

INSTRUCTION MANUAL

Digital Indicating Controller **BCS2, BCR2, BCD2**

No. BCx21JE9 2025.04

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For detailed usage, refer to the Instruction Manual for the BCS2, BCR2, and BCD2. Please download the full Instruction Manual from Shinko website.
<https://shinko-technos.co.jp/e/> → Support & Downloads → Downloads → Manuals

Thank you for purchasing our BCS2, BCR2, BCD2, Digital Indicating Controller. This manual contains instructions for the mounting, functions, operations and notes when operating the BCS2, BCR2, and BCD2. To ensure safe and correct use, thoroughly read and understand this manual before using this instrument. To prevent accidents arising from the misuse of this instrument, please ensure the operator receives this manual.

Safety Precautions (Be sure to read these precautions before using our products.)

The safety precautions are classified into 2 categories: "Warning" and "Caution".

⚠ **Warning:** Procedures which may lead to dangerous conditions and cause death or serious injury, if not carried out properly.

⚠ **Caution:** Procedures which may lead to dangerous conditions and cause superficial to medium injury or physical damage or may degrade or damage the product, if not carried out properly.

Warning

- To prevent an electric shock or fire, only Shinko or other qualified service personnel may handle the inner assembly.
- To prevent an electric shock, fire or damage to the instrument, parts replacement may only be undertaken by Shinko or other qualified service personnel.

SAFETY PRECAUTIONS

- To ensure safe and correct use, thoroughly read and understand this manual before using this instrument.
- This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after purpose-of-use consultation with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- This instrument is designed to be installed through the control panel indoors.
- External protection devices such as protective 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. Proper periodic maintenance is also required.
- This instrument must be used under the conditions and environment described in this 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.

Warning on Model Label**Caution**

Failure to handle this instrument properly may result in minor or moderate injury or property damage due to fire, malfunction, malfunction, or electric shock. Please read this manual before using the product to ensure that you fully understand the product.

Specifications

Power supply voltage	100 to 240 V AC 50/60Hz, Allowable fluctuation: 85 to 264 V AC 24 V AC/DC 50/60Hz, Allowable fluctuation: 20 to 28 V AC/DC
Base accuracy (At ambient temperature 23°C, for a single unit mounting)	Thermocouple: Within $\pm 0.2\%$ of each input span ± 1 digit. However, R, S inputs, 0 to 200°C (32 to 392°F): Within $\pm 6^\circ\text{C}$ (12°F) B input, 0 to 300°C (32 to 572°F): Accuracy is not guaranteed. K, J, E, T, N inputs, Less than 0°C (32°F): Within $\pm 0.4\%$ of input span ± 1 digit RTD: Within $\pm 0.1\%$ of each input span ± 1 digit Direct current, voltage inputs: Within $\pm 0.2\%$ of each input span ± 1 digit
Input sampling period	125 ms
Power consumption	100 to 240 V AC: Approx. 8 VA max. (11 VA max. if all options added) 24 V AC: Approx. 5 VA max. (8 VA max. if all options are added) 24 V DC: Approx. 5 W max. (8 W max. if all options are added)
Ambient temperature/Humidity	-10 to 55°C, 35 to 85%RH (No icing, Non-condensing)
Altitude	2,000 m or less
Weight	BCS2: Approx. 110g, BCR2: Approx. 160g, BCD2: Approx. 220g
Accessories	Mounting frame: 1 piece (BCS2) Screw type mounting bracket: 1 piece (BCR2, BCD2) Instruction manual excerpt: 1 copy

Caution for Mounting

This instrument is intended to be used under the following environmental conditions (IEC61010-1): Overvoltage category II, Pollution degree 2
Ensure the mounting location corresponds to the following conditions:

- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gases
- No mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of -10 to 55°C (14 to 131°F) (No icing)
- An ambient non-condensing humidity of 35 to 85%RH (Non-condensing)
- No large capacity electromagnetic switches or cables through which large current is flowing
- No water, oil or chemicals or where the vapors of these substances can come into direct contact with the unit
- Take note that the ambient temperature of this unit – not the ambient temperature of the control panel – must not exceed 55°C (131°F) if mounted through the face of a control panel, otherwise the life of electronic components (especially electrolytic capacitors) may be shortened.

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.

