



# DIGITAL INDICATOR CONTROLLER

## MODEL SC-F50

### Features

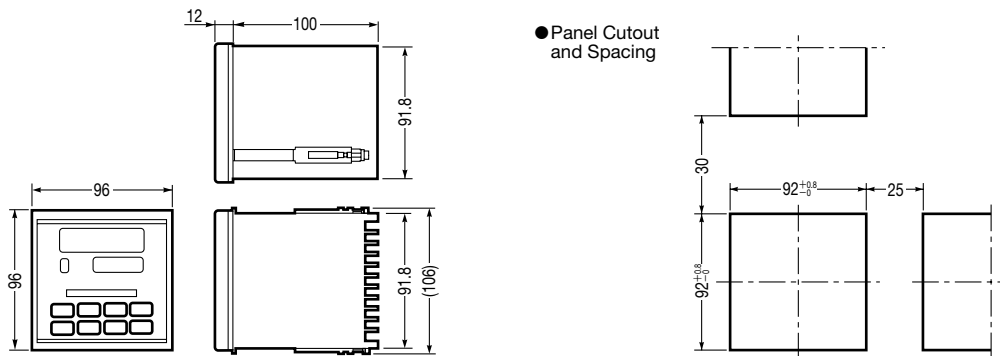
**Compact multi-purpose controller for accurate control of temperature, pressure, flow and level. Ideal for equipment automation and systems creation in many fields.**

1. High measurement accuracy of 0.1% F.S.
2. Eight target settings can be stored in memory.
3. Uses auto-tuning calculation method for excellent stability and responsiveness.
4. Bar graph shows output status and deviation from setpoint.
5. Allows the addition of alarm output, transmission output and/or remote operation as well as computer communication.
6. With overshoot prevention by a new PID algorithm control.
7. Rated voltage free between 100 and 120V AC.
8. Conforms with CE marking.



### Dimensions

Units : mm



### Wiring Terminals

No.	Function	No.	Function	No.	Function
1	GND Ground	22	COM (-) Relay contact input	12	DI Mode change
2	100-240V AC Power	23	1 Area change	13	COM (-) Relay contact input
3		24	2 Area change	14	O FBR (Y input)
4	COM	25	4 Area change	15	W FBR (Y input)
5	AL1 Alarm 1	26	① SG Communication	16	C FBR (Y input)
6	AL2 Alarm 2	27	② SD Communication	17	+ ① Heater break current sensor
7	① COM Control output (OUT2) ① Relay contact output	28	③ RD Communication	18	- ② Remote analog setting input
8	② COM Control output (OUT2) ② Voltage/current output	29	R(A) Communication	19	A ① RTD
9	① COM Control output (OUT1)	30	R(B) Communication	20	B ② Thermocouple
10	② NO Control output (OUT1) ② Voltage/current output	31	Ao Transmission output	21	B ③ Voltage (Low)
11	③ NC Control output (OUT1) ③ Triac trigger output	32		21	B ④ Current/Voltage (High)

