1. Safety Precautions

- Power Supply
  Ensure that the instrument’s supply voltage matches the voltage of the power supply before turning on the power.
  - Do Not Use in Explosive Atmosphere
  - Do not operate the instrument in locations with combustible gases or steam. Operation in such environments constitutes an extremely safe threat. Use of the instrument in environments with high concentrations of corrosive gas (H2S, SO2, Cl2) is not recommended.

- Do Not Remove Internal Unit
  - The internal unit must not be removed by anyone other than YOKOGAWA’s service personnel. There are dangerous high voltage parts inside. Additionally, do not replace the fuse by yourself.
  - Damage to the Protective Construction
  - Operation of the instrument in a manner not specified in the manual may damage its protective construction.

2. Model and Suffix Codes

- UT35A


This is an explanation of how to dispose of this product based on Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC. This directive is only valid in the EU.

Marking
This product complies with the WEEE Directive (2002/96/EC) marking requirement.

This marking indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category
With reference to the equipment types in the WEEE directive Annex I, this product is classified as a “Monitoring and Control instrument” product. Do not dispose in domestic household waste. When disposing products in the EU, contact your local Yokogawa Europe B.V. office.

4. Accessories (sold separately)

5. Note

- If the instrument is moved from a location with low temperature and low humidity to a place with high temperature and high humidity, or if the temperature changes rapidly, condensation will result. Moreover, in the case of thermocouple inputs, measurement errors will result. To avoid such a situation, leave the instrument in the new environment under ambient conditions for more than 1 hour before using.

Installation Location
The instrument should be installed in indoor locations meeting the following conditions:

- Instrumental panel
  - The instrument is designed to be mounted in an instrumental panel. Mount the instrument in a location with the terminal portions not exposed to wind.
  - Ventilated locations
  - Mounting the instrument in a location subject to ventilation will prevent the instrument from operating normally and protect the display.

- Locations with little mechanical vibration
  - Install the instrument in a location subject to little mechanical vibration.

- Horizontal location
  - Mount the instrument horizontally and ensure that it is level, with no inclination to the right or left.

Installation

- Install the instrument in a location subject to direct sunlight or close to a heater.
- Install the instrument in a location with static electricity levels that remain close to an average temperature of 25°C. Do not install in locations subject to direct sunlight or close to a heater, as this adversely affects the instrument.
- Locations with substantial amounts of oily fumes, steam, moisture, dust, or corrosive gases
  - The presence of oily fumes, steam, moisture, dust, or corrosive gases adversely affects the instrument. Do not mount the instrument in locations subject to any of these substances.
- Areas near electromagnetic field generating sources
  - The instrument has a function for measurements in environments with a high magnetic field. If the instrument is used in locations close to a strong electromagnetic field generating source, the magnetic field may cause measurement errors.
- Locations where the display is difficult to see
  - The instrument has an LCD for the display unit, and this can be difficult to see from extremely oblique angles. Mount the instrument in a location where it can be seen as much as possible from the front.
- Areas close to flammable articles
  - Absolutely do not place the instrument directly on flammable surfaces. If such a circumstance cannot be avoided, the instrument must be placed close to a flammable item, provided a shelf is available. Use a 1.43 mm thick black plate, 1.6 mm thick black plated steel or 1.6 mm thick unplated steel with a space of at least 150 mm between it and the instrument on the top, front, and back.
- Areas subject to being splashed with water
  - Be sure to turn off the power supply to the controller before installing it on the panel to avoid an electric shock.
4. Hardware Specifications

**This instrument is for Measurement Category I (CAT.I). Do not use it for measurements in locations falling under Measurement Categories II, III, and IV.**

### Input Specifications

- **Universal Input (Equipped as standard)**
  - **Number of inputs:** 1
  - **Input type, range, and measurement accuracy:** See the table below.

<table>
<thead>
<tr>
<th>Input Type</th>
<th>DC Voltage/resistance</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>10 V (0.9 to 10 V)</td>
<td>±0.3 %</td>
</tr>
<tr>
<td>T</td>
<td>10 V (0.9 to 10 V)</td>
<td>±0.3 %</td>
</tr>
<tr>
<td>U</td>
<td>10 V (0.9 to 10 V)</td>
<td>±0.3 %</td>
</tr>
<tr>
<td>W</td>
<td>10 V (0.9 to 10 V)</td>
<td>±0.3 %</td>
</tr>
<tr>
<td>Th</td>
<td>10 V (0.9 to 10 V)</td>
<td>±0.3 %</td>
</tr>
</tbody>
</table>

- **Alarm output:**
  - **Alarm output type:** contact point 1a; 3 points
  - **Alarm current:** less than 10 mA

- **Positional Proportional Output Specifications**
  - **Signal input:** Slide resistance: 100 Ω to 2.5 kΩ thermal break alarm when the measured value is less than the break detection value.
  - **Temperature rise time:** 0.5 to 1 second (for time proportional output)

### Analog Output Specifications

- **Number of outputs:** 4
- **Output type:** Voltage output
- **Output range:** DC voltage/current

