

C7G Multi-loop Controller with Multifunction Display

Overview

The C7G multi-loop controller with multifunction display (hereafter also called simply “this device”) can calculate diagnostic parameters, known collectively as the health index, that help to predict failure of other equipment, in addition to calculations for PID (proportional, integral and derivative) control of process variables such as temperature, pressure, flow rate, pH, and liquid level.

The controller consists of a display unit with a 3.5-inch QVGA LCD and a touch panel, as well as a main unit capable of controlling up to four loops with an input sampling cycle of 10 ms and an indication accuracy of ± 0.1 %FS.

The display unit and main unit can be installed separately for installation flexibility.

A wide variety of interfaces, including Ethernet, RS-485 serial communication, microSD memory card, Micro USB port, and 7 digital input/outputs are provided as standard features. Setup, operation, and monitoring can be easily accomplished using the display unit and Smart Loader Package.

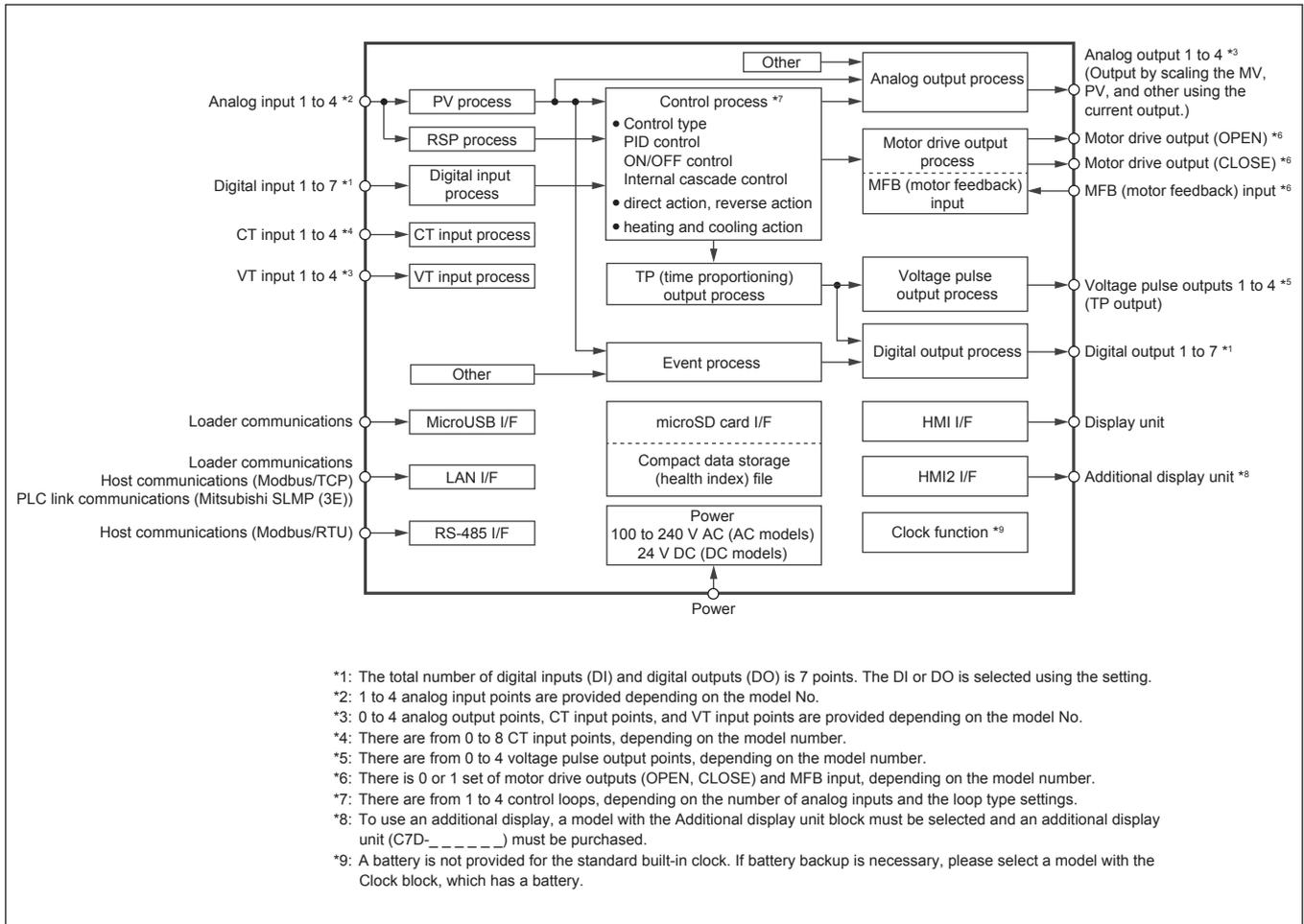
This controller is compliant with the IEC Directive and is CE marked.

Features

- High-speed and high-accuracy control is available with an input sampling cycle as fast as 10 ms and an indication accuracy of ± 0.1 % FS. Process data can be stored with the compact data storage function (microSD card).
- Diagnostic and management information is created with our unique process data–processing technology (the health index function).
- One module can execute PID control for up to 4 loops.
- Various information is displayed on a 3.5-inch QVGA LCD with easy touchscreen operation.
- The display unit and main unit can be installed separately
Standard distance: less than 30 m
If display unit is separately powered: 30 to 100 m
- Protective structure of display face: IP67
- Ethernet and RS-485 serial communications (Modbus) are supported as standard features.
- For setup and file management the SLP-C7 Smart Loader Package can be used.
- Parameters can be downloaded to the C7G when it is powered by the USB bus power function when the MicroUSB port and the PC are connected with a USB cable.



C7G Basic Functional Blocks



Specifications

Analog Input block	Input type	Full multi-range for thermocouple, resistance temperature detector (RTD), DC current, and DC voltage	
		No. of control loops	4 loops max. (configurable by the loop type setting)
		Range type	☞ Table 1, "Input types and ranges" (p. 8)
		Sampling cycle	10 ms, 50 ms, 100 ms (factory default: 50 ms)
		Burnout	Depends on the input range (☞ Table 1, "Input types and ranges," p. 8)
		Over-range judgment	Below -10 % or above 110 % of the range
		Decimal point position	0 to 4 digits after the decimal point are displayed. Values are displayed so that the entire value does not exceed 5 digits. (Note: Effective resolution depends on the range.)
	Thermo-couple	Reference contact compensation accuracy	±0.5 °C (ambient temperature 21 to 27 °C, under standard conditions) ±1.5 °C (ambient temperature 0 to 50 °C, under standard conditions except for ambient temperature)
		Reference contact compensation method	Compensation within the C7G
		Input bias current	0.12 µA max. (under standard conditions) *From the positive (+) terminal
		Allowable input voltage	-1.5 to +1.5 V
	Resistance temperature detector (RTD)	Measuring current	1.0 mA (typical, from terminals A and B, under standard conditions)
		Allowable wiring resistance	85 Ω max. (per wire)
		Effect of wiring resistance	0.013 °C/Ω
	DC voltage DC current	Input bias current	0 to 10 V range : 10 µA max. (under standard conditions) 1–5 V or 0–5 V range: 5 µA max. (under standard conditions)
		Allowable input voltage	DC voltage input: -15 to +15 V DC current input: -1.5 to +1.5 V
Input impedance		DC voltage input: 1 MΩ min. DC current input: 50 Ω	
Scaling		-32000 to +32000 U (Max. 5 digits within the above range, max. 4 digits after the decimal point, reverse scaling possible)	
Display unit (included) (C7D-xxxxxx)	Screen specifications	3.5-inch QVGA LCD	
	Status display (LED):	1 (power)	
	Operation buttons	Touchscreen (resistive) and 3 hardware buttons	
	Display power source	Main unit (if distance from connector on the main unit or connector on the additional display unit block to the display unit is less than 30 m) 5 V DC external power supply (if distance from connector on the main unit or connector on the additional display unit block to the display unit is 30 to 100 m)	
	Protection rating	IP67 (front of display unit only)	
	Interface language	English/Japanese (switchable)	
	Service life of LCD	5 years (at ambient temperature of 25 °C and brightness setting 4, for half-life of back-light brightness)	
DI (digital input)/ DO (digital output) block	No. of I/Os	7 max. (select DI, DO, or TP by setting), shared common Note: TP (time proportioning output) can be selected for DI/DO terminals 4 to 7.	
	Digital input	Compatible output type	Non-voltage contacts or open collector (sink type)
		Open terminal voltage	7 V max.
		Terminal current (when shorted):	1 mA (under standard conditions)
		On-state contact resistance (no-voltage contact)	500 Ω max. (under standard conditions)
		Off-state contact resistance (no-voltage contact)	100 kΩ max. (under standard conditions)
		Allowable on-state residual current for open collector	1 V max. (under standard conditions)
		Allowable off-state residual current for open collector	100 µA max. (under standard conditions)
		Input sampling cycle	10 ms
		Minimum pulse width for ON detection	20 ms min. (for 10 ms sampling cycle), 40 ms min. (50 or 100 ms sampling cycle)
		Function assignment	RUN/READY mode selection, AUTO/MANUAL mode selection, LSP/RSP mode selection, SP group selection, CDS stop/start, etc.

