User's Manual

UTAdvanced

UT35A-L Digital Indicating Controller User's Manual for Limit Control Type

IM 05P04D41-01EN

YOKOGAWA
Yokogawa Electric Corporation

IM 05P04D41-01EN
3rd Edition

Notice of Alterations

CE/UKCA Standard Compliant

CE/UKCA 規格適合

UTAdvanced

English

Please change the description in the UTAdvanced Operation Guide and User's Manual as follows.

Authorised Representative in the EEA and the Importer into the EU/EEA Market

The Authorised Representative for this product in the EEA and the importer for this product into the EU/EEA market via Yokogawa sale channel is:
Yokogawa Europe B.V.
Euroweg 2, 3825 HD Amersfoort,The Netherlands

Importer for This Product into the Great Britain Market

In relation to UKCA marking, the importer for this product into the Great Britain market via the YOKOGAWA sales channel is :
Yokogawa United Kingdom Limited
Stuart Road Manor Park Runcorn, WA7 1TR, United Kingdom

Protection of Environment

Waste Electrical and Electronic Equipment (WEEE)

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

Japanese

UTAdvanced シリーズのオペレーションガイドおよびユーザーズマニュアルの記載を下記の通り変更いたします。

認定代理人 / 輸入業者

横河ヨーロッパ（Yokogawa Europe B.V. Euroweg 2, 3825 HD Amersfoort, The Netherlands）は、欧州経済領域における本製品の認定代理人であり、欧州連合及び欧州経済領域への本製品の輸入業者です。

UKCA 市場への輸入業者

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廃電気電子機器指令

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IM 05P01C31-01Z1-S12 P.1/1
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Product Registration

Thank you for purchasing YOKOGAWA products.

YOKOGAWA provides registered users with a variety of information and