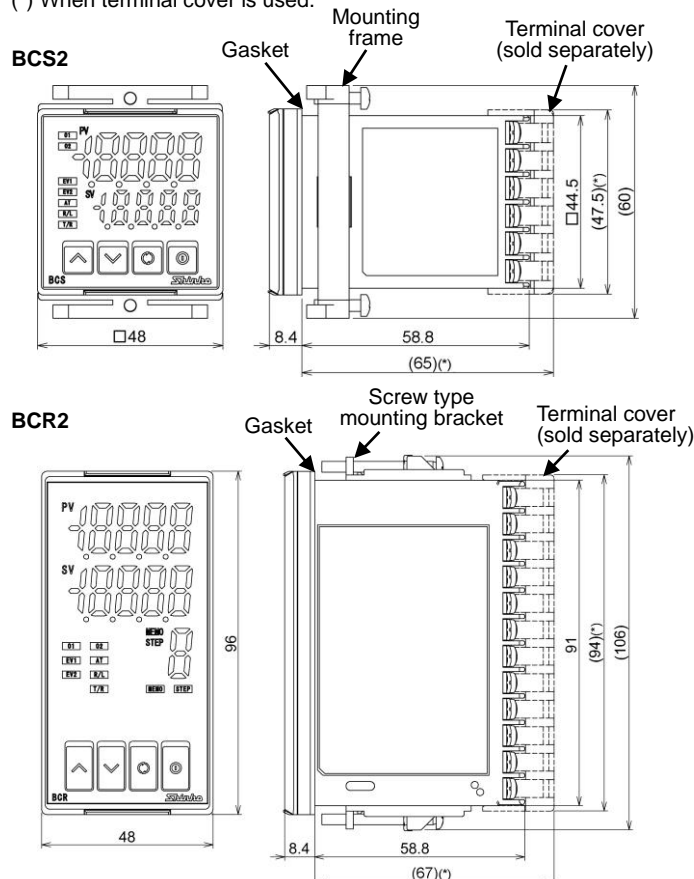
Compliance with Safety Standards**Caution**

- Always install the recommended fuse described in this manual externally.
- If the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.
- Use a device with reinforced insulation or double insulation for the external circuit connected to this product.
- When using this product as a UL certified product, use a power supply conforming to Class 2 or LIM for the external circuit connected to the product.

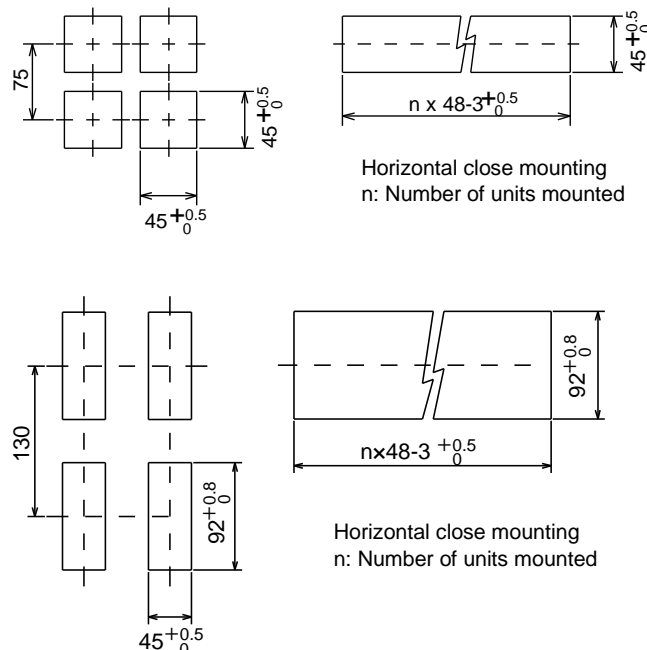
Control output (OUT1)	Relay contact 1a, Control capacity: 3 A 250 V AC (resistive load) 1 A 250 V AC (inductive load $\cos\phi=0.4$) Electric life: 100,000 cycles, Minimum applicable load: 10 mA 5 V DC Non-contact voltage (for SSR drive): 12 V DC $\pm 15\%$ Max 40 mA (short circuit protected) Direct current: 4 to 20 mA DC (Resolution: 12000) Load resistance: Max. 550 Ω
EVT output	Relay contact 1a, Control capacity: 3 A 250 V AC (resistive load) 1 A 250 V AC (inductive load $\cos\phi=0.4$) Electric life: 100,000 cycles, Minimum applicable load: 10 mA 5 V DC
Control output (OUT2) (DS, DA, EV2 options)	Relay contact 1a, Control capacity: 3 A 250 V AC (resistive load) 1 A 250 V AC (inductive load $\cos\phi=0.4$) Electric life: 100,000 cycles (If EV2 option is ordered, and 019 is selected from Event Output EV2 allocation.) Non-contact voltage (for SSR drive): 12 V DC $\pm 15\%$ Max 40 mA (short circuit protected) Direct current: 4 to 20 mA DC (Resolution: 12000) Load resistance: Max 550 Ω