DI (digital input)/ DO (digital output) block	Digital output	Output method	Open collector (sink type)	
		Load voltage	4.5 to 28.8 V DC	
		Maximum load current	100 mA for each terminal	
		Overcurrent detection	130 mA or more When an overcurrent is detected, the output is turned OFF, and the status is checked every 5 seconds. If the status returns to normal, the output returns to normal automatically.	
		On-state residual voltage	0.5 V max. (under standard conditions)	
		Off-state leak current	100 µA max. (under standard conditions)	
		Function assignment	Select an event status or a standard bit code	
	Time proportional output	Output method	Same as digital output	
		Number of outputs	4 max. (DI/DO terminals 4 to 7)	
		Min. OFF time / ON time	In time proportional cycle shorter than 10 s: 1 ms In time proportional cycle of 10 s or longer: 250 ms	
Control unit	Control operation	PID control (reverse action, direct action, heating and cooling action), ON/OFF control (reverse action, direct action)		
	PID Control	Proportional band (P)	0.1 to 3200 % (5 digits max. within this range, 4 digits max. after the decimal point)	
		Integral time (I)	0 to 32000 s (5 digits max. within this range, 4 digits max. after the decimal point) No integral calculation when the setting is 0.	
		Derivative time (D)	0 to 32000 s (5 digits max. within this range, 4 digits max. after the decimal point) No derivative calculation when the setting is 0.	
		MV limits	-10 to +110 % (5 digits max. within this range, 4 digits max. after the decimal point)	
		Manual reset	-10 to +110% (5 digits max. within this range, 4 digits max. after the decimal point)	
		Number of PID groups	8 groups per loop	
		PID group selection	SP group interlocking system	
		MV change limit	0 to 10000 %/s (5 digits max. within this range, 4 digits max. after the decimal point) No limit when the setting is 0.	
		Auto-tuning	PID automatic setting using the limit cycle method	
		Control cycle	Same as sampling cycle	
	SP (LSP: Local SP)	Number of LSP groups	8 groups per loop	
		SP ramp unit	0: s, 1: min, 2: h	
		Ramp up and down slopes	0 to 32000	
	Direct/reverse operation selection	Switchable		
	Heating/cooling control deadband	-100.0 to +100.0 %		
	Analog input processing unit	Linear scaling low and high limits	-32000 to +32000 (5 digits max. within this range, 4 digits max. after the decimal point)	
Filter		0.0000 to 120.00 s		
Ratio		0.0010 to 10.000		
Bias		-32000 to +32000 (5 digits max. within this range, 4 digits max. after the decimal point)		
Event functions	Operation type	PV high limit, PV low limit, PV high and low limits, deviation high limit, deviation low limit, deviation high and low limits, deviation high limit (final SP basis), deviation low limit (final SP reference), deviation high and low limits (final SP basis), SP high limit, SP low limit, SP high and low limits, MV high limit, MV low limit, MV high and low limits, MFB high and low limits, standard numerical code high limit, standard numerical code low limit, standard numerical code high and low limits, PV change rate, PV change rate high limit, PV change rate low limit, standard numerical code change rate high limit, standard numerical code change rate low limit, Alarm (state), READY (state), MANUAL (state), RSP (state), AT running (state), SP ramp running (state), control direct action (state), control with estimated MFB (state), timer (state)		
	Number of events	16		
	Main setting / subsetting	-32000 to +32000 (5 digits max. within this range, 4 digits max. after the decimal point)		
	Hysteresis	0 to 32000 (5 digits max. within this range, 4 digits max. after the decimal point)		
	READY mode operation	Selectable from "continuation" and "forced OFF."		
	Direct/reverse	Select the polarity to turn ON/OFF in event output		
	Standby	0: None, 1: Standby, 2: Standby + standby when the SP is modified		
	On-delay time	0 to 3200 s (4 digits max. within this range, 4 digits max. after the decimal point)		
	OFF-delay time	0 to 3200 s (4 digits max. within this range, 4 digits max. after the decimal point)		
Approximation by linearization	Number of groups	8		
	Breakpoints per group	10		
	Available for	Analog input, analog output, voltage pulse output		

Analog current output block	Current output (1)	Type	4–20 mA DC / 0–20 mA DC	
		Output type	Control output (MV), process value (PV), set value (SP), standard numerical code, etc.	
		Accuracy	0.1 % FS	
		Allowable load resistance	600 Ω max.	
		Output resolution	1/16000 min.	
	CT (current) input (1)	Recommended current transformer	QN206A (hole dia. 5.8 mm, 800 turns), QN212A (hole dia. 12 mm, 800 turns) Note: Not UL-certified	
		Measuring current range	0.4–50.0 AAC, 50/60 Hz (peak current: 71 A, 800 turns, 1 power wire loop)	
		Maximum allowable current	70 AAC (peak current: 99 A max. with 800 turns and 1 pass of the power wire)	
		Indication accuracy	±1 % FS ±1 digit (under standard conditions, CT accuracy is not included)	
		Indication resolution	0.1 AAC	
	VT (voltage) input (1)	Indication update cycle	100 ms	
		Recommended voltage transformer	81406725-003 Note: Not UL-certified.	
		Voltage measurement range	24 to 240 V AC, 50/60 Hz (peak voltage: 339 V max.; recommended voltage: transformer primary side 200 V, secondary side 10 V)	
		Maximum allowable voltage	264 V AC (peak voltage: 373 V; recommended voltage transformer primary side: 200 V, secondary side: 10 V)	
		Indication accuracy	±1 % FS ±1 digit	
Indication resolution		0.1 V AC		
Input impedance		160 kΩ (typ)		
Voltage pulse output block	Voltage pulse output (1)	Indication update cycle	100 ms	
		Output voltage	12 V DC +15/-10 % (under standard conditions)	
		Allowable current	25 mA max	
		Load limit current	30 mA ±10 %	
		OFF-state leak current	100 μA max. (under standard conditions)	
Voltage pulse output block	CT (current) input (2)	Output response time	100 μs max. for 10↔90 % of output voltage	
		Specifications	Same as CT (current) input for the analog current output block	
Motor drive output block		Relay output OPEN CLOSE	Contact configuration	Switching between OPEN output and CLOSE output (with function for turning both outputs OFF at the same time)
			Contact rating	250 V AC, 2 A (cos φ = 0.4); 24 V DC, 2.5 A (L/R = 0.7 ms)
	Contact voltage		250 V AC / 125 V DC max.	
	Service life		100,000 cycles min. (at the rated specifications)	
	Minimum requirements for switching		24 V DC, 40 mA	
	Interlock		With prevention of simultaneous ON if contact welding occurs	
	Motor feedback (MFB) input 1	Allowed potentiometer resistance	100 to 2500 Ω (wiring resistance included)	
		Indication accuracy	±0.5 % FS (under standard conditions)	
		Sampling cycle	100 ms	
		Operation at burnout	Y line break: downscale Other line break: upscale	
Clock block (with battery)	Clock function	Clock function	Hours, minutes, seconds, calendar (years 2000 to 2099, supports leap years)	
		Clock accuracy	Monthly error: ±65 s (under standard conditions)	
		Service life	10 years (battery life when not energized, under standard conditions)	
		Built-in battery	Lithium battery	
		Block replacement	Possible (optional parts sold separately)	
Additional display unit block	Number of connectable units	Number of connectable units	1	
		Connector	RJ-45	
External communication	Ethernet	Transmission line type	Compliant with IEEE 802.3u 100BASE-TX (FastEthernet)	
		Communication method	Full duplex	
		No. of connections	3 (for Modbus/TCP and loader communication via Ethernet)	
		Transmission speed	100 Mbps max.	
		No. of physical ports (connectors)	1 (RJ-45)	
		Cable	UTP cable (4P) Cat 5e min. (straight) (ANSI/TIA/EIA-568-B both ends)	
		Protocol:	Modbus/TCP, Mitsubishi SLMP (3E) (for PLC link communication)	

External communication	RS-485 communication	Signal level	RS-485-compliant
		Network	Multidrop (up to 31 slave stations for 1 host station)
		Communications/synchronization type	Half-duplex, start-stop synchronization
		Maximum cable length	500 m
		No. of communication wires	3-wire system
		Transmission speed	9600, 19200, 38400, 57600, 115200 bps
		Terminating resistor	External (120 Ω, 1/2 W min.)
		Data length	8 bits
		Stop bits	1 or 2 bits
		Parity bit	Even parity, odd parity, or no parity
	Protocol	Modbus/RTU	
	Loader communication	Dedicated PC loader	SLP-C7FJ91 (free version), SLP-C7-J91 (paid version)
		Cable	USB-to-Micro-USB (Type A/B) cable (USB 2.0 supported, 5 m max.) or Ethernet cable
	Power supply	When connected with a USB cable, the device can be powered by the PC and parameters can be changed.	
Data storage	SD	microSD/SDHC-compliant (4 GB), for the compact data storage and health index functions	
General specifications	Backup memory	EEPROM (durability: 1 million erase-write cycles max., for parameter settings)	
	Power consumption	AC models: 25 VA 10 W max. DC models: 12 W max.	
	Power-on inrush current	25 A max./10 ms max.	
	Start delay at power-on	10 s max. (the time until normal operation begins under standard conditions)	
	Allowable transient power loss	AC models: 20 ms min. DC models: 5 ms min.	
	Insulation resistance	20 MΩ min. (between power supply terminal (#1 or #2) and frame ground terminal (#3), with a 500 V DC megger)	
	Dielectric strength	AC models: 1500 V AC for 1 min Between AC power supply terminal (#1 or #2) and frame ground terminal (#3) Between AC power supply terminal (#1 or #2) and secondary terminals (except for motor block output terminals (#1 to #3)) Between AC power supply terminal (#1 or #2) and motor block terminals (#1 to #3) Between motor block output terminals (#1 to #3) and frame ground terminal (#3) Between motor block output terminals (#1 to #3) and secondary terminals other than motor block output terminals (#1 to #3) DC models 1500 V AC for 1 min Between motor block output terminals (#1 to #3) and frame ground terminal (#3) Between motor block output terminals (#1 to #3) and DC power supply terminal (#1 or #2) Between motor block output terminals (#1 to #3) and secondary terminals other than motor block output terminals (#1 to #3) 500 V AC for 1 min Between DC power supply terminal (#1 or #2) and frame ground terminal (#3) Between DC power supply terminal (#1 or #2) and secondary terminals other than motor block output terminals (#1 to #3)	
	Case material	Main unit: Modified PPE (case), polycarbonate (board holder, front mask) Display unit: Modified PPE (case), polycarbonate (back cover), PET film (protective sheet)	
	Case color	Black	
	Applicable standards	EN 61010-1, EN 61326-1 (for use in industrial locations) Note: During EMC testing, the reading or output may fluctuate by the equivalent of ±10 % FS. cULus: UL 61010-1, CSA C22.2 No. 61010-1 (applicable model needs to be selected)	
	Overvoltage category	Category II (IEC 60364-4-443, IEC 60664-1)	
	Installation	Main unit: Mounting on a DIN rail (standard) or on the display unit using the mounting bracket Display unit: Mounting using φ3 screws (standard) or the mounting bracket (mount in a 92 × 92 mm hole)	
	Weight	Main unit: 500 g max. Display unit: 150 g max. Integrated mounting bracket : 150 g max.	
	Built-in clock accuracy	Monthly error: ±140 s (±65 s if the clock block with battery is used) Note: The time is reset to 00:00:00 1/1/2000 (default) at power-on (including power restoration). Note: For a firmware version of the MAIN block 3.*.* or earlier (* represents any number), the time is reset to 00:00:00 1/1/2014 (default).	

