

PUM Series

# Multi-loop module type Temperature controller

**Smart!**

- Optimum multiple-zone control
- Heater break alarm CT (8 points)
- Program-less host communication

**User friendly!**

- Detachable terminal
- Simple loader operation

**Fast!**

- High-speed data communication (230.4kbps)
- High-speed data sampling



Fuji Electric Co., Ltd.

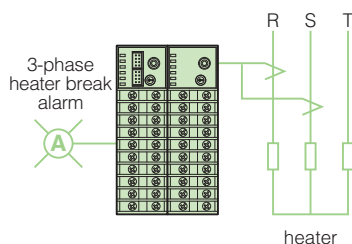
ECNO:1162b

## FEATURES

### Smart!

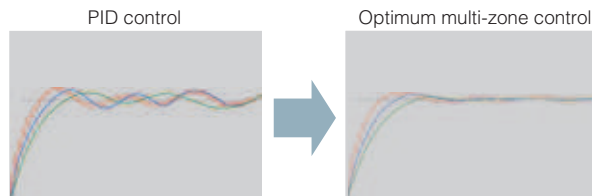
#### Heater break alarm CT (8 points)

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



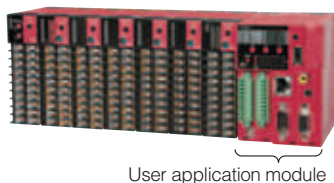
#### Optimum multi-zone control

Our original algorithm maintains stable and highly precise temperature control in multiple zones where interference is unavoidable.



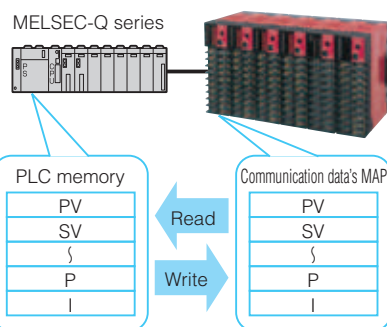
#### User application module

This is a module to be able to execute an optimum multiple-zone control engine, two-dimensional optimum control engine, and other user applications on an universal OS (Linux) by connecting to the PUM. This module is equipped with USB (host), SD card I/F, Ethernet, and Video/audio output as an external interface.



#### Programless communication with upper device

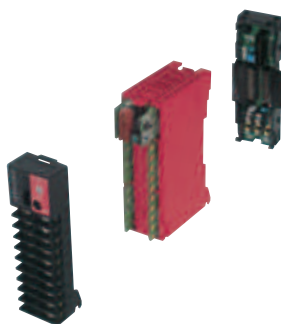
High-speed communication is possible because it is only assigned important data.



### User friendly!

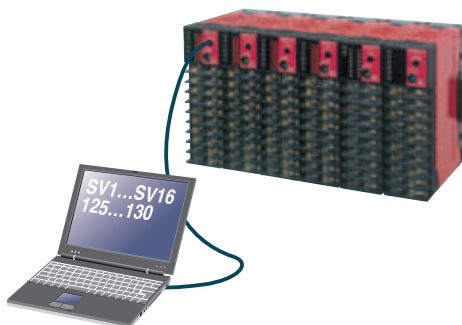
#### Detachable terminal structure

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

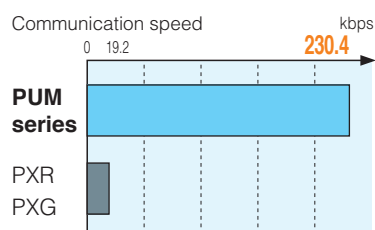
It is easy to attach the DIN rail by backside lock-tab. The backside lock-tab can connect each multi-loop controller.



### Fast!

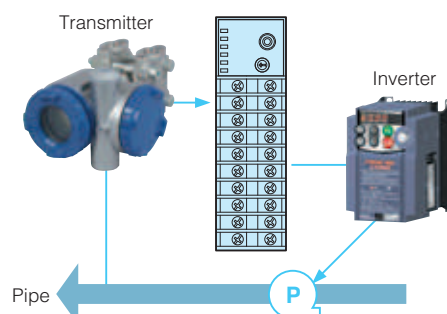
#### High-speed communication with upper device

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



#### High-speed sampling time

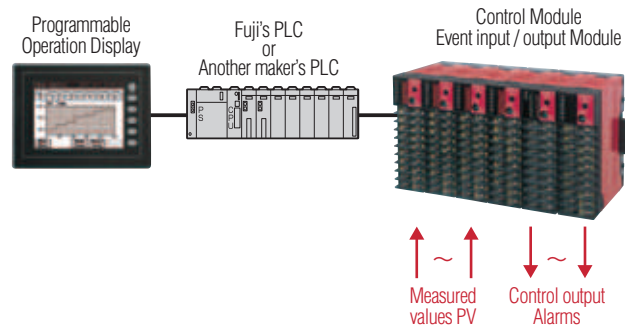
200msec sampling time enable it to apply to not only temperature measurement but also process measurement such as pressure control and flow control, etc.



## APPLICATIONS

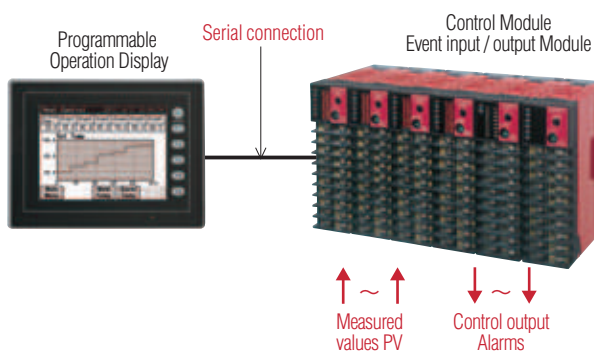
### Case 1 Input/output device of I/O units in programmable logic controller

#### <Separated PLC type>

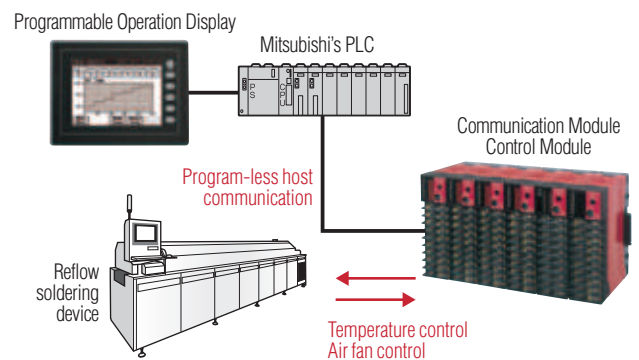


### Case 2 Temperature controller

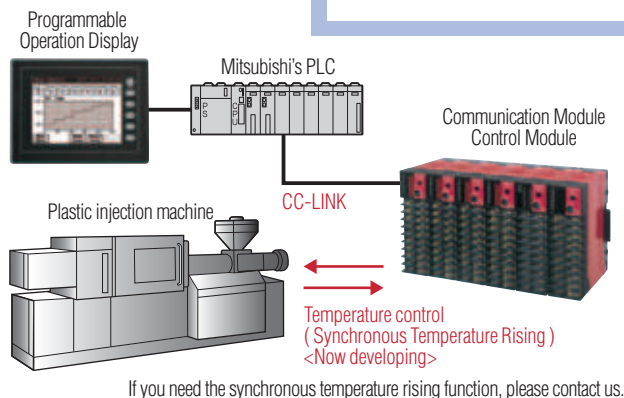
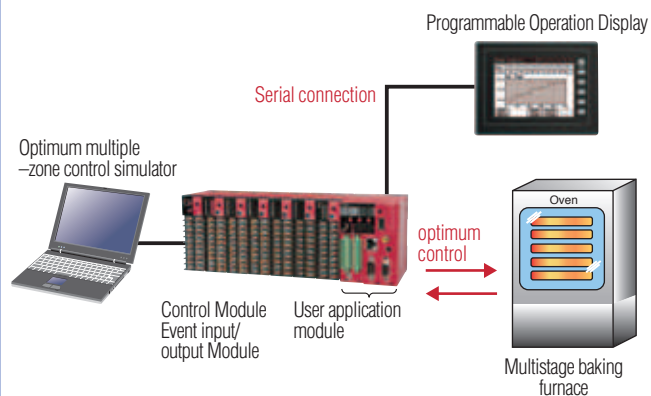
#### <Multi Temperature controllers type>



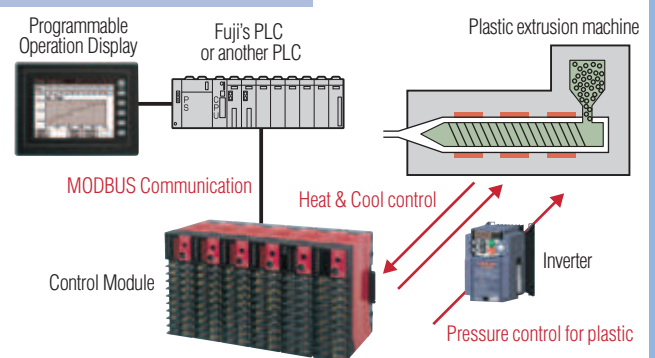
#### <Reflow soldering device>



#### <Flat panel display baking furnace>




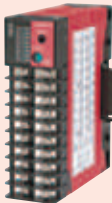






#### <Plastic injection machine>



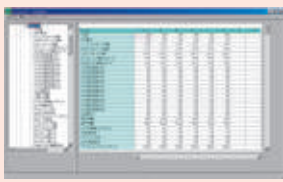




#### <Plastic extrusion machine>



# VARIATIONS

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

	Kind	Type	See page
Communication	<b>PROFINET Commu- nication Module</b> <Now developing>	PUMCE	none
	<b>Features</b> Class B compliant 100BASE-T 2 port switch NRT/IRT-compatible		
High performance	<b>User Application Module</b> <Now developing>	PUML	none
	<b>Features</b> Variety of functions running on an universal OS (Linux) USB (host) , SD card I/F, Ethernet, and Video/audio output are equipped as an external interface		
Support Tools	<b>Programming Loader on Personal computer</b>		9
	<b>Features</b> Easy setting and user friendly		
Peripheral instrument	<b>Programmable Operation Display</b>		10
	<b>Features</b> Easy connect by serial connection		
	<b>Automation Software</b>		10
	<b>Features</b> SCADA software, example		
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>	<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>	29