Dimensions (Scale: mm)

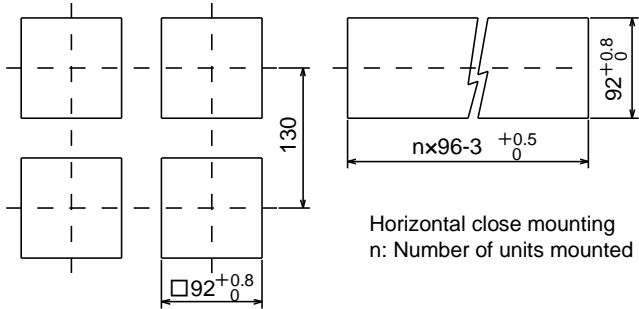
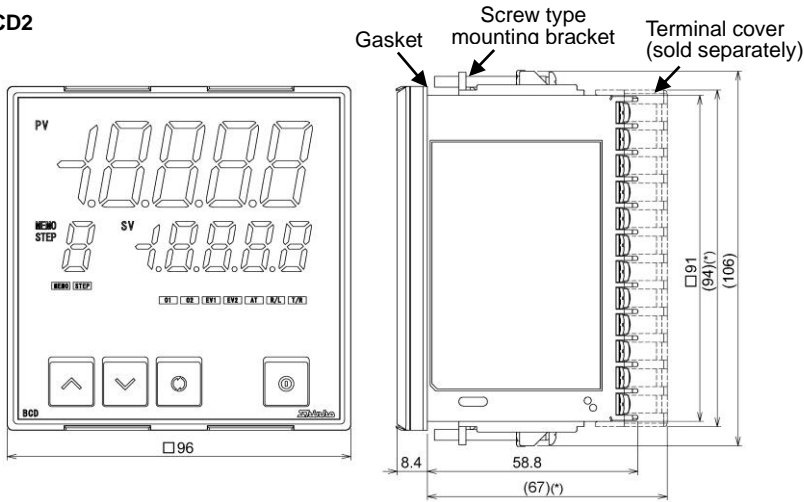
(*) When terminal cover is used.

**Panel Cutout** (Scale: mm)**Caution**

If horizontal close mounting is used for the unit, IP66 specification (Drip-proof/Dust-proof) may be compromised, and all warranties will be invalidated.