General specifications	Standard conditions	Ambient temperature	23 °C -2/+5 °C	
		Ambient humidity	60 ±5 % RH	
		Power voltage	AC models: 105 V AC ±10 %. DC models: 24 V DC ±5 %	
		Power frequency	AC models: 50 Hz ±1 %, 60 Hz ±1 %	
		Vibration	0 m/s ²	
		Shock	0 m/s ²	
		Mounting angle	Main unit: Reference plane ±3 °, Display unit: No restriction (if mounted separately from the main unit)	
	Space	Reference plane ±10 ° (main unit, and main unit and display unit in integrated mounting), no restriction for display unit in standard mounting		
	Operating conditions	Ambient temperature	0 to 50 °C (0 to 40 °C if 2 or more main units are gang-mounted), 0 to 50 °C (display unit)	
		Ambient humidity	10 to 90 % RH (without condensation)	
		Rated power	AC models: 100 to 240 V AC (operating input voltage: 85 to 264 V AC) DC models: 24 V DC (operating input voltage: 20.4 to 28.8 V DC)	
		Power frequency	AC models: 50 Hz ±2 % or 60 Hz ±2 %	
		Vibration	0 to 5 m/s ² (10 to 60 Hz for 2 h each in x, y, and z directions)	
		Shock	0 to 100 m/s ²	
		Mounting angle	Reference plane ±10 ° (main unit, and main unit and display unit in integrated mounting), no restriction for display unit in standard mounting	
		Altitude	2000 m max.	
		Pollution degree	2	
		Installation location	Indoors	
	Transportation and storage conditions	Space	50 mm min. above and below No space is needed around the display unit	
		Ambient temperature	-20 to +70 °C	
Ambient humidity		10 to 95 % RH (without condensation)		
Vibration		0 to 10 m/s ² (10 to 60 Hz for 2 h each in x, y, and z directions)		
Accessories	Shock	0 to 300 m/s ² (3 times each in x, y, and z directions)		
	Item	Qty.	Application	
	Standard gasket	1	For the display unit of the standard model (C7G _ 4).	
	Display unit mounting screws (6 mm)	5	Standard model (C7G _ 4)	
	Display unit mounting screws (10 mm)	5	Standard model (C7G _ 4)	
	Set screws (for securing temporarily)	2	Standard model (C7G _ 4)	
	Gasket with 92 × 92 mm hole	1	Integrated mounting model (C7G _ 3)	
	Integrated-mounting bracket	1	Integrated mounting model (C7G _ 3)	
Display unit mounting screws (6 mm)	5	Integrated mounting model (C7G _ 3)		
Integrated-mounting cable	1	Integrated mounting model (C7G _ 3)		

Table 1. Input types and ranges

Input type	Range type Nos.	Sensor	Range	Accuracy	Resolution	Burnout
Thermocouple	1	K	-200 to +1200 °C	±0.1 % FS ± 1 digit *1	0.1 °C	Upscale (110 % FS)
	2	K	0 to 1200 °C	±0.1 % FS ± 1 digit	0.1 °C	
	3	K	0 to 800 °C	±0.1 % FS ± 1 digit	0.1 °C	
	4	K	0 to 600 °C	±0.1 % FS ± 1 digit	0.1 °C	
	5	K	0 to 400 °C	±0.1 % FS ± 1 digit	0.1 °C	
	6	K	-200 to +400 °C	±0.1 % FS ± 1 digit *1	0.1 °C	
	7	K	-200 to +200 °C	±0.1 % FS ± 1 digit *1	0.1 °C	
	8	J	0 to 1200 °C	±0.1 % FS ± 1 digit	0.1 °C	
	9	J	0 to 800 °C	±0.1 % FS ± 1 digit	0.1 °C	
	10	J	0 to 600 °C	±0.1 % FS ± 1 digit	0.1 °C	
	11	J	-200 to +400 °C	±0.1 % FS ± 1 digit *1	0.1 °C	
	12	E	0 to 800 °C	±0.1 % FS ± 1 digit	0.1 °C	
	13	E	0 to 600 °C	±0.1 % FS ± 1 digit	0.1 °C	
	14	T	-200 to +400 °C	±0.1 % FS ± 1 digit *1	0.1 °C	
	15	R	0 to 1600 °C	±0.1 % FS ± 1 digit *2	0.1 °C	
	16	S	0 to 1600 °C	±0.1 % FS ± 1 digit *2	0.1 °C	
	17	B	0 to 1800 °C	±0.2 % FS ± 1 digit *3	0.1 °C	
	20	WRe5-26	0 to 1400 °C	±0.1 % FS ± 1 digit	0.1 °C	
	21	WRe5-26	0 to 2300 °C	±0.1 % FS ± 1 digit	0.1 °C	

*1. For -200 to 0 °C, ±0.2 % FS ± 1 digit

*2. For 0 to 100 °C, ±0.2 % FS ± 1 digit

*3. For 0 to 260 °C, ±4 % FS ± 1 digit. For 260 to 800 °C, ±0.4 % FS ± 1 digit

Input type	Range type Nos.	Sensor	Range	Accuracy	Resolution	Burnout
Resistance temperature detector (RTD)	41	Pt100	-200 to +500 °C	±0.1 % FS ± 1 digit	0.1 °C	Upscale (110 % FS)
	43	Pt100	-200 to +200 °C	±0.1 % FS ± 1 digit	0.01 °C	
	45	Pt100	-100 to +300 °C	±0.1 % FS ± 1 digit	0.01 °C	
	47	Pt100	-100 to +200 °C	±0.1 % FS ± 1 digit	0.01 °C	
	49	Pt100	-100 to +150 °C	±0.1 % FS ± 1 digit	0.01 °C	
	51	Pt100	-50 to +200 °C	±0.1 % FS ± 1 digit	0.01 °C	
	53	Pt100	-50 to +100 °C	±0.1 % FS ± 1 digit	0.01 °C	
	55	Pt100	-60 to +40 °C	±0.1 % FS ± 1 digit	0.01 °C	
	57	Pt100	-40 to +60 °C	±0.1 % FS ± 1 digit	0.01 °C	
	59	Pt100	-10 to +60 °C	±0.1 % FS ± 1 digit	0.01 °C	
	61	Pt100	0 to 100 °C	±0.1 % FS ± 1 digit	0.01 °C	
	63	Pt100	0 to 200 °C	±0.1 % FS ± 1 digit	0.01 °C	
	65	Pt100	0 to 300 °C	±0.1 % FS ± 1 digit	0.01 °C	
	67	Pt100	0 to 500 °C	±0.1 % FS ± 1 digit	0.1 °C	
Linear	86	Voltage (V)	1 to 5 V	±0.1 % FS ± 1 digit	1/90000 or better	Downscale (-10 % FS)
	87	Voltage (V)	0 to 5 V	±0.1 % FS ± 1 digit		Burnout not detected (around 0 % FS)
	88	Voltage (V)	0 to 10 V	±0.1 % FS ± 1 digit		Burnout not detected (around 0 % FS)
	89	Current (mA)	0 to 20 mA	±0.1 % FS ± 1 digit		Burnout not detected (around 0 % FS)
	90	Current (mA)	4 to 20 mA	±0.1 % FS ± 1 digit		Downscale (-10 % FS)

Input type	Range type Nos.	Sensor	Range	Accuracy	Resolution	Burnout
Not used	0	None	Always 0	---	---	-

Input sensor standards reference

Thermocouple K, E, J, T, B, R, S: JIS C 1602-2015
 WRe5-26: ASTM E988-96 (Reapproved 2002)
 (JIS C 1602:2015, C thermocouple)