<table>
<thead>
<tr>
<th>Standard Signal</th>
<th>DC Voltage</th>
<th>AC Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.000 to 5.000 V</td>
<td>4 to 20 mA</td>
<td></td>
</tr>
<tr>
<td>0.400 to 2.000 V</td>
<td>2 to 10 mA</td>
<td></td>
</tr>
<tr>
<td>0.00 to 10.00 V</td>
<td>0 to 5 mA</td>
<td></td>
</tr>
</tbody>
</table>

### Retransmission Output Specifications

- **Number of outputs:** Retransmission output: 1, shared with 15 V DC loop power supply or Cooling-side control output
- **Current output:** 4 to 20 mA or 20 mA DC/AC output

<table>
<thead>
<tr>
<th>Standard Signal</th>
<th>DC Voltage</th>
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</tr>
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</tr>
<tr>
<td>0.00 to 10.00 V</td>
<td>0 to 5 mA</td>
<td></td>
</tr>
</tbody>
</table>

### Contact Input Specifications

- **Number of inputs:** See the table of Model and Suffix Codes.
- **Input type:** Voltage contact input or transistor contact input
- **Input range:** 12 V DC, 10 mA or more
- **Contact resistance:** 100 Ω or less

- **Transistor contact input:**
  - **Input range:** 24 V DC, 50 mA or more
  - **Contact resistance:** 100 Ω or less

### Contact Transistor Output Specifications

- **Number of outputs:** See the table of Model and Suffix Codes.
- **Output type:** Open collector (SINK current)
- **Output range:** Max. 24 V, 50 mA
- **Output time resolution:** Min. 200 ms

### Heater Break Alarm Specifications

- **Number of outputs:** 2
- **Output type:** Voltage contact output
- **Measurement accuracy:** 0.1 % of input span (less or less than 10 mA)

### 24 V DC Loop Power Supply Specifications

- **Power:** Is supplied to a 2-wire transmitter.
- **Power supply:** 21.6 to 28.0 V DC
- **Rated current:** 4 to 20 mA
- **Maximum supply current:** About 30 mA (with short-circuit current limiting circuit)

### Safety and EMC Standards

- **Safety:**) Compliant with IEC/EN61010-1 (IEC), approved by CAN/CSA C22.2 No.61010-1 (CSA), approved by UL/CSA (UL61010-1). Installation category: CAT II Pollution degree: 2 Measurement category: I (CAT.I) Rated measurement input voltage: Max. 10 V DC Rated transient overvoltage: 1500 V (Note): This is a reference safety standard value for Measurement Category I of IEC/EN61010-1. It is not necessarily a guarantee of instrument performance.

- **EMC Conformity standards:**
  - CE marking: EN61326-1, Class A, Table 2 (For use in industrial locations)
  - EN61326-2-3: EN50011, Class 1
  - EN61326-2-2: EN50011, Class 1
  - EN61000-3-3: C-Tick marks
  - EN50011, Class 1, Group 1
  - EN61000-3-3: C-Tick marks
  - EN50011, Class 1, Group 1

### Mounting the Instrument Main Unit

Provide an instrument panel sheet steel of 1.0 to 10 mm thickness. After opening the mounting hole on the panel, follow the procedures below to install the control:

1. Insert the controller into the opening from the front of the panel so that the terminal board on the rear is at the far side.
2. Set the brackets on the two corners of the controller as shown in the figure below, then tighten the screws of the brackets. Take care not to overtighten them.

### External Dimensions and Panel Cutout Dimensions

- **UT35A**
  - Unit mm (approx. inch)
  - General mounting: 85.2 x 130.0 x 39.0
  - Side-by-side close mounting: 85.2 x 130.0 x 50.0

- **UT32A**
  - Unit mm (approx. inch)
  - General mounting: 60.7 x 110.0 x 39.0
  - Side-by-side close mounting: 60.7 x 110.0 x 50.0

### Hardware Specifications

- **Input resistances:** CAT.I: 10 kΩ, CAT.II: 25 kΩ
- **Input range:** AC voltage/current

<table>
<thead>
<tr>
<th>Standard Signal</th>
<th>DC Voltage</th>
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</tr>
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<td></td>
</tr>
<tr>
<td>0.00 to 10.00 V</td>
<td>0 to 5 mA</td>
<td></td>
</tr>
</tbody>
</table>

- **Allowable signal source resistances:**
  - TC or mV input: 250 Ω or less
  - DC voltage input: 240 Ω or less

- **Effects of signal source resistance:**
  - 0.1 % or less
  - 0.2 % or less

- **Allowable input voltage/current:**
  - TC, mA and RTD input: ±0.1 V DC
  - Voltage input: ±0.5 V DC
  - mA input: ±0.5 mA

- **Input noise:** 0.05 µV/Ω or less

- **Effects of signal source resistance:**
  - 0.1 % or less
  - 0.2 % or less

- **Power supply:** 14.5 to 18.0 V DC

- **Maximum supply current:** About 21 mA (with short-circuit current limiting circuit)

- **Input resistance:**
  - Current: 4 to 20 mA
  - Voltage: 0 to 10 V

- **Allowable input voltage/current:**
  - TC, mA and RTD input: ±0.1 V DC
  - Voltage input: ±0.5 V DC
  - mA input: ±0.5 mA

