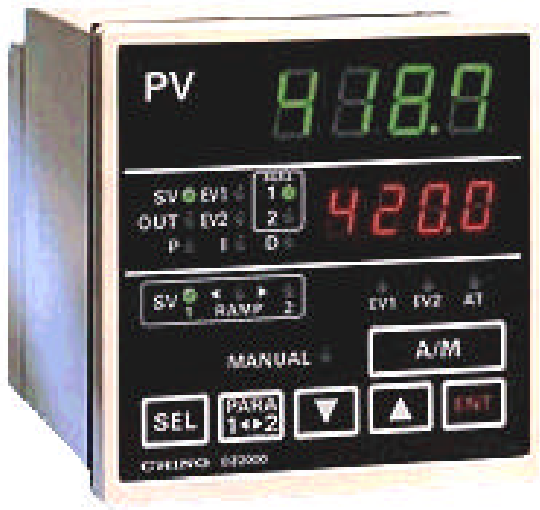
DZ2000 SERIES STEP TYPE DIGITAL INDICATING CONTROLLER

PERFORMANCE SPECIFICATION
CHINO

MODEL DZ20□□□



The DZ2000 series is a digital indicating controller having a feature to switch two groups of control set values by a front key. It can set PID constants, alarm setting, and other various parameters individually to two groups of set values.
This easy-to-operate digital indicating controller is combined with auto tune and fuzzy logic.

■ FEATURES

・ Easy Operation and Reliable Control

Owing to the full multi-range inputs, select-able control outputs, auto tune, fuzzy logic and other features, this instrument ensures simplified control and easy operation The set-ting of parameters and operation are easy.

・ Dust-proof and Water-proof Structure Con-forming to IP65

The front operation panel is constructed to be dust-proof and water-proof to conform to IP65 of IEC standards (IEC529).

・ Two Groups of Control Set Values can be Set

Two groups of control set values can be set, and PID constants, events, and other various parameters can be set individually to individual setting.

・ Simple Program Control has been Realized at a Low Cost

Program control can be done easily by hold time of two groups of control set values and ramp setting (up and down) of the set values switching-change time.

■ MODEL

DZ 20 □□□□□□

Control output (PID system)
1: On-off pulse type
2: On-off servo type
3: Current output type
5: SSR drive pulse type
U: Control output multi type
(on-off pulse type/current out put type/SSR drive pulse type)

External input/output (option)
0: None
1: CT input *1
2: External drive 3* 2
3: CT input and external drive

CE-marking (option)
— : Not provided.
E: With CE-marking

Communication interface (option)
0: None A: RS-422A
R: RS-232C S: RS-485

Transmission output (option)
0:None 3: 0~10V
1: 4~20mA 4: Others
2: 0~ 1V

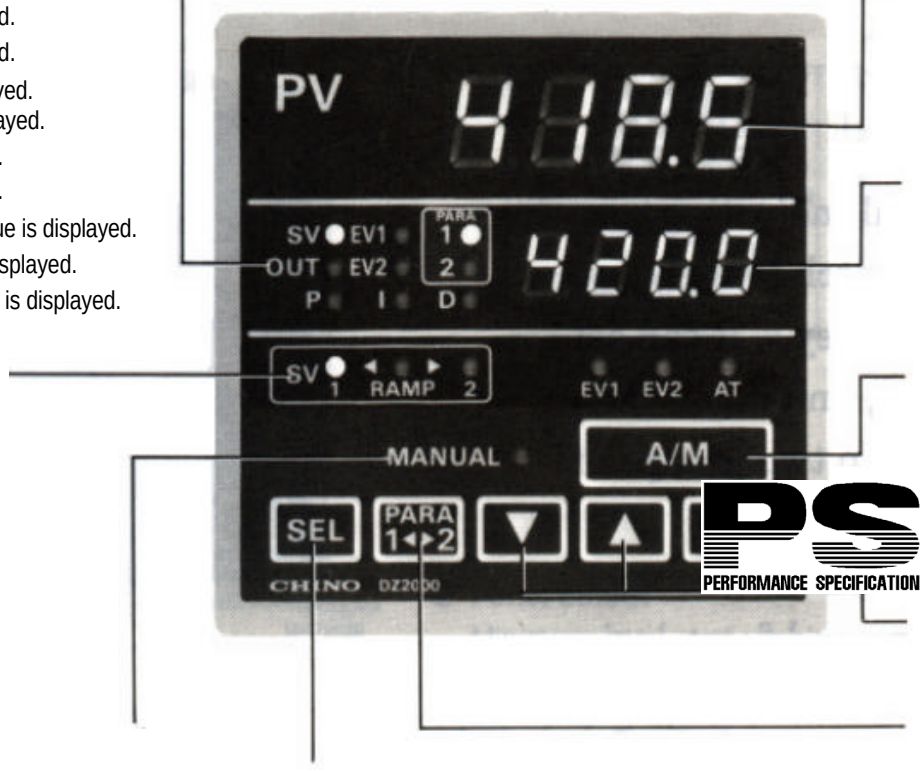
Remote signal input (option) (Remote/local selection)
0: None 7: 0~10V
5: 4 ~ 20mA 8: Others
6: 0 ~ 1V

