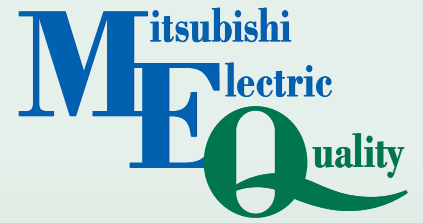




Changes for the Better

AIR TO WATER HEAT PUMP SYSTEMS



ecodan
Renewable Heating Technology

DATA BOOK

for a greener tomorrow



Contents

Outdoor unit..... A-1

Outdoor unit

Cylinder unit / Hydrobox B-1

Cylinder / Hydrobox

Flow temp. controller..... C-1

Flow temp. controller

Optional parts D-1

Optional parts

When installing or relocating, or servicing the heat pump, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards. The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.

1	Specifications	A-2
	1.1 Outdoor unit specifications.....	A-2
	1.2 Capacity	A-12
	1.3 Maximum outlet water temperature	A-18
	1.4 Available range (Water flow rate, return water temp.)....	A-20
2	Outlines and dimensions	A-23
	2.1 Packaged-type units	A-23
	2.2 Split-type units	A-26
3	Wiring diagrams.....	A-33
	3.1 Packaged-type units	A-33
	3.2 Split-type units	A-37
4	Refrigerant system diagrams	A-47
	4.1 Packaged-type units	A-48
	4.2 Split-type units	A-49
5	Performance data	A-53
	5.1 Cooling performance data.....	A-54
	5.2 Heating performance data	A-55
	5.3 Part load chart.....	A-63
	5.4 Best COP	A-77
6	Noise criterion curves	A-78
	6.1 Packaged-type units	A-78
	6.2 Split-type units	A-79
7	Earthquake-proof strength analysis	A-82
8	Error code table	A-96
9	Installation location	A-97
	9.1 Packaged-type units (Power inverter/Zubadan).....	A-97
	9.2 Split-type units (Power inverter).....	A-99
	9.3 Split-type units (Mr.SLIM+).....	A-101
	9.4 Split-type units (Zubadan).....	A-103

1.1 Outdoor unit specifications

(1) Packaged-type units

■ Power inverter

Model Name			PUHZ-W50VHA(-BS)	PUHZ-W85VHA2(-BS)
Power supply (phase, cycle, voltage)			1φ, 230V, 50Hz	1φ, 230V, 50Hz
	Max. current	A	13.0	23.0
Breaker size			A	16
Outer casing			Galvanized plate	Galvanized plate
External finish			Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1
Refrigerant control			Linear expansion valve	Linear expansion valve
Compressor			Hermetic twin rotary	Hermetic twin rotary
	Model		SNB130FGCM	TNB220FLHM1T
	Motor output	kW	0.9	1.3
	Start type		Inverter	Inverter
	Protection devices		HP switch Discharge thermo Comp. Surface thermo	HP switch Discharge thermo Comp. Surface thermo
	Oil (Model)	L	0.35 (FV50S)	0.67 (FV50S)
Crankcase heater			W	-
Heat exchanger	Air		Plate fin coil	Plate fin coil
	Water		Plate heat exchanger	Plate heat exchanger
Fan	Fan(drive) x No.		Propeller fan x 1	Propeller fan x 1
	Fan motor output	kW	0.086	0.074
	Air flow	m ³ /min(CFM)	50 (1,760)	49 (1,730)
Defrost method			Reverse cycle	Reverse cycle
Noise level (SPL)	Heating	dB(A)	46	48
	Cooling	dB(A)	45	48
Noise level (PWL)	Heating	dB(A)	61	66
Dimensions	Width	mm(in)	950 (37-3/8)	950 (37-3/8)
	Depth	mm(in)	330+30 (13+1-3/16)	330+30 (13+1-3/16)
	Height	mm(in)	740 (29-3/16)	943 (37-1/8)
Weight			kg(lbs)	64 (141)
Refrigerant			R410A	R410A
	Quantity	kg(lbs)	1.7 (3.7)	2.4 (5.3)
Pipe size O.D.	Liquid	mm(in)	-	-
	Gas	mm(in)	-	-
Connection method			-	-
Between the indoor & outdoor unit	Height difference	m	-	-
	Piping length	m	-	-
Guaranteed operating range (Outdoor)	Heating	°C	-15 ~ +35	-20 ~ +35
	Cooling	°C	-5 ~ +46	-5 ~ +46
Outlet water temp. (Max in heating, Min in cooling)	Heating	°C	+60	+60
	Cooling	°C	+5	+5
Nominal return water temperature range	Heating	°C	+9 ~ +59	+9 ~ +59
	Cooling	°C	+8 ~ +28	+8 ~ +28
Water flow rate range			L/min	6.5 ~ 14.3

■ Zubadan

Model Name			PUHZ-HW112YHA2(-BS)	PUHZ-HW140VHA2(-BS)	PUHZ-HW140YHA2(-BS)
Power supply (phase, cycle, voltage)			3φ, 400V, 50Hz	1φ, 230V, 50Hz	3φ, 400V, 50Hz
	Max. current	A	13.0	35.0	13.0
Breaker size		A	16	40	16
Outer casing			Galvanized plate	Galvanized plate	Galvanized plate
External finish			Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1
Refrigerant control			Linear expansion valve	Linear expansion valve	Linear expansion valve
Compressor			Hermetic scroll	Hermetic scroll	Hermetic scroll
	Model		ANB33FJFMT	ANB42FJGMT	ANB42FJFMT
	Motor output	kW	2.5	3.0	3.0
	Start type		Inverter	Inverter	Inverter
	Protection devices		HP switch LP switch Discharge thermo Comp. Surface thermo	HP switch LP switch Discharge thermo Comp. Surface thermo	HP switch LP switch Discharge thermo Comp. Surface thermo
	Oil (Model)	L	0.9 (FV50S)	0.9 (FV50S)	0.9 (FV50S)
Crankcase heater		W	-	-	-
Heat exchanger	Air		Plate fin coil	Plate fin coil	Plate fin coil
	Water		Plate heat exchanger	Plate heat exchanger	Plate heat exchanger
Fan	Fan(drive) x No.		Propeller fan x 2	Propeller fan x 2	Propeller fan x 2
	Fan motor output	kW	0.074 x 2	0.074 x 2	0.074 x 2
	Air flow	m ³ /min (CFM)	100 (3,350)	100 (3,350)	100 (3,350)
Defrost method			Reverse cycle	Reverse cycle	Reverse cycle
Noise level (SPL)	Heating	dB(A)	53	53	53
	Cooling	dB(A)	53	53	53
Noise level (PWL)	Heating	dB(A)	67	67	67
Dimensions	Width	mm(in)	1020 (40-3/16)	1020 (40-3/16)	1020 (40-3/16)
	Depth	mm(in)	330+30 (13+1-3/16)	330+30 (13+1-3/16)	330+30 (13+1-3/16)
	Height	mm(in)	1350 (53-1/8)	1350 (53-1/8)	1350 (53-1/8)
Weight		kg(lbs)	148 (327)	134 (296)	148 (327)
Refrigerant			R410A	R410A	R410A
	Quantity	kg(lbs)	4.0 (8.8)	4.3 (9.5)	4.3 (9.5)
Pipe size O.D.	Liquid	mm(in)	-	-	-
	Gas	mm(in)	-	-	-
Connection method			-	-	-
Between the indoor & outdoor unit	Height difference	m	-	-	-
	Piping length	m	-	-	-
Guaranteed operating range (Outdoor)	Heating	°C	-25 ~ +35	-25 ~ +35	-25 ~ +35
	Cooling	°C	-5 ~ +46	-5 ~ +46	-5 ~ +46
Outlet water temp. (Max in heating, Min in cooling)	Heating	°C	+60	+60	+60
	Cooling	°C	+5	+5	+5
Nominal return water temperature range	Heating	°C	+11 ~ +59	+10 ~ +59	+10 ~ +59
	Cooling	°C	+8 ~ +28	+8 ~ +28	+8 ~ +28
Water flow rate range		L/min	14.4 ~ 32.1	17.9 ~ 40.1	17.9 ~ 40.1

(2) Split-type units

■ Power inverter

Model Name			PUHZ-SW40VHA(-BS)	PUHZ-SW50VHA(-BS)
Power supply (phase, cycle, voltage)			1φ, 230V, 50Hz	1φ, 230V, 50Hz
	Max. current	A	13.0	13.0
Breaker size			A	16
Outer casing			Galvanized plate	Galvanized plate
External finish			Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1
Refrigerant control			Linear expansion valve	Linear expansion valve
Compressor			Hermetic twin rotary	Hermetic twin rotary
	Model		SNB130FGCM2	SNB130FGCM2
	Motor output	kW	0.9	0.9
	Start type		Inverter	Inverter
	Protection devices		HP switch Discharge thermo Comp. Surface thermo	HP switch Discharge thermo Comp. Surface thermo
	Oil (Model)	L	0.5(FV50S)	0.5(FV50S)
Crankcase heater			W	-
Heat exchanger	Air		Plate fin coil	Plate fin coil
	Water		-	-
Fan	Fan(drive) x No.		Propeller fan	Propeller fan
	Fan motor output	kW	0.04	0.04
	Air flow	m ³ /min(CFM)	35 (1,240)	35 (1,240)
Defrost method			Reverse cycle	Reverse cycle
Noise level (SPL)	Heating	dB(A)	45	46
	Cooling	dB(A)	45	46
Noise level (PWL)	Heating	dB(A)	62	63
Dimensions	Width	mm(in)	800 (31-1/2)	800 (31-1/2)
	Depth	mm(in)	300+23 (11-13/16+7/8)	300+23 (11-13/16+7/8)
	Height	mm(in)	600 (23-5/8)	600 (23-5/8)
Weight		kg(lbs)	42 (93)	42 (93)
Refrigerant			R410A	R410A
	Quantity	kg(lbs)	2.1 (4.6)	2.1 (4.6)
Pipe size O.D.	Liquid	mm(in)	6.35 (1/4)	6.35 (1/4)
	Gas	mm(in)	12.7 (1/2)	12.7 (1/2)
Connection method			Flared	Flared
Between the indoor & outdoor unit	Height difference	m	Max. 10	Max. 10
	Piping length	m	Max. 40	Max. 40
Guaranteed operating range (Outdoor)	Heating	°C	-15 ~ +21	-15 ~ +21
	DHW	°C	-15 ~ +35	-15 ~ +35
	Cooling	°C	-5 ~ +46	-5 ~ +46
Outlet water temp. (Max in heating, Min in cooling)	Heating	°C	+60	+60
	Cooling	°C	+5	+5
Nominal return water temperature range	Heating	°C	+9 ~ +59	+9 ~ +59
	Cooling	°C	+8 ~ +28	+8 ~ +28
Water flow rate range		L/min	7.1 ~ 11.8	7.1 ~ 17.2

Model Name			PUHZ-SW75VHA(-BS)
Power supply (phase, cycle, voltage)			1φ, 230V, 50Hz
	Max. current	A	19.0
Breaker size			A 25
Outer casing			Galvanized plate
External finish			Munsell 3Y 7.8/1.1
Refrigerant control			Linear expansion valve
Compressor			Hermetic twin rotary
	Model		TNB220FLHMT
	Motor output	kW	1.3
	Start type		Inverter
	Protection devices		HP switch Discharge thermo Comp. Surface thermo
	Oil (Model)	L	0.87 (FV50S)
Crankcase heater			W -
Heat exchanger	Air		Plate fin coil
	Water		-
Fan	Fan(drive) x No.		Propeller fan
	Fan motor output	kW	0.074
	Air flow	m ³ /min(CFM)	55 (1,940)
Defrost method			Reverse cycle
Noise level (SPL)	Heating	dB(A)	51
	Cooling	dB(A)	48
Noise level (PWL)	Heating	dB(A)	69
Dimensions	Width	mm(in)	950 (37-3/8)
	Depth	mm(in)	330+30 (13+1-3/16)
	Height	mm(in)	943 (37-1/8)
Weight		kg(lbs)	75 (166)
Refrigerant			R410A
	Quantity	kg(lbs)	3.2(7.0)
Pipe size O.D.	Liquid	mm(in)	9.52 (3/8)
	Gas	mm(in)	15.88 (5/8)
Connection method			Flared
Between the indoor & outdoor unit	Height difference	m	Max. 10
	Piping length	m	Max. 40
Guaranteed operating range (Outdoor)	Heating	°C	-20 ~ +21
	DHW	°C	-20 ~ +35
	Cooling	°C	-5 ~ +46
Outlet water temp. (Max in heating, Min in cooling)	Heating	°C	+60
	Cooling	°C	+5
Nominal return water temperature range	Heating	°C	+11 ~ +59
	Cooling	°C	+8 ~ +28
Water flow rate range		L/min	10.2 ~ 22.9

1 Specifications

Outdoor unit

Outdoor unit

Model Name			PUHZ-SW100VHA(-BS)	PUHZ-SW100YHA(-BS)
Power supply (phase, cycle, voltage)			1φ, 230V, 50Hz	3φ, 400V, 50Hz
	Max. current	A	29.5	13.0
Breaker size			32	16
Outer casing			Galvanized plate	Galvanized plate
External finish			Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1
Refrigerant control			Linear expansion valve	Linear expansion valve
Compressor			Hermetic scroll	Hermetic scroll
	Model		ANB33FNEMT	ANB33FNDMT
	Motor output	kW	2.5	2.5
	Start type		Inverter	Inverter
	Protection devices		HP switch LP switch Discharge thermo Comp. Surface thermo	HP switch LP switch Discharge thermo Comp. Surface thermo
	Oil (Model)	L	1.40 (FV50S)	1.40 (FV50S)
Crankcase heater			W	-
Heat exchanger		Air	Plate fin coil	Plate fin coil
		Water	-	-
Fan	Fan(drive) x No.		Propeller fan ×2	Propeller fan ×2
	Fan motor output	kW	0.074 ×2	0.074 ×2
	Air flow	m ³ /min (CFM)	100 (3,350)	100 (3,350)
Defrost method			Reverse cycle	Reverse cycle
Noise level (SPL)	Heating	dB(A)	54	54
	Cooling	dB(A)	50	50
Noise level (PWL)	Heating	dB(A)	70	70
Dimensions	Width	mm(in)	950 (37-3/8)	950 (37-3/8)
	Depth	mm(in)	330+30 (13+1-3/16)	330+30 (13+1-3/16)
	Height	mm(in)	1350 (53-1/8)	1350 (53-1/8)
Weight		kg(lbs)	118(261)	130 (287)
Refrigerant			R410A	R410A
	Quantity	kg(lbs)	4.6 (10.2)	4.6 (10.2)
Pipe size O.D.	Liquid	mm(in)	9.52 (3/8)	9.52 (3/8)
	Gas	mm(in)	15.88 (5/8)	15.88 (5/8)
Connection method			Flared	Flared
Between the indoor & outdoor unit	Height difference	m	Max. 30	Max. 30
	Piping length	m	Max. 75	Max. 75
Guaranteed operating range (Outdoor)	Heating	°C	-20 ~ +21	-20 ~ +21
	DHW	°C	-20 ~ +35	-20 ~ +35
	Cooling	°C	-5 ~ +46	-5 ~ +46
Outlet water temp. (Max in heating, Min in cooling)	Heating	°C	+60	+60
	Cooling	°C	+5	+5
Nominal return water temperature range	Heating	°C	+10 ~ +59	+10 ~ +59
	Cooling	°C	+8 ~ +28	+8 ~ +28
Water flow rate range		L/min	14.4 ~ 32.1	14.4 ~ 32.1

1 Specifications

Outdoor unit

Model Name			PUHZ-SW120VHA(-BS)	PUHZ-SW120YHA(-BS)
Power supply (phase, cycle, voltage)			1φ, 230V, 50Hz	3φ, 400V, 50Hz
	Max. current	A	29.5	13.0
Breaker size		A	32	16
Outer casing			Galvanized plate	Galvanized plate
External finish			Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1
Refrigerant control			Linear expansion valve	Linear expansion valve
Compressor			Hermetic scroll	Hermetic scroll
	Model		ANB42FNEMT	ANB42FNDMT
	Motor output	kW	3.0	3.0
	Start type		Inverter	Inverter
	Protection devices		HP switch LP switch Discharge thermo Comp. Surface thermo	HP switch LP switch Discharge thermo Comp. Surface thermo
	Oil (Model)	L	1.40 (FV50S)	1.40 (FV50S)
Crankcase heater		W	-	-
Heat exchanger	Air		Plate fin coil	Plate fin coil
	Water		-	-
Fan	Fan(drive) x No.		Propeller fan ×2	Propeller fan ×2
	Fan motor output	kW	0.074 ×2	0.074 ×2
	Air flow	m ³ /min (CFM)	100 (3,350)	100 (3,350)
Defrost method			Reverse cycle	Reverse cycle
Noise level (SPL)	Heating	dB(A)	54	54
	Cooling	dB(A)	51	51
Noise level (PWL)	Heating	dB(A)	72	72
Dimensions	Width	mm(in)	950 (37-3/8)	950 (37-3/8)
	Depth	mm(in)	330+30 (13+1-3/16)	330+30 (13+1-3/16)
	Height	mm(in)	1350 (53-1/8)	1350 (53-1/8)
Weight		kg(lbs)	118(261)	130 (287)
Refrigerant			R410A	R410A
	Quantity	kg(lbs)	4.6 (10.2)	4.6 (10.2)
Pipe size O.D.	Liquid	mm(in)	9.52 (3/8)	9.52 (3/8)
	Gas	mm(in)	15.88 (5/8)	15.88 (5/8)
Connection method			Flared	Flared
Between the indoor & outdoor unit	Height difference	m	Max. 30	Max. 30
	Piping length	m	Max. 75	Max. 75
Guaranteed operating range (Outdoor)	Heating	°C	-20 ~ +21	-20 ~ +21
	DHW	°C	-20 ~ +35	-20 ~ +35
	Cooling	°C	-5 ~ +46	-5 ~ +46
Outlet water temp. (Max in heating, Min in cooling)	Heating	°C	+60	+60
	Cooling	°C	+5	+5
Nominal return water temperature range	Heating	°C	+10 ~ +59	+10 ~ +59
	Cooling	°C	+8 ~ +28	+8 ~ +28
Water flow rate range		L/min	20.1 ~ 45.9	20.1 ~ 45.9

Model Name			PUHZ-RP200YKA	PUHZ-RP250YKA
Power supply (phase, cycle, voltage)			3φ, 400V, 50Hz	3φ, 400V, 50Hz
	Max. current	A	19.0	21.0
Breaker size			A	32
Outer casing			Galvanized plate	Galvanized plate
External finish			Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1
Refrigerant control			Linear expansion valve	Linear expansion valve
Compressor			Hermetic scroll	Hermetic scroll
	Model		ANB52FFPMT	ANB66FFZMT
	Motor output	kW	4.7	5.5
Start type			Inverter	Inverter
Protection devices			HP switch Discharge thermo Comp. Surface thermo	HP switch Discharge thermo Comp. Surface thermo
	Oil (Model)	L	2.30 (FV50S)	2.30 (FV50S)
Crankcase heater			W	-
Heat exchanger		Air	Plate fin coil	Plate fin coil
		Water	-	-
Fan	Fan(drive) x No.		Propeller fan x 2	Propeller fan x 2
	Fan motor output		kW	0.150 x 2
	Air flow		m ³ /min(CFM)	140 (4,940)
Defrost method			Reverse cycle	Reverse cycle
Noise level (SPL)		Heating	dB	59
		Cooling	dB	58
Noise level (PWL)		dB	76	76
Dimensions		Width	mm(in)	1050 (41-5/16)
		Depth	mm(in)	330+30 (13+1-3/16)
		Height	mm(in)	1338 (52-11/16)
Weight		kg(lbs)	135 (297)	141 (311)
Refrigerant			R410A	R410A
	Quantity	kg(lbs)	7.1 (15.7)	7.7 (17.0)
Pipe size O.D.		Liquid	mm(in)	9.52 (3/8)
		Gas	mm(in)	25.4 (1)
Connection method			Flared	Flared
Between the indoor & outdoor unit		Height difference	m	Max. 30
		Piping length	m	Max. 120
Guaranteed operating range (Outdoor)		Heating	°C	-20 ~ +35
		Cooling	°C	-5 ~ +46
Outlet water temp. (Max in heating, Min in cooling)		Heating	°C	+53
		Cooling	°C	+5
Nominal return water temperature range		Heating	°C	+10 ~ +52
		Cooling	°C	+8 ~ +28
Water flow rate range		L/min	27.3 ~ 64.2	32.1 ~ 80.3

■ Mr.SLIM+

Model Name			PUHZ-FRP71VHA
Power supply (phase, cycle, voltage)			1φ, 230V, 50Hz
	Max. current	A	19.0
Breaker size			A 25
Outer casing			Galvanized plate
External finish			Munsell 3Y 7.8/1.1
Refrigerant control			Linear expansion valve
Compressor			Hermetic
	Model		SNB172FSHM1
	Motor output	kW	1.6
	Start type		Inverter
	Protection devices		HP switch Discharge thermo Comp. Surface thermo
	Oil (Model)	L	0.70 (FV50S)
Crankcase heater			W -
Heat exchanger		Air	Plate fin coil
		Water	-
Fan	Fan(drive) x No.		Propeller fan x 1
	Fan motor output		kW 0.086
	Air flow		m ³ /min(CFM) 55 (1,940)
Defrost method			Reverse cycle
Noise level (SPL)	ATA Cooling HR Cooling	dB	47
	ATA Heating ATW Heating	dB	48
Noise level (PWL)	ATA Cooling HR Cooling	dB	67
	ATA Heating ATW Heating	dB	68
Dimensions	Width	mm(in)	950 (37-3/8)
	Depth	mm(in)	330+30 (13+1-3/16)
	Height	mm(in)	943 (37-1/8)
Weight		kg(lbs)	73 (161)
Refrigerant			R410A
	Quantity	kg(lbs)	3.8 (8.4)
Pipe size O.D.	ATA	Liquid	mm(in) 9.52 (3/8)
		Gas	mm(in) 15.88 (5/8)
	ATW	Liquid	mm(in) 9.52 (3/8)
		Gas	mm(in) 15.88 (5/8)
Connection method			Flared
Between the indoor & outdoor unit	Height difference	m	Max. 20
	Piping length	m	Max. 60m total, Max. 30m for each
Guaranteed operating range (Outdoor)	ATA Cooling	°C	-5 ~ +46
	ATA Heating	°C	-20 ~ +21
	ATW Heating	°C	-20 ~ +35
	HR Cooling	°C	+15 ~ +46
Outlet water temp. (Max in heating)	ATW Heating	°C	+60
Nominal return water temperature range	ATW Heating	°C	+11 ~ +59
Water flow rate range		L/min	11.5 ~ 22.9

Zubadan

Model Name			PUHZ-SHW80VHA	PUHZ-SHW112VHA	PUHZ-SHW112YHA	
Power supply (phase, cycle, voltage)			1φ, 230V, 50Hz	1φ, 230V, 50Hz	3φ, 400V, 50Hz	
Max. current	A		29.5	35.0	13.0	
Breaker size		A	32	40	16	
Outer casing			Galvanized plate	Galvanized plate	Galvanized plate	
External finish			Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1	
Refrigerant control			Linear expansion valve	Linear expansion valve	Linear expansion valve	
Compressor			Hermetic scroll	Hermetic scroll	Hermetic scroll	
Model			ANB33FJMMT	ANB33FJMMT	ANB33FJLMT	
Motor output	kW		2.5	2.5	2.5	
Start type			Inverter	Inverter	Inverter	
Protection devices			HP switch LP switch Discharge thermo Comp. Surface thermo	HP switch LP switch Discharge thermo Comp. Surface thermo	HP switch LP switch Discharge thermo Comp. Surface thermo	
Oil (Model)	L		1.40 (FV50S)	1.40 (FV50S)	1.40 (FV50S)	
Crankcase heater		W	-	-	-	
Heat exchanger		Air	Plate fin coil	Plate fin coil	Plate fin coil	
		Water	-	-	-	
Fan		Fan(drive) x No.		Propeller fan ×2	Propeller fan ×2	
		Fan motor output		kW	0.074 ×2	0.074 ×2
		Air flow		m ³ /min (CFM)	100 (3,350)	100 (3,350)
Defrost method			Reverse cycle	Reverse cycle	Reverse cycle	
Noise level (SPL)		Heating	dB(A)	51	52	
		Cooling	dB(A)	50	51	
Noise level (PWL)		Heating	dB(A)	69	70	
Dimensions		Width	mm(in)	950 (37-3/8)	950 (37-3/8)	
		Depth	mm(in)	330+30 (13+1-3/16)	330+30 (13+1-3/16)	
		Height	mm(in)	1350 (53-1/8)	1350 (53-1/8)	
Weight		kg(lbs)	120 (265)	120 (265)	134 (296)	
Refrigerant			R410A	R410A	R410A	
		Quantity	kg(lbs)	5.5 (12.1)	5.5 (12.1)	
Pipe size O.D.		Liquid	mm(in)	9.52 (3/8)	9.52 (3/8)	
		Gas	mm(in)	15.88 (5/8)	15.88 (5/8)	
Connection method			Flared	Flared	Flared	
Between the indoor & outdoor unit		Height difference	m	Max. 30	Max. 30	
		Piping length	m	Max. 75	Max. 75	
Guaranteed operating range (Outdoor)		Heating	°C	-25 ~ +21	-25 ~ +21	
		DHW	°C	-25 ~ +35	-25 ~ +35	
		Cooling	°C	-5 ~ +46	-5 ~ +46	
Outlet water temp. (Max in heating, Min in cooling)		Heating	°C	+60	+60	
		Cooling	°C	+5	+5	
Nominal return water temperature range		Heating	°C	+10 ~ +59	+10 ~ +59	
		Cooling	°C	+8 ~ +28	+8 ~ +28	
Water flow rate range		L/min	10.2 ~ 22.9	14.4 ~ 32.1	14.4 ~ 32.1	

1 Specifications

Outdoor unit

Model Name			PUHZ-SHW140YHA	PUHZ-SHW230YKA
Power supply (phase, cycle, voltage)			3φ, 400V, 50Hz	3φ, 400V, 50Hz
	Max. current	A	13.0	26.0
Breaker size			A	16
Outer casing			Galvanized plate	Galvanized plate
External finish			Munsell 3Y 7.8/1.1	Munsell 3Y 7.8/1.1
Refrigerant control			Linear expansion valve	Linear expansion valve
Compressor			Hermetic scroll	Hermetic scroll
	Model		ANB33FJLMT	ANB66FJNMT
	Motor output	kW	2.5	4.7
	Start type		Inverter	Inverter
	Protection devices		HP switch LP switch Discharge thermo Comp. Surface thermo	HP switch LP switch Discharge thermo Comp. Surface thermo
	Oil (Model)	L	1.40 (FV50S)	1.70 (FV50S)
Crankcase heater			W	-
Heat exchanger	Air		Plate fin coil	Plate fin coil
	Water		-	-
Fan	Fan(drive) x No.		Propeller fan ×2	Propeller fan ×2
	Fan motor output	kW	0.074 ×2	0.150 ×2
	Air flow	m ³ /min(CFM)	100 (3,350)	140 (4,940)
Defrost method			Reverse cycle	Reverse cycle
Noise level (SPL)	Heating	dB(A)	52	59
	Cooling	dB(A)	51	58
Noise level (PWL)	Heating	dB(A)	70	75
Dimensions	Width	mm(in)	950 (37-3/8)	1050 (41-5/16)
	Depth	mm(in)	330+30 (13+1-3/16)	330+30 (13+1-3/16)
	Height	mm(in)	1350 (53-1/8)	1338 (52-11/16)
Weight			kg(lbs)	134 (296)
Refrigerant			R410A	R410A
	Quantity	kg(lbs)	5.5 (12.1)	7.1 (15.7)
Pipe size O.D.	Liquid	mm(in)	9.52 (3/8)	9.52 (3/8)
	Gas	mm(in)	15.88 (5/8)	25.4 (1)
Connection method			Flared	Flared
Between the indoor & outdoor unit	Height difference	m	Max. 30	Max. 30
	Piping length	m	Max. 75	Max. 80
Guaranteed operating range (Outdoor)	Heating	°C	-25 ~ +21	-25 ~ +21
	DHW	°C	-25 ~ +35	-25 ~ +35
	Cooling	°C	-5 ~ +46	-5 ~ +46
Outlet water temp. (Max in heating, Min in cooling)	Heating	°C	+60	+60
	Cooling	°C	+5	+5
Nominal return water temperature range	Heating	°C	+10 ~ +59	+10 ~ +59
	Cooling	°C	+8 ~ +28	+8 ~ +28
Water flow rate range			L/min	17.9 ~ 40.1

1.2 Capacity

(1) Packaged-type units

■ Power inverter

Model name			PUHZ-W50VHA(-BS)	PUHZ-W85VHA2(-BS)
Nominal water flow rate (Heating mode)		L/min	14.30	25.80
Heating (A7/W35)	Capacity	kW	5.00	9.00
	COP		4.10	4.18
	Power input	kW	1.22	2.15
Heating (A2/W35)	Capacity	kW	5.00	8.50
	COP		3.13	3.17
	Power input	kW	1.60	2.68
Pressure difference (water circuit)		kPa	12	13.5
Heating pump input (based on EN14511)		kW	0.01	0.02
Nominal water flow rate (Cooling mode)		L/min	12.90	21.50
Cooling (A35/W7)	Capacity	kW	4.50	7.50
	EER (COP)		2.94	2.47
	Power input	kW	1.53	3.04
Cooling (A35/W18)	Capacity	kW	4.50	7.50
	EER (COP)		4.13	3.93
	Power input	kW	1.09	1.91
Pressure difference (water circuit)		kPa	10	10
Cooling pump input (based on EN14511)		kW	0.01	0.01
Recommended plate heat exchanger			Built-in	Built-in

Note: "COP" and "Power input" in the above table are values that contains the "pump input (based on EN 14511)".

■ Zubadan

Model name			PUHZ-HW112YHA2(-BS)	PUHZ-HW140V/YHA2(-BS)
Nominal water flow rate (Heating mode)		L/min	32.10	40.10
Heating (A7/W35)	Capacity	kW	11.20	14.00
	COP		4.42	4.25
	Power input	kW	2.53	3.29
Heating (A2/W35)	Capacity	kW	11.20	14.00
	COP		3.11	3.11
	Power input	kW	3.60	4.50
Pressure difference (water circuit)		kPa	6	9
Heating pump input (based on EN14511)		kW	0.01	0.02
Nominal water flow rate (Cooling mode)		L/min	28.70	35.80
Cooling (A35/W7)	Capacity	kW	10.00	12.50
	EER (COP)		2.78	2.50
	Power input	kW	3.60	5.00
Cooling (A35/W18)	Capacity	kW	10.00	12.50
	EER (COP)		4.10	3.60
	Power input	kW	2.44	3.47
Pressure difference (water circuit)		kPa	5	7
Cooling pump input (based on EN14511)		kW	0.01	0.02
Recommended plate heat exchanger			Built-in	Built-in

Note: "COP" and "Power input" in the above table are values that contains the "pump input (based on EN 14511)".

(2) Split-type units

■ Power inverter

Model name			PUHZ-SW40VHA(-BS)	PUHZ-SW50VHA(-BS)
Nominal water flow rate (Heating mode)		L/min	11.80	17.20
Heating (A7/W35)	Capacity	kW	4.10	6.00
	COP		4.80	4.42
	Power input	kW	0.85	1.36
Heating (A2/W35)	Capacity	kW	4.00	5.00
	COP		3.24	2.97
	Power input	kW	1.24	1.68
Pressure difference (water circuit)		kPa	-	-
Heating pump input (based on EN14511)		kW	-	-
Nominal water flow rate (Cooling mode)		L/min	10.30	12.90
Cooling (A35/W7)	Capacity	kW	3.60	4.50
	EER (COP)		2.71	2.38
	Power input	kW	1.33	1.89
Cooling (A35/W18)	Capacity	kW	3.60	5.00
	EER (COP)		4.65	3.96
	Power input	kW	0.77	1.26
Pressure difference (water circuit)		kPa	-	-
Cooling pump input (based on EN14511)		kW	-	-
Recommended plate heat exchanger			ACH70-40	ACH70-40

The table shows performance data obtained when a plate heat exchanger is connected.

Model name			PUHZ-SW75VHA(-BS)
Nominal water flow rate (Heating mode)		L/min	22.90
Heating (A7/W35)	Capacity	kW	8.00
	COP		4.40
	Power input	kW	1.82
Heating (A2/W35)	Capacity	kW	7.50
	COP		3.40
	Power input	kW	2.21
Pressure difference (water circuit)		kPa	-
Heating pump input (based on EN14511)		kW	-
Nominal water flow rate (Cooling mode)		L/min	18.90
Cooling (A35/W7)	Capacity	kW	6.60
	EER (COP)		2.55
	Power input	kW	2.59
Cooling (A35/W18)	Capacity	kW	7.10
	EER (COP)		4.01
	Power input	kW	1.77
Pressure difference (water circuit)		kPa	-
Cooling pump input (based on EN14511)		kW	-
Recommended plate heat exchanger			ACH70-40

The table shows performance data obtained when a plate heat exchanger is connected.

Model name			PUHZ-SW100VHA(-BS)	PUHZ-SW100YHA(-BS)
Nominal water flow rate (Heating mode)		L/min	32.10	32.10
Heating (A7/W35)	Capacity	kW	11.20	11.20
	COP		4.45	4.45
	Power input	kW	2.52	2.52
Heating (A2/W35)	Capacity	kW	10.00	10.00
	COP		3.32	3.32
	Power input	kW	3.01	3.01
Pressure difference (water circuit)		kPa	-	-
Heating pump input (based on EN14511)		kW	-	-
Nominal water flow rate (Cooling mode)		L/min	26.10	26.10
Cooling (A35/W7)	Capacity	kW	9.10	9.10
	EER (COP)		2.75	2.75
	Power input	kW	3.31	3.31
Cooling (A35/W18)	Capacity	kW	10.00	10.00
	EER (COP)		4.35	4.35
	Power input	kW	2.30	2.30
Pressure difference (water circuit)		kPa	-	-
Cooling pump input (based on EN14511)		kW	-	-
Recommended plate heat exchanger			ACH70-40	ACH70-40

The table shows performance data obtained when a plate heat exchanger is connected.

Model name			PUHZ-SW120VHA(-BS)	PUHZ-SW120YHA(-BS)
Nominal water flow rate (Heating mode)		L/min	45.90	45.90
Heating (A7/W35)	Capacity	kW	16.00	16.00
	COP		4.10	4.10
	Power input	kW	3.90	3.90
Heating (A2/W35)	Capacity	kW	12.00	12.00
	COP		3.24	3.24
	Power input	kW	3.70	3.70
Pressure difference (water circuit)		kPa	-	-
Heating pump input (based on EN14511)		kW	-	-
Nominal water flow rate (Cooling mode)		L/min	35.80	35.80
Cooling (A35/W7)	Capacity	kW	12.50	12.50
	EER (COP)		2.32	2.32
	Power input	kW	5.30	5.30
Cooling (A35/W18)	Capacity	kW	14.00	14.00
	EER (COP)		4.08	4.08
	Power input	kW	3.43	3.43
Pressure difference (water circuit)		kPa	-	-
Cooling pump input (based on EN14511)		kW	-	-
Recommended plate heat exchanger			ACH70-40	ACH70-40

The table shows performance data obtained when a plate heat exchanger is connected.

Model name			PUHZ-RP200YKA	PUHZ-RP250YKA
Nominal water flow rate (Heating mode)		L/min	64.2	80.3
Heating (A7/W35)	Capacity	kW	22.40	27.00
	COP		3.73	3.39
	Power input	kW	6.01	7.97
Heating (A2/W35)	Capacity	kW	17.50	19.20
	COP		2.66	2.53
	Power input	kW	6.57	7.60
Pressure difference (water circuit)		kPa	-	-
Heating pump input (based on EN14511)		kW	-	-
Nominal water flow rate (Cooling mode)		L/min	54.5	64.2
Cooling (A35/W7)	Capacity	kW	18.50	20.60
	EER (COP)		2.31	1.90
	Power input	kW	8.00	10.87
Cooling (A35/W18)	Capacity	kW	19.00	25.00
	EER (COP)		3.78	3.10
	Power input	kW	5.02	8.07
Pressure difference (water circuit)		kPa	-	-
Cooling pump input (based on EN14511)		kW	-	-
Recommended plate heat exchanger			ACH70-40 x 2 Parallel connection	ACH70-40 x 2 Parallel connection

The table shows performance data obtained when a plate heat exchanger is connected.

■ Mr.SLIM+

Model name			PUHZ-FRP71VHA
Nominal water flow rate (Heating mode)		L/min	22.90
Heating (A7/W35)	Capacity	kW	8.00
	COP		4.08
	Power input	kW	1.96
Heating (A2/W35)	Capacity	kW	7.50
	COP		2.83
	Power input	kW	2.65
Pressure difference (water circuit)		kPa	-
Heating pump input (based on EN14511)		kW	-
Recommended plate heat exchanger			ACH70-40

The table shows performance data obtained when a plate heat exchanger is connected.

■ Zubadan

Model name		PUHZ-SHW80VHA	PUHZ-SHW112VHA	
Nominal water flow rate (Heating mode)		L/min	22.90	32.10
Heating (A7/W35)	Capacity	kW	8.00	11.20
	COP		4.65	4.46
	Power input	kW	1.72	2.51
Heating (A2/W35)	Capacity	kW	8.00	11.20
	COP		3.55	3.34
	Power input	kW	2.25	3.35
Pressure difference (water circuit)		kPa	-	-
Heating pump input (based on EN14511)		kW	-	-
Nominal water flow rate (Cooling mode)		L/min	20.40	28.70
Cooling (A35/W7)	Capacity	kW	7.10	10.00
	EER (COP)		3.31	2.83
	Power input	kW	2.15	3.53
Cooling (A35/W18)	Capacity	kW	7.10	10.00
	EER (COP)		4.52	4.74
	Power input	kW	1.57	2.11
Pressure difference (water circuit)		kPa	-	-
Cooling pump input (based on EN14511)		kW	-	-
Recommended plate heat exchanger			ACH70-40	ACH70-40

The table shows performance data obtained when a plate heat exchanger is connected.

Model name		PUHZ-SHW112YHA	PUHZ-SHW140YHA	
Nominal water flow rate (Heating mode)		L/min	32.10	40.10
Heating (A7/W35)	Capacity	kW	11.20	14.00
	COP		4.46	4.22
	Power input	kW	2.51	3.32
Heating (A2/W35)	Capacity	kW	11.20	14.00
	COP		3.34	2.96
	Power input	kW	3.35	4.73
Pressure difference (water circuit)		kPa	-	-
Heating pump input (based on EN14511)		kW	-	-
Nominal water flow rate (Cooling mode)		L/min	28.70	35.80
Cooling (A35/W7)	Capacity	kW	10.00	12.50
	EER (COP)		2.83	2.17
	Power input	kW	3.53	5.76
Cooling (A35/W18)	Capacity	kW	10.00	12.50
	EER (COP)		4.74	4.26
	Power input	kW	2.11	2.93
Pressure difference (water circuit)		kPa	-	-
Cooling pump input (based on EN14511)		kW	-	-
Recommended plate heat exchanger			ACH70-40	ACH70-40

The table shows performance data obtained when a plate heat exchanger is connected.

Model name		PUHZ-SHW230YKA	
Nominal water flow rate (Heating mode)		L/min	65.90
Heating (A7/W35)	Capacity	kW	23.00
	COP		3.65
	Power input	kW	6.30
Heating (A2/W35)	Capacity	kW	23.00
	COP		2.37
	Power input	kW	9.71
Pressure difference (water circuit)		kPa	-
Heating pump input (based on EN14511)		kW	-
Nominal water flow rate (Cooling mode)		L/min	57.30
Cooling (A35/W7)	Capacity	kW	20.00
	EER (COP)		2.22
	Power input	kW	9.01
Cooling (A35/W18)	Capacity	kW	20.00
	EER (COP)		3.55
	Power input	kW	5.64
Pressure difference (water circuit)		kPa	-
Cooling pump input (based on EN14511)		kW	-
Recommended plate heat exchanger		ACH70-40 x 2 Parallel connection	

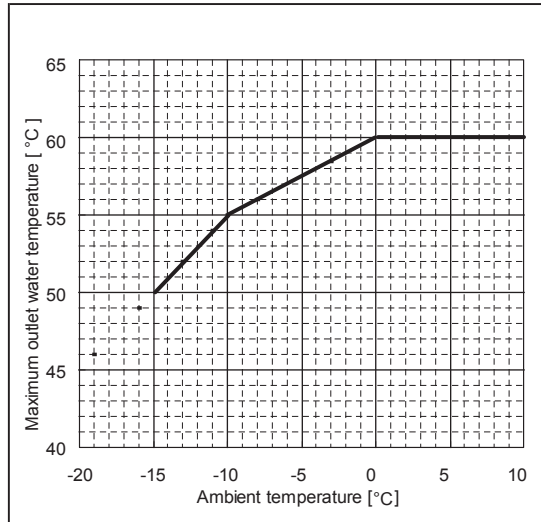
The table shows performance data obtained when a plate heat exchanger is connected.

1.3 Maximum outlet water temperature

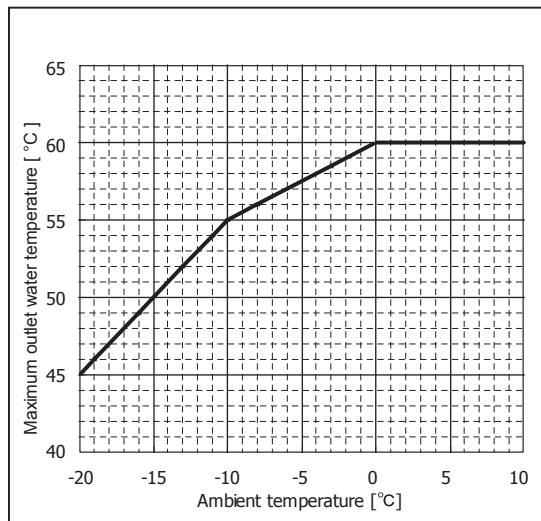
(1) Packaged-type units

■ Power inverter

PUHZ-W50VHA(-BS)

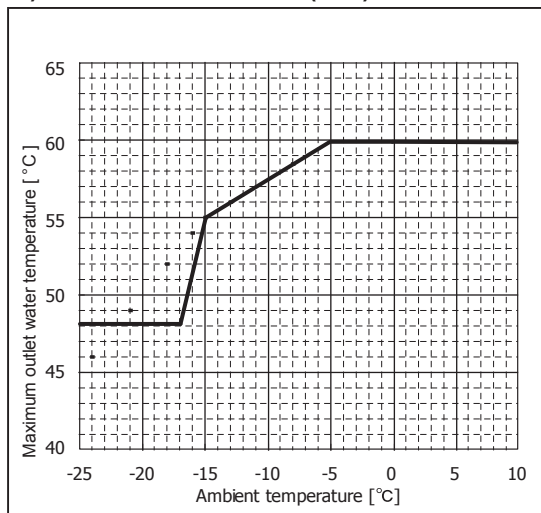


PUHZ-W85VHA2(-BS)



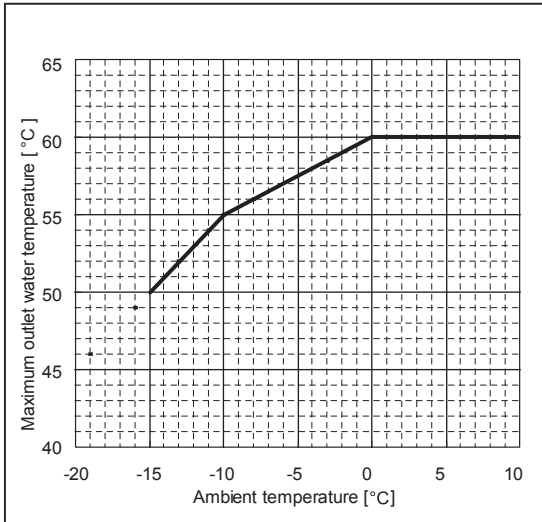
■ Zubadan

PUHZ-HW112/140YHA2(-BS) PUHZ-HW140VHA2(-BS)

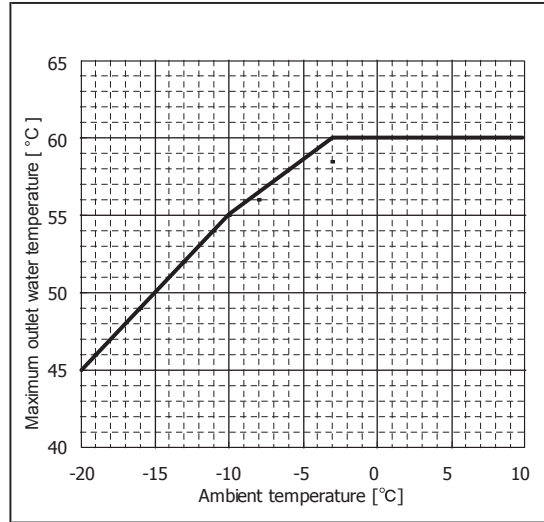


(2) Split-type units

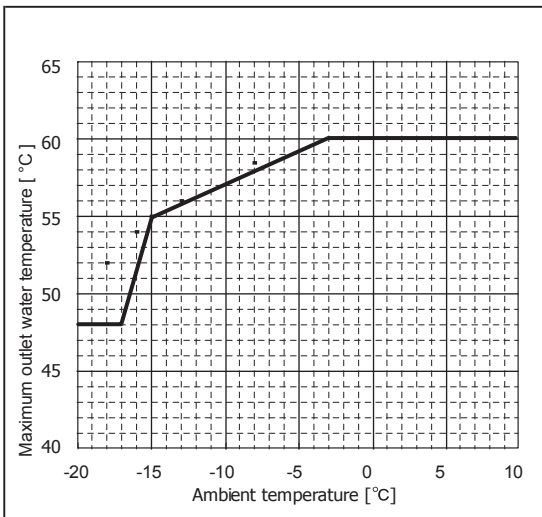
■Power inverter PUHZ-SW40/50VHA



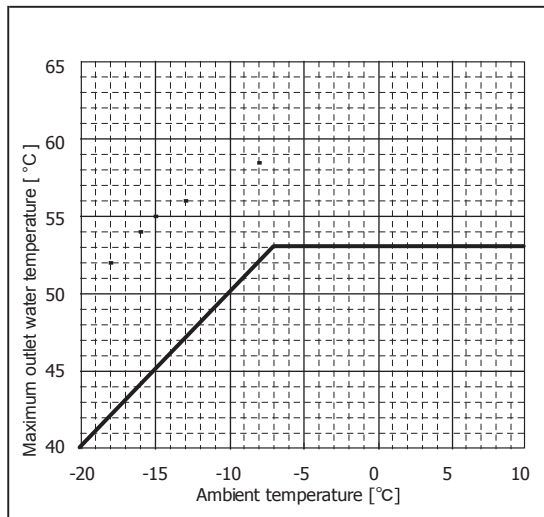
PUHZ-SW75VHA



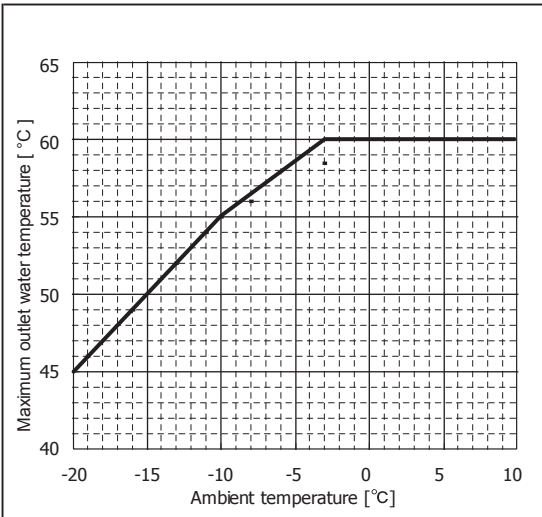
PUHZ-SW100/120VHA PUHZ-SW100/120YHA



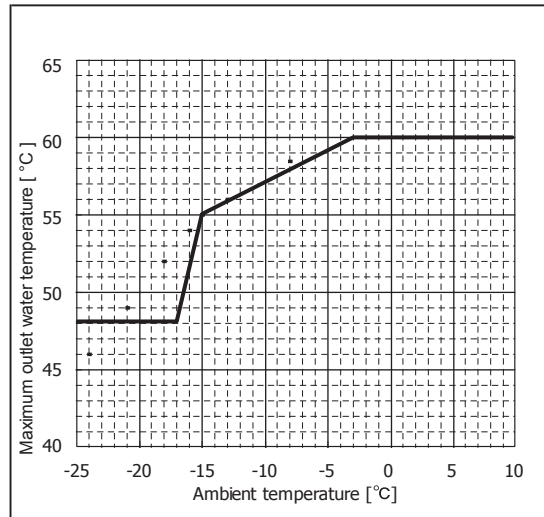
PUHZ-RP200/250YKA



■Mr.SLIM+ PUHZ-FRP71VHA



■Zubadan PUHZ-SHW80/112VHA PUHZ-SHW112/140YHA PUHZ-SHW230YKA

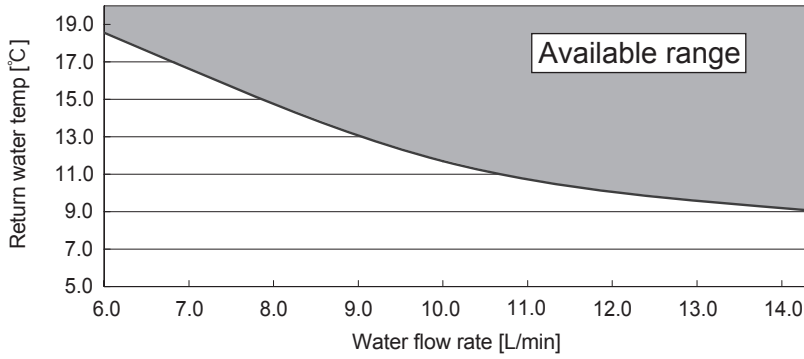


1.4 Available range (Water flow rate, return water temp.)

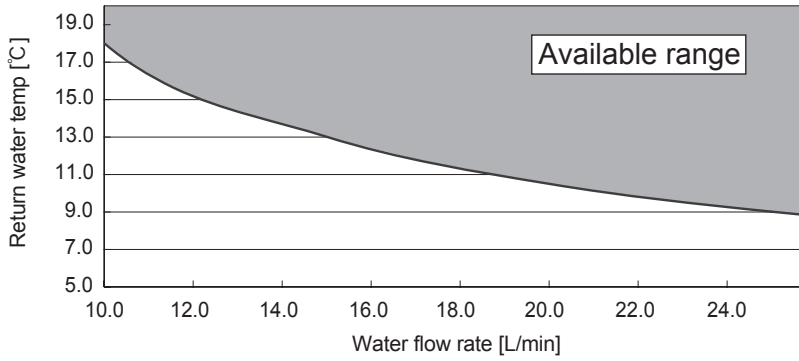
(1) Packaged-type units

■ Heating

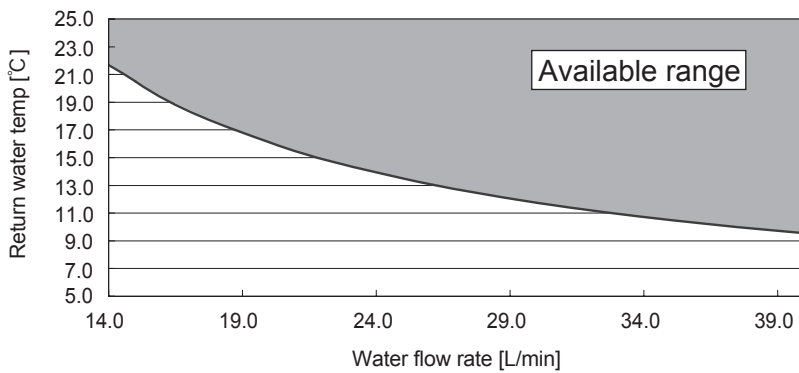
PUHZ-W50VHA(-BS)



PUHZ-W85VHA2(-BS)



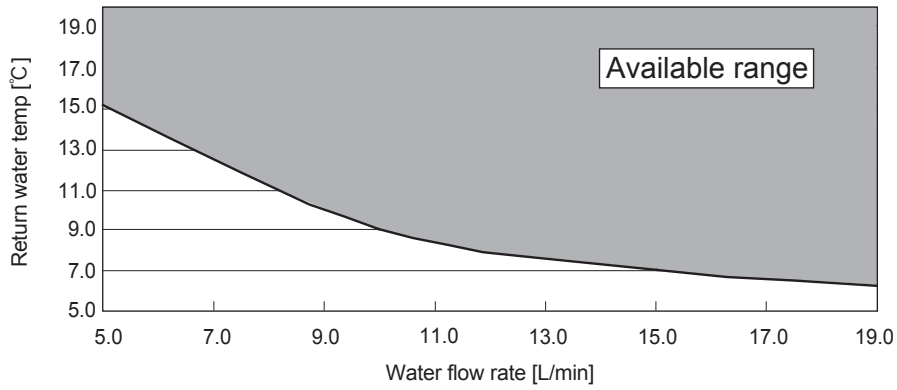
PUHZ-HW112/140YHA2(-BS) PUHZ-HW140VHA2(-BS)



(2) Split-type units

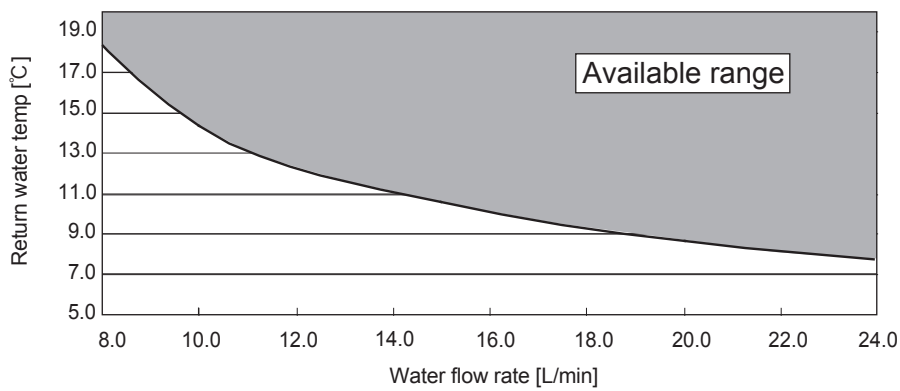
※ When a recommended plate heat exchanger is installed

PUHZ-SW40/50VHA(-BS)



PUHZ-SW75VHA(-BS)

PUHZ-SHW80VHA

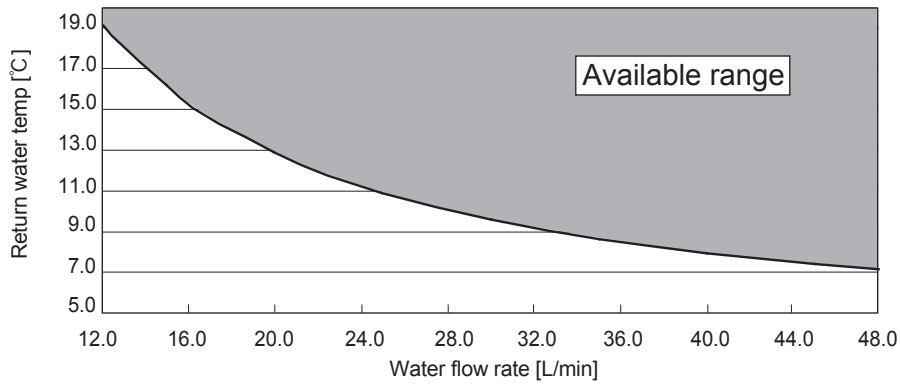


PUHZ-SW100/120VHA(-BS)

PUHZ-SHW112VHA

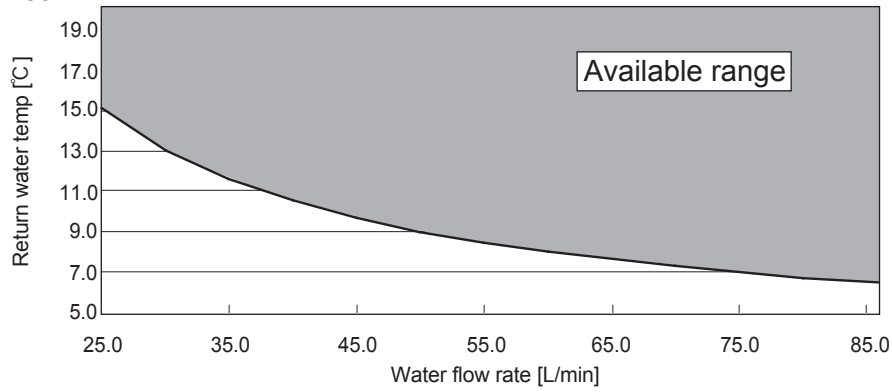
PUHZ-SW100/120YHA(-BS)

PUHZ-SHW112/140YHA

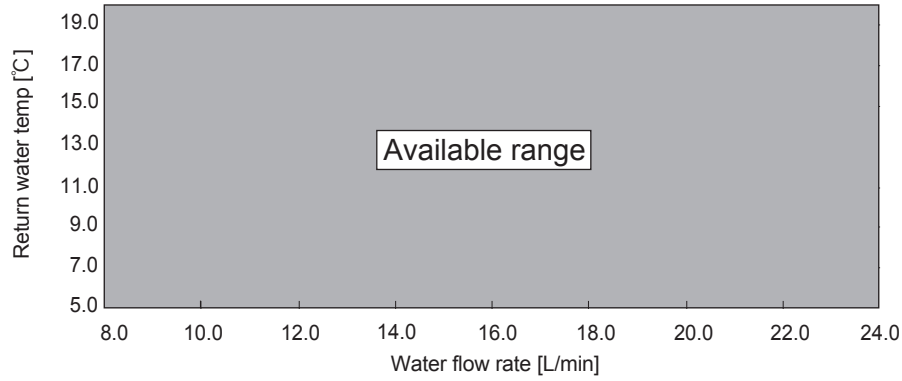


PUHZ-RP200YKA
PUHZ-RP250YKA

PUHZ-SHW230YKA



PUHZ-FRP71VHA

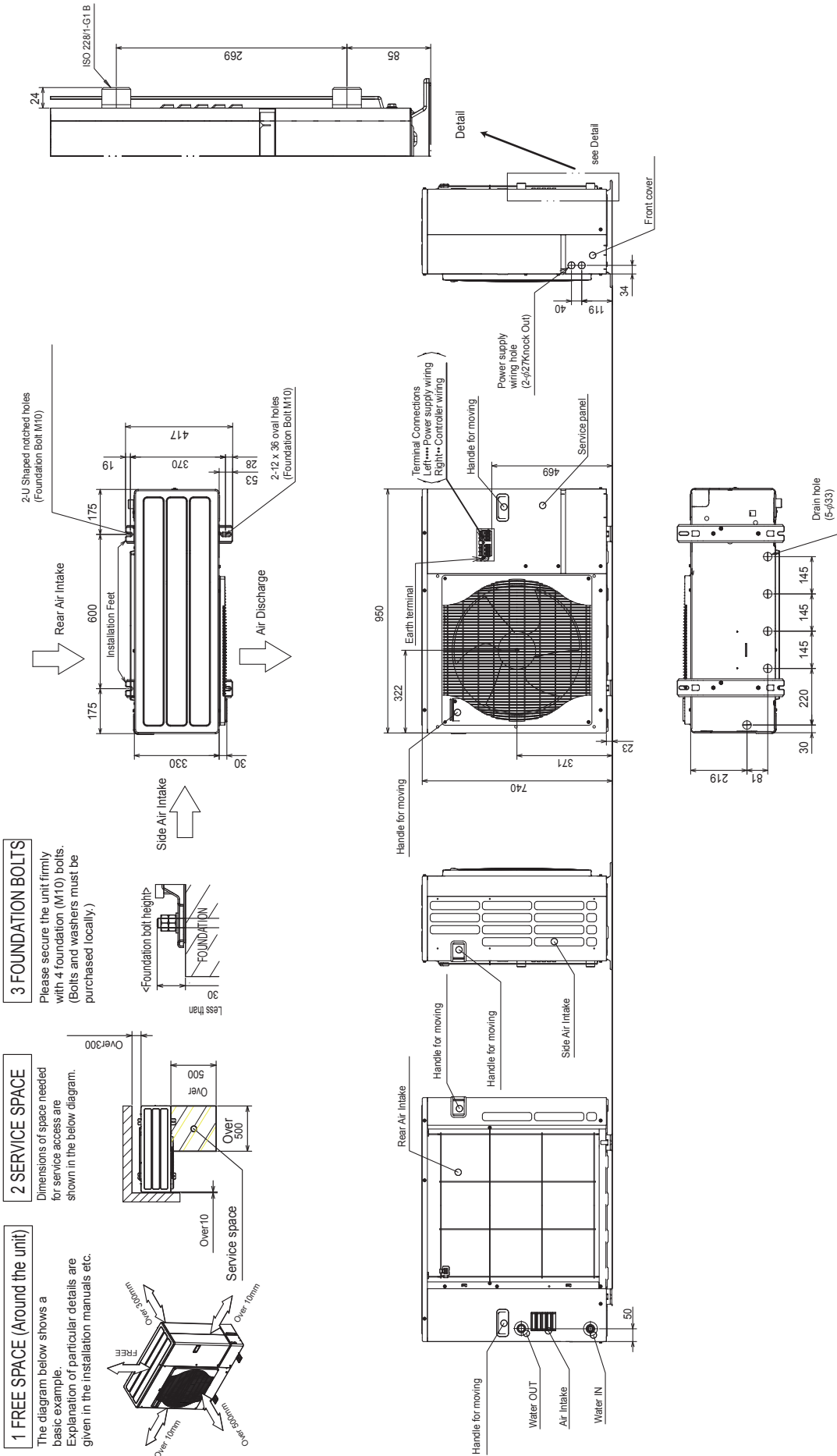


2.1 Packaged-type units

■ PUHZ-W50VHA(-BS)

Unit : mm

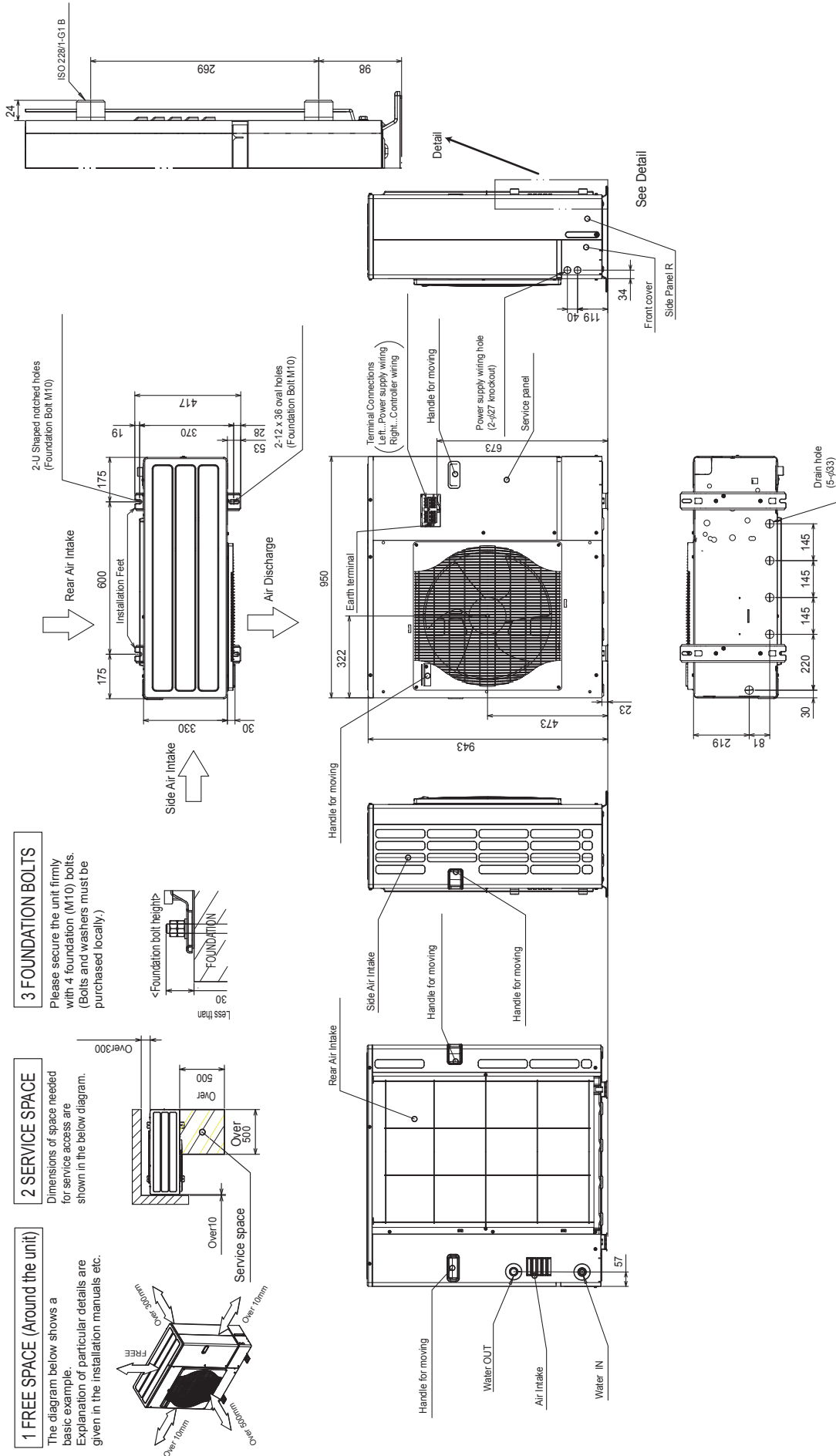
Outdoor unit



■ PUAZ-W85VHA2(-BS)

Unit : mm

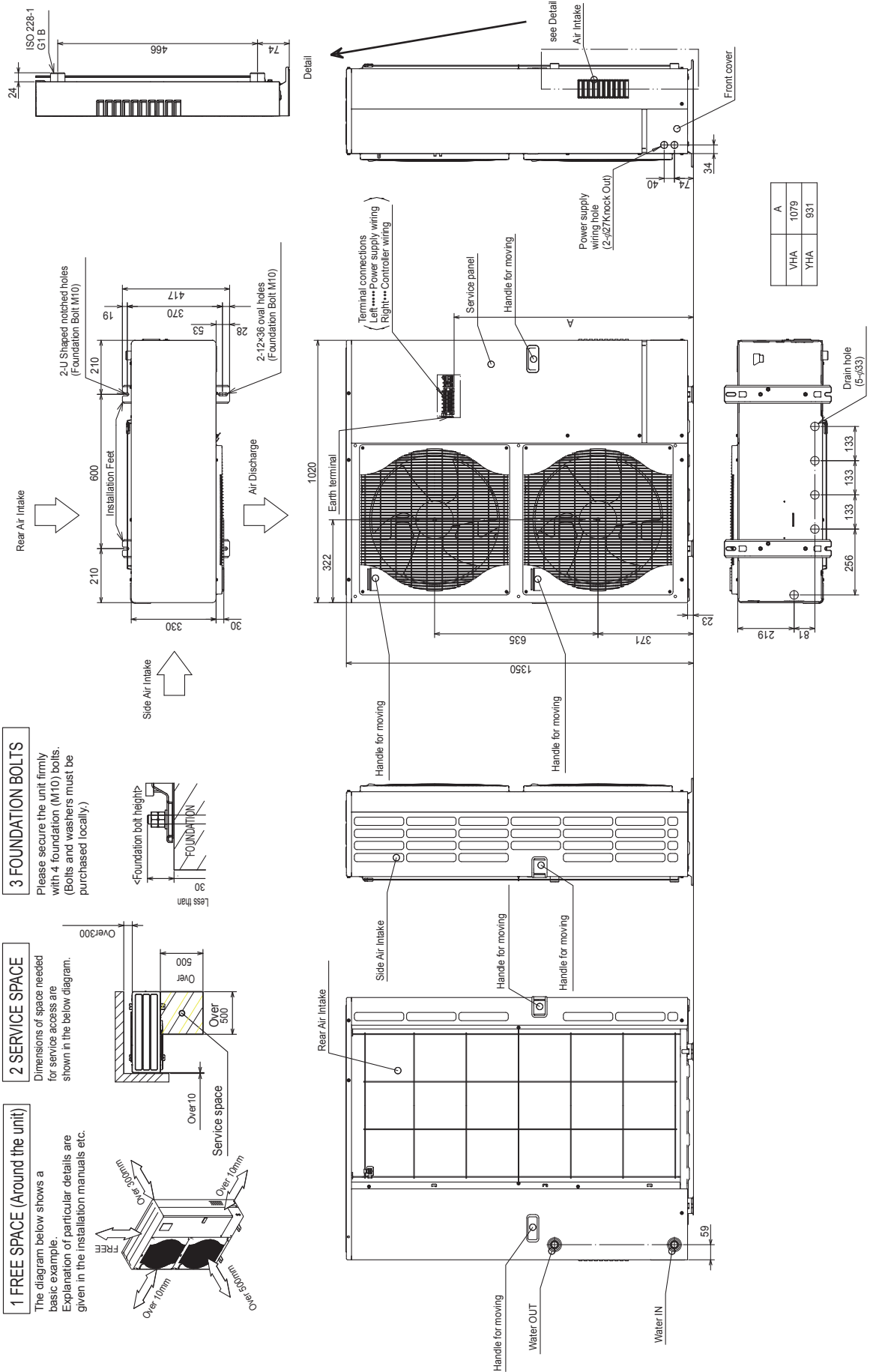
Outdoor unit



■ PUAZ-HW112YHA2(-BS) PUAZ-HW140V/YHA2(-BS)

Unit : mm

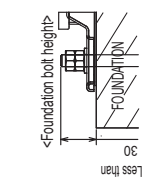
Outdoor unit



A	
YHA	1079
YHA	931

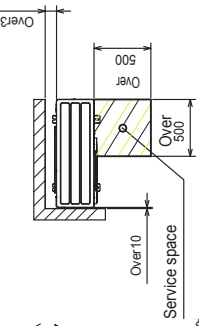
3 FOUNDATION BOLTS

Please secure the unit firmly with 4 foundation (M10) bolts. (Bolts and washers must be purchased locally).



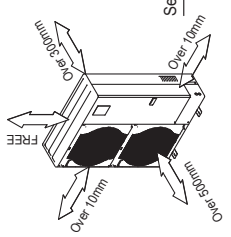
2 SERVICE SPACE

Dimensions of space needed for service access are shown in the below diagram.



1 FREE SPACE (Around the unit)

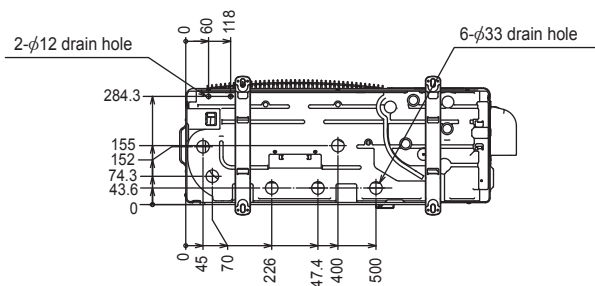
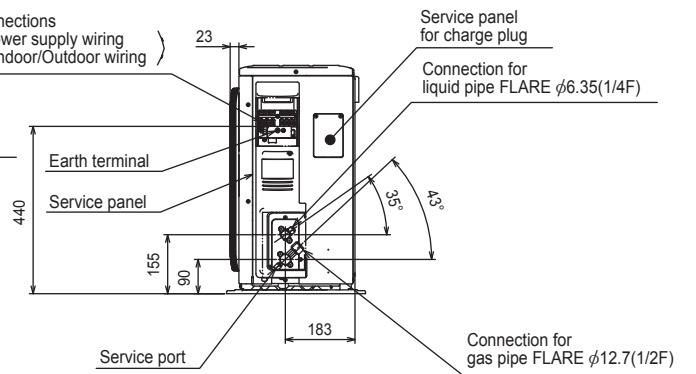
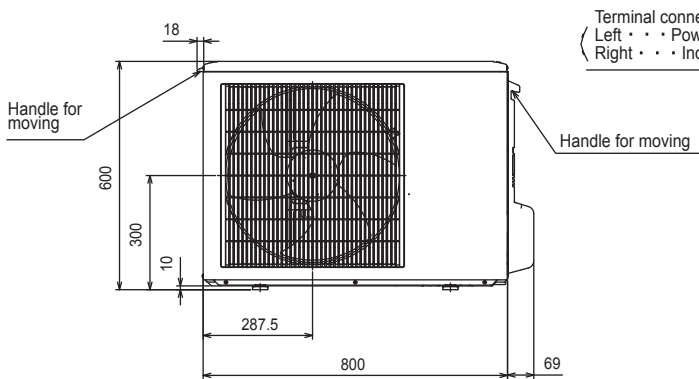
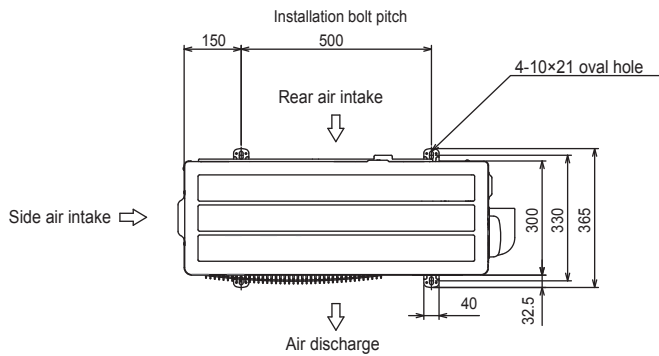
The diagram below shows a basic example. Explanation of particular details are given in the installation manuals etc.



2.2 Split-type units

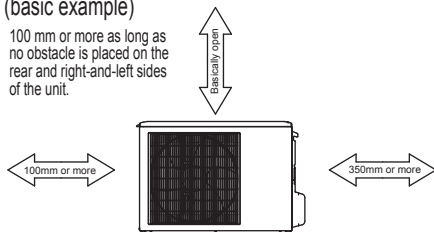
Unit : mm

■ PUAZ-SW40/50VHA(-BS)

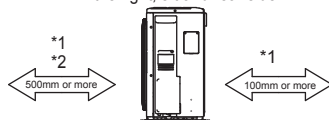


Free space around the outdoor unit (basic example)

100 mm or more as long as no obstacle is placed on the rear and right-and-left sides of the unit.



2 sides should be open in the right, left and rear side.



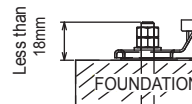
Minimum installation space for outdoor unit

- *1 In the place where short cycle tends to occur, cooling and heating capacity and power consumption might get lowered 10%. Air outlet guide (optional PAC-SG58SG) will help them improve.
- *2 If air discharges to the wall, the surface might get stained.

FOUNDATION BOLTS

Please secure the unit firmly with 4 foundation (M10) bolts. (Bolts, washers and nut must be purchased locally).

<Foundation bolt height>



PIPING-WIRING DIRECTION

Piping and wiring connection can be made from the rear direction only.

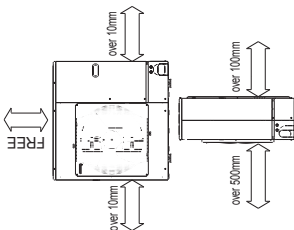
■ PUHZ-SW75VHA(-BS)

Unit : mm

Outdoor unit

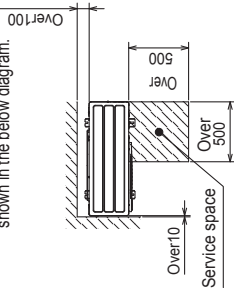
1 FREE SPACE (Around the unit)

The diagram below shows a basic example. Explanation of particular details is given in the installation manuals etc.



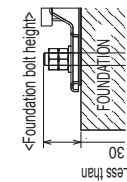
2 SERVICE SPACE

Dimensions of space needed for service access are shown in the below diagram.



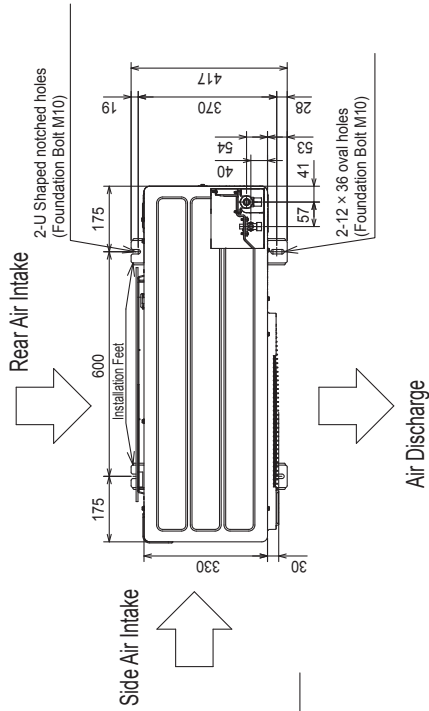
3 FOUNDATION BOLTS

Please secure the unit firmly with 4 foundation (M10) bolts. (Bolts and washers must be purchased locally.)



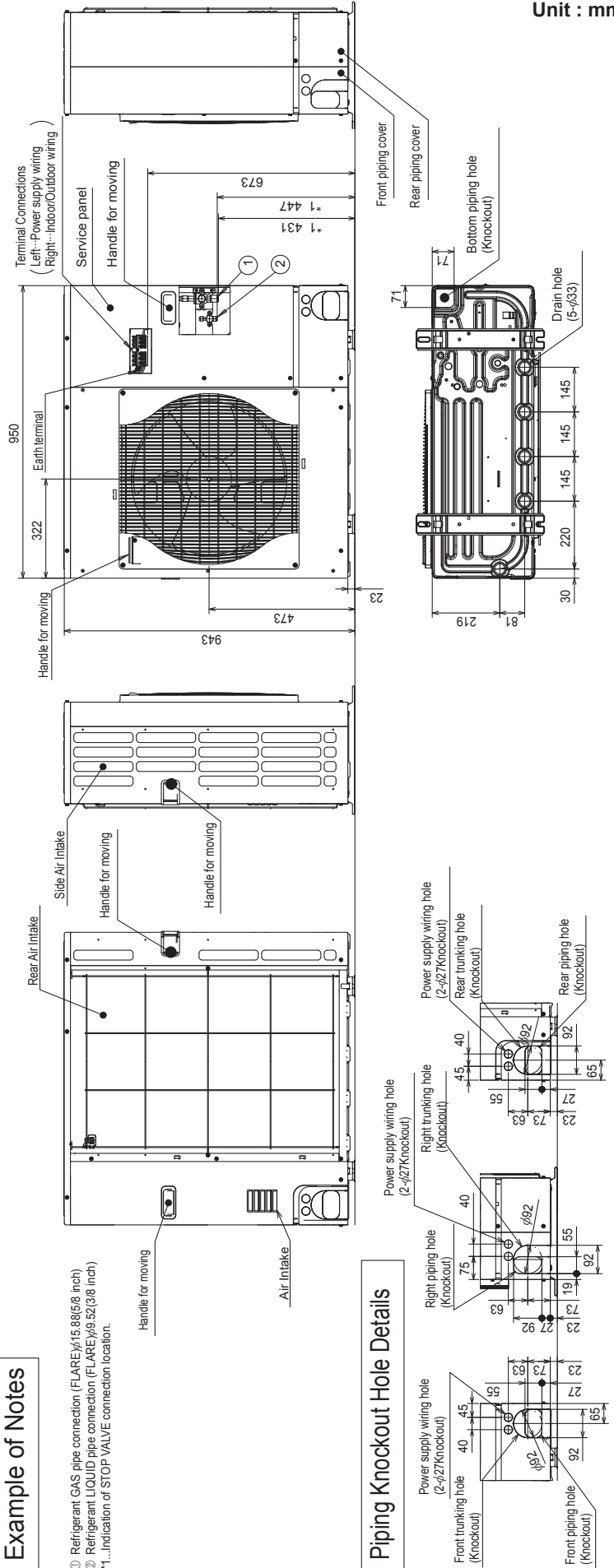
4 PIPING-WIRING DIRECTIONS

Piping and wiring connections can be made from 4 directions: front, right, rear and below.

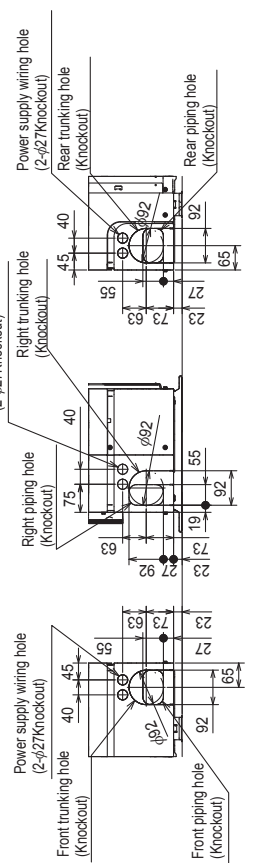


Example of Notes

- ① Refrigerant GAS pipe connection (FLARE)φ15.88(6/8 inch)
- ② Refrigerant LIQUID pipe connection (FLARE)φ9.52(3/8 inch)
- *1...Indication of STOP VALVE connection location.



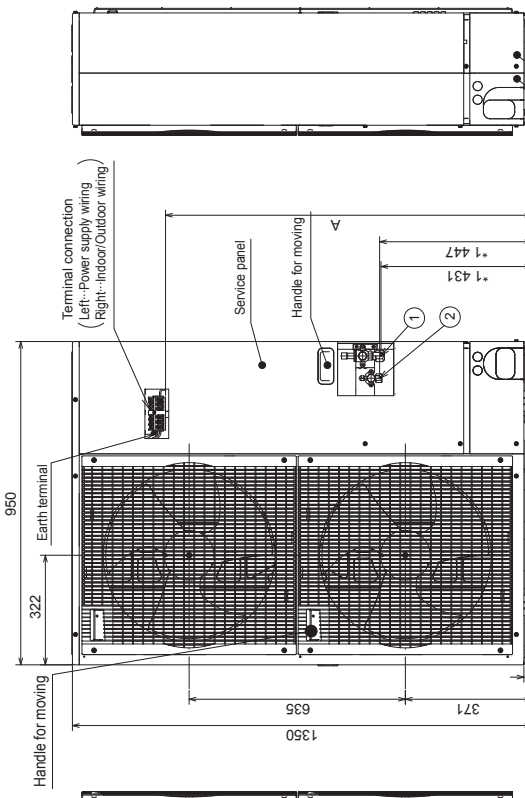
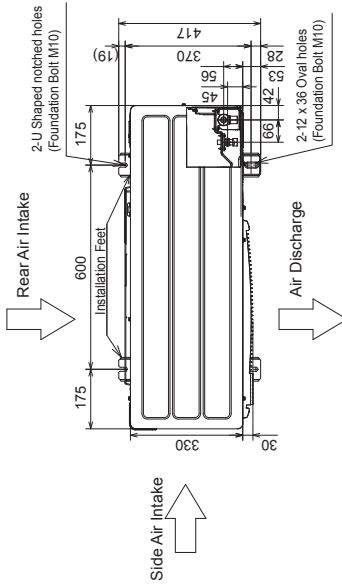
Piping Knockout Hole Details



■ PUAZ-SW100/120VHA(-BS)
 PUAZ-SW100/120YHA(-BS)

Unit : mm

Outdoor unit



A	VHA	1,079
	YHA	930

1 FREE SPACE (Around the unit)

The diagram below shows a basic example. Explanation of particular details is given in the installation manuals etc.

2 SERVICE SPACE

Dimensions of space needed for service access are shown in the below diagram.

3 FOUNDATION BOLTS

Please secure the unit firmly with 4 foundation (M10) bolts. (Bolts and washers must be purchased locally)

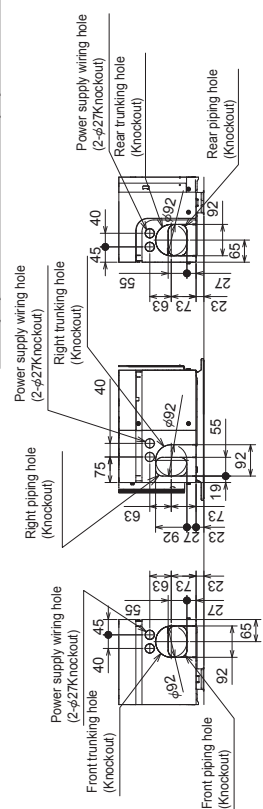
4 PIPING-WIRING DIRECTIONS

Piping and wiring connections can be made from 4 directions: front, right, rear and below.

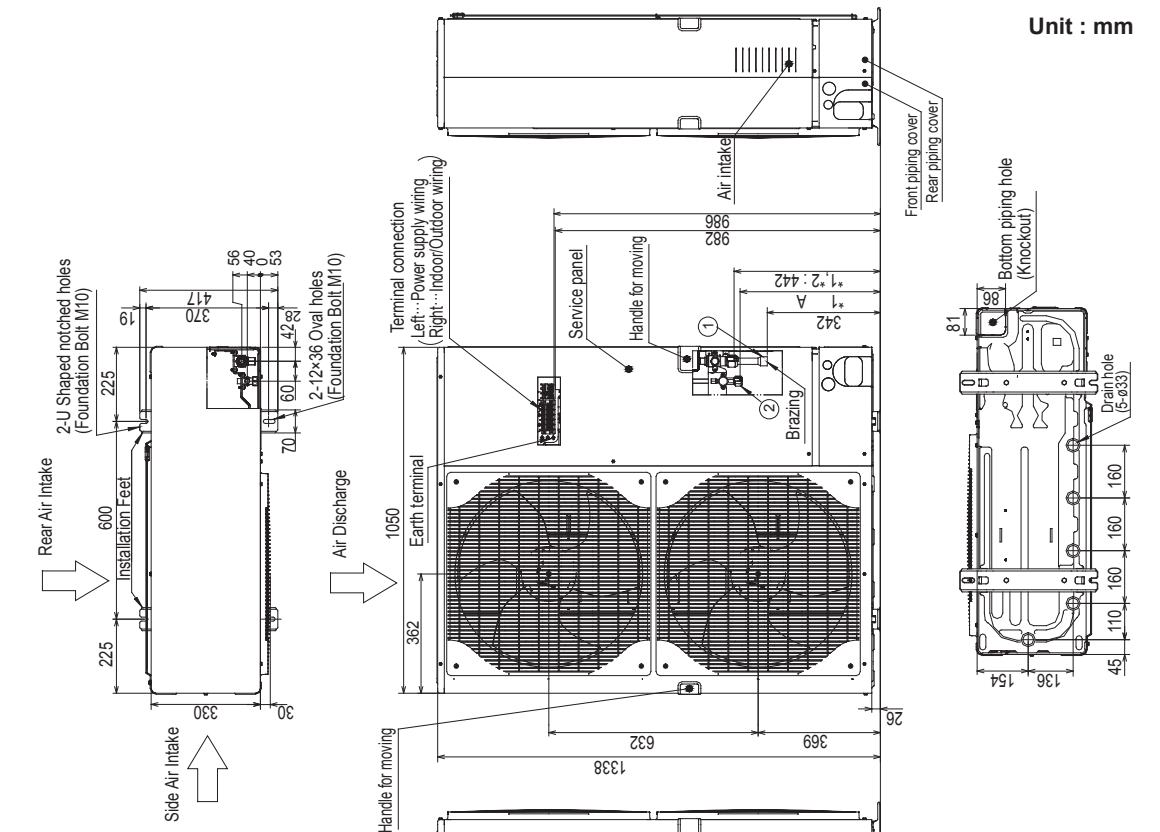
Example of Notes

- ① --- Refrigerant GAS pipe connection (FLARE) φ15.88(5/8 inch)
- ② --- Refrigerant LIQUID pipe connection (FLARE) φ 9.52(3/8 inch)
- *1 --- Indication of STOP VALVE connection location.

Piping Knockout Hole Details



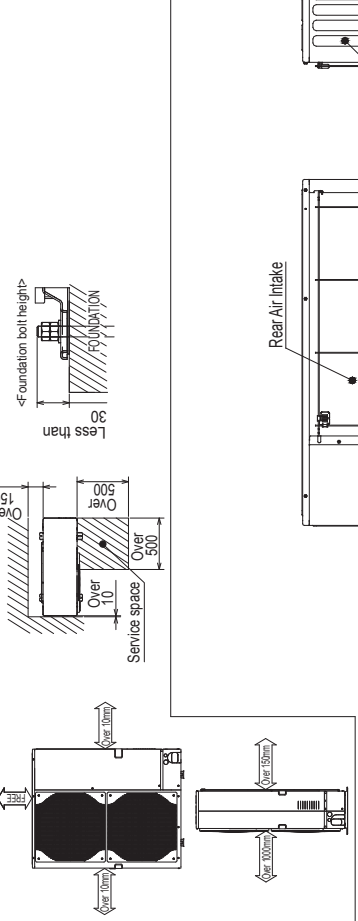
■ PUHZ-RP200/250YKA



Unit : mm

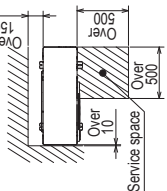
1 FREE SPACE (Around the unit)

The diagram below shows a basic example. Explanation of particular details are given in the installation manuals etc.



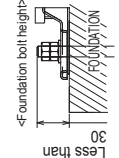
2 SERVICE SPACE

Dimensions of space needed for service access are shown in the below diagram.



3 FOUNDATION BOLTS

Please secure the unit firmly with 4 foundation (M10) bolts. (Bolts and washers must be purchased locally).



4 PIPING-WIRING DIRECTIONS

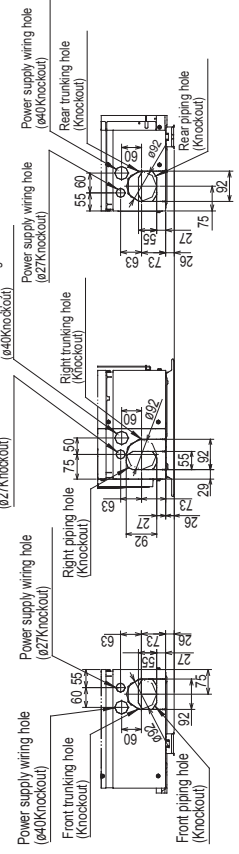
Piping and wiring connections can be made from 4 directions: FRONT, Right, Rear and Below.

Example of Notes

- ① ... Refrigerant GAS pipe connection (attached JOINT)ø25.4(Brazing locally)
- ② ... Refrigerant LIQUID pipe connection (FLARE)
- *1...Indication of STOP VALVE connection location.
- *2...(FLARE)ø 19.05(3/4F)

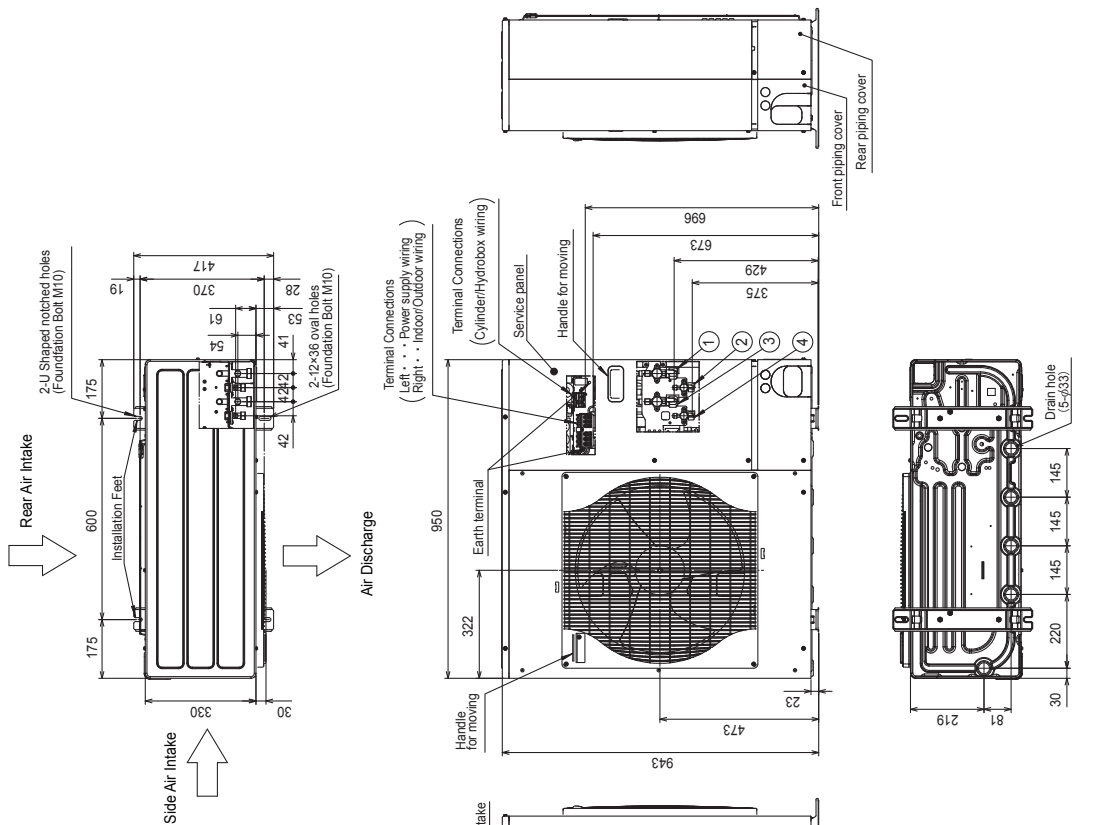
Model	② connection	A
PUHZ-RP200YKA	ø9.52(3/8F)	450
PUHZ-RP250YKA	ø12.7(1/2F)	424

Piping Knockout Hole Details



Unit : mm

■ PUHZ-FRP71VHA

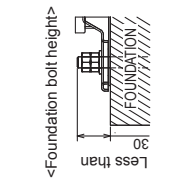


4 PIPING-WIRING DIRECTIONS

Piping and wiring connections can be made from 4 directions: Front, right, rear and below.

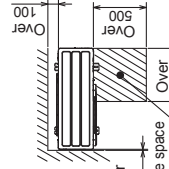
3 FOUNDATION BOLTS

Please secure the unit firmly with 4 foundation (M10) bolts. (Bolts and washers must be purchased locally.)



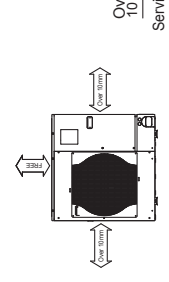
2 SERVICE SPACE

Dimensions of space needed for service access are shown in the below diagram.



1 FREE SPACE (Around the unit)

The diagram below shows a basic example. Explanation of particular details are given in the installation manuals etc.



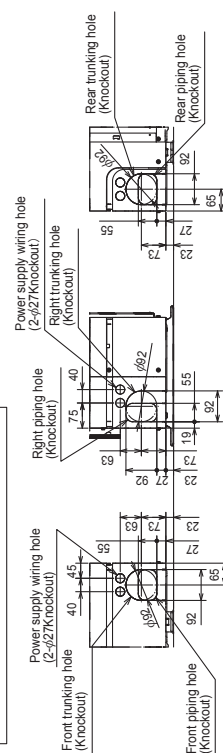
Example of Notes

- ① ... Refrigerant GAS pipe connection (FLARE) ∅15.88 (5/8F)
*Connect to indoor unit.
- ② ... Refrigerant LIQUID pipe connection (FLARE) ∅9.52 (3/8F)
*Connect to indoor unit.
- ③ ... Refrigerant GAS pipe connection (FLARE) ∅15.88 (5/8F)
*Connect to cylinder unit or hydrobox.
- ④ ... Refrigerant LIQUID pipe connection (FLARE) ∅9.52 (3/8F)
*Connect to cylinder unit or hydrobox.

This tap mark indicates the cylinder/hydro unit connection side for the following parts.

- Terminal bed for the connecting cables, S1/S2/S3.
- Stop valves, gas and liquid for the refrigerant connection.

Piping Knockout Hole Details



■ PUAZ-SHW80/112VHA
PUAZ-SHW112/140YHA

Unit : mm

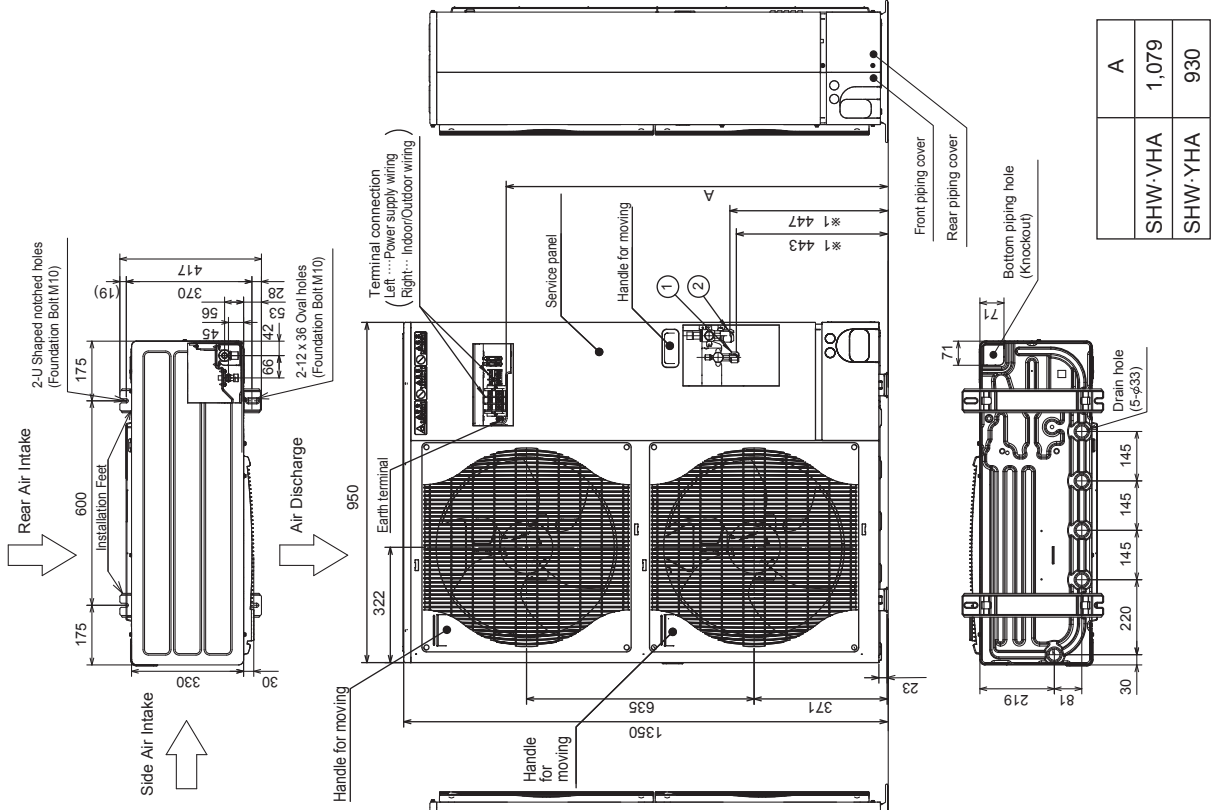
Outdoor unit

1 FREE SPACE (Around the unit)
The diagram below shows a basic example. Explanation of particular details is given in the installation manuals etc.

2 SERVICE SPACE
Dimensions of space needed for service access are shown in the below diagram.

3 FOUNDATION BOLTS
Please secure the unit firmly with 4 foundation (M10) bolts. (Bolts and washers must be purchased locally.)

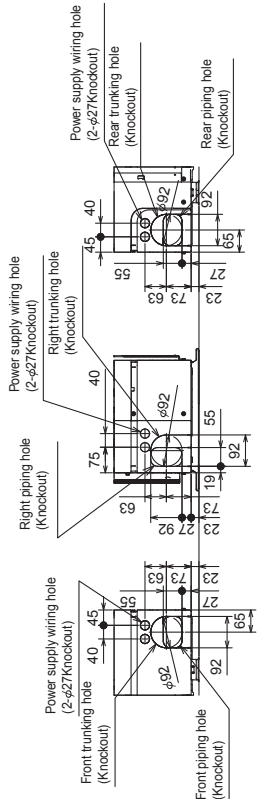
4 PIPING-WIRING DIRECTIONS
Piping and wiring connections can be made from 4 directions: front, right, rear and below.



Example of Notes

- ①...Refrigerant GAS pipe connection (FLARE)φ15.88(5/8 inch)
- ②...Refrigerant LIQUID pipe connection (FLARE)φ 9.52(3/8 inch)
- *1 ...Indication of STOP VALVE connection location.

Piping Knockout Hole Details

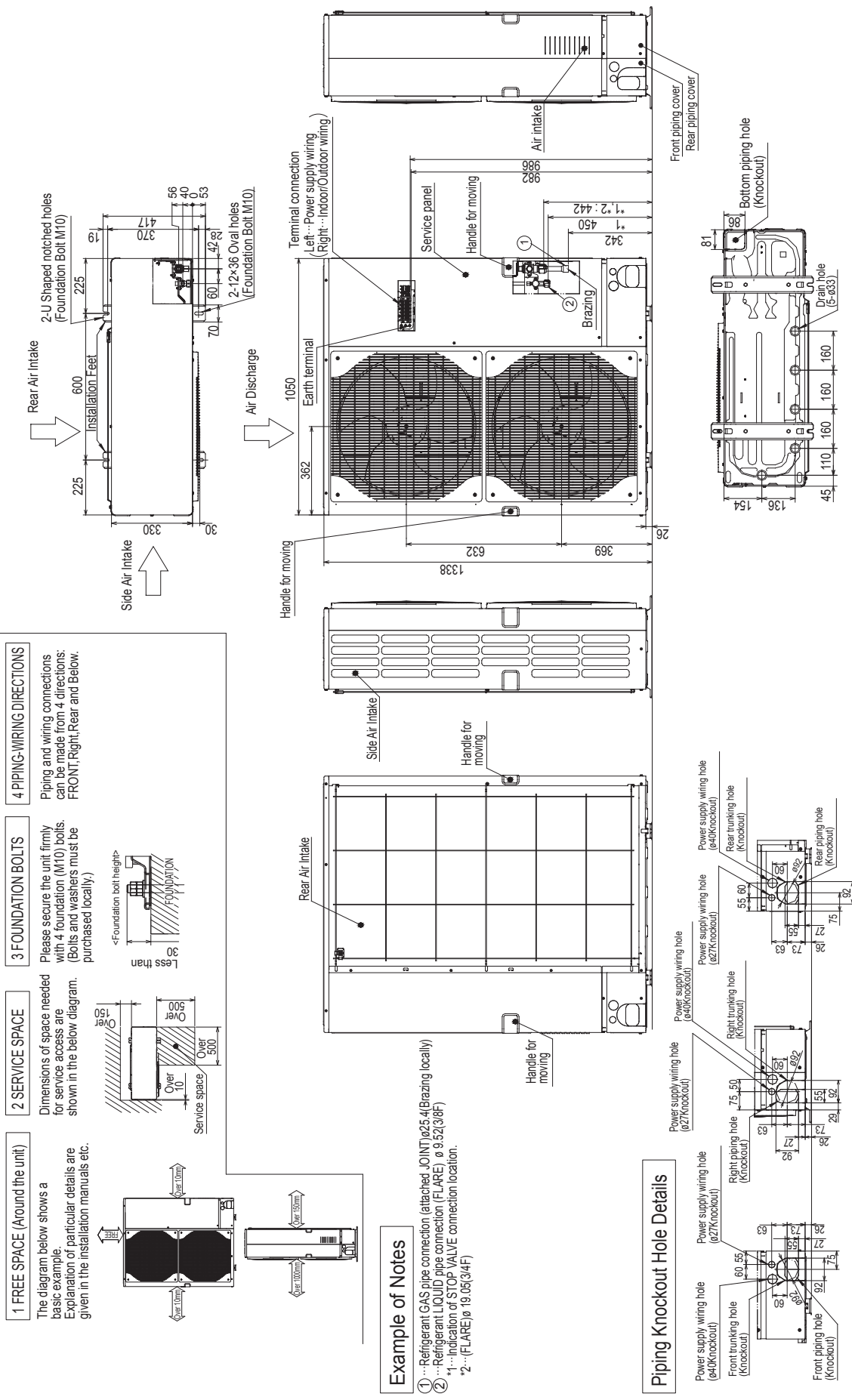


A	
SHW-VHA	1,079
SHW-YHA	930

■ PUHZ-SHW230YKA

Unit : mm

Outdoor unit

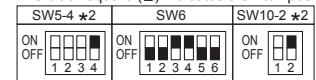


3.1 Packaged-type units

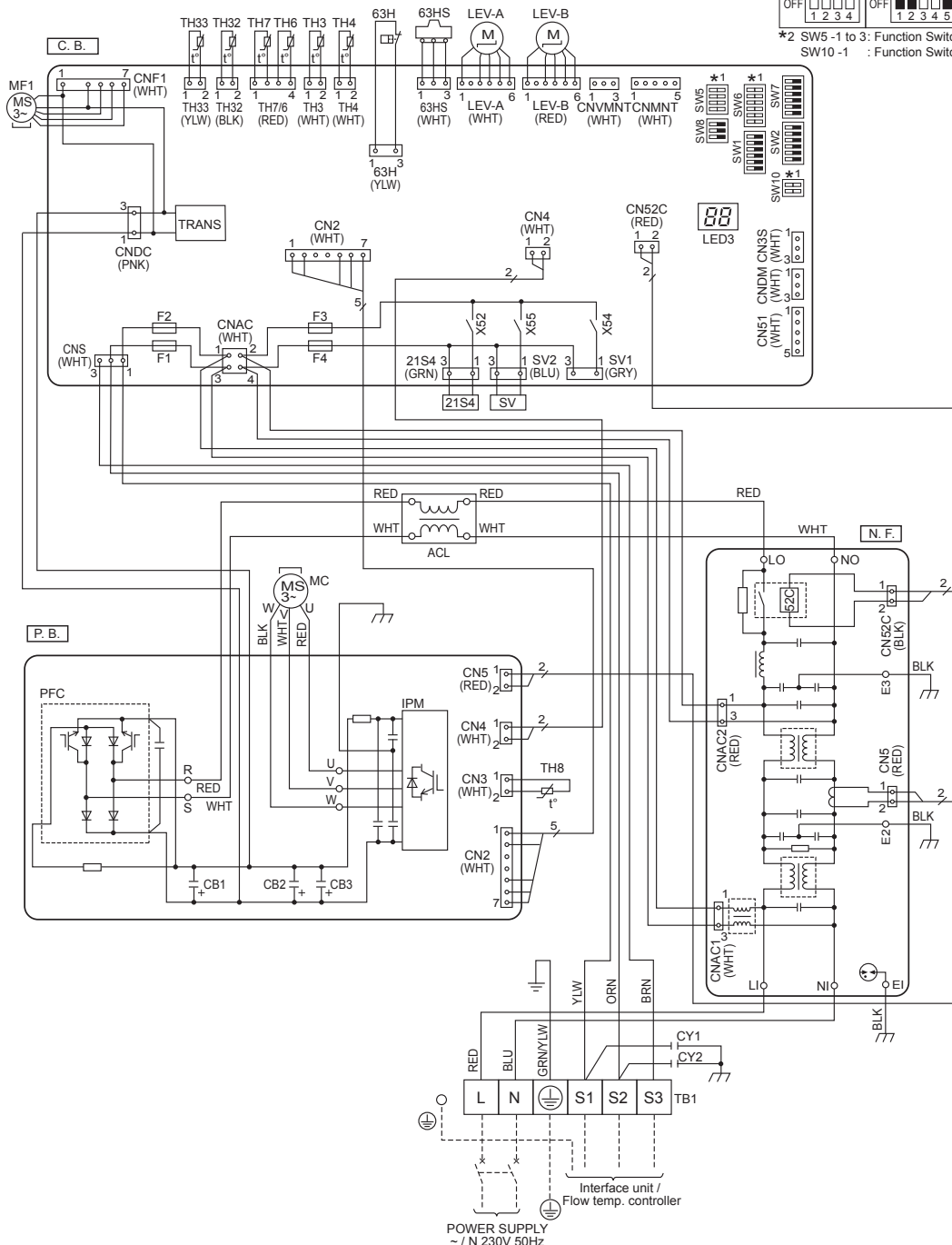
■ PUAZ-W50VHA(-BS)

SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block<Power Supply, Interface unit / Flow temp. controller>	CB1, CB2, CB3	Main Smoothing Capacitor
MC	Motor for Compressor	PFC/IPM	Power Module
MF1	Fan Motor	N. F.	Noise Filter Circuit Board
21S4	Solenoid Valve<Four-Way Valve>	LI, LO	Connection Terminal<L-Phase>
SV	Solenoid Valve<Bypass Valve>	NI, NO	Connection Terminal<N-Phase>
63H	High Pressure Switch	EI, E2, E3	Connection Terminal<Ground>
63HS	High Pressure Sensor	52C	52C Relay
TH3	Thermistor<Liquid>	C. B.	Controller Circuit Board
TH4	Thermistor<Discharge>	SW1	Switch<Function Switch>
TH6	Thermistor<Plate HEX Liquid>	SW2	Switch<Function Switch>
TH7	Thermistor<Ambient>	SW5	Switch<Function Switch, Model Select>
TH8	Thermistor<Heat Sink>	SW6	Switch<Model Select>
TH32	Thermistor<Inlet Water>	SW8	Switch<Function Switch>
TH33	Thermistor<Comp. Surface>	SW10	Switch<Function Switch, Model Select>
LEV-A, LEV-B	Electronic Expansion Valve	SV1	Connector<Connection for Option>
ACL	Reactor	CNDM	Connector<Connection for Option>
CY1, CY2	Capacitor	LED3	LED<Operation/Inspection Indicators>
P. B.	Power Circuit Board	F1, F2, F3, F4	Fuse<T6.3AL250V>
R/S	Connection Terminal<L/N-Phase>	X52, X54, X55	Relay
U/V/W	Connection Terminal<U/V/W-Phase>		

*1 MODEL SELECT
The black square (■) indicates a switch position.



*2 SW5 - 1 to 3: Function Switch
SW10 - 1 : Function Switch

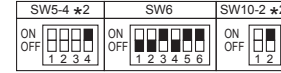


PUHZ-W85VHA2(-BS)

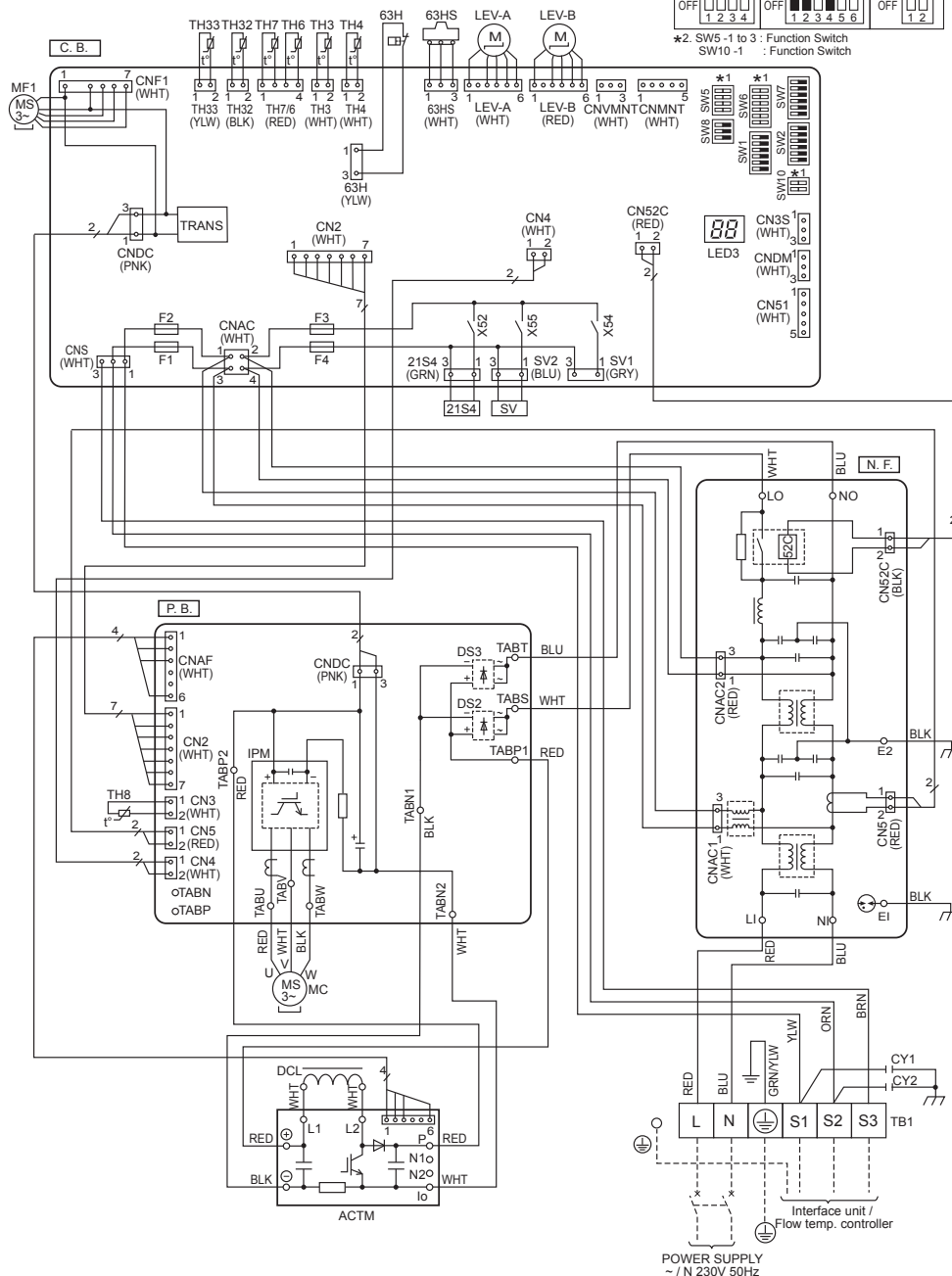
Outdoor unit

SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply,Interface unit / Flow temp. controller>	TABP1/P2	Connection Terminal <DC Voltage>
MC	Motor for Compressor	TABN1/N2	Connection Terminal <DC Voltage>
MF1	Fan Motor	DS2, DS3	Diode bridge
21S4	Solenoid Valve (Four-Way Valve)	IPM	Power Module
SV	Solenoid Valve <Bypass Valve>	N. F.	Noise Filter Circuit Board
63H	High Pressure Switch	LI, LO	Connection Terminal <L-Phase>
63HS	High Pressure Sensor	NI, NO	Connection Terminal <N-Phase>
TH3	Thermistor <Liquid>	E1, E2	Connection Terminal <Ground>
TH4	Thermistor <Discharge>	52C	52C Relay
TH6	Thermistor <Plate HEX Liquid>	C. B.	Controller Circuit Board
TH7	Thermistor <Ambient>	SW1	Switch <Function Switch>
TH8	Thermistor <Heat Sink>	SW2	Switch <Function Switch>
TH32	Thermistor <Inlet Water>	SW5	Switch <Function Switch, Model Select>
TH33	Thermistor <Comp. Surface>	SW6	Switch <Model Select>
LEV-A, LEV-B	Electronic Expansion Valve	SW7	Switch <Function Switch>
DCL	Reactor	SW8	Switch <Function Switch>
ACTM	Active Filter Module	SW10	Switch <Function Switch, Model Select>
CY1, CY2	Capacitor	SV1	Connector <Connection for Option>
P. B.	Power Circuit Board	CNDM	Connector <Connection for Option>
TABU/V/W	Connection Terminal <U/V/W-Phase>	LED3	LED <Operation/Inspection Indicators>
TABS/T	Connection Terminal <L/N-Phase>	F1, F2, F3, F4	Fuse <T6.3AL250V>
		X52, X54, X55	Relay

*1 MODEL SELECT
The black square (■) indicates a switch position.



*2 SW5 -1 to 3 : Function Switch
SW10 -1 : Function Switch

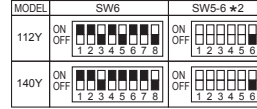


POWER SUPPLY
~ / N 230V 50Hz

PUHZ-HW112/140YHA2(-BS)

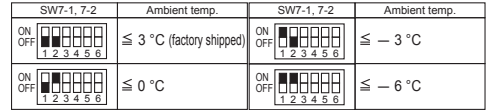
SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block<Power Supply>	N. F.	Noise Filter Circuit Board
TB2	Terminal Block<Indoor/Outdoor>	LI1, LI2, LI3, NI	Connection Terminal<L1/L2/L3-Power Supply>
MC	Motor for Compressor	LO1, LO2, LO3, NO	Connection Terminal<L1/L2/L3-Power Supply>
MF1, MF2	Fan Motor	GD1, GD3	Connection Terminal<Ground>
21S4	Solenoid Valve(Four-Way Valve)	CONV. B.	Converter Circuit Board
63H	High Pressure Switch	L1-A1/IN	Connection Terminal<L1-Power Supply>
63L	Low Pressure Switch	L1-A2/OU	Connection Terminal<L1-Power Supply>
63HS	High Pressure Sensor	L2-A2/OU	Connection Terminal<L2-Power Supply>
TH3	Thermistor<Liquid>	L3-A2/OU	Connection Terminal<L3-Power Supply>
TH4	Thermistor<Discharge>	N-IN	Connection Terminal
TH6	Thermistor<Plate HEX Liquid>	CK-OU	Connection Terminal
TH7	Thermistor<Ambient>	C. B.	Controller Circuit Board
TH8	Thermistor(internal)<Heat Sink>	SW1	Switch<Manual Defrost, Defect History, Record Reset, Function Switch>
TH32	Thermistor<Inlet Water>	SW2	Switch<Function Switch>
TH33	Thermistor<Suction>	SW5	Switch<Function Switch, Model Select>
TH34	Thermistor<Comp. Surface>	SW6	Switch<Model Select>
LEVA, LEVB, LEVC	Linear Expansion Valve	SW7	Switch<Function Switch>
ACL1, ACL2, ACL3, ACL4	Reactor	SW8	Switch<Function Switch>
RS	Rush Current Protect Resistor	SW9	Switch<Function Switch>
CB1, CB2	Main Smoothing Capacitor	CN51	Connector<Connection for Option>
CK	Capacitor	CNDM	Connector<Connection for Option>
P. B.	Power Circuit Board	SV1/CH	Connector<Connection for Option>
TB-U/V/W	Connection Terminal<U/V/W-Phase>	SS	Connector<Connection for Option>
TB-L1/L2/L3	Connection Terminal<L1/L2/L3-Power Supply>	LED3	LED<Operation/Inspection Indicators>
TB-P2	Connection Terminal	F1, F2, F3, F4	Fuse<T6.3AL250V>
TB-C1	Connection Terminal	X51, X52, X54	Relay
TB-N1	Connection Terminal		
X52A	52C Relay		

*1 MODEL SELECT
The black square (■) indicates a switch position.

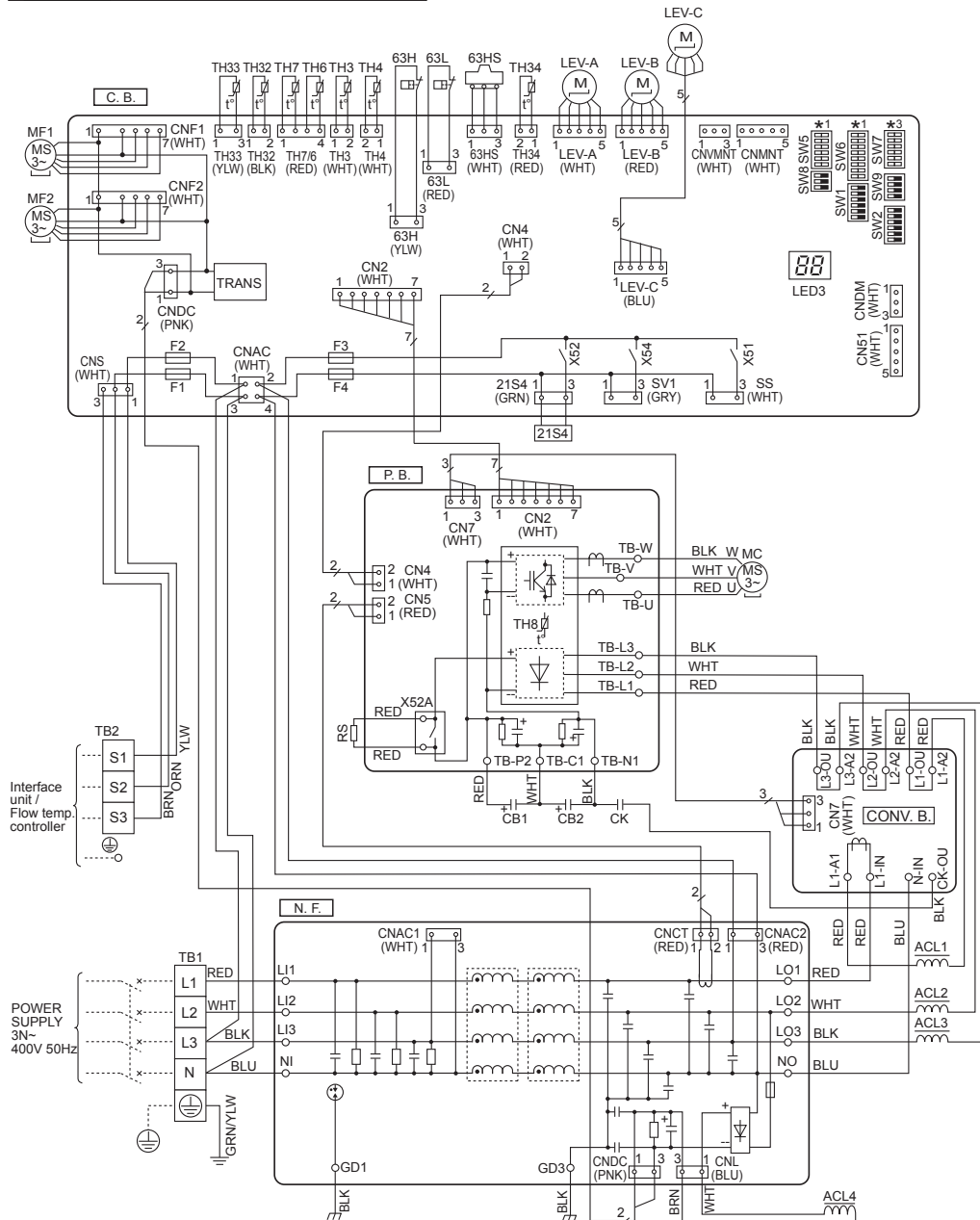


*2. SW5 -1 to 5 : Function Switch

*3 Ambient temp. of ZUBADAN Flash Injection becomes effective.
The black square (■) indicates a switch position.



SW7-3 to 6 : Function Switch



Outdoor unit

PUHZ-HW140VHA2(-BS)

SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block<Power Supply, Indoor/Outdoor>	NI	Connection Terminal<N-Phase>
MC	Motor for Compressor	DCL1, DCL2	Connection Terminal<Reactor>
MF1, MF2	Fan Motor	IGBT	Power Module
21S4	Solenoid Valve<Four-Way Valve>	E1, E2, E3, E4	Connection Terminal<Ground>
63H	High Pressure Switch	C. B.	Controller Circuit Board
63L	Low Pressure Switch	SW1	Switch<Manual Defrost, Defect History, Record Reset, Function Switch>
63HS	High Pressure Sensor	SW2	Switch<Function Switch>
TH3	Thermistor<Liquid>	SW5	Switch<Function Switch, Model Select>
TH4	Thermistor<Discharge>	SW6	Switch<Model Select>
TH6	Thermistor<Inlet Water>	SW7	Switch<Function Switch>
TH7	Thermistor<Ambient>	SW8	Switch<Function Switch>
TH8	Thermistor<Internal><Heat Sink>	SW9	Switch<Function Switch>
TH32	Thermistor<Inlet Water>	CN51	Connector<Connection for Option>
TH33	Thermistor<Suction>	SS	Connector<Connection for Option>
TH34	Thermistor<Comp. Surface>	SV1	Connector<Connection for Option>
LEV-A, LEV-B, LEV-C	Linear Expansion Valve	CNDM	Connector <Connection for Option>
DCL	Reactor	LED3	LED<Operation/Inspection Indicators>
CB	Main Smoothing Capacitor	F1, F2, F3, F4	Fuse<T6.3AL250V>
CY1, CY2	Capacitor	X51, X52, X54	Relay
P. B.	Power Circuit Board		
U, V, W	Connection Terminal<U/V/W-Phase>		
LI	Connection Terminal<L-Phase>		

***1 MODEL SELECT**
The black square (■) indicates a switch position.

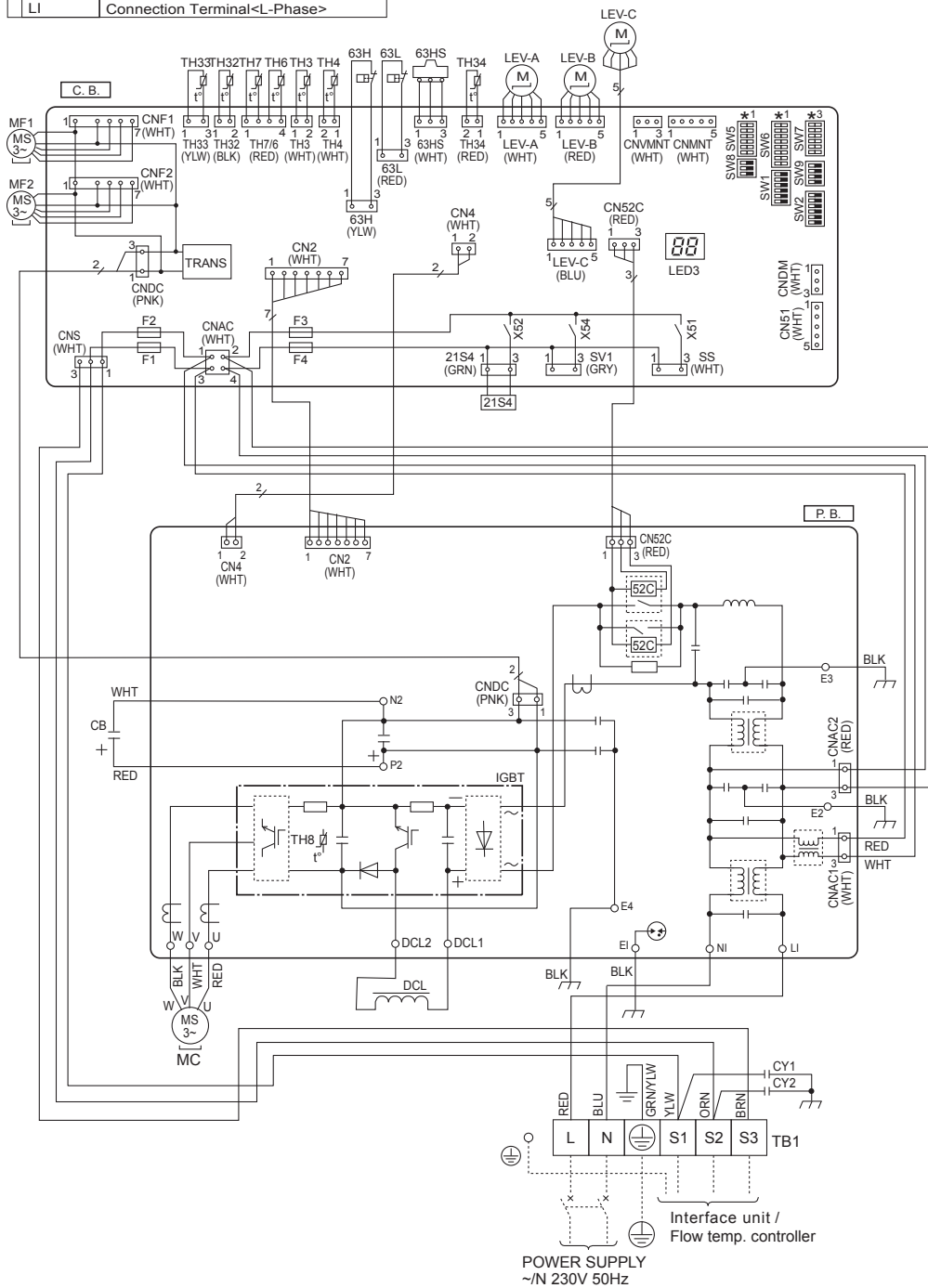
MODEL	SW6	SW5-6 *2
140V	ON OFF	ON OFF
	1 2 3 4 5 6 7 8	1 2 3 4 5 6

***2. SW5 - 1 to 5 : Function Switch**

***3 Ambient temp. of ZUBADAN Flash Injection becomes effective.**
The black square (■) indicates a switch position.

SW7-1, 7-2	Ambient temp.	SW7-1, 7-2	Ambient temp.
ON OFF	≤ 3 °C (factory shipped)	ON OFF	≤ - 3 °C
1 2 3 4 5 6		1 2 3 4 5 6	
ON OFF	≤ 0 °C	ON OFF	≤ - 6 °C
1 2 3 4 5 6		1 2 3 4 5 6	

SW7-3 to 6 : Function Switch



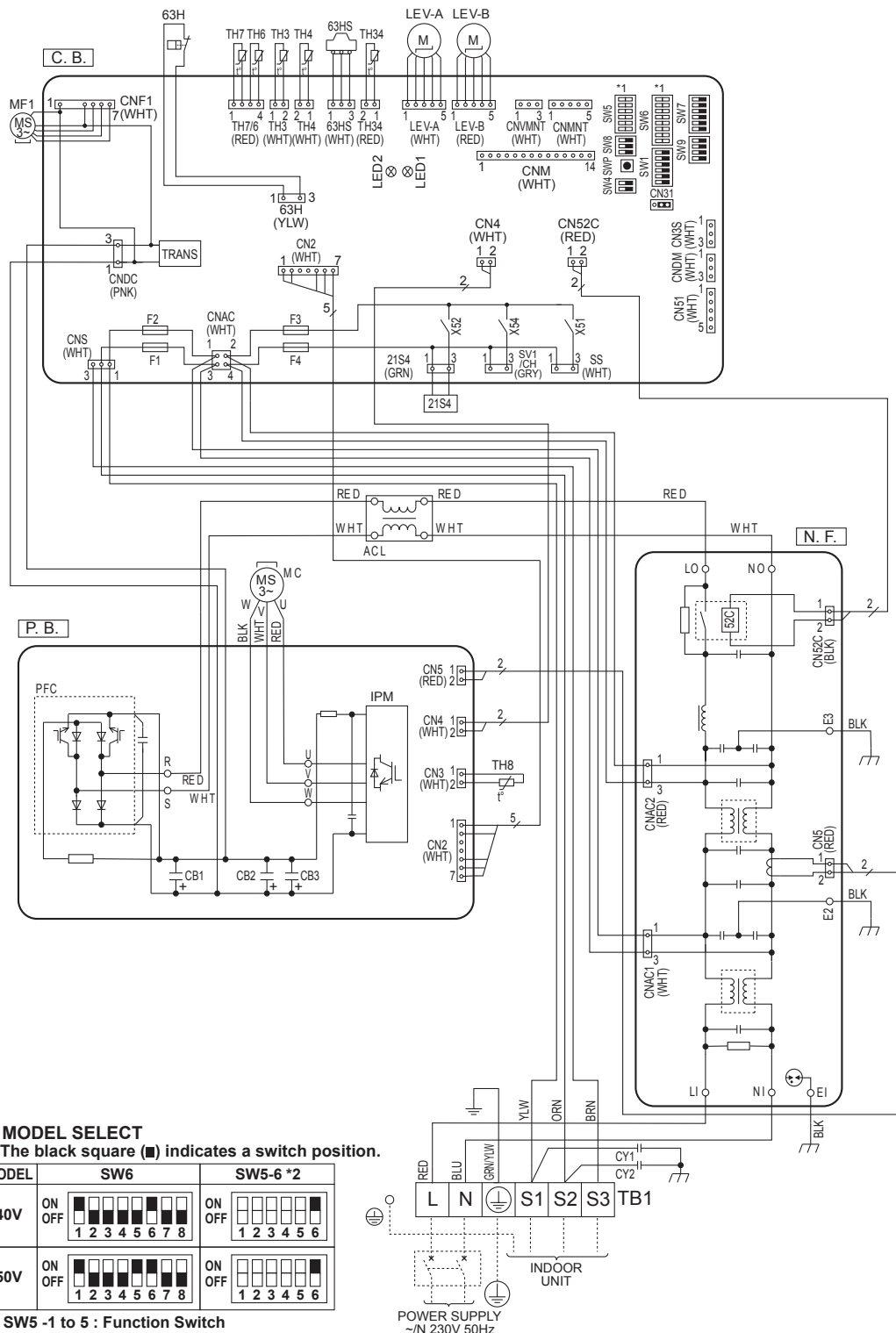
POWER SUPPLY
~N 230V 50Hz

Interface unit /
Flow temp. controller

3.2 Split-type units

■ PUHZ-SW40/50VHA(-BS)

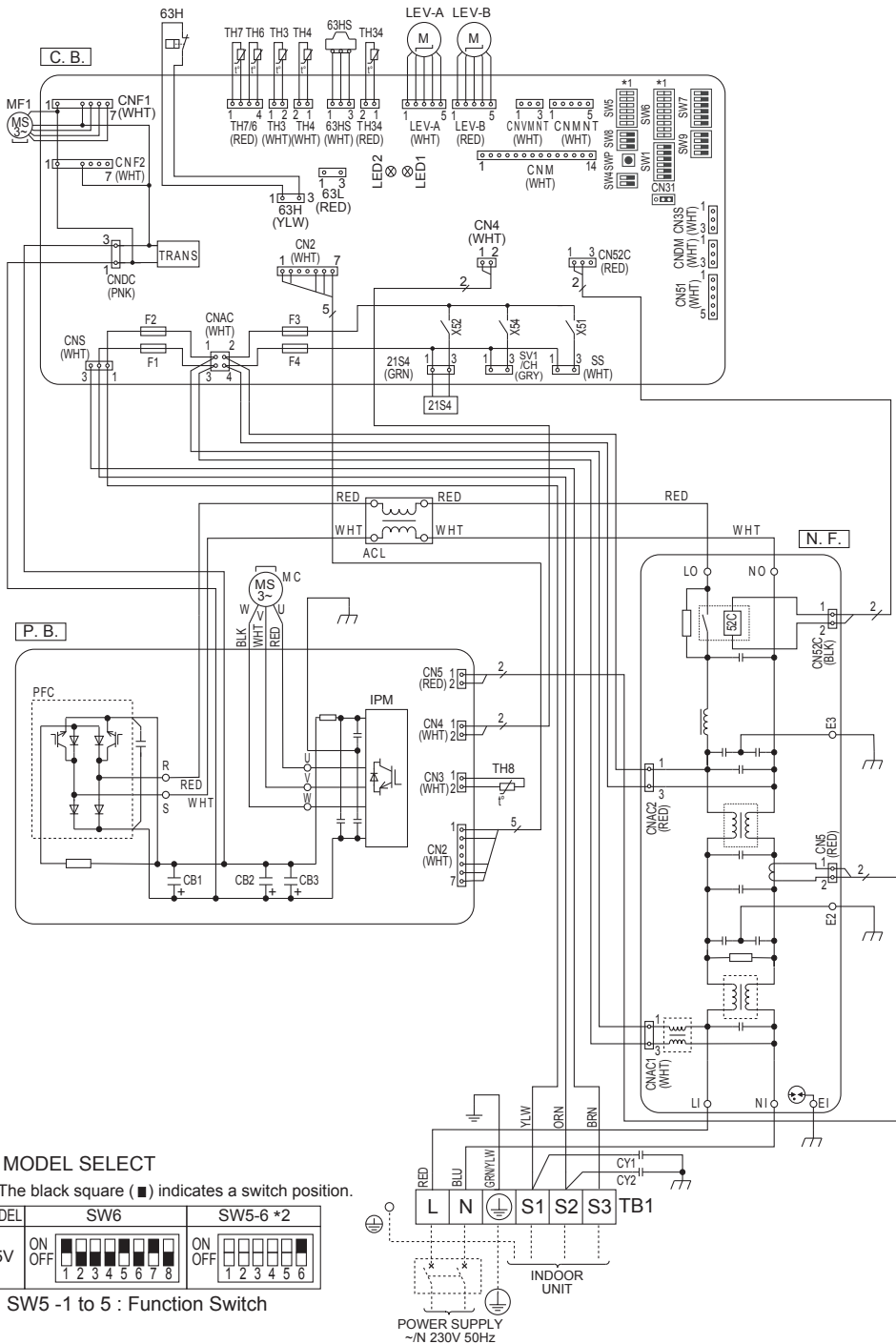
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply, Indoor/Outdoor>	P. B.	Power Circuit Board	SW5	Switch <Function Switch, Model Select>
MC	Motor for Compressor	R, S	Connection Terminal <L/N-Phase>	SW6	Switch <Model Select>
MF1	Fan Motor	U, V, W	Connection Terminal <U/V/W-Phase>	SW7	Switch <Function Switch>
21S4	Solenoid Valve (Four-Way Valve)	IPM	Power Module	SW8	Switch <Function Switch>
63H	High Pressure Switch	PFC	Converter	SW9	Switch <Function Switch>
63HS	High Pressure Sensor	CB1, CB2, CB3	Main Smoothing Capacitor	SWP	Switch <Pump Down>
TH3	Thermistor <Liquid>	N. F.	Noise Filter Circuit Board	CN31	Connector <Emergency Operation>
TH4	Thermistor <Discharge>	LI, LO	Connection Terminal <L-Phase>	CNDM	Connector <Connection for Option>
TH6	Thermistor <2-Phase Pipe>	NI, NO	Connection Terminal <N-Phase>	CN51	Connector <Connection for Option>
TH7	Thermistor <Ambient>	EI, E2, E3	Connection Terminal <Ground>	SV1/CH	Connector <Connection for Option>
TH8	Thermistor <Heat Sink>	52C	52C Relay	SS	Connector <Connection for Option>
TH34	Thermistor <Comp. Surface>	C. B.	Controller Circuit Board	CNM	Connector <Connection for Option>
LEV-A, LEV-B	Linear Expansion Valve	SW1	Switch <Manual Defrost, Defect History, Record Reset, Refrigerant Address>	LED1, LED2	LED <Operation Inspection Indicators>
ACL	Reactor	SW4	Switch <Test Operation>	F1, F2, F3, F4	Fuse <T6.3AL250V>
CY1, CY2	Capacitor			X51, X52, X54	Relay



Outdoor unit

■ PUAZ-SW75VHA(-BS)

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply, Indoor/Outdoor>	P.B.	Power Circuit Board	SW5	Switch <Function Switch, Model Select>
MC	Motor for Compressor	R, S	Connection Terminal <L/N-Phase>	SW6	Switch <Model Select>
MF1	Fan Motor	U, V, W	Connection Terminal <U/V/W-Phase>	SW7	Switch <Function Switch>
Z1S4	Solenoid Valve (Four-Way Valve)	IPM	Power Module	SW8	Switch <Function Switch>
63H	High Pressure Switch	PFC	Converter	SW9	Switch <Function Switch>
63HS	High Pressure Sensor	CB1, CB2, CB3	Main Smoothing Capacitor	SWP	Switch <Pump Down>
TH3	Thermistor <Liquid>	N.F.	Noise Filter Circuit Board	CN31	Connector <Emergency Operation>
TH4	Thermistor <Discharge>	LI, LO	Connection Terminal <L-Phase>	CNDM	Connector <Connection for Option>
TH6	Thermistor <2-Phase Pipe>	NI, NO	Connection Terminal <N-Phase>	CN51	Connector <Connection for Option>
TH7	Thermistor <Ambient>	EI, E2, E3	Connection Terminal <Ground>	SV1/CH	Connector <Connection for Option>
TH8	Thermistor <Heat Sink>	52C	52C Relay	SS	Connector <Connection for Option>
TH34	Thermistor <Comp. Surface>	C.B.	Controller Circuit Board	CNM	Connector <Connection for Option>
LEV-A, LEV-B	Linear Expansion Valve	SW1	Switch <Manual Defrost, Defect History, Record Reset, Refrigerant Address>	LED1, LED2	LED <Operation Inspection Indicators>
ACL	Reactor	SW4	Switch <Test Operation>	F1, F2, F3, F4	Fuse <T6.3A/250V>
CY1, CY2	Capacitor			X51, X52, X54	Relay



*1 MODEL SELECT
The black square (■) indicates a switch position.

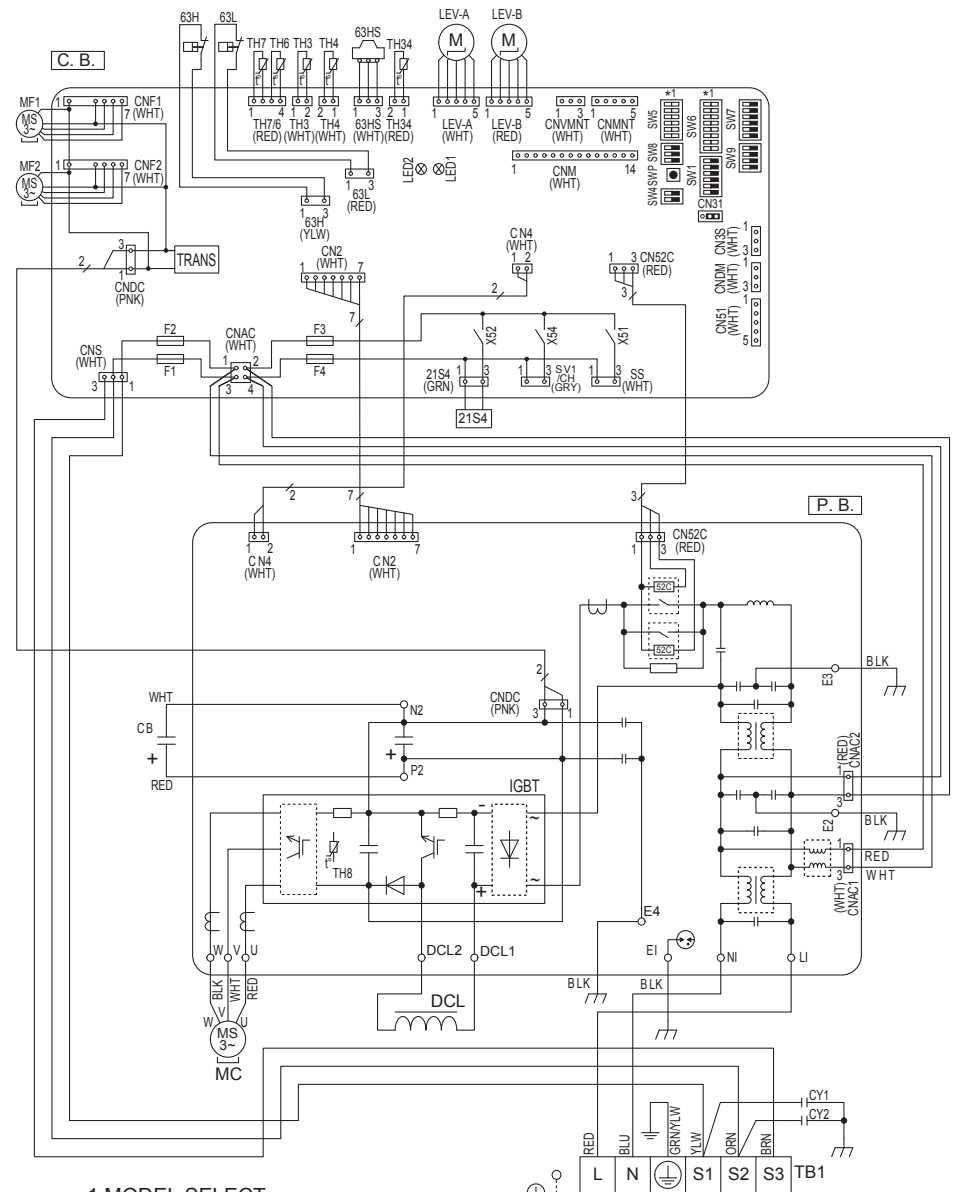
MODEL	SW6	SW5-6 *2																																																						
75V	<table border="1"> <tr> <td>ON</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> </tr> <tr> <td>OFF</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td></td> </tr> </table>	ON	■	■	■	■	■	■	■	■	■	OFF	□	□	□	□	□	□	□	□	□		1	2	3	4	5	6	7	8		<table border="1"> <tr> <td>ON</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> <td>■</td> </tr> <tr> <td>OFF</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> <td>□</td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td></td> </tr> </table>	ON	■	■	■	■	■	■	■	OFF	□	□	□	□	□	□	□		1	2	3	4	5	6	
ON	■	■	■	■	■	■	■	■	■																																															
OFF	□	□	□	□	□	□	□	□	□																																															
	1	2	3	4	5	6	7	8																																																
ON	■	■	■	■	■	■	■																																																	
OFF	□	□	□	□	□	□	□																																																	
	1	2	3	4	5	6																																																		

*2 SW5 -1 to 5 : Function Switch

PUHZ-SW100/120VHA(-BS)

Outdoor unit

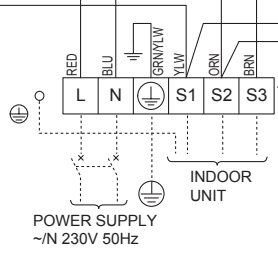
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply, Indoor/Outdoor>	P. B.	Power Circuit Board	SW7	Switch <Function Switch>
MC	Motor for Compressor	U, V, W	Connection Terminal <U/V/W-Phase>	SW8	Switch <Function Switch>
MF1, MF2	Fan Motor	LI	Connection Terminal <L-Phase>	SW9	Switch <Function Switch>
21S4	Solenoid Valve (Four-Way Valve)	NI	Connection Terminal <N-Phase>	SWP	Switch <Pump Down>
63H	High Pressure Switch	P2	Connection Terminal	CN31	Connector <Emergency Operation>
63L	Low Pressure Switch	N2	Connection Terminal	CNDM	Connector <Connection for Option>
63HS	High Pressure Sensor	DCL1, DCL2	Connection Terminal <Reactor>	CN51	Connector <Connection for Option>
TH3	Thermistor <Liquid>	IGBT	Power Module	SV1/CH	Connector <Connection for Option>
TH4	Thermistor <Discharge>	E1, E2, E3, E4	Connection Terminal <Ground>	SS	Connector <Connection for Option>
TH6	Thermistor <2-Phase Pipe>	52C	52C Relay	CNM	Connector <Connection for Option>
TH7	Thermistor <Ambient>	C. B.	Controller Circuit Board	LED1, LED2	LED <Operation Inspection Indicators>
TH8	Thermistor (internal) <Heat Sink>	SW1	Switch <Manual Defrost, Defect History, Record Reset, Refrigerant Address>	F1, F2, F3, F4	Fuse <T6.3AL250V>
TH34	Thermistor <Comp. Surface>	SW4	Switch <Test Operation>	X51, X52, X54	Relay
LEV-A, LEV-B	Linear Expansion Valve	SW5	Switch <Function Switch, Model Select>		
DCL	Reactor	SW6	Switch <Model Select>		
CB	Main Smoothing Capacitor				
CY1, CY2	Capacitor				



*1 MODEL SELECT
The black square (■) indicates a switch position.

