Operation Guide

UP35A Program Controller Operation Guide



IM 05P02D41-11EN Installation and Wiring



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Yokogawa Electric Corporation

This operation guide describes installation, wiring, and other tasks required to make the controller ready for operation

Contents

- 1. Safety Precautions
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Introduction

Thank you for purchasing the UP35A Program Controller.

This operation guide describes the basic operations related to the single-loop control function of the UP35A. 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 (L4502XP)	x1
Operation Guide (this document)	x7 (A3 size
(Installation and Wiring, Initial Settings, Programming, Operation	ns, and Parameters)

Target Readers

This guide is intended for the following personnel;

- · Engineers responsible for installation, wiring, and maintenance of the equipment.
- · Personnel responsible for normal daily operation of the equipment.

1. Safety Precautions

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



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.



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.





The equipment wholly protected by double insulation or reinforced insulation.



Functional grounding terminals

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

Note

Identifies important information required to operate the instrument.

■ Warning and Disclaimer

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

■ Safety, Protection, and Modification of the Product

- (1) In order to protect the system controlled by this product and the product itself, and to ensure safe operation, observe the safety precautions described in the user's manual. Use of the instrument in a manner not prescribed herein may compromise the product's functions and the protection features inherent in the device. We assume no liability for safety, or responsibility for the product's quality performance or functionality should users fail to observe these instructions when operating the product.
- (2) Installation of protection and/or safety circuits with respect to a lightning protector; protective equipment for the system controlled by the product and the product itself; foolproof or 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 (H2S, SO_x, etc.) for extended periods of time may cause a failure.

Do Not Remove Internal Unit

The internal unit should not be removed by anyone other than YOKOGAWA's service personnel. There are dangerous high voltage parts inside. Additionally, do not replace the fuse by yourself.

Damage to the Protective Construction

Operation of the instrument in a manner not specified in the user's manual may damage its protective construction.



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.

Model and Suffix Codes

■ UP35A

[Style:S2]

Model	Suffix code		suffix	Description				
UP35A					Program Controller (provided with retransmission output or 15 V DC loop power supply, 3 DIs, and 3 DOs) (Power supply: 100-240 V AC) 2 program patterns / 20 program segments (Max. 20 segments per pattern)			
Type 1:	-0							Standard type
Basic	-1							Position proportional type
control	-2							Heating/cooling type
Type 2:		0						None
Functions		1						5 additional DOs, 5 additional DIs
			0					None
			1					RS-485 communication (Max.38.4 kbps, 2-wire/4-wire)
			2					Ethernet communication (with serial gateway function)
Type 3: Ope	en		3					CC-Link communication (with Modbus master function)
networks			4					PROFIBUS-DP communication (with Modbus master function)
			5					DeviceNet communication (with Modbus master function)
				-1				English
Display land		- (+4)		-2		Π		German
Display lang	yuay	e (1)		-3				French
				-4				Spanish
Case color					0			White (Light gray)
Case color					1			Black (Light charcoal gray)
Fixed code -00			-00		Always "-00"			
•						/AP	Additional 2 program patterns / 20 program segments	
Optional su	ffiv o	odoc					/HA	Heater break alarm (*2)
Optional su	IIIX C	oues					/DC	Power supply 24 V AC/DC
							/CT	Coating (*3)

- English, German, French, and Spanish can be displayed as the guide display.
- When "-0" or "-2" is specified for the Type 1 code, the /HA option can be specified
- When the /CT option is specified, the UP35A does not conform to the safety standards (UL and CSA) and CE marking

Accessories (sold separately)

The following is an accessory sold separately

LL50A Parameter Setting Software

Model	Suffix code	Description
LL50A	-00	Parameter Setting Software

- Terminal Cover
- For UP35A: Model UTAP001
- User's Manual (A4 size)
- Note: User's Manual can be downloaded from a website.
- User's Manual (CD-ROM), Model: UTAP003
- Note: Contains all manuals.
- Brackets

Part number: L4502TP (2 pcs for upper and lower sides)

■ Waste Electrical and Electronic Equipment (WEEE), Directive 2002/96/EC

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

Marking

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

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

Product Category

With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a "Monitoring and Control instrumentation" product. Do not dispose in domestic household waste. When disposing products in the EU contact your local Yokogawa Europe B.V. office.

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.

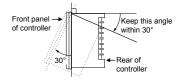
However, make sure that the terminal portions are not exposed to wind. Exposure to wind may cause the temperature sensor accuracy to deteriorate. To mount multiple indicating controllers, see the external dimensions/panel cutout dimensions which follow. If mounting other instruments adjacent to the instrument, 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

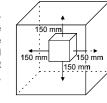
Do not place magnets or tools that generate magnetism near the instrument. If the instrument is used in locations close to a strong electromagnetic field generating source, the magnetic field may cause measurement errors.

· 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 ◀

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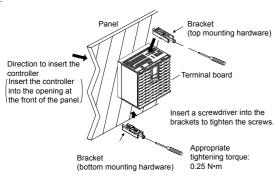
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■ Mounting the Instrument Main Unit

Provide an instrumented panel steel sheet of 1 to 10 mm thickness.

After opening the mounting hole on the panel, follow the procedures below to install

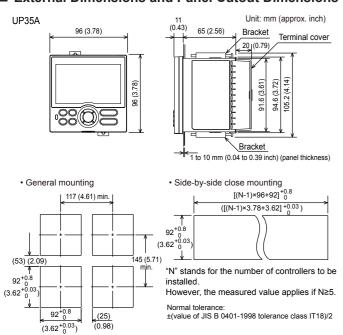
- 1) Insert the controller into the opening from the front of the panel so that the terminal board on the rear is at the far side.
- 2) Set the brackets in place on the top and bottom of the controller as shown in the figure below, then tighten the screws of the brackets. Take care not to overtighten





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

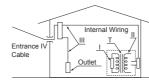
■ External Dimensions and Panel Cutout Dimensions



Hardware Specifications



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



Category Measurement category		Description	Remarks	
I	CAT.I	For measurements performed on circuits not directly connected to MAINS.	-	
II	CAT.II	For measurements performed on circuits directly connected to the low-voltage installation.	Appliances, portable equipments, etc.	
III	CAT.III	For measurements performed in the building installation.	Distribution board, circuit breaker, etc.	
IV	CAT.IV	For measurements performed at the source of the low-voltage installation.	Overhead wire, cable systems, etc.	

■ Input Specifications

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

lanui	Type	Instrume	nt Range	Accuracy
inpu	туре	°C	°F	Accuracy
		-270.0 to 1370.0°C	-450.0 to 2500.0°F	±0.1% of instrument range ±1 digit for
	K	-270.0 to 1000.0°C	-450.0 to 2300.0°F	0°C or more
		-200.0 to 500.0°C	-200.0 to 1000.0°F	±0.2% of instrument range ±1 digit for less than 0°C
	J	-200.0 to 1200.0°C	-300.0 to 2300.0°F	±2% of instrument range ±1 digit for
	_	-270.0 to 400.0°C	-450.0 to 750.0°F	less than -200.0°C of thermocouple K
	Т	0.0 to 400.0°C	-200.0 to 750.0°F	±1% of instrument range ±1 digit for less than -200.0°C of thermocouple T
	В	0.0 to 1800.0°C	32 to 3300°F	±0.15% of instrument range ±1 digit for 400°C or more ±5% of instrument range ±1 digit for less than 400°C
	S	0.0 to 1700.0°C	32 to 3100°F	±0.15% of instrument range ±1 digit
	R	0.0 to 1700.0°C	32 to 3100°F	150.15% of institution range ±1 digit
Thermo- couple	N	-200.0 to 1300.0°C	-300.0 to 2400.0°F	±0.1% of instrument range ±1 digit ±0.25% of instrument range ±1 digit for less than 0°C
	E	-270.0 to 1000.0°C	-450.0 to 1800.0°F]
	L	-200.0 to 900.0°C	-300.0 to 1600.0°F	0°C or more ±0.2% of instrument range ±1 digit for
	U	-200.0 to 400.0°C	-300.0 to 750.0°F	less than 0°C
		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 Accuracy is not guaranteed for less than 800°C.
	W97Re3- W75Re25	0.0 to 2000.0°C	32 to 3600°F	±0.2% of instrument range ±1 digit
	JPt100	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit (Note 1)
RTD		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.1% of instrument range ±1 digit
KID		-200.0 to 850.0°C	-300.0 to 1560.0°F	±0.1% of instrument range ±1 digit
	Pt100	-200.0 to 500.0°C	-300.0 to 1000.0°F	(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	0.00 mA	
		0.000 to	2.000 V	±0.1% of instrument range ±1 digit
		0.00 to 1	10.00 V	120.170 or monument range ±1 digit
DC volta	ge/current	0.00 to 20]
		-10.00 to 2	20.00 mV]
		0.0 to 10	0.0 mV	

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

±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: 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 M Ω 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 μ V/ Ω or less

DC voltage input: $2 k\Omega$ 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: $\pm 0.1^{\circ}$ 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

■ 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

■ Step Response Time Specifications

(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 (control output): 240 V AC, 3 A or 30 V DC, 3 A (resistance load) Contact point 1a (alarm 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: This cannot be used for a small load of 10 mA or less

■ Position Proportional Output Specifications

Position signal input:

Slide resistance: 100 Ω to 2.5 k Ω 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 cannot be used for a small load of 10 mA or less

■ Retransmission Output Specifications

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

■ 15 V DC Loop Power Supply Specifications

(Shared with retransmission output or Cooling-side control output.)

- Power supply: 14.5 to 18.0 V DC
- · Maximum supply current: About 21 mA (with short-circuit current limiting circuit)

■ Contact Input Specifications

- Number of inputs: See the table of Model and Suffix Codes.
- · Input type: No-voltage contact input or transistor contact input
- · Input contact rating: 12 V DC, 10 mA or more
 - Use a contact with a minimum on-current of 1 mA or more.
- · ON/OFF detection:

No-voltage contact input:

Contact resistance of 1 $k\Omega$ or less is determined as "ON" and contact

resistance of 50 k Ω 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 uA when "OFF."

- Minimum status detection hold time: Control period +50 ms
- · Use: PTNO. switch, operation mode switch, and event input

■ 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. 200 ms

■ 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 ± 1digit (CT error is not included.)
- Heater current detection resolution: Within 1/250 of current transformer input range
- Break detection On-time: Min. 0.2 second (for time proportional output)

■ Safety and EMC Standards

• Safety: Compliant with IEC/EN61010-1 (CE), approved by CAN/CSA C22.2 No.61010-1 (CSA), approved by UL61010-1.

Installation category: CAT. II Pollution degree: 2

Measurement category: I (CAT. I)

Rated measurement input voltage: Max. 10 V DC

Rated transient overvoltage: 1500 V (Note) Note: This is a reference safety standard value for Measurement Category I of IEC/EN/CSA/ UL61010-1. This value is not necessarily a guarantee of instrument performance.

· EMC Conformity standards:

CE marking

EN61326-1 Class A, Table 2 (For use in industrial locations)

EN61326-2-3

EN 55011 Class A, Group1 EN 61000-3-2 Class A

EN 61000-3-3 C-tick mark

EN 55011 Class A, Group1

The instrument continues to operate at a measurement accuracy of within ±20% of the range during testing.

