# Operation Guide

**UT75A**
Digital Indicating Controller
Operation Guide for Single-loop Control

**UTAdvanced**

*Functional Enhancement*

**IM 05P01B41-11EN** | **Installation and Wiring**

## YOKOGAWA ◆
Yokogawa Electric Corporation

This operation guide describes installation, wiring, and other tasks required to make the controller ready for operation.
For details of the each function, refer to the electronic manual. User's manuals can be downloaded or viewed at the following URL.

⬇ **http://www.yokogawa.com/ns/ut/im/**

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1. Safety Precautions
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## Introduction

Thank you for purchasing the UT75A Digital Indicating Controller.
This operation guide describes the basic operations related to the single-loop control function of the UT75A. The guide should be provided to the end user of this product.
Be sure to read this operation guide before using the product in order to ensure correct operation.
Before using the product, refer to the table of Model and Suffix Codes to make sure that the delivered product is consistent with the model and suffix codes you ordered. Also make sure that the following items are included in the package.

- Digital Indicating Controller (the model you ordered) ..............................x1
- Set of Brackets ..................................................................................x1
- Unit Label (L4502VZ) ..........................................................................x1
- Tag Label (L4502VE) (Only when ordered.) ...........................................x1
- Terminal Cover (L4502XP for UT75A) ....................................................x1
- Operation Guide for Single-loop Control (this document) ........................x7 (A3 size)
  (Installation and Wiring, Initial Settings, Operations, and Parameters)

● Target Readers
This guide is intended for the following personnel;
- Engineers responsible for installation, wiring, and maintenance of the equipment.
- Personnel responsible for normal daily operation of the equipment.

## 1. Safety Precautions

The following symbol is used on the instrument. It indicates the possibility of injury to the user or damage to the instrument, and signifies that the user must refer to the user's manual for special instructions. The same symbol is used in the user's manual on pages that the user needs to refer to, together with the term "WARNING" or "CAUTION."

⚠ **WARNING** — Calls attention to actions or conditions that could cause serious or fatal injury to the user, and indicates precautions that should be taken to prevent such occurrences.

⚠ **CAUTION** — Calls attention to actions or conditions that could cause injury to the user or damage to the instrument or property and indicates precautions that should be taken to prevent such occurrences.

∿ **AC**

≂ **AC/DC**

▣ The equipment wholly protected by double insulation or reinforced insulation.

⏚ Functional grounding terminals
(Do not use this terminal as a protective grounding terminal.)

### Note

Identifies important information required to operate the instrument.

## ■ Warning and Disclaimer

(1) YOKOGAWA makes no warranties regarding the product except those stated in the WARRANTY that is provided separately.
(2) The product is provided on an "as is" basis. YOKOGAWA assumes no liability to any person or entity for any loss or damage, direct or indirect, arising from the use of the product or from any unpredictable defect of the product.

## ■ Safety, Protection, and Modification of the Product

(1) In order to protect the system controlled by this product and the product itself, and to ensure safe operation, observe the safety precautions described in the user's manual. Use of the instrument in a manner not prescribed herein may compromise the product's functions and the protection features inherent in the device. We assume no liability for safety, or responsibility for the product's quality, performance or functionality should users fail to observe these instructions when operating the product.
(2) Installation of protection and/or safety circuits with respect to a lightning protector; protective equipment for the system controlled by the product and the product itself; foolproof or fail-safe design of a process or line using the system controlled by the product or the product itself; and/or the design and installation of other protective and safety circuits are to be appropriately implemented as the customer deems necessary.
(3) Be sure to use the spare parts approved by YOKOGAWA when replacing parts or consumables.
(4) This product is not designed or manufactured to be used in critical applications that directly affect or threaten human lives. Such applications include nuclear power equipment, devices using radioactivity, railway facilities, aviation equipment, air navigation facilities, aviation facilities, and medical equipment. If so used, it is the user's responsibility to include in the system additional equipment and devices that ensure personnel safety.
(5) Modification of the product is strictly prohibited.
(6) This product is intended to be handled by skilled/trained personnel for electric devices.
(7) This product is UL Recognized Component. In order to comply with UL standards, end-products are necessary to be designed by those who have knowledge of the requirements.

⚠ **WARNING**
● **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 an Explosive Atmosphere**
  Do not operate the instrument in locations with combustible or explosive gases or steam. Operation in such environments constitutes an extreme safety hazard. Use of the instrument in environments with high concentrations of corrosive gas ($H_2S$, $SO_x$, etc.) for extended periods of time may cause a failure.
● **Do Not Remove Internal Unit**
  The internal unit should 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 user's manual may damage its protective construction.

⚠ **CAUTION**
This instrument is an EMC class A product. In a domestic environment this product may cause radio interference in which case the user needs to take adequate measures.

## ■ Protection of Environment

**Waste Electrical and Electronic Equipment (WEEE), Directive**

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

● Marking
  This product complies with the WEEE Directive 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, this product is classified as a "Small equipment" product.
  Do not dispose in domestic household waste. When disposing products in the EU, contact your local Yokogawa Europe B.V. office.

## 2. Model and Suffix Codes

### ■ UT75A

| Model | Suffix code | | | Optional suffix code | Description |
|---|---|---|---|---|---|
| **UT75A** | | | | | Digital Indicating Controller (provided with retransmission output or 15 V DC loop power supply, 3 DIs, and 3 DOs) (Power supply 100-240 V AC) |
| Type 1: Basic control | -0 | | | | Standard type |
| | -1 | | | | Position proportional type |
| | -5 | | | | Dual-loop type |
| Type 2: Functions | | 0 | | | 5 additional DIs and 5 additional DOs |
| | | 1 | | | Remote (1 additional aux. analog) input, RS485 communication (Max.19.2 kbps, 2-wire), 1 additional DI, and 5 additional DOs |
| | | 2 | | | Remote (2 additional aux. analog) inputs, RS485 communication (Max.19.2 kbps, 2-wire), 2 additional DIs |
| | | 3 | | | Remote (1 additional aux. analog) input, 6 additional DIs, 5 additional DOs (*1) |
| Type 3: Open networks | | | 0 | | None |
| | | | 1 | | RS-485 communication (Max.38.4 kbps, 2-wire/4-wire) and 5 additional DIs |
| | | | 2 | | Ethernet communication (with serial gateway function) |
| | | | 3 | | CC-Link communication (with Modbus master function) |
| | | | 4 | | PROFIBUS-DP communication (with Modbus master function) |
| | | | 5 | | DeviceNet communication (with Modbus master function) |
| Display language (*2) | | | | -1 | English (Default.Can be switched to Spanish by the setting.) |
| | | | | -2 | German (Customized order) |
| | | | | -3 | French (Customized order) |
| | | | | -4 | Spanish (Default. Can be switched to English by the setting.) |
| Case color | | | | 0 | White (Light gray) |
| | | | | 1 | Black (Light charcoal gray) |
| Fixed code | | | | -00 | Always "-00" |
| Optional suffix codes | | | | /DC | Power supply 24 V AC/DC |
| | | | | /CP | Carbon potential Calculation function (*3) |
| | | | | /CT | Coating (*4) |

*1: When Type 1 code is "-5", "3" cannot be specified for Type 2 code.
*2: English and Spanish are available for the guide display. (German and French guide displays are customized. Contact our representatives for inquiries.)
*3: Only when Type 2 code is "1", "2" or "3", the /CP option can be specified.
*4: When the /CT option is specified, the UT75A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for EEA-market).

### ■ Customized Product

For customized product, the product is identified by the option code of /S# (where '#' is a number).
Contact your supplier in case your instrument has option /S#, and you are not in the possession of FX1-[Model code]-S# or IM [Model code]-S# (where [Model code] means, for example, UT55A).

### ■ Accessories (sold separately)

The following is an accessory sold separately.
- LL50A Parameter Setting Software

| Model | Suffix code | Description |
|---|---|---|
| **LL50A** | -00 | Parameter Setting Software |

- External Precision Resistor

| Model | Suffix code | Description |
|---|---|---|
| **X010** | See the General Specifications (*) | Resistance Module |

  *: Necessary to input the current signal to the voltage input terminal.
- Terminal Cover: Model UTAP001
- User's Manual (A4 size)
  * User's Manual can be downloaded from a website.
- Brackets
  Part number: L4502TP (2 pcs for upper and lower sides)

- Authorised Representative in the EEA
  Yokogawa Europe BV. (Address: Euroweg 2 , 3825 HD Amersfoort, The Netherlands) is the Authorised Representative of Yokogawa Electric Corporation for this Product in the EEA.
- Printed Manuals

| Model | Description |
|---|---|
| UT75A Digital Indicating Controller Operation Guide | IM 05P01B41-11EN |
| Precautions on the Use of the UTAdvanced Series | IM 05P01A01-11EN |

- Electronic Manuals
  You can download the latest manuals from the following website:
  URL: http://www.yokogawa.com/ns/ut/im/

| Model | Description |
|---|---|
| UT75A Digital Indicating Controller Operation Guide | IM 05P01B41-11EN |
| UT75A Digital Indicating Controller User's Manual | IM 05P01B41-01EN |
| UTAdvanced Series Communication Interface (RS-485, Ethernet) User's Manual | IM 05P07A01-01EN |
| UTAdvanced Series Communication Interface (Open Network) User's Manual | IM 05P07A01-02EN |
| LL50A Parameter Setting Software Installation Manual | IM 05P05A01-01EN |
| LL50A Parameter Setting Software User's Manual | IM 05P05A01-02EN |
| Precautions on the Use of the UTAdvanced Series | IM 05P01A01-11EN |

- General Specification

| Model | Description |
|---|---|
| UT75A Digital Indicating Controller | GS 05P01B41-01EN |
| LL50A Parameter Setting Software | GS 05P05A01-01EN |

* The last two characters of the manual number and general specification number indicate the language in which the manual is written.

## 3. How to Install

### ■ Installation Location

The instrument should be installed in indoor operation meeting the following conditions:
- **Instrumented panel**
  This instrument is designed to be mounted in an instrumented panel. Mount the instrument in a location where its terminals will not inadvertently be touched.
- **Well ventilated locations**
  Mount the instrument in well ventilated locations to prevent the instrument's internal temperature from rising.
  However, make sure that the terminal portions are not exposed to wind. Exposure to wind may cause the temperature sensor accuracy to deteriorate. To mount multiple indicating controllers, see the external dimensions/panel cutout dimensions which follow. If mounting other instruments adjacent to the instrument, comply with these panel cutout dimensions to provide sufficient clearance between the instruments.
- **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.
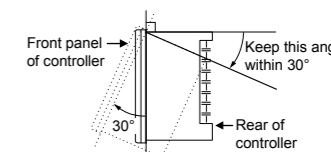


### Note

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 prior to using it.

Do not mount the instrument in the following locations:
- **Outdoors**
- **Locations subject to direct sunlight or close to a heater**
  Install the instrument in a location with stable temperatures that remain close to an average temperature of 23°C. Do not mount it in locations subject to direct sunlight or close to a heater. Doing so 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**
  Do not place magnets or tools that generate magnetism near the instrument. 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 uses 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 is unavoidable and the instrument must be placed close to a flammable item, provide a shield for it made of 1.43 mm thick 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, bottom, and sides.
- **Areas subject to being splashed with water**
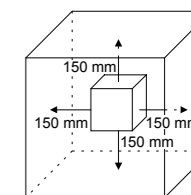


⚠ **WARNING**
Be sure to turn OFF the power supply to the controller before installing it on the panel to avoid an electric shock.

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YOKOGAWA CORPORATION OF AMERICA
  Head office and for product sales
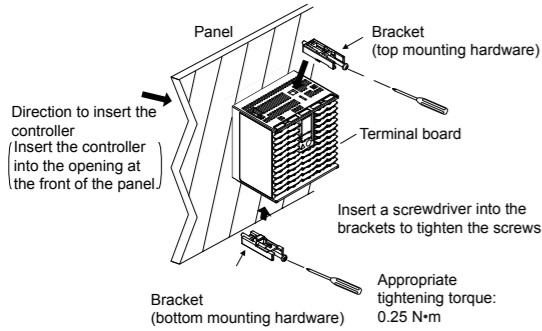  2 Dart Road, Newnan, Georgia 30265, USA
YOKOGAWA EUROPE B.V.
  Headquarters
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## ■ Mounting the Instrument Main Unit

Provide an instrumented panel steel sheet of 1 to 10 mm thickness.
After opening the mounting hole on the panel, follow the procedures below to install the controller:
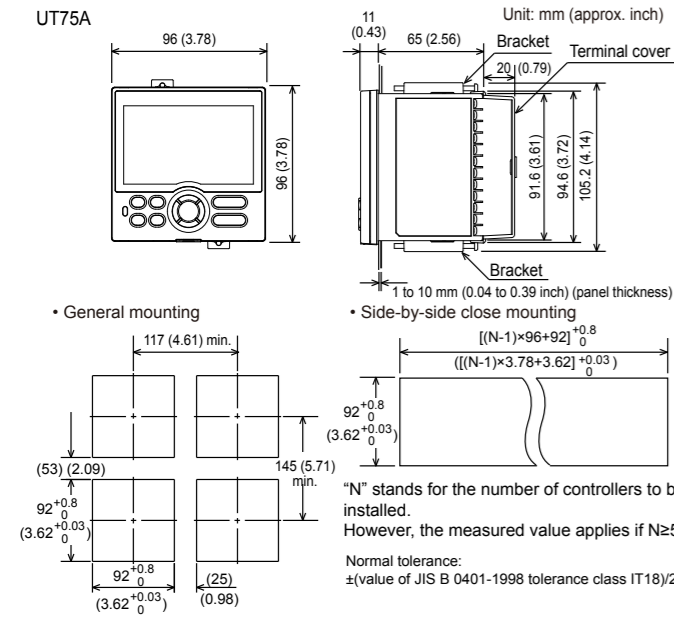
1) Insert the controller into the opening from the front of the panel so that the terminal board on the rear is at the far side.
2) Set the brackets in place on the top and bottom of the controller as shown in the figure below, then tighten the screws of the brackets. Take care not to overtighten them.



Panel
Bracket (top mounting hardware)
Direction to insert the controller
(Insert the controller into the opening at the front of the panel.)
Terminal board
Insert a screwdriver into the brackets to tighten the screws.
Bracket (bottom mounting hardware)
Appropriate tightening torque: 0.25 N·m

⚠ **CAUTION**
- Tighten the screws with appropriate tightening torque within 0.25 N·m. Otherwise it may cause the case deformation or the bracket damage.
- Make sure that foreign materials do not enter the inside of the instrument through the case's slit holes.

## ■ External Dimensions and Panel Cutout Dimensions

UT75A

Unit: mm (approx. inch)



96 (3.78)
11 (0.43)
65 (2.56)
20 (0.79)
Bracket
Terminal cover
96 (3.78)
91.6 (3.61)
94.6 (3.72)
105.2 (4.14)
Bracket
1 to 10 mm (0.04 to 0.39 inch) (panel thickness)

• General mounting
117 (4.61) min.
92 +0.8/0 (3.62 +0.03/0)
(53) (2.09)
92 +0.8/0 (3.62 +0.03/0)
92 +0.8/0 (3.62 +0.03/0)
(25) (0.98)

• Side-by-side close mounting
[(N-1)×96+92] +0.8/0
([(N-1)×3.78+3.62] +0.03/0)
92 +0.8/0 (3.62 +0.03/0)
145 (5.71) min.

"N" stands for the number of controllers to be installed.
However, the measured value applies if N≥5.

Normal tolerance:
±(value of JIS B 0401-1998 tolerance class IT18)/2

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## 4. Hardware Specifications

⚠ **WARNING**
This instrument is for Measurement Category No.1.
Do not use it for measurements in locations falling under Measurement Categories No.2, No.3, and No.4.



Internal Wiring
Entrance IV Cable
Outlet
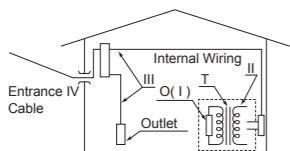
| Category | IEC/EN/CSA/UL 61010-1 | EN 61010-2-030 | Remarks |
|---|---|---|---|
| No.1 | Measurement Category I | O (Other) | For measurements performed on circuits not directly connected to MAINS. |
| No.2 | Measurement Category II | Measurement Category II | For measurements performed on circuits directly connected to the low-voltage installation. |
| No.3 | Measurement Category III | Measurement Category III | For measurements performed in the building installation. |
| No.4 | Measurement Category IV | Measurement Category IV | For measurements performed at the source of the low-voltage installation. |

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## ■ Input Specifications

### ●Universal Input (PV)

- Number of inputs: 1 point or 2 points (Type 1 code = -5)
- Input type, instrument range, and measurement accuracy: See the table below,

| Input Type | | Instrument Range | | Accuracy |
|---|---|---|---|---|
| | | °C | °F | |
| Thermo-couple | K | -270.0 to 1370.0°C | -450.0 to 2500.0°F | ±0.1% of instrument range ±1 digit for 0°C or more |
| | | -270.0 to 1000.0°C | -450.0 to 2300.0°F | ±0.2% of instrument range ±1 digit for less than 0°C |
| | | -200.0 to 500.0°C | -200.0 to 1000.0°F | |
| | J | -200.0 to 1200.0°C | -300.0 to 2300.0°F | ±2% of instrument range ±1 digit for less than -200.0°C of thermocouple K |
| | T | -270.0 to 400.0°C | -450.0 to 750.0°F | ±1% of instrument range ±1 digit for less than -200.0°C of thermocouple T |
| | | 0.0 to 400.0°C | -200.0 to 750.0°F | |
| | B | 0.0 to 1800.0°C | 32 to 3300°F | ±0.15% of instrument range ±1 digit for 400°C or more ±5% of instrument range ±1 digit for less than 400°C |
| | S | 0.0 to 1700.0°C | 32 to 3100°F | ±0.15% of instrument range ±1 digit |
| | R | 0.0 to 1700.0°C | 32 to 3100°F | |
| | N | -200.0 to 1300.0°C | -300.0 to 2400.0°F | ±0.1% of instrument range ±1 digit ±0.25% of instrument range ±1 digit for less than 0°C |
| | E | -270.0 to 1000.0°C | -450.0 to 1800.0°F | ±0.1% of instrument range ±1 digit for 0°C or more |
| | L | -200.0 to 900.0°C | -300.0 to 1600.0°F | ±0.2% of instrument range ±1 digit for less than 0°C |
| | U | -200.0 to 400.0°C | -300.0 to 750.0°F | ±0.1% of instrument range ±1 digit for 0°C or more ±1.5% of instrument range ±1 digit for less than -200.0°C of thermocouple E. |
| | | 0.0 to 400.0°C | -200.0 to 1000.0°F | |
| | W | 0.0 to 2300.0°C | 32 to 4200°F | ±0.2% of instrument range ±1 digit (Note 2) |
| | Platinel 2 | 0.0 to 1390.0°C | 32.0 to 2500.0°F | ±0.1% of instrument range ±1 digit |
| | PR20-40 | 0.0 to 1900.0°C | 32 to 3400°F | ±0.5% of instrument range ±1 digit for 800°C or more Accuracy is not guaranteed for less than 800°C. |
| | W97Re3-W75Re25 | 0.0 to 2000.0°C | 32 to 3600°F | ±0.2% of instrument range ±1 digit |
| RTD | JPt100 | -200.0 to 500.0°C | -300.0 to 1000.0°F | ±0.1% of instrument range ±1 digit (Note 1) |
| | | -150.00 to 150.00°C | -200.0 to 300.0°F | |
| | Pt100 | -200.0 to 850.0°C | -300.0 to 1560.0°F | ±0.1% of instrument range ±1 digit (Note 1) |
| | | -200.0 to 500.0°C | -300.0 to 1000.0°F | |
| | | -150.00 to 150.00°C | -200.0 to 300.0°F | |
| Standard signal | | 0.400 to 2.000 V | | ±0.1% of instrument range ±1 digit |
| | | 1.000 to 5.000 V | | |
| | | 4.00 to 20.00 mA | | |
| DC voltage/current | | 0.000 to 2.000 V | | |
| | | 0.00 to 10.00 V | | |
| | | 0.00 to 20.00 mA | | |
| | | -10.00 to 20.00 mV | | |
| | | 0.0 to 100.0 mV | | |

The accuracy is that in the standard operating conditions: 23±2°C, 55±10%RH, and power frequency at 50/60 Hz.
Note 1: ±0.3°C ±1 digit in the range between 0 and 100°C, ±0.5°C ±1 digit in the range between -100 and 200°C.
Note 2: W: W-5% Re/W-26% Re(Hoskins Mfg.Co.). ASTM E988

- Input sampling (control) period: Select from 50, 100, and 200 ms
- Burnout detection:
  Functions at TC, RTD, and standard signal.
  Upscale, downscale, and off can be specified.
  For standard signal, burnout is determined to have occurred if it is 0.1 V or 0.4 mA or less.
- Input bias current: 0.05 μA (for TC or RTD)
- Measured current (RTD): About 0.16 mA
- Input resistance:
  TC or mV input: 1 MΩ or more
  V input: About 1 MΩ
  mA input: About 250 Ω
- Allowable signal source resistance:
  TC or mV input: 250 Ω or less
  Effects of signal source resistance: 0.1 μV/Ω or less
  DC voltage input: 2 kΩ or less
  Effects of signal source resistance: About 0.01%/100 Ω
- Allowable wiring resistance:
  RTD input: Max. 150 Ω/wire (The conductor resistance between the three wires shall be equal.)
  Wiring resistance effect: ±0.1°C/10 Ω
- Allowable input voltage/current:
  TC, mV, mA and RTD input: ±10 V DC
  V input: ±20 V DC
  mA input: ±40 mA
- Noise rejection ratio:
  Normal mode: 40 dB or more (at 50/60 Hz)
  Common mode: 120 dB or more (at 50/60 Hz)
  For 100-240 V AC, the power frequency can be set manually. Automatic detection is also available.
  For 24 V AC/DC, the power frequency can be set manually.
- Reference junction compensation error:
  ±1.0°C (15 to 35°C)
  ±1.5°C (-10 to 15°C and 35 to 50°C)
- Applicable standards: JIS/IEC/DIN (ITS-90) for TC and RTD

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## ●Universal Input (PV2) (Type 1 code = -5)

- Input type, instrument range, and measurement accuracy: Same as universal input except the table below.

| Input Type | | Instrument Range | | Accuracy |
|---|---|---|---|---|
| | | °C | °F | |
| 4-wire RTD | JPt100 | -200.0 to 500.0°C | -300.0 to 1000.0°F | ±0.5°C ±1 digit |
| | | -150.00 to 150.00°C | -200.0 to 300.0°F | ±0.2°C ±1 digit |
| | Pt100 | -200.0 to 850.0°C | -300.0 to 1560.0°F | ±0.1% of instrument range ±1 digit (Note 1) |
| | | -200.0 to 500.0°C | -300.0 to 1000.0°F | ±0.5°C ±1 digit |
| | | -150.00 to 150.00°C | -200.0 to 300.0°F | ±0.2°C ±1 digit |

Note 1: ±0.5°C ±1 digit in the range between -200.0 and 500.0°C/-300.0 and 1000.0°F.