Resistance temperature detector Pt100: JIS C 1604-2013

Table 2. Compact data storage (CDS) and health index settings

Item	Specifications	Note	
Compact data storage (CDS)	Recording cycle	0: Same as sampling cycle 1: 0.1 s 2: 1 s 3: 10 s 4: 1 min 5: 10 min	Set according to the response time of the control target
	Operation type	0: Stop 1: DI1 status 2: DI2 status 11 to 26: Events 1 to 16 1024 to 2047: Standard bit codes	Operates when ON and records data.
Health Index	Operation type	0: Stop 1: DI1 status 2: DI2 status 11 to 26: Events 1 to 16 1024 to 2047: Standard bit codes	Operates for loops 1 to 4 individually
	R value scale	0 to 10	Result of primary operation × power of 10
	Ideal data	0.0000 to 32000	
	Deviation low limit	0.0000 to 32000	No low limit when 0.0000
	Deviation high limit	0.0000 to 32000	No high limit when 0.0000
	SP high limit	-32000 to +32000	
File	Saved to	MicroSD memory card	
	Saving timing	Every 8 KB	
	Saved format	Text (CSV)	Extension: .DAT
	Number of files saved	65000 max.	
Records (for Data selection = Standard)	Context section	P (Proportional band)	Setting at CDS start
		I (Integral time)	
		D (Derivative time)	
		OL	
		OH	
		SP limit	
	Definite R value	Definite value at CDS end	
	Chronological data selection (cyclic recording)	Timestamp	
		SP	
		PV	
		MV	
		R value	
RMS current value		CT input*	
RMS voltage value	VT input*		
Actuator (heater) resistance	Calculates using the CT input current and the VT input voltage)		
Records (for Data selection = Custom)	Number of data items	1 to 40	The number of items set in "Number of data items" is enabled.
	Data type (Data 1 to 40)	1024 to 2047: Standard bit codes 2048 to 3071: Standard numerical codes ☞ Table 3, "Standard bit codes" (p. 10), ☞ Table 4, "Standard numerical codes" (p. 11).	
	Recording	Data is recorded periodically according to the settings for "Data type" and "Number of data items."	
Diagnostic parameter	Health index	Definite R value	In the normalization responsiveness (K_p/T_p) transfer function, gain is defined as K_p and the time constant as T_p .
	Calculation timing	When the health index function is running	Calculated from the data when the PV is rising during batch processing.

* The recorded details vary depending on the type of output block to which the MV is assigned.
 AO-C block: RMS current, RMS voltage, actuator resistance
 V-P block: CT1 RMS current, CT2 RMS current

Table 3. Standard bit codes

The range of standard bit codes is 1024 to 2027.

Codes not listed below are reserved for the system, so do not use them for configuration.

Standard bit code	Meaning of the standard bit codes	Standard bit code	Meaning of the standard bit codes	Standard bit code	Meaning of the standard bit codes
1024	Always 0 (Off)	1169	DI/DO2 terminal status	1650	Loop 3 SP ramp-up in progress
1025	Always 1 (On)	1170	DI/DO3 terminal status	1651	Loop 4 SP ramp-up in progress
1088	Event 1	1171	DI/DO4 terminal status	1652	Loop 1 SP ramp-down in progress
1089	Event 2	1172	DI/DO5 terminal status	1653	Loop 2 SP ramp-down in progress
1090	Event 3	1173	DI/DO6 terminal status	1654	Loop 3 SP ramp-down in progress
1091	Event 4	1174	DI/DO7 terminal status	1655	Loop 4 SP ramp-down in progress
1092	Event 5	1280	V-P terminal status (block A2)	1792	All typical alarms (logical OR of all alarms be displayed)
1093	Event 6	1281	V-P terminal status (block B2)	1824	Loop 1 PV low limit error
1094	Event 7	1282	V-P terminal status (block A1)	1825	Loop 1 PV high limit error
1095	Event 8	1283	V-P terminal status (block B1)	1826	Loop 1 RSP low limit error
1096	Event 9	1408	User-defined bit 1	1827	Loop 1 RSP high limit error
1097	Event 10	1409	User-defined bit 2	1828	Loop 2 PV low limit error
1098	Event 11	1410	User-defined bit 3	1829	Loop 2 PV high limit error
1099	Event 12	1411	User-defined bit 4	1830	Loop 2 RSP low limit error
1100	Event 13	1412	User-defined bit 5	1831	Loop 2 RSP high limit error
1101	Event 14	1413	User-defined bit 6	1832	Loop 3 PV low limit error
1102	Event 15	1414	User-defined bit 7	1833	Loop 3 PV high limit error
1103	Event 16	1415	User-defined bit 8	1836	Loop 4 PV low limit error
1120	CT1 heater burnout detection (block A2)	1416	User-defined bit 9	1837	Loop 4 PV high limit error
1121	CT2 heater burnout detection (block A2)	1417	User-defined bit 10	1880	MFB input error
1122	CT1 heater burnout detection (block B2)	1418	User-defined bit 11	1884	Adjusting MFB
1123	CT2 heater burnout detection (block B2)	1419	User-defined bit 12	1888	Estimating MFB
1124	CT1 heater burnout detection (block A1)	1420	User-defined bit 13	1896	MFB adjustment error
1125	CT2 heater burnout detection (block A1)	1421	User-defined bit 14	1900	Motor drive output OPEN
1126	CT1 heater burnout detection (block B1)	1422	User-defined bit 15	1904	Motor drive output CLOSE
1127	CT2 heater burnout detection (block B1)	1423	User-defined bit 16	1920	Reception monitoring 1
1128	CT1 overcurrent detection (block A2)	1440	Result of logical operation 1	1921	Reception monitoring 2
1129	CT2 overcurrent detection (block A2)	1441	Result of logical operation 2	1922	Reception monitoring 3
1130	CT1 overcurrent detection (block B2)	1442	Result of logical operation 3	1952	CT/MT input error (block A2 CT)
1131	CT2 overcurrent detection (block B2)	1443	Result of logical operation 4	1953	CT/VT input error (block A2 VT)
1132	CT1 overcurrent detection (block A1)	1444	Result of logical operation 5	1954	CT/VT input error (block B2 CT)
1133	CT2 overcurrent detection (block A1)	1445	Result of logical operation 6	1955	CT/VT input error (block B2 VT)
1134	CT1 overcurrent detection (block B1)	1446	Result of logical operation 7	1956	CT/VT input error (block A1 CT)
1135	CT2 overcurrent detection (block B1)	1447	Result of logical operation 8	1957	CT/VT input error (block A1 VT)
1136	CT1 short-circuit detection (block A2)	1448	Result of logical operation 9	1958	CT/VT input error (block B1 CT)
1137	CT2 short-circuit detection (block A2)	1449	Result of logical operation 10	1959	CT/VT input error (block B1 VT)
1138	CT1 short-circuit detection (block B2)	1450	Result of logical operation 11	1960	CT/CT input error (block A2 CT1)
1139	CT2 short-circuit detection (block B2)	1451	Result of logical operation 12	1961	CT/CT input error (block A2 CT2)
1140	CT1 short-circuit detection (block A1)	1452	Result of logical operation 13	1962	CT/CT input error (block B2 CT1)
1141	CT2 short-circuit detection (block A1)	1453	Result of logical operation 14	1963	CT/CT input error (block B2 CT2)
1142	CT1 short-circuit detection (block B1)	1454	Result of logical operation 15	1964	CT/CT input error (block A1 CT1)
1143	CT2 short-circuit detection (block B1)	1455	Result of logical operation 16	1965	CT/CT input error (block A1 CT2)
1168	DI/DO1 terminal status	1504	At CDS start	1966	CT/CT input error (block B1 CT1)
		1505	Loop 1 health index running	1967	CT/CT input error (block B1 CT2)
		1506	Loop 2 health index running	1973	Memory error
		1507	Loop 3 health index running	1977	Battery error (CLOCK block)
		1508	Loop 4 health index running	1991	Block error
		1517	Display unit connection status	1992	SD card error
		1518	Additional display unit connection status	2000	Block alarm IO failure (block A1)
		1568	Loop 1 RUN/READY status	2001	Block alarm IO failure (block A2)
		1569	Loop 2 RUN/READY status	2002	Block alarm IO failure (block A3)
		1570	Loop 3 RUN/READY status	2003	Block alarm IO failure (block A4)
		1571	Loop 4 RUN/READY status	2004	Block alarm IO failure (block B1)
		1584	Loop 1 Auto/manual status	2005	Block alarm IO failure (block B2)
		1585	Loop 2 Auto/manual status	2006	Block alarm IO failure (block B3)
		1586	Loop 3 Auto/Manual status	2007	Block alarm IO failure (block B4)
		1587	Loop 4 Auto/Manual status	2008	Block alarm HMI block failure
		1600	Loop 1 AT stop/start status	2009	Block alarm SUB2 block failure (RS-485)
		1601	Loop 2 AT stop/start status	2010	Block alarm SUB1 block failure (DI DO)
		1602	Loop 3 AT stop/start status	2011	Block alarm MAIN block failure
		1603	Loop 4 AT stop/start status		
		1616	Loop 1 LSP/RSP status		
		1617	Loop 2 LSP/RSP status		
		1648	Loop 1 SP ramp-up in progress		
		1649	Loop 2 SP ramp-up in progress		

Table 4. Standard numerical codes

The range of the standard numerical codes is 2048 to 2790.

Codes not listed below are reserved for the system, so do not use them for configuration.

