MITSUBISHI ELECTRIC

Air-conditioner Control System

Touch Controller TC-24A

Installation Manual

For distribution to dealers and contractors only

Thoroughly read the following safety precautions prior to installation. Refer to the Initial Setting Manual and the Instruction Book for information on operating or making the settings for the controller. Also, refer to the air conditioning unit installation manuals for how to connect cables or how to install air conditioning units.

1 Safety Precautions

- Thoroughly read the following safety precautions prior to installation.
- Observe the following precautions to ensure safety.

⚠ **WARNING**	Indicates a risk of death or serious injury.
⚠ **CAUTION**	Indicates a risk of serious injury or structural damage.

- Nomenclature



(Prohibited actions) (Do not touch) (No water) (No wet hands) (Fire hazards) (Electric shock hazards) (Injury hazards) (Important actions) (Grounding required)

- After reading this manual, pass it on to the end user to retain for future reference.
- Keep this manual for future reference and refer to it as necessary. This manual should be made available to those who repair or relocate the controller. Make sure that the manual is passed on to any future TC-24A users.

All electric work must be performed by qualified personnel.

General precautions

⚠WARNING

Do not install the unit in a place where large amounts of oil, steam, organic solvents, or corrosive gases, such as sulfuric gas, are present or where acidic/alkaline solutions or sprays are used frequently. These substances can compromise the performance of the unit or cause certain components of the unit to corrode, which can result in electric shock, malfunctions, smoke, or fire.

To reduce the risk of shorting, current leakage, electric shock, malfunctions, smoke, or fire, do not wash the controller with water or any other liquid.

To reduce the risk of electric shock, malfunctions, smoke or fire, do not operate the switches/buttons or touch other electrical parts with wet hands.

To reduce the risk of injury or electric shock, before spraying a chemical around the controller, stop the operation and cover the controller.

To reduce the risk of injury or electric shock, stop the operation and switch off the power supply before cleaning, maintaining, or inspecting the controller.

Properly install all required covers to keep moisture and dust out of the controller. Dust accumulation and water can cause electric shock, smoke, or fire.

To reduce the risk of injury, keep children away while installing, inspecting, or repairing the controller.

⚠CAUTION

To reduce the risk of fire or explosion, do not place flammable materials or use flammable sprays around the controller.

To reduce the risk of damage to the controller, do not directly spray insecticide or other flammable sprays on the controller.

To reduce the risk of electric shock or malfunctions, do not touch the touch panel, switches, or buttons with a pointy or sharp object.

To reduce the risk of injury and electric shock, avoid contact with sharp edges of certain parts.

To avoid injury from broken glass, do not apply excessive force on the glass parts.

To reduce the risk of injury, wear protective gear when working on the controller.

Precautions during installation

⚠WARNING

Do not install the controller where there is a risk of leaking flammable gas. If flammable gas accumulates around the controller, it may ignite and cause a fire or explosion.

Properly dispose of the packing materials. Plastic bags pose suffocation hazard to children.

Take appropriate safety measures against earthquakes to prevent the controller from causing injury.

To prevent injury, install the controller on a flat surface strong enough to support its weight.

⚠CAUTION

To reduce the risk of shorting, current leakage, electric shock, malfunctions, smoke, or fire, do not install the controller in a place exposed to water or in a condensing environment.

Controller must be installed by qualified personnel according to the instructions detailed in the Installation Manual. Improper installation may result in electric shock or fire.

Precautions during wiring

⚠WARNING

To reduce the risk of damage to the controller, malfunctions, smoke, or fire, do not connect the power cable to the signal terminal block.

Properly secure the cables in place and provide adequate slack in the cables so as not to stress the terminals.Improperly connected cables may break, overheat, and cause smoke or fire.

To reduce the risk of injury or electric shock, switch off the main power before performing electrical work.

All electric work must be performed by a qualified electrician according to the local regulations, standards, and the instructions detailed in the Installation Manual.Capacity shortage to the power supply circuit or improper installation may result in malfunction, electric shock, smoke, or fire.

To reduce the risk of electric shock, install a breaker and a residual current circuit breaker on the power supply. To reduce the risk of electric shock, smoke, or fire, install a breaker for each controller.

Use properly rated breakers and fuses (breaker, local switch <switch + fuse>, no-fuse breaker).The use of a breaker with a breaking capacity greater than the specified capacity may cause electric shock, malfunctions, smoke, or fire.

To reduce the risk of current leakage, overheating, smoke, or fire, use properly rated cables with adequate current carrying capacity.

Proper grounding must be provided by a licensed electrician.
Do not connect the grounding wire to a gas pipe, water pipe, lightning rod, or telephone wire. Improper grounding may result in electric shock, smoke, fire, or malfunction due to electrical noise interference.

