Instruction manual

for

DIN rail mounting type indicating controller DCL-33A

To prevent accidents arising from the misuse of this controller, please ensure the operator using it receives this manual.

> ⚠ # Caution
>
> • This instrument should be used according to the specifications described in this manual.
>   If it is not used according to the specifications, it may malfunction or breakdown.
> • Be sure to follow the warnings and cautions. Otherwise serious injury or accidents may occur.
> • The contents of this instruction manual are subject to change without notice.
> • Care has been taken to assure that the contents of this instruction manual are correct, but if there are
>   any doubts, mistakes or questions, please inform our sales department.
> • This instrument is designed to be installed in a control panel. If not, measures must be taken to ensure
>   that the operator can not touch power terminals or other high voltage sections.
> • Be sure to check that the power is turned off before cleaning this instrument.
> • Use a soft and dry cloth when cleaning the instrument.
>   (If paint thinner is used, it might deform or tarnish the unit.)
> • As the display section is vulnerable, do not strike or scratch it with a hard object.
> • Any unauthorized transfer or copying of this document, in part or in whole, is prohibited.
> • SHINKO TECHNOS CO., LTD is not liable for any damages or secondary damages incurred as
>   a result of using this product, including any indirect damages.

1. Model name

1.1 Model name

DCL-	3	3	A	- □／□,□ □□□			Series name: DCL-300 (W22.5 x H75 x D100mm)	
Control action	3						PID	
Alarm		A					Selectable by key operation *1	
Control output			R				Relay contact: 1a	
			S				Non-contact voltage (for SSR): 12 , V DC	
			A				DC current: 4 to 20mA DC	
Input				M			Multi-range *2	
Supply voltage					1		Supply voltage 24V AC/DC *3	
Option						W (5A)	Heater burnout alarm	CT input rating: 5A
						W (10A)		CT input rating: 10A
						W (20A)		CT input rating: 20A
						W (50A)		CT input rating: 50A
						C5	Serial communication	Based on EIA RS-485

*1: Alarm action (9 types and No alarm) and Energized/Deenergized can be selected by key operation.

*2: Thermocouple, RTD, DC current and DC voltage can be selected by key operation.

*3: Standard supply voltage is 100 to 240V AC. Write down [1] after alphanumeric character only when
    24V AC/DC is ordered.

1.1 Model name

Model name labels are put on the right side of the case and the inner assembly.
For Heater burnout alarm output, CT input rating value is written in the bracket ( ).

Model name label

		(example)
(1) Model name -----------------	DCL-33A-R/M	Relay contact output/ Multi-range input
(2) Option name -------------	W(20A)	Heater burnout alarm output
Supply voltage*		
Instrument No. -----------------	No.XXXXXXX	

(Only on internal assembly)   *Write 1 only for 24V AC/DC

2. Name and functions of the sections

(1) EVT indicator
A red LED lights up when Event output [Alarm, Loop break alarm
or Heater burnout alarm (Option)] is ON.

(2) OUT indicator
A green LED lights up when OUT output is ON.
For current output type, this blinks in 0.25 seconds cycle
corresponding to the output manipulated variable .

(3) T/R indicator
A yellow LED blinks while serial communication TX output (Transmission)

(4) AT indicator
A yellow LED blinks while PID auto-tuning is being performed.

(5) PV display
Indicates input value (PV) with a Red LED.

(6) SV display
Indicates setting value (SV) with a Green LED.

(7) Increase key
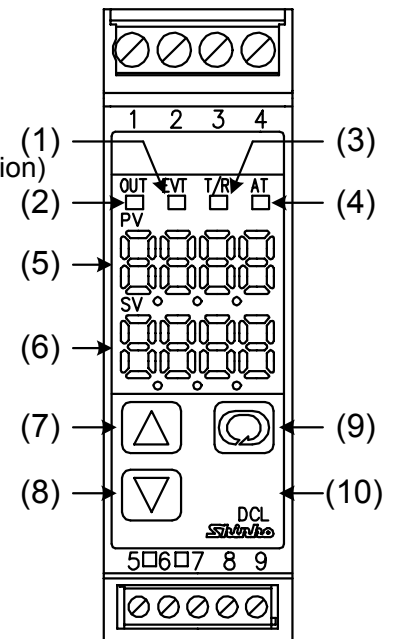Increases numeric value.

(8) Decrease key
Decreases numeric value.

(9) Mode key
Changes the setting mode or registers the setting value.
(Resisters the setting value by pressing the Mode key.)

(10) Sub-mode key
Calls auxiliary function setting mode 2 in combination with the mode key.

(Fig. 2-1)

⚠ Caution
When setting the specifications and functions of this controller, connect the terminals 1 and 2 for power
source first, then set them referring to "5. Setup" before performing "3. Mounting to the control panel"
and "4. Wiring".


3. Mounting to the control panel

3.1 Site selection
This instrument is intended to be used under the following environmental conditions (IEC61010-1).
: Overvoltage category Ⅱ, Pollution degree 2

**Mount the controller in a place with:**
- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gasses
- Few mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of 0 to 50℃ (32 to 122℉) without rapid change
- An ambient non-condensing humidity of 35 to 85%RH
- 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
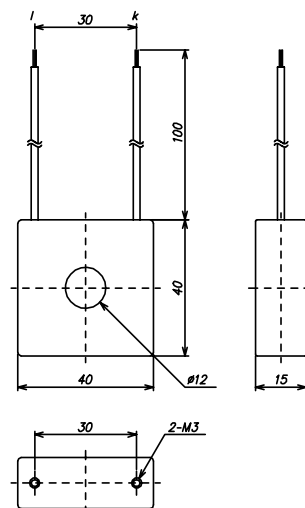 the controller

3.2 External dimension
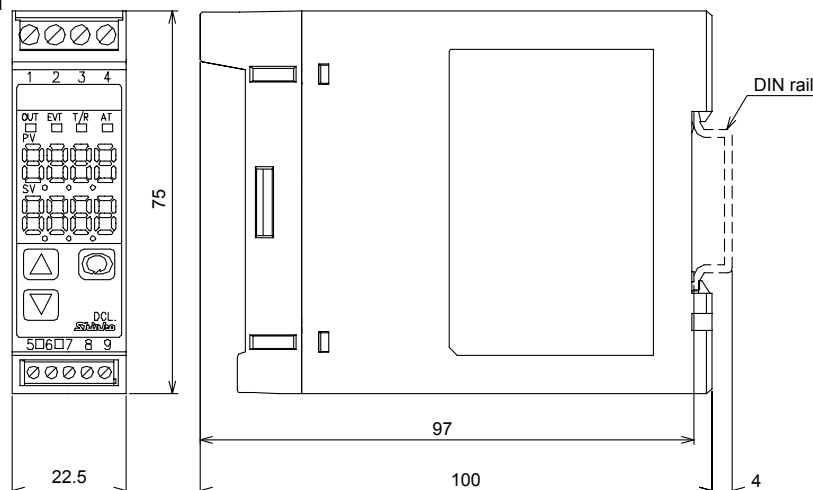
(Fig. 3.2-1)

3.3 CT (Current transformer) external dimension
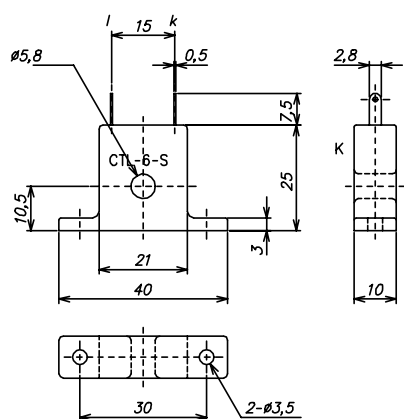
CTL-6S (for 20A)

CTL-12-S36-10L1 (for 50A)

(Fig. 3.3-1)

3.4 Mounting to DIN rail

> ⚠ # Caution
>
> **Mount the DIN rail horizontally.**
> **When DIN rail is mounted vertically, be sure to use commercially available fastening plates at the end of DCL-33A series. Mount the DCL-33A series to the DIN rail so that the DCL-33A series may be fixed. However, if the DIN rail is mounted horizontally in a position susceptible to vibration or shock, the fastening plates must be used as well.**

● **Recommended fastening plate**

Omron corporation	End plate	PEP-M
IDEC corporation	Fastening plate	BNL6P, BNL8P
Matsushita electric works, LTD.	Fastening plate	ATA4806

[1] Hook (1) of the DCL-33A series on the upper side of the DIN rail. (Fig. 3.4-1)

[2] Making (1) part of the DCL-33A series as a support, fit the lower part of the DCL-33A series to the DIN rail.

