

Operation Guide



IM 05P02C41-11EN

UP55A Program Controller

Operation Guide for Single-loop Control

Installation and Wiring



Functional Enhancement

YOKOGAWA

«Standard Code Model»

7th Edition: Dec. 2022

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. Manuals can be downloaded or viewed at the following URL.

 <https://www.yokogawa.com/ns/ut/im/>

## Contents

- Safety Precautions
- Model and Suffix Codes
- How to Install
- Hardware Specifications
- How to Connect Wires
- Terminal Wiring Diagrams

## Introduction

Thank you for purchasing the UP55A Program Controller.

This operation guide describes the basic operations related to the single-loop control function of the UP55A. 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.

For details of each function, refer to the electronic manual. 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.

- Program Controller (the model you ordered) .....x1
- Set of Brackets .....x1
- Unit Label (L4502VZ) .....x1
- Tag Label (L4502VE) .....x1  
(Only when ordered.)
- Terminal Cover .....x1
- Operation Guide for Single-loop Control (this document) .....x7 (A3 size)  
(Installation and Wiring, Initial Settings, Programming, 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 operation guide or user's manual for special instructions. The same symbol is operation guide and 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 operation guide. 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 failsafe 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.



- **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<sub>2</sub>S, SO<sub>x</sub>, 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 operation guide may damage its protective construction.



**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.**

## 2. Model and Suffix Codes

### ■ UP55A «Standard Code Model»

| Model                 | Suffix code           | Option code | Description                                                                                                                                                                                                                                                                                |
|-----------------------|-----------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UP55A                 |                       |             | Program Controller (Power supply: 100-240 V AC)30 program patterns / 300 program segments (99 program patterns / 600 program segments when the option /AP is specified. Max. 99 segments per pattern) (provided with retransmission output or 15 V DC loop power supply, 8 DIs, and 8 DOs) |
|                       | Type 1: Basic control | -0          | Standard type                                                                                                                                                                                                                                                                              |
|                       |                       | -1          | Position proportional type                                                                                                                                                                                                                                                                 |
|                       |                       | -2          | Heating/cooling type                                                                                                                                                                                                                                                                       |
| Type 2: Functions     |                       | 0           | None                                                                                                                                                                                                                                                                                       |
|                       |                       | 1           | Remote (1 additional aux. analog) input, 1 additional DI                                                                                                                                                                                                                                   |
|                       |                       | 2           | RS-485 communication (Max.19.2 kpbs, 2-wire/4-wire)                                                                                                                                                                                                                                        |
|                       |                       | 3           | 10 additional DOs (*1)                                                                                                                                                                                                                                                                     |
| Type 3: Open networks |                       | 4           | 3 additional aux. analog inputs, 2 DIs and 5 DOs to be deleted                                                                                                                                                                                                                             |
|                       |                       | 0           | None                                                                                                                                                                                                                                                                                       |
|                       |                       | 1           | RS-485 communication (Max.38.4 kpbs, 2-wire/4-wire)                                                                                                                                                                                                                                        |
|                       |                       | 2           | Ethernet communication (with serial gateway function)                                                                                                                                                                                                                                      |
| Display language (*2) |                       | 3           | CC-Link communication (with Modbus master function)                                                                                                                                                                                                                                        |
|                       |                       | 4           | PROFIBUS-DP communication (with Modbus master function)                                                                                                                                                                                                                                    |
|                       |                       | 5           | DeviceNet communication (with Modbus master function)                                                                                                                                                                                                                                      |
|                       |                       | -1          | English (Default. Can be switched to other language by the setting.)                                                                                                                                                                                                                       |
| Case color            |                       | -2          | German (Default. Can be switched to other language by the setting.)                                                                                                                                                                                                                        |
|                       |                       | -3          | French (Default. Can be switched to other language by the setting.)                                                                                                                                                                                                                        |
|                       |                       | -4          | Spanish (Default. Can be switched to other language by the setting.)                                                                                                                                                                                                                       |
|                       |                       | 0           | White (Light gray)                                                                                                                                                                                                                                                                         |
|                       |                       | 1           | Black (Light charcoal gray)                                                                                                                                                                                                                                                                |

|              |     |                                                                                                                                       |
|--------------|-----|---------------------------------------------------------------------------------------------------------------------------------------|
| Fixed code   | -00 | Always "-00" (for Standard Code Model)                                                                                                |
| Option codes | /AP | 69 additional patterns/300 additional segments                                                                                        |
|              | /DR | Additional direct input (TC, 3-wire/4-wire RTD) and current input to Remote (1 additional aux. analog) input, 1 DI to be deleted (*3) |
|              | /HA | Heater break alarm (*4)                                                                                                               |
|              | /DC | Power supply 24 V AC/DC                                                                                                               |
|              | /CT | Coating (*5)                                                                                                                          |

- \*1: When the Type 2 code is "3", only "0" can be specified for the Type 3 code.
- \*2: English, German, French, and Spanish are available for the guide display.
- \*3: The /DR option can be specified only when the Type 2 code is "1" or "4."
- \*4: The /HA option can be specified only when the Type 1 code is "-0."
- \*5: When the /CT option is specified, the UP55A 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 (*) |

- \*: Necessary to input the current signal to the voltage input terminal.
- Terminal Cover: Model UTAP001
- Manuals
  - \* Manuals can be downloaded from a website. URL: <https://www.yokogawa.com/ns/ut/im/>
- Brackets
  - Part number: L4502TP (2 pcs for upper and lower sides)

### ■ Protection of Environment

#### Waste Electrical and Electronic Equipment (WEEE)



(Only valid in the EEA for EU WEEE Directive and in the UK for UK WEEE Regulation)

This product complies with the WEEE marking requirement. This marking indicates that you must not discard this electrical/electronic product in domestic household waste. When disposing of products in the EEA or UK, contact your local Yokogawa office in the EEA or UK respectively.

### ■ QR Code

The product has a QR Code pasted for efficient plant maintenance work and asset information management. It enables confirming the specifications of purchased products and user's manuals.

For more details, please refer to the following URL.

<https://www.yokogawa.com/qrcode>

QR Code is a registered trademark of DENSO WAVE INCORPORATED.

- Authorised Representative in the EEA and the Importer into the EU/EEA Market
- The Authorised Representative for this product in the EEA and the importer for this product into the EU/EEA market via Yokogawa sale channel is: Yokogawa Europe B.V.  
Euroweg 2, 3825 HD Amersfoort, The Netherlands
- Importer for This Product into the Great Britain Market
- In relation to UKCA marking, the importer for this product into the Great Britain market via the YOKOGAWA sales channel is : Yokogawa United Kingdom Limited  
Stuart Road Manor Park Runcorn, WA7 1TR, United Kingdom
- Printed Manuals

| Model                                                          | Description      |
|----------------------------------------------------------------|------------------|
| UP55A Program Controller Operation Guide «Standard Code Model» | IM 05P02C41-11EN |
| UP55A Program Controller Operation Guide «Detailed Code Model» | IM 05P02C41-15EN |
| Precautions on the Use of the UTAdvanced Series                | IM 05P01A01-11EN |

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

| Model                                                                      | Description      |
|----------------------------------------------------------------------------|------------------|
| UP55A Program Controller Operation Guide «Standard Code Model»             | IM 05P02C41-11EN |
| UP55A Program Controller Operation Guide «Detailed Code Model»             | IM 05P02C41-15EN |
| UP55A Program Controller User's Manual                                     | IM 05P02C41-01EN |
| 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      |
|----------------------------------|------------------|
| UP55A Program Controller         | GS 05P02C41-01EN |
| LL50A Parameter Setting Software | GS 05P05A01-01EN |

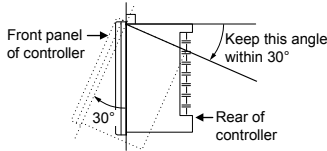
- \* The last two characters of the manual number and general specification number indicate the language in which the manual is written.

## 3. How to Install

### ■ Installation Location

The instrument should be installed in indoor locations 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.

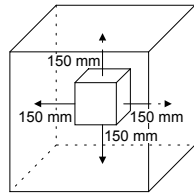


### Note

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**



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

YOKOGAWA



YOKOGAWA ELECTRIC CORPORATION

Network Solutions Business Division

2-9-32, Naka-cho Musashino-shi, Tokyo 180-8750 JAPAN

YOKOGAWA CORPORATION OF AMERICA

Head office and for product sales

2 Dart Road, Newnan, Georgia 30265, USA

YOKOGAWA EUROPE B.V.

Headquarters

Euroweg 2, 3825 HD Amersfoort, THE NETHERLANDS

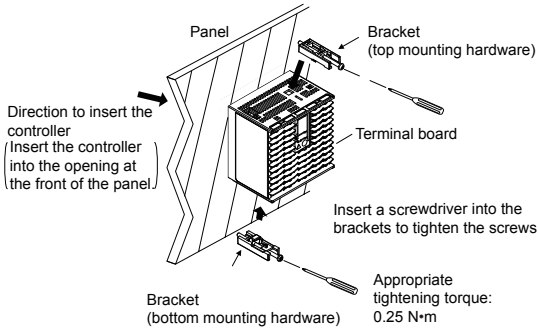
[www.yokogawa.com](http://www.yokogawa.com)

All Rights Reserved, Copyright © 2010 Yokogawa Electric Corporation

## ■ Mounting the Instrument Main Unit

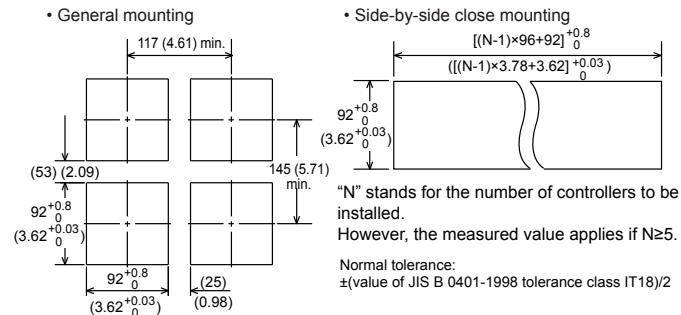
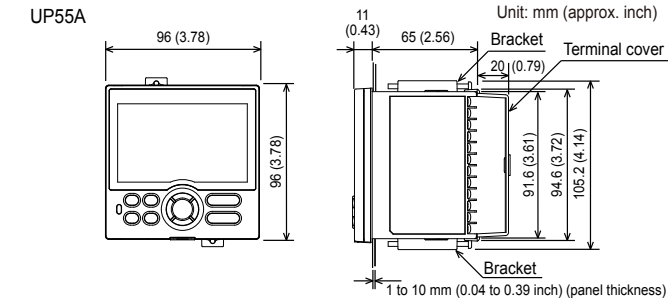
Provide an instrumented panel steel sheet of 1 to 10 mm thickness.  
After opening the mounting hole on the panel, follow the procedures below to install the controller:

- 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.



- 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.

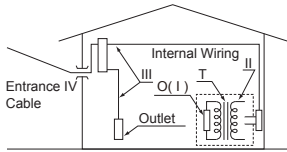
## ■ External Dimensions and Panel Cutout Dimensions



## 4. Hardware Specifications



**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.**



| 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.                  |

## ■ Input Specifications

### ●Universal Input (Equipped as standard)

- Number of inputs: 1
- 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                                                                                      | ±2% of instrument range ±1 digit for less than -200.0°C of thermocouple K                                     |
|                    | J               | -200.0 to 1200.0°C  | -300.0 to 2300.0°F                                                                                      | ±1% of instrument range ±1 digit for less than -200.0°C of thermocouple T                                     |
|                    |                 | -270.0 to 400.0°C   | -450.0 to 750.0°F                                                                                       |                                                                                                               |
|                    | 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<br>±5% of instrument range ±1 digit for less than 400°C |
|                    | S               | 0.0 to 1700.0°C     | 32 to 3100°F                                                                                            |                                                                                                               |
|                    | R               | 0.0 to 1700.0°C     | 32 to 3100°F                                                                                            | ±0.15% of instrument range ±1 digit                                                                           |
|                    |                 |                     |                                                                                                         |                                                                                                               |
|                    | N               | -200.0 to 1300.0°C  | -300.0 to 2400.0°F                                                                                      | ±0.1% of instrument range ±1 digit<br>±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                                                          |
|                    |                 | -200.0 to 400.0°C   | -300.0 to 750.0°F                                                                                       |                                                                                                               |
| U                  | 0.0 to 400.0°C  | -200.0 to 1000.0°F  | ±1.5% of instrument range ±1 digit for less than -200.0°C of thermocouple E.                            |                                                                                                               |
|                    |                 |                     |                                                                                                         |                                                                                                               |
| 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<br>Accuracy is not guaranteed for less than 800°C. |                                                                                                               |
|                    |                 |                     |                                                                                                         |                                                                                                               |
| W97Re3-<br>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                                                                                       | ±0.1% of instrument range ±1 digit                                                                            |
|                    |                 | -200.0 to 850.0°C   | -300.0 to 1560.0°F                                                                                      | ±0.1% of instrument range ±1 digit (Note 1)                                                                   |
|                    | Pt100           | -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                                                                                       | ±0.1% of instrument range ±1 digit                                                                            |
| Standard signal    |                 | 0.400 to 2.000 V    |                                                                                                         |                                                                                                               |
|                    |                 | 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 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

### ●Auxiliary Analog Input

- 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.

### ●Remote Input with Direct Input

- Number of inputs: See the table of Model and Suffix Codes.
- 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 of instrument range ±1 digit         |
|            |        | -150.00 to 150.00°C | -200.0 to 300.0°F  | ±0.2°C of instrument range ±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 of instrument range ±1 digit         |
|            |        | -150.00 to 150.00°C | -200.0 to 300.0°F  | ±0.2°C of instrument range ±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

## ■ 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 less.
- 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: PTNO. switch, operation mode switch, and event input

## ■ Analog Output Specifications

- Number of outputs:
  - Control output: 1
  - Cooling-side control output of Heating/cooling type: 1
- 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: Retransmission output; 1, 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 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 output: contact point 1c; 1 point
    - Cooling-side control output of Heating/cooling type: contact point 1c; 1 point
    - Event output: contact point 1a; 3 points (common is independent)
  - Contact rating:
    - Contact point 1c (control output): 250 V AC, 3 A or 30 V DC, 3A (resistance load)
    - Contact point 1a (event output): 240 V AC, 1A or 30 V DC, 1 A (resistance load)
  - Use: Time proportional output, event output, alarm output, FAIL output, etc.
  - Time resolution of control output: 10 ms or 0.1% of output, whichever is larger
- 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.

## ■ 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. 100 ms
- Use: Event output, 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.

## ■ Heater Break Alarm Specifications

- Number of inputs: 2
- Number of outputs: 2 (transistor contact output)
- Use: Measures the heater current using an external current transformer (CT) and generates a heater break alarm when the measured value is less than the break detection value.
- Current transformer input resistance: About 9.4 Ω
- Current transformer input range: 0.0 to 0.1 Arms (0.12 Arms or more cannot be applied.)
- Heater current setting range: OFF, 0.1 to 300.0 Arms
  - Heater current measured value display range: 0.0 to 360.0 Arms
  - Note: The CT ratio can be set. CT ratio setting range: 1 to 3300
- Recommended CT: CT from U.R.D., Ltd.
  - CTL-6-S-H: CT ratio 800, measurable current range: 0.1 to 80.0 Arms
  - CTL-12L-30: CT ratio 3000, measurable current range: 0.1 to 180.0 Arms
- Heater current measurement period: 200 ms
- Heater current measurement accuracy: ±5% of current transformer input range span ± 1 digit (CT error is not included.)
- Heater current detection resolution: Within 1/250 of current transformer input range span
- Break detection On-time: Min. 0.2 second (for time proportional output)



## ■ 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  $\pm 20\%$  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 (RCM)

EN 55011 Class A, Group 1 compliant

KC marking

Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

## ■ Environment Standard

EU RoHS directive: EN IEC 63000

## ■ 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 (Charcoal gray light)
- 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 tilting 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 terminals                                                                                                                      |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Remote (universal) input terminals with direct input / Remote input terminals                                                                        |  |  |
| Aux. analog (AIN2) input terminals                                                                                                                   |  |  |
| Aux. analog (AIN4) input terminals                                                                                                                   |  |  |
| Control, retransmission (analog) output terminals<br>(not isolated between the analog output terminals)<br>Valve position (feedback) input terminals |  |  |
| Control relay (contact point c) output terminals                                                                                                     |  |  |
| PV event-1 relay (contact point a) output terminals                                                                                                  |  |  |
| PV event-2 relay (contact point a) output terminals                                                                                                  |  |  |
| PV event-3 relay (contact point a) output terminals                                                                                                  |  |  |
| Position proportional relay output terminals                                                                                                         |  |  |
| Contact input terminals (all)<br>RS-485 communication terminals (2 ports)                                                                            |  |  |
| Contact output (transistor) terminals                                                                                                                |  |  |
| Ethernet communication terminal                                                                                                                      |  |  |
| PROFIBUS-DP/DeviceNet/CC-Link communication terminals                                                                                                |  |  |
| Current transformer input terminals                                                                                                                  |  |  |

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/s<sup>2</sup> or less, 1oct/min for 90 minutes each in the three axis directions
- Short-period vibration: 14.7 m/s<sup>2</sup>, 15 seconds or less
- Shock: 98 m/s<sup>2</sup> 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 function is not affected.