■ Construction, Installation, and Wiring

- Dust-proof and drip-proof: IP56 (for front panel) (Not available for side-by-side close mounting.)
- Material: Polycarbonate (Flame retardancy: UL94V-0)
- · Case color: White (Light gray) or Black (Light charcoal gray)
- · Weight: 0.5 kg or less
- External dimensions (mm): 96 (W) × 96 (H) × 65 (depth from the panel face) (Depth except the projection on the rear panel)
- · Installation: Direct panel mounting; mounting bracket, one each for upper and lower mounting
- Panel cutout dimensions (mm): 92^{+0.8/0} (W) × 92^{+0.8/0} (H)
- Mounting attitude: Up to 30 degrees above the horizontal. No downward titling allowed.
- · Wiring: M3 screw terminal with square washer (for signal wiring and power wiring)

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■ 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 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 $M\Omega$ or more at 500 V DC
- Isolation specifications

isolation specifications		
PV (universal) input terminals		
Control, retransmission (analog) output terminals (not isolated between the analog output terminals) Valve position (feedback) input terminals		
Control relay (contact point c/contact point a x 2) output terminals		
PV event-1 relay (contact point a) output terminals	Internal	Power
PV event-2 relay (contact point a) output terminals	circuits	supply
Time event-1 relay (contact point a) output terminals		
Position proportional relay output terminals		
Contact input terminals (all) RS-485 communication terminals		
24 V DC loop power supply terminals		
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 (-10 to 40°C for side-by-side close mounting)
 For the CC-Link option, 0 to 50 °C (0 to 40 °C for side-by-side close mounting)
- Ambient humidity: 20 to 90% RH (no condensation allowed)
- Magnetic field: 400 A/m or less
- Continuous vibration at 5 to 9 Hz: Half amplitude of 1.5 mm or less, 1oct/min for 90 minutes each in the three axis directions

Continuous vibration at 9 to 150 Hz: 4.9 m/s² or less, 1oct/min for 90 minutes each in the three axis directions

- Short-period vibration: 14.7 m/s², 15 seconds or less
- Shock: 98 m/s² or less, 11 ms
- · Altitude: 2000 m or less above sea level
- Warm-up time: 30 minutes or more after the power is turned on
- Startup time: Within 10 seconds
- *: The LCD (a liquid crystal display) is used for a display portion of this product. The LCD has a characteristic that the display action becomes late at the low temperature. However, the control fuction is not affected.

Transportation and Storage Conditions:

- Temperature: -25 to 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: ±1 µV/°C or ±0.01% of F.S./°C, whichever is larger Current input: ±0.01% of F.S./°C

RTD input: ±0.05°C/°C (ambient temperature) or less

Analog output: ±0.02% of F.S./°C or less

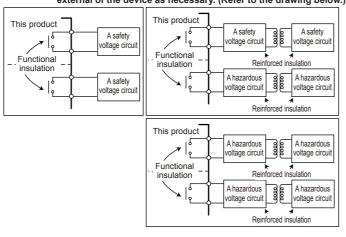
Effect of power supply voltage fluctuation

Analog input: ±0.05% of F.S. or less Analog output: ±0.05% of F.S. or less (Each within rated voltage range)

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.
- 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.
- For control relay output, alarm relay output, and power terminal connections, use heat-resistant cables.
- Since the insulation provided to each relay output terminal is Functional insulation, provide Reinforced insulation to the external of the device as necessary. (Refer to the drawing below.)





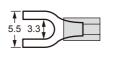
- When connecting two or more crimp-on terminal lugs to the single terminal block, bend the crimp-on terminal lugs as shown in the figure before tightening the screw.
- Note that the wiring of two or more crimp-on terminal lugs to the single high-voltage terminal of the power supply and relay, etc. does 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 mm² or more

 Applicable terminal lug
 Applicable wire size mm² (AWG#)
 (φ d)
 (A)
 (F)

 M3
 0.25 to 1.65 (22 to 16)
 3.3
 5.5
 4.2

• Cable Specifications and Recommended Cables

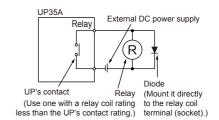
Purpose	Name and Manufacturer				
Power supply, relay contact outputs	600 V Grade heat-resistant PVC insulated wires, JIS C 3317(HIV), 0.9 to 2.0 mm ²				
Thermocouple	Shielded compensating lead wires, JIS C 1610				
RTD	Shielded wires (three/four conductors), UL2482 (Hitachi Cable)				
Other signals (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)

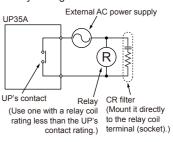
DeviceNet Connector (wiring side) (Part number: L4502BW)

Recommended tightening torque: 0.5 to 0.6 N·m

DC Relay Wiring



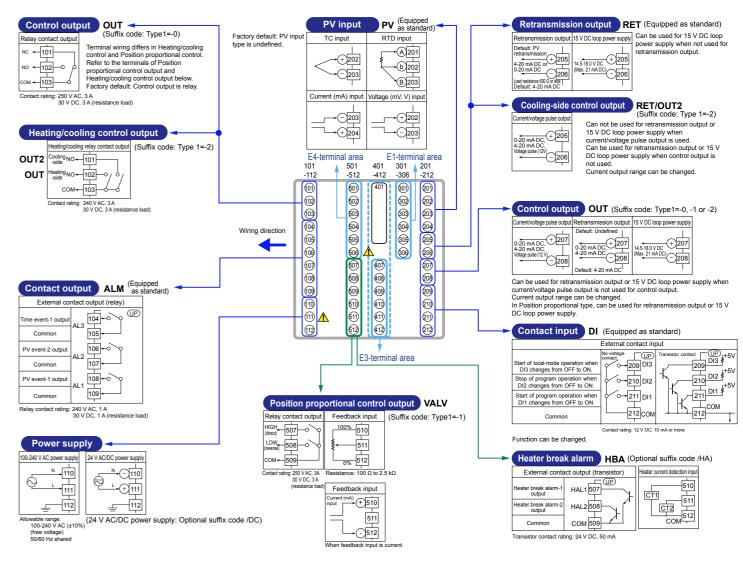
AC Relay Wiring



. Terminal Wiring Diagrams

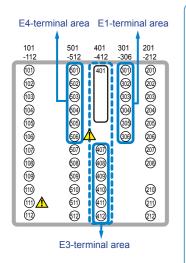


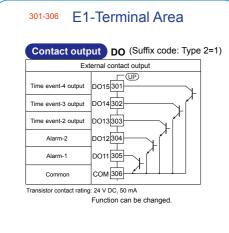
- · Do not use an unassigned terminal as the relay terminal.
- Do not use a 100-240 V AC power supply for the 24 V AC/DC model; otherwise, the instrument will malfunction.

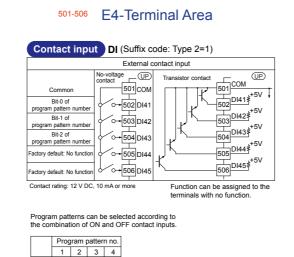


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■ UP35A (Continued from page 3)

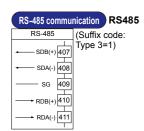


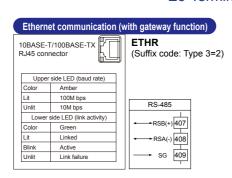




DI43 OFF OFF OFF ON

401-412 E3-Terminal Area





1 2 3 4 5			O CHK O RDY O ERR	Data 390Ω 390Ω 390Ω 390Ω 390Ω 390Ω 390Ω 390Ω	If the UT is located at the e
Pin	Pin Signal name			Description	separately needed.
1	VP		+5V bus p	oower	These are to be prepared to
2	RxI	xD/TxD-P Data sign		al ata receive/transmit)	users. (390 Ω: 2 pcs. 220 Ω 1 pc., or an active
3	RxI	D/TxD-N	Data sign (negative	al data recive/transmit)	terminator.)
4	DG	ND	Signal gro	ound	
5	SH	IELD	Shield gro	ound	
LE	D	Lif	t	Unlit	RS-485
CH (re			le error	Normal	+→ RSB(+) 407
RDY (green) Normal Communic successfu			No electricity, or Communication failure	RSA(-) 408	
ERR (red) Not conne communic failure (fla		ation	Normal	→ sg 409	

`			· oommanioaa		
1 2 3 4 5			1 4	N_H 21Ω N_L	DNET (Suffix code: Type 3= If the UT is located at the end of a segment for the DeviceNet communication wiring,
Pin	Si	ignal name	Descrip	tion	terminating resistors are separately needed
1	V-	+	DeviceNet power s	upply 24V	These are to be
2	CA	AN_H	RX/TX + signal	prepared by users.	
3	DF	RAIN	Shield/Drain wire		(121 Ω: 1 pc.)
4	CA	AN_L	RX/TX - signal		
5	V	-	DeviceNet power s	upply common	
LE	D	L	it/flashing	Unlit	
CH (re		User profile	e error	Normal	RS-485
MA	succes Not cor		nmunicating (green, lit). ed (green, flashing).		+→ RSB(+) 407
MNS (green /red)			ailure (red, lit). timeout (red, flashing)	No electricity	+
			/Communication en/red, flashing)		→ sg 409

1 2 3 4 5			оснк] 110Ω) DB	(Suffix code: Type 3=3) If the UT is located at the end of a segment for the CC-Link communication wiring,
Pin		gnal name	Descr	ription	terminating resistors are separately needed.
1	F		Flame ground		These are to be
2	SL	.D	Shield		prepared by users.
3	D	3	RX/TX signal gro	ound	(110 Ω: 1 pc.)
4	Di	В	RX/TX - signal		
5	D	Ą	RX/TX + signal		
LE	D		Lit	Unlit	
CHI (rec		User profile Address er		Normal	RS-485
L EF				Normal	RSB(+) 407
	L RUN Normal (green) Communicating successfully		No carrier detected/ Communication timeout	RSA(-) 408	

CC-Link communication (with Modbus master)

[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.
	SYS		_	System data error	System data is corrupted.	Faulty. Contact us for repair.
	PAR 0004 (for user default value error only)			User (parameter) default value error	User parameter is corrupted. Initialized to factory default value.	
	PAR 0010 (for setup parameter error only)		Setup parameter (PA.ER)	Setup parameter error	Setup parameter data is corrupted. Initialized to user default value.	Check and reconfigure the initialized setting parameters. Error indication is erased when the power is turned on again.
	PAR 0020 (for operation parameter error only)			Operation parameter error	operation parameter data is corrupted.	
	PAR 0040 (for program pattern error only)			Program pattern error	Program pattern data is corrupted. All program patterns are deleted.	
	SLOT 0015 (0015: Error occurs to all hardware of E1 to E4-terminal areas.)		Setup parameter (OP.ER)	Nonresponding hardware of extended function (E1 to E4-terminal areas)	Inconsistence of system data and hardware of extended function. Nonresponding communication between hardware of extended function (E1 to E4-terminal areas).	Faulty. Contact us for repair.
Normal	No. and in direction	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.
indication	Normal indication	Rightmost decimal point on Symbol display blinks.		Faulty FRAM	Data writing (storing) to FRAM is impossible.	Contact us for repair.
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.
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

The errors s	The errors shown below may occur during operation. (For input/output action when each error occurs, see User's Manual.									
PV display (Operation Display)	Setpoint display (Operation Display)	Status indicator (Operation Display)	Parameter that displays error details	Error description	Cause and diagnosis	Remedy				
AD.ERR	Normal indication (Note)	_	Setup parameter (AD1.E)	Analog input terminal ADC error •PV input	Analog input terminal AD value error	Faulty. Contact us for repair.				
RJC.E (Displays RJC. E and PV alternately.)	Normal indication (Note)	_	Setup parameter (AD1.E)	Universal input terminal RJC error •PV input	Universal input terminal RJC error	Faulty. Contact us for repair. Set the parameter RJC to OFF to erase error indication.				
			Setup parameter (AD1.E)	Analog input terminal burnout error •PV input	Analog input terminal sensor burnout	Check wiring and sensor. Error indication is erased in normal operation.				
B.OUT	Normal indication (Note)	_	Setup parameter (PV1.E)	PV input burnout error	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)	PV input over-scale PV input under-scale (PV values out of -5 to 105%)	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	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	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.				
Normal indication				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)	Auto-tuning time-out	Auto-tuning does not end even when 24 hours have elapsed after the start of tuning.	Check the process. Hold down any key to erase the error indication				
VAT.E	Normal indication	_	Setup parameter (AD2.E)	Valve position automatic adjustment error	Fully-closed valve position is equal to or larger than the fully-open valve position after automatic valve position adjustment is performed.	Check wiring and valve. Hold down any key to erase the error indication.				
Normal indication	0.000 00000 (Decimal point on the left of the Symbol display blinks)	_	Setup parameter (OP.ER)	Communication error (RS-485 communication)	Framing parity error Buffer overflow Inter-character time-out Checksum error (PC link communication with checksum) CRC check error (Modbus/RTU) LRC check error (Modbus/ASCII)	Check the communication parameters. Recovery at normal receipt. Hold down any key to stop blinking.				
Normal indication	0.000 00000 (Decimal point on the left of the Symbol display blinks)	_	Setup parameter (OP.ER)	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.