* 1: [CT input (option: heater breakage detection)] is not applicable when the control output is [2 On-off servo type] and [3 Current output type].
* 2: External drive includes the external set value switching, external A/M switching, and external preset manual switching.

■ NAMES OF COMPONENT PARTS

Display items guide display
Indicates the display items of No.2 display in operation mode.
PARA1 : Lights when SV1 parameter is displayed.
PARA2 : Lights when SV2 parameter is displayed.
SV : Lights when control set value (SV) is displayed.
OUT: Lights when control output value is displayed.
EV1 : Lights when event 1 set value is displayed.
EV2 : Lights when event 2 set value is displayed.
P : Lights when proportional constant (P) set value is displayed.
I : Lights when integral constant (I) set value is displayed.
D : Lights when derivative constant (D) set value is displayed.

Status display
SV1: Lights when execution SV1 is displayed.
SV2: Lights when execution SV2 is displayed.
RAMP: Lights during ramp operation of SV.
EV1: Lights when event 1 occurred.
EV2: Lights when event 2 occurred.
AT : Lights when auto tuning is executed.



No.1 display
Indicates process variable (PV) in operation mode or set contents in setting mode.

No.2 display
Indicates control set values (SV), output values event set values, and PID set values in operation mode or indicates mode Na and set-ting items in setting mode.

Auto/Manual (AIM) key
Selects auto or manual output mode.

Entry (ENT) key
This key is used to set the desired constants to be set or functions to be selected.