## Applicable standards

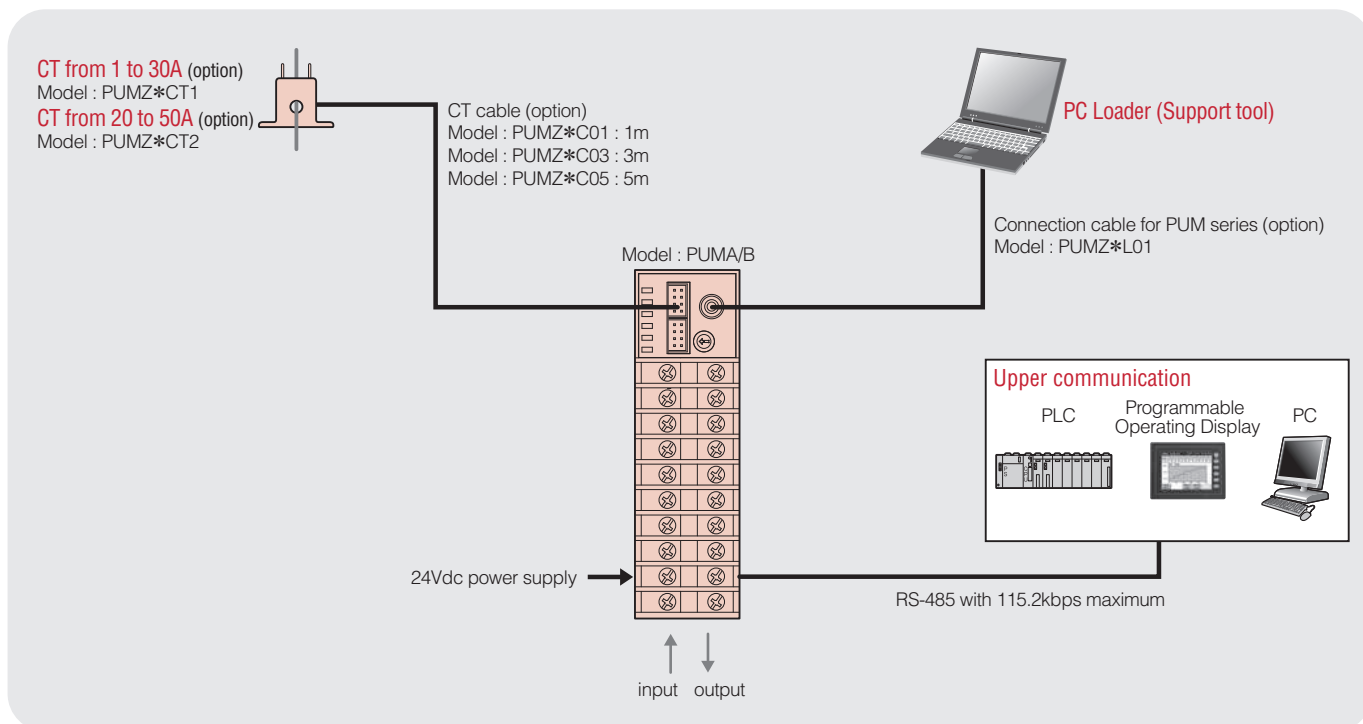
	UL LISTED	CE	RoHS
PUMA/B	△	○	○
PUME	△	○	○
PUMV	△	▲	○
PUMN	△	▲	○
PUMT	△	▲	○
PUMCL	△	▲	○
PUMCM	△	▲	○
PUMCP	—	○	○
PUMCE	—	▲	○
PUML	—	▲	○

○: Compatible, △: Suspended, ▲: Scheduled to acquire, — : Incompatible

## SYSTEM CONSTRUCTION FOR EXAMPLE

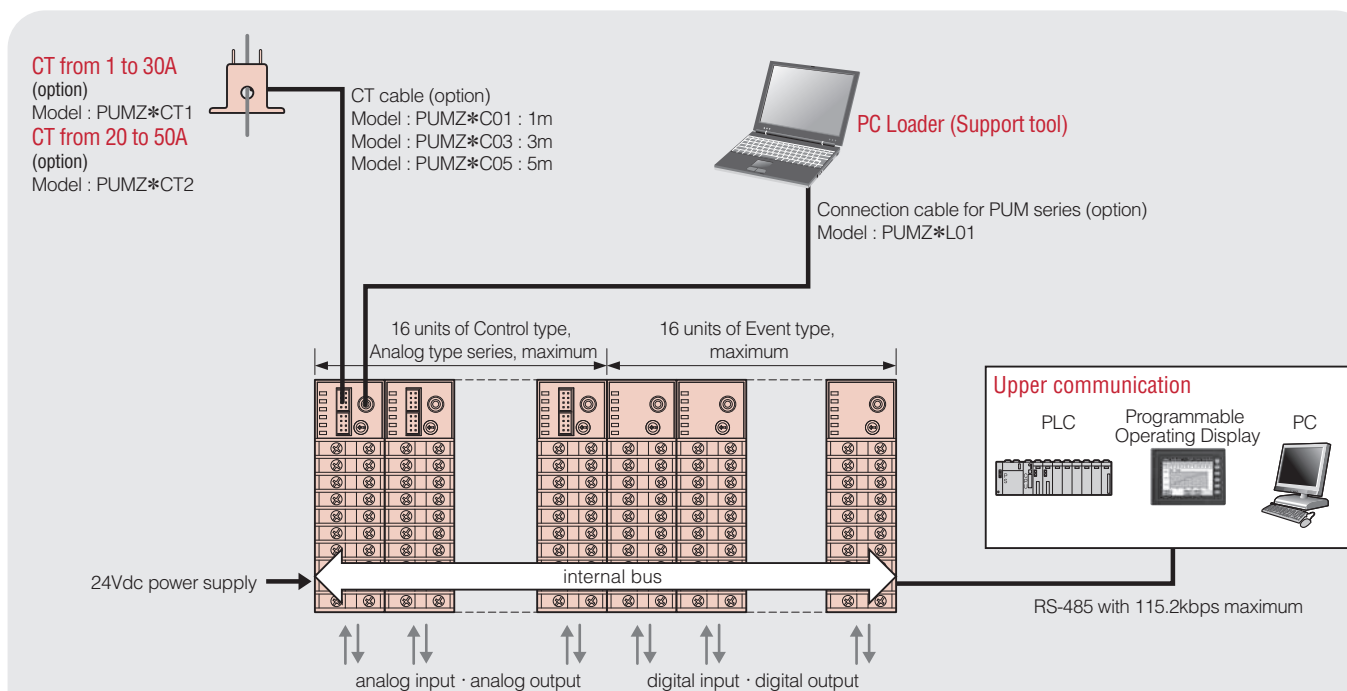
### 1 Basic system (minimum system construction)

- 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.



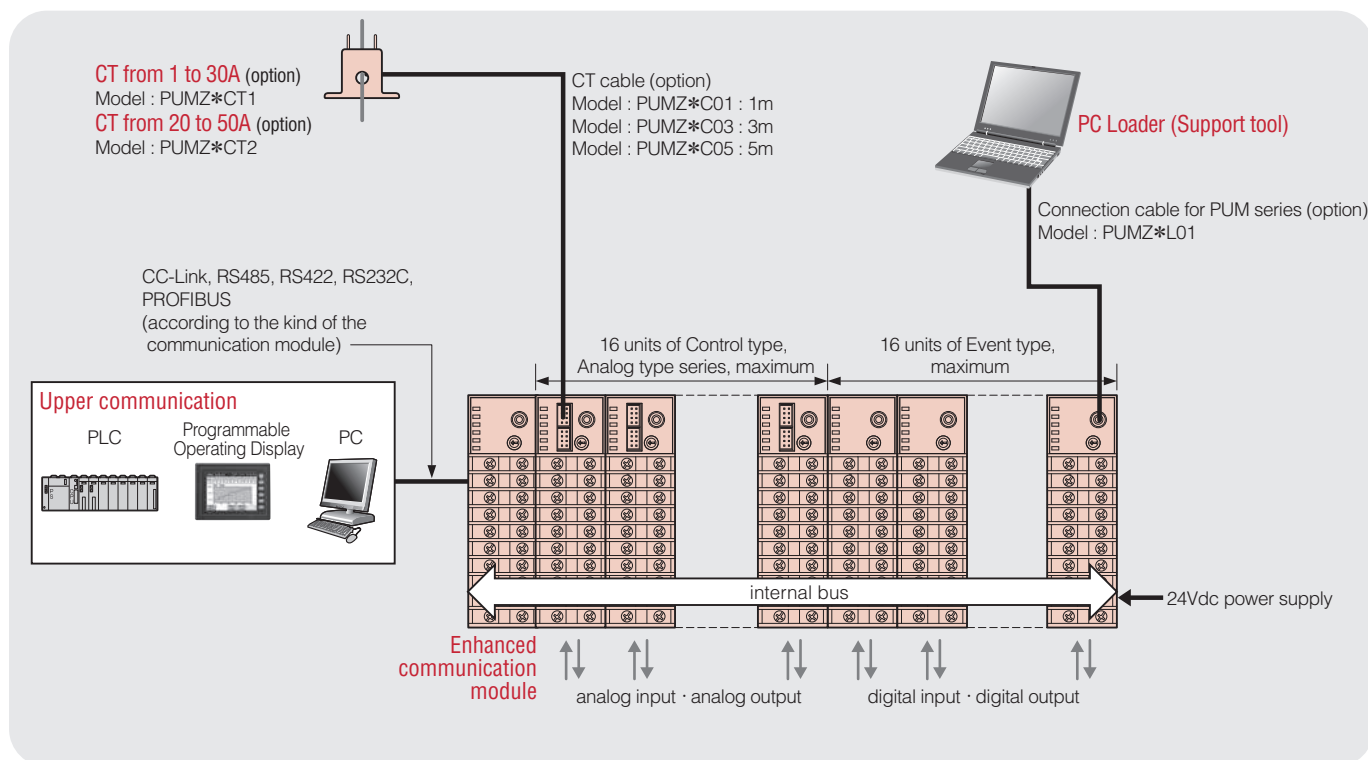
### 2 Basic system (maximum system construction)

- 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.