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Operation Guide

UP35A Program Controller Operation Guide



Initial Settings



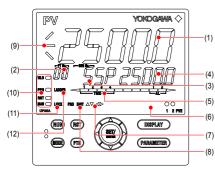
Yokogawa Electric Corporation

This operation guide describes basic settings and operations of the UP35A. 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.

Contents

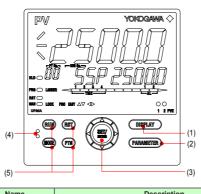
- 1. Names and Functions of Display Parts
- 2. Setup Procedure
- 3. Quick Setting Function (Setting of Input and Output)
- 4. Adjusting Valve Position Automatically (for a Position Proportional Type Controller Only)
- 5. Setting Alarm Type
- 6. Setting Alarm Setpoint

Names and Functions of Display Parts



(2) + (3) + (4) : Setpoint display

No. in figure	Name	Description									
(1)	PV display (white or red)	Displays PV. Displays an error code if an error occurs. Displays the scrolling guide in the Menu Display and Parameter Setting Display when the guide display ON/OFF is set to ON.									
(2)	Group display (pattern number) (green)	1 to 4 represent pattern numbers in the Operation Display. Displays a group number (1 to 4 or R) and terminal area (E1 to E4) in the Parameter Setting Display.									
(3)	Symbol display (orange)	Displays a parai	meter symbol.								
(4)	Data display (orange)	Displays a parai	meter setpoint and men	u 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) 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 Event displays of	events occur. can be set by the parame	eter.							
(7)	Key navigation indica- tor (green)	Lit or blinks when the Up/Down or Left/Right arrow key operat is possible.									
		Displays the setting conditions of the parameter display level function.									
(8)	Parameter display level	Paramet	ter display level	EASY	PRO						
(6)	indicator (green)	Easy setting mo	ode	Lit	Unlit						
		Standard settin	g mode	Unlit	Unlit						
		Professional se	tting mode	Unlit	Lit						
(9)	Program monitor (green)	: Lit when a	tus of increment, consta nt. a program setpoint is inc a program setpoint is or a program setpoint is de	creasing.	rement of the						
		Displays the ope	erating conditions and co	ontrol status.							
		Indicator	Desc	ription							
		HLD	Lit when in hold mode	(HLD).							
(10)	Status indicator (green and red)	PRG	Lit when in program pa (PRG). Lit while the Stroperation (S.TM) is ava	arting time of							
		RST Lit when in reset mode (RST).									
		MAN Lit when in manual mode (MAN). Blinks during auto-tuning.									
(11)	Security indicator (red)	Lit if a password	is set. The setup paran	neter settings	are locked.						
(12)	Ladder operation indicator (green)	Lit while the ladder program operation is executed.									

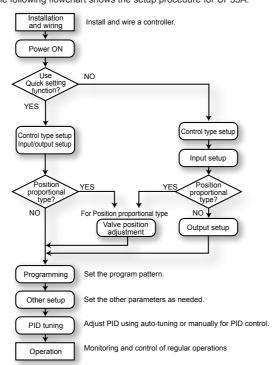


No. in figure	Name	Description
(1)	DISPLAY key	Used to switch the Operation Displays. Press the key in the Operation Display to switch the provided Operation Displays. Press the key in the Menu Display or Parameter Setting Display to return to the Operation Display.
(2)	PARAMETER key	Hold down the key for 3 seconds to move to the Operation Parameter Setting Display. Hold down the key and the Left arrow key simultaneously for 3 seconds to move to the Setup Parameter Setting Display. Press the key in the Parameter Setting Display to return to the Menu Display. Press the key once to cancel the parameter set- ting (setpoint is blinking).
(3)	SET/ENTER key Up/Down/Left/Right arrow keys	SET/ENTER key Press the key in the Menu Display to move to the Parameter Setting Display of the Menu. Press the key in the Parameter Setting Display to transfer to the parameter setting mode (setpoint is blinking), and the parameter can be changed. Press the key during parameter setting mode to register the setpoint. Up/Down/Left/Right arrow keys Press the Left/Right arrow keys in the Menu Display to switch the Displays. Press the Up/Down/Left/Right arrow keys in the Parameter Setting Display to switch the Displays. Press the Up/Down arrow keys during parameter setting mode (setpoint is blinking) to change a setpoint. Press the Left/Right arrow keys during parameter setting mode (setpoint is blinking) to move between digits according to the parameter.
(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 RST key MODE key PTN key	RUN key: Press the RUN key for 1 second while an operation display is shown starts the program pattern operation. RST key: Press the RST key for 1 second while an operation display is shown stops the program pattern operation. MODE key: Presents a display for switching between the HOLD, ADVANCE, PROG, RESET, LOCAL and AUTO/MAN. In order to change the operation mode, press the SET/ENTER key while the setpoint is blinking. 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 blink stops.
Note: The con	nmunication connector	(maintenance port) for LL50A Parameter Setting Software is

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 UP35A.



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

The Quick setting function is a function to easily set the basic function of the control-

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.

Operation in Initial Display

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

Operation for Setting

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

■ Making Settings Using Quick Setting Function

Example: Setting to PID control, thermocouple type K (range of 0.0 to 500.0°C), and current control output

For the detailed procedure and switching of displays, see "Flow of Quick Setting Function" below. For the parameters to set, see the next page

- (1) Press the SET/ENTER key while YES for QSM (Quick setting mode) is displayed. (2) Set the control type parameter (CNT) to PID (PID control).
- (3) Set the PV input type parameter (IN) to K1 (-270.0 to 1370.0 °C).
- (4) Set the PV input unit parameter (UNIT) to C (Degree Celsius).
- (5) Set the maximum value of PV input range parameter (RH) to 500.0.
- (6) Set the minimum value of PV input range parameter (RL) to 0.0.
- (7) Set the output type selection parameter (OT) to OUT terminals (current).

The upper limit value of the setting range is displayed for the parameter RH (maximum value

of PV input range)

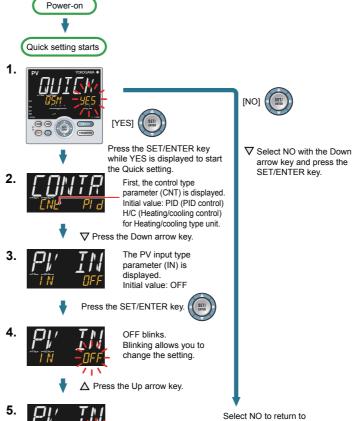
Press the SET/ENTER key.

move between digits.

(8) Finally, EXIT is displayed. Change NO to YES and press the SET/ENTER key to complete the setup. Operation Display appears.

■ Flow of Quick Setting Function

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



Press the SET/ENTER key.

▼ Press the Down arrow key.

▼ Press the Down arrow key.

K1 has been registered.

The PV input unit parameter

(UNIT) is displayed Initial value: C (Degree

6.

the Operation Display

10 11

The parameter RH (maximum value of PV input range) has been changed to 500.0.

Change the setpoint using the Up/Down arrow keys to increase and decrease the

value and the Left/Right arrow keys to





The last digit of the upper limit value blinks.



 $\triangleleft \triangleright$

The setpoint for the parameter RH has been registered.

▼ Press the Down arrow key.

Follow the same procedure to set RL to 0.0 and OT to 00 02 Set other parameters as needed





Finally, EXIT is displayed Press the SET/ENTER key to swtich to the setting mode. Change NO to YES and press the SET/ENTER key to complete the setup of the basic function Operation Display appears.

The Quick setting function continues in the NO state.







Displays the measured input value (PV). Displays the starting target setpoint (SSP).

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Parameters to be set

Control Type

Parameter Symbol	Name of Parameter	Setting Range
CNT	Control type	PID: PID control ONOF: ON/OFF control (1 point of hysteresis) ONOF2: ON/OFF control (2 points of hysteresis) 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 K1: -270.0 to 1370.0 °C / -450.0 to 2500.0 °F K2: -270.0 to 1000.0 °C / -450.0 to 2300.0 °F K3: -200.0 to 500.0 °C / -200.0 to 1000.0 °F J3: -200.0 to 500.0 °C / -300.0 to 2300.0 °F J3: -200.0 to 1200.0 °C / -300.0 to 2300.0 °F T1: -270.0 to 400.0 °C / -450.0 to 750.0 °F T2: 0.0 to 400.0 °C / -200.0 to 750.0 °F B: 0.0 to 1800.0 °C / -200.0 to 750.0 °F B: 0.0 to 1700.0 °C / 32 to 3300 °F R: 0.0 to 1700.0 °C / 32 to 3300 °F R: 0.0 to 1700.0 °C / 32 to 3100 °F R: -200.0 to 1300.0 °C / -300.0 to 2400.0 °F E: -270.0 to 1000.0 °C / -450.0 to 1800.0 °F L: -200.0 to 1000.0 °C / -450.0 to 1800.0 °F L: -200.0 to 1000.0 °C / -450.0 to 1800.0 °F W: 0.0 to 2300.0 °C / -300.0 to 1500.0 °F W: 0.0 to 2300.0 °C / 32 to 3400 °F WE: 0.0 to 3300.0 °C / 32 to 3400 °F WRE: 0.0 to 1900.0 °C / 32 to 3400 °F WRE: 0.0 to 1900.0 °C / 32 to 3400 °F WRE: 0.0 to 500.0 °C / -300.0 to 1500.0 °F PT1: -200.0 to 500.0 °C / -300.0 to 1500.0 °F PT1: -200.0 to 500.0 °C / -300.0 to 1500.0 °F PT1: -200.0 to 500.0 °C / -300.0 to 1500.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F D3: -150.00 to 150.00 °C / -200.0 to 300.0 °F D4: -200.00 to 500.00 °C / -200.0 to 300.0 °F D4: -200.00 to 500.00 °C / -200.0 to 300.0 °F D4: -200.00 to 500.00 °C / -200.0 to 300.0 °F D4: -200.00 to 500.00 °C / -200.0 to 300.0 °F D4: -200.00 to 500.00 °C / -200.0 to 300.0 °F D4: -200.00 to 500.00 °C / -200.0 to 300.0 °F D4: -200.00 to 500.00 °C / -200.0 to 300.0 °F D4: -200.00 to 500.00 °C / -200.0 to 500				
UNIT	PV input unit	-: No unit, C: Degree Celsius -: No unit,: No unit,: No unit, F: Degree Fahrenheit				
RH	Maximum value of PV input range	Depends on the input type. For temperature input - Set the temperature range that is actually controlled. (RL <rh) -<="" current="" for="" input="" td="" voltage=""></rh)>				
RL	Minimum value of PV input range	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 (SH). (Input is always 0% when RL = RH.)				
SDP	PV input scale decimal point position	0: No decimal place 3: Three decimal places 1: One decimal place 4: Four decimal places 2: Two decimal places				
SH	Maximum value of PV input scale	10000 to 20000 (\$1,584) \$4 \$1 \$20000				
SL	Minimum value of PV input scale	19999 to 30000, (SL <sh), -="" 30000<="" sh="" sl="" td="" ="" ≤=""></sh),>				

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								
от	Output type selection L Upper two digits Lower two digits	Control output or Heating- side control output (Lower two digits) 00: OFF 01: OUT terminals (voltage pulse) 02: OUT terminals (current) 03: OUT terminals (relay) 06: OUT2 terminals (relay) 07: RET/OUT2 terminals (voltage pulse) 08: RET/OUT2 terminals (current)	Cooling-side control output (Upper two digits) 00: OFF 01: OUT terminals (voltage pulse) 02: OUT terminals (current) 03: OUT terminals (relay) 06: OUT2 terminals (relay) 07: RET/OUT2 terminals (voltage pulse) 08: RET/OUT2 terminals (current)							
СТ	Control output cycle time Heating-side control output cycle time (in Heating/cooling control)	0.5 to 1000.0 s								
СТс	Cooling-side control output cycle time									

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 and local operation



PARAMETER

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.

