



# MULTI-CONTROLLER

## MODEL SC-F71

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

#### Features

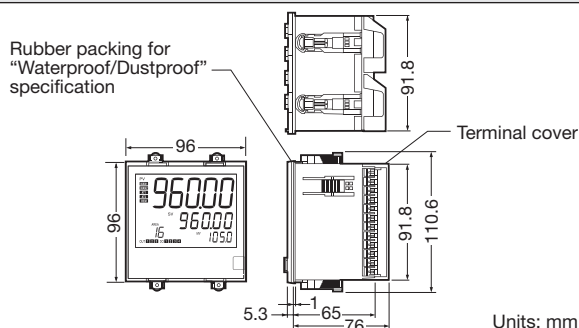
Compact multi-purpose controller for a wide range of operations. Ideal for equipment automation and systems creation in many fields.

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

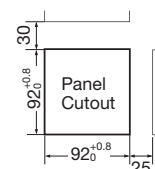
1. High measurement accuracy of 0.1% F.S.
2. Quick and easy to determine PID setting using auto-tune function for excellent stability and responsiveness. Overshoot prevention function.
3. 16 target settings can be stored in memory.
4. 5 digit × 3 row panel clearly displays a variety of information.
5. 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.



#### Dimensions



#### • Panel Cutout and Spacing



Panel thickness: 1 to 10 mm

#### Wiring Terminals

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

## 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	1M $\Omega$ minimum	—	1M $\Omega$ minimum	approx. 50 $\Omega$
	Measurement Accuracy	See "Measurement Accuracy" for details $\pm (0.1\% \text{ F.S.} + 1 \text{ digit})$			
	Number of inputs	2 inputs (Input 2 can be configure for used with two-loop control or remote setting input)			
Settings / Displays	Sampling Period	0.05 second for one-loop control, 0.1 second for two-loop control			
	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 Action Types	<ul style="list-style-type: none"> <li>• PID action with auto-tuning (reverse / forward)</li> <li>• Heating/cooling PID action</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 action or two-loop control)		
		Output Signal	Current output: 4 to 20 mA or 0 to 20 mA, load resistance: 500 $\Omega$ maximum		
Transmission Output	No. of Contacts	2 or 1 contacts (for heating/cooling PID action or two-loop control)			
	Output Types	Measured values (PV), set values, deviation values, heating control output values, cooling control output values (for heating/cooling PID action only)			
	Output Signal	Current output: 4 to 20 mA or 0 to 20 mA, load resistance: 500 $\Omega$ maximum			
Event Output	No. of Contacts	4 contacts			
	Output Types	Measurement upper limit, measurement lower limit, deviation upper limit, deviation lower limit			
	Output Signal	1a contact (contact rating (resistive load): 250 V AC (1 A) / 30 V DC (0.5 A))			
External Input	Analog Setting Input	No. of Contacts	1 contact or none (for heating/cooling PID action or two-loop control)		
	Function	Input target setting via external analog signal			
Communication	Contact Input	No. of Contacts	6 or 4 contacts (when communication function selected)		
		Function	RUN/STOP, AUTO/MAN, REM/LOC selection, memory area selection		
	Host Communication	Interface	Based on RS-422A, EIA standard		
		Protocol	Original communication: ANSI X3.28-1976 subcategory 2.5 A4 compliant MODBUS communication: MODBUS-RTU PLC communication: MAPMAN communication		
Loader Communication	Comm. Speed	2400, 4800, 9600, 19200, 38400, 57600 bps			
	Protocol	Original communication: ANSI X3.28-1976 subcategory 2.5 A4 compliant			
	Comm. Speed	38400 bps			
General Specs.	Connectable Devices	1 device			
	Connection Method	RKC Instrument Inc. COM-K2 cable (from front panel connector)			
General Specs.	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 $^{\circ}\text{C}$	$\pm (1.0 \text{ }^{\circ}\text{C} + 1 \text{ digit})$
	-100 $^{\circ}\text{C}$ to < 500 $^{\circ}\text{C}$	$\pm (0.5 \text{ }^{\circ}\text{C} + 1 \text{ digit})$
	$\geq 500 \text{ }^{\circ}\text{C}$	$\pm (0.1\% \text{ of reading} + 1 \text{ digit})$
N, R, S, PtII, W5Re/W26Re <sup>2)</sup>	< 0 $^{\circ}\text{C}$	$\pm (2.0 \text{ }^{\circ}\text{C} + 1 \text{ digit})$
	0 $^{\circ}\text{C}$ to < 1000 $^{\circ}\text{C}$	$\pm 1.0 \text{ }^{\circ}\text{C} + 1 \text{ digit}$
	$\geq 1000 \text{ }^{\circ}\text{C}$	$\pm (0.1\% \text{ of reading} + 1 \text{ digit})$
B <sup>2)</sup>	< 400 $^{\circ}\text{C}$	$\pm (70 \text{ }^{\circ}\text{C} + 1 \text{ digit})$
	400 $^{\circ}\text{C}$ to < 1000 $^{\circ}\text{C}$	$\pm (1.4 \text{ }^{\circ}\text{C} + 1 \text{ digit})$
	$\geq 1000 \text{ }^{\circ}\text{C}$	$\pm (0.1\% \text{ of reading} + 1 \text{ digit})$
PR40-20 <sup>2)</sup>	< 400 $^{\circ}\text{C}$	$\pm (20 \text{ }^{\circ}\text{C} + 1 \text{ digit})$
	400 $^{\circ}\text{C}$ to < 1000 $^{\circ}\text{C}$	$\pm (10 \text{ }^{\circ}\text{C} + 1 \text{ digit})$
	$\geq 1000 \text{ }^{\circ}\text{C}$	$\pm (0.1\% \text{ of reading} + 1 \text{ digit})$
Pt100, JPt100	< 200 $^{\circ}\text{C}$	$\pm (0.2 \text{ }^{\circ}\text{C} + 1 \text{ digit})$
	$\geq 200 \text{ }^{\circ}\text{C}$	$\pm (0.1\% \text{ of reading} + 1 \text{ digit})$
	0.00 to 50.00 $^{\circ}\text{C}$	$\pm (0.10 \text{ }^{\circ}\text{C} + 1 \text{ digit})$
Voltage/Current input	$\pm (0.1\% \text{ of span} + 1 \text{ digit})$	