- Input sampling (control) period: Same as universal input
- Burnout detection: Same as universal input

### ●Auxiliary Analog Input (Type 2 code = 1, 2 or 3)

- Use: Remote setpoint setting, external compensating input, auxiliary input for computation, etc.
- Number of inputs: See the table of Model and Suffix Codes.
- Input type, instrument range, and measurement accuracy: See the table below.

| Input Type | Instrument Range | Accuracy |
|---|---|---|
| Standard signal | 0.400 to 2.000 V | ±0.2% of instrument range ±1 digit |
| | 1.000 to 5.000 V | ±0.1% of instrument range ±1 digit |
| DC voltage | 0.000 to 2.000 V | ±0.2% of instrument range ±1 digit |
| | 0.00 to 10.00 V | ±0.1% of instrument range ±1 digit |
| DC voltage for high-input impedance | 0.000 to 1.250 V | ±0.1% of instrument range ±1 digit |

- Input sampling (control) period: Same as universal input
- Input resistance: About 1 MΩ
  However, 10 MΩ or more for DC voltage for high-input impedance range
- 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 inputs: See the table of Model and Suffix Codes.
- Input type: No-voltage contact input or transistor contact input
- Input contact rating: 12 V DC, 10 mA or more
  Use a contact with a minimum on-current of 1 mA or more.
- ON/OFF detection:
  No-voltage contact input:
    Contact resistance of 1 kΩ or less is determined as "ON" and contact resistance of 50 kΩ or more as "OFF."
  Transistor contact input:
    Input voltage of 2 V or less is determined as "ON" and leakage current must not exceed 100 μA when "OFF."
- Minimum status detection hold time: Control period +50 ms
- Use: SP switch, operation mode switch, and event input

## ■ Analog Output Specifications

- Number of outputs:
  Control output: 1 point (standard), which is shared with transmission output.
  Loop-2 control output: 1 point, which is shared with transmission output.
- Output type: Current output or voltage pulse output
- Current output: 4 to 20 mA DC or 0 to 20 mA DC/load resistance of 600 Ω or less
- Current output accuracy: ±0.1% of span (±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:
  Use: 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, whichever is larger

## ■ Retransmission Output Specifications

- Number of outputs: 1 point (standard), which is shared with 15 V DC loop power supply
- Current output: 4 to 20 mA DC or 0 to 20 mA DC/ load resistance of 600 Ω or less
- Current output accuracy (conversion accuracy from PV display on the set scale): ±0.1% of span (±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.
  This is not conversion accuracy through input and output but the performance of transmission output itself.

## ■ 15 V DC Loop Power Supply Specifications

(Shared with retransmission output)
- Power supply: 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 (when the control period is 50 ms or 100 ms)
Within 1 s (when the control period is 200 ms)
(63% of analog output response time when a step change of 10 to 90% of input span is applied)

---

## ■ Relay Contact Output Specifications

- Contact type and number of outputs:
  Control relay output: one 1c-contact point
  Loop-2 control relay output: one 1c-contact point
  Alarm output: 3 1a-contact points (Common is separated)
- Contact rating:
  Contact point 1c (control output): 250 V AC, 3 A or 30 V DC, 3A (resistance load)
  Contact point 1a (alarm output): 240 V AC, 1A or 30 V DC, 1 A (resistance load)
Note: 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.
- Use: Time proportional output, alarm output, FAIL output, etc.
- Time resolution of control output: 10 ms or 0.1% of output, whichever is larger

## ■ Transistor Contact Output Specifications

- Number of outputs: See the table of Model and Suffix Codes.
- Output type: Open collector (SINK current)
- Output contact rating: Max. 24 V DC, 50 mA
- Output time resolution: Min. 50 ms
- Use: 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 (with disconnection detection)
- Sampling period: 50 ms
- Measurement resolution: 0.1% of input span
- Position proportional relay output:
  Contact point 1a; 2 points, 250 V AC, 3 A or 30 V DC, 3 A (resistance load)
Note: This should always be used with a load of 10 mA or more.

## ■ 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 (for all model including LL50A)
  EN 55011 Class A, Group 1
  KC marking:
  Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

## ■ Construction, Installation, and Wiring

- Dust-proof and drip-proof: IP66 (for front panel) (Not available for side-by-side close mounting.)
- Material: Polycarbonate (Flame retardancy: UL94V-0)
- Case color: White (Light gray) or Black (Light charcoal gray)
- Weight: 0.5 kg or less
- External dimensions (mm): 96 (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): 92 +0.8/0 (W) × 92 +0.8/0 (H)
- Mounting attitude: Up to 30 degrees above the horizontal. No downward titling 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 AC/DC (+10%/-15%) (for /DC option)
- Power consumption: 18 VA (DC:9 VA, AC: 14 VA if /DC option is specified)
- Data backup: Nonvolatile memory
- Power holdup time: 20 ms (for 100 V AC drive)
- Withstanding voltage
  Between primary terminals and secondary terminals: 2300 V AC for 1 minute (UL, CSA)
  Between primary terminals and secondary terminals: 3000 V AC for 1 minute (CE)
  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 functional grounding terminals.)
    *: Power terminals for 24V 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

| | | |
|---|---|---|
| PV (universal) input terminal | | |
| PV2 (universal) input terminal | | |
| Aux. analog (AIN2) input terminals | | |
| Aux. analog (AIN4) input terminals/remote input terminals | | |
| Control and transmission (analog) output terminal (not isolated between the analog output terminals) Valve position (feedback) input terminal | | |
| Control relay (c-contact) output terminal | | |
| Alarm-1 relay (a-contact) output terminal | Internal circuits | Power supply |
| Alarm-2 relay (a-contact) output terminal | | |
| Alarm-3 relay (a-contact) output terminal | | |
| Position proportional relay output terminal | | |
| Contact input terminal (All) RS485 communication terminal (2 ports) | | |
| Contact output (transistor) terminal | | |
| Ethernet/PROFIBUS-DP/CC-Link/DeviceNet communication 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) 0 to 50 °C if the CC-Link option is specified. (side-byside mounting: 0 to 40 °C)
- Ambient humidity: 20 to 90% RH (no condensation allowed)
- Magnetic field: 400 A/m or less
- Continuous vibration at 5 to 9 Hz: Half amplitude of 1.5 mm or less,1oct/min for 90 minutes each in the three axis directions
  Continuous vibration at 9 to 150 Hz: 4.9 m/s² or less, 1oct/min for 90 minutes each in the three axis directions
- Short-period vibration: 14.7 m/s², 15 seconds or less
- Shock: 98 m/s² or less, 11 ms
- Altitude: 2000 m or less above sea level
- Warm-up time: 30 minutes or more after the power is turned on
- Startup time: Within 10 seconds
- *: The LCD (a liquid crystal display) is used for a display portion of this product. The LCD has a characteristic that the display action becomes late at the low temperature. However, the control fuction is not affected.

### Transportation and Storage Conditions:

- Temperature: -25 to 70ºC
- Temperature change rate: 20ºC/h or less
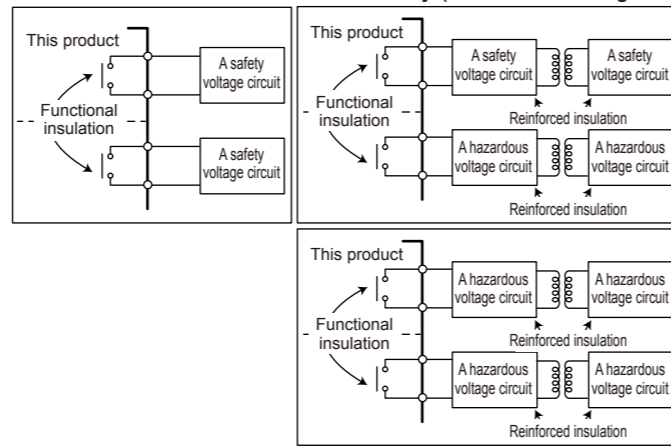- Humidity: 5 to 95% RH (no condensation allowed)

### Effects of Operating Conditions

- Effect of ambient temperature:
  Voltage or TC input: ±1 µV/ºC or ±0.01% of F.S./ºC, whichever is larger
  Current input: ±0.01% of F.S./ºC
  RTD input: ±0.05ºC/ºC (ambient temperature) or less
  Analog output: ±0.02% of F.S./ºC or less
- Effect of power supply voltage fluctuation
  Analog input: ±0.05% of F.S. or less
  Analog output: ±0.05% of F.S. or less
  (Each within rated voltage range)

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⚠ **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.**
- **For the wiring cable, the temperature rating is 75 °C or more.**
- **As a safety measure, always install a circuit breaker (an IEC 60947-compatible product, 5 A, 100 V or 220 V AC) in an easily accessible location near the instrument. Moreover, provide indication that the switch is a 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.**
- **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.)**

| This product | | | |
|---|---|---|---|
| Functional insulation → | A safety voltage circuit | | |
| | A safety voltage circuit | | |

| This product | | |
|---|---|---|
| Functional insulation → | A safety voltage circuit | A safety voltage circuit |
| | A hazardous voltage circuit | A hazardous voltage circuit |

Reinforced insulation

| This product | | |
|---|---|---|
| Functional insulation → | A hazardous voltage circuit | A hazardous voltage circuit |
| | A hazardous voltage circuit | A hazardous voltage circuit |

Reinforced insulation

⚠ **CAUTION**

- **When connecting two or more crimp-on terminal lugs to the single terminal block, bend the crimp-on terminal lugs before tightening the screw.**
- **Note that the wiring of two or more crimp-on terminal lugs to the single high-voltage terminal of the power supply and relay, etc. does not comply with the safety standard.**

⚠ **CAUTION**

- **Provide electricity from a single-phase power supply. If the power is noisy, install an isolation transformer on the primary side, and use a line filter on the secondary side. When measures against noise are taken, do not install the primary and secondary power cables close to each other.**
- **If there is a risk of external lightning surges, use a lightning arrester etc.**
- **For TC input, use shielded compensating lead wires for wiring. For RTD input, use shielded wires that have low conductor resistance and cause no significant differences in resistance between the three wires.**
- **Since the control output relay has a life span (resistance load of 100,000 times), use the auxiliary relay to perform ON/OFF control.**
- **The use of inductance (L) loads such as auxiliary relays, motors and solenoid valves causes malfunction or relay failure; always insert a CR filter for use with alternating current or a diode for use with direct current, as a spark-removal surge suppression circuit, into the line in parallel with the load.**
- **After completing the wiring, the terminal cover is recommended to use for the instrument.**

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### ● Recommended Crimp-on Terminal Lugs

(⌀d)

(A) (F)   5.5  3.3
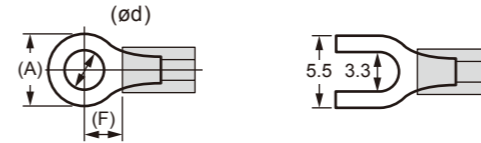
Recommended tightening torque: 0.6 N·m
Applicable wire size: Power supply wiring 1.25 mm² or more

| Applicable terminal lug | Applicable wire  size mm² (AWG#) | (φ d) | (A) | (F) |
|---|---|---|---|---|
| M3 | 0.25 to 1.65 (22 to 16) | 3.3 | 5.5 | 4.2 |

### ● Cable Specifications and Recommended Cables
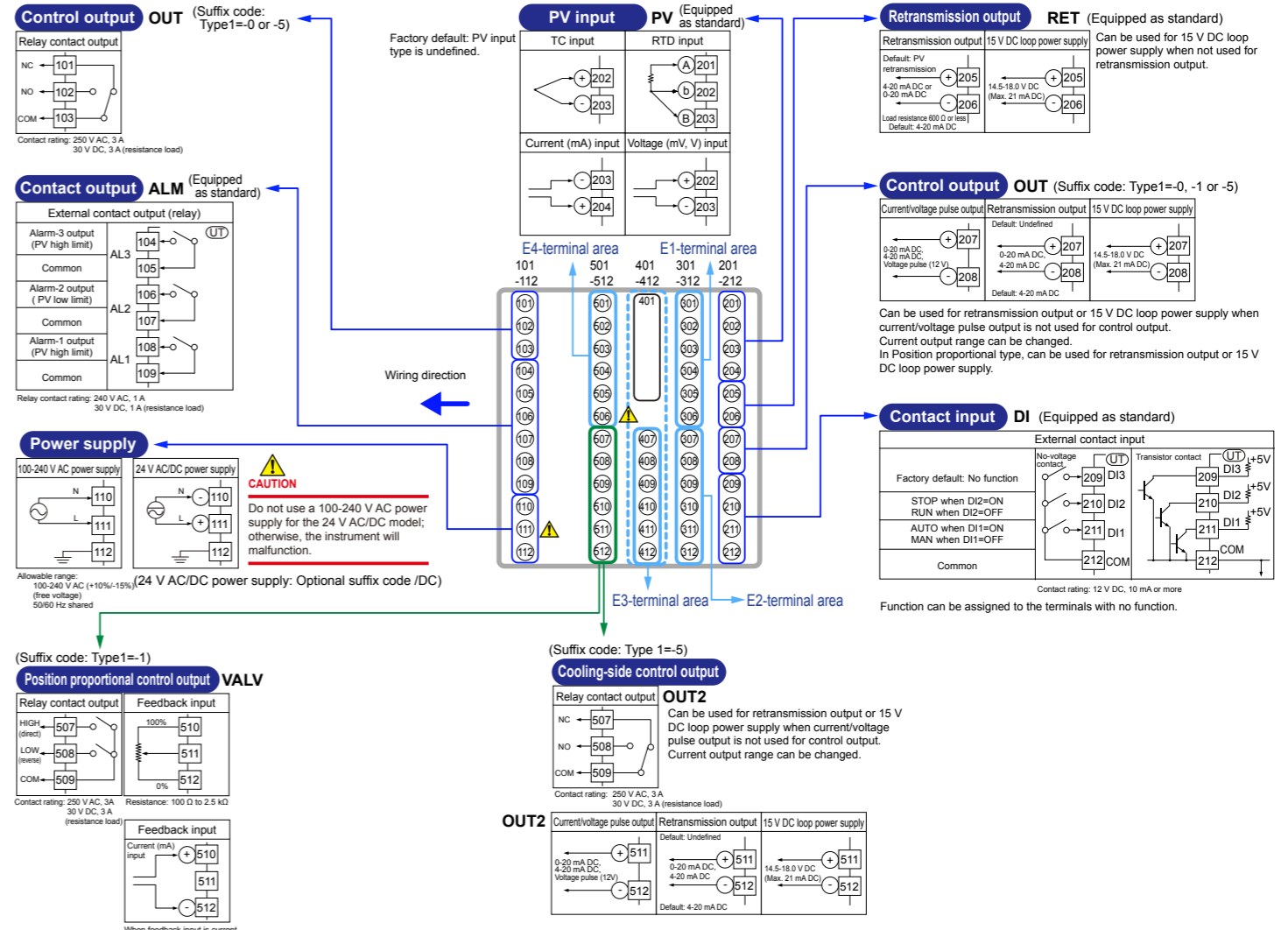
| Purpose | Name and Manufacturer |
|---|---|
| Power supply, relay contact outputs | 600 V Grade heat-resistant PVC insulated wires, JIS C 3317(HIV), 0.9 to 2.0 mm² |
| Thermocouple | Shielded compensating lead wires, JIS C 1610 For thermocouple input (PV input and remote input with direct input), shielded compensating lead wire of cross-sectional area less than or equal to 0.75 mm² is recommended. If the cross-sectional area is wide, the reference junction compensation error may be large. |
| RTD | Shielded wires (three/four conductors), UL2482 (Hitachi Cable) |
| Other signals (other than contact input/output) | Shielded wires |
| Other signals (contact input/output) | Unshielded wires |
| RS-485 communication | Shielded wires |
| Ethernet communication | 100 BASE-TX (CAT-5)/10 BASE-T |
| PROFIBUS-DP communication | Dedicated cable for PROFIBUS-DP (Shielded two-wires) |
| DeviceNet communication | Dedicated cable for DeviceNet (Shielded five-wires) |
| CC-Link communication | Dedicated cable for CC-Link (Shielded three-wires) |

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PROFIBUS-DP/CC-Link Connector (wiring side) (Part number: A1987JT)
DeviceNet Connector (wiring side) (Part number: L4502BW)
Recommended tightening torque: 0.5 to 0.6 N·m

### DC Relay Wiring

UT75A

Relay    External DC power supply
(R)
Diode
(Mount it directly to the relay coil terminal (socket).)
UT's contact
(Use one with a relay coil rating less than the UT's contact rating.)   Relay

### AC Relay Wiring

UT75A

External AC power supply
(R)
UT's contact
(Use one with a relay coil rating less than the UT's contact rating.)   Relay
CR filter
(Mount it directly to the relay coil terminal (socket).)

### Transistor Output Wiring

UT
Load    DO
COM
power

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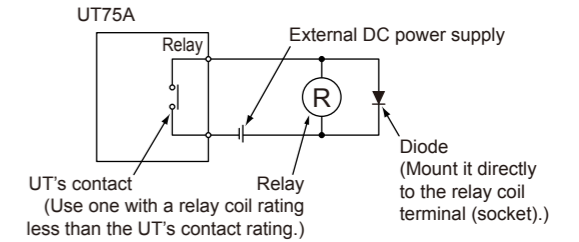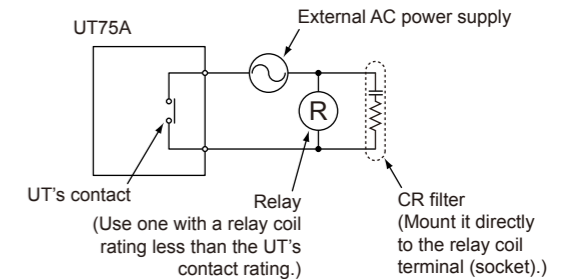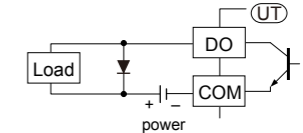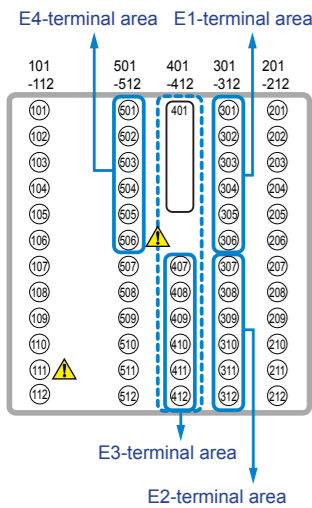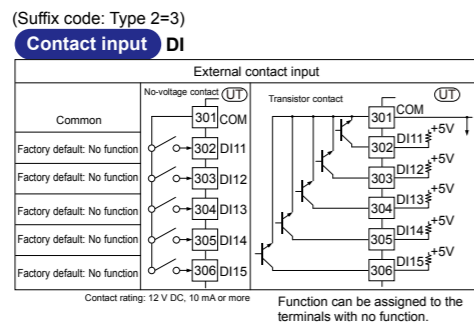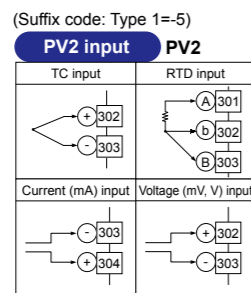## 6.  Terminal Wiring Diagrams

⚠ **CAUTION**

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

### ■ UT75A

**Control output  OUT** (Suffix code: Type1=-0 or -5)

Relay contact output
NC  101
NO  102
COM  103
Contact rating: 250 V AC, 3 A 30 V DC, 3 A (resistance load)

**Contact output  ALM** (Equipped as standard)

External contact output (relay)
Alarm-3 output (PV high limit)  104  AL3
Common  105
Alarm-2 output (PV low limit)  106  AL2
Common  107
Alarm-1 output (PV high limit)  108  AL1
Common  109
Relay contact rating: 240 V AC, 1 A 30 V DC, 1 A (resistance load)

**Power supply**

100-240 V AC power supply
N  110
L  111
112

24 V AC/DC power supply
N  110
L  111
112

⚠ **CAUTION**
Do not use a 100-240 V AC power supply for the 24 V AC/DC model; otherwise, the instrument will malfunction.

Allowable range:
100-240 V AC (+10%/-15%) (free voltage) 50/60 Hz shared   (24 V AC/DC power supply: Optional suffix code /DC)

**PV input  PV** (Equipped as standard)

Factory default: PV input type is undefined.
TC input   RTD input
+ 202    (A) 201
203    (B) 202
(B) 203
Current (mA) input   Voltage (mV, V) input
203    202
+ 204    203

**Retransmission output  RET** (Equipped as standard)

Retransmission output   15 V DC loop power supply
Default: PV retransmission   205  205
4-20 mA DC or 0-20 mA DC   206   14.5-18.0 V DC (Max, 21 mA DC)  206
Load resistance 600 Ω or less Default: 4-20 mA DC
Can be used for 15 V DC loop power supply when not used for retransmission output.

**Control output  OUT** (Suffix code: Type1=-0, -1 or -5)

Current/voltage pulse output   Retransmission output   15 V DC loop power supply
Default: Undefined   207  207  207
0-20 mA DC 4-20 mA DC Voltage pulse (12V)  208   0-20 mA DC 4-20 mA DC  208   14.5-18.0 V DC (Max, 21 mA DC)  208
Default: 4-20 mA DC
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.
In Position proportional type, can be used for retransmission output or 15 V DC loop power supply.

**Contact input  DI** (Equipped as standard)

External contact input
No-voltage contact   Transistor contact
Factory default: No function   209  DI3   UT +5V   209  DI3 +5V
STOP when DI2=ON RUN when DI2=OFF   210  DI2  +5V   210  DI2 +5V
AUTO when DI1=ON MAN when DI1=OFF   211  DI1  +5V   211  DI1 +5V
Common   212  COM   212  COM
Contact rating: 12 V DC, 10 mA or more
Function can be assigned to the terminals with no function.

Factory default: PV input type is undefined.