⚠CAUTION

To reduce the risk of electric shock, shorting, or malfunctions, keep wire pieces and sheath shavings out of the terminal block.

To reduce the risk of shorting, current leakage, electric shock, or malfunctions, keep the cables out of contact with controller edges.

To reduce the risk of electric shock, malfunctions, or fire, seal the gap between the cables and cable access holes with putty.

Precautions for moving or repairing the controller

⚠WARNING

The controller should be repaired or moved only by qualified personnel. Do not disassemble or modify the controller.
Improper installation or repair may cause injury, electric shock, or fire.

⚠CAUTION

To reduce the risk of shorting, electric shock, fire, or malfunction, do not touch the circuit board with tools or with your hands, and do not allow dust to accumulate on the circuit board.

Additional precautions

To avoid damage to the controller, use appropriate tools to install, inspect, or repair the controller.

TC-24A is designed for exclusive use with the Building Management System by Mitsubishi Electric. The use of this controller for with other systems or for other purposes may cause malfunctions.

Take appropriate measures against electrical noise interference when installing the air conditioners in hospitals or facilities with radio communication capabilities.
Inverter, high-frequency medical, or wireless communication equipment as well as power generators may cause the air conditioning system to malfunction. Air conditioning system may also adversely affect the operation of these types of equipment by creating electrical noise.

To avoid malfunctions, do not bundle power cables and signal cables together, or place them in the same metallic conduit.

To avoid damage to the controller, do not overtighten the screws.

To avoid discoloration, do not use benzene, thinner, or chemical rag to clean the controller.To clean the controller, wipe with a soft cloth soaked in water with mild detergent, wipe off the detergent with a wet cloth, and wipe off water with a dry cloth.

To avoid damage to the controller, provide protection against static electricity.

Do not use solderless terminals to connect cables to the terminal block.
Solderless terminals may come in contact with the circuit board and cause malfunctions or damage the controller cover.

To avoid damage to the controller, do not make holes on the controller cover.

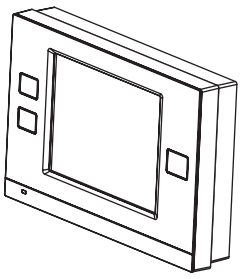
To avoid deformation and malfunction, do not install the remote controller in direct sunlight or where the ambient temperature may exceed 40ºC (104ºF) or drop below 0ºC (32ºF).

2 Parts list

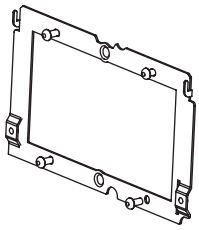
The package contains the following parts.

	Parts	Qty.
1.	Touch Controller	1
2.	Mounting bracket	1
3.	M4.1 wood screws x 16 *1 (Use to attach the mounting bracket to a wall.)	4
4.	M4 Roundhead cross slot screws x 30 *1 (Use to attach the mounting bracket to an electric box.)	4
5.	M4 roundhead screws with spring washers/washers x 20 (Use to attach the mounting bracket to the controller.) *1	2
6.	Installation Manual (This manual)	1
7.	Initial Setting Manual	1
8.	Instruction Book	1

