DZ1000 SERIES
DIGITAL INDICATING CONTROLLER

PERFORMANCE SPECIFICATION
CHINO

MODEL DZ10□□

The DZ1000 series is a new generation of high performance economical 96 × 96mm digital indicating controller, having the benefit of full multi-range inputs, selectable control outputs, combined with auto tune and fuzzy logic for precious and stable set point control.
An abundance of options are prepared, including digital communications, to allow system integration in an automated control strategy.

■ FEATURES

- **Full Multi-range Inputs**
  Thermocouple, resistance thermometer, DC voltage, and current are defined by the input selector switch.
- **Control Output Multi Functions**
  The on-off pulse output, SSR drive output, and current output signals are also selected, however the on-off servo type is supplied as a separate model.
- **Auto Tuning and Fuzzy Functions are Provided as a Standard.**
  Automatic setting of PID constants, overshoot suppression, and other control functions can be done easily by using auto tune and fuzzy features.
- **Easy Operation and Secure Running**
  Parameters (set values, alarms, and PID constants) that may be changed during operation can be configured easily according to the "display item guide."
  Parameters that are rarely changed during operation are configured as engineering parameters by discriminating them from those in normal operation display.
- **Abundant Option Functions**
  Remote/local switching, transmission output, external auto/manual switching, heater breakage detection (CT) input, and other options are available.
- **Simple Instrumentation by Communication Function**
  The system can easily be graded up by combining with a personal computer through the communication interface RS-232C,RS-422A, RS-485.

■ MODEL

DZ 10 □□□□□□

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 *
2: External A/M selection
3: CT input * + External A/M selection

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

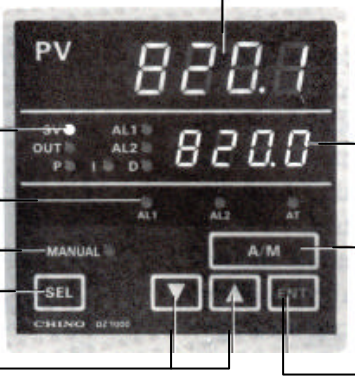
Communication interface (option)
0: None
R: RS-232C
A: RS-422A
S: RS-485

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

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

*: [CT input (option: heater breakage detection)] is not applicable when the control output is [2 On-off servo type] and [3 Current output type].

■ NAMES OF COMPONENT PARTS



Display items guide display
Indicates the display items of No.2 display in operation mode.
SV: Lights when control set value (SV) is displayed.
OUT: Lights when control output value is displayed.
P: Lights when proportional constant (P) set value is displayed.
L: Lights when integral constant (I) set value is displayed.
D: Lights when derivative constant (D) set value is displayed.
AL1: Lights when alarm 1 set value is displayed.
AL2: Lights when alarm 2 set value is displayed.

Status display
AL1 : Lights when alarm I occurred.
AL2: Lights when alarm 2 occurred.
AT : Lights when auto tuning is executed.

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

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

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

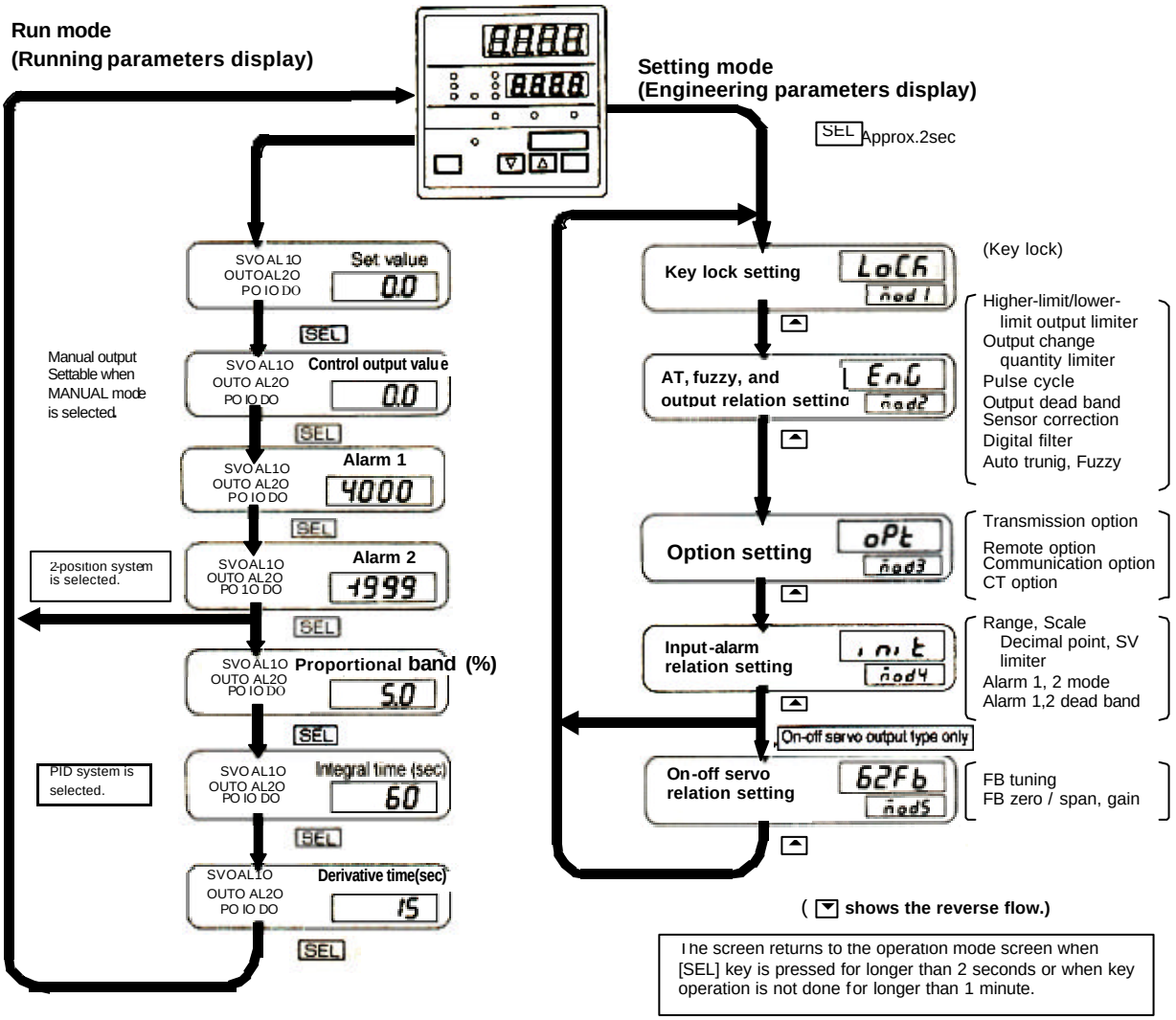
No.1 display
Indicates process variable (PV) in operation mode or set contents in setting mode.