 \triangleright 25.8 3.

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.

5.

△ 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.

PARAMETER

Hold down the key for 3 seconds.

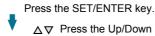
2. 268

MODE menu is displayed.

Press the Right arrow key until ALRM menu appears.



ALRM menu is displayed.



∧ ▼ Press the Up/Down arrow keys to display the parameter needs to be changed

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

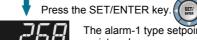
Press the SET/ENTER key.



The last digit of the setpoint blinks.

 $\Delta \nabla$ 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.

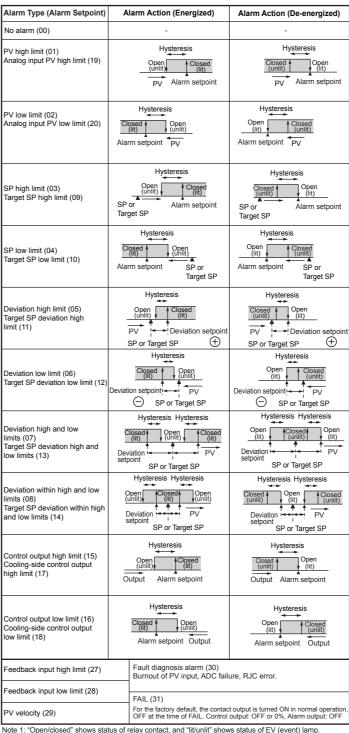




The alarm-1 type setpoint 02 (PV low limit) is registered. After the setup is completed, press the DISPLAY key once to return to the Operation Display.

Stand-by action Energized/De-energized Latch action

- 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.



Note 2: (+) Positive setpoint, (-) Negative setpoint

Setting Display of Alarm Type Stand-by Action Abnormal The alarm output **▼**PV low limit Alarm type Without (0) or With (1) Stand-by action in this region even if the PV valule Energized (0) / De-energized (1) is below PV low limit alarm setpoint. l atch action (0/1/2/3/4) See User's Manua

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

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."

- 1. Show the Operation Display.
- 2. Display MODE menu with the same procedure as described in Setting Alarm Type.

Press the Right arrow key.



Press the SET/ENTER key.



— Time

758 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.

Δ∇ Up/Down arrow keys: changing parameters

Display the parameter that need to be changed.



Press the SET/ENTER key.



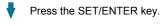
c'bb

5.

6.

Blinks during the change.

Change the setpoint using the Up/Down arrow keys to increase and decrease the ✓ Value and the Left/Right arrow keys to move between digits.





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

Operation Guide

UP35A Program Controller Operation Guide



Programming



Yokogawa Electric Corporation

This operation guide describes basic program settings of the UP35A. 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.)

Contents

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

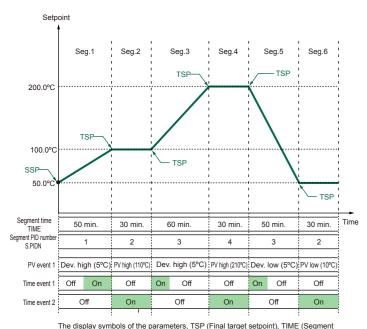
1. Overview of Program Patterns

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

- 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 $^{\circ}\text{C},$ 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.

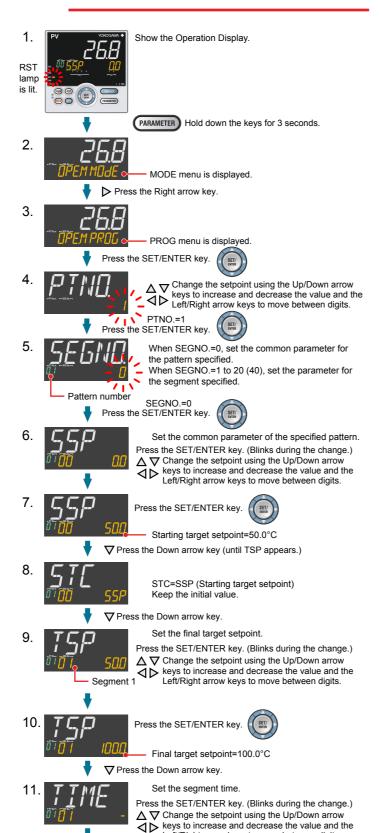
See User's Manual for the Wait and Repeat actions, Zone PID, Start of program operation (Start code), Changing operation mode at segment switching (Junction code), Local mode.

2. Creating Program Patterns

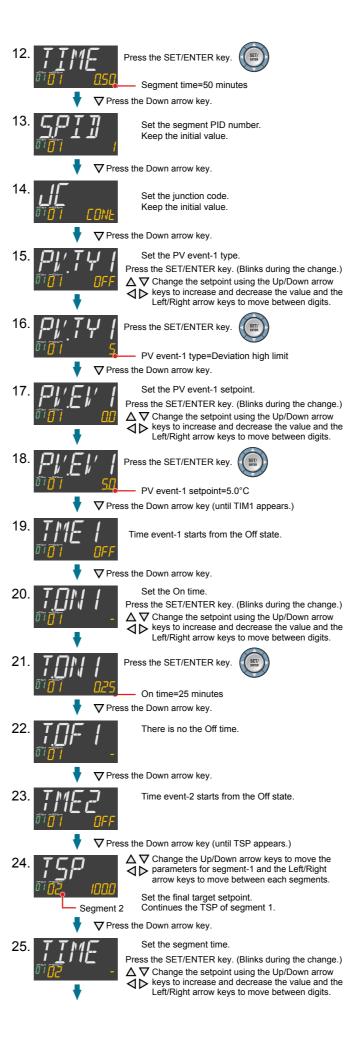
The following operating procedure describes an example of creating the program discussed in "1. Overview of Program Patterns."



Before creating the program, reverify the PV Input Range, Program Time Unit (TMU), and Segment Setting Method (SEG.T) parameters. If the setting of these setup parameter is changed, the program patterns created and stored so far will be all cleared (initialized) !! Be careful.



Left/Right arrow keys to move between digits.





3. Program Pattern Setup Charts

You can register max. 10 program segments/pattern with the UP35A 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	

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

< Program Pattern Data (common parameter) >

3		,
Parameter symbol	Parameter name	User settings
SSP	Starting target setpoint	
STC	Start code	
WT.SW1	Wait function ON/OFF	
WZ.UP1	Upper-side wait zone	
WZ.LO1	Lower-side wait zone	
WT.TM1	Wait time	
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 or local 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 20 (40 when the option "/AP" is specified.)
ERR23	Segment insert error	New segment cannot be inserted because the number of segments in a pattern exceeded 20 (40 when the option "/AP" is specified.)
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 () i		i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
Unit ()	i	- +	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
	i		i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
	i		i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
A program pattern can be drawn in the right table.	i		i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
	i		i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
	i	- ,	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
	i	- +	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
	i	- 	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i
Minimum value of PV input range / Minimum value of PV input scale () [·	·	·	T			T		·	T							T	T

Parameter	Parameter		Segments																		
symbol	Parameter name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TSP	Final target setpoint																				
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																				
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																				
TOEA	Off time of time quant 4																				

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Operation Guide

UP35A **Program Controller** Operation Guide



Operations



Yokogawa Electric Corporation

This operation guide describes key entries for operating the UP35A. 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

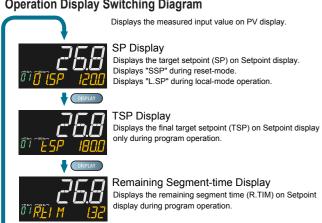
The scrolling guide is displayed on PV display in the Parameter Setting Display. This guide can be turned on/off with the MODE key.

Contents

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

Monitoring-purpose Operation Displays Available during Operation

Operation Display Switching Diagram





OUT Display / Heating/cooling OUT Display Displays the control output value (OUT) on Setpoint display Displays the control output values (C.H.) of heating and cooling sides on Setpoint display (C.H. can be changed in manual mode).



Segment Number Display

Displays the segment number (SEG.N) for which operation is in progress, the number of segments included in the selected program pattern.



Remaining Repetition Display

Displays the number of remaining repetitions (R.CYC) on Setpoint display. This display is displayed only when the repeat function is set and the operation mode is PROG.



Program Pattern Display

Displays the program pattern (overview) on Setpoint display. Program pattern display can be scrolled using Up/Down/Left/Right arrow keys. Soak and ramp can be displayed.



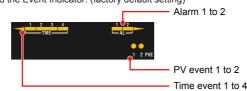
After showing the Program Pattern Display, press the DISPLAY key to show the following displays conditionally.

For details, see User's Manual,

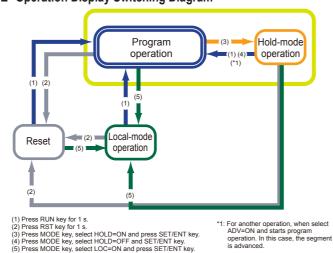
Standard, Position Proportional, and Heating/Cooling Types

- 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)
- 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)

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

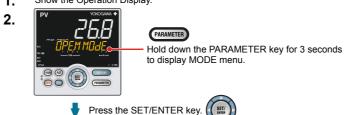
Make sure that the controller is in automatic mode (AUTO) and in run mode (RUN) before auto-tuning. For setting to AUTO, see "5. Switching between AUTO and MAN," and for setting to RUN, see "4. Switching between RUN and RESET." If the setpoint is known in advance or auto-tuning does not find any appropriate PID constants, set the PID manually. For setting the PID manually, see User's Manual.



Do not perform auto-tuning for the following processes.

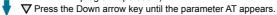
Tune PID manually.

- · 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.
- Show the Operation Display.





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



The parameter AT (auto-tuning switch) is displayed

OFF blinks.

Press the SET/ENTER key.

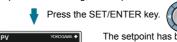


△ → Press the Up/Down arrow keys to display the required setpoint.



Blinks during the change.

The setting range is 1 to 8 (represent group numbers) or R. To perform auto-tuning for the PID of group 1, set the parameter AT to 1. To guit the auto-tuning, set the parameter to OFF





26.6

8.

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

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

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

3. Selecting Program Pattern Number (PT.No)

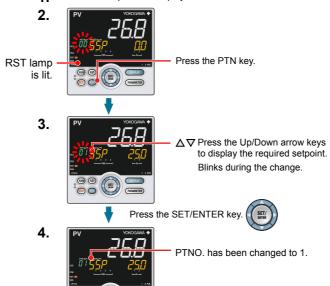
Program pattern number selection can be performed using any of the following: (1) key, (2) Parameter, (3) Contact input, and (4) Communication.

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.

Show the Operation Display. 1.

PARAMETER



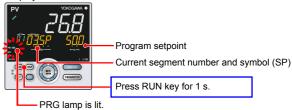
4. Switching between RUN and RESET

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,

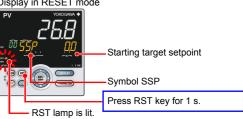
Display in RUN mode



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

0 1 0 3 15 500 - The number of segments included in the selected program pattern. The segment number for which operation is in progress.

