

PUM Series

# Multi-loop module type Temperature controller

**Smart!**

- Heater break alarm CT (8 points)
- Program-less host communication

**User friendly!**

- Detachable terminal
- Simple loader operation

**Fast!**

- High-speed data communication
- High-speed data sampling

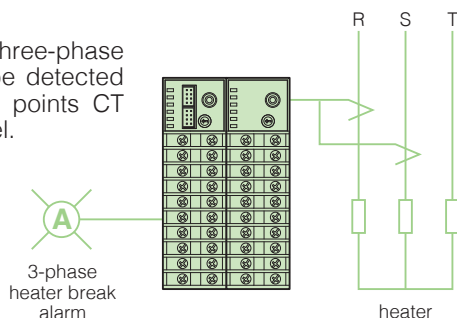


## FEATURES

### Smart!

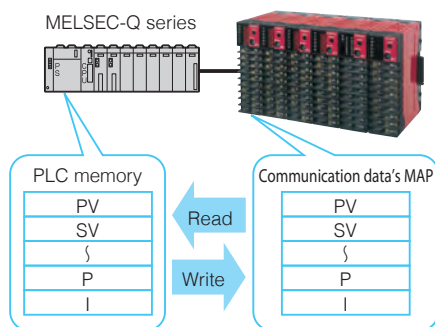
#### Heater break alarm CT (8 points)

A break in a three-phase heater can be detected with using 2 points CT per 1-channel.



#### Programless communication with upper device

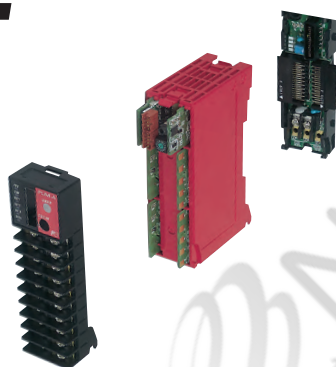
High-speed communication is possible because it is only assigned important data.



### User friendly!

#### Detachable terminal structure

The terminal is attachable and detachable without using a screw driver. Wiring time for maintenance is reduced substantially.



#### Simple loader on the Personal Computer

Simple loader is available to change all module parameter setting without changing each loader connection.

If "favorite function" is used, the frequently-used parameter can be edited preferentially.



#### Easy to attach to the DIN rail

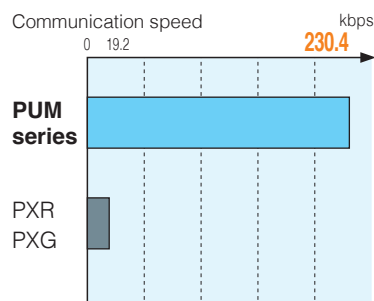
It is easy to attached the DIN rail by backside lock-tab. The backside lock-tab can connect each multi-loop controller.



### Fast!

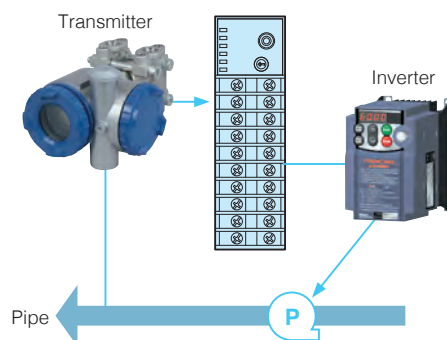
#### High-speed communication with upper device

You can rest easy with the multi-loop controller because hi-speed communication with 230.4kbps and no time-lag.



#### High-speed sampling time

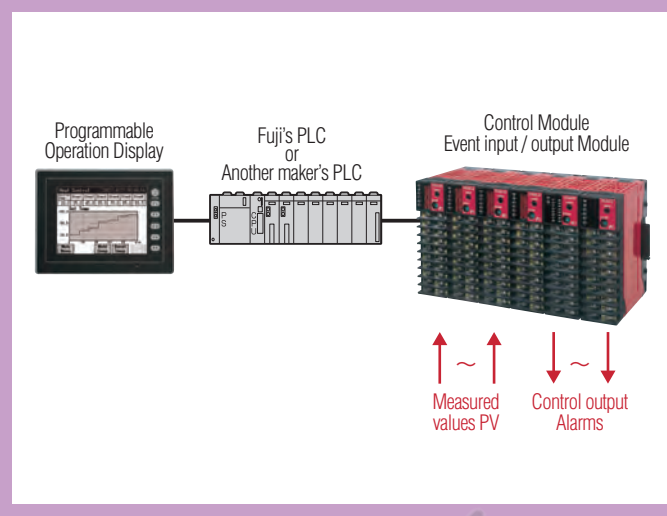
200msec sampling time enable it to apply to not only temperature measurement but also process measurement such as pressure control and flow control, etc.



## APPLICATIONS

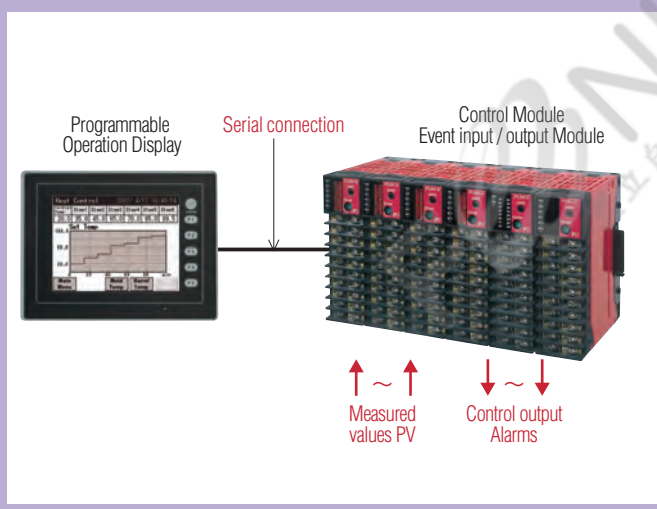
### Case 1 Input/output device of I/O units in programmable logic controller

#### <Separated PLC type>

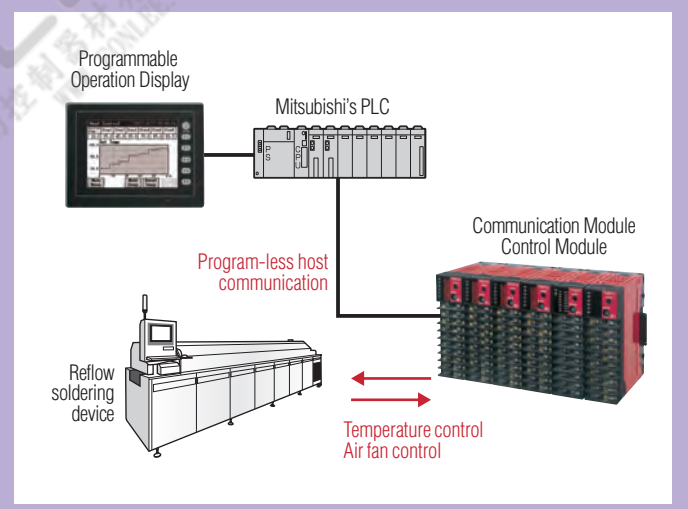


### Case 2 Temperature controller

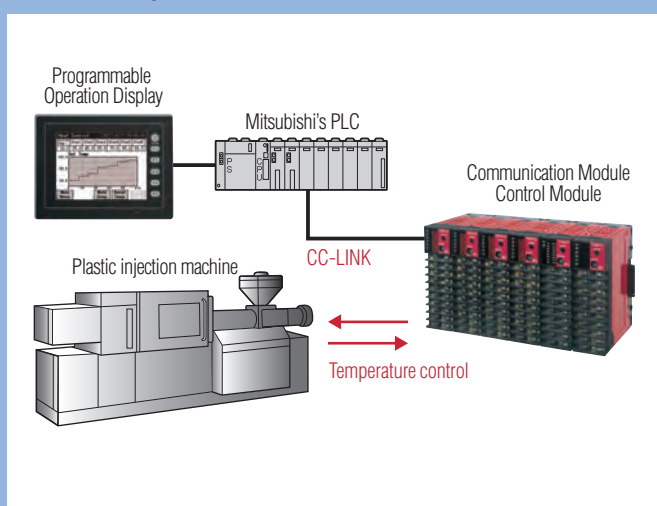
#### <Multi Temperature controllers type>



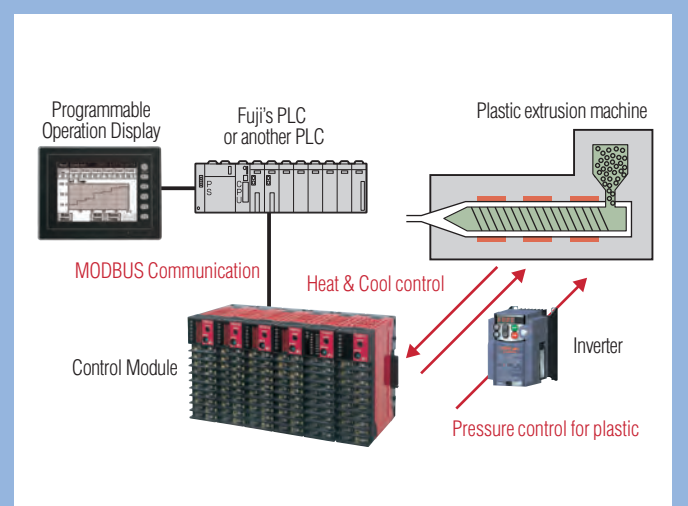
#### <Reflow soldering device>



#### <Plastic injection machine>

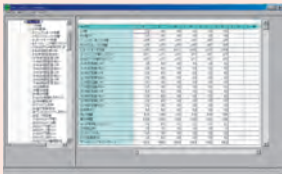
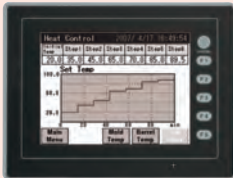


#### <Plastic extrusion machine>



# VARIATIONS

|                      | Kind                                                                                                                     | Type                                                                                | See page |
|----------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------|
| Temperature control  | <b>Control Module</b>                                                                                                    | PUMA/B                                                                              | 11       |
|                      | <b>Features</b><br>Inputs have 2ch or 4ch type<br>3-phase Heater break detections have each ch. (option)                 |    |          |
| Digital input/output | <b>Event input/output Module</b>                                                                                         | PUME                                                                                | 13       |
|                      | <b>Features</b><br>8 points alarm DO output<br>8 points DI input for external switching control                          |    |          |
| Analog input/output  | <b>Analog input &amp; output Module</b>                                                                                  | PUMV                                                                                | 14       |
|                      | <b>Features</b><br>Inputs have 4 points and<br>Outputs have 4 points                                                     |    |          |
|                      | <b>Analog input Module</b>                                                                                               | PUMN                                                                                | 16       |
|                      | <b>Features</b><br>Inputs have 4 points                                                                                  |   |          |
|                      | <b>Analog output Module</b>                                                                                              | PUMT                                                                                | 18       |
|                      | <b>Features</b><br>Outputs have 4 points                                                                                 |  |          |
| Communication        | <b>CC-LINK Communication Module</b>                                                                                      | PUMCL                                                                               | 19       |
|                      | <b>Features</b><br>Communication speed data with 10Mbps                                                                  |  |          |
|                      | <b>Mitsubishi PLC's Module with programless communications</b>                                                           | PUMCM                                                                               | 20       |
|                      | <b>Features</b><br>Direct address map only for Mitsubishi's PLC.Reduction of your programming work for Mitsubishi's PLC. |  |          |
|                      | <b>PROFIBUS Communication Module</b>                                                                                     | PUMCP                                                                               | 21       |
|                      | <b>Features</b><br>PROFIBUS DP-V0 (Slave device) Communication speed data with 12Mbps                                    |  |          |

|               | Kind                                                                                                                                                                                | Type                                                                                         | See page |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------|
| Communication | <b>Ethernet Communication Module</b><br><b>Features</b><br>10BASE-T/100BASE-TX Compatible                                                                                           | PUMCE<br> | 22       |
|               | <b>Programming Loader on Personal computer</b><br><b>Features</b><br>Easy setting and user friendly                                                                                 |           | 9        |
| Support Tools | <b>Programmable Operation Display</b><br><b>Features</b><br>Easy connect by serial connection                                                                                       |           | 10       |
|               | <b>Automation Software</b><br><b>Features</b><br>SCADA software, example                                                                                                            |          | 10       |
| Accessory     | <ul style="list-style-type: none"><li>Terminating resistance for RS-485</li><li>DIN rail end plate</li><li>Connector's cover side-by-side</li><li>Terminal cover of front</li></ul> |                                                                                              | 30       |
|               | <ul style="list-style-type: none"><li>Connection cable for PUM series</li><li>Fuji's original CT input cable</li><li>Fuji's original CT</li></ul>                                   |                                                                                              |          |

## Applicable standards

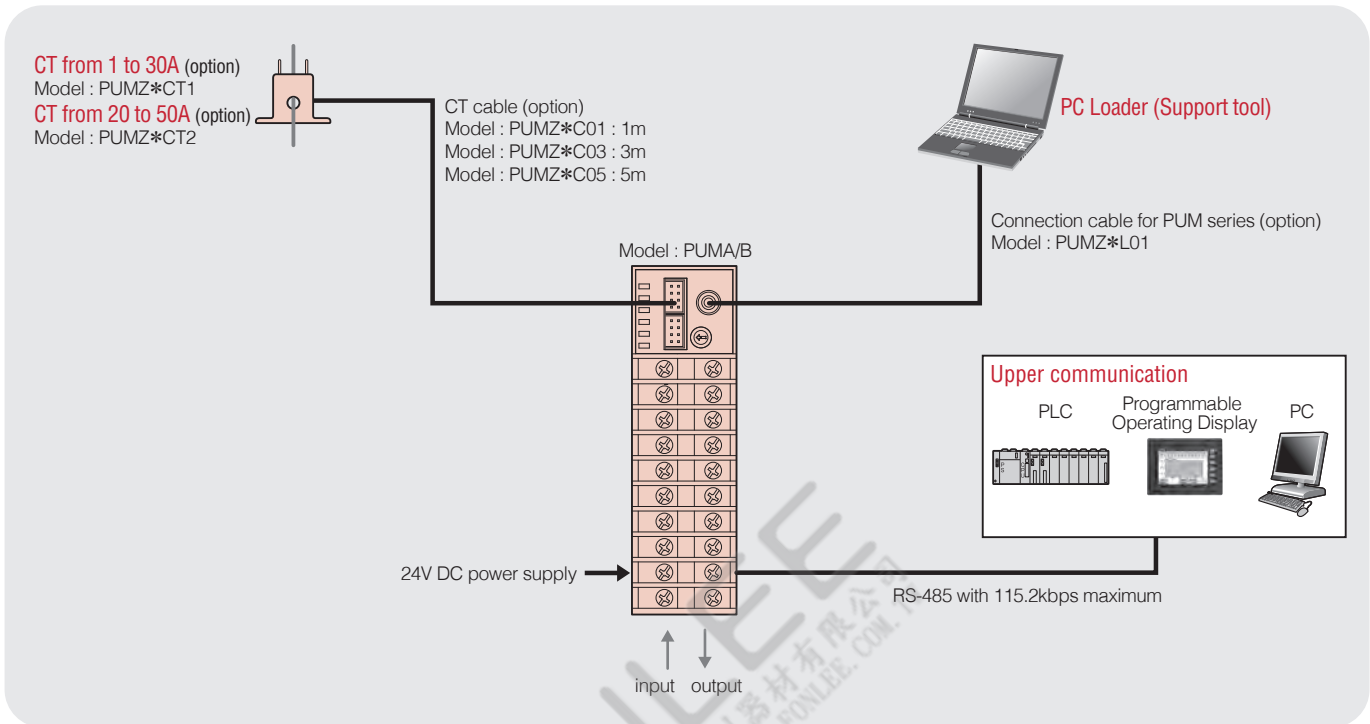
|        | UL LISTED | CE | RoHS |
|--------|-----------|----|------|
| PUMA/B | ○         | ○  | ○    |
| PUME   | ○         | ○  | ○    |
| PUMV   | ○         | ○  | ○    |
| PUMN   | ○         | ○  | ○    |
| PUMT   | ○         | ○  | ○    |
| PUMCL  | ○         | ○  | ○    |
| PUMCM  | ○         | ○  | ○    |
| PUMCP  | —         | ○  | ○    |
| PUMCE  | —         | ○  | ○    |

○: Compatible, —: Incompatible

## SYSTEM CONSTRUCTION FOR EXAMPLE

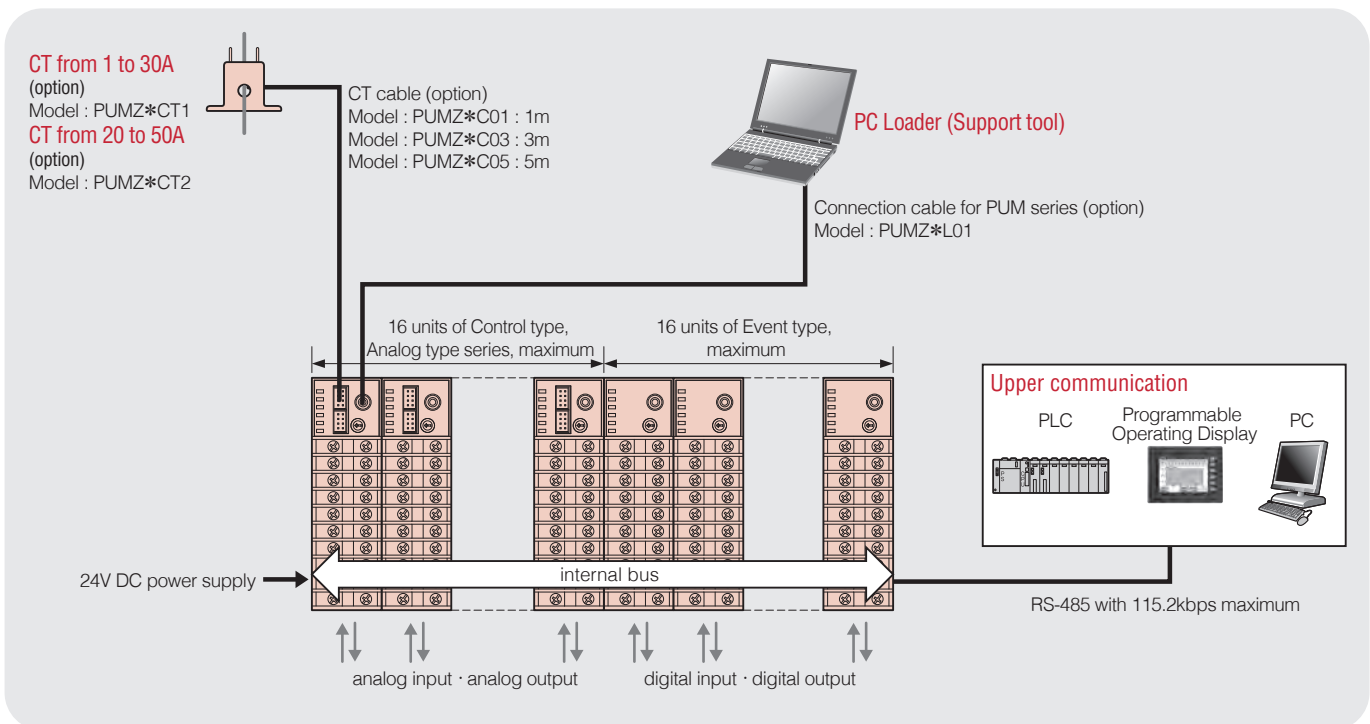
### 1 Basic system (minimum system construction)

- In case of minimum system construction, 4ch or 2ch
- RS-485 communication is standard, not option
- \*When you use the heating and cooling control, PUMA can control max. 2 channels and PUMB can control max.1 channel.