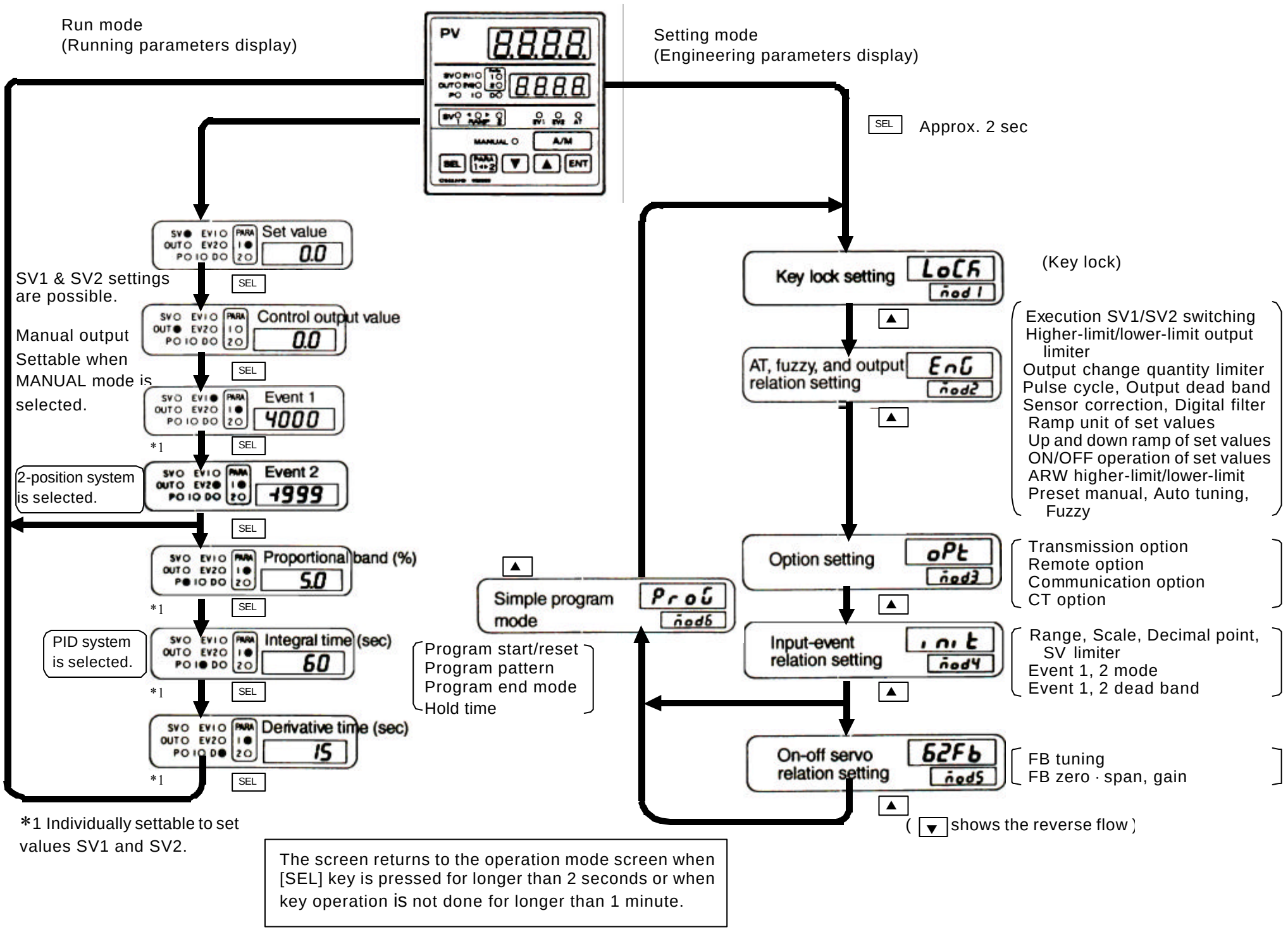
Up (D) key, down (Ñ) key
These keys are used to change set values or to select a mode in setting mode.

Parameter (PARA) key
Switches parameter 1 or 2 display.

Auto/Manual display
MANUAL: Lights in manual output mode.

Select (SEL) key
Selects parameters in the operation mode and also selects either setting mode or operation mode.

■ PARAMETERS SETTING AND DISPLAY



*1 Individually settable to set values SV1 and SV2.

The screen returns to the operation mode screen when [SEL] key is pressed for longer than 2 seconds or when key operation is not done for longer than 1 minute.

■ GENERAL SPECIFICATIONS

Input signal : Thermocouples … B, R, S, N, K, E, J, T, U, L
DC voltage …… ± 20mV, ± 5V
DC current …… 0 to 20mA
Resistance thermometer ……
Pt100, Jpt100, Old Pt50

Measuring range:
See the measuring range table.
(Settable within the range in case of DC voltage and current input)
Multi-range consisting of 11 kinds of thermocouple range, 2 kinds of DC voltage range, 1 kind of DC current range, and 5 kinds of resistance thermometer range (19 kinds in total)
(Internal switch selection)

Measuring accuracy rating:
± 0.3% of measuring range ± 1 digit (Under the reference operating conditions)

Exceptional provisions:

Thermocouple input	Higher than -200°C but lower than 0°C	± 0.6% of measuring range ± 1 digit
B thermocouple	Higher than 0°C but lower than 400°C	± 5% of measuring range
	Higher than 400°C but lower than 800°C	± 0.6% of measuring range ± 1 digit
R thermocouple	Higher than 0°C but lower than 200°C	± 0.6% of measuring range ± 1 digit
S thermocouple	Higher than 0°C but lower than 200°C	± 0.6% of measuring range ± 1 digit

Reference operating conditions:

Ambient temperature	23℃ ± 2℃
Ambient humidity	55% ± 5%RH
Power voltage	100VAC ± 1%, 50/60Hz ± 1%

Warm-up time Longer than 30mm.
Condition free of being affected by the instrument operation.

