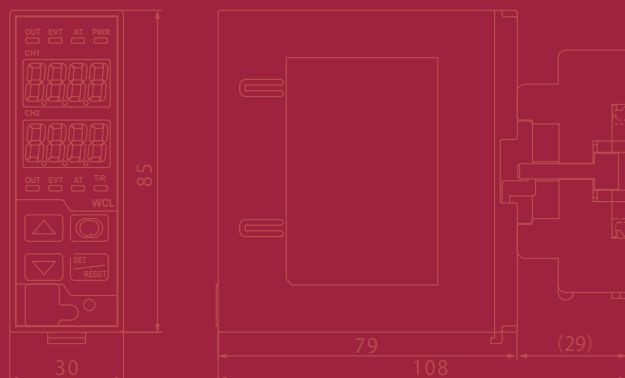


# 2ch Plug-in Controller



User defined combinations

***Selectable input sampling period***



***Various functions provided***

Energy, space saving

# Full display plug-in controller

## ● Specs selectable in accordance with usage !

The following are selectable in accordance with usage.

Controller spec	2ch controller	2-unit functions are equipped.
	CH difference input (*)	Difference between CH1 and CH2 inputs can be set and maintained constantly.
	CH addition input (*)	Addition value of CH1 and CH2 inputs can be maintained constantly.
	Heating/Cooling control output (*)	CH2 output works as OUT2.
	Cascade control (*)	MV is calculated from PV and SV of CH2, and is used as SV of CH1, with which CH1 control computation is carried out, then outputs from CH1 control output.
	External setting input (*)	External analog signal becomes the SV.
	1-input 2-output (*)	2 outputs occur simultaneously.
	Transmission output	Converting the value (PV, SV or MV) to analog signal every input sampling period, outputs the value in current. (only when CH2 control output is DC current)
Timer spec	Potentiometer input	Sets SV from an external potentiometer.
	Control timer	Control timer starts if CH1 input exceeds Control timer start temperature, and after Control timer time has elapsed, control will stop.
	Delay timer	Delay timer starts when external contact is closed, and Timer output turns ON (or OFF) after ON (or OFF) delay timer time has passed.



- Selectable from Block function. [Block function can be set from a PC, using a USB communication cable (sold separately) and console software.]

## ● High accuracy control possible !

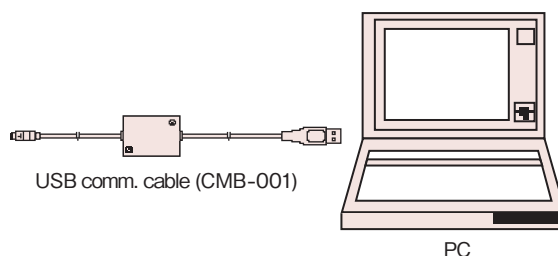
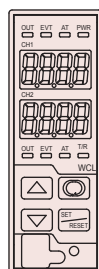
Input sampling period is selectable via keypad from a choice of: 25ms, 125ms, 250ms  
High accuracy control can be performed by selecting an optimal sampling period.

## ● Settings via cable (separate purchase)

Input type and control action, etc. can be set from a PC, using a communication cable (sold separately) and the provided console software.  
Customizable in accordance with various usages. (Block function)

There are other functions as follows.

- Reading and setting of the SV, PID values and various set values
- Reading of the PV and action status
- Function change



## ● Energy, space saving !

### ● Auto-light function

Display brightness is controlled after measurement from the front light sensor. This saves energy when connecting multiple units.



Light sensor

### ● Display-off function

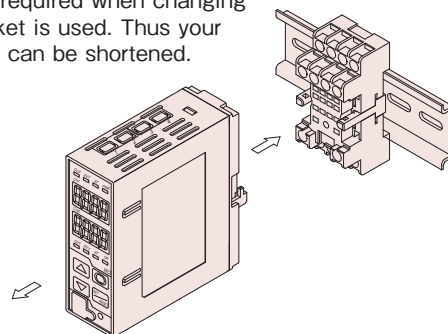
Displays are turned off when operation does not occur for the time set during Indication time setting.  
PV, SV or no indication is selectable during Display selection mode via keypad.

