



REX-D100 REX-D400 REX-D900



General Description

The D series controller features wide variety of functions, such as fuzzy logic algorithm, universal input/output, retransmission and digital communication. The D series controller eliminates bothersome modifications, and is ideal for applications to which simple standard controller does not fit.

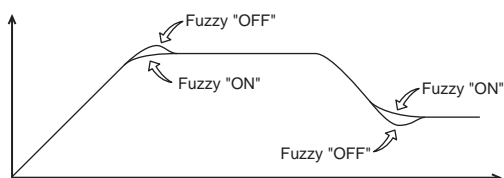
The REX-D900Z for control motor is also available. Feedback resistance is not necessary so that you can save wiring cost and do not have to worry about feedback resistance failure.

Features

- ☆ Fuzzy logic algorithm
- ☆ Ramp rate setting of setpoint change
- ☆ Standard universal inputs and outputs
- ☆ Retransmission
- ☆ Two setpoints

Fuzzy logic algorithm

The D series controller features an advanced fuzzy logic algorithm that suppresses and eliminates overshoot and undershoot on startup and SV change.



Ramp rate setting of setpoint change

You can limit the ramp rate of setpoint change by setting the maximum tolerable amount of SV change per minute. This function makes the D series suitable for applications which do not allow radical output amount change.

Standard universal inputs and outputs

Input type can be selected from twelve different thermocouples, two RTDs or eight different DC current inputs, and be easily changed through the front keys. The D series also offers a choice of three different standard outputs, relay, voltage pulse for SSR drive or 4-20mA DC. The D series eliminates bothersome plug-in modules or modification with soldering.

Retransmission (Analog output)

The D series provides a retransmission output. Output types can be chosen among the measured value, set value, deviation, manipulated output, or current transformer input. Output signal can be selected from 0-5V, 0-10V, 1-5V, 0-20mA or 4-20mA.

Two setpoints

You can have two independent setpoints values, and switch it from each other by contact input.

Various optional functions

Various optional functions are available.

- Three phase or single phase heater break alarm
- Loop break alarm
- NEMA4X waterproof/dustproof protection for REX-D100
- RS-422A/RS-485 digital communications

Digital Temperature Controller D series



Specifications

Input

Input (Universal input)

- a) Thermocouple : K, J, R, S, B, E, T, N (JIS/IEC), PLII (NBS)
W5Re/W26Re (ASTM), U, L (DIN)
Influence of external resistance : Approx. 0.4 μ V/ Ω
Input break action : Up-scale
- b) RTD : Pt100 (JIS/IEC), JPt100 (JIS)
Influence of input lead : Approx. less than 10 Ω
Input break action : Up-scale
- c) DC low voltage input : 0 to 10mV, 0 to 100mV, 0 to 1V
Input break action : Up-scale
- d) DC high voltage input : 0 to 5V, 1 to 5V, 0 to 10V
Input break action : Down-scale
- e) DC current : 0 to 20mA, 4 to 20mA
Input break action : Down-scale
· A 250 Ω resistor is externally connected.

Sampling time

0.5 sec

PV bias

- Temperature input : -1999(-199.9) to 9999(999.9) $^{\circ}$ C/ $^{\circ}$ F
DC voltage, DC current : -1999 to 9999(A decimal point position is the same as that of PV.)

Performance

Measuring accuracy

- \pm (0.3% of span + 1 digit)
Cold-junction temperature compensation error
Within \pm 1.5 $^{\circ}$ C (between 0 and 50 $^{\circ}$ C [32 and 122 $^{\circ}$ F])
· Accuracy is not guaranteed between 0 and 400 $^{\circ}$ C (0 and 752 $^{\circ}$ F) for type B input.
Accuracy is not guaranteed between 0 and 32 $^{\circ}$ F for type N, PLII and W5Re/W26Re.

