Instruction Manual (Installation)

Multi-loop module type Temperature Controller
Enhanced Communication Module
(Ethernet communication)

Model: PUMCE

Fuji Electric Co., Ltd. INP-TN1PUMCEa-E

Thank you for purchasing the Fuji module type temperature controller.
Once you have confirmed that this is the product you ordered, please use it in accordance with the following instructions.
For detailed information on operating this equipment, please refer to the separate user's manual.
In addition, please keep this instruction manual within easy reach of the actual person using this equipment.
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CAUTION

The contents of this manual are subjected to change without notice.
This manual is compiled with possible care in the interests of accuracy, however, Fuji Electric shall not be held liable for any damages, including indirect damage, caused by typographical errors, absence of information or use of information in this manual.

Scope of application

- This equipment must be used under the following conditions:
- the use of the equipment incurs no risk of a serious accident even if a failure or malfunction occurs on the equipment, and
- in case of product failure or malfunction, safety measures such as redundant design, prevention of malfunction, fail safe system, foolproof mechanism are provided outside of the equipment.
- This product is designed and manufactured as a general-purpose product for general industrial applications.
- The warranty does not apply to the following cases:
- for the use not described in or beyond the conditions or environment specified in the instruction manual or the user manual,
- for the use which has large influence on publicity including nuclear power and other power generation, gas, and/or water,
- for the use in which safety is especially required, because it may seriously affect railroads, vehicles, combustion equipment, medical equipment, entertainment devices, safety equipment, defense equipment, and/or human lives and property.
  However, we will study the possibility of application of the equipment for the above use, if the user limits the usage of it and agrees to require no special quality. Please consult us.

Confirming Specifications and Accessories

Before using the product, confirm that it matches the type ordered.
(Refer to page 4 for model codes.)
Confirm that all of the following accessories are included.

Temperature Controller Enhanced Communication Module (Ethernet Communication)	1 Unit
Instruction Manual	1 Copy

Related Information

Refer to "Module Type Temperature Controller Enhanced Communication Module (Ethernet Communication) User's Manual" for details about the items described in this manual.

Content	Material name	Material No.
Specification	Catalog	21B1-E-0054
Operating instruction	Ethernet Communication Module User's manual	INP-TN5A2052-E
Tool	PUM parameter loader	INP-TN5A1634-E

Please Read First (Safety Warnings)

Please read this section thoroughly before use and observe the mentioned safety warnings fully.
Safety warnings are classified into "Warning", "Caution" and "Risk of Electrical Shock".

⚠ Warning	Improper use of the equipment may result in death or serious injuries.
⚠ Caution	Improper use of the equipment may cause injury or property damage.
⚠ Risk of Electrical Shock	A risk of electrical shock is present and the associated warning should be observed.

1 Warranty

1-1 Period of warranty

Warranty period for this product including accessories is one year after delivery.

1-2 Scope of warranty

(1) If any failure or malfunction attributable to Fuji Electric occurs in the period of warranty, we will replace the product or failed parts without charge. Please note that, in the case where our engineer needs to visit your place for replacement, we cannot provide commissioning and/or readjustment for whole system using our products.
The warranty does not apply to failure or malfunction resulting from:
a) inappropriate conditions, environment, handling or usage that is not instructed in a catalog, instruction book or user's manual, or overuse of the product,
b) other devices or software not originate in Fuji Electric,
c) improper use, or an alteration or repair that is not performed by Fuji Electric,
d) factors that do not originate in the purchased or delivered product,
e) damages incurred during transportation or fall after purchase,
f) factors that were not foreseeable by the practical application of science and technology at the time of purchase or delivery,
g) any reason that Fuji Electric is not responsible for, including a disaster or natural disaster such as earthquake, thunder, storm and flood damage, or inevitable accidents such as abnormal voltage.
(2) Regardless of the time period of the occurrence, Fuji Electric is not liable for the damage caused by the factors Fuji Electric is not responsible for, opportunity loss of the purchaser caused by malfunction of Fuji Electric product, passive damages, damage caused due to special situations regardless of whether it was foreseeable or not, and secondary damage, accident compensation, damage to products that were not manufactured by Fuji Electric, and compensation towards other operations.