## Specifications

Item		Description	
Input Signal (See next page for ranges)	Input Signal Type	[Signal Type]	
		Thermocouple	
	RTD	Pt100 (JIS/IEC/DIN) JPt100 (JIS)	
		Voltage (LOW) (HIGH)	0 - 10mV, 0 - 100mV, 0 - 1V 0 - 5V, 0 - 10V, 1 - 5V
Current	0 - 20mA, 4 - 20mA		
Measurement Accuracy		± (0.1% F.S. +1 digit)	
Sampling Period		250mSEC	
Display	Data Displayed	<ul style="list-style-type: none"> <li>• Measurement value</li> <li>• Target set value</li> <li>• Deviation or operation output level meter</li> <li>• Alarm/control output status</li> </ul>	
	Measurement/Setting Display	Double-row 4-digit, 7 segment LED	
	Indicator/Setting Accuracy	Same as measurement accuracy	
Control Output	Control Action Types	<ul style="list-style-type: none"> <li>• Two-position (ON/OFF relay)</li> <li>• PID action with auto tuning</li> <li>• Position proportional PID</li> <li>• Heating/Cooling PID action</li> </ul>	
	Kind	Relay Output	1c contact 250V AC, 3A (resistance load) 1a contact at cooling side when Heating/Cooling PID action
		Current Output	4 - 20mA DC, 0 - 20mA DC (allowable load resistance 600Ω maximum)
		Voltage Output	0 - 5V DC, 0 - 10V DC, 1 - 5V DC (allowable load resistance 1kΩ minimum)
		Voltage Pulse Output	0/12V DC (allowable load resistance 600Ω minimum)
		Triac Trigger Output	Zero-cross method. Effective ON current: 50mA (50°C), 70mA (25°C)
	Auto-tuning	Available (3 response speeds selectable: slow, medium, fast)	
	Change Rate Limiter	0.1 - 100.0% variable (OFF at 0)	
	Proportional Band (P)	0.1 - 999.9% (0 setting not possible)	
	Integral Time (I)	1 - 3600 seconds (0 setting not possible)	
Derivative Time (D)	1 - 3600 seconds (PI action at 0)		
Target Setting	Number of Target Settings	8 (preset in memory)	
	Memory Area External Selection	Possible (Non voltage contact input)	
	Remote Analog Setting	Possible	
Alarm	Output Points	2 1a relay contact outputs/250V AC, 1A (resistance load)	
	Types of Alarm	Upper limit, lower limit, upper limit deviation, lower limit deviation, upper/lower limit deviation, etc. (standby function availability can be selected)	
Communications	Optional		
	Output Points	1	
	Output Types	Selectable 1 from measured value, set value, deviation, control output	
	Communications method	RS-422A, RS-485, RS-232C selectable as option	
	Synchronizing method	Start-stop synchronizing	
Communications speeds	1200, 2400, 4800, 9600, 19200 Bps		
Communications code	JIS (ASCII) 7-bit code		
General	Voltage	Free between 100 - 240V AC (50/60Hz)	
	Power Consumption	15VA maximum	
	Withstand Voltage	Between power terminal and ground: 1500V AC for 1 minute	
		Between measurement terminal and ground: 1000V AC for 1 minute	
	Insulation Resistance	Between power terminal and ground: 500V DC/20MΩ minimum	
		Between measurement terminal and ground: 500V DC/20MΩ minimum	
	Power Interruption Backup	Lithium battery for memory backup (service life 10 years)	
	Ambient Temperature Range	0 - 50 °C	
	Ambient Humidity Range	45 - 85% RH (non-condensing)	
	Vibration Resistance	0.5G maximum	
	Installation Method	Panel installation	
Weight	Approximately 450g		
Material	ABS resin (black)		

See next page

Possible scaling at any point



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 Types	Input Range [°C]	Code	Input Range [°F]	Code
Thermocouple (TC)	Type K (EX-: CA) [JIS/IEC]	-199.9 - 300.0 °C	K08	0.0 - 800.0 °F	KA4
		0.0 - 400.0 °C	K09	0 - 2400 °F	KA5
		0.0 - 800.0 °C	K10		
		0 - 1300 °C	K11		
	Type J (EX-: IC) [JIS/IEC]	-199.9 - 300.0 °C	J07	0.0 - 700.0 °F	JA4
		0.0 - 400.0 °C	J08	0 - 2100 °F	JA5
		0.0 - 800.0 °C	J09		
		0 - 1200 °C	J06		
	Type T (EX-: CC) [JIS/IEC]	-199.9 - 300.0 °C	T05	-199.9 - 400.0 °F	TA6
		0.0 - 400.0 °C	T06	0.0 - 700.0 °F	TA7
	Type E (EX-: CRC) [JIS/IEC]	0.0 - 700.0 °C	E03	0 - 1800 °F	EA3
		0 - 1000 °C	E02		
	Type R [JIS/IEC]	0 - 1700 °C	R03	0 - 3200 °F	RA1
Type S [JIS/IEC]	0 - 1700 °C	S03	0 - 3200 °F	SA1	
Type B [JIS/IEC]	0 - 1800 °C	B03	0 - 3300 °F	BA3	
Type N [NBS]	0 - 1300 °C	N02	0 - 2300 °F	NA1	
Type L [DIN]	0.0 - 400.0 °C	L03	0 - 1600 °F	LA2	
	0.0 - 900.0 °C	L04			
Type U [DIN]	0.0 - 600.0 °C	U04	0 - 1100 °F	UA4	
Type PLII [NBS]	0 - 1300 °C	A01	0 - 2300 °F	AA3	
Type W5Re/W26Re [ASTM]	0 - 2300 °C	W03	0 - 4200 °F	WA2	
RTD	Pt100 [JIS/IEC]	-100.0 - 100.0 °C	D04	-150.0 - 200.0 °F	DB1
		-199.9 - 600.0 °C	D12	-199.9 - 999.9 °F	DB3
	JPt100 [JIS]	-100.0 - 100.0 °C	P04	-150.0 - 200.0 °F	PB1
		-199.9 - 500.0 °C	P11	-199.9 - 900.0 °F	PB2
Voltage (LOW)	0 - 10mV	0.0 - 100.0%	101	/	
	0 - 100mV	0.0 - 100.0%	201		
	0 - 1 V	0.0 - 100.0%	301		
Voltage (HIGH)	0 - 5 V	0.0 - 100.0%	401		
	0 - 10 V	0.0 - 100.0%	501		
	1 - 5 V	0.0 - 100.0%	601		
Current	0 - 20mA	0.0 - 100.0%	701		
	4 - 20mA	0.0 - 100.0%	801		