### Transportation and Storage Conditions:

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

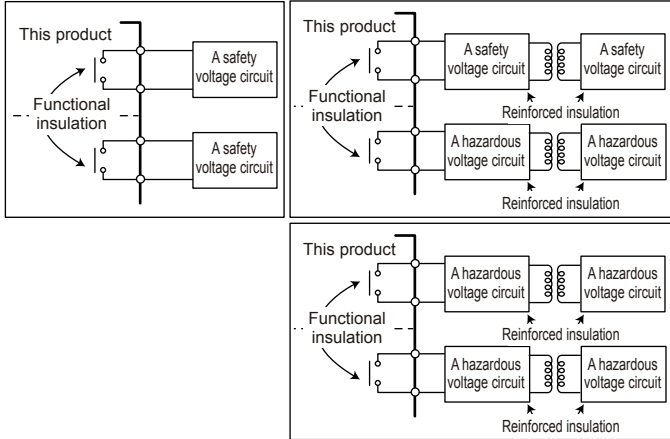
### Effects of Operating Conditions

- Effect of ambient temperature:  
Voltage or TC input:  $\pm 1 \mu\text{V}/^\circ\text{C}$  or  $\pm 0.01\%$  of F.S./°C, whichever is larger  
Current input:  $\pm 0.01\%$  of F.S./°C  
RTD input:  $\pm 0.05^\circ\text{C}/^\circ\text{C}$  (ambient temperature) or less  
Analog output:  $\pm 0.02\%$  of F.S./°C or less
- Effect of power supply voltage fluctuation  
Analog input:  $\pm 0.05\%$  of F.S. or less  
Analog output:  $\pm 0.05\%$  of F.S. or less  
(Each within rated voltage range)

## 5. How to Connect Wires



- **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.)**

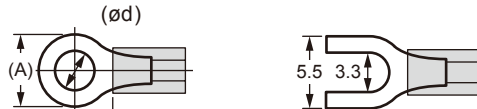


- **When connecting two or more crimp-on terminal lugs to the single terminal block, bend the crimp-on terminal lugs before tightening the screw.**
- **Note that the wiring of two or more crimp-on terminal lugs to the single high-voltage terminal of the power supply and relay, etc. does not comply with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



- **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.**

## ● Recommended Crimp-on Terminal Lugs



Recommended tightening torque: 0.6 N·m

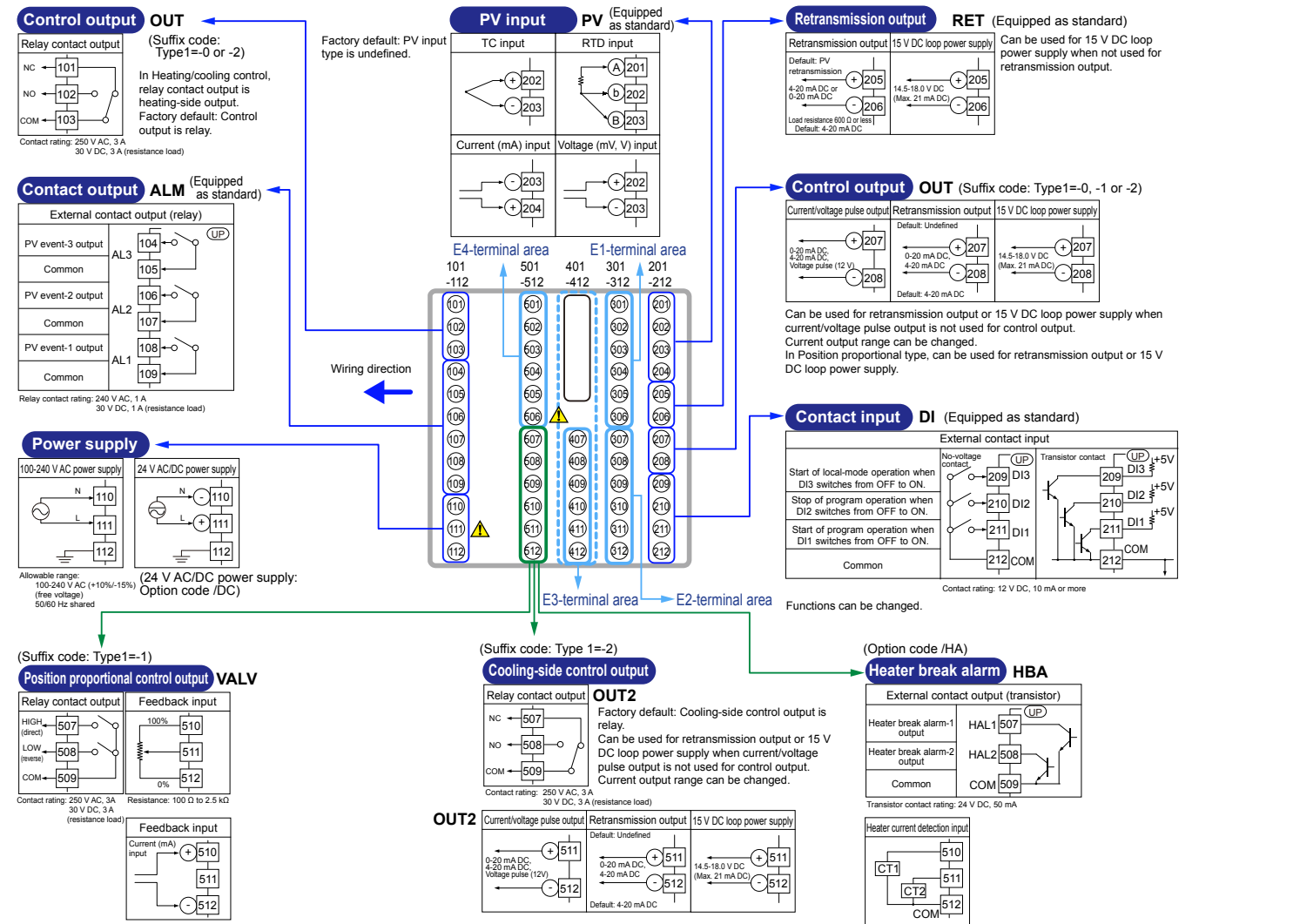
Applicable wire size: Power supply wiring 1.25 mm<sup>2</sup> or more

## 6. Terminal Wiring Diagrams



- **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.**

### ■ UP55A



| Applicable terminal lug | Applicable wire size mm <sup>2</sup> (AWG#) | (ø d) | (A) | (F) |
|-------------------------|---------------------------------------------|-------|-----|-----|
| M3                      | 0.25 to 1.65 (22 to 16)                     | 3.3   | 5.5 | 4.2 |

## ● Cable Specifications and Recommended Cables

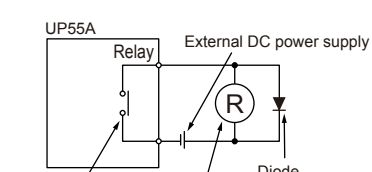
| Purpose                                         | Name and Manufacturer                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power supply, relay contact outputs             | 600 V Grade heat-resistant PVC insulated wires, JIS C 3317(HIV), 0.9 to 2.0 mm <sup>2</sup>                                                                                                                                                                                                                                           |
| Thermocouple                                    | Shielded compensating lead wires, JIS C 1610<br>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 mm <sup>2</sup> 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)                                                                                                                                                                                                                                                                                    |

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

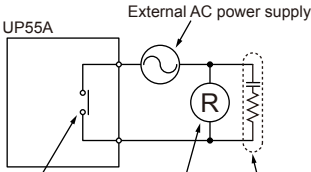


UP's contact  
(Use one with a relay coil rating less than the UP's contact rating.)

Relay  
(Mount it directly to the relay coil terminal (socket).)

Diode  
(Mount it directly to the relay coil terminal (socket).)

### AC Relay Wiring



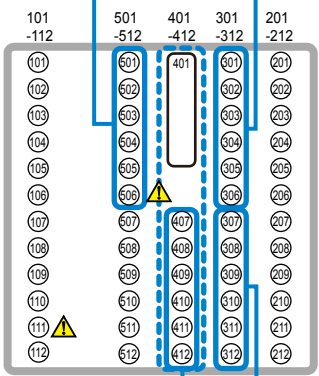
UP's contact  
(Use one with a relay coil rating less than the UP's contact rating.)

Relay  
(Mount it directly to the relay coil terminal (socket).)

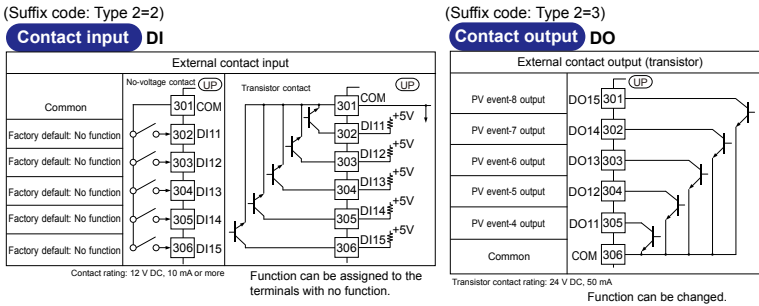
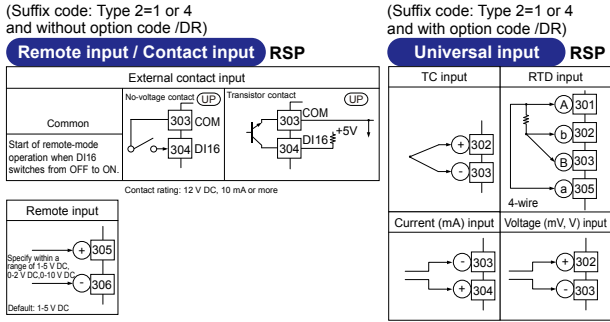
CR filter  
(Mount it directly to the relay coil terminal (socket).)

■ UP55A (Continued from page 3)

E4-terminal area E1-terminal area

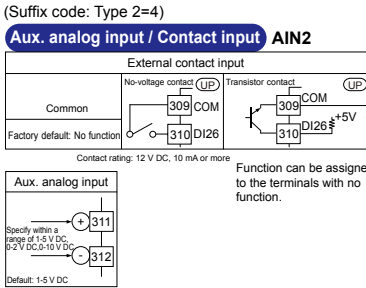
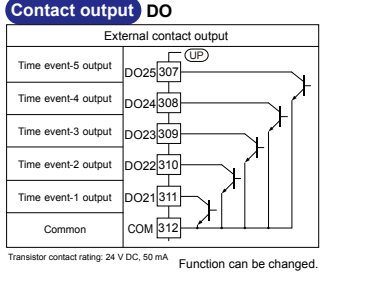


301-306 E1-Terminal Area



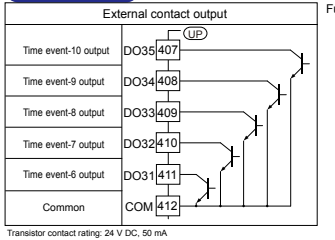
307-312 E2-Terminal Area

(Equipped as standard, however suffix code: Type 2= except 4)

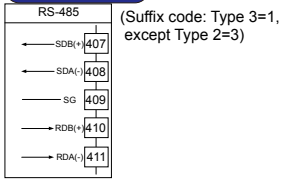


401-412 E3-Terminal Area

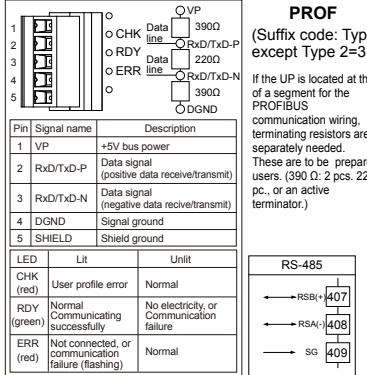
**Contact output DO** (Suffix code: Type 2=3)



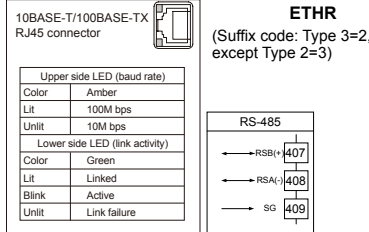
**RS-485 communication RS485**



**PROFIBUS-DP communication (with Modbus master)**



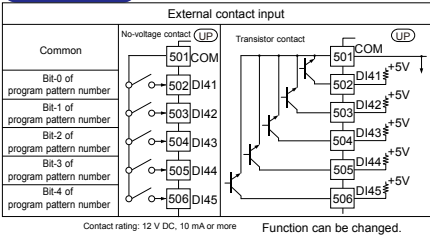
**Ethernet communication (with gateway function)**



501-506 E4-Terminal Area

(Equipped as standard, however suffix code: Type 2= except 2 and 4)

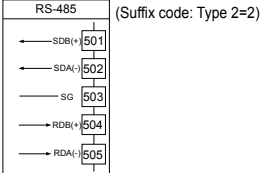
**Contact input DI**



A program pattern is selected with the combination of ON and OFF of a contact input. In the case of a pattern 5, ON (1) of "DI45 to DI41" and OFF (0) is represented as a binary number "00101"; it is "5" decimally. The pattern 13 or later can be selected similarly.

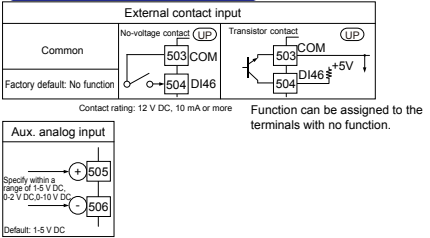
| Program pattern number |     |     |     |     |     |     |     |     |     |     |     |     |
|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                        | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |
| DI41                   | ON  | OFF | ON  | OFF | ON  | OFF | ON  | OFF | ON  | OFF | ON  | OFF |
| DI42                   | OFF | ON  | ON  | OFF | OFF | ON  | ON  | OFF | OFF | ON  | ON  | OFF |
| DI43                   | OFF | OFF | OFF | ON  | ON  | ON  | ON  | OFF | OFF | OFF | OFF | ON  |
| DI44                   | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ON  | ON  | ON  | ON  | ON  |
| DI45                   | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |

**RS-485 communication RS485**



(Suffix code: Type 2=4)

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



[ Operations 13. Troubleshooting ] ■ 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.                                                                                          |
|                                | 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.                    |                                                                                                                         |
|                                | PAR 0040 (for program pattern error only)                                  |                                                   | Setup parameter (OP.ER)               | Program pattern error                                                 | Program pattern data is corrupted. All program patterns are deleted.                         | Faulty. Contact us for repair.                                                                                          |
|                                | SLOT 0017 (0017: Error occurs to all hardware of E1 to E4-terminal areas.) |                                                   |                                       | Nonresponding hardware of extended function (E1 to E4-terminal areas) | Nonresponding communication between hardware of extended function (E1 to E4-terminal areas). |                                                                                                                         |
| 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.                                                                                          |
| Normal indication              | Normal indication                                                          | Rightmost decimal point on Symbol display blinks. | Setup parameter (LA.ER)               | Faulty FRAM                                                           | Data writing (storing) to FRAM is impossible.                                                | Download the ladder program again.                                                                                      |
| 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.                                                                                        |

[ Operations 13. Troubleshooting ] ■ 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<br>•PV input<br>•RSP input (E1-terminal area)<br>•AIN2 input (E2-terminal area)<br>•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<br>•PV input<br>•RSP 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 error<br>•PV input<br>•RSP input (E1-terminal area)<br>•AIN2 input (E2-terminal area)<br>•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<br>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)               | RSP input burnout error (Loop 1)                                                                                                                                                              | 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)               | Burnout error when RSP input is used for control (Loop 1)                                                                                                                                     | 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. (When the load factor is 100% or more, and the computation does not end within the control period.) | 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. |
|                                             | 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)               | Framing parity error<br>Buffer overflow<br>Inter-character time-out<br>Checksum error (PC link communication with checksum)<br>CRC check error (Modbus/RTU)<br>LRC check error (Modbus/ASCII) | Communication error (RS-485 communication)                                                                                                              | Check the communication parameters. Recovery at normal receipt. Hold down any key to stop blinking.                      |
|                                             |                                                                      |                                                   |                                       | 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

UP55A  
Program Controller  
Operation Guide for Single-loop Control



Initial Settings



**YOKOGAWA**  **«Standard Code Model»**  
Yokogawa Electric Corporation

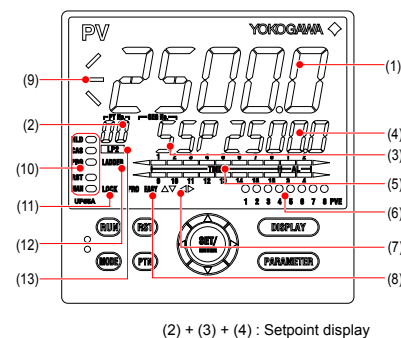
This operation guide describes basic settings and operations of the UP55A.  
For details of each function, see the electronic manual.  
The scrolling guide is displayed on PV display in the Parameter Setting Display.  
This guide can be turned on/off with the MODE key.  
For details of the each function, refer to the electronic manual. Manuals can be  
downloaded or viewed at the following URL.

 <https://www.yokogawa.com/ns/ut/im/>

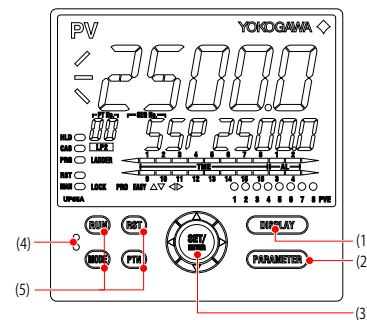
## Contents

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

## 1. Names and Functions of Display Parts



| No. in figure             | Name                                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|---------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------|-----|------------------------------|-----|---------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------|-------|-------------------------------|-------|--------------------------------------------------------------|
| (1)                       | PV display (white or red)                                    | Displays PV.<br>Displays an error code if an error occurs.<br>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 (pattern number) (green)                       | 1 to 30 (99 when the option "AP" is specified) represent pattern numbers in the Operation Display.<br>Displays a group number (1 to 8 or R) and terminal area (E1 to E4) in the Parameter Setting Display.                                                                                                                                                                                                                                                                                    |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| (3)                       | Symbol display (orange)                                      | Displays a parameter symbol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| (4)                       | Data display (orange)                                        | Displays a parameter setpoint and menu symbol.                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| (5)                       | Bar-graph display (event, alarm) (orange)                    | Displays the event status and the segment position in the Operation Display. (Default values: Time event status, Alarm status)<br>Displays control output value (OUT) and measured input value (PV). The data to be displayed can be set by the parameter.                                                                                                                                                                                                                                    |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| (6)                       | Event indicator (orange)                                     | Lit when the PV events occur.<br>Event displays 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.                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              | <table><tr><th>Parameter display level</th><th>EASY</th><th>PRO</th></tr><tr><td>Easy setting mode</td><td>Lit</td><td>Unlit</td></tr><tr><td>Standard setting mode</td><td>Unlit</td><td>Unlit</td></tr><tr><td>Professional setting mode</td><td>Unlit</td><td>Lit</td></tr></table>                                                                                                                                                                                                        | Parameter display level                                                                                            | EASY        | PRO | Easy setting mode            | Lit | Unlit                           | Standard setting mode | Unlit                                                                                                              | Unlit | Professional setting mode     | Unlit | Lit                                                          |
|                           |                                                              | Parameter display level                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | EASY                                                                                                               | PRO         |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              | Easy setting mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Lit                                                                                                                | Unlit       |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| Standard setting mode     | Unlit                                                        | Unlit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| Professional setting mode | Unlit                                                        | Lit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| (9)                       | Program monitor (green)                                      | Displays the status of increment, constancy, and decrement of the program setpoint.<br> : Lit when a program setpoint is increasing.<br> : Lit when a program setpoint is constant.<br> : Lit when a program setpoint is decreasing. |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| (10)                      | Status indicator (green and red)                             | Displays the operating conditions and control status.                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              | <table><tr><th>Indicator</th><th>Description</th></tr><tr><td>HLD</td><td>Lit when in hold mode (HLD).</td></tr><tr><td>CAS</td><td>Lit when in cascade mode (CAS).</td></tr><tr><td>PRG</td><td>Lit when in program operation mode (PRG).<br/>Lit while the Starting time of program operation (S.TM) is available.</td></tr><tr><td>RST</td><td>Lit when in reset mode (RST).</td></tr><tr><td>MAN</td><td>Lit when in manual mode (MAN).<br/>Blinks during auto-tuning.</td></tr></table>  | Indicator                                                                                                          | Description | HLD | Lit when in hold mode (HLD). | CAS | Lit when in cascade mode (CAS). | PRG                   | Lit when in program operation mode (PRG).<br>Lit while the Starting time of program operation (S.TM) is available. | RST   | Lit when in reset mode (RST). | MAN   | Lit when in manual mode (MAN).<br>Blinks during auto-tuning. |
|                           |                                                              | Indicator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Description                                                                                                        |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              | HLD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Lit when in hold mode (HLD).                                                                                       |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              | CAS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Lit when in cascade mode (CAS).                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              | PRG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Lit when in program operation mode (PRG).<br>Lit while the Starting time of program operation (S.TM) is available. |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| RST                       | Lit when in reset mode (RST).                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| MAN                       | Lit when in manual mode (MAN).<br>Blinks during auto-tuning. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
|                           |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| (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 program operation is executed.                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |
| (13)                      | Loop 2 indicator (LP2 lamp) (green)                          | Lit when the control mode is Cascade control.<br>In the Operation Display, the LP2 lamp is lit while the Loop-2 data is displayed on Setpoint display.<br>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.                                                                                                                                  |                                                                                                                    |             |     |                              |     |                                 |                       |                                                                                                                    |       |                               |       |                                                              |