1-3 Period for repair and provision of spare parts after product discontinuation (maintenance period)

The discontinued models (products) can be repaired for five years from the date of discontinuation.
Also, most spare parts used for repair are provided for five years from the date of discontinuation. However, some electric parts may not be obtained due to their short life cycle. In this case, repair or provision of the parts may be difficult in the above period. Please contact Fuji Electric or its service providers for further information.

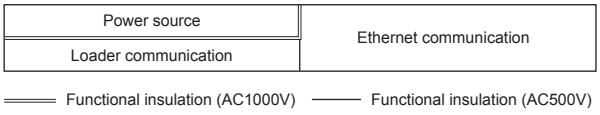
2 ⚠ Warning

2-1 Installation and Wiring

- This equipment is intended to be used under the following conditions.

Ambient temperature	-10 to 50 degree C
Ambient humidity	90% RH or below (with no condensation)
Warm-up time	30 min. or more
Installation category	IEC61010-1: class II
Pollution level	IEC61010-1: degree 2

- The insulation class of the equipment is as below. Before installing, confirm that the insulation class for the equipment meets usage requirements.



- In cases where damages or problems with this equipment may lead to serious accidents, install appropriate external protective circuit.
- To avoid product failure or damage, provide the rated power voltage.
- To prevent electric shock and equipment failure, do not turn the power ON until all wiring is completed.
- Before turning the power ON, make sure clearance space has been secured for shock or fire prevention.
- Do not touch the terminal while the machine is ON. There are risks of shock or equipment errors.
- Never disassemble, convert, modify or repair this equipment. There are risks of abnormal operation, shock or fire.
- All of the wiring should be class 1 type wiring, or the low voltage wires should be routed separately from the hazardous voltage wires to ensure separation of circuits.
- When using a AWG-16 cable, you should use the crimp terminal that material thickness is 0.9mm or less.
- Do not use any electrical components that have gotten wet. Otherwise, you may get electric shock or it may result in fire.

2-2 Maintenance

- Turn OFF the power when installing or removing the equipment. Otherwise, it may cause shock, abnormal operation, or equipment failure.
- Periodic maintenance is recommended for continuous and safe use of this equipment.
- Some parts installed on this equipment have a limited life and/or may deteriorate with age.

2-3 Service life

- This product, excluding limited-life parts, is designed for a service life of 10 years under general operating conditions.
- The warranty period for this unit (including accessories) is one year with appropriate use.

2-4 Limited-life parts and consumable parts

This product contains the following limited-life parts and consumable parts which may affect the service life of the product itself.
(1) Aluminum electrolytic capacitor
- Designed service life: 10 years under general working conditions
- Symptoms when a capacitor loses its capacity: deterioration of power quality, malfunction
- Factors which affect capacitor life: temperature
  The life is shortened by half when the temperature rises by 10°C. (Arrhenius' law)
- Replacement: Estimate the lifetime of capacitor according to your operating environment, and have the capacitor replaced or overhauled at appropriate time, at least once in 10 years.

Do not use capacitors beyond its lifetime. Otherwise, electrolyte leakage or depletion may cause odor, smoke, or fire. Please contact Fuji Electric or its service providers when an overhaul is required.

3 ⚠ Caution

3-1 Cautions when Installing

Install in a UL listed enclosure only.
Please avoid installing in the following locations.
- Where the ambient temperature is beyond the range of -10 to 50 degree C when the equipment is in use.
- Where the ambient humidity is beyond 90% RH when the equipment is in use.
- With rapid temperature changes, leading to dew condensation.
- Where corrosive gas (especially sulfide gas and ammonia) or flammable gas is generated.
- With direct vibration or shock to the equipment.
- Where they may be contact with water, oil, chemicals, steam or hot water. (If the equipment gets wet, since there is a risk of electric leakage or fire, have it inspected by Fuji distributor.)
- With high concentration of atmospheric dust, salt or iron particles.
- With inductive interference, resulting in static electricity, magnetic fields or noise.
- In direct sunlight.
- Where accumulation of heat due to radiant heat is generated.
- A switch or circuit Breaker shall be included in the building installation. Please be it in close proximately to the equipment and within easy reach of the operator, and mark it as the disconnecting device for the equipment.

