

Model C7G

Multi loop controller with multifunctions display

ELECTRONIC
EQUIPMENT

ACOUSTIC

WEIGHING

ANTI-TILTING

VALVES

TEMPERATURE

DETECT
A FIRE®

FLOW/
RATE

DENSITY

INTERFACE

PRESSURE

LEVEL



A significantly enhanced role for digital indicating controllers

This PID controller handles up to four loops with a top sampling cycle of 10 ms at an accuracy of 0.1% F.S. In addition, its separable structure, compact data storage, and health index* function make it useful in ways that conventional controllers cannot match.

TF
180

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Excellent usability

We developed the hardware from the user's viewpoint in order to achieve a high level of usability.

Excellent usability and readability

- 3.5-inch full dot matrix LCD offers crystal-clear display of values and graphs during control operation.
- Touch panel provides user-friendly operability. If lost, just press the home button

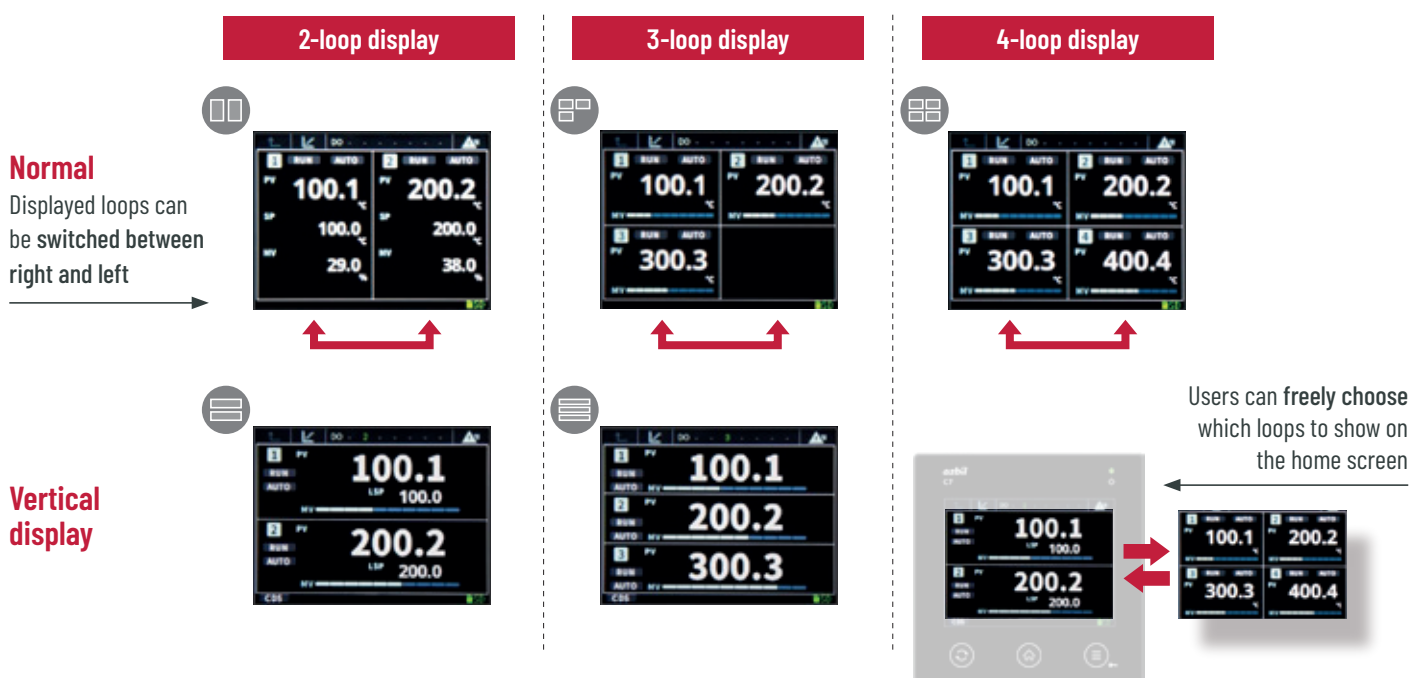
Withstands a variety of environments

- Display unit features an IP67 protection rating. Resistance to dust and water drops allows use in a range of environments.
- Resistive touch-panel is easy to operate in cleanrooms, etc., where gloves are worn.



Selectable home screen

One controller handles up to 4 loops. The C76 breaks the single-loop controller mold by allowing users to select the required number of loops. The loops that are displayed on the screen can also be changed through home screen settings.

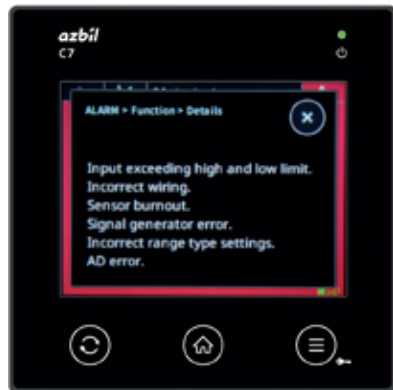


Clarity at a glance set for full name display of C76 alarms and settings

Parameter settings and gauge alarms can be displayed by name rather than by code number, reducing the need to refer to the manual during setup and alarm handling. Both English and Japanese are available and can be seamlessly switched during operation.

Sample display 1
English

(Controller alarm indication)



Sample display 2
Japanese

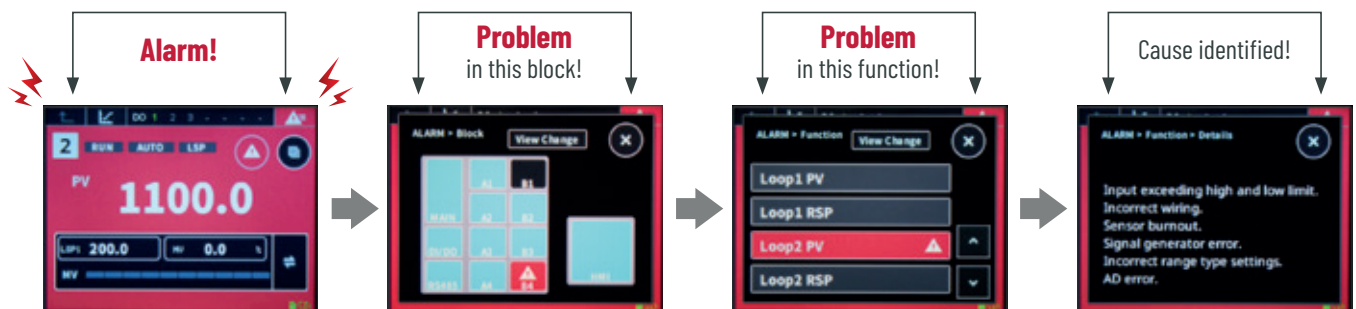
(Parameter settings indication)



Easily identify the cause of alarms

The hierarchical design of the alarm screen allows easy identification of the location and cause of generated alarms.

[Example: sensor input error]



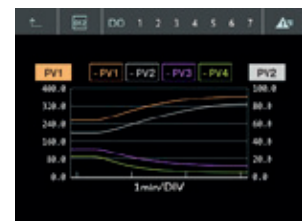
Graphs are helpful in trial-run adjustments

Control status can be conveniently checked on a graph while making trial-run adjustments.