Display in RESET mode



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

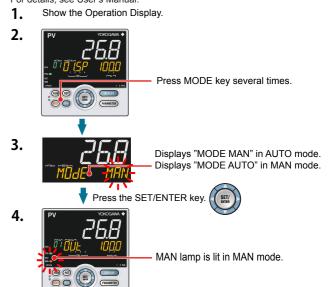
When the controller is stoppe	u, input and outputs are as follows.
PV input	Displays the PV value.
Control output	When the zone PID selection parameter (ZON) is set to segment PID selection, the preset output value for the PID group number 1 is output. When the zone PID selection parameter (ZON) is set 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.

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).

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.

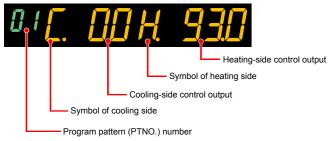


Up arrow key: increases control output Down arrow key: decreases control output

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

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

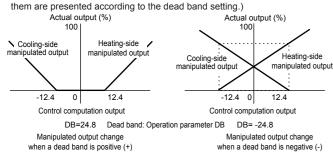
Manual operation in Heating/cooling control



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

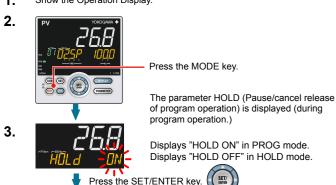


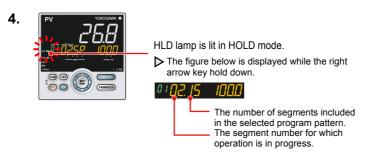
Enabling/Disabling Hold Mode of Program Operation

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

Show the Operation Display.





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) Execute the "Advance" function during hold-mode operation. In this case, the seament is advanced.

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 pro-



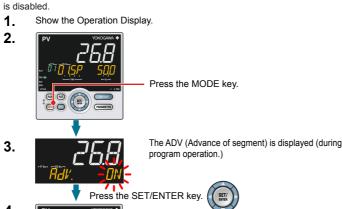
Executing "Advance" Function

"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

1



The segment is advanced. (CADAMETER)

10. Switching to Local-mode (LOCAL) Operation

Switching to local-mode can be performed using any of the following: (1) MODE key (user function key), (2) Parameter, (3) Contact input, and (4) Commu-

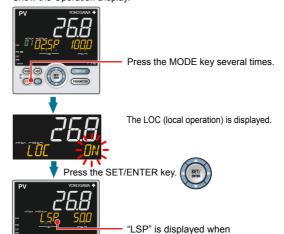
The following shows an example of switching using the MODE key.

Show the Operation Display. 1.

2.

3.

4.



in local-mode operation.

11. Changing Setpoints during Local-mode Operation

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

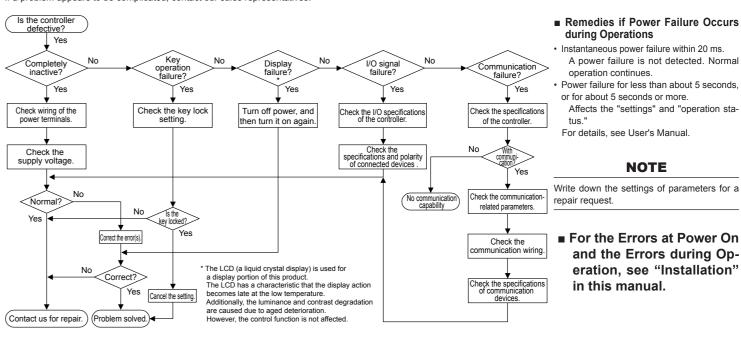


12. Troubleshooting

■ Troubleshooting Flow

SET THANKETS

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.



UP35A Program Controller Operation Guide



Parameters

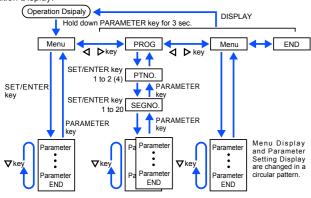


Yokogawa Electric Corporation

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

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 type (CNT), etc. The parameters for professional setting mode (LEVL: PRO) are not described in this manual. See User's Manual.

■ Operation Mode

Menu symbol: MDJE (MODE)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
HOLD)	Pause/cancel release of program operation	Display during program operation. ON: Pause OFF: Cancel release (Program operation restart)	OFF		
Adl ' (ADV)	Advance of segment	Display during program operation. Set as "ADV = ON" to advance from the current segment to the next seg- ment.	OFF		
MDdE (MODE)	Operation mode	RESET: Stop of program operation PROG: Start of program operation LOCAL: Start of local-mode operation	RESET		
F M (A.M)	AUTO/MAN switch	AUTO: Automatic mode MAN: Manual mode	MAN		
PLN (D.)	Program pattern number selection	0: Not select program pattern 1 to 2 (4 when the option "/AP" is specified.)	0		
55 Ł (SST)	Start-of-program seg- ment number	1 to 20 (40 when the option "/AP" is specified.) The setting value returns to "1" when the program operation (PROG) changes into RESET or LOCAL.	1		EASY
PFUd (P.FWD)	Fast-forwarding of program operation	Normal, 2: Twice, 5: Five times, Then times Use this function when checking the program pattern setting. Only Segment time and Time event can be faster. The operation returns to the normal speed after fast-forwarding.	1		
AL (AT)	AUTO-tuning switch	OFF: Disable 1 to 4: Perform auto-tuning. Tuning result is stored in the specified numbered PID. R: Tuning result is stored in the PID for reference deviation.	OFF		
PI d (PID)	PID number	The PID group number being selected is displayed. 1 to 4, R: PID group for reference deviation.	1		

■ SELECT Parameter

Menu symbol: [5 (CS)

Parameter symbol	Nam	Name of Parameter		ameter Setting Range		Initial value	User setting	Display level		
Registered parameter symbol	SELECT parameter		Setting range of a registered parameter. For details, see User's Manual.			-	Table below	EASY		
Parameter	n=10	n=11	n=12	2 n=13	n=14	n=15	n=16	n=17	n=18	n=19
CSn										

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

■ Program Setting Parameter

Menu symbol: (PPIII, PROG > PTIIII PTNO. (=01 to 02 (04) > 5F [3] SEGNO. (=00))

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Displa level
55P (SSP)	Starting target setpoint	0.0 to 100.0% of PV input range (EU) (Setting range: P.RL to P.RH)	P.RL		
57 <u>[</u> (STC)	Start code	SSP: Program operation begins with the starting target setpoint. RAMP: Ramp-prioritized PV start TIME: Time-prioritized PV start LSP: Local-mode start sTC=TIME cannot be selected when the parameter SEG.T is TM.RT.	SSP		EASY
WT.SW1)	Wait function ON/OFF	OFF: Disable ON: Enable	OFF		
<u>И</u> <u>7</u> Ш Р 	Upper-side wait zone	0.0 to 10.0% of PV input range (EU)	0.5% of PV input range		
<i>H<u>7L</u> [] </i> (WZ.LO1)	Lower-side wait zone	0.0 to 10.0% of PV input range (EO)	0.5% of PV input range		
ИТ.Т/1 / (WТ.ТМ1)	Wait time	OFF: No function 0.00 to 999.59 ("hour.minute" or "min- ute.second") * Available only for the wait time at the segment switching. * Use the parameter TMU to set the time unit. (Common in the instrument.)	OFF		STD
R_Y_L (R.CYCL)	Number of repeat cycles	0 to 999, CONT (limitless number of times)	0		
RSTRT (R.STRT)	Repeat cycle start segment number	1 to 20 (40)	1		
PEN] (R.END)	Repeat cycle end segment number	1 ≤ R.STRT ≤ R.END ≤ 20 (40)	1		

■ Program Setting Parameter

Menu symbol: (PRDD PROG > PTMD PTNO. (=01 to 02 (04)) > 5EDMD SEGNO. (=01 to 20 (40))

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
75P (TSP)	Final target setpoint	0.0 to 100.0% of PV input range (EU) (Setting range: P.RL to P.RH)	P.RL		
71 11E (TIME)	Segment time setting	-: Unregistered 0.00 to 999.59 ("hour.minute" or "minute.second") * Setting available for the parameter SEG.T=TIME. * Use the parameter TMU to set the time unit. (Common in the instrument.) * If the setting is 0.00, TSP changes in stepwise after one control period.	1	See	
TMPT (TM.RT)	Segment ramp-rate setting	-: Unregistered Ramp: 0.0 to 100.0% of PV input range span (EUS) / 1 hour or 1 minute Soak: 0.00 to 999.59 ("hour.minute" or "minute.second") * Setting available for the parameter SEG.T=TM.RT * Use the parameter TMU to set the time unit. (Common in the instrument.) Per 1 hour: TMU=HH.MM, Per 1 minute: TMU=MM.SS * 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.	-	"Pro- gram- ming" in this manual.	EASY
5 P1 d (S.PID)	Segment PID number selection	1 to 4 * PID number can be set when the parameter "ZON = 0."	1		
JE (JC)	Junction code	CONT: Switching for continuation. HOLD: Hold-on switching (the controller holds the end-of-segment setpoint when the segment is completed, to perform control). LOCAL: Local-mode switching (the controller switches to a local setpoint when the segment is completed). W.SW: Wait during switching between segments. W.IV: Wait within a segment interval. W.SL: Segment switching (the controller switches to a local setpoint when the segment is completed after release.) PLK.1 to PLK.4: Linked to patterns 1 to 4. INS.: Allows a segment to be added to the end of a specified segment. DEL:: Allows a specified segment to be deleted.	CONT	See "Pro- gram- ming" in this manual.	STD

■ Program Setting Parameter

Menu symbol: (PROG > PTIME PTNO. (=1 to 02 (04)) > 5 F M SEGNO. (=01 to 20 (40)) Continued.

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
PV:TY I to PV:TY2 (PV:TY1 to PV:TY2)	PV event-1 to -2 type	OFF: Disable (Energized) 1: PV high limit, 2: PV low limit, 3: SP high limit, 4: SP low limit, 5: Deviation high limit, 6: Deviation high limit, 6: Deviation high and low limits, 7: Deviation high and low limits, 8: Deviation within high and low limits, 9: Target SP high limit, 10: Target SP deviation high limit, 10: Target SP deviation high limit, 12: Target SP deviation high and low limits, 13: Target SP deviation within 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 * Add 100 for "de-energized". For example, when the PV high limit is de-energized, the setting is 101.	OFF	See "Pro-	
Pl'El' I to Pl'El' 2 (PV.EV1 to PV.EV2)	PV event-1 to -2 setpoint	Set a display value of setpoint of PV alarm, SP alarm, deviation alarm, or output alarm19999 to 30000 (Set a value within the input range.) Decimal point position depends on the input type.	0	gram- ming" in this manual.	STD
TME I to TME4 (TME1 to TME4)	Start condition of time event 1 to 4	ON: Start ON state OFF: Start OFF state	OFF		
T_N / to T_NY (T.ON1 to T.ON4)	On time of time event 1 to 4	-: Unregistered 0.01 to 999.59 ("hour.minute" or "minute. second") * Available only within the segment time.	-		
TDF 1 to TDF 4 (T.OF1 to T.OF4)	Off time of time event 1 to 4	OFF when the operation mode is changed to the mode except the program operation. Use the parameter TMU to set the time unit. (Common in the instrument.)	-		

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.
Time event parameters are displayed in order of Time event 1 (TME1, T.ON1, T.OF1), Time event 2, Time event 3,

■ Local Setting Parameter

Menu symbol: [[[(LOC)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
L5P (LSP)	Local target setpoint	0.0 to 100.0% of PV input range (EU) (Setting range: P.RL to P.RH)	P.RL		
LPI d (L.PID)	PID number se- lection for local- mode operation	Set a PID group number to use. 1 to 4 * Available only for the L.PID when ZON = 0 or 5. * If set to "Local PID selection," local PID is selected irrespective of the operation modes.	1		EASY
LEYI to LEYZ (LTY1 to LTY2)	Local event-1 to -2 type	OFF: Disable (Energized) 1: PV high limit, 2: PV low limit, 3: SP high limit, 4: SP low limit, 5: Deviation high limit, 6: Deviation how limit, 7: Deviation high and low limits, 8: Deviation high and low limits, 9: Target SP high limit, 10: Target SP how limit, 11: Target SP deviation high limit, 12: Target SP deviation high limit, 13: Target SP deviation low limit, 13: Target SP deviation high and low limits, 14: Target SP deviation high and low limits, 15: OUT high limit, 16: OUT low limit, 17: Cooling-side OUT high limit, 18: Cooling-side OUT high limit, 18: Cooling-side OUT low limit * Add 100 for "de-energized". For example, when the PV high limit is de-energized, the setting is 101.	OFF		STD
LEV 1 to LEV 2 (L.EV1 to L.EV2)	Local event-1 to -2 setpoint	Set a display value of setpoint of PV alarm, SP alarm, deviation alarm, or output alarm1999 to 30000 (Set a value within the input range.) Decimal point position depends on the input type	0		

Local event parameters are displayed in order of Local event 1 (L.TY1, L.EV1), Local event 2.

