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

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Codes</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT150L</td>
<td>...............</td>
<td>Limit Controller (1/16 DIN size)</td>
</tr>
<tr>
<td>Control output</td>
<td>R ..............</td>
<td>Relay output</td>
</tr>
<tr>
<td>Fixed code</td>
<td>N .............</td>
<td>Always N</td>
</tr>
<tr>
<td>Option</td>
<td>AL ............</td>
<td>Alarm outputs (2 points)</td>
</tr>
<tr>
<td></td>
<td>EX ............</td>
<td>Digital input (1 point)</td>
</tr>
<tr>
<td></td>
<td>RET ...........</td>
<td>PV retransmission output in 4 to 20 mA</td>
</tr>
<tr>
<td></td>
<td>RS ............</td>
<td>Communication function</td>
</tr>
</tbody>
</table>

MEASURED VALUE INPUT

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

Table 1. Measured Input Ranges

<table>
<thead>
<tr>
<th>Input Type</th>
<th>Range(°C)</th>
<th>Range(°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouple</td>
<td>-270 to 1370</td>
<td>-300 to 2500</td>
</tr>
<tr>
<td></td>
<td>0.0 to 600.0</td>
<td>32.0 to 999.9</td>
</tr>
<tr>
<td></td>
<td>0.0 to 400.0</td>
<td>32.0 to 750.0</td>
</tr>
<tr>
<td></td>
<td>-199.9 to 200.0</td>
<td>-300.0 to 400.0</td>
</tr>
<tr>
<td></td>
<td>-199.9 to 999.9</td>
<td>-300.0 to 2100.0</td>
</tr>
<tr>
<td></td>
<td>-199.9 to 400.0</td>
<td>-300.0 to 750.0</td>
</tr>
<tr>
<td></td>
<td>-199.9 to 999.9</td>
<td>-300.0 to 1800.0</td>
</tr>
<tr>
<td></td>
<td>0 to 1700</td>
<td>32 to 3100</td>
</tr>
<tr>
<td></td>
<td>0 to 1700</td>
<td>32 to 3100</td>
</tr>
<tr>
<td></td>
<td>0 to 1800</td>
<td>32 to 3200</td>
</tr>
<tr>
<td></td>
<td>-200 to 1300</td>
<td>-300 to 2400</td>
</tr>
<tr>
<td></td>
<td>-199.9 to 900.0</td>
<td>-300 to 1600</td>
</tr>
<tr>
<td></td>
<td>-199.9 to 400.0</td>
<td>-300 to 750</td>
</tr>
<tr>
<td>Platinel 2</td>
<td>0 to 1390</td>
<td>32 to 2500</td>
</tr>
<tr>
<td>Pt100</td>
<td>-199.9 to 850.0</td>
<td>-199.9 to 999.9</td>
</tr>
<tr>
<td></td>
<td>0.0 to 400.0</td>
<td>32.0 to 750.0</td>
</tr>
<tr>
<td></td>
<td>-199.9 to 200.0</td>
<td>-300 to 400</td>
</tr>
<tr>
<td></td>
<td>-199.9 to 99.9</td>
<td>-199.9 to 99.9</td>
</tr>
<tr>
<td>JP100</td>
<td>-199.9 to 500.0</td>
<td>-199.9 to 999.9</td>
</tr>
</tbody>
</table>

Note: Scaling is enable in the following 4 range.

- 0.0 to 100.0
- 0.000 to 5.000
- 1.000 to 5.000
- 0.0 to 10.00

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 “ ” 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.
HARDWARE SPECIFICATIONS

Measured Value (PV) Input

Input terminals
Input type: Universal; can be selected by software
Input accuracy (at 23 ±2°C ambient temperature)
• Thermocouple: ±2°C ±10% of range
• RTD: ±0.02% of range ±0.02°C (±0.005% of range ±0.002°C)
• Thermistor: 2% (±4°C to ±28°C)
• Current: ±20mA ±5% of full scale

Response time:
63% of the maximum excursion when PV abruptly changes from 10% to 90%.

Allowable input voltage:
• Thermocouple or RTD: ±10 V DC
• Thermistor: ±30 V DC

Burn-off 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 resistance: 250 Ω for thermocouple or DC mV input
2 kΩ for DC V input

Maximum allowable wiring resistance for RTD input
150 Ω (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 thermocouple or RTD input

Noise rejection ratio (50/60Hz): Normal mode noise: Min. 80dB
Common mode noise: Min. 120dB (Min. 90dB for DC V input)

Error of reference junction compensation:
±2°C at 0°C
±5°C for thermocouple input –100°C to 0°C

Sampling period for measured value input:
2 second or less, 63% (10-90%)

Alarm types:
2 relay contacts

Alarm output:
• Alarm output
• Control output

Note: The alarm output relays cannot be set to the same.

Contact capacity:
1 A at 240 V AC
3 A at 30 V DC (with resistance load)

Relay contact capacity:
3 A at 240 V AC
1 A at 30 V DC

Alarm Functions

• Alarm Functions (Option Code /AL)

Alarm types: 22 types
(Alert action can be set by software):
PV high limit, PV low limit, Deviation high limit, Deviation low 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, PV high limit, PV low limit, Fault diagnostic output, FAIL output

Alarm output: 2 relay contacts
Relay contact capacity: 1 A at 240 V AC or 3 A at 30 V DC (with resistance load)
Note: The alarm output relays cannot be replaced by users.

Redemption Output

The redemption 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 G50C0E2-10E)

Communication Protocol

Personal computer link: Used for communication with a personal computer. (The built-in 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 (including the controller)
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 necessary to guarantee instrument performance.

Power Supply and Isolation

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):
3000 V AC for 1 minute
Between relay terminals and secondary terminals (500 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 output:
±0.05% of F.S./°C

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.

Power supply terminals (100-240 V AC)
Control output terminals (relay contacts)
Alarm output terminals (2 relay contacts)
PV transmission output terminals for /RET (2 relay contacts)

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 site-side close case 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
Ambient temperature: 0-50°C (0-40°C when mounted in an outdoor cabinet)
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/s² (0.5G) or less
Short-period vibrations: 14.7 m/s² (1G) for 15 seconds or less
Shock: 98 m/s² (11G) 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.
Resistance temperature detector: ±0.05% C/C

(2) Effect from fluctuation of power supply voltage (within rated range)
Al/An input: ±0.2% of F.S. (±0.002% of F.S.)

(3) Transportation and Storage Conditions
Temperature: –25 to 70°C
Humidity: 0 to 90% 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)

### EXTERNAL DIMENSIONS

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

- Retransmission Output
- Alarm outputs
- Measured Value (PV) Input
- TC Input
- RTD Input
- DC mV or V Input
- Power Supply
- Control Output

(Note): RS and /EX cannot be specified at the same time.