- **Input noise:** 0.05 µV/Ω or less

- **Effects of signal source resistance:**
  - 0.1 % or less
  - 0.2 % or less

- **Power supply:** 14.5 to 18.0 V DC

- **Maximum supply current:** About 21 mA (with short-circuit current limiting circuit)
■ Construction, Installation, and Wiring

- Dustproof and drip-proof IP66 (for front panel) (Not available for side-by-side close mounting.)
- Material: Polyurethane (Flame retardancy: UL94V-0)
- Case color: White (Light gray) or Black (Light charcoal gray)
- Weight: 0.5 kg or less
- External dimensions (mm): UT32A: 96 (W) × 96 (H) × 65 (depth from the panel face) UT35A: 148 (W) × 96 (H) × 65 (depth from the panel face) (Depth except the projection on the rear panel)
- Installation: Direct panel mounting; mounting bracket, one each for upper and lower mounting
- Panel cutout dimensions (mm): UT32A: 90 (W) × 90 (H) UT35A: 142 (W) × 92 (H)
- Mounting: up to 30 degrees above the horizontal. No dowel nail fitting allowed.
- Wiring: M3 screw terminal with square washer (for signal wiring and power wiring)

■ Power Supply Specifications and Isolation

- Power supply
  - Rated voltage: 100-240 V AC (+10%/-15%, 50/60 Hz)
  - 24 V DC (±10%/-15% (for DC option))
- Power consumption (DCA VA, AC 14 VA if /DC option is specified) UT32A: 15 VA UT 74 VA, AC 11 VA if DC option is specified)
- Data backup: Nonvolatile memory
- Power backup: 20 ms (for 100 V AC drive)
- Between primary terminals and secondary terminals: 2300 V AC for 1 minute
- Between primary terminals: 1500 V AC for 1 minute
- Between secondary terminals: 500 V AC for 1 minute
- Primary terminals: Power, and relay output terminals; Secondary terminals: Analog I/O signal terminals, contact input terminals, communication terminals, and ground terminals.
- Power terminals for 24 VDC circuits are the secondary terminals.
- Insulation resistance: Between power supply terminals and a grounding terminal 20 MΩ or more at 500 V DC.
- Isolation specifications:

---

### 5. How to Connect Wires

**WARNING**

- Wiring work must be carried out by a person with basic electrical knowledge and practical experience.

- Be sure to turn off the power supply to the controller before wiring to avoid an electric shock. Use a tester or similar device to ensure that no power is being supplied to a cable to be connected.

- As a safety measure, always install a circuit breaker (an IEC 60947-compliant product, 5 A, 100 V, or 20 V AC) in an easily accessible location near the instrument. Moreover, provide indication that the switch is the device for turning off the power to the instrument.

- Install the power cable keeping a distance of more than 1 cm from other signal wires.

- The power cable is required to meet the IEC standards concerned or the requirements of the area in which the instrument is being installed.

- Wiring should be installed to conform to NEC (National Electrical Code: ANSI/NFPA-70) or the wiring construction standards in countries or regions where wiring will be installed.

- For control relay output, alarm relay output, and power terminal connections, use heat-resistant cables.

- Since the insulation provided to each relay output terminal is Functional insulation, provide Reinforced insulation to the external of the device as necessary. (Refer to the drawing below.)

---

### 6. Terminal Wiring Diagrams

**CAUTION**

- Do not use an unassigned terminal as the relay terminal.
- UT35A is not a 100-240 V AC power supply for the 24 V AC/DC model; otherwise, the instrument will malfunction.

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### Recommended Crimp-on Terminal Lugs

- Power input (UT35A/UT32A)
- Recommended tightening torque: 0.6 N m
- Applicable wire size: Power supply wiring 1.25 mm² or more

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### Power Supply

- **Primary**
  - Temperature change rate: 20ºC/h or less
- **Transportation and Storage Conditions**
  - Magnetic field: 400 A/m or less
  - Ambient humidity: 20 to 90% RH (no condensation allowed)
  - Ambient temperature: -10 to 50ºC (-10 to 40ºC for side-by-side close mounting)

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### Transportation and Storage Conditions

- Temperature: -25 to 70ºC
- Thermal change rate: 20ºC/h or less
- Humidity: 5 to 95% RH (no condensation allowed)
This guide can be turned on/off with the Fn key.

This operation guide describes basic settings and operations of the UT35A/UT32A.

## Contents

1. Names and Functions of Display Parts
2. Setup Procedure
3. Quick Setting Function (Setting of Input and Output)
4. Operation Display
5. Other Setup
6. Settings and Alarm Setpoint
7. Quick Setting Function

### 1. Names and Functions of Display Parts

- **Key Description**
  - (7) Key: navigation indicates.
  - (4) Data display (orange): Displays a parameter setpoint and menu symbol.
  - (3) Security indicator (red): Lit if a password is set. The setup parameter settings are locked. It is the communication interface for the adapter cable used when the UT35A displays.
  - (2) Control type setup (green): Displays the parameter setting display when the guide display ON/OFF is set to ON.
  - (1) UT35A: DISPLAY key (white or red)
  - (6) Lightmeter function: Used to switch the display types.

