General Specifications

Model UP150
Program Temperature Controller

UT100 SERIES

GS 05C01F12-01E

■ GENERAL

The UP150 program temperature controller has one program pattern consisting of 16 segments, and it can easily be set and operated.

The two event outputs are provided as standard, and the external contact input, communication and retransmission output as options.

The universal input selectable an input type among TC, RTD and Voltage, and the three types of outputs are also provided.

The front panel has a splash-proof and dust-proof design (IP65), which enables the use in the dusty environment.

UP150

■ MODEL AND SUFFIX CODES

Model	Suffix code	Description
UP150	.....	Program Temperature Controller
Control output	–R.....	Relay output (time-proportional PID or on/off control)
	–V.....	Voltage pulse output (time-proportional PID)
	–A.....	4 to 20 mA output (continuous PID)
Fixed code	N.....	Always N
Option	/EX	RUN/RESET switching, and HOLD program /cancel HOLD program switching by external contacts (Note1)
	/RET	PV retransmission output in 4 to 20 mA
	/RS	Communication function (MODBUS, PC-Link, Ladder) (Note1) (Note2)
	/V24	Power Supply 24 V DC / 24 V AC

Note1: /RS option and /EX option cannot be specified at the same time.
Note2: When specifying the /RS option, be sure to order the required number of copies of Communication Functions User's Manual separeately.

Check the package contents against the list below.
- Program temperature controller ····· 1
- Mounting bracket ····· 1
- User's manual ····· 1

■ SPECIFICATIONS

PV/SP data display		4-digits PV/SP separately
PV input	Method	Universal input
	Termocouple	K, J, T, E, R, S, B, N, L, U, Platinel 2
	RTD	Pt100, JPt100
	Voltage	0 to 100 mV, 0 to 5 V, 1 to 5 V, 0 to 10 V
Input accuracy	Thermocouple	±2°C ±1digit
	RTD	±1°C ±1digit
	Voltage (mV, V)	±0.3% ±1digit
Sampling period		500 ms
Number of program pattern		1 program pattern
Number of program segment		16 segment
Program time span		0 second to 1,599 hour
Accuracy of program time span		±2% of program time span
Control ouput	Method	When ordering, specify control output
	Relay output	Time-proportional PID or ON/OFF
	Voltage pulse output	Time-proportional PID
	4 to 20 mA DC output	Continuous PID
Event output	Number of points	2 relay outputs
	Type	PV event and time event
Power supply		100 to 240 VAC or 24 VAC/DC(option)
Safety and EMC standard		CSA, CE and UL
Construction (front protection)		IP65
Dimensions and weight		48(W)X48(H)X100(D)mm, approx. 200g
Option	External contact input (when /EX is specified)	Run/Reset, Hold/Cancel Hold
	PV retransmission output, can be scaled (when /RET is specified)	4 to 20 mA DC
	RS485 communication (when /RS is specified)	MODBUS/Ladder/PC-link protocol
	24 V Power supply (when /V24 is specified)	24 V DC / 24 V AC

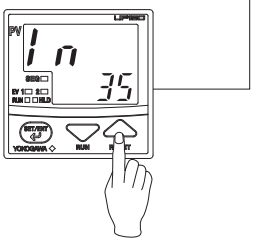
■ MEASURED VALUE INPUT

The UP150 allows you to freely change the input type by software.

● **UP150 Measured Input Ranges**

Input type		Range (°C)	Range code (°C)	Range (°F)	Range code (°F)
Unspecified			OFF		
Thermocouple	K	–270 to 1370°C	1	–300 to 2500°F	31
		0.0 to 600.0°C	2	32.0 to 999.9°F	32
		0.0 to 400.0°C	3	32.0 to 750.0°F	33
		–199.9 to 200.0°C	4	–300 to 400°F	34
	J	–199.9 to 999.9°C	5	–300 to 2100°F	35
	T	–199.9 to 400.0°C	6	–300 to 750°F	36
	E	–199.9 to 999.9°C	7	–300 to 1800°F	37
	R	0 to 1700°C	8	32 to 3100°F	38
	S	0 to 1700°C	9	32 to 3100°F	39
	B	0 to 1800°C	10	32 to 3200°F	40
	N	–200 to 1300°C	11	–300 to 2400°F	41
	L	–199.9 to 900.0°C	12	–300 to 1600°F	42
	U	–199.9 to 400.0°C	13	–300 to 750°F	43
	Platinel 2	0 to 1390°C	14	32 to 2500°F	44
RTD	Pt100	–199.9 to 850.0°C	15	–199.9 to 999.9°F	45
		0.0 to 400.0°C	16	32.0 to 750.0°F	46
		–199.9 to 200.0°C	17	–300 to 400°F	47
		–19.9 to 99.9°C	18	–199.9 to 999.9°F	48
	JPt100	–199.9 to 500.0°C	19		
DC voltage	0 to 100 mV	0.0 to 100.0	20		
	0 to 5 V	0.000 to 5.000	21		
	1 to 5 V	1.000 to 5.000	22		
	0 to 10 V	0.00 to 10.00	23		