   DCL-33A series will be completely fixed to DIN rail with a "Click" sound. (Fig.3.4-1)
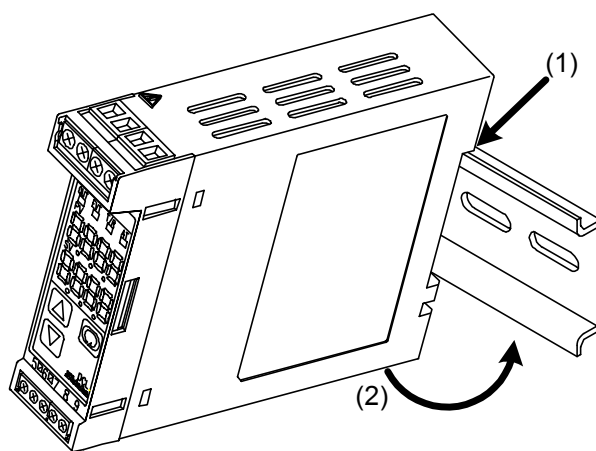
(Fig. 3.4-1)

4. Wiring and connection

> ⚠ **Warning**
>
> Turn the power supplied to the instrument OFF before wiring or checking it.
> Working or touching the terminal with the power switched ON may result in Electric
> Shock causing severe injury or death.

> ⚠ **Caution**
>
> - Do not leave wire chips into the DCL-33A series when wiring, because they could cause fire, malfunction and trouble.
> - Insert the connecting cable into the designated connector securely to prevent malfunction, or it may cause malfunction due to imperfect contact.
> - Connect the AC power wiring to the designated terminal as is written in this instruction manual, or it may burn and damage the DCL-33A series.
> - Tighten the terminal screw with the specified torque, or damage the terminal screw and deform the case.
> - Use thermocouple and compensating lead wire that fit sensor input specification of this unit.
> - Use the 3-wire RTD that fits sensor input specification of this unit.
> - Do not confuse the polarity when using DC voltage and current inputs in the case 24V DC is used.
> - Keep input wire (Thermocouple, RTD) away from power source and load wire when wiring.
> - To prevent the unit from harmful effects of the unexpected level noise, it is recommended that a surge absorber to be installed between the electromagnetic switch coils.
> - This unit has neither built-in power switch nor fuse. Therfore it is necessary to install them in the circuit near the external unit.
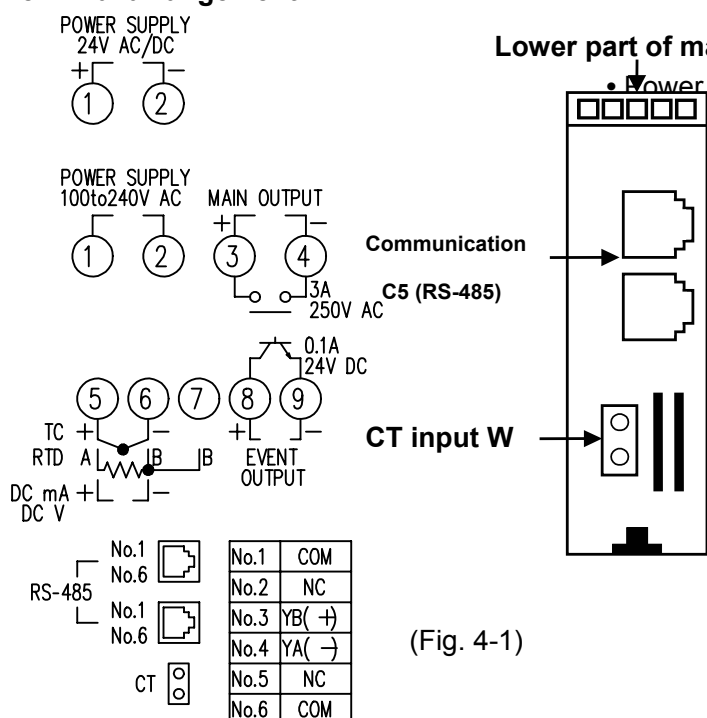>   (Recommended fuse: Rated voltage 250V AC, Rated current 2A, Fuse type: Time-lag fuse)

● **Note**

Tighten the terminal screw properly referring to the table below.

Terminal screw	Terminal No.	Torque
M2.6	1 to 4	Max. 0.5N・m
M2.0	5 to 9	Max. 0.25N・m

● **Terminal arrangement**

Lower part of main body

- Power supply
- MAIN OUTPUT: Control output
- EVENT OUTPUT: Outputs when Alarm, Loop break alarm or Heater burnout alarm [option] is ON
- RS-485: Serial communication
- TC : Thermocouple
- RTD : Resistance temperature detector
- DC : DC current or DC voltage

No.1	COM
No.2	NC
No.3	YB(+)
No.4	YA(−)
No.5	NC
No.6	COM

(Fig. 4-1)

- **Option: Heater burnout alarm**
  This alarm is not available for detecting current under phase control.
  Use the current transformer (CT) provided, and pass a lead wire of the heater circuit into a hole of the CT. When wiring, keep the CT wire away from any AC source or load wires to avoid the external interference.

(Fig. 4-2)
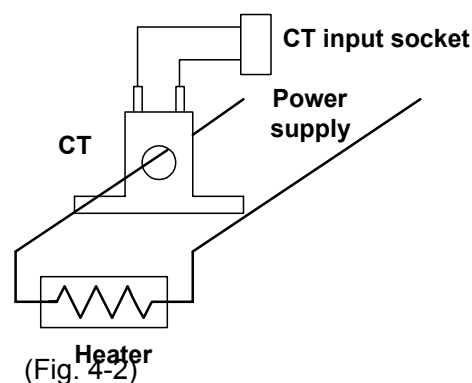
5. Setup

The sensor input character and temperature unit are indicated on the PV display for approx. 3 seconds after the power is turned on, and the input range high limit value is indicated on the SV display. (Table 5-1)
(If any other value is set in the scaling high limit value, it is indicated on the SV display.)
During this time all outputs and the LED indicators are in OFF status. After that the control starts indicating actual temperature on the PV display and setting value on the SV display.
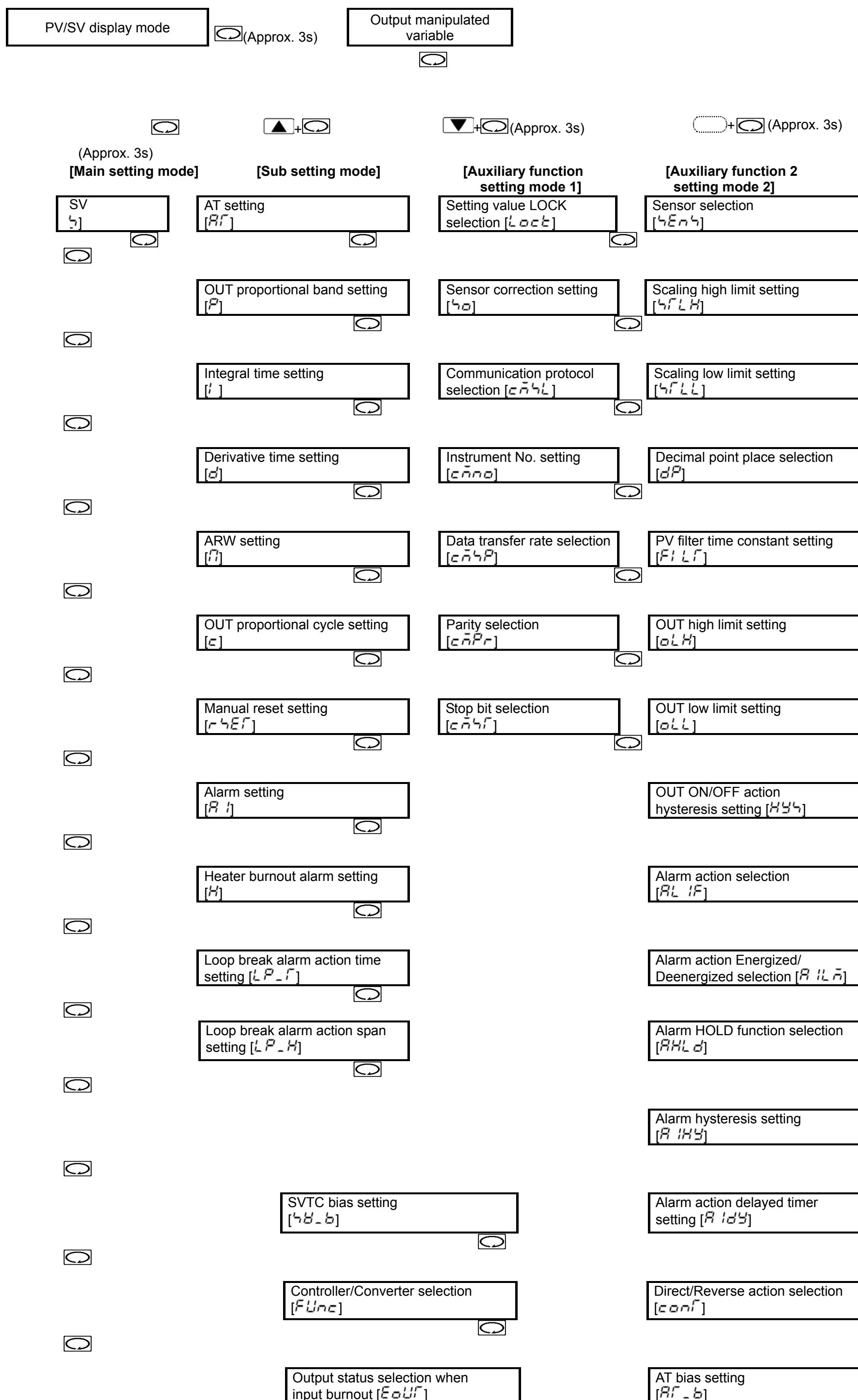
(Table 5-1)

