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MITSUBISHI ELECTRIC Air-conditioner Network System
Transmission Booster
PAC-SF46EPA-G



INSTALLATION MANUAL

Read this manual thoroughly before using the Transmission Booster.

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This manual describes the installation of the PAC-SF46EPA Transmission Booster and the air conditioner units. For the information about how to install the central controller or the air conditioner units, see the installation manual for them. For your safety, first be sure to read “1 Safety Precautions” described below thoroughly and then install the PAC-SF46EPA correctly. After reading this installation manual, keep it in a location that is easy to find. If the PAC-SF46EPA Transmission Booster is going to be operated by another person, make sure that this manual is given to them.


1 Safety Precautions


Before installing this unit, make sure you read all the “Safety Precautions”. The “Safety Precautions” provide very important points regarding safety. Make sure you follow them.

Symbols and Terms

 WARNING	Statements identify condition or practices that could result in personal injury or loss of life.
 CAUTION	Statements identify condition or practices that could result in damage to the unit or other property.

Specific Precautions

 WARNING	
<p>Ask your dealer or technical representative to install. Any deficiency caused by your own installation may result in an electric shock and fire.</p>	<p>Ensure that installation work is done correctly following this installation manual. Any deficiency caused by installation may result in an electric shock or fire.</p>
<p>Install in a place which is strong enough to withstand the weight of the unit. Any lack of the strength may cause the unit to fall down, resulting in a personal injury.</p>	<p>All electrical work must be performed by a licensed technician, according to local regulations and the instructions given in this manual. Any lack of electric circuit or any deficiency caused by installation may result in an electric shock or fire.</p>
<p>Wire and connect using the desired cables securely so that any external force exerted on the cable is not imparted on to the terminal connections. Imperfect connection and fixing may result in heating or fire.</p>	<p>Do not move and re-install the unit yourself. Any deficiency caused by installation may result in an electric shock or fire. Ask your distributor or special vender for moving and installation.</p>
<p>Never modify or repair the unit by yourself. Any deficiency caused by your modification or repair may result in an electric shock or fire. Consult with your distributor for repair.</p>	<p>This appliance must be earthed (grounded). Make sure to install a protect earth (PE)/grounding line. Do not connect the PE (grounding) line to gas or water pipes, lightning conductors or telephone grounding lines. Improper grounding may cause an electric shock.</p>
<p>Make sure that the unit is powered by a dedicated line. Other appliances connected to the same line could cause an overload.</p>	<p>Securely install the cover (panel) of the PAC-SF46EPA. If the cover (panel) is not installed properly, dust or water may enter the unit and fire or electric shock may result.</p>
<p>Make sure that there is a main power switch. A ready accessible breaker for power source line helps reduce the risk of electric shocks. Installation of a breaker is mandatory in same area.</p>	

 CAUTION	
<p>Do not install any place exposed to flammable gas leakage. Flammable gases that accumulates around the body of the unit may caused an explosion.</p>	<p>Do not install in any steamy place such as bath room or kitchen. Avoid any place where moisture is condensed into dew. Doing so may cause an electric shock or a malfunction.</p>
<p>Do not use in any special environment. If use in any place exposed to oil (including machine oil), steam and sulfuric gas may degrade performances significantly or damage the component parts.</p>	<p>Do not install in any place where acidic or alkaline solution or special spray or other similar substances are used. Doing so may cause an electric shock or malfunction.</p>
<p>Wire so that it wires do not received any tension. Tension may caused wire breakage, heating or fire.</p>	<p>Use standard wires in compliance with the current capacity. A failure to do this may result in an electric leakage, heating or fire.</p>
<p>Do not wash with water. Doing so may cause an electric shock or malfunction.</p>	<p>Do not touch any PCB (Printed Circuit Board) with your hand or tools. Do not allow dust to collect on the PCB. Doing so may cause fire or an electric shock.</p>
<p>Do not install in any place at a temperature of more than 40°C (104°F) or less than 0°C (32°F) or exposed to direct sunlight.</p>	<p>This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.</p>
<p>Use only an earth leakage breaker and fuse of the specified capacity. If no earth leakage breaker is installed, it may cause an electric shock. Using fuse and wire or copper wire with too large a capacity may cause a malfunction to the unit or fire.</p>	

⚠ CAUTION

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.