### 2. Setup Procedure

- **Flow of Quick Setting Function**
  - In Quick setting mode, the parameter guide appears on the display.
  - This guide can be turned on/off with the Fn key.

### 3. Quick Setting Function (Setting of Input and Output)

#### Operation in Initial Display

- Press the SET/ENTER key while YES is displayed to start the Quick setting function.
  - If you change YES to NO and press the SET/ENTER key, Operation Display will appear without starting the Quick setting function.

#### Operation for Setting

- To select the parameter setting displayed as the initial value, press the Down arrow key to move to the next parameter.

### 4. Operation Display

- **Operation**: Displays the scrolling guide in the Menu Display and Parameter Setting Display when the guide display ON/OFF is set to ON.
- **PV display (white or red)**: Displays an error state if an error occurs. The operation guide is displayed on the Parameter Screen Display when the guide display ON/OFF is set to ON.
- **Group display (green)**: Displays parameter (CNT) number (1 to 4) or the parameter setting display when the guide display ON/OFF is set to ON.
- **Parameter display (green and red)**: Displays the parameter name and value.
- **Error display (orange)**: Displays the last digit of the upper limit value blinks. The upper limit value of the setting range is displayed for the parameter RH (maximum value of PV input range).
- **Key operation function**: Press the SET/ENTER key.
- **Function indicator (red)**: Blinking allows you to make changes (setting mode).
  - Pressing the Down arrow key while YES is displayed in the Operation Display.
  - The operation guide is displayed on the Parameter Screen Display when the guide display ON/OFF is set to ON.
  - The UT35A has F1, F2, and FN keys. To use these keys, press the SET/ENTER key.
  - Press the Left/Right arrow keys in the Menu Display to move to the Parameter Setting Display.
  - Press the Right arrow key to move to the Parameter Setting Display.
  - The quick setting function can only be used if the operation guide is displayed in the Menu Display.
  - The operation guide is displayed in the Menu Display.
  - The parameter setting display is displayed in the Menu Display.

### 5. Other Setup

#### Quick Setting Function

- **Flow of Quick Setting Function**
  - The Quick setting function is a function to easily set the basic function of the control.
  - For Position proportional type adjustment.

#### Making Settings Using Quick Setting Function

Example: Setting to PID control, thermocouple type K (range of 0 to 588.0°C), and current output

- To change and set the parameter setting, press the SET/ENTER key to start the setup blinking.
  - The blinking state allows you to make changes (setting mode).
  - Use the Up/Down/Left/Right arrow keys to change the setup.
  - Press the SET/ENTER key to register the setting.

- **Setting Display**
  - Press the SET/ENTER key while YES for GSM (Quick setting mode) is displayed.
  - Press the SET/ENTER key while NO for Quick setting is displayed.
  - The parameter RH (maximum value of PV input range) can only be used if the operation guide is displayed in the Menu Display.
### Parameters to be set

#### Control Type

<table>
<thead>
<tr>
<th>Parameter Symbol</th>
<th>Name of Parameter</th>
<th>Setting Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNT (Continuous)</td>
<td>CNT Control</td>
<td>0-100% (when used with a ratio controller in a step mode)</td>
</tr>
<tr>
<td>CV (Current)</td>
<td>CV Control</td>
<td>0-100% (when used with a current controller in a step mode)</td>
</tr>
<tr>
<td>CV (Volts)</td>
<td>CV Control</td>
<td>0-100% (when used with a voltage controller in a step mode)</td>
</tr>
<tr>
<td>SV (Setvalue)</td>
<td>SV Control</td>
<td>0-100% (when used with a setvalue controller in a step mode)</td>
</tr>
<tr>
<td>DMP (Digital)</td>
<td>DMP Control</td>
<td>0-100% (when used with a digital controller in a step mode)</td>
</tr>
</tbody>
</table>

#### Input Function

- Automatically returns to OFF.
- Press the SET/ENTER key.
- Hold the down the keys for 3 seconds.
- When a password is set, PASS is displayed. If the correct password is not entered, setup parameters cannot be changed.
- Press the Right arrow key until OUT menu appears.

#### Output Function

- CNT menu is displayed.
- Press the SET/ENTER key.
- The parameter V-AT (automatic valve position adjustment) is displayed.
- Press the SET/ENTER key.
- OFF blinks.
- Press the Up arrow key.
- ON is displayed. Blinks during the change.

- CN has been registered and the automatic adjustment of the valve position starts. Display the key or DISP key once to return to the Operation Display.
- When the adjustment is completed normally, the indication automatically returns to OFF.
- When VAT E appears on PV display, it indicates an error.
- Check the wiring for input and perform the automatic adjustment again. To perform a valve adjustment manually, see User’s Manual.

### 5. Setting Alarm Type

#### The following procedure shows an example of changing the alarm-1 type (factory default: PV high/no alarm) to PV low limit (alarm setpoint: 02).