3-2 Cautions when Mounting to Cabinets / DIN rails

- After mounting modules onto DIN rails, make sure to fasten them firmly by pushing up the locking tabs.
- When connecting modules, first, connect them with release of all modules' locking tabs, and then push all of them up to lock.
- Make sure to turn the power OFF, when removing the front terminal block from the main body or removing the main body from the base part.
- In order not to disturb heat dissipation, do not block the air vents on the top and bottom of the equipment.
- For mounting / dismounting modules to / from DIN rails, space more than 30mm should be provided.
- Use only the screws supplied with the product.

3-3 Cautions for Wiring

- For wiring to the terminal block, use solderless terminals of screw size M3. The screw size of the terminal block: M3 × 7 (with a square washer) Cramp torque: 0.78N-m (8kgf-cm)
- To avoid the influence of inductive noise, signal wires should be separated from electric power lines or load lines.
- If you use RS-232C communication, use it with the noise filter attached to AC power line. (This is not necessary if implementating the complete preparation for noise of power line.
- To comply with CE marking (EMC), it is recommended to add ferrite cores to the communication cable and the power supply cable.

3-4 Error Operation

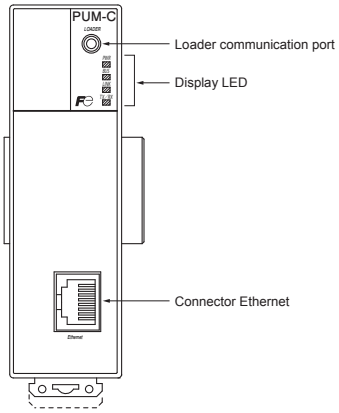
- The alarm function does not work properly when an error occurs unless the correct settings are made. Make sure to verify its setting prior to starting operation.

3-5 Other cautions

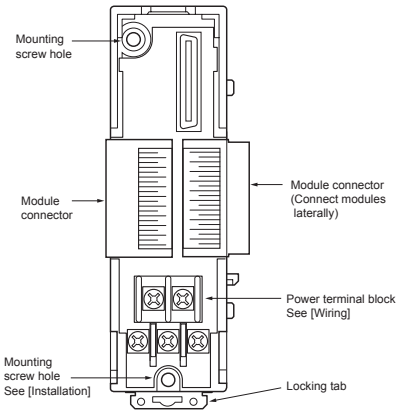
- Do not wipe the equipment with organic solvent, such as alcohol or benzene, etc. Use a neutral cleaning agent for cleaning it.
- Do not use mobile phones near the equipment (within 50cm). Otherwise the malfunction may result.
- The use of the equipment near radios, TVs, or wireless devices may cause malfunctions.
- After the power is turned ON, it needs 5 to 20 sec. until the equipment starts communication.
- Prior to wiring / connecting the equipment, always take appropriate measures to eliminate static electricity (ESD).
- Prevent dust or contaminants getting into the equipment. Otherwise, it may result in fire.

Part names and functions

- Main unit



- Base part



Display LED
Six LED lamps indicate the following operation conditions.

Bridge communication

LED	Green	Red	Orange
PWR	ON: Normal operation	–	–
BUS	ON: inter-module communication (receiving)	–	ON: inter-module communication (transmitting)
LINK	ON: normal Ethernet communication link	–	–
TX/RX	–	–	ON: Ethernet communication data receiving or transmitting

Mapping communication

LED	Green	Red	Orange
PWR	ON: Normal operation Blinking (0.5-sec. intervals): Performing initial polling with PUM	Blinking (1.0-sec. intervals): No communication established due to inter-device communication fault Blinking (0.5-sec. intervals): Registered parameter is out of range Switch setting is out of range EEPROM failure Invalid MAC address	–
BUS	ON: inter-module communication (receiving)	–	ON: inter-module communication (transmitting)
LINK	ON: normal Ethernet communication link	–	–
TX/RX	–	–	ON: Ethernet communication data receiving or transmitting

