Digital Controller # COMPACT CONTROLLER M [CC-M] (PROGRAMMABLE STEP OUTPUT TYPE)

DATA SHEET

The Compact Controller M (programmable step output type) is a single-loop process controller.

It accepts 1 to 5 V DC and signals from thermocouples and resistance bulb as input, and is provided with abundant control and computation functions to allow configuring a flexible system with a high cost performance.

FEATURES

1. **Control and computation functions dependent on wafers**
   Control and computation functions are implemented by combining function-software packages called "WAFERS." Since the WAFERS are built in the controller, optimum system can be programmed by using the front-panel keys and the PC based configurator.

2. **High visibility ensured with color graphic display**
   A color LCD is adopted for graphic display of multi-loop bar graph and trend screens,etc.

3. **Open configuration and network connection (option)**
   Communication function via Fuji's PLC link (T-link) is available at option.

4. **Memory card (option)**
   Memory card can save any data, for example process input, WAFER output, etc.

SPECIFICATIONS

1. **Control and Computation Functions**
   Control and computation functions are implemented by combining function-software packages called "WAFERS." Combination of WAFERS is called "WAFER connection." CC-M comprises 100 kinds of WAFERS.
   WAFER connection is made by operating the keys on the front panel or using the PC based configurator.

(1) PID control
 • Number of loops and PID:
   1 loop (1 control output / 2PID)
 • Proportional band (P):
   1.0 to 3276.7%, set at 3000.0% for delivery
 • Integration time (I):
   0.1 to 3276.7 s, set at 3000.0 s for delivery
 • Derivative time (D):
   0.0 to 900.0 s, set at 0.0 s for delivery
(2) Programming function
 • Programming method:
   Wafer connection method
   It is selectable in Code Symbol whether wafer connection is to be made by user or Fuji Electric.
 • Program capacity:
   48 WAFERS
 • Kind of wafer : 100 kinds listed in Table 1
(3) Computation cycle:
   200 ms
(4) Alarm function
 • Method   : Alarm can be displayed and output through WAFER connection.
 • Kinds   : Each high/low of PV and SV, PV change rate alarm, high/low deviations.

■ Fuji Electric Systems Co., Ltd.

2. Input Signals

Performance in standard operating conditions (23±2°C, 55±10% RH, power supply voltage 100 V AC to 240 V AC power frequency 50/60 Hz, or 24 V DC, without vibration and external noise).

2-1 Analog input signal

• **Number of inputs:**

7 points with screw terminal type and 8 points with compression terminal type.

• **Inpute signal types:**

DC voltage, thermocouple (option), resistance bulb (option)

2 thermocouple inputs or 2 resistance bulb inputs are selectable in Code Symbol.

(1) DC voltage/DC current

• Open-angle input is assigned to AI1 in an unchangeable manner.
• **Input range:** Selectable among 0 to 5 V DC, 1 to 5 V DC and 0 to 10 V DC
  Initial set before delivery : 1 to 5 V DC
• **Input accuracy**: ±0.1% of input span±1 digit
• **Scaling (Engineering data conversion):** Settable within a range from -32767 to 32767
  4, 3, 2, 1 or 0 digit below decimal point is selectable.
  Initial set before delivery : 0.00% to 100.00%
• **Engineering unit:** Settable in up to 8 characters
  Usable characters: Alphabets, numerals, symbols such as +, − , ∗,etc.
• **Input accuracy guarantee range:** -5% to 105% of input range. However, minus inputs are excluded.
• **Maximum continuous permissible voltage:** ±35 V
• **Input resistance:** 1 MΩ or more
• **Influence by ambient temperature:** ±0.1% FS/10°C or less.
• **Influence by power supply fluctuation:** ±0.1% FS or less.
• **Isolation:** Non-isolated from internal circuit.
• **In case of current input:** Shunt resistor need to be connected to the analog input terminal.
  (250 Ω shunt resistor is optional item)

(2) Thermocouple (option)

• **Types and measurable ranges:**
  * See Table 2.
• **Input accuracy:** ±0.2% FS ±1 digit
  [Note]B type: ±5% between 0 to 400°C
    S and R type: ±1%between 0 to 500°C
    All type of TC: ±5% under−100°C
• **Reference junction compensation error:** ±1.0°C (provided measurable range is −50°C and higher)
  [Note]Reference junction compensation resistor is connected at external input terminal in case of thermocouple input is ordered.

• **Influence by signal source resistance:** About 0.25 µV/Ω
• **Influence by ambient temperature:** ±0.2% FS/10°C ±1°C or less.
• **Influence by power supply fluctuation:** ±0.2% FS ±1°C or less
• **Burnout detection:** Provided
• **Isolation:** Isolated from internal circuit.

(3) Resistance bulb (option)

• **Types and measurable ranges:**
  * See Table 2.
• **Input accuracy:** ±0.2% FS ±1 digit
• **Input accuracy guarantee range:** -5% to 105% of input range
• **Allowable wiring resistance:** 10Ω or less per wire, provided wiring resistance must be equal among 3 wires (Zener barrier connection unallowable)
• **Influence by ambient temperature:** ±0.2% FS/10°C or less.
• **Influence by power supply fluctuation:** ±0.2% FS or less
• **Burnout detection:** Provided
• **Isolation:** Isolated from internal circuit.

[Note] FS: full span.

• **Sampling period:**
  100 ms

2-2 Digital input signal

• **Number of inputs:**
  10 inputs
• **Electrical specifications:**
  No-voltage contact or transistor contact ON/0 V, OFF/24 V, ON current/about 8 mA
  Isolated from the internal circuit by photocoupler. Not isolated between each digital input and output.
• **Contact rating:** 30 V DC, 10 mA or more
• **Signal judgment:**
  No-voltage contact
    Contact resistance;
      200 Ω or less at ON,
      100 kΩ or more at OFF
  Transistor contact
    1V max at ON.,
    leakage current 100µA max. at OFF

3. Output Signals

Performance in standard operating conditions (23±2°C, 55±10% RH, power supply voltage 100 V AC to 240 V AC power frequency 50/60 Hz, or 24 V DC, without vibration and external noise).

