Overview
The UT35A/RSP and UT32A/RSP are single-loop controller with a non-isolated remote input. Digital indicating controllers employ an easy-to-read, 14-segment large color LCD display, along with navigation keys, thus greatly increasing the monitoring and operating capabilities. A ladder sequence function is included as standard. The short depth of the controller helps save instrument panel space. The UT35A and UT32A also support open networks such as Ethernet communication.

Features
- Equipped with non-isolated remote input (not isolated from PV input). Can be used for remote setpoint setting, external compensating input, auxiliary input for computation, and the like.
- A 14-segment, active (PV display color changing function) color LCD display is employed. Two five-digit, high-resolution displays are possible. Alphabet letters can be displayed in an easy-to-read manner. The guide display shows parameter names.
- Easy to operate Navigation keys (SET/ENTER and Up/Down/Left/Right arrow keys) are employed to facilitate making settings.
- 65 mm depth The small depth enables the mounting in a thin and small instrument panel.
- Ladder sequence function is included as standard. This function allows for creating a simple sequence control. Dedicated LL50A Parameter Setting Software (sold separately) allows for performing programming using a ladder language.
- Various built-in open network functions such as Ethernet are available. Easy connection with various vendors’ PLCs is possible. (UT32A support CC-Link and RS485 communication only.)
- Quick setting function Setting only the minimum necessary parameters for operation is possible.
- Equipped with a multitude of functions Universal I/O and retransmission output are included as standard. PID control, heating/cooling control, etc. are available.
- LL50A Parameter Setting Software (sold separately) The parameters and ladder programs of UTAdvanced digital indicating controller can be built from a PC using this software. It makes data management even easier.
- Dust-proof and drip-proof IP66 (for front panel) (Not applicable to side-by-side close mounting.) NEMA4 (Hose-down test only)

Functional Specifications
Control Specifications
(1) Control Mode
Single-loop control
(2) Control period
200 ms

<table>
<thead>
<tr>
<th>Model and suffix code (See the model code)</th>
<th>Number of analog input points</th>
<th>Number of analog output points</th>
<th>Number of contact input points</th>
<th>Number of contact output points</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT35A</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>+1×RSP</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>+2×RSP</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>UT32A</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>+1×RSP</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>+2×RSP</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

*1: Excluding control output
*2: In the case cooling control output is analog output, it cannot be used for transmission output.
*3: Excluding control output relays

Control Computation Function
(1) Types of control
- PID control
- ON/OFF control (*4)
- Two-position two-level control (*5)
- Heating and cooling control (*5)

*4: Not selectable for Position proportional type
*5: Selectable for heating and cooling control
(2) Control Computation Function
(a) Target setting point and the number of PID parameter groups
Respectively, four sets of target setpoints, alarm setpoints, and PID parameters can be set.
(b) Selecting the PID parameter group
The following PID parameter groups can be selected.
• Target setpoint number (SPNO) (The PID number can be set arbitrarily.)
• Measured input zone PID
• Target setpoint zone PID
• Reached target setpoint zone PID
(c) Auto-tuning
• Tuning results can be selected from two options, Normal or Stable.
• Tuning output limit can be set. (It cannot be used in heating/cooling control.)
(d) “Super” function: Overshoot-suppressing function
(e) “Super 2” function: Hunting-suppressing function
(f) STOP preset output function
(g) Input ERROR preset output function
(h) MANUAL preset output function

(3) Operation Mode Switching

| Operation mode switching | AUTO/MANUAL and RUN/STOP switching REMOTE/LOCAL switching (only model with communication option) |

(4) Control Parameter Setting Range

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportional band</td>
<td>0.1 to 1000%</td>
</tr>
<tr>
<td>Integral time</td>
<td>1 to 6000 sec. or OFF (using manual reset)</td>
</tr>
<tr>
<td>Derivative time</td>
<td>1 to 6000 sec. or OFF</td>
</tr>
<tr>
<td>ON/OFF control</td>
<td>0.0 to 100.0% of measured input range width</td>
</tr>
<tr>
<td>Preset output value</td>
<td>-5.0 to 105.0% (however, 0 mA or less cannot be output)</td>
</tr>
<tr>
<td>High/low output limit</td>
<td>-5.0 to 105.0% Low limit setpoint &lt; high limit setpoint</td>
</tr>
<tr>
<td>Tight shut function</td>
<td>When manual control is carried out with 4 to 20 mA output, control output can be reduced to about 0 mA.</td>
</tr>
<tr>
<td>Rate-of-change limiter of output</td>
<td>0.1 to 100.0%/sec., OFF</td>
</tr>
<tr>
<td>Output deadband</td>
<td>For heating and cooling control: -100.0 to 50.0% For position proportional control: 1.0 to 10.0%</td>
</tr>
</tbody>
</table>

Alarm Functions

- **Types of Alarm**
  - Measured value alarm
  - Deviation alarm
  - Rate-of-change alarm

- **Setpoint alarm**
  - SP (setpoint) high/low limit alarm
  - Target SP high/low limit alarm
  - Target SP deviation high/low limit alarm
  - Target SP deviation high and low limits alarm
  - Target SP deviation within high and low limits alarm

