CONTROLLER

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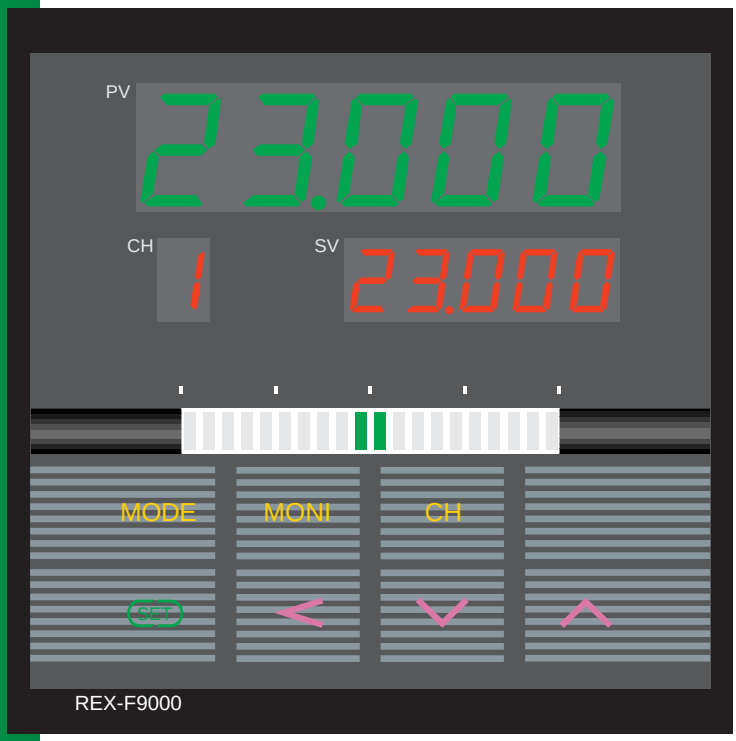
REX-F9000

High Resolution Didital Controller



0.001°C

RKC® RKC INSTRUMENT INC.

REX-F9000

High resolution temperature controller

1 channel

2 channels

High accuracy

The accuracy is ±0.05˚C.
Most suitable for the temperature control of the equipment for semiconductor manufacturing, calibration, laboratory experiment, etc. where the high accuracy is required.

±0.05˚C

High resolution

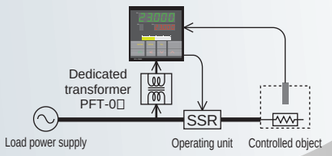
REX-F9000 has high resolution of 0.001˚C.
Input range is 0.000 to 50,000˚C.

0.001˚C

High stability

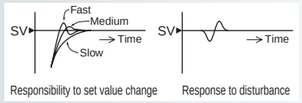
Power feed forward function

The electric power feed forward is applied to PID output to prevent the turbulence at the voltage change of a load.



Brilliant PID

The brilliant PID control allows 3 types of the selection of " Responsibility to a set point" from among "Fast", "Medium" and "Slow" according to the application of customers keeping the optimum PID constant for the "responsibility to disturbance".



Application

Semiconductor manufacturing equipment

In the semiconductor manufacturing process, an aligner requires advanced temperature control. The REX-F9000 with high accuracy, high resolution and high stability is most suitable for the temperature control of a stepper.

Calibration furnace

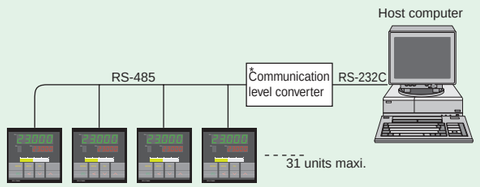
For the temperature control of a calibration furnace where the temperature control is important.

For various type of experiments

The stability of temperature as one of the important experimental conditions is indispensable to increase the accuracy of experiments.
The high accuracy and high stability of REX-F9000 meets this requirement.

Communication function

The communication function is based on RS-485, and 31 units of REX-F9000 can be connected to a host computer by multi-drop connection. Further REX-F9000 is compatible for rudder communication protocol, which allows the direct communication with a PLC.