1. Show the Operation Display.
2. Hold down the key for 3 seconds.
3. MODE menu is displayed. Press the Right arrow key until ALRM menu appears.
4. ALRM menu is displayed. Press the SET/ENTER key.
5. The parameter AL1 (alarm-1 type) is displayed.

### 6. Setting Alarm Setpoint

#### The following procedure shows an example of changing the alarm-1 setpoint of group 1 to 190.0.

1. Show the Operation Display.
2. Display MODE menu with the same procedure as described in Setting Alarm Type.
3. Press the SET/ENTER key.
4. The parameter A1 is displayed. A1 to A4 represent the alarm-1 to -4 setpoints.
5. Press the SET/ENTER key.
6. Press the Down arrow key until AL1 appears.
7. Display the parameter and group that need to be changed.

#### Each parameter and group can be changed in the Parameter Setting Displays of alarms using arrow keys.
- Press the Up arrow key: parameters increase.
- Press the Down arrow key: parameters decrease.
- Blinks during the change.
- Change the setpoint using the Up/Down arrow keys.
- The alarm-1 setpoint (PV low limit) is registered after the setup is completed. Press the DISPLAY key or DISP key once to return to the Operation Display.

#### The setpoint has been registered. After the setup is completed, press the DISPLAY key or DISP key once to return to the Operation Display.
1. Setting Target Setpoint (SP)

1. Show the SP Display (Operation Display).
   (This is an example of setting the target setpoint.
   In cases where the communication is specified, the parameter R.L (REMOTE/LOCAL switch) is displayed.

2. Hold down the PARAMETER key or PARA key for 3 seconds to display MODE menu.

3. Press the SET/ENTER key.

4. Press the Down arrow key until the parameter SPNO. appears.

   The parameter SPNO. (SP number selection) is displayed.

5. Press the SET/ENTER key.

6. Change the setpoint using the Up/Down arrow keys.
   Blinks during the change.

7. The setpoint has been registered. The start auto-tuning.
   The stop lamp is lit in AUTO mode.
   When AUTO is switched into MAN, the control output value in AUTO mode is held.
   The controller can be operated manually from the hold value.
   In cases where the communication is specified, the parameter R.L (REMOTE/LOCAL switch) is displayed.

8. Press the SET/ENTER key.

   The MAN lamp goes off, which means that the auto-tuning completed normally.

3. Performing/Canceling Auto-tuning

Auto-tuning should be performed after setting a target setpoint.
Make sure that the controller is in automatic mode (AUTO) and in run mode (RUN)
before auto-tuning. (If setting to AUTO, see “5. Switching between AUTO and MAN,” and for setting to RUN, see “6. Switching between RUN and STOP.”)
If the setpoint value in advance or auto-tuning does not find any appropriate PID constants, set the PID manually.
For setting the PID manually, see User’s Manual.

Do not perform auto-tuning for the following processes.
Tune PID manually.

Processes which do not allow the output to be turned on and off temporarily.
Processes which prohibit severe output changes at control valves (or other actuators).
Processes in which product quality can be adversely affected if PV values fluctuate beyond their allowable ranges.

4. Selecting Target Setpoint Numbers (SPNO.)

The following operating procedures are an example of changing the target setpoint number (SPNO.) from 1 to 2.
Each SP has its PID group. The PID group set for the parameter PIDN (PID number selection) is used.

1. Show the Operation Display.

2. Hold down the PARAMETER key or PARA key for 3 seconds to display MODE menu.

3. Press the SET/ENTER key.

4. In cases where the communication is specified, the parameter R.L (REMOTE/LOCAL switch) is displayed.

5. Press the Down arrow key until the parameter SPNO. appears.

   The parameter SPNO. (SP number selection) is displayed.

6. Press the SET/ENTER key.

7. Change the setpoint using the Up/Down arrow keys.
   Blinks during the change.

8. The setpoint has been registered. The start auto-tuning.
   The stop lamp is lit in AUTO mode.
   When AUTO is switched into MAN, the control output value in AUTO mode is held.
   The controller can be operated manually from the hold value.
   Although the display of UT35A is used in this guide, UT32A can be operated similarly.
   For details, see User’s Manual.
7. Switching between REM (Remote) and LCL (Local)

Remote and local switching can be performed using any of the following:

(1) Control input
(2) Parameter, (3) Communication, and (4) User function key.

LCL (Local) Control is performed using the target setpoint on the control.

REM (Remote) Control is performed using a setpoint via communication for the target setpoint. The communication wiring is specified.

When the control input is ON, operation cannot be performed by using the parameter, communication, or key. When the control input is OFF, the setting is switched using the parameter, communication, or key, the last switching operation is performed.

When a dead band is present, the symbol display blinks during the change.

NOTE

- The PID group for the local SP number is used as PID in remote mode.

1. Show the Operation Display.
2. Hold down the PARAMETER key or PARA key for 3 seconds to display MODE menu.
3. Press the SET/ENTER key.
4. Change the operation mode using the Up/Down arrow keys. Blinks during the change.
5. The REM lamp is lit.