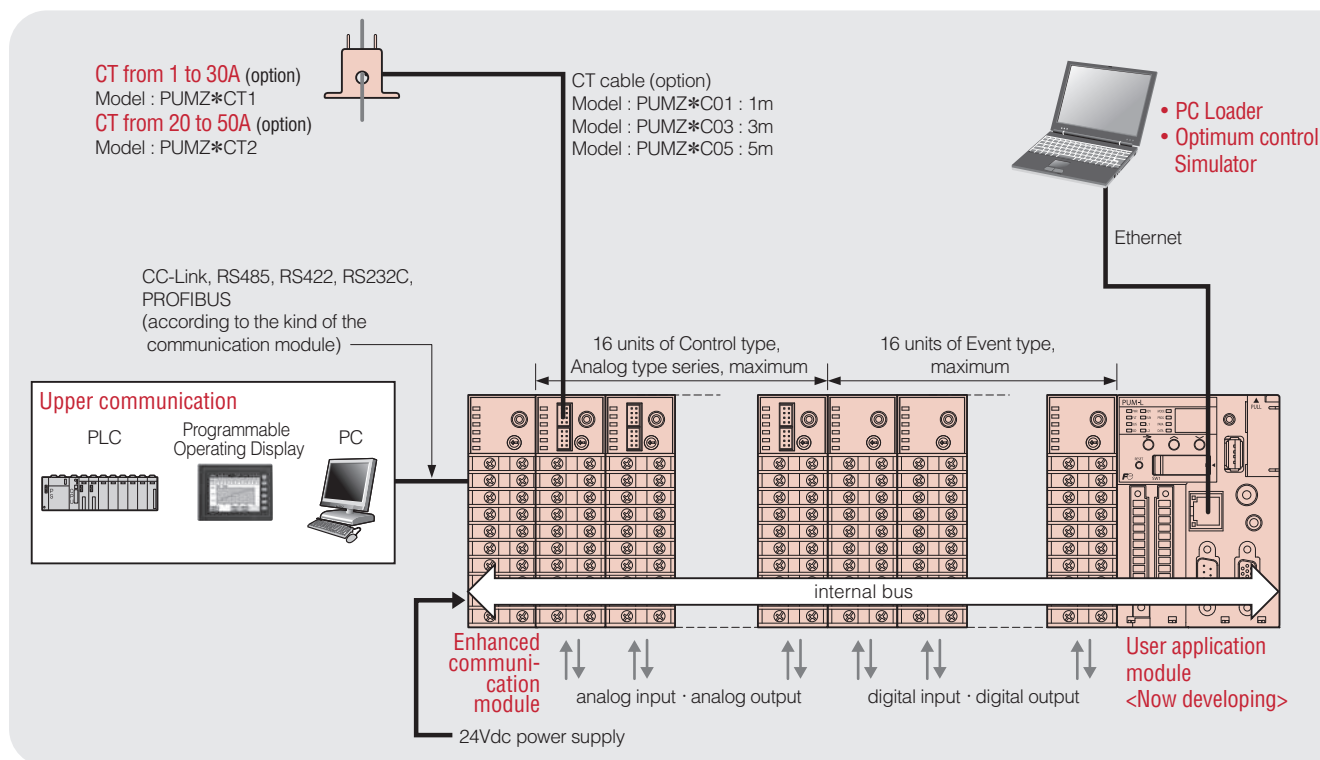
### 3 Enhanced communication type

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



### 4 Optimum control

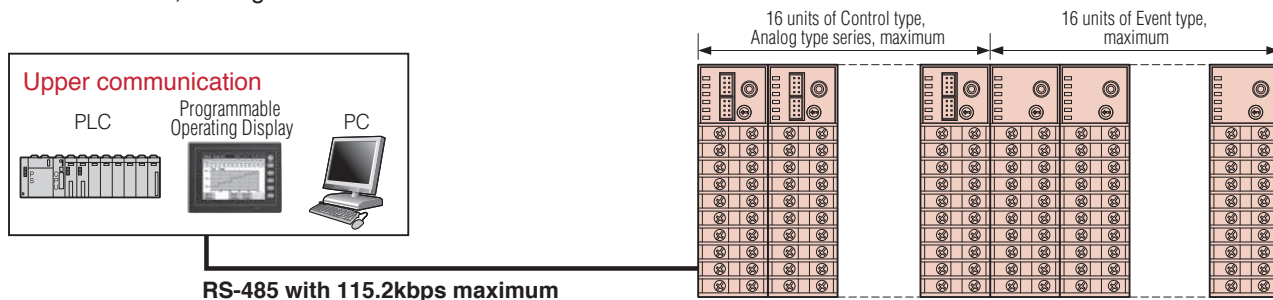
- Performing optimum multiple-zone control or other user applications
- User application module is connected on the extreme right of analog type series and Event type.



## COMMUNICATION MODULE

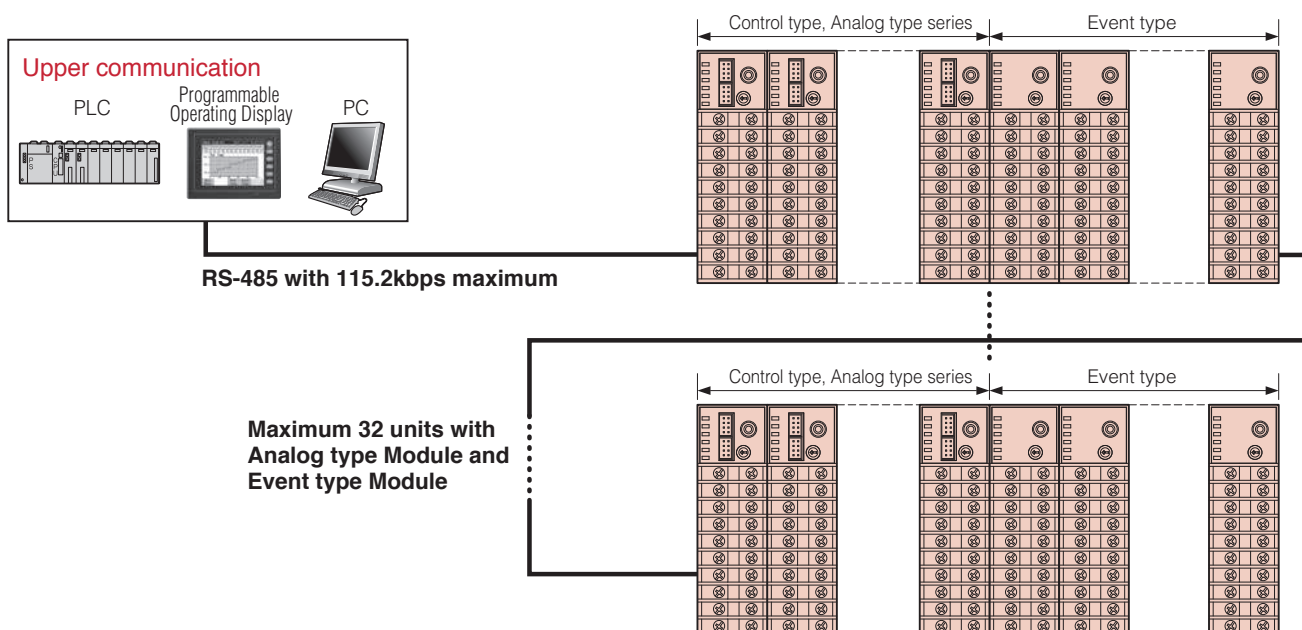
### 1-1 Modbus protocol Communications (lateral connections of a maximum of 16 modules)

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)

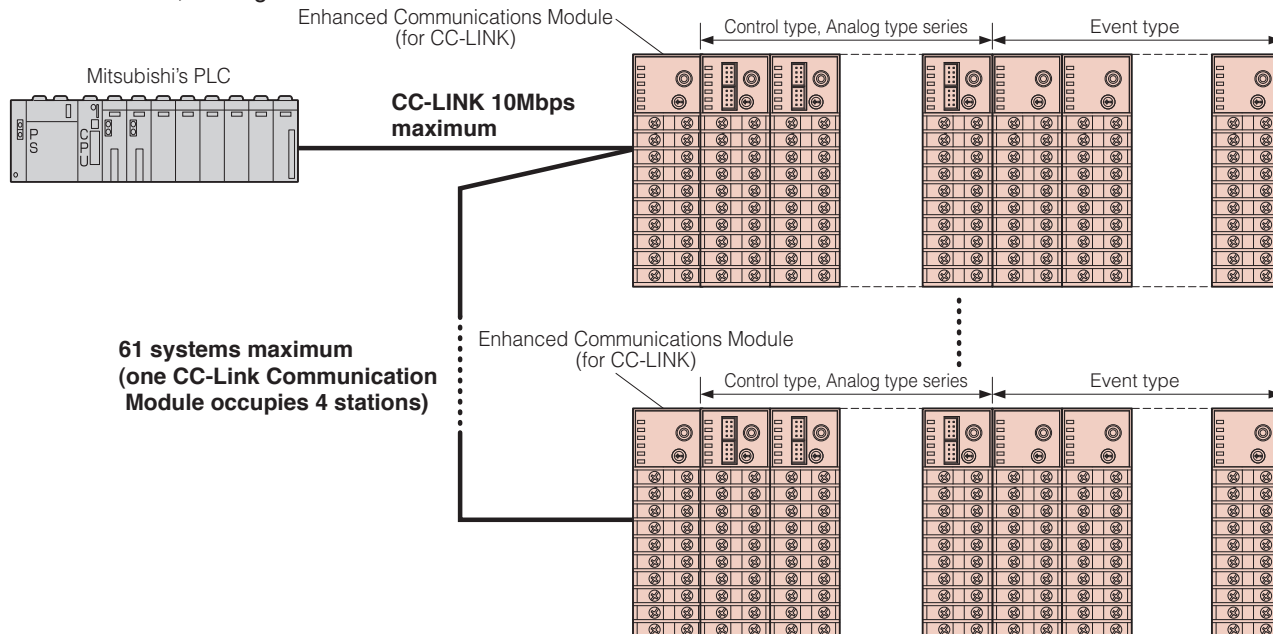
Control Module, Analog I/O Module are 16 units maximum and Event I/O Module are 16 units maximum.



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

Control Module, Analog I/O Module are 64ch maximum

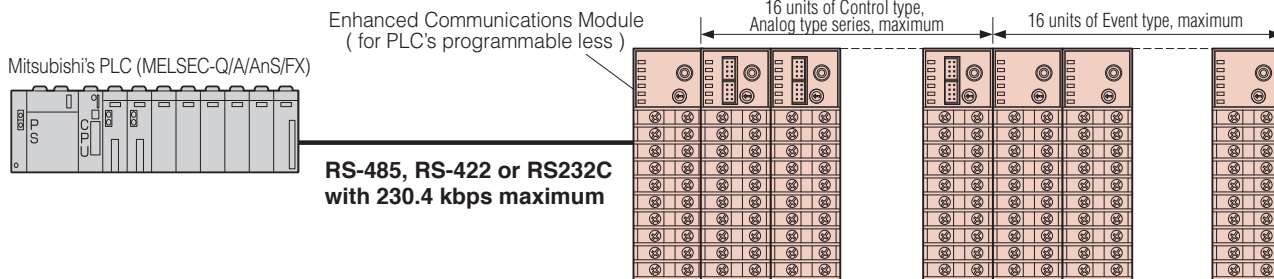
Enhanced Communications Module (for CC-LINK)





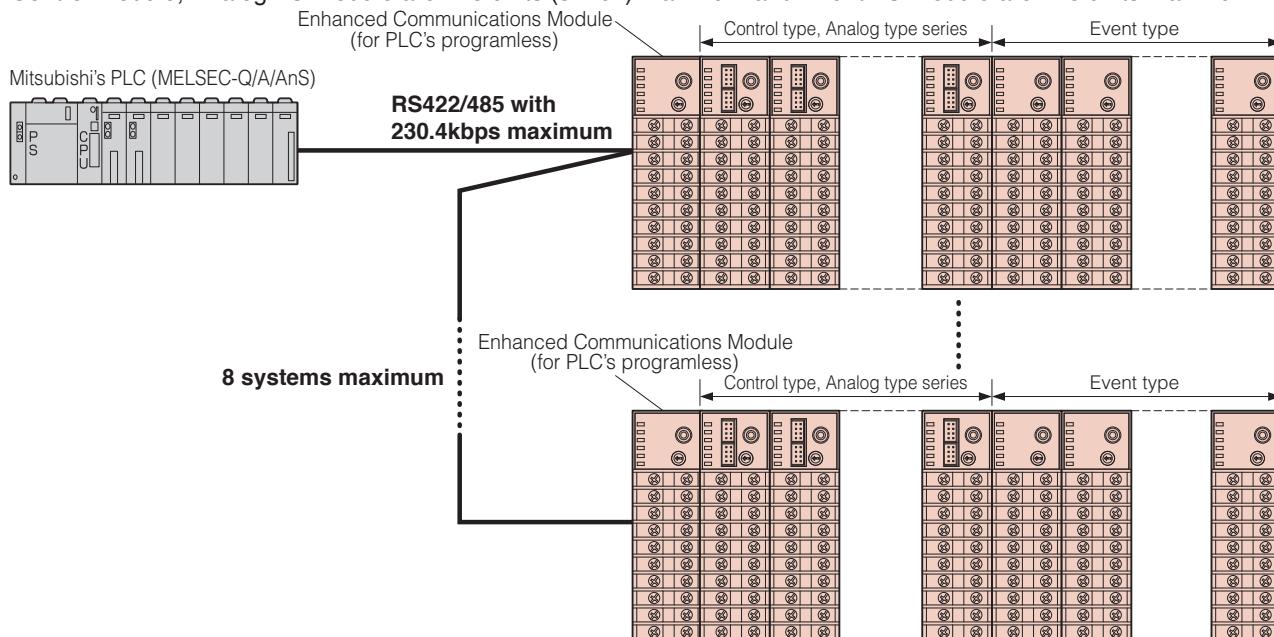
### 3-1 Mitsubishi's PLC with programless communications (Continuance connections by maximum)