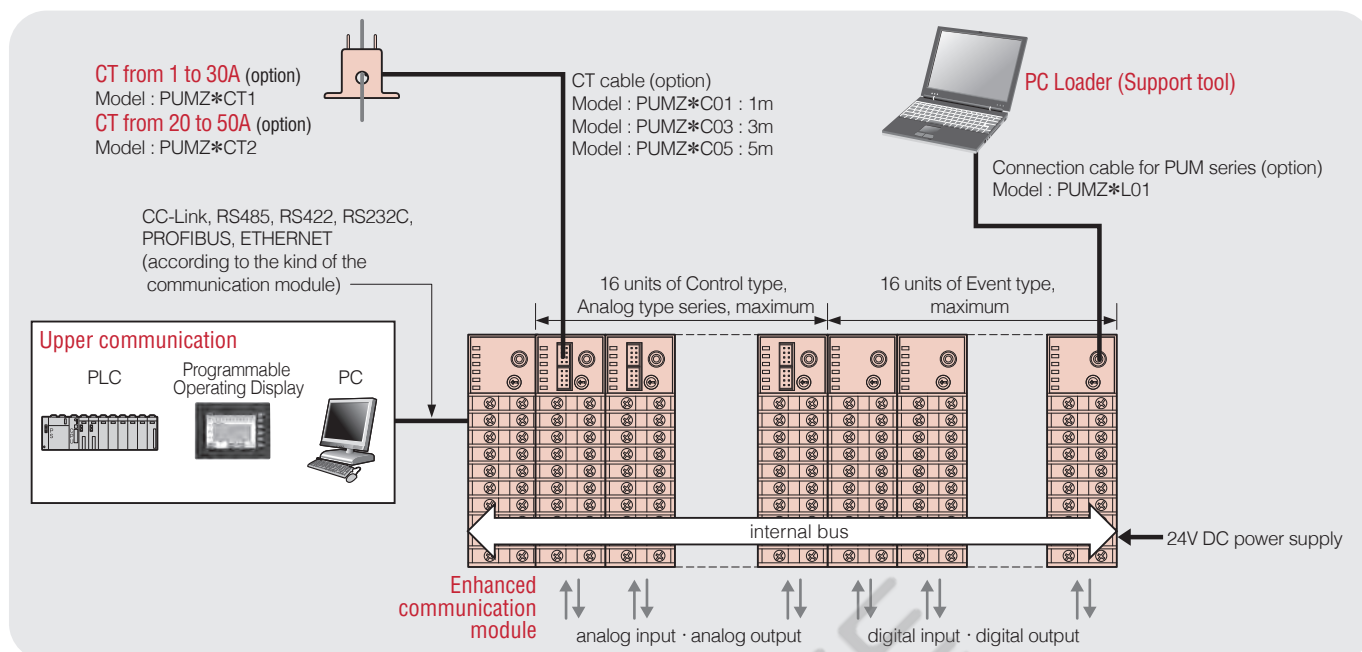
### 2 Basic system (maximum system construction)

- When you use analog input/output, or digital input/output in addition to 4ch/2ch control module.
- You can construct up to 16 units for control, and analog input/output type (control module, analog input/output) plus up to 16 units for digital input/output type (event module).
- Setting St. numbers is necessary for internal communications. (Station No.= setting value of Station No. configuration switch +1)  
Make sure that there is no duplicate station number (0 to 15) in control type, analog type series.  
Make sure that there is no duplicate station number (0 to 15) in event type series.  
You can use the duplicate station number between control type, analog type series and event type.



### 3 Enhanced communication type

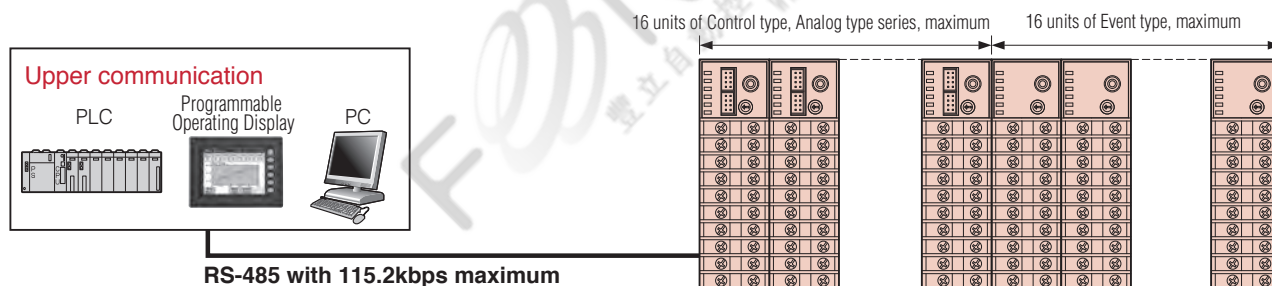
- Performing CC-LINK communication, PLC program-less communication, PROFIBUS, and ETHERNET communication. Enhanced communication module is connected to the left end of control type, analog type series and event type.



## COMMUNICATION MODULE

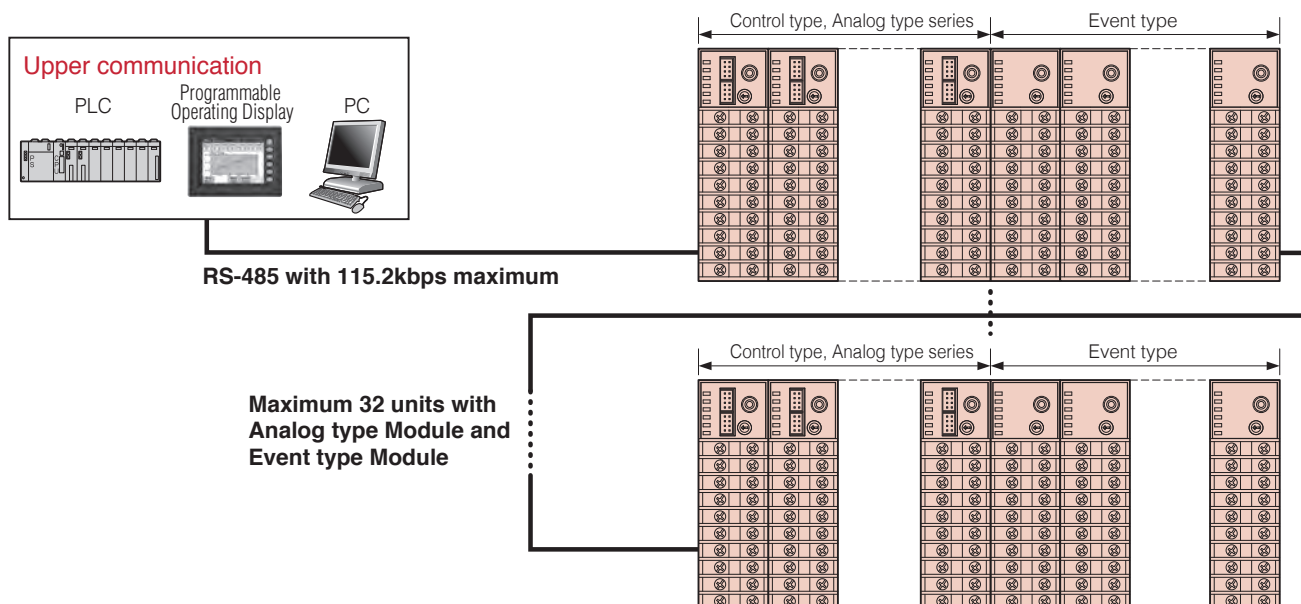
### 1-1 Modbus protocol Communications (lateral connections of a maximum of 16 modules)

Control Module, Analog I/O Module are 16 units maximum and Event I/O Module are 16 units maximum.

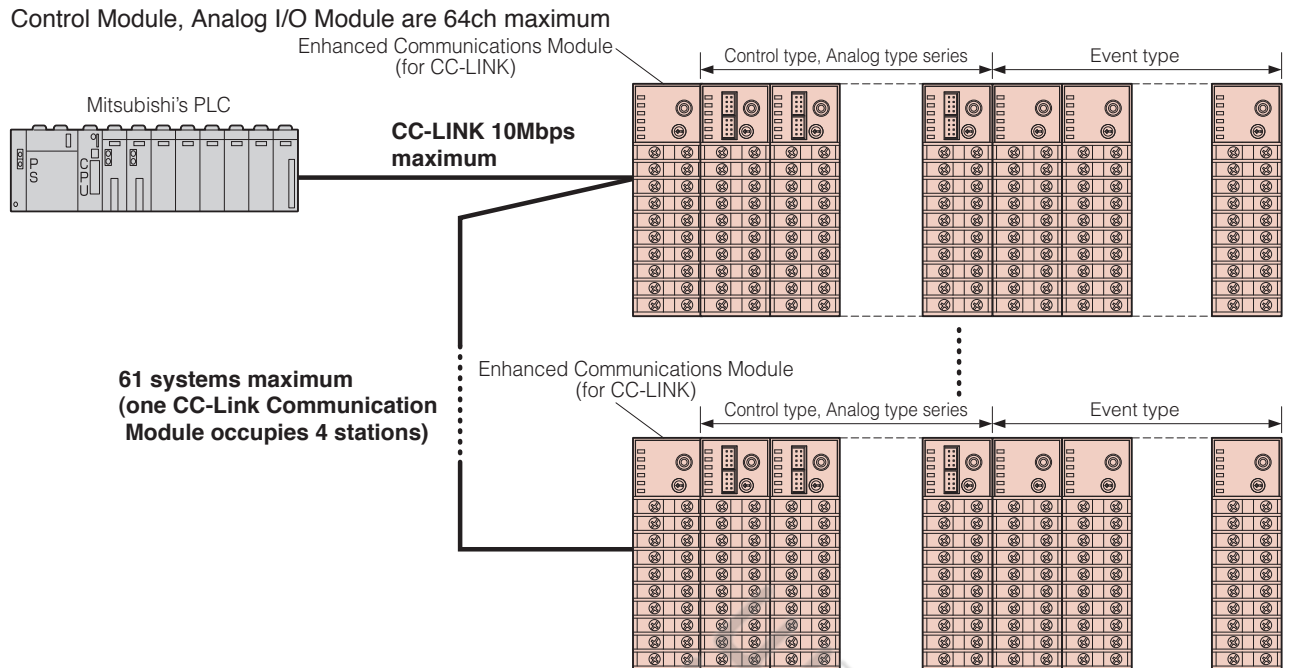


### 1-2 Modbus protocol Communications (distributed allocations)

Control Module, Analog I/O Module are 16 units maximum and Event I/O Module are 16 units maximum.

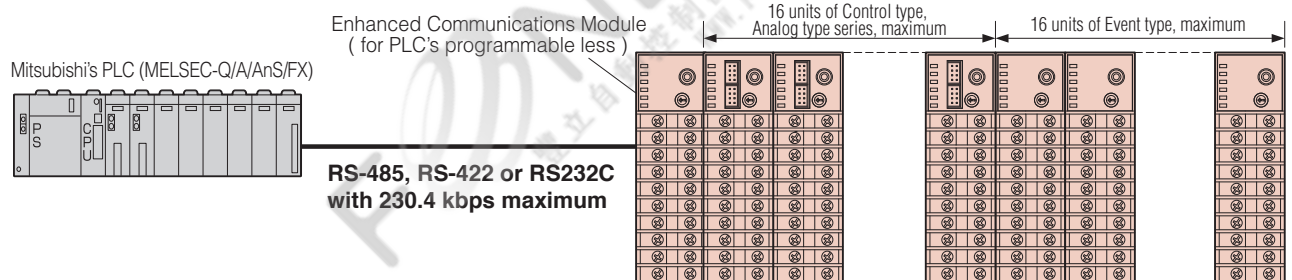


## 2-1 CC-Link protocol Communications (distributed allocations)



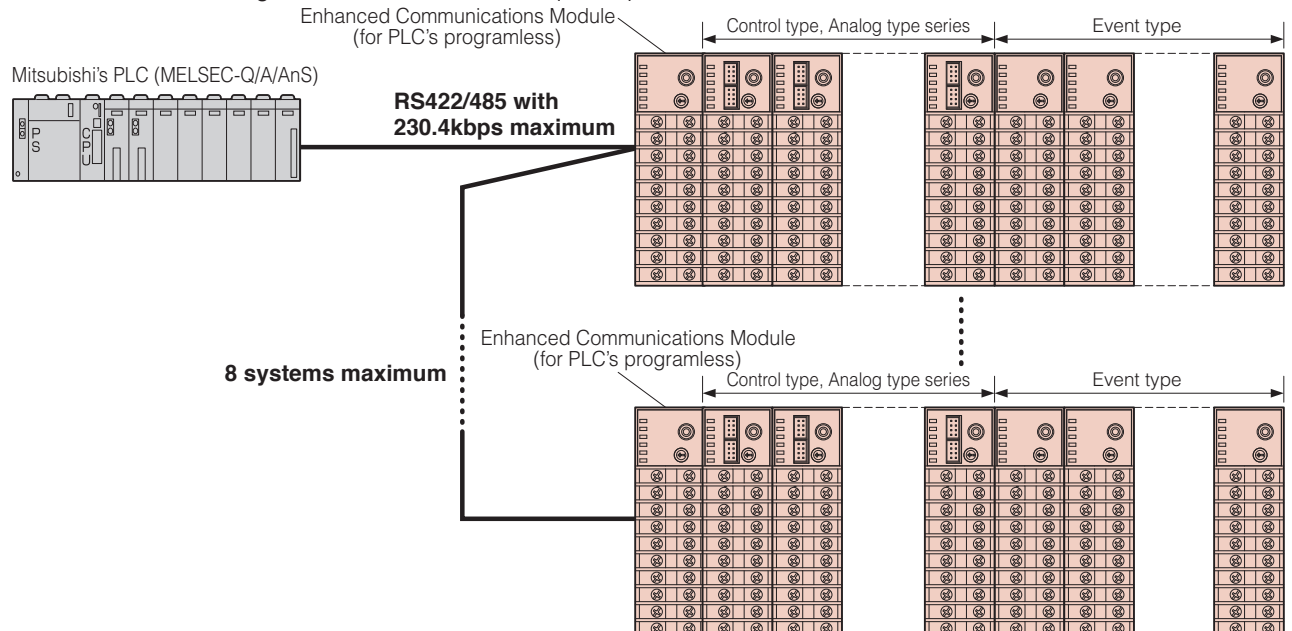
## 3-1 Mitsubishi's PLC with programless communications (Continuance connections by maximum)

Control Module, Analog I/O Module are 16 units maximum and Event I/O Module are 16 units maximum.



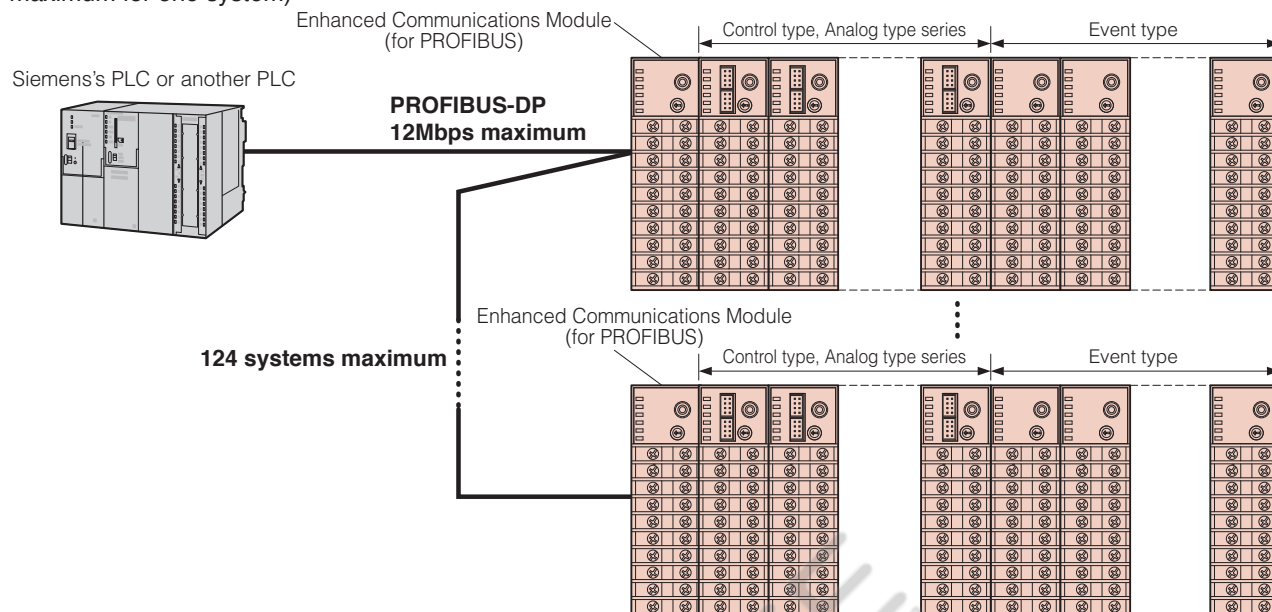
## 3-2 Mitsubishi's PLC with programless communications (distributed allocations)

Control Module, Analog I/O Module are 128 units (512ch) maximum and Event I/O Module are 128 units maximum



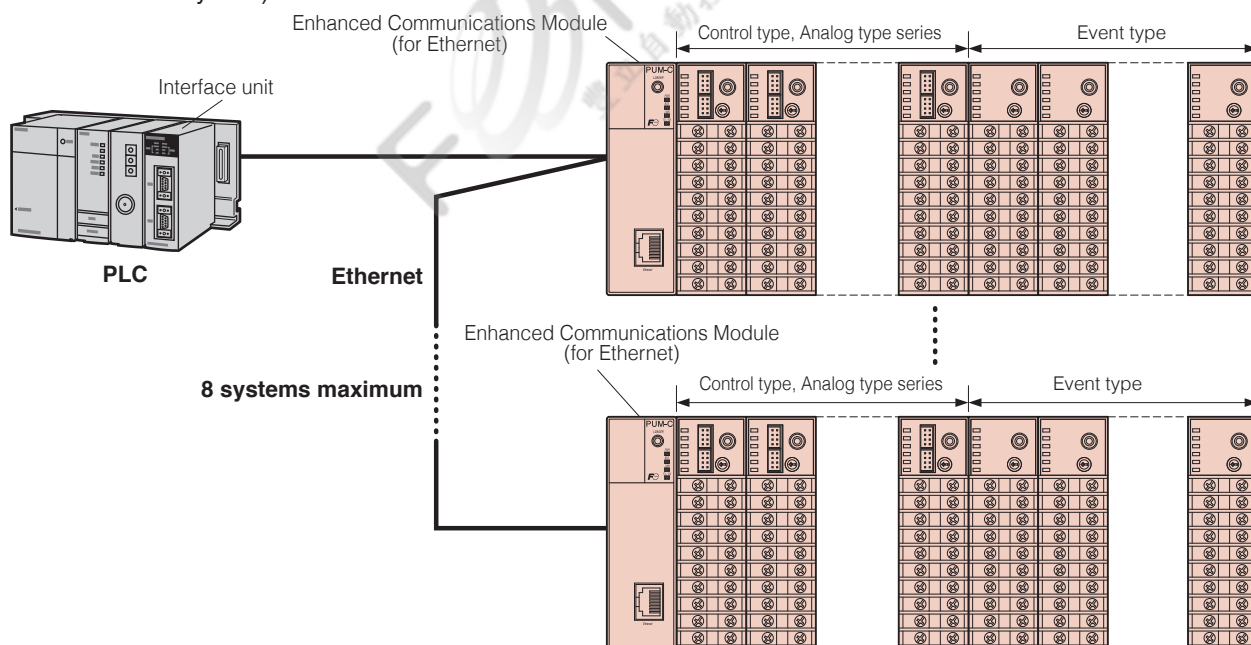
## 4-1 PROFIBUS Communications (distributed allocations)

124 system maximum (Control Module, Analog I/O Module are 16 units maximum and Event I/O Module are 16 units maximum for one system)



## 5-1 Ethernet Communications (distributed allocations)

8 system maximum (Control Module, Analog I/O Module are 16 units maximum and Event I/O Module are 16 units maximum for one system)



## LOADER SOFTWARE

PUM series are prepared by loader software. This software is supported by windows PC.

### Basic Loader for Control Module, Analog I/O Module, and Event I/O Module and Enhanced Communication Module (except for CC-Link communication type)

**Free software** It is available to download for Fuji's HP. This URL is [http://www.fujielectric.com/products/instruments/products/z\\_series/top.html](http://www.fujielectric.com/products/instruments/products/z_series/top.html)

#### SMART LOADER

You can set the all modules with the loader ports on the control modules without replacing cables. There are two kinds of modules; the master and the slave. (All modules are set to slave in shipping, and they can be set as master by the loader software) Only the master is capable of setting and display of all modules, and those of slave is individual. Only 1 unit can be set as the master in all modules. When two or more master exists, correct operation is not performed. When operating the parameters of the enhanced communication module, connect the loader connecting cable to the loader communication port of the enhanced communication module. You can grasp the whole control conditions easily by monitoring parameter display, setting, and control conditions.

#### EASY LOADER

You can operate this software without having the instruction manual!

This software has PULL DOWN MENU, and detailed online help.