Standard numerical codes	Meaning of the standard numerical codes	Standard numerical codes	Meaning of the standard numerical codes	Standard numerical codes	Meaning of the standard numerical codes
2048	Always 0.0	2499	CT2 measured current when output ON (block B2)	2738	CT1 Time proportioning current (block B2)
2111	User-defined value 1	2500	CT1 measured current when output ON (block A1)	2739	CT2 Time proportioning current (block B2)
2112	User-defined value 2	2501	CT2 measured current when output ON (block A1)	2740	CT1 Time proportioning current (block A1)
2113	User-defined value 3	2502	CT1 measured current when output ON (block B1)	2741	CT2 Time proportioning current (block A1)
2114	User-defined value 4	2503	CT2 measured current when output ON (block B1)	2742	CT1 Time proportioning current (block B1)
2115	User-defined value 5	2512	CT1 measured current when output OFF (block A2)	2743	CT2 Time proportioning current (block B1)
2116	User-defined value 6	2513	CT2 measured current when output OFF (block A2)	2752	Loop 1 definite R value
2117	User-defined value 7	2514	CT1 measured current when output OFF (block B2)	2753	Loop 2 definite R value
2118	User-defined value 8	2515	CT2 measured current when output OFF (block B2)	2754	Loop 3 definite R value
2119	User-defined value 9	2516	CT1 measured current when output OFF (block A1)	2755	Loop 4 definite R value
2120	User-defined value 10	2517	CT2 measured current when output OFF (block A1)	2760	Loop 1 R value
2121	User-defined value 11	2518	CT1 measured current when output OFF (block B1)	2761	Loop 2 R value
2122	User-defined value 12	2519	CT2 measured current when output OFF (block B1)	2762	Loop 3 R value
2123	User-defined value 13	2528	Loop 1 deviation (PV - SP)	2763	Loop 4 R value
2124	User-defined value 14	2529	Loop 2 deviation (PV - SP)	2768	AO-C percent output value (block A2)
2125	User-defined value 15	2530	Loop 3 deviation (PV - SP)	2769	AO-C percent output value (block B2)
2126	User-defined value 16	2531	Loop 4 deviation (PV - SP)	2770	AO-C percent output value (block A1)
2304	AI (block A4)	2544	CT input value (block A2)	2771	AO-C percent output value (block B1)
2305	AI (block B4)	2545	CT input value (block B2)	2776	V-P percent output value (block A2)
2306	AI (block A3)	2546	CT input value (block A1)	2777	V-P percent output value (block B2)
2307	AI (block B3)	2547	CT input value (block B1)	2778	V-P percent output value (block A1)
2312	PV (block A4)	2548	VT input value (block A2)	2779	V-P percent output value (block B1)
2313	PV (block B4)	2549	VT input value (block B2)	2787	TP percent output value (DO4)
2314	PV (block A3)	2550	VT input value (block A1)	2788	TP percent output value (DO5)
2315	PV (block B3)	2551	VT input value (block B1)	2789	TP percent output value (DO6)
2320	Loop 1 PV	2552	Resistance (block A2)	2790	TP percent output value (DO7)
2321	Loop 2 PV	2553	Resistance (block B2)		
2322	Loop 3 PV	2554	Resistance (block A1)		
2323	Loop 4 PV	2555	Resistance (block B1)		
2336	Loop 1 SP (in use)	2656	Event 1 timer remaining time		
2337	Loop 2 SP (in use)	2657	Event 2 timer remaining time		
2338	Loop 3 SP (in use)	2658	Event 3 timer remaining time		
2339	Loop 4 SP (in use)	2659	Event 4 timer remaining time		
2352	Loop 1 SP (final value)	2660	Event 5 timer remaining time		
2353	Loop 2 SP (final value)	2661	Event 6 timer remaining time		
2354	Loop 3 SP (final value)	2662	Event 7 timer remaining time		
2355	Loop 4 SP (final value)	2663	Event 8 timer remaining time		
2416	Loop 1 MV	2664	Event 9 timer remaining time		
2417	Loop 2 MV	2665	Event 10 timer remaining time		
2418	Loop 3 MV	2666	Event 11 timer remaining time		
2419	Loop 4 MV	2667	Event 12 timer remaining time		
2432	Loop 1 MV for heating	2668	Event 13 timer remaining time		
2433	Loop 2 MV for heating	2669	Event 14 timer remaining time		
2434	Loop 3 MV for heating	2670	Event 15 timer remaining time		
2435	Loop 4 MV for heating	2671	Event 16 timer remaining time		
2448	Loop 1 MV for cooling	2736	CT1 Time proportioning current (block A2)		
2449	Loop 2 MV for cooling	2737	CT2 Time proportioning current (block A2)		
2450	Loop 3 MV for cooling				
2451	Loop 4 MV for cooling				
2464	MFB opening amount (estimated)				
2472	MFB opening amount (actual value)				
2479	MFB count value				
2496	CT1 measured current when output ON (block A2)				
2497	CT2 measured current when output ON (block A2)				
2498	CT1 measured current when output ON (block B2)				

Model selection

Example: C7GA411CC0D00

Main unit				I/O slot				Other				Description			
Basic model No.			Comm.	Size	Slots A3, A4	Slots B3, B4	Slots A1, A2	Slots B1, B2	Option	Add'l proc.	Add'l spec.		Special support		
1	2	3	4	5	6	7	8	9	10	11	12		13		
C	7	G											Multi-loop controller with multifunction display		
			A										Communication (Ethernet, RS-485, USB), DI/DO (× 7)		
				3									Integrated-mounting kit included *1		
				4									Standard mounting		
													Slot A3	Slot A4	
													PV1 (full-multi) × 1	AI	
													PV1 (full-multi) + RSP1 (full-multi) *2	AI	
													Slot B3	Slot B4	
													0	None	
													1	PV2 (full-multi) × 1	AI
													2	PV2 (full-multi) + RSP2 (full-multi) *3	AI
														Slot A1	Slot A2
													C	Current output (CT and VT inputs, 1 each) × 1	AO-C
													V	Voltage pulse output (2 CT inputs) × 1	V-P
													F	Current output (CT and VT inputs, 1 each) × 2	AO-C
													W	Voltage pulse output (2 CT inputs) × 2	V-P
													N	Current output (CT and VT inputs, 1 each) + voltage pulse output (2 CT inputs)	AO-C
														Slot B1	Slot B2
													0	None	
													C	Current output (CT and VT inputs, 1 each) × 1	AO-C
													V	Voltage pulse output (2 CT inputs) × 1	V-P
													F	Current output (CT and VT inputs, 1 each) × 2	AO-C
													W	Voltage pulse output (2 CT inputs) × 2	V-P
													N	Current output (CT and VT inputs, 1 each) + voltage pulse output (2 CT inputs)	AO-C
													G	Current output (CT and VT inputs, 1 each) + additional display unit	HMI2
													H	Voltage pulse output (2 CT inputs) + additional display unit	HMI2
													L	Current output (CT and VT inputs, 1 each) + clock (with battery)	Clock
													P	Voltage pulse output (2 CT inputs) + clock (with battery)	Clock
													0	None	
													0	None	
													D	With inspection report	
													Y	With traceability certificate	
													0	AC power. CE, KC, GB-compliant	
													A	AC power. CE, KC, GB, UL-compliant	
													D	DC power. CE, KC, GB-compliant	
													0	No special support	

Condition:
 Selectable if the 6th digit of the model number (slots A3, A4) is "2."

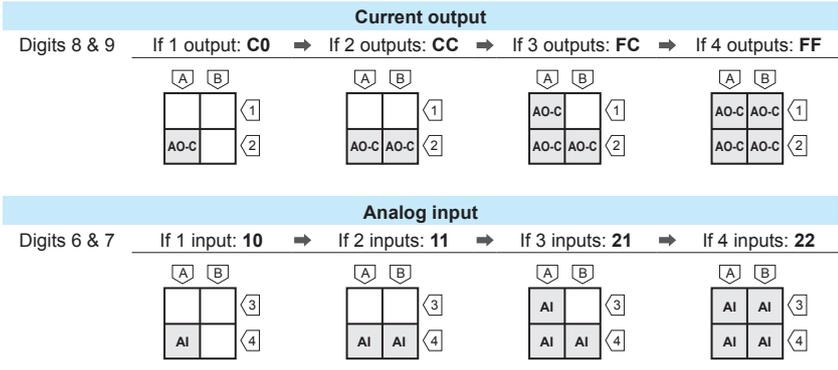
Condition:
 Selectable if the 8th digit of the model number (slots A1, A2) is V, C, or F
 Selectable if the 8th digit of the model number (slots A1, A2) is C, F, or N
 Selectable if the 8th digit of the model number (slots A1, A2) is V, C, W, or N
 Selectable if the 8th digit of the model number (slots A1, A2) is F
 Selectable if the 8th digit of the model number (slots A1, A2) is W or N
 Selectable if the 8th digit of the model number (slots A1, A2) is F or N
 Selectable if the 8th digit of the model number (slots A1, A2) is C, F, or N
 Selectable if the 8th digit of the model number (slots A1, A2) is V, C, W, or N
 Selectable if the 8th digit of the model number (slots A1, A2) is C, F, or N
 Selectable if the 8th digit of the model number (slots A1, A2) is V, C, W, or N

Condition:
 Selectable if the 8th digit of the model number (slots A1, A2) is C or F and the 9th digit (slots B1, B2) is 0, C, or F.

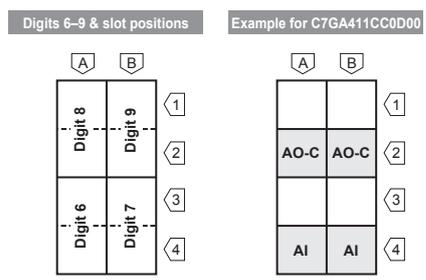
- *1. A rear-mounting bracket and a dedicated cable for connecting the display unit are included with the product.
- *2. RSP1 can be switched for use as PV3.
- *3. RSP2 can be switched for use as PV4.
- *4. Current transformer (CT) and voltage transformer (VT) are not included.
- *5. Additional display unit is not included.