E4-terminal area   E1-terminal area
101  501  601  201
-112  -512  -412  301 -312  -212

401

Wiring direction

E3-terminal area   E2-terminal area

(Suffix code: Type1=-1)

**Position proportional control output  VALV**

Relay contact output
HIGH (direct)  507   Feedback input
LOW (reverse)  508   100%  510
509   511
0%  512
Contact rating: 250 V AC, 3A 30 V DC, 3 A (resistance load)
Feedback input: 100 Ω to 2.5 kΩ

Feedback input
Current (mA) input   510
511
512
When feedback input is current

(Suffix code: Type 1=-5)

**Cooling-side control output  OUT2**

Relay contact output
NC  507
NO  508
COM  509
Contact rating: 250 V AC, 3 A 30 V DC, 3 A (resistance load)
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.

**OUT2**   Current/voltage pulse output   Retransmission output   15 V DC loop power supply
0-20 mA DC 4-20 mA DC Voltage pulse (12V)  511   Default: Undefined 0-20 mA DC 4-20 mA DC  511   14.5-18.0 V DC (Max, 21 mA DC)  511
512   512   512
Default: 4-20 mA DC

# E1-Terminal Area

301-306

(Suffix code: Type 1=-5)

**PV2 input** PV2 — TC input / RTD input / Current (mA) input / Voltage (mV, V) input

+302, −303, A 301, B 302, B 303, +303, +304, +302, −303

(Suffix code: Type 2=3)

**Contact input** DI — External contact input

Common; Factory default: No function 301 COM / 302 DI11 / 303 DI12 / 304 DI13 / 305 DI14 / 306 DI15

No-voltage contact / Transistor contact (+5V)

Contact rating: 12 V DC, 10 mA or more. Function can be assigned to the terminals with no function.

# E2-Terminal Area

307-312

(Suffix code: Type 2=0, 1 or 2)

**Contact output** DO — External contact output

DO25 307 / DO24 308 / DO23 309 / DO22 310 / DO21 311 / Common 312

Factory default: No function. Transistor contact rating: 24 V DC, 50 mA. Function can be assigned to the terminals with no function.

(Suffix code: Type 2=2)

**Aux. analog input / Contact input** AIN2 — External contact input

Common; Factory default: No function 309 COM / 310 DI26

No-voltage contact / Transistor contact (+5V). Contact rating: 12 V DC, 10 mA or more. Function can be assigned to the terminals with no function.

Aux. analog input: +311 / 312. Specify within a range of 1-5 V DC, 0-2 V DC, 0-10 V DC. Default: 1-5 V DC.

Aux. analog input can be used for feedforward input in Single-loop control and Single-loop position proportional control.

# E3-Terminal Area

401-412

**RS-485 communication/Contact input** — RS485/DI (Suffix code: Type 3=1)
SDB(+) 1, SDA(-) 2, SG 3, RDB(+) 4, RDA(-) 5

External contact input. Common; Factory default: No function 407 COM / 408 DI31 / 409 DI32 / 410 DI33 / 411 DI34 / 412 DI35. Contact rating: 12 V DC, 10 mA or more. Function can be assigned to the terminals with no function.

**Ethernet communication (with gateway function)** — ETHR (Suffix code: Type 3=2) 10BASE-T/100BASE-TX RJ45 connector

**CC-Link communication (with Modbus master)** — CC-L (Suffix code: Type 3=3)

**PROFIBUS-DP communication (with Modbus master)** — PROF (Suffix code: Type 3=4)

**DeviceNet communication (with Modbus master)** — DNET (Suffix code: Type 3=5)

# E4-Terminal Area

501-506

(Suffix code: Type 2=0)

**Contact input** DI — External contact input. Common; Factory default: No function 501 COM / 502 DI41 / 503 DI42 / 504 DI43 / 505 DI44 / 506 DI45. No-voltage contact / Transistor contact (+5V). Contact rating: 12 V DC, 10 mA or more. Function can be assigned to the terminals with no function.

**RS-485 communication / Remote input / Contact input** — AIN4/RS485 (Suffix code: Type 2=1 or 2)

(Suffix code: Type 2=3)

**Aux. analog input/Contact input** AIN4

Aux. analog input can be used for feedforward input in Single-loop control and Single-loop position proportional control.

## ■ 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.

| PV display (Operation Display) | Setpoint display (Operation Display) | Status indicator (Operation Display) | Parameter that displays error details | Error description | Cause and diagnosis | Remedy |
|---|---|---|---|---|---|---|
| Indication off | Indication off | — | — | Faulty MCU RAM / MCU ROM | MCU RAM / MCU ROM are failed. | Faulty. Contact us for repair. |
| ERR | SYS - - - - - | — | — | System data error | System data is corrupted. | Faulty. Contact us for repair. |
| ERR | PAR 0004 (for user default value error only) | — | Setup parameter (PA.ER) | User (parameter) default value error | User parameter is corrupted. Initialized to factory default value. | Check and reconfigure the initialized setting parameters. Error indication is erased when the power is turned on again. |
| | PAR 0010 (for setup parameter error only) | | | Setup parameter error | Setup parameter data is corrupted. Initialized to user default value. | |
| | PAR 0020 (for operation parameter error only) | | | Operation parameter error | Operation parameter data is corrupted. Initialized to user default value. | |
| | SLOT 0017 (0017: Error occurs to all hardware of E1 to E4-terminal areas.) | | Setup parameter (OP.ER) | Nonresponding hardware of extended function (E1 to E4-terminal areas) | Inconsistence of system data and hardware of extended function. Nonresponding communication between hardware of extended function (E1 to E4-terminal areas). | Faulty. Contact us for repair. |
| Normal indication | Normal indication | Rightmost decimal point on PV display blinks. | Setup parameter (PA.ER) | Calibration value error | Initialized to calibrated default value because of corrupted factory default value. | Faulty. Contact us for repair. |
| | | Rightmost decimal point on Symbol display blinks. | | Faulty FRAM | Data writing (storing) to FRAM is impossible. | |
| Normal indication | Normal indication | LADDER lamp blinks | Setup parameter (LA.ER) | Corrupted ladder program | Ladder program is corrupted. Operates without ladder program. | Download the ladder program again. |
| Normal indication | 0.000 00000 (Decimal point on the left of the Symbol display blinks) | — | Setup parameter (OP.ER) | User profile error | User profile is corrupted. | Download the user profile again. |

## ■ Errors during Operation

The errors shown below may occur during operation. (For input/output action when each error occurs, see User's Manual.)

| PV display (Operation Display) | Setpoint display (Operation Display) | Status indicator (Operation Display) | Parameter that displays error details | Error description | Cause and diagnosis | Remedy |
|---|---|---|---|---|---|---|
| AD.ERR | Normal indication (Note) | — | Setup parameter (AD1.E) | Analog input terminal ADC error •PV input •PV2 input (E1-terminal area) •AIN2 input (E2-terminal area) •AIN4 input (E4-terminal area) | Analog input terminal AD value error | Faulty. Contact us for repair. |
| RJC.E (Displays RJC.E and PV alternately.) | Normal indication (Note) | — | Setup parameter (AD1.E) | Universal input terminal RJC error •PV input •PV2 input (E1-terminal area) | Universal input terminal RJC error | Faulty. Contact us for repair. Set the parameter RJC to OFF to erase error indication. |
| B.OUT | Normal indication (Note) | — | Setup parameter (AD1.E) | Analog input terminal burnout •PV input •PV2 input (E1-terminal area) •AIN2 input (E2-terminal area) •AIN4 input (E4-terminal area) | Analog input terminal sensor burnout | Check wiring and sensor. Error indication is erased in normal operation. |
| | | | Setup parameter (PV1.E / PV2.E) | PV input burnout error (Loop 1, Loop 2) | Burnout of analog input connected to PV | Check wiring and sensor of connected analog input terminals. Error indication is erased in normal operation. |
| OVER -OVER | Normal indication | — | Setup parameter (PV1.E / PV2.E) | PV input over-scale PV input under-scale (PV values out of -5 to 105%) (Loop 1, Loop 2) | PV input is out of -5 to 105%. Also occurs when the data out of range which is the ladder calculation result is input. | Check analog input value or ladder program. |
| Normal indication | Normal indication | — | Setup parameter (PV1.E / PV2.E) | AIN4 input burnout error (Loop 1, Loop 2) | Burnout of analog input connected to RSP | Check wiring and sensor. Error indication is erased in normal operation. |
| Normal indication | RSP B.OUT | — | Setup parameter (PV1.E / PV2.E) | Burnout error when AIN4 input is used for control (Loop 1, Loop 2) | Burnout of analog input connected to RSP when RSP is used for control computation | Check wiring and sensor. Error indication is erased in normal operation. |
| Normal indication | OUT - - - - - | — | Setup parameter (AD2.E) | Feedback input resistor/current burnout | Feedback input burnout | Check wiring of feedback input resistor/current. Error indication is erased in normal operation. |
| Normal indication | Normal indication | LADDER lamp blinks | Setup parameter (LA.ER) | Ladder calculation overflow | Floating point computation for ladder calculation is infinite. | Check the ladder program. |
| | | | | Load factor over 100% | Computation does not end within the control period (load factor is 100% or more). | Change the control period or reduce the number of steps for the ladder program. |
| | | | | Load factor over 200% (Forced end) | Computation does not end within the control period (load factor is 200% or more). | Change the control period or reduce the number of steps for the ladder program. |
| | | | | Ladder program error | Ladder program is corrupted. | Download the ladder program again. If the error indication is still not erased, there is a fault. Contact us for repair. |
| Normal indication | 0.000 00000 (Decimal point on the left of the Symbol display blinks) | — | Setup parameter (OP.ER) | Peer-to-peer communication error | Peer-to-peer communication error | Check that the target devices are connected correctly. Recovery at normal receipt. |
| AT.E | Normal indication | — | Setup parameter (PV1.E/PV2.E) | Auto-tuning time-out (Loop 1, Loop 2) | Auto-tuning does not end even when 24 hours have elapsed after the start of tuning. | Check the process. Hold down any key to erase the error indication |
| VAT.E | Normal indication | — | Setup parameter (AD2.E) | Valve position automatic adjustment error | Fully-closed valve position is equal to or larger than the fully-open valve position after automatic valve position adjustment is performed. | Check wiring and valve. Hold down any key to erase the error indication. |
| Normal indication | 0.000 00000 (Decimal point on the left of the Symbol display blinks) | — | Setup parameter (OP.ER) | Communication error (RS-485 communication) | Framing parity error / Buffer overflow / Inter-character time-out / Checksum error (PC link communication with checksum) / CRC check error (Modbus/RTU) / LRC check error (Modbus/ASCII) | Check the communication parameters. Recovery at normal receipt. Hold down any key to stop blinking. |
| Normal indication | 0.000 00000 (Decimal point on the left of the Symbol display blinks) | — | Setup parameter (OP.ER) | Communication error (coordinated operation) | Inconsistence of loop between coordinated master and slaves | Check the communication parameters. Recovery at normal receipt. Change from remote to local mode to stop blinking. |
| | | | | | Communication from coordinated master is interrupted for 2 seconds. | When the mode is changed from remote to local, SP tracking does not work even if it is set to ON. |
| Normal indication | 0.000 00000 (Decimal point on the left of the Symbol display blinks) | — | Setup parameter (OP.ER) | User profile error | User profile is corrupted. | Download the user profile again. |
| Normal indication | Normal indication | Rightmost decimal point on Symbol display blinks. | Setup parameter (PA.ER) | Faulty FRAM | Writing (storing) data to FRAM is impossible. | Faulty. Contact us for repair. |
| Undefined | Undefined | — | — | Faulty MCU / DCU (ROM / RAM error, corrupted) | MCU / DCU is corrupted. | Faulty. Contact us for repair. |

Note: When an error occurs in input shown in Analog input display (Operation display), Setpoint display shows the same symbol as the PV display.

# Operation Guide

**UT75A**
Digital Indicating Controller
Operation Guide for Single-loop Control

*UTAdvanced*

Functional Enhancement

**Initial Settings**
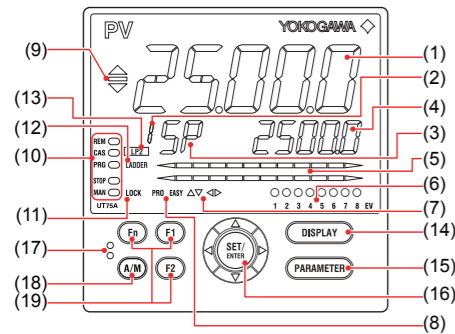
**YOKOGAWA** ◆
Yokogawa Electric Corporation

This operation guide describes basic settings and operations of the UT75A.
For details of each function, see the electronic manual contained.
The scrolling guide is displayed on PV display in the Parameter Setting Display.
This guide can be turned on/off with the Fn key.
For details of the each function, refer to the electronic manual. User's manuals can be downloaded or viewed at the following URL.

⬇ http://www.yokogawa.com/ns/ut/im/

## Contents

1. Names and Functions of Display Parts
2. Setup Procedure
3. Quick Setting Function (Setting of Input and Output)
4. Adjusting Valve Position Automatically (for a Position Proportional Type Controller Only)
5. Setting Alarm Type
6. Setting Alarm Setpoint
7. Overview of Program Patterns
8. Creating Program Patterns
9. Program Pattern Setup Charts

## 1. Names and Functions of Display Parts

(2)+(3)+(4)：設定値表示部と呼びます。

| No. in figure | Name | Description |
|---|---|---|
| (1) | PV display (white or red) | Displays PV. Displays an error code if an error occurs. Displays the scrolling guide in the Menu Display and Parameter Setting Display when the guide display ON/OFF is set to ON. |
| (2) | Group display (green) | Displays a group number (1 to 16 or R) and terminal area (E1 to E4). 1 to 20 represent SP numbers in the Operation Display. R and E1 to E4 are displayed in the Parameter Setting Display. If the SELECT display is registered, Custom display number (C1 to C3) is displayed. |
| (3) | Symbol display (orange) | Displays a parameter symbol. |
| (4) | Data display (orange) | Displays a parameter setpoint and menu symbol. |
| (5) | Bar-graph display (orange and white) | Displays control output value (OUT) and measured input value (PV). The data to be displayed can be set by the parameter. Initial value: upper bar (deviation), lower bar (control output, internal computed value in Position proportional control); in Heating/cooling control, upper bar (heating-side control output), lower bar (cooling-side control output) |
| (6) | Event indicator (orange) | Lit when the alarms 1 to 8 occur. (Initial value: 1 to 4) Event displays other than alarms can be set by the parameter. |
| (7) | Key navigation indicator (green) | Lit or blinks when the Up/Down or Left/Right arrow key operation is possible. |
| (8) | Parameter display level indicator (green) | Displays the setting conditions of the parameter display level function. |

| Parameter display level | EASY | PRO |
|---|---|---|
| Easy setting mode | Lit | Unlit |
| Standard setting mode | Unlit | Unlit |
| Professional setting mode | Unlit | Lit |

| No. in figure | Name | Description |
|---|---|---|
| (9) | Deviation indicator (green) | Displays the status of a deviation (PV - SP). ▲ : Lit if a deviation exceeds the deviation display band. ▬ : Lit when a deviation is within the deviation display band. ▼ : Lit if a deviation falls below the deviation display band. The deviation indicator is unlit if the Displays other than the Operation Display or SELECT Display are shown. Deviation display band can be set by the parameter. |
| (10) | Status indicator (green and red) | Displays the operating conditions and control status. |

| Indicator | Description |
|---|---|
| REM | Lit when in remote mode (REM). |
| CAS | Lit when in cascade mode (CAS). |
| PRG | Lit when in program pattern operation mode (PRG). Blinks during hold operation. |
| STOP | Lit when in stop mode (STOP). |
| MAN | Lit when in manual mode (MAN). Blinks during auto-tuning. |

| No. in figure | Name | Description |
|---|---|---|
| (11) | Security indicator (red) | Lit if a password is set. The setup parameter settings are locked. |
| (12) | Ladder operation indicator (green) | Lit while the ladder operation is executed. |
| (13) | Loop 2 indicator (LP2 lamp) (green) | Lit when the control mode is Cascade control or Dual-loop control. In the Operation Display, the LP2 lamp is lit while the Loop-2 data is displayed on Setpoint display. In the Parameter Setting Display, the LP2 lamp indicates the loop of displayed menu symbol or parameter symbol. The LP2 lamp is lit while the Loop-2 menu symbol or parameter symbol is displayed. |
| (14) | DISPLAY key | Used to switch the Operation Displays. Press the key in the Operation Display to switch the provided Operation Displays. Press the key in the Menu Display or Parameter Setting Display to return to the Operation Display. |
| (15) | PARAMETER key | Hold down the key for 3 seconds to move to the Operation Parameter Setting Display. Hold down the key and the Left arrow key simultaneously for 3 seconds to move to the Setup Parameter Setting Display. Press the key from the Parameter Setting Display to return to the Menu Display. Press the key once to cancel the parameter setting (setpoint is blinking). |
| (16) | SET/ENTER key Up/Down/Left/Right arrow keys | SET/ENTER key Press the key in the Menu Display to move to the Parameter Setting Display of the Menu. Press the key in the Parameter Setting Display to transfer to the parameter setting mode (setpoint is blinking), and the parameter can be changed. Press the key during parameter setting mode to register the setpoint. Up/Down/Left/Right arrow keys Press the Left/Right arrow keys in the Menu Display to switch the Displays. Press the Up/Down/Left/Right arrow keys in the Parameter Setting Display to switch the Displays. Press the Up/Down arrow keys during parameter setting mode (setpoint is blinking) to change a setpoint. Press the Left/Right arrow keys during parameter setting mode (setpoint is blinking) to move between digits according to the parameter. |
| (17) | Light-loader interface | It is the communication interface for the adapter cable used when setting and storing parameters from a PC. The LL50A Parameter Setting Software (sold separately) is required. |
| (18) | A/M key | Used to switch between AUTO and MAN modes. The setting is switched between AUTO and MAN each time the key is pressed. |
| (19) | User function keys | The UT75A has F1, F2, and Fn keys. The user can assign a function to the key. The function is set by the parameter. |

Note: The communication connector (maintenance port) for LL50A Parameter Setting Software is on the top of the unit.

## 2. Setup Procedure

The following flowchart shows the setup procedure for UT75A.

- **Installation and wiring** — Install and wire a controller.
- **Power ON**
- **Use Quick setting function?** — YES / NO
  - Control mode: Single-loop control only
  - **Control type setup Input/output setup**
  - **Position proportional type?** — YES → For Position proportional type → Valve position adjustment / NO
  - (NO path) **Control mode setup** → **Control type setup** → **Input setup** → **Position proportional type?** YES → Valve position adjustment / NO → **Output setup**
- **Other setup** — Set the other parameters as needed.
- **PID tuning** — Adjust PID using auto-tuning or manually for PID control.
- **Operation** — Monitoring and control of regular operations.

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

The Quick setting function is a function to easily set the basic function of the controller.
Turn on the controller to start the Quick setting function.
This function allows you to easily set the control type, input, and output, and quickly start the control action.
The items (parameters) to be set by Quick setting function are as follows.
(1) Control type (PID control, Heating/cooling control, etc.)
(2) Input function (PV input type, range, scale (at voltage input), etc.)
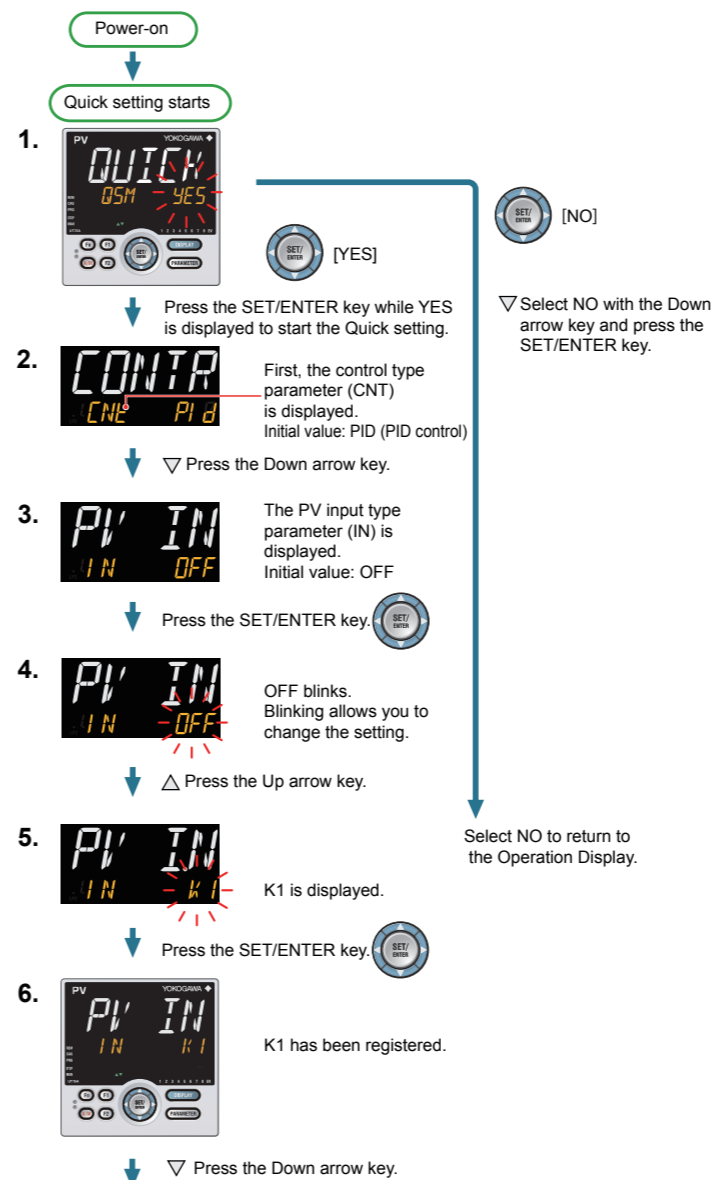(3) Output function (control output type and cycle time)

After turning on the controller, first decide whether or not to use the Quick setting function.
The Quick setting function can be used only when the control mode is Single-loop control. For other control modes, set the functions without using the Quick setting function.