2 Product Feature

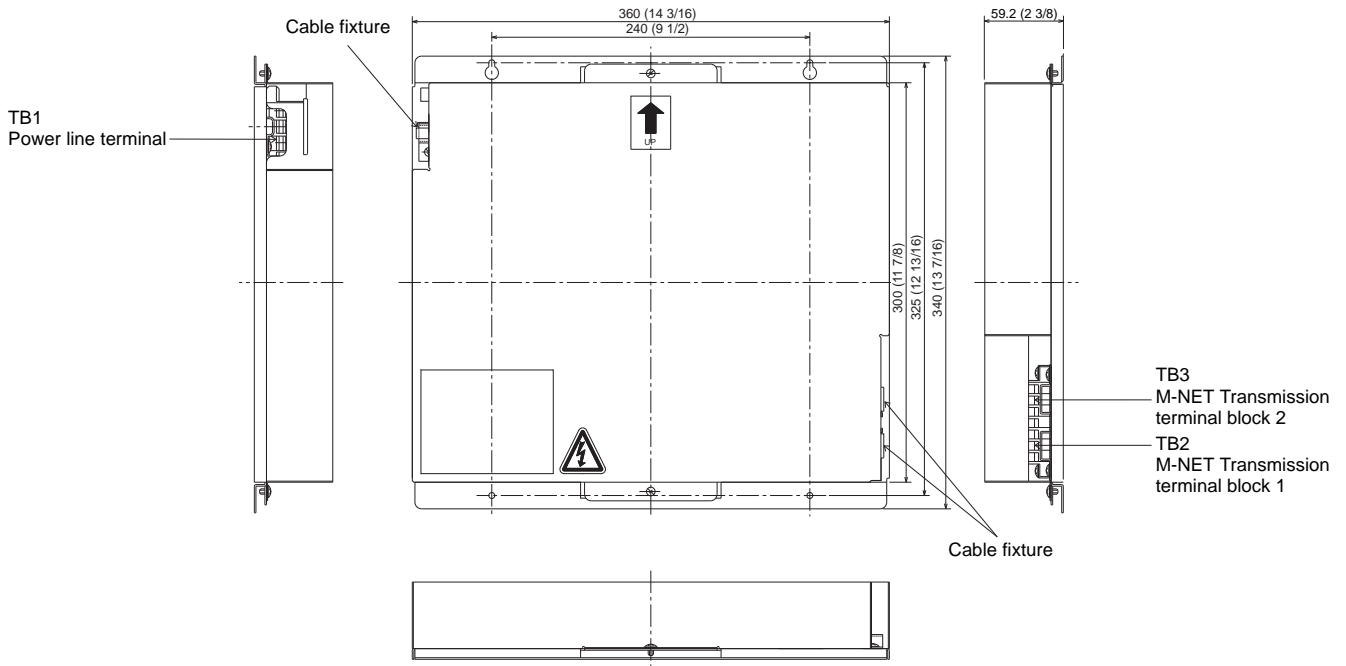
2-1. Specification

Source power requirement	Rated input voltage and current	EU: ~220 V - 240 V ; 0.7 A / 50 Hz Single-phase US: ~208 V - 230 V ; 0.7 A / 60 Hz Single-phase
	Fuse: 2.0 A Time-delay type (IEC127-2 S.S.5)	
Voltage/current of output on the Transmission Booster side	DC28 V - 30 V 1.7 A (Maximum loading)	
Environmental condition	Temperature	Operating range 0 - 40 °C / 32 - 104 °F Storage range -20 - 60 °C / -4 - 140 °F
	Humidity	30 - 90 %RH (No condensation)
Dimensions	340 (H) × 360 (W) × 59.2 (D) mm / 13 7/16 (H) × 14 3/16 (W) × 2 3/8 (D) in	
Weight	3.4 kg / 7 1/2 lb	
Installation Environment	In the metal control panel box (indoor) * This unit is installed and used in a business office or equivalent environment.	
Sound Pressure Level	The A-weighted sound pressure level is below 70 dB.	

2-2. Power supply coefficient, power consumption coefficient, and L coefficient

	Power supply coefficient	Power consumption coefficient	L coefficient
TB2	0	0	0
TB3	25	0	0

2-3. Appearance



Unit: mm (in)

3 Installation

3-1. Parts prepared at site

Please prepare the following parts before installation of the unit.