Symbol	Block Name	Description
AI	Analog Input	Full-multi range (thermocouple, RTD, DC current, DC voltage) input × 1
V-P	Voltage pulse output	Voltage pulse output (12 V DC) × 1 Two input terminals for the current transformer (CT) for detecting heater burnout, overcurrent, and short circuit are included.*4
AO-C	Analog current output	Current output (4–20 mA DC / 0–20 mA DC) × 1 Input terminals for the current transformer (CT) for measuring current and the voltage transformer (VT) for measuring voltage are included (1 each).*4
HMI2	Additional display unit	Connector for the second display unit *5
Clock	Clock function	Clock (available for CDS and health index) with a battery

Model No. recommendations



Sample block implementations for model No. and slot positions



Model selection (models with motor output)

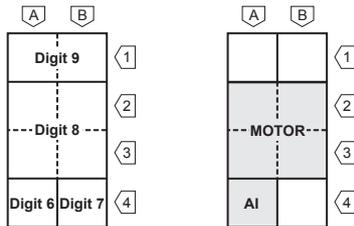
Example: C7GA410M00D00

Main unit					I/O slot					Other			Description
Basic model No.			Comm.	Size	A4	B4	A2-3, B2-3	A1, B1	Option	Add'l proc.	Add'l spec.	Special support	
1	2	3	4	5	6	7	8	9	10	11	12	13	
C	7	G											Multi-loop controller with multifunction display
			A										Communication (Ethernet, RS-485, USB), DI/DO (× 7)
				3									Integrated-mounting kit included *1
				4									Standard mounting
													Slot A4
	1												1 PV (full-multi)
													Slot B4
	0												None
	1												PV2 (full-multi) *2
													Slots A2-3, B2-3
													MOTOR
													Slot A1
													Slot B1
	0												None
	C												Current output (CT and VT inputs, 1 each) × 1
	V												Voltage pulse output (2 CT inputs) × 1
	N												Current output (CT and VT inputs, 1 each) + voltage pulse output (2 CT inputs)
	G												Current output (CT and VT inputs, 1 each) + additional display unit
	L												Current output (CT and VT inputs, 1 each) + clock (with battery)
	0												None
	0												None
	D												With inspection report
	Y												With traceability certificate
	0												AC power. CE, KC, GB-compliant
	D												DC power. CE, KC, GB-compliant
	0												No special support

Sample block implementations for model No. and slot positions

Digits 6-9 & slot positions

Example for C7GA411CC0D00



- *1. A rear-mounting bracket and a dedicated cable for connecting the display unit are included with the product.
- *2. PV2 can be switched for use as RSP1.
- *3. Current transformer (CT) and voltage transformer (VT) are not included.
- *4. Additional display unit is sold separately.

Symbol	Block Name	Description
AI	Analog Input	Full-multi range (thermocouple, RTD, DC current, DC voltage) input × 1
V-P	Voltage pulse output	Voltage pulse output (12 V DC) × 1 Two input terminals for the current transformer (CT) for detecting heater burnout, overcurrent, and short circuit are included.*3
AO-C	Analog current output	Current output (4-20 mA DC / 0-20 mA DC) × 1 Input terminals for the current transformer (CT) for measuring current and the voltage transformer (VT) for measuring voltage are included (1 each).*3
MOTOR	Motor drive output	Motor drive output (100/200 V AC) Direct (OPEN) output, reverse (CLOSE) output, and motor feedback (MFB) inputs are included.
HMI2	Additional display unit	Connector for the second display unit *4
Clock	Clock function	Clock (available for CDS and health index) with a battery

Model selection (display unit)

Example: C7D-400D00

Main unit					Other					Description	
Basic model No.				Installation method	Option 1	Option 2	Add'l proc.	Add'l spec.	Special support		
1	2	3	4	5	6	7	8	9	10		
C	7	D	-							Additional display unit	
				3						Integrated-mounting kit included *1	
				4						Standard mounting	
					0					None	
						0				None	
							0			None	
								D		With inspection report	
									0	CE, KC, GB-compliant	
										0	No special support

- *1. A rear mounting bracket is included.

Accessories (sold separately)

Name	Model No.
SLP-C7 Smart Loader Package (free version) *	SLP-C7FJ91
SLP-C7 Smart Loader Package (paid version)	SLP-C7-J91
Current transformer (5.8 mm in diameter)	QN206A
Current transformer (12 mm in diameter)	QN212A
Voltage transformer (for 200 V AC)	81406725-003

Model No. and loop type

The following table shows the possible combinations of model No. and loop type with regard to analog input.

OK : Combination is possible

— : Combination is not possible

For possible combinations, slots for AI blocks and loop PVs or RSPs assigned to the blocks are shown.

PV1 : LOOP1 PV

PV2 : LOOP2 PV

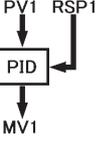
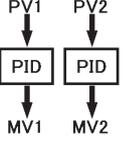
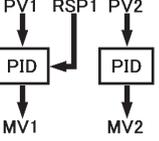
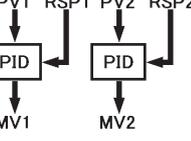
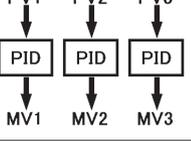
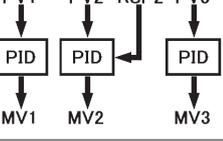
PV3 : LOOP3 PV

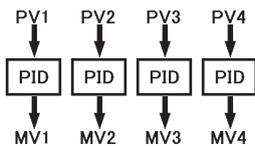
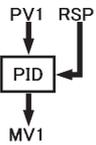
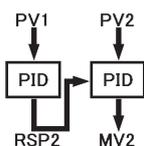
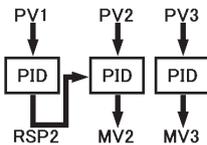
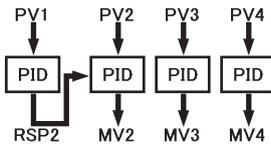
PV4 : LOOP4 PV

RSP1 : LOOP1 RSP

RSP2 : LOOP2 RSP

Not used : The AI block slot exists but is not assigned to the PV or RSP of a loop.

Loop type	6th and 7th digits of the model No. (C7GA _ _ _ _ _)				
	10	20	11	21	22
0: 1 loop 	OK A4: PV1	OK A4: PV1 A3: Not used	OK A4: PV1 B4: Not used	OK A4: PV1 A3: Not used B4: Not used	OK A4: PV1 A3: Not used B4: Not used B3: Not used
1: 1 loop + 1 RSP 	—	OK A4: PV1 A3: RSP1	—	OK A4: PV1 A3: RSP1 B4: Not used	OK A4: PV1 A3: RSP1 B4: Not used B3: Not used
2: 2 loops 	—	—	OK A4: PV1 B4: PV2	OK A4: PV1 A3: Not used B4: PV2	OK A4: PV1 A3: Not used B4: PV2 B3: Not used
3: 2 loops + 1 RSP 	—	—	—	OK A4: PV1 A3: RSP1 B4: PV2	OK A4: PV1 A3: RSP1 B4: PV2 B3: Not used
4: 2 loops + 2 RSPs 	—	—	—	—	OK A4: PV1 A3: RSP1 B4: PV2 B3: RSP2
5: 3 loops 	—	—	—	OK A4: PV1 A3: PV3 B4: PV2	OK A4: PV1 A3: PV3 B4: PV2 B3: Not used
6: 3 loops + 1 RSP 	—	—	—	—	OK A4: PV1 A3: PV3 B4: PV2 B3: RSP2

Loop type	6th and 7th digits of the model No. (C7GA _____)				
	10	20	11	21	22
7: 4 loops 	—	—	—	—	OK A4: PV1 A3: PV3 B4: PV2 B3: PV4
8: 1 loop + 1 RSP 	—	—	OK A4: PV1 B4: RSP1	—	—
9: Internal cascade 	—	—	OK A4: PV1 (master) B4: PV2 (slave)	OK A4: PV1 (master) A3: None B4: PV2 (slave)	OK A4: PV1 (master) A3: None B4: PV2 (slave) B3: None
10: Internal cascade + 1 loop 	—	—	—	OK A4: PV1 (master) A3: PV3 B4: PV2 (slave)	OK A4: PV1 (master) A3: PV3 B4: PV2 (slave) B3: None
11: Internal cascade + 2 loops 	—	—	—	—	OK A4: PV1 (master) A3: PV3 B4: PV2 (slave) B3: PV4