- **Output alarm**
  - Control output high/low limit alarm
  - Cooling control output high/low limit alarm

- **Other alarms**
  - Heater disconnection alarm (for /HA option)
  - Self-diagnosis alarm

<table>
<thead>
<tr>
<th>Alarm functions</th>
<th>Alarmstand-by action</th>
<th>Alarm latch (forced reset) function</th>
<th>Alarm hysteresis</th>
<th>Alarm ON/OFF delay timer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of alarm settings</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of alarm output points</td>
<td>Up to 8 (differs by model code)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contact I/O Function

This function allows for allocating the input error condition, operation condition, alarm condition or other conditions to the contact input and contact output.

| Contact input | AUTO/MANUAL switching | REMOTE/LOCAL switching (only model with communication option) | STOP/START switching | Switching to AUTO | Switching to MANUAL | Switching to REMOTE (only model with communication option) | Switching to LOCAL (only model with communication option) | AUTO-TUNING START/STOP switching | LCD backlight ON/OFF switching | Message interrupt displays 1 through 4 | SP number specification | PID number specification |
|---------------|-----------------------|---------------------------------------------------------------|----------------------|------------------|--------------------|---------------------------------------------------------------|----------------------------------------------------------|---------------------------|----------------------------|-----------------------------|-----------------------------|
| Contact output | Alarms 1 through 4 | Manual preset output number specification | Status output |

Ladder Sequence Function

<table>
<thead>
<tr>
<th>(1) Number of I/O Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UT35A/RSP</strong></td>
</tr>
<tr>
<td>Number of digital input points</td>
</tr>
<tr>
<td>Number of digital output points</td>
</tr>
</tbody>
</table>

This is limited by the number of contact I/O signal points. (See the model code.)

<table>
<thead>
<tr>
<th>(2) Types of Command</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of basic command types</strong></td>
</tr>
<tr>
<td><strong>Number of application command types</strong></td>
</tr>
</tbody>
</table>

(3) Sequence Device

<table>
<thead>
<tr>
<th>Types of device</th>
<th>Number of points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital I/O</td>
<td>7 (max)</td>
</tr>
<tr>
<td>Output relay</td>
<td>8 (max)</td>
</tr>
<tr>
<td>Internal device</td>
<td>256</td>
</tr>
<tr>
<td>M relay (bit data)</td>
<td>28</td>
</tr>
<tr>
<td>P register (parameter)</td>
<td>10</td>
</tr>
<tr>
<td>K register (constant)</td>
<td>30</td>
</tr>
<tr>
<td>Special device</td>
<td>12</td>
</tr>
<tr>
<td>Special relay (bit data)</td>
<td>12</td>
</tr>
</tbody>
</table>

* Process data and process relay can be used besides the above-mentioned.

(4) Program capacity
Max Program capacity: 300 steps *
* Available number of steps differs according to the parameters and using command.

(5) Ladder computation period
Ladder computation period is the same as control period.
### Communication Function

<table>
<thead>
<tr>
<th>Function</th>
<th>Method</th>
<th>Interface</th>
<th>Targets</th>
<th>Max connection</th>
<th>Communication Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modbus/TCP</strong></td>
<td>Server</td>
<td>Ethernet</td>
<td>PLC and others</td>
<td>2 connections</td>
<td></td>
</tr>
<tr>
<td><strong>PROFIBUS-DP</strong></td>
<td>Slave</td>
<td>RS-485</td>
<td>PLC and others</td>
<td>Number of nodes: 126</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modbus master function</td>
<td>RS-485</td>
<td>UT75A, UT55A, UT52A, UT35A, UP55A, UP35A, UP32A, UM33A</td>
<td>31 Units (Main Controller is included.)</td>
<td></td>
</tr>
<tr>
<td><strong>CC-Link</strong></td>
<td>Slave</td>
<td>RS-485</td>
<td>PLC and others</td>
<td>Number of nodes: 42 (Remote device)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modbus master function</td>
<td>RS-485</td>
<td>UT75A, UT55A, UT52A, UT35A, UP55A, UP35A, UP32A, UM33A</td>
<td>31 Units (Main Controller is included.)</td>
<td></td>
</tr>
<tr>
<td><strong>DeviceNet</strong></td>
<td>Slave</td>
<td>RS-485</td>
<td>PLC and others</td>
<td>Number of nodes: 64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modbus master function</td>
<td>RS-485</td>
<td>UT75A, UT55A, UT52A, UT35A, UP55A, UP35A, UP32A, UM33A</td>
<td>31 Units (Main Controller is included.)</td>
<td></td>
</tr>
<tr>
<td><strong>Peer to peer</strong></td>
<td>Multi-drop</td>
<td>RS-485 (2 wire only)</td>
<td>UT75A, UT55A, UT52A, UT35A, UP35A, UP32A</td>
<td>Read/Write: 4 units Read only: 28 units</td>
<td></td>
</tr>
<tr>
<td><strong>Ladder</strong></td>
<td>Slave</td>
<td>RS-485</td>
<td>PLC and others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Physical Interface**