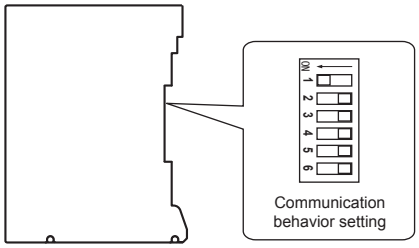
Programless communication

LED	Green	Red	Orange
PWR	ON: Normal operation Blinking (0.5-sec. intervals): Performing initial polling with PUM	ON: faulty communication with Micrex-SX Blinking (1.0-sec. intervals): No communication established due to inter-device communication fault Blinking (0.5-sec. intervals): Registered parameter is out of range Switch setting is out of range EEPROM failure Invalid MAC address	–
BUS	ON: inter-module communication (receiving)	–	ON: inter-module communication (transmitting)
LINK	ON: normal Ethernet communication link	–	–
TX/RX	–	–	ON: Ethernet communication data receiving or transmitting

Setting

- Communication behavior setting

Set communication behavior by DIP switches on the back of the module (SW1 to SW6).

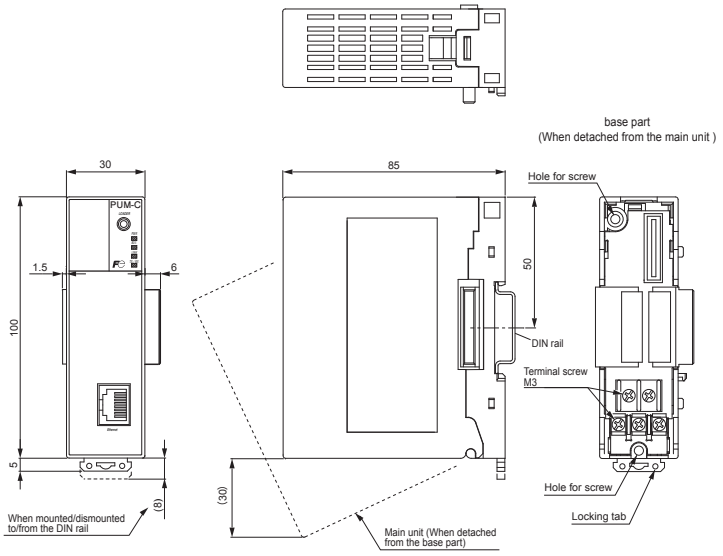


Communication behavior	SW No.					
	1	2 (Note 1)	3 (Note 1)	4	5	6
Modbus/TCP bridge communication	Note 2	OFF	OFF	OFF		
Modbus/TCP mapping communication		OFF	ON			
Micrex-SX programless communciation		ON	OFF			

Note 1: You cannot set both SW2 and SW3 to ON simultaneously.
Note 2: When you set SW1 to ON, the Ethernet communication setting will be restored to factory default.

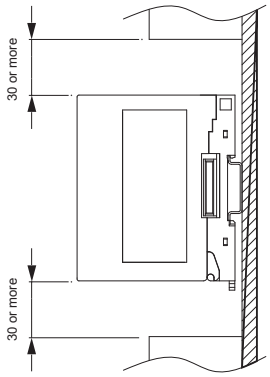
Mounting

- Dimensions



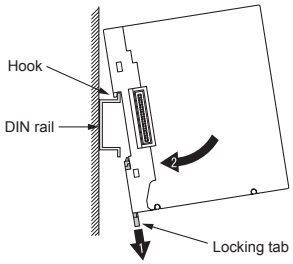
- Cautions when mounting

Make sure to leave a minimum space of 30 mm (50mm is recommended) both above and below the equipment.

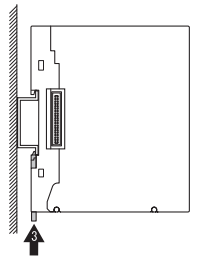


- Mounting to DIN rails

1. Pull down the locking tab of the base part. Hook the back part of the unit onto the upper part of the DIN rails.
2. Push the unit towards the direction of the arrow 2.

