ProcessVent

Design handbook

Hoval

Responsibility for energy and environment

Recovery of heat from the process air in production halls

Contents

Hoval

A

ProcessVent heat PVH

Compact unit for ventilating and heating production halls
with heat recovery from process air

1 Use

1.1 Intended use

The ProcessVent unit is used to recover heat from process air and supply fresh air to halls containing enclosed machine tools or welding plants. The extract air from the extract air purification plant flows through a plate heat exchanger in an oil-tight design and is routed to the outside via a duct; the heat it contains is transferred to the supply air. Additionally equipped with a heating coil for post-heating of the supply air.

Intended use also includes compliance with the installation, commissioning, operating and servicing conditions (operating manual).
Any use above and beyond this is deemed improper. The manufacturer can accept no liability for damage resulting from improper use.

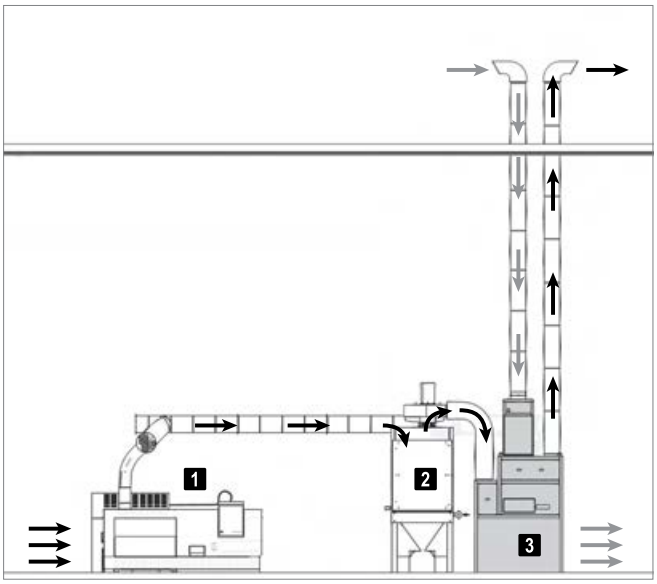
1.2 User group

The unit may only be installed, operated and serviced by authorised and trained specialist personnel who are familiar with the unit and aware of the risks involved.
The operating manual is intended for English-speaking operating engineers and technicians and for specialist building services, heating and ventilation technology personnel.

2 Construction and operation

The ProcessVent unit forms one overall system with the extract air purification plant: The extract air purification plant draws off soiled air from machine tools or welding plants by means of a fan. It purifies this process air and transports it onwards through the extract air duct to the ProcessVent unit.

The ProcessVent unit fulfils the following functions:
- Heating with connection to hot water supply
- Fresh air supply
- Extract air removal (with air conveyance via the extract air purification plant)
- Recovery of heat from the process air
- Recirculation operation
- Air filtration

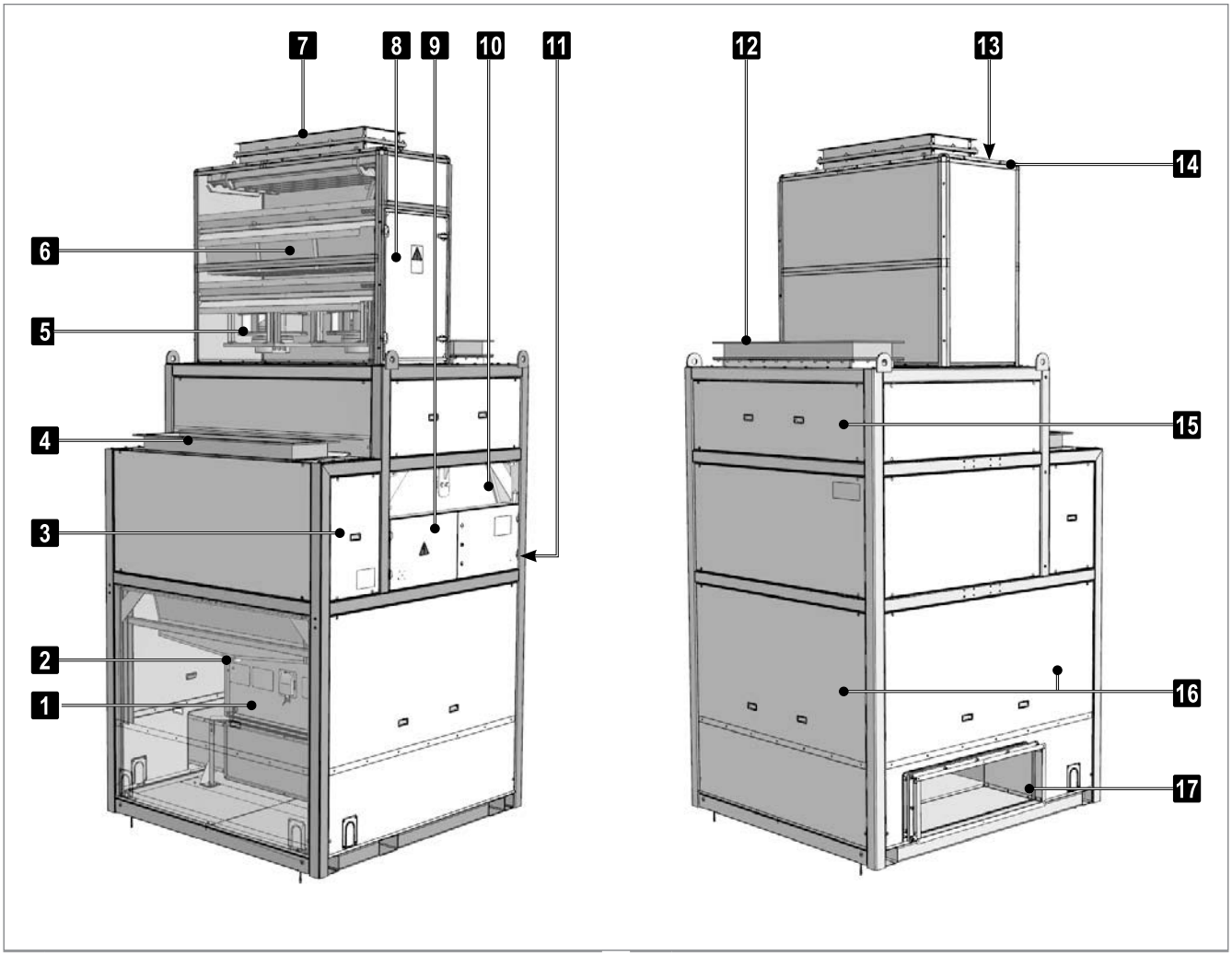


1	Machine tool
2	Extract air purification plant
3	ProcessVent

Fig. A1: **The ProcessVent unit forms one overall system with the extract air purification plant.**

A

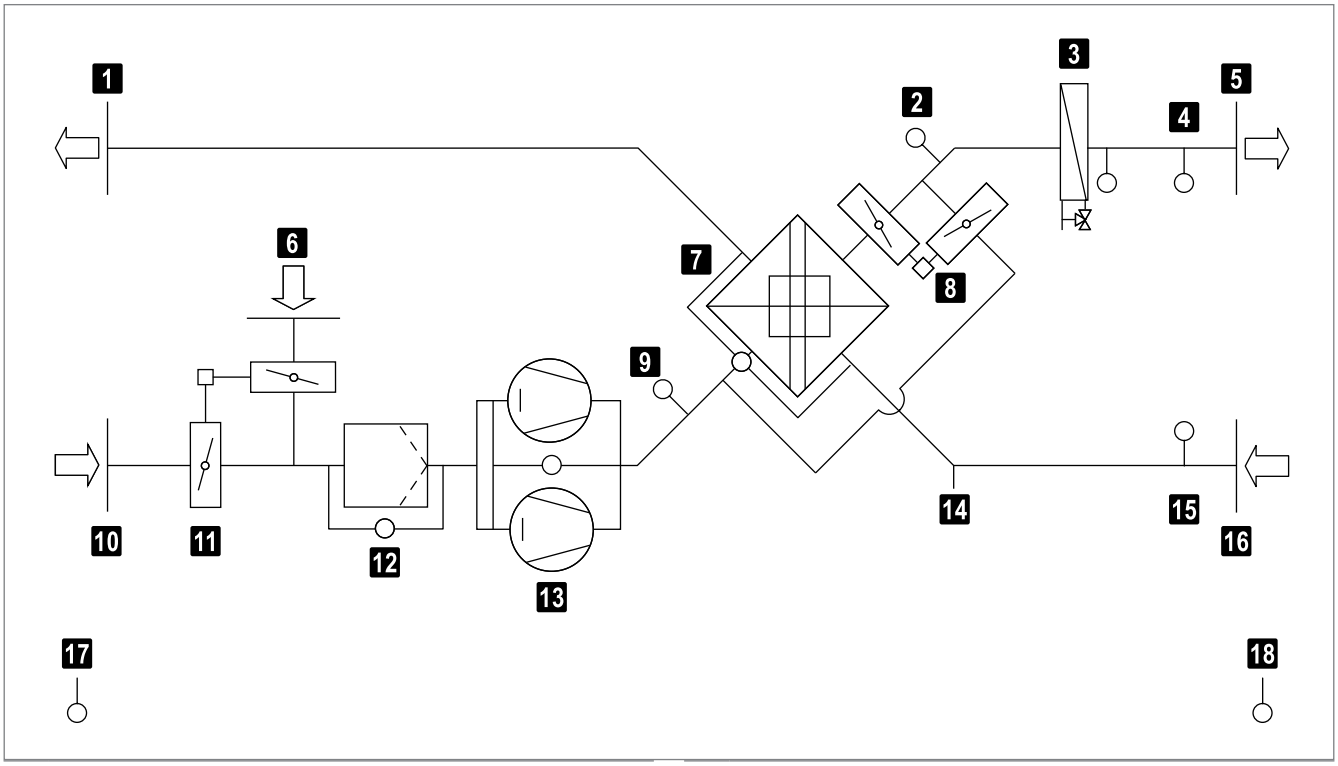
2.1 Construction



1	Heating coil	10	Plate heat exchanger with frost monitoring
2	Plate heat exchanger condensate connection	11	ER and bypass damper with continuous actuator
3	Access door, extract air	12	Duct connection, exhaust air
4	Duct connection, extract air	13	Recirculation air inlet
5	Supply air fans	14	Fresh air/recirculation damper with continuous actuator
6	Fresh air filter (class F7) with filter monitoring	15	Access door, exhaust air
7	Duct connection, fresh air	16	Access panels, supply air (on all sides)
8	Access door, fresh air	17	Supply air duct connection, rear
9	Control box		

Fig. A2: Unit construction

2.2 Operational diagram



1	Exhaust air	10	Fresh air
2	Temperature sensor, energy monitoring (optional)	11	Fresh air/recirculation damper with actuator
3	Heating coil with frost controller	12	Fresh air filter with differential pressure switch
4	Supply air sensor	13	Supply air fans with volume flow monitoring
5	Supply air	14	Condensate connection
6	Recirculation	15	Extract air sensor
7	Plate heat exchanger with differential pressure switch	16	Extract air
8	ER/bypass damper with actuator	17	Fresh air sensor
9	Mixed air sensor	18	Room air sensor

Fig. A3: Operational diagram

2.3 Operating modes

The unit has the following operating modes:

- Ventilation
- Supply air
- Recirculation
- Recirculation night
- Night cooling summer
- Off

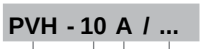
The ProcessNet control system or the higher-level building management system controls the overall plant automatically. The operating mode of the ProcessVent units depends on:

- the time programme
- the operating states of the machines from which the process air is to be drawn off

The following applies: When the machines are in operation, the ProcessVent unit always works in 'Ventilation' mode. The operating mode defined in the time programme is overridden. You can also control the operating mode of the ProcessVent unit manually and thus independently of the overall plant (e.g. for maintenance activities).
You will find a detailed description of the ProcessNet control system in Section F 'Control systems' of this handbook.

Code	ProcessVent operating mode	Description
VE	**Ventilation** The unit blows fresh air into the room. The fresh air quantity is constant; it is dependent on the extract air volume flow. The extract air from the extract air purification plant flows through the plate heat exchanger into the open air. The room temperature set value day is active. The heating and energy recovery are controlled depending on the heat demand and temperature conditions.	Supply air fan.....On [1] Energy recovery .....0 – 100% Fresh air damper .....Open Recirculation damper.....Closed Heating .....0 – 100% 1) Nominal volume flow as per setting in the control system (adjusted to the extract air volume flow)
SA	**Supply air** The unit blows fresh air into the room. The fresh air quantity is constant. Room air flows into the open via open doors and windows or is drawn off via an external system. The room temperature set value day is active. The heating is regulated according to the head demand.	Supply air fan.....On [1] Energy recovery .....0% Fresh air damper .....Open Recirculation damper.....Closed Heating .....0 – 100% 1) Nominal volume flow as per setting in the control system
REC	**Recirculation** If there is a heat demand, the unit draws in room air via the recirculation damper, warms it and blows it back into the room. The room temperature set value day is active. The recirculation volume flow depends on the heat demand.	Supply air fan.....0 - 100% [1] Energy recovery .....0% Fresh air damper .....Closed Recirculation damper.....Open Heating .....On [1] 1) Dependent on heat demand
RECN	**Recirculation night** Like REC, but with room temperature set value night	
NCS	**Night cooling summer** On/off operation with room temperature set value night: - If current temperatures permit, the unit blows cool fresh air into the room and thus uses it for free cooling. - If current temperatures do not permit free cooling, the unit switches off.	Supply air fan.....On [1] [2] Energy recovery .....0% Fresh air damper .....Open [2] Recirculation damper.....Closed [2] Heating .....Off 1) Volume flow set in the control system 2) Depending on temperature conditions
OFF	**Off** The unit is switched off. The frost protection switch remains active.	Supply air fan.....Off Energy recovery .....0% Fresh air damper .....Closed Recirculation damper.....Open Heating .....Off

3 Unit type reference



Unit type
ProcessVent heat (with heating coil)

Unit size
10

Coil
A Heating coil type A
B Heating coil type B
C Heating coil type C

Options
You will find a detailed description of all optional components in Section D 'Options' of this handbook.

4 Technical data

4.1 Application limits

Extract air temperature	max.	50	°C
Extract air relative humidity (incl. oil vapours)	max.	100	%
Dust content of extract air	max.	5	mg/m³
Oil content of extract air [1)]	max.	10	mg/m³
Fresh air temperature	min.	-30	°C
Ambient temperature		4 … 40	°C
Heating medium temperature	max.	120	°C
Operating pressure	max.	800	kPa
Supply air temperature	max.	60	°C
Amount of condensate (at up to 10 m delivery head)	max.	1.2	m³/h
Differential pressure fresh air/extract air	max.	2500	Pa
Overpressure/underpressure	max.	1500	Pa

[1)] Conventional mineral, synthetic and ester oils and emulsions from the field of machining

Table A1: Application limits

- The unit is not suitable for use in potentially explosive atmospheres.
- The unit is not suitable for use in rooms with active humidification.
- The unit is corrosion-protected, but only suitable for use in applications where the extract air contains very aggressive substances (sulphur, methanol, acetone, toluene, etc.) to a limited extent. Please contact Hoval applications support.

4.2 Air flow rate, electrical connections

Air distribution	Nominal air flow rate [1]	10 000	m³/h
Heat recovery	Heat recovery efficiency, dry	61	%
	Heat recovery efficiency, moist (max.)	95	%
Fan characteristics	Supply voltage	3 x 400	VAC
	Permitted voltage tolerance	±10	%
	Frequency	50	Hz
	Nominal power consumption	2 x 2.4	kW
	Current consumption	2 x 3.9	A
	Speed of rotation (nominal)	2400	rpm
Actuators	Supply voltage	24	VDC
	Control voltage	2…10	VDC
Filter	Filter class	F7	
	Factory setting, pressure monitor	250	Pa
Plate heat exchanger	Factory setting, pressure monitor	250	Pa

[1] Control range 3000…12 000 m³/h
The air flow rate depends on the extract air volume flow. Operation at minimum air flow rate is only recommended in partial load operation or intermittent operation.

Table A2: Technical data

Unit type		**PVH-10A**	**PVH-10B**	**PVH-10C**
Available pressure	Pa	530	520	460

Table A3: **Available fan pressure to compensate for external pressure drops (at nominal air flow rate)**

4.3 Sound level

Position		Duct connection, fresh air	Duct connection, supply air	Displacement **flow diffuser (option)**
Sound power level	dB(A)	71	66	75
Sound pressure level	dB(A)	–	–	59 [1]

1) Applies at a distance of 1 m from the unit, measuring surface sound pressure level according to DIN 45636

Table A4: Sound level

4.4 Heat output

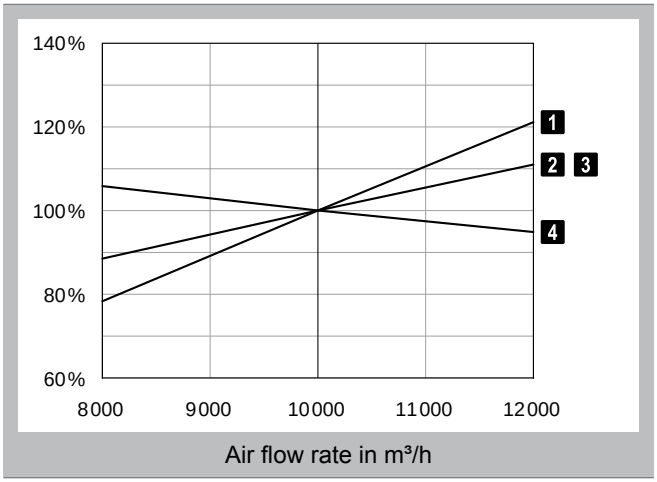
The following applies for the data provided in the tables:

- The data applies for the supply air temperatures specified. This requires the air to be blown into the room via a supply air duct and induction outlets. The supply air temperature must be restricted for units with displacement flow diffusers:
  – Reference value for heating operation: supply air max. 5 K warmer than room air

  The heat output also decreases accordingly. Please contact Hoval applications support for a project-specific design.

- The total output of the unit is calculated from the heat output of the coil plus the output from energy recovery ($Q + Q_{ER}$).

- The data applies for the nominal air flow rate of 10 000 m³/h. The actual values are dependent on the actual air flow rate. The percentage change in these values for volume flows in the range 8 000…12 000 m³/h is shown in Diagram A1. For air flow rates under 8 000 m³/h, please contact Hoval applications support.



1	Water pressure drop
2	Heat output
3	Water flow rate
4	Supply air temperature

Diagram A1: **Changes in output data depending on the air flow rate**

Fresh air -15 °C/90%				Heating medium 80/60 °C				Heating medium 60/40 °C			
Type	t_{Ext}	rh_{Ext}	Q_{ER}	Q	t_S	Δp_W	m_W	Q	t_S	Δp_W	m_W
	°C	%	kW	kW	°C	kPa	l/h	kW	°C	kPa	l/h
A	15	20	62	77	26	13	3390	51	18	6	2219
		40	65	76	26	13	3331	50	19	6	2163
		60	70	75	27	12	3273	49	20	6	2106
		80	77	72	29	12	3156	46	21	5	1994
		100	84	69	30	11	3040	43	22	5	1882
	20	20	73	73	28	12	3214	47	20	6	2050
		40	77	72	29	12	3156	46	21	5	1994
		60	85	69	30	11	3040	43	22	5	1882
		80	93	65	32	10	2867	40	25	4	1715
		100	101	63	33	10	2753	37	26	4	1603
	25	20	84	69	30	11	3040	43	22	5	1882
		40	90	68	31	10	2983	42	23	5	1826
		60	99	63	33	9	2753	37	26	4	1603
		80	109	59	35	8	2582	33	28	3	1437
		100	119	55	37	7	2412	29	30	2	1271
	30	20	95	64	33	9	2810	38	25	4	1659
		40	104	62	34	9	2696	36	27	3	1548
		60	115	58	36	8	2525	32	28	3	1382
		80	126	53	39	6	2299	27	31	2	1161
		100	137	49	41	6	2131	23	33	1	994
B	15	20	62	100	32	21	4381	66	23	10	2868
		40	65	98	33	20	4305	64	23	10	2794
		60	70	97	33	20	4229	63	24	9	2721
		80	77	93	35	18	4077	59	25	8	2575
		100	84	90	36	17	3926	56	26	8	2430
	20	20	73	95	34	19	4153	61	24	9	2648
		40	77	93	35	18	4077	59	25	8	2575
		60	85	90	36	17	3926	56	26	8	2430
		80	93	85	38	15	3701	51	28	6	2213
		100	101	81	39	14	3553	48	29	6	2070
	25	20	84	90	36	17	3926	56	26	8	2430
		40	90	86	37	16	3776	53	27	7	2285
		60	99	81	39	14	3553	48	29	6	2070
		80	109	76	40	13	3331	43	31	5	1854
		100	119	71	42	11	3110	38	32	4	1640
	30	20	95	83	38	15	3627	49	28	6	2141
		40	104	79	39	14	3478	46	30	5	1998
		60	115	74	41	12	3257	41	31	4	1783
		80	126	68	43	10	2965	35	33	3	1497
		100	137	63	45	9	2747	30	35	2	1282

C	15	20	62	167	51	30	7302	112	36	15	4877
		40	65	164	51	29	7174	110	36	14	4755
		60	70	161	52	28	7047	107	36	14	4633
		80	77	155	53	26	6794	101	37	12	4392
		100	84	149	53	24	6543	96	38	11	4151
	20	20	73	158	52	27	6920	104	37	13	4512
		40	77	155	53	26	6794	101	37	12	4392
		60	85	149	53	24	6543	96	38	11	4151
		80	93	141	54	22	6170	87	38	9	3794
		100	101	135	55	20	5924	82	39	8	3557
	25	20	84	149	53	24	6543	96	38	11	4151
		40	90	144	54	23	6294	90	38	10	3913
		60	99	135	55	20	5924	82	39	8	3557
		80	109	127	55	18	5558	74	40	7	3203
		100	119	119	56	16	5196	66	41	6	2850
	30	20	95	138	54	21	6047	85	39	9	3675
		40	104	132	55	19	5802	79	39	8	3438
		60	115	124	56	17	5437	71	40	6	3805
		80	126	113	57	15	4957	60	41	5	2615
		100	137	105	58	13	4602	52	42	4	2236

Legend:
Type = Type of coil
t_{Ext} = Extract air temperature
rh_{Ext} = Extract air humidity
Q_{ER} = Energy recovery output
Q = Coil heat output
t_S = Supply air temperature
Δp_W = Water pressure drop
m_W = Water flow rate

Table A5: Heat outputs of the ProcessVent heat at -15 °C

Fresh air -5 °C/90%				Heating medium 80/60 °C				Heating medium 60/40 °C			
Type	t_{Ext}	rh_{Ext}	Q_{ER}	Q	t_S	Δp_W	m_W	Q	t_S	Δp_W	m_W
	°C	%	kW	kW	°C	kPa	l/h	kW	°C	kPa	l/h
A	15	20	41	73	28	12	3214	47	20	6	2050
		40	42	72	29	12	3156	46	21	5	1993
		60	45	70	29	11	3098	45	22	5	1937
		80	50	69	30	11	3040	43	22	5	1881
		100	57	67	31	10	2924	41	24	4	1770
	20	20	52	69	30	11	3040	43	22	5	1881
		40	53	68	31	10	2982	42	23	5	1826
		60	58	67	31	10	2924	41	24	4	1770
		80	65	63	33	9	2752	37	26	4	1603
		100	73	60	35	8	2638	34	27	3	1492
	25	20	62	64	33	9	2810	38	25	4	1659
		40	65	63	33	9	2752	37	26	4	1603
		60	72	60	35	8	2638	34	27	3	1492
		80	81	58	36	8	2525	32	28	4	1382
		100	91	54	38	7	2355	28	30	2	1216
	30	20	73	60	35	8	2638	34	27	3	1492
		40	78	59	35	8	2581	33	28	3	1437
		60	86	55	37	7	2412	29	30	2	1271
		80	97	51	39	6	2243	26	32	2	1105
		100	107	47	41	5	2075	22	34	1	938
B	15	20	41	95	34	19	4152	61	24	9	2648
		40	42	93	35	18	4076	59	25	8	2575
		60	45	91	35	18	4001	58	26	8	2502
		80	50	90	36	17	3926	56	26	8	2430
		100	57	86	37	16	3776	53	27	7	2285
	20	20	52	90	36	17	3926	56	26	8	2430
		40	53	88	36	17	3850	54	27	7	2357
		60	58	86	37	16	3776	53	27	7	2285
		80	65	81	39	14	3552	48	29	6	2069
		100	73	78	40	13	3404	44	30	5	1926
	25	20	62	83	38	15	3626	49	28	6	2141
		40	65	81	39	14	3552	48	29	6	2069
		60	72	78	40	13	3404	44	30	5	1926
		80	81	74	41	12	3186	41	31	4	1783
		100	91	69	43	11	3037	36	33	3	1568
	30	20	73	78	40	13	3404	44	30	5	1926
		40	78	76	40	13	3330	43	31	5	1854
		60	86	71	42	11	3110	38	32	4	1640
		80	97	66	44	10	2891	33	34	3	1425
		100	107	61	46	8	2674	28	36	2	1210