MODEL	SW6	SW5-6 *2
100V	ON OFF 1 2 3 4 5 6 7 8	ON OFF 1 2 3 4 5 6
120V	ON OFF 1 2 3 4 5 6 7 8	ON OFF 1 2 3 4 5 6

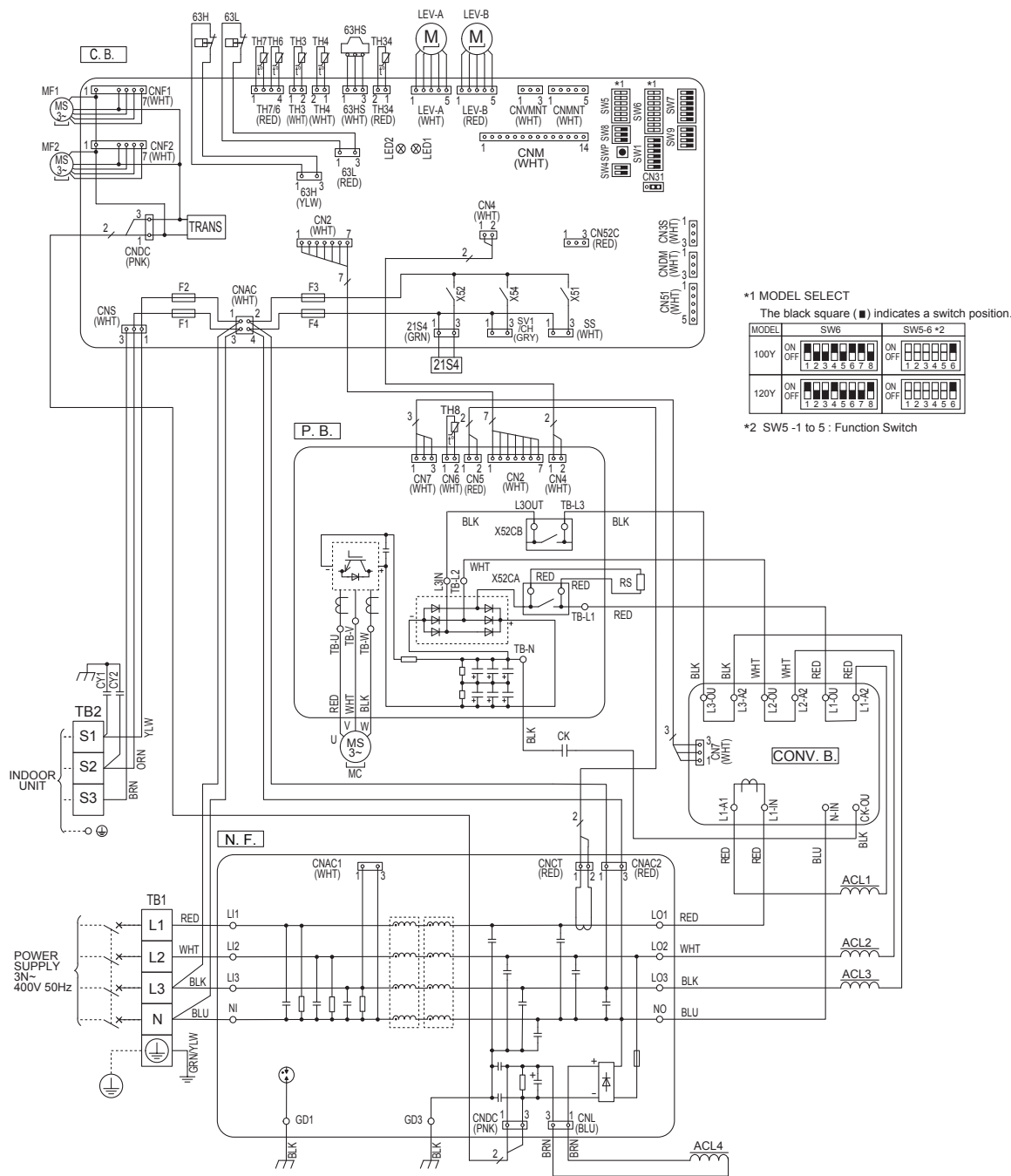
*2 SW5 -1 to 5 : Function Switch



PUHZ-SW100/120YHA(-BS)

Outdoor unit

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply>	P. B.	Power Circuit Board	C. B.	Controller Circuit Board
TB2	Terminal Block <Indoor/Outdoor>	TB-U/V/W	Connection Terminal <U/V/W-Phase>	SW1	Switch <Manual Defrost, Defect History, Record Reset, Refrigerant Address>
MC	Motor for Compressor	TB-L1/L2/L3	Connection Terminal <L1/L2/L3-Power Supply>	SW4	Switch <Test Operation>
MF1, MF2	Fan Motor	TB-N	Connection Terminal	SW5	Switch <Function Switch, Model Select>
21S4	Solenoid Valve (Four-Way Valve)	X52CA/B	52C Relay	SW6	Switch <Model Select>
63H	High Pressure Switch	N. F.	Noise Filter Circuit Board	SW7	Switch <Function Switch>
63L	Low Pressure Switch	L1/L1/L2/L3/NI	Connection Terminal <L1/L2/L3/N-Power Supply>	SW8	Switch <Function Switch>
63HS	High Pressure Sensor	L01/L02/L03/NO	Connection Terminal <L1/L2/L3/N-Power Supply>	SW9	Switch <Function Switch>
TH3	Thermistor <Liquid>	GD1, GD3	Connection Terminal <Ground>	SWP	Switch <Pump Down>
TH4	Thermistor <Discharge>	CONV. B.	Converter Circuit Board	CN31	Connector <Emergency Operation>
TH6	Thermistor <2-Phase Pipe>	L1-A1/IN	Connection Terminal <L1-Power Supply>	CNDM	Connector <Connection for Option>
TH7	Thermistor <Ambient>	L1-A2/OU	Connection Terminal <L1-Power Supply>	CN51	Connector <Connection for Option>
TH8	Thermistor <Heat Sink>	L2-A2/OU	Connection Terminal <L2-Power Supply>	SV1/CH	Connector <Connection for Option>
TH34	Thermistor <Comp. Surface>	L3-A2/OU	Connection Terminal <L3-Power Supply>	SS	Connector <Connection for Option>
LEV-A, LEV-B	Linear Expansion Valve	N-IN	Connection Terminal	CNM	Connector <Connection for Option>
AC1, AC2, AC3, AC4	Reactor	CK-OU	Connection Terminal	LED1, LED2	LED <Operation Inspection Indicators>
CY1, CY2	Capacitor			F1, F2, F3, F4	FUSE <T6.3AL 250V>
CK	Capacitor			X51, X52, X54	Relay
RS	Rush Current Protect Resistor				



***1 MODEL SELECT**
The black square (■) indicates a switch position.

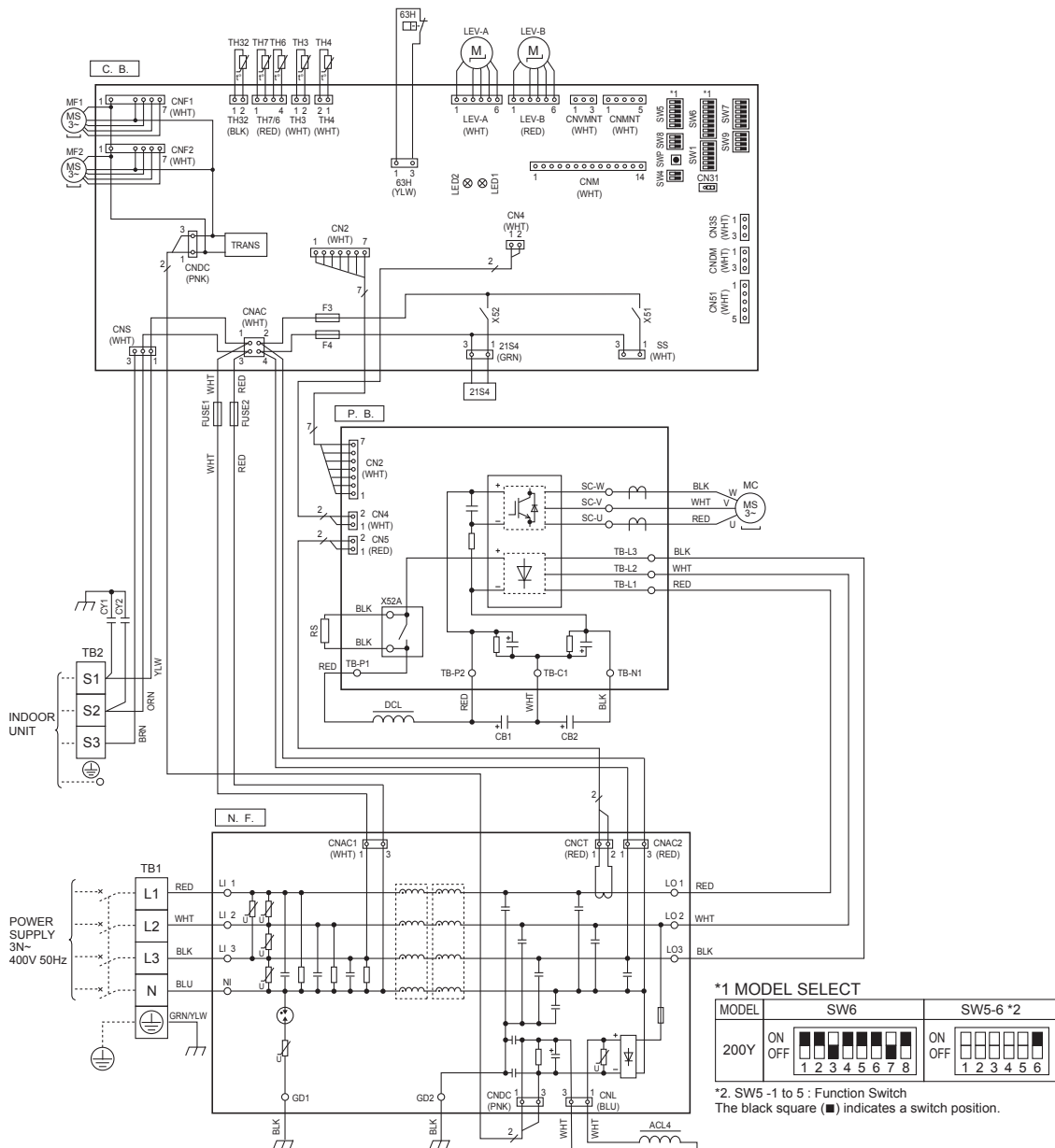
MODEL	SW6	SW5-6 *2
100Y	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4 5 6 7 8	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4 5 6
120Y	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4 5 6 7 8	ON OFF ■ ■ ■ ■ ■ ■ ■ ■ 1 2 3 4 5 6

***2 SW5-1 to 5 : Function Switch**

PUHZ-RP200YKA

Outdoor unit

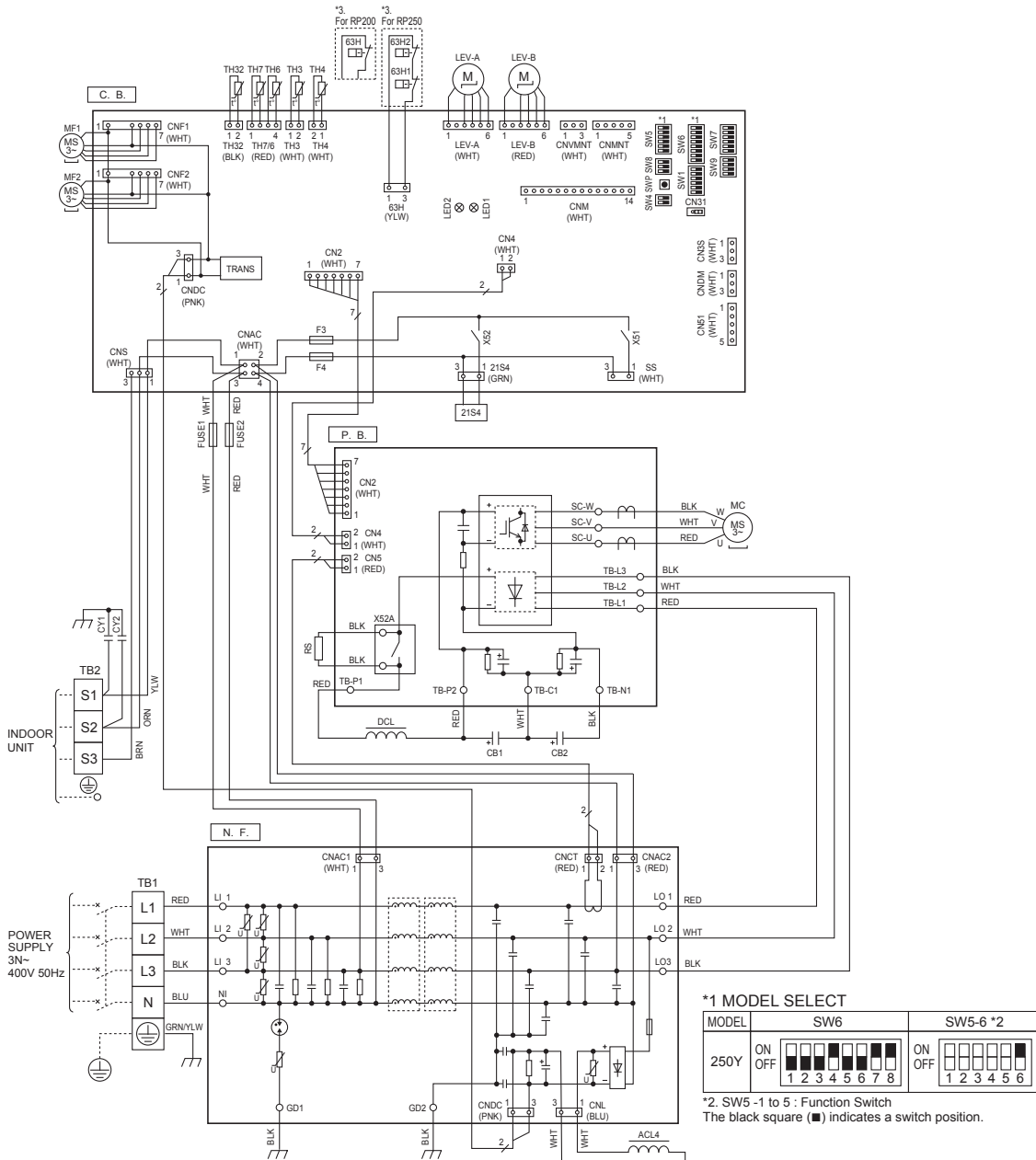
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block<Power Supply>	P.B.	Power Circuit Board	SW7	Switch<Function Setup>
TB2	Terminal Block<Indoor/Outdoor>	SC-U/V/W	Connection Terminal<U/V/W-Phase>	SW8	Switch<Function Setup>
MC	Motor for Compressor	TB-L1/L2/L3	Connection Terminal<L1/L2/L3-Power supply>	SW9	Switch
MF1,MF2	Fan Motor	TB-P1	Connection Terminal	SWP	Switch<Pump Down>
21S4	Solenoid Valve (Four-Way Valve)	TB-P2	Connection Terminal	CN31	Connector<Emergency Operation>
63H	High Pressure Switch	TB-C1	Connection Terminal	LED1,LED2	LED<Operation Inspection Indicators>
TH3	Thermistor<Outdoor Pipe>	TB-N1	Connection Terminal	F3,F4	Fuse< T6.3AL250V>
TH4	Thermistor<Discharge>	X52A	52C Relay	SS	Connector<Connection for Option>
TH6	Thermistor<Outdoor 2-Phase Pipe>	N.F.	Noise Filter Circuit Board	CNM	Connector<A-Control Service Inspection Kit>
TH7	Thermistor<Outdoor>	LU1/L2/L3/N1	Connection Terminal<L1/L2/L3/N1-Power supply>	CNDM	Connector
TH32	Thermistor<Shell>	LO1/LO2/LO3	Connection Terminal<L1/L2/L3-Power supply>	CN3S	Connector<Connection for Option>
LEV-A,LEV-B	Electronic Expansion Valve	GD1,GD2	Connection Terminal<Ground>	CN51	Connector<Connection for Option>
ACL4	Reactor	C.B.	Controller Circuit Board	X51,X52	Relay
DCL	Reactor	SW1	Switch<Forced Defrost, Defect History Record Reset, Refrigerant Address>		
CB1,CB2	Main Smoothing Capacitor	SW4	Switch<Test Operation>		
RS	Rush Current Protect Resistor	SW5	Switch<Function Switch>		
FUSE1, FUSE2	Fuse<T15AL250V>	SW6	Switch<Model Select>		
CY1,CY2	Capacitor				



PUHZ-RP250YKA

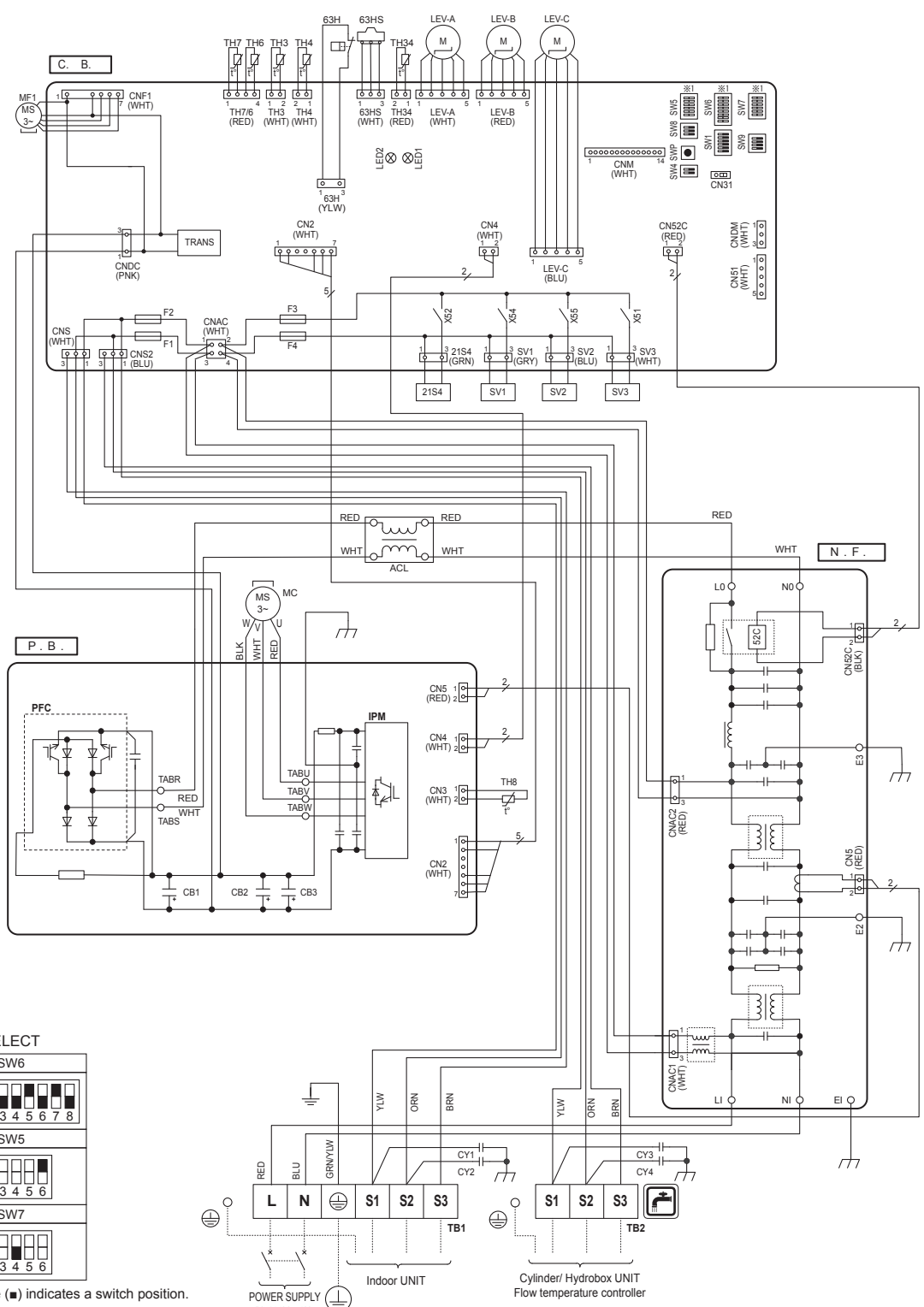
Outdoor unit

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block<Power Supply>	P.B.	Power Circuit Board	SW7	Switch<Function Setup>
TB2	Terminal Block<Indoor/Outdoor>	SC-U/V/W	Connection Terminal<U/V/W-Phase>	SW8	Switch<Function Setup>
MC	Motor for Compressor	TB-L1/L2/L3	Connection Terminal<L1/L2/L3-Power supply>	SW9	Switch
MF1,MF2	Fan Motor	TB-P1	Connection Terminal	SWP	Switch<Pump Down>
21S4	Solenoid Valve (Four-Way Valve)	TB-P2	Connection Terminal	CN31	Connector<Emergency Operation>
63H,63H1,63H2	High Pressure Switch	TB-C1	Connection Terminal	LED1,LED2	LED<Operation Inspection Indicators>
TH3	Thermistor<Outdoor Pipe>	TB-N1	Connection Terminal	F3,F4	Fuse< T6,3AL250V>
TH4	Thermistor<Discharge>	X52A	52C Relay	SS	Connector<Connection for Option>
TH6	Thermistor<Outdoor 2-Phase Pipe>	N.F.	Noise Filter Circuit Board	CNM	Connector<A-Control Service Inspection Kit>
TH7	Thermistor<Outdoor>	L1/L2/L3/NI	Connection Terminal<L1/L2/L3/NI-Power supply>	CNDM	Connector
TH32	Thermistor<Shell>	LO1/ LO2/LO3	Connection Terminal<L1/L2/L3-Power supply>		< Connection for Option (Contact Input)>
LEV-A,LEV-B	Electronic Expansion Valve	GD1,GD2	Connection Terminal<Ground>	CN3S	Connector<Connection for Option>
ACL4	Reactor	C.B.	Controller Circuit Board	CN51	Connector<Connection for Option>
DCL	Reactor	SW1	Switch<Forced Defrost, Defect History Record Reset, Refrigerant Address>	X51,X52	Relay
CB1,CB2	Main Smoothing Capacitor	SW4	Switch<Test Operation>		
RS	Rush Current Protect Resistor	SW5	Switch<Function Switch>		
FUSE1,FUSE2	Fuse<T15AL250V>	SW6	Switch<Model Select>		
CY1,CY2	Capacitor				

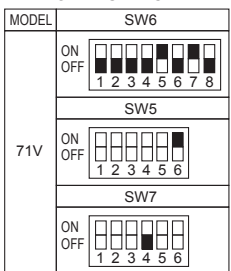


PUHZ-FRP71VHA

Outdoor unit



※1 MODEL SELECT

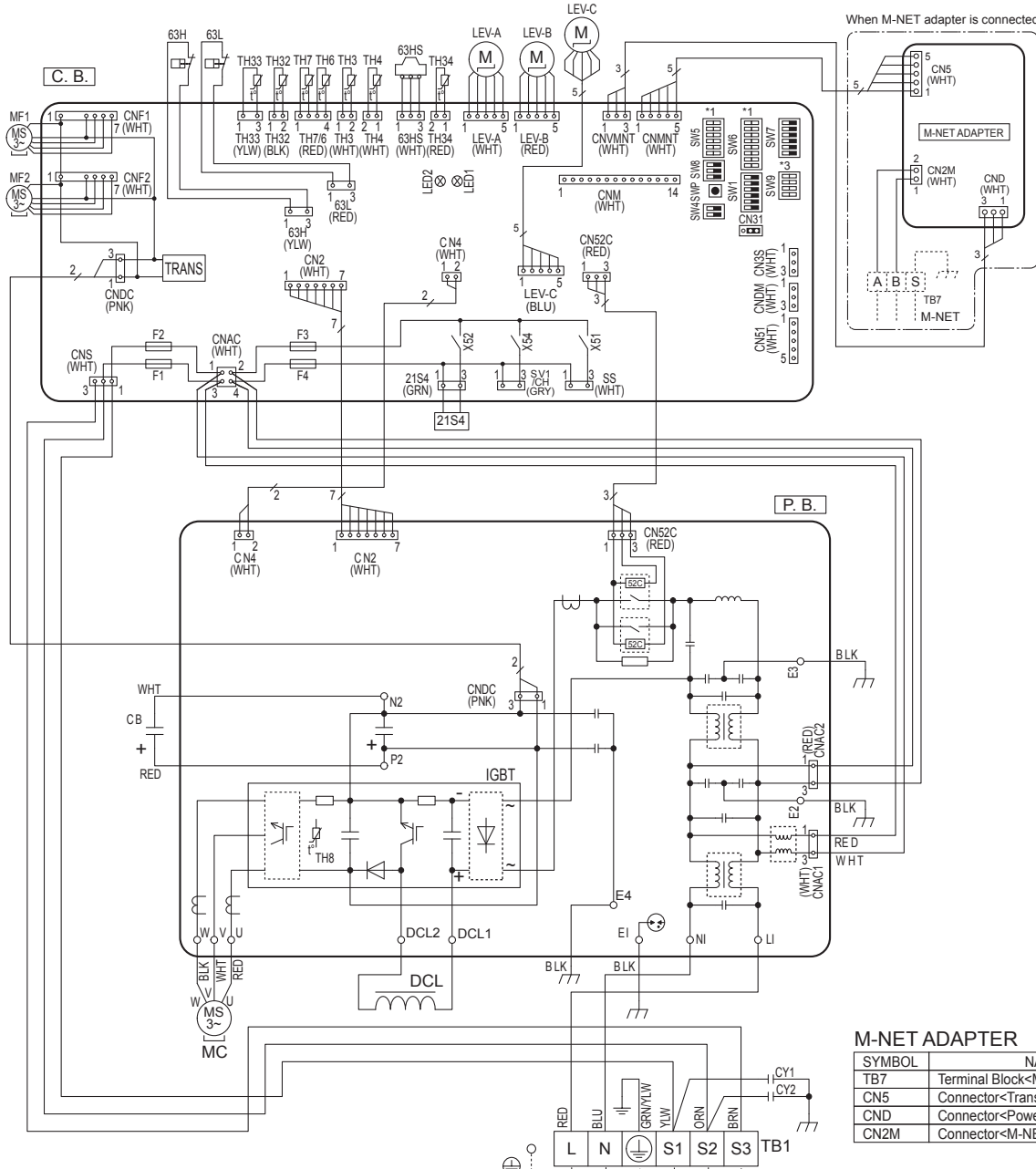


The black square (■) indicates a switch position.

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block<Power Supply, Indoor/Outdoor>	P.B.	Power Circuit Board	SW7	Switch<Function Switch, Model Select>
TB2	Terminal Block<Cylinder/HydroboxUNIT/Outdoor>	TABR/S	Connection Terminal<L/N-Phase>	SW8	Switch<Function Switch>
MC	Motor for Compressor	TABU/V/W	Connection Terminal<U/V/W-Phase>	SW9	Switch<Function Switch>
MF1	Fan Motor	IPM	Power Module	LED1,LED2	LED <Operation Inspection Indicators>
21S4	Solenoid Valve (Four-Way Valve)	PFC	Converter	F1~4	Fuse<T6.3AL250V>
SV1~3	Solenoid Valve	CB1~CB3	Main Smoothing Capacitor	SWP	Switch<Pump Down>
63H	High Pressure Switch	N.F.	Noise Filter Circuit Board	CN31	Connector<Emergency Operation>
63HS	High Pressure Sensor	L/LI/LO	Connection Terminal<L-Phase>	CN51	Connector<Connection for Option>
TH3	Thermistor<Outdoor Pipe>	NI/NO	Connection Terminal<N-Phase>	CNM	Connector<A-Control Service Inspection Kit>
TH4	Thermistor<Discharge>	EI,E2,E3	Connection Terminal<Ground>	CNDM	Connector < Connected for Option (Contact Input)>
TH6	Thermistor<Outdoor 2-Phase Pipe>	52C	52C Relay	X51,X52,X54,X55	Relay
TH7	Thermistor<Outdoor>	C.B.	Controller Circuit Board		
TH8	Thermistor<Heat Sink>	SW1	Switch<Forced Defrost, Defect History Record Reset, Refrigerant Address>		
TH34	Thermistor<Comp. Surface>	SW4	Switch<Test Operation>		
LEV-A,LEV-B,LEV-C	Linear Expansion Valve	SW5	Switch<Function Switch, Model Select>		
ACL	Reactor	SW6	Switch<Model Select>		
CY1~4	Capacitor				

PUHZ-SHW80/112VHA

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block<Power Supply, Indoor/Outdoor>	DCL	Reactor	SW4	Switch<Test Operation>
MC	Motor for Compressor	CB	Main Smoothing Capacitor	SW5	Switch<Function Switch, Model Select>
MF1, MF2	Fan Motor	CY1, CY2	Capacitor	SW6	Switch<Model Select>
21S4	Solenoid Valve (Four-Way Valve)	P. B.	Power Circuit Board	SW7	Switch<Function Switch>
63H	High Pressure Switch	U, V, W	Connection Terminal<U/V/W-Phase>	SW8	Switch<Function Switch>
63L	Low Pressure Switch	LI	Connection Terminal<L-Phase>	SW9	Switch<Function Switch>
63HS	High Pressure Sensor	NI	Connection Terminal<N-Phase>	SWP	Switch<Pump Down>
TH3	Thermistor<Liquid>	P2	Connection Terminal	CN31	Connector<Emergency Operation>
TH4	Thermistor<Discharge>	N2	Connection Terminal	CNDM	Connector<Connection for Option>
TH6	Thermistor<2-Phase Pipe>	DCL1, DCL2	Connection Terminal<Reactor>	CN51	Connector<Connection for Option>
TH7	Thermistor<Ambient>	IGBT	Power Module	SV1/CH	Connector<Connection for Option>
TH8	Thermistor (internal) <Heat Sink>	E1, E2, E3, E4	Connection Terminal<Ground>	SS	Connector<Connection for Option>
TH32	Thermistor<Suction>	52C	52C Relay	CNM	Connector<Connection for Option>
TH33	Thermistor<Ref. check>	C. B.	Controller Circuit Board	LED1, LED2	LED<Operation Inspection Indicators>
TH34	Thermistor<Comp. Surface>	SW1	Switch<Manual Defrost, Defect History, Record Reset, Refrigerant Address>	F1, F2, F3, F4	Fuse<T6.3AL250V>
LEV-A, LEV-B, LEV-C	Linear Expansion Valve			X51, X52, X54	Relay



M-NET ADAPTER

SYMBOL	NAME
TB7	Terminal Block<M-NET connection>
CN5	Connector<Transmission>
CND	Connector<Power Supply>
CN2M	Connector<M-NET communication>

*3 Ambient temp. of ZUBADAN Flash Injection becomes effective. The black square (■) indicates a switch position.

Ambient temp.	SW9-3,4 *4	Ambient temp.	SW9-3,4 *4
3°C or less (Initial setting)	ON OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 2 3 4	-3°C or less	ON OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 2 3 4
0°C or less	ON OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 2 3 4	-6°C or less	ON OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 2 3 4

*4 SW9-1 to 2 : Function Switch

*1 MODEL SELECT The black square (■) indicates a switch position.

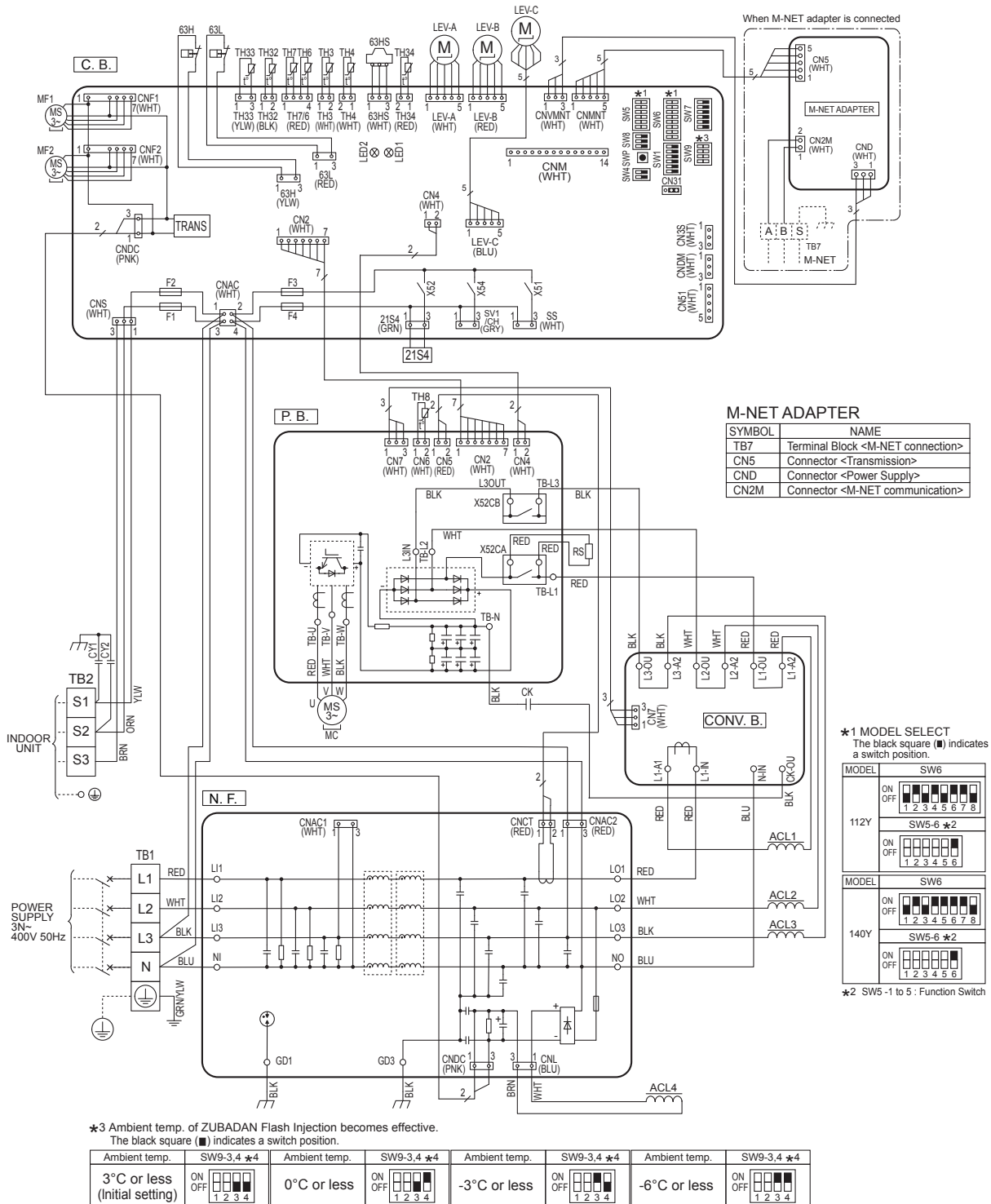
MODEL	SW6	SW5-6 *2
80V	ON OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 2 3 4 5 6 7 8	ON OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 2 3 4 5 6
112V	ON OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 2 3 4 5 6 7 8	ON OFF <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 1 2 3 4 5 6

*2 SW5 -1 to 5 : Function Switch

PUHZ-SHW112/140YHA

Outdoor unit

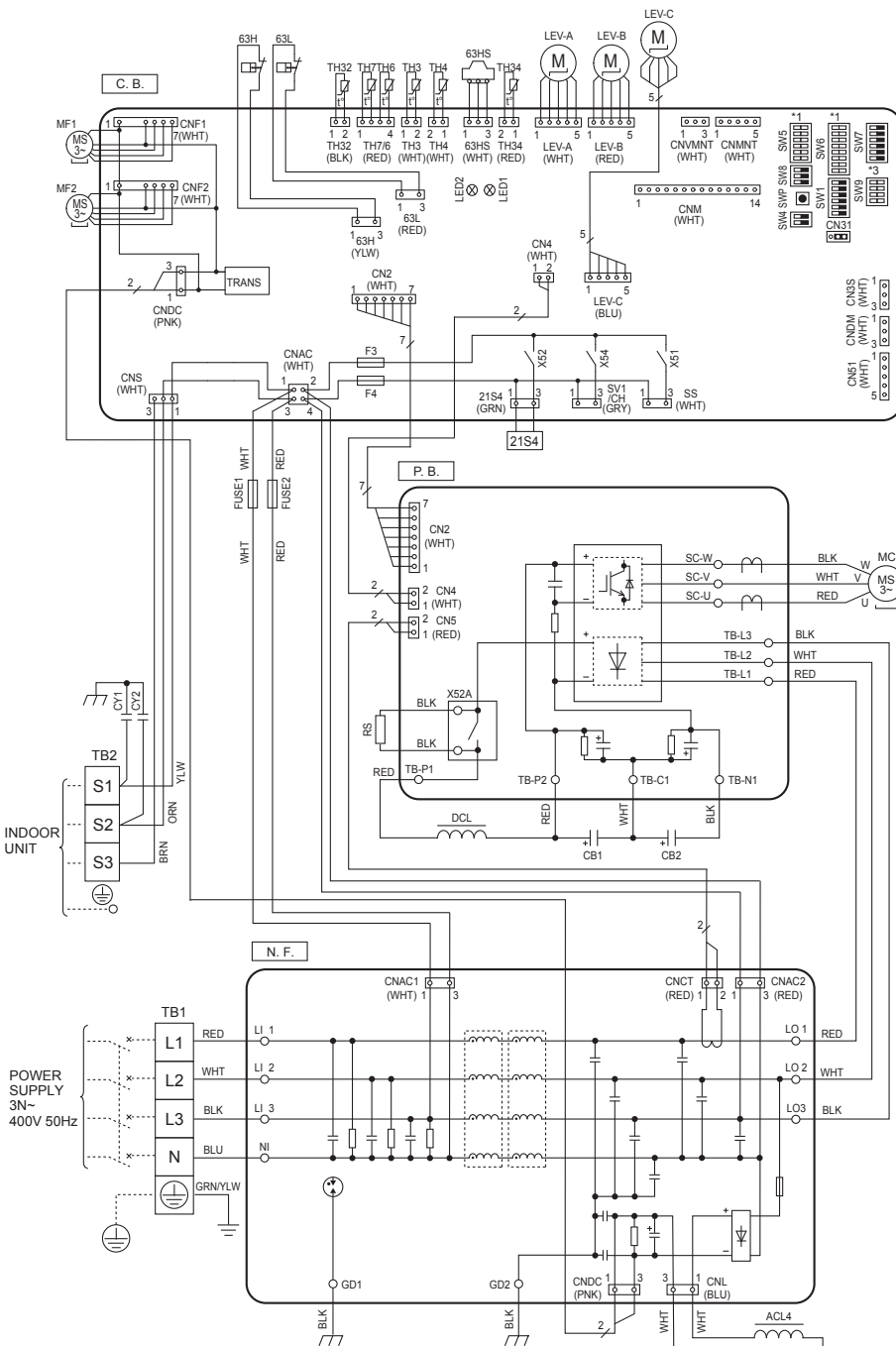
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply>	CK	Capacitor	C. B.	Controller Circuit Board
TB2	Terminal Block <Indoor/Outdoor>	RS	Rush Current Protect Resistor	SW1	Switch <Manual Defrost, Defect History, Record Reset, Refrigerant Address>
MC	Motor for Compressor	P. B.	Power Circuit Board <L1/L2/L3-Power Supply>	SW4	Switch <Test Operation>
MF1, MF2	Fan Motor	TB-U/V/W	Connection Terminal <U/V/W-Phase>	SW5	Switch <Function Switch, Model Select>
21S4	Solenoid Valve (Four-Way Valve)	TB-L1/L2/L3	Connection Terminal	SW6	Switch <Model Select>
63H	High Pressure Switch	TB-N	Connection Terminal	SW7	Switch <Function Switch>
63L	Low Pressure Switch	X52CA/B	52C Relay	SW8	Switch <Function Switch>
63HS	High Pressure Sensor	N. F.	Noise Filter Circuit Board	SW9	Switch <Function Switch>
TH3	Thermistor <Liquid>	LI1, LI2, LI3, NI	Connection Terminal <L1/L2/L3/N-Power Supply>	SWP	Switch <Pump Down>
TH4	Thermistor <Discharge>	LO1, LO2, LO3, NO	Connection Terminal <L1/L2/L3/N-Power Supply>	CN31	Connector <Emergency Operation>
TH6	Thermistor <2-Phase Pipe>	GD1, GD3	Connection Terminal <Ground>	CNDM	Connector <Connection for Option>
TH7	Thermistor <Ambient>	CONV. B.	Converter Circuit Board	CN51	Connector <Connection for Option>
TH8	Thermistor <Heat Sink>	L1-A1/IN	Connection Terminal <L1-Power Supply>	SV1/CH	Connector <Connection for Option>
TH32	Thermistor <Suction>	L1-A2/OU	Connection Terminal <L1-Power Supply>	SS	Connector <Connection for Option>
TH33	Thermistor <Ref. check>	L2-A2/OU	Connection Terminal <L2-Power Supply>	CNM	Connector <Connection for Option>
TH34	Thermistor <Comp. Surface>	L3-A2/OU	Connection Terminal <L3-Power Supply>	LED1, LED2	LED <Operation Inspection Indicators>
LEV-A, LEV-B, LEV-C	Linear Expansion Valve	N-IN	Connection Terminal	F1, F2, F3, F4	FUSE <T6.3AL250V>
ACL1, ACL2, ACL3, ACL4	Reactor	CK-OU	Connection Terminal	X51, X52, X54	Relay
CY1, CY2	Capacitor				



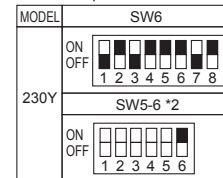
PUHZ-SHW230YKA

Outdoor unit

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block<Power Supply>	FUSE1, FUSE2	Fuse<T15AL250V>	SW6	Switch<Model Select>
TB2	Terminal Block<Indoor/Outdoor>	CY1, CY2	Capacitor	SW7	Switch<Function Switch>
MC	Motor for Compressor	P. B.	Power Circuit Board	SW8	Switch<Function Switch>
MF1, MF2	Fan Motor	SC-U/V/W	Connection Terminal<U/V/W-Phase>	SW9	Switch<Function Switch>
Z1S4	Solenoid Valve (Four-Way Valve)	TB-L1/L2/L3	Connection Terminal<L1/L2/L3-Power supply>	SWP	Switch<Pump Down>
63H	High Pressure Switch	TB-P1	Connection Terminal	CN31	Connector<Emergency Operation>
63L	Low Pressure Switch	TB-P2	Connection Terminal	LED1, LED2	LED<Operation Inspection Indicators>
63HS	High Pressure Sensor	TB-C1	Connection Terminal	F3, F4	Fuse<T6.3AL250V>
TH3	Thermistor<Liquid>	TB-N1	Connection Terminal	SV1	Connector<Connection for Option>
TH4	Thermistor<Discharge>	X52A	52C Relay	SS	Connector<Connection for Option>
TH6	Thermistor<2-Phase Pipe>	N. F.	Noise Filter Circuit Board	CNM	Connector<Connection for Option>
TH7	Thermistor<Ambient>	L1/L1/L2/L3/N1	Connection Terminal<L1/L2/L3/N1-Power supply>	CNMNT	Connector<Connection for Option>
TH32	Thermistor<Suction>	L01/L02/L03	Connection Terminal<L1/L2/L3-Power supply>	CNVMNT	Connector<Connection for Option>
TH34	Thermistor<Comp. Surface>	GD1, GD2	Connection Terminal<Ground>	CNDM	Connector<Connection for Option>
LEV-A, LEV-B, LEV-C	Electronic Expansion Valve	C. B.	Controller Circuit Board	CN3S	Connector<Connection for Option>
ACL4	Reactor	SW1	Switch<Forced Defrost, Defect History Record Reset, Refrigerant Address>	CN51	Connector<Connection for Option>
DCL	Reactor	SW4	Switch<Test Operation>	X51, X52, X54	Relay
CB1, CB2	Main Smoothing Capacitor	SW5	Switch<Function Switch, Model Select>		
RS	Rush Current Protect Resistor				



*1 MODEL SELECT
The black square (■) indicates a switch position.



*2 SW5-1 to 5 : Function Switch.

*3 Ambient temp. of ZUBADAN Flash Injection becomes effective.
The black square (■) indicates a switch position.

Ambient temp.	SW9-3.4 *4	Ambient temp.	SW9-3.4 *4	Ambient temp.	SW9-3.4 *4	Ambient temp.	SW9-3.4 *4
3°C or less (Initial setting)	ON OFF ■ ■ ■ ■ 1 2 3 4	0°C or less	ON OFF ■ ■ ■ ■ 1 2 3 4	-3°C or less	ON OFF ■ ■ ■ ■ 1 2 3 4	-6°C or less	ON OFF ■ ■ ■ ■ 1 2 3 4

*4 SW9-1 to 2 : Function Switch

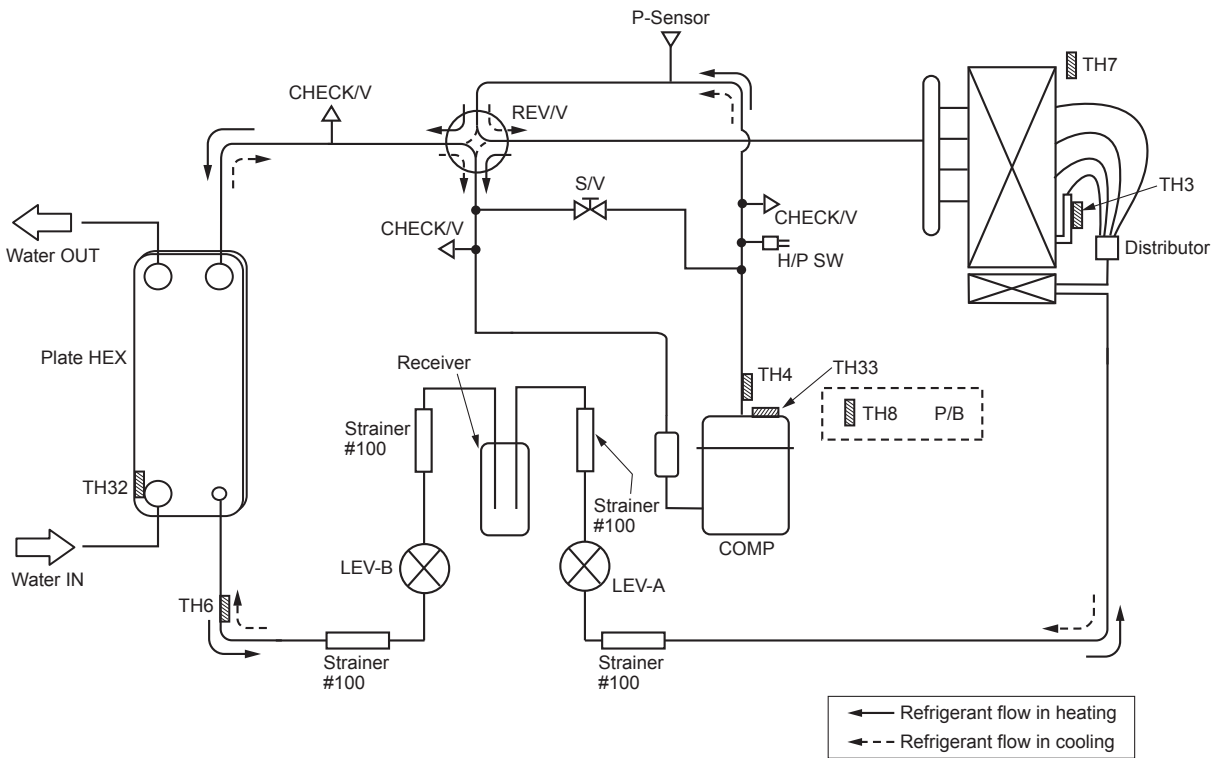
Refer to the following table to find out the meanings of the symbols in the refrigerant circuit diagram.

Symbol	Part name	Detail
COMP	Compressor	DC inverter twin rotary compressor : W50/85, SW40/50/75, FRP71 DC inverter scroll compressor : HW112/140 (Mitsubishi Electric Corporation) RP200/250, SW100/120 SHW80/112/140/230
H/P SW	High pressure switch (63H)	For protection (OFF: 4.15MPa)
H/P SW ②	High pressure switch (63H2)	For protection (OFF: 3.6MPa)
L/P SW	Low pressure switch (63L)	For protection (OFF: -0.03MPa)
Plate HEX	Plate Heat Exchanger	MWA1-28LM (MITSUBISHI) : (PUHZ-W50VHA) MWA1-44LM (MITSUBISHI) : (PUHZ-W85VHA2) MWA2-46LM (MITSUBISHI) : (PUHZ-HW·HA2)
REV/V	Reversing (4-way) valve (21S4)	Change the refrigerant circuit (Heating / Cooling) and for Defrosting
S/V	Solenoid valve	For production test use
		SN1~3 Changing the refrigerant circuit (PUHZ-FRP)
STOP VALVE	Stop valve	For refrigerant charge
CHECK/V	Check valve	High pressure / Low pressure / For production test use
P-Sensor	Pressure sensor (63HS)	For calculation of the condensing temperature from high pressure
P/B	Power board	Inverter power board
LEV-A	Linear expansion valve -A	Heating: Secondary LEV Cooling: Primary LEV
		Change the refrigerant circuit (PUHZ-FRP)
LEV-B	Linear expansion valve -B	Heating: Primary LEV Cooling: Secondary LEV
		Change the refrigerant circuit (PUHZ-FRP)
LEV-C	Linear expansion valve -C	For HIC (PUHZ-HW·HA2, SHW·HA/KA)
		Change the refrigerant circuit (PUHZ-FRP)
TH34	Comp. surface temperature thermistor	For compressor protection (PUHZ-HW·HA2, SW·HA, SHW·HA/KA, FRP·VHA)
TH33	Comp. surface temperature thermistor	For compressor protection (PUHZ-W·HA(2))
	Suction temperature thermistor	For LEV control (PUHZ-HW·HA2)
	Ref. check temperature thermistor	For refrigerant leak check (PUHZ-SHW·HA)
TH32	Comp. surface temperature thermistor	For compressor protection (PUHZ-RP·KA)
	Suction temperature thermistor	For LEV control (PUHZ-SHW·HA/KA)
	Inlet water temperature thermistor	For freeze protection and for compressor frequency control (PUHZ-W·HA(2))
TH3	Liquid temperature thermistor	Heating: Evaporating temperature Cooling: Sub cool liquid temperature
TH4	Discharge temperature thermistor	For LEV control and for compressor protection
TH6	Plate HEX liquid temperature thermistor	Heating: Sub cool liquid temperature Cooling: Evaporating temperature
	Outdoor HEX temperature (PUHZ-FRP)	—
TH7	Ambient temperature thermistor	For fan control and for compressor frequency control
TH8	Heatsink temperature thermistor	For power board protection
Receiver	Receiver	For accumulation of refrigerant
Power Receiver	Power Receiver	For accumulation of refrigerant
HIC	Heat interchange circuit	For high capacity
Accumulator	Accumulator	For accumulation of refrigerant

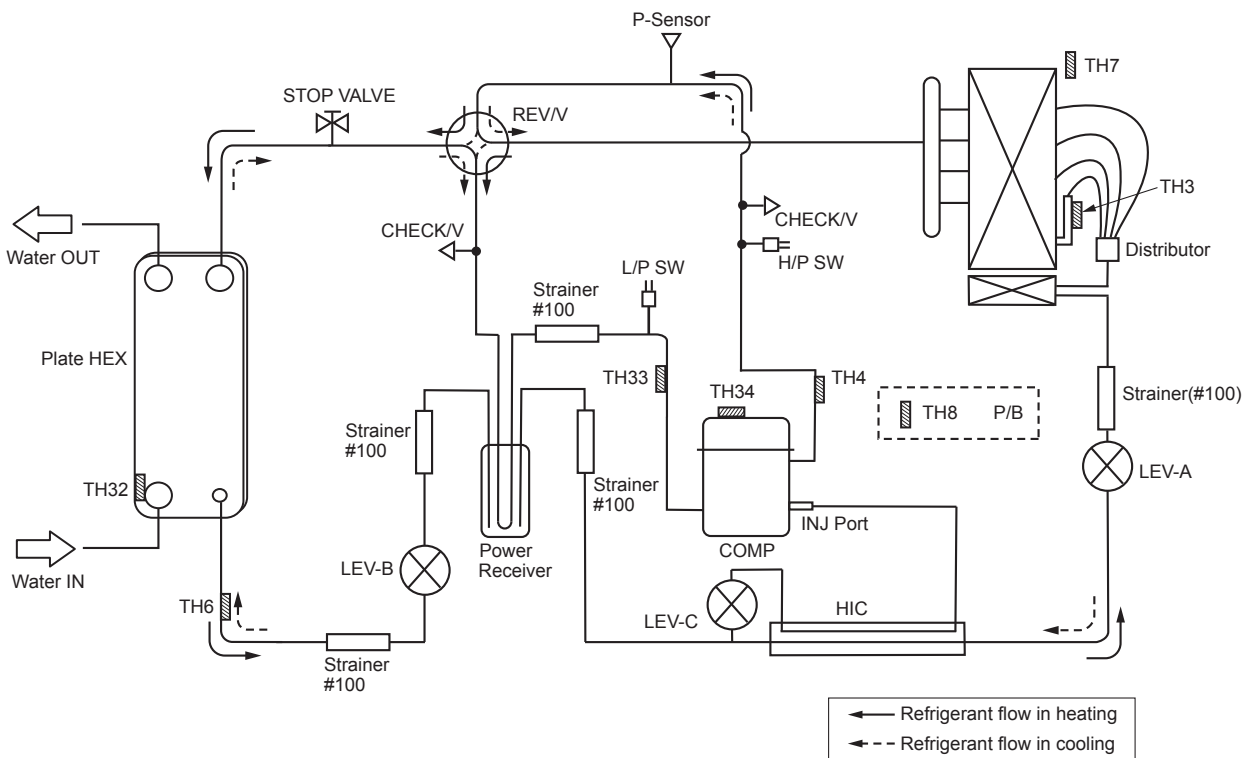
Outdoor unit

4.1 Packaged-type units

■ PUAZ-W50VHA(-BS) PUAZ-W85VHA2(-BS)



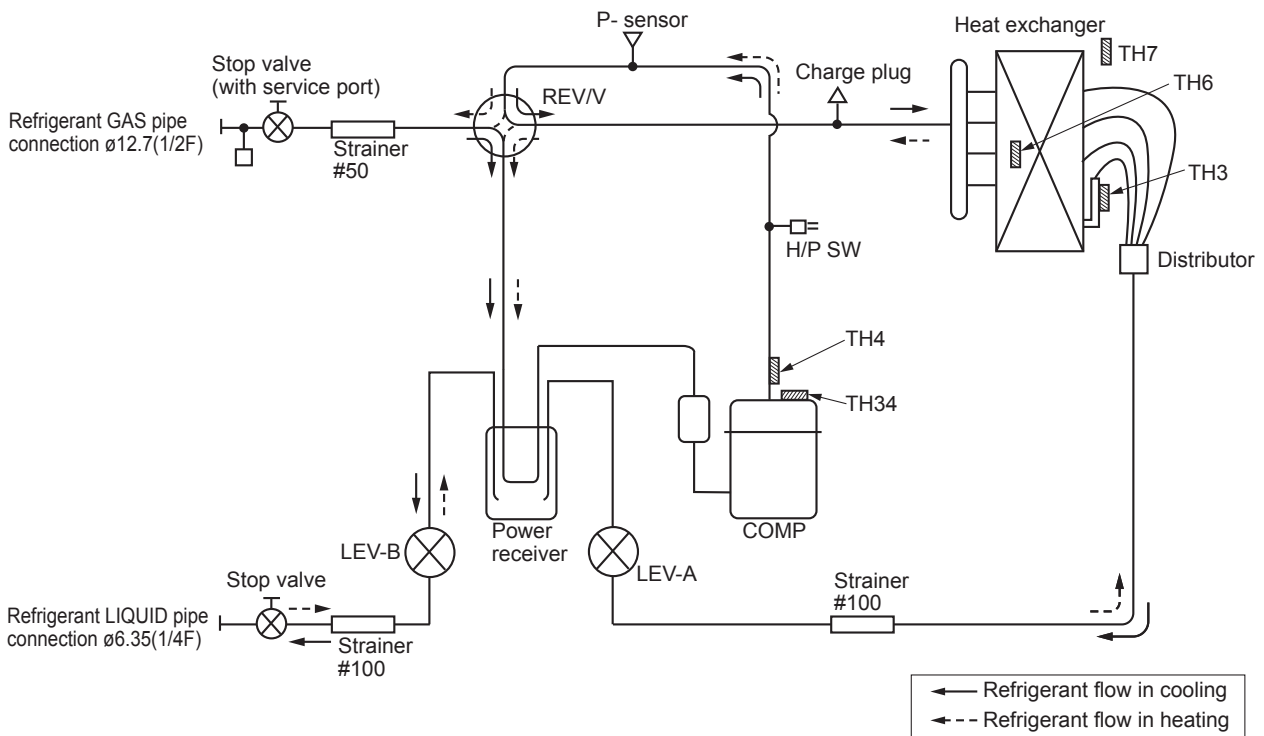
■ PUAZ-HW112YHA2(-BS) PUAZ-HW140V/YHA2(-BS)



4.2 Split-type units

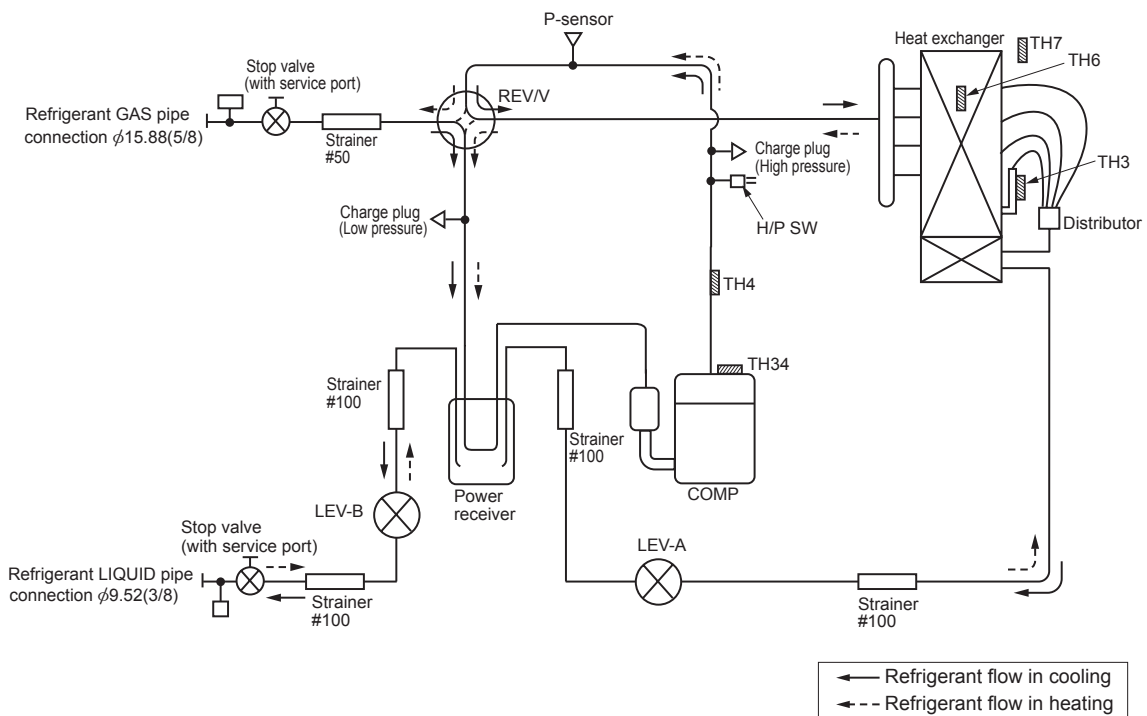
■ PUAZ-SW40VHA(-BS) PUAZ-SW50VHA(-BS)

Unit : mm (inch)



■ PUAZ-SW75VHA(-BS)

Unit : mm (inch)



Outdoor unit

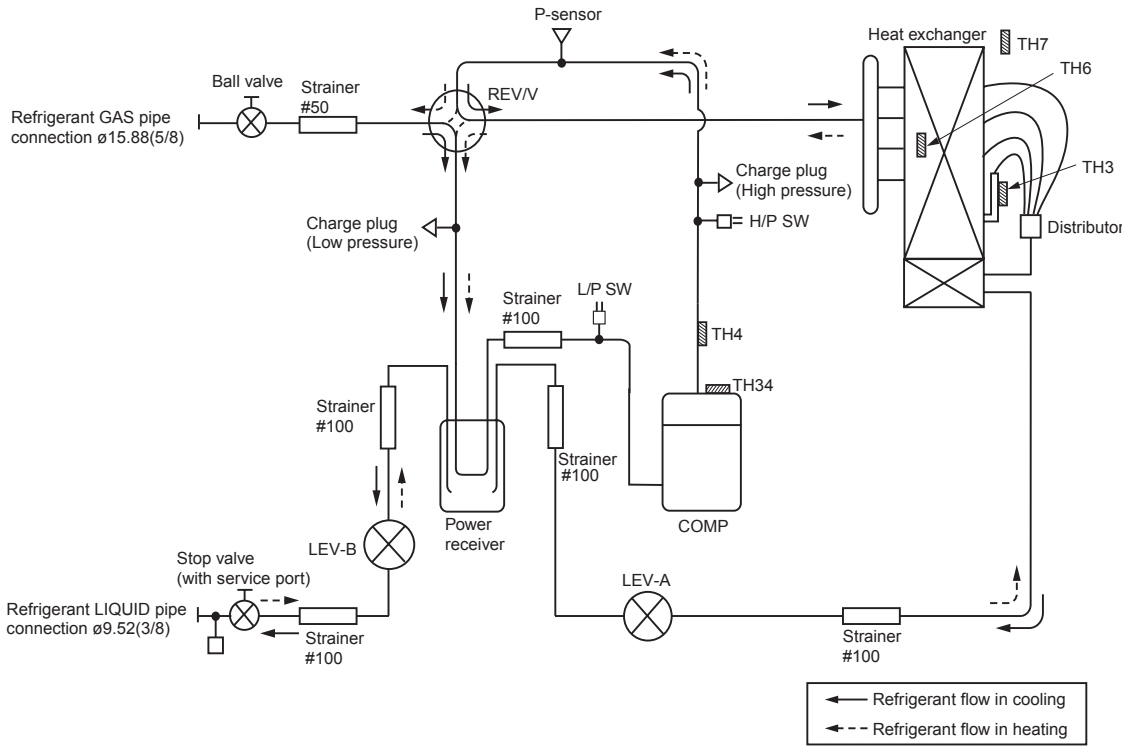
4 Refrigerant system diagrams

Outdoor unit

Outdoor unit

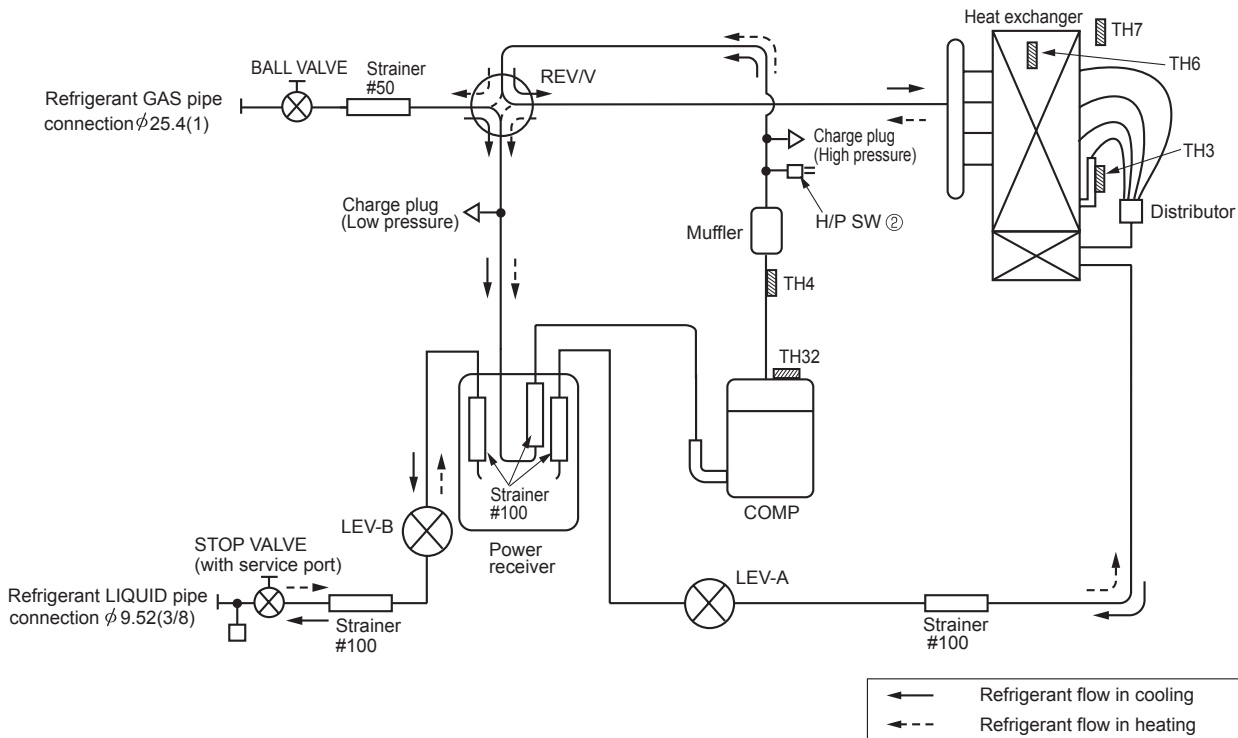
- PUAZ-SW100VHA(-BS) PUAZ-SW100YHA(-BS)
- PUAZ-SW120VHA(-BS) PUAZ-SW120YHA(-BS)

Unit : mm (inch)



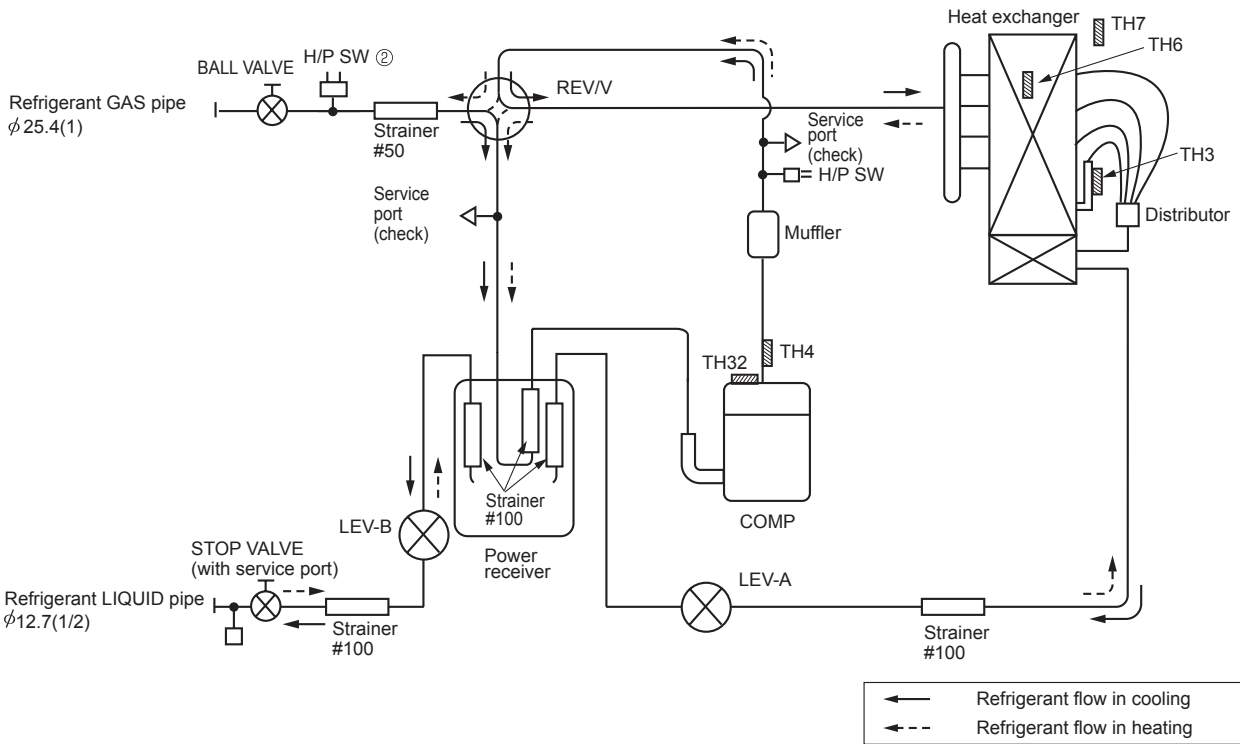
■ PUAZ-RP200YKA

Unit : mm (inch)

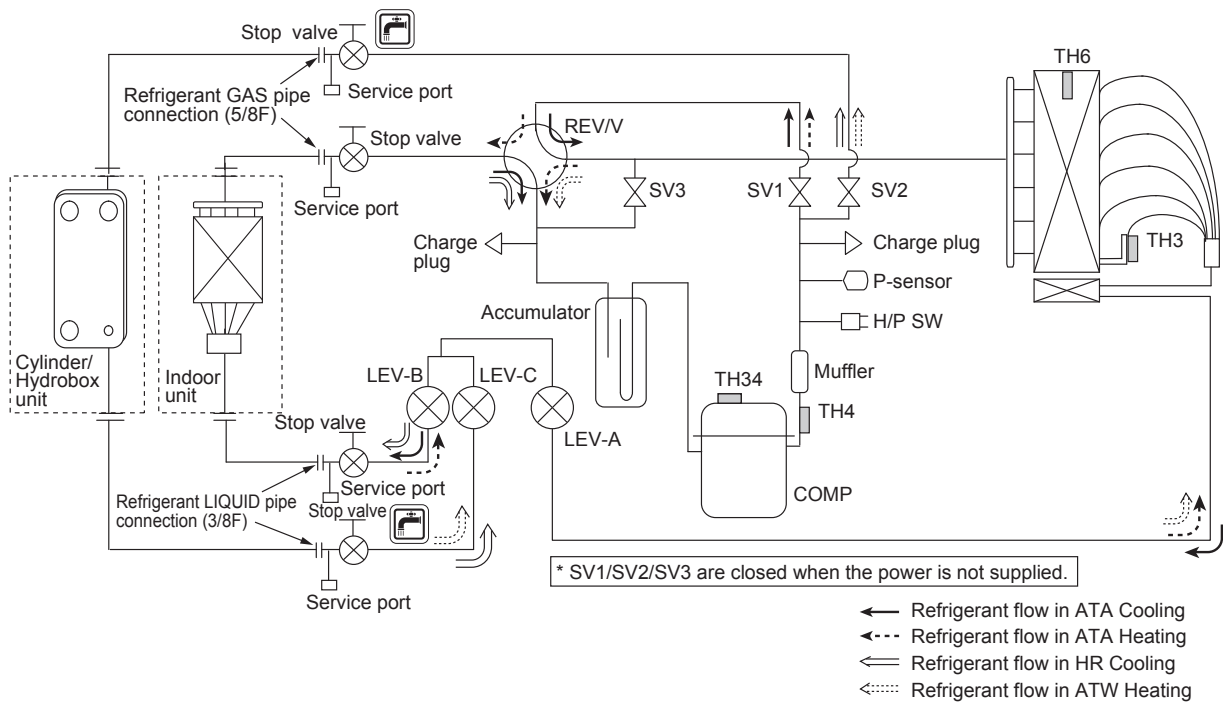


■ PUAZ-RP250YKA

Unit : mm (inch)



■ PUAZ-FRP71VHA



Outdoor unit

4 Refrigerant system diagrams

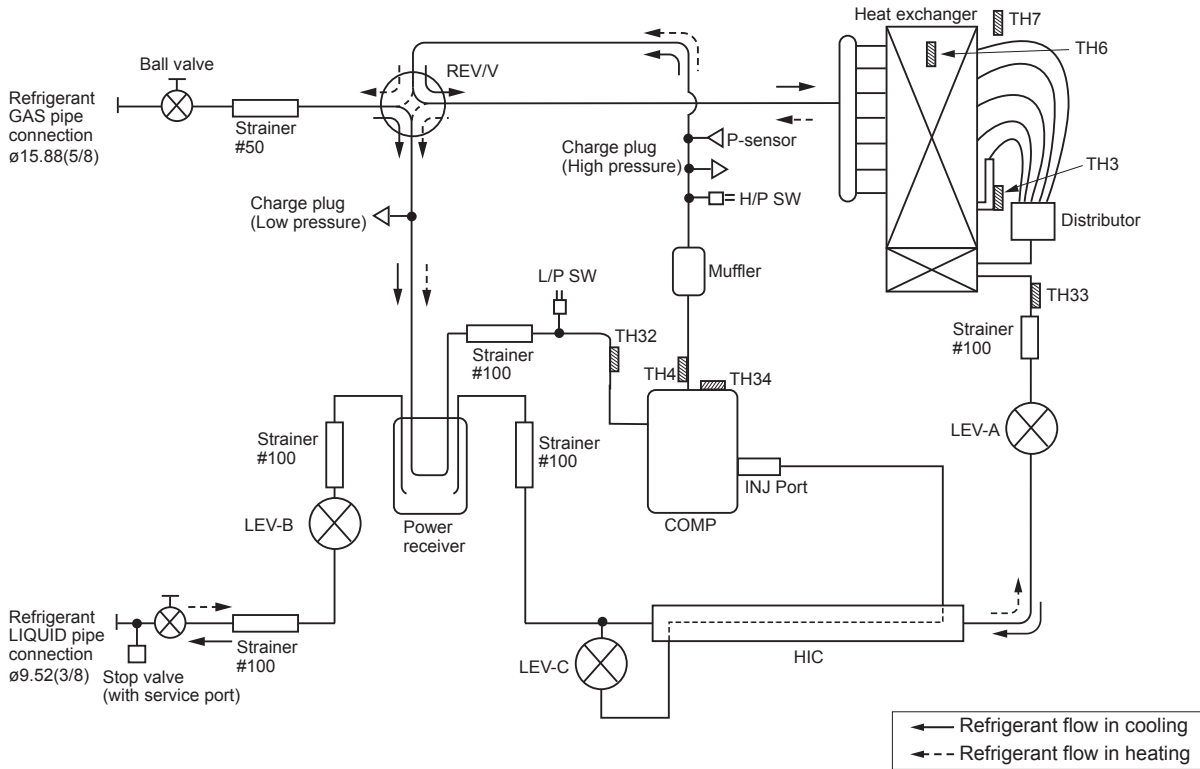
Outdoor unit

Outdoor unit

■ PUAZ-SHW80VHA
PUAZ-SHW112YHA

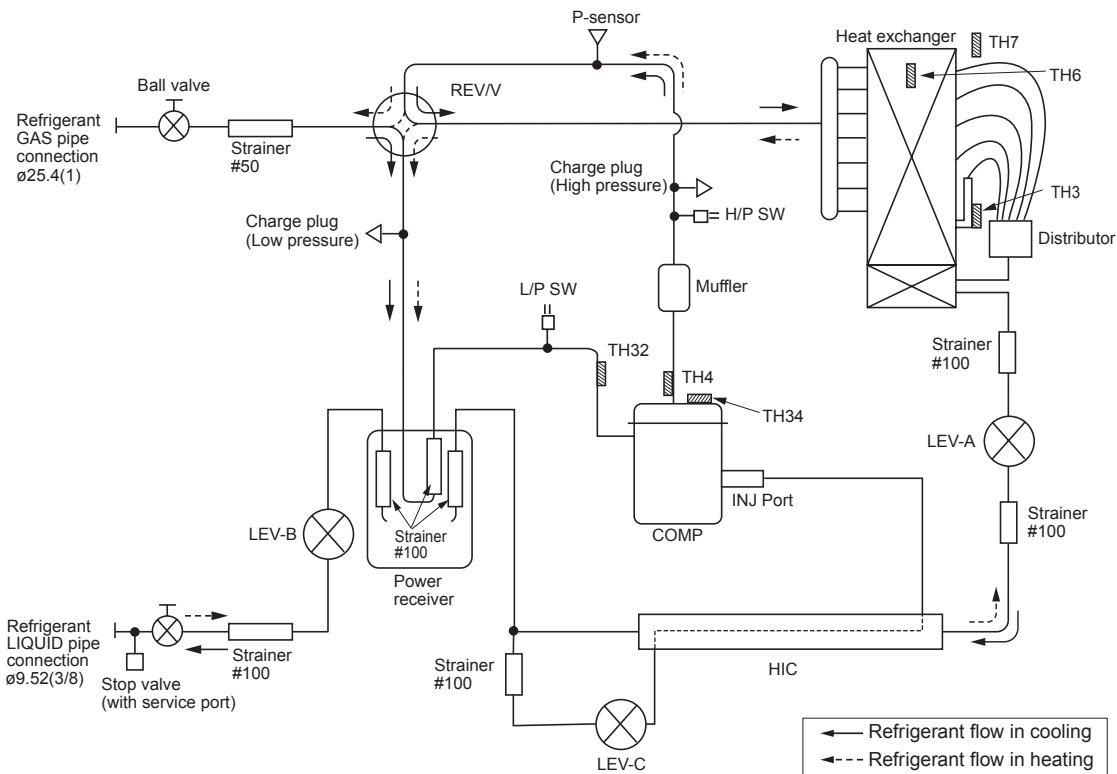
PUAZ-SHW112VHA
PUAZ-SHW140YHA

Unit : mm (inch)



■ PUAZ-SHW230YKA

Unit : mm (inch)



Definition of terms

Max :Maximum performance required when I/F is connected.

Nominal :Nominal performance required when I/F is connected.


Mid :Medium performance (80% of Nominal capacity) required when I/F is connected.

Min :Minimum performance required when I/F is connected.

STEP7 :Maximum performance required when I/F is connected.

STEP4 :Medium performance required when I/F is connected.

STEP1 :Minimum performance required when I/F is connected.

 :This icon means injection circuit is active.

NOTES:

- The reference data at water outlet temperatures of 35°C,40°C,45°C,50°C,55°C and 60°C are shown. (The maximum water outlet temperature of the RP200 and RP250 models is 53°C.)
- The data at water outlet temperature of 25°C are shown except for SHW230 model and RP series.
- Gray highlighted data means integrated data including defrost operation.
- Actual performance may vary depending on operating conditions.
- These data are measured based on EN14511-2011.

5.1 Cooling performance data

<Note> These data are measured based on EN14511-2011.

■ Power inverter

Ambient temperature [°C]		35			
Water outlet temperature [°C]		7		18	
Model		Capacity	EER	Capacity	EER
PUHZ-SW 40VHA (-BS)	Max	4.00	2.60	4.50	4.27
	Nominal	3.60	2.71	3.60	4.65
	Mid	2.88	2.88	2.88	4.78
	Min	1.12	2.97	1.71	4.68
PUHZ-SW 50VHA (-BS)	Max	4.50	2.38	5.00	3.96
	Nominal	4.50	2.38	5.00	3.96
	Mid	3.60	2.71	4.00	4.51
	Min	1.12	2.97	1.71	4.68
PUHZ-SW 75VHA (-BS)	Max	6.60	2.55	9.50	3.08
	Nominal	6.60	2.55	7.10	4.01
	Mid	5.28	2.83	5.68	4.28
	Min	1.97	2.98	2.58	4.38
PUHZ-SW 100V/YHA (-BS)	Max	9.10	2.75	14.00	3.54
	Nominal	9.10	2.75	10.00	4.35
	Mid	7.28	3.02	8.00	4.44
	Min	3.19	3.06	4.58	4.36
PUHZ-SW 120V/YHA (-BS)	Max	12.50	2.32	16.00	3.59
	Nominal	12.50	2.32	14.00	4.08
	Mid	10.00	2.83	11.20	4.62
	Min	4.12	3.24	5.80	4.83

■ Zubadan

Ambient temperature [°C]		35			
Water outlet temperature [°C]		7		18	
Model		Capacity	EER	Capacity	EER
PUHZ-SHW 80VHA	Max	9.56	2.83	10.00	4.74
	Nominal	7.10	3.31	7.10	4.52
	Mid	5.68	3.28	5.68	4.43
	Min	3.41	3.09	4.52	4.39
PUHZ-SHW 112V/YHA	Max	11.17	2.46	14.00	3.78
	Nominal	10.00	2.83	10.00	4.74
	Mid	8.00	3.18	8.00	4.61
	Min	3.40	3.09	4.50	4.39
PUHZ-SHW 140YHA	Max	12.50	2.17	16.00	3.23
	Nominal	12.50	2.17	12.50	4.26
	Mid	10.00	2.74	10.00	4.73
	Min	3.39	3.09	4.49	4.39
PUHZ-SHW 230YKA	Max	20.00	2.22	24.00	2.65
	Nominal	20.00	2.22	20.00	3.55
	Mid	16.00	2.47	16.00	4.15
	Min	8.85	2.98	13.70	4.37

5 Performance data

Outdoor unit

5.2 Heating performance data

<Note> These data are measured based on EN14511-2011.

(1) Packaged-type units

■ PUHZ-W50VHA(-BS)

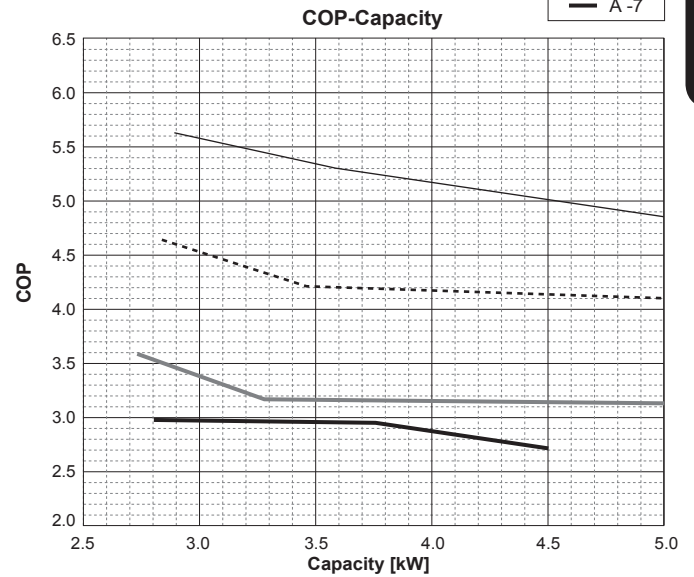
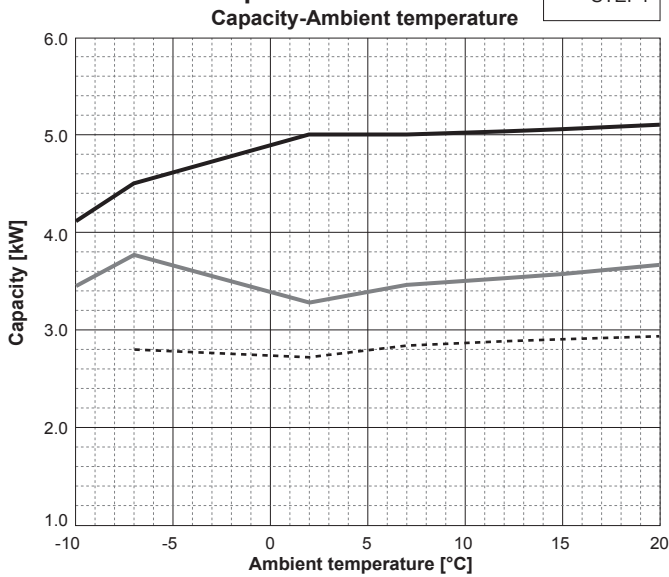
Water outlet temperature [°C]		25		35		40		45		50		55		60	
Ambient temperature [°C]		Capacity	COP	Capacity	COP	Capacity	COP	Capacity	COP	Capacity	COP	Capacity	COP	Capacity	COP
STEP7	-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-15	-	-	3.50	2.24	3.50	2.06	3.50	1.87	-	-	-	-	-	-
	-10	4.24	2.88	4.13	2.55	4.13	2.32	4.13	2.10	4.23	1.94	4.34	1.78	-	-
	-7	5.20	3.19	4.50	2.73	4.50	2.49	4.50	2.24	4.50	2.05	4.50	1.85	-	-
	2	5.15	3.40	5.00	3.13	5.00	2.85	5.00	2.56	4.99	2.31	4.97	2.05	4.97	1.74
	7	5.30	5.15	5.00	4.10	5.00	3.66	5.00	3.21	5.00	2.89	5.00	2.56	5.00	2.14
	12	5.34	5.85	5.04	4.57	5.03	4.01	5.03	3.44	5.08	3.06	5.12	2.68	5.12	2.24
	20	5.35	6.28	5.06	4.84	5.06	4.22	5.05	3.59	5.12	3.17	5.20	2.74	5.20	2.30
STEP4	-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-15	-	-	2.93	2.44	2.86	2.20	2.78	1.96	-	-	-	-	-	-
	-10	3.58	3.17	3.45	2.77	3.36	2.48	3.27	2.19	3.36	1.99	3.45	1.79	-	-
	-7	3.91	3.41	3.76	2.96	3.67	2.65	3.57	2.33	3.55	2.13	3.53	1.92	-	-
	2	3.43	3.97	3.27	3.17	3.48	3.03	3.68	2.88	3.72	2.60	3.76	2.32	3.76	1.98
	7	3.81	5.54	3.46	4.22	3.62	3.81	3.77	3.40	3.79	3.01	3.80	2.62	3.80	2.42
	12	3.85	6.21	3.54	4.90	3.67	4.28	3.80	3.65	3.81	3.21	3.82	2.77	3.82	2.53
	20	3.90	6.68	3.58	5.32	3.70	4.56	3.83	3.81	3.83	3.34	3.82	2.87	3.82	2.59
STEP1	-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-7	2.90	3.52	2.80	2.99	2.75	2.67	2.70	2.35	2.62	2.12	2.53	1.89	-	-
	2	2.97	4.16	2.73	3.59	2.95	3.23	3.17	2.86	2.78	2.54	2.39	2.21	-	-
	7	2.98	5.69	2.83	4.64	3.00	4.03	3.17	3.41	3.17	3.07	3.17	2.73	-	-
	12	3.01	6.59	2.87	5.26	3.02	4.49	3.17	3.73	3.32	3.32	3.47	2.91	-	-
	20	3.01	7.06	2.90	5.64	3.03	4.78	3.17	3.91	3.41	3.46	3.66	3.01	-	-
20	3.08	7.78	2.94	6.26	3.06	5.25	3.17	4.23	3.57	3.71	3.66	3.19	-	-	

■ PUHZ-W85VHA2(-BS)

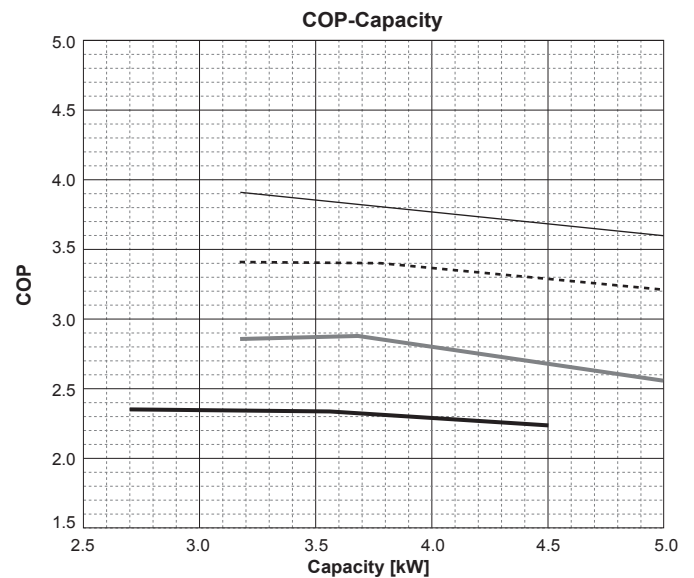
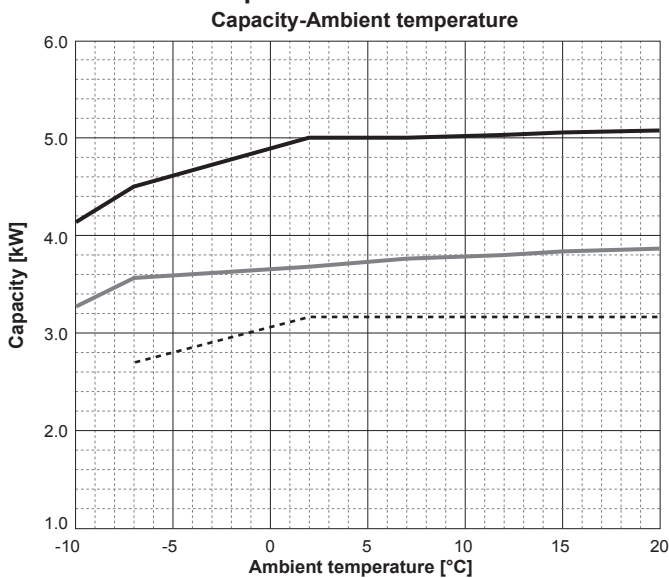
Water outlet temperature [°C]		25		35		40		45		50		55		60	
Ambient temperature [°C]		Capacity	COP	Capacity	COP	Capacity	COP	Capacity	COP	Capacity	COP	Capacity	COP	Capacity	COP
STEP7	-20	-	-	4.91	1.89	4.91	1.70	4.91	1.52	-	-	-	-	-	-
	-15	-	-	6.10	2.15	6.10	1.95	6.10	1.74	-	-	-	-	-	-
	-10	7.28	2.94	7.29	2.41	7.29	2.19	7.29	1.97	7.57	1.79	7.85	1.62	-	-
	-7	8.00	3.42	8.00	2.57	8.00	2.34	8.00	2.10	8.00	1.92	8.00	1.73	-	-
	2	8.50	3.61	8.50	3.17	8.50	2.89	8.50	2.61	8.47	2.34	8.44	2.06	8.44	1.82
	7	9.00	5.33	9.00	4.19	9.00	3.72	9.00	3.24	9.00	2.88	9.00	2.51	9.00	2.23
	12	9.04	5.69	9.07	4.74	9.21	4.17	9.35	3.59	9.24	3.17	9.14	2.76	9.14	2.37
	20	9.08	6.12	9.10	5.08	9.33	4.44	9.55	3.80	9.39	3.35	9.23	2.90	9.23	2.46
STEP4	-20	-	-	5.31	2.29	5.08	2.03	4.85	1.78	-	-	-	-	-	-
	-15	-	-	5.67	2.55	5.52	2.30	5.37	2.04	-	-	-	-	-	-
	-10	6.15	3.15	6.03	2.81	5.96	2.56	5.90	2.30	6.21	2.12	6.53	1.94	-	-
	-7	6.27	3.54	6.24	2.97	6.23	2.72	6.21	2.46	6.24	2.25	6.26	2.04	-	-
	2	5.60	4.27	5.58	3.90	5.60	3.50	5.61	3.10	5.53	2.72	5.44	2.34	5.44	2.09
	7	6.29	5.58	5.77	4.66	5.57	4.11	5.37	3.56	5.46	3.12	5.54	2.68	5.56	2.34
	12	6.31	6.58	5.98	5.39	5.87	4.70	5.76	4.00	5.82	3.49	5.88	2.99	5.88	2.63
	20	6.39	7.26	6.10	5.84	6.05	5.05	6.00	4.26	6.04	3.72	6.09	3.17	6.06	2.81
STEP1	-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-7	3.38	3.51	3.30	3.00	3.52	2.75	3.73	2.49	3.76	2.26	3.78	2.02	-	-
	2	3.42	4.69	3.33	4.01	3.27	3.44	3.20	2.86	3.20	2.52	3.20	2.18	-	-
	7	4.07	5.76	3.94	4.80	3.88	4.17	3.81	3.53	3.79	3.06	3.77	2.58	-	-
	12	4.65	7.02	4.53	5.65	4.46	4.85	4.40	4.06	4.44	3.50	4.47	2.94	-	-
	20	5.01	7.70	4.88	6.16	4.82	5.27	4.75	4.37	4.82	3.77	4.90	3.16	-	-
20	5.60	8.66	5.47	7.01	5.41	5.96	5.34	4.90	5.47	4.21	5.60	3.52	-	-	

5.3 Part load chart PUHZ-W50VHA(-BS)

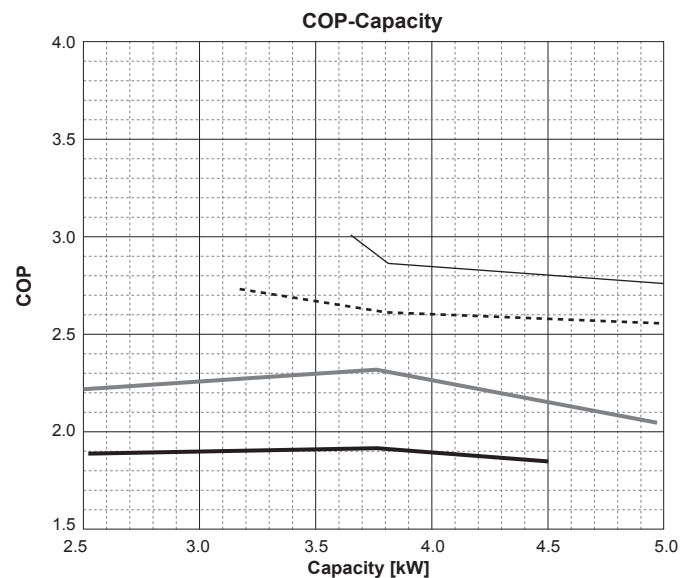
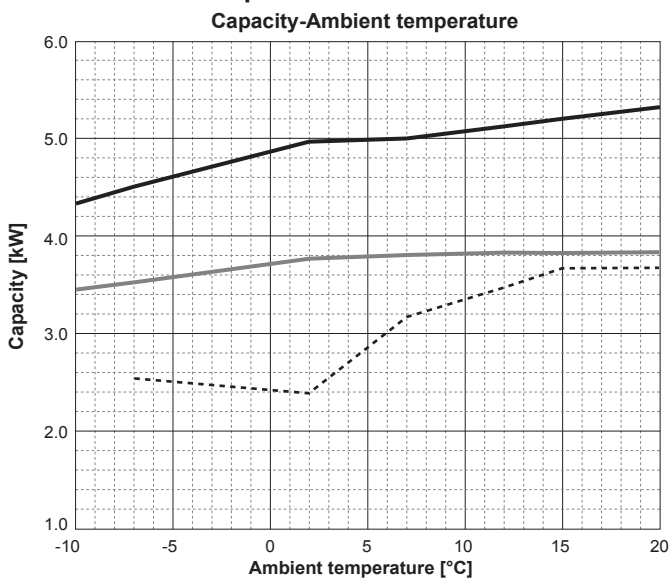
Water outlet temperature 35 [°C]



Water outlet temperature 45 [°C]



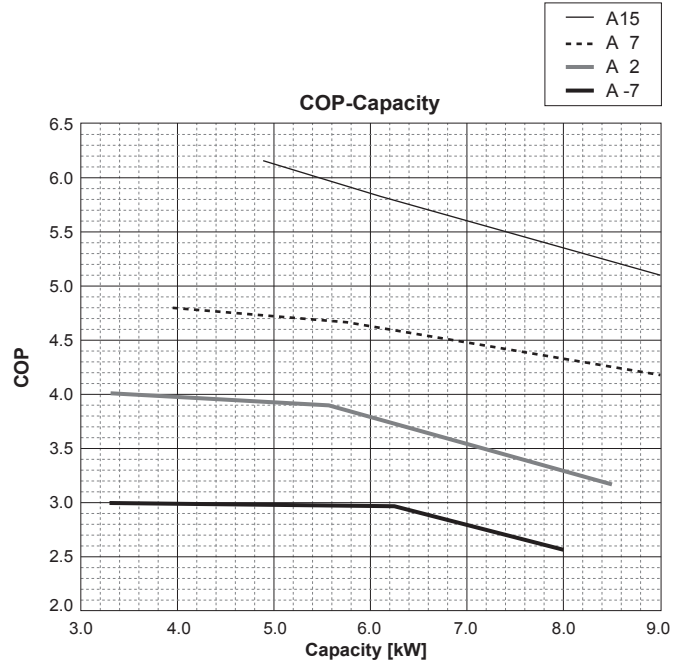
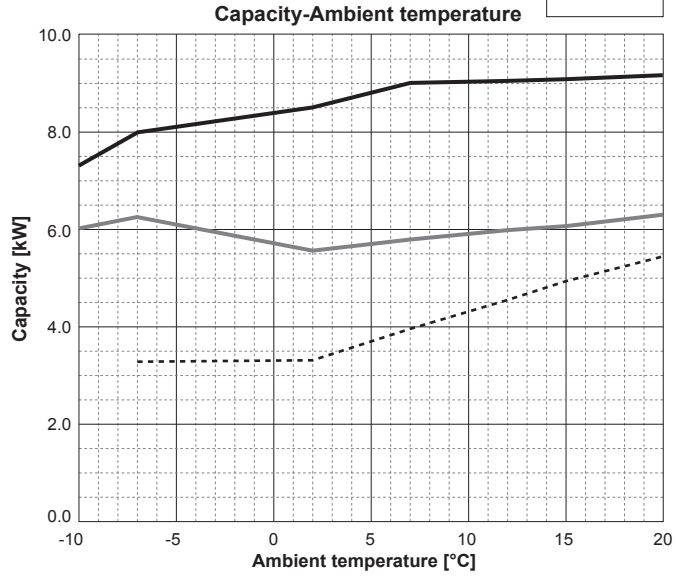
Water outlet temperature 55 [°C]



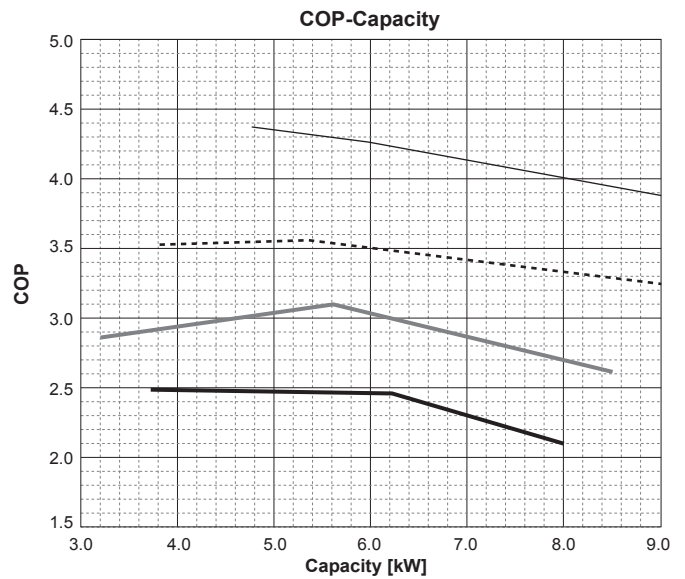
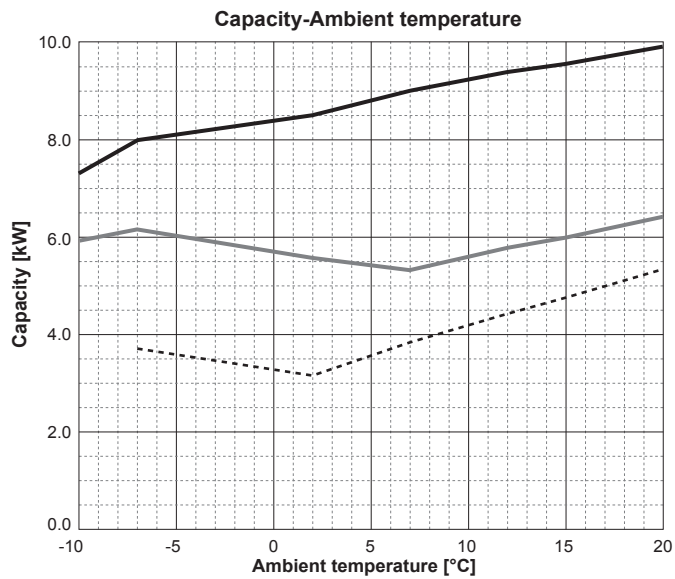
Outdoor unit

PUHZ-W85VHA2(-BS)

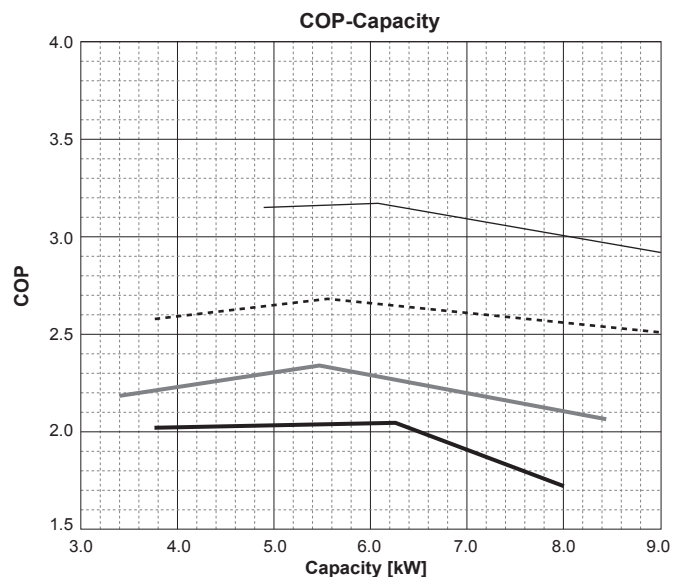
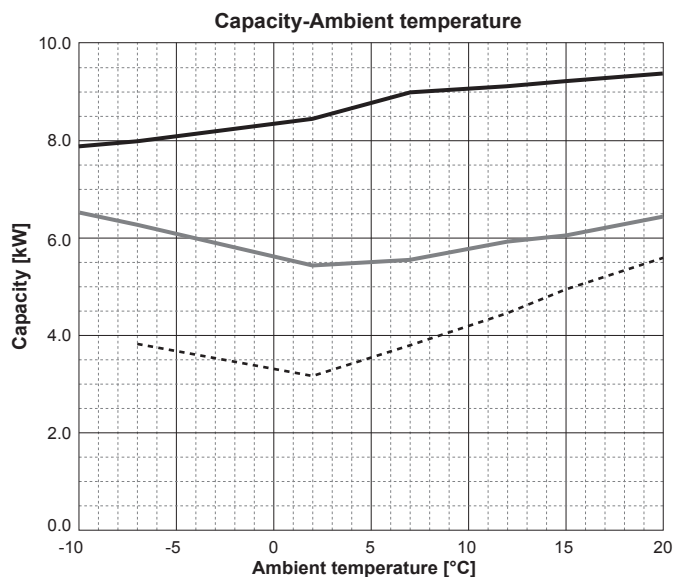
■ Water outlet temperature 35 [°C]



■ Water outlet temperature 45 [°C]

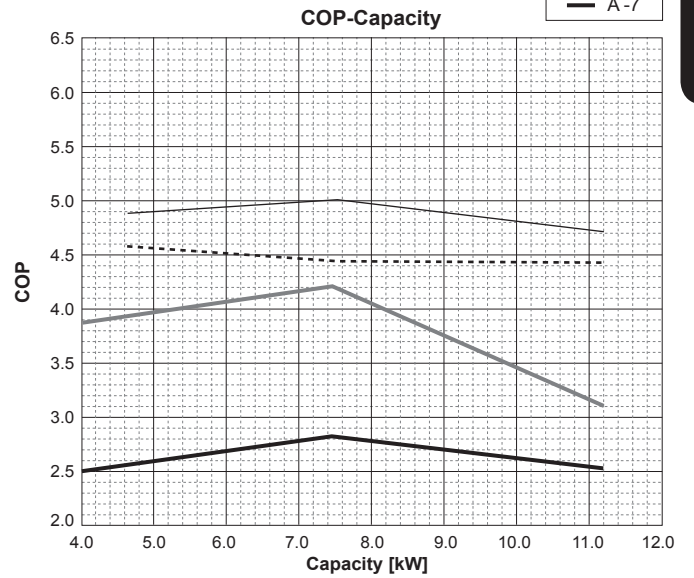
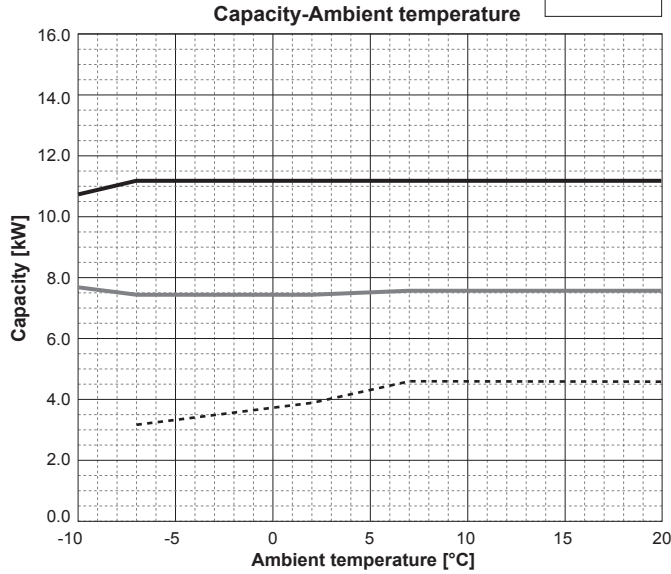


■ Water outlet temperature 55 [°C]

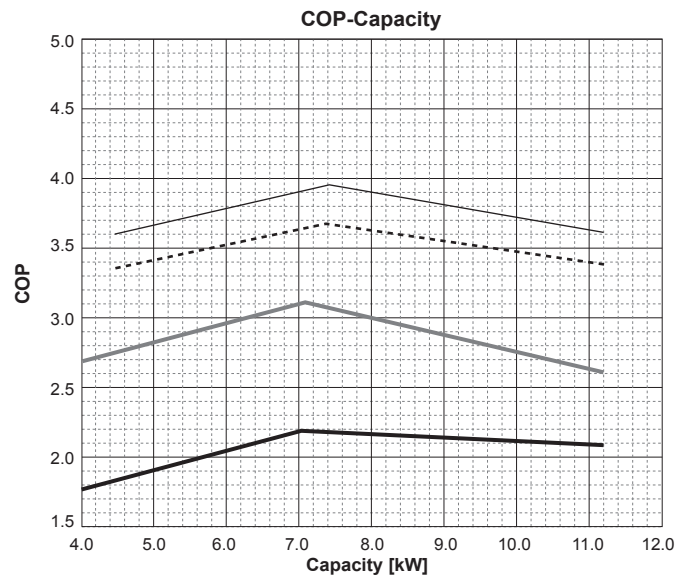
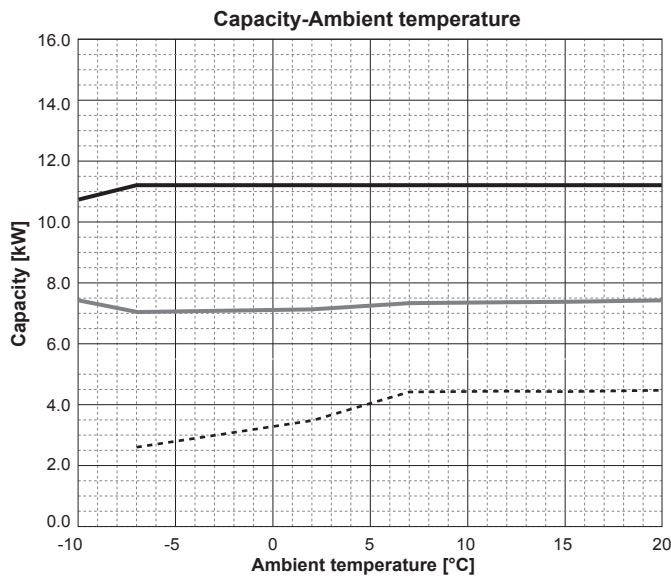


PUHZ-HW112YHA2(-BS)

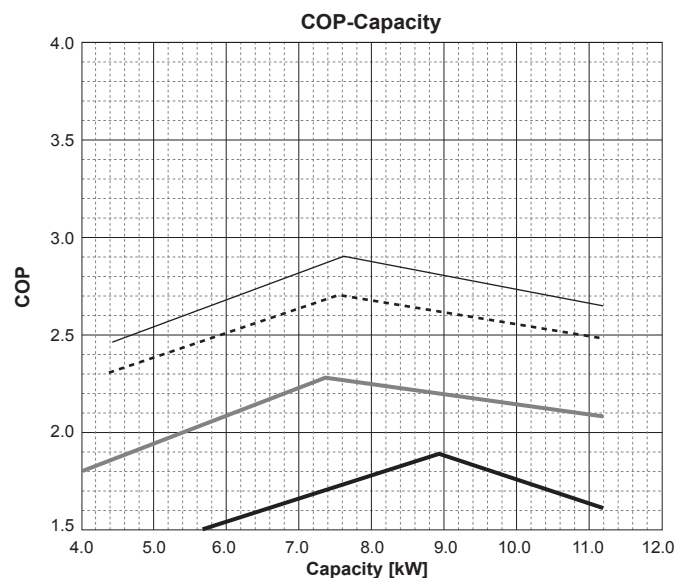
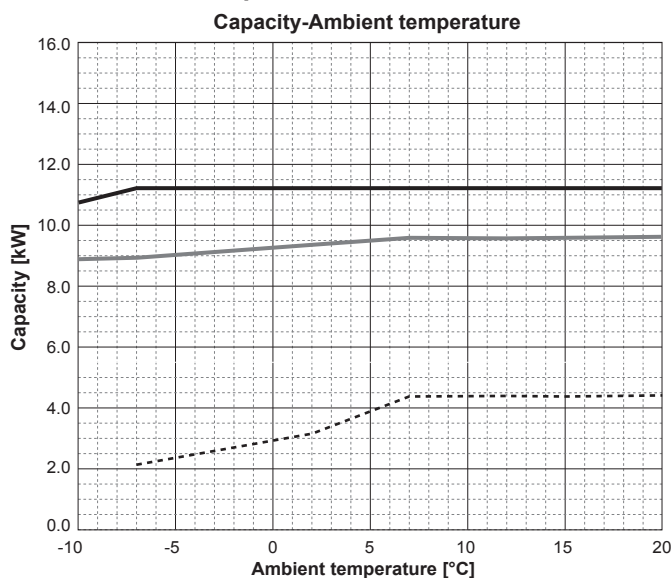
■ Water outlet temperature 35 [°C]



■ Water outlet temperature 45 [°C]



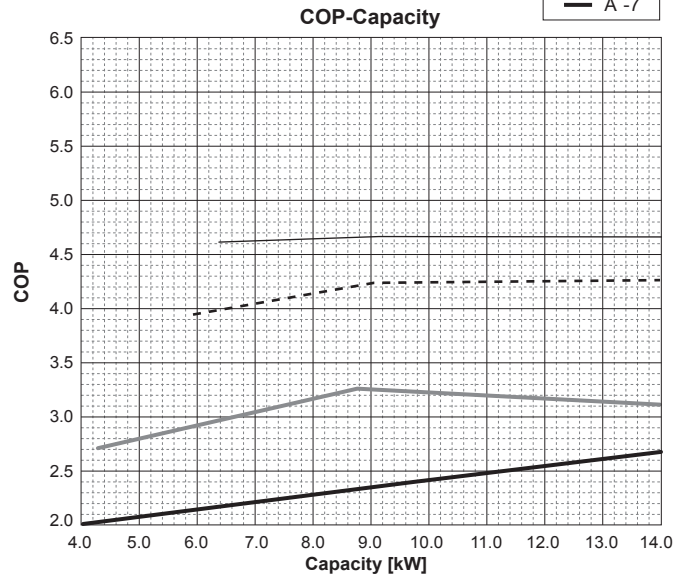
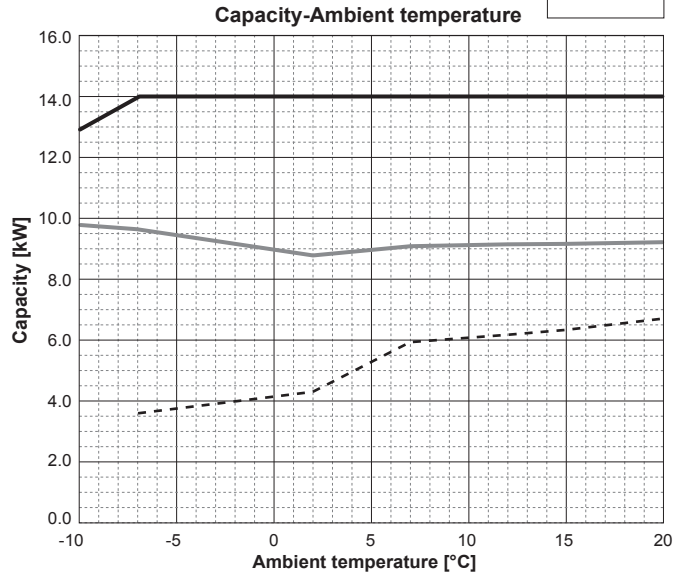
■ Water outlet temperature 55 [°C]



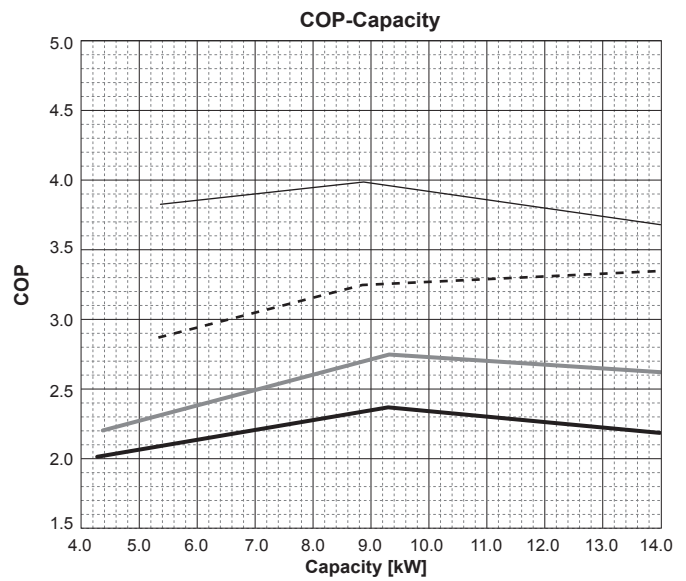
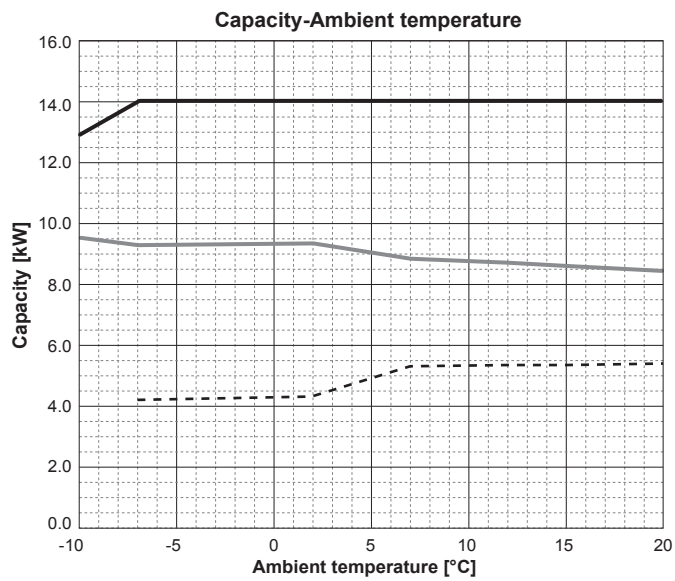
Outdoor unit

PUHZ-HW140V/YHA2(-BS)

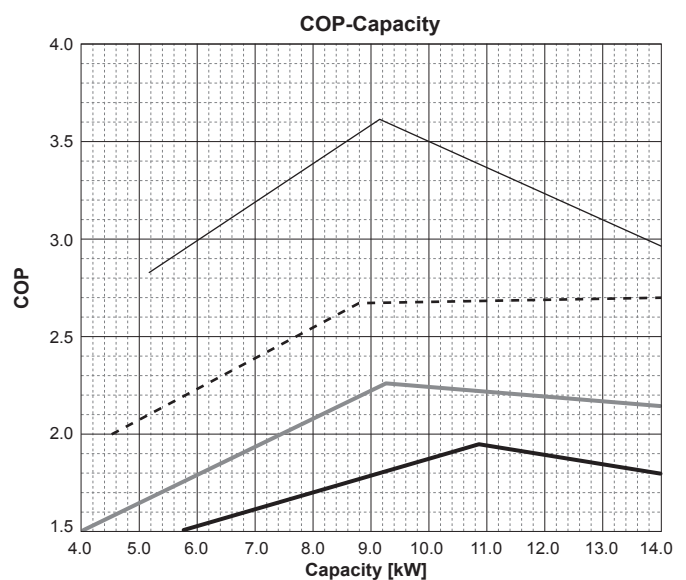
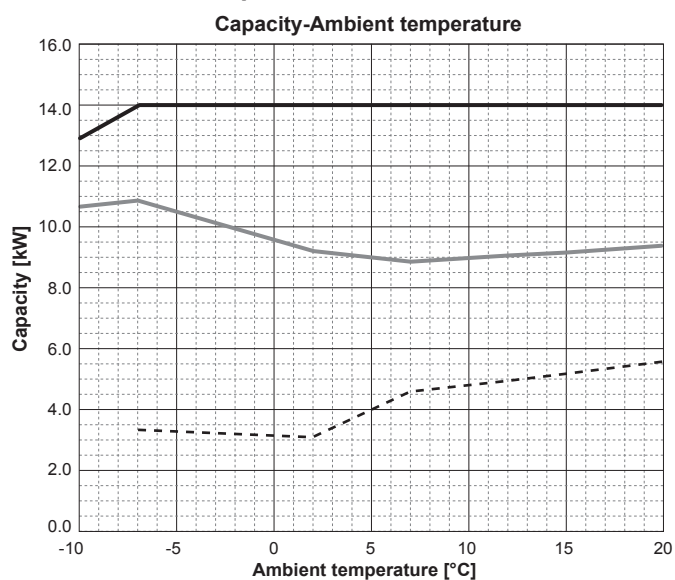
Water outlet temperature 35 [°C]



Water outlet temperature 45 [°C]

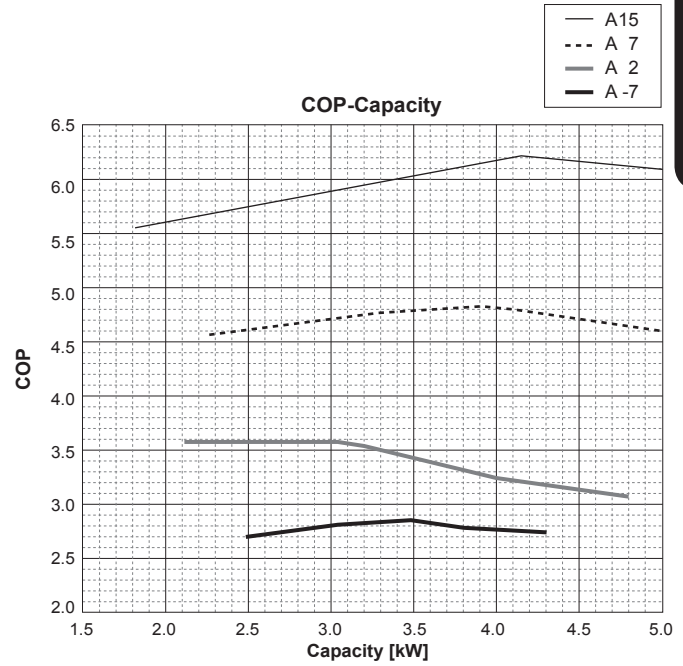
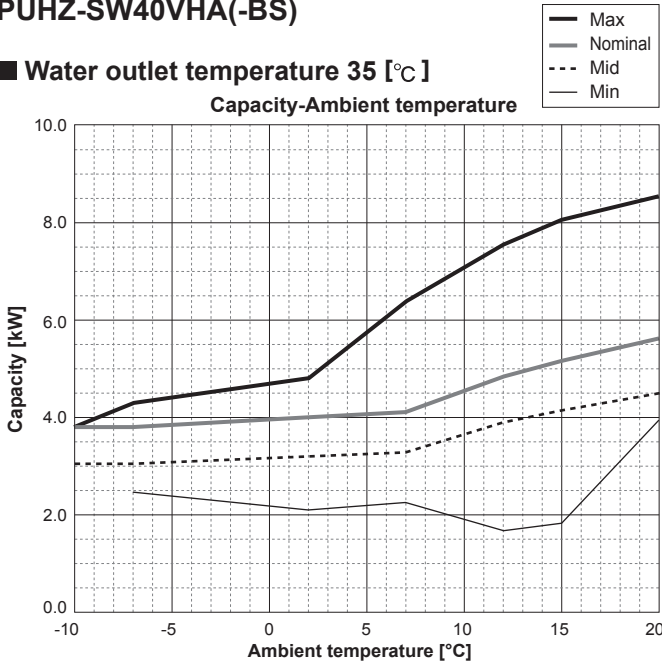


Water outlet temperature 55 [°C]

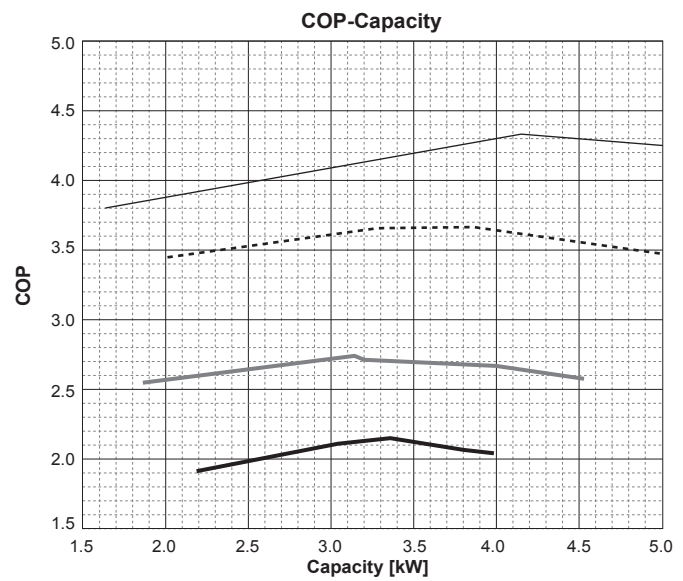
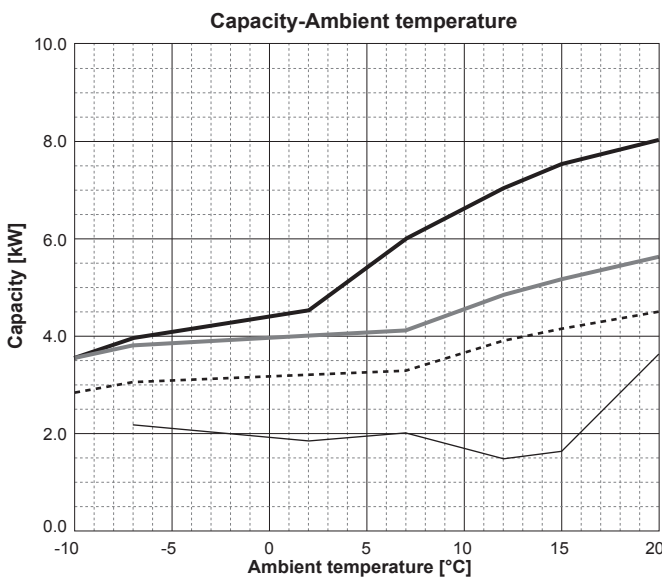


PUHZ-SW40VHA(-BS)

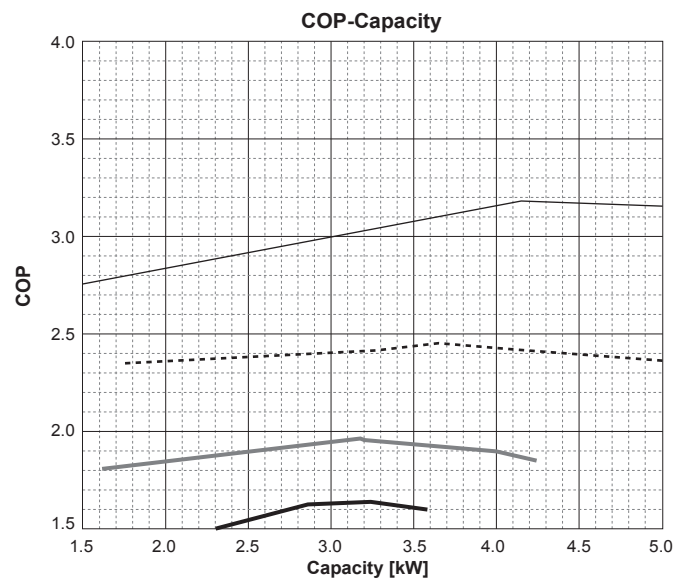
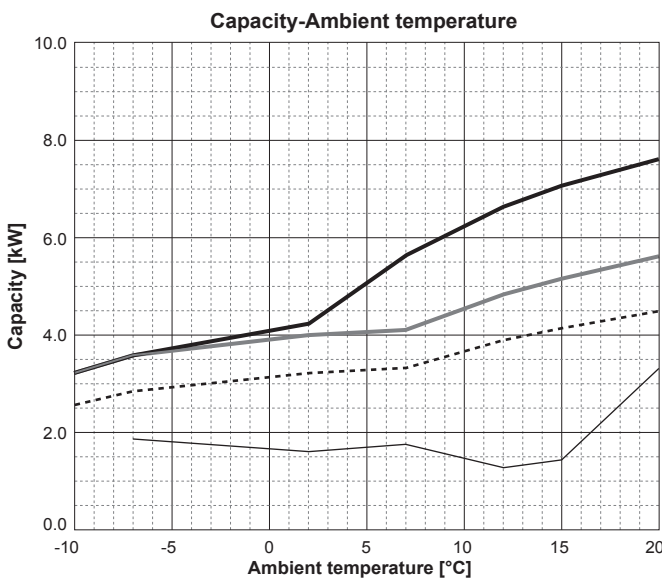
Water outlet temperature 35 [°C]



Water outlet temperature 45 [°C]



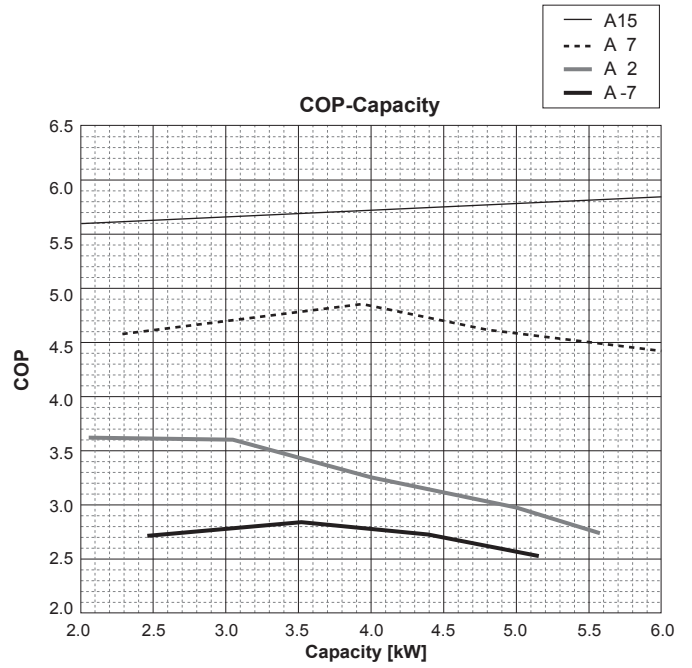
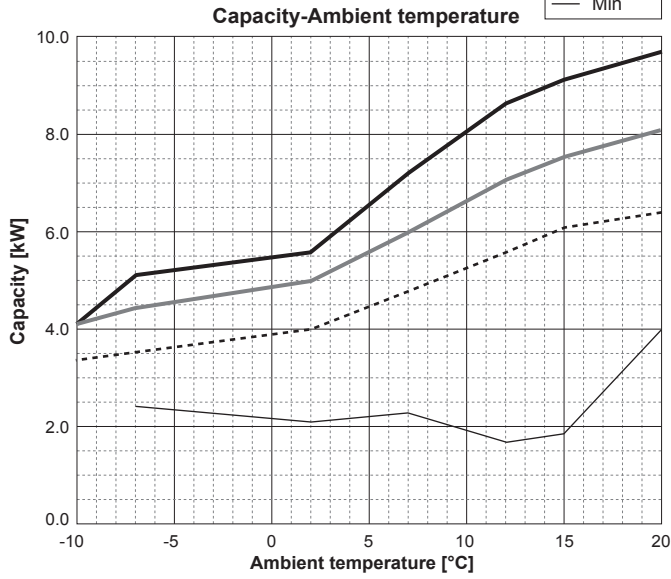
Water outlet temperature 55 [°C]



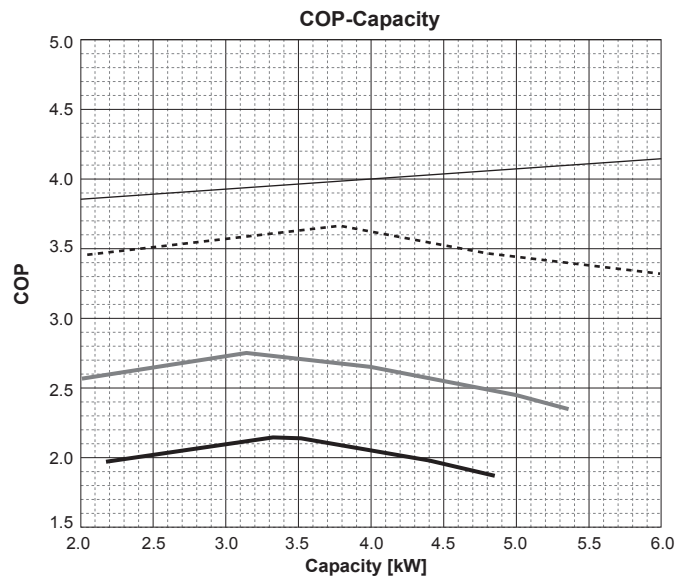
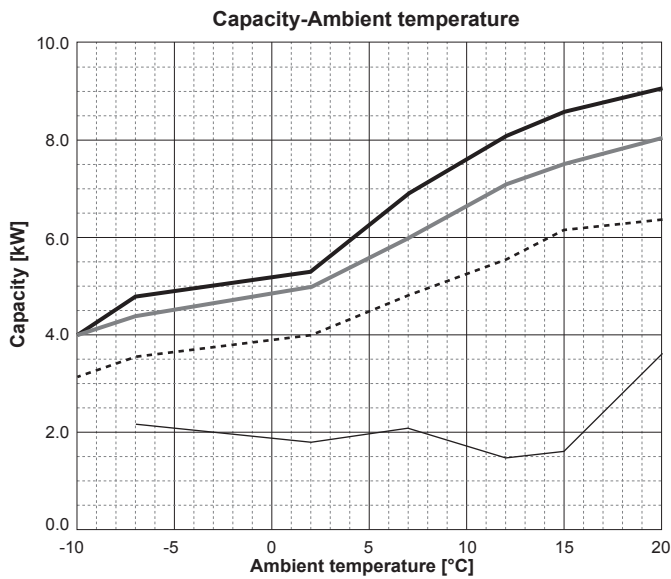
Outdoor unit

PUHZ-SW50VHA(-BS)

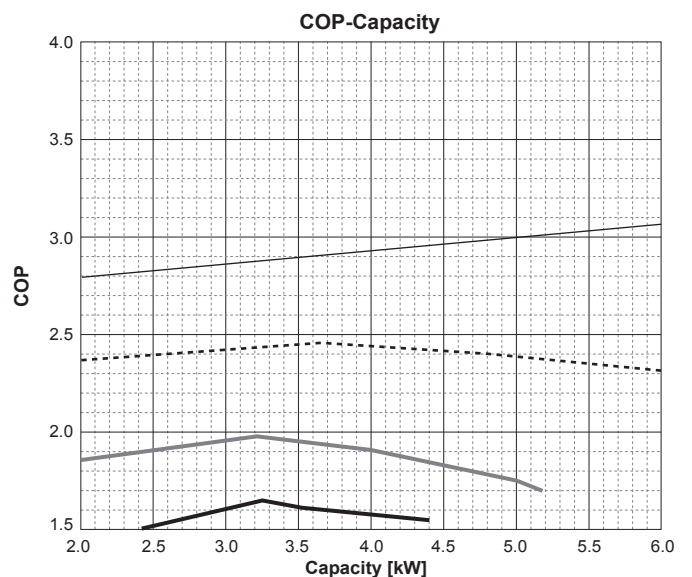
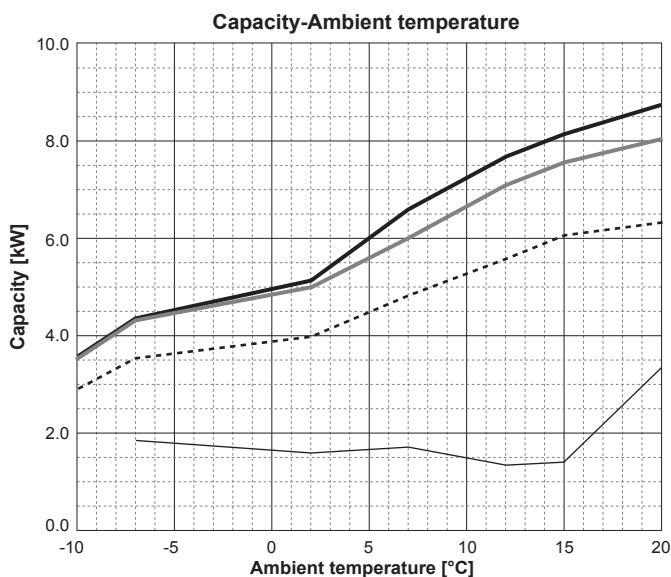
■ Water outlet temperature 35 [°C]



■ Water outlet temperature 45 [°C]

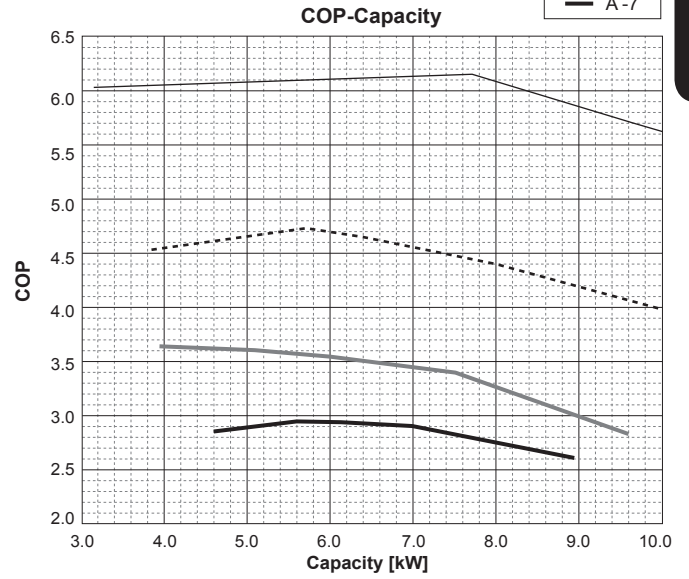
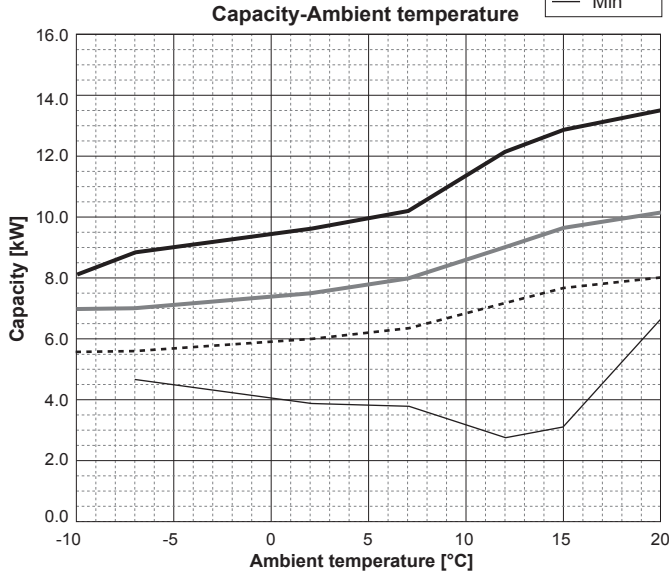


■ Water outlet temperature 55 [°C]

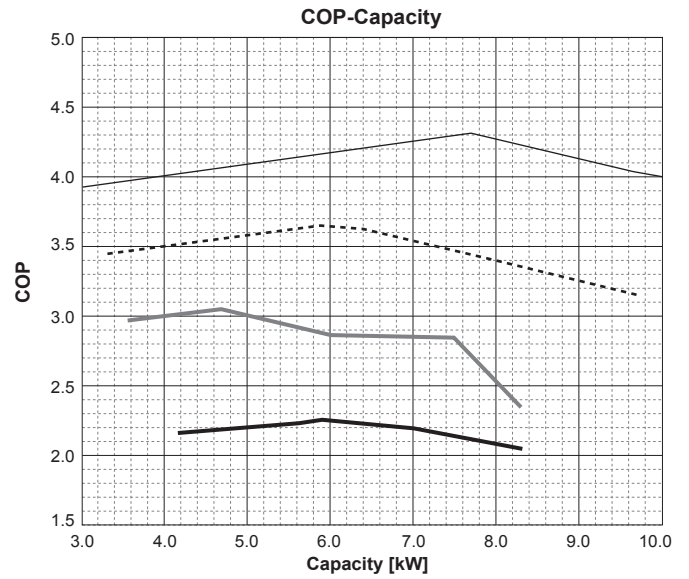
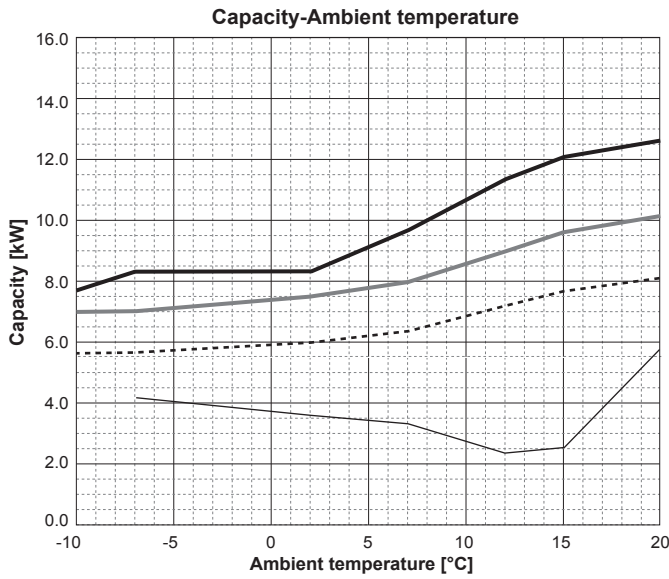


PUHZ-SW75VHA(-BS)

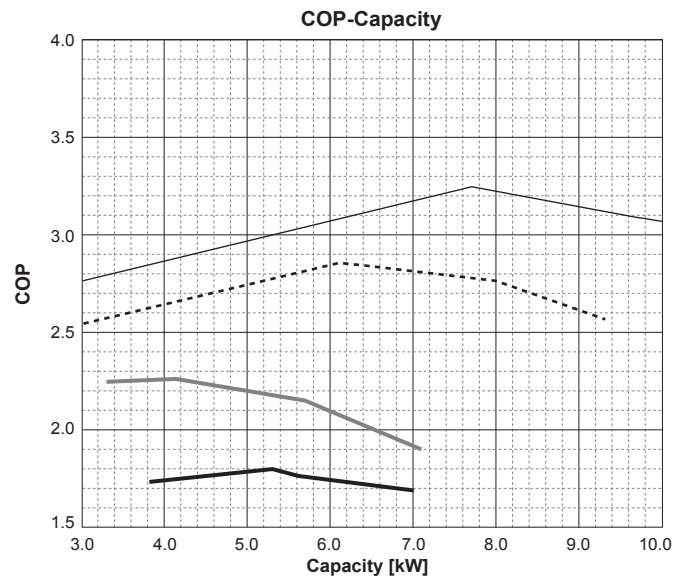
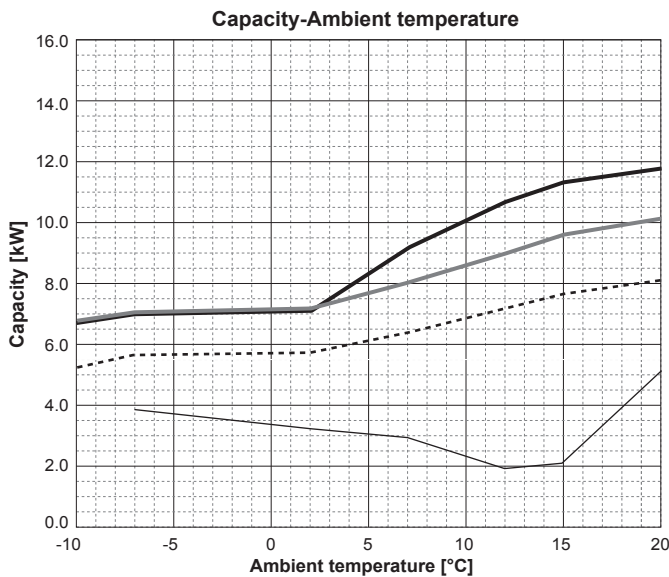
Water outlet temperature 35 [°C]



Water outlet temperature 45 [°C]



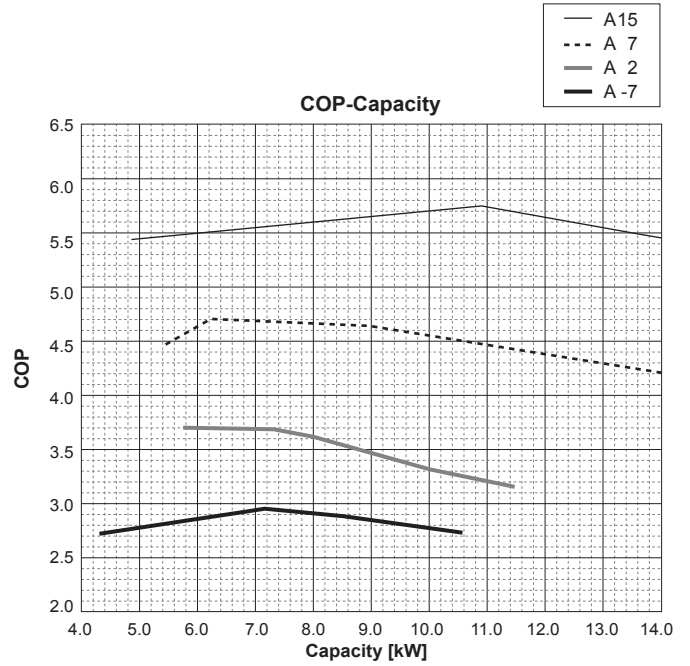
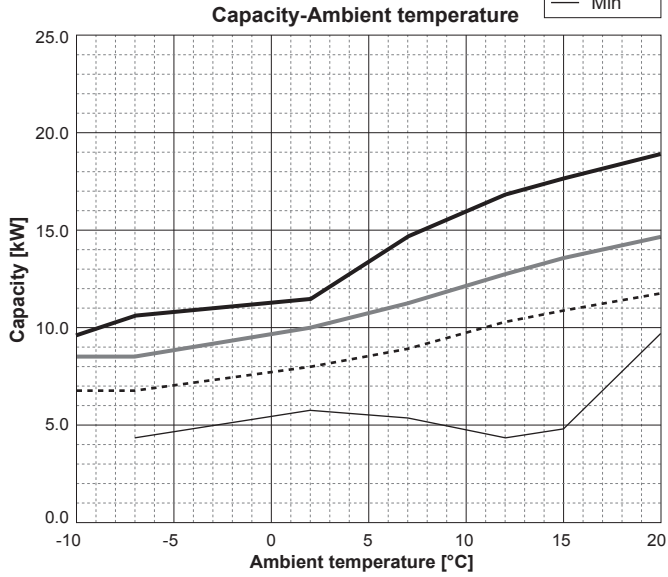
Water outlet temperature 55 [°C]



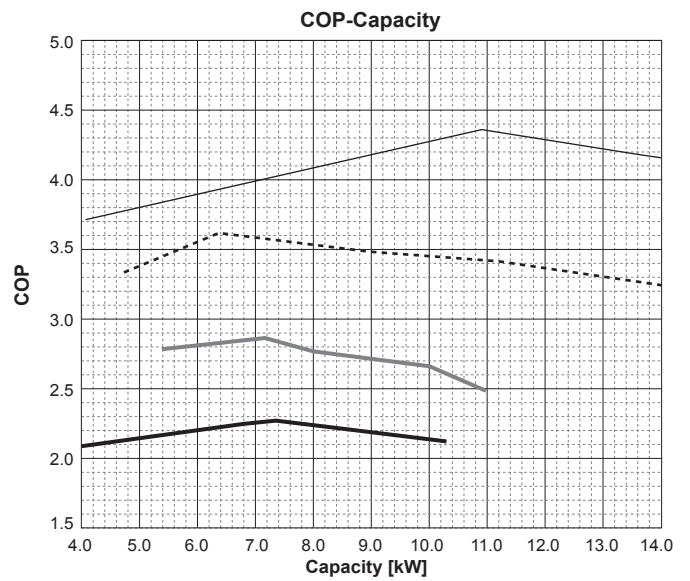
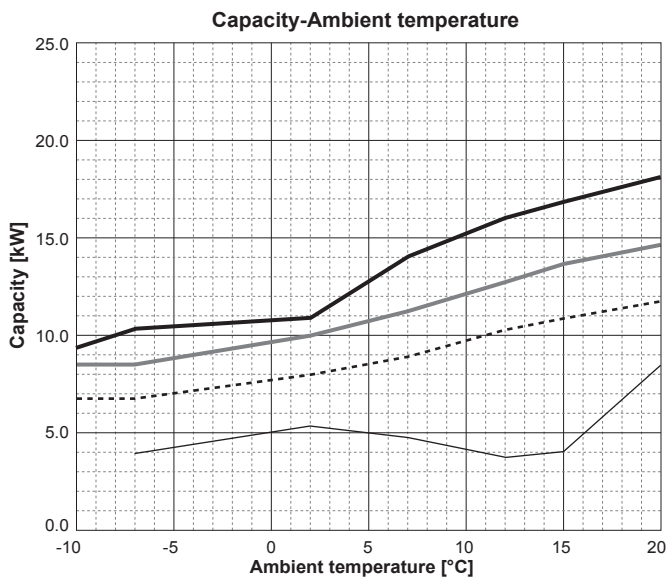
Outdoor unit

PUHZ-SW100V/YHA(-BS)

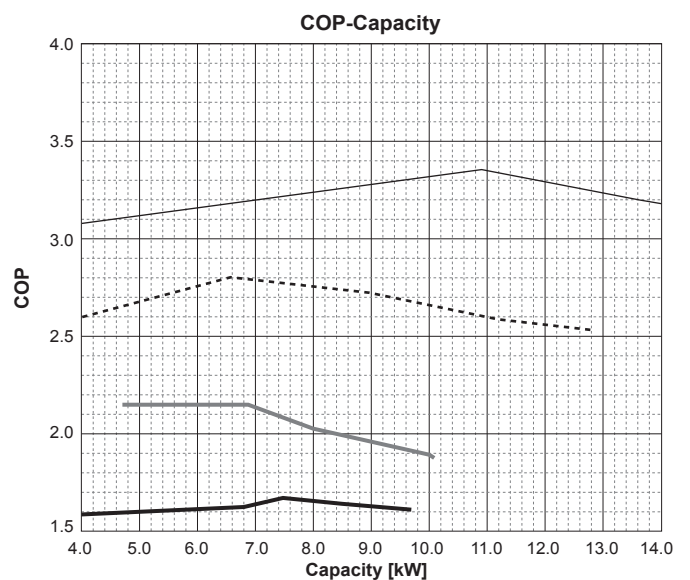
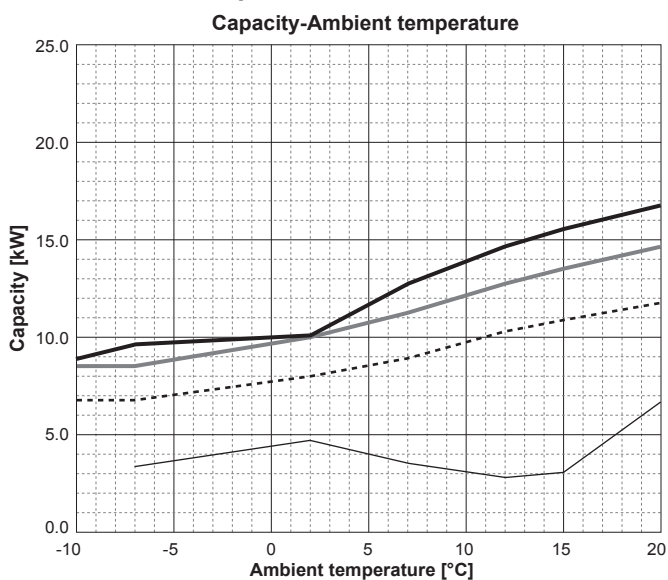
■ Water outlet temperature 35 [°C]



■ Water outlet temperature 45 [°C]

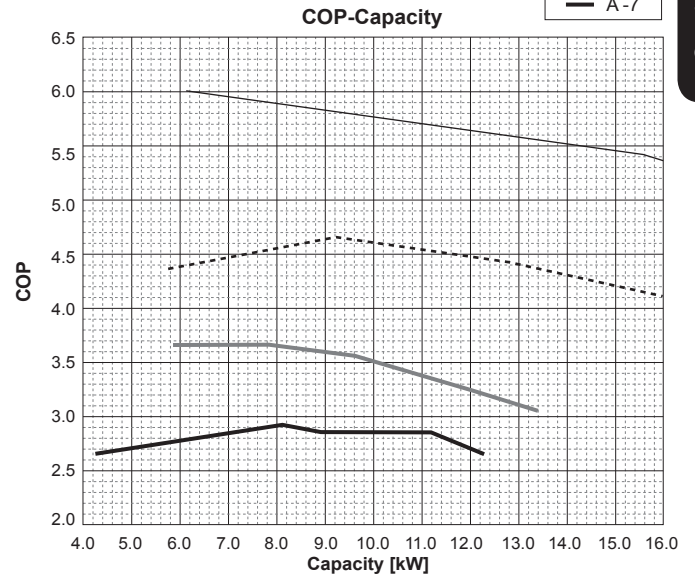
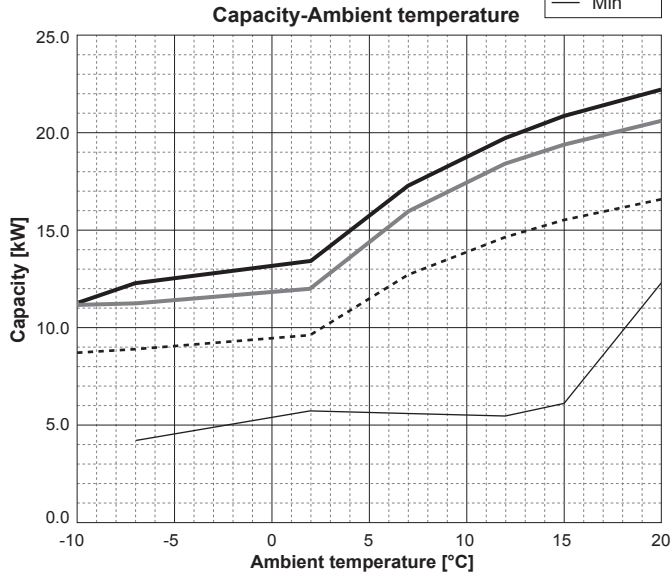


■ Water outlet temperature 55 [°C]

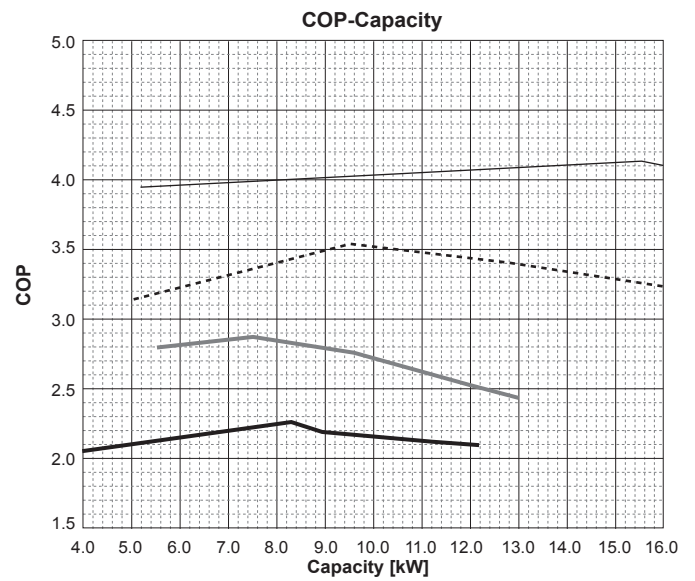
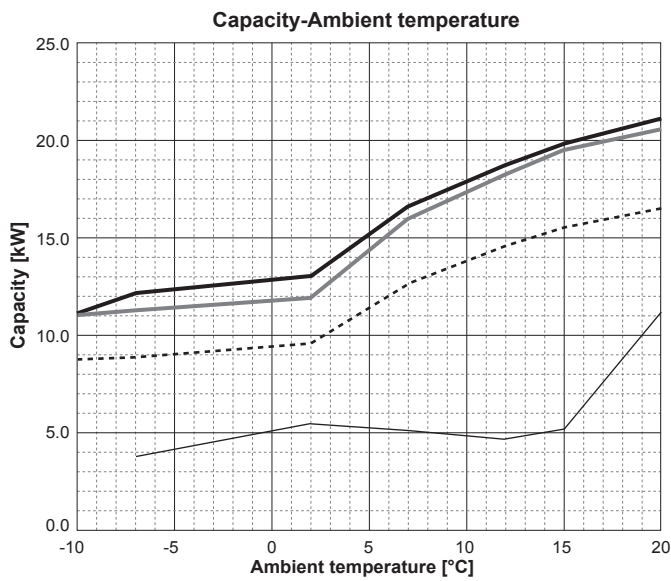


PUHZ-SW120V/YHA(-BS)

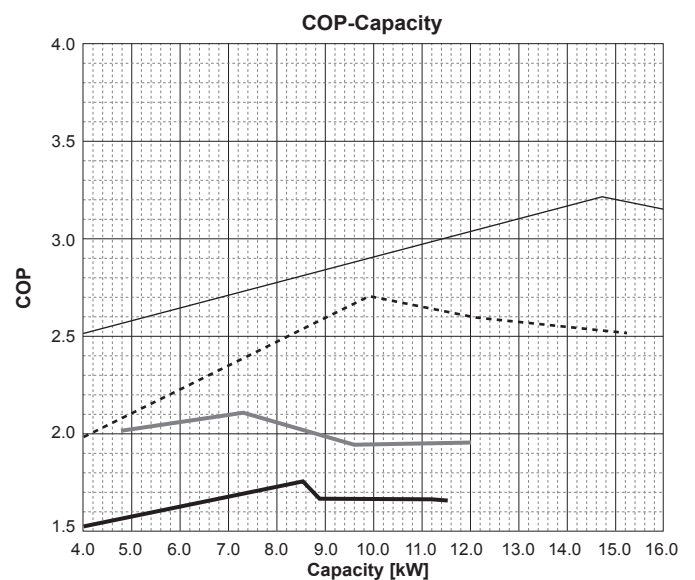
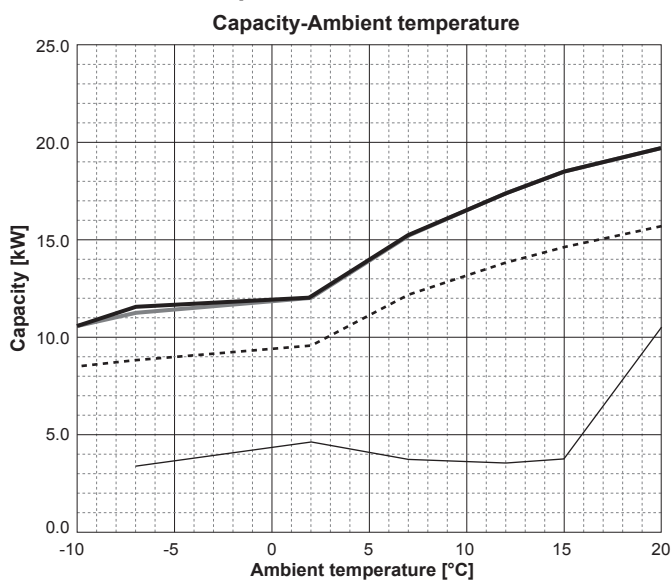
Water outlet temperature 35 [°C]



Water outlet temperature 45 [°C]



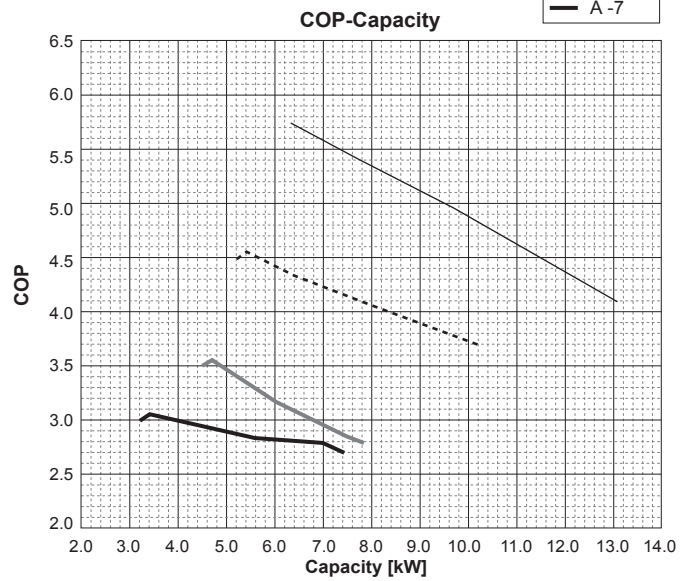
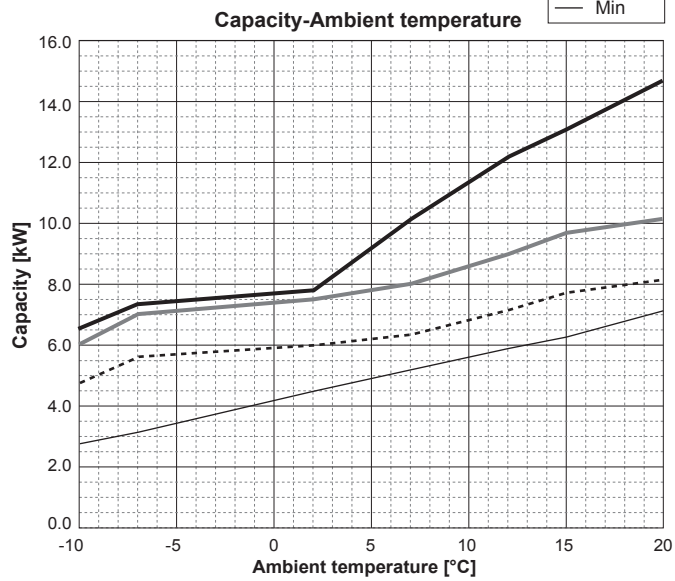
Water outlet temperature 55 [°C]



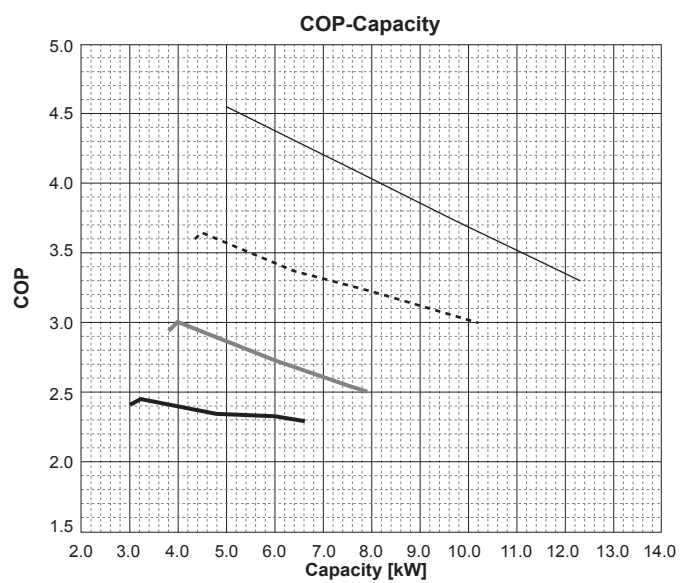
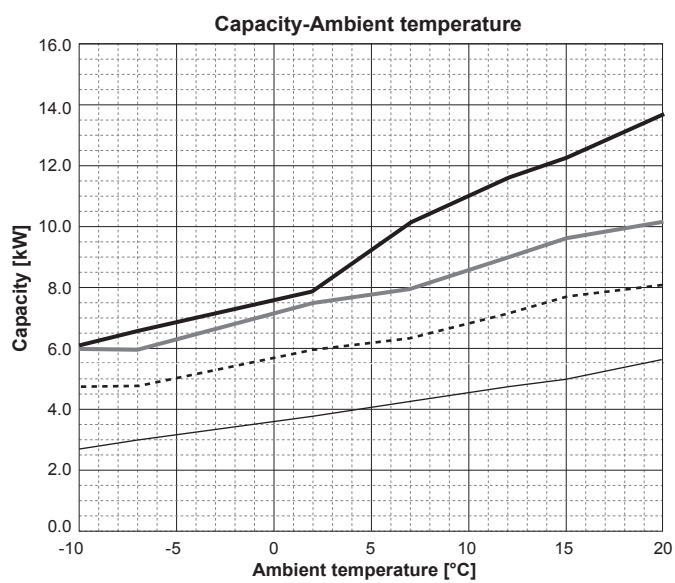
Outdoor unit

PUHZ-FRP71VHA

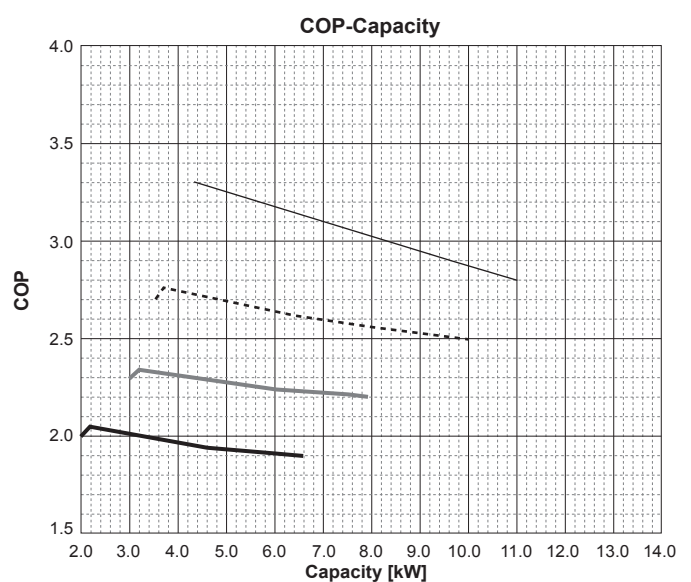
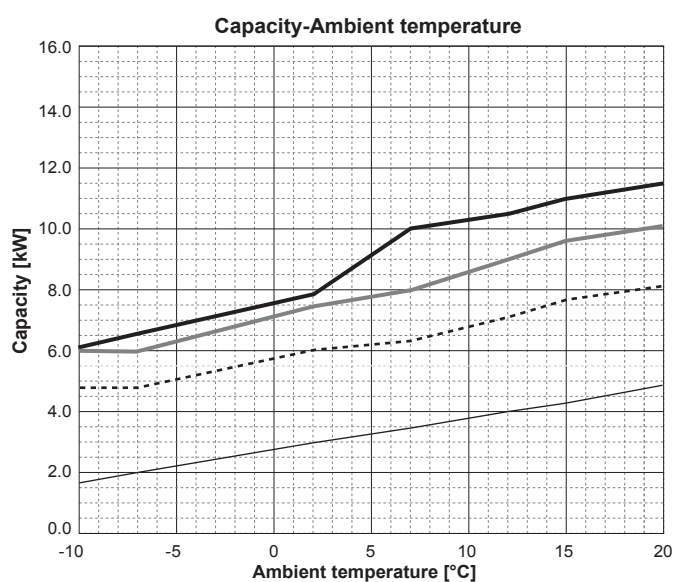
■ Water outlet temperature 35 [°C]



■ Water outlet temperature 45 [°C]

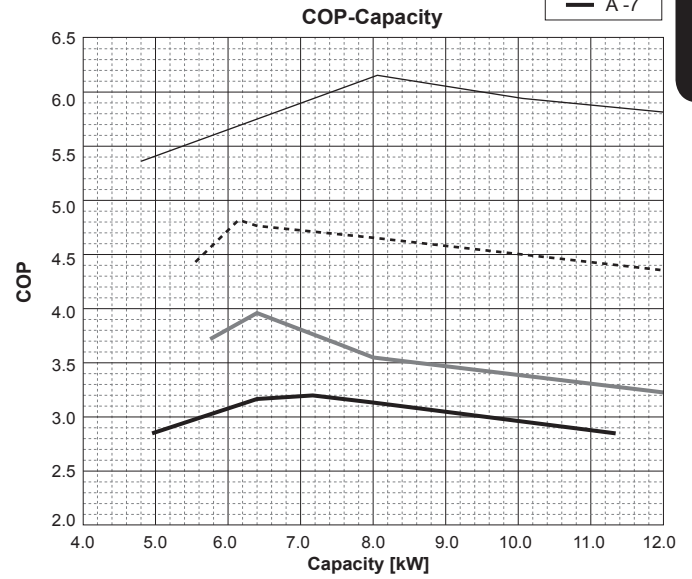
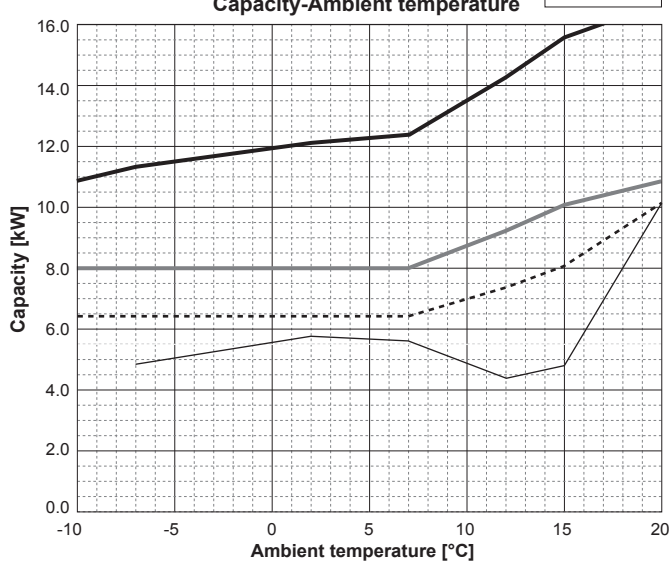


■ Water outlet temperature 55 [°C]

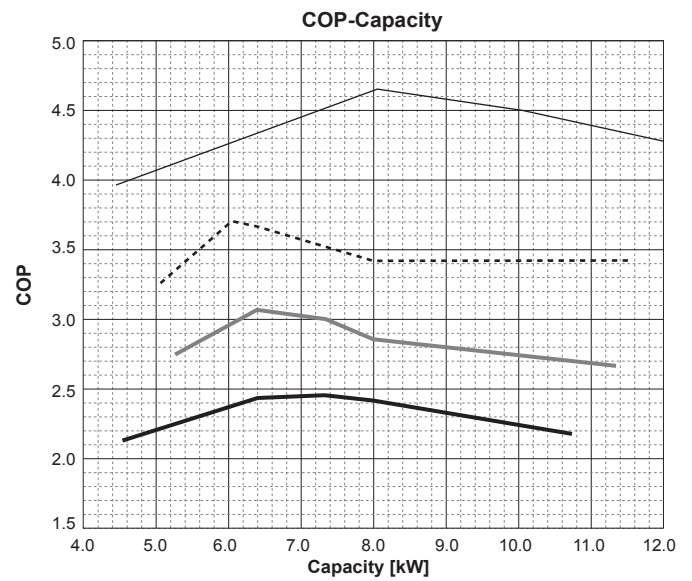
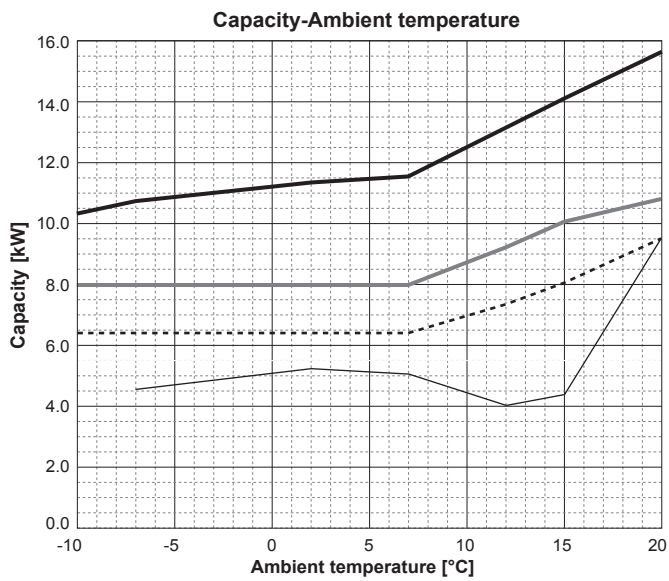