### 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.
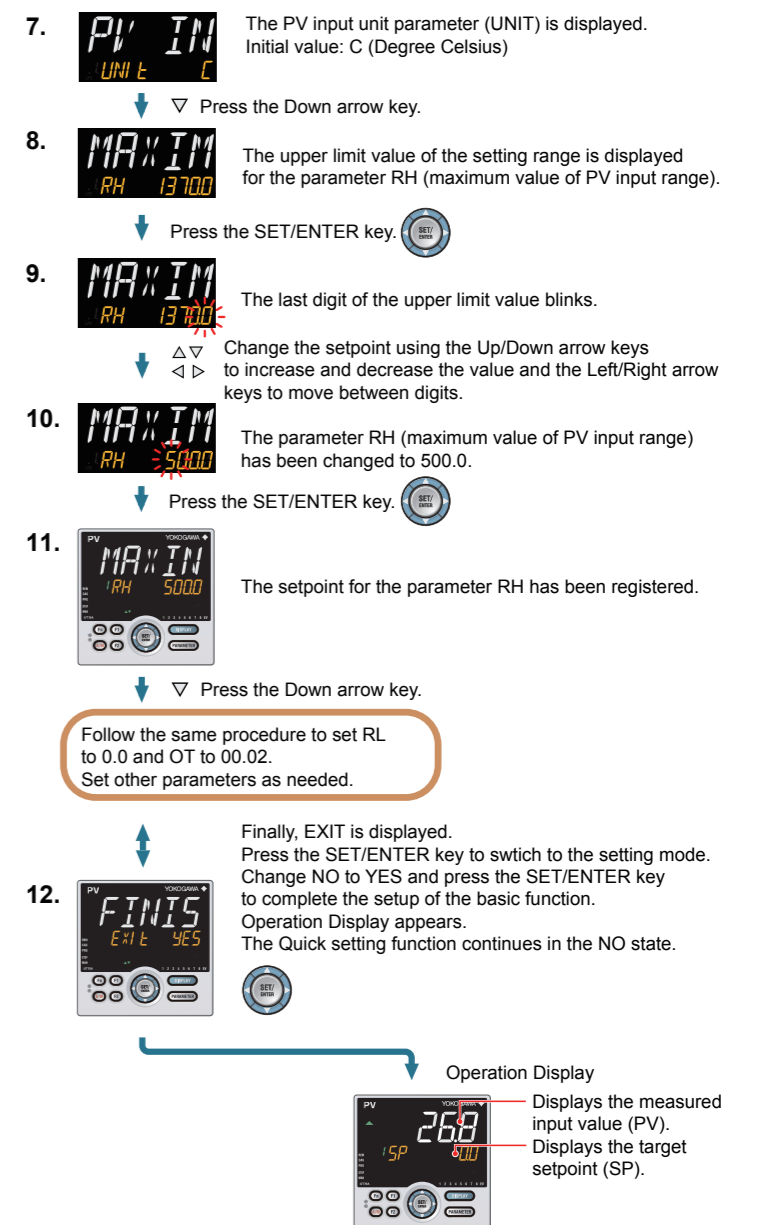
### Operation for Setting

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

### ■ Making Settings Using Quick Setting Function

**Example: Setting to PID control, thermocouple type K (range of 0.0 to 500.0°C), and current control output**
For the detailed procedure and switching of displays, see "Flow of Quick Setting Function" below. For the parameters to set, see the next page.

(1) Press the SET/ENTER key while YES for QSM (Quick setting mode) is displayed.
(2) Set the control type parameter (CNT) to PID (PID control).
(3) Set the PV input type parameter (IN) to K1 (-270.0 to 1370.0 °C).
(4) Set the PV input unit parameter (UNIT) to C (Degree Celsius).
(5) Set the maximum value of PV input range parameter (RH) to 500.0.
(6) Set the minimum value of PV input range parameter (RL) to 0.0.
(7) Set the output type selection parameter (OT) to OUT terminals (current).
(8) Finally, EXIT is displayed. Change NO to YES and press the SET/ENTER key to complete the setup. Operation Display appears.

### ■ Flow of Quick Setting Function

In Quick setting mode, the parameter guide appears on PV display.
This guide can be turned on/off with the Fn key.

**Power-on** → **Quick setting starts**

1. QUICK / QSM YES — Press the SET/ENTER key while YES is displayed to start the Quick setting. [YES]
   [NO] ▽ Select NO with the Down arrow key and press the SET/ENTER key.

2. CONTR / CNT PID — First, the control type parameter (CNT) is displayed. Initial value: PID (PID control) ▽ Press the Down arrow key.

3. PV IN / IN OFF — The PV input type parameter (IN) is displayed. Initial value: OFF — Press the SET/ENTER key.

4. PV IN / IN OFF — OFF blinks. Blinking allows you to change the setting. △ Press the Up arrow key.

5. PV IN / IN K1 — K1 is displayed. Press the SET/ENTER key.

6. PV IN / IN K1 — K1 has been registered. ▽ Press the Down arrow key.

   Select NO to return to the Operation Display.

7. PV IN / UNIT C — The PV input unit parameter (UNIT) is displayed. Initial value: C (Degree Celsius) ▽ Press the Down arrow key.

8. MAXIM / RH 13700 — The upper limit value of the setting range is displayed for the parameter RH (maximum value of PV input range). Press the SET/ENTER key.

9. MAXIM / RH 13700 — The last digit of the upper limit value blinks. △▽ ◁▷ Change the setpoint using the Up/Down arrow keys to increase and decrease the value and the Left/Right arrow keys to move between digits.

10. MAXIM / RH 5000 — The parameter RH (maximum value of PV input range) has been changed to 500.0. Press the SET/ENTER key.

11. MAXIM / RH 5000 — The setpoint for the parameter RH has been registered. ▽ Press the Down arrow key.

    Follow the same procedure to set RL to 0.0 and OT to 00.02. Set other parameters as needed.

12. FINIS / EXIT YES — Finally, EXIT is displayed. Press the SET/ENTER key to swtich to the setting mode. Change NO to YES and press the SET/ENTER key to complete the setup of the basic function. Operation Display appears. The Quick setting function continues in the NO state.

    **Operation Display** — 26.8 / 1SP — Displays the measured input value (PV). Displays the target setpoint (SP).

## ■ Parameters to be set

### Control Type

| Parameter Symbol | Name of Parameter | Setting Range |
|---|---|---|
| CNT | Control type | PID: PID control<br>ONOF: ON/OFF control (1 point of hysteresis)<br>ONOF2: ON/OFF control (2 points of hysteresis)<br>2P2L: Two-position two-level control<br>H/C: Heating/cooling control<br>S-PI: Sample PI control<br>BATCH: BATCH PID control<br>FFPID: Feedforward control |

Note: Some setpoints may not be displayed depending on the model and suffix codes.

### Input Function

| Parameter Symbol | Name of Parameter | Setting Range |
|---|---|---|
| IN | PV input type | OFF: Disable<br>K1: -270.0 to 1370.0 °C / -450.0 to 2500.0 °F<br>K2: -270.0 to 1000.0 °C / -450.0 to 2300.0 °F<br>K3: -200.0 to 500.0 °C / -200.0 to 1000.0 °F<br>J: -200.0 to 1200.0 °C / -300.0 to 2300.0 °F<br>T1: -270.0 to 400.0 °C / -450.0 to 750.0 °F<br>T2: 0.0 to 400.0 °C / -200.0 to 750.0 °F<br>B: 0.0 to 1800.0 °C / 32 to 3300 °F<br>S: 0.0 to 1700.0 °C / 32 to 3100 °F<br>R: 0.0 to 1700.0 °C / 32 to 3100 °F<br>N: -200.0 to 1300.0 °C / -300.0 to 2400.0 °F<br>E: -270.0 to 1000.0 °C / -450.0 to 1800.0 °F<br>L: -200.0 to 900.0 °C / -300.0 to 1600.0 °F<br>U1: -200.0 to 400.0 °C / -300.0 to 750.0 °F<br>U2: 0.0 to 400.0 °C / -200.0 to 1000.0 °F<br>W: 0.0 to 2300.0 °C / 32 to 4200 °F<br>PL2: 0.0 to 1390.0 °C / 32.0 to 2500.0 °F<br>P2040: 0.0 to 1900.0 °C / 32 to 3400 °F<br>WRE: 0.0 to 2000.0 °C / 32 to 3600 °F<br>JPT1: -200.0 to 500.0 °C / -300.0 to 1000.0 °F<br>JPT2: -150.00 to 150.00 °C / -200.0 to 300.0 °F<br>PT1: -200.0 to 850.0 °C / -300.0 to 1560.0 °F<br>PT2: -200.0 to 500.00 °C / -300.0 to 1000.0 °F<br>PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F<br>0.4-2V: 0.400 to 2.000 V<br>1-5V: 1.000 to 5.000 V<br>4-20: 4.00 to 20.00 mA<br>0-2V: 0.000 to 2.000 V<br>0-10V: 0.00 to 10.00 V<br>0-20: 0.00 to 20.00 mA<br>-1020: -10.00 to 20.00 mV<br>0-100: 0.0 to 100.0 mV |
| UNIT | PV input unit | -: No unit, C: Degree Celsius<br>-: No unit, -: No unit, F: Degree Fahrenheit |
| RH | Maximum value of PV input range | Depends on the input type.<br>- For temperature input -<br>Set the temperature range that is actually controlled. (RL<RH)<br>- For voltage / current input -<br>Set the range of a voltage / current signal that is applied. |
| RL | Minimum value of PV input range | The scale across which the voltage / current signal is actually controlled should be set using the maximum value of input scale (SH) and minimum value of input scale (SL). (Input is always 0% when RL = RH.) |
| SDP | PV input scale decimal point position | 0: No decimal place    3: Three decimal places<br>1: One decimal place    4: Four decimal places<br>2: Two decimal places |
| SH | Maximum value of PV input scale | -19999 to 30000, (SL<SH), \| SH - SL \| ≤ 30000 |
| SL | Minimum value of PV input scale | |

Note 1: SDP, SH, and SL are displayed only for voltage/current input.
Note 2: W: W-5%Re/W-26%Re (Hoskins Mfg.Co.), ASTM E988

### Output Function

| Parameter Symbol | Name of Parameter | Setting Range | |
|---|---|---|---|
| OT | Output type selection | Control output or Heating-side control output (Lower two digits)<br>00: OFF<br>01: OUT terminals (voltage pulse)<br>02: OUT terminals (current)<br>03: OUT terminals (relay)<br>04: OUT2 terminals (voltage pulse)<br>05: OUT2 terminals (current)<br>06: OUT2 terminals (relay)<br>07: RET terminals (voltage pulse)<br>08: RET terminals (current)<br>09: AL3 terminals (relay)<br>10: AL2 terminals (relay) | Cooling-side control output (Upper two digits)<br>00: OFF<br>01: OUT terminals (voltage pulse)<br>02: OUT terminals (current)<br>03: OUT terminals (relay)<br>04: OUT2 terminals (voltage pulse)<br>05: OUT2 terminals (current)<br>06: OUT2 terminals (relay)<br>07: RET terminals (voltage pulse)<br>08: RET terminals (current)<br>09: AL3 terminals (relay)<br>10: AL2 terminals (relay) |
| CT | Control output cycle time<br>Heating-side control output cycle time (in Heating/cooling control) | 0.5 to 1000.0 s | |
| CTc | Cooling-side control output cycle time | | |

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## 4. Adjusting Valve Position Automatically (for a Position Proportional Type Controller Only)

The following operating procedure describes how to input feedback signals from the control valve and adjust the fully-open and fully-closed positions of the control valve automatically. The fully-open and fully-closed positions of the valve can be adjusted automatically by inputting feedback signals from the valve. To adjust the valve position, you need to carry out the connection and bring the controller into manual mode. For the connection, see "6. Terminal Wiring Diagrams" in "Installation and Wiring", and for the manual mode, see "5. Switching between AUTO and MAN" in "Operations."

---

1.  Show the Operation Display.

   MAN is lit

   Hold 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.

2.  CTL menu is displayed.

   ▷ Press the Right arrow key until OUT menu appears.

3.  OUT menu is displayed.

   Press the SET/ENTER key.

4.  The parameter V.AT (automatic valve position adjustment) is displayed.

   Press the SET/ENTER key.

5.  OFF blinks.

   △ Press the Up arrow key.

6.  ON is displayed. Blinks during the change.

   Press the SET/ENTER key.

7.  ON has been registered and the automatic adjustment of the valve position starts. V.AT blinks during the automatic adjustment. After the adjustment is completed, press the DISPLAY 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 feedback input and perform the automatic adjustment again. To perform a valve adjustment manually, see User's Manual.

---

## 5. Setting Alarm Type

The following operating procedure shows an example of changing the alarm-1 type (factory default: PV high limit alarm) to PV low limit alarm (setpoint: 02).

1.  Show the Operation Display.

   PARAMETER
   Hold down the key for 3 seconds.

2.  MODE menu is displayed.

   ▷ Press the Right arrow key until ALRM menu appears.

3.  ALRM menu is displayed.

   Press the SET/ENTER key.

4.  The parameter AL1 (alarm-1 type) is displayed.

   Press the SET/ENTER key.

5.  The last digit of the setpoint blinks.

   △▽ Change the setpoint using the Up/Down arrow keys to increase and decrease the value and
   ◁ ▷ the Left/Right arrow keys to move between digits.

   Press the SET/ENTER key.

6.  The alarm-1 type setpoint 02 (PV low limit) is registered. After the setup is completed, press the DISPLAY key once to return to the Operation Display.
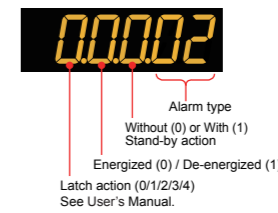
   Symbol — Stand-by action / Energized/De-energized / Latch action

   ● To change the alarm value, change the last 2 digits of the 5-digit value.
   ● Stand-by action and excitation are turned on or off by selecting 1 or 0. (See "Setting Display of Alarm Type.")
   ● For the latch action, see User's Manual.

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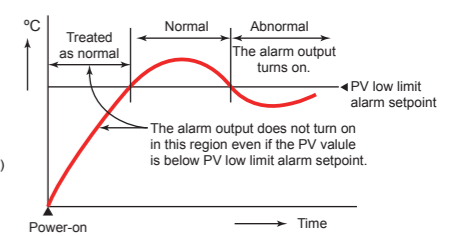| Alarm Type (Alarm Setpoint) | Alarm Action (Energized) | Alarm Action (De-energized) |
|---|---|---|
| No alarm (00) | - | - |
| PV high limit (01)<br>Analog input PV high limit (19)<br>Analog input  high limit (21)<br>Analog input AIN2 high limit (23)<br>Analog input AIN4 high limit (25) |  |  |
| PV low limit (02)<br>Analog input PV low limit (20)<br>Analog input PV2 low limit (22)<br>Analog input AIN2 low limit (24)<br>Analog input AIN4 low limit (26) |  |  |
| SP high limit (03)<br>Target SP high limit (09) |  |  |
| SP low limit (04)<br>Target SP low limit (10) |  |  |
| Deviation high limit (05)<br>Target SP deviation high limit (11)<br>Deviation(%) high limit (32)<br>Target SP deviation(%) high limit (36) |  |  |
| Deviation low limit (06)<br>Target SP deviation low limit (12)<br>Deviation(%) low limit (33)<br>Target SP deviation(%) low limit (37) |  |  |
| Deviation high and low limits (07)<br>Target SP deviation high and low limits (13)<br>Deviation(%) high and low limits (34)<br>Target SP deviation(%) high and low limits (38) |  |  |
| Deviation within high and low limits (08)<br>Target SP deviation within high and low limits (14)<br>Deviation(%) within high and low limits (35)<br>Target SP deviation(%) within high and low limits (39) |  |  |
| Control output high limit (15)<br>Cooling-side control output high limit (17) |  |  |
| Control output low limit (16)<br>Cooling-side control output low limit (18) |  |  |
| Feedback input high limit (27) | Fault diagnosis alarm (30) | |
| Feedback input low limit (28) | Burnout of PV input, PV2 input, or AIN2/AIN4 auxiliary analog input. ADC failure, RJC error. | |
| PV velocity (29) | FAIL (31)<br>For the factory default, the control output is turned ON in normal operation. OFF at the time of FAIL. Control output: OFF or 0%, Alarm output: OFF | |

Note 1: "Open/closed" shows status of relay contact, and "lit/unlit" shows status of EV (event) lamp.
Note 2: ⊕ Positive setpoint, ⊖ Negative setpoint

---

Setting Display of Alarm Type    Stand-by Action



- Alarm type
- Without (0) or With (1) Stand-by action
- Energized (0) / De-energized (1)
- Latch action (0/1/2/3/4)
- See User's Manual.



---

## 6. Setting Alarm Setpoint

The following operating procedure shows an example of setting the alarm-1 setpoint of group 1 to 180.0.
Before setting the alarm setpoint, check the alarm type.
To change the alarm type, see "5. Setting Alarm Type."

1. Show the Operation Display.

2. Display MODE menu with the same procedure as described in Setting Alarm Type.

   ▷ Press the Right arrow key.

3.  SP menu is displayed.

   Press the SET/ENTER key.

4.  Press the SET/ENTER key.

   ▽ Press the Down arrow key until A1 appears.

5.  The parameter A1 is displayed. A1 to A8 represent the alarm-1 to -8 setpoints.

   Group

   Each parameter and group can be changed in the Parameter Setting Displays of alarms using arrow keys.
   △▽ Up/Down arrow keys: parameters
   ◁▷ Left/Right arrow keys: groups

   Display the parameter and group that need to be changed.

   Press the SET/ENTER key.

6.  Blinks during the change.

   △▽ Change the setpoint using the Up/Down arrow keys to increase and decrease the value and
   ◁ ▷ the Left/Right arrow keys to move between digits.

   Press the SET/ENTER key.

7.  The setpoint has been registered. After the setup is completed, press the DISPLAY key once to return to the Operation Display.

---

### Initializing parameter values

Parameters that you have changed can be initialized to factory default values or user default values. For details, see "Parameter Initialization" in the User's Manual.

### Changing the parameter display levels

This operation guide does not explain all the parameters. To display all the parameters, you need to change the parameter display level to professional setting mode. For details, see "Setting Security Functions" in the User's Manual.

# 7. Overview of Program Patterns

The programming example given here demonstrates how to do the tasks outlined below.

1) **Program the controller to start program operation at 50.0°C and raise the temperature up to 100.0°C in 50 minutes.**
2) **When the temperature reaches 100.0°C, keep it at this level for 30 minutes.**
3) **Raise the temperature up to 200.0°C in 60 minutes.**
4) **When the temperature reaches 200.0°C, keep it at this level for 30 minutes.**
5) **Lower the temperature to 50.0°C in 50 minutes.**
6) **When the temperature reaches 50.0°C, keep it at this level for 30 minutes.**

PV input ranges are following:
Maximum value of PV input range: 250.0°C
Minimum value of PV input range: 0.0°C
PV input unit: C

**Program pattern action type (PGTY): 1, 2, or 3**
Zone PID selection (ZON): Segment PID selection (0)
SP ramp-rate unit (TMU): HOUR
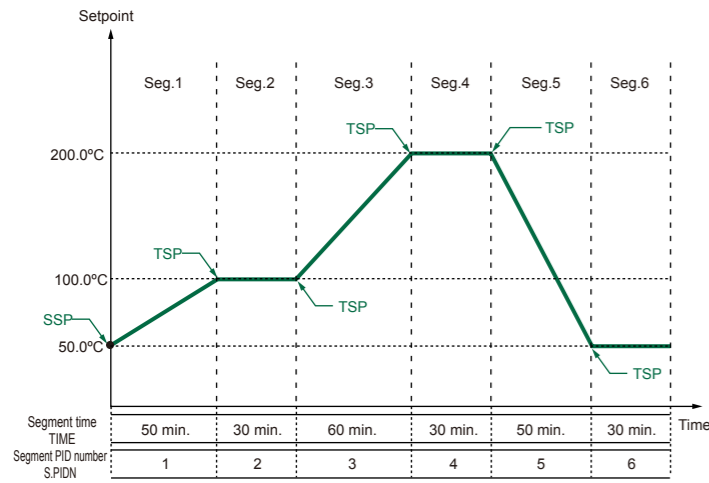
The display symbols of the parameters, TSP (Final target setpoint), TIME (Segment time setting), and S.PID (Segmet PID number selection) are the same in each segment. However, the segment can be recognized by the number displayed on the Symbol display.

See User's Manual for the Wait and Repeat actions, Zone PID, Start of program operation (Start code), Changing operation mode at segment switching (Junction code), Local mode, and Remote mode.
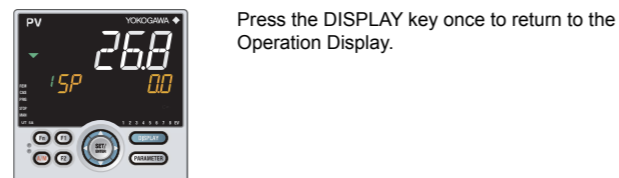
# 8. Creating Program Patterns

The following operating procedure describes an example of creating the program discussed in "7. Overview of Program Patterns."

⚠ **CAUTION**
Be sure to check the PV input range, Sp ramp-rate unit (TMU) before creating.

1. Show the Operation Display.

   PARAMETER  Hold down the keys for 3 seconds.

2. OPEM MODE — MODE menu is displayed.

   ▷ Press the Right arrow key.

3. OPEM PROG — PROG menu is displayed.

   Press the SET/ENTER key.

4. StC SSP — STC=SSP (Starting target setpoint)
   Keep the initial value.

   Press the Down arrow key.

---

5. SSP 0.0
   Set the common parameter of the specified pattern.
   Press the SET/ENTER key. (Blinks during the change.)
   △▽ Change the setpoint using the Up/Down arrow keys to increase and decrease the value and the ◁▷ Left/Right arrow keys to move between digits.

6. SSP 50.0
   Press the SET/ENTER key.
   Starting target setpoint=50.0°C
   Press the Up/Down arrow key.

7. JC CONt
   Set the junction code.
   Keep the initial value.
   ▽ Press the Down arrow key (until TSP appears.)

8. tSP 50.0
   Set the final target setpoint.
   Press the SET/ENTER key. (Blinks during the change.)
   △▽ Change the setpoint using the Up/Down arrow ◁▷ keys to increase and decrease the value and the Left/Right arrow keys to move between digits.
   Segment 1

9. tSP 100.0
   Press the SET/ENTER key.
   Final target setpoint=100.0°C
   ▽ Press the Down arrow key.

10. tIME -
    Set the segment time.
    Press the SET/ENTER key. (Blinks during the change.)
    △▽ Change the setpoint using the Up/Down arrow ◁▷ keys to increase and decrease the value and the Left/Right arrow keys to move between digits.

11. tIME 0.50
    Press the SET/ENTER key.
    Segment time=50 minutes
    ▽ Press the Down arrow key.

12. SPI d 1
    Set the segment PID number.
    Keep the initial value.

- Settings for the segment 2 to 6 can be done similarly.
- For programming and the settings for Wait and Repeat actions, see User's Manual.

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

---

# 9. Program Pattern Setup Charts

| System name | |
|---|---|
| Program No. | |
| Program name | |
| Model | |
| Serial No. | |

The following parameters are necessary to be set before programming.
For the setting range, see "Parameters."

