Digital Temperature Controller **S series**

REX-S100
REX-S400
REX-S900

General Description

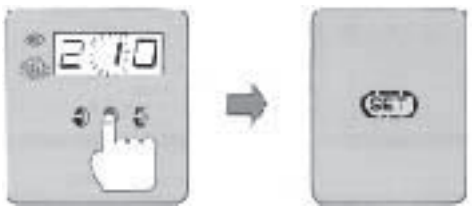
The S Series are user-friendly and economical controllers with autotuning function.
The deviation display lamp provides at-a-glance indication of value deviation between the measured value and the set value.
Optional two temperature alarms including heater break alarm and loop break alarm are available.

Features

☆ Cost effective
☆ Simple operation
☆ Deviation display lamp
☆ Optional two alarms
☆ Heater break alarm and loop break alarm
☆ CE, UL, CSA approved

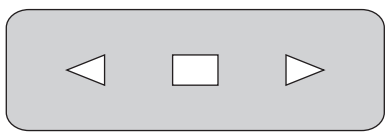
Simple operation

The operation is straight forward so that less technical knowledge is required. For example, each key corresponds to each digit when changing the set value.



Deviation display lamp

The deviation display lamp provides at-a-glance display of the deviation between set value and the process value.



Heater break alarm (HBA)

The HBA function monitors the load via an external current transformer*1 and detects failures in the control circuit such as heater breaks and the failure of a mechanical or solid state relay. When the control output is on and the load current drops below the HBA set value, the heater break alarm is activated. Conversely, when the control output is off and the load current still exists, the heater break alarm is turned on.

*1 Current transformer: CTL-6-P-N (0 to 30A),
CTL-12-S56-10L-N (0 to 100A)

Loop break alarm (LBA)

The control loop break alarm (LBA) monitors and protects an entire temperature control system. The LBA detects heater break, thermocouple or RTD failures, short circuits, or the failure of an operating device such as a mechanical or solid state relay.

When the PID computed value reaches 100% and the temperature does not respond in LBA set time, the loop break alarm is activated. Conversely, when the PID value reaches 0% and the temperature does not respond accordingly, the loop break alarm is turned on.

Specifications

Inputs

Input (Universal input)
a) Thermocouple : K, J, E, T, N (JIS/IEC), U, L (DIN)
• Influence of external resistance : Approx. 0.35μV/Ω
• Input break action : Up-scale
b) RTD : Pt100 (JIS/IEC), JPt100 (JIS)
• Influence of input lead resistance : Approx. 0.01[%/Ω] of reading
• Maximum 10Ω per wire
• Input break action : Up-scale

Sampling time
0.5 sec

Performance

Measuring accuracy
a) Thermocouple
±(0.5% of SV + 1 digit) or ±3℃ (6℉) whichever is larger
b) RTD
±(0.5% of SV + 1 digit) or ±2℃ (4℉) whichever is larger

Insulation resistance
More than 20MΩ (500V DC) between measured and ground terminals
More than 20MΩ (500V DC) between power and ground terminals

Dielectric strength
1000V AC for one minute between measured and ground terminals
1500V AC for one minute between power and ground terminals

Control

Control method
PID control with autotuning
Reverse action as standard (Direct action also available)

Major setting range

Setting range :	Same as input range.
Proportional band :	1 to span (ON/OFF action when P=0)
• Differential gap at ON/OFF action is 2℃ (℉).	
Integral time :	0 to 999sec.(PD action when I=0)
Derivative time :	0 to 999sec. (P I action when D=0)
Anti-reset windup (ARW) :	1 to 100% of proportional band
Proportional cycle time :	1 to 100 sec.

Control output

Relay contact output :	Form C contact, 250V AC 3A (resistive load) (Form A contact : REX-S100)
Voltage pulse output :	0/12V DC (Load resistance : More than 600Ω)

Alarms (Optional)

Temperature alarm

a) Number of alarms :	2 points (Maximum)
b) Alarm action :	Deviation High, Low, High - Low, Band Process High, Low
c) Alarm differential gap :	2℃ (℉) as standard.

Heater break alarm (For single phase)

a) Number of inputs :	1 point
b) CT type :	CTL-6-P-N (30A), CTL-12-S56-10L-N (100A)
c) Display range :	0 to 100A
d) Accuracy :	± 5% of input value or ± 2A (whichever is larger)

• Output from alarm 2 terminal.

Control loop break alarm (LBA)

a) LBA time setting :	0.1 to 99.9 minutes.
b) LBA deadband :	0 to 999℃ (℉) (OFF by setting zero)

Alarm output
Relay contact output, Form A contact, 250V AC 1A (resistive load)

General specifications

External Dimensions (W x H x D)
REX-S100 : 48 x 48 x 100mm
REX-S400 : 48 x 96 x 100mm
REX-S900 : 96 x 96 x 100mm

Supply voltage
a) 85 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
Less than 9VA for standard AC type
Less than 4VA for 24V AC type
Less than 120mA for 24V DC type

Effect by power failure
A power failure of 20msec or less will not affect the control action.
If power failure of more than 20msec occurs, controller will restart.

Operating environments : 0 to 50℃ [32 to 122℉] , 45 to 85% RH

Memory backup : Backed up by Non-volatile memory.