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

Auto/Manual (A/ M) 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.

■ PARAMETERS SETTING AND DISPLAY



■ 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 11kinds 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		
B thermocouple	Higher than -200°C but lower than 0°C	± 0.6% of measuring range ± 1 digit
	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°C ± 2°C
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 in strument 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-display item guide displays by individual LED
4-status displays by individual LED (2 alarm 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 (SV), output values,
alarm set value, P, I, D in operation mode
Parameter setting items in setting mode
Status 1 ... Display color Red
AL1 — Lights when alarm 1 occurred.
AL2 — Lights when alarm 2 occurred.
MANUAL— Lights when control output value is adjusted manually.
Status 2 ... Display color Green
AT — Lights when auto tuning is executed.
Display item guide ... Display color Green
SV — Lights when control set value is dis - played.
OUT — Lights when control output value is displayed.
AL1 — Lights when alarm 1 set value is displayed.
AL2 — Lights when alarm 2 set value is displayed.
P — Lights when proportional constant is displayed.
I — Lights when integral constant is dis- played.
D — Lights when derivative constant is dis - played.

Display resolution:
Temperature input
0°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 in put … 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 allowable.)

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 mm.
Measuring terminals - power terminals 1500VAC, 1 min.
Measuring terminals-protective conductor terminal 500VAC, 1 mm.

Power consumption : Max. approx. 15VA
Case and terminal cover : ABS resin
Color : Gray
Front panel : 1EC529 1P65
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 :
Within the measuring range (-1999 to 9999)

Control setting accuracy rating :
± 1 digit (Relative error to indicating values)

Auto tuning: Standard equipment
PID constants are manually settable.

PID constants : P …… 0.1 to 999.9%
I …… 0 to 9999 sec
D……0 to 9999 sec

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

Output limiter: Higher limit …… 0.0 to 105.0%
Lower limit …… -5.0 to 100.0%

Output variable limiter :
0.1 to 100.0%

Output dead band :
0.1 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 select able by DIP switches.

Output Specifications

* **Current output type PID controller**
  Output signal : 4 to 2 0mADC
  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 occation 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 l0mA, 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.)

■ ALARM SPECIFICATIONS

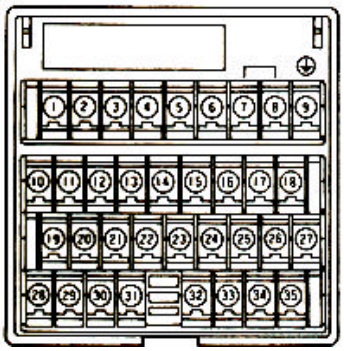
No. of alarm points : 2 points (ALl, AL2)
Alarm system
: Absolute value alarm
Higher-limit/lower-limit, Standby function Provided/not provided
Deviation alarm ……
Higher-limit/lower-limit, Standby function provided/not provided
Heater breakage alarm (Only when the CT input option is provided in pulse output type.)
Alarm dead band
: 1,000 times of the setting resolution from 0
Alarm 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 10mAC, 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.)