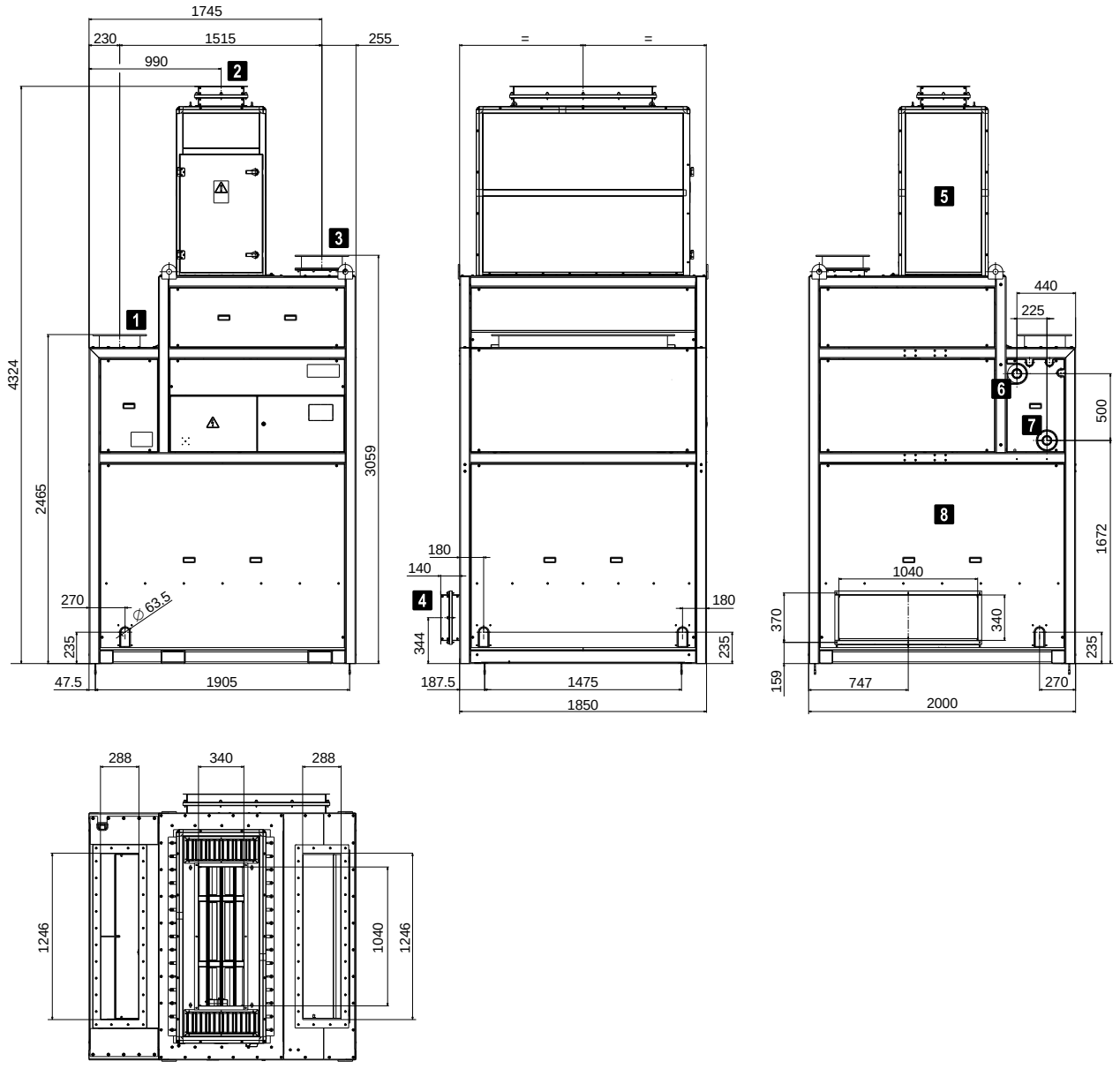
C	15	20	41	158	52	27	6920	104	37	13	4512
		40	42	155	52	26	6749	101	37	12	4391
		60	45	152	53	25	6668	98	37	12	4271
		80	50	149	53	24	6543	96	38	11	4151
		100	57	144	54	23	6294	90	38	10	3912
	20	20	52	149	53	24	6543	96	38	11	4151
		40	53	146	53	23	6418	93	38	11	4032
		60	58	144	54	23	6294	90	38	10	3912
		80	65	135	55	0	5924	82	39	8	3556
		100	73	130	55	19	5679	77	40	7	3320
	25	20	62	138	54	21	6047	85	39	9	3675
		40	65	135	53	20	5924	82	39	8	3556
		60	72	130	55	19	5679	77	40	7	3320
		80	81	124	56	17	5437	71	40	6	3085
		100	91	116	57	15	5076	63	41	5	2732
	30	20	73	130	55	19	5679	77	40	7	3320
		40	78	127	55	18	5558	74	40	7	3202
		60	86	119	56	16	5196	66	41	6	2850
		80	97	110	57	14	4838	58	41	4	2497
		100	107	102	58	12	4484	49	42	3	2142

Legend:
Type = Type of coil
t_{Ext} = Extract air temperature
rh_{Ext} = Extract air humidity
Q_{ER} = Energy recovery output
Q = Coil heat output
t_S = Supply air temperature
Δp_W = Water pressure drop
m_W = Water flow rate

Table A6: Heat outputs of the ProcessVent heat at -5 °C

A

4.5 Dimensions and weights



1	Extract air duct connection	5	Fresh air module
2	Fresh air duct connection	6	Return pipe feedthrough
3	Exhaust air duct connection	7	Flow pipe feedthrough
4	Supply air duct connection, rear	8	Base unit

Fig. A4: **Dimensional drawing (dimensions in mm)**

Unit type			PVH-10A	PVH-10B	PVH-10C
Components	Base unit	kg	1449	1449	1459
	Fresh air module	kg	240	240	240
	Total	**kg**	**1689**	**1689**	**1699**
Options	Hydraulic assembly for diverting system	kg	32	32	32

Table A7: Weights

A

5 Specification texts

ProcessVent heat

Compact unit for ventilating and heating production halls with heat recovery from process air, consisting of:

- Fresh air module
- Base unit with heat recovery in an oil-tight design, air treatment and air introduction
- Control system
- Optional components

Fresh air module

Self-supporting, double-shell, foamed panel construction with insulation free of thermal bridges made of closed-cell polyurethane (PUR, building materials class B1 according to DIN 4102-1); equipped with jack rings for transport and installation on-site.

The fresh air module contains:

Fresh air/recirculation damper:
Opposed dampers for switching between fresh air and recirculation operation, including continuous actuator with safety function in the event of a power failure.

Fresh air filter:
Designed as a compact filter of class F7, including differential pressure switch for filter monitoring.

STANDARD FANS

Supply air fans:
Designed as maintenance-free, direct-drive radial fans with high-efficiency EC motors, backwards-curved, 3D contoured blades and a free-running rotating wheel made of a high-performance composite material; infinitely variable (2 pieces).

HIGH-PRESSURE FANS

High-pressure fans:
Designed as maintenance-free, direct-drive radial fans with high-efficiency EC motors, backwards-curved blades and a free-running rotating wheel made of aluminium; infinitely variable (2 pieces); in a high-pressure design to compensate for external pressure drops (e.g. through air ducts).

Duct connection, fresh air:
Compensator with ventilation flange, fits on flange S30, for connection to the on-site fresh air duct.

Access door, fresh air:
Large access opening for easily accessing the fresh air filter and the fans for maintenance purposes.

FRESH AIR MODULE, UPRIGHT

The fresh air module is intended for upright installation on the base unit and equipped with plug-in connections for easy electrical installation.

FRESH AIR MODULE, HORIZONTAL

The fresh air module is intended for horizontal installation on the base unit and equipped with plug-in connections for easy electrical installation; including connection duct and transverse support made of sheet steel, welded, with high-quality anti-corrosion primer and paint finish.

PAINT FINISH AS DESIRED

The casing of the fresh air module is painted in the RAL colour of the customer's choice.

Base unit with heat recovery in an oil-tight design, air treatment and air introduction

Supporting framework construction made of steel sections, welded, with high-quality anti-corrosion primer and paint finish; bottom tray made of sheet steel, water and oil-tight, with high-quality anti-corrosion primer and paint finish; cover panels made of aluzinc sheet steel; equipped with jack rings and fork-lift openings for transport and installation on-site.

The base unit contains:

Cross-flow plate heat exchanger:
In a water and oil-tight design to recover heat from process air. Exchanger package consists of epoxy-coated aluminium plates with pressed-in spacers. The plates have a keyed fold connection with one another, which multiplies the material strength for the air inlet and outlet. The corners of the exchanger package are stuck into the aluminium press-drawn hollow sections of the casing with a sealing compound to form a water and oil-tight seal. The side walls made of sheet steel with a high-quality anti-corrosion primer and paint finish are screwed flush with these corners and sealed so they are water and oil-tight. A bypass is positioned in the flow of supply air and sealed so it is air and oil-tight against the extract air side; leak test according to company standard. Opposed ER and bypass damper mounted on the casing to control the output of the cross-flow plate heat exchanger, including continuous actuator. Frost monitoring on the extract air side by means of differential pressure switch.

Condensate drip tray with drain:
In a water and oil-tight design to remove oily condensate from the cross-flow plate heat exchanger, with high-quality anti-corrosion primer and paint finish.

Extract air and exhaust air duct section:
Water and oil-tight welded construction made of steel for conveying air containing oil, insulated with closed-cell Polycell (building materials class B2 according to DIN 4102-1), equipped with media-resistant compensators (2 pieces) with DIN flanged connecting pieces for connection to the on-site extract air and exhaust air duct.

Fresh air duct section:
Transition between the fresh air module and the cross-flow plate heat exchanger, made of aluzinc sheet steel, insulated with closed-cell Polycell (building materials class B2 according to DIN 4102-1).

Supply air duct section:
Transition between the cross-flow plate heat exchanger and the air introduction section, made of aluzinc sheet steel.

Air treatment unit, heating:
Casing made of aluzinc sheet steel, includes the heating coil made of copper tubes and aluminium fins and the frost controller.

SUPPLY AIR DUCT CONNECTION, REAR

Air outlet box with supply air duct section:
Connection to the on-site air distribution system, equipped with a compensator with ventilation flange, fits on flange S30, for connection to the on-site supply air duct (on the rear of the unit).

SUPPLY AIR DUCT CONNECTION, LEFT

Air outlet box with supply air duct section:
Connection to the on-site air distribution system, equipped with a compensator with ventilation flange, fits on flange S30, for connection to the on-site supply air duct (on the left of the unit).

DISPLACEMENT FLOW DIFFUSER

Displacement flow diffuser:
Cover panels towards the bottom of the base unit designed as a displacement flow diffuser for introducing the supply air into the occupied area in a low-pulse, duct-free manner; consisting of:
- Outlet panel designed as a perforated sheet
- Fabric mat for air distribution
- Spring rods for attaching the fabric mat

Access openings:
- Access door, exhaust air: large access opening for easily accessing the cross-flow plate heat exchanger for maintenance purposes; panel designed with a water and oil-tight closing system
- Access door, extract air: large access opening for easily accessing the condensate drip tray with drain for maintenance purposes; panel designed with a water and oil-tight closing system
- Access panel, supply air: large revision openings on all sides (4 pieces) with panels for easily accessing other components for maintenance purposes (depending on equipment: ER and bypass damper, coil, hydraulic connections, return pump station, condensate drain)

Control box with control module as part of the Hoval ProcessNet control system:
- Control box made of sheet steel, powder-coated with textured paint in light grey (RAL 7035), integrated flush with the framework construction
- Control module fully prewired with all I/O components:
  - Supply air fans
  - Actuator, fresh air/recirculation damper
  - Actuator, ER/bypass damper
  - Temperature sensor, mixed air
  - Temperature sensor, supply air
  - Frost monitoring, plate heat exchanger
  - Frost controller
  - Differential pressure switch, fresh air filter
  - Volume flow monitoring, supply air fans
  - Optional components as required
- Room and fresh air sensors supplied with plug, for on-site installation at a suitable location and wiring to the socket on the outside of the unit
- Mains power terminals
- Fuse for the electronics
- Transformer for control module and actuators
- Cable glands designed as cable feedthrough plates

STANDARD PAINT FINISH

The following components of the base unit are painted in Hoval red (RAL 3000):
- Framework construction
- Bottom tray
- Side walls of the plate heat exchanger
- Condensate drip tray
- Extract air and exhaust air duct section

PAINT FINISH AS DESIRED

The following components of the base unit are painted in the RAL colour of the customer's choice:
- Framework construction
- Bottom tray
- Side walls of the plate heat exchanger
- Condensate drip tray
- Extract air and exhaust air duct section

Options for the unit

Hydraulic assembly for diverting system:
Prefabricated assembly for the hydraulic diverting system, installed in the unit, consisting of:
- 3-way control ball valve designed with a continuous actuator
- Line balancing valve STAD with integrated drain valve
- Ball valve with extended spindle
- Connecting pipes with bypass designed as galvanised malleable cast-iron threaded pipes
- Screw joints for easy connection to the on-site distributor circuit

Assembly fully insulated with closed-cell insulating material to prevent energy loss and surface condensation on the assembly's components; 3-way control ball valve with plug-in connection fully prewired on the control box for easy maintenance; components adapted to the relevant heating/cooling coil and the ProcessNet control system

The output is regulated via the 3-way control ball valve: the medium is routed through the coil or the bypass. The bypass is dimensioned such that it corresponds to the resistance of the coil. This ensures that the pressure in the load circuit remains constant.

The line balancing valve in the flow coordinates the total resistance of the load with the distribution circuit. In addition, the line balancing valve can also be used to shut the line off completely.

Technical data, line balancing valve:
- Max. pressure 800 kPa at 120°

Technical data, control ball valve:
- Supply voltage: 24 V DC
- Control voltage 0…10 V DC
- Operating range: 2…10 V DC
- Position response: 2…10 V DC
- Actuator run time: 4 s/90°
- Casing material: nickel-plated hot-pressed brass
- Closing element material: stainless steel

Return pump station water:
Pump station for returning condensate for recycling or disposal; suitable for water-emulsion mixtures; installed in the unit, fully electrically prewired; consisting of:
- Hosing from condensate drains to pump receiver
- Pump receiver
- Submersible pump
- Check valve
- Level probe

Technical data:
- Pump output: 25 l/min
- Delivery head: 8 m
- Motor output: 0.14 kW
- Speed of rotation: 2 700 rpm
- Voltage: 3 x 400 V AC
- Frequency: 50 Hz
- Protection rating: IP 55
- Pump material: PPS
- Pump shaft material: 1.4104
- Pump receiver material: SJ235R
- Piping material: Threaded pipe according to DIN 2440, seamlessly galvanised, including fittings; PVC fabric hoses
- Nominal diameter of the connections: ¾ "

Return pump station oil:
Pump station for returning condensate for recycling or disposal; suitable for oily condensate from the plate heat exchanger (with an upstream oil separator); installed in the unit, fully electrically prewired; consisting of:
- Hosing from condensate drains to pump receiver
- Pump receiver
- Submersible pump
- Check valve
- Level probe

Technical data:
- Pump output: 25 l/min
- Delivery head: 8 m
- Motor output: 0.14 kW
- Speed of rotation: 2 700 rpm
- Voltage: 3 x 400 V AC
- Frequency: 50 Hz
- Protection rating: IP 55
- Pump material: PPS
- Pump shaft material: 1.4104
- Pump receiver material: SJ235R
- Piping material: Threaded pipe according to DIN 2440, seamlessly galvanised, including fittings; PVC fabric hoses
- Nominal diameter of the connections: ¾ "

Control systems

Control system for the energy-optimised operation of Hoval ProcessVent plants, designed as a decentralised I/O system, with the following main features:

- Control module integrated in every unit, for autonomous and individual regulation of the units, allowing for precise adaptation to the operating conditions
- Master-slave function for forming zones of several units being operated under the same conditions (e.g. same room temperature set values, same operating times)
- Operating mode switching via
  - Time programme, holiday and vacation calendar
  - Specification of a building management system
- The following control functions are performed by the control module:
  - Control of energy recovery depending on the temperature conditions
  - Control of supply air temperature via fixed value control or room air/supply air cascade control
  - Fixed value control of volume flow
  - Soft starting to protect the unit when switching over to operating states with fresh air
  - Defrosting if plate heat exchanger is iced up using the flow of extract air during plant operation
  - Messages relating to the plant's heat or cool demand for external heating and refrigerating systems
  - Fire control: connection for an external signal to shut the plant down in the event of a fire
  - Signal for controlling external extract air systems when the plant is in an operating state where only fresh air is supplied to the hall and no extract air is removed from it (supply air/night cooling summer operating mode)
- Simple connection of the units to a building management system via an interface integrated in the control module by means of the Profinet protocol in order to exchange the following data:
  - Current operating mode
  - Temperature control strategy
  - Temperature set values
  - Temperature actual values
  - Damper positions
  - Alarms
  - Energy meter (energy monitoring option)
- Alarm handling via control module by means of 1 collective alarm routed to terminal and transmission of alarm signals for visualisation
- Running time meter for each unit
- Back-up and restore function for easy saving of user settings and loading of factory settings
- Electrical documentation supplied in the control box

Options for control systems

Connection via Ethernet:
Electrical components and software interface for exchanging signals between Hoval ProcessVent and Hoval ProcessClean extract air purification plants via Ethernet; electrical components installed and fully prewired in the ProcessVent control box; visualisation on the ProcessClean extract air purification plant.

Connection via Profinet:
Electrical components and software interface for exchanging signals between Hoval ProcessVent and Hoval ProcessClean extract air purification plants via Profinet; electrical components installed and fully prewired in the ProcessVent control box; visualisation on the ProcessClean extract air purification plant.

Connection via Profibus DP coupler:
Electrical components and software interface for exchanging signals between Hoval ProcessVent and Hoval ProcessClean extract air purification plants via a Profibus DP coupler; electrical components installed and fully prewired in the ProcessVent control box; visualisation on the ProcessClean extract air purification plant.

Connection via external signals:
Electrical components and software interface for connecting one or more (maximum 4) non-Hoval extract air purification plants to the Hoval ProcessNet control system; visualisation via building management system or touchpanel on the unit.
Connection via digital inputs and outputs:

- Digital inputs, operating message, extract air purification plant 1 – 4
- Digital input, emergency stop, extract air purification plant
- Digital input, collective alarm
- Digital outputs, enable, extract air purification plant 1 – 4

Room temperature averaging:
3 additional room air sensors supplied for averaging; for on-site installation at a suitable location and wiring to the socket on the outside of the unit

Energy monitoring:
Calculation of the energy saved with the cross-flow plate heat exchanger and display on the operator terminal; additional temperature sensor and analogue input installed in the unit; fully prewired.

Design for injection system:
Components for controlling and protecting a heating/cooling pump integrated in the control box; digital output routed to terminals in the control box.

Requirements for the pump in the load circuit:

- Power supply: 230 VAC
- Power consumption: max. 1 kW

– Current consumption: max. 4 A
– Input signal for activation of control of pump ON
– Output signal for pump alarm

Control of supply air damper:
Control of an on-site supply air damper depending on the operating state of the compact unit; consisting of:
- Digital output routed to terminals in the control box (0...10 V DC)
- Output terminals in the control box for supplying power to the actuator (24 V DC)
- Analogue input for position return signal from the actuator (2...10 V DC)

Control of exhaust air damper:
Control of an on-site exhaust air damper depending on the operating state of the extract air purification plant; consisting of:
- Digital output routed to terminals in the control box (0...10 V DC)
- Output terminals in the control box for supplying power to the actuator (24 V DC)
- Analogue input for position return signal from the actuator (2...10 V DC)

Touchpanel on the unit:
Preprogrammed plug & play operator terminal with graphical user interface for using the Hoval ProcessVent in plants with non-Hoval extract air purification plants:
- Touchpanel with colour display installed in the doors of the control box
- Facilitates monitoring and programming of Hoval ProcessNet (operating modes, temperature values, time programme, calendar, alarm handling, control parameters)

Power supply:
Power supply for Hoval ProcessVent if this is installed in conjunction with non-Hoval extract air purification plants. The power supply contains the following components:
- Mains power terminals
- Circuit breaker to protect the supply air fans of the Hoval ProcessVent
- 3-pin safety relay installed in the control box doors
- In the design for injection system: circuit breaker to protect the heating pump

Technical data

General:
Nominal air quantity: _____ m^3/h
External available pressure: _____ Pa

Dimensions (length x width x height):
Base unit: 2000 x 1850 x 2904 mm
Fresh air module: 1631 x 700 x 1430 mm
Total: 2000 x 1850 x 4334 mm

Weight:
Base unit: _____ kg
Fresh air module: _____ kg
Total: _____ kg

Fans:
Supply voltage: 3 x 400 V AC/50 Hz
Power consumption: _____ kW
Current consumption: _____ A
Speed of rotation (nominal): _____ rpm
Protection rating: IP 54

Sound data:
Sound power level:
– Duct connection, fresh air: _____ dB(A)
– Duct connection, supply air: _____ dB(A)
– Displacement flow diffuser: _____ dB(A)
Sound pressure level at 1 m distance from the unit: _____ dB(A)

Heat recovery:
Fresh air temperature: _____ °C
Fresh air relative humidity: _____ %
Extract air temperature: _____ °C
Extract air relative humidity: _____ %

Heat recovery efficiency, dry: _____ %
Heat recovery efficiency, moist: _____ %
Pressure drop: _____ Pa

Technical data, heating coil:
Heat output: _____ kW
Flow/return: _____ °C
Supply air temperature: _____ °C
At air inlet temperature: _____ °C
Operating pressure: _____ kPa

ProcessVent cool PVC

Compact unit for ventilating, heating and cooling production halls with heat recovery from process air

1 Use

1.1 Intended use

The ProcessVent unit is used to recover heat from process air and supply fresh air to halls containing enclosed machine tools or welding plants. The extract air from the extract air purification plant flows through a plate heat exchanger in an oil-tight design and is routed to the outside via a duct; the heat it contains is transferred to the supply air. Additionally equipped with a heating/cooling coil for post-heating or cooling of the supply air.

Intended use also includes compliance with the installation, commissioning, operating and servicing conditions (operating manual).
Any use above and beyond this is deemed improper. The manufacturer can accept no liability for damage resulting from improper use.

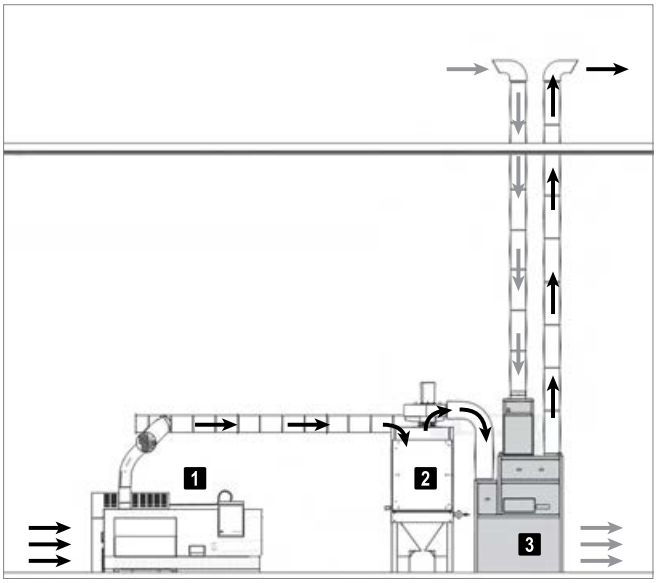
1.2 User group

The unit may only be installed, operated and serviced by authorised and trained specialist personnel who are familiar with the unit and aware of the risks involved.
The operating manual is intended for English-speaking operating engineers and technicians and for specialist building services, heating and ventilation technology personnel.

2 Construction and operation

The ProcessVent unit forms one overall system with the extract air purification plant: The extract air purification plant draws off soiled air from machine tools or welding plants by means of a fan. It purifies this process air and transports it onwards through the extract air duct to the ProcessVent unit.