Preparation parts	Specification
Unit fixing screw	M4 screw x 4 pcs
Power cable/ Protective earth cable (Ground cable)	Use sheathed vinyl cord or wire. Wire type: Wire should not be lighter than ordinary PVC sheathed flexible cord IEC 60227 (designation 60227 IEC 53) Wire size: 0.75 mm ² to 2 mm ² (AWG18 to 14)
Main power switch (Circuit breaker)	Qty.: 1 pc Type: 250 VAC, Single-phase 3 A
Transmission cable	Type of the cable; Sheathed vinyl cords or cable which comply with the following specifications or equivalent. <ul style="list-style-type: none"> • CPEVS ϕ1.2 mm to ϕ1.6 mm • CVVS 1.25 mm² to 2 mm² (AWG16 to 14) * CPEV; PE insulated PVC jacketed shielded communication cable * CVVS; PVC insulated PVC jacketed shielded control cable PE: Polyethylene PVC: Polyvinyl chloride Cable length: Please refer to section "5 Transmission cable length limitation".

*Use a breaker with a contact distance of 3 mm (1/8 in) or more.

3-2. Installation space and the direction

PAC-SF46EPA Transmission Booster is not waterproof type. Therefore this unit shall be installed in a metal control panel box (steel: thickness 1 mm (3/64 in) or more). Please prepare the metal control panel box in consider with installation space as shown in the Fig.3-1.

The unit shall be also installed in vertical direction only indicated by the arrow making on the cover as shown in the Fig.3-1.

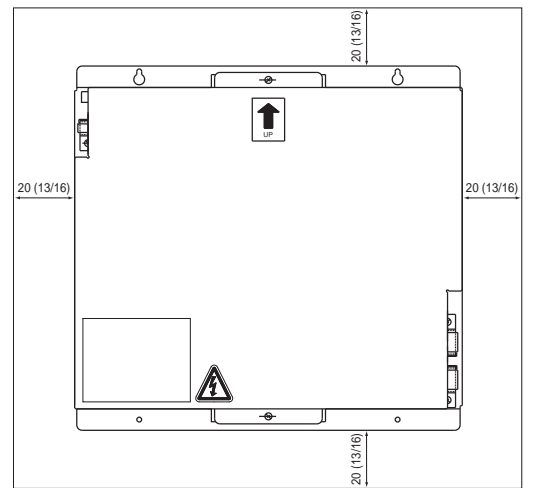


Fig.3-1

Unit: mm (in)

3-3. Unit installation

Fix the unit to the metal control panel box using M4 screw as shown in the Fig.3-2.

CAUTION:

- The unit should be fixed with 4 positions to prevent from unit falling down.
- Install the booster in a location which can withstand a load of 3.4 kg (7 1/2 lb).
- Position the unit, making sure not to drop it.

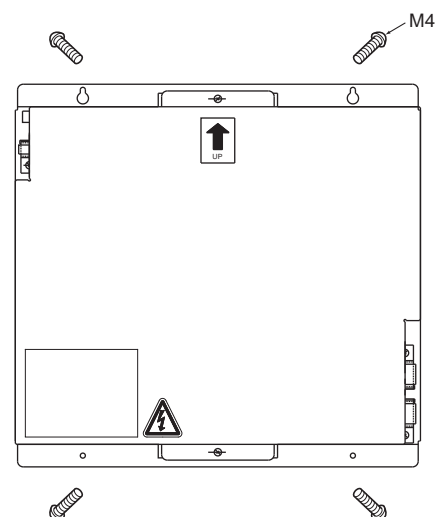


Fig.3-2

4 Wiring

⚠ WARNING:

- All electric work must be performed according to local regulations. Improper electrical work may result in electric shock or fire.
- Be sure to shut off the power source of the unit and the all other unit to be connected to the Transmission Booster before wiring.
- Firmly secure the wiring so that it does not become disconnected.

⚠ CAUTION:

- Do not connect the AC power line to the M-NET and POWER (30 VDC) terminal blocks of this device to prevent unit failure.