| Input	Scale range		Resolution
K	-200 to 1370 ℃	-320 to 2500 ℉	1℃ (℉)
	-199.9 to 400.0℃	-199.9 to 750.0℉	0.1℃ (℉)
J	-200 to1000 ℃	-320 to1800 ℉	1℃ (℉)
R	0 to 1760 ℃	0 to 3200 ℉	1℃ (℉)
S	0 to 1760 ℃	0 to 3200 ℉	1℃ (℉)
B	0 to 1820 ℃	0 to 3300 ℉	1℃ (℉)
E	-200 to 800 ℃	-320 to 1500 ℉	1℃ (℉)
T	-199.9 to 400.0℃	-199.9 to 750.0℉	0.1℃ (℉)
N	-200 to 1300 ℃	-320 to 2300 ℉	1℃ (℉)
PL-Ⅱ	0 to 1390 ℃	0 to 2500 ℉	1℃ (℉)
C (W/Re5-26)	0 to 2315 ℃	0 to 4200 ℉	1℃ (℉)
Pt100	-199.9 to 850.0 ℃	-199.9 to 999.9℉	0.1℃ (℉)
	-200 to 850 ℃	-300 to 1500 ℉	1℃ (℉)
JPt100	-199.9 to 500.0 ℃	-199.9 to 900.0℉	0.1℃ (℉)
	-200 to 500 ℃	-300 to 900 ℉	1℃ (℉)
4 to 20mA DC	-1999 to 9999 *1,*2		1
0 to 20mA DC	-1999 to 9999 *1,*2		1
0 to 1V DC	-1999 to 9999 *1		1
0 to 5V DC	-1999 to 9999 *1		1
1 to 5V DC	-1999 to 9999 *1		1
0 to 10V DC	-1999 to 9999 *1		1

*1: Input range and decimal point place can be changed.
*2: A shunt resistor (50Ω) purchased separately must be connected between the input terminals.

5.1 Setting flow chart

PV/SV display mode ⟳(Approx. 3s) Output manipulated variable
⟳

⟳ (Approx. 3s) | ▲+⟳ | ▼+⟳ (Approx. 3s) | ⬚+⟳ (Approx. 3s)

[Main setting mode] | **[Sub setting mode]** | **[Auxiliary function setting mode 1]** | **[Auxiliary function 2 setting mode 2]**

[Main setting mode]	[Sub setting mode]	[Auxiliary function setting mode 1]	[Auxiliary function 2 setting mode 2]
SV `5]`	AT setting `[Rr]`	Setting value LOCK selection `[Lock]`	Sensor selection `[5En5]`
	OUT proportional band setting `[P]`	Sensor correction setting `[5o]`	Scaling high limit setting `[5rLH]`
	Integral time setting `[i ]`	Communication protocol selection `[cō5L]`	Scaling low limit setting `[5rLL]`
	Derivative time setting `[d]`	Instrument No. setting `[cōno]`	Decimal point place selection `[dP]`
	ARW setting `[ī]`	Data transfer rate selection `[cō5P]`	PV filter time constant setting `[FiLr]`
	OUT proportional cycle setting `[c]`	Parity selection `[cōPr]`	OUT high limit setting `[oLH]`
	Manual reset setting `[r5Er]`	Stop bit selection `[cō5r]`	OUT low limit setting `[oLL]`
	Alarm setting `[R i]`		OUT ON/OFF action hysteresis setting `[HY5]`
	Heater burnout alarm setting `[H]`		Alarm action selection `[RL iF]`
	Loop break alarm action time setting `[LP_r]`		Alarm action Energized/Deenergized selection `[R iLō]`
	Loop break alarm action span setting `[LP_H]`		Alarm HOLD function selection `[RHLd]`
			Alarm hysteresis setting `[R iHY]`
	SVTC bias setting `[5b_b]`		Alarm action delayed timer setting `[R idY]`
	Controller/Converter selection `[FUnc]`		Direct/Reverse action selection `[conr]`
	Output status selection when input burnout `[EoUr]`		AT bias setting `[Rr_b]`

5.2 Main setting mode

Character	Name, Description, Setting range	Default value
⅃	**SV** • Sets the value for controlled object. • Scaling low limit value to scaling high limit value (Decimal point place follows the selection for DC voltage and current inputs)	0℃

5.3 Sub setting mode

Character	Name, Description, Setting range	Default value
AՐ	**AT setting** • Performs PID auto-tuning. However when PID auto-tuning does not finish after 4 hours, PID auto-tuning is shut down compulsory. • PID auto-tuning cancellation : − − − − PID auto-tuning performance: AՐ	− − − −
P	**OUT proportional band setting** • Sets the proportional band. • The control action becomes ON/OFF when set to 0.0 • Setting range: 0.0 to 110.0%	2.5%
ⅰ	**Integral time setting** • Sets the integral time. • Setting the value to 0 disables this function. • This setting item is not indicated for ON/OFF action. • Setting range: 0 to 1000 seconds	200 seconds
d	**Derivative time setting** • Sets the derivative time. • Setting the value to 0 disables this function. • This setting item is not indicated for ON/OFF action. • Setting range: 0 to 300 seconds	50 seconds
Π	**Anti-reset windup setting** • This setting item is indicated only for PID action. • Setting range: 0 to 100%	50%
⊏	**OUT proportional cycle setting** • Sets the proportional cycle value for the control output (OUT). • This setting item is not indicated for ON/OFF action or DC current output. • Setting range: 1 to 120 seconds	30 seconds or 3 seconds
ⱹⰋEՐ	**Manual reset setting** • Sets the reset value manually. • This setting item is indicated only for P and PD action. • ±Proportional band converted value (In the case of DC voltage and current inputs, decimal point place follows the selection.)	0.0

A ⅰ	**Alarm setting**
	• Sets the action point for the alarm output.
	• Setting the value to 0 or 0.0 disables this function.
	  (excluding Process high and Process low alarms)
	  When Loop break alarm and Heater burnout alarm are applied together, the output is common.
	• This setting item is not indicated when "No alarm" action is selected in [Alarm action selection].
	• See (Table 5.3-1). (In the case of DC voltage and DC current inputs, decimal point place follows the selection.)
		0℃

H☐☐☐ and ☐XX.X are indicated in turn.	**Heater burnout alarm setting** • Sets the heater current value for Heater burnout alarm. • Setting the value to 0.0 disables this function. • Self-holding is not available for the alarm output. When alarm and Loop break alarm are applied together, the output is common.	0.0A

	• This setting item is not indicated when Heater burnout alarm is not added. • Rating 5A : 0.0 to 5.0A Rating 20A: 0.0 to 20.0A Rating 10A: 0.0 to10.0A Rating 50A: 0.0 to 50.0A	
LP_г	**Loop break alarm action time setting** • Sets the action time to assess the Loop break alarm. • Setting the value to 0 disables this function. • When alarm and Heater burnout alarm are applied together, the output is common. • Setting range: 0 to 200 minutes	0 minutes
LP_H	**Loop break alarm action span setting** • Sets the action span to assess the Loop break alarm. • Setting the value to 0 disables this function. • When alarm and Heater burnout alarm are applied together, the output is common. • Thermocouple, RTD inputs: 0 to 150℃ (℉) or 0.0 to 150.0℃ (℉) DC voltage and current inputs: 0 to 1500 (Decimal point place follows the selection)	0℃

