### General Specifications

**UT55A/MDL, UT52A/MDL**

**Digital Indicating Controller (DIN Rail Mounting Type)**

**Yokogawa Electric Corporation**

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**GS 05P01C81-01EN**

1st Edition Mar.31, 2015 (YK)


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**Overview**

The UT55A/MDL and UT52A/MDL controllers can be mounted in an enclosure. A ladder sequence function is included as standard. The short depth of the controller helps save space in an enclosure. The UT55A and UT52A also support open networks such as Ethernet communication.

The UT55A and UT52A have a Panel mounting type (without option code /MDL). For more details, please see General Specification GS 05P01C31-01EN.

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**Features**

- **Simple panel surface**
  Mounting the controller in an enclosure simplifies the panel surface.

- **Ladder sequence function**
  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. (UT52A support CC-Link and RS485 communication only.)

- **Equipped with a multitude of functions**
  Universal I/O, eight control modes (cascade control, etc.), and retransmission output are included as standard. PID control, heating/cooling control, feed forward control, etc. are available.

- **LL50A Parameter Setting Software**
  (sold separately)
  The parameters and ladder programs of UTAdvanced controller can be built from a PC using this software. It makes data management even easier.

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**Functional Specifications**

**Control Specifications**

(1) **Control Mode**

Control functions of the controller can be set as control modes.

<table>
<thead>
<tr>
<th>Control mode</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGL (1)</td>
<td>Single-loop control</td>
</tr>
<tr>
<td>CAS1 (2)</td>
<td>Cascade primary-loop control (1)</td>
</tr>
<tr>
<td>CAS2 (3)</td>
<td>Cascade secondary-loop control (1)</td>
</tr>
<tr>
<td>CAS (4)</td>
<td>Cascade control</td>
</tr>
<tr>
<td>BUM (5)</td>
<td>Loop control for backup (1)</td>
</tr>
<tr>
<td>PVSW (6)</td>
<td>Loop control with PV switching (1)</td>
</tr>
<tr>
<td>PVSEL (7)</td>
<td>Loop control with PV auto-set (Max./Min./Ave./Diff.) (1)</td>
</tr>
<tr>
<td>PVHD (8)</td>
<td>Control with PV hold function</td>
</tr>
</tbody>
</table>

*1: Remote auxiliary analog input is required.

2) **Control period**

Selectable from 50 ms (2), 100 ms, and 200 ms

*2: Cascade control (Control mode 4) cannot be used. “Super” function or “Super 2” function cannot be used.

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**Control Computation Specifications**

(1) **Combination of types of control and control modes**

<table>
<thead>
<tr>
<th>Types of control</th>
<th>Control mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>PID</td>
<td>1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>ON/OFF control</td>
<td>✓ N/A ✓ N/A ✓ N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>Two-position, two-level control</td>
<td>✓ N/A ✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>Heating and cooling control</td>
<td>✓ N/A ✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>Sample PI control</td>
<td>✓ N/A ✓ N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>Batch PID control</td>
<td>✓ N/A ✓ N/A ✓</td>
</tr>
<tr>
<td>Feedforward control</td>
<td>✓ N/A ✓ N/A ✓</td>
</tr>
</tbody>
</table>

* ✓: Available  N/A: Not Available

*6: Selectable for heating and cooling control

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**Table of Number of Inputs and Outputs**

<table>
<thead>
<tr>
<th>Model and suffix 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>UT55A</td>
<td>1 1 3 3</td>
<td>2 1 4 3</td>
<td>2 1 4 (3) 3</td>
<td>2 1 4 (3) 3</td>
</tr>
<tr>
<td>UT52A</td>
<td>1 1 3 3</td>
<td>2 1 4 (3) 3</td>
<td>2 1 4 (3) 3</td>
<td>2 1 4 (3) 3</td>
</tr>
</tbody>
</table>

*3: Excluding control output

*4: The numbers in parentheses show the numbers of points in each model with RSP direct input. /DR option.