User-scalable



For example, to select thermocouple type J (°F), set the range code to 35.

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■ HARDWARE SPECIFICATIONS

Measured Value (PV) Input

Input: 1 point
Input type: Universal; can be selected by software
Input accuracy (at 23 ±2°C ambient temperature)
• Thermocouple: ±2°C ±1digit
However,
• ±4°C for thermocouple input –270 to –100°C
• ±3°C for thermocouple input –100 to 0°C
• ±5°C for types R and S (±9°C for 0 to 500°C)
• ±9°C for type B (accuracy is not guaranteed for 0 to 400°C)
• RTD: ±1°C ±1digit
• Voltage(mV, V) : ±0.3% ±1digit
Sampling period for measured value input: 500 ms
Burn-out detection: Functions for thermocouple or RTD input (burn-out upscale only; cannot be switched off)
Input resistance: 1 MΩ or greater for thermocouple or DC mV input. Approx. 1 MΩ for DC V input
Maximum allowable signal source resistance :
250 Ω for thermocouple or DC mV input
2 kΩ for DC V input
Maximum allowable wiring resistance for RTD input:
10 Ω/wire (The resistance values of three wires must be the same.)
Allowable input voltage:
±10 V DC for thermocouple or DC mV input
±20 V DC for DC V input
Noise rejection ratio (50/60Hz):
Normal mode noise: Min. 40dB
Common mode noise: Min. 120dB (Min. 90dB for DC V input)
Error of reference junction compensation:
±1.5°C (at 15-35°C)
±2.0°C (at 0-50°C)
The reference junction compensation cannot be switched off.
Applicable standards:
Thermocouple and resistance temperature detector(RTD)
JIS/IEC/DIN (ITS90)
Response time:
2 second or less, 63% (10-90%) (The time required for transmission output to reach 63% of the maximum excursion when PV abruptly changes from 10% to 90%)

Contact Inputs

The contact inputs are provided only when the /EX option is specified.
Function: (1) HOLD/Cancel HOLD switching
(2) RUN/RESET switching
Input: 2 points (with the shared common terminal)
Input type: Non-voltage contact or transistor contact input
Contact capacity: At least 12 V/10 mA
On/off judgment: On state for 1 kΩ or less; off state for 20 kΩ or greater

Control Output

Output: 1 point
Output type: Choose one from (1) to (3) below:
(1) Relay contact output
Contact capacity: 3 A at 240 V AC or 3 A at 30 V DC (with resistance load)
Note: The control output relay cannot be replaced by users.
(2) Voltage pulse output
On voltage: 12-18 V DC
Off voltage: 0.1 V DC or less
load resistance: 600 Ω or greater
short-circuit current: approx. 30 mA
(3) Current output
Output signal: 4 to 20 mA
Maximum load resistance: 600 Ω
Output accuracy: ±0.3% of span (at 23±2°C ambient temperature)

Event Functions

● PV Event Functions
PV event types: 10 types
PV high limit, PV low limit, Deviation high limit, Deviation low limit, De-energized on deviation high limit, De-energized on deviation low limit, Deviation high and low limits, Deviation within high and low limits, De-energized on PV high limit, De-energized on PV low limit
● Time Event Functions
The time event function begins countdown when a program operation starts, and after the elapse of a preset time, outputs an on-time event signal (contact output: ON) or off-time event signal (contact output: OFF).
PV and Time event outputs: 2 relay contacts Relay contact capacity: 1 A at 240 V AC or 1 A at 30 V DC (with resistance load) (COM terminal is common)
Note: The PV and time event output relays cannot be replaced by users.