4-1. Wiring procedure

1. Remove the screws used to secure the cover, and then open the cover.

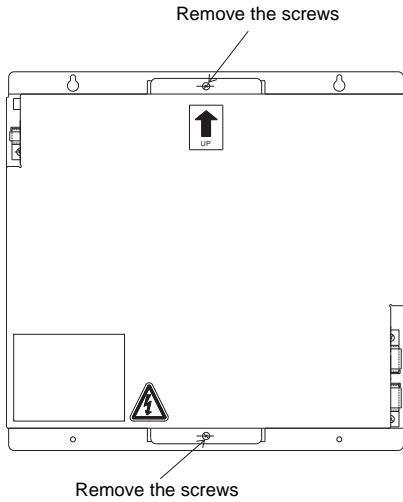


Fig.4-1

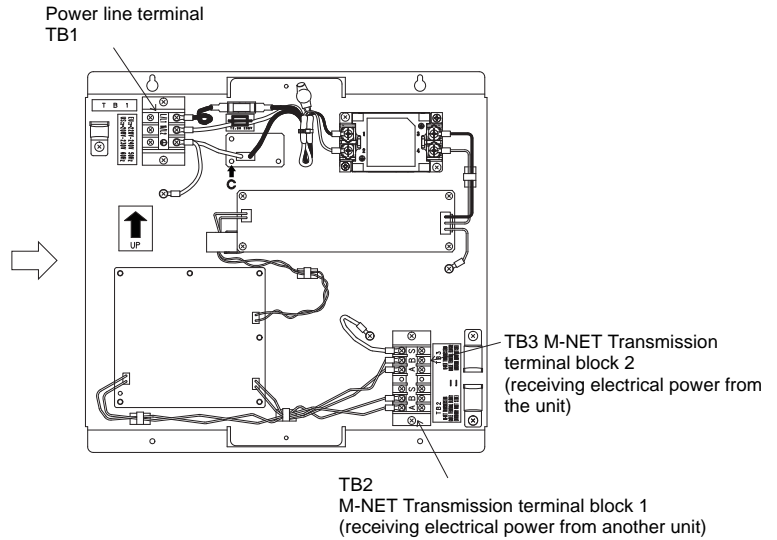


Fig.4-2

2. Connect the power supply and transmission wiring. (Refer to 4-2 and 4-3.)
3. After connection for the each cable, fasten the each cable with the cable fixture.
4. After finishing the wiring, be sure to secure the cover with the screws before turning on the power source.

4-2. Power Line

Wire the power cable and protective earth cable (grounding cable) to L/L1, N/L2 and the earth line (grounding line) terminals on the TB1 as shown in the Fig.4-3.

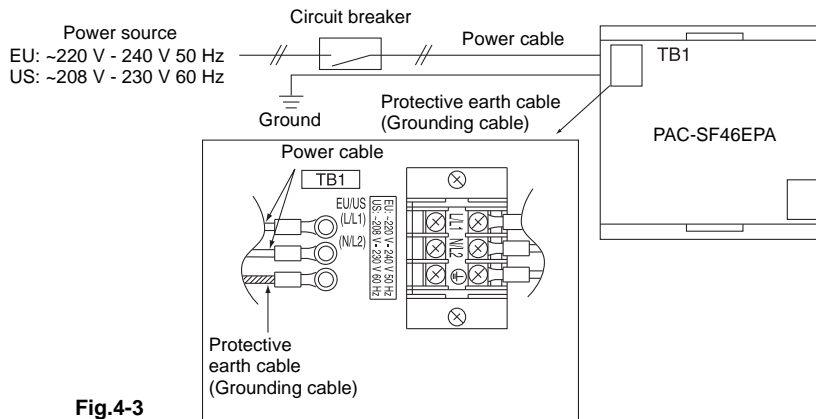


Fig.4-3

* EU shows L/N and the US shows L1/L2

4-3. M-NET transmission line

Wire the M-NET transmission cable to A, B (non-polarity data) and S (shield) terminals on the TB2 and TB3 as shown in the Fig.4-4.