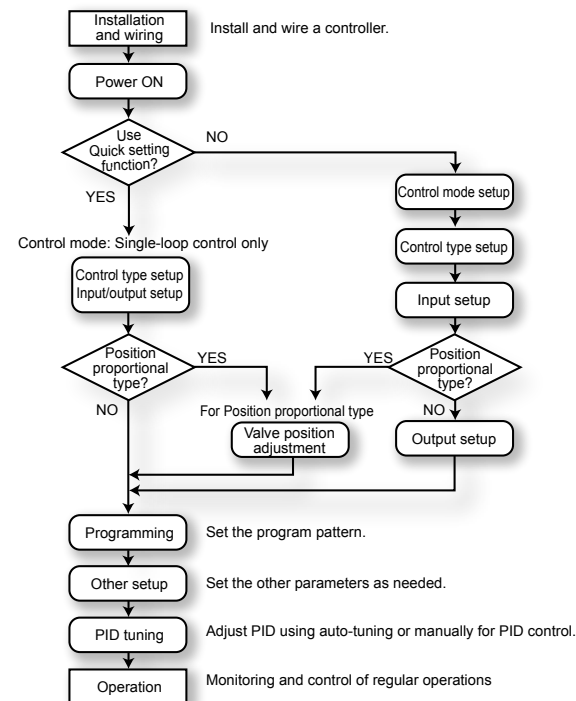


| No. in figure | Name                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1)           | DISPLAY key                                    | Used to switch the Operation Displays.<br>Press the key in the Operation Display to switch the provided Operation Displays.<br>Press the key in the Menu Display or Parameter Setting Display to return to the Operation Display.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| (2)           | PARAMETER key                                  | Hold down the key for 3 seconds to move to the Operation Parameter Setting Display.<br>Hold down the key and the Left arrow key simultaneously for 3 seconds to move to the Setup Parameter Setting Display.<br>Press the key in the Parameter Setting Display to return to the Menu Display. Press the key once to cancel the parameter setting (setpoint is blinking).                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| (3)           | SET/ENTER key<br>Up/Down/Left/Right arrow keys | SET/ENTER key<br>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.<br>Press the key during parameter setting mode to register the setpoint.<br>Up/Down/Left/Right arrow keys<br>Press the Left/Right arrow keys in the Menu Display to switch the Displays.<br>Press the Up/Down/Left/Right arrow keys in the Parameter Setting Display to switch the Displays.<br>Press the Up/Down arrow keys during parameter setting mode (setpoint is blinking) to change a setpoint.<br>Press the Left/Right arrow keys during parameter setting mode (setpoint is blinking) to move between digits according to the parameter. |
| (4)           | 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| (5)           | RUN key<br>RST key<br>MODE key<br>PTN key      | RUN key: Press the RUN key for 1 second while an operation display is shown starts the program pattern operation.<br>RST key: Press the RST key for 1 second while an operation display is shown stops the program pattern operation.<br>MODE key: Presents a display for switching between the HOLD, ADVANCE, PROG, RESET, LOCAL, REMOTE and AUTO/MAN. In order to change the operation mode, press the SET/ENTER key while the setpoint is blinking.<br>PTN key: A program pattern number can be selected during the operation except the program pattern operation. (The program pattern number displayed on the Group display blinks.) When the PTN key is pressed while the program pattern number is blinking, the blinking stops.<br>Users can assign functions to the key using parameters.            |

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 UP55A.



### 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.

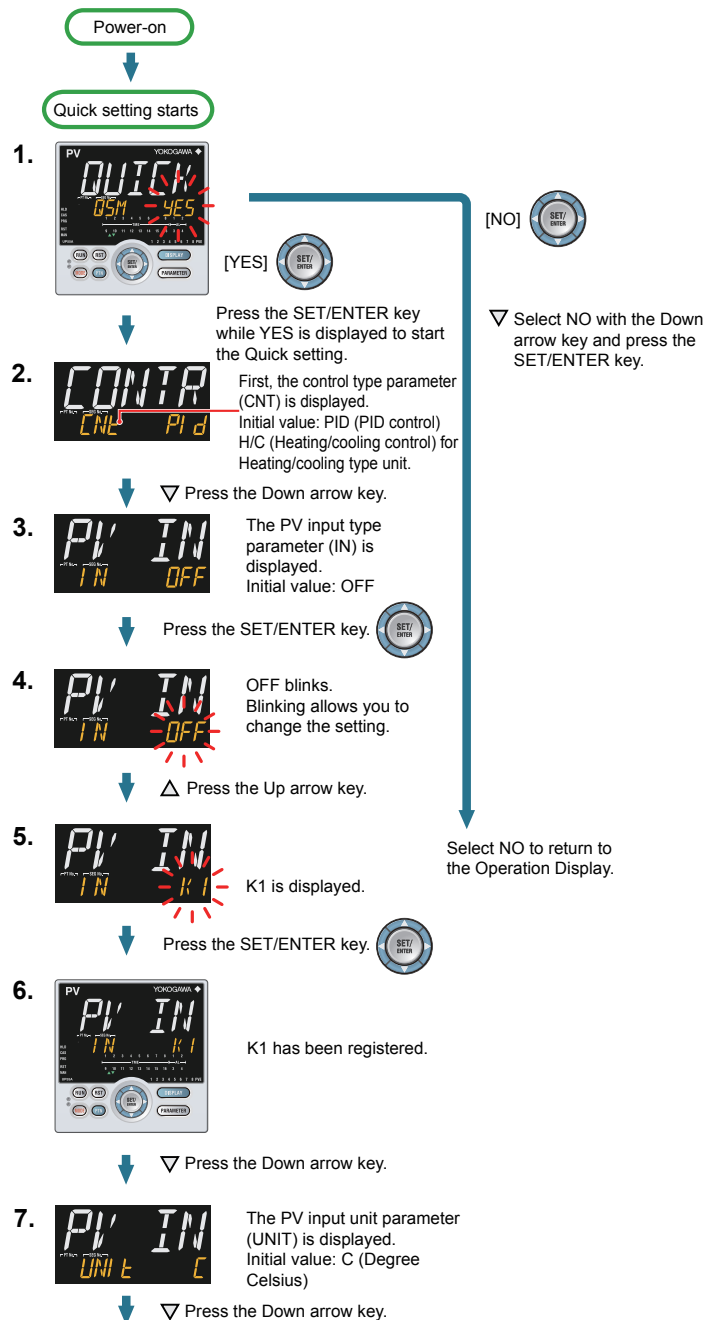
The Quick setting function can be used only when the control mode is Single-loop control. For other control modes, set the functions without using the Quick setting function.

### 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.

## ■ 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 MODE key.



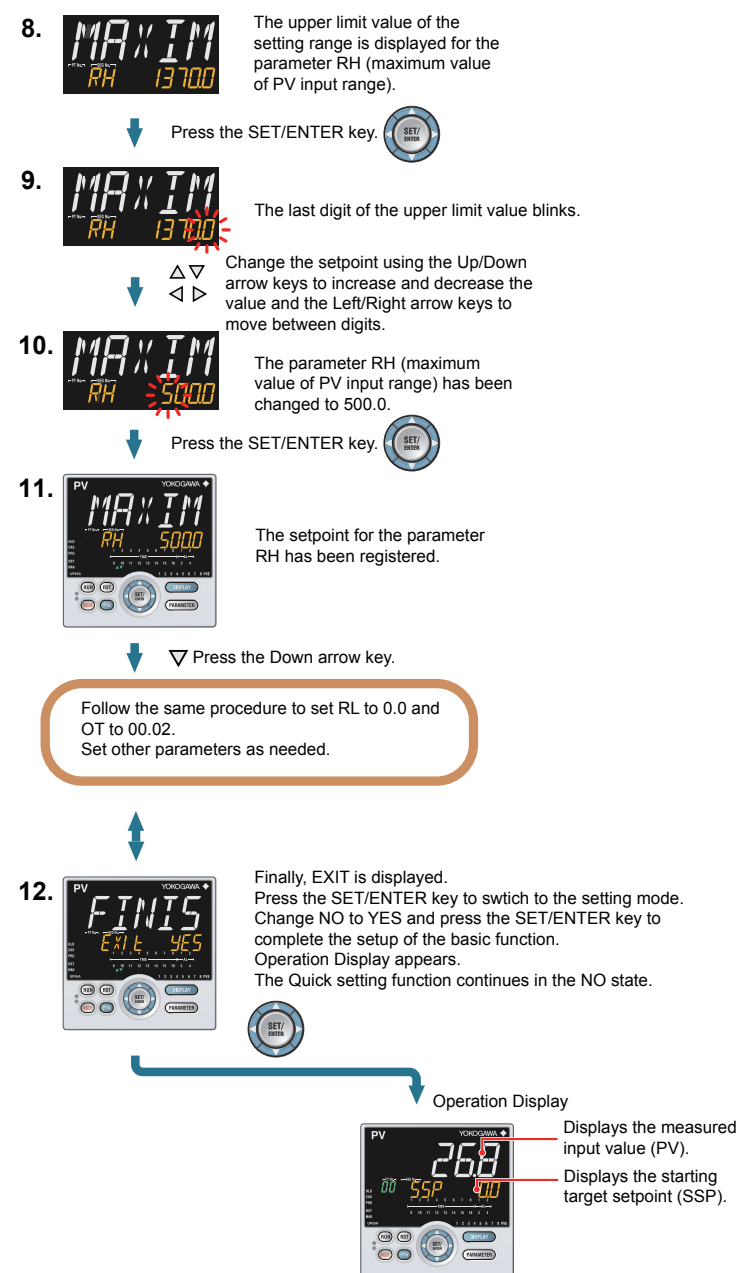
## Operation for Setting

- 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.



■ 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>H/C: Heating/cooling 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 3400 °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 500.0 °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, - -: 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. 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 = SL)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| RL               | Minimum value of PV input range       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SDP              | PV 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| SH               | Maximum value of PV input scale       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| SL               | Minimum value of PV input scale       | -19999 to 30000, (SL<SH),   SH - SL   ≤ 30000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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>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) |
| CT               | Control output cycle time              | Heating-side control output cycle time (in Heating/cooling control)<br>0.5 to 1000.0 s                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CTc              | Cooling-side control output cycle time |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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." The automatic adjustment can be done in program pattern operation, local operation, and remote operation.

- MAN is lit. Show the Operation Display.
- 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. CTL menu is displayed.
- Press the Right arrow key until OUT menu appears. OUT menu is displayed.
- Press the SET/ENTER key. The parameter V.AT (automatic valve position adjustment) is displayed.
- Press the SET/ENTER key. OFF blinks.
- Press the Up arrow key. ON is displayed. Blinks during the change.
- Press the SET/ENTER key. 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 or DISP key once to return to the Operation Display.

- When the adjustment is completed normally, the indication automatically returns to OFF.
- When VAT.E appears on PV display, it indicates an error. Check the wiring for feedback input and perform the automatic adjustment again. To perform a valve adjustment manually, see User's Manual.

5. Setting Alarm Type

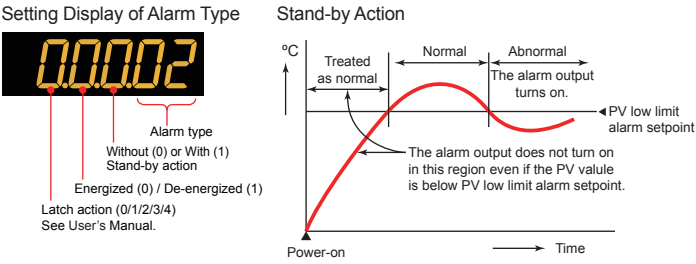
The following operating procedure shows an example of changing the alarm-1 type (factory default: PV high limit alarm) to PV low limit alarm (setpoint: 02). (These alarms work irrespective of the operation mode.)

- Show the Operation Display.
- Hold down the key for 3 seconds. MODE menu is displayed.
- Press the Right arrow key until ALRM menu appears. ALRM menu is displayed.
- Press the SET/ENTER key. Press the Up/Down arrow keys to display the parameter needs to be changed. The parameter AL1 (alarm-1 type) is displayed.
- Press the SET/ENTER key.

- 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.
  - 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.
- To change the alarm type, 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.

| 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 RSP high limit (21)<br>Analog input AIN2 high limit (23)<br>Analog input AIN4 high limit (25) | Hysteresis<br>Open (unit) Closed (lit)<br>PV, RSP, AIN2 Alarm setpoint or AIN4                                                                      | Hysteresis<br>Closed (unit) Open (lit)<br>PV, RSP, AIN2 Alarm setpoint or AIN4                           |
| PV low limit (02)<br>Analog input PV low limit (20)<br>Analog input RSP low limit (22)<br>Analog input AIN2 low limit (24)<br>Analog input AIN4 low limit (26)      | Hysteresis<br>Closed (lit) Open (unit)<br>Alarm setpoint PV, RSP, AIN2 or AIN4                                                                      | Hysteresis<br>Open (lit) Closed (unit)<br>Alarm setpoint PV, RSP, AIN2 or AIN4                           |
| SP high limit (03)<br>Target SP high limit (09)                                                                                                                     | Hysteresis<br>Open (unit) Closed (lit)<br>SP or Target SP Alarm setpoint                                                                            | Hysteresis<br>Closed (unit) Open (lit)<br>SP or Target SP Alarm setpoint                                 |
| SP low limit (04)<br>Target SP low limit (10)                                                                                                                       | Hysteresis<br>Closed (lit) Open (unit)<br>Alarm setpoint SP or Target SP                                                                            | Hysteresis<br>Open (lit) Closed (unit)<br>Alarm setpoint SP or Target SP                                 |
| Deviation high limit (05)<br>Target SP deviation high limit (11)                                                                                                    | Hysteresis<br>Open (unit) Closed (lit)<br>PV Deviation setpoint SP or Target SP ⊕                                                                   | Hysteresis<br>Closed (unit) Open (lit)<br>PV Deviation setpoint SP or Target SP ⊕                        |
| Deviation low limit (06)<br>Target SP deviation low limit (12)                                                                                                      | Hysteresis<br>Closed (lit) Open (unit)<br>Deviation setpoint PV SP or Target SP ⊖                                                                   | Hysteresis<br>Open (unit) Closed (lit)<br>Deviation setpoint PV SP or Target SP ⊖                        |
| Deviation high and low limits (07)<br>Target SP deviation high and low limits (13)                                                                                  | Hysteresis Hysteresis<br>Closed (lit) Open (unit) Closed (lit)<br>Deviation setpoint PV SP or Target SP                                             | Hysteresis Hysteresis<br>Open (lit) Closed (unit) Open (lit)<br>Deviation setpoint PV SP or Target SP    |
| Deviation within high and low limits (08)<br>Target SP deviation within high and low limits (14)                                                                    | Hysteresis Hysteresis<br>Open (unit) Closed (lit) Open (unit)<br>Deviation setpoint PV SP or Target SP                                              | Hysteresis Hysteresis<br>Closed (unit) Open (lit) Closed (unit)<br>Deviation setpoint PV SP or Target SP |
| Control output high limit (15)<br>Cooling-side control output high limit (17)                                                                                       | Hysteresis<br>Open (unit) Closed (lit)<br>Output Alarm setpoint                                                                                     | Hysteresis<br>Closed (unit) Open (lit)<br>Output Alarm setpoint                                          |
| Control output low limit (16)<br>Cooling-side control output low limit (18)                                                                                         | Hysteresis<br>Closed (lit) Open (unit)<br>Alarm setpoint Output                                                                                     | Hysteresis<br>Open (lit) Closed (unit)<br>Alarm setpoint Output                                          |
| Feedback input high limit (27)                                                                                                                                      | Fault diagnosis alarm (30)<br>Burnout of PV input, RSP remote input, or AIN2/AIN4 auxiliary analog input. ADC failure, RJC error.                   |                                                                                                          |
| Feedback input low limit (28)                                                                                                                                       | FAIL (31)                                                                                                                                           |                                                                                                          |
| PV velocity (29)                                                                                                                                                    | For the factory default, the contact 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



Note that the SP in reset-mode is SSP (Starting target setpoint).

6. Setting Alarm Setpoint

The following operating procedure shows an example of setting the alarm-1 setpoint to 180.0. (These alarms work irrespective of the operation mode.) Before setting the alarm setpoint, check the alarm type. To change the alarm type, see "5. Setting Alarm Type."

- Show the Operation Display.
- Display MODE menu with the same procedure as described in Setting Alarm Type. Press the Right arrow key.
- AL menu is displayed.
- Press the SET/ENTER key. The parameter A1 is displayed. A1 to A8 represent the alarm-1 to -8 setpoints.

Each parameter can be changed in the Parameter Setting Displays of alarms using arrow keys.  
△▽ Up/Down arrow keys: changing parameters

- Display the parameter that need to be changed.
- 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.
  - Press the SET/ENTER key.
  - 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.



This operation guide describes basic program settings of the UP55A. For details of each function, see the electronic manual. The scrolling guide is displayed on PV display in the Parameter Setting Display. This guide can be turned on/off with the MODE key. (The scrolling guide is OFF when displaying the Program parameter setting display first.) For details of the each function, refer to the electronic manual. Manuals can be downloaded or viewed at the following URL.

<https://www.yokogawa.com/ns/ut/im/>

Contents

- 1. Overview of Program Patterns
- 2. Creating Program Patterns
- 3. Program Pattern Setup Charts

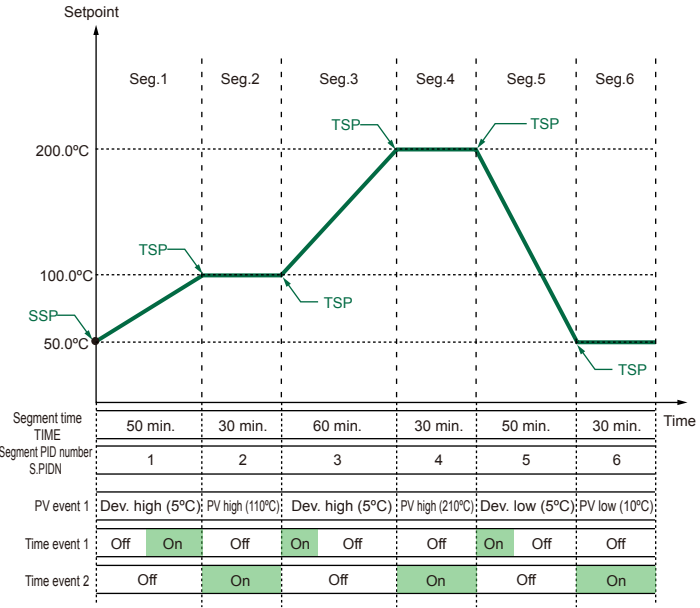
1. Overview of Program Patterns

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

Zone PID selection (ZON): Segment PID selection (0)  
Segment setting method (SEG.T): Segment time setting (TIME)  
Program time unit (TMU): hour.minute (HH.MM)



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.