## < Setup Parameters >

| Parameter symbol | Parameter name | User settings |
|---|---|---|
| TMU | SP ramp-rate unit | |
| ZON | Zone PID selection | |
| PGTY | Program pattern action type | |

The following parameters are common parameters for the program pattern specified.
For the setting range, see "Parameters."

## < Program Pattern Data (common parameter) >

| Parameter symbol | Parameter name | User settings |
|---|---|---|
| STC | Start code | |
| SSP | Starting target setpoint | |
| SSP | Starting target setpoint (for program pattern-2 retransmission) | |
| JC | Junction code | |
| WT.SW | Wait function ON/OFF | |
| WZ.UP | Upper-side wait zone | |
| WZ.LO | Lower-side wait zone | |
| R.CYCL | Number of repeat cycles | |

## < Program Pattern Data (parameters for segments) >

Maximum value of PV input range / Maximum value of PV input scale ( )

Unit

A program pattern can be drawn in the right table.

Minimum value of PV input range / Minimum value of PV input scale ( )

| Parameter symbol | Parameter name | Segments | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| TSP | Final target setpoint | | | | | | | | | | | | | | | | | | | | |
| TSP | Final target setpoint (for program pattern-2 retransmission) | | | | | | | | | | | | | | | | | | | | |
| TIME | Segment time setting | | | | | | | | | | | | | | | | | | | | |
| S.PID | Segment PID number selection | | | | | | | | | | | | | | | | | | | | |

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# Operation Guide

UT75A
Digital Indicating Controller
Operation Guide for Single-loop Control

*UTAdvanced*

Functional Enhancement

**Operations**

**YOKOGAWA ◆**
Yokogawa Electric Corporation

This operation guide describes key entries for operating the UT75A.
For operations using external contact inputs, see "DI" of "6. Terminal Wiring Diagrams" in "Installation and Wiring."
If you cannot remember how to carry out an operation during setting, press the DISPLAY key once. This brings you to the display (Operation Display) that appears at power-on.
The scrolling guide is displayed on PV display in the Parameter Setting Display. This guide can be turned on/off with the Fn key.
For details of the each function, refer to the electronic manual. User's manuals can be downloaded or viewed at the following URL.

⬇ http://www.yokogawa.com/ns/ut/im/

## Contents

## 1. Monitoring-purpose Operation Displays Available during Operation

### ■ Operation Display Switching Diagram for Standard and Position Proportional Types

**• SP Display**
Displays the measured input value on PV display.
Displays the target setpoint (SP) on Setpoint display (SP can be changed).

**• OUT Display**
Displays the measured input value on PV display.
Displays the control output value (OUT) on Setpoint display (OUT can be changed in manual mode).
Displays the valve's feedback input value (at 0 to 100% valve opening) in Position proportional control.



SP Display
(SP can be changed.)

OUT Display
(OUT can be changed.)
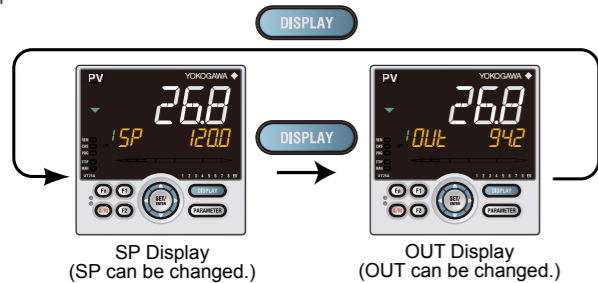
### Standard, Position Proportional, and Heating/Cooling Types

- SELECT Displays 1 to 5 (which appear when registered)
- Analog Input Display (display only) (factory default: non-display)
- Position Proportional Computation Output Display (display only) (factory default: non-display)
- PID Number Display (display only) (factory default: non-display)

### ■ Operation Display Switching Diagram for Heating/Cooling Control

**• SP Display**
Displays the measured input value on PV display.
Displays the target setpoint (SP) on Setpoint display (SP can be changed).

**• OUT Display**
Displays the measured input value on PV display.
Displays the control output values (C.H.) of heating and cooling sides on Setpoint display (C.H. can be changed in manual mode).



SP Display
(SP can be changed.)

Heating/cooling OUT Display
(OUT can be changed.)
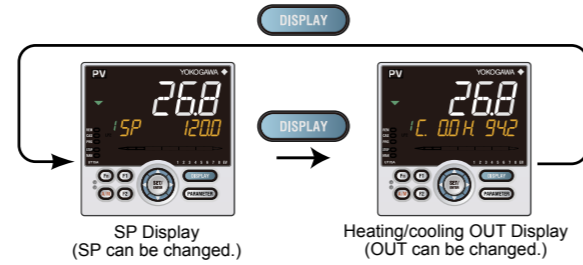
After showing the OUT Display, press the DISPLAY key to show the following displays conditionally. For details, see User's Manual.

## 2. Setting Target Setpoint (SP)
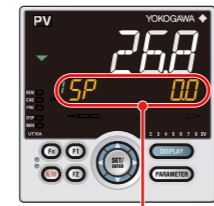


1. Show the SP Display (Operation Display). (This is an example of setting the target setpoint to 150.0).

2. Press the SET/ENTER key to start the last digit of the setpoint blinking. Blinking allows you to change the value.

3. ◁▷ To set the setpoint, use the △▽ Left/Right arrow keys to move between digits and the Up/Down arrow keys to increase and decrease the value.

4. When the required value is displayed, press the SET/ENTER key to register the setpoint.

## 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. For 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 is known 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.

⚠ **CAUTION**

**Do not perform auto-tuning for the following processes. Tune PID manually.**
- **Processes with fast response such as flow rate control and pressure control.**
- **Processes which do not allow the output to be turned on and off even 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.**

1. Show the Operation Display.

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

Press the SET/ENTER key.

3. The parameter R.L (REMOTE/LOCAL switch) is displayed.

▽ Press the Down arrow key until the parameter AT appears.

4. The parameter AT (auto-tuning switch) is displayed.

Press the SET/ENTER key.

5. OFF blinks.

△▽ Press the Up/Down arrow keys to display the required setpoint.

6. Blinks during the change.

The setting range is 1 to 16 (represent group numbers) or R.
To perform auto-tuning for the PID of group 1, set the parameter AT to 1.
To quit the auto-tuning, set the parameter to OFF.

Press the SET/ENTER key.

7. The setpoint has been registered. This starts auto-tuning.
The limiter can be set to the output during auto-tuning. For details, see User's Manual.

During auto-tuning,
- The MAN lamp blinks.
- The OUT symbol appears.
- The output values at 100.0% and 0% appear alternately.

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

## 4. Selecting Target Setpoint Numbers (SPNO.)

The following operating procedure shows 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 for 3 seconds to display MODE menu.

Press the SET/ENTER key.

3. The parameter R.L (REMOTE/LOCAL switch) is displayed.

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

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

Press the SET/ENTER key.

5. △▽ Change the setpoint using the Up/Down arrow keys.
Blinks during the change.

Press the SET/ENTER key.

6. The setpoint has been registered.
Press the DISPLAY key once to return to the Operation Display.

7. SPNO. has been changed to 2.

## 5. Switching between AUTO and MAN

AUTO and MAN switching can be performed using any of the following: (1) A/M key, (2) Contact input, (3) Communication, and (4) User function key.
The figure below shows a direct operation using the A/M key.
When AUTO and MAN switching function is assigned to the contact input, and the contact input is ON, the switching by key operation cannot be performed.
For details, see User's Manual.



MAN lamp is lit in MAN mode.

Each time you press the A/M key, AUTO and MAN is switched alternately.
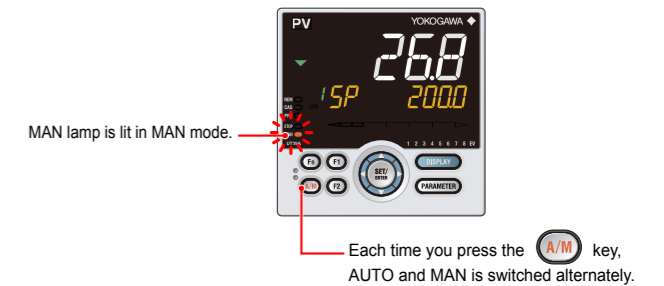
When AUTO is switched into MAN, the control output value in AUTO mode is held.
The controller can be operated manually from the hold value.
If the manual preset output is set (MPON parameter ≠ OFF), the controller can be operated manually from the arbitrary output value (MPO1 to MPO5 parameters).

## 6. Switching between RUN and STOP

RUN and STOP switching can be performed using any of the following: (1) Contact input, (2) Parameter, (3) Communication, and (4) User function key.
The following shows an example of switching using the contact input.
(The switching function is assigned to DI2 contact for the factory default.)
For details of other switching methods and the display appearing when the operation is started, see User's Manual.
When the controller is stopped, input and outputs are as follows:

| | |
|---|---|
| PV input | Displays the PV value. |
| Control output | Displays the preset output value. The preset output value is set for each PID group. |
| Alarm output | Turns the output on in case of an alarm. |

## Display in STOP mode

"STOP" is displayed on Symbol display and "preset output value" is displayed on Data display.

Display in STOP mode

OFF: Operation RUN
ON: Operation STOP

Preset output (PO)
Valve opening (0-100%) for Position proportional type

STOP lamp is lit.

## Display in STOP mode in Heating/cooling control

"Cooling-side preset output value" is displayed on the left side of the "ST" symbol, and "Heating-side preset output value" is on the right side.

Display in STOP mode

OFF: Operation RUN
ON: Operation STOP

Heating-side preset output (PO)
Cooling-side preset output (POc)
STOP lamp is lit ·

## 7. Switching between REM (Remote) and LCL (Local)

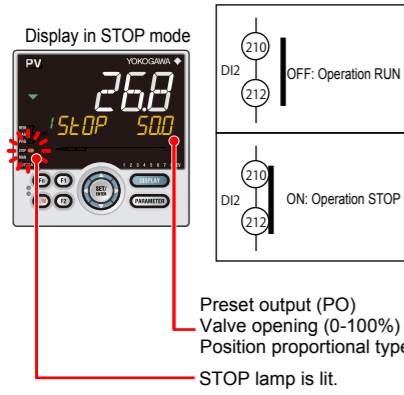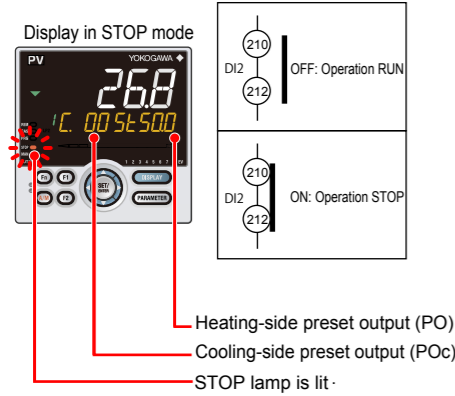Remote and local switching can be performed using any of the following:
(1) Contact input, (2) Parameter, (3) Communication, and (4) User function key.

### LCL (Local)
Control is performed using the target setpoint set on the controller.

### REM (Remote)
Control is performed using an external analog signal that is used as the target setpoint. The following shows an example of switching from local to remote using the parameter.
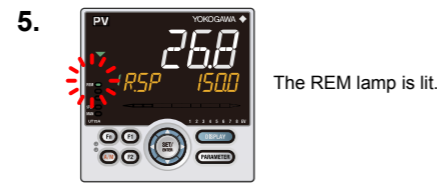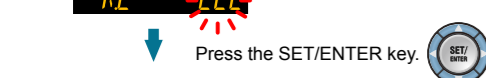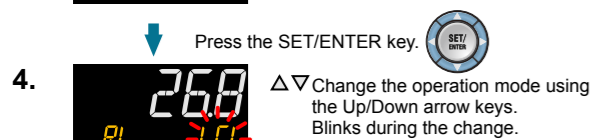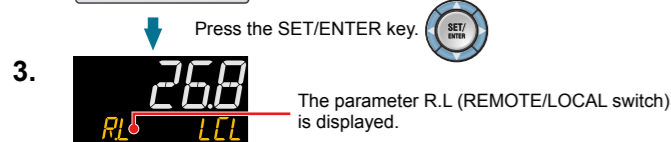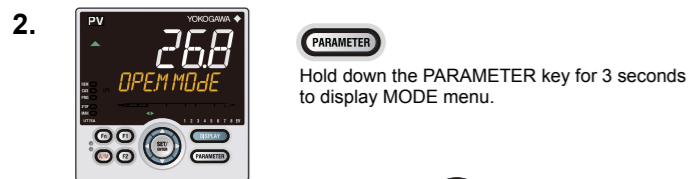For details of other switching methods, see User's Manual.
• The PID group for the local SP number is used as PID in remote mode.

### NOTE
When the contact input is ON, operation cannot be performed using the parameter, communication, or key. When the contact input is OFF and the setting is switched using the parameter, communication, or key, the last switching operation is performed.
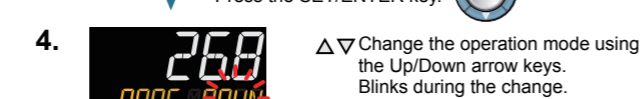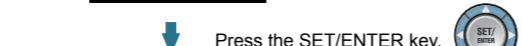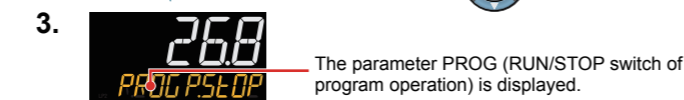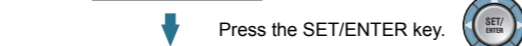
**1.** Show the Operation Display.

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

Press the SET/ENTER key.

**3.** The parameter R.L (REMOTE/LOCAL switch) is displayed.

Press the SET/ENTER key.

**4.** △▽ Change the operation mode using the Up/Down arrow keys. Blinks during the change.
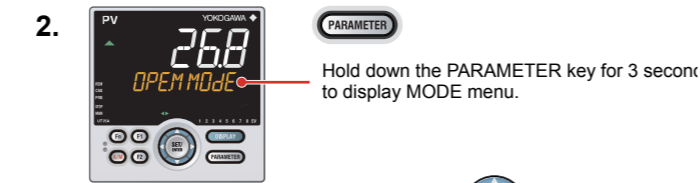
Press the SET/ENTER key.

**5.** The REM lamp is lit.

## 8. Switching between P.RUN (Start program) and P.STOP (Stop program)

Program start/stop switching can be performed using any of the following: (1) Contact input, (2) Parameter, and (3) Communication.
Setting the program pattern action type (PGTY) to 1, 2, or 3 enables the program start/stop switching.

**1.** Show the Operation Display.

**2.** Hold down the PARAMETER key for 3 second to display MODE menu.

Press the SET/ENTER key.

**3.** The parameter PROG (RUN/STOP switch of program operation) is displayed.

Press the SET/ENTER key.

**4.** △▽ Change the operation mode using the Up/Down arrow keys. Blinks during the change.

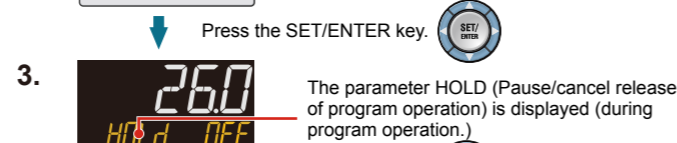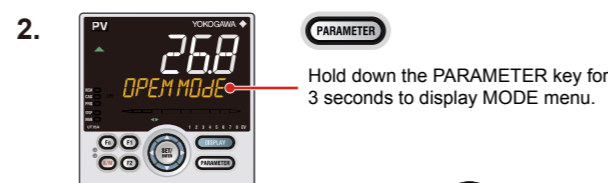Press the SET/ENTER key.

**5.** The PRG lamp is lit.

## 9. Enabling/Disabling Hold Mode of Program Operation

Enabling/disabling hold mode of program operation can be performed during program operation using any of the following: (1) Parameter, (2) Contact input, (3) Communication, and (4) User function key.
The following shows an example of switching using the parameter.

**1.** Show the Operation Display.

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

Press the SET/ENTER key.

**3.** The parameter HOLD (Pause/cancel release of program operation) is displayed (during program operation.)

Press the SET/ENTER key.

**4.** △▽ Change the setpoint using the Up/Down arrow keys. Blinks during the change.

Press the SET/ENTER key.

**5.** The PRG lamp blinks.

## 10. Executing "Advance" Function

"Advance" can be performed during program operation using any of the following: (1) Parameter, (2) Contact input, (3) Communication, and (4) User function key.
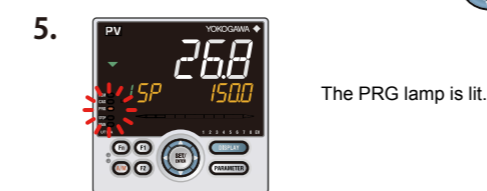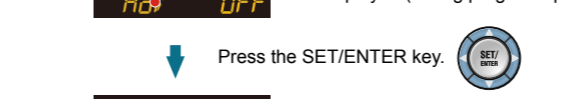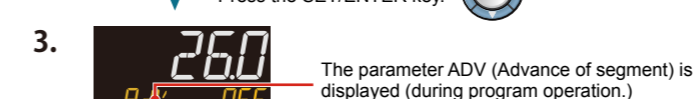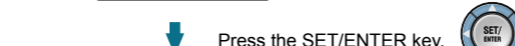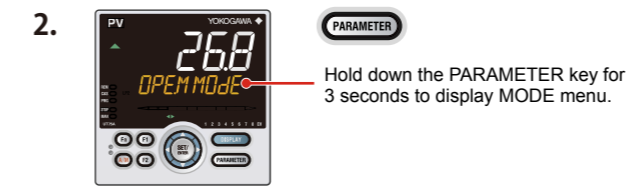The following shows an example of switching using the parameter.
When executing the "Advance" function during hold-mode operation, the hold mode is disabled.

**1.** Show the Operation Display.

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

Press the SET/ENTER key.

**3.** The parameter ADV (Advance of segment) is displayed (during program operation.)

Press the SET/ENTER key.

**4.** △▽ Change the setpoint using the Up/Down arrow keys. Blinks during the change.

Press the SET/ENTER key.

**5.** The PRG lamp is lit.

## 12. Troubleshooting

### ■ Troubleshooting Flow

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

Is the controller defective?

Completely inactive? — No → Key operation failure? — No → Display failure? * — No → I/O signal failure? — No → Communication failure?

Yes: Check wiring of the power terminals. / Check the key lock setting. / Turn off power, and then turn it on again. / Check the I/O specifications of the controller. / Check the specifications of the controller.

Check the supply voltage.

Check the specifications and polarity of connected devices.

With communication? — No / Yes

Normal? — No

No communication capability

Check the communication-related parameters.

Correct the error(s).

Is the key locked? — No / Yes

Check the communication wiring.

Normal? Yes

Correct? — No / Yes

Cancel the setting.

Check the specifications of communication devices.

Contact us for repair.

Problem solved.

* The LCD (a liquid crystal display) is used for a display portion of this product.
The LCD has a characteristic that the display action becomes late at the low temperature.
Additionally, the luminance and contrast degradation are caused due to aged deterioration.
However, the control function is not affected.

## 11. Manipulating Control Output in Manual Mode

### NOTE
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).
Even if the SET/ENTER key is not pressed, the control output value changes according to the displayed value.
In stop mode (when the STOP lamp is lit), control output cannot be manipulated.

MAN lamp is lit.

Up arrow key: increases control output.
Down arrow key: decreases control output.

In Position proportional control:
Up arrow key; opens the valve.
Down arrow key; closes the valve.
Output; only while pressing a key.
OUT; valve opening (0-100%)

Output manipulation in Position proportional control is not restricted from output limiters (OH, OL).
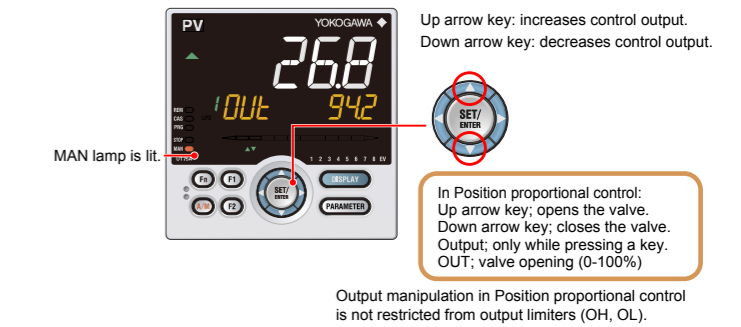
### Manual operation in Heating/cooling control

Heating-side control output
Symbol of heating side
Cooling-side control output
Symbol of cooling side
Target setpoint (SP) number
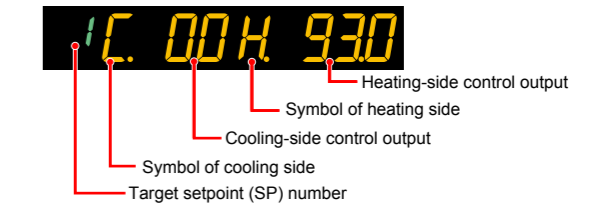
Up arrow key: concurrently decreases cooling-side control output and increases heating-side control output.
Down arrow key: concurrently increases cooling-side control output and decreases heating-side control output.
(Either none of the heating-side and cooling-side outputs are presented, or both of them are presented according to the dead band setting.)
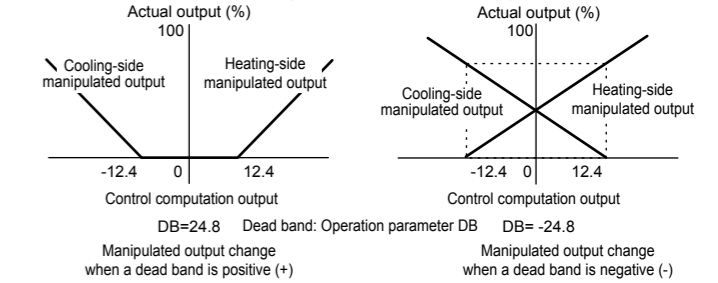
Actual output (%) 100
Cooling-side manipulated output
Heating-side manipulated output
-12.4  0  12.4
Control computation output
DB=24.8
Manipulated output change when a dead band is positive (+)

Actual output (%) 100
Cooling-side manipulated output
Heating-side manipulated output
-12.4  0  12.4
Control computation output
Dead band: Operation parameter DB  DB= -24.8
Manipulated output change when a dead band is negative (-)
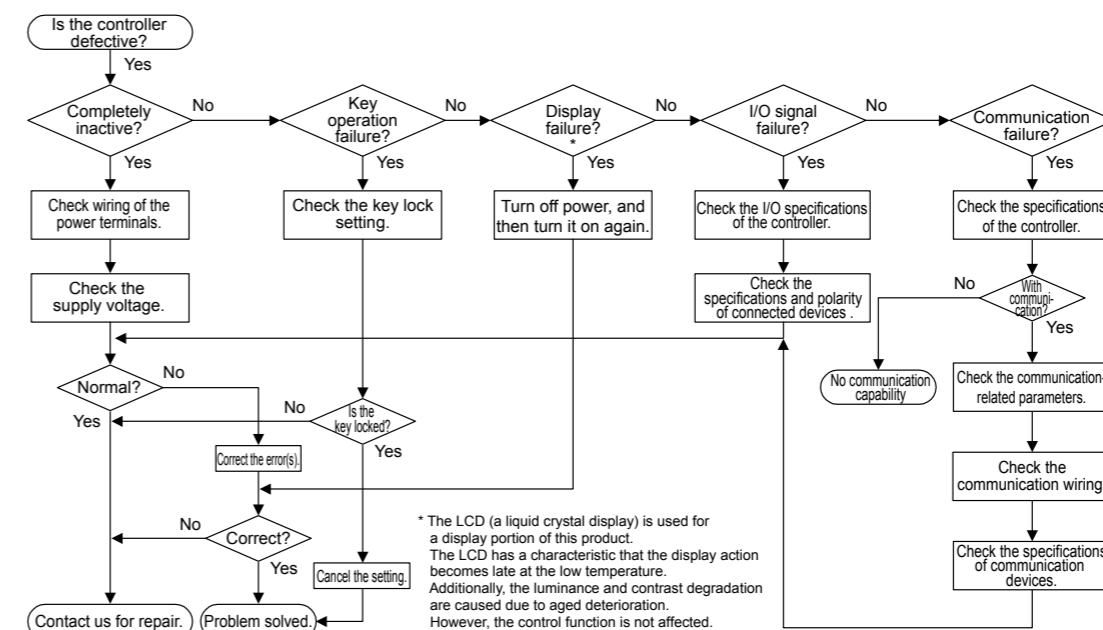
### ■ Remedies if Power Failure Occurs during Operations

• Instantaneous power failure within 20 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.