*Recommended product :

Specifications

Input

Number of input	: 1 point or 2 points (2 points type : Released soon)
Input	: RTD : Pt100(JIS/IEC), JPt100(JIS)
	* 3 wire system or 4 wire system
Input range	: 0.000 ~ 50.000˚C
Sampling time	: 0.1 sec
Influence of input lead	: Less than 0.04˚C * Less than 10Ω per wire
Action at input break	: Up scale
Action at input short circuit	: Down scale
PV bias	: -19.999 ~ 19.999˚C
Digital filter	: 0.1 ~ 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
Input display accuracy	: ±0.05˚C (Ambient temperature 23˚C ±5˚C)
Insulation resistance	: More than 20MΩ (500V DC) between measued and ground terminal
	More than 20MΩ (500V DC) between power and ground terminal
Withstand voltage	: 1000V AC for one minute between measued and ground terminal
	1500V AC for one minute between power and ground terminal
	2300V AC for one minute between power and input terminal

Control

Control method	: Brilliant PID control with autothuning
	*Direct/Reverse action (Selectable)
Control computing cycle	: 0.1 sec
Setting range	: a) Set value (SV) : 0.000~50.000˚C
	b) Proportional band : 0.001~50.000˚C
	c) Integral time : 0.1~3600.0 sec
	d) Derivative time : 0.1~3600.0 sec (PI action when 0 is set.)
	e) Control response parameter : 0(Slow), 1(Medium), 2(Fast)
	f) Proportional cycle : 0.1~100.0 sec (Only voltage pulse output)
Control output	: a) Voltage pulse output : 0/12V DC (Load resistance : More than 600Ω)
	b) Current output : 4~20mA DC (Load resistance : Less than 600Ω)
	*Output resolution : More than 13 bit
	*Output impedance : More than 5 MΩ
Output limiter	: Possible high and low limit set up.

Alarm output

Number of alarm	: 2 points
Alarm types	: a) Deviation high alarm
	b) Deviation low alarm
	c) Deviation high / low alarm
	d) Band alarm
	e) Process high alarm
	f) Pocess low alarm
	*Hold action can be programmed.
Setting range	: a) Deviation and band alarm : -19.999~19.999˚C
	*Action is not guaranteed case for an action point of input range outside.
	b) Process alarm : 0.000~50.000˚C
Differential gap	: 0.000~5.000˚C
Alarm timer	: 0~600 sec
Alarm method	: Energized output or de-energized output
Output	: Relay contact output 250V AC 1A (Resistive load) Form 1a

Digital communications

Communication standard	: RS-485 Conformity (2-wire)
Protocol	: ANSI X3.28(1976) 2.5 A4 or ladder communication
Communication method	: Half-duplex multidrop connection
Synchronous method	: Asynchronous method
Communication speed	: 1200BPS, 2400BPS, 4800BPS, 9600BPS, 19200BPS
	*Selectable
Bit configuration	: a) Start bit : 1
	b) Data bit : 7 or 8
	c) Parity bit : "with" or "without", even or odd in case of "with" parity
	d) Stop bit : 1 or 2
	*b)~d) selectable
Maximum connection	: 32 (Address can be set from 0 to 99.)

Contact input

Number of point	: 1 point
Contact input type	: RUN/STOP
Input rating	: Non voltage contact input
	a) OPEN : 500kΩ or more
	b) CLOSE : 10Ω or less

Analog output (Option)

Number of output	: 1 point
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 bit 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