*1 ISO metric screw thread



1. Touch Controller



2. Mounting bracket

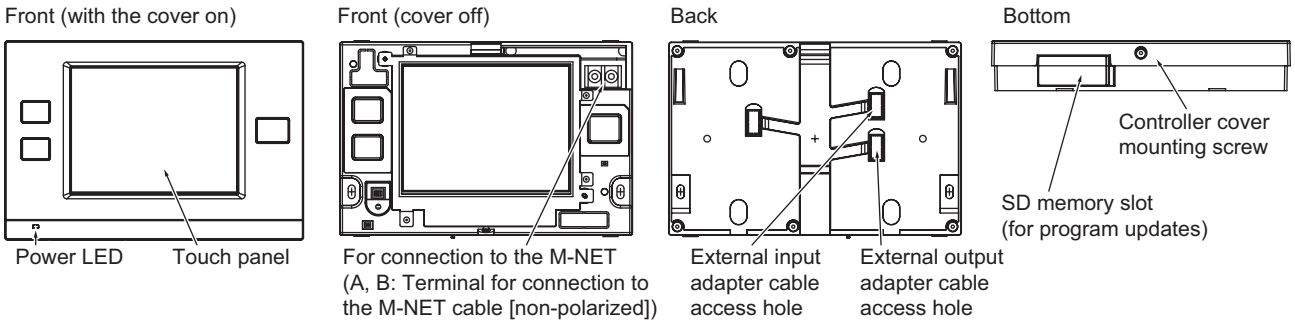
3 Product specifications

1. Specifications

Specifications			
Power source		30VDC *1 (for connection to M-NET only)	Receives power from the power supply unit for transmission line or from outdoor units via the M-NET transmission cable. The power consumption coefficient*2 of Touch Controller is "4."
Operating conditions	Temperature	Operating temperature range	0~40˚C [32˚F~104˚F]
		Storage temperature range	-20~+70˚C [-4˚F~+158˚F]
	Humidity	30%~90%RH (Non-condensing)	
Weight		0.5kg [1-1/8 lbs.]	
External dimensions (W x H x D)		180 x 120 x 30 mm 7-3/32 x 4-23/32 x 1-3/16 in	

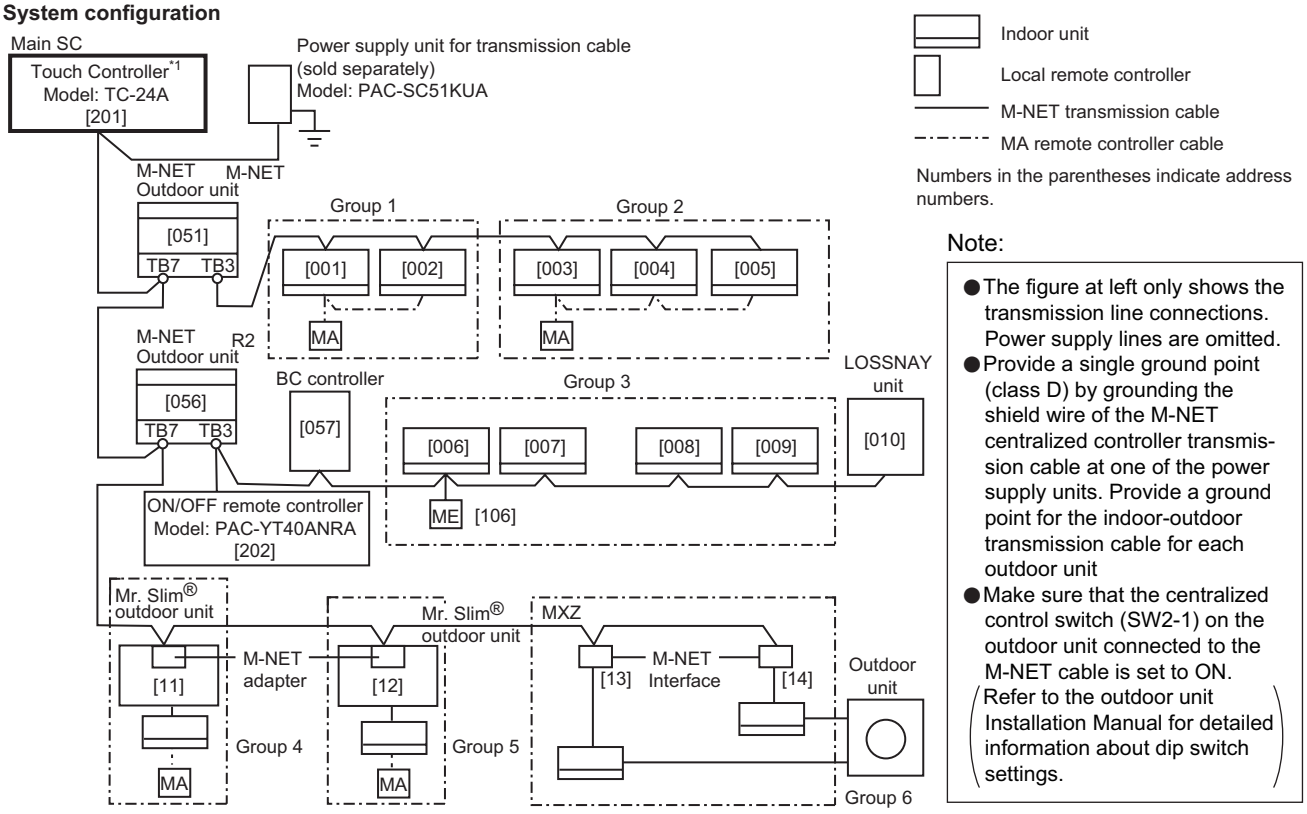
*1 Not for use with a generic DC power supply device. Use the power supply unit for transmission line (PAC-SC51KUA etc.) by Mitsubishi.
*2 "Power consumption Coefficient" is a coefficient to calculate the relative power consumption of the devices that receive power through the M-NET transmission line.
Refer to the note at the end of Chapter 4 "System diagram."