*5: Excluding control output relays

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(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

<table>
<thead>
<tr>
<th>Operation mode switching</th>
<th>AUTO/MANUAL and RUN/STOP switching</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CASCADE/AUTO/MANUAL switching</td>
</tr>
<tr>
<td></td>
<td>REMOTE/LOCAL switching</td>
</tr>
</tbody>
</table>

(4) Control Parameter Setting Range

- Proportional band: 0.1 to 999.9%
- Integral time: 1 to 600 sec. or OFF (using manual reset)
- Derivative time: 1 to 600 sec. or OFF
- ON/OFF control hysteresis (one or two hysteresis points): 0.0 to 100.0% of measured input range width
- Preset output value: -5.0 to 105.0% (however, 0 mA or less cannot be output)
- High/low output limiter: -5.0 to 105.0% Low limit setpoint < high limit setpoint
- Tight shut function: When manual control is carried out with 4 to 20 mA output, control output can be reduced to about 0 mA.
- Rate-of-change limiter of output: 0.1 to 100.0%/sec., OFF
- Output deadband: For heating and cooling control: -100.0 to 50.0%

(5) Ladder computation period

Ladder computation period is the same as control period.

Alarm Functions

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

  - Setpoint alarm
    - SP (setpoint) 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
    - Cooling control output high/low limit alarm

  - Other alarms
    - Self-diagnosis alarm
    - FAIL

  - Alarm output action
    - Alarm stand-by action
    - Alarm latch (forced reset) function
    - Alarm hysteresis
    - Alarm ON/OFF delay timer

  - Number of alarm settings: 8 (per loop)
  - Number of alarm output points: Up to 8 (differs by model code)

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.

<table>
<thead>
<tr>
<th>Contact input</th>
<th>AUTO/MANUAL switching</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>REMOTE/LOCAL switching</td>
</tr>
<tr>
<td></td>
<td>STOP/START switching</td>
</tr>
<tr>
<td></td>
<td>Switching to CASCADE</td>
</tr>
<tr>
<td></td>
<td>Switching to AUTO</td>
</tr>
<tr>
<td></td>
<td>Switching to MANUAL</td>
</tr>
<tr>
<td></td>
<td>Switching to REMOTE</td>
</tr>
<tr>
<td></td>
<td>Switching to LOCAL</td>
</tr>
<tr>
<td></td>
<td>AUTO-TUNING START/STOP switching</td>
</tr>
<tr>
<td></td>
<td>OUTPUT TRACKING switching</td>
</tr>
<tr>
<td></td>
<td>Two-input switching</td>
</tr>
<tr>
<td></td>
<td>PV Hold</td>
</tr>
<tr>
<td></td>
<td>SP number specification</td>
</tr>
<tr>
<td></td>
<td>PID number specification</td>
</tr>
<tr>
<td></td>
<td>Manual preset output number specification</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contact output</th>
<th>Loop 1 alarms 1 through 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loop 2 alarms 1 through 8 (for cascade control)</td>
</tr>
<tr>
<td></td>
<td>Status output</td>
</tr>
</tbody>
</table>

Ladder Sequence Function

1. Number of I/O Points

<table>
<thead>
<tr>
<th>Number of digital input points</th>
<th>UT55A/MDL</th>
<th>UT52A/MDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of digital output points</td>
<td>Up to 9</td>
<td>Up to 4</td>
</tr>
<tr>
<td></td>
<td>Up to 18</td>
<td>Up to 3</td>
</tr>
</tbody>
</table>

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

2. Types of Command

<table>
<thead>
<tr>
<th>Number of basic command types</th>
<th>13</th>
<th>Load, AND, OR, Timer, Counter, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of application command types</td>
<td>73</td>
<td>Comparison, reverse, addition/ subtraction/multiplication/ division, logic operation, high/ low limiter, etc.</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></td>
</tr>
<tr>
<td>Input relay</td>
<td>9 (max)</td>
</tr>
<tr>
<td>Output relay</td>
<td>8 (max)</td>
</tr>
<tr>
<td>Internal device</td>
<td></td>
</tr>
<tr>
<td>M relay (bit data)</td>
<td>256</td>
</tr>
<tr>
<td>DAT register (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></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: 500 steps *
*: Available number of steps differs according to the parameters, using command and control period.