2. Creating Program Patterns

The following operating procedure describes an example of creating the program discussed in "1. Overview of Program Patterns."



Note that the program patterns are all deleted if the settings change after creating program patterns. Be sure to check the PV input range, Program time unit (TMU), and Segment setting method (SEG.T) before creating.

1. Show the Operation Display. RST lamp is lit.
2. MODE menu is displayed.
3. PROG menu is displayed.
4. PTNO.=1
5. SEGNO=0
6. Set the common parameter of the specified pattern.
7. Starting target setpoint=50.0°C
8. STC=SSP (Starting target setpoint) Keep the initial value.
9. Set the final target setpoint.
10. Final target setpoint=100.0°C
11. Set the segment time.

12. Segment time=50 minutes
13. Set the segment PID number. Keep the initial value.
14. Set the junction code. Keep the initial value.
15. Set the PV event-1 type.
16. PV event-1 type=Deviation high limit
17. Set the PV event-1 setpoint.
18. PV event-1 setpoint=5.0°C
19. Time event-1 starts from the Off state.
20. Set the On time.
21. On time=25 minutes
22. There is no the Off time.
23. Time event-2 starts from the Off state.
24. Set the final target setpoint. Continues the TSP of segment 1.
25. Set the segment time.

26. Segment time=30 minutes
27. Set the segment PID number.
28. Segment PID number=2
29. Set the junction code. In this case, the former segment is left unchanged.
30. Set the PV event-1 type.
31. PV event-1 type=PV high limit
32. Set the PV event-1 setpoint.
33. PV event-1 setpoint=110.0°C
34. Time event-1 starts from the Off state.
35. Set the time event 2.
36. Start condition of time event 2=ON start
37. Press the DISPLAY key once to return to the Operation Display.

- Settings for the segment 3 to 6 can be done similarly.
- For programming and the settings for Wait and Repeat actions, see User's Manual.

3. Program Pattern Setup Charts

You can register max. 99 program segments with the UP55A controller. Create as many copies of the chart as necessary.

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

The following parameters are necessary to be set before programming.  
Note that the program is deleted if TMU or SEG.T is changed after creating programs.  
For the setting range, see "Parameters."

< Setup Parameters >

| Parameter symbol | Parameter name                   | User settings |
|------------------|----------------------------------|---------------|
| TMU              | Program time unit                |               |
| SEG.T            | Segment setting method           |               |
| ZON              | Zone PID selection               |               |
| PT2.G            | Program pattern-2 retransmission |               |

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 |
|------------------|-----------------------------------------------------------------|---------------|
| SSP              | Starting target setpoint                                        |               |
| SSP              | Starting target setpoint (for program pattern-2 retransmission) |               |
| STC              | Start code                                                      |               |
| WT.SW1           | Wait function ON/OFF 1                                          |               |
| WZ.UP1           | Upper-side wait zone 1                                          |               |
| WZ.LO1           | Lower-side wait zone 1                                          |               |
| WT.TM1           | Wait time 1                                                     |               |
| WT.SW2           | Wait function ON/OFF 2                                          |               |
| WZ.UP2           | Upper-side wait zone 2                                          |               |
| WZ.LO2           | Lower-side wait zone 2                                          |               |
| WT.TM2           | Wait time 2                                                     |               |
| WT.SW3           | Wait function ON/OFF 3                                          |               |
| WZ.UP3           | Upper-side wait zone 3                                          |               |
| WZ.LO3           | Lower-side wait zone 3                                          |               |
| WT.TM3           | Wait time 3                                                     |               |
| WT.SW4           | Wait function ON/OFF 4                                          |               |
| WZ.UP4           | Upper-side wait zone 4                                          |               |
| WZ.LO4           | Lower-side wait zone 4                                          |               |
| WT.TM4           | Wait time 4                                                     |               |
| WT.SW5           | Wait function ON/OFF 5                                          |               |
| WZ.UP5           | Upper-side wait zone 5                                          |               |
| WZ.LO5           | Lower-side wait zone 5                                          |               |
| WT.TM5           | Wait time 5                                                     |               |
| R.CYCL           | Number of repeat cycles                                         |               |
| R.STRT           | Repeat cycle start segment number                               |               |
| R.END            | Repeat cycle end segment number                                 |               |

Error Indication at Program Pattern Creation and Editing

| Error code | Error information                                                | Cause of error                                                                                                             |
|------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| ERR01      | Pattern creation or editing is disable during program operation. | Deleting or copying of the program pattern, or inserting or deleting of the segment was executed during program operation. |
| ERR22      | Segment write error                                              | The total number of segments exceeded 300 (600 when the option "/AP" is specified).                                        |
| ERR23      | Segment insert error                                             | New segment cannot be inserted because the number of segments in a pattern exceeded 99.                                    |
| ERR32      | Pattern source specification error                               | No pattern exists in the source.                                                                                           |
| ERR33      | Pattern destination specification error                          | Patterns already exist in the destination.                                                                                 |
| ERR41      | Pattern delete error                                             | The pattern to be deleted does not exist.                                                                                  |

Except the above errors, there are some error codes in communication. For details, see User's Manual.

< 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                                       |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TM.RT            | Segment ramp-rate setting                                  |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| S.PID            | Segment PID number selection                               |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| JC               | Junction code                                              |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.TY1           | PV event-1 type                                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.EV1           | PV event-1 setpoint                                        |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.TY2           | PV event-2 type                                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.EV2           | PV event-2 setpoint                                        |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.TY3           | PV event-3 type                                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.EV3           | PV event-3 setpoint                                        |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.TY4           | PV event-4 type                                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.EV4           | PV event-4 setpoint                                        |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.TY5           | PV event-5 type                                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.EV5           | PV event-5 setpoint                                        |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.TY6           | PV event-6 type                                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.EV6           | PV event-6 setpoint                                        |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.TY7           | PV event-7 type                                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.EV7           | PV event-7 setpoint                                        |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.TY8           | PV event-8 type                                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| PV.EV8           | PV event-8 setpoint                                        |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME1             | Start condition of time event 1                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON1            | On time of time event 1                                    |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF1            | Off time of time event 1                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME2             | Start condition of time event 2                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON2            | On time of time event 2                                    |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF2            | Off time of time event 2                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME3             | Start condition of time event 3                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON3            | On time of time event 3                                    |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF3            | Off time of time event 3                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME4             | Start condition of time event 4                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON4            | On time of time event 4                                    |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF4            | Off time of time event 4                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME5             | Start condition of time event 5                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON5            | On time of time event 5                                    |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF5            | Off time of time event 5                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME6             | Start condition of time event 6                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON6            | On time of time event 6                                    |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF6            | Off time of time event 6                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME7             | Start condition of time event 7                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON7            | On time of time event 7                                    |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF7            | Off time of time event 7                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME8             | Start condition of time event 8                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON8            | On time of time event 8                                    |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF8            | Off time of time event 8                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME9             | Start condition of time event 9                            |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON9            | On time of time event 9                                    |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF9            | Off time of time event 9                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME10            | Start condition of time event 10                           |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON10           | On time of time event 10                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF10           | Off time of time event 10                                  |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME11            | Start condition of time event 11                           |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON11           | On time of time event 11                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF11           | Off time of time event 11                                  |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME12            | Start condition of time event 12                           |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON12           | On time of time event 12                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF12           | Off time of time event 12                                  |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME13            | Start condition of time event 13                           |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON13           | On time of time event 13                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF13           | Off time of time event 13                                  |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME14            | Start condition of time event 14                           |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON14           | On time of time event 14                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF14           | Off time of time event 14                                  |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME15            | Start condition of time event 15                           |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON15           | On time of time event 15                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF15           | Off time of time event 15                                  |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| TME16            | Start condition of time event 16                           |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.ON16           | On time of time event 16                                   |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
| T.OF16           | Off time of time event 16                                  |          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |



This operation guide describes key entries for operating the UP55A. 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 MODE key.

For details of the each function, refer to the electronic manual. Manuals can be downloaded or viewed at the following URL.

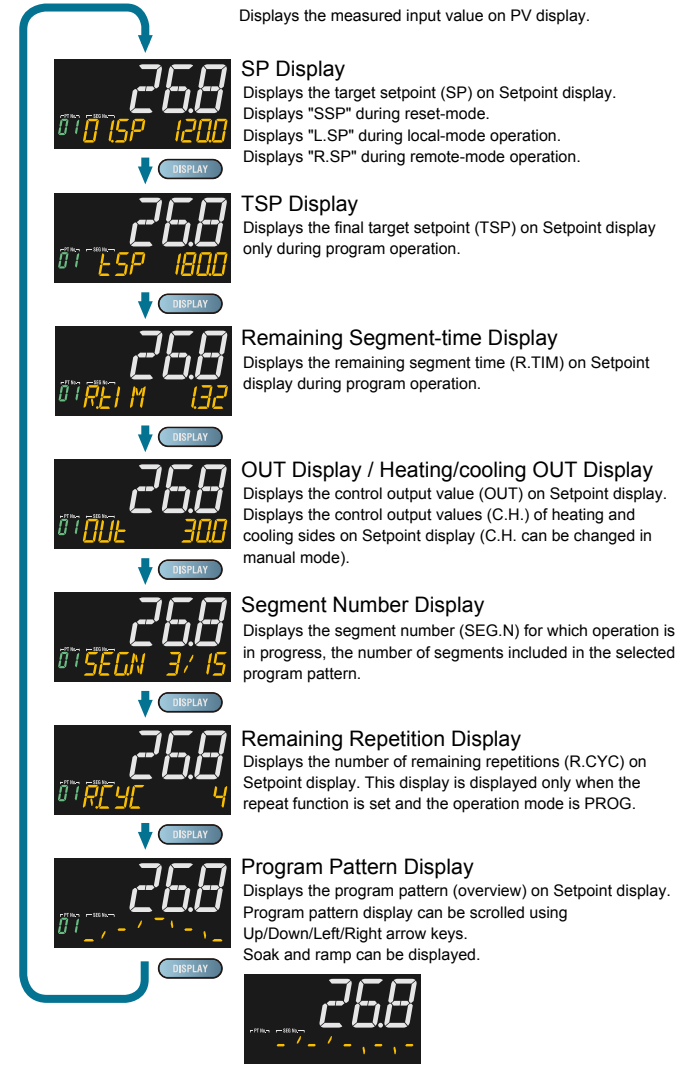
<https://www.yokogawa.com/ns/ut/im/>

Contents

- Monitoring-purpose Operation Displays Available during Operation
- Performing/Canceling Auto-tuning
- Selecting Program Pattern Number (PT.No)
- Switching between RUN and RESET
- Switching between AUTO and MAN
- Manipulating Control Output in Manual Mode
- Enabling/Disabling Hold-mode (HOLD) of Program Operation
- Changing Program Setpoints when in Hold-mode (HOLD)
- Executing "Advance" (ADV) Function
- Switching to Local-mode (LOCAL) Operation
- Changing Setpoints during Local-mode (LOCAL) Operation
- Switching to Remote-mode (REMOTE) Operation
- Troubleshooting

1. Monitoring-purpose Operation Displays Available during Operation

■ Operation Display Switching Diagram



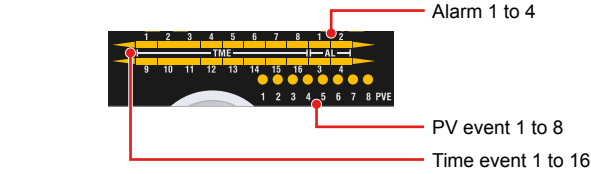
After showing the Program Pattern Display, press the DISPLAY key to show the following displays conditionally. For details, see User's Manual.

Standard, Position Proportional, and Heating/Cooling Types

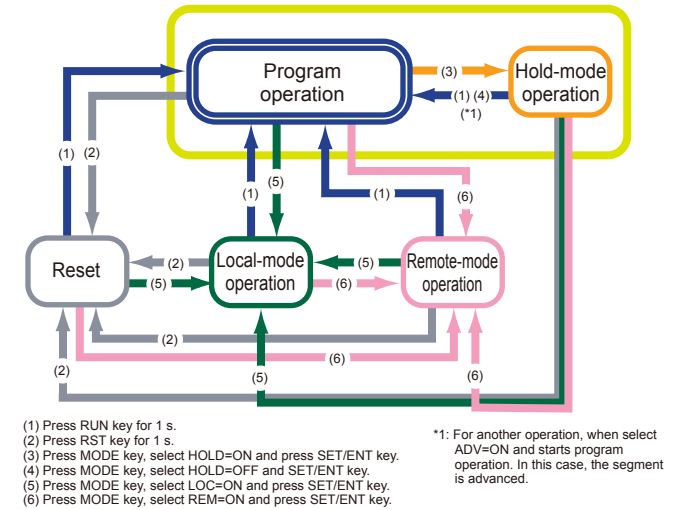
- SELECT Displays 1 to 5 (which appear when registered)
- Analog Input Display (display only) (factory default: non-display)
- Position Proportional Computation Output Display (display only) (factory default: non-display)
- PID Number Display (display only) (factory default: non-display)
- Alarm-5 to -8 Status Display (which appear when registered)
- Heater Break Alarm-1 Current Display (display only) (for heater break alarm option only)
- Heater Break Alarm-2 Current Display (display only) (for heater break alarm option only)

■ Event Display

Time event (TME), PV event (PVE) and alarm (AL) are displayed on the Bar-graph display and the Event Indicator. (factory default setting)



■ Operation Display Switching Diagram



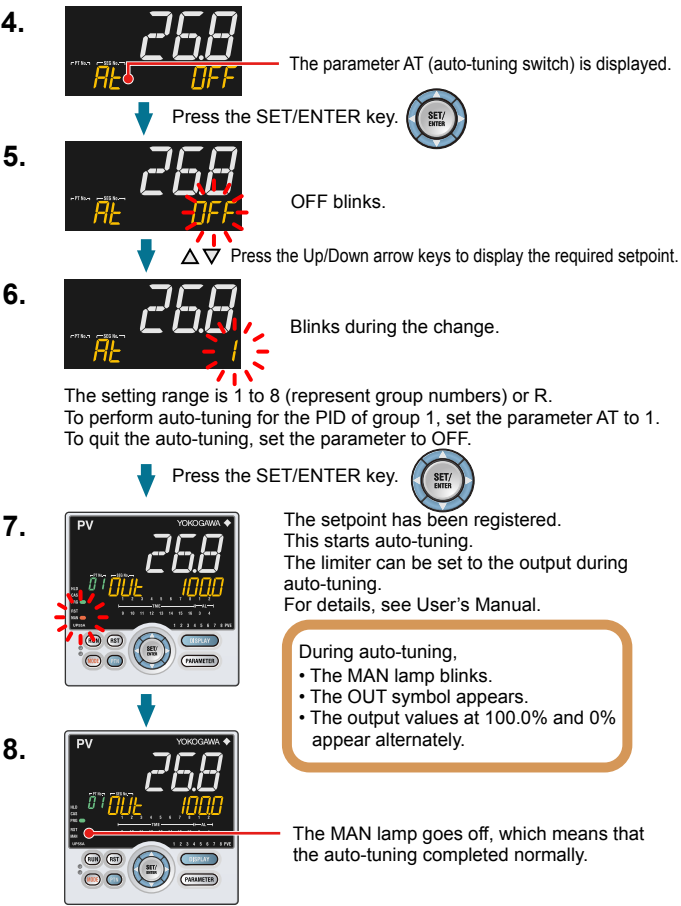
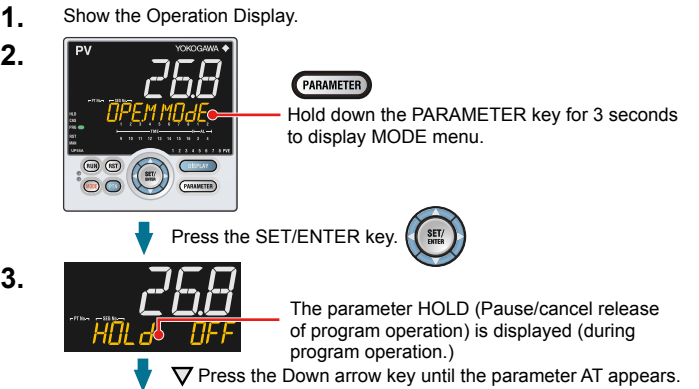
2. Performing/Canceling Auto-tuning

Auto-tuning should be performed after setting a program pattern. 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 "4. Switching between RUN and RESET."

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.



- 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.

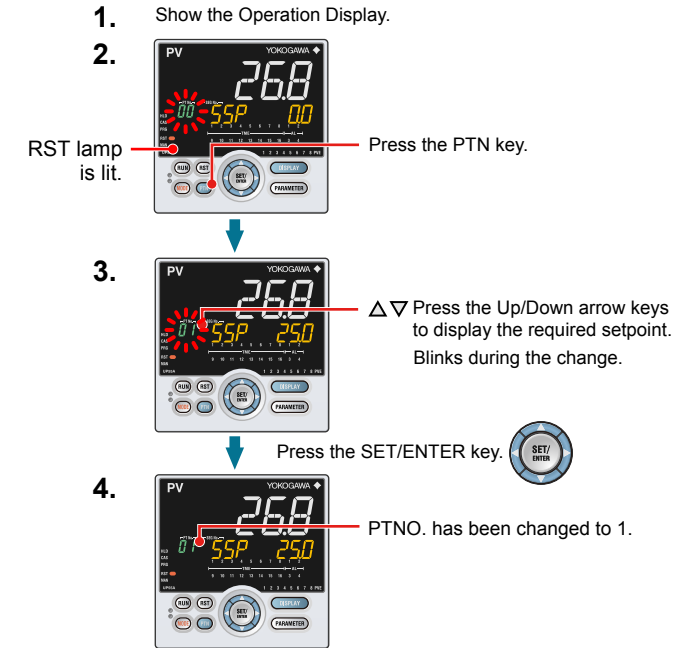


3. Selecting Program Pattern Number (PT.No)

Program pattern number selection can be performed using any of the following: (1) key, (2) Parameter, (3) Contact input, and (4) Communication.

The following shows an example of changing the program pattern number (PTNO.) to 1 using the key.

Program pattern number can be selected when the controller is in a RESET mode.