### ● 2ch, but so compact!

Economizes the control panel.  
30x85x108mm (WxHxD, including the socket)

### ● Improve your work efficiency

No wiring required when changing units as socket is used. Thus your working time can be shortened.



※Sockets are sold separately



ASK-001-1 (Round terminal unusable, with Finger-safe function)



ASK-002-1 (For round terminal)

## Various functions provided

### I/O for each channel is individually selectable

#### • Input

Individually selectable from thermocouple, RTD, DC current, DC voltage for each channel.  
Also infrared thermocouples (RD-300 series, RD-401) are usable.

#### • Output

Specify from Relay contact, Non-contact voltage or DC current.  
(e.g.) CH1 control output: Relay contact  
CH2 control output: DC current

#### ■ Model

WCL - 1	3	A -								Series name: WCL-13A
Control action	3									PID
Alarm action	A									Alarm type can be selected by keypad.
CH1 control output		R								Relay contact
		S								Non-contact voltage
		A								DC current
CH2 control output		R								Relay contact (Timer spec) (*1)
		S								Non-contact voltage
		A								DC current
CH1 input		M								Multi-range
		I								Infrared thermocouple
CH2 input		M								Multi-range
		I								Infrared thermocouple
		P								Potentiometer
		T								Timer spec (*1)
Supply voltage										100 to 240V AC (standard) (*2)
										24V AC/DC (*2)
Option								W ( 20A)		Heater burnout alarm: Single-phase 20A (CT sold separately)
								W ( 100A)		Heater burnout alarm: Single-phase 100A (CT sold separately)
								W3 ( 20A)		Heater burnout alarm: 3-phase 20A (CT sold separately)
								W3 (100A)		Heater burnout alarm: 3-phase 100A (CT sold separately)
								C5		Serial communication RS-485

(\*1): If timer spec is selected for CH2 input, CH2 output will be Relay contact (Timer spec).

(\*2): Supply voltage 100 to 240V AC is standard. When ordering 24V AC/DC, enter "1" after the input code.

#### ■ Rated input range

##### • Multi-range input

Input		Input range	
Thermocouple	K	-200 to 1370 °C	-320 to 2500 °F
		-199.9 to 400.0 °C	-199.9 to 750.0 °F
	J	-200 to 1000 °C	-320 to 1800 °F
	R	0 to 1760 °C	0 to 3200 °F
	S	0 to 1760 °C	0 to 3200 °F
	B	0 to 1820 °C	0 to 3300 °F
	E	-200 to 800 °C	-320 to 1500 °F
	T	-199.9 to 400.0 °C	-199.9 to 750.0 °F
	N	-200 to 1300 °C	-320 to 2300 °F
	PL-II	0 to 1390 °C	0 to 2500 °F
	C(W/Re5-26)	0 to 2315 °C	0 to 4200 °F

Input		Input range	
RTD	Pt100	-199.9 to 850.0 °C	-199.9 to 999.9 °F
		-200 to 850 °C	-300 to 1500 °F
	JPt100	-199.9 to 500.0 °C	-199.9 to 900.0 °F
		-200 to 500 °C	-300 to 900 °F
DC current (*1)	4 to 20mA DC 0 to 20mA DC	-1999 to 9999 Scaling and decimal point place change are possible.	
DC voltage	0 to 1V DC		
	0 to 5V DC		
	1 to 5V DC		
	0 to 10V DC		

(\*1): 50Ω shunt resistor (sold separately) should be connected externally.

##### • Infrared thermocouple input

Input (*2)	Input range	
-18 to 25 °C	-50 to 500 °C	-58 to 932 °F
5 to 45 °C		
25 to 80 °C		
70 to 105 °C		
90 to 120 °C		
115 to 155 °C		
145 to 190 °C		
180 to 250 °C		

(\*2): Specify the using temperature range.