(Table 5.3-1)

Alarm action type	Setting range	
High limit alarm	-(Scaling span) to scaling span	Minimum negative setting value: -199.9 or -1999
Low limit alarm	-(Scaling span) to scaling span	
High/Low limits alarm	0 to scaling span	
High/Low limit range alarm	0 to scaling span	
Process high alarm	Scaling low limit value to scaling high limit value	
Process low alarm	Scaling low limit value to scaling high limit value	Maximum positive setting value: 999.9 or 9999
High limit alarm with standby	-(Scaling span) to scaling span	
Low limit alarm with standby	-(Scaling span) to scaling span	
High/Low limits with standby	0 to scaling span	

5.4 Auxiliary function setting mode 1

Character	Name, Description, Setting range	Default value

Lock	**Setting value LOCK selection**
	• Locks the setting value to prevent setting errors.
	  The setting item to be locked is dependent on the designation.
	• PID auto-tuning cannot be carried out when Lock1 or Lock2 is selected. Be sure to select LOCK 3 when our programmable controller (with SVTC) is used together.
	• ---- (Unlock) : All setting values can be changed.
	  Loc1 (LOCK 1): None of setting values can be changed.
	  Loc2 (LOCK 2): Only main setting mode can be changed.
		Unlock

	Loc3 (LOCK 3): All setting values can be changed except Controller/Converter function selection. But do not change each setting item of auxiliary function setting mode 2. Changed data reverts to their former value after power is turned off because they are not saved in the non-volatile memory. Lock 3 is suitable when our programmable controller (with SVTC) is used together because it has noting to do with memory life.	
Sc	**Sensor correction setting** • Sets the sensor correction value of the sensor. • Thermocouple and RTD inputs: -100.0 to 100.0℃ (℉) DC voltage and current inputs: -1000 to 1000 (Decimal point place follows the selection.)	0.0℃
cм5L	**Communication protocol selection** • Selects communication protocol. • This item is not indicated when [Option: C5] is not added.	Shinko protocol

Character	Name, Description, Setting range	Default value
	• Shinko protocol: $\bar{n}o\bar{n}L$, Modbus ASCII mode: $\bar{n}odA$ Modbus RTU mode: $\bar{n}odr$	
$c\bar{n}no$	**Instrument number setting** • Sets individual instrument number to each DCL-33A when connecting plural DCL-33As in serial communication. • This item is not indicated when [Option: C5] is not added. • Setting range: 0 to 95	0
$c\bar{n}5P$	**Data transfer rate selection** • Selects data transfer rate in conformity with host computer • This item is not indicated when [Option: C5] is not added. • 2400bps: 24, 4800bps: 48, 9600bps: 96, 19200bps: 192	9600bps
$c\bar{n}Pr$	**Parity selection** • Selects parity. • This item is not indicated when [Option: C5] is not added or when Shinko is selected in Communication protocol selection • None: $nonE$, Even: $EUEn$, Odd: odd	Even
$c\bar{n}5\Gamma$	**Stop bit selection** • Selects stop bit. • This item is not indicated when [Option: C5] is not added or when Shinko is selected in Communication protocol selection • Setting: 1 or 2	1

5.5 Auxiliary function setting mode 2

Character	Name, Description, Setting range	Default value
$5En5$	**Input type selection** • Selects a sensor type and temperature unit from thermocouple (22 types), RTD (8 types), DC current (2 types) and DC voltage (4 types). • When changing input type from DC voltage input to the others, detach the sensor connected to this unit before changing. Input circuit will break down if input type is change while the sensor is connected.	K (-200 to 1370℃)
	K -200 to 1370 ℃: $E\quad C$ K -320 to 2500 ℉: $E\quad F$ -199.9 to 400.0℃: $E\quad .C$ -199.9 to 750.0℉: $E\quad .F$ J -200 to 1000 ℃: $J\quad C$ J -320 to 1800 ℉: $J\quad F$ R 0 to 1760 ℃: $r\quad C$ R 0 to 3200 ℉: $r\quad F$ S 0 to 1760 ℃: $5\quad C$ S 0 to 3200 ℉: $5\quad F$ B 0 to 1820 ℃: $b\quad C$ B 0 to 3300 ℉: $b\quad F$ E -200 to 800 ℃: $E\quad C$ E -320 to 1500 ℉: $E\quad F$ T -199.9 to 400.0℃: $\Gamma\quad .C$ T -199.9 to 750.0℉: $\Gamma\quad .F$ N -200 to 1300 ℃: $n\quad C$ N -320 to 2300 ℉: $n\quad F$ PL-Ⅱ 0 to 1390 ℃: $PL2C$ PL-Ⅱ 0 to 2500 ℉: $PL2F$ C(W/Re5-26) 0 to 2315 ℃: $c\quad C$ C (W/Re5-26) 0 to 4200 ℉: $c\quad F$ Pt100 -199.9 to 850.0℃: $Pr\ .C$ Pt100 -199.9 to 999.9℉: $Pr\ .F$ JPt100 -199.9 to 500.0℃: $JPr.C$ JPt100 -199.9 to 900.0℉: $JPr.F$ Pt100 -200 to 850 ℃: $Pr\quad C$ Pt100 -300 to 1500 ℉: $Pr\quad F$ JPt100 -200 to 500 ℃: $JPrC$ JPt100 -300 to 900 ℉: $JPrF$ 4 to 20mA -1999 to 9999 : $420A$ 0 to 20mA -1999 to 9999 : $020A$ 0 to 1V -1999 to 9999 : $0\ 1U$ 0 to 5V -1999 to 9999 : $0\ 5U$ 1 to 5V -1999 to 9999 : $1\ 5U$ 0 to 10V -1999 to 9999 : $0\ 10U$	
$5\Gamma LH$	**Scaling high limit setting** • Sets the scaling high limit value. • Scaling low limit setting value to Input range high limit value (For DC voltage and current inputs, decimal point place follows the selection.)	1370℃
$5\Gamma LL$	**Scaling low limit setting** • Sets the scaling low limit value. • Input range low limit value to scaling high limit setting value	-200℃

	(For DC voltage and current inputs, decimal point place follows the selection.)	
dP	**Decimal point place selection** • Selects the decimal point place. However, when thermocouple or RTD input is selected in the sensor selection, this setting item is not indicated. • No decimal point to 3 digits after decimal point	No decimal point
FILT	**PV filter time constant setting** • Sets the PV filter time constant. If the setting value is too large, it affects control result due to the response delay. • Setting range: 0.0 to 10.0 seconds	0.0 seconds
oLH	**OUT high limit setting** • Sets the OUT high limit value. • This setting item is not indicated when ON/OFF action. • **Setting range: OUT low limit value to 105%** Setting greater than 100% is effective to DC current output type.	100%
oLL	**OUT low limit setting** • Sets the OUT low limit value. • This setting item is not indicated during ON/OFF action. • Setting range: -5% to OUT high limit value Setting less than 0% is effective to DC current output type.	0%
HYS	**OUT ON/OFF action hysteresis setting** • Sets the ON/OFF action hysteresis for the OUT. • This setting item is indicated only for ON/OFF action (P=0). • Thermocouple and RTD inputs: 0.1 to 100.0℃(℉) DC voltage and current inputs : 1 to 1000 (Decimal point place follows the selection)	1.0℃
AL1F	**Alarm action selection** • Selects an alarm action type. No alarm : - - - - High limit alarm : *H* Low limit alarm : *L* High/Low limits alarm : *HL* High/Low limit range alarm : *Ui d* Process high alarm : *Ah* Process low alarm : *rAh* High limit alarm with standby : *H u* Low limit alarm with standby : *L u* High/Low limits alarm with standby : *HL u*	No alarm
AILm	**Alarm action Energized/Deenergized** • Selects the alarm action Energized/Deenergized. • This setting item is not indicated when "No alarm" action is selected in [Alarm action selection]. • Energized : *nomL*, Deenergized: *rEbh*	Energized
AHLd	**Alarm HOLD function selection** • Selects whether alarm HOLD function is [Used] or not. If alarm HOLD function is set to [Used], once the alarm functions, alarm output remains until the power is turned off. • This setting item is not indicated when "No alarm" action is selected in [Alarm action selection]. • Alarm HOLD [Not used]: *nonE*, Alarm HOLD [Used]: *HoLd*	Alarm HOLD [Not used]
A1HY	**Alarm hysteresis setting** • Sets the alarm hysteresis. • This setting item is not indicated when "No alarm" action is selected in [Alarm action selection]. • Thermocouple and RTD inputs: 0.1 to 100.0℃(℉) DC voltage and current inputs : 1 to 1000 (Decimal point place follows the selection.)	1.0℃