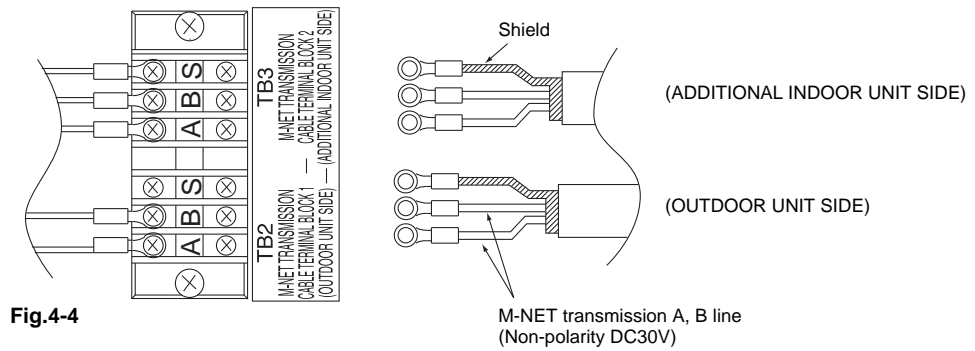


Fig.4-4

NOTES:

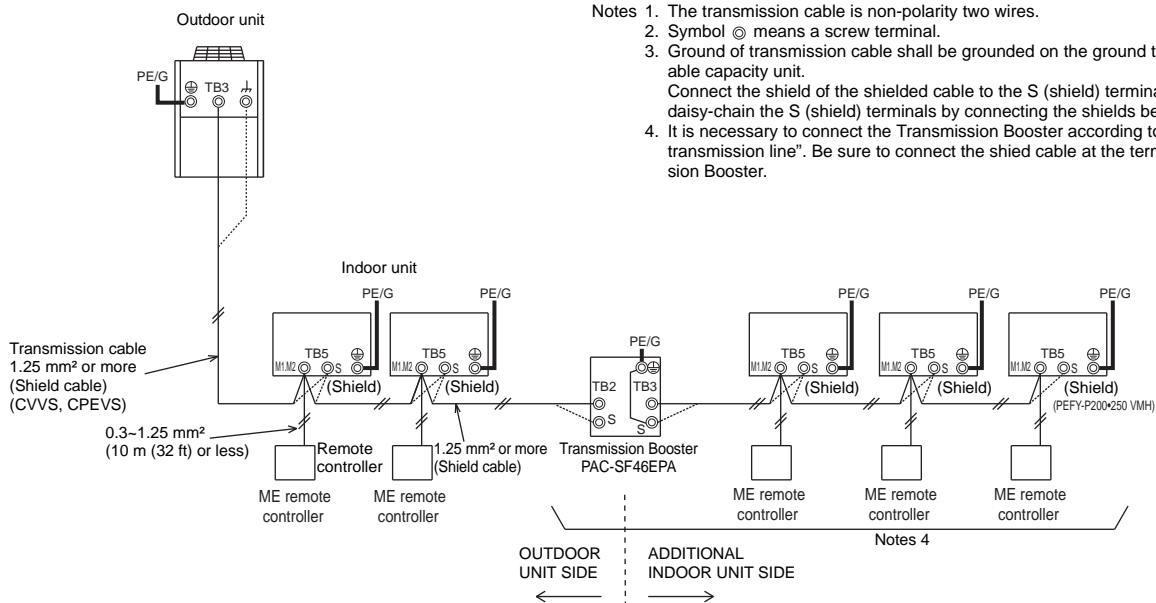
- The shield wire of M-NET transmission line shall be grounded by one point similar to earthing (grounding) method.
- The shield wire shall be connected to the S terminal of the only one unit on the common transmission line.

CAUTION:

- Do not mistake transmission line terminal block 1 (TB2) and transmission line terminal block 2 (TB3) when performing the wiring. The Transmission Booster will not operate correctly if the terminal blocks are connected in reverse.
- Since the M-NET transmission line is 30 VDC, do not mistake it with the power line when performing the wiring. (The machine will be broken if the power line is connected to TB2 or TB3.)
- In order to prevent erroneous operations, do not store the power line and M-NET transmission line banded together or in the same conduit.
- Connect the ground wire certainly.
(If the ground wire is not correctly connected, there is a danger of electric shocks or incorrect operations due to the influence of the noise.)
- Never use a megohm tester on the transmission line terminal blocks (TB2 and TB3).