8. Manipulating Control Output in Manual Mode

In manual mode, control output is manipulated by operating the keys (the value is changed using the Up/Down arrow keys, then outputted as it is). Actual output is 0-100%. Even if the SET/ENTER key is not pressed, the control output value changes according to the displayed value.

In step mode (when the STOP lamp is lit), control output cannot be manipulated.

NOTE

- When setup parameter (PARA) is set, the value is changed using the Down arrow key.
- The symbol display is lit.
- The Actual output (%), Target setpoint (SP) number, and Symbol of heating side are presented according to the dead band setting.
- DB = 24.8 Dead band: Normal indication (Note)
- When a dead band is positive (+), the value is manipulated for 3 seconds to display MODE menu.
- When a dead band is negative (-), the value is manipulated for 3 seconds to display MODE menu.

Manual operation in Heating/cooling control

<table>
<thead>
<tr>
<th>Symbol of heating side Control output</th>
<th>Symbol of cooling side Target setpoint (SP) number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling-side control output</td>
<td>Symbol of heating side</td>
</tr>
<tr>
<td>Heating-side control output</td>
<td></td>
</tr>
<tr>
<td>Up arrow key: conc. decreases control output and increases heating-side control output. Down arrow key: conc. increases heating-side control output and decreases cooling-side control output.</td>
<td>Either one of the heating-side and cooling-side outputs are presented, or both of them are presented according to the dead band setting.</td>
</tr>
</tbody>
</table>

9. Troubleshooting Flow

- If the Operation Display does not appear after turning on the controller’s power, check the procedures in the following chart. If a problem appears to be complicated, contact our sales representatives.

- Remedies if Power Failure Occurs during Operations
  - If there is no power failure within 30 ms, a power failure is not detected. Normal operation continues.
  - Power failure for less than about 5 seconds, or for about 5 seconds or more.
  - Affects the “settings” and “operation status.”
  - For details, see User’s Manual.

- Errors at Power On
  - The errors shown below may occur in the fault diagnosis when the power is turned on. (For details of Setpoint display and input/output action when each error occurs, see User’s Manual).
  - ERRORS at Power On
    - 9. Troubleshooting
      - 7. Switching between REM (Remote) and LCL (Local)
        - Control input is ON, operation cannot be performed using the parameter, communication, or key. When the control input is OFF, the setting is switched using the parameter, communication, or key, the last switching operation is performed.
**Operation Parameters**

Hold down the PARAMETER key or PARA key for 3 seconds to move from the Operation Display to the Operation Parameter Display Setting. Press the DISPL key once to return to the Operation Display.

### Operation Setting
- To select the parameter setting displayed as the initial value, press the Down arrow key to move to the next parameter.
- To change and set the parameter setting, press the SET/ENTER key to start the setting.

Note: There are some parameters which are not displayed depending on the model and suffix codes, control type (CNT), etc. See User's Manual for the parameters for professional setting mode (LEDV, LCD). Please refer to the User's Manual for the details.

#### Operation Mode

<table>
<thead>
<tr>
<th>Parameter symbol</th>
<th>Name of Parameter</th>
<th>Setting Range</th>
<th>Initial value</th>
<th>User setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOP/STN switch</td>
<td>R/LN Select mode</td>
<td>R/LN mode</td>
<td>YES</td>
<td>YES</td>
<td>STD</td>
</tr>
<tr>
<td>[W/L]</td>
<td>Local mode</td>
<td>L/L mode</td>
<td>YES</td>
<td>YES</td>
<td>STD</td>
</tr>
<tr>
<td>[SU]</td>
<td>Start-up timer</td>
<td>Start-up timer (s)</td>
<td>500</td>
<td>500</td>
<td>STD</td>
</tr>
<tr>
<td>[SU]</td>
<td>SP number selection</td>
<td>SP number (1 to 4)</td>
<td>1 to 4</td>
<td>1</td>
<td>STD</td>
</tr>
<tr>
<td>[SU]</td>
<td>PID number selection</td>
<td>PID number of group for reference level</td>
<td>1 to 4</td>
<td>1</td>
<td>STD</td>
</tr>
</tbody>
</table>

#### SELECT Parameter

<table>
<thead>
<tr>
<th>Parameter symbol</th>
<th>Name of Parameter</th>
<th>Setting range of a registered parameters</th>
<th>Initial value</th>
<th>User setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELECT parameter</td>
<td>10 (SPNO.)</td>
<td>Falling range of SP groups</td>
<td>1 to 4</td>
<td>1</td>
<td>STD</td>
</tr>
</tbody>
</table>

For the setting of SELECT parameters, see User's Manual.