R ¦dY	**Alarm action delayed timer setting** • Sets the alarm action delayed time. Alarm output activates when the setting time has passed after the input enters alarm output range. • This setting item is not indicated when "No alarm" action is selected in [Alarm action selection]. • Setting range: 0 to 9999 seconds	0 seconds
$con\Gamma$	**Direct/Reverse selection** • Selects reverse (heating) or direct (cooling) control action. • Reverse (Heating) action : $HE\,R\Gamma$ Direct (Cooling) action : $cooL$	Reverse (Heating) action
$R\Gamma\_b$	**AT bias setting** • Set the PID auto-tuning bias value. • This setting item is not indicated when DC voltage or current input is selected in [Sensor selection] and when action is not PID, either. • Setting range: 0 to 50℃(0 to 100℉) or 0.0 to 50.0℃(0.0 to 100.0℉)	20℃
$5\theta\_b$	**SVTC bias setting** • Control desired value : Value that was received by SVTC command + SVTC bias value •This setting item is not indicated when [Option: C5] is not added.	0
$FUnc$	**Controller/ Converter function selection** • Selects controller or converter function. • This setting item is indicated only when the control output is DC current output type. • Controller function: $cn\Gamma r$, Converter function: $cn\theta\Gamma$	Controller function
$Eo\theta\Gamma$	**Output status selection when input burnout** • Selects whether the OUT output is turned OFF or not when DC input is overscale or underscale. • This setting item is indicated only when DC input and DC current output type. • oFF (output OFF), on (output ON)	Output OFF

Sensor correction function
This corrects the input value from the sensor. When a sensor cannot be set at a location where control is desired, the sensor measuring temperature may deviate from the temperature in the controlled location. When controlling with multiple controllers, the accuracy of the sensors or dispersion of load capacity has influence on the control.
Therefore, sometimes the measured temperature (input value) does not concur with the same setting value. In such case the control can be set at the desired temperature by correcting the input value of the sensors.

Loop break alarm
The alarm will be activated when the process variable (PV) does not rise as much value as the span or greater within the time it takes to assess the Loop break alarm after the manipulated variable has reached 0% or the output low limit value. When the control action is Direct (Cooling), the alarm acts conversely.

Energized/Deenergized function
[If alarm action Energized is selected]
When the alarm output indicator is lit, the alarm output (between terminal 8 and 9) is conducted (ON).
When the alarm output indicator is unlit, the alarm output is not conducted (OFF).
[If alarm action Deenergized is selected]
When the alarm output indicator is lit, the alarm output (between terminal 8 and 9) is not conducted (OFF).
When the alarm output indicator is unlit, the alarm output is conducted (ON).

High limit alarm (Energized setting)   **High limit alarm (Deenergize setting)**
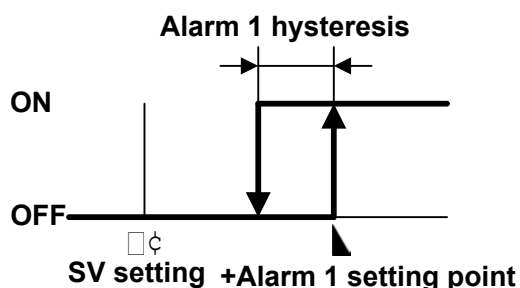
Alarm 1 hysteresis   Alarm 1 hysteresis

ON   ON

OFF   OFF

SV setting +Alarm 1 setting point   Main setting +Alarm setting point
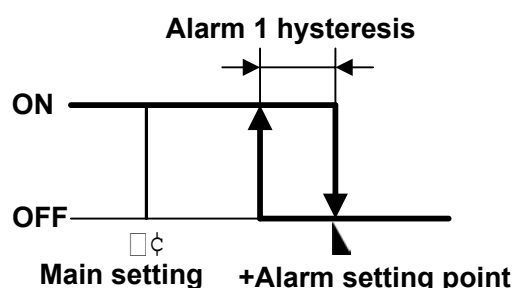
(Fig. 5.5-1)   (Fig. 5.5-2)

5.6 Control output manipulated variable indication

Name and Description
Control output manipulated variable indication 　**Press the [MODE] key for approx. 3 seconds during PV/SV display mode.** 　Keep pressing the [MODE] key until the output manipulated variable shows up, though the main setting mode appears during the process. 　(The control output manipulated variable is indicated on the SV display and the decimal point at the second digit blinks in 0.5 seconds cycle: 　Pressing the [MODE] key again, it reverts to the PV/SV display mode.

6. Converter function

⚠ **Caution**
Since the input/output response of this unit is approx. 1s, input value must be longer than 1 second when converter function is used. **When switching from converter function to controller function, the control parameter and the values set by converter function are held even if the function is switched to the controller function.** **So, correct the control parameter and values set by converter function to the value necessary to the controller function after switching to the controller function.**

The converter function of this instrument converts each input (Thermocouple, RTD, DC voltage and DC current input) value to "4 to 20mA DC" and outputs using the control parameter of the controller.
When this instrument is used as a converter, follow the process (1) to (7) described below.
When the process (1) to (7) is finished, this instrument can be used as a converter.

(1) Wire and connect this instrument. (Power, Input and Output)
(2) Turn the power of this instrument ON.
(3) Call the "Auxiliary function setting mode 2" by pressing the ⌴ and [MODE] key at the same time (for approx. 3s).
(4) Select the sensor type from "Sensor selection (ᔓᨑᨶᔓ)".
(5) Set the high limit of the value which is going to be converted during "Scaling high limit setting (ᔓᨑᒪᕼ)".
(6) Set the low limit of the value which is going to be converted during "Scaling low limit setting (ᔓᨑᒪᕼ)".
(7) Select converter (ᨸᨑᒿᨑ) from "Controller/ Converter function selection (ᖴᨶᨶᨶ)".
　• **To activate the alarm action by Converter function, set the alarm action to Process alarm action.**

If converter function is selected from "Controller/Converter function selection" in Auxiliary function setting mode 2, the parameter below is automatically set. (Table 6-1)
However, this is applied only to the DC current output type.

(Table 6-1)

Setting item	Setting value	Setting item	Setting value
SV	Scaling low limit	Alarm setting	0
Proportional band	100.0%	Loop break alarm action time	0 seconds
Integral time	0 seconds	Loop break alarm action span	0
Derivative time	0 seconds	Direct/Reverse action selection	Direct action
Manual reset setting	0.0		

7. Running

When mounting and wiring to the control panel (DIN rail) are finished, start the operation following the next procedure.

(1) Turn the power supply to the DCL-33A series ON.
　For approx. 3s after power on, character of the sensor type and temperature unit are indicated on the PV display, and the input range high limit value is indicated on the SV display. See (Table 5-1).
　(If any other value is set at the scaling high limit value setting, SV display indicates it.)
　During this time, all outputs and LED indicators are in their OFF status.
　After that PV display indicates actual temperature and SV display indicates the main setting value.

(2) Input the setting value.
　Input each setting value referring to "5. Setup".

(3) Turn the load circuit power ON.
Starts control action so as to keep temperature of the controlled object at the main setting value.

8. Action explanations

8.1 OUT action

	Heating (Reverse) action	Cooling (Direct) action
Control action	ON, Proportional band, OFF, SV setting	Proportional band, ON, OFF, SV setting
Relay contact output	⑥⑦ ⑥⑦ ⑥⑦ — Cycle action is performed according to deviation	⑥⑦ ⑥⑦ ⑥⑦ — Cycle action is performed according to deviation
Non-contact voltage output	+ ⑥ 12V DC − ⑦ / + ⑥ 12/0V DC − ⑦ / + ⑥ 0V DC − ⑦ — Cycle action is performed according to deviation	+ ⑥ 0V DC − ⑦ / + ⑥ 0/12V DC − ⑦ / + ⑥ 12V DC − ⑦ — Cycle action is performed according to deviation
DC current output	+ ⑥ 20mA DC − ⑦ / + ⑥ 20 to 4mA DC − ⑦ / + ⑥ 4mA DC − ⑦ — Changes continuously according to deviation	+ ⑥ 4mA DC − ⑦ / + ⑥ 4 to 20mA DC − ⑦ / + ⑥ 20mA DC − ⑦ — Changes continuously according to deviation
Indicator (OUT) Green	Lit ▨ Unlit	Unlit ▨ Lit

▨ part : Acts ON or OFF.