Temperature measuring unit:
°C or °F (Internal switch selection)

Sampling cycle : Approx. 0.2sec.

Burnout : Higher-limit burnout is provided for the thermocouple input, resistance thermometer input, and mV input as the standard equipment.
Output 0% and higher-limit alarm ON at burnout

Measuring input shift (Sensor correction):
-200 to 1000 times of setting resolution

Digital filter : 0.0 to 99.9sec

Scaling : Range/scale optional setting (- 1999 to 9999) in case of voltage and current inputs

Scale decimal point : 0 to 3

Display system :
4-digit 2-stage display by 7-segment LED
7-status displays by individual LED
9-display item guide displays by individual LED
(2 event points, AT, and auto/manual display)

Display contents:
No. 1 display LED . . . Display color Green
Process variables (PV) in operation mode
Set contents in setting mode
No.2 display LED . . . Display color Red Control set value (present SV/SV1/SV2), output values, event set value (EV1/EV2), P (P1/P2), I (I1/I2), D (D1/D2) in operation mode
Parameter setting items in setting mode
Status 1 . . . Display color Red
EV1 — Lights when event 1 occurred.
EV2 — Lights when event 2 occurred.
MANUAL — Lights when control output value is adjusted manually.
Status 2 . . . Display color Green
AT — Lights when auto tuning is executed.
SV1 — Lights when execution SV1 is selected.
SV2 — Lights when execution SV2 is selected.
RAMP — Lights during ramp operation of SV.
Display item guide . . . Display color Green
SV — Lights when control set value is displayed.
OUT — Lights when control output value is displayed.
EV1 — Lights when event 1 set value is dEs-played.
EV2 — Lights when event 2 set value is displayed.
P — Lights when proportional constant is displayed.
I — Lights when integral constant is displayed.
D — Lights when derivative constant is displayed.
PARA1 —Lights when SV1 parameters are displayed.
PARA2— Lights when SV2 parameters are displayed.

Display resolution:

Temperature input ……
0.1°C (when the measuring input is lower than the maximum value 1000'C)
1°C (when the measuring input is higher than the maximum value 1000'C)

DC voltage, current input …… 4-digit display

(Decimal point position and scaling are optional.)

Automatic reset:

Reset to operation mode automatically, if no key operation is done for longer than 1 minute in setting mode.

Rated supply voltage:

100 to 240VAC, 50/60Hz free

* 50/60Hz setting is to be set in case of CT input option.

Allowable power voltage : 90 to 264VAC

Working temperature range: -10 to 50°C

Working humidity range:

20 to 90%RH (No dew condensation is allow-able.)

Countermeasure against power Interruption:

Set contents are held for longer than 10 years by the lithium battery.

Allowable signal source resistance:

Thermocouple, DC voltage ……
Lower than 100Ω

Resistance thermometer ……

Lower than 5Ω per wire

(Wiring resistance of 3 wires shall be equal to each other.)

Input resistance:

Thermocouple, DC voltage …… Higher than 5MΩ

DC current …… Approx. 35Ω

Measuring current (Resistance thermometer input): 2mA ± 20%

Maximum allowable input range:

DC voltage : …… ± 6V
DC current : …… 25mA

Maximum common mode voltage : 250VAC

Common mode rejection ratio : More than 130dB

(Signal source resistance: Lower than 1Ω)

Series mode rejection ratio:

More than 50dB

(Signal source resistance: Lower than 1Ω)

Insulation resistance:

Power terminals - Protective conductor terminal 500VDC, Higher than 20MΩ)

Measuring terminals - Protective conductor terminal 500VDC, Higher than 20MΩ)

Measuring terminals - power terminals 500V DC, Higher than 20MΩ)

Dielectric strength:

Power terminals - Protective conductor terminal

1500VAC, 1 min.

Measuring terminals - power terminals 1500V AC, 1 min.

Measuring terminals - Protective conductor terminal

500VAC, 1 min.

