TLV®

MULTI-CONTROLLER

MODEL SC-F70

MULTI-PURPOSE CONTROLLER WITH MC-COS CONTROL FEATURE

Benefits

Compact multi-purpose controller for a wide range of operations. Ideal for equipment automation and systems creation in many fields.
Allows pressure or temperature control when combined with automatic control valve [MC-COS(R)].
Allows PID action with auto-tuning when combined with pneumatic control valve.
Allows dual position (ON-OFF) control when combined with ON-OFF valve.

1. High measurement accuracy of 0.1% F.S.
2. Quick and easy to determine PID setting using auto-tune function for excellent stability and responsiveness. Overshoot prevention function.
3. Eight target settings can be stored in memory.
4. Up to 4 alarm outputs and 3 transmission outputs.
5. Measurement input area can accommodate various input signals.
6. Voltage: 100V - 240V AC.
7. Conforms with CE marking.

Dimensions

(in)

● Panel Cutout and Spacing
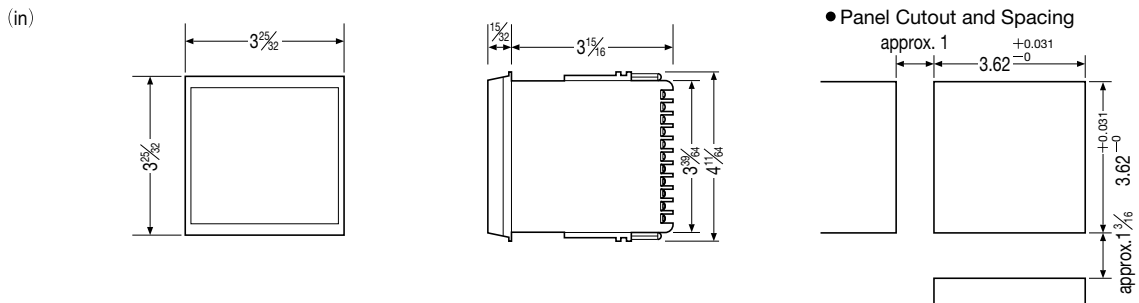
Wiring Terminals

No.	Function	No.	Function	No.	Function
1	Ground terminal	33	R(A)	22	Di1
2	Power terminals	34	R(B)	23	COM(−) / Contact input terminals
3		35	T(A) / T/R(A) / SD	24	Di2 / Contact input terminals
4	AL1 NO	36	T(B) / T/R(B) RD — Communications terminals	25	Di3 / RSV + 0-5V, 1-5V 0-10V, 0-20mA 4-20mA — Analog setting input terminals
5	AL2 NO / Alarm 1/Alarm 2 output terminals	37	SG / SG / SG	26	Di4
6		38	AO1 + 4-20mA — Transmission output 1 terminals	27	17 +24V DC 4-20mA — Input terminals ① Thermocouple input ② RTD input ③ Voltage input (LOW) ④ Voltage input (HIGH) or Current input ⑤ Current input and sensor power Output terminals ⑥ Sensor power
7	OUT1/AL3 NO	39		28	18 IN
8	NC / Control output 1 or alarm output 3 terminals	40	OUT2/AL4 NO — Control output 2 or alarm output 4 terminals	29	19
9		41		30	20
10	OUT1/AO3 + 4-20mA — Control output 1 or transmission output 3 terminals	42	OUT2/AO2 + 4-20mA — Control output 2 or transmission output 2 terminals	31	21
11		43		32	

Specifications

		Thermocouple	RTD	DC Voltage (LOW)	DC Voltage (HIGH)	DC Current
Measurement Input	Measurement Input Types *1	● K ● J ● E ● T ● U ● L	● Pt100 ● JPt100	● 0 - 10mV ● 0 - 100mV ● 0 - 1V	● 0 - 5V ● 1 - 5V ● 0 - 10V	● 0 - 20mA ● 4 - 20mA
	Effects of Signal Resistance	approx. 0.2 μV/Ω	—	—	—	—
	Input Line Resistance		maximum 10Ω	—	—	—
	Allowable Input Voltage	—	—	within ± 4V	within ± 12V	—
	Allowable Input Impedance	1MΩ minimum	—	approx. 1MΩ	approx. 1MΩ	approx. 250Ω
	Display during Input Disconnection	Upscale	Upscale	—	—	—
	Display during Input Short-Circuit	—	Downscale	—	—	—
	Measurement Accuracy	± (0.1% F.S. ＋ 1 digit)				
	Cold Junction Compensation Error	approx. ± 1.0 ℃［℉］ within range of 32 ℉ - 122 ℉				
	Sampling Period	0.25 second				
Displays	Set and Measurement Values Display	4 digit 7 segment LED (orange)				
	Symbol Display	3 digit 7 segment LED (orange)				
	Operation Display	11 LED's indicate operating mode				
Settings	Setting Range (SV)	Same as measurement input ranges				
	Setting Resolution	0.1℃［℉］	0.1℃［℉］	Depends on measurement input scaling		
	Memory Area Function	8 memory items				
	Analog Setting Input — Input Types	—	—	0 - 5V, 1 - 5V, 0 - 10V		0 - 20mA, 4 - 20mA
	Analog Setting Input — Input Impedance	—	—	approx. 1MΩ		approx. 250Ω
	Analog Setting Input — Input Accuracy	± (0.1% F.S. ＋ 1 digit)				
	Analog Setting Input — Input Voltage Range	within ± 12V				