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></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Server</td>
<td>Ethernet</td>
<td>PLC and others</td>
<td>2 connections</td>
<td></td>
</tr>
<tr>
<td><strong>Modbus (RTU/ASCII)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slave</td>
<td>RS-485</td>
<td>PLC and others</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PROFIBUS-DP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slave</td>
<td>RS-485</td>
<td>PLC and others</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modbus master function</td>
<td>RS-485</td>
<td>UT75A, UT55A, UT52A, UT35A, UT32A, UP55A, UP35A, UM33A(2)</td>
<td>31 Units (Main Controller is included.)</td>
<td></td>
</tr>
<tr>
<td><strong>CC-Link</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slave</td>
<td>RS-485</td>
<td>PLC and others</td>
<td>Number of nodes: 126</td>
<td></td>
</tr>
<tr>
<td><strong>DeviceNet</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slave</td>
<td>RS-485</td>
<td>PLC and others</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modbus master function</td>
<td>RS-485</td>
<td>UT75A, UT55A, UT52A, UT35A, UT32A, UP55A, UP35A, UM33A(2)</td>
<td>31 Units (Main Controller is included.)</td>
<td></td>
</tr>
<tr>
<td><strong>Peer to peer</strong></td>
<td></td>
<td>Multi-drop</td>
<td></td>
<td>Read/Write: 4 units Read only: 28 units</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2 wire only)</td>
<td>UT75A, UT55A, UT52A, UT35A, UT32A, UP55A, UP35A, UP32A</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Coordinated Communication</strong></td>
<td></td>
<td>Master/Slave</td>
<td>UT75A, UT55A, UT52A, UT35A, UT32A, UP55A, UP35A, UP32A</td>
<td>31 units (Main Controller is included.)</td>
<td></td>
</tr>
<tr>
<td><strong>PC link</strong></td>
<td></td>
<td>Slave</td>
<td>PC and others</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ladder</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1: UT digital indicating controller, Signal conditioner JUXTA, Power monitor POWERCERT can be connected.

*2: UT digital indication controllers can be connected.

### 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) |                  |
|          | Standard : EIA RS-485 |                  |
| RS-485   | Communication method : Two-wire harf-duplex or four-wire harf-duplex, start-stop synchronorization and non-procedural |                  |
|          | Baud rate : 600, 1200, 2400, 4800, 9600, 19200 or 38400bps (3), Peer to peer communication is fixed at 19200bps |                  |
|          | Maximum communication distance : 1200m |                  |
|          | Terminating resistor : 220Ω (External) |                  |
|          | “38400bps” is available only for UT55A (Type 3 code = 1) and UT52A (Type 2 code = 1) |                  |

*3: 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 (4) |
| Communication distance | 1200m (9.6k to 93.75k) 1000m (187.5k) 400m (0.5M) 200m (1.5M) 100m (3M to 12M) |

*4: AUTO automatically sets the baud rate to that of the host controller (PROFIBUS-DP master).

### CC-Link

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

### DeviceNet

| Field bus (IEC61158) |
| Baud rate | 125k, 250k, 500kbps |
| Transmission distance | 500m (125kbps), 250m (250kbps), 100m (500kbps) |
### Hardware Specifications

#### Display Specifications

The controller status can be verified with the LED.

<table>
<thead>
<tr>
<th>Status</th>
<th>LED</th>
<th>Lit/Blinks</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Green</td>
<td>Lit</td>
<td></td>
</tr>
<tr>
<td>Communication error</td>
<td>Green</td>
<td>Blinks</td>
<td></td>
</tr>
<tr>
<td>Instrument failure</td>
<td>Red</td>
<td>Lit</td>
<td>Parameter error/Program error</td>
</tr>
<tr>
<td>Input error</td>
<td>Red</td>
<td>Blinks</td>
<td>Sensor burnout, input over</td>
</tr>
</tbody>
</table>

- **Status LED Lit/Blinks**
  - **Green Lit**: Normal
  - **Green Blinks**: Communication error
  - **Red Lit**: Instrument failure
  - **Red Blinks**: Input error

**LED lamp**

UT55A/MDL Front (with terminal cover)

UT52A/MDL Front (with terminal cover)