Accuracy of Program Time

±2% of program time

Retransmission Output

The retransmission output is provided only when the /RET option is specified.
Output signal: Measured value in 4-20 mA DC, can be scaled.
Maximum load resistance: 600 Ω
Output accuracy: ±0.3% of span (at 23±2°C ambient temperature)

Communication Function

The communication function is provided only when the /RS option is specified. (For details, read the user's manual of the communications functions IM 05C01E12-10E.)
● Communication Protocol
Personal computer link: Used for communication with a personal computer, or UT link module of the FA-M3 controller (from Yokogawa Electric Corporation).
Ladder communication: Used for communication with a ladder communication module of the FA-M3, or a programmable controller (PLC) of other manufacturers.
MODBUS communication: Used for communication with equipment featuring the MODBUS protocol.
● Communication Interface
Applicable standards: Complies with EIA RS-485
Number of controllers that can be connected: Up to 31
Maximum communication distance: 1,200 m
Communication method: Two-wire half-duplex, start-stop synchronization, non-procedural
Baud rate: 2400, 4800, or 9600 bps

Safety and EMC Standards

Safety: Compliant with IEC/EN61010-1 (CE), IEC/EN61010-2-030 (CE), approved by CAN/CSA C22.2 No.61010-1 (CSA), approved by UL61010-1.
Installation category: II, Pollution degree: 2
Measurement category: I (CAT I) (UL, CSA)
O (Other) (CE)
Rated measurement input voltage: Max. 10 V DC
Rated transient overvoltage: 1500 V (*)
* This is a reference safety standard value for measurement category I of IEC/EN/CSA/UL61010-1. This value is not necessarily a guarantee of instrument performance.
EMC standards: Complies with EN61326
The UP150 program temperature controller conforms to the standards specified under the following conditions. All wires except those for the power supply and relay contact output terminals are shielded. The controller does not fluctuate more than 20% even when noise is applied.
KC marking:
Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

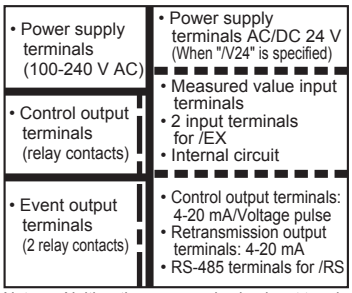
Power Supply and Isolation

● Power Supply

Power supply	Voltage	Rated at 100-240 V AC (±10%) AC/DC 24 V, 20 to 29 V of allowable range when "/V24" is specified.
	Frequency	50 or 60Hz
Maximum power consumption		8 V A max. (4W max.) 3W max. when "/V24" is specified.
Memory		Non-volatile memory
Withstanding voltage	Between primary terminals and secondary terminals (See Notes 1 and 3.)	CE: 3000 V AC for 1 minute (Between relay terminals and secondary terminals 1500 V AC for 1 minute) UL/CSA: 1500 V AC for 1 minute (Note 2)
Insulation resistance	Between primary terminals and secondary terminals (See Notes 1 and 3.)	20 MΩ or more at 500 V DC

Note 1: The primary terminals are the power supply terminals and event output terminals. The secondary terminals are the analog input and output terminals, the voltage pulse output terminals, and the contact input terminals.
Note 2: The withstanding voltage is specified as 2300 V AC per minute to provide a margin of safety.
Note 3: AC/DC 24 V terminals are secondary terminals.

● Isolation
The bold lines below indicate reinforced insulation, and the broken line indicates functional insulation. In case of CE conformity, alternate long and short dash line indicates basic insulation.



Note: Neither the measured value input terminals, nor 2 input terminals for the /EX option are isolated from the internal circuit.