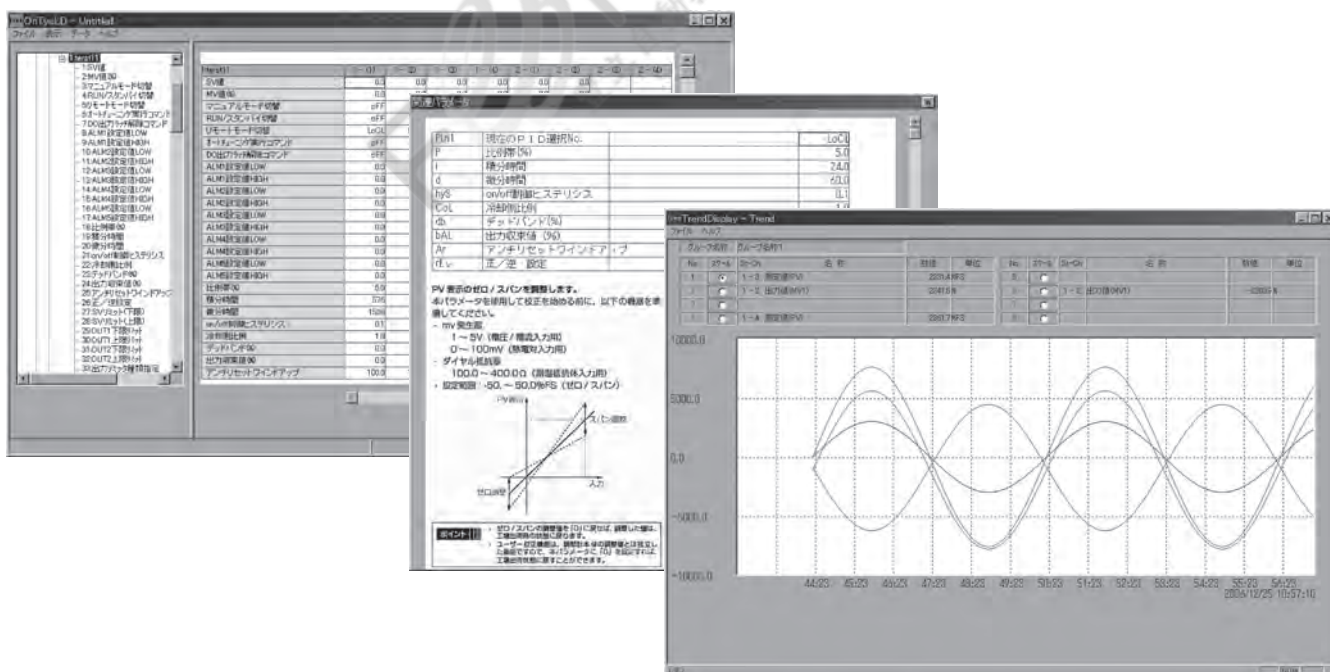
Editing display is tree style, and it is easy to search your parameter needs.

#### BILINGUAL LOADER

English version and Japanese version be selected initial configurations.

#### PARAMETER SETTINGS and NAMES OPTIMIZE TO MEET CUSTOMER'S REQUIREMENT

If you can use "favorite function" on software, it is easy to access time important parameters. It can change the name of each parameters at any time.



|                |                                                                                                                                                                                                                                                                                                                                             |                                              |                                                                                                                                                                                                               |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic function | Setting, displaying, editing the parameters<br>Display the construction of all modules<br>DATA trending (data trend display function, trend data display function in CSV format)<br>Utility function (copy the same parameters, printing and saving data by CSV files)<br>Communications (Upload, Download, Saving in files, Opening files) | Handling model                               | CONTROL MODULE : MODEL PUMA/PUMB<br>ANALOG I/O MODULE : MODEL PUMV/PUMN/PUMT<br>EVENT I/O MODULE : MODEL PUME<br>ENHANCED COMMUNICATION MODULE : MODEL PUMCM/PUMCP/PUMCE                                      |
| Connection     | Only original connection cable, but it is same as PXH or PXG cable.<br>Original cable : MODEL PUMZ* L01, Pin-jack 3-pole, D-sub 9pin                                                                                                                                                                                                        | Recommended environment of personal computer | OS:WINDOWS 2000, WINDOWS XP/7 (Global version and Japanese local version)<br>CPU: 300MHz<br>MEMORY: 128MB over<br>FREE SPACE in Hard Disk: over 500MB<br>CD-ROM drive : necessary<br>MONITOR: over 1024 x 768 |

## Citect SCADA SOFTWARE

### Feature

- 1 Citect can support your system development by expanding function, reliability, great visual.
- 2 The perfect redundant functions, HMI, Server client, duplication of LAN, these functions are standard.
- 3 Hi-speed access to huge data-base with low load of CPU working.
- 4 The small system for 75 points below is matching, and the large system for 400,000 points over is possible.
- 5 It is not need to stop the operating system now for change expansion function.
- 6 License's up-grade is available

### Trend display

It is possible for trend sampling method that cyclic type or situation of event causing type.  
The sampling interval is setting from 10ms to 24 hours.

It is possible to change the area and graphic mode until execute the trending.

If you can push "zoom button", expand the your selecting area.

Clip-board copy function can be pasted the spread-sheet data on third-party software.



Trending display of Citect SCADA can add more trend-pen when the project is now executing.

If you can push "trend statistics button", display the minimum, maximum, average, and standard deviation.

The trending data is able to be printed that the color is direct impression display, or mono-tone display. It is possible to compose the trending figure on the Citect's report.

## MONITOUCH V8 series

For optimal performance, connectivity and usability.

The MONITOUCH V8 series has expanded the potential of programmable operator interface panels.

### Realize the Ideal

#### High Performance

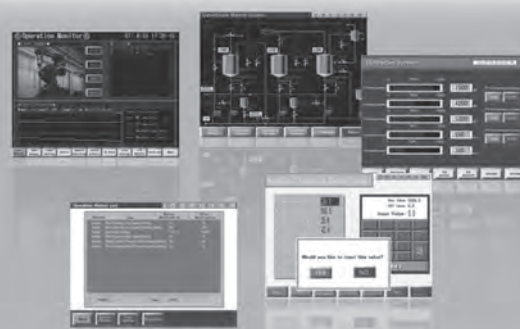
The new MONITOUCH series has realized the best possible performance with a newly developed high-speed algorithm and a high level of visibility for efficient operation.

#### Connectivity

8-way communication with up to eight kinds of devices and two USB channels ensure high compatibility and expandability of your system.

#### Usability

User-friendly component parts and functional switches enable simple and speedy display configuration.

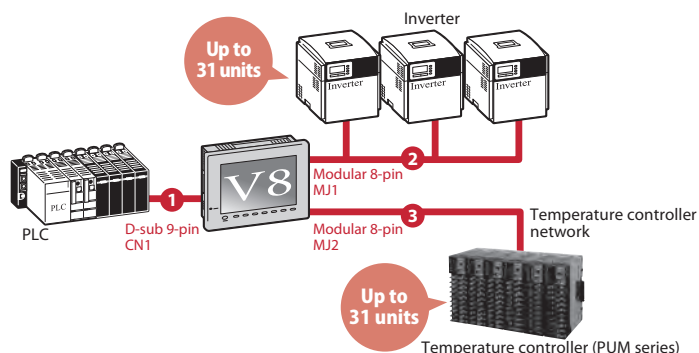


### Network Examples

#### Serial connection with PUM series (three ports)

- Making a network linked with various automation devices
- PLCs and peripherals of up to three kinds of units can be connected by serial connection.

Even though two or more types of temperature controllers and inverters are used, they can be connected with one V8.



# Specifications of PUM series

## Control Module Type : PUMA/B

### Process value input

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No. of input                          | 2 or 4 points (1 point/channel)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Input signal                          | Select from group I or II on the model code. (setting can be done according to channel with in group)<br>Group I : Thermocouple<br>Resistance bulb (3-wire): Pt100, JPt100<br>Group II : DC voltage, current<br>DC0 to 5V, DC1 to 5V, DC0 to 10V, DC2 to 10V<br>DC0 to 20mA, DC4 to 20mA<br>*The power current input is external in 250Ω resistance. It's input of DC0 to 5V or DC1 to 5V Range.                                                                                                                                                                                            |
| Measurement range and input type      | See table 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Measurement accuracy (Ta=23°C)        | Thermocouple : $\pm 0.3\%FS \pm 1\text{digit} \pm 1\text{ degree C}$ or $\pm 3\text{ degrees C}$ whichever is greater<br>*Unless<br>B thermocouple 0 to 500 degrees C : $\pm 5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>R thermocouple 0 to 500 degrees C : $\pm 1\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>T thermocouple -200 to 0 degree C : $\pm 0.5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>Resistance bulb input : $\pm 0.3\%FS \pm 1\text{digit}$ or $\pm 1\text{ degree C}$ whichever is greater<br>Voltage / Current input : $\pm 0.3\%FS \pm 1\text{digit}$ |
| Resolution                            | See table 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Temperature fluctuation               | $\pm 0.3\%FS/10\text{ degrees C}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Input sampling cycle                  | 200ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Input impedance                       | Thermocouple: 1M Ω or more<br>Current input : 250 Ω<br>Voltage input : approx. 1M Ω                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Influence of signal source resistance | Thermocouple: $\pm 0.3\%FS \pm 1\text{digit} / 100\text{ Ω}$<br>Voltage input : $\pm 0.3\%FS \pm 1\text{digit} / 500\text{ Ω}$                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Allowable wiring resistance           | Resistance bulb: 10 Ω or less (per wire)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Allowable input voltage               | DC voltage input: within $\pm 15V$<br>Current input: within $\pm 25mA$<br>Thermocouple/resistance bulb: within $\pm 5V$                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Noise rejection ratio                 | Normal mode: 30dB or more (50/60Hz)<br>Common mode: 120dB or more (50/60Hz)<br>between process value input and earth ground, power supply, output 220V AC, 50/60Hz                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Input compensation                    | a) User adjustment: zero point, span point $\pm 50\%FS$<br>b) PV shift: $\pm 10\%FS$<br>c) First order lag filter : 0.0 to 120.0 sec.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Over range, under range               | Out of range of -5 to 105%FS (Accuracy cannot be ensured for -5 to 0, 100 to 105%FS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Insulation                            | Functional insulation between channels, and with any other input/output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### Heater break detector (CT) input

|                             |                                                                                                                                             |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| No. of input                | 4 or 8 points (2 points/control ch.)                                                                                                        |
| Input type                  | Single-phase type CT /point<br>1 to 30A: CTL-6-S-H<br>20 to 50A: CTL-12-S36-8                                                               |
| Current detection accuracy  | Input value $\pm 10\%$ or $\pm 2A$ , whichever is greater                                                                                   |
| Time required for detection | ON detection: 800 ms or more<br>OFF detection: 2 sec. or more                                                                               |
| Connection method           | Connector for heater break detector [on the front of module]                                                                                |
| Insulation                  | No insulation between channels<br>No insulation with communication port (RS-485, loader)<br>Function insulation with any other input/output |

### Control output

|                         |                                                                                                     |
|-------------------------|-----------------------------------------------------------------------------------------------------|
| No. of output           | 2 points (1 point/ch.) or 4 points (2 points/ch.)                                                   |
| Control output behavior | Heat (reverse action) or cool (direct action), or heat/cool (control output 2 points/loop required) |

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output type | Selected from ① to ③ (by 2 channels)<br>① Relay contact output<br>- Proportional cycle : 1 to 150 sec.<br>- Contact structure : 1a (SPST) contact<br>- Contact capacity : 220V AC/30V DC, 3A (resistance load) 220V AC/30V DC, 1A (inductive load)<br>- Min. switching current: 100mA (24V DC)<br>- Mechanical life: 20,000,000 switching or more(100/min.)<br>- Electric life: 100,000 switching or more (rated load)<br>- Insulation: Basic insulation with any other input/output<br>② SSR/SSC drive output<br>- Proportional cycle : 1 to 150 sec.<br>- Minimum resolution : 5ms<br>- ON voltage : 10V DC (8 to 12V DC)<br>- OFF voltage : 0.5V DC or less<br>- Max. current : 20mA DC (per point)<br>- Load resistance : 500 Ω or more<br>- Insulation : No insulation with any other output (excluding relay output)<br>Functional insulation with others than those above<br>③ Current output (4 to 20mA DC, 0 to 20mA DC)<br>- Actual output range : 0mA to 20.6mA DC<br>- Accuracy : $\pm 0.3\%FS$ (less than 1mA : $\pm 5\%FS$ )<br>- Linearity : $\pm 0.3\%FS$ (less than 1mA : $\pm 5\%FS$ )<br>- Resolution : 5,000 or more<br>- Ripple current : P-P 0.3mA or less<br>- Load resistance : 300 Ω or less<br>- Insulation : No insulation with any other output (excluding relay output)<br>Functional insulation with others than those above |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Analog re-transmission output

|               |                                             |
|---------------|---------------------------------------------|
| No. of output | 2 points (OUT3, OUT4 applied)               |
| Output type   | Current output (4 to 20mA DC, 0 to 20mA DC) |
| Option        | Output scaling                              |

### RS-485 interface

|                               |                                                                                                             |
|-------------------------------|-------------------------------------------------------------------------------------------------------------|
| Communication standards       | RS-485 compatible                                                                                           |
| No. of port                   | 1 port                                                                                                      |
| Communication, synchro method | Two-wire, half-duplex, asynchronous cycle                                                                   |
| Communication speed           | 9.6k, 19.2k, 38.4k, 115.2kbps                                                                               |
| Communication distance        | 1km (38.4kbps or less), 250m (115.2kbps)                                                                    |
| Recommended cable             | KPEV-SB 0.5sq-equivalent                                                                                    |
| No. of connectable units      | 33 units (master and slave)(32 units if any modules other than PUM series are included in slaves.)          |
| Data format                   | Data bit; 8, parity; even / odd / none                                                                      |
| Protocol                      | Modbus RTU compatible                                                                                       |
| Insulation                    | No insulation with loader communication port, CT input. Functional insulation with any other input / output |

### Loader communication (RS-232C) interface

|                               |                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                       |
| No. of port                   | 1 port                                                                                   |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                          |
| Communication speed           | 19.2kbps (fixed)                                                                         |
| Data format                   | Data bit 8, no parity                                                                    |
| Protocol                      | Modbus RTU compatible                                                                    |
| Connection method             | 2.5 diameter mini-plug/jack [on the front of the module] (Common cable with PXG, PXH)    |
| Insulation                    | No insulation with RS-485, CT input. Functional insulation with any other input / output |

## Control functions

|                   |                                                                                                                                                                                                                           |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control methods   | (1) PID control (including FUZZY PID control)-PID constant : Set by auto tuning<br>(2) PID 2 (Heat /cool) control (including FUZZY PID control)-PID constant : Set by auto tuning                                         |
| Control parameter | Proportional band (P) : 0.0 to 999.9%, P=0: 2 position control ON<br>Integration time (I): 0 sec to 3200 sec. I=0 : Integration OFF<br>Derivation time (D): 0.0 to 999.9 sec. D=0: Derivation OFF<br>Control cycle: 200ms |
| Control mode      | Mode type: Auto / Manual / Remote<br>Mode switching: Auto ⇄ Manual : balance less / bump less transfer<br>Auto/Manual ⇒ Remote : balance/bump less transfer<br>Auto/Manual ⇄ Remote : balance/bump less transfer          |

## Alarm function

|              |                                                                                                                                                                        |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alarm type   | PV value (Lower/upper limit, absolute / deviation value, range)<br>Loop burnout alarm, Error alarm, etc. (Non-excitation, delay, latch, timer function also available) |
| Alarm output | Data output via communication or output from event input / output module                                                                                               |

## Heater break alarm

|                         |                                                                                                                                           |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| No. of alarm set-points | 4 or 8 points (2 points/control channel)                                                                                                  |
| Alarm type              | Detect when output ON (break detection)<br>Detect when output OFF (leakage current detection) (setting can be done separately by point)   |
| Heater current alarm    | Detectable current range: 1A to 50A<br>Detected current resolution: 0.1A<br>Setting resolution: 0.1A<br>Operation dead band: 0.0 to 50.0A |
| Alarm output            | Data output via communication or output from event input / output module                                                                  |

## Display, configuration

|                  |                                                      |
|------------------|------------------------------------------------------|
| Display          | Status display LED (2 colors x 6 points)             |
| Display contents | RUN/FAULT, RS-485 TX/RX, OUT / ERR by loop (4 loops) |
| Setting device   | Rotary SW x 1                                        |
| Set contents     | RS-485 Station No. (Station No.= setting value + 1)  |

## Structure

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case material       | Polyphenylene oxide (flame retardant grade : UL94V-0 equivalent)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Case color          | Case ; red ,Terminal, base part ; black                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Protection          | Body : IP20 grade protection (ventilation slits on the top and the bottom of the body)<br>Terminal : IP00 grade protection, terminal cover is available as an option                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Dimensions          | 30 (W) × 100 (H) × 85 (D) mm (excluding terminal cover and projected part)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Weight              | Approx. 200 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Installation method | DIN rail mounting or mounting with M3 screws inside a cabinet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Extend terminal     | <ul style="list-style-type: none"> <li>Process value input / control output : Detachable terminal block (M3 screw x 20 terminals)</li> <li>Power supply connection: Terminal block on the base part (M3 screw x 2 terminals) Power is supplied via side connectors in the case of lateral connecting. (Max. 33 units)</li> <li>RS-485 communication connection : Terminal block on the base part (M3 screw x 3 terminals) RS-485 communication is connected via side connectors in the case of lateral connecting.</li> <li>CT input : Special connectors (8pin×2 pcs.) [on the front of the module]</li> <li>Loader communication port : 2.5 diameter mini-plug / jack [on the front of the module]</li> </ul> |

## General specification

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|---------------------------|-----|---------------------------|-----|-----------------------------|-----|-----------------------------|---------------------------|-----------------------------|---------------------------|-----------------------------|---------------------------|-----------------------------|---------------------------|
| Power supply                | 24V DC±10%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| Power consumption           | Max. 3.2W (135mA) [when 24V DC is applied]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| Effect of power outage      | Outage of 2ms or less ; no impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| Memory backup               | Nonvolatile memory (EEPROM)<br>No. of update ; 100,000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| Insulation resistance       | 20MΩ or more (500V DC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| Insulation block diagram    | <table border="1"> <tr> <td>Power</td><td>PV1</td></tr> <tr> <td>Loader communication port</td><td>PV2</td></tr> <tr> <td>RS-485 communication port</td><td>PV3</td></tr> <tr> <td>CT Input (CT1A, B - CT4A,B)</td><td>PV4</td></tr> <tr> <td>OUT1 (relay contact output)</td><td>OUT1 (SSR drive, current)</td></tr> <tr> <td>OUT2 (relay contact output)</td><td>OUT2 (SSR drive, current)</td></tr> <tr> <td>OUT3 (relay contact output)</td><td>OUT3 (SSR drive, current)</td></tr> <tr> <td>OUT4 (relay contact output)</td><td>OUT4 (SSR drive, current)</td></tr> </table> | Power | PV1 | Loader communication port | PV2 | RS-485 communication port | PV3 | CT Input (CT1A, B - CT4A,B) | PV4 | OUT1 (relay contact output) | OUT1 (SSR drive, current) | OUT2 (relay contact output) | OUT2 (SSR drive, current) | OUT3 (relay contact output) | OUT3 (SSR drive, current) | OUT4 (relay contact output) | OUT4 (SSR drive, current) |
| Power                       | PV1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| Loader communication port   | PV2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| RS-485 communication port   | PV3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| CT Input (CT1A, B - CT4A,B) | PV4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| OUT1 (relay contact output) | OUT1 (SSR drive, current)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| OUT2 (relay contact output) | OUT2 (SSR drive, current)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| OUT3 (relay contact output) | OUT3 (SSR drive, current)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |
| OUT4 (relay contact output) | OUT4 (SSR drive, current)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |     |                           |     |                           |     |                             |     |                             |                           |                             |                           |                             |                           |                             |                           |

—Basic insulation (1500V AC)—Functional insulation (1000V AC)—Functional insulation (500V AC)

## Normal operating condition

|                     |                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | -10 to 50 degrees C<br>★ "Ambient temperature" is the temperature underneath the controller inside the equipment or the cabinet where the controller is installed. |
| Ambient humidity    | 90% RH or less (non condensing)                                                                                                                                    |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less                                                                                                                       |
| Warmup time         | 30 min. or more                                                                                                                                                    |

## Transporting, storage conditions (packing conditions)

|                     |                                              |
|---------------------|----------------------------------------------|
| Storage temperature | -20 to 60 degrees C                          |
| Ambient humidity    | 90%RH or less (no condensing)                |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less |
| Shock               | 294m/s <sup>2</sup> (30G) or less            |

[Table 1] Input type and standard input range

| Input type            | Input code | Measurement range [degree C] | Min. measurement [degree C]   |
|-----------------------|------------|------------------------------|-------------------------------|
| Resistance bulb (IEC) | Pt100 Ω    | 2                            | 0 to 150                      |
|                       |            | 3                            | -150 to 300                   |
|                       |            | 4                            | -150 to 850                   |
| Thermocouple          | J          | 5                            | 0 to 400                      |
|                       |            | 6                            | 0 to 800                      |
|                       |            | 7                            | 0 to 400                      |
|                       | K          | 8                            | 0 to 800                      |
|                       |            | 9                            | 0 to 1200                     |
|                       |            | 10                           | 0 to 1600                     |
|                       | B          | 11                           | 0 to 1800                     |
|                       | S          | 12                           | 0 to 1600                     |
|                       | T          | 13                           | -199 to 400                   |
|                       | E          | 14                           | -199 to 800                   |
|                       | N          | 18                           | 0 to 1300                     |
|                       | PL- II     | 19                           | 0 to 1300                     |
| DC voltage            | DC0-5V     | 21                           | -1999 to 9999 (scaling range) |
|                       | DC1-5V     | 22                           |                               |
|                       | DC0-10V    | 23                           |                               |
|                       | DC2-10V    | 24                           |                               |

## ■Event Input/Output Module Type : PUME

### ■Digital Input

|                  |                                                           |
|------------------|-----------------------------------------------------------|
| No. of input     | 8 points (4points/common × 2blocks)                       |
| Input type       | Voltage contact input, sink/source common (bidirectional) |
| Input rating     | 24V DS, input impedance approx. 4.7KΩ                     |
| Input judgment   | ON judgment: 16 to 26.4V DC<br>OFF judgment: 0 to 5V DC   |
| Input read cycle | 200ms (min.pulse width)                                   |
| Insulation       | Functional insulation with internal circuit               |
| Option           | NOT/AND/OR logic operation, Latch action                  |

