



# MULTI-CONTROLLER

## MODEL SC-F71

### COMPACT MULTI-PURPOSE CONTROLLER WITH MC-COS CONTROL FEATURE

#### Features

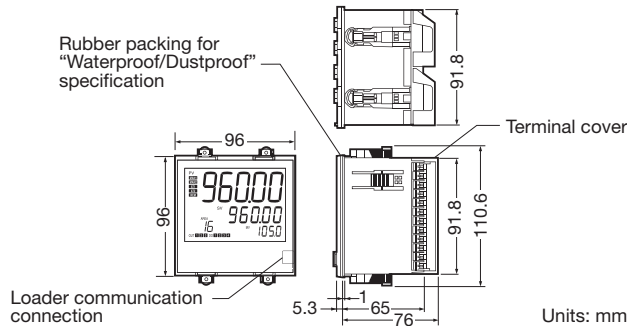
**Compact multi-purpose controller for a wide range of operations. Ideal for equipment automation and systems creation in many fields.**

Allows pressure or temperature control when combined with automatic control valve [MC-COS (R)]. Allows PID control with auto-tuning when combined with pneumatic control valves.

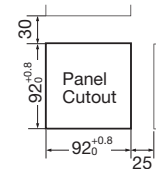
1. High measurement accuracy of 0.1% F.S.
2. Quick and easy to determine PID setting using auto-tune function for excellent stability and responsiveness. Overshoot prevention function.
3. 16 target settings can be stored in memory.
4. 5 digit x 3 row panel clearly displays a variety of information.
5. Up to 4 contacts for event output, up to 3 contacts for transmission output and up to 6 contacts for external input.
6. Measurement input area can accommodate various input signals.
7. Voltage: 100 V - 240 V AC.
8. Conforms with CE marking.
9. Loader communication connection available on front panel. Requires optional USB adapter.



#### Dimensions



#### Panel Cutout and Spacing



Panel thickness: 1 to 10 mm

#### Wiring Terminals

No.	Function	No.	Function	No.	Function
1	AC 100-240V L N Power Terminals	25	+ Voltage Pulse/Current Output 3 (OUT3)	13	NO Relay Contact Digital Output 2 (DO 2)
2		26	- Voltage Pulse/Current	14	
3	+ Output 2 (OUT2)	27	(Voltage Free Contact Input) COM	15	NO Relay Contact Digital Output 3 (DO 3)
4	- Current Output	28	DI 1	16	
5	+ Output 1 (OUT1)	29	DI 2	17	NO Relay Contact Digital Output 4 (DO 4)
6	- Current Output	30	DI 3	18	
7		31	DI 4	19	
8	NO Relay Contact Digital Output 1 (DO 1)	32	DI 5	20	
9		33	DI 6	21	
10	A Measurement Input 1	34	R(A)	22	A Remote Setting Input Measurement Input 2
11	B (1) Thermocouple (2) RTD	35	R(B)	23	B (1) Thermocouple (2) RTD
12	(1) (2) (3) Voltage/Current	36	SG Communication RS-422A	24	B (3) Voltage/Current