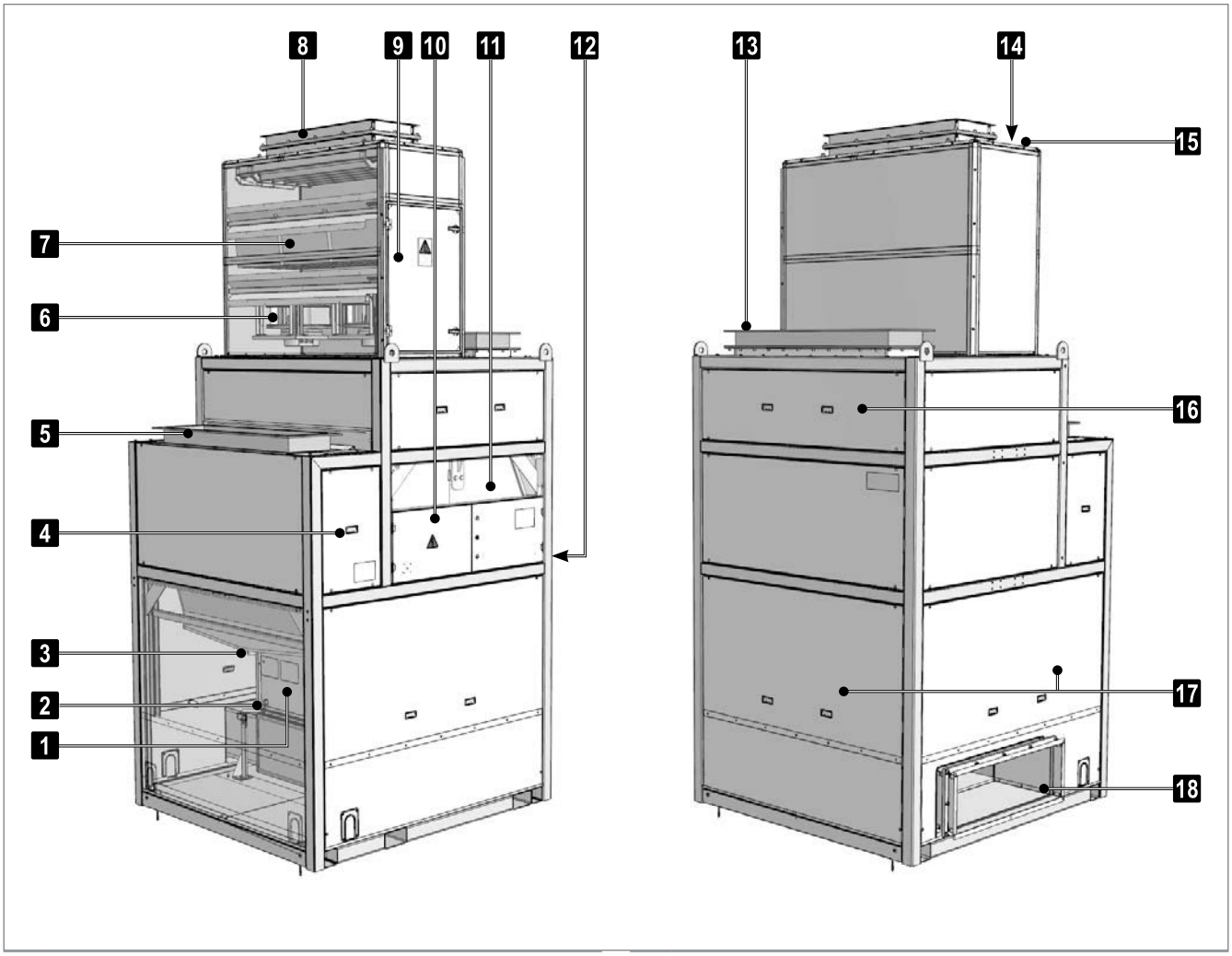
The ProcessVent unit fulfils the following functions:
- Heating with connection to hot water supply
- Cooling with connection to chilled water system
- Fresh air supply
- Extract air removal (with air conveyance via the extract air purification plant)
- Recovery of heat from the process air
- Recirculation operation
- Air filtration



1	Machine tool
2	Extract air purification plant
3	ProcessVent

Fig. B1: **The ProcessVent unit forms one overall system with the extract air purification plant.**

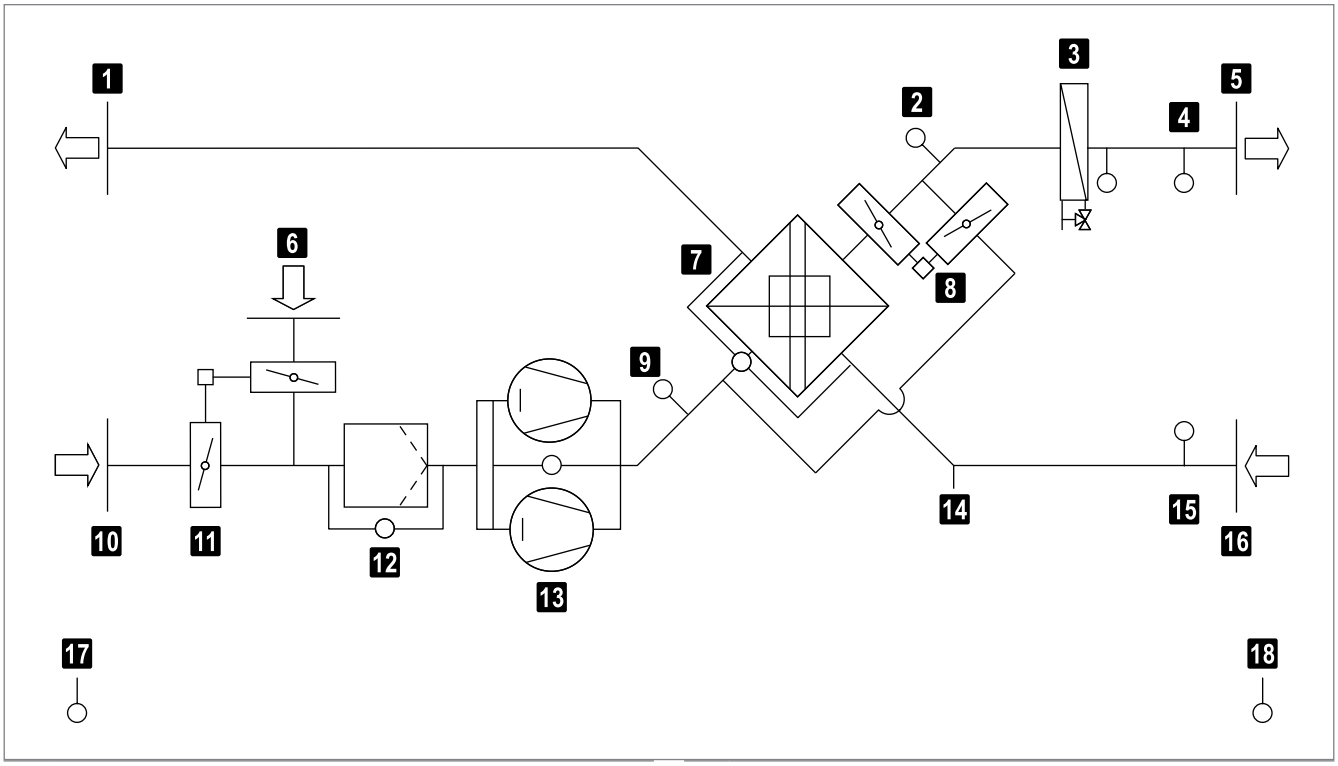
2.1 Construction



1	Heating/cooling coil with condensate separator	10	Control box
2	Condensate connection, heating/cooling coil	11	Plate heat exchanger with frost monitoring
3	Condensate connection, plate heat exchanger	12	ER and bypass damper with continuous actuator
4	Access door, extract air	13	Duct connection, exhaust air
5	Duct connection, extract air	14	Recirculation air inlet
6	Supply air fans	15	Fresh air/recirculation damper with continuous actuator
7	Fresh air filter (class F7) with filter monitoring	16	Access door, exhaust air
8	Duct connection, fresh air	17	Access panels, supply air (on all sides)
9	Access door, fresh air	18	Supply air duct connection, rear

Fig. B2: Unit construction

2.2 Operational diagram



1	Exhaust air	10	Fresh air
2	Temperature sensor, energy monitoring (optional)	11	Fresh air/recirculation damper with actuator
3	Heating/cooling coil with frost controller and condensate separator	12	Fresh air filter with differential pressure switch
4	Supply air sensor	13	Supply air fans with volume flow monitoring
5	Supply air	14	Condensate connection
6	Recirculation	15	Extract air sensor
7	Plate heat exchanger with differential pressure switch	16	Extract air
8	ER/bypass damper with actuator	17	Fresh air sensor
9	Mixed air sensor	18	Room air sensor

Fig. B3: Operational diagram

2.3 Operating modes

The unit has the following operating modes:

- Ventilation
- Supply air
- Recirculation
- Recirculation night
- Night cooling summer
- Off

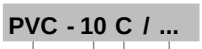
The ProcessNet control system or the higher-level building management system controls the overall plant automatically. The operating mode of the ProcessVent units depends on:

- the time programme
- the operating states of the machines from which the process air is to be drawn off

The following applies: When the machines are in operation, the ProcessVent unit always works in 'Ventilation' mode. The operating mode defined in the time programme is overridden. You can also control the operating mode of the ProcessVent unit manually and thus independently of the overall plant (e.g. for maintenance activities).
You will find a detailed description of the ProcessNet control system in Section F 'Control systems' of this handbook.

Code	ProcessVent operating mode	Description
VE	**Ventilation** The unit blows fresh air into the room. The fresh air quantity is constant; it is dependent on the extract air volume flow. The extract air from the extract air purification plant flows through the plate heat exchanger into the open air. The room temperature set value day is active. Heating/cooling and energy recovery are regulated depending on the heat/cool demand and the temperature conditions.	Supply air fan.....On [1] Energy recovery .....0 – 100% Fresh air damper .....Open Recirculation damper.....Closed Heating/cooling.....0 - 100% 1) Nominal volume flow as per setting in the control system (adjusted to the extract air volume flow)
SA	**Supply air** The unit blows fresh air into the room. The fresh air quantity is constant. Room air flows into the open via open doors and windows or is drawn off via an external system. The room temperature set value day is active. Heating/cooling is regulated depending on the heat/cool demand.	Supply air fan.....On [1] Energy recovery .....0% Fresh air damper .....Open Recirculation damper.....Closed Heating/cooling.....0 - 100% 1) Nominal volume flow as per setting in the control system
REC	**Recirculation** In the case of heat/cool demand, the unit draws in room air via the recirculation damper, heats or cools it and blows it back into the room. The room temperature set value day is active. The recirculation volume flow depends on the heat/cool demand.	Supply air fan.....0 - 100% [1] Energy recovery .....0% Fresh air damper .....Closed Recirculation damper.....Open Heating/cooling.....On [1]
RECN	**Recirculation night** Like REC, but with room temperature set value night	1) Dependent on heat/cool demand
NCS	**Night cooling summer** On/off operation with room temperature set value night: - If current temperatures permit, the unit blows cool fresh air into the room and thus uses it for free cooling. - If current temperatures do not permit free cooling, the unit switches off.	Supply air fan.....On [1] [2] Energy recovery .....0% Fresh air damper .....Open [2] Recirculation damper.....Closed [2] Heating/cooling.....Off 1) Volume flow set in the control system 2) Depending on temperature conditions
OFF	**Off** The unit is switched off. The frost protection switch remains active.	Supply air fan.....Off Energy recovery .....0% Fresh air damper .....Closed Recirculation damper.....Open Heating/cooling.....Off

3 Unit type reference



Unit type
ProcessVent cool (with heating/cooling coil)

Unit size
10

Coil
C Heating/cooling coil type C
D Heating/cooling coil type D

Options
You will find a detailed description of all optional components in Section D 'Options' of this handbook.

4 Technical data

4.1 Application limits

Extract air temperature	max.	50	°C
Extract air relative humidity (incl. oil vapours)	max.	100	%
Dust content of extract air	max.	5	mg/m³
Oil content of extract air [1)]	max.	10	mg/m³
Fresh air temperature	min.	-30	°C
Ambient temperature		4 … 40	°C
Heating medium temperature	max.	120	°C
Operating pressure	max.	800	kPa
Supply air temperature	max.	60	°C
Amount of condensate (at up to 10 m delivery head)	max.	1.2	m³/h
Differential pressure fresh air/extract air	max.	2500	Pa
Overpressure/underpressure	max.	1500	Pa

[1)] Conventional mineral, synthetic and ester oils and emulsions from the field of machining

Table B1: Application limits

- The unit is not suitable for use in potentially explosive atmospheres.
- The unit is not suitable for use in rooms with active humidification.
- The unit is corrosion-protected, but only suitable for use in applications where the extract air contains very aggressive substances (sulphur, methanol, acetone, toluene, etc.) to a limited extent. Please contact Hoval applications support.

4.2 Air flow rate, electrical connections

Air distribution	Nominal air flow rate [1]	10 000	m³/h
Heat recovery	Heat recovery efficiency, dry	61	%
	Heat recovery efficiency, moist (max.)	95	%
Fan characteristics	Supply voltage	3 x 400	VAC
	Permitted voltage tolerance	±10	%
	Frequency	50	Hz
	Nominal power consumption	2 x 2.4	kW
	Current consumption	2 x 3.9	A
	Speed of rotation (nominal)	2400	rpm
Actuators	Supply voltage	24	VDC
	Control voltage	2…10	VDC
Filter	Filter class	F7	
	Factory setting, pressure monitor	250	Pa
Plate heat exchanger	Factory setting, pressure monitor	250	Pa

[1] Control range 3000…12 000 m³/h
The air flow rate depends on the extract air volume flow. Operation at minimum air flow rate is only recommended in partial load operation or intermittent operation.

Table B2: Technical data

Unit type		**PVC-10C**	**PVC-10D**
Available pressure	Pa	420	320

Table B3: **Available fan pressure to compensate for external pressure drops (at nominal air flow rate)**

4.3 Sound level

Position		Duct connection, fresh air	Duct connection, supply air	Displacement **flow diffuser (option)**
Sound power level	dB(A)	71	66	75
Sound pressure level	dB(A)	–	–	59 [1]

1) Applies at a distance of 1 m from the unit, measuring surface sound pressure level according to DIN 45636

Table B4: Sound level

4.4 Heat output

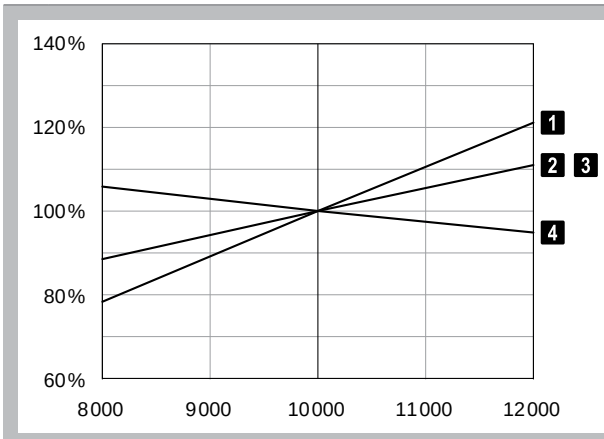
The following applies for the data provided in the tables:

- The data applies for the supply air temperatures specified. This requires the air to be blown into the room via a supply air duct and induction outlets. The supply air temperature must be restricted for units with displacement flow diffusers:
  - Reference value for heating operation: supply air max. 5 K warmer than room air
  - Reference value for cooling operation: supply air max. 6 K colder than room air

  The heat output/cooling capacity also decreases accordingly. Please contact Hoval applications support for a project-specific design.

- The total output of the unit is calculated from the heat output of the coil plus the output from energy recovery ($Q + Q_{ER}$).

- The data applies for the nominal air flow rate of 10 000 m³/h. The actual values are dependent on the actual air flow rate. The percentage change in these values for volume flows in the range 8 000…12 000 m³/h is shown in Diagram B1. For air flow rates under 8 000 m³/h, please contact Hoval applications support.



1	Water pressure drop
2	Heat output
3	Water flow rate
4	Supply air temperature

Diagram B1: **Changes in output data depending on the air flow rate**

Fresh air -15 °C/90%				Heating medium 80/60 °C				Heating medium 60/40 °C			
Type	t_{Ext}	rh_{Ext}	Q_{ER}	Q	t_S	Δp_W	m_W	Q	t_S	Δp_W	m_W
	°C	%	kW	kW	°C	kPa	l/h	kW	°C	kPa	l/h
C	15	20	62	167	51	30	7302	112	36	15	4877
		40	65	164	51	29	7174	110	36	14	4755
		60	70	161	52	28	7047	107	36	14	4633
		80	77	155	53	26	6794	101	37	12	4392
		100	84	149	53	24	6543	96	38	11	4151
	20	20	73	158	52	27	6920	104	37	13	4512
		40	77	155	53	26	6794	101	37	12	4392
		60	85	149	53	24	6543	96	38	11	4151
		80	93	141	54	22	6170	87	38	9	3794
		100	101	135	55	20	5924	82	39	8	3557
	25	20	84	149	53	24	6543	96	38	11	4151
		40	90	144	54	23	6294	90	38	10	3913
		60	99	135	55	20	5924	82	39	8	3557
		80	109	127	55	18	5558	74	40	7	3203
		100	119	119	56	16	5196	66	41	6	2850
	30	20	95	138	54	21	6047	85	39	9	3675
		40	104	132	55	19	5802	79	39	8	3438
		60	115	124	56	17	5437	71	40	6	3805
		80	126	113	57	15	4957	60	41	5	2615
		100	137	105	58	13	4602	52	42	4	2236
D	15	20	62	199	60	26	8737	138	43	14	5996
		40	65	199	60	26	8737	138	43	14	5996
		60	70	191	60	24	8521	131	43	13	5704
		80	77	182	60	22	7998	125	44	12	5414
		100	84	174	60	20	7636	118	44	11	5126
	20	20	73	187	60	23	8181	128	43	12	5558
		40	77	182	60	22	7998	125	44	12	5415
		60	85	174	60	20	7636	118	44	11	5126
		80	93	162	60	18	7103	108	44	9	4698
		100	101	154	60	16	6753	102	45	8	4414
	25	20	84	174	60	20	7636	118	44	11	5126
		40	90	166	60	19	7279	112	44	10	4840
		60	99	154	60	16	6753	102	45	8	4414
		80	109	142	60	14	6238	92	45	7	3991
		100	119	131	60	12	5733	82	46	5	3570
	30	20	95	158	60	17	6927	105	45	9	4556
		40	104	150	60	16	6580	99	45	8	4273
		60	115	138	60	14	6069	89	45	6	3851
		80	126	123	60	11	5402	76	46	5	3290
		100	137	112	60	9	4915	66	46	4	2867

Legend:
Type = Type of coil
t_{Ext} = Extract air temperature
rh_{Ext} = Extract air humidity
Q_{ER} = Energy recovery output
Q = Coil heat output
t_S = Supply air temperature
Δp_W = Water pressure drop
m_W = Water flow rate

Table B5: Heat outputs of the ProcessVent cool at -15 °C

Fresh air -5 °C/90%				Heating medium 80/60 °C				Heating medium 60/40 °C			
Type	t_{Ext}	rh_{Ext}	Q_{ER}	Q	t_S	Δp_W	m_W	Q	t_S	Δp_W	m_W
	°C	%	kW	kW	°C	kPa	l/h	kW	°C	kPa	l/h
C	15	20	41	158	52	27	6920	104	37	13	4512
		40	42	155	52	26	6749	101	37	12	4391
		60	45	152	53	25	6668	98	37	12	4271
		80	50	149	53	24	6543	96	38	11	4151
		100	57	144	54	23	6294	90	38	10	3912
	20	20	52	149	53	24	6543	96	38	11	4151
		40	53	146	53	23	6418	93	38	11	4032
		60	58	144	54	23	6294	90	38	10	3912
		80	65	135	55	0	5924	82	39	8	3556
		100	73	130	55	19	5679	77	40	7	3320
	25	20	62	138	54	21	6047	85	39	9	3675
		40	65	135	53	20	5924	82	39	8	3556
		60	72	130	55	19	5679	77	40	7	3320
		80	81	124	56	17	5437	71	40	6	3085
		100	91	116	57	15	5076	63	41	5	2732
	30	20	73	130	55	19	5679	77	40	7	3320
		40	78	127	55	18	5558	74	40	7	3202
		60	86	119	56	16	5196	66	41	6	2850
		80	97	110	57	14	4838	58	41	4	2497
		100	107	102	58	12	4484	49	42	3	2142
D	15	20	41	187	60	23	8183	128	43	12	5558
		40	42	183	60	22	8000	125	44	12	5414
		60	45	183	60	22	8000	125	44	12	5414
		80	50	174	60	20	7638	118	44	11	5126
		100	57	166	60	19	7281	112	44	10	4840
	20	20	52	174	60	20	7638	118	44	11	5126
		40	53	170	60	20	7459	115	44	10	4983
		60	58	166	60	19	7281	112	44	10	4840
		80	65	154	60	16	6755	102	45	8	4414
		100	73	146	60	15	6410	95	45	7	4132
	25	20	62	158	60	17	6929	105	45	9	4556
		40	65	154	60	16	6755	102	45	8	4414
		60	72	146	60	15	6410	90	45	7	4132
		80	81	139	60	14	6070	89	45	6	3851
		100	91	127	60	12	5569	79	46	5	3430
	30	20	73	146	60	15	6410	95	45	7	4132
		40	78	142	60	14	6240	92	45	7	3991
		60	86	131	60	12	5735	82	46	5	3570
		80	97	120	60	10	5240	73	46	4	3149
		100	107	109	60	9	4756	63	46	3	2725

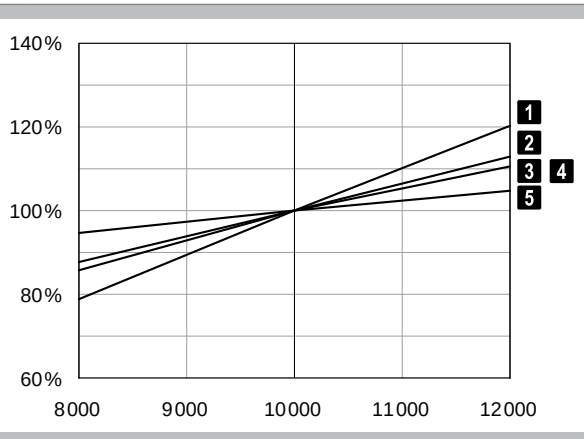
Legend:
Type = Type of coil
t_{Ext} = Extract air temperature
rh_{Ext} = Extract air humidity
Q_{ER} = Energy recovery output
Q = Coil heat output
t_S = Supply air temperature
Δp_W = Water pressure drop
m_W = Water flow rate

Table B6: Heat outputs of the ProcessVent cool at -5 °C

4.5 Cooling capacity

The following applies for the data provided in the tables:

- The total sensitive cooling capacity of the unit is calculated from the sensitive cooling capacity of the coil plus the output from energy recovery (Q_{sen} + Q_{ER}).
- The data applies for the nominal air flow rate of 10 000 m³/h. The actual values are dependent on the actual air flow rate. The percentage change in these values for volume flows in the range 8 000…12 000 m³/h is shown in Diagram B2. For air flow rates under 8 000 m³/h, please contact Hoval applications support.



1	Water pressure drop
2	Cooling capacity, sensitive
3	Cooling capacity, total
4	Water flow rate
5	Supply air temperature

Diagram B2: **Changes in output data depending on the air flow rate**

Cooling capacity with upstream dry filter or oil/emulsion mist separator

			Cooling medium 6/12 °C						Cooling medium 8/14 °C					
Type	t_{Fre}	rh_{Fre}	Q_{sen}	Q_{tot}	t_S	Δp_W	m_W	m_C	Q_{sen}	Q_{tot}	t_S	Δp_W	m_W	m_C
	°C	%	kW	kW	°C	kPa	l/h	l/h	kW	kW	°C	kPa	l/h	l/h
C	28	40	42	46	15	30	6527	6	38	39	17	22	5547	2
		60	38	67	16	60	9531	41	34	56	18	43	8018	32
	30	40	46	54	16	41	7707	12	42	46	17	30	6534	6
		60	42	79	17	82	11345	54	38	69	18	63	9832	44
	32	40	49	63	17	54	8990	20	46	54	18	40	7718	12
		60	45	93	18	110	13269	68	41	82	19	87	11744	58
D	28	40	50	58	13	30	8301	12	45	49	14	22	6972	5
		60	47	85	14	61	12236	55	42	73	15	45	10402	44
	30	40	54	69	13	41	9855	21	50	58	15	30	8319	12
		60	51	101	14	83	14479	71	47	88	16	64	12650	60
	32	40	59	81	14	55	11544	32	54	69	15	41	9843	21
		60	56	118	15	109	16850	88	51	105	16	88	15031	77

Legend:
Type = Type of coil
t_{Fre} = Fresh air temperature
rh_{Fre} = Fresh air humidity
Q_{sen} = Sensitive cooling capacity of the coil
Q_{tot} = Total cooling capacity
t_S = Supply air temperature
Δp_W = Water pressure drop
m_W = Water flow rate
m_C = Amount of condensate

Refers to: Extract air temperature ≥ fresh air temperature (→ without energy recovery)

Table B7: **Cooling capacities of the ProcessVent cool with upstream dry filter or oil/emulsion mist separator**

Cooling capacity with upstream wet separator

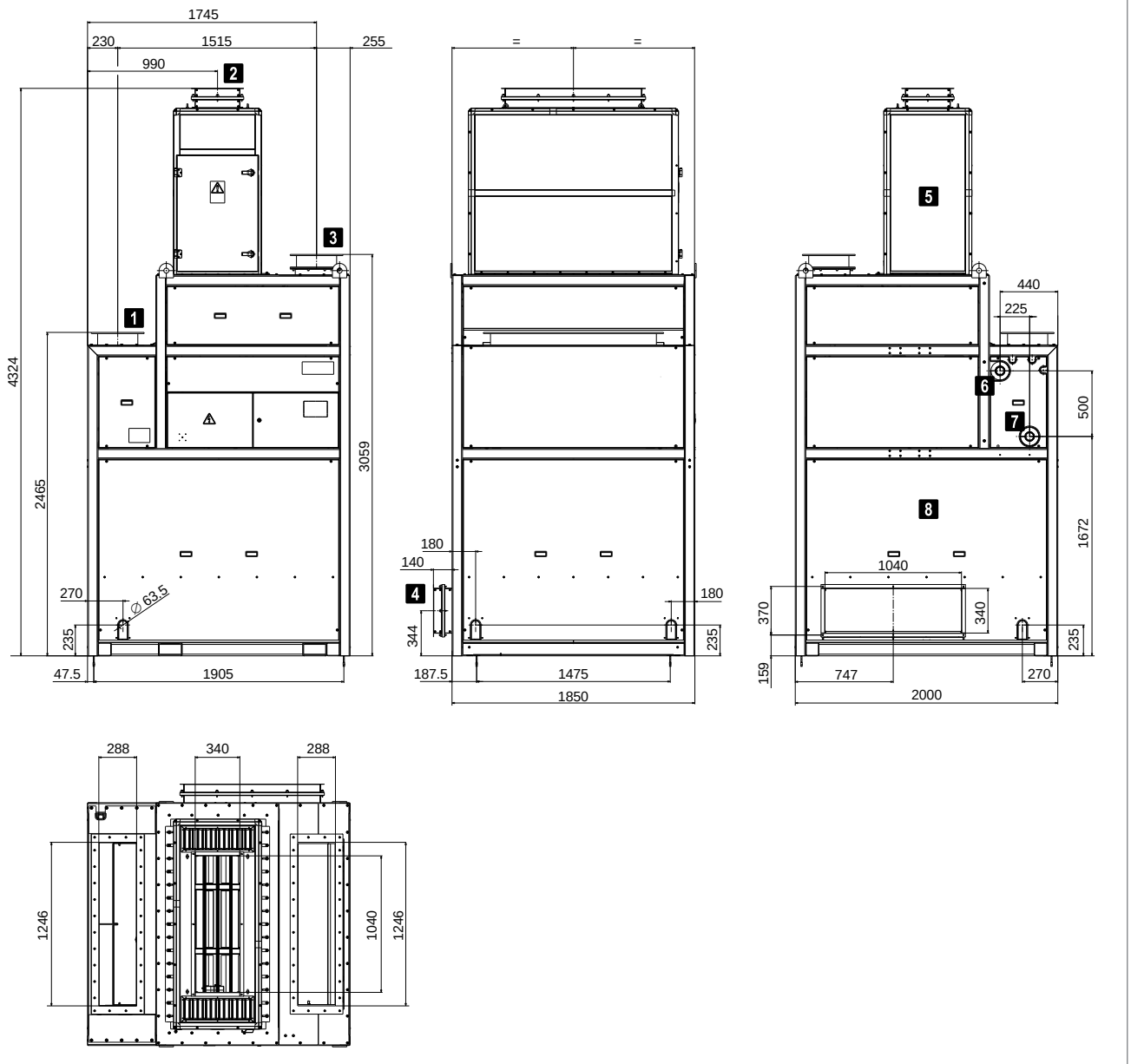
					Cooling medium 6/12 °C						Cooling medium 8/14 °C					
Type	t_{Ext}	t_{Fre}	rh_{Fre}	Q_{ER}	Q_{sen}	Q_{tot}	t_S	Δp_W	m_W	m_C	Q_{sen}	Q_{tot}	t_S	Δp_W	m_W	m_C
	°C	°C	%	kW	kW	kW	°C	kPa	l/h	l/h	kW	kW	°C	kPa	l/h	l/h
C	15	28	40	27	22	27	14	12	3854	8	18	19	15	6	2776	2
			60	28	21	53	15	40	7623	46	17	43	16	26	6098	37
		30	40	31	23	35	14	19	5042	18	19	24	15	9	3483	8
			60	33	23	60	15	50	8582	53	19	49	16	34	7060	44
		32	40	35	25	44	15	29	6363	28	21	34	16	17	4827	19
			60	37	24	70	16	65	9953	66	20	59	17	47	8433	55
	20	28	40	17	29	34	14	18	4872	7	26	27	15	11	3847	2
			60	17	26	57	15	45	8144	44	22	46	17	31	6623	35
		30	40	21	30	41	15	25	5890	25	26	30	16	14	4350	6
			60	21	27	68	16	63	9765	59	23	58	17	46	8247	49
		32	40	25	32	51	15	37	7276	27	28	40	17	24	5750	18
			60	25	28	79	17	82	11340	73	25	69	18	63	9820	63
	25	28	40	6	37	41	15	25	5854	6	33	34	16	17	4871	2
			60	6	33	62	16	53	8894	41	29	52	17	37	7378	32
		30	40	10	38	47	16	31	6680	13	34	36	17	20	5153	4
			60	11	34	74	17	73	10611	57	31	64	18	55	9095	47
		32	40	15	39	56	16	43	7972	24	36	47	17	31	6664	16
			60	15	35	87	17	98	12441	73	32	76	18	76	10914	64
D	15	28	40	27	27	36	12	13	5118	13	22	26	13	7	3665	5
			60	28	27	69	13	42	9896	60	22	56	14	28	8033	49
		30	40	31	29	47	12	20	6683	26	23	33	14	11	4754	14
			60	33	30	77	13	51	11084	68	25	64	15	36	9231	57
		32	40	35	31	58	13	30	8326	39	26	45	14	19	6444	28
			60	37	30	81	13	55	11539	74	24	68	15	40	9689	62
	20	28	40	17	36	44	12	19	6336	13	31	35	14	12	4984	5
			60	17	33	74	99	46	10536	58	28	61	15	32	8682	47
		30	40	21	37	54	13	27	7730	24	32	41	14	16	5841	13
			60	21	35	88	14	64	12547	75	30	75	12	47	10703	64
		32	40	25	40	66	13	38	9449	38	34	53	15	25	7591	27
			60	25	37	101	14	83	14502	93	32	88	15	64	12661	81
	25	28	40	6	44	52	13	25	7509	12	40	43	14	18	6198	5
			60	6	41	80	14	54	11454	55	36	67	15	39	9612	44
		30	40	10	46	61	13	33	8702	22	41	48	15	21	6840	11
			60	11	43	95	14	74	13582	74	38	82	15	56	11740	63
		32	40	15	48	72	13	45	10301	35	43	60	15	32	8586	25
			60	15	45	111	14	98	15846	94	40	98	16	77	14018	83