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



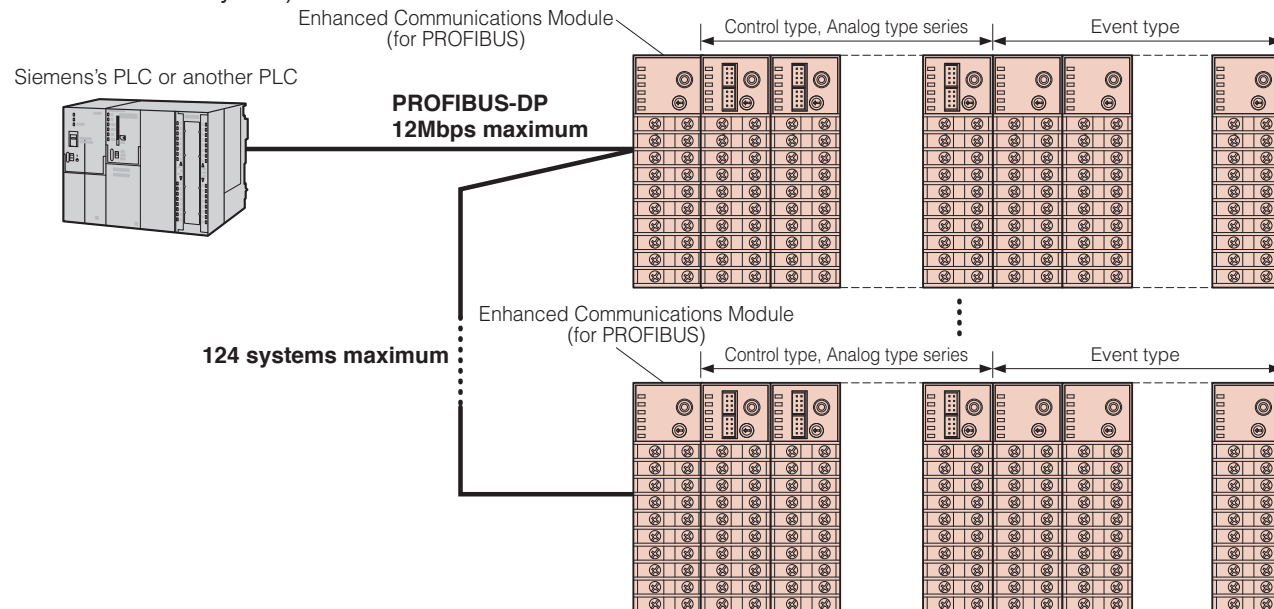
### 3-2 Mitsubishi's PLC with programless communications (distributed allocations)

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)





## 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.fic-net.jp>

#### 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.

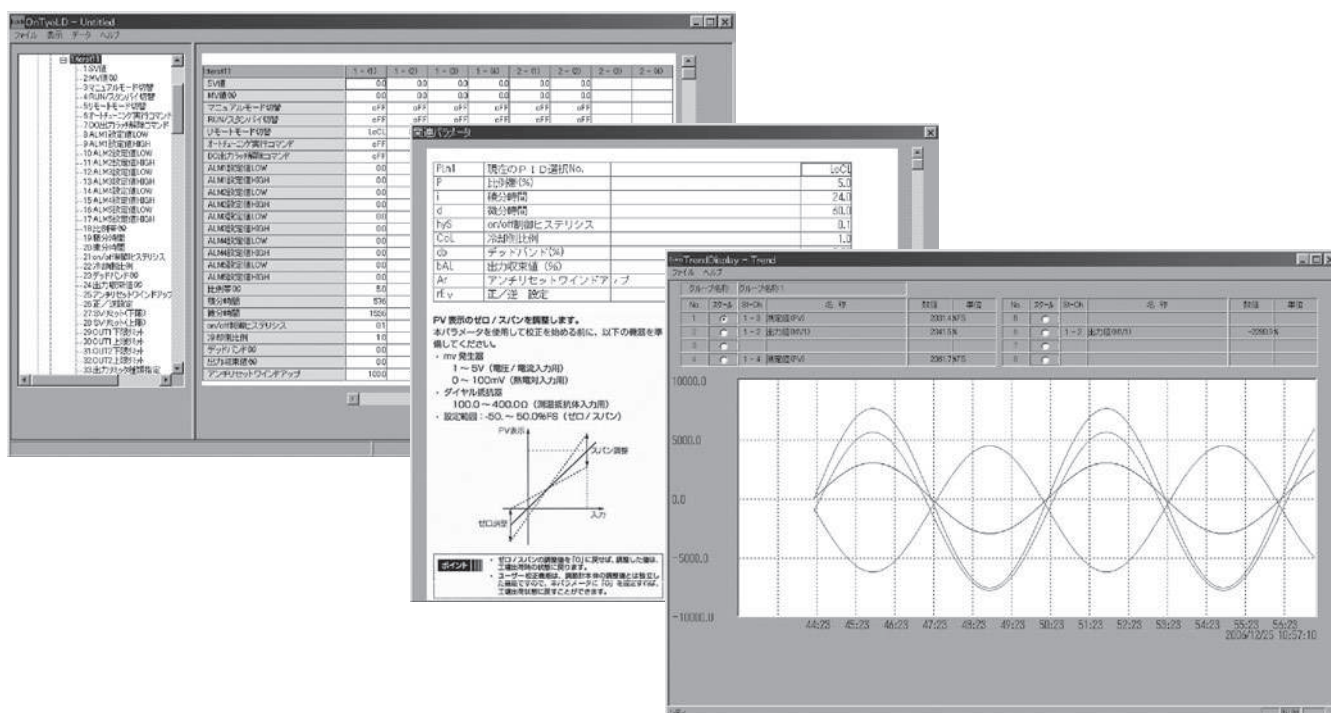
Editing display is tree style, and it is easy to search your parameter needs.

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

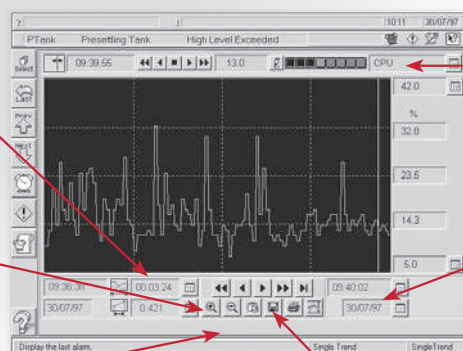
### Trend display

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

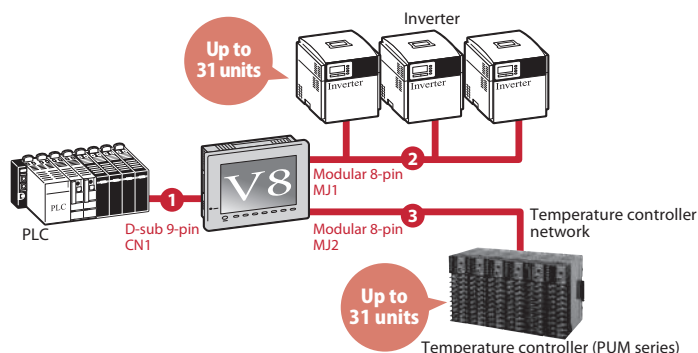
User-friendly component parts and functional switches enable simple and speedy display configuration.

### 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) Group I : Thermocouple Resistance bulb (3-wire): Pt100, JPt100 Group II : DC voltage, current DC0 to 5V, DC1 to 5V, DC0 to 10V, DC2 to 10V DC0 to 20mA, DC4 to 20mA *The power current input is external in 250ohm 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 *Unless B thermocouple 0 to 500 degrees C : $\pm 5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$ R thermocouple 0 to 500 degrees C : $\pm 1\%FS \pm 1\text{digit} \pm 1\text{ degree C}$ T thermocouple -200 to 0 degree C : $\pm 0.5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$ Resistance bulb input : $\pm 0.3\%FS \pm 1\text{digit}$ or $\pm 1\text{ degree C}$ whichever is greater 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 ohm or more Current input : 250 ohm Voltage input : approx. 1M ohm
Influence of signal source resistance	Thermocouple: $\pm 0.3\%FS \pm 1\text{digit}$ / 100 ohm Voltage input : $\pm 0.3\%FS \pm 1\text{digit}$ / 500 ohm
Allowable wiring resistance	Resistance bulb: 10 ohm or less (per wire)
Allowable input voltage	DC voltage input: within $\pm 15V$ Current input: within $\pm 25mA$ Thermocouple/resistance bulb: within $\pm 5V$
Noise rejection ratio	Normal mode: 30dB or more (50/60Hz) Common mode: 120dB or more (50/60Hz) between process value input and earth ground, power supply, output 220Vac, 50/60Hz
Input compensation	a) User adjustment: zero point, span point $\pm 50\%FS$ b) PV shift: $\pm 10\%FS$ 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 1 to 30A: CTL-6-S-H 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 OFF detection: 2 sec. or more
Connection method	Connector for heater break detector [on the front of module]
Insulation	No insulation between channels No insulation with communication port (RS-485, loader) 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) ① Relay contact output - Proportional cycle : 1 to 150 sec. - Contact structure : 1a (SPST) contact - Contact capacity : 220Vac/30Vdc, 3A (resistance load) 220Vac/30Vdc, 1A (inductive load) - Min. switching current: 100mA (24V DC) - Mechanical life: 20,000,000 switching or more (100/min.) - Electric life: 100,000 switching or more (rated load) - Insulation: Basic insulation with any other input/output ② SSR/SSC drive output - Proportional cycle : 1 to 150 sec. - Minimum resolution : 5ms - ON voltage : 10Vdc (8 to 12Vdc) - OFF voltage : 0.5Vdc or less - Max. current : 20mA <sub>dc</sub> (per point) - Load resistance : 500 ohm or more - Insulation : No insulation with any other output (excluding relay output) Functional insulation with others than those above ③ Current output (4 to 20mA <sub>dc</sub> , 0 to 20mA <sub>dc</sub> ) - Actual output range : 0mA to 20.6mA <sub>dc</sub> - 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 - Load resistance : 300 ohm or less - Insulation : No insulation with any other output (excluding relay output) Functional insulation with others than those above
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### Analog re-transmission output