### ■Digital Output

|               |                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No. of output | 8 points (4points/common × 2blocks)                                                                                                                                                                                                                                                                                                                                                                                           |
| Output type   | Select from a) and b) according to model type specification<br>a) Relay contact output<br>- Contact structure: SPST contact<br>- Contact capacity: 220V AC/30V DA, 1A<br>- Insulation: Functional insulation with internal circuit<br>b) Transistor open collector (sink) output<br>- Rating: 24V DC, 100mA (Residual voltage when power is ON: 1.5V DC or less)<br>- Insulation: Functional insulation with internal circuit |
| Option        | Control output/Event output selection, NOT/AND/OR logic operation, Latch action                                                                                                                                                                                                                                                                                                                                               |

### ■RS-485 interface

|                               |                                                                                                    |
|-------------------------------|----------------------------------------------------------------------------------------------------|
| Communication standards       | RS-485 compatible                                                                                  |
| No. of port                   | 1 port                                                                                             |
| Communication, synchro method | Two-wire, half-duplex, asynchronous cycle                                                          |
| Communication speed           | 9.6k, 19.2k, 38.4k, 115.2kbps                                                                      |
| Communication distance        | 1km (38.4kbps or less), 250m (115.2kbps)                                                           |
| Recommended cable             | KPEV-SB 0.5sq-equivalent                                                                           |
| No. of connectable units      | 33 units (master and slave)(32 units if any modules other than PUM series are included in slaves.) |
| Data format                   | Data bit; 8, parity; even / odd / none                                                             |
| Protocol                      | Modbus RTU compatible                                                                              |
| Insulation                    | No insulation with loader communication port.<br>Functional insulation with any other input/output |

### ■Loader communication (RS-232C) interface

|                               |                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                    |
| No. of port                   | 1 port                                                                                |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                       |
| Communication speed           | 19.2kbps (fixed)                                                                      |
| Data format                   | Data bit 8, no parity                                                                 |
| Protocol                      | Modbus RTU compatible                                                                 |
| Connection method             | 2.5 diameter mini-plug/jack [on the front of the module] (Common cable with PXG, PXH) |
| Insulation                    | No insulation with RS-485<br>Functional insulation with any other input/output        |

### ■Display, configuration

|                  |                                                           |
|------------------|-----------------------------------------------------------|
| Display          | Status display LED (2 colors x 2 points + 16 points)      |
| Display contents | RUN/FAULT, RS-485 TX/RX, input x8 points output x8 points |
| Setting device   | Rotary SW x 1 [on the front of the module]                |
| Set contents     | RS-485 Station No. (Station No. = setting value + 17)     |

### ■Structure

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case material       | Polyphenylene oxide (flame retardant grade : UL94V-0 equivalent)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Case color          | Case ; red , Terminal, base part ; black                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Protection          | Body : IP20 grade protection (ventilation slits on the top and the bottom of the body)<br>Terminal : IP00 grade protection, terminal cover is available as an option                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Dimensions          | 30(W)×100(H)×85(D) mm(excluding terminal cover and projected part)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Weight              | Approx. 200 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Installation method | DIN rail mounting or mounting with M3 screws inside a cabinet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| External terminal   | <ul style="list-style-type: none"> <li>Digital input / digital output : Detachable terminal block (M3 screw x 20 terminals)</li> <li>Power supply connection: Terminal block on the base part (M3 screw x 2 terminals) Power is supplied via side connectors in the case of lateral connecting. (Max. 33 units)</li> <li>RS-485 communication connection : Terminal block on the base part (M3 screw x 3 terminals) RS-485 communication is connected via side connectors in the case of lateral connecting.</li> <li>Loader communication port : 2.5 diameter mini-plug / jack [on the front of the module]</li> </ul> |

### ■General specification

|                           |                                                                                                                                                                                                                                                                                                                 |       |          |                           |          |                           |          |  |          |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------|---------------------------|----------|---------------------------|----------|--|----------|
| Power supply              | 24V DC±10%                                                                                                                                                                                                                                                                                                      |       |          |                           |          |                           |          |  |          |
| Power consumption         | Max. 3.2W (135mA) [when 24V DC is applied]                                                                                                                                                                                                                                                                      |       |          |                           |          |                           |          |  |          |
| Effect of power outage    | Outage of 2ms or less ; no impact                                                                                                                                                                                                                                                                               |       |          |                           |          |                           |          |  |          |
| Memory backup             | Nonvolatile memory (EEPROM)<br>No. of update ; 100,000                                                                                                                                                                                                                                                          |       |          |                           |          |                           |          |  |          |
| Insulation resistance     | 20MΩ or more (500V DC)                                                                                                                                                                                                                                                                                          |       |          |                           |          |                           |          |  |          |
| Insulation block diagram  | <table border="1"> <tr> <td>Power</td><td>Di1 to 4</td></tr> <tr> <td>Loader communication port</td><td>Di5 to 8</td></tr> <tr> <td>RS-485 communication port</td><td>Do1 to 4</td></tr> <tr> <td></td><td>Do5 to 8</td></tr> </table> <p>=Functional insulation (1000V AC)–Functional insulation (500V AC)</p> | Power | Di1 to 4 | Loader communication port | Di5 to 8 | RS-485 communication port | Do1 to 4 |  | Do5 to 8 |
| Power                     | Di1 to 4                                                                                                                                                                                                                                                                                                        |       |          |                           |          |                           |          |  |          |
| Loader communication port | Di5 to 8                                                                                                                                                                                                                                                                                                        |       |          |                           |          |                           |          |  |          |
| RS-485 communication port | Do1 to 4                                                                                                                                                                                                                                                                                                        |       |          |                           |          |                           |          |  |          |
|                           | Do5 to 8                                                                                                                                                                                                                                                                                                        |       |          |                           |          |                           |          |  |          |

### ■Normal operating condition

|                     |                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | -10 to 50 degrees C<br>* "Ambient temperature" is the temperature underneath the controller inside the equipment or the cabinet where the controller is installed. |
| Ambient humidity    | 90%RH or less (no condensing)                                                                                                                                      |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less                                                                                                                       |
| Warmup time         | 30 min. or more                                                                                                                                                    |

### ■Transporting, storage conditions (packing conditions)

|                     |                                              |
|---------------------|----------------------------------------------|
| Storage temperature | -20 to 60 degrees C                          |
| Ambient humidity    | 90%RH or less (no condensing)                |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less |
| Shock               | 294m/s <sup>2</sup> (30G) or less            |

## ■ Analog Input/Output Module Type : PUMV

### ■ Analog Input

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No. of input                          | 4 points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Input signal                          | Select from the group I or II depending on the model code.<br>Group I: Thermocouple: K, J, T, E, R, B, S, N, PL-II<br>Resistance bulb (3-wire): Pt100, JPt100<br>Group II : DC voltage, current DC0 to 5V, DC1 to 5V,<br>DC0 to 10V, DC2 to 10V<br>DC0 to 20mA, DC4 to 20mA<br>*The power current input is external in 250Ω resistance. It's input of DC0 to 5V or DC1 to 5V Range.                                                                                                                                                                                                      |
| Measurement range and input type      | See table 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Measurement accuracy (Ta=23°C)        | Thermocouple input: : $\pm 0.3\%FS \pm 1\text{digit} \pm 1\text{ degree C}$ or $\pm 3\text{ degrees C}$ whichever is greater<br>*Unless<br>B thermocouple 0 to 500 degrees C : $\pm 5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>R thermocouple 0 to 500 degrees C : $\pm 1\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>T thermocouple -200 to 0 degree C : $\pm 0.5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>Resistance bulb input : $\pm 0.3\%FS \pm 1\text{digit}$ or $\pm 1\text{ degree C}$ whichever is greater<br>Voltage input : $\pm 0.3\%FS \pm 1\text{digit}$ |
| Resolution                            | See table 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Temperature fluctuation               | $\pm 0.3\%FS/10\text{ degrees C}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Input sampling cycle                  | 200ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Input impedance                       | Thermocouple: 1M Ω or more<br>Current input : 250 Ω<br>Voltage input : approx. 1M Ω                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Influence of signal source resistance | Thermocouple: $\pm 0.3\%FS \pm 1\text{digit} / 100\text{ Ω}$<br>Voltage input : $\pm 0.3\%FS \pm 1\text{digit} / 500\text{ Ω}$                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Allowable wiring resistance           | Resistance bulb input: 10 Ω or less (per wire)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Allowable input voltage               | DC voltage input: within $\pm 15V$<br>Current input: within $\pm 25mA$<br>Thermocouple/resistance bulb: within $\pm 5V$                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Noise rejection ratio                 | Normal mode: 30dB or more (50/60Hz)<br>Common mode: 120dB or more (50/60Hz) between earth, power supply, output 220V AC, 50/60Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Input compensation                    | a) User adjustment: zero point, span point $\pm 50\%FS$<br>b) PV shift: $\pm 10\%FS$<br>c) First order lag filter : 0.0 to 120.0 sec. (Filter off when setting is 0.0)                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Over range, under range               | Out of range of -5 to 105%FS (Accuracy cannot be ensured for -5 to 0, 100 to 105%FS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Insulation                            | Functional insulation between channels, and with any other input/output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

### ■ Analog Output

|                     |                                                                                                                                                            |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No. of output       | 4 points                                                                                                                                                   |
| Output type         | Current output DC 4 to 20mA, DC 0 to 20mA                                                                                                                  |
| Actual output range | DC 0mA to 20.6mA                                                                                                                                           |
| Accuracy            | $\pm 0.3\%FS$ (less than 1mA : $\pm 5\%FS$ )                                                                                                               |
| Linearity           | $\pm 0.3\%FS$ (less than 1mA : $\pm 5\%FS$ )                                                                                                               |
| Resolution          | 5,000 or more                                                                                                                                              |
| Ripple current      | P-P 0.3mA or less                                                                                                                                          |
| Loading resistance  | 300 Ω or less                                                                                                                                              |
| Insulation          | No insulation with any other output<br>Function insulation with others (power supply, analog input, RS485 communication, and loader port) than those above |

### ■ RS-485 interface

|                               |                                                                                                    |
|-------------------------------|----------------------------------------------------------------------------------------------------|
| Communication standards       | RS-485 compatible                                                                                  |
| No. of port                   | 1 port                                                                                             |
| Communication, synchro method | Two-wire, half-duplex, asynchronous cycle                                                          |
| Communication speed           | 9.6k, 19.2k, 38.4k, 115.2kbps                                                                      |
| Communication distance        | 1km (38.4kbps or less), 250m (115.2kbps)                                                           |
| Recommended cable             | KPEV-SB 0.5sq-equivalent                                                                           |
| No. of connectable units      | 33 units (master and slave)(32 units if any modules other than PUM series are included in slaves.) |
| Data format                   | Data bit; 8, parity; even / odd / none                                                             |
| Protocol                      | Modbus RTU compatible                                                                              |
| Insulation                    | No insulation with loader communication port, Functional insulation with any other input / output  |

### ■ Loader communication (RS-232C) interface

|                               |                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                    |
| No. of port                   | 1 port                                                                                |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                       |
| Communication speed           | 19.2kbps (fixed)                                                                      |
| Data format                   | Data bit 8, no parity                                                                 |
| Protocol                      | Modbus RTU compatible                                                                 |
| Connection method             | 2.5 diameter mini-plug/jack [on the front of the module] (Common cable with PXG, PXH) |
| Insulation                    | No insulation with RS-485, Functional insulation with any other input / output        |

### ■ Display, configuration

|                  |                                                      |
|------------------|------------------------------------------------------|
| Display          | Status display LED (2 colors x 6 points)             |
| Display contents | RUN/FAULT, RS-485 TX/RX, OUT / ERR by loop (4 loops) |
| Setting device   | Rotary SW x 1                                        |
| Set contents     | RS-485 Station No. (Station No.= setting value + 1)  |

### ■ Structure

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case material       | Polyphenylene oxide (flame retardant grade : UL94V-0 equivalent)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Case color          | Case ; red , Terminal, base part ; black                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Protection          | Body : IP20 grade protection (ventilation slits on the top and the bottom of the body)<br>Terminal : IP00 grade protection, terminal cover is available as an option                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Dimensions          | 30 (W) × 100 (H) × 85 (D) mm (excluding terminal cover)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Weight              | Approx. 200 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Installation method | DIN rail mounting or mounting with M3 screws inside a cabinet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| External terminal   | <ul style="list-style-type: none"> <li>Process value input / control output : Detachable terminal block (M3 screw x 20 terminals)</li> <li>Power supply connection: Terminal block on the base part (M3 screw x 2 terminals) Power is supplied via side connectors in the case of lateral connecting. (Max. 33 units)</li> <li>RS-485 communication connection : Terminal block on the base part (M3 screw x 3 terminals) RS-485 communication is connected via side connectors in the case of lateral connecting.</li> <li>Loader communication port : 2.5 diameter mini-plug / jack [on the front of the module]</li> </ul> |

### General specification

|                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|---------------------------|-----|---------------------------|-----|--|-----|--|----------------|--|----------------|--|----------------|--|----------------|
| Power supply                                                      | 24V DC±10%                                                                                                                                                                                                                                                                                                                                                                                     |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
| Power consumption                                                 | Max. 3.2W (135mA) [when 24V DC is applied]                                                                                                                                                                                                                                                                                                                                                     |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
| Effect of power outage                                            | Outage of 2ms or less ; no impact                                                                                                                                                                                                                                                                                                                                                              |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
| Memory backup                                                     | Nonvolatile memory (EEPROM) No. of update ; 100,000                                                                                                                                                                                                                                                                                                                                            |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
| Insulation resistance                                             | 20MΩ or more (500V DC)                                                                                                                                                                                                                                                                                                                                                                         |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
| Insulation block diagram                                          | <table border="1"> <tr> <td>Power</td><td>PV1</td></tr> <tr> <td>Loader communication port</td><td>PV2</td></tr> <tr> <td>RS-485 communication port</td><td>PV3</td></tr> <tr> <td></td><td>PV4</td></tr> <tr> <td></td><td>OUT1 (current)</td></tr> <tr> <td></td><td>OUT2 (current)</td></tr> <tr> <td></td><td>OUT3 (current)</td></tr> <tr> <td></td><td>OUT4 (current)</td></tr> </table> | Power | PV1 | Loader communication port | PV2 | RS-485 communication port | PV3 |  | PV4 |  | OUT1 (current) |  | OUT2 (current) |  | OUT3 (current) |  | OUT4 (current) |
| Power                                                             | PV1                                                                                                                                                                                                                                                                                                                                                                                            |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
| Loader communication port                                         | PV2                                                                                                                                                                                                                                                                                                                                                                                            |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
| RS-485 communication port                                         | PV3                                                                                                                                                                                                                                                                                                                                                                                            |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
|                                                                   | PV4                                                                                                                                                                                                                                                                                                                                                                                            |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
|                                                                   | OUT1 (current)                                                                                                                                                                                                                                                                                                                                                                                 |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
|                                                                   | OUT2 (current)                                                                                                                                                                                                                                                                                                                                                                                 |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
|                                                                   | OUT3 (current)                                                                                                                                                                                                                                                                                                                                                                                 |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
|                                                                   | OUT4 (current)                                                                                                                                                                                                                                                                                                                                                                                 |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |
| =Functional insulation (1000V AC)–Functional insulation (500V AC) |                                                                                                                                                                                                                                                                                                                                                                                                |       |     |                           |     |                           |     |  |     |  |                |  |                |  |                |  |                |

### Normal operating condition

|                     |                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | -10 to 50 degrees C<br>* "Ambient temperature" is the temperature underneath the controller inside the equipment or the cabinet where the controller is installed. |
| Ambient humidity    | 90%RH or less (no condensing)                                                                                                                                      |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less                                                                                                                       |
| Shock               | 49m/s <sup>2</sup> (5G) or less                                                                                                                                    |
| Warmup time         | 30 min. or more                                                                                                                                                    |

### Transporting, storage conditions (packing conditions)

|                     |                                              |
|---------------------|----------------------------------------------|
| Storage temperature | -20 to 60 degrees C                          |
| Ambient humidity    | 90%RH or less (no condensing)                |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less |
| Shock               | 294m/s <sup>2</sup> (30G) or less            |

## ■ Analog Input Module Type : PUMN

### ■ Analog Input

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No. of input                          | 4 points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Input signal                          | Select from group I or II on the model code.<br>Group I: Thermocouple: K, J, T, E, R, B, S, N, PL-II<br>Resistance bulb (3-wire) : Pt100, JPt100<br>Group II : DC voltage, current DC0 to 5V, DC1 to 5V,<br>DC0 to 10V, DC2 to 10V<br>DC0 to 20mA, DC4 to 20mA<br>*The power current input is external in 250Ω resistance. It's<br>input of DC0 to 5V or DC1 to 5V Range.                                                                                                                                                                                                                            |
| Measurement range and input type      | See table 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Measurement accuracy (Ta=23°C)        | Thermocouple input: : $\pm 0.3\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>or $\pm 3\text{ degrees C}$ whichever is greater<br>*Unless<br>B thermocouple 0 to 500 degrees C :<br>$\pm 5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>R thermocouple 0 to 500 degrees C :<br>$\pm 1\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>T thermocouple -200 to 0 degree C :<br>$\pm 0.5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$<br>Resistance bulb input : $\pm 0.3\%FS \pm 1\text{digit}$ or $\pm 1\text{ degree C}$ whichever is greater<br>Voltage input : $\pm 0.3\%FS \pm 1\text{digit}$ |
| Resolution                            | See table 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Temperature fluctuation               | $\pm 0.3\%FS/10\text{ degrees C}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Input sampling cycle                  | 200ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Input impedance                       | Thermocouple: 1M Ω or more<br>Current input : 250 Ω<br>Voltage input : approx. 1M Ω                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Influence of signal source resistance | Thermocouple: $\pm 0.3\%FS \pm 1\text{digit} / 100\text{ Ω}$<br>Voltage input : $\pm 0.3\%FS \pm 1\text{digit} / 500\text{ Ω}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Allowable wiring resistance           | Resistance bulb input: 10 Ω or less (per wire)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Allowable input voltage               | DC voltage input: within $\pm 15V$<br>Current input: within $\pm 25mA$<br>Thermocouple/resistance bulb: within $\pm 5V$                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Noise rejection ratio                 | Normal mode: 30dB or more (50/60Hz)<br>Common mode: 120dB or more (50/60Hz)<br>between process value input and earth ground,<br>power supply, output 220V AC, 50/60Hz                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Input compensation                    | a) User adjustment: zero point, span point $\pm 50\%FS$<br>b) PV shift: $\pm 10\%FS$<br>c) First order lag filter : 0.0 to 120.0 sec. (filter off<br>when setting is 0.0)                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Over range, under range               | Out of range of -5 to 105%FS (Accuracy cannot be<br>ensured for -5 to 0, 100 to 105%FS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Insulation                            | Functional insulation between channels, and with<br>any other input/output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

### ■ RS-485 interface

|                               |                                                                                                       |
|-------------------------------|-------------------------------------------------------------------------------------------------------|
| Communication standards       | RS-485 compatible                                                                                     |
| No. of port                   | 1 port                                                                                                |
| Communication, synchro method | Two-wire, half-duplex, asynchronous cycle                                                             |
| Communication speed           | 9.6k, 19.2k, 38.4k, 115.2kbps                                                                         |
| Communication distance        | 1km (38.4kbps or less), 250m (115.2kbps)                                                              |
| Recommended cable             | KPEV-SB 0.5sq-equivalent                                                                              |
| No. of connectable units      | 33 units (master and slave)(32 units if any modules<br>other than PUM series are included in slaves.) |
| Data format                   | Data bit; 8, parity; even / odd / none                                                                |
| Protocol                      | Modbus RTU compatible                                                                                 |
| Insulation                    | No insulation with loader communication port<br>Functional insulation with any other input/output     |

### ■ Loader communication (RS-232C) interface

|                               |                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                       |
| No. of port                   | 1 port                                                                                   |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                          |
| Communication speed           | 19.2kbps (fixed)                                                                         |
| Data format                   | Data bit 8, no parity                                                                    |
| Protocol                      | Modbus RTU compatible                                                                    |
| Connection method             | 2.5 diameter mini-plug/jack [on the front of the<br>module] (Common cable with PXG, PXH) |
| Insulation                    | No insulation with RS-485<br>Functional insulation with any other input/output           |

### ■ Display, configuration

|                  |                                                      |
|------------------|------------------------------------------------------|
| Display          | Status display LED (2 colors x 2 points + 4points)   |
| Display contents | RUN/FAULT, RS-485 TX/RX, Input ERR/Output by<br>loop |
| Setting device   | Rotary SW x 1                                        |
| Set contents     | RS-485 Station No. (Station No.= setting value + 1)  |