2. Unit Components and Functions



4 System diagram

1. System configuration



Note:

- The figure at left only shows the transmission line connections. Power supply lines are omitted.
- Provide a single ground point (class D) by grounding the shield wire of the M-NET centralized controller transmission cable at one of the power supply units. Provide a ground point for the indoor-outdoor transmission cable for each outdoor unit
- Make sure that the centralized control switch (SW2-1) on the outdoor unit connected to the M-NET cable is set to ON. (Refer to the outdoor unit Installation Manual for detailed information about dip switch settings.)

1 The power consumption coefficient of the Touch Controller is 4 and that of an indoor unit is "1", which means that each TC-24A unit consumes power equivalent to four indoor units. (*Indoor units receive power through the M-NET transmission line to maintain communication during power failure.) Refer to the CITY MULTI DATABOOK for details. The total power consumption of the connected devices should not exceed the capacity of the power supply units.
The Design Tool by MITSUBISHI ELECTRIC allows its user to design air conditioning systems easily.
TC-24A is compatible with the Design Tool version 3.71 or later.
The Touch Controller can be connected to either TB7 or TB3.
When connected to TB3, no power supply units are required.

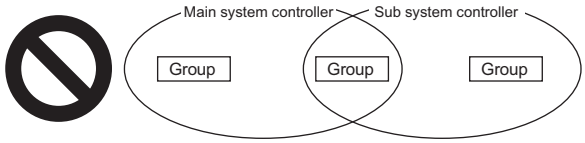
●Address settings (Address overlaps are not allowed.)

	Address setting	Address range
Indoor unit	Assign the lowest address to the main indoor unit in the group, and assign sequential addresses to the rest of the indoor units in the same group. Note: The following models require two addresses: PEFY-AF1200CFM and PEFY-AF1200CFM-R	1~50
Outdoor unit	Assign an address that equals the lowest indoor unit address in the same refrigerant system plus 50.	51~100
Auxiliary outdoor unit (BC controller)	Assign an address that equals the address of the outdoor unit in the same refrigerant system plus 1.	52~100
LOSSNAY unit	Assign an arbitrary but unused address to each Lossnay unit after assigning an address to all indoor units.	1~50
Mr. Slim® unit	Same rules as for the indoor units apply. An M-NET adapter (sold separately) is required.	1~50
MXZ unit	Same rules as for the indoor units apply. An M-NET interface (sold separately) is required.	1~50
M-NET remote controller	Assign an address that equals the address of the main indoor unit with the lowest address in the group plus 100. Add 150 instead of 100 to set a sub-remote controller.	101~200
Sub system controller	Assign an address that equals the lowest number of the group to be controlled plus 200.	201~250
DIDO (PAC-YG66DCA)	Assign an arbitrary but unused address to the controller after completing the address setting for the units with an address between 1 and 50. The number of controllable units depends on the number of channels used. (1 channel = I unit)	1~50
MA remote controller	Address setting is not required. The connection of two remote controllers requires the main/sub setting for each controller to be made.	–

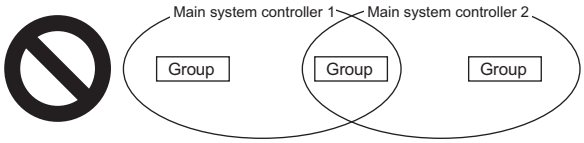
Note

●Touch Controller is for exclusive use as a Main system Controller and cannot be used as a Sub system controller. The system cannot be configured as shown in the examples below.

►Groups that are not controlled by a main controller cannot be controlled from a sub controller.

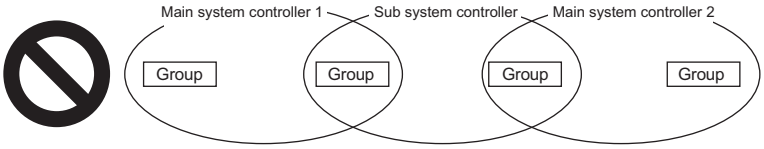


►Each group cannot be controlled by two or more main controllers.



*Exception:
Although AG-150A series and TC-24A are both designed for use as the main system controllers, they can be used in combination with each other. When using them in combination, make the group settings from both controllers. Enter the address from each controller in the field for registering the address of the system controller in each group.

►Sub controllers cannot be controlled by two or more main controllers.



2. M-NET wiring design

(1) M-NET transmission cable specifications and restrictions

Cable Specifications	Facility type	All facility types
	Type	Shielded cable CVVS・CPEVS・MVVS
	No. of cores	2-core
	Size	CVVS, MVVS: 1.25 mm² (AWG16) or larger CPEVS: ø1.2 mm (AWG16 or its equivalent) or larger
Maximum indoor-outdoor transmission cable length		200 m [656 ft]
Maximum length of transmission line for centralized control and indoor-outdoor transmission cables (Maximum cable distance via outdoor unit)		500 m [1640 ft] *The maximum cable distance from the power supply unit to each outdoor unit or to the system controller is 200 m [656 ft].