■ OPTION SPECIFICATIONS

Option name	Contents
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.
Transmission signal output	Output signal (Designate 1 type) : 4 to 20mADC (Load resistance: Lower than 600Ω) 0 to1VDC, 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 Transmission type : One of PV, SV, MV, RSV, or MFB (On-off servo type opening) is settable. Transmission scale : -1999 to 9999 optionally settable (Minimum value/maximum value) [Reference] Temperature coefficient : 0.2 to 0.3% /10°C
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)

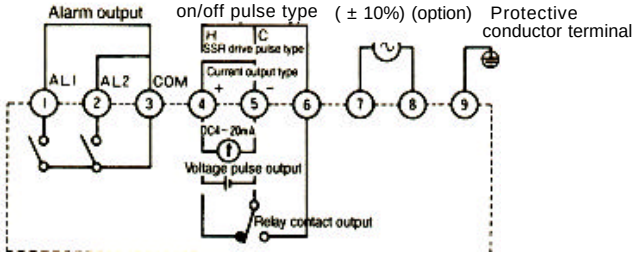
Option name	Contents
	Remote scale -1999 to 9999 optionally settable (Maximum value/minimum value) Remote shift -200 to 1000 times of the setting resolution Remote/Local selection External contact signal External contact capacity: 5VDC, 2mA or higher
Heater breakage detection function (CT input)	Input signal : 0 to 5AAC (50/60Hz) Resolution: Approx. 1/100
Auto/manual external switching	Auto output and manual output are selectable by an external contact input. External contact capacity 5VDC, 2mA or higher
External contact protective device	For light load : 0.01μF + 120Ω (Switching current: Lower than 0.2A) For heavy load: 0.5μF + 470 (Switching current: Higher than 0.2A)
Front protective cover	Transparent acryl
24VDC drive CE-marking	Power supply: 24VDC 10% Power consumption: About 10W Standards: EN55011 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.

■ TERMINAL BOARD

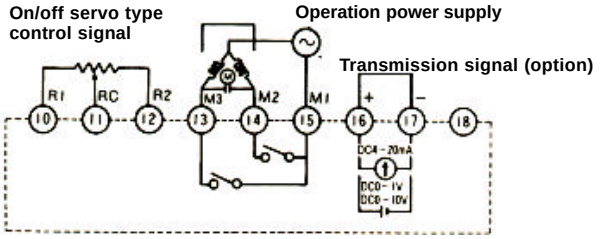


Instrument rated power supply
100-240VAC, 24VDC
(± 10%) (option)

Protective conductor terminal



CT input (option)



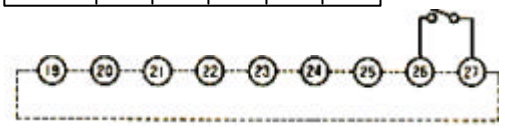
· Control Output

No contact protective device is built in for the on-off pulse type and on-off servo type relay output. Mount the contact protective device externally to meet the load capacity. When the contact protective device is not externally mounted, malfunction may occur due to the melting of relay contacts within a short time. Since this relay is small-sized, it is recommendable to mount a buffer relay externally.

Communication interface (option)

RS-232C	SD	—	RD	—	SG
RS-422A	SDA	SDB	RDA	RDB	SG
RS-485	SA	SB	—	—	SG

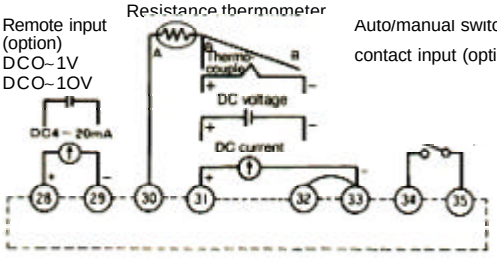
Remote/local switching contact input (option)



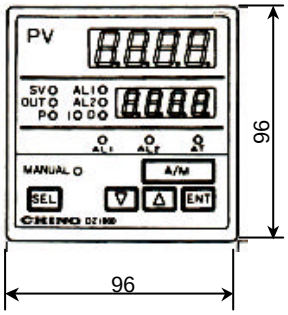
Input signal
Resistance thermometer

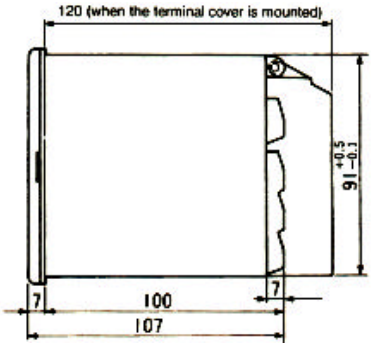
Remote input (option)
DC0~1V
DC0~10V

Auto/manual switching contact input (option)

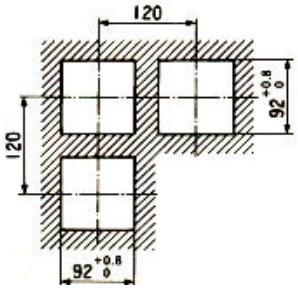


■ EXTERNAL DIMENSIONS

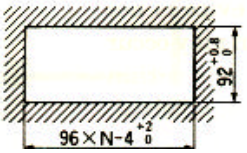




• **Panel cutout**



• **Closed instrumentation panel dimensions**



N: No. of mounting instruments

Unit: mm

Specifications subject to change without notice. Original 1997.4

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