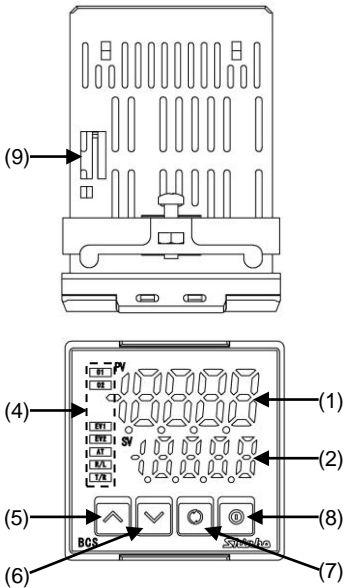


BCD2

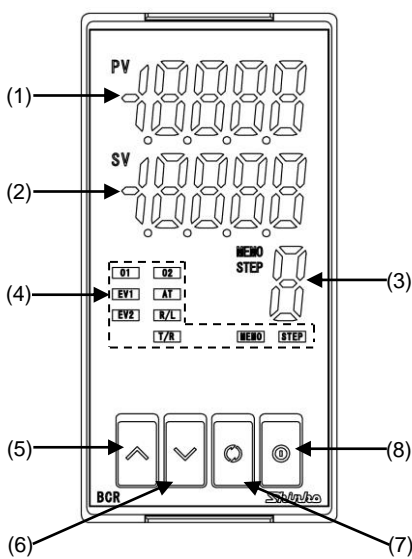


Names and Functions of Controller

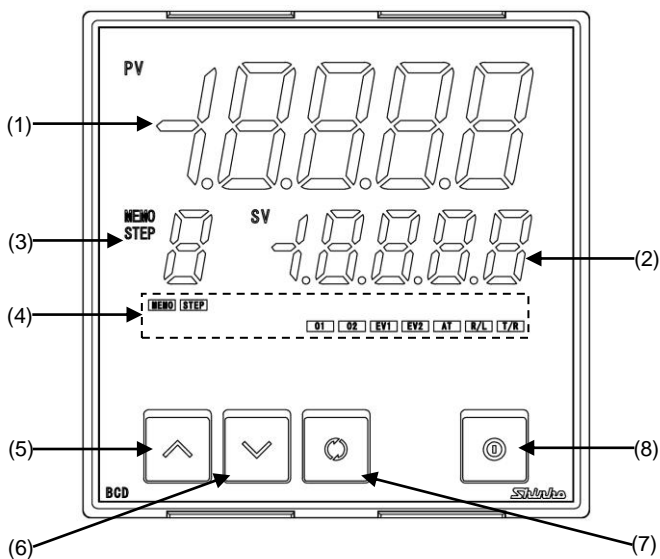
BCS2



BCR2



BCD2



Displays

(1)	PV Display	Indicates the PV (process variable), or setting characters in setting mode.
(2)	SV Display	Indicates the SV (desired value) or set data in setting mode. In Monitor mode, indicates MV (manipulated variable), remaining time (Program control), step number (Program control) (*) or Set value memory number (Fixed value control) (*). (*) For BCS2 only
(3)	MEMO/STEP Display	Indicates Set value memory number or step number (Program control). (For BCR2, BCD2)

Action Indicators

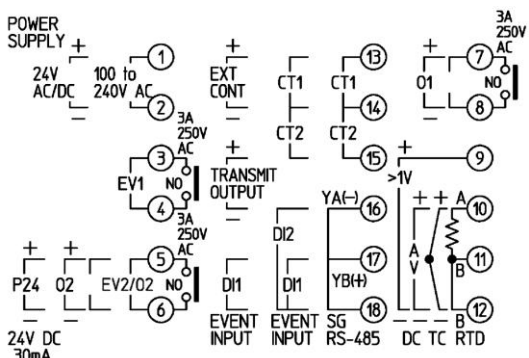
(4)	O1	Lit when control output OUT1 is ON. For direct current output type, flashes corresponding to the MV in 125 ms cycles.
	O2	Lit when control output OUT2 (EV2, DS, DA or EV2+D□ option) is ON. For direct current output type, flashes corresponding to the MV in 125 ms cycles.
	EV1	Lit when Event output 1 is ON.
	EV2	Lit when Event output 2 (EV2 or EV2+D□ option) is ON.
	AT	Flashes while AT or Auto-reset is performing.
	R/L	Lit while in Remote action (EIT option).
	T/R	Lit during Serial communication (C5W or C5 option) TX (transmitting) output.
	MEMO	Lit when Set value memory number is indicated. (For BCR2, BCD2)
	STEP	Lit when Step number (Program control) is indicated. (For BCR2, BCD2)

Keys, Connector

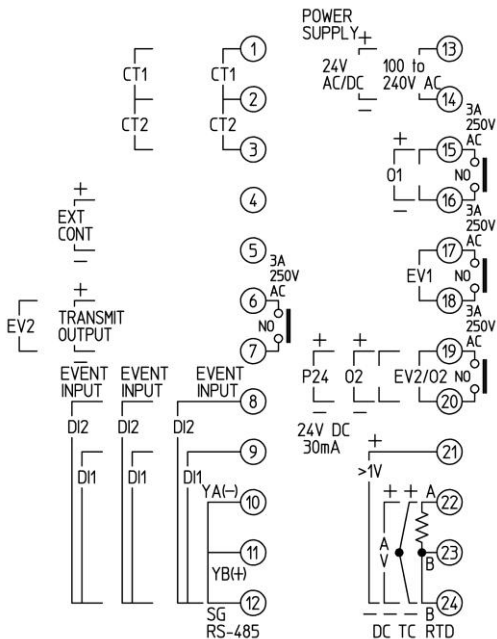
(5)	UP key	Increases the numeric value. If this key is pressed for 1 sec during Program control, the unit proceeds to the next step. (Advance function)
(6)	DOWN key	Decreases the numeric value.
(7)	MODE key	Selects a setting mode, and registers the set data. If the MODE key is pressed in RUN mode for 3 sec, the unit moves to Monitor mode.
(8)	OUT/OFF key	By pressing this key for 1 sec, one of the following items selected in [OUT/OFF key function] is indicated. <ul style="list-style-type: none">Control output OFF function: Turns control output ON or OFF.Auto/Manual control: Switches the Auto/Manual control.Program control: Starts or stops the Program control.
(9)	Console connector	By connecting to the tool cable (CMD-001, sold separately), the following operations can be conducted from an external computer using the Console software SWC-BCx01M. <ul style="list-style-type: none">Reading and setting of SV, PID and various set valuesReading of PV and action statusFunction change. (Console connector is located on the top of the BCS2, BCR2, and BCD2 case.)