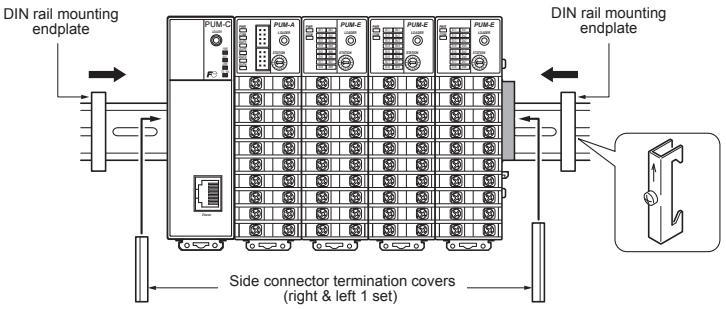


3. Pull up the locking tab of the base part to fasten the equipment onto the DIN rails.
   - When connecting the equipment after mounting it to the DIN rail, do not pull the locking tab up at this point yet.



- Attaching the endplates

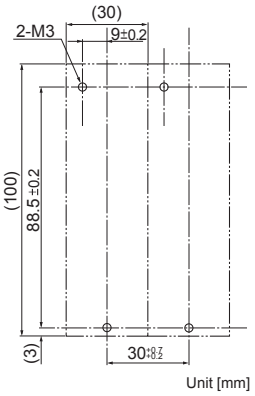
If you want to fix the equipment onto the DIN rails more firmly, use endplates (optional) and a pair of side connector termination covers (optional).



- Fixing with screws

When fixing the equipment on the wall using screws, connect module base parts first.
*Fixing screws are to be prepared by customers.

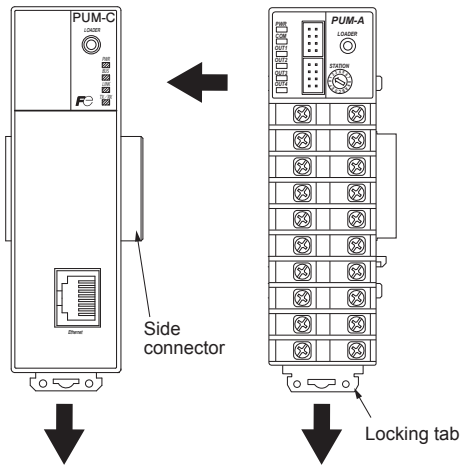
1. Decide the mounting position, referring to the figure below for the mounting screw hole.



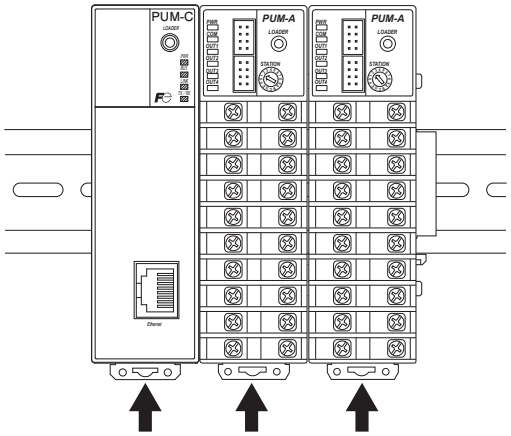
2. Remove the main unit from the base part.
   - See [How to detach the base part]
3. Connect the base part, and then pull all the locking tabs up to fasten.
4. Fix the base part onto the mounting position on the wall with screws.
5. Attach the module main unit to the base part.

- Connecting modules

1. Check the locking tab is pulled down.
2. Connect modules by connecting the side connectors with each other.



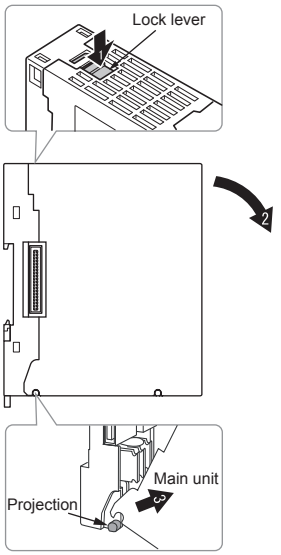
3. After mounting modules to the DIN rails, push up all the locking tabs. Modules are fastened to the DIN rails and to each other at the same time.
4. The power supplies are connected each other inside connected modules.