Legend:
- Type = Type of coil
- t_{Ext} = Extract air temperature
- t_{Fre} = Fresh air temperature
- rh_{Fre} = Fresh air humidity
- Q_{ER} = Energy recovery output
- Q_{sen} = Sensitive cooling capacity of the coil
- Q_{tot} = Total cooling capacity of the coil
- t_S = Supply air temperature
- Δp_W = Water pressure drop
- m_W = Water flow rate
- m_C = Amount of condensate

Refers to: Relative humidity of the extract air = 100%

Table B8: Cooling capacities of the ProcessVent cool with upstream wet separator

4.6 Dimensions and weights



1	Extract air duct connection	5	Fresh air module
2	Fresh air duct connection	6	Return pipe feedthrough
3	Exhaust air duct connection	7	Flow pipe feedthrough
4	Supply air duct connection, rear	8	Base unit

Fig. B4: **Dimensional drawing (dimensions in mm)**

Unit type			PVC-10C	PVC-10D
Components	Base unit	kg	1495	1514
	Fresh air module	kg	240	240
	Total	**kg**	**1735**	**1754**
Options	Hydraulic assembly for diverting system	kg	32	38
	4-pipe switching	kg	48	54

Table B9: Weights

5 Specification texts

ProcessVent cool

Compact unit for ventilating, heating and cooling production halls with heat recovery from process air, consisting of:
- Fresh air module
- Base unit with heat recovery in an oil-tight design, air treatment and air introduction
- Control system
- Optional components

Fresh air module

Self-supporting, double-shell, foamed panel construction with insulation free of thermal bridges made of closed-cell polyurethane (PUR, building materials class B1 according to DIN 4102-1); equipped with jack rings for transport and installation on-site.

The fresh air module contains:

Fresh air/recirculation damper:
Opposed dampers for switching between fresh air and recirculation operation, including continuous actuator with safety function in the event of a power failure.

Fresh air filter:
Designed as a compact filter of class F7, including differential pressure switch for filter monitoring.

STANDARD FANS

Supply air fans:
Designed as maintenance-free, direct-drive radial fans with high-efficiency EC motors, backwards-curved, 3D contoured blades and a free-running rotating wheel made of a high-performance composite material; infinitely variable (2 pieces).

HIGH-PRESSURE FANS

High-pressure fans:
Designed as maintenance-free, direct-drive radial fans with high-efficiency EC motors, backwards-curved blades and a free-running rotating wheel made of aluminium; infinitely variable (2 pieces); in a high-pressure design to compensate for external pressure drops (e.g. through air ducts).

Duct connection, fresh air:
Compensator with ventilation flange, fits on flange S30, for connection to the on-site fresh air duct.

Access door, fresh air:
Large access opening for easily accessing the fresh air filter and the fans for maintenance purposes.

FRESH AIR MODULE, UPRIGHT

The fresh air module is intended for upright installation on the base unit and equipped with plug-in connections for easy electrical installation.

FRESH AIR MODULE, HORIZONTAL

The fresh air module is intended for horizontal installation on the base unit and equipped with plug-in connections for easy electrical installation; including connection duct and transverse support made of sheet steel, welded, with high-quality anti-corrosion primer and paint finish.

PAINT FINISH AS DESIRED

The casing of the fresh air module is painted in the RAL colour of the customer's choice.

Base unit with heat recovery in an oil-tight design, air treatment and air introduction

Supporting framework construction made of steel sections, welded, with high-quality anti-corrosion primer and paint finish; bottom tray made of sheet steel, water and oil-tight, with high-quality anti-corrosion primer and paint finish; cover panels made of aluzinc sheet steel; equipped with jack rings and fork-lift openings for transport and installation on-site.

The base unit contains:

Cross-flow plate heat exchanger:
In a water and oil-tight design to recover heat from process air. Exchanger package consists of epoxy-coated aluminium plates with pressed-in spacers. The plates have a keyed fold connection with one another, which multiplies the material strength for the air inlet and outlet. The corners of the exchanger package are stuck into the aluminium press-drawn hollow sections of the casing with a sealing compound to form a water and oil-tight seal. The side walls made of sheet steel with a high-quality anti-corrosion primer and paint finish are screwed flush with these corners and sealed so they are water and oil-tight. A bypass is positioned in the flow of supply air and sealed so it is air and oil-tight against the extract air side; leak test according to company standard. Opposed ER and bypass damper mounted on the casing to control the output of the cross-flow plate heat exchanger, including continuous actuator. Frost monitoring on the extract air side by means of differential pressure switch.

Condensate drip tray with drain:
In a water and oil-tight design to remove oily condensate from the cross-flow plate heat exchanger, with high-quality anti-corrosion primer and paint finish.

Extract air and exhaust air duct section:
Water and oil-tight welded construction made of steel for conveying air containing oil, insulated with closed-cell Polycell (building materials class B2 according to DIN 4102-1), equipped with media-resistant compensators (2 pieces) with DIN flanged connecting pieces for connection to the on-site extract air and exhaust air duct.

Fresh air duct section:
Transition between the fresh air module and the cross-flow plate heat exchanger, made of aluzinc sheet steel, insulated with closed-cell Polycell (building materials class B2 according to DIN 4102-1).

Supply air duct section:
Transition between the cross-flow plate heat exchanger and the air introduction section, made of aluzinc sheet steel.

Air treatment unit, heating/cooling:
Aluzinc sheet steel casing, containing the heating/cooling coil made of copper tubes and aluminium fins, the condensate separator with collecting channel and the frost controller; trap supplied for connection to an on-site condensate line.

Supply air duct connection, rear

Air outlet box with supply air duct section:
Connection to the on-site air distribution system, equipped with a compensator with ventilation flange, fits on flange S30, for connection to the on-site supply air duct (on the rear of the unit).

Supply air duct connection, left

Air outlet box with supply air duct section:
Connection to the on-site air distribution system, equipped with a compensator with ventilation flange, fits on flange S30, for connection to the on-site supply air duct (on the left of the unit).

Displacement flow diffuser

Displacement flow diffuser:
Cover panels towards the bottom of the base unit designed as a displacement flow diffuser for introducing the supply air into the occupied area in a low-pulse, duct-free manner; consisting of:
- Outlet panel designed as a perforated sheet
- Fabric mat for air distribution
- Spring rods for attaching the fabric mat

Access openings:
- Access door, exhaust air: large access opening for easily accessing the cross-flow plate heat exchanger for maintenance purposes; panel designed with a water and oil-tight closing system
- Access door, extract air: large access opening for easily accessing the condensate drip tray with drain for maintenance purposes; panel designed with a water and oil-tight closing system
- Access panel, supply air: large revision openings on all sides (4 pieces) with panels for easily accessing other components for maintenance purposes (depending on equipment: ER and bypass damper, coil, hydraulic connections, return pump station, condensate drain)

Control box with control module as part of the Hoval ProcessNet control system:
- Control box made of sheet steel, powder-coated with textured paint in light grey (RAL 7035), integrated flush with the framework construction
- Control module fully prewired with all I/O components:
  - Supply air fans
  - Actuator, fresh air/recirculation damper
  - Actuator, ER/bypass damper
  - Temperature sensor, mixed air
  - Temperature sensor, supply air
  - Frost monitoring, plate heat exchanger
  - Frost controller
  - Differential pressure switch, fresh air filter
  - Volume flow monitoring, supply air fans
  - Optional components as required
- Room and fresh air sensors supplied with plug, for on-site installation at a suitable location and wiring to the socket on the outside of the unit
- Mains power terminals
- Fuse for the electronics
- Transformer for control module and actuators
- Cable glands designed as cable feedthrough plates

Standard paint finish

The following components of the base unit are painted in Hoval red (RAL 3000):
- Framework construction
- Bottom tray
- Side walls of the plate heat exchanger
- Condensate drip tray
- Extract air and exhaust air duct section

Paint finish as desired

The following components of the base unit are painted in the RAL colour of the customer's choice:
- Framework construction
- Bottom tray
- Side walls of the plate heat exchanger
- Condensate drip tray
- Extract air and exhaust air duct section

Options for the unit

Hydraulic assembly for diverting system:
Prefabricated assembly for the hydraulic diverting system, installed in the unit, consisting of:
- 3-way control ball valve designed with a continuous actuator
- Line balancing valve STAD with integrated drain valve
- Ball valve with extended spindle
- Connecting pipes with bypass designed as galvanised malleable cast-iron threaded pipes
- Screw joints for easy connection to the on-site distributor circuit

Assembly fully insulated with closed-cell insulating material to prevent energy loss and surface condensation on the assembly's components; 3-way control ball valve with plug-in connection fully prewired on the control box for easy maintenance; components adapted to the relevant heating/cooling coil and the ProcessNet control system

The output is regulated via the 3-way control ball valve: the medium is routed through the coil or the bypass. The bypass is dimensioned such that it corresponds to the resistance of the coil. This ensures that the pressure in the load circuit remains constant.

The line balancing valve in the flow coordinates the total resistance of the load with the distribution circuit. In addition, the line balancing valve can also be used to shut the line off completely.

Technical data, line balancing valve:
- Max. pressure 800 kPa at 120°

Technical data, control ball valve:
- Supply voltage: 24 V DC
- Control voltage 0…10 V DC
- Operating range: 2…10 V DC
- Position response: 2…10 V DC
- Actuator run time: 4 s/90°
- Casing material: nickel-plated hot-pressed brass
- Closing element material: stainless steel

4-pipe switching, complete:
Prefabricated assembly for simple switch-over between heating and cooling in plants with 2 separate hydraulic circuits; consisting of:
- 2-way switching valves (4 pieces), designed as a ball valve with OPEN/CLOSED actuator and auxiliary switch for signalling the end positions
- Shut-off ball valves with extended spindle (8 pieces)
- Pipes designed as galvanised malleable cast-iron threaded pipes
- Screw joints for easy connection to the on-site distributor circuit

Assembly fully insulated with closed-cell insulating material to prevent energy loss and surface condensation on the assembly's components; switching valves with plug-in connection fully prewired on the control box for easy maintenance; components adapted to the hydraulic assembly.

Electrical components for automatic switch-over between heating and cooling integrated in the control box:
- Digital outputs for controlling the 2-way switching valves (4 pieces)
- Digital inputs for monitoring the end positions of the 2-way switching valves by means of auxiliary switches (8 pieces)

Electrical components adapted to the ProcessNet control system

The switch-over is performed automatically depending on the heat/cool demand.

Technical data, 2-way switching valve:
- Supply voltage: 24 V DC
- Control voltage OPEN/CLOSED
- Actuator run time: 90 s/90°

Return pump station water:
Pump station for returning condensate for recycling or disposal; suitable for water-emulsion mixtures; installed in the unit, fully electrically prewired; consisting of:
- Hosing from condensate drains to pump receiver
- Pump receiver
- Submersible pump
- Check valve
- Level probe

Technical data:
- Pump output: 25 l/min
- Delivery head: 8 m
- Motor output: 0.14 kW
- Speed of rotation: 2 700 rpm
- Voltage: 3 x 400 V AC
- Frequency: 50 Hz
- Protection rating: IP 55
- Pump material: PPS
- Pump shaft material: 1.4104
- Pump receiver material: SJ235R
- Piping material: Threaded pipe according to DIN 2440, seamlessly galvanised, including fittings; PVC fabric hoses
- Nominal diameter of the connections: ¾ "

Return pump station oil:
Pump station for returning condensate for recycling or disposal; suitable for oily condensate from the plate heat exchanger (with an upstream oil separator); installed in the unit, fully electrically prewired; consisting of:
- Hosing from condensate drains to pump receiver
- Pump receiver
- Submersible pump
- Check valve
- Level probe

Technical data:
- Pump output: 25 l/min
- Delivery head: 8 m
- Motor output: 0.14 kW
- Speed of rotation: 2 700 rpm
- Voltage: 3 x 400 V AC
- Frequency: 50 Hz
- Protection rating: IP 55
- Pump material: PPS
- Pump shaft material: 1.4104
- Pump receiver material: SJ235R
- Piping material: Threaded pipe according to DIN 2440, seamlessly galvanised, including fittings; PVC fabric hoses
- Nominal diameter of the connections: ¾ "

Control systems

Control system for the energy-optimised operation of Hoval ProcessVent plants, designed as a decentralised I/O system, with the following main features:
- Control module integrated in every unit, for autonomous and individual regulation of the units, allowing for precise adaptation to the operating conditions
- Master-slave function for forming zones of several units being operated under the same conditions (e.g. same room temperature set values, same operating times)
- Operating mode switching via
  - Time programme, holiday and vacation calendar
  - Specification of a building management system
- The following control functions are performed by the control module:
  - Control of energy recovery depending on the temperature conditions
  - Control of supply air temperature via fixed value control or room air/supply air cascade control
  - Fixed value control of volume flow
  - Soft starting to protect the unit when switching over to operating states with fresh air
  - Defrosting if plate heat exchanger is iced up using the flow of extract air during plant operation
  - Messages relating to the plant's heat or cool demand for external heating and refrigerating systems
  - Fire control: connection for an external signal to shut the plant down in the event of a fire
  - Signal for controlling external extract air systems when the plant is in an operating state where only fresh air is supplied to the hall and no extract air is removed from it (supply air/night cooling summer operating mode)
- Simple connection of the units to a building management system via an interface integrated in the control module by means of the Profinet protocol in order to exchange the following data:
  - Current operating mode
  - Temperature control strategy
  - Temperature set values
  - Temperature actual values
  - Damper positions
  - Alarms
  - Energy meter (energy monitoring option)
- Alarm handling via control module by means of 1 collective alarm routed to terminal and transmission of alarm signals for visualisation
- Running time meter for each unit
- Back-up and restore function for easy saving of user settings and loading of factory settings
- Electrical documentation supplied in the control box

Options for control systems

4-pipe switching, electrical
Electrical components for automatic switch-over between heating and cooling integrated in the control box; for controlling an assembly created on-site for 4-pipe switching via 2-way switching valves:
- Digital outputs for controlling the 2-way switching valves (4 pieces)
- Digital inputs for monitoring the end positions of the 2-way switching valves by means of auxiliary switches (8 pieces)

Electrical components adapted to the ProcessNet control system

Technical requirements for the 2-way switching valves:
- Supply voltage: 24 V DC
- Control voltage OPEN/CLOSED
- Actuator run time: 90 s/90°

Connection via Ethernet:
Electrical components and software interface for exchanging signals between Hoval ProcessVent and Hoval ProcessClean extract air purification plants via Ethernet; electrical components installed and fully prewired in the ProcessVent control box; visualisation on the ProcessClean extract air purification plant.

Connection via Profinet:
Electrical components and software interface for exchanging signals between Hoval ProcessVent and Hoval ProcessClean extract air purification plants via Profinet; electrical components installed and fully prewired in the ProcessVent control box; visualisation on the ProcessClean extract air purification plant.

Connection via Profibus DP coupler:
Electrical components and software interface for exchanging signals between Hoval ProcessVent and Hoval ProcessClean extract air purification plants via a Profibus DP coupler; electrical components installed and fully prewired in the ProcessVent control box; visualisation on the ProcessClean extract air purification plant.

Connection via external signals:
Electrical components and software interface for connecting one or more (maximum 4) non-Hoval extract air purification plants to the Hoval ProcessNet control system; visualisation via building management system or touchpanel on the unit.
Connection via digital inputs and outputs:
- Digital inputs, operating message, extract air purification plant 1 – 4
- Digital input, emergency stop, extract air purification plant
- Digital input, collective alarm
- Digital outputs, enable, extract air purification plant 1 – 4

Room temperature averaging:
3 additional room air sensors supplied for averaging; for on-site installation at a suitable location and wiring to the socket on the outside of the unit

Energy monitoring:
Calculation of the energy saved with the cross-flow plate heat exchanger and display on the operator terminal; additional temperature sensor and analogue input installed in the unit; fully prewired.

Design for injection system:
Components for controlling and protecting a heating/cooling pump integrated in the control box; digital output routed to terminals in the control box.

Requirements for the pump in the load circuit:
- Power supply: 230 VAC
- Power consumption: max. 1 kW
- Current consumption: max. 4 A
- Input signal for activation of control of pump ON
- Output signal for pump alarm

Control of supply air damper:
Control of an on-site supply air damper depending on the operating state of the compact unit; consisting of:
- Digital output routed to terminals in the control box (0...10 V DC)
- Output terminals in the control box for supplying power to the actuator (24 V DC)
- Analogue input for position return signal from the actuator (2...10 V DC)

Control of exhaust air damper:
Control of an on-site exhaust air damper depending on the operating state of the extract air purification plant; consisting of:
- Digital output routed to terminals in the control box (0...10 V DC)
- Output terminals in the control box for supplying power to the actuator (24 V DC)
- Analogue input for position return signal from the actuator (2...10 V DC)

Touchpanel on the unit:
Preprogrammed plug & play operator terminal with graphical user interface for using the Hoval ProcessVent in plants with non-Hoval extract air purification plants:
- Touchpanel with colour display installed in the doors of the control box
- Facilitates monitoring and programming of Hoval ProcessNet (operating modes, temperature values, time programme, calendar, alarm handling, control parameters)

Power supply:
Power supply for Hoval ProcessVent if this is installed in conjunction with non-Hoval extract air purification plants. The power supply contains the following components:

- Mains power terminals
- Circuit breaker to protect the supply air fans of the Hoval ProcessVent
- 3-pin safety relay installed in the control box doors
- In the design for injection system: circuit breaker to protect the heating pump

Technical data

General:
Nominal air quantity: _____ m³/h
External available pressure: _____ Pa

Dimensions (length x width x height):
Base unit: 2000 x 1850 x 2904 mm
Fresh air module: 1631 x 700 x 1430 mm
Total: 2000 x 1850 x 4334 mm

Weight:
Base unit: _____ kg
Fresh air module: _____ kg
Total: _____ kg

Fans:
Supply voltage: 3 x 400 V AC/50 Hz
Power consumption: _____ kW
Current consumption: _____ A
Speed of rotation (nominal): _____ rpm
Protection rating: IP 54

Sound data:
Sound power level:
– Duct connection, fresh air: _____ dB(A)
– Duct connection, supply air: _____ dB(A)
– Displacement flow diffuser: _____ dB(A)
Sound pressure level at 1 m distance from the unit: _____ dB(A)

Heat recovery:
Fresh air temperature: _____ °C
Fresh air relative humidity: _____ %
Extract air temperature: _____ °C
Extract air relative humidity: _____ %

Heat recovery efficiency, dry: _____ %
Heat recovery efficiency, moist: _____ %
Pressure drop: _____ Pa

Technical data, heating coil:
Heat output: _____ kW
Flow/return: _____ °C
Supply air temperature: _____ °C
At air inlet temperature: _____ °C
Operating pressure: _____ kPa

Technical data, cooling coil:
Cooling capacity: _____ kW
Flow/return: _____ °C
Supply air temperature: _____ °C
At air inlet temperature: _____ °C
Operating pressure: _____ kPa

ProcessVent PV

Compact unit for ventilating production halls
with heat recovery from process air

C

1 Use

1.1 Intended use

The ProcessVent unit is used to recover heat from process air and supply fresh air to halls containing enclosed machine tools or welding plants. The extract air from the extract air purification plant flows through a plate heat exchanger in an oil-tight design and is routed to the outside via a duct; the heat it contains is transferred to the supply air.

Intended use also includes compliance with the installation, commissioning, operating and servicing conditions (operating manual).
Any use above and beyond this is deemed improper. The manufacturer can accept no liability for damage resulting from improper use.

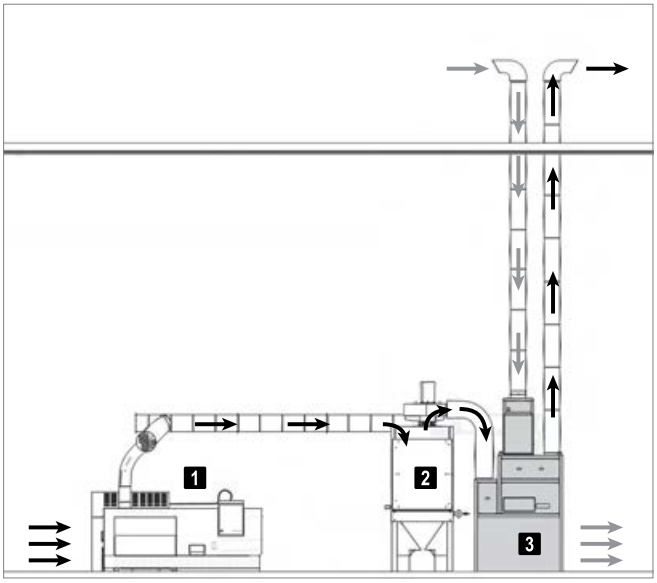
1.2 User group

The unit may only be installed, operated and serviced by authorised and trained specialist personnel who are familiar with the unit and aware of the risks involved.
The operating manual is intended for English-speaking operating engineers and technicians and for specialist building services, heating and ventilation technology personnel.

2 Construction and operation

The ProcessVent unit forms one overall system with the extract air purification plant: The extract air purification plant draws off soiled air from machine tools or welding plants by means of a fan. It purifies this process air and transports it onwards through the extract air duct to the ProcessVent unit.