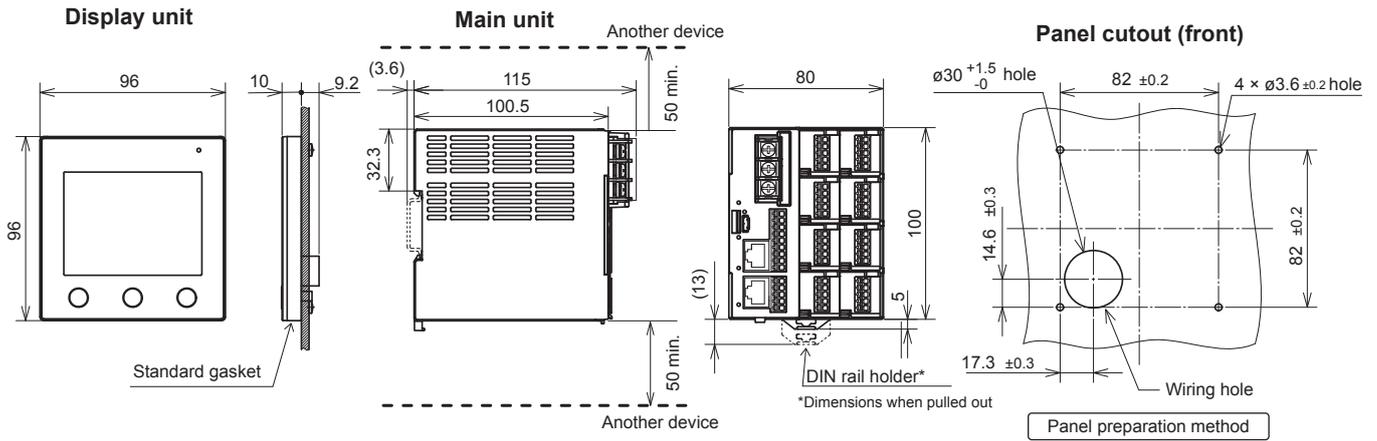
! Handling Precautions

- The value of unused AI blocks is not displayed. To display a PV value for monitoring even if there is no need to control it, select a loop type that has the AI block assigned to a PV. Ex.: if model No. digits 6–7 are “11,” select a 2:2 loop, not a 0:1 loop. In such a case, since the PV is actually not controlled, it is not necessary to set the analog current output block or DI/DO block to output MV.

External Dimensions and Mounting

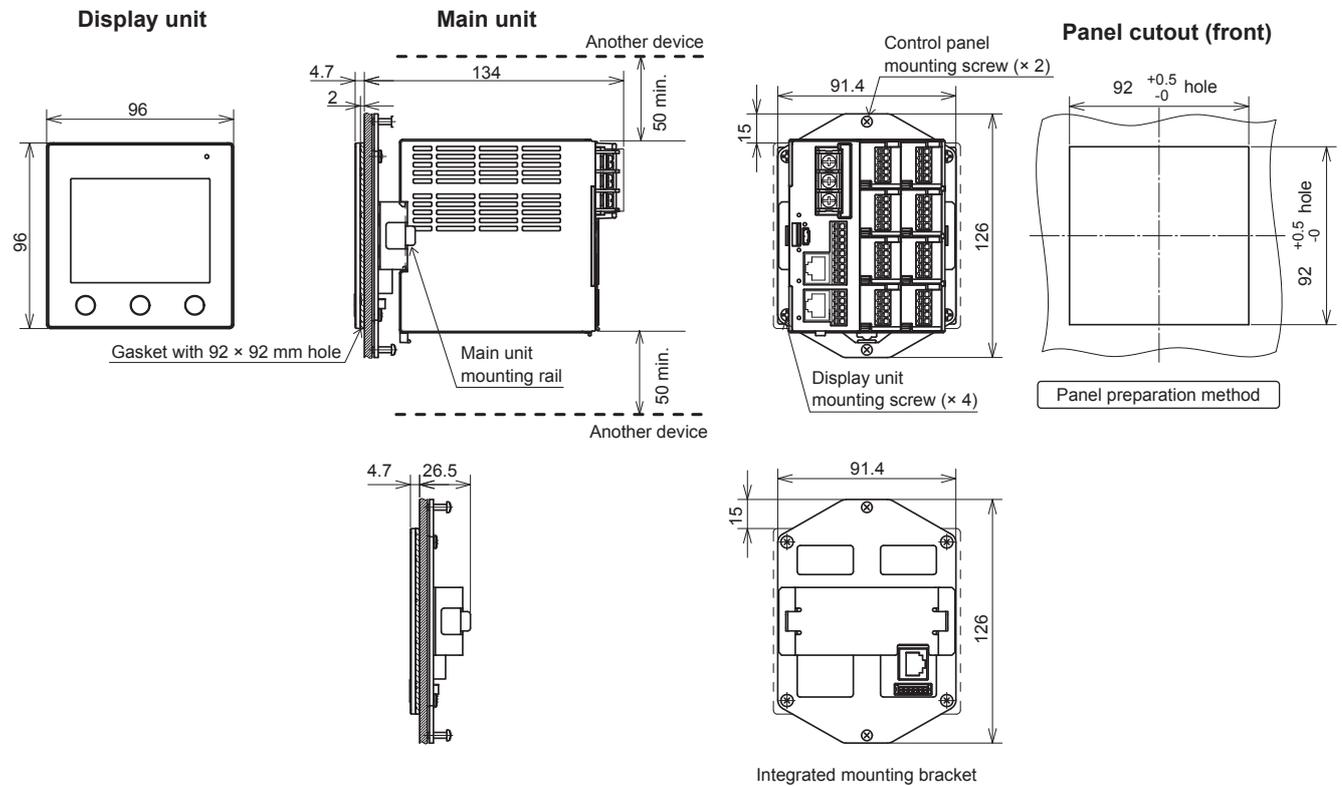
Standard mounting

(Unit: mm)



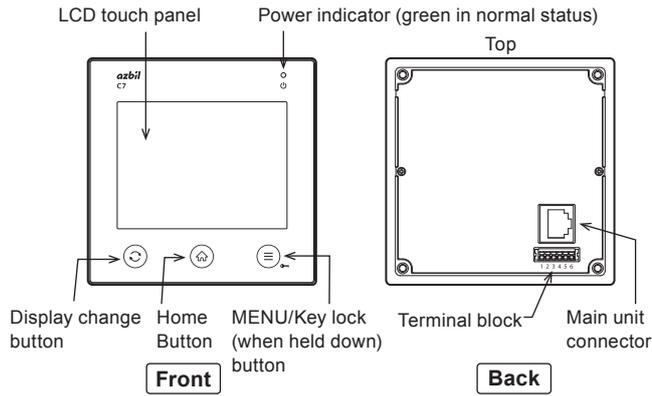
Integrated mounting

(Unit: mm)

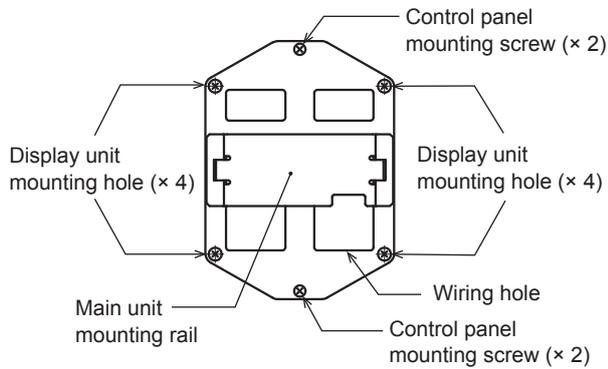


Part Names and Functions

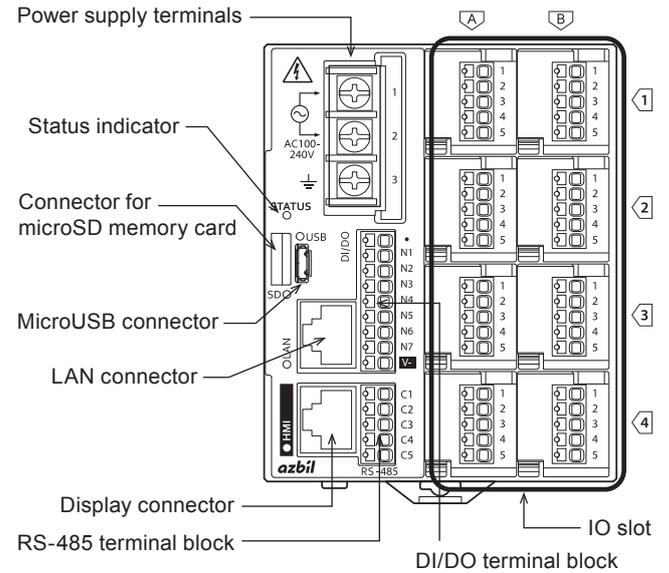
• Display unit



• Integrated mounting bracket (included with integrated mounting models)