Insulation resistance

- More than 20M Ω (500V DC) between input terminals and ground
More than 20M Ω (500V DC) between power terminals and ground

Dielectric strength

- 1000V AC for one minute between input terminals and ground
1500V AC for one minute between power terminals and ground

Control

Control method

- a) PID control with autotuning and fuzzy logic
b) Heat/cool PID control with autotuning and fuzzy logic

Major setting range

- Setting range : Same as input range.
Heat-side proportional band : 1(0.1) to setting limit high.
(ON/OFF action when P=0)
Cool-side proportional band : 1 to 3000% of heat-side proportional band
(Heat/cool ON/OFF action when Pc=0)
Integral time : 1 to 3600sec.(P + D action when I=0)
Derivative time : 1 to 3600sec.(P + I action when D=0)
Deadband/Overlap : -10(-10.0) to 10(10.0) $^{\circ}$ C/ $^{\circ}$ F (Temperature input)
-10.0 to 10.0% of span (Voltage, current input)
Proportional cycle time : 1 to 100 sec.
Output limiter high : -5.0 to +105.0%
Output limiter low : -5.0 to +105.0%
Manual control : -5.0 to +105.0%
(Heat/cool control type : -105.0 to +105.0%)

Control output

- Relay output : Form C contact, 250V AC 3A (resistive load)
(Form A contact : D100)
Voltage pulse output : 0/12V DC
(Load resistance :More than 600 Ω)
* OUT1 of D400/D900 : 0/15V DC (Load resistance :More than 1K Ω)
Current output : 0 to 20mA, 4 to 20mA DC
(Load resistance :Less than 600 Ω)
Continuous voltage output : 0 to 5V, 0 to 10V, 1 to 5V DC
(Load resistance :More than 1k Ω)

Combination of output and type

Output	Type	OK : Available N/A: Not available	
	D100 Specify when ordering	D400/900 (OUT1) Universal output	D400/900 (OUT2) Specify when ordering
Relay contact	OK	OK	OK
Voltage pulse	OK	OK	OK
Current	OK	OK	OK
Continuous voltage	OK	N/A	OK

Alarm

Temperature alarm

- a) Number of alarms : 2 points
b) Alarm action : Programmable (process, deviation, SV, FAIL)
c) Alarm differential gap : -10 (-10.0) to 10 (10.0)
d) Alarm delay : 0 to 600 sec.

Control loop break alarm

- a) LBA time setting : 0 to 7200 sec. (LBA OFF by setting Zero)
b) LBA deadband : 0 to 9999 $^{\circ}$ C [$^{\circ}$ F] or 100% of span
(OFF by setting zero)
· Output from ALM1 terminal
OR output with temperature alarm is available.
· Not available for heat/cool control type.

Heater break alarm (Optional)

- a) Number of inputs : 1 or 2 points.(2 points for 3-phase heater)
b) CT type : CTL-6-P-N (30A), CTL-12-S56-10L-N (100A)
c) Display range : 0.0 to 100.0A (OFF by setting Zero)
d) Accuracy : \pm 5% of input value or 2A
(whichever is larger)

- Output from ALM2 terminal
OR output with temperature alarm is available.

Alarm output

- Relay output, Form A contact 250V AC 0.5A (resistive load)

Options

External contact input

- Number of inputs : 1 point.
Type : SV1/SV2 selection (open : SV1, close : SV2)

- REX-D400/900: Standard function, REX-D100: Optional function

Analog output

- a) Number of outputs : 1 point
b) Output signal : 0 to 5V, 0 to 10V, 1 to 5V DC
(Load resistance : More than 1k Ω)
0 to 20mA, 4 to 20mA DC
(Load resistance : Less than 600 Ω)

- Output data can be selected among process value, deviation, set point, manipulated output value (heat-side or cool-side), current transformer input (With HBA function).

Digital communications

- a) Communication method : RS-485 (2-wire), RS-422A(4-wire)
b) Communication speed : 1200, 2400, 4800, 9600, 19200 bps
c) Bit format
Start bit : 1
Data bit : 7 or 8
Parity bit : Without, Odd or Even
Stop bit : 1 or 2
d) Communication code : ASCII(JIS) 7-bit code

General specifications

External Dimensions (W x H x D)

- D100 : 48 x 48 x 100mm
D400 : 48 x 96 x 100mm
D900 : 96 x 96 x 100mm

Supply voltage

- a) 90 to 264V AC (Including supply voltage variation)
[Rating : 100 to 240V AC] (50/60Hz common)
b) 21.6 to 26.4V AC(Including supply voltage variation)
[Rating : 24V AC] (50/60Hz common)
c) 21.6 to 26.4V DC(Ripple rate 10% p-p or less)
[Rating : 24V DC]

Power consumption

- D100 : Less than 11VA (100 to 240V AC)
Less than 7.0VA (24V AC)
Less than 180mA (24V DC)
D400/900 : Less than 12VA (100 to 240V AC)
Less than 7.5VA (24V AC)
Less than 200mA (24V DC)

Effect by power failure

- A power failure of 20 msec or less will not affect the control action.