4-4. Wiring example

Example. PUHY-P***YHM



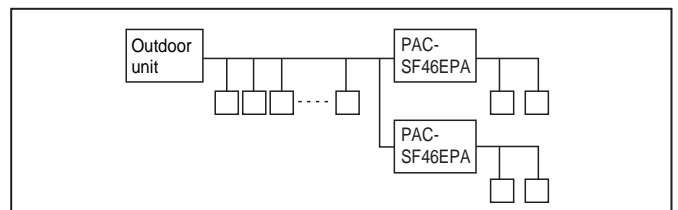
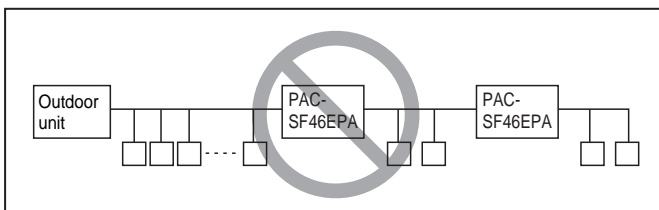
Notes 1. The transmission cable is non-polarity two wires.

2. Symbol ⊙ means a screw terminal.

3. Ground of transmission cable shall be grounded on the ground terminal (⊕) of only variable capacity unit.

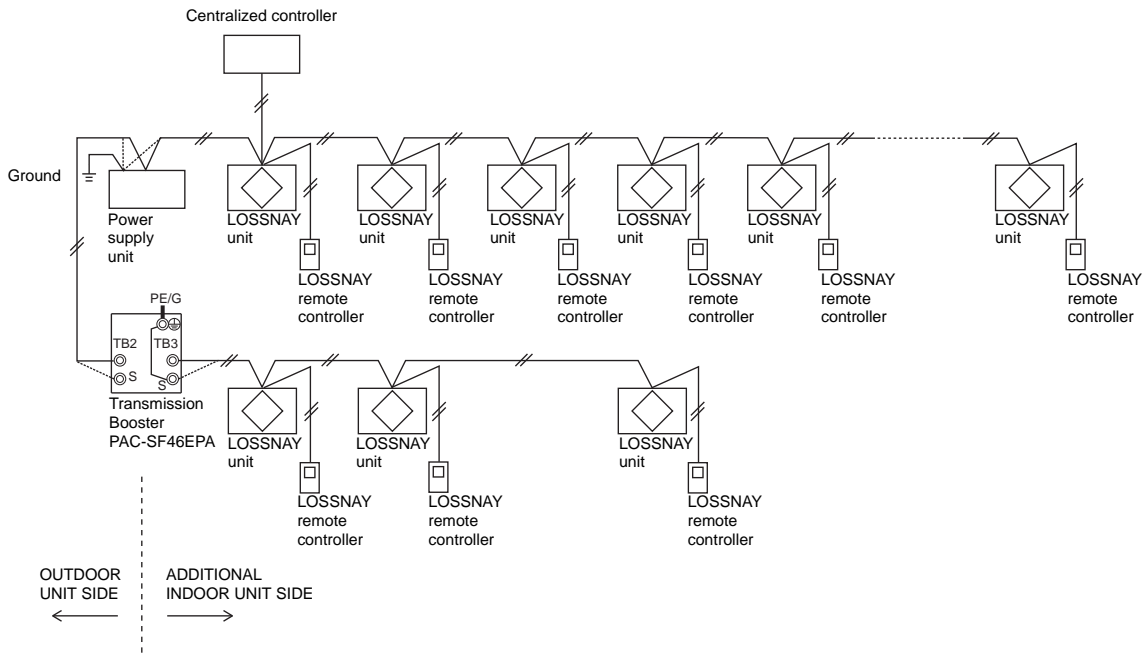
Connect the shield of the shielded cable to the S (shield) terminals on the indoor units or daisy-chain the S (shield) terminals by connecting the shields between the indoor units.

4. It is necessary to connect the Transmission Booster according to "6 Supply capacity to transmission line". Be sure to connect the shield cable at the terminal (S) in the Transmission Booster.



* Do not connect the Transmission Boosters in series.