PUHZ-SHW80VHA

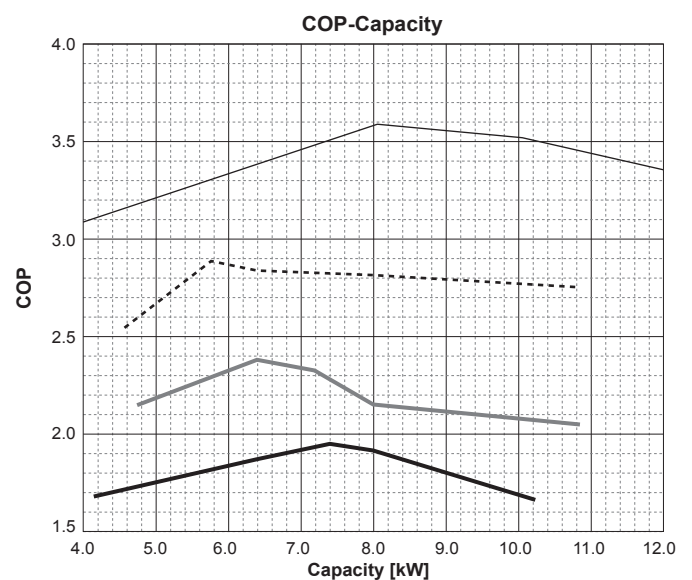
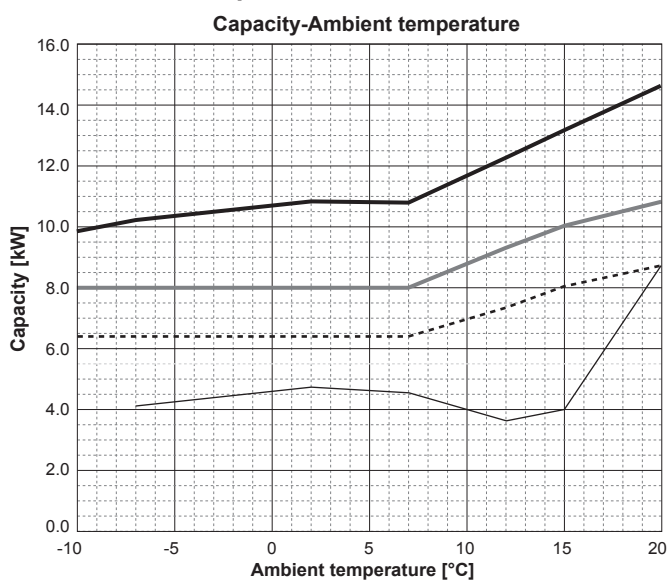
Water outlet temperature 35 [°C]



Water outlet temperature 45 [°C]



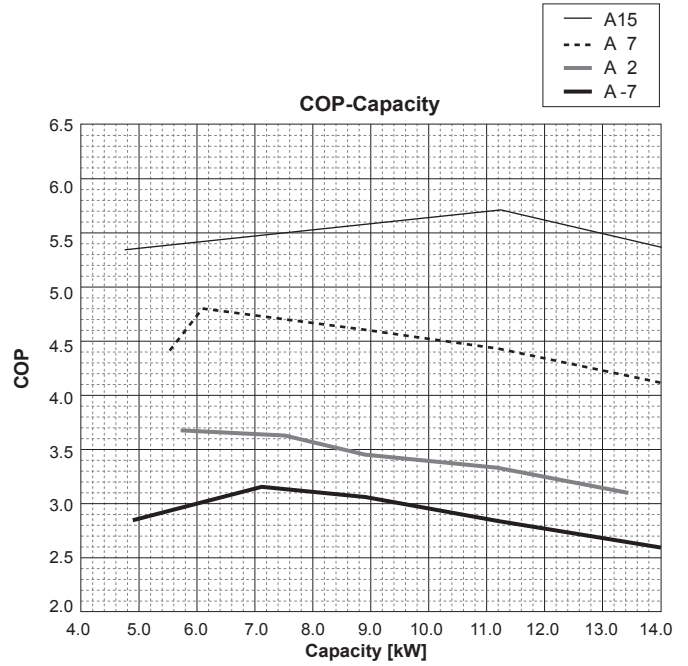
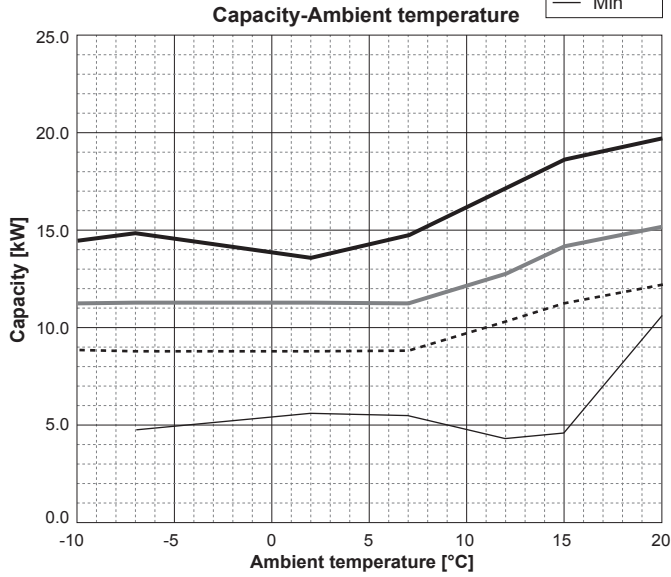
Water outlet temperature 55 [°C]



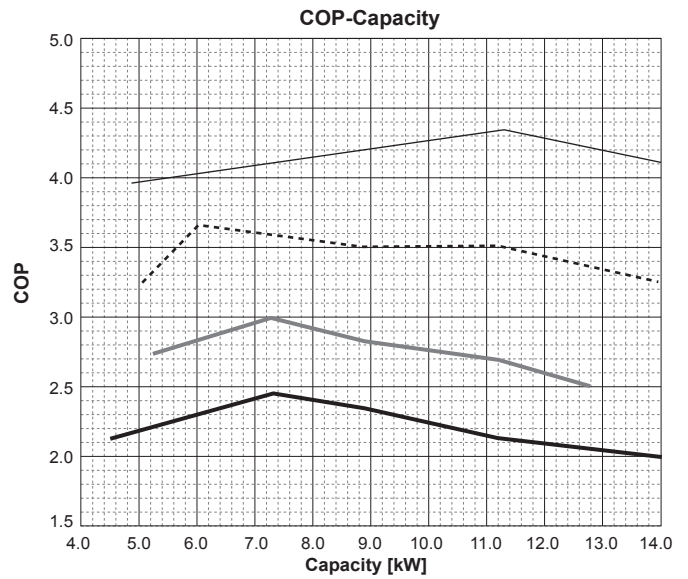
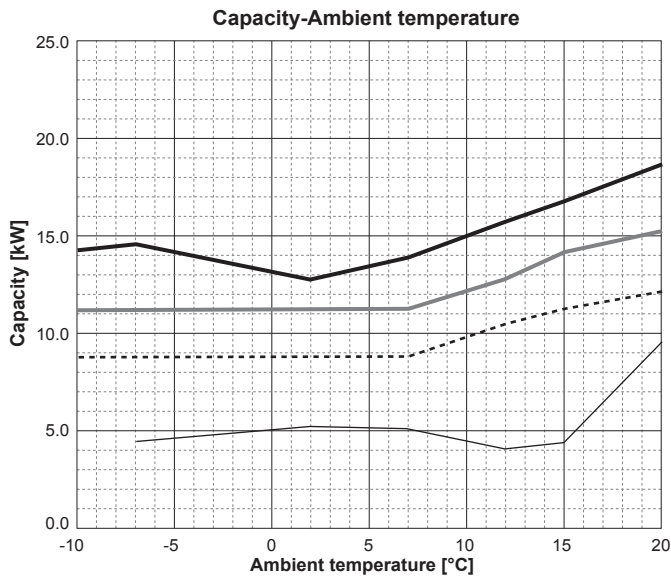
Outdoor unit

PUHZ-SHW112V/YHA

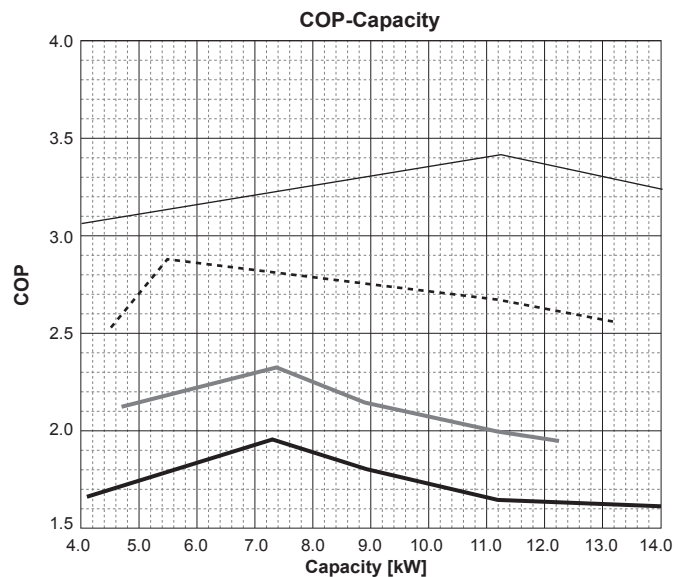
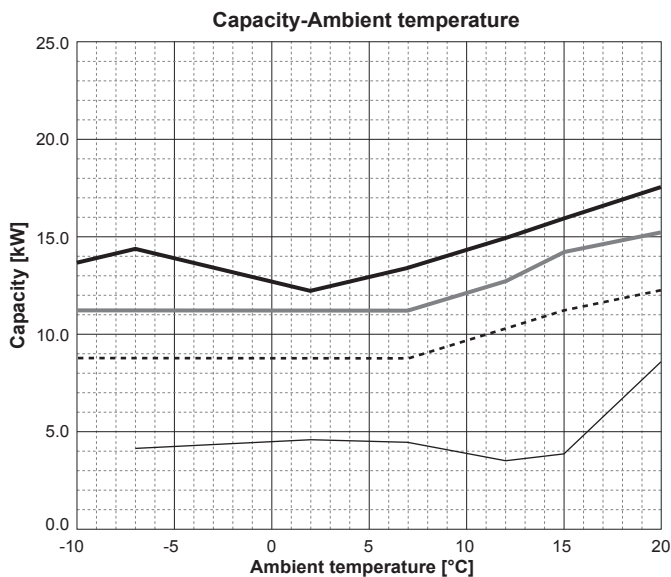
Water outlet temperature 35 [°C]



Water outlet temperature 45 [°C]

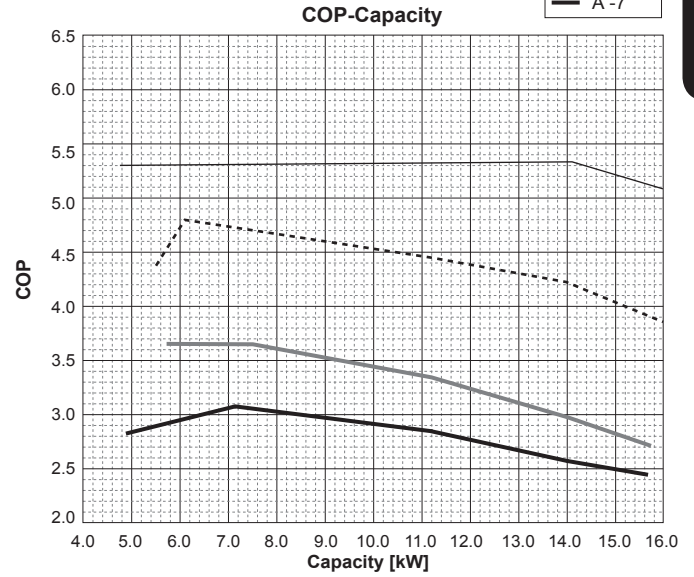
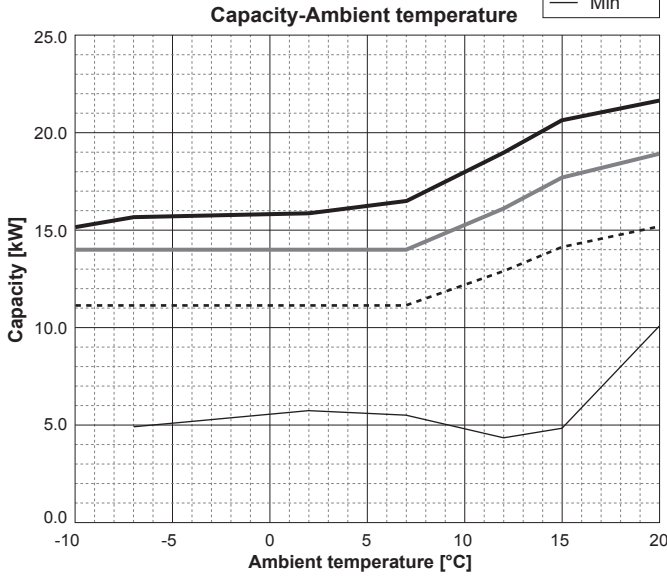


Water outlet temperature 55 [°C]

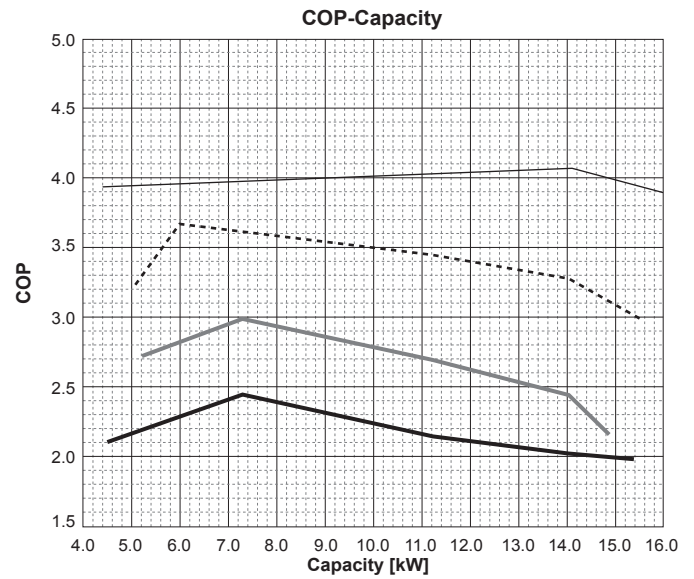
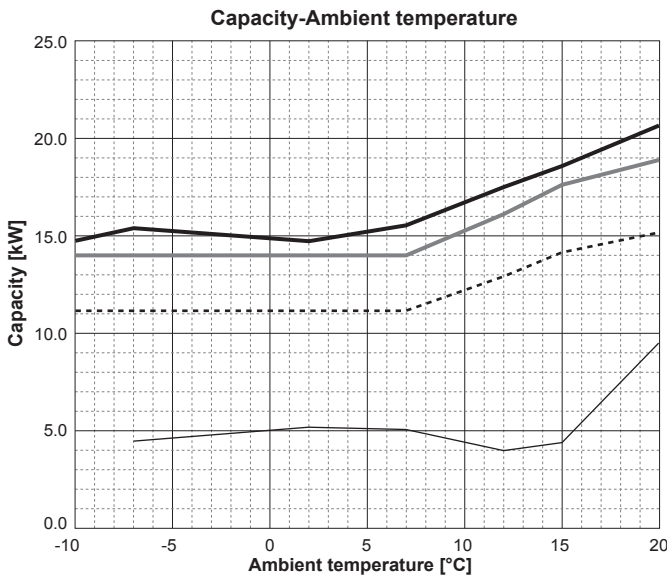


PUHZ-SHW140YHA

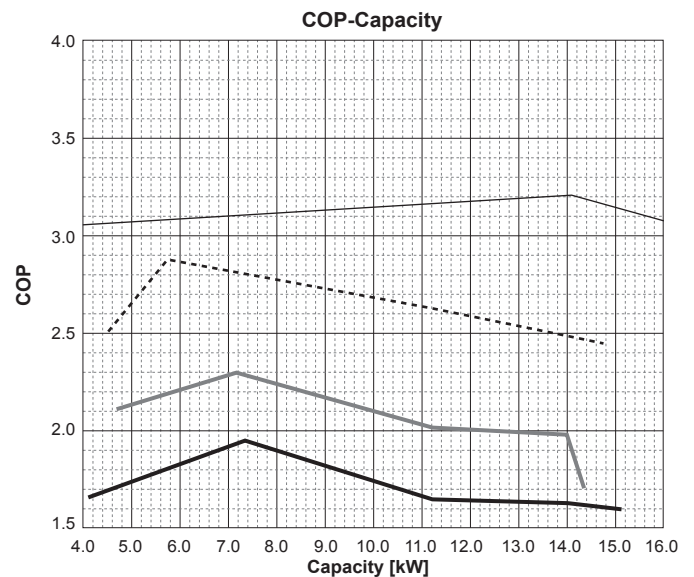
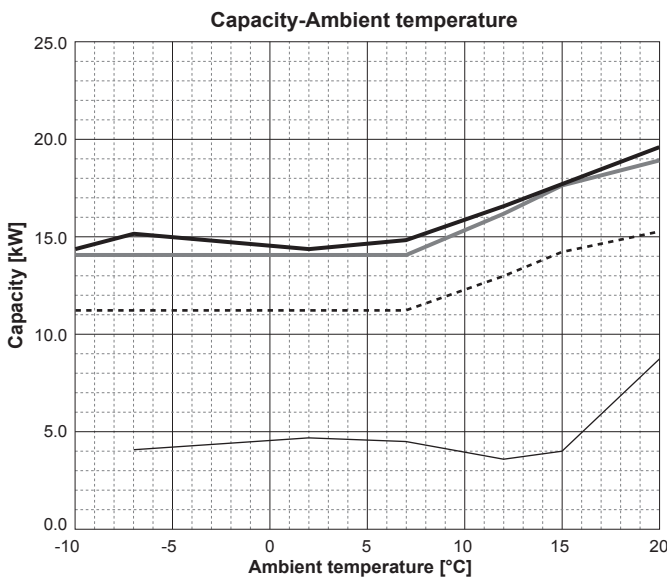
Water outlet temperature 35 [°C]



Water outlet temperature 45 [°C]



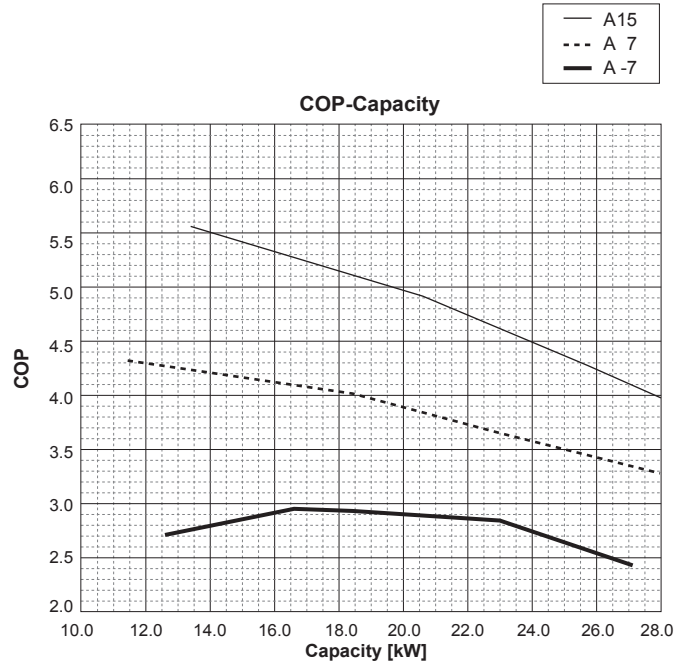
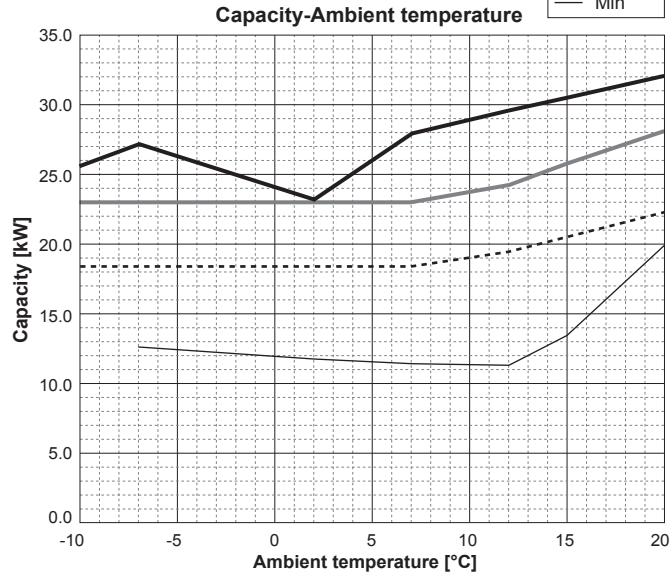
Water outlet temperature 55 [°C]



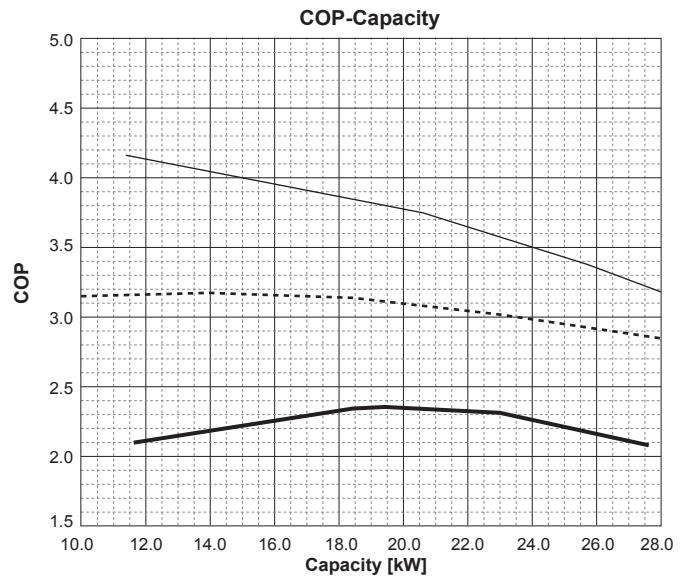
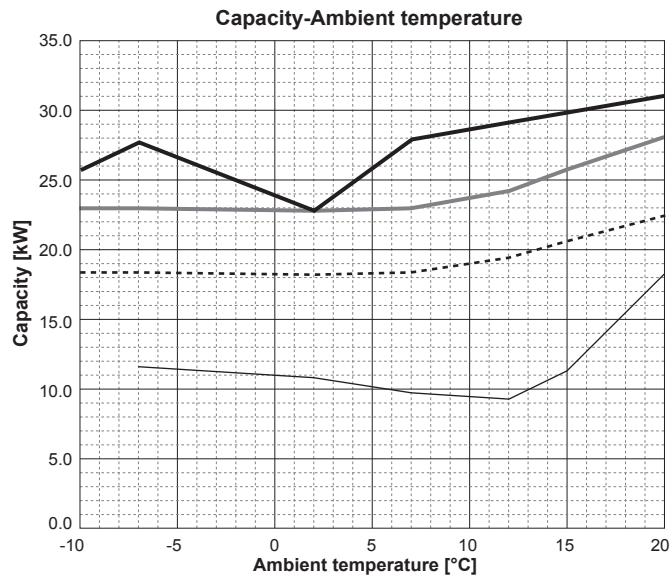
Outdoor unit

PUHZ-SHW230YKA

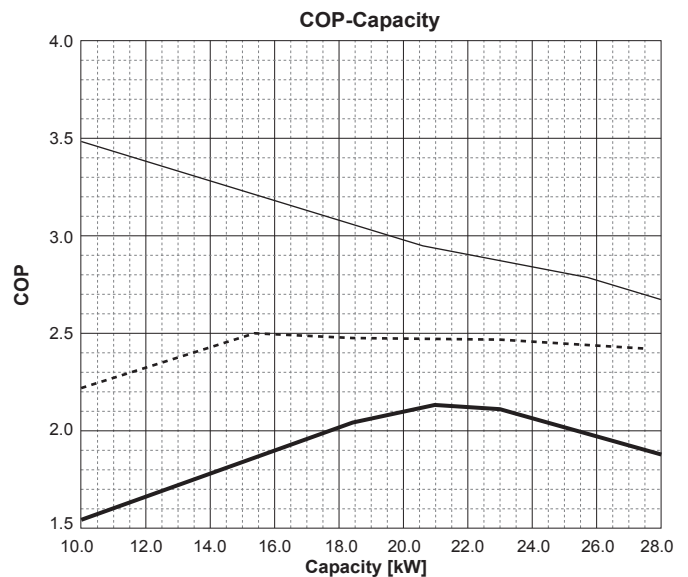
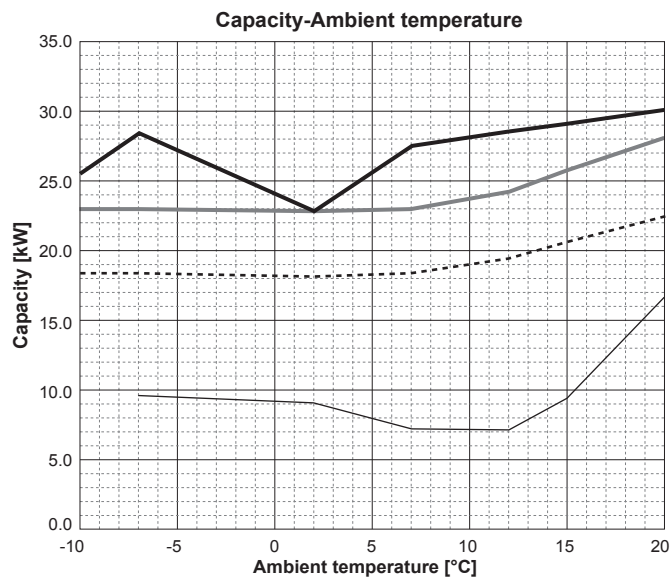
■ Water outlet temperature 35 [°C]



■ Water outlet temperature 45 [°C]



■ Water outlet temperature 55 [°C]



5.4 Best COP

■ Power inverter

<Notes>

- 1) These data are measured based on EN14511-2011.
- 2) Max COP of each model at each condition are shown.

Water outlet temperature[°C]		35		45		55	
Ambient temperature[°C]		Capacity	COP	Capacity	COP	Capacity	COP
PUHZ-SW 40VHA(-BS)	-7	3.49	2.85	3.36	2.15	3.24	1.65
	2	3.04	3.58	3.14	2.74	3.18	1.98
		2.85	3.72	2.82	2.87	2.79	2.08
PUHZ-SW 50VHA(-BS)	-7	3.52	2.85	3.39	2.16	3.26	1.66
	2	3.06	3.60	3.16	2.76	3.21	1.99
		2.87	3.74	2.85	2.88	2.82	2.09
PUHZ-SW 75VHA(-BS)	-7	6.16	2.95	5.92	2.26	5.33	1.80
	2	5.11	3.60	4.73	3.05	4.18	2.28
		4.57	3.71	4.23	3.12	3.75	2.35
PUHZ-SW 100V/YHA(-BS)	-7	7.15	2.95	7.35	2.27	7.48	1.68
	2	7.32	3.69	7.17	2.86	6.89	2.15
		6.74	3.88	6.63	2.97	6.42	2.29
PUHZ-SW 120V/YHA(-BS)	-7	8.11	2.92	8.34	2.26	8.56	1.76
	2	7.81	3.67	7.54	2.88	7.32	2.12
		6.82	3.84	6.78	2.97	6.72	2.21
7	9.24	4.65	9.55	3.54	9.89	2.71	

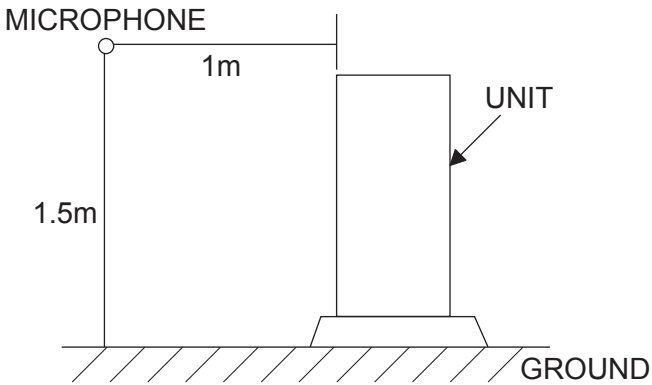
■ Mr.SLIM+

Water outlet temperature[°C]		35		45		55	
Ambient temperature[°C]		Capacity	COP	Capacity	COP	Capacity	COP
PUHZ-FRP 71VHA	-7	3.40	3.05	3.20	2.45	2.20	2.05
	2	4.70	3.55	4.00	3.00	3.20	2.35
		4.40	3.65	3.90	3.10	2.90	2.45
7	5.40	4.55	4.50	3.65	3.70	2.75	

■ Zubadan

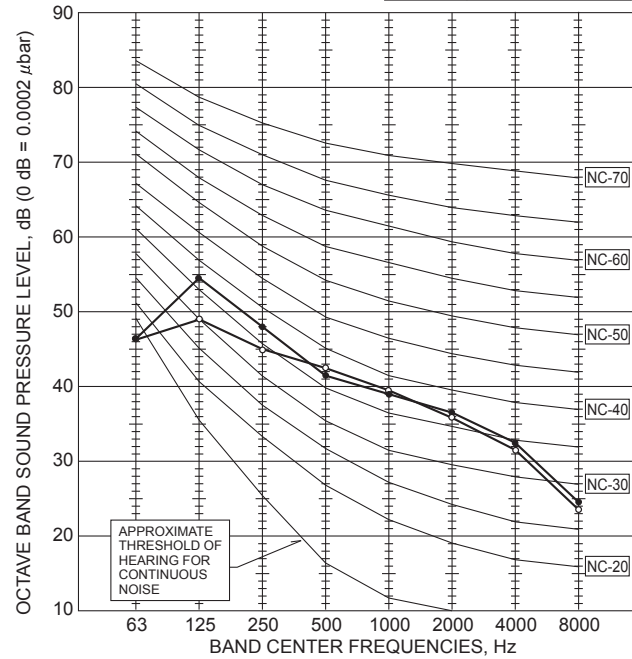
Water outlet temperature[°C]		35		45		55	
Ambient temperature[°C]		Capacity	COP	Capacity	COP	Capacity	COP
PUHZ-SHW 80VHA	-7	7.18	3.20	7.33	2.46	7.40	1.97
	2	7.54	3.68	7.35	3.00	7.21	2.33
		6.82	4.06	6.72	3.15	6.66	2.46
PUHZ-SHW 112V/YHA	-7	7.16	3.18	7.31	2.45	7.38	1.96
	2	7.52	3.66	7.33	2.99	7.19	2.32
		6.80	4.04	6.70	3.13	6.64	2.45
PUHZ-SHW 140YHA	-7	7.14	3.18	7.29	2.44	7.36	1.96
	2	7.50	3.65	7.31	2.98	7.17	2.31
		6.79	4.03	6.69	3.13	6.63	2.44
PUHZ-SHW 230YKA	-7	16.68	2.95	19.41	2.37	20.98	2.13
	2	13.20	3.45	13.04	2.59	12.91	2.27
		12.49	3.55	12.22	2.73	12.00	2.33
7	11.43	4.31	13.94	3.17	15.42	2.50	

6.1 Packaged-type units



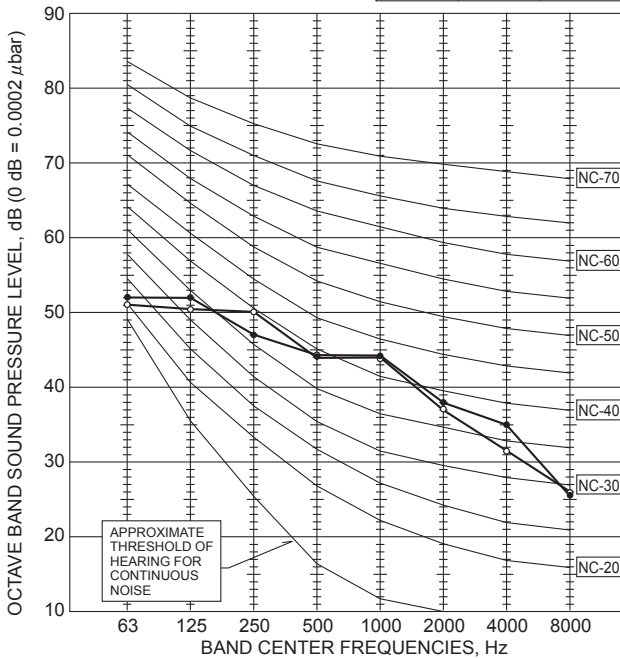
PUHZ-W50VHA(-BS)

MODE	SPL(dB)	LINE
COOLING	45	○—○
HEATING	46	●—●



PUHZ-W85VHA2(-BS)

MODE	SPL(dB)	LINE
COOLING	48	○—○
HEATING	48	●—●

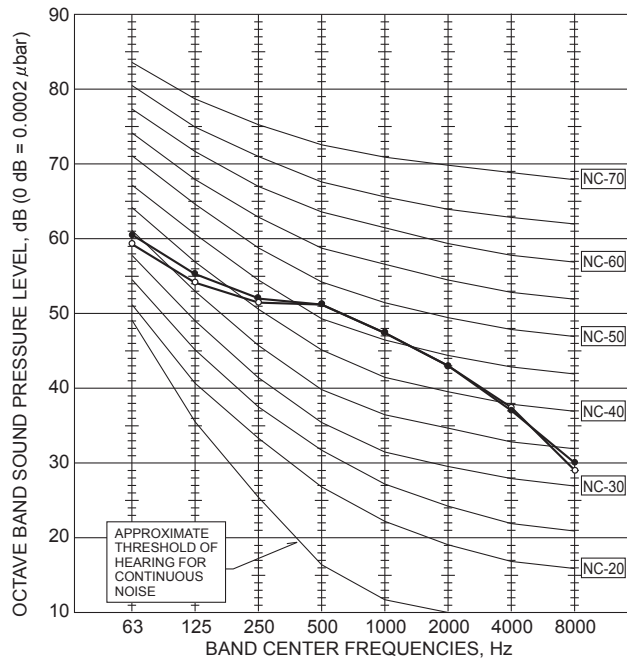


PUHZ-HW112YHA2(-BS)

PUHZ-HW140VHA2(-BS)

PUHZ-HW140YHA2(-BS)

MODE	SPL(dB)	LINE
COOLING	53	○—○
HEATING	53	●—●

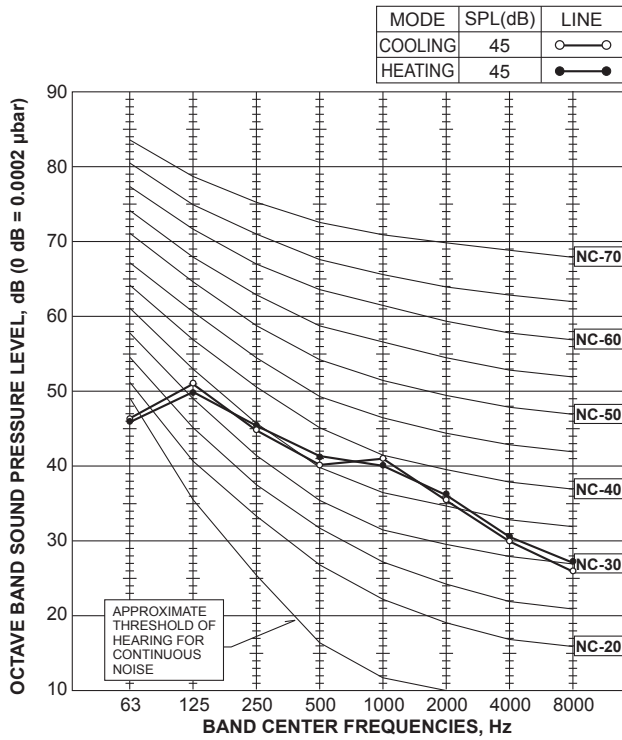


<Notes>

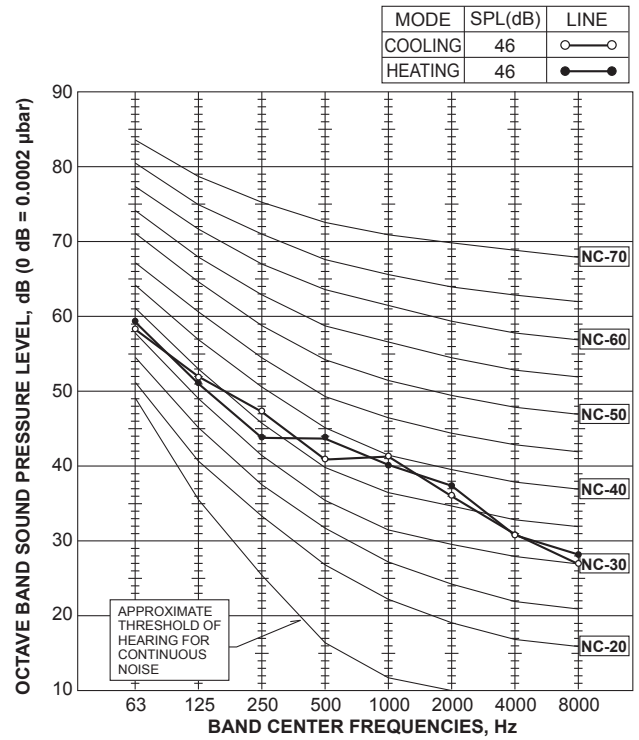
- 1) Sound data is taken when the system is running stably.
- 2) Relatively large noise could be heard transiently in the case 4-way valve, or LEV operates.

6.2 Split-type units

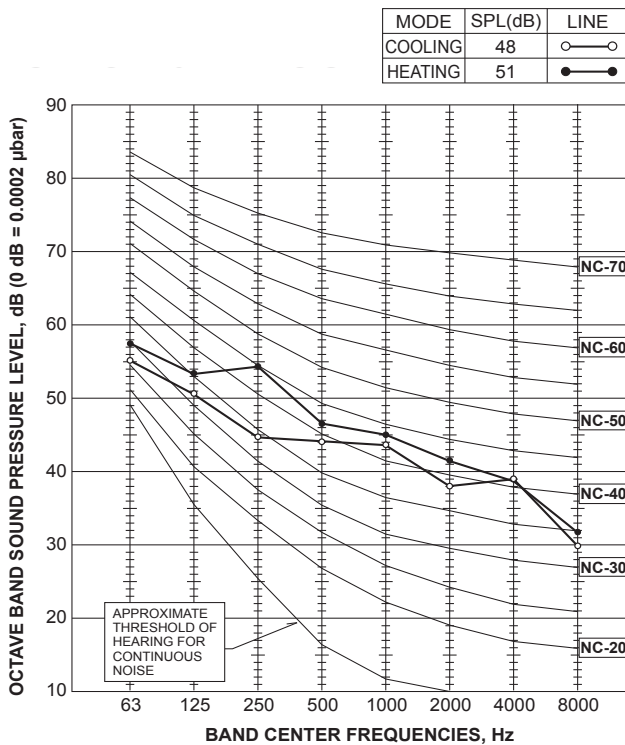
■ PUIZ-SW40VHA(-BS)



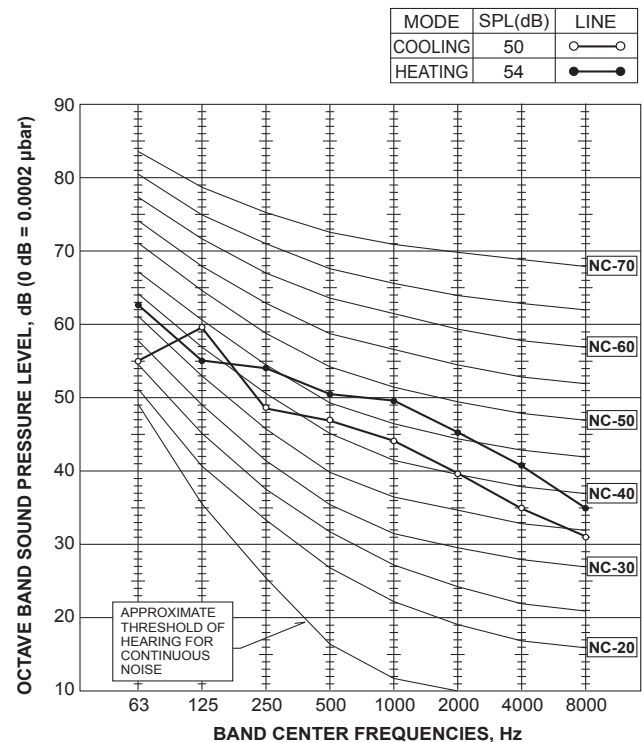
■ PUIZ-SW50VHA(-BS)



■ PUIZ-SW75VHA(-BS)



■ PUIZ-SW100VHA(-BS) PUIZ-SW100YHA(-BS)



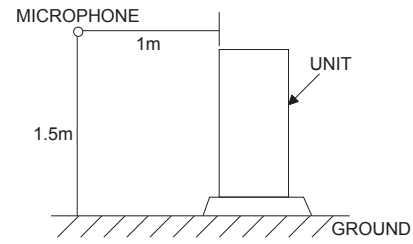
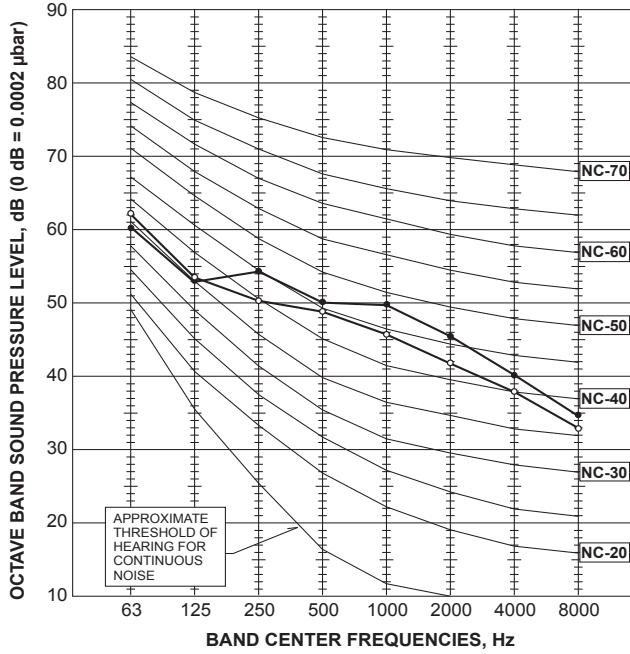
<Notes>

- 1) Sound data is taken when the system is running stably.
- 2) Relatively large noise could be heard transiently in the case 4-way valve, or LEV operates.

Outdoor unit

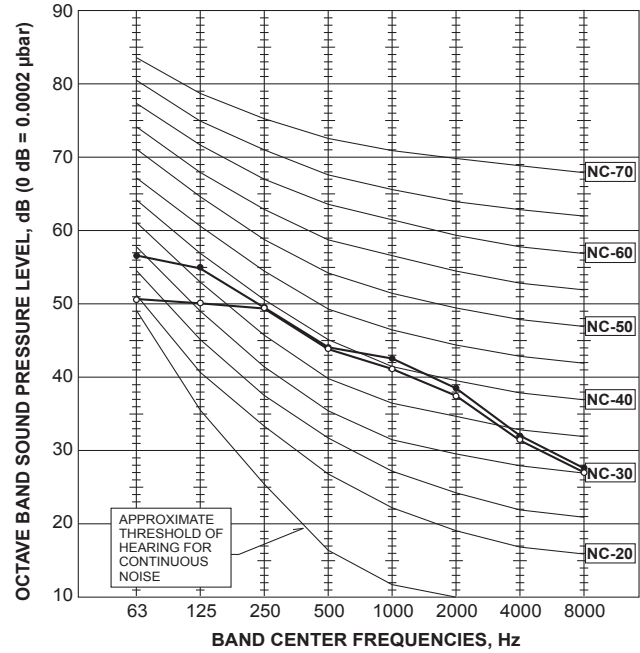
PUHZ-SW120VHA(-BS) PUHZ-SW120YHA(-BS)

MODE	SPL(dB)	LINE
COOLING	51	
HEATING	54	



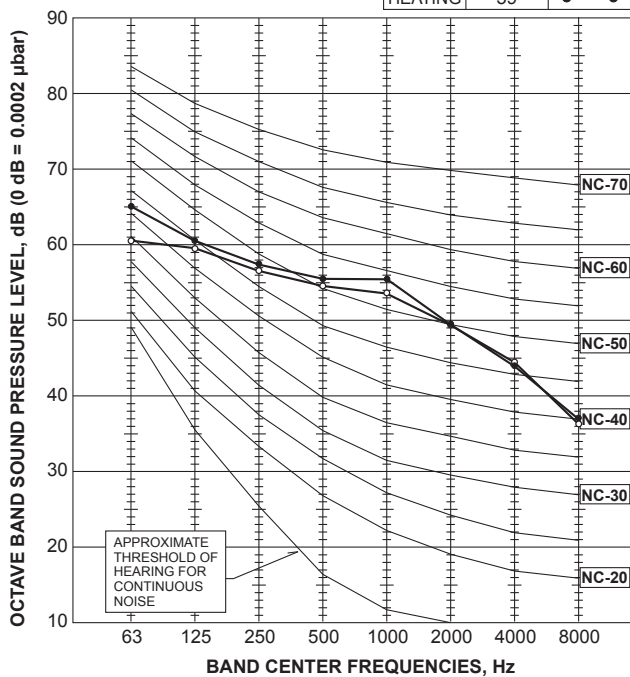
PUHZ-FRP71VHA

MODE	SPL(dB)	LINE
ATA Cooling, HR Cooling	47	
ATA Heating, ATW Heating	48	



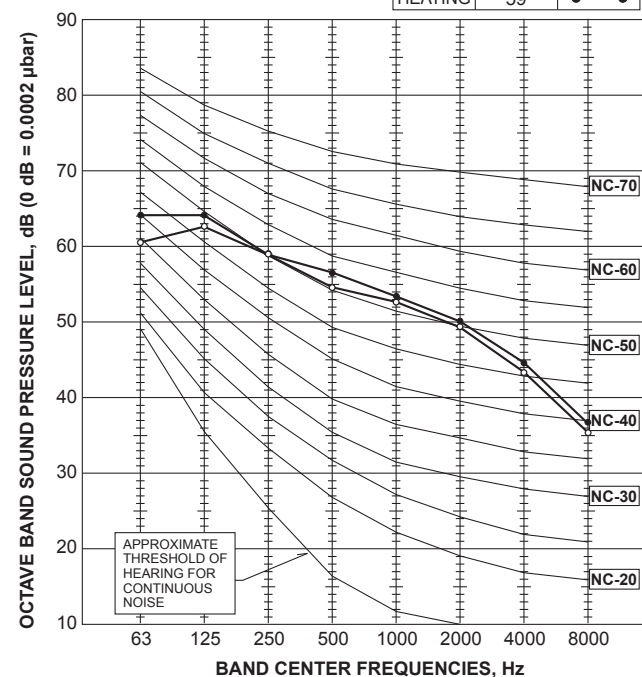
PUHZ-RP200YKA

MODE	SPL(dB)	LINE
COOLING	58	
HEATING	59	



PUHZ-RP250YKA

MODE	SPL(dB)	LINE
COOLING	58	
HEATING	59	

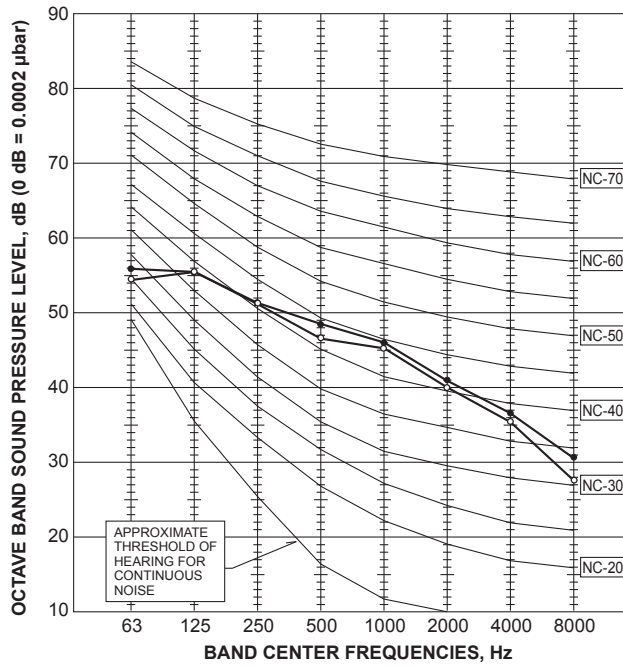


<Notes>

- 1) Sound data is taken when the system is running stably.
- 2) Relatively large noise could be heard transiently in the case 4-way valve, or LEV operates.

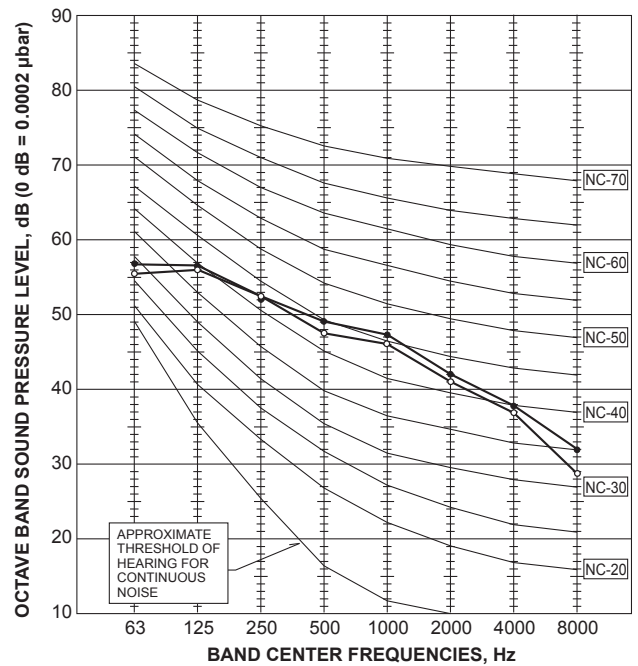
PUHZ-SHW80VHA

MODE	SPL(dB)	LINE
COOLING	50	○—○
HEATING	51	●—●



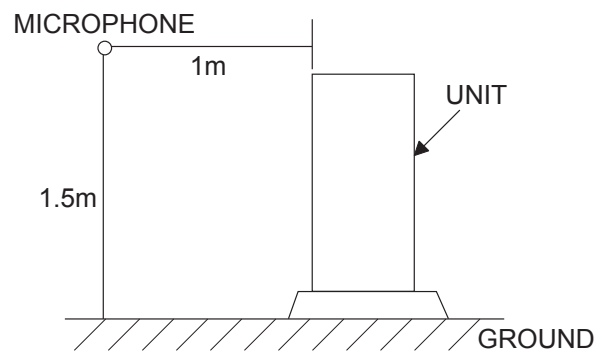
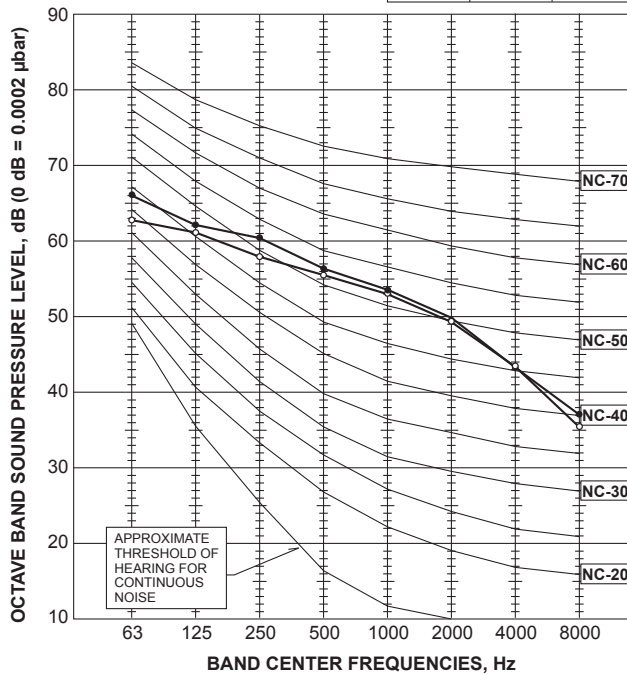
PUHZ-SHW112VHA PUHZ-SHW112/140YHA

MODE	SPL(dB)	LINE
COOLING	51	○—○
HEATING	52	●—●



PUHZ-SHW230YKA

MODE	SPL(dB)	LINE
COOLING	58	○—○
HEATING	59	●—●



<Notes>

- 1) Sound data is taken when the system is running stably.
- 2) Relatively large noise could be heard transiently in the case 4-way valve, or LEV operates.

1.Type:

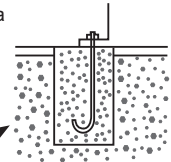
2.Model name:

3.Specification

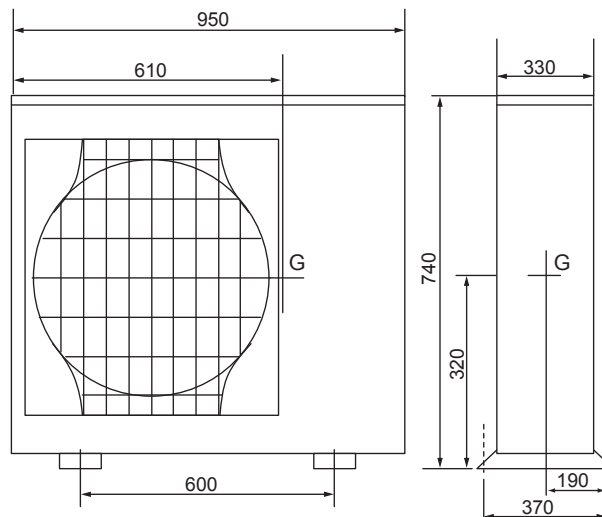
- | | | | |
|---|-----|----------------------------------|---|
| (1) Unit mass | W= | <input type="text" value="64"/> | kg |
| (2) Anchor bolt | | | |
| 1.The total number of bolts | N= | <input type="text" value="4"/> | |
| 2.The size and shape | "=M | <input type="text" value="10"/> | type |
| 3.The axis section area per one bolt | A= | <input type="text" value="78"/> | mm ² = <input type="text" value="78"/> × 10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= | <input type="text" value="2"/> | |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= | <input type="text" value="320"/> | mm= <input type="text" value="0.320"/> m |
| (4) The bolt-span from the examination angle | L= | <input type="text" value="370"/> | mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= | <input type="text" value="190"/> | mm(Lg ≤ L/2)= <input type="text" value="0.190"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | | | | |
|--|---|--|--|---|
| (1) The horizontal seismic coefficient for designing | Kh= | <input type="text" value="1.0"/> | | |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= | <input type="text" value="0.5"/> | | |
| (3) The horizontal earthquake forces for designing | Fh=Kh · W · 9.8= | <input type="text" value="627.2"/> | N | |
| (4) The vertical earthquake forces for designing | Fv=Kv · W · 9.8= | <input type="text" value="313.6"/> | N | |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g \cdot (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ | = | <input type="text" value="190.7"/> | N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= | <input type="text" value="156.8"/> | N | |
| (7) The stress arising to the anchor bolt | | | | |
| 1.The tensile stress | $\sigma = R_b / A =$ | <input type="text" value="2.4"/> | MPa < ft=176.4MPa | |
| 2.The shearing stress | $\tau = Q / A =$ | <input type="text" value="2.0"/> | MPa < fs=132.3MPa | |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4\sigma + 1.6\tau =$ | <input type="text" value="243.7"/> | MPa | |
| | $\sigma =$ | <input type="text" value="2.4"/> | MPa | |
| | < f _{ts} = | <input type="text" value="176.4"/> | MPa | |
| (8) The construction way of the anchor bolt | | | | |
| 1.The construction way of the anchor bolt | = | <input type="text" value="Boxed J type anchor"/> | | |
| 2.The thickness of the concrete | = | <input type="text" value="120"/> | mm= <input type="text" value="0.120"/> m | |
| 3.The length of buried part of bolt | = | <input type="text" value="70"/> | mm= <input type="text" value="0.070"/> m | |
| 4.The permissible withdrawal weight | Ta= | <input type="text" value="3136"/> | N > Rb= <input type="text" value="190.7"/> N | |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

2.Model name:

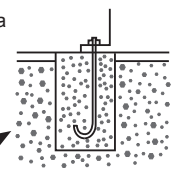
3.Specification

- | | |
|---|---|
| (1) Unit mass | W= <input type="text" value="79"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts | N= <input type="text" value="4"/> |
| 2.The size and shape | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt | A= <input type="text" value="78"/> mm ² = <input type="text" value="78 × 10<sup>-6"/> "/> m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="400"/> mm= <input type="text" value="0.400"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="180"/> mm(Lg ≤ L/2)= <input type="text" value="0.180"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

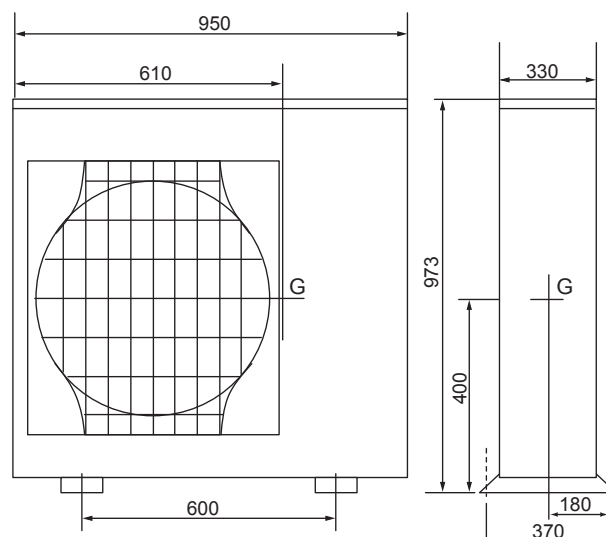
- | | |
|--|--|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh · W · 9.8= <input type="text" value="774.2"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv · W · 9.8= <input type="text" value="387.1"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g - (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="324.3"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="193.6"/> N |
| (7) The stress arising to the anchor bolt | |

- | | |
|--|---|
| 1.The tensile stress | $\sigma = R_b/A =$ <input type="text" value="4.2"/> MPa < $f_t = 176.4$ MPa |
| 2.The shearing stress | $\tau = Q/A =$ <input type="text" value="2.5"/> MPa < $f_s = 132.3$ MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4\sigma + 1.6\tau =$ <input type="text" value="243.0"/> MPa |
| | $\sigma =$ <input type="text" value="4.2"/> MPa < $f_{ts} = 176.4$ MPa |



- | | |
|---|--|
| (8) The construction way of the anchor bolt | = <input type="text" value="Boxed J type anchor"/> |
| 1.The construction way of the anchor bolt | |
| 2.The thickness of the concrete | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="324.3"/> N |

Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

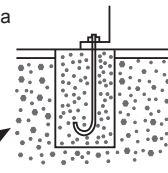
2.Model name:

3.Specification

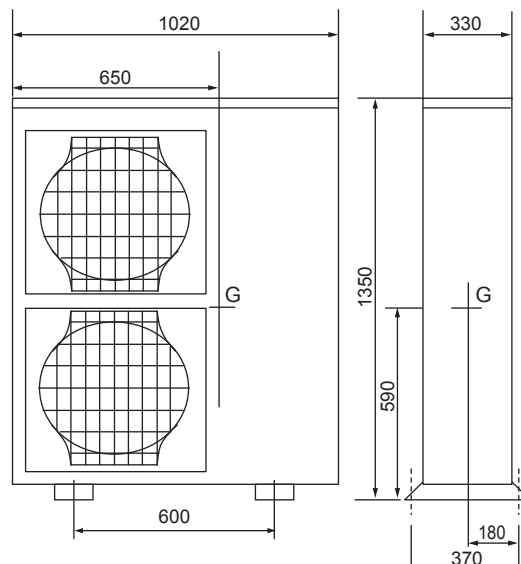
- | | |
|---|---|
| (1) Unit mass | W= <input type="text" value="134"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts | N= <input type="text" value="4"/> |
| 2.The size and shape | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt. | A= <input type="text" value="78"/> mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="590"/> mm= <input type="text" value="0.590"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="180"/> mm(Lg≤L/2)= <input type="text" value="0.180"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | |
|---|--|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh·W·9.8= <input type="text" value="1313.2"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv·W·9.8= <input type="text" value="656.6"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g - (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="887.3"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="328.3"/> N |
| (7) The stress arising to the anchor bolt | |
| 1.The tensile stress | $\sigma = R_b/A =$ <input type="text" value="11.4"/> MPa < ft=176.4MPa |
| 2.The shearing stress | $\tau = Q/A =$ <input type="text" value="4.2"/> Pa < fs=132.3MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time. | $f_{ts} = 1.4\tau - 1.6\sigma =$ <input type="text" value="240.2"/> MPa |
| | $\sigma =$ <input type="text" value="11.4"/> MPa < $f_{ts} =$ <input type="text" value="176.2"/> MPa |
| (8) The construction way of the anchor bolt | |
| 1.The construction way of the anchor bolt | = <input type="text" value="Boxed J type anchor"/> |
| 2.The thickness of the concrete | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="887.3"/> N |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

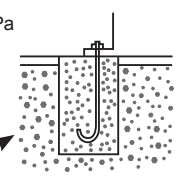
2.Model name:

3.Specification

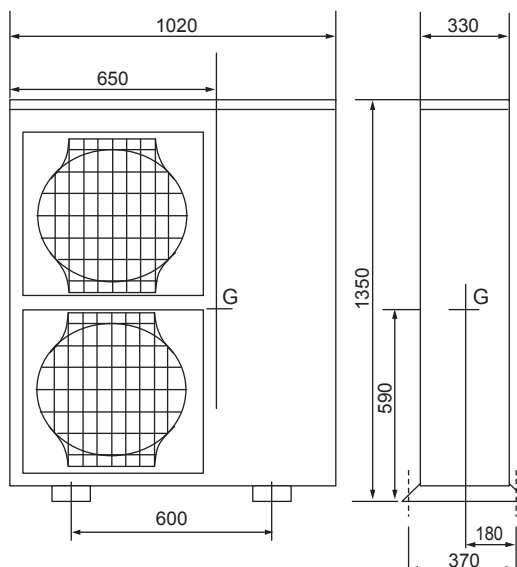
- | | |
|---|---|
| (1) Unit mass | W= <input type="text" value="148"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts | N= <input type="text" value="4"/> |
| 2.The size and shape | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt | A= <input type="text" value="78"/> mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="590"/> mm= <input type="text" value="0.590"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="180"/> mm(Lg ≤ L/2)= <input type="text" value="0.180"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | |
|--|--|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh · W · 9.8= <input type="text" value="1450.4"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv · W · 9.8= <input type="text" value="725.2"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g - (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="980.0"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="362.6"/> N |
| (7) The stress arising to the anchor bolt | |
| 1.The tensile stress | $\sigma = R_b / A =$ <input type="text" value="12.6"/> MPa < ft=176.4MPa |
| 2.The shearing stress | $\tau = Q / A =$ <input type="text" value="4.6"/> MPa < fs=132.3MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time | fts=1.4 τ -1.6 σ = <input type="text" value="239.5"/> MPa
< fts= <input type="text" value="176.4"/> MPa |
| (8) The construction way of the anchor bolt | |
| 1.The construction way of the anchor bolt | = <input type="text" value="Boxed J type anchor"/> |
| 2.The thickness of the concrete | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="980"/> N |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

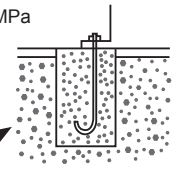
2.Model name:

3.Specification

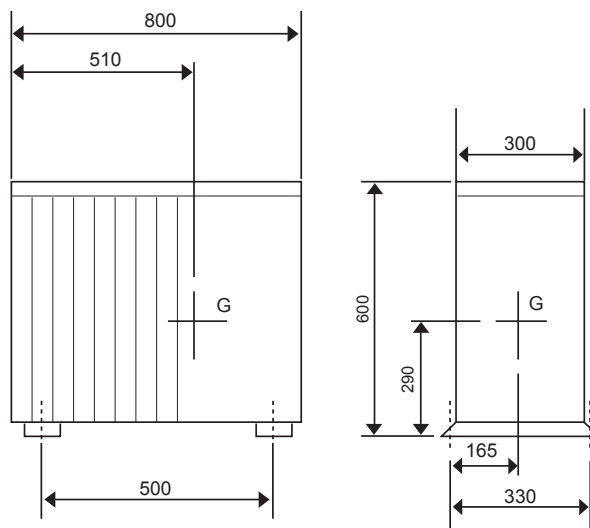
- | | | | |
|---|-----|----------------------------------|--|
| (1) Unit mass | W= | <input type="text" value="42"/> | kg |
| (2) Anchor bolt | | | |
| 1.The total number of bolts | N= | <input type="text" value="4"/> | |
| 2.The size and shape | "=M | <input type="text" value="10"/> | type |
| 3.The axis section area per one bolt | A= | <input type="text" value="78"/> | mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= | <input type="text" value="2"/> | |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= | <input type="text" value="290"/> | mm= <input type="text" value="0.290"/> m |
| (4) The bolt-span from the examination angle | L= | <input type="text" value="330"/> | mm= <input type="text" value="0.330"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= | <input type="text" value="165"/> | mm(Lg ≤ L/2)= <input type="text" value="0.165"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | | | | |
|--|---|--|---|-----|
| (1) The horizontal seismic coefficient for designing | Kh= | <input type="text" value="1.0"/> | | |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= | <input type="text" value="0.5"/> | | |
| (3) The horizontal earthquake forces for designing | Fh=Kh · W · 9.8= | <input type="text" value="411.6"/> | N | |
| (4) The vertical earthquake forces for designing | Fv=Kv · W · 9.8= | <input type="text" value="205.8"/> | N | |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g - (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ | = | <input type="text" value="129.4"/> | N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= | <input type="text" value="102.9"/> | N | |
| (7) The stress arising to the anchor bolt | | | | |
| 1.The tensile stress | $\sigma = R_b / A =$ | <input type="text" value="1.7"/> | MPa < $f_t = 176.4$ MPa | |
| 2.The shearing stress | $\tau = Q / A =$ | <input type="text" value="1.3"/> | MPa < $f_s = 132.3$ MPa | |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4f_t - 1.6\tau =$ | <input type="text" value="244.9"/> | MPa | |
| | $\sigma =$ | <input type="text" value="1.7"/> | MPa < $f_{ts} =$ <input type="text" value="244.9"/> | MPa |
| (8) The construction way of the anchor bolt | | | | |
| 1.The construction way of the anchor bolt | = | <input type="text" value="Boxed J type anchor"/> | | |
| 2.The thickness of the concrete | = | <input type="text" value="120"/> | mm= <input type="text" value="0.120"/> m | |
| 3.The length of buried part of bolt | = | <input type="text" value="70"/> | mm= <input type="text" value="0.070"/> m | |
| 4.The permissible withdrawal weight | Ta= | <input type="text" value="3136"/> | N > Rb= <input type="text" value="129"/> | N |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

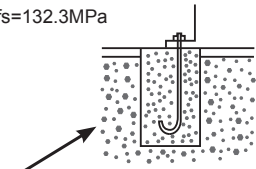
2.Model name:

3.Specification

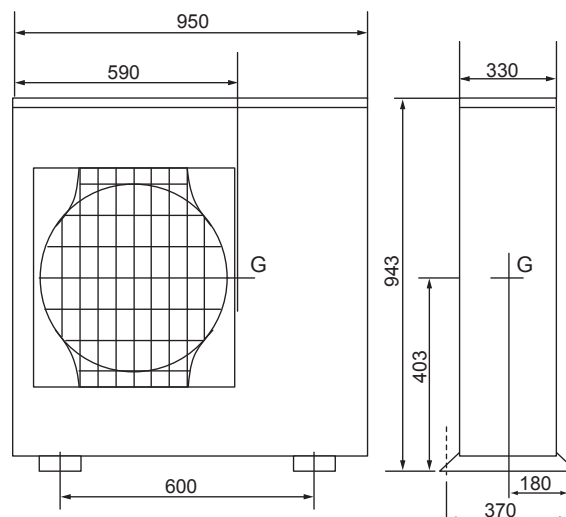
- | | |
|---|---|
| (1) Unit mass | W= <input type="text" value="75"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts | N= <input type="text" value="4"/> |
| 2.The size and shape | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt | A= <input type="text" value="78"/> mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="403"/> mm= <input type="text" value="0.403"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="180"/> mm(Lg≤L/2)= <input type="text" value="0.180"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | |
|--|--|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh·W·9.8= <input type="text" value="735.0"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv·W·9.8= <input type="text" value="367.5"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g \cdot (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="311.0"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="183.8"/> N |
| (7) The stress arising to the anchor bolt | |
| 1.The tensile stress | $\sigma = R_b/A =$ <input type="text" value="4.0"/> MPa < ft=176.4MPa |
| 2.The shearing stress | $\tau = Q/A =$ <input type="text" value="2.4"/> MPa < fs=132.3MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4\sigma - 1.6\tau =$ <input type="text" value="243.1"/> MPa |
| | $\sigma =$ <input type="text" value="3.6"/> MPa < fts= <input type="text" value="243.1"/> MPa |
| (8) The construction way of the anchor bolt | |
| 1.The construction way of the anchor bolt | = <input type="text" value="Boxed J type anchor"/> |
| 2.The thickness of the concrete | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="311"/> N |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

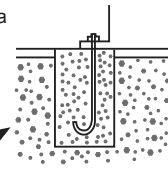
2.Model name:

3.Specification

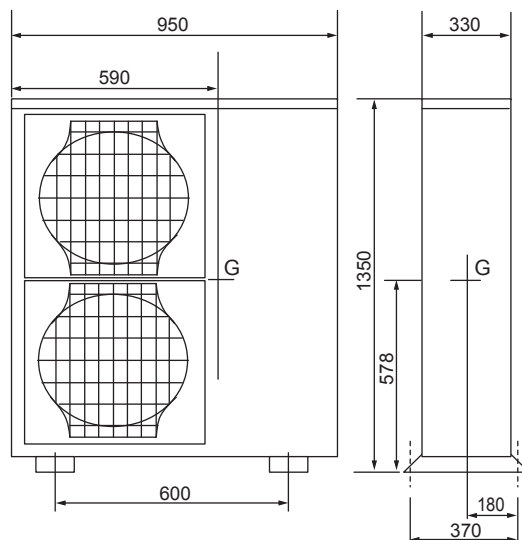
- | | | | |
|---|-----|----------------------------------|--|
| (1) Unit mass | W= | <input type="text" value="118"/> | kg |
| (2) Anchor bolt | | | |
| 1.The total number of bolts | N= | <input type="text" value="4"/> | |
| 2.The size and shape | "=M | <input type="text" value="10"/> | type |
| 3.The axis section area per one bolt | A= | <input type="text" value="78"/> | mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= | <input type="text" value="2"/> | |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= | <input type="text" value="578"/> | mm= <input type="text" value="0.578"/> m |
| (4) The bolt-span from the examination angle | L= | <input type="text" value="370"/> | mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= | <input type="text" value="180"/> | mm(Lg ≤ L/2)= <input type="text" value="0.180"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | | | | |
|--|---|--|--|---|
| (1) The horizontal seismic coefficient for designing | Kh= | <input type="text" value="1.0"/> | | |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= | <input type="text" value="0.5"/> | | |
| (3) The horizontal earthquake forces for designing | Fh=Kh · W · 9.8= | <input type="text" value="1156.4"/> | N | |
| (4) The vertical earthquake forces for designing | Fv=Kv · W · 9.8= | <input type="text" value="578.2"/> | N | |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g \cdot (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ | = | <input type="text" value="763.0"/> | N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= | <input type="text" value="289.1"/> | N | |
| (7) The stress arising to the anchor bolt | | | | |
| 1.The tensile stress | $\sigma = R_b / A =$ | <input type="text" value="9.8"/> | MPa < ft=176.4MPa | |
| 2.The shearing stress | $\tau = Q / A =$ | <input type="text" value="3.7"/> | MPa < fs=132.3MPa | |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4\tau - 1.6\tau =$ | <input type="text" value="241.0"/> | MPa | |
| | $\sigma =$ | <input type="text" value="9.8"/> | MPa < fts= | |
| | | <input type="text" value="241.0"/> | MPa | |
| (8) The construction way of the anchor bolt | | | | |
| 1.The construction way of the anchor bolt | = | <input type="text" value="Boxed J type anchor"/> | | |
| 2.The thickness of the concrete | = | <input type="text" value="120"/> | mm= <input type="text" value="0.120"/> m | |
| 3.The length of buried part of bolt | = | <input type="text" value="70"/> | mm= <input type="text" value="0.070"/> m | |
| 4.The permissible withdrawal weight | Ta= | <input type="text" value="3136"/> | N > Rb= <input type="text" value="776"/> | |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

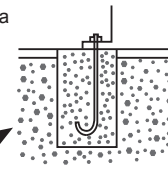
2.Model name:

3.Specification

- | | |
|---|---|
| (1) Unit mass | W= <input type="text" value="130"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts | N= <input type="text" value="4"/> |
| 2.The size and shape | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt | A= <input type="text" value="78"/> mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="578"/> mm= <input type="text" value="0.578"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="180"/> mm(Lg≤L/2)= <input type="text" value="0.180"/> m |

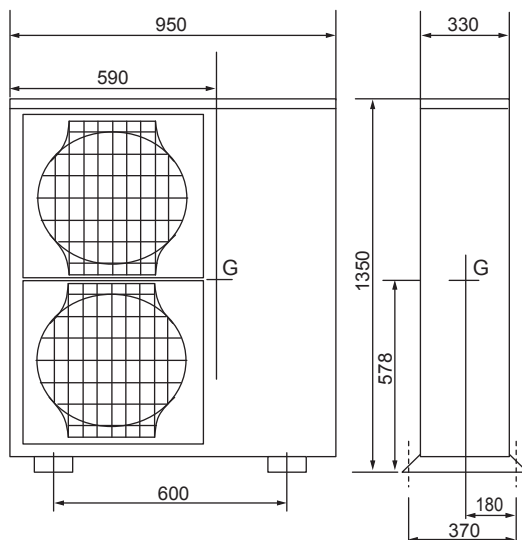
4.The examination calculation (by rounding off to the first decimal place of each item)

- | | |
|--|--|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh·W·9.8= <input type="text" value="1274.0"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv·W·9.8= <input type="text" value="637.0"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g - (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="840.0"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="318.5"/> N |
| (7) The stress arising to the anchor bolt | |
| 1.The tensile stress | $\sigma = R_b / A =$ <input type="text" value="10.8"/> MPa < ft=176.4MPa |
| 2.The shearing stress | $\tau = Q / A =$ <input type="text" value="4.1"/> MPa < fs=132.3MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4f_t - 1.6\tau =$ <input type="text" value="240.4"/> MPa |
| | $\sigma =$ <input type="text" value="10.8"/> MPa < $f_{ts} =$ <input type="text" value="240.4"/> MPa |



- | | |
|---|--|
| (8) The construction way of the anchor bolt | |
| 1.The construction way of the anchor bolt | = <input type="text" value="Boxed J type anchor"/> |
| 2.The thickness of the concrete | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="776"/> N |

Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

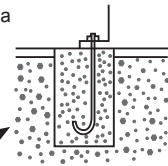
2.Model name:

3.Specification

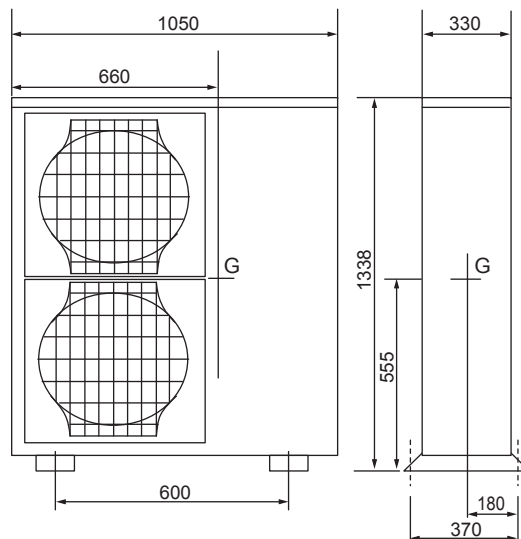
- | | |
|--|---|
| (1) Unit mass | W= <input type="text" value="135"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts. | N= <input type="text" value="4"/> |
| 2.The size and shape. | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt. | A= <input type="text" value="78"/> mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted. | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="555"/> mm= <input type="text" value="0.555"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="180"/> mm(Lg≤L/2)= <input type="text" value="0.180"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | |
|---|--|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh·W·9.8= <input type="text" value="1323.0"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv·W·9.8= <input type="text" value="661.5"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g - (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="831.3"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="330.8"/> N |
| (7) The stress arising to the anchor bolt | |
| 1.The tensile stress. | $\sigma = R_b/A =$ <input type="text" value="10.7"/> MPa < ft=176.4MPa |
| 2.The shearing stress. | $\tau = Q/A =$ <input type="text" value="4.2"/> MPa < fs=132.3MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time. | $f_{ts} = 1.4\sigma - 1.6\tau =$ <input type="text" value="240.2"/> MPa |
| | $\sigma =$ <input type="text" value="10.7"/> MPa < $f_{ts} =$ <input type="text" value="240.2"/> MPa |
| (8) The construction way of the anchor bolt | |
| 1.The construction way of the anchor bolt. | = <input type="text" value="Boxed J type anchor"/> |
| 2.The thickness of the concrete. | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt. | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight. | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="831"/> N |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

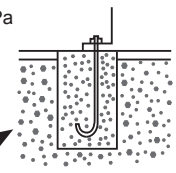
2.Model name:

3.Specification

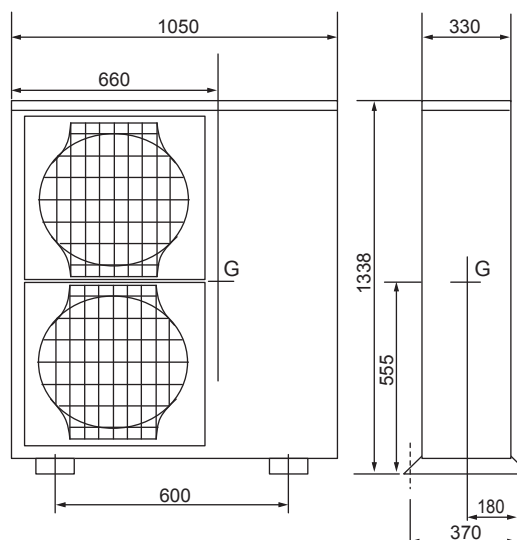
- | | | | |
|--|-----|----------------------------------|--|
| (1) Unit mass | W= | <input type="text" value="141"/> | kg |
| (2) Anchor bolt | | | |
| 1.The total number of bolts. | N= | <input type="text" value="4"/> | |
| 2.The size and shape. | "=M | <input type="text" value="10"/> | type |
| 3.The axis section area per one bolt. | A= | <input type="text" value="78"/> | mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted. | Nt= | <input type="text" value="2"/> | |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= | <input type="text" value="555"/> | mm= <input type="text" value="0.555"/> m |
| (4) The bolt-span from the examination angle | L= | <input type="text" value="370"/> | mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= | <input type="text" value="180"/> | mm(Lg≤L/2)= <input type="text" value="0.180"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | | | | |
|---|---|--|---|-----|
| (1) The horizontal seismic coefficient for designing | Kh= | <input type="text" value="1.0"/> | | |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= | <input type="text" value="0.5"/> | | |
| (3) The horizontal earthquake forces for designing | Fh=Kh·W·9.8= | <input type="text" value="1381.8"/> | N | |
| (4) The vertical earthquake forces for designing | Fv=Kv·W·9.8= | <input type="text" value="690.9"/> | N | |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g - (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ | = | <input type="text" value="868.3"/> | N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= | <input type="text" value="345.5"/> | N | |
| (7) The stress arising to the anchor bolt | | | | |
| 1.The tensile stress. | $\sigma = R_b/A =$ | <input type="text" value="11.1"/> | MPa < $f_t = 176.4$ MPa | |
| 2.The shearing stress. | $\tau = Q/A =$ | <input type="text" value="4.4"/> | MPa < $f_s = 132.3$ MPa | |
| 3.The stress when affected by both the shearing and the tensile at the same time. | $f_{ts} = 1.4f_t - 1.6\tau =$ | <input type="text" value="239.9"/> | MPa | |
| | $\sigma =$ | <input type="text" value="11.1"/> | MPa < $f_{ts} =$ <input type="text" value="239.9"/> | MPa |
| (8) The construction way of the anchor bolt | | | | |
| 1.The construction way of the anchor bolt. | = | <input type="text" value="Boxed J type anchor"/> | | |
| 2.The thickness of the concrete. | = | <input type="text" value="120"/> | mm= <input type="text" value="0.120"/> m | |
| 3.The length of buried part of bolt. | = | <input type="text" value="70"/> | mm= <input type="text" value="0.070"/> m | |
| 4.The permissible withdrawal weight. | Ta= | <input type="text" value="3136"/> | N > Rb= <input type="text" value="868"/> | N |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

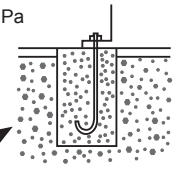
2.Model name:

3.Specification

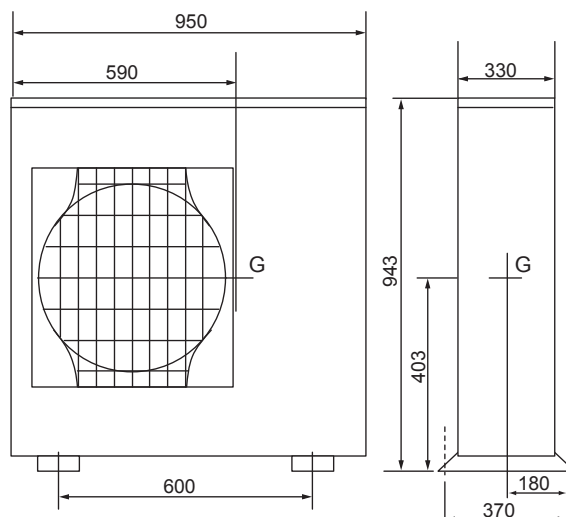
- | | |
|---|---|
| (1) Unit mass | W= <input type="text" value="73"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts | N= <input type="text" value="4"/> |
| 2.The size and shape | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt | A= <input type="text" value="78"/> mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="445"/> mm= <input type="text" value="0.445"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="185"/> mm(Lg≤L/2)= <input type="text" value="0.185"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | |
|--|--|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh·W·9.8= <input type="text" value="715.4"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv·W·9.8= <input type="text" value="357.7"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g \cdot (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="340.8"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="178.9"/> N |
| (7) The stress arising to the anchor bolt | |
| 1.The tensile stress | $\sigma = R_b/A =$ <input type="text" value="4.4"/> MPa < ft=176.4MPa |
| 2.The shearing stress | $\tau = Q/A =$ <input type="text" value="2.3"/> MPa < fs=132.3MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4f_t - 1.6\tau =$ <input type="text" value="242.7"/> MPa |
| | $\sigma =$ <input type="text" value="4.4"/> MPa < $f_{ts} =$ <input type="text" value="242.7"/> MPa |
| (8) The construction way of the anchor bolt | |
| 1.The construction way of the anchor bolt | = <input type="text" value="Boxed J type anchor"/> |
| 2.The thickness of the concrete | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="340.8"/> N |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

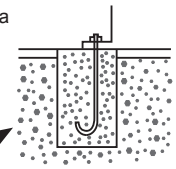
2.Model name:

3.Specification

- | | |
|---|--|
| (1) Unit mass | W= <input type="text" value="120"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts | N= <input type="text" value="4"/> |
| 2.The size and shape | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt | A= <input type="text" value="78"/> mm ² = <input type="text" value="78"/> × 10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="578"/> mm= <input type="text" value="0.578"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="180"/> mm(Lg ≤ L/2)= <input type="text" value="0.180"/> m |

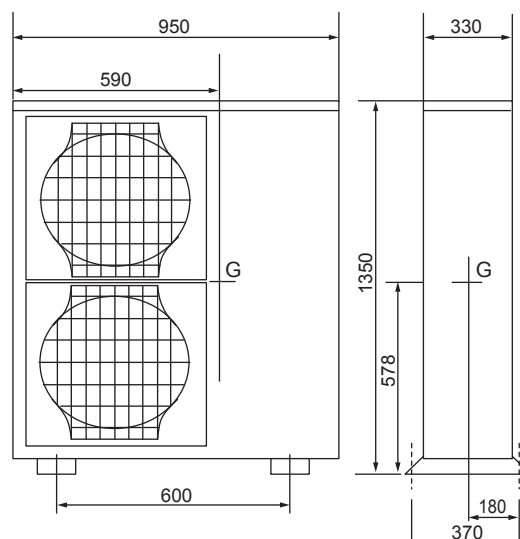
4.The examination calculation (by rounding off to the first decimal place of each item)

- | | |
|--|--|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh · W · 9.8= <input type="text" value="1176.0"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv · W · 9.8= <input type="text" value="588.0"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g \cdot (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="775.5"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="294.0"/> N |
| (7) The stress arising to the anchor bolt | |
| 1.The tensile stress | $\sigma = R_b / A =$ <input type="text" value="9.9"/> MPa < ft=176.4MPa |
| 2.The shearing stress | $\tau = Q / A =$ <input type="text" value="3.8"/> MPa < fs=132.3MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4\tau - 1.6\tau =$ <input type="text" value="240.9"/> MPa |
| | $\sigma =$ <input type="text" value="9.9"/> MPa < $f_{ts} =$ <input type="text" value="240.9"/> MPa |



- | | |
|---|--|
| (8) The construction way of the anchor bolt | |
| 1.The construction way of the anchor bolt | = <input type="text" value="Boxed J type anchor"/> |
| 2.The thickness of the concrete | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="776"/> N |

Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

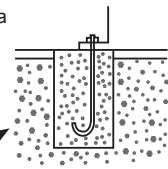
2.Model name:

3.Specification

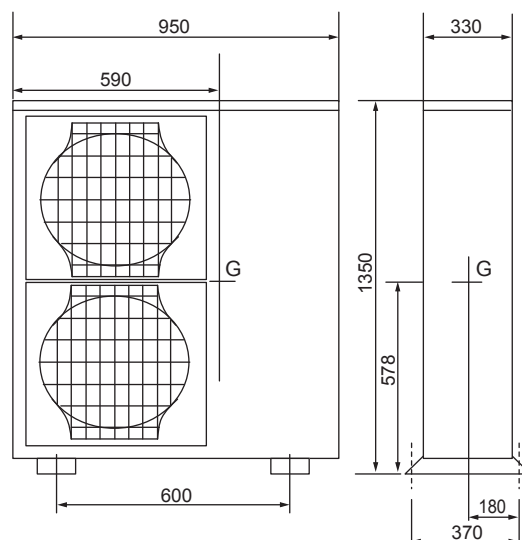
- | | |
|---|---|
| (1) Unit mass | W= <input type="text" value="134"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts | N= <input type="text" value="4"/> |
| 2.The size and shape | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt | A= <input type="text" value="78"/> mm ² = <input type="text" value="78"/> ×10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="578"/> mm= <input type="text" value="0.578"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="180"/> mm(Lg≤L/2)= <input type="text" value="0.180"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | |
|--|---|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh·W·9.8= <input type="text" value="1313.2"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv·W·9.8= <input type="text" value="656.6"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g \cdot (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="866.0"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="328.3"/> N |
| (7) The stress arising to the anchor bolt | |
| 1.The tensile stress | $\sigma = R_b/A =$ <input type="text" value="11.1"/> MPa < ft=176.4MPa |
| 2.The shearing stress | $\tau = Q/A =$ <input type="text" value="4.2"/> MPa < fs=132.3MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4\tau - 1.6\sigma =$ <input type="text" value="240.2"/> MPa < fts= <input type="text" value="240.2"/> MPa |
| | $\sigma =$ <input type="text" value="11.1"/> MPa |
| (8) The construction way of the anchor bolt | |
| 1.The construction way of the anchor bolt | = <input type="text" value="Boxed J type anchor"/> |
| 2.The thickness of the concrete | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="866"/> N |



Since the results from the examination above, the anchor bolt has enough strength.



1.Type:

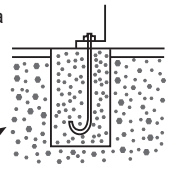
2.Model name:

3.Specification

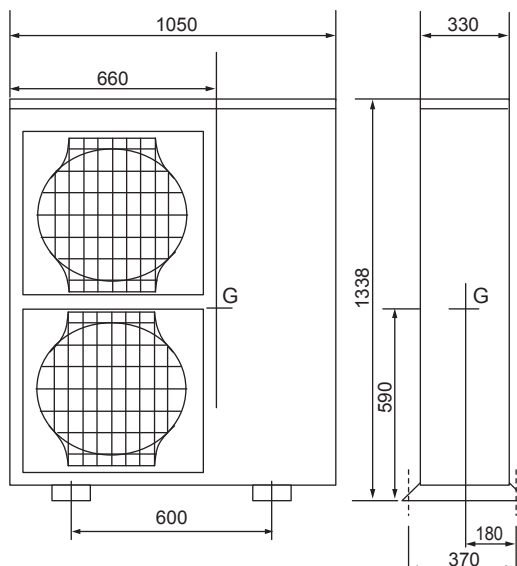
- | | |
|---|--|
| (1) Unit mass | W= <input type="text" value="148"/> kg |
| (2) Anchor bolt | |
| 1.The total number of bolts | N= <input type="text" value="4"/> |
| 2.The size and shape | "=M <input type="text" value="10"/> type |
| 3.The axis section area per one bolt | A= <input type="text" value="78"/> mm ² = <input type="text" value="78"/> × 10 ⁻⁶ m ² |
| 4.The total number of bolts in one side which be pulled stronger when the unit inverted | Nt= <input type="text" value="2"/> |
| (3) The height between the installing surface and the center of gravity of the unit | Hg= <input type="text" value="590"/> mm= <input type="text" value="0.590"/> m |
| (4) The bolt-span from the examination angle | L= <input type="text" value="370"/> mm= <input type="text" value="0.370"/> m |
| (5) The distance between the center of bolt and the center of gravity of the unit | Lg= <input type="text" value="180"/> mm(Lg ≤ L/2)= <input type="text" value="0.180"/> m |

4.The examination calculation (by rounding off to the first decimal place of each item)

- | | |
|--|--|
| (1) The horizontal seismic coefficient for designing | Kh= <input type="text" value="1.0"/> |
| (2) The vertical seismic coefficient for designing | Kv=Kh/2= <input type="text" value="0.5"/> |
| (3) The horizontal earthquake forces for designing | Fh=Kh · W · 9.8= <input type="text" value="1450.4"/> N |
| (4) The vertical earthquake forces for designing | Fv=Kv · W · 9.8= <input type="text" value="725.2"/> N |
| (5) The withdrawal strength of the anchor bolt | $R_b = \frac{F_h \cdot H_g - (W \cdot 9.8 - F_v) \cdot L_g}{L \cdot N_t}$ = <input type="text" value="980.0"/> N |
| (6) The shear forces of the anchor bolt | Q=Fh/N= <input type="text" value="362.6"/> N |
| (7) The stress arising to the anchor bolt | |
| 1.The tensile stress | $\sigma = R_b/A =$ <input type="text" value="12.6"/> MPa < ft=176.4MPa |
| 2.The shearing stress | $\tau = Q/A =$ <input type="text" value="4.6"/> MPa < fs=132.3MPa |
| 3.The stress when affected by both the shearing and the tensile at the same time | $f_{ts} = 1.4\tau - 1.6\sigma =$ <input type="text" value="239.5"/> MPa |
| | $\sigma =$ <input type="text" value="12.3"/> MPa < fts= <input type="text" value="176.4"/> MPa |
| (8) The construction way of the anchor bolt | |
| 1.The construction way of the anchor bolt | = <input type="text" value="Boxed J type anchor"/> |
| 2.The thickness of the concrete | = <input type="text" value="120"/> mm= <input type="text" value="0.120"/> m |
| 3.The length of buried part of bolt | = <input type="text" value="70"/> mm= <input type="text" value="0.070"/> m |
| 4.The permissible withdrawal weight | Ta= <input type="text" value="3136"/> N > Rb= <input type="text" value="960.1"/> N |



Since the results from the examination above, the anchor bolt has enough strength.



Display	Contents to be inspected (During operation)
U1	Abnormal high pressure (63H operated)
U2	Abnormal temperature of discharge/Comp. Surface, shortage of refrigerant
U3	Open/short (TH4, TH34(PUHZ-HW·HA2, SW·HA, SHW·HA/KA, FRP·VHA), TH33(PUHZ-W·HA(2)))
U4	Open/short (TH3, TH6, TH7, TH8, TH32 and TH33(PUHZ-HW·HA2, SW·HA, SHW·HA/KA))
U5	Abnormal temperature of heatsink
U6	Abnormality in power module
U7	Abnormal super heat
U8	Abnormality in outdoor fan motor
U9	Voltage error, Current sensor error (Input current)
Ud	Overheat error
UF	Compressor overcurrent shutoff (When Comp. locked)
UH	Current sensor error (Comp. current), Input overcurrent shutoff
UL	Abnormal low pressure (63L operated)
UP	Compressor overcurrent shutoff
P6	Freezing/overheating protection
P8	Abnormality temperature of pipe
UE	Abnormal pressure (63HS operated)
PE	Abnormal temperature of inlet water
Ed	Serial communication error
EA, Eb, EC	Incorrect wiring indoor / outdoor unit connection
E6 - E9	Indoor / Outdoor unit communication error
E0, E3 - E5	Remote communication error
EE, EF	Combination error, undefined error

Display	Contents to be inspected (When power is turned on)
F3	63L connector (red) open
F5	63H connector (yellow) open
F9	2 connectors (63H and 63L) open

9.1. Packaged-type units (Power inverter / ZUBADAN)

PUHZ-W50VHA(-BS), PUHZ-W85VHA2(-BS),

PUHZ-HW112YHA2(-BS), PUHZ-HW140VHA2(-BS), PUHZ-HW140YHA2(-BS)

(mm)

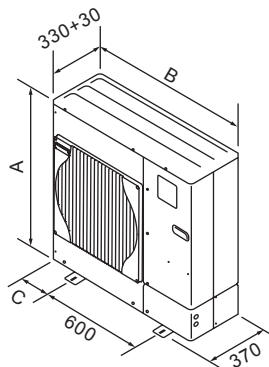


Fig. 1-1

Models	A(mm)	B(mm)	C(mm)
50	740	950	175
85	943	950	175
112	1350	1020	210
140	1350	1020	210

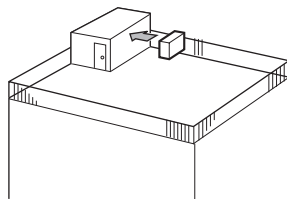


Fig. 1-2

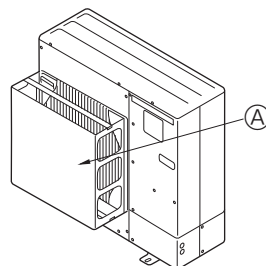


Fig. 1-3

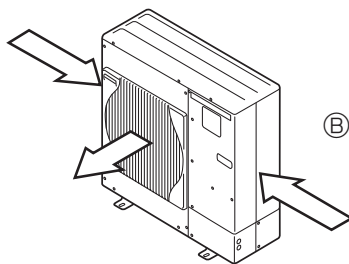


Fig. 1-4

9.1.1. Choosing the outdoor unit installation location

- Avoid locations where the unit is exposed to direct sunlight or other sources of heat.
- Select a location where noise emitted by the unit does not disturb neighbors.
- Select a location where easy wiring and pipe access to the power source is available.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that condensate water may be produced by the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered with snow. In areas where heavy snow fall is anticipated, special precautions must be taken to prevent the snow from blocking the air intake such as to install the unit at higher position or installing a hood on the air intake. This can reduce the airflow and the unit may not operate properly.
- Avoid locations where the unit is exposed to oil, steam, or sulfuric gas.
- Make sure to hold the handles to transport the unit. Do not hold the base of the unit, as there is a risk that hands or fingers may be pinched.

9.1.2. Outline dimensions (Outdoor unit) (Fig. 1-1)

9.1.3. Windy location installation

When installing the outdoor unit on a rooftop or other location where the unit is exposed to strong wind, do not face the air outlet of the unit directly into the winds. Strong wind entering the air outlet may impede the normal airflow and it may result in a malfunction.

The following shows three examples of precautions against strong winds.

- ① Face the air outlet towards the nearest available wall keeping about 50 cm distance. (Fig. 1-2)
- ② Install an optional air guide if the unit is installed in a location where strong winds such as a typhoon, etc. may directly blow to the air outlet. (Fig. 1-3)
 - Ⓐ Air protection guide
- ③ Position the unit so that the outlet air can blow at right angle to the seasonal wind direction, if possible. (Fig. 1-4)
 - Ⓑ Wind direction

9.1.4. NECESSARY SPACE TO INSTALL

(1) When installing a single outdoor unit (Refer to the next page)

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.

The figures in parentheses are for 112/140 models.

Refer to the figures for each case.

- ① Obstacles at rear only (Fig. 1-5)
- ② Obstacles at rear and above only (Fig. 1-6)
- ③ Obstacles at rear and sides only (Fig. 1-7)
- ④ Obstacles at front only (Fig. 1-8)
 - *When using an optional air outlet guide, the clearance for 112/140 models is 500 mm or more.
- ⑤ Obstacles at front and rear only (Fig. 1-9)
 - *When using an optional air outlet guide, the clearance for 112/140 models is 500 mm or more.
- ⑥ Obstacles at rear, sides, and above only (Fig. 1-10)
 - *Do not install the optional air outlet guides for upward airflow.

(2) When installing multiple outdoor units (Refer to the next page)

Leave 10 mm space or more between the units.

The figures in parentheses are for 112/140 models.

- ① Obstacles at rear only (Fig. 1-11)
- ② Obstacles at rear and above only (Fig. 1-12)
 - No more than 3 units must be installed side by side. In addition, leave space as shown.
 - Do not install the optional air outlet guides for upward airflow.
- ③ Obstacles at front only (Fig. 1-13)
 - *When using an optional air outlet guide, the clearance for 112/140 models is 1000 mm or more.
- ④ Obstacles at front and rear only (Fig. 1-14)
 - *When using an optional air outlet guide, the clearance for 112/140 models is 1000 mm or more.
- ⑤ Single parallel unit arrangement (Fig. 1-15)
 - *When using an optional air outlet guide installed for upward airflow, the clearance is 500 (1000) mm or more.
- ⑥ Multiple parallel unit arrangement (Fig. 1-16)
 - *When using an optional air outlet guide installed for upward airflow, the clearance is 1000 (1500) mm or more.
- ⑦ Stacked unit arrangement (Fig. 1-17)
 - The units can be stacked up to 2 units high.
 - No more than 2 stacked units must be installed side by side. In addition, leave space as shown.

UNIT : mm
() : HW112,140

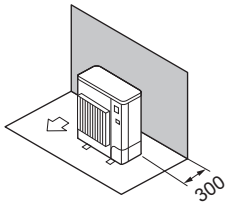


Fig. 1-5

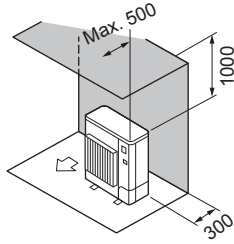


Fig. 1-6

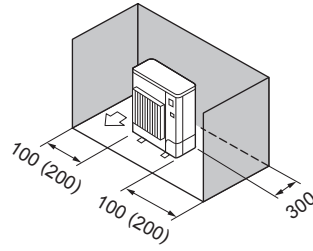


Fig. 1-7

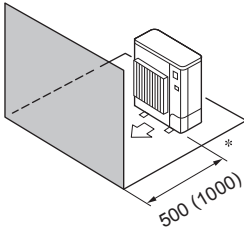


Fig. 1-8

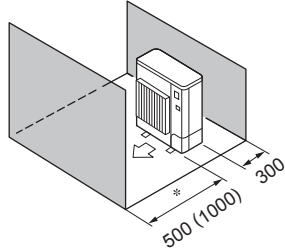


Fig. 1-9

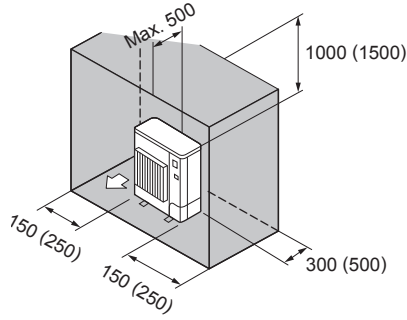


Fig. 1-10

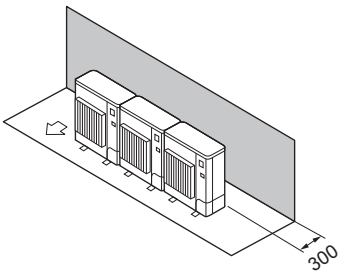


Fig. 1-11

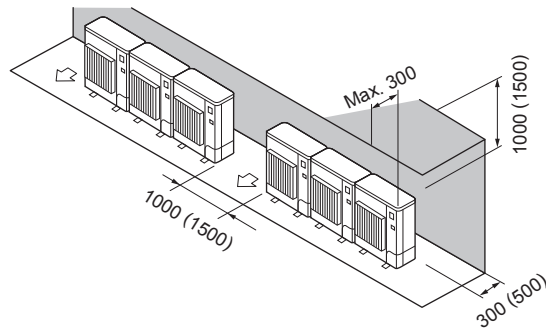


Fig. 1-12

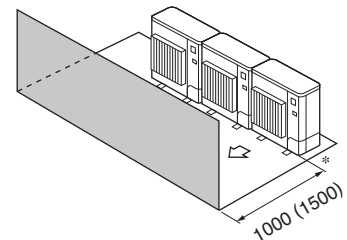


Fig. 1-13

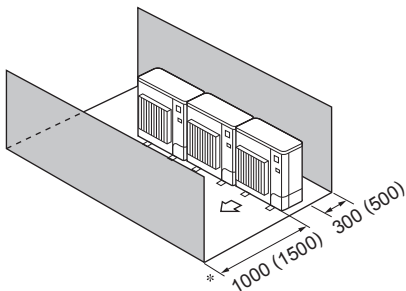


Fig. 1-14

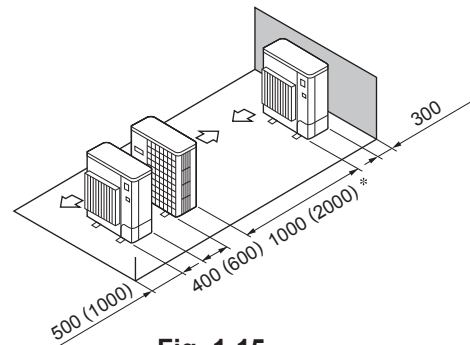


Fig. 1-15

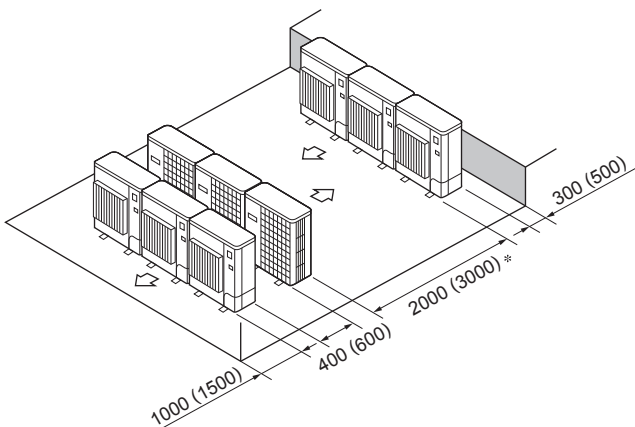


Fig. 1-16

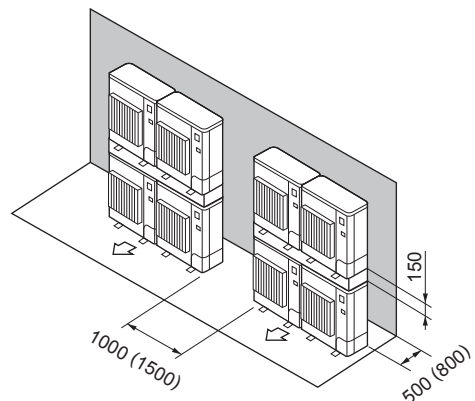


Fig. 1-17

9.2 Split-type units (Power inverter)

PUHZ-SW40~120VHA(-BS), PUHZ-SW100/120YHA(-BS), PUHZ-RP200/250YKA

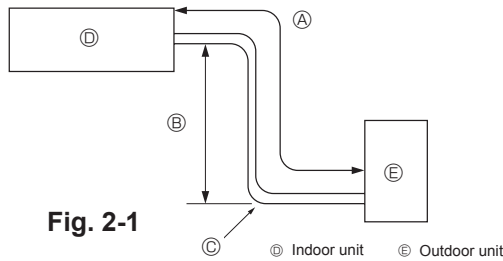


Fig. 2-1

9.2.1. Refrigerant pipe (Fig. 2-1)

▶ Check that the difference between the heights of the indoor and outdoor units, the length of refrigerant pipe, and the number of bends in the pipe are within the limits shown below.

Models	Ⓐ Pipe length (one way)	Ⓑ Height difference	Ⓒ Number of bends (one way)
SW40,50,75	Max. 40 m	Max. 10 m	Max. 15
SW100,120	Max. 75 m	Max. 30 m	Max. 15
RP200, 250	Max. 120 m	Max. 30 m	Max. 15

• Height difference limitations are binding regardless of which unit, indoor or outdoor, is positioned higher.

9.2.2. Choosing the outdoor unit installation location

- Avoid locations exposed to direct sunlight or other sources of heat.
- Select a location from which noise emitted by the unit will not inconvenience neighbors.
- Select a location permitting easy wiring and pipe access to the power source and indoor unit.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that water may drain from the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered by snow. In areas where heavy snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
- Avoid locations exposed to oil, steam, or sulfuric gas.
- Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, hands or fingers may be pinched.

9.2.3. Outline dimensions (Outdoor unit) (Fig. 2-2)

9.2.4. Ventilation and service space

(1) Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds. Strong wind entering the air outlet may impede the normal airflow and a malfunction may result. The following shows three examples of precautions against strong winds.

- ① Face the air outlet towards the nearest available wall about 50 cm away from the wall. (Fig. 2-3)
- ② Install an optional air guide if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 2-4)
 - Ⓐ Air protection guide
- ③ Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 2-5)
 - Ⓑ Wind direction

(2) When installing a single outdoor unit (Refer to the next page)

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.

The figures in parentheses are for SW100,120 models. Refer to the figures for each case.

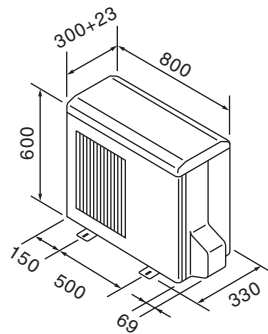
- ① Obstacles at rear only (Fig. 2-6)
- ② Obstacles at rear and above only (Fig. 2-7)
- ③ Obstacles at rear and sides only (Fig. 2-8)
 - * 350 for SW40,50.
- ④ Obstacles at front only (Fig. 2-9)
 - * When using an optional air outlet guide, the clearance for SW100,120 models is 500 mm or more.
- ⑤ Obstacles at front and rear only (Fig. 2-10)
 - * When using an optional air outlet guide, the clearance for SW100,120 models is 500 mm or more.
- ⑥ Obstacles at rear, sides, and above only (Fig. 2-11)
 - * 350 for SW40,50.
 - Do not install the optional air outlet guides for upward airflow.

(3) When installing multiple outdoor units (Refer to the next page)

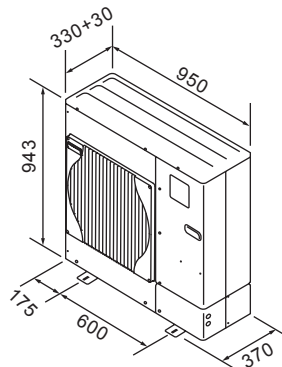
Leave 350 mm for SW40,50 and 10 mm for SW75-120 space or more between the units. The figures in parentheses are for SW100,120 models.

- ① Obstacles at rear only (Fig. 2-12)
- ② Obstacles at rear and above only (Fig. 2-13)
 - No more than 3 units must be installed side by side. In addition, leave space as shown.
 - Do not install the optional air outlet guides for upward airflow.
- ③ Obstacles at front only (Fig. 2-14)
 - * When using an optional air outlet guide, the clearance for SW100,120 models is 1000 mm or more.
- ④ Obstacles at front and rear only (Fig. 2-15)
 - * When using an optional air outlet guide, the clearance for SW100,120 models is 1000 mm or more.
- ⑤ Single parallel unit arrangement (Fig. 2-16)
 - * When using an optional air outlet guide installed for upward airflow, the clearance is 500 (1000) mm or more.
- ⑥ Multiple parallel unit arrangement (Fig. 2-17)
 - * When using an optional air outlet guide installed for upward airflow, the clearance is 1000 (1500) mm or more.
- ⑦ Stacked unit arrangement (Fig. 2-18)
 - The units can be stacked up to two units high.
 - No more than 2 stacked units must be installed side by side. In addition, leave space as shown.

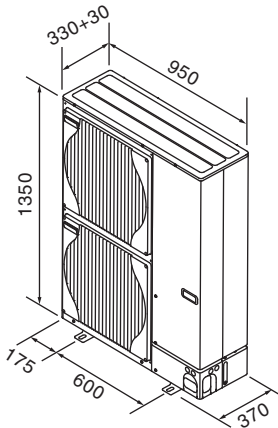
■ SW40, 50



■ SW75



■ SW100, 120



■ RP200, 250

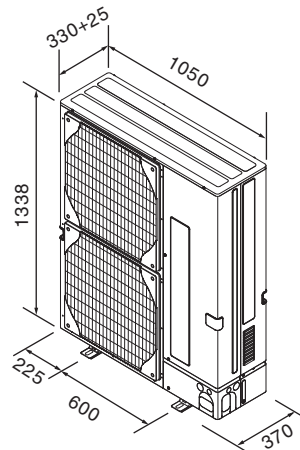


Fig. 2-2

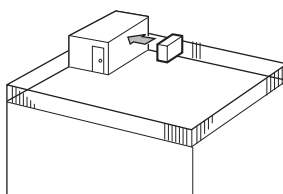


Fig. 2-3

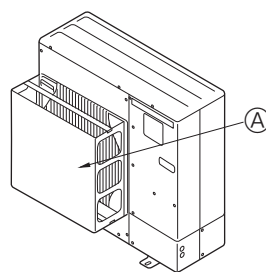


Fig. 2-4

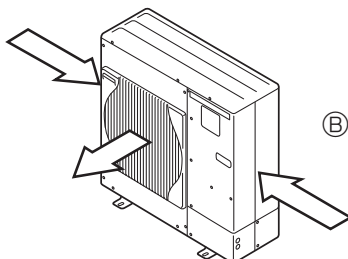


Fig. 2-5

UNIT : mm
 () : SW100,120
 RP200, 250

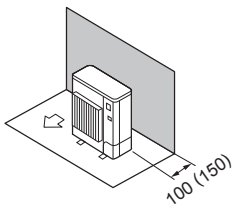


Fig. 2-6

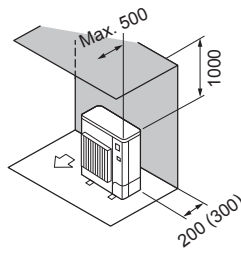


Fig. 2-7

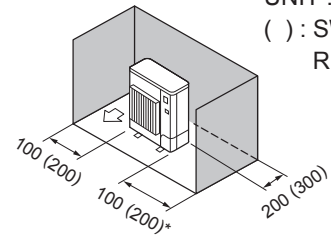


Fig. 2-8

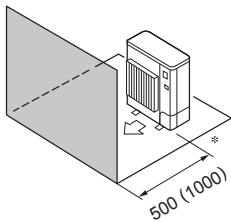


Fig. 2-9

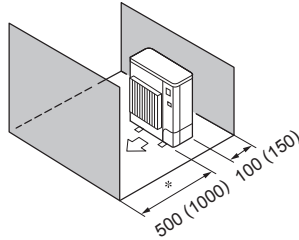


Fig. 2-10

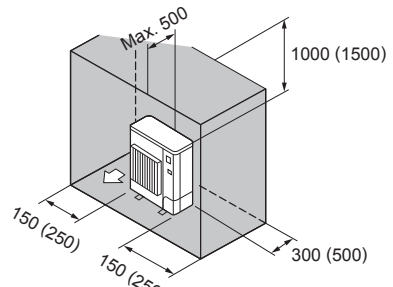


Fig. 2-11

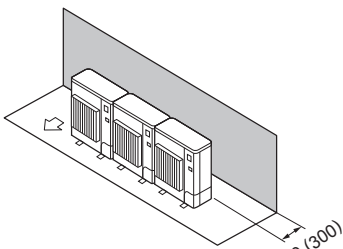


Fig. 2-12

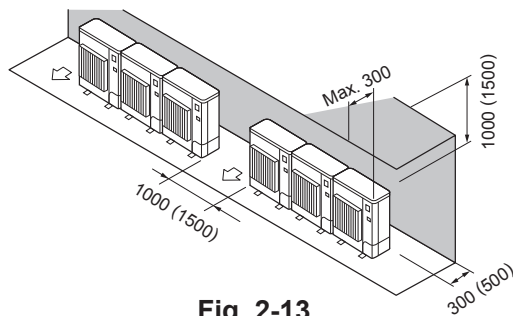


Fig. 2-13

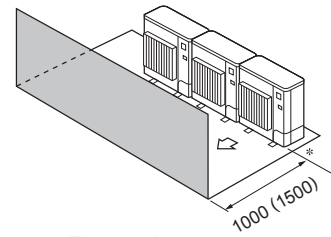


Fig. 2-14

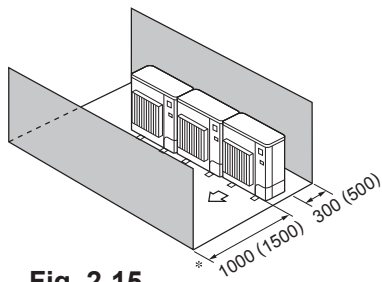


Fig. 2-15

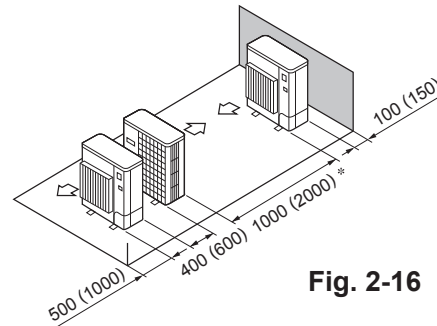


Fig. 2-16

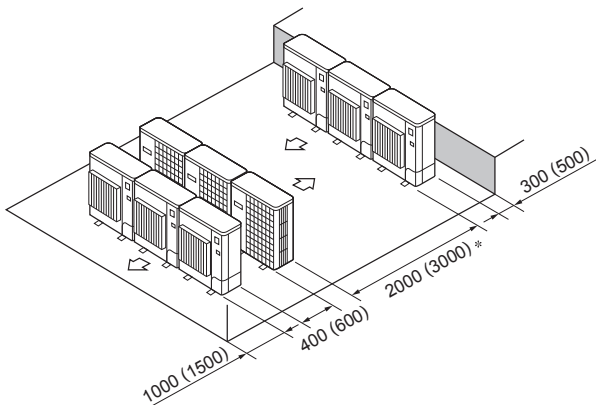


Fig. 2-17

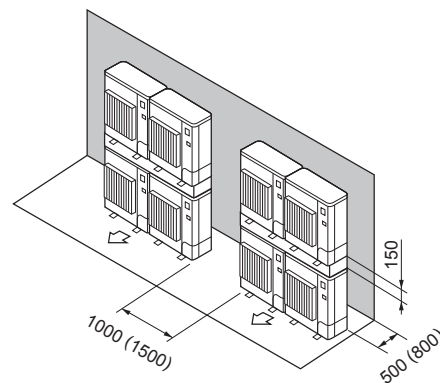


Fig. 2-18

9.3 Split-type units (Mr.SLIM+)

PUHZ-FRP71VHA

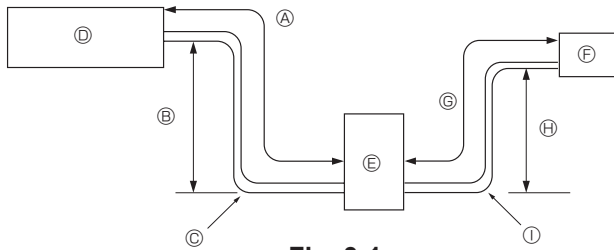


Fig. 3-1

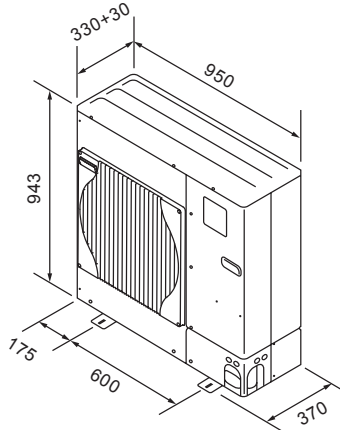


Fig. 3-2

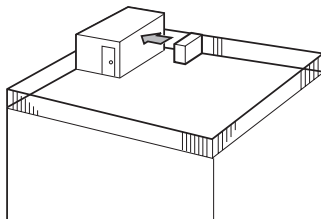


Fig. 3-3

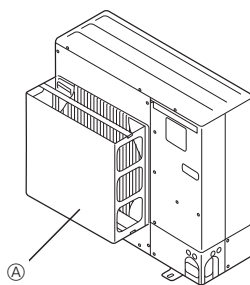


Fig. 3-4

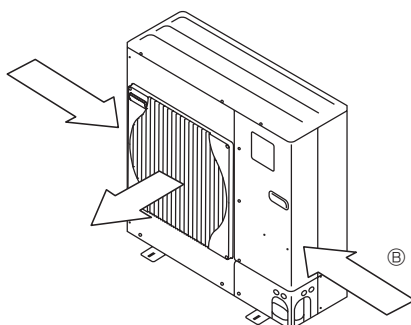


Fig. 3-5

9.3.1. Refrigerant pipe (Fig. 3-1)

▶ Check that the difference between the heights of the indoor and outdoor units, the length of refrigerant pipe, and the number of bends in the pipe are within the limits shown below.

Ⓐ,Ⓒ Pipe length (one way)	Ⓑ,Ⓓ Height difference	Ⓔ,Ⓘ Number of bends (one way)
Max. 30 m for each	Max. 20 m for each	Max. 15 for each

- Height difference limitations are binding regardless of which unit, indoor or outdoor, is positioned higher.
- Ⓓ Indoor unit
- Ⓔ Outdoor unit
- Ⓘ Cylinder unit or Hydrobox

9.3.2. Choosing the outdoor unit installation location

- Avoid locations exposed to direct sunlight or other sources of heat.
- Select a location from which noise emitted by the unit will not inconvenience neighbors.
- Select a location permitting easy wiring and pipe access to the power source and indoor unit.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that water may drain from the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered by snow. In areas where heavy snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
- Avoid locations exposed to oil, steam, or sulfuric gas.
- Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, hands or fingers may be pinched.

9.3.3. Outline dimensions (Outdoor unit) (Fig. 3-2)

9.3.4. Ventilation and service space

(1) Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds. Strong wind entering the air outlet may impede the normal airflow and a malfunction may result.

The following shows three examples of precautions against strong winds.

- ① Face the air outlet towards the nearest available wall about 50 cm away from the wall. (Fig. 3-3)
- ② Install an optional air guide if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 3-4)
 - Ⓐ Air protection guide
- ③ Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 3-5)
 - Ⓑ Wind direction

(2) When installing a single outdoor unit (Refer to the next page)

Minimum dimensions are indicated as follows, except for Max., meaning Maximum dimensions.

Refer to the figures for each case.

- ① Obstacles at rear only (Fig. 3-6)
- ② Obstacles at rear and above only (Fig. 3-7)
- ③ Obstacles at rear and sides only (Fig. 3-8)
- ④ Obstacles at front only (Fig. 3-9)
- ⑤ Obstacles at front and rear only (Fig. 3-10)
- ⑥ Obstacles at rear, sides, and above only (Fig. 3-11)
 - Do not install the optional air outlet guides for upward airflow.

(3) When installing multiple outdoor units (Refer to the next page)

Leave 10 mm space or more between the units.

- ① Obstacles at rear only (Fig. 3-12)
- ② Obstacles at rear and above only (Fig. 3-13)
 - No more than 3 units must be installed side by side. In addition, leave space as shown.
 - Do not install the optional air outlet guides for upward airflow.
- ③ Obstacles at front only (Fig. 3-14)
- ④ Obstacles at front and rear only (Fig. 3-15)
- ⑤ Single parallel unit arrangement (Fig. 3-16)
 - * When using an optional air outlet guide installed for upward airflow, the clearance should be 500 mm or more.
- ⑥ Multiple parallel unit arrangement (Fig. 3-17)
 - * When using an optional air outlet guide installed for upward airflow, the clearance should be 1000 mm or more.
- ⑦ Stacked unit arrangement (Fig. 3-18)
 - The units can be stacked up to two units high.
 - No more than 2 stacked units must be installed side by side. In addition, leave space as shown.

UNIT : mm

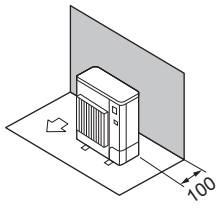


Fig. 3-6

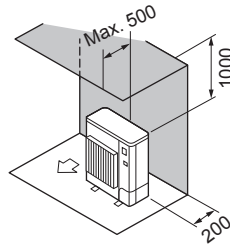


Fig. 3-7

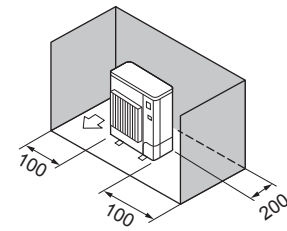


Fig. 3-8

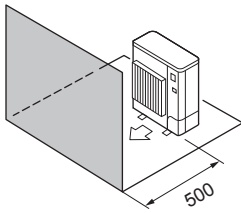


Fig. 3-9

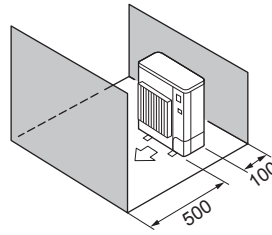


Fig. 3-10

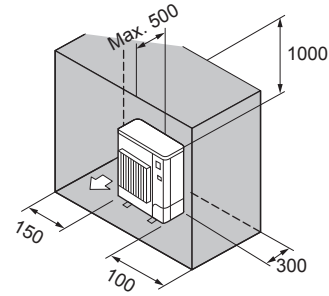


Fig. 3-11

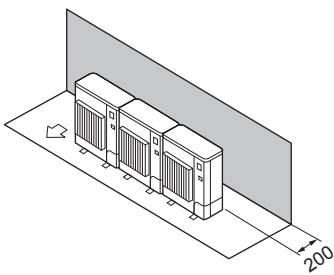


Fig. 3-12

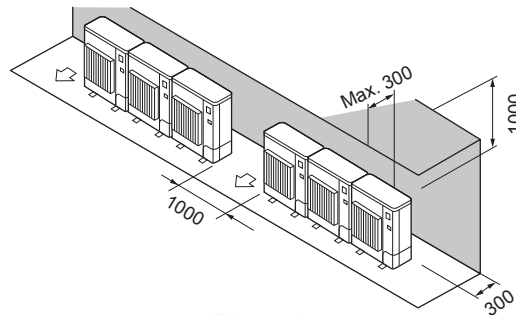


Fig. 3-13

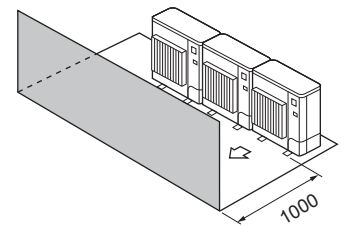


Fig. 3-14

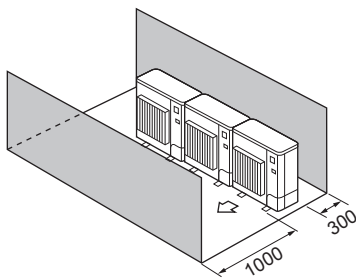


Fig. 3-15

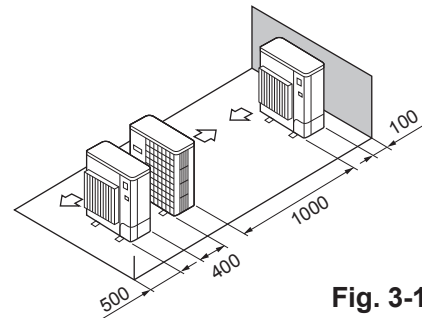


Fig. 3-16

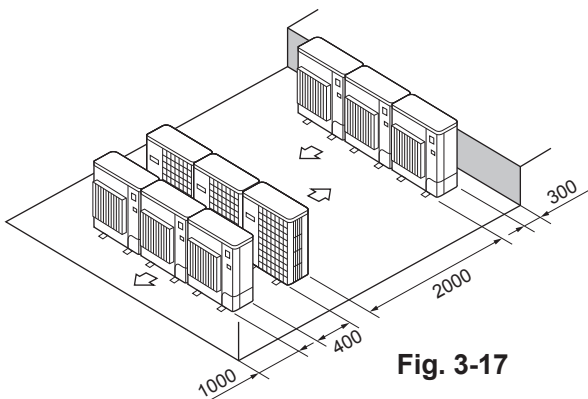


Fig. 3-17

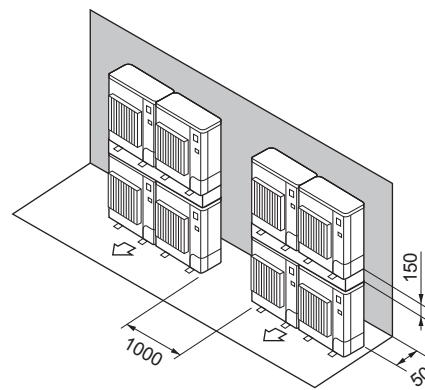


Fig. 3-18

9.4 Split-type units (ZUBADAN)

PUHZ-SHW80VHA, PUHZ-SHW112VHA,
PUHZ-SHW112YHA, PUHZ-SHW140YHA,
PUHZ-SHW230YKA

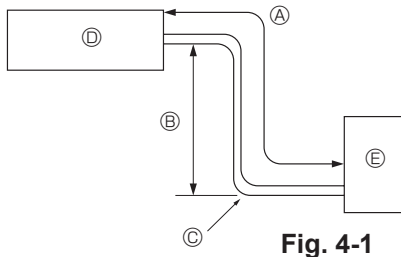
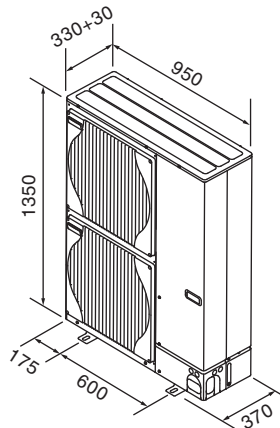


Fig. 4-1

SHW80,112,140



SHW230

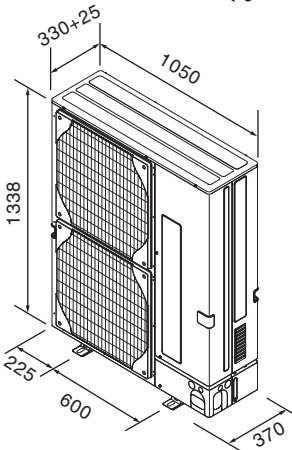


Fig. 4-2

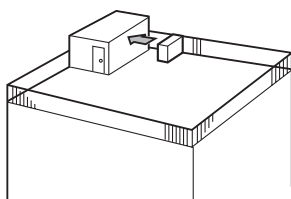


Fig. 4-3

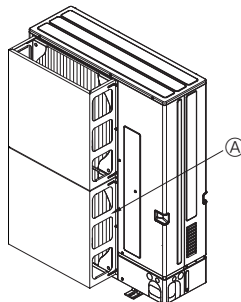


Fig. 4-4

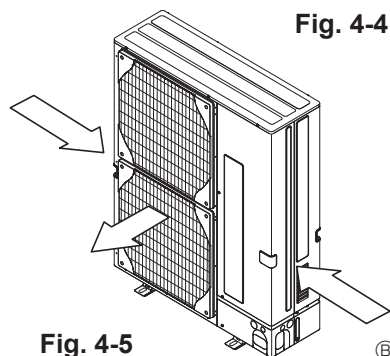


Fig. 4-5

9.4.1. Refrigerant pipe (Fig. 4-1)

Check that the difference between the heights of the indoor and outdoor units, the length of refrigerant pipe, and the number of bends in the pipe are within the limits shown below.

Models	Ⓐ Pipe length (one way)	Ⓑ Height difference	Ⓒ Number of bends (one way)
SHW80,112,140	Max. 75 m	Max. 30 m	Max. 15
SHW230	Max. 80 m	Max. 30 m	Max. 15

- Height difference limitations are binding regardless of which unit, indoor or outdoor, is positioned higher.
- ⓐIndoor unit ⓑOutdoor unit

9.4.2. Choosing the outdoor unit installation location

- Avoid locations exposed to direct sunlight or other sources of heat.
- Select a location from which noise emitted by the unit will not inconvenience neighbors.
- Select a location permitting easy wiring and pipe access to the power source and indoor unit.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that water may drain from the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered by snow. In areas where heavy snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
- Avoid locations exposed to oil, steam, or sulfuric gas.
- Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, hands or fingers may be pinched.

9.4.3. Outline dimensions (Outdoor unit) (Fig. 4-2)

9.4.4. Ventilation and service space

(1) Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds. Strong wind entering the air outlet may impede the normal airflow and a malfunction may result.

The following shows three examples of precautions against strong winds.

- ① Face the air outlet towards the nearest available wall about 50 cm away from the wall. (Fig. 4-3)
- ② Install an optional air guide if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 4-4)
 - ⒶAir protection guide
- ③ Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 4-5)
 - ⒷWind direction

(2) When installing a single outdoor unit (Refer to the next page)

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.

Refer to the figures for each case.

- ① Obstacles at rear only (Fig. 4-6)
- ② Obstacles at rear and above only (Fig. 4-7)
- ③ Obstacles at rear and sides only (Fig. 4-8)
- ④ Obstacles at front only (Fig. 4-9)
 - *When using the optional air outlet guides, the clearance is 500 mm or more.
- ⑤ Obstacles at front and rear only (Fig. 4-10)
 - *When using the optional air outlet guides, the clearance is 500 mm or more.
- ⑥ Obstacles at rear, sides, and above only (Fig. 4-11)
 - *Do not install the optional air outlet guides for upward airflow.

(3) When installing multiple outdoor units (Refer to the next page)

Leave 10 mm space or more between the units.

- ① Obstacles at rear only (Fig. 4-12)
- ② Obstacles at rear and above only (Fig. 4-13)
 - No more than 3 units must be installed side by side. In addition, leave space as shown.
 - Do not install the optional air outlet guides for upward airflow.
- ③ Obstacles at front only (Fig. 4-14)
 - *When using the optional air outlet guides, the clearance is 1000 mm or more.
- ④ Obstacles at front and rear only (Fig. 4-15)
 - *When using the optional air outlet guides, the clearance is 1000 mm or more.
- ⑤ Single parallel unit arrangement (Fig. 4-16)
 - *When using the optional air outlet guides installed for upward airflow, the clearance is 1000 mm or more.
- ⑥ Multiple parallel unit arrangement (Fig. 4-17)
 - *When using the optional air outlet guides installed for upward airflow, the clearance is 1500 mm or more.
- ⑦ Stacked unit arrangement (Fig. 4-18)
 - The units can be stacked up to 2 units high.
 - No more than 2 stacked units must be installed side by side. In addition, leave space as shown.

UNIT : mm

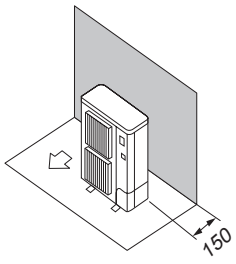


Fig. 4-6

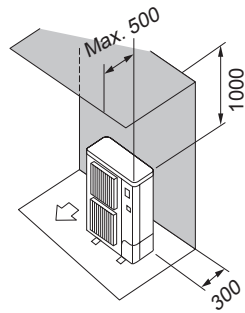


Fig. 4-7

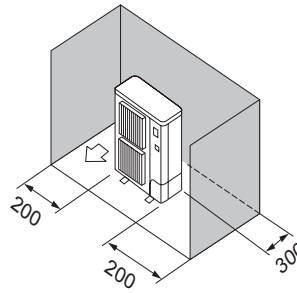


Fig. 4-8

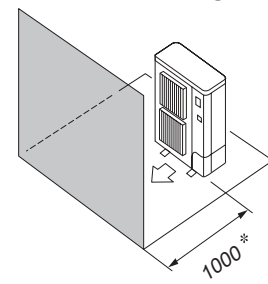


Fig. 4-9

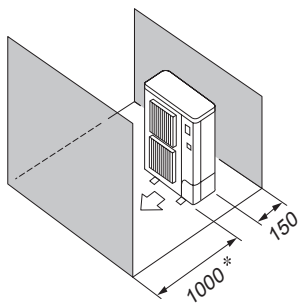


Fig. 4-10

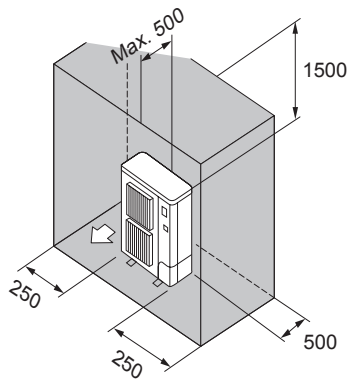


Fig. 4-11

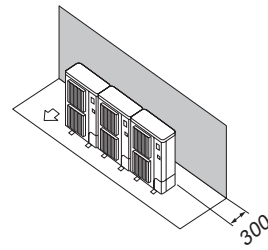


Fig. 4-12

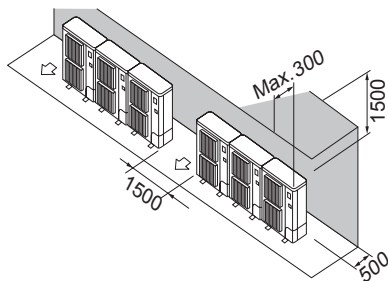


Fig. 4-13

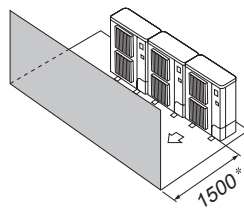


Fig. 4-14

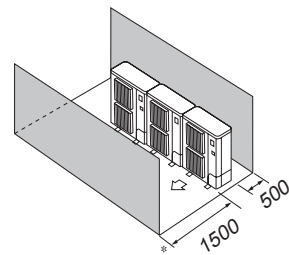


Fig. 4-15

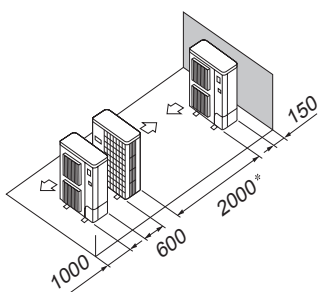


Fig. 4-16

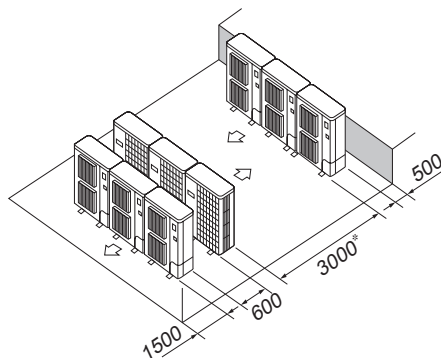


Fig. 4-17

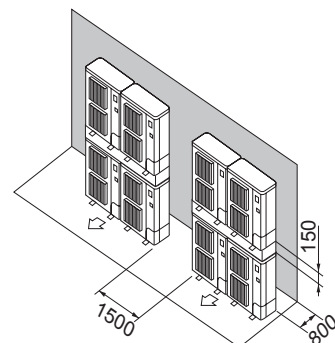


Fig. 4-18

MEMO

A series of horizontal dashed lines for writing.

Cooling mode is available only for ERSC-VM2B model (hydrobox).

1	Specifications	B-2
1.1	Combination table	B-2
1.2	Cylinder unit	B-3
1.3	Hydrobox.....	B-6
2	Outlines and dimensions	B-8
2.1	Cylinder unit	B-8
2.2	Hydrobox.....	B-9
2.3	System configuration	B-11
2.4	Service access diagrams	B-12
3	Wiring diagrams.....	B-13
3.1	Cylinder unit	B-13
3.2	Hydrobox.....	B-35
3.3	Using SD memory card	B-53
3.4	Caution on connecting DHW tank(Hydrobox)	B-54
3.5	Wiring for 2-zone temperature control	B-55
4	Water circuit diagrams	B-56
4.1	Water quality and system preparation.....	B-61
4.2	Water pipe work.....	B-61
4.3	Performance curve external pressure.....	B-63
4.4	Safety device discharge arrangements for UK(G3)	B-65
5	Performance curves	B-67
5.1	Combination Performance	B-67
5.2	Heat time data (DHW mode).....	B-69
6	System Set Up.....	B-74
7	Troubleshooting.....	B-90
7.1	Cylinder unit	B-90
7.2	Hydrobox.....	B-99
8	Supplementary information	B-108

1.1 Combination table

MODELS		POWER INVERTER		ZUBADAN		POWER INVERTER										Mr.SLIM+	ZUBADAN				
TYPE		PACKAGE				SPLIT															
		Heat pump																			
REFRIGERANT		R410A																			
TYPE	Model name	PUHZ-W60VHA	PUHZ-W85VHA2	PUHZ-HW112YHA2	PUHZ-HW140YHA2	PUHZ-HW140YHA2	PUHZ-SW40VHA	PUHZ-SW50VHA	PUHZ-SW75VHA	PUHZ-SW100VHA	PUHZ-SW100YHA	PUHZ-SW120VHA	PUHZ-SW120YHA	PUHZ-RP200YKA	PUHZ-RP250YKA	PUHZ-FRP71VHA	PUHZ-SHW80VHA	PUHZ-SHW112YHA	PUHZ-SHW112YHA	PUHZ-SHW140YHA	PUHZ-SHW230YKA
		CYLINDER UNIT	EHST20C-VM6HB						●	●	●	●	●	●	●			●	●	●	●
EHST20C-YM9HB							●	●	●	●	●	●	●			●	●	●	●	●	
EHST20C-TM9HB							●	●	●	●	●	●	●			●	●	●	●	●	
EHST20C-VM2B							●	●	●	●	●	●	●			●	●	●	●	●	
EHST20C-VM6B							●	●	●	●	●	●	●			●	●	●	●	●	
EHST20C-YM9B							●	●	●	●	●	●	●			●	●	●	●	●	
EHST20C-VM6EB							●	●	●	●	●	●	●			●	●	●	●	●	
EHST20C-YM9EB							●	●	●	●	●	●	●			●	●	●	●	●	
EHST20C-VM6SB							●	●	●	●	●	●	●			●	●	●	●	●	
EHPT20X-VM2HB	●		●	●	●	●															
EHPT20X-VM6HB	●		●	●	●	●															
EHPT20X-YM9HB	●		●	●	●	●															
EHPT20X-TM9HB	●	●	●	●	●																
EHPT20X-VM6B	●	●	●	●	●																
EHPT20X-YM9B	●	●	●	●	●																
HYDROBOX	EHSC-VM2B						●	●	●	●	●	●	●			●	●	●	●	●	
	EHSC-VM6B						●	●	●	●	●	●	●			●	●	●	●	●	
	EHSC-YM9B						●	●	●	●	●	●	●			●	●	●	●	●	
	EHSC-TM9B						●	●	●	●	●	●	●			●	●	●	●	●	
	EHSC-VM6EB						●	●	●	●	●	●	●			●	●	●	●	●	
	EHSC-YM9EB						●	●	●	●	●	●	●			●	●	●	●	●	
	EHPX-VM2B	●	●	●	●	●															
	EHPX-VM6B	●	●	●	●	●															
	EHPX-YM9B	●	●	●	●	●															
	ERSC-VM2B						●	●	●	●	●	●	●				●	●	●	●	

● : Combination is available.

Blank: Combination is NOT available.

1.2 Cylinder unit

Model name			EHST20C-VM6HB	EHST20C-YM9HB	EHST20C-VM2B	EHST20C-TM9HB	EHST20C-VM6B		
Dimensions	Without package	Height	mm	1600	1600	1600	1600	1600	
		Width	mm	595	595	595	595	595	
		Depth	mm	680	680	680	680	680	
	With package	Height	mm	1850	1850	1850	1850	1850	
		Width	mm	660	660	660	660	660	
		Depth	mm	800	800	800	800	800	
Casing	Munsell	-	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2		
	RAL code	-	RAL 9016	RAL 9016	RAL 9016	RAL 9016	RAL 9016		
	Material	-	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal		
Product weight (empty)		kg	128	128	125	128	127		
Product weight (full)		kg	343	343	340	343	342		
Gross weight		kg	145	145	142	145	144		
Type of Installation		-	Floor standing	Floor standing	Floor standing	Floor standing	Floor standing		
Electrical data	Control board *1 (Including 2 pumps)	Power supply	Ph	~N	~N	~N	~N	~N	
			V	230	230	230	230	230	
			Hz	50	50	50	50	50	
		Input	kW	0.21	0.21	0.21	0.21	0.21	
			Current	A	1.55	1.55	1.55	1.55	
			Breaker	A	10	10	10	10	
	Booster heater	Power supply	Ph	~N	3~	~N	3~	~N	
			V	230	400	230	230	230	
			Hz	50	50	50	50	50	
		Capacity	kW	2+4	3+6	2	3+6	2+4	
			Heater step	-	3	3	1	3	
			Current	A	26	13	9	23	
	Breaker	A	32	16	16	32	32		
		Immersion heater	Power supply	Ph	~N	~N	-	~N	-
				V	230	230	-	230	-
	Hz			50	50	-	50	-	
	Capacity		kW	3	3	-	3	-	
			Current	A	13	13	-	13	-
			Breaker	A	16	16	-	16	-
	Water circulation pump (Primary circuit)	Input (When the flow rate is max.)	Speed 1	W	36	36	36	36	36
			Speed 2	W	56	56	56	56	56
			Speed 3	W	63	63	63	63	63
			Speed 4	W	63	63	63	63	63
			Speed 5	W	63	63	63	63	63
Current (When the flow rate is max.)		Speed 1	A	0.3	0.3	0.3	0.3	0.3	
		Speed 2	A	0.4	0.4	0.4	0.4	0.4	
		Speed 3	A	0.5	0.5	0.5	0.5	0.5	
		Speed 4	A	0.5	0.5	0.5	0.5	0.5	
		Speed 5	A	0.5	0.5	0.5	0.5	0.5	
Head difference		Max.	m	7.0	7.0	7.0	7.0	7.0	
		20L/min	m	5.9	5.9	5.9	5.9	5.9	
		30L/min	m	4.5	4.5	4.5	4.5	4.5	
Performance curve			-			Refer to the following page			
Flow rate		Primary circuit	Max.*2	L/min	27.7	27.7	27.7	27.7	27.7
	Min.*3		L/min	7.1	7.1	7.1	7.1	7.1	
Heat exchanger	Refrigerant - Primary circuit water		-	Plate	Plate	Plate	Plate	Plate	
	Primary circuit water - Domestic hot water		-	Coil in tank	Coil in tank	Coil in tank	Coil in tank	Coil in tank	
	Coil: Surface area	m ²	1.1*2	1.1*2	1.1*2	1.1*2	1.1*2		
	Coil: Length	m	14*2	14*2	14*2	14*2	14*2		
	Coil: Capacity	L	6.8*2	6.8*2	6.8*2	6.8*2	6.8*2		
Coil: Material	-	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel			
Domestic hot water tank	Volume	L	200	200	200	200	200		
	Material	-	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)		
	Time to raise DHW tank temp 15 - 65°C *4	min	21.75	21.75	21.75	21.75	21.75		
	Time to reheat 70% of DHW tank to 65°C *4	min	16	16	16	16	16		
	Heat loss *5	kWh/24h	1.99	1.99	1.99	1.99	1.99		
Expansion vessel (Primary circuit)	Volume	L	12	12	12	12	12		
	Charge pressure	MPa	0.1	0.1	0.1	0.1	0.1		
Safety device	Primary circuit	Control thermistor	°C	1~80	1~80	1~80	1~80	1~80	
		Pressure relief valve	MPa	0.3	0.3	0.3	0.3	0.3	
		Flow switch (Min. flow)	L/min	5.5±1.0	5.5±1.0	5.5±1.0	5.5±1.0	5.5±1.0	
		BH manual reset thermostat	°C	90	90	90	90	90	
	DHW tank	BH thermal Cut Off	°C	121	121	121	121	121	
		Control thermistor	°C	75	75	75	75	75	
		IH manual reset thermostat	°C	85	85	85	85	85	
	Temperature & pressure relief valve	°C	-	-	-	-	-		
		MPa	1.0	1.0	1.0	1.0	1.0		
Connections	Water	Primary circuit	mm	28	28	28	28	28	
		DHW circuit	mm	22	22	22	22	22	
		Solar circuit	mm	-	-	-	-	-	
	Refrigerant	Gas	mm	15.88	15.88	15.88	15.88	15.88	
		Liquid	mm	9.52	9.52	9.52	9.52	9.52	
Refrigerant *6	Guaranteed operating range *7		°C	0~35	0~35	0~35	0~35	0~35	
			%RH	≤80	≤80	≤80	≤80	≤80	
	Outdoor temperature	Heating	°C	See outdoor unit spec table					
Cooling		°C							
Operating range	Heating	Room temperature	°C	10~30	10~30	10~30	10~30	10~30	
		Flow temperature	°C	25~60	25~60	25~60	25~60	25~60	
	Cooling	Room temperature	°C	-	-	-	-	-	
		Flow temperature	°C	-	-	-	-	-	
	DHW	°C	40~60	40~60	40~60	40~60	40~60		
		Legionella prevention	°C	60~70	60~70	60~70	60~70	60~70	
Sound level (SPL)		dB(A)	28	28	28	28	28		

*1 When powered from independent source.

*2 If the water flow rate exceeds maximum, the flow speed will be greater than 1.5 m/s, which could corrode the pipes.

*3 If the water flow is less than minimum, the flow switch will be activated.

*4 Tested under BS7206 conditions (Primary flow to cylinder coil 80-82 deg C). Conducted by WRC.

*5 Calculated from 24h temperature decay at top of the tank from 65degC (ambient temperature approx. 20degC). Tested by WRC.

*6 Refrigerant of outdoor unit connected to cylinder unit.

*7 The environment must be frost-free.

1 Specifications

Cylinder unit / Hydrobox

1.2 Cylinder unit

Model name			EHST20C-VM9B	EHST20C-VM6EB	EHST20C-VM9EB	EHST20C-VM6SB	EHPT20X-VM2HB			
Dimensions	Without package	Height	mm	1600	1600	1600	1600	1600		
		Width	mm	595	595	595	595	595		
		Depth	mm	680	680	680	680	680		
	With package	Height	mm	1850	1850	1850	1850	1850		
		Width	mm	660	660	660	660	660		
		Depth	mm	800	800	800	800	800		
Casing	Munsell	-	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2			
	RAL code	-	RAL 9016	RAL 9016	RAL 9016	RAL 9016	RAL 9016			
	Material	-	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal			
Product weight (empty)			kg	127	122	122	128	113		
Product weight (full)			kg	342	337	337	343	326		
Gross weight			kg	144	139	139	145	130		
Type of installation			-	Floor standing	Floor standing	Floor standing	Floor standing	Floor standing		
Electrical data	Control board *1 (Including 2 pumps)	Power supply	Ph	~N	~N	~N	~N	~N		
			V	230	230	230	230	230		
			Hz	50	50	50	50	50		
		Booster heater	Input	kW	0.21	0.21	0.21	0.21	0.21	
				Current	A	1.55	1.55	1.55	1.55	1.55
				Breaker	A	10	10	10	10	10
	Immersion heater		Power supply	Ph	3~	~N	3~	~N	~N	
				V	400	230	400	230	230	
				Hz	50	50	50	50	50	
		Capacity	kW	3+6	2+4	3+6	2+4	2		
			Heater step	-	3	3	3	3	1	
			Current	A	13	26	13	26	9	
	Breaker		A	16	32	16	32	16		
	Breaker		Ph	-	-	-	-	~N		
			V	-	-	-	-	230		
		Hz	-	-	-	-	50			
		Capacity	kW	-	-	-	-	3		
		Current	A	-	-	-	-	13		
		Breaker	A	-	-	-	-	16		
	Water circulation pump (Primary circuit)	Input (When the flow rate is max.)	Speed 1	W	36	36	36	36	36	
			Speed 2	W	56	56	56	56	56	
Speed 3			W	63	63	63	63	63		
Speed 4			W	63	63	63	63	63		
Speed 5			W	63	63	63	63	63		
Current (When the flow rate is max.)		Speed 1	A	0.3	0.3	0.3	0.3	0.3		
		Speed 2	A	0.4	0.4	0.4	0.4	0.4		
		Speed 3	A	0.5	0.5	0.5	0.5	0.5		
		Speed 4	A	0.5	0.5	0.5	0.5	0.5		
		Speed 5	A	0.5	0.5	0.5	0.5	0.5		
Head difference		Max.	m	7.0	7.0	7.0	7.0	7.0		
		20L/min	m	5.9	5.9	5.9	5.9	5.9		
		30L/min	m	4.5	4.5	4.5	4.5	4.5		
Performance curve			-	Refer to the following page						
Flow rate		Primary circuit	Max.*2	L/min	27.7	27.7	27.7	27.7	27.7	
	Min.*3		L/min	7.1	7.1	7.1	7.1	7.1		
Heat exchanger	Refrigerant - Primary circuit water		-	Plate	Plate	Plate	Plate	-		
	Primary circuit water - Domestic hot water		-	Coil in tank	Coil in tank	Coil in tank	Coil in tank	Coil in tank		
	Coil: Surface area	m ²	1.1*2	1.1*2	1.1*2	1.1 + 1.1(Solar)	1.1*2			
	Coil: Length	m	14*2	14*2	14*2	14 + 14(Solar)	14*2			
	Coil: Capacity	L	6.8*2	6.8*2	6.8*2	6.8 + 6.8(Solar)	6.8*2			
Coil: Material	-	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel				
Domestic hot water tank	Volume	L	200	200	200	200	200			
	Material	-	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)	Duplex 2101 stainless steel (EN10088)			
	Time to raise DHW tank temp 15 - 65°C *4	min	21.75	21.75	21.75	21.75	21.75			
	Time to reheat 70% of DHW tank to 65°C *4	min	16	16	16	16	16			
Heat loss *5	kWh/24h	1.99	1.99	1.99	1.99	1.99				
Expansion vessel (Primary circuit)	Volume	L	12	-	-	12	12			
	Charge pressure	MPa	0.1	-	-	0.1	0.1			
Safety device	Primary circuit	Control thermistor	°C	1~80	1~80	1~80	1~80	1~80		
		Pressure relief valve	MPa	0.3	0.3	0.3	0.3	0.3		
		Flow switch (Min. flow)	L/min	5.5±1.0	5.5±1.0	5.5±1.0	5.5±1.0	5.5±1.0		
		BH manual reset thermostat	°C	90	90	90	90	90		
	DHW tank	BH thermal Cut Off	°C	121	121	121	121	121		
		Control thermistor	°C	75	75	75	75	75		
		IH manual reset thermostat	°C	85	85	85	85	85		
		Temperature & pressure relief valve	°C	-	-	-	-	90		
		MPa	1.0	1.0	1.0	1.0	0.7			
		MPa	1.0	1.0	1.0	1.0	0.7			
Connections	Water	Primary circuit	mm	28	28	28	28	28		
		DHW circuit	mm	22	22	22	22	22		
		Solar circuit	mm	-	-	-	22	-		
	Refrigerant	Gas	mm	15.88	15.88	15.88	15.88	-		
		Liquid	mm	9.52	9.52	9.52	9.52	-		
		mm	9.52	9.52	9.52	9.52	-			
Refrigerant *6	-	R410A	R410A	R410A	R410A	R410A				
Guaranteed operating range *7	Ambient	°C	0~35	0~35	0~35	0~35	0~35			
		%RH	≤80	≤80	≤80	≤80	≤80			
	Outdoor temperature	Heating	°C	See outdoor unit spec table						
Cooling		°C	See outdoor unit spec table							
Operating range	Heating	Room temperature	°C	10~30	10~30	10~30	10~30	10~30		
		Flow temperature	°C	25~60	25~60	25~60	25~60	25~60		
	Cooling	Room temperature	°C	-	-	-	-	-		
		Flow temperature	°C	-	-	-	-	-		
	DHW	°C	40~60	40~60	40~60	40~60	40~60			
		°C	60~70	60~70	60~70	60~70	60~70			
Sound level (SPL)	dB(A)	28	28	28	28	28				

*1 When powered from independent source.
 *2 If the water flow rate exceeds maximum, the flow speed will be greater than 1.5 m/s, which could corrode the pipes.
 *3 If the water flow is less than minimum, the flow switch will be activated.
 *4 Tested under BS7206 conditions (Primary flow to cylinder coil 80-82 deg C). Conducted by WRc.
 *5 Calculated from 24h temperature decay at top of the tank from 65degC (ambient temperature approx. 20degC). Tested by WRc.
 *6 Refrigerant of outdoor unit connected to cylinder unit.
 *7 The environment must be frost-free.

1.2 Cylinder unit

Model name			EHPT20X-VM6HB	EHPT20X-YM9HB	EHPT20X-TM9HB	EHPT20X-VM6B	EHPT20X-YM9B			
Dimensions	Without package	Height	mm	1600	1600	1600	1600	1600		
		Width	mm	595	595	595	595	595		
		Depth	mm	680	680	680	680	680		
	With package	Height	mm	1850	1850	1850	1850	1850		
		Width	mm	660	660	660	660	660		
		Depth	mm	800	800	800	800	800		
Casing	Munsell	-	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2			
	RAL code	-	RAL 9016	RAL 9016	RAL 9016	RAL 9016	RAL 9016			
	Material	-	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal			
Product weight (empty)		kg	115	115	115	114	114			
Product weight (full)		kg	328	328	328	327	327			
Gross weight		kg	132	132	132	131	131			
Type of Installation		-	Floor standing	Floor standing	Floor standing	Floor standing	Floor standing			
Electrical data	Control board *1 (Including 2 pumps)	Power supply	Ph	~N	~N	~N	~N	~N		
			V	230	230	230	230	230		
			Hz	50	50	50	50	50		
		Booster heater	Input	kW	0.21	0.21	0.21	0.21	0.21	
				Current	A	1.55	1.55	1.55	1.55	1.55
				Breaker	A	10	10	10	10	10
	Immersion heater		Power supply	Ph	~N	3~	3~	~N	3~	
				V	230	400	230	230	400	
				Hz	50	50	50	50	50	
		Capacity	kW	2+4	3+6	3+6	2+4	3+6		
			Heater step	-	3	3	3	3		
			Current	A	26	13	23	26	13	
	Breaker		A	32	16	32	32	16		
	Performance curve		Power supply	Ph	~N	~N	~N	-	-	
				V	230	230	230	-	-	
		Hz		50	50	50	-	-		
		Capacity	kW	3	3	3	-	-		
			Current	A	13	13	13	-	-	
			Breaker	A	16	16	16	-	-	
	Head difference		Max.	m	7.0	7.0	7.0	7.0	7.0	
				20L/min	m	5.9	5.9	5.9	5.9	
30L/min				m	4.5	4.5	4.5	4.5		
Performance curve		-	Refer to the following page							
Flow rate		Primary circuit	Max.*2	L/min	27.7	27.7	27.7	27.7	27.7	
			Min.*3	L/min	7.1	7.1	7.1	7.1	7.1	
Heat exchanger	Refrigerant - Primary circuit water		-	-	-	-	-			
	Primary circuit water - Domestic hot water		-	Coil in tank	Coil in tank	Coil in tank	Coil in tank			
	Coil: Surface area	m ²	1.1*2	1.1*2	1.1*2	1.1*2	1.1*2			
	Coil: Length	m	14*2	14*2	14*2	14*2	14*2			
	Coil: Capacity	L	6.8*2	6.8*2	6.8*2	6.8*2	6.8*2			
Coil: Material		-	Stainless steel	Stainless steel	Stainless steel	Stainless steel				
Domestic hot water tank	Volume		L	200	200	200	200			
	Material		-	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)	Duplex 2304 stainless steel (EN10088)			
	Time to raise DHW tank temp 15 - 65°C *4		min	21.75	21.75	21.75	21.75			
	Time to reheat 70% of DHW tank to 65°C *4		min	16	16	16	16			
	Heat loss *5		kWh/24h	1.99	1.99	1.99	1.99			
Expansion vessel (Primary circuit)	Volume		L	12	12	12	12			
	Charge pressure		MPa	0.1	0.1	0.1	0.1			
Safety device	Primary circuit	Control thermistor	°C	1~80	1~80	1~80	1~80			
		Pressure relief valve	MPa	0.3	0.3	0.3	0.3			
		Flow switch (Min. flow)	L/min	5.5±1.0	5.5±1.0	5.5±1.0	5.5±1.0			
		BH manual reset thermostat	°C	90	90	90	90			
		BH thermal Cut Off	°C	121	121	121	121			
	DHW tank	Control thermistor	°C	75	75	75	75			
		IH manual reset thermostat	°C	85	85	85	85			
		Temperature & pressure relief valve	°C	-	-	-	-			
			MPa	1.0	1.0	1.0	1.0			
Connections	Water	Primary circuit	mm	28	28	28	28			
		DHW circuit	mm	22	22	22	22			
		Solar circuit	mm	-	-	-	-			
	Refrigerant	Gas	mm	-	-	-	-			
		Liquid	mm	-	-	-	-			
Refrigerant *6		-	R410A	R410A	R410A	R410A				
Guaranteed operating range *7	Ambient	°C	0~35	0~35	0~35	0~35				
		%RH	≤80	≤80	≤80	≤80				
	Outdoor temperature	Heating	°C	See outdoor unit spec table						
		Cooling	°C	-						
Operating range	Heating	Room temperature	°C	10~30	10~30	10~30	10~30			
		Flow temperature	°C	25~60	25~60	25~60	25~60			
	Cooling	Room temperature	°C	-	-	-	-			
		Flow temperature	°C	-	-	-	-			
	DHW		°C	40~60	40~60	40~60	40~60			
	Legionella prevention		°C	60~70	60~70	60~70	60~70			
Sound level (SPL)		dB(A)	28	28	28	28				

*1 When powered from independent source.
 *2 If the water flow rate exceeds maximum, the flow speed will be greater than 1.5 m/s, which could corrode the pipes.
 *3 If the water flow is less than minimum, the flow switch will be activated.
 *4 Tested under BS7206 conditions (Primary flow to cylinder coil 80-82 deg C). Conducted by WRc.
 *5 Calculated from 24h temperature decay at top of the tank from 65degC (ambient temperature approx. 20degC). Tested by WRc.
 *6 Refrigerant of outdoor unit connected to cylinder unit.
 *7 The environment must be frost-free.