#### Universal Input Specifications

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

<table>
<thead>
<tr>
<th>Types of Input</th>
<th>Instrument range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>-450.0 to 2500.0°C</td>
<td>±0.1% of instrument range</td>
</tr>
<tr>
<td>J</td>
<td>-200.0 to 1000.0°F</td>
<td>±0.2% of instrument range</td>
</tr>
<tr>
<td>T</td>
<td>0.0 to 200.0°C</td>
<td>±0.15% of instrument range</td>
</tr>
<tr>
<td>B</td>
<td>0.0 to 1000.0°C</td>
<td>±0.15% of instrument range</td>
</tr>
<tr>
<td>S</td>
<td>0.0 to 1700.0°C</td>
<td>±0.15% of instrument range</td>
</tr>
<tr>
<td>R</td>
<td>0.0 to 1700.0°C</td>
<td>±0.25% of instrument range</td>
</tr>
<tr>
<td>N</td>
<td>-200.0 to 1300.0°C</td>
<td>±0.1% of instrument range</td>
</tr>
<tr>
<td>E</td>
<td>-200.0 to 1900.0°C</td>
<td>±0.1% of instrument range</td>
</tr>
<tr>
<td>L</td>
<td>-200.0 to 1800.0°C</td>
<td>±0.1% of instrument range</td>
</tr>
<tr>
<td>U</td>
<td>0.0 to 1000.0°C</td>
<td>±0.15% of instrument range</td>
</tr>
<tr>
<td>W(*)</td>
<td>0.0 to 2300.0°C</td>
<td>±0.2% of instrument range</td>
</tr>
<tr>
<td>Platinel 2</td>
<td>0.0 to 1390.0°C</td>
<td>±0.1% of instrument range</td>
</tr>
<tr>
<td>PR20-40</td>
<td>0.0 to 1900.0°C</td>
<td>±0.5% of instrument range</td>
</tr>
<tr>
<td>W3F</td>
<td>0.0 to 2000.0°C</td>
<td>±0.2% of instrument range</td>
</tr>
<tr>
<td>JP100</td>
<td>-150.0 to 1000.0°C</td>
<td>±1.0% of instrument range</td>
</tr>
<tr>
<td>Pt100</td>
<td>-150.0 to 1000.0°C</td>
<td>±1.0% of instrument range</td>
</tr>
</tbody>
</table>

- **Standard signal**
  - 2.000 V ±1%
  - 1.000 V ±1%
  - 4.00 mV ±1%

- **DC voltage**
  - 0.00 V ±1%
  - 1.000 mA ±1%

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

*W-5% Re/W-26% Re (Hoskins Mfg Co.), ASTM E988*

- **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 0.4 mA 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
  ±40 mA DC for mA 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)

**Auxiliary Analog Input Specifications**

• This function can be used for remote setpoint setting, external compensating input, auxiliary input for computation, etc.
• Number of input points: see the model code table.
• For types of input, instrument range, and measurement accuracy, see the table below.

<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>DC voltage</td>
<td>0.000 to 2.000 V</td>
<td>±0.2% of instrument range ±1 digit</td>
</tr>
<tr>
<td>DC voltage with High input impedance</td>
<td>0.000 to 1.250 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
  However, 10 MΩ or more for high input impedance
• 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: 3 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 2 points when analog control output and cooling-side 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 value 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 500 ms (for a control period of 50 ms or 100 ms)
Within 1 s (for a control period of 200 ms)
(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
  - Cooling output of heating and cooling control: one 1c-contact point (For UT55A/MDL only)
  - For UT52A/MDL heating/cooling output: 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: For alarm output: 1 A at 240 V AC or 1 A at 30 V DC (resistance load)
  - For UT52A/MDL control relay output: 3 A at 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 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 50 ms
- Application: alarm output, FAIL output, etc.

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)

Maintenance Port Specifications
The maintenance port is used to connect a dedicated cable when using the LL50A Parameter Setting Software (sold separately). Through this port, you can set controller parameters, download ladder programs, and so on.
For details, see the LL50A General Specifications (GS05P05A01-01EN).