3-1 Analog output signal

(1) Auxiliary analog output

• **Number of outputs:**
  5 points with screw terminal type and 4 points with compression terminal type
• **Types of signal :** Selectable among 0 to 5 V DC, 1 to 5 V DC and 0 to 10 V DC
  Initial set before delivery: 1 to 5 V DC
• **Output accuracy:**
  ±0.1% FS

- Load resistance:

  15 kΩ or more
- Output guarantee range:
  - 1 to 5 VDC : −12.5% to 112.5%
  - 0 to 5 VDC : 0% to 112.5%
  - 0 to 10VDC : 0% to 105%
- Influence by power supply fluctuation:

  ±0.1% FS or less
- Isolation   : Non-isolated from internal circuit

3-2 Control output signal
- Number of outputs:

  1 pair
  Increasing pulse; DO1
  Decreasing pulse; DO2
- Electrical specifications:

  Transistor open collector
  1 V max. at ON, 10 μA max at OFF.
  Isolated from the internal circuit by photocoupler. Not isolated between each digital input and output.
- Output rating : 30 V DC, 100 mA max. (resistive load)

  [Note] Control outputs should be crossed sequentially by an external sequence so that the increasing and decreasing pulse signals are not turned to ON at the same time.

3-3 Digital output signal
- Number of outputs:

  8 outputs
- Electrical specifications:

  Transistor open collector
  1 V max. at ON, 10 μA max at OFF.
  Isolated from the internal circuit by photocoupler. Not isolated between each digital input and output.
- Output rating : 30 V DC, 100 mA max. (resistive load)

3-4 Fault output signal (terminal symbol FLT)
- Number of outputs:

  1 output
- Electrical specifications:

  Transistor open collector
  1 V max. at ON, 10 μA max at OFF.
  Isolated from the internal circuit by photocoupler. Not isolated between each digital input and output.
- Output rating : 30 V DC, 100 mA max. (resistive load)

4. Display
- Display unit : 16 Colors graphic liquid crystal display, with CFL back light and contrast adjust function.
- Contents of display:
  - Menu
  - Loop panel
    Bar graph display, digital display, etc.
  - Tuning screen
  - Trend screen (max. 8 screens)
  - Alarm and alarm historical screen
  - Analog input/output and digital input/output indication screen
  - WAFER connection screen
  - Parameter setting screen

5. Setting and Operation
(1) Set point setting method
- Setting key   : Up key/down key
- Setting speed : About 40 s/FS
- Setting resolution:

  0.05% FS/each key press
(2) Control output operation method
- Operation key : Up key, down key
(3) Operation mode
- Selectable operation modes:

  C (or R), A and M modes

  [Note] C: Cascade mode (mode of operation according to external set value)

      R: Remote mode (mode of operation according to external set value)

      A: Auto mode (mode of operation according to the value set on front face of this controller)

      M: Manual mode (operation mode in which operator manipulates control output manually)

  [Supplement] In the C and R modes, operations are the same, i.e., only the markings on the nameplate are different.
- Setting method :

  Selection is required in Code Symbol among the following.
  C-A-M
  A-M
  R-A-M
- Operation mode changeover:

  Balance bumpless transfer from A to R and from A to C. Balanceless bumpless transfer in other mode changeover.

  [Note] Balance bumpless transfer is a mode in which the operator is required to balance each SV for transfer.

  Balanceless bumpless transfer is a mode in which the controller automatically balances each SV for transfer.
(4) Security
- Method   : Setting of a password
- Password   : Settable in 4 numerals (within 0000 to ffff)

  Initial set before delivery: 0000
- Contents of security:

  Inhibition of parameter setting
(5) Other setting items
- Tag name   : Settable in up to 8 characters

  Usable characters; alphabes, numerals, symboles such as +, − , *,etc.

6. Power Supply
- Voltage rating : 100 V to 240 V AC 50/60 Hz/24 V DC

  [as specified in Code Symbol]
- Allowable range:

  85 V to 264 V AC/20 V to 30 V DC
  [as specified in Code Symbol]
- Frequency   : 47 to 63 Hz
- Power consumption:

  60 VA or less (100 V to 240 V AC)/
  30 W or less (24 V DC)
  [as specified in Code Symbol]
- Power supply output voltage:
  (terminal symbol VP and PC)

  20V to 30V DC,max. 40mA

7. General performance and characteristics

• Insulation resistance:

500 V DC, 50 MΩ or more.

• Dielectric strength:

- 2,000 V AC for 1 minute between power terminal and ground terminal in case of 100 V to 240 V AC power supply
- 500 V AC for 1 minute between power terminal and ground terminal in case of 24 V DC power supply.
- 500 V AC for 1 minute between signal communication terminals and ground terminal

• Rush current : 60 A or less. (100 V AC to 240 V AC power supply)

• Clock : Set and display year, month, day, hour, minute, second
Accuracy : ±100 ppm (monthly gain/loss about 4 minutes) except of time lag shorter than 1 s / power ON / OFF action.

• Memory backup:

- Protection by lithium battery. (expected battery life is about 2 years under room temperature)
- Parameter and program are stored in non-volatile memory.