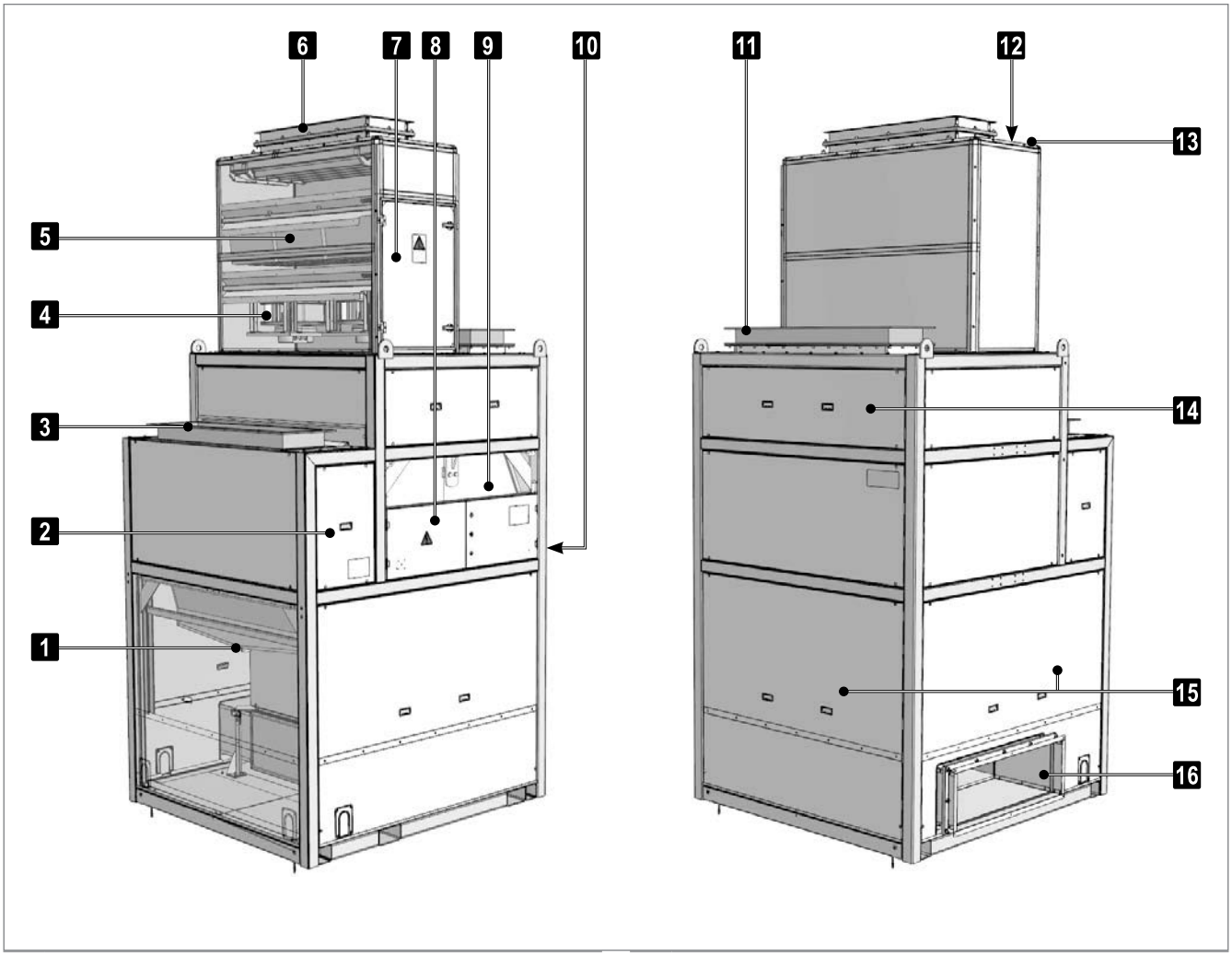
The ProcessVent unit fulfils the following functions:
- Fresh air supply
- Extract air removal (with air conveyance via the extract air purification plant)
- Recovery of heat from the process air
- Recirculation operation
- Air filtration



1	Machine tool
2	Extract air purification plant
3	ProcessVent

Fig. C1: **The ProcessVent unit forms one overall system with the extract air purification plant.**

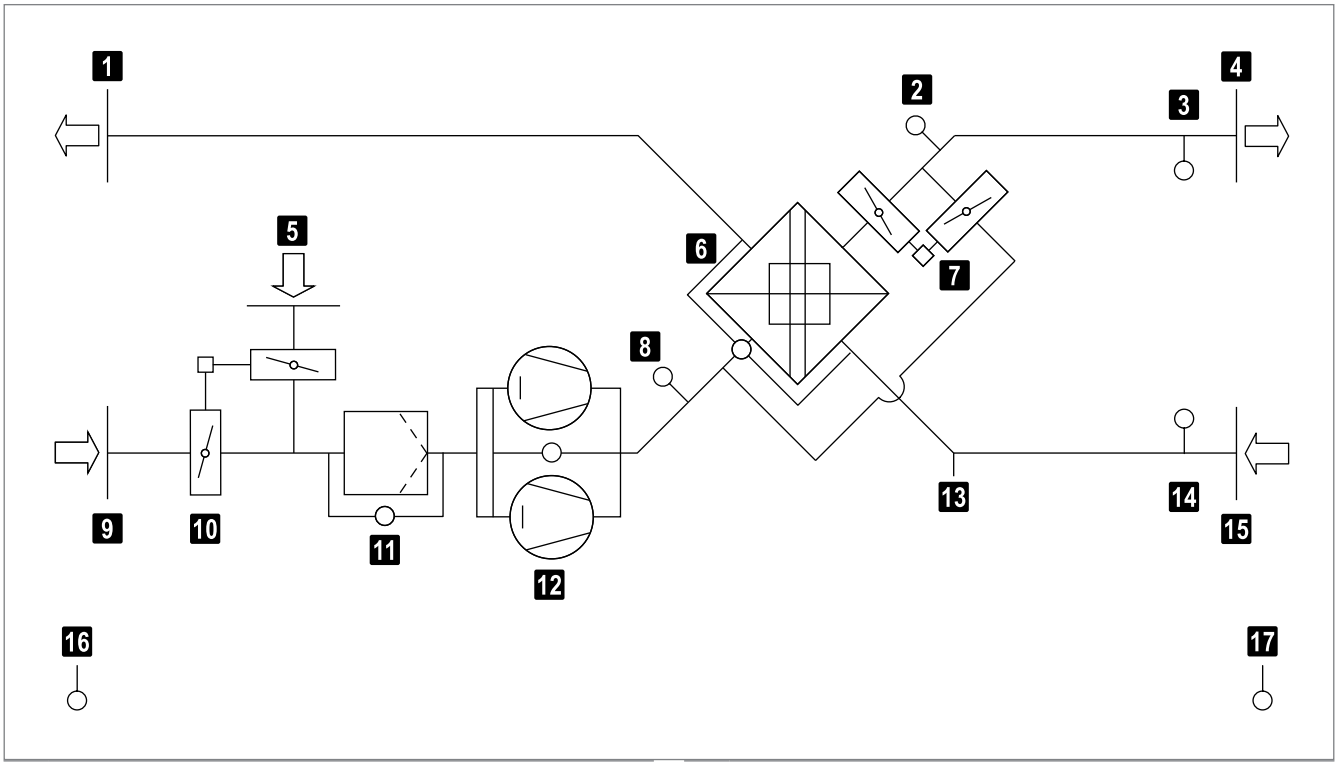
2.1 Construction



1	Condensate connection	9	Plate heat exchanger with frost monitoring
2	Access door, extract air	10	ER and bypass damper with continuous actuator
3	Duct connection, extract air	11	Duct connection, exhaust air
4	Supply air fans	12	Recirculation air inlet
5	Fresh air filter (class F7) with filter monitoring	13	Fresh air/recirculation damper with continuous actuator
6	Duct connection, fresh air	14	Access door, exhaust air
7	Access door, fresh air	15	Access panels, supply air (on all sides)
8	Control box	16	Supply air duct connection, rear

Fig. C2: Unit construction

2.2 Operational diagram



1	Exhaust air	10	Fresh air/recirculation damper with actuator
2	Temperature sensor, energy monitoring (optional)	11	Fresh air filter with differential pressure switch
3	Supply air sensor	12	Supply air fans with volume flow monitoring
4	Supply air	13	Condensate connection
5	Recirculation	14	Extract air sensor
6	Plate heat exchanger with differential pressure switch	15	Extract air
7	ER/bypass damper with actuator	16	Fresh air sensor
8	Mixed air sensor	17	Room air sensor
9	Fresh air		

Fig. C3: Operational diagram

2.3 Operating modes

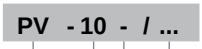
The unit has the following operating modes:
- Ventilation
- Supply air
- Night cooling summer
- Off

The ProcessNet control system or the higher-level building management system controls the overall plant automatically. The operating mode of the ProcessVent units depends on:
- the time programme
- the operating states of the machines from which the process air is to be drawn off

The following applies: When the machines are in operation, the ProcessVent unit always works in 'Ventilation' mode. The operating mode defined in the time programme is overridden. You can also control the operating mode of the ProcessVent unit manually and thus independently of the overall plant (e.g. for maintenance activities).
You will find a detailed description of the ProcessNet control system in Section F 'Control systems' of this handbook.

Code	ProcessVent operating mode	Description
VE	**Ventilation** The unit blows fresh air into the room. The fresh air quantity is constant; it is dependent on the extract air volume flow. The extract air from the extract air purification plant flows through the plate heat exchanger into the open air. The room temperature set value day is active. Energy recovery is controlled depending on the heat demand and temperature conditions.	Supply air fan.....On [1] Energy recovery .....0–100% Fresh air damper .....Open Recirculation damper.....Closed 1) Nominal volume flow as per setting in the control system (adjusted to the extract air volume flow)
SA	**Supply air** The unit blows fresh air into the room. The fresh air quantity is constant. Room air flows into the open via open doors and windows or is drawn off via an external system.	Supply air fan.....On [1] Energy recovery .....0% Fresh air damper .....Open Recirculation damper.....Closed 1) Nominal volume flow as per setting in the control system
NCS	**Night cooling summer** On/off operation with room temperature set value night: ■ If current temperatures permit, the unit blows cool fresh air into the room and thus uses it for free cooling. ■ If current temperatures do not permit free cooling, the unit switches off.	Supply air fan.....On [1] [2] Energy recovery .....0% Fresh air damper .....Open [2] Recirculation damper.....Closed [2] 1) Volume flow set in the control system 2) Depending on temperature conditions
OFF	**Off** The unit is switched off.	Supply air fan.....Off Energy recovery .....0% Fresh air damper .....Closed Recirculation damper.....Open

3 Unit type reference



Unit type
ProcessVent

Unit size
10

Coil
Without coil

Options
You will find a detailed description of all optional components in Section D 'Options' of this handbook.

4 Technical data

4.1 Application limits

Extract air temperature	max.	50	°C
Extract air relative humidity (incl. oil vapours)	max.	100	%
Dust content of extract air	max.	5	mg/m³
Oil content of extract air [1)]	max.	10	mg/m³
Fresh air temperature	min.	-30	°C
Ambient temperature		4 … 40	°C
Supply air temperature	max.	60	°C
Amount of condensate (at up to 10 m delivery head)	max.	1.2	m³/h
Differential pressure fresh air/extract air	max.	2500	Pa
Overpressure/underpressure	max.	1500	Pa

[1)] Conventional mineral, synthetic and ester oils and emulsions from the field of machining

Table C1: Application limits

- The unit is not suitable for use in potentially explosive atmospheres.
- The unit is not suitable for use in rooms with active humidification.
- The unit is corrosion-protected, but only suitable for use in applications where the extract air contains very aggressive substances (sulphur, methanol, acetone, toluene, etc.) to a limited extent. Please contact Hoval applications support.

4.2 Air flow rate, electrical connections

Air distribution	Nominal air flow rate [1]	10 000	m³/h
Heat recovery	Heat recovery efficiency, dry	61	%
	Heat recovery efficiency, moist (max.)	95	%
Fan characteristics	Supply voltage	3 x 400	VAC
	Permitted voltage tolerance	±10	%
	Frequency	50	Hz
	Nominal power consumption	2 x 2.4	kW
	Current consumption	2 x 3.9	A
	Speed of rotation (nominal)	2400	rpm
Actuators	Supply voltage	24	VDC
	Control voltage	2…10	VDC
Filter	Filter class	F7	
	Factory setting, pressure monitor	250	Pa
Plate heat exchanger	Factory setting, pressure monitor	250	Pa

[1] Control range 3000…12 000 m³/h
The air flow rate depends on the extract air volume flow. Operation at minimum air flow rate is only recommended in partial load operation or intermittent operation.

Table C2: Technical data

Unit type		**PV-10**
Available pressure	Pa	570

Table C3: **Available fan pressure to compensate for external pressure drops (at nominal air flow rate)**

4.3 Sound level

Position		Duct connection, fresh air	Duct connection, supply air	Displacement **flow diffuser (option)**
Sound power level	dB(A)	71	66	75
Sound pressure level	dB(A)	–	–	59 [1]

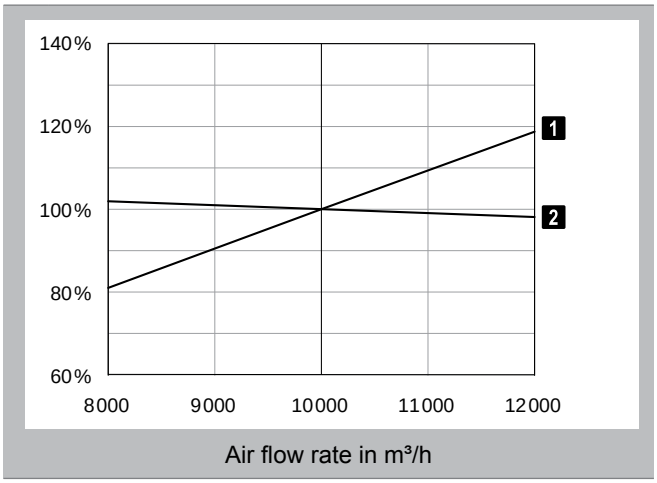
1) Applies at a distance of 1 m from the unit, measuring surface sound pressure level according to DIN 45636

Table C4: Sound level

C

4.4 Energy recovery

The data applies for the nominal air flow rate of 10 000 m³/h. The actual values are dependent on the actual air flow rate. The percentage change in these values for volume flows in the range 8 000…12 000 m³/h is shown in Diagram C1. For air flow rates under 8 000 m³/h, please contact Hoval applications support.



1 Energy recovery

2 Supply air temperature

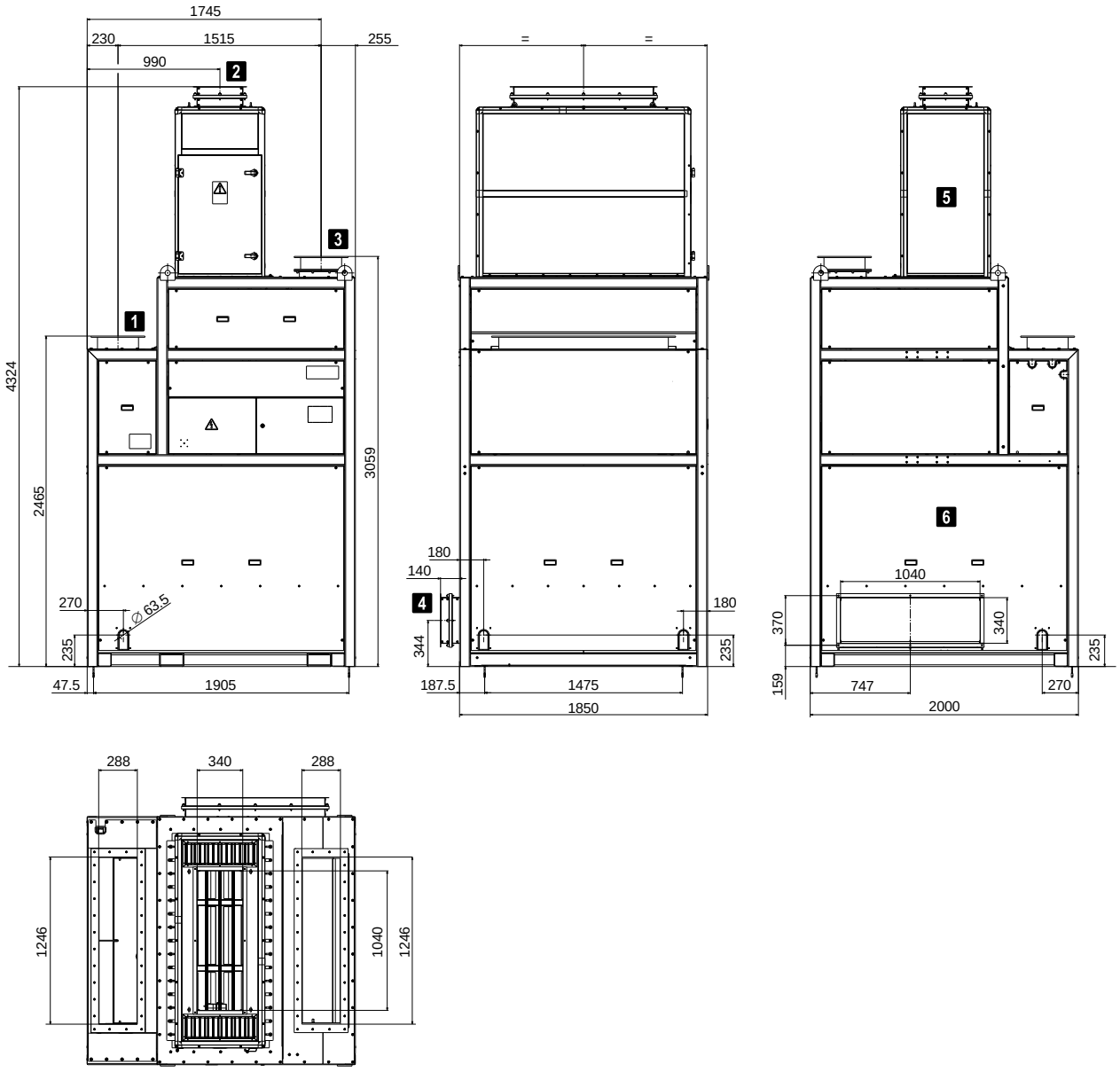
Diagram C1: **Changes in output data depending on the air flow rate**

	Fresh air	-15 °C/90%		-5 °C/90%	
t_{Ext}	rh_{Ext}	Q_{ER}	t_S	Q_{ER}	t_S
°C	%	kW	°C	kW	°C
15	20	62	4	41	7
	40	65	4	42	8
	60	70	6	45	8
	80	77	8	50	10
	100	84	10	57	12
20	20	73	7	52	10
	40	77	8	53	11
	60	85	10	58	12
	80	93	13	65	15
	100	101	15	73	17
25	20	84	10	62	14
	40	90	12	65	15
	60	99	15	72	17
	80	109	18	81	19
	100	119	21	91	22
30	20	95	14	73	17
	40	104	16	78	18
	60	115	19	86	21
	80	126	23	97	24
	100	137	26	107	27

Legend:
t_{Ext} = Extract air temperature
rh_{Ext} = Extract air humidity
Q_{ER} = Energy recovery output
t_S = Supply air temperature

Table C5: Energy recovery output of the ProcessVent

4.5 Dimensions and weights



1	Extract air duct connection	4	Supply air duct connection, rear
2	Fresh air duct connection	5	Fresh air module
3	Exhaust air duct connection	6	Base unit

Fig. C4: **Dimensional drawing (dimensions in mm)**

Unit type			PV-10
Components	Base unit	kg	1417
	Fresh air module	kg	240
	Total	**kg**	**1657**

Table C6: Weights

5 Specification texts

ProcessVent

Compact unit for ventilating production halls with heat recovery from process air, consisting of:
- Fresh air module
- Base unit with heat recovery in an oil-tight design, air treatment and air introduction
- Control system
- Optional components

Fresh air module

Self-supporting, double-shell, foamed panel construction with insulation free of thermal bridges made of closed-cell polyurethane (PUR, building materials class B1 according to DIN 4102-1); equipped with jack rings for transport and installation on-site.

The fresh air module contains:

Fresh air/recirculation damper:
Opposed dampers for switching between fresh air and recirculation operation, including continuous actuator with safety function in the event of a power failure.

Fresh air filter:
Designed as a compact filter of class F7, including differential pressure switch for filter monitoring.

STANDARD FANS

Supply air fans:
Designed as maintenance-free, direct-drive radial fans with high-efficiency EC motors, backwards-curved, 3D contoured blades and a free-running rotating wheel made of a high-performance composite material; infinitely variable (2 pieces).

HIGH-PRESSURE FANS

High-pressure fans:
Designed as maintenance-free, direct-drive radial fans with high-efficiency EC motors, backwards-curved blades and a free-running rotating wheel made of aluminium; infinitely variable (2 pieces); in a high-pressure design to compensate for external pressure drops (e.g. through air ducts).

Duct connection, fresh air:
Compensator with ventilation flange, fits on flange S30, for connection to the on-site fresh air duct.

Access door, fresh air:
Large access opening for easily accessing the fresh air filter and the fans for maintenance purposes.

Fresh air module, upright

The fresh air module is intended for upright installation on the base unit and equipped with plug-in connections for easy electrical installation.

Fresh air module, horizontal

The fresh air module is intended for horizontal installation on the base unit and equipped with plug-in connections for easy electrical installation; including connection duct and transverse support made of sheet steel, welded, with high-quality anti-corrosion primer and paint finish.

Paint finish as desired

The casing of the fresh air module is painted in the RAL colour of the customer's choice.

Base unit with heat recovery in an oil-tight design, air treatment and air introduction

Supporting framework construction made of steel sections, welded, with high-quality anti-corrosion primer and paint finish; bottom tray made of sheet steel, water and oil-tight, with high-quality anti-corrosion primer and paint finish; cover panels made of aluzinc sheet steel; equipped with jack rings and fork-lift openings for transport and installation on-site.

The base unit contains:

Cross-flow plate heat exchanger:
In a water and oil-tight design to recover heat from process air. Exchanger package consists of epoxy-coated aluminium plates with pressed-in spacers. The plates have a keyed fold connection with one another, which multiplies the material strength for the air inlet and outlet. The corners of the exchanger package are stuck into the aluminium press-drawn hollow sections of the casing with a sealing compound to form a water and oil-tight seal. The side walls made of sheet steel with a high-quality anti-corrosion primer and paint finish are screwed flush with these corners and sealed so they are water and oil-tight. A bypass is positioned in the flow of supply air and sealed so it is air and oil-tight against the extract air side; leak test according to company standard. Opposed ER and bypass damper mounted on the casing to control the output of the cross-flow plate heat exchanger, including continuous actuator. Frost monitoring on the extract air side by means of differential pressure switch.

Condensate drip tray with drain:
In a water and oil-tight design to remove oily condensate from the cross-flow plate heat exchanger, with high-quality anti-corrosion primer and paint finish.

Extract air and exhaust air duct section:
Water and oil-tight welded construction made of steel for conveying air containing oil, insulated with closed-cell Polycell (building materials class B2 according to DIN 4102-1), equipped with media-resistant compensators (2 pieces) with DIN flanged connecting pieces for connection to the on-site extract air and exhaust air duct.

Fresh air duct section:
Transition between the fresh air module and the cross-flow plate heat exchanger, made of aluzinc sheet steel, insulated with closed-cell Polycell (building materials class B2 according to DIN 4102-1).

Supply air duct section:
Transition between the cross-flow plate heat exchanger and the air introduction section, made of aluzinc sheet steel.

Supply air duct connection, rear

Air outlet box with supply air duct section:
Connection to the on-site air distribution system, equipped with a compensator with ventilation flange, fits on flange S30, for connection to the on-site supply air duct (on the rear of the unit).

Supply air duct connection, left

Air outlet box with supply air duct section:
Connection to the on-site air distribution system, equipped with a compensator with ventilation flange, fits on flange S30, for connection to the on-site supply air duct (on the left of the unit).

Displacement flow diffuser

Displacement flow diffuser:
Cover panels towards the bottom of the base unit designed as a displacement flow diffuser for introducing the supply air into the occupied area in a low-pulse, duct-free manner; consisting of:
- Outlet panel designed as a perforated sheet
- Fabric mat for air distribution
- Spring rods for attaching the fabric mat

Access openings:
- Access door, exhaust air: large access opening for easily accessing the cross-flow plate heat exchanger for maintenance purposes; panel designed with a water and oil-tight closing system
- Access door, extract air: large access opening for easily accessing the condensate drip tray with drain for maintenance purposes; panel designed with a water and oil-tight closing system
- Access panel, supply air: large revision openings on all sides (4 pieces) with panels for easily accessing other components for maintenance purposes (depending on equipment: ER and bypass damper, return pump station, condensate drain).

Control box with control module as part of the Hoval ProcessNet control system:

- Control box made of sheet steel, powder-coated with textured paint in light grey (RAL 7035), integrated flush with the framework construction
- Control module fully prewired with all I/O components:
  - Supply air fans
  - Actuator, fresh air/recirculation damper
  - Actuator, ER/bypass damper
  - Temperature sensor, mixed air
  - Temperature sensor, supply air
  - Frost monitoring, plate heat exchanger
  - Differential pressure switch, fresh air filter
  - Volume flow monitoring, supply air fans
  - Optional components as required
- Room and fresh air sensors supplied with plug, for on-site installation at a suitable location and wiring to the socket on the outside of the unit
- Mains power terminals
- Fuse for the electronics
- Transformer for control module and actuators
- Cable glands designed as cable feedthrough plates

STANDARD PAINT FINISH

The following components of the base unit are painted in Hoval red (RAL 3000):

- Framework construction
- Bottom tray
- Side walls of the plate heat exchanger
- Condensate drip tray
- Extract air and exhaust air duct section

PAINT FINISH AS DESIRED

The following components of the base unit are painted in the RAL colour of the customer's choice:

- Framework construction
- Bottom tray
- Side walls of the plate heat exchanger
- Condensate drip tray
- Extract air and exhaust air duct section

Options for the unit

Return pump station water:
Pump station for returning condensate for recycling or disposal; suitable for water-emulsion mixtures; installed in the unit, fully electrically prewired; consisting of:

- Hosing from condensate drains to pump receiver
- Pump receiver
- Submersible pump
- Check valve
- Level probe

Technical data:

- Pump output: 25 l/min
- Delivery head: 8 m
- Motor output: 0.14 kW
- Speed of rotation: 2 700 rpm
- Voltage: 3 x 400 V AC
- Frequency: 50 Hz
- Protection rating: IP 55
- Pump material: PPS
- Pump shaft material: 1.4104
- Pump receiver material: SJ235R
- Piping material: Threaded pipe according to DIN 2440, seamlessly galvanised, including fittings; PVC fabric hoses
- Nominal diameter of the connections: ¾ "

Return pump station oil:
Pump station for returning condensate for recycling or disposal; suitable for oily condensate from the plate heat exchanger (with an upstream oil separator); installed in the unit, fully electrically prewired; consisting of:

- Hosing from condensate drains to pump receiver
- Pump receiver
- Submersible pump
- Check valve
- Level probe

Technical data:

- Pump output: 25 l/min
- Delivery head: 8 m
- Motor output: 0.14 kW
- Speed of rotation: 2 700 rpm
- Voltage: 3 x 400 V AC
- Frequency: 50 Hz
- Protection rating: IP 55
- Pump material: PPS
- Pump shaft material: 1.4104
- Pump receiver material: SJ235R
- Piping material: Threaded pipe according to DIN 2440, seamlessly galvanised, including fittings; PVC fabric hoses
- Nominal diameter of the connections: ¾ "

Control systems

Control system for the energy-optimised operation of Hoval ProcessVent plants, designed as a decentralised I/O system, with the following main features:

- Control module integrated in every unit, for autonomous and individual regulation of the units, allowing for precise adaptation to the operating conditions
- Master-slave function for forming zones of several units being operated under the same conditions (e.g. same room temperature set values, same operating times)
- Operating mode switching via
  - Time programme, holiday and vacation calendar
  - Specification of a building management system
- The following control functions are performed by the control module:
  - Control of energy recovery depending on the temperature conditions
  - Control of supply air temperature via fixed value control or room air/supply air cascade control
  - Fixed value control of volume flow
  - Soft starting to protect the unit when switching over to operating states with fresh air
  - Defrosting if plate heat exchanger is iced up using the flow of extract air during plant operation
  - Messages relating to the plant's heat or cool demand for external heating and refrigerating systems
  - Fire control: connection for an external signal to shut the plant down in the event of a fire
  - Signal for controlling external extract air systems when the plant is in an operating state where only fresh air is supplied to the hall and no extract air is removed from it (supply air/night cooling summer operating mode)
- Simple connection of the units to a building management system via an interface integrated in the control module by means of the Profinet protocol in order to exchange the following data:
  - Current operating mode
  - Temperature control strategy
  - Temperature set values
  - Temperature actual values
  - Damper positions
  - Alarms
  - Energy meter (energy monitoring option)
- Alarm handling via control module by means of 1 collective alarm routed to terminal and transmission of alarm signals for visualisation
- Running time meter for each unit
- Back-up and restore function for easy saving of user settings and loading of factory settings
- Electrical documentation supplied in the control box

Options for control systems

Connection via Ethernet:
Electrical components and software interface for exchanging signals between Hoval ProcessVent and Hoval ProcessClean extract air purification plants via Ethernet; electrical components installed and fully prewired in the ProcessVent control box; visualisation on the ProcessClean extract air purification plant.