### ■ Structure

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case material       | Polyphenylene oxide (flame retardant grade :<br>UL94V-0 equivalent)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Case color          | Case ; red , Terminal, base part ; black                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Protection          | Body : IP20 grade protection (ventilation slits on the<br>top and the bottom of the body)<br>Terminal : IP00 grade protection, terminal cover is<br>available as an option                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Dimensions          | 30 (W) × 100 (H) × 85 (D) mm (excluding terminal<br>cover)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Weight              | Approx. 200 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Installation method | DIN rail mounting or mounting with M3 screws<br>inside a cabinet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| External terminal   | <ul style="list-style-type: none"> <li>Process value input / control output : Detachable<br/>terminal block (M3 screw x 20 terminals)</li> <li>Power supply connection: Terminal block on<br/>the base part (M3 screw x 2 terminals) Power is<br/>supplied via side connectors in the case of lateral<br/>connecting. (Max. 33 units)</li> <li>RS-485 communication connection : Terminal<br/>block on the base part (M3 screw x 3 terminals)<br/>RS-485 communication is connected via side<br/>connectors in the case of lateral connecting.</li> <li>Loader communication port : 2.5 diameter mini-<br/>plug / jack [on the front of the module]"</li> </ul> |

### ■ General specification

|                           |                                                                                                                                                                                                                    |       |     |                           |     |                           |     |  |     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|---------------------------|-----|---------------------------|-----|--|-----|
| Power supply              | 24V DC $\pm 10\%$                                                                                                                                                                                                  |       |     |                           |     |                           |     |  |     |
| Power consumption         | Max. 3.2W (135mA) [when 24V DC is applied]                                                                                                                                                                         |       |     |                           |     |                           |     |  |     |
| Effect of power outage    | Outage of 2ms or less ; no impact                                                                                                                                                                                  |       |     |                           |     |                           |     |  |     |
| Memory backup             | Nonvolatile memory (EEPROM)<br>No. of update ; 100,000                                                                                                                                                             |       |     |                           |     |                           |     |  |     |
| Insulation resistance     | 20MΩ or more (500V DC)                                                                                                                                                                                             |       |     |                           |     |                           |     |  |     |
| Insulation block diagram  | <table border="1"> <tr> <td>Power</td><td>PV1</td></tr> <tr> <td>Loader communication port</td><td>PV2</td></tr> <tr> <td>RS-485 communication port</td><td>PV3</td></tr> <tr> <td></td><td>PV4</td></tr> </table> | Power | PV1 | Loader communication port | PV2 | RS-485 communication port | PV3 |  | PV4 |
| Power                     | PV1                                                                                                                                                                                                                |       |     |                           |     |                           |     |  |     |
| Loader communication port | PV2                                                                                                                                                                                                                |       |     |                           |     |                           |     |  |     |
| RS-485 communication port | PV3                                                                                                                                                                                                                |       |     |                           |     |                           |     |  |     |
|                           | PV4                                                                                                                                                                                                                |       |     |                           |     |                           |     |  |     |

=Functional insulation (1000V AC)–Functional insulation (500V AC)

**■ Normal operating condition**

|                     |                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | -10 to 50 degrees C<br>* "Ambient temperature" is the temperature underneath the controller inside the equipment or the cabinet where the controller is installed. |
| Ambient humidity    | 90%RH or less (no condensing)                                                                                                                                      |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less                                                                                                                       |
| Warmup time         | 30 min. or more                                                                                                                                                    |

**■ Transporting, storage conditions (packing conditions)**

|                     |                                              |
|---------------------|----------------------------------------------|
| Storage temperature | -20 to 60 degrees C                          |
| Ambient humidity    | 90%RH or less (no condensing)                |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less |
| Shock               | 294m/s <sup>2</sup> (30G) or less            |

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## ■ Analog Output Module Type : PUMT

### ■ Analog Output

|                     |                                                                                                                                                             |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No. of output       | 4 points                                                                                                                                                    |
| Output type         | Current output DC 4 to 20mA, DC 0 to 20mA                                                                                                                   |
| Actual output range | DC 0mA to 20.6mA                                                                                                                                            |
| Accuracy            | ±0.3%FS (less than 1mA : ±5%FS)                                                                                                                             |
| Linearity           | ±0.3%FS (less than 1mA : ±5%FS)                                                                                                                             |
| Resolution          | 5,000 or more                                                                                                                                               |
| Ripple current      | P-P 0.3mA or less                                                                                                                                           |
| Loading resistance  | 300 Ω or less                                                                                                                                               |
| Insulation          | No insulation with any other output<br>Functional insulation with others (power source, analog input, RS485 communication and loader port) than those above |

### ■ RS-485 interface

|                               |                                                                                                    |
|-------------------------------|----------------------------------------------------------------------------------------------------|
| Communication standards       | RS-485 compatible                                                                                  |
| No. of port                   | 1 port                                                                                             |
| Communication, synchro method | Two-wire, half-duplex, asynchronous cycle                                                          |
| Communication speed           | 9.6k, 19.2k, 38.4k, 115.2kbps                                                                      |
| Communication distance        | 1km (38.4kbps or less), 250m (115.2kbps)                                                           |
| Recommended cable             | KPEV-SB 0.5sq-equivalent                                                                           |
| No. of connectable units      | 33 units (master and slave)(32 units if any modules other than PUM series are included in slaves.) |
| Data format                   | Data bit; 8, parity; even / odd / none                                                             |
| Protocol                      | Modbus RTU compatible                                                                              |
| Insulation                    | No insulation with loader communication port<br>Functional insulation with any other input/output  |

### ■ Loader communication (RS-232C) interface

|                               |                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                    |
| No. of port                   | 1 port                                                                                |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                       |
| Communication speed           | 19.2kbps (fixed)                                                                      |
| Data format                   | Data bit 8, no parity                                                                 |
| Protocol                      | Modbus RTU compatible                                                                 |
| Connection method             | 2.5 diameter mini-plug/jack [on the front of the module] (Common cable with PXG, PXH) |
| Insulation                    | No insulation with RS485<br>Functional insulation with any other input/output         |

### ■ Display, configuration

|                  |                                                     |
|------------------|-----------------------------------------------------|
| Display          | Status display LED (2 colors x 2 points + 4points)  |
| Display contents | RUN/FAULT, RS-485 TX/RX, Input ERR/Output by loop   |
| Setting device   | Rotary SW x 1                                       |
| Set contents     | RS-485 Station No. (Station No.= setting value + 1) |

### ■ Structure

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case material       | Polyphenylene oxide (flame retardant grade : UL94V-0 equivalent)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Case color          | Case ; red , Terminal, base part ; black                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Protection          | Body : IP20 grade protection (ventilation slits on the top and the bottom of the body)<br>Terminal : IP00 grade protection, terminal cover is available as an option                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Dimensions          | 30 (W) × 100 (H) × 85 (D) mm (excluding terminal cover)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Weight              | Approx. 200 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Installation method | DIN rail mounting or mounting with M3 screws inside a cabinet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| External terminal   | <ul style="list-style-type: none"> <li>Process value input / control output : Detachable terminal block (M3 screw x 20 terminals)</li> <li>Power supply connection: Terminal block on the base part (M3 screw x 2 terminals) Power is supplied via side connectors in the case of lateral connecting. (Max. 33 units)</li> <li>RS-485 communication connection : Terminal block on the base part (M3 screw x 3 terminals) RS-485 communication is connected via side connectors in the case of lateral connecting.</li> <li>Loader communication port : 2.5 diameter mini-plug / jack [on the front of the module]"</li> </ul> |

### ■ General specification

|                           |                                                                                                                                                                                                                                                                                                                                         |       |                |                           |                |                           |                |  |                |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------|---------------------------|----------------|---------------------------|----------------|--|----------------|
| Power supply              | 24V DC±10%                                                                                                                                                                                                                                                                                                                              |       |                |                           |                |                           |                |  |                |
| Power consumption         | Max. 3.2W (135mA) [when 24V DC is applied]                                                                                                                                                                                                                                                                                              |       |                |                           |                |                           |                |  |                |
| Effect of power outage    | Outage of 2ms or less ; no impact                                                                                                                                                                                                                                                                                                       |       |                |                           |                |                           |                |  |                |
| Memory backup             | Nonvolatile memory (EEPROM)<br>No. of update ; 100,000                                                                                                                                                                                                                                                                                  |       |                |                           |                |                           |                |  |                |
| Insulation resistance     | 20MQ or more (500V DC)                                                                                                                                                                                                                                                                                                                  |       |                |                           |                |                           |                |  |                |
| Insulation block diagram  | <table border="1"> <tr> <td>Power</td><td>OUT1 (current)</td></tr> <tr> <td>Loader communication port</td><td>OUT2 (current)</td></tr> <tr> <td>RS-485 communication port</td><td>OUT3 (current)</td></tr> <tr> <td></td><td>OUT4 (current)</td></tr> </table> <p>=Functional insulation (1000V AC)–Functional insulation (500V AC)</p> | Power | OUT1 (current) | Loader communication port | OUT2 (current) | RS-485 communication port | OUT3 (current) |  | OUT4 (current) |
| Power                     | OUT1 (current)                                                                                                                                                                                                                                                                                                                          |       |                |                           |                |                           |                |  |                |
| Loader communication port | OUT2 (current)                                                                                                                                                                                                                                                                                                                          |       |                |                           |                |                           |                |  |                |
| RS-485 communication port | OUT3 (current)                                                                                                                                                                                                                                                                                                                          |       |                |                           |                |                           |                |  |                |
|                           | OUT4 (current)                                                                                                                                                                                                                                                                                                                          |       |                |                           |                |                           |                |  |                |

### ■ Normal operating condition

|                     |                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | -10 to 50 degrees C<br>* "Ambient temperature" is the temperature underneath the controller inside the equipment or the cabinet where the controller is installed. |
| Ambient humidity    | 90%RH or less (no condensing)                                                                                                                                      |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less                                                                                                                       |
| Warmup time         | 30 min. or more                                                                                                                                                    |

### ■ Transporting, storage conditions (packing conditions)

|                     |                                              |
|---------------------|----------------------------------------------|
| Storage temperature | -20 to 60 degrees C                          |
| Ambient humidity    | 90%RH or less (no condensing)                |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less |
| Shock               | 294m/s <sup>2</sup> (30G) or less            |

## ■CC-Link Communication Module Type:PUMCL

### ■CC-Link Communication

|                                                                |                                                                                                |                    |              |                           |                     |              |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------|--------------|---------------------------|---------------------|--------------|
| Version                                                        | CC-Link Ver. 2.00/1.10                                                                         |                    |              |                           |                     |              |
| Kind of device                                                 | Remote device                                                                                  |                    |              |                           |                     |              |
| Communication speed or Communication distance                  | Communication speed                                                                            | 156kbps            | 625kbps      | 2.5Mbps                   | 5Mbps               | 10Mbps       |
|                                                                | Total extension distance                                                                       | 1200m or less      | 900m or less | 400m or less              | 200m or less        | 100m or less |
|                                                                | Refer to the CC-Link Cable Wiring manual (issued by CC-Link partner association) about details |                    |              |                           |                     |              |
| Shared units/<br>Station numbers for communication data length | Shared 4 stations / providing number 1 to 61                                                   |                    |              |                           |                     |              |
|                                                                | Shared stations/extended cyclic                                                                | Remote I/O (RX/RY) |              | Remote Register (RWr/RWw) | Control Module PUMA |              |
|                                                                | 4 stations × 1                                                                                 | Each 128bit        |              | 16 word                   | 2 or 4 units        |              |
|                                                                | 4 stations × 2                                                                                 | Each 256bit        |              | 32 word                   | 4 or 8 units        |              |
|                                                                | 4 stations × 4                                                                                 | Each 512bit        |              | 64 word                   | 8 or 16 units       |              |
| Connection cable                                               | CC-Link original cable for version 1.10                                                        |                    |              |                           |                     |              |
| Connection method                                              | Detachable terminal block (M3 screw)                                                           |                    |              |                           |                     |              |
| Terminating resistor                                           | External type (110 Ω, 1/2W)                                                                    |                    |              |                           |                     |              |

### ■Loader communication (RS-232C) interface

|                               |                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                    |
| No. of port                   | 1 port                                                                                |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                       |
| Communication speed           | 19.2kbps (fixed)                                                                      |
| Data format                   | Data bit 8, no parity                                                                 |
| Protocol                      | Modbus RTU compatible                                                                 |
| Connection method             | 2.5 diameter mini-plug/jack [on the front of the module] (Common cable with PXG, PXH) |
| Insulation                    | Functional insulation with any other input/output                                     |

### ■Display, configuration

|                                |                                                                                                |                 |
|--------------------------------|------------------------------------------------------------------------------------------------|-----------------|
| Display                        | Status display LED (2 colors × 2 points + 4points)                                             |                 |
| Display contents               | RUN/FAULT<br>Control Module Connection status (TX/RX)<br>CC-Link status (L.RUN, L.ERR, SD, RD) |                 |
| Setting device or Set contents | Setting device                                                                                 |                 |
|                                | Front                                                                                          | Rotary SW×2     |
|                                | Equipment interior                                                                             | Rotary SW×1     |
|                                |                                                                                                | Dip SW (6bit)×1 |
|                                | Set contents                                                                                   |                 |
|                                | CC-Link Setting Station numbers                                                                |                 |
|                                | CC-Link Setting Communication speed                                                            |                 |
|                                | CC-Link Setting mode                                                                           |                 |

### ■Structure

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case material       | Polyphenylene oxide (flame retardant grade : UL94V-0 equivalent)                                                                                                                                                                                                                                                                                                                                                           |
| Case color          | Case ; red ,Terminal, base part ; black                                                                                                                                                                                                                                                                                                                                                                                    |
| Protection          | Body : IP20 grade protection (ventilation slits on the top and the bottom of the body)<br>Terminal : IP00 grade protection, terminal cover is available as an option                                                                                                                                                                                                                                                       |
| Dimensions          | 30 (W) × 100 (H) × 85 (D) mm (excluding terminal cover)                                                                                                                                                                                                                                                                                                                                                                    |
| Weight              | Approx. 200 g                                                                                                                                                                                                                                                                                                                                                                                                              |
| Installation method | DIN rail mounting or mounting with M3 screws inside a cabinet                                                                                                                                                                                                                                                                                                                                                              |
| External terminal   | <ul style="list-style-type: none"> <li>CC-Link communication terminal: Detachable terminal block (M3 screw × 20 terminals)</li> <li>Power supply connection: Terminal block on the base part (M3 screw × 2 terminals) Power is supplied via side connectors in the case of lateral connecting. (Max. 33 units)</li> <li>Loader communication port : 2.5 diameter mini-plug / jack [on the front of the module]"</li> </ul> |

### ■General specification

|                           |                                                                                                                                                                                                                                                                                          |       |                                               |                           |                       |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------------|---------------------------|-----------------------|
| Power supply              | 24V DC±10%                                                                                                                                                                                                                                                                               |       |                                               |                           |                       |
| Power consumption         | Max. 3.2 W(135 mA) [when 24V DC is applied]                                                                                                                                                                                                                                              |       |                                               |                           |                       |
| Effect of power outage    | Outage of 2ms or less ; no impact                                                                                                                                                                                                                                                        |       |                                               |                           |                       |
| Memory backup             | Nonvolatile memory (EEPROM)<br>No. of update ; 100,000                                                                                                                                                                                                                                   |       |                                               |                           |                       |
| Insulation resistance     | 20MΩ or more (500V DC)                                                                                                                                                                                                                                                                   |       |                                               |                           |                       |
| Insulation block diagram  | <table border="1"> <tr> <td>Power</td><td>SLD/FG terminal (CC-Link connecting terminal)</td></tr> <tr> <td>Loader communication port</td><td>CC-Link communication</td></tr> </table> <p>=Basic insulation (1000V AC)-Functional insulation (500V AC)-Functional insulation (50V AC)</p> | Power | SLD/FG terminal (CC-Link connecting terminal) | Loader communication port | CC-Link communication |
| Power                     | SLD/FG terminal (CC-Link connecting terminal)                                                                                                                                                                                                                                            |       |                                               |                           |                       |
| Loader communication port | CC-Link communication                                                                                                                                                                                                                                                                    |       |                                               |                           |                       |

### ■Normal operating condition

|                     |                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | -10 to 50 degrees C<br>* "Ambient temperature" is the temperature underneath the controller inside the equipment or the cabinet where the controller is installed. |
| Ambient humidity    | 90%RH or less (no condensing)                                                                                                                                      |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less                                                                                                                       |
| Warmup time         | 30 min. or more                                                                                                                                                    |

### ■Transporting, storage conditions (packing conditions)

|                     |                                              |
|---------------------|----------------------------------------------|
| Storage temperature | -20 to 60 degrees C                          |
| Ambient humidity    | 90%RH or less (no condensing)                |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less |
| Shock               | 294m/s <sup>2</sup> (30G) or less            |

## ■ Mitsubishi PLC program less communication Module Type:PUMCM

### ■ RS-485 / RS422 communication

|                               |                                                                                                                                                                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Communication standards       | RS-485/RS422 compatible                                                                                                                                        |
| No. of port                   | 1port                                                                                                                                                          |
| Communication, synchro method | RS-485 interface; 2-wire, half-duplex, asynchronous cycle<br>RS-422 interface; 4-wire, half duplex, asynchronous cycle                                         |
| Communication speed           | 9.6k, 19.2k, 38.4k, 57.6k, 115.2k, 230.4kbps                                                                                                                   |
| Communication distance        | MELSEC-Q series 1000m or less<br>MELSEC-A series 500m or less<br>MELSEC-FX series 500m or less                                                                 |
| Recommended cable             | KFPEV-SB2P 0.5sq /FUJI ELECTRIC CABLE CO., LTD                                                                                                                 |
| Data format                   | Start bit 1, Data bit; 8 parity; even/odd/none<br>Stop bit 1                                                                                                   |
| Protocol                      | MC protocol (type2, 4, 5)                                                                                                                                      |
| Insulation                    | No insulation with any communication interface other than loader interface,<br>Functional insulation with loader communication interface and other all signals |
| Function                      | MELSEC-Q/A/AnS/FX series of PLC and program less communication                                                                                                 |
| 1:N Connection                | Usable PLC is MELSEC-Q/A/AnS series.<br>Configuration by using FX series is not possible.                                                                      |

### ■ RS232-C communication

|                               |                                                                                                                                                                              |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                                                                                                           |
| No. of port                   | 1port                                                                                                                                                                        |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                                                                                                              |
| Communication speed           | 9.6k, 19.2k, 38.4k, 57.6k, 115.2k, 230.4kbps                                                                                                                                 |
| Data format                   | Start bit 1, Data bit; 8 parity; even/odd/none<br>Stop bit 1                                                                                                                 |
| Protocol                      | MC protocol (type2, 4, 5)                                                                                                                                                    |
| Insulation                    | No insulation with any communication interface other than loader communication interface,<br>Functional insulation with loader communication interface and other all signals |
| Function                      | MELSEC-Q/A/AnS/FX series of PLC and program less communication                                                                                                               |
| 1:N Connection                | Unusable                                                                                                                                                                     |

### ■ Loader communication (RS-232C) interface

|                               |                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                       |
| No. of port                   | 1 port                                                                                   |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                          |
| Communication speed           | 19.2kbps (fixed)                                                                         |
| Data format                   | Data bit 8, no parity                                                                    |
| Protocol                      | Modbus RTU compatible                                                                    |
| Connection method             | 2.5 diameter mini-plug/jack [on the front of the module]<br>(Common cable with PXG, PXH) |
| Insulation                    | Functional insulation with any other signals                                             |

### ■ Display, configuration

|                                     |                                                                                                         |                   |                                           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------|
| Display                             | Status display LED (2 colors x 2 points + 4points)                                                      |                   |                                           |
| Display contents                    | RUN/FAULT, internal communication status<br>Communication TX/RX (Port1),<br>Communication TX/RX (Port2) |                   |                                           |
| Setting device and setting contents | Setting device                                                                                          |                   | Setting contents                          |
|                                     | Front face                                                                                              | Rotary SW x 1     | Programless communication station setting |
|                                     | Within the device                                                                                       | DIP SW (6bit) x 1 | RS-232C/RS-422/RS485<br>Operation mode    |

### ■ Setting

| Communicable combination of MC protocol and MC protocol frame type | Commu-nication object | I/F     | A compatible 1C frame             |        |       |
|--------------------------------------------------------------------|-----------------------|---------|-----------------------------------|--------|-------|
|                                                                    |                       |         | QnA compatible 4C frame<br>Type 5 | Type 2 | Type4 |
| Q series                                                           |                       | RS-232C | ○                                 | ○      | ○     |
|                                                                    |                       | RS-422  | ◎                                 | ◎      | ×     |
|                                                                    |                       | RS-485  | ×                                 | ◎      | ○     |
| A series                                                           |                       | RS-232C | ×                                 | ○      | ○     |
|                                                                    |                       | RS-422  | ×                                 | ◎      | ×     |
|                                                                    |                       | RS-485  | ×                                 | ◎      | ○     |
| FX series                                                          |                       | RS-232C | ×                                 | ×      | ○     |
|                                                                    |                       | RS-485  | ×                                 | ×      | ○     |

◎ : 1:1 connection + 1:N connection is available  
 ○ : 1:1 connection is available  
 × : Any connection are not available

When using 1:N connection, the settings of every connected programless communication modules should be the same.