Terminal Arrangement

BCS2



BCR2, BCD2

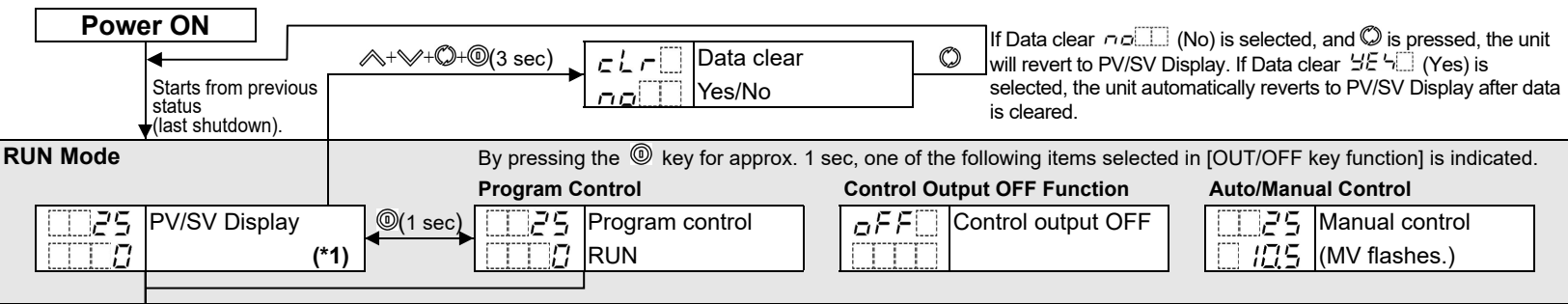


POWER SUPPLY	Supply voltage 100 to 240 V AC or 24V AC/DC (For 24 V DC, ensure polarity is correct.)
EV1	Event output EV1
EV2	Event output EV2 (EV2, EV2+D□ options)
O2	Control output OUT2 (EV2, DS, DA, EV2+D□ options)
P24	24 V DC Insulated power output (P24 option)
O1	Control output OUT1
TC	Thermocouple input
RTD	RTD input
DC	DC voltage, current input
CT1	CT input 1 (C5W, EIW, W options)
CT2	CT input 2 (C5W, EIW, W options)
RS-485	Serial communication RS-485 (C5W, C5 options)
EVENT INPUT	Event input DI1 (C5W, EIW, EIT, EI options) (C5W: For BCR2, BCD2) Event input DI2 (C5W, EIW, EIT, EI options) (C5W, EIT: For BCR2, BCD2)
EXT CONT	External setting input (EIT option)
TRANSMIT OUTPUT	Transmission output (EIT option)

Caution

Do not pull or bend the lead wire on the terminal side when wiring or after wiring, as it could cause malfunction.

Key Operation Flowchart



● About Setting Item

Input type

Input type

• Upper left: PV Display: Indicates setting characters.

• Lower left: SV Display: Indicates factory default.

• Right side: Indicates the setting item.

: This setting item is optional, and appears only when the option is ordered.

(*1) If 'Program control' is selected in [OUT/OFF key function], the unit enters Standby mode (Program control waiting).

(*2) Not available if 'Program control' is selected in [OUT/OFF key function].

(*3) If the option is ordered, and if 'Set value memory' is selected in [Event input DI1/DI2 allocation], setting items SV2 to SV4 are available.

