REX-F9000

General Description

The REX-F9000 is a high resolution temperature controller that has been specifically designed for applications where precise process control with three decimal places (0.001°C) is required. This instrument is easy-to-use and offers versatile functions such as dual loop control, bar-graph display, autotuning, communications, analog outputs and contact inputs. The REX-F9000 combines a wide range of features with optimum PID values for fast, accurate response to process changes for maximum control performance.

Features

☆ High resolution
☆ High accuracy
☆ Power feed forward function
☆ 2-channel control
☆ Brilliant PID
☆ Digital communications

High Resolution

REX-F9000 has a high resolution of 0.001°C over an input range of 0.000 to 50.000°C.

0.001°C

Power Feed Forward Function

The REX-F9000 constantly monitors the electrical load through a dedicated transformer. It then adjusts PID outputs relative to power supply fluctuations to prevent sudden load output changes to the electrical heating elements.
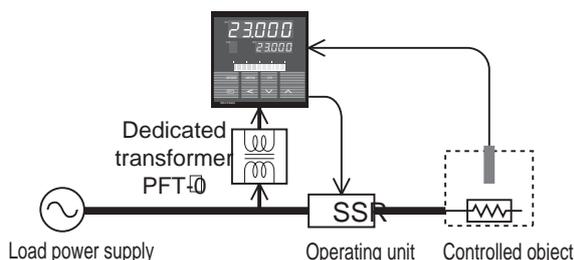

High Accuracy

Primary industrial applications are semiconductor equipment and laboratory equipment or anywhere that extremely accurate temperature is required.

±0.05°C

Brilliant PID

The Brilliant PID combines stable control with quick response. With conventional PID control, there is a conflict between control stability and quick response time. Response to set point changes may be compromised when stability is improved; conversely, stability may be compromised when quick response to SV change is achieved. Brilliant PID retains optimum PID values for stability, while offering the flexibility to choose the control response type that is needed such as Fast, Medium and Slow. Select the Fast response type when quick response is required or the Slow response to avoid overshooting.

Response to the SV change
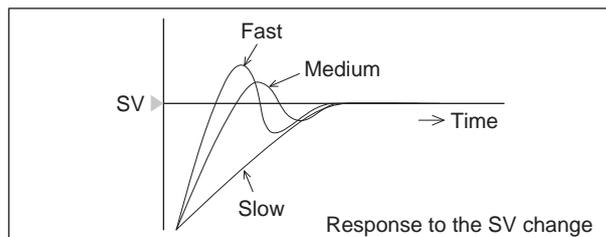
2-Channel Control

The REX-F9000 is available with 2-channel input for dual channel control.

Digital Temperature Controller REX-F9000

Specifications

Input

Number of Inputs
1 or 2 points

Input
RTD : Pt100 (JIS/IEC), JPt100 (JIS)
• 3 or 4 wire system
• Influence of input lead resistance : Less than 0.04°C
(Less than 10Ω per wire)
• Input break action : Up-scale
• Input short action : Down-scale

Input Range
0.000 to 50.000°C

Sampling Time
0.1 sec

PV Bias
-19.999 to 19.999°C

Digital Filter
0.1 to 100.0 sec (No filter when 0.0 is set)

Performance

Setting Accuracy
a) Temperature : ±0.05°C
b) Other setting : Within ±0.1% of setting range

Measuring Accuracy
±0.05°C (Ambient temperature 23°C ±5°C)

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
Brilliant PID control with autotuning
•Direct /Reverse action (Selectable)

Major Setting Range
Set value :   0.000 to 50.000°C
Proportional band :   0.001 to 50.000°C
Integral time :   0.1 to 3600.0 sec. (Zero is not settable)
Derivative time :   0.1 to 3600.0 sec. (PI action when D=0)
Control response :   0 (Slow), 1 (Medium), 2 (Fast)
Proportional cycle :   0.1 to 100.0 sec. (Only voltage pulse output)

Control Output
Voltage pulse output :   0/12V DC
(Load resistance : More than 600Ω)
Current output :   4 to 20mA DC
(Load resistance : Less than 600Ω)
• Output resolution : More than 13 bits
• Output impedance : More than 5MΩ

Alarms

Temperature Alarm
a) Number of alarms :   2 points / channel
b) Type :   Deviation High, Low, High/Low, Band
Process High, Low
Set value High, Low
c) Setting range :   Deviation and band alarm : -19.999 to 19.999°C
(Action is not guaranteed in the case of an
alarm setting that is outside of the input range.)
Process alarm : 0.000 to 50.000°C
d) Alarm differential gap : 0.000 to 5.000°C
e) Alarm timer :   0 to 600 sec.

Alarm Output
Relay output, Form A contact 250V AC 1A (resistive load)
Energized or de-energized output

Communications

Communication Method : RS-485 (2-wire)
Communication Speed : 1200, 2400, 4800, 9600, 19200 BPS
Bit Format
Start bit :   1
Data bit :   7 or 8
Parity bit :   Without, Odd or Even
Stop bit :   1 or 2
Communication Code :   ASCII (JIS) 7-bit code
Maximum Connection :   31 (Address can be set from 0 to 99.)