#### Infrared thermocouple RD-300 series, RD-401

Thermocouple	K
Accuracy	Within ±3% of the indicated value or 3.3°C, whichever is greater. (When the emissivity of the object is 0.9) However, for the range 185 to 250°C, within ±5% of the indicated value.
Repeatability	Within ±1% of the measured value or 1°C, whichever is greater.
Response time	0.2sec (at 63.2% response)
Output	Corresponds to Electromotive force of the thermocouple K
Ambient temp.	RD-300 series : 27 to 93°C
compensation range	RD-401 : -18 to 70°C

For details, please consult us or our agency.

#### Accessories sold separately

##### Socket:

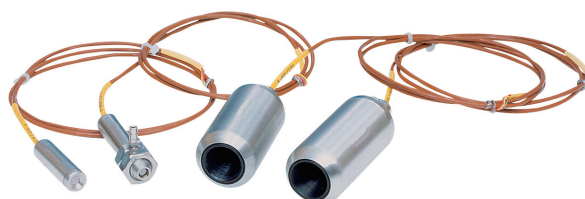
ASK-001-1 (with finger-safe)
(Round terminals unusable)
ASK-002-1 (Round terminal usable)

##### Heater burnout alarm (option):

CT (CTL-6S): For 20A
CT (CTL-12-S36-10L1U): For 100A
Connector harness W 3m

##### Others

RES-S01-050 Shunt resistor (50Ω): For DC current input
CMB-001: USB communication cable



### ■ Name and functions of sections



**Increase key**

Increases the numeric value.



**Decrease key**

Decreases the numeric value.

While the key is pressed in the PV/SV display mode, the SV can be indicated when PV is indicated, and vice versa.



### Mode key

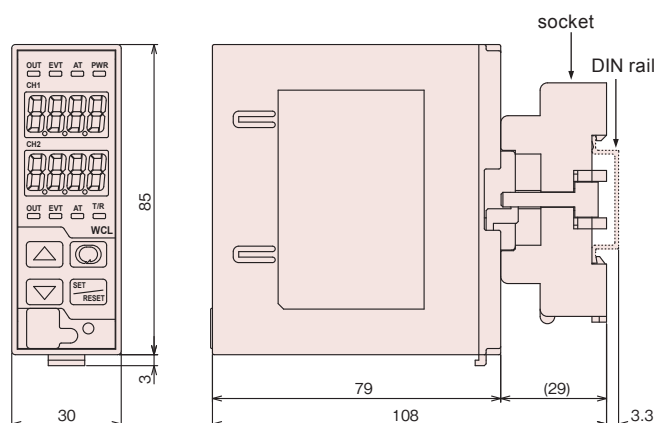
Selects the setting group. If Mode key is pressed for 3sec in the PV/SV display mode, the unit moves to the MV indication mode. By pressing the Mode key again, the unit reverts to the PV/SV display mode.



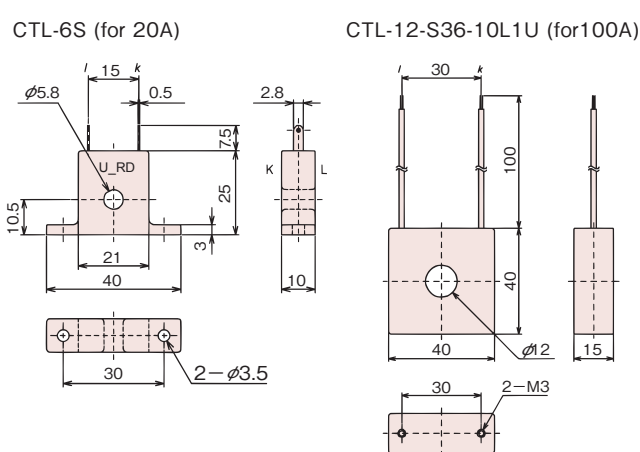
**SET/RESET key**

Switches the setting modes, and registers the set value.  
For timer spec, resets the timer action in the case of  
Control timer function

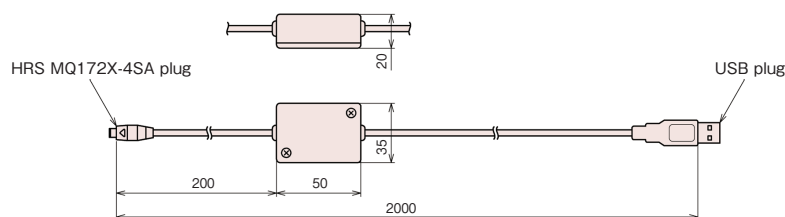
■ **External dimensions** (Scale: mm)