■ Alarm Setpoint Setting Parameter

Menu symbol: Π_L (AL)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
# 1 to #2 (A1 to A2)	Alarm-1 to -2 setpoint	These alarms work irrespective of the operation mode. Set a display value of setpoint of PV alarm, SP alarm, deviation alarm, output alarm, or velocity alarm1999 to 30000 (Set a value within the input range.) Decimal point position depends on the input type	0	Table below	EASY

Parameter	n=1	n=2
An		

■ SP-related Setting Parameter

Menu symbol: 5P5 (SPS)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
SPL (SPT)	SP tracking selection	Tracking is performed when the mode changes from Program to Local. (The local setpoint keeps track of the program setpoint.) OFF, ON	OFF		
5LM (S.TM)	Starting time of program operation	0.00 to 999.59 ("hour.minute" or "minute.second" (common use of instrument) * Use the parameter TMU to set the time unit.	0.00		STD
PN[(PNC)		OFF: Not cleared. ON: Cleared. (Set the program number before restart program operation) * 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

Menu symbol: PLRM (ALRM)

	Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
	EHY I to EHY2 (EHY1 to EHY2)	Event-1 to -2 hysteresis	The hysteresis setpoint of PV event or Local event is set to the parcentage of 0.0 to 100.0%. The setting value (%) is for the PV input range span or output span.	0.5		STD
	FIL I to FIL 2 (AL1 to AL2)	Alarm-1 to -2 type Example: Alarm-1 RL	These alarms work irrespective of the operation mode. Set a 5-digit value in the following order. [Alarm type: 2 digits (see below)] + [Without (0) or With (1) Stand-by action] + [Energized (0) or De-energized (1)] + [Latch action (0/1/2/3/4)] For latch action, see User's Manual. Alarm type: 2 digits 00: Disable 01: Pv high limit 02: Pv low limit 03: SP high limit 04: SP low limit 05: Deviation high limit 06: Deviation high limit 07: Deviation high and low limits 08: Deviation high and low limits 09: Target SP high limit 10: Target SP bigh limit 11: Target SP deviation high limit 12: Target SP deviation high limit 13: Target SP deviation within 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 high limit 19: Analog input PV high limit 20: Analog input PV low limit 21: Feedback input limit limit 22: Feedback input limit limit 23: Fault diagnosis 31: FAIL	AL1: PV high limit (01) Without- Stand- by action (0) Energi- zed (0) Latch action (0) AL2: PV low limit (02) Without Stand- by action (0) Latch action (0) Latch action (0) (0) Latch action (0) Latch action (0) Latch action (0)	Table below	EASY
	1 ′ Ł / to 1 ′ Ł 2 (VT1 to VT2)	PV velocity alarm time setpoint 1 to 2	0.01 to 99.59 (minute.second)	1.00		
	#⅓ / to #⅓² (HY1 to HY2)	Alarm-1 to -2 hysteresis	Set a display value of setpoint of hysteresis1999 to 30000 (Set a value within the input range.) 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		
	49N / to 49N2 (DYN1 to DYN2)	Alarm-1 to -2 On-delay timer	An alarm output is ON when the delay timer expires after the alarm setpoint is reached. 0.00 to 99.59 (minute.second)	0.00		STD
	AMD)	Alarm mode	O: Always active 1: Not active in RESET mode 2: Not active in RESET or MAN mode	0		
ı	Parameter	n=1 n=2				

ALn VTn HYn DYNn

■ PV-related Setting Parameter

Menu symbol: PV5 (PVS)

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

■ PID Setting Parameter

Menu symbol: 🏳 ຝ (PID)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
P _(P)	Proportional band Heating-side proportion- al band (in Heating/cool- ing control)	0.0 to 999.9% When 0.0% is set, it operates as 0.1%. Heating-side ON/OFF control applies when 0.0% in Heating/cooling control	5.0%		
/ (I)	Integral time Heating-side integral time (in Heating/cooling control)	OFF: Disable 1 to 6000 s	240 s		
d (D)	Derivative time Heating-side derivative time (in Heating/cooling control)	OFF: Disable 1 to 6000 s	60 s		
[]H (OH)	Control output high limit Heating-side control output high limit (in Heating/cooling control)	-4.9 to 105.0%, (OL <oh) In Heating/cooling control: 0.1 to 105.0% (OL<oh)< td=""><td>100.0%</td><td></td><td></td></oh)<></oh) 	100.0%		
<u>DL</u> (OL)	Control output low limit Heating-side control output low limit (in Heat- ing/cooling control)	-5.0 to 104.9%, (OL <oh), (ol<oh)<="" 0.0="" 104.9%="" control:="" cooling="" heating="" in="" sd:="" shut="" td="" tight="" to=""><td>0.0%</td><td></td><td></td></oh),>	0.0%		
M P (MR)	Manual reset	Enabled when integral time is OFF. The manual reset value equals the output value when PV = SP5.0 to 105.0%	50.0%		EASY
HY5	Hysteresis (in ON/OFF control or Position proportional control)	In ON/OFF control: 0.0 to 100.0% of PV input range span (EUS)	In ON/OFF control: 0.5 % of PV input range span		
(HYS)	Heating-side ON/OFF control hysteresis (in Heating/cooling control)	In Heating/cooling control or Position proportional control: 0.0 to 100.0%	In Heating/ cooling control or Position- proportional control: 0.5 %		
HULP (HY.UP)	Upper-side hysteresis (in ON/OFF control)	0.0 to 100.0% of PV input range	0.5 % of PV input		
H YL [] (HY.LO)	Lower-side hysteresis (in ON/OFF control)	span (EUS)	range span		
d? (DR)	Direct/reverse action switch	RVS: Reverse action DIR: Direct action	RVS		STD
P <u>c</u> (Pc)	Cooling-side proportional band	0.0 to 999.9% (Cooling-side ON/OFF control applies when 0.0% in Heating/cooling control)	5.0%		
/ <u></u>	Cooling-side integral time	OFF: Disable 1 to 6000 s	240 s		
dc (Dc)	Cooling-side derivative time	OFF: Disable 1 to 6000 s	60 s		
∏H∟ (OHc)	Cooling-side control output high limit	0.1 to 105.0%, (OLc <ohc)< td=""><td>100.0%</td><td></td><td></td></ohc)<>	100.0%		
OLc)	Cooling-side control output low limit	0.0 to 104.9%, (OLc <ohc)< td=""><td>0.0%</td><td></td><td>EASY</td></ohc)<>	0.0%		EASY
H 45 c (HYSc)	Cooling-side ON/OFF control hysteresis	0.0 to 100.0%	0.5%		
db (DB)	Output dead band (in Heating/cooling control or Position proportional control)	In Heating/cooling control: -100.0 to 50.0%. In Position proportional control: 1.0 to 10.0%.	3.0%		
P [] (PO)	Preset output Heating-side preset output (in Heating/cool- ing control)	In RESET mode, fixed control output can be generated. In Position propor- tional control, Valve opening can be set; -5.0 to 105.0%	0.0%		
P[]_ c (POc)	Cooling-side preset output	In RESET mode, cooling-side fixed control output can be generated5.0 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.

If you are usi	ng two or mo	ore groups o	T PID parame	eters, use th
Parameter	n=2	n=3	n=4	R
Р				
I				
D				
ОН				
OL				
MR				
HYS				
HY.UP				
HY.LO				
DR				
Pc				
lc				
Dc				
OHc				
OLc				
HYSc				
DB				
PO				
POc				

■ Tuning Parameter

Menu symbol: LINE (TUNE)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Displa leve
5 [(SC)	Super function	OFF: Disable 1: Overshoot suppressing function (normal mode) 2: Hunting suppressing function (stable mode) Enables to answer the wider characteristic changes compared with response mode. 3: Hunting suppressing function (response mode) Enables quick follow-up and short converging time of PV for the changed SP. 4: Overshoot suppressing function (strong suppressing mode) Note: Setpoints 2 and 3 must be used in PID control or PI control. Disabled in the following controls: 1) ON/OFF control, 2) PD control, 3) P control, 4) Heating/cooling control. Do not use the function for the control processes with response such as flow or pressure control.	OFF		EAS
ALLY (AT.TY)	Auto-tuning type	0: Normal 1: Stability	0		STI
AR (AR)	Anti-reset windup (excess integration prevention)	AUTO, 50.0 to 200.0%	AUTO		
OPR)	Output velocity limiter	OFF: Disable 0.1 to 100.0%/s	OFF		
MPON (MPON)	Manual preset output number selection	Select the output used in MAN mode when switched from AUTO to MAN mode. OFF: Hold the control output in AUTO mode (bumpless) 1: Use manual preset output 1 (output bump) 2: Use manual preset output 2 (output bump) 3: Use manual preset output 3 (output bump) 4: Use manual preset output 4 (output bump) 5: Use manual preset output 5 (output bump) 5: Use manual preset output 6 (output bump)	OFF		STE
MP() I to MP() S MP() to MP() 5)	Manual preset output 1 to 5	-5.0 to 105.0% However, output is limited to the output high limit and low limit.	0.0%	Table below	

■ Zone Control Parameter

Menu symbol: ZINE (ZONE)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
RP 1 to RP3 (RP1 to RP3)	Reference point 1 to 3	Set reference points at which switching is carried out between groups of PID constants according to the given temperature zone. 0.0 to 100.0% of PV input range (EU) (RP1 ≤ RP2) ≤ RP3)	100.0% of PV input range	Table below	STD
RHY (RHY)	Zone PID switching hysteresis	Hysteresis can be set for switching at a reference point. 0.0 to 10.0% of PV input range span (EUS)	0.5 % of PV input range span		STD
Rdl' (RDV)	Reference deviation	Set a deviation from SP. The PID for reference deviation is used if there is a larger deviation than the preset reference deviation. OFF: Disable 0.0 + 1 digit to 100.0% of PV input range span (EUS)	OFF		STD

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

Use the follow	ring table to re	cord the refer	ence point set	ting val
Parameter	n=1	n=2	n=3	1

■ P Parameter (for Ladder Program)

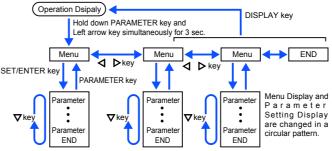
Menu symbol:

	,		,								
	Parameter symbol	Nan	ne of Para	ameter		Setting	g Range		Initial value	User setting	Display level
	P[] / to P [] (P01 to P10)		o P10 para	ameter		using LL5		imal point neter Set-	0	Table below	STD
- 3											
	Parameter	n=01	n=02	n=03	n=04	n=05	n=06	n=07	n=08	n=09	n=10
Ì	Pn										