8.2 OUT ON/OFF action

	Heating (reverse) action	Cooling (direct) action
Control action	ON, Hysteresis, OFF, SV setting	Hysteresis, ON, OFF, SV setting
Relay contact output	③④ ③④	③④ ③④
Non-contact voltage output	+ ③ 12V DC − ④ / + ③ 0V DC − ④	+ ③ 0V DC − ④ / + ③ 12V DC − ④
DC current output	+ ③ 20mA DC − ④ / + ③ 4mA DC − ④	+ ③ 4mA DC − ④ / + ③ 20mA DC − ④
Indication (OUT) Green	Lit ▨ Unlit	Unlit ▨ Lit

▨ part: Acts ON or OFF.

8.3 Event (Alarm) action

	High limit alarm	Low limit alarm	High/Low limits alarm
Alarm action	ON / OFF; - Alarm setting point, Main setting, + Alarm setting point; Alarm hysteresis	ON / OFF; - Alarm setting point, Main setting, + Alarm setting point; Alarm hysteresis	ON / OFF; Alarm setting point, Main setting, Alarm setting point; Alarm hysteresis
Alarm output	+ side / - side	+ side / - side	

	High/Low limit range alarm	Process high alarm	Process low alarm
Alarm action	ON / OFF; Alarm setting point, Main setting, Alarm setting point; Alarm hysteresis	ON / OFF; Alarm setting point; Alarm hysteresis	ON / OFF; Alarm setting point; Alarm hysteresis
Alarm output			

	High limit alarm with standby	Low limit alarm with standby	High/Low limit alarm with standby
Alarm action	ON / OFF; - Alarm setting point, Main setting, + Alarm setting point; Alarm hysteresis	ON / OFF; - Alarm setting point, Main setting, + Alarm setting point; Alarm hysteresis	ON / OFF; Alarm setting point, Main setting, Alarm setting point; Alarm hysteresis
Alarm output	+ side / - side	+ side / - side	

■ : Event (EVT) output terminal between 8 and 9 is ON.

▨ : Event (EVT) output terminal between 8 and 9 is ON or OFF.

☐ : Event (EVT) output terminal between 8 and 9 is OFF.

▨ : Standby functions in this section.

Event (EVT) output indicator lights when between output terminal
8 and 9 is ON, and goes out when between them is OFF.

8.4 EVT (Heater burnout alarm) action

Heater burnout Alarm action	ON / OFF; Heater burnout alarm setting point; Small — Large; Load current
Indication (HB) Red	Lit — Unlit

■ : Event (EVT) output terminal between 8 and 9 is ON

☐ : Event (EVT) output terminal between 8 and 9 is OFF

Event (EVT) output indicator lights when output terminal between 8 and 9 is ON, goes out when OFF
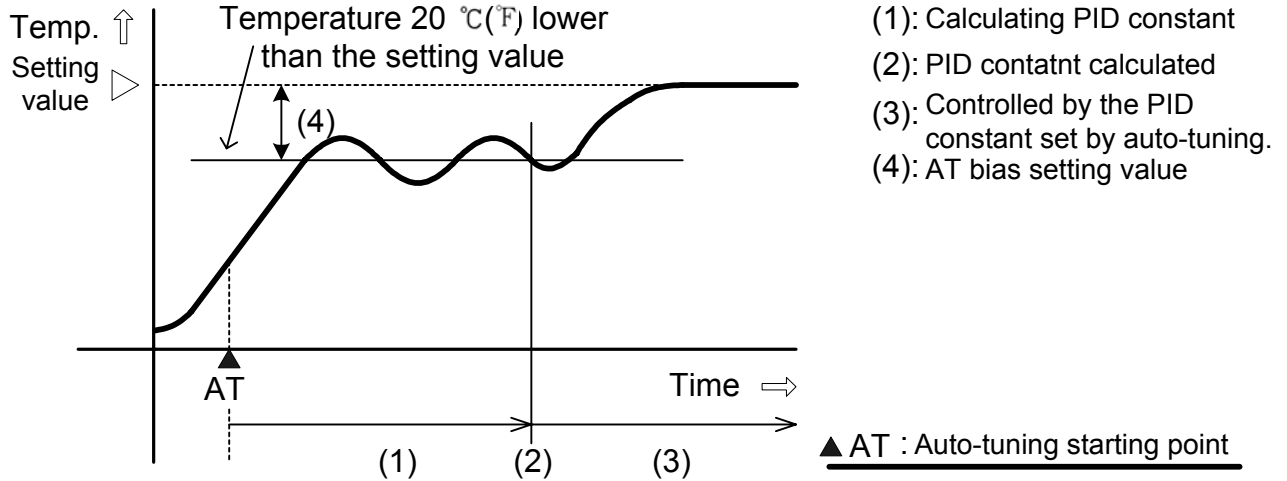
9. PID auto-tuning of the DCL-33A Series

In order to decide each P, I, D and ARW a value automatically, this system gives a fluctuation to the controlled object to get an optimal value.
1 of 3 types of fluctuation below are automatically selected.

[When the difference between setting value and processing temperature is large in rising]

When AT bias is set to 20℃(℉), a fluctuation is given at the temperature 20℃(℉) lower than the setting value.

(1): Calculating PID constant
(2): PID contatnt calculated
(3): Controlled by the PID constant set by auto-tuning.
(4): AT bias setting value

▲AT : Auto-tuning starting point

[When control is stable]

A fluctuation is given at the setting value.

(1): Calculating PID constant
(2): PID constant calculated
(3): Controlled by PID constant set by auto-tuning

▲AT：Auto-tuning starting point
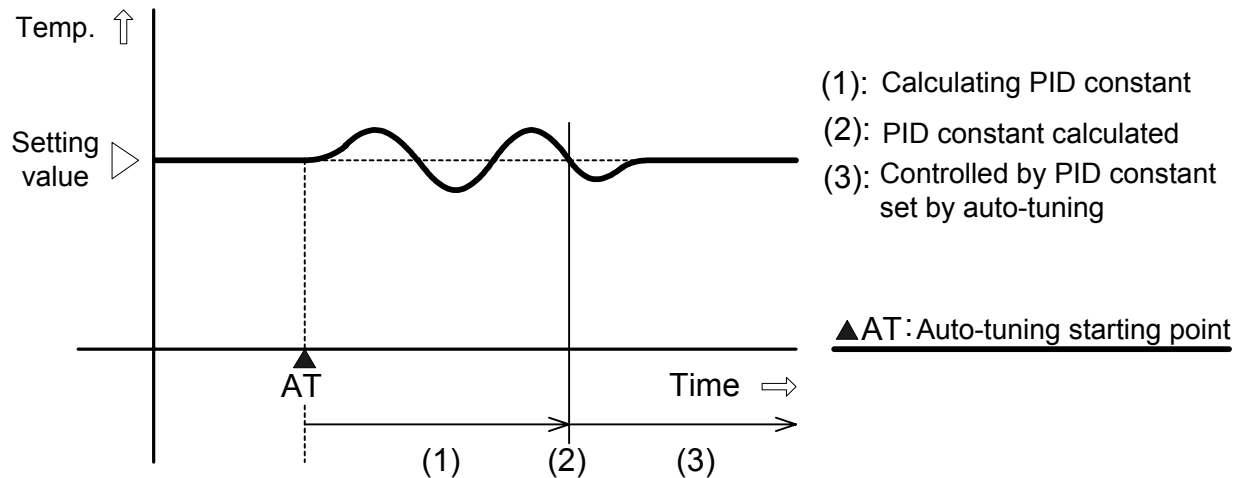
[When the difference between the setting value and processing temperature is large when temperature falls]

When AT bias is set to 20℃(℉), a fluctuation is given at the temperature 20℃(℉) higher than the setting value.