Power consumption : Max. approx. 15VA

Case and terminal cover : ABS resin

Color : Gray

Front panel : IEC529 IP65

Mounting method : Flush-panel mounting

Weight : Approx. 600g

■ CONTROL SPECIFICATIONS

Control switching cycle : Approx. 0.2sec

Control system (PID system)

: Current output type
On-off pulse type
SSR drive pulse type
Current output type/On-off pulse type/SSR drive pulse type, Multiple
On-off servo type PID system
(2-position outputs are selectable by DIP switches)

Control set value

: 2 groups selection
Within the measuring range (-1999 to 9999)
Set value limit possible
Execution set values SV1/SV2 switching by front panel setting
Execution set values SV1/SV2 switching by external signal
(option)

Set value ramp function

: Two kinds of ramp values are settable for up ramp and down ramp of set values

Ramp **unit of set values**

: °C/min, °C /hour (1 kind common to up ramp/down ramp)

Up ramp of set values

: 0 to 9999 (0 =Not operated)

Down ramp of set values

: 0 to 9999 (0 =Not operated)

PV start function

: At SV change (front panel, external signal), power on and MAN → AUTO switching (front panel, external signal) (External MAN, preset MAN)
ON/OFF switching is possible. (Engineering mode setting)

Control setting accuracy rating

: ± 1 digit (Relative error to indicating values)

Auto tuning

: Standard equipment
PID constants are manually settable.

PID constants

: Two groups switching by interlocking with SV
(PID values corresponding to the aimed set value No. are used during ramp operation of set values.)
P …… 0.1 to 999.9 %
I …… 0 to 9999 sec
D …… 0 to 9999 sec

ARW (anti-reset windup)

: Higher limit …… 0.0 to 100.0%
Lower limit …… 100.0 to 0.0%

Fuzzy function: Overheat suppression function by fuzzy operation is provided as the standard equipment.
ON/OFF settable (PID system only)

Output limiter: Two groups switching by interlocking with SV
Higher limit …… 0.0 to 5.0%
Lower limit …… -5.0 to 100.0%

Output variable limiter

: 0.1 to 100.0%

Output dead band

: 0.l to 9.9%
(In case of 2-position system control)

Auto output/Manual output (AUTO/MANUAL)

: Balanceless bumpless selection

Manual output range

: -5.0 to 105.0% (Settable every 0. 1%)

Control action : Direct action/reverse action are selectable by DIP switches.

Output Specifications

* **Current output type PID controller**

Output signal : 4 to 20 mADC

Load resistance : Lower than 600Ω

* **On-off pulse type PID controller**

Output signal : On-off pulse conductive signal

Contact capacity : Resistive load 100VAC 2A, 200VAC 1A
Inductive load 100VAC 1A, 200VAC 0.5A
Minimum load 10mA, 5VDC or higher

Electrical life of relay

: More than 100,000 times

On-off pulse cycle : Approx. 1sec to approx. 120sec variable (1-sec step)

Contact protective device

: Not built in. (An option contact protective device is externally mounted as occasion demands.)

***SSR drive type PID controller**

Output signal : DC voltage pulse signal
ON 12VDC ± 20% (max. 20mA)
OFF Lower than 0.8VDC

Pulse cycle : Approx. 1sec to Approx. 120sec variable (1-sec step)

* **On-off servo type PID controller**

Output signal : On-off servo conductive signal

Contact capacity : Resistive load 100VAC 2A, 200VAC 1A
Inductive load 100VAC 1A, 200VAC 0.5A
Minimum load 10mA, 5VDC or higher

Electrical life of relay
: More than 100,000 times

Contact protective device
: Not built in. (An option contact protective device is externally mounted as occasion demands.)

■ EVENT SPECIFICATIONS

No. of event points : 2 points (EV1, EV2)

Event system

: Absolute value alarm
Higher-limit/lower-limit, Standby function provided/not provided
Deviation alarm ……
Higher-limit/lower-limit, Standby function provided/not provided
Output value alarm ……
Higher-limit/lower-limit, Standby function provided/not provided
Heater breakage alarm (Only when the CT input option is provided in pulse output type.)
SV status (ON during SV ramp, ON during SV no-ramp, Event set values are ineffective in this case.)

