General Specifications

Model UT150L
Limit Controller

UT100 SERIES

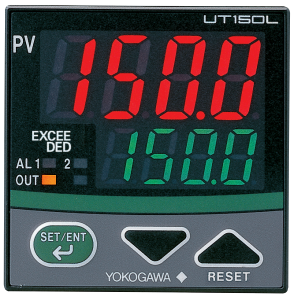
GS 05C01E22-01E

■ GENERAL

The UT150L is an FM approved limit controller that can be configured either as a high limit or as a low limit controller by a user.

The UT150L features universal input, two alarm outputs, retransmission output, a timer to count the total time the setpoint is exceeded, and a register to retain the maximum temperature reached.

The RS485 communication interface is available optionally.



■ MODEL AND SUFFIX CODES

Model	Suffix Codes	Descriptions
UT150L	.....	Lim-it Controller (1/16 DIN size)
Control output	–R.....	Relay output
Fixed code	N.....	Always N
Option	/AL	Alarm outputs (2 points)
	/EX	Digital input (1 point)
	/RET	PV retransmission output in 4 to 20 mA
	/RS	Communication function

■ MEASURED VALUE INPUT

The UT100 series allows you to freely change the input type by software.

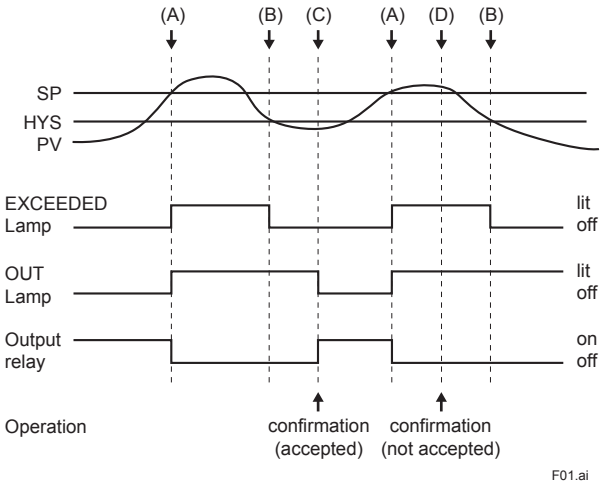
Table 1. Measured Input Ranges

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	-300.0 to 400.0°F	34
	J	-199.9 to 999.9°C		5	-300.0 to 2100°F	35
	T	-199.9 to 400.0°C		6	-300.0 to 750.0°F	36
	E	-199.9 to 999.9°C		7	-300.0 to 1800.0°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	Note: Scalling is enable in the following 4 range. -1999 to 9999, -199.9 to 999.9, -199.99 to 99.99, -1.999 to 9.999	
DC voltage	0 to100 mV	0.0 to 100.0	Note	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		

■ LIMIT CONTROL FUNCTION

When a measured value (PV) exceeds a setpoint (SP), “EXCEEDED” lamp lights, and “OUT” lamp turns ON (A). The limit output relay is de-energized then. “EXCEEDED” lamp turns off when PV goes into normal condition, while the output (OUT) display lamp stays on as it is (B). The output (OUT) display lamp turns off when a confirming operation is done by an operator (C). The way to confirm is pressing the “ RESET ” key (or by an external contact, according to the setting of setup parameter DIS). The confirming operation is not accepted during PV exceeds SP (D) (during EXCEEDED lamp lights*). State of output relay is de-energized whenever “OUT” lamp is on.

* Check the “HYS” value if the EXCEEDED lamp is not turn off when PV is lower than SP.



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YOKOGAWA
Yokogawa Electric Corporation

GS 05C01E22-01E

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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 type 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 (burnout 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 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%)

Control Output

Output: 1 point
Output type: 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.

Alarm Functions

● Alarm Functions (Option Code /AL)
Alarm types: 22 types
(waiting action can be set by software):
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, High and low limits within deviation, De-energized on PV high limit, De-energized on PV low limit, Fault diagnosis output, FAIL output
Alarm output: 2 relay contacts
Relay contact capacity: 1 A at 240 V AC or 1 A at 30 V DC (with resistance load)
Note: The alarm output relays cannot be replaced by users.