### NOTE
Write down the settings of parameters for a repair request.

### ■ For the Errors at Power On and the Errors during Operation, see "Installation" in this manual.

# Operation Guide

**UT75A**
Digital Indicating Controller
Operation Guide for Single-loop Control

UTAdvanced

**Parameters**

*Functional Enhancement*

**YOKOGAWA ◆**
Yokogawa Electric Corporation

This operation guide describes the functions of parameters briefly. The parameter symbols listed are in the order shown on the display in each group of menu symbols. In addition, each parameter table has a "User Setting" column, where you can record your setpoints when setting them in the controller. The scrolling guide is displayed on PV display in the Parameter Setting Display. This guide can be turned on/off with the Fn key. For details of the each function, refer to the electronic manual. User's manuals can be downloaded or viewed at the following URL.

⬇ http://www.yokogawa.com/ns/ut/im/

## Operation Parameters

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



The parameter groups can be switched using ◁, ▷ keys.

Move to the Setup Parameter Setting Display:
Hold down the PARAMETER key and the Left arrow key simultaneously for 3 sec.

### 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 setpoint blinking. The blinking state allows you to make changes (setting mode). Use the Up/Down/Left/Right arrow keys to change the setpoint. Press the SET/ENTER key to register the setting.
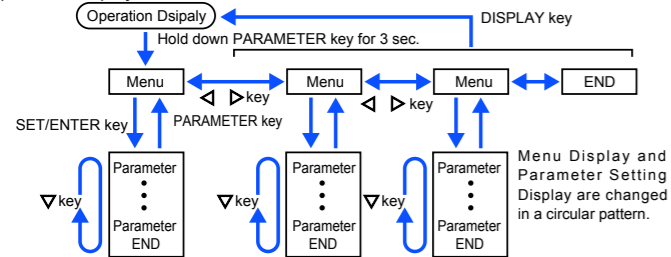
Note that there are some parameters which are not displayed depending on the model and suffix codes, control mode (CTLM), control type (CNT), etc. The parameters for professional setting mode (LEVL: PRO) are not described in this manual. See User's Manual.

### ■ Operation Mode

Menu symbol: `MOdE` (MODE)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| `S.R` (S.R) | STOP/RUN switch | STOP: Stop mode<br>RUN: Run mode<br>Preset output (PO) is generated in STOP mode.<br>Default: Not displayed. STOP/RUN switch is assigned to contact input. | RUN | | |
| `R.L` (R.L) | REMOTE/LOCAL switch | LCL: Local mode<br>REM: Remote mode<br>Select a remote input method for acquiring the target setpoint from remote input or communication using the parameter RMS. | LCL | | |
| `HOLd` (HOLD) | Pause/cancel release of program operation | Display during program operation.<br>ON: Pause<br>OFF: Cancel release (Program operation restart) | OFF | | |
| `AdV` (ADV) | Advance of segment | Display during program operation.<br>Set as "ADV = ON" to advance from the current segment to the next segment. | OFF | | EASY |
| `PROG` (PROG) | RUN/STOP switch of program operation | Parameter PROG is displayed when PGTY is set to other than 0.<br>P.STOP: Stop of program operation<br>P.RUN: Start of program operation | P.STOP | | |
| `At` (AT) | AUTO-tuning switch | OFF: Disable<br>1 to 16: Perform auto-tuning. Tuning result is stored in the specified numbered PID.<br>R: Tuning result is stored in the PID for reference deviation. | OFF | | |
| `SPNO.` (SPNO.) | SP number selection | 1 to 20 (Depends on the setup parameter SPGR. setting.) | 1 | | |
| `PI d` (PID) | PID number | The PID group being selected is displayed.<br>1 to 16, R: PID group for reference deviation | 1 | | |

### ■ SELECT Parameter

Menu symbol: `CS` (CS)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| Registered parameter symbol | SELECT parameter 10 to 19 | Setting range of a registered parameter.<br>For details, see User's Manual. | — | Table below | EASY |

| Parameter | n=10 | n=11 | n=12 | n=13 | n=14 | n=15 | n=16 | n=17 | n=18 | n=19 |
|---|---|---|---|---|---|---|---|---|---|---|
| CSn | | | | | | | | | | |

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

### ■ Program Setting Parameter

Menu symbol: `PROG` (PROG)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| `STC` (STC) | Start code | SSP: Program operation begins with the starting target setpoint.<br>RAMP: Ramp-prioritized PV start<br>TIME: Time-prioritized PV start | SSP | | |
| `SSP` (SSP) | Starting target setpoint | 0.0 to 100.0% of PV input range (EU) (Setting range: P.RL to P.RH) | P.RL | | |
| `JC` (JC) | Junction code | CONT: Switching for continuation<br>HOLD: Hold-on switching (the controller holds the end-of-segment setpoint when the segment is completed, to perform control). | CONT | | EASY |
| `WT.SW` (WT.SW) | Wait function ON/OFF | OFF: Disable<br>ON: Enable | OFF | | |
| `WZ.UP` (WZ.UP) | Upper-side wait zone | 0.0 to 10.0% of PV input range (EU) | 0.5% of PV input range | | |
| `WZ.LO1` (WZ.LO1) | Lower-side wait zone | | 0.5% of PV input range | | |
| `R.CYCL` (R.CYCL) | Number of repeat cycles | 0 to 999, CONT (limitless number of times) | 0 | | |

When the program pattern-2 retransmission is selected (PGTY=2), the second loop is also displayed for the parameter SSP. (LP2 lamp is lit.)

### ■ Program Setting Parameter

(The following parameters are displayed to press the right/left arrow key during displaying above parameter.)

Menu symbol: `PROG` (PROG)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| `TSP` (TSP) | Final target setpoint | 0.0 to 100.0% of PV input range (EU) (Setting range: P.RL to P.RH) | P.RL | | |
| `TIME` (TIME) | Segment time setting | -: Unregistered<br>0.00 to 99.59 ("hour.minute" or "minute.second")<br>* Use the parameter TMU to set the time unit. (Common in the instrument.)<br>* If the setting is 0.00, TSP changes in stepwise after one control period. | - | See "Initial Settings" in this manual. | EASY |
| `S.PID` (S.PID) | Segment PID number selection | 1 to 16 | 1 | | |

When the program pattern-2 retransmission is selected (PGTY=2), the second loop is also displayed for the parameter TSP. (LP2 lamp is lit.)

### ■ SP and Alarm Setpoint Setting Parameter

Menu symbol: `SP` (SP)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| `SP.J` (SP.J) | Jump to SP group | The specified SP group is displayed.<br>1 to 20 (Depends on the setup parameter SPGR. setting.) | 1 | - | |
| `SP` (SP) | Target setpoint | 0.0 to 100.0% of PV input range (EU) (Setting range: SPL to SPH) | SPL | | |
| `SUb` (SUB) | Sub-target setpoint (in Two-position two-level control) | Set the offset from SP.<br>-100.0 to 100.0% of PV input range span (EUS) | 0.0 % of PV input range span | | |
| `PI dN` (PIDN) | PID number selection | Set a PID group number to use.<br>1 to 16 (Depends on the setup parameter PIDG. setting.) | 1 to 8 | | EASY |
| `A1 to A8` (A1 to A8) | Alarm-1 to -8 setpoint | Set a display value of setpoint of PV alarm, SP alarm, deviation alarm, output alarm, or velocity alarm.<br>-19999 to 30000 (Set a value within the input range.)<br>Decimal point position depends on the input type | 0 | Table below | |
| `UPR` (UPR) | SP ramp-up rate | Used to prevent SP from changing suddenly.<br>Set a ramp-up rate or ramp-down rate per hour or minute. Set a time unit using the parameter TMU.<br>OFF, 0.0 + 1 digit to 100.0% of PV input range span (EUS) | OFF | | |
| `dNR` (DNR) | SP ramp-down rate | | OFF | | |

For the parameter SP (target setpoint), 8 groups are displayed for the factory default. The number of groups can be changed by the setup parameter SPGR. (number of SP groups). For the alarm setpoint parameter, alarm-1 to -4 are displayed for the factory default. The number of alarms can be changed using the setup parameter ALNO. (number of alarms). To change the number of SP groups or alarms, see User's Manual .

Use the following table to record SP and alarm setpoints.

| Parameter | n=1 | n=2 | n=3 | n=4 | n=5 | n=6 | n=7 | n=8 |
|---|---|---|---|---|---|---|---|---|
| SP | | | | | | | | |
| SUB | | | | | | | | |
| PIDN | | | | | | | | |
| A1 | | | | | | | | |
| A2 | | | | | | | | |
| A3 | | | | | | | | |
| A4 | | | | | | | | |
| A5 | | | | | | | | |
| A6 | | | | | | | | |
| A7 | | | | | | | | |
| A8 | | | | | | | | |
| UPR | | | | | | | | |
| DNR | | | | | | | | |

n: group number

### ■ SP-related Setting Parameter

Menu symbol: `SPS` (SPS)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| `RMS` (RMS) | Remote input method | RSP: Via auxiliary analog input<br>COM: Via communication | RSP | | |
| `RFL` (RFL) | Remote input filter | OFF, 1 to 120 s | OFF | | |
| `RT` (RT) | Remote input ratio | SP = Remote input x RT + Remote input bias<br>0.001 to 9.999 | 1.000 | | STD |
| `RbS` (RBS) | Remote input bias | -100.0 to 100.0% of PV input range span (EUS) | 0.0 % of PV input range span | | |
| `tMU` (TMU) | SP ramp-rate time unit | HOUR: Ramp-up rate or ramp-down rate per hour<br>MIN: Ramp-up rate or ramp-down rate per minute<br>SEC: Ramp-up rate or ramp-down rate per second | HOUR | | EASY |
| `SPt` (SPT) | SP tracking selection | Tracking is performed when the mode changes from Remote to Local. (The local setpoint keeps track of the remote setpoint.)<br>OFF, ON | ON | | |
| `PVt` (PVT) | PV tracking selection | Causes the setpoint to keep track of the PV so the setpoint automatically reverts to its original value at a preset rate of change. The UPR, DNR, and TMU are used in combination.<br>Operating conditions: 1) MAN → AUTO, 2) STOP → AUTO, 3) Power-on, 4) SP number change, 5) SP change<br>OFF, ON | OFF | | STD |

### ■ Alarm Function Setting Parameter

Menu symbol: `ALRM` (ALRM)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| `AL1 to AL8` (AL1 to AL8) | Alarm-1 to 8 type<br><br>Example: Alarm-1<br>`AL1 00001`<br>Latch action<br>Energized/De-energize<br>Stand-by action<br>Alarm type | Set a 5-digit value in the following order.<br>[Latch action (0/1/2/3/4)] + [Energized (0) or De-energized (1)] + [Without (0) or With (1) Stand-by action] + [Alarm type: 2 digits (see below)]<br>For latch action, see User's Manual.<br><br>Alarm type: 2 digits<br>00: Disable<br>01: PV high limit<br>02: PV low limit<br>03: SP high limit<br>04: SP low limit<br>05: Deviation high limit<br>06: Deviation low limit<br>07: Deviation high and low limits<br>08: Deviation within high and low limits<br>09: Target SP high limit<br>10: Target SP low limit<br>11: Target SP deviation high limit<br>12: Target SP deviation low limit<br>13: Target SP deviation high and low limits<br>14: Target SP deviation within high and low limits<br>15: OUT high limit<br>16: OUT low limit<br>17: Cooling-side OUT high limit<br>18: Cooling-side OUT low limit<br>19: Analog input PV high limit<br>20: Analog input PV low limit<br>21: Analog input PV2 high limit<br>22: Analog input PV2 low limit<br>23: Analog input AIN2 high limit<br>24: Analog input AIN2 low limit<br>25: Analog input AIN4 high limit<br>26: Analog input AIN4 low limit<br>27: Feedback input high limit<br>28: Feedback input low limit<br>29: PV velocity<br>30: Fault diagnosis<br>31: FAIL<br>32: Deviation(%) high limit<br>33: Deviation(%) low limit<br>34: Deviation(%) high and low limits<br>35: Deviation(%) within high and low limits<br>36: Target SP deviation(%) high limit<br>37: Target SP deviation(%) low limit<br>38: Target SP deviation(%) high and low limits<br>39: Target SP deviation(%) within high and low limits | AL1, AL3: Latch action (0) Energized (0) Without Stand-by action (0) PV high limit (01)<br><br>AL2, AL4: Latch action (0) Energized (0) Without Stand-by action (0) PV low limit (02)<br><br>AL5 to AL8: not displayed for factory default | Table below | EASY |

### ■ PV velocity alarm time / hysteresis / delay / mode

| Parameter | | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|---|
| `Vt1 to Vt8` (VT1 to VT8) | | PV velocity alarm time setpoint 1 to 8 | 0.01 to 99.59 (minute.second) | 1.00 | Table below | EASY |
| `HY1 to HY8` (HY1 to HY8) | | Alarm-1 to -8 hysteresis | Set a display value of setpoint of hysteresis.<br>-19999 to 30000 (Set a value within the input range.)<br>Decimal point position depends on the input type. When the decimal point position for the input type is set to "1", the initial value of the hysteresis is "1.0". | 10 | Table below | EASY |
| `dYN1 to dYN8` (DYN1 to DYN8) | | Alarm-1 to -8 On-delay timer | An alarm output is ON when the delay timer expires after the alarm setpoint is reached.<br>0.00 to 99.59 (minute.second) | 0.00 | Table below | STD |
| `AMd` (AMD) | | Alarm mode | 0: Always active<br>1: Not active in STOP mode<br>2: Not active in STOP or MAN mode | 0 | | |

For the alarm function setting parameter, 4 alarms are displayed for the factory default. The number of alarms can be changed by the setup parameter ALNO. (number of alarms). To change the number of alarms, see User's Manual.

| Parameter | n=1 | n=2 | n=3 | n=4 | n=5 | n=6 | n=7 | n=8 |
|---|---|---|---|---|---|---|---|---|
| ALn | | | | | | | | |
| VTn | | | | | | | | |
| HYn | | | | | | | | |
| DYNn | | | | | | | | |

n: alarm number

### ■ PV-related Setting Parameter

Menu symbol: `PVS` (PVS)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| `bS` (BS) | PV input bias | -100.0 to 100.0% of PV input range span (EUS) | 0.0 % of PV input range span | | EASY |
| `FL` (FL) | PV input filter | OFF, 1 to 120 s | OFF | | |

### ■ PID Setting Parameter

Menu symbol: `PI d` (PID)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| `PI dJ` (PID.J) | Jump to PID group | The specified PID group is displayed.<br>1 to 16 (Depends on the setup parameter PIDG. setting.) | 1 | - | |
| `P` (P) | Proportional band Heating-side proportional band (in Heating/cooling control) | 0.0 to 999.9%<br>When 0.0% is set, it operates as 0.1%.<br>Heating-side ON/OFF control applies when 0.0% in Heating/cooling control | 5.0% | | |
| `I` (I) | Integral time Heating-side integral time (in Heating/cooling control) | OFF: Disable<br>1 to 6000 s | 240 s | | |
| `d` (D) | Derivative time Heating-side derivative time (in Heating/cooling control) | OFF: Disable<br>1 to 6000 s | 60 s | | |
| `OH` (OH) | Control output high limit Heating-side control output high limit (in Heating/cooling control) | -4.9 to 105.0%, (OL<OH)<br>In Heating/cooling control: 0.1 to 105.0% (OL<OH) | 100.0% | | EASY |
| `OL` (OL) | Control output low limit Heating-side control output low limit (in Heating/cooling control) | -5.0 to 104.9%, (OL<OH), SD: Tight shut<br>In Heating/cooling control: 0.0 to 104.9% (OL<OH) | 0.0% | | |
| `MR` (MR) | Manual reset | Enabled when integral time is OFF.<br>The manual reset value equals the output value when PV = SP.<br>-5.0 to 105.0% | 50.0% | | |
| `HYS` (HYS) | Hysteresis (in ON/OFF control, Position proportional control, or Two-position two-level control) Heating-side ON/OFF control hysteresis (in Heating/cooling control) | In ON/OFF control or Two-position two-level control: 0.0 to 100.0% of PV input range span (EUS)<br>In Heating/cooling control or Position proportional control: 0.0 to 100.0% | *1 | | |
| `SUHY` (SU.HY) | Sub-hysteresis (in Two-position two-level control) | 0.0 to 100.0% of PV input range span (EUS) | 0.5 % of PV input range span | | |
| `HYUP` (HY.UP) | Upper-side hysteresis (in ON/OFF control) | 0.0 to 100.0% of PV input range span (EUS) | 0.5 % of PV input range span | | EASY |
| `HYLO` (HY.LO) | Lower-side hysteresis (in ON/OFF control) | | 0.5 % of PV input range span | | |
| `dR` (DR) | Direct/reverse action switch | RVS: Reverse action<br>DIR: Direct action | RVS | | |
| `SUdR` (SU.DR) | Sub-direct/reverse action switch (in Two-position two-level control) | | DIR | | STD |

*1: In ON/OFF control or Two-position two-level control: 0.5 % of PV input range span
In Heating/cooling control or Position proportional control: 0.5 %

# Operation Parameters (Continued from page 11)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | Display level |
|---|---|---|---|---|
| Pc (Pc) | Cooling-side proportional band | 0.0 to 999.9% (Cooling-side ON/OFF control applies when 0.0% in Heating/cooling control) | 5.0% | |
| Ic (Ic) | Cooling-side integral time | OFF: Disable 1 to 6000 s | 240 s | |
| dc (Dc) | Cooling-side derivative time | OFF: Disable 1 to 6000 s | 60 s | STD |
| OHc (OHc) | Cooling-side control output high limit | 0.1 to 105.0%, (OLc<OHc) | 100.0% | |
| OLc (OLc) | Cooling-side control output low limit | 0.0 to 104.9%, (OLc<OHc) | 0.0% | |
| HYSc (HYSc) | Cooling-side ON/OFF control hysteresis | 0.0 to 100.0% | 0.5% | EASY |
| db (DB) | Output dead band (in Heating/cooling control or Position proportional control) | In Heating/cooling control: -100.0 to 50.0% In Position proportional control: 1.0 to 10.0% | 3.0% | |
| PO (PO) | Preset output Heating-side preset output (in Heating/cooling control) | In STOP mode, fixed control output can be generated. In Position proportional control, Valve opening can be set; -5.0 to 105.0% | 0.0% | |
| SUPO (SU.PO) | Sub-preset output (in Two-position two-level control) | In STOP mode, fixed sub-control output can be generated. 0%, 100% | 0% | |
| POc (POc) | Cooling-side preset output | In STOP mode, cooling-side fixed control output can be generated. -5.0 to 105.0% | 0.0% | |

For the PID setting parameter, 8 groups are displayed for the factory default.
The number of groups can be changed by the setup parameter PIDG. (number of PID groups). To change the number of PID groups, see User's Manual.
If you are using two or more groups of PID parameters, use the following table to record their setting values.

| Parameter | n=2 | n=3 | n=4 | n=5 | n=6 | n=7 | n=8 | R |
|---|---|---|---|---|---|---|---|---|
| P | | | | | | | | |
| I | | | | | | | | |
| D | | | | | | | | |
| OH | | | | | | | | |
| OL | | | | | | | | |
| MR | | | | | | | | |
| HYS | | | | | | | | |
| SU.HY | | | | | | | | |
| HY.UP | | | | | | | | |
| HY.LO | | | | | | | | |
| DR | | | | | | | | |
| SU.DR | | | | | | | | |
| Pc | | | | | | | | |
| Ic | | | | | | | | |
| Dc | | | | | | | | |
| OHc | | | | | | | | |
| OLc | | | | | | | | |
| HYSc | | | | | | | | |
| DB | | | | | | | | |
| PO | | | | | | | | |
| SU.PO | | | | | | | | |
| POc | | | | | | | | |

n: group number

## ■ Tuning Parameter
Menu symbol: TUNE (TUNE)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| SC (SC) | Super function | OFF: Disable 1: Overshoot suppressing function (normal mode) 2: Hunting suppressing function (stable mode) Enables to answer the wider characteristic changes compared with response mode. 3: Hunting suppressing function (response mode) Enables quick follow-up and short converging time of PV for the changed SP. 4: Overshoot suppressing function (strong suppressing mode) Note: Setpoints 2 and 3 must be used in PID control or PI control. Disabled in the following controls: 1) ON/OFF control, 2) PD control, 3) P control, 4) Heating/cooling control. Do not use the function for the control processes with response such as flow or pressure control. | OFF | | EASY |
| AtTY (AT.TY) | Auto-tuning type | 0: Normal 1: Stability | 0 | | STD |
| StM (STM) | Sample PI sampled time | 0 to 9999 s | 60 s | | EASY |
| SWd (SWD) | Sample PI control time span | 0 to 9999 s | 30 s | | EASY |
| AR (AR) | Anti-reset windup (excess integration prevention) | AUTO, 50.0 to 200.0% | AUTO | | STD |