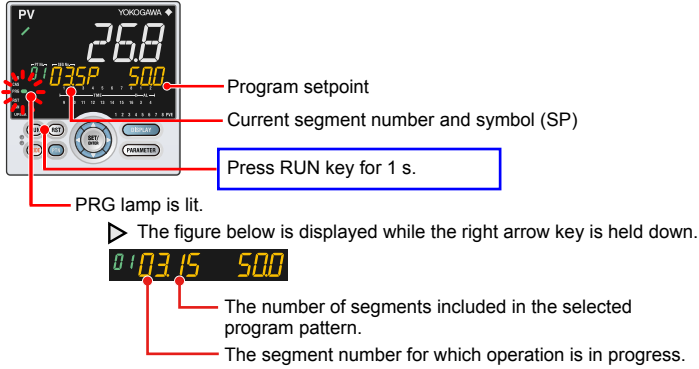
4. Switching between RUN and RESET

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

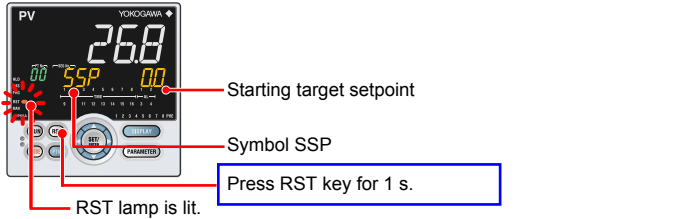
The following shows an example of switching using the key.

For details of other switching methods and the display appearing when the operation is started, see User's Manual.

Display in RUN mode



Display in RESET mode



When the controller is stopped, input and outputs are as follows:

|                |                                                                                                                                                                                                                                                                                                                                    |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PV input       | Displays the PV value.                                                                                                                                                                                                                                                                                                             |
| Control output | When the zone PID selection parameter (ZON) is set to segment PID selection, the preset output value for the PID group number 1 is output. When the zone PID selection parameter (ZON) is set to other than segment PID selection, the preset output value for the PID group number for which zone control is performed is output. |
| Event output   | Turns the output off in case of an event.                                                                                                                                                                                                                                                                                          |
| Alarm output   | Turns the output on in case of an alarm.                                                                                                                                                                                                                                                                                           |

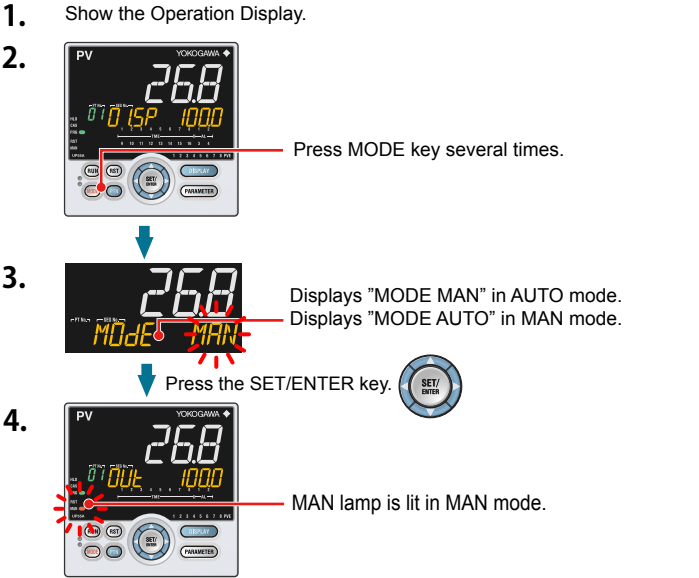
5. Switching between AUTO and MAN

AUTO and MAN switching can be performed using any of the following: (1) MODE key, (2) Contact input, (3) Contact input, and (4) Communication.

The following shows an example of switching using the MODE 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.



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).

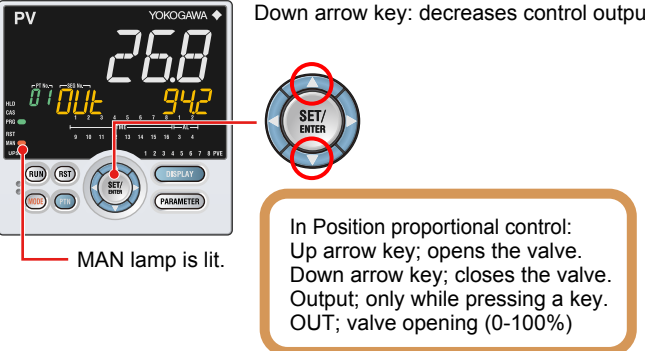
## 6. Manipulating Control Output in Manual Mode

### 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.

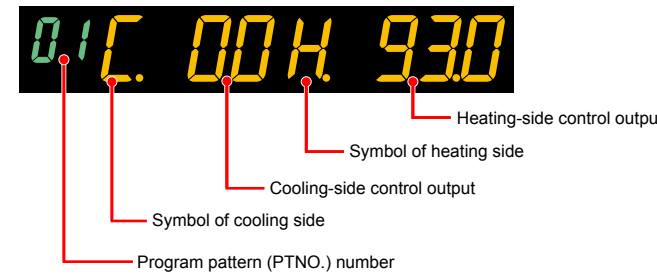
In stop mode (when the RST lamp is lit), control output cannot be manipulated.

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



Output manipulation in Position proportional control is not restricted from output limiters (OH, OL).

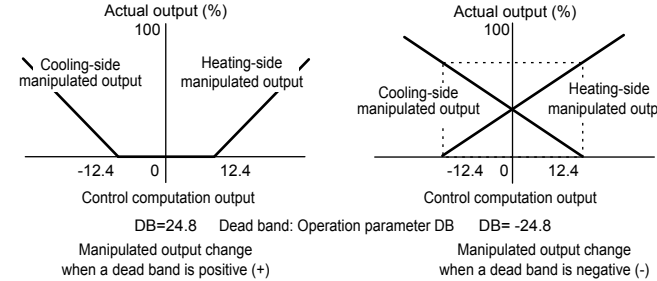
### Manual operation in Heating/cooling control



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.)

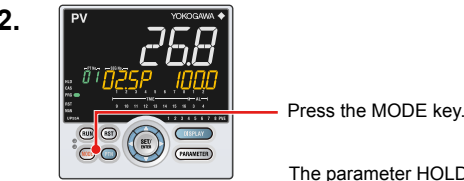


## 7. Enabling/Disabling Hold Mode of Program Operation

Enabling/disabling hold mode of program operation can be performed during program operation using any of the following: (1) MODE key, (2) Parameter, (3) Contact input, and (4) Communication.

The following shows an example of switching using the MODE key.

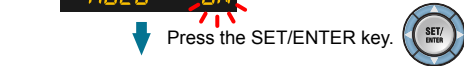
1. Show the Operation Display.



Press the MODE key.

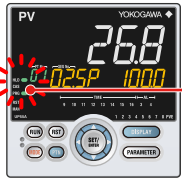
The parameter HOLD (Pause/cancel release of program operation) is displayed (during program operation.)

2. Displays "HOLD ON" in PROG mode.  
Displays "HOLD OFF" in HOLD mode.



Press the SET/ENTER key.

- 4.



HLD lamp is lit in HOLD mode.

The figure below is displayed while the right arrow key hold down.



The number of segments included in the selected program pattern.  
The segment number for which operation is in progress.

Other operating procedures for disabling the hold mode:

- (1) Press the RUN key for 1 second during hold-mode operation. In this case, the controller resumes program operation.
- (2) Excute the "Advance" function during hold-mode operation. In this case, the segment is advanced.

## 8. Changing Program Setpoints when in Hold Mode

The following operating procedures changes a program setpoint of soak segment during Hold-mode operation.

The program operation is started when releasing the Hold after changing the program setpoint.

1. Set program operation in hold mode.



Press the SET/ENTER key.

2. Blinks during the change.



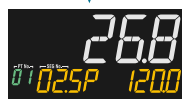
Press the Up/Down arrow keys to display the required setpoint.

3. Blinks during the change.



Press the SET/ENTER key.

4. The segment is advanced.



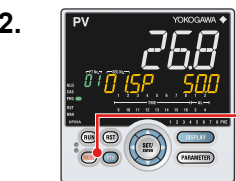
## 9. Executing "Advance" Function

"Advance" can be performed during program operation using any of the following: (1) MODE key, (2) Parameter, (3) Contact input, and (4) Communication.

The following shows an example of switching using the MODE key.

When executing the "Advance" function during hold-mode operation, the hold mode is disabled.

1. Show the Operation Display.



Press the MODE key.

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



Press the SET/ENTER key.

4. The segment is advanced.



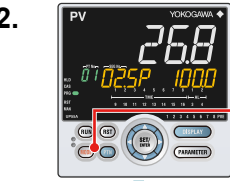
## 10. Switching to Local-mode (LOCAL) Operation

Switching to loca-mode can be performed using any of the following:

- (1) MODE key (user function key), (2) Parameter, (3) Contact input, and (4) Communication.

The following shows an example of switching using the MODE key.

1. Show the Operation Display.



Press the MODE key several times.

3. The LOC (local operation) is displayed.



Press the SET/ENTER key.

4. "LSP" is displayed when in local-mode operation.



## 11. Changing Setpoints during Local-mode Operation

The following operating procedures changes setpoints during local-mode operation.

1. "LSP" is displayed when in local-mode operation



Press the SET/ENTER key.

2. Blinks during the change.



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

3. Blinks during the change.



Press the SET/ENTER key.

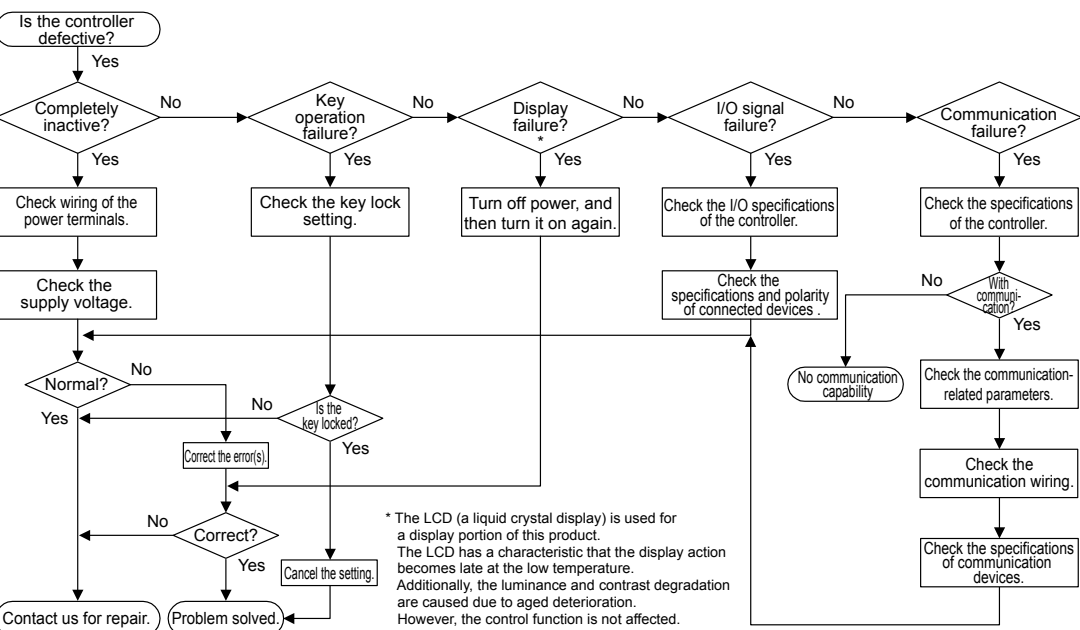
4. The segment is advanced.



## 13. 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.



### ■ 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

UP55A  
Program Controller  
Operation Guide for Single-loop Control

Parameters

UTAdvanced  
Functional Enhancement

YOKOGAWA

Yokogawa Electric Corporation

«Standard Code Model»

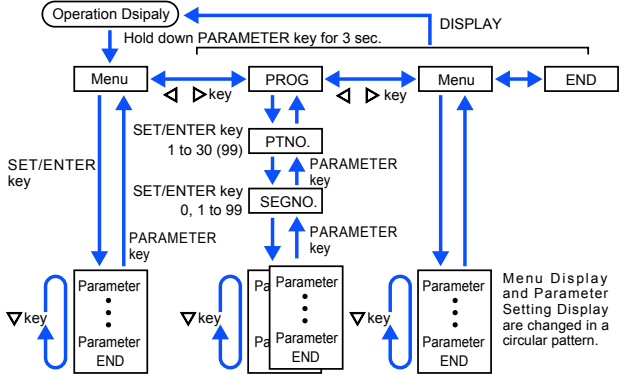
This operation guide describes the functions of parameters briefly. The parameter symbols listed are in the order shown on the display in each group of menu symbols. In addition, each parameter table has a “User Setting” column, where you can record your setpoints when setting them in the controller. The scrolling guide is displayed on PV display in the Parameter Setting Display. This guide can be turned on/off with the MODE key.

For details of the each function, refer to the electronic manual. Manuals can be downloaded or viewed at the following URL.

https://www.yokogawa.com/ns/ut/im/

Operation Parameters / Program 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

| Parameter symbol     | Name of Parameter                         | Setting Range                                                                                                                                                                                                                             | Initial value | User setting | Display level |
|----------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>HOLD</i> (HOLD)   | Pause/cancel release of program operation | Display during program operation.<br>ON: Pause<br>OFF: Cancel release (Program operation restart)                                                                                                                                         | OFF           |              |               |
| <i>ADV</i> (ADV)     | Advance of segment                        | Display during program operation.<br>Set as “ADV = ON” to advance from the current segment to the next segment.                                                                                                                           | OFF           |              |               |
| <i>MODE</i> (MODE)   | Operation mode                            | RESET: Stop of program operation<br>PROG: Start of program operation<br>LOCAL: Start of local-mode operation<br>REM: Start of remote-mode operation                                                                                       | RESET         |              |               |
| <i>AM</i> (A.M)      | AUTO/MAN switch                           | AUTO: Automatic mode<br>MAN: Manual mode                                                                                                                                                                                                  | MAN           |              |               |
| <i>PTNO.</i> (PTNO.) | Program pattern number selection          | 0: Not select program pattern<br>1 to 30 (99 when the option “AP” is specified)                                                                                                                                                           | 0             |              |               |
| <i>SST</i> (SST)     | Start-of-program segment number           | 1 to 99<br>The setting value returns to “1” when the program operation (PROG) changes into RESET, LOCAL, or REM.                                                                                                                          | 1             |              | EASY          |
| <i>P.FWD</i> (P.FWD) | Fast-forwarding of program operation      | 1: Normal, 2: Twice, 5: Five times, 10: Ten times<br>* Use this function when checking the program pattern setting. Only Segment time and Time event can be faster.<br>* The operation returns to the normal speed after fast-forwarding. | 1             |              |               |
| <i>RT</i> (AT)       | AUTO-tuning switch                        | OFF: Disable<br>1 to 8: 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           |              |               |
| <i>PID</i> (PID)     | PID number                                | The PID group number being selected is displayed.<br>1 to 8, R: PID group for reference deviation                                                                                                                                         | 1             |              |               |

SELECT Parameter

| 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. For details, see User’s Manual. | —             | Table below  | EASY          |
| Parameter CSn               | n=10 n=11 n=12 n=13 n=14 n=15 n=16 n=17 n=18 n=19 |                                                                          |               |              |               |

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

Program Setting Parameter

| Parameter symbol                                  | Name of Parameter                 | Setting Range                                                                                                                                                                                                                                                 | Initial value          | User setting | Display level |
|---------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------|---------------|
| <i>SSP</i> (SSP)                                  | Starting target setpoint          | 0.0 to 100.0% of PV input range (EU) (Setting range: P.RL to P.RH)                                                                                                                                                                                            | P.RL                   |              |               |
| <i>STC</i> (STC)                                  | Start code                        | SSP: Program operation begins with the starting target setpoint.<br>RAMP: Ramp-prioritized PV start<br>TIME: Time-prioritized PV start<br>LSP: Local-mode start<br>RSP: Remote-mode start<br>* STC=TIME cannot be selected when the parameter SEG.T is TM.RT. | SSP                    |              | EASY          |
| <i>WT.SW1</i> to <i>WT.SW5</i> (WT.SW1 to WT.SW5) | Wait function ON/OFF 1 to 5       | OFF: Disable<br>ON: Enable                                                                                                                                                                                                                                    | OFF                    |              |               |
| <i>WZ.UP1</i> to <i>WZ.UP5</i> (WZ.UP1 to WZ.UP5) | Upper-side wait zone 1 to 5       | 0.0 to 10.0% of PV input range (EU)                                                                                                                                                                                                                           | 0.5% of PV input range |              |               |
| <i>WZ.LO1</i> to <i>WZ.LO5</i> (WZ.LO1 to WZ.LO5) | Lower-side wait zone 1 to 5       |                                                                                                                                                                                                                                                               | 0.5% of PV input range |              |               |
| <i>WT.TM1</i> to <i>WT.TM5</i> (WT.TM1 to WT.TM5) | Wait time 1 to 5                  | OFF: No function<br>0.00 to 999.59 (“hour.minute” or “minute.second”)<br>* Available only for the wait time at the segment switching.<br>* Use the parameter TMU to set the time unit. (Common in the instrument.)                                            | OFF                    |              | STD           |
| <i>RCYCL</i> (R.CYCL)                             | Number of repeat cycles           | 0 to 999, CONT (limitless number of times)                                                                                                                                                                                                                    | 0                      |              |               |
| <i>RSTRT</i> (R.STRT)                             | Repeat cycle start segment number | 1 to 99                                                                                                                                                                                                                                                       | 1                      |              |               |
| <i>REND</i> (R.END)                               | Repeat cycle end segment number   | 1 ≤ R.STRT ≤ R.END ≤ 99                                                                                                                                                                                                                                       | 1                      |              |               |

When the program pattern-2 retransmission is selected (PT2.G=ON), the second loop is also displayed for the parameter SSP. (LP2 lamp is lit.)  
Wait-function-related parameters are displayed in order of the 1st group (WT.SW1, WT.TM1, WZ.UP1, Z.LO1), the 2nd group, the 3rd group, and so on.