### ■ Structure

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case material       | Polyphenylene oxide (flame retardant grade : UL94V-0 equivalent)                                                                                                                                                                                                                                                                                                                                                                |
| Case color          | Case ; red , Terminal, base part ; black                                                                                                                                                                                                                                                                                                                                                                                        |
| Protection          | Body : IP20 grade protection (ventilation slits on the top and the bottom of the body)<br>Terminal : IP00 grade protection, terminal cover is available as an option                                                                                                                                                                                                                                                            |
| Dimensions          | 30 (W) × 100 (H) × 85 (D) mm (excluding terminal cover)                                                                                                                                                                                                                                                                                                                                                                         |
| Weight              | Approx. 200 g                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Installation method | DIN rail mounting or mounting with M3 screws inside a cabinet                                                                                                                                                                                                                                                                                                                                                                   |
| External terminal   | <ul style="list-style-type: none"> <li>Programless communication interface: Detachable terminal block (M3 screw x 20 terminals)</li> <li>Power supply connection: Terminal block on the base part (M3 screw x 2 terminals) Power is supplied via side connectors in the case of lateral connecting. (Max. 33 units)</li> <li>Loader communication port : 2.5 diameter mini-plug / jack [on the front of the module]"</li> </ul> |

### ■ General specification

|                           |                                                                                                                                                                                                                        |       |         |                           |                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|---------------------------|------------------|
| Power supply              | 24V DC±10%                                                                                                                                                                                                             |       |         |                           |                  |
| Power consumption         | Max. 3.2W (135mA) [when 24V DC is applied]                                                                                                                                                                             |       |         |                           |                  |
| Effect of power outage    | Outage of 2ms or less ; no impact                                                                                                                                                                                      |       |         |                           |                  |
| Memory backup             | Nonvolatile memory (EEPROM)<br>No. of update ; 100,000                                                                                                                                                                 |       |         |                           |                  |
| Insulation resistance     | 20MΩ or more (500V DC)                                                                                                                                                                                                 |       |         |                           |                  |
| Insulation block diagram  | <table border="1"> <tr> <td>Power</td><td>RS-232C</td></tr> <tr> <td>Loader communication port</td><td>RS-422<br/>RS-485</td></tr> </table> <p>=Functional insulation (1000V AC) - Functional insulation (500V AC)</p> | Power | RS-232C | Loader communication port | RS-422<br>RS-485 |
| Power                     | RS-232C                                                                                                                                                                                                                |       |         |                           |                  |
| Loader communication port | RS-422<br>RS-485                                                                                                                                                                                                       |       |         |                           |                  |

### ■ Normal operating condition

|                     |                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | -10 to 50 degrees C<br>* "Ambient temperature" is the temperature underneath the controller inside the equipment or the cabinet where the controller is installed. |
| Ambient humidity    | 90%RH or less (no condensing)                                                                                                                                      |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less                                                                                                                       |
| Warmup time         | 30 min. or more                                                                                                                                                    |

### ■ Transporting, storage conditions (packing conditions)

|                     |                                              |
|---------------------|----------------------------------------------|
| Storage temperature | -20 to 60 degrees C                          |
| Ambient humidity    | 90%RH or less (no condensing)                |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less |
| Shock               | 294m/s <sup>2</sup> (30G) or less            |

## ■ PROFIBUS communication Module Type:PUMCP

### ■ PROFIBUS communication

|                                                  |                                                                                                                              |                                        |               |                                         |              |                 |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------|-----------------------------------------|--------------|-----------------|
| Compliant version                                | PROFIBUS DP-V0 (Cyclic communication)                                                                                        |                                        |               |                                         |              |                 |
| Station type                                     | Slave device                                                                                                                 |                                        |               |                                         |              |                 |
| Communication speed and distance                 | Speed                                                                                                                        | 9.6, 19.2, 93.75 kbps                  | 187.5 kbps    | 500 kbps                                | 1.5M bps     | 3M, 6M, 12M bps |
|                                                  | Dis- tance                                                                                                                   | 1200m or less                          | 1000m or less | 400m or less                            | 200m or less | 100m or less    |
| Station number                                   | Settable station number by rotary SW: 1 to 99<br>Settable station number by parameters: 1 to 125(If rotary SW is set to "0") |                                        |               |                                         |              |                 |
| Communication data length (Cyclic communication) | The number of words for input and output can respectively be selected for the table below.                                   |                                        |               |                                         |              |                 |
|                                                  | No                                                                                                                           | communication setting for "input area" |               | Communication setting for "output area" |              |                 |
|                                                  | 1                                                                                                                            | 8 words                                |               | 8 words                                 |              |                 |
|                                                  | 2                                                                                                                            | 16 words                               |               | 16 words                                |              |                 |
|                                                  | 3                                                                                                                            | 32 words                               |               | 32 words                                |              |                 |
|                                                  | 4                                                                                                                            | 64 words                               |               | 64 words                                |              |                 |
|                                                  | 5                                                                                                                            | 108 words                              |               | 108 words                               |              |                 |
| Connecting cable                                 | Type A compatible cable for PROFIBUS                                                                                         |                                        |               |                                         |              |                 |
| Connecting method                                | M3 screw terminal block                                                                                                      |                                        |               |                                         |              |                 |
| Termination resistance                           | External (220Ω, 1/2W) or depends on the internal SW setting.                                                                 |                                        |               |                                         |              |                 |

### ■ Loader communication (RS-232C) interface

|                               |                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                       |
| No. of port                   | 1 port                                                                                   |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                          |
| Communication speed           | 19.2kbps (fixed)                                                                         |
| Data format                   | Data bit 8, no parity                                                                    |
| Protocol                      | Modbus RTU compatible                                                                    |
| Connection method             | 2.5 diameter mini-plug/jack [on the front of the module]<br>(Common cable with PXG, PXH) |
| Insulation                    | Functional insulation with any other input/output                                        |

### ■ Display, configuration

|                                     |                                                                             |                    |                               |
|-------------------------------------|-----------------------------------------------------------------------------|--------------------|-------------------------------|
| Display                             | Status display LED (2 colors x 2 points + 1point)                           |                    |                               |
| Display contents                    | RUN/FAULT,control module connection status (TX/RX)<br>PROFIBUS status (ONL) |                    |                               |
| Setting device and setting contents | Setting device                                                              |                    | Set contents                  |
|                                     | Front                                                                       | Rotary SW x 2      | PROFIBUS Station No. setting  |
|                                     | Inside                                                                      | Dip SW (3bits) x 1 | Word setting of date exchange |

### ■ Structure

|                     |                                                                                                                                                                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case material       | Polyphenylene oxide (flame retardant grade : UL94V-0 equivalent)                                                                                                     |
| Case color          | Case ; red , Terminal, base part ; black                                                                                                                             |
| Protection          | Body : IP20 grade protection (ventilation slits on the top and the bottom of the body)<br>Terminal : IP00 grade protection, terminal cover is available as an option |
| Dimensions          | 30 (W) × 100 (H) × 85 (D) mm (excluding terminal cover and projected part)                                                                                           |
| Weight              | Approx. 200 g                                                                                                                                                        |
| Installation method | DIN rail mounting or mounting with M3 screws inside a cabinet                                                                                                        |

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| External terminal | <ul style="list-style-type: none"> <li>PROFIBUS communication: Detachable terminal block(M3 screw x 20 terminals)</li> <li>Power supply connection: Terminal block on the base part (M3 screw x 2 terminals) Power is supplied via side connectors in the case of lateral connecting. (Max. 33 units)</li> <li>Loader communication port : 2.5 diameter mini-plug / jack [on the front of the module]</li> </ul> |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### ■ General specification

|                          |                                                                                                                              |                        |                        |                           |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|---------------------------|
| Power supply             | 24V DC±10%                                                                                                                   |                        |                        |                           |
| Power consumption        | Max. 3.2W (135mA) [when 24V DC is applied]                                                                                   |                        |                        |                           |
| Impact of power outage   | Outage of 2ms or less ; no impact                                                                                            |                        |                        |                           |
| Memory backup            | Nonvolatile memory (EEPROM)<br>No. of update ; 100,000                                                                       |                        |                        |                           |
| Insulation resistance    | 20MΩ or more (500V DC)                                                                                                       |                        |                        |                           |
| Insulation block diagram | <table><tr><td>Power</td><td rowspan="2">PROFIBUS communication</td></tr><tr><td>Loader communication port</td></tr></table> | Power                  | PROFIBUS communication | Loader communication port |
|                          | Power                                                                                                                        | PROFIBUS communication |                        |                           |
|                          | Loader communication port                                                                                                    |                        |                        |                           |
|                          | =Functional insulation (1000V AC) - Functional insulation (500V AC)                                                          |                        |                        |                           |

### ■ Normal operating condition

|                     |                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | -10 to 50 degrees C<br>* "Ambient temperature" is the temperature underneath the controller inside the equipment or the cabinet where the controller is installed. |
| Ambient humidity    | 90%RH or less (no condensing)                                                                                                                                      |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less                                                                                                                       |
| Warmup time         | 30 min. or more                                                                                                                                                    |

### ■ Transporting, storage conditions (packing conditions)

|                     |                                              |
|---------------------|----------------------------------------------|
| Storage temperature | -20 to 60 degrees C                          |
| Ambient humidity    | 90%RH or less (no condensing)                |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less |
| Shock               | 294m/s <sup>2</sup> (30G) or less            |

## ■ Ethernet communication Modul Type:PUMCE

### ■ Ethernet communication

|                                                 |                                                |
|-------------------------------------------------|------------------------------------------------|
| Communication speed                             | 10/100Mbps                                     |
| Interface                                       | 10BASE-T/100BASE-TX, Auto-negotiation function |
| The number of simultaneously communicable nodes | 1 station                                      |
| Network topology                                | star                                           |
| Communication distance                          | 100m (between hub and node)                    |
| Communication protocol                          | conforms to IEEE802.3/IEEE802.3u               |
| Recommended hub                                 | Industrial hub                                 |
| Hub cascade connection                          | depends on the specification of Industrial hub |
| Connecting method                               | RJ-45                                          |
| IP address                                      | IPv4 supported (IPv6 not supported)            |
| DHCP                                            | unsupported                                    |
| Multiple operation                              | Full and Half duplex                           |
| Relay router                                    | Max. 8                                         |
| Port number                                     | 502                                            |

### ■ Communication function

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bridge communication                | PUMs can connect to Ethernet network with PUMCE which functions as a converter between Modbus/TCP and Modbus/RTU. A host device can monitor or configure most of the parameters of connected PUMA/B, PUMV/N/T, and PUME by designating the station numbers and the register numbers of these devices.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Mapping communication               | PUMs can connect to Ethernet network with PUMCE which functions as a repeater between Modbus/TCP and Modbus/RTU. PUMCE periodically updates designated parameters (station numbers and register numbers) of PUMA/B, PUMV/N/T, and PUME. A host device can monitor or configure parameters of PUMA/B, PUMV/N/T, and PUME by accessing the register of PUMCE. Monitoring area and setting area can be set within 712 words(*1) each.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Micrex-SX programless communication | <p>PUMCE can communicate with Micrex-SX without program, by controlling Micrex-SX loader commands. In programless communication, by changing registers in Micrex-SX you can monitor or configure parameters (station numbers and register numbers) of PUMA/B, PUMV/N/T, and PUME that have been set in PUMCE. Since this function requires no communication program for Micrex-SX, it can save memory and reduce workload. Monitoring area and setting area can be set within 712 words(*1) each.</p> <p>Connectable devices</p> <p>CPU unit</p> <p>SPH2000 series</p> <p>NP1PM-48R/NP1PM-48E/NP1PM-256E</p> <p>SPH3000 series</p> <p>NP1PU-048E/NP1PU-256E</p> <p>Number of connectable devices: Max. 10</p> <p>Communication module</p> <p>NP1L-ET1</p> <p>Number of connectable devices: Max. 8</p> <p>*1 PUMA/B, PUMV/N/T: 32 words per unit</p> <p>PUME: 8 words per unit</p> |

### ■ Loader communication (RS-232C) interface

|                               |                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------|
| Communication standards       | RS-232C compatible                                                                    |
| No. of port                   | 1 port                                                                                |
| Communication, synchro method | Half-duplex, asynchronous cycle                                                       |
| Communication speed           | 19.2kbps (fixed)                                                                      |
| Data format                   | Data bit 8, no parity                                                                 |
| Protocol                      | Modbus RTU compatible                                                                 |
| Connection method             | 2.5 diameter mini-plug/jack [on the front of the module] (Common cable with PXG, PXH) |
| Insulation                    | Functional insulation with any other input/output                                     |

### ■ Display, configuration

|                                 |                                                                                                                                              |                    |                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------|
| Display                         | Status display LED (2 colors × 2 points + 1 point)                                                                                           |                    |                          |
| Display contents                | RUN/FAULT (PWR), connection status between modules (BUS), Ethernet status (LINK), Ethernet communication data transmission/reception (TX/RX) |                    |                          |
| Setting device and set contents | Setting device                                                                                                                               |                    | Set contents             |
|                                 | Inside                                                                                                                                       | Dip SW (6bits) × 1 | Setting of communication |

### ■ Structure

|                     |                                                                                                                                                                                                                                                                                                                                              |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case material       | Polyphenylene oxide<br>(flame retardant grade : UL94V-0 equivalent)                                                                                                                                                                                                                                                                          |
| Case color          | Body ; black<br>Terminal, base part ; black                                                                                                                                                                                                                                                                                                  |
| Protection          | - Body: IP20 grade protection<br>(ventilation slits on the top and the bottom of the body)<br>- Terminal: IP00 grade protection                                                                                                                                                                                                              |
| Dimensions          | 30 (W) × 100 (H) × 85 (D) mm<br>(excluding terminal cover and projected part)                                                                                                                                                                                                                                                                |
| Weight              | Approx. 110 g                                                                                                                                                                                                                                                                                                                                |
| Installation method | DIN rail mounting or mounting with M3 screws inside a cabinet                                                                                                                                                                                                                                                                                |
| Extrenal terminal   | - Ethernet connection:<br>RJ-45 connector on front panel<br>- Power supply connection:<br>Terminal block on the base part<br>(M3 screw × 2 terminals)<br>Power is supplied via side connectors in case of lateral connecting. (Max. 33 units)<br>- Loader communication port:<br>2.5 diameter mini-plug/jack<br>[on the front of the module] |

### ■ General specification

|                       |                                                                                                                   |
|-----------------------|-------------------------------------------------------------------------------------------------------------------|
| Power supply          | 24V DC ±10%                                                                                                       |
| Power consumption     | Max. 3.2W (135mA) [when 24V DC is applied]                                                                        |
| Insulation resistance | 20MΩ or more (500V DC)                                                                                            |
| Withstand voltage     | Power supply ↔ loader communication<br>1000V AC 1 min.<br>Power supply ↔ Ethernet communication<br>500V AC 1 min. |

### ■ Normal operating condition

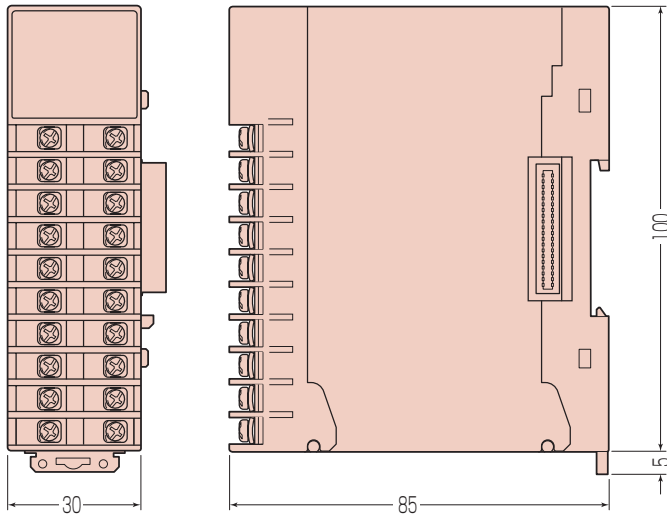
|                     |                                                                                                                                                                    |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | -10 to 50 degrees C<br>* "Ambient temperature" is the temperature underneath the controller inside the equipment or the cabinet where the controller is installed. |
| Ambient humidity    | 90%RH or less (no condensing)                                                                                                                                      |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less                                                                                                                       |

### ■ Transporting, storage conditions (packing conditions)

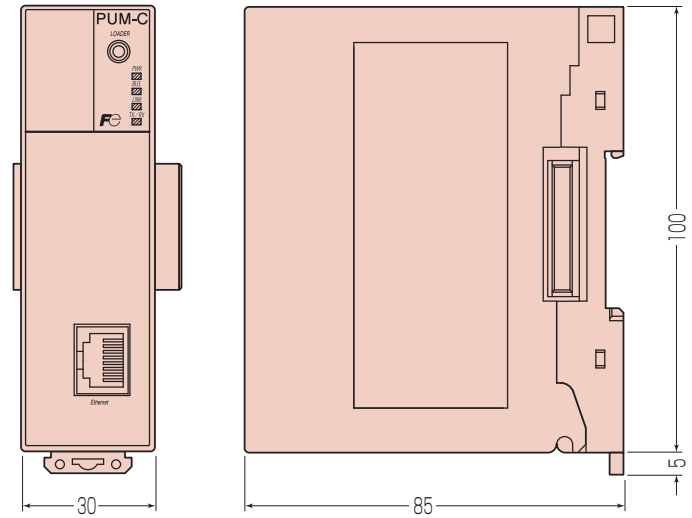
|                     |                                              |
|---------------------|----------------------------------------------|
| Storage temperature | -20 to 60 degrees C                          |
| Ambient humidity    | 90%RH or less (no condensing)                |
| Vibration           | 10 to 70Hz, 9.8m/s <sup>2</sup> (1G) or less |
| Shock               | 294m/s <sup>2</sup> (30G) or less            |

## OUTLINE DIAGRAM (Unit:mm)

CODE: PUMA/B/E/V/N/T/C



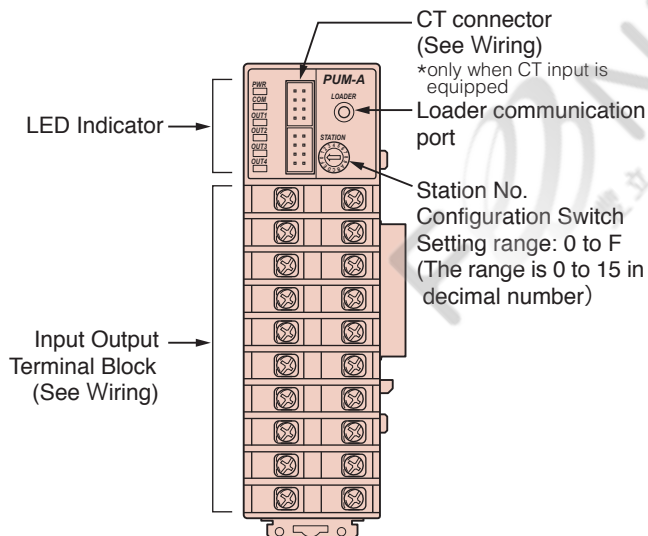
CODE: PUMCE



## PART NAMES AND FUNCTIONS

Main unit

CODE: PUMA/B

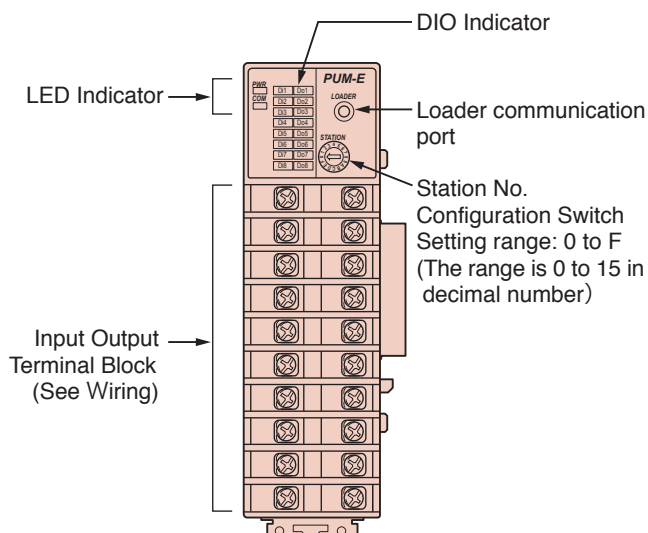


**LEDIndicator** Six LED lamps indicate the following operational conditions

| LED    | LED Status  | Color  | Operational condition                                            |
|--------|-------------|--------|------------------------------------------------------------------|
| PWR    | Illuminated | green  | Normal operation (Slave station of internal communication)       |
|        | Blinking    | green  | Normal operation (Master station of internal communication)      |
|        | Illuminated | red    | System fault (A/D converter error, internal communication error) |
|        | Blinking    | red    | Input error                                                      |
| COM    | Illuminated | green  | RS485 receiving                                                  |
|        | Illuminated | orange | RS485 transmitting                                               |
| OUT1-4 | Illuminated | green  | Corresponding channel outputting                                 |
|        | Illuminated | red    | Corresponding channel input error                                |