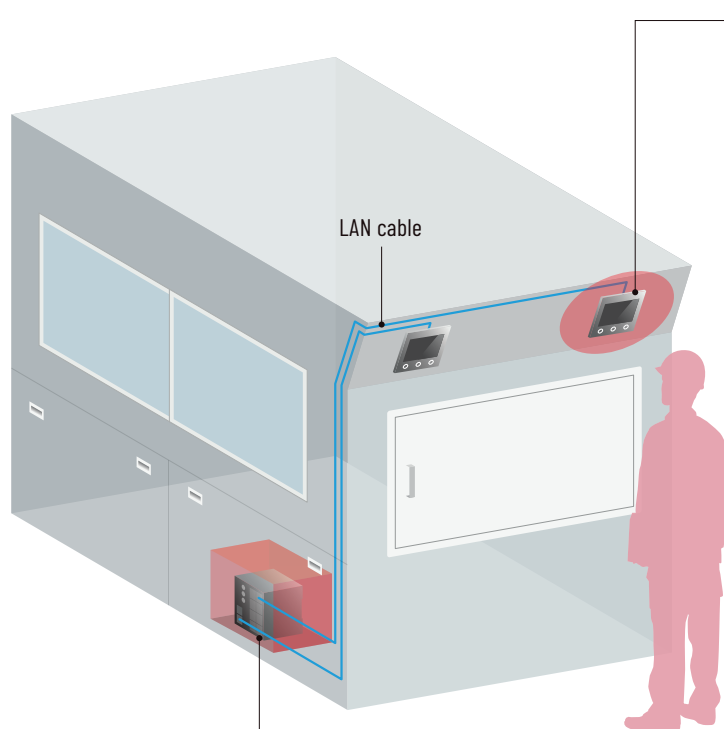
1-loop graph



Multi-loop graph



Separable display allows for flexible positioning



Main unit

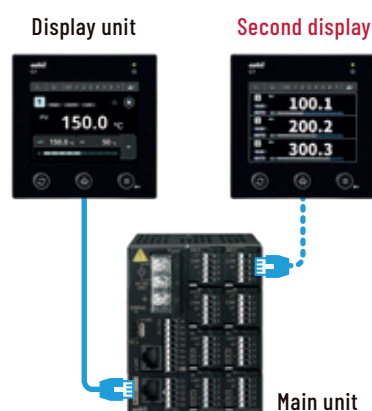
Easy DIN-rail mounting.
In addition to reducing the wiring to the panel, this structure greatly improves installation flexibility.

Display unit

Since power is supplied from the main unit, separate power wiring is not needed for displays installed less than 30 meters from the main unit. (A separate power supply is required for distances from 30 to 100 meters.)

Additional display unit block

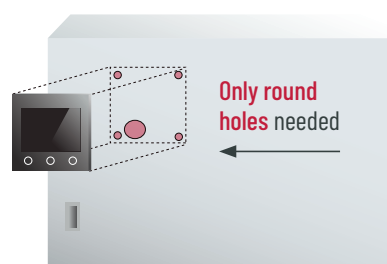
Unlike conventional controllers, a second display can be added. The home screen of each display unit can be customized as desired.



POINT 01

Simplified panel cutout mounting holes

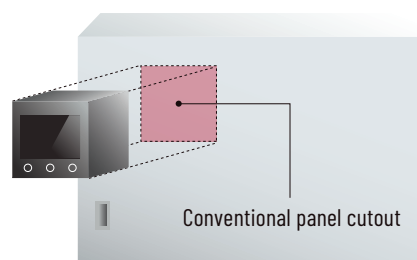
Panel mounting requires only round holes. The tools previously required to make panel cutouts are not needed, allowing much simpler mounting.



POINT 02

Conventional panel cutouts also OK

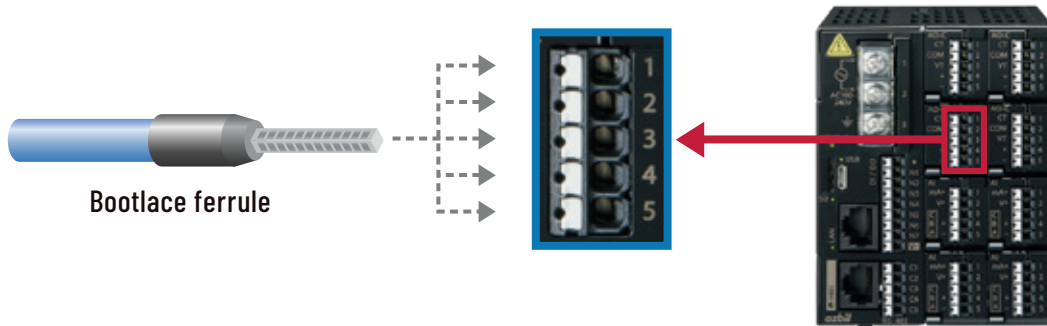
As with conventional controllers, integrated mounting of the display unit attached to the main unit is also fine.



Insert wire. Spring-type terminals are that easy!

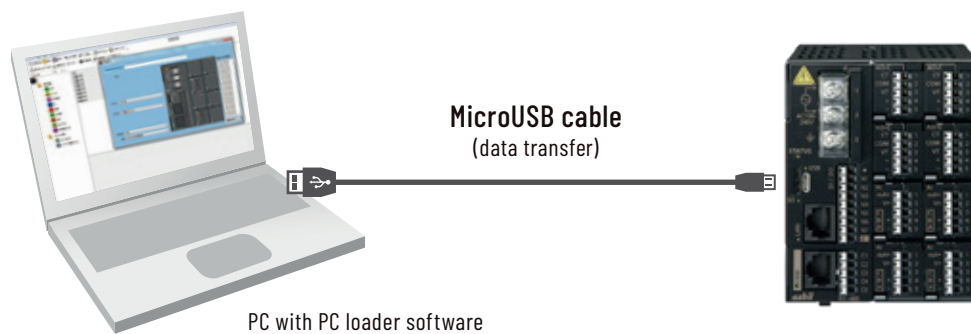
Spring-type terminals simplify wiring and improve reliability. They can be connected by simply inserting the bootlace ferrules. The spring clamp method achieves reliable electric contacts.

- **Much simpler** than conventional wiring methods.
- **No more hassles** after inserting the wire.



Configuration without a power supply

Parameters can be loaded and stored with the Smart Loader Package when the main unit is connected to a PC with a MicroUSB cable.



The free version* of the Smart Loader Package can be ~~down~~loaded from our webpage.

Smart Loader Package*



<https://aa-industrial.azbil.com/jp/en>

* Configuration and monitoring software tool

- **Free version** (model SLP-C7FJ91)
- **Paid version** (model SLP-C7-J91)

Includes configuration, monitoring, and Health Index functions.

Includes additional functions not available in the free version (advanced monitoring function and Health Index screen).

Basic functions of model C7G

HIGH-SPEED CONTROL

Up to 4 loops can be controlled at speeds of up to 10 ms. Ideal for heater control and other high-gain processes that require high-speed control.

A diversity of built-in functions

Cascade control

Compatible with internal cascade control functions. Especially effective for large-scale process control with slow dynamics.

4-wire RTD input

Achieves high-precision measurements **without needing to account for wiring resistance.**

Broken-line approximation

Equipped **with broken-line approximation function for input and output.** Controllability is improved by utilizing this feature for functions such as non-linear sensor output and output to high-gain actuators.

Power supply voltage compensation

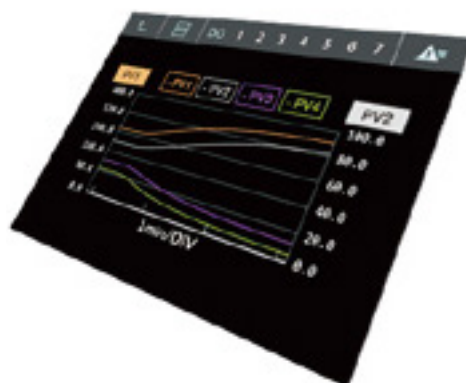
The heater power supply voltage can be monitored for fluctuations in order to **calculate corrections to the manipulated variable (MV) output.**

Parameter lock (with password)

With the lock level setting, **display and setting of parameters using the device's display and reading/writing parameters by the PC loader** can be prohibited.