8. Operating and storage conditions

• Operating temperature:

0 to 50˚C
0 to 40°C in case of multiple mounting
Temperature change rate: Max. 10˚C / h

• Transport and storage temperature:

-20 to 70˚C
(Temperature change rate: Max. 20˚C / h)

• Operating humidity:

5 to 90% RH, condensation unallowable

• Transport and storage humidity:

5 to 95% RH, condensation unallowable

• Operating continuous vibration:

4.9 m/s^2 or less

• Transport and storage shock:

Fall of 60cm max. in packed status

9. Power Failure and restart Function

• Permissible duration of momentary power failure:

20 ms at 90V AC (100 V to 240 V AC only)

[Note] In case of 24 V DC, system power supply unit (model: PXJ) is recommended to avoid power failure problem.

• Behavior at power failure detection:

Control stops at detection of power failure.

• Power recovery mode:

Selectable initial start and continuous start

10. Self-Diagnosis

• Control and computation circuit failure:

Monitoring with watchdog timer

• Input signal failure:

- Voltage/current input
Monitoring of range over
- Thermocouple and resistance bulb
Monitoring of disconection

• Behavior at failure:

: FLT is indicated, FLT lamp lights, FLT output signal turns on, control stops and control output is OFF. (Open-angle is held.)

11. Structure

• Enclosure : Plastic (material: PC-ABS)
• Finish color : Front frame and enclosure both gray
• Flame resistance:

UL94V-0

• Protection : Front face; IP54 (display unit and operation key)

• External dimensions (width x height x depth):

Screw terminal type 72 x 144 x 272 mm
Compression terminal type 72 x 144 x 280 mm

• Mass : 1.9 kg or less
• Mounting method:

Flush on indoor panel
Vertical mounting as standard
Tilted mounting allowed within backward angle 0° to 45°.

90° to 45°
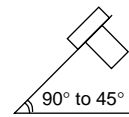
For panel cutout dimension, refer to Panel Cutout Dimensions

• External terminal:

Selectable in Code Symbol between the following.
Screw terminal type (M3.5)
Compression terminal type

12. Communications (option)
12-1 T-link interface (option)
- Communication mode:

  Communication with upper level and communication with lower level
- High order communication:

  Connection with CPU capsule

  I/O transmission; 4, 8 or 16-word input/output or input and output

  Message transmission; Single element composition
- Low order communication:

  Connection with I/O equipment

  Connectable model; FTLS, PNA, PYH

  I/O transmission only, input/output area of 100 words (without message transmission, transmission with master, loader transmission, duplex transmission)
- Common items between communications with high and low orders:

  Topology; Multidrop

  Communication speed; 500 kbps

  Communication distance;

  Max. 500 m in total extension distance (upper-level side), max. 50 m (lower-level side)

  Isolation; Not isolated from internal circuit

  Terminating resistor; 100 Ω (separately available)

12-2 Loader interface
- Communication protocol:

  Compliance with Modbus® protocol
- Physical specification:

  RS-232C
- Communication distance:

  Max. 3 m

13. Memory Card Interface (option)
- Specification : Compact Flash® (Based on CFA)
- Compatible memory card:

  5 V flash memory card

  Capacity 4, 20 and 32 MB
- Application : Process data logging (32 points or less)
- Saving period : 1s to 2h
- Data storage capacity:

Memory card capacity	Data storge
4MB	about 180 thousand data
20MB	about 900 thousand data
32MB	about 1.35 million data

[Note] The data of max. 16 points (4 screens) can be storaged at storage time as 1 s.
- Format method:

  Dependent on this controller
- Data readout : Readout by PC using PCMCIA card slot
- Recommended memory card:

  Made by Sandisk corporation

  Sandisk compact Flash memory card is standardized and on the market.

14. Standards under Conformity
(1) General safety:

  IEC 1010-1 (1990)

  EN 61010-1 (1993)

(2) EMC : Emission   EN 50081-2 (1994)

  Immunity   EN 50082-2 (1995)

15. Configuration Software (optional item)
15-1 Programming loader software
Contained in the CD-ROM version instruction manual (PDZQ1001) attached to the controller. However, communication cable (PDZL1001) is separately available.
- Wafer connection can be input, edited, uploaded and downloaded.
- Parameters for various operations can be input, edited, uploaded and downloaded.

15-2 Recommended personal computer system
- Hardware   : DOS/V machine, Pentium 100MHz or higher

  Free hard disk capacity 40MB or more, memory capacity 32MB or more
- Operating system:

  Microsoft® Windows® 98SE/2000/XP Japanese

[Caution on use]
1. Unlike the preceding models, a potentiometer interface (resistance input) for inputting the open angle of a motor-operated valve is not incorporated. For the above purpose, therefore, voltage input is required with a signal converter externally connected.

   Also, since open-angle input is assigned between AI1 and SC, this input will be indicated on the MV indicator (when using wafers 45 and 46).
2. Control output is assigned to the multi-connector section. So, a 34-pin multi-connector should be prepared depending on your specifications, referring to "Items to be ordered separately (items separately available)."
3. For control output, crossing interlock with relays or the like interlock is required so that both incremental and decremental pulse signals will not turn on simultaneously.

Table 1
List of WAFERS

WAFER name	Kinds	Outline
Primary PID	9	Carries out computation on the primary loop.
Secondary PID	4	Carries out computation on the secondary loop.
Gain schedule	2	Outputs the PID parameter corresponding to input 1 according to the gain schedule table.
Bit concatevate	8	Outputs digital data as word data to an external expansion I/O.
Bit slicing	1	Slices the digital data acquired as word data from an external expansion I/O into each bit.
Encoder	1	Encodes an input signal into a binary code.
Sawtooth wave generator	1	Generates a sawtooth wave with a slope entered for each cycle time.
BCD	5	Converts BCD data into binary data and binary data into BCD data.
Logical operation	6	Carries out AND,OR,NOT,XOR and a combination of these logical operations.
Arithmetic operation	8	Carries out a combination of addition,subtraction,multiplication and division.
Temperature/pressure compensation	1	Carries out temperature and pressure compensation through use of differential pressure,compensated pressure,proper temperature.
Linearize	7	Carries out segmented-line approximation with 15-segmented-line function.
Program control	4	Time schedule control by step or polygonal line approximation with 7 segments.
Flip-flop	1	RS flip-flop.
Pulse width integration	1	Adds the change of input at each basic cycle to the previous integration value.
Selector	1	Compares two input values,and provides High output(Large one), Low output(Small one),and result of judgement on large/small.
Changeover	1	Selects input or output via a switch function.Analog hold circuit also provided.
Timer	1	Outputs on-delay,off-delay timer signal via start of input signal according to timer setting.
Absolute value/sign inversion	1	Carries out absolute value processing on input and outputs the result.Also judges the sign(Positive,negative)of input value and outputs the result.