■ CT external dimensions (Scale: mm)



■ USB communication cable CMB-001 (Scale: mm)



### ■ Standard specifications

Display	PV/SV display: 7-segment Red LED 4-digit, Character size 7.4×4mm (H× W)
Input	Thermocouple: K, J, R, S, B, E, T, N, PL-II, C (W/Re5-26) External resistance: 100Ω or less, however, for B input, 40Ω or less RTD : Pt100, JPt100 3-wire system (Allowable input lead wire resistance: 10Ω or less per wire) DC current : 0 to 20mA DC, 4 to 20mA DC: Input impedance: 50Ω (50Ω shunt resistor must be connected between input terminals.) Allowable input current: 50mA DC or less (When 50 Ω shunt resistor is connected.)
	DC voltage : 0 to 1V DC: Input impedance: 1MΩ or more Allowable input current: 5V DC or less, Allowable signal source resistance: 2kΩ or less 0 to 5V DC, 1 to 5V DC, 0 to 10V DC: Input impedance: 100kΩ or more Allowable input voltage: 15V DC or less, Allowable signal source resistance: 100Ω or less
	Infrared thermocouple: RD-300 series, RD-401
Accuracy (Setting/Indication)	Thermocouple : Within ±0.2% of each input span ±1 digit, or ±2°C (4°F), whichever is greater However, R, S input, 0 to 200°C (0 to 400°F): Within ±6°C (12°F) B input, 0 to 300°C (0 to 600°F): The accuracy is not guaranteed. K, J, E, T, N input, less than 0°C (32°F): Within ±0.4% of each input span ±1digit RTD : Within ±0.1% of each input span ±1digit, or ±1°C (2°F), whichever is greater DC current, voltage : Within ±0.2% of each input span ±1digit Infrared thermocouple : Within ±0.2% of each input span ±1digit, or ±2°C (4°F), whichever is greater PV varies as Infrared emissivity setting value is changed. Setting range: 0.100 to 1.000 (Default: 0.900)
Input sampling period	25ms, 125ms, 250ms: Selectable by keypad (Default: 125ms)