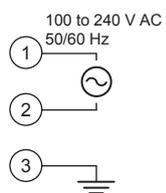


• Main unit

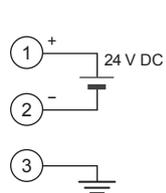


Terminal Connections

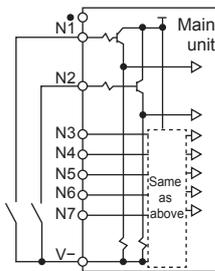
AC power supply



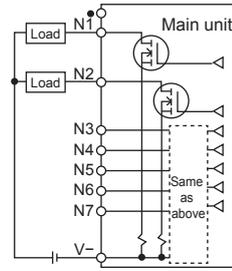
DC power supply



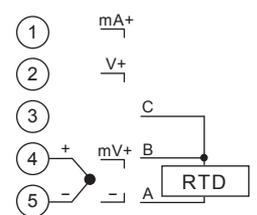
DI wiring example



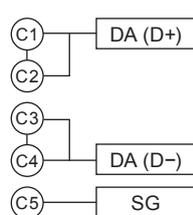
DO wiring example



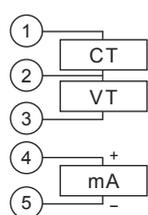
Full multiple inputs



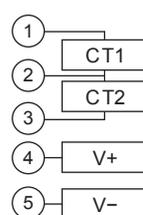
RS-485



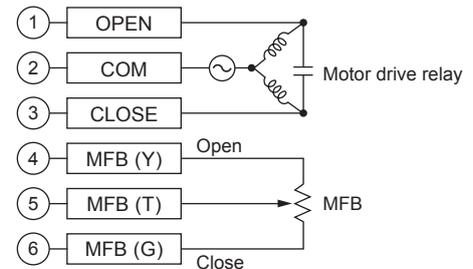
Current output



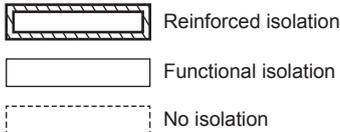
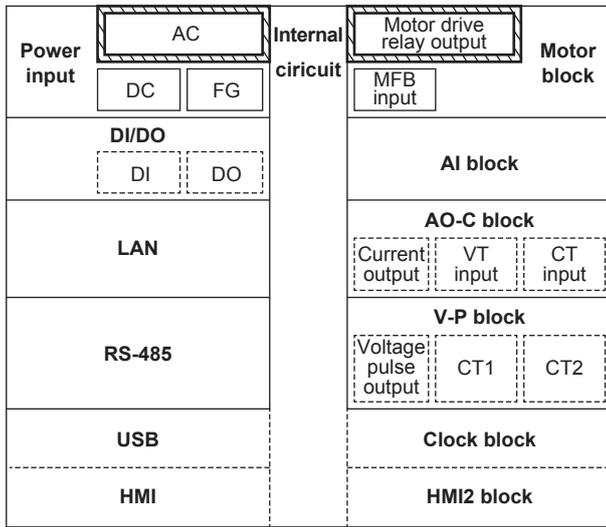
Voltage pulse output



Motor drive output



I/O isolation



- *1. Blocks are functionally isolated from one another.
- *2. The power block (AC) and the motor block (relay output) have reinforced insulation for isolation from all other circuits.

Wiring Precautions

Before touching the main unit or display unit, or removing/inserting cables, touch a grounded panel to discharge static electricity from your body.

Power input

AC power

- 1: AC power supply live line
- 2: AC power neutral line
- 3: Frame ground

DC power

- 1: DC power +
- 2: DC power -
- 3: Frame ground

Handling Precautions

- Before touching the power input terminal box, shut off the input power.
- After completing the work, be sure to mount the cover on the power input terminal block.

Note: Applicable crimp terminal for power input:
 Crimp terminal for M4 (8.5 mm or less wide).
 Proper tightening torque: 1.4 N·m

DI/DO (digital inputs and outputs)

- : NC (not connected)
- N1-7 : DI/DO 1-7 (DI and DO can be switched by changing the setting.)
- V- : COM (common terminal)

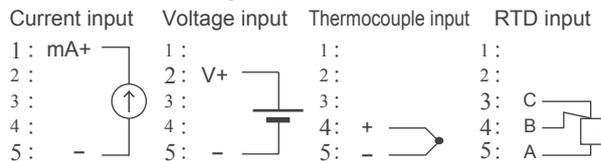
RS-485 (RS-485 communication port)

- C1 : — DA (Data+)
- C2 : — } Terminating resistor
- C3 : — }
- C4 : — DB (Data-)
- C5 : — SG

Handling Precautions

- Connect a terminating resistor (120 Ω, 1/2 W) to both ends of the communication line.
- To connect two terminals (e.g., SG + another) together, use a crimp terminal for two wires.

AI block (analog input)



Allowable input voltage

Current input: -1.5 to +1.5 V

Voltage input: -15 to +15 V

Thermocouple input: -1.5 to +1.5 V

AO-C block (current outputs with CT and VT inputs)

- 1 : CT input
- 2 : CT/VT common
- 3 : VT input
- 4 : Current output +
- 5 : Current output -

Maximum allowable input

CT: 90 mA and 130 mA peak (AC)

1 V and 1.4 V peak (AC)

VT: 18 V and 26 V peak (AC)

Transient overvoltage

CT: supply voltage + 250 V

Handling Precautions

- If a current transformer is used for a UL-compliant model, the transformer must be compliant with UL 2808 (categories XOBA and XOBA7). Do not use an uncertified current transformer.

V-P block (voltage pulse outputs and 2 CT inputs)

- 1 : CT1
- 2 : Common
- 3 : CT2
- 4 : Voltage pulse output +
- 5 : Voltage pulse output -

Maximum allowable input

CT: 90 mA and 130 mA peak (AC)

1 V and 1.4 V peak (AC)

Transient overvoltage

CT: supply voltage + 250 V

Load current:

Voltage pulse output: 25 mA max.

■ MOTOR block (motor drive relay output: with MFB inputs)

1 : OPEN] Contact voltage: 250 V AC / 125 V DC max.
2 : Common	
3 : CLOSE	
4 : MFB (Y)] Potentiometer for motor feedback (100 to 2500 Ω)
5 : MFB (T)	
6 : MFB (G)	

■ Recommended ferrules

Manufacturer : Phoenix Contact
Crimp tool : CRIMPFOX 6

DI/DO, RS-485, AI, AO-C, V-P

Designation	Order Nos.	Cross section (mm ²)	Note
AI 0,25-8 YE	3203037	0.25 (AWG24)	With insulation sleeve
AI 0,34-8-TQ	3203066	0.34 (AWG22)	With insulation sleeve
AI 0,5-8 WH	3200014	0.50 (AWG20)	With insulation sleeve
AI 0,75-8 GY	3200519	0.75 (AWG18)	With insulation sleeve
A1-8	3202517	1.00 (AWG18)	Without insulation sleeve Used to crimp two JKPEV-S-2Px0.5SQ together.
A1,5-7	3200263	1.50 (AWG16)	Without insulation sleeve Used to crimp two JKPEV-S-2Px0.75SQ together.
AI-TWIN 2X0, 5-8 WH	3200933	0.50 (AWG20)	With insulation sleeve, twin
AI-TWIN 2X0, 75-8 GY	3200807	0.75 (AWG18)	With insulation sleeve, twin

MOTOR

Designation	Order Nos.	Cross section (mm ²)	Note
AI0,75-8 BU	3200027	0.75 (AWG18)	With insulation sleeve
AI1-8 RD	3200030	1.00 (AWG18)	With insulation sleeve
AI1,5-8 RD	3201136	1.50 (AWG16)	With insulation sleeve
AI2,5-10 BU	3202533	2.00 (AWG14)	With insulation sleeve

HMI (display unit)

Designation	Order Nos.	Cross section (mm ²)	Note
AI0.25-6 YE	3203024	0.25 (AWG24)	For display connector, without insulation sleeve

■ USB connection

Connect the device to the PC using a USB-to-MicroUSB (type A or B) cable.

! Handling Precautions

- Connection and disconnection of the MicroUSB is hazardous because there is a power terminal nearby. Be sure to turn off the power before connecting or disconnecting the cable.

Note: Use a data communication cable.

■ Inserting or removing a microSD memory card

Insert the microSD memory card all the way inside. Pushing on the memory card lightly will release it, enabling you to remove the card.

! Handling Precautions

- Do not insert or remove a memory card while the indicator near the connector is flashing.
- Connection and disconnection of a microSD memory card is hazardous because there is a power terminal nearby. Be sure to turn off the power before connecting or disconnecting the card.

■ Connecting the LAN cable for Ethernet

Use a Cat5E or higher LAN cable to make the connection.

■ Connecting the main unit to the display unit using a cable

• For standard mounting

Use a Cat5E or higher straight LAN cable to make the connection. (Cat5E, T568A, or T568B wiring. Both ends use RJ45 plug (8P8C modular).)

*1. A 4-core LAN cable cannot be used.

*2. If the length of the cable between the main unit and the display unit is from 30 m to 100 m, an external power source must be connected for the display unit.

• Wiring for integrated mounting

Insert the rod-shape crimp terminal lug of the wires with the specified colors of the included cable into the terminal block of the display unit..

1: White/orange	4: White/green
2: Blue	5: Green
3: White/blue	6: Brown

Operation Check

After connecting the main unit to the display unit and turning on the power, a display will appear.

The display that first appears on the screen after power-on is called the initial display.

Display change button : Switches the display.

HOME button : Returns to the initial display.

MENU/Key lock button:

Displays the menu. Pressing the button for four seconds or longer locks the keys. Disabling the key lock is then the only operation permitted. Pressing the button again for four seconds or longer disables the key lock.

Troubleshooting

■ Model number and serial number

The model number and serial number are printed on the top of the main unit near the front of the unit.

Have these numbers ready before contacting us.

■ Problems in installation

First, check the following regarding wiring:

- Connectors are securely inserted into the ports.
- Connectors are inserted into the right ports.
- Wires are properly connected to the power supply terminal block.

■ **Power is not turned on**

Status	Countermeasures
The status indicator on the main unit is off.	Check the the power input connections and voltage.
The status indicator on the main unit is lit green or the power indicator on the display unit is off.	Standard mounting: Check the LAN cable (8-core straight). Check the connectors. Integrated mounting: Check if the wiring on the back of the display unit is correct. Check connectors on the main unit.
The power indicator on the display unit is lit green and the LCD remains black.	There may be a problem with the device. Please contact us.
The status indicator on the main unit is lit red.	There may be a problem with the device. Please contact us.

■ **Blurry display**

A thin film is applied on the protection sheet of the display for protection during transportation. Please remove the protective film.

■ **Alarms (the status indicator is blinking red)**

Please refer to the user’s manual.

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- Modbus is a trademark and the property of Schneider Electric SE, its subsidiaries and affiliated companies.

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