### SP and Alarm Setpoint Setting Parameter

<table>
<thead>
<tr>
<th>Parameter symbol</th>
<th>Name of Parameter</th>
<th>Setting Range</th>
<th>Initial value</th>
<th>User setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SPNO.)</td>
<td>Target setpoint</td>
<td>User input remote SP setpoint (SP.U)</td>
<td>0.0 to 100.0%</td>
<td>0.0</td>
<td>STD</td>
</tr>
<tr>
<td>(SPNO.)</td>
<td>Sub-target setpoint (in two-position control)</td>
<td>User input remote SP setpoint (SP.U)</td>
<td>0.0 to 100.0%</td>
<td>0.0</td>
<td>STD</td>
</tr>
<tr>
<td>(PMD)</td>
<td>PID number selection</td>
<td>PID number of group for reference level</td>
<td>1 to 4</td>
<td>1</td>
<td>STD</td>
</tr>
<tr>
<td>(PMD)</td>
<td>Alarm time to 4 setpoint</td>
<td>Alarm time to 4 setpoint (AL1 to AL4)</td>
<td>1 to 4</td>
<td>1</td>
<td>STD</td>
</tr>
</tbody>
</table>

#### Alarm Function Setting Parameter

<table>
<thead>
<tr>
<th>Parameter symbol</th>
<th>Name of Parameter</th>
<th>Setting Range</th>
<th>Initial value</th>
<th>User setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PMD)</td>
<td>Alarm function type</td>
<td>Alarm function type (FHL, FHY)</td>
<td>FHL</td>
<td>FHL</td>
<td>STD</td>
</tr>
<tr>
<td>(PMD)</td>
<td>Alarm function type (SU.HY)</td>
<td>Alarm function type (SU.HY)</td>
<td>SU.HY</td>
<td>SU.HY</td>
<td>STD</td>
</tr>
<tr>
<td>(PMD)</td>
<td>Alarm function type (SU.CM)</td>
<td>Alarm function type (SU.CM)</td>
<td>SU.CM</td>
<td>SU.CM</td>
<td>STD</td>
</tr>
</tbody>
</table>

### PV-related Setting Parameter

<table>
<thead>
<tr>
<th>Parameter symbol</th>
<th>Name of Parameter</th>
<th>Setting Range</th>
<th>Initial value</th>
<th>User setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PMD)</td>
<td>PV input filter</td>
<td>PV input filter</td>
<td>OFF</td>
<td>OFF</td>
<td>STD</td>
</tr>
<tr>
<td>(PMD)</td>
<td>PV input filter</td>
<td>PV input filter</td>
<td>OFF</td>
<td>OFF</td>
<td>STD</td>
</tr>
</tbody>
</table>
### Zone Control Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Setting Range</th>
<th>Initial value</th>
<th>Default setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td>PID to PID parameter</td>
<td>RPM</td>
<td>1 to 4</td>
<td>1 to 4</td>
<td>4</td>
<td>STD</td>
</tr>
</tbody>
</table>

- **Reference point 1 to 3**
  - Use reference point at which switching of PID constants according to the given input range.
  - Reference point 1: -5.0 to 105.0%
  - Reference point 2: -19999 to 30000,
  - Reference point 3: 0.0 to 100.0%

- **Zone PID switching function**
  - Switching according to the given input range.
  - Range: 0.0 to 105.0%

- **Reference deviation**
  - Set a deviation from 0.0 that PID for setpoint deviation is equal to a larger deviation than the preset reference deviation.
  - Default deviation: OFF

For Zone control, set the setup parameter ZON (zone PID selection) to Zone PID selection.

#### Setup Parameters

Hold down the PARAMETER key or PARA key and Left arrow key simultaneously for 3 seconds to move from the Operation Display or Operation Parameter Setting Display to the Setup Parameter Setting Display.

Press the DISPLAY key or DISP key once to return to the Operation Display.

### P Parameter (for Ladder Program)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Setting Range</th>
<th>Initial value</th>
<th>Default setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td>PID to PID parameter</td>
<td>RPM</td>
<td>1 to 4</td>
<td>1 to 4</td>
<td>4</td>
<td>STD</td>
</tr>
</tbody>
</table>

- **Reference point 1 to 3**
  - Use reference point at which switching of PID constants according to the given input range.
  - Reference point 1: -5.0 to 105.0%
  - Reference point 2: -19999 to 30000,
  - Reference point 3: 0.0 to 100.0%

- **Zone PID switching function**
  - Switching according to the given input range.
  - Range: 0.0 to 105.0%

- **Reference deviation**
  - Set a deviation from 0.0 that PID for setpoint deviation is equal to a larger deviation than the preset reference deviation.
  - Default deviation: OFF

For Zone control, set the setup parameter ZON (zone PID selection) to Zone PID selection.

#### Operation for Setting

- To select the parameter setting displayed as the initial value, press the Down arrow key to move to the next parameter.
- To change and set the parameter setting, press the SET/ENTER key to start the setup function. The blinking state allows you to make changes (setting mode). Use the Up/Dwn/Lft/Rgt arrow keys to change the setup. Press the SET/ENTER key to register the setting.

Note that there are some parameters which are not displayed depending on the Model and Suffix codes, control type (CNT), etc. The parameters for professional setting mode (LEV, PRI) are not described in this manual. See User’s Manual.