<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
Type T (EX: CC) [JIS/IEC]		-200.0 – +400.0 °C	T19
		-200.0 – +400.0 °C	T19
Type S [JIS/IEC]		-50 – +1768 °C	S06
Type R [JIS/IEC]	0 – 1600 °C	R01	
	-50 – +1768 °C	R07	
Type E (EX: CRC) [JIS/IEC]	0 – 800 °C	E01	
Type B [JIS/IEC]	0 – 1800 °C	B03	
Type N [JIS/IEC]	0 – 1300 °C	N02	
Type PLII [NBS]	0 – 1300 °C	A01	
Type W5Re/W26Re [ASTM]	0 – 2300 °C	W03	
Type PR40-20 [ASTM]	0 – 1800 °C	F02	
	0 – 3200 °F	FA2	
Type U [DIN]	-199.9 – +600.0 °C	U01	
Type L [DIN]	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	
	Type Pt100 [JIS/IEC]	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	
		Programmable range -19999 to +99999	

**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		
		KH15	0 – 5.00	005	
			0 – 10.00	006	
			0 – 20.00	007	
	0 – 5.00		101		
	°C / barg	MBS33M	0 – 10.00	102	
			0 – 20.00	103	
			0 – 25.00	104	
		KH15	0 – 5.00	105	
			0 – 10.00	106	
			0 – 20.00	107	
0 – 72.5			201		
MC-COSR	°F / psig	MBS33M	0 – 145.0	202	
			0 – 290.1	203	
		0 – 362.6	204		
		KH15	0 – 75.0	205	
	0 – 150.0		206		
	°C / kPaG	MBS33M	0 – 500	301	
			0 – 1000	302	
		0 – 2000	303		
0 – 2500		304			
MC-VCOS	°C / mmHgG	MBS33M	0 – 0.500	401	
			0 – 1.000	402	
	KH15	0 – 2.000	403		
		0 – 2.500	404		
	°C / mmHg abs	MBS33M	-760 – 2240	A01	
			-736 – 736	A02	
		KH15	0 – 3000	A13	
			24 – 1496	A14	
		°C / mbarg	MBS33M	-1013 – 2987	B01
				-981 – 981	B02
		°C / mbar abs	MBS33M	0 – 4000	B13
				33 – 1994	B14
	MC-VCOSR	°C / inHgG	MBS33M	-29.9 – 88.2	C01
				0 – 118.1	C12
°F / psig		MBS33M	-14.70 – 43.32	D01	
			-14.22 – 14.22	D02	
°F / psi abs	MBS33M	0 – 58.02	D13		
		0.48 – 28.92	D14		
°C / kPaG	MBS33M	-101.3 – 298.7	E01		
		0 – 400.0	E12		

**Temperature Unit Codes**

Applicable Valve	Unit	Code
MC-COS	°C / kg/cm <sup>2</sup>	001
	°C / bar	101
	°F / psi	201
MC-COSR	°C / kPa	301
	°C / MPa	401
MC-VCOS	°C / mmHg	A01
	°C / mbar	B01
MC-VCOSR	°C / inHg	C01
	°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"/> - <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 action with auto-tuning (Reverse)</li> <li>● PID action with auto-tuning (Forward)</li> <li>● Heating/cooling PID action</li> <li>● Pressure control operation [MC-COS (R)-3]</li> <li>● Pressure control operation [MC-COS (R)-16, 15-50mm]</li> <li>● Pressure control operation [MC-COS (R)-16, 65-150mm]</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 Specifications	Communications Function <ul style="list-style-type: none"> <li>● None</li> <li>● RS-422A (4-wire type)</li> </ul>	N 4	Select to match the computer to be connected
	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 <ul style="list-style-type: none"> <li>Pressure control operation</li> <li>Temperature control operation</li> </ul>		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