Connection via Profinet:
Electrical components and software interface for exchanging signals between Hoval ProcessVent and Hoval ProcessClean extract air purification plants via Profinet; electrical components installed and fully prewired in the ProcessVent control box; visualisation on the ProcessClean extract air purification plant.

Connection via Profibus DP coupler:
Electrical components and software interface for exchanging signals between Hoval ProcessVent and Hoval ProcessClean extract air purification plants via a Profibus DP coupler; electrical components installed and fully prewired in the ProcessVent control box; visualisation on the ProcessClean extract air purification plant.

Connection via external signals:
Electrical components and software interface for connecting one or more (maximum 4) non-Hoval extract air purification plants to the Hoval ProcessNet control system; visualisation via building management system or touchpanel on the unit.
Connection via digital inputs and outputs:

- Digital inputs, operating message, extract air purification plant 1 – 4
- Digital input, emergency stop, extract air purification plant
- Digital input, collective alarm
- Digital outputs, enable, extract air purification plant 1 – 4

Room temperature averaging:
3 additional room air sensors supplied for averaging; for on-site installation at a suitable location and wiring to the socket on the outside of the unit

Energy monitoring:
Calculation of the energy saved with the cross-flow plate heat exchanger and display on the operator terminal; additional temperature sensor and analogue input installed in the unit; fully prewired.

Control of supply air damper:
Control of an on-site supply air damper depending on the operating state of the compact unit; consisting of:
- Digital output routed to terminals in the control box (0...10 V DC)
- Output terminals in the control box for supplying power to the actuator (24 V DC)
- Analogue input for position return signal from the actuator (2...10 V DC)

Control of exhaust air damper:
Control of an on-site exhaust air damper depending on the operating state of the extract air purification plant; consisting of:
- Digital output routed to terminals in the control box (0...10 V DC)
- Output terminals in the control box for supplying power to the actuator (24 V DC)
- Analogue input for position return signal from the actuator (2...10 V DC)

Touchpanel on the unit:
Preprogrammed plug & play operator terminal with graphical user interface for using the Hoval ProcessVent in plants with non-Hoval extract air purification plants:
- Touchpanel with colour display installed in the doors of the control box
- Facilitates monitoring and programming of Hoval ProcessNet (operating modes, temperature values, time programme, calendar, alarm handling, control parameters)

Power supply:
Power supply for Hoval ProcessVent if this is installed in conjunction with non-Hoval extract air purification plants. The power supply contains the following components:
- Mains power terminals
- Circuit breaker to protect the supply air fans of the Hoval ProcessVent
- 3-pin safety relay installed in the control box doors
- In the design for injection system: circuit breaker to protect the heating pump

Technical data

General:
Nominal air quantity: _____ m^3/h
External available pressure: _____ Pa

Dimensions (length x width x height):
Base unit: 2000 x 1850 x 2904 mm
Fresh air module: 1631 x 700 x 1430 mm
Total: 2000 x 1850 x 4334 mm

Weight:
Base unit: _____ kg
Fresh air module: _____ kg
Total: _____ kg

Fans:
Supply voltage: 3 x 400 V AC/50 Hz
Power consumption: _____ kW
Current consumption: _____ A
Speed of rotation (nominal): _____ rpm
Protection rating: IP 54

Sound data:
Sound power level:
– Duct connection, fresh air: _____ dB(A)
– Duct connection, supply air: _____ dB(A)
– Displacement flow diffuser: _____ dB(A)
Sound pressure level at 1 m distance from the unit: _____ dB(A)

Heat recovery:
Fresh air temperature: _____ °C
Fresh air relative humidity: _____ %
Extract air temperature: _____ °C
Extract air relative humidity: _____ %

Heat recovery efficiency, dry: _____ %
Heat recovery efficiency, moist: _____ %
Pressure drop: _____ Pa

Options

1 Unit type reference

PVH - 10 A / SV . K1 . AS . SL / HY . U1 . RW / PN . ET . MR / EM . ES . ZK . FK / TP . LV

Unit type

PV	ProcessVent
PVH	ProcessVent heat (with heating coil)
PVC	ProcessVent cool (with heating/cooling coil)

Unit size

10

Coil

A, B, C	Heating coil type A, B or C
C, D	Heating/cooling coil type C or D
-	Without

Fans

SV	Standard fans
HV	High-pressure fans

Air outlet

K1	Supply air duct connection, rear (standard)
K2	Supply air duct connection, left
QL	Displacement flow diffuser

Fresh air module

AS	Fresh air module, upright (standard)
AH	Fresh air module, horizontal

Paint finish

SL	Standard paint finish
AL	Paint finish as desired

Hydraulic assembly for diverting system

--	Without (standard)
HY	Hydraulic assembly for diverting system

4-pipe switching

--	Without (standard)
U1	4-pipe switching, complete
U2	4-pipe switching, only electrical components

Return pump station

--	Without (standard)
RW	Return pump station water
RO	Return pump station oil
R2	Return pump station water and oil

PVH - 10 A / SV . K1 . AS . SL / HY . U1 . RW / PN . ET . MR / EM . ES . ZK . FK / TP . LV

Control
PN Design for ProcessNet (standard)

Connection, extract air purification
ET Ethernet (standard)
PT Profinet
PK Profibus DP coupler
IO Connection via external signals (I/O)

Room temperature averaging
-- Without (standard)
MR Room temperature averaging

Energy monitoring
-- Without (standard)
EM Energy monitoring

Injection system
-- Without (standard)
ES Design for injection system

Control of supply air damper
-- Without (standard)
ZK Control of supply air damper

Control of exhaust air damper
-- Without (standard)
FK Control of exhaust air damper

Visualisation
-- External visualisation (standard)
TP Touchpanel on the unit

Power supply
-- Without (standard)
LV Power supply

2 High-pressure fans (HV)

High-pressure fans are EC fans with a higher available pressure to compensate for external pressure drops (e.g. through air ducts). They replace the standard fans.

Supply voltage	3 x 400	VAC
Permitted voltage tolerance	±10	%
Frequency	50	Hz
Nominal power consumption	2 x 4.1	kW
Current consumption	2 x 6.5	A
Speed of rotation (nominal)	2900	rpm

Table D1: Fan characteristics of the high-pressure fans

Unit type		**PV**	**PVH**			**PVC**	
Coil		–	A	B	C	C	D
Available pressure	Pa	810	760	740	670	580	500

Table D2: Available high-pressure fan pressure to compensate for external pressure **drops (at nominal air flow rate)**

Position		Duct connection, fresh air	Duct connection, supply air	Displacement **flow diffuser (option)**
Sound power level	dB(A)	78	74	81
Sound pressure level	dB(A)	–	–	65 [1)]

1) Applies at a distance of 1 m from the unit, measuring surface sound pressure level according to DIN 45636

Table D3: **Sound level of the units with high-pressure fans (at nominal air flow rate)**

3 Air outlet

3.1 Supply air duct connection, left (K2)

The compensator for the supply air duct is mounted on the left side of the unit.

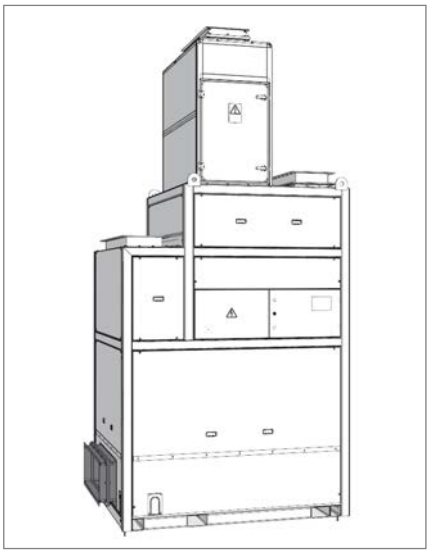


Fig. D1: **Unit with supply air duct connection on left**

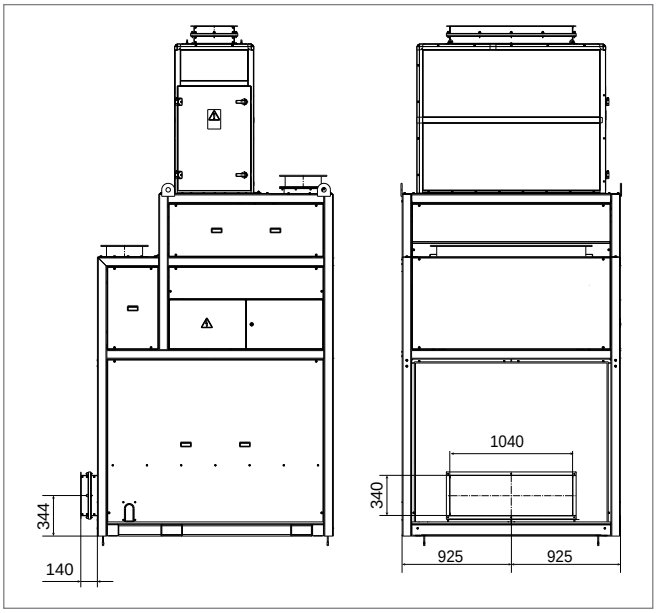


Fig. D2: **Dimensional drawing for supply air duct connection on left (dimensions in mm)**

3.2 Displacement flow diffuser (QL)

Units with a displacement flow diffuser introduce the supply air into the occupied area in a low-pulse, duct-free manner. The bottom section of the base unit is covered with perforated sheets on all sides. Behind these sheets is a fabric mat, which is attached with spring rods, for air distribution.

Fig. D3: **Unit with displacement flow diffuser**

4 Fresh air module, horizontal (AH)

For reasons of space, it can make sense to install the fresh air module on the base unit horizontally, rather than upright. To achieve this, the unit can be supplied complete with a connection duct and a support made of sheet steel. The connection duct must be insulated on-site (30 mm with heat transfer coefficient λ = 0.04 W/mK).

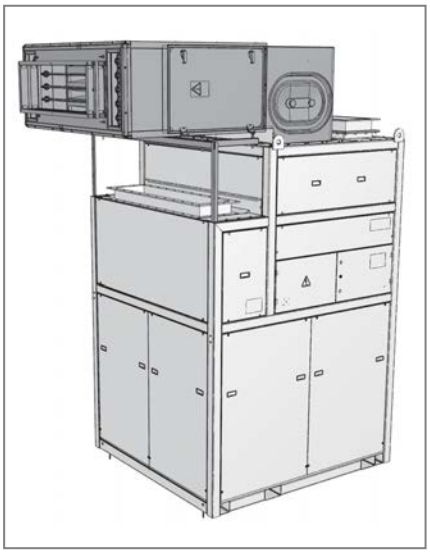


Fig. D4: **Unit with fresh air module installed horizontally**

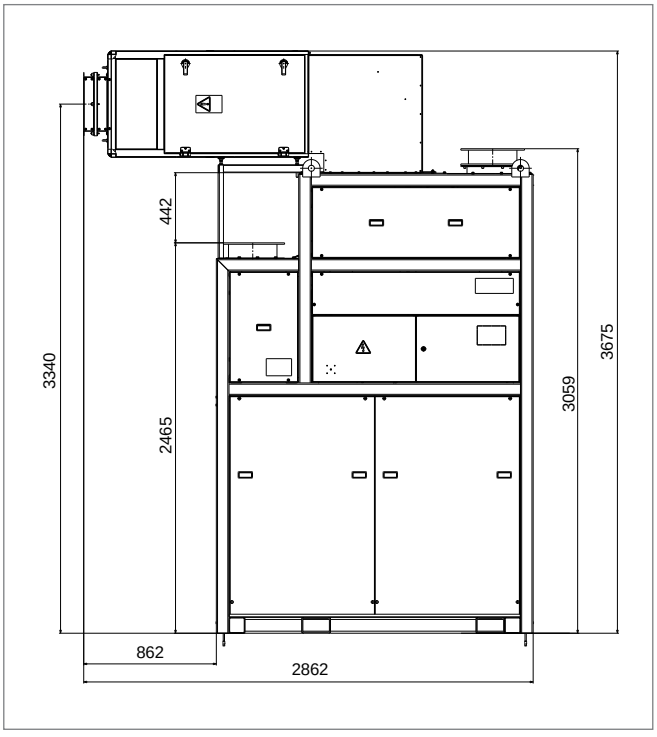


Fig. D5: **Dimensional drawing for fresh air module, horizontal (dimensions in mm)**

5 Paint finish as desired (AL)

The following components are painted in Hoval red (RAL 3000) as standard:

- Framework construction
- Bottom tray
- Side walls of the plate heat exchanger
- Condensate drip tray
- Extract air and exhaust air duct section

These components and the casing of the fresh air module can be painted in any other colour as an option (state the RAL number in the order).

6 Hydraulic assembly for diverting system (HY)

There is an assembly for the hydraulic diverting system installed in the unit. It is fully insulated and comprises the following components:

- 3-way control ball valve
- Line balancing valve STAD
- Ball valve
- Pipes
- Screw joints for easy connection to the on-site distributor circuit (on the back of the unit)

Coil	3-way control ball valve		Flow/return connection
	DN	Kvs	
A B C	25	10 m³/h	External thread 1½ "
D	32	16 m³/h	External thread 2 "

Table D4: Technical data of the hydraulic assembly for diverting system

Supply voltage	24	VDC
Control voltage	0…10	VDC
Operating range	2…10	VDC
Position response	2…10	VDC
Actuator run time	4	s

Table D5: Technical data of the 3-way control ball valve

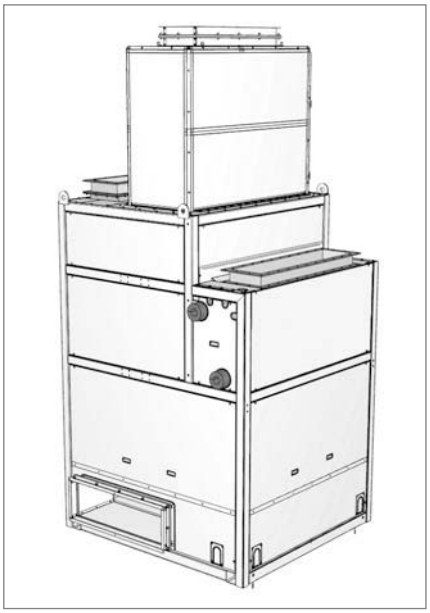
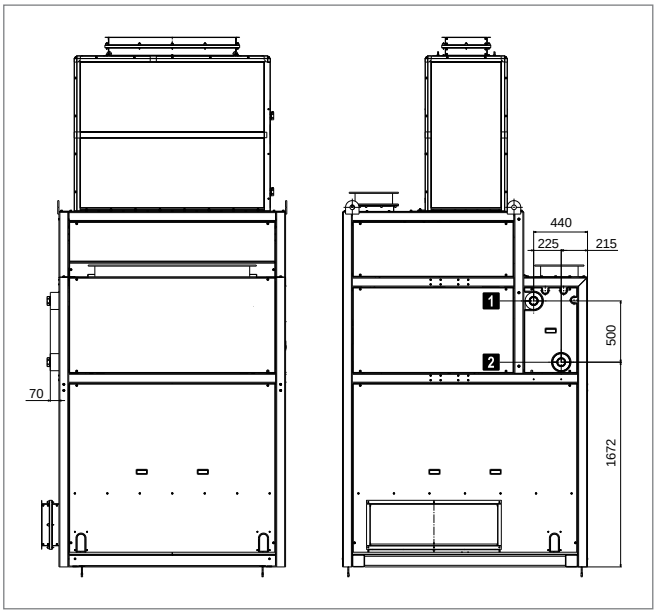


Fig. D6: Connections of the hydraulic assembly for diverting system



1 Return

2 Flow

Fig. D7: **Dimensional drawing for hydraulic connections (dimensions in mm)**

7 4-pipe switching

The 4-pipe switching allows automatic switch-over between heating and cooling in systems with 2 separate hydraulic circuits.

7.1 4-pipe switching, complete (U1)

An assembly for automatic switch-over is attached to the unit. It is fully insulated and comprises the following components:

- 2-way switching valves with auxiliary switch
- Shut-off ball valves
- Piping to the hydraulic assembly for diverting system
- Screw joints for easy connection to the on-site distributor circuit

The electrical components for automatic switch-over are installed and prewired in the terminal box.

Coil	DN	Flow/return connection	Stroke/force
Type C	25	External thread 1½ "	10 Nm
Type D	32	External thread 2 "	10 Nm

Table D6: Technical data of the 4-pipe switching assembly

Supply voltage	24	V DC
Control voltage	OPEN/CLOSED	
Actuator run time	90	s

Table D7: Technical data of the 2-way switching valves

7.2 4-pipe switching, only electrical components (U2)

The electrical components for automatic switch-over are installed in the terminal box (4-pipe switching assembly and wiring on-site; see electrical schematic for connections).

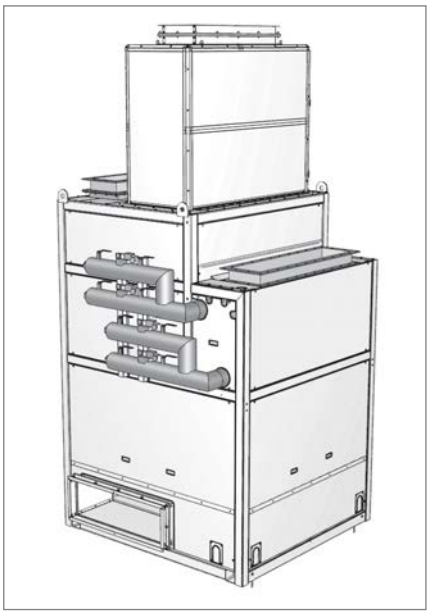
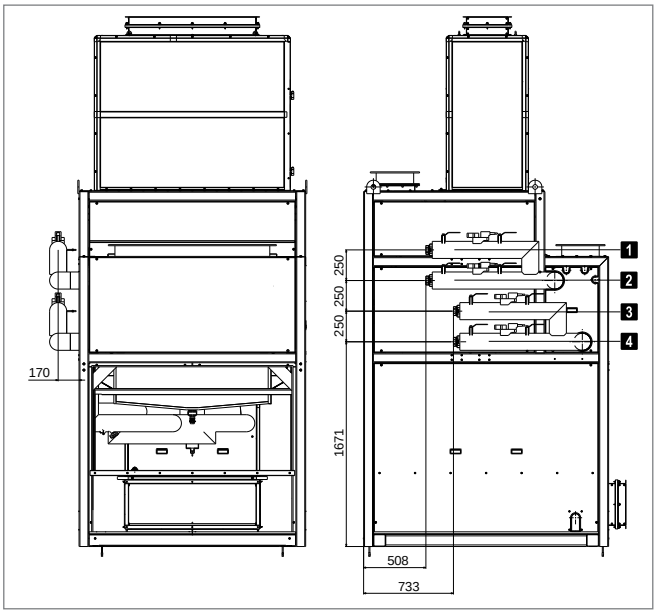


Fig. D8: Unit with 4-pipe switching



1	Heating return
2	Cooling return
3	Heating flow
4	Cooling flow

Fig. D9: Dimensional drawing for 4-pipe switching (dimensions in mm)

D

8 Return pump station

8.1 Return pump station water (RW)

The return pump station water is used for the removal of condensate in applications where connection to the waste water system via a simple condensate line is not possible. It drains the following media or returns them to the process for recycling:

- Water-emulsion mixtures from the plate heat exchanger (with an upstream emulsion separator, wet separator or dry filter)
- Condensate from the cooling coil

The return pump station is installed and prewired in the unit.

8.2 Return pump station oil (RO)

The return pump station oil is used for the removal of condensate in applications where connection to the waste water system via a simple condensate line is not possible. It drains the following media or returns them to the process for recycling:

- Oily condensate from the plate heat exchanger (with an upstream oil separator)

The return pump station is installed and prewired in the unit.

Output	25	l/min
Delivery head	8	m
Supply voltage	3 x 400	VAC
Frequency	Hz	50
Condensate drain connection	¾" (internal thread)	

Table D8: **Technical data of the return pump stations (water and oil)**

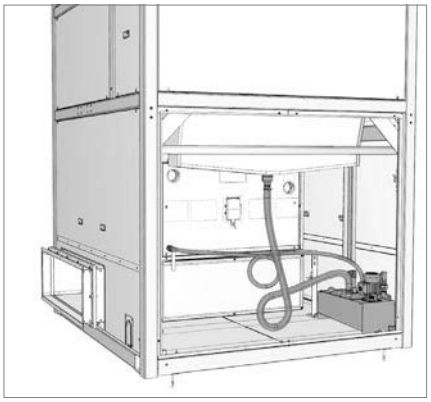


Fig. D10: Return pump station installed in the unit

Notice
You will find a description of the options for control systems in Section F 'Control systems' of this handbook.

Contents

Transport and installation

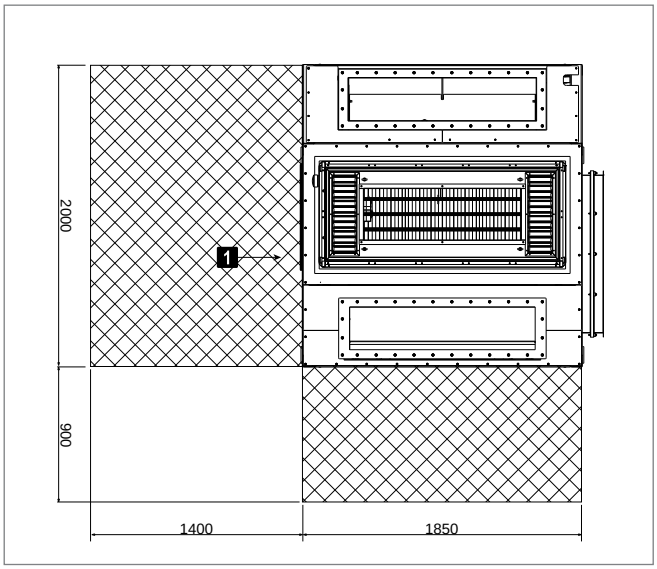
1 Assembly

The unit is delivered in 2 or 3 sections on pallets:
- Base unit
- Fresh air module
- Connection duct and support for horizontal installation of the fresh air module (option)

The following guidelines are important when preparing for assembly:
- A crane or fork lift is required to transport the unit to the installation site and assemble it.
- The unit is supplied with 4 fixing plates for attaching it to the floor.
- Follow the assembly instructions included.

1.1 Installation site

- The unit must be erected at an inside location that is protected against frost.
- Install the unit horizontally.
- Ensure that the installation surface is of sufficient load-bearing capacity. The weight of the unit is distributed over 4 points (see Fig. E2).
- Position the unit in accordance with the position of the air ducts.
- If the unit is equipped with a displacement flow diffuser, ensure unhindered dispersion of the supply air stream (approx. 1 m clear space all-round, up to 1.8 m height).
- The unit must be accessible and connecting lines must be able to be dismantled for maintenance and servicing work.



1 Control box

Fig. E1: Space requirements for maintenance and servicing (dimensions in mm)

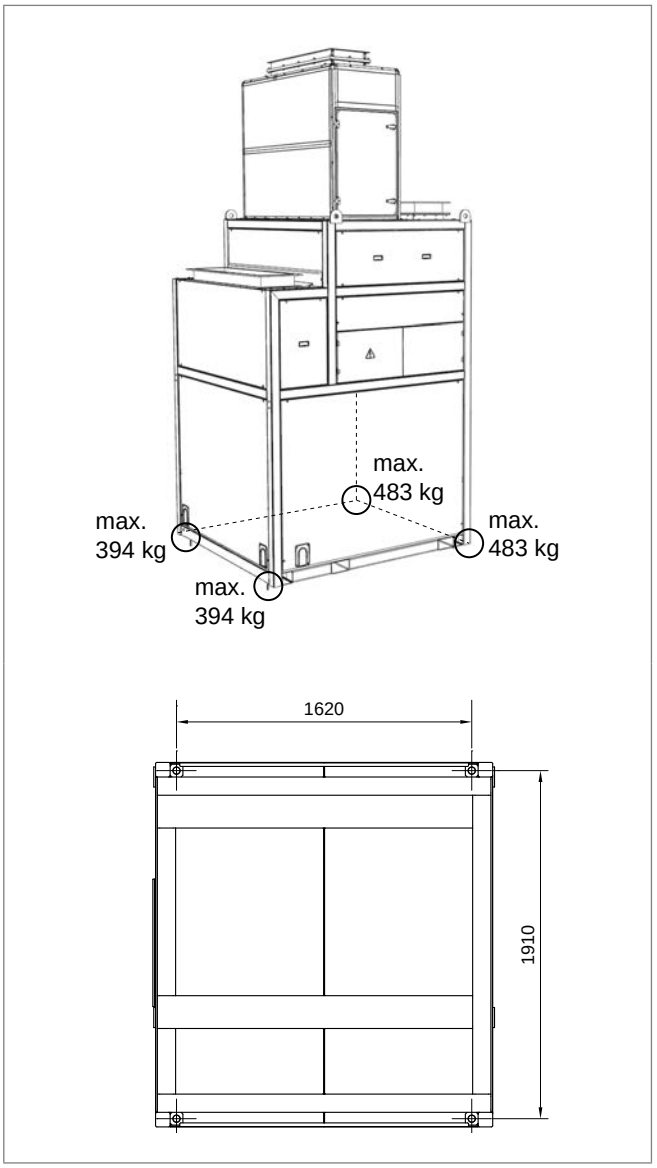


Fig. E2: Load distribution

1.2 Connecting the air ducts

- The extract air and exhaust air duct is designed according to plant-specific conditions:
  - In plants with an upstream oil/emulsion separator or with minimal quantity lubrication (MQL), the ducts must have an oil-tight design.
  - In plants with an upstream dry filter or wet separator, the ducts must be designed in galvanised sheet steel.
- The unit must not be subjected to the weight of the ducts. Suspend the ducts from the ceiling or support them on the floor.
- Connect the air ducts via the compensators so they are free of tension and vibrations.
- Insulate the fresh air and exhaust air duct, including the compensator, right up to the point where it leaves the building (30 mm with heat transfer coefficient λ = 0.04 W/mK).
- Arrange the fresh air suction and the exhaust air outlet via the roof in the opposite direction to prevent a short circuit.