Operating environments : 0 to 50 $^{\circ}$ C [32 to 122 $^{\circ}$ F], 20 to 80% RH

Memory backup : Backed up by EEPROM.

Data retaining period : Approx 10 years (depends on storage and operating conditions.)

Net weight

- D100 : Approx. 180g
D400 : Approx. 250g
D900 : Approx. 360g

Model and Suffix Code

◆ REX-D100

Specifications	Model and Suffix Code																	
Model	D100											<input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> * <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/>						
Control method *2	PID control with AT Heat/cool PID with AT										F							
Control output (OUT1)	Relay output Voltage pulse DC mA, V (See output signal code table)										M	V						
Control output (OUT2)	No output (control method F) Relay output Voltage pulse DC mA, V (See output signal code table)										N	M	V					
Alarm	No alarm Two alarms										N	D						
Heater break alarm(HBA) *1, *3	Not supplied Single-phase heater break alarm Three-phase heater break alarm										N	S	S					
Contact input (Step) *1	Not supplied SV1/SV2 step function										N	1						
Analog output *1	Not supplied See output signal code table (Output signal code 4-8)															N		
Digital communications *1	Not supplied RS-485 (2-wire system)															N	5	
Waterproof and dustproof (NEMA4X)	Not supplied Waterproof and dustproof protection																	N

*1 : One function can be selected from contact input , analog output, three-phase heater break alarm and digital communication.

*2 : If the heat/cool PID control with AT is selected, contact input, analog output, three-phase heater break alarm or digital communication can not be added.

*3 : If continuous voltage / current output is specified, no heater break alarm can be added.

· For DC current input, a 250Ω resistor should be externally connected to the input terminals.

◆ REX-D400/900

Specifications	Model and Suffix Code																	
Model	D400 D900											<input type="checkbox"/> - <input type="checkbox"/> * <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/>						
Control method *1, *2	PID control with AT Heat/cool PID with AT										F	W						
Control output (OUT2)	No output (control method F) Relay output Voltage pulse DC mA, V (See output signal code table)										N	M	V					
Alarm	No alarm Two alarms										N	D						
Heater break alarm(HBA) /Step function	Not supplied (with step function) Single-phase heater break alarm (with step function) Three-phase heater break alarm (without step function)										N	S	S					
Analog output *1, *2	Not supplied See output signal code table (See output signal code table)															N		
Digital communications *2	Not supplied RS-422A (4-wire system) RS-485 (2-wire system)																	N

*1 : If the heat / cool PID control with AT is selected, no analog output can be added.

*2 : If the heat / cool PID control with AT or analog output is selected, the digital communication function should be RS-485.

*3 : If continuous voltage / current output is specified, no heater break alarm can be added.

· For DC current input, a 250Ω resistor should be externally connected to the input terminals.

Range and input table

Thermocouple

Input	Range	Input	Range
K	-199.9 - 999.9 °C	B	0 - 1820 °C
	-200 - 1372 °C		0 - 3308 °F
	-199.9 - 999.9 °F	E	-200 - 1000 °C
	-330 - 2500 °F		-330 - 1832 °F
J	-199.9 - 999.9 °C	N	0 - 1300 °C
	-200 - 1200 °C		0 - 2372 °F
	-199.9 - 999.9 °F	PLII	0 - 1390 °C
-330 - 2192 °F	0 - 2534 °F		
T	-199.9 - 400.0 °C	W5Re	0 - 2320 °C
	-199.9 - 752.0 °F	/W26Re	0 - 4208 °F
R	0 - 1769 °C	U	0 - 600 °C
	0 - 3216 °F		0 - 1100 °F
S	0 - 1769 °C	L	0 - 900 °C
	0 - 3216 °F		0 - 1600 °F

RTD

Input	Range
JPt100	-199.9 - 510.0 °C
	-199.9 - 950.0 °F
Pt100	-199.9 - 660.0 °C
	-199.9 - 999.9 °F

Voltage and current

Input	Range
0 - 10mV	Scale range and decimal point are programmable in the range of -1999 to 9999.
0 - 100mV	
0 - 1V	
0 - 5V	
1 - 5V	
0 - 10V	
0 - 20mA*1	
4 - 20mA*2	

Current input

*1 For "0 - 20mA DC" input, a 250Ω resistor (±0.02% ±10PPM, more than 0.25W) is necessary to be connected externally to "0 - 5V DC" input.