Event set values
: Two groups (PARA1, PARA2) are set to event outputs (EV1, EV2) individually.
Two groups (PARA1, PARA2) are switched by interlocking with SV.

Event dead band
: 1,000 times of the setting resolution from 0

Event output
: Output signal …… Relay A contact output (Common)

Contact capacity
: Resistive load 100VAC 0.5A, 200VAC 0.2A
Inductive load 100VAC 0.2A, 200VAC 0.1A
Minimum load 10mA, 5VDC or higher

Electrical life of relay
: More than 100,000 times

Contact protective device
: Not built in. (An option contact protective device is externally mounted as occation demands.)

■ SIMPLE PROGRAM SPECIFICATIONS

Program functions
: Simple program control can be done by combining 2 groups of SV and set value ramp function with the inter-nal hold time timer.

Program patterns
: One of4 kinds is selectively executed. i-stage trapezoidal pattern / 3-stage trapezoidal pattern / repetition of 2-stage trapezoidal pattern

Hold time 1/2/3 : 1~ 999 minutes

Program start/reset
: Front panel operation or external signal (option)

Program end : Automatic switching to preset manual or fixed set value control

Preset manual setting range
: -5.0 to 105.0%

■ OPTION SPECIFICATIONS

·Communication interface

Communication types
: One of RS-232C, RS-422A, or RS-485 is to be specified.

Transmission speed
: One of 9600, 4800, 2400, or 1200bps is settable.

Address : 01 to 99

Communication function
: One of setting, data send, digital transmission, or communication remote functions is settable.

Digital transmission types
: One of PV, SV, MV, RSV, or MFB (on-off servo type opening) is settable. (Settable independently ofanalog transmission types)

·Transmission signal output

Output signal (Designate 1 type)
: 4 to 20mADC
(Load resistance: Lower than 600Ω)
0 to 1VDC, 0 to 10VDC
(Output resistance approx. 15Ω, Maximum load current 2mA)

Output accuracy
: ±0. 5%. of the transmission scale range
(Excluding the measuring accuracy under the reference operating conditions)

Output resolution : Approx. 1/3000

Analog transmission type
: One of PV, SV, MV, RSV, or MFB (On-off servo type opening) is settable.
(Settable independently of digital transmission types)
Transmission scale
: -1999 to 9999 optionally settable
(Minimum value/maximum value)
[Reference] **Temperature coefficient**
: 0.2 to 0.3%/ lot

- **Remote/Local selection**

Input signal (Designate 1 type)
: 4 to 20mADC
(Input resistance approx. 50Ω)
0 to 1VDC (Input resistance approx. 500kΩ or over)
0 to 10VDC (Input resistance approx. 100kΩ or over)
Input accuracy
: ± 0.5% of input range ± 1 digit
(Under the reference operating conditions)
Remote scale: -1999 to 9999 optionally settable
(Maximum value/minimum value)
Remote shift: -200 to 1000 times of the setting resolution
Remote/Local selection
: External contact signal (No-voltage)

- **Heater breakage detection function (CT input)**

Input signal : 0 to 5AAC (50/60Hz)
Resolution : Approx. 1/100

- **External drive**

① External switching of set values and external drive of programs
Front panel operation and external signal operation switching
Execution SV1/SV2 switching and program start/re-set
② External switching of A/M
Switching of auto output and manual output
③ External switching of preset manual
External contact capacity: 5VDC, 2mA or over

- **External contact protective device**

For light load : 0.01μF+ 120Ω
(Switching current: Lower than 0.2A)
For light load : 0.5μF + 47Ω
(Switching current: Higher than 0.2A)

- **DC power drive**

Power voltage : 24VDC (± 10%).