Control	Control Action Types	● PID action with auto-tuning ● Heating/cooling PID action ● Pressure control [MC-COS(R) / MC-VCOS(R)] ● Temperature control [MC-COS(R) / MC-VCOS(R)]
Control Output	Heating (OUT 1) *2 — Current Output	Output: 4 - 20mA; Load resistance: 600Ω maximum; Output accuracy: ± 0.1% of span * Selecting relay output for the heating control output sets it to transmission output 3 (AO3).
	Heating (OUT 1) *2 — Relay Output	Contact: 1c contact 250V AC, 3A (resistance load) * Selecting current output for the heating control output sets it to alarm output 3 (AL3).
	Cooling (OUT 2) *3 — Current Output	Output: 4 - 20mA; Load resistance: 600Ω maximum; Output accuracy: ± 0.1% of span * Selecting relay output for the cooling control output sets it to transmission output 2 (AO2).
	Cooling (OUT 2) *3 — Relay Output	Contact: 1a contact 250V AC, 3A (resistance load) * Selecting current output for the cooling control output sets it to alarm output 4 (AL4).
Alarm Output	Number of Alarm Contacts	● PID action with auto-tuning: When heating control output is set to current output: 4 contacts 　　　　　　　　When heating control output is set to relay output: 3 contacts ● Heating/cooling PID action: When both heating and cooling control output are set to current output: 4 contacts 　　　　　　　　When both heating and cooling control output are set to relay output: 2 contacts 　　　　　　　　When heating control output is set to current output and cooling control output is set to relay output: 3 contacts ● Pressure control: 4 contacts ● Temperature control: 4 contacts
	Alarm Types	No alarm, measurement upper limit, measurement lower limit, deviation upper limit, deviation lower limit, deviation upper & lower limits, within deviation range, measurement upper limit with standby, measurement lower limit with standby, deviation upper limit with standby, deviation lower limit with standby, deviation upper/lower limits with standby, input error, FAIL status, control error (for pressure control only)
	Output *4	Relay contact output 1a contact 250V AC, 1A (resistance load)
	Alarm Displays	Red surface emitting LEDs (AL1/AL2/AL3/AL4)
Transmission Output	Number. of Output Contacts	● PID action with auto-tuning: When heating control output is set to current output: 2 contacts 　　　　　　　　When heating control output is set to relay output: 3 contacts ● Heating/cooling PID action: When both heating and cooling control output are set to current output: 1 contact 　　　　　　　　When both heating and cooling control output are set to relay output: 3 contacts 　　　　　　　　When heating control output is set to current output and cooling control output is set to relay output: 2 contacts ● Pressure control: 2 contacts ● Temperature control: 2 contacts
	Output Types	Measured values, set values, deviation values, heating control output values, cooling control output values (for heating/cooling PID action only)
	Output Signals	4 - 20mA DC
	Load Resistance	600Ω maximum
	Output Accuracy	0.1% of span

*1 Types changeable with jumper switches and PARAMETERS.
*2 Either current output or relay contact output can be specified for heating control output (but set to current output for pressure control or temperature control).
*3 Either current output or relay contact output can be specified for cooling control output: cooling control output only set for heating/cooling PID action.
*4 Specifications shown are for Alarms 1 and 2. Alarm 3 is for heating control output; Alarm 4 is for cooling control output.

Specifications

External Remote Input	Analog Setting Input Types	No. of Contacts	1 analog input contact and 1 no-voltage contact
		Function	Analog input-enters target setting from outside Contact input-MAN/AUT or LOC/REM selection
	Area Selection Contact Input Types	No. of Contacts	4 no-voltage contacts
		Function	Contact input-MAN/AUT selection and area selection, or LOC/REM selection and area selection, or Area selection
Communications	Communications Method		RS-422A: 4-wire type; RS-485: 2-wire type; RS-232C
	Communications Code		JIS (ASCII) 7-bit code
Self-Diagnostic Function	Check Items		ROM/RAM check, input value check, CPU power monitoring, watchdog timer
	Error Displays		FAIL lamp lights up (except during input error)
	Error Output		When FAIL lamp lights up: all output OFF During input error: action selectable
Ambient Conditions	Ambient Temperature		32 ˚F - 122 ˚F
	Ambient Humidity		20 - 85% RH
	Line Voltage Fluctuations		Rated voltage ± 10%
	Power Frequency Fluctuations		Rated value ± 5%
General Specifications	Insulation Resistance		Between measurement terminal and ground: 500V DC/20MΩ minimum Between power terminal and ground: 500V DC/20MΩ minimum
	Maximum Allowed Voltage		Between measurement terminal and ground: 1000V AC for 1 minute Between power terminal and ground: 1500V AC for 1 minute
	Line Voltage		100 - 240V AC, 50/60Hz
	Power Consumption		13VA at 240V・10VA at 100V
	Effect of Power Outage		No effect for power outage of 50 msec or less
	Memory Backup		Setting data backed up by lithium battery. Service life approximately 10 years *
	Weight		Approximately 1 lb. 2 oz. maximum
	Accessories		1 set of fittings (2)

* Will depend on product storage time, storage environment, operating conditions, etc.