## Specifications

Item		Description			
Measurement Input	Measurement Input Types	Thermocouple (TC)	RTD	Voltage	Current
	Effects of Signal Resistance	See next page for ranges			
	Input Line Resistance	approx. 0.18 $\mu\text{V}/\Omega$	—	—	—
	Input Impedance	—	approx. 0.006%/ $\Omega$ of span	—	—
	Measurement Accuracy	1M $\Omega$ minimum	—	1M $\Omega$ minimum	approx. 50 $\Omega$
Displays	Measurement Accuracy	See "Measurement Accuracy" for details $\pm$ (0.1% F.S. + 1 digit)			
	Number of inputs	2 inputs (Input 2 can be configured for used with 2-loop control or remote setting input)			
	Sampling Period	0.05 second for 1-loop control, 0.1 second for 2-loop control			
Settings	Set Values Display	5 digit 11 segment LED + 5 digit 7 segment LED $\times$ 2 lines			
	Area Display	2 digit 7 segment LED			
Control	Operation Display	MAN1, MAN2, AT1, AT2, REM, OUT1, OUT2, OUT3, D01, D02, D03, D04, ALM			
	Number of Memory Settings	16 memory items			
Output	Memory Functions	Target setting, soft start time, event set value (and more)			
	Control Operation Types	<ul style="list-style-type: none"> <li>• PID control with auto-tuning (reverse / direct)</li> <li>• Heating/cooling PID control</li> <li>• Pressure control [MC-COS(R) / MC-VCOS(R)]</li> <li>• Temperature control [MC-COS(R) / MC-VCOS(R)]</li> </ul>			
		Control Output	No. of Contacts	1 or 2 contacts (for heating/cooling PID control or 2-loop control)	
	Transmission Output	Output Signal	Current output: 4 to 20 mA or 0 to 20 mA, load resistance: 500 $\Omega$ maximum		
External Input	Transmission Output	No. of Contacts	2 or 1 contacts (for heating/cooling PID control or 2-loop control)		
		Output Types	Measured values (PV), set values, deviation values, heating control output values, cooling control output values (for heating/cooling PID control only)		
	Event Output	Output Signal	Current output: 4 to 20 mA or 0 to 20 mA, load resistance: 500 $\Omega$ maximum		
Communication	Event Output	No. of Contacts	4 contacts		
		Output Types	Measurement upper limit, measurement lower limit, deviation upper limit, deviation lower limit		
Communication	Analog Setting Input	Output Signal	1a contact (contact rating (resistive load): 250 V AC (1 A) / 30 V DC (0.5 A))		
		No. of Contacts	1 contact or none (for heating/cooling PID control or 2-loop control)		
Communication	Contact Input	Function	Input target setting via external analog signal		
		No. of Contacts	6 or 4 contacts (when communication function selected)		
Communication	Host Communication	Function	RUN/STOP, AUTO/MAN, REM/LOC selection, memory area selection		
		Interface	Based on RS-422A, EIA standard		
	Loader Communication	Protocol	Original communication: ANSI X3.28-1976 subcategory 2.5 A4 compliant MODBUS communication: MODBUS-RTU PLC communication*: MAPMAN communication (* Optional USB adapter and PROTEM-T software required)		
		Comm. Speed	2400, 4800, 9600, 19200, 38400, 57600 bps		
Communication	Loader Communication	Protocol	Original communication: ANSI X3.28-1976 subcategory 2.5 A4 compliant		
		Comm. Speed	38400 bps		
General Specs.	Connectable Devices	1 device			
	Connection Method	Optional USB adapter: RKC Instrument Inc. COM-K2 cable (from front panel connector)			
	Ambient Temperature Range	-10 to +55 $^{\circ}\text{C}$			
	Ambient Humidity Range	5 – 95% RH (non-condensing)			
	Voltage	Rating 100 – 240 V AC (50/60 Hz)			
	Power Consumption	7.4 VA maximum (at 100 V AC), 10.9 VA maximum (at 240 V AC)			
	Effect of Power Outage	No effect for power outage of 20 ms or less (5 ms for current input)			
Memory Backup	Backed up by non-volatile memory, data storage period approx. 10 years (depending on storage time and environment and operating conditions, etc.)				
Weight	approx. 300 g				
Protection Class	IP65 (optional; applicable when front panel cover and loader connector covers are attached)				
Accessories	Terminal covers (2 covers per controller); Rubber packing for "Waterproof/Dustproof" specifications (pre-fitted)				

## Measurement Accuracy

Input Types	Input Range	Accuracy
K, J, T, E, U, L <sup>1)</sup>	< -100 $^{\circ}\text{C}$	$\pm$ (1.0 $^{\circ}\text{C}$ + 1 digit)
	-100 $^{\circ}\text{C}$ to < + 500 $^{\circ}\text{C}$	$\pm$ (0.5 $^{\circ}\text{C}$ + 1 digit)
	$\geq$ 500 $^{\circ}\text{C}$	$\pm$ (0.1% of reading + 1 digit)
N, R, S, Pt100, W5Re/W26Re <sup>2)</sup>	< 0 $^{\circ}\text{C}$	$\pm$ (2.0 $^{\circ}\text{C}$ + 1 digit)
	0 $^{\circ}\text{C}$ to < 1000 $^{\circ}\text{C}$	$\pm$ (1.0 $^{\circ}\text{C}$ + 1 digit)
	$\geq$ 1000 $^{\circ}\text{C}$	$\pm$ (0.1% of reading + 1 digit)
B <sup>2)</sup>	< 400 $^{\circ}\text{C}$	$\pm$ (70 $^{\circ}\text{C}$ + 1 digit)
	400 $^{\circ}\text{C}$ to < 1000 $^{\circ}\text{C}$	$\pm$ (1.4 $^{\circ}\text{C}$ + 1 digit)
	$\geq$ 1000 $^{\circ}\text{C}$	$\pm$ (0.1% of reading + 1 digit)
PR40-20 <sup>2)</sup>	< 400 $^{\circ}\text{C}$	$\pm$ (20 $^{\circ}\text{C}$ + 1 digit)
	400 $^{\circ}\text{C}$ to < 1000 $^{\circ}\text{C}$	$\pm$ (10 $^{\circ}\text{C}$ + 1 digit)
	$\geq$ 1000 $^{\circ}\text{C}$	$\pm$ (0.1% of reading + 1 digit)
Pt100, JPt100	< 200 $^{\circ}\text{C}$	$\pm$ (0.2 $^{\circ}\text{C}$ + 1 digit)
	$\geq$ 200 $^{\circ}\text{C}$	$\pm$ (0.1% of reading + 1 digit)
	0.00 to 50.00 $^{\circ}\text{C}$	$\pm$ (0.10 $^{\circ}\text{C}$ + 1 digit)
Voltage/Current input	$\pm$ (0.1% of span + 1 digit)	