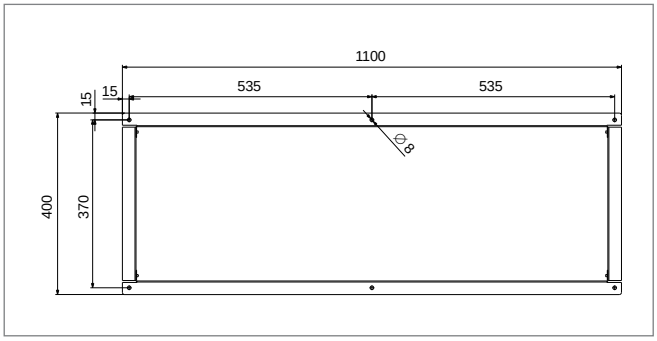


Fig. E3: **Dimensional drawing for fresh air and supply air duct (dimensions in mm)**

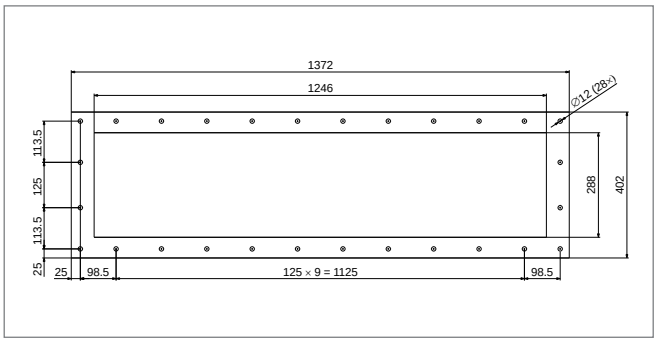


Fig. E4: **Dimensional drawing for extract air and exhaust air duct (dimensions in mm)**

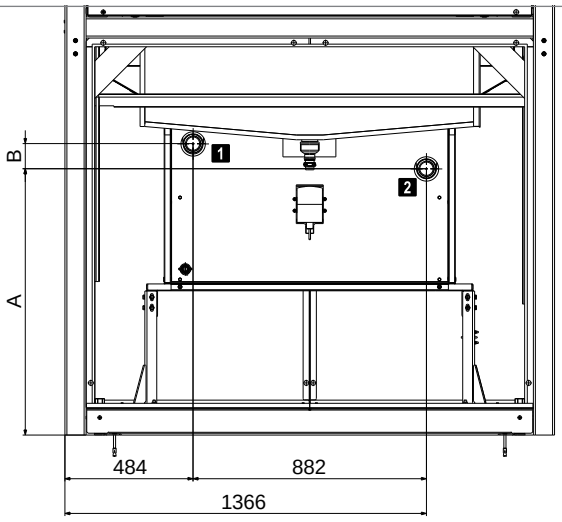
E

2 Hydraulic installation

2.1 Heating/cooling coil

- Warm or hot water up to a max. temperature of 120 °C can be used as a heating medium.
- Connect the heating/cooling coil in accordance with the hydraulic schematic.
- Depending on local conditions, check whether compensators for linear expansion are required for the supply and return lines and/or articulated connections are required for the units.
- Insulate the hydraulic lines.
- Hydraulically coordinate the individual units within one control group so that uniform pressure admission is ensured.
- Do not apply any loads to the coil, e.g. by means of the flow or return.
- The condensate separator in cooling units only functions while the fan is running. No coolant must be allowed to circulate in the heating/cooling coil when the unit is switched off.

Notice
Use the options 'Hydraulic assembly' and '4-pipe switching' for quick and easy hydraulic installation.



1 Return
2 Flow

Dimension	PVH-10ABC	PVC-10C	PVC-10D
A	1015	1015	1006
B	78	78	95

Fig. E5: **Dimensional drawing for hydraulic connections (dimensions in mm)**

2.2 Condensate connection

Condensate arising in the plate heat exchanger and possibly in the cooling section must be removed via a condensate line.

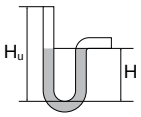
- Adequately size the slope and cross section of the condensate line to prevent a condensate backwash.
- Make sure that the condensate can drain off freely.
- Depending on the specific application, the condensate may contain residue of oil, emulsions and cooling lubricants. Ensure that the condensate is disposed of or recycled in accordance with local regulations.

Nominal sizes	
Plate heat exchanger condensate connection	2"
Cooling section condensate connection	¾"

Table E1: Nominal sizes of the condensate connections

To prevent air escaping via the condensate line, the line must be connected via a trap (pipe trap or hose trap). The height of the trap depends on the maximum overpressure of the extract air purification plant fan (p_{max}):

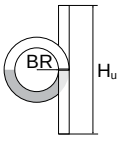
Pipe trap



$H = 0.1 \cdot p_{max}$
$H_u = H + 75$

Example:
p_{max} = 1000 Pa
H = 0.1 · 1000 = 100 mm
H_u = 100 + 75 = 175 mm

Hose trap



$BR = 0.1 \cdot p_{max} + 25$
$H_u = 0.2 \cdot p_{max} + 150$

Example:
p_{max} = 1000 Pa
BR = 0.1 · 1000 + 25 = 125 mm
H_u = 0.2 · 1000 + 150 = 350 mm

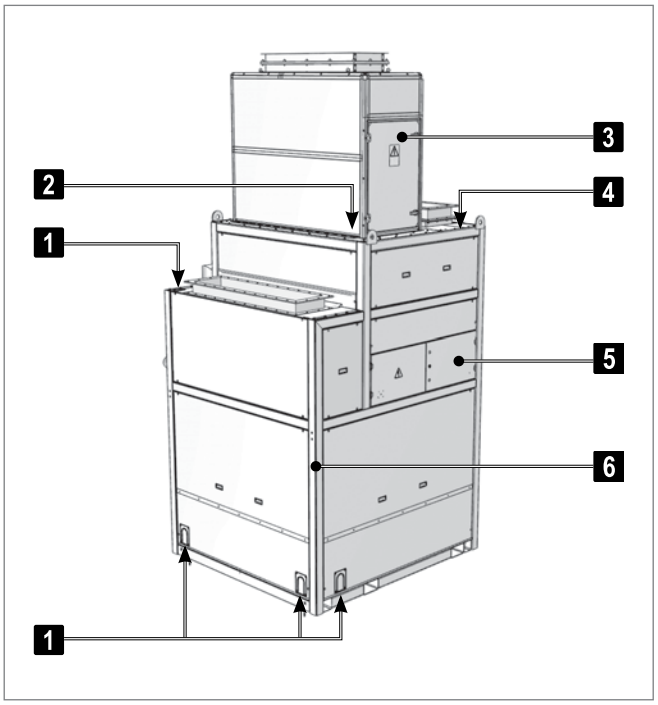
Legend: p_{max} = Fan overpressure in Pa
BR = Bending radius of the hose in mm (depending on the hose used)

Table E2: Calculation of the effective height for the trap

- Connect the trap directly at the condensate connection.
- Fill the trap with water before commissioning, after each cleaning operation and after an extended downtime.

3 Electrical installation

- Observe all applicable regulations (e.g. EN 60204-1) .
- For long supply lines, select cable cross-sections in accordance with the technical regulations.
- Carry out electrical installation in accordance with the wiring diagram.
- Route the cables for the control systems separate from mains cables.
- Establish the plug-in connection between the base unit and the fresh air module (see Fig. E6):
  - Open the fresh air access door.
  - Establish plug-in connections as shown in the wiring diagram.
- The room air sensor and the fresh air sensor are supplied loose in the control box. Install the temperature sensors at a suitable location and wire them to the plug-in connections on the unit.
- Connect the unit frame with the foundation earth electrode and label it with an earthing label.
- Secure all connections against working loose.



1	Cable feedthroughs [1)]
2	Plug-in connection, base unit – fresh air module
3	Access door, fresh air
4	Plug-in connections, temperature sensor
5	Control box
6	Equipotential bonding on the unit frame

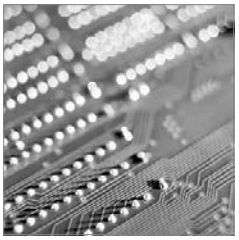
1) On the unit design with a displacement flow diffuser, no cable feedthroughs are provided at the bottom near to the floor.

Fig. E6: Electrical installation

Designation	Reference	Voltage	Cable	Comment
Power supply		3 x 400 VAC	5 x 4 mm²	
Connection, extract air purification	Ethernet/Profinet		CAT5e RJ45	Max. length 100 m
	Profibus DP coupler		2 x 0.34 mm²	Shielded, max. length 200 m at 1 500 kbit/s
	External signals			
	Operating message, extract air purification 1		2 x 1.0 mm²	
	Operating message, extract air purification 2		2 x 1.0 mm²	
	Operating message, extract air purification 3		2 x 1.0 mm²	
	Operating message, extract air purification 4		2 x 1.0 mm²	
	Enable, extract air purification 1	Volt-free	2 x 1.0 mm²	Max. 6 A, 250 V, 1 500 VA
	Enable, extract air purification 2	Volt-free	2 x 1.0 mm²	Max. 6 A, 250 V, 1 500 VA
	Enable, extract air purification 3	Volt-free	2 x 1.0 mm²	Max. 6 A, 250 V, 1 500 VA
	Enable, extract air purification 4	Volt-free	2 x 1.0 mm²	Max. 6 A, 250 V, 1 500 VA
	Emergency stop, extract air purification		2 x 1.0 mm²	
	Collective alarm, extract air purification		2 x 1.0 mm²	
Enable heating	PVH / PVC	Volt-free	2 x 1.0 mm²	Max. 6 A, 250 V, 1 500 VA
Enable cooling	PVC	Volt-free	2 x 1.0 mm²	Max. 6 A, 250 V, 1 500 VA
Heating/cooling switch-over	PVC	Volt-free	2 x 1.0 mm²	Max. 6 A, 250 V, 1 500 VA
Mixing valve	PVH / PVC with on-site mixing valve	24 V DC	4 x 0.75 mm²	With option 'Hydraulic assembly' installed and prewired in the unit
Fresh air sensor			2 x 0.5 mm²	Plug supplied
Room air sensor			2 x 0.5 mm²	Plug supplied
Options				
Room temperature averaging			3 x 0.5 mm²	Plug supplied
4-pipe switching, only electrical components	Switching valve, heating flow	24 V DC	3 x 0.75 mm²	Power supply
			6 x 0.75 mm²	Control line
	Switching valve, heating return	24 V DC	3 x 0.75 mm²	Power supply
			6 x 0.75 mm²	Control line
	Switching valve, cooling flow	24 V DC	3 x 0.75 mm²	Power supply
			6 x 0.75 mm²	Control line
	Switching valve, cooling return	24 V DC	3 x 0.75 mm²	Power supply
			6 x 0.75 mm²	Control line
Pump in the load circuit (injection system)		230 VAC	4 x 1.5 mm²	Power supply
		24 V DC	4 x 0.5 mm²	Control line
Control of supply air damper		24 V DC	4 x 0.75 mm²	
Control of exhaust air damper		24 V DC	4 x 0.75 mm²	
Collective alarm		Volt-free	3 x 1.5 mm²	Max. 6 A, 250 V, 1 500 VA
Fire alarm		Volt-free	2 x 1.0 mm²	Max. 6 A, 250 V, 1 500 VA
External extract air system		Volt-free	2 x 1.0 mm²	Max. 6 A, 250 V, 1 500 VA
BMS integration			CAT5e RJ45	System bus

Table E3: Cable list for on-site connections

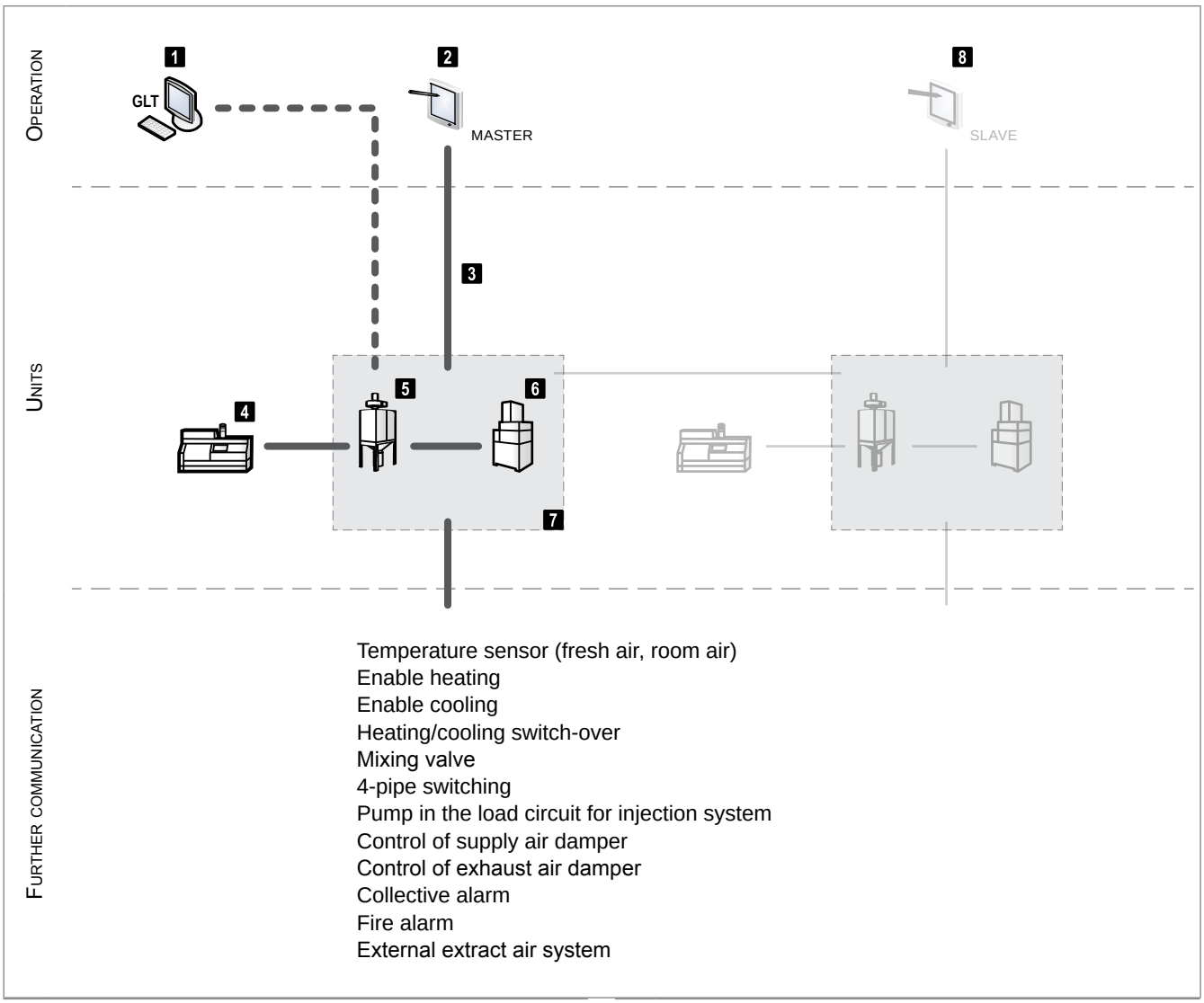
Contents



Control systems

1 ProcessNet system set-up

The Hoval ProcessNet control system regulates and controls the overall plant automatically and ensures that all components are operated in an energy-efficient manner according to need. It is set up as a decentralised I/O system.



1	Building management system (optional)	5	Extract air purification plant
2	ProcessMaster operator terminal	6	ProcessVent
3	System bus	7	Overall system, extract air purification and indoor climate control
4	Machines (machine tool, welding plant)	8	Other plants

Fig. F1: ProcessNet system set-up

1.1 Basic principles

Overall system, extract air purification and indoor climate control
A control module is installed in every ProcessVent to allow for autonomous and individual control. This module communicates with the assigned extract air purification plant via the system bus, forming an overall system with said plant.
The operating mode for this overall system is defined via the time programme or by the building management system. The actual operating state also depends on whether the extracting machines are operational or shut down.

Zone formation
In plants with several such overall systems, control zones are formed according to the master-slave concept.
- The master defines the current set values for room control.
- The slaves adopt the set values which apply to them, depending on their current operating mode. Therefore, they continue to work autonomously, according to the extracting machines and the time programme or the building management system.

1.2 Operation

ProcessMaster operator terminal
The ProcessMaster serves as the operator terminal. It is a touchpanel that provides an easy and clear way to operate the plant. The ProcessMaster gives the user access to all required information and settings:
- Display and set operating modes
- Display temperatures and set room temperature set values
- Display and program the time programme and the calendar
- Display and handle alarms
- Display and set control parameters

There are 2 options for positioning the ProcessMaster:
- In plants with Hoval ProcessClean extract air purification plants, the ProcessMaster is installed in the ProcessClean control box.
- In plants with non-Hoval extract air purification plants, the ProcessMaster is installed in the ProcessVent control box (touchpanel on the unit option).

Integration into the building management system (BMS)
ProcessNet can be easily integrated into the building management system via an integrated interface. Data is exchanged via Profinet with the following data blocks:
- DB320 (receive)
- DB321 (send)

You will find a full parameter list in Chapter 6.

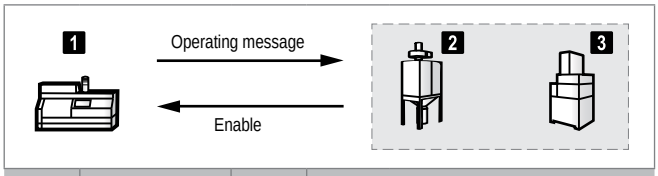
1.3 Control mode

3 different control modes are available in ProcessNet:

AUTO BMS	The building management system defines the operating mode; it also depends on the operating states of the machines.
AUTO TIME PROGRAMME	The time programme defines the operating mode; it also depends on the operating states of the machines.
LOCAL	The user defines the operating mode manually; it is not overridden by the machines (e.g. during maintenance). The machines and the extract air purification plant are usually shut down.

The required control mode is selected on the ProcessMaster.

Operating modes in control mode **AUTO BMS** and in control mode **AUTO TIME PROGRAMME**

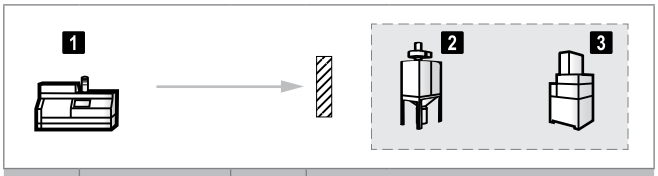


1	Operating mode **specification**	2	3	
On	VE	On	VE	Ventilation
	SA	On	VE	Ventilation
	REC	On	VE	Ventilation
	RECN	On	VE	Ventilation
	NCS	On	VE	Ventilation
Off	VE	Off	OFF	Off
	SA	Off	SA	Supply air
	REC	Off	REC	Recirculation
	RECN	Off	RECN	Recirculation night
	NCS	Off	NCS	Night cooling summer

Legend:
1 Operating state of the machine
2 Operating state of the extract air purification plant
3 Operating state of ProcessVent

Table F1: **Operating states of the extract air purification plant and the ProcessVent in control mode AUTO BMS and control mode AUTO TIME PROGRAMME**

Operating modes in control mode **LOCAL**



1	Operating mode **specification**	2	3	
Off	VE	Off	VE	Ventilation
	SA	Off	SA	Supply air
	REC	Off	REC	Recirculation
	RECN	Off	RECN	Recirculation night
	NCS	Off	NCS	Night cooling summer
	OFF	Off	OFF	Off

Legend:
1 Operating state of the machine
2 Operating state of the extract air purification plant
3 Operating state of ProcessVent

Table F2: **Operating states of the extract air purification plant and the ProcessVent in control mode LOCAL**

2 Control functions

2.1 Room temperature control in extract air operation

The room temperature can be controlled in 2 different ways in extract air operation – that is, in the VE (ventilation) and SA (supply air) operating modes. The control strategy can be selected via the software:

- Room air/supply air cascade control:
  A set value is defined for the room temperature. Dependent on the actual value of the room temperature and the current control deviation, the PI controller defines a set value for the supply air temperature.

- Supply air temperature control:
  A set value is defined for the supply air temperature. The supply air temperature is regulated to this set value; the room temperature is not taken into account here.

To reach the set value, ProcessNet controls the components in the following order:
- The ER damper is opened.
- The heating or cooling mixing valve is opened.
- The supply air volume flow is reduced to an adjustable minimum volume flow.

2.2 Room temperature control in recirculation operation

In recirculation operation – that is, in the REC (recirculation) and RECN (recirculation night) operating modes – ProcessNet controls the room temperature via the patented TempTronic algorithm; this ensures that heating and/or cooling is performed in the most cost-effective manner possible.
A set value is defined for the room temperature. The air is blown into the room at the maximum permitted supply air temperature in heating operation or at the minimum permitted supply air temperature in cooling operation. The supply air volume flow is controlled dependent on the actual value of the room temperature and the current control deviation.

2.3 Control of the supply air volume flow

The supply air volume flow is controlled and thus adapted to the extract air volume flow. The set value (= nominal volume flow) is defined via the ProcessMaster or the building management system.

3 Safety functions

3.1 Soft starting

The soft starting function prevents the coil from freezing when switching from recirculation to extract air operation. The coil is preheated and the fresh air damper is initially opened only as much as is necessary for the mixed air temperature to be in the frost-free range. Only once the supply air temperature has reached the set value is the fresh air damper opened fully.

3.2 Defrost switch

When fresh air temperatures are very low, condensate in the extract air may freeze. To protect against icing up, the pressure drop in the plate heat exchanger is monitored. If this becomes too large, the unit switches to defrost operation automatically:

ProcessVent heat/cool
The fresh air flows through the bypass. The warm extract air defrosts the exchanger.

ProcessVent
The unit switches to recirculation operation.

3.3 Frost protection switch

- If the supply air temperature drops below a defined value (6 K above the set frost protection temperature), the heating mixing valve is opened continuously.
- If the supply air temperature drops below the frost protection temperature, the frost alarm is displayed and the device switches off.

The frost protection temperature can be regulated.

3.4 Fan overrun

The fan overrun is used to cool the coil down or dry it out when heating or cooling operation is being switched off. The required time is defined via the ProcessMaster.

Notice
To avoid underpressure or overpressure arising in the building, set the overrun time for the extract air fan of the extract air purification plant to the same value.

F

4 Control options

4.1 Connection, extract air purification

Ethernet (ET)
The extract air purification plant is connected to the unit via Ethernet:
- Data exchange via defined interface
- Visualisation on the extract air purification plant (no touch-panel on the unit)

Profinet (PT)
The extract air purification plant is connected to the unit via Profinet:
- Data exchange via defined interface
- Visualisation on the extract air purification plant (no touch-panel on the unit)

Profibus DP coupler (PK)
The extract air purification plant is connected to the unit via Profibus DP coupler:
- Data exchange via defined interface
- Visualisation on the extract air purification plant (no touch-panel on the unit)

Connection via external signals (IO)
One or more (max. 4) non-Hoval extract air purification plants are connected to the unit via external signals. The fresh air quantity of the ProcessVent unit depends on the extract air volume flow of the individual plants. Where several plants are operated in parallel, the values are added up accordingly.
- Visualisation via building management system or touch-panel on the unit

Digital inputs	■ Operating message, extract air purification plant 1 – 4 ■ Emergency stop, extract air purification plant ■ Collective alarm
Digital outputs	■ Enable for extract air purification plant 1 – 4

Table F3: Digital inputs and outputs with connection via external signals

4.2 Room temperature averaging (MR)

4 room air sensors for averaging in the occupied area are supplied (wiring to be provided on-site).

4.3 Energy monitoring (EM)

Energy monitoring determines the amount of energy recovered in the plate heat exchanger (separate counters for heating and cooling energy) and displays it on the operator terminal. For this reason, there is an additional temperature sensor installed and prewired in the unit.

4.4 Design for injection system (ES)

Instead of a diverting system, an injection system can also be installed in the load circuit. In the design for injection system, additional components for control of the pumps in the load circuit are installed in the control box.

Requirements for the pump in the load circuit:
- Power supply: 230 VAC
- Power consumption: max. 1 kW
- Current consumption: max. 4 A
- Input signal for activation of control of pump ON
- Output signal for pump alarm

4.5 Control of supply air damper (ZK)

Hoval ProcessNet can control an on-site supply air damper. This control is performed dependent on an adjustable threshold value for the supply air volume flow.

Supply voltage	24	VDC
Control voltage	0…10	VDC
Return signal	2…10	VDC

Table F4: Control of supply air damper

4.6 Control of exhaust air damper (FK)

Hoval ProcessNet can control an on-site exhaust air damper. This control is performed dependent on the operating state of the extract air purification plant(s).

Supply voltage	24	VDC
Control voltage	0…10	VDC
Return signal	2…10	VDC

Table F5: Control of exhaust air damper

4.7 Touchpanel on the unit (TP)

The touchpanel on the unit serves as an operator terminal in systems with non-Hoval extract air purification plants. It gives trained users access to all information and settings that are necessary for normal operation:

- Display and set operating modes
- Display temperatures and set temperature set values
- Display and programme the time programme
- Display and handle alarms
- Display and set control parameters

4.8 Power supply (LV)

In systems with non-Hoval extract air purification plants, the power supply for the unit can be integrated in the terminal box (with safety relay).

5 Alarms and monitoring

The Hoval ProcessNet monitors itself. All alarms are entered in the alarm list and displayed on the operator terminal. Priority A alarms are also displayed via a collective alarm indicator installed on-site as required.