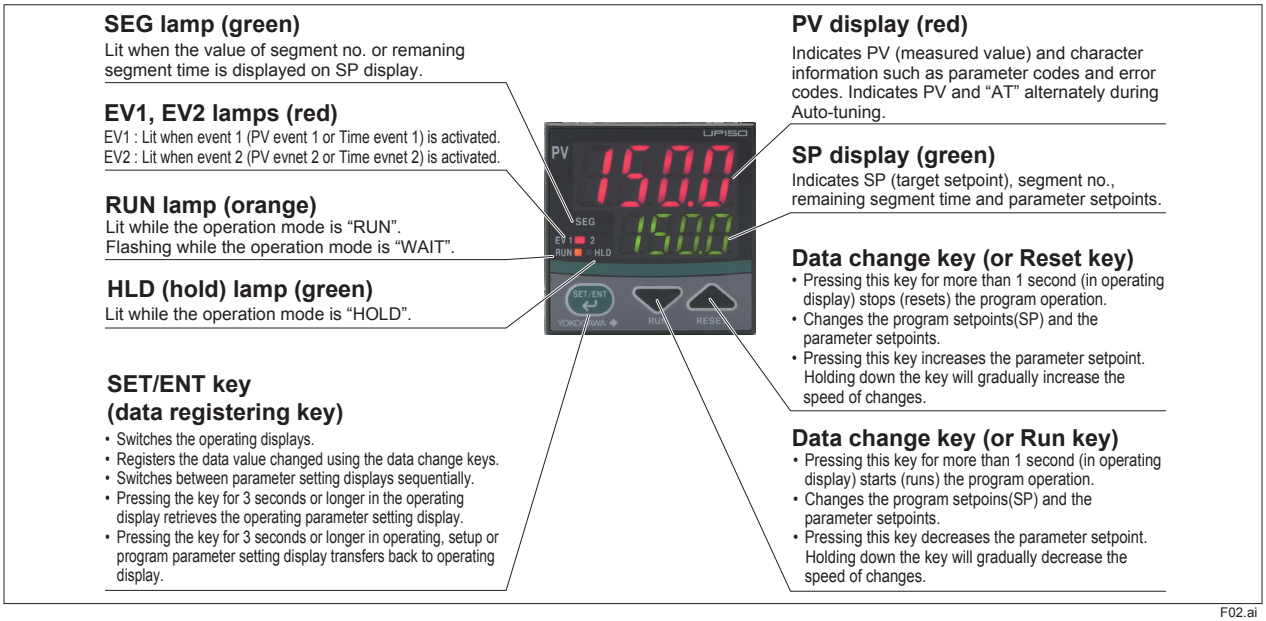
Construction, Mounting, and Wiring

Construction: Dust-proof and splash-proof front panel (compliant with IP65). Splash-proof construction is not available for side-by-side close mounting.
Casing: ABS resin and polycarbonate
Case color: Black
Weight: approx. 200g
Mounting: Flush panel mounting
Wiring: Screw terminals

Environmental Conditions

● Normal Operating Conditions
Warm-up time: At least 30 minutes
Ambient temperature:0-50°C (0-40°C when mounted side-by-side)
Rate of change of temperature: 10°C/h or less
Ambient humidity: 20-90% RH (no condensation allowed)
Magnetic field: 400 A/m or less
Continuous vibrations of 5 to 14Hz: Amplitude of 1.2 mm or less
Continuous vibrations of 14 to 150Hz: 4.9 m/s^2 (0.5G) or less
Short-period vibrations: 14.7 m/s^2 (1.5G) for 15 seconds or less
Shock: 98 m/s^2 (10G) for 11 milliseconds or less
Mounting angle: Upward incline of up to 30 degrees; downward incline is not allowed.
Altitude: 2000 m or less above sea level
● Maximum Effects from Operating Conditions
(1) Temperature effects
Thermocouple, DC mV and DC V input: ±2μV/°C or ±0.02% of F.S./°C, whichever is larger
Resistance temperature detector: ±0.05°C/°C
Analog output: ±0.05% of F.S./°C
(2) Effect from fluctuation of power supply voltage (within rated voltage range)
Analog input: ±0.2μV/V or ±0.002% of F.S./V, whichever is larger
Analog output: ±0.05% of F.S. /V
● Transportation and Storage Conditions
Temperature: –25 to 70°C
Humidity: 5 to 95% RH (no condensation allowed)
Shock: Package drop height 90cm (when packed in the dedicated package)

■ DISPLAY AND OPERATION FUNCTIONS



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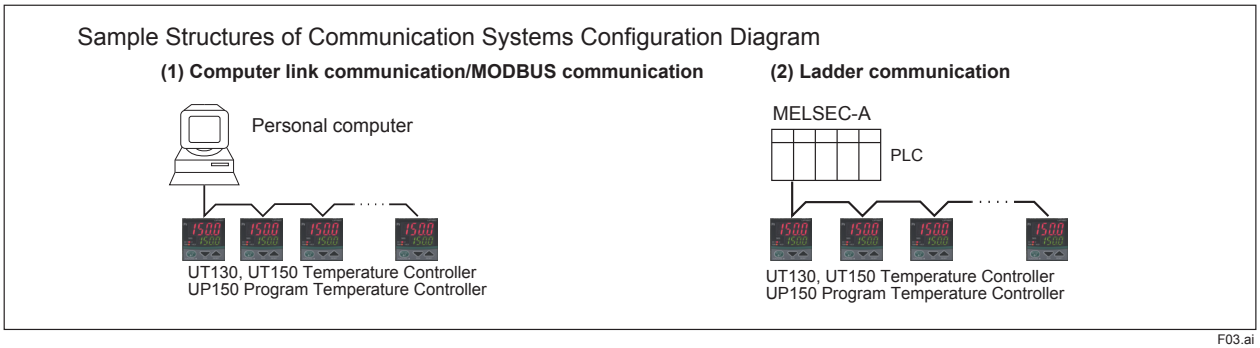
■ COMMUNICATION FUNCTIONS