WAFER name	Kinds	Outline
Square root extraction	1	Extracts square root of input value and outputs the result.Low input cutoff function equipped.
Lead,lag	3	Carries out lead/lag operation on the input and outputs the results. Used as analog filter function and for various compensations.
Limiter	1	Limits the input within the range of high/low limit settings,and outputs the result.Also outputs high/low limit alarm signal.
Ramp function	2	Outputs signal which changes...in ramp from toward target value at the set full scale time.There are two of these wafers...in minute unit and hour unit.
Analog averaging	1	Carries out sequential integration on input data,calculates the average value at each averaging time, and otuputs the result.
Analog integration	1	Integrates the value obtained by multiplying the input data by a proportional constant,and outputs the result.
Pulse generation	1	Outputs a pulse at the set time interval.
Dead band	1	Adds dead band compensation to the input and outputs the result.
Pulse No.counter	1	Detects rise of pulse and counts the number of pulses.
Pulse No.output	1	Integrates the input signal and converts it to number of pulses for output.
Decoder	1	Decodes 2-bit pure binary input and outputs it to 4 terminals.
Running average	2	Calculates ranning average of input data and outputs the result.
Sample & hold	1	Holds the input value according to sample signal(0/1)and continues the output.
Dead time	6	Usable for dead time compensation control etc.Data sampling can be done in 1 sec or 1 min units.
ON-OFF	1	Outputs ON-OFF signal with hysteresis.
Alarm	1	Compares the input and set value and outputs the judgment result.
Palse width modurator	1	Performs output processing in time proportional PID control.
Indicator	8	Indicate input data on the front display (using 3 bar-graph display)

A variety of applications are possible through combination of WAFERS.

Table 2

List of Thermocouple and Resistance Bulb Measurable range

Input signal		Input type code	Input range code	Measurable range°C
Thermocouple	J	01	00	0.0~400.0
	J		01	0.0~800.0
	K		02	0.0~400.0
	K		03	0.0~800.0
	K		04	0.0~1200.0
	R		05	0.0~1600.0
	B		06	0.0~1800.0
	T		07	-200.0~200.0
	T		08	-150.0~400.0
	E		09	0.0~800.0
	E		10	-200.0~800.0
	S		11	0.0~1600.0
	N		12	0.0~1300.0
	U		13	-200.0~400.0
	WRe5-26		14	0.0~2300.0
	PL Ⅱ		15	0.0~1300.0
Resistance bulb	Pt100	00	00	0.0~150.0
			01	0.0~300.0
			02	0.0~500.0
			03	0.0~600.0
			04	-50.0~100.0
			05	-100.0~200.0
			06	-200.0~600.0
			07	-200.0~850.0
	JPt100		08	0.0~150.0
			09	0.0~300.0
			10	0.0~500.0
			11	0.0~600.0
			12	-50.0~100.0
			13	-100.0~200.0
			14	-200.0~600.0

SCOPE OF DELIVERY

Controller, panel mounting bracket, instruction manual (depend on code symbols)

Items to be ordered separately (items separately available)

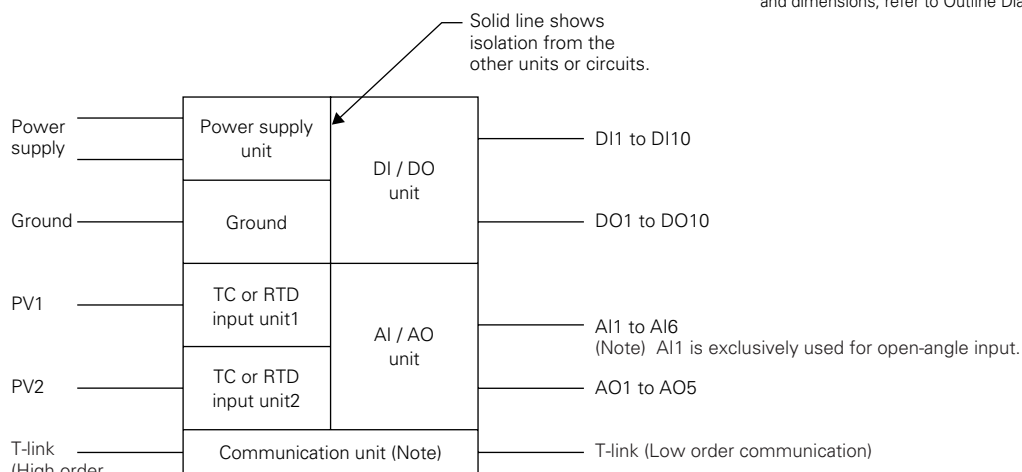| Item	Type	Specification	Unit of sale
Terminating resistor (100 Ω)	PDZR1001	For screw terminal	1
	PDZR2001	For compression terminal	1
34-pin multi-connector (Note 1)	PDZC1001	Soldering type straight terminal	1
	PDZC2001	Soldering type right-angle terminal	1
	PDZC3001	Solderless type straight terminal	1
	PDZC4001	Solderless type right-angle terminal	1
Shunt resistor (280 Ω)	PDZS1001	For screw terminal	1
	PDZS2001	For compression terminal	1
Special transmission cable for configurator software	PDZL1001	(Length 3 m)	1
Communication cable (Note2)			
For screw terminals between PDC and PDC	PDZK1xx1	With M3.5 solderless terminal at both ends	1
For screw terminals between PDC and PLC	PDZK2xx1	With M3.5 solderless terminal at both ends	1
For screw terminals between PDC and PC	PDZK3xx1	9-pin connector on PC side	1
For compression terminal between PDC and PDC	PDZK4xx1	With compression terminal at both ends	1
For compression terminal between PDC and PLC	PDZK5xx1	With M3.5 solderless terminal on PLC side	1
For compression terminal between PDC and PC	PDZK6xx1	9-pin connector on PC side	1
Extension case (under development)	PDZE2002	For CC-F replacement	1
Printed instruction manual (written in Japanese) for compact controller M (CC-M)	PDZX6001	Printed instruction manual	1
Printed instruction manual (written in English) for compact controller M (CC-M)	PDZX7001	Printed instruction manual	1
Instruction manual in CD-ROM (common for Japanese and English) (Note 3)	PDZQ1001	CD-ROM version instruction manual	1
Fixture (Note 4)	PDZA1001	Improved fixture	1