Display unit settings

The display can show, separately for each loop, **the units of measurement desired for the application.**



Pattern operation

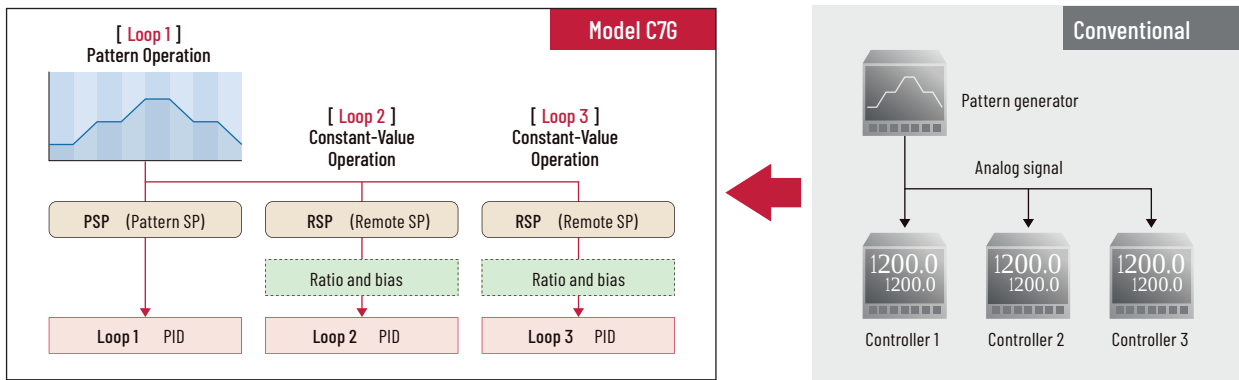
The C76 is equipped with pattern operation. The same **pattern operation** can be used for up to 4 loops, or individual patterns operations can be executed. Functions that are needed for pattern operations, like PV start and Guarantee soak, are of course available.

Item	Function
Number of patterns and segments	16 patterns, 32 segments per pattern
Time units	0.01 s, 0.1 s, 1 s, 1 min
Operation modes	Pattern operation (Pattern SP) ↔ Constant-value operation (LSP/RSP)
Pattern operation functions	HOLD, Guarantee soak (start and end points), PV start, Advance, Cyclic operation, Pattern link, Operation end state (READY, END, constant-value operation), Pattern SP change limits (high and low limits)
Event functions	Segment events 1 to 32
Host communication	Pattern settings and segment settings can be read and write.

CASE EXAMPLE

MULTI-LOOP PATTERN OPERATION

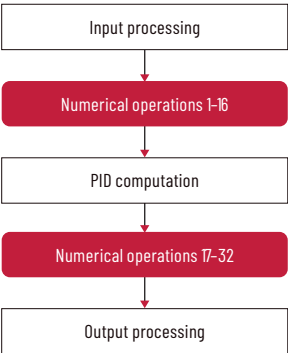
Multiple loops (up to four) can be controlled simultaneously with just one C76 unit, instead of using a group of conventional controllers receiving analog signal outputs from a pattern generator as remote set point (SP) inputs.



Numerical operation

Various (**up to 32**) **numeric data items** in the device **can be processed numerically**, and the results can be **monitored** and **recorded (to CDS)**, or used for **status checking using event functions** or for **control by changing the sensor input**.

Signal flow



24 types of calculation function (typical functions only are shown)

$aX+bY$	Division	Switch selector	High selector
Low selector	Soft switch selector	High/low limiter	Change rate limiter
Lead/lag	Absolute value	Linearization table	Hold
One-shot timer	Timer	Dead Time	Moving Average

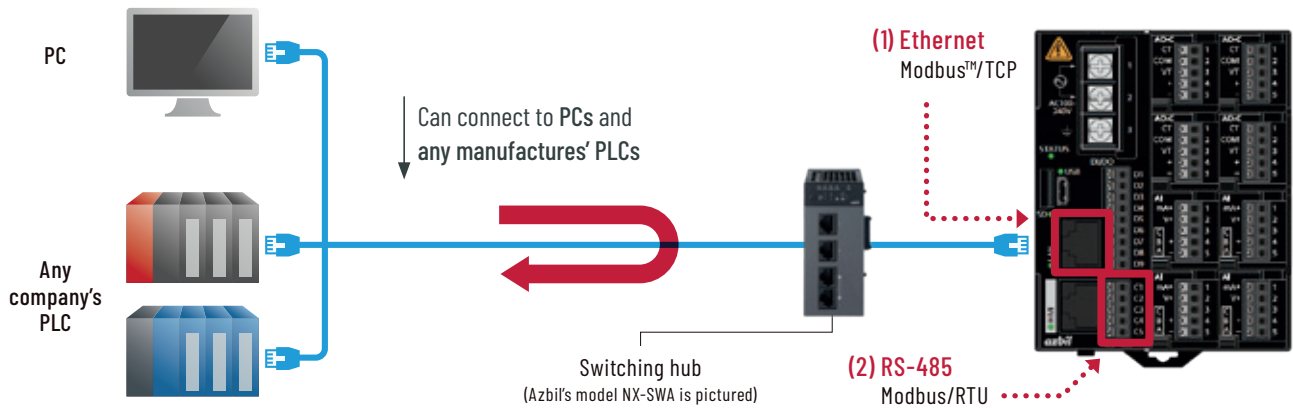
Sample uses

- Sensor input changeover
- 2-input/1-output control (switchable by control output selection)
- Control by average of 2 inputs
- Override control
- Sample hold

Value is maximized by seamless coordination with other equipment

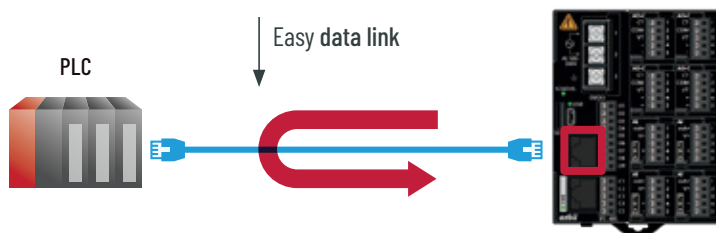
Comes standard with two communication ports

Both Ethernet and RS-485 support is a standard feature. With high-speed (Ethernet) communication and serial (RS-485) communication, a high degree of flexibility is ensured for equipment-internal instrumentation networks and controller-controller instrumentation networks.



PLC link function

Utilizing Ethernet, model C7G can exchange data with a PLC without a communication converter (gateway) or dedicated program. (It uses Mitsubishi MC protocol/SLMP (3E).)

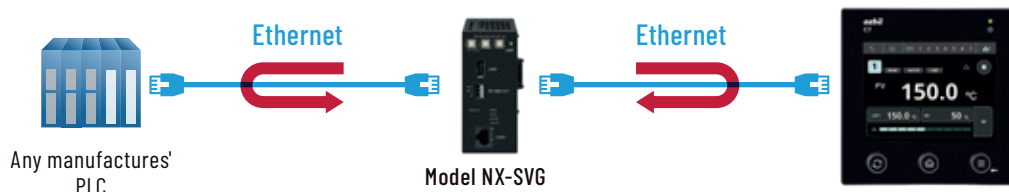


Connectable PLCs

Mitsubishi Electric Corporation	MELSEC IQ-R
	MELSEC Q
	MELSEC L
Keyence Corporation	MELSEC IQ-F
	KV-7000 series
	KV-5000/3000 series
	KV-Nano series

Even easier instrumentation with a Network instrumentation module smart device gateway* model NX-SVG

Our model NX-SVG allows easy instrumentation using Ethernet.