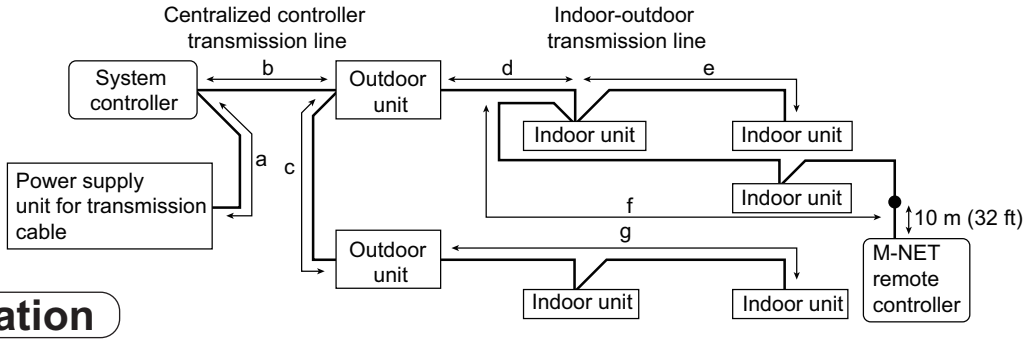
The figure below shows the M-NET transmission wiring diagram for City Multi air conditioners.

The maximum length of centralized control M-NET transmission line and the indoor-outdoor transmission line per system can be expressed in the following formulas. Labels "a through g" represent the sections of wiring in the system in the figure below. These limits ensure normal signal communication over the M-NET transmission line.

If the line length exceeds the maximum length, M-NET signal attenuation can occur, rendering normal communication and control impossible.

a+b+d+e(f) ≤ 500 m (1640 ft) a+b+c+g ≤ 500 m (1640 ft) e(f)+d+c+g ≤ 500 m (1640 ft)

The maximum length of local remote controller cable is 10 m (32 ft). The length that exceeds 10 m (32 ft) must be included in the maximum total line length 500 m (1640 ft).



5 Installation

1. Field-supplied parts

The following parts are required to install the controller.

Parts	Qty.	Note
Triple electric box	1	Not required for wall-surface installation
Thin metal conduit	As appropriate	
Lock nut and bushing	As appropriate	
M-NET cable	As appropriate	Shielded cable CVVS, MVVS: 1.25 mm²~2 mm² (AWG16~14) CPEVS: Ø1.2 mm~Ø1.6 mm (AWG16~14 or their equivalents)

2. Required tools

•A knife or nippers •Crosshead driver

3. Installation methods

Follow the instructions provided for the selected installation option.

(a) Wall-embedded installation using an electric box
(b) Wall-surface installation
(b-1) To route the cable through the wall
(b-2) To route the cable along the wall surface

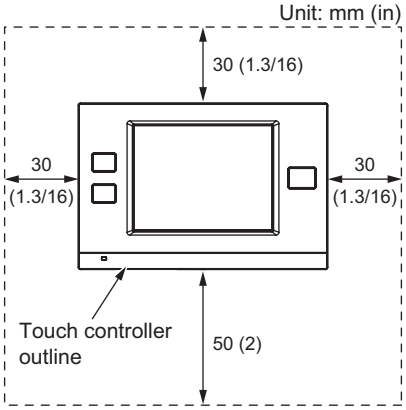
4. Preparation

(1) Install a breaker on the power supply unit side before installing the controller.

(2) Select an installation site for the Touch Controller.

- Install the controller at the user's eye level for easy operation.
- Ensure there is enough clearance space as shown in the figure at right.
- Ensure there is enough clearance space to allow for easy access to the panel and the buttons.

Unit: mm (in)



(3) Bring the cable end up to the controller.

Ensure the M-NET transmission cables and external input/output cables are long enough to reach the controller. Have extra cables to extend these cables as necessary.

- To install the controller according to the instructions provided in sections (a) and (b-1) above
  Include an extra 30 cm (12 in) of cable to provide adequate slack in the cable.
  Remove the sheath on the M-NET transmission cable up to 20 cm (8 in) from the end.
- To install the controller according to the instructions provided in section (b-2) above
  Include an extra 15 cm (6 in) of cable to provide adequate slack in the cable.
  Remove the sheath on the M-NET transmission cable up to 10 cm (4 in) from the end.