- **Front protective cover**

Transparent acryl

■ CE-MARKING

- **Standards**
EN550 11 group 1 class A
EN50082+2 (Industrial environment)
- **Rated supply voltage :** 24VDC (within ± 10%)
- **Power consumption :** About 10W
- **Rated value of control output (On-off pulse type, On-off servo type)**

Contact capacity:
Resistive load — 30VAC 2A, 24VDC 1A
Inductive load — 30VAC 1A, 24VDC 0.5A
Minimum load — 10mA, 5VDC or higher

- **Rated value of alarm output**

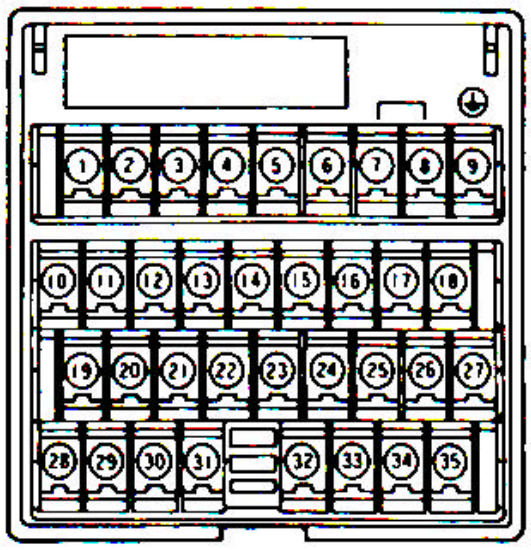
Contact capacity:
Resistive load — 30VAC 0.5A, 24VDC 0.2A
Inductive load — 30VAC 0.2A. 24VDC 0. 1A
Minimum load — 10mA, 5VDC or higher

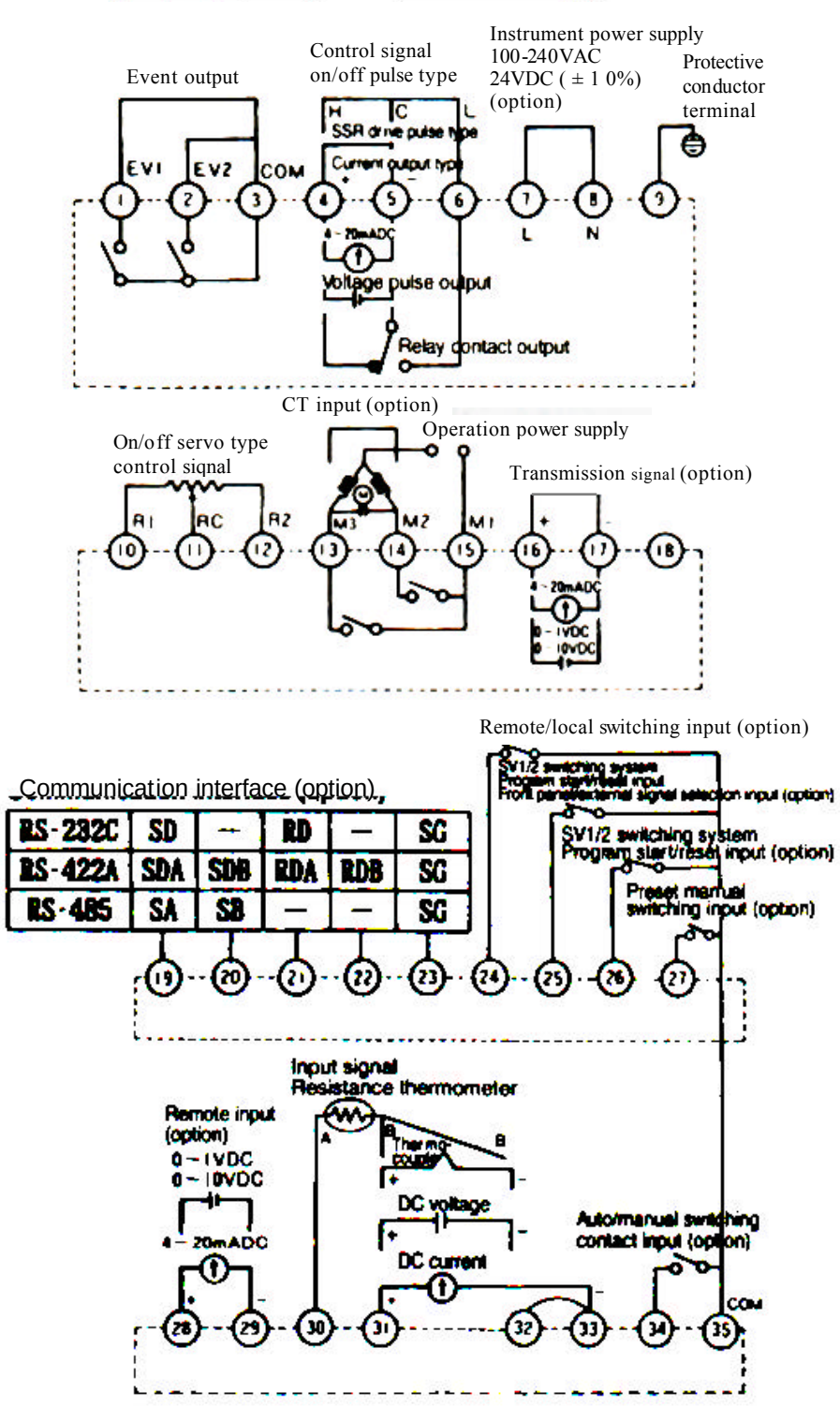
There is a case of variation of [Maximum ±200μV] or [Temperature equivalent to E.M.F. of ±200μV] under EMC test environment.