Example. Centralized controller and LOSSNAY units



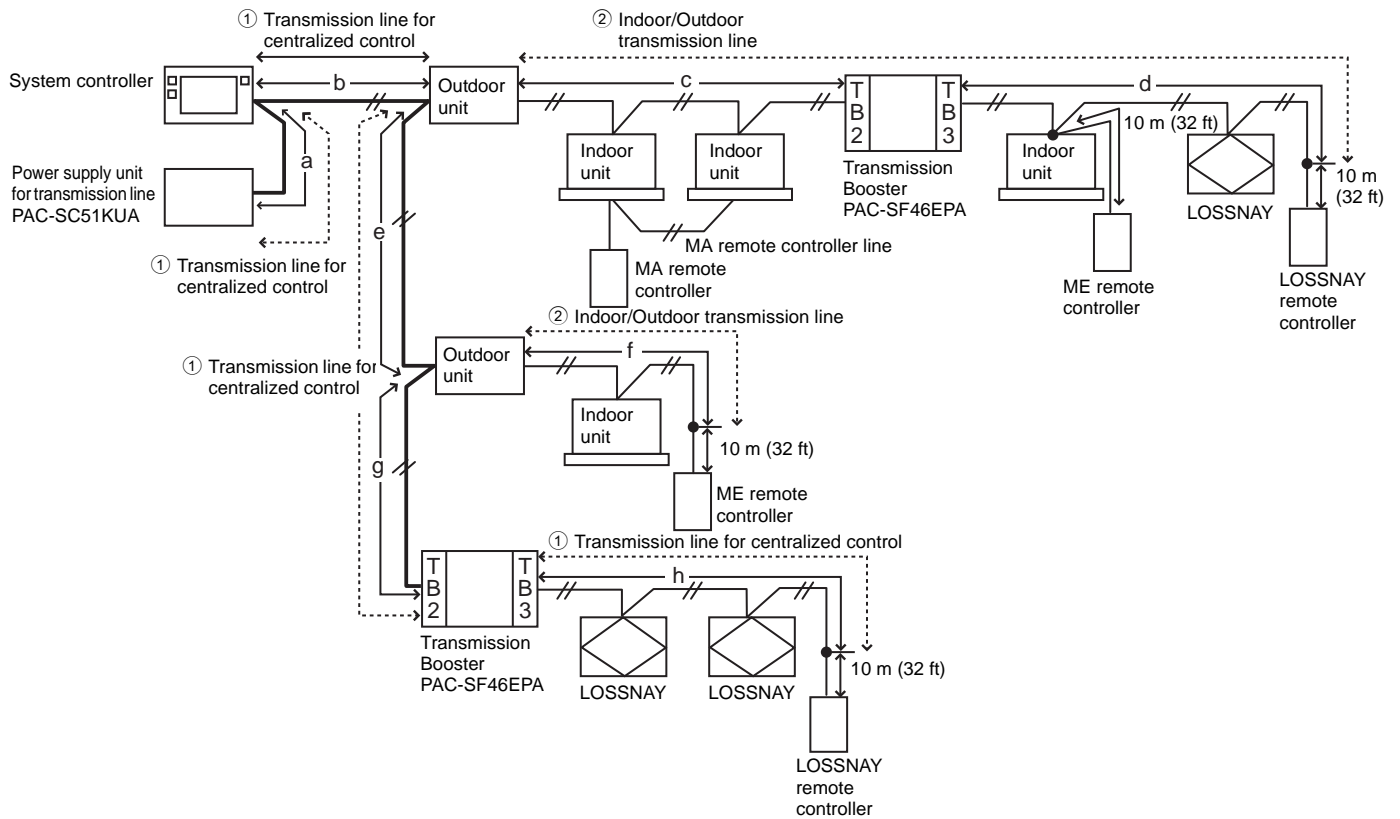
Note *This unit cannot be used to extend the transmission line.

5 Transmission cable length limitation

Wiring example

The wiring depends on the system configuration. For details, refer to DATA BOOK.

Example <M-NET transmission line>



- Total wiring length: 500 m (1,640 ft) max.
The maximum allowable wiring length of the M-NET transmission line for centralized control system and for Indoor/Outdoor system is shown in the formula below. Refer to the figure above for the alphabet in the formula.
If the calculated wiring length exceeds the maximum value, M-NET signal cannot be sent to the end-device and communication/control cannot be made.

$$a+b+c+d \leq 500 \text{ m (1,640 ft)} \quad a+b+e+f \leq 500 \text{ m (1,640 ft)} \quad a+b+e+g+h \leq 500 \text{ m (1,640 ft)}$$

$$d+c+e+f \leq 500 \text{ m (1,640 ft)} \quad d+c+e+g+h \leq 500 \text{ m (1,640 ft)} \quad f+g+h \leq 500 \text{ m (1,640 ft)}$$

The maximum wiring length for local remote controller is 10 m (32 ft). The section that exceeds 10 m (32 ft) must be included in the total wiring length (500 m (1,640 ft) max.)