Note

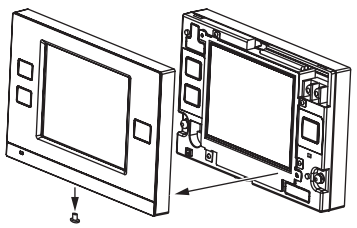
Refer to section 6 "External input output" for how to connect external input/output signal cables.

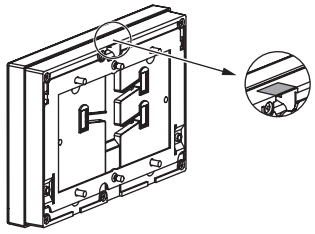
Note

Do not push the shield wire into or connect it to the TC-24A. Trim the shield wire, cover it with vinyl insulating tape, and leave it outside the controller.

(4) Prepare the Touch Controller.

Unscrew the screw at the bottom of the controller, and remove the cover.
To route the cable along the wall surface, cut out the rectangle knockout hole (18 mm (W) x 9 mm (D)) at the top of the controller with a knife or a nipper (shown as the shaded area in the figure below at right).





5. Installation steps

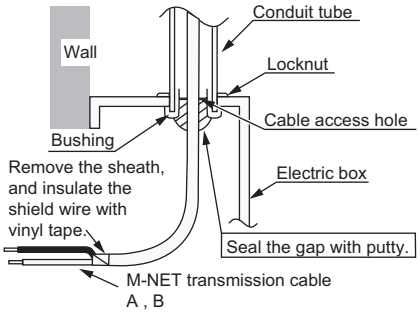
(1) Routing the cables

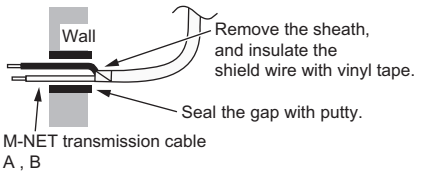
(a) Wall-embedded installation using an electric box
Pull the M-NET transmission cable through the hole on the wall and the electric box, and seal the gap between the cable and the end of the conduit tube.

(b) Wall-surface installation

•To route the cable through the wall :
Drill a hole in the wall, push the M-NET transmission cable through the hole, and seal the gap between the cable and the hole with putty.

•To route the cable along the wall surface :
It is approximately 10 cm (4 in) from the cable access hole on the back of TC-24A to the M-NET terminal block. Trim off the excess transmission cable, if any.



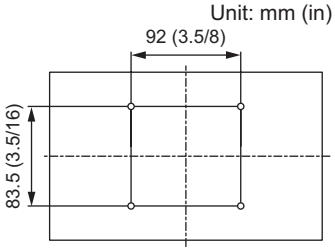


To reduce the risk of electric shock, malfunctions, or fire, seal the gap between the cables and access holes with putty.

(2) Attach the mounting bracket on the wall.

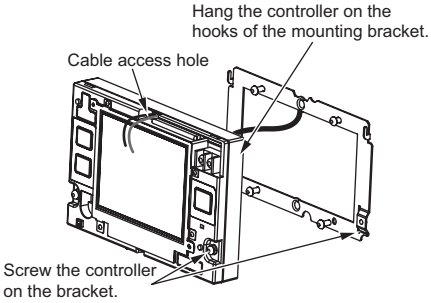
Attach the mounting bracket on the designated area on the wall using the supplied screws.
The pitch for the mounting bracket is shown in the figure at right.

Unit: mm (in)



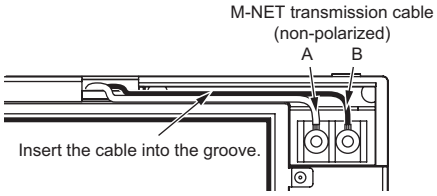
(3) Attach the controller to the mounting bracket.

After inserting the M-NET transmission cables (A and B) through the cable access hole on the controller from the back, hang the controller on the hooks of the mounting bracket.
Attach the controller to the mounting bracket using twenty M4 screws with spring washers/washers.



(4) Connect the cables.

Connect the M-NET transmission cables (A and B) to the terminal block. M-NET transmission cable is non-polarized.
Insert the cables in the groove on the controller so they will not be pinched when the cover is installed.

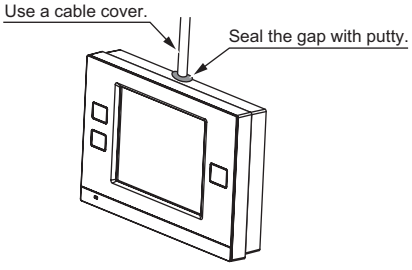


Note

- **The M-NET terminal on the controller is only for connection to the M-NET cable. Do not connect an AC power supply.**
- **Do not daisy-chain M-NET terminals.**

*To route the cable along the wall surface

Secure the cables in place with a cable cover, and seal the gap between the cable cover and the controller with putty.