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 (*)
  - This is a reference safety standard value for measurement category I of CSA/UL 61010-1, and for measurement category O of IEC/EN 61010-2-030. This value is not necessarily a guarantee of instrument performance.
- EMC standards:
  - Compliant with CE marking
    - EN 61326-1 Class A, Table 2 (For use in industrial locations), EN 61326-2-3
    - The instrument continues to operate at a measurement accuracy of within ±20% of the range during testing.
    - EN 55011 Class A, Group 1
    - EN 61000-3-2 Class A
    - EN 61000-3-3
    - EMC Regulatory Arrangement in Australia and New Zealand
    - EN 55011 Class A, Group 1
- 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: UT55A/MDL: 18 VA (For the /DC option. DC: 9 VA, AC: 14 VA)
  UT52A/MDL: 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.)
  *: Power terminals for 24 V AC/DC models are the secondary 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>PV (universal) input terminal, Maintenance port</th>
<th>Remote input terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aux. analog (AIN1) input terminals</td>
<td>Control and transmission (analog) output terminal (not isolated between the analog output terminals)</td>
</tr>
<tr>
<td>Aux. analog (AIN2) input terminals</td>
<td>Control relay (c-contact) output terminal</td>
</tr>
<tr>
<td>Control relay (c-contact) output terminal</td>
<td>Alarm-1 relay (a-contact) output terminal</td>
</tr>
<tr>
<td>Alarm-1 relay (a-contact) output terminal</td>
<td>Alarm-2 relay (a-contact) output terminal</td>
</tr>
<tr>
<td>Alarm-2 relay (a-contact) output terminal</td>
<td>Alarm-3 relay (a-contact) output terminal</td>
</tr>
<tr>
<td>Alarm-3 relay (a-contact) output terminal</td>
<td>Contact input terminal (All)</td>
</tr>
<tr>
<td>Contact input terminal (All)</td>
<td>RS485 communication terminal</td>
</tr>
<tr>
<td>RS485 communication terminal</td>
<td>Ethernet/PROFIBUS-DP/CC-Link/DeviceNet communication terminal</td>
</tr>
</tbody>
</table>

The circuits divided by lines are insulated mutually.

Environmental Conditions

Normal operating conditions
- Ambient temperature: -10 to 50°C
  If the CC-Link option is specified, 0 to 50 °C for UT55A/MDL; 0 to 40 °C for UT52A/MDL.
  (side-by-side mounting: 0 to 50 °C for UT55A/MDL; 0 to 40 °C for UT52A/MDL)
- 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 μ V/°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 (For the block diagrams of other control modes, see the user’s manual)

- Remote input can be used when UT55A suffix code Type 2 = 2, 4, 5, or 7; UT52A suffix code Type 2 = 1.

- Communication: RS-485, Ethernet, PROFIBUS-DP, DeviceNet, CC-Link

- Feedforward input can be used when UT55A suffix code Type 2 = 7.

- DI8 is equipped when UT55A suffix code Type 2 = 2, 4, 5, or 7; UT52A suffix code Type 2 = 1.

Input ladder calculation program (signal goes to the control computation as is when without ladder program). For ladder program, see the ULLA Parameter 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 ULLA Parameter Setting Software User’s Manual.

Legend
- Terminal
- Parameter
- Function

The control output terminal is specified by the parameter OT. Other current output terminals can be used as retransmission output.

Output can be used when UT55A suffix code Type 2 = 2, 4, 5, or 7; UT52A suffix code Type 2 = 1.

DI16 is equipped when UT55A suffix code Type 2 = 2, 4, 5, or 7; UT52A suffix code Type 2 = 1.
Terminal Arrangement

Terminal Arrangement for UT55A/MDL Single Loop Control (for the terminal arrangements of other control modes, see the user's manual.)

- **Control output**
  - Suffix code: Type 1=-0, -1 or -2
  - Factory default: PV input is uninstalled.
  - Can be used for 10 V DC loop power supply when not used for retransmission output.

- **Contact output**
  - ALM (Suffix code: Type 1=-2)
  - E1-terminal area
  - E4-terminal area
  - Terminal area

- **Power supply**
  - E1-terminal area
  - E2-terminal area
  - E3-terminal area

- **PV input**
  - E1-terminal area
  - E2-terminal area
  - E3-terminal area
  - E4-terminal area

- **Remote input / Contact input**
  - Type 2=3 or 5
  - Type 2=7
  - Factory default: No function

- **External contact input**
  - Type 2=-2
  - Factory default: Can be used for retransmission output or 15 V DC loop power supply when current/voltage pulse output is not used for control output. Current output range can be changed.

- **Contact rating**
  - Terminal area
  - 12 V DC, 10 mA or more
  - 250 V AC, 3 A
  - 100-240 V AC power supply

- **Contact output**
  - NC
  - 100-240 V
  - 50/60 Hz shared (free voltage)

- **Retransmission output**
  - RET (Equipped as standard)
  - 15 V DC loop power supply

- **Alarm-1 output**
  - Alarm-3 output

- **DO21**
  - DO23

- **DI**
  - E1-terminal area
  - E2-terminal area
  - E3-terminal area

- **Factory default:**
  - Cooling-side control output
  - CAN be used for retransmission output when current/voltage pulse output is not used for control output. Current output range can be changed.
  - Voltage (mV, V) input
  - Remote input
  - Auxiliary analog input / Contact input
  - as standard (Equipped)