(Note 1) Screw terminal type required for using control output and digital input/output (see Outline Diagram). Prepare separately if needed.

(Note 2) Transmission cable for T-link. Length needs to be specified.

(Note 3) This CD-ROM contains the instruction manuals written in Japanese and English, and the programming loader program (for Japanese Windows®).

(Note 4) An improved fixture adopted starting from the PDA-2. For the shape and dimensions, refer to Outline Diagram.

Block diagram of electrical isolation

Solid line shows isolation from the other units or circuits.

Power supply → Power supply unit

Ground → Ground

PV1 → TC or RTD input unit1

PV2 → TC or RTD input unit2

T-link (High order communication) → Communication unit (Note)

DI / DO unit → DI1 to DI10 / DO1 to DO10

AI / AO unit → AI1 to AI6 (Note) AI1 is exclusively used for open-angle input. / AO1 to AO5

→ T-link (Low order communication)

(Note) Not isolated from the analog input/output section in case of T-link.

CODE SYMBOLS

1 2 3 4 5 6 7 8	9 10 11 12 13	14 15	
P D C 2 -	-		Description

Code	Description
2	**Equipment function <4th digit>** Programmable type Note 1
1	**Number of control loops <5th digit>** 1 loop (1 control output)
1 2	**External terminal <6th digit>** M3.5 screw Compression terminal
A C D E	**Input signal <7th digit>** 1 to 5 V DC Note 2 Thermocouple Note 3 Resistance bulb Pt100 Note 3 Resistance bulb JPt100 Note 3
A B	**Power supply voltage <9th digit>** 100 V to 240 V AC (usable range 85 V to 264 V AC), 50/60 Hz 24 V DC (usable range 20 V to 30 V DC)
C A R	**Setting method <10th digit>** C-A-M type A-M type R-A-M type
Y	**Backup operation unit <11th digit>** None

Communication function/memory card interface <12th digit>   Notes 4 and 5

Code	(High order communication)	(Low order communication)	(Memory card interface)
Y	Without	Without	Without
M	Without	Without	With
A	T-link	Without	Without
B	T-link	T-link	Without
S	T-link	Without	With
T	T-link	T-link	With

Code	Description
Y C	**Instruction manual <13th digit>** None CD-ROM version instruction manual (common for both Japanese and English) Note 8
1	**Programming method <14th digit>** Wafer connection method
0 8	**Wafer connection <15th digit>** Without wafer connection Note 6 With wafer connection Max. 48 wafers Note 7

Note 1) Control and computation functions are configured by wafer connection.
Note 2) For current input, conversion into a voltage is required using a shunt resistor.
      This resistor is separately available.
Note 3) Each of thermocouple and resistance bulb input is an option and limited to 2 points max.
      The remaining input will be 1 to 5 V DC.
Note 4) The communication cable and terminating resistor are separately available.
Note 5) Memory card should be purchased from a dealer such as personal computer shop.
Note 6) In this case, users must connect wafers by themselves.
      A tool necessary for this connection is separately available.
Note 7) For ordering, a wafer connecting specification document needs to be presented.