- **Ethernet**
  - Standard: IEEE802.3 (10BASE-T, 100BASE-TX)
  - Max segment length: 100m
  - Max. Connecting Configuration: Cascade Max. 4 level (10BASE-T), Max. 2 level (100BASE-TX)

- **RS-485**
  - Standard: EIA RS-485
  - Communication method: Two-wire half-duplex or four-wire half-duplex, start-stop synchronization, and non-procedural
  - Baud rate: 600,1200,2400,4800,9600,19200 or 38400bps, Peer to peer communication is fixed at 19200bps
  - Maximum communication distance: 1200m
  - Terminating resistor: 220Ω (External)

- **PROFIBUS-DP**
  - Standard: Field bus (IEC61158)
  - Corresponding version: DP V0
  - Baud rate: 9.6k, 19.2k, 45.45k, 93.75k, 187.5k, 0.5M, 1.5M, 3M, 6M, 12M, AUTO (3)
  - Communication distance: 1200m (9.6k to 93.75k), 1000m (187.5k), 400m (0.5M), 200m (1M)
  - Terminating resistor: 220Ω (External)

- **CC-Link**
  - Supported version: Remote device (Ver.1.10, Ver.2.00)
  - Baud rate: 156k, 625k, 2.5M, 5M, 10M bps
  - Transmission distance: 1.2km (156k bps), 600m (625k bps), 200m (2.5M bps), 150m (5M bps), 100m (10M bps)
  - When using optical repeater: 7.6 km (156k) to 4.3 km (10M)

- **DeviceNet**
  - Field bus (IEC61158)
  - Baud rate: 125k, 250k, 500k bps
  - Transmission distance: 500m (125k bps), 250m (250k bps), 100m (500k bps)

*1: UT digital indicating controller, Signal conditioner JUXTA, Power monitor POWERCERT can be connected.
*2: UT digital indication controllers can be connected.
*3: AUTO automatically sets the baud rate to that of the host controller (PROFIBUS-DP master).

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**Hardware Specifications**

**Display Specifications**
- PV display
  - 5-digit, 14-segment active color LCD (white/red)
  - Character height: 21.5 mm for UT35A and 13.0 mm for UT32A
- Data display
  - 5-digit, 11-segment color LCD (orange)
- Bar graph display
  - 12-segment color LCD (orange)

**Universal Input Specifications**
- Number of input points: 1
- Types of input, instrument range, and measurement accuracy (see the table below)

**Table: Types of Input**

<table>
<thead>
<tr>
<th>Types of Input</th>
<th>Instrument range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>-270.0 to 1270.0°C</td>
<td>±0.1% of instrument range ±1 digit for 0°C or more</td>
</tr>
<tr>
<td>J</td>
<td>-270.0 to 1200.0°C</td>
<td>±2% of instrument range ±1 digit for less than 0°C</td>
</tr>
<tr>
<td>T</td>
<td>0.0 to 400.0°C</td>
<td>±0.15% of instrument range ±1 digit for 400°C or more</td>
</tr>
<tr>
<td>B</td>
<td>0.0 to 1800.0°C</td>
<td>±0.15% of instrument range ±1 digit for 400°C or more</td>
</tr>
<tr>
<td>S</td>
<td>0.0 to 1700.0°C</td>
<td>±0.15% of instrument range ±1 digit</td>
</tr>
<tr>
<td>K</td>
<td>-200.0 to 1300.0°C</td>
<td>±0.1% of instrument range ±1 digit</td>
</tr>
<tr>
<td>E</td>
<td>-200.0 to 1000.0°C</td>
<td>±0.25% of instrument range ±1 digit for 0°C or more</td>
</tr>
<tr>
<td>L</td>
<td>-200.0 to 1300.0°C</td>
<td>±0.2% of instrument range ±1 digit for less than 0°C</td>
</tr>
<tr>
<td>U</td>
<td>0.0 to 400.0°C</td>
<td>±0.5% of instrument range ±1 digit for 800°C or more</td>
</tr>
<tr>
<td>W(4°C)</td>
<td>0.0 to 2300.0°C</td>
<td>±0.2% of instrument range ±1 digit</td>
</tr>
<tr>
<td>Platinel 2</td>
<td>0.0 to 1390.0°C</td>
<td>±0.1% of instrument range ±1 digit</td>
</tr>
<tr>
<td>PR20-40</td>
<td>0.0 to 1900.0°C</td>
<td>±0.5% of instrument range ±1 digit for 800°C or more</td>
</tr>
<tr>
<td>W(7°C) Re/675/285</td>
<td>0.0 to 2000.0°C</td>
<td>±0.2% of instrument range ±1 digit</td>
</tr>
<tr>
<td>JPH100</td>
<td>-200.0 to 500.0°C</td>
<td>±0.1% of instrument range ±1 digit</td>
</tr>
<tr>
<td>Pt100</td>
<td>-150.0 to 150.0°C</td>
<td>±0.1% of instrument range ±1 digit</td>
</tr>
<tr>
<td>Standard signal</td>
<td>0.400 to 2.0000 V</td>
<td>±0.1% of instrument range ±1 digit</td>
</tr>
</tbody>
</table>

The accuracy is that in the standard operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz.