No. of output	2 points (OUT3, OUT4 applied)
Output type	Current output (4 to 20mA <sub>dc</sub> , 0 to 20mA <sub>dc</sub> )
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 (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 Integration time (I): 0 sec to 3200 sec. I=0 : Integration OFF Derivation time (D): 0.0 to 999.9 sec. D=0: Derivation OFF Control cycle: 200ms
Control mode	Mode type: Auto / Manual / Remote Mode switching: Auto ⇄ Manual : balance less / bump less transfer Auto/Manual ⇒ Remote : balance/bump less transfer Auto/Manual ⇄ Remote : balance/bump less transfer

## Alarm function

Alarm type	PV value (Lower/upper limit, absolute / deviation value, range) 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) Detect when output OFF (leakage current detection) (setting can be done separately by point)
Heater current alarm	Detectable current range: 1A to 50A Detected current resolution: 0.1A Setting resolution: 0.1A 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) 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	24Vdc±10%																
Power consumption	Max. 3.2W (135mA) [when 24Vdc 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 (500Vdc)																
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 (1500VAC)=Functional insulation (1000VAC) —Functional insulation (500VAC)																	

## Normal operating condition

Ambient temperature	-10 to 50 degrees C ★ "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)	Pt100ohm	2	0 to 150	0.1
		3	-150 to 300	0.1
		4	-150 to 850	1
Thermocouple	J	5	0 to 400	0.1
		6	0 to 800	0.1
	K	7	0 to 400	0.1
		8	0 to 800	0.1
		9	0 to 1200	1
	R	10	0 to 1600	1
	B	11	0 to 1800	1
	S	12	0 to 1600	1
	T	13	-199 to 400	0.1
	E	14	-199 to 800	0.1
	N	18	0 to 1300	1
DC voltage	PL- II	19	0 to 1300	1
	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. 4.7Kohm
Input judgment	ON judgment: 16 to 26.4V DC 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 a) Relay contact output - Contact structure: SPST contact - Contact capacity: 220V AC/30V DA, 1A - Insulation: Functional insulation with internal circuit b) Transistor open collector (sink) output - Rating: 24V DC, 100mA (Residual voltage when power is ON: 1.5V DC or less) - 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. 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 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) 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	24Vdc±10%								
Power consumption	Max. 3.2W (135mA) [when 24Vdc 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 (500Vdc)								
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 (1000VAC)–Functional insulation (500VAC)</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 * "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. Group I: Thermocouple: K, J, T, E, R, B, S, N, PL-II Resistance bulb (3-wire): Pt100, JPt100 Group II : DC voltage, current DC0 to 5V, DC1 to 5V, DC0 to 10V, DC2 to 10V DC0 to 20mA, DC4 to 20mA *The power current input is external in 250ohm 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 *Unless B thermocouple 0 to 500 degrees C : $\pm 5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$ R thermocouple 0 to 500 degrees C : $\pm 1\%FS \pm 1\text{digit} \pm 1\text{ degree C}$ T thermocouple -200 to 0 degree C : $\pm 0.5\%FS \pm 1\text{digit} \pm 1\text{ degree C}$ Resistance bulb input : $\pm 0.3\%FS \pm 1\text{digit}$ or $\pm 1\text{ degree C}$ whichever is greater 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 ohm or more Current input : 250 ohm Voltage input : approx. 1M ohm
Influence of signal source resistance	Thermocouple: $\pm 0.3\%FS \pm 1\text{digit} / 100\text{ ohm}$ Voltage input : $\pm 0.3\%FS \pm 1\text{digit} / 500\text{ ohm}$
Allowable wiring resistance	Resistance bulb input: 10 ohm or less (per wire)
Allowable input voltage	DC voltage input: within $\pm 15V$ Current input: within $\pm 25mA$ Thermocouple/resistance bulb: within $\pm 5V$
Noise rejection ratio	Normal mode: 30dB or more (50/60Hz) Common mode: 120dB or more (50/60Hz) between earth, power supply, output 220Vac, 50/60Hz
Input compensation	a) User adjustment: zero point, span point $\pm 50\%FS$ b) PV shift: $\pm 10\%FS$ 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 ohm or less
Insulation	No insulation with any other output 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) 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	24Vdc±10%																
Power consumption	Max. 3.2W (135mA) [when 24Vdc 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 (500Vdc)																
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 (1000VAC)–Functional insulation (500VAC)																	

### ■ Normal operating condition

Ambient temperature	-10 to 50 degrees C * "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. Group I: Thermocouple: K, J, T, E, R, B, S, N, PL-II Resistance bulb (3-wire) : Pt100, JPt100 Group II : DC voltage, current DC0 to 5V, DC1 to 5V, DC0 to 10V, DC2 to 10V DC0 to 20mA, DC4 to 20mA *The power current input is external in 250ohm 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: : $\pm 0.3\%FS \pm 1\text{digit} \pm 1$ degree C or $\pm 3$ degrees C whichever is greater *Unless B thermocouple 0 to 500 degrees C : $\pm 5\%FS \pm 1\text{digit} \pm 1$ degree C R thermocouple 0 to 500 degrees C : $\pm 1\%FS \pm 1\text{digit} \pm 1$ degree C T thermocouple -200 to 0 degree C : $\pm 0.5\%FS \pm 1\text{digit} \pm 1$ degree C Resistance bulb input : $\pm 0.3\%FS \pm 1\text{digit}$ or $\pm 1$ degree C whichever is greater Voltage input : $\pm 0.3\%FS \pm 1\text{digit}$
Resolution	See table 1
Temperature fluctuation	$\pm 0.3\%FS/10$ degrees C
Input sampling cycle	200ms
Input impedance	Thermocouple: 1M ohm or more Current input : 250 ohm Voltage input : approx. 1M ohm
Influence of signal source resistance	Thermocouple: $\pm 0.3\%FS \pm 1\text{digit} / 100$ ohm Voltage input : $\pm 0.3\%FS \pm 1\text{digit} / 500$ ohm
Allowable wiring resistance	Resistance bulb input: 10 ohm or less (per wire)
Allowable input voltage	DC voltage input: within $\pm 15V$ Current input: within $\pm 25mA$ Thermocouple/resistance bulb: within $\pm 5V$
Noise rejection ratio	Normal mode: 30dB or more (50/60Hz) Common mode: 120dB or more (50/60Hz) between process value input and earth ground, power supply, output 220Vac, 50/60Hz
Input compensation	a) User adjustment: zero point, span point $\pm 50\%FS$ b) PV shift: $\pm 10\%FS$ 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

### ■ 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 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) 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	24Vdc $\pm 10\%$								
Power consumption	Max. 3.2W (135mA) [when 24Vdc 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	20M $\Omega$ or more (500Vdc)								
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 (1000VAC)–Functional insulation (500VAC)

**■ Normal operating condition**

Ambient temperature	-10 to 50 degrees C * "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 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 ohm or less
Insulation	No insulation with any other output 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 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 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) 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	24Vdc±10%								
Power consumption	Max. 3.2W (135mA) [when 24Vdc 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	20MQ or more (500Vdc)								
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 (1000VAC)–Functional insulation (500VAC)</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 * "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/ 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 ohm, 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 Control Module Connection status (TX/RX) CC-Link status (L.RUN, L.ERR, SD, RD)	
Setting device or Set contents	Setting device	Set contents
	Front	Rotary SW×2 CC-Link Setting Station numbers
	Equipment interior	Rotary SW×1 CC-Link Setting Communication speed Dip SW (6bit)×1 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) 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	24Vdc±10%				
Power consumption	Max. 3.2 W(135 mA) [when 24Vdc 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 (500Vdc)				
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 (1000VAC)—Functional insulation (500VAC)—Functional insulation (50VAC)</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 * "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 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 MELSEC-A series 500m or less 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 Stop bit 1
Protocol	MC protocol (type2, 4, 5)
Insulation	No insulation with any communication interface other than loader interface, 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. 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 Stop bit 1
Protocol	MC protocol (type2, 4, 5)
Insulation	No insulation with any communication interface other than loader communication interface, 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] (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 Communication TX/RX (Port1), 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 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 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) 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	24Vdc±10%				
Power consumption	Max. 3.2W (135mA) [when 24Vdc 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 (500Vdc)				
Insulation block diagram	<table border="1"> <tr> <td>Power</td><td>RS-232C</td></tr> <tr> <td>Loader communication port</td><td>RS-422 RS-485</td></tr> </table> <p>=Functional insulation (1000VAC) - Functional insulation (500VAC)</p>	Power	RS-232C	Loader communication port	RS-422 RS-485
Power	RS-232C				
Loader communication port	RS-422 RS-485				

### ■ Normal operating condition

Ambient temperature	-10 to 50 degrees C * "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 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] (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) 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) 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 × 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>
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### ■ General specification

Power supply	24Vdc±10%		
Power consumption	Max. 3.2W (135mA) [when 24Vdc is applied]		
Impact 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 (500Vdc)		
Insulation block diagram	<table><tr><td>Power</td></tr><tr><td>Loader communication port</td></tr></table>	Power	Loader communication port
	Power		
	Loader communication port		
=Functional insulation (1000VAC) - Functional insulation (500VAC)			
PROFIBUS communication			

### ■ Normal operating condition

Ambient temperature	-10 to 50 degrees C * "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

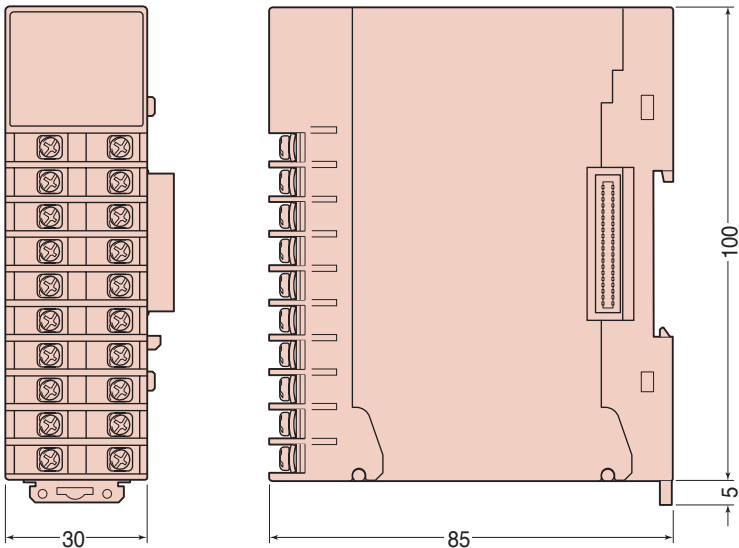
### ■ Transporting, storage conditions (packing conditions)

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



OUTLINE DIAGRAM (Unit:mm)