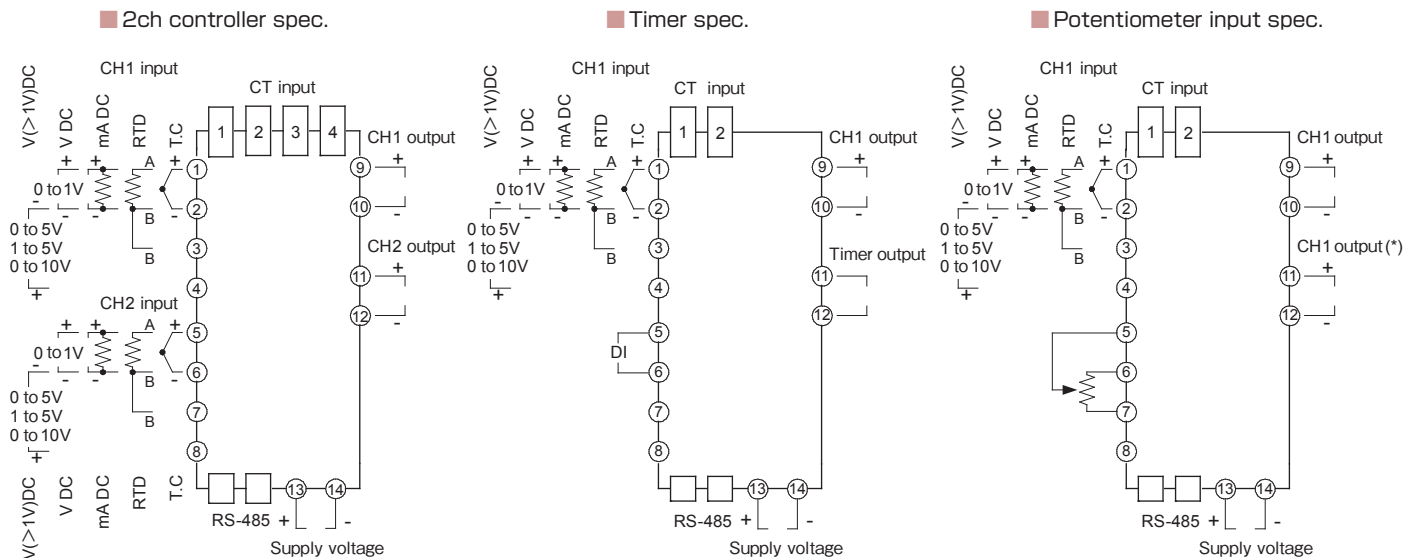
Potentiometer input setting accuracy	Whole resistance : 1kΩ to 10kΩ Reference voltage : 1V DC Accuracy : The same as setting accuracy Temperature coefficient : ±0.05%/°C Potentiometer input sampling: Depends on the input sampling selection ·Potentiometer input high and low limit depend on the External setting input high and low limit.
Control output	Relay contact: 1a Control capacity: 3A 250V AC (Resistive load), 1A 250V AC (Inductive load cosφ=0.4), Electric life: 100,000 cycles Non-contact voltage: 12V DC±15% Max. 40mA DC (Short circuit protected) DC current: 4 to 20mA DC Load resistance: Max. 550Ω
Control action	The following actions can be selected by keypad. (Default: PID) PID (with auto-tuning), PI, PD (with auto-reset), P (with auto-reset), ON/OFF Proportional band (P) : 0 to 9999°C(°F), 0.0 to 999.9°C(°F) or 0.0 to 999.9% (ON/OFF action when set to 0 or 0.0) (Default: 10°C) Integral time(I) : 0 to 3600sec (Off when set to 0) (Default: 200sec) Derivative time(D) : 0 to 3600sec (Off when set to 0) (Default: 50sec) ARW : 0 to 100% (Default: 0%) Proportional cycle : 1 to 120sec (Default: Relay contact 30sec, Non-contact voltage 3sec) (Not available for DC current output) ON/OFF hysteresis : 0.1 to 100.0°C(°F) or 1 to 1000 (The placement of the decimal point follows the selection) (Default: 1.0°C) Output high limit : 0 to 100% (DC current: -5 to 105%) Output low limit : 0 to 100% (DC current: -5 to 105%) Reset : ±100.0 (Default: 0.0) DC voltage, current: ±1000 (The placement of the decimal point follows the selection) Output rate-of-change: 0 to 100% (Default: 0%)
Alarm action	Output: No output (Reads with status flag in Serial communication) Alarm type can be selected by keypad (Default: No alarm action) High limit alarm (Deviation setting) Setting range: -(Input span) to input span Low limit alarm (Deviation setting) Setting range: -(Input span) to input span High/Low limits alarm (Deviation setting) Setting range: 0 to input span High/Low limit range alarm (Deviation setting) Setting range: 0 to input span Process high alarm Setting range: Input range low limit to input range high limit value Process low alarm Setting range: Input range low limit to input range high limit value High limit alarm with standby (Deviation setting) Setting range: -(Input span) to input span Low limit alarm with standby (Deviation setting) Setting range: -(Input span) to input span High/Low limits alarm with standby (Deviation setting) Setting range: 0 to input span Setting accuracy :The same as indication accuracy Action : ON/OFF action Hysteresis : Thermocouple, RTD input: 0.1 to 100.0 °C(°F), DC current, voltage input: 1 to 1000 Alarm delay timer : 0 to 9999sec
Loop break alarm	Detects actuator troubles (heater burnout or sensor burnout) Output : No output (Reads with status flag in Serial communication) Loop break alarm time : 0 to 200 minutes Loop break alarm span : Thermocouple, RTD input : 0 to 150°C(°F) or 0.0 to 150.0°C(°F) DC current, voltage : 0 to 1500 (The replacement of decimal point follows the selection.)
SV ramp	When the SV is adjusted, it approaches the new SV by the preset rate-of-change (°C/min, °F/min). When the power is turned on, the control starts from the PV, and approaches the SV by the rate-of-change Not available when set to 0. (Default: SV rise rate: 0, SV fall rate: 0) SV rise rate/SV fall rate setting: Thermocouple input (excluding T input): 0 to 9999°C/min (°F/min), Thermocouple T, RTD input: 0.0 to 999.9°C/min (°F/min), DC input: The replacement of the decimal point follows the selection.