1. ±0.3°C and ±1 digit in the range between 0 and 100°C
2. ±0.5°C ±1 digit in the range between -100 and 200°C

- Applicable standards: JIS, IEC and DIN (ITS-90) for thermocouples and resistance-temperature detectors (RTD)
- Input sampling period: Synchronized to control period
- Burnout detection
  - Upscale and downscale of function, and OFF can be specified for the standard signal of thermocouple and resistance-temperature detector (RTD). For integrated signal input, 0.1 V or less is judged as a burnout.
  - Input bias current: 0.05 μA (for thermocouple and resistance-temperature detector (RTD))
  - Resistance-temperature detector (RTD) measured current: About 0.16 mA
  - Input resistance
    - 1 MΩ or more for thermocouple/mV input
    - About 1 MΩ for voltage input
    - About 250 Ω for current input (with built-in shunt resistance)
  - Allowable signal source resistance
    - 250 Ω or less for thermocouple/mV input
    - Effect of signal source resistance: 0.1 μV/Ω or less
  - 2 kΩ or less for DC voltage input
  - Effect of signal source resistance: about 0.01%/100 Ω
  - Allowable wiring resistance
    - Up to 150 Ω per line for resistance-temperature detector (RTD) input (conductor resistance between the three lines shall be equal)
    - Effect of wiring resistance: ±0.1°C/10 Ω
  - Allowable input voltage/current
    - ±10 V DC for thermocouple/mV/mA or resistance-temperature detector (RTD) input
    - ±20 V DC for V input
  - Noise reduction ratio
    - 40 dB or more (at 50/60 Hz) in normal mode
    - 120 dB or more (at 50/60 Hz) in common mode
  - Reference junction compensation error
    - ±1.0°C (15 to 35°C)
    - ±1.5°C (-10 to 5°C and 35 to 50°C)

**Remote Input with Direct Input Specifications (Non-isolated)**
- This function can be used for remote setpoint setting, external compensating input, auxiliary input for computation, etc.
- Number of input points: 1 point
- For types of input, instrument range, and measurement accuracy, see the table below.

**Table: Types of Input**

<table>
<thead>
<tr>
<th>Types of input</th>
<th>Instrument range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated signal</td>
<td>0.400 to 2.000 V</td>
<td>±0.2% of instrument range ±1 digit</td>
</tr>
<tr>
<td></td>
<td>1.000 to 5.000 V</td>
<td>±0.1% of instrument range ±1 digit</td>
</tr>
<tr>
<td>DC voltage</td>
<td>0.000 to 2.000 V</td>
<td>±0.2% of instrument range ±1 digit</td>
</tr>
<tr>
<td></td>
<td>0.000 to 10.00 V</td>
<td>±0.1% of instrument range ±1 digit</td>
</tr>
</tbody>
</table>

- Input sampling period: Synchronized to control period
- Input resistance: about 1 MΩ
- Burnout detection: Functions at standard signal Burnout is determined to have occurred if it is 0.1 V or less.
Contact Input Specifications
• Number of points: 2 points (standard)
  For the maximum number of points, see the model and suffix code table.
• Input type: no-voltage contact input or transistor contact input
• Input contact capacity: 12 V DC, 10 mA or more
  Be sure to use a contact with a minimum ON current of 1 mA or less
• ON/OFF detection
  For no-voltage contact input:
  - Contact resistance 1 kΩ or less in ON state
  - Contact resistance 50 kΩ or more in OFF state
  Transistor contact input:
  - 2 V or less in ON state
  - Leak current 100 μA or less in OFF state
• Status detection minimum hold time: control period + 50 ms
• Application: SP switching, operation mode switching, event input

Analog Output Specifications
• Number of points
  - Control output (heating-side output): 1 point (standard), which is shared with transmission output
  - Cooling-side output: 1 point, which is shared with transmission output
• Output functions
  Current output or voltage pulse output
• Current output
  - 4 to 20 mA DC or 0 to 20 mA DC/load resistance 600 Ω or less
• Current output accuracy
  ±0.1% of span (however, ±5% of span for 1 mA or less)
  - The accuracy is that in the standard operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz
• Voltage pulse output
  Application: time proportional output
  ON voltage: 12 V or more/load resistance of 600 Ω or more
  OFF voltage: 0.1 V DC or less
  Time resolution: 10 ms or 0.1% of output value, whichever is larger

Retransmission Output Specifications
• Number of points: 1 point (standard), which is shared with 15 V DC loop power supply
  Additional 1 points when analog control output are not used
• Output function: current output
  - 4 to 20 mA DC or 0 to 20 mA DC/load resistance 600 Ω or less
• Current output accuracy (conversion accuracy from PV display on the set scale): ±0.1% of span (however, ±5% of span for 1 mA or less)
  - The accuracy is that in the basic operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz
  - This is not conversion accuracy through input and output but the performance of transmission output itself.