Data transfer can be easily configured by simply setting the source and target devices. Easy setup of data transmission is achieved without requiring communication programs by PLC ladder programming.

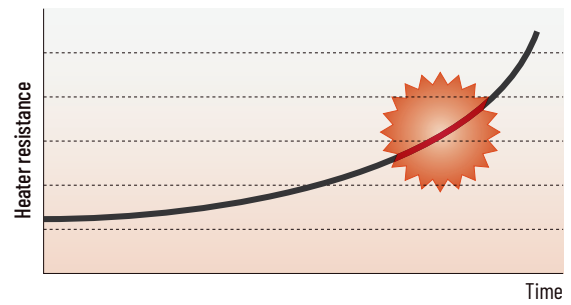
*A communication gateway that allows the interchange of information between various kinds of control device without programming, enabling smarter development work.

Diagnostic and management information for problem-solving

The controller displays and records changes in heater resistance to show the heater's condition

BHeater voltage and current is measurable from the voltage transformer (VT) input and current transformer (CT) input and is displayed as RMS values. Based on the values measured for VT input and CT input, heater resistance can be calculated, monitored (displayed/transmitted), and recorded.* The state of a heater whose resistance characteristics vary depending on the temperature environment is easier to know by recording* the resistance together with the temperature control status.

*The controller's CDS (compact data storage) function is used for recording.



Sample display of
RMS current and RMS voltage

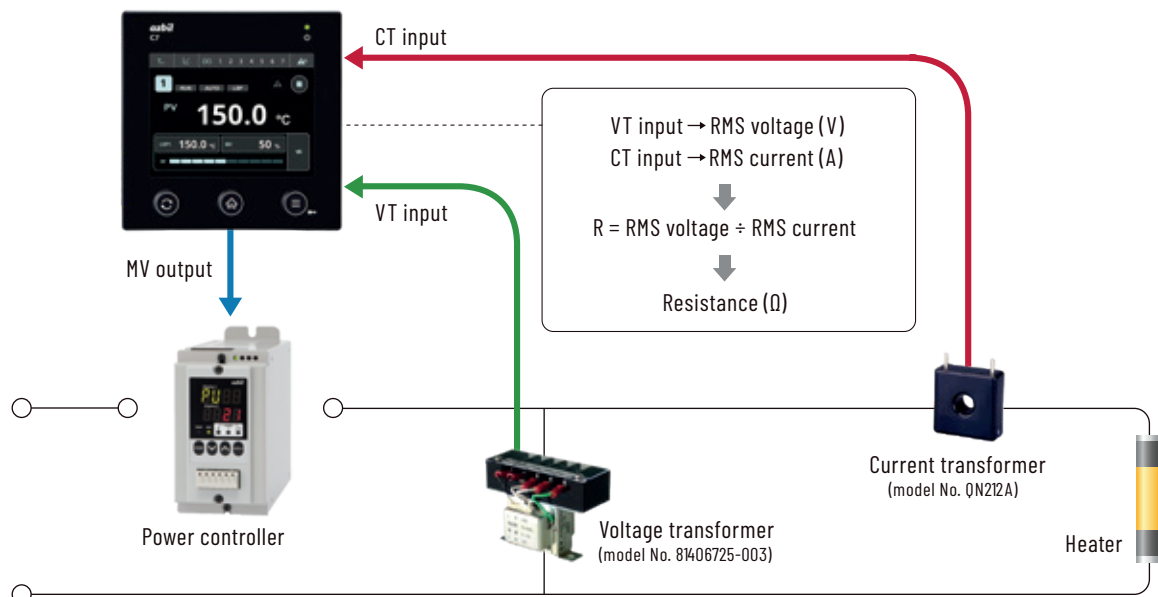


Sample display of
resistance



Display of RMS current, RMS voltage, and resistance measurements

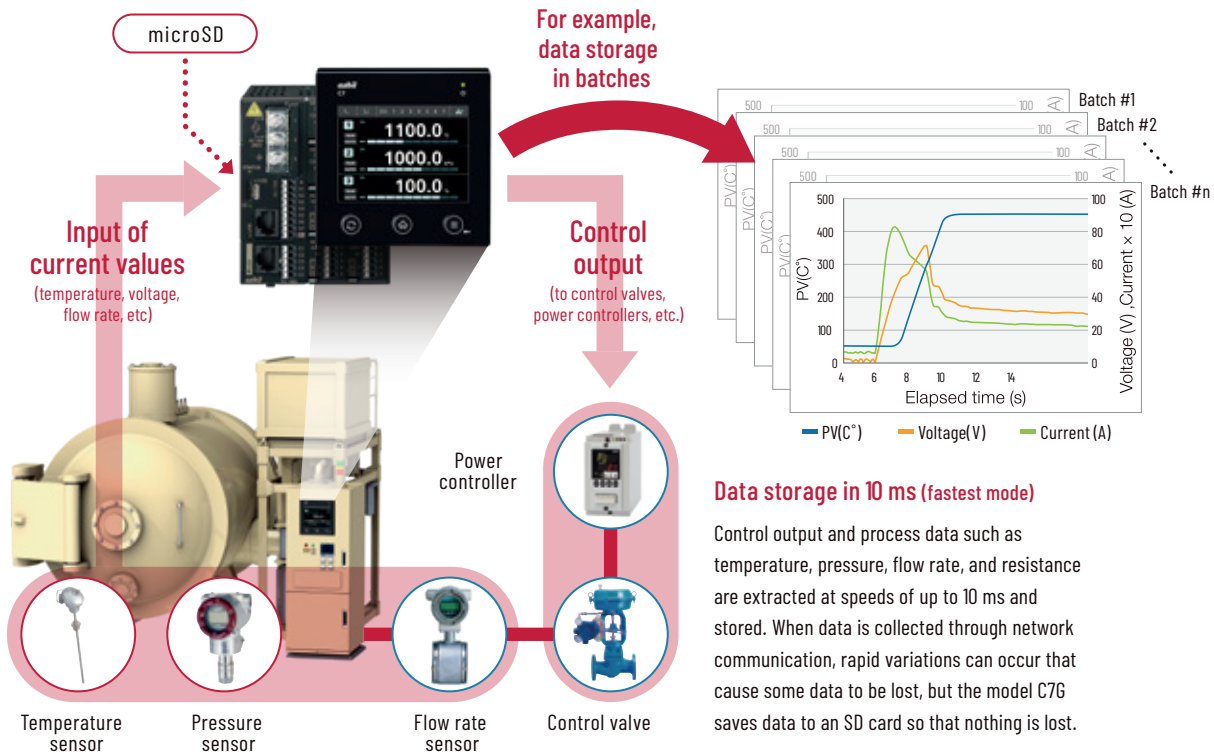
EXAMPLE OF INSTRUMENTATION



Diagnostic and management information for problem-solving

Compact data storage (CDS)

Compact data storage is Azbil's new technology for effective data recording. It can record necessary data at fixed intervals and also record just the required pieces of data, thus allowing controllers to achieve data processing and management at FA control layer.



Data storage in 10 ms (fastest mode)

Control output and process data such as temperature, pressure, flow rate, and resistance are extracted at speeds of up to 10 ms and stored. When data is collected through network communication, rapid variations can occur that cause some data to be lost, but the model C76 saves data to an SD card so that nothing is lost.