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 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: [LL (CTL)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
ENE (CNT)	Control type	PID: PID control ONOF: ON/OFF control (1 point of hysteresis) ONOF2: ON/OFF control (2 points of hysteresis) H/C: Heating/cooling control	PID or H/C (for Heating/ Cooling- type)		EASY
ZDN (ZON)	Zone PID selection	O: Segment PID selection 1: Zone PID selection (selection by PV) 2: Zone PID selection (selection by target SP) 4: Zone PID selection (selection by SP) 5: Local PID selection * If set to "Segment PID selection," allows PID constants to be selected for each segments. * If set to "Zone PID selection," automatically selects PID constants according to the range set in the Reference point. * If set to "Local PID selection," local PID is selected irrespective of the operation modes.	1		STD
SEGLE (SEG.T)	Segment setting method	TIME: Segment time setting TM.RT: Segment ramp-rate setting * Note: A change of setting deletes a program pattern.	TIME		EASY
EMU (TMU)	Program time unit	HH.MM: hour.minute MM.SS: minute.second	нн.мм		

■ PV Input Setting Parameter

Menu symbol: $P_{l'}^{\prime\prime}$ (PV)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
<i>J. N</i> (IN)	PV input type	OFF: Disable K1: -270.0 to 1370.0 °C / -450.0 to 2500.0 °F K2: -270.0 to 1000.0 °C / -450.0 to 2300.0 °F K3: -200.0 to 500.0 °C / -200.0 to 1000.0 °F J: -200.0 to 500.0 °C / -200.0 to 1000.0 °F J: -200.0 to 400.0 °C / -200.0 to 750.0 °F T2: -0.0 to 400.0 °C / -200.0 to 750.0 °F T2: -0.0 to 400.0 °C / -200.0 to 750.0 °F B: 0.0 to 1800.0 °C / 32 to 3100 °F R: 0.0 to 1700.0 °C / 32 to 3100 °F R: 0.0 to 1700.0 °C / 32 to 3100 °F R: 0.0 to 1700.0 °C / 32 to 3100 °F U: -200.0 to 1300.0 °C / -300.0 to 2400.0 °F U: -200.0 to 1300.0 °C / -300.0 to 1800.0 °F U: -200.0 to 400.0 °C / -300.0 to 1800.0 °F U: -200.0 to 400.0 °C / -300.0 to 1800.0 °F U2: -200.0 to 400.0 °C / -300.0 to 1800.0 °F U2: -200.0 to 400.0 °C / -300.0 to 1800.0 °F U2: -200.0 to 500.0 °C / -300.0 to 1000.0 °F WE -0.0 to 2300.0 °C / 32 to 3400 °F P2040: -0.0 to 1900.0 °C / 32 to 3400 °F P2040: -0.0 to 1900.0 °C / 30.0 to 1500.0 °C P2040: -0.0 to 500.0 °C / -300.0 to 1500.0 °F P11: -200.0 to 500.0 °C / -300.0 to 1500.0 °F P12: -200.0 to 500.0 °C / -300.0 to 1500.0 °F P13: -150.00 to 150.0 °C / -300.0 to 1500.0 °F P3: -150.00 to 500.0 °C / -300.0 to 1500.0 °F P3: -150.00 to 500.0 °C / -300.0 to 1500.0 °F P3: -150.00 to 500.0 °C / -300.0 to 1000.0 °F P3: -150.00 to 500.0 °C / -300.0 to 1000.0 °F P3: -150.00 to 500.0 °C / -300.0 to 1000.0 °F D3: -150.00 to 500.0 °C / -200.0 to 300.0 °F -2042051000 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -200.0 to 300.0 °C -300.0 to 500.0 °C / -300.0 to 500.0 °C -300.0 to 500.0 °C	OFF		EASY

UNI Ł	PV input unit	-: No unit, C: Degree Celsius, -: No unit,: No unit,: No unit, F: Degree Fahrenheit	С	
PH (RH)	Maximum value of PV input range	Depends on the input type For temperature input - Set the temperature range that is actually controlled. (RL <rh) -="" a="" applied.<="" current="" for="" input="" is="" of="" range="" set="" signal="" td="" that="" the="" voltage=""><td>Depends on the input type</td><td></td></rh)>	Depends on the input type	
PL (RL)	Minimum value of PV input range	The scale across which the voltage / current signal is actually controlled should be set using the maximum value of input scale (SH) and mini- mum value of input scale (SL). (Input is always 0% when RL = RH.)	Depends on the input type	EASY
5dP (SDP)	PV input scale decimal point position	0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places 4: Four decimal places	Depends on the input type	
5 H (SH)	Maximum value of PV input scale	-19999 to 30000, (SL <sh),< td=""><td>Depends on the input type</td><td></td></sh),<>	Depends on the input type	
5 L (SL)	Minimum value of PV input scale	SH - SL ≤ 30000	Depends on the input type	
65L (BSL)	PV input burnout action	OFF: Disable UP: Upscale DOWN: Downscale	Depends on the input type	
ALS (A.BS)	PV analog input bias	-100.0 to 100.0% of PV input range span (EUS)	0.0 % of PV input range span	STD
AFL (A.FL)	PV analog input filter	OFF, 1 to 120 s	OFF	
W-5% Re/W-	26% Re(Hoskins Mfa Co.)	ASTM F988 WRF: W97Re3-W75Re25	5	

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

■ Input Range, SP Limiter Setting Parameter

Menu symbol: MPI/ (MP)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
PUNI (P.UNI)	Control PV input unit	-: No unit C: Degree Celsius -: No unit,: No unit F: Degree Fahrenheit	Same as PV input unit		
P.J.P (P.DP)	Control PV input decimal point position	0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places 4: Four decimal places	1		
PRH (P.RH)	Maximum value of control PV input range	-19999 to 30000, (P.RL <p.rh),< td=""><td>Depends on the input type</td><td></td><td>STD</td></p.rh),<>	Depends on the input type		STD
PRL (P.RL)	Minimum value of control PV input range	P.RH - P.RL ≤ 30000	Depends on the input type		
5PH (SPH)	SP high limit	0.0 to 100.0% of PV input range (EU), (SPL <sph)< td=""><td>100.0 % of PV input range</td><td></td><td></td></sph)<>	100.0 % of PV input range		
5PL (SPL)	SP low limit	* Places the limit on the program setpoint, or local setpoint during program operation.	0.0 % of PV input range		

■ Output Setting Parameter

Menu symbol: [][] (OUT)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
D E (OT)	Output type selection Upper two digits Lower two digits	Control output or Heating-side control output (Lower two digits) 00: OFF 01: OUT terminals (voltage pulse) 02: OUT terminals (current) 03: OUT terminals (relay) 06: OUT2 terminals (relay) 07: RET/OUT2 terminals (voltage pulse) 08: RET/OUT2 terminals (current) Cooling-side control output (Upper two digits) 00: OFF 01: OUT terminals (voltage pulse) 02: OUT terminals (relay) 03: OUT terminals (relay) 06: OUT2 terminals (relay) 07: RET/OUT2 terminals (voltage pulse) 08: RET/OUT2 terminals (voltage pulse)	Standard type: 00.03 Heating/ cooling type: 06.03		
[<i>E</i> (CT)	Control output cycle time Heating-side control output cycle time (in Heating/cooling control)	0.5 to 1000.0 s	30.0 s		EASY
[E c (CTc)	Cooling-side control output cycle time		30.0 s		
l'AL (V.AT)	Automatic valve position adjustment	OFF: Stop automatic adjustment ON: Start automatic adjustment	OFF		
//R5 (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		
/ / <u>L</u> (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.	-		
/ / H (V.H)	Fully-opened valve position setting	Pressing the SET/ENTER key with valve position set to the fully-opened position by Up arrow key causes the adjusted value to be stored. When V.H adjustment is completed, V.H stops blinking.	-		
Ł <i>RŁ</i> (TR.T)	Valve traveling time	5 to 300 s	60 s		
l′,M∏⊿ (V.MOD)	Valve adjusting mode	O: Valve position feedback type 1: Valve position feedback type (moves to the estimating type if a feedback input error or break occurs.) 2: Valve position estimating type	0		STD
RL5 (RTS)	Retransmission output type of RET	OFF: Disable PV1: PV SP1: SP OUT1: OUT (Valve opening: 0 to 100 % in Position proportional control) LPS: 15 V DC loop power supply TSP1: Target SP HOUT1: Heating-side OUT COUT1: Cooling-side OUT MV1: Position proportional output (internal computed value) PV: PV terminals analog input	PV1		EASY
RLH (RTH)	Maximum value of retransmission output scale of RET	When RTS = PV1, SP1, TSP1, PV RTL + 1 digit to 30000 -1999 to RTH - 1 digit Decimal point position: When RTS=PV1, SP1, or TSP1,	100 % of PV input range		STD
RLL (RTL)	Minimum value of retransmission output scale of RET	decimal point position is same as that of PV input. When RTS=PV, decimal point position is same as that of PV input scale.	0 % of PV input range		0.5
[] IRS (01RS)	Retransmission output type of OUT current output	Same as RTS	OFF		
[] 	Maximum value of retransmission output scale of OUT current output	When O1RS = PV1, SP1, TSP1, PV O1RL + 1 digit to 30000 -19999 to O1RH - 1 digit Decimal point position: When O1RS=PV1, SP1, or TSP1, deci-	-		STD
[] [RL (01RL)	Minimum value of retransmission output scale of OUT current output	mal point position is same as that of PV input. When O1RS =PV, decimal point position is same as that of PV input scale.	-		
<u>П</u> ЦЯ (OU.A)	OUT current output range	4-20: 4 to 20 mA 0-20: 0 to 20 mA	4-20		CTC
RELA (RET.A)	RET current output range	20-4: 20 to 4 mA 20-0: 20 to 0 mA	4-20		STD

■ Heater Break Alarm Setting Parameter

Menu symbol: ### (HBA)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
Hb 15 (HB1.S)	Heater break alarm-1 function selection	0: Heater current measurement	1		
Hb2.5 (HB2.S)	Heater break alarm-2 function selection	1: Heater break alarm	1		
Hb / (HB1)	Heater break alarm-1 current setpoint	OFF, 0.1 to 300.0 Arms	OFF		EASY
Hb2 (HB2)	Heater break alarm-2 current setpoint		OFF		EAST
<i>[L]</i> (CT1.T)	CT1 coil winding number ratio	1 to 3300	800		
[<i>L2L</i> (CT2.T)	CT2 coil winding number ratio	110 3300	800		
HdN I (HDN1)	Heater break alarm-1 On-delay timer	0.00 to 00.50 (m.s)	0.00		STD
HdN2 (HDN2)	Heater break alarm-2 On-delay timer	0.00 to 99.59 (m.s)	0.00		310

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 (E3-terminal Area)

Menu symbol: **7485** (R485)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
P5L (PSL)	Protocol selection	PCL: PC link communication PCLSM: PC link communication (with checksum) LADR: Ladder communication CO-M: Coordinated master station MBASC: Modbus (ASCII) MBRTU: Modbus (RTU) P-P: Peer-to-peer communication	MBRTU		
6P5 (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 * The baud rate for RS-485 is up to 19.2 k bps in E4-terminal area.	19200		EASY
PRI (PRI)	Parity	NONE: None, EVEN: Even, ODD: Odd	EVEN		
5. P (STP)	Stop bit	1: 1 bit, 2: 2 bits	1		
dLN (DLN)	Data length	7: 7 bits, 8: 8 bits	8		
ADR)	Address	1 to 99	1		

■ Ethernet Communication Setting Parameter (E3-terminal Area)