15V DC Loop Power Supply Specifications
• Number of points: 1 point (standard), which is shared with retransmission output
  - Control output (1 point) can also be used.
• Supply voltage: 14.5 to 18.0 V DC
• Maximum supply current: about 21 mA (with short-circuit current limiting circuit)

Step Response Time Specifications
Within 1 s
( Response time at 63% of transmission output when a change is made stepwise in the range between 10 and 90% of input span)

Relay Contact Output Specifications
• Types of contact and number of points
  - Control relay output: one 1c-contact point
  - Control output of heating and cooling control: 2 1a-contact points
  - Alarm output: 3 1a-contact points (Common is separated)
• Contact rating
  - 1c-contact: 3 A at 250 V AC or 3 A at 30 V DC (resistance load)
  - 1a-contact: 240 V AC or 3 A at 30 V DC (resistance load)
  - The control output should always be used with a load of 10 mA or more.
  - The alarm output should also always be used with a load of 1 mA or more.
• Application: time proportional output, alarm output, FAIL output, etc.
• Time resolution for control output: 10 ms or 0.1% of output value, whichever is larger

Transistor Contact Output Specifications
• Number of points: see the model and suffix code table
• Output form: open collector (sink current)
• Output contact capacity: Up to 24 V DC, 50 mA
• Output time resolution: min 200 ms
• Application: alarm output, FAIL output, etc.

Position Proportional Output Specifications
• Position signal input
  Slide resistance: 100 Ω to 2.5 kΩ of total resistance
  100% side and slide line: with disconnection detection
  0% side: without disconnection detection
  Current input: 4 to 20 mA DC (with disconnection detection)
  Input resistance: about 330 Ω
• Sampling period: 50 ms
• Measurement resolution: 0.1% of input span
• Position proportional relay output
  UT35A: Two 1a-contact points, 3 A at 250 V AC or 3A at 30 V DC (resistance load)
  UT32A: Two 1a-contact points, 3 A at 240 V AC or 3A at 30 V DC (resistance load)
  -*: This should always be used with a load of 10 mA or more.
Heater Break Alarm Specifications (for /HA Option)

- **Function:** Measures the heater current using an external current transformer (CT) and generates a heater break alarm when the measured value is less than the disconnection detection value.

- **Number of input points:** 2 points
- **Number of output points:** 2 points (transistor contract output)
- **CT input resistance:** about 9.4 Ω
- **CT input range:** 0.0 to 0.1 Arms (0.12 Arms or more cannot be applied)
- **Heater current alarm setting range:** OFF, 0.1 to 300.0 Arms

Heater current measured value display range: 0.0 to 360.0 Arms

- The CT ratio can be set. CT ratio setting range: 1 to 3300

- **Recommended CT:** CT from URD Co. Ltd.
  - CTL-6-S-H: CT ratio 800, measurable current range: 0.1 to 80.0 Arms
  - CTL-12L-30: CT ratio 3000, measurable current range: 0.1 to 180.0 Arms

- **Heater current measurement period:** 200 ms
- **Heater current measurement accuracy:** ±5% of CT input range span ±1 digit (CT error is not included)
- **Heater current detection resolution:** Within 1/250 of CT input range span

- **Disconnection detection ON time:** Minimum 200 ms. (for time proportional output)

**24 V DC Loop Power Supply Specifications (for /LP Option)**

- **Application:** Power is supplied to the 2-wire transmitter.

- **Supply voltage:** 21.6 to 28.0 V DC
- **Rated current:** 4 to 20 mA DC
- **Maximum supply current:** About 30 mA (with short-circuit current limiting circuit)

**Safety and EMC Standards**

- **Safety:**
  - Compliant with IEC/EN 61010-1 (CE), IEC/EN 61010-2-201 (CE), IEC/EN 61010-2-030 (CE), approved by CAN/CSA C22.2 No. 61010-1 (CSA), approved by UL 61010-1.
  - 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 (*)

- **EMC standards:**
  - Compliant with CE marking
    - EN 61326-1 Class A, Table 2 (For use in industrial locations).
    - EN 61326-2-3

- **KC marking:** Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

**Power Supply Specifications and Isolation**

- **Power supply**
  - **Rated voltage:** 100 to 240 V AC (+10%/-15%), 50/60 Hz
  - **24 V AC/DC (+10%/-15%)** (When the /DC option is specified)

- **Power consumption:**
  - **UT35A/RSP:** 18 VA (For the /DC option. DC: 9 VA, AC: 14 VA)
  - **UT32A/RSP:** 15 VA (For the /DC option. DC: 7 VA, AC: 11 VA)

- **Storage:** Nonvolatile memory

- **Allowable power interruption time:** 20 ms (at 100 V AC)

- **Withstanding voltage**
  - **2300 V AC for 1 minute between primary and secondary terminals (UL, CSA)**
  - **3000 V AC for 1 minute between primary and secondary terminals (CE)**
  - **1500 V AC for 1 minute between primary terminals**
  - **500 V AC for 1 minute between secondary terminals**

  (Primary terminals = Power (*) and relay output terminals, Secondary terminals = Analog I/O signal terminals, contact input terminals, communication terminals, and functional grounding terminals.)