### Control Function Setting Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Setting Range</th>
<th>Initial value</th>
<th>Default setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td>PID to PID parameter</td>
<td>RPM</td>
<td>1 to 4</td>
<td>1 to 4</td>
<td>4</td>
<td>STD</td>
</tr>
</tbody>
</table>

- **Reference point 1 to 3**
  - Use reference point at which switching of PID constants according to the given input range.
  - Reference point 1: -5.0 to 105.0%
  - Reference point 2: -19999 to 30000,
  - Reference point 3: 0.0 to 100.0%

- **Zone PID switching function**
  - Switching according to the given input range.
  - Range: 0.0 to 105.0%

- **Reference deviation**
  - Set a deviation from 0.0 that PID for setpoint deviation is equal to a larger deviation than the preset reference deviation.
  - Default deviation: OFF

For Zone control, set the setup parameter ZON (zone PID selection) to Zone PID selection.

#### Operation for Setting

- To select the parameter setting displayed as the initial value, press the Down arrow key to move to the next parameter.
- To change and set the parameter setting, press the SET/ENTER key to start the setup function. The blinking state allows you to make changes (setting mode). Use the Up/Dwn/Lft/Rgt arrow keys to change the setup. Press the SET/ENTER key to register the setting.

Note that there are some parameters which are not displayed depending on the Model and Suffix codes, control type (CNT), etc. The parameters for professional setting mode (LEV, PRI) are not described in this manual. See User’s Manual.
### Output Setting Parameter

**Menu symbol:** [OUT](#)  
**Parameter symbol:** [OUT](#)  
**Name of Parameter:**  
**Setting Range:**  
**Initial Value:**  
**User Setting:**  
**Display level:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Name</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output type selection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0] Attack</td>
<td>Lower 3 digits</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Control output cycle time**  
- **Cooling-side control output cycle time**

#### Heater Break Alarm Setting Parameter

**Menu symbol:** [OHA](#)  
**Parameter symbol:** [OHA](#)  
**Name of Parameter:**  
**Setting Range:**  
**Initial Value:**  
**User Setting:**  
**Display level:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Name</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heater break alarm 1 function selection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Function current measurement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Heater breaker switch (ON)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Cooling-side heater break alarm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Heater break alarm 2 function selection</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Function current measurement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Heater breaker switch (ON)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Cooling-side heater break alarm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Ethernet Communication Setting Parameter

**Menu symbol:** [ETH](#)  
**Parameter symbol:** [ETH](#)  
**Name of Parameter:**  
**Setting Range:**  
**Initial Value:**  
**User Setting:**  
**Display level:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Name</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-speed response</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CC-Link Communication Setting Parameter

**Menu symbol:** [CLC](#)  
**Parameter symbol:** [CLC](#)  
**Name of Parameter:**  
**Setting Range:**  
**Initial Value:**  
**User Setting:**  
**Display level:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Name</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Default gateway</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PRO-FIBUS-DP Communication Setting Parameter

**Menu symbol:** [FIB-DP](#)  
**Parameter symbol:** [FIB-DP](#)  
**Name of Parameter:**  
**Setting Range:**  
**Initial Value:**  
**User Setting:**  
**Display level:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Name</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use function key 1 active setting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DeviceNet Communication Setting Parameter

**Menu symbol:** [DNET](#)  
**Parameter symbol:** [DNET](#)  
**Name of Parameter:**  
**Setting Range:**  
**Initial Value:**  
**User Setting:**  
**Display level:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Name</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use function key 2 active setting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Name</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethernet setting switch</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**In cases where the current transformers manufactured by U.R.D. Co., Ltd are used, set the following value for the coil winding number ratio.**

CT: 120-5 H, 800 CT: 12L-30: 3000

---

**Menu symbol:** [MPV](#)  
**Parameter symbol:** [MPV](#)  
**Name of Parameter:**  
**Setting Range:**  
**Initial Value:**  
**User Setting:**  
**Display level:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Name</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BUCKET</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Display Function Setting Parameter

<table>
<thead>
<tr>
<th>Parameter symbol</th>
<th>Name of Parameter</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Select</strong></td>
<td>Display color</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System</strong></td>
<td>Menu symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DI</strong></td>
<td>Numbering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DO</strong></td>
<td>Setting E1/E4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Error</strong></td>
<td>Version Confirmation Parameter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parameter Display Level</strong></td>
<td>Parameter symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DI Function Registration Parameter

<table>
<thead>
<tr>
<th>Parameter symbol</th>
<th>Name of Parameter</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Display</strong></td>
<td>Function</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Menu</strong></td>
<td>Symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Setting</strong></td>
<td>Parameter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parameter</strong></td>
<td>Symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DO</strong></td>
<td>Symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Symbol</strong></td>
<td>Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Symbol</strong></td>
<td>Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DI Function Numbering Parameter

<table>
<thead>
<tr>
<th>Parameter symbol</th>
<th>Name of Parameter</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Display</strong></td>
<td>Function</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Setting</strong></td>
<td>Parameter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parameter</strong></td>
<td>Symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>Function</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parameter</strong></td>
<td>Symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>Function</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parameter</strong></td>
<td>Symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Display Function Setting Parameter

<table>
<thead>
<tr>
<th>Parameter symbol</th>
<th>Name of Parameter</th>
<th>Setting Range</th>
<th>Initial Value</th>
<th>User Setting</th>
<th>Display Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Select</strong></td>
<td>Display color</td>
<td></td>
<td></td>
<td></td>
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