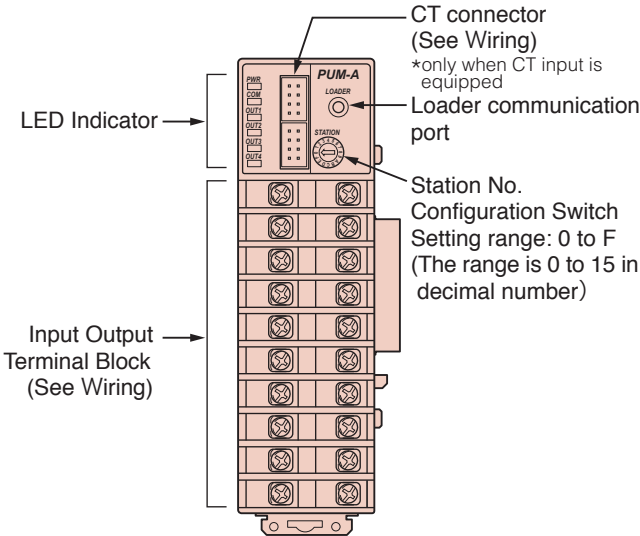
CODE: PUMA/B/E/V/NT/C



PART NAMES AND FUNCTIONS

Main unit

CODE: PUMA/B

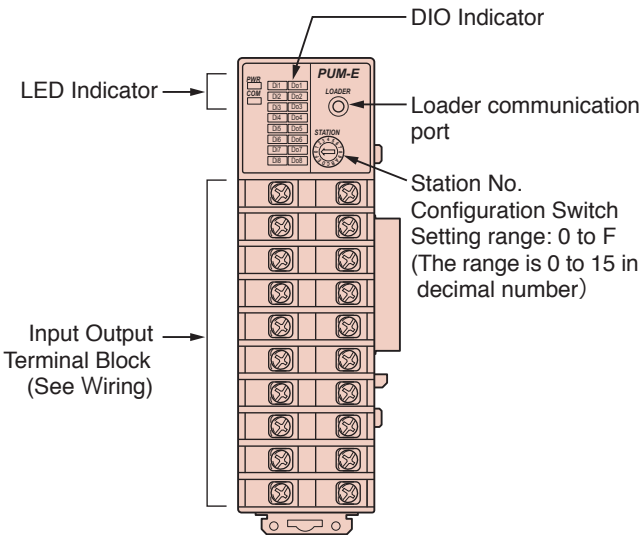


LEDIndicator Six LED lamps indicate the following operational conditions

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

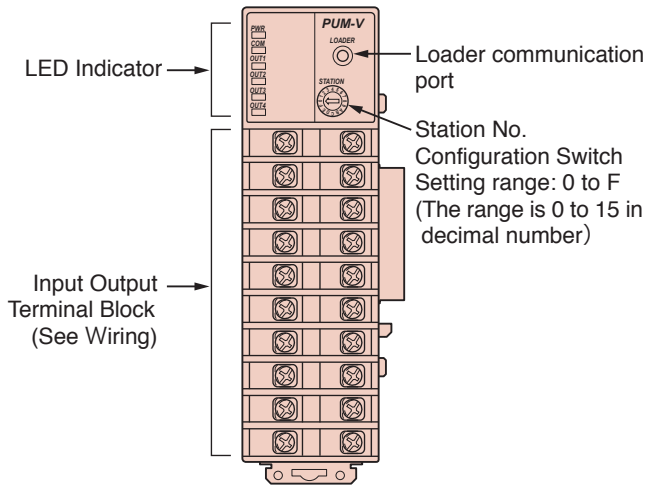


LEDIndicator Eighteen LED lamps indicate the following operational conditions

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



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

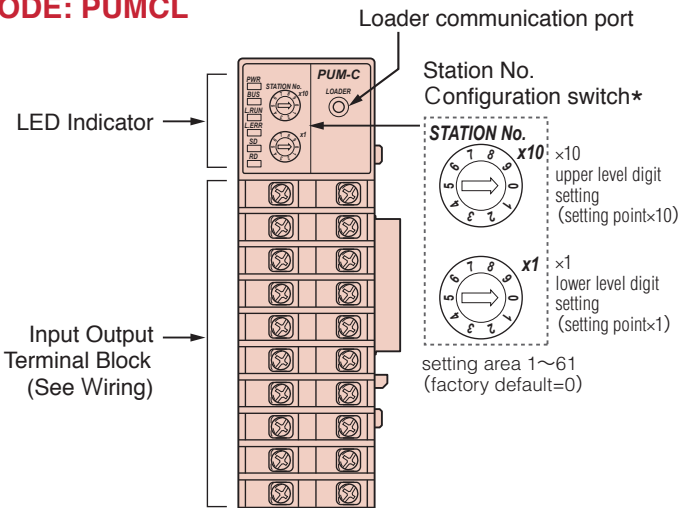
LED	LED Status	Color	Operational condition
PWR	Illuminated	green	Normal operation (Slave station of internal communication)
	Blinking	green	Normal operation (Master station of internal communication)
	Illuminated	red	System fault (A/D converter error, internal communication error)
	Blinking	red	Input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

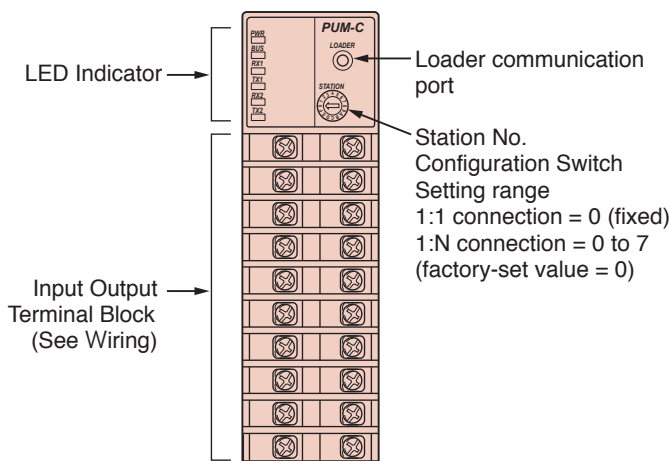


**LEDIndicator** Six LED lamps indicate the following operational conditions

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

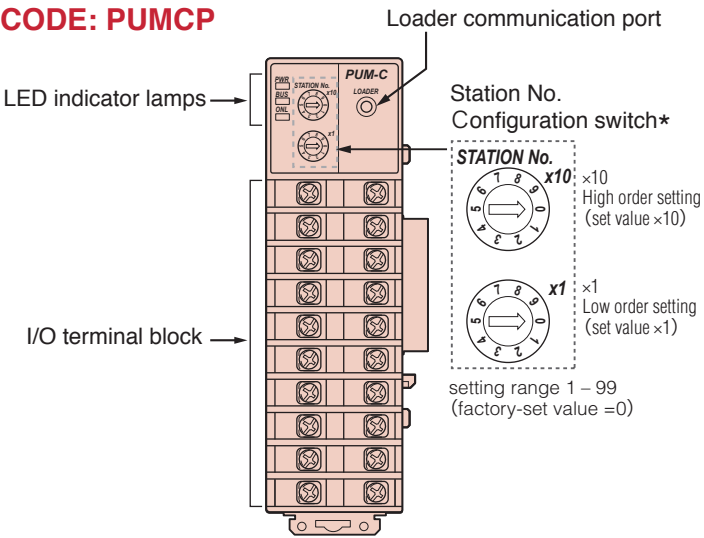


**LEDIndicator** Six LED lamps indicate the following operational conditions

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



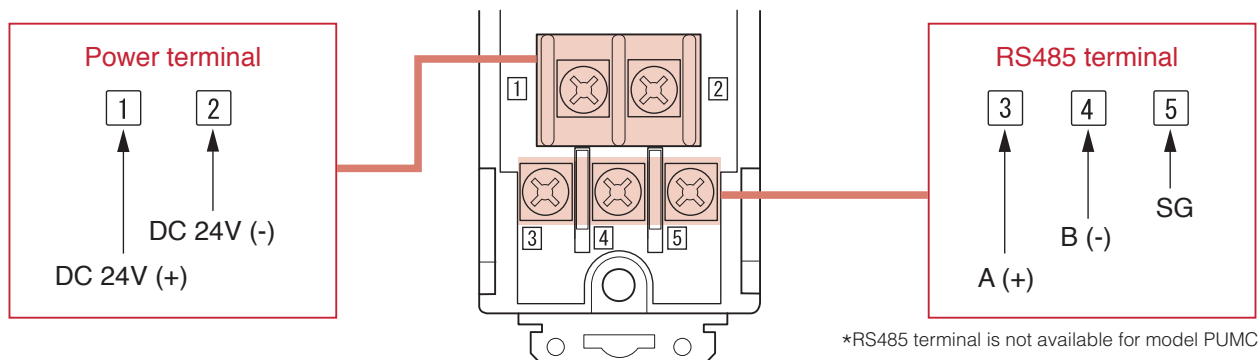
LEDindicator Three LED lamps indicate the following operational conditions