- Transmission line for centralized control: 200 m (656 ft) max.

The maximum allowable wiring length from the power supply unit, which is on the transmission line for centralized control, to each outdoor unit and system controller is shown in the formula below. The value shows the maximum length that the power can be supplied to the transmission line for centralized control. If the calculated length exceeds the maximum value, the power cannot be supplied to the end-device and communication/control cannot be made.

$$a+b \leq 200 \text{ m (656 ft)} \quad a+b+e+g \leq 200 \text{ m (656 ft)}$$

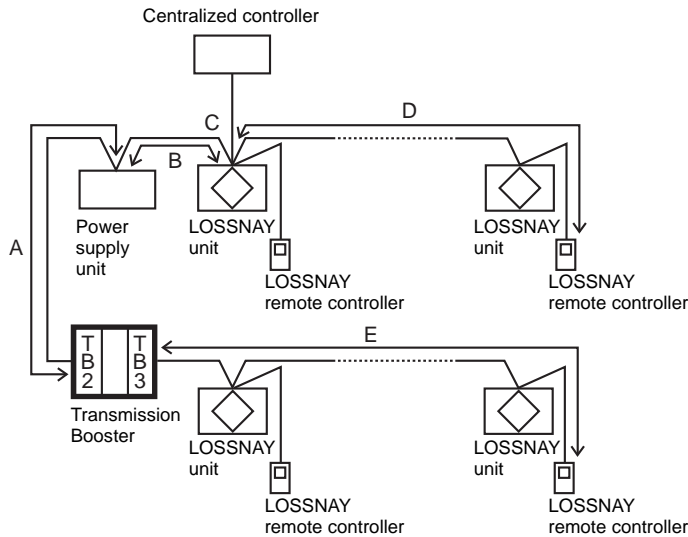
$$h \leq 200 \text{ m (656 ft)}$$

- Indoor/Outdoor transmission line: 200 m (656 ft) max.

The maximum allowable wiring length is shown in the formula below. The value shows the maximum length that the power can be supplied to Indoor/Outdoor transmission line. If the length exceeds the maximum value, the power cannot be supplied to the end-device and communication/control cannot be made.

$$d \leq 200 \text{ m (656 ft)} \quad c+d \leq 200 \text{ m (656 ft)} \quad f \leq 200 \text{ m (656 ft)}$$

Example for LOSSNAY



Transmission line length limits

(1) Maximum distance between ends should be less than 500 m (1,640 ft).

Ex.) A+B+D+E,
A+B+C+E,
C+D

(2) Maximum distance from power supply should be less than 200 m (656 ft).

Ex.) B+D, B+C, A, E

NOTES:

- If the total length of the remote controller's wiring is less than 10 m (32 ft), use 0.75 mm² (AWG18) cable, and do not add their lengths to the length calculations made above.
- If the total length of the remote controller's wiring is more than 10 m (32 ft), use 1.25 mm² (AWG16) cable or ϕ 1.2 mm or more shielded cable for the length of wiring exceeding 10 m (32 ft), and be sure to add their lengths to the length calculations made above.

6 Supply capacity to transmission line

In order to ensure proper communication among Outdoor unit, Indoor unit, LOSSNAY, and OA processing unit GUF-RD(H), and Controllers, the transmission power situation for the M-NET should be observed. In some cases, Transmission Booster should be used.

- Terminal block 1 for transmission line (TB2)
Power is not supplied to terminal block 1 for transmission line. (Supply capacity: 0)
- Terminal block 2 for transmission line (TB3)
The power supply coefficient of terminal block 2 for transmission line is 25.
Refer to the latest DATA BOOK for details about the power consumption coefficient of the connected unit model.

This product is designed and intended for use in the residential,
commercial and light-industrial environment.

The product at hand is
based on the following
EU regulations:

- Low Voltage Directive 2014/35/EU
- Electromagnetic Compatibility Directive
89/336/EEC, 2014/30/EU
- Restriction of Hazardous Substances
2011/65/EU

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