Actions to be displayed for COM and OUT1-4 can be allocated with using parameter

CODE: PUME

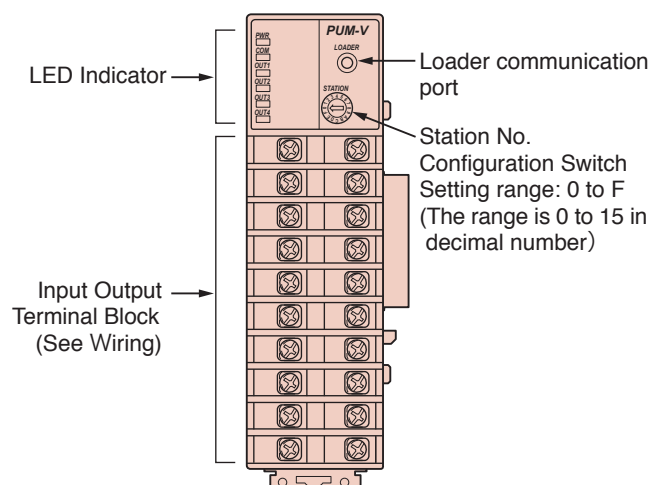


**LEDIndicator** Eighteen LED lamps indicate the following operational conditions

| LED   | GREEN              | RED   | ORANGE             |
|-------|--------------------|-------|--------------------|
| PWR   | RUN                | Error | —                  |
| COM   | RS485 receiving    | Error | RS485 transmitting |
| Di1-8 | Digital inputting  |       |                    |
| Do1-8 | Digital outputting |       |                    |

Actions to be displayed for COM can be allocated with using parameter

## CODE: PUMV/N/T



**LED Indicator** Six LED lamps indicate the following operational conditions

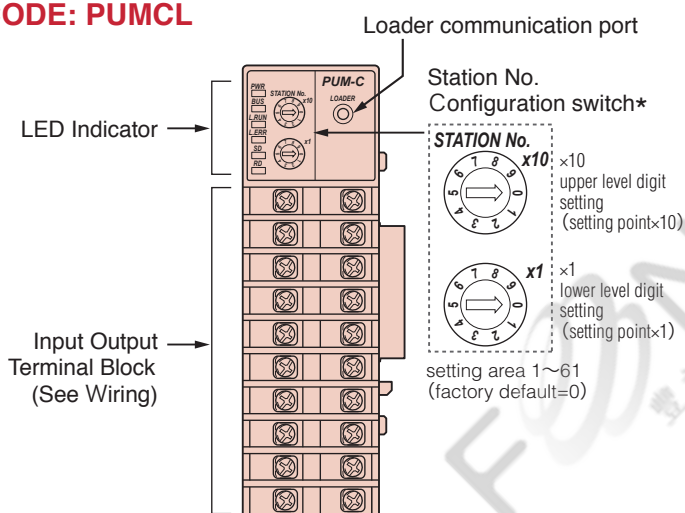
| LED    | LED Status  | Color  | Operational condition                                            |
|--------|-------------|--------|------------------------------------------------------------------|
| PWR    | Illuminated | green  | Normal operation (Slave station of internal communication)       |
|        | Blinking    | green  | Normal operation (Master station of internal communication)      |
|        | Illuminated | red    | System fault (A/D converter error, internal communication error) |
|        | Blinking    | red    | Input error                                                      |
| COM    | Illuminated | green  | RS485 receiving                                                  |
|        | Illuminated | orange | RS485 transmitting                                               |
| OUT1-4 | Illuminated | green  | Corresponding channel outputting *1                              |
|        | Illuminated | red    | Corresponding channel input error *2                             |

Actions to be displayed for COM and OUT1-4 can be allocated with using parameter

\*1 Illuminated green is not available for model PUMN

\*2 Illuminated red is not available for model PUMT

## CODE: PUMCL

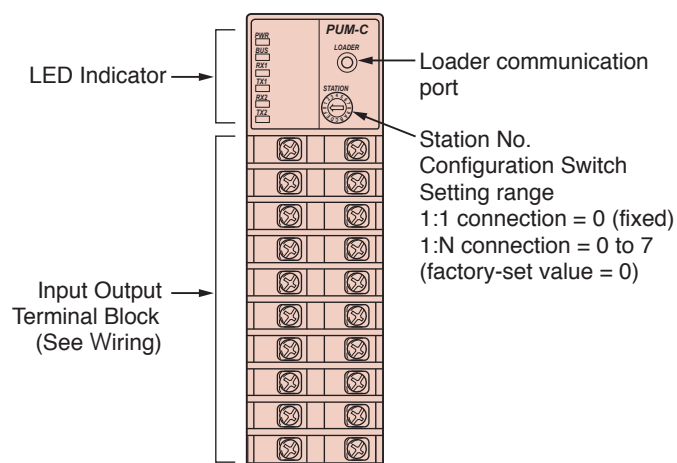


**LED Indicator** Six LED lamps indicate the following operational conditions

| LED  | LED Status    | Color  | Operational condition                |
|------|---------------|--------|--------------------------------------|
| PWR  | Illuminated   | green  | RUN                                  |
|      | Illuminated   | red    | Error                                |
| BUS  | Illuminated   | green  | Internal bus receiving               |
|      | Illuminated   | orange | Internal bus transmitting            |
| LRUN | Illuminated   | green  | CC-Link normal operation             |
|      | Slow Blinking | green  | CC-Link error                        |
|      | Fast Blinking | green  | CC-Link communication initialization |
| LERR | Illuminated   | red    | CC-Link setting error                |
|      | Slow Blinking | red    | CC-Link operation error              |
|      | Fast Blinking | red    | CC-Link change setting               |
| SD   | Illuminated   | green  | CC-Link transmitting                 |
| RD   | Illuminated   | green  | CC-Link receiving                    |

\*Appearing cannot do the communication of CC-Link as factory default (0)  
Set an station No. by all means

## CODE: PUMCM

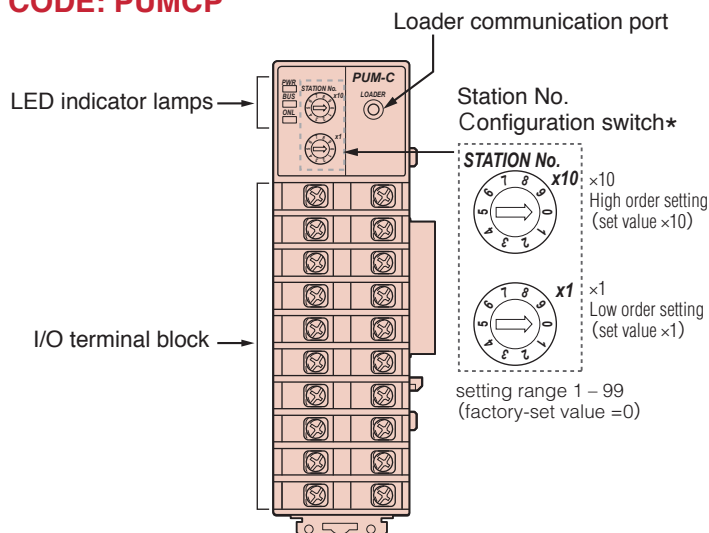


**LED Indicator** Six LED lamps indicate the following operational conditions

| LED | LED Status    | Color  | Operational condition                                                 |
|-----|---------------|--------|-----------------------------------------------------------------------|
| PWR | Illuminated   | green  | RUN                                                                   |
|     | Slow Blinking | green  | No communications with any modules (inter-module communication FAULT) |
|     | Fast Blinking | green  | Executing initial polling Waiting communication during 1:N connection |
|     | Illuminated   | red    | No communication with PLC (inter-PLC communication FAULT)             |
|     | Blinking      | red    | System FAULT *1                                                       |
| BUS | Illuminated   | green  | Inter-module communication being received                             |
|     | Illuminated   | orange | Inter-module communication being sent                                 |
| RX1 | Illuminated   | green  | RS-232C/RS-485 being received                                         |
| TX1 | Illuminated   | orange | RS-232C/RS-422/RS-485 being sent                                      |
| RX2 | Illuminated   | green  | RS-422 being received                                                 |
| TX2 | —             | —      | (Unused)                                                              |

\*Note 1: Sources of system faults: EEPROM FAULT, Station No. configuration SW FAULT, DIP SW FAULT

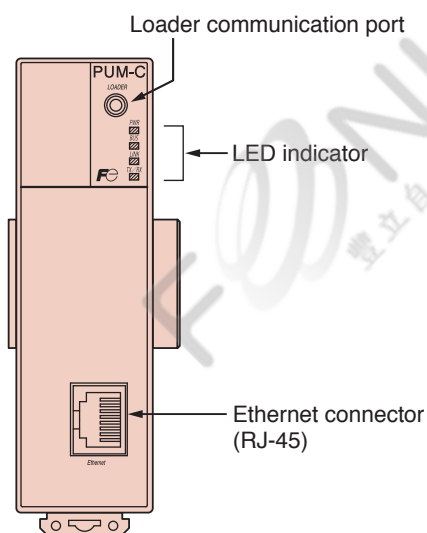
## CODE: PUMCP



**LEDIndicator** Three LED lamps indicate the following operational conditions

| LED | LED Status    | Color  | Operational condition                                                    |
|-----|---------------|--------|--------------------------------------------------------------------------|
| PWR | Illuminated   | green  | Normal operation                                                         |
|     | Slow Blinking | green  | Waiting initial polling                                                  |
|     | Fast Blinking | green  | During initial polling                                                   |
|     | Illuminated   | red    | PROFIBUS Error                                                           |
|     | Slow Blinking | red    | Parameter/SW setting registered on communication module is invalid value |
|     | Fast Blinking | red    | All of temperature control modules dropped out                           |
| BUS | Illuminated   | green  | Inter-module communication being sent                                    |
|     | Illuminated   | orange | Inter-module communication being received                                |
| ONL | Illuminated   | green  | During PROFIBUS communication                                            |
|     | Blinking      | green  | PROFIBUS communication is in a standby state                             |

## CODE: PUMCE



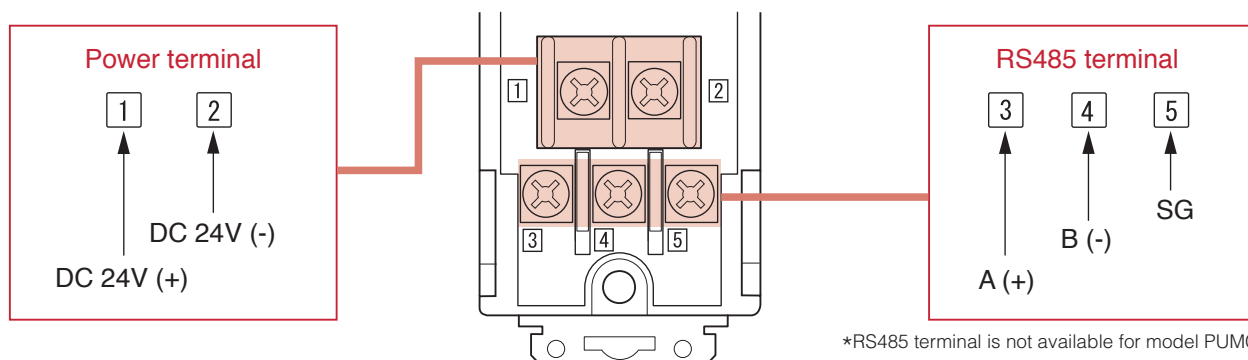
**LEDIndicator** LED lamps indicate the following operational conditions

| LED   | LED Status     | Color  | Operational condition                                                |
|-------|----------------|--------|----------------------------------------------------------------------|
| PWR   | Illuminated    | green  | RUN                                                                  |
|       | Blinking (1Hz) | green  | No communication with any modules (inter-module communication FAULT) |
|       | Blinking (2Hz) | green  | Performing initial polling with PUM                                  |
|       | Illuminated    | red    | System FAULT, or abnormal connection with Micrex-SX                  |
|       | Blinking (1Hz) | red    | Set value for parameter or switch is invalid                         |
|       | Blinking (2Hz) | red    | No communication with PUM                                            |
| BUS   | Illuminated    | green  | Inter-module communication (receiving)                               |
|       | Illuminated    | orange | Inter-module communication (transmitting)                            |
| LINK  | Illuminated    | green  | Normal Ethernet communication link                                   |
| TX/RX | Illuminated    | orange | Ethernet communication data receiving or transmitting                |

## WIRING

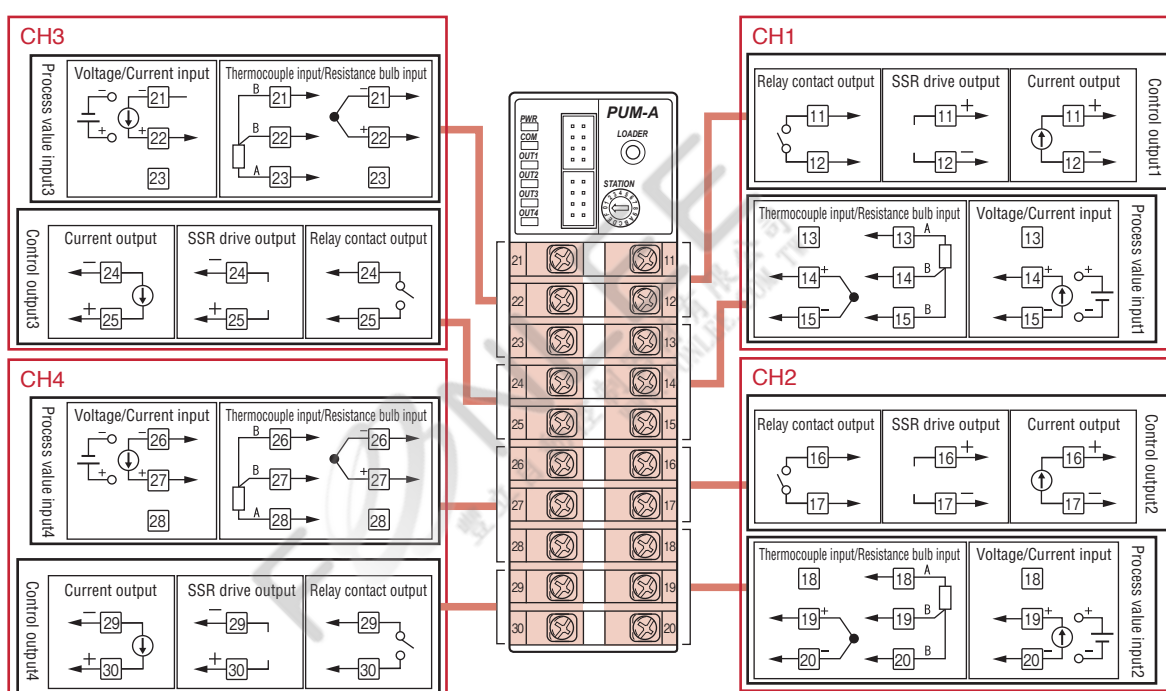
### Base part

CODE: PUMA/B/E/V/N/T/C COMMON

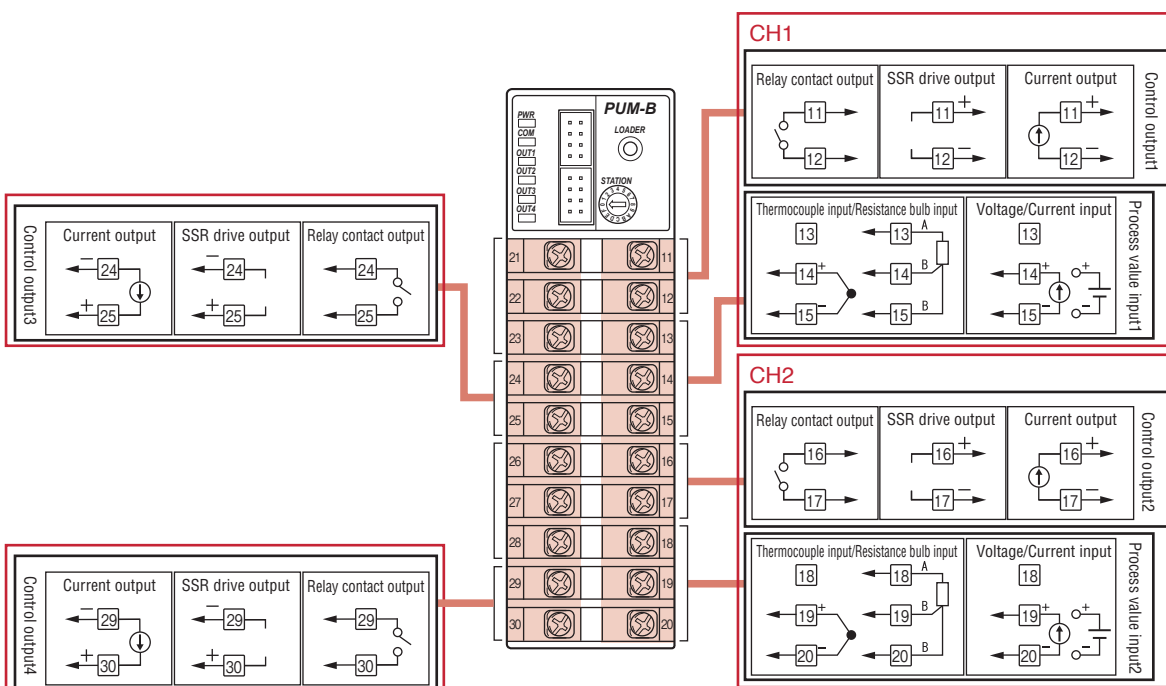


### Front terminal block

CODE: PUMA

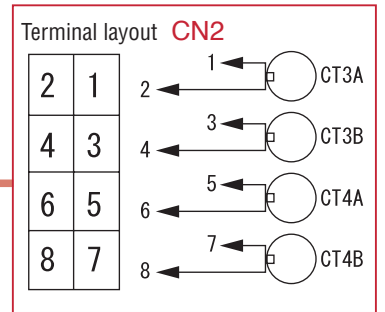
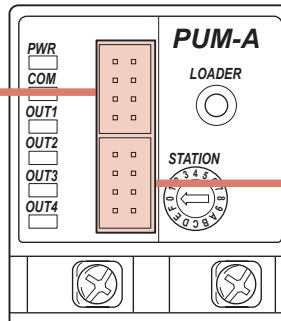
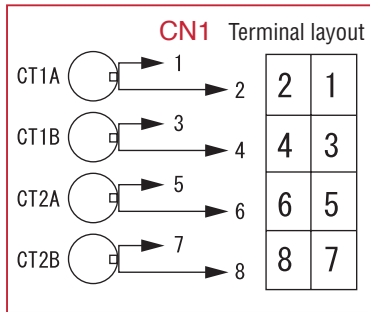


CODE: PUMB

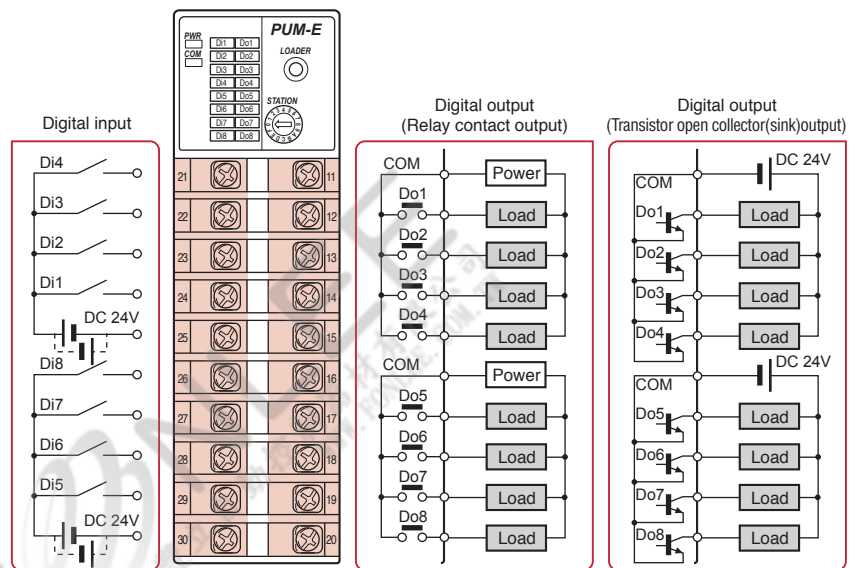


PUMA/B COMMON

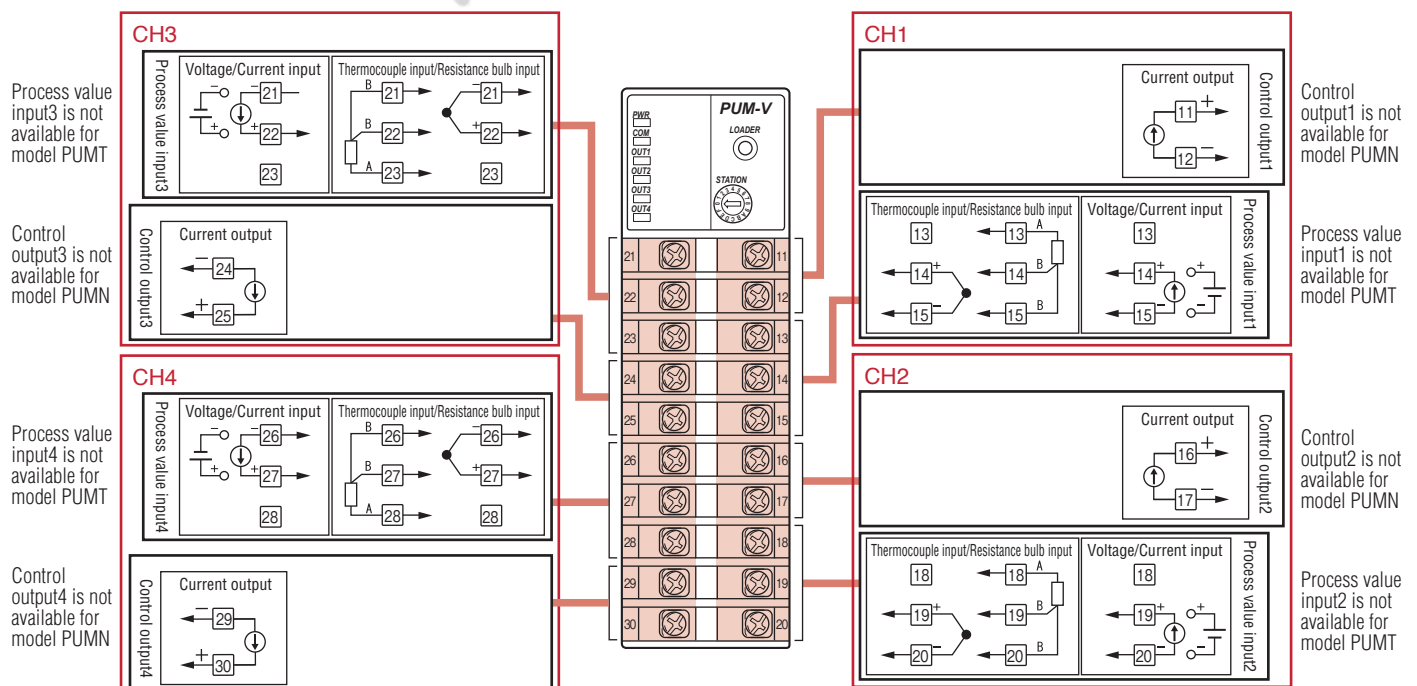
\* Pin No. 2,4,6,8 of CN1 and CN2 are connected inside the equipment.  
\* CN2 cannot be used for PUMB