If 'Program control' is selected in [OUT/OFF key function], SV2 to SV9, Steps 1 to 9 time, Steps 1 to 9 wait value are available.

(*4) The unit cannot proceed to Monitor mode if it is in Standby of Program control.

(*5) Available only when 'Program control' is selected in [OUT/OFF key function].

● Key Operation

- + + + (3 sec): Press and hold the , , , keys (in that order) together for approx. 3 sec.
- + (3 sec): Press and hold the , keys (in that order) together for approx. 3 sec.
- + : Press and hold the , keys (in that order) together.
- + (3 sec): Press and hold the , keys (in that order) together for approx. 3 sec.
- + + (5 sec): Press and hold the , , keys (in that order) together for approx. 5 sec.
- Set (or select) each item with the or key, and register the value with the key
- : If the key is pressed, the unit proceeds to the next item, illustrated by an arrow.
- Pressing key moves back to the previous item.
- To revert to RUN mode, press and hold the key for approx. 3 sec while in any mode.
- To revert to RUN mode, press and hold the key for approx. 3 sec while in any mode.
- If 'Control output OFF function' is selected in [OUT/OFF key function], the unit will enter Control output OFF status. If 'Auto/Manual control' is selected, the unit will enter Manual control status.
- If 'Program control' is selected, the unit will enter Program control RUN or Standby mode.

Initial Setting Mode

Input type

Scaling high limit

Scaling high limit

Scaling low limit

Scaling low limit

Decimal point place

Event output EV1 allocation (*6)

Event output EV2 allocation (*6)

Heater burnout alarm 1 value

Heater burnout alarm 2 value

Loop break alarm time

Loop break alarm span

Event input DI1 allocation

Event input DI2 allocation

External setting input high limit

External setting input low limit

Transmission output type

Transmission output high limit

Transmission output low limit

SV1

SV2

SV3

SV4

Reverts to RUN mode.

Main Setting Mode

SV1

Step 1 time

Step 1 time

Step 1 wait value

Step 1 wait value

SV2

SV2

Step 9 wait value

Step 9 wait value

Indicates setting items for Steps 2 to 9. (*3)

Reverts to RUN mode.

Monitor Mode

MV indication (Decimal point flashes.)

Remaining time (*5)

Current step number (BCS2) (*5)

SV number (BCS2) (*2)

Reverts to RUN mode.

Sub Setting Mode

AT/Auto-reset Perform/Cancel

OUT1 proportional band

OUT1 proportional band

Integral time

Integral time

Derivative time

Derivative time

ARW

ARW

Manual reset

Manual reset

OUT1 proportional cycle

OUT1 proportional cycle

OUT1 ON/OFF hysteresis

OUT1 ON/OFF hysteresis

OUT1 high limit

OUT1 high limit

OUT1 low limit

OUT1 low limit

OUT1 rate-of-change

OUT1 rate-of-change

OUT2 cooling method

OUT2 cooling method

OUT2 proportional band

OUT2 proportional band

OUT2 proportional cycle

OUT2 proportional cycle

OUT2 ON/OFF hysteresis

OUT2 ON/OFF hysteresis

OUT2 high limit

OUT2 high limit

OUT2 low limit

OUT2 low limit

Overlap/Dead band

Overlap/Dead band

Direct/Reverse action

Direct/Reverse action

EV1 alarm value

EV1 alarm value

EV1 high limit alarm value

EV1 high limit alarm value

EV2 alarm value

EV2 alarm value

EV2 high limit alarm value

EV2 high limit alarm value

Heater burnout alarm 1 value

Heater burnout alarm 1 value

Heater burnout alarm 2 value

Heater burnout alarm 2 value

Loop break alarm time

Loop break alarm time

Loop break alarm span

Loop break alarm span

Reverts to RUN mode.