- **Insulation resistance**
  - Between power supply terminals and a grounding terminal: 20 MΩ or more at 500 V DC

**Isolation specifications**

<table>
<thead>
<tr>
<th>Internal circuits</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control and transmission (analog) output terminal</td>
<td>(not isolated between the analog output terminals)</td>
</tr>
<tr>
<td>Valve position (feedback) input terminal</td>
<td></td>
</tr>
<tr>
<td>Control relay (c-contact or 2 a-contact) output terminal</td>
<td></td>
</tr>
<tr>
<td>Alarm-1 relay (a-contact) output terminal</td>
<td></td>
</tr>
<tr>
<td>Alarm-2 relay (a-contact) output terminal</td>
<td></td>
</tr>
<tr>
<td>Alarm-3 relay (a-contact) output terminal</td>
<td></td>
</tr>
<tr>
<td>Position proportional relay output terminal</td>
<td></td>
</tr>
<tr>
<td>Contact input terminal (AI)</td>
<td></td>
</tr>
<tr>
<td>RS485 communication terminal (2 ports)</td>
<td></td>
</tr>
<tr>
<td>24 V DC loop power supply terminal</td>
<td></td>
</tr>
<tr>
<td>Contact output (transistor) terminal</td>
<td></td>
</tr>
<tr>
<td>Ethernet/PROFIBUS-DP/CC-Link/DeviceNet communication terminal</td>
<td></td>
</tr>
</tbody>
</table>

Current transformer input terminal

The circuits divided by lines are insulated mutually.
Environmental Conditions

Normal operating conditions
• Ambient temperature: -10 to 50°C (side-by-side mounting: -10 to 40°C)
  If the CC-Link option is specified, 0 to 50°C for UT35A/RSP; 0 to 40°C for UT32A/RSP.
  (side-by-side mounting: 0 to 40°C for UT35A and UT32A with CC-Link option)
• Ambient humidity: 20 to 90% RH (no condensation)
• Magnetic field: 400 A/m or less
• Continuous vibration (at 5 to 9 Hz) Half amplitude of 1.5 mm or less
  (at 9 to 150 Hz) 4.9 m/s² or less, 1 oct/min for 90 minutes each in the three axis directions
• Rapid vibration: 14.7 m/s², 15 s or less
• Impact: 98 m/s² or less, 11 msec.
• Installation altitude: 2,000 m or less above sea level
• Warm-up time: 30 minutes or more after the power is turned on
• Start-up time within 10 s

Transportation and Storage Conditions
• Temperature: -25 to 70°C
• Temperature change rate: 20°C per hour or less
• Humidity: 5 to 95%RH (no condensation)

Effects of Operating Conditions
• Effect of ambient temperature
  For voltage or TC input:
  ±1 μV/°C or ±0.01% of F.S. (instrument range)/°C, whichever is greater
  For RTD input:
  ±0.05°C/°C (ambient temperature) or less
  For current input:
  ±0.01% of F.S. (instrument range)/°C
  For analog output:
  ±0.02% of F.S./°C or less
• Effect of power supply fluctuation:
  For analog input: ±0.05% of F.S. (instrument range) or less
  For analog output: ±0.05% of F.S. or less
  (Each within rated voltage range)
### Block Diagram

#### Single Loop Control

**Input ladder calculation program** (signal goes to the control computation as is when without ladder program)

For ladder program, see the LL50A Parameters Setting Software User's Manual.

---

**Output ladder calculation program** (signal goes to the output as is when without ladder program)

For ladder program, see the LL50A Parameters Setting Software User's Manual.

---

For option code /HA

- **Heater break alarm 1**
- **Heater break alarm 2**

---

For option code /LP

- **OUT retransmission output**
- **RET retransmission output**

*After the control output terminal is specified by the parameter OT, other current output terminals can be used as retransmission output.*
Terminal Arrangement for UT35A/RSP Single Loop Control

- **Control output (Option code: RSP)**
  - OUT (Suffix code: Type 1=-0)
  - Terminal wiring differs in heating/cooling control and Position proportional control.
  - Refer to the terminals of Position proportional control output and heating/cooling control output below. Factory default: control output in relay.

- **Output and Heating/cooling control output below.**
  - Position proportional control.

- **Terminal wiring differs in Heating/cooling control and**
  - OUT2
  - 30 V DC, 1 A (resistance load)
  - Relay contact rating: 240 V AC, 1 A

- **Heating/cooling relay contact output**
  - 100-240 V AC (±10%/-15%) shared
  - Allowable range:
    - 30 V DC, 3 A (resistance load)
    - Contact rating: 250 V AC, 3 A
  - Heating - side
  - COM
  - NO
  - 103
  - 102
  - 101
  - 30 V DC, 3 A (resistance load)
  - Heating/cooling relay contact output

- **Heater break alarm**
  - ALM
  - (Option code: Type 1=-2)
  - (Suffix code: Type 1=-1)
  - Heater break alarm-1
  - Heater break alarm-2
  - Factory default: as standard)
  - (Equipped as standard)
  - Heater current detection input

- **Power supply**
  - 24 V AC/DC power supply: Option code /DC
  - 100-240 V AC power supply
  - 100-240 V AC (+10%/-15%)
  - Power supply
  - Common
  - External contact output (relay)

- **Contact output**
  - ALM
  - (Suffix code: Type 1=-0)
  - STOP when DI2=ON
  - RUN when DI2=OFF
  - MANUAL when DI1=OFF
  - AUTO when DI1=ON

- **Contact input**
  - DI
  - (Option code: Type 1=-0, -1 or -2)
  - Function can be assigned to the terminals with no function.