(1): Calculating PID constacnt
(2): PID constant calculated
(3): Controlled by PID constant set by auto-tuning
(4): AT bias setting value

▲ AT: Auto-tuning starting point
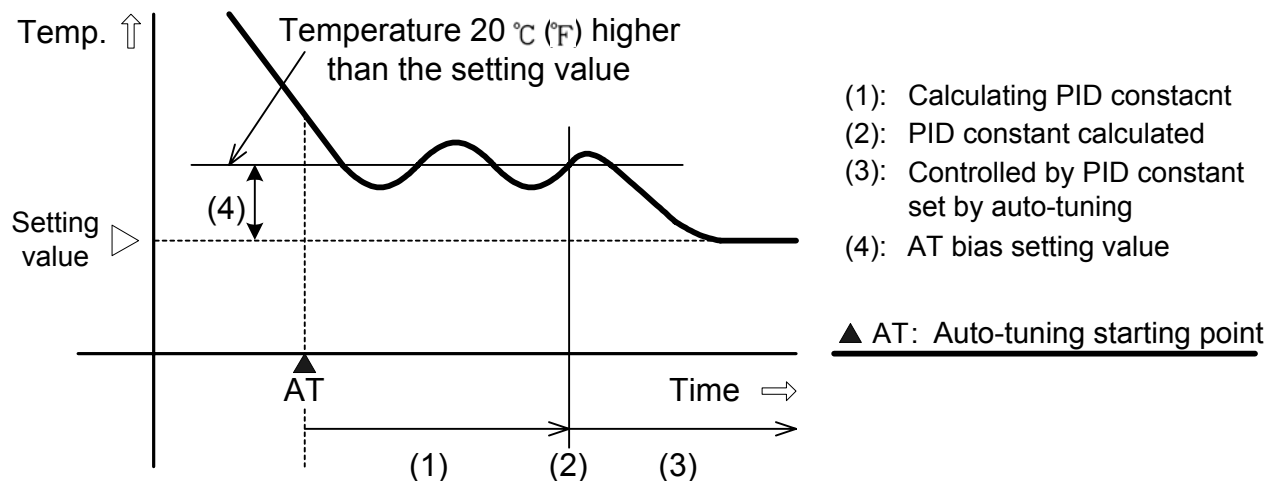
10. Specifications

10.1 Standard specification

Model name : DIN rail mounting indicating controller
Mounting method : DIN rail mounting method
Setting system : Input system using membrane sheet key
Display : PV display: Red LED 4 digits, Character size 7.4 x 4mm (H x W)
SV display: Green LED 4 digits, Character size 7.4 x 4mm (H x W)

Input

Thermocouple : K, J, R, S, E, T, N, PL-Ⅱ, C (W/Re5-26) External resistance: 100Ω or less
For thermocouple B, External resistance, 40Ω or less
RTD : Pt100, JPt100, 3-wire system
Allowable input wire resistance (10Ω or less per wire)
DC current : 0 to 20mA DC, 4 to 20mA, input impedance 50Ω
[Connect 50Ω shunt resistor (sold separately) between input terminal 5 and 6.]
Allowable input current: 50mA or less
DC voltage :

	0 to 1V DC	0 to 5V DC, 1 to 5V DC, 0 to 10V DC
Input impedance	1MΩ or greater	100kΩ or greater
Allowable input voltage	5V or less	15V or less
Allowable signal source resistance	2kΩ or less	100Ω or less

Accuracy (Indicating, Setting)

Thermocouple input: Within ±0.2% of input span ±1 digit or ±2℃(4℉) whichever is greater
R, S input 0 to 200℃(0 to 400℉): Within ±6℃(12℉)
B input 0 to 300℃(0 to 600℉): Accuracy is not guaranteed.
K, J, E, N input less than 0℃ (32℉): Within ±0.4% of input span ±1 digit
RTD input : Within ±0.1% of input span ±1 digit or within ±1℃(2℉)
whichever is greater.
DC voltage input : Within ±0.2% of input span ±1 digit
DC current input : Within ±0.2% of input span ±1 digit
Input sampling period : 0.25 seconds

Control

Control action
• PID action (with auto-tuning function)
• PI action: When 0 is set to derivative time
• PD action (with manual reset function): When 0 is set to integral time
• P action (with manual reset function): When 0 is set to derivative and integral time
• ON/OFF action: When 0 is set to proportional band
OUT proportional band : 0.0 to 110.0% (ON/OFF action when set to 0.0)
Integral time : 0 to 1000 seconds (Off when set to 0)
Derivative time : 0 to 300 seconds (Off when set to 0)
OUT proportional cycle : 1 to 120 seconds
ARW : 0 to 100%
Manual reset : ±Proportional band converted value
Output limit : 0 to 100% (DC current output type: -5 to 105%)
(Not available for ON/OFF action)
Hysteresis : Thermocouple and RTD input: 0.1 to 100.0℃(℉)
DC voltage and current inputs: 1 to 1000
(Decimal point place follows the selection)

Control output (OUT)
• Relay contact: 1a Control capacity 3A 250V AC (Resistive load)
1A 250V AC (Inductive load COS ø =0.4)
Electric life 100,000 times
• Non-contact voltage (for SSR drive): 12 , V DC Max. 40mA (Short-circuit protected)
• DC current: 4 to 20mA DC, Load resistance: Max. 550Ω
Output accuracy: Within ±0.2% of output span
Resolution : 12000

EVT output

• Alarm output [Common output with Loop break alarm, Heater burnout alarm (option)]

The alarm action point is set by $\pm$ deviation to the main setting (excluding Process alarm) and when input exceeds the range in $\pm$ deviation setting (excluding Process alarm) to the main setting, alarm (EVT) turns ON or OFF (High/Low limit range alarm), and when Deenergized is selected in Energized/Deenergized selection, alarm (EVT) is activated conversely.

Setting accuracy: The same as indicating accuracy

Action   : ON/OFF action

Hysteresis   : Thermocouple and RTD input: 0.1 to 100.0℃(℉)

         : DC voltage and current input: 1 to 1000

          (Decimal point place follows the selection)

Output   : Open collector, Control capacity 24V DC 0.1A (Max.)

Alarm output action: One alarm action is selectable from below by front key operation.

       High limit, Low limit, High/Low limits, High/Low limit range, Process high,

       Process low, High limit with standby, Low limit with standby,

       High/Low limits with standby and No alarm action

Energized/Deenergized: Alarm (EVT) output Energized/Deenergized can be selected.

	Energized	Deenergized
Red (EVT) LED	Lights	Lights
EVT output	ON	OFF

Alarm HOLD function selection: Once the alarm is activated, alarm output is remains

         until power is turned off.

• Loop break alarm output [Common output with Alarm and Heater burnout alarm (Option)]

Detects heater burnout, sensor burnout, and abnormality at the operation end.

Setting range: Loop break alarm action time setting: 0 to 200 minutes

        Loop break alarm action span setting:

         Thermocouple and RTD input: 0 to 150℃(℉) or 0.0 to 150.0℃(℉)
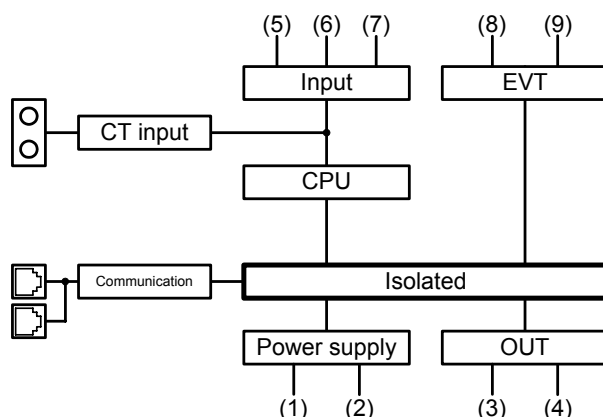
         DC voltage and current input : 0 to 1500

             (Decimal point place follows the selection.)

   Output: Open collector, Control capacity 24V DC 0.1A (Max.)

Converter function   : See "6. Converter function"

Isolation • Dielectric strength: Circuit isolation structure

* **When OUT is Non-contact voltage or DC current output, between OUT and Communication is non-isolated.**

Isolation resistance   : 10MΩ or greater at 500V DC except the above

Dielectric strength   : 1.5kV AC for 1 minute between input terminal and power terminal

          1.5kV AC for 1 minute between output terminal and power terminal

Power   : 100 to 240V AC 50/60Hz, 24VAC/DC 50/60Hz

Allowable voltage fluctuation 100 to 240V AC : 85 to 264V AC

        24V AC/DC   : 20 to 28V AC/DC

Power consumption : Approx. 6VA

Ambient temperature : 0 to 50℃

Ambient humidity   : 35 to 85%RH (No condensation)

Weight   : Approx. 120g

External dimension : 22.5 x 75 x 100mm (W x H x D)

Material : Flame resistant resin (Case)
Color : Light gray (Case)

Attached function:
      [Setting value lock]
      [Sensor correction]
    [Power failure countermeasure]
      The setting data is backed up in non-volatile IC memory.
    [Self-diagnosis]
      The CPU is monitored by a watchdog timer and when any abnormal status is found on the CPU,
      all outputs are OFF and controller is switched to warm-up status.
    [Automatic cold junction temperature compensation] (Only thermocouple input)
      Detects the temperature at the connection terminal between thermocouple and instrument and
      keeps it on the same status at which the reference junction is located at $0℃(32℉)$.
    [Input burnout indication]
      Thermocouple, RTD input
      If the PV exceeds the Indication range high limit value, the PV display blinks " ‾ ‾ ‾ ‾ ", and if the
      PV exceeds the Indication range low limit value, the PV display blinks " ＿ ＿ ＿ ＿ ".
      If the PV exceeds the Control range, OUT is turned OFF (for DC current output type, OUT low limit
        value).
      (However, for manual control, it outputs the manipulated variable which has been already set)