Program Setting Parameter

| Parameter symbol    | Name of Parameter            | Setting Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Initial value | User setting                       | Display level |
|---------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------|---------------|
| <i>TSP</i> (TSP)    | Final target setpoint        | 0.0 to 100.0% of PV input range (EU) (Setting range: P.RL to P.RH)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | P.RL          |                                    |               |
| <i>TIME</i> (TIME)  | Segment time setting         | --: Unregistered<br>0.00 to 999.59 (“hour.minute” or “minute.second”)<br>* Setting available for the parameter SEG.T=TIME.<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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -             |                                    |               |
| <i>TMRT</i> (TM.RT) | Segment ramp-rate setting    | --: Unregistered<br>Ramp: 0.0 to 100.0% of PV input range span (EUS) / 1 hour or 1 minute<br>Soak: 0.00 to 999.59 (“hour.minute” or “minute.second”)<br>* Setting available for the parameter SEG.T=TM.RT<br>* Use the parameter TMU to set the time unit. (Common in the instrument.)<br>Per 1 hour: TMU=HH.MM, Per 1 minute: TMU=MM.SS<br>* If it is set to 0.0% of the input range span, or the segment time 0.00, the program moves to the next segment after one control period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -             | See “Program-ming” in this manual. | EASY          |
| <i>SPID</i> (S.PID) | Segment PID number selection | 1 to 8<br>* PID number can be set when the parameter “ZON = 0.”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1             |                                    |               |
| <i>JC</i> (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).<br>LOCAL: Local-mode switching (the controller switches to a local setpoint when the segment is completed).<br>REM: Remote-mode switching (the controller switches to a remote setpoint when the segment is completed).<br>W.SW1 to W.SW5: Wait during switching between segments.<br>W.IV1 to W.IV5: Wait within a segment interval.<br>W.SL1 to W.SL5: Segment switching (the controller switches to a local setpoint when the segment is completed after release.) (5 groups)<br>W.SR1 to W.SR5: Segment switching (the controller switches to a remote setpoint when the segment is completed after release.) (5 groups)<br>PLK.1 to PLK.30 (PLK.99): Linked to patterns 1 to 30 (99).<br>INS.: Allows a segment to be added to the end of a specified segment.<br>DEL.: Allows a specified segment to be deleted. | CONT          | See “Program-ming” in this manual. | STD           |

When the program pattern-2 retransmission is selected (PT2.G=ON), the second loop is also displayed for the parameter SSP. (LP2 lamp is lit.)

Program Setting Parameter

| Parameter symbol                                  | Name of Parameter                                                                                                                                                                                   | Setting Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Initial value | User setting                       | Display level |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------|---------------|
| <i>PV.TY1</i> to <i>PV.TY8</i> (PV.TY1 to PV.TY8) | PV event-1 to -8 type                                                                                                                                                                               | OFF: Disable (Energized)<br>1: PV high limit, 2: PV low limit, 3: SP high limit, 4: SP low limit, 5: Deviation high limit, 6: Deviation low limit, 7: Deviation high and low limits, 8: Deviation within high and low limits, 9: Target SP high limit, 10: Target SP low limit, 11: Target SP deviation high limit, 12: Target SP deviation low limit, 13: Target SP deviation high and low limits, 14: Target SP deviation within high and low limits, 15: OUT high limit, 16: OUT low limit, 17: Cooling-side OUT high limit, 18: Cooling-side OUT low limit<br>* Add 100 for “de-energized”. For example, when the PV high limit is de-energized, the setting is 101. | OFF           | See “Program-ming” in this manual. | STD           |
| <i>PV.EV1</i> to <i>PV.EV8</i> (PV.EV1 to PV.EV8) | Set a display value of setpoint of PV alarm, SP alarm, deviation alarm, or output alarm. -19999 to 30000 (Set a value within the input range.)<br>Decimal point position depends on the input type. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0             |                                    |               |
| <i>TME1</i> to <i>TME16</i> (TME1 to TME16)       | Start condition of time event 1 to 16                                                                                                                                                               | ON: Start ON state<br>OFF: Start OFF state                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OFF           |                                    |               |
| <i>T.ON1</i> to <i>T.OF16</i> (T.ON1 to T.ON16)   | On time of time event 1 to 16                                                                                                                                                                       | --: Unregistered<br>0.01 to 999.59 (“hour.minute” or “minute.second”)<br>* Available only within the segment time.<br>* OFF when the operation mode is changed to the mode except the program operation.<br>* Use the parameter TMU to set the time unit. (Common in the instrument.)                                                                                                                                                                                                                                                                                                                                                                                    | -             |                                    |               |
| <i>T.OF1</i> to <i>T.OF16</i> (T.OF1 to T.OF16)   | Off time of time event 1 to 16                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -             |                                    |               |

PV event and Time event are available only during the program operation.  
PV event parameters are displayed in order of PV event 1 (PV.TY1, PV.EV1), PV event 2, PV event 3, and so on.  
Time event parameters are displayed in order of Time event 1 (TME1, T.ON1, T.OF1), Time event 2, Time event 3, and so on.

Local Setting Parameter

| Parameter symbol                            | Name of Parameter                             | Setting Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Initial value | User setting | Display level |
|---------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>LSP</i> (LSP)                            | Local target setpoint                         | 0.0 to 100.0% of PV input range (EU) (Setting range: P.RL to P.RH)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | P.RL          |              |               |
| <i>LPID</i> (L.PID)                         | PID number selection for local-mode operation | Set a PID group number to use.<br>1 to 8<br>* Available only for the L.PID when ZON = 0 or 5.<br>* If set to “Local PID selection,” local PID is selected irrespective of the operation modes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1             |              | EASY          |
| <i>LEV1</i> to <i>LEV8</i> (L.EV1 to L.EV8) | Local event-1 to -8 type                      | OFF: Disable (Energized)<br>1: PV high limit, 2: PV low limit, 3: SP high limit, 4: SP low limit, 5: Deviation high limit, 6: Deviation low limit, 7: Deviation high and low limits, 8: Deviation within high and low limits, 9: Target SP high limit, 10: Target SP low limit, 11: Target SP deviation high limit, 12: Target SP deviation low limit, 13: Target SP deviation high and low limits, 14: Target SP deviation within high and low limits, 15: OUT high limit, 16: OUT low limit, 17: Cooling-side OUT high limit, 18: Cooling-side OUT low limit, 19: Analog input PV high limit, 20: Analog input PV low limit, 21: Analog input RSP high limit, 22: Analog input RSP low limit, 23: Analog input AIN2 high limit, 24: Analog input AIN2 low limit, 25: Analog input AIN4 high limit, 26: Analog input AIN4 low limit, 27: Feedback input high limit, 28: Feedback input low limit, 29: PV velocity, 30: Fault diagnosis, 31: FAIL, 32: Deviation(%) high limit, 33: Deviation(%) low limit, 34: Deviation(%) high and low limits, 35: Deviation(%) within high and low limits, 36: Target SP deviation(%) high limit, 37: Target SP deviation(%) low limit, 38: Target SP deviation(%) high and low limits, 39: Target SP deviation(%) within high and low limits | OFF           |              | STD           |
| <i>LEV1</i> to <i>LEV8</i> (L.EV1 to L.EV8) | Local event-1 to -8 setpoint                  | Set a display value of setpoint of PV alarm, SP alarm, deviation alarm, or output alarm. -19999 to 30000 (Set a value within the input range.)<br>Decimal point position depends on the input type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0             |              |               |

When the program pattern-2 retransmission is selected (PT2.G=ON), the second loop is also displayed for the parameter LSP. (LP2 lamp is lit.)  
Local event parameters are displayed in order of Local event 1 (L.TY1, L.EV1), Local event 2, Local event 3, and so on. The parameters for professional setting mode (LEVL: PRO) is not described in this manual. See User’s Manual.

Alarm Setpoint Setting Parameter

| Parameter symbol                    | Name of Parameter      | Setting Range                                                                                                                                                                                                                                                               | Initial value | User setting | Display level |
|-------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>AL1</i> to <i>AL8</i> (A1 to A8) | Alarm-1 to -8 setpoint | These alarms work irrespective of the operation mode.<br>Set a display value of setpoint of PV alarm, SP alarm, deviation alarm, output alarm, or velocity alarm. -19999 to 30000 (Set a value within the input range.)<br>Decimal point position depends on the input type | 0             | Table below  | EASY          |

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 |
| An        |     |     |     |     |     |     |     |     |

SP-related Setting Parameter

| Parameter symbol  | Name of Parameter                  | Setting Range                                                                                                                                                                                                               | Initial value                | User setting | Display level |
|-------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------|---------------|
| <i>RMS</i> (RMS)  | Remote input method                | RSP: Via remote (auxiliary analog) input<br>COM: Via communication                                                                                                                                                          | RSP                          |              |               |
| <i>RFL</i> (RFL)  | Remote input filter                | OFF, 1 to 120 s                                                                                                                                                                                                             | OFF                          |              |               |
| <i>RT</i> (RT)    | Remote input ratio                 | SP = Remote input x RT + Remote input bias<br>0.001 to 9.999                                                                                                                                                                | 1.000                        |              |               |
| <i>RBS</i> (RBS)  | Remote input bias                  | -100.0 to 100.0% of PV input range span (EUS)                                                                                                                                                                               | 0.0 % of PV input range span |              |               |
| <i>SPT</i> (SPT)  | SP tracking selection              | Tracking is performed when the mode changes from Program or Remote to Local. (The local setpoint keeps track of the program or remote setpoint.) OFF, ON                                                                    | OFF                          |              | STD           |
| <i>SLM</i> (S.TM) | Starting time of program operation | 0.00 to 999.59 (“hour.minute” or “minute.second” (common use of instrument)<br>* Use the parameter TMU to set the time unit.                                                                                                | 0.00                         |              |               |
| <i>PNC</i> (PNC)  | Program pattern number clearance   | OFF: Not cleared.<br>ON: Cleared.<br>(Set the program No. before restart program operation)<br>* The controller resets (clears) the program pattern number on the operating display to “0” at the end of program operation. | OFF                          |              |               |

Alarm Function Setting Parameter

| Parameter symbol                          | Name of Parameter                                                                                    | Setting Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Initial value                                                                                                                                                                                                                                  | User setting | Display level |
|-------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|
| <i>EHY1</i> to <i>EHY8</i> (EHY1 to EHY8) | Event-1 to -8 hysteresis                                                                             | The hysteresis setpoint of PV event or Local event is set to the percentage of 0.0 to 100.0%.<br>The setting value (%) is for the PV input range span or output span.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.5                                                                                                                                                                                                                                            |              | STD           |
| <i>AL1</i> to <i>AL8</i> (AL1 to AL8)     | Alarm-1 to -8 type<br>Example: Alarm-1<br>Latched action<br>Energized/De-energize<br>Stand-by action | These alarms work irrespective of the operation mode.<br>Set a 5-digit value in the following order. [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 RSP high limit<br>22: Analog input RSP 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: Latched action (0) Energized (0) Without Stand-by action (0) PV high limit (01)<br><br>AL2, AL4: Latched 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          |
| <i>VT1</i> to <i>VT8</i> (VT1 to VT8)     | PV velocity alarm time setpoint 1 to 8                                                               | 0.01 to 99.59 (minute.second)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.00                                                                                                                                                                                                                                           |              |               |
| <i>HY1</i> to <i>HY8</i> (HY1 to HY8)     | Alarm-1 to -8 hysteresis                                                                             | Set a display value of setpoint of hysteresis. -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                                                                                                                                                                                                                                             |              |               |

|                                                     |                              |                                                                                                                          |      |             |     |
|-----------------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------|------|-------------|-----|
| <b><i>DYN1</i> to <i>DYN8</i></b><br>(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 |
| <b><i>AMD</i></b><br>(AMD)                          | Alarm mode                   | 0: Always active<br>1: Not active in RESET mode<br>2: Not active in RESET 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 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|
| EHYn      |     |     |     |     |     |     |     |     |
| ALn       |     |     |     |     |     |     |     |     |
| VTn       |     |     |     |     |     |     |     |     |
| HYn       |     |     |     |     |     |     |     |     |
| DYNn      |     |     |     |     |     |     |     |     |

n: alarm number

### ■ PV-related Setting Parameter

Menu symbol: *PV'S* (PVS)

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

### ■ PID Setting Parameter

Menu symbol:  (PID)

| Parameter symbol  | Name of Parameter                                                                                                                      | Setting Range                                                                                                                             | Initial value                                                                                                           | User setting | Display level |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------|---------------|
| $P$<br>(P)        | Proportional band<br>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%                                                                                                                    |              |               |
| $I$<br>(I)        | Integral time<br>Heating-side integral time (in Heating/cooling control)                                                               | OFF: Disable<br>1 to 6000 s                                                                                                               | 240 s                                                                                                                   |              |               |
| $d$<br>(D)        | Derivative time<br>Heating-side derivative time (in Heating/cooling control)                                                           | OFF: Disable<br>1 to 6000 s                                                                                                               | 60 s                                                                                                                    |              |               |
| $OH$<br>(OH)      | Control output high limit<br>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%                                                                                                                  |              |               |
| $OL$<br>(OL)      | Control output low limit<br>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%                                                                                                                    |              |               |
| $MR$<br>(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%                                                                                                                   |              |               |
| $HYS$<br>(HYS)    | Hysteresis (in ON/OFF control or Position proportional control)<br>Heating-side ON/OFF control hysteresis (in Heating/cooling control) | In ON/OFF control: 0.0 to 100.0% of PV input range span<br><br>In Heating/cooling control or Position proportional control: 0.0 to 100.0% | In ON/OFF control: 0.5% of PV input range span<br><br>In Heating/cooling control or Position proportional control: 0.5% |              | EASY          |
| $HYUP$<br>(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                                                                                             |              |               |
| $HYLO$<br>(HY.LO) | Lower-side hysteresis (in ON/OFF control)                                                                                              |                                                                                                                                           | 0.5% of PV input range span                                                                                             |              |               |
| $dR$<br>(DR)      | Direct/reverse action switch                                                                                                           | RVS: Reverse action<br>DIR: Direct action                                                                                                 | RVS                                                                                                                     |              | STD           |
| $P_c$<br>(Pc)     | Cooling-side proportional band                                                                                                         | 0.0 to 999.9%<br>(Cooling-side ON/OFF control applies when 0.0% in Heating/cooling control)                                               | 5.0%                                                                                                                    |              |               |
| $I_c$<br>(Ic)     | Cooling-side integral time                                                                                                             | OFF: Disable<br>1 to 6000 s                                                                                                               | 240 s                                                                                                                   |              |               |
| $d_c$<br>(Dc)     | Cooling-side derivative time                                                                                                           | OFF: Disable<br>1 to 6000 s                                                                                                               | 60 s                                                                                                                    |              | EASY          |
| $OH_c$<br>(OHc)   | Cooling-side control output high limit                                                                                                 | 0.1 to 105.0%, (OLc<OHc)                                                                                                                  | 100.0%                                                                                                                  |              |               |
| $OL_c$<br>(OLc)   | Cooling-side control output low limit                                                                                                  | 0.0 to 104.9%, (OLc<OHc)                                                                                                                  | 0.0%                                                                                                                    |              |               |

|                                                      |                                                                                |                                                                                                                                  |      |      |
|------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------|------|
| <b><i>HYS<sub>c</sub></i></b><br>(HYS <sub>c</sub> ) | Cooling-side ON/OFF control hysteresis                                         | 0.0 to 100.0%                                                                                                                    | 0.5% | EASY |
| <b><i>db</i></b><br>(DB)                             | Output dead band (in Heating/cooling control or Position proportional control) | In Heating/cooling control: -100.0 to 50.0%<br>In Position proportional control: 1.0 to 10.0%                                    | 3.0% |      |
| <b><i>PO</i></b><br>(PO)                             | Preset output Heating-side preset output (in Heating/cooling control)          | In RESET mode, fixed control output can be generated. In Position proportional control, Valve opening can be set; -5.0 to 105.0% | 0.0% | EASY |
| <b><i>PO<sub>c</sub></i></b><br>(PO <sub>c</sub> )   | Cooling-side preset output                                                     | In RESET mode, cooling-side fixed control output can be generated. -5.0 to 105.0%                                                | 0.0% |      |

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              |     |     |     |     |     |     |     |   |
| HYUP             |     |     |     |     |     |     |     |   |
| HYLO             |     |     |     |     |     |     |     |   |
| DR               |     |     |     |     |     |     |     |   |
| Pc               |     |     |     |     |     |     |     |   |
| Ic               |     |     |     |     |     |     |     |   |
| Dc               |     |     |     |     |     |     |     |   |
| OHc              |     |     |     |     |     |     |     |   |
| OLc              |     |     |     |     |     |     |     |   |
| HYS <sub>c</sub> |     |     |     |     |     |     |     |   |
| DB               |     |     |     |     |     |     |     |   |
| PO               |     |     |     |     |     |     |     |   |
| PO <sub>c</sub>  |     |     |     |     |     |     |     |   |

n: group number

## ■ Tuning Parameter

Menu symbol: **TUNE** (TUNE)

| Parameter symbol                      | Name of Parameter                                 | Setting Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Initial value | User setting | Setting level |
|---------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <b>SC</b><br>(SC)                     | Super function                                    | OFF: Disable<br>1: Overshoot suppressing function (normal mode)<br>2: Hunting suppressing function (stable mode)<br>Enables to answer the wider characteristic changes compared with response mode.<br>3: Hunting suppressing function (response mode)<br>Enables quick follow-up and short converging time of PV for the changed SP.<br>4: Overshoot suppressing function (strong suppressing mode)<br>Note: Setpoints 2 and 3 must be used in PID control or PI control.<br>Disabled in the following controls:<br>1) ON/OFF control, 2) PD control, 3) P control, 4) Heating/cooling control.<br>Do not use the function for the control processes with response such as flow or pressure control. | OFF           |              | EASY          |
| <b>AT.TY</b><br>(AT.TY)               | Auto-tuning type                                  | 0: Normal<br>1: Stability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0             |              | STD           |
| <b>AR</b><br>(AR)                     | Anti-reset windup (excess integration prevention) | AUTO, 50.0 to 200.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | AUTO          |              |               |
| <b>OPR</b><br>(OPR)                   | Output velocity limiter                           | OFF: Disable<br>0.1 to 100.0%/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | OFF           |              |               |
| <b>MPON</b><br>(MPON)                 | Manual preset output number selection             | Select the output used in MAN mode when switched from AUTO to MAN mode.<br>OFF: Hold the control output in AUTO mode (bumpless)<br>1: Use manual preset output 1 (output bump)<br>2: Use manual preset output 2 (output bump)<br>3: Use manual preset output 3 (output bump)<br>4: Use manual preset output 4 (output bump)<br>5: Use manual preset output 5 (output bump)                                                                                                                                                                                                                                                                                                                            | OFF           |              | STD           |
| <b>MPO1 to MPOS</b><br>(MPO1 to MPOS) | Manual preset output 1 to 5                       | -5.0 to 105.0%<br>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 |
|-----------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------|---------------|
| <i>RP1 to RP7</i><br>(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.<br>0.0 to 100.0% of PV input range (EU)<br>(RP1 ≤ RP2 ≤ RP3 ≤ RP4 ≤ RP5 ≤ RP6 ≤ RP7) | 100.0% of PV input range | Table below  | STD           |

|                            |                               |                                                                                                                                                                                                              |                              |  |     |
|----------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--|-----|
| <b><i>RHY</i></b><br>(RHY) | Zone PID switching hysteresis | Hysteresis can be set for switching at a reference point.<br>0.0 to 10.0% of PV input range span (EUS)                                                                                                       | 0.5 % of PV input range span |  | STD |
| <b><i>RdV</i></b><br>(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.<br>OFF: Disable<br>0.0 + 1 digit to 100.0% of PV input range span (EUS) | OFF                          |  | STD |

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 $P10$<br>(P01 to P10) | P01 to P10 parameter | -19999 to 30000 (Set a decimal point position using LL50A Parameter Setting Software.) | 0             | Table below  | STD           |

[illegible]

### ■ 10-segment Linearizer-1, -2 Setting Parameter

Menu symbol: *PYS 1* (PYS1) *PYS2* (PYS2)

| Parameter symbol                                          | Name of Parameter                                                           | Setting Range                                                                                                                                                                                                        | Initial value     | User setting | Display level |
|-----------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------|---------------|
| <i>PYS</i><br>(PYS)                                       | 10-segment linearizer selection                                             | OFF: Disable<br>PV: PV analog input<br>RSP: RSP analog input<br>AIN2: AIN2 analog input<br>AIN4: AIN4 analog input<br>PVIN: PV input<br>OUT: OUT analog output<br>OUT2: OUT2 analog output<br>RET: RET analog output | PV<br>(CTL: SGL)  |              |               |
| <i>RI</i><br>(A1)                                         | 10-segment linearizer input 1                                               | -66.7 to 105.0% of input range (EU)<br>Output linearizer: -5.0 to 105.0%                                                                                                                                             | 0.0%              |              |               |
| <i>BI</i><br>(B1)                                         | 10-segment linearizer output 1                                              | 10-segment linearizer bias: -66.7 to 105.0% of input range span (EUS)<br>10-segment linearizer approximation: -66.7 to 105.0% of input range (EU)<br>Output linearizer: -5.0 to 105.0%                               | 0.0%              |              | STD           |
| <i>RI2 to RI11, BI2 to BI11</i><br>(A2 to A11, B2 to B11) | 10-segment linearizer input 2 to 11<br>10-segment linearizer output 2 to 11 | Same as A1 and B1                                                                                                                                                                                                    | Same as A1 and B1 |              |               |
| <i>PMD</i><br>(PMD)                                       | 10-segment linearizer mode                                                  | 0: 10-segment linearizer bias<br>1: 10-segment linearizer approximation                                                                                                                                              | 0                 |              |               |

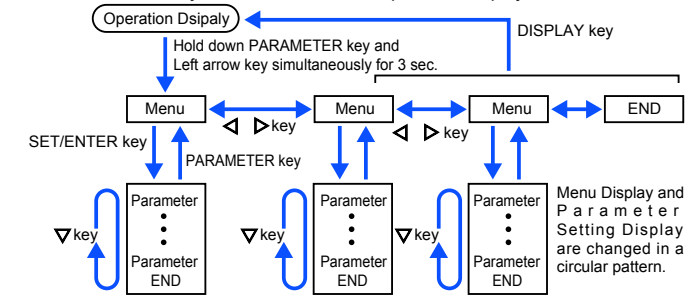
Use the following table to record the 10-segment linearizer input and output setting values.