- **Position proportional control output**
  - VALV
  - 0% to 100%
  - Feedback input
  - Factory default: 1-5 V DC
  - Power supply
  - Common
  - External contact output (relay)

- **Remote input RSP**
  - Remote input
  - 0-2 V DC, 0-10 V DC
  - PV input type is
  - Factory default: 1-5 V DC
  - TC input
  - Current (mA)
  - Resistance: 100 Ω to 2.5 k Ω
  - Default: 4-20 mA DC, 0-20 mA DC, 4-20 mA DC, 0-20 mA DC

- **Retransmission output**
  - RET (Equipped as standard)
  - Can be used for 10 V DC loop power supply when control output is used.
  - Can be used for retransmission output or 15 V DC loop power supply when control output is not used.

- **Cooling-side control output**
  - RET/OUT2 (Suffix code: Type 1=-2)
  - Can be used for retransmission output or 15 V DC loop power supply when control output is not used.
  - Can be used for retransmission output or 15 V DC loop power supply when control output is used.

- **Function can be assigned to the terminals with no function.**

- **Retransmission output**
  - RET (Equipped as standard)
  - Can be used for 10 V DC loop power supply when control output is used.
  - Can be used for retransmission output or 15 V DC loop power supply when control output is not used.

- **Current/voltage pulse output**
  - Current/voltage pulse output
  - 15 V DC loop power supply
  - 4-20 mA DC loop power supply
  - Default: 4-20 mA DC
  - Can not be used for retransmission output or 15 V DC loop power supply when control output is used.
  - Can be used for retransmission output or 15 V DC loop power supply when control output is not used.

- **Current/voltage pulse output**
  - Current/voltage pulse output
  - 15 V DC loop power supply
  - 4-20 mA DC loop power supply
  - Default: 4-20 mA DC
  - Can not be used for retransmission output or 15 V DC loop power supply when control output is used.
  - Can be used for retransmission output or 15 V DC loop power supply when control output is not used.
Terminal Arrangement for UT32A/RSP Single Loop Control

Control output
(Relay contact rating: 240 V AC, 1 A
30 V DC, 3 A (resistance load)
Contact rating: 250 V AC, 3 A
50/60 Hz shared
(free voltage)
100-240 V AC (+10%/-15%)
Allowable range:
COM
Factory default: Control output is relay.
output and Heating/cooling control output below.
Refer to the terminals of Position proportional control
Position proportional control.

Heating/cooling control output
Power supply

(Option code /RSP)

Alarm-3 output
(PV high limit)
(PV low limit)
Heating/cooling relay contact output

Common

External contact output (relay)

External contact output (transistor)

Contact input

ALM (Equipped as standard)

Power supply

[24 V AC/DC power supply: Option code /DC]

30 V DC, 3 A (resistance load)
Contact rating: 240 V AC, 3 A
COM
Factory default: No function

30 V DC, 3 A
Resistance: 100 Ω

Rightarrow

DI12
DI11
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### Construction, Mounting, and Wiring

- **Dust-proof and drip-proof:** IP66 (Front panel) (Not applicable to side-by-side close mounting)/NEMA4 *
  - *: Hose-down test only
- **Material:** Polycarbonate resin (Flame retardancy: UL94 V-0)
- **Case color:** White (Light gray) or Black (Light charcoal gray)
- **Weight:** 0.5 kg or less
- **External dimensions (mm):**
  - UT35A: 96 (width) x 96 (height) x 65 (depth from the panel surface)
  - UT32A: 48 (width) x 96 (height) x 65 (depth from the panel surface)
- **Mounting:** Direct panel mounting; mounting bracket, one each for upper and lower mounting
- **Panel cutout dimensions (mm):**
  - UT35A: 92+0.8/0 (width) x 92+0.8/0 (height)
  - UT32A: 45+0.6/0 (width) x 92+0.8/0 (height)
- **Mounting position:** Up to 30 degrees above the horizontal. No downward titling allowed.
- **Wiring:** M3 screw terminal with square washer (signal wiring and power)
---