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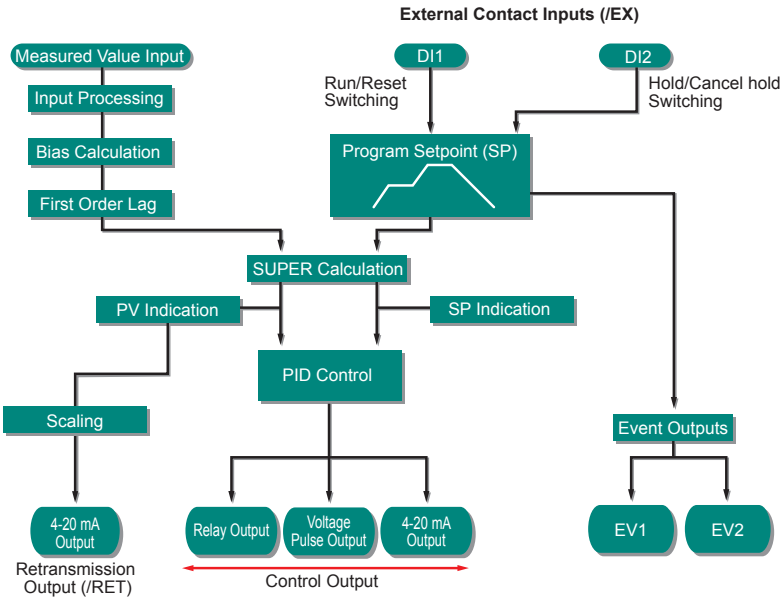
■ FUNCTION BLOCK DIAGRAM

When ordering, please specify the suffix and option codes according to the functions required.



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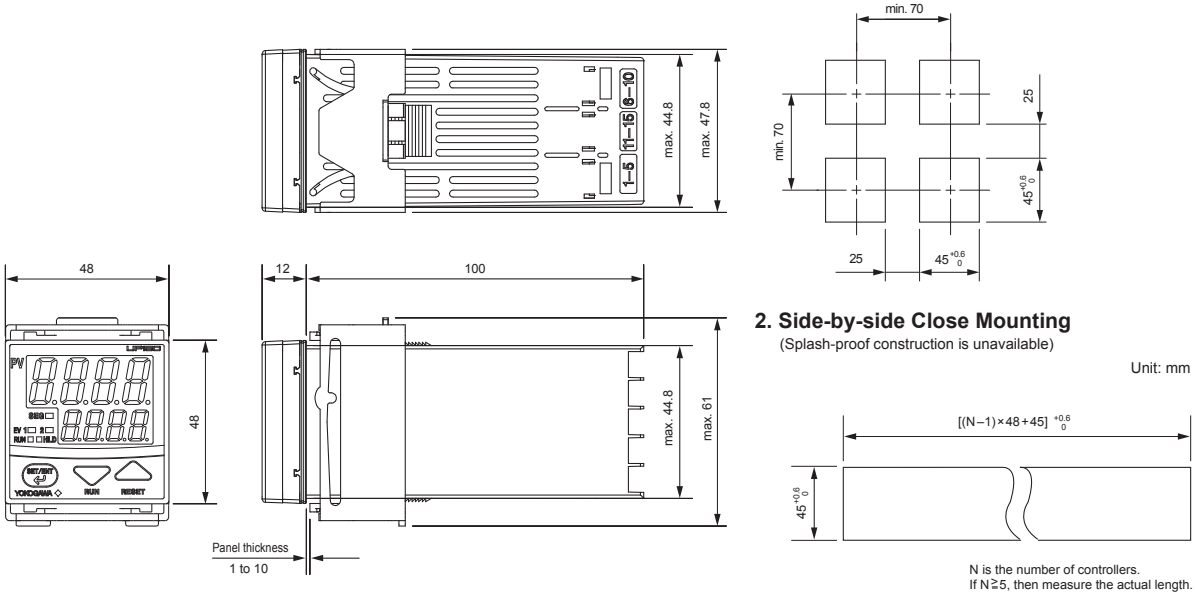
■ EXTERNAL DIMENSIONS AND PANEL CUTOUT DIMENSIONS

1. General Mounting



2. Side-by-side Close Mounting

(Splash-proof construction is unavailable)

Unit: mm

N is the number of controllers.
If N≧5, then measure the actual length.