1.3 Hydrobox

Model name			EHSC-VM2B		EHSC-VM6B		EHSC-VM9B		EHSC-TM9B		EHSC-VM6EB	
Dimensions	Without package	Height	mm	800	800	800	800	800	800	800	800	800
		Width	mm	530	530	530	530	530	530	530	530	530
		Depth	mm	360	360	360	360	360	360	360	360	360
	With package	Height	mm	990	990	990	990	990	990	990	990	990
		Width	mm	600	600	600	600	600	600	600	600	600
		Depth	mm	560	560	560	560	560	560	560	560	560
Casing	Munsell	-	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	
	RAL code	-	RAL 9016	RAL 9016	RAL 9016	RAL 9016	RAL 9016	RAL 9016	RAL 9016	RAL 9016	RAL 9016	
	Material	-	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	
Product weight (empty)			kg	51	53	53	53	53	53	53	49	
Product weight (full)			kg	57	59	59	59	59	59	59	55	
Gross weight			kg	64	66	66	66	66	66	66	62	
Type of Installation			-	Wall mounted	Wall mounted	Wall mounted	Wall mounted	Wall mounted	Wall mounted	Wall mounted	Wall mounted	
Electrical data	Control board *1 (Including 2 pumps)	Power supply	Ph	~N	~N	~N	~N	~N	~N	~N	~N	
			V	230	230	230	230	230	230			
			Hz	50	50	50	50	50	50			
		Input	kW	0.21	0.21	0.21	0.21	0.21	0.21			
			Current	A	1.55	1.55	1.55	1.55	1.55			
			Breaker	A	10	10	10	10	10			
	Booster heater	Power supply	Ph	~N	~N	3~	~N	~N				
			V	230	230	400	230	230				
			Hz	50	50	50	50	50				
		Capacity	kW	2	2+4	3+6	3+6	2+4				
			Heater step	-	1	3	3	3				
			Current	A	9	26	13	23				
	Breaker	A	16	32	16	32	32					
		Immersion heater	Power supply	Ph	-	-	-	-				
				V	-	-	-	-				
	Hz			-	-	-	-					
	Capacity		kW	-	-	-	-	-				
			Current	A	-	-	-	-				
			Breaker	A	-	-	-	-				
	Water circulation pump (Primary circuit)	Input (When the flow rate is max.)	Speed 1	W	36	36	36	36				
			Speed 2	W	56	56	56	56				
			Speed 3	W	63	63	63	63				
			Speed 4	W	63	63	63	63				
			Speed 5	W	63	63	63	63				
Current (When the flow rate is max.)		Speed 1	A	0.3	0.3	0.3	0.3					
		Speed 2	A	0.4	0.4	0.4	0.4					
		Speed 3	A	0.5	0.5	0.5	0.5					
		Speed 4	A	0.5	0.5	0.5	0.5					
		Speed 5	A	0.5	0.5	0.5	0.5					
Head difference		Max.	m	7.0	7.0	7.0	7.0					
		20L/min	m	5.9	5.9	5.9	5.9					
		30L/min	m	4.5	4.5	4.5	4.5					
Performance curve			-	Refer to the following page								
Flow rate		Primary circuit	Max.*2	L/min	27.7	27.7	27.7	27.7				
	Min.*3		L/min	7.1	7.1	7.1	7.1					
Heat exchanger	Refrigerant - Primary circuit water		-	Plate	Plate	Plate	Plate					
	Primary circuit water - Domestic hot water		-	-	-	-						
	Coil: Surface area	m ²	-	-	-	-						
	Coil: Length	m	-	-	-	-						
	Coil: Capacity	L	-	-	-	-						
Domestic hot water tank	Volume	L	-	-	-	-						
	Material	-	-	-	-	-						
	Time to raise DHW tank temp 15 - 65°C *4	min	-	-	-	-						
	Time to reheat 70% of DHW tank to 65°C *4	min	-	-	-	-						
	Heat loss *5	kWh/24h	-	-	-	-						
Expansion vessel (Primary circuit)	Volume	L	10	10	10	10						
	Charge pressure	MPa	0.1	0.1	0.1	0.1						
Safety device	Primary circuit	Control thermistor	°C	1~80	1~80	1~80	1~80					
		Pressure relief valve	MPa	0.3	0.3	0.3	0.3					
		Flow switch (Min. flow)	L/min	5.5±1.0	5.5±1.0	5.5±1.0	5.5±1.0					
		BH manual reset thermostat	°C	90	90	90	90					
		BH thermal Cut Off	°C	121	121	121	121					
	DHW tank	Control thermistor	°C	-	-	-	-					
		IH manual reset thermostat	°C	-	-	-	-					
		Temperature & pressure relief valve	°C	-	-	-	-					
			MPa	-	-	-	-					
			-	-	-	-	-					
Connections	Water	Primary circuit	mm	28	28	28	28					
		DHW circuit	mm	-	-	-	-					
		Solar circuit	mm	-	-	-	-					
	Refrigerant	Gas	mm	15.88	15.88	15.88	15.88					
		Liquid	mm	9.52	9.52	9.52	9.52					
			-	R410A	R410A	R410A	R410A					
Refrigerant *6		-	R410A	R410A	R410A	R410A						
	Guaranteed operating range *7	Ambient	°C	0~35	0~35	0~35	0~35					
			%RH	≤80	≤80	≤80	≤80					
Operating range	Heating	Room temperature	°C	10~30	10~30	10~30	10~30					
		Flow temperature	°C	25~60	25~60	25~60	25~60					
	Cooling	Room temperature	°C	-	-	-	-					
		Flow temperature	°C	-	-	-	-					
	DHW	°C	-	-	-	-						
	Legionella prevention	°C	-	-	-	-						
Sound level (SPL)		dB(A)	28	28	28	28						

*1 When powered from independent source.
 *2 If the water flow rate exceeds maximum, the flow speed will be greater than 1.5 m/s, which could corrode the pipes.
 *3 If the water flow is less than minimum, the flow switch will be activated.
 *4 Tested under BS7206 conditions (Primary flow to cylinder coil 80-92 deg C). Conducted by WRC.
 *5 Calculated from 24h temperature decay at top of the tank from 65degC (ambient temperature approx. 20degC). Tested by WRC.
 *6 Refrigerant of outdoor unit connected to cylinder unit.
 *7 The environment must be frost-free.

1.3 Hydrobox

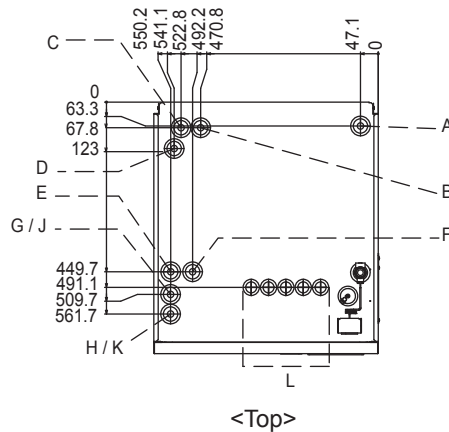
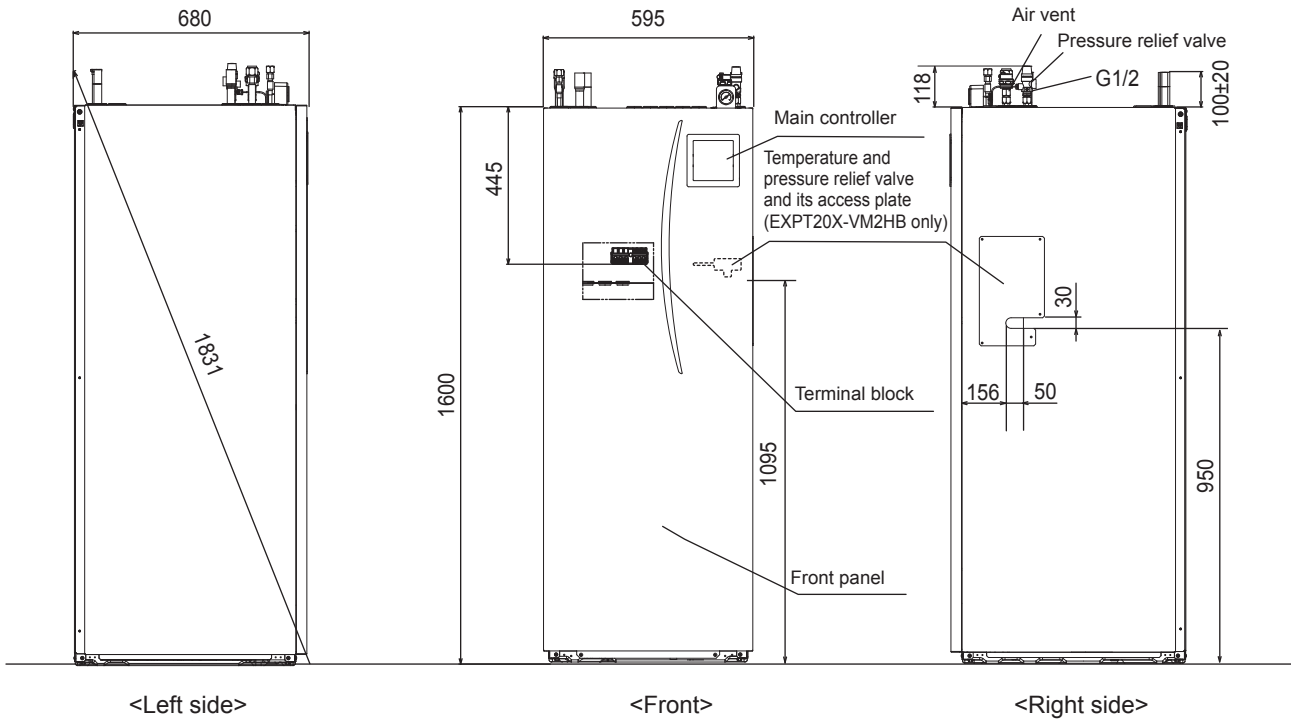
Model name			EHSC-VM9EB	EHPX-VM2B	EHPX-VM6B	EHPX-VM9B	ERSC-VM2B		
Dimensions	Without package	Height	mm	800	800	800	800	860	
		Width	mm	530	530	530	530	530	
		Depth	mm	360	360	360	360	360	
	With package	Height	mm	990	990	990	990	1050	
		Width	mm	600	600	600	600	600	
		Depth	mm	560	560	560	560	560	
Casing	Munsell	-	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2	1Y 9.2/0.2		
	RAL code	-	RAL 9016	RAL 9016	RAL 9016	RAL 9016	RAL 9016		
	Material	-	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal	Pre-coated metal		
Product weight (empty)		kg	49	39	41	41	54		
Product weight (full)		kg	55	44	46	46	60		
Gross weight		kg	62	52	54	54	68		
Type of installation		-	Wall mounted	Wall mounted	Wall mounted	Wall mounted	Wall mounted		
Electrical data	Control board *1 (Including 2 pumps)	Power supply	Ph	~N	~N	~N	~N	~N	
			V	230	230	230	230	230	
			Hz	50	50	50	50	50	
		Input	kW	0.21	0.21	0.21	0.21	0.21	
			Current	A	1.55	1.55	1.55	1.55	1.55
			Breaker	A	10	10	10	10	10
	Booster heater	Power supply	Ph	3~	~N	~N	3~	~N	
			V	400	230	230	400	230	
			Hz	50	50	50	50	50	
		Capacity	kW	3+6	2	2+4	3+6	2	
			Heater step	-	3	1	3	1	
			Current	A	13	9	26	13	9
	Breaker	A	16	16	32	16	16		
		Immersion heater	Power supply	Ph	-	-	-	-	-
				V	-	-	-	-	-
	Hz			-	-	-	-	-	
	Capacity		kW	-	-	-	-	-	
			Current	A	-	-	-	-	
	Breaker	A	-	-	-	-	-		
		Water circulation pump (Primary circuit)	Input (When the flow rate is max.)	Speed 1	W	36	36	36	36
	Speed 2			W	56	56	56	56	
Speed 3	W			63	63	63	63		
Speed 4	W			63	63	63	63		
Speed 5	W			63	63	63	63		
Current (When the flow rate is max.)	Speed 1		A	0.3	0.3	0.3	0.3		
	Speed 2	A	0.4	0.4	0.4	0.4			
	Speed 3	A	0.5	0.5	0.5	0.5			
	Speed 4	A	0.5	0.5	0.5	0.5			
	Speed 5	A	0.5	0.5	0.5	0.5			
Head difference	Max.	m	7.0	7.0	7.0	7.0	7.0		
	20L/min	m	5.9	5.9	5.9	5.9	5.9		
	30L/min	m	4.5	4.5	4.5	4.5	4.5		
Performance curve		-	Refer to the following page						
Flow rate	Primary circuit	Max.*2	L/min	27.7	27.7	27.7	27.7	27.7	
		Min.*3	L/min	7.1	7.1	7.1	7.1	7.1	
Heat exchanger	Refrigerant - Primary circuit water		-	Plate	-	-	-	Plate	
	Primary circuit water - Domestic hot water		-	-	-	-	-	-	
	Coil: Surface area	m ²	-	-	-	-	-	-	
		Coil: Length	m	-	-	-	-	-	
		Coil: Capacity	L	-	-	-	-	-	
Coil: Material		-	-	-	-	-	-		
Domestic hot water tank	Volume		L	-	-	-	-		
	Material		-	-	-	-	-		
	Time to raise DHW tank temp 15 - 65°C *4		min	-	-	-	-		
	Time to reheat 70% of DHW tank to 65°C *4		min	-	-	-	-		
	Heat loss *5		kWh/24h	-	-	-	-		
Expansion vessel (Primary circuit)	Volume		L	-	10	10	10		
	Charge pressure		MPa	-	0.1	0.1	0.1		
Safety device	Primary circuit	Control thermostat	°C	1~80	1~80	1~80	1~80	1~80	
		Pressure relief valve	MPa	0.3	0.3	0.3	0.3	0.3	
		Flow switch (Min. flow)	L/min	5.5±1.0	5.5±1.0	5.5±1.0	5.5±1.0	5.5±1.0	
		BH manual reset thermostat	°C	90	90	90	90	90	
		BH thermal Cut Off	°C	121	121	121	121	121	
	DHW tank	Control thermostat	°C	-	-	-	-	-	
		IH manual reset thermostat	°C	-	-	-	-	-	
		Temperature & pressure relief valve	°C	-	-	-	-	-	
		MPa	-	-	-	-	-		
		MPa	-	-	-	-	-		
Connections	Water	Primary circuit	mm	28	28	28	28	28	
		DHW circuit	mm	-	-	-	-	-	
		Solar circuit	mm	-	-	-	-	-	
	Refrigerant	Gas	mm	15.88	-	-	-	15.88	
		Liquid	mm	9.52	-	-	-	9.52	
		Refrigerant *6	-	R410A	R410A	R410A	R410A	R410A	
Guaranteed operating range *7	Ambient	°C	0~35	0~35	0~35	0~35	0~35		
		%RH	≤80	≤80	≤80	≤80	≤80		
	Outdoor temperature	Heating	°C	See outdoor unit spec table					
Cooling		°C	See outdoor unit spec table						
Operating range	Heating	Room temperature	°C	10~30	10~30	10~30	10~30	10~30	
		Flow temperature	°C	25~60	25~60	25~60	25~60	25~60	
	Cooling	Room temperature	°C	-	-	-	-	-	
		Flow temperature	°C	-	-	-	-	5~25	
	DHW		°C	-	-	-	-	-	
	Legionella prevention		°C	-	-	-	-	-	
Sound level (SPL)		dB(A)	28	28	28	28	28		

*1 When powered from independent source.
 *2 If the water flow rate exceeds maximum, the flow speed will be greater than 1.5 m/s, which could corrode the pipes.
 *3 If the water flow is less than minimum, the flow switch will be activated.
 *4 Tested under BS7206 conditions (Primary flow to cylinder coil 80-92 deg C). Conducted by WRc.
 *5 Calculated from 24h temperature decay at top of the tank from 65degC (ambient temperature approx. 20degC). Tested by WRc.
 *6 Refrigerant of outdoor unit connected to cylinder unit.
 *7 The environment must be frost-free.

2.1 Cylinder unit

■ Technical Drawings

<Unit: mm>

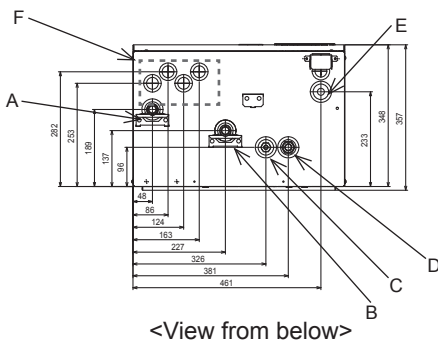
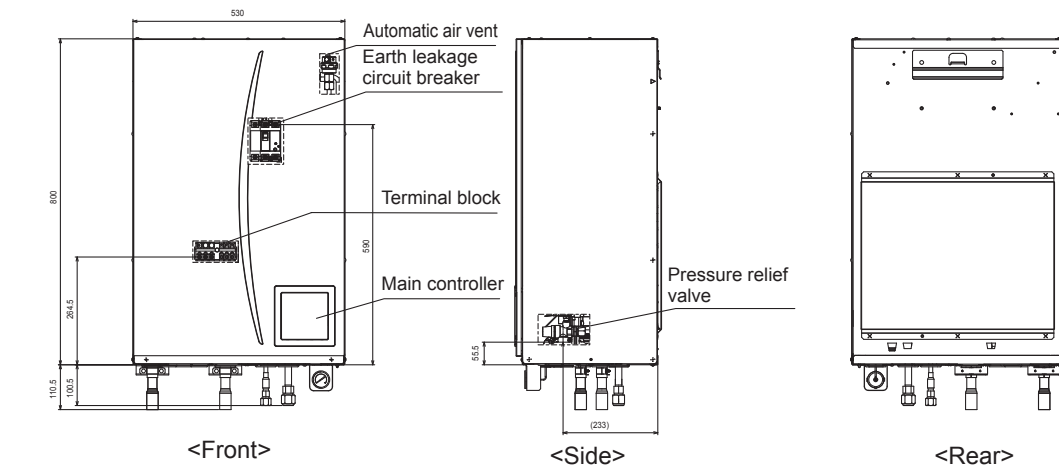


Letter	Pipe description	Connection size/type
A	DHW outlet connection	22 mm/Compression
B	Cold water inlet connection	22 mm/Compression
C/D	Solar (ancillary heat source) connection	22 mm/Compression
E	Space heating return connection	28 mm/Compression
F	Space heating flow connection	28 mm/Compression
G	Flow from heat pump connection (No plate heat exchanger)	28 mm/Compression
H	Return to heat pump connection (No plate heat exchanger)	28 mm/Compression
J	Refrigerant (GAS) (With plate heat exchanger)	15.88 mm/Flare
K	Refrigerant (LIQUID) (With plate heat exchanger)	9.52 mm/Flare
L	Electrical cable inlets ①②③④⑤ ○ ○ ○ ○ ○	— For inlets ① and ②, run low-voltage wires including external input wires and thermostat wires. For inlets ③, ④, and ⑤, run high-voltage wires including power cable, indoor-outdoor cable, and external output wires. *For a wireless receiver (option) cable, use inlet ①.

<Table 2.1>

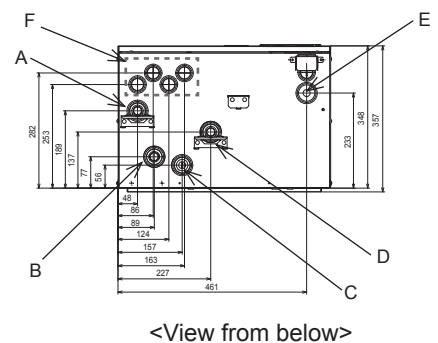
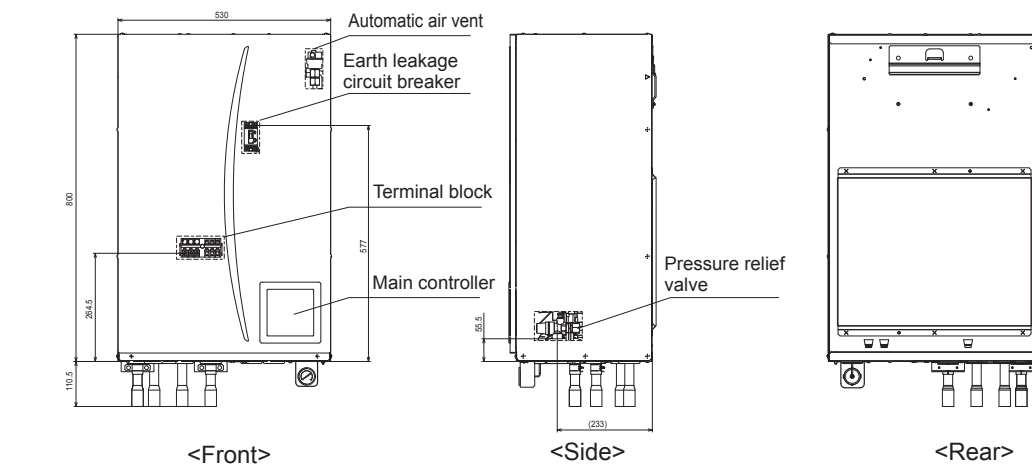
2.2 Hydrobox

<EHSC> (Split model system)



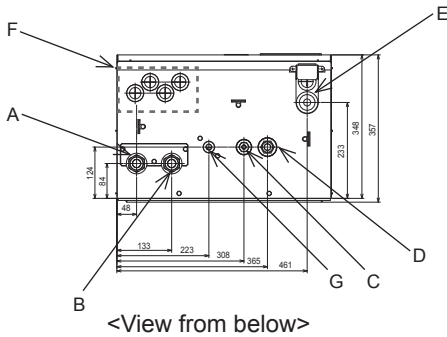
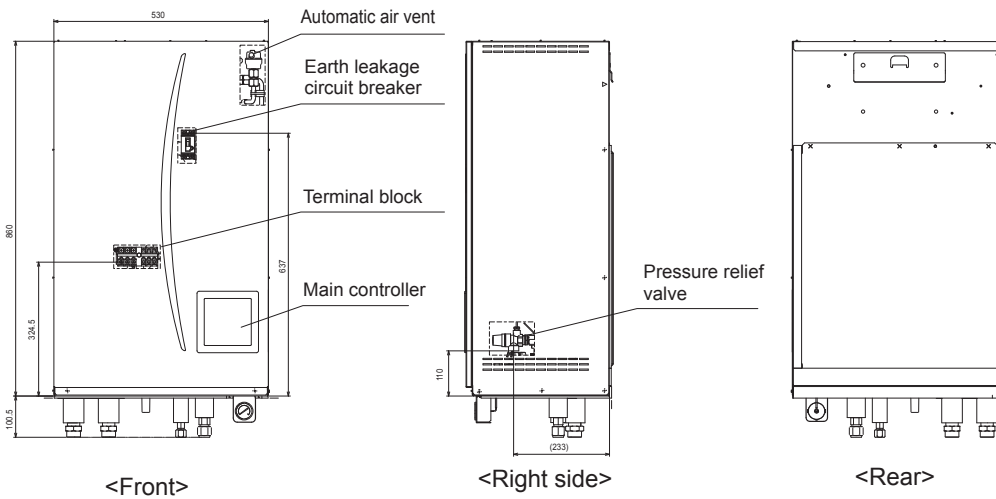
Letter	Pipe description	Connection size/type
A	Space heating/Indirect DHW tank (primary) return connection	28 mm/Compression
B	Space heating/Indirect DHW tank (primary) flow connection	28 mm/Compression
C	Refrigerant (Liquid)	9.52 mm/Flare
D	Refrigerant (Gas)	15.88 mm/Flare
E	Discharge pipe (by installer) from pressure relief valve	G1/2" female (valve port within hydrobox casing)
F	Electrical cable inlets ① ② ③ ④	For inlets ① and ②, run low-voltage wires including external input wires and thermistor wires. For inlets ③ and ④, run high-voltage wires including power cable, indoor-outdoor cable, and external output wires. *For a wireless receiver (option) cable, use inlet ①.

<EHPX> (Packaged model system)



Letter	Pipe description	Connection size/type
A	Space heating/Indirect DHW tank (primary) return connection	28 mm/Compression
B	Flow connection from heat pump	28 mm/Compression
C	Return connection to heat pump	28 mm/Compression
D	Space heating/Indirect DHW tank (primary) flow connection	28 mm/Compression
E	Discharge pipe (by installer) from pressure relief valve	G1/2" female (valve port within hydrobox casing)
F	Electrical cable inlets ① ② ③ ④	For inlets ① and ②, run low-voltage wires including external input wires and thermistor wires. For inlets ③ and ④, run high-voltage wires including power cable, indoor-outdoor cable, and external output wires. *For a wireless receiver (option) cable, use inlet ①.

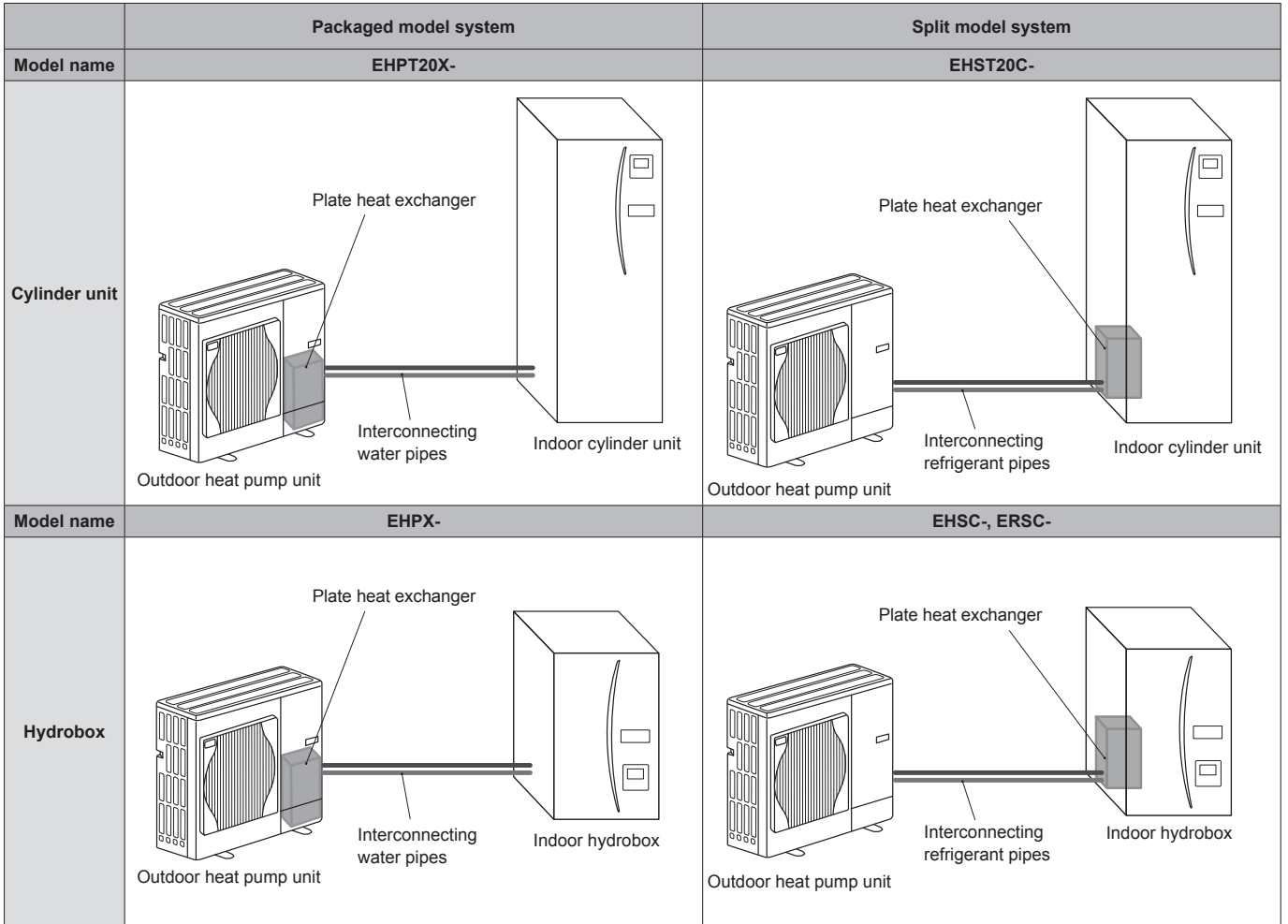
<ERSC> (Split model system)



Letter	Pipe description	Connection size/type
A	Space heating and cooling/ Indirect DHW tank (primary) return connection	G1 nut
B	Space heating and cooling/ Indirect DHW tank (primary) flow connection	G1 nut
C	Refrigerant (Liquid)	9.52 mm/Flare
D	Refrigerant (Gas)	15.88 mm/Flare
E	Discharge pipe (by installer) from pressure relief valve	G1/2" female (valve port within hydrobox casing)
F	Electrical cable inlets ① ② ③ ④	— For inlets ① and ②, run low-voltage wires including external input wires and thermistor wires. For inlets ③ and ④, run high-voltage wires including power cable, indoor-outdoor cable, and external output wires. *For a wireless receiver (option) cable, use inlet ①.
G	Drain socket	O.D. ø20

Cylinder / Hydrobox

2.3 System configuration



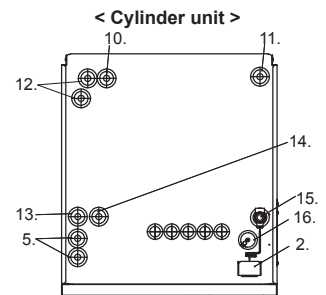
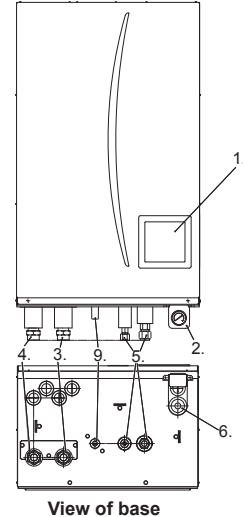
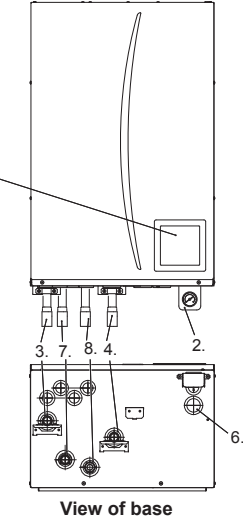
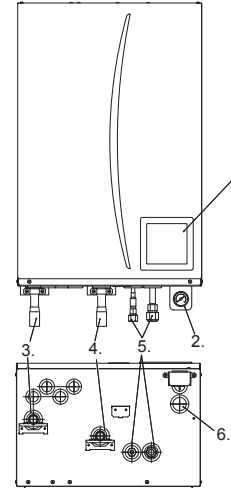
Important Parts of the Units - Points to Note

< Hydrobox >

EHSC (Split model system)

EHPX (Package model system)

ERSC (Split model system)



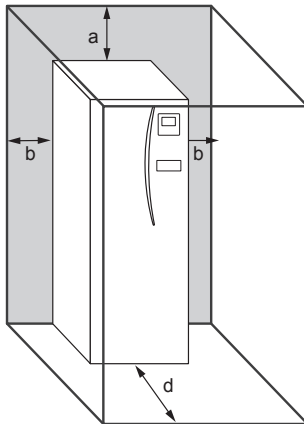
- | | | |
|--|--|---|
| 1. Main controller | 7. Flow connection from heat pump | 13. Space heating return connection |
| 2. Manometer (Pressure gauge) | 8. Return connection to heat pump | 14. Space heating flow connection |
| 3. Space heating/Indirect DHW tank (primary) return connection | 9. Drain socket | 15. Pressure relief valve |
| 4. Space heating/Indirect DHW tank (primary) flow connection | 10. Cold water inlet connection | 16. Automatic air vent |
| 5. Heat pump/refrigerant connections | 11. DHW outlet connection | 17. Temperature and pressure relief valve |
| 6. Discharge pipe from pressure relief valve | 12. Solar (ancillary heat source) connection | *EHPT20X-VM2HB ONLY |

2.4 Service access diagrams

■ Cylinder unit

Service access	
Parameter	Dimension (mm)
a	300
b	150
c (distance behind unit not visible in Figure 2.4.1)	10
d	500

Sufficient space MUST be left for the provision of discharge pipework as detailed in National and Local Building Regulations.



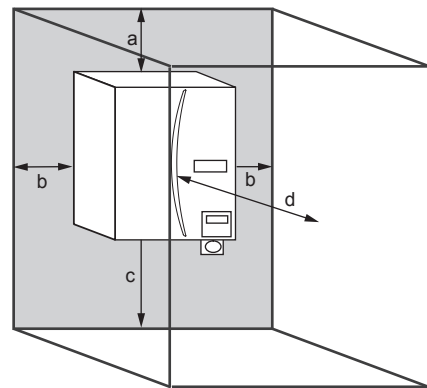
<Figure 2.4.1>
Service access

The cylinder unit must be located indoors and in a frost-free environment, for example in a utility room, to minimise heat loss from stored water.

■ Hydrobox

Service access	
Parameter	Dimension (mm)
a	200
b	150
c	500
d	500

Sufficient space MUST be left for the provision of discharge pipework as detailed in National and Local building regulations.



<Figure 2.4.2>
Service access

The hydrobox must be located indoors and in a frost-free environment, for example in a utility room.

3.1 Cylinder unit

3.1.1 Wiring diagrams

EHST20C-VM6HB

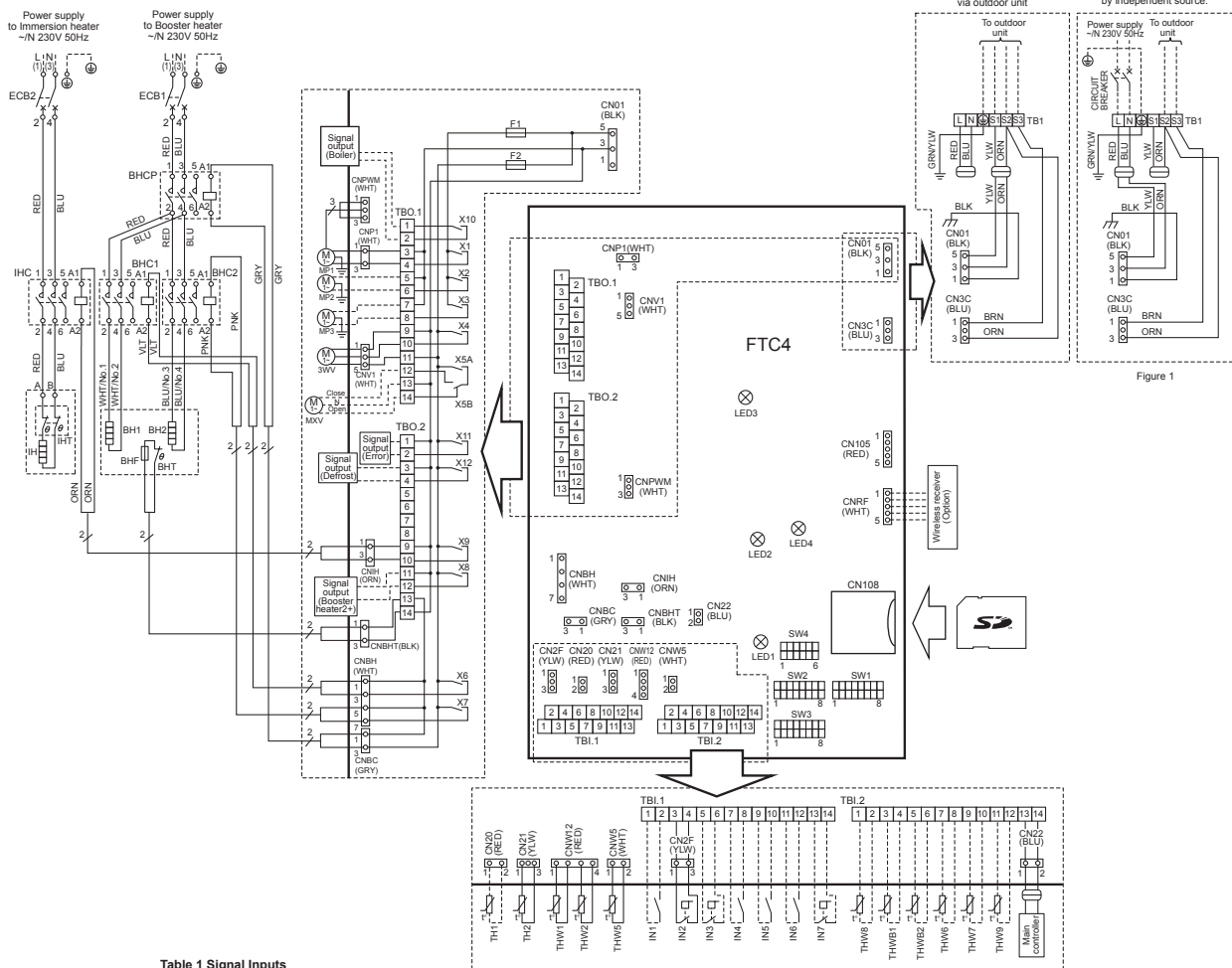


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	—
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	—
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	—
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	—
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	—

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.

*2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	—	Heating
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	—	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>
ECB1	Earth leakage circuit breaker for booster heater
ECB2	Earth leakage circuit breaker for immersion heater
MP1	Water circulation pump1(Space heating & DHW)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)
3WV	3-way valve
MXV	Mixing valve (Field supply)
BHT	Thermostat for booster heater
BHF	Thermal fuse for booster heater
BH1	Booster heater 1
BH2	Booster heater 2
BHC1	Contactor for booster heater 1
BHC2	Contactor for booster heater 2
BHCP	Contactor for booster heater protection
IHT	Thermostat (fixed temp.) for immersion heater
IH	Immersion heater
IHC	Contactor for immersion heater

Symbol	Name
TH1	Thermistor (Room temp.)(Option)
TH2	Thermistor (Ref. liquid temp.)
THW1	Thermistor (Flow water temp.)
THW2	Thermistor (Return water temp.)
THW5	Thermistor (DHW tank water temp.)
THW6	Thermistor (Zone1 flow temp.)(Option)
THW7	Thermistor (Zone1 return temp.)(Option)
THW8	Thermistor (Zone2 flow temp.)(Option)
THW9	Thermistor (Zone2 return temp.)(Option)
THWB1	Thermistor (Boiler flow temp.)(Option)
THWB2	Thermistor (Boiler return temp.)(Option)
IN1	Room thermostat 1 (Field supply)
IN2	Flow switch 1
IN3	Flow switch 2 (Field supply)
IN4	Demand control (Field supply)
IN5	Outdoor thermostat (Field supply)
IN6	Room thermostat 2 (Field supply)
IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>.
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPFM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, : connector, : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHST20C-YM9HB

Cylinder / Hydrobox

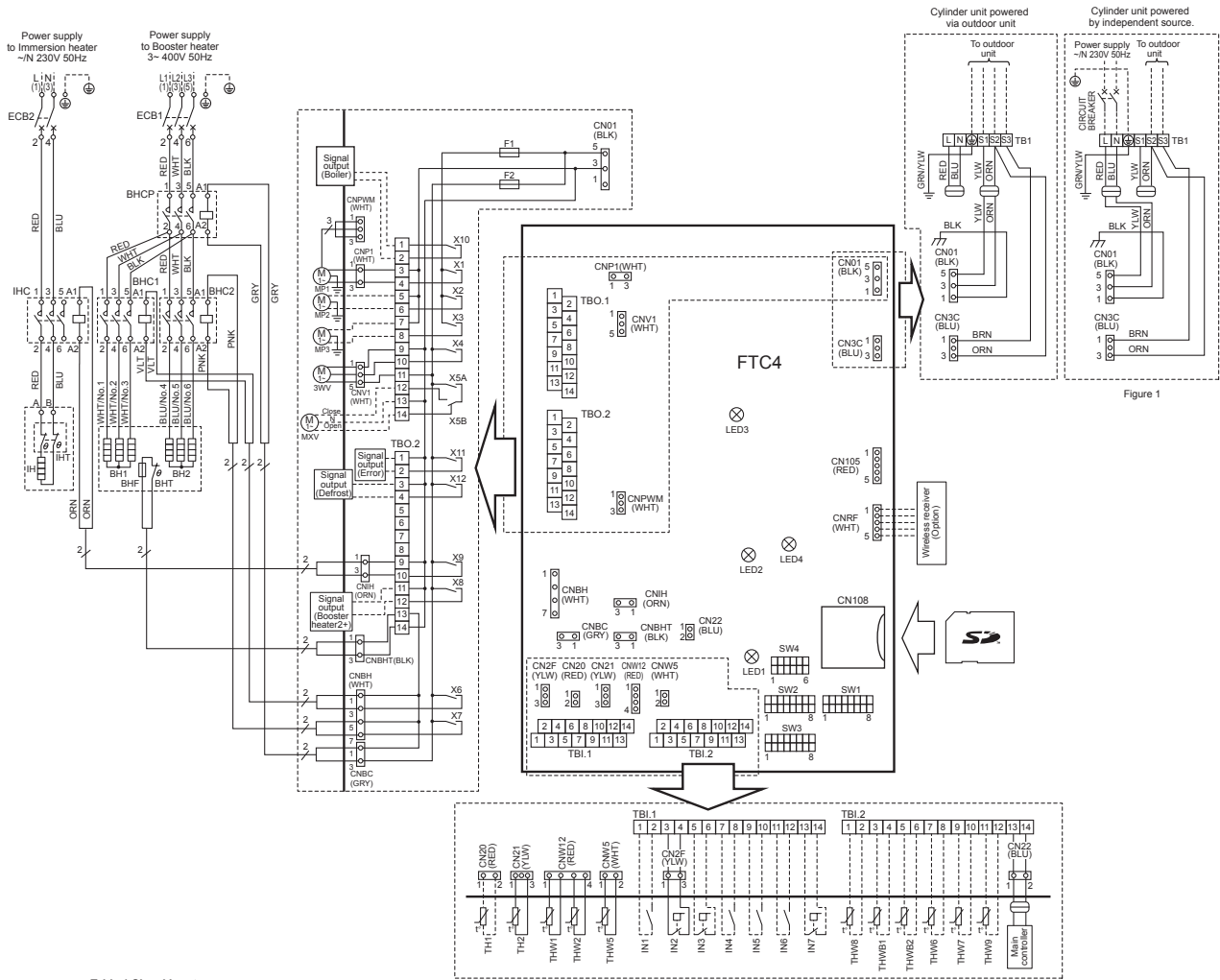


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation 2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation 2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-3 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13 TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>
ECB1	Earth leakage circuit breaker for booster heater
ECB2	Earth leakage circuit breaker for immersion heater
MP1	Water circulation pump1(Space heating & DHW)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)
3WV	3-way valve
MXV	Mixing valve (Field supply)
BHT	Thermostat for booster heater
BHF	Thermal fuse for booster heater
BH1	Booster heater 1
BH2	Booster heater 2
BHC1	Contactor for booster heater 1
BHC2	Contactor for booster heater 2
BHCP	Contactor for booster heater protection
IHT	Thermostat (fixed temp.) for immersion heater
IH	Immersion heater
IHC	Contactor for immersion heater

Symbol	Name
TH1	Thermistor (Room temp.)(Option)
TH2	Thermistor (Ref. liquid temp.)
THW1	Thermistor (Flow water temp.)
THW2	Thermistor (Return water temp.)
THW5	Thermistor (DHW tank water temp.)
THW6	Thermistor (Zone1 flow temp.)(Option)
THW7	Thermistor (Zone1 return temp.)(Option)
THW8	Thermistor (Zone2 flow temp.)(Option)
THW9	Thermistor (Zone2 return temp.)(Option)
THWB1	Thermistor (Boiler flow temp.)(Option)
THWB2	Thermistor (Boiler return temp.)(Option)
IN1	Room thermostat 1 (Field supply)
IN2	Flow switch 1
IN3	Flow switch 2 (Field supply)
IN4	Demand control (Field supply)
IN5	Outdoor thermostat (Field supply)
IN6	Room thermostat 2 (Field supply)
IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, [] connector, [] terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHST20C-TM9HB

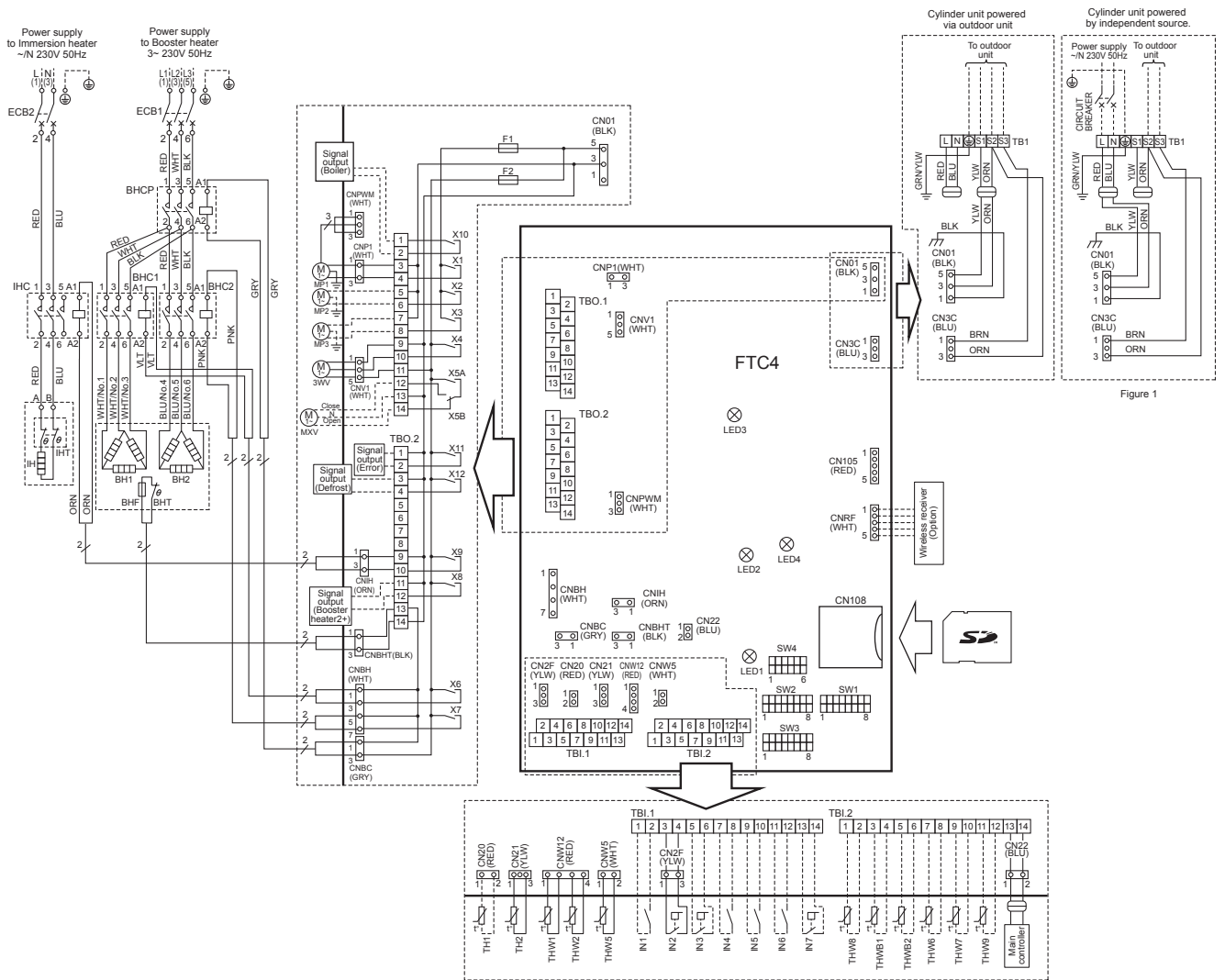


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation ²
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation ²
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Booster heater 1 output	Stop	Open
OUT7	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT8	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT9	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT10	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT11	TBI.1 1-2	—	Boiler output	OFF	ON
OUT12	TBO.2 1-2	—	Error output	Normal	Error
OUT13	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)
ECB2	Earth leakage circuit breaker for immersion heater	THW1	Thermistor (Flow water temp.)
MP1	Water circulation pump1(Space heating & DHW)	THW2	Thermistor (Return water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW5	Thermistor (DHW tank water temp.)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
3WV	3-way valve	THW7	Thermistor (Zone1 return temp.)(Option)
MKV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)
BH2	Booster heater 2	IN1	Room thermostat 1 (Field supply)
BHC1	Contactor for booster heater 1	IN2	Flow switch 1
BHC2	Contactor for booster heater 2	IN3	Flow switch 2 (Field supply)
BHCP	Contactor for booster heater protection	IN4	Demand control (Field supply)
IHT	Thermostat (fixed temp.) for immersion heater	IN5	Outdoor thermostat (Field supply)
IH	Immersion heater	IN6	Room thermostat 2 (Field supply)
IHC	Contactor for immersion heater	IN7	Flow switch 3 (Field supply)

Symbol	Name
TBI.1-2	Terminal block <Outputs>
TH1-2	Thermistor (Ref. liquid temp.)
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

1. Symbols used in wiring diagram are, : connector, : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHST20C-VM2B

Cylinder / Hydrobox

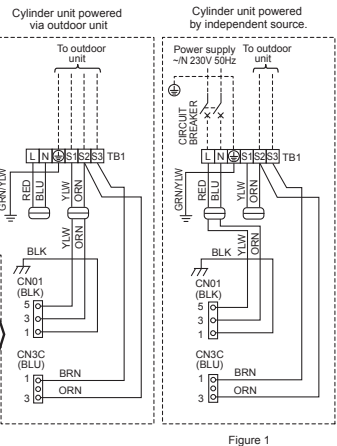
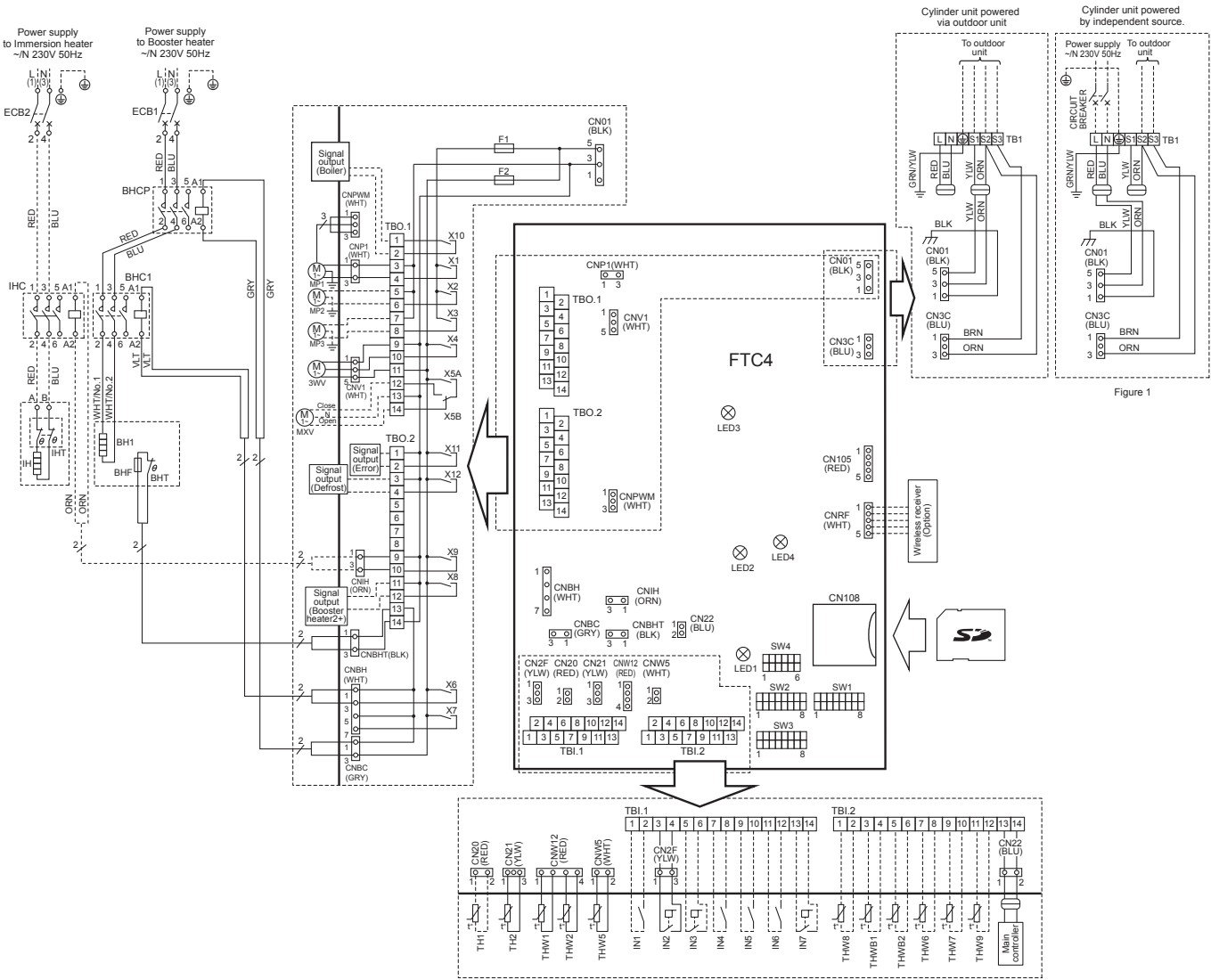


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source Off/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)
ECB2	Earth leakage circuit breaker for immersion heater (Option)	THW1	Thermistor (Flow water temp.)
MP1	Water circulation pump1 (Space heating & DHW)	THW2	Thermistor (Return water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW5	Thermistor (DHW tank water temp.)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
3WV	3-way valve	THW7	Thermistor (Zone1 return temp.)(Option)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
MXV	Mixing valve (Field supply)	THW9	Thermistor (Zone2 return temp.)(Option)
BHT	Thermostat for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BHF	Thermal fuse for booster heater	THWB2	Thermistor (Boiler return temp.)(Option)
BH1	Booster heater 1	IN1	Room thermostat 1 (Field supply)
BHC1	Contactor for booster heater 1	IN2	Flow switch 1
BHCP	Contactor for booster heater protection	IN3	Flow switch 2 (Field supply)
IHT	Thermostat (fixed temp.) for immersion heater (Option)	IN4	Demand control (Field supply)
IH	Immersion heater (Option)	IN5	Outdoor thermostat (Field supply)
IHC	Contactor for immersion heater (Option)	IN6	Room thermostat 2 (Field supply)
		IN7	Flow switch 3 (Field supply)

FLOW TEMP. CONTROLLER (FTC4)	
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

1. Symbols used in wiring diagram are, [] connector, [] terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHST20C-VM6B

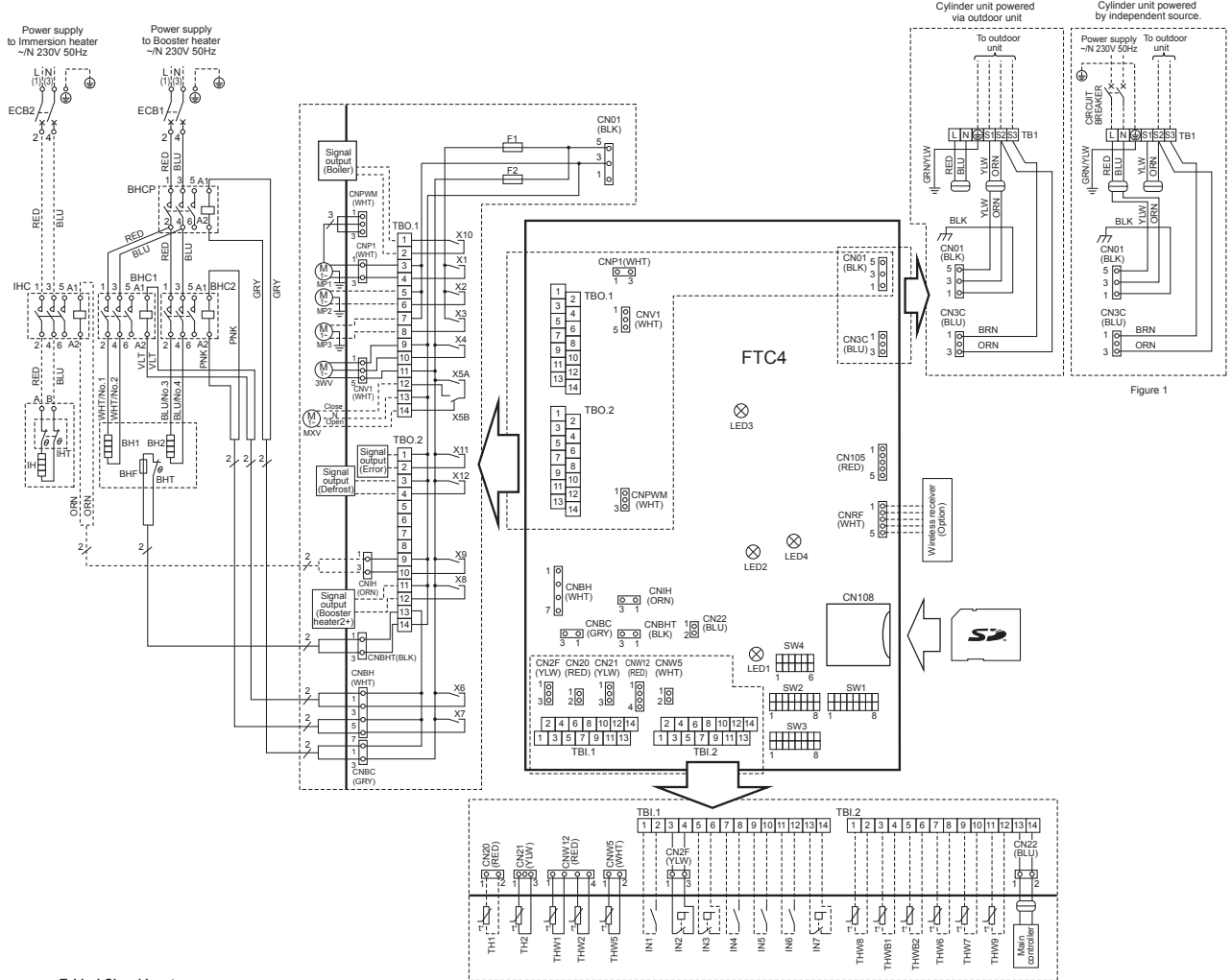


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

- If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
	TBO.1 13-14	—		Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name	Symbol	Name	Flow Temp. CONTROLLER (FTC4)
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)	TBO.1-2 Terminal block <Outputs>
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)	TBI.1-2 Terminal block <Signal Inputs, Thermistor>
ECB2	Earth leakage circuit breaker for immersion heater (Option)	THW1	Thermistor (Flow water temp.)	F1-F2 Fuse (T6.3AL250V)
MP1	Water circulation pump1 (Space heating & DHW)	THW2	Thermistor (Return water temp.)	SW1-4 Dip switch *See <3.1.2 Dip switch functions>
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW5	Thermistor (DHW tank water temp.)	X1-X12 Relay
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)	LED1 Power supply (FTC4)
3WV	3-way valve	THW7	Thermistor (Zone1 return temp.)(Option)	LED2 Power supply (Main controller)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)	LED3 Communication (FTC4-Outdoor unit)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)	LED4 Reading or writing data to SD card
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)	CNPWM Pump speed control signal for MP1
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)	CNI08 SD card connector
BH2	Booster heater 2	IN1	Room thermostat 1 (Field supply)	
BHC1	Contactor for booster heater 1	IN2	Flow switch 1	
BHC2	Contactor for booster heater 2	IN3	Flow switch 2 (Field supply)	
BHCP	Contactor for booster heater protection	IN4	Demand control (Field supply)	
IHT	Thermostat (fixed temp.) for immersion heater (Option)	IN5	Outdoor thermostat (Field supply)	
IH	Immersion heater (Option)	IN6	Room thermostat 2 (Field supply)	
IHC	Contactor for immersion heater (Option)	IN7	Flow switch 3 (Field supply)	

- Symbols used in wiring diagram are:
 [] : connector, [] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHST20C-YM9B

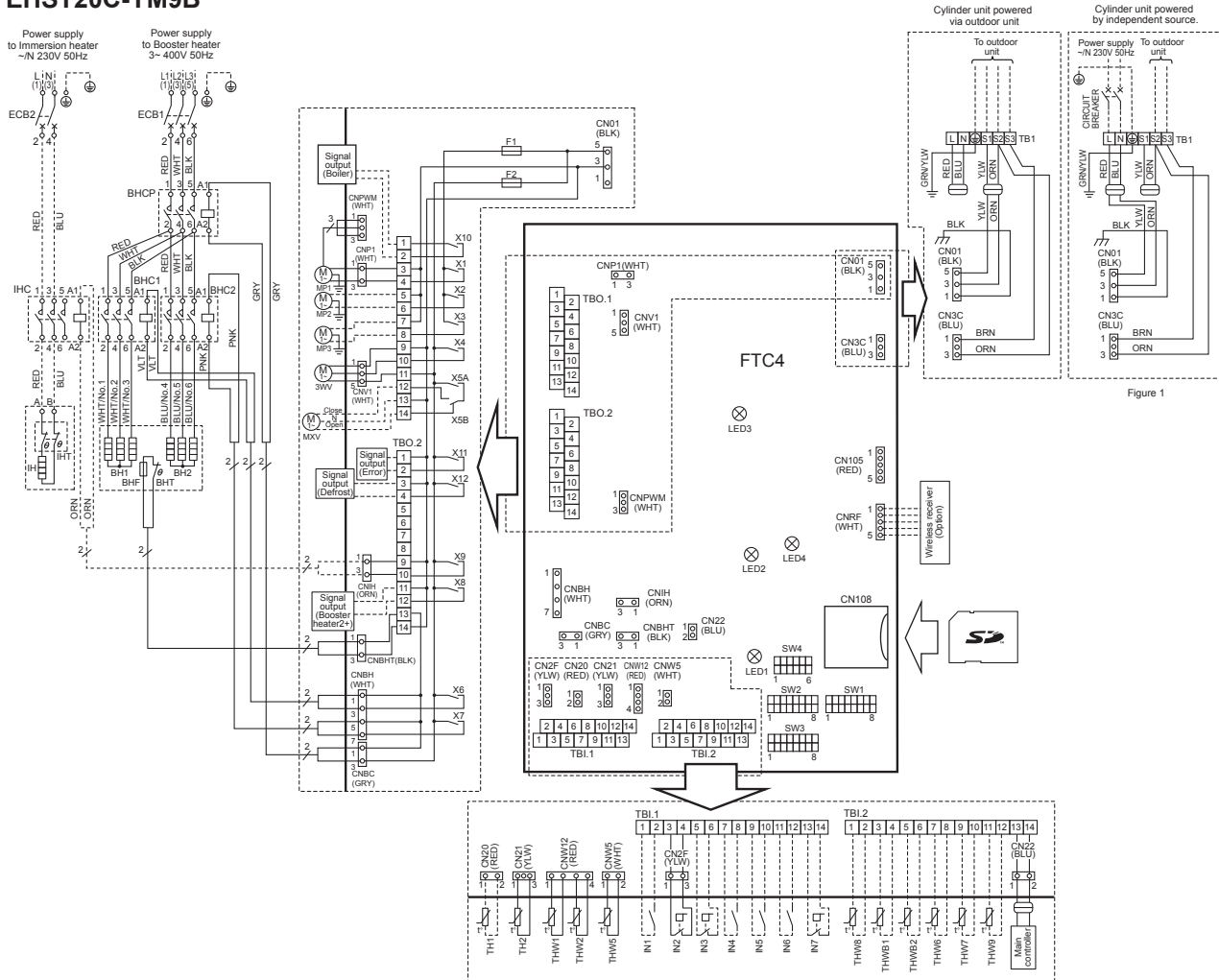


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source Off/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)
ECB2	Earth leakage circuit breaker for immersion heater (Option)	THW1	Thermistor (Flow water temp.)
MP1	Water circulation pump1(Space heating & DHW)	THW2	Thermistor (Return water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW5	Thermistor (DHW tank water temp.)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
3WV	3-way valve	THW7	Thermistor (Zone1 return temp.)(Option)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)
BH2	Booster heater 2	IN1	Room thermostat 1 (Field supply)
BHC1	Contactor for booster heater 1	IN2	Flow switch 1
BHC2	Contactor for booster heater 2	IN3	Flow switch 2 (Field supply)
BHCP	Contactor for booster heater protection	IN4	Demand control (Field supply)
IHT	Thermostat (fixed temp.) for immersion heater (Option)	IN5	Outdoor thermostat (Field supply)
IH	Immersion heater (Option)	IN6	Room thermostat 2 (Field supply)
IHC	Contactor for immersion heater (Option)	IN7	Flow switch 3 (Field supply)

FLOW TEMP. CONTROLLER (FTC4)	
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, \square : connector, \square : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHST20C-VM6EB

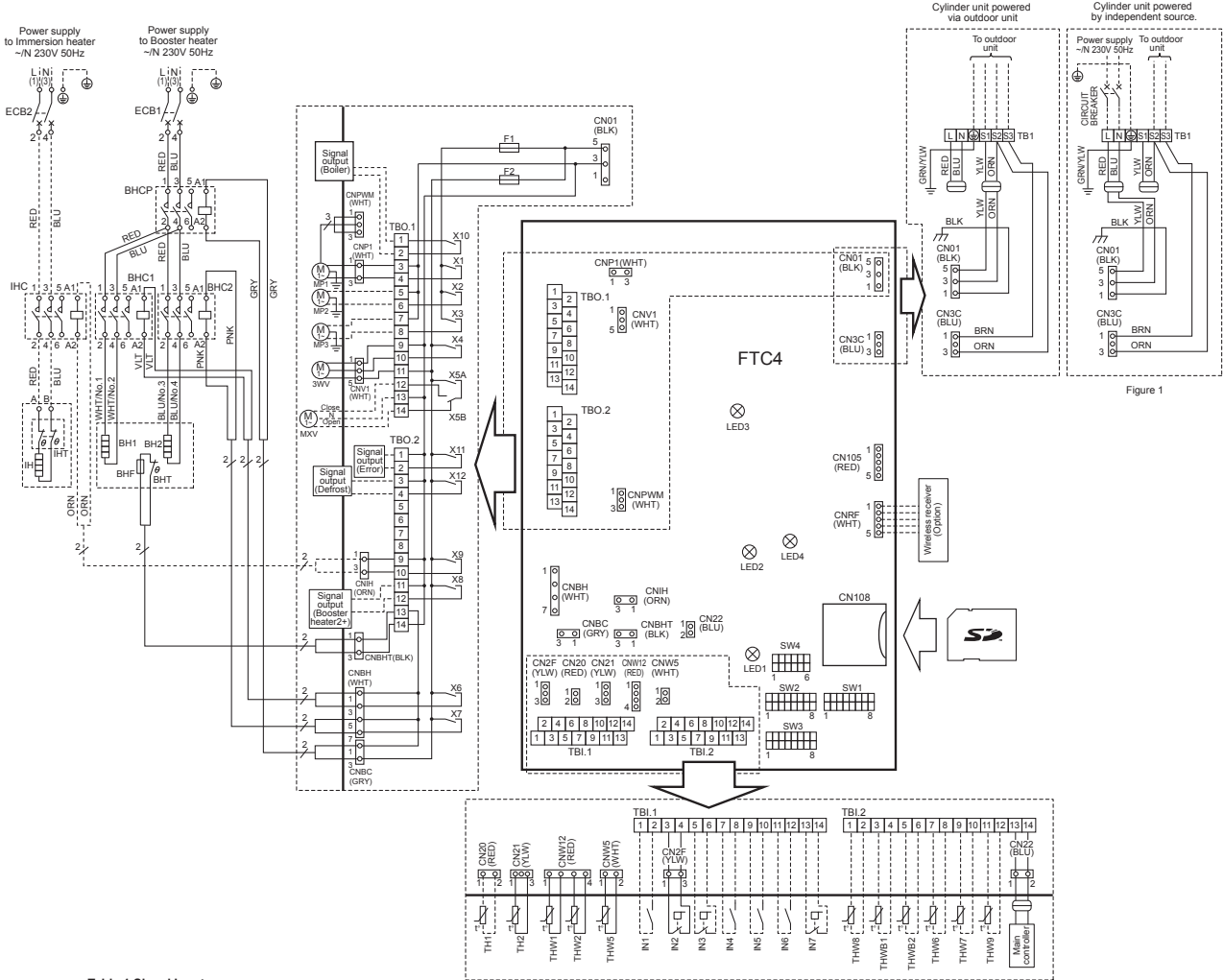


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT10	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>
ECB1	Earth leakage circuit breaker for booster heater
ECB2	Earth leakage circuit breaker for immersion heater (Option)
MP1	Water circulation pump1(Space heating & DHW)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)
3WV	3-way valve
MXV	Mixing valve (Field supply)
BHT	Thermostat for booster heater
BHF	Thermal fuse for booster heater
BH1	Booster heater 1
BH2	Booster heater 2
BHC1	Contactor for booster heater 1
BHC2	Contactor for booster heater 2
BHCP	Contactor for booster heater protection
IHT	Thermostat (fixed temp.) for immersion heater (Option)
IH	Immersion heater (Option)
IHC	Contactor for immersion heater (Option)

Symbol	Name
TH1	Thermistor (Room temp.)(Option)
TH2	Thermistor (Ref. liquid temp.)
THW1	Thermistor (Flow water temp.)
THW2	Thermistor (Return water temp.)
THW5	Thermistor (DHW tank water temp.)
THW6	Thermistor (Zone1 flow temp.)(Option)
THW7	Thermistor (Zone1 return temp.)(Option)
THW8	Thermistor (Zone2 flow temp.)(Option)
THW9	Thermistor (Zone2 return temp.)(Option)
THWB1	Thermistor (Boiler flow temp.)(Option)
THWB2	Thermistor (Boiler return temp.)(Option)
IN1	Room thermostat 1 (Field supply)
IN2	Flow switch 1
IN3	Flow switch 2 (Field supply)
IN4	Demand control (Field supply)
IN5	Outdoor thermostat (Field supply)
IN6	Room thermostat 2 (Field supply)
IN7	Flow switch 3 (Field supply)

Symbol	Name
FTC4	FLOW TEMP. CONTROLLER (FTC4)
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, [] : connector, [] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHST20C-YM9EB

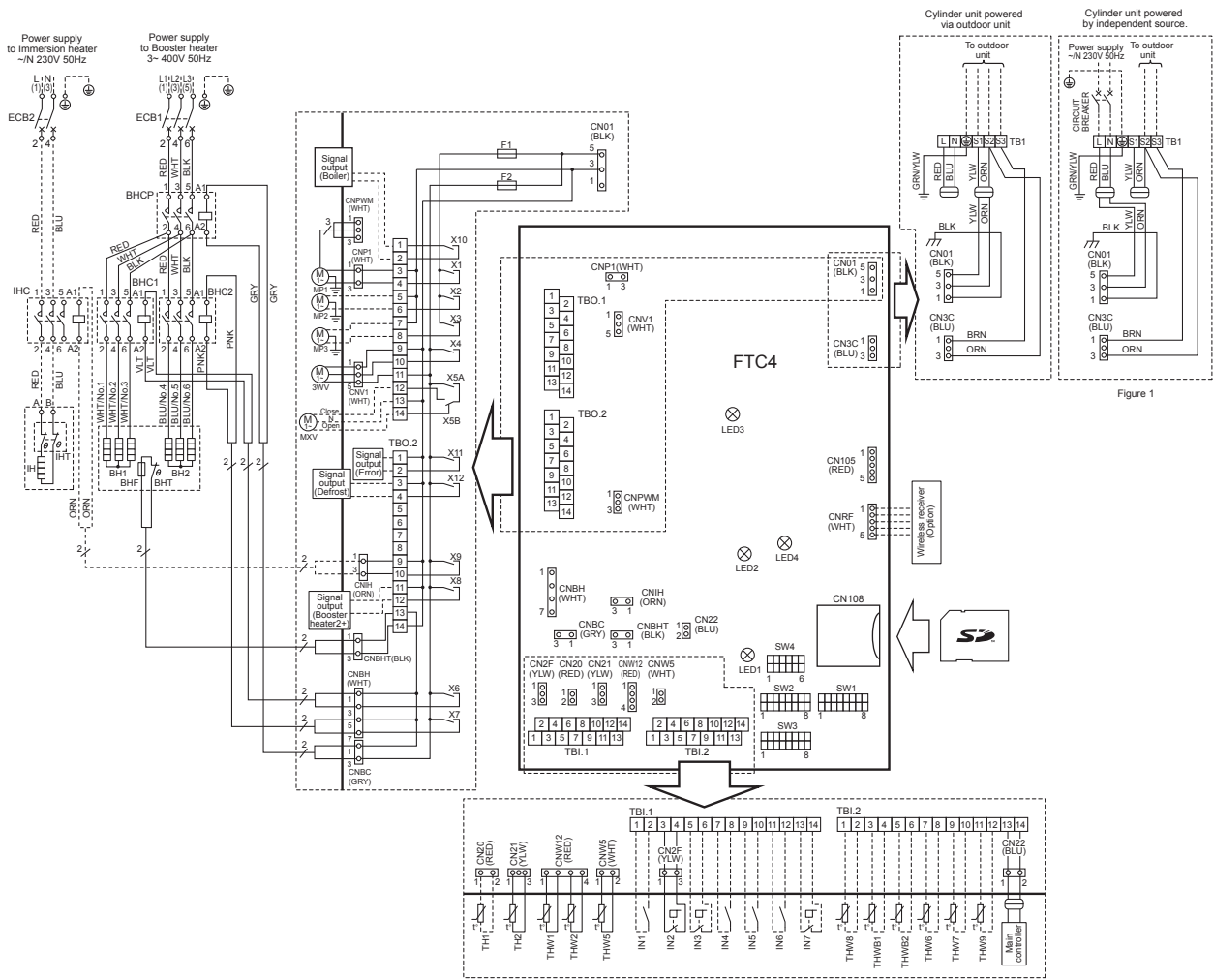


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation*2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation*2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2 output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name	Symbol	Name
TBI.1	Terminal block <Power supply Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)
ECB2	Earth leakage circuit breaker for immersion heater (Option)	THW1	Thermistor (Flow water temp.)
MP1	Water circulation pump1 (Space heating & DHW)	THW2	Thermistor (Return water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW5	Thermistor (DHW tank water temp.)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
3WV	3-way valve	THW7	Thermistor (Zone1 return temp.)(Option)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)
BH2	Booster heater 2	IN1	Room thermostat 1 (Field supply)
BHC1	Contact for booster heater 1	IN2	Flow switch 1
BHC2	Contact for booster heater 2	IN3	Flow switch 2 (Field supply)
BHCP	Contact for booster heater protection	IN4	Demand control (Field supply)
IHT	Thermostat (fixed temp.) for immersion heater (Option)	IN5	Outdoor thermostat (Field supply)
IH	Immersion heater (Option)	IN6	Room thermostat 2 (Field supply)
IHC	Contact for immersion heater (Option)	IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are:
 : connector, : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHST20C-VM6SB

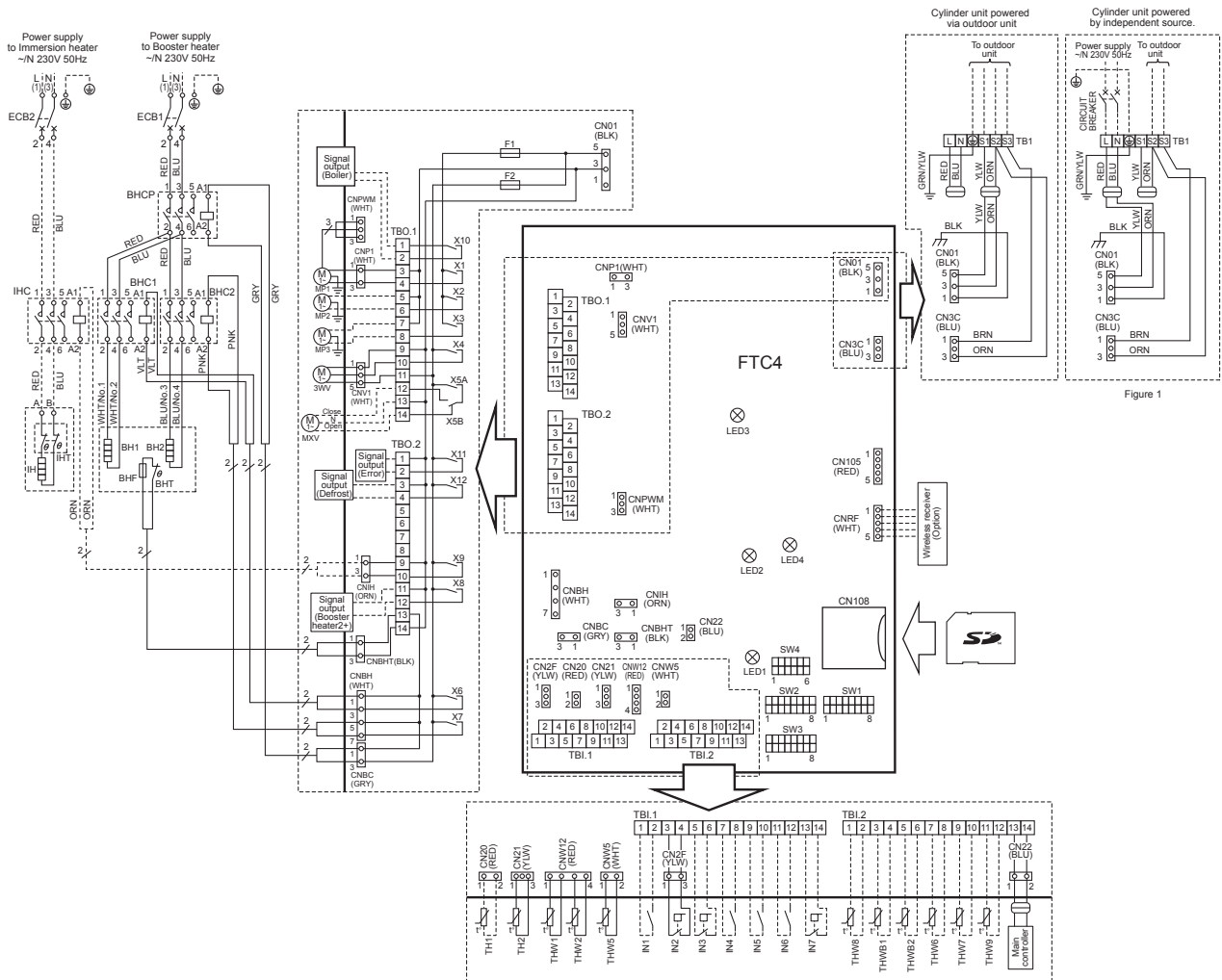


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT5	TBO.1 13-14	—		Stop	Open
OUT6	—	CNBH 1-3		Booster heater 1 output	OFF
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>
ECB1	Earth leakage circuit breaker for booster heater
ECB2	Earth leakage circuit breaker for immersion heater (Option)
MP1	Water circulation pump1(Space heating & DHW)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)
3WV	3-way valve
MXV	Mixing valve (Field supply)
MXV	Mixing valve (Field supply)
BHT	Thermostat for booster heater
BHF	Thermal fuse for booster heater
BH1	Booster heater 1
BH2	Booster heater 2
BHC1	Contactor for booster heater 1
BHC2	Contactor for booster heater 2
BHCP	Contactor for booster heater protection
IHT	Thermostat (fixed temp.) for immersion heater (Option)
IH	Immersion heater (Option)
IHC	Contactor for immersion heater (Option)

Symbol	Name
TH1	Thermistor (Room temp.)(Option)
TH2	Thermistor (Ref. liquid temp.)
THW1	Thermistor (Flow water temp.)
THW2	Thermistor (Return water temp.)
THW5	Thermistor (DHW tank water temp.)
THW6	Thermistor (Zone1 flow temp.)(Option)
THW7	Thermistor (Zone1 return temp.)(Option)
THW8	Thermistor (Zone2 flow temp.)(Option)
THW9	Thermistor (Zone2 return temp.)(Option)
THWB1	Thermistor (Boiler flow temp.)(Option)
THWB2	Thermistor (Boiler return temp.)(Option)
IN1	Room thermostat 1 (Field supply)
IN2	Flow switch 1
IN3	Flow switch 2 (Field supply)
IN4	Demand control (Field supply)
IN5	Outdoor thermostat (Field supply)
IN6	Room thermostat 2 (Field supply)
IN7	Flow switch 3 (Field supply)

Symbol	Name
FTC4	FLOW TEMP. CONTROLLER (FTC4)
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are: : connector, : terminal block
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHPT20X-VM2HB

Cylinder / Hydrobox

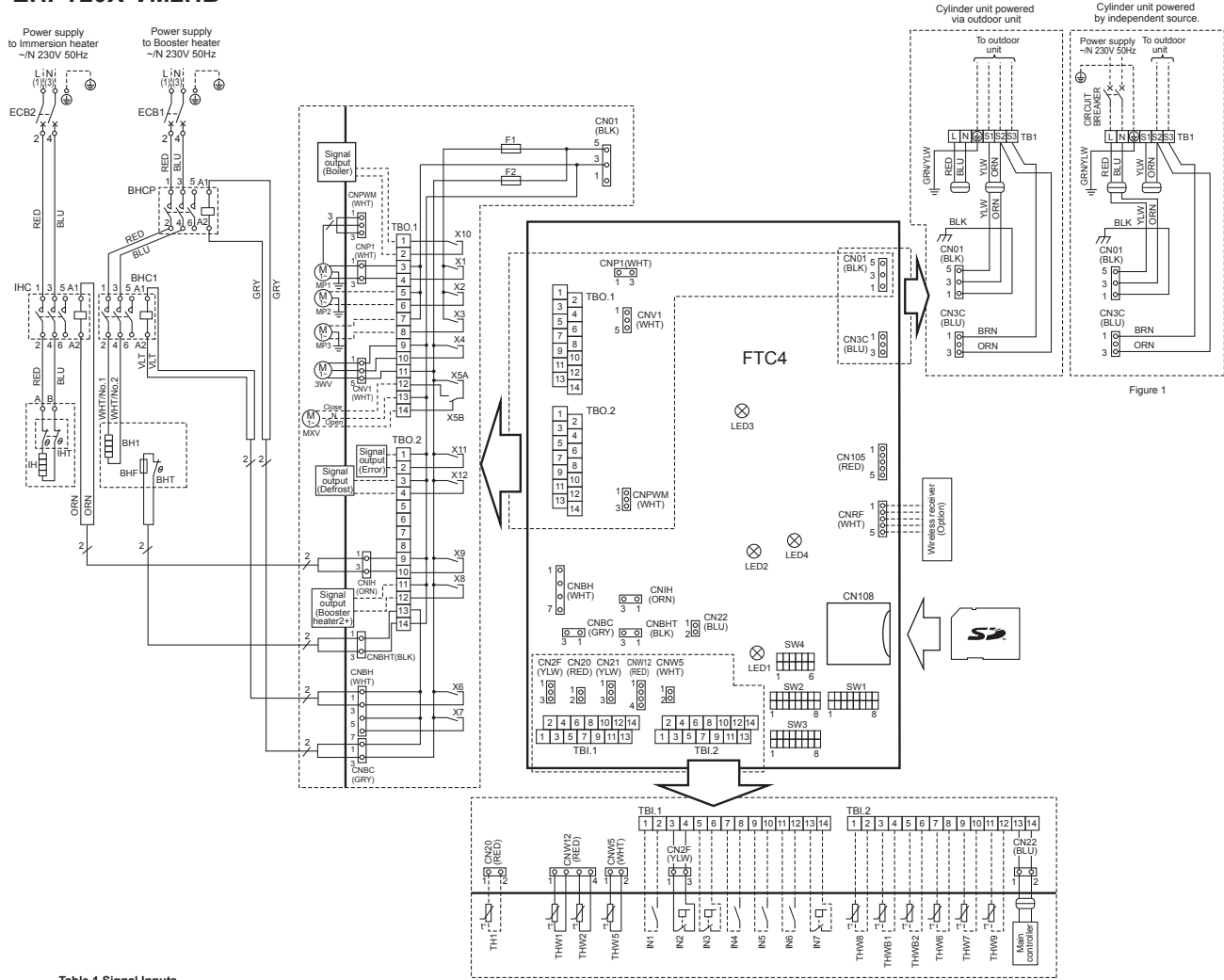


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source Off/Boiler operation*2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CN1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CN1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>
ECB1	Earth leakage circuit breaker for booster heater
ECB2	Earth leakage circuit breaker for immersion heater
MP1	Water circulation pump1(Space heating & DHW)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)
3WV	3-way valve
MXV	Mixing valve (Field supply)
BHT	Thermostat for booster heater
BHF	Thermal fuse for booster heater
BH1	Booster heater 1
BHC1	Contactor for booster heater 1
BHCP	Contactor for booster heater protection
IHT	Thermostat (fixed temp.) for immersion heater
IH	Immersion heater
IHC	Contactor for immersion heater

Symbol	Name
TH1	Thermistor (Room temp.)(Option)
THW1	Thermistor (Flow water temp.)
THW2	Thermistor (Return water temp.)
THW5	Thermistor (DHW tank water temp.)
THW6	Thermistor (Zone 1 flow temp.)(Option)
THW7	Thermistor (Zone 1 return temp.)(Option)
THW8	Thermistor (Zone 2 flow temp.)(Option)
THW9	Thermistor (Zone 2 return temp.)(Option)
THWB1	Thermistor (Boiler flow temp.)(Option)
THWB2	Thermistor (Boiler return temp.)(Option)
IN1	Room thermostat 1 (Field supply)
IN2	Flow switch 1
IN3	Flow switch 2 (Field supply)
IN4	Demand control (Field supply)
IN5	Outdoor thermostat (Field supply)
IN6	Room thermostat 2 (Field supply)
IN7	Flow switch 3 (Field supply)

FLOW TEMP. CONTROLLER (FTC4)	
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNP1W	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, [] : connector, [] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHPT20X-VM6HB

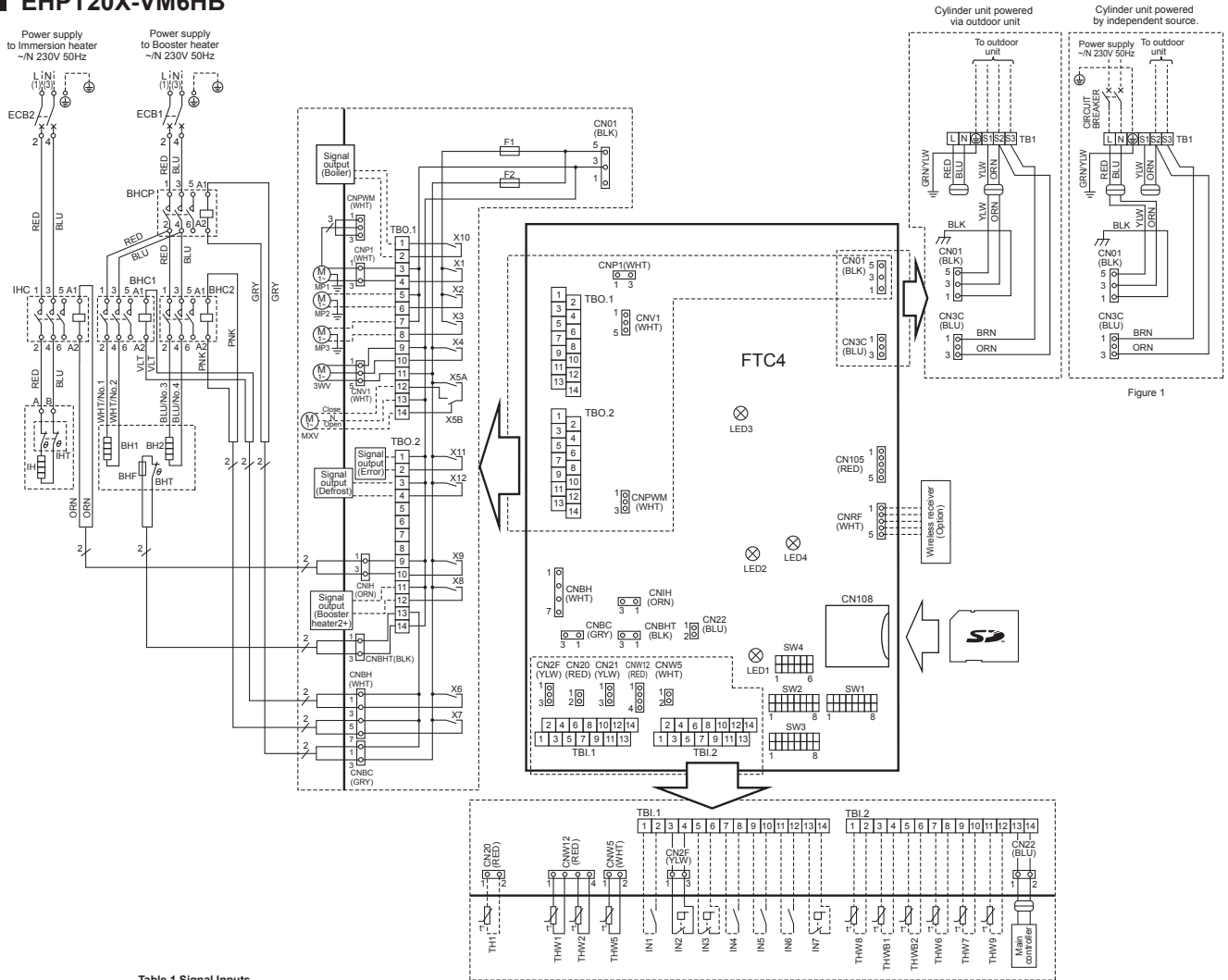


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.

*2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/Input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	Normal	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>
ECB1	Earth leakage circuit breaker for booster heater
ECB2	Earth leakage circuit breaker for immersion heater
MP1	Water circulation pump1(Space heating & DHW)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)
3WV	3-way valve
MXV	Mixing valve (Field supply)
BHT	Thermostat for booster heater
BHF	Thermal fuse for booster heater
BH1	Booster heater 1
BH2	Booster heater 2
BHC1	Contact for booster heater 1
BHC2	Contact for booster heater 2
BHCP	Contact for booster heater protection
IHT	Thermostat (fixed temp.) for immersion heater
IH	Immersion heater
IHC	Contact for immersion heater

Symbol	Name
TH1	Thermistor (Room temp.)(Option)
THW1	Thermistor (Flow water temp.)
THW2	Thermistor (Return water temp.)
THW5	Thermistor (DHW tank water temp.)
THW6	Thermistor (Zone 1 flow temp.)(Option)
THW7	Thermistor (Zone 1 return temp.)(Option)
THW8	Thermistor (Zone 2 flow temp.)(Option)
THW9	Thermistor (Zone 2 return temp.)(Option)
THWB1	Thermistor (Boiler flow temp.)(Option)
THWB2	Thermistor (Boiler return temp.)(Option)
IN1	Room thermostat 1 (Field supply)
IN2	Flow switch 1
IN3	Flow switch 2 (Field supply)
IN4	Demand control (Field supply)
IN5	Outdoor thermostat (Field supply)
IN6	Room thermostat 2 (Field supply)
IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, [] : connector, [] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHPT20X-YM9HB

Cylinder / Hydrobox

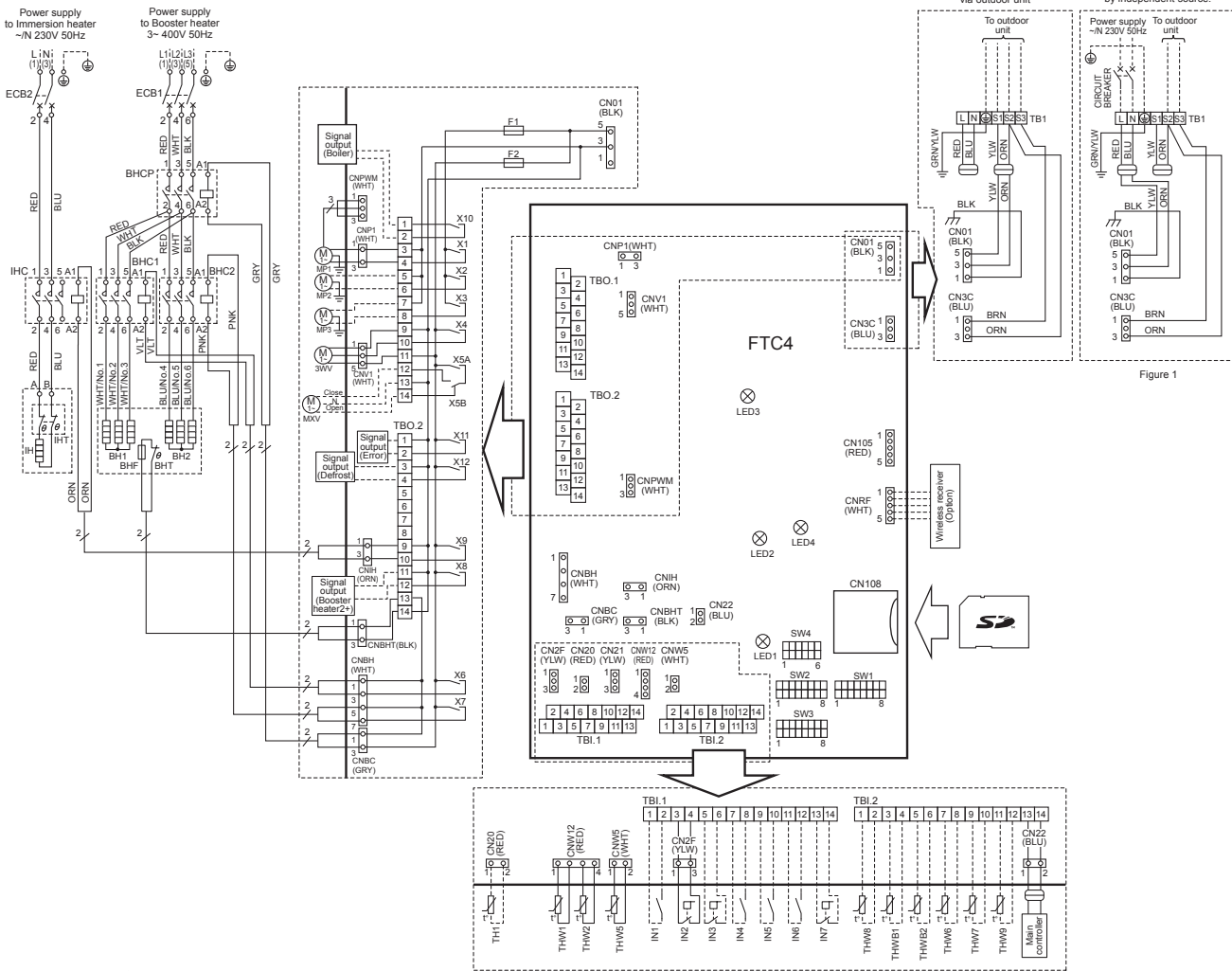


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heater source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

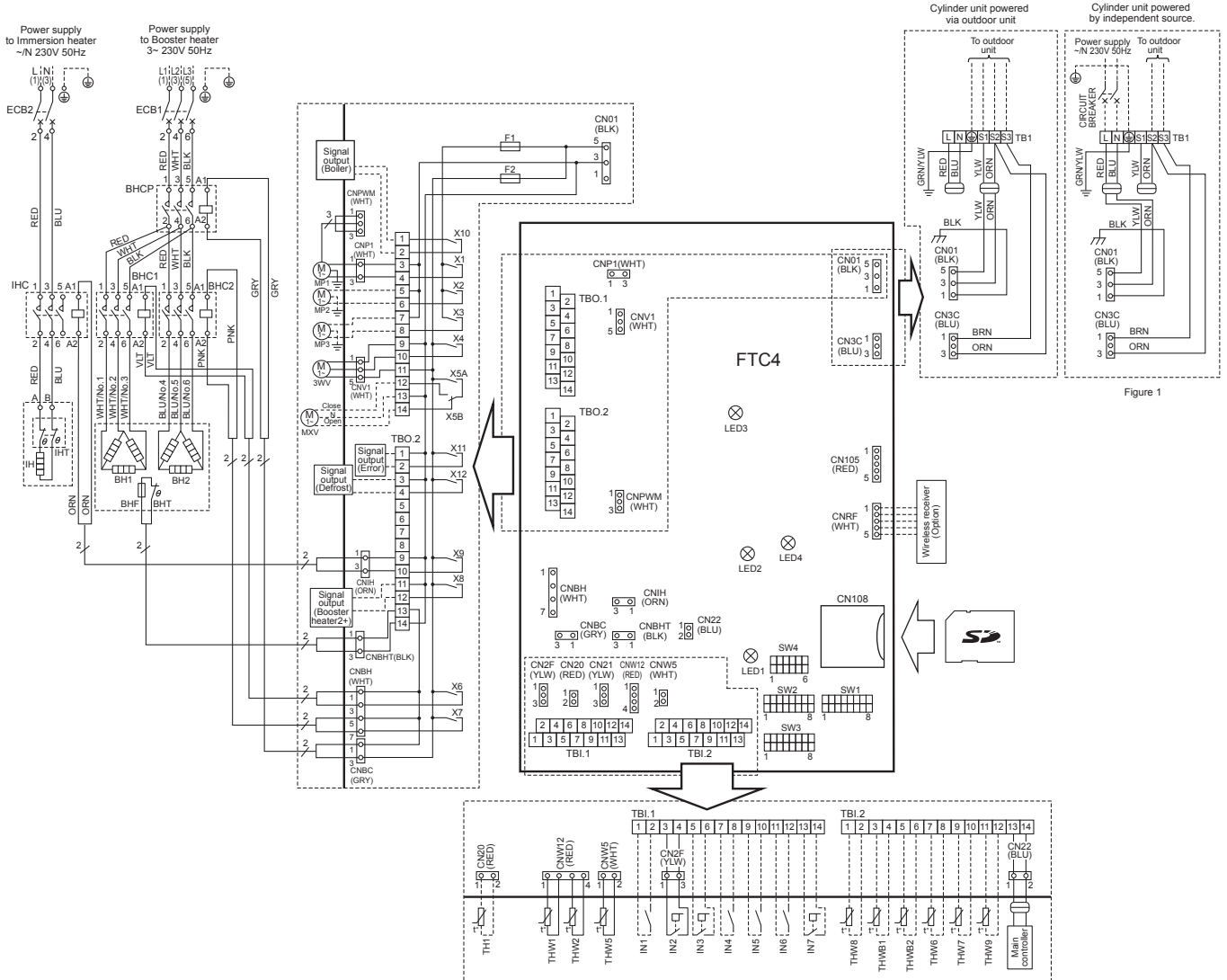
Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name	Symbol	Name	FLOW TEMP. CONTROLLER (FTC4)
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)	TBO.1-2 Terminal block <Outputs>
ECB1	Earth leakage circuit breaker for booster heater	THW1	Thermistor (Flow water temp.)	TBI.1-2 Terminal block <Signal inputs, Thermistor>
ECB2	Earth leakage circuit breaker for immersion heater	THW2	Thermistor (Return water temp.)	F1-F2 Fuse (T6.3AL250V)
MP1	Water circulation pump1(Space heating & DHW)	THW5	Thermistor (DHW tank water temp.)	SW1-4 Dip switch *See <3.1.2 Dip switch functions>
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW6	Thermistor (Zone 1 flow temp.)(Option)	X1-X12 Relay
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW7	Thermistor (Zone 1 return temp.)(Option)	LED1 Power supply (FTC4)
3WV	3-way valve	THW8	Thermistor (Zone 2 flow temp.)(Option)	LED2 Power supply (Main controller)
MKV	Mixing valve (Field supply)	THW9	Thermistor (Zone 2 return temp.)(Option)	LED3 Communication (FTC4-Outdoor unit)
BHT	Thermostat for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)	LED4 Reading or writing data to SD card
BHF	Thermal fuse for booster heater	THWB2	Thermistor (Boiler return temp.)(Option)	CNPWM Pump speed control signal for MP1
BH1	Booster heater 1	IN1	Room thermostat 1 (Field supply)	CN108 SD card connector
BH2	Booster heater 2	IN2	Flow switch 1	
BHC1	Contactor for booster heater 1	IN3	Flow switch 2 (Field supply)	
BHC2	Contactor for booster heater 2	IN4	Demand control (Field supply)	
BHCP	Contactor for booster heater protection	IN5	Outdoor thermostat (Field supply)	
IHT	Thermostat (fixed temp.) for immersion heater	IN6	Room thermostat 2 (Field supply)	
IH	Immersion heater	IN7	Flow switch 3 (Field supply)	
IHC	Contactor for immersion heater			

- Symbols used in wiring diagram are: : connector, : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHPT20X-TM9HB



Cylinder / Hydrobox

Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/Input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT7	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT8	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	THW1	Thermistor (Flow water temp.)
ECB2	Earth leakage circuit breaker for immersion heater	THW2	Thermistor (Return water temp.)
MP1	Water circulation pump1(Space heating & DHW)	THW5	Thermistor (DHW tank water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW6	Thermistor (Zone 1 flow temp.)(Option)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW7	Thermistor (Zone 1 return temp.)(Option)
3WV	3-way valve	THW8	Thermistor (Zone 2 flow temp.)(Option)
MXV	Mixing valve (Field supply)	THW9	Thermistor (Zone 2 return temp.)(Option)
BHT	Thermostat for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BHF	Thermal fuse for booster heater	THWB2	Thermistor (Boiler return temp.)(Option)
BH1	Booster heater 1	IN1	Room thermostat 1 (Field supply)
BH2	Booster heater 2	IN2	Flow switch 1
BHC1	Contactor for booster heater 1	IN3	Flow switch 2 (Field supply)
BHC2	Contactor for booster heater 2	IN4	Demand control (Field supply)
BHCP	Contactor for booster heater protection	IN5	Outdoor thermostat (Field supply)
IHT	Thermostat (fixed temp.) for immersion heater	IN6	Room thermostat 2 (Field supply)
IH	Immersion heater	IN7	Flow switch 3 (Field supply)
IHC	Contactor for immersion heater		

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are: : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHPT20X-VM6B

Cylinder / Hydrobox

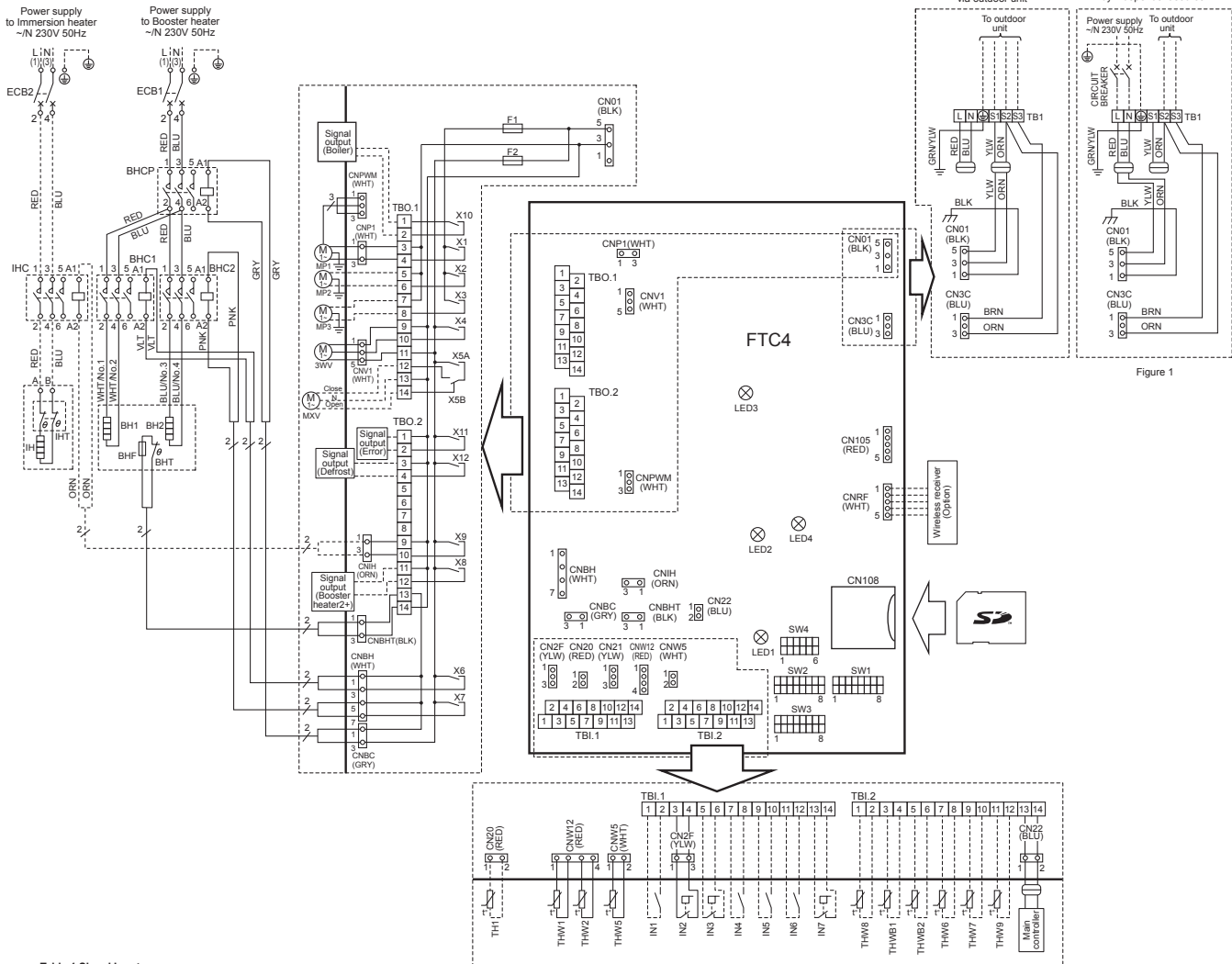


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	Refer to SW2-2 in <3.1.2 Dip switch functions>
IN2	TBO.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	Refer to SW2-1 in <3.1.2 Dip switch functions>
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	Refer to SW3-1 in <3.1.2 Dip switch functions>
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBO.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	Refer to SW3-2 in <3.1.2 Dip switch functions>
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	Refer to SW3-4 in <3.1.2 Dip switch functions>

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	THW1	Thermistor (Flow temp. temp.)
ECB2	Earth leakage circuit breaker for immersion heater (Option)	THW2	Thermistor (Return water temp.)
MP1	Water circulation pump1(Space heating & DHW)	THW5	Thermistor (DHW tank water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW6	Thermistor (Zone 1 flow temp.)(Option)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW7	Thermistor (Zone 1 return temp.)(Option)
3WV	3-way valve	THW8	Thermistor (Zone 2 flow temp.)(Option)
MXV	Mixing valve (Field supply)	THW9	Thermistor (Zone 2 return temp.)(Option)
MXV	Mixing valve (Field supply)	THWB1	Thermistor (Boiler flow temp.)(Option)
BHT	Thermostat for booster heater	THWB2	Thermistor (Boiler return temp.)(Option)
BHF	Thermal fuse for booster heater	IN1	Room thermostat 1 (Field supply)
BH1	Booster heater 1	IN2	Flow switch 1
BH2	Booster heater 2	IN3	Flow switch 2 (Field supply)
BHC1	Contactor for booster heater 1	IN4	Demand control (Field supply)
BHC2	Contactor for booster heater 2	IN5	Outdoor thermostat (Field supply)
BHCP	Contactor for booster heater protection	IN6	Room thermostat 2 (Field supply)
IHT	Thermostat (fixed temp.) for immersion heater (Option)	IN7	Flow switch 3 (Field supply)
IH	Immersion heater (Option)		
IHC	Contactor for immersion heater (Option)		

Symbol	Name	Symbol	Name
TH1	Thermistor (Room temp.)(Option)	THW1	Thermistor (Flow temp. temp.)
THW1	Thermistor (Flow temp. temp.)	THW2	Thermistor (Return water temp.)
THW2	Thermistor (Return water temp.)	THW5	Thermistor (DHW tank water temp.)
THW5	Thermistor (DHW tank water temp.)	THW6	Thermistor (Zone 1 flow temp.)(Option)
THW6	Thermistor (Zone 1 flow temp.)(Option)	THW7	Thermistor (Zone 1 return temp.)(Option)
THW7	Thermistor (Zone 1 return temp.)(Option)	THW8	Thermistor (Zone 2 flow temp.)(Option)
THW8	Thermistor (Zone 2 flow temp.)(Option)	THW9	Thermistor (Zone 2 return temp.)(Option)
THW9	Thermistor (Zone 2 return temp.)(Option)	THWB1	Thermistor (Boiler flow temp.)(Option)
THWB1	Thermistor (Boiler flow temp.)(Option)	THWB2	Thermistor (Boiler return temp.)(Option)
THWB2	Thermistor (Boiler return temp.)(Option)	IN1	Room thermostat 1 (Field supply)
IN1	Room thermostat 1 (Field supply)	IN2	Flow switch 1
IN2	Flow switch 1	IN3	Flow switch 2 (Field supply)
IN3	Flow switch 2 (Field supply)	IN4	Demand control (Field supply)
IN4	Demand control (Field supply)	IN5	Outdoor thermostat (Field supply)
IN5	Outdoor thermostat (Field supply)	IN6	Room thermostat 2 (Field supply)
IN6	Room thermostat 2 (Field supply)	IN7	Flow switch 3 (Field supply)
IN7	Flow switch 3 (Field supply)		

FLOW TEMP. CONTROLLER (FTC4)	
TBO1-2	Terminal block <Outputs>
TBI-2	Terminal block <Signal inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CN1PM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, : connector, : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHPT20X-YM9B

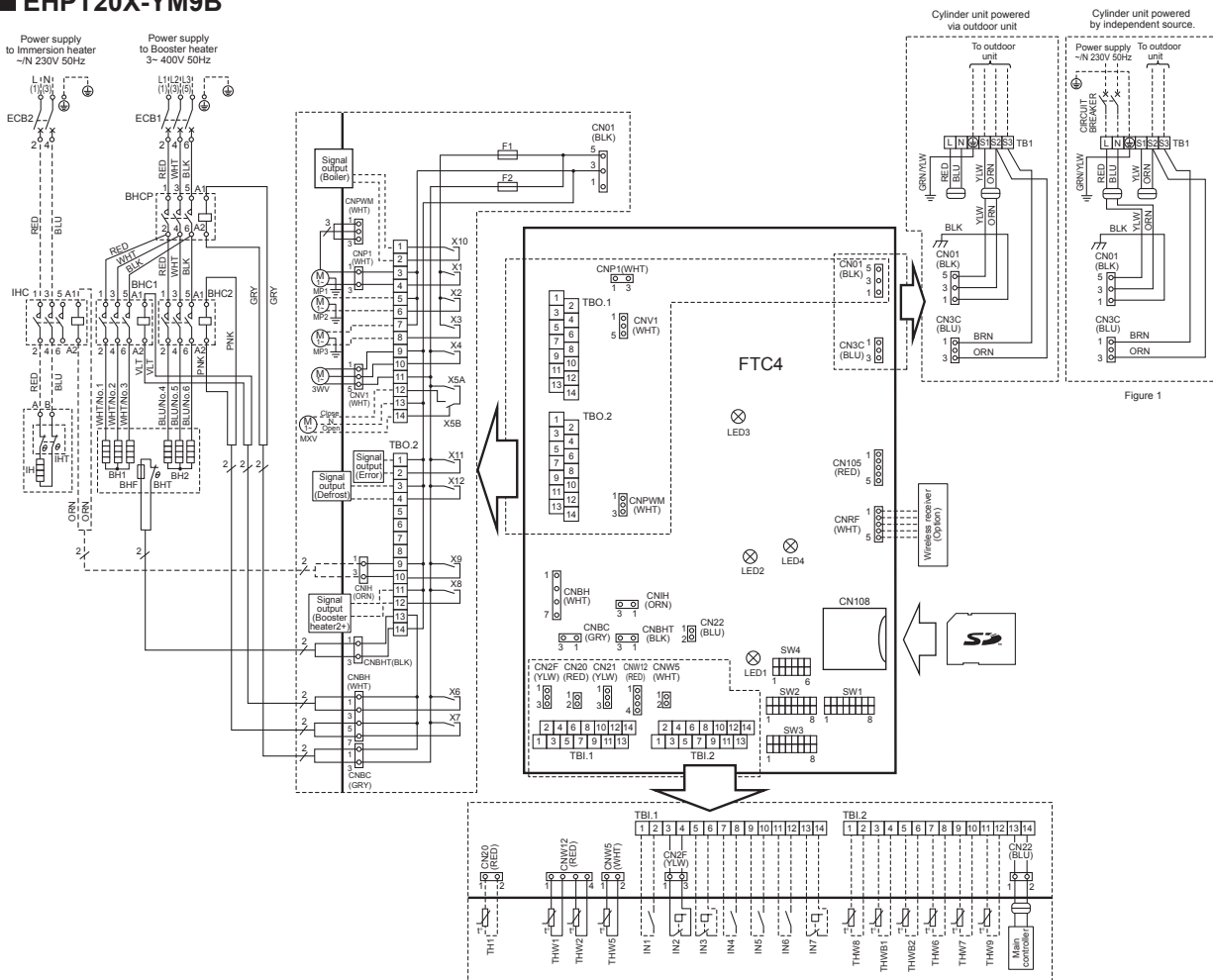


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source Off/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.

*2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT5	TBO.1 13-14	—		Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost

Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>
ECB1	Earth leakage circuit breaker for booster heater
ECB2	Earth leakage circuit breaker for immersion heater (Option)
MP1	Water circulation pump1(Space heating & DHW)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)
3WV	3-way valve
MXV	Mixing valve (Field supply)
BHT	Thermostat for booster heater
BHF	Thermal fuse for booster heater
BH1	Booster heater 1
BH2	Booster heater 2
BHC1	Contactor for booster heater 1
BHC2	Contactor for booster heater 2
BHCP	Contactor for booster heater protection
IHT	Thermostat (fixed temp.) for immersion heater (Option)
IH	Immersion heater (Option)
IHC	Contactor for immersion heater (Option)

Symbol	Name
TH1	Thermistor (Room temp.)(Option)
THW1	Thermistor (Flow water temp.)
THW2	Thermistor (Return water temp.)
THW5	Thermistor (DHW tank water temp.)
THW6	Thermistor (Zone 1 flow temp.)(Option)
THW7	Thermistor (Zone 1 return temp.)(Option)
THW8	Thermistor (Zone 2 flow temp.)(Option)
THW9	Thermistor (Zone 2 return temp.)(Option)
THWB1	Thermistor (Boiler flow temp.)(Option)
THWB2	Thermistor (Boiler return temp.)(Option)
IN1	Room thermostat 1 (Field supply)
IN2	Flow switch 1
IN3	Flow switch 2 (Field supply)
IN4	Demand control (Field supply)
IN5	Outdoor thermostat (Field supply)
IN6	Room thermostat 2 (Field supply)
IN7	Flow switch 3 (Field supply)

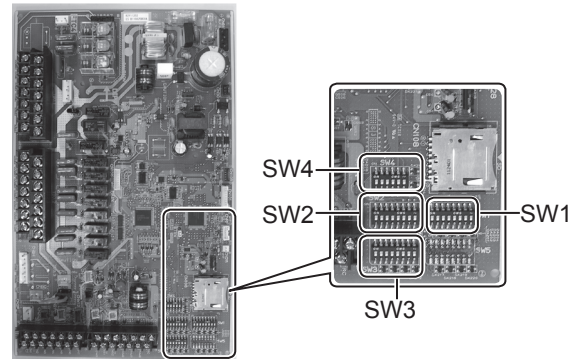
Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See <3.1.2 Dip switch functions>
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, : connector, : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

3.1.2 Dip switch functions (Cylinder unit)

Located on the FTC4 printed circuit board are 4 sets of small white switches known as Dip switches. The Dip switch number is printed on the circuit board next to the relevant switches. The word ON is printed on the circuit board and on the Dip switch block itself. To move the switch you will need to use a pin or the corner of a thin metal ruler or similar.

Dip switch settings are listed below in Table 3.1.1. Make sure to turn off both indoor unit and outdoor unit power supplies before changing the switch settings.



<Figure 3.1.1>

Dip switch	Function	OFF	ON	Default settings: Indoor unit model
SW1	SW1-1 Boiler	WITHOUT Boiler	WITH Boiler	OFF
	SW1-2 Heat pump maximum outlet water temperature	55°C	60°C	ON *1
	SW1-3 DHW tank	WITHOUT DHW tank	WITH DHW tank	ON
	SW1-4 Immersion heater	WITHOUT Immersion heater	WITH Immersion heater	OFF: Except EHST20C-*M*HB EHPT20X-*M*HB ON : EHST20C-*M*HB EHPT20X-*M*HB
	SW1-5 Booster heater	WITHOUT Booster heater	WITH Booster heater	ON
	SW1-6 Booster heater function	For heating only	For heating and DHW	ON
	SW1-7 Outdoor unit type	Split type	Packaged type	OFF: EHST20C-*M**B ON : EHPT20X-*M**B
	SW1-8 Wireless remote controller	WITHOUT Wireless remote controller	WITH Wireless remote controller	OFF
SW2	SW2-1 Room thermostat1 input (IN1) logic change	Zone1 operation stop at thermostat short	Zone1 operation stop at thermostat open	OFF
	SW2-2 Flow switch1 input (IN2) logic change	Failure detection at short	Failure detection at open	ON
	SW2-3 Booster heater capacity restriction	Inactive	Active	OFF: Except EH*T20*-VM2*B ON : EH*T20*-VM2*B
	SW2-4	—	—	OFF
	SW2-5 Automatic switch to backup heat source operation (When outdoor unit stops by error)	Inactive	Active *2	OFF
	SW2-6 Mixing tank	WITHOUT Mixing tank	WITH Mixing tank	OFF
	SW2-7 2-zone temperature control	Inactive	Active	OFF
	SW2-8	—	—	OFF
SW3	SW3-1 Room thermostat 2 input (IN6) logic change	Zone2 operation stop at thermostat short	Zone2 operation stop at thermostat open	OFF
	SW3-2 Flow switch 2 input (IN3) logic change	Failure detection at short	Failure detection at open	OFF
	SW3-3 Flow switch 3 input (IN7) logic change	Failure detection at short	Failure detection at open	OFF
	SW3-4	—	—	OFF
	SW3-5 Heating mode function *3	Inactive	Active	OFF
	SW3-6	—	—	OFF
	SW3-7	—	—	OFF
	SW3-8	—	—	OFF
SW4	SW4-1	—	—	OFF
	SW4-2	—	—	OFF
	SW4-3	—	—	OFF
	SW4-4	—	—	OFF
	SW4-5 Emergency mode (Heater only operation)	Normal	Emergency mode (Heater only operation) (To be activated only when powered ON)	OFF *4
	SW4-6 Emergency mode (Boiler operation)	Normal	Emergency mode (Boiler operation) (To be activated only when powered ON)	OFF *4

<Table 3.1.1>

- Note:**
- *1. When the cylinder unit is connected with a PUHZ-RP outdoor unit of which maximum outlet water temperature is 55°C, Dip SW1-2 must be changed to OFF.
 - *2. External output (OUT11) will be available. For safety reasons, this function is not available for certain errors. (In that case, system operation must be stopped and only the water circulation pump keeps running.)
 - *3 This switch functions only when the cylinder unit is connected with a PUHZ-FRP outdoor unit. When another type of outdoor unit is connected, the heating mode function is active regardless of the fact that this switch is ON or OFF.
 - *4. If emergency mode is no longer required, return the switch to OFF position.

■ Automatic switch to backup heat source operation

Back-up heater operation (*1) will automatically run when the outdoor unit stops abnormally.

To enable the function, switch Dip SW 2-5 to ON.

During the back-up operation, an error code(s) and the contact number will be displayed alternately.

External output (OUT11) will be available.

To clear the fault(s), reset the power breakers on the indoor and outdoor units.

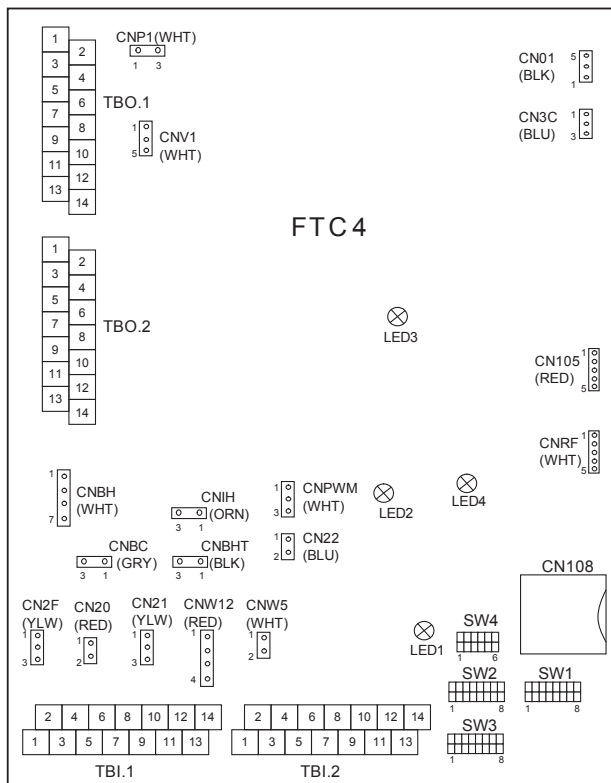
<Applicable error codes (*2)>

E6 to 9, ED, P6, P8, U1 to 8, UD, UE, UF, UL, UP

(*1) Prolonged running of the back-up operation may affect the life of the heat source.

(*2) For safety reasons, this function is not available for certain faults. (System operation must be stopped and only pump keeps running.)

3.1.3 Connecting inputs/outputs (Cylinder unit)



When the wires are wired to adjacent terminals use ring terminals and insulate the wires.

<Figure 3.1.2>

■ Signal inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.1.2 Dip switch functions>.	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.1.2 Dip switch functions>.	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.1.2 Dip switch functions>.	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/ Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input (*1)	Standard operation	Heater operation/ Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.1.2 Dip switch functions>.	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.1.2 Dip switch functions>.	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.

*2. To turn on the boiler operation, use the main controller to select "Boiler" in "External input setting" screen in the service menu.

Wiring specification and field supply parts

Item	Name	Model and specifications
Signal input function	Signal input wire	Use sheathed vinyl coated cord or cable. Max. 10 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm
	Switch	Non-voltage "a" contact signals Remote switch: minimum applicable load 12V DC, 0.1mA

Thermistor inputs

Name	Terminal block	Connector	Item	Optional part model
TH1	—	CN20	Thermistor (Room temp.) (Option)*1	PAC-SE41TS-E
TH2	—	CN21	Thermistor (Ref. liquid temp.)	—
THW1	—	CNW12 1-2	Thermistor (Flow water temp.)	—
THW2	—	CNW12 3-4	Thermistor (Return water temp.)	—
THW5	—	CNW5	Thermistor (DHW tank water temp.)	—
THW6	TBI.2 7-8	—	Thermistor (Zone1 flow water temp.) (Option)*1	PAC-TH011-E
THW7	TBI.2 9-10	—	Thermistor (Zone1 return water temp.) (Option)*1	PAC-TH011-E
THW8	TBI.2 1-2	—	Thermistor (Zone2 flow water temp.) (Option)*1	PAC-TH011-E
THW9	TBI.2 11-12	—	Thermistor (Zone2 return water temp.) (Option)*1	PAC-TH011-E
THWB1	TBI.2 3-4	—	Thermistor (Boiler flow water temp.) (Option)*1	PAC-TH011HT-E
THWB2	TBI.2 5-6	—	Thermistor (Boiler return water temp.) (Option)*1	PAC-TH011HT-E

Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each temperature. If the wiring is too long, bundle it with a strap to adjust the length.

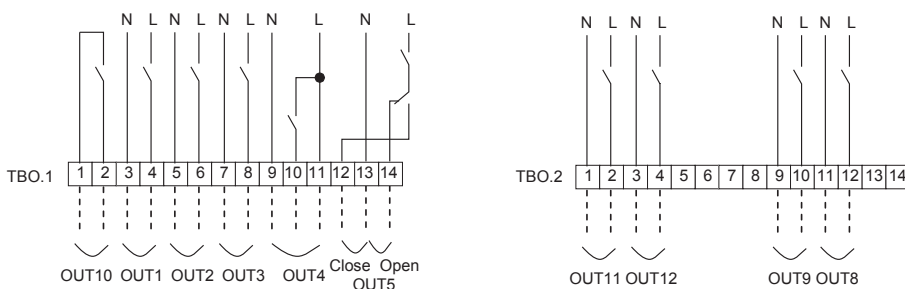
*1. The maximum length of the thermistor wiring is 5 m.

When the wires are wired to adjacent terminals, use ring terminals and insulate the wires.

Outputs

Name	Terminal block	Connector	Item	OFF	ON	Signal/Max current	Max. total current
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON	230V AC 1.0 A Max	3.0 A (a)
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON	230V AC 1.0 A Max	
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON	230V AC 1.0 A Max	
OUT4	TBO.1 9-11	CNV1	3-way valve 1 output	Heating	DHW	230V AC 0.1 A Max	3.0 A (b)
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close	230V AC 0.1 A Max	
	TBO.1 13-14			Open			
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT11	TBO.2 1-2	—	Error output	Normal	Error	230V AC 0.5 A Max	
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost	230V AC 0.5 A Max	
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON	non-voltage contact • 220 - 240V AC (30V DC) • 0.5 A or less • 10 mA 5V DC or more	—

Do not connect to the terminals that are indicated as “—” in the “Terminal block” field.



Wiring specification and field supply parts

Item	Name	Model and specifications
External output function	Outputs wire	Use sheathed vinyl coated cord or cable. Max. 30 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm

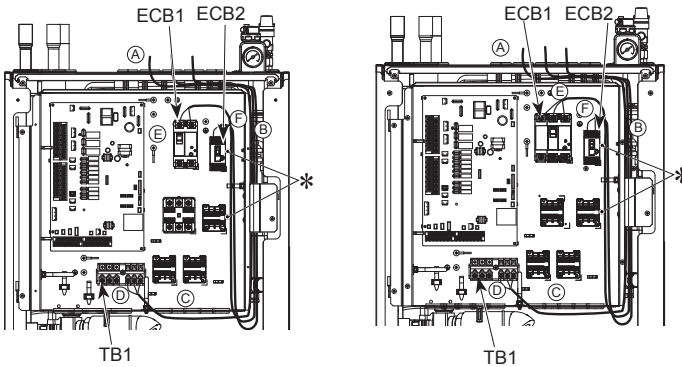
Note:

- When the cylinder unit is powered via outdoor unit, the maximum grand total current of (a)+(b) is 3.0 A.
- Do not connect multiple water circulation pumps directly to each output (OUT1, OUT2, and OUT3). In such a case, connect them via (a) relay(s).
- Do not connect water circulation pumps to both TBO.1 3-4 and CNP1 at the same time.
- Connect an appropriate surge absorber to OUT10 (TBO.1 1-2) depending on the load at site.

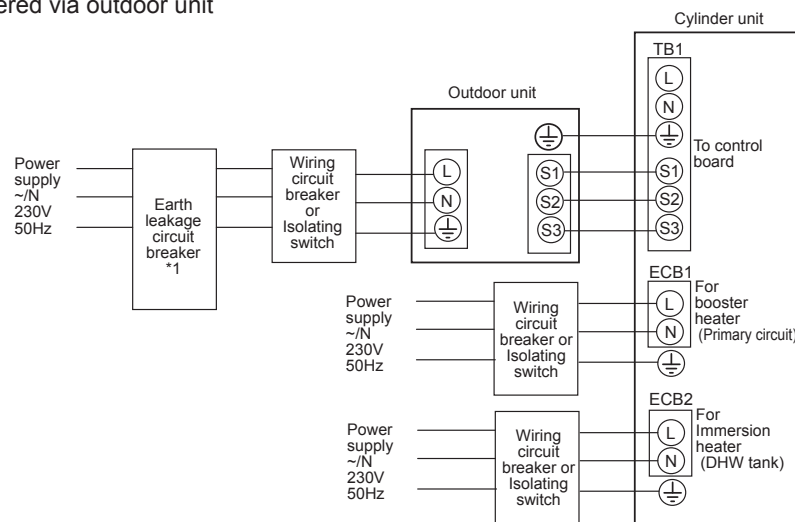
3.1.4 Electrical Connection (Cylinder unit)

All electrical work should be carried out by a suitably qualified technician. Failure to comply with this could lead to electrocution, fire, and death. It will also invalidate product warranty. All wiring should be according to national wiring regulations.

Breaker abbreviation	Meaning
ECB1	Earth leakage circuit breaker for booster heater
ECB2	Earth leakage circuit breaker for immersion heater
TB1	Terminal block 1



<1 phase (with immersion heater)>
Option 1: Cylinder unit powered via outdoor unit
<1 phase>



*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.
*2 Affix label A that is included with the manuals near each wiring diagram for cylinder unit and outdoor units

<Figure 3.1.3>
Electrical connections 1 phase

Description	Power supply	Capacity (Indoor unit Ref.)	Breaker	Wiring
Booster heater (Primary circuit)	~N 230 V 50 Hz	2 kW	16 A *1	2.5 mm ²
		6 kW	32 A *1	6.0 mm ²
Immersion heater (DHW tank)	~N 230 V 50 Hz	3 kW	16 A *1	2.5 mm ²

Wiring No. x size (mm ²)	Cylinder unit - Outdoor unit		
	Cylinder unit - Outdoor unit	*2	3 × 1.5 (polar)
Cylinder unit - Outdoor unit earth	*2	1 × Min. 1.5	
Circuit rating	Cylinder unit - Outdoor unit S1 - S2	*3	230V AC
	Cylinder unit - Outdoor unit S2 - S3	*3	24V DC

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
*2. Max. 45 m
If 2.5 mm² used, Max. 50 m
If 2.5 mm² used and S3 separated, Max. 80 m
*3. The values given in the table above are not always measured against the ground value.

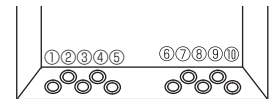
- Note:**
1. Wiring size must comply with the applicable local and national codes.
 2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

The cylinder unit can be powered in two ways.
1. Power cable is run from the outdoor unit to the cylinder unit.
2. Cylinder unit has independent power source

Connections should be made to the terminals indicated in the figures to the left below depending on the phase.

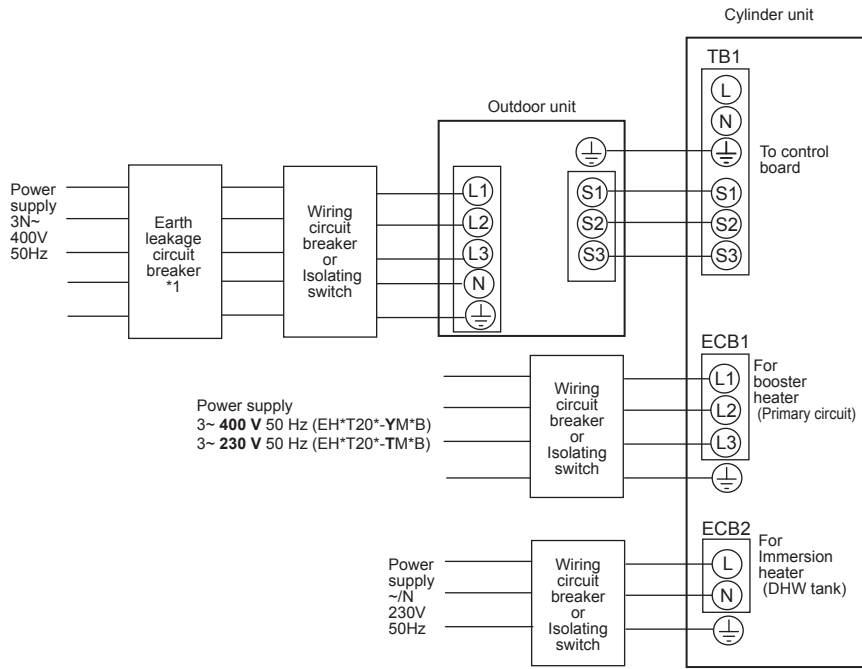
Booster heater and immersion heater should be connected independently from one another to dedicated power supplies.

- Locally supplied wiring should be inserted through the inlets situated on the top of the cylinder unit. (Refer to <Table 3.7>.)
- Wiring should be fed down the right hand side of the control and electrical box and clamped in place using clips provided.
- The wires should be inserted individually through the cable inlets as below.
- Outputs wire
- Signal input wire
- Wireless receiver (option) wire (PAR-WR51R-E)
- to 10 Power line and indoor-outdoor wire
- Connect the outdoor unit – cylinder unit connecting cable to TB1.
- Connect the power cable for the booster heater to ECB1.
- If immersion heater is present, connect the power cable to ECB2.



- Avoid contact between wiring and parts (*).
- Make sure that ECB1 and ECB2 are ON.
- On completion of wiring ensure main controller cable is connected to the relay connector.

<3 phase>



*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

*2 Affix label A that is included with the manuals near each wiring diagram for cylinder unit and outdoor units

<Figure 3.1.4>
Electrical connections 3 phase

Description	Power supply	Capacity (Indoor unit Ref.)	Breaker	Wiring
Booster heater (Primary circuit)	3~ 400 V 50 Hz	9 kW	16 A *1	2.5 mm ²
	3~ 230 V 50 Hz	9 kW	32 A *1	6.0 mm ²
Immersion heater (DHW tank)	~/N 230 V 50 Hz	3 kW	16 A *1	2.5 mm ²

Wiring Wiring No. x size (mm ²)	Cylinder unit - Outdoor unit	*2	3 x 1.5 (polar)
	Cylinder unit - Outdoor unit earth	*2	1 x Min. 1.5
Circuit rating	Cylinder unit - Outdoor unit S1 - S2	*3	230V AC
	Cylinder unit - Outdoor unit S2 - S3	*3	24V DC

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV).
The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

*2. Max. 45 m

If 2.5 mm² used, Max. 50 m

If 2.5 mm² used and S3 separated, Max. 80 m

*3. The values given in the table above are not always measured against the ground value.

- Note:**
1. Wiring size must comply with the applicable local and national codes.
 2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

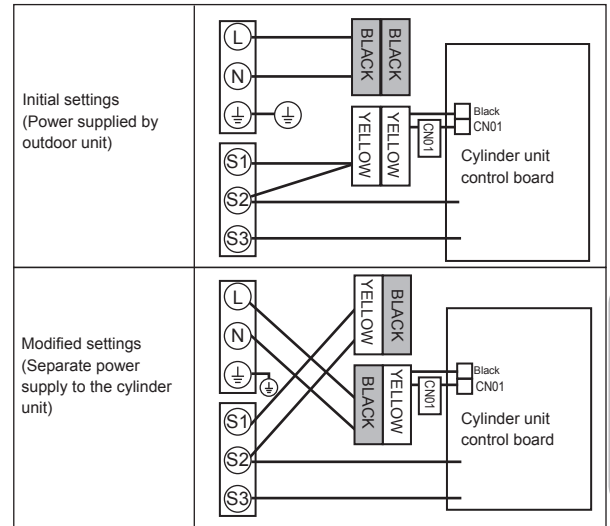
3 Wiring diagrams

Cylinder unit / Hydrobox

Option 2: Cylinder unit powered by independent source.

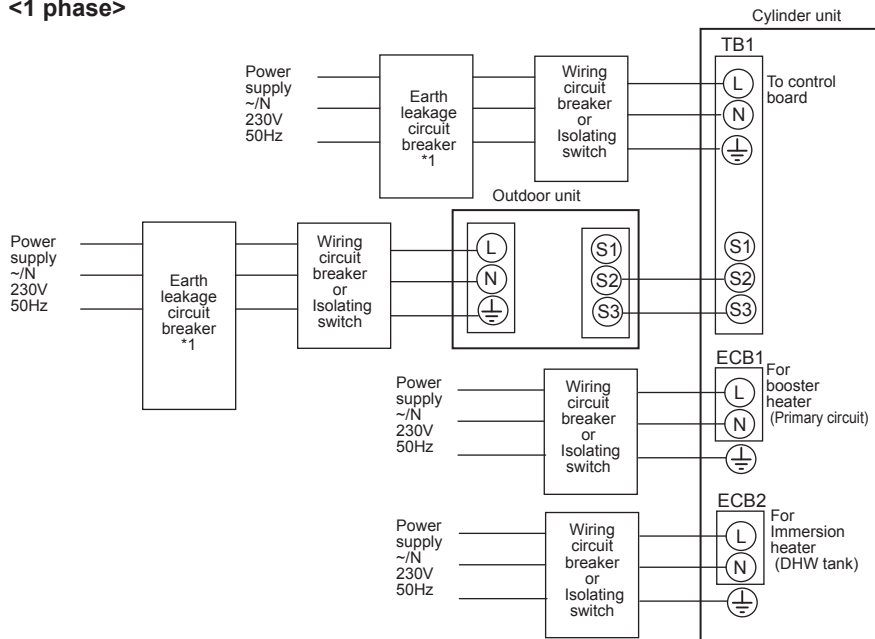
If the cylinder unit and outdoor unit have separate power supplies, the following requirements MUST be carried out:

- Change the connector connections in the control and electrical box of the cylinder unit (see Figure 3.1.5)
- Turn the outdoor unit DIP switch SW8-3 to ON
- Turn on the outdoor unit BEFORE the cylinder unit.



<Figure 3.1.5>

<1 phase>



<Figure 3.1.6>
Electrical connections 1 phase

- *1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.
*2 Affix label B that is included with the manuals near each wiring diagram for cylinder unit and outdoor units.

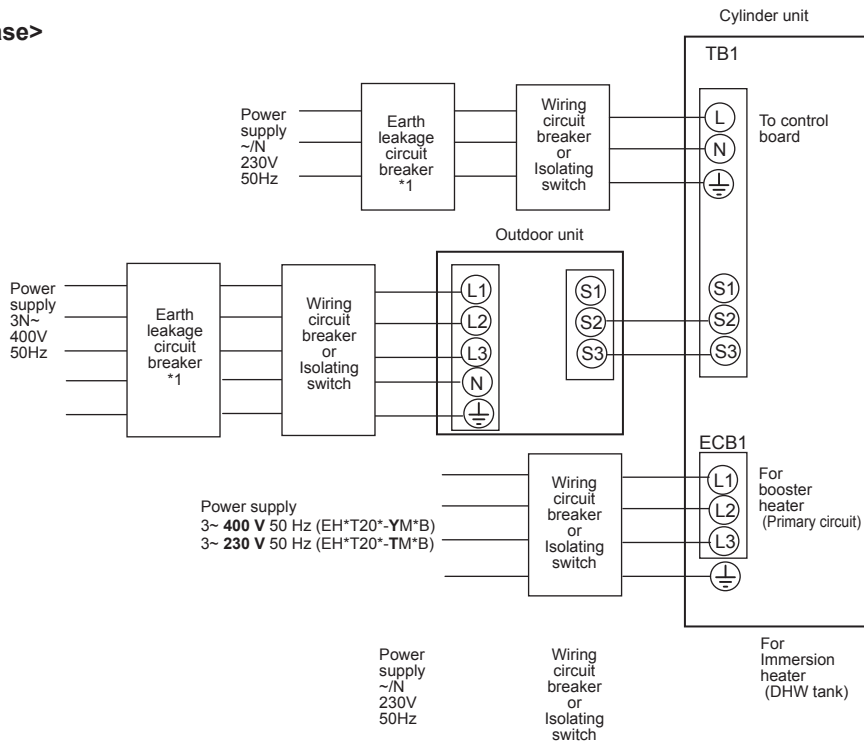
Description	Power supply	Capacity (Indoor unit Ref.)	Breaker	Wiring
Booster heater (Primary circuit)	~N 230 V 50 Hz	2 kW	16 A *1	2.5 mm ²
		6 kW	32 A *1	6.0 mm ²
Immersion heater (DHW tank)	~N 230 V 50 Hz	3 kW	16 A *1	2.5 mm ²

Cylinder unit power supply		~N 230 V 50 Hz
Cylinder unit input capacity		
Main switch (Breaker)		*1 16 A
Wiring No. * size (mm ²)	Cylinder unit power supply	2 × Min. 1.5
	Cylinder unit power supply earth	1 × Min. 1.5
	Cylinder unit - Outdoor unit	*2 2 × Min. 0.3
	Cylinder unit - Outdoor unit earth	—
Circuit rating	Cylinder unit L - N	*3 230V AC
	Cylinder unit - Outdoor unit S1 - S2	*3 —
	Cylinder unit - Outdoor unit S2 - S3	*3 24V DC

- *1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
*2. Max. 120 m
*3. The values given in the table above are not always measured against the ground value.

- Note:**
1. Wiring size must comply with the applicable local and national codes.
 2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

<3 phase>



<Figure 3.1.7>
Electrical connections 3 phase

*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.
*2 Affix label B that is included with the manuals near each wiring diagram for cylinder unit and outdoor units.

Description	Power supply	Capacity (Indoor unit Ref.)	Breaker	Wiring
Booster heater (Primary circuit)	3~ 400 V 50 Hz	9 kW	16 A *1	2.5 mm ²
	3~ 230 V 50 Hz	9 kW	32 A *1	6.0 mm ²
Immersion heater (DHW tank)	~N 230 V 50 Hz	3 kW	16 A *1	2.5 mm ²

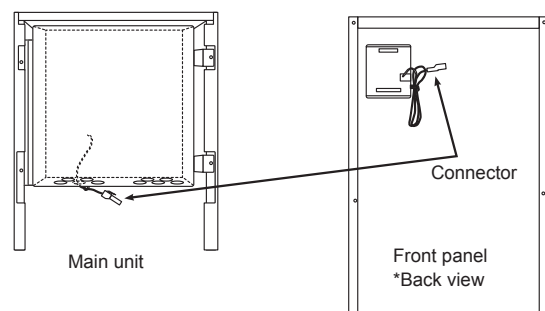
Cylinder unit power supply		~N 230 V 50 Hz
Cylinder unit input capacity		*1 16 A
Main switch (Breaker)		
Wiring No. x size (mm ²)	Cylinder unit power supply	2 x Min. 1.5
	Cylinder unit power supply earth	1 x Min. 1.5
	Cylinder unit - Outdoor unit	*2 2 x Min. 0.3
	Cylinder unit - Outdoor unit earth	—
Circuit rating	Cylinder unit L - N	*3 230V AC
	Cylinder unit - Outdoor unit S1 - S2	*3 —
	Cylinder unit - Outdoor unit S2 - S3	*3 24V DC

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
*2. Max. 120 m
*3. The values given in the table above are not always measured against the ground value.

- Note:**
1. Wiring size must comply with the applicable local and national codes.
 2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

<Before system set up>

1. At factory setting, the main controller cable (Fig. 3.1.8) on the main unit is not connected to the connector (Fig. 3.1.9) on the front panel. After completing installation and wiring in the field, connect the main controller cable to the connector, then turn on the power.
2. Insert the included SD memory card into the FTC4 control board. (Refer to section 3.3.)



<Figure 3.1.8>

<Figure 3.1.9>

3.2 Hydrobox

3.2.1 Wiring diagrams

EHSC-VM2B

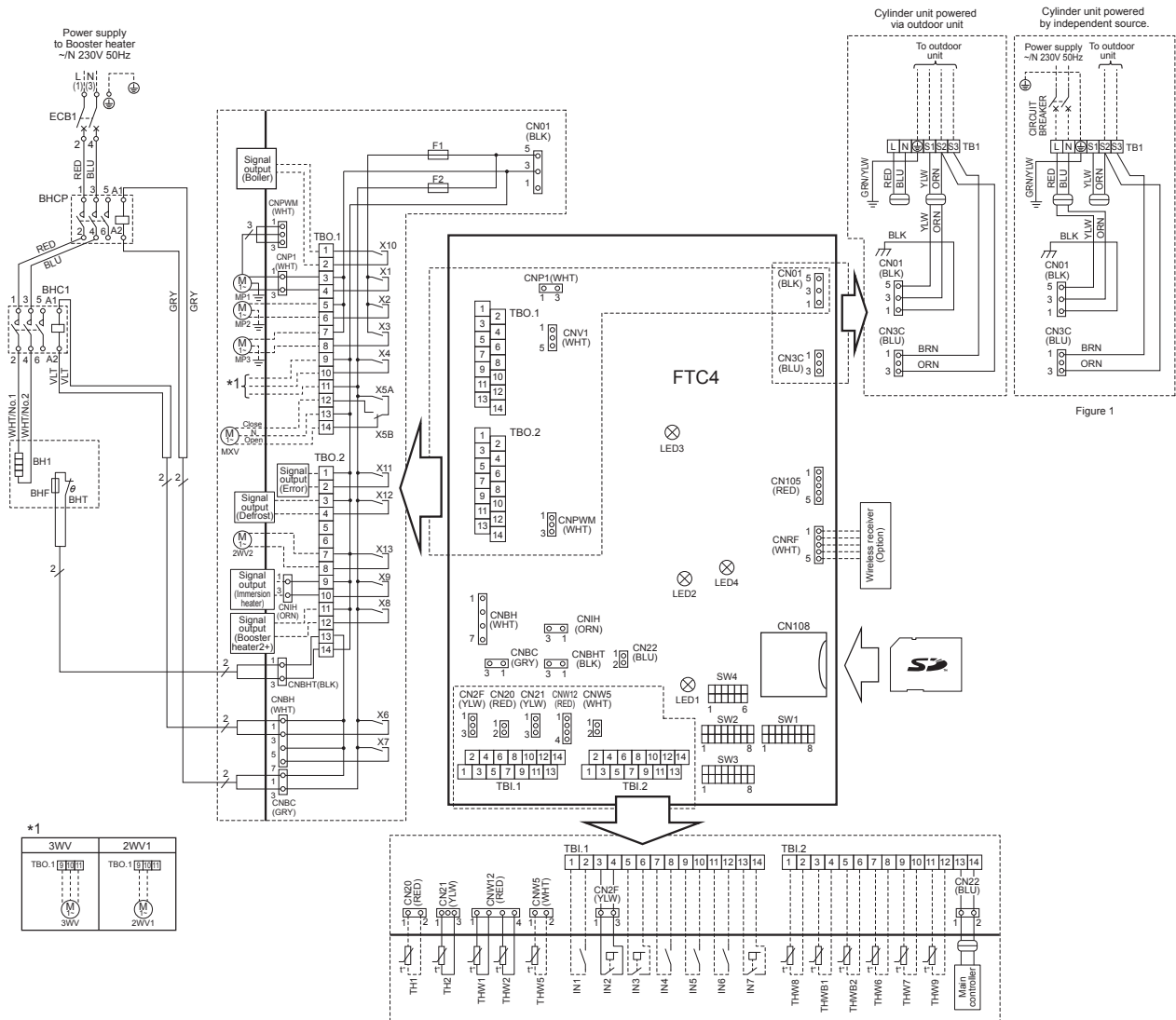


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.

*2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve1) output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT7	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)
MP1	Water circulation pump1 (Space heating & DHW)	THW1	Thermistor (Flow water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW2	Thermistor (Return water temp.)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW5	Thermistor (DHW tank water temp.)(Option)
3W/2W1	3-way valve (2-way valve1)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
2WV2	2-way valve2 (Field supply)	THW7	Thermistor (Zone1 return temp.)(Option)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)
BHC1	Contactor for booster heater 1	IN1	Room thermostat 1 (Field supply)
BHCP	Contactor for booster heater protection	IN2	Flow switch 1
		IN3	Flow switch 2 (Field supply)
		IN4	Demand control (Field supply)
		IN5	Outdoor thermostat 2 (Field supply)
		IN6	Room thermostat 2 (Field supply)
		IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See 3.2.2 Dip switch functions
X1-X13	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNV1-4	Pump speed control signal for MP1
CN108	SD card connector

1. Symbols used in wiring diagram are, [] : connector, [] : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHSC-VM6B

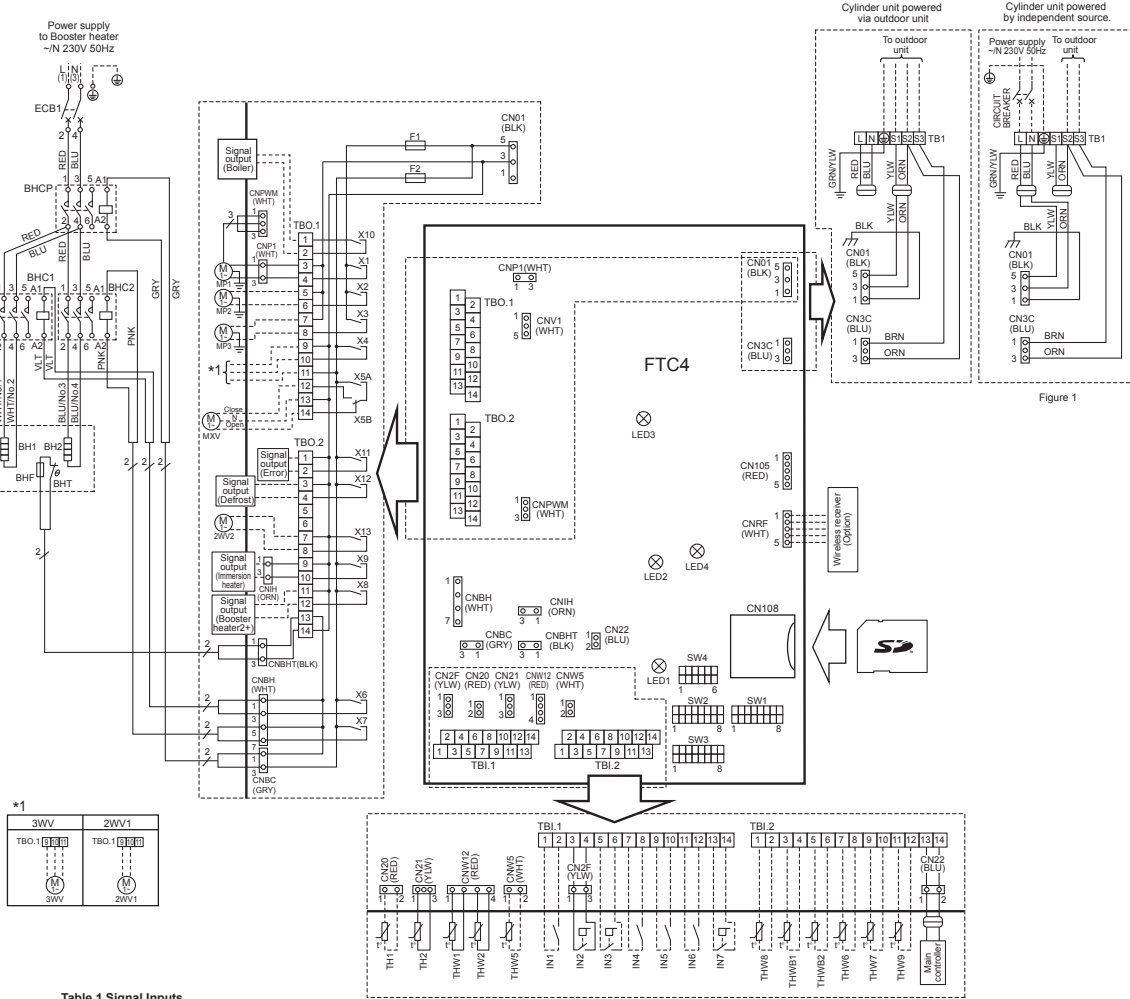


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heater source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve*1) output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)
MP1	Water circulation pump1(Space heating & DHW)	THW1	Thermistor (Flow water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW2	Thermistor (Return water temp.)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW5	Thermistor (DHW tank water temp.)(Option)
3W1/2W1	3-way valve (2-way valve*1)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
2W2	2-way valve2 (Field supply)	THW7	Thermistor (Zone1 return temp.)(Option)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)
BH2	Booster heater 2	IN1	Room thermostat 1 (Field supply)
BHC1	Contactor for booster heater 1	IN2	Flow switch 1
BHC2	Contactor for booster heater 2	IN3	Flow switch 2 (Field supply)
BHCP	Contactor for booster heater protection	IN4	Demand control (Field supply)
		IN5	Outdoor thermostat (Field supply)
		IN6	Room thermostat 2 (Field supply)
		IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See 3.2.2 Dip switch functions
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, [] : connector, [] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHSC-YM9B

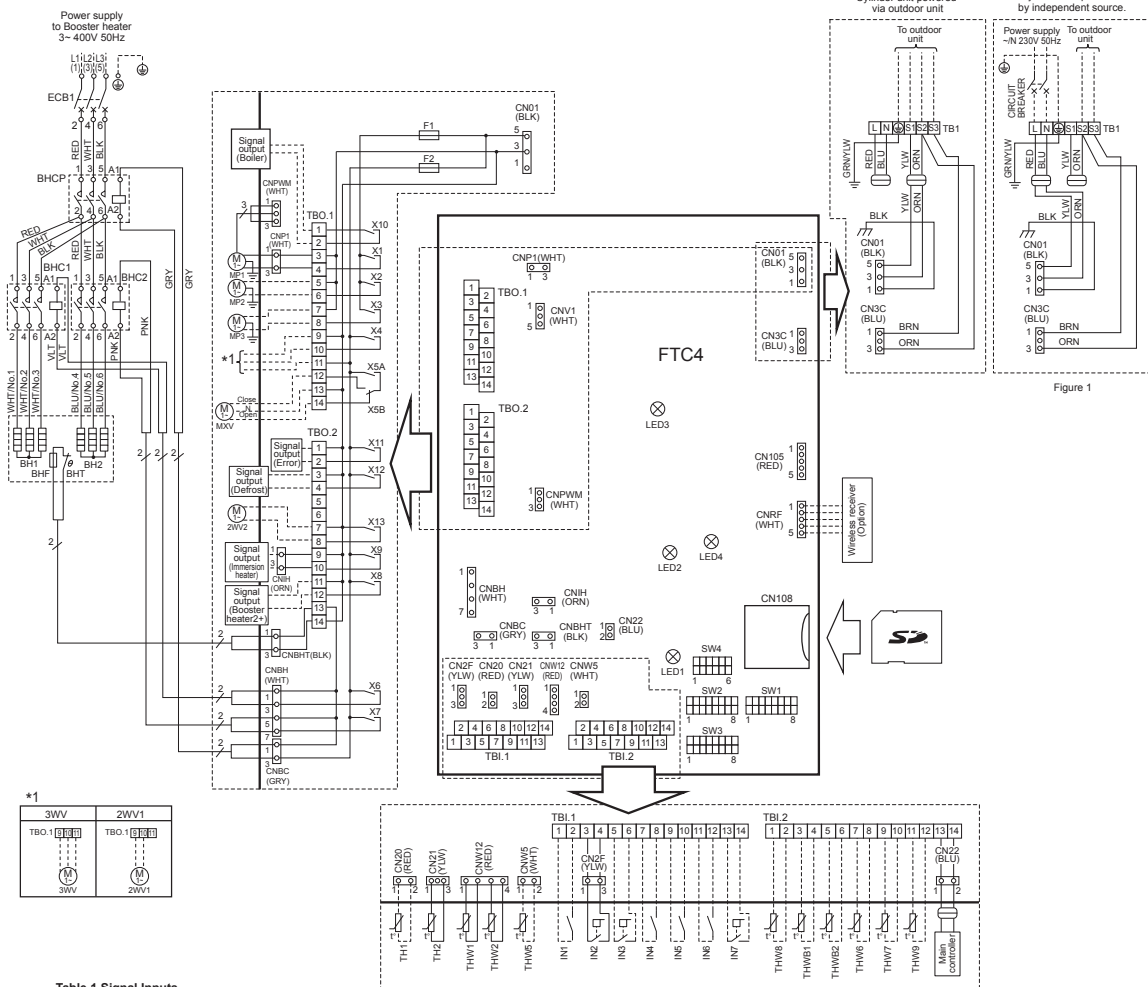


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBO.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	
IN2	TBO.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	
IN3	TBO.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>	
IN4	TBO.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBO.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBO.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	
IN7	TBO.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve 1) output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	—	CNBH 1-3	Booster heater 1 output	Stop	Open
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2* output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECCB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)
MP1	Water circulation pump1(Space heating & DHW)	THW1	Thermistor (Flow water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW2	Thermistor (Return water temp.)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW5	Thermistor (DHW tank water temp.)(Option)
3W1(2W1)	3-way valve (2-way valve 1)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
2WV2	2-way valve2 (Field supply)	THW7	Thermistor (Zone1 return temp.)(Option)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)
BH2	Booster heater 2	IN1	Room thermostat 1 (Field supply)
BHC1	Contact for booster heater 1	IN2	Flow switch 1
BHC2	Contact for booster heater 2	IN3	Flow switch 2 (Field supply)
BHCP	Contact for booster heater protection	IN4	Demand control (Field supply)
		IN5	Outdoor thermostat (Field supply)
		IN6	Room thermostat 2 (Field supply)
		IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3A/250V)
SW1-4	Dip switch *See 3.2.2 Dip switch functions
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, [] : connector, [] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHSC-TM9B

Cylinder / Hydrobox

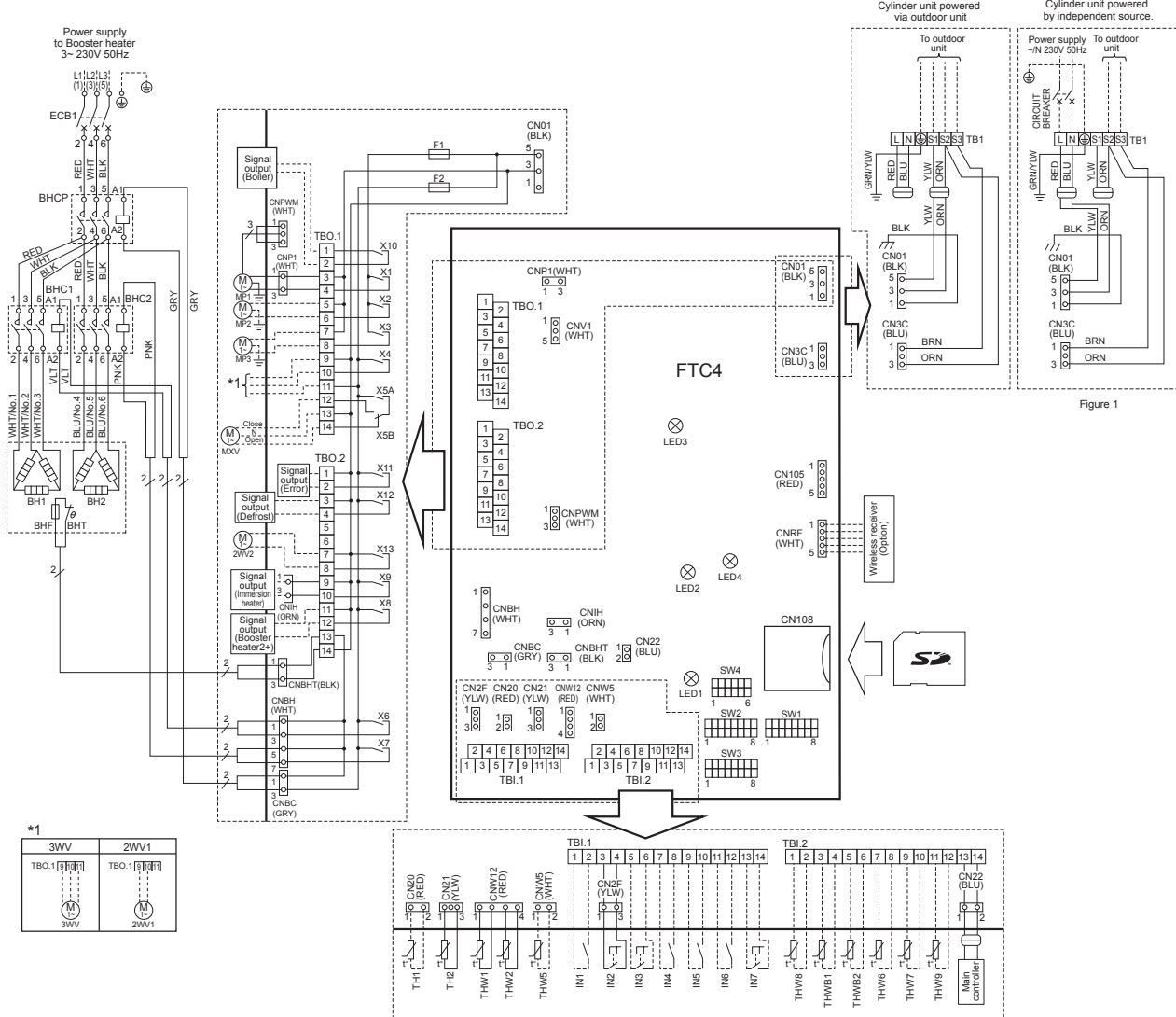


Figure 1

Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	Refer to SW2-2 in <3.2.2 Dip switch functions>
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	Refer to SW2-3 in <3.2.2 Dip switch functions>
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>	Refer to SW3-3 in <3.2.2 Dip switch functions>
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation ²
IN5	TBI.1 9-10	—	Outdoor thermostat input ¹	Standard operation	Heater operation/Boiler operation ²
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	Refer to SW3-2 in <3.2.2 Dip switch functions>
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	Refer to SW3-4 in <3.2.2 Dip switch functions>

¹. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
². To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve1) output	Heating	DHW
OUT5	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)
MP1	Water circulation pump1(Space heating & DHW)	THW1	Thermistor (Flow water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW2	Thermistor (Return water temp.)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW5	Thermistor (DHW tank water temp.)(Option)
3WV(2WV)	3-way valve (2-way valve1)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
2WV2	2-way valve2 (Field supply)	THW7	Thermistor (Zone1 return temp.)(Option)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)
BH2	Booster heater 2	IN1	Room thermostat 1 (Field supply)
BHC1	Contactor for booster heater 1	IN2	Flow switch 1
BHC2	Contactor for booster heater 2	IN3	Flow switch 2 (Field supply)
BHCP	Contactor for booster heater protection	IN4	Demand control (Field supply)
		IN5	Outdoor thermostat (Field supply)
		IN6	Room thermostat 2 (Field supply)
		IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See 3.2.2 Dip switch functions
X1-X13	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNP1M	Pump speed control signal for MP1
CN108	SD card connector

1. Symbols used in wiring diagram are, (□) connector, (□) terminal block.
 2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
 3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
 4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When two to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHSC-VM6EB

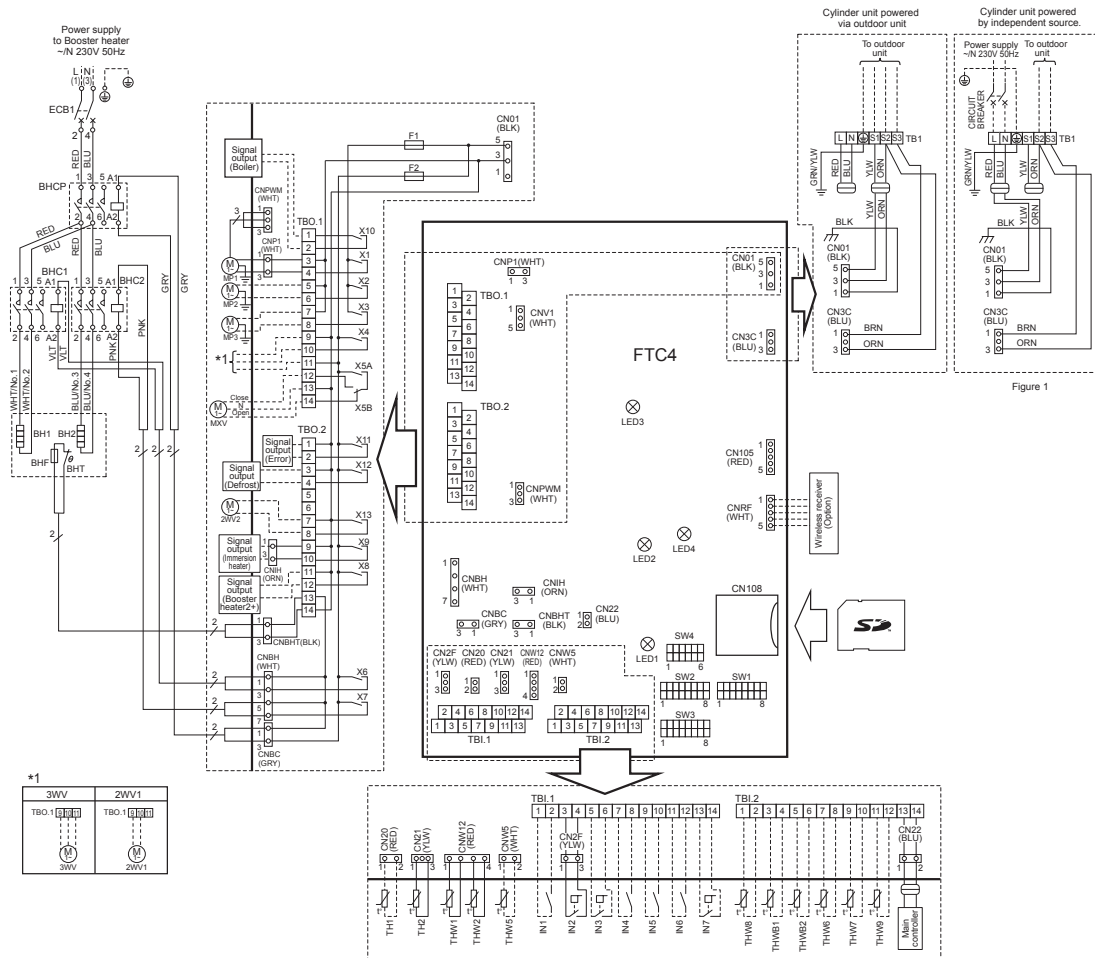


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	
IN2	TBI.1 3-4	CNZF	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.