      Input signal and measurable range will meet the following specifications for product delivery.
      For specification of voltage input   : 0.00 to 100.00% scale
      For specification of thermocouple   : K thermocouple, measurable range 0.0 to 400.0°C
      For specification of resistance bulb : Measurable range 0.0 to 150.0°C with both Pt and JPt
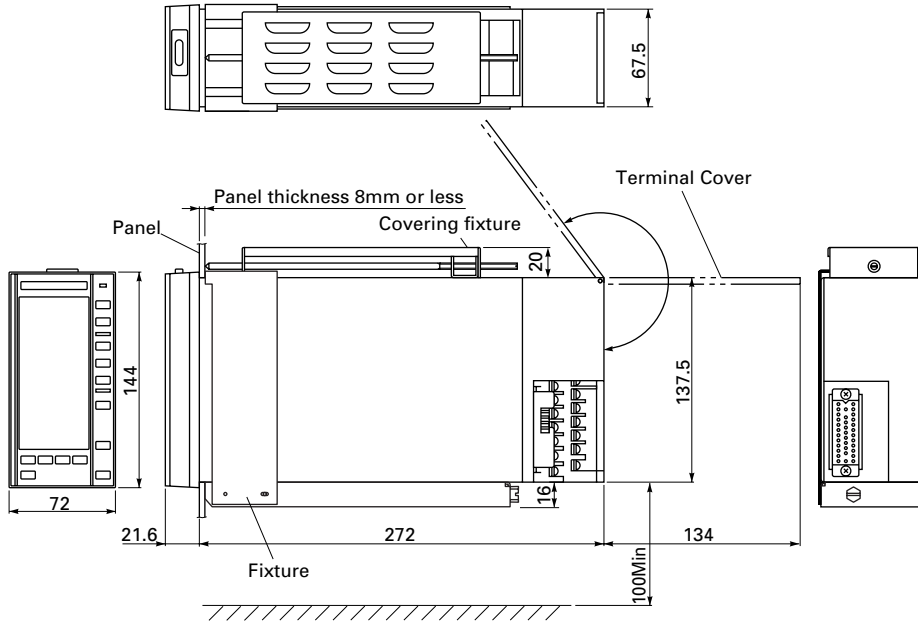Note 8) This CD-ROM contains the programming loader written in Japanese.
      However, the communication cable (PDZL1001) is separately available.
      The relevant manual is stored in the PDF file format.
      For reading the manual, Adobe® Acrobat® Reader is required.
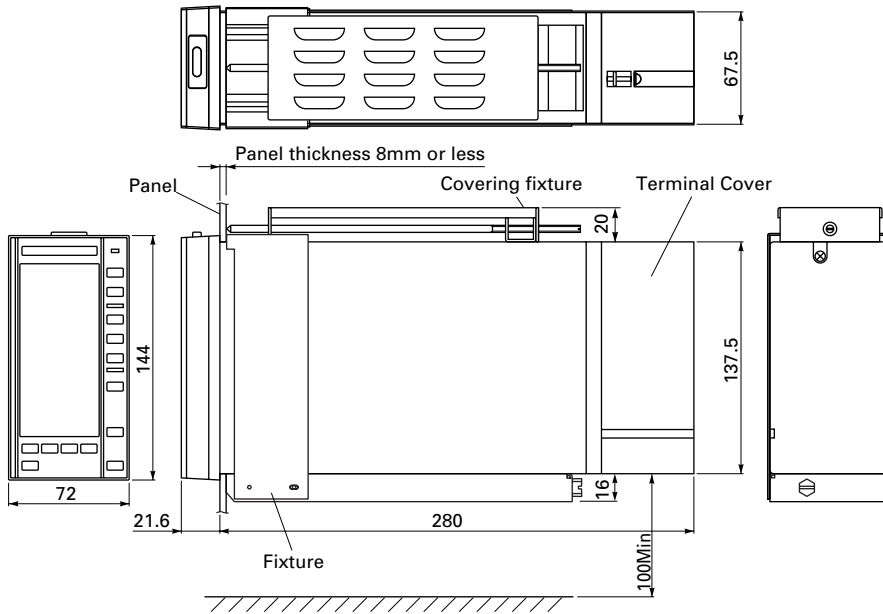   The CD-ROM also contains the Acrobat® Reader setup program.

FUNCTIONAL DIAGRAM

T-link high order
comminication

T-link · MICREX

Control and computation
WAFER region

T-link
(option)

Memory
card
(option)

Loop 1

1st
PID

2nd
PID

Note)
Analog input

Thermocople /
Resistance bulb
(option)

Note)
Analog
output

Digital
input

Digital
output

Control output

Screw
terminal
or
compression
terminal

Multi-
connector

For screw
terminals
only

Modbus®
(RS232C)

T-link
(option)

T-link · FTLS/
PYH

PC

Configuration software

T-link low order
communication

Note) The numbers of analog input
and auxiliary analog output
vary with external terminals.

OUTLINE DIAGRAM (screw terminal type) (Unit : mm)

Panel thickness 8mm or less

Panel

Covering fixture

Terminal Cover

20

137.5

67.5

144

72

21.6

272

16

134

100Min

Fixture

Note) When there is any object like other instrument or floor below the controller, an open space of 100 mm min. is required between the bottom face of controller and such an object.

OUTLINE DIAGRAM (compression terminal type) (Unit : mm)

Panel thickness 8mm or less

Panel

Covering fixture

Terminal Cover

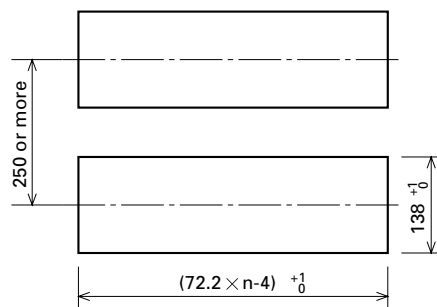20

137.5

67.5

144

72

21.6

280

16

100Min

Fixture

Note) When there is any object like other instrument or floor below the controller, an open space of 100 mm min. is required between the bottom face of controller and such an object.