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| Parameter symbol | Name of Parameter | Setting Range | Initial value | Display level |
|---|---|---|---|---|
| OPRU (OPR.U) | Upper-side output velocity limiter | OFF: Disable 0.1 to 100.0%/s | OFF | |
| OPRd (OPR.D) | Lower-side output velocity limiter | OFF: Disable 0.1 to 100.0%/s | OFF | |
| MPON (MPON) | Manual preset output number selection | Select the output used in MAN mode when switched from AUTO to MAN mode. OFF: Hold the control output in AUTO mode (bumpless) 1: Use manual preset output 1 (output bump) 2: Use manual preset output 2 (output bump) 3: Use manual preset output 3 (output bump) 4: Use manual preset output 4 (output bump) 5: Use manual preset output 5 (output bump) | OFF | STD |
| MPO1 toMPO5 (MPO1 to MPO5) | Manual preset output 1 to 5 | -5.0 to 105.0% However, output is limited to the output high limit and low limit. | 0.0% | Table below |

Use the following table to record the manual preset output setting value.

| Parameter | n=1 | n=2 | n=3 | n=4 | n=5 |
|---|---|---|---|---|---|
| MPOn | | | | | |

## ■ Zone Control Parameter
Menu symbol: ZONE (ZONE)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| RP1 toRP7 (RP1 to RP7) | Reference point 1 to 7 | Set reference points at which switching is carried out between groups of PID constants according to the given temperature zone. 0.0 to 100.0% of PV input range (EU) (RP1 ≤ RP2 ≤ RP3 ≤ RP4 ≤ RP5 ≤ RP6 ≤ RP7) | 100.0% of PV input range | Table below | |
| RHY (RHY) | Zone PID switching hysteresis | Hysteresis can be set for switching at a reference point. 0.0 to 10.0% of PV input range span (EUS) | 0.5 % of PV input range span | | STD |
| RdV (RDV) | Reference deviation | Set a deviation from SP. The PID for reference deviation is used if there is a larger deviation than the preset reference deviation. OFF: Disable 0.0 + 1 digit to 100.0% of PV input range span (EUS) | OFF | | |

For Zone control, set the setup parameter ZON (zone PID selection) to Zone PID selection.
Use the following table to record the reference point setting value.

| Parameter | n=1 | n=2 | n=3 | n=4 | n=5 | n=6 | n=7 |
|---|---|---|---|---|---|---|---|
| RPn | | | | | | | |

## ■ P Parameter (for Ladder Program)
Menu symbol: PPAR (PPAR)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| P01 to P30 (P01 to P30) | P01 to P30 parameter | -19999 to 30000 (Set a decimal point position using LL50A Parameter Setting Software.) | 0 | Table below | STD |

| Parameter | n=01 | n=02 | n=03 | n=04 | n=05 | n=06 | n=07 | n=08 | n=09 | n=10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Pn | | | | | | | | | | |
| Parameter | n=11 | n=12 | n=13 | n=14 | n=15 | n=16 | n=17 | n=18 | n=19 | n=20 |
| Pn | | | | | | | | | | |
| Parameter | n=21 | n=22 | n=23 | n=24 | n=25 | n=26 | n=27 | n=28 | n=29 | n=30 |
| Pn | | | | | | | | | | |

## ■ 10-segment Linearizer-1, -2 Setting Parameter
Menu symbol: PYS1 (PYS1) PYS2 (PYS2)

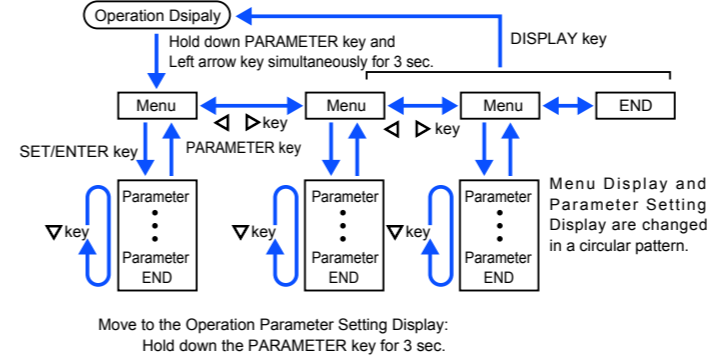| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| PYS (PYS) | 10-segment linearizer selection | OFF: Disable PV: PV analog input PV2: PV2 analog input AIN2: AIN2 analog input AIN4: AIN4 analog input PVIN: PV input OUT: OUT analog output OUT2: OUT2 analog output RET: RET analog output PV2IN: PV2 input 20PV: 20-segment linearizer, PV analog input 20PV2: 20-segment linearizer, PV2 analog input 20AI2: 20-segment linearizer, AIN2 analog input 20AI4: 20-segment linearizer, AIN4 analog input LDR10: 10-segment linearizer, used by the ladder program LDR20: 20-segment linearizer, used by the ladder program | PV (CTLM: SGL) | | STD |
| A1 (A1) | 10-segment linearizer input 1 | -66.7 to 105.0% of input range (EU) Output linearizer: -5.0 to 105.0% | 0.0% | | |
| b1 (B1) | 10-segment linearizer output 1 | 10-segment linearizer bias: -66.7 to 105.0% of input range span (EUS) 10-segment linearizer approximation: -66.7 to 105.0% of input range (EU) Output linearizer: -5.0 to 105.0% | 0.0% | | |

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| Parameter symbol | Name of Parameter | Setting Range | Initial value | Display level |
|---|---|---|---|---|
| A2 to A11, b2 to b11 (A2 to A11, B2 to B11) | 10-segment linearizer input 2 to 11 10-segment linearizer output 2 to 11 | Same as A1 and B1 | Same as A1 and B1 | STD |
| PMd (PMD) | 10-segment linearizer mode | 0: 10-segment linearizer bias 1: 10-segment linearizer approximation | 0 | |

Use the following table to record the 10-segment linearizer input and output setting values.

| Parameter | n=2 | n=3 | n=4 | n=5 | n=6 | n=7 | n=8 | n=9 | n=10 | n=11 |
|---|---|---|---|---|---|---|---|---|---|---|
| An | | | | | | | | | | |
| Bn | | | | | | | | | | |

# Setup Parameters

Hold down the PARAMETER 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 once to return to the Operation Display.



Move to the Operation Parameter Setting Display:
Hold down the PARAMETER key for 3 sec.

## 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 setpoint blinking. The blinking state allows you to make changes (setting mode). Use the Up/Down/Left/Right arrow keys to change the setpoint. 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 mode (CTLM), control type (CNT), etc. The parameters for professional setting mode (LEVL: PRO) are not described in this manual. See User's Manual.

## ■ Control Function Setting Parameter
Menu symbol: CTL (CTL)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| CtLM (CTLM) | Control mode | When using the controls other than Single-loop control, see User's Manual. SGL: Single-loop control CAS1: Cascade primary-loop control CAS2: Cascade secondary-loop control CAS: Cascade control BUM: Loop control for backup PVSW: Loop control with PV switching PVSEL: Loop control with PV auto-selector PVHD: Loop control with PV-hold function 2LP: Dual-loop control | SGL | | STD |
| CNt (CNT) | Control type | PID: PID control ONOF: ON/OFF control (1 point of hysteresis) ONOF2: ON/OFF control (2 points of hysteresis) 2P2L: Two-position two-level control H/C: Heating/cooling control S-PI: Sample PI control BATCH: Batch PID control FFPID: Feedforward control | PID or H/C (for Heating/ Cooling type) | | EASY |
| SPGR. (SPGR.) | Number of SP groups | Set a number of SP groups to use. 1 to 20 | 8 | | STD |
| ZON (ZON) | Zone PID selection | If set to "SP group number selection," allows PID constants to be selected for each SP group. If set to "Zone PID selection," automatically selects PID constants according to the range set in the Reference point. 0: SP group number selection 1 1: Zone PID selection (selection by PV) 2: Zone PID selection (selection by target SP) 3: SP group number selection 2 4: Zone PID selection (selection by SP) | 0 | | STD |
| PGtY (PGTY) | Program pattern action type | 0: Not used. 1: The program pattern for loop-1 can be used. 2: The program pattern for loop-1 and the program pattern-2 retransmission can be used. 3: The program pattern for loop-1 and loop-2 can be used. | | | |

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| Parameter symbol | Name of Parameter | Setting Range | Initial value | Display level |
|---|---|---|---|---|
| PIdG. (PIDG.) | Number of PID groups | Set a number of PID groups to use. 1 to 16 | 8 | STD |
| SMP (SMP) | Input sampling period (control period) | 50: 50 ms, 100: 100 ms, 200: 200 ms | 100 | |
| SRPG (SRPG) | STOP/RUN action for program operation | Interlocking control of RUN/STOP switch of program operation (PROG) and STOP/RUN switch (S.R). OFF: Cannot be operated simultaneously ON: Can be operated simultaneously | OFF | EASY |

## ■ PV Input Setting Parameter
Menu symbol: PV (PV)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| IN (IN) | PV input type | OFF: Disable K1: -270.0 to 1370.0 °C / -450.0 to 2500.0 °F K2: -270.0 to 1000.0 °C / -450.0 to 2300.0 °F K3: -200.0 to 500.0 °C / -200.0 to 1000.0 °F J: -200.0 to 1200.0 °C / -300.0 to 2300.0 °F T1: -270.0 to 400.0 °C / -450.0 to 750.0 °F T2: 0.0 to 400.0 °C / -200.0 to 750.0 °F B: 0.0 to 1800.0 °C / 32 to 3300 °F S: 0.0 to 1700.0 °C / 32 to 3100 °F R: 0.0 to 1700.0 °C / 32 to 3100 °F N: -200.0 to 1300.0 °C / -300.0 to 2400.0 °F E: -270.0 to 1000.0 °C / -450.0 to 1800.0 °F L: -200.0 to 900.0 °C / -300.0 to 1600.0 °F U1: -200.0 to 400.0 °C / -300.0 to 750.0 °F U2: 0.0 to 400.0 °C / -200.0 to 1000.0 °F W: 0.0 to 2300.0 °C / 32 to 4200 °F PL2: 0.0 to 1390.0 °C / 32.0 to 2500.0 °F P2040: 0.0 to 1900.0 °C / 32 to 3400 °F WRE: 0.0 to 2000.0 °C / 32 to 3600 °F JPT1: -200.0 to 500.0 °C / -300.0 to 1000.0 °F JPT2: -150.0 to 150.0 °C / -200.0 to 300.0 °F PT1: -200.0 to 850.0 °C / -300.0 to 1560.0 °F PT2: -200.0 to 500.0 °C / -300.0 to 1000.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F 0.4-2V: 0.400 to 2.000 V 1-5V: 1.000 to 5.000 V 4-20: 4.00 to 20.00 mA 0-2V: 0.000 to 2.000 V 0-10V: 0.00 to 10.00 V 0-20: 0.00 to 20.00 mA -1020: -10.00 to 20.00 mV 0-100: 0.0 to 100.0 mV | OFF | | EASY |
| UNIt (UNIT) | PV input unit | -: No unit, C: Degree Celsius -: No unit, - -: No unit, - - -: No unit, F: Degree Fahrenheit | C | | |
| RH (RH) | Maximum value of PV input range | Depends on the input type. -For temperature input- Set the temperature range that is actually controlled. (RL<RH) -For voltage / current input- Set the range of a voltage/current signal that is applied. The scale across which the voltage/current signal is actually controlled should be set using the maximum value of input scale (SH) and minimum value of input scale (SL). (Input is always 0% when RL = RH.) | Depends on the input type | | |
| RL (RL) | Minimum value of PV input range | | Depends on the input type | | |
| SdP (SDP) | PV input scale decimal point position | 0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places 4: Four decimal places | Depends on the input type | | |
| SH (SH) | Maximum value of PV input scale | -19999 to 30000, (SL<SH), \| SH - SL \| ≤ 30000 | Depends on the input type | | |
| SL (SL) | Minimum value of PV input scale | | Depends on the input type | | |
| bSL (BSL) | PV input burnout action | OFF: Disable UP: Upscale DOWN: Downscale | Depends on the input type | | |
| AbS (A.BS) | PV analog input bias | -100.0 to 100.0% of PV input range span (EUS) | 0.0 % of PV input range span | | STD |
| AFL (A.FL) | PV analog input filter | OFF, 1 to 120 s | OFF | | |

W: W-5% Re/W-26% Re(Hoskins Mfg.Co.). ASTM E988, WRE: W97Re3-W75Re25

## ■ PV2 Input Setting Parameter (E1-terminal Area)
Menu symbol: PV2 (PV2)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| IN (IN) | PV2 input type | Same as PV input type | 1-5V | | |
| UNIt (UNIT) | PV2 input unit | -: No unit, C: Degree Celsius -: No unit, - -: No unit, - - -: No unit, F: Degree Fahrenheit | C | | |
| RH (RH) | Maximum value of PV2 input range | Depends on the input type. -For temperature (/DR option) input- Set the temperature range that is actually controlled. (RL<RH) -For voltage / current (/DR option) input- Set the range of a voltage / current signal that is applied. The scale across which the voltage/current signal is actually controlled should be set using the maximum value of input scale (SH) and minimum value of input scale (SL). (Input is always 0% when RL = RH.) | Depends on the input type | | EASY |
| RL (RL) | Minimum value of PV2 input range | | Depends on the input type | | |

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| SdP (SDP) | PV2 input scale decimal point position | 0: No decimal place<br>1: One decimal place<br>2: Two decimal places<br>3: Three decimal places<br>4: Four decimal places | Depends on the input type | | EASY |
| SH (SH) | Maximum value of PV2 input scale | -19999 to 30000, (SL<SH),<br>\| SH - SL \| ≤ 30000 | Depends on the input type | | |
| SL (SL) | Minimum value of PV2 input scale | | Depends on the input type | | |
| bSL (BSL) | PV2 input burnout action | OFF: Disable<br>UP: Upscale<br>DOWN: Downscale | Depends on the input type | | STD |
| RtdS (RTD.S) | RTD wiring system | 3-W: 3-wire system<br>4-W: 4-wire system | 3-W | | |

### ■ AIN2 Aux. Analog Input/AIN4 Remote Input Setting Parameter (E2/E4-terminal Area)

Menu symbol: AIN2 (AIN2) AIN4 (AIN4)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| IN (IN) | AIN2 aux. analog input type<br>AIN4 remote input type | 0.4-2 V: 0.400 to 2.000 V<br>1-5 V: 1.000 to 5.000 V<br>0-2 V: 0.000 to 2.000 V<br>0-10 V: 0.00 to 10.00 V<br>0-125: 0.000 to 1.250 V | 1-5 V | | |
| UNIt (UNIT) | AIN2 aux. analog input unit<br>AIN4 remote input unit | -: No unit<br>C: Degree Celsius<br>-: No unit, - -: No unit, - - -: No unit<br>F: Degree Fahrenheit | C | | |
| RH (RH) | Maximum value of AIN2 aux. analog input range<br>Maximum value of AIN4 remote input range | Depends on the input type.<br>Set the range of a voltage signal that is applied.<br>The scale across which the voltage signal is actually controlled should be set using the maximum value of input scale (SH) and minimum value of input scale (SL).<br>(Input is always 0% when RL = RH.) | Depends on the input type | | |
| RL (RL) | Minimum value of AIN2 aux. analog input range<br>Minimum value of AIN4 remote input range | | Depends on the input type | | EASY |
| SdP (SDP) | AIN2 aux. analog input scale decimal point position<br>AIN4 remote input scale decimal point position | 0: No decimal place<br>1: One decimal place<br>2: Two decimal places<br>3: Three decimal places<br>4: Four decimal places | Depends on the input type | | |
| SH (SH) | Maximum value of AIN2 aux. analog input scale<br>Maximum value of AIN4 remote input scale | -19999 to 30000, (SL<SH),<br>\| SH - SL \| ≤ 30000 | Depends on the input type | | |
| SL (SL) | Minimum value of AIN2 aux. analog input scale<br>Minimum value of AIN4 remote input scale | | Depends on the input type | | |
| bSL (BSL) | AIN2 aux. analog input burnout action<br>AIN4 remote input burn-out action | OFF: Disable<br>UP: Upscale<br>DOWN: Downscale | Depends on the input type | | STD |

### ■ Input Range, SP Limiter Setting Parameter

Menu symbol: MPV (MPV)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| PUNI (P.UNI) | Control PV input unit | -: No unit<br>C: Degree Celsius<br>-: No unit, - -: No unit, - - -: No unit<br>F: Degree Fahrenheit | Same as PV input unit | | |
| PdP (P.DP) | Control PV input decimal point position | 0: No decimal place<br>1: One decimal place<br>2: Two decimal places<br>3: Three decimal places<br>4: Four decimal places | Depends on the input type | | |
| PRH (P.RH) | Maximum value of control PV input range | -19999 to 30000, (P.RL<P.RH),<br>\| P.RH - P.RL \| ≤ 30000 | Depends on the input type | | STD |
| PRL (P.RL) | Minimum value of control PV input range | | Depends on the input type | | |
| SPH (SPH) | SP high limit | 0.0 to 100.0% of PV input range (EU), (SPL<SPH) | 100.0 % of PV input range | | |
| SPL (SPL) | SP low limit | * SPH and SPL do not work, when creating the program pattern. | 0.0 % of PV input range | | |

### ■ Output Setting Parameter

Menu symbol: OUt (OUT)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| Ot (OT) | Output type selection<br><br>Ot 0001<br>Upper two digits / Lower two digits | Control output or Heating-side control output (Lower two digits)<br>00: OFF<br>01: OUT terminals (voltage pulse)<br>02: OUT terminals (current)<br>03: OUT terminals (relay)<br>04: OUT2 terminals (voltage pulse)<br>05: OUT2 terminals (current)<br>06: OUT2 terminals (relay)<br>07: RET terminals (voltage pulse)<br>08: RET terminals (current)<br>09: AL3 terminals (relay)<br>10: AL2 terminals (relay)<br>Cooling-side control output (Upper two digits)<br>00: OFF<br>01: OUT terminals (voltage pulse)<br>02: OUT terminals (current)<br>03: OUT terminals (relay)<br>04: OUT2 terminals (voltage pulse)<br>05: OUT2 terminals (current)<br>06: OUT2 terminals (relay)<br>07: RET terminals (voltage pulse)<br>08: RET terminals (current)<br>09: AL3 terminals (relay)<br>10: AL2 terminals (relay) | Standard type: 00.03 | | EASY |
| Ct (CT) | Control output cycle time<br>Heating-side control output cycle time (in Heating/cooling control) | 0.5 to 1000.0 s | 30.0 s | | |
| Ctc (CTc) | Cooling-side control output cycle time | | 30.0 s | | |
| V.At (V.AT) | Automatic valve position adjustment | OFF: Stop automatic adjustment<br>ON: Start automatic adjustment | OFF | | |
| V.RS (V.RS) | Valve position setting reset | Setting V.RS to ON resets the valve adjustment settings and causes the indication "V.RS" to blink. | OFF | | EASY |
| V.L (V.L) | Fully-closed valve position setting | Pressing the SET/ENTER key with valve position set to the fully-closed position by Down arrow key causes the adjusted value to be stored. When V.L adjustment is complete, V.L stops blinking. | 105.0 | | |
| V.H (V.H) | Fully-opened valve position setting | Pressing the SET/ENTER key with valve position set to the fully-opened position by Up arrow key causes the adjusted value to be stored. When V.H adjustment is complete, V.H stops blinking | 105.0 | | |
| tRt (TR.T) | Valve traveling time | 5 to 300 s | 60 s | | STD |
| V.MOd (V.MOD) | Valve adjusting mode | 0: Valve position feedback type<br>1: Valve position feedback type (moves to the estimating type if a feedback input error or break occurs.)<br>2: Valve position estimating type | 0 | | |
| RtS (RTS) | Retransmission output type of RET | OFF: Disable<br>PV1: PV<br>SP1: SP<br>OUT1: OUT (Valve opening: 0 to 100% in Position proportional control)<br>LPS: 15 V DC loop power supply<br>PV2: Loop-2 PV<br>SP2: Loop-2 SP<br>OUT2: Loop-2 OUT<br>TSP1: Target SP<br>HOUT1: Heating-side OUT<br>COUT1: Cooling-side OUT<br>MV1: Position proportional output (internal computed value)<br>TSP2: Loop-2 target SP<br>HOUT2: Loop-2 heating-side OUT<br>COUT2: Loop-2 cooling-side OUT<br>MV2: Loop-2 position proportional output (internal computed value)<br>PV: PV terminals analog input<br>A.PV2: PV2 terminals analog input<br>AIN2: AIN2 terminals analog input<br>AIN4: AIN4 terminals analog input<br>* Loop-2 setting values are unavailable in Single-loop control. | PV1 | | EASY |
| RtH (RTH) | Maximum value of retransmission output scale of RET | When RTS = PV1, SP1, PV2, SP2, TSP1, TSP2, PV, A.PV2, AIN2, or AIN4, RTL + 1 digit to 30000<br>-19999 to RTH - 1 digit<br>Decimal point position:<br>When RTS=PV1, SP1, or TSP1, decimal point position is same as that of PV input.<br>When RTS=PV2, SP2, or TSP2, decimal point position is same as that of PV2 input.<br>When RTS=PV, decimal point position is same as that of PV input scale.<br>When RTS=A.PV2, decimal point position is same as that of PV2 input scale.<br>When RTS=AIN2, decimal point position is same as that of AIN2 scale.<br>When RTS=AIN4, decimal point position is same as that of AIN4 scale. | 100 % of PV input range | | STD |
| RtL (RTL) | Minimum value of retransmission output scale of RET | | 0 % of PV input range | | |