To reduce the risk of electric shock, malfunctions, or fire, seal the gap between the cables and access holes with putty.

(5) Replace the cover.

Snap the cover into place, and attach it to the controller with a screw at the bottom.
*Tighten the screw to a torque of 10 N·m or less.

6 Using external input/output

1. External signal input (CN2)

*To use external input, an external input/output adapter (PAC-YT41HAA; sold separately) is required.

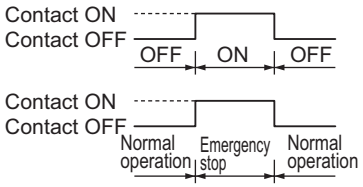
(1) External input

Using external dry contact signals, the following operation of all air conditioning units can be controlled from the Touch Controller: Emergency stop/Normal operation, ON/OFF, Permit/Prohibit local remote controller operation. These settings are made on the External Input Settings on the Initial Settings screen that is accessible from the Service Menu screen. (Refer to Chapter 3 in the Initial Setting Manual.)

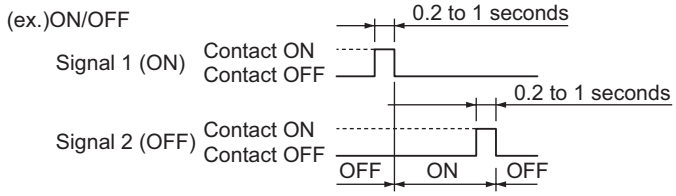
Mode	External input signal setting	Notes
1	Do not use external input. (Factory setting)	-
2	Emergency stop/Normal operation signal (level signal)	When the units are not operating after receiving an emergency stop signal, the ON/OFF operation from the local remote controller will not be allowed, and the ON/OFF and Prohibit/Permit settings on the Touch Controller cannot be changed. Timer operation will not function.
3	ON/OFF signal (level signal)	ON/OFF operation from the local remote controller will not be allowed, and the ON/OFF and Prohibit/Permit settings on the Touch Controller cannot be changed. Timer operation will not function.
4	ON/OFF and Prohibit/Permit remote controller operation signal (pulse signal)	The ON-signal pulse width should be set to a value between 0.2 and 1 seconds.

(2) Level signal and pulse signal

(A) Level signal



(B) Pulse signal



*Same for Prohibit/Permit remote controller operation.

(3) External input specifications

CN2	Lead wire	Emergency stop/Normal operation signal (level signal)	ON/OFF level signal	ON/OFF, Prohibit/Permit remote controller operation (pulse signal)
1	Green	Built-in 5 VDC power for external input * Exclusively for use with external input. Not usable for other purposes.		
2	Yellow	Emergency stop/Normal operation signal input	ON/OFF signal input	ON signal input
3	Orange	Not used	Not used	OFF signal input
4	Red	Not used	Not used	Prohibit-local-remote-controller-operation signal input
5	Brown	Not used	Not used	Permit-local-remote-controller-operation signal input

(A) Level signal

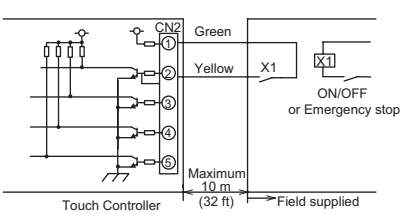
- tIf the type of signal assigned to the external input contact is "Emergency/Normal," the units in normal operation will stop when the signal input changes from OFF to ON. Conversely, the units that are stopped will resume normal operation when the signal changes from ON to OFF. After the emergency stop is reset, the original operating status of each air conditioning unit will not be automatically restored. The air conditioning units must be started up manually.
- If the type of signal assigned to the external input contact is "ON/OFF," the units that are stopped will start operation after the input signal changes from OFF to ON. Conversely, the units that are in operation will stop after the input signal changes from ON to OFF.

(B) Pulse signal

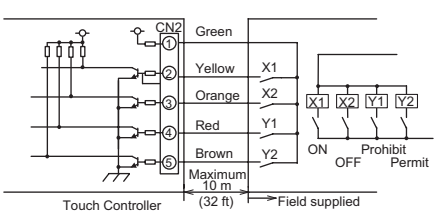
- If the incoming signal is the same as the signal that is currently being received, no status change will occur.
- If local remote controller operation is prohibited, ON/OFF status, operation mode, or temperature setting cannot be changed and filter sign cannot be reset from the remote controller.
- The ON-signal pulse width should be set to a value between 0.2 and 1 seconds.