Dustproof and waterproof structure	: IP54 (Dustpoof and waterproof are effective only to the front direction when installed on a panel.)
Supply voltage	: a) AC type : 85 to 264V AC (50/60Hz)
	Including power voltage fluctuation (100 to 240V AC rating)
	b) 24V AC type : 21.6 to 26.4V AC
	Including power voltage fluctuation (24V AC rating)
	c) 24V DC type : 21.6 to 26.4V DC
	Including power voltage fluctuation (24V DC rating)
Power consumption	: a) AC type : Less than 13 VA (at 100V AC)
	Less than 19 VA (at 240V AC)
	b) 24V AC type : Less than 11 VA
	c) 24V DC type : Less than 340 mA
Momentary power failue	: Not affected by power failure less than 20 msec.
Memory backup	: Backed up by non-volatile memory. Date retaining period : Approx 10 years
"FAIL" output	: Check item : MCU trouble, MCU supply voltage trouble, Watchdog timer, EEPROM error, Input circuit trouble, Adjustment error, Sensor break
	Output : Relay contact output 250V AC 1A Form 1a (Resistive Load) Abnormal time open
	Display : "FAIL" LED light on.
Ambient temperature	: 0 to 50˚C
Ambient humidity	: 45 to 85% RH (Non dewfall)
Net weight	: Approx. ??? g
External dimensions	: 96 x 96 x 100 mm (H x W x D)
Environment	: Should be free corrosive and flammable gas and dust.
Other conditions	: Free from external noise, vibration, shock and exposure to direct sunlight.

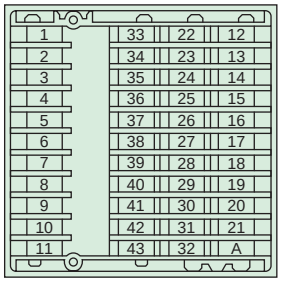
Compliance with standards

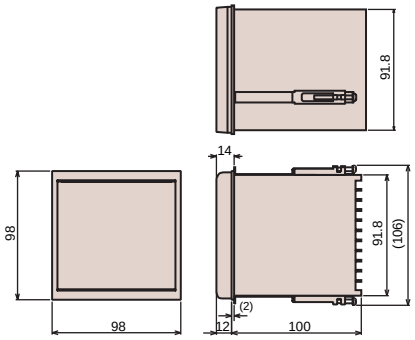
CE marked
UL recognized
CSA certified

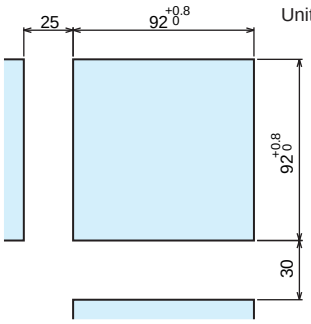
Model and Suffix Code

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

Rear terminal, External dimensions and Panel cutouts







Unit : mm

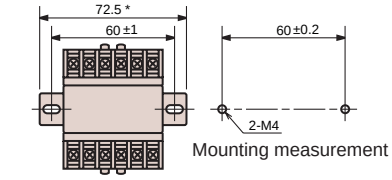
No.	Description	
1		Ground
2	AC 100 to 240V / AC 24V / DC 24V +	Power Supply
3		
4	NO FAIL	FAIL Output
5		
6	+ DI RUN/STOP	Digital Input
7	SG	
8	T/R(A) RS-485	Communications
9	T/R(B)	
10		Feedback Transformer Input
11		

No.	Description	
40	AO +	Analog Output
41	–	
42	AO +	
43	–	

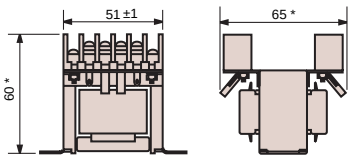
No.		Description	
22	12	+	Control Output
23	13	–	
24	14	NO	Alarm Output
25	15	NO	
26	16	NO	
27	17		
28	18		
29	19	RTD	Measured Input
30	20		
31	21		
32	A		

For channel 1
For channel 2

Power feedback transformer



Mounting measurement



* Maximum

Safty Warning	•Before operating this product, read the instruction manual carefully to avoid incorrect operation. •This product is intended for use with industrial machines, medial equipment test and measuring equipment. It is not designed for use with medical equipment. •If it is possible that an accident may occur as a result of the failure of the product or some other abnormality, an appropriate independent protection device must be installed. •When installing this product, avoid the following: *Direct exposure to sunlight.
	∗ The ambient temperature is lower than 0°C degrees or higher than 50°C ∗ In areas subject to high humidity. Ambient humidity should not be lower than 45% or higher than 85%RH ∗ Direct contact with water. ∗ Corrosive environments. ∗ Hazardous areas containing explosive or flammable gases. ∗ Vibration or shock. ∗ Areas subject to electrical noise caused by inductive interference, static electricity or magnetic fields.

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