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

## WIRING

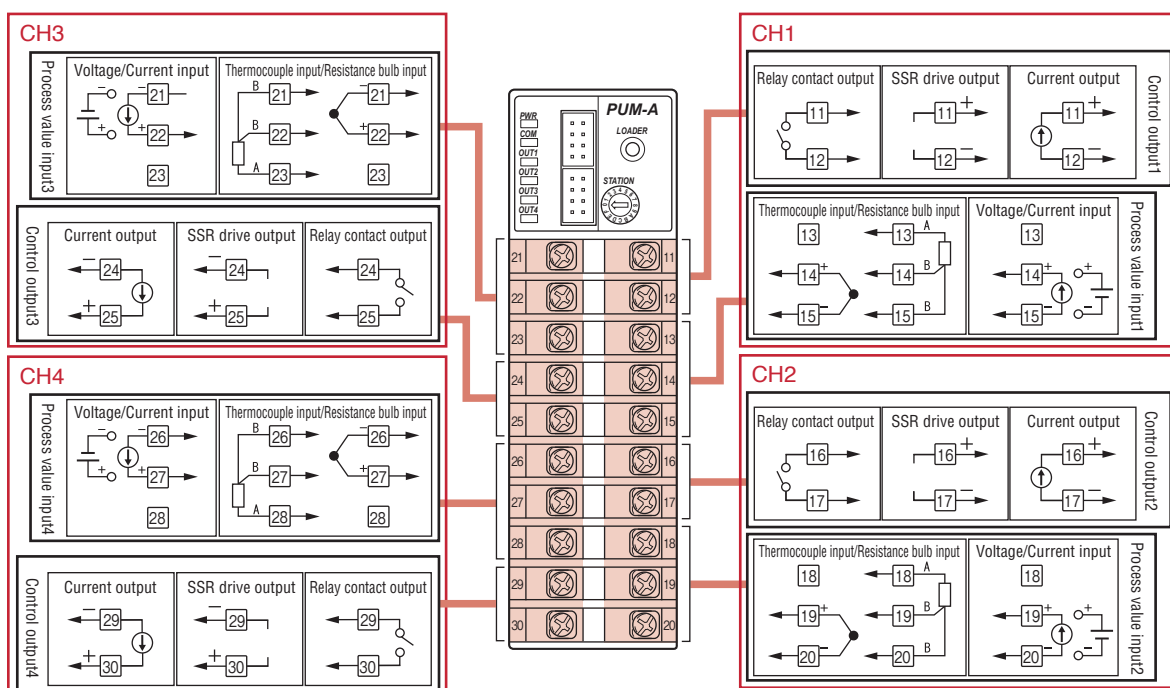
### Base part

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

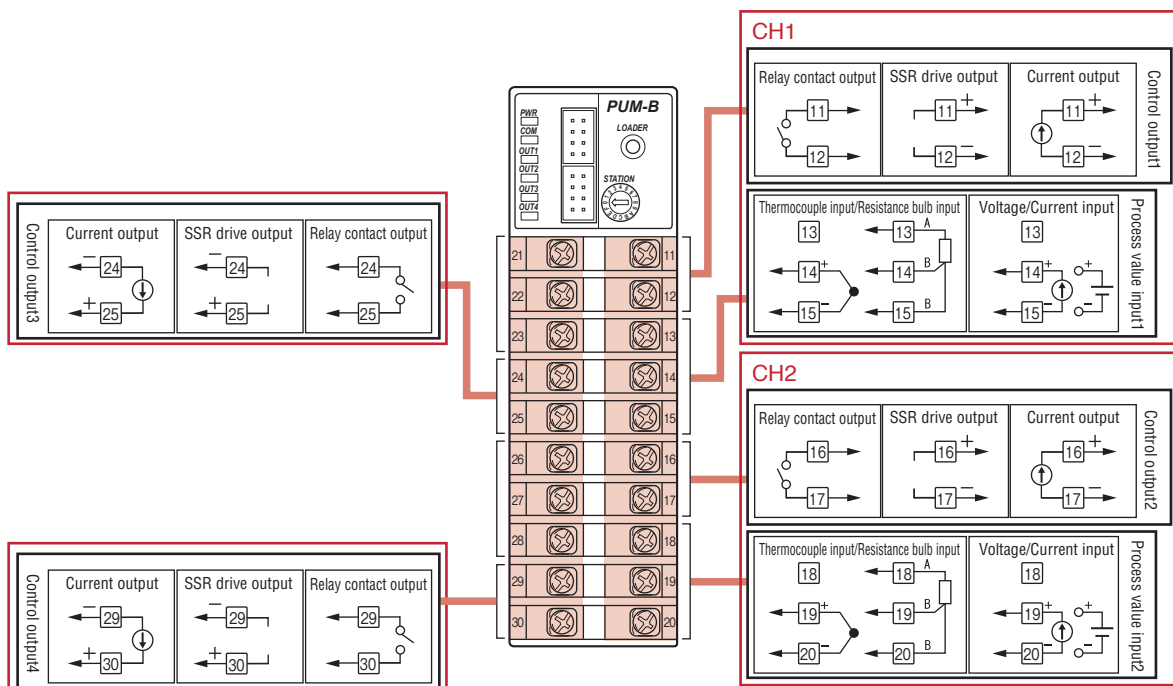


### Front terminal block

CODE: PUMA

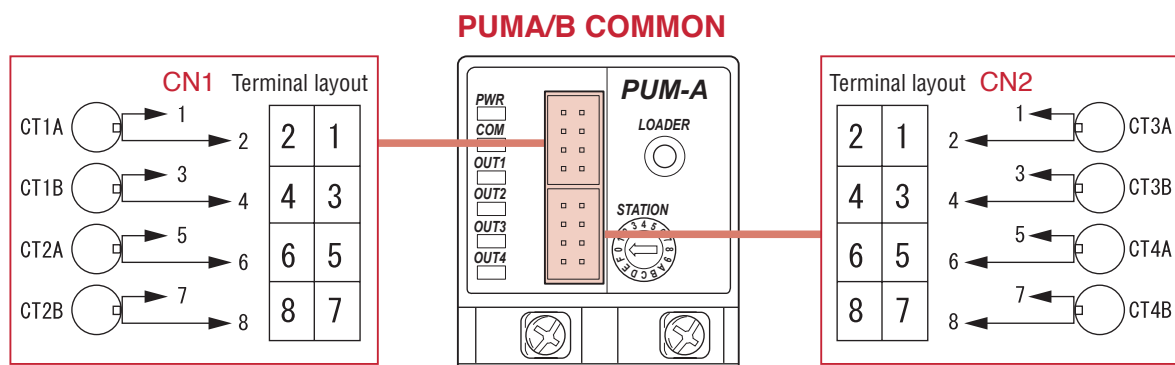


CODE: PUMB

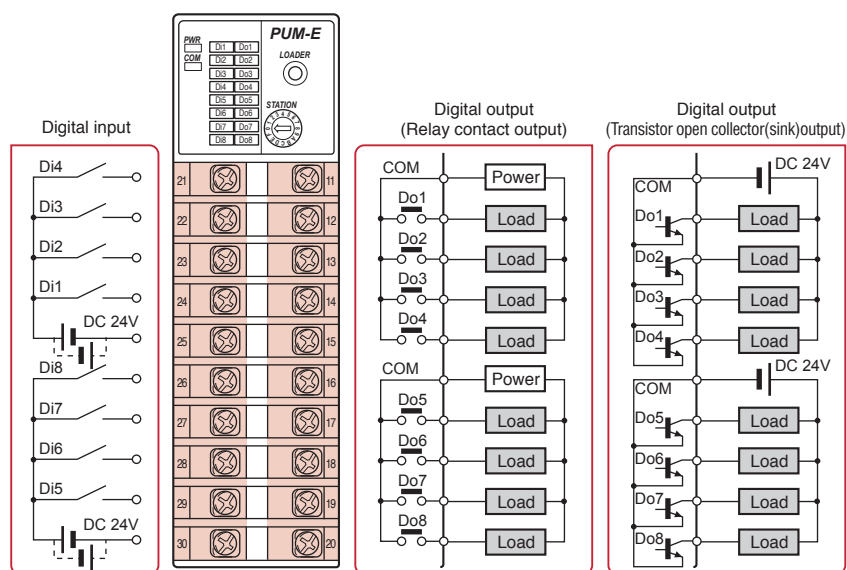




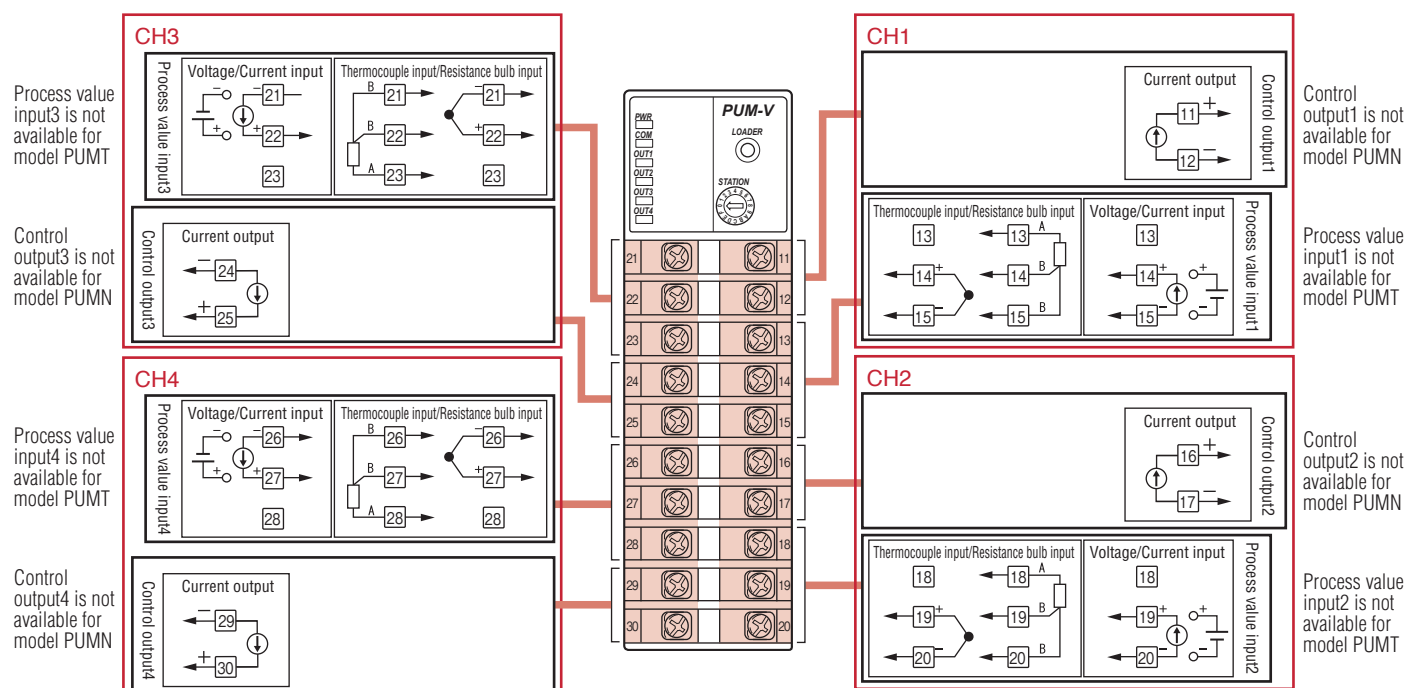
\* Pin No. 2,4,6,8 of CN1 and CN2 are connected inside the equipment.  
\* CN2 cannot be used for PUMB