- **Current/voltage pulse output**
  - 4-20 mA DC or retransmission
  - Default: PV

- **Control output**
  - OUT
  - Suffix code: Type 1=-0, -1 or -2
  - Factory default: No function
  - MAN when DI2=OFF
  - STOP when DI2=ON
  - AUTO when DI1=ON

- **DI16**
  - Default: 1-5 V DC

- **Voltage pulse (12V)**
  - 4-20 mA DC
  - 0-20 mA DC

- **Voltage (mV, V) input**
  - -112
  - 101
  - 102
  - 103
  - 104
  - 105
  - 106
  - 107
  - 108
  - 109
  - 110
  - 111
  - 112

- **DC input**
  - DI1
  - DI2
  - DI3

- **Motor output**
  - 201
  - 202
  - 203
  - 204
  - 205
  - 206
  - 207
  - 208
  - 209
  - 210
  - 211
  - 212

- **Temperature input**
  - TC input

- **Auxiliary analog input / Contact input**
  - Type 2=7
  - Function can be assigned to the terminals with no function.

- **Function can be assigned to the terminals with no function.**
Terminal Arrangement for UT52A/MDL Single Loop Control (for the terminal arrangements of other control modes, see the user’s manual.)

**Table: Terminal Arrangement**

<table>
<thead>
<tr>
<th>Terminal Area</th>
<th>Power Supply</th>
<th>PV Input</th>
<th>Control Output</th>
<th>Retransmission Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1-1</td>
<td>24 V AC/DC power supply (Option code: DC)</td>
<td>Contact input</td>
<td>Relay contact output</td>
<td>Contact output</td>
</tr>
<tr>
<td>E1-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Local/Remote Control**
  - LOCAL when DI16=OFF
  - REMOTE when DI16=ON

- **Communication Options**
  - RS-485 communication / Remote input / Contact input
  - CC-Link communication (with Modbus master)

- **Alarm Outputs**
  - AL1 (PV high limit)
  - AL2 (PV low limit)
  - AL3

- **Current/Voltage Pulse Outputs**
  - PV RETransmission output
  - Load resistance 600\(\Omega\)
  - 0-20 mA DC
  - 4-20 mA DC or 0-20 mA DC, 4-20 mA DC, Voltage pulse (12 V)

- **Contact Outputs**
  - Contact rating: 12 V DC, 10 mA or more
  - No-voltage contact

- **Transistor Outputs**
  - Contact rating: 12 V DC, 10 mA or more
  - Transistor output

- **Factory Defaults**
  - Control output is relay (suffix code: Type 2=1)
  - Default: PV retransmission

**Diagram:**
- E1-Terminal Area
- RS/PR5485
- CC-L
## External Dimensions

### UT55A/MDL

<table>
<thead>
<tr>
<th>External Dimensions</th>
<th>Unit: mm (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>96(3.78)</td>
</tr>
<tr>
<td>Height</td>
<td>146(5.75)</td>
</tr>
<tr>
<td>Depth</td>
<td>100(3.94)</td>
</tr>
</tbody>
</table>

Note:
Trigonometry
General tolerance = ±(JIS B 0401-1998 tolerance class IT18)/2

### UT52A/MDL

<table>
<thead>
<tr>
<th>External Dimensions</th>
<th>Unit: mm (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>48.2(1.90)</td>
</tr>
<tr>
<td>Height</td>
<td>146(5.75)</td>
</tr>
<tr>
<td>Depth</td>
<td>100(3.94)</td>
</tr>
</tbody>
</table>