Engineering Mode 1

Set value lock

Event input DI1 allocation

Event input DI2 allocation

Event output EV1 allocation (*6)

Event output EV2 allocation (*6)

Sensor correction coefficient

Sensor correction coefficient

Sensor correction

Sensor correction

PV filter time constant

PV filter time constant

Communication protocol

Communication protocol

Instrument number

Instrument number

Communication speed

Communication speed

Data bit/Parity

Data bit/Parity

Stop bit

Stop bit

Response delay time

Response delay time

Engineering Mode 2

SVTC bias

SVTC bias

Remote/Local

Remote/Local

External setting input high limit

External setting input high limit

External setting input low limit

External setting input low limit

Remote bias

Remote bias

Transmission output type

Transmission output type

Transmission output high limit

Transmission output high limit

Transmission output low limit

Transmission output low limit

Step time unit

Step time unit

Power restore action

Power restore action

Program start temperature

Program start temperature

Program control start type

Program control start type

Number of repetitions

Number of repetitions

SV Rise/Fall rate action

SV Rise/Fall rate action

Engineering Mode 3

SV rise rate

SV rise rate

SV fall rate

SV fall rate

Indication when control output OFF

Indication when control output OFF

AT bias

AT bias

AT gain

AT gain

Output status when input errors occur

Output status when input errors occur

OUT/OFF key function

OUT/OFF key function

Auto/Manual control after power ON

Auto/Manual control after power ON

Indication time

Indication time

OUT1 MV preset value

OUT1 MV preset value

OUT2 MV preset value

OUT2 MV preset value

Controller/Converter

Controller/Converter

Error indication Enabled/Disabled

Error indication Enabled/Disabled

Reverts to RUN mode.

Engineering Mode 4

Control method

Control method

Proportional gain 2DOF coefficient (α)

Proportional gain 2DOF coefficient (α)

Integral 2DOF coefficient (β)

Integral 2DOF coefficient (β)

Reverts to RUN mode.

(*6)

If Alarm output (001 to 012) or Time signal output (015) is selected in [Event output EV1/EV2 allocation], and the key is pressed, the following items will be indicated.

If 'Alarm output' is selected in [Event output EV1 allocation]

Event output EV1 allocation (*6)

EV1 alarm value 0

Enabled/Disabled

EV1 alarm value

EV1 alarm value

EV1 high limit alarm value

EV1 high limit alarm value

EV1 alarm hysteresis

EV1 alarm hysteresis

EV1 alarm delay time

EV1 alarm delay time

EV1 alarm Ener-gized/De-energized

EV1 alarm Ener-gized/De-energized

The unit moves to the item after [Event output EV1 allocation].

If 'Time signal output' is selected in [Event output EV1 allocation]

TS1 output step number

TS1 output step number

TS1 OFF time






















TS1 OFF time

TS1 ON time

TS1 ON time

The unit moves to the item after [Event output EV1 allocation].

If Alarm output (001 to 012) or Time signal output (015) is selected in [Event output EV2 allocation], read EV2, TS2 for EV1, TS1.

Input type	
 K	-200 to 1370 °C
 N	-200.0 to 400.0 °C
 J	-200 to 1000 °C
 R	0 to 1760 °C
 S	0 to 1760 °C
 B	0 to 1820 °C
 E	-200 to 800 °C
 T	-200.0 to 400.0 °C
 PL-2F	-200 to 1300 °C
 C(W/Re5-26)	0 to 1390 °C
 Pt100	-200.0 to 850.0 °C
 JPT100	-200.0 to 500.0 °C
 PPT100	-200 to 850 °C
 JPT100	-200 to 500 °C
 K	-328 to 2498 °F
 F	-328.0 to 752.0 °F
 J	-328 to 1832 °F
 R	32 to 3200 °F
 S	32 to 3200 °F
 B	32 to 3308 °F
 E	-328 to 1472 °F

T	-328.0 to 752.0 °F
N	-328 to 2372 °F
PL-2F	PL-II 32 to 2534 °F
C(W/Re5-26)	32 to 4199 °F
Pt100	-328.0 to 1562.0 °F
JPT100	-328.0 to 932.0 °F
PPT100	-328 to 1562 °F
JPT100	-328 to 932 °F
Pt100	-200 to 10000
JPT100	0 to 20 mA -2000 to 10000
PPT100	0 to 1 V -2000 to 10000
JPT100	0 to 5 V -2000 to 10000
Pt100	1 to 5 V -2000 to 10000
JPT100	0 to 10 V -2000 to 10000
PPT100	0 to 10 V -2000 to 10000
Pt100	-200 to 850 °C
JPT100	-200 to 500 °C
PPT100	-200 to 500 °C
K	-328 to 2498 °F
F	-328.0 to 752.0 °F
J	-328 to 1832 °F
R	32 to 3200 °F
S	32 to 3200 °F
B	32 to 3308 °F
E	-328 to 1472 °F