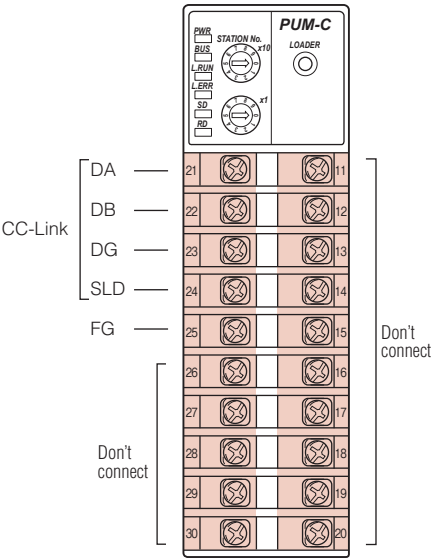
## CODE: PUME



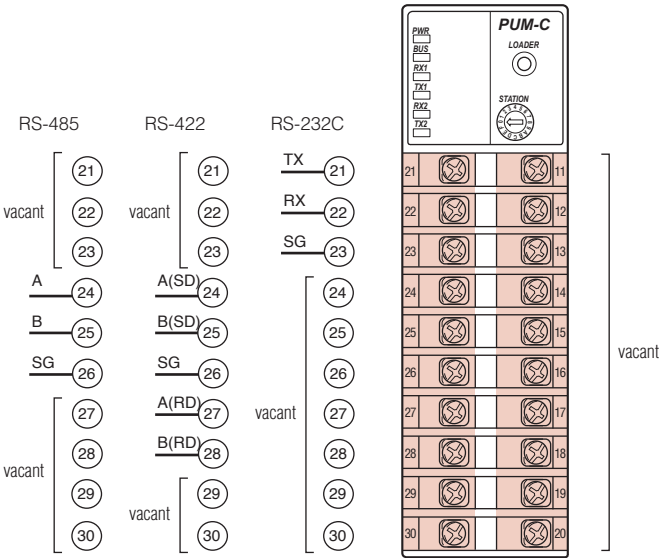
## CODE: PUMV/N/T



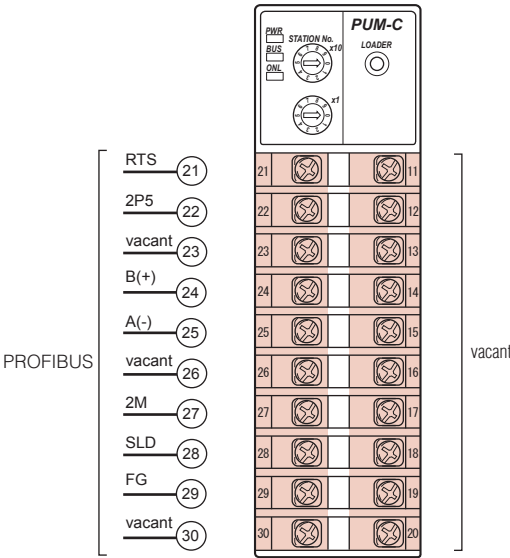
CODE: PUMCL



CODE: PUMCM



CODE: PUMCP



## CODE 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) Voltage/current (all channels) Thermocouple/Resistance bulb (ch1,2), voltage/current (ch3,4)	T	A								
6 <OUT1, 2 output type>	Relay output SSR drive output Note 1 Current output (4 to 20mA)		C	A							
7 <OUT3, 4 output type>	Relay output SSR drive output Note 1 Current output (4 to 20mA)			E	A						
8 <Version No.>						1					
10 <Operation Manual>	Japanese English							A			
11 <Option>	Not fitted Note 2 CT input (8 points)								B		
									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) Voltage/current (all channels)	T	A								
6 <OUT1, 2 output type>	Relay output SSR drive output Note 1 Current output (4 to 20mA)			A	C						
7 <OUT3, 4 output type>	Note 2 None Relay output SSR drive output Note 3 Current output (4 to 20mA)			E	Y	A					
8 <Version No.>						1					
10 <Operation Manual>	Japanese English							A			
11 <Option>	Not fitted Note 4 CT input (4 points)								B		
									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 Relay contact output	C						
8 <Version No.>						1		
10 <Operation Manual>	Japanese 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 analog input module AI4 analog output module AO4	V	N								
5 <Input type>	Note 1 Input: Thermocouple /Resistance bulb (all channels) Note 1 Input: Voltage/current (all channels) Note 1 Input: Thermocouple /Resistance bulb (ch1,2) Voltage/current (ch3,4) Note 2 Analog output module	T	A								
6 <OUT1, 2 output type>	Note 3 None Note4 Current output (4 to 20mA)		Y								
7 <OUT3, 4 output type>	Note3 None Note4 Current output (4 to 20mA)			E							
8 <Version No.>						1					
10 <Operation Manual>	Japanese 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

PUM 4 5 6 7 8 9 10  
Y Y 1 - 0

Digit	Description	
4	<Module type>	enhanced communication modul
5	<Communication module>	CC-Link communication MITSUBISHI –PLC Program-less communication PROFIBUS communication
8	<Version No.>	1
10	<Operation Manual>	Japanese English

## Accessories

PUMZ\* 6 7 8

Digit	Description	
6	RS485 terminating resistance	A 0 1
7	Note1 DIN rail mounting end plate	A 0 2
8	Note1 Side connecting terminal cover (right & left 1set)	A 0 3
	Note1 Front face screw terminal cover	A 0 4
	Note2 Loader connecting cable (RS232C)	L 0 1
	Note3,4 CT input terminal cable (for 4 points) (l=1m)	C 0 1
	Note3,4 CT input terminal cable (for 4 points) (l=3m)	C 0 3
	Note3,4 CT input terminal cable (for 4 points) (l=5m)	C 0 5
	CT for 1 to 30A (CTL-6-S-H)	C T 1
	CT for 20 to 50A (CTL-12-S36-8)	C T 2

Note1) Only 10 unit for your order

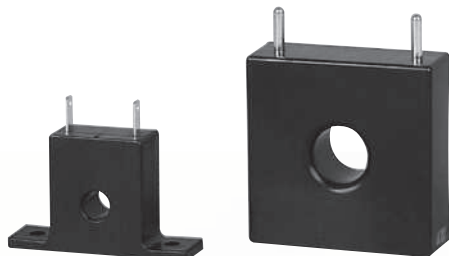
Note2) It is necessary for using USB port to repairer the "USB-Serial" convert

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

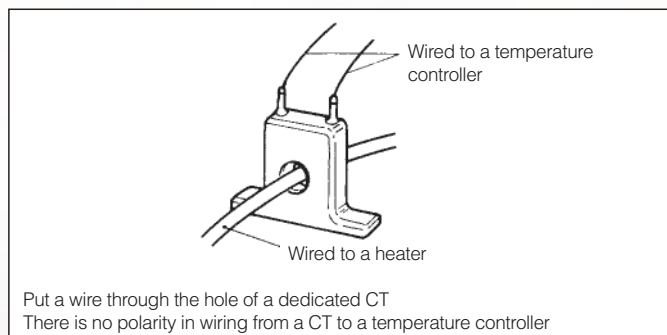
## ACCESSORIES

### Heater current detector (CT)



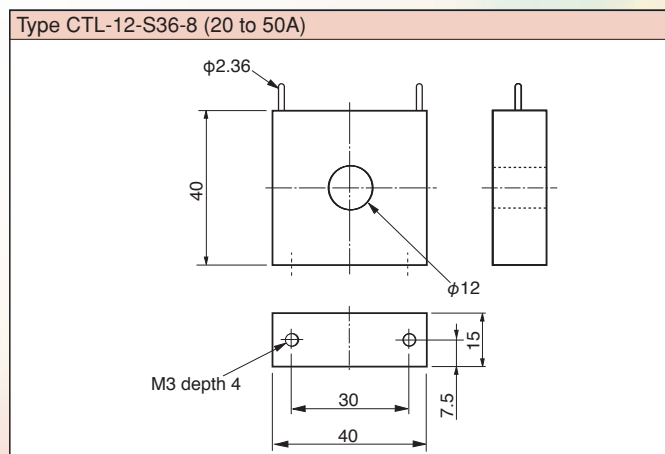
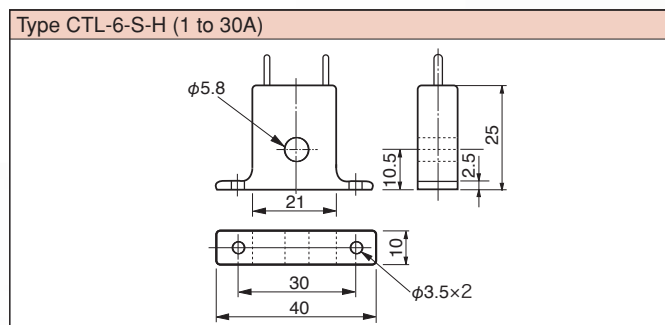
### General specification

	For 1 to 30A	For 20 to 50A
Type	CTL-6-S-H	CTL-12-S36-8
Dimension (HxWxD mm)	25x40x10	40x40x15
Through-bore (mm)	φ5.8	φ12



- 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> 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> 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> 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> 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> 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

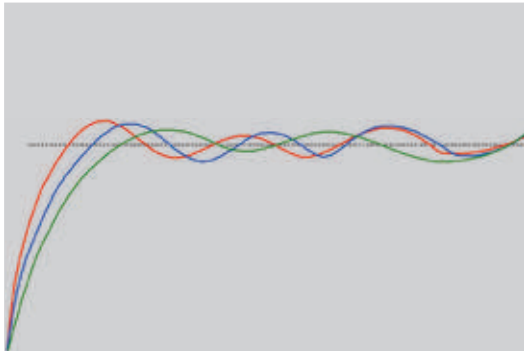
PAT 4 5 6 7 8 9 10 11 12 13 14  
    3 1 1 — Y Y Y Y Y Y — Y

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

## **Optimum multiple-zone controller** (If you need a detailed specification, please contact us.)

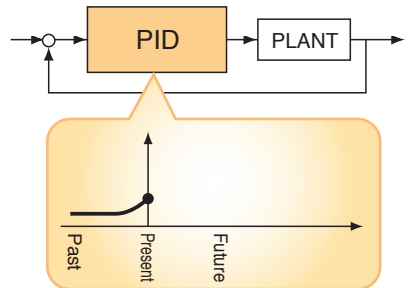
### Optimum multiple-zone controller (Patent pending)

- It applies to the control systems with mutual interference of multiple-zone
- It applies to the case that interference for temperature control between zones occurs, as the case of reflow furnace

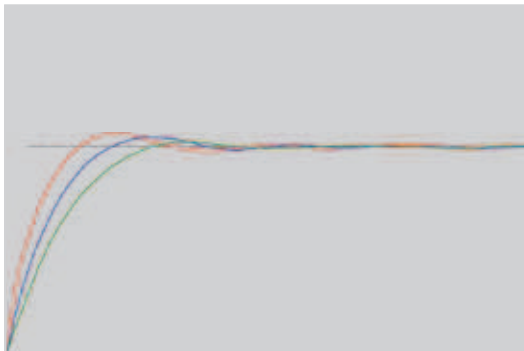


#### ●PID control

It calculates and controls based on the value in past and present

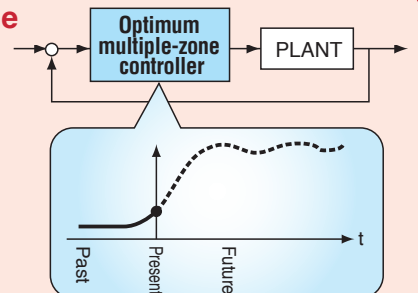


### Optimum multi-zone control by Fuji's original algorithm

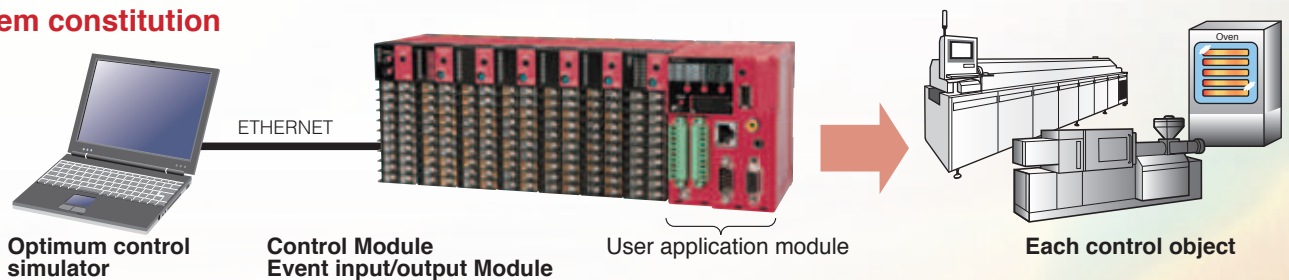


#### ●Optimum multiple-zone controller

Optimum multiple-zone control  
It controls and calculates based on values in past, present, and future with the model of the PLANT in the controller



### System constitution



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