How to detach the base part

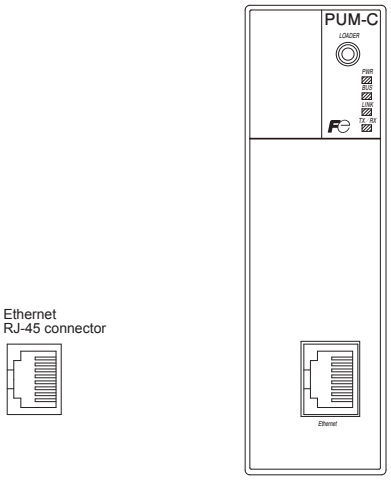
1. Press the lock lever on the top of the equipment.
2. Pull forward the upper part of main unit.
3. Detach the cutout on the lower end of the back of the main unit from the projection on the base part.

- To attach the main unit to the base part, reverse the above procedure.
- Make sure the lock lever on the main unit is fitted into the base part after attaching.

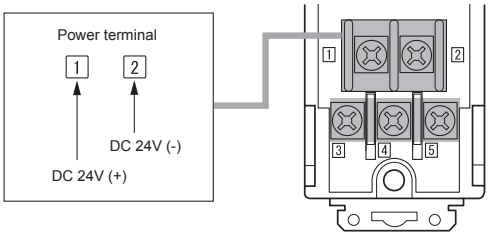


Terminal Figure

- Front face terminal block



- Base part (power terminal)



Note 1: Power cables more than one should not be connected between power terminals.
Note 2: Do not use terminals 3, 4, and 5.

Specification

General Specification

Power Supply	:	24V DC ±10%
Power Consumption	:	Maximum 3.2W (135mA) [when 24Vdc is applied]
Dimensions	:	30(W)×100(H)×85(D) mm (excluding projection and terminal cover)
Weight	:	Approx. 110g
Installation Method	:	DIN rail mounting inside a cabinet / wall mounting with M3 screws
Ambient Temperature*	:	-10 to 50 degrees C Note: "Ambient temperature" means the temperature underneath the equipment installed inside a dvice or a cabinet.
Ambient Humidity:	:	90%RH or less (no condensing)
Storage temperature/humidity:		-20 to 60°C, 90%RH
Memory Backup:	:	Backup by nonvolatile memory (EEPROM) The number of rewriting: 100,000 times

Communication Functions

Communication specifications	: Ethernet 10BASE-T/100BASE-TX compliance
The number of port	: 1 port
Recommended hub	: Industrial hub
Communication protocol	: IEEE802.3/IEEE802.3u compliance
Communication speed	: 10/100Mbps Auto-negotiation
Communication distance	: 100m (between a hub and the device)
Recommended cable: Ethernet cable	: Catgory 5e

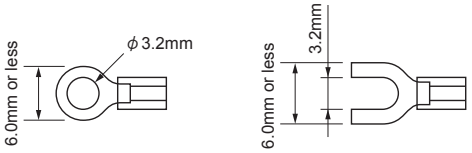
Crimp terminal size

Please prepare cables and crimp terminals of the size indicated below.

Cable type	Size
Power supply, output, others	0.25 to 1.25mm^2 (AWG 22 to 16)

Crimp terminal

Cable size	Screw tightening torque
0.25 to 1.25mm^2 (AWG 22 to 16)	0.8 N•m



Round-shaped solderless terminal Y-shaped solderless terminal

* Material thickness 0.9mm or less.

Model code

Enhanced communication module (Ethernet communication)

1	2	3	4	5	6	7	8		9	10	Contents
P	U	M			Y	Y	1	–	0	C	Module type
			C								Enhanced communication module
											Communication functions
			E								Ethernet communication

Model code (Optional)

1	2	3	4	5	6	7	8	Contents
P	U	M	Z	*	A	0	2	DIN rail mounting endplate
					A	0	3	Side connector termination cover (right & left 1 set)
					L	0	1	Loader connecting cable (RS232C)

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