\* The internal hardware configuration has 3 types.

①: Temperature Input (TC + RTD)

②: Voltage Input (Voltage [HIGH] + Voltage [LOW]) } Voltage [LOW] can be used in both.

③: Current Input (Current + Voltage [LOW])

Within each group, the Input Type and Range can be changed by Parameter.

\* The range of Voltage [HIGH and LOW] and Current Input can be changed freely.

Factory setting is 0.0 - 100.0%.

1st and 2nd Alarm Types	
Deviation upper limit	A
Deviation lower limit	B
Deviation upper and lower limits	C
Within deviation range	D
Deviation upper limit w. standby	E
Deviation lower limit w. standby	F
Deviation upper/lower limits w. standby	G
Measurement upper limit	H
Measurement lower limit	J
Measurement upper limit w. standby	K
Measurement lower limit w. standby	L
FAIL status, control error	M
Heater break (for 30 A)	P
Heater break (for 100 A)	S
No alarm	N

\* Heater Break Alarm is selectable only for the 2nd Alarm.

\* Type and Alarm is selectable by parameter.

Types of Remote Analog Setting Input		
	None	N
Voltage (LOW)	0 - 10mV	1
	0 - 100mV	2
	0 - 1 V	3
Voltage (HIGH)	0 - 5 V	4
	0 - 10 V	5
	1 - 5 V	6
Current	0 - 20mA	7
	4 - 20mA	8

\* The Internal hardware configuration of the above 4 groups is different.

\* The setting input type of each group can be changed by parameter

Contact Input Type	
None	N
Memory Area Switch	1
AUT/MAN Switch	2
REM/LOC Switch	3
COMP/LOC Switch	4
Memory Switch + AUT/MAN Switch	5
Memory Switch + REM/LOC Switch	6
Memory Switch + COMP/LOC Switch	7

\* 2 cannot be selected when control action is ON-OFF or Heating/Cooling PID action.

Analog Transmission Output Type		
	None	N
Voltage (LOW)	0 - 10mV	1
	0 - 100mV	2
	0 - 1 V	3
Voltage (HIGH)	0 - 5 V	4
	0 - 10 V	5
	1 - 5 V	6
Current	0 - 20mA	7
	4 - 20mA	8

\* The above Analog Transmission can be selected only for ON-OFF & PID action with Auto Tuning.