H/L limits alarm																																			
H/L limits independent																																			
H/L limit range alarm																																			
H/L limit range independent																																			
Process high alarm																																			
Process low alarm																																			
High limit with standby																																			
Low limit with standby																																			
H/L limits with standby																																			
H/L limits with standby independent																																			
Heater burnout alarm output																																			
Loop break alarm output																																			
Time signal output																																			
Output during AT																																			
Pattern end output																																			
Output by communication command																																			
Heating/Cooling control relay contact output (for EV2 only)																																			
<table><tr><td> Disabled</td></tr><tr><td> Enabled</td></tr><tr><td> Energized</td></tr><tr><td> De-energized</td></tr><tr><td> No event</td></tr><tr><td> Set value memory</td></tr><tr><td> Control ON/OFF</td></tr><tr><td> Direct/Reverse action</td></tr><tr><td> Preset output 1 ON/OFF</td></tr><tr><td> Preset output 2 ON/OFF</td></tr><tr><td> Auto/Manual control</td></tr><tr><td> Remote/Local</td></tr><tr><td> Program control Run/Stop</td></tr><tr><td> Program control Holding/Not holding</td></tr><tr><td> Program control Advance function</td></tr><tr><td> Integral action Holding</td></tr><tr><td><table><tr><td> PV transmission</td></tr><tr><td> SV transmission</td></tr><tr><td> MV transmission</td></tr><tr><td> DV transmission</td></tr><tr><td> AT Perform</td></tr><tr><td> AT on startup Perform</td></tr><tr><td> Auto-reset Perform</td></tr><tr><td> Air cooling</td></tr><tr><td> Oil cooling</td></tr><tr><td> Water cooling</td></tr><tr><td> Reverse action</td></tr><tr><td> Direct action</td></tr><tr><td> Unlock</td></tr><tr><td> Lock 1</td></tr><tr><td> Lock 2</td></tr><tr><td> Lock 3</td></tr><tr><td> Lock 4</td></tr><tr><td> Lock 5</td></tr></table></td></tr></table>	Disabled	Enabled	Energized	De-energized	No event	Set value memory	Control ON/OFF	Direct/Reverse action	Preset output 1 ON/OFF	Preset output 2 ON/OFF	Auto/Manual control	Remote/Local	Program control Run/Stop	Program control Holding/Not holding	Program control Advance function	Integral action Holding	<table><tr><td> PV transmission</td></tr><tr><td> SV transmission</td></tr><tr><td> MV transmission</td></tr><tr><td> DV transmission</td></tr><tr><td> AT Perform</td></tr><tr><td> AT on startup Perform</td></tr><tr><td> Auto-reset Perform</td></tr><tr><td> Air cooling</td></tr><tr><td> Oil cooling</td></tr><tr><td> Water cooling</td></tr><tr><td> Reverse action</td></tr><tr><td> Direct action</td></tr><tr><td> Unlock</td></tr><tr><td> Lock 1</td></tr><tr><td> Lock 2</td></tr><tr><td> Lock 3</td></tr><tr><td> Lock 4</td></tr><tr><td> Lock 5</td></tr></table>	PV transmission	SV transmission	MV transmission	DV transmission	AT Perform	AT on startup Perform	Auto-reset Perform	Air cooling	Oil cooling	Water cooling	Reverse action	Direct action	Unlock	Lock 1	Lock 2	Lock 3	Lock 4	Lock 5
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Program control Advance function																																			
Integral action Holding																																			
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Shinko protocol
Modbus ASCII
Modbus RTU
Shinko protocol (JC command allocation)
Modbus ASCII (JC command allocation)
Modbus RTU (JC command allocation)
9600 bps
19200 bps
38400 bps
8 bits/No parity
7 bits/No parity
8 bits/Even
7 bits/Even
8 bits/Odd
7 bits/Odd
1 bit

2 bits
Local
Remote
Hours:Minutes
Minutes:Seconds
Stop
Continue (resume)
Suspend (on hold)
PV start
PVR start
SV start
SV start
PV start
OFF indication
No indication
PV indication

PV + Any Alarm active
Output OFF
Output ON
Control output OFF
Auto/Manual control
Program control
Automatic control
Manual control
Controller
Converter
Disabled
Enabled
Usual PID
2DOF PID