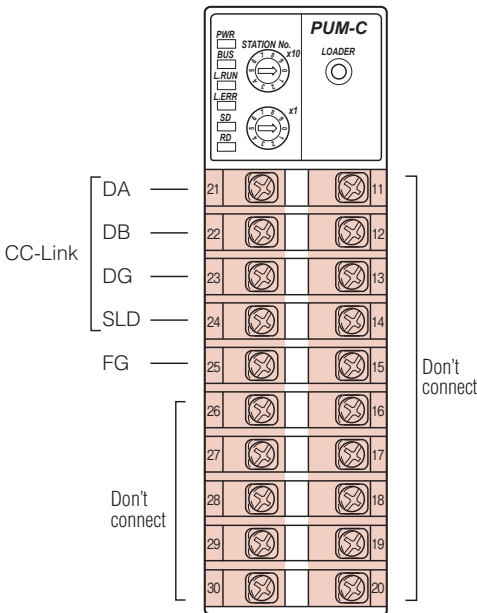
CODE: PUME



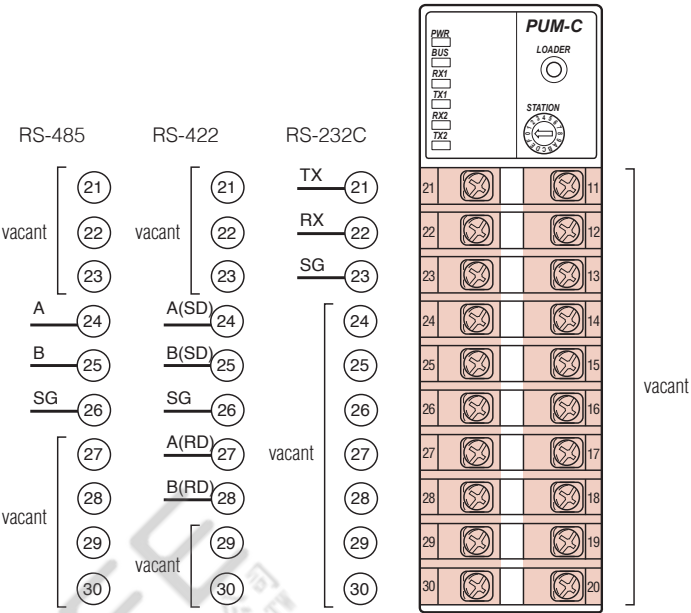
CODE: PUMV/N/T



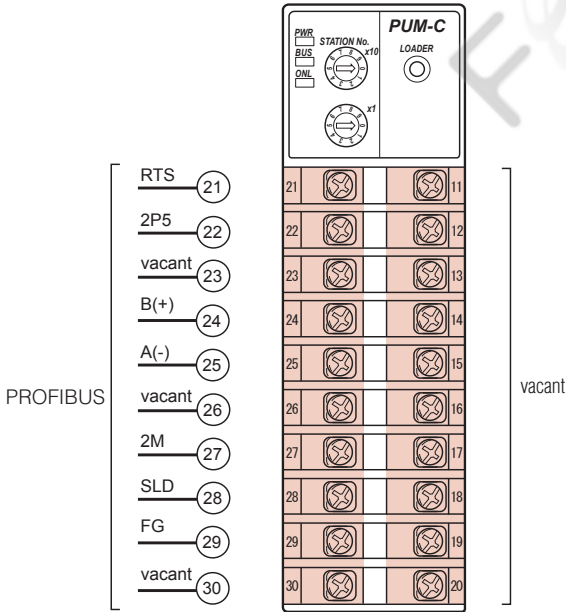
CODE: PUMCL



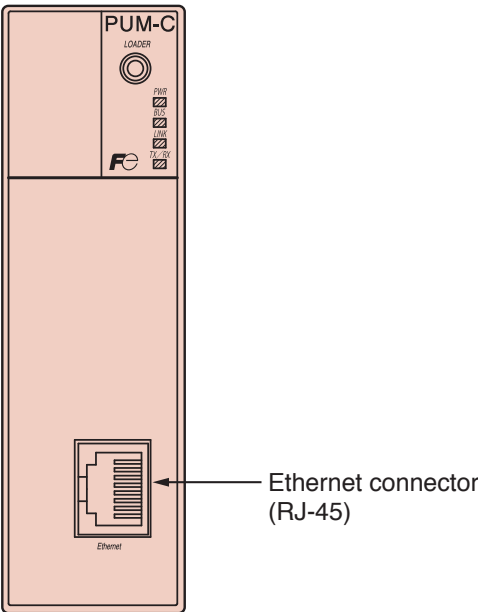
CODE: PUMCM



CODE: PUMCP



CODE: PUMCE



## CODE SYMBOLS

### Control module (4channels)

| Digit | Description           | 4                                                                                                                                               | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|-------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|----|----|----|----|
| 4     | <Module type>         | 4ch control module                                                                                                                              | A |   |   |   |   |    |    |    |    |
| 5     | <Input type>          | Thermocouple /Resistance bulb (all channels)<br>Voltage/current (all channels)<br>Thermocouple/Resistance bulb (ch1,2), voltage/current (ch3,4) | T | A | C |   |   |    |    |    |    |
| 6     | <OUT1, 2 output type> | Relay output<br>SSR drive output<br>Note 1 Current output (4 to 20mA)                                                                           |   |   | A | C | E |    |    |    |    |
| 7     | <OUT3, 4 output type> | Relay output<br>SSR drive output<br>Note 1 Current output (4 to 20mA)                                                                           |   |   | A | C | E |    |    |    |    |
| 8     | <Version No.>         |                                                                                                                                                 |   |   |   | 1 |   |    |    |    |    |
| 10    | <Operation Manual>    | Japanese<br>English                                                                                                                             |   |   |   |   |   | A  | B  |    |    |
| 11    | <Option>              | Not fitted<br>Note 2 CT input (8 points)                                                                                                        |   |   |   |   |   |    |    | Y  | C  |

Note1) It is impossible to combine "C" in the 11th digits

Note2) It is possible to combine "E" in the 6th/7th digits

### Control module (2channels)

| Digit | Description           | 4                                                                             | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|-------|-----------------------|-------------------------------------------------------------------------------|---|---|---|---|---|----|----|----|----|
| 4     | <Module type>         | 2ch control module                                                            | B |   |   |   |   |    |    |    |    |
| 5     | <Input type>          | Thermocouple/Resistance bulb (all channels)<br>Voltage/current (all channels) | T | A |   |   |   |    |    |    |    |
| 6     | <OUT1, 2 output type> | Relay output<br>SSR drive output<br>Note 1 Current output (4 to 20mA)         |   |   | A | C | E |    |    |    |    |
| 7     | <OUT3, 4 output type> | None<br>Relay output<br>SSR drive output<br>Note 3 Current output (4 to 20mA) |   |   | Y | A | C | E  |    |    |    |
| 8     | <Version No.>         |                                                                               |   |   |   | 1 |   |    |    |    |    |
| 10    | <Operation Manual>    | Japanese<br>English                                                           |   |   |   |   |   | A  | B  |    |    |
| 11    | <Option>              | Not fitted<br>Note 4 CT input (4 points)                                      |   |   |   |   |   |    |    | Y  | C  |

Note1) It is impossible to combine "C" in the 11th digits

Note2) You need OUT3/OUT4 for the heating/cooling control

Note3) You need to set the current output to use transfer output

Note4) It is impossible to combine "E" in the 6th digits

### Event input/output module

| Digit | Description        | 4                                                               | 5 | 6 | 7 | 8 | 9 | 10 |
|-------|--------------------|-----------------------------------------------------------------|---|---|---|---|---|----|
| 4     | <Module type>      | Event input/output module (Di 8 points/ Do 8 points)            | E |   |   |   |   |    |
| 5     | <Input type>       | Transistor open collector (sink) output<br>Relay contact output | C | R |   |   |   |    |
| 8     | <Version No.>      |                                                                 |   |   |   | 1 |   |    |
| 10    | <Operation Manual> | Japanese<br>English                                             |   |   |   |   | A | B  |

### Input/output analog module

| Digit | Description           | 4                                                                                                                                                                                                                           | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|-------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|----|----|----|----|
| 4     | <Module type>         | analog input/output module AI4/AO4<br>analog input module AI4<br>analog output module AO4                                                                                                                                   | V | N | T |   |   |    |    |    |    |
| 5     | <Input type>          | Note 1 Input: Thermocouple /Resistance bulb (all channels)<br>Note 1 Input: Voltage/current (all channels)<br>Note 1 Input: Thermocouple /Resistance bulb (ch1,2)<br>Voltage/current (ch3,4)<br>Note 2 Analog output module | T | A | C |   |   |    |    |    |    |
| 6     | <OUT1, 2 output type> | Note 3 None<br>Note4 Current output (4 to 20mA)                                                                                                                                                                             |   |   | Y | E |   |    |    |    |    |
| 7     | <OUT3, 4 output type> | Note3 None<br>Note4 Current output (4 to 20mA)                                                                                                                                                                              |   |   | Y | E |   |    |    |    |    |
| 8     | <Version No.>         |                                                                                                                                                                                                                             |   |   |   | 1 |   |    |    |    |    |
| 10    | <Operation Manual>    | Japanese<br>English                                                                                                                                                                                                         |   |   |   |   |   | A  | B  |    |    |

Note1) You can select only "V, N" in the 4th

Note2) You can select only "T" in the 4th

Note3) You can select only "N" in the 4th

Note4) You can select only "V, T" in the 4th

## Enhanced communication module

| Digit         | Description                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <Module type> | enhanced communication modul                                                                                            | <b>PUM</b> <span style="border: 1px solid black; padding: 0 2px;">4</span> <span style="border: 1px solid black; padding: 0 2px;">5</span> <span style="border: 1px solid black; padding: 0 2px;">6</span> <span style="border: 1px solid black; padding: 0 2px;">7</span> <span style="border: 1px solid black; padding: 0 2px;">8</span> <span style="border: 1px solid black; padding: 0 2px;">9</span> <span style="border: 1px solid black; padding: 0 2px;">10</span> |
| 4             | <Communication module>                                                                                                  | <b>C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5             | CC-Link communication<br>MITSUBISHI –PLC Program-less communication<br>PROFIBUS communication<br>Ethernet communication | <b>L</b><br><b>M</b><br><b>P</b><br><b>E</b>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 8             | <Version No.>                                                                                                           | <b>1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 10            | <Operation Manual>                                                                                                      | <b>A</b><br><b>B</b><br><b>C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            |

## Accessories

| Digit | Description                                              |                                                                                                                                                                                                               |
|-------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6     | RS485 terminating resistance                             | <b>PUMZ *</b> <span style="border: 1px solid black; padding: 0 2px;">6</span> <span style="border: 1px solid black; padding: 0 2px;">7</span> <span style="border: 1px solid black; padding: 0 2px;">8</span> |
| 7     | Note1 DIN rail mounting end plate                        | <b>A 0 1</b>                                                                                                                                                                                                  |
| 8     | Note1 Side connecting terminal cover (right & left 1set) | <b>A 0 2</b>                                                                                                                                                                                                  |
|       | Note1 Front face screw terminal cover                    | <b>A 0 3</b>                                                                                                                                                                                                  |
|       | Note2 Loader connecting cable (RS232C)                   | <b>A 0 4</b>                                                                                                                                                                                                  |
|       | Note3,4 CT input terminal cable (for 4 points) (l=1m)    | <b>L 0 1</b>                                                                                                                                                                                                  |
|       | Note3,4 CT input terminal cable (for 4 points) (l=3m)    | <b>C 0 1</b>                                                                                                                                                                                                  |
|       | Note3,4 CT input terminal cable (for 4 points) (l=5m)    | <b>C 0 3</b>                                                                                                                                                                                                  |
|       | CT for 1 to 30A (CTL-6-S-H)                              | <b>C 0 5</b>                                                                                                                                                                                                  |
|       | CT for 20 to 50A (CTL-12-S36-8)                          | <b>C T 1</b>                                                                                                                                                                                                  |
|       |                                                          | <b>C T 2</b>                                                                                                                                                                                                  |

Note1) Only 10 unit for your order

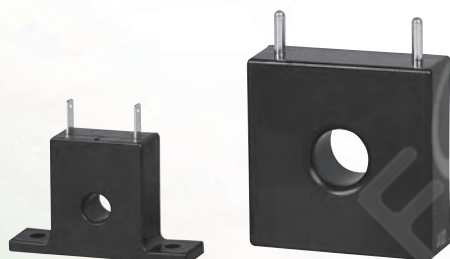
Note2) It is necessary for using USB port to repairer the "USB-Serial" convert

Note3) A single CT input cable is for 3-phase and 2channels (CT 4 points) or single-phase and 2 channels (CT 2 points)

Note4) Connection of the cable to CT sensor should be arranged by user

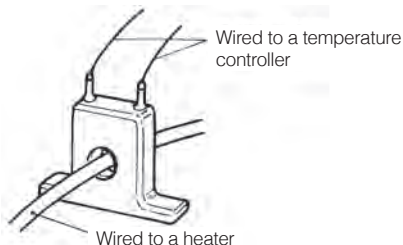
## ACCESSORIES

### Heater current detector (CT)



#### General specification

|                      | For 1 to 30A | For 20 to 50A |
|----------------------|--------------|---------------|
| Type                 | CTL-6-S-H    | CTL-12-S36-8  |
| Dimension (H×W×D mm) | 25×40×10     | 40×40×15      |
| Through-bore (mm)    | φ5.8         | φ12           |



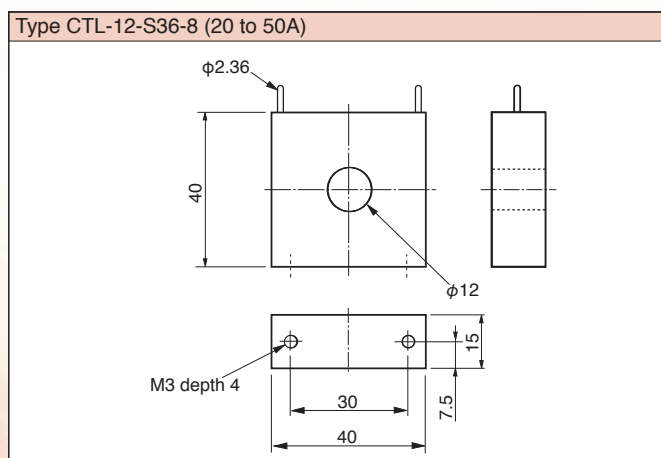
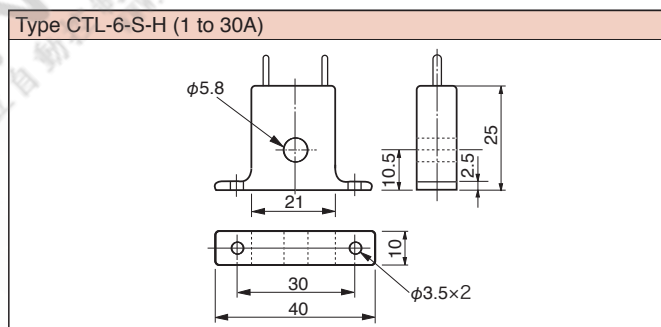
Put a wire through the hole of a dedicated CT  
There is no polarity in wiring from a CT to a temperature controller

- Set the "Current at alarm action point" according to the heater to be used.  
Ex.) In the case of parallel use of 2 heaters with 2,000W/115V, if tried to detect heater break of one of them: Rated current = 34.8A In the case of one heater break; Current = 17.4A  
Set the "Alarm action point" to "26.1A", which is between the rated current and broken state.

(Note) Set the "alarm action point" of over 15% of the rated current. Detection of "alarm action point" less than 15% may not be performed correctly.

- This cannot be used when the heater is controlled by thyristor phase angle control system.

#### Outline Diagram (unit:mm)



## PERIPHERAL INSTRUMENTS

### ●Programmable Operation Display

| Name                     | type    | specification      |                                                               |             |
|--------------------------|---------|--------------------|---------------------------------------------------------------|-------------|
| <b>V815</b><br>15.0inch  | V815iX  | TFT Color LCD      | Built-in LAN / video · RGB · sound unit compatible (optional) | 100-240V AC |
|                          | V815iXD | XGA                | Built-in LAN / video · RGB · sound unit compatible (optional) | 24V DC      |
| <b>V812</b><br>12.1inch  | V812S   | TFT Color LCD      |                                                               | 100-240V AC |
|                          | V812iS  | SVGA               | Built-in LAN / video · RGB · sound unit compatible (optional) |             |
|                          | V812SD  |                    |                                                               | 24V DC      |
|                          | V812iSD |                    | Built-in LAN / video · RGB · sound unit compatible (optional) |             |
| <b>V810</b><br>10.4 inch | V810S   | TFT Color LCD      |                                                               | 100-240V AC |
|                          | V810iS  | SVGA               | Built-in LAN / video · RGB · sound unit compatible (optional) |             |
|                          | V810SD  |                    |                                                               | 24V DC      |
|                          | V810iSD |                    | Built-in LAN / video · RGB · sound unit compatible (optional) |             |
|                          | V810T   | TFT Color LCD      |                                                               | 100-240V AC |
|                          | V810iT  | VGA                | Built-in LAN / video · RGB · sound unit compatible (optional) |             |
|                          | V810TD  |                    |                                                               | 24V DC      |
|                          | V810iTD |                    | Built-in LAN / video · RGB · sound unit compatible (optional) |             |
|                          | V810C   |                    |                                                               | 100-240V AC |
|                          | V810iC  |                    | Built-in LAN                                                  |             |
|                          | V810CD  |                    |                                                               | 24V DC      |
|                          | V810iCD |                    | Built-in LAN                                                  |             |
| <b>V808</b><br>8.4inch   | V808SD  | TFT Color LCD      |                                                               | 24V DC      |
|                          | V808iSD | SVGA               | Built-in LAN / video · RGB · sound unit compatible (optional) |             |
|                          | V808CD  | TFT Color LCD      |                                                               |             |
|                          | V808iCD | VGA                | Built-in LAN                                                  |             |
| <b>V806</b><br>5.7inch   | V806TD  | TFT Color LCD      |                                                               |             |
|                          | V806iTD | QVGA               | Built-in LAN                                                  |             |
|                          | V806CD  | STN Color LCD      |                                                               |             |
|                          | V806iCD | QVGA               | Built-in LAN                                                  |             |
|                          | V806MD  | STN monochrome LCD |                                                               |             |
|                          | V806iMD | QVGA               | Built-in LAN                                                  |             |

### ●Automation software CITECT SCADA

PAT 4 5 6 7 8 — 9 10 11 12 13 14

PAT     3 1 1 — Y Y Y Y Y Y — Y

| digit |                       | specification                 | type code |
|-------|-----------------------|-------------------------------|-----------|
| 4     | <type of license key> | software (no license key)     | YY        |
| 5     | <I/O points>          | full license key 75points     | FA        |
|       |                       | full license key 150points    | FB        |
|       |                       | full license key 500points    | FC        |
|       |                       | full license key 1,500points  | FD        |
|       |                       | full license key 5,000points  | FE        |
|       |                       | full license key 15,000points | FF        |
|       |                       | full license key Unrestricted | FM        |

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