Recording method

Custom

This is a simplified data recording method that allows users to register and record up to 40 pieces of data as desired. CUSTUM or RING mode can be selected for data accumulation. Here, data in CSV file format is accumulated in microSD memory cards.

Recording method

Standard

This method is used with our proprietary primary data processing technology, "health index." Recorded data cannot be used by controllers of other models. Data is recorded in batches or during temperature rises (step change) and processed by way of the "health index."

Clock function block (with battery)

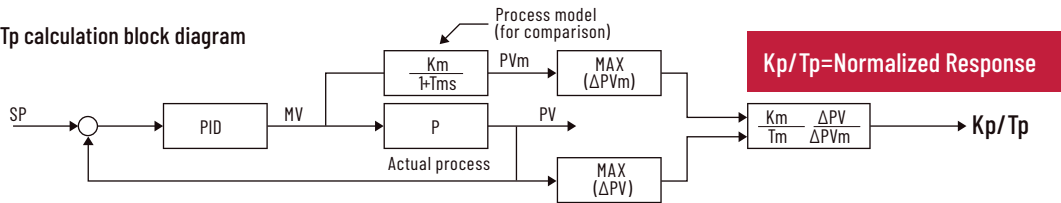
Recorded timestamp data is backed up by a battery.

Diagnostic and management information for problem-solving

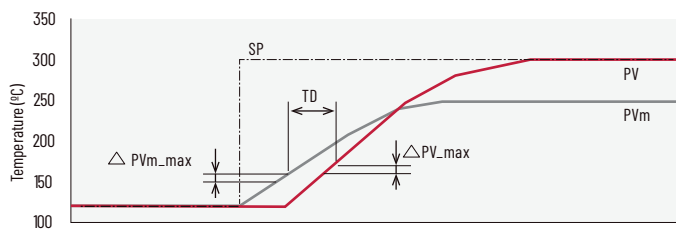
Process diagnosis (Health index function)

Loop characteristics are quantified using process data for control. Loop soundness is monitored to detect status changes. Quantified data is provided for edge computing that in turn contributes to promotion of IoT services.

Kp/Tp calculation block diagram



ΔPV_max, ΔPvm_max, and TD



Transfer function
Heating control can be expressed by the following approximation formula:

$$P = K_p \exp(-L_p s) / (1 + T_p s)$$

K_p : Process gain T_p : Time constant L_p : Waste time

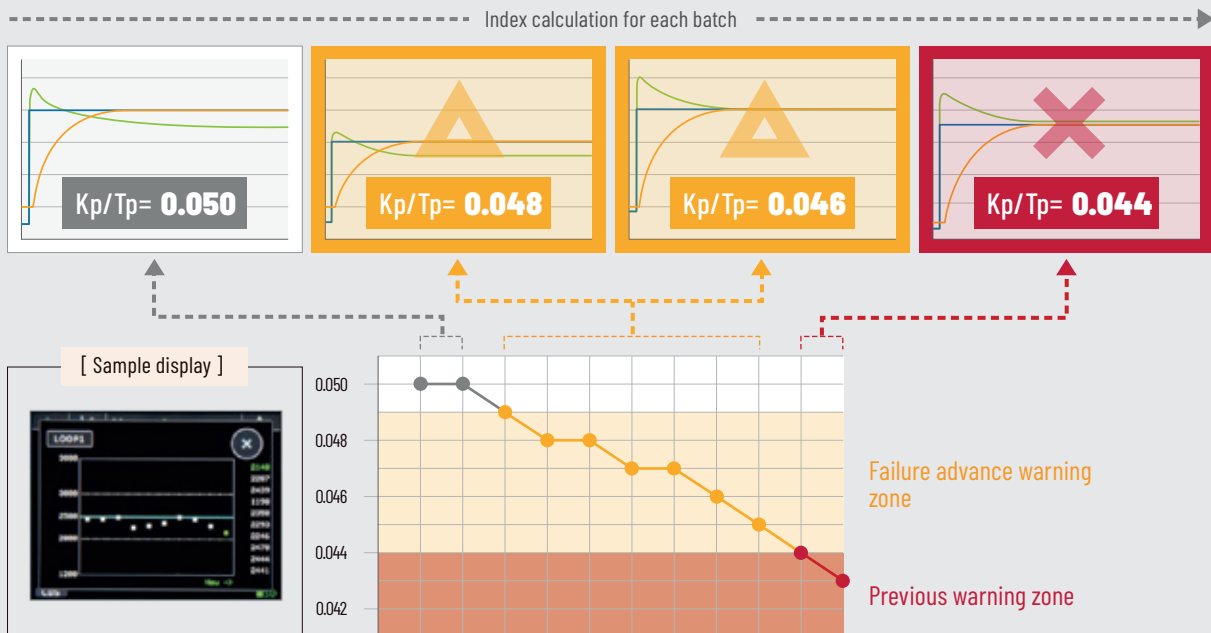
Normalized responsiveness is calculated with the following formula:

$$K_p/T_p = (K_m/T_m) (\Delta PV_{\max} / \Delta Pvm_{\max}) \quad L_p \doteq TD$$

By comparing the maximum amount of process change in a transient response ($\Delta PV_{\max}$) and the same value for the model ($\Delta Pvm_{\max}$), the value of "Process gain (K_p) ÷ time constant (T_p)" is calculated as the Health Index (control loop quality). The health index is calculated while CDS is activated, and is then stored on the microSD memory card. (Depending on processing conditions, calculation may sometimes not be possible.)

How to use

The health index is an approximation of control loop condition. By storing data in batches and comparing it with initial values, equipment status changes can be detected **before a failure occurs**.



Specification

Display unit (included) Additional display unit (model C7D- - - - -)	Screen specifications		3.5-inch QVGA LCD
	Operation buttons		Touch panel (resistive) and 3 hardware buttons
	Power for display unit		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)
	Protective rating		IP67 (front of display unit only)
	Interface language		English/Japanese (switchable by setting)
	Service life of LCD		5 years (at ambient temperature of 25 °C and brightness setting 4, for half-life of backlight brightness)
DI (Digital Input) / DO (Digital Output) block	No. of I/Os		7 max. (select DI/DO/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)
		Function assignment	RUN/READY mode selection, AUTO/MANUAL mode selection, LSP/RSP mode selection, SP group selection, CDS stop/start, etc.
	Digital output	Output method	Open collector
		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	1 ms when time proportional cycle is less than 10 s. 250 ms when time proportional cycle is 10 s or more.
AI (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		See Table of input types and ranges.
	Sampling cycle		10 ms, 50 ms, 100 ms (factory default: 50 ms)
	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.)
	Thermocouple	Reference junction 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 model C76
	Resistance temperature detector (RTD)	Measuring current	1.0 mA (typical, current from terminals A and B; under standard conditions)
		Allowable wiring resistance	85 Ω max. (per wire)
	DC voltage DC current	Input bias current	0 to 10 V range: 10 µA max. (under standard conditions) 1 to 5 V or 0 to 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
		Scaling	-32000 to +32000 U (Max. 5 digits within the above range, max. 4 digits after the decimal point, reverse scaling possible)
AI-R block	Input type		4-wire RTD
	Number of control loops		Same as for the AI block
	Range type		See the table of input types and ranges.
	Sampling cycle		Same as for the AI block
	Decimal point position		Same as for the AI block
	4-wire RTD	Measuring current	1.0 mA (typical, flows out of terminal 5, flows into terminal 3, under standard conditions)
		Allowable wiring resistance	2 Ω max. (per wire)
AO-C (Analog current output) block	Current output (I)	Type	4 to 20 mA DC / 0 to 20 mA DC
		Output type	Control output (MV), process value (PV), set value (SP), standard numerical code, etc.
		Allowable load resistance	600 Ω max.
		Output resolution	1/16000 min.
	CT (current) input (I)	Recommended current transformer	QN206A (hole diameter: 5.8 mm, 800 turns), QN212A (hole diameter: 12 mm, 800 turns). Note: Not UL-certified
V-P (Voltage pulse output) block	VT (voltage) input (I)	Current measurement range	0.4 to 50.0 A AC, 50/60 Hz (peak current: 71 A, 800 turns, 1 power wire loop)
		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)
		Output voltage	12 V DC +15/-10 % (under standard conditions)
		Allowable current	25 mA max.
V-P2 block	CT (current) input (2)	Specifications	Same as for the CT (current) input of the AO-C block
	Voltage pulse output (I)	Output voltage	Same as for the voltage pulse output of the VP block
	Allowable current	Specifications	Same as for the voltage pulse output of the VP block
		Specifications	Same as for the VT (voltage) input of the AO-C block
MOTOR (Motor drive output) block	Motor drive output relay	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 max. / 125 V DC max.
	MFB (Motor feedback) input	Allowable potentiometer	100 to 2500 Ω (wiring resistance included)
DI (Digital input) block	Number of inputs		4 (common)
	Compatible output type		Non-voltage contacts or open collector
	Function assignment		RUN/READY mode selection, LSP/RSP mode selection, SP group selection, PID group selection, CDS stop/start, etc.
DO (Digital output) block	Number of outputs		4 (common)
	Output type		Open collector (sink type)
	Function assignment		Select an event status or a standard bit code