<sup>1)</sup> Accuracy is not guaranteed for less than -100.0  $^{\circ}\text{C}$

<sup>2)</sup> Accuracy is not guaranteed for less than 400.0  $^{\circ}\text{C}$  for Input type R, S, B, PR40-20 and W5Re/W26Re

**Measurement Input Types & Ranges**

Input Types	Input Range	Code	
Thermocouple (TC)	0 – 200 °C	K01	
	0 – 400 °C	K02	
	0 – 600 °C	K03	
	0 – 800 °C	K04	
	0 – 1200 °C	K06	
	0 – 1372 °C	K07	
	-199.9 – +300.0 °C	K08	
	0.0 – 400.0 °C	K09	
	0.0 – 800.0 °C	K10	
	0 – 300 °C	K14	
	-200 – +1372 °C	K41	
	-200.0 – +1372.0 °C	K42	
	0 – 800 °F	KA1	
	0 – 1600 °F	KA2	
	0 – 2502 °F	KA3	
	Type K (EX: CA) [JIS/IEC]	0 – 200 °C	J01
		0 – 400 °C	J02
		0 – 600 °C	J03
		0 – 800 °C	J04
		0.0 – 400.0 °C	J08
-200.0 – +1200.0 °C		J29	
0 – 800 °F		JA1	
0 – 2192 °F		JA3	
0 – 400 °F		JA6	
Type J (EX: IC) [JIS/IEC]		-199.9 – +400.0 °C	T01
	-199.9 – +100.0 °C	T02	
	-100.0 – +200.0 °C	T03	
	-200.0 – +400.0 °C	T19	
	Type S [JIS/IEC]	S06	
	0 – 1600 °C	R01	
	-50 – +1768 °C	R07	
	Type R [JIS/IEC]	R07	
	0 – 800 °C	E01	
	0 – 1800 °C	B03	
0 – 1300 °C	N02		
0 – 1300 °C	A01		
0 – 2300 °C	W03		
0 – 1800 °C	F02		
0 – 3200 °F	FA2		
-199.9 – +600.0 °C	U01		
0 – 900.0 °C	L04		
RTD	-199.9 – +649.0 °C	D01	
	-100.0 – +100.0 °C	D04	
	-100.0 – +200.0 °C	D05	
	0.0 – 50.0 °C	D06	
	0.0 – 100.0 °C	D07	
	0.0 – 200.0 °C	D08	
	0.0 – 300.0 °C	D09	
	0.0 – 500.0 °C	D10	
	-199.9 – +600.0 °C	D12	
	-200.0 – +200.0 °C	D21	
	0.00 – 50.00 °C	D27	
	-100.00 – +100.00 °C	D34	
	-200.0 – +850.0 °C	D35	
	-199.9 – +999.9 °F	DA1	
	0.0 – 500.0 °F	DA9	
	0.0 – 200.0 °C	P08	
	-100.00 – +100.00 °C	P29	
	-200.0 – +640.0 °C	P30	
	Voltage/Current	0 – 10 mV DC	101
		0 – 100 mV DC	201
0 – 1 V DC		301	
0 – 5 V DC		401	
0 – 10 V DC		501	
1 – 5 V DC		601	
0 – 20 mA DC		701	
4 – 20 mA DC		801	
-10 – +10 V DC		904	
-5 – +5 V DC		905	