[illegible]

## 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 |
|------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------|---------------|
| <b>CTLM</b><br>(CTL.M) | Control mode                           | When using the controls other than Single-loop control, see User's Manual.<br>SGL: Single-loop control<br>CAS1: Cascade primary-loop control<br>CAS: Cascade control<br>PVSW: Loop control with PV switching<br>PVSEL: Loop control with PV auto-selector                                                                                                                                                                                                                                                              | SGL                                   |              | STD           |
| <b>CNT</b><br>(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>H/C: Heating/cooling control                                                                                                                                                                                                                                                                                                                                                                     | PID or H/C (for Heating/Cooling type) |              | EASY          |
| <b>ZON</b><br>(ZON)    | Zone PID selection                     | 0: Segment PID selection<br>1: Zone PID selection (selection by PV)<br>2: Zone PID selection (selection by target SP)<br>4: Zone PID selection (selection by SP)<br>5: Local PID selection<br>* If set to "Segment PID selection," allows PID constants to be selected for each segments.<br>* If set to "Zone PID selection," automatically selects PID constants according to the range set in the Reference point.<br>* If set to "Local PID selection," local PID is selected irrespective of the operation modes. | 1                                     |              | STD           |
| <b>SEGE</b><br>(SEG.T) | Segment setting method                 | TIME: Segment time setting<br>TM.RT: Segment ramp-rate setting<br>* Note: A change of setting deletes a program pattern.                                                                                                                                                                                                                                                                                                                                                                                               | TIME                                  |              | EASY          |
| <b>TMU</b><br>(TMU)    | Program time unit                      | HH.MM: hour.minute<br>MM.SS: minute.second                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | HH.MM                                 |              |               |
| <b>PT2G</b><br>(PT2.G) | Program pattern-2 retransmission       | OFF: Not used.<br>ON: used.<br>* The controller can serve as a program pattern generator.<br>* Retransmission output types (RTS, O1RS, or O2RS) need to be set to SP2.                                                                                                                                                                                                                                                                                                                                                 | OFF                                   |              | STD           |
| <b>SMP</b><br>(SMP)    | Input sampling period (control period) | 100: 100 ms, 200: 200 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 200                                   |              |               |

### ■ PV Input Setting Parameter

Menu symbol: *PV* (PV)

| Parameter symbol      | Name of Parameter                     | Setting Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Initial value             | User setting | EASY level |
|-----------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------|------------|
| <b>IN</b><br>(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: -150.0 to 150.0 °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 500.0 °C / -300.0 to 1000.0 °F<br>PT3: -150.0 to 150.0 °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 | OFF                       |              | EASY       |
| <b>UNIT</b><br>(UNIT) | PV input unit                         | -: No unit, C: Degree Celsius,<br>-: No unit, -: No unit, -: No unit,<br>F: Degree Fahrenheit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | C                         |              |            |
| <b>RH</b><br>(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)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Depends on the input type |              |            |
| <b>RL</b><br>(RL)     | Minimum value of PV input range       | - For voltage / current input -<br>Set the range of a voltage / current signal that is applied.<br>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).<br>(Input is always 0% when RL = RH.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Depends on the input type |              |            |
| <b>SDP</b><br>(SDP)   | PV 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 |              |            |



■ PV Input Setting Parameter (Continued)

|                      |                                 |                                                  |                              |  |      |
|----------------------|---------------------------------|--------------------------------------------------|------------------------------|--|------|
| <i>SH</i><br>(SH)    | Maximum value of PV input scale | -19999 to 30000, (SL<SH),<br>  SH - SL   ≤ 30000 | Depends on the input type    |  | EASY |
| <i>SL</i><br>(SL)    | Minimum value of PV input scale |                                                  | Depends on the input type    |  |      |
| <i>bSL</i><br>(BSL)  | PV input burnout action         | OFF: Disable<br>UP: Upscale<br>DOWN: Downscale   | Depends on the input type    |  | STD  |
| <i>AbS</i><br>(A.BS) | PV analog input bias            | -100.0 to 100.0% of PV input range span (EUS)    | 0.0 % of PV input range span |  |      |
| <i>AFI</i><br>(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

■ RSP Input Setting Parameter (E1-terminal Area)

Menu symbol: *RSP* (RSP)

| Parameter symbol       | Name of Parameter                             | Setting Range                                                                                                                                                                                                                                          | Initial value             | User setting | Display level |
|------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------|---------------|
| <i>IN</i><br>(IN)      | RSP remote input type                         | 0.4-2V: 0.400 to 2.000 V<br>1-5V: 1.000 to 5.000 V<br>0-2V: 0.000 to 2.000 V<br>0-10V: 0.00 to 10.00 V<br>0-12S: 0.000 to 1.250 V<br>For option /DR, RSP remote input type is same as PV input type                                                    | 1-5V                      |              |               |
| <i>UNIT</i><br>(UNIT)  | RSP remote input unit                         | -: No unit, C: Degree Celsius,<br>-: No unit, -: No unit, - - -: No unit, F: Degree Fahrenheit                                                                                                                                                         | C                         |              |               |
| <i>RH</i><br>(RH)      | Maximum value of RSP remote input range       | Depends on the input type.<br>- For temperature (/DR option) input -<br>Set the temperature range that is actually controlled. (RL<RH)<br>- For voltage / current (/DR option) input -<br>Set the range of a voltage / current signal that is applied. | Depends on the input type |              | EASY          |
| <i>RL</i><br>(RL)      | Minimum value of RSP remote 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.)                                         | Depends on the input type |              |               |
| <i>SDP</i><br>(SDP)    | RSP 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 |              |               |
| <i>SH</i><br>(SH)      | Maximum value of RSP remote input scale       | -19999 to 30000, (SL<SH),<br>  SH - SL   ≤ 30000                                                                                                                                                                                                       | Depends on the input type |              |               |
| <i>SL</i><br>(SL)      | Minimum value of RSP remote input scale       |                                                                                                                                                                                                                                                        | Depends on the input type |              |               |
| <i>bSL</i><br>(BSL)    | RSP remote input burn-out action              | OFF: Disable<br>UP: Upscale<br>DOWN: Downscale                                                                                                                                                                                                         | Depends on the input type |              | STD           |
| <i>RTdS</i><br>(RTD.S) | RTD wiring system                             | 3-W: 3-wire system<br>4-W: 4-wire system<br>(The LL50A Parameter Setting Software is required to use RSP terminals input as PV.)                                                                                                                       | 3-W                       |              |               |

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

Menu symbol: *AI N2* (AIN2) *AI N4* (AIN4)

| Parameter symbol      | Name of Parameter                                        | Setting Range                                                                                                                                                                                                                                                                            | Initial value             | User setting | Display level |
|-----------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------|---------------|
| <i>IN</i><br>(IN)     | AIN2/AIN4 aux. analog 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>0-12S: 0.000 to 1.250 V                                                                                                                                                    | 1-5 V                     |              |               |
| <i>UNIT</i><br>(UNIT) | AIN2/AIN4 aux. analog input unit                         | -: No unit<br>C: Degree Celsius<br>-: No unit<br>- -: No unit<br>- - -: No unit<br>F: Degree Fahrenheit                                                                                                                                                                                  | C                         |              |               |
| <i>RH</i><br>(RH)     | Maximum value of AIN2/ AIN4 aux. analog 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). (Input is always 0% when RL = RH.) | Depends on the input type |              | EASY          |
| <i>RL</i><br>(RL)     | Minimum value of AIN2/ AIN4 aux. analog input range      |                                                                                                                                                                                                                                                                                          | Depends on the input type |              |               |
| <i>SDP</i><br>(SDP)   | AIN2/AIN4 aux. analog 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 |              |               |
| <i>SH</i><br>(SH)     | Maximum value of AIN2/ AIN4 aux. analog input scale      | -19999 to 30000, (SL<SH),<br>  SH - SL   ≤ 30000                                                                                                                                                                                                                                         | Depends on the input type |              |               |
| <i>SL</i><br>(SL)     | Minimum value of AIN2/ AIN4 aux. analog input scale      |                                                                                                                                                                                                                                                                                          | Depends on the input type |              |               |
| <i>bSL</i><br>(BSL)   | AIN2/AIN4 aux. analog input burnout action               | OFF: Disable<br>UP: Upscale<br>DOWN: Downscale                                                                                                                                                                                                                                           | Depends on the input type |              | STD           |

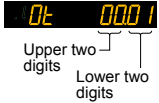
■ Input Range, SP Limiter Setting Parameter

Menu symbol: *MPV* (MPV)

| Parameter symbol       | Name of Parameter                       | Setting Range                                                                                                                                                                                                                                                                                                                                                                   | Initial value             | User setting | Display level |
|------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------|---------------|
| <i>PUNI</i><br>(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     |              |               |
| <i>PdP</i><br>(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 |              | STD           |
| <i>PRH</i><br>(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 |              |               |
| <i>PRL</i><br>(P.RL)   | Minimum value of control PV input range |                                                                                                                                                                                                                                                                                                                                                                                 | Depends on the input type |              |               |
| <i>SPH</i><br>(SPH)    | SP high limit                           | 0.0 to 100.0% of PV input range (EU), (SPL<SPH)<br>Place limits on the program setpoints or the local setpoints when the controller is in program operation.<br>* Places the limit on the program setpoint, local setpoint, or remote setpoint during program operation.<br>* When LP2 lamp is on, SPH and SPL limit the program setpoint for program pattern 2 retransmission. | 100.0 % of PV input range |              |               |
| <i>SPL</i><br>(SPL)    | SP low limit                            |                                                                                                                                                                                                                                                                                                                                                                                 | 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 |
|------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------|---------------|
| <i>OT</i><br>(OT)      | Output type selection<br> | 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>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)                                                                                                                                                                                  | Standard type: 00.03<br>Heating/cooling type: 06.03 |              |               |
| <i>CT</i><br>(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                                              |              | EASY          |
| <i>CTc</i><br>(CTc)    | Cooling-side control output cycle time                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 30.0 s                                              |              |               |
| <i>VAT</i><br>(V.AT)   | Automatic valve position adjustment                                                                         | OFF: Stop automatic adjustment<br>ON: Start automatic adjustment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | OFF                                                 |              |               |
| <i>VRS</i><br>(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                                                 |              |               |
| <i>V.L</i><br>(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 completed, V.L stops blinking.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                                                   |              |               |
| <i>V.H</i><br>(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 completed, V.H stops blinking.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -                                                   |              |               |
| <i>TRT</i><br>(TR.T)   | Valve traveling time                                                                                        | 5 to 300 s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 60 s                                                |              |               |
| <i>VMOD</i><br>(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                                                   |              | STD           |
| <i>RTS</i><br>(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>RSP: RSP 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          |

|                        |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                         |  |     |
|------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--|-----|
| <i>RTH</i><br>(RTH)    | Maximum value of retransmission output scale of RET                 | When RTS = PV1, SP1, PV2, SP2, TSP1, TSP2, PV, RSP, 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 RSP input.<br>When RTS=PV, decimal point position is same as that of PV input scale.<br>When RTS=RSP, decimal point position is same as that of RSP 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 |
| <i>RTL</i><br>(RTL)    | Minimum value of retransmission output scale of RET                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0 % of PV input range   |  |     |
| <i>OIRS</i><br>(O1RS)  | Retransmission output type of OUT current output                    | Same as RTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OFF                     |  |     |
| <i>OIRH</i><br>(O1RH)  | Maximum value of retransmission output scale of OUT current output  | When O1RS = PV1, SP1, PV2, SP2, TSP1, TSP2, PV, RSP, 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 RSP input.<br>When O1RS =PV, decimal point position is same as that of PV input scale.<br>When O1RS =RSP, decimal point position is same as that of RSP 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 |
| <i>OIRL</i><br>(O1RL)  | Minimum value of retransmission output scale of OUT current output  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -                       |  |     |
| <i>O2RS</i><br>(O2RS)  | Retransmission output type of OUT2 current output                   | Same as RTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OFF                     |  |     |
| <i>O2RH</i><br>(O2RH)  | Maximum value of retransmission output scale of OUT2 current output | When O2RS = PV1, SP1, PV2, SP2, TSP1, TSP2, PV, RSP, 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 RSP input.<br>When O2RS =PV, decimal point position is same as that of PV input scale.<br>When O2RS =RSP, decimal point position is same as that of RSP 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 |
| <i>O2RL</i><br>(O2RL)  | Minimum value of retransmission output scale of OUT2 current output |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -                       |  |     |
| <i>OUR</i><br>(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                    |  |     |
| <i>OU2A</i><br>(OU2.A) | OUT2 current output range                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4-20                    |  |     |
| <i>RELA</i><br>(RET.A) | RET current output range                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4-20                    |  |     |

■ Heater Break Alarm Setting Parameter

Menu symbol: *HbA* (HBA)

| Parameter symbol       | Name of Parameter                       | Setting Range                                          | Initial value | User setting | Display level |
|------------------------|-----------------------------------------|--------------------------------------------------------|---------------|--------------|---------------|
| <i>HbIS</i><br>(HB1.S) | Heater break alarm-1 function selection | 0: Heater current measurement<br>1: Heater break alarm | 1             |              | EASY          |
| <i>Hb2S</i><br>(HB2.S) | Heater break alarm-2 function selection |                                                        | 1             |              |               |
| <i>HbI</i><br>(HB1)    | Heater break alarm-1 current setpoint   | OFF, 0.1 to 300.0 Arms                                 | OFF           |              |               |
| <i>Hb2</i><br>(HB2)    | Heater break alarm-2 current setpoint   |                                                        | OFF           |              |               |
| <i>CT1t</i><br>(CT1.T) | CT1 coil winding number ratio           | 1 to 3300                                              | 800           |              | STD           |
| <i>CT2t</i><br>(CT2.T) | CT2 coil winding number ratio           |                                                        | 800           |              |               |
| <i>HdN1</i><br>(HDN1)  | Heater break alarm-1 On-delay timer     | 0.00 to 99.59 (m.s)                                    | 0.00          |              |               |
| <i>HdN2</i><br>(HDN2)  | Heater break alarm-2 On-delay timer     |                                                        | 0.00          |              |               |

In cases where the current transformers manufactured by U.R.D. Co., Ltd are used, set the following value for the coil winding number ratio.  
CTL-6-S-H: 800, CTL-12L-30: 3000

■ RS-485 Communication Setting Parameter (E1/E3/E4-terminal Area)