Specification

CLOCK (Clock function) block (with battery)	Clock function		Hours, minutes, seconds, calendar (years 2000 to 2099, supports leap years)
	Clock accuracy		Monthly error: less than ± 65 s (under standard conditions)
	Service life		10 years (battery life when not energized; under standard conditions)
HIM2 (Additional display unit) block	No. of connectable units		1
	Connector		RJ-45
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 the range at the left, 4 digits max. after the decimal point)
		Integral time (I)	0 to 32000 s (5 digits max. within the range at the left, 4 digits max. after the decimal point); No integral calculation if the setting is 0.
		Derivative time (D)	0 to 32000 s (5 digits max. within the range at the left, 4 digits max. after the decimal point); No derivative calculation if the setting is 0.
		Number of PID groups	8 groups per loop
		Auto-tuning	PID automatic setting using the limit cycle method
Analog input processing unit	SP (LSP: Local SP)	Number of LSP groups	8 groups per loop
	Filter	0.0000 to 120.00 s	
	Ratio	0.0010 to 10.000	
	Bias	-32000 to +32000 (5 digits within this range, 4 digits max. after the decimal point)	
Linear approximation functions	Number of groups, breakpoints per group	8 groups, 20 breakpoints	
	Available functions	Analog input, analog output, etc.	
Event functions	Operation types	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 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 (status), READY (status), MANUAL (status), RSP (status), AT running (status), SP ramp running (status), Control direct action (status), MFB (status), Timer (status)	
	Number of events	16	
Pattern operation functions	Number of patterns and segments	16 patterns, 32 segments per pattern	
	Segment setting method	Set with set point (SP) and time	
	Time units	0.01 s, 0.1 s, 1 s, 1 min	
	Function	HOLD, Guarantee soak (start and end points), PV start, Advance, Cyclic operation, Pattern link, etc.	
	Operation end state	READY, END, constant-value operation	
	Event	Segment events 1 to 32	
Numeric calculation section	Number of units	32	
	Calculation types	aX+bY, Division, Switch selector, High selector, Low selector, Soft switch selector, High/low limiter, Change rate limiter, Lead/lag, Absolute value, Linearization table, Hold, One-shot timer, NOP (No Operation), Timer, Square-root extraction, Deviation monitor, Integration pulse output I, Integration pulse output II, Log, Exponent, Integral, Derivative, Dead time, Moving average	
External communication	Ethernet	Transmission line type	Compliant with IEEE 802.3u 100BASE-TX (FastEthernet)
		No. of connections	4 (The total number of connections for Modbus/TCP and loader communications via Ethernet is 1 to 3, and the number of connections for PLC link communication is fixed at 1.)
		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 Electric SLM (3E) (for PLC link communication), Loder Communications via Ethernet
		Signal level	RS-485 compliant
	RS-485 communication	Network	Multidrop (up to 31 slave stations for 1 host station)
		No. of communication wires	3-wire system
		Transmission speed	9600, 19200, 38400, 57600, 115200 bps
		Protocol	Modbus/RTU
	Loader communication	Dedicated PC loader	SLP-C7F-J91 (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	Memory backup		EEPROM (durability: 1 million erase-write cycles min.), for parameters settings
	Power consumption		AC models: 25 VA 10 W max. DC models: 12 W max.
	Case material		Main unit: Modified PPE (case), polycarbonate (board holder, front mask) Display unit: Modified PPE (case), polycarbonate (back cover), PET film (decorative 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. UL 61010-1, CAN/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 $\phi 3$ screws (standard) or the mounting bracket (mount in a 92 x 92 mm hole)
	Built-in clock accuracy		Monthly error: less than ± 140 s (less than ± 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).
	Standard conditions	Ambient temperature	23 °C -2/+5 °C
		Ambient humidity	60 $\pm$ 5 % RH
		Power voltage	AC models: 105 V AC ± 10 %. DC models: 24 V DC ± 5 %
	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 voltage	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)
		Mounting angle	Reference plane $\pm 10^\circ$ (main unit, and main unit and display unit in integrated mounting), no restriction for display unit in standard mounting

Specification

Input types and ranges

Input type	Range type Nos.	Sensor	Range	Accuracy	Effective resolution
Thermocouple	1	K	-200 to +1,200°C	±0.1 % FS ±1 digit *1	0.1 °C
	2	K	0 to 1,200°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 1,200°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 1,600°C	±0.1 % FS ±1 digit *2	0.1 °C
	16	S	0 to 1,600°C	±0.1 % FS ±1 digit *2	0.1 °C
	17	B	0 to 1,800°C	±0.1 % FS ±1 digit *3	0.1 °C
	18	N	0 to 1,300°C	±0.1 % FS ±1 digit	0.1 °C
	19	PLII	0 to 1,300°C	±0.1 % FS ±1 digit	0.1 °C
	20	WRe5-26	0 to 1,400°C	±0.1 % FS ±1 digit	0.1 °C
	21	WRe5-26	0 to 2,300°C	±0.1 % FS ±1 digit	0.1 °C
	23	PR40-20	0 to 1,900°C	±0.5 % FS ±1 digit *4	0.1 °C
Resistance temperature detector (RTD)	41	Pt100	-200 to +500°C	±0.1 % FS ±1 digit	0.1 °C
	43	Pt100	-200 to +200°C	*5 Below 50 °C: ±0.10 °C 50 °C to below 150 °C: ±0.15 °C 150 °C or above: ±0.1 % FS ±1 digit	0.01 °C
	45	Pt100	-100 to +300°C		0.01 °C
	47	Pt100	-100 to +200°C		0.01 °C
	49	Pt100	-100 to +150°C		0.01 °C
	51	Pt100	-50 to +200°C		0.01 °C
	53	Pt100	-50 to +100°C	Below 50 °C: ±0.10 °C 50 to 100 °C: ±0.15 °C *5	0.01 °C
	55	Pt100	-60 to +40°C	±0.10 °C *5	0.01 °C
	57	Pt100	-40 to +60°C	Below 50 °C: ±0.10 °C 50 to 60 °C: ±0.11 °C *5	0.01 °C
	59	Pt100	-10 to +60°C	±0.1 % FS ±1 digit	0.01 °C
	61	Pt100	0 to 100°C	Below 50 °C: ±0.10 °C 50 to 100 °C: ±0.11 °C *5	0.01 °C
	63	Pt100	0 to 200°C	*5 Below 50 °C: ±0.10 °C 50 °C to below 150 °C: ±0.15 °C 150 °C or above: ±0.1 % FS ±1 digit	0.01 °C
	65	Pt100	0 to 300°C		0.01 °C
	67	Pt100	0 to 500°C		0.1 °C
	69	Pt100	-200 to +850°C	±0.1 % FS ±1 digit	0.1 °C
4-wire RTD	71	Pt100	-100 to +100°C	±0.05°C	0.001 °C
	73	Pt100	0 to 32°C	±0.05°C	0.001 °C
	75	Pt100	0 to 100°C	±0.05°C	0.001 °C
Linear	86	Voltage (V)	1 to 5V	±0.1 % FS ±1 digit	1/90000 or better
	87	Voltage (V)	0 to 5V	±0.1 % FS ±1 digit	
	88	Voltage (V)	0 to 10V	±0.1 % FS ±1 digit	
	89	Current (mA)	0 to 20mA	±0.1 % FS ±1 digit	
	90	Current (mA)	4 to 20mA	±0.1 % FS ±1 digit	
	92	Voltage (V)	-10 to +10V	±0.1 % FS ±1 digit	