**Pressure Unit & Range Codes**

Applicable Valve	Unit	Pressure Sensor Model	Range	Code					
MC-COS	°C / kg/cm <sup>2</sup> G	MBS33M	0 – 5.10	001					
			0 – 10.20	002					
			0 – 20.40	003					
			0 – 25.50	004					
			0 – 5.00	005					
	°C / barg	KH15	0 – 10.00	006					
			0 – 20.00	007					
			0 – 5.00	101					
			0 – 10.00	102					
			0 – 20.00	103					
MC-COSR	°C / barg	MBS33M	0 – 25.00	104					
			0 – 5.00	105					
			0 – 10.00	106					
			0 – 20.00	107					
			0 – 72.5	201					
	°F / psig	KH15	0 – 145.0	202					
			0 – 290.1	203					
			0 – 362.6	204					
			0 – 75.0	205					
			0 – 150.0	206					
MC-VCOS	°C / kPaG	MBS33M	0 – 500	301					
			0 – 1000	302					
			0 – 2000	303					
			0 – 2500	304					
			0 – 0.500	401					
	°C / MPaG	MBS33M	0 – 1.000	402					
			0 – 2.000	403					
			0 – 2.500	404					
			°C / mmHgG	MBS33M	-760 – +2240	A01			
			°C / mmHg abs	MBS33M	-736 – +736	A02			
MC-VCOSR	°C / mmHg abs	KH15	0 – 3000	A13					
			24 – 1496	A14					
			-1013 – +2987	B01					
			°C / mbarg	KH15	-981 – +981	B02			
			°C / mbar abs	MBS33M	0 – 4000	B13			
	MC-VCOS	°C / mbar abs	KH15	33 – 1994	B14				
				°C / inHgG	MBS33M	-29.9 – +88.2	C01		
				°C / inHg abs	MBS33M	0 – 118.1	C12		
						°F / psig	MBS33M	-14.70 – +43.32	D01
						°F / psi	KH15	-14.22 – +14.22	D02
°F / psi abs		MBS33M	0 – 58.02			D13			
°F / psi abs		KH15	0.48 – 28.92			D14			
MC-VCOSR		°C / kPaG	MBS33M	-101.3 – +298.7	E01				
				°C / kPa abs	MBS33M	0 – 400.0	E12		

**Temperature Unit Codes**

Applicable Valve	Unit	Code
MC-COS	°C / kg/cm <sup>2</sup>	001
	°C / bar	101
MC-COSR	°F / psi	201
	°C / kPa	301
MC-VCOS	°C / MPa	401
	°C / mmHg	A01
MC-VCOSR	°C / mbar	B01
	°C / inHg	C01
MC-VCOSR	°F / psi	D01
	°C / kPa	E01

### Specifications Checksheet

		Code	Remarks
Model	SC-F71	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	For boxes in the "code" section to the left, enter the appropriate code from among the specification items below each box.
Basic Specifications	Control Operation Type	<ul style="list-style-type: none"> <li>• PID control with auto-tuning (Reverse)</li> <li>• PID control with auto-tuning (Direct)</li> <li>• Heating/cooling PID control</li> <li>• Pressure control operation [MC-COS (R)-3]</li> <li>• Pressure control operation [MC-COS (R)-16, 15-50 mm]</li> <li>• Pressure control operation [MC-COS (R)-16, 65-150 mm]</li> <li>• Pressure control operation [MC-COS (R)-21]</li> <li>• Pressure control operation [MC-VCOS (R) ]</li> <li>• Temperature control operation [MC-COS (R)-16]</li> <li>• Temperature control operation [MC-VCOS (R)]</li> </ul>	F D G 2 3 4 5 6 7 8
Additional Specs.	Communications Function	<ul style="list-style-type: none"> <li>• None</li> <li>• RS-422A (4-wire type)</li> </ul>	N 4
	Waterproof/Dustproof	<ul style="list-style-type: none"> <li>• Waterproof/dustproof (IP65)</li> </ul>	1
Initial Settings*	Measurement Input Types & Ranges (PV)	<ul style="list-style-type: none"> <li>• Thermocouple (TC)</li> <li>• RTD</li> <li>• Voltage input</li> <li>• Current input</li> </ul>	Range code <input type="text"/> <input type="text"/>
	Pressure/ Temperature Sensor Range	Pressure control operation  Temperature control operation	Range code <input type="text"/> <input type="text"/>

\* 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.

### Options

Front panel cover	Clear resin, snap-on type
Sensor power source	OMRON Corporation S8VS-01524, 24 V DC
USB communication adapter	RKC Instrument Inc. COM-K2-4, 1.5 m (with RKC W-BV-05-1500)

### Data Management Tool PROTEM-T

Functions	Verify and set SC-F71 set values Log trend data Create complete set value lists Back-up set values
Operating System	Windows 7/8/8.1/10 (32-bit/64-bit)

For details and to download, see TLV website. Optional USB adapter required for communication with SC-F71.

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Manufacturer  
**TLV** CO., LTD.  
Kakogawa, Japan  
is approved by LRQA Ltd. to ISO 9001/14001