### Model and Suffix Code

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Option code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT35A</td>
<td>/RSP</td>
<td>(Required)</td>
<td>Digital Indicating Controller (Power supply: 100-240 V AC) (provided with retransmission output or 15 V DC loop power supply, 2 DIs, and 3 DOs)</td>
</tr>
<tr>
<td>Type 1: Basic control</td>
<td>-0</td>
<td>Standard type</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1</td>
<td>Position proportional type</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-2</td>
<td>Heating / cooling type</td>
<td></td>
</tr>
<tr>
<td>Type 2: Functions</td>
<td>0</td>
<td>None</td>
<td>2 additional DIs, 2 additional DOs</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>None</td>
<td>5 additional DIs, 5 additional DOs</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Type 3: Open networks</td>
<td>0</td>
<td>RS-485 communication (Max. 38.4 kbps, 2-wire / 4-wire)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Ethernet communication (with serial gateway function)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>CC-Link communication (with Modbus master function)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>PROFINET communication (with Modbus master function)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>DeviceNet communication (with Modbus master function)</td>
<td></td>
</tr>
<tr>
<td>Display language (1)</td>
<td>-1</td>
<td>English (Default. Can be switched to other language by the setting.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-2</td>
<td>German (Default. Can be switched to other language by the setting.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-3</td>
<td>French (Default. Can be switched to other language by the setting.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-4</td>
<td>Spanish (Default. Can be switched to other language by the setting.)</td>
<td></td>
</tr>
<tr>
<td>Case color</td>
<td>0</td>
<td>White</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Black</td>
<td>1</td>
</tr>
<tr>
<td>Fixed code</td>
<td>-00</td>
<td>Always “-00” (for Standard Code Model)</td>
<td></td>
</tr>
</tbody>
</table>

**Option codes**

<table>
<thead>
<tr>
<th>Option code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/RSP</td>
<td>Non-isolated remote input</td>
</tr>
<tr>
<td>/LP</td>
<td>24 V DC loop power supply (2)</td>
</tr>
<tr>
<td>/HA</td>
<td>Heater break alarm (2)</td>
</tr>
<tr>
<td>/DC</td>
<td>Power supply 24 V AC/DC</td>
</tr>
<tr>
<td>/CT</td>
<td>Coating (2)</td>
</tr>
<tr>
<td>/CV</td>
<td>Terminal cover</td>
</tr>
</tbody>
</table>

- **1:** English, German, French, and Spanish are available for the guide display.
- **2:** The /LP option can be specified in the combination of Type 2 code (any of “0” or “1”) and Type 3 code (any of “0” or “1”).
- **3:** The /HA option can be specified only when the Type 1 code is “-0” or “-2.”
- **4:** When the /CT option is specified, the UT35A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for EEA-market).

---

### Model and Suffix Code

<table>
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<tr>
<td>UT32A</td>
<td>/RSP</td>
<td>(Required)</td>
<td>Digital Indicating Controller (Power supply: 100-240 V AC) (provided with retransmission output or 15 V DC loop power supply, 2 DIs, and 3 DOs)</td>
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<tr>
<td>Type 1: Basic control</td>
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<td>-2</td>
<td>Heating / cooling type</td>
<td></td>
</tr>
<tr>
<td>Type 2: Functions</td>
<td>0</td>
<td>None</td>
<td>2 additional DIs and 2 additional DOs</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Type 3: Open networks</td>
<td>0</td>
<td>CC-Link communication (with Modbus master function) (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Display language (2)</td>
<td>-1</td>
<td>English (Default. Can be switched to other language by the setting.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-2</td>
<td>German (Default. Can be switched to other language by the setting.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-3</td>
<td>French (Default. Can be switched to other language by the setting.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-4</td>
<td>Spanish (Default. Can be switched to other language by the setting.)</td>
<td></td>
</tr>
<tr>
<td>Case color</td>
<td>0</td>
<td>White</td>
<td>0</td>
</tr>
<tr>
<td></td>
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<tr>
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<td>Coating (2)</td>
</tr>
<tr>
<td>/CV</td>
<td>Terminal cover</td>
</tr>
</tbody>
</table>

- **1:** When the /LP option is specified, the RS-485 communication of the Type 2 code “1” is 2-wire system.
- **2:** The type 3 code “3” can be specified only when the Type 1 code is “-0” and the Type 2 code is “0.”
- **3:** English, German, French, and Spanish are available for the guide display.
- **4:** The /LP option can be specified in the combination of Type 1 code (any of “-0” or “-1”), Type 2 code (any of “0” or “1”) and Type 3 code “0.”
- **5:** The /HA option can be specified in the combination of Type 1 code “-0” or “-2” and Type 3 code “0.”
- **6:** When the /CT option is specified, the UT32A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for EEA-market).
■ Items to be specified when ordering
Model and suffix codes, whether User's Manual and QIC required.

■ Standard accessories
Brackets (mounting hardware), Unit label, Operation Guide

■ Special Order Items

<table>
<thead>
<tr>
<th>Model code</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL50A</td>
<td>-00</td>
<td>Parameter Setting Software</td>
</tr>
<tr>
<td>X910</td>
<td></td>
<td>See the General Specifications(*) Resistance Module</td>
</tr>
</tbody>
</table>

*: Necessary to input the current signal to the voltage input terminal.

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal cover (for UT35A)</td>
<td>UTAP001</td>
</tr>
<tr>
<td>Terminal cover (for UT32A)</td>
<td>UTAP002</td>
</tr>
<tr>
<td>User’s Manual (CD)</td>
<td>UTAP003</td>
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User’s Manual
Product user’s manuals can be downloaded or viewed at the following URL. To view the user’s manual, you need to use Adobe Reader 7 or later by Adobe Systems.

URL: http://www.yokogawa.com/ns/ut/im/