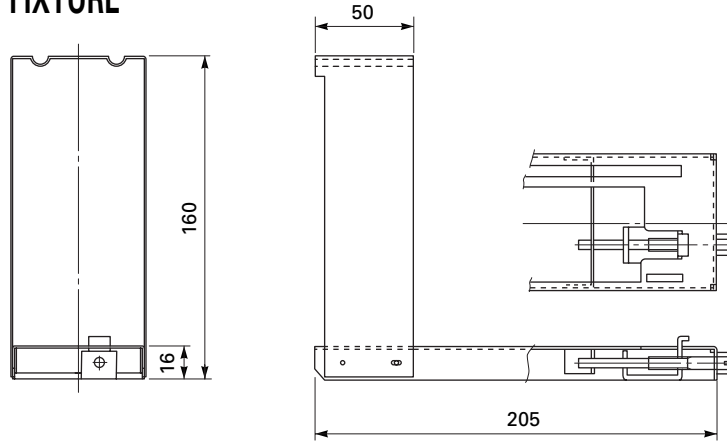## PANEL CUTOUT DIMENSIONS

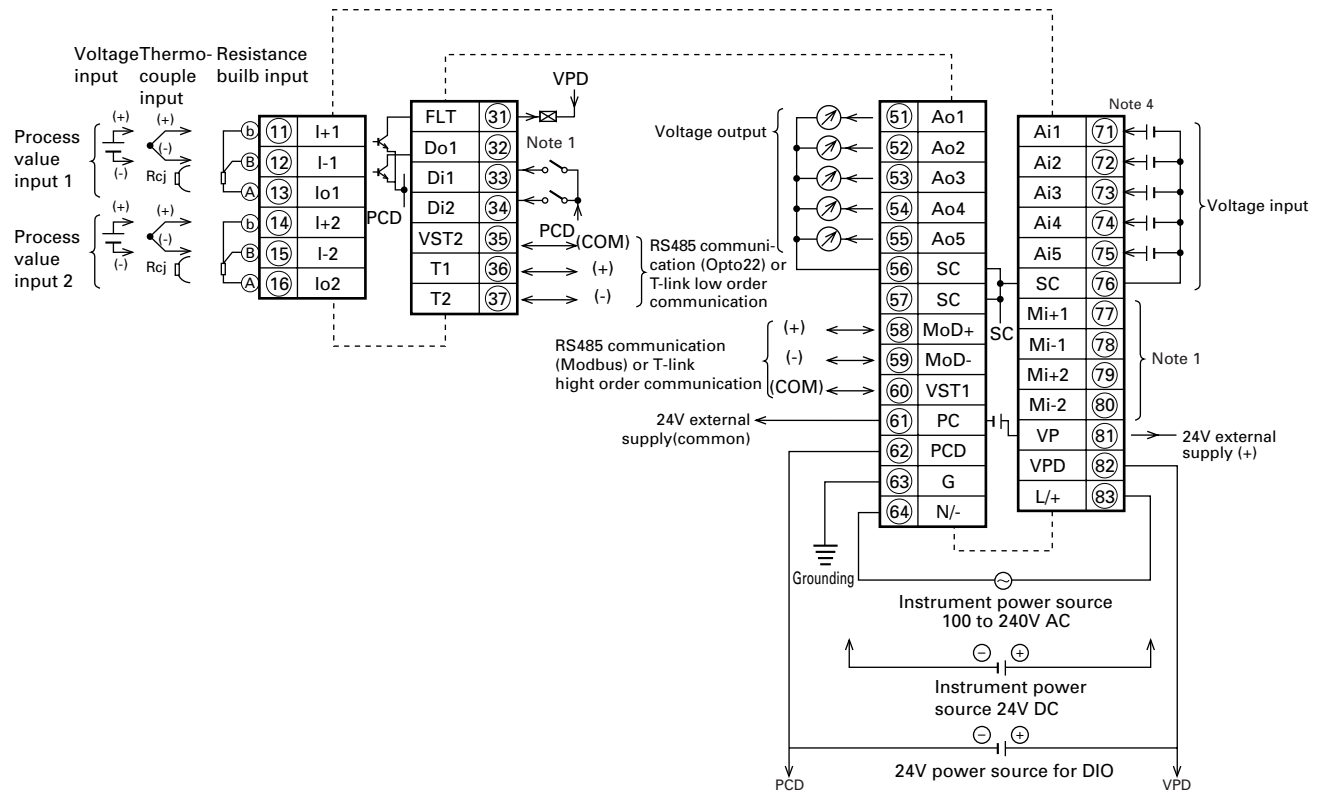For mounting one unit
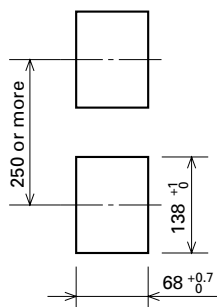
For mounting multiple "n" units

250 or more

250 or more

138^{+1}_{0}

138^{+1}_{0}

$68^{+0.7}_{0}$

$(72.2 \times n\text{-}4)^{+1}_{0}$
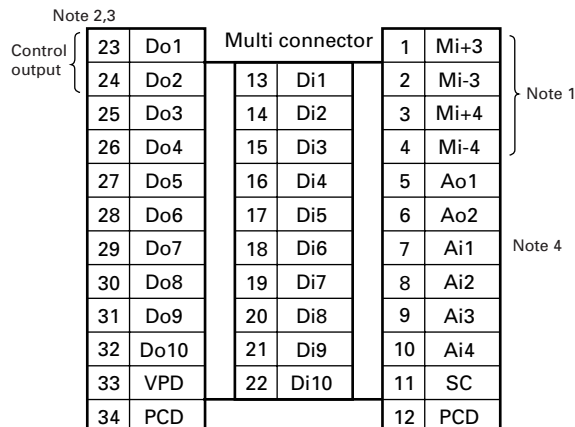
Number of units
$n \geqq 2$

FIXTURE

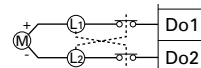## EXTERNAL CONNECTION DIAGRAM (Screw terminal type, M3.5 screw section)

EXTERNAL CONNECTION DIAGRAM (Screw terminal type, multi-connector section)

Note 1) Screw terminals No. 32, 77, 78, 79, 80 and MULTI-CONNECTOR No. 1, 2, 3, 4 donot used (can't connect).

Note 2) Control output is allocated to MULTI-CONNECTOR No. 23 and 24. Prepare a mulit-connector (any one below) separately.