Note:
Trigonometry
General tolerance = ±(JIS B 0401-1998 tolerance class IT18)/2

## Construction, Mounting, and Wiring

- **Construction:** DIN rail mounting type
- **Material:** Polycarbonate resin (Flame retardancy: UL94 V-0)
- **DIN rail mounting bracket material:** Panel steel sheet
- **Case color:** Black (Light Charcoal gray)
- **Weight:** 1 kg or less
- **External dimensions (mm):**
  - UT55A/MDL: 96 (width) x 146 (height) x 100 (depth)
  - UT52A/MDL: 48.2 (width) x 146 (height) x 100 (depth)
- **Compatible DIN rails:** TH35-7.5Fe, TH35-7.5At, JIS C 2812
- **Mounting position:** Horizontal.
- **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>UT55A</td>
<td>/MDL</td>
<td>(Required)</td>
<td>Digital Indicating Controller (Power supply 100-240 V AC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(provided with retransmission output or 15 V DC loop power supply, 3 DIs, and 3 DOs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(without the display parts and keys)</td>
</tr>
<tr>
<td>Type 1:</td>
<td>-0</td>
<td>Standard type</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>-2</td>
<td>Heating/cooling type</td>
<td>None</td>
</tr>
<tr>
<td>Type 2:</td>
<td>Functions</td>
<td></td>
<td>Remote (1 additional aux. analog input, 1 additional DI, and RS-485 communication (Max. 19.2 kbps, 2-wire or 2-wire/4-wire) *)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 additional DIs and 5 additional DOs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Remote (1 additional aux. analog input and 1 additional DI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Remote (1 additional aux. analog input, 6 additional DIs, and 6 additional DOs)</td>
</tr>
<tr>
<td>Type 3:</td>
<td>Open networks</td>
<td></td>
<td>RS-485 communication (Max. 38.4 kbps, 2-wire/4-wire)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ethernet communication (with serial gateway function)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CC-Link communication (with Modbus master function)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PROFINET DP communication (with Modbus master function)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DeviceNet communication (with Modbus master function)</td>
</tr>
<tr>
<td>Fixed code</td>
<td>-1</td>
<td>Temperature unit: deg C &amp; deg F</td>
<td></td>
</tr>
<tr>
<td>Case color</td>
<td>-00</td>
<td>Black (Light charcoal gray)</td>
<td></td>
</tr>
<tr>
<td>Option codes</td>
<td>/MDL</td>
<td>(Required)</td>
<td>Mount on DIN rail (without the display parts and keys) (*)</td>
</tr>
<tr>
<td></td>
<td>/LP</td>
<td>24 V DC loop power supply (**)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>/DC</td>
<td>Power supply 24 V AC/DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>/CT</td>
<td>Coating (*)</td>
<td></td>
</tr>
</tbody>
</table>

*1: When the /MDL option is specified, the model and the suffix codes are as follows:

- UT55A-010-10-00/x/MDL
- UT55A-033-11-00/x/MDL

*2: When the /MDL option is specified, the UT55A 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>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Option code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT52A</td>
<td>/MDL</td>
<td>(Required)</td>
<td>Digital Indicating Controller (Power supply 100-240 V AC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(provided with retransmission output or 15 V DC loop power supply, 3 DIs, and 3 DOs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(without the display parts and keys)</td>
</tr>
<tr>
<td>Type 1:</td>
<td>-0</td>
<td>Standard type</td>
<td>None</td>
</tr>
<tr>
<td>Type 2:</td>
<td>Functions</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Remote (1 additional aux. analog input, 1 additional DI, and RS-485 communication (Max. 38.4 kbps, 2-wire) *)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CC-Link communication (with Modbus master function)</td>
</tr>
<tr>
<td>Fixed code</td>
<td>-1</td>
<td>Temperature unit: deg C &amp; deg F</td>
<td></td>
</tr>
<tr>
<td>Case color</td>
<td>-00</td>
<td>Black (Light charcoal gray)</td>
<td></td>
</tr>
<tr>
<td>Option codes</td>
<td>/MDL</td>
<td>(Required)</td>
<td>Mount on DIN rail (without the display parts and keys) (*)</td>
</tr>
<tr>
<td></td>
<td>/DC</td>
<td>Power supply 24 V AC/DC</td>
<td></td>
</tr>
</tbody>
</table>

*1: When the /MDL option is specified, the model and the suffix codes are as follows:

- UT52A-010-1-00/x/MDL
- UT52A-033-1-00/x/MDL

*2: When the /CT option is specified, the UT52A 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

■ 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>X010</td>
<td></td>
<td>See the General Specifications(*)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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 UT55A)</td>
<td>UTAP001</td>
</tr>
<tr>
<td>Terminal cover (for UT52A)</td>
<td>UTAP002</td>
</tr>
<tr>
<td>User's Manual (CD)</td>
<td>UTAP003</td>
</tr>
<tr>
<td>Wall mount bracket (for UT52A/MDL)</td>
<td>UTAP005</td>
</tr>
</tbody>
</table>

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/