Heating / Cooling Control output (Block function)	CH2 output will be OUT2. OUT2 proportional band : 0.0 to 10.0 times OUT1 (CH1) proportional band (ON/OFF action when set to 0) OUT2 Integral time : The same as that of OUT1 (CH1) OUT2 derivative time : The same as that of OUT1 (CH1) OUT2 proportional cycle : 1 to 120sec (Default: Relay contact: 30sec, Non-contact voltage: 3sec) (Not available for DC current output) Overlap/Dead band : Thermocouple, RTD input : -100.0 to 100.0°C(°F) DC current, voltage input : -1000 to 1000 (The placement of the decimal point follows the selection) OUT2 ON/OFF hysteresis : Thermocouple, RTD input : 0.1 to 100.0°C(°F) (Default: 1.0°C) DC current, voltage input : 1 to 1000 (The placement of the decimal point follows the selection) Output high limit : 0 to 100% (DC current: -5 to 105%) (Default: 100%, Not available for ON/OFF action) Output low limit : 0 to 100% (DC current: -5 to 105%) (Default: 0%, Not available for ON/OFF action) OUT2 action mode : Air cooling (linear characteristic, Default), Oil cooling (1.5th power of the linear characteristic), Water cooling (2nd power of the linear characteristic). Selectable by keypad Control output : Relay contact, 1a (OUT2:R): Control capacity: 3A 250V AC (Resistive load), Electric life: 100,000 cycles Non-contact voltage (for SSR drive) (OUT2: S): 12V DC±15% Max. 40mA (short circuit protected) DC current (OUT2: A): 4 to 20mA DC, Resolution (12000), Load resistance: Max. 600Ω
External setting input (Block function)	External analog signal will become the SV. Control desired value adds remote bias value to the SV. As a setting signal, specify any DC range during CH2 input type selection. Setting signal : DC current: 4 to 20mA or 0 to 20mA, DC voltage: 1 to 5V or 0 to 1V Allowable input : DC current: 50mA DC or less, DC voltage (0 to 1V): 5V DC or less, DC voltage (1 to 5V): 10V DC or less Input impedance : DC current: 50Ω [A shunt resistor (sold separately) is needed as an external extension], DC voltage: 100kΩ Input sampling : Depends on the input sampling selection
Transmission output (Block function)	Converting any value (PV, SV or MV) to analog signal every input sampling period, outputs the value in current. (Default: PV) Resolution: 1/10000, Current: 4 to 20mA DC (Load resistance Max. 550Ω) Output accuracy: Within ±0.3% of Transmission output span.
Timer performance	Time accuracy: Within ±0.5% of setting time
Timer spec	Control timer or Delay timer function is selectable by keypad. <b>•Control timer</b> Control timer starts if CH1 input exceeds Control timer start temperature, and after Control timer time has passed, control (Output low limit value for DC current output) and alarm action will stop. <b>•Delay timer</b> Delay timer starts when DI input is ON (Closed), Timer output turns ON after ON delay timer time has passed. Timer output turns OFF after OFF delay timer time has passed. Timer output: The same as Relay contact. Between DI terminals, Open: OFF, Closed: ON, Circuit current when closed: 7mA
Supply voltage	100 to 240V AC 50/60Hz, 24V AC/DC 50/60Hz (Allowable voltage fluctuation range: 85 to 264V AC, 20 to 28V AC/DC)
Power consumption	Approx. 9VA
Insulation resistance	10MΩ or more, at 500V DC
Dielectric strength	1.5kV AC for one minute
Environment	Between power terminal and ground, between input terminal and ground, between input terminal and power terminal.
Case (Material, Color)	Ambient temperature: 0 to 50°C Ambient humidity: 35 to 85%RH (Non-condensing)
Mounting, Setting method	Material: Flame-resistant resin Color: Light gray
Dimensions, Weight	Mounting: DIN rail Setting: Sheet key input
Attached functions	Dimensions: 30×85×108mm (W×H×D, including the socket) Weight: Approx. 200g (including the socket)
Accessories sold separately	Sensor correction, Set value lock, Automatic cold junction temperature compensation (Only for thermocouple), Burnout (Overscale), Indication range, Control range, Power failure countermeasure, Self-diagnosis, Warm-up indication, Display-off function, Auto-light function 50Ω shunt resistor (RES-S01-050) for DC current input, USB communication cable (CMB-001) Heater burnout alarm (option) : CT (CTL-6S) for 20A, CT (CTL-12-S36-10L1U) for 100A, Connector harness W 3m Socket : ASK-001-1 (Finger-Safe) (Round terminals unusable), ASK-002-1 (Round terminal usable)