Menu symbol: *R485* (R485)

| Parameter symbol    | Name of Parameter  | Setting Range                                                                                                                                                                                                                                                                      | Initial value | User setting | Display level |
|---------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>PSL</i><br>(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>MBASC: Modbus (ASCII)<br>MBRTU: Modbus (RTU)<br>CO-M2: Coordinated master station (2-loop mode)<br>P-P: Peer-to-peer communication | MBRTU         |              |               |
| <i>bPS</i><br>(BPS) | Baud rate          | 600: 600 bps, 1200: 1200 bps, 2400: 2400 bps, 4800: 4800 bps, 9600: 9600 bps, 19200: 19.2k bps, 38400: 38.4k bps<br>* The baud rate for RS-485 is up to 19.2 k bps in E4-terminal area.                                                                                            | 19200         |              | EASY          |
| <i>PRi</i><br>(PRI) | Parity             | NONE: None, EVEN: Even, ODD: Odd                                                                                                                                                                                                                                                   | EVEN          |              |               |
| <i>StP</i><br>(STP) | Stop bit           | 1: 1 bit, 2: 2 bits                                                                                                                                                                                                                                                                | 1             |              |               |
| <i>dLN</i><br>(DLN) | Data length        | 7: 7 bits, 8: 8 bits                                                                                                                                                                                                                                                               | 8             |              |               |
| <i>AdR</i><br>(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 |
|---------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>HSR</i><br>(HSR)                                                 | High-speed response mode                                           | OFF, 1 to 8                                                                                                                                       | 1             |              |               |
| <i>bPS</i><br>(BPS)                                                 | Baud rate                                                          | 9600: 9600 bps, 19200: 19.2k bps, 38400: 38.4k bps                                                                                                | 38400         |              |               |
| <i>PRi</i><br>(PRI)                                                 | Parity                                                             | NONE: None, EVEN: Even, ODD: Odd                                                                                                                  | EVEN          |              |               |
| <i>IP1 to IP4</i><br>(IP1 toIP4)                                    | IP address 1 to 4                                                  | 0 to 255<br>Initial value: (IP1),(IP2),(IP3),(IP4) = (192),(168),(1),(1)                                                                          | See left      | Table below  | EASY          |
| <i>SM1 to SM4</i><br>(SM1 to SM4)                                   | Subnet mask 1 to 4                                                 | 0 to 255<br>Initial value: (SM1),(SM2),(SM3),(SM4) = (255),(255),(255),(0)                                                                        | See left      | Table below  |               |
| <i>dG1 to dG4</i><br>(DG1 to DG4)                                   | Default gateway 1 to 4                                             | 0 to 255<br>Initial value: (DG1),(DG2),(DG3),(DG4) = (0),(0),(0),(0)                                                                              | See left      | Table below  |               |
| <i>PRT</i><br>(PRT)                                                 | Port number                                                        | 502, 1024 to 65535                                                                                                                                | 502           |              |               |
| <i>IPAR</i><br>(IPAR)                                               | IP access restriction                                              | OFF: Disable, ON: Enable                                                                                                                          | OFF           |              |               |
| <i>IP1 to IP4, 2IP1 to 2IP4</i><br>(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: (1.IP1),(1.IP2),(1.IP3),(1.IP4) = (255),(255),(255),(255)<br>(2.IP1),(2.IP2),(2.IP3),(2.IP4) = (255),(255),(255),(255) | See left      | Table below  |               |
| <i>ESW</i><br>(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 |
|-----------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>bR</i><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          |
| <i>AdR</i><br>(ADR)   | Address           | 0 to 125                                                                                                                                                                                     | 3             |              |               |
| <i>bPS</i><br>(BPS)   | Baud rate         | 9600: 9600 bps<br>19200: 19.2k bps<br>38400: 38.4k bps                                                                                                                                       | 38400         |              |               |
| <i>FILE</i><br>(FILE) | Profile number    | 0, 11 to 15                                                                                                                                                                                  | 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 |
|-----------------------|-------------------|--------------------------------------------------------|---------------|--------------|---------------|
| <i>bR</i><br>(BR)     | Baud rate         | 125K: 125k bps<br>250K: 250k bps<br>500K: 500k bps     | 125K          |              | EASY          |
| <i>AdR</i><br>(ADR)   | Address           | 0 to 63                                                | 63            |              |               |
| <i>bPS</i><br>(BPS)   | Baud rate         | 9600: 9600 bps<br>19200: 19.2k bps<br>38400: 38.4k bps | 38400         |              |               |
| <i>FILE</i><br>(FILE) | Profile number    | 0, 11 to 15                                            | 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 |
|-----------------------|-------------------|----------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>bR</i><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           |              | EASY          |
| <i>AdR</i><br>(ADR)   | Address           | 1 to 64                                                                          | 1             |              |               |
| <i>bPS</i><br>(BPS)   | Baud rate         | 9600: 9600 bps<br>19200: 19.2k bps<br>38400: 38.4k bps                           | 38400         |              |               |
| <i>FILE</i><br>(FILE) | Profile number    | 0, 11 to 15<br>(0, 11: Ver.1.10) (12 to 15: Ver.2.00)                            | 0             |              |               |

■ Display Function Setting Parameter

Menu symbol: *di SP* (DISP)

| Parameter symbol       | Name of Parameter                                       | Setting Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Initial value                | User setting | Display level |
|------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------|---------------|
| <i>PCMD</i><br>(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          |
| <i>PCH</i><br>(PCH)    | PV color change high limit                              | Set a display value when in PV limit or SP deviation.<br>~9999 to 30000 (Set a value within the input range.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0                            |              |               |
| <i>PCL</i><br>(PCL)    | PV color change low limit                               | Decimal point position depends on the input type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0                            |              |               |
| <i>PTSL</i><br>(PTSL)  | Program display pattern selection                       | PTN: Pattern display<br>SK.RP: Ramp and soak display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | PTN                          |              | STD           |
| <i>bAR 1</i><br>(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, 4: SP, 5: Deviation<br>6: Loop-2 OUT, Loop-2 heating-side OUT<br>7: Loop-2 cooling-side OUT<br>8: Loop-2 PV, 9: Loop-2 SP<br>10: Loop-2 deviation<br>11 to 16: Disable                                                                                                                                                                                                                                                                                | 23                           |              |               |
| <i>bAR2</i><br>(BAR2)  | Lower bar-graph display registration                    | 17: Feedback input (valve opening)<br>18: PV terminals analog input<br>19: RSP terminals analog input<br>20: AIN2 terminals analog input<br>21: AIN4 terminals analog input<br>22: Segment progress<br>23: Time event and alarm status<br>24: TSP<br>25: TSP deviation                                                                                                                                                                                                                                                                                                         | 0                            |              |               |
| <i>bdV</i><br>(BDV)    | Bar-graph deviation display band                        | 0.0 to 100.0% of PV input range span (EUS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1.0 % of PV input range span |              |               |
| <i>GUID</i><br>(GUID)  | Guide display ON/OFF                                    | OFF: Nondisplay, ON: Display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ON                           |              | STD           |
| <i>ECO</i><br>(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                          |              |               |
| <i>bRI</i><br>(BRI)    | Brightness                                              | (Dark) 1 to 5 (Bright)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3                            |              | EASY          |
| <i>MLSD</i><br>(MLSD)  | Least significant digital mask of PV display            | OFF: With least significant digit<br>ON: Without least significant digit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | OFF                          |              | STD           |
| <i>MKTP</i><br>(MKTP)  | Method for least significant digital mask of PV display | 0: Rounding, 1: Rounding-off                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                            |              | STD           |

■ SELECT Display Setting Parameter

Menu symbol: *CSEL* (CSEL)

| Parameter symbol                          | Name of Parameter                   | Setting Range                                                                                                                                                                                                    | Initial value | User setting | Display level |
|-------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>CS 1</i> to <i>CS5</i><br>(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, 2201 to 5000, 6701 to 6710<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 |
|------------------------|-------------------------------------------|--------------------------|---------------|--------------|---------------|
| <i>COMW</i><br>(COM.W) | Communication write enable/disable        | OFF: Enable, ON: Disable | OFF           |              | STD           |
| <i>dATA</i><br>(DATA)  | Front panel parameter data (▼,▲) key lock |                          | OFF           |              |               |
| <i>RUN</i><br>(RUN)    | Front panel RUN key lock                  |                          | OFF           |              |               |
| <i>RST</i><br>(RST)    | Front panel RST key lock                  | OFF: Unlock, ON: Lock    | OFF           |              |               |
| <i>PTN</i><br>(PTN)    | Front panel PTN key lock                  |                          | OFF           |              |               |
| <i>MODE</i><br>(MODE)  | Front panel MODE 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 |
|-----------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>PRG</i><br>(PRG)   | Switch to PROG (Start of program operation)          |                                                                                            | 5025          |              | STD           |
| <i>RST</i><br>(RST)   | Switch to RESET (Stop of program operation)          |                                                                                            | 5026          |              |               |
| <i>LOC</i><br>(LOC)   | Switch to LOCAL(LSP) (Start of local-mode operation) |                                                                                            | 5027          |              |               |
| <i>REM</i><br>(REM)   | Switch to REMOTE                                     |                                                                                            | 5046          |              |               |
| <i>P/R</i><br>(P/R)   | PROG/RESET Switch                                    | Set an I relay number of contact input.<br>Set "OFF" to disable the function.              | OFF           |              |               |
| <i>P/H</i><br>(P/H)   | PROG/HOLD Switch                                     |                                                                                            | OFF           |              |               |
| <i>P/L</i><br>(P/L)   | PROG/LOCAL(LSP) Switch                               | Standard terminals<br>DI1: 5025, DI2: 5026, DI3: 5027                                      | OFF           |              |               |
| <i>HOLD</i><br>(HOLD) | Switch to HOLD (Start of hold-mode operation)        | E1-terminal area<br>DI11: 5041, DI12: 5042, DI13: 5043, DI14: 5044, DI15: 5045, DI16: 5046 | OFF           |              |               |
| <i>ADV</i><br>(ADV)   | Advance of segment                                   | E2 -terminal area<br>DI26: 5062                                                            | OFF           |              |               |
| <i>WAIT</i><br>(WAIT) | Wait ON/OFF switch                                   | E4-terminal area<br>DI41: 5089, DI42: 5090, DI43: 5091, DI44: 5092, DI45: 5093, DI46: 5094 | OFF           |              |               |
| <i>A/M</i><br>(A/M)   | AUTO/MAN switch                                      |                                                                                            | OFF           |              |               |
| <i>AT</i><br>(AT)     | Auto-tuning START/STOP switch                        |                                                                                            | OFF           |              |               |
| <i>LAT</i><br>(LAT)   | Latch release                                        |                                                                                            | OFF           |              | STD           |
| <i>LCD</i><br>(LCD)   | LCD backlight ON/OFF switch                          |                                                                                            | OFF           |              |               |
| <i>PVRW</i><br>(PVRW) | PV red/white switch                                  |                                                                                            | OFF           |              |               |

■ DI Function Numbering Parameter

Menu symbol: *di NU* ( )

| Parameter symbol        | Name of Parameter               | Setting Range   | Initial value | User setting | Display level |
|-------------------------|---------------------------------|-----------------|---------------|--------------|---------------|
| <i>PTB0</i><br>(PT.B0)  | Bit-0 of program pattern number | See next table. | 5089          |              | EASY          |
| <i>PTB 1</i><br>(PT.B1) | Bit-1 of program pattern number |                 | 5090          |              |               |
| <i>PTb2</i><br>(PT.B2)  | Bit-2 of program pattern number |                 | 5091          |              |               |
| <i>PTb3</i><br>(PT.B3)  | Bit-3 of program pattern number |                 | 5092          |              |               |
| <i>PTb4</i><br>(PT.B4)  | Bit-4 of program pattern number |                 | 5093          |              |               |
| <i>PTb5</i><br>(PT.B5)  | Bit-5 of program pattern number |                 | OFF           |              |               |
| <i>PTb6</i><br>(PT.B6)  | Bit-6 of program pattern number |                 | OFF           |              |               |

|                         |                                      |                                                                               |     |  |     |
|-------------------------|--------------------------------------|-------------------------------------------------------------------------------|-----|--|-----|
| <i>PTb 7</i><br>(PT.B7) | Bit-7 of program pattern number      | Set an I relay number of contact input.<br>Set "OFF" to disable the function. | OFF |  | STD |
| <i>PNb0</i><br>(PN.B0)  | Bit-0 of PID number                  |                                                                               | OFF |  |     |
| <i>PNb 1</i><br>(PN.B1) | Bit-1 of PID number                  |                                                                               | OFF |  |     |
| <i>PNb2</i><br>(PN.B2)  | Bit-2 of PID number                  |                                                                               | OFF |  |     |
| <i>PNb3</i><br>(PN.B3)  | Bit-3 of PID number                  |                                                                               | OFF |  |     |
| <i>MPb0</i><br>(MP.B0)  | Bit-0 of manual preset output number |                                                                               | OFF |  |     |
| <i>MPb 1</i><br>(MP.B1) | Bit-1 of manual preset output number |                                                                               | OFF |  |     |
| <i>MPb2</i><br>(MP.B2)  | Bit-2 of manual preset output number |                                                                               | OFF |  |     |

■ AL1-AL3 Function Registration Parameter

Menu symbol: *ALM* (ALM)

| Parameter symbol        | Name of Parameter             | Setting Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Initial value | User setting | Display level |
|-------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>AL 1S</i><br>(AL1.S) | AL1 function selection        | Set an I relay number. For the items other than below, see User's Manual. Ex.) Set the number 4353 for AL1.S to use the alarm 1.<br>Set "OFF" to disable the function.<br>Setting range: 4001 to 6304<br>No function: OFF,<br>PV event 1: 4801, PV event 2: 4802, PV event 3: 4803, PV event 4: 4805, PV event 5: 4806, PV event 6: 4807, PV event 7: 4809, PV event 8: 4810, Time event 1: 4817, Time event 2: 4818, Time event 3: 4819, Time event 4: 4821, Time event 5: 4822, Time event 6: 4823, Time event 7: 4825, Time event 8: 4826, Time event 9: 4833, Time event 10: 4834, Time event 11: 4835, Time event 12: 4837, Time event 13: 4838, Time event 14: 4839, Time event 15: 4841, Time event 16: 4842, Alarm 1: 4353, Alarm 2: 4354, Alarm 3: 4355, Alarm 4: 4357, Alarm 5: 4358, Alarm 6: 4359, Alarm 7: 4361, Alarm 8: 4362<br>AUTO (OFF) / MAN (ON) status: 4177<br>Program RESET status: 4181<br>Program RUN status: 4182<br>Local operation status: 4183<br>Remote operation status: 4185<br>HOLD mode status: 4189<br>Program advance status: 4187<br>Pattern end signal (1 second): 4265<br>Pattern end signal (3 seconds): 4266<br>Pattern end signal (5 seconds): 4267<br>Wait end signal (1 second) : 4257<br>Wait end signal (3 seconds) : 4258<br>Wait end signal (5 seconds) : 4259<br>Output tracking (ON) switching signal: 4186<br>FAIL (Normally ON) output: 4256 | 4801          |              | STD           |
| <i>AL2S</i><br>(AL2.S)  | AL2 function selection        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4802          |              |               |
| <i>AL3S</i><br>(AL3.S)  | AL3 function selection        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4803          |              |               |
| <i>ORS</i><br>(OR.S)    | OUT relay function selection  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | OFF           |              |               |
| <i>OR2S</i><br>(OR2.S)  | OUT2 relay function selection |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | OFF           |              |               |
|                         |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |              |               |

■ DO Setting Parameter (E1/E2/E3-terminal Area)

Menu symbol: *dO* (DO)

| Parameter symbol        | Name of Parameter                 | Setting Range                                                                                                                                                                          | Initial value | User setting | Display level |
|-------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>dO 1S</i><br>(DO1.S) | DO11/DO21/DO31 function selection | Same as AL1.S<br>Set "OFF" to disable the function.                                                                                                                                    | See left      | Table below  | STD           |
| <i>dO2S</i><br>(DO2.S)  | DO12/DO22/DO32 function selection | Initial value: DO11=4805, DO12=4806<br>DO13=4807, DO14=4809, DO15=4810, DO21=4817, DO22=4818, DO23=4819<br>DO24=4821, DO25=4822, DO31=4823, DO32=4825, DO33=4826, DO34=4833, DO35=4834 | See left      |              |               |
| <i>dO3S</i><br>(DO3.S)  | DO13/DO23/DO33 function selection |                                                                                                                                                                                        | See left      |              |               |
| <i>dO4S</i><br>(DO4.S)  | DO14/DO24/DO34 function selection |                                                                                                                                                                                        | See left      |              |               |
| <i>dO5S</i><br>(DO5.S)  | DO15/DO25/DO35 function selection |                                                                                                                                                                                        | See left      |              |               |
|                         |                                   |                                                                                                                                                                                        |               |              |               |

Use the following table to record DO setting value.

|           |                  |                  |                  |
|-----------|------------------|------------------|------------------|
| Parameter | E1-terminal Area | E2-terminal Area | E3-terminal Area |
| DO1.S     |                  |                  |                  |
| DO2.S     |                  |                  |                  |
| DO3.S     |                  |                  |                  |
| DO4.S     |                  |                  |                  |
| DO5.S     |                  |                  |                  |

■ System Setting Parameter

Menu symbol: *SYS* (SYS)

| Parameter symbol     | Name of Parameter | Setting Range                                                                                                                                                                                                                        | Initial value | User setting | Display level |
|----------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>RMd</i><br>(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>RESET: Start from AUTO and RESET.<br>Outputs the preset output value. | CONT          |              | STD           |
| <i>RLM</i><br>(R.TM) | Restart timer     | Set time between power on and the instant where controller starts computation. 0 to 10 s                                                                                                                                             | 0             |              |               |

|                       |                           |                                                                                                                                                                                              |                                       |  |      |
|-----------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--|------|
| <i>EPO</i><br>(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                                     |  | STD  |
| <i>FREQ</i><br>(FREQ) | Power frequency           | AUTO, 60: 60 Hz, 50: 50 Hz                                                                                                                                                                   | AUTO                                  |  |      |
| <i>QSM</i><br>(QSM)   | Quick setting mode        | OFF: Disable<br>ON: Enable                                                                                                                                                                   | ON                                    |  | EASY |
| <i>LANG</i><br>(LANG) | Guide display language    | ENG: English<br>FRA: French<br>GER: German<br>SPA: Spanish                                                                                                                                   | Depends on the model and suffix codes |  |      |
| <i>PASS</i><br>(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 |
|-------------------------|----------------------------------|---------------|---------------|
| <i>PAER</i><br>(PA.ER)  | Parameter error status           |               | EASY          |
| <i>OPER</i><br>(OP.ER)  | Option error status              |               |               |
| <i>Ad 1E</i><br>(AD1.E) | A/D converter error status 1     |               |               |
| <i>Ad2E</i><br>(AD2.E)  | A/D converter error status 2     |               |               |
| <i>PV 1E</i><br>(PV1.E) | Loop-1 PV input error status     |               | EASY          |
| <i>PV 2E</i><br>(PV2.E) | Loop-2 PV input error status     |               |               |
| <i>LAER</i><br>(LA.ER)  | Ladder error status              |               |               |
| <i>MCU</i><br>(MCU)     | MCU version                      |               |               |
| <i>dCU</i><br>(DCU)     | DCU version                      |               | EASY          |
| <i>ECU 1</i><br>(ECU1)  | ECU-1 version (E1-terminal area) |               |               |
| <i>ECU2</i><br>(ECU2)   | ECU-2 version (E2-terminal area) |               |               |
| <i>ECU3</i><br>(ECU3)   | ECU-3 version (E3-terminal area) |               |               |
| <i>ECU4</i><br>(ECU4)   | ECU-4 version (E4-terminal area) |               | EASY          |
| <i>PARA</i><br>(PARA)   | Parameter version                |               |               |
| <i>H.VER</i><br>(H.VER) | Product version                  |               |               |
| <i>SER 1</i><br>(SER1)  | Serial number 1                  |               |               |
| <i>SER2</i><br>(SER2)   | Serial number 2                  |               | EASY          |
| <i>MAC 1</i><br>(MAC1)  | MAC address 1 (E3-terminal area) |               |               |
| <i>MAC2</i><br>(MAC2)   | MAC address 2 (E3-terminal area) |               |               |
| <i>MAC3</i><br>(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 |
|-------------------------|-------------------------|-----------------------------------------------------------------------------------------|---------------|--------------|---------------|
| <i>LEV L</i><br>(LEV.L) | 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.

Trademarks

- Our product names or brand names mentioned in this manual are the trademarks or registered trademarks of Yokogawa Electric Corporation.
- Adobe, Acrobat, and Postscript are either registered trademarks or trademarks of Adobe Systems Incorporated.
- Ethernet is a registered trademark of XEROX Corporation in the United States.
- Modbus is a registered trademark of Schneider Electric.
- PROFIBUS-DP is a registered trademark of PROFIBUS User Organization.
- DeviceNet is a registered trademark of Open DeviceNet Vendor Association.
- CC-Link is a registered trademark of CC-Link Partner Association.
- We do not use the TM or ® mark to indicate these trademarks or registered trademarks in this manual.
- All other product names mentioned in this manual are trademarks or registered trademarks of their respective companies.