*2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve1) output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)
MP1	Water circulation pump1(Space heating & DHW)	THW1	Thermistor (Flow water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW2	Thermistor (Return water temp.)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW5	Thermistor (DHW tank water temp.)(Option)
3WV(2WV1)	3-way valve (2-way valve1)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
2WV2	2-way valve2 (Field supply)	THW7	Thermistor (Zone1 return temp.)(Option)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)
BH2	Booster heater 2	IN1	Room thermostat 1 (Field supply)
BHC1	Contactor for booster heater 1	IN2	Room thermostat 2 (Field supply)
BHC2	Contactor for booster heater 2	IN3	Flow switch 1
BHCP	Contactor for booster heater protection	IN4	Flow switch 2 (Field supply)
		IN5	Demand control (Field supply)
		IN6	Outdoor thermostat (Field supply)
		IN7	Room thermostat 2 (Field supply)
		IN8	Flow switch 3 (Field supply)

FLOW TEMP. CONTROLLER (FTC4)	
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See 3.2.2 Dip switch functions
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, [] : connector, [] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHSC-YM9EB

Cylinder / Hydrobox

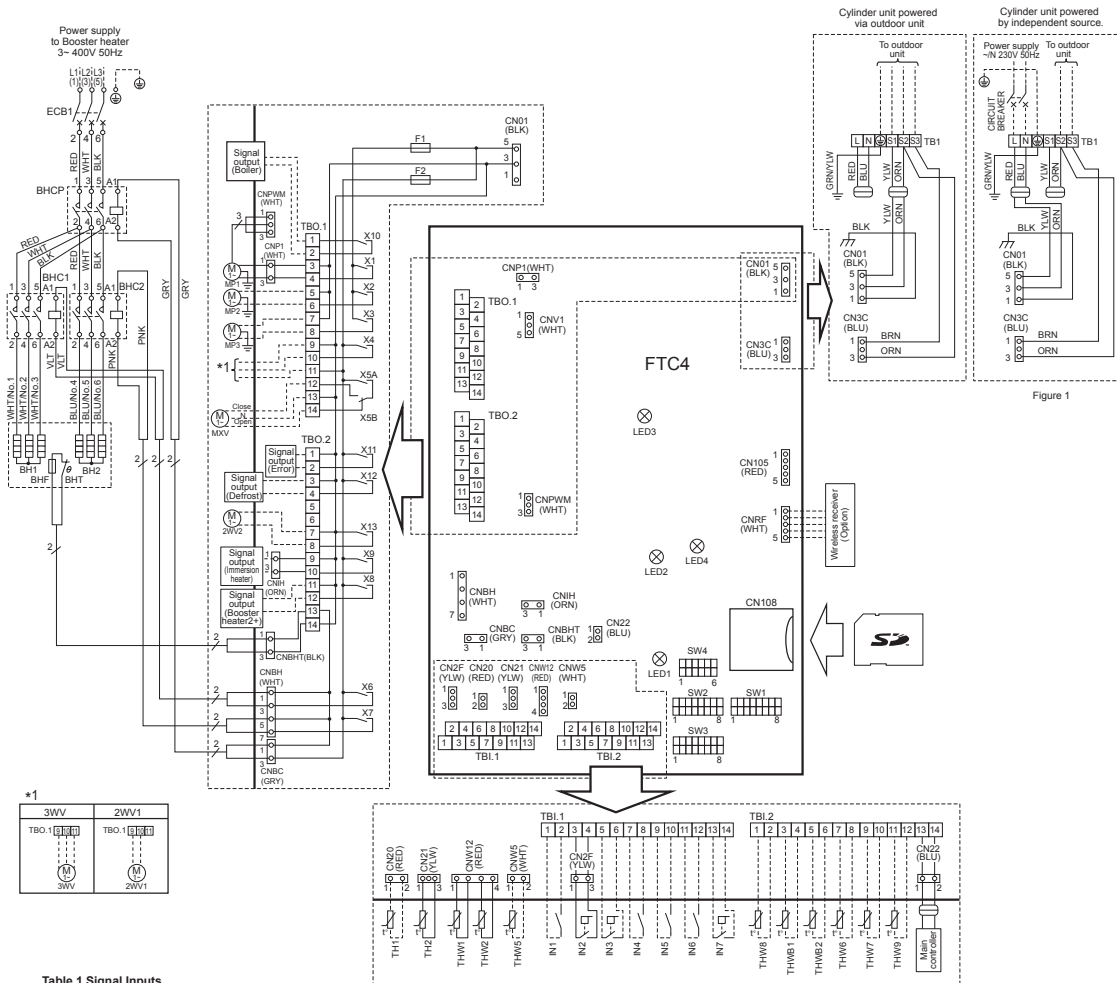


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve1) output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT5	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating

Symbol	Name	Symbol	Name	FLOW TEMP CONTROLLER (FTC4)
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)	TBO.1-2 Terminal block <Outputs>
ECB1	Earth leakage circuit breaker for booster heater	TH2	Thermistor (Ref. liquid temp.)	TBI.1-2 Terminal block <Signal Inputs, Thermistor>
MP1	Water circulation pump1(Space heating & DHW)	THW1	Thermistor (Flow water temp.)	F1-F2 Fuse (T6.3AL250V)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW2	Thermistor (Return water temp.)	SW1-4 Dip switch *See 3.2.2 Dip switch functions
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW5	Thermistor (DHW tank water temp.)(Option)	X1-X12 Relay
3WV(2W)	3-way valve (2-way valve1)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)	LED1 Power supply (FTC4)
2WV2	2-way valve2 (Field supply)	THW7	Thermistor (Zone1 return temp.)(Option)	LED2 Power supply (Main controller)
MXV	Mixing valve (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)	LED3 Communication (FTC4-Outdoor unit)
BHT	Thermostat for booster heater	THW9	Thermistor (Zone2 return temp.)(Option)	LED4 Reading or writing data to SD card
BHF	Thermal fuse for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)	CNPWM Pump speed control signal for MP1
BH1	Booster heater 1	THWB2	Thermistor (Boiler return temp.)(Option)	CN108 SD card connector
BH2	Booster heater 2	IN1	Room thermostat 1 (Field supply)	
BHC1	Contactor for booster heater 1	IN2	Flow switch 1	
BHC2	Contactor for booster heater 2	IN3	Flow switch 2 (Field supply)	
BHCP	Contactor for booster heater protection	IN4	Demand control (Field supply)	
		IN5	Outdoor thermostat (Field supply)	
		IN6	Room thermostat 2 (Field supply)	
		IN7	Flow switch 3 (Field supply)	

- Symbols used in wiring diagram are,
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHPX-VM2B

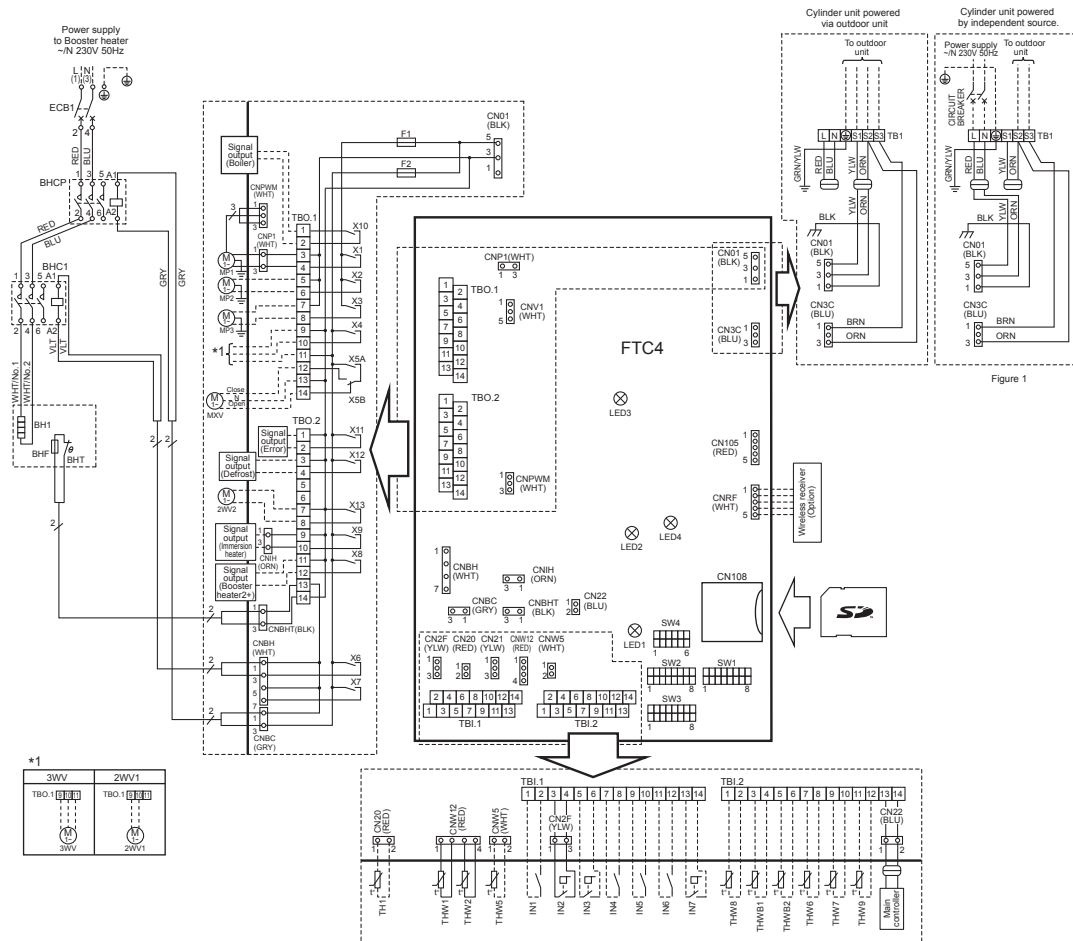


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	---	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	Refer to SW2-1 in <3.2.2 Dip switch functions>
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	Refer to SW2-2 in <3.2.2 Dip switch functions>
IN3	TBI.1 5-6	---	Flow switch 2 input (Zone1)	Refer to SW3-1 in <3.2.2 Dip switch functions>	Refer to SW3-1 in <3.2.2 Dip switch functions>
IN4	TBI.1 7-8	---	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	---	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	---	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	Refer to SW3-1 in <3.2.2 Dip switch functions>
IN7	TBI.1 13-14	---	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	Refer to SW3-3 in <3.2.2 Dip switch functions>

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	---	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	---	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve1) output	Heating	DHW
OUT5	TBO.1 12-13	---	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	---	Mixing valve output	Stop	Open
OUT6	---	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	---	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	---	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	---	Boiler output	OFF	ON
OUT11	TBO.2 1-2	---	Error output	Normal	Error
OUT12	TBO.2 3-4	---	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	---	2-way valve 2 output	DHW	Heating

Symbol	Name	Symbol	Name
TBI	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	THW1	Thermistor (Flow water temp.)
MP1	Water circulation pump1 (Space heating & DHW)	THW2	Thermistor (Return water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW5	Thermistor (DHW tank water temp.)(Option)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
3W1(2W1)	3-way valve (2-way valve1)(Field supply)	THW7	Thermistor (Zone1 return temp.)(Option)
2WV2	2-way valve2 (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
MXV	Mixing valve (Field supply)	THW9	Thermistor (Zone2 return temp.)(Option)
BHT	Thermostat for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BHF	Thermal fuse for booster heater	THWB2	Thermistor (Boiler return temp.)(Option)
BH1	Booster heater 1	IN1	Room thermostat 1 (Field supply)
BHC1	Contactor for booster heater 1	IN2	Flow switch 1
BHCP	Contactor for booster heater protection	IN3	Flow switch 2 (Field supply)
		IN4	Demand control (Field supply)
		IN5	Outdoor thermostat (Field supply)
		IN6	Room thermostat 2 (Field supply)
		IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See 3.2.2 Dip switch functions
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPM	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, [] : connector, [] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHPX-VM6B

Cylinder / Hydrobox

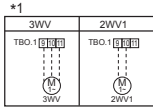
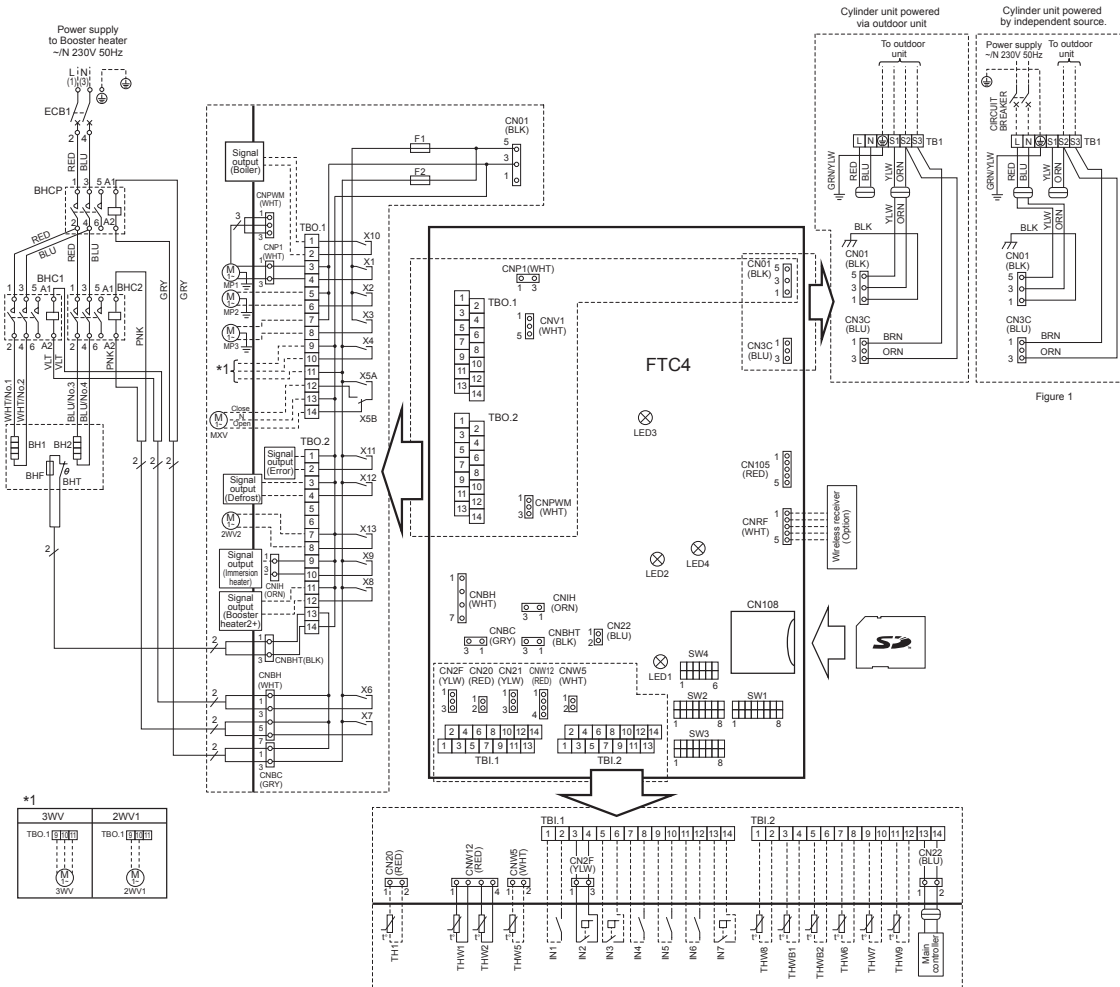


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heater source Off/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater source/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve1) output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	THW1	Thermistor (Flow water temp.)
MP1	Water circulation pump1 (Space heating & DHW)	THW2	Thermistor (Return water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW5	Thermistor (DHW tank water temp.)(Option)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
3WV/2WV1	3-way valve (2-way valve1)(Field supply)	THW7	Thermistor (Zone1 return temp.)(Option)
2WV2	2-way valve2 (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
MXV	Mixing valve (Field supply)	THW9	Thermistor (Zone2 return temp.)(Option)
BHT	Thermostat for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BHF	Thermal fuse for booster heater	THWB2	Thermistor (Boiler return temp.)(Option)
BH1	Booster heater 1	IN1	Room thermostat 1 (Field supply)
BH2	Booster heater 2	IN2	Flow switch 1
BHC1	Contact for booster heater 1	IN3	Flow switch 2 (Field supply)
BHC2	Contact for booster heater 2	IN4	Demand control (Field supply)
BHCP	Contact for booster heater protection	IN5	Outdoor thermostat (Field supply)
		IN6	Room thermostat 2 (Field supply)
		IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See 3.2.2 Dip switch functions
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

1. Symbols used in wiring diagram are, : connector, : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

EHPX-YM9B

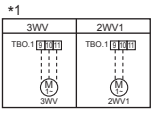
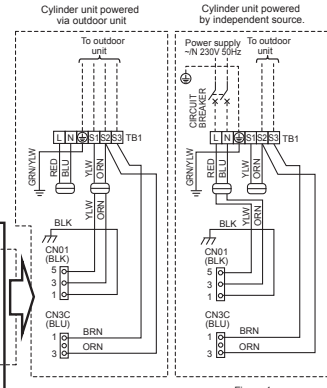
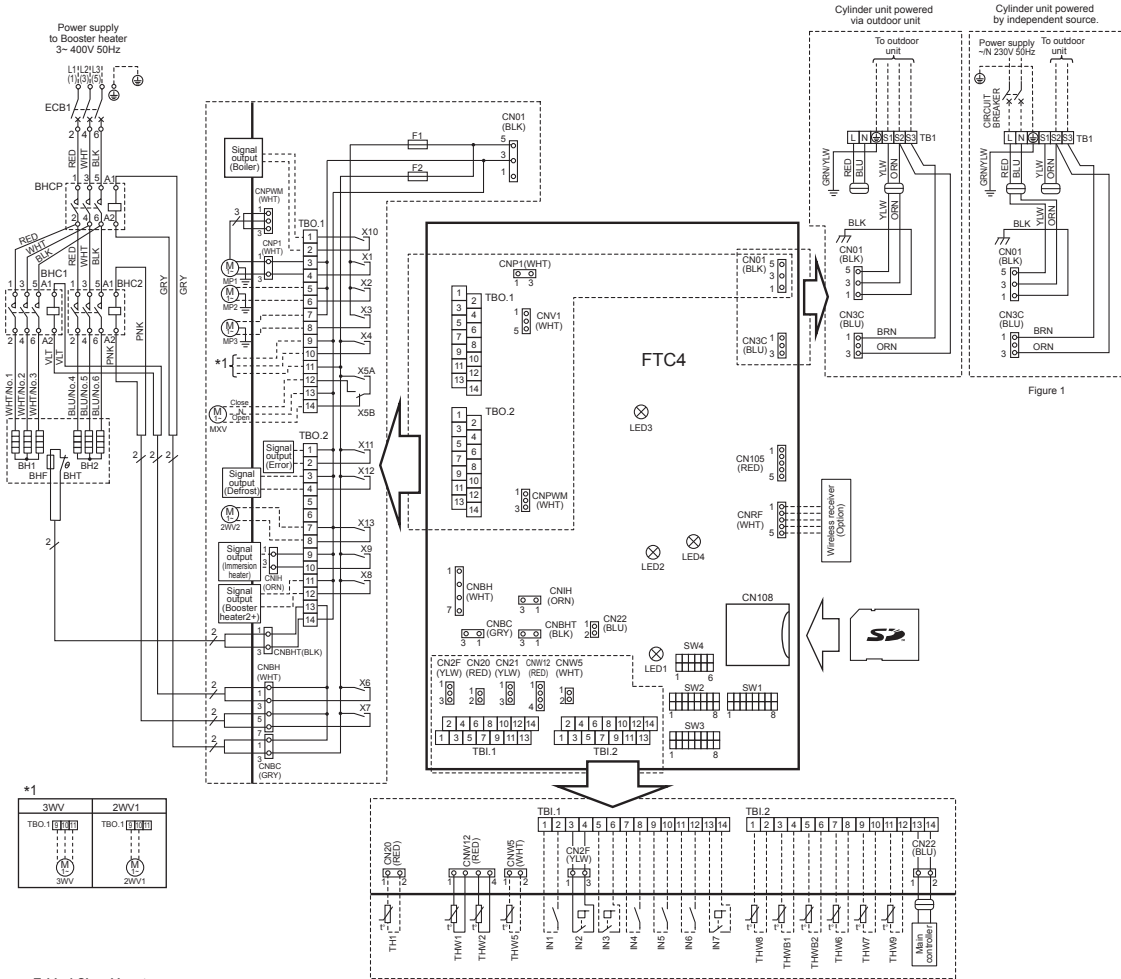


Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	

- *1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/Input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve1) output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Mixing valve output	Stop	Open
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating

Symbol	Name	Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>	TH1	Thermistor (Room temp.)(Option)
ECB1	Earth leakage circuit breaker for booster heater	THW1	Thermistor (Flow water temp.)
MP1	Water circulation pump1(Space heating & DHW)	THW2	Thermistor (Return water temp.)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)	THW5	Thermistor (DHW tank water temp.)(Option)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)	THW6	Thermistor (Zone1 flow temp.)(Option)
3W/2WV1	3-way valve (2-way valve1)(Field supply)	THW7	Thermistor (Zone1 return temp.)(Option)
2WV2	2-way valve2 (Field supply)	THW8	Thermistor (Zone2 flow temp.)(Option)
MXV	Mixing valve (Field supply)	THW9	Thermistor (Zone2 return temp.)(Option)
BHT	Thermostat for booster heater	THWB1	Thermistor (Boiler flow temp.)(Option)
BHF	Thermal fuse for booster heater	THWB2	Thermistor (Boiler return temp.)(Option)
BH1	Booster heater 1	IN1	Room thermostat 1 (Field supply)
BH2	Booster heater 2	IN2	Flow switch 1
BHC1	Contact for booster heater 1	IN3	Flow switch 2 (Field supply)
BHC2	Contact for booster heater 2	IN4	Demand control (Field supply)
BHCP	Contact for booster heater protection	IN5	Outdoor thermostat (Field supply)
		IN6	Room thermostat 2 (Field supply)
		IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See 3.2.2 Dip switch functions
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNP1M	Pump speed control signal for MP1
CN108	SD card connector

- Symbols used in wiring diagram are, [] : connector, [] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

ERSC-VM2B

Cylinder / Hydrobox

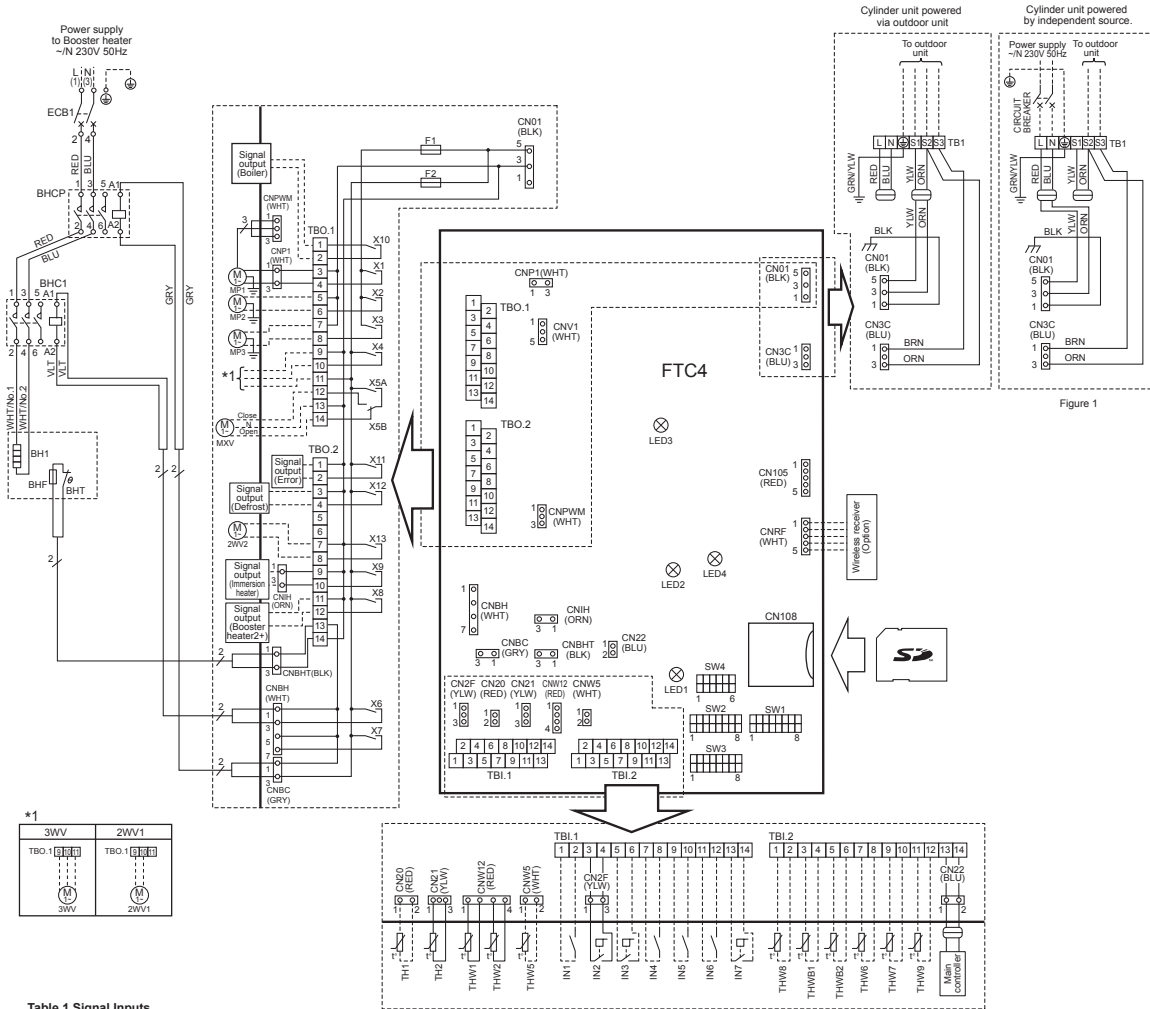


Figure 1

Table 1 Signal Inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>	—
IN2	TBI.1 3-4	—	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>	—
IN3	TBI.1 5-6	CN2F	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>	—
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input *1	Standard operation	Heater operation/Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>	—
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>	—

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.

*2. To turn on the boiler operation, use the main controller to select "Boiler" in "External/input setting" screen in the service menu.

Table 2 Outputs

Name	Terminal block	Connector	Item	OFF	ON
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve1) output	Heating	DHW
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close
OUT6	TBO.1 13-14	—	Booster heater 1 output	Stop	Open
OUT7	—	CNBH 1-3	Booster heater 2 output	OFF	ON
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON
OUT11	TBO.2 1-2	—	Error output	Normal	Error
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating

Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>
ECB1	Earth leakage circuit breaker for booster heater
MP1	Water circulation pump1(Space heating & DHW)
MP2	Water circulation pump2 (Space heating for Zone1)(Field supply)
MP3	Water circulation pump3 (Space heating for Zone2)(Field supply)
3W/2W1	3-way valve (2-way valve1)(Field supply)
2WV2	2-way valve2 (Field supply)
MXV	Mixing valve (Field supply)
BHT	Thermostat for booster heater
BHF	Thermal fuse for booster heater
BH1	Booster heater 1
BHC1	Contactor for booster heater 1
BHCP	Contactor for booster heater protection

Symbol	Name
TH1	Thermistor (Room temp.)(Option)
TH2	Thermistor (Ref. liquid temp.)
THW1	Thermistor (Flow water temp.)
THW2	Thermistor (Return water temp.)
THW5	Thermistor (DHW tank water temp.)(Option)
THW6	Thermistor (Zone1 flow temp.)(Option)
THW7	Thermistor (Zone1 return temp.)(Option)
THW8	Thermistor (Zone2 flow temp.)(Option)
THW9	Thermistor (Zone2 return temp.)(Option)
THWB1	Thermistor (Boiler flow temp.)(Option)
THWB2	Thermistor (Boiler return temp.)(Option)
IN1	Room thermostat 1 (Field supply)
IN2	Flow switch 1
IN3	Flow switch 2 (Field supply)
IN4	Demand control (Field supply)
IN5	Outdoor thermostat (Field supply)
IN6	Room thermostat 2 (Field supply)
IN7	Flow switch 3 (Field supply)

Symbol	Name
TBO.1-2	Terminal block <Outputs>
TBI.1-2	Terminal block <Signal Inputs, Thermistor>
F1-F2	Fuse (T6.3AL250V)
SW1-4	Dip switch *See 3.2.2 Dip switch functions
X1-X12	Relay
LED1	Power supply (FTC4)
LED2	Power supply (Main controller)
LED3	Communication (FTC4-Outdoor unit)
LED4	Reading or writing data to SD card
CNPWM	Pump speed control signal for MP1
CN108	SD card connector

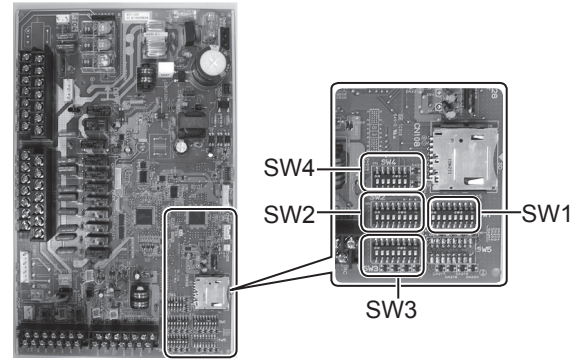
- Symbols used in wiring diagram are: [Symbol] : connector, [Symbol] : terminal block.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
- This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

3.2.2 Dip switch setting (Hydrobox)

Located on the FTC4 printed circuit board are 4 sets of small white switches known as Dip switches. The Dip switch number is printed on the circuit board next to the relevant switches. The word ON is printed on the circuit board and on the Dip switch block itself. To move the switch you will need to use a pin or the corner of a thin metal ruler or similar.

Dip switch settings are listed below in Table 3.2.1.

Make sure to turn off both indoor unit and outdoor unit power supplies before changing the switch settings.



<Figure 3.2.1>

Dip switch	Function	OFF	ON	Default settings: Indoor unit model
SW1	SW1-1 Boiler	WITHOUT Boiler	WITH Boiler	OFF
	SW1-2 Heat pump maximum outlet water temperature	55°C	60°C	ON *1
	SW1-3 DHW tank	WITHOUT DHW tank	WITH DHW tank	OFF
	SW1-4 Immersion heater	WITHOUT Immersion heater	WITH Immersion heater	OFF
	SW1-5 Booster heater	WITHOUT Booster heater	WITH Booster heater	ON
	SW1-6 Booster heater function	For heating only	For heating and DHW	ON
	SW1-7 Outdoor unit type	Split type	Packaged type	OFF: E*SC-*M*B ON : EHPX-*M*B
	SW1-8 Wireless remote controller	WITHOUT Wireless remote controller	WITH Wireless remote controller	OFF
SW2	SW2-1 Room thermostat1 input (IN1) logic change	Zone1 operation stop at thermostat short	Zone1 operation stop at thermostat open	OFF
	SW2-2 Flow switch1 input (IN2) logic change	Failure detection at short	Failure detection at open	ON
	SW2-3 Booster heater capacity restriction	Inactive	Active	OFF: Except E***-VM2B ON : E***-VM2B
	SW2-4 Cooling mode function	Inactive	Active	OFF: Except ERSC-VM2B ON : ERSC-VM2B
	SW2-5 Automatic switch to backup heat source operation (When outdoor unit stops by error)	Inactive	Active *2	OFF
	SW2-6 Mixing tank	WITHOUT Mixing tank	WITH Mixing tank	OFF
	SW2-7 2-zone temperature control	Inactive	Active	OFF
	SW2-8	—	—	OFF
SW3	SW3-1 Room thermostat 2 input (IN6) logic change	Zone2 operation stop at thermostat short	Zone2 operation stop at thermostat open	OFF
	SW3-2 Flow switch 2 input (IN3) logic change	Failure detection at short	Failure detection at open	OFF
	SW3-3 Flow switch 3 input (IN7) logic change	Failure detection at short	Failure detection at open	OFF
	SW3-4 Cooling operation in Zone2	Not in use	In use	OFF
	SW3-5 Heating mode function *3	Inactive	Active	OFF
	SW3-6	—	—	OFF
	SW3-7	—	—	OFF
	SW3-8	—	—	OFF
SW4	SW4-1 Multiple outdoor units control	Inactive	Active	OFF
	SW4-2 Position of multiple outdoor units control *4	Slave	Master	OFF
	SW4-3	—	—	OFF
	SW4-4	—	—	OFF
	SW4-5 Emergency mode (Heater only operation)	Normal	"Emergency mode (Heater only operation) (To be activated only when powered ON)"	OFF *5
	SW4-6 Emergency mode (Boiler operation)	Normal	"Emergency mode (Boiler operation) (To be activated only when powered ON)"	OFF *5

<Table 3.2.1>

- Note:**
- *1. When the hydrobox is connected with a PUHZ-RP outdoor unit of which maximum outlet water temperature is 55°C, Dip SW1-2 must be changed to OFF.
 - *2. OUT11 will be available. For safety reasons, this function is not available for certain errors. (In that case, system operation must be stopped and only the water circulation pump keeps running.)
 - *3 This switch functions only when the hydrobox is connected with a PUHZ-FRP outdoor unit. When another type of outdoor unit is connected, the heating mode function is active regardless of the fact that this switch is ON or OFF.
 - *4. SW4-2 is available only when SW4-1 is ON.
 - *5. If emergency mode is no longer required, return the switch to OFF position.

Automatic switch to backup heat source operation

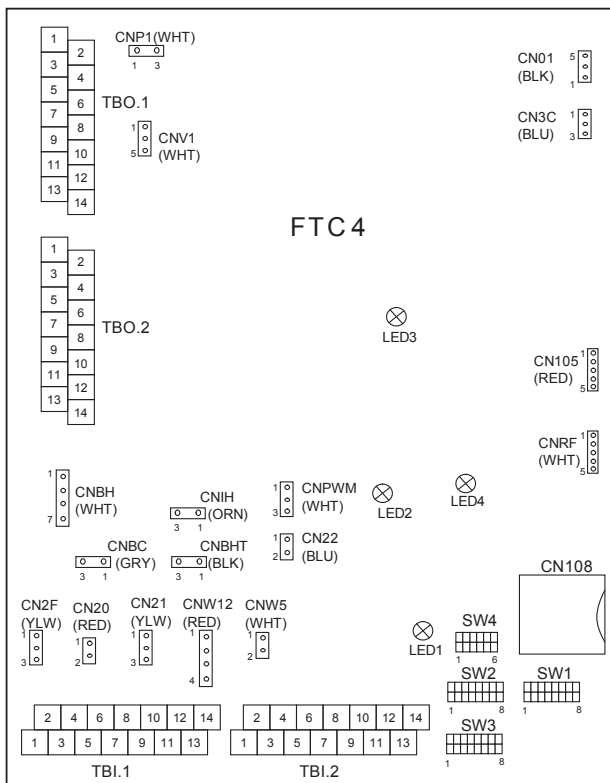
Back-up heater operation (*1) will automatically run when the outdoor unit stops abnormally.
 To enable the function, switch Dip SW 2-5 to ON.
 During the back-up operation, an error code(s) and the contact number will be displayed alternately.
 External output (OUT11) will be available.
 To clear the fault(s), reset the power breakers on the indoor and outdoor units.

<Applicable error codes (*2)>
 E6 to 9, ED, P6, P8, U1 to 8, UD, UE, UF, UL, UP

(*1) Prolonged running of the back-up operation may affect the life of the heat source.
 (*2) For safety reasons, this function is not available for certain faults. (System operation must be stopped and only pump keeps running.)

Cylinder / Hydrobox

3.2.3 Connecting inputs/outputs (Hydrobox)



When the wires are wired to adjacent terminals use ring terminals and insulate the wires.

<Figure 3.2.2>

Signal inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <3.2.2 Dip switch functions>.	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <3.2.2 Dip switch functions>.	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <3.2.2 Dip switch functions>.	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/ Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input (*1)	Standard operation	Heater operation/ Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <3.2.2 Dip switch functions>.	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <3.2.2 Dip switch functions>.	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External input setting" screen in the service menu.

Wiring specification and field supply parts

Item	Name	Model and specifications
Signal input function	Signal input wire	Use sheathed vinyl coated cord or cable. Max. 10 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm
	Switch	Non-voltage "a" contact signals Remote switch: minimum applicable load 12V DC, 0.1mA

■ Thermistor inputs

Name	Terminal block	Connector	Item	Optional part model
TH1	—	CN20	Thermistor (Room temp.) (Option)*1	PAC-SE41TS-E
TH2	—	CN21	Thermistor (Ref. liquid temp.)	—
THW1	—	CNW12 1-2	Thermistor (Flow water temp.)	—
THW2	—	CNW12 3-4	Thermistor (Return water temp.)	—
THW5	—	CNW5	Thermistor (DHW tank water temp.) (Option)*1	PAC-TH011TK-E
THW6	TBI.2 7-8	—	Thermistor (Zone1 flow water temp.) (Option)*1	PAC-TH011-E
THW7	TBI.2 9-10	—	Thermistor (Zone1 return water temp.) (Option)*1	PAC-TH011-E
THW8	TBI.2 1-2	—	Thermistor (Zone2 flow water temp.) (Option)*1	PAC-TH011-E
THW9	TBI.2 11-12	—	Thermistor (Zone2 return water temp.) (Option)*1	PAC-TH011-E
THWB1	TBI.2 3-4	—	Thermistor (Boiler flow water temp.) (Option)*1	PAC-TH011HT-E
THWB2	TBI.2 5-6	—	Thermistor (Boiler return water temp.) (Option)*1	PAC-TH011HT-E

Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each temperature.

If the wiring is too long, bundle it with a strap to adjust the length.

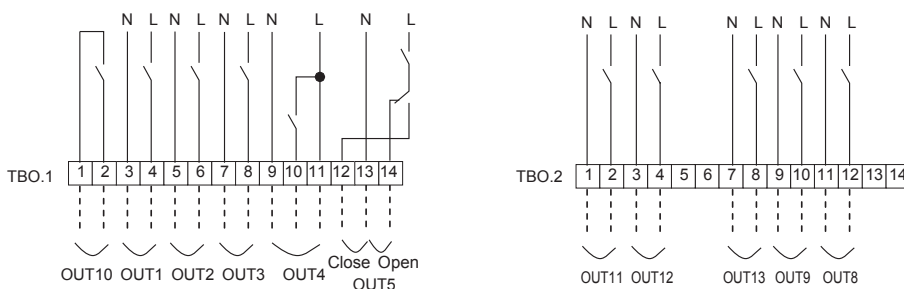
*1. The maximum length of the thermistor wiring is 5 m.

When the wires are wired to adjacent terminals, use ring terminals and insulate the wires.

■ Outputs

Name	Terminal block	Connector	Item	OFF	ON	Signal/Max current	Max. total current
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON	230V AC 1.0 A Max	3.0 A (a)
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON	230V AC 1.0 A Max	
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON	230V AC 1.0 A Max	
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve 1) output	Heating	DHW	230V AC 0.1 A Max	3.0 A (b)
OUT5	TBO.1 12-13 TBO.1 13-14	—	Mixing valve output	Stop Stop	Close Open	230V AC 0.1 A Max	
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT11	TBO.2 1-2	—	Error output	Normal	Error	230V AC 0.5 A Max	
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost	230V AC 0.5 A Max	
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating	230V AC 0.1 A Max	
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON	non-voltage contact • 220 - 240V AC (30V DC) 0.5A or less • 10 mA 5V DC or more	—

Do not connect to the terminals that are indicated as “—” in the “Terminal block” field.



Wiring specification and field supply parts

Item	Name	Model and specifications
External output function	Outputs wire	Use sheathed vinyl coated cord or cable. Max. 30 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm

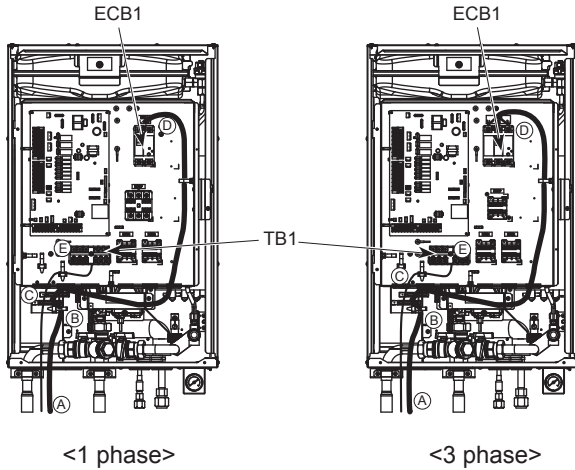
Note:

- When the hydrobox is powered via outdoor unit, the maximum grand total current of (a)+(b) is 3.0 A.
- Do not connect multiple water circulation pumps directly to each output (OUT1, OUT2, and OUT3). In such a case, connect them via (a) relay(s).
- Do not connect water circulation pumps to both TBO.1 3-4 and CNP1 at the same time.
- Connect an appropriate surge absorber to OUT10 (TBO.1 1-2) depending on the load at site.

3.2.4 Electrical Connection(Hydrobox)

All electrical work should be carried out by a suitably qualified technician. Failure to comply with this could lead to electrocution, fire, and death. It will also invalidate product warranty. All wiring should be according to national wiring regulations.

Breaker abbreviation	Meaning
ECB1	Earth leakage circuit breaker for booster heater
TB1	Terminal block 1



<Figure 3.2.3>

The hydrobox can be powered in two ways.

1. Power cable is run from the outdoor unit to the hydrobox.
2. Hydrobox has independent power source.

Connections should be made to the terminals indicated in the figures to the left below depending on the phase.

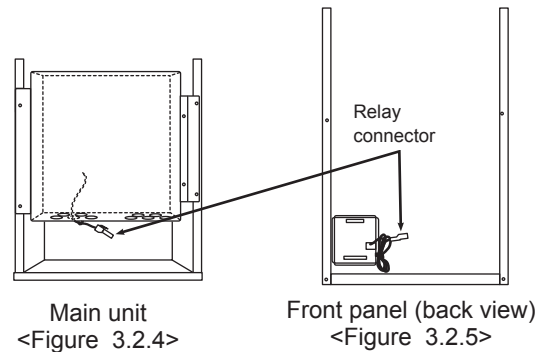
Booster heater and immersion heater should be connected independently from one another to dedicated power supplies.

- Ⓐ Locally supplied wiring should be inserted through the inlets situated on the base of the hydrobox.
 - Ⓑ Wiring should be fed down the right hand side of the control and electrical box and clamped in place using clips provided.
 - Ⓒ The wires should be inserted individually through the cable inlets as below.
- ④ Output wires
 - ⑤ Signal input wires
 - ⑥ Wireless receiver (option) wire (PAR-WR51R-E)
 - ⑦ to ⑩ Power line and indoor-outdoor wire
- Ⓓ Connect the outdoor unit – hydrobox connecting cable to TB1.
 - Ⓔ Connect the power cable for the booster heater to ECB1.

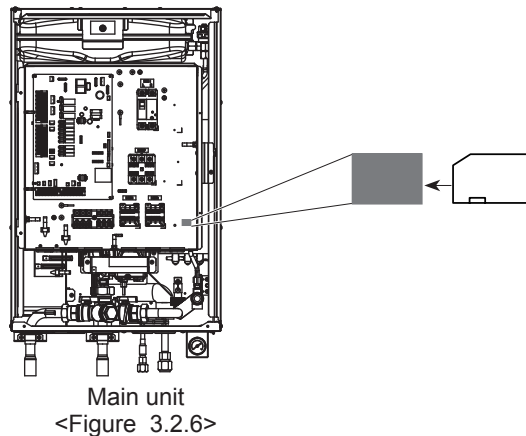
• Make sure that ECB1 is ON.

Hydrobox NOTICE

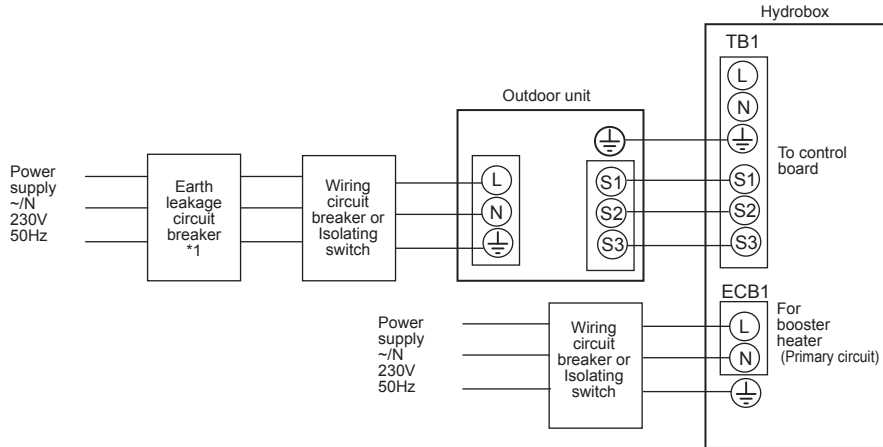
1. When the hydrobox leaves the factory, the main controller cable (Fig. 3.2.4) on the main unit is not connected to the controller's relay connector (Fig. 3.2.5) on the front panel. After completing installation and wiring in the field, connect the main controller cable to the relay connector, then turn on the power.



2. Before setting up the system, insert the included SD memory card. (For more details, refer to section 3.3.)



Option 1: Hydrobox powered via outdoor unit
 <1 phase>



*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.
 *2 Affix label A that is included with the manuals near each wiring diagram for hydrobox and outdoor units.

<Figure 3.2.7>
 Electrical connections 1 phase

Description	Power supply	Capacity	Breaker	Wiring
Booster heater (Primary circuit)	~N 230 V 50 Hz	2 kW	16 A *1	2.5 mm ²
		6 kW	32 A *1	6.0 mm ²

Wiring No. x size (mm ²)	Hydrobox - Outdoor unit	*2	3 x 1.5 (polar)
	Hydrobox - Outdoor unit earth	*2	1 x Min. 1.5
Circuit rating	Hydrobox - Outdoor unit S1 - S2	*3	230V AC
	Hydrobox - Outdoor unit S2 - S3	*3	24V DC

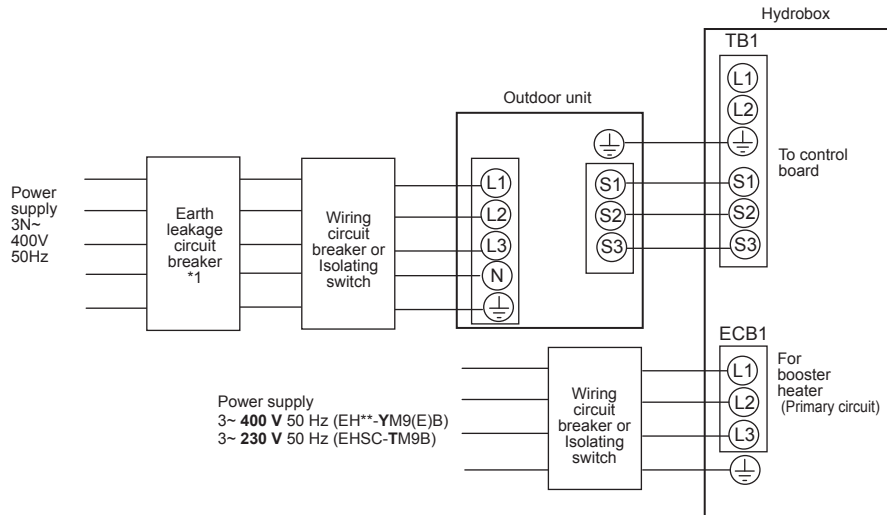
*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

*2. Max. 45 m
 If 2.5 mm² used, Max. 50 m
 If 2.5 mm² used and S3 separated, Max. 80 m

*3. The values given in the table above are not always measured against the ground value.

- Notes:**
1. Wiring size must comply with the applicable local and national codes.
 2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
 Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

<3 phase>



*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.
 *2 Affix label A that is included with the manuals near each wiring diagram for hydrobox and outdoor units.

<Figure 3.2.8>
 Electrical connections 3 phase

Description	Power supply	Capacity	Breaker	Wiring
Booster heater (Primary circuit)	3~ 400 V 50 Hz	9 kW	16 A *1	2.5 mm ²
	3~ 230 V 50 Hz	9 kW	32 A *1	6.0 mm ²

Wiring No. x size (mm ²)	Hydrobox - Outdoor unit	*2	3 × 1.5 (polar)
	Hydrobox - Outdoor unit earth	*2	1 × Min. 1.5
Circuit rating	Hydrobox - Outdoor unit S1 - S2	*3	230V AC
	Hydrobox - Outdoor unit S2 - S3	*3	24V DC

- *1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
- *2. Max. 45 m
 If 2.5 mm² used, Max. 50 m
 If 2.5 mm² used and S3 separated, Max. 80 m
- *3. The values given in the table above are not always measured against the ground value.

- Notes:**
1. Wiring size must comply with the applicable local and national codes.
 2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
 Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

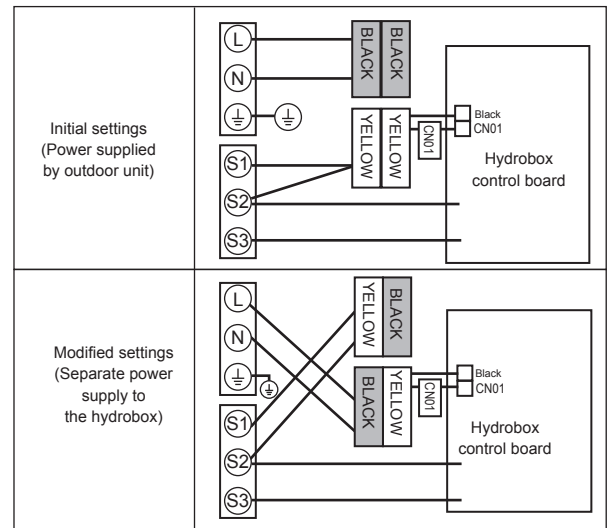
3 Wiring diagrams

Cylinder unit / Hydrobox

Option2: Hydrobox powered by independent source

If the hydrobox and outdoor units have separate power supplies, the following requirements MUST be carried out:

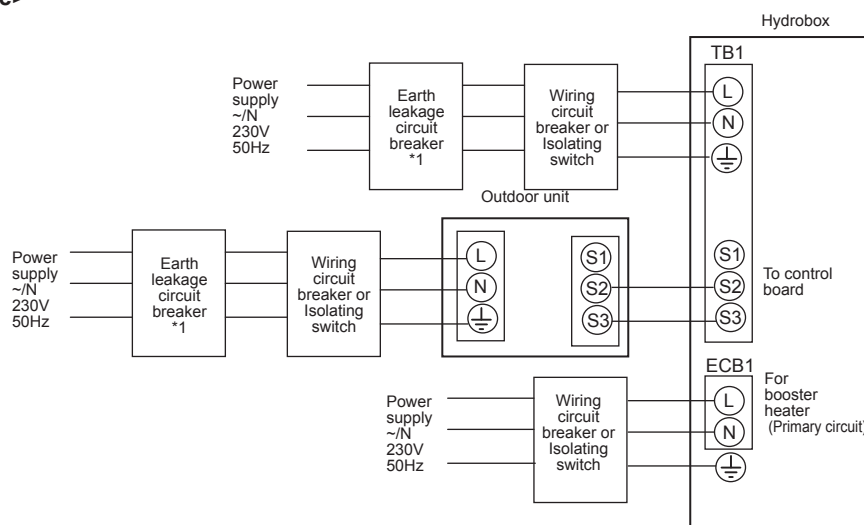
- Change connector connections in hydrobox control and electrical box (see Figure 3.2.9).
- Turn the outdoor unit DIP switch SW8-3 to ON.
- Turn on the outdoor unit BEFORE the hydrobox.



Cylinder / Hydrobox

<1 phase>

<Figure 3.2.9>



<Figure 3.2.10>
Electrical connections 1 phase

*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

*2 Affix label B that is included with the manuals near each wiring diagram for hydrobox and outdoor units.

Description	Power supply	Capacity	Breaker	Wiring
Booster heater (Primary circuit)	~N 230 V 50 Hz	2 kW	16 A *1	2.5 mm ²
		6 kW	32 A *1	6.0 mm ²

Hydrobox power supply		~N 230 V 50 Hz
Hydrobox input capacity		*1
Main switch (Breaker)		16 A
Wiring No. x size (mm ²)	Hydrobox power supply	2 x Min. 1.5
	Hydrobox power supply earth	1 x Min. 1.5
	Hydrobox - Outdoor unit	*2
	Hydrobox - Outdoor unit earth	—
Circuit rating	Hydrobox L - N	*3
	Hydrobox - Outdoor unit S1 - S2	*3
	Hydrobox - Outdoor unit S2 - S3	*3

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV).

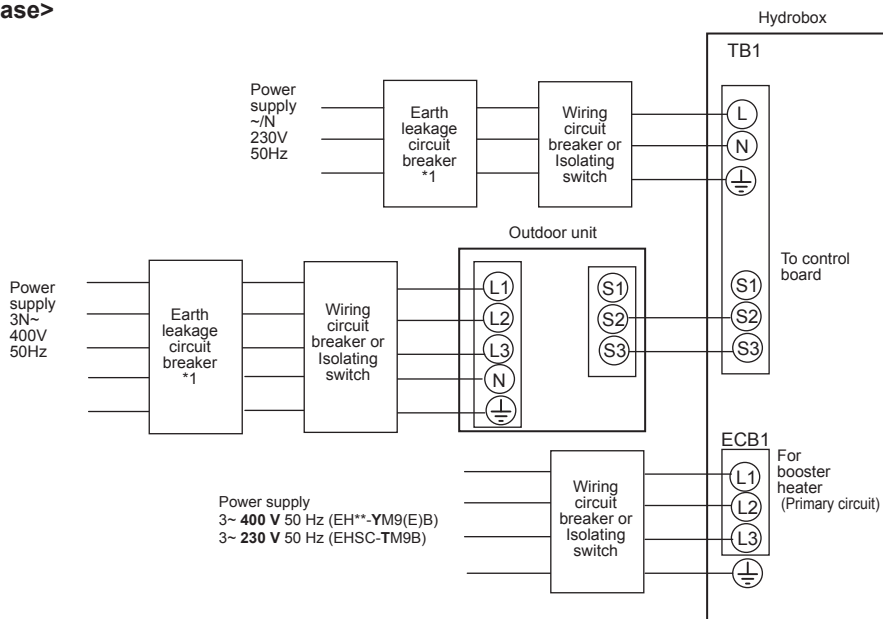
The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

*2. Max. 120 m

*3. The values given in the table above are not always measured against the ground value.

- Notes:**
1. Wiring size must comply with the applicable local and national codes.
 2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

<3 phase>



*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.
 *2 Affix label B which is included with the manuals near each wiring diagram for hydrobox and outdoor units.

<Figure 3.2.11>
 Electrical connections 3 phase

Description	Power supply	Capacity	Breaker	Wiring
Booster heater (Primary circuit)	3~ 400 V 50 Hz	9 kW	16 A *1	2.5 mm ²
	3~ 230 V 50 Hz	9 kW	32 A *1	6.0 mm ²

Hydrobox power supply		~N 230 V 50 Hz	
Hydrobox input capacity	*1	16 A	
Main switch (Breaker)			
Wiring No. x size (mm ²)	Hydrobox power supply	2 x Min. 1.5	
	Hydrobox power supply earth	1 x Min. 1.5	
	Hydrobox - Outdoor unit	*2	2 x Min. 0.3
	Hydrobox - Outdoor unit earth	—	
Circuit rating	Hydrobox L - N	*3	230V AC
	Hydrobox - Outdoor unit S1 - S2	*3	—
	Hydrobox - Outdoor unit S2 - S3	*3	24V DC

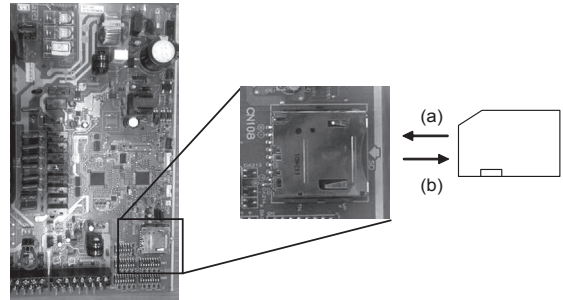
*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV).
 The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
 *2. Max. 120 m
 *3. The values given in the table above are not always measured against the ground value.

- Notes:**
1. Wiring size must comply with the applicable local and national codes.
 2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
 Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each heater. Insufficient power supply capacity might cause chattering.

3.3 Using SD memory card

The hydrobox is equipped with an SD memory card interface in FTC4. Using an SD memory card can simplify main controller settings and can store operating logs. *1

(a) For insertion, push on the SD memory card until it clicks into place.
 (b) For ejection, push on the SD memory card until it clicks.
Note: To avoid cutting fingers, do not touch sharp edges of the SD memory card connector (CN108) on the FTC4 control board.



<Handling precautions>

- (1) Use an SD memory card that complies with the SD standards. Check that the SD memory card has a logo on it of those shown to the right.
- (2) SD memory cards to the SD standards include SD, SDHC, miniSD, micro SD, and microSDHC memory cards. The capacities are available up to 32 GB. Choose that with a maximum allowable temperature of 55°C.
- (3) When the SD memory card is a miniSD, miniSDHC, microSD, or micro SDHC memory card, use an SD memory card converter adapter.
- (4) Before writing to the SD memory card, release the write-protect switch.



- (5) Before inserting or ejecting an SD memory card, make sure to power off the system. If an SD memory card is inserted or ejected with the system powered on, the stored data could be corrupted or the SD memory card be damaged. *An SD memory card is live for a whilst after the system is powered off. Before insertion or ejection wait until the LED lamps on the FTC4 control board are all off.
- (6) The read and write operations have been verified using the following SD memory cards, however, these operations are not always guaranteed as the specifications of these SD memory cards could change.

Manufacturer	Model	Tested in
Verbatim	#44015 0912-61	Mar. 2012
SanDisk	SDSDB-002G-B35	Oct. 2011
Panasonic	RP-SDP04GE1K	Oct. 2011
Arvato	2GB PS8032 TSB 24nm MLC	Jun. 2012

Before using a new SD memory card (including the card that comes with the unit), always check that the SD memory card can be safely read and written to by the FTC4 controller.

<How to check read and write operations>

- a) Check for correct wiring of power supply to the system. For more details, refer to section 3.2.4.
(Do not power on the system at this point.)
 - b) Insert an SD memory card.
 - c) Power on the system.
 - d) The LED4 lamp lights if the read and write operations are successfully completed. If the LED4 lamp continues blinking or does not light, the SD memory card cannot be read or written to by the FTC4 controller.
- (7) Make sure to follow the instruction and the requirement of the SD memory card's manufacturer.
 - (8) Format the SD memory card if determined unreadable in step (6). This could make it readable.
Download an SD card formatter from the following site.
SD Association homepage: <https://www.sdcard.org/>
NOTE/supports FAT file system but not NTFS file system.
 - (9) Mitsubishi Electric is not liable for any damages, in whole or in part, including failure of writing to an SD memory card, and corruption and loss of the saved data, or the like. Back up saved data as necessary.
 - (10) Do not touch any electronic parts on the FTC4 control board when inserting or ejecting an SD memory card, or else the control board could fail.

Logos		
Capacities		
2 GB to 32 GB *2		
SD speed classes		
All		

* The SD Logo is a trademark of SD-3C, LLC.
 The miniSD logo is a trademark of SD-3C, LLC.
 The microSD logo is a trademark of SD-3C, LLC.

*1 To edit main controller settings or to check operating data, an Ecodan service tool (for use with PC) is required.

*2 A 2-GB SD memory card stores up to 30 days of operation logs.

3.4 Caution on connecting DHW tank (Hydrobox)

Note:

- Be aware that the respective DHW operations are greatly effected by the selections of the components such as tank, immersion heater, or the like.
- Follow your local regulations to perform system configuration.

1. To enable switching of the water circulation circuit between the DHW mode and the heating mode, install a 3-way valve (field supply). The 3-way valve and the DHW tank should be positioned as shown in the system diagram on the page B-59, Figure 4.5 or 4.6 as applicable.

The use of two 2-way valves can perform the same function as a 3-way valve.

2. Install the optional thermistor THW5 (optional part PAC-TH011TK-E) on the DHW tank.

It is recommended to position the thermistor at the mid point of the DHW tank capacity. Insulate thermistor from ambient air. Especially for double (insulated) tank, thermistor should be attached to the inner side (to detect the water temperature).

3. Connect the thermistor lead to the CNW5 connector on the FTC4.

If the thermistor lead is too long bundle it with a strap to adjust the length.

4. The output terminals for the 3-way valve is TBO.1 9-11 (OUT4).

The TBO.1 9-11 terminals on the FTC4 are shown in the wiring diagram on Figure 3.2.2.

Choose the terminals that the 3-way valve is connected to between TBO.1 9-10, or TBO.1 9-11, according to the rated voltage.

When the rated current of the 3-way valve exceeds 0.1A, be sure to use a relay with maximum voltage and current ratings of 230V AC / 0.1A when connecting to the FTC4. Do not directly connect the 3-way valve cable to the FTC4. Connect the relay cable to the TBO.1 9-10 terminals.

3-way valve must be of SPST type. SPDT type can NOT be used.

For systems using 2-way valves instead of a 3-way valve please read the following;

Specification of 2-way valve (field supply)

- Power supply: 230V AC
- Current: 0.1A Max (If over 0.1A you must use a relay)
- Type: Normally closed

	Installation position	Electrical connection terminal block	Output signal		
			Heating	DHW	System OFF
2-way valve1	DHW	TBO.1 9-10	OFF (closed)	ON (open)	OFF (closed)
2-way valve2	Heating	TBO.2 7-8	ON (open)	OFF (closed)	OFF (closed)

Note: Should the 2-way valve become blocked the water circulation will stop.

A by-pass valve or circuit should be installed between pump and 2-way valve for safety.

The TBO.2 7-8 terminals on the FTC4 are shown in the wiring diagram.

The 2-way valve (field supply) should be installed according to the instructions supplied with it. Follow 2-way valve's manufacturer's instructions as to whether to connect an earth cable or not.

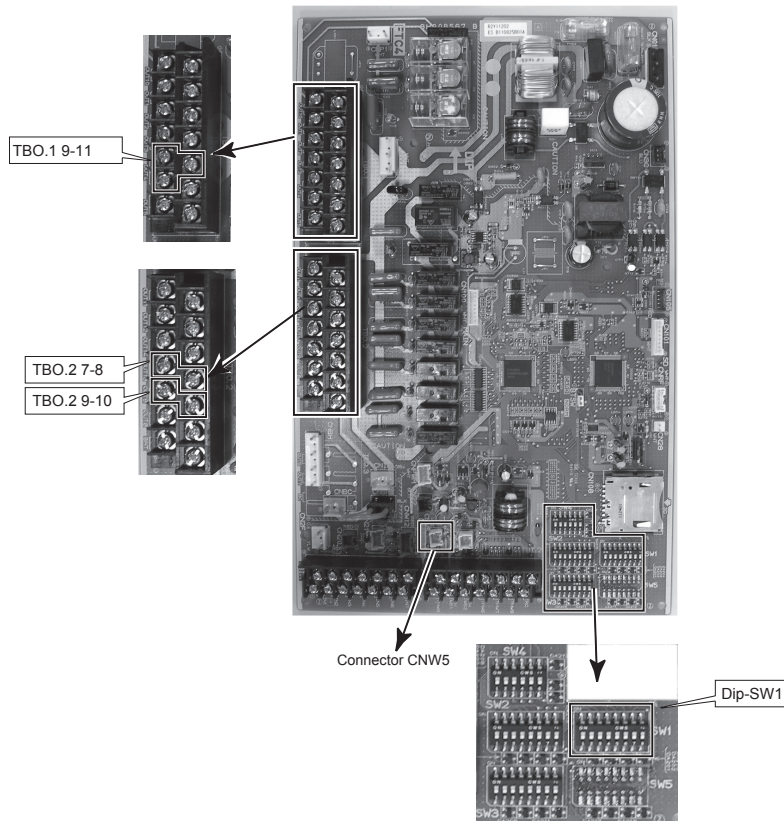
- For the 2-way valve, choose the one that slowly opens and shuts off to prevent water hammer sound.
- Choose the 2-way valve equipped with manual override, which is necessary for topping up or draining of water.

5. Turn the DIP SW1-3 on the FTC4 to ON.

6. When using an immersion heater (field supply), connect a contact relay cable for the immersion heater to TBO.2 9-10 (OUT9), and turn the Dip SW1-4 to ON. Do NOT directly connect the power cable to the FTC4.

Note:

- When an immersion heater is installed, select appropriate breaker capacity and a cable with appropriate diameter on the basis of heater output.
- When wiring an immersion heater in the field, always install an earth leakage breaker to prevent accidental electric shock.



- ⚠ WARNING: When connecting DHW tank**
- (1) Attach the optional thermistor THW5 (PAC-TH011TK-E).
 - (2) Always use earth leakage breaker when connecting immersion heater.
 - (3) When installing an immersion heater, be sure that the immersion heater has a built-in direct cut-off thermostat.
 - (4) Connect a pressure relief valve on the sanitary water side.
 - (5) It is essential that no check valve or isolating valve is fitted between the hydrobox and the pressure relief valve.

Recommended DHW system

Where system involves a DHW tank:

DHW tank	Immersion heater	Booster heater	BH function	System diagram	Thermistor
Present	Absent	Present	For space heating/ cooling and DHW		THW1: Flow water temp. THW2: Return water temp. THW5: Tank water temp. (optional part PAC-TH011TK-E)
Present	Present	Present	For space heating/ cooling and DHW		THW1: Flow water temp. THW2: Return water temp. THW5: Tank water temp. (optional part PAC-TH011TK-E)

*The use of two 2-way valves can perform same function as a 3-way valve.

3.5 Wiring for 2-zone temperature control

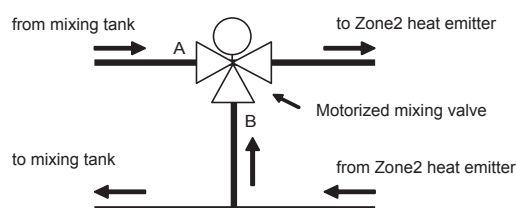
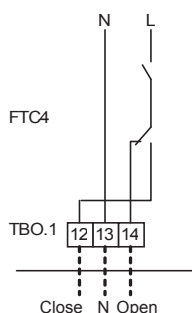
- Water circulation pump 2 (Zone1 water circulation pump) / Water circulation pump 3 (Zone2 water circulation pump)
Electrically wire water circulation pumps 2 and 3 to the appropriate output terminals. (Refer to "Outputs" in 3.1.3. or 3.2.3.)
- Flow switch 2 (Zone1 flow switch) / Flow switch 3 (Zone2 flow switch)
Connect flow switches 2 and 3 to the appropriate terminals. (Refer to "Signal inputs" in 3.1.3. or 3.2.3.)
Set dip switches 3-2 and 3-3 according to the functions of individual flow switches 2 and 3. (Refer to "Dip switch functions" in 3.1.2. or 3.2.2.)
- Thermistor
Connect the thermistor to monitor the Zone1 flow temp. to the THW6 (TBI. 2-7 and 2-8) terminals.
Connect the thermistor to monitor the Zone1 return temp. to the THW7 (TBI. 2-9 and 2-10) terminals.
Connect the thermistor to monitor the Zone2 flow temp. to the THW8 (TBI. 2-1 and 2-2) terminals.
Connect the thermistor to monitor the Zone2 return temp. to the THW9 (TBI. 2-11 and 2-12) terminals.

The maximum length of the thermistor wiring is 5 m. Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each hot water temperature through zones.

If the wiring is too long, bundle it with a strap to adjust the length.

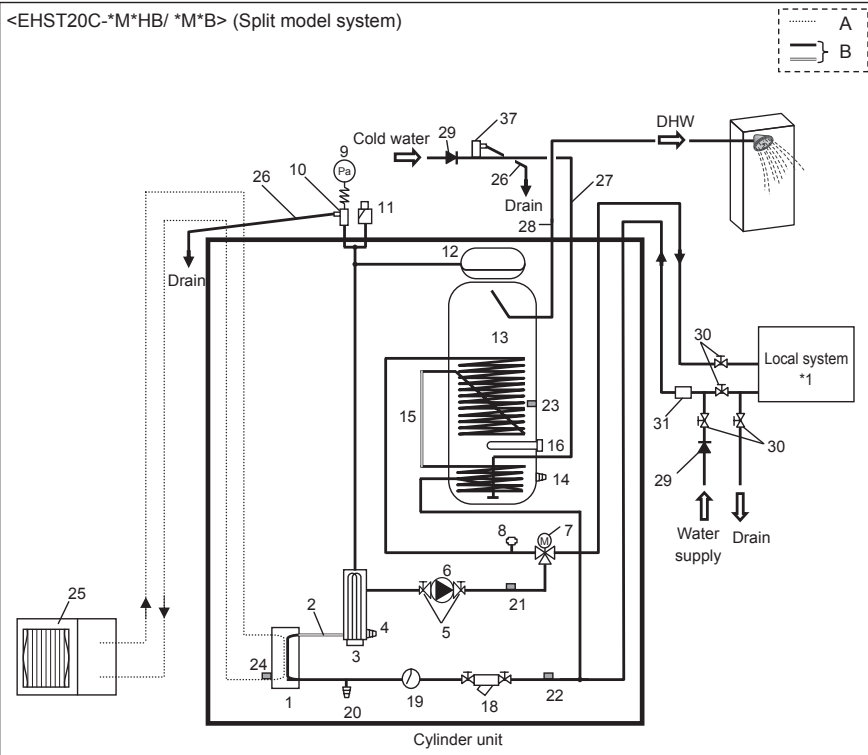
- Motorized mixing valve
Connect three wires coming from the motorized mixing valve to the appropriate terminals referring to "Outputs" in 3.1.3. or 3.2.3.

Note: Connect the signal line to open Port A (hot water inlet port) to TBO. 1-14 (Open), the signal line to open Port B (cold water inlet port) to TBO. 1-12 (Close), and the neutral terminal wire to TBO. 1-13 (N).



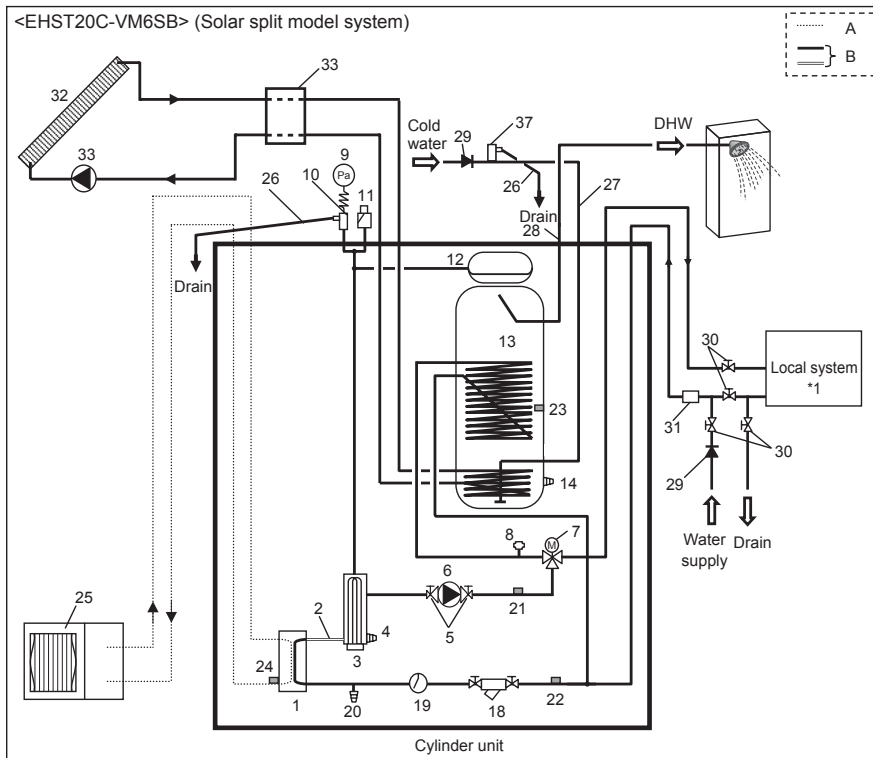
Cylinder unit

<EHST20C-*M*HB/ *M*B> (Split model system)



<Figure 4.1>

<EHST20C-VM6SB> (Solar split model system)



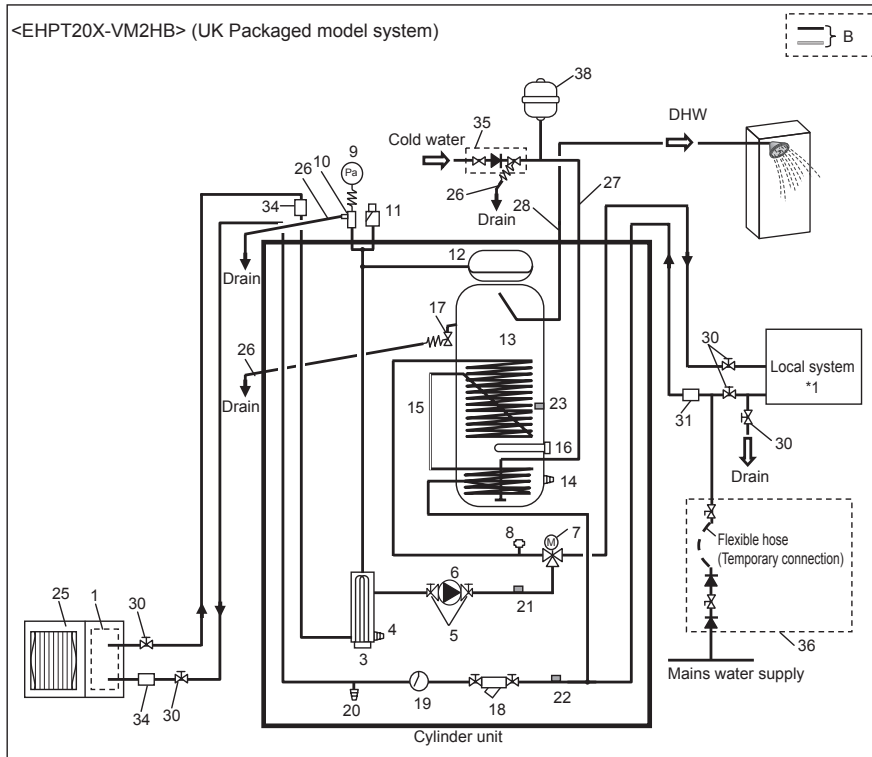
<Figure 4.2>

- A. Refrigerant pipe
 - B. Water pipe
 - 1. Plate heat exchanger
 - 2. Flexible hose
 - 3. Booster heater 1,2
 - 4. Drain cock (booster heater)
 - 5. Pump valve
 - 6. Water circulation pump 1
 - 7. 3-way valve
 - 8. Manual air vent
 - 9. Manometer
 - 10. Pressure relief valve (3 bar)
 - 11. Automatic air vent
 - 12. Expansion vessel (except EHST20C-*M*EB)
 - 13. DHW tank
 - 14. Drain cock (DHW tank)
 - 15. Flexible hose
 - 16. Immersion heater (only for EH*T20*-*M*HB)
 - 18. Strainer valve
 - 19. Flow switch
 - 20. Drain cock (primary circuit)
 - 21. THW1
 - 22. THW2
 - 23. THW5
 - 24. TH2
 - 25. Outdoor unit
 - 26. Drain pipe (field supply)
 - 27. Cold water inlet pipe
 - 28. DHW outlet connection
 - 29. Back flow prevention device (field supply)
 - 30. Isolating valve (field supply)
 - 31. Magnetic filter (field supply) (recommended)
 - 32. Solar panel (field supply)
 - 33. Solar hydraulic kit (kit to be compatible for use with FTC 4 (field supply)
 - 37. Pressure relief valve (10 bar) (accessory)
- *1 Refer to Page B-60.

Note

- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the pressure relief valve (item 37) and the cylinder unit (safety matter).
- Be sure to install a strainer, on the inlet pipework to the cylinder unit.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- A backflow prevention device must be installed on the cold water supply pipework (IEC 61770)
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent any corrosive reaction taking place which may damage the pipework.

UK Packaged model system <Example>



<Figure 4.3>

- B. Water pipe
- 1. Plate heat exchanger
- 3. Booster heater 1,2
- 4. Drain cock for booster heater)
- 5. Pump valve
- 6. Water circulation pump 1
- 7. 3-way valve
- 8. Manual air vent
- 9. Manometer
- 10. Pressure relief valve
- 11. Automatic air vent
- 12. Expansion vessel
- 13. DHW tank
- 14. Drain cock for DHW tank
- 15. Flexible hose
- 16. Immersion heater (only for EH*T20*-*M*HB)
- 17. T&P relief valve
- 18. Strainer valve
- 19. Flow switch
- 20. Drain cock for primary circuit
- 21. THW1
- 22. THW2
- 23. THW5
- 25. Outdoor unit
- 26. Drain pipe (field supply)
- 27. Cold water inlet pipe
- 28. DHW outlet connection
- 30. Isolating valve (field supply)
- 31. Magnetic filter (field supply) (recommended)
- 34. Strainer (field supply)
- 35. Inlet control group supplied with UK model ONLY*
- 36. Filling loop (Ball valves, check valves, and flexible hose) supplied with UK model ONLY*
- 38. Potable expansion vessel supplied with UK model ONLY*

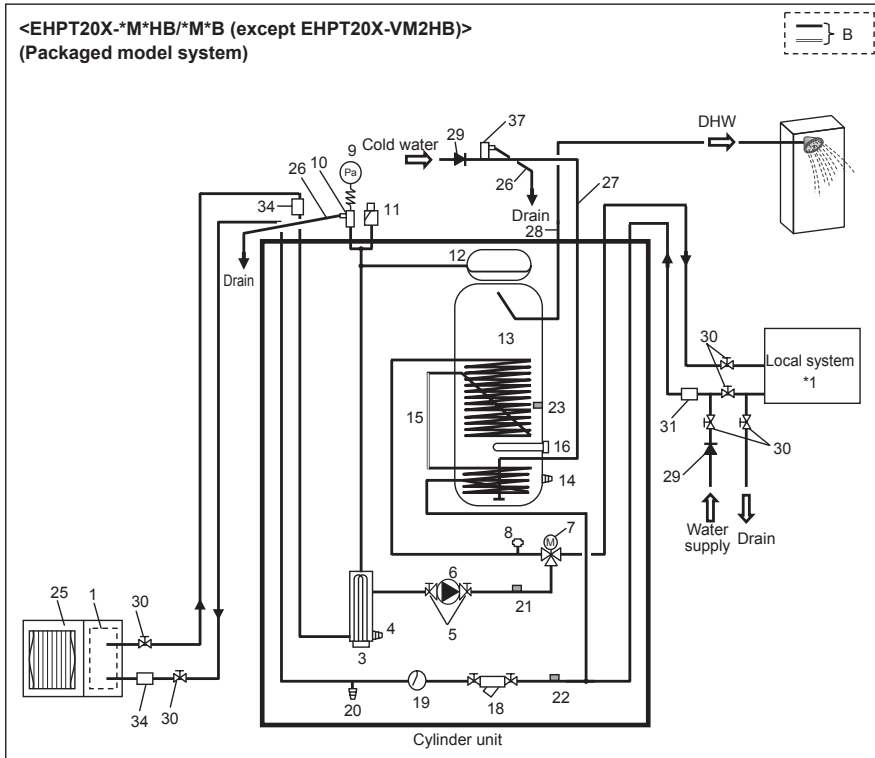
*Please refer to [PAC-WK01UK-E](#) Installation Manual for more information.

*1 Refer to Page B-60.

Model name	EHPT20X-VM2HB
Maximum supply pressure to the pressure reducing valve	16 bar
Operating pressure (Potable side)	3.5 bar
Expansion vessel charge setting pressure (Potable side)	3.5 bar
Expansion valve setting pressure (Potable side)	6.0 bar
Immersion heater specification (Potable side)	
* EN60335/Type 3000W single phase 230V 50Hz, length 460 mm	3000 W, 230 V
** Use only Mitsubishi Electric service parts as a direct replacement.	
DHW tank capacity	200 L
Mass of the unit when full	332 kg
Maximum primary working pressure	2.5 bar

Note

- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the expansion valve (item 35) and the cylinder unit (safety matter).
- Be sure to install a strainer, on the inlet pipework to the cylinder unit.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent any corrosive reaction taking place which may damage any pipework.
- Filling loop's flexible hose must be removed following the filling procedure. Item provided with unit as loose accessory.
- Install the inlet control group (item 35) above the level of the T&P relief valve (item 17). This will ensure DHW tank will not require drain-down to service/maintain the inlet control group.



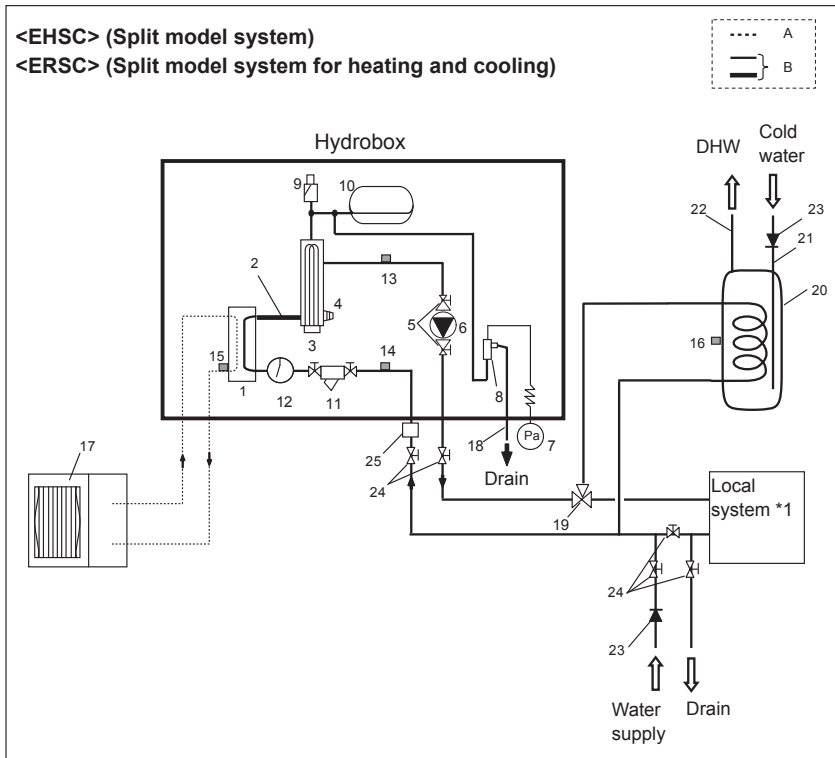
<Figure 4.4>

- B. Water pipe
1. Plate heat exchanger
 3. Booster heater 1,2
 4. Drain cock for booster heater
 5. Pump valve
 6. Water circulation pump 1
 7. 3-way valve
 8. Manual air vent
 9. Manometer
 10. Pressure relief valve (3 bar)
 11. Automatic air vent
 12. Expansion vessel
 13. DHW tank
 14. Drain cock for DHW tank
 15. Flexible hose
 16. Immersion heater (only for EH*T20*-*M*HB)
 18. Strainer valve
 19. Flow switch
 20. Drain cock for primary circuit
 21. THW1
 22. THW2
 23. THW5
 25. Outdoor unit
 26. Drain pipe (field supply)
 27. Cold water inlet pipe
 28. DHW outlet connection
 29. Back flow prevention device (field supply)
 30. Isolating valve (field supply)
 31. Magnetic filter (field supply) (recommended)
 34. Strainer (field supply)
 37. Pressure relief valve (10 bar) (accessory)
- *1 Refer to Page B-60.

Note

- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the pressure relief valve (item 37) and the cylinder unit (safety matter).
- Be sure to install a strainer, on the inlet pipework to the cylinder unit.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- A backflow prevention device must be installed on the cold water supply pipework (IEC 61770)
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent any corrosive reaction taking place which may damage the pipework.)

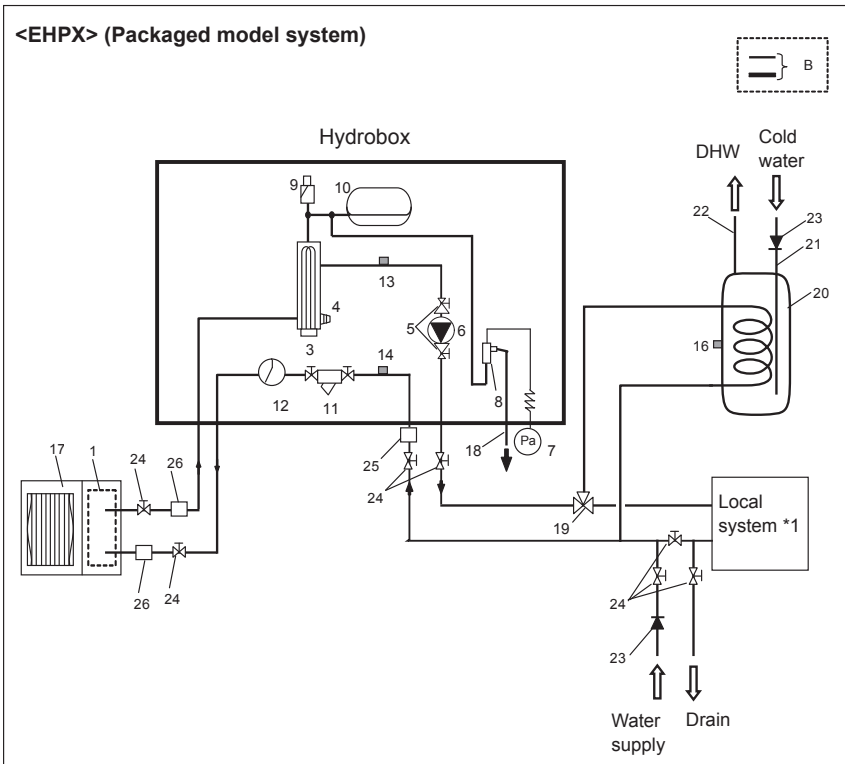
Hydrobox



<Figure 4.5>

- A. Refrigerant pipe
- B. Water pipe
- 1. Plate heat exchanger
- 2. Flexible hose
- 3. Booster heater 1,2
- 4. Drain cock (booster heater)
- 5. Pump valve
- 6. Water circulation pump 1
- 7. Manometer
- 8. Pressure relief valve
- 9. Automatic air vent
- 10. Expansion vessel (except EHSC-*M*EB)
- 11. Strainer valve
- 12. Flow switch
- 13. THW1
- 14. THW2
- 15. TH2
- 16. THW5 (optional part PAC-TH011TK-E)
- 17. Outdoor unit
- 18. Drain pipe (field supply)
- 19. 3-way valve (field supply)
- 20. DHW indirect unvented tank (field supply)
- 21. Cold water inlet pipe (field supply)
- 22. DHW outlet connection (field supply)
- 23. Back flow prevention device (field supply)
- 24. Isolating valve (field supply)
- 25. Magnetic filter is recommended (field supply).
- 26. Strainer (field supply)

*1 Refer to Page B-60.



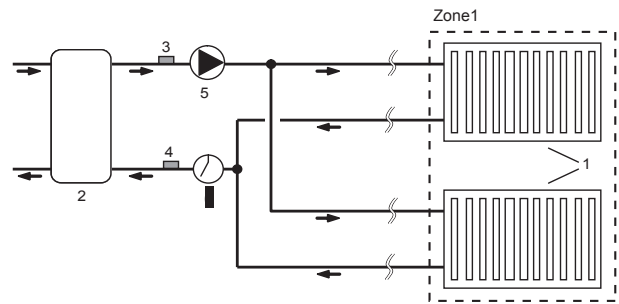
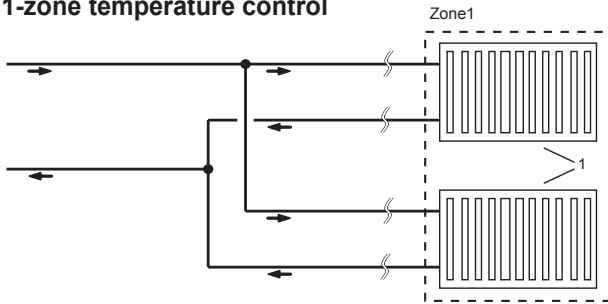
<Figure 4.6>

Note

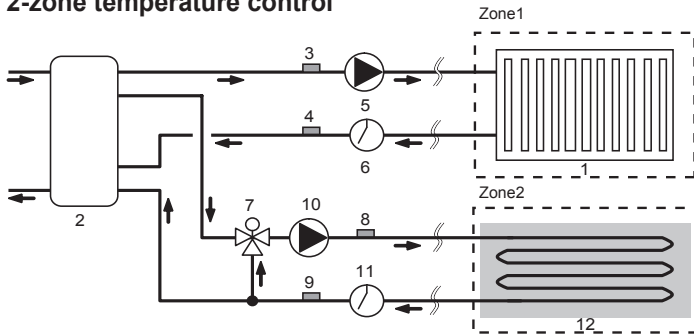
- Be sure to follow your local regulations to perform system configuration of the DHW connections.
- DHW connections are not included in the hydrobox package. All required parts are to be sourced locally.
- To enable draining of the hydrobox an isolating valve should be positioned on both the inlet and outlet pipework.
- Be sure to install a strainer, on the inlet pipe work to the hydrobox.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- A backflow prevention device must be installed on water supply pipework (IEC 61770).
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent a corrosive reaction taking place which will damage the pipework.

Local system

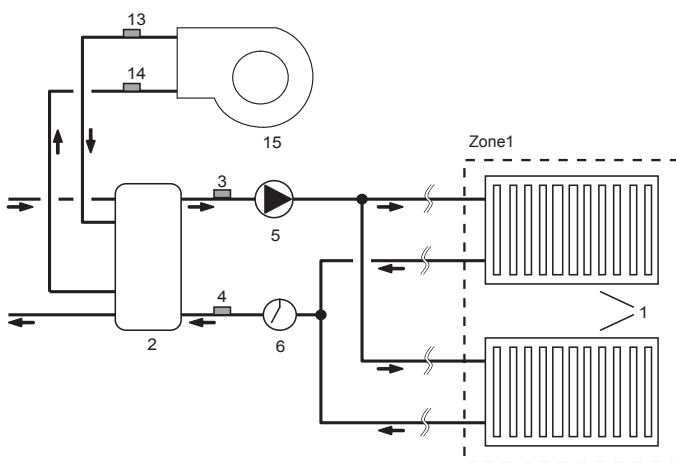
1-zone temperature control



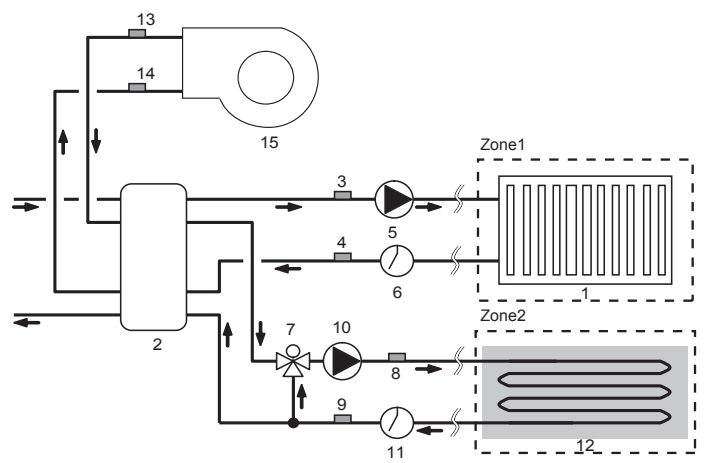
2-zone temperature control



1-zone temperature control with boiler



2-zone temperature control with boiler



- 1. Zone1 heat emitters (e.g. radiator, fan coil unit) (field supply)
- 2. Mixing tank (field supply)
- 3. Zone1 flow water temp. thermistor (THW6)
- 4. Zone1 return water temp. thermistor (THW7) } Optional part : PAC-TH011-E
- 5. Zone1 water circulation pump (field supply)
- 6. Zone1 flow switch (field supply) *
- 7. Motorized mixing valve (field supply)
- 8. Zone2 flow water temp. thermistor (THW8)
- 9. Zone2 return water temp. thermistor (THW9) } Optional part : PAC-TH011-E
- 10. Zone2 water circulation pump (field supply)
- 11. Zone2 flow switch (field supply) *
- 12. Zone2 heat emitters (e.g. underfloor heating) (field supply)
- 13. Boiler flow water temp. thermistor (THWB1)
- 14. Boiler return water temp. thermistor (THWB2) } Optional part : PAC-TH011HT-E
- 15. Boiler

* Flow switch specifications: DC13 V / 0.1 mA / Both normally-open and normally-closed types can be used. (Set Dip switch 3 to select the logics. Refer to " 3.1.2 Dip switch functions (cylinder)" or " 3.2.2 Dip switch functions (hydrobox)")

Note

- Two different flow temperatures are NOT available in Cooling mode. The flow temperature for Zone2 during Cooling mode is controlled to be the same temperature as that for Zone1.
- The water circuit for Zone2 can be closed during Cooling mode using dip switch 3-4.
- Cooling mode cannot run under 2-zone temperature control but can run both in Zone1 and Zone2 under 1-zone temperature control.

4.1 Water Quality and System Preparation

■ General

- Water quality should be to European Directive 98/83 EC standards.
 - pH value of 6.5-8.0 (Recommended: pH6.5 - 7.5)
 - Calcium ≤ 100 mg/l
 - Chlorine ≤ 100 mg/l
 - Iron/Manganese ≤ 0.5 mg/l
- In known hard water areas, to prevent/minimise scaling, it is beneficial to restrict the routine stored water temperature (DHW max. temp.) to 55°C.

■ Anti-Freeze

Anti-freeze solutions MUST use propylene glycol with a toxicity rating of Class 1 as listed in Clinical Toxicology of Commercial Products, 5th Edition.

Note: Ethylene glycol is toxic and must NOT be used in the primary water circuit in case of any cross-contamination of the potable circuit.

■ New Installation (primary water circuit)

- Before connecting outdoor unit, thoroughly cleanse pipework of building debris, solder etc using a suitable chemical cleansing agent.
- Flush the system to remove chemical cleanser.
- For all packaged model systems add a combined inhibitor and anti-freeze solution to prevent damage to the pipework and system components.
- For split model systems the responsible installer should decide if anti-freeze solution is necessary for each site's conditions. Corrosion inhibitor however should always be used.

■ Existing Installation (primary water circuit)

- Before connecting outdoor unit the existing heating circuit MUST be chemically cleansed to remove existing debris from the heating circuit.
- Flush the system to remove chemical cleanser.
- For all packaged model systems add a combined inhibitor and anti-freeze solution to prevent damage to the pipework and system components.
- For split model systems the responsible installer should decide if anti-freeze solution is necessary for each site's conditions. Corrosion inhibitor however should always be used.

When using chemical cleansers and inhibitors always follow manufacturer's instructions and ensure the product is appropriate for the materials used in the water circuit

4.2 Water pipe work

■ Hot Water Pipework

The cylinder unit is **UNVENTED**. When installing unvented hot water systems building regulations part G3 (England and Wales), P3 (Scotland) and P5 (Northern Ireland) should be adhered to. If outside of the UK please adhere to your own country's regulations for unvented hot water systems.

Connect the flow for the DHW to pipe (*1).

The function of the following safety components of the cylinder unit and hydrobox should be checked on installation for any abnormalities;

- Pressure relief valve
- Temperature and pressure relief valve (EHPT20X-VM2HB ONLY)
- Expansion vessel pre-charge (gas charge pressure)

The instruction on the following pages regarding safe discharge of hot water from Safety devices should be followed carefully.

- The pipework will become very hot, so should be insulated to prevent burns.
- When connecting pipework, ensure that no foreign objects such as debris or the like do not enter the pipe.

■ Cold Water Pipework

Cold water to the suitable standard (see section 4.1) should be introduced to the system by connecting pipes (*1) using appropriate fittings.

■ Hydraulic filter work (ONLY EHPT series)

Install a hydraulic filter or strainer (field supply) at the water intake.

*1: For details about positions for connecting pipes, refer to the appropriate Installation manuals.

■ Minimum amount of water required in the space heating circuit

Outdoor heat pump unit		Minimum water quantity [L]
Packaged model	PUHZ-W50	40
	PUHZ-W85	60
	PUHZ-HW112	80
	PUHZ-HW140	100
Split model	PUHZ-RP35	32
	PUHZ-RP50	40
	PUHZ-RP60	50
	PUHZ-(H)RP71	60
	PUHZ-(H)RP100	80
	PUHZ-(H)RP125	100
	PUHZ-RP140	120
	PUHZ-SW40	32
	PUHZ-SW50	40
	PUHZ-SW75	60
	PUHZ-SW100	80
	PUHZ-SW120	120
	PUHZ-FRP71	60
	PUHZ-SHW80	60
	PUHZ-SHW112	80
	PUHZ-SHW140	100

■ Pipework Connections

Connections to the cylinder unit and hydrobox should be made using the 22 mm or 28 mm compression as appropriate. Do not over-tighten compression fittings as this will lead to deformation of the olive ring and potential leaks.

Note: To weld the pipes in the field, cool the pipes on the cylinder unit using wet towel etc.

■ Insulation of Pipework

- All exposed water pipework should be insulated to prevent unnecessary heat loss and condensation. To prevent condensate entering the cylinder unit, the pipework and connections at the top of the cylinder unit and hydrobox should be carefully insulated.
- Cold and hot water pipework should not be run close together where possible, to avoid unwanted heat transfer.
- Pipework between outdoor heat pump unit and cylinder unit and hydrobox should be insulated with suitable pipe insulation material with a thermal conductivity of ≤ 0.04 W/m.K.

■ Sizing Expansion Vessels

Expansion vessel volume must fit the local system water volume. To size an expansion vessel for the heating circuit the following formula and graph can be used. When the necessary expansion vessel volume exceeds the volume of an built-in expansion vessel, install an additional expansion vessel so that the sum of the volumes of the expansion vessels exceeds the necessary expansion vessel volume.

* For installation of EHST20C-*M*EB and EHSC-*M*EB models, provide and install an expansion vessel in the field as the model does not come fitted with an expansion vessel.

$$V = \frac{\epsilon \times G}{1 - \frac{P_1 + 0.098}{P_2 + 0.098}}$$

Where;

- V : Necessary expansion vessel volume [L]
- ϵ : Water expansion coefficient
- G : Total volume of water in the system [L]
- P₁ : Expansion vessel setting pressure [MPa]
- P₂ : Max pressure during operation [MPa]

Graph to the right is for the following values

- ϵ : at 70 °C = 0.0229
- P₁ : 0.1 MPa
- P₂ : 0.3 MPa

*A 30% safety margin has been added.

■ Filling the System (Primary Circuit)

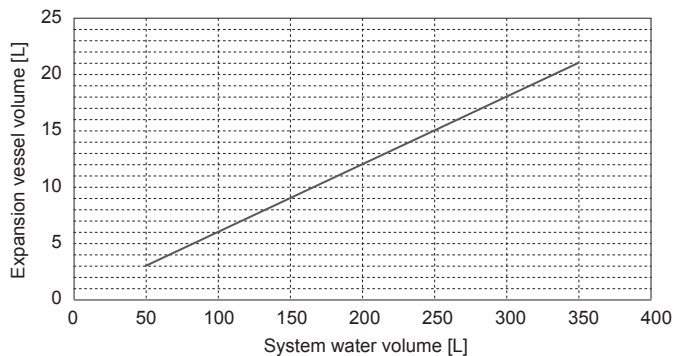
Filling

- Check all connections including factory fitted ones are tight.
- Insulate pipework between cylinder unit or hydrobox, and outdoor unit.
- Thoroughly clean and flush, system of all debris (see section 4.2 for instruction.)
- Fill cylinder unit with potable water. Fill primary heating circuit with water and suitable anti-freeze and inhibitor as necessary. **Always use a filling loop with double check valve when filling the primary circuit to avoid back flow contamination of water supply.**

- Anti-freeze should always be used for packaged model systems (see section 4.1 for instruction). It is the responsibility of the installer to decide if anti-freeze solution should be used in split model systems depending on each site's conditions. Corrosion inhibitor should be used in both split model and packaged model systems.
- When connecting metal pipes of different materials insulate the joints to prevent a corrosive reaction taking place which will damage the pipework.

- Check for leakages. If leakage is found, retighten the screws onto the connections.
- Pressurise system to 1 bar.
- Release all trapped air using air vents during and following heating period.
- Top up with water as necessary. (If pressure is below 1 bar)

Expansion vessel sizing



<Figure 4.2.1>

■ Water circulation pump characteristics

Pump speed can be selected on the pump (see Section 4.3). Adjust the pump speed setting so that the flow rate in the primary circuit is appropriate for the outdoor unit installed see Table 4.2.1. It may be necessary to add an additional pump to the system depending on the length and lift of the primary circuit.

<Second pump >

If a second pump is required for the installation please read the following carefully.

If a second pump is used in the system it can be positioned in 2 ways.

The position of the pump influences which terminal of the FTC4 the signal cable should be wired to. If the additional pump(s) have current greater than 1A please use appropriate relay. Pump signal cable can either be wired to TBO.1 1-2 or CNP1 but not both.

Option 1 (Space heating only)

If the second pump is being used for the heating circuit only then the signal cable should be wired to TBO.1 terminals 3 and 4 (OUT2). In this position the pump can be run at a different speed to the cylinder unit's in-built pump.

Option 2 (Primary circuit DHW and space heating)

If the second pump is being used in the primary circuit between the cylinder unit and the outdoor unit (Package system ONLY) then the signal cable should be wired to TBO.1 terminals 1 and 2 (OUT1). In this position the pump speed **MUST** match the speed of the cylinder unit's in-built pump.

	Outdoor heat pump unit	Water flow rate range [L/min]
Packaged	PUHZ-W50	7.1 - 14.3
	PUHZ-W85	10.0 - 25.8
	PUHZ-HW112	14.4 - 27.7
	PUHZ-HW140	17.9 - 27.7
Split	PUHZ-RP35	7.1 - 11.8
	PUHZ-RP50	7.1 - 17.2
	PUHZ-RP60	8.6 - 20.1
	PUHZ-(H)RP71	10.2 - 22.9
	PUHZ-(H)RP100	14.4 - 27.7
	PUHZ-(H)RP125	17.9 - 27.7
	PUHZ-RP140	20.1 - 27.7
	PUHZ-SW40	7.1 - 11.8
	PUHZ-SW50	7.1 - 17.2
	PUHZ-SW75	10.2 - 22.9
	PUHZ-SW100	14.4 - 27.7
	PUHZ-SW120	20.1 - 27.7
	PUHZ-FRP71	11.5 - 22.9
	PUHZ-SHW80	10.2 - 22.9
	PUHZ-SHW112	14.4 - 27.7
	PUHZ-SHW140	17.9 - 27.7

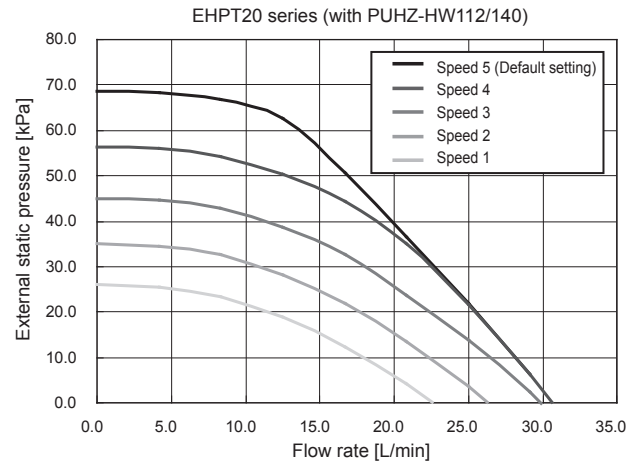
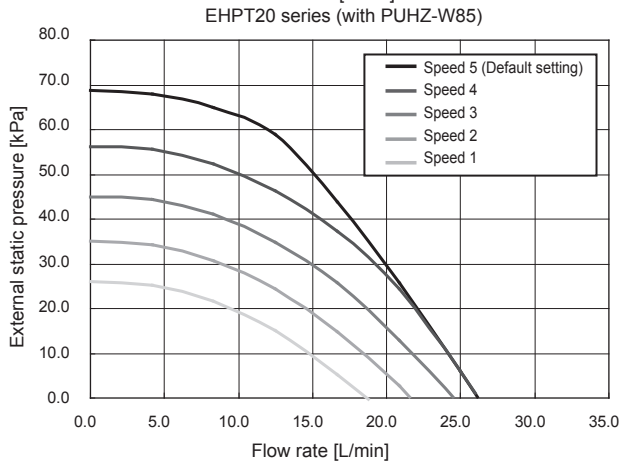
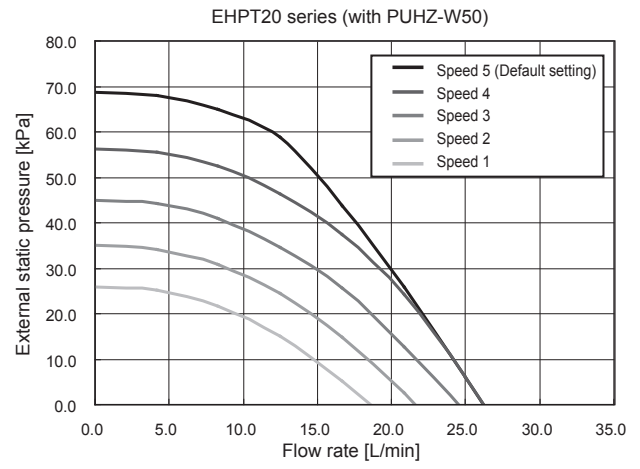
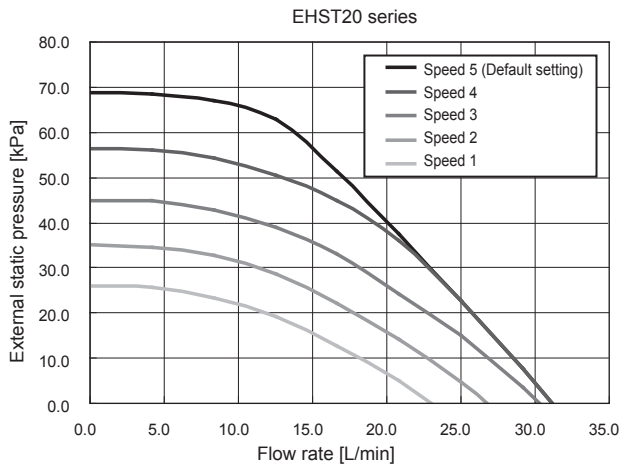
<Table 4.2.1>

* If the water flow rate is less than 7.1 L/min, the flow switch will be activated. If the water flow rate exceeds 27.7 L/min, the flow speed will be greater than 1.5 m/s, which could corrode the pipes.

4.3 Performance curve external pressure

■ Cylinder unit

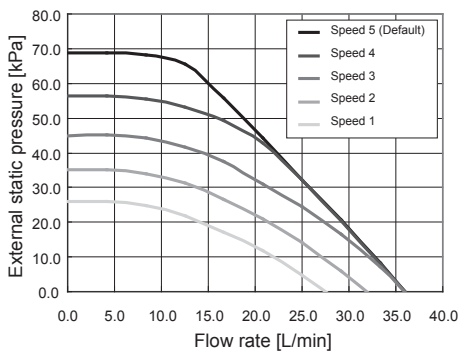
EHST20C-VM6HB, EHST20C-YM9HB, EHST20C-TM9HB, EHST20C-VM2B, EHST20C-VM6B, EHST20C-YM9B, EHST20C-VM6EB, EHST20C-YM9EB, EHST20C-VM6SB, EHPT20X-VM2HB, EHPT20X-VM6HB, EHPT20X-YM9HB, EHPT20X-TM9HB, EHPT20X-VM6B, EHPT20X-YM9B



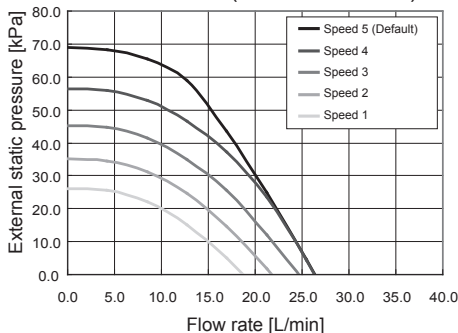
*For installation of EHPT20 series, set its pump speed with a pressure drop between the cylinder unit and the outdoor unit factored into the external static pressure.

■ Hydrobox

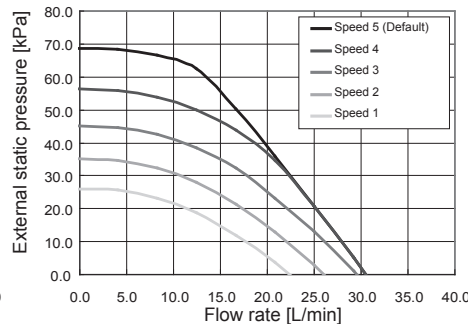
EHSC-VM2B, EHSC-VM6B, EHSC-YM9B, EHSC-TM9B, EHSC-VM6EB, EHSC-YM9EB, ERSC-VM2B



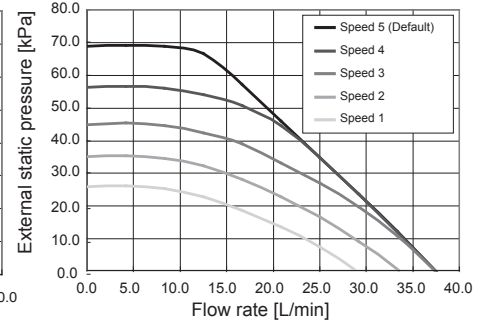
EHPX-VM2B, EHPX-VM6B, EHPX-YM9B
EHPX series * (with PUHZ-W50)



EHPX series * (with PUHZ-W85)



EHPX series * (with PUHZ-HW112/140)



*For installation of EHPX series, set its pump speed with a pressure drop between the cylinder unit and the outdoor unit factored into the external static pressure.

■ Safety Device Connections <Cylinder unit>

The expansion relief valve on the secondary hot water side, and the temperature and pressure (T&P) relief valve (*1), situated part way down the DHW tank on the right hand side, both need appropriate discharge pipework. In accordance with Building Regulations a tundish must be fitted into the pipework within 500 mm of the safety device (also see Figure 4.4.1). Due to the distance between the two safety devices it may be necessary to fit each safety device with its own tundish before you run the pipework together to a safe discharge (see Figure 4.3.6). The right side panel has a window (*2) so that connection can be made to the factory fitted temperature and pressure relief valve. If you wish to make the connection in a different position you will have to cut a hole in the side panel yourself. However it remains necessary that the drainage parameters outlined in the appropriate Building Regulations are complied with.

- *1 Temperature and pressure relief valve fitted on EHPT20X-VM2HB ONLY.
- *2 Unscrew the plate on the right-side panel, connect the T&P relief valve to the discharge pipework, and refit the plate. Always replace the plate so that no gaps exist between the plate and side panel and the plate and drain pipe to avoid heat loss.

Note: Alternatively the discharges from the expansion relief valve and T&P relief valve may commonly discharge to a singular tundish, so long as this tundish is located within 500 mm of the T&P relief valve. When connecting discharge pipes to the safety devices, beware not to strain the inlet connections.

Diagram part No.	Description	Connection size	Connection type
2	Pressure relief valve	G 1/2	Female
6	Temperature and pressure relief valve (Factory fitted)	15 mm	Compression
★	Expansion relief valve (part of inlet control group)	15 mm	Compression

<Table 4.3.1>

Always refer to local regulations when installing discharge pipework. Install discharge pipework in a frost-free environment. It is necessary to provide appropriate drainage from the pressure relief valve situated on top of the cylinder unit to prevent damage to the unit and the surrounding area from any steam or hot water released. Relief valves MUST NOT be used for any other purpose.

- For UK use WK01UK-E kit, for other countries please see below;
- Any discharge pipework should be capable of withstanding discharge of hot water. Discharge pipework should be installed in a continuously downward direction. Discharge pipework must be left open to the environment.

<Pressure relief valve included with the cylinder unit>
 * Only EHPT20X-VM2HB does not include following pressure relief valve.

Item	Quantity
Pressure relief valve (1.0 MPa (10 bar))	1

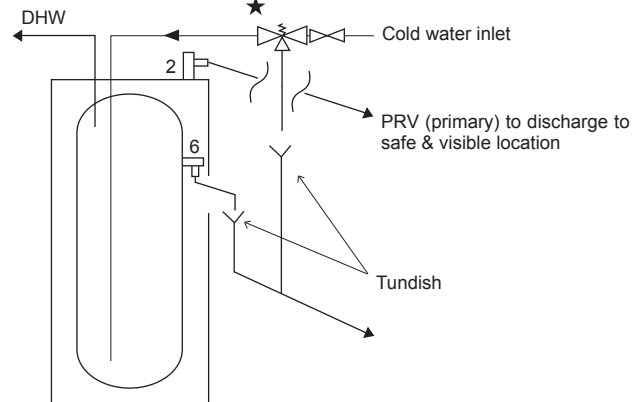
Install a pressure relief valve (1.0MPa (10 bar)) on the local piping connected to the cold water inlet. A pressure relief valve should be installed between the pressure reducing valve and the cylinder unit (see Figures 3.6, 3.7 and 3.9).

Note: It is essential no check valve or isolation valve is fitted between the cylinder unit connection and the 10 bar pressure relief valve accessory (safety matter).

The connection size is G1/2" (the drain connection size G3/4").
 The cold water inlet can be identified on the diagram label on top of the cylinder unit.

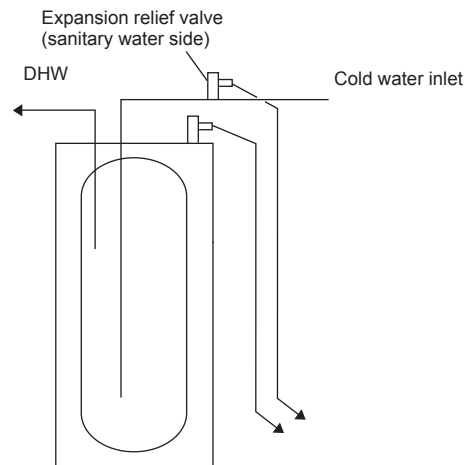
<Accessory location>
 The pressure relief valve accessory pack can be found inside the cylinder unit, taped to the base.

EHPT20X-VM2HB (for UK)



Other models

The expansion vessel on the sanitary water side shall be installed as necessary in accordance with your local regulations.



<Figure 4.3.1>

4.4 Safety Device Discharge Arrangements for UK (G3)

The following instructions are a requirement of UK Building Regulations and must be adhered to. For other countries please refer to local legislation. If you are in any doubt please seek advice from local building planning office.

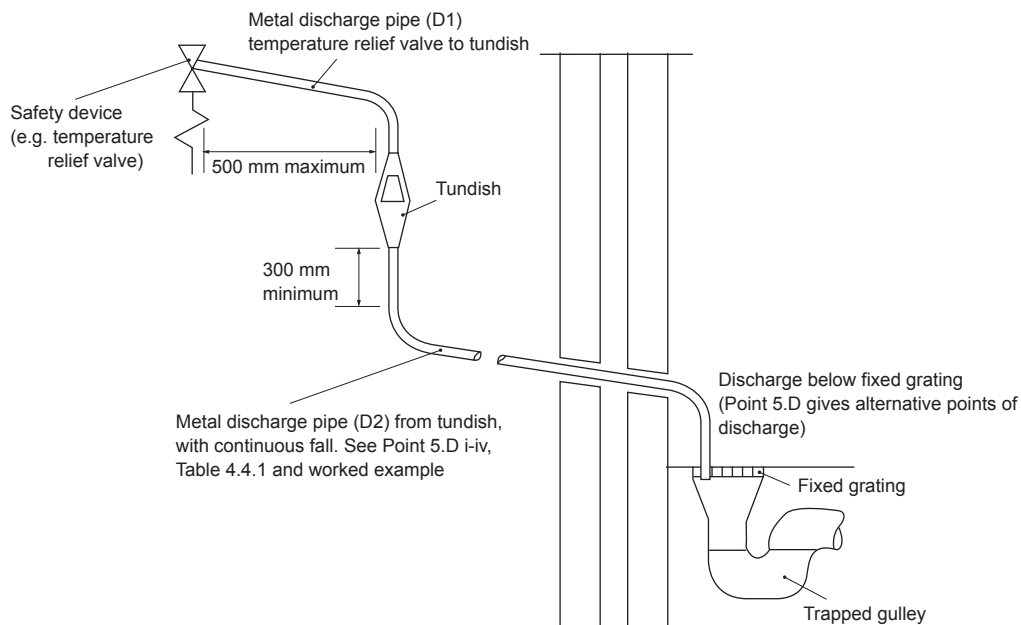
1. Position the inlet control group so that discharge from both safety valves can be joined together via a 15 mm end feed Tee.
2. Connect the tundish and route the discharge pipe as shown in Figure 4.4.1.
3. The tundish should be fitted vertically and as close to the safety device as possible and within 500 mm of the device.
4. The tundish should be visible to occupants and positioned away from electrical devices.
5. The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal construction and:
 - A) Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9 m long i.e. discharge pipes between 9 m and 18 m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27 m at least 3 sizes larger, and so on. Bends must be taken into account in calculating the flow resistance. Refer to Figure 4.4.1, Table 4.4.1 and the worked example. An alternative approach for sizing discharge pipes would be to follow BS 6700: 1987 specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their cartilages.
 - B) Have a vertical section of pipe at least 300 mm long, below the tundish before any elbows or bends in the pipework.
 - C) Be installed with a continuous fall.
 - D) Have discharges visible at both the tundish and the final point of discharge but where this is not possible or is practically difficult there should be clear visibility at one or other of these locations. Examples of acceptable discharge arrangements are:

- i. Ideally below a fixed grating and above the water seal in a trapped gully.
- ii. Downward discharges at low level; i.e. up to 100 mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children may play or otherwise come into contact with discharges a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.
- iii. Discharges at high level; e.g. into a metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3 m from any plastics guttering system that would collect such discharges (tundish visible).
- iv. Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation discharging can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected. If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

Note: The discharge will consist of scalding water and steam. Asphalt, roofing felt and nonmetallic rainwater goods may be damaged by such discharges.

Worked example: The example below is for a G½ temperature relief valve with a discharge pipe (D2) having 4 No. elbows and length of 7 m from the tundish to the point of discharge.

From Table 4.4.1: Maximum resistance allowed for a straight length of 22 mm copper discharge pipe (D2) from a G½ temperature relief valve is: 9.0 m subtract the resistance for 4 No. 22 mm elbows at 0.8 m each = 3.2 m. Therefore the maximum permitted length equates to: 5.8 m. 5.8 m is less than the actual length of 7 m, therefore calculate the next largest size. Maximum resistance allowed for a straight length of 28 mm pipe (D2) from a G½ temperature relief valve equates to: 18 m Subtract the resistance for 4 No. 28 mm elbows at 1.0 m each = 4 m. Therefore the maximum permitted length equates to: 14 m. As the actual length is 7 m, a 28 mm (D2) copper pipe will be satisfactory.



<Figure 4.4.1>

Valve outlet size	Minimum size of discharge pipe D1	Minimum size of discharge pipe D2 from tundish	Maximum resistance allowed, expressed as a length of straight pipe (no elbows or bends)	Resistance created by each elbow or bend
G 1/2	15 mm	22 mm	Up to 9 m	0.8 m
		28 mm	Up to 18 m	1.0 m
		35 mm	Up to 27 m	1.4 m
G 3/4	22 mm	28 mm	Up to 9 m	1.0 m
		35 mm	Up to 18 m	1.4 m
		42 mm	Up to 27 m	1.7 m
G1	28 mm	35 mm	Up to 9 m	1.4 m
		42 mm	Up to 18 m	1.7 m
		54 mm	Up to 27 m	2.3 m

<Table 4.4.1>

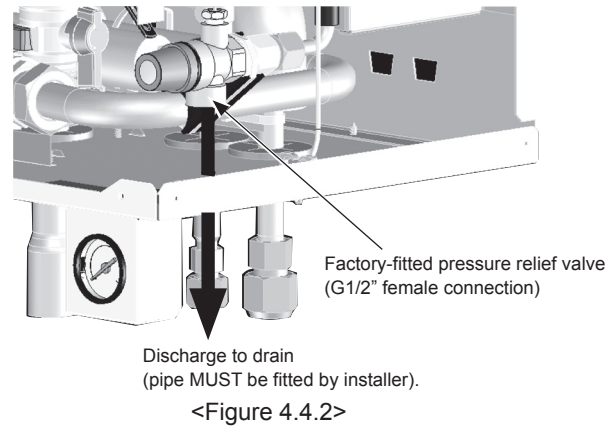
■ Safety Device Connections

The hydrobox contains a pressure relief valve. (see <Figure 4.4.2>) The connection size is G1/2" female. The installer MUST connect appropriate discharge pipework from this valve in accordance with local and national regulations.

Failure to do so will result in discharge from the pressure relief valve directly into the hydrobox and cause serious damage to the product.

All pipework used should be capable of withstanding discharge of hot water. Relief valves should NOT be used for any other purpose, and their discharges should terminate in a safe and appropriate manner in accordance with local regulation requirements.

Note: Beware that the manometer and the pressure relief valve are NOT strained on its capillary side and on its inlet side respectively. If a pressure relief valve is added, it is essential that no check valve or isolation valve is fitted between the hydrobox connection and the added pressure relief valve (safety matter).



■ Piping diagram for 2-zone temperature control

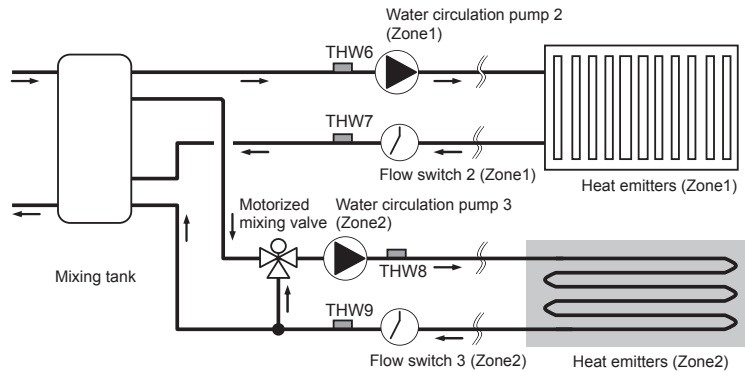
The following component parts are required for piping for 2-zone control operation. Arrange the following component parts.

- Mixing tank (field supply)
- Motorized mixing valve (field supply)
- Water circulation pump (× 2) (field supply)
- Flow switch (× 2) (field supply)
- Thermistor (× 4) *2 sets of (PAC-TH011-E) thersmistors are required.

Wire the component parts to the water circuit referring to <Figure 4.4.3>.

For more details on wiring, refer to "3.5 Wiring for 2-zone temperature controls".

Note: Do not install the thermistors on the mixing tank. This could affect correct monitoring of flow and return temperatures through each zone. Install the Zone2 flow temp. thermistor (THW8) near the mixing valve.



Thermistor (THW6): Zone1 flow temp.
 Thermistor (THW7): Zone1 return temp.
 Thermistor (THW8): Zone2 flow temp.
 Thermistor (THW9): Zone2 return temp.

<Figure 4.4.3>

5.1 Combination performance

■ Combination performance (Split type)

			Cylinder unit								Hydrobox						
			EHST20C-VM6HB	EHST20C-YM9HB	EHST20C-TM9HB	EHST20C-VM2B	EHST20C-VM6B	EHST20C-YM9B	EHST20C-VM6EB	EHST20C-YM9EB	EHST20C-VM6SB	EHSC-VM2B	EHSC-VM6B	EHSC-YM9B	EHSC-TM9B	EHSC-VM6EB	EHSC-YM9EB
Outdoor unit			PUHZ-SW40VHA(-BS)														
Heating A7/W35	Capacity	kW												4.10			
	COP	-												4.80			
	Power input(*)	kW												0.85			
Heating A7/W45	Capacity	kW												4.10			
	COP	-												3.63			
	Power input(*)	kW												1.13			
Heating A2/W35	Capacity	kW												4.00			
	COP	-												3.24			
	Power input(*)	kW												1.24			
Outdoor unit			PUHZ-SW50VHA(-BS)														
Heating A7/W35	Capacity	kW												6.00			
	COP	-												4.42			
	Power input(*)	kW												1.36			
Heating A7/W45	Capacity	kW												6.00			
	COP	-												3.32			
	Power input(*)	kW												1.81			
Heating A2/W35	Capacity	kW												5.00			
	COP	-												2.97			
	Power input(*)	kW												1.68			
Outdoor unit			PUHZ-SW75VHA(-BS)														
Heating A7/W35	Capacity	kW												8.00			
	COP	-												4.40			
	Power input(*)	kW												1.81			
Heating A7/W45	Capacity	kW												8.00			
	COP	-												3.40			
	Power input(*)	kW												2.35			
Heating A2/W35	Capacity	kW												7.50			
	COP	-												3.40			
	Power input(*)	kW												2.21			
Outdoor unit			PUHZ-SW100VHA/YHA(-BS)														
Heating A7/W35	Capacity	kW												11.20			
	COP	-												4.45			
	Power input(*)	kW												2.52			
Heating A7/W45	Capacity	kW												11.20			
	COP	-												3.42			
	Power input(*)	kW												3.28			
Heating A2/W35	Capacity	kW												10.00			
	COP	-												3.32			
	Power input(*)	kW												3.01			
Outdoor unit			PUHZ-SW120VHA/YHA(-BS)														
Heating A7/W35	Capacity	kW												16.00			
	COP	-												4.10			
	Power input(*)	kW												3.90			
Heating A7/W45	Capacity	kW												16.00			
	COP	-												3.23			
	Power input(*)	kW												4.95			
Heating A2/W35	Capacity	kW												12.00			
	COP	-												3.24			
	Power input(*)	kW												3.70			
Outdoor unit			PUHZ-FRP71VHA														
Heating A7/W35	Capacity	kW												8.00			
	COP	-												4.08			
	Power input(*)	kW												1.96			
Heating A7/W45	Capacity	kW												8.00			
	COP	-												3.20			
	Power input(*)	kW												2.50			
Heating A2/W35	Capacity	kW												7.50			
	COP	-												2.83			
	Power input(*)	kW												2.65			

* The pump input value is not included.
 Heating A7/W35: Heating Outside air DB 7°C/WB 6°C, Water outlet temperature 35°C (ΔT=5°C)
 A7/W45: Heating Outside air DB 7°C/WB 6°C, Water outlet temperature 45°C (ΔT=5°C)
 A2/W35: Heating Outside air DB 2°C/WB 1°C, Water outlet temperature 35°C (ΔT=5°C)

Cylinder / Hydrobox

■ Combination performance (Split type)

			Cylinder unit							Hydrobox					
			EHST20C-VM6HB	EHST20C-YM9HB	EHST20C-TM9HB	EHST20C-VM2B	EHST20C-VM6B	EHST20C-YM9B	EHST20C-VM6EB	EHST20C-YM9EB	EHST20C-VM6SB	EHSC-VM2B	EHSC-VM6B	EHSC-YM9B	EHSC-TM9B
Outdoor unit			PUHZ-SHW80VHA												
Heating A7/W35	Capacity	kW	8.00												
	COP	-	4.65												
	Power input(*)	kW	1.72												
Heating A7/W45	Capacity	kW	8.00												
	COP	-	3.42												
	Power input(*)	kW	2.34												
Heating A2/W35	Capacity	kW	8.00												
	COP	-	3.55												
	Power input(*)	kW	2.25												
Outdoor unit			PUHZ-SHW112VHA/YHA												
Heating A7/W35	Capacity	kW	11.20												
	COP	-	4.46												
	Power input(*)	kW	2.51												
Heating A7/W45	Capacity	kW	11.20												
	COP	-	3.51												
	Power input(*)	kW	3.20												
Heating A2/W35	Capacity	kW	11.20												
	COP	-	3.34												
	Power input(*)	kW	3.35												
Outdoor unit			PUHZ-SHW140YHA												
Heating A7/W35	Capacity	kW	14.00												
	COP	-	4.22												
	Power input(*)	kW	3.32												
Heating A7/W45	Capacity	kW	14.00												
	COP	-	3.28												
	Power input(*)	kW	4.27												
Heating A2/W35	Capacity	kW	14.00												
	COP	-	2.96												
	Power input(*)	kW	4.73												

■ Combination performance (Package type)

			Cylinder unit						Hydrobox			
			EHPT20X-VM2HB	EHPT20X-VM6HB	EHPT20X-YM9HB	EHPT20X-TM9HB	EHPT20X-VM6B	EHPT20X-YM9B	EHPX-VM2B	EHPX-VM6B	EHSC-YM9B	ERSC-VM2B
Outdoor unit			PUHZ-W50VHA(-BS)									
Heating A7/W35	Capacity	kW	5.00									
	COP	-	4.10									
	Power input(**)	kW	1.22									
Heating A7/W45	Capacity	kW	5.00									
	COP	-	3.21									
	Power input(**)	kW	1.56									
Heating A2/W35	Capacity	kW	5.00									
	COP	-	3.13									
	Power input(**)	kW	1.60									
Outdoor unit			PUHZ-W85VHA2(-BS)									
Heating A7/W35	Capacity	kW	9.00									
	COP	-	4.18									
	Power input(**)	kW	2.15									
Heating A7/W45	Capacity	kW	9.00									
	COP	-	3.24									
	Power input(**)	kW	2.78									
Heating A2/W35	Capacity	kW	8.50									
	COP	-	3.17									
	Power input(**)	kW	2.68									
Outdoor unit			PUHZ-HW112YHA2(-BS)									
Heating A7/W35	Capacity	kW	11.20									
	COP	-	4.42									
	Power input(**)	kW	2.53									
Heating A7/W45	Capacity	kW	11.20									
	COP	-	3.39									
	Power input(**)	kW	3.30									
Heating A2/W35	Capacity	kW	11.20									
	COP	-	3.11									
	Power input(**)	kW	3.60									
Outdoor unit			PUHZ-HW140VHA2/YHA2(-BS)									
Heating A7/W35	Capacity	kW	14.00									
	COP	-	4.25									
	Power input(**)	kW	3.29									
Heating A7/W45	Capacity	kW	14.00									
	COP	-	3.35									
	Power input(**)	kW	4.18									
Heating A2/W35	Capacity	kW	14.00									
	COP	-	3.11									
	Power input(**)	kW	4.50									

* The pump input value is not included.

** The pump input value is included (based on EN 14511).

Heating A7W35: Heating Outside air DB 7°C/WB 6°C, Water outlet temperature 35°C (ΔT=5°C)

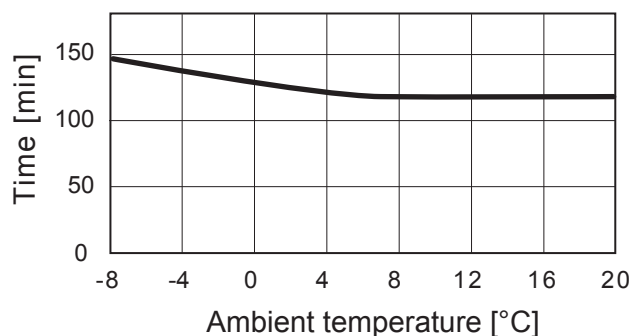
A7W45: Heating Outside air DB 7°C/WB 6°C, Water outlet temperature 45°C (ΔT=5°C)

A2W35: Heating Outside air DB 2°C/WB 1°C, Water outlet temperature 35°C (ΔT=5°C)

5.2 Heat time data (DHW mode)

■ PUAZ-W50VHA(-BS)

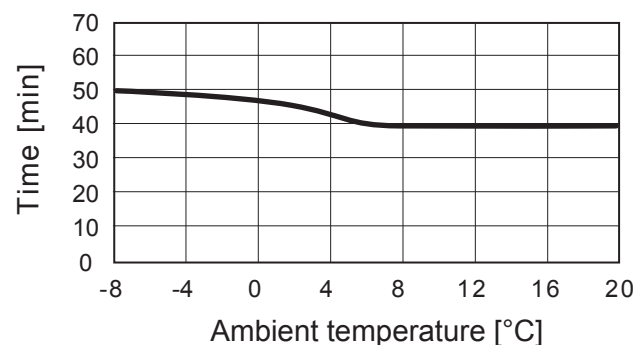
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	145	130	120	120

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55[°C]

Reheat time

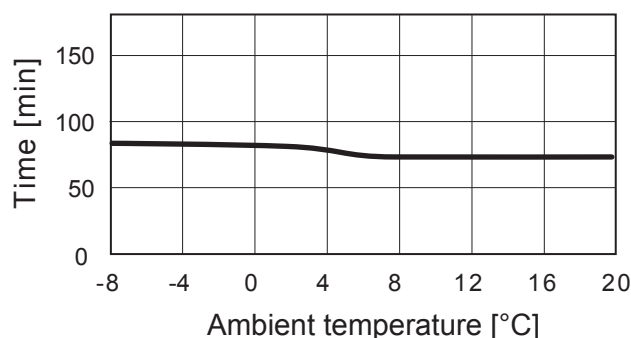


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	50	45	40	40

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-W85VHA2(-BS)

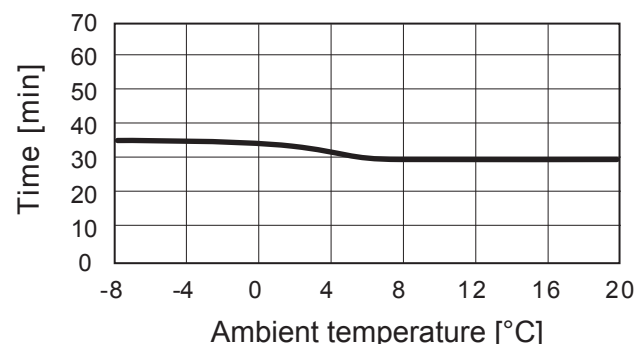
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	85	80	75	75

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55 [°C]

Reheat time

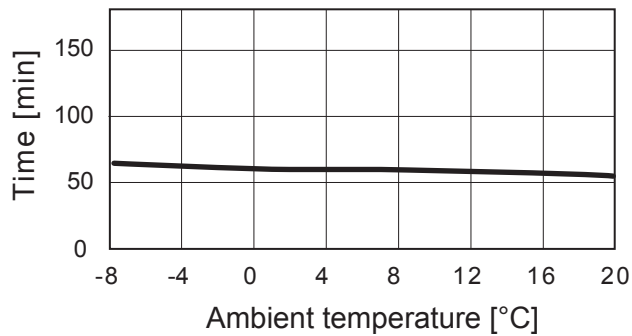


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	35	35	30	30

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-HW112YHA2(-BS)

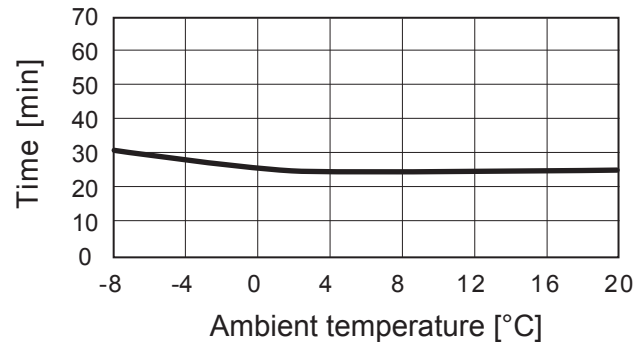
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	65	60	60	55

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55 [°C]

Reheat time

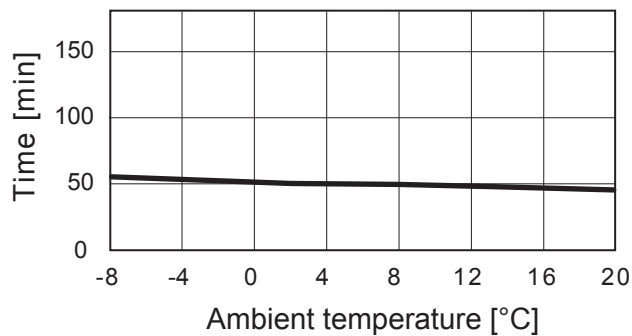


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	30	25	25	25

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-HW140VHA2/YHA2(-BS)

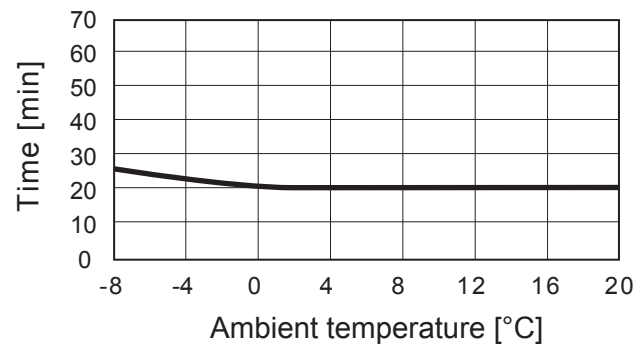
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	55	50	50	45

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55 [°C]

Reheat time

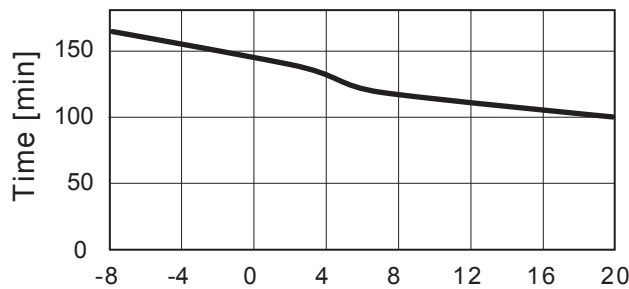


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	25	20	20	20

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-SW40VHA(-BS)

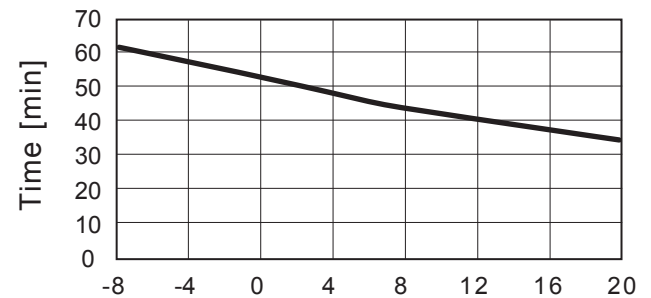
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	165	140	120	100

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55 [°C]

Reheat time

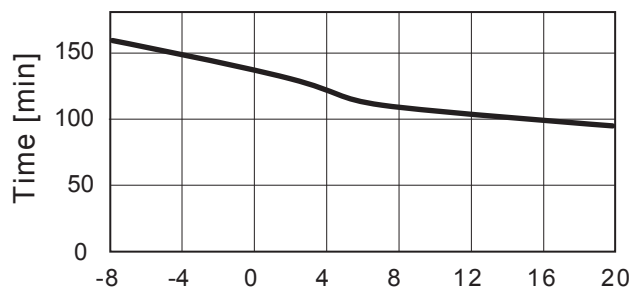


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	60	50	44	35

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-SW50VHA(-BS)

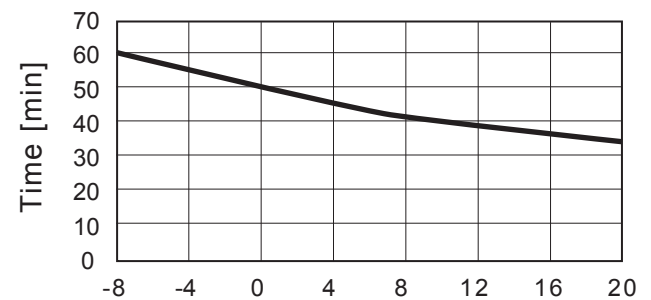
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	160	130	110	95

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55 [°C]

Reheat time

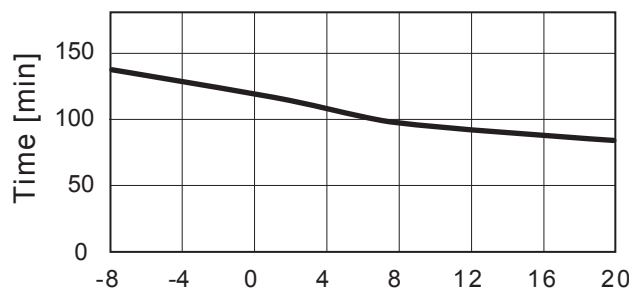


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	58	48	42	34

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-SW75VHA(-BS)

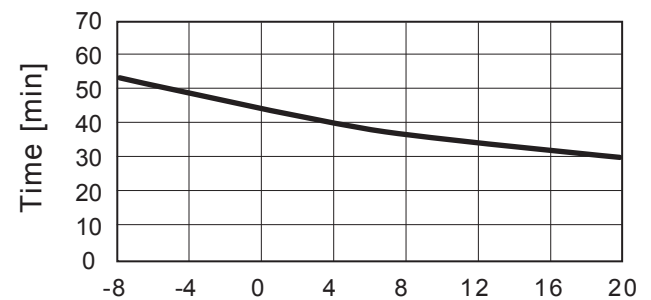
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	135	115	100	85

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55 [°C]

Reheat time

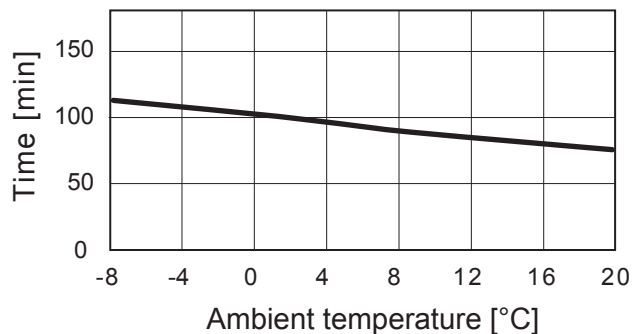


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	52	44	36	30

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-SW100VHA/YHA(-BS)

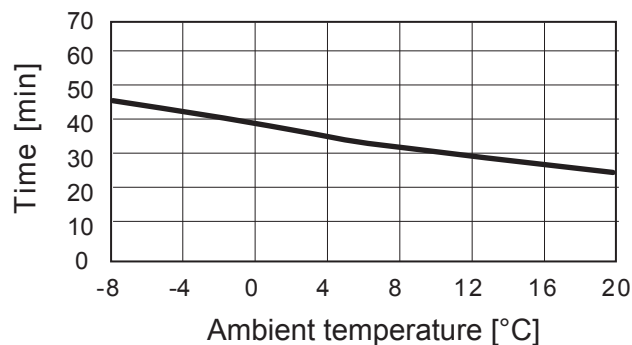
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	110	100	90	75

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55 [°C]

Reheat time

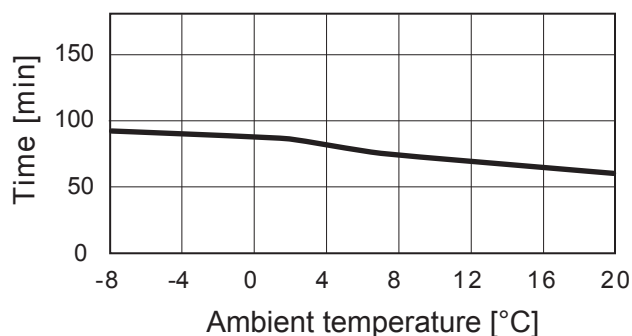


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	46	40	34	26

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-SW120VHA/YHA(-BS)

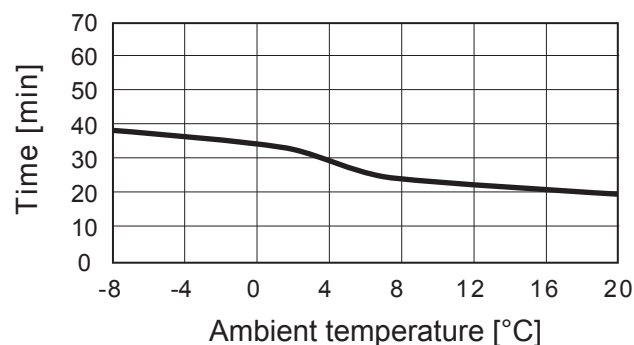
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	90	85	75	60

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55 [°C]

Reheat time

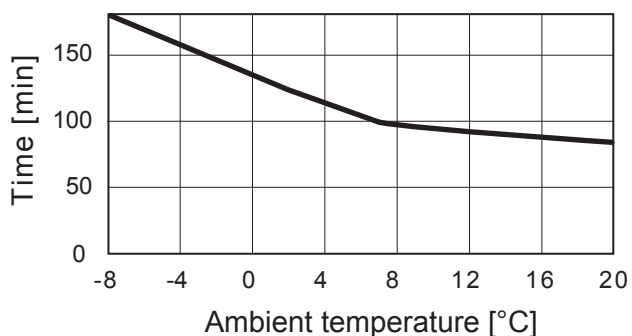


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	38	32	25	20

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-FRP71VHA

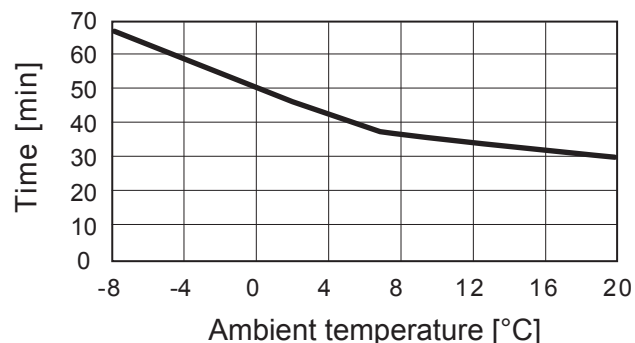
Heat time



	Ambient temperature [°C]			
	-7	2	7	20
Heat time (min)	171	122	100	85

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55 [°C]

Reheat time

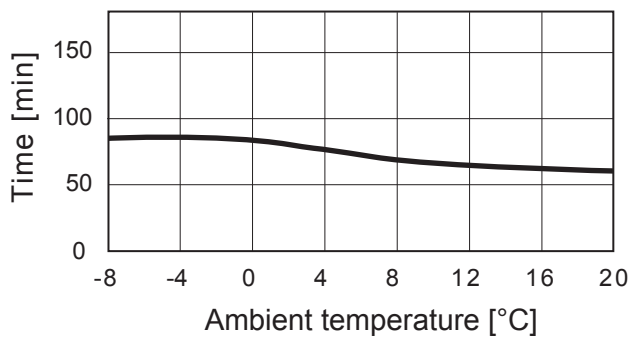


	Ambient temperature [°C]			
	-7	2	7	20
Reheat time (min)	66	47	36	30

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50% (100 [L]) of DHW tank to 55 [°C]

■ PUAZ-SHW80VHA

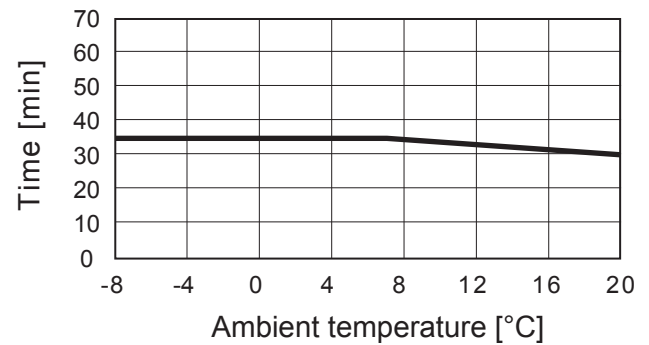
Heat time



Heat time (min)	Ambient temperature [°C]			
	-7	2	7	20
85	80	70	60	

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55[°C]

Reheat time

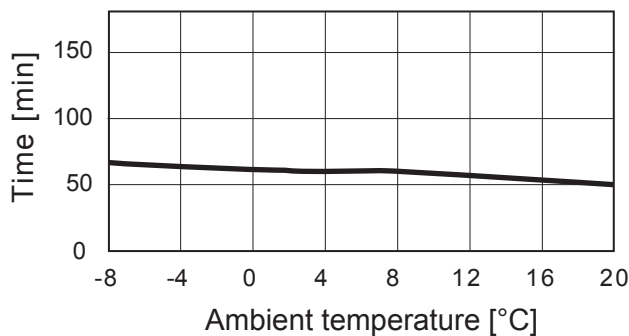


Reheat time (min)	Ambient temperature [°C]			
	-7	2	7	20
35	35	35	30	

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50%(100 [L]) of DHW tank to 55 [°C]

■ PUAZ-SHW112VHA/YHA

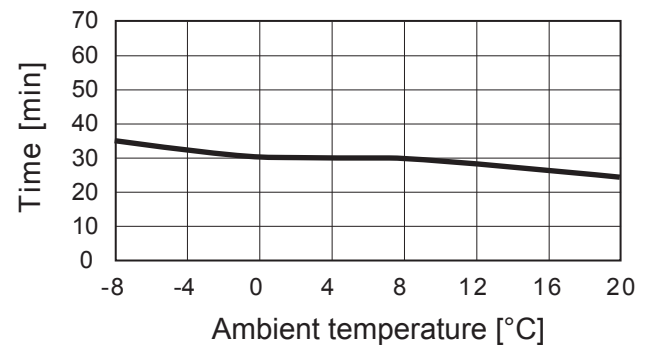
Heat time



Heat time (min)	Ambient temperature [°C]			
	-7	2	7	20
65	60	60	50	

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55[°C]

Reheat time

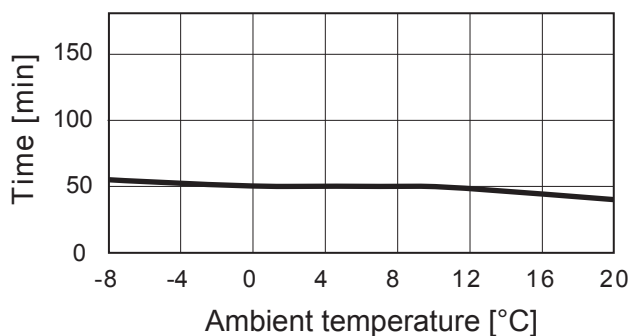


Reheat time (min)	Ambient temperature [°C]			
	-7	2	7	20
35	30	30	25	

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50%(100 [L]) of DHW tank to 55 [°C]

■ PUAZ-SHW140YHA

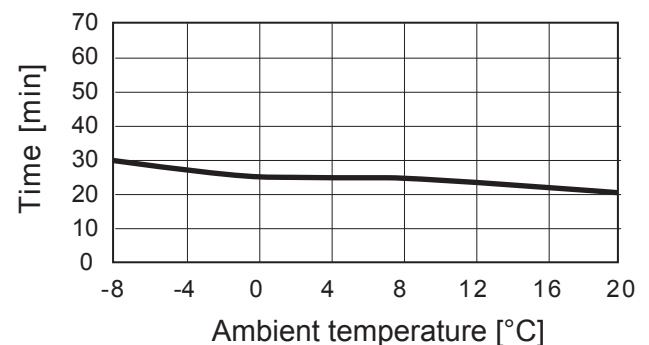
Heat time



Heat time (min)	Ambient temperature [°C]			
	-7	2	7	20
55	50	50	40	

- Mitsubishi's domestic hot water tank (200 [L])
- Time to raise DHW tank temperature 15 – 55[°C]

Reheat time



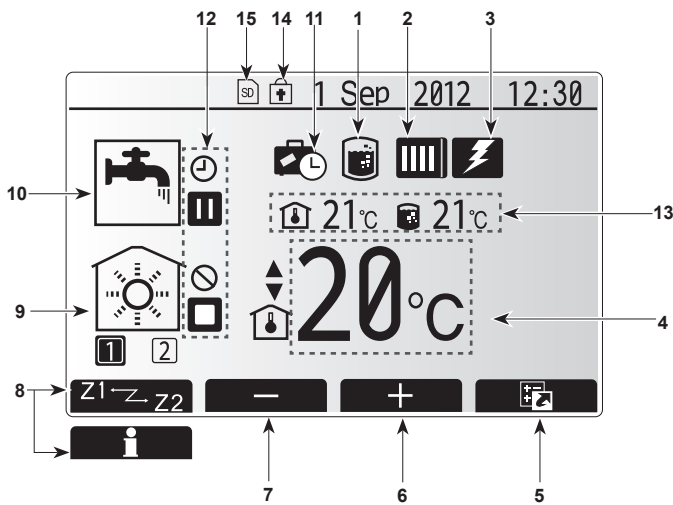
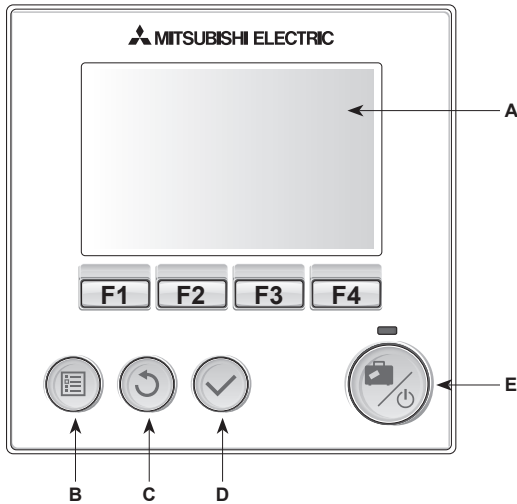
Reheat time (min)	Ambient temperature [°C]			
	-7	2	7	20
30	25	25	20	

- Mitsubishi's domestic hot water tank (200 [L])
- Time to reheat 50%(100 [L]) of DHW tank to 55 [°C]

Main Controller

To change the settings of your heating/cooling system please use the main controller located on the front panel of the cylinder unit or hydrobox. The following is a guide to viewing the main settings. Should you require more information please contact your installer or local Mitsubishi Electric dealer. Cooling mode is available for ERS series only. However, Cooling mode is not available when the indoor unit is connected to PUAZ-FRP.