Options

[Please specify options according to users' needs. When ordering, specify an option to be applied]

Heater burnout alarm [W, W3]	Watches the heater current with current transformer (CT), detects the burnout. Not available for DC current output type. Output : No output (Reads with status flag in serial communication) Rated current : Single-phase 20A, 3-phase 20A, Single-phase 100A, 3-phase100A (Must be specified) Single-phase: Detects with CT1 input, 3-phase: Detects with CT1 & CT2 input Setting range : 0.0 to 20.0A when 20A is selected (Off when set to 0.0), 0.0 to100.0A when 100A is selected (Off when set to 0.0) Setting accuracy : ±5% of the rated current Action point : Set value Action : ON/OFF action
Serial communication [C5]	The following operations can be carried out from an external computer. (1) Reading and setting of the SV, PID values, (2) Reading of the PV and action status, (3) Function change Communication interface: EIA RS-485 Communication method : Half-duplex communication Synchronization method : Start-stop synchronization Communication speed : 9600/19200/38400bps, Selectable by keypad (Default: 9600bps) Data bit/parity : Data bit: 7/8, Parity: Even/Odd/No parity, Selectable by keypad (Default: 7 bits/Even parity) Stop bit : 1 or 2, Selectable by keypad (Default: 1) Communication protocol : Shinko protocol, Modbus (ASCII mode or RTU mode), Selectable by keypad. (Default: Shinko protocol) The communication converter IF-400 is available for Shinko protocol and Modbus protocol. (Communication speed 38400bps is not usable.)

Terminal arrangement

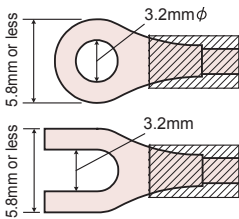


(\*):Effective when Heating/Cooling control output" or "1-input, 2-output" is selected in block function.

- DC : DC current, voltage input for CH1/CH2 [For DC current input, connect 50Ω shunt resistor (sold separately) between input terminals]
- TC : Thermocouple input, infrared thermocouple input for CH1/CH2
- RTD : Resistance temperature detector input for CH1/CH2
- DI : Digital input

Solderless terminal

Use a solderless terminal with an insulation sleeve in which an M3 screw fits as follows. For the sockets with finger-safe & screw fall prevention functions, the round terminals are unusable. The torque should be 0.63N•m.



- To ensure safe and correct use, thoroughly read and understand the manual before using this instrument.
- This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after consulting purpose of use with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- External protection devices such as protection equipment against excessive temperature rise, etc. must be installed, as malfunction of this product could result in serious damage to the system or injury to personnel. Also proper periodic maintenance is required.
- This instrument must be used under the conditions and environment described in the manual. Shinko Technos Co., Ltd. does not accept liability for any injury, loss of life or damage occurring due to the instrument being used under conditions not otherwise stated in this manual.

Caution with respect to Export Trade Control Ordinance

To avoid this instrument from being used as a component in, or as being utilized in the manufacture of weapons of mass destruction (i.e. military applications, military equipment, etc.), please investigate the end users and the final use of this instrument. In the case of resale, ensure that this instrument is not illegally exported.

- This catalog is as of August 2009 and its contents are subject to change without notice.  
- If you have any inquiries, please consult us or our agency.