Retransmission Output

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

Contact Input

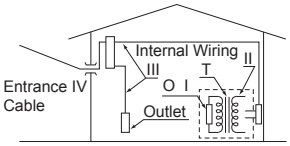
The contact inputs are provided only when the /EX option is specified.
Function: Resetting “exceeded status”
Input: 1 point
Input type: Non-voltage contact or transistor contact input
Contact capacity: At least 12 V/10 mA
On/off judgment: On state for 1 kΩ or less; off state for 20 kΩ or greater

Communication Function

The communication function is provided only when the /RS option is specified. (For details, read the user’s manual of the communication functions IM 05C01E22-10E.)
● 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 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

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. Certified by FM-3810 and FM-3545.
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.



No.	IEC/EN/CSA •UL61010-1: 2001	EN 61010-2-030	Description	Remarks
No. 1	Measurement Category I	O (Other)	For measurements performed on circuits not directly connected to MAINS.	
No. 2	Measurement Category II	Measurement Category II	For measurements performed on circuits directly connected to the low voltage installation.	Appliances, portable equipments, etc.
No. 3	Measurement Category III	Measurement Category III	For measurements performed in the building installation.	Distribution board, circuit breaker, etc.
No. 4	Measurement Category IV	Measurement Category IV	For measurements performed at the source of the lowvoltage installation.	Overhead wire, cable systems, etc.

EMC standards: Complies with EN61326, EN61000-3-2, EN61000-3-3 and EN55011 (CE).
The instrument continues to operate at a measuring accuracy of within ±20% of the range during tests.
KC marking:
Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

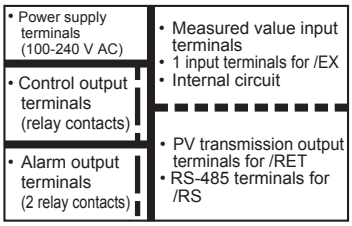
Power Supply and Isolation

● Power Supply

Power supply	Voltage	Rated at 100-240 V AC (±10%)
	Frequency	50 or 60Hz
Maximum power consumption		8 V A max. (4W max.)
Memory		Non-volatile memory
Withstanding voltage	Between primary terminals and secondary terminals (See note 1.)	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
Insulation resistance	Between primary terminals and secondary terminals (See note 1.)	20 MΩ or more at 500 V DC

Note 1: The primary terminals are the power supply terminals and relay output terminals. The secondary terminals are the analog input and output terminals, the voltage pulse output terminals, and the contact input 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 input terminals for the /EX option are isolated from the internal circuit.

Construction, Mounting, and Wiring

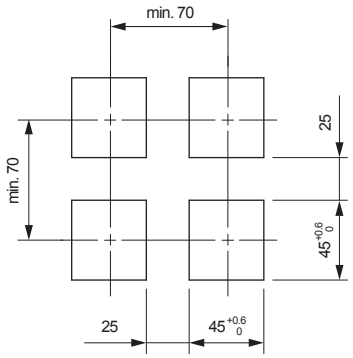
Construction: Dust-proof and drip-proof front panel conforming to IP65. For side-by-side close installation the controller loses its dust-proof and drip-proof protection.
Casing: ABS resin and polycarbonate
Case color: Black
Mounting: Flush panel mounting
Terminals: Screw terminals

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 the 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 the 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)

■ PANEL CUTOUT DIMENSIONS

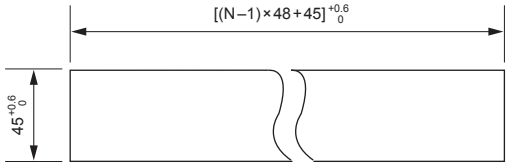
1. General Mounting



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.