Contact Input

Number of Inputs :   1 point
Type :   RUN/STOP
Input Rating :   Non-voltage contact input
 a) OPEN :   500kΩ or more
 b) CLOSE :   10Ω or less

Analog Output   (Optional)

Number of Outputs :   1 point / channel
Output Types :   a) Measured value (PV)
b) Deviation (DV)
c) Set value (SV)
d) Manipulated output value (MV)
Output Scaling :   High limit and Low limit are available.
Output Resolution :   13 bits or more
Output Accuracy :   0.1% of span
Output Ripple :   0.1% of span (When resistive load)

NO	Output Signal	Output Impedance	Allowable Load Resistance
4	0 – 5 V	Less than 0.1Ω	More than 1kΩ
6	1 – 5 V	Less than 0.1Ω	More than 1kΩ
7	0 – 20mA	Less than 5MΩ	Less than 600Ω
8	4 – 20mA	Less than 5MΩ	Less than 600Ω

General Specifications

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:24VDC]
Power Consumption
Less than 13VA for standard AC type (at 100V AC)
Less than 19VA for standard AC type (at 240V AC)
Less than 11VA for 24V AC type
Less than 340mA for 24V DC type
Power Failure Effect
Not affected by power failure shorter than 20msec, otherwise reset to
the initial state.
FAIL Output
a) Check item : MCU trouble, MCU supply voltage trouble, watchdog
timer, EEPROM error, input circuit trouble,
adjustment error, sensor break
b) Output :   Relay output, Form A contact 250V AC 1A
(resistive load) Abnormal time open.
Operating Environments : 0 to 50°C [32 to 122°F] , 45 to 85% RH
Memory Backup : Backed up by non-volatile memory.
Number of writing : Approx. 100,000 times
Net Weight
Approx. 530g
External Dimensions (W x H x D)
96 x 96 x 100mm

Compliance with Standards

• CE Mark
• UL/cUL Recognized
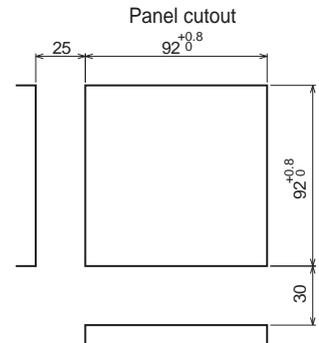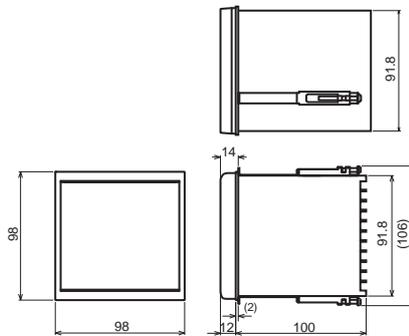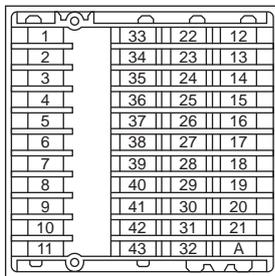
Digital Temperature Controller REX-F9000

Model and Suffix Code

Specifications		Model and Suffix Code							
Model	F9000			— □	□	□ — □ ✳ □		□ / □	
Type	1 channel type			1					
	2 channels type			2					
Control output (CH1)	Voltage pulse output				V				
	Current output				8				
Control output (CH2)	Not supplied (1 channel type)					N			
	Voltage pulse output					V			
	Current output					8			
Power supply	24V AC/DC					3			
	100 to 240V AC					4			
Analog output (CH1)	Not supplied						N		
	0 to 5V DC						4		
	1 to 5V DC						6		
	0 to 20mA DC						7		
	4 to 20mA DC						8		
Analog output (CH2)	Not supplied							N	
	0 to 5V DC							4	
	1 to 5V DC							6	
	0 to 20mA DC							7	
	4 to 20mA DC							8	
Power feedback transformer *	Not supplied								N
	Load power supply 100V (100 to 120V AC)								1
	Load power supply 200V (200 to 240V AC)								2

* Power feedback transformer not required when replacing the F9000. Select (N).
When ordering transformer for replacement, specify one of the following model codes.
100 to 120V AC type : **PFT-01**
200 to 240V AC type : **PFT-02**

External Dimensions and Rear Terminals

Unit : mm

Panel cutout

Power feedback transformer

No.		Description	
1		Ground	
2	AC 100 to 240V / AC 24V / DC 24V +	Power Supply	
3			
4	NO FAIL	FAIL Output	
5			
6	DI RUN/STOP +	Digital Input	
7	SG		
8	T/R(A) RS-485	Communications	
9	T/R(B)		
10		Feedback Transformer Input	
11			

No.		Description	
40	AO + For channel 2	Analog Output	
41	—		
42	AO + For channel 1		
43	—		

No.			Description	
22	12	+	Control Output	
23	13	—		
24	14		Alarm Output	
25	15	NO		
26	16	NO		
27	17			
28	18			
29	19	A'	Measured Input	
30	20	A		
31	21	B RTD		
32	A	B		

For channel 1
For channel 2