■ MEASURING RANGES

Input type		Input range	
		°C	°F
Thermo-couple	B	0 ~ 1820	32 ~ 3300
	R	0 ~ 1760	32 ~ 3200
	S	0 ~ 1760	32 ~ 3200
	N	0 ~ 1300	32 ~ 2450
	K	-200 ~1370	-300 ~ 2450
		-200 ~ 500	-300 ~ 900
	E	-200 ~ 700	-300 ~ 1250
	J	-200 ~ 900	-300 ~ 1650
	T	-200 ~ 400	-300 ~ 700
	U	-200 ~ 400	-300 ~ 700
	L	-200 ~ 900	-300 ~ 1650
DC voltage	mV	-20 ~ 20	Scaling setting range --1999~9999 Decimal point position is variable
	V	-5 ~ 5	
DC current	mA	0 ~ 20	
Resistance thermometer	Pt100	-200 ~ 660	-300 ~ 1200
		-200 ~ 200	-300 ~ 300
	JPt100	-200 ~ 649	-300 ~ 1200
		-200 ~ 200	-300 ~ 300
	Old Pt100	-200 ~ 649	-300 ~ 1200

■ TERMINAL BOARD

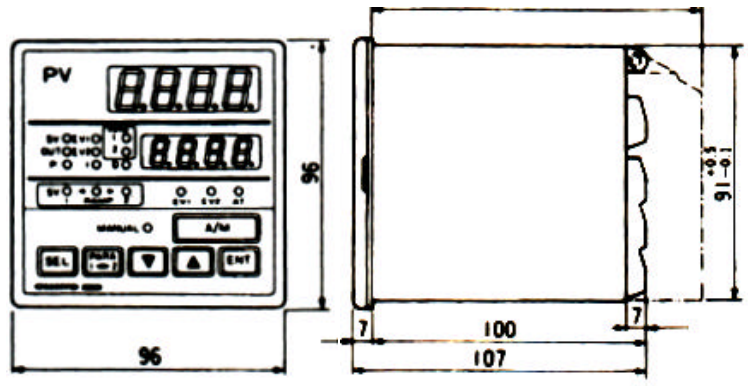




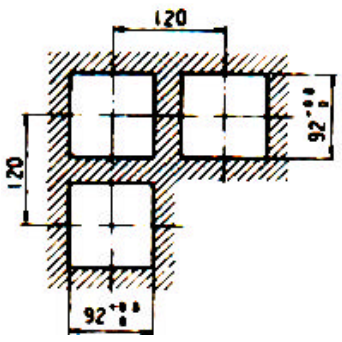
■ EXTERNAL DIMENSIONS

- **External Dimensions**

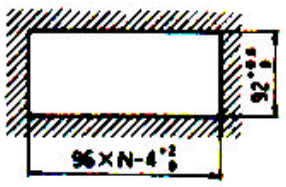
120 (when the terminal cover is mounted)



- **Panel cutout**
  Minimum interval of panel mounting



- **Closed instrumentation panel dimensions**



N: No. of mounting instruments

Unit: mm

Specifications subject to change without notice. Printed in Japan (I) I 997.4 (NT)

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