⚠ **CAUTION** To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

Measurement Input Types & Ranges

	Input Type	Input Range [˚C]	Code	Input Range [˚F]	Code
Thermocouple (TC)	Type K (EX-: CA) [JIS/IEC]	0.0 - 400.0 0.0 - 800.0	0 1	0.0 - 800.0	200
	Type J (EX-: IC) [JIS/IEC]	0.0 - 400.0 0.0 - 800.0	10 11	0.0 - 700.0	210
	Type E (EX-: CRC) [JIS/IEC]	0.0 - 700.0	20	0.0 - 999.9	220
	Type T (EX-: CC) [JIS/IEC]	0.0 - 400.0	30	0.0 - 700.0	230
	Type U [DIN]	0.0 - 600.0	40	0.0 - 999.0	240
	Type L [DIN]	0.0 - 400.0	50	0.0 - 700.0	250
RTD	JPt 100 [JIS]	0.0 - 300.0 0.0 - 500.0	400 401	0.0 - 600.0 0.0 - 900.0	500 501
	Pt 100 [JIS/IEC]	○ 0.0 - 300.0 0.0 - 600.0	410 411	0.0 - 600.0 0.0 - 999.9	510 511
Voltage (LOW)	0 - 10mV 0 - 100mV 0 - 1V	Arbitrary scaling possible	600 601 602		
Voltage (HIGH)	0 - 5V 1 - 5V 0 - 10V	Arbitrary scaling possible	610 611 612		
Current	0 - 20mA ● 4 - 20mA	Arbitrary scaling possible	700 701		

●: Factory default for pressure control
○: Factory default for all control types other than pressure control

Specifications Checksheet

		Code			Remarks
Model		SC-F70	[ ]	* [ ]	[ ]	For boxes in the "code" section at left, enter the appropriate code from among the specification items below each box.

Basic Specifications

	Control Operation Type		Code	Remarks
	• PID action with auto-tuning	0		Select to match the valve that will be used with the controller.
	• Heating / cooling PID action	1		
	• Pressure control operation [MC-COS(R)-3]	2		
	• Pressure control operation [MC-COS(R)-16, ½″- 2″]	3		
	• Pressure control operation [MC-COS(R)-16, 2 ½″- 6″]	4		
	• Pressure control operation [MC-COS-21]	5		
	• Pressure control operation [MC-VCOS(R)]	6		
	• Temperature control operation [MC-COS(R)-16]	7		
	• Temperature control operation [MC-VCOS(R)]	8		

Additional Specifications

Remote External Input		Code	Remarks
• None		N	Remote area selection operation is possible when "D" is specified. Remote analog setting operation is possible when "A" is specified.
• Area selection input (Di 4 contacts)		D	
• Analog setting input (RSV ＋ Di 1 contact)		A	

Communications Function		Code	Remarks
• None		N	Select to match the computer to be connected.
• RS-232C		1	
• RS-422A (4-wire type)		4	
• RS-485 (2-wire type)		5	

Initial Settings*

Measurement Input Types & Ranges

☐ RTD
☐ Thermocouple (TC)
☐ Voltage (low) input
☐ Voltage (high) input
☐ Current input

Range code [ ] [ ] [ ]

Remarks:
- Select the type and range code from "Table of Measurement Input Types and Ranges".
- Values can be changed after the controller has been shipped by changing jumper switches and PARAMETERS.

Types of Remote Analog Setting Input

Current input   ☐ 0 - 20mA   ☐ 4 - 20mA
Voltage input   ☐ 0 - 5V   ☐ 1 - 5V   ☐ 0 - 10V

Remarks: Specify only for models equipped with remote analog setting input.

Pressure Sensor Range

☐	0 - 2000 kPaG	☐ 0.00 - 20.40 kg/cm²G
☐	0 - 1000 kPaG	☐ 0.00 - 10.20 kg/cm²G
☐	0 - 500 kPaG	☐ 0.00 - 5.10 kg/cm²G
☐	-101.3 - 298.7 kPaG	☐ -760 - 2240 mmHg G
☐	0 - 400 kPaG abs	☐ 0 - 3000 Torr (mmHg)
☐	0.00 - 20.00 barg	☐ 0.0 - 290.1 psig
☐	0.00 - 10.00 barg	☐ 0.0 - 145.0 psig
☐	0.00 - 05.00 barg	☐ 0.0 - 72.5 psig
☐	-1013 - 2987 mbarg	☐ -14.70 - 43.32 psig
☐	0 - 4000 mbar abs	☐ 0.00 - 58.02 psi abs
☐ Other: range (　-　) unit (　)		

Remarks: Specify the range of the pressure sensor to be connected (when pressure control has been selected).

* Initial settings can be changed after the controller has been shipped from the factory. When not specified in advance, items are set to their default values before shipment.