*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

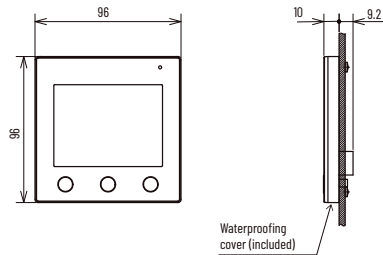
*4. For 0 to 300 °C, ±2.5 % FS ±1 digit; for 300 to 800 °C, ±1.5 % FS ±1 digit

*5. Note that, for model C7 controllers manufactured before August 2024 (before date code 243201001), the accuracy is ±0.1 % FS ±1 digit for all temperature ranges.

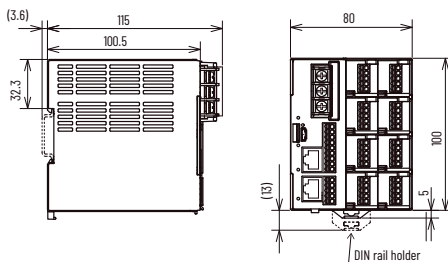
External dimensions and mounting (Unit: mm)

Standard mounting

■ Display unit, additional display unit

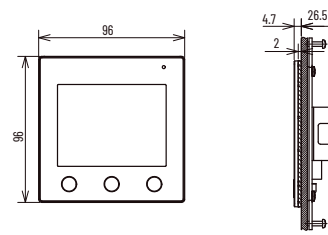


■ Main unit

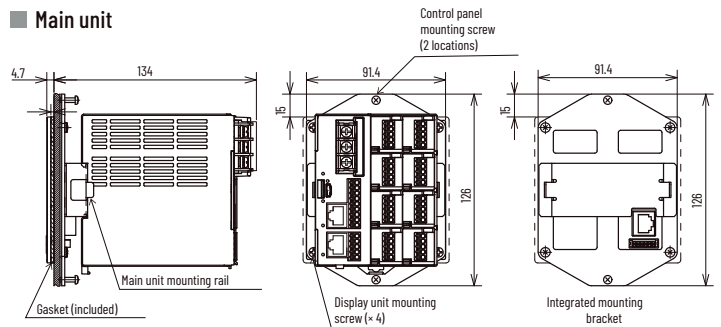


Integrated-mounting

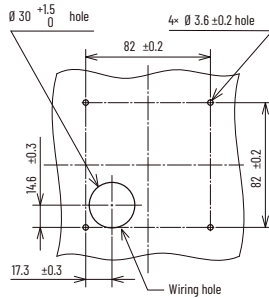
■ Display unit, additional display unit



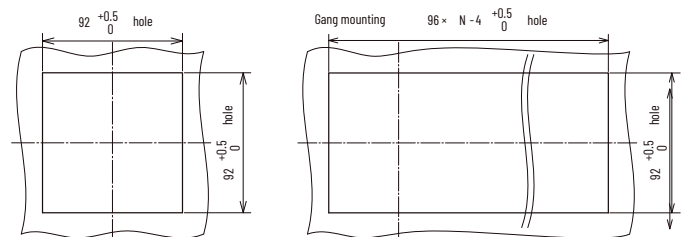
■ Main unit



■ Panel cutout (front)

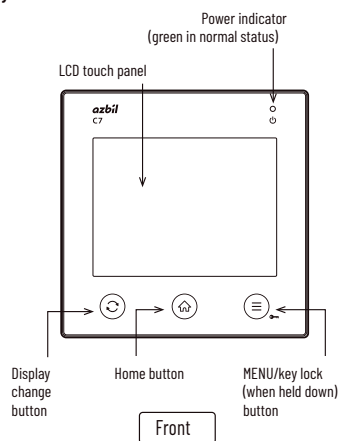


■ Panel cutout (front)

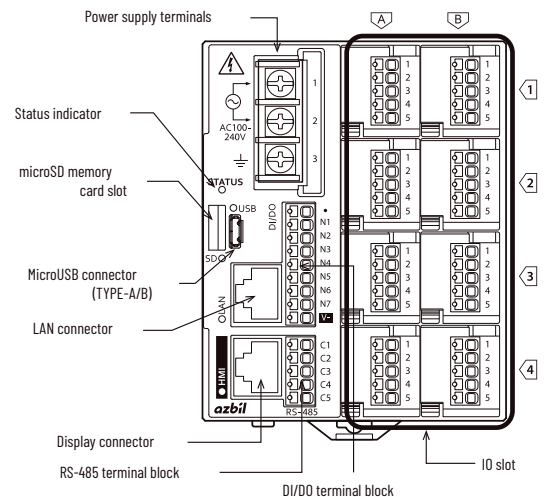


Part names and functions

■ Display unit



■ Main unit



Example: C7GA41CCOD00

If the 8th digit (slots A1 A2) is C, V, F, I, or 2
 If the 8th digit (slots A1 A2) is C, F, N, or 1
 If the 8th digit (slots A1 A2) is C, V, W, N, I, or 2
 If the 8th digit (slots A1 A2) is F
 If the 8th digit (slots A1 A2) is W or N
 If the 8th digit (slots A1 A2) is F or N
 If the 8th digit (slots A1 A2) is C, F, N, or 1
 If the 8th digit (slots A1 A2) is C, V, W, N, I, or 2
 If the 8th digit (slots A1 A2) is C, F, N, or 1
 If the 8th digit (slots A1 A2) is C, V, W, N, I, or 2
 If the 8th digit (slots A1 A2) is F, or 1
 If the 8th digit (slots A1 A2) is W, N, I, or 2

Example: C7GA410M00D00

Main unit			I/O slot			Other				Description					
Basic model No.			Communication	Size	A4	B4	A 2-3, 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	Multi-loop controller with multifunction display Communications (Ethernet, RS-485, USB), DI/DO (sink output, source input) × 7 Integrated mounting *1 Standard (separate) mounting		
C	7	G	A												
				3											
				4											
													Slot A4		
1													PV1 (full-multi) × 1	AI	
														Slot B4	
0													None		
1													PV2 (full-multi) × 1 **4	AI	
														Slots A2-3, B2-3	
M													Motor drive output (with MFB input)	MOTOR	
														Slot AI	Slot B1
0													None		
C													Current output (CT and VT inputs, 1 each) × 1	AO-C	
V													Voltage pulse output (2 CT inputs) × 1	V-P	
N													Current output (CT and VT inputs, 1 each) + voltage pulse output (2 CT inputs)	AO-C	V-P
G													Current output (CT and VT inputs, 1 each) + additional display unit	AO-C	HM12
L													Current output (CT and VT inputs, 1 each) + clock (with battery)	AO-C	CLOCK
1													Current output (CT and VT inputs, 1 each) + DO (sink output) × 4	AO-C	DO
4													DO (sink output) × 4 + clock (with battery)	DO	CLOCK
0													None		
0													None		
D													With inspection report		
Y													With traceability certificate		
0													AC power. CE, KC, UKCA-compliant		
D													DC power. CE, KC, UKCA-compliant		
A													AC power. CE, KC, UKCA, UL-compliant		
B													DC power. CE, KC, UKCA, UL-compliant		
0													No special support		
F													Fahrenheit temperature supported *		

* Do not select this option if the controller is used in countries (regions) that prohibit the use of non-CE units.