Menu symbol: **ELHR** (ETHR)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
H5R (HSR)	High-speed response mode	OFF, 1 to 8	1		
6PS)	Baud rate	9600: 9600 bps, 19200: 19.2k bps, 38400: 38.4k bps	38400		
PRI (PRI)	Parity	NONE: None, EVEN: Even, ODD: Odd	EVEN		
/ P / to / P4 (IP1 toIP4)	IP address 1 to 4	0 to 255 Initial value: (IP1).(IP2).(IP3).(IP4) = (192).(168).(1).(1)	See left	Table below	
5M / to 5M4 (SM1 to SM4)	Subnet mask 1 to 4	0 to 255 Initial value: (SM1).(SM2).(SM3). (SM4) = (255).(255).(255).(0)	See left	Table below	
d[to d[4 (DG1 to DG4)	Default gateway 1 to 4	0 to 255 Initial value: (DG1).(DG2).(DG3). (DG4) = (0).(0).(0).(0)	See left	Table below	EASY
PRL (PRT)	Port number	502, 1024 to 65535	502		
I PAR (IPAR)	IP access restriction	OFF: Disable, ON: Enable	OFF		
## P to ## P4, 21 P to 21 P4 (1.IP1 to 1.IP4, 2.IP1 to 2.IP4)	Permitted IP address 1-1 to 1-4 Permitted IP address 2-1 to 2-4	0 to 255 Initial value: (1.IP1).(1.IP2).(1.IP3).(1.IP4) = (255).(255).(255).(255) (2.IP1).(2.IP2).(2.IP3).(2.IP4) = (255).(255).(255).(255)	See left	Table below	
ESW)	Ethernet setting switch	Setting this parameter to "ON" en- ables the Ethernet communication parameter settings. 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: PRUF (PROF)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
LR (BR)	Baud rate	9.6K: 9.6k bps 19.2K: 19.2k bps 93.75K: 93.75k bps 187.5K: 187.5k bps 0.5M: 0.5M bps 1.5M: 1.5M bps 3M: 3M bps 6M: 6M bps 12M: 12M bps AUTO 45.45K: 45.45k bps	AUTO		EASY
AdR (ADR)	Address	0 to 125	3		
6PS)	Baud rate	9600: 9600 bps 19200: 19.2k bps 38400: 38.4k bps	38400		
FI LE	Profile number	0, 11 to 13	0		

■ DeviceNet Communication Setting Parameter (E3-terminal Area)

Menu symbol: ANF (DNET)

Menu symbol: ONE (DNE I)						
Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level	
₽₽ (BR)	Baud rate	125K: 125k bps 250K: 250k bps 500K: 500k bps	125M			
AdR (ADR)	Address	0 to 63	63			
6PS)	Baud rate	9600: 9600 bps 19200: 19.2k bps 38400: 38.4k bps	38400		EASY	
FI LE	Profile number	0, 11 to 13	0			

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

Menu symbol: [[-L (CC-L)

werld symbol. LL -L (GG-L)						
Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level	
BR (BR)	Baud rate	156K: 156k bps 625K: 625k bps 2.5K: 2.5k bps 5M: 5M bps 10M: 10M bps	10M			
AdR (ADR)	Address	1 to 64	3		EASY	
<i>bP5</i> (BPS)	Baud rate	9600: 9600 bps 19200: 19.2k bps 38400: 38.4k bps	38400			
FI LE	Profile number	0, 11 to 13 (0, 11: Ver.1.10) (12, 13: Ver.2.00)	0			

■ Display Function Setting Parameter

Menu symbol: # 5P (DISP)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
PEMd (PCMD)	Active color PV display switch	0: Fixed in white 1: Fixed in red 2: Link to alarm 1 (Alarm OFF: white, Alarm ON: red) 3: Link to alarm 1 (Alarm OFF: red, Alarm ON: white) 4: Link to alarm 1 or 2 (Alarm OFF: white, Alarm ON: white) 5: Link to alarm 1 or 2 (Alarm OFF: red, Alarm ON: red) 5: Link to alarm 1 or 2 (Alarm OFF: red, Alarm ON: white) 6: PV limit (Within range: white, Out of range: red) 7: PV limit (Within range: red, Out of range: white) 8: SP deviation (Within deviation: white, Out of deviation: red) 9: SP deviation (Within deviation: red, Out of deviation: white, Out of deviation: white) 10: Link to DI (ON: red, OFF: white)	0		EASY
P[H (PCH)	PV color change high limit	Set a display value when in PV limit or SP deviation19999 to 30000 (Set a value within	0		
P[L (PCL)	PV color change low limit	the input range.)	0		

PESL (PTSL)	Program display pattern selection	PTN: Pattern display SK.RP: Ramp and soak display	PTN	
LAR I (BAR1)	Bar-graph display registration	O: Disable 1: OUT, Heating-side OUT, Internal value in Position proportional control 2: Cooling-side OUT 3: PV 4: SP 5: Deviation 6 to 16: Disable 17: Feedback input (valve opening) 18: PV terminals analog input 19 to 22: Disable 23: Time event and alarm status	23	STD
bdl' (BDV)	Bar-graph deviation display band	0.0 to 100.0% of PV input range span (EUS)	10.0 % of PV input range span	
GUID)	Guide display ON/OFF	OFF: Nondisplay, ON: Display	ON	STD
E[D (ECO)	Economy mode	OFF: Disable 1: Economy mode ON (All indications except PV display OFF) 2: Economy mode ON (All indications OFF) 3: Brightness 10 % (whole indication)	OFF	
BRI (BRI)	Brightness	(Dark) 1 to 5 (Bright)	3	EASY
ML 5d (MLSD)	Least significant digital mask of PV display	OFF: With least significant digit ON: Without least significant digit	OFF	STD

■ SELECT Display Setting Parameter

Menu symbol: [5EL (CSEL)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
[5 to [55] (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. OFF, 2201 to 5000 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
 n=4
 n=5
 n=6
 n=7
 n=6
 n=7
 n=6
 n=7
 n=6
 n=7
 n=6
 n=7
 n=7

■ Key Lock Setting Parameter

Menu symbol: // [[(KLOC)

Display level
STD
310
er

■ DI Function Registration Parameter

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
PR[(PRG)	Switch to PROG (Start of program operation)		5025		
R5L (RST)	Switch to RESET (Stop of program operation)		5026		
LOC)	Switch to LOCAL(LSP) (Start of local-mode operation)		5027		
P, / P (P/R)	PROG/RESET Switch		OFF		
P / H (P/H)	PROG/HOLD Switch		OFF		
P ./ L (P/L)	PROG/LOCAL(LSP) Switch	Set an I relay number of contact input. Set "OFF" to disable the function. Standard terminals	OFF		
HOLD)	Switch to HOLD (Start of hold-mode operation)		OFF		STD
Adl' (ADV)	Advance of segment	DI1: 5025, DI2: 5026, DI3: 5027 E4-terminal area	OFF		0.5
WAIT)	Wait ON/OFF switch	DI41: 5089, DI42: 5090, DI43: 5091, DI44: 5092, DI45: 5093	OFF		
A / M (A/M)	AUTO/MAN switch		OFF		
AL (AT)	Auto-tuning START/STOP switch	-	OFF		
LAL (LAT)	Latch release		OFF		
LEd (LCD)	LCD backlight ON/OFF switch		OFF		
Pl'PU (PVRW)	PV red/white switch		OFF		

■ DI Function Numbering Parameter

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
P<u>L</u>LD (PT.B0)	Bit-0 of program pattern number		5089		
P<u>L</u>L 1 (PT.B1)	Bit-1 of program pattern number		5090		EASY
PL.b.2 (PT.B2)	Bit-2 of program pattern number		5091		
PN <u>B</u> (D) (PN.B0)	Bit-0 of PID number	Set an I relay number of contact input. Set "OFF" to disable the function.	OFF		
PNL 1 (PN.B1)	Bit-1 of PID number	Standard terminals DI1: 5025, DI2: 5026, DI3: 5027	OFF		
PN62 (PN.B2)	Bit-2 of PID number	E4-terminal area DI41: 5089, DI42: 5090, DI43: 5091, DI44: 5092, DI45: 5093	OFF		STD
MP.b0 (MP.B0)	Bit-0 of manual preset output number		OFF		310
MP.b 1 (MP.B1)	Bit-1 of manual preset output number		OFF		
Hb 1 (MP.B2)	Bit-2 of manual preset output number		OFF		

■ AL1-AL3 Function Registration Parameter

Menu symbol: \not H M (ALM)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
AL 15 (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. Set "OFF" to disable the function. Setting range: 4001 to 6304 No function: OFF PV event 1: 4801, PV event 2: 4802 Time event 2: 4818, Time event 2: 4818, Time event 3: 4819, Time event 4: 4821 Alarm 1: 4353 Alarm 2: 4354 AUTO (ON) / MAN (OFF) status: 4177 Program RESET status: 4181 Program RESET status: 4181 Program RUN status: 4183 HOLD mode status: 4183 HOLD mode status: 4187 Pattern end signal (1 second): 4265 Pattern end signal (3 seconds): 4266 Pattern end signal (1 second): 4267 Wait end signal (3 seconds): 4257 Wait end signal (3 Seconds): 4258 Wait end signal (5 seconds): 4258 Wait end signal (5 seconds): 4259 FAIL (Normally ON) output: 4256	For the items other than below, see User's Manual. 4801		
AL 2.5 (AL2.S)	AL2 function selection		4802		
AL 35 (AL3.S)	AL3 function selection		4817		
[]R.5 (OR.S)	OUT relay function selection		OFF		STD
02 P5 (OR2.S)	OUT2 relay function selection		OFF		

■ DO Setting Parameter (E1-terminal Area)

Menu symbol: d[] (DO)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
dD l5 (DO1.S)	DO11 function selection	Same as AL1.S Set "OFF" to disable the function.	4353	Table below	STD
d02.5 (D02.S)	DO12 function selection		4354		
dD35 (DO3.S)	DO13 function selection		4818		
d045 (D04.S)	DO14 function selection		4819		
d05.5 (D05.S)	DO15 function selection		4821		

Use the following table to record DO setting value.

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

■ System Setting Parameter

Menu symbol: 545 (SYS)

symbol	Name of Parameter	Setting Range	Initial value	setting	level
RMd (R.MD)	Restart mode	Set how the controller should recover from a power failure of 5 seconds or more. CONT: Continue action set before power failure. MAN: Start from MAN. RESET: Start from AUTO and RESET. Outputs the preset output value.	CONT		STD
RLM (R.TM)	Restart timer	Set time between power on and the instant where controller starts computation. 0 to 10 s	0		
EP () (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. 0: Preset output 1: 0% output 2: 100% output	0		STD
FREQ (FREQ)	Power frequency	AUTO, 60: 60 Hz, 50: 50 Hz	AUTO		
Q5M (QSM)	Quick setting mode	OFF: Disable ON: Enable	ON		
LANG)	Guide display language	ENG: English FRA: French GER: German SPA: Spanish	Depends on the model and suffix codes		EASY
PRSS (PASS)	Password setting	0 (No password) to 65535	0		

■ Error and Version Confirmation Parameter (for display only)

Menu symbol: L'ER (VER)

Parameter symbol	Name of Parameter	Status record	Display level
PRER (PA.ER)	Parameter error status		
OP.ER)	Option error status		
Ad IE (AD1.E)	A/D converter error status 1		
Ad2E (AD2.E)	A/D converter error status 2		
PV (E (PV1.E)	PV input error status		
LRER (LA.ER)	Ladder error status		
MEU (MCU)	MCU version		
dEU (DCU)	DCU version		
E[U (ECU1)	ECU-1 version (E1-terminal area)		EASY
E[U] (ECU3)	ECU-3 version (E3-terminal area)		LAST
E[U4 (ECU4)	ECU-4 version (E4-terminal area)		
PARA (PARA)	Parameter version		
HJ'ER (H.VER)	Product version		
5ER 1 (SER1)	Serial number 1		
5ER2 (SER2)	Serial number 2		
MAC 1 (MAC1)	MAC address 1 (E3-terminal area)		
MRE2 (MAC2)	MAC address 2 (E3-terminal area)		
MAC3)	MAC address 3 (E3-terminal area)		

■ Parameter Display Level Parameter

Menu symbol: L L'L (LVL)

Parameter symbol	Name of Parameter	Setting Range	Initial value	User setting	Display level
LEVL)	Parameter display level	EASY: Easy setting mode STD: Standard setting mode PRO: Professional setting mode	STD		EASY

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

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