*2 For "4 - 20mA DC" input, a 250Ω resistor (±0.02% ±10PPM, more than 0.25W) is necessary to be connected externally to "1 - 5V DC" input.

Output signal code table

4	0 - 5V DC	5	0 - 10V DC	6	1 - 5V DC	7	0 - 20mA DC	8	4 - 20mA DC
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How to specify safety standard

When you specify the models with CE mark • UL/CSA certification, please add the suffix of "/CE" to the model code.

Supply voltage

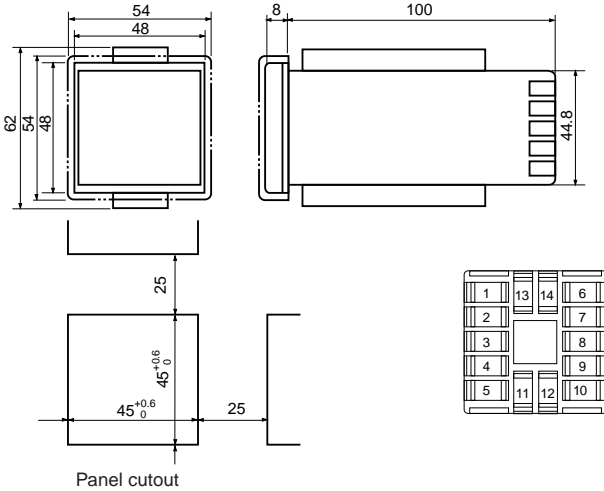
100 - 240V AC
24V AC
24V DC
Please specify when ordering.

Digital Temperature Controller D series

External Dimensions and Rear Terminals

REX-D100

Unit : mm



No.	Description
1	Alarm output
2	Relay contact output
3	Relay contact output
4	Control output 1
5	Control output 1

No.	Description
6	Power supply
7	Power supply
8	Measured input
9	Measured input
10	Measured input

No.	Description
13	Control output 2
14	Control output 2

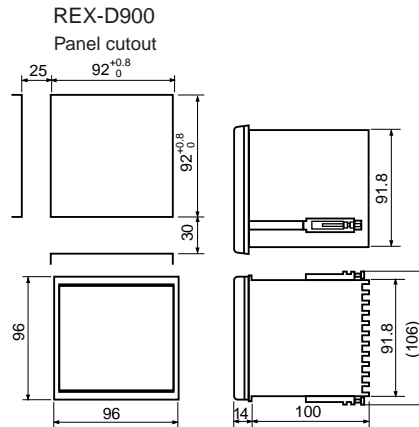
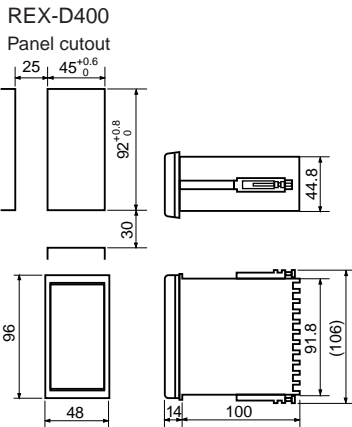
No.	Description
11	Current transformer input 1
12	Current transformer input 1

* Double-dotted line shows the front cover conforming to NEMA 4X.
The panel thickness shall be 1 to 10 mm.

REX-D400

Unit : mm

REX-D900



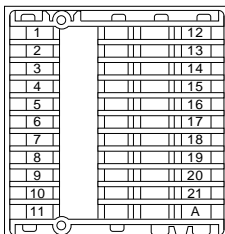
* The panel thickness shall be 1 to 8 mm.

* The panel thickness shall be 1 to 8 mm.

REX-D400



REX-D900



No.	Description
1	Power supply
2	Power supply
3	Control output OUT1
4	Relay contact output
5	Relay contact output
6	Alarm output
7	Relay contact output
8	Relay contact output
9	Measured input
10	Measured input
11	Measured input

No.	Description
12	Control output 1
13	Control output 1
14	Control output 2
15	Control output 2
16	Control output 2
17	Control output 2
18	Control output 2
19	Control output 2
20	Control output 2
21	Control output 2