Normal Allowable Deviation= ±(Value of JIS B 0401-1999 tolerance grade IT18) /2

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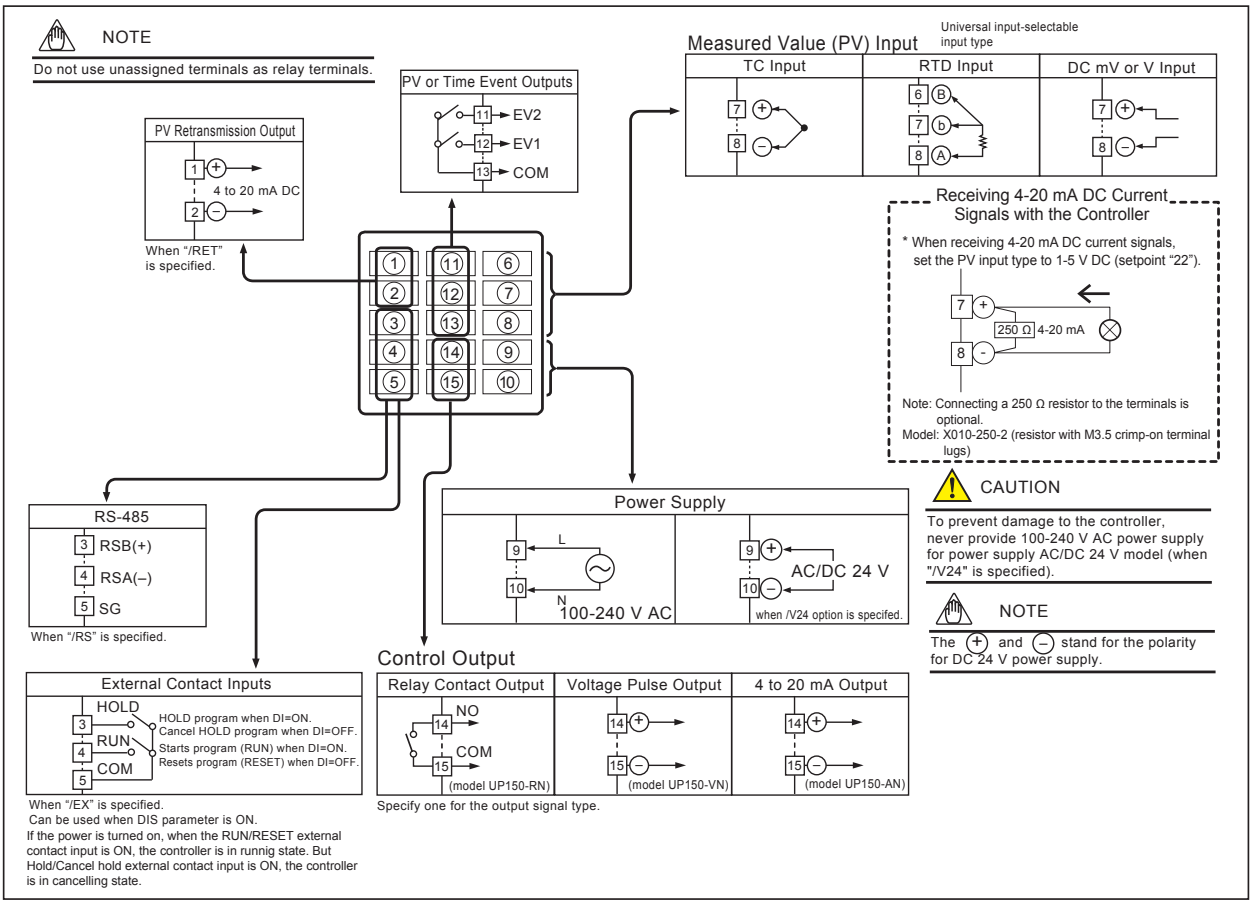
■ TERMINAL ARRANGEMENTS



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