Net weight
REX-S100 : Approx. 170g
REX-S400 : Approx. 260g
REX-S900 : Approx. 340g

Model and Suffix Code

Specifications	Model and Suffix Code
Model	S100 (48 x 48mm size) S400 (48 x 96mm size) S900 (96 x 96mm size) F □ – □ □ * □ □
Control action	PID control with AT F
Input type	See range and input code table □
Scale range	See range and input code table □
Control output	Relay contact output Voltage pulse output M V
Alarm 1	No alarm See alarm code table N □
Alarm 2	No alarm See alarm code table N □

• For CE marked, UL approved and CSA certified products, please add the suffix of "CE" to the end of the model code.

Range and input code table

Thermocouple input

Input	Code		Range
K	K	21	0 — 999°C
	K	B1	0 — 999°F
J	J	13	0 — 999°C
	J	A8	0 — 999°F
E	E	05	0 — 999°C
	E	A4	0 — 999°F
T	T	11	-199 — 400°C
	T	B2	-199 — 752°F
N	N	03	0 — 999°C
	N	A3	0 — 999°F
U	U	07	-199 — 600°C
	U	A7	-199 — 999°F
L	L	05	0 — 900°C
	L	A4	0 — 999°F

RTD input

Input	Code		Range
Pt100	D	19	-199 — 649°C
	D	B6	-199 — 999°F
JPt100	P	19	-199 — 649°C
	P	B5	-199 — 999°F

Alarm code table

Code	Type
A	Deviation High
B	Deviation Low
C	Deviation High - Low
D	Deviation Band
E	Deviation High with hold
F	Deviation Low with hold
G	Deviation High - Low with hold
H	Process High
J	Process Low
K	Process High with hold
L	Process Low with hold
P	Heater break alarm (CTL- 6P-N [30A])
S	Heater break alarm (CTL-12-S56-10L-N [100A])
R	Loop break alarm (LBA)

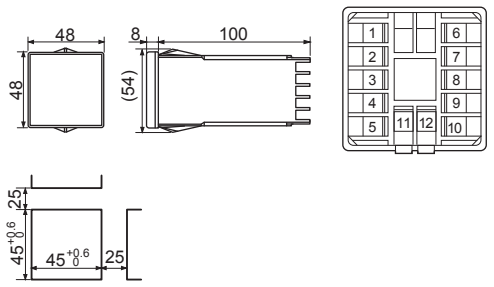
Supply voltage

100 - 240V AC
24V AC
24V DC

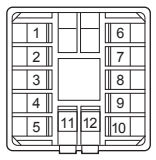
External Dimensions and Rear Terminals

REX-S100

(Unit : mm)



Panel cutout



No.	Description	
1		Alarm output
2	NO Alarm 1	
3	NO Alarm 2	Relay contact output
4	(1) (2) +	Control Output
5	−	(1) Relay contact output (2) Voltage DC/Current DC

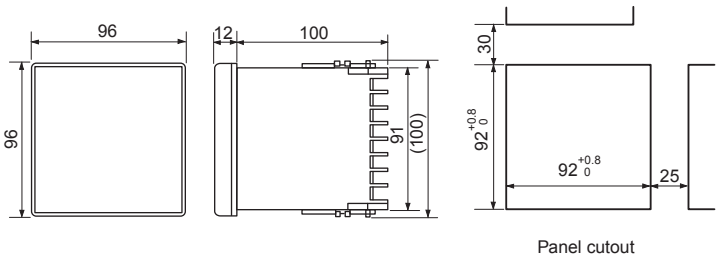
No.	Description	
6	AC 100 to 240V	Power supply
7	AC 24V / DC + 24V −	
8	(1) +	Measured input (1) Thermocouple (2) RTD
9	(1) −	
10	A B B (2)	

No.	Description	
11	CT CT input for heater break alarm	Current transformer input
12		

• Use 6.2mm or less solderless terminal.

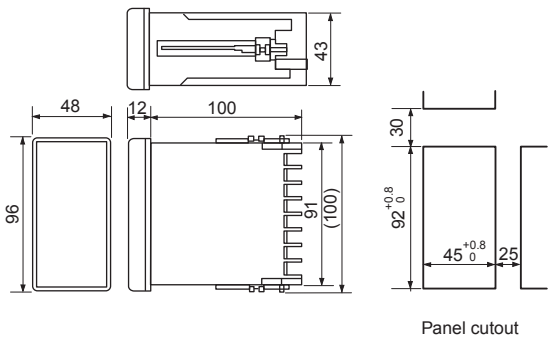
(Unit : mm)

REX-S900



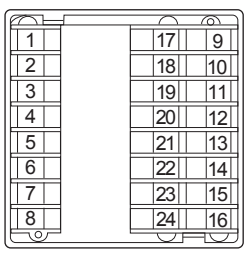
Panel cutout

REX-S400

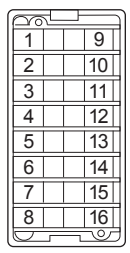


Panel cutout

REX-S900



REX-S400



No.	Description	
1		Ground
2	AC 100 to 240V	Power supply
3	AC 24V / DC + 24V −	
4		
5		
6	(1) C NO	Control Output (1) Relay contact output (2) Voltage DC/Current DC
7	(2) +	
8	NC −	

No.	Description	
9		Alarm output
10	NO Alarm 1	Relay contact output
11	NO Alarm 2	
12	CT CT input for heater break alarm	Current transformer input
13		
14	B	Measured input (1) Thermocouple (2) RTD
15	B	
16	A (1) + (2) −	

• Use 6.2mm or less solderless terminal.