Input	Input range	Indication range	Control range
K T	-199.9 to 400.0℃	-199.9 to 450.0℃	-205.0 to 450.0℃
	-199.9 to 750.0℉	-199.9 to 850.0℉	-209.0 to 850.0℉
K	-200 to 1370℃	-250 to 1420℃	-250 to 1420℃
	-320 to 2500℉	-370 to 2550℉	-370 to 2550℉
J	-200 to 1000℃	-250 to 1050℃	-250 to 1050℃
	-320 to 1800℉	-370 to 1850℉	-370 to 1850℉
R S	0 to 1760℃	-50 to 1810℃	-50 to 1810℃
	0 to 3200℉	-50 to 3250℉	-50 to 3250℉
B	0 to 1820℃	-50 to 1870℃	-50 to 1870℃
	0 to 3300℉	-50 to 3350℉	-50 to 3350℉
E	-200 to 800℃	-250 to 850℃	-250 to 850℃
	-320 to 1500℉	-370 to 1550℉	-370 to 1550℉
N	-200 to 1300℃	-250 to 1350℃	-250 to 1350℃
	-320 to 2300℉	-370 to 2350℉	-370 to 2350℉
PL-	0 to 1390℃	-50 to 1440℃	-50 to 1440℃
	0 to 2500℉	-50 to 2550℉	-50 to 2550℉
C(W/Re5-26)	0 to 2315℃	-50 to 2365℃	-50 to 2365℃
	0 to 4200℉	-50 to 4250℉	-50 to 4250℉
Pt100	-199.9 to 850.0℃	-199.9 to 900.0℃	-210.0 to 900.0℃
	-200 to 850℃	-210 to 900℃	-210 to 900℃
	-199.9 to 999.9℉	-199.9 to 999.9℉	-211.0 to 1099.9℉
	-300 to 1500℉	-318 to 1600℉	-318 to 1600℉
JPt100	-199.9 to 500.0℃	-199.9 to 550.0℃	-206.0 to 550.0℃
	-200 to 500℃	-206 to 550℃	-206 to 550℃
	-199.9 to 900.0℉	-199.9 to 999.9℉	-211.0 to 999.9℉
	-300 to 900℉	-312 to 1000℉	-312 to 1000℉

      DC current and voltage inputs
      If the PV exceeds Indication range high limit value, the PV display blinks " ‾ ‾ ‾ ‾ ", and if the PV
      exceeds the Indication range low limit value, the PV display blinks " ＿ ＿ ＿ ＿ ".
      Indication range : [Scaling low limit value – Scaling span x 1%] to [Scaling high limit value
                 +Scaling span x 10%]
                 However, if the PV exceeds the range "–1999 to 9999", the PV display
                 blinks " ‾ ‾ ‾ ‾ " or " ＿ ＿ ＿ ＿ ".
      Control range : [Scaling low limit value – Scaling span x 1%] to [Scaling high limit value
                 +Scaling span x 10%]
      DC input burnout : When DC input is burnt out, PV display blinks " ＿ ＿ ＿ ＿ " for "4 to 20mA DC"

and "1 to 5V DC" inputs, and " ‾ ‾ ‾ ‾ " for "0 to 1V DC" input.
For "0 to 20mA DC", "0 to 5V DC" and "0 to 10V DC" inputs, the PV display
indicates the corresponding value for which 0mA or 1V is inputted.

[Burnout]
When the thermocouple or RTD input is burnt out, OUT is turned off and PV display blinks
" ‾ ‾ ‾ ‾ ".

Accessories included: Instruction manual: 1 copy
Wire harness 3m   : 1 piece [When Heater burnout alarm (option) is added]
When Heater burnout alarm (option) is added:
CT (CTL-6S)   : 1 piece [When Heater burnout alarm (option) is added]
[Rating 5A, 10A, 20A]
CT (CTL-12-S36-10L1): 1 piece [Rating 50A]
Accessories sold separately: Shunt resistor (50Ω) for DC current input
Terminator (120Ω) for serial communication: RES-T01-120

10.2 Optional specification

Heater burnout alarm (W)
Watches the heater current with CT (Current transformer) and detects the burnout.
When this option is added, it shares common output with alarm output and Loop break alarm.
This option cannot be applied to the current output type.
Rating   : 5A [W (5A)], 10A [W (10A)], 20A [W (20A)], 50A [W (50A)] (Must be designated)
Setting range   : 5A [W (5A)]: 0.0 to 5.0A (Off when set to 0.0)
10A [W (10A)]: 0.0 to 10.0A (Off when set to 0.0)
20A [W (20A)]: 0.0 to 20.0A (Off when set to 0.0)
50A [W (50A)]: 0.0 to 50.0A (Off when set to 0.0)
Setting accuracy : ±5% of the rated value
Action   : ON/OFF action
Output   : Open collector
Control capacity 24V DC   0.1A (Max.)

Serial communication (C5)
The following operation is performed from external computer.
(1) Reading and setting of the main setting value, PID and other various setting values
(2) Reading of the input value and action status
(3) Function change
Communication interface   : Based on EIA RS-485
Communication method   : Half-duplex start-stop synchronous
Data transfer rate   : 2400/ 4800/ 9600/ 19200bps (Selectable by key operation)
Parity   : Even/ Odd/ None (Selectable by key operation)
Stop bit   : 1 or 2 (Selectable by key operation)
Communication protocol   : Shinko/ Modbus RTU/ Modbus ASCII (Selectable by key operation)
Number of connectable units   : A maximum of 31 units per host computer
Communication error detection : Parity and Checksum
Digital external setting   : SV of programmable controller can be transmitted digitally by
combining programmable controller (with option SVTC) and the
JCS-33A (with option C5)
[Setting value LOCK of the DCL-33A must be set to LOCK 3.]
When data from programmable controller is greater than SV
high limit setting or smaller than SV low limit setting, DCL-33A
ignores the value and controls the previous value that exceeded
SV high limit or low limit.
Control desired value is the value that is added SVTC bias value
to the received value by SVTC command.

11. Troubleshooting

If any malfunctions occur, refer to the following items after checking the power supply and wiring.

11.1 Indication

Phenomenon	Presumed cause and solution
" ‾ ‾ ‾ ‾ " is blinking on the PV display.	• Sensor (Thermocouple, RTD and DC voltage 0 to 1V DC input) is burnt out. **Change the sensor for a new one.** • The lead wire of the sensor (Thermocouple, RTD and DC voltage 0 to 1V DC input) is not securely connected. **Connect it to the terminal properly.**
The indication on the PV display does not change.	• Check if the input signal source for DC voltage (0 to 10V DC) and DC current (0 to 20mA DC) is normal. • Is the lead wire of the sensor DC current (0 to 20mA DC) and DC voltage (0 to 10V DC) securely connected to the terminal? **Connect the sensor lead wire securely to the instrument terminal.**
" ＿ ＿ ＿ ＿ " is blinking on the PV display.	• Check if the input signal source for sensor DC current (4 to 20mA DC) and DC voltage (1 to 5V DC) input is normal. • Is the input signal wire of DC current (4 to 20mA DC) and DC voltage(1 to 5V DC) securely connected to the terminal of this instrument? **Connect the input signal wire securely to the terminal of the instrument.**
The indication on the PV display is abnormal or unstable.	• Is designation of the sensor input correct? **Set the correct sensor input.** • Is the polarity of the sensor input correct? **Wire it correctly.** • Temperature unit (℃/℉) is mistaken. **Set the correct unit.** • AC may be leaking into the input of this controller from thermocouple or the RTD connected to the measured object. **Keep AC from leaking into the input of this controller from thermocouple or RTD of the measured object.**
"$Err\ 1$" is indicated on the PV display.	• Internal memory is out of order. **Please contact our sales branch or the shop where you purchased this unit.**

11.2 Key operation

Phenomenon	Presumed cause and solution
• Setting values do not change even if the ▲ or ▼ key is pressed during setting mode	• Mode1 or mode 2 is selected in setting value lock selection. **Cancel the Lock mode.** • PID auto-tuning is performing. **Cancel PID auto-tuning.**
• Unable to set the value above or below scaling high limit or low limit within the input range even if the ▲ or ▼ key is pressed.	• The value of scaling high limit setting or low limit setting in auxiliary function setting mode 2 may be set at the point the value does not change. **Set the proper value.**

• If you have any inquiries, please consult our agency or the shop where you purchased the unit.

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