### ■ Output Setting Parameter

Menu symbol: OUt (OUT)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| O1RS (O1RS) | Retransmission output type of OUT current output | Same as RTS | OFF | | |
| O1RH (O1RH) | Maximum value of retransmission output scale of OUT current output | When O1RS = PV1, SP1, PV2, SP2, TSP1, TSP2, PV, A.PV2, AIN2, or AIN4, O1RL + 1 digit to 30000<br>-19999 to O1RH - 1 digit<br>Decimal point position:<br>When O1RS=PV1, SP1, or TSP1, decimal point position is same as that of PV input.<br>When O1RS =PV2, SP2, or TSP2, decimal point position is same as that of PV2 input.<br>When O1RS =PV, decimal point position is same as that of PV input scale.<br>When O1RS =A.PV2, decimal point position is same as that of PV2 input scale.<br>When O1RS =AIN2, decimal point position is same as that of AIN2 scale.<br>When O1RS =AIN4, decimal point position is same as that of AIN4 scale. | - | | STD |
| O1RL (O1RL) | Minimum value of retransmission output scale of OUT current output | | - | | |
| O2RS (O2RS) | Retransmission output type of OUT2 current output | Same as RTS | OFF | | |
| O2RH (O2RH) | Maximum value of retransmission output scale of OUT2 current output | When O2RS = PV1, SP1, PV2, SP2, TSP1, TSP2, PV, A.PV2, AIN2, or AIN4, O2RL + 1 digit to 30000<br>-19999 to O2RH - 1 digit<br>Decimal point position:<br>When O2RS=PV1, SP1, or TSP1, decimal point position is same as that of PV input.<br>When O2RS =PV2, SP2, or TSP2, decimal point position is same as that of PV2 input.<br>When O2RS =PV, decimal point position is same as that of PV input scale.<br>When O2RS =A.PV2, decimal point position is same as that of PV2 input scale.<br>When O2RS =AIN2, decimal point position is same as that of AIN2 scale.<br>When O2RS =AIN4, decimal point position is same as that of AIN4 scale. | - | | STD |
| O2RL (O2RL) | Minimum value of retransmission output scale of OUT2 current output | | - | | |
| OUA (OU.A) | OUT current output range | 4-20: 4 to 20 mA<br>0-20: 0 to 20 mA<br>20-4: 20 to 4 mA<br>20-0: 20 to 0 mA | 4-20 | | |
| OU2A (OU2.A) | OUT2 current output range | | 4-20 | | STD |
| REtA (RET.A) | RET current output range | | 4-20 | | |

### ■ RS-485 Communication Setting Parameter (E3/E4-terminal Area)

Menu symbol: R485 (R485)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| PSL (PSL) | Protocol selection | PCL: PC link communication<br>PCLSM: PC link communication (with checksum)<br>LADR: Ladder communication<br>CO-M: Coordinated master station<br>CO-S: Coordinated slave station<br>MBASC: Modbus (ASCII)<br>MBRTU: Modbus (RTU)<br>CO-M2: Coordinated master station (Loop-2 mode)<br>CO-S1: Coordinated slave station (Loop-1 mode)<br>CO-S2: Coordinated slave station (Loop-2 mode)<br>P-P: Peer-to-peer communication | MBRTU | | |
| bPS (BPS) | Baud rate | 600: 600 bps<br>1200: 1200 bps<br>2400: 2400 bps<br>4800: 4800 bps<br>9600: 9600 bps<br>19200: 19.2k bps<br>38400: 38.4k bps<br>* The baud rate for RS-485 is up to 19.2 k bps in E4-terminal area. | 19200 | | EASY |
| PRI (PRI) | Parity | NONE: None<br>EVEN: Even<br>ODD: Odd | EVEN | | |
| StP (STP) | Stop bit | 1: 1 bit, 2: 2 bits | 1 | | |
| dLN (DLN) | Data length | 7: 7 bits, 8: 8 bits | 8 | | |
| AdR (ADR) | Address | 1 to 99 | 1 | | |

### ■ Ethernet Communication Setting Parameter (E3-terminal Area)

Menu symbol: EtHR (ETHR)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| HSR (HSR) | High-speed response mode | OFF, 1 to 8 | 1 | | |
| bPS (BPS) | Baud rate | 9600: 9600 bps<br>19200: 19.2k bps<br>38400: 38.4k bps | 38400 | | EASY |
| PRI (PRI) | Parity | NONE: None<br>EVEN: Even<br>ODD: Odd | EVEN | | |
| IP1 to IP4 (IP1 to IP4) | IP address 1 to 4 | 0 to 255<br>Initial value:<br>(IP1).(IP2).(IP3).(IP4)<br>=(192).(168).(1).(1) | See left | Table below | |
| SM1 to SM4 (SM1 to SM4) | Subnet mask 1 to 4 | 0 to 255<br>Initial value: (SM1).(SM2).(SM3).(SM4)<br>=(255).(255).(255).(0) | See left | Table below | |
| dG1 to dG4 (DG1 to DG4) | Default gateway 1 to 4 | 0 to 255<br>Initial value: (DG1).(DG2).(DG3).(DG4)<br>=(0).(0).(0).(0) | See left | Table below | |
| PRt (PRT) | Port number | 502, 1024 to 65535 | 502 | | EASY |
| IPAR (IPAR) | IP access restriction | OFF: Disable, ON: Enable | OFF | | |
| 1IP1 to 1IP4, 2IP1 to 2IP4 (1.IP1 to 1.IP4, 2.IP1 to 2.IP4) | Permitted IP address 1-1 to 1-4<br>Permitted IP address 2-1 to 2-4 | 0 to 255<br>Initial value:<br>(1.IP1).(1.IP2).(1.IP3).(1.IP4)<br>=(255).(255).(255).(255)<br>(2.IP1).(2.IP2).(2.IP3).(2.IP4)<br>=(255).(255).(255).(255) | See left | Table below | |
| ESW (ESW) | Ethernet setting switch | Setting this parameter to "ON" enables the Ethernet communication parameter settings.<br>OFF, ON | OFF | | |

Use the following table to record Ethernet communication setting value.

| Parameter | n=1 | n=2 | n=3 | n=4 |
|---|---|---|---|---|
| IPn | | | | |
| SMn | | | | |
| DGn | | | | |
| 1.IPn | | | | |
| 2.IPn | | | | |

### ■ PROFIBUS-DP Communication Setting Parameter (E3-terminal Area)

Menu symbol: PROF (PROF)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| bR (BR) | Baud rate | 9.6K: 9.6k bps<br>19.2K: 19.2k bps<br>93.75K: 93.75k bps<br>187.5K: 187.5k bps<br>0.5M: 0.5M bps<br>1.5M: 1.5M bps<br>3M: 3M bps<br>6M: 6M bps<br>12M: 12M bps<br>AUTO<br>45.45K: 45.45k bps | AUTO | | EASY |
| AdR (ADR) | Address | 0 to 125 | 3 | | |
| bPS (BPS) | Baud rate | 9600: 9600 bps<br>19200: 19.2k bps<br>38400: 38.4k bps | 38400 | | |
| FILE (FILE) | Profile number | 0, 21 to 25 | 0 | | |

### ■ DeviceNet Communication Setting Parameter (E3-terminal Area)

Menu symbol: dNET (DNET)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| bR (BR) | Baud rate | 125K: 125k bps<br>250K: 250k bps<br>500K: 500k bps | 125K | | |
| AdR (ADR) | Address | 0 to 63 | 63 | | EASY |
| bPS (BPS) | Baud rate | 9600: 9600 bps<br>19200: 19.2k bps<br>38400: 38.4k bps | 38400 | | |
| FILE (FILE) | Profile number | 0, 21 to 25 | 0 | | |

### ■ CC-Link Communication Setting Parameter (E3-terminal Area)

Menu symbol: CC-L (CC-L)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| bR (BR) | Baud rate | 156K: 156k bps<br>625K: 625k bps<br>2.5K: 2.5k bps<br>5M: 5M bps<br>10M: 10M bps | 10M | | |
| AdR (ADR) | Address | 1 to 64 | 1 | | EASY |
| bPS (BPS) | Baud rate | 9600: 9600 bps<br>19200: 19.2k bps<br>38400: 38.4k bps | 38400 | | |
| FILE (FILE) | Profile number | 0, 21 to 25 | 0 | | |

## ■ Key Action Setting Parameter

Menu symbol: KEY (KEY)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| F1 (F1) | User function key-1 action setting | OFF: Disable<br>A/M: AUTO/MAN switch<br>C/A/M: CAS/AUTO/MAN switch<br>R/L1: REM/LCL switch<br>R/L2: Loop-2 REM/LCL switch<br>S/R: STOP/RUN switch<br>CAS: Switch to CAS<br>AUTO: Switch to AUTO | OFF | | |
| F2 (F2) | User function key-2 action setting | MAN: Switch to MAN<br>REM1: Switch to REM<br>LCL1: Switch to LCL<br>REM2: Switch to Loop-2 REM<br>LCL2: Switch to Loop-2 LCL<br>STOP: Switch to STOP<br>RUN: Switch to RUN<br>AT: Auto-tuning | OFF | | |
| FN (Fn) | User function key-n action setting | LTUP: LCD brightness UP<br>LTDN: LCD brightness DOWN<br>BRI: Adjust LCD brightness<br>LCD: LCD backlight ON/OFF switch<br>LAT: Latch release<br>PID: PID tuning switch<br>HLD: Start of hold-mode operation<br>ADV: Advance of segment<br>HOME: Home display switch<br>LPCH: Loop-1/Loop-2 display switch<br>A/MS: Displaying loop AUTO/MAN switch<br>R/LS: Displaying loop REM/LCL switch<br>S/RS: Displaying loop STOP/RUN switch<br>AUTS: Switch to AUTO displaying loop<br>MANS: Switch to MAN displaying loop<br>REMS: Switch to REM displaying loop<br>LCLS: Switch to LCL displaying loop<br>STPS: Switch to STOP displaying loop<br>RUNS: Switch to RUN displaying loop<br>ATS: Displaying loop auto-tuning<br>PIDS: PID tuning switch displaying loop<br>P.RUN: Start of program operation<br>P.STP: Stop of program operation<br>* Loop-2 setting values are unavailable in Single-loop control. | PID | | EASY |

## ■ Display Function Setting Parameter

Menu symbol: DISP (DISP)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| dVb (DVB) | Deviation display band | Permits a change in the span of deviation shown on the front-panel deviation monitor.<br>0.0 to 100.0% of PV input range span (EUS). | 1.0% of PV input range span | | STD |
| PCMd (PCMD) | Active color PV display switch | 0: Fixed in white<br>1: Fixed in red<br>2: Link to alarm 1 (Alarm OFF: white, Alarm ON: red)<br>3: Link to alarm 1 (Alarm OFF: red, Alarm ON: white)<br>4: Link to alarm 1 or 2 (Alarm OFF: white, Alarm ON: red)<br>5: Link to alarm 1 or 2 (Alarm OFF: red, Alarm ON: white)<br>6: PV limit (Within range: white, Out of range: red)<br>7: PV limit (Within range: red, Out of range: white)<br>8: SP deviation (Within deviation: white, Out of deviation: red)<br>9: SP deviation (Within deviation: red, Out of deviation: white)<br>10: Link to DI (ON: red, OFF: white) | 0 | | EASY |
| PCH (PCH) | PV color change high limit | Set a display value when in PV limit or SP deviation.<br>-19999 to 30000 (Set a value within the input range.)<br>Decimal point position depends on the input type. | 0 | | |
| PCL (PCL) | PV color change low limit | | 0 | | |
| bAR1 (BAR1) | Upper bar-graph display registration | 0: Disable<br>1: OUT, Heating-side OUT, Internal value in Position proportional control<br>2: Cooling-side OUT<br>3: PV<br>4: SP<br>5: Deviation<br>6: Loop-2 OUT, Loop-2 heating-side OUT<br>7: Loop-2 cooling-side OUT<br>8: Loop-2 PV<br>9: Loop-2 SP<br>10: Loop-2 deviation<br>11 to 16: Disable<br>17: Feedback input (valve opening)<br>18: PV terminals analog input<br>19: PV2 terminals analog input<br>20: AIN2 terminals analog input<br>21: AIN4 terminals analog input<br>22: Display loop Heating-side OUT, Internal value in Position proportional control<br>23: Display loop Cooling-side OUT<br>24: Display loop PV<br>25: Display loop SP<br>26: Display loop Deviation<br>27: TSP, 28: TSP deviation<br>29: Loop-2 TSP<br>30: Loop-2 TSP deviation | 5) | | STD |
| bAR2 (BAR2) | Lower bar-graph display registration | | 1 (Position proportional type: 17) | | STD |
| bdV (BDV) | Bar-graph deviation display band | 0.0 to 100.0% of PV input range span (EUS) | 1.0% of PV input range span | | STD |
| GUId (GUID) | Guide display ON/OFF | OFF: Nondisplay, ON: Display | ON | | |

## ■ SELECT Display Setting Parameter

Menu symbol: CSEL (CSEL)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| ECO (ECO) | Economy mode | OFF: Disable<br>1: Economy mode ON (All indications except PV display OFF)<br>2: Economy mode ON (All indications OFF)<br>3: Brightness 10% (whole indication) | OFF | | STD |
| bRI (BRI) | Brightness | (Dark) 1 to 5 (Bright) | 3 | | EASY |
| MLSd (MLSD) | Least significant digital mask of PV display | OFF: With least significant digit<br>ON: Without least significant digit | OFF | | |
| MKTP (MKTP) | Method for least significant digital mask of PV display | 0: Rounding, 1: Rounding-off | 0 | | STD |
| SW.LP (SW.LP) | Loop 1/2 display switch | 1LP: Loop 1<br>2LP: Loop 2 | 1LP | | |

## ■ SELECT Display Setting Parameter

Menu symbol: CSEL (CSEL)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| CS1 to CS5 (CS1 to CS5) | SELECT Display-1 to -5 registration | Register the operation parameter (except the Operation Mode) that is frequently modified to display it in the Operation Display.<br>OFF, 2301 to 10000<br>For the setting range, see User's Manual. | OFF | | STD |

Use the following table to record SELECT Display setting value.

| Parameter | n=1 | n=2 | n=3 | n=4 | n=5 |
|---|---|---|---|---|---|
| CSn | | | | | |

## ■ Key Lock Setting Parameter

Menu symbol: KLOC (KLOC)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| COMW (COM.W) | Communication write enable/disable | OFF: Enable, ON: Disable | OFF | | |
| dATA (DATA) | Front panel parameter data (▼,▲) key lock | OFF: Unlock, ON: Lock | OFF | | STD |
| A/M (A/M) | Front panel A/M key lock | | OFF | | |

## ■ DI Function Registration Parameter

Menu symbol: DI.SL (DI.SL)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| A/M (A/M) | AUTO/MAN switch | | 5025 | | |
| R/L (R/L) | REMOTE/LOCAL switch | | 5094 | | |
| S/R (S/R) | STOP/RUN switch | | 5026 | | |
| CAS (CAS) | Switch to CAS | | OFF | | |
| AUTO (AUTO) | Switch to AUTO | Set an I relay number of contact input.<br>Set "OFF" to disable the function. | OFF | | |
| MAN (MAN) | Switch to MAN | Standard terminals<br>DI1: 5025, DI2: 5026, DI3: 5027 | OFF | | |
| REM (REM) | Switch to REMOTE | E2 -terminal area<br>DI26: 5062 | OFF | | |
| LCL (LCL) | Switch to LOCAL | E1-terminal area<br>DI11: 5041, DI12: 5042, DI13: 5043, DI14: 5044, DI15: 5045 | OFF | | STD |
| AdV (ADV) | Advance of segment | | OFF | | |
| HOLd (HOLD) | Hold ON/OFF switch | E3-terminal area<br>DI31: 5073, DI32: 5074, DI33: 5075, DI34: 5076, DI35: 5077 | OFF | | |
| At (AT) | Auto-tuning START/STOP switch | E4-terminal area<br>DI41: 5089, DI42: 5090, DI43: 5091, DI44: 5092, DI45: 5093, DI46: 5094 | OFF | | |
| LAt (LAT) | Latch release | | OFF | | |
| LCd (LCD) | LCD backlight ON/OFF switch | | OFF | | |
| PVRW (PVRW) | PV red/white switch | | OFF | | |
| PRUN (P.RUN) | Run switch of program operation | | OFF | | |
| PStP (P.STP) | Stop switch of program operation | | OFF | | |

## ■ DI Function Numbering Parameter

Menu symbol: DI.NU (DI.NU)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| SPb0 (SP.B0) | Bit-0 of SP number | | OFF | | |
| SPb1 (SP.B1) | Bit-1 of SP number | See next paragraph. | OFF | | EASY |
| SPb2 (SP.B2) | Bit-2 of SP number | | OFF | | |

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| SPb3 (SP.B3) | Bit-3 of SP number | See next paragraph. | OFF | | EASY |
| SPb4 (SP.B4) | Bit-4 of SP number | | OFF | | |
| PNb0 (PN.B0) | Bit-0 of PID number | Set an I relay number of contact input.<br>Set "OFF" to disable the function. | OFF | | |
| PNb1 (PN.B1) | Bit-1 of PID number | Standard terminals<br>DI1: 5025, DI2: 5026, DI3: 5027 | OFF | | |
| PNb2 (PN.B2) | Bit-2 of PID number | E2 -terminal area<br>DI26: 5062 | OFF | | |
| PNb3 (PN.B3) | Bit-3 of PID number | E1-terminal area<br>DI11: 5041, DI12: 5042, DI13: 5043, DI14: 5044, DI15: 5045 | OFF | | STD |
| PNb4 (PN.B4) | Bit-4 of PID number | E3-terminal area<br>DI31: 5073, DI32: 5074, DI33: 5075, DI34: 5076, DI35: 5077 | OFF | | |
| MPb0 (MP.B0) | Bit-0 of manual preset output number | E4-terminal area<br>DI41: 5089, DI42: 5090, DI43: 5091, DI44: 5092, DI45: 5093, DI46: 5094 | OFF | | |
| MPb1 (MP.B1) | Bit-1 of manual preset output number | | OFF | | |
| MPb2 (MP.B2) | Bit-2 of manual preset output number | | OFF | | |
| SPbC (SP.BC) | Bit changing method of SP number | 0: Status switch 1<br>1: Status switch 2 | 0 | | STD |

## ■ AL1-AL3 Function Registration Parameter

Menu symbol: ALM (ALM)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| AL1S (AL1.S) | AL1 function selection | Set an I relay number. For the items other than below, see Communication User's Manual.<br>Ex.) Set the number 4353 for AL1.S to use the alarm 1.<br>Set "OFF" to disable the function. | 4353 | | |
| AL2S (AL2.S) | AL2 function selection | No function: OFF<br>Alarm 1: 4353 | 4354 | | |
| AL3S (AL3.S) | AL3 function selection | Alarm 2: 4354<br>Alarm 3: 4355<br>Alarm 4: 4357 | 4355 | | STD |
| ORS (OR.S) | OUT relay function selection | Alarm 5: 4358<br>Alarm 6: 4359<br>Alarm 7: 4361<br>Alarm 8: 4362 | OFF | | |
| OR2S (OR2.S) | OUT2 relay function selection | AUTO (OFF) / MAN (ON) status: 4193<br>REM (ON) / LCL (OFF) status: 4194<br>STOP (ON) / RUN (OFF) status: 4195<br>Output tracking (ON) switching signal: 4201<br>FAIL (Normally ON) output: 4256 | OFF | | |

## ■ DO Setting Parameter (E2-terminal Area)

Menu symbol: DO (DO)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| dO1S (DO1.S) | DO21 function selection | | See left | | |
| dO2S (DO2.S) | DO22 function selection | Same as AL1.S<br>Set "OFF" to disable the function. | See left | | |
| dO3S (DO3.S) | DO23 function selection | Initial value:<br>DO21=4357, DO22=4358, DO23=4359, DO24=4361, DO25=4362 | See left | | STD |
| dO4S (DO4.S) | DO24 function selection | | See left | | |
| dO5S (DO5.S) | DO25 function selection | | See left | | |

## ■ System Setting Parameter

Menu symbol: SYS (SYS)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| RMd (R.MD) | Restart mode | Set how the controller should recover from a power failure of 5 seconds or more.<br>CONT: Continue action set before power failure.<br>MAN: Start from MAN.<br>AUTO: Start from AUTO.<br>CONT2: Continue action set before power failure. Preset output starts. | CONT | | |
| RtM (R.TM) | Restart timer | Set time between power on and the instant where controller starts computation.<br>0 to 10 s | 0 | | STD |
| EPO (EPO) | Input error preset output | Set preset output value when the input burnout or ADC error occurs. Manual output is prioritized when the input burnout occurs in MAN.<br>0: Preset output<br>1: 0% output<br>2: 100% output | 0 | | |
| FREQ (FREQ) | Power frequency | AUTO, 60: 60 Hz, 50: 50 Hz | AUTO | | EASY |
| QSM (QSM) | Quick setting mode | OFF: Disable<br>ON: Enable | ON | | |

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| LANG (LANG) | Guide display language | ENG: English<br>SPA: Spanish<br>* German and French guide displays are customized. Contact our representatives for inquiries. | Depends on the model and suffix codes | | EASY |
| PASS (PASS) | Password setting | 0 (No password) to 65535 | 0 | | |

## ■ Error and Version Confirmation Parameter (for display only)

Menu symbol: VER (VER)

| Parameter symbol | Name of Parameter | Status record | Display level |
|---|---|---|---|
| PRER (PA.ER) | Parameter error status | | |
| OPER (OP.ER) | Option error status | | |
| Ad1E (AD1.E) | A/D converter error status 1 | | |
| Ad2E (AD2.E) | A/D converter error status 2 | | |
| PV1E (PV1.E) | Loop-1 PV input error status | | |
| PV2E (PV2.E) | Loop-2 PV input error status | | |
| LAER (LA.ER) | Ladder error status | | |
| MCU (MCU) | MCU version | | |
| dCU (DCU) | DCU version | | EASY |
| ECU1 (ECU1) | ECU-1 version (E1-terminal area) | | |
| ECU2 (ECU2) | ECU-2 version (E2-terminal area) | | |
| ECU3 (ECU3) | ECU-3 version (E3-terminal area) | | |
| ECU4 (ECU4) | ECU-4 version (E4-terminal area) | | |
| PARA (PARA) | Parameter version | | |
| HVER (H.VER) | Product version | | |
| SER1 (SER1) | Serial number 1 | | |
| SER2 (SER2) | Serial number 2 | | |
| MAC1 (MAC1) | MAC address 1 (E3-terminal area) | | |
| MAC2 (MAC2) | MAC address 2 (E3-terminal area) | | |
| MAC3 (MAC3) | MAC address 3 (E3-terminal area) | | |

* The parameters for Loop-2 are unavailable in Single-loop control.

## ■ Parameter Display Level Parameter

Menu symbol: LVL (LVL)

| Parameter symbol | Name of Parameter | Setting Range | Initial value | User setting | Display level |
|---|---|---|---|---|---|
| LEVL (LEVL) | Parameter display level | EASY: Easy setting mode<br>STD: Standard setting mode<br>PRO: Professional setting mode | STD | | EASY |

* For Professional setting mode, see User's Manual.

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