Alarm	Priority	Cause	System response [1]	Remedy
Fire alarm	A	Signal for fire alarm active	■ The fresh air damper closes. ■ The unit switches off.	Check external fire alarm signal.
Emergency stop, extract air purification plant	A	Emergency stop signal for extract air purification plant active	■ The fresh air damper closes. ■ The unit switches off.	Check extract air purification, switch off emergency stop if required.
Communication fault, extract air purification	A	Communication between extract air purification and ProcessVent interrupted or faulty	■ The fresh air damper closes. ■ The unit switches off.	Contact customer service.
Fault accessing analogue input module	A	Internal PLC fault	■ The fresh air damper closes. ■ The unit switches off.	Contact customer service.
Fault accessing analogue output module	A	Internal PLC fault	■ The fresh air damper closes. ■ The unit switches off.	Contact customer service.
Fan 1 not ready	A	Fan 1 defective or control faulty	■ The fresh air damper closes. ■ The unit switches off.	Contact customer service.
Fan 2 not ready	A	Fan 2 defective or control faulty		
Plate heat exchanger soiled (plant off)	A	Differential pressure of the plate heat exchanger too high for an extended period	■ The fresh air damper closes. ■ The unit switches off.	Clean the plate heat exchanger.
Coil frost alarm	A	Supply air temperature lower than frost protection temperature	■ The fresh air damper closes. ■ The unit switches off. ■ The mixing valve opens 100%.	Contact customer service.
Maximum supply air temperature exceeded	A	Current supply air temperature higher than maximum permitted supply air temperature	■ The fresh air damper closes. ■ The unit switches off.	Contact customer service.
Supply air sensor (incorrect parameter settings)	A	Supply air sensor defective	■ The fresh air damper closes. ■ The unit switches off.	Contact customer service.
Supply air sensor (cable break/short circuit)	A			
Supply air sensor (outside measuring range)	A			

[1] If ProcessNet is also controlling on-site supply air or exhaust air dampers, these are closed too.

Table F6: **Extract from the alarm list (priority A alarms)**

6 BMS parameter list

Address	Offset	Symbol name	Type	Default	Lower limit	Upper limit	Unit	Comment
GLT_Rcv (DB 320)								
Communication								
0,0		GLT_Rcv.LifeBit	BOOL	FALSE				Communication monitoring: life bit from BMS
Operating modes								
2,0		GLT_Rcv.OpMode.CurrentMode	INT	1	1	5		Operating mode (1 = VE; 2 = REC; 3 = RECN; 4 = SA; 5 = NCS)
Control strategy								
4,0		GLT_Rcv.TempCtrlStrategy	BOOL	FALSE				Temperature control strategy (0 = supply air temp. control; 1 = room air/supply air cascade control)
Set values								
6,0		GLT_Rcv.SP.RoomTempDay	REAL	18.0	5.0	40.0	°C	Set value, room temperature day: ventilation (VE), recirculation (REC), supply air (SA)
10,0		GLT_Rcv.SP.RoomTempNight	REAL	16.0	5.0	40.0	°C	Set value, room temperature night: recirculation night (RECN), night cooling summer (NCS)
14,0		GLT_Rcv.SP.SupplyAirTemp	REAL	19.0	5.0	40.0	°C	Set value, supply air temperature: ventilation (VE), supply air (SA)
External value specifications								
18,0		GLT_Rcv.External.TempFreshAir	REAL	-60.0	-50.0	100.0	°C	External value, fresh air temperature
22,0		GLT_Rcv.External.TempRoom	REAL	-60.0	-50.0	100.0	°C	External value, room temperature
26,0		GLT_Rcv.External.MediumIndication	BOOL	FALSE				External value, heating/cooling switch-over (0 = heating; 1 = cooling)
GLT_Send (DB 321)								
Communication								
0,0	0,0	GLT_Send.LifeBit	BOOL	FALSE				Communication monitoring: toggling life bit to BMS (BMS writes back bit 1:1)
Operating mode selector								
2,0	0,0	GLT_Send.OpMode.Selector	INT	0	0	2		Operating mode selector, control mode (0 = Local; 1 = Auto time programme; 2 = Auto BMS)
Operating modes								
4,0	0,0	GLT_Send.OpMode.CurrentMode	INT	0	0	9		Current operating mode (0 = OFF; 1 = VE; 2 = REC; 3 = RECN; 4 = SA; 5 = NCS)
Operating status, extract air purification								
6,0	0,0	GLT_Send.SeparatorRun	BOOL	FALSE				Current operating status, extract air purification (0 = not active; 1 = active)
Collective alarm								
8,0	0,0	GLT_Send.CollectiveAlarm.PrioA	BOOL	FALSE				Collective alarm, priority A (0 = no alarm; 1 = alarm active) → plant stops running
8,1	0,1	GLT_Send.CollectiveAlarm.PrioB	BOOL	FALSE				Collective alarm, priority B (0 = no alarm; 1 = alarm active) → plant continues to run
Control strategy								
10,0	0,0	GLT_Send.TempCtrlStrategy	BOOL	FALSE				Temperature control strategy (0 = supply air temp. control; 1 = room air/supply air cascade control)
Set values								
12,0	0,0	GLT_Send.SP.RoomTempDay	REAL	18.0	5.0	40.0	°C	Set value, room temperature day: ventilation (VE), recirculation (REC), supply air (SA)
16,0	4,0	GLT_Send.SP.RoomTempNight	REAL	16.0	5.0	40.0	°C	Set value, room temperature night: recirculation night (RECN), night cooling summer (NCS)
20,0	8,0	GLT_Send.SP.SupplyAirTemp	REAL	19.0	5.0	40.0	°C	Set value, supply air temperature: ventilation (VE), supply air (SA)

Address	Offset	Symbol name	Type	Default	Lower limit	Upper limit	Unit	Comment
Actual values								
24,0	0,0	GLT_Send.PV.TempSupplyAir	REAL	0.0	-60.0	250.0	°C	Actual value, supply air temperature
28,0	4,0	GLT_Send.PV.TempFreshAir	REAL	0.0	-60.0	250.0	°C	Actual value, fresh air temperature
32,0	8,0	GLT_Send.PV.TempExhaustAir	REAL	0.0	-60.0	250.0	°C	Actual value, extract air temperature
36,0	12,0	GLT_Send.PV.TempRoom	REAL	0.0	-60.0	250.0	°C	Actual value, room temperature
40,0	16,0	GLT_Send.PV.SupplyAir	REAL	0.0	0.0	Max.	m³/h	Actual value, supply air volume flow
44,0	20,0	GLT_Send.PV.DamperPosOutsideAir	REAL	0.0	0.0	100.0	%	Actual value, fresh air damper position
48,0	24,0	GLT_Send.PV.DamperPosRecirculationAir	REAL	0.0	0.0	100.0	%	Actual value, recirculation damper position
52,0	28,0	GLT_Send.PV.DamperPosERG	REAL	0.0	0.0	100.0	%	Actual value, ER damper position
56,0	32,0	GLT_Send.PV.DamperPosBypass	REAL	0.0	0.0	100.0	%	Actual value, bypass damper position
60,0	36,0	GLT_Send.PV.ValvePosRegister	REAL	0.0	0.0	100.0	%	Actual value, mixing valve
64,0	40,0	GLT_Send.PV.DemandHeating	BOOL	FALSE				Actual value, enable heating (0 = no heat demand; 1 = heat demand)
64,1	40,1	GLT_Send.PV.DemandCooling	BOOL	FALSE				Actual value, enable cooling (0 = no cool demand; 1 = cool demand)
64,2	40,2	GLT_Send.PV.MediumIndication	BOOL	FALSE				Actual value, heating/cooling switch-over (0 = heating; 1 = cooling)
64,3	40,3	GLT_Send.PV.DemandExtractAirSystem	BOOL	FALSE				Actual value, external extract air system demand (0 = no demand; 1 = demand active)
Energy monitoring								
66,0	0,0	GLT_Send.Monitoring.HeatFlow	REAL	0.0			kW	Current heat flow
70,0	4,0	GLT_Send.Monitoring.CoolFlow	REAL	0.0			kW	Current cool flow
74,0	8,0	GLT_Send.Monitoring.HeatEnergy	REAL	0.0			kWh	Energy savings, heating
78,0	12,0	GLT_Send.Monitoring.CoolEnergy	REAL	0.0			kWh	Energy savings, cooling
External value specifications								
82,0	0,0	GLT_Send.External.TempFreshAir	REAL	20.0	-50.0	100.0	°C	External value, fresh air temperature
86,0	4,0	GLT_Send.External.TempRoom	REAL	20.0	-50.0	100.0	°C	External value, room temperature
90,0	8,0	GLT_Send.External.MediumIndication	BOOL	FALSE				External value, heating/cooling switch-over (0 = heating; 1 = cooling)
Switch-over value specifications								
92,0	0,0	GLT_Send.SourceSelection.TempFreshAir	BOOL	FALSE				Fresh air temperature switch-over (0 = internal sensor; 1 = external specification)
92,1	0,1	GLT_Send.SourceSelection.TempRoom	BOOL	FALSE				Room temperature switch-over (0 = internal sensor; 1 = external specification)
92,2	0,2	GLT_Send.SourceSelection.MediumIndication	BOOL	FALSE				Heating/cooling switch-over (0 = internal sensor; 1 = external specification)
ALM_UM								
ALM_UM.ALM_General								
100,0	0,0	ALM_UM.ALM_General.Alm[0]	BOOL	0		No. 9	Pr. A	A009: Fire alarm
	0,1	ALM_UM.ALM_General.Alm[1]	BOOL	0		No. 10	Pr. A	A010: Emergency stop, extract air purification plant
	0,2	ALM_UM.ALM_General.Alm[2]	BOOL	0		No. 11	Pr. A	A011: Communication fault, extract air purification (life bit fault)
	0,3	ALM_UM.ALM_General.Alm[3]	BOOL	0		No. 12	Pr. A	A012: Fault accessing analogue input module
	0,4	ALM_UM.ALM_General.Alm[4]	BOOL	0		No. 13	Pr. A	A013: Fault accessing analogue output module
	1,0	ALM_UM.ALM_General.Alm[8]	BOOL	0		No. 1	Pr. B	B001: Communication fault, BMS (life bit fault)
	1,1	ALM_UM.ALM_General.Alm[9]	BOOL	0		No. 2	Pr. B	B002: Actual value from BMS, fresh air temperature, limit value fault
	1,2	ALM_UM.ALM_General.Alm[10]	BOOL	0		No. 3	Pr. B	B003: Actual value from BMS, room temperature, limit value fault

Address	Offset	Symbol name	Type	Default	Lower limit	Upper limit	Unit	Comment
	2,0	ALM_UM.ALM_General.Alm[16]	BOOL	0		No. 25	Pr. B	B025: Master/slave zone: communication fault alarm
	2,1	ALM_UM.ALM_General.Alm[17]	BOOL	0		No. 26	Pr. B	B026: Master/slave zone: no data received alarm
	2,4	ALM_UM.ALM_General.Alm[20]	BOOL	0		No. 29	Pr. B	B029: Master/slave fresh air temperature: communication fault alarm
	2,5	ALM_UM.ALM_General.Alm[21]	BOOL	0		No. 30	Pr. B	B030: Master/slave fresh air temperature: no data received alarm
	3,0	ALM_UM.ALM_General.Alm[24]	BOOL	0		No. 17	Pr. B	B017: Master/slave room temperature: communication fault alarm
	3,1	ALM_UM.ALM_General.Alm[25]	BOOL	0		No. 18	Pr. B	B018: Master/slave room temperature: no data received alarm
	3,4	ALM_UM.ALM_General.Alm[28]	BOOL	0		No. 21	Pr. B	B021: Return pump station water: motor circuit breaker
	3,5	ALM_UM.ALM_General.Alm[29]	BOOL	0		No. 22	Pr. B	B022: Return pump station water: max. level does not decrease
	3,6	ALM_UM.ALM_General.Alm[30]	BOOL	0		No. 23	Pr. B	B023: Return pump station oil: motor circuit breaker
	3,7	ALM_UM.ALM_General.Alm[31]	BOOL	0		No. 24	Pr. B	B024: Return pump station oil: max. level does not decrease
ALM_UM.ALM_EM_ExtractAirGroup								
104,0	0,0	ALM_UM.ALM_EM_ExtractAirGroup.Alm[0]	BOOL	0		No. 41	Pr. B	B041: Extract air sensor (incorrect parameter settings)
	0,1	ALM_UM.ALM_EM_ExtractAirGroup.Alm[1]	BOOL	0		No. 42	Pr. B	B042: Extract air sensor (cable break/short circuit)
	0,2	ALM_UM.ALM_EM_ExtractAirGroup.Alm[2]	BOOL	0		No. 43	Pr. B	B043: Extract air sensor (outside measuring range)
	1,2	ALM_UM.ALM_EM_ExtractAirGroup.Alm[10]	BOOL	0		No. 35	Pr. B	B035: Exhaust air damper (position is not reached)
	1,3	ALM_UM.ALM_EM_ExtractAirGroup.Alm[11]	BOOL	0		No. 36	Pr. B	B036: Exhaust air damper (incorrect parameter settings)
	1,4	ALM_UM.ALM_EM_ExtractAirGroup.Alm[12]	BOOL	0		No. 37	Pr. B	B037: Exhaust air damper (cable break/short circuit)
	1,5	ALM_UM.ALM_EM_ExtractAirGroup.Alm[13]	BOOL	0		No. 38	Pr. B	B038: Exhaust air damper (outside measuring range)
ALM_UM.ALM_EM_MixingBox								
108,0	0,0	ALM_UM.ALM_EM_MixingBox.Alm[0]	BOOL	0		No. 73	Pr. B	B073: Fresh air sensor (incorrect parameter settings)
	0,1	ALM_UM.ALM_EM_MixingBox.Alm[1]	BOOL	0		No. 74	Pr. B	B074: Fresh air sensor (cable break/short circuit)
	0,2	ALM_UM.ALM_EM_MixingBox.Alm[2]	BOOL	0		No. 75	Pr. B	B075: Fresh air sensor (outside measuring range)
	0,3	ALM_UM.ALM_EM_MixingBox.Alm[3]	BOOL	0		No. 76	Pr. B	B076: Mixed air sensor (incorrect parameter settings)
	0,4	ALM_UM.ALM_EM_MixingBox.Alm[4]	BOOL	0		No. 77	Pr. B	B077: Mixed air sensor (cable break/short circuit)
	0,5	ALM_UM.ALM_EM_MixingBox.Alm[5]	BOOL	0		No. 78	Pr. B	B078: Mixed air sensor (outside measuring range)
	1,2	ALM_UM.ALM_EM_MixingBox.Alm[10]	BOOL	0		No. 67	Pr. B	B067: Fresh air/recirculation damper (position is not reached)
	1,3	ALM_UM.ALM_EM_MixingBox.Alm[11]	BOOL	0		No. 68	Pr. B	B068: Fresh air/recirculation damper (incorrect parameter settings)
	1,4	ALM_UM.ALM_EM_MixingBox.Alm[12]	BOOL	0		No. 69	Pr. B	B069: Fresh air/recirculation damper (cable break/short circuit)
	1,5	ALM_UM.ALM_EM_MixingBox.Alm[13]	BOOL	0		No. 70	Pr. B	B070: Fresh air/recirculation damper (outside measuring range)
ALM_UM.ALM_EM_AirSupply								
112,0	0,0	ALM_UM.ALM_EM_AirSupply.Alm[0]	BOOL	0		No. 105	Pr. B	B105: Volume flow measurement (incorrect parameter settings)
	0,1	ALM_UM.ALM_EM_AirSupply.Alm[1]	BOOL	0		No. 106	Pr. B	B106: Volume flow measurement (cable break/short circuit)
	0,2	ALM_UM.ALM_EM_AirSupply.Alm[2]	BOOL	0		No. 107	Pr. B	B107: Volume flow measurement (outside measuring range)
	1,0	ALM_UM.ALM_EM_AirSupply.Alm[8]	BOOL	0		No. 97	Pr. B	B097: Filter soiled
	1,1	ALM_UM.ALM_EM_AirSupply.Alm[9]	BOOL	0		No. 98	Pr. B	B098: Controller, supply air volume flow set value not reached
	1,2	ALM_UM.ALM_EM_AirSupply.Alm[10]	BOOL	0		No. 99	Pr. A	A099: Fan 1 not ready
	1,3	ALM_UM.ALM_EM_AirSupply.Alm[11]	BOOL	0		No. 100	Pr. A	A100: Fan 2 not ready
	2,0	ALM_UM.ALM_EM_AirSupply.Alm[16]	BOOL	0		No. 121	Pr. B	B121: Supply air damper (position is not reached)
	2,1	ALM_UM.ALM_EM_AirSupply.Alm[17]	BOOL	0		No. 122	Pr. B	B122: Supply air damper (incorrect parameter settings)

Address	Offset	Symbol name	Type	Default	Lower limit	Upper limit	Unit	Comment
	2,2	ALM_UM.ALM_EM_AirSupply.Alm[18]	BOOL	0		No. 123	Pr. B	B123: Supply air damper (cable break/short circuit)
	2,3	ALM_UM.ALM_EM_AirSupply.Alm[19]	BOOL	0		No. 124	Pr. B	B124: Supply air damper (outside measuring range)
ALM_UM.ALM_EM_EnergyRecovery								
116,0	0,0	ALM_UM.ALM_EM_EnergyRecovery.Alm[0]	BOOL	0		No. 137	Pr. B	B137: ER damper (position is not reached)
	0,1	ALM_UM.ALM_EM_EnergyRecovery.Alm[1]	BOOL	0		No. 138	Pr. B	B138: ER damper (incorrect parameter settings)
	0,2	ALM_UM.ALM_EM_EnergyRecovery.Alm[2]	BOOL	0		No. 139	Pr. B	B139: ER damper (cable break/short circuit)
	0,3	ALM_UM.ALM_EM_EnergyRecovery.Alm[3]	BOOL	0		No. 140	Pr. B	B140: ER damper (outside measuring range)
	1,0	ALM_UM.ALM_EM_EnergyRecovery.Alm[8]	BOOL	0		No. 129	Pr. B	B129: Plate heat exchanger soiled (plant running)
	1,1	ALM_UM.ALM_EM_EnergyRecovery.Alm[9]	BOOL	0		No. 130	Pr. A	A130: Plate heat exchanger soiled (plant off)
ALM_UM.ALM_EM_HeatingCoil								
120,0	0,0	ALM_UM.ALM_EM_HeatingCoil.Alm[0]	BOOL	0		No. 169	Pr. B	B169: Mixing valve (position is not reached)
	0,1	ALM_UM.ALM_EM_HeatingCoil.Alm[1]	BOOL	0		No. 170	Pr. B	B170: Mixing valve (incorrect parameter settings)
	0,2	ALM_UM.ALM_EM_HeatingCoil.Alm[2]	BOOL	0		No. 171	Pr. B	B171: Mixing valve (cable break/short circuit)
	0,3	ALM_UM.ALM_EM_HeatingCoil.Alm[3]	BOOL	0		No. 172	Pr. B	B172: Mixing valve (outside measuring range)
	1,0	ALM_UM.ALM_EM_HeatingCoil.Alm[8]	BOOL	0		No. 161	Pr. A	A161: Coil frost alarm
	1,1	ALM_UM.ALM_EM_HeatingCoil.Alm[9]	BOOL	0		No. 162	Pr. B	B162: Coil frost protection
	1,2	ALM_UM.ALM_EM_HeatingCoil.Alm[10]	BOOL	0		No. 163	Pr. B	B163: Heating medium not available
	1,3	ALM_UM.ALM_EM_HeatingCoil.Alm[11]	BOOL	0		No. 164	Pr. B	B164: Cooling medium not available
	1,4	ALM_UM.ALM_EM_HeatingCoil.Alm[12]	BOOL	0		No. 165	Pr. B	B165: Flow valve, heating medium: open return signal missing
	1,5	ALM_UM.ALM_EM_HeatingCoil.Alm[13]	BOOL	0		No. 166	Pr. B	B166: Flow valve, heating medium: closed return signal missing
	1,6	ALM_UM.ALM_EM_HeatingCoil.Alm[14]	BOOL	0		No. 167	Pr. B	B167: Flow valve, heating medium: both position messages simultaneously
	1,7	ALM_UM.ALM_EM_HeatingCoil.Alm[15]	BOOL	0		No. 168	Pr. B	B168: Return valve, heating medium: open return signal missing
	2,0	ALM_UM.ALM_EM_HeatingCoil.Alm[16]	BOOL	0		No. 185	Pr. B	B185: Return valve, heating medium: closed return signal missing
	2,1	ALM_UM.ALM_EM_HeatingCoil.Alm[17]	BOOL	0		No. 186	Pr. B	B186: Return valve, heating medium: both position messages simultaneously
	2,2	ALM_UM.ALM_EM_HeatingCoil.Alm[18]	BOOL	0		No. 187	Pr. B	B187: Flow valve, cooling medium: open return signal missing
	2,3	ALM_UM.ALM_EM_HeatingCoil.Alm[19]	BOOL	0		No. 188	Pr. B	B188: Flow valve, cooling medium: closed return signal missing
	2,4	ALM_UM.ALM_EM_HeatingCoil.Alm[20]	BOOL	0		No. 189	Pr. B	B189: Flow valve, cooling medium: both position messages simultaneously
	2,5	ALM_UM.ALM_EM_HeatingCoil.Alm[21]	BOOL	0		No. 190	Pr. B	B190: Return valve, cooling medium: open return signal missing
	2,6	ALM_UM.ALM_EM_HeatingCoil.Alm[22]	BOOL	0		No. 191	Pr. B	B191: Return valve, cooling medium: closed return signal missing
	2,7	ALM_UM.ALM_EM_HeatingCoil.Alm[23]	BOOL	0		No. 192	Pr. B	B192: Return valve, cooling medium: both position messages simultaneously
ALM_UM.ALM_EM_TempCtrl								
124,0	0,0	ALM_UM.ALM_EM_TempCtrl.Alm[0]	BOOL	0		No. 201	Pr. A	A201: Maximum supply air temperature exceeded
	0,1	ALM_UM.ALM_EM_TempCtrl.Alm[1]	BOOL	0		No. 202	Pr. B	B202: Supply air temperature controller does not reach set value
	1,0	ALM_UM.ALM_EM_TempCtrl.Alm[8]	BOOL	0		No. 193	Pr. B	B193: Supply air sensor (incorrect parameter settings)
	1,1	ALM_UM.ALM_EM_TempCtrl.Alm[9]	BOOL	0		No. 194	Pr. B	B194: Supply air sensor (cable break/short circuit)
	1,2	ALM_UM.ALM_EM_TempCtrl.Alm[10]	BOOL	0		No. 195	Pr. B	B195: Supply air sensor (outside measuring range)
	1,3	ALM_UM.ALM_EM_TempCtrl.Alm[11]	BOOL	0		No. 196	Pr. B	B196: Room air sensor (incorrect parameter settings)
	1,4	ALM_UM.ALM_EM_TempCtrl.Alm[12]	BOOL	0		No. 197	Pr. B	B197: Room air sensor (cable break/short circuit)
	1,5	ALM_UM.ALM_EM_TempCtrl.Alm[13]	BOOL	0		No. 198	Pr. B	B198: Room air sensor (outside measuring range)

System design

1 Location of the temperature sensors

1.1 Room air sensor

Install the sensor at a height of about 1.5 m in a representative location in the occupied area. Its measured values must not be distorted by the presence of sources of heat or cold (machines, direct sunlight, windows, doors, etc.).
Normally, you should use one room air sensor for each control zone. It is also possible to install four sensors to determine the average temperature value.

1.2 Fresh air sensor

Install the sensor at least 3 m above the ground on a north-facing wall, so that it is protected from direct sunlight. Provide additional cover for the sensor and thermally insulate it from the building.
Only one fresh air sensor is needed per control zone.

2 Maintenance schedule

Activity	Interval
Change the filter	When the alarm 'Filter' is displayed, at least annually
Clean the plate heat exchanger and condensate drip tray	When the alarm 'PHE dirty' is displayed
Visually check the heating/ cooling coil for dirt build-up and clean if necessary (PVH and PVC unit types only)	Every 3 months
Clean the return pump station (option)	Every 3 months
Comprehensive functional check and cleaning of the unit	Annually by the manufacturer's customer service technicians

Table G1: Maintenance schedule

3 General checklist

- Does the installation surface have sufficient load-bearing capacity?
- Is the available fan pressure sufficient to compensate for pressure drops in the duct network?
- Is there enough space to carry out maintenance and servicing work? Are the access doors accessible without obstacles?
- Are there installation problems in the hall, such as craneways, false ceilings or similar?
- Does the air quantity balance in the hall – that is, between the extract air purification plant and the ventilation system – need to be equalised?
- Are the application limits complied with?
- Does the extract air contain corrosive media?
- Which heating/cooling medium is being used?
- Are unit options required?
- Are control system options required?
- How are the control zones subdivided?
- Where should the control panel, which contains the operating options, be positioned?
- Do the units need to be connected to a central building management system?

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Hoval

Responsibility for energy and environment

The Hoval brand is internationally known as one of the leading suppliers of indoor climate control solutions. More than 65 years of experience have given us the necessary capabilities and motivation to continuously develop exceptional solutions and technically advanced equipment. Maximising energy efficiency and thus protecting the environment are both our commitment and our incentive. Hoval has established itself as an expert provider of intelligent heating and ventilation systems that are exported to over 50 countries worldwide.

Hoval heating technology

As an energy-neutral supplier with a full range of products, Hoval helps its customers to select innovative system solutions for a wide range of energy sources, such as heat pumps, biomass, solar energy, gas, oil and district heating. Services range from private residential units to large-scale industrial projects.

Hoval comfort ventilation

Increased comfort and more efficient use of energy from private housing to industrial halls: our comfort ventilation products provide fresh, clean air for living and working space. Our innovative system for a healthy room climate uses heat and moisture recovery, while at the same time protecting energy resources and providing a healthier environment.

Hoval indoor climate systems

Indoor climate systems ensure top air quality and economical usability. Hoval has been installing decentralised systems for many years. The key is to combine multiple combinations of air-conditioners that can be controlled separately or together as a single system. This enables Hoval to respond flexibly to a wide range of requirements for heating, cooling and ventilation.

Hoval heat recovery

Efficient use of energy due to heat recovery. Hoval offers two different solutions: plate heat exchangers as a recuperative system and rotary heat exchangers as a regenerative system.

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