(4) Sample circuit recommended

(A) Level signal



(B) Pulse signal



•The relays and extension cables are field supplied.
•Use a no-voltage contact and minute load relay (minimum application load 5VDC-1mA).
•The length of the connection cable extension should not exceed 10 m (32 ft). (Use a cable of 0.3 mm² (22AWG) or thicker.)
•Insulate the area with vinyl tape where the controller cable and the extension cable are connected.
•Insulate the end of unused lead wires with tape.

2. External signal output

*To use external output, an external input/output adapter (PAC-YT41HAA; sold separately) is required.
Requires a separate external power source.

(1) External signal output (CN3)

Operation signal will be output when one or more air conditioning units are in operation, and error signal will be output when one or more units are in error.
The On-signal will be output even during an error.

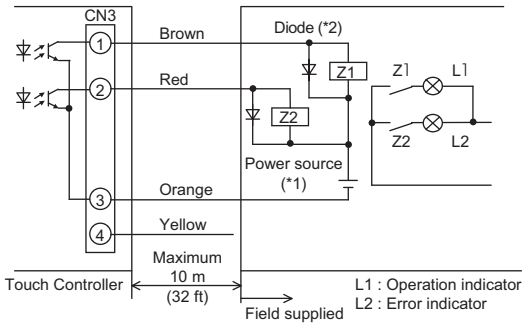
(2) External output specifications

CN3	Lead wire	Signal
1	Brown	ON/OFF
2	Red	Error/Normal

CN3	Lead wire	Signal
3	Orange	Ground for all external outputs
4	Yellow	Not used

(3) Sample circuit recommended

Relay-driven circuit



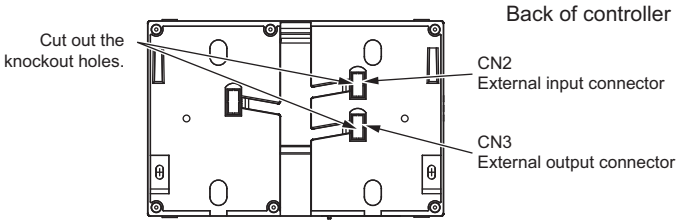
Use relays that meet the following specifications for relays indicated as Z1 and Z2 in the figure.

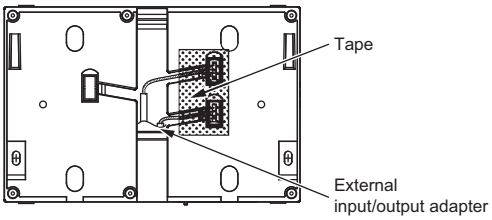
Operating coil
Rated voltage:12 VDC or 24 VDC
Power consumption: 0.9 W or below
(*1) Select a power supply suitable for the relays used. (12 VDC or 24 VDC)
(*2) Use a diode at each end of the relay coil.

- Each element will turn on when an error occurs during operation.
- The maximum length of extension cable is 10 m (32 ft). (Use a cable of 0.3 mm² (22AWG) or thicker.)
- Insulate the area with vinyl tape where the controller cable and the extension cable are connected.
- Relays, lamps, diode, extension cables are field-supplied.

Note

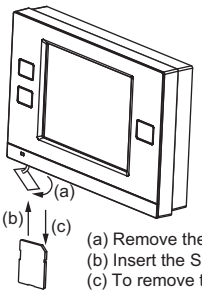
- To connect cables from an external input/output adapter to connectors CN2 and CN3 on the controller, cut out the appropriate knockout holes on the controller with nippers.
  After connecting the cables to the connectors, hold the cables in place with a piece of tape included with the external input/output adapter (PAC-YT41HAA).
- Use caution not to damage the circuit board with the nippers or other tools when cutting out knockout holes.

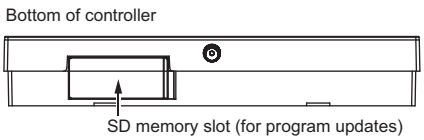




7 Using an SD memory card

The Touch Controller has a slot for an SD memory card at the bottom that can be used to update software.
Refer to the Initial Setting Manual for the detailed information about updates.
*Only the 1GB and 2GB SD memory cards by SanDisk are supported. "SD Logo is a trademark of SD-3C , LLC."





(a) Remove the SD memory card slot cover from the controller.
(b) Insert the SD memory card into the slot until it clicks.
(c) To remove the SD memory card, push it in until it clicks.

8 Optional Parts

Parts	Model	Usage	Note
External input/output adapter	PAC-YT41HAA	Enables the use of external input/output function	Required to use the external input/output function 5-wire cable (input) , 4-wire cable (output)

9 Note

■ **A protective film is placed on the display.**
Remove the protective film off the display before use.