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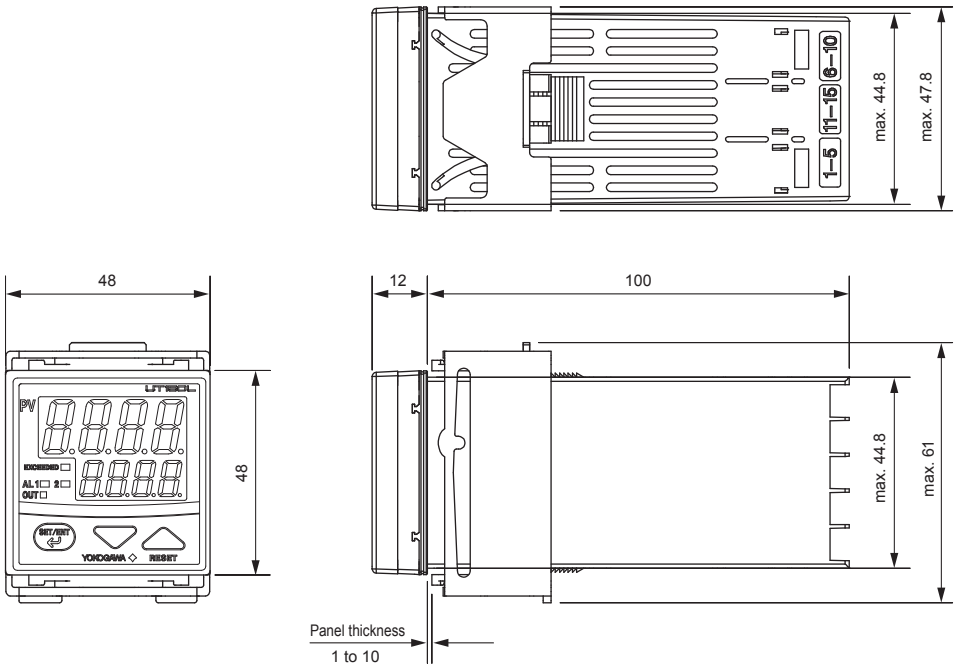
■ EXTERNAL DIMENSIONS

Unit: mm



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

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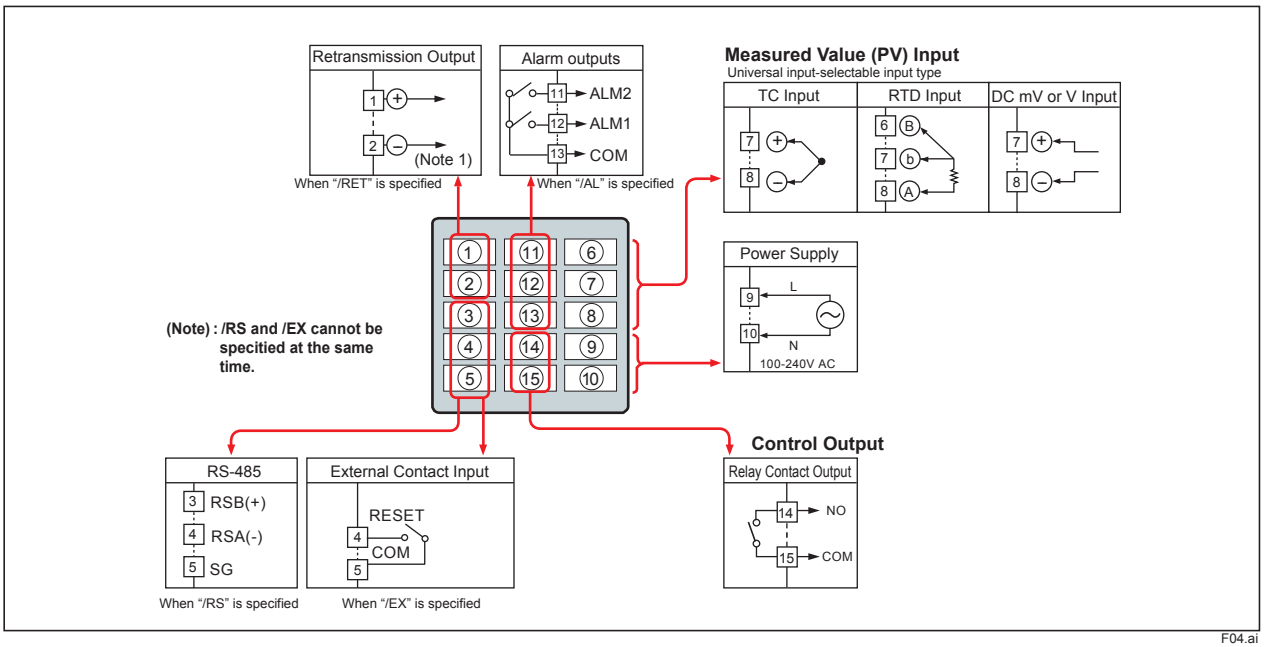
■ TERMINAL ARRANGEMENT



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