Cylinder / Hydrobox



<Main controller parts>

Letter	Name	Function
A	Screen	Screen in which all information is displayed
B	Menu	Access to system settings for initial set up and modifications.
C	Back	Return to previous menu.
D	Confirm	Used to select or save. (Enter key)
E	Power/Holiday	If system is switched off pressing once will turn system on. Pressing again when system is switched on will enable Holiday Mode. Holding the button down for 3 secs will turn the system off. (*1)
F1-4	Function keys	Used to scroll through menu and adjust settings. Function is determined by the menu screen visible on screen A.

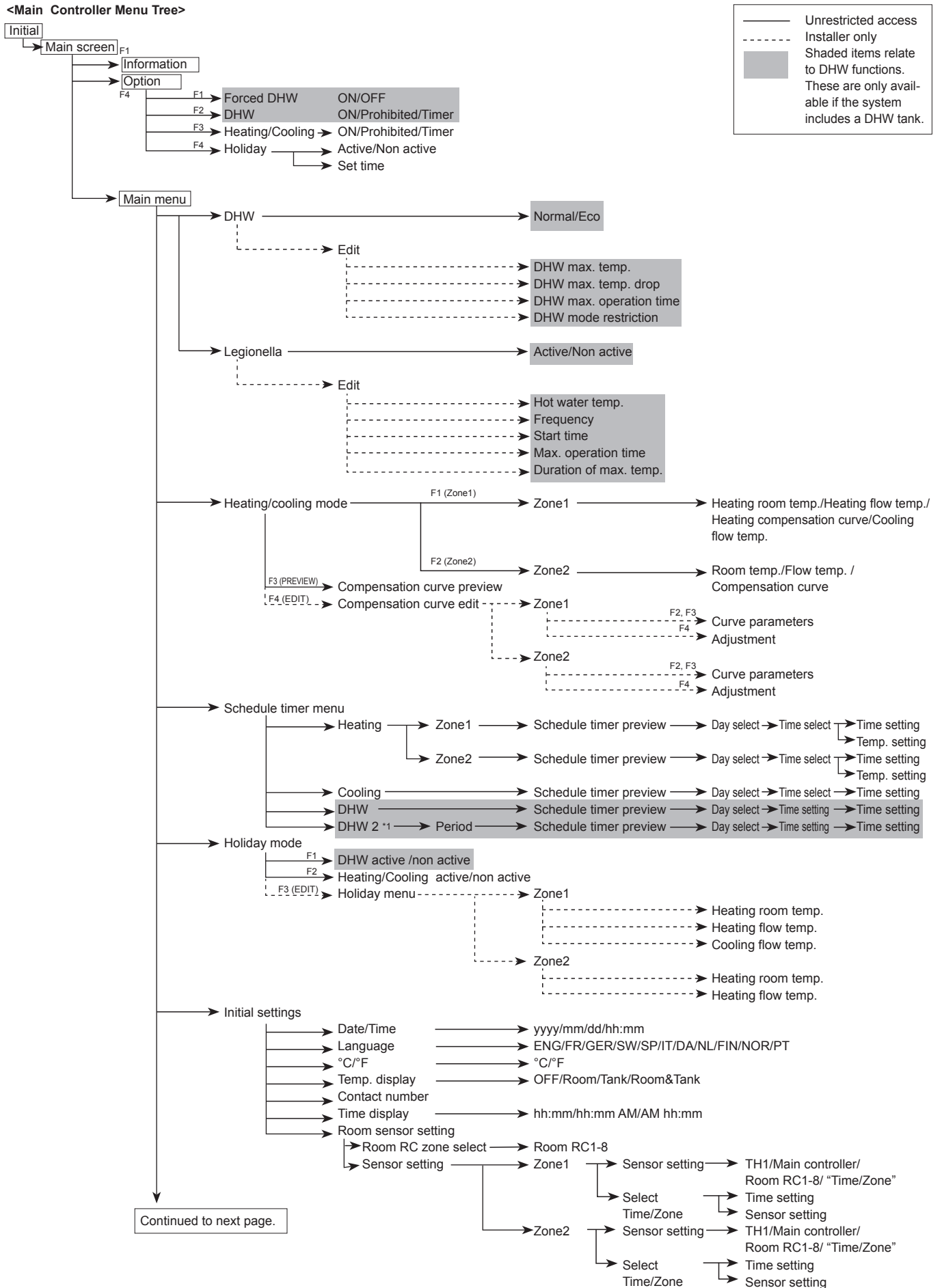
*1

When the system is switched off or the power supply is disconnected, the cylinder unit and hydrobox protection functions (e.g. freeze stat. function) will NOT operate. Please beware that without these safety functions enabled the cylinder unit and hydrobox may potentially become exposed to damage.

<Main screen icons>

	Icon	Description
1	Legionella prevention	When this icon is displayed 'Legionella prevention mode' is active.
2	Heat pump	'Heat pump' is running
		Defrosting
		Emergency heating
3	Electric heater	When this icon is displayed the 'Electric heaters' (booster or immersion heater) are in use.
4	Target temperature	Target flow temperature
		Target room temperature
		Compensation curve
5	OPTION	Pressing the function button below this icon will display the quick view menu.
6	+	Increase desired temperature.
7	-	Decrease desired temperature.
8	Z1-Z2	Pressing the function button below this icon switches between Zone1 and Zone2.
		Information
9	Space heating (cooling) mode	Heating mode Zone1 or Zone2
		Cooling mode
10	DHW mode	Normal or ECO mode
11	Holiday mode	When this icon is displayed 'Holiday mode' activated.
12	Timer icons	Timer
		Prohibited
		Stand-by
		Stop
		Operating
13	Current temperature	Current room temperature
		Current water temperature of DHW tank
14	Menu lock icon	The Menu button is locked or the switching of the operation modes between DHW and Heating operations are disabled in the Option screen.
15	SD card icons	SD memory card is inserted. Normal operation.
		SD memory card is inserted. Abnormal operation.

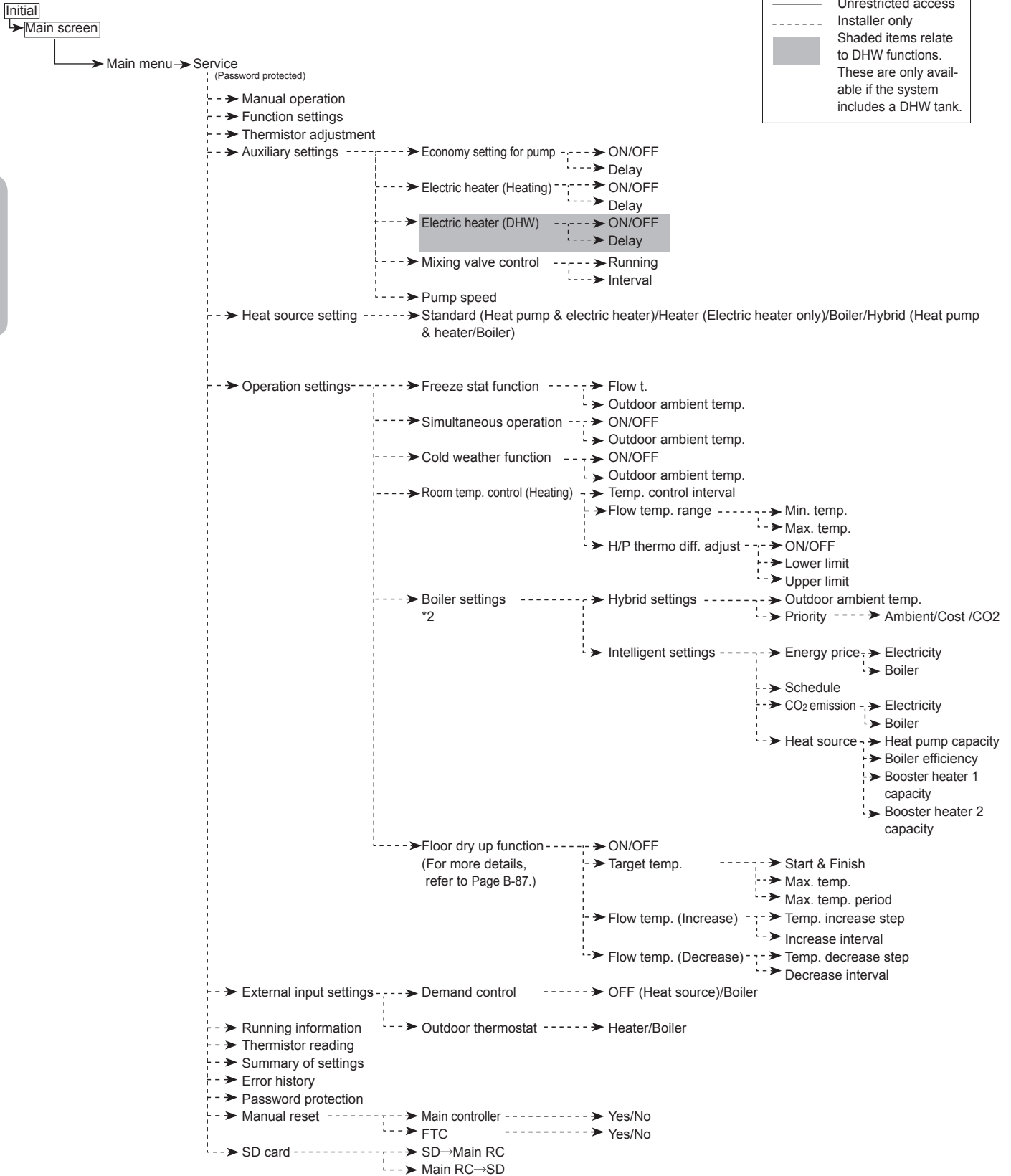
<Main Controller Menu Tree>



Continued to next page.

*1 When a PUHZ-FRP outdoor unit is connected.

<Main Controller Menu Tree>



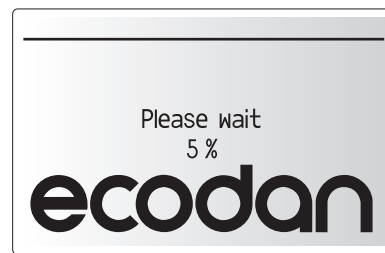
*2 For more details, refer to the installation manual of PAC-TH011HT-E.

Continued from the previous page.

■ Setting the Main Controller

After the power has been connected to the outdoor unit and hydrobox (See chapter 4.5) the initial system settings can be entered via the main controller.

1. Check all breakers and other safety devices are correctly installed and turn on power to the system.
2. When the main controller switched on for the first time, the screen automatically goes to Initial settings menu, Language setting screen and Date/Time setting screen in order.
3. Main controller will automatically start up. Wait approximately 6 mins whilst the control menus load.
4. When the controller is ready a blank screen with a line running across the top will be displayed.
5. Press button E (Power) (refer to page 34) to turn on the system. Before turning on the system, perform initial settings as instructed below.



■ Main Settings Menu

The main settings menu can be accessed by pressing the MENU button. To reduce the risk of untrained end users altering the settings accidentally there are two access levels to the main settings; and the service section menu is password protected.

User Level – Short press

If the MENU button is pressed once for a short time the main settings will be displayed but without the edit function. This will enable the user to view current settings but **NOT** change the parameters.

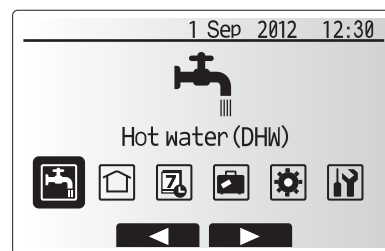
Installer Level – Long press

If the MENU button is pressed down for 3 secs the main settings will be displayed with all functionality available.

The following items can be viewed and/or edited (dependent on access level).

- Domestic Hot water (DHW)
- Heating/Cooling
- Schedule timer
- Holiday mode
- Initial settings
- Service (Password protected)

Use the F2 and F3 buttons to move between the icons. The highlighted icon will appear as a larger version in the centre of the screen. Press CONFIRM to select and edit the highlighted mode.



Icon	Description
	Hot water (DHW)
	Heating/Cooling
	Schedule timer
	Holiday mode
	Initial settings
	Service

■ Initial Settings

From the Initial settings menu the installer can set the following.

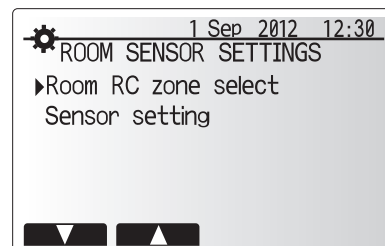
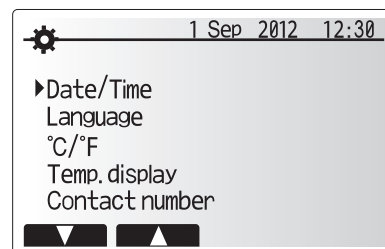
- Date/Time
- Language
- °C/°F
- Temp. display
- Contact number
- Time display
- Room sensor settings

1. Use buttons F1 and F2 to move scroll through the menu list. When the title is highlighted press CONFIRM to edit.
2. Use function buttons appropriate to edit each setting then press CONFIRM to save the setting.

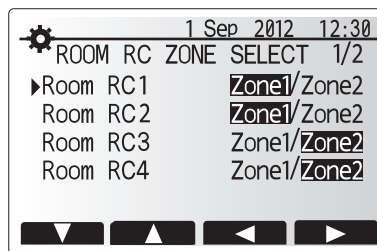
<Room sensor settings>

For room sensor settings it is important to choose the correct room sensor depending on the heating mode the system will operate in.

1. From the Initial settings menu select Room sensor settings.



- When 2-zone temperature control is active or wireless remote controllers are available, from Room RC zone select screen, select zone no. to assign to each remote controller.



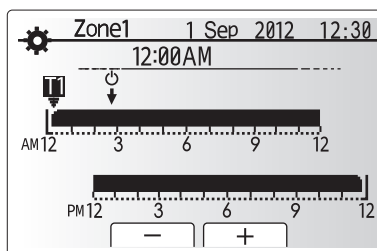
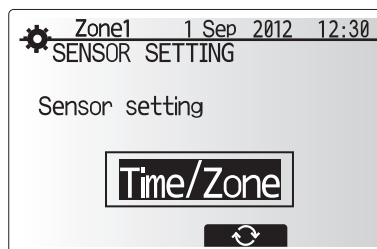
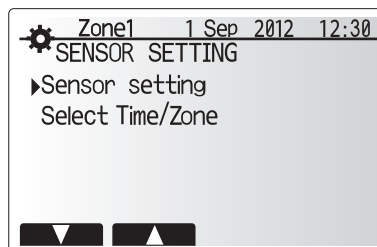
- From Sensor setting screen, select a room sensor to be used for monitoring the room temperature from Zone1 and Zone2 separately.

Control option	Corresponding initial settings room sensor	
	Zone1	Zone2
A	Room RC1-8 (one each for Zone1 and Zone2)	*
B	TH1	*
C	Main controller	*
D	*	*

* Not specified (if a field-supplied room thermostat is used)

Room RC1-8 (one each for Zone1 and Zone2) (if a wireless remote controller is used as a room thermostat)

- From Sensor setting screen, select Time/Zone to make it possible to use different room sensors according to the time schedule set in the Select Time/Zone menu. The room sensors can be switched up to 4 times within 24 hours .



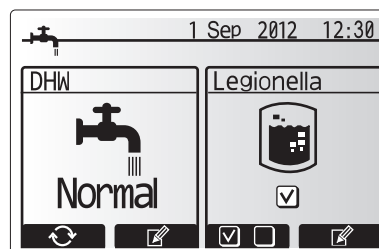
Time/Zone schedule setting screen

Domestic Hot Water (DHW)/Legionella Prevention

The domestic hot water and legionella prevention menus control the operation of DHW tank heat ups.

<DHW mode settings>

- Highlight the hot water icon and press CONFIRM.
- Use button F1 to switch between Normal and ECO heating modes.
- To edit the mode press F2 to display the HOT WATER (DHW) SETTING menu.
- Use F2 and F3 keys to scroll through the menu selecting each component in turn by pressing CONFIRM. See the table below for description of each setting.
- Enter the desired number using the function keys and press CONFIRM.



Menu subtitle	Function	Range	Unit	Default value
DHW max. temp	Desired temperature of stored hot water	40 - 60	°C	50
DHW max. temperature drop	Difference in temperature between DHW max. temp and the temperature at which DHW mode restarts	5 - 30	°C	10
DHW max. operation time	Max time allowed for stored water heating DHW mode	30 - 120	min	60
DHW mode restriction	The time period after DHW mode when space heating has priority over DHW mode temporarily preventing further stored water heating (Only when DHW max. operation time has passed.)	30 - 120	min	30

Explanation of DHW operation

- When the DHW tank temperature drops from "DHW max. temp" by more than the "DHW max. temperature drop" (set by installer), DHW mode operates and the flow from the primary heating/cooling circuit is diverted to heat the water in the DHW tank.
- When the temperature of the stored water reaches the 'DHW max. temp.' set by the installer or if the 'DHW max. operation time' set by the installer is exceeded DHW mode ceases to operate.
- Whilst DHW mode is in operation primary hot water is not directed to the space heating/cooling circuit.
- Directly after DHW max. operation time 'DHW mode restriction' will routinely operate. The duration of this feature is set by the installer and during its operation DHW mode can not (normally) be reactivated, allowing time for the system to deliver primary hot water to the space heating/cooling if required. However, if at this time there is no current demand for space heating/cooling, the system will automatically resume DHW mode. This will continue until it receives a demand for space heating/cooling.
- After the 'DHW mode restriction' operation the DHW mode can operate again and DHW tank heating will continue according to system demand.

<Eco mode>

DHW mode can run in either 'Normal' or 'Eco' mode. Normal mode will heat the water in the DHW tank more quickly using the full power of the heat pump. Eco mode takes a little longer to heat the water in the DHW tank but the energy used is reduced. This is because heat pump operation is restricted using signals from the FTC4 based on measured DHW tank temperature.

Note: The actual energy saved in Eco mode will vary according to outdoor ambient temperature.

Return to the DHW/legionella prevention menu.

Legionella Prevention Mode settings (LP mode)

1. Use button F3 to choose legionella mode active YES/NO.
2. Use button F4 to edit the legionella function.
3. Use F1 and F2 keys to scroll through the menu selecting each subtitle in turn by pressing CONFIRM. See the table below for description of each setting.
4. Enter the desired number using the function keys and press CONFIRM.

During Legionella Prevention Mode the temperature of the stored water is increased above 60°C to inhibit legionella bacterium growth. It is strongly recommended that this is done at regular intervals. Please check local regulations for the recommended frequency of heat ups.

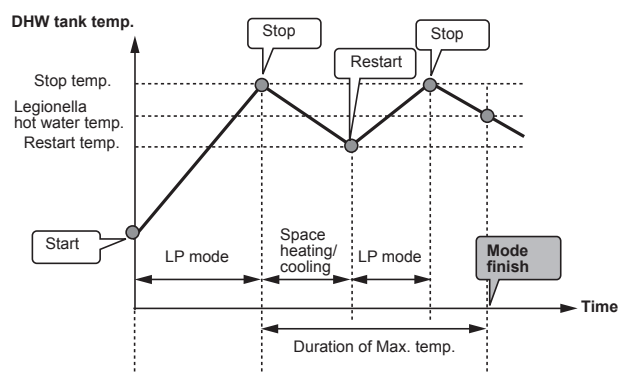
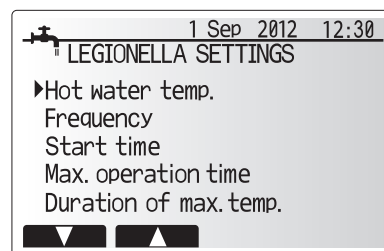
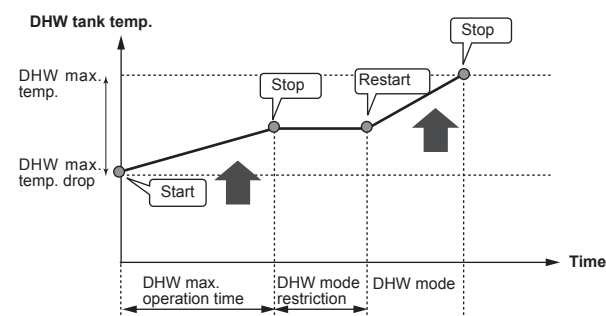
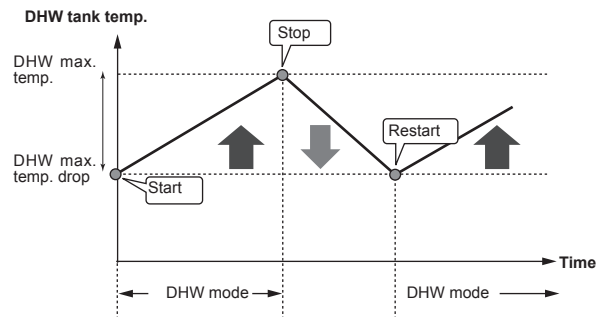
Note: When failures occur on the hydrobox, the LP mode may not function normally.

Menu subtitle	Function	Range	Unit	Default value
Hot water temp.	Desired temp of stored hot water	60-70	°C	65
Frequency	Time between LP mode DHW tank heat ups	1-30	day	15
Start time	Time when LP mode will begin	0:00-23:00	-	03:00
Max. operation time	Maximum time allowed for LP mode DHW tank heat	1-5	hour	3
Duration of max. temp.	The time period after LP mode max. water temp has been reached	1-120	min	30

Explanation of Legionella Prevention Mode operation

- At the time entered by the installer 'Start time' flow of useful heat from the system is diverted to heat the water in the DHW tank.
- When the temperature of the stored water exceeds the 'Hot Water temp.' set by the installer (above 65°C) primary circuit water is no longer diverted to heat the DHW tank.
- Whilst LP mode is in operation hot water is not directed to the space heating /cooling circuit.
- Directly after LP mode operation 'Duration of max. temp' will operate. The duration of this feature is set by the installer and during its operation stored water temperature will be monitored.
- If stored water temperature should drop to LP restart temp, LP mode will restart and primary water flow from the heat source(s) will be directed to the DHW tank to boost the temperature. Once the set time for Duration of Max. temp has passed LP mode will not recur for the set interval (set by installer).
- It is the responsibility of the installer to ensure the settings for legionella prevention are compliant with local and national guidelines.

Please note that LP mode uses the assistance of electric heaters (if present) to supplement the energy input of the heat pump. Heating water for long periods of time is not efficient and will increase running costs. The installer should give careful consideration to the necessity of legionella prevention treatment whilst not wasting energy by heating the stored water for excessive time periods. The end user should understand the importance of this feature. **ALWAYS COMPLY WITH LOCAL AND NATIONAL GUIDANCE FOR YOUR COUNTRY REGARDING LEGIONELLA PREVENTION.**



(LP mode: Legionella Prevention mode)

Forced DHW

The forced DHW function is used to force the system to operate in DHW mode. In normal operation the water in the DHW tank will be heated either to the set temperature or for the maximum DHW time, whichever occurs first. However should there be a high demand for hot water 'Forced DHW' function can be used to prevent the system from routinely switching to space heating/cooling and continue to provide DHW tank heating.

Forced DHW operation is activated by pressing button F1 and Back button in the 'Option Screen'. After DHW operation finishes, the system will automatically return to normal operation. To cancel forced DHW operation hold down button F1 in the 'Option Screen'.

■ Heating/Cooling

The heating and cooling menus deal with space heating and cooling typically using either a radiator or underfloor system depending on the installation.

From the main settings menu

1. Use F2 and F3 buttons to highlight heating/cooling icon then press CONFIRM.
2. The heating and cooling menu will be displayed.
3. To select the sub-menus press the function button below the icon required. E.g. for mode change of Zone1 press F1

Heating/Cooling

1. Under this sub-menu the mode of heating or cooling is selected.
2. Choose between

- Heating flow temperature (🔥)
- Heating room temperature (🏠)
- Heating compensation curve (📈)
- Cooling flow temperature (❄️)

Heating room temperature cannot be selected both in Zone1 and Zone2. When Cooling flow temp. is selected in Zone1, Cooling flow temp is automatically selected in Zone2. Zone1 and Zone2 are controlled at the same set temperature. If using an underfloor system in Cooling mode, do not set the flow temperature too low to avoid formation of condensation.

3. To choose between the different modes for heating and cooling, highlight the mode preferred and press select.

If compensation curve mode was selected as the heating mode please read the following instructions.

Explanation of compensation curve

During late spring and summer usually the demand for space heating is reduced. To prevent the heat pump from producing excessive flow temperatures for the primary circuit the compensation curve mode can be used to maximise efficiency and reduce running costs.

The compensation curve is used to restrict the flow temperature of the primary space heating circuit dependent on the outdoor ambient temperature. The FTC4 uses information from both an outdoor ambient temperature sensor and a temperature sensor on the primary circuit supply to ensure the heat pump is not producing excessive flow temperatures if the weather conditions do not require it.

<Compensation curve setting>

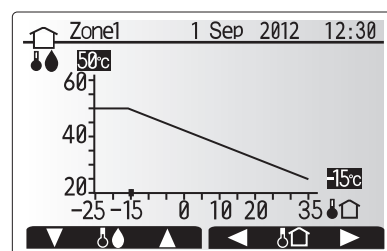
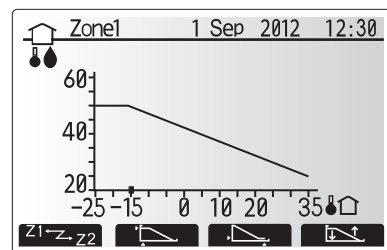
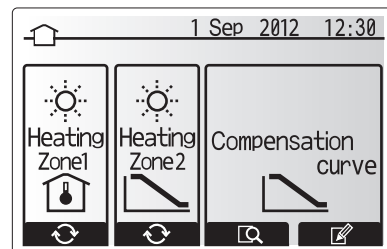
*This setting cannot be performed in cooling mode.

1. From the heating menu select edit using the F3 function button.
2. The compensation curve setting screen will be displayed.
3. In 2-zone heating operation, press F1 to switch between Zone1 and Zone2.
4. Press F2 to alter the Hi parameter (when flow temp is maximum and outdoor ambient temp is minimum).
5. Press F3 to alter the Lo parameter (when flow temp is minimum and outdoor ambient temp is maximum).
6. Press F4 to add an extra point (adjust).

Pressing F2-4 will cause the relevant edit screen to be displayed. Editing Lo and Hi parameters is done in the same way; please see the following for more detailed explanation of parameter editing.

In the parameter (Lo/Hi) edit screen the flow temperature and outdoor ambient temperature for the compensation curve graph can be set and altered for the 2 extremes of Hi and Lo.

1. Press F1 and F2 to change the flow temperature (y-axis of compensation curve).
2. Pressing F1 will raise the desired flow temperature for the set outdoor ambient temperature.
3. Pressing F2 will lower the desired flow temperature for the set outdoor ambient temperature.
4. Press F3 and F4 to change the outdoor ambient temperature (x-axis of compensation curve).
5. Pressing F3 will lower the outdoor ambient temperature for the set flow temperature.
6. Pressing F4 will raise the outdoor ambient temperature for the set flow temperature.



■ Holiday mode

Holiday mode can be activated in 2 ways. Both methods will result in the Holiday Mode activation screen being shown.

Option 1.

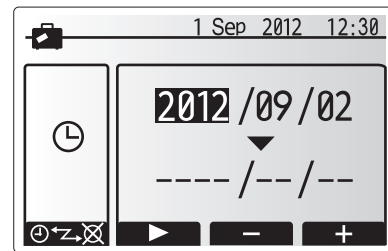
From the main menu screen button E should be pressed. Be careful not to hold down button E for too long as this will turn off the controller and system.

Option 2.

From the main menu screen press button F4. The current settings screen will be displayed. Press button F4 again to access the holiday mode activation screen.

Once the holiday mode activation screen is displayed you can activate/deactivate and select the duration that you would like holiday mode to run for.

- Press button F1 to activate or deactivate holiday mode.
- Use buttons F2, F3 and F4 to input the date which you would like holiday mode to activate or deactivate for space heating/cooling.

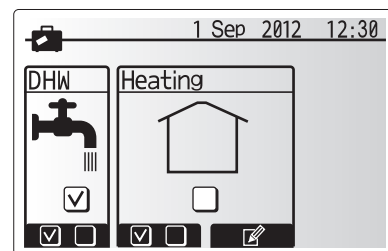


Holiday Mode activation screen

<Editing holiday mode>

To change the Holiday mode settings e.g. the flow temp, you must access the holiday mode menu from the main settings menu.

1. From main menu screen press button B.
2. Use buttons F2 and F3 to scroll through menu until Holiday Mode is highlighted.
3. Press CONFIRM button.
4. The holiday mode status screen is displayed.
5. To change the flow temperature or room temperatures on heating mode press button F3.
6. A list of variables will be displayed. Choose the one you wish to modify using buttons F1/F2 then press CONFIRM.
7. Adjust the temperature using buttons F3 and F2 and press CONFIRM button to save changes.

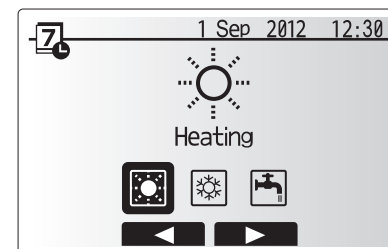


Holiday Mode status screen

■ Schedule timer

The schedule timer mode allows daily and weekly space heating/cooling and DHW patterns to be entered.

1. From the main settings menu use F2 and F3 to highlight the schedule timer icon then press CONFIRM.
2. The schedule timer sub menu will be displayed. The icons show the following modes;
 - Heating
 - Cooling
 - Hot Water (DHW)
3. Use F2 and F3 buttons to move between mode icons then press CONFIRM to be shown the preview screen for each mode.



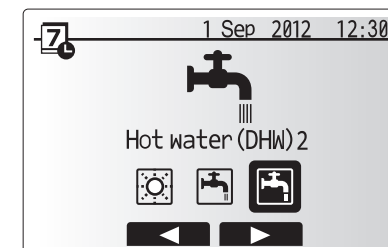
Mode select screen

The preview screen allows you to view the current settings. In 2-zone heating operation, press F1 to switch between Zone1 and Zone2. Days of the week are displayed across the top of the screen. Where day appears underlined the settings are the same for all those days underlined.

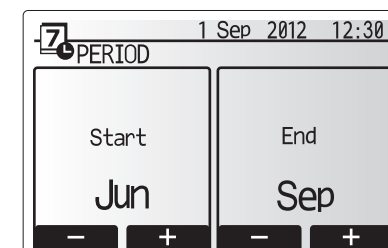
Hours of the day and night are represented as a bar across the main part of the screen. Where the bar is solid black, space heating/DHW (whichever is selected) is allowed.

When a PUAZ-FRP outdoor unit is connected, DHW schedule timer setting can be set for two periods into which a year is divided. In this menu screen, the duration of Period 2 can be entered. The rest of the set duration comes set as Period 1.

1. From the main settings menu use F2 and F3 to highlight the schedule timer icon then press CONFIRM.
2. The schedule timer sub menu will be displayed. The icons show the following modes;
 - Heating
 - Hot Water (DHW)
 - Hot Water (DHW) 2
3. Use F2 and F3 buttons to move between mode icons to select the Hot Water (DHW) 2 icon.
4. Use F1 to F4 buttons to select start and end months that apply to Period 2.
5. Press CONFIRM to be shown the preview screen for each mode.



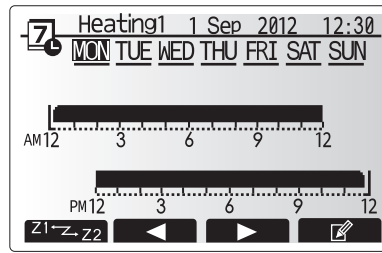
Mode select screen when PUAZ-FRP connected



Period setting screen when PUAZ-FRP connected

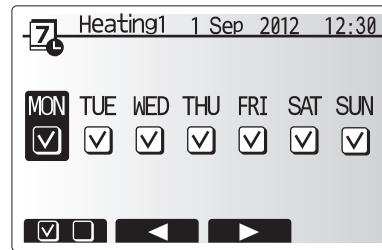
<Setting the schedule timer>

1. In the preview menu screen press F4 button.



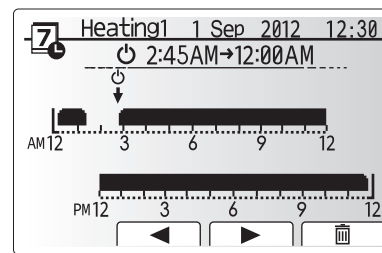
Preview screen

2. First select the days of the week you wish to schedule.
3. Press F2/F3 buttons to move between days and F1 to check or uncheck the box.
4. When you have selected the days press CONFIRM.



Day of week select screen

5. The time bar edit screen will be displayed.
6. Use buttons F2/F3 to move to the point at which you do not want the selected mode to be active press CONFIRM to start.
7. Use F3 button to set the required time of inactivity then press CONFIRM.
8. You can add up to 4 periods of inactivity within a 24 hour interval.



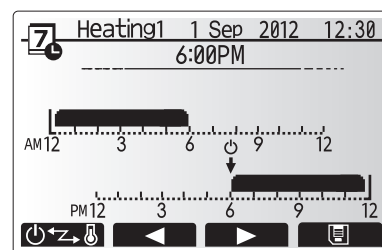
Time of period setting screen 1

9. Press F4 to save settings.

When scheduling heating, button F1 changes the scheduled variable between time and temperature. This enables a lower temperature to be set for a number of hours e.g. a lower temperature may be required at night when the occupants are sleeping.

Note:

- The schedule timer for space heating/cooling and DHW are set in the same way. However for Cooling and DHW only time can be used as scheduling variable.
- A small rubbish bin character is also displayed choosing this icon will delete the last unsaved action.
- It is necessary to use the SAVE function F4 button to save settings. CONFIRM does NOT act as SAVE for this menu.



Time of period setting screen 2

■ Service Menu

The service menu provides functions for use by installer or service engineer. It is NOT intended the home owner alters settings within this menu. It is for this reason password protection is required to prevent unauthorised access to the service settings.

1. From the main setting menu use F2 and F3 to highlight the service icon then press CONFIRM.
2. You will be prompted to enter a password. **THE FACTORY DEFAULT PASSWORD IS "0000"**.
3. Press CONFIRM.
(It takes approx. 30 secs to load the service menu.)

The service menu is navigated using the F1 and F2 buttons to scroll through the functions. The menu is split across three screens and is comprised of the following functions;

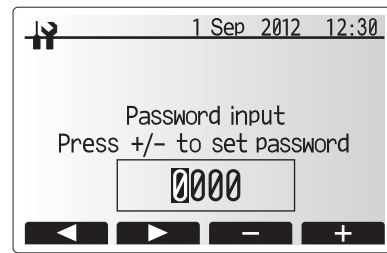
1. Manual operation
2. Function settings
3. Thermistor adjustment
4. Auxiliary settings
5. Heat source setting
6. Operation settings
7. External input settings
8. Running information
9. Thermistor reading
10. Summary of settings
11. Error history
12. Password protection
13. Manual reset
14. SD card

In this Installation Manual, instructions will be given only for the following functions;

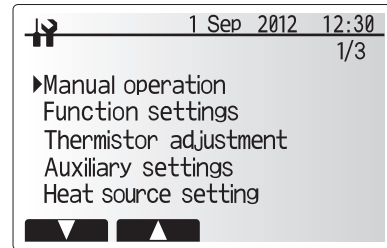
1. Manual operation
2. Auxiliary settings
3. Heat source setting
4. Operation settings
5. External input settings
6. Password protection
7. Manual reset
8. SD card

Information on the other functions can be found by consulting the service manual.

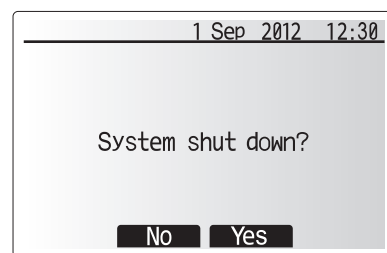
Note: Many functions can not be set whilst the indoor unit is running. The installer should turn OFF the unit before trying to set these functions. If the installer attempts to change the settings whilst the unit is running the main controller will display a reminder message prompting the installer to stop operation before continuing. By selecting "Yes" the unit will cease operation.



Screen 1 of service menu



Screen 2 of service menu



System off prompt screen

Manual operation

During the filling of the system the water circulation pump and 3-way valve can be manually overridden using manual operation mode. When manual operation is selected a small timer icon appears in the screen. The function selected will only remain in manual operation for a maximum of 2 hours. This is to prevent accidental permanent override of the FTC4.

1. From the service menu use F1 and F2 buttons to scroll through list until Manual Operation is highlighted.
2. Press CONFIRM.
3. Manual operation menu screen is displayed.
4. To activate manual operation press the function button under the desired part.

► Example

Pressing F3 button will switch manual operation mode ON for the main 3-way valve. When filling of the DHW tank is complete the installer should access this menu again and press F3 to deactivate manual operation of the part. Alternatively after 2 hours manual operation mode will no longer be active and FTC4 will resume control of the part.

NOTE: Manual operation and heat source setting can not be selected if the system is running. A screen will be displayed asking the installer to stop the system before these modes can be activated. The system automatically stops 2 hours after last operation.

Auxiliary settings

This function is used to set the parameters for any auxiliary parts used in the system.

From the service menu use F1 and F2 buttons to highlight Auxiliary settings then press CONFIRM.

<Economy settings for pump>

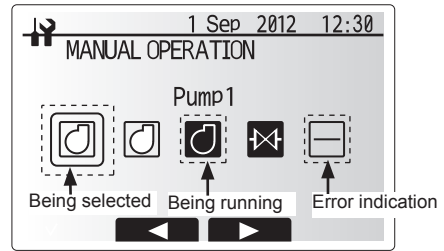
1. From the Auxiliary settings menu highlight Economy Settings for water circulation pump.
2. Press CONFIRM.
3. The economy settings for water circulation pump screen is displayed.
4. Use button F1 to switch the economy settings ON/OFF.
5. Use buttons F3 and F4 to adjust the time the water circulation pump will run. (3 - 60 mins)

<Electric heater (Heating)>

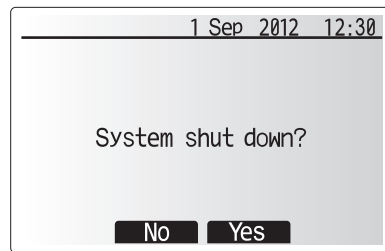
1. From the Auxiliary settings menu highlight Electric heater (heating).
2. Press CONFIRM.
3. The Electric heater (heating) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater will assist in space heating. (5 -180mins)

<Electric heater (DHW)>

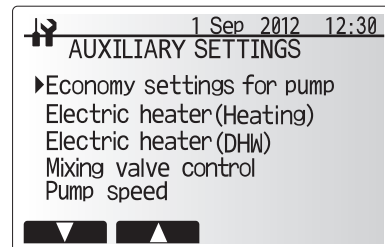
1. From the Auxiliary settings menu highlight Electric heater (DHW).
2. Press CONFIRM.
3. The Electric heater (DHW) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater and the immersion heater (if present) will assist in DHW heating. (15 -30mins)



Manual operation menu screen



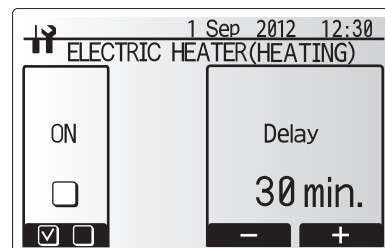
System off prompt screen



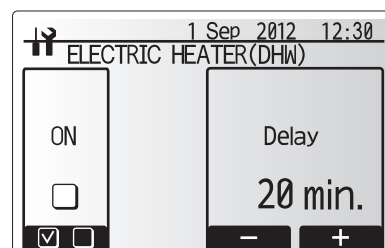
Auxiliary settings menu screen



Economy settings for pump screen



Electric heater (Heating) screen



Electric heater (DHW) screen

<Mixing valve control>

1. From the Auxiliary settings menu highlight Mixing valve control.
2. Press CONFIRM.
3. The Mixing valve control screen is displayed.
4. Use F1 and F2 buttons to set Running time between 10 to 240 seconds. The Running time equals to a period from full open of the valve (at a hot water mixing ratio of 100%) to full close (at a cold water mixing ratio of 100%).

Note: Set the Running time according to the specifications of the actuator of each mixing valve.

1. From the Auxiliary settings menu highlight Mixing valve control.
2. Press CONFIRM.
3. The Mixing valve control screen is displayed.
4. Press F3 and F4 buttons to set the interval between 2-zone temperature controls of the mixing valve between 1 to 30 mins.

Note: It is recommended to set the interval to 2 minutes that is a default value. With the interval set longer, it could take longer to warm up a room.

<Pump speed>

1. From the Auxiliary settings menu highlight water circulation pump speed.
2. Press CONFIRM.
3. Press F3 and F4 buttons to select a refrigerant address of which you wish to configure or check the settings, and press CONFIRM. *1
4. The Pump speed screen is displayed.
5. Use F2 and F3 buttons to set the pump speed of the water circulation pump between 1 and 5.

*1 For multiple outdoor units control system only.

Heat source setting

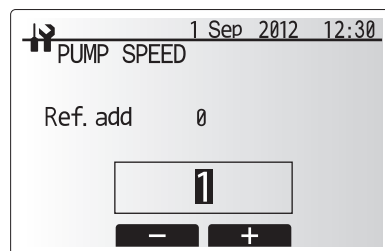
The default heat source setting is heat pump and all electric heaters present in the system to be operational. This is referred to as Standard operation on the menu.

1. From the service menu use F1 and F2 buttons to scroll through list until *Heat Source Setting* is highlighted.
2. Press CONFIRM.
3. Heat source setting menu screen is displayed.
4. Press F3 button until preferred heat source is displayed.
5. Press CONFIRM.

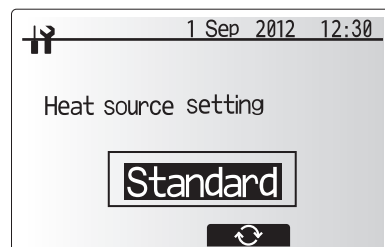
6. If you wish to return to the service menu without saving the setting press return button. You will be asked if you are sure you wish to cancel the changes. Choose Yes or No as appropriate.



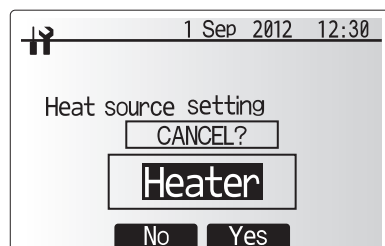
Mixing valve setting screen



Pump speed setting screen



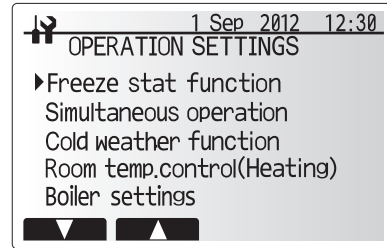
Heat source setting screen



Cancel last action screen

Operation settings

1. To access the Operation settings menu use F1 and F2 buttons to scroll through the service menu until Operation settings is highlighted.
2. Press CONFIRM.
3. Operation settings menu is displayed.

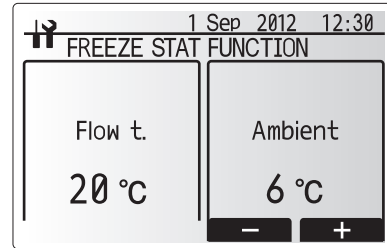


Operation settings menu screen

<Freeze stat function>

1. From the Auxiliary settings menu highlight Freeze Stat Function.
2. Press CONFIRM.
3. The freeze stat function screen will be displayed.
4. Use buttons F3 and F4 to adjust the minimum outdoor ambient temperature at which freeze stat function will begin to operate, (3 - 20 °C) or choose *. If asterisk (*) is chosen freeze stat function is deactivated. (i.e. primary water freeze risk)

Note: When the system is turned off, freeze stat function is not enabled.

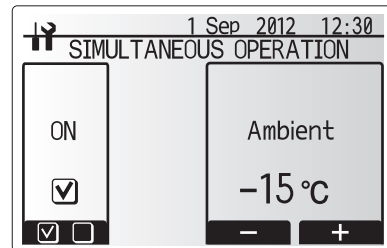


Freeze stat function screen

<Simultaneous Operation>

For periods of very low outside temperature this mode can be used. Simultaneous operation allows both DHW and space heating to run together by using the heat pump and/or booster heater to provide space heating whilst only the immersion heater provides heating for DHW. This operation is only available if BOTH a DHW tank AND immersion heater are present on the system.

1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Simultaneous operation is highlighted.
2. Press CONFIRM.
3. Simultaneous operation screen is displayed.
4. To switch simultaneous operation ON/OFF press F1.
5. To alter the temperature at which simultaneous operation starts use F3 and F4.



Simultaneous operation screen

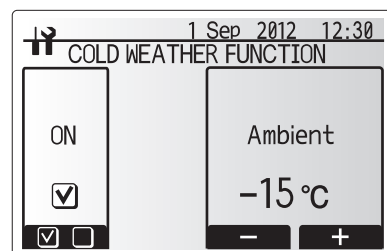
Note:

- Range of outdoor ambient temperature is -15°C to 10°C (default -15°C).
- System shall automatically return to routine operation. This will happen when the outdoor ambient temp rises above the selected temp for this specific mode of operation.

<Cold weather function>

For extremely low outdoor ambient temperature conditions when the heat pump's capacity is restricted the heating or DHW is provided only by the electric booster heater (and immersion if present). This function is intended for use during extreme cold periods only. Extensive use of direct electrical heaters ONLY will result in higher electric usage and may reduce working life of heaters and related parts.

1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Cold weather function is highlighted.
2. Press CONFIRM.
3. Cold weather function screen is displayed.
4. To switch Cold weather function ON/OFF press F1.
5. To alter the temperature at which heater switching function starts use F3 and F4.



Cold weather function screen

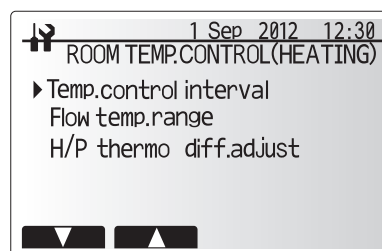
Note:

- Range of outdoor ambient temperature is -15°C to -10°C (default -15°C).
- System shall automatically return to routine operation. This will happen when the outdoor ambient temp rises above the selected temp for this specific mode of operation.

<Room Temp. Control (Heating)>

This function allows operational setting of flow temperature range from the Eco-dan and also the time interval at which the FTC4 collects and processes data for the auto adaptation mode.

1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Room temp. control (Heating) is highlighted.
2. Press CONFIRM.
3. Use F1 and F2 keys to scroll through the menu selecting each subtitle in turn by pressing CONFIRM. See the table below for description of each setting.
4. Enter the desired number using the function keys and press CONFIRM.



Room temp. control (Heating) screen

Menu subtitle	Function	Range	Unit	Default	
Temp. control interval	Selectable according to the heat emitter type and the materials of floor (i.e. radiators, floor heating-thick, -thin concrete, wood, etc.)	10 - 60	mins.	10	
Flow temperature range	Minimum temp.	To minimize the loss by frequent ON and OFF in mild outdoor ambient temp. seasons.	25 - 45	°C	30
	Maximum temp.	To set max. possible flow temp according to the type of heat emitters.	35 - 60	°C	50
Heat pump thermo diff.adjust	On/Off	To minimize the loss by frequent ON and OFF in mild outdoor ambient temp. seasons.	On/Off	—	On
	Lower limit	Prohibits heat pump operation until the flow temperature drops below the target flow temperature minus lower limit value.	-9 - -1	°C	-5
	Upper limit	Allows heat pump operation until the flow temperature rises above the target flow temperature plus upper limit value.	+3 - +5	°C	+5

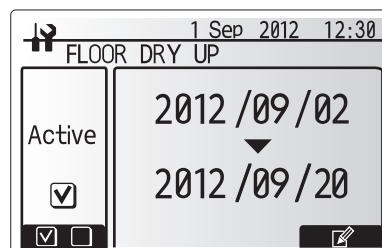
*1 The minimum flow temperature that prohibits heat pump operation is 20°C.

*2 The maximum flow temperature that allows heat pump operation equals to the maximum temperature set in the flow temp. range menu.

<Floor dry up function>

The Floor dry up function automatically changes the target hot water temperature in stages to gradually dry concrete when this particular type of underfloor heating system is installed.

1. Turn off the system using the main controller.
2. From the Operation settings in the service menu, use F1 and F2 buttons to scroll through the list until Floor dry up function is highlighted.
3. Press CONFIRM to display the FLOOR DRY UP screen.
4. To change settings, press F4. For details on settings, refer to the table below.
5. To start the Floor dry up operation, press F1 button to check a box below "Active" and press CONFIRM



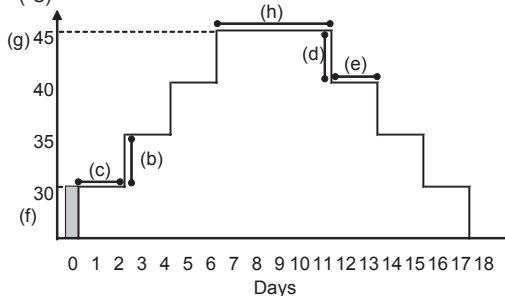
*1. Upon completion of the operation the system stops all the operations except the Freeze stat. operation.

*2. For Floor dry up function, the target flow temp. of Zone1 is the same as that of Zone2.

Note:

- This function is not available when a PUHZ-FRP outdoor unit is connected.
- Disconnect wiring to signal inputs of room thermostat, demand control, and outdoor thermostat, or the target flow temp. may not be maintained.

Target flow temp. (°C)



Functions	Symbol	Description	Option/Range	Unit	Default
Floor dry up function	a	Set the function to ON and power on the system using the main controller, and the dry up heating operation will start.	On/Off	-	Off
Flow temp. (increase)	Flow temp. increase step	Sets the increase step of the target flow temp.	+1 - +10	°C	+5
	Increase interval	Sets the period for which the same target flow temp is maintained.	1 - 7	day	2
Flow temp. (decrease)	Flow temp. decrease step	Sets the decrease step of the target flow temp.	-1 - -10	°C	-5
	Decrease interval	Sets the period for which the same target flow temp is maintained.	1 - 7	day	2
Target temperature	Start & Finish	Sets the target flow temp. at the start and the finish of the operation.	25 - 60	°C	30
	Max. target temp.	Sets the maximum target flow temp.	25 - 60	°C	45
	Max. temp. period	Sets the period for which the maximum target flow temp. is maintained.	1 - 20	day	5

External input settings

From the service menu use F1 and F2 buttons to highlight External input settings then press CONFIRM.

<Demand control (IN4)>

1. From the External input settings menu highlight Demand control (IN4).
2. Press CONFIRM.

3. The Demand control screen is displayed.
4. Press F3 button to select Heat source OFF or Boiler.
5. Press CONFIRM.

Note: The selection of "OFF", whilst a signal is being sent to IN4, forcefully stops all the heat source operations and the selection of "Boiler" stops operations of heat pump and electric heater and performs boiler operation.

<Outdoor thermostat (IN5)>

1. From the External input settings menu highlight Outdoor thermostat (IN5).
2. Press CONFIRM.
3. The Outdoor thermostat screen is displayed.
4. Press F3 button to select Heater or Boiler.
5. Press CONFIRM.

Note: The selection of "Heater", whilst a signal is being sent to IN5, performs electric-heater-only operation and the selection of "Boiler" performs boiler operation.

Password protection

Password protection is available to prevent unauthorised access to the service menu by untrained persons.

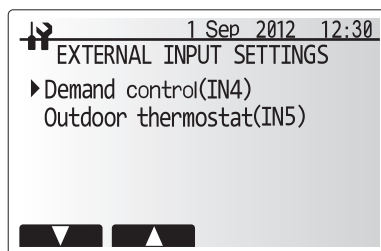
1. From the service menu use F1 and F2 buttons to scroll through list until *Password protection* is highlighted.
2. Press CONFIRM.
3. When password input screen is displayed use buttons F1 and F2 to move left and right between the four digits, F3 to lower the selected digit by 1, and F4 to increase the selected digit by 1.
4. When you have input your password press CONFIRM.

5. The password verify screen is displayed.
6. To verify your new password press button F3.
7. Your password is now set and the completion screen is displayed.

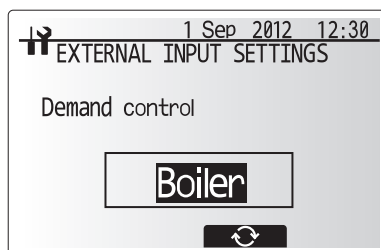
<Resetting the password>

If you forget the password you entered, or have to service a unit somebody else installed, you can reset the password to the factory default of 0000.

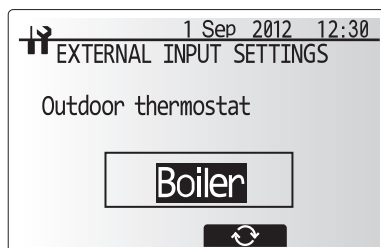
1. From the main settings menu scroll down the functions until Service Menu is highlighted.
2. Press CONFIRM.
3. You will be prompted to enter a password.
4. Hold down buttons F3 and F4 together for 3 secs
5. You will be asked if you wish to continue and reset the password to default setting.
6. To reset press button F3.
7. The password is now reset to 0000.



External input settings menu screen



Demand control screen



Outdoor thermostat setting screen



Password input screen



Password verify screen

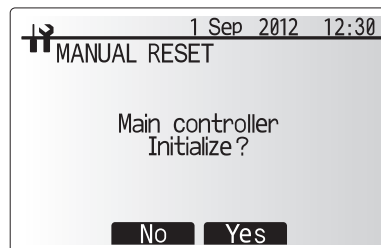
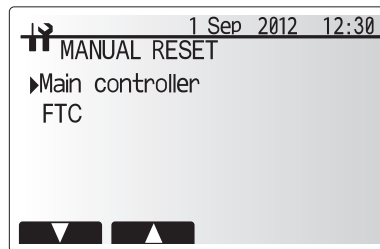


Completion screen

Manual reset

Should you wish to restore the factory settings at any time you should use the manual reset function. Please note this will reset ALL functions to the factory default settings.

1. From the service menu use F1 and F2 buttons to scroll through list until Manual Reset is highlighted.
2. Press CONFIRM.
3. The Manual reset screen is displayed.
4. Choose either Manual Reset for FTC4 or Main Controller.
5. Press F3 button to confirm manual reset of chosen device.



SD card

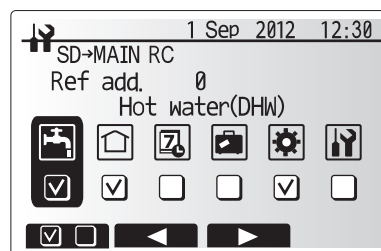
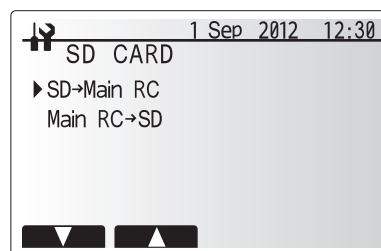
The use of an SD memory card simplifies the main controller settings in the field.

*Ecodan service tool (for use with PC tool) is necessary for the setting.

<SD → Main RC>

1. From the SD card setting use F1 and F2 buttons to scroll through list until "SD → Main RC" is highlighted.
2. Press CONFIRM.
3. Press F3 and F4 buttons to set the Ref. address. *1
4. Use F1, F2 and F3 buttons to select a menu to write to the main controller.
5. Press CONFIRM to start downloading.
6. Wait for a few minutes until "Complete!" appears.

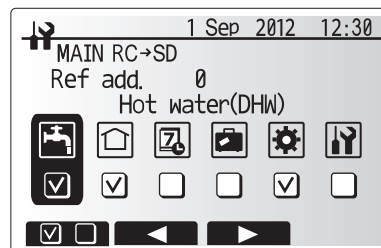
*1 For multiple outdoor units control system only.



<Main RC → SD>

1. From the SD card setting use F1 and F2 buttons to scroll through list until Main RC → SD is highlighted.
2. Press CONFIRM.
3. Press F3 and F4 buttons to set the Ref. address. *1
4. Use F1, F2 and F3 buttons to select a menu to write to the SD memory card.
5. Press CONFIRM to start uploading.
6. Wait for a few minutes until "Complete!" appears.

*1 For multiple outdoor units control system only.



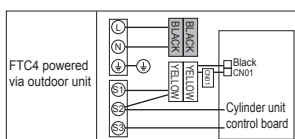
7.1. Cylinder unit

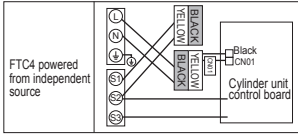
The indoor cylinder unit is UNVENTED. Under UK law* the system must be serviced **once a year** by a qualified individual. Servicing and maintenance of the outdoor unit should only be done by a Mitsubishi Electric trained technician with relevant qualifications and experience. Any electrical work should be done by a tradesperson with the appropriate electrical qualifications. Any maintenance or 'DIY' fixes done by a non-accredited person could invalidate the Warranty and/or result in damage to the cylinder unit and injury to the person.

* Building regulations – England & Wales Part G3, Scotland P3, Northern Ireland P5. If outside of the UK please refer to local building regulations regarding unvented hot water storage.

Basic Troubleshooting for Cylinder Unit

No.	Fault symptom	Possible cause	Explanation - Solution
1	Main controller display is blank.	<ol style="list-style-type: none"> There is no power supply to main controller. Power is supplied to main controller, however, the display on the main controller does not appear. 	<ol style="list-style-type: none"> Check LED2 on FTC4. (See <Figure 3.1.2>.) <ol style="list-style-type: none"> When LED2 is lit. Check for damage or contact failure of the main controller wiring. When LED2 is blinking. Refer to No. 5 below. When LED2 is not lit. Refer to No. 4 below. Check the following: <ul style="list-style-type: none"> Disconnection between the main controller cable and the FTC4 control board Failure of the main controller if "Please Wait" is not displayed. Refer to No. 2 below if "Please Wait" is displayed.
2	"Please Wait" remains displayed on the main controller.	<ol style="list-style-type: none"> "Please Wait" is displayed for up to 6 minutes. Communication failure between the main controller and FTC4. Communication failure between FTC4 and outdoor unit. 	<ol style="list-style-type: none"> Normal operation. 3. Main controller start up checks/procedure. <ol style="list-style-type: none"> If "0%" or "50-99%" is displayed below "Please Wait" there is a communication error between the main controller and the FTC4 control board. <ul style="list-style-type: none"> Check wiring connections on the main controller. Replace the main controller or the FTC4 control board. If "1-49%" is displayed there is a communication error between the outdoor unit's and FTC4's control boards. <ul style="list-style-type: none"> Check the wiring connections on the outdoor unit control board and the FTC4 control board. (Ensure S1 and S2 are not cross-wired and S3 is securely wired with no damage. (See section 3.1.4.)) Replace the outdoor unit's and/or the FTC4's control boards.
3	The main screen appears with a press of the "ON" button, but disappears in a second.	The main controller operations do not work for a whilst after the settings are changed in the service menu. This is because the system takes time to apply the changes.	Normal operation. The indoor unit is applying updated settings made in the service menu. Normal operation will start shortly.
4	LED2 on FTC4 is off. (See <Figure 3.1.2>.)	<p>When LED1 on FTC4 is also off. (See <Figure 3.1.2>.) <FTC4 powered via outdoor unit.></p> <ol style="list-style-type: none"> The outdoor unit is not supplied at the rated voltage. Defective outdoor controller circuit board. FTC4 is not supplied with 220 to 240V AC. FTC4 failure. Faulty connector wiring. 	<ol style="list-style-type: none"> Check the voltage across the terminals L and N or L3 and N on the outdoor power board. (See section 3.1.4.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check wiring of the outdoor unit and of the breaker. When the voltage is at 220 to 240V AC, go to "2." below. Check the voltage across the outdoor unit terminals S1 and S2. (See section 3.1.4.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check the fuse on the outdoor control board and check for faulty wiring. When the voltage is 220 to 240V AC, go to "3." below. Check the voltage across the indoor unit terminals S1 and S2. (See section 3.1.4.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check FTC4-outdoor unit wiring for faults. When the voltage is 220 to 240V AC, go to "4." below. Check the FTC4 control board. <ul style="list-style-type: none"> Check the fuse on FTC4 control board. Check for faulty wiring. If no problem found with the wiring, the FTC4 control board is faulty. Check the connector wiring. <ul style="list-style-type: none"> When the connectors are wired incorrectly, re-wire the connectors referring to below. (See section 3.1.4.)



No.	Fault symptom	Possible cause	Explanation - Solution
4	LED2 on FTC4 is off. (See Figure <3.1.2>)	<FTC4 powered on independent source> 1. FTC4 is not supplied with 220 to 240V AC. 2. There are problems in the method of connecting the connectors. 3. FTC4 failure.	1. Check the voltage across the L and N terminals on the indoor power supply terminal block. (See section 3.1.4.) • When the voltage is not 220 to 240V AC, check for faulty wiring to power supply. • When the voltage is 220 to 240V AC, go to 2. below. 2. Check for faulty wiring between the connectors. • When the connectors are wired incorrectly re-wire them correctly referring to below. (See section 3.1.4 and a wiring diagram on the control and electrical box cover.)  • If no problem found with the wiring, go to 3. below. 3. Check the FTC4 control board. • Check the fuse on FTC4 control board. • Check for faulty wiring. • If no problem found with the wiring, the FTC4 control board is faulty.
		When LED1 on FTC4 is lit. Incorrect setting of refrigerant address for outdoor unit. (None of the refrigerant address is set to "0".)	Recheck the refrigerant address setting on the outdoor unit. Set the refrigerant address to "0". (Set refrigerant address using SW1(3 - 6) on outdoor controller circuit board.)
5	LED2 on FTC4 is blinking. (See Figure <3.1.2>)	When LED1 is also blinking on FTC4 . Faulty wiring between FTC4 and outdoor unit	Check for faulty wiring between FTC4 and outdoor unit.
		When LED1 on FTC4 is lit. 1. Faulty wiring in main controller Multiple indoor units have been wired to a single outdoor unit. 2. Short-circuited wiring in main controller 3. Main controller failure	1. Check for faulty wiring in main controller. The number of indoor units that can be wired to a single outdoor unit is one. Additional indoor units must be wired individually to a single outdoor unit. 2.3. Remove main controller wires and check LED2 on FTC4. (See Figure 3.1.2.) • If LED2 is blinking check for short circuits in the main controller wiring . • If LED2 is lit, wire the main controller again and: - if LED2 is blinking, the main controller is faulty; - if LED2 is lit, faulty wiring of the main controller has been corrected.
6	LED4 on FTC4 is off. (See figure <3.1.2>)	1. SD memory card is NOT inserted into the memory card slot with correct orientation. 2. Not an SD standards compliant memory card.	1. Correctly insert SD memory card in place until a click is heard. 2. Use an SD standards compliant memory card. (Refer to section 3.3.)
	LED4 on FTC4 is blinking. (See Figure <3.1.2>)	1. Full of data. 2. Write-protected. 3. NOT formatted. 4. Formatted in NTFS file system.	1. Move or delete data, or replace SD memory card with a new one. 2. Release the write-protect switch. 3. Refer to "3.3 Using SD memory card". 4. FTC4 is Not compatible with NTFS file system. Use an SD memory card formatted in FAT file system.
7	No water at hot tap.	1. Cold main off 2. Strainer (field supply) blocked.	1. Check and open stop cock. 2. Isolate water supply and clean strainer.
8	Cold water at tap.	1. Hot water run out. 2. Prohibit, schedule timer or holiday mode selected. 3. Heat pump not working. 4. Booster heater cut-out tripped. 5. The earth leakage circuit breaker for booster heater breaker (ECB1) tripped. 6. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button. 7. Immersion heater cut-out tripped. 8. Immersion heater breaker (ECB2) tripped. 9. 3-way valve fault	1. Ensure DHW mode is operating and wait for DHW tank to re-heat. 2. Check settings and change as appropriate. 3. Check heat pump – consult outdoor unit service manual. 4. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. See component parts diagram (section 3.) to find out its position. 5. Check the cause and reset if safe. 6. Check resistance across the thermal cut-out, if open then the connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer. 7. Check immersion heater thermostat and press reset button, located on immersion heater boss, if safe. If the heater has been operated with no water inside it may have failed, so please replace it with a new one. 8. Check the cause and reset if safe. 9. Check plumbing/wiring to 3-way valve. (i) Manually override 3-way valve using the main controller. (Refer to <Manual operation> in section 6.) If the valve does not still function, go to (ii) below. (ii) Replace 3-way valve coil. If the valve does not still function, go to (iii) below. (iii) Replace 3-way valve. (Refer to the service manual.)

No.	Fault symptom	Possible cause	Explanation - Solution
9	Water heating takes longer.	<ol style="list-style-type: none"> Heat pump not working. Booster heater cut-out tripped. Booster heater breaker (ECB1) tripped. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button. Immersion heater cut-out has been triggered. Immersion heater breaker (ECB2) tripped. 	<ol style="list-style-type: none"> Check heat pump – consult outdoor unit service manual. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. See component parts diagram (section 3.) to find out its position. Check the cause and reset if safe. Check resistance across the thermal cut-out, if open then connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer. Check immersion heater thermostat and press reset button located on immersion heater boss, if safe. If the heater kept running with no water inside, this may have resulted in failure, so replace it with a new one. Check the cause and reset if safe.
10	Temperature of DHW tank water dropped.	<p>When DHW operation is not running, the DHW tank emits heat and the water temperature decreases to a certain level. If water in the DHW tank is reheated frequently because of a significant drop in water temperature, check for the following.</p> <ol style="list-style-type: none"> Water leakage in the pipes that connect to the DHW tank Insulation material coming loose or off. 3-way valve failure 	<ol style="list-style-type: none"> Take the following measures. <ul style="list-style-type: none"> Retighten the nuts holding the pipes onto the DHW tank. Replace seal materials. Replace the pipes. Fix insulation. Check plumbing/wiring to 3-way valve. <ol style="list-style-type: none"> Manually override 3-way valve using the main controller. (Refer to <Manual operation> in section 6.) If the valve does not still function, go to (ii) below. Replace 3-way valve coil. If the valve does not still function, go to (iii) below. Replace 3-way valve. (Refer to the service manual.)
11	Hot or warm water from cold tap.	Heat of hot water pipe is transferred to cold water pipe.	Insulate/re-route pipework.
12	Water leakage	<ol style="list-style-type: none"> Poorly sealed connections of water circuit components Water circuit components reaching the end of life 	<ol style="list-style-type: none"> Tighten connections as required. Refer to PARTS CATALOG in the service manual for expected part lifetimes and replace them as necessary.
13	Heating system does not reach the set temperature.	<ol style="list-style-type: none"> Prohibit, schedule timer or holiday mode selected. Check settings and change as appropriate. The temperature sensor is located in a room that has a different temperature relative to that of the rest of the house. Heat pump not working. Booster heater cut-out tripped. Booster heater breaker (ECB1) tripped. The booster heater thermal cut-out tripped and can not be reset using the manual reset button. Incorrectly sized heat emitter. 3-way valve failure Battery problem (*wireless control only) If a mixing tank is installed, the flow rate between the mixing tank and the cylinder unit is less than that between the mixing tank and the local system. 	<ol style="list-style-type: none"> Check settings and change as appropriate. Check the battery power and replace if flat. Relocate the temperature sensor to a more suitable room. Check heat pump – consult outdoor unit service manual. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. (See component parts diagram section 3. for position.) Check the cause of the trip and reset if safe. Check resistance across the thermal cut-out, if open then the connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer. Check the heat emitter surface area is adequate. Increase size if necessary. Check plumbing/wiring to 3-way valve. <ol style="list-style-type: none"> Manually override 3-way valve using the main controller. (Refer to <Manual operation> in 6.). If the 3-way valve does not function, go to (ii) below. Replace 3-way valve coil. If the 3-way valve coil is replaced but the 3-way valve does not function go to (iii) below. Replace 3-way valve. (Refer to the service manual.) Check the battery power and replace if flat. Increase the flow rate between the mixing tank and the cylinder unit decrease that between the mixing tank and the local system.

No.	Fault symptom	Possible cause	Explanation - Solution
14	In 2-zone temperature control, only Zone2 does not reach the set temperature.	<ol style="list-style-type: none"> When Zone1 and Zone2 are both in heating mode, the hot water temperature in Zone2 does not exceed that in Zone1. Faulty wiring of motorized mixing valve Faulty installation of motorized mixing valve Incorrect setting of Running time Motorized mixing valve failure 	<ol style="list-style-type: none"> Normal action no action necessary. Refer to "3.5 Wiring for 2-zone temperature control". Check for correct installation. (Refer to the manual included with each motorized mixing valve.) Check for correct setting of Running time. Inspect the mixing valve. (Refer to the manual included with each motorized mixing valve.)
15	When a PUHZ-FRP outdoor unit is connected, DHW or Heating operation cannot run.	The outdoor unit is set to have operation of the indoor unit of air conditioner take precedence over that of the cylinder unit, and in the main controller settings "Electric heater (Heating)" or "Electric heater (DHW)" is turned off.	Turn ON Electric heater (Heating) or Electric heater (DHW) using the main controller.
16	When a PUHZ-FRP outdoor unit is connected and is in heat recovery operation, the set temperature is not reached.	When the outdoor unit is set to have cooling operation of the indoor unit of air conditioner take precedence over that of the cylinder unit, the outdoor unit controls the frequency of the compressor according to the load of air conditioner. The DHW and heating run according to that frequency.	Normal operation no action necessary. If Air-to-Water system is given priority in operation, comp Hz can be regulated depending on the load of DHW or Heating. For more details, refer to the PUHZ-FRP installation manual.
17	After DHW operation room temperature rises slightly.	At the end of the DHW mode operation the 3-way valve diverts hot water away from the DHW circuit into space heating circuit. This is done to prevent the cylinder unit components from overheating. The amount of hot water directed into the space heating circuit varies according to the type of the system and of the pipe run between the plate heat exchanger and the cylinder unit.	Normal operation no action necessary.
18	The room temperature rises during DHW operation.	3-way valve failure	Check the 3-way valve. (i) Manually override 3-way valve using the main controller. (Refer to <Manual operation> in 6.). If the 3-way valve does not function, go to (ii) below. (ii) Replace 3-way valve coil. If the 3-way valve coil is replaced but the 3-way valve does not function go to (iii) below. (iii) Replace 3-way valve. (Refer to the service manual.)
19	Water discharges from pressure relief valve. (Primary circuit)	<ol style="list-style-type: none"> If continual – pressure relief valve may be damaged. If intermittent – expansion vessel charge may have reduced/bladder perished. 	<ol style="list-style-type: none"> Turn the handle on the pressure relief valve to check for foreign objects in it. If the problem is not still solved, replace the pressure relief valve with a new one. Check pressure in expansion vessel. Recharge to 1 bar if necessary. If bladder perished replace expansion vessel with a new one.
20	Water discharges from pressure relief valve (accessory supplied item). (Sanitary circuit)	<ol style="list-style-type: none"> If continual – field supplied pressure reducing valve not working. If continual – pressure relief valve seat may be damaged. If intermittent – expansion vessel charge may have reduced/bladder perished. DHW tank may have subjected to backflow. 	<ol style="list-style-type: none"> Check function of pressure reducing valve and replace if necessary. Turn the handle on the pressure relief valve to check for foreign objects inside. If the problem is not still solved, replace the pressure relief valve. Check gas-side pressure in expansion vessel. Recharge to correct precharge pressure if necessary. If bladder perished replace expansion vessel with a new one with appropriate pre-charge. Check gas-side pressure in DHW tank. If pressure in DHW tank is similar to that in incoming mains, cold water supply that merges with incoming mains water supply could flow back to DHW tank. Investigate source of back-feed and rectify error in pipework/fitting configuration. Adjust pressure in cold supply.
21	Water discharges from temperature and pressure relief valve (EHPT20X-VM2HB only) (Sanitary circuit)	<ol style="list-style-type: none"> If continual – field supplied pressure reducing valve not working. If continual – temperature and pressure relief valve may be damaged. If intermittent – expansion vessel charge may have reduced/bladder perished. DHW tank may have subjected to backflow. Unit has overheated – thermal controls have failed. 	<ol style="list-style-type: none"> Check function of pressure reducing valve and replace if necessary. Turn the handle on the temperature and pressure relief valve to check for foreign objects inside. If the problem is not still solved, replace the temperature and pressure relief valve with a new one. Check gas-side pressure in expansion vessel. Recharge to correct precharge pressure if necessary. If bladder perished replace expansion vessel with a new one with appropriate pre-charge. Check pressure in DHW tank. If pressure in DHW tank is similar to that in incoming mains, cold water supply that merges with incoming mains water supply could flow back to DHW tank. Investigate source of back-feed and rectify error in pipework/fitting configuration. Adjust pressure in cold supply. Switch off power to the heat pump and immersion heaters. Leave water running. Wait until discharge stops. Isolate water supply and replace if faulty.

No.	Fault symptom	Possible cause	Explanation - Solution
22	Water discharges from expansion relief valve - part of Inlet Control Group (EHPT20X-VM2HB only) (sanitary circuit).	1. If continual – field supplied pressure reducing valve not working. 2. If continual – expansion relief valve may be damaged. 3. If intermittent – expansion vessel charge may have reduced/bladder perished. 4. DHW tank may have subjected to backflow. 5. Unit has overheated – thermal controls have failed.	1. Check function of pressure reducing valve and replace if necessary. 2. Turn the handle on the expansion relief valve to check for foreign objects inside. If the problem is not still solved, replace the expansion relief valve with a new one. 3. Check gas-side pressure in expansion vessel. Recharge to correct precharge pressure if necessary. If bladder perished replace expansion vessel with a new one with appropriate precharge. 4. Check pressure in DHW tank. If pressure in DHW tank is similar to that in incoming mains, cold water supply that merges with incoming mains water supply could flow back to DHW tank. Investigate source of back-feed and rectify error in pipework/fitting configuration. Adjust pressure in cold supply. 5. Switch off power to the heat pump and immersion heaters. Leave water running. Wait until discharge stops. Isolate water supply and replace if faulty.
23	Noisy water circulation pump	Air in water circulation pump.	Use manual and automatic air vents to remove air from system. Top up water if necessary to achieve 1 bar on primary circuit.
24	Noise during hot water draw off typically worse in the morning.	1. Loose airing cupboard pipework. 2. Heaters switching on/off.	1. Install extra pipe fastening clips. 2. Normal operation no action necessary.
25	Mechanical noise heard coming from the cylinder unit.	1. Heaters switching on/off. 2. 3-way valve changing position between DHW and heating mode.	Normal operation no action necessary.
26	Water circulation pump runs for a short time unexpectedly.	Water circulation pump jam prevention mechanism (routine) to inhibit the build-up of scale.	Normal operation no action necessary.
27	Milky/Cloudy water (Sanitary circuit)	Oxygenated water	Water from any pressurised system will release oxygen bubbles when water is running. The bubbles will settle out.
28	Heating mode has been on standby for a long time (does not start operation smoothly.)	The time of "Delay" set in "Economy settings for pump" is too short. (Go to "Service menu" → "Auxiliary settings" → "Economy settings for pump").	Increase the time of "Delay" in "Economy settings for pump" .
29	The cylinder unit that was running in the heating mode before power failure is running in the DHW mode after power recovery.	The cylinder unit is designed to run in an operation mode with a higher priority (i.e. DHW mode in this case) at power recovery.	• Normal operation. • After the DHW max. operation time has elapsed or the DHW max. temperature has been reached, the DHW mode switches to the other mode (ex. Heating mode).

■ Annual Maintenance

It is essential that the cylinder unit is serviced at least once a year by a qualified individual any spare parts required should be purchased from Mitsubishi Electric. **NEVER** bypass safety devices or operate the unit without them being fully operational.

<Draining the cylinder unit and its primary heating circuit (local)>

WARNING: DRAINED WATER MAY BE VERY HOT

- Before attempting to drain the cylinder unit isolate from the electrical supply to prevent the immersion and booster heaters burning out.
- Isolate cold water feed to DHW tank.
- Attach a hose to the DHW tank drain cock. The hose should be able to withstand heat as the draining water could be very hot. The hose should drain to a place lower than the DHW tank bottom to encourage siphoning. Open a hot water tap to start draining without a vacuum.
- When the DHW tank is drained close drain cock and hot tap.
- Attach hose to booster heater drain cock and water circuit drain cock. The hose should be able to withstand heat as the draining water could be very hot. The hose should drain to a place lower than the booster heater drain cock to encourage siphoning. Open the pump valves and the strainer valves.
- Water remains in the strainer still after the cylinder unit was drained. Drain the strainer by removing the strainer cover.

<Annual maintenance points>

Use the Annual Maintenance Log Book as a guide to carrying out the necessary checks on the cylinder unit and outdoor unit.

■ Error Codes (Cylinder unit)

Code	Error	Action
L3	Circulation water temperature overheat protection	Flow rate may be reduced check for; <ul style="list-style-type: none"> • Water leakage • Strainer blockage • Water circulation pump function (Error code may display during filling of primary circuit, complete filling and reset error code.)
L4	DHW tank water temperature overheat protection	Check the immersion heater and it's contactor.
L5	Indoor unit temperature thermistor (THW1, THW2, THW5, THW6, THW7, THW8, THW9) failure	Check resistance across the thermistor.
L6	Circulation water freeze protection	See Action for L3.
L8	Heating operation error	Re-attach any thermistors that have become dislodged.
L9	Low primary circuit flow rate detected by flow switch (flow switches 1, 2, 3)	See Action for L3. If the flow switch itself does not work, replace it. Caution: The pump valves may be hot, please take care.
LC	Boiler circulation water temperature overheat protection	Check if the setting temperature of the Boiler for heating exceeds the restriction. (See the manual of the thermistors "PAC-TH011HT-E") Flow rate of the heating circuit from the boiler may be reduced. Check for <ul style="list-style-type: none"> • water leakage, • strainer blockage • water circulation pump function.
LD	Boiler temperature thermistor (THWB1, THWB2) failure	Check resistance across the thermistor.
LE	Boiler operation error	See Action for L8. Check the status of the boiler.
LH	Boiler circulation water freeze protection	Flow rate of the heating circuit from the boiler may be reduced. Check for <ul style="list-style-type: none"> • water leakage • strainer blockage • water circulation pump function.
LL	Setting errors of Dip switches on FTC4 control board	For boiler operation, check that Dip SW1-1 is set to ON (With Boiler) and Dip SW2-6 is set to ON (With Mixing Tank). For 2-zone temperature control, check Dip SW2-7 is set to ON (2-zone) and Dip SW2-6 is set to ON (With Mixing Tank).
J0	Communication failure between FTC4 and wireless receiver	Check connection cable for damage or lose connections.
P1	Thermistor (Room temp.) (TH1) failure	Check resistance across the thermistor.
P2	Thermistor (Ref. liquid temp.) (TH2) failure	Check resistance across the thermistor.
P6	Anti-freeze protection of plate heat exchanger	See Action for L3. Check for correct amount of refrigerant.
J1 - J8	Communication failure between wireless receiver and wireless remote controller	Check wireless remote controller's battery is not flat. Check the pairing between wireless receiver to wireless remote controller. Test the wireless communication. (See the manual of wireless system)
E0 - E5	Communication failure between main controller and FTC4	Check connection cable for damage or loose connections.
E6 - EF	Communication failure between FTC4 and outdoor unit	Check that the outdoor unit has not been turned off. Check connection cable for damage or loose connections. Refer to outdoor unit service manual.
E9	Outdoor unit receives no signal from indoor unit.	Check both units are switched on. Check connection cable for damage or loose connections. Refer to outdoor unit service manual.
U*, F*	Outdoor unit failure	Refer to outdoor unit service manual.

Note: To cancel error codes please switch system off (Press button E, on Main Controller, for 3 secs).

■ Engineers Forms (Cylinder unit)

Should settings be changed from default, please enter and record new setting in 'Field Setting' column. This will ease resetting in the future should the system use change or the circuit board need to be replaced.

Commissioning/Field settings record sheet

Main controller screen		Parameters	Default setting	Field setting	Notes	
Main	Zone1 heating room temp.		10°C - 30°C	20°C		
	Zone2 heating room temp. *1		10°C - 30°C	20°C		
	Zone1 heating flow temp.		25°C - 60°C	45°C		
	Zone2 heating flow temp. *1		25°C - 60°C	35°C		
	Zone1 heating compensation curve		-9°C - +9°C	0°C		
	Zone2 heating compensation curve *1		-9°C - +9°C	0°C		
	Holiday mode		Active/Non active/Set time	—		
Option	Forced DHW operation		On/Off	—		
	DHW		On/Off/Timer	On		
	Heating		On/Off/Timer	On		
	Holiday mode		Active/Non active/Set time	—		
Setting	DHW	Operation mode		Normal/Eco	Normal	
		DHW max. temp.		40°C - 60°C	50°C	
		DHW temp. drop		5°C - 30°C	10°C	
		DHW max. operation time		30 - 120 mins	60 mins	
		DHW mode restriction		30 - 120 mins	30 mins	
		Legionella prevention		Active	Yes	
	Legionella prevention	Hot water temp.		60°C - 70°C	65°C	
		Frequency		1 - 30 days	15 days	
		Start time		00.00 - 23.00	03.00	
		Max. operation time		1 - 5 hours	3 hours	
		Duration of maximum temp.		1 - 120 mins	30 min	
		Heating		Zone1 operation mode	Room temp/Flow temp/Compensation curve	
		Zone2 operation mode *1		Room temp/Flow temp/Compensation curve	Compensation curve	
		Compensation curve	Hi set point	Zone1 outdoor ambient temp.		-15°C - +35°C
	Zone1 flow temp.			25°C - 60°C	50°C	
	Zone2 outdoor ambient temp. *1			-15°C - +35°C	-15°C	
	Zone2 flow temp. *1			25°C - 60°C	40°C	
	Lo set point		Zone1 outdoor ambient temp.		-15°C - +35°C	35°C
			Zone1 flow temp.		25°C - 60°C	25°C
			Zone2 outdoor ambient temp. *1		-15°C - +35°C	35°C
			Zone2 flow temp.		25°C - 60°C	25°C
	Adjust		Zone1 outdoor ambient temp.		-14°C - +34°C	—
			Zone1 flow temp.		25°C - 60°C	—
			Zone2 outdoor ambient temp. *1		-14°C - +34°C	—
			Zone2 flow temp. *1		25°C - 60°C	—
	Holiday	DHW		Active/Non active	Non active	
		Heating		Active/Non active	Active	
		Zone1 heating room temp.		10°C - 30°C	15°C	
		Zone2 heating room temp. *1		10°C - 30°C	15°C	
		Zone1 heating flow temp.		25°C - 60°C	35°C	
		Zone2 heating flow temp. *1		25°C - 60°C	25°C	
	Initial settings	Language		ENG/FR/GER/SW/SP/IT/DA/NL/FIN/NOR/PT	ENG	
°C/°F		°C/°F	°C			
Temp. display		Room/DHW tank/Room&DHW tank /Off	Off			
Time display		hh:mm/hh:mm AM/AM hh:mm	hh:mm			
Room sensor settings for Zone1		TH1/Main RC/Room RC1-8/"Time/Zone"	TH1			
Room sensor settings for Zone2 *1		TH1/Main RC/Room RC1-8/"Time/Zone"	TH1			
Room RC zone select *1		Zone1/Zone2	Zone1			
Service menu	Thermistor adjustment	THW1		-10°C - +10°C	0°C	
		THW2		-10°C - +10°C	0°C	
		THW5		-10°C - +10°C	0°C	
		THW6		-10°C - +10°C	0°C	
		THW7		-10°C - +10°C	0°C	
		THW8		-10°C - +10°C	0°C	
		THW9		-10°C - +10°C	0°C	
		THWB1		-10°C - +10°C	0°C	
		THWB2		-10°C - +10°C	0°C	
	Auxiliary settings	Economy settings for pump.		On/Off *4	On	
		Time before pump switched off (3 - 60 mins) *2		10 mins		
		Electric heater (Heating)		Space heating: On (used)/Off (not used)	On	
		Electric heater delay timer (5 - 180 mins)		30 mins		
		Electric heater (DHW)		DHW: On (used)/Off (not used)	On	
		Electric heater delay timer (15 - 30 mins)		15 mins		
Mixing valve control		Running (10 - 240 secs)	120 secs			
Interval (1 - 30 mins)		2 mins				
Pump speed		Pump speed (1 - 5)	5			

*1 The settings related to Zone2 can be switched only when Zone2 temperature control is enabled (when Dip SW2-6 and SW2-7 are ON).

*2 Decreasing "time before pump switched off" may increase the duration of stand-by in Heating mode.

(From the previous page.)

Engineers Forms (Cylinder unit)

Commissioning/Field settings record sheet (continued from the previous page)

Main controller screen		Parameters		Default setting	Field setting	Notes			
Service menu	Heat source setting	Standard/Heater/Boiler/Hybrid *3		Standard					
		Operation settings	Freeze stat function	Outdoor ambient temp. (3 - 20°C)	5°C				
			Simultaneous operation (DHW/ Heating)	On/Off *4		Off			
		Outdoor ambient temp. (-15 - +10°C)			-15°C				
		Cold weather function	On/Off *4		Off				
			Outdoor ambient temp. (-15 - -10°C)		-15°C				
		Room temp control (Heating)	Temp. control interval (10 - 60 mins)		10 mins				
			Flow temp. range	Min. temp. (25 - 45°C)	30°C				
				Max. temp. (35 - 60°C)	50°C				
			Heat pump thermo diff. adjust	On/Off *4		On			
				Lower limit (-9 - -1°C)		-5°C			
		Upper limit (+3 - +5°C)			5°C				
		Boiler operation	Hybrid settings	Outdoor ambient temp. (-15 - +10°C)		-15°C			
				Priority mode (Ambient/ Cost/CO ₂)		Ambient			
			Intelligent settings	Energy price *5	Electricity (0.001 - 999 */kWh)		0.5 */kWh		
					Boiler (0.001 - 999 */kWh)		0.5 */kWh		
				CO ₂ emission	Electricity (0.001 - 999 kg -CO ₂ /kWh)		0.5 kg -CO ₂ /kWh		
			Boiler (0.001 - 999 kg -CO ₂ / kWh)			0.5 kg -CO ₂ / kWh			
			Heat source	Heat pump capacity (1 - 40 kW)		11.2 kW			
				Boiler efficiency (25 - 150%)		80%			
				Booster heater 1 capacity (1 - 20 kW)		2 kW			
				Booster heater 2 capacity (1 - 20 kW)		4 kW			
			Floor dry up function	On/Off *4			Off		
				Target temp.	Start&Finish (25 - 60°C)		30°C		
					Max. temp. (25 - 60°C)		45°C		
		Max. temp. period (1 - 20 days)				5 days			
		Flow temp. (Increase)		Temp. increase step (+1 - +10°C)		+5°C			
				Increase interval (1 - 7 days)		2 days			
Flow temp. (Decrease)	Temp. decrease step (-1 - -10°C)			-5°C					
	Decrease interval (1 - 7 days)		2 days						
External input settings	Demand control (IN4)	Heat source OFF/Boiler operation		Boiler operation					
	Outdoor thermostat (IN5)	Heater operation/Boiler operation		Boiler operation					

*3 When Dip SW1-1 is set to OFF "WITHOUT Boiler" or SW2-6 is set to OFF "WITHOUT Mixing tank", neither Boiler nor Hybrid can be selected.

*4 On: the function is active; Off: the function is inactive.

5 "" of "*/kwh" represents currency unit (e.g. € or £ or the like)

Annual Maintenance Log Book (Cylinder unit)

Contractor name		Engineer name	
Site name		Site number	

Cylinder unit maintenance record sheet

Warranty number		Model number	
		Serial number	

No.	Mechanical	Frequency	Notes
1	Turn OFF water supply, drain DHW tank, remove mesh from strainer clean and replace in strainer. *1		
2	Keep water supply OFF, open hot water taps and check the primary-side expansion vessel charge pressure. Top up if necessary (1 bar).		
3	Keep water supply OFF and check the potable vessel charge pressure. Top up if necessary (3.5 bar).		
4	Keep water supply OFF. In hard water areas de-scaling of the immersion heaters may be required.		
5	Drop the primary/heating system pressure to zero check and if necessary top up the expansion vessel (1 bar). Air valve of expansion vessel is TR-412.		
6	Turn water supply ON, open the pressure relief valve and then the expansion relief valve in turn. Check for unrestricted discharge to the tundish and that the valves reseal correctly. Check there are no blockages in the tundish and associated pipework.		
7	Check and if necessary top up the concentration of anti-freeze/inhibitor (if used in the system).		
8	Top up the primary/heating system using a temporary backflow prevention filling loop and re-pressurise to 1 bar.		
9	Heat system and check pressure does not rise above 3 bar and no water is released from the safety valves.		
10	Release any air from the system.		
11	To check the 3-way valve for inside leaks, confirm that the temperature of the heat emitter does not rise when running the DHW mode.		
Refrigerant models only [except EHPT20 series]		Frequency	Notes
1	Refer to outdoor unit manual.		
Electrical		Frequency	Notes
1	Check condition of cables.		
2	Check rating and fuse fitted on the electricity supply.		
Controller		Frequency	Notes
1	Check field settings against factory recommendations.		
2	Check operation of motorized valves ensure they reseal correctly.		
3	Check battery power of wireless thermostat and replace if necessary.		

Outdoor heat pump unit maintenance record sheet

Model number		Serial number	
No.	Mechanical	Frequency	Notes
1	Inspect grill and air inlet for trapped debris/damage.		
2	Check condensate drain provision.		
3	Check integrity of water pipework and insulation.		
4	Check all electrical connections.		
5	Check and record the operation voltage.		

* Checks should be carried out once a year.

*1 Be sure to reattach the mesh after washing.

Note: Within the first couple of months of installation, remove and clean the cylinder unit's strainer plus any that are fitted external to the cylinder unit. This is especially important when installing on an existing system.

In addition to annual servicing it is necessary to replace or inspect some parts after a certain period of system operation. Please see tables below for detailed instructions. Replacement and inspection of parts should always be done by a competent person with relevant training and qualifications.

Parts which require regular replacement

Parts	Replace every	Possible failures
Pressure relief valve (PRV) Air vent (Auto/Manual) Drain cock (Primary circuit) Flexible hose Manometer Inlet control group (ICG)*	6 years	Water leakage due to brass/copper corrosion (Dezincification)

* OPTIONAL PARTS for UK

Parts which require regular inspection

Parts	Check every	Possible failures
Immersion heater	2 years	Earth leakage causing circuit breaker to activate (Heater is always OFF)
Water circulation pump	20,000 hrs (3 years)	Water circulation pump failure

Parts which must NOT be reused when servicing

* O-ring

* Gasket

Note: Always replace the gasket for pump with a new one at each regular maintenance (every 20,000 hours of use or every 3 years).

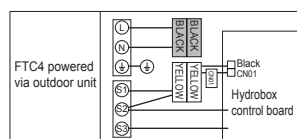
7.2. Hydrobox

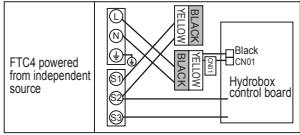
The indoor hydrobox must be serviced **once a year** by a qualified individual. Servicing and maintenance of the outdoor unit should only be done by a Mitsubishi Electric trained technician with relevant qualifications and experience. Any electrical work should be done by a tradesperson with the appropriate electrical

qualifications. Any maintenance or 'DIY' fixes done by a non-accredited person could invalidate the Warranty and/or result in damage to the hydrobox and injury to the person.

Basic Troubleshooting for Hydrobox

No.	Fault symptom	Possible cause	Explanation - Solution
1	Main controller display is blank.	<ol style="list-style-type: none"> There is no power supply to main controller. Power is supplied to main controller, however, the display on the main controller does not appear. 	<ol style="list-style-type: none"> Check LED2 on FTC4. (See <Figure 3.2.2>.) <ol style="list-style-type: none"> When LED2 is lit. Check for damage or contact failure of the main controller wiring. When LED2 is blinking. Refer to No. 5 below. When LED2 is not lit. Refer to No. 4 below. Check the following: <ul style="list-style-type: none"> Disconnection between the main controller cable and the FTC4 control board Failure of the main controller if "Please Wait" is not displayed. Refer to No. 2 below if "Please Wait" is displayed.
2	"Please Wait" remains displayed on the main controller.	<ol style="list-style-type: none"> "Please Wait" is displayed for up to 6 minutes. Communication failure between the main controller and FTC4. Communication failure between FTC4 and outdoor unit. 	<ol style="list-style-type: none"> Normal operation. 3. Main controller start up checks/procedure. <ol style="list-style-type: none"> If "0%" or "50-99%" is displayed below "Please Wait" there is a communication error between the main controller and the FTC4 control board. <ul style="list-style-type: none"> Check wiring connections on the main controller. Replace the main controller or the FTC4 control board. If "1-49%" is displayed there is a communication error between the outdoor unit's and FTC4's control boards. <ul style="list-style-type: none"> Check the wiring connections on the outdoor unit control board and the FTC4 control board. (Ensure S1 and S2 are not cross-wired and S3 is securely wired with no damage. (See section 3.2.4.) Replace the outdoor unit's and/or the FTC4's control boards.
3	The main screen appears with a press of the "ON" button, but disappears in a second.	The main controller operations do not work for a while after the settings are changed in the service menu. This is because the system takes time to apply the changes.	Normal operation. The indoor unit is applying updated settings made in the service menu. Normal operation will start shortly.
4	LED2 on FTC4 is off. (See <Figure 3.2.2>.)	When LED1 on FTC4 is also off. (See <Figure 3.2.2>.) <FTC4 powered via outdoor unit.> <ol style="list-style-type: none"> The outdoor unit is not supplied at the rated voltage. Defective outdoor controller circuit board. FTC4 is not supplied with 220 to 240V AC. FTC4 failure. Faulty connector wiring. 	<ol style="list-style-type: none"> Check the voltage across the terminals L and N or L3 and N on the outdoor power board. (See section 3.2.4.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check wiring of the outdoor unit and of the breaker. When the voltage is at 220 to 240V AC, go to "2." below. Check the voltage across the outdoor unit terminals S1 and S2. (See section 3.2.4.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check the fuse on the outdoor control board and check for faulty wiring. When the voltage is 220 to 240V AC, go to "3." below. Check the voltage across the indoor unit terminals S1 and S2. (See section 3.2.4.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check FTC4-outdoor unit wiring for faults. When the voltage is 220 to 240V AC, go to "4." below. Check the FTC4 control board. <ul style="list-style-type: none"> Check the fuse on FTC4 control board. Check for faulty wiring. If no problem found with the wiring, the FTC4 control board is faulty. Check the connector wiring. <ul style="list-style-type: none"> When the connectors are wired incorrectly, re-wire the connectors referring to below. (See section 3.2.4.)



No.	Fault symptom	Possible cause	Explanation - Solution
4	LED2 on FTC4 is off. (See Figure <3.2.2>)	<FTC4 powered on independent source> 1. FTC4 is not supplied with 220 to 240V AC. 2. There are problems in the method of connecting the connectors. 3. FTC4 failure.	1. Check the voltage across the L and N terminals on the indoor power supply terminal block. (See section 3.2.4.) • When the voltage is not 220 to 240V AC, check for faulty wiring to power supply. • When the voltage is 220 to 240V AC, go to 2. below. 2. Check for faulty wiring between the connectors. • When the connectors are wired incorrectly re-wire them correctly referring to below. (See section 3.2.4 and a wiring diagram on the control and electrical box cover.)  • If no problem found with the wiring, go to 3. below.
		When LED1 on FTC4 is lit. Incorrect setting of refrigerant address for outdoor unit. (None of the refrigerant address is set to "0".)	Recheck the refrigerant address setting on the outdoor unit. Set the refrigerant address to "0". (Set refrigerant address using SW1(3 - 6) on outdoor controller circuit board.)
5	LED2 on FTC4 is blinking. (See Figure <3.2.2>)	When LED1 is also blinking on FTC4 . Faulty wiring between FTC4 and outdoor unit	Check for faulty wiring between FTC4 and outdoor unit.
		When LED1 on FTC4 is lit. 1. Faulty wiring in main controller Multiple indoor units have been wired to a single outdoor unit. 2. Short-circuited wiring in main controller 3. Main controller failure	1. Check for faulty wiring in main controller. The number of indoor units that can be wired to a single outdoor unit is one. Additional indoor units must be wired individually to a single outdoor unit. 2.,3 Remove main controller wires and check LED2 on FTC4. (See Figure 3.2.2.) • If LED2 is blinking check for short circuits in the main controller wiring . • If LED2 is lit, wire the main controller again and: - if LED2 is blinking, the main controller is faulty; - if LED2 is lit, faulty wiring of the main controller has been corrected.
6	LED4 on FTC4 is off. (See figure <3.2.2>)	1. SD memory card is NOT inserted into the memory card slot with correct orientation. 2. Not an SD standards compliant memory card.	1. Correctly insert SD memory card in place until a click is heard. 2. Use an SD standards compliant memory card. (Refer to section 3.3.)
	LED4 on FTC4 is blinking. (See Figure <3.2.2>)	1. Full of data. 2. Write-protected. 3. NOT formatted. 4. Formatted in NTFS file system.	1. Move or delete data, or replace SD memory card with a new one. 2. Release the write-protect switch. 3. Refer to "3.3 Using SD memory card". 4. FTC4 is Not compatible with NTFS file system. Use an SD memory card formatted in FAT file system.
7	No water at hot tap.	1. Cold main off 2. Strainer (field supply) blocked.	1. Check and open stop cock. 2. Isolate water supply and clean strainer.
8	Cold water at tap.	1. Hot water run out. 2. Prohibit, schedule timer or holiday mode selected. 3. Heat pump not working. 4. Booster heater cut-out tripped. 5. The earth leakage circuit breaker for booster heater breaker (ECB1) tripped. 6. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button. 7. Immersion heater cut-out tripped. 8. Immersion heater breaker (ECB2) tripped. 9. 3-way valve fault	1. Ensure DHW mode is operating and wait for DHW tank to re-heat. 2. Check settings and change as appropriate. 3. Check heat pump – consult outdoor unit service manual. 4. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. See component parts diagram (section 3.) to find out its position. 5. Check the cause and reset if safe. 6. Check resistance across the thermal cut-out, if open then the connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer. 7. Check immersion heater thermostat and press reset button, located on immersion heater boss, if safe. If the heater has been operated with no water inside it may have failed, so please replace it with a new one. 8. Check the cause and reset if safe. 9. Check plumbing/wiring to 3-way valve. (i) Manually override 3-way valve using the main controller. (Refer to <Manual operation> in section 6.) If the valve does not still function, go to (ii) below. (ii) Replace 3-way valve.

No.	Fault symptom	Possible cause	Explanation - Solution
9	Water heating takes longer.	<ol style="list-style-type: none"> Heat pump not working. Booster heater cut-out tripped. Booster heater breaker (ECB1) tripped. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button. Immersion heater cut-out has been triggered. Immersion heater breaker (ECB2) tripped. 	<ol style="list-style-type: none"> Check heat pump – consult outdoor unit service manual. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. See component parts diagram (section 3.) to find out its position. Check the cause and reset if safe. Check resistance across the thermal cut-out, if open then connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer. Check immersion heater thermostat and press reset button if safe. If the heater kept running with no water inside, this may have resulted in failure, so replace it with a new one. Check the cause and reset if safe.
10	Temperature of DHW tank water dropped.	<p>When DHW operation is not running, the DHW tank emits heat and the water temperature decreases to a certain level. If water in the DHW tank is reheated frequently because of a significant drop in water temperature, check for the following.</p> <ol style="list-style-type: none"> Water leakage in the pipes that connect to the DHW tank Insulation material coming loose or off. 3-way valve failure 	<ol style="list-style-type: none"> Take the following measures. <ul style="list-style-type: none"> Retighten the nuts holding the pipes onto the DHW tank. Replace seal materials. Replace the pipes. Fix insulation. Check plumbing/wiring to 3-way valve. <ol style="list-style-type: none"> Manually override 3-way valve using the main controller. (Refer to <Manual operation> in section 6.) If the valve does not still function, go to (ii) below. Replace 3-way valve.
11	Hot or warm water from cold tap.	Heat of hot water pipe is transferred to cold water pipe.	Insulate/re-route pipework.
12	Water leakage	<ol style="list-style-type: none"> Poorly sealed connections of water circuit components Water circuit components reaching the end of life 	<ol style="list-style-type: none"> Tighten connections as required. Refer to PARTS CATALOG in the service manual for expected part lifetimes and replace them as necessary.
13	Heating system does not reach the set temperature.	<ol style="list-style-type: none"> Prohibit, schedule timer or holiday mode selected. Check settings and change as appropriate. The temperature sensor is located in a room that has a different temperature relative to that of the rest of the house. Heat pump not working. Booster heater cut-out tripped. Booster heater breaker (ECB1) tripped. The booster heater thermal cut-out tripped and can not be reset using the manual reset button. Incorrectly sized heat emitter. 3-way valve failure Battery problem (*wireless control only) If a mixing tank is installed, the flow rate between the mixing tank and the hydrobox is less than that between the mixing tank and the local system. 	<ol style="list-style-type: none"> Check settings and change as appropriate. Check the battery power and replace if flat. Relocate the temperature sensor to a more suitable room. Check heat pump – consult outdoor unit service manual. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. (See component parts diagram section 3. for position.) Check the cause of the trip and reset if safe. Check resistance across the thermal cut-out, if open then the connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer. Check the heat emitter surface area is adequate. Increase size if necessary. Check plumbing/wiring to 3-way valve. Check the battery power and replace if flat. Increase the flow rate between the mixing tank and the hydrobox decrease that between the mixing tank and the local system.

No.	Fault symptom	Possible cause	Explanation - Solution
14	In 2-zone temperature control, only Zone2 does not reach the set temperature.	<ol style="list-style-type: none"> When Zone1 and Zone2 are both in heating mode, the hot water temperature in Zone2 does not exceed that in Zone1. Faulty wiring of motorized mixing valve Faulty installation of motorized mixing valve Incorrect setting of Running time Motorized mixing valve failure 	<ol style="list-style-type: none"> Normal action no action necessary. Refer to "3.5 Wiring for 2-zone temperature control". Check for correct installation. (Refer to the manual included with each motorized mixing valve.) Check for correct setting of Running time. Inspect the mixing valve. (Refer to the manual included with each motorized mixing valve.)
15	When a PUHZ-FRP outdoor unit is connected, DHW or Heating operation cannot run.	The outdoor unit is set to have operation of the indoor unit of air conditioner take precedence over that of the hydrobox, and in the main controller settings "Electric heater (Heating)" or "Electric heater (DHW)" is turned off.	Turn ON Electric heater (Heating) or Electric heater (DHW) using the main controller.
16	When a PUHZ-FRP outdoor unit is connected and is in heat recovery operation, the set temperature is not reached.	When the outdoor unit is set to have cooling operation of the indoor unit of air conditioner take precedence over that of the hydrobox, the outdoor unit controls the frequency of the compressor according to the load of air conditioner. The DHW and heating run according to that frequency.	Normal operation no action necessary. If Air-to-Water system is given priority in operation, comp Hz can be regulated depending on the load of DHW or Heating. For more details, refer to the PUHZ-FRP installation manual.
17	After DHW operation room temperature rises slightly.	At the end of the DHW mode operation the 3-way valve diverts hot water away from the DHW circuit into space heating circuit. This is done to prevent the hydrobox components from overheating. The amount of hot water directed into the space heating circuit varies according to the type of the system and of the pipe run between the plate heat exchanger and the hydrobox.	Normal operation no action necessary.
18	The room temperature rises during DHW operation.	3-way valve failure	Check the 3-way valve.
19	Water discharges from pressure relief valve. (Primary circuit)	<ol style="list-style-type: none"> If continual – pressure relief valve may be damaged. If intermittent – expansion vessel charge may have reduced/bladder perished. 	<ol style="list-style-type: none"> Turn the handle on the pressure relief valve to check for foreign objects in it. If the problem is not still solved, replace the pressure relief valve with a new one. Check pressure in expansion vessel. Recharge to 1 bar if necessary. If bladder perished replace expansion vessel with a new one.
20	Water discharges from pressure relief valve (field supplied item). (Sanitary circuit)	<ol style="list-style-type: none"> If continual – field supplied pressure reducing valve not working. If continual – pressure relief valve seat may be damaged. If intermittent – expansion vessel charge may have reduced/bladder perished. DHW tank may have subjected to backflow. 	<ol style="list-style-type: none"> Check function of pressure reducing valve and replace if necessary. Turn the handle on the pressure relief valve to check for foreign objects inside. If the problem is not still solved, replace the pressure relief valve. Check gas-side pressure in expansion vessel. Recharge to correct precharge pressure if necessary. If bladder perished replace expansion vessel with a new one with appropriate pre-charge. Check the pressure in DHW tank. If pressure in DHW tank is similar to that in the incoming mains, cold water supply that merges with incoming mains water supply could flow back to DHW tank. Investigate source of back-feed and rectify error in pipework/fitting configuration. Adjust pressure in cold supply.
21	Noisy water circulation pump	Air in water circulation pump .	Use manual and automatic air vents to remove air from system. Top up water if necessary to achieve 1 bar on primary circuit.
22	Noise during hot water draw off typically worse in the morning.	<ol style="list-style-type: none"> Loose airing cupboard pipework. Heaters switching on/off. 	<ol style="list-style-type: none"> Install extra pipe fastening clips. Normal operation no action necessary.
23	Mechanical noise heard coming from the hydrobox.	<ol style="list-style-type: none"> Heaters switching on/off. 3-way valve changing position between DHW and heating mode. 	Normal operation no action necessary.
24	Water circulation pump runs for a short time unexpectedly .	Water circulation pump jam prevention mechanism (routine) to inhibit the build-up of scale.	Normal operation no action necessary.
25	Milky/Cloudy water (Sanitary circuit)	Oxygenated water	Water from any pressurised system will release oxygen bubbles when water is running. The bubbles will settle out.
26	Heating mode has been on standby for a long time (does not start operation smoothly.)	The time of "Delay" set in "Economy settings for pump" is too short. (Go to "Service menu" → "Auxiliary settings" → "Economy settings for pump").	Increase the time of "Delay" in "Economy settings for pump" .

No.	Fault symptom	Possible cause	Explanation - Solution
27	The hydrobox that was running in the heating mode before power failure is running in the DHW mode after power recovery.	The hydrobox is designed to run in an operation mode with a higher priority (i.e. DHW mode in this case) at power recovery.	<ul style="list-style-type: none"> • Normal operation. • After the DHW max. operation time has elapsed or the DHW max. temperature has been reached, the DHW mode switches to the other mode (ex. Heating mode).
28	Cooling mode is NOT available.	Dip SW2-4 is OFF.	Turn Dip SW2-4 to ON. (Refer to "3.2.2 Dip switch functions" in this manual.)
29	The cooling system does not cool down to the set temperature.	<ol style="list-style-type: none"> 1. When the water in the circulation circuit is unduly hot, Cooling mode starts with a delay for the protection of the outdoor unit. 2. When the outdoor temperature is lower than the preset temperature below which the freeze stat. function is activated, Cooling mode does not start running. 	<ol style="list-style-type: none"> 1. Normal operation. 2. To run Cooling mode overriding the freeze stat. function, adjust the preset temperature that activates the freeze stat. function. (Refer to "<Freeze stat function>" on Page B-86.
30	The electric heaters are activated shortly after DHW or LP mode starts running after Cooling mode.	The setting time period of Heat-pump-only operation is short.	Adjust the setting time period of Heat-pump only operation. (Refer to "<Electric heater (DHW)>" on Page B-84.
31	During DHW or LP mode following the cooling mode, error L6 (circulation water freeze protection) occurs and operation stops frequently.	The unit runs in Cooling mode when the outdoor ambient temperature is lower than 10°C (outside of the guaranteed operating range). (When defrosting operation is running at such a low outdoor ambient temperature after Cooling mode is switched to DHW or LP mode, the water temperature in the cooling circuit drops too low, which could result in L6 error to stop the operation.	Do not run Cooling mode when the outdoor ambient temperature is lower than 10°C. Cooling mode will automatically stop when the outdoor ambient temperature drops to the temperature that is 3°C higher than the preset temperature that activates the freeze stat. function. (Cooling operation will automatically recover when the outdoor ambient temperature rises to the temperature that is 5°C higher than the preset temperature.) (Refer to "<Freeze stat function>" on Page B-86.)

■ Annual Maintenance

It is essential that the hydrobox is serviced at least once a year by a qualified individual any spare parts required MUST be purchased from Mitsubishi Electric (safety matter).

NEVER bypass safety devices or operate the unit without them being fully operational.

<Draining the hydrobox>

WARNING: DRAINED WATER MAY BE VERY HOT

1. Before attempting to drain the hydrobox isolate from the electrical supply to prevent booster heater burning out.
2. Isolate hydrobox from primary water circuit and drain water from hydrobox. Use a suitable heat resistant hose to assist in these operations.
3. Drain any remaining water from booster heater using fitted drain cock and hose to safely drain the unit.
4. After the hydrobox is drained, water remains in the following component parts. Drain water completely by checking the inside of the parts.
 - Strainer (Remove the strainer cover.)
 - Pressure relief valve (Operate the valve.)

<Annual maintenance points>

Use the Annual Maintenance Log Book as a guide to carrying out the necessary checks on the hydrobox and outdoor unit.

■ Error Codes

Code	Error	Action
L3	Circulation water temperature overheat protection	Flow rate may be reduced check for; <ul style="list-style-type: none"> • Water leakage • Strainer blockage • Water circulation pump function (Error code may display during filling of primary circuit, complete filling and reset error code.)
L4	DHW tank water temperature overheat protection	Check the immersion heater and it's contactor.
L5	Indoor unit temperature thermistor (THW1, THW2, THW5, THW6, THW7, THW8, THW9) failure	Check resistance across the thermistor.
L6	Circulation water freeze protection	See Action for L3.
L8	Heating operation error	Re-attach any thermistors that have become dislodged.
L9	Low primary circuit flow rate detected by flow switch (flow switches 1, 2, 3)	See Action for L3. If the flow switch itself does not work, replace it. Caution: The pump valves may be hot, please take care.
LC	Boiler circulation water temperature overheat protection	Check if the setting temperature of the Boiler for heating exceeds the restriction. (See the manual of the thermistors "PAC-TH011HT-E") Flow rate of the heating circuit from the boiler may be reduced. Check for <ul style="list-style-type: none"> • water leakage, • strainer blockage • water circulation pump function.
LD	Boiler temperature thermistor (THWB1, THWB2) failure	Check resistance across the thermistor.
LE	Boiler operation error	See Action for L8. Check the status of the boiler.

Code	Error	Action
LH	Boiler circulation water freeze protection	Flow rate of the heating circuit from the boiler may be reduced. Check for <ul style="list-style-type: none"> • water leakage • strainer blockage • water circulation pump function.
LL	Setting errors of Dip switches on FTC4 control board	For boiler operation, check that Dip SW1-1 is set to ON (With Boiler) and Dip SW2-6 is set to ON (With Mixing Tank). For 2-zone temperature control, check Dip SW2-7 is set to ON (2-zone) and Dip SW2-6 is set to ON (With Mixing Tank).
J0	Communication failure between FTC4 and wireless receiver	Check connection cable for damage or loose connections.
P1	Thermistor (Room temp.) (TH1) failure	Check resistance across the thermistor.
P2	Thermistor (Ref. liquid temp.) (TH2) failure	Check resistance across the thermistor.
P6	Anti-freeze protection of plate heat exchanger	See Action for L3. Check for correct amount of refrigerant.
J1 - J8	Communication failure between wireless receiver and wireless remote controller	Check wireless remote controller's battery is not flat. Check the pairing between wireless receiver to wireless remote controller. Test the wireless communication. (See the manual of wireless system)
E0 - E5	Communication failure between main controller and FTC4	Check connection cable for damage or loose connections.
E6 - EF	Communication failure between FTC4 and outdoor unit	Check that the outdoor unit has not been turned off. Check connection cable for damage or loose connections. Refer to outdoor unit service manual.
E9	Outdoor unit receives no signal from indoor unit.	Check both units are switched on. Check connection cable for damage or loose connections. Refer to outdoor unit service manual.
U*, F*	Outdoor unit failure	Refer to outdoor unit service manual.

Note: To cancel error codes please switch system off (Press button E, on Main Controller, for 3 secs).

■ Engineers Forms (1/2) (Hydrobox)

Should settings be changed from default, please enter and record new setting in 'Field Setting' column. This will ease resetting in the future should the system use change or the circuit board need to be replaced.

Commissioning/Field settings record sheet

Main controller screen		Parameters	Default setting	Field setting	Notes	
Main		Zone1 heating room temp	10°C - 30°C	20°C		
		Zone2 heating room temp *1	10°C - 30°C	20°C		
		Zone1 heating flow temp	25°C - 60°C	45°C		
		Zone2 heating flow temp *1	25°C - 60°C	35°C		
		Cooling flow temp *2	5°C - 25°C	15°C		
		Zone1 heating compensation curve	-9°C - + 9°C	0°C		
		Zone2 heating compensation curve *1	-9°C - + 9°C	0°C		
		Holiday mode	Active/Non active/Set time	-		
Option		Forced DHW operation	On/Off	-		
		DHW	On/Off/Timer	On		
		Heating	On/Off/Timer	On		
		Holiday mode	Active/Non active/Set time	-		
Setting	DHW *3	Operation mode	Normal/Eco	Normal		
		DHW max. temp.	40°C - 60°C	50°C		
		DHW temp. drop	5°C - 30°C	10°C		
		DHW max. operation time	30 - 120 mins	60 mins		
		DHW mode restriction	30 - 120 mins	30 mins		
	Legionella prevention *3	Active	Yes/No	Yes		
		Hot water temp	60°C - 70°C	65°C		
		Frequency	1 - 30 days	15 days		
		Start time	00.00 - 23.00	03.00		
		Max. operation time	1 - 5 hours	3 hours		
		Duration of maximum temp.	1 - 120 mins	30 min		
	Heating/Cooling *2	Zone1 operation mode	Heating room temp/Heating flow temp/Heating compensation curve/Cooling flow temp	Room temp		
		Zone2 operation mode *1	Heating room temp/Heating flow temp/Heating compensation curve	Compensation curve		
	Compensation curve	Hi set point	Zone1 outdoor ambient temp	-15°C - +35°C	-15°C	
			Zone1 flow temp	25°C - 60°C	50°C	
			Zone2 outdoor ambient temp *1	-15°C - +35°C	-15°C	
			Zone2 flow temp *1	25°C - 60°C	40°C	
		Lo set point	Zone1 outdoor ambient temp	-15°C - +35°C	35°C	
			Zone1 flow temp	25°C - 60°C	25°C	
			Zone2 outdoor ambient temp *1	-15°C - +35°C	35°C	
			Zone2 flow temp *1	25°C - 60°C	25°C	
		Adjust	Zone1 outdoor ambient temp	-14°C - +34°C	—	
			Zone1 flow temp	25°C - 60°C	—	
			Zone2 outdoor ambient temp *1	-14°C - +34°C	—	
			Zone2 flow temp *1	25°C - 60°C	—	
	Holiday	DHW *3	Active/Non active	Non active		
		Heating/Cooling *2	Active/Non active	Active		
		Zone1 heating room temp	10°C - 30°C	15°C		
		Zone2 heating room temp *1	10°C - 30°C	15°C		
		Zone1 heating flow temp	25°C - 60°C	35°C		
		Zone2 heating flow temp *1	25°C - 60°C	25°C		
		Cooling flow temp *2	5°C - 25°C	25°C		
Initial settings	Language	ENG/FR/GER/SW/SP/IT/DA/NL/FIN/NOR/PT	ENG			
	°C/°F	°C/°F	°C			
	Temp. display	Room/DHW tank/Room&DHW tank /Off	Off			
	Time display	hh:mm/hh:mm AM/AM hh:mm	hh:mm			
	Room sensor settings for Zone1	TH1/Main RC/Room RC1-8/"Time/Zone"	TH1			
	Room sensor settings for Zone2 *1	TH1/Main RC/Room RC1-8/"Time/Zone"	TH1			
Service menu	Thermistor adjustment	THW1	-10°C - +10°C	0°C		
		THW2	-10°C - +10°C	0°C		
		THW5	-10°C - +10°C	0°C		
		THW6	-10°C - +10°C	0°C		
		THW7	-10°C - +10°C	0°C		
		THW8	-10°C - +10°C	0°C		
		THW9	-10°C - +10°C	0°C		
		THWB1	-10°C - +10°C	0°C		
		THWB2	-10°C - +10°C	0°C		

*1 The settings related to Zone2 can be switched only when Zone2 temperature control is enabled (when Dip SW2-6 and SW 2-7 are ON).

*2 Cooling mode settings are available for ERSC-VM2B only.

*3 Only available if DHW tank present in system.

*4 Decreasing "time before pump switched off" may increase the duration of stand-by in Heating mode.

■ Engineers Forms (2/2) (Hydrobox)

Commissioning/Field settings record sheet (continued from the previous page)

Main controller screen			Parameters	Default setting	Field setting	Notes		
Setting	Service menu	Auxiliary settings	Economy settings for pump	On/Off	On			
			Electric heater (Heating)	Time before pump switched off (3 - 60 mins) *4	10 mins			
			Electric heater (DHW) *3	Space heating: On (used)/Off (not used)	On			
			Mixing valve control	Electric heater delay timer (5 - 180 mins)	30 mins			
			Pump speed	DHW: On (used)/Off (not used)	On			
				Electric heater delay timer (15 - 30 mins)	15 mins			
				Running time (10 - 240 secs)	120 secs			
		Heat source setting		Interval (1 - 30 mins)	2 mins			
				Pump speed (1 - 5)	5			
		Operation settings	Freeze stat function	Standard/Heater/Boiler/Hybrid *5	Standard			
			Simultaneous operation (DHW/Heating)	Outdoor ambient temp. (3 - 20°C)	5°C			
			Cold weather function	On/Off *6	Off			
				Outdoor ambient temp. (-15 - +10°C)	-15°C			
			Room temp control (Heating)	Outdoor ambient temp. (-15 - -10°C)	-15°C			
				Temp. control interval (10 - 60 mins)	10 mins			
				Flow temp. range	Min. temp. (25 - 45°C)	30°C		
					Max. temp. (35 - 60°C)	50°C		
			Heat pump thermo diff. adjust	On/Off *6	On			
				Lower limit (-9 - -1°C)	-5°C			
				Upper limit (+3 - +5°C)	5°C			
			Boiler operation	Hybrid settings	Outdoor ambient temp. (-15 - +10°C)	-15°C		
					Priority mode (Ambient/Cost/CO ₂)	Ambient		
				Intelligent settings	Energy price *7	Electricity (0.001 - 999 €/kWh)	0.5 €/kWh	
					CO ₂ emission	Boiler (0.001 - 999 €/kWh)	0.5 €/kWh	
						Electricity (0.001 - 999 kg -CO ₂ /kWh)	0.5 kg -CO ₂ /kWh	
					Heat source	Boiler (0.001 - 999 kg -CO ₂ /kWh)	0.5 kg -CO ₂ /kWh	
				Heat pump capacity (1 - 40 kW)		11.2 kW		
				Boiler efficiency (25 - 150%)		80%		
			Floor dry up function	On/Off *6	Off			
		Target temp.		Start&Finish (25 - 60°C)	30°C			
				Max. temp. (25 - 60°C)	45°C			
				Max. temp. period (1 - 20 days)	5 days			
		Flow temp. (Increase)		Temp. increase step (+1 - +10°C)	+5°C			
Increase interval (1 - 7 days)	2 days							
Flow temp. (Decrease)	Temp. decrease step (-1 - -10°C)	-5°C						
	Decrease interval (1 - 7 days)	2 days						
External input settings	Demand control (IN4)	Heat source OFF/Boiler operation	Boiler operation					
	Outdoor thermostat (IN5)	Heater operation/Boiler operation	Boiler operation					

*5 When Dip SW1-1 is set to OFF "WITHOUT Boiler" or SW2-6 is set to OFF "WITHOUT Mixing tank", neither Boiler nor Hybrid can be selected.

*6 On: the function is active; Off: the function is inactive.

7 "" of "€/kwh" represents currency unit (e.g. € or £ or the like)

■ Annual Maintenance Log Book

Contractor name		Engineer name	
Site name		Site number	

Hydrobox maintenance record sheet			
Warranty number		Model number	
		Serial number	
No.	Mechanical	Frequency	Notes
1	Isolate and drain hydrobox, remove mesh from internal strainer clean and replace.		
2	Open the pressure relief valve, check for unrestricted discharge to the tundish and that the valve reseats correctly. Check there are no blockages in the tundish and associated pipe work.		
3	Drop the primary/heating system pressure to zero check and if necessary top up the expansion relief vessel (1 bar). Air valve of expansion vessel is TR-412.		
4	Check and if necessary top up the concentration of anti-freeze/inhibitor (if used in the system).		
5	Top up the primary/heating system using an appropriate filling loop and re-pressurise to 1 bar.		
6	Heat system and check pressure does not rise above 3 bar and no water is released from the safety valves.		
7	Release any air from the system.		
Refrigerant models only [EXCEPT EHPX]		Frequency	Notes
1	Refer to outdoor unit manual.		
Electrical		Frequency	Notes
1	Check condition of cables.		
2	Check rating and fuse fitted on the electricity supply.		
Controller		Frequency	Notes
1	Check field settings against factory recommendations.		
2	Check battery power of wireless thermostat and replace if necessary.		
Outdoor heat pump unit maintenance record sheet			
Model number		Serial number	
		Frequency	Notes
No.	Mechanical		
1	Inspect grill, heat exchanger fins and air inlet for trapped debris/damage.		
2	Check condensate drain provision.		
3	Check integrity of water pipe work and insulation.		
4	Check all electrical connections.		
5	Check and record the operation voltage.		

* All the above checks should be carried out once a year.

Note:

Within the first couple of months of installation, remove and clean the hydrobox's strainer plus any that are fitted external to the hydrobox. This is especially important when installing on an existing system.

In addition to annual servicing it is necessary to replace or inspect some parts after a certain period of system operation. Please see tables below for detailed instructions. Replacement and inspection of parts should always be done by a competent person with relevant training and qualifications.

Parts which require regular replacement

Parts	Replace every	Possible failures
Pressure relief valve (PRV) Air vent (Auto/Manual) Drain cock (Primary circuit) Flexible hose Manometer	6 years	Water leakage due to brass/copper corrosion (Dezincification)

Parts which require regular inspection

Parts	Check every	Possible failures
Immersion heater	2 years	Earth leakage causing circuit breaker to activate (Heater is always OFF)
Water circulation pump	20,000 hrs (3 years)	Water circulation pump failure

Parts which must NOT be reused when servicing

- * O-ring
- * Gasket

Note:

Always replace the gasket for pump with a new one at each regular maintenance (every 20,000 hours of use or every 3 years).

■ Refrigerant collecting (pumpdown) for split model systems only

Refer to "Refrigerant collection" in the outdoor unit installation manual or service manual.

■ Back-up operation of boiler

Heating operation is backed up by boiler.

For more details, refer to the installation manual of PAC-TH011HT-E.

<Installation & System set up>

1. Set Dip-SW 1-1 to ON "With boiler" and SW2-6 to ON "With Mixing tank".
2. Install the thermistors THWB1 (Flow temp.) and THWB2 (return temp.) *1 on the boiler circuit.
3. Connect the output wire (OUT10: Boiler operation) to the signal input (room thermostat input) on the boiler. *2
4. Install one of the following room temp. thermostats. *3
 - Wireless remote controller (option)
 - Room temp. thermostat (field supply)
 - Main controller (remote position)

*1 The boiler temp. thermistor is an optional part.

*2 OUT10 has no voltage across it.

*3 Boiler heating is controlled on/off by the room temp. thermostat.

<Remote controller settings>

1. Go to Service menu > Heat source setting and choose "Boiler" or "Auto". *4
2. Go to Service menu > Operation settings > Boiler settings to make detailed settings for "Auto" above .

*4 The "Auto" automatically switches heat sources between Heat pump (and Electric heater) and boiler.

■ Multiple outdoor units control

To realize bigger systems by using multiple outdoor units, up to 6 units of the same model can be connected.

The hydrobox can be used as a slave unit for multiple outdoor unit control.

For more details, refer to the installation manual of PAC-IF051/052B-E.

<Dip switch setting>

- Set Dip SW4-1 to ON "Active: multiple outdoor unit control".
- Keep Dip SW4-2 OFF (default setting) (master/slave setting: slave).
- Set Dip SW1-3 to ON when the hydrobox is connected to a DHW tank.

1	Safety precautions	FOR INSTALLER	C-2
1.1	Before installation (Environment)		C-2
1.2	Before installation or relocation		C-2
1.3	Before electric work		C-2
1.4	Before starting the test run		C-2
1.5	Electric booster and immersion heaters		C-3
2	Installing the FTC4 unit		C-4
2.1	Check the parts (Fig. 2.1.1)		C-4
2.2	Choosing the FTC4 unit installation location		C-4
2.3	Installing the FTC4 unit (Fig. 2.3.1,2.3.2,2.3.3,2.3.4)		C-5
3	System		C-6
3.1	First step (Electrical work)		C-6
3.2	Second step (Outdoor unit type)		C-6
3.3	Third step (Functions setting)		C-7
3.4	Fourth step (Functions setting)		C-8
3.5	Local system		C-11
3.6	Piping diagram for 2-zone temperature control		C-11
4	Electrical work		C-12
4.1	Electrical connection		C-12
4.2	Connecting the main controller		C-14
4.3	Remote Controller Options		C-17
4.4	Connecting the thermistor cables		C-19
4.5	Connecting inputs/outputs		C-21
4.6	Wiring for heater		C-23
4.7	Wiring for 2-zone temperature control		C-24
4.8	Installation procedure for DHW tank		C-25
4.9	Using SD memory card		C-26
5	Dip Switch setting		C-27
5.1	Dip Switch Functions		C-27
5.2	Outdoor unit type		C-28
5.3	Functions setting		C-28
5.4	Operation setting		C-30
5.5	Emergency mode (Heater only operation)		C-31
5.6	Emergency mode (Boiler operation)		C-31
6	Before test run		C-32
6.1	Check		C-32
6.2	Self-check		C-32
7	Main controller operation		C-33
7.1	Safety precautions	FOR USER	C-33
7.2	Main Controller		C-34
8	Troubleshooting		C-52
9	Multiple outdoor units control		C-57
9.1	Wiring for multiple outdoor units control		C-57
9.2	Pipe work		C-58
9.3	Electrical connection		C-61
9.4	Main controller wiring		C-64
9.5	Connecting the thermistor cables		C-64
9.6	Dip switch functions		C-65
9.7	Connecting inputs/outputs		C-66
10	Supplementary information		C-70
10.1	Refrigerant collecting (pumpdown) for split model systems only		C-70
10.2	Back-up operation of boiler		C-70

- ▶ Before installing the FTC4 unit, make sure you read all the "Safety precautions".
- ▶ Please report to your supply authority or obtain their consent before connecting this equipment to the power supply system.

⚠ Warning:

Precautions that must be observed to prevent injuries or death.

⚠ Caution:

Precautions that must be observed to prevent damage to the unit.

⚠ Warning:

- The unit must not be installed by the user. Ask an installer or an authorized technician to install the unit. If the unit is installed improperly, electric shock, or fire may be caused.
- For installation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with refrigerant specified in the outdoor unit installation manual.
- The unit must be installed according to the instructions in order to minimize the risk of damage by earthquakes, typhoons, or strong winds. Improperly installed units may fall down and cause damage or injuries.
- The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.
- All electric work must be performed by a qualified technician according to local regulations and the instructions given in this manual. The unit must be powered by dedicated power lines and the correct voltage and circuit breakers must be used. Power lines with insufficient capacity or incorrect electrical work may result in electric shock or fire.

After installation, perform the test run to ensure normal operation. Then explain to your customer the "Safety Precautions" *1, use, and maintenance of the unit based on the information in this manual. This manual must be given to the user. This manual must always be kept by the actual users.

*1 "Safety Precautions" for user is indicated on page 33.

⚠ : This indicates a part which must be grounded.

⚠ Warning:

Carefully read the labels attached to the unit.

- Only the specified cables can be used for wiring. Connections must be made securely without tension on the terminals. If cables are connected or installed improperly, it may result in overheating or fire.
- Terminal block cover panel of the unit must be firmly fixed. If the cover panel is mounted improperly, dust and moisture may enter the unit, and it may cause electric shock or fire.
- Make sure to use accessories authorized by Mitsubishi Electric and ask an installer or an authorized technician to install them. If accessories are improperly installed, it may cause electric shock, or fire.
- Do not remodel the unit. Consult an installer for repairs. If alterations or repairs are not performed correctly, it may cause electric shock or fire.
- The user should never attempt to repair the unit or transfer it to another location. If the unit is installed improperly, it may cause electric shock or fire. If the FTC4 unit needs to be repaired or moved, ask an installer or an authorized technician.
- During installing a heat pump system, keep water from splashing on the FTC4 unit.
- When installing sensors and parts, do not expose the terminals.

1.1 Before installation (Environment)

⚠ Caution:

- Do not install the FTC4 unit in outdoor location as it is designed for indoor installation only. Otherwise electric shock or breakdown may be caused by water, wind or dust.
- Do not use the unit in an unusual environment. If the FTC4 unit is installed or exposed to steam, volatile oil (including machine oil), or sulfuric gas, or exposed to briny air, the internal parts can be damaged.
- Do not install the unit where combustible gases may leak, be produced, flow, or accumulate. If combustible gas accumulates around the unit, it may cause fire or explosion.

- When installing the unit in a hospital or in a building where communications equipment are installed, you may need to take measures to prevent noise and electronic interference. Inverters, home appliances, high-frequency medical equipment, and radio communications equipment can cause the FTC4 unit to malfunction or to breakdown. At the same time, the noise and electric interference from the FTC4 unit may disturb the proper operation of nearby medical equipment, and communications equipment.

1.2 Before installation or relocation

⚠ Caution:

- Be very careful when moving the units. Do not hold the packaging bands. Wear protective gloves to unpack and to move the units, in order to avoid injury to your hands.

- Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause injuries.
- Do not wash the FTC4 unit. You may receive an electric shock.

1.3 Before electric work

⚠ Caution:

- Be sure to install a circuit breaker. If it is not installed, there may be a risk to get an electric shock.
- For the power lines, use standard cables of sufficient capacity. Otherwise, it may cause a short circuit, overheating, or fire.
- When installing the power lines, do not apply tension to the cables. The cables may be cut or overheated resulting in a fire.

- Make sure to ground the unit. Do not connect the ground wire to gas or water pipes, lightning rods, or telephone grounding lines. If the unit is not properly grounded, there may be a risk to get an electric shock.
- Make sure to use circuit breakers (ground fault interrupter, isolating switch (+B fuse), and molded case circuit breaker) with the specified capacity. If the circuit breaker capacity is larger than the specified capacity, breakdown or fire may result.

1.4 Before starting the test run

⚠ Caution:

- Turn on the main power switch of the outdoor unit more than 12 hours before starting operation. Starting operation immediately after turning on the power switch can severely damage the internal parts. Keep the main power switch turned on during the operation period.
- In heating mode, to avoid the heat emitters being damaged by excessively hot water, set the target flow temperature to a minimum of 2°C below the maximum allowable temperature of all the heat emitters. For Zone2, set the target flow temperature to a minimum of 5°C below the maximum allowable flow temperature of all the heat emitters in Zone2 circuit.

- Before starting operation, check that all protective parts are correctly installed. Make sure not to get injured by touching high voltage parts.
- Do not touch any switch with wet hands. There may be a risk to get an electric shock.
- After stopping operation, make sure to wait at least 5 minutes before turning off the main power. Otherwise, it may cause breakdown.

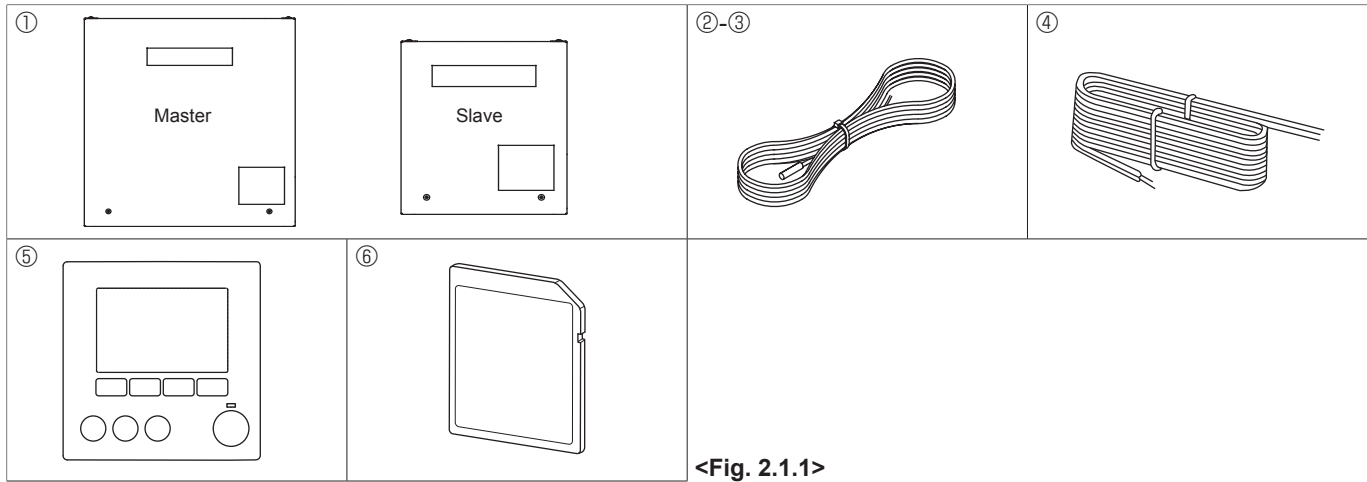
1.5 Electric booster and immersion heaters

⚠ Warning:

- FTC4 has signal outputs for heaters however it can not isolate power to them in the event of overheating. All electrical heaters used on the water circuit must have
 - a) A thermostat to prevent overheating.
 - b) A non-self resetting thermal mechanism to prevent overheating.

Abbreviations and glossary

Abbreviations/Word	Description
Ambient temperature	The outdoor temperature
Freeze stat. function	Heating to prevent water pipes freezing
ASHP/HP	Air source heat pump
COP	Coefficient of performance the efficiency of the heat pump
Cylinder unit	Indoor unvented DHW tank and component plumbing parts
Hydrobox	Indoor unit housing the component plumbing parts (NO DHW tank)
DeltaT	Difference in temperature between two system locations.
DHW mode	Domestic hot water heating mode for showers, sinks, etc
Flow rate	Speed at which water circulates around the primary circuit
Flow temperature	Temperature at which water is delivered to the primary circuit
FTC4 (Master)	Flow temperature controller, the circuit board in charge of controlling the system, master board for multiple outdoor units control
FTC4 (Slave)	Slave board for multiple outdoor units control
Compensation curve mode	Space heating incorporating outdoor temperature compensation
Heating mode	Space heating through radiators or UFH
Cooling mode	Space cooling through radiators or UFC
Legionella	Bacteria potentially found in plumbing, showers and water tanks that may cause Legionnaires disease
LP mode	Legionella prevention mode – a function on systems with tanks to prevent the growth of legionella bacterium
Packaged model	Plate heat exchanger in the outdoor heat pump unit
Refrigerant	A compound used within the heat cycle that goes through a phase change from gas to liquid
Split model	Plate heat exchanger in the indoor unit
TRV	Thermostatic radiator valve – a valve on the entrance or exit of the radiator panel controlling the heat output
UFH	Under floor heating – a system of water carrying pipes under the floor, that warms the floor surface
UFC	Under floor cooling – a system of water carrying pipes under the floor, that cools the floor surface



2.1 Check the parts (Fig. 2.1.1)

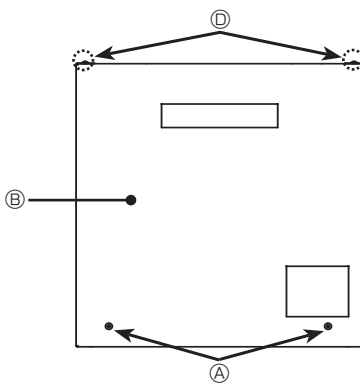
The FTC4 unit should be supplied with the following parts.

	Part name	Wiring diagram symbol	Q'ty
①	FTC4 (master) unit: PAC-IF051/052B-E FTC4 (slave) unit: PAC-SIF051B-E		1
②	Liquid refrigerant temp. thermistor (Lead wire: 5m/Red, Connector: 3p/Yellow)	TH2	1 *1
③	Flow water temp. and Return water temp. thermistor (Lead wire: 5m/Gray(Flow water temp.), 5m/Black(Return water temp.), Connector: 4p/Red)	THW1/2	1
④	Main controller cable (10 m)		1
⑤	Main controller		1 *2
⑥	SD memory card		1

*1 Not included with PAC-IF052B-E.

*2 Not included with PAC-SIF051B-E.

2.2 Choosing the FTC4 unit installation location

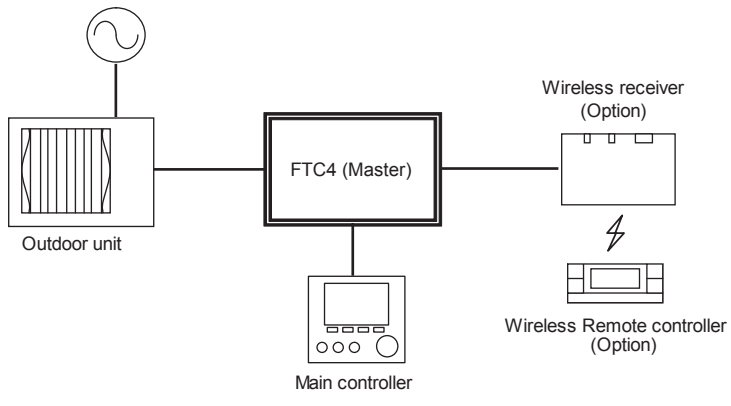
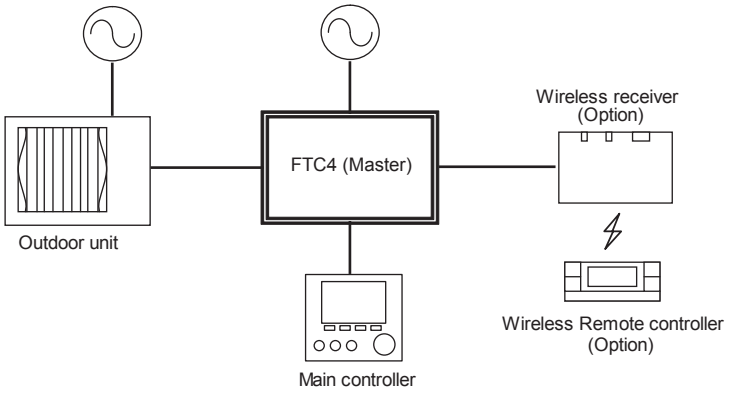


- Do not install the FTC4 units outdoors as it is designed for indoor installation only. (The FTC4 circuit board and casing are not waterproof.)
- Avoid locations where the unit is exposed to direct sunlight or other sources of heat.
- Select a location where easy wiring access to the power source is available.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit is exposed to oil, steam, or sulfuric gas.
- Do not install in location that is hot or humid for long periods of time.

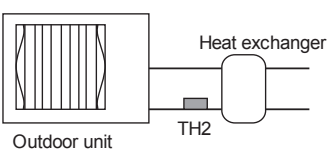
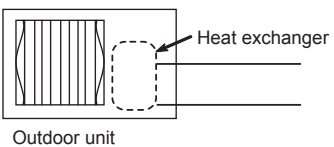
The FTC4 (Master) is designed for use with a number of heat pump systems. Please refer to the following table to find the relevant installation information for your system.

For multiple outdoor units control with FTC4 (Slave), see section 9.

3.1 First step (Electrical work)

Power supplies	System diagram	Reference section
FTC4 (Master) powered via outdoor unit		4.1 4.2
FTC4 (Master) powered by independent source		4.1 4.2

3.2 Second step (Outdoor unit type)

Outdoor unit type	System diagram	Thermistor	Reference section
Split		TH2: Liquid refrigerant temp.	4.4 5.2
Packaged		—	4.4 5.2

* PAC-IF052B-E is not available for Split-type system.

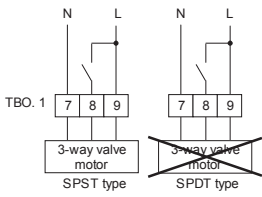
3.3 Third step (Functions setting)

DHW tank	Immersion heater	Booster heater	BH function	System diagram	Thermistor	Reference section	Remarks
Present	Absent	Present	For heating and DHW		THW1: Flow water temp. THW2: Return water temp. THW5: Tank water temp.	4.4 4.5 5.3	
Present	Present	Present	For heating and DHW		THW1: Flow water temp. THW2: Return water temp. THW5: Tank water temp.	4.4 4.5 5.3	
Present	Absent	Present	For heating only		THW1: Flow water temp. THW2: Return water temp. THW5: Tank water temp.	4.4 4.5 5.3	1. 'Legionella Prevention Mode' cannot be selected in this system.
Present	Absent	Absent	—		THW1: Flow water temp. THW2: Return water temp. THW5: Tank water temp.	4.4 4.5 5.3	1. 'Legionella Prevention Mode' cannot be selected in this system. 2. Please make sure water circuit not to get frozen during defrost.
Present	Present	Present	For heating only		THW1: Flow water temp. THW2: Return water temp. THW5: Tank water temp.	4.4 4.5 5.3	
Present	Present	Absent	—		THW1: Flow water temp. THW2: Return water temp. THW5: Tank water temp.	4.4 4.5 5.3	
Absent	Absent	Present	—		THW1: Flow water temp. THW2: Return water temp.	4.4 4.5 5.3	
Absent	Absent	Absent	—		THW1: Flow water temp. THW2: Return water temp.	4.4 4.5 5.3	1. Please make sure water circuit not to get frozen during defrost.

* The use of two 2-way valves can perform same function as a 3-way valve.

3.4 Fourth step (Functions setting)

* Make sure to check the followings for your safety when designing a system. These are the minimum requirement for the safe use of FTC4 unit.

Parts name	Requirement																																																			
Flow switch	It is required to protect system from the effects of insufficient flow.																																																			
Strainer /Magnetic filter (water circuit)	Provide it as required to protect parts from damages caused by iron particles/water/contamination (e.g. the position before pump and return part from emitters).																																																			
Pressure relief valve (Primary circuit side) (Sanitary water side)	It is required to protect system from reaching high pressure. Select the operating pressure depending on water pressure in the circuit in normal use. ※ Follow the national regulations.																																																			
3-way valve	<p>Current: 0.1A Max (If over 0.1A you must use a relay) Power supply: 230V AC Connect earth cable, if there is one. Type: SPST ※ SPDT type can NOT be used.</p> 																																																			
2-way valve	<p>Current: 0.1A Max (If over 0.1A you must use a relay) Power supply: 230V AC Connect earth cable, if there is one. Type: Normally closed Select the 2-way valve that slowly opens and shuts off to prevent water hammer. A by-pass valve or circuit should be installed between pump and 2-way valve for safety (to release pressure when the both 2-way valves are closed). Select a 2-way valve equipped with manual override, which is necessary for topping up or draining of water.</p>																																																			
Water circulation pump	<p>Current: 1.0A Max, Power supply: 230V AC When connecting a pump with an electric current of $\geq 1A$ or multiple pumps, please note the following.</p> <ol style="list-style-type: none"> Use (a) relay(s). When power is supplied from outdoor unit, TOTAL current (including the other parts) requirement MUST be $\leq 3A$ (otherwise, the fuse on the outdoor unit PCB will blow.) When independent power supplies (i.e. from the FTC4 unit itself) , total current for the pump(s) is $\leq 3A$. (otherwise, the fuse on the FTC4 PCB will blow.) <p>Connect earth cable, if there is one. Adjust the pump speed setting so that the flow rate in the primary circuit is appropriate for the outdoor unit installed see the table and figures below.</p> <table border="1" data-bbox="300 1276 901 1904"> <thead> <tr> <th colspan="2">Outdoor heat pump unit</th> <th>Water flow rate range [L/min]</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Packaged</td> <td>PUHZ-W50</td> <td>6.5 - 14.3</td> </tr> <tr> <td>PUHZ-W85</td> <td>10.0 - 25.8</td> </tr> <tr> <td>PUHZ-HW112</td> <td>14.4 - 32.1</td> </tr> <tr> <td>PUHZ-HW140</td> <td>17.9 - 40.1</td> </tr> <tr> <td rowspan="18">Split</td> <td>PUHZ-RP35</td> <td>5.0 - 11.8</td> </tr> <tr> <td>PUHZ-RP50</td> <td>7.0 - 17.2</td> </tr> <tr> <td>PUHZ-RP60</td> <td>8.6 - 20.1</td> </tr> <tr> <td>PUHZ-(H)RP71</td> <td>10.2 - 22.9</td> </tr> <tr> <td>PUHZ-(H)RP100</td> <td>14.4 - 32.1</td> </tr> <tr> <td>PUHZ-(H)RP125</td> <td>17.9 - 40.1</td> </tr> <tr> <td>PUHZ-RP140</td> <td>20.1 - 45.9</td> </tr> <tr> <td>PUHZ-RP200</td> <td>27.3 - 64.2</td> </tr> <tr> <td>PUHZ-HRP200</td> <td>28.7 - 68.9</td> </tr> <tr> <td>PUHZ-RP250</td> <td>32.1 - 80.3</td> </tr> <tr> <td>PUHZ-SW40</td> <td>5.0 - 11.8</td> </tr> <tr> <td>PUHZ-SW50</td> <td>7.0 - 17.2</td> </tr> <tr> <td>PUHZ-SW75</td> <td>10.2 - 22.9</td> </tr> <tr> <td>PUHZ-SW100</td> <td>14.4 - 32.1</td> </tr> <tr> <td>PUHZ-SW120</td> <td>20.1 - 45.9</td> </tr> <tr> <td>PUHZ-SHW80</td> <td>10.2 - 22.9</td> </tr> <tr> <td>PUHZ-SHW112</td> <td>14.4 - 32.1</td> </tr> <tr> <td>PUHZ-SHW140</td> <td>17.9 - 40.1</td> </tr> <tr> <td>PUHZ-SHW230</td> <td>28.7 - 68.9</td> </tr> </tbody> </table> <p>* The water velocity in pipes should be kept within certain limits of material to avoid erosion corrosion and excessive noise generation. (e.g. Copper pipe: 1.5m/s)</p>	Outdoor heat pump unit		Water flow rate range [L/min]	Packaged	PUHZ-W50	6.5 - 14.3	PUHZ-W85	10.0 - 25.8	PUHZ-HW112	14.4 - 32.1	PUHZ-HW140	17.9 - 40.1	Split	PUHZ-RP35	5.0 - 11.8	PUHZ-RP50	7.0 - 17.2	PUHZ-RP60	8.6 - 20.1	PUHZ-(H)RP71	10.2 - 22.9	PUHZ-(H)RP100	14.4 - 32.1	PUHZ-(H)RP125	17.9 - 40.1	PUHZ-RP140	20.1 - 45.9	PUHZ-RP200	27.3 - 64.2	PUHZ-HRP200	28.7 - 68.9	PUHZ-RP250	32.1 - 80.3	PUHZ-SW40	5.0 - 11.8	PUHZ-SW50	7.0 - 17.2	PUHZ-SW75	10.2 - 22.9	PUHZ-SW100	14.4 - 32.1	PUHZ-SW120	20.1 - 45.9	PUHZ-SHW80	10.2 - 22.9	PUHZ-SHW112	14.4 - 32.1	PUHZ-SHW140	17.9 - 40.1	PUHZ-SHW230	28.7 - 68.9
Outdoor heat pump unit		Water flow rate range [L/min]																																																		
Packaged	PUHZ-W50	6.5 - 14.3																																																		
	PUHZ-W85	10.0 - 25.8																																																		
	PUHZ-HW112	14.4 - 32.1																																																		
	PUHZ-HW140	17.9 - 40.1																																																		
Split	PUHZ-RP35	5.0 - 11.8																																																		
	PUHZ-RP50	7.0 - 17.2																																																		
	PUHZ-RP60	8.6 - 20.1																																																		
	PUHZ-(H)RP71	10.2 - 22.9																																																		
	PUHZ-(H)RP100	14.4 - 32.1																																																		
	PUHZ-(H)RP125	17.9 - 40.1																																																		
	PUHZ-RP140	20.1 - 45.9																																																		
	PUHZ-RP200	27.3 - 64.2																																																		
	PUHZ-HRP200	28.7 - 68.9																																																		
	PUHZ-RP250	32.1 - 80.3																																																		
	PUHZ-SW40	5.0 - 11.8																																																		
	PUHZ-SW50	7.0 - 17.2																																																		
	PUHZ-SW75	10.2 - 22.9																																																		
	PUHZ-SW100	14.4 - 32.1																																																		
	PUHZ-SW120	20.1 - 45.9																																																		
	PUHZ-SHW80	10.2 - 22.9																																																		
	PUHZ-SHW112	14.4 - 32.1																																																		
	PUHZ-SHW140	17.9 - 40.1																																																		
PUHZ-SHW230	28.7 - 68.9																																																			

Continue to the next page.

Flow temp.controller

From the previous page.

Parts name	Requirement
Water circulation pump	<p>(1) Packaged-type units</p> <p>■ Heating</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="331 331 890 607"> <p>PUHZ-W50</p> </div> <div data-bbox="938 331 1497 607"> <p>PUHZ-W85</p> </div> </div> <div style="margin-top: 20px;"> <p>PUHZ-HW112/140</p> </div> <p>(2) Split-type units</p> <p>■ Heating</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="331 1144 890 1420"> <p>PUHZ-RP35/50 *1 PUHZ-SW40/50 *3</p> </div> <div data-bbox="938 1144 1497 1420"> <p>PUHZ-RP60/71 *2 PUHZ-HRP71 *3 PUHZ-SW75 *3 PUHZ-SHW80 *3</p> </div> </div> <div style="margin-top: 20px;"> <div style="display: flex; justify-content: space-around;"> <div data-bbox="331 1487 890 1785"> <p>PUHZ-RP100/125/140 *3 PUHZ-HRP100/125 *3 PUHZ-SW100/120 *3 *3 PUHZ-SHW112/140 *3</p> </div> <div data-bbox="938 1487 1497 1785"> <p>PUHZ-RP200/250 *4 PUHZ-HRP200 *4 PUHZ-SHW230 *4</p> </div> </div> </div>

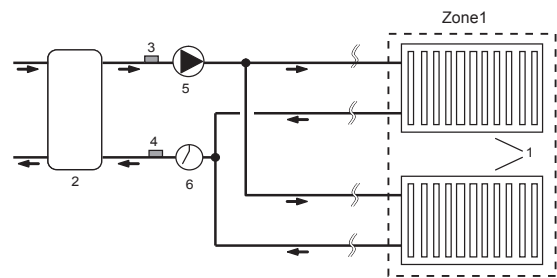
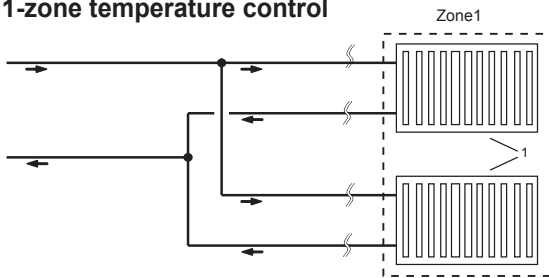
*1 When the connected plate heat exchanger is ACH 30-30 made by ALFA LAVAL.
 *2 When the connected plate heat exchanger is ACH 70-30 made by ALFA LAVAL.
 *3 When the connected plate heat exchanger is ACH 70-40 made by ALFA LAVAL.
 *4 When two ACH 70-40 plate heat exchangers made by ALFA LAVAL are parallel-connected.