Specifications Checksheet

		Code										Remarks	
Model	SC-F50		<input type="text"/>	<input type="text"/>	-	<input type="text"/>	*	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	For boxes in the "code" section at left, enter the appropriate code from among the specification items below each box.
	Control Operation Type	<ul style="list-style-type: none"> <li>● 2-Position (ON-OFF)</li> <li>● PID action with auto-tuning</li> <li>● Heating/cooling PID action</li> <li>● Position proportional PID action</li> </ul>	A									<ul style="list-style-type: none"> <li>● When [A] is specified only [M, V, G] of Control Output 1 is selectable.</li> <li>● When [Y] is specified, only [M] of Control Output 1 is selectable.</li> </ul>	
Basic Specifications	Measurement Input Types Ranges [PV]	<ul style="list-style-type: none"> <li>● Pt100 [-199.9 - 600.0 °C]</li> <li>● TC K [0.0 - 400.0 °C]</li> <li>● Current [4 - 20mA]</li> <li>● Other ( )</li> </ul>	D12									<ul style="list-style-type: none"> <li>● See "Measurement Input Types &amp; Ranges" for all types.</li> </ul>	
	Control Output1 [OUT1]	<ul style="list-style-type: none"> <li>● Relay Contact</li> <li>● Voltage Pulse</li> <li>● Triac Trigger</li> <li>● Voltage [0 - 5V]</li> <li>● Voltage [0 - 10V]</li> <li>● Voltage [1 - 5V]</li> <li>● Current [0 - 20mA]</li> <li>● Current [4 - 20mA]</li> </ul>	M	V	G							<ul style="list-style-type: none"> <li>● When ON-OFF [A] Control Operation is specified, only [M, V, G] of Control Output 1 is selectable.</li> <li>● When Position Proportional PID [Y] of Control Operation is specified, only [M] of Control Output 1 is selectable.</li> </ul>	
	Control Output2 [OUT2]	<ul style="list-style-type: none"> <li>● None (Alarm Control is A, or Y)</li> <li>● Relay contact</li> <li>● Voltage Pulse</li> <li>● Voltage [0 - 5V]</li> <li>● Voltage [0 - 10V]</li> <li>● Voltage [1 - 5V]</li> <li>● Current [0 - 20mA]</li> <li>● Current [4 - 20mA]</li> </ul>	Blank	M	V								<ul style="list-style-type: none"> <li>● Control Output 2 is selectable only when the Control Operation is Heating/Cooling PID [V].</li> <li>● Triac Trigger is not selectable in Control Output 2.</li> </ul>
	1st Alarm [AL1]	<ul style="list-style-type: none"> <li>● None</li> <li>● Deviation upper limit</li> <li>● Other ( )</li> </ul>				N	A						<ul style="list-style-type: none"> <li>● See "Measurement Input Types &amp; Ranges" for all Alarm types.</li> <li>● Type of Alarm can be changed after shipment.</li> <li>● Heater Break Alarm and Remote Setting Input cannot be selected together.</li> </ul>
	2nd Alarm [AL2]	<ul style="list-style-type: none"> <li>● None</li> <li>● Deviation lower limit</li> <li>● Other ( )</li> </ul>						N	B				
	Optional Specifications	Remote Setting Input [RSV]	<ul style="list-style-type: none"> <li>● None</li> <li>● Current [4 - 20mA]</li> <li>● Other ( )</li> </ul>						N	8			<ul style="list-style-type: none"> <li>● See "Measurement Input Types &amp; Ranges" for all Input Signal types.</li> </ul>
Contact Input [EXT]		<ul style="list-style-type: none"> <li>● None</li> <li>● Memory Area Switching (3 contacts) + REM/LOC Switching (1 contact)</li> <li>● Other ( )</li> </ul>						N	6			<ul style="list-style-type: none"> <li>● See "Measurement Input Types &amp; Ranges" for all Contact Input types. Maximum : 4 contacts.</li> </ul>	
Analog Transmission Output [AO]		<ul style="list-style-type: none"> <li>● None</li> <li>● Current [4 - 20mA]</li> <li>● Other ( )</li> </ul>						N	8			<ul style="list-style-type: none"> <li>● See "Measurement Input Types &amp; Ranges" for all Analog Transmission Output types.</li> </ul>	
Communication [COM]		<ul style="list-style-type: none"> <li>● None</li> <li>● RS-232C</li> <li>● RS-422A (4 wires)</li> <li>● RS-485 (2 wires)</li> </ul>								N	1	4	5
Remarks													

Manufacturer

ISO 9001/ISO 14001



Kakogawa, Japan

is approved by LRQA Ltd. to ISO 9001/14001