Twenty models are supported, as listed on the right:

C7GA34440DA0	C7GA33330DA0	C7GA344FF0DA0	C7GA333CC0DA0	C7GA344F0DA0
C7GA44440DA0	C7GA33330DA0	C7GA444FF0DA0	C7GA333CC0DA0	C7GA444F0DA0
C7GA34440DB0	C7GA33330DB0	C7GA344FF0DB0	C7GA333CC0DB0	C7GA344F0DB0
C7GA44440DB0	C7GA33330DB0	C7GA444FF0DB0	C7GA333CC0DB0	C7GA444F0DB0

Main unit				I/O					Other				Description		
Basic model No.			Communi- cation	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	A	1									Multi-loop controller with multifunction display Communication (Ethernet, RS-485, USB), 7 digital input/outputs (sink output, source input) No display Integrated mounting * ¹		
				3											
					3									Slot A3	Slot A4
					4								PV1 (AI-R 4-wire RTD input) + PV3 (AI-R 4-wire RTD input)	AI-R	AI-R
														Slot B3	Slot B4
						3							PV2 (AI-R 4-wire RTD input) × 1		AI-R
						4							PV2 (AI-R 4-wire RTD input) + PV4 (AI-R 4-wire RTD input)	AI-R	AI-R
														Slot A1	Slot A2
					C								Current output (CT and VT inputs, 1 each) × 1	A0-C	A0-C
					F								Current output (CT and VT inputs, 1 each) × 2	A0-C	A0-C
					3								Voltage pulse output (CT and VT inputs, 1 each) × 1		V-P2
					4								Voltage pulse output (CT and VT inputs, 1 each) × 2	V-P2	V-P2
														Slot B1	Slot B2
						C							Current output (CT and VT inputs, 1 each) × 1		A0-C
						F							Current output (CT and VT inputs, 1 each) × 2	A0-C	A0-C
						3							Voltage pulse output (CT and VT inputs, 1 each) × 1		V-P2
						4							Voltage pulse output (CT and VT inputs, 1 each) × 2	V-P2	V-P2
							0						None		
								0					With inspection report		
										A			AC power. CE, KC, UKCA, UL-compliant		
										B			DC power. CE, KC, UKCA, UL-compliant		
											0		No special support		

Symbol	Block name	Description
AI	Analog input	Full multi-range input (thermocouple, RTD, DC current, DC voltage)
V-P	Voltage pulse output	Voltage pulse output (12 V DC) 2 input terminals for the current transformer (CT) for detecting heater burnout, overcurrent, and short circuits *5
AO-C	Analog current output	Current output (4~20 mA DC / 0~20 mA DC) Input terminals for the current transformer (CT) for measuring current and the voltage transformer (VT) for measuring voltage (1 each) *5
HMI2	Additional display unit	Connector for the second display unit *6
CLOCK	Clock function	Clock (available for CDS and health index) with a battery
MOTOR	Motor drive output	Motor drive outputs (100/200 V AC) (direct (OPEN), reverse (CLOSE)) with motor feedback (MFB) inputs
DI	Digital input	4 digital inputs (external power source required)
DO	Digital output	4 digital outputs (sink output)
AI-R	4-wire RTD input	14-wire RTD input
V-P2	Voltage pulse output 2	1 voltage pulse output (12 V DC) Input terminals for the current transformer (CT) for measuring current and the voltage transformer (VT) for measuring voltage (1 each) *5

Current output

Digits 8 & 9 If 1 output: C0 ➡ If 2 outputs: CC ➡ If 3 outputs: FC ➡ If 4 outputs: FF

The diagram illustrates the current output for digits 8 and 9 using a 2x2 grid. The grid is labeled with 'A' and 'B' at the top. The output is shown as a shaded area in the bottom row. For digit 8, the bottom-left cell is shaded and labeled 'A0-C'. For digit 9, the bottom-left and bottom-right cells are shaded and labeled 'A0-C'.

[1]

Digits 6-9 & slot positions		Example for C76A4MCC000	
A	B	A	B
Digit 8	Digit 9		
		AO-C	AO-C
Digit 6	Digit 7	AI	AI

[2]

Digits 6-9 & slot positions		Example for C76A4MOM0000	
A	B	A	B
Digit 9			
Digit 8		MOTOR	
Digit 6	Digit 7	AI	

*6. Additional display unit is sold separately.

Optional parts

Additional display unit (sold separately)

Example: C7D-400000

Main unit				Other						Description
Basic model No.				Installation	Option 1	Option 2	Add'l proc.	Add'l spec.	Special support	
1	2	3	4	5	6	7	8	9	10	
C	7	G	—							Additional display unit for multi-loop controller with multifunction display
				3						Integrated mounting*1
				4						Standard (separate) mounting
					0					English, Japanese
						0				None
							0			None
								0		With inspection report
									0	CE, KG, UKCA-compliant
									0	No special support

*1. A integrated mounting bracket is included.

Parts (sold separately)

Part name	Model No.	Part name	Model No.
SLP-C7 Smart Loader Package (free version)*1	SLP-C7FJ91	CLOCK block (for replacement)*3	84501420-001
SLP-C7 Smart Loader Package (paid version)	SLP-C7-J91	MOTOR block (for replacement)*3	84501421-001
Power terminal cover (10 covers included)	81447704-001	Current transformer (dia. 5.8 mm)	QN206A
C7 (display unit) mounting method change kit*2	84503167-001	Current transformer (dia. 12 mm)	QN212A
microSD card (for replacement)	84502552-001	Voltage transformer (200 V AC)	81406725-003

*1. Downloadable from our website

<https://aa-industrial.azbil.com/jp/en>

*2. A integrated mounting bracket, a dedicated cable for connecting the display unit, and standard gasket, gasket with 92x92 mm hole are included with the product.

*3. Mounting bracket for replacement is included.

Accessories

Part name	Qty.			Notes
	Standard (separate) mounting model (C7G_4)	Integrated mounting model (C7G_3)	Model without display (C7G_1)	
Main unit	1	1	1	
Display unit	1	1	0	
Standard gasket	1	0	0	Mounted on the display unit
Gasket with 92x92 mm hole	0	1	0	
Display unit mounting screws (6 mm)	5	5	0	4 screws plus 1 spare
Display unit mounting screw (10 mm)	5	0	0	4 screws plus 1 spare
Setscrew for temporary mounting	2	0	0	
Integrating bracket	0	1	0	
Integrating cable	0	1	0	
Installation Manual	1	1	1	
Instruction for safe use	1	1	1	
microSD card	1	1	0	Inserted into the main unit
Power terminal cover	1	1	1	Mounted on the main unit