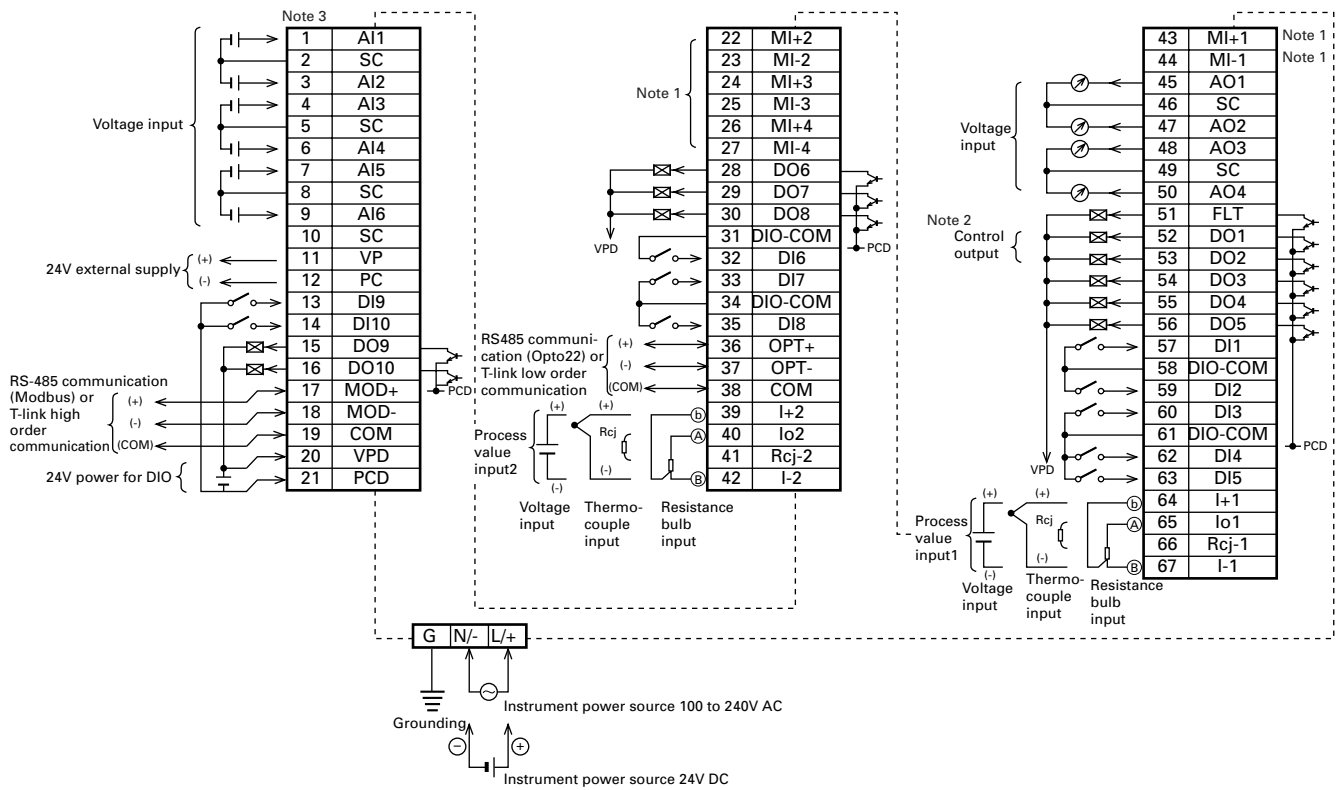|	
PDZC1001	Soldering type straight terminal
PDZC2001	Soldering type right-angle terminal
PDZC3001	Solderless type straight terminal
PDZC4001	Solderless type right-angle terminal

Note 3) Control output should be cross-connected to each other, externally.

Note 4) Connect open-angle input between screw terminals Nos. 71 and SC or multi-connector pin 7 and 11.

EXTERNAL CONNECTION DIAGRAM (Compression terminal type)

1	AI1
2	SC
3	AI2
4	AI3
5	SC
6	AI4
7	AI5
8	SC
9	AI6
10	SC
11	VP
12	PC
13	DI9
14	DI10
15	DO9
16	DO10
17	MOD+
18	MOD-
19	COM
20	VPD
21	PCD

Note 3

Voltage input

24V external supply (+) (-)

RS-485 communication (Modbus) or T-link high order communication (+) (-) (COM)

24V power for DIO

22	MI+2
23	MI-2
24	MI+3
25	MI-3
26	MI+4
27	MI-4
28	DO6
29	DO7
30	DO8
31	DIO-COM
32	DI6
33	DI7
34	DIO-COM
35	DI8
36	OPT+
37	OPT-
38	COM
39	I+2
40	Io2
41	Rcj-2
42	I-2

Note 1

VPD

PCD

RS485 communication (Opto22) or T-link low order communication (+) (-) (COM)

Process value input2

Voltage input / Thermo-couple input / Resistance bulb input

43	MI+1
44	MI-1
45	AO1
46	SC
47	AO2
48	AO3
49	SC
50	AO4
51	FLT
52	DO1
53	DO2
54	DO3
55	DO4
56	DO5
57	DI1
58	DIO-COM
59	DI2
60	DI3
61	DIO-COM
62	DI4
63	DI5
64	I+1
65	Io1
66	Rcj-1
67	I-1

Note 1

Voltage input

Note 2 Control output

VPD

PCD

Process value input1

Voltage input / Thermo-couple input / Resistance bulb input

G | N/- | L/+

Grounding

Instrument power source 100 to 240V AC

Instrument power source 24V DC

Note 1) COMPRESSION TERMINAL No. 22, 23, 24, 25, 26, 27, 43, 44 donot be use (can't connect).
Note 2) Control output should be cross-connected to each other, externally.
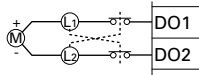
Note 3) Connect open-angle input between compression terminals Nos. 1 and SC.

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⚠ Caution on Safety

*Before using this product, be sure to read its instruction manual in advance.

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