Parts name	Requirement																						
Booster heater	<p>General</p> <ul style="list-style-type: none"> * Consider necessity and capacity of booster heater to meet the following points. <ol style="list-style-type: none"> (1) Heating capacity and flow water temperature should always be sufficient. (2) System can increase the temperature of the stored water in tank to inhibit legionella bacterium growth. <p>(Note) System without neither booster heater or immersion heater, 'Legionella Prevention Mode' is NOT available.</p> (3) Water circuit should not be frozen during defrost operation. 																						
	<p>Control Power for Contactor</p> <p>Current: 0.5A Max , Power supply: 230V AC</p> <p>* Use a relay.</p>																						
	<p>Separate power for Heater</p> <p>Install an earth leakage circuit breaker (ECB) for heater, separate from control power (See Fig.1 and Fig.2).</p> <p>* When using two booster heaters, booster heater 1 capacity must be less than that of booster heater 2.</p> <p>When using a single booster heater, connect to BH1 (TBO.3 1-2 (OUT6)) , and turn the Dip SW2-3 to ON. (Booster heater capacity restriction)</p>																						
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><Fig. 1 (1 phase)></p> </div> <div style="text-align: center;"> <p><Fig. 2 (3 phase)></p> </div> </div> <p>Heater capacity/Breaker/wiring (recommended)</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p><1 Phase></p> <table border="1"> <thead> <tr> <th>Description</th> <th>Power supply</th> <th>Total capacity (BH1 + BH2)</th> <th>Breaker</th> <th>Wiring</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Booster heater (Primary circuit)</td> <td rowspan="2">~N 230V 50Hz</td> <td>2 kW (2 kW + 0 kW)</td> <td>16 A</td> <td>2.5 mm²</td> </tr> <tr> <td>6 kW (2 kW + 4 kW)</td> <td>32 A</td> <td>6.0 mm²</td> </tr> </tbody> </table> </div> <div style="width: 45%;"> <p><3 Phase></p> <table border="1"> <thead> <tr> <th>Description</th> <th>Power supply</th> <th>Total capacity (BH1 + BH2)</th> <th>Breaker</th> <th>Wiring</th> </tr> </thead> <tbody> <tr> <td>Booster heater (Primary circuit)</td> <td>3~ 400V 50Hz</td> <td>9 kW (3 kW + 6 kW)</td> <td>16 A</td> <td>2.5 mm²</td> </tr> </tbody> </table> </div> </div> <p>* When installing a booster heater with the capacity of bigger than shown above, select an appropriate size breaker and cable (diameter) based on the maximum possible electric current.</p>	Description	Power supply	Total capacity (BH1 + BH2)	Breaker	Wiring	Booster heater (Primary circuit)	~N 230V 50Hz	2 kW (2 kW + 0 kW)	16 A	2.5 mm ²	6 kW (2 kW + 4 kW)	32 A	6.0 mm ²	Description	Power supply	Total capacity (BH1 + BH2)	Breaker	Wiring	Booster heater (Primary circuit)	3~ 400V 50Hz	9 kW (3 kW + 6 kW)	16 A
Description	Power supply	Total capacity (BH1 + BH2)	Breaker	Wiring																			
Booster heater (Primary circuit)	~N 230V 50Hz	2 kW (2 kW + 0 kW)	16 A	2.5 mm ²																			
		6 kW (2 kW + 4 kW)	32 A	6.0 mm ²																			
Description	Power supply	Total capacity (BH1 + BH2)	Breaker	Wiring																			
Booster heater (Primary circuit)	3~ 400V 50Hz	9 kW (3 kW + 6 kW)	16 A	2.5 mm ²																			
Safety device	<p>(1) Use an overheat protection thermostat (manual reset type) (to detect unusual temperature increase/heating up without water). Protection device operating temperature must be above 80 °C. Protection device should not operate quickly, but water circuit must not boil even when heater(s) overshoot.</p> <p>(Reference value) Thermostat operation temperature used in our Cylinder unit and Hydrobox : 90 °C ± 4 °C</p> <p>(2) Connect a pressure relief valve on the primary circuit side.</p>																						
Immersion heater	<p>General</p> <ul style="list-style-type: none"> * Consider necessity and capacity of immersion heater to meet the following points. <ol style="list-style-type: none"> (1) Heating capacity and flow water temperature should always be sufficient. (2) System can increase the temperature of the stored water in tank to inhibit legionella bacterium growth. <p>(Note) System without neither booster heater or immersion heater can not select 'Legionella Prevention Mode'.</p> 																						
	<p>Control Power for Contactor</p> <p>Current: 0.5A Max , Power supply: 230V AC</p> <p>* Use a relay.</p>																						
	<p>Separate power for heater</p> <p>Install an earth leakage circuit breaker (ECB) for heater, separate from control power (See Fig.1 and Fig.2).</p> <p>*ECB is built-in in PAC-IF052B-E.</p> <p>Heater capacity/Breaker/wiring (recommended)</p> <p><1 Phase></p> <table border="1"> <thead> <tr> <th>Description</th> <th>Power supply</th> <th>Capacity</th> <th>Breaker</th> <th>Wiring</th> </tr> </thead> <tbody> <tr> <td>Immersion heater (DHW tank)</td> <td>~N 230V 50Hz</td> <td>3 kW</td> <td>16 A</td> <td>2.5 mm²</td> </tr> </tbody> </table> <p>* When installing an immersion heater with the capacity of bigger than shown above, select an appropriate size breaker and cable (diameter) based on the maximum possible electric current.</p>	Description	Power supply	Capacity	Breaker	Wiring	Immersion heater (DHW tank)	~N 230V 50Hz	3 kW	16 A	2.5 mm ²												
Description	Power supply	Capacity	Breaker	Wiring																			
Immersion heater (DHW tank)	~N 230V 50Hz	3 kW	16 A	2.5 mm ²																			
Safety device	<p>(1) Install the enclosed thermistor THW5 on the DHW tank. (Microcomputer detecting temperature for protection: 80 °C)</p> <p>(2) Use a built-in direct cut-off thermostat (manual reset type). Protection device operating temperature must be above 80 °C. Protection device should not operate quickly, but water circuit must not boil even when a heater overshoots.</p> <p>(Reference value) Thermostat operation temperature used in our Cylinder unit : 85 °C ± 5°C</p> <p>(3) Connect a pressure relief valve on the sanitary water side.</p>																						
Mixing valve	<p>Current: 0.1 A Max (If over 0.1 A you must use a relay)</p> <p>Power supply: 230V AC</p> <p>Connect earth cable, if there is one.</p> <p>Type: Refer to the right figure.</p> <div style="text-align: center;"> <p>Mixing valve</p> </div>																						
Expansion Vessel (Primary circuit side) Expansion Vessel (Sanitary water side)	<p>When the water circuit is closed, select the expansion vessel according to water quantity of the water circuit.</p> <p>* Follow the national regulations.</p>																						
Limits of TOTAL electric current when connecting field supply parts	<p>Option 1. (Power supply from outdoor unit)</p> <p>TOTAL current requirement MUST be ≤ 3A (otherwise, the fuse on the outdoor unit PCB will blow).</p> <p>Option 2. (Independent power supply (i.e. from the FTC4 unit itself))</p> <p>TOTAL current of the pump(s) MUST be ≤ 3A.</p> <p>The total current allowed for parts except pumps is ≤ 3A. (otherwise, the fuse on the FTC4 PCB will blow.)</p>																						

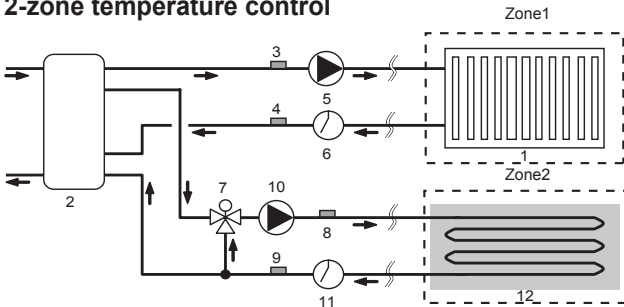
Flow temp.controller

3.5 Local system

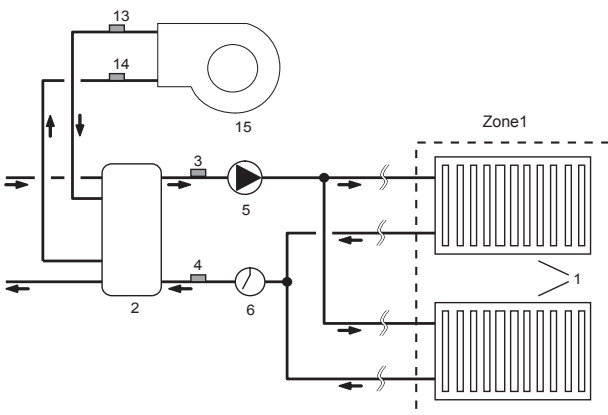
1-zone temperature control



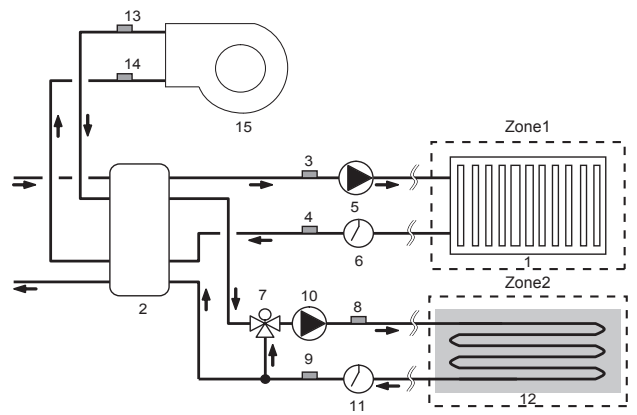
2-zone temperature control



1-zone temperature control with boiler



2-zone temperature control with boiler



1. Zone1 heat emitters (e.g. radiator, fan coil unit) (field supply)
2. Mixing tank (field supply)
3. Zone1 flow water temp. thermistor (THW6) (option)
4. Zone1 return water temp. thermistor (THW7) (option)
5. Zone1 water circulation pump (field supply)
6. Zone1 flow switch (field supply)
7. Motorized mixing valve (field supply)
8. Zone2 flow water temp. thermistor (THW8) (option)

9. Zone2 return water temp. thermistor (THW9) (option)
10. Zone2 water circulation pump (field supply)
11. Zone2 flow switch (field supply)
12. Zone2 heat emitters (e.g. underfloor heating) (field supply)
13. Boiler flow water temp. thermistor (THWB1) (option)
14. Boiler return water temp. thermistor (THWB2) (option)
15. Boiler

Note: Cooling mode cannot run under 2-zone temperature control but can run both in Zone1 and Zone2 under 1-zone temperature control.

3.6 Piping diagram for 2-zone temperature control

The following component parts are required for piping for 2-zone control operation.

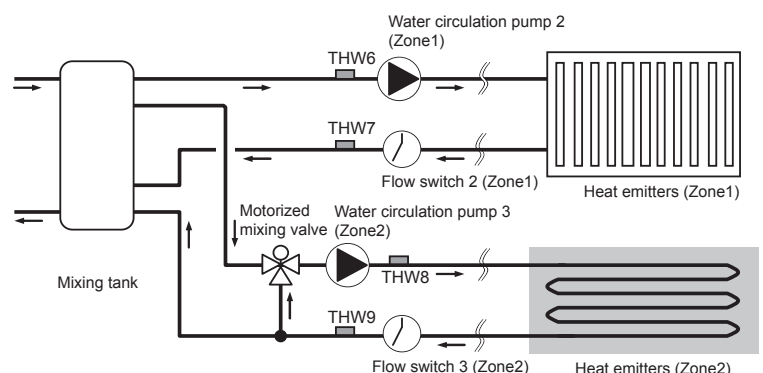
Arrange the following component parts.

- Mixing tank (field supply)
- Motorized mixing valve (field supply)
- Water circulation pump (x 2) (field supply)
- Flow switch (x 2) (field supply)
- Thermistor (x 4) *2 sets of (PAC-TH011-E) thermistors are required.

Wire the component parts to the water circuit referring to the figure below.

For more details on wiring, refer to "4.7 Wiring for 2-zone temperature controls".

Note: Do not install the thermistors on the mixing tank. This could affect correct monitoring of flow and return temperatures through each zone.
Install the Zone2 flow temp. thermistor (THW8) near the mixing valve.



- Thermistor (THW6): Zone1 flow temp.
- Thermistor (THW7): Zone1 return temp.
- Thermistor (THW8): Zone2 flow temp.
- Thermistor (THW9): Zone2 return temp.

4.1 Electrical connection

All electrical work should be carried out by a suitably qualified technician. Failure to comply with this could lead to electrocution, fire, and death. It will also invalidate product warranty. All wiring should be according to national wiring regulations. For multiple outdoor units control with FTC4 (Slave), see section 9.

FTC4 (Master) can be powered in two ways.

1. Power cable is run from the outdoor unit to FTC4 (Master).
2. FTC4 (Master) has independent power source

Connections should be made to the terminals indicated in the following figures depending on the phase.

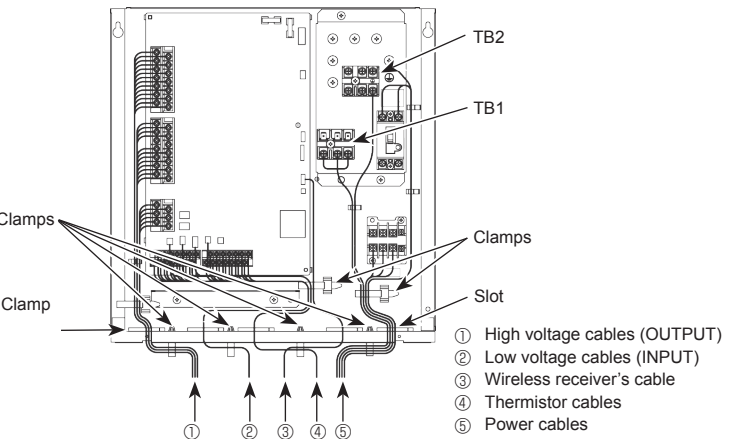
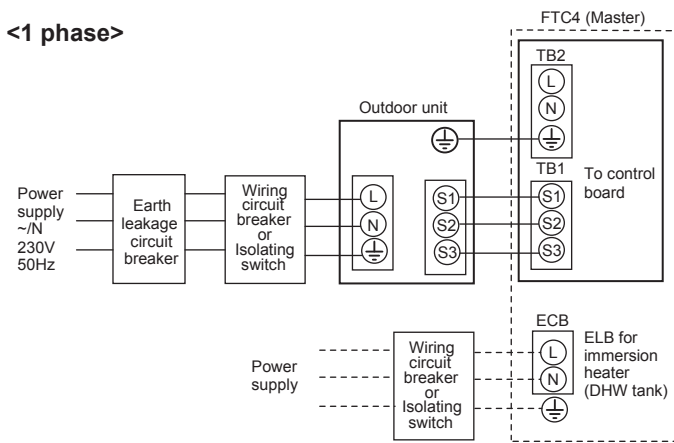
Breaker abbreviation	Meaning
ECB	Earth leakage circuit breaker for immersion heater
TB1	Terminal bed 1
TB2	Terminal bed 2

Immersion heater should be connected independently from one another to dedicated power supplies.

- Notes:**
1. Do not run the low voltage cables through a slot that the high voltage cables go through.
 2. Do not run other cables through a slot that the wireless receiver's cable goes through.
 3. Do not bundle power cables together with other cables.
 4. Bundle cables as figure above by using clamps.

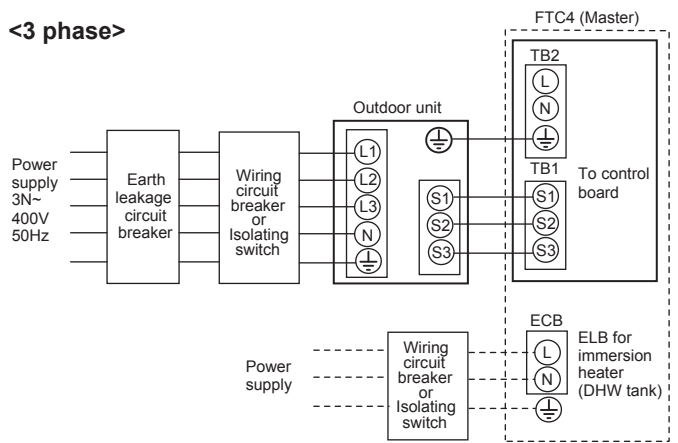
Option 1: FTC4 (Master) powered via outdoor unit

<1 phase>



<Fig. 4.1.1> Wiring for PAC-IF052B-E

<3 phase>



<Fig. 4.1.2> Electrical connections 1 phase/3 phase

□ : PAC-IF051B-E
 □ : PAC-IF052B-E

*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

*2 Affix label A that is included with the manuals near each wiring diagram for FTC4 (Master) and outdoor units.

Note: In accordance with IEE regulations the circuit breaker/isolating switch located on the outdoor unit should be installed with lockable devices (health and safety).

Wiring No. Wiring size (mm ²)	FTC4 (Master) - Outdoor unit	*2	3 × 1.5 (polar)
	FTC4 (Master) - Outdoor unit earth	*2	1 × Min. 1.5
Circuit rating	FTC4 (Master) - Outdoor unit S1 - S2	*3	AC230V
	FTC4 (Master) - Outdoor unit S2 - S3	*3	DC24V

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

*2. Max. 45 m
 If 2.5 mm² used, Max. 50 m
 If 2.5 mm² used and S3 separated, Max. 80 m

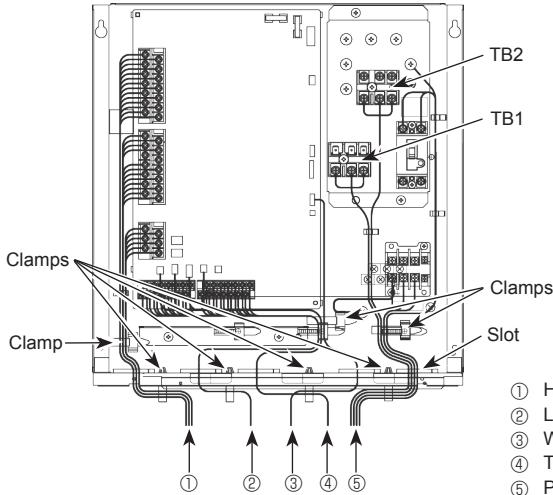
*3. The values given in the table above are not always measured against the ground value.

- Notes:**
1. Wiring size must comply with the applicable local and national codes.
 2. FTC4 (Master)/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
 FTC4 (Master) power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each individual heater. Insufficient power supply capacity might cause chattering.

Option 2: FTC4 (Master) powered by independent source

If FTC4 (Master) and outdoor units have separate power supplies, the following requirements MUST be carried out:

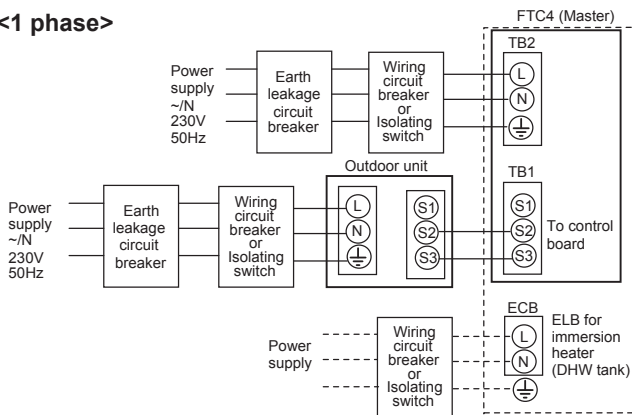
- **FTC4 (Master) unit electrical box connector connections changed (see Fig. 4.1.3)**
- **Outdoor unit DIP switch settings changed to SW8-3 ON**
- **Turn on the outdoor unit before the FTC4 (Master).**



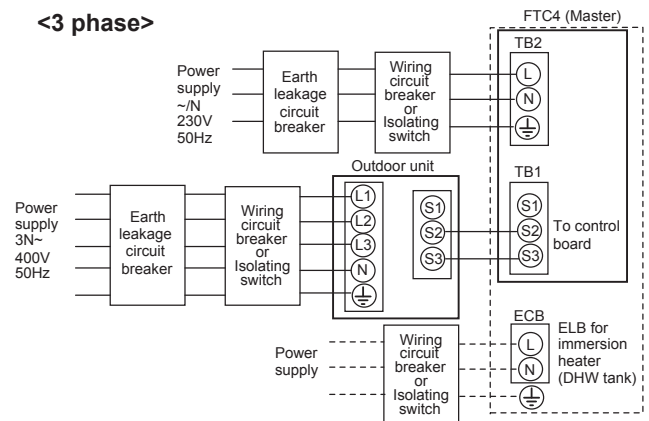
<Fig. 4.1.4> Wiring for PAC-IF052B-E

- Notes: 1. Do not run the low voltage cables through a slot that the high voltage cables go through.
 2. Do not run other cables through a slot that the wireless receiver's cable goes through.
 3. Do not bundle power cables together with other cables.
 4. Bundle cables as figure above by using clamps.

<1 phase>



<3 phase>



<Fig. 4.1.5> Electrical connections 1 phase/3 phase

□ : PAC-IF051B-E
 □ : PAC-IF052B-E

- *1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.
 *2 Affix label B that is included with the manuals near each wiring diagram for FTC4 (Master) and outdoor units.

Note: In accordance with IEE regulations the circuit breaker/isolating switch located on the outdoor unit should be installed with lockable devices (health and safety).

FTC4 (Master) power supply		~N 230 V 50 Hz
FTC4 (Master) input capacity Main switch (Breaker)		*1 16 A
Wiring No. x size (mm ²)	FTC4 (Master) power supply	2 × Min. 1.5
	FTC4 (Master) power supply earth	1 × Min. 1.5
	FTC4 (Master) - Outdoor unit	*2 2 × Min. 0.3
	FTC4 (Master) - Outdoor unit earth	—
Circuit rating	FTC4 (Master) L - N	*3 AC230V
	FTC4 (Master) - Outdoor unit S1 - S2	*3 —
	FTC4 (Master) - Outdoor unit S2 - S3	*3 DC24V

- *1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
 *2. Max. 120 m
 *3. The values given in the table above are not always measured against the ground value.

Notes: 1. Wiring size must comply with the applicable local and national codes.

2. FTC4 (Master) unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
 FTC4 (Master) unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.
 4. Please keep enough output capacity of power supply for each individual heater. Insufficient power supply capacity might cause chattering.

4.2 Connecting the main controller

4.2.1 Connect the main controller cable to FTC4 (Mas-

Connect the main controller cable to 11 and 12 on the terminal block (TBI. 2) on the FTC4 (Master) controller. <Fig. 4.2.1>

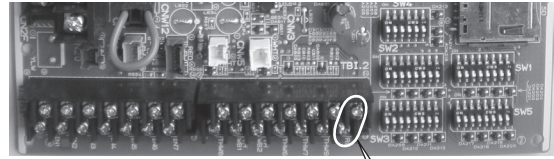
Wiring wire No. × size (mm²): 2 × 0.3 (non polar)

The 10 m wire is attached as an accessory. Max. 500 m

Wiring size must comply with the applicable local and national codes.

Circuit rating: 12V DC

Circuit rating is NOT always against the ground.



<Fig. 4.2.1>

TBI.2 RC

Location to place the main controller

When using the Remote controller options (refer to section 4.3), place the main controller on appropriate location that meets the following points to detect room temperature.

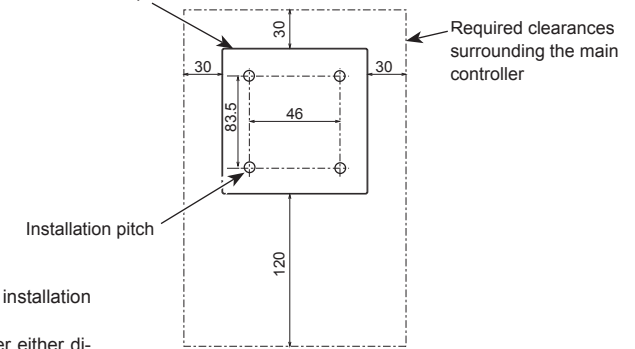
- Do not place the main controller in the periphery of a door or a window.
- Do not place the main controller near heat or cold sources, such as a radiator or the like.

Notes:

Wiring for main controller cable shall be (5 cm or more) apart from power source wiring so that it is not influenced by electric noise from power source wiring. (Do not insert main controller cable and power source wiring in the same conduit.) (Refer to Fig. 4.1.1)

When wiring to TBI.2, use the ring type terminals and insulate them from the cables of adjoining terminals.

Main controller profile



<Fig. 4.2.2>

4.2.2 Installing the main controller

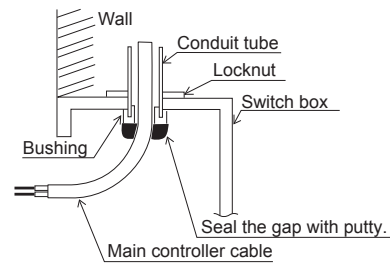
1. The main controller can be installed either in the switch box or directly on the wall. Perform the installation properly according to the method.

- (1) Secure clearances shown in <Fig. 4.2.2> regardless of whether installing the main controller either directly on the wall or in the switch box.
- (2) Prepare the following items in the field.

- Double switch box
- Thin metal conduit
- Locknut and bushing
- Cable cover
- Wall plug

2. Drill an installation hole in the wall.

- Installation using a switch box
 - Drill a hole in the wall for the switch box, and install the switch box in the hole.
 - Fit the conduit tube into the switch box.
- Direct wall installation
 - Drill a cable access hole and thread the main controller cable through it.



<Fig. 4.2.3>

⚠ Caution:

To prevent entry of dew, water, and insects, seal the gap between the cable and the hole through which the cable is threaded with putty. Otherwise, electric shock, fire, or failure may result.

3. Have the main controller ready.

Remove the back cover from the main controller.

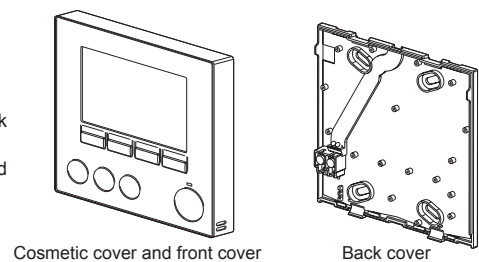
4. Connect the main controller cable to the terminal block on the back cover.

Modify the main controller cable as shown in <Fig. 4.2.5>, and thread the cable from behind the back cover.

Completely thread the cable to the front so that the unsheathed part of the cable cannot be seen behind the back cover.

Connect the main controller cable to the terminal block on the back cover.

- Direct wall installation
 - Seal the gap between the cable and the hole through which the cable is threaded.



Cosmetic cover and front cover

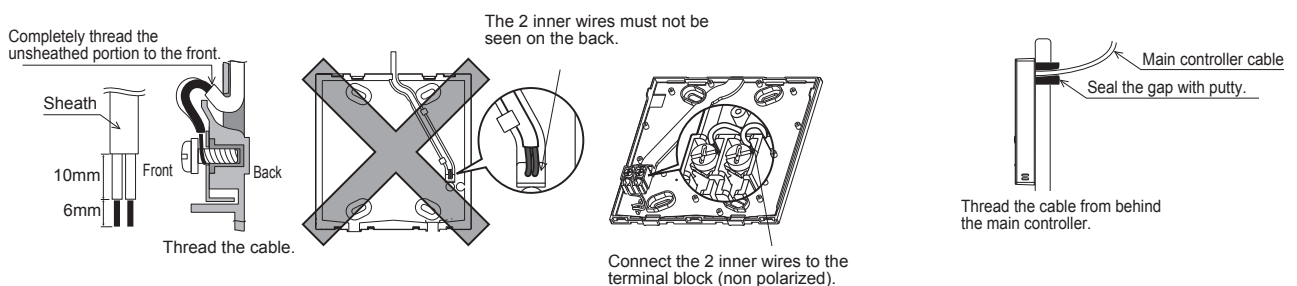
Back cover

<Fig. 4.2.4>

⚠ Caution

To prevent electric shock or failure, keep the sheath ends or any other foreign objects out of the terminal block.

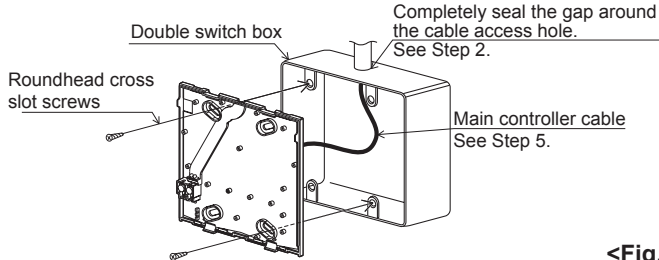
Do not use ring terminals to connect the wires to the terminal block on the back cover. The terminals will come in contact with the control board and the cosmetic cover, which will result in failure.



<Fig. 4.2.5>

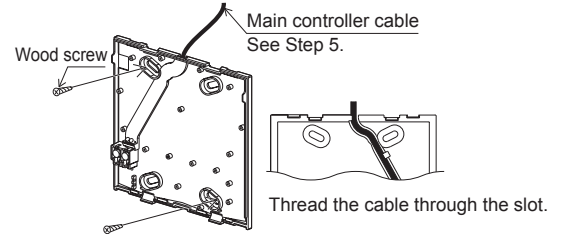
5. Install the back cover.

- Installation using a switch box
 - When installing the back cover in the switch box, secure at least two corners of the switch box with screws.



■ Direct wall installation

- Thread the cable through the slot provided.
- When mounting the back cover on the wall, secure at least two corners of the main controller with screws.
- To prevent the back cover from lifting, use top-left bottom-right corners of the main controller (viewed from the front) to secure the back cover to the wall with wall plugs or the like.



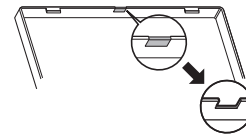
<Fig. 4.2.6>

⚠ Caution:

To avoid causing deformation or cracks to the main controller, do not overtighten the screws and make an additional installation hole(s).

6. Cut out the cable access hole.

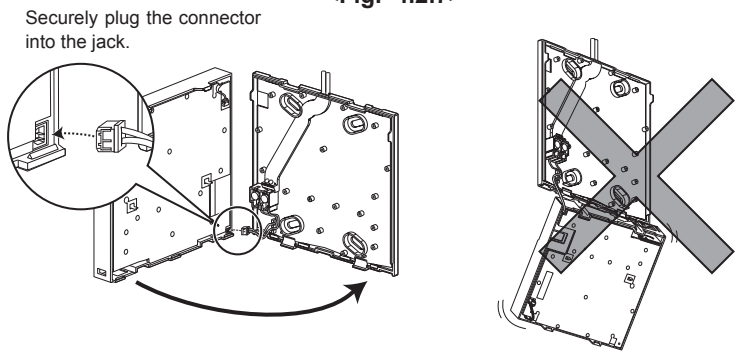
- Direct wall installation
 - Cut out the knockout hole (indicated with grey in <Fig. 4.2.7>) in the cosmetic cover by knife or nipper.
 - Thread the main controller cable from the slot behind the back cover through this access hole.



<Fig. 4.2.7>

7. Plug the lead wire cable into the front cover.

Plug the lead wire cable coming from the back cover into the front cover.



Securely plug the connector into the jack.

<Fig. 4.2.8>

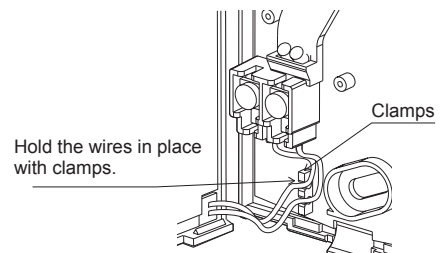
⚠ Caution:

To avoid failures, do not remove the controller board protective sheet and the controller board from the front cover. After the cable is plugged into the front cover, do not hang the front cover as shown in <Fig. 4.2.8>. Otherwise, the main controller cable could sever, which could cause malfunction to the main controller.

8. Fit the lead wires into the clamps.

⚠ Caution:

Hold the wires in place with clamps to prevent excessive strain from being applied on the terminal block and causing cable breakage.

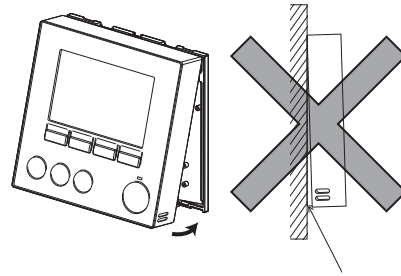


<Fig. 4.2.9>

9. Fit the front cover and the cosmetic cover onto the back cover.
 The front cover assembly (fitted with the cosmetic cover at factory shipment) has two tabs on top. Hook the tabs onto the back cover and snap the front cover onto the back cover into place. Check that the cover is securely installed.

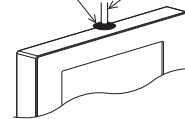
⚠ Caution:
When the front cover is correctly attached to the back cover a click is heard. If the cover is not clicked into place it may fall off.

- Direct wall installation (when routing the main controller cable along the wall surface)
 - Thread the main controller cable through the cable access hole at the top of the main controller.
 - Seal the gap between the cable and the access hole with putty.
 - Use a cable cover.



<Fig. 4.2.10>

Seal the gap between the cable and the access hole with putty. Use a cable cover.

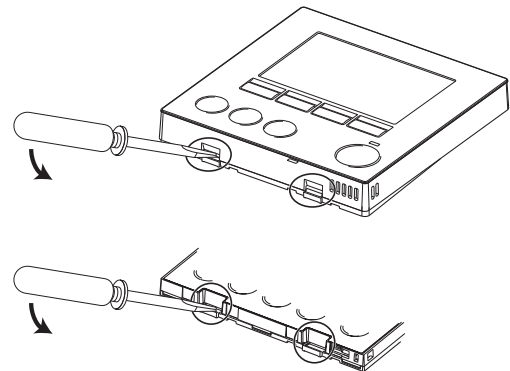


Thread the main controller cable through the cable access hole at the top of the main controller.

<Fig. 4.2.11>

- Disassembling the front cover and the cosmetic cover
 - (1) Remove the cosmetic cover.
 Insert a flat head screwdriver into either of two open slots at the bottom of the main controller and move the screwdriver handle downward as shown. The engagement of the tabs will be released. Then pull the cosmetic cover toward the front to remove the cosmetic cover.
 - (2) Remove the front cover.
 Insert a flat head screwdriver into either of two open slots at the bottom of the main controller. The subsequent procedure is the same as that of the cosmetic cover.

⚠ Caution:
Use a 5 mm- flat head screwdriver. Do not turn the screwdriver forcibly while placing the blade in the slots. Doing so could break the covers.



<Fig. 4.2.12>

4.3 Remote Controller Options

The FTC4 (cased) comes factory fitted with a main controller. This incorporates a thermistor for temperature monitoring and a graphical user interface to enable set-up, view current status and input scheduling functions. The main controller is also used for servicing purposes. This facility is accessed via password protected service menus.

To provide the best efficiency Mitsubishi Electric recommends using automatic adaptation function based on room temperature. To use this function a room thermistor needs to be present in a main living area. This can be done in a number of ways the most convenient are detailed below.

Refer to heating section of this manual for instructions on how to set compensation curve, flow temp or room temp (Auto adaptation).

For instructions on how to set the thermistor input for the FTC4 (Master) please refer to Initial settings section.

The factory setting for space heating mode is set to Room temp. (auto adaptation). If there is no room sensor present in the system, this setting must be changed to either Compensation curve mode or Flow temp mode.

Note: Auto-adaptation is not available in Cooling mode.

■ 1-zone temperature control

<p>Control option A</p> <p>This option features the main controller and the Mitsubishi Electric wireless remote controller. The wireless remote controller is used to monitor room temperature and can be used to make changes to the space heating settings, boost DHW (*1) and switch to holiday mode without having to directly use the main controller.</p> <p>If more than one wireless remote controller is used, the most recently requested temperature setting will commonly be applied to all rooms by the central control system regardless of which wireless remote controller was used. No hierarchy exists across these remote controllers.</p> <p>Wire the wireless receiver to FTC4 (Master) referring to the wireless remote controller instruction manual. Turn DIP SW1-8 to ON. Before operation configure the wireless remote controller to transmit and receive data referring to the wireless remote controller installation manual.)</p>	
<p>Control option B</p> <p>This option features the main controller and the Mitsubishi Electric thermistor wired to FTC4 (Master). The thermistor is used to monitor room temperature but can not make any changes in control operation. Any changes to DHW (*1) must be made using the main controller mounted on the FTC4 (Master).</p> <p>Wire the thermistor to the TH1 connector on FTC4 (Master). The number of room temperature thermistors that can be connected to FTC4 (Master) is always one.</p>	
<p>Control option C</p> <p>This option features the main controller being removed from the FTC4 (Master) and situated in a different room. A thermistor built in the main controller can be used for monitoring the room temperature for Auto Adaptation function whilst keeping all its features of the main controller available.</p> <p>The main controller and FTC4 (Master) are connected by a 2-core, 0.3 mm², non-polar cable (field supply) with a maximum length of 500 m.</p> <p>To use the sensor in the main controller the main controller should come off from the FTC4 (Master). Otherwise it will detect the temperature of the FTC4 (Master) instead of room temperature. This will affect the output of the space heating.</p>	
<p>Control option D (Flow temp. or compensation curve only)</p> <p>This option features the main controller and a locally supplied thermostat wired to FTC4 (Master). The thermostat is used to set the maximum temperature for heating room. Any changes to DHW (*1) must be made using main controller mounted on the FTC4 (Master).</p> <p>The thermostat is wired to IN1 in TBI.1 on FTC4 (Master). The number of thermostats that can be connected to FTC4 (Master) is always one.</p> <p>The wireless remote controller can be also used as a thermostat.</p>	

*1 If applicable

2-zone temperature control

Control option A

This option features the main controller, the Mitsubishi Electric wireless remote controller and a locally supplied thermostat.

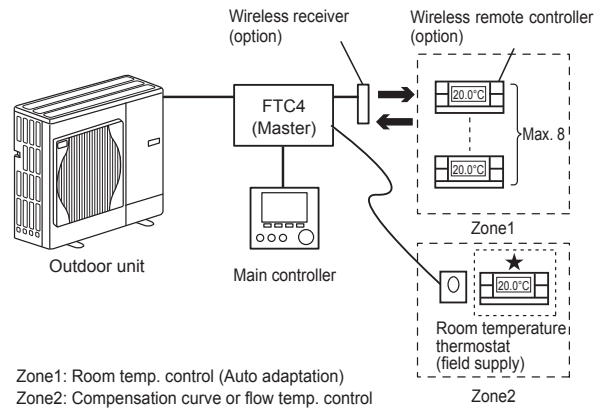
The wireless remote controller is used to monitor the Zone1 room temperature and the thermostat is used to monitor the Zone2 room temperature.
The thermostat can be also allocated to Zone1 and the wireless remote controller to Zone2.

The wireless remote controller can be also used to make changes to the space heating settings, boost DHW (*1) and switch to holiday mode without having to use the main controller.

If more than one wireless remote controller is used, the last temperature setting adjustment/demand will be applied to ALL rooms in same zone.

Wire the wireless receiver to FTC4 (Master) referring to the wireless remote controller instruction manual. Turn DIP SW1-8 to ON. Before operation configure the wireless remote controller to transmit and receive data referring to the wireless remote controller installation manual.)

The thermostat is used to set the maximum temperature for heating Zone2 room. The thermostat is wired to IN6 on FTC4 (Master). (If the thermostat is allocated to Zone1, it is wired to IN1 on TBI.1.) (Refer to 4.5.)



Control option B

This option features the main controller, the Mitsubishi Electric thermistor and a locally supplied thermostat that are wired to FTC4 (Master).

The thermistor is used to monitor the Zone1 room temperature and the thermostat is used to control the Zone2 room temperature.

The thermostat can be also allocated to Zone1 and the thermistor to Zone2.

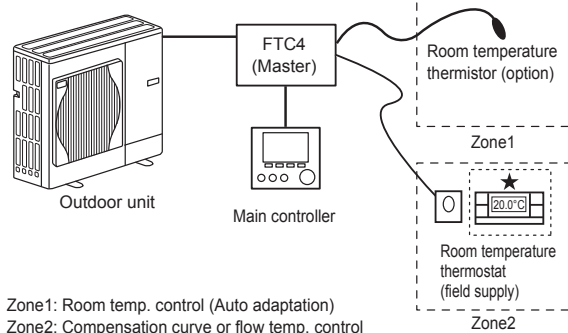
The thermistor can not make any changes in control operation. Any changes to DHW (*1) must be made using the main controller mounted on the FTC4 (Master).

Wire the thermistor to the TH1 connector on FTC4 (Master).

The number of room temperature thermistors that can be connected to FTC4 (Master) is always one.

The thermostat is used to set the maximum temperature for heating Zone2 room.

The thermostat is wired to IN6 on FTC4 (Master). (If the thermostat is allocated to Zone1, wire it to IN1 on TBI.1.) (Refer to 4.5.)



Control option C

This option features the main controller (with in-built thermistor) that is removed from the FTC4 (Master) to monitor the Zone1 room temperature and a locally supplied thermostat to monitor the Zone2 room temperature.

The thermostat can be also allocated to Zone1 and the thermistor to Zone2.

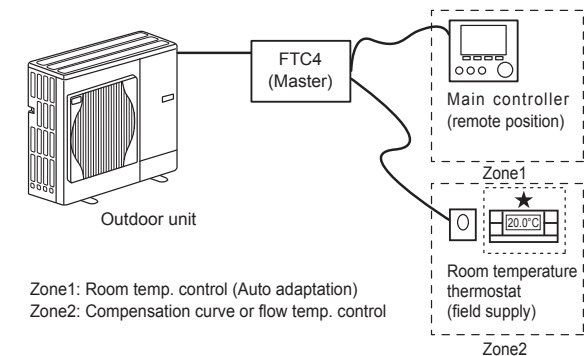
A thermistor built into the main controller can be used for monitoring the room temperature for Auto Adaptation function whilst keeping all its features of the main controller available.

The main controller and FTC4 (Master) are connected by a 2-core, 0.3 mm², non-polar cable (field supply) with a maximum length of 500 m.

To use the sensor in the main controller the main controller should be detached from the FTC4 (Master). Otherwise it will detect the temperature of the FTC4 (Master) instead of room temperature. This will affect the output of the space heating.

The thermostat is used to set the maximum temperature for heating Zone2 room.

The thermostat is wired to IN6 on FTC4 (Master). (If the thermostat is allocated to Zone1, wire it to IN1 on TBI.1.) (Refer to 4.5.)

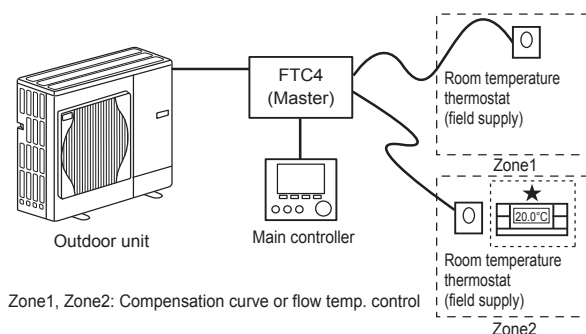


Control option D

This option features the locally supplied thermostats wired to FTC4 (Master). The thermostats are individually allocated to Zone1 and Zone2. The thermostats are used to set each maximum temperature for heating Zone1 and Zone2 rooms. Any changes to DHW (*1) must be made using the main controller mounted on the FTC4 (Master).

The thermostat for Zone1 is wired to IN1 in TBI.1 on FTC4 (Master).

The thermostat for Zone2 is wired to IN6 in TBI.1 on FTC4 (Master).



*1 If applicable

*2 For the options above, the sensor types can be exchanged between Zone1 and Zone2. (e.g. Wireless remote controller in Zone1 and Room temp thermostat in Zone2 can be changed to Room temp thermostat and wireless remote controller, respectively).

Also, the wireless remote controller can be used to function as a thermostat as well, if required.

4.4 Connecting the thermistor cables

Connect the thermistor for the FTC4 (Master) controller.
For multiple outdoor units control with FTC4 (Slave), see section 9.

4.4.1 Connecting the room temp. thermistor (TH1) cable

TH1 is an optional part (PAC-SE41TS-E).
TH1 is required to use the auto adaptation function. However, when room temperature detection is conducted by the main controller or the wireless remote controller (optional), this part is not required.
Connect the TH1 cable to the CN20 connector on FTC4 (Master).
When the TH1 cable is too long, bundle the excess cable outside the FTC4 (Master) unit.
For more details, refer to Section 4.3 in this manual or the installation manual that comes with PAC-SE41TS-E.
When using TH1, place this sensor on appropriate location to detect room temperature.

4.4.2 Connecting the refrigerant pipe temp. thermistor (TH2) cable

Connect the TH2 cable to the CN21 connector on FTC4 (Master).
For split Outdoor unit : Connect TH2.
For packaged Outdoor unit : It is NOT necessary to connect TH2.

When the TH2 cable is too long, bundle the excess cable outside the FTC4 (Master) unit.
Do not bind the wires in the FTC4 (Master) unit.

<Thermistor position>

Place TH2 on **refrigerant** piping (**liquid** side).
It is recommended to protect the thermistor with heat insulating materials so as not to be affected by ambient temperature.

Note: Be sure to place TH2 where it correctly detects refrigerant piping temp. (liquid side).
Because;
(1) TH2 is required to detect heating subcool correctly.
(2) Refrigerant temperature of water-to-refrigerant heat exchanger also needs to be detected for protection purpose.

4.4.3 Connecting the flow water temp. thermistor (THW1) cable and the return water temp. thermistor (THW2) cable

The THW1 and the THW2 cables share a connector, and the connector connects to CNW12 connector on FTC4 (Master).

When the THW1 and THW2 cables are too long, bundle the excess cables outside the FTC4 (Master) unit.
Do not bind the wires in the FTC4 (Master) unit.

<Thermistor position>

Place THW1 on **water** piping (water **outlet** side) after booster heater, and THW2 on the water inlet side.
It is recommended to protect the thermistor with heat insulating materials so as not to be affected by ambient temperature.
Note: Be sure to attach THW1 where it correctly detects Flow temp. (water outlet side). For more details, see Page 7.

4.4.4 Connecting the actual DHW tank thermistor (THW5) cable

Connect the THW5 cable to the CNW5 connector on FTC4 (Master) if the DHW tank is available.
When the THW5 cable supplied with FTC4 (Master) is too long, bundle the excess cable outside the FTC4 (Master) unit.
Do not bind the wires in the FTC4 (Master) unit.

<Thermistor position>

Place THW5 on the position where tank water temperature can be detected correctly.
It is recommended to position the thermistor at the mid height of the DHW tank (to control DHW heating with this sensor).
It is recommended to protect the thermistor with heat insulating materials so as not to be affected by ambient temperature.
Especially for double (insulated) tank, thermistor should be attached to the inner side (to detect the water temperature).

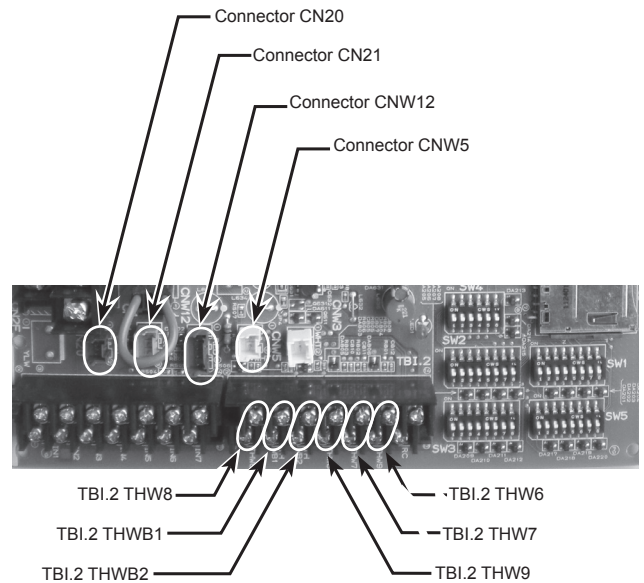
Note:

Connect the terminals by using the ring terminals and also insulate the cables of adjoining terminals when wiring to TBI.1 or 2.
The necessary thermistor (THW6, THW7, THW8, THW9) connection for 2-zone temperature control, refer to "4.7 Wiring for 2-zone temperature control" .

The necessary thermistor (THWB1, THWB2, THW6, THW7) connection for back-up operation of boiler, refer to the installation manual of PAC-TH011HT-E .

⚠ Caution:

Do not route the thermistor cables together with power cables.
The sensor part of the thermistor should be installed where user can not access.
(It should be separated, by supplementary insulation, from areas the user can access.)



<Fig. 4.4.1>

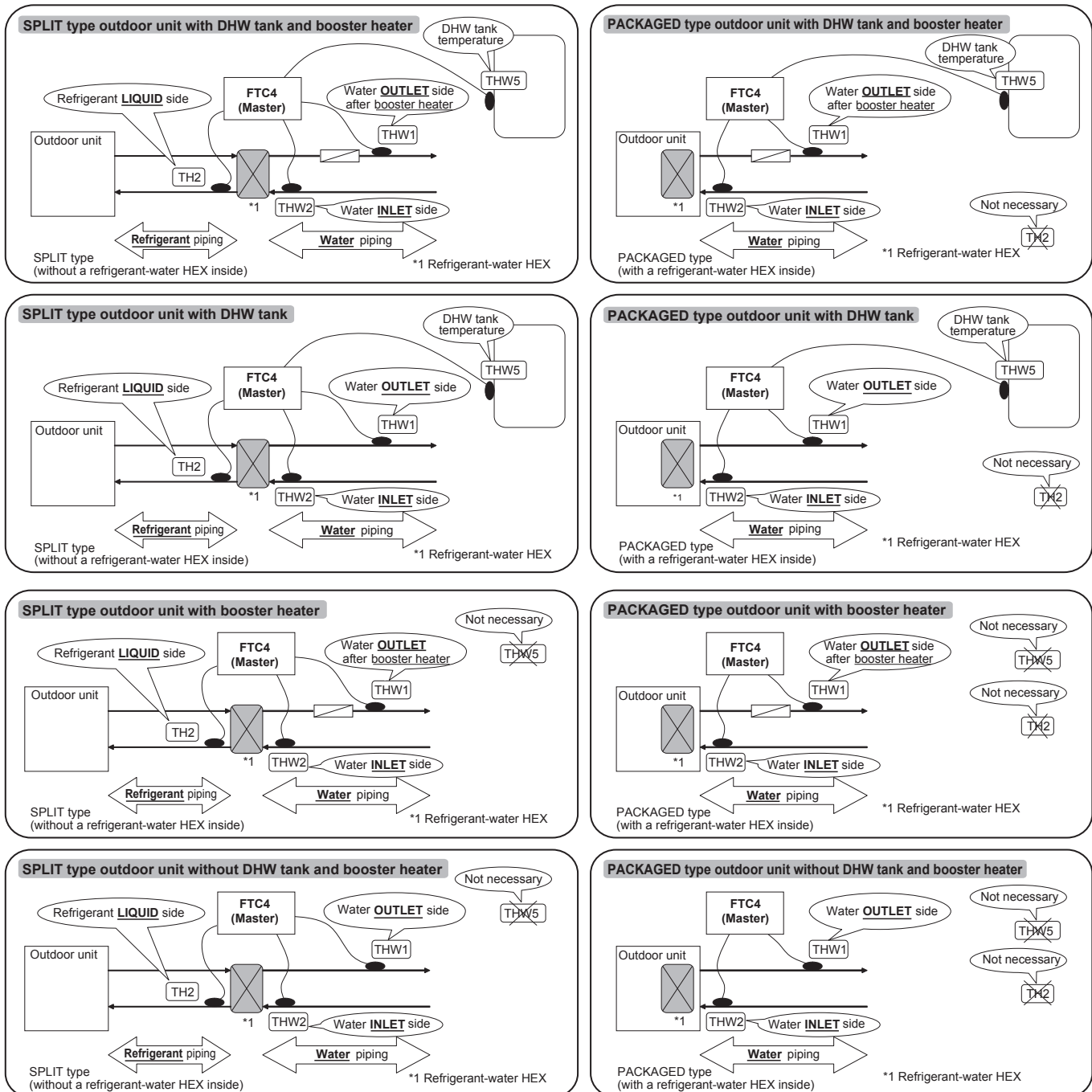
4.4.5 Thermistor position and necessity

<Thermistor position and necessity>

Outdoor unit type	DHW tank	TH2	THW1	THW2	THW5
Split	Present	✓	✓	✓	✓
	Absent	✓	✓	✓	—
Packaged	Present	—	✓	✓	✓
	Absent	—	✓	✓	—

✓: Necessary. Connect the thermistor.

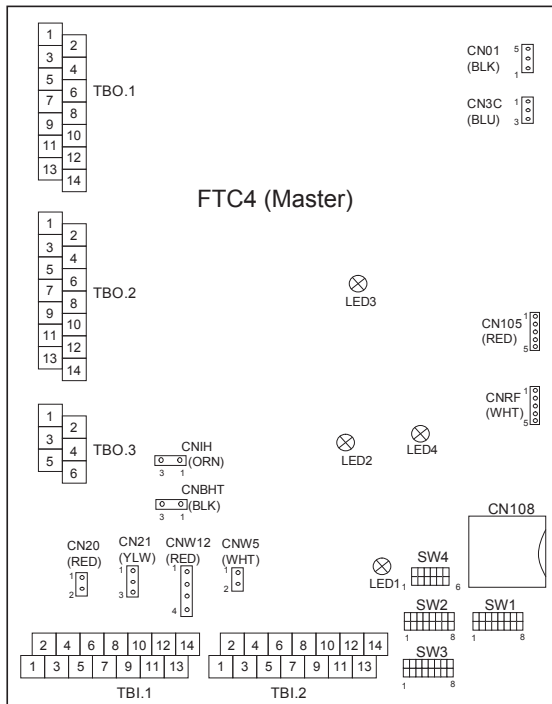
—: Not necessary. The thermistor is not required, do not connect.



<Fig. 4.4.2>

4.5 Connecting inputs/outputs

For multiple outdoor units control with FTC4 (Slave), see section 9.



When the wires are wired to adjacent terminals use ring terminals and insulate the wires.

Flow temp.controller

4.5.1 Signal inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <5.1 Dip Switch Functions>.	
IN2	TBI.1 3-4	—	Flow switch 1 input	Refer to SW2-2 in <5.1 Dip Switch Functions>.	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <5.1 Dip Switch Functions>.	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/ Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input (*1)	Standard operation	Heater operation/ Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <5.1 Dip Switch Functions>.	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <5.1 Dip Switch Functions>.	

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
 *2. To turn on the boiler operation, use the main controller to select "Boiler" in "External input setting" screen in the service menu.

Wiring specification and field supply parts

Item	Name	Model and specifications
Signal input function	Signal input wire	Use sheathed vinyl coated cord or cable. Max. 10 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm
	Switch	Non-voltage "a" contact signals Remote switch: minimum applicable load 12V DC, 1mA

4.5.2 Thermistor inputs

Name	Terminal block	Connector	Item	Optional part model
TH1	—	CN20	Thermistor (Room temp.) (Option)*1	PAC-SE41TS-E
TH2	—	CN21	Thermistor (Ref. liquid temp.)*2	—
THW1	—	CNW12 1-2	Thermistor (Flow water temp.)	—
THW2	—	CNW12 3-4	Thermistor (Return water temp.)	—
THW5	—	CNW5	Thermistor (DHW tank water temp.) (Option)*1	PAC-TH011TK-E
THW6	TBI.2 7-8	—	Thermistor (Zone1 flow water temp.) (Option)*1	—
THW7	TBI.2 9-10	—	Thermistor (Zone1 return water temp.) (Option)*1	PAC-TH011-E
THW8	TBI.2 1-2	—	Thermistor (Zone2 flow water temp.) (Option)*1	—
THW9	TBI.2 11-12	—	Thermistor (Zone2 return water temp.) (Option)*1	PAC-TH011-E
THWB1	TBI.2 3-4	—	Thermistor (Boiler flow water temp.) (Option)*1	—
THWB2	TBI.2 5-6	—	Thermistor (Boiler return water temp.) (Option)*1	PAC-TH011HT-E

Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each temperature.

If the wiring is too long, bundle it with a strap to adjust the length.

*1. The maximum length of the thermistor wiring is 5 m.

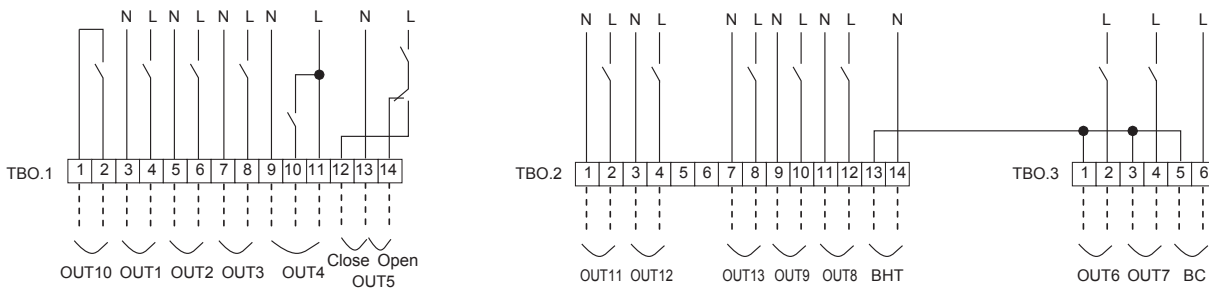
When the wires are wired to adjacent terminals, use ring terminals and insulate the wires.

*2. Except PAC-IF052B-E

4.5.3 Outputs

Name	Terminal block	Connector	Item	OFF	ON	Signal/Max current	Max. total current
OUT1	TBO.1 3-4	—	Water circulation pump 1 output (Space heating & DHW)	OFF	ON	230V AC 1.0 A Max	3.0 A (a)
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON	230V AC 1.0 A Max	
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON	230V AC 1.0 A Max	
OUT4	TBO.1 9-11	—	3-way valve (2-way valve 1) output	Heating	DHW	230V AC 0.1 A Max	3.0 A (b)
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close	230V AC 0.1 A Max	
	TBO.1 13-14			Stop	Open		
OUT6	TBO.3 1-2	—	Booster heater 1 output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT7	TBO.3 3-4	—	Booster heater 2 output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT11	TBO.2 1-2	—	Error output	Normal	Error	230V AC 0.5 A Max	
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost	230V AC 0.5 A Max	
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating	230V AC 0.1 A Max	
BC	TBO.3 5-6	—	Booster heater protection output	OFF (BHT open)	ON (BHT short)	230V AC 0.5 A Max	
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON	non-voltage contact • 220 - 240V AC (30V DC) 0.5A or less • 10 mA 5V DC or more	—
BHT	TBO.2 13-14	CNBHT	Thermostat for booster heater	Thermostat	Normal: short / High temp.: open		

Flow temp.controller



Wiring specification and field supply parts

Item	Name	Model and specifications
External output function	Outputs wire	Use sheathed vinyl coated cord or cable. Max. 30 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm

- Note:**
1. When the hydrobox is powered via outdoor unit, the maximum grand total current of (a)+(b) is 3.0 A.
 2. Do not connect multiple water circulation pumps directly to each output (OUT1, OUT2, and OUT3). In such a case, connect them via (a) relay(s).
 3. Connect an appropriate surge absorber to OUT10 (TBO.1 1-2) depending on the load at site.

4.6 Wiring for heater

<Care to be taken when connecting a booster heater(s)>

The initial setting assumes that the connected booster heater(s) has a built-in direct cut-off thermostat. <Fig. 4.6.1>

When the connected booster heater(s) has a built-in indirect cut-off thermostat, perform wiring according to the following items. < Fig. 4.6.2>

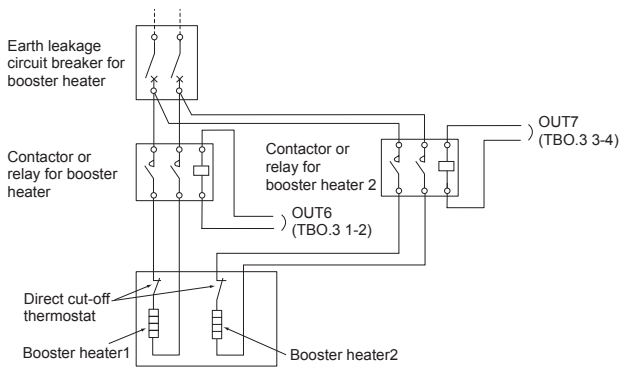
- Connect the thermostat signal to BHT (TBO.2 13-14).
- Remove the jumper wire from connector CNBHT.
- Connect a contactor (or relay) for protecting the booster heater.
(Connect the electromagnetic coil terminals to BC (TBO.3 5-6).

* Do not remove the jumper wire from connector CNBHT when the connected booster heater(s) has a built-in direct cut-off thermostat. < Fig. 4.6.1>

<Care to be taken when connecting an immersion heater>

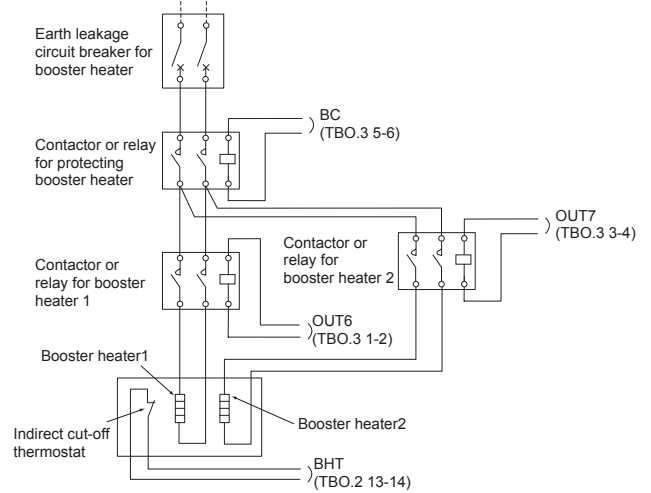
The initial setting assumes that the connected immersion heater has a built-in direct cut-off thermostat. <Fig. 4.6.3>

<Wiring for booster heater with a built-in direct cut-off thermostat>



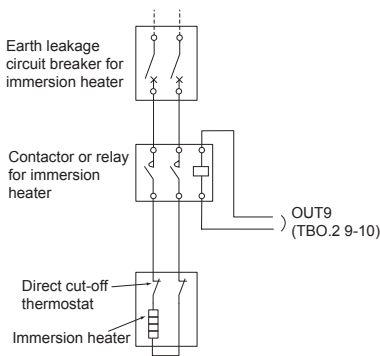
<Fig. 4.6.1>

<Wiring for booster heater with a built-in indirect cut-off thermostat>

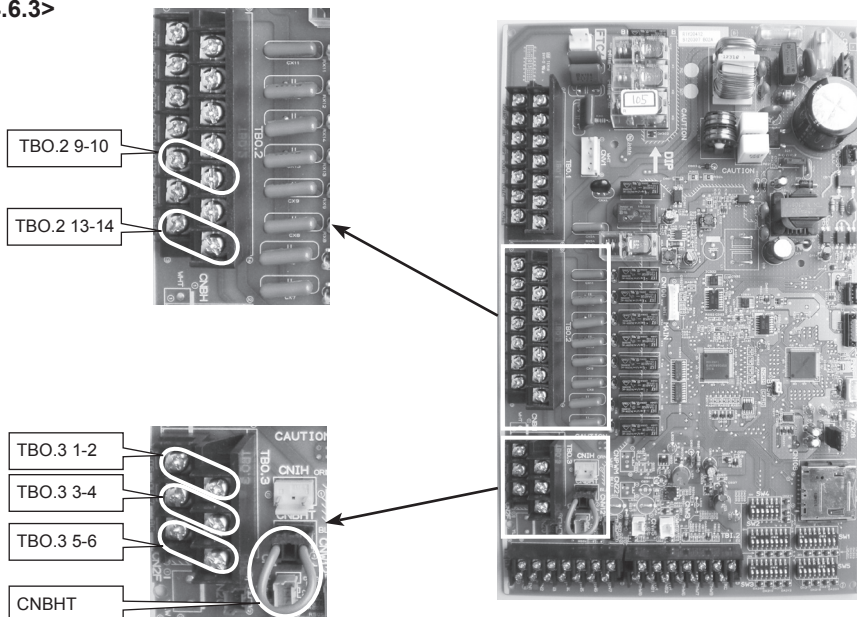


<Fig. 4.6.2>

<Wiring for immersion heater with a built-in direct cut-off thermostat>



<Fig. 4.6.3>



4.7 Wiring for 2-zone temperature control

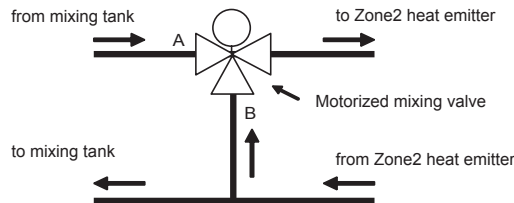
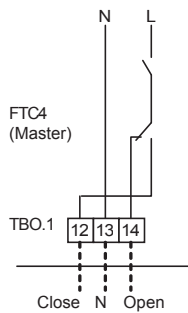
1. Water circulation pump 2 (Zone1 water circulation pump) / Water circulation pump 3 (Zone2 water circulation pump)
Electrically wire water circulation pumps 2 and 3 to the appropriate output terminals. (Refer to "Outputs" in 4.5.)
2. Flow switch 2 (Zone1 flow switch) / Flow switch 3 (Zone2 flow switch)
Connect flow switches 2 and 3 to the appropriate terminals. (Refer to "Signal inputs" in 4.5.)
Set dip switches 3-2 and 3-3 according to the functions of individual flow switches 2 and 3. (Refer to "Dip switch setting" in 5.)
3. Thermistor
Connect the thermistor to monitor the Zone1 flow temp. to the THW6 (TBI. 2-7 and 2-8) terminals.
Connect the thermistor to monitor the Zone1 return temp. to the THW7 (TBI. 2-9 and 2-10) terminals.
Connect the thermistor to monitor the Zone2 flow temp. to the THW8 (TBI. 2-1 and 2-2) terminals.
Connect the thermistor to monitor the Zone2 return temp. to the THW9 (TBI. 2-11 and 2-12) terminals.

The maximum length of the thermistor wiring is 5 m. Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each hot water temperature through zones.

If the wiring is too long, bundle it with a strap to adjust the length.

4. Motorized mixing valve
Connect three wires coming from the motorized mixing valve to the appropriate terminals referring to "Outputs" in 5.2.

Note: Connect the signal line to open Port A (hot water inlet port) to TBO. 1-14 (Open), the signal line to open Port B (cold water inlet port) to TBO. 1-12 (Close), and the neutral terminal wire to TBO. 1-13 (N).



Flow temp.controller

4.8 Installation procedure for DHW tank

Note:

- Be aware that the respective DHW operations are greatly effected by the selections of the components such as tank, immersion heater, or the like.
- Follow your local regulations to perform system configuration.

1. To enable switching of the water circulation circuit between the DHW mode and the heating mode, install a 3-way valve (field supply). The 3-way valve and the DHW tank should be positioned as shown in the system diagram in section 3.
The use of two 2-way valves can perform the same function as a 3-way valve.
2. Install the optional thermistor THW5 (optional part PAC-TH011TK-E) on the DHW tank.
It is recommended to position the thermistor at the mid point of the DHW tank capacity. Insulate thermistor from ambient air. Especially for double (insulated) tank, thermistor should be attached to the inner side (to detect the water temperature).
3. Connect the thermistor lead to the CNW5 connector on the FTC4 (Master).
If the thermistor lead is too long bundle it with a strap to adjust the length.
4. The output terminals for the 3-way valve is TBO.1 9-11 (OUT4).
The TBO.1 9-11 terminals on the FTC4 (Master) are shown in the wiring diagram on the page 21.
Choose the terminals that the 3-way valve is connected to between TBO.1 9-10, or TBO.1 9-11, according to the rated voltage.
When the rated current of the 3-way valve exceeds 0.1A, be sure to use a relay with maximum voltage and current ratings of 230V AC / 0.1A when connecting to the FTC4 (Master). Do not directly connect the 3-way valve cable to the FTC4 (Master). Connect the relay cable to the TBO.1 9-10 terminals. 3-way valve must be of SPST type. SPDT type can NOT be used.
For systems using 2-way valves instead of a 3-way valve please read the following;

Specification of 2-way valve (field supply)

- Power supply: 230V AC
- Current: 0.1A Max (If over 0.1A you must use a relay)
- Type: Normally closed

	Installation position	Electrical connection terminal block	Output signal		System OFF
			Heating	DHW	
2-way valve1	DHW	TBO.1 9-10	OFF (closed)	ON (open)	OFF (closed)
2-way valve2	Heating	TBO.2 7-8	ON (open)	OFF (closed)	OFF (closed)

Note: Should the 2-way valve become blocked the water circulation will stop. A by-pass valve or circuit should be installed between pump and 2-way valve for safety.

The TBO.2 7-8 terminals on the FTC4 (Master) are shown in the wiring diagram.

The 2-way valve (field supply) should be installed according to the instructions supplied with it. Follow 2-way valve's manufacturer's instructions as to whether to connect an earth cable or not.

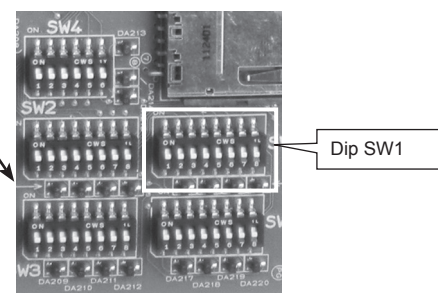
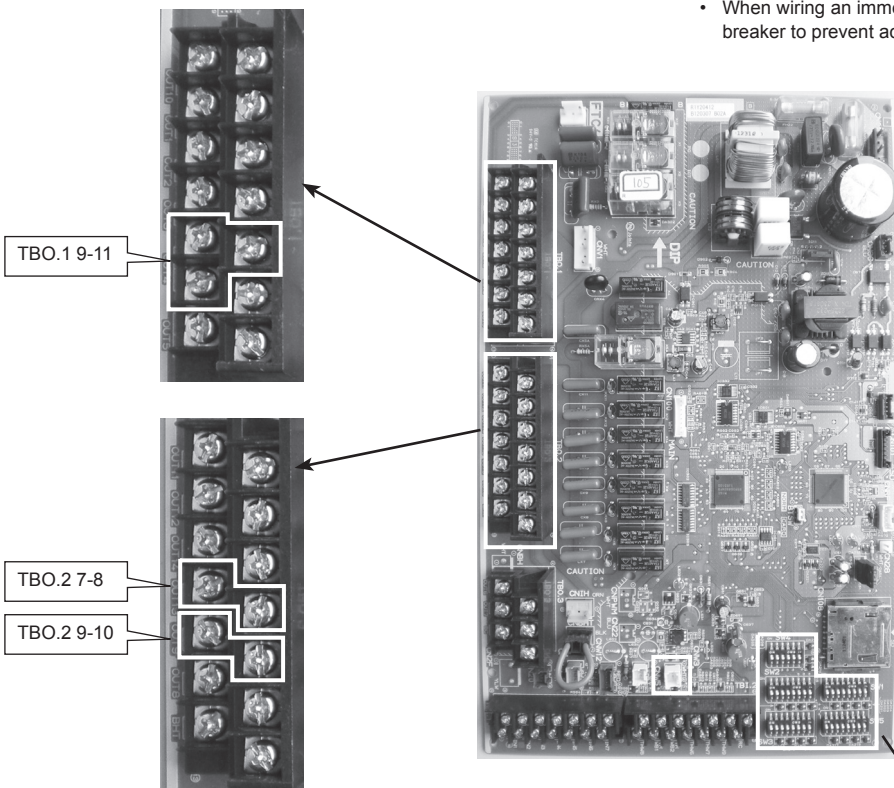
- For the 2-way valve, choose the one that slowly opens and shuts off to prevent water hammer sound.
- Choose the 2-way valve equipped with manual override, which is necessary for topping up or draining of water.

5. Turn the DIP SW1-3 on the FTC4 (Master) to ON.

6. When using an immersion heater (field supply), connect a contact relay cable for the immersion heater to TBO.2 9-10 (OUT9), and turn the Dip SW1-4 to ON. Do NOT directly connect the power cable to the FTC4 (Master).

Note:

- When an immersion heater is installed, select appropriate breaker capacity and a cable with appropriate diameter on the basis of heater output.
- When wiring an immersion heater in the field, always install an earth leakage breaker to prevent accidental electric shock.



- ⚠ WARNING: When connecting DHW tank**
- (1) Attach the optional thermistor THW5 (PAC-TH011TK-E).
 - (2) Always use earth leakage breaker when connecting immersion heater.
 - (3) When installing an immersion heater, be sure that the immersion heater has a built-in direct cut-off thermostat.
 - (4) Connect a pressure relief valve on the sanitary water side.

4.9 Using SD memory card

FTC4 is equipped with an SD memory card interface.

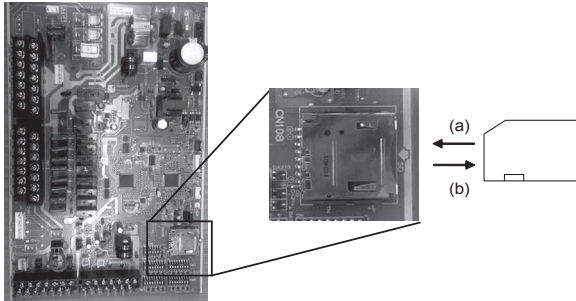
Using an SD memory card can simplify main controller settings and can store operating logs. *1

<Handling precautions>

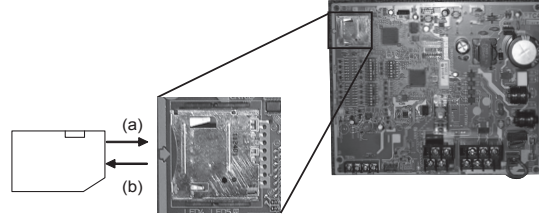
(1) Use an SD memory card that complies with the SD standards. Check that

- (a) For insertion, push on the SD memory card until it clicks into place.
 (b) For ejection, push on the SD memory card until it clicks.

Note: To avoid cutting fingers, do not touch sharp edges of the SD memory card connector (CN108) on the FTC4 control board.



FTC4 (Master)



FTC4 (Slave)

the SD memory card has a logo on it of those shown to the right.

- (2) SD memory cards to the SD standards include SD, SDHC, miniSD, micro SD, and microSDHC memory cards. The capacities are available up to 32 GB. Choose that with a maximum allowable temperature of 55°C.
- (3) When the SD memory card is a miniSD, miniSDHC, microSD, or micro SDHC memory card, use an SD memory card converter adapter.
- (4) Before writing to the SD memory card, release the write-protect switch.



- (5) Before inserting or ejecting an SD memory card, make sure to power off the system. If an SD memory card is inserted or ejected with the system powered on, the stored data could be corrupted or the SD memory card be damaged. *An SD memory card is live for a whilst after the system is powered off. Before insertion or ejection wait until the LED lamps on the FTC4 control board are all off.
- (6) The read and write operations have been verified using the following SD memory cards, however, these operations are not always guaranteed as the specifications of these SD memory cards could change.

Logos		
Capacities		
2 GB to 32 GB *2		
SD speed classes		
All		

* The SD Logo is a trademark of SD-3C, LLC.
 The miniSD logo is a trademark of SD-3C, LLC.
 The microSD logo is a trademark of SD-3C, LLC.

*1 To edit main controller settings or to check operating data, an Ecodan service tool (for use with PC) is required.

*2 A 2-GB SD memory card stores up to 30 days of operation logs.

Manufacturer	Model	Tested in
Verbatim	#44015 0912-61	Mar. 2012
SanDisk	SDSDB-002G-B35	Oct. 2011
Panasonic	RP-SDP04GE1K	Oct. 2011
Arvato	2GB PS8032 TSB 24nm MLC	Jun. 2012

Before using a new SD memory card (including the card that comes with the unit), always check that the SD memory card can be safely read and written to by the FTC4 controller.

<How to check read and write operations>

- a) Check for correct wiring of power supply to the system. For more details, refer to section 4.1.
 (Do not power on the system at this point.)
- b) Insert an SD memory card.
- c) Power on the system.
- d) The LED4 lamp lights if the read and write operations are successfully completed. If the LED4 lamp continues blinking or does not light, the SD memory card cannot be read or written to by the FTC4 controller.
- (7) Make sure to follow the instruction and the requirement of the SD memory card's manufacturer.
- (8) Format the SD memory card if determined unreadable in step (6). This could make it readable.
 Download an SD card formatter from the following site.
 SD Association homepage: <https://www.sdcard.org/>
- (9) FTC4 supports FAT file system but not NTFS file system.
- (10) Mitsubishi Electric is not liable for any damages, in whole or in part, including failure of writing to an SD memory card, and corruption and loss of the saved data, or the like. Back up saved data as necessary.
- (11) Do not touch any electronic parts on the FTC4 control board when inserting or ejecting an SD memory card, or else the control board could fail.

Flow temp.controller

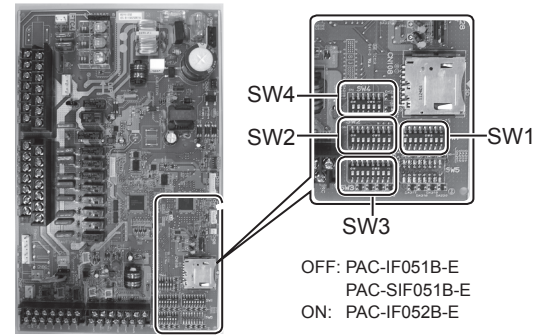
5.1 Dip Switch Functions

Located on the FTC4 printed circuit board are 4 sets of small white switches known as Dip switches. The Dip switch number is printed on the circuit board next to the relevant switches. The word ON is printed on the circuit board and on the Dip switch block itself. To move the switch you will need to use a pin or the corner of a thin metal ruler or similar.

Dip switch settings are listed below.

Make sure to turn off both indoor unit and outdoor unit power supplies before changing the switch settings.

For multiple outdoor units control with FTC4 (Slave), see section 9.



Dip switch	Function	OFF	ON	Default settings: Indoor unit model
SW1	SW1-1 Boiler	WITHOUT Boiler	WITH Boiler	OFF
	SW1-2 Heat pump maximum outlet water temperature	55°C	60°C	ON *1
	SW1-3 DHW tank	WITHOUT DHW tank	WITH DHW tank	OFF: PAC-IF051B-E PAC-SIF051B-E ON: PAC-IF052B-E
	SW1-4 Immersion heater	WITHOUT Immersion heater	WITH Immersion heater	OFF: PAC-IF051B-E PAC-SIF051B-E ON: PAC-IF052B-E
	SW1-5 Booster heater	WITHOUT Booster heater	WITH Booster heater	ON
	SW1-6 Booster heater function	For heating only	For heating and DHW	ON
	SW1-7 Outdoor unit type	Split type	Packaged type	OFF: PAC-IF051B-E PAC-SIF051B-E ON: PAC-IF052B-E
	SW1-8 Wireless remote controller	WITHOUT Wireless remote controller	WITH Wireless remote controller	OFF
SW2	SW2-1 Room thermostat1 input (IN1) logic change	Zone1 operation stop at thermostat short	Zone1 operation stop at thermostat open	OFF
	SW2-2 Flow switch1 input (IN2) logic change	Failure detection at short	Failure detection at open	ON
	SW2-3 Booster heater capacity restriction	Inactive	Active	OFF
	SW2-4 Cooling mode function	Inactive	Active	OFF
	SW2-5 Automatic switch to backup heat source operation (When outdoor unit stops by error)	Inactive	Active *2	OFF
	SW2-6 Mixing tank	WITHOUT Mixing tank	WITH Mixing tank	OFF
	SW2-7 2-zone temperature control	Inactive	Active	OFF
	SW2-8 —	—	-	OFF
SW3	SW3-1 Room thermostat 2 input (IN6) logic change	Zone2 operation stop at thermostat short	Zone2 operation stop at thermostat open	OFF
	SW3-2 Flow switch 2 input (IN3) logic change	Failure detection at short	Failure detection at open	OFF
	SW3-3 Flow switch 3 input (IN7) logic change	Failure detection at short	Failure detection at open	OFF
	SW3-4 Cooling operation in Zone2	Not in use	In use	OFF
	SW3-5 Heating mode function *3	Inactive	Active	OFF
	SW3-6 —	—	—	OFF
	SW3-7 —	—	—	OFF
	SW3-8 —	—	—	OFF
SW4	SW4-1 Multiple outdoor units control	Inactive	Active	OFF: PAC-IF051B-E PAC-IF052B-E ON : PAC-SIF051B-E
	SW4-2 Position of multiple outdoor units control *4	Slave	Master	OFF
	SW4-3 —	—	—	OFF
	SW4-4 —	—	—	OFF
	SW4-5 Emergency mode (Heater only operation)	Normal	"Emergency mode (Heater only operation) (To be activated only when powered ON)"	OFF *5
	SW4-6 Emergency mode (Boiler operation)	Normal	"Emergency mode (Boiler operation) (To be activated only when powered ON)"	OFF *5

Note: *1. When the FTC4 is connected with a PUIHZ-RP outdoor unit of which maximum outlet water temperature is 55°C, Dip SW1-2 must be changed to OFF.

*2. OUT11 will be available. For safety reasons, this function is not available for certain errors. (In that case, system operation must be stopped and only the water circulation pump keeps running.)

*3 This switch functions only when the FTC4 is connected with a PUIHZ-FRP outdoor unit. When another type of outdoor unit is connected, the heating mode function is active regardless of the fact that this switch is ON or OFF.

*4. SW4-2 is available only when SW4-1 is ON.

*5. If emergency mode is no longer required, return the switch to OFF position.

5.2 Outdoor unit type

Set Dip SW 1-7 to set the outdoor unit type.

Dip SW 1-7	Setting	Note
OFF	Split type	Necessary to connect TH2
ON	Packaged type	Not necessary to connect TH2

Set Dip SW 1-2 to set the heat pump maximum outlet water temperature.

Dip SW 1-2	Setting
OFF	55 °C
ON	60 °C

When the outdoor unit is a PUAZ-RP series set the Dip SW 1-2 to ON, other than that, set the Dip SW 1-2 to OFF.

Note: When Dip SW 1-2 is OFF (55°C) and an electric heater is not installed (*), 'Legionella Prevention Mode' is NOT available.

* Dip SW settings set when no electric heater is installed.

Dip SW 1-2	Dip SW 1-4	Dip SW 1-5	Dip SW 1-6
OFF	OFF	ON	OFF
OFF	OFF	OFF	(ON/OFF)

5.3 Functions setting

Set Dip SW 1-3 to set whether the system has a DHW tank.

Dip SW 1-3	Setting	Note
OFF	WITHOUT DHW tank	Not necessary to connect THW5
ON	WITH DHW tank	Necessary to connect THW5

When Dip SW 1-3 is OFF, DHW mode is not available.

Set Dip SW 1-4 to set whether the system has an immersion heater.

Dip SW 1-4	Setting
OFF	WITHOUT immersion heater
ON	WITH immersion heater

Set Dip SW 1-5 to set whether the system has a booster heater.

Dip SW 1-5	Setting
OFF	WITHOUT booster heater
ON	WITH booster heater

Set Dip SW 1-6 to set the booster heater function.

Dip SW 1-6	Setting
OFF	For heating only
ON	For heating and DHW

Set Dip SW 1-1 to set whether the system has a boiler.

Dip SW 1-1	Setting
OFF	WITHOUT boiler
ON	WITH boiler

When Dip SW 1-1 is OFF, back-up operation of boiler is not available.

Set Dip SW 2-6 to set whether the system has a mixing tank.

Dip SW 2-6	Setting
OFF	WITHOUT mixing tank
ON	WITH mixing tank

When Dip SW 2-6 is OFF, back-up operation of boiler is not available.

When Dip SW 2-7 is OFF, 2-zone temperature control is not available.

Set Dip SW 2-7 to set activate or deactivate 2-zone temperature control.

Dip SW 2-7	Setting
OFF	Inactive
ON	Active

When Dip SW 2-7 is OFF, 2-zone temperature control is not available.

Set Dip SW 4-1 to set activate or deactivate multiple units control.

Dip SW 4-1	Setting
OFF	Inactive
ON	Active

When Dip SW 4-1 is OFF, 2-zone temperature control is not available.

Set Dip SW 4-2 to set master or slave of multiple units control.

Dip SW 4-2	Setting
OFF	Slave
ON	Master

When multiple units control is not available, setting of Dip SW 4-2 is not necessary.

<Summary of Function setting>

Dip SW 1-3 (DHW tank)	Dip SW 1-4 (Immersion heater)	Dip SW 1-5 (Booster heater)	Dip SW 1-6 (BH function)	System diagram
ON (WITH DHW tank)	OFF (WITHOUT immersion heater)	ON (WITH booster heater)	ON (For heating and DHW)	
ON (WITH DHW tank)	ON (WITH immersion heater)	ON (WITH booster heater)	ON (For heating and DHW)	
ON (WITH DHW tank)	OFF (WITHOUT immersion heater)	ON (WITH booster heater)	OFF (For heating only)	
ON (WITH DHW tank)	OFF (WITHOUT immersion heater)	OFF (WITHOUT booster heater)	—	
ON (WITH DHW tank)	ON (WITH immersion heater)	ON (WITH booster heater)	OFF (For heating only)	
ON (WITH DHW tank)	ON (WITH immersion heater)	OFF (WITHOUT booster heater)	—	
OFF (WITHOUT DHW tank)	OFF (WITHOUT immersion heater)	ON (WITH booster heater)	OFF	
OFF (WITHOUT DHW tank)	OFF (WITHOUT immersion heater)	OFF (WITHOUT booster heater)	—	

* The use of two 2-way valves can perform same function as a 3-way valve.

5.4 Operation setting

Set Dip SW 1-8 to set whether the system has a wireless remote controller.

Dip SW 1-8	Setting
OFF	WITHOUT wireless remote controller
ON	WITH wireless remote controller

Set Dip SW 2-1 to set the room thermostat 1 input (IN1) logic.

Dip SW 2-1	Setting
OFF	Operation stop at thermostat short
ON	Operation stop at thermostat open

Set Dip SW 2-2 to set the flow switch 1 input (IN2) logic.

Dip SW 2-2	Setting
OFF	Failure detection at short
ON	Failure detection at open

Set Dip SW 2-3 to set the restriction on the capacity of booster heater.

Dip SW 2-3	Setting
OFF	Inactive
ON	Active

When Dip SW 2-3 is ON, booster heater 2 and 2+ operation is not available. (Only booster heater 1 is available)

Notes: ① When installing one booster heater, use OUT6 (Booster Heater 1) and switch SW2-3 to ON.

② When installing two booster heaters, use OUT6 (Booster Heater 1) and OUT7 (Booster heater 2). In such cases, use OUT7 (Booster heater 2) to connect the one with higher capacity. Or, make the sum of the capacities of OUT7 (Booster heater 2) and OUT8 (Booster 2+) greater than the capacity of OUT6 (Booster 1).

Reference: Summary of Booster heater control

The booster heater is controlled in the following three steps.

		Booster heater 1 (OUT6)	Booster heater 2 (OUT7)	Booster heater 2+ (OUT8)	
OFF		OFF	OFF	OFF	} Controlled to this extent when SW2-3 is ON.
ON	STEP 1	ON	OFF	OFF	
	STEP 2	OFF	ON	ON	
	STEP 3	ON	ON	ON	

Output synchronised with Booster heater 2

Set Dip SW 2-4 to set activate or deactivate cooling mode.

Dip SW 2-4	Setting
OFF	Inactive
ON	Active

When Dip SW 2-4 is OFF, cooling mode is not available.

Set Dip SW 2-5 to set the automatic switch to backup heater only operation. (When outdoor unit stops by error.)

Dip SW 2-5	Setting
OFF	Inactive
ON	Active

Set Dip SW 3-1 to set the room thermostat 2 input (IN6) logic.

Dip SW 3-1	Setting
OFF	Operation stop at thermostat short
ON	Operation stop at thermostat open

Set Dip SW 3-2 to set the flow switch 2 input (IN3) logic.

Dip SW 3-2	Setting
OFF	Operation stop at thermostat short
ON	Operation stop at thermostat open

Set Dip SW 3-3 to set the flow switch 3 input (IN7) logic.

Dip SW 3-3	Setting
OFF	Operation stop at thermostat short
ON	Operation stop at thermostat open

Set Dip SW3-4 whether to make cooling operation in Zone 2 available.

Dip SW 3-4	Setting
OFF	Not in use
ON	In use

When Dip SW3-4 is set to OFF, cooling operation in Zone 2 is not available.

Set Dip SW 3-5 to set activate or deactivate heating mode.

Dip SW 3-5	Setting
OFF	Inactive
ON	Active

When the connected outdoor unit is not of PUHZ-FRP model, heating mode is always active regardless of Dip SW3-5 setting.

Flow temp.controller

5.5 Emergency mode (Heater only operation)

The emergency mode is available when a failure on the outdoor unit of the heat pump or a communication error occurs.

This mode uses booster heater or immersion heater as a heat source and automatically controls between the DHW mode and the heating mode. When the system is not incorporated with heater, the emergency mode is not available.

Before starting the emergency mode, turn off the outdoor unit and FTC4 (Master), and then turn Dip SW 4-5 to ON. Then, turn on FTC4 (Master) to start the emergency mode. FTC4 (Master) can be power-supplied by the outdoor unit or directly by power source.

If emergency mode is no longer required, please turn off both outdoor and indoor unit power supply before returning Dip SW4-5 to OFF position.

5.6 Emergency mode (Boiler operation)

The emergency mode is available when a failure on the outdoor unit of the heat pump or a communication error occurs.

This mode uses boiler as a heat source and automatically controls the heating mode. When the system is not incorporated with boiler, the emergency mode is not available.

Before starting the emergency mode, turn off the outdoor unit and FTC4 (Master), and then turn Dip SW 4-6 to ON. Then, turn on FTC4 (Master) to start the emergency mode. FTC4 (Master) can be power-supplied by the outdoor unit or directly by power source.

If emergency mode is no longer required, please turn off both outdoor and indoor unit power supply before returning Dip SW4-6 to OFF position.

6.1 Check

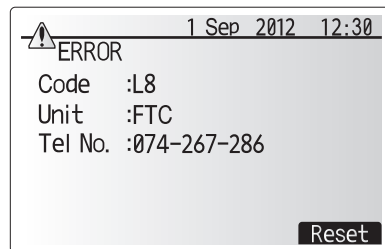
After completing installation and the wiring and piping of the local application and outdoor units, check for refrigerant leakage, looseness in the power supply or control wiring, wrong polarity, and power cable is securely connected. Use a 500-volt megohmmeter to check that the resistance between the power supply terminals and ground is at least 1.0MΩ.

Warning:

Do not use the system if the insulation resistance is less than 1.0MΩ.

Caution:

Do not carry out this test on the control wiring (low voltage circuit) terminals.



6.2 Self-check

When an error occurs when power is applied or during operation

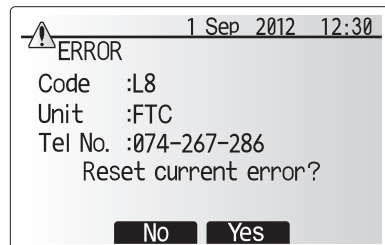
■ Indication of error details

The code, unit, address, and telephone number are displayed.

The telephone number is displayed if registered.

■ Resetting the error

Press the F4 (RESET) button, and the F3 (Yes) button to reset the current error.



Flow temp.controller

Code	Error	Action
L3	Circulation water temperature overheat protection	Flow rate may be reduced check for; <ul style="list-style-type: none"> • Water leakage • Strainer blockage • Water circulation pump function (Error code may display during filling of primary circuit, complete filling and reset error code.)
L4	DHW tank water temperature overheat protection	Check the immersion heater and it's contactor.
L5	Indoor unit temperature thermistor (THW1, THW2, THW5, THW6, THW7, THW8, THW9) failure	Check resistance across the thermistor.
L6	Circulation water freeze protection	See Action for L3.
L8	Heating operation error	Re-attach any thermistors that have become dislodged.
L9	Low primary circuit flow rate detected by flow switch (flow switches 1, 2, 3)	See Action for L3. If the flow switch itself does not work, replace it. Caution: The pump valves may be hot, please take care.
LC	Boiler circulation water temperature overheat protection	Check if the setting temperature of the Boiler for heating exceeds the restriction. (See the manual of the thermistors "PAC-TH011HT-E") Flow rate of the heating circuit from the boiler may be reduced. Check for <ul style="list-style-type: none"> • water leakage, • strainer blockage • water circulation pump function.
LD	Boiler temperature thermistor (THWB1, THWB2) failure	Check resistance across the thermistor.
LE	Boiler operation error	See Action for L8. Check the status of the boiler.
LH	Boiler circulation water freeze protection	Flow rate of the heating circuit from the boiler may be reduced. Check for <ul style="list-style-type: none"> • water leakage • strainer blockage • water circulation pump function.
LL	Setting errors of Dip switches on FTC4 control board	For boiler operation, check that Dip SW1-1 is set to ON (With Boiler) and Dip SW2-6 is set to ON (With Mixing Tank). For 2-zone temperature control, check Dip SW2-7 is set to ON (2-zone) and Dip SW2-6 is set to ON (With Mixing Tank). For multiple outdoor units control system, check that Dip SW1-3 is set to ON on the slave unit that runs DHW operation.
J0	Communication failure between FTC4 and wireless receiver	Check connection cable for damage or lose connections.
P1	Thermistor (Room temp.) (TH1) failure	Check resistance across the thermistor.
P2	Thermistor (Ref. liquid temp.) (TH2) failure	Check resistance across the thermistor.
P6	Anti-freeze protection of plate heat exchanger	See Action for L3. Check for correct amount of refrigerant.
J1 - J8	Communication failure between wireless receiver and wireless remote controller	Check wireless remote controller's battery is not flat. Check the pairing between wireless receiver to wireless remote controller. Test the wireless communication. (See the manual of wireless system)
J9	Communication failure between main controller and FTC4 (Slave)	Check connection cable for damage or loose connections.
E0 - E5	Communication failure between main controller and FTC4	Check connection cable for damage or loose connections.
E6 - EF	Communication failure between FTC4 and outdoor unit	Check that the outdoor unit has not been turned off. Check connection cable for damage or loose connections. Refer to outdoor unit service manual.
E9	Outdoor unit receives no signal from indoor unit.	Check both units are switched on. Check connection cable for damage or loose connections. Refer to outdoor unit service manual.
U*, F*	Outdoor unit failure	Refer to outdoor unit service manual.

Note: To cancel error codes please switch system off (Press button E, on Main Controller, for 3 secs).

Note (Marking for WEEE)



This symbol mark is for EU countries only.

This symbol mark is according to the directive 2002/96/EC Article 10 Information for users and Annex IV.

Your MITSUBISHI ELECTRIC product is designed and manufactured with high quality materials and components which can be recycled and reused.

This symbol means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from your household waste. Please, dispose of this equipment at your local community waste collection/recycling centre.

In the European Union there are separate collection systems for used electrical and electronic product.

Please, help us to conserve the environment we live in!

7.1 Safety precautions

FOR USER

- ▶ Before installing the unit, make sure you read all the "Safety Precautions".
- ▶ The "Safety Precautions" provide very important points regarding safety. Make sure you follow them.
- ▶ Please report to or take consent by the supply authority before connection to the system.

Symbols used in the text

⚠ Warning:

Describes precautions that should be observed to prevent danger of injury or death to the user.

⚠ Caution:

Describes precautions that should be observed to prevent damage to the unit.

Symbols used in the illustrations

⚡ : Indicates a part which must be grounded.

⚠ Warning:

- For appliances not accessible to the general public.
- The unit must not be installed by the user. Ask the dealer or an authorized company to install the unit. If the unit is installed improperly, water leakage, electric shock or fire may result.
- Do not stand on, or place any items on the unit.
- Do not splash water over the unit and do not touch the unit with wet hands. An electric shock may result.
- Do not spray combustible gas close to the unit. Fire may result.
- Do not place a gas heater or any other open-flame appliance where it will be exposed to the air discharged from the unit. Incomplete combustion may result.
- Do not remove the front panel or the fan guard from the outdoor unit when it is running.
- When you notice exceptionally abnormal noise or vibration, stop operation, turn off the power switch, and contact your dealer.

- Never insert fingers, sticks etc. into the intakes or outlets.
- If you detect odd smells, stop using the unit, turn off the power switch and consult your dealer. Otherwise, a breakdown, electric shock or fire may result.
- If the supply cable is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- If the refrigeration gas blows out or leaks, stop the operation of the air conditioner, thoroughly ventilate the room, and contact your dealer.
- Do not install in location that is hot or humid for long periods of time.

⚠ Caution:

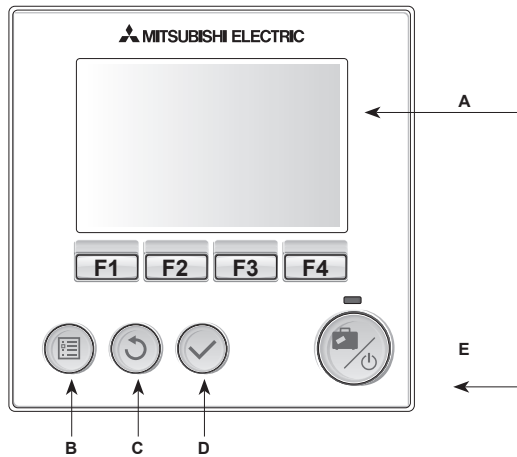
- Do not use any sharp object to push the buttons, as this may damage the main controller.
- Never block or cover the indoor or outdoor unit's intakes or outlets.

Disposing of the unit

When you need to dispose of the unit, consult your dealer.

7.2 Main Controller

Flow temp.controller



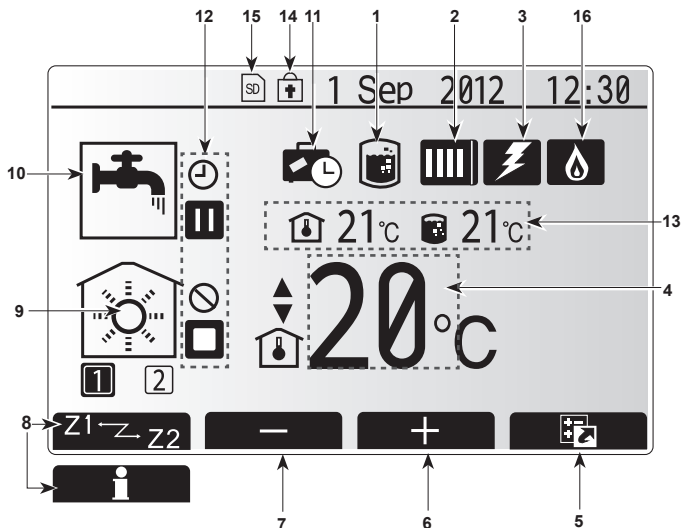
<Main controller parts>

Letter	Name	Function
A	Screen	Screen in which all information is displayed
B	Menu	Access to system settings for initial set up and modifications.
C	Back	Return to previous menu.
D	Confirm	Used to select or save. (Enter key)
E	Power/Holiday	If system is switched off pressing once will turn system on. Pressing again when system is switched on will enable Holiday Mode. Holding the button down for 3 secs will turn the system off. (*1)
F1-4	Function keys	Used to scroll through menu and adjust settings. Function is determined by the menu screen visible on screen A.

*1

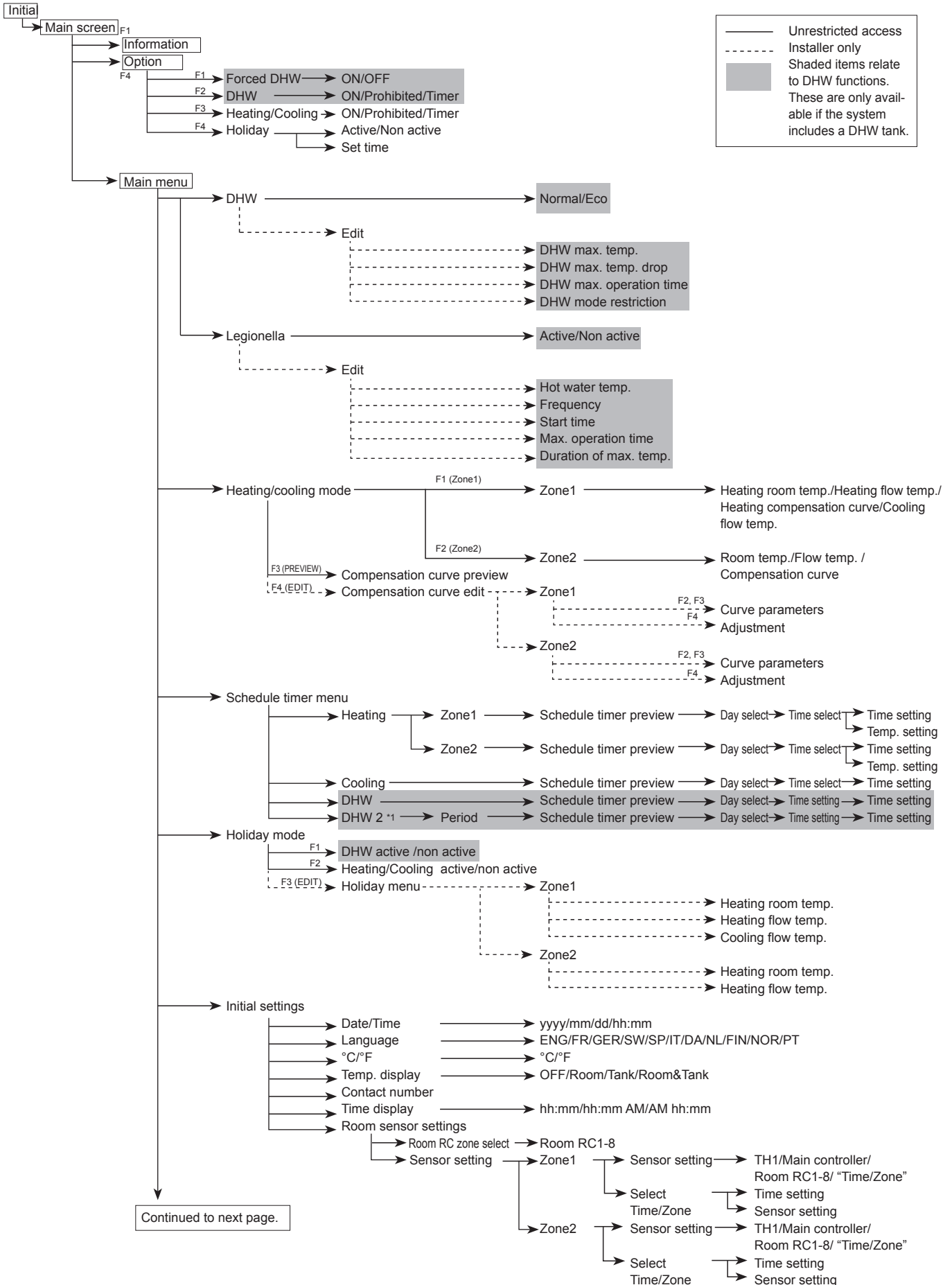
When the system is switched off or the power supply is disconnected, the water circuit protection functions (e.g. freeze stat. function) will NOT operate. Please beware that without these safety functions enabled the water circuit may potentially become exposed to damage.

<Main screen icons>



	Icon	Description
1	Legionella prevention	When this icon is displayed 'Legionella prevention mode' is active.
2	Heat pump	'Heat pump' is running.
		Defrosting.
		Emergency heating.
3	Electric heater	When this icon is displayed the 'Electric heaters' (booster or immersion heater) are in use.
4	Target temperature	Target flow temperature
		Target room temperature
		Compensation curve
5	OPTION	Pressing the function button below this icon will display the quick view menu.
6	+	Increase desired temperature.
7	-	Decrease desired temperature.
8	Z1 Z2	Pressing the function button below this icon switches between Zone1 and Zone2.
	Information	Pressing the function button below this icon displays the information screen.
9	Space heating (cooling) mode	Heating mode Zone1 or Zone2
		Cooling mode
10	DHW mode	Normal or ECO mode
11	Holiday mode	When this icon is displayed 'Holiday mode' activated.
12		Timer
		Prohibited
		Stand-by
		Stop
		Operating
13	Current temperature	Current room temperature
		Current water temperature of DHW tank
14		The Menu button is locked.
15		SD memory card is inserted. Normal operation.
		SD memory card is inserted. Abnormal operation.
16	Boiler	When this icon is displayed, 'Boiler' is in use.

<Main Controller Menu Tree>

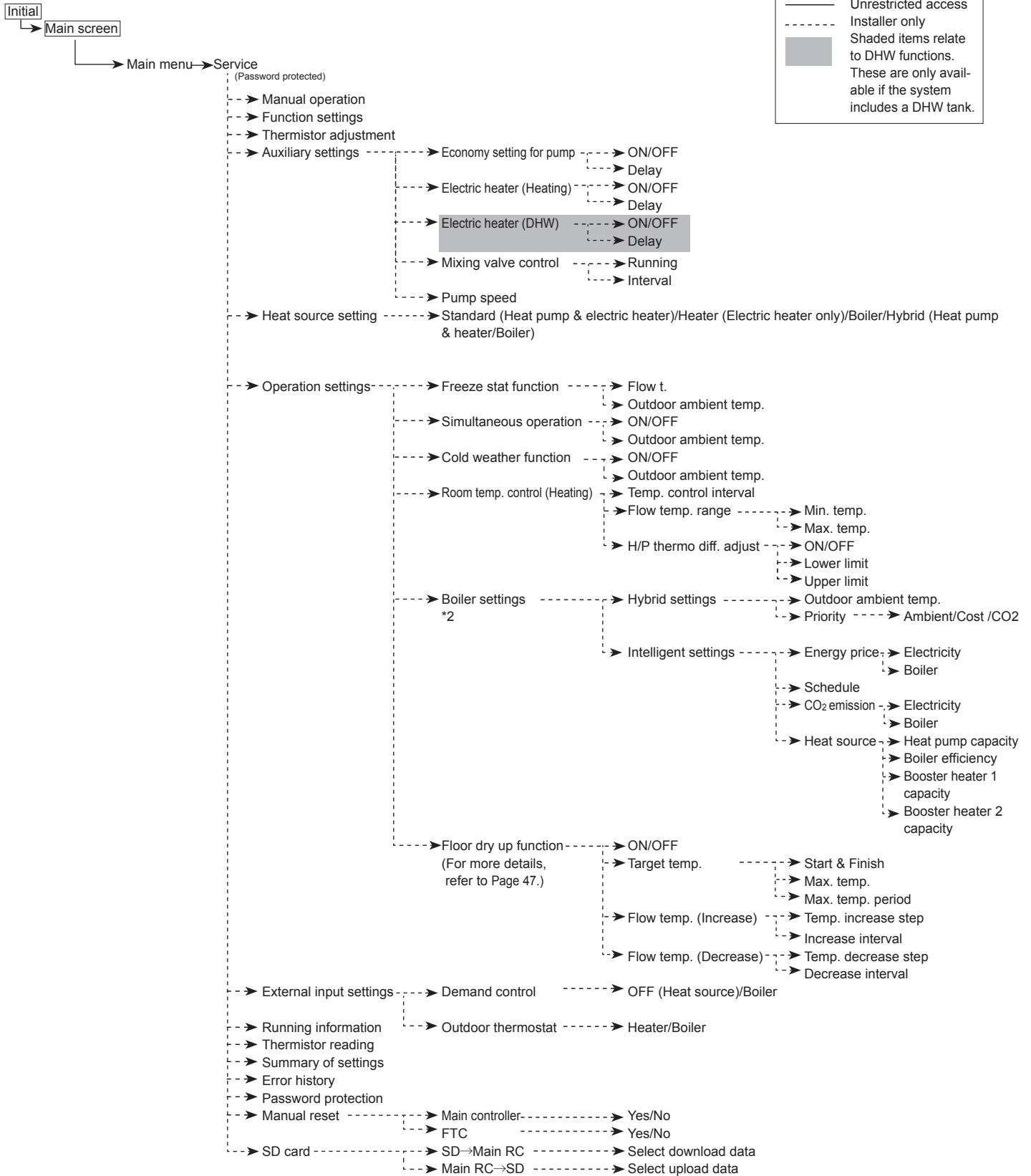


Continued to next page.

*1 When a PUHZ-FRP outdoor unit is connected.

Flow temp.controller

<Main Controller Menu Tree>



— Unrestricted access
 - - - - - Installer only
 ■ Shaded items relate to DHW functions. These are only available if the system includes a DHW tank.

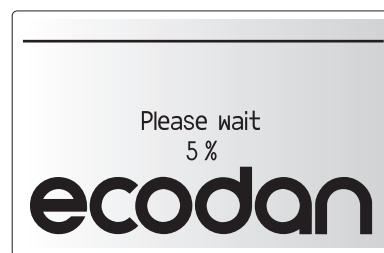
*2 For more details, refer to the installation manual of PAC-TH011HT-E.

Continued from the previous page.

■ Setting the Main Controller

After the power has been connected to the outdoor unit and hydrobox (See section 4.1) the initial system settings can be entered via the main controller.

1. Check all breakers and other safety devices are correctly installed and turn on power to the system.
2. When the main controller switched on for the first time, the screen automatically goes to Initial settings menu, Language setting screen and Date/Time setting screen in order.
3. Main controller will automatically start up. Wait approximately 6 mins whilst the control menus load.
4. When the controller is ready a blank screen with a line running across the top will be displayed.
5. Press button E (Power) (refer to page 34) to turn on the system. Before turning on the system, perform initial settings as instructed below.



■ Main Settings Menu

The main settings menu can be accessed by pressing the MENU button. To reduce the risk of untrained end users altering the settings accidentally there are two access levels to the main settings; and the service section menu is password protected.

User Level – Short press

If the MENU button is pressed once for a short time the main settings will be displayed but without the edit function. This will enable the user to view current settings but **NOT** change the parameters.

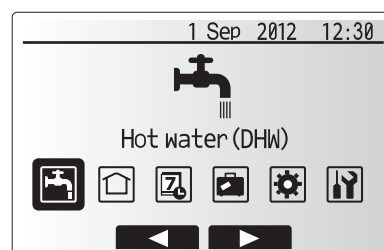
Installer Level – Long press

If the MENU button is pressed down for 3 secs the main settings will be displayed with all functionality available.

The following items can be viewed and/or edited (dependent on access level).

- Domestic Hot water (DHW)
- Heating/Cooling
- Schedule timer
- Holiday mode
- Initial settings
- Service (Password protected)

Use the F2 and F3 buttons to move between the icons. The highlighted icon will appear as a larger version in the centre of the screen. Press CONFIRM to select and edit the highlighted mode.



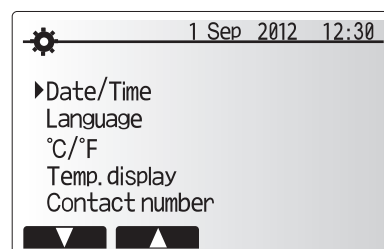
Icon	Description
	Hot water (DHW)
	Heating/Cooling
	Schedule timer
	Holiday mode
	Initial settings
	Service

■ Initial Settings

From the Initial settings menu the installer can set the following.

- Date/Time
- Language
- °C/°F
- Temp. display
- Contact number
- Time display
- Room sensor settings

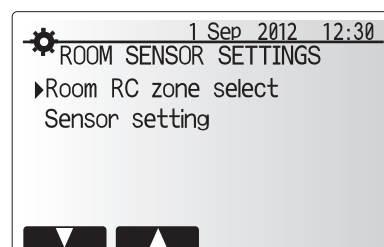
1. Use buttons F1 and F2 to move scroll through the menu list. When the title is highlighted press CONFIRM to edit.
2. Use function buttons appropriate to edit each setting then press CONFIRM to save the setting.



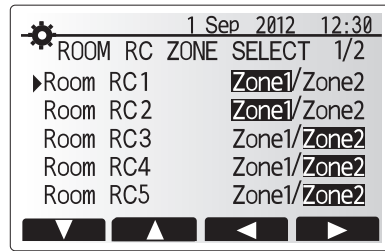
<Room sensor settings>

For room sensor settings it is important to choose the correct room sensor depending on the heating mode the system will operate in.

1. From the Initial settings menu select Room sensor settings.



2. When 2-zone temperature control is active or wireless remote controllers are available, from Room RC zone select screen, select zone no. to assign to each remote controller.

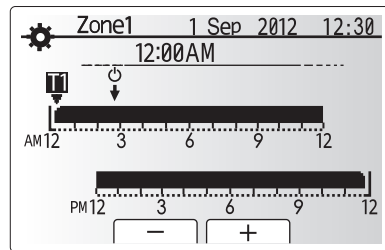
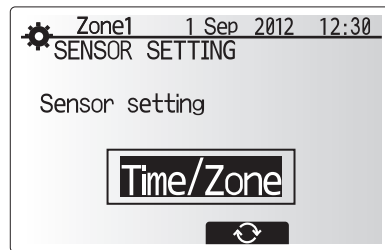
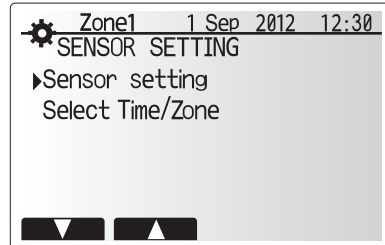


3. From Sensor setting screen, select a room sensor to be used for monitoring the room temperature from Zone1 and Zone2 separately.

Control option ("Remote Controller Options" (Installation manual))	Corresponding initial settings room sensor	
	Zone1	Zone2
A	Room RC1-8 (one each for Zone1 and Zone2)	*
B	TH1	*
C	Main controller	*
D	*	*

* Not specified (if a field-supplied room thermostat is used)
Room RC1-8 (one each for Zone1 and Zone2) (if a wireless remote controller is used as a room thermostat)

4. From Sensor setting screen, select Time/Zone to make it possible to use different room sensors according to the time schedule set in the Select Time/Zone



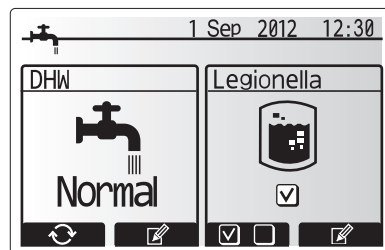
Time/Zone schedule setting screen

Domestic Hot Water (DHW)/Legionella Prevention

The domestic hot water and legionella prevention menus control the operation of DHW tank heat ups.

<DHW mode settings>

1. Highlight the hot water icon and press CONFIRM.
2. Use button F1 to switch between Normal and ECO heating modes.
3. To edit the mode press F2 to display the HOT WATER (DHW) SETTING menu.
4. Use F2 and F3 keys to scroll through the menu selecting each component in turn by pressing CONFIRM. See the table below for description of each setting.
5. Enter the desired number using the function keys and press CONFIRM.



Menu subtitle	Function	Range	Unit	Default value
DHW max. temp	Desired temperature of stored hot water	40 - 60	°C	50
DHW max. temperature drop	Difference in temperature between DHW max. temp and the temperature at which DHW mode re-starts	5 - 30	°C	10
DHW max. operation time	Max time allowed for stored water heating DHW mode	30 - 120	min	60
DHW mode restriction	The time period after DHW mode when space heating has priority over DHW mode temporarily preventing further stored water heating (Only when DHW max. operation time has passed.)	30 - 120	min	30

Explanation of DHW operation

- When the DHW tank temperature drops from “DHW max. temp.” by more than the “DHW max. temperature drop” (set by installer), DHW mode operates and the flow from the primary heating/cooling circuit is diverted to heat the water in the DHW tank.
- When the temperature of the stored water reaches the ‘DHW max. temp.’ set by the installer or if the ‘DHW max. operation time’ set by the installer is exceeded DHW mode ceases to operate.
- Whilst DHW mode is in operation primary hot water is not directed to the space heating/cooling circuit.
- Directly after DHW max. operation time ‘DHW mode restriction’ will routinely operate. The duration of this feature is set by the installer and during its operation DHW mode can not (normally) be reactivated, allowing time for the system to deliver primary hot water to the space heating/cooling if required. However, if at this time there is no current demand for space heating/cooling, the system will automatically resume DHW mode. This will continue until it receives a demand for space heating/cooling.
- After the ‘DHW mode restriction’ operation the DHW mode can operate again and DHW tank heating will continue according to system demand.

<Eco mode>

DHW mode can run in either ‘Normal’ or ‘Eco’ mode. Normal mode will heat the water in the DHW tank more quickly using the full power of the heat pump. Eco mode takes a little longer to heat the water in the DHW tank but the energy used is reduced. This is because heat pump operation is restricted using signals from the FTC4 based on measured DHW tank temperature.

Note: The actual energy saved in Eco mode will vary according to outdoor ambient temperature.

Return to the DHW/legionella prevention menu.

Legionella Prevention Mode settings (LP mode)

1. Use button F3 to choose legionella mode active YES/NO.
2. Use button F4 to edit the legionella function.
3. Use F1 and F2 keys to scroll through the menu selecting each subtitle in turn by pressing CONFIRM. See the table below for description of each setting.
4. Enter the desired number using the function keys and press CONFIRM.

During Legionella Prevention Mode the temperature of the stored water is increased above 60°C to inhibit legionella bacterium growth. It is strongly recommended that this is done at regular intervals. Please check local regulations for the recommended frequency of heat ups.

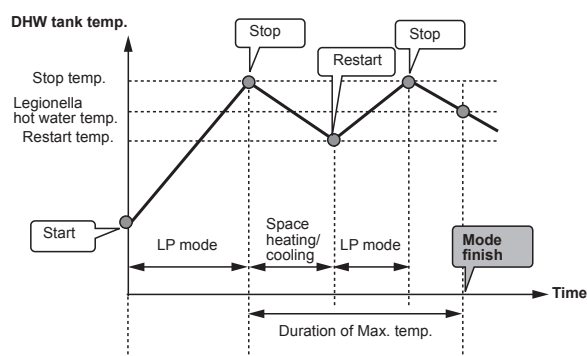
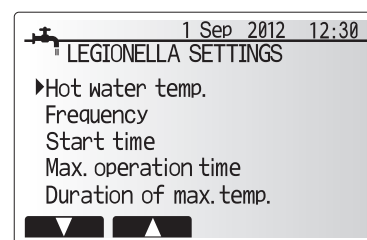
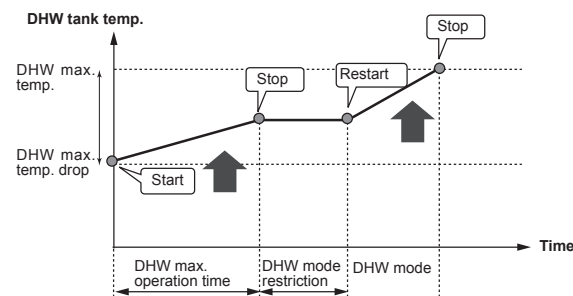
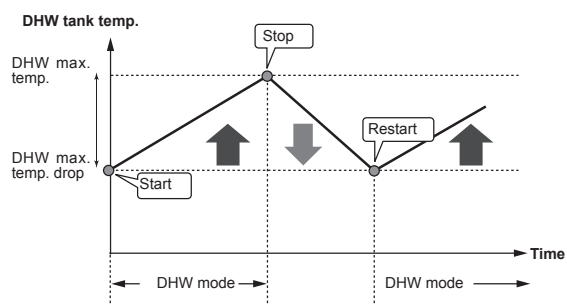
Note: When failures occur on the hydrobox, the LP mode may not function normally.

Menu subtitle	Function	Range	Unit	Default value
Hot water temp.	Desired temp of stored hot water	60–70	°C	65
Frequency	Time between LP mode DHW tank heat ups	1–30	day	15
Start time	Time when LP mode will begin	0:00–23:00	-	03:00
Max. operation time	Maximum time allowed for LP mode DHW tank heat	1–5	hour	3
Duration of max. temp.	The time period after LP mode max. water temp has been reached	1–120	min	30

Explanation of Legionella Prevention Mode operation

- At the time entered by the installer ‘Start time’ flow of useful heat from the system is diverted to heat the water in the DHW tank.
- When the temperature of the stored water exceeds the ‘Hot Water temp.’ set by the installer (above 65°C) primary circuit water is no longer diverted to heat the DHW tank.
- Whilst LP mode is in operation hot water is not directed to the space heating /cooling circuit.
- Directly after LP mode operation ‘Duration of max. temp.’ will operate. The duration of this feature is set by the installer and during its operation stored water temperature will be monitored.
- If stored water temperature should drop to LP restart temp, LP mode will restart and primary water flow from the heat source(s) will be directed to the DHW tank to boost the temperature. Once the set time for Duration of Max. temp has passed LP mode will not recur for the set interval (set by installer).
- It is the responsibility of the installer to ensure the settings for legionella prevention are compliant with local and national guidelines.

Please note that LP mode uses the assistance of electric heaters (if present) to supplement the energy input of the heat pump. Heating water for long periods of time is not efficient and will increase running costs. The installer should give careful consideration to the necessity of legionella prevention treatment whilst not wasting energy by heating the stored water for excessive time periods. The end user should understand the importance of this feature.
ALWAYS COMPLY WITH LOCAL AND NATIONAL GUIDANCE FOR YOUR COUNTRY REGARDING LEGIONELLA PREVENTION.



(LP mode: Legionella Prevention mode)

Forced DHW

The forced DHW function is used to force the system to operate in DHW mode. In normal operation the water in the DHW tank will be heated either to the set temperature or for the maximum DHW time, whichever occurs first. However should there be a high demand for hot water 'Forced DHW' function can be used to prevent the system from routinely switching to space heating/cooling and continue to provide DHW tank heating. Forced DHW operation is activated by pressing button F1 and Back button in the 'Option Screen'. After DHW operation finishes, the system will automatically return to normal operation. To cancel forced DHW operation hold down button F1 in the 'Option Screen'.

■ Heating/Cooling

The heating and cooling menus deal with space heating and cooling typically using either a radiator or underfloor system depending on the installation.

From the main settings menu

1. Use F2 and F3 buttons to highlight heating/cooling icon then press CONFIRM.
2. The heating and cooling menu will be displayed.
3. To select the sub-menus press the function button below the icon required. E.g. for mode change of Zone1 press F1

Heating/Cooling

1. Under this sub-menu the mode of heating or cooling is selected.
2. Choose between

- Heating flow temperature (🔥)
- Heating room temperature (🏠)
- Heating compensation curve (📈)
- Cooling flow temperature (❄️)

Heating room temperature cannot be selected both in Zone1 and Zone2.

When Cooling flow temp. is selected in Zone1, Cooling flow temp is automatically selected in Zone2. Zone1 and Zone2 are controlled at the same set temperature. If using an underfloor system in Cooling mode, do not set the flow temperature too low to avoid formation of condensation.

3. To choose between the different modes for heating and cooling, highlight the mode preferred and press select.

If compensation curve mode was selected as the heating mode please read the following instructions.

Explanation of compensation curve

During late spring and summer usually the demand for space heating is reduced. To prevent the heat pump from producing excessive flow temperatures for the primary circuit the compensation curve mode can be used to maximise efficiency and reduce running costs.

The compensation curve is used to restrict the flow temperature of the primary space heating circuit dependent on the outdoor ambient temperature. The FTC4 uses information from both an outdoor ambient temperature sensor and a temperature sensor on the primary circuit supply to ensure the heat pump is not producing excessive flow temperatures if the weather conditions do not require it.

The compensation curve is used to restrict the flow temperature of the primary space heating circuit dependent on the outdoor ambient temperature. The FTC4 uses information from both an outdoor ambient temperature sensor and a temperature sensor on the primary circuit supply to ensure the heat pump is not producing excessive flow temperatures if the weather conditions do not require it.

<Compensation curve setting>

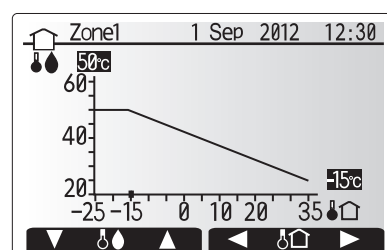
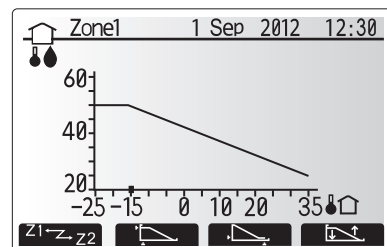
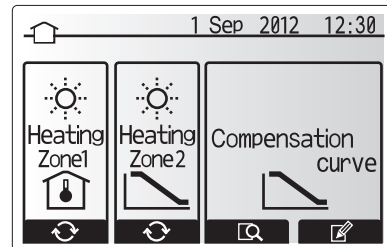
*This setting cannot be performed in cooling mode.

1. From the heating menu select edit using the F3 function button.
2. The compensation curve setting screen will be displayed.
3. In 2-zone heating operation, press F1 to switch between Zone1 and Zone2.
4. Press F2 to alter the Hi parameter (when flow temp is maximum and outdoor ambient temp is minimum).
5. Press F3 to alter the Lo parameter (when flow temp is minimum and outdoor ambient temp is maximum).
6. Press F4 to add an extra point (adjust).

Pressing F2-4 will cause the relevant edit screen to be displayed. Editing Lo and Hi parameters is done in the same way; please see the following for more detailed explanation of parameter editing.

In the parameter (Lo/Hi) edit screen the flow temperature and outdoor ambient temperature for the compensation curve graph can be set and altered for the 2 extremes of Hi and Lo.

1. Press F1 and F2 to change the flow temperature (y-axis of compensation curve).
2. Pressing F1 will raise the desired flow temperature for the set outdoor ambient temperature.
3. Pressing F2 will lower the desired flow temperature for the set outdoor ambient temperature.
4. Press F3 and F4 to change the outdoor ambient temperature (x-axis of compensation curve).
5. Pressing F3 will lower the outdoor ambient temperature for the set flow temperature.
6. Pressing F4 will raise the outdoor ambient temperature for the set flow temperature.



Flow temp.controller

■ Holiday mode

Holiday mode can be activated in 2 ways. Both methods will result in the Holiday Mode activation screen being shown.

Option 1.

From the main menu screen button E should be pressed. Be careful not to hold down button E for too long as this will turn off the controller and system.

Option 2.

From the main menu screen press button F4. The current settings screen will be displayed. Press button F4 again to access the holiday mode activation screen.

Once the holiday mode activation screen is displayed you can activate/deactivate and select the duration that you would like holiday mode to run for.

- Press button F1 to activate or deactivate holiday mode.
- Use buttons F2, F3 and F4 to input the date which you would like holiday mode to activate or deactivate for space heating/cooling.

<Editing holiday mode>

To change the Holiday mode settings e.g. the flow temp, you must access the holiday mode menu from the main settings menu.

1. From main menu screen press button B.
2. Use buttons F2 and F3 to scroll through menu until Holiday Mode is highlighted.
3. Press CONFIRM button.
4. The holiday mode status screen is displayed.
5. To change the flow temperature or room temperatures on heating mode press button F3.
6. A list of variables will be displayed. Choose the one you wish to modify using buttons F1/F2 then press CONFIRM.
7. Adjust the temperature using buttons F3 and F2 and press CONFIRM button to save changes.

■ Schedule timer

The schedule timer mode allows daily and weekly space heating/cooling and DHW patterns to be entered.

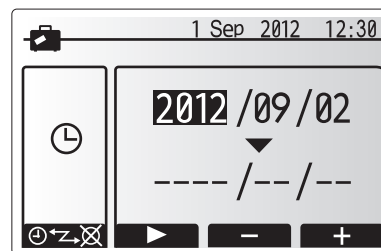
1. From the main settings menu use F2 and F3 to highlight the schedule timer icon then press CONFIRM.
2. The schedule timer sub menu will be displayed. The icons show the following modes;
 - Heating
 - Cooling
 - Hot Water (DHW)
3. Use F2 and F3 buttons to move between mode icons then press CONFIRM to be shown the preview screen for each mode.

The preview screen allows you to view the current settings. In 2-zone heating operation, press F1 to switch between Zone1 and Zone2. Days of the week are displayed across the top of the screen. Where day appears underlined the settings are the same for all those days underlined.

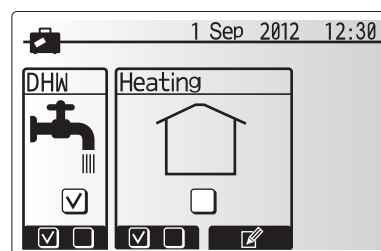
Hours of the day and night are represented as a bar across the main part of the screen. Where the bar is solid black, space heating/DHW (whichever is selected) is allowed.

When a PUHZ-FRP outdoor unit is connected, DHW schedule timer setting can be set for two periods into which a year is divided. In this menu screen, the duration of Period 2 can be entered. The rest of the set duration comes set as Period 1.

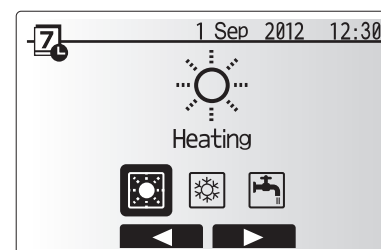
1. From the main settings menu use F2 and F3 to highlight the schedule timer icon then press CONFIRM.
2. The schedule timer sub menu will be displayed. The icons show the following modes;
 - Heating
 - Hot Water (DHW)
 - Hot Water (DHW) 2
3. Use F2 and F3 buttons to move between mode icons to select the Hot Water (DHW) 2 icon.
4. Use F1 to F4 buttons to select start and end months that apply to Period 2.
5. Press CONFIRM to be shown the preview screen for each mode.



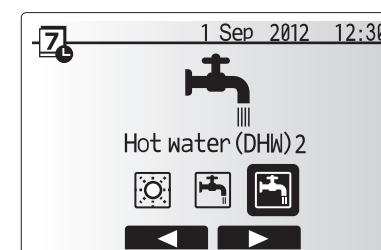
Holiday Mode activation screen



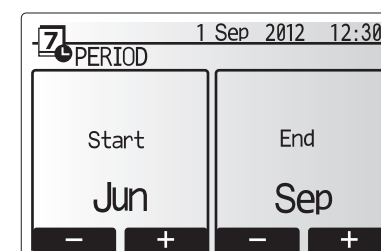
Holiday Mode status screen



Mode select screen



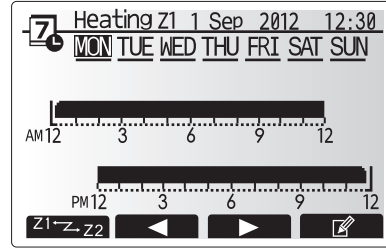
Mode select screen when PUHZ-FRP connected



Period setting screen when PUHZ-FRP connected

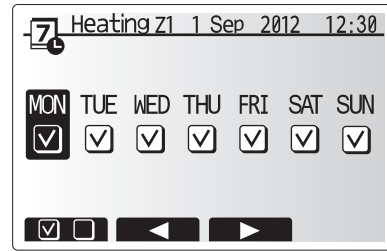
<Setting the schedule timer>

1. In the preview menu screen press F4 button.
* In the case of 2-zone system, press F1 button to switch between Zone1 and Zone2.



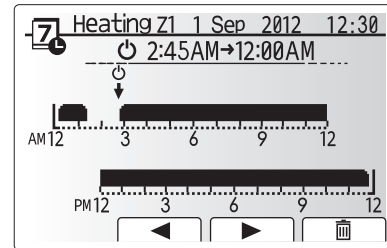
Preview screen

2. First select the days of the week you wish to schedule.
3. Press F2/F3 buttons to move between days and F1 to check or uncheck the box.
4. When you have selected the days press CONFIRM.



Day of week select screen

5. The time bar edit screen will be displayed.
6. Use buttons F2/F3 to move to the point at which you do not want the selected mode to be active press CONFIRM to start.
7. Use F3 button to set the required time of inactivity then press CONFIRM.
8. You can add up to 4 periods of inactivity within a 24 hour interval.



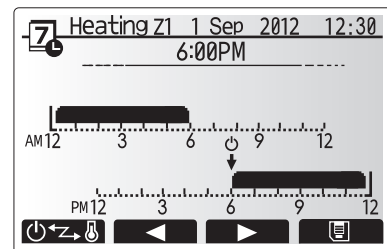
Time of period setting screen 1

9. Press F4 to save settings.

When scheduling heating, button F1 changes the scheduled variable between time and temperature. This enables a lower temperature to be set for a number of hours e.g. a lower temperature may be required at night when the occupants are sleeping.

Note:

- The schedule timer for space heating/cooling and DHW are set in the same way. However for Cooling and DHW only time can be used as scheduling variable.
- A small rubbish bin character is also displayed choosing this icon will delete the last unsaved action.
- It is necessary to use the SAVE function F4 button to save settings. CONFIRM does NOT act as SAVE for this menu.



Time of period setting screen 2

■ Service Menu

The service menu provides functions for use by installer or service engineer. It is NOT intended the home owner alters settings within this menu. It is for this reason password protection is required to prevent unauthorised access to the service settings.

1. From the main setting menu use F2 and F3 to highlight the service icon then press CONFIRM.
2. You will be prompted to enter a password. **THE FACTORY DEFAULT PASSWORD IS "0000"**.
3. Press CONFIRM.
(It takes approx. 30 secs to load the service menu.)

The service menu is navigated using the F1 and F2 buttons to scroll through the functions. The menu is split across two screens and is comprised of the following functions;

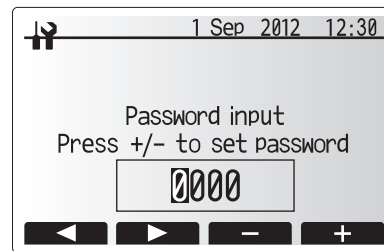
1. Manual operation
2. Function settings
3. Thermistor adjustment
4. Auxiliary settings
5. Heat source setting
6. Operation settings
7. External input settings
8. Running information
9. Thermistor reading
10. Summary of settings
11. Error history
12. Password protection
13. Manual reset
14. SD card

In this Installation Manual, instructions will be given only for the following functions;

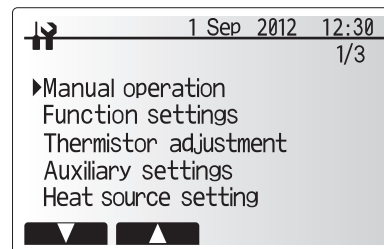
1. Manual operation
2. Auxiliary settings
3. Heat source setting
4. Operation settings
5. External input settings
6. Password protection
7. Manual reset
8. SD card

Information on the other functions can be found by consulting the service manual.

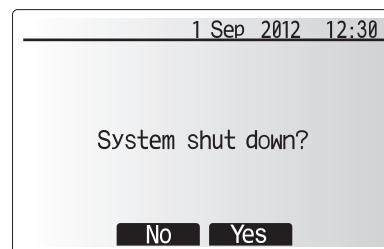
Note: Many functions can not be set whilst the indoor unit is running. The installer should turn OFF the unit before trying to set these functions. If the installer attempts to change the settings whilst the unit is running the main controller will display a reminder message prompting the installer to stop operation before continuing. By selecting "Yes" the unit will cease operation.



Screen 1 of service menu



Screen 2 of service menu



System off prompt screen

Manual operation

During the filling of the system the water circulation pump and 3-way valve can be manually overridden using manual operation mode.

When manual operation is selected a small timer icon appears in the screen. The function selected will only remain in manual operation for a maximum of 2 hours. This is to prevent accidental permanent override of the FTC4.

1. From the service menu use F1 and F2 buttons to scroll through list until Manual Operation is highlighted.
2. Press CONFIRM.
3. Manual operation menu screen is displayed.
4. To activate manual operation press the function button under the desired part.

► Example

Pressing F3 button will switch manual operation mode ON for the main 3-way valve. When filling of the DHW tank is complete the installer should access this menu again and press F3 to deactivate manual operation of the part. Alternatively after 2 hours manual operation mode will no longer be active and FTC4 will resume control of the part.

NOTE: Manual operation and heat source setting can not be selected if the system is running. A screen will be displayed asking the installer to stop the system before these modes can be activated. The system automatically stops 2 hours after last operation.

Auxiliary settings

This function is used to set the parameters for any auxiliary parts used in the system.

From the service menu use F1 and F2 buttons to highlight Auxiliary settings then press CONFIRM.

<Economy settings for pump>

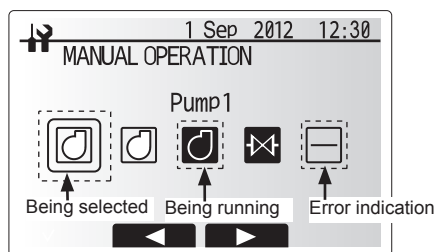
1. From the Auxiliary settings menu highlight Economy Settings for water circulation pump.
2. Press CONFIRM.
3. The economy settings for water circulation pump screen is displayed.
4. Use button F1 to switch the water circulation pump ON/OFF.
5. Use buttons F3 and F4 to adjust the time the water circulation pump will run. (3 - 60 mins)

<Electric heater (Heating)>

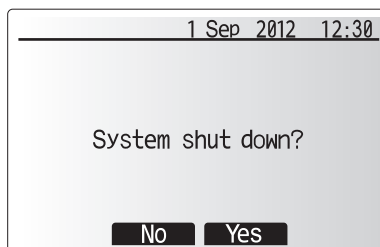
1. From the Auxiliary settings menu highlight Electric heater (heating).
2. Press CONFIRM.
3. The Electric heater (heating) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater will assist in space heating. (5 -180mins)

<Electric heater (DHW)>

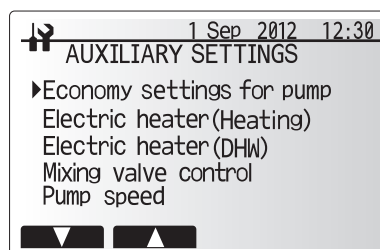
1. From the Auxiliary settings menu highlight Electric heater (DHW).
2. Press CONFIRM.
3. The Electric heater (DHW) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater and the immersion heater (if present) will assist in DHW heating. (15 -30mins)



Manual operation menu screen



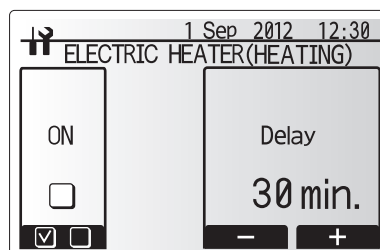
System off prompt screen



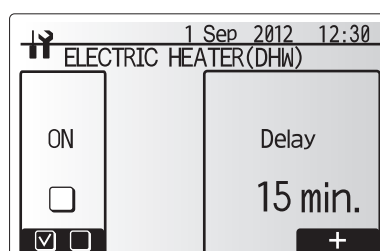
Auxiliary settings menu screen



Economy settings for pump screen



Electric heater (Heating) screen



Electric heater (DHW) screen

<Mixing valve control>

1. From the Auxiliary settings menu highlight Mixing valve control.
2. Press CONFIRM.
3. The Mixing valve control screen is displayed.
4. Use F1 and F2 buttons to set Running time between 30 to 240 seconds. The Running time equals to a period from full open of the valve (at a hot water mixing ratio of 100%) to full close (at a cold water mixing ratio of 100%).

Note: Set the Running time according to the specifications of the actuator of each mixing valve.

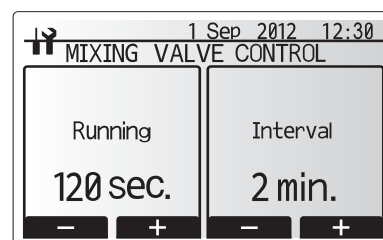
1. From the Auxiliary settings menu highlight Mixing valve control.
2. Press CONFIRM.
3. The Mixing valve control screen is displayed.
4. Press F3 and F4 buttons to set the interval between 2-zone temperature controls of the mixing valve between 1 to 30 mins.

Note: It is recommended to set the interval to 2 minutes that is a default value. With the interval set longer, it could take longer to warm up a room.

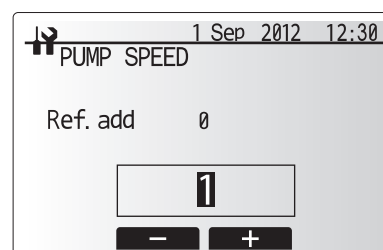
<Pump speed>

1. From the Auxiliary settings menu highlight water circulation pump speed.
2. Press CONFIRM.
3. Press F3 and F4 buttons to select a refrigerant address of which you wish to configure or check the settings, and press CONFIRM. *1
4. The Pump speed screen is displayed.
5. Use F2 and F3 buttons to set the pump speed of the water circulation pump between 1 to 5.

*1 For multiple outdoor units control system only.



Mixing valve setting screen



Pump speed setting screen

Heat source setting

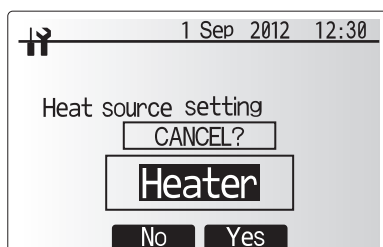
The default heat source setting is heat pump and all electric heaters present in the system to be operational. This is referred to as Standard operation on the menu.

1. From the service menu use F1 and F2 buttons to scroll through list until *Heat Source Setting* is highlighted.
2. Press CONFIRM.
3. Heat source setting menu screen is displayed.
4. Press F3 button until preferred heat source is displayed.
5. Press CONFIRM.



Heat source setting screen

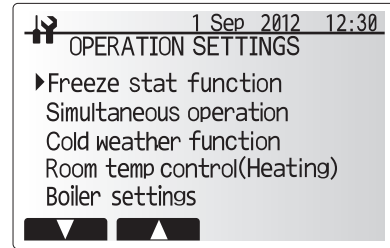
6. If you wish to return to the service menu without saving the setting press return button. You will be asked if you are sure you wish to cancel the changes. Choose Yes or No as appropriate.



Cancel last action screen

Operation settings

1. To access the Operation settings menu use F1 and F2 buttons to scroll through the service menu until Operation settings is highlighted.
2. Press CONFIRM.
3. Operation settings menu is displayed.

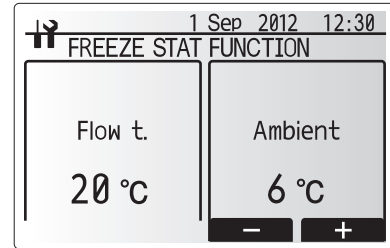


Operation settings menu screen

<Freeze stat function>

1. From the Auxiliary settings menu highlight Freeze Stat Function.
2. Press CONFIRM.
3. The freeze stat function screen will be displayed.
4. Use buttons F3 and F4 to adjust the minimum outdoor ambient temperature which freeze stat function will begin to operate, (3 - 20 °C) or choose *. If asterisk (*) is chosen freeze stat function is deactivated. (i.e. primary water freeze risk)

Note: When the system is turned off, freeze stat function is not enabled.



Freeze stat function screen

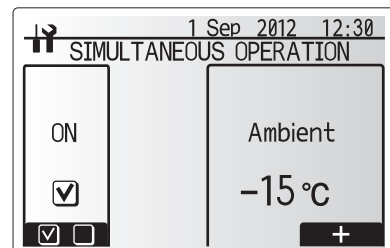
<Simultaneous Operation>

For periods of very low outside temperature this mode can be used. Simultaneous operation allows both DHW and space heating to run together by using the heat pump and/or booster heater to provide space heating whilst only the immersion heater provides heating for DHW. This operation is only available if BOTH a DHW tank AND immersion heater are present on the system.

1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Simultaneous operation is highlighted.
2. Press CONFIRM.
3. Simultaneous operation screen is displayed.
4. To switch simultaneous operation ON/OFF press F1.
5. To alter the temperature at which simultaneous operation starts use F3 and F4.

Note:

- Range of outdoor ambient temperature is -15°C to 10°C (default -15°C).
- System shall automatically return to routine operation. This will happen when the outdoor ambient temp rises above the selected temp for this specific mode of operation.



Simultaneous operation screen

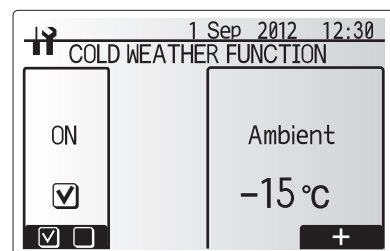
<Cold weather function>

For extremely low outdoor ambient temperature conditions when the heat pump's capacity is restricted the heating or DHW is provided only by the electric booster heater (and immersion if present). This function is intended for use during extreme cold periods only. Extensive use of direct electrical heaters ONLY will result in higher electric usage and may reduce working life of heaters and related parts.

1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Cold weather function is highlighted.
2. Press CONFIRM.
3. Cold weather function screen is displayed.
4. To switch Cold weather function ON/OFF press F1.
5. To alter the temperature at which heater switching function starts use F3 and F4.

Note:

- Range of outdoor ambient temperature is -15°C to -10°C (default -15°C).
- System shall automatically return to routine operation. This will happen when the outdoor ambient temp rises above the selected temp for this specific mode of operation.

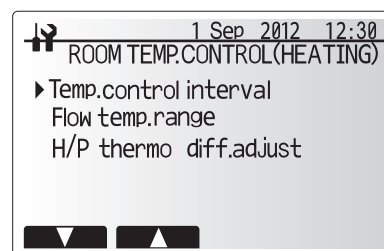


Cold weather function screen

<Room Temp Control (Heating)>

This function allows operational setting of flow temperature range from the Ecodan and also the time interval at which the FTC4 collects and processes data for the auto adaptation mode.

1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Room temp. control (HEATING) is highlighted.
2. Press CONFIRM.
3. Use F1 and F2 keys to scroll through the menu selecting each subtitle in turn by pressing CONFIRM. See the table below for description of each setting.
4. Enter the desired number using the function keys and press CONFIRM.



Room temp. control (HEATING) screen

Menu subtitle	Function	Range	Unit	Default	
Temp. control interval	Selectable according to the heat emitter type and the materials of floor (i.e. radiators, floor heating-thick, -thin concrete, wood, etc.)	10 - 60	mins.	10	
Flow temperature range	Minimum temp.	To minimize the loss by frequent ON and OFF in mild outdoor ambient temp. seasons.	25 - 45	°C	30
	Maximum temp.	To set max. possible flow temp according to the type of heat emitters.	35 - 60	°C	50
Heat pump thermo diff.adjust	On/Off	To minimize the loss by frequent ON and OFF in mild outdoor ambient temp. seasons.	On/Off	—	On
	Lower limit	Prohibits heat pump operation until the flow temperature drops below the target flow temperature minus lower limit value.	-9 - -1	°C	-5
	Upper limit	Allows heat pump operation until the flow temperature rises above the target flow temperature plus upper limit value.	+3 - +5	°C	+5

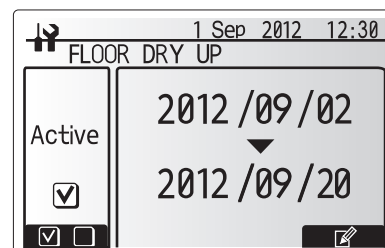
*1 The minimum flow temperature that prohibits heat pump operation is 20°C.

*2 The maximum flow temperature that allows heat pump operation equals to the maximum temperature set in the flow temp. range menu.

<Floor dry up function>

The Floor dry up function automatically changes the target hot water temperature in stages to gradually dry concrete when this particular type of underfloor heating system is installed.

1. Turn off the system using the main controller.
2. From the Operation settings in the service menu, use F1 and F2 buttons to scroll through the list until Floor dry up function is highlighted.
3. Press CONFIRM to display the FLOOR DRY UP screen.
4. To change settings, press F4. For details on settings, refer to the table below.
5. To start the Floor dry up operation, press F1 button to check a box below "Active" and press CONFIRM

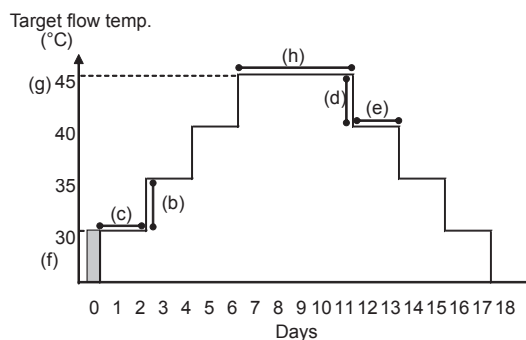


*1. Upon completion of the operation the system stops all the operations except the Freeze stat. operation.

*2. For Floor dry up function, the target flow temp. of Zone1 is the same as that of Zone2.

Note:

- This function is not available when a PUHZ-FRP outdoor unit is connected.
- Disconnect wiring to signal inputs of room thermostat, demand control, and outdoor thermostat, or the target flow temp. may not be maintained.



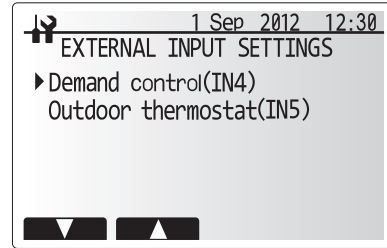
Functions	Symbol	Description	Option/Range	Unit	Default	
Floor dry up function	a	Set the function to ON and power on the system using the main controller, and the dry up heating operation will start.	On/Off	-	Off	
Flow temp. (increase)	Flow temp. increase step	b	Sets the increase step of the target flow temp.	+1 - +10	°C	+5
	Increase interval	c	Sets the period for which the same target flow temp is maintained.	1 - 7	day	2
Flow temp. (decrease)	Flow temp. decrease step	d	Sets the decrease step of the target flow temp.	-1 - -10	°C	-5
	Decrease interval	e	Sets the period for which the same target flow temp is maintained.	1 - 7	day	2
Target temperature	Start & Finish	f	Sets the target flow temp. at the start and the finish of the operation.	25 - 60	°C	30
	Max. target temp.	g	Sets the maximum target flow temp.	25 - 60	°C	45
	Max. temp. period	h	Sets the period for which the maximum target flow temp. is maintained.	1 - 20	day	5

External input settings

From the service menu use F1 and F2 buttons to highlight External input settings then press CONFIRM.

<Demand control (IN4)>

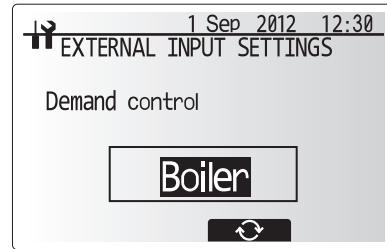
1. From the External input settings menu highlight Demand control (IN4).
2. Press CONFIRM.
3. The Demand control screen is displayed.



External input settings menu screen

4. Press F3 button to select Heat source OFF or Boiler.
5. Press CONFIRM.

Note: The selection of "OFF", whilst a signal is being sent to IN4, forcefully stops all the heat source operations and the selection of "Boiler" stops operations of heat pump and electric heater and performs boiler operation.

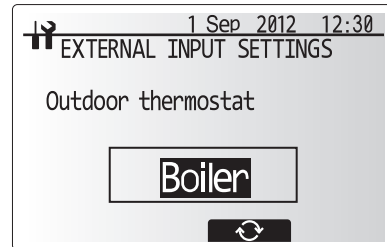


Demand control screen

<Outdoor thermostat (IN5)>

1. From the External input settings menu highlight Outdoor thermostat (IN5).
2. Press CONFIRM.
3. The Outdoor thermostat screen is displayed.
4. Press F3 button to select Heater or Boiler.
5. Press CONFIRM.

Note: The selection of "Heater", whilst a signal is being sent to IN5, performs electric-heater-only operation and the selection of "Boiler" performs boiler operation.



Outdoor thermostat setting screen

Password protection

Password protection is available to prevent unauthorised access to the service menu by untrained persons.

1. From the service menu use F1 and F2 buttons to scroll through list until *Password protection* is highlighted.
2. Press CONFIRM.
3. When password input screen is displayed use buttons F1 and F2 to move left and right between the four digits, F3 to lower the selected digit by 1, and F4 to increase the selected digit by 1.
4. When you have input your password press CONFIRM.



Password input screen

5. The password verify screen is displayed.
6. To verify your new password press button F3.
7. Your password is now set and the completion screen is displayed.



Password verify screen

<Resetting the password>

If you forget the password you entered, or have to service a unit somebody else installed, you can reset the password to the factory default of 0000.

1. From the main settings menu scroll down the functions until Service Menu is highlighted.
2. Press CONFIRM.
3. You will be prompted to enter a password.
4. Hold down buttons F3 and F4 together for 3 secs
5. You will be asked if you wish to continue and reset the password to default setting.
6. To reset press button F3.
7. The password is now reset to 0000.



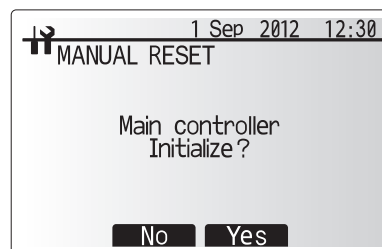
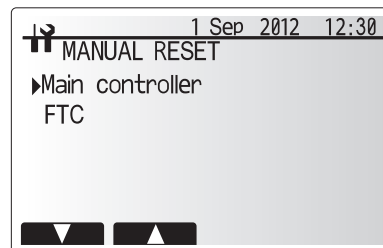
Completion screen

Manual reset

Should you wish to restore the factory settings at any time you should use the manual reset function. Please note this will reset ALL functions to the factory default settings.

1. From the service menu use F1 and F2 buttons to scroll through list until Manual Reset is highlighted.
2. Press CONFIRM.
3. The Manual reset screen is displayed.
4. Choose either Manual Reset for FTC4 or Main Controller.

5. Press F3 button to confirm manual reset of chosen device.

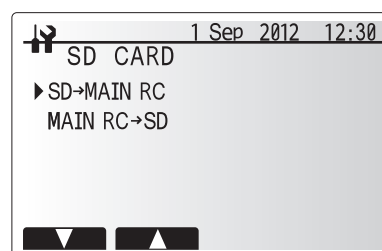


SD card

The use of an SD memory card simplifies the main controller settings in the field.
 *Ecodan service tool (for use with PC tool) is necessary for the setting.

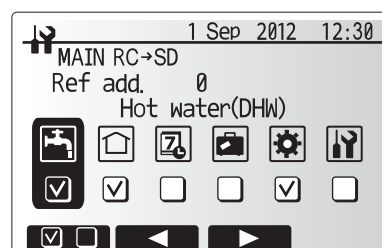
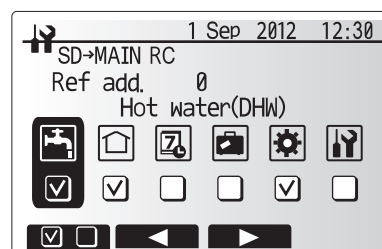
<SD → Main RC>

1. From the SD card setting use F1 and F2 buttons to scroll through list until "SD → Main RC" is highlighted.
 2. Press CONFIRM.
 3. Press F3 and F4 buttons to set the Ref. address. *1
 4. Use F1, F2 and F3 buttons to select a menu to write to the main controller.
 5. Press CONFIRM to start downloading.
 6. Wait for a few minutes until "Complete!" appears.
- *1 For multiple outdoor units control system only.



<Main RC → SD>

1. From the SD card setting use F1 and F2 buttons to scroll through list until Main RC → SD is highlighted.
 2. Press CONFIRM.
 3. Press F3 and F4 buttons to set the Ref. address. *1
 4. Use F1, F2 and F3 buttons to select a menu to write to the SD memory card.
 5. Press CONFIRM to start uploading.
 6. Wait for a few minutes until "Complete!" appears.
- *1 For multiple outdoor units control system only.



7 Main controller operation

Flow temp.controller

Should settings be changed from default please enter new setting in 'Field Setting' column. This will ease resetting in the future should the system use change or the circuit board need to be replaced.

Commissioning/Field settings record sheet

Main controller screen		Parameters	Default setting	Field setting	Notes	
Main	Zone1 heating room temp	10°C - 30°C	20°C			
	Zone2 heating room temp *1	10°C - 30°C	20°C			
	Zone1 heating flow temp	25°C - 60°C	45°C			
	Zone2 heating flow temp *1	25°C - 60°C	35°C			
	Cooling flow temp *2	5°C - 25°C	15°C			
	Zone1 heating compensation curve	-9°C - + 9°C	0°C			
	Zone2 heating compensation curve *1	-9°C - + 9°C	0°C			
	Holiday mode	Active/Non active/Set time	-			
Option	Forced DHW operation	On/Off	-			
	DHW	On/Off/Timer	On			
	Heating	On/Off/Timer	On			
	Holiday mode	Active/Non active/Set time	-			
Setting	DHW *3	Operation mode	Normal/Eco	Normal		
		DHW max. temp.	40°C - 60°C	50°C		
		DHW temp. drop	5°C - 30°C	10°C		
		DHW max. operation time	30 - 120 mins	60 mins		
		DHW mode restriction	30 - 120 mins	30 mins		
		Legionella prevention *3	Active	Yes/No	Yes	
	Heating/Cooling *2	Zone1 operation mode	Heating room temp/Heating flow temp/Heating compensation curve/Cooling flow temp	Room temp		
			Zone2 operation mode *1	Heating room temp/Heating flow temp/Heating compensation curve	Compensation curve	
		Hi set point	Zone1 outdoor ambient temp	-15°C - +35°C	-15°C	
			Zone1 flow temp	25°C - 60°C	50°C	
		Lo set point	Zone2 outdoor ambient temp *1	-15°C - +35°C	-15°C	
			Zone2 flow temp *1	25°C - 60°C	40°C	
			Zone1 outdoor ambient temp	-15°C - +35°C	35°C	
	Zone1 flow temp		25°C - 60°C	25°C		
	Adjust	Zone2 outdoor ambient temp *1	-15°C - +35°C	35°C		
		Zone2 flow temp *1	25°C - 60°C	25°C		
		Zone1 outdoor ambient temp	-14°C - +34°C	-		
		Zone1 flow temp	25°C - 60°C	-		
	Holiday	DHW *3	Active/Non active	Non active		
			Heating/Cooling *2	Active/Non active	Active	
		Zone1 heating room temp	10°C - 30°C	15°C		
		Zone2 heating room temp *1	10°C - 30°C	15°C		
		Zone1 heating flow temp	25°C - 60°C	35°C		
		Zone2 heating flow temp *1	25°C - 60°C	25°C		
		Cooling flow temp *2	5°C - 25°C	25°C		
	Initial settings	Language	ENG/FR/GER/SW/SP/IT/DA/NL/FIN/NOR/PT	ENG		
		°C/°F	°C/°F	°C		
		Temp. display	Room/DHW tank/Room&DHW tank /Off	Off		
Time display		hh:mm/hh:mm AM/AM hh:mm	hh:mm			
Room sensor settings for Zone1		TH1/Main RC/Room RC1-8/"Time/Zone"	TH1			
Room sensor settings for Zone2 *1		TH1/Main RC/Room RC1-8/"Time/Zone"	TH1			
Room RC zone select *1		Zone1/Zone2	Zone1			
Service menu	Thermistor adjustment	THW1	-10°C - +10°C	0°C		
		THW2	-10°C - +10°C	0°C		
		THW5	-10°C - +10°C	0°C		
		THW6	-10°C - +10°C	0°C		
		THW7	-10°C - +10°C	0°C		
		THW8	-10°C - +10°C	0°C		
		THW9	-10°C - +10°C	0°C		
		THWB1	-10°C - +10°C	0°C		
		THWB2	-10°C - +10°C	0°C		
	Auxiliary settings	Economy settings for pump	On/Off Time before pump switched off (3 - 60 mins) *4	On 10 mins		
		Electric heater (Heating)	Space heating: On (used)/Off (not used) Electric heater delay timer (5 - 180 mins)	On 30 mins		
		Electric heater (DHW) *3	DHW: On (used)/Off (not used) Electric heater delay timer (15 - 30 mins)	On 15 mins		
		Mixing valve control	Running time (10 - 240 secs) Interval (1 - 30 mins)	120 secs 2 mins		
		Pump speed	Pump speed (1 - 5)	5		

*1 The settings related to Zone2 can be switched only when Zone2 temperature control is enabled (when Dip SW2-6 and SW 2-7 are ON).

*2 Cooling mode settings are available for ERSC-VM2B only.

*3 Only available if DHW tank present in system.

*4 Decreasing "time before pump switched off" may increase the duration of stand-by in Heating mode.

Commissioning/Field settings record sheet (continued from the previous page)

Main controller screen			Parameters	Default setting	Field setting	Notes	
Service menu	Heat source setting	Freeze stat function	Standard/Heater/Boiler/Hybrid *5	Standard			
		Operation settings	Outdoor ambient temp. (3 - 20°C)	5°C			
	Simultaneous operation (DHW/ Heating)		On/Off *6	Off			
	Cold weather function	Outdoor ambient temp. (-15 - +10°C)	-15°C				
		On/Off *6	Off				
	Room temp control (Heating)	Outdoor ambient temp. (-15 - -10°C)	-15°C				
		Temp. control interval (10 - 60 mins)	10 mins				
		Flow temp. range	Min. temp. (25 - 45°C)	30°C			
			Max. temp. (35 - 60°C)	50°C			
		Heat pump thermo diff. adjust	On/Off *6	On			
			Lower limit (-9 - -1°C)	-5°C			
	Upper limit (+3 - +5°C)		5°C				
	Boiler operation	Hybrid settings	Outdoor ambient temp. (-15 - +10°C)	-15°C			
			Priority mode (Ambient/Cost/CO ₂)	Ambient			
		Intelligent settings	Energy price *7	Electricity (0.001 - 999 */kWh)	0.5 */kWh		
			Boiler (0.001 - 999 */kWh)	0.5 */kWh			
		CO ₂ emission	Electricity (0.001 - 999 kg -CO ₂ /kWh)	0.5 kg -CO ₂ /kWh			
			Boiler (0.001 - 999 kg -CO ₂ /kWh)	0.5 kg -CO ₂ /kWh			
		Heat source	Heat pump capacity (1 - 40 kW)	11.2 kW			
			Boiler efficiency (25 - 150%)	80%			
			Booster heater 1 capacity (1 - 20 kW)	2 kW			
			Booster heater 2 capacity (1 - 20 kW)	4 kW			
	Floor dry up function	On/Off *6	Off				
		Target temp.	Start&Finish (25 - 60°C)	30°C			
Max. temp. (25 - 60°C)			45°C				
Max. temp. period (1 - 20 days)			5 days				
Flow temp. (Increase)		Temp. increase step (+1 - +10°C)	+5°C				
		Increase interval (1 - 7 days)	2 days				
Flow temp. (Decrease)		Temp. decrease step (-1 - -10°C)	-5°C				
	Decrease interval (1 - 7 days)	2 days					
External input settings	Demand control (IN4)	Heat source OFF/Boiler operation	Boiler operation				
	Outdoor thermostat (IN5)	Heater operation/Boiler operation	Boiler operation				

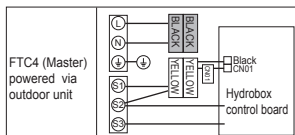
*5 When Dip SW1-1 is set to OFF "WITHOUT Boiler" or SW2-6 is set to OFF "WITHOUT Mixing tank", neither Boiler nor Hybrid can be selected.

*6 On: the function is active; Off: the function is inactive.

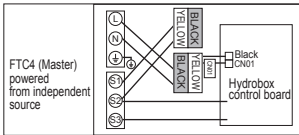
7 "" of */kwh" represents currency unit (e.g. € or £ or the like)

<Troubleshooting by inferior phenomena>

No.	Fault symptom	Possible cause	Explanation - Solution
1	Main controller display is blank.	<ol style="list-style-type: none"> There is no power supply to main controller. Power is supplied to main controller, however, the display on the main controller does not appear. 	<ol style="list-style-type: none"> Check LED2 on FTC4 (Master). (See <Figure 4.5.1>.) <ol style="list-style-type: none"> When LED2 is lit. Check for damage or contact failure of the main controller wiring. When LED2 is blinking. Refer to No. 5 below. When LED2 is not lit. Refer to No. 4 below. Check the following: <ul style="list-style-type: none"> Disconnection between the main controller cable and the FTC4 (Master) control board Failure of the main controller if "Please Wait" is not displayed. Refer to No. 2 below if "Please Wait" is displayed.
2	"Please Wait" remains displayed on the main controller.	<ol style="list-style-type: none"> "Please Wait" is displayed for up to 6 minutes. Communication failure between the main controller and FTC4 (Master). Communication failure between FTC4 (Master) and outdoor unit. 	<ol style="list-style-type: none"> Normal operation. 3. Main controller start up checks/procedure. <ol style="list-style-type: none"> If "0%" or "50-99%" is displayed below "Please Wait" there is a communication error between the main controller and the FTC4 (Master) control board. <ul style="list-style-type: none"> Check wiring connections on the main controller. Replace the main controller or the FTC4 (Master) control board. If "1-49%" is displayed there is a communication error between the outdoor unit's and FTC4 (Master) control boards. <ul style="list-style-type: none"> Check the wiring connections on the outdoor unit control board and the FTC4 (Master) control board. (Ensure S1 and S2 are not cross-wired and S3 is securely wired with no damage. (See section 4.1.) Replace the outdoor unit's and/or the FTC4 (Master) control boards.
3	The main screen appears with a press of the "ON" button, but disappears in a second.	The main controller operations do not work for a whilst after the settings are changed in the service menu. This is because the system takes time to apply the changes.	<p>Normal operation.</p> <p>The indoor unit is applying updated settings made in the service menu. Normal operation will start shortly.</p>
4	LED2 on FTC4 (Master) is off. (See <Figure 4.5.1>.)	<p>When LED1 on FTC4 (Master) is also off. (See <Figure 4.5.1>.)</p> <p><FTC4 (Master) powered via outdoor unit.></p> <ol style="list-style-type: none"> The outdoor unit is not supplied at the rated voltage. Defective outdoor controller circuit board. FTC4 (Master) is not supplied with 220 to 240V AC. FTC4 (Master) failure. Faulty connector wiring. 	<ol style="list-style-type: none"> Check the voltage across the terminals L and N or L3 and N on the outdoor power board. (See section 4.1.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check wiring of the outdoor unit and of the breaker. When the voltage is at 220 to 240V AC, go to "2." below. Check the voltage across the outdoor unit terminals S1 and S2. (See section 4.1.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check the fuse on the outdoor control board and check for faulty wiring. When the voltage is 220 to 240V AC, go to "3." below. Check the voltage across the indoor unit terminals S1 and S2. (See section 4.1.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check FTC4 (Master)-outdoor unit wiring for faults. When the voltage is 220 to 240V AC, go to "4." below. Check the FTC4 (Master) control board. <ul style="list-style-type: none"> Check the fuse on FTC4 (Master) control board. Check for faulty wiring. If no problem found with the wiring, the FTC4 (Master) control board is faulty. Check the connector wiring. <ul style="list-style-type: none"> When the connectors are wired incorrectly, re-wire the connectors referring to below. (See section 4.1.)



Flow temp.controller

No.	Fault symptom	Possible cause	Explanation - Solution
4.	LED2 on FTC4 (Master) is off. (See Figure <4.5.1>)	<FTC4 (Master) powered on independent source>	1. Check the voltage across the L and N terminals on the indoor power supply terminal block. (See section 4.1.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check for faulty wiring to power supply. When the voltage is 220 to 240V AC, go to 2. below. 2. Check for faulty wiring between the connectors. <ul style="list-style-type: none"> When the connectors are wired incorrectly re-wire them correctly referring to below. (See section 4.1 and a wiring diagram on the control and electrical box cover.)  <ul style="list-style-type: none"> If no problem found with the wiring, go to 3. below. 3. Check the FTC4 (Master) control board. <ul style="list-style-type: none"> Check the fuse on FTC4 (Master) control board. Check for faulty wiring. If no problem found with the wiring, the FTC4 (Master) control board is faulty.
		1. FTC4 (Master) is not supplied with 220 to 240V AC. 2. There are problems in the method of connecting the connectors. 3. FTC4 (Master) failure.	
		When LED1 on FTC4 (Master) is lit. Incorrect setting of refrigerant address for outdoor unit. (None of the refrigerant address is set to "0".)	Recheck the refrigerant address setting on the outdoor unit. Set the refrigerant address to "0". (Set refrigerant address using SW1(3 - 6) on outdoor controller circuit board.)
5	LED2 on FTC4 (Master) is blinking. (See Figure <4.5.1>)	When LED1 is also blinking on FTC4 (Master). Faulty wiring between FTC4 (Master) and outdoor unit	Check for faulty wiring between FTC4 (Master) and outdoor unit.
		When LED1 on FTC4 (Master) is lit. <ol style="list-style-type: none"> Faulty wiring in main controller Multiple indoor units have been wired to a single outdoor unit. Short-circuited wiring in main controller Main controller failure 	<ol style="list-style-type: none"> Check for faulty wiring in main controller. The number of indoor units that can be wired to a single outdoor unit is one. Additional indoor units must be wired individually to a single outdoor unit. 3. Remove main controller wires and check LED2 on FTC4 (Master). (See Figure 4.5.1.) <ul style="list-style-type: none"> If LED2 is blinking check for short circuits in the main controller wiring . If LED2 is lit, wire the main controller again and: <ul style="list-style-type: none"> - if LED2 is blinking, the main controller is faulty; - if LED2 is lit, faulty wiring of the main controller has been corrected.
6	LED4 on FTC4 (Master) is off. (See figure <4.5.1>)	<ol style="list-style-type: none"> SD memory card is NOT inserted into the memory card slot with correct orientation. Not an SD standards compliant memory card. 	<ol style="list-style-type: none"> Correctly insert SD memory card in place until a click is heard. Use an SD standards compliant memory card. (Refer to section 4.9.)
	LED4 on FTC4 (Master) is blinking. (See Figure <4.5.1>)	<ol style="list-style-type: none"> Full of data. Write-protected. NOT formatted. Formatted in NTFS file system. 	<ol style="list-style-type: none"> Move or delete data, or replace SD memory card with a new one. Release the write-protect switch. Refer to "4.9 Using SD memory card". FTC4 is Not compatible with NTFS file system. Use an SD memory card formatted in FAT file system.
7	No water at hot tap.	<ol style="list-style-type: none"> Cold main off Strainer (field supply) blocked. 	<ol style="list-style-type: none"> Check and open stop cock. Isolate water supply and clean strainer.
8	Cold water at tap.	<ol style="list-style-type: none"> Hot water run out. Prohibit, schedule timer or holiday mode selected. Heat pump not working. Booster heater cut-out tripped. The earth leakage circuit breaker for booster heater breaker (ECB1) tripped. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button. Immersion heater cut-out tripped. Immersion heater breaker (ECB2) tripped. 3-way valve fault 	<ol style="list-style-type: none"> Ensure DHW mode is operating and wait for DHW tank to re-heat. Check settings and change as appropriate. Check heat pump – consult outdoor unit service manual. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. See component parts diagram (Installation manual of Hydrobox, section 3.) to find out its position. Check the cause and reset if safe. Check resistance across the thermal cut-out, if open then the connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer. Check immersion heater thermostat and press reset button, located on immersion heater boss, if safe. If the heater has been operated with no water inside it may have failed, so please replace it with a new one. Check the cause and reset if safe. Check plumbing/wiring to 3-way valve. <ol style="list-style-type: none"> Manually override 3-way valve using the main controller. (Refer to <Manual operation> in section 7.2.) If the valve does not still function, go to (ii) below. Replace 3-way valve coil. If the valve does not still function, go to (iii) below. Replace 3-way valve. (Refer to the service manual.)

No.	Fault symptom	Possible cause	Explanation - Solution
9	Water heating takes longer.	<ol style="list-style-type: none"> Heat pump not working. Booster heater cut-out tripped. Booster heater breaker tripped. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button. Immersion heater cut-out has been triggered. Immersion heater breaker tripped. 	<ol style="list-style-type: none"> Check heat pump – consult outdoor unit service manual. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. See component parts diagram (Installation manual of Hydrobox, section 3.) to find out its position. Check the cause and reset if safe. Check resistance across the thermal cut-out, if open then connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer. Check immersion heater thermostat and press reset button located on immersion heater boss, if safe. If the heater kept running with no water inside, this may have resulted in failure, so replace it with a new one. Check the cause and reset if safe.
10	Temperature of DHW tank water dropped.	<p>When DHW operation is not running, the DHW tank emits heat and the water temperature decreases to a certain level. If water in the DHW tank is reheated frequently because of a significant drop in water temperature, check for the following.</p> <ol style="list-style-type: none"> Water leakage in the pipes that connect to the DHW tank Insulation material coming loose or off. 3-way valve failure 	<ol style="list-style-type: none"> Take the following measures. <ul style="list-style-type: none"> Retighten the nuts holding the pipes onto the DHW tank. Replace seal materials. Replace the pipes. Fix insulation. Check plumbing/wiring to 3-way valve. <ol style="list-style-type: none"> Manually override 3-way valve using the main controller. (Refer to <Manual operation> in section 7.2.) If the valve does not still function, go to (ii) below. Replace 3-way valve coil. If the valve does not still function, go to (iii) below. Replace 3-way valve. (Refer to the service manual.)
11	Hot or warm water from cold tap.	Heat of hot water pipe is transferred to cold water pipe.	Insulate/re-route pipework.
12	Water leakage	<ol style="list-style-type: none"> Poorly sealed connections of water circuit components Water circuit components reaching the end of life 	<ol style="list-style-type: none"> Tighten connections as required. Refer to PARTS CATALOG in the service manual for expected part lifetimes and replace them as necessary.
13	Heating system does not reach the set temperature.	<ol style="list-style-type: none"> Prohibit, schedule timer or holiday mode selected. Check settings and change as appropriate. The temperature sensor is located in a room that has a different temperature relative to that of the rest of the house. Heat pump not working. Booster heater cut-out tripped. Booster heater breaker (ECB1) tripped. The booster heater thermal cut-out tripped and can not be reset using the manual reset button. Incorrectly sized heat emitter. 3-way valve failure Battery problem (*wireless control only) If a mixing tank is installed, the flow rate between the mixing tank and the hydrobox is less than that between the mixing tank and the local system. 	<ol style="list-style-type: none"> Check settings and change as appropriate. Check the battery power and replace if flat. Relocate the temperature sensor to a more suitable room. Check heat pump – consult outdoor unit service manual. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. (See component parts diagram in Installation manual of Hydrobox, section 3. for position.) Check the cause of the trip and reset if safe. Check resistance across the thermal cut-out, if open then the connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer. Check the heat emitter surface area is adequate. Increase size if necessary. Check plumbing/wiring to 3-way valve. Check the battery power and replace it flat. Increase the flow rate between the mixing tank and the hydrobox decrease that between the mixing tank and the local system.

No.	Fault symptom	Possible cause	Explanation - Solution
14	In 2-zone temperature control, only Zone2 does not reach the set temperature.	<ol style="list-style-type: none"> When Zone1 and Zone2 are both in heating mode, the hot water temperature in Zone2 does not exceed that in Zone1. Faulty wiring of motorized mixing valve Faulty installation of motorized mixing valve Incorrect setting of Running time Motorized mixing valve failure 	<ol style="list-style-type: none"> Normal action no action necessary. Refer to "5.3 Wiring for 2-zone temperature control". Check for correct installation. (Refer to the manual included with each motorized mixing valve.) Check for correct setting of Running time. Inspect the mixing valve. (Refer to the manual included with each motorized mixing valve.)
15	When a PUHZ-FRP outdoor unit is connected, DHW or Heating operation cannot run.	The outdoor unit is set to have operation of the indoor unit of air conditioner take precedence over that of the hydrobox, and in the main controller settings "Electric heater (Heating)" or "Electric heater (DHW)" is turned off.	Turn ON Electric heater (Heating) or Electric heater (DHW) using the main controller.
16	When a PUHZ-FRP outdoor unit is connected and is in heat recovery operation, the set temperature is not reached.	When the outdoor unit is set to have cooling operation of the indoor unit of air conditioner take precedence over that of the hydrobox, the outdoor unit controls the frequency of the compressor according to the load of air conditioner. The DHW and heating run according to that frequency.	Normal operation no action necessary. If Air-to-Water system is given priority in operation, comp Hz can be regulated depending on the load of DHW or Heating. For more details, refer to the PUHZ-FRP installation manual.
17	After DHW operation room temperature rises slightly.	At the end of the DHW mode operation the 3-way valve diverts hot water away from the DHW circuit into space heating circuit. This is done to prevent the hydrobox components from overheating. The amount of hot water directed into the space heating circuit varies according to the type of the system and of the pipe run between the plate heat exchanger and the hydrobox.	Normal operation no action necessary.
18	The room temperature rises during DHW operation.	3-way valve failure	Check the 3-way valve.
19	Water discharges from pressure relief valve. (Primary circuit)	<ol style="list-style-type: none"> If continual – pressure relief valve may be damaged. If intermittent – expansion vessel charge may have reduced/bladder perished. 	<ol style="list-style-type: none"> Turn the handle on the pressure relief valve to check for foreign objects in it. If the problem is not still solved, replace the pressure relief valve with a new one. Check pressure in expansion vessel. Recharge to 1 bar if necessary. If bladder perished replace expansion vessel with a new one.
20	Water discharges from pressure relief valve (field supplied item). (Sanitary circuit)	<ol style="list-style-type: none"> If continual – field supplied pressure reducing valve not working. If continual – pressure relief valve seat may be damaged. If intermittent – expansion vessel charge may have reduced/bladder perished. DHW tank may have subjected to backflow. 	<ol style="list-style-type: none"> Check function of pressure reducing valve and replace if necessary. Turn the handle on the pressure relief valve to check for foreign objects inside. If the problem is not still solved, replace the pressure relief valve. Check gas-side pressure in expansion vessel. Recharge to correct precharge pressure if necessary. If bladder perished replace expansion vessel with a new one with appropriate pre-charge. Check gas-side pressure in DHW tank. If pressure in DHW tank is similar to that in incoming mains, cold water supply that merges with incoming mains water supply could flow back to DHW tank. Investigate source of back-feed and rectify error in pipework/fitting configuration. Adjust pressure in cold supply.
21	Noisy water circulation pump	Air in water circulation pump .	Use manual and automatic air vents to remove air from system. Top up water if necessary to achieve 1 bar on primary circuit.
22	Noise during hot water draw off typically worse in the morning.	<ol style="list-style-type: none"> Loose airing cupboard pipework. Heaters switching on/off. 	<ol style="list-style-type: none"> Install extra pipe fastening clips. Normal operation no action necessary.
23	Mechanical noise heard coming from the hydrobox.	<ol style="list-style-type: none"> Heaters switching on/off. 3-way valve changing position between DHW and heating mode. 	Normal operation no action necessary.
24	Water circulation pump runs for a short time unexpectedly .	Water circulation pump jam prevention mechanism (routine) to inhibit the build-up of scale.	Normal operation no action necessary.
25	Milky/Cloudy water (Sanitary circuit)	Oxygenated water	Water from any pressurised system will release oxygen bubbles when water is running. The bubbles will settle out.
26	Heating mode has been on standby for a long time (does not start operation smoothly.)	The time of "Delay" set in "Economy settings for pump" is too short. (Go to "Service menu" → "Auxiliary settings" → "Economy settings for pump").	Increase the time of "Delay" in "Economy settings for pump" .

No.	Fault symptom	Possible cause	Explanation - Solution
27	The hydrobox that was running in the heating mode before power failure is running in the DHW mode after power recovery.	The hydrobox is designed to run in an operation mode with a higher priority (i.e. DHW mode in this case) at power recovery.	<ul style="list-style-type: none"> • Normal operation. • After the DHW max. operation time has elapsed or the DHW max. temperature has been reached, the DHW mode switches to the other mode (ex. Heating mode).
28	Cooling mode is NOT available.	Dip SW2-4 is OFF.	Turn Dip SW2-4 to ON. (Refer to "5.1 Dip Switch Functions" in this manual.)
29	The cooling system does not cool down to the set temperature.	<ol style="list-style-type: none"> 1. When the water in the circulation circuit is unduly hot, Cooling mode starts with a delay for the protection of the outdoor unit. 2. When the outdoor temperature is lower than the preset temperature below which the freeze stat. function is activated, Cooling mode does not start running. 	<ol style="list-style-type: none"> 1. Normal operation. 2. To run Cooling mode overriding the freeze stat. function, adjust the preset temperature below which the freeze stat. function is activated. (Refer to "<Freeze stat function>" on Page 46.
30	The electric heaters are activated shortly after DHW or LP mode starts running after Cooling mode.	The setting time period of Heat-pump-only operation is short.	Adjust the setting time period of Heat-pump only operation. (Refer to "<Electric heater (DHW)>" on Page 44.
31	During DHW or LP mode following the cooling mode, error L6 (circulation water freeze protection) occurs and operation stops frequently.	If the preset temperature below which the freeze stat. function is activated is low, error L6 is more likely to occur interruption operation before the freeze stat. function is activated.	Adjust the preset temperature below which the freeze stat. function is activated. (Refer to "<Freeze stat function>" on Page 46.

9.1 Wiring for multiple outdoor units control

To establish a larger system, up to 6 outdoor units of the same model can be connected in one system.

Note: PUHZ-FRP outdoor unit is not available for multiple outdoor units control.

9.1.1 Requirements

<Outdoor unit>

- (a) Up to 6 units can be connected.
- (b) All the outdoor units must be of the same model.
- (c) The outdoor units must be connected to slave units.

<FTC: Master unit>

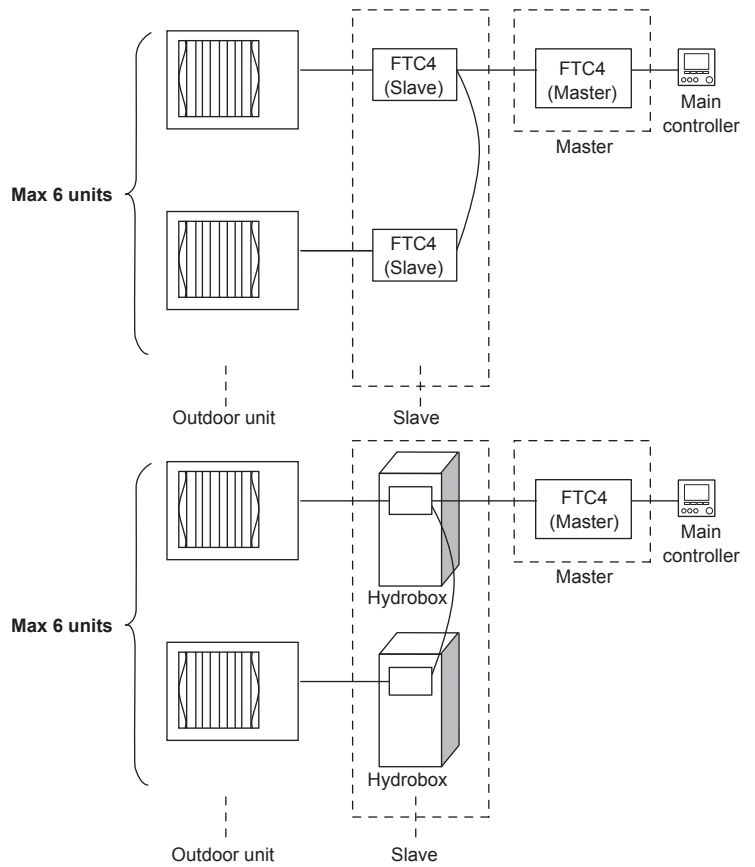
Each slave unit is controlled by the master unit.

- (a) The outdoor units must NOT be connected to the master unit.
Make sure that the master unit is powered by independent source.
- (b) Wire the main controller to TBI.2 13-14 on the master unit.
- (c) Wire the electric heater to the master unit.

<FTC: Slave unit>

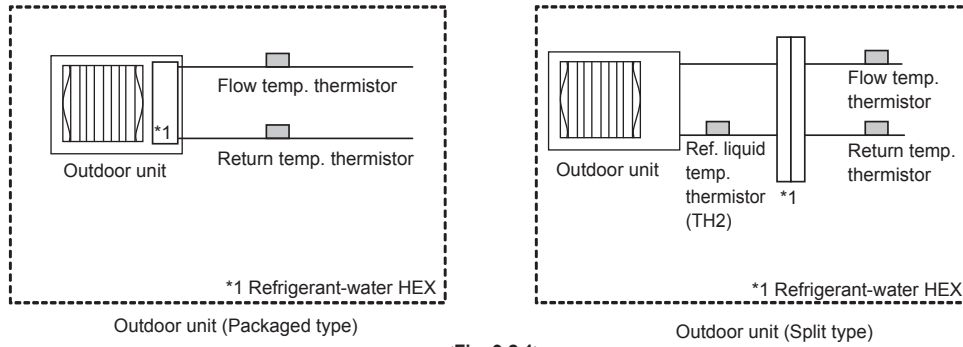
The hydrobox or PAC-SIF051B-E is used as a slave unit

- (a) Connect each outdoor unit to a slave unit.
- (b) The main controller must NOT be wired to a slave unit.



9.2 Pipe work

Following is the system example of two outdoor units being connected in one system.



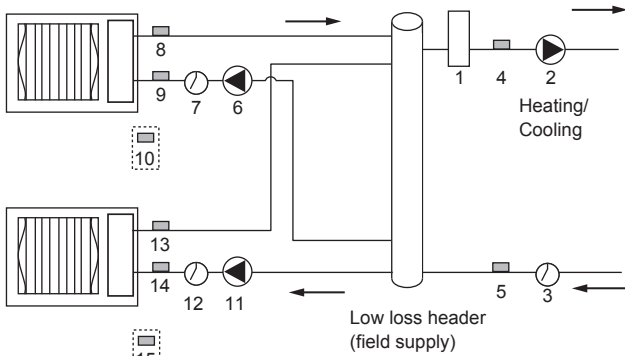
<Fig. 9.2.1>

IMPORTANT NOTE

Keep the minimum amount of water required in the space heating circuit according to the number of outdoor units.

System 1: Heating/Cooling system

- Install a low loss header (field supply).
- Install booster heater toward the local system, relative to the low loss header.



<Fig. 9.2.2>

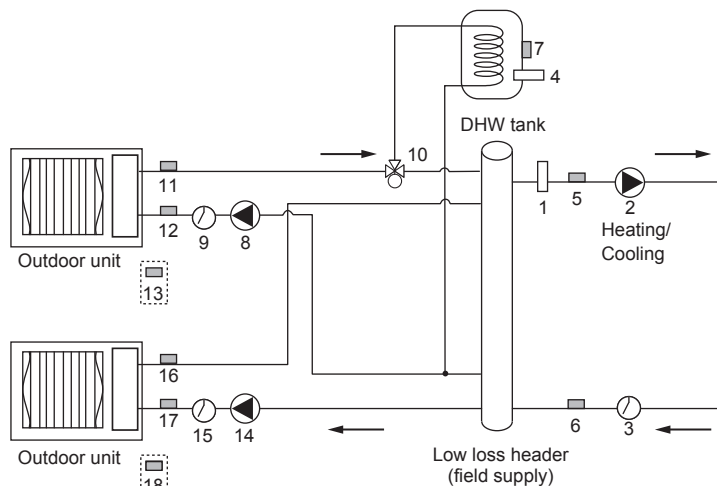
No.	Component	Wiring		
		Master	Slave 1	Slave 2
1	Booster heater (field supply)	✓		
2	Circulation pump1 (field supply)	✓		
3	Flow switch1 (field supply) *2	✓		
4	Flow temp. thermistor (THW1)	✓		
5	Return temp. thermistor (THW2)	✓		
6	Slave1 circulation pump1 (field supply)		✓	
7	Slave1 flow switch (field supply) *2		✓	
8	Slave1 flow temp. thermistor (THW1)		✓	
9	Slave1 return temp. thermistor (THW2)		✓	
10	Slave1 ref. liquid temp. thermistor (TH2) *1		✓	
11	Slave2 circulation pump1 (field supply)			✓
12	Slave2 flow switch (field supply) *2			✓
13	Slave2 flow temp. thermistor (THW1)			✓
14	Slave2 return temp. thermistor (THW2)			✓
15	Slave2 ref. liquid temp. thermistor (TH2) *1			✓

*1 When the outdoor unit is split type, TH2 needs to be installed. <Fig. 9.2.1>

*2 For safety protection, it is recommended to install a flow switch.

System 2: Heating/Cooling & DHW system

- Install DHW tank toward the outdoor unit, relative to the low loss header.
- Wire 3-way valve (or 2-way valve 1, 2 to FTC (slave unit)).
- LP mode uses assistance of electric heater. Place an immersion heater on the DHW circuit.
- Install a low loss header (field supply).
- Install booster heater toward the local system, relative to the low loss header.



<Fig. 9.2.3>

No.	Component	Wiring		
		Master	Slave 1	Slave 2
1	Booster heater (field supply)	✓		
2	Circulation pump1 (field supply)	✓		
3	Flow switch1 (field supply) *2	✓		
4	Immersion heater (field supply)	✓		
5	Flow temp. thermistor (THW1)	✓		
6	Return temp. thermistor (THW2)	✓		
7	Tank water temp. (THW5)	✓		
8	Slave1 circulation pump1 (field supply)		✓	
9	Slave1 flow switch (field supply) *2		✓	
10	Slave1 3-way valve (field supply) *3		✓	
11	Slave1 flow temp. thermistor (THW1)		✓	
12	Slave1 return temp. thermistor (THW2)		✓	
13	Slave1 ref. liquid temp. thermistor (TH2) *1		✓	
14	Slave2 circulation pump1 (field supply)			✓
15	Slave2 flow switch (field supply) *2			✓
16	Slave2 flow temp. thermistor (THW1)			✓
17	Slave2 return temp. thermistor (THW2)			✓
18	Slave2 ref. liquid temp. thermistor (TH2) *1			✓

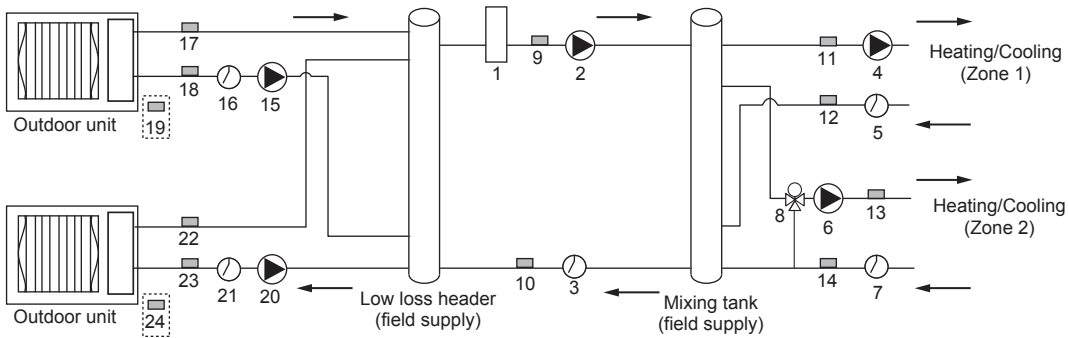
*1 When the outdoor unit is split type, TH2 needs to be installed. <Fig. 9.2.1>

*2 For safety protection, it is recommended to install a flow switch.

*3 The use of two 2-way valves can perform the same function as a 3-way valve.

System 3: 2-zone temperature control

- Install a mixing tank (field supply) for 2-zone temperature control.
- Install a low loss header (field supply).
- Install booster heater toward the local system, relative to the low loss header.
- For details on 2-zone installation, refer to "3.6 Piping".



<Fig. 9.2.4>

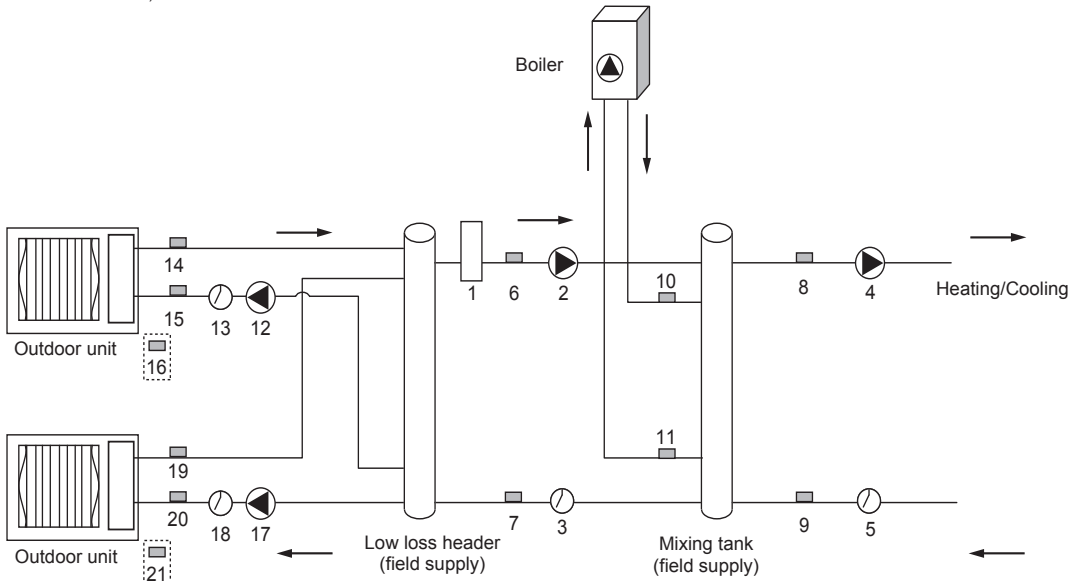
No.	Component	Wiring		
		Master	Slave 1	Slave 2
1	Booster heater (field supply)	✓		
2	Circulation pump1 (field supply)	✓		
3	Flow switch1 (field supply) *2	✓		
4	Circulation pump2 (field supply)	✓		
5	Flow switch2 (field supply) *2	✓		
6	Circulation pump3 (field supply)	✓		
7	Flow switch3 (field supply) *2	✓		
8	Motorized mixing valve (field supply)	✓		
9	Flow temp. thermistor (THW1)	✓		
10	Return temp. thermistor (THW2)	✓		
11	Zone1 flow temp. thermistor (THW6) (option)	✓		
12	Zone1 return temp. thermistor (THW7) (option)	✓		
13	Zone2 flow temp. thermistor (THW8) (option)	✓		
14	Zone2 return temp. thermistor (THW9) (option)	✓		
15	Slave1 circulation pump1 (field supply)		✓	
16	Slave1 flow switch (field supply) *2		✓	
17	Slave1 flow temp. thermistor(THW1)		✓	
18	Slave1 return temp. thermistor (THW2)		✓	
19	Slave1 ref. liquid temp. thermistor (TH2) *1		✓	
20	Slave2 circulation pump1 (field supply)			✓
21	Slave2 flow switch (field supply) *2			✓
22	Slave2 flow temp. thermistor (THW1)			✓
23	Slave2 return temp. thermistor (THW2)			✓
24	Slave2 ref. liquid temp. thermistor (TH2) *1			✓

*1 When the outdoor unit is split type, TH2 needs to be installed. <Fig. 9.2.1>

*2 For safety protection, it is recommended to install a flow switch.

System 4: Heating/Cooling system (with Boiler)

- Install a mixing tank (field supply) for connection of the boiler.
- Install a low loss header (field supply).
- Install booster heater between low loss header and mixing tank.
- For more details, refer to the installation manual of PAC-TH011HT-E.



<Fig. 9.2.5>

No.	Component	Wiring		
		Master	Slave 1	Slave 2
1	Booster heater (field supply)	✓		
2	Circulation pump1 (field supply)	✓		
3	Flow switch1 (field supply) *2	✓		
4	Circulation pump2 (field supply)	✓		
5	Flow switch2 (field supply) *2	✓		
6	Flow temp. thermistor (THW1)	✓		
7	Return temp. thermistor (THW2)	✓		
8	Flow temp. thermistor (THW6) (option)	✓		
9	Return temp. thermistor (THW7) (option)	✓		
10	Boiler flow temp. thermistor (THWB1) (option)	✓		

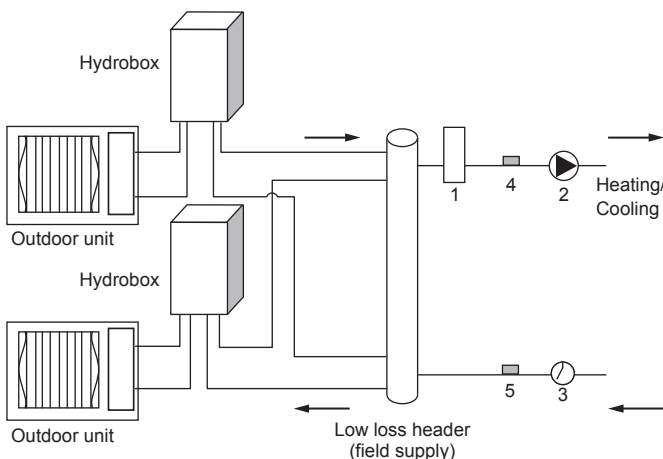
*1 When the outdoor unit is split type, TH2 needs to be installed. <Fig. 9.2.1>

*2 For safety protection, it is recommended to instal a flow switch.

No.	Component	Wiring		
		Master	Slave 1	Slave 2
11	Boiler return temp. thermistor (THWB2) (option)	✓		
12	Slave1 circulation pump1 (field supply)		✓	
13	Slave1 flow switch (field supply) *2		✓	
14	Slave1 flow temp. thermistor (THW1)		✓	
15	Slave1 return temp. thermistor (THW2)		✓	
16	Slave1 ref. liquid temp. thermistor (TH2) *1		✓	
17	Slave2 circulation pump1 (field supply)			✓
18	Slave2 flow switch (field supply) *2			✓
19	Slave2 flow temp. thermistor (THW1)			✓
20	Slave2 return temp. thermistor (THW2)			✓
21	Slave2 ref. liquid temp. thermistor (TH2) *1			✓

System 5: Heating/Cooling system (with Hydrobox)

- Install a low loss header (field supply).
- Install booster heater toward the local system, relative to the low loss header.



<Fig. 9.2.6>

No.	Component	Wiring		
		Master	Slave 1 (Hydrobox)	Slave 2 (Hydrobox)
1	Booster heater(field supply)	✓		
2	Circulation pump1 (field supply)	✓		
3	Flow switch1 (field supply) *2	✓		
4	Flow temp. thermistor (THW1)	✓		
5	Return temp. thermistor (THW2)	✓		

*2 For safety protection, it is recommended to instal a flow switch.

9.3 Electrical connection

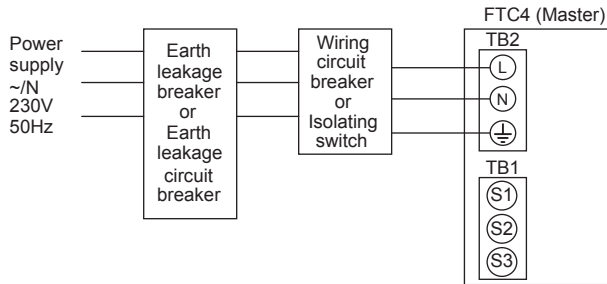
All electrical work should be carried out by a suitably qualified technician. Failure to comply with this could lead to electrocution, fire, and death. It will also invalidate product warranty. All wiring should be according to national wiring regulations.

9.3.1 Master unit

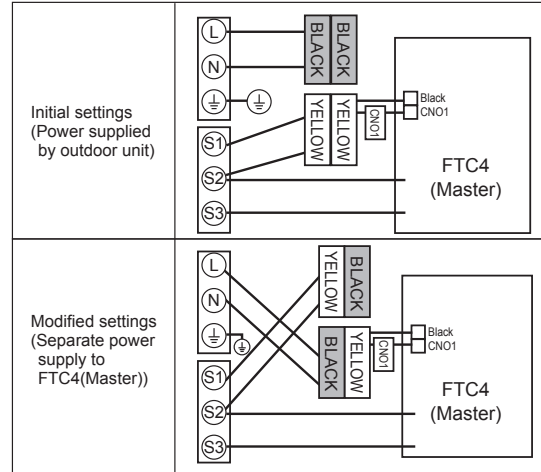
■ FTC4 (Master)

Outdoor unit must NOT be connected to FTC4 (Master) unit.

FTC4 (Master) unit electrical box connector connections changed (see Fig. 9.3.2)



<Fig. 9.3.1>



<Fig. 9.3.2>

9.3.2. Slave unit

Connect each outdoor unit to a slave unit.

FTC4 (Slave) can be powered in two ways.

1. Power cable is run from the outdoor unit to a slave unit.
2. FTC (Slave) has independent power source.

■ FTC4 (Master) (PAC-IF051B-E) used as slave

• For wiring as a slave controller, refer to "4.1 Electrical connection". *1

*1 Don't connect the power cable to the booster heater because it doesn't work in slave controller setting.

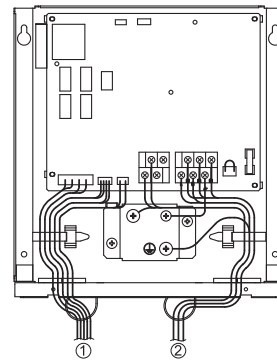
■ FTC4 (Slave) (PAC-SIF051B-E) <Fig. 9.3.3>

FTC4 (Slave) can be powered in two ways.

1. Power cable is run from the outdoor unit to FTC4 (Slave).
2. FTC4 (Slave) has independent power source

Note:

- Do not run the low voltage cables through a slot that the high voltage cables go through.
- Bundle cables by using clamps as shown in the figure to the right .

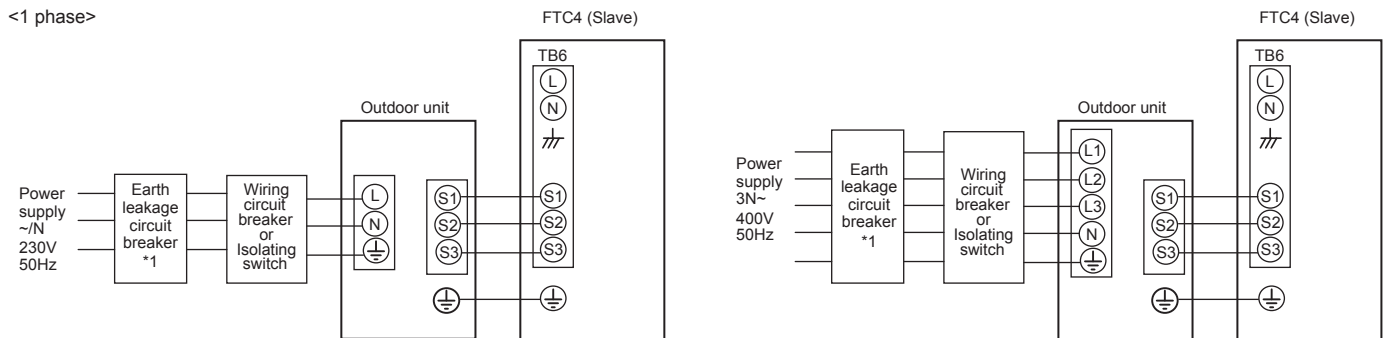


① Low voltage cables (INPUT) & Thermistor cables
② High voltage cables (OUTPUT) & Power cables

<Fig. 9.3.3>

Option 1: FTC4 (Slave) powered via outdoor unit

<1 phase>



<Fig. 9.3.4>

*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

Note: In accordance with IEE regulations the circuit breaker/isolating switch located on the outdoor unit should be installed with lockable devices (health and safety).

Wiring No. Wiring size (mm ²)	FTC4 (Slave) - Outdoor unit		3 × 1.5 (polar)
	FTC4 (Slave) - Outdoor unit earth	*2	1 × Min. 1.5
Circuit rating	FTC4 (Slave) - Outdoor unit S1 - S2	*3	230V AC
	FTC4 (Slave) - Outdoor unit S2 - S3	*3	24V DC

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

*2. Max. 45 m

If 2.5 mm² used, Max. 50 m

If 2.5 mm² used and S3 separated, Max. 80 m

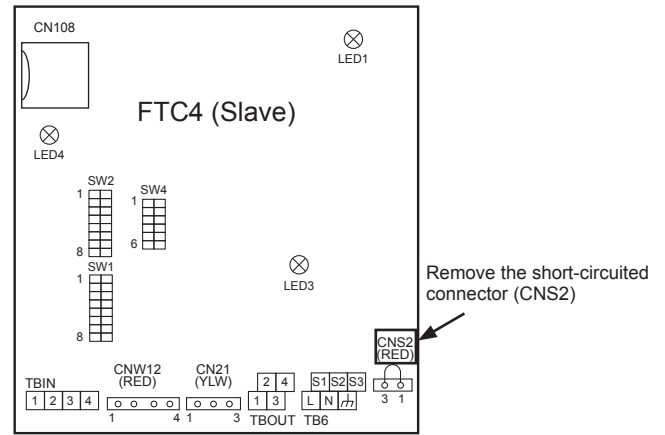
*3. The values given in the table above are not always measured against the ground value.

- Notes:**
1. Wiring size must comply with the applicable local and national codes.
 2. FTC4 (Slave)/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
FTC4 (Slave) power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.

Option 2: FTC4 (Slave) powered by independent source

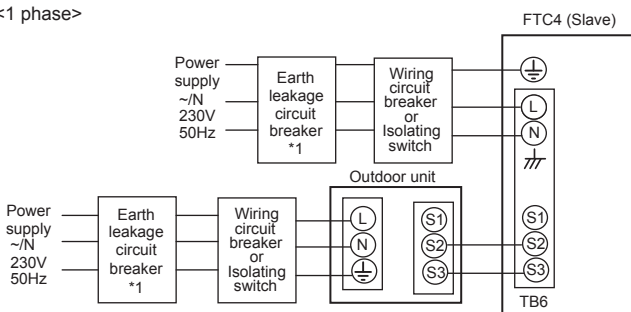
If FTC4 (Slave) and outdoor units have separate power supplies, the following requirements MUST be carried out:

- Remove the short-circuited connector (CNS2) on FTC4 (Slave) (see <Fig. 9.3.5>.)
- Turn the outdoor unit DIP switch SW8-3 to ON
- Turn on the outdoor unit BEFORE the FTC4 (Slave).

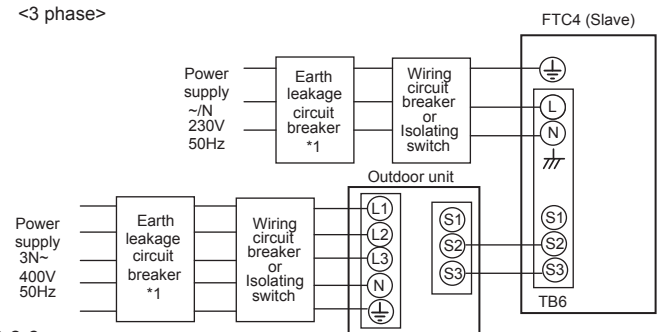


<Fig. 9.3.5>

<1 phase>



<3 phase>



<Fig. 9.3.6>

*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

FTC4 (Slave) power supply		~N 230 V 50 Hz
FTC4 (Slave) input capacity		*1 16 A
Main switch (Breaker)		
Wiring No. x size (mm ²)	FTC4 (Slave) power supply	2 x Min. 1.5
	FTC4 (Slave) power supply earth	1 x Min. 1.5
	FTC4 (Slave) - Outdoor unit	*2 2 x Min. 0.3
	FTC4 (Slave) - Outdoor unit earth	—
Circuit rating	FTC4 (Slave) L - N	*3 230V AC
	FTC4 (Slave) - Outdoor unit S1 - S2	*3 —
	FTC4 (Slave) - Outdoor unit S2 - S3	*3 24V DC

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

*2. Max. 45 m
If 2.5 mm² used, Max. 50 m
If 2.5 mm² used and S3 separated, Max. 80 m

*3. The values given in the table above are not always measured against the ground value.

- Notes:**
1. Wiring size must comply with the applicable local and national codes.
 2. FTC4 (Slave)/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)
FTC4 (Slave) power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
 3. Install an earth longer than other cables.

Hydrobox

- For wiring as a slave controller (hydrobox), refer to "4.5 Electrical Connection" in Hydrobox installation manual. *1
- *1 Don't connect the power cable to the booster heater because it doesn't work in slave controller setting.
- *2 Don't connect the main controller cable.

<Before system set up>

Insert the included SD memory card into the FTC4 control board. (Refer to section 4.9.)

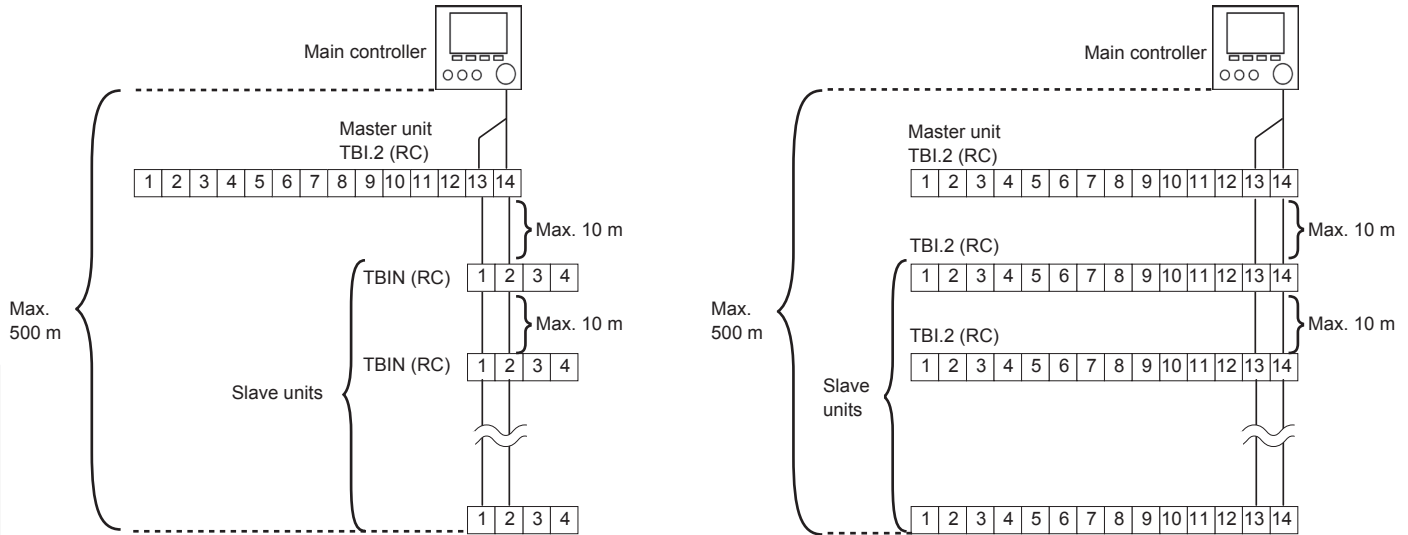
9.4 Main controller wiring

- (a) Wire the main controller to TBI.2 RC terminals on the master unit. The main controller must NOT be connected to a slave unit.
- (b) Use the daisy chain wiring method to wire the master unit and slave units by connecting TBI.2 RC terminals. *1

*1 The maximum length between each units wiring is 10 m. The maximum length of total daisy-chain wiring is 500 m.

■ PAC-SIF051B-E

■ Hydrobox (with FTC4 (Master) that is set as slave)



<Fig. 9.4.1>

Note: Wiring for main controller cable and daisy chain cable shall be (5 cm or more) apart from power source wiring so that it is not influenced by electrical noise from power source wiring. (Do NOT insert main controller cable and power source wiring in the same conduit.)

9.5 Connecting the thermistor cables

Connect the thermistor for the FTC4 (Slave) controller.

9.5.1 Connecting the refrigerant pipe temp. thermistor (TH2) cable

Connect the TH2 cable to the CN21 connector on FTC4 (Slave).

For split Outdoor unit : Connect TH2.

For packaged Outdoor unit : It is NOT necessary to connect TH2.

When the TH2 cable is too long, bundle the excess cable outside the FTC4 (Slave) unit. Do not bind the wires in the FTC4 (Slave) unit.

<Thermistor position>

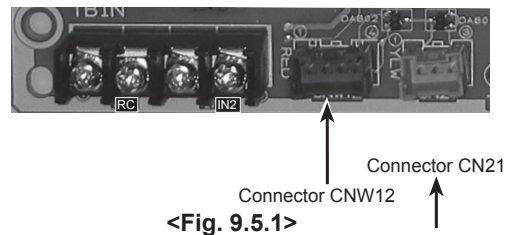
Place TH2 on **refrigerant** piping (**liquid** side).

It is recommended to protect the thermistor with heat insulating materials so as not to be affected by ambient temperature.

Note: Be sure to place TH2 where it correctly detects refrigerant piping temp. (liquid side).

Because;

- (1) TH2 is required to detect heating subcool correctly.
- (2) Refrigerant temperature of water-to-refrigerant heat exchanger also needs to be detected for protection purpose.



<Fig. 9.5.1>

9.5.2 Connecting the flow water temp. thermistor (THW1) cable and the return water temp. thermistor (THW2) cable

The THW1 and the THW2 cables share a connector, and the connector connects to CNW12 connector on FTC4 (Slave).

When the THW1 and THW2 cables are too long, bundle the excess cables outside the FTC4 (Slave) unit.

Do not bind the wires in the FTC4 (Slave) unit.

<Thermistor position>

Place THW1 on **water** piping (**water outlet** side) after booster heater, and THW2 on the water inlet side.

It is recommended to protect the thermistor with heat insulating materials so as not to be affected by ambient temperature.

Note: Be sure to attach THW1 where it correctly detects Flow temp. (water outlet side). For more details, see Page 7.

⚠ Caution:

Do not route the thermistor cables together with power cables.

The sensor part of the thermistor should be installed where user can not access.

(It should be separated, by supplementary insulation, from areas the user can access.)

9.6 Dip switch functions

<Outdoor unit>

- Set refrigerant address on each outdoor unit from 1 to 6.

Note: Do NOT use refrigerant address 0 as 0 is used for FTC4 (Master). The address range is from 1 to 6.

Split model (SW1-3 to SW1-6)

Dip switch	Refrigerant address number					
	Add. 1	Add. 2	Add. 3	Add. 4	Add. 5	Add. 6
SW1-1	—	—	—	—	—	—
SW1-2	—	—	—	—	—	—
SW1-3	ON	OFF	ON	OFF	ON	OFF
SW1-4	OFF	ON	ON	OFF	OFF	ON
SW1-5	OFF	OFF	OFF	ON	ON	ON
SW1-6	OFF	OFF	OFF	OFF	OFF	OFF

Packaged model (SW7-3 to SW7-6)

Dip switch	Refrigerant address number					
	Add. 1	Add. 2	Add. 3	Add. 4	Add. 5	Add. 6
SW7-1	—	—	—	—	—	—
SW7-2	—	—	—	—	—	—
SW7-3	ON	OFF	ON	OFF	ON	OFF
SW7-4	OFF	ON	ON	OFF	OFF	ON
SW7-5	OFF	OFF	OFF	ON	ON	ON
SW7-6	OFF	OFF	OFF	OFF	OFF	OFF

<FTC4: Master>

- Set Dip SW4-1 and SW4-2 to ON.
- For more details refer to "5. Dip Switch setting."

<FTC4: Slave>

- Set Dip SW4-1 to ON "Active :multiple outdoor unit control".
- Set Dip SW1-7 (Outdoor unit type) on each slave unit according to each connected outdoor unit type.
- Set only Dip-SW1-3 to ON on the slave unit that runs DHW operation.

Dip switch		Function	OFF	ON	Master	Slave (PAC-SIF051B-E)	Slave *1 (Hydrobox)
SW1	SW1-1	Bolier	WITHOUT Bolier	WITH Bolier	✓	—	—
	SW1-2	Heat pump maximum outlet water temperature	55°C	60°C	✓	✓	✓
	SW1-3	DHW tank	WITHOUT DHW tank	WITH DHW tank	✓	✓	✓
	SW1-4	Immersion heater	WITHOUT Immersion heater	WITH Immersion heater	✓	—	—
	SW1-5	Booster heater	WITHOUT Booster heater	WITH Booster heater	✓	—	—
	SW1-6	Booster heater function	For heating only	For heating and DHW	—	—	—
	SW1-7	Outdoor unit type	Split type	Packaged type	—	✓	✓
	SW1-8	Wireless remote controller	WITHOUT Wireless remote controller	WITH Wireless remote controller	✓	—	—
SW2	SW2-1	Room thermostat1 input (IN1) logic change	Zone1 operation stop at short	Zone1 operation stop at open	✓	—	—
	SW2-2	Flow switch1 input (IN2) logic change	Failure detection at short	Failure detection at open	✓	✓	✓
	SW2-3	Booster heater capacity restriction	Inactive	Active	✓	—	—
	SW2-4	Cooling mode function	Inactive	Active	✓	—	—
	SW2-5	"Automatic switch to backup heater only operation (When outdoor unit stops by error)"	Inactive	Active	✓	—	—
	SW2-6	Mixing tank	WITHOUT Mixing tank	WITH Mixing tank	✓*2	—	—
	SW2-7	2-zone temperature control	Inactive	Active	✓	—	—
	SW2-8	—	—	—	—	—	—
SW3	SW3-1	Room thermostat2 input (IN6) logic change	Zone2 operation stop at short	Zone2 operation stop at open	✓	/	—
	SW3-2	Flow switch2 input (IN3) logic change	Failure detection at short	Abnormality detection at open	✓		—
	SW3-3	Flow switch3 input (IN7) logic change	Failure detection at short	Abnormality detection at open	✓		—
	SW3-4	Cooling operation in zone2	NOT in use	In use	✓		—
	SW3-5	Heating mode function	Inactive	Active	✓		—
	SW3-6	—	—	—	—		—
	SW3-7	—	—	—	—		—
	SW3-8	—	—	—	—		—
SW4	SW4-1	Multiple unit control	Inactive	Active	ON	ON	ON
	SW4-2	Position of multiple outdoor units control	Slave	Master	ON	OFF	OFF
	SW4-3	—	—	—	—	—	—
	SW4-4	—	—	—	—	—	—
	SW4-5	Emergency mode (Heater only operation)	Normal	"Emergency mode (Heater only operation) (To be activated only when powered ON)"	✓	—	—
	SW4-6	Emergency mode (Bolier operation)	Normal	"Emergency mode (Bolier operation) (To be activated only when powered ON)"	✓	—	—

*1 When FTC4 (Master) in Hydrobox is set as Slave.

*2 Set Dip SW2-6 to ON in "System 3 (2 zone)" and in "System 4 (with Boiler)" mentioned in "9.2 Pipe work."

✓ : Setting is required

— : NO setting (function is not available)

9.7 Connecting inputs/outputs

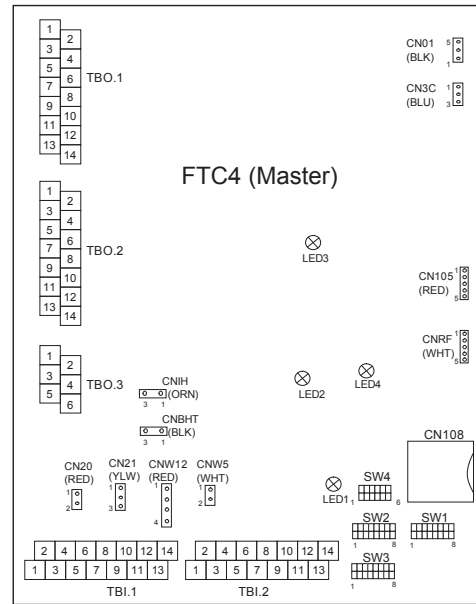
When the wires are wired to adjacent terminals use ring terminals and insulate the wires.

<Electrical connection for master controller>

- Refer to "4.5 Connecting inputs/outputs"

<Electrical connection for slave controller>

- PAC-IF051B-E



<Fig. 9.7.1>

Signal inputs

Name	Terminal block	Connector	Item	OFF (Open)	OFF (Short)
RC	TBI.2 13-14	—	Communication cable between indoor units	—	—
IN2	TBI.1 3-4	—	Flow switch 1 input	Refer to SW2-2 in <9.6 Dip Switch Functions>.	

Wiring specification and field supply parts

Item	Name	Model and specifications
Signal input function	Signal input wire	Use sheathed vinyl coated cord or cable. Max. 10 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm
	Switch	Non-voltage "a" contact signals Remote switch: minimum applicable load 12V DC, 1mA

Thermistor inputs

Name	Terminal block	Connector	Item	Optional part model
TH2	—	CN21	Thermistor (Ref. liquid temp.)	—
THW1	—	CNW12 1-2	Thermistor (Flow water temp.)	—
THW2	—	CNW12 3-4	Thermistor (Return water temp.)	—

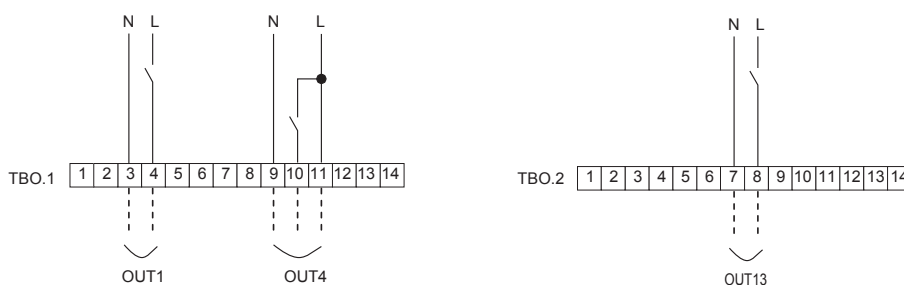
Note:

Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each temperature.

If the wiring is too long, bundle it with a strap to adjust the length.

Outputs

Name	Terminal block	Connector	Item	OFF	ON	Signal/Max current
OUT1	TBO.1 3-4	—	Water circulation pump 1 output	OFF	ON	230V AC 1.0 A Max
OUT4	TBO.1 9-11	—	3-way valve (2-way valve 1) output	Heating	DHW	230V AC 0.1 A Max
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating	230V AC 0.1 A Max



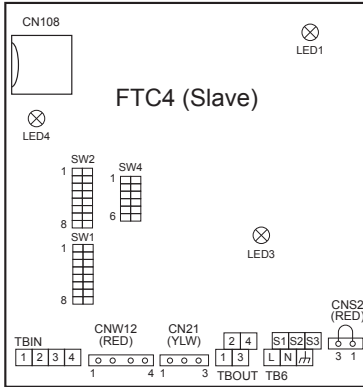
<Fig. 9.7.2>

Wiring specification and field supply parts

Item	Name	Model and specifications
External output function	Outputs wire	Use sheathed vinyl coated cord or cable. Max. 30 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm

Note: Do not connect multiple water circulation pumps directly to each output (OUT1). In such a case, connect them via (a) relay(s).

■ PAC-SIF051B-E



<Fig. 9.7.3>

Signal inputs

Name	Terminal block	Connector	Item	OFF (Open)	OFF (Short)
RC	TBIN 1-2	—	Communication cable between indoor units	—	—
IN2	TBIN 3-4	CN2F	Flow switch input	Refer to SW2-2 in <9.6 Dip Switch Functions>.	

Wiring specification and field supply parts

Item	Name	Model and specifications
Signal input function	Signal input wire	Use sheathed vinyl coated cord or cable. Max. 10 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm
	Switch	Non-voltage "a" contact signals Remote switch: minimum applicable load 12V DC, 1mA

Thermistor inputs

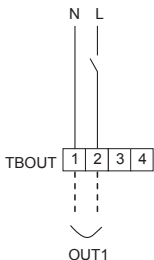
Name	Terminal block	Connector	Item	Optional part model
TH2	—	CN21	Thermistor (Ref. liquid temp.)	—
THW1	—	CNW12 1-2	Thermistor (Flow water temp.)	—
THW2	—	CNW12 3-4	Thermistor (Return water temp.)	—

Note:

Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each temperature.
If the wiring is too long, bundle it with a strap to adjust the length.

Output

Name	Terminal block	Connector	Item	OFF	ON	Signal/Max current
OUT1	TBOUT 1-2	—	Water circulation pump 1 output	OFF	ON	230V AC 1.0 A Max



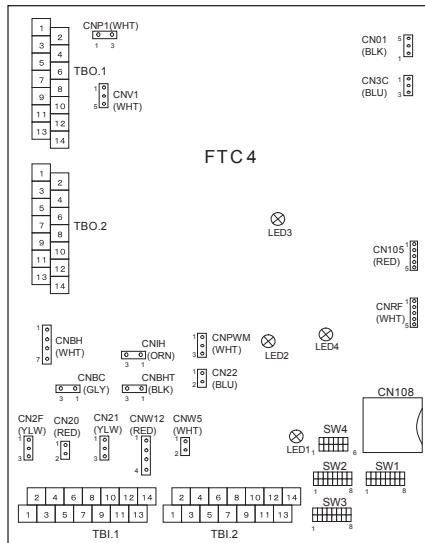
<Fig. 9.7.4>

Wiring specification and field supply parts

Item	Name	Model and specifications
External output function	Outputs wire	Use sheathed vinyl coated cord or cable. Max. 30 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm

Note: Do not connect multiple water circulation pumps directly to each output (OUT1). In such a case, connect them via (a) relay(s).

Hydrobox



<Fig. 9.7.5>

Signal inputs

Name	Terminal block	Connector	Item	OFF (Open)	OFF (Short)
RC	TBI.2 13-14	CN22	Communication cable between indoor units	—	—
IN2	TBI.1 3-4	CN2F	Flow switch input	Refer to SW2-2 in <9.6 Dip Switch Functions>.	

Wiring specification and field supply parts

Item	Name	Model and specifications
Signal input function	Signal input wire	Use sheathed vinyl coated cord or cable. Max. 10 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm
	Switch	Non-voltage "a" contact signals Remote switch: minimum applicable load 12V DC, 1mA

Thermistor inputs

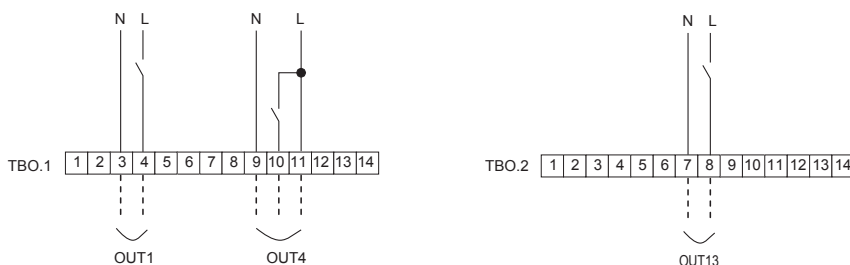
Name	Terminal block	Connector	Item	Optional part model
TH2	—	CN21	Thermistor (Ref. liquid temp.)	—
THW1	—	CNW12 1-2	Thermistor (Flow water temp.)	—
THW2	—	CNW12 3-4	Thermistor (Return water temp.)	—

Note:

Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each temperature.
If the wiring is too long, bundle it with a strap to adjust the length.

Outputs

Name	Terminal block	Connector	Item	OFF	ON	Signal/Max current
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output	OFF	ON	230V AC 1.0 A Max
OUT4	TBO.1 9-11	CNV1	3-way valve (2-way valve 1) output	Heating	DHW	230V AC 0.1 A Max
OUT13	TBO.2 7-8	—	2-way valve 2 output	DHW	Heating	230V AC 0.1 A Max



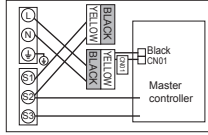
<Fig. 9.7.2>

Wiring specification and field supply parts

Item	Name	Model and specifications
External output function	Outputs wire	Use sheathed vinyl coated cord or cable. Max. 30 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm ² to 1.25 mm ² Solid wire: ø0.65 mm to ø1.2 mm

Note: Do not connect multiple water circulation pumps directly to each output (OUT1). In such a case, connect them via (a) relay(s).

Basic Troubleshooting for multiple outdoor units control

No.	Fault symptom	Possible cause	Explanation - Solution
1	Main controller display is blank.	<ol style="list-style-type: none"> There is no power supply to main controller. Power is supplied to the main controller, however, the display on the main controller does not appear. 	<ol style="list-style-type: none"> Check LED2 on the master controller. (See <Figure 5.2.1>.) <ol style="list-style-type: none"> When LED2 is lit. Check for damage or contact failure of the main controller wiring. When LED2 is blinking. Refer to No. 4 below. When LED2 is not lit. Refer to No. 3 below. Check the following: <ul style="list-style-type: none"> Disconnection between the main controller cable and the master controller. Failure of the main controller if "Please Wait" is not displayed. Refer to No. 2 below if "Please Wait" is displayed.
2	"Please Wait" remains displayed on the main controller.	<ol style="list-style-type: none"> "Please Wait" is displayed for up to 6 minutes. Communication failure between the main controller and master/slave controller. Communication failure between slave controller and outdoor unit. 	<ol style="list-style-type: none"> Normal operation. 3. Main controller start up checks/procedure. <ol style="list-style-type: none"> If "0%" or "50-99%" is displayed below "Please Wait" there is a communication error between the main controller and the master/slave controller. <ul style="list-style-type: none"> Check wiring connections on the main controller. Replace the main controller or master/slave controller. If "1-49%" is displayed there is a communication error between the outdoor unit's control board and slave controller. <ul style="list-style-type: none"> Check the wiring connections on the outdoor unit control board and the slave controller. (Ensure S1 and S2 are not cross-wired and S3 is securely wired with no damage. (See section 4.5.) Replace the outdoor unit's control board and/or the slave controller.
3	LED2 on master controller is off. (See <Figure 5.2.1>.)	<p>When LED1 on master controller is also off. (See <Figure 5.2.1>.)</p> <ol style="list-style-type: none"> Master controller is not supplied with 220 to 240V AC. There are problems in the method of connecting the connectors. Master controller failure. 	<ol style="list-style-type: none"> Check the voltage across the L and N terminals on the indoor power supply terminal block. (See section 4.5.) <ul style="list-style-type: none"> When the voltage is not 220 to 240V AC, check for faulty wiring to power supply. When the voltage is 220 to 240V AC, go to 2. below. Check for faulty wiring between the connectors. <ul style="list-style-type: none"> When the connectors are wired incorrectly re-wire them correctly referring to below. (See section 4.5 and a wiring diagram on the control and electrical box cover.)  <ol style="list-style-type: none"> If no problem found with the wiring, go to 3. below. Check the master controller. <ul style="list-style-type: none"> Check the fuse on the master controller. Check for faulty wiring. Check Dip SW4-2 is ON. If no problem found with the wiring, the master controller is faulty.
4	LED2 on FTC4 is blinking. (See Figure <5.2.1>)	<p>When LED1 is also blinking on master controller.</p> <p>When LED1 on master controller is lit.</p> <ol style="list-style-type: none"> Faulty wiring in main controller Multiple indoor units have been wired to a single outdoor unit. Short-circuited wiring in main controller Main controller failure Dip SW setting failure 	<p>Check for faulty wiring between master controllers.</p> <ol style="list-style-type: none"> Check for faulty wiring in main controller. The number of indoor units that can be wired to a single outdoor unit is one. Additional indoor units must be wired individually to a single outdoor unit. 3. Remove main controller wires and check LED2 on master controller. (See Figure 5.2.1.) <ul style="list-style-type: none"> If LED2 is blinking check for short circuits in the main controller wiring . If LED2 is lit, wire the main controller again and: <ul style="list-style-type: none"> - if LED2 is blinking, the main controller is faulty; - if LED2 is lit, faulty wiring of the main controller has been corrected. 4. Check Dip SW 4-2 on the slave controller is OFF.

For other details, refer to "8. Troubleshooting".

10.1 Refrigerant collecting (pumpdown) for split model systems only

Refer to "Refrigerant collection" in the outdoor unit installation manual or service manual.

10.2 Back-up operation of boiler

Heating operation is backed up by boiler.

For more details, refer to the installation manual of PAC-TH011HT-E.

<Installation & System set up>

1. Set Dip-SW 1-1 to ON "With boiler" and SW2-6 to ON "With Mixing tank".
2. Install the thermistors THWB1 (Flow temp.) and THWB2 (return temp.) *1 on the boiler circuit.
3. Connect the output wire (OUT10: Boiler operation) to the signal input (room thermostat input) on the boiler. *2
4. Install one of the following room temp. thermostats. *3

- Wireless remote controller (option)
- Room temp. thermostat (field supply)
- Main controller (remote position)

*1 The boiler temp. thermistor is an optional part.

*2 OUT10 has no voltage across it.

*3 Boiler heating is controlled on/off by the room temp. thermostat.

<Remote controller settings>

1. Go to Service menu > Heat source setting and choose "Boiler" or "Hybrid". *3
2. Go to Service menu > Operation settings > Boiler settings to make detailed settings for "Hybrid" above .

*3 The "Hybrid" automatically switches heat sources between Heat pump (and Electric heater) and boiler.

Local application factors

- * This FTC4 is designed to connect Mr.Slim/Ecodan inverter outdoor unit of MITSUBISHI ELECTRIC to local systems. Please check the following when designing the local system.
- * MITSUBISHI ELECTRIC does not take any responsibility for the local system design.

Heat exchanger

(1) Withstanding pressure

Designed pressure of outdoor unit is 4.15 MPa. Following must be satisfied for burst pressure of connecting application.
Burst pressure: More than 12.45 MPa (3 times more than designed pressure)

(2) Performance

Secure the heat exchanger capacity which meets the following conditions. If the conditions are not met, it may result in malfunction caused by the protection operation or the outdoor unit may be turned off due to the operation of protection system.

- In case of hot water supply, condense temperature is less than 58 °C in max. frequency operation with the outside temperature 7 °C D.B./6 °C W.B.

(3) Heat exchanger internal capacity

Heat exchanger internal capacity must be within the capacity range shown below. If the heat exchanger below the minimum capacity is connected, it may result in the back flow of liquid or the failure of the compressor.

If the heat exchanger above the maximum capacity is connected, it may result in the deficiency in performance due to lack of refrigerant or overheating of the compressor.

Minimum capacity: $10 \times \text{Model capacity [cm}^3\text{]}$ / Maximum capacity: $30 \times \text{Model capacity [cm}^3\text{]}$

e.g. When connecting to PUHZ-HRP100 VHA

Minimum capacity : $10 \times 100 = 1000 \text{ cm}^3$
Maximum capacity : $30 \times 100 = 3000 \text{ cm}^3$

Model capacity	35	50	60	71	100	125	140	200	250
Maximum capacity [cm ³]	1050	1500	1800	2130	3000	3750	4200	6000	7500
Minimum capacity [cm ³]	350	500	600	710	1000	1250	1400	2000	2500

(4) Contamination maintenance

1. Wash the inside of heat exchanger to keep it clean. Be sure to RINSE not to leave flux. Do not use chlorine detergent when washing.
2. Be sure that the amount of contamination per unit cubic content of heat transfer pipe is less than the following amount.

Example) In case of $\phi 9.52 \text{ mm}$

Residual water: 0.6 mg/m, Residual oil: 0.5 mg/m, Solid foreign object: 1.8 mg/m

Thermistor position

Refer to 4.4.

Notes

- Install the hydraulic filter at the water inlet pipework.
- Inlet water temperature of heat exchanger should be within the range 5 °C - 55 °C.
- Water quality should be to European Directive 98/83 EC standards
 - pH value of 6.5 - 8
 - Calcium $\leq 100 \text{ mg/L}$
 - Chlorine $\leq 100 \text{ mg/L}$
 - Iron/Manganese $\leq 0.5 \text{ mg/L}$
- Refrigerant pipe diameter from outdoor unit to refrigerant-water HEX (Only for SPLIT type)
Use the pipe with same diameter size as the refrigerant pipe connection diameter of outdoor unit. (Refer to outdoor unit installation manual.)
- Ensure that there is sufficient anti-freeze chemical in the water circuit. It is recommended to use 7 : 4 anti-freeze to water ratio.
- The water velocity in pipes should be kept within certain limits of material to avoid erosion, corrosion and excessive noise generation.
Be aware, and take care of , that local velocities in small pipes, bends and similar obstructions can exceed the values above.
e.g.) Copper: 1.5 m/s

⚠ Warning:

- Always use water that meets the above quality requirements. Using water that does not meet these standards may result in damage to the system pipework and heating components.
- Never use anything other than water as a medium. It may cause a fire or an explosion.
- Do not use heated water that is produced by the air to water heat pump directly for drinking or cooking. There is a risk to damage your health. There is also a risk that installing the water heat exchanger may corrode if the necessary water quality for air to water heat pump system cannot be maintained. If you wish to use the heated water from the heated pump for these purposes, take measure such as to the second heat exchanger within the water piping system.

Contents

1	ATW Wireless System	D-2
	1. Safety Precautions	D-2
	2. Accessories and Installation Tool	D-3
	3. Before using ATW Wireless System.....	D-3
	4. Installing Wireless Receiver	D-4
	5. Pairing process	D-9
	6. Setting Wireless Remote Controllers	D-10
	7. Wireless Receiver Operation	D-13
	8. Q&A	D-15
	9. Specifications	D-16
2	Immersion Heater	D-17
3	EHPT Accessories for UK.....	D-21
4	HIGH TEMP. THERMISTOR	D-25

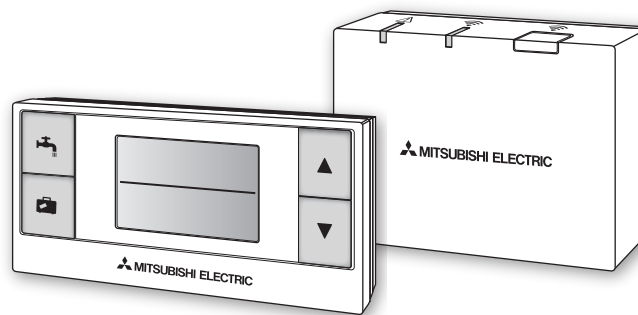


ecodan

Wireless Remote Controller and Receiver

PAR-WT50R-E

PAR-WR51R-E



This manual explains installation of the PAR-WR51R-E wireless receiver and the PAR-WT50R-E wireless remote controller, and settings of these devices. Before installing the devices, read this manual thoroughly. After reading, be sure to hand this manual to the user.

1. Safety Precautions

- The precautions mentioned below are important to use the device safely. Be sure to understand and follow them.
- The following hazardous classification shows the likelihood and severity of hazards if a person does not follow the instructions contained on the following signs.

Warning	Indicates a hazardous situation which, if a person does not follow the instructions, could result in death or serious injury.
Caution	Indicates a potentially hazardous situation that, if a person does not follow the instructions, may result in bodily injury or property damage.

Optional parts

Warning	
► Installation	
Do not use the device in particular environments.	Do not use the device in particular environments where the following substances are present in large amounts: oil, vapour, organic solvent, corrosive gas (such as ammonia, sulphuric compounds, and acid or the like), or where acid or alkali solution, or particular sprays are used frequently. This could affect operating performance, or cause corrosion, which could result in electrical shock, breakdown, smoke generation, or fire.
Do not place the devices in an environment where flammable gas may occur, stay, flow in, or leak.	Build-up of flammable gas could result in fire or explosion.
The device must be installed by a dealer or an authorised technician according to the appropriate installation manual.	If the device is installed improperly, electric shock or fire could result.
Do not place the device in an environment that exposes it to large amounts of vapor or condensation.	Electric shock, fire, or breakdown could result.
► Wiring	
The wireless receiver's maximum voltage is 12V DC. Do not connect 230V AC power source to the wireless receiver.	Breakdown, ignition, or fire could result.
Connections must be made securely and without tension or external force on the terminals.	If connections are made improperly, breaking of wire, heat generation, or fire could result.
► Others	
Do not use sharp objects to press the buttons.	Electric shock or breakdown may result.
Do not touch or operate the device with wet hands.	Electric shock or breakdown may result.
Do not wash the device with water or solution or the like.	Electric shock or breakdown may result.
When installing or repairing the device, ask a dealer or a qualified technician.	If the device is not installed properly, electric shock, smoke generation, or fire could result from entry of dust or water.
Do not disassemble or modify.	

⚠ Caution

Do not drop the device.	This could break the case or affect the device enough to make it inoperable.
Install the device in a place capable of bearing its own weight .	If the device is not installed securely or properly, the wireless receiver may fall.

■ Disposal

This symbol mark is for EU countries only.



This symbol mark is according to the directive 2002/96/EC Article 10 Information for users and Annex IV, and/or to the directive 2006/66/EC Article 20 Information for end-users and Annex II.

Your MITSUBISHI ELECTRIC product is designed and manufactured with high quality materials and components which can be recycled and/or reused. This symbol means that electrical and electronic equipment, batteries and accumulators, at their end-of-life, should be disposed of separately from your household waste. If a chemical symbol is printed beneath the symbol, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration.

This will be indicated as follows: Hg: mercury (0.0005%), Cd; cadmium (0.002 %), Pb: lead (0.004%)

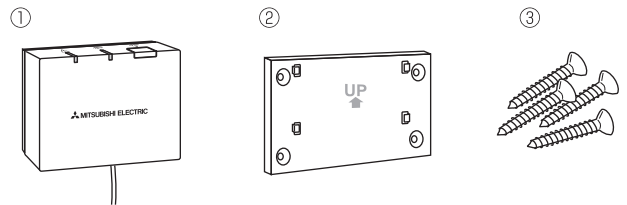
In the European Union there are separate collection systems for used electrical and electronic products, batteries and accumulators.

Please, dispose of this equipment, batteries and accumulators correctly at your local community waste collection/recycling centre. Please, help us to conserve the environment we live in!

2. Accessories and Installation Tool

The following items are included in the box.

Item	Nos.
① Wireless receiver <PAR-WR51R-E> (2 m long cable included)	1
② Bracket	1
③ Flat head screw (4.1 × 6)	4
④ Installation and setting manual	1



* Installing of the devices requires a Phillips-head screwdriver (No.2 6 mm).

3. Before using ATW wireless system

Following is the summary of the procedure for installing and setting the wireless system.

1. Devices and manuals required to set and install the wireless system

- ① PAR-WR50R-E wireless remote controller
- ② PAR-WR51R-E wireless receiver
- ③ ATW wireless system installation and setting manual (this manual)
- ④ Wireless remote controller operation manual (hereinafter abbreviated as OM)
- ⑤ Ecodan system installation manual (hereinafter abbreviated as IM)

2. Installing and setting procedure

- ① Power off the ecodan system.
- ② Install the wireless receiver on the ecodan system.
(See "4. Installing the Wireless Receiver" in this manual.)

When installing the wireless receiver, be sure to set the SW1-8 on the control board to ON. (See "5.1 DIP Switch Functions" in IM.)

- ③ Power on the ecodan system, and the LEDs will blink on the receiver for 3 seconds.
- ④ Place two AA alkaline batteries in the wireless remote controller.
(See "Batteries" in "4. Before Operation" in OM.)
- ⑤ Perform pairing process between the wireless receiver and the remote controller.
(See "5. Pairing process" in this manual.)

The wireless receiver does not go through a pairing process unless the ecodan system is off. When the system is ON, be sure to turn it off before beginning the pairing process.

- ⑥ Test wireless communication between the wireless remote controller and the wireless receiver.
(See "6.4 Communication Test" in "6. Setting wireless remote controllers" in this manual.)
- ⑦ Position the wireless remote controller in an appropriate place.
(See "4. Before Operation" in OM.)
- ⑧ To set the wireless remote controller as a room sensor that monitors room temperature, see "Remote Controller Options" in IM.

- ⑨ Use the main controller to set the ecodan system to the room temp. (🏠) mode.
 When the flow temp. (💧) mode or the compensation curve (📈) mode is selected, the wireless remote controller will operate as a thermostat. (See "Main Controller" in IM.)

When the remote controller set as a room sensor runs out of battery or gets a communication error during room temp. mode, the room temp. mode will automatically switch to the compensation curve mode. The room temp. mode will be restored by battery replacement or solution of communication error.

Installation and setting of the wireless remote controller is complete. To set additional wireless remote controllers, repeat Step ⑤ to ⑧

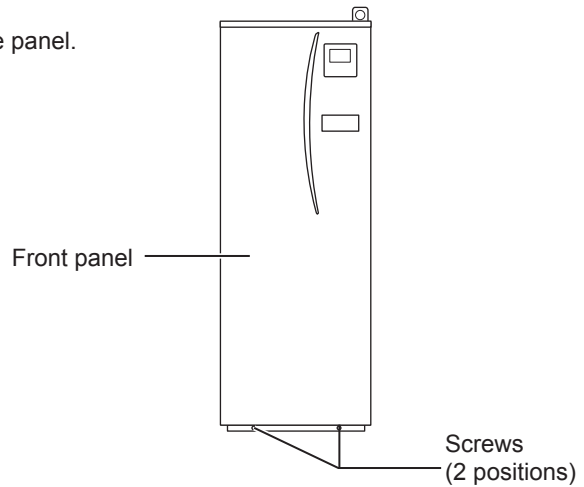
4. Installing Wireless Receiver

4.1 Connecting to Cylinder unit

* Before installation, be sure to turn off the main power supply.

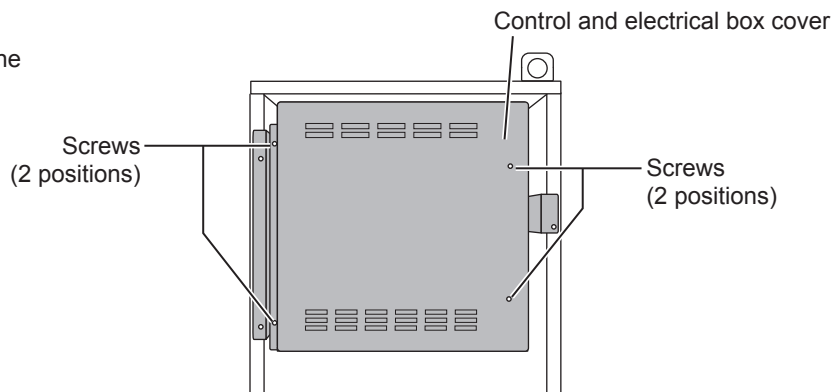
- ① Remove the two screws that hold the front panel, and remove the panel.

If the removed front panel is set aside away from the indoor unit, ensure the relay connector on the main controller is disconnected.

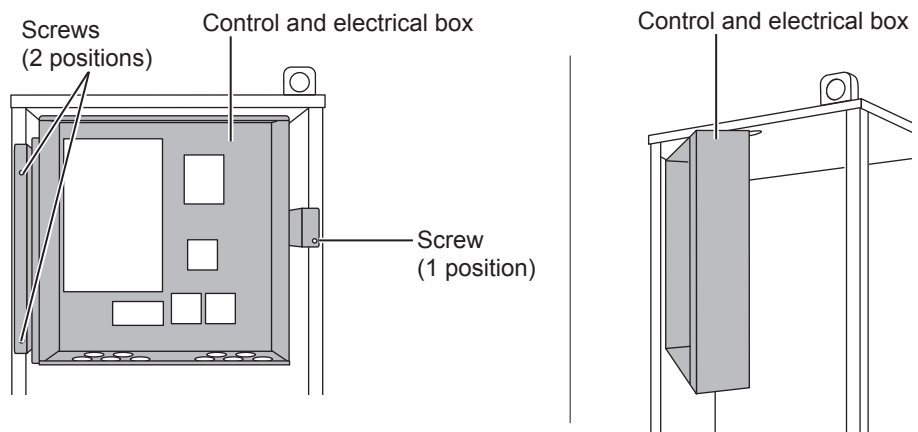


Optional parts

- ② Remove the four screws to remove the control and electrical box cover.

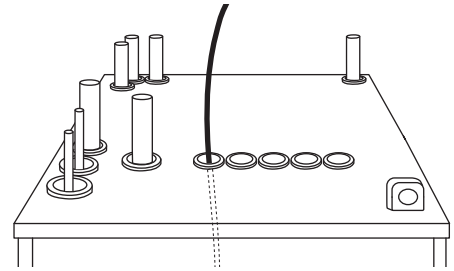


- ③ Remove the two screws and pull the control and electrical box so that the control and electrical box is swung toward you from right.

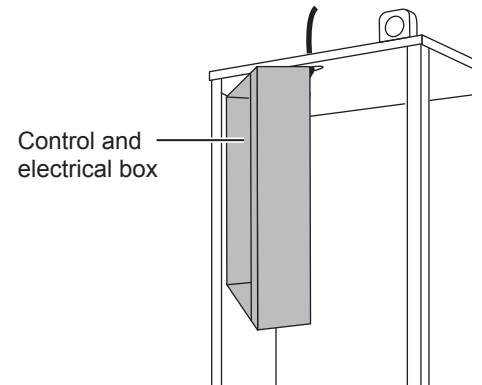
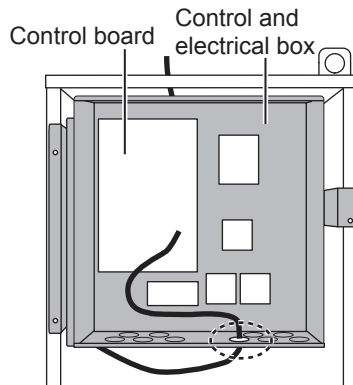


- ④ Run the receiver's cable into the cylinder unit through the leftmost inlet on top of the unit.

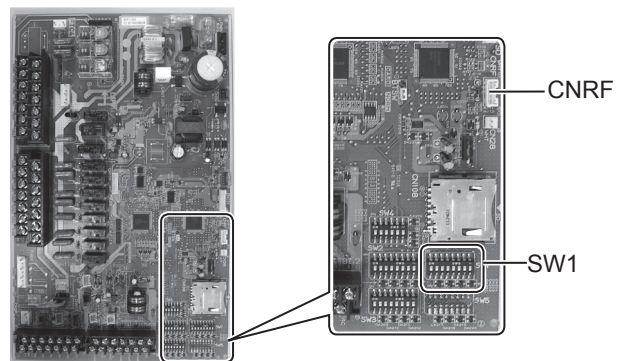
Do not run the receiver's cable through an inlet that a power cable goes through and do not bundle the cable together with a power cable.



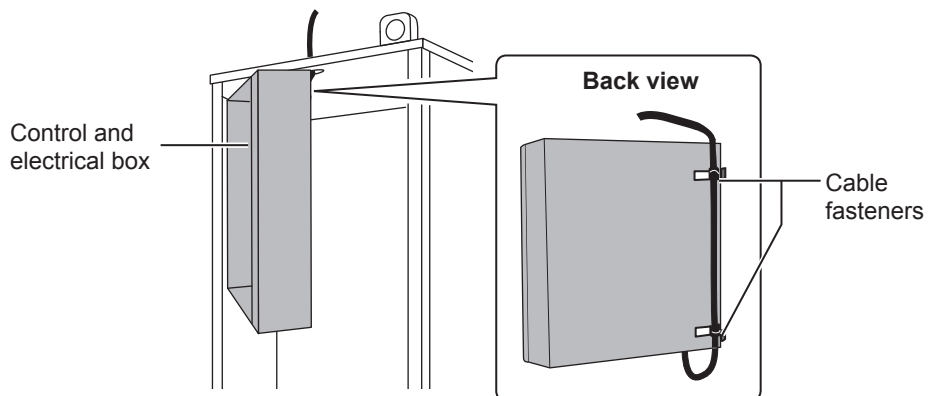
- ⑤ Route the cable out the back of the control and electrical box, and run the cable into the box through the shown inlet in the underside of the box.



- ⑥ Connect the cable connector to the CNRF terminal on the control board. Switch ON SW1-8.



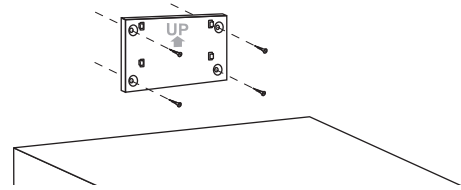
- ⑦ Remove excessive slack on the cable and secure the cable with two cable fasteners on the back left side of the control and electrical box.



- ⑧ Place the control and electrical box back in the original position and reinstall the seven screws.

- ⑨ Check the maximum reach of the cable and install the bracket on the wall with screws.

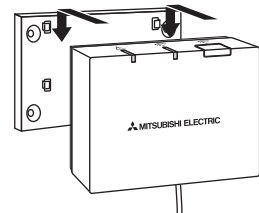
Do not excessively pull the cable when checking the maximum reach.



<Notice>

- **Do not overtighten the screws.**
 - ▶ The bracket may deform or break.
- **When installing the bracket, select an interference-free space.**
 - ▶ Keep the installing area at least 10 cm away from metal or a wall box. If unable to do so, always place the room wireless remote controllers in locations where the communication test determines that the wireless remote controllers are fully capable of communication with the wireless receiver.
- **Do not install the bracket with screws on the exterior casing of the cylinder unit.**
 - ▶ The internal parts may be damaged, which could result in breakdown of the indoor unit.
- **Do not install the bracket where the receiver could be exposed to moisture or leaked water from piping connections above.**
 - ▶ The wireless receiver subjected to moisture or leaked water could cause electric shock, fire, or its breakdown.

- ⑩ Place the wireless receiver on the fixed bracket.
Hook the holes on the back of the wireless receiver onto the projections on the bracket, and fix the wireless receiver in place.



<Notice>

- **Do not place the wireless receiver inside the cylinder unit.**
 - ▶ Both the wireless receiver and its wire may break due to heat inside the indoor unit.
- **Do not let the wireless receiver stand on top of the cylinder unit. Always fix the wireless receiver onto the bracket.**
 - ▶ Wireless communication performance may be affected.
- **Do not pull the cable excessively.**
 - ▶ Breakdown, ignition, or fire may result.
- **Do not have the wireless receiver suspended.**
 - ▶ Breakdown, ignition, or fire may result.

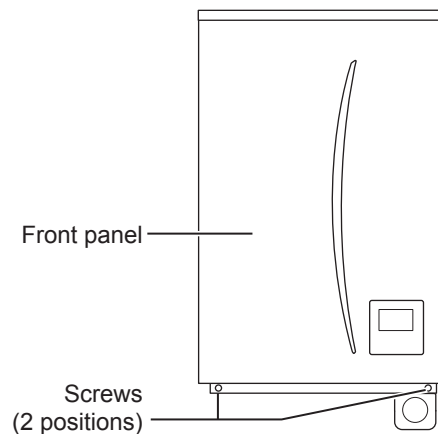
- ⑪ Close the control and electrical box cover, and fix it with screws.

- ⑫ Fix the front panel with screws.

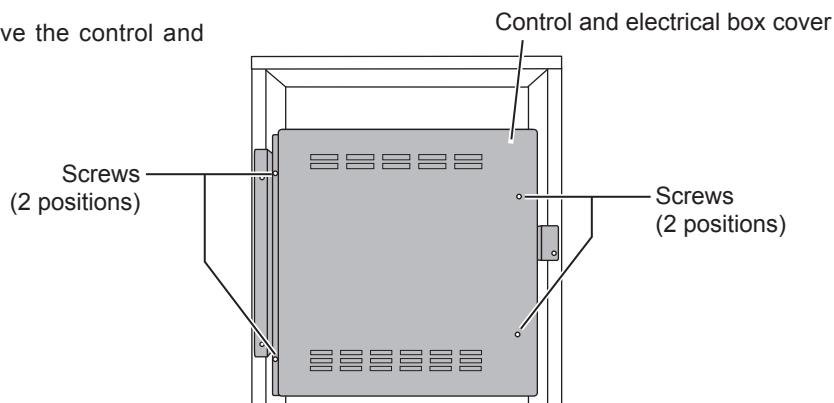
4.2 Connecting to Hydrobox

* Before installation, be sure to turn off the main power supply.

- ① Remove the two screws that hold the front panel, and remove the panel.

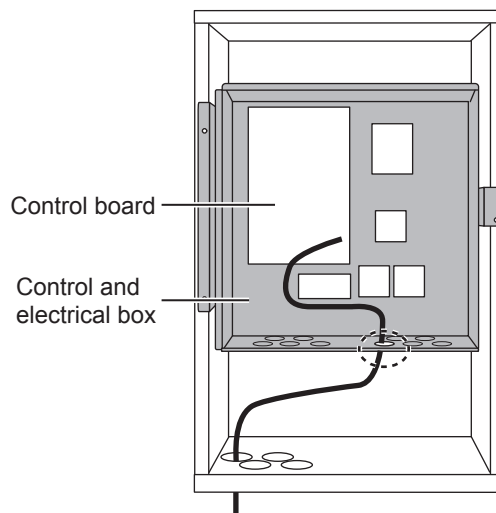


- ② Remove the four screws and remove the control and electrical box cover.

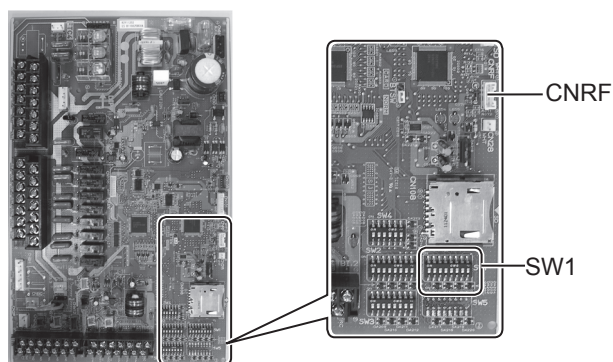


- ③ Route the receiver's cable into the hydrobox through the leftmost inlet at the bottom of the unit. Then route into the control and electrical box through the shown inlet at the bottom of the control and electrical box.

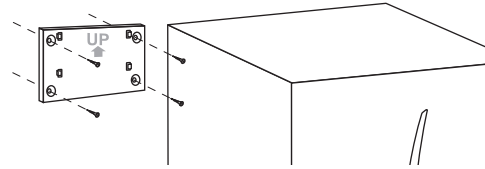
- Do not bundle the receiver cable with a power cable.
- Do not run the cable through an inlet that a power cable goes through.



- ④ Connect the cable connector to CNRF on the control board. Switch ON SW1-8.



- ⑤ Check the maximum reach of the cable and install the bracket with screws.



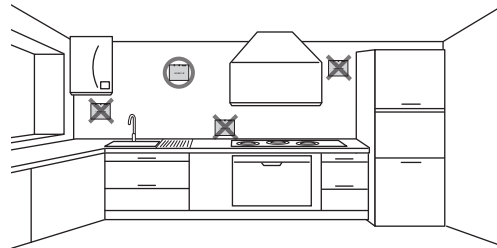
Do not excessively pull the cable when measuring the maximum reach.

<Notice>

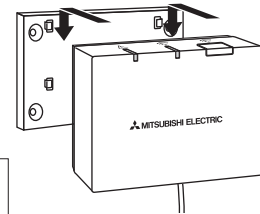
- **Do not overtighten the screws.**
 - ▶ The bracket may deform or break.
- **When installing the bracket, select an interference-free space.**
 - ▶ Keep the installing area at least 10 cm away from metal or a wall box. If unable to do so, always place the room wireless remote controllers in locations where the communication test determines that the wireless remote controllers are fully capable of communication with the wireless receiver.
- **Do not install the bracket with screws on the exterior casing of the cylinder unit.**
 - ▶ The internal parts may be damaged, which could result in breakdown of the indoor unit.
- **Do not install the bracket where the receiver could be exposed to moisture or leaked water from piping connections above.**
 - ▶ The wireless receiver subjected to moisture could cause electric shock, fire, or its breakdown.

When installing the wireless receiver, observe the following.

- Keep the other electric or electronic devices (e.g. radio, induction heating cooker, microwave oven, refrigerator, and mobile phone or the like) at least 50 cm away from the wireless receiver.
- Place the wireless receiver in an interference-free area and keep the wireless receiver away from metal.



- ⑥ Place the wireless receiver on the fixed bracket. Hook the holes on the back of the wireless receiver onto the projections on the bracket, and fix the wireless receiver.



<Notice>



- **Do not place the wireless receiver inside the cylinder unit.**
 - ▶ Both the wireless receiver and its wire may break due to heat inside the indoor unit.
- **Do not pull the cable excessively.**
 - ▶ Breakdown, ignition, or fire may result.
- **Do not have the wireless receiver suspended.**
 - ▶ Breakdown, ignition, or fire may result.

- ⑦ Close the control and electrical box cover, and fix it with the screws.

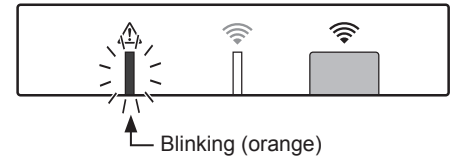
- ⑧ Hold the front panel with the screws.

5. Pairing process

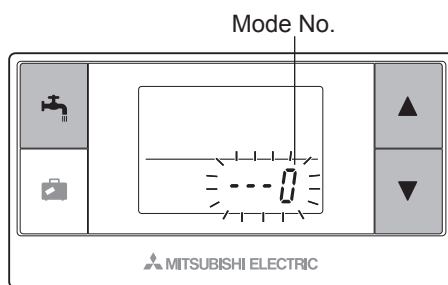
- If the wireless remote controller is not paired, the indoor unit cannot be operated using the remote controller.
- Before using the wireless remote controllers, always ensure to go through a pairing process.
- Pairing is NOT possible unless the ecodan system is off. When the ecodan system is ON, be sure to turn it off before starting the pairing process.
- The wireless receiver is also needed for pairing, so please make sure to operate the wireless remote controller near the wireless receiver.




① Hold down  button on the wireless receiver for 3 seconds or more until orange  LED blinks.

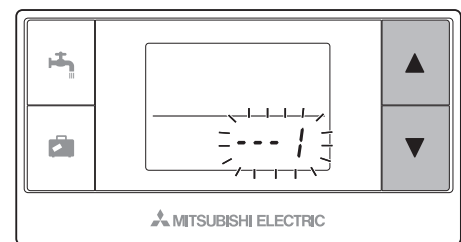
The pairing mode is cancelled by pressing  button.





② Hold down ,  and  buttons simultaneously for at







③ Press  or  button to set the mode number to "1" and press  button.

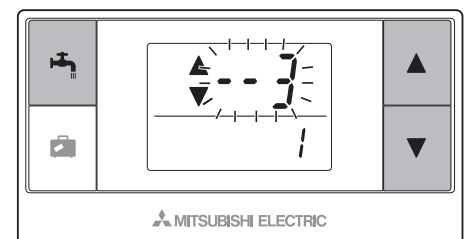
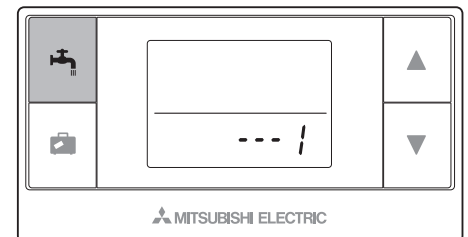


④ When  button is pressed in the middle of setting, the screen returns to the previous indication.


When  appears on the display, do not perform pairing. The power may be turned off in the middle of pairing, which may lose the pairing information.

⑤ Press  or  button to select a pairing address, and press  button to set the address.
" - " (no setting) is displayed initially. Choose a number from 1 to 8.

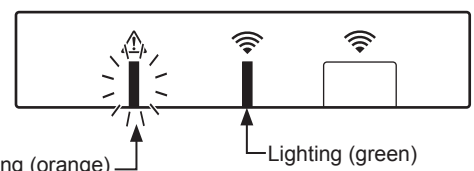
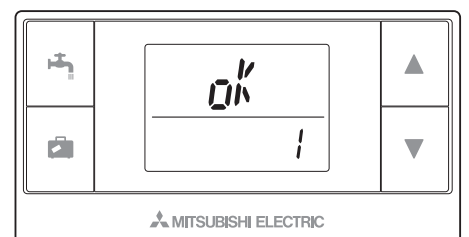
After pressing  button, the wireless remote controller starts communication with the wireless receiver.



When using multiple wireless remote controllers in one ecodan system, be sure to set different address for each remote controller.

⑥ When the pairing process has been successfully performed, "OK" is shown on the remote controller and green  LED steadily lights on the wireless receiver.

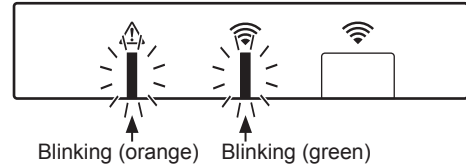
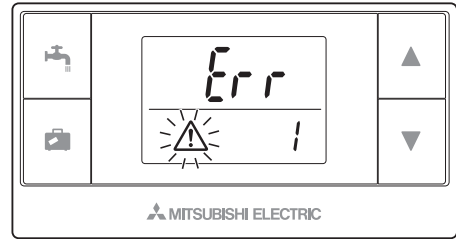
<Pairing is successful>



When "Err" appears on the remote controller and green LED on the wireless receiver blinks, correctly repeat the same process from step 5.

Even if the pairing process failed, the wireless receiver stays in the pairing mode for 5 minutes unless cancelled.

<Pairing is unsuccessful>



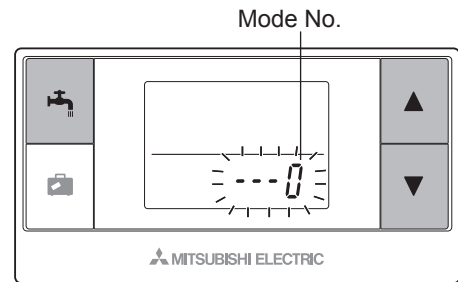
<<Main causes that prevent successful pairing>>

- **The wireless receiver does not enter the pairing mode.**
 - ▶ Press button for 3 seconds or more until orange LED blinks. Make sure to turn off the ecodan system by main controller.
- **Pairing is attempted outside the transmission range of the wireless receiver.**
 - ▶ Adjust the distance between the wireless receiver and remote controller, and so try again. If the distance is excessively short, pairing may fail. Keep the distance of about 50 cm.
- **The wireless remote controller has been already paired with the wireless receiver.**
 - ▶ The pairing address assigned to a wireless remote controller cannot be changed by remote controller. Use the wireless receiver to reset pairing information. (Refer to "(3) Resetting pairing information" in "7.3. Wireless Receiver Functions".)

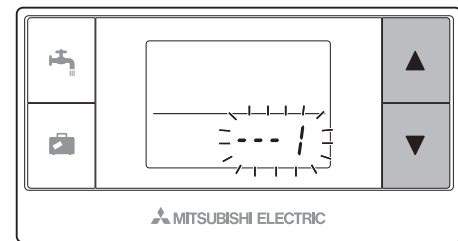
Even when power fails or when the batteries run down, the pairing information will be kept.

6. Setting wireless remote controllers

- ① Hold down , and buttons simultaneously for at least 3 seconds until the mode number blinks.

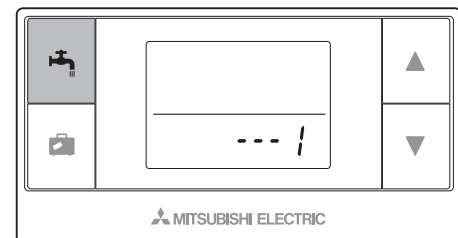


- ② Press or button to choose a mode number.



- ③ Confirm setting by pressing button. The display stops blinking and lights steadily.

When button is pressed in the middle of setting, the screen returns to the previous indication.

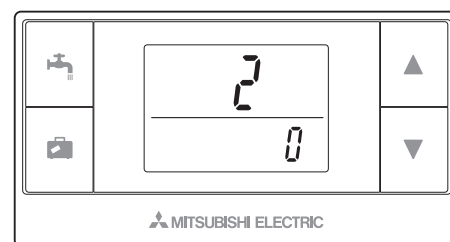


Mode No.	Names	Functions	Initial settings
0	Pairing address display	To view the own pairing address of the wireless remote controller.	
1	Pairing	To perform a pairing process with the wireless receiver.	
2	Temperature unit	To select °C or °F.	°C
3	Communication test	Communication test with the wireless receiver.	
4	Room temperature display	Actual room temperature display	OFF
5	Automatic zone no. display	To enable or disable automatic zone no. display.	OFF

6.1. Viewing Address Number (Mode No. 0)

Set the mode no. to "0".

The display to the right shows that the address is set to "2".



6.2. Pairing (Mode No. 1)

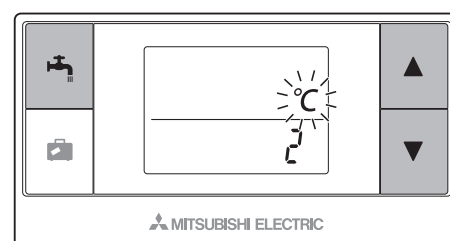
For details, refer to "5. Pairing process".

6.3. Selecting the Temperature Unit (Mode No. 2)

Set the mode no. to "2".

The temperature reading can be selected between Celsius (°C) or Fahrenheit (°F).

Press or button to select °C or °F and press button to confirm the selection.



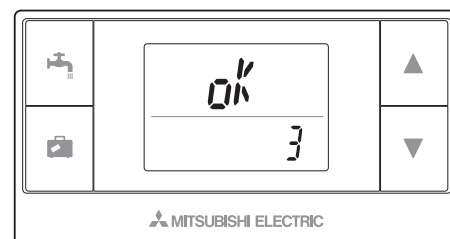
6.4. Communication Test (Mode No. 3)

Set the mode no. to "3".

Communication test is performed between the wireless remote controller and the wireless receiver.

When the display shows "ok", this indicates that the communication between the remote controller and the receiver is established. If "Err" is shown, the wireless remote controller is not communicating with the wireless receiver.

Do not leave the wireless remote controller in a location where the communication test results in "Err".



Optional parts

Before conducting the communication test, ensure that the wireless remote controller goes through a pairing process.

6.5. Displaying or Hiding Room Temperature (Mode No. 4)

Set the mode no. to "4".

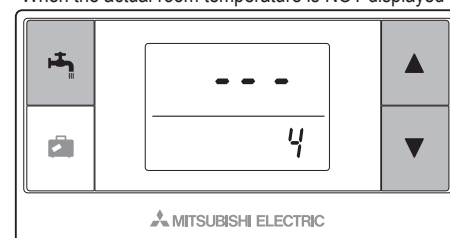
Select either displaying or hiding the room temperature.

Press or button to select displaying or hiding the room temperature, and press button to save the setting.

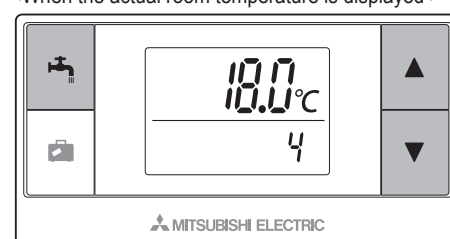
Hiding : " - - - ".

Displaying : Actual room temperature is displayed

<When the actual room temperature is NOT displayed >

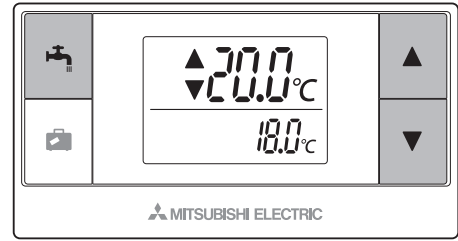


<When the actual room temperature is displayed >



When the indoor unit is operating, the room temperature display shows the actual room temperature (18°C) below and the set temperature (20°C) above as shown in the figure to the right. The measurable temperature range is from 0°C to 40°C.

If the measured room temperature is out of 0°C to 40°C range, the room temperature display blinks.



When the wireless remote controller is installed on a bracket, room temperature might not be accurate being affected by the wall temperature. Perform a test run and place the remote controller where the room temperature can be correctly detected.

6.6. Automatic Zone No. Display (Mode No. 5)

Set the mode no. to "5".

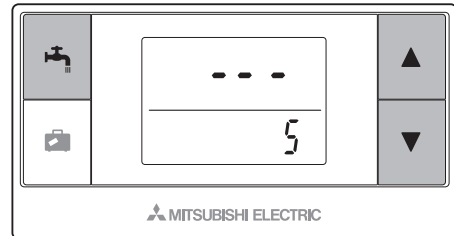
When the automatic zone no. display is active, a zone number assigned to the remote controller is displayed for 3 seconds after temperature setting.

Press ▲ or ▼ button to select between " - - - " and z_1 or z_2 , and press button to save setting.

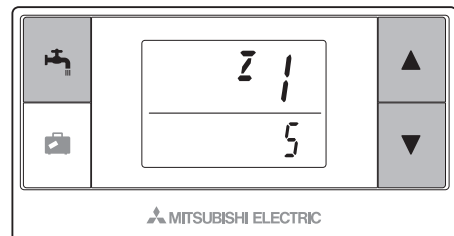
Inactive : " - - - ".

Active : The zone no. (z_1 or z_2) assigned to the remote controller is shown.

<Inactive>



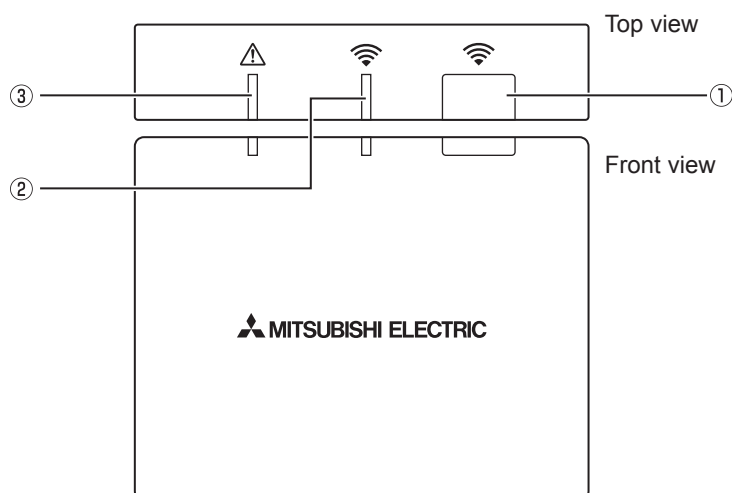
<Active>



7. Wireless Receiver Operation

The wireless receiver is powered by indoor unit. It communicates with the wireless remote controller(s), and transmits to the indoor unit the operation status and commands received from the wireless remote controller(s). The wireless receiver has two modes available: pairing mode and pairing reset mode.

7.1. Functions of Buttons and Displays





Number	Item	Description
①	Setting button	To switch operating mode.
②	Communication LED (green)	To indicate that the wireless receiver is communicating.
③	Operation LED (orange)	To show operating status of the wireless receiver.

Optional parts

The following table shows the operating and illuminating status of the LEDs.

Operation LED (orange)	Communication LED (green)	Description
Blinking	Blinking	Power is ON (for 3 seconds).
Off	Off	Normal mode: Not paired
Off	On	Normal mode: Paired
Off	Blinking	Normal mode: Communicating
Blinking	Off	Performing a pairing process
Blinking	On	Pairing: Successful
Blinking	Blinking	Pairing: Unsuccessful
On	On	Pairing information is cleared

7.2. Turning on Power



When the wireless receiver is powered by indoor unit after installation, green  LED and orange  LED blink for 3 seconds..

Power ON

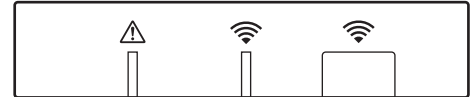


7.3. Wireless Receiver Functions

(1) Normal mode

When the wireless receiver is paired with a wireless remote controller, green  LED comes on. When the wireless receiver is communicating with a wireless remote controller, green  LED blinks.

Not paired



Paired



Transmitting






(2) Pairing mode

*For details, refer to "5. Pairing process" in this manual.






(3) Resetting pairing information

Once pairing information has been cleared, ALL the wireless remote controllers need go through a pairing process again.

Hold down  button for 5 seconds or more until  and  LED light while pairing mode is active. All the pairing information is cleared.



8. Q&A

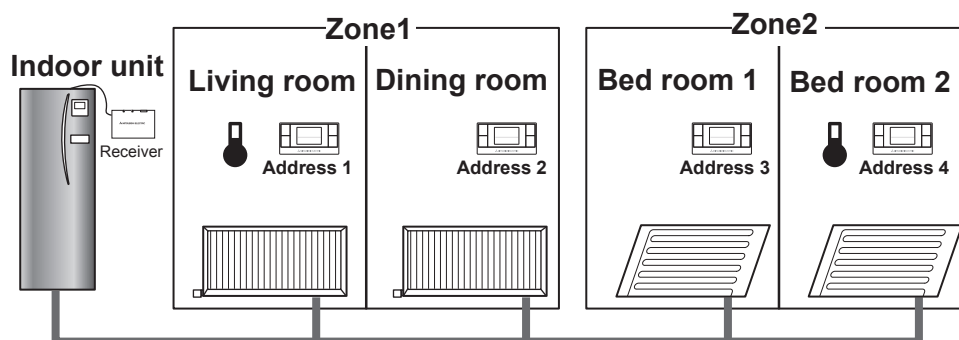
Questions	Answers
How many wireless remote controllers are allowed to be paired?	Up to 8 controllers.
What should be noted about Pairing?	<ul style="list-style-type: none"> • The same address cannot be assigned to multiple remote controllers • If the same address is assigned to multiple controllers, the address can be assigned to only the last paired remote controller. • Once the remote controller is paired, its pairing address cannot be changed by remote controller. Use the wireless receiver to reset pairing information.
What causes a communication error between the wireless remote controller and wireless receiver?	Check the following possible causes. <ul style="list-style-type: none"> • The batteries on the wireless remote controller are running out. • The transmitted signal does not reach the wireless receiver. • The wireless remote controller is not paired.
What measures should be taken when the room temp. display indicates "1" with  ?	The indoor unit or outdoor unit has a failure. Refer to the indications on the main controller and take appropriate measures. Please also check installation and service manuals for the indoor unit.
What measures should be taken when the room temp. display indicates "2" with  ?	The thermistor inside the wireless remote controller has a failure. Check the resistance of the thermistor. (When the room temperature is between 0 and 40°C, the resistance must be between 5 and 28 kΩ.)
What measures should be taken when the room temp. display indicates "3" with  ?	A communication error occurs between the wireless remote controller and the wireless receiver. Check the following possible causes. <ul style="list-style-type: none"> • The signal that is transmitted by the wireless remote controller does not reach the wireless receiver. • The wireless remote controller is not paired.
What measures should be taken when the room temp. display indicates "4" with  ?	A communication error occurs between the wireless receiver and the indoor unit. Check the following possible causes. <ul style="list-style-type: none"> • The cable connecting between the wireless receiver and the indoor unit has severed. • The wireless receiver is not correctly connected to the indoor unit.
What measures should be taken when the room temp. display indicates "E" with  ?	Backup heater is running due to a failure of the indoor unit or the outdoor unit. Check the error code displayed on the main controller and take appropriate measures accordingly. The holiday mode is NOT available during backup heater only operation.


Optional parts

<<2-zone temperature control>>

- A thermistor is built in the remote controller (Room RC) or the main controller (Main RC), or TH1. The indoor unit refers to temperature monitored by a selected thermistor and controls temperature for each zone.
- For 2-zone temperature control, one room sensor can be selected for Zone1 and Zone2 separately. The room sensor is used for monitoring room temperature.
- The selection of room sensor can be fixed or changed according to time, using a schedule timer.

Note: Room sensor can be selected by main controller only.



When  is shown on the remote controller, this indicates that the remote controller is used for monitoring the room temperature. In this example, the living room temperature monitored by remote controller 1 is regarded as the room temperature for Zone1. The bed room 2 temperature monitored by remote controller 4 is regarded as the room temperature for Zone2.

9. Specifications

Item	Description
Power source	12V DC (powered by indoor unit)
Operating temperature and humidity requirements	Temperature: 0 to 40°C Humidity 30 to 90%RH (No condensation)
Weight	150 g (excluding a cable)
Dimension (W×H×D)	100 mm × 80 mm × 30 mm



CYLINDER UNIT OPTIONAL PARTS

IMMERSION HEATER (1Ph 3kW)

PAC-IH03V-E

INSTALLATION MANUAL

- Before starting installation, read the following description together with the installation manual included with the cylinder unit.
- Please read carefully and observe fully the following safety precautions.

⚠ WARNING Precaution that must be observed to prevent injuries or death.

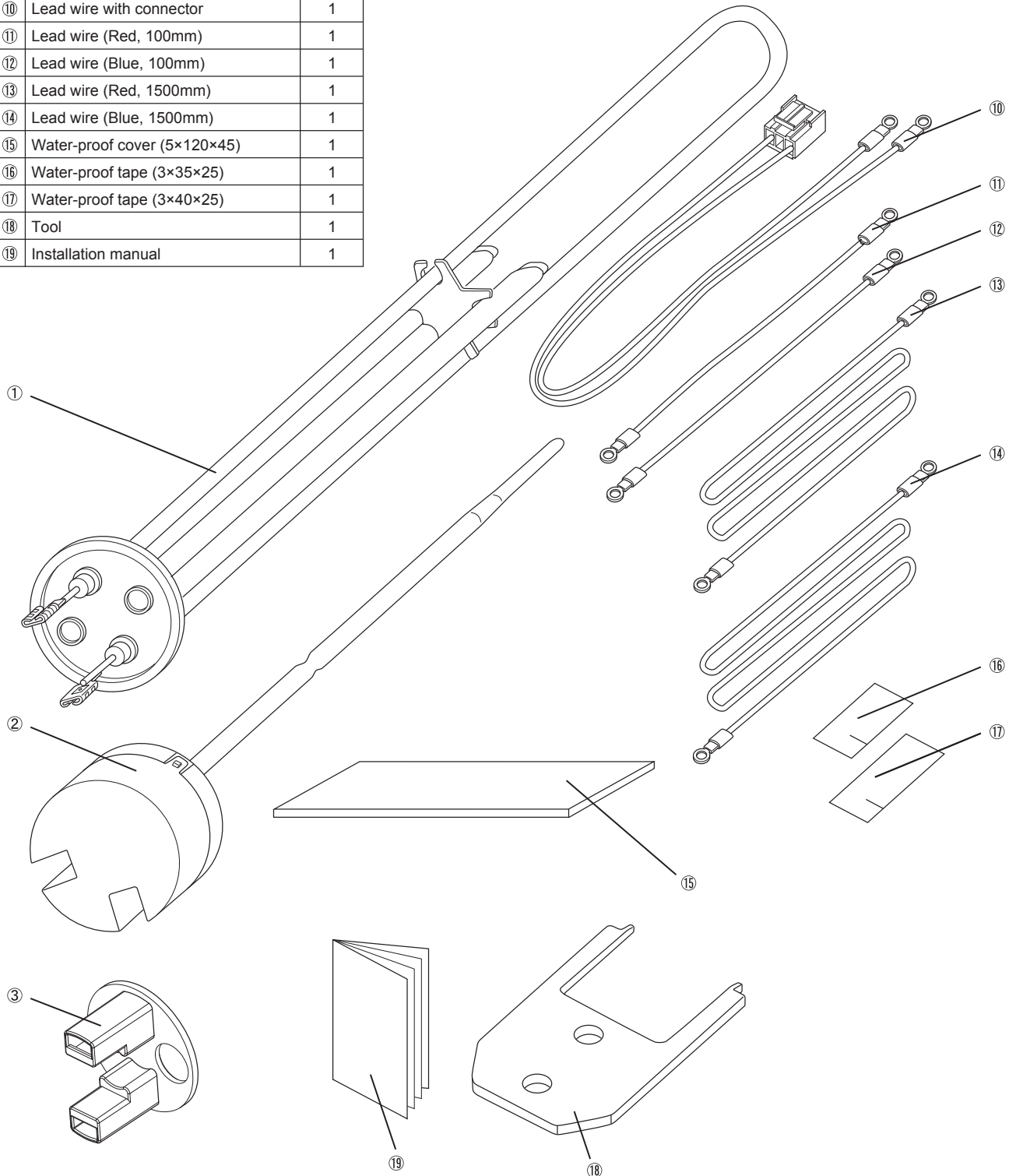
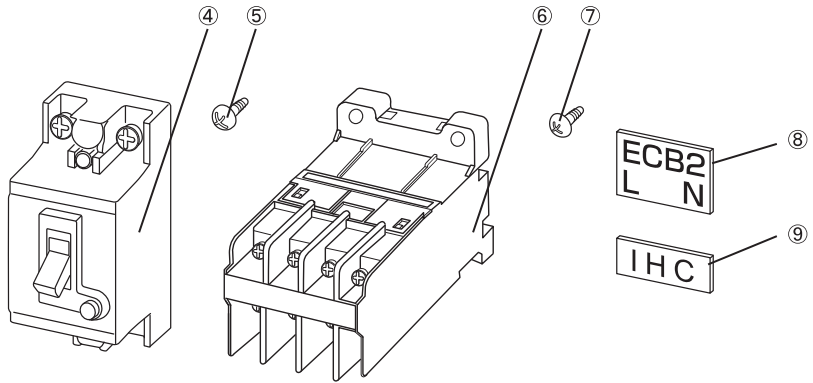
- After installation carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user.
Tell your customers to keep this installation manual together with the operation manual, and when they give or sell this machine to any other person include this installation manual and operation manual with it.

⚠ WARNING

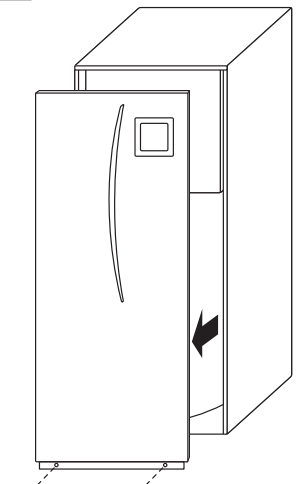
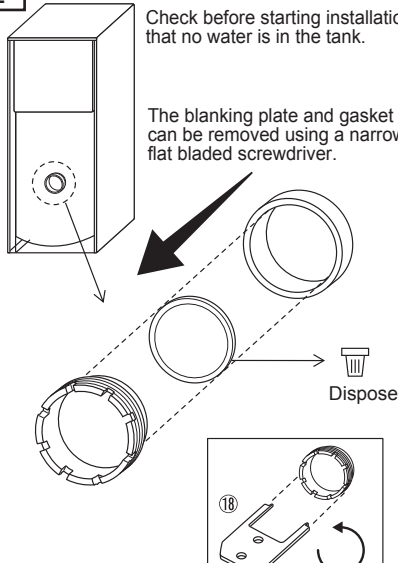
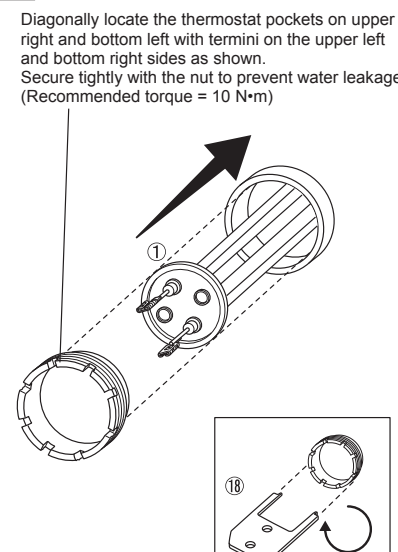
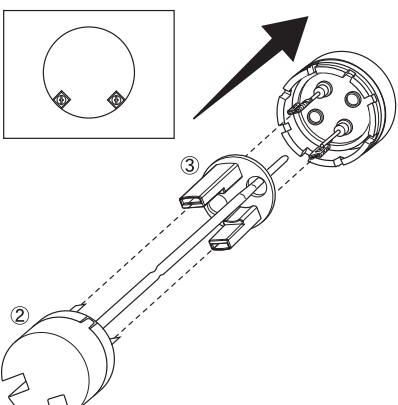
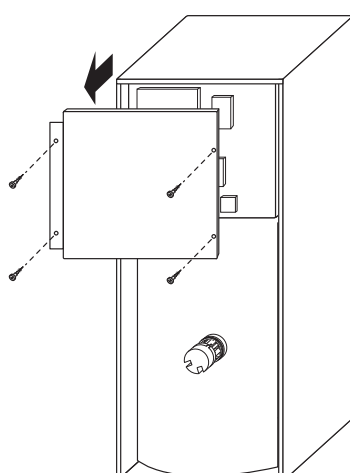
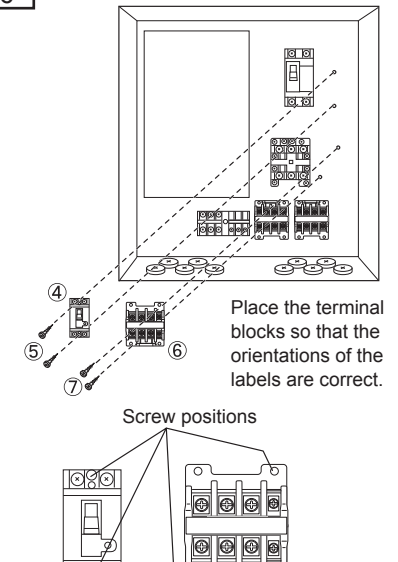
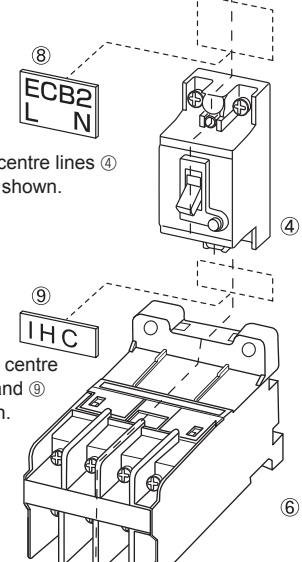
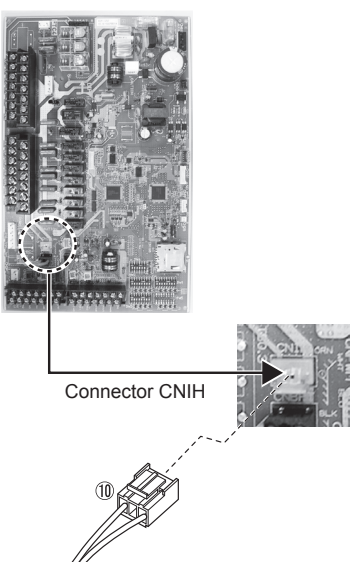
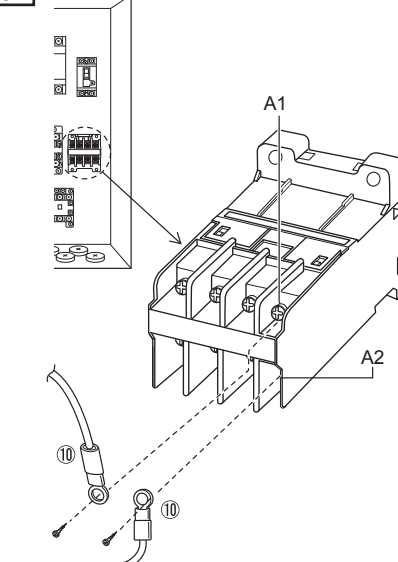
- If the cylinder has already been connected to the power supply ensure circuit breaker is off before carrying out electrical work.
- If the immersion heater is installed incorrectly or modified after installation by the user, water leakage, electric shock or fire may result.
- All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- The immersion heater must be powered by a dedicated power supply and the correct voltage and correctly sized circuit breakers must be used.
- Connections must be made securely and without tension on the terminals.
The included component parts of the PAC-IH03V-E IMMERSION HEATER (1Ph 3kW) shall be used only for the purposes indicated in the installation manual.
- Before inserting the immersion heater, check that no component part contacts the immersion heater inside of the tank.
If operating the system without solving the problem, fire could occur or foreign matters could enter the tank.

Contents

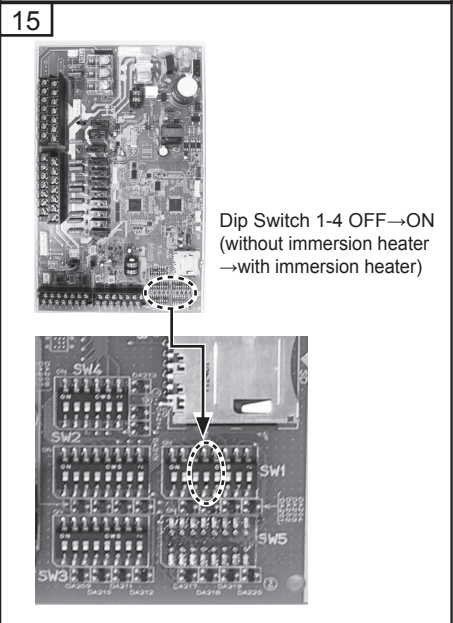
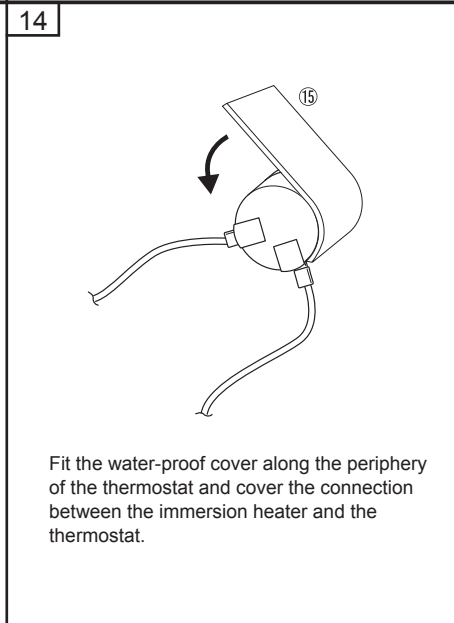
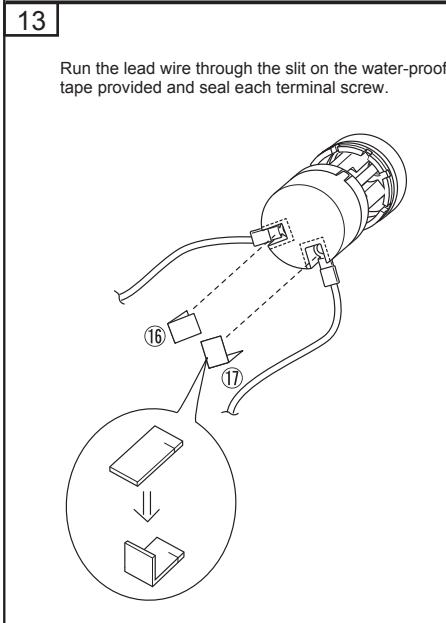
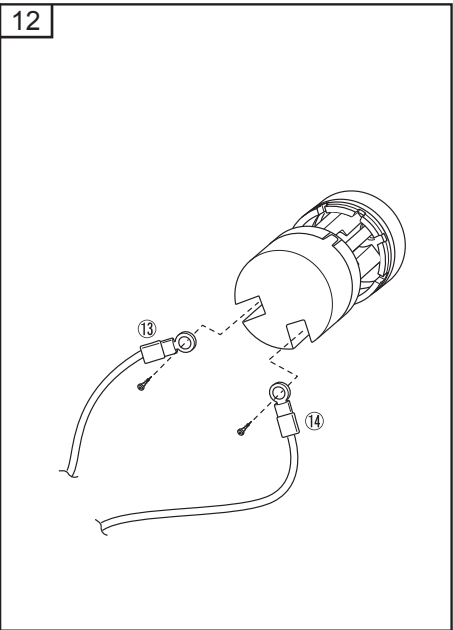
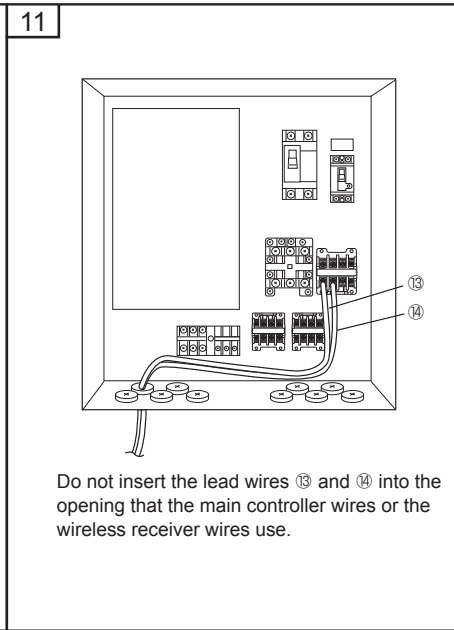
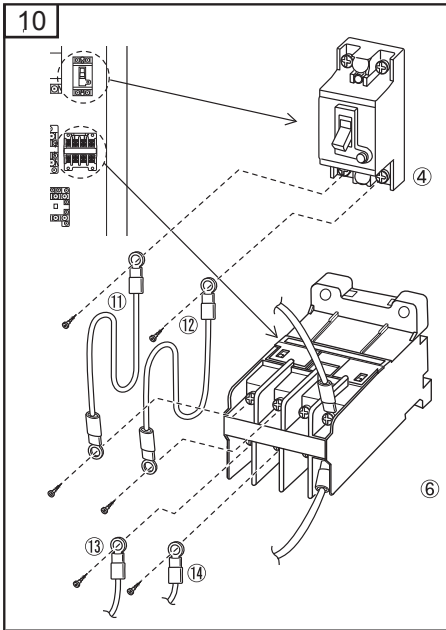
	Item	Piece
①	Immersion heater	1
②	Thermostat (High limit thermal cut-out)	1
③	Tab cover	1
④	Earth leakage breaker	1
⑤	Screw (4×25)	2
⑥	Relay	1
⑦	Screw (4×16)	2
⑧	Label (for Earth leakage breaker)	1
⑨	Label (for Relay)	1
⑩	Lead wire with connector	1
⑪	Lead wire (Red, 100mm)	1
⑫	Lead wire (Blue, 100mm)	1
⑬	Lead wire (Red, 1500mm)	1
⑭	Lead wire (Blue, 1500mm)	1
⑮	Water-proof cover (5×120×45)	1
⑯	Water-proof tape (3×35×25)	1
⑰	Water-proof tape (3×40×25)	1
⑱	Tool	1
⑲	Installation manual	1



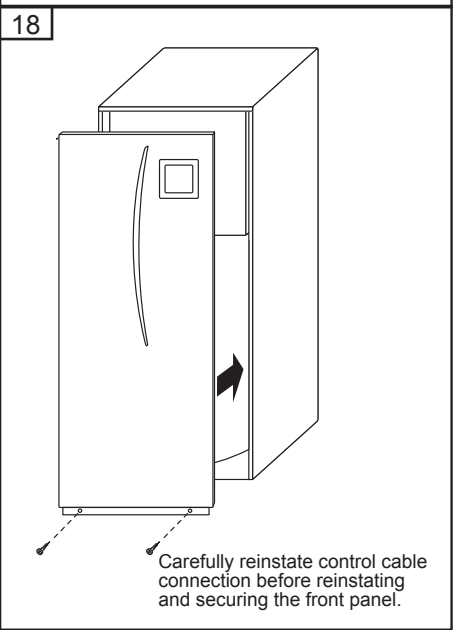
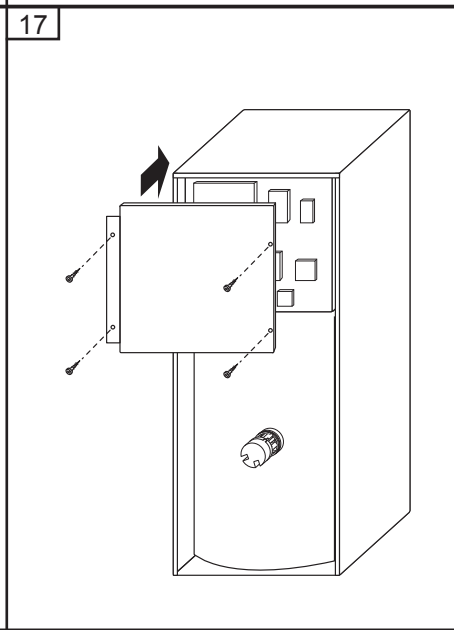
Optional parts

<p>1</p>  <p>Carefully remove front panel by disconnecting the control cable from beneath the unit's main control box.</p>	<p>2</p>  <p>Check before starting installation that no water is in the tank.</p> <p>The blanking plate and gasket can be removed using a narrow flat bladed screwdriver.</p> <p>Dispose</p>	<p>3</p>  <p>Diagonally locate the thermostat pockets on upper right and bottom left with termini on the upper left and bottom right sides as shown. Secure tightly with the nut to prevent water leakage. (Recommended torque = 10 N·m)</p>
<p>4</p>  <p>Reinstall plastic tab cover over the connectors then insert the thermostat rod into the upper right hand pocket. The terminals on the white plastic head should be positioned at the bottom as shown.</p> <p>Assemble ② and ③ securely.</p>	<p>5</p> 	<p>6</p>  <p>Place the terminal blocks so that the orientations of the labels are correct.</p> <p>Screw positions</p>
<p>7</p>  <p>Align the centre lines ④ and ⑥ as shown.</p> <p>Align the centre lines ⑧ and ⑨ as shown.</p>	<p>8</p>  <p>Connector CNIH</p>	<p>9</p>  <p>A1</p> <p>A2</p>

Optional parts



For details about wiring to power supply and circuit breaker, refer to the installation manual for the cylinder unit.
Fill tank with water and ensure that no water leaks around the periphery of the immersion heater.



Optional parts



CYLINDER UNIT OPTIONAL PARTS

EHPT ACCESSORIES for UK

PAC-WK01UK-E

INSTALLATION MANUAL

- Before starting installation, read the following description together with the installation manual included with the cylinder unit.
- Please read carefully and observe fully the following safety precautions.

⚠ WARNING Precautions that must be observed to prevent injuries or death.

- After installation carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user.

Tell your customers to keep this installation manual together with the operation manual, and when they give or sell this machine to any other person include this installation manual and operation manual with it.

⚠ WARNING

- Before installing any accessories on the cylinder unit ensure the unit is isolated from the power supply.
- Connections must be made securely and without tension on the terminals.
The included component parts of the PAC-WK01UK-E EHPT ACCESSORIES for UK shall be used only for the purposes indicated in the installation manual.

In addition to annual servicing it is necessary to replace or inspect the ICG after a certain period of system operation. Please see table below for detailed instructions. Replacement and inspection of the ICG should always be done by a competent person with relevant training and qualifications.

Part which requires regular replacement

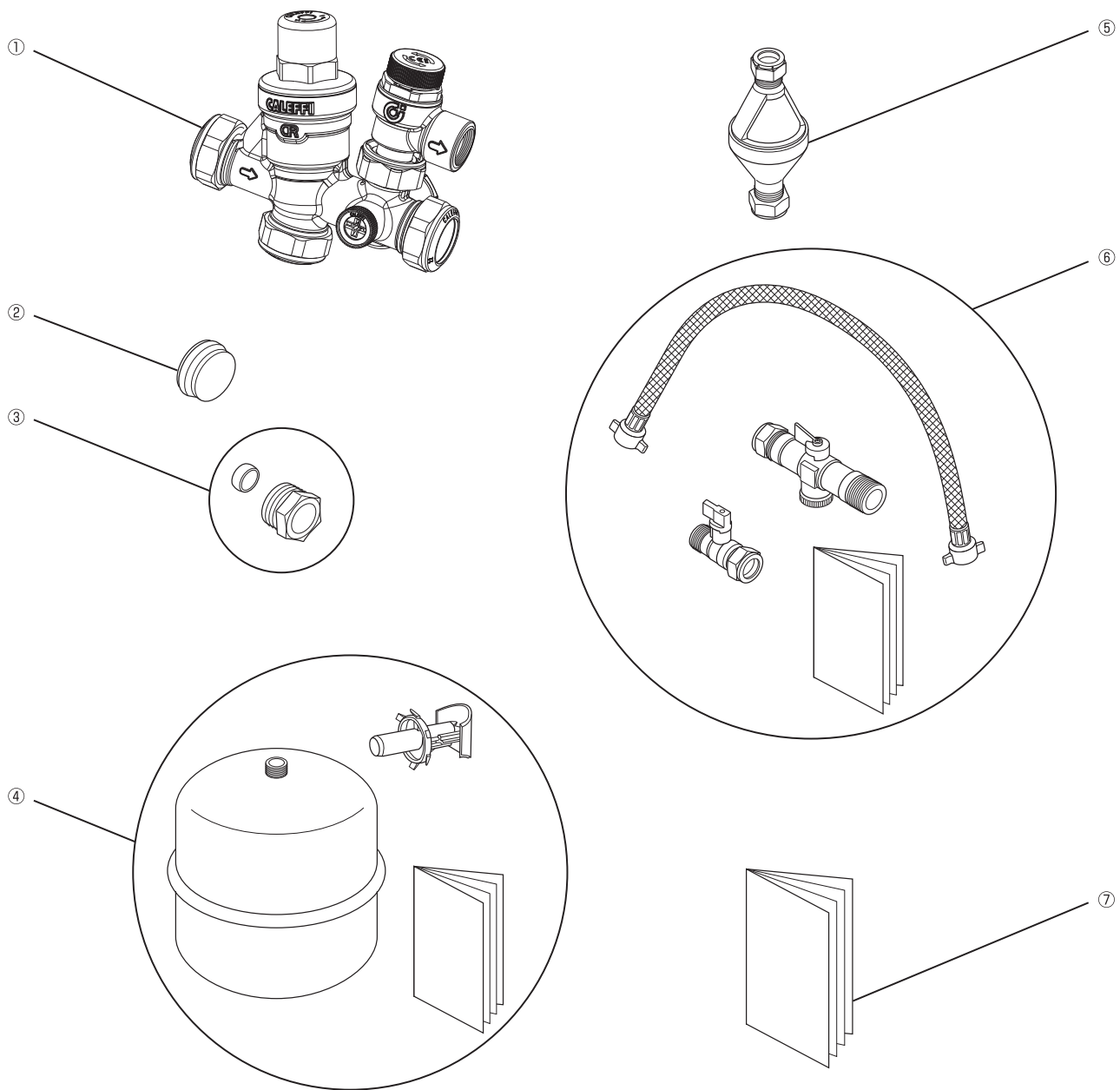
Part	Replace every	Possible failures
Inlet control group (ICG)	6 years	Water leakage due to brass corrosion (Dezincification)

Contents

	Item	Piece(s)
①	Unvented inlet control group (Pressure reducing valve/strainer/check valves/expansion relief valve).	1
②	Blanking cap (22mm)	1
③	Nipple & Olive (15mm)	1
④	Expansion vessel 18L (R3/4")	1
⑤	Tundish (15mm, 22mm)	2
⑥	Filling loop (15mm)	1
⑦	Installation manual	1

The parts ① to ⑤ are provided to meet the requirements for the UK Building Regulation G3.
 The parts ② and ③ are accessory parts for the unvented inlet control group.
 The pressure reducing valve is factory set at 3.5 bar and the expansion relief valve at 6.0 bar.
 The gas charge pressure for the expansion vessel is 3.5 bar.

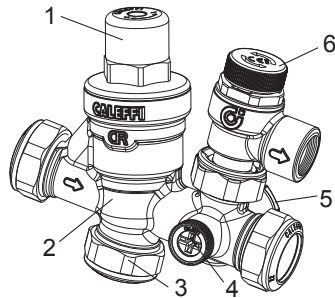
Optional parts



Installation

Carefully follow these instructions and ensure that the installation conforms to UK Building Regulation G3 and the Water Supply Regulations.

Unvented inlet control group (ICG)



Item	Component
1	Pressure reducing valve
2	Manifold block (Including check valve)
3	22mm balanced cold water take-off
4	Pressure gauge port
5	3/4" connection for exp.vessel
6	Expansion relief valve

It is recommended that isolating valves are installed upstream and downstream to facilitate any future maintenance. For safety reasons, it is essential that no isolation valve is fitted between the ICG and the cold water inlet connection of the cylinder.

Install the pressure reducing valve with its embossed arrow pointing in the direction of flow.

Ensure the expansion relief valve is seated correctly into the main block/ casting and its nut is fully tightened to secure its position.

Ensure that the expansion relief valve discharge pipework has a continuous fall and terminates via a tundish and in such a position as not to cause injury.

The first 22mm connection (Item 3 above) can be used to provide an unbalanced cold water supply. It must never be used to connect the expansion vessel. If not used, use the blanking cap (22mm) supplied.

The small black plug is a connection prepared for a pressure gauge, which is available when specified.

On the opposite side of the manifold to the pressure gauge connection, there is a 3/4" plastic plugged connection that may be used for direct mounting to the expansion vessel if required.

Expansion vessel

Install the expansion vessel between the pressure reducing valve and the cylinder unit or by using the appropriate port of the ICG. (Ensure the expansion vessel is connected to an active section of the potable pipework and is NOT directly connected to any redundant "Dead-leg" section of pipework.)

Note:

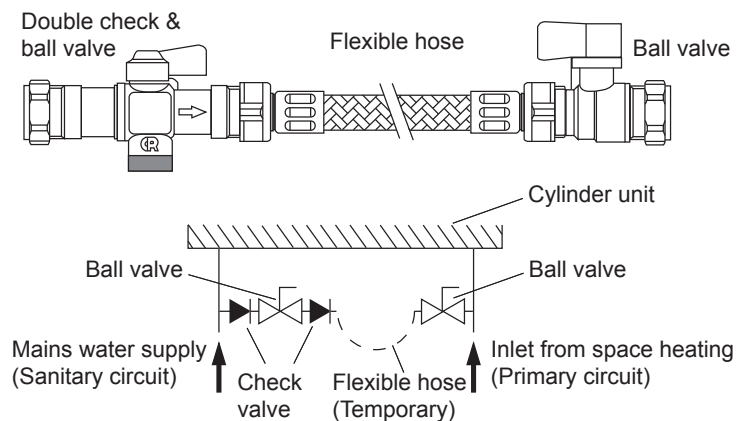
- When connecting the ICG to the expansion vessel using a field-supplied flexible hose, provide sufficient bending radius to prevent abnormal noise.
- For more details about the following instructions, refer to the installation manual provided with the potable expansion vessel, as well as this manual.
 - If the expansion vessel is installed separately to the ICG (ie. direct in-line) then the supplied flow diverter can be used.
 - ICG should always be installed on cold water supply to cylinder to comply with WRAS/Building Regulation G3.
 - The ICG should be installed above the level of the T&P valve. This will avoid the requirement to drain cylinder when servicing the ICG in future.
 - Expansion vessel should be installed hanging from connecting pipework.
 - Expansion vessel should be fastened to a suitable surface (wall etc.) to prevent strain on pipe connection.
 - Gas inlet screw type of expansion vessel: 8V1

Tundish

Install the tundishes in accordance with the UK Building Regulation G3. For more details refer to the "Safety Device Discharge Arrangements" section in the installation manual for the cylinder unit .

Filling loop

Note: Refer to the installation manual provided with the filling loop as well.



Optional parts

The procedure and recommendations specified in the cylinder unit installation manual for filling and pressurising the primary heating circuit of the cylinder unit must be followed.

The heating return pipe and the cold water supply pipe must be provided with tees with a short length of R250 (half hard) copper tube in the side port.

Fit the double check valve to the pipe from the mains supply pipe using the compression joint, which complies with BS EN 1252-2, ensuring that the flow through the valve is in the same direction as the arrow on the body.

Fit the ball valve to the pipe from the heating return using the compression joint.

Connect the flexible hose between the double check valve and ball valve and tighten the wing nuts to make water tight joints.

Open both ball valves and fill the system, when the pressure starts to increase on the cylinder unit pressure gauge partially close the ball valve on the double check valve to control the pressure to that specified by the cylinder unit installation manual.

Once filling and pressurisation have been completed, close both ball valves and remove the flexible hose.

If the flexible hose is removed it is recommended that caps(not supplied) are fitted to both valve connections to prevent any potential leakage.

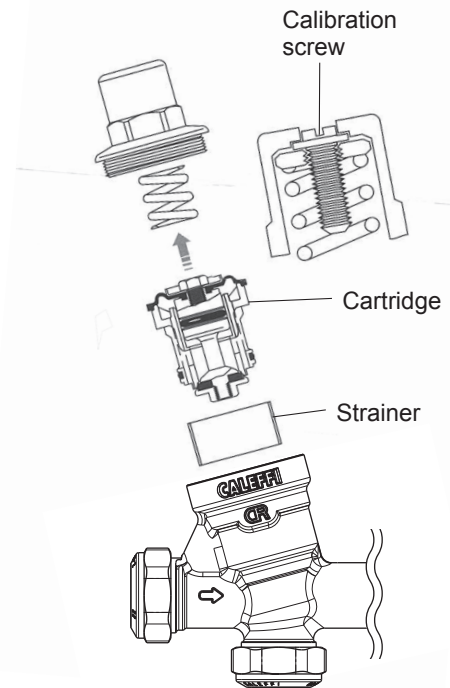
Maintenance and service

Pressure reducing valve

Under normal circumstances the pressure reducing valve should not require any maintenance, but regular inspection and cleaning is recommended.

If the strainer or cartridge are damaged replace entire valve.

1. Isolate the water supply to the pressure reducing valve.
2. Unscrew anticlockwise the central calibration screw to decompress the spring.
3. Remove the plastic cover using a spanner on the hexagon faces.
4. Extract the cartridge with the aid of long nosed pliers to grip the head of the set screw.
5. Remove the strainer element.
*If the strainer or cartridge are damaged replace item(s) accordingly.
6. Clean the strainer element and cartridge under clean running water.
7. Replace the strainer, cartridge and cover.
8. Turn on the water supply and check for leakage.
9. Re-calibrate the pressure reducing valve. (Rotate it clockwise to increase the outlet pressure and anticlockwise to reduce it.)



Expansion relief valve

Manually operate (rotate head anti-clockwise) the expansion relief valve to ensure free water flow through discharge port and connecting pipe.

Expansion vessel

The pre-charge gas pressure must be checked annually to make sure that the expansion vessel is in working order.

If water discharges through the expansion relief valve, it is possible that the expansion vessel's existing gas pre-charge pressure is too low.

Check this in the following manner:

1. Close the water supply.
2. Drain the sanitary circuit until the pressure is 0 bar.
3. Check the pre-charge.
4. Increase the gas pre-charge pressure with nitrogen/air to 3.5 bar.

Make sure that the pre-charge is not higher than the maximum working pressure.

If the expansion vessel cannot be pressurized, it is possible that the membrane has a leak.

If so, you must then replace the expansion vessel.



PARTS NAME : HIGH TEMP. THERMISTOR

PARTS No. : PAC-TH011HT-E <G>

SALES MODEL CODE : 7H1THR2G



MITSUBISHI ELECTRIC CORPORATION

INSTALLATION MANUAL

- Before starting installation, read the following description together with the installation manual included with the unit.
- Please read carefully and observe fully the following safety precautions.

⚠ WARNING Precautions that must be observed to prevent injuries or death.

- After installation carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user.

Tell your customers to keep this installation manual together with the operation manual, and when they give or sell this machine to any other person include this installation manual and operation manual with it.

⚠ WARNING

- Before installing any accessories on the unit ensure the unit is isolated from the power supply.
- Connections must be made securely and without tension on the terminals.
- All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- The flow temperature from boiler MUST NOT exceed 70 °C (*1).
- Before running Floor Dry-up function, disconnect IN4 and IN5 wirings. (*2)

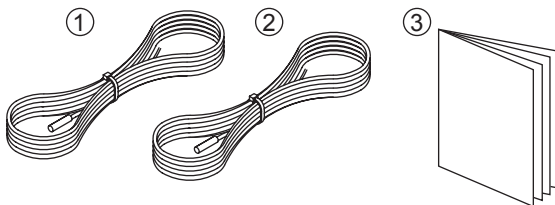
*1 When the temperature sensed by flow temp. thermistor or return temp. thermistor exceeds 80°C, FTC4 will detect it as overheat error.

*2 High-temperature water produced by boiler operation could flow in and this could cause a big damage to the floor.

- Make sure to install the boiler that has overheat protection and output flow temperature control.

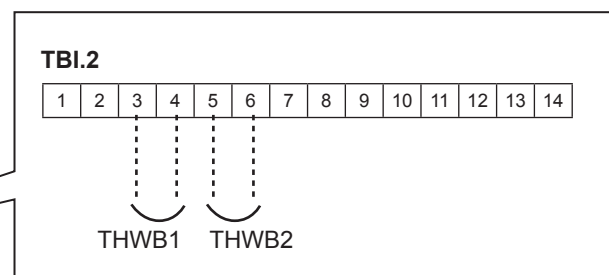
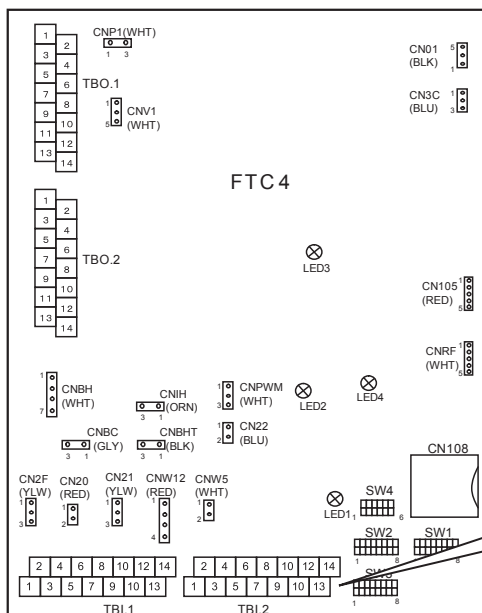
Optional parts

<Included items>



	Item	Piece
①	Boiler flow temp. thermistor (THWB1) 5 m, color: gray	1
②	Boiler return temp. thermistor (THWB2) 5 m, color: black	1
③	Installation manual	1

<Connecting boiler thermistor>



1. System

- Heat source can be switched between heat pump and boiler by external input from power supplier or outdoor temperature thermistor.
- Heat source can be switched according to running cost, CO₂ emission, or outdoor temp.
- In case of outdoor unit failure, backup operation is possible with boiler. *1

*1 When Hybrid is selected as heat source.

When Dip SW2-5 (Automatic switch to backup heat source operation) is set to ON.

Note: FTC4 can control boiler only in space heating mode.

Heat source	Heating	DHW
Heat pump	✓	✓
Boiler	✓	—

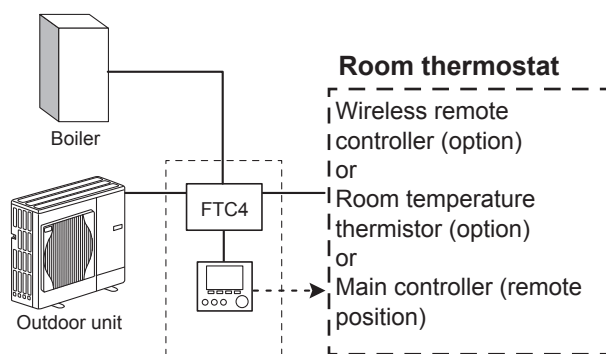
1.1 Room thermostat connection

IMPORTANT NOTE

Be sure to connect room thermostat to FTC4.

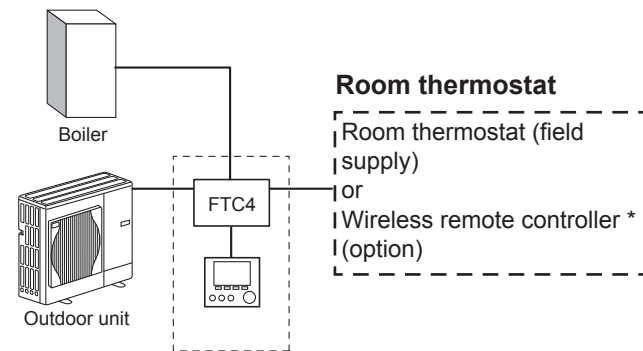
When boiler is running, the heating operation is regulated by the room thermostat connected to FTC4.

a) Heating room temperature (🏠)



b) Heating flow temperature (🌡️)

c) Heating compensation curve (📈)



* Wireless remote controller can be changed to room thermostat.

1.2 Pipe work

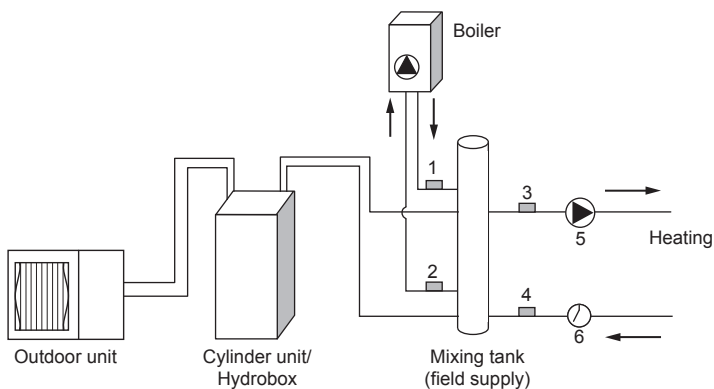
(a) Boiler and heat pump are connected in parallel.

(b) Install a mixing tank (field supply).

(c) Put 2 thermistors in boiler circuit. (THWB1: Flow temp., THWB2: Return temp.)

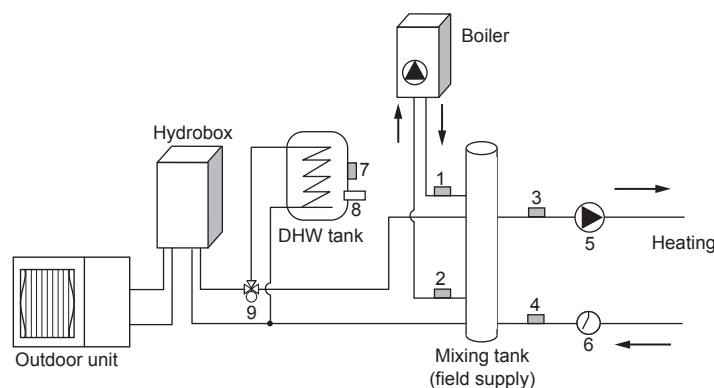
* It is recommended to protect the thermistors with heat insulating materials so as not to be affected by ambient temperature.

Note: These lead wires of the thermistors must avoid being in contact with pipe surfaces.



Number	Component
1	Boiler flow temp. thermistor (THWB1)
2	Boiler return temp. thermistor (THWB2)
3	Flow temp. thermistor (THW6) (option)
4	Return temp. thermistor (THW7) (option)
5	Circulation pump (field supply)
6	Flow switch (field supply) *1

*1 For safety protection, it is recommended to install a flow switch.



Number	Component
1	Boiler flow temp. thermistor (THWB1)
2	Boiler return temp. thermistor (THWB2)
3	Flow temp. thermistor (THW6) (option)
4	Return temp. thermistor (THW7) (option)
5	Circulation pump (field supply)
6	Flow switch (field supply) *1
7	Tank water temp. (THW5)
8	Immersion heater (field supply)
9	3-way valve (field supply) *2

*1 For safety protection, it is recommended to install a flow switch.

*2 The use of two 2-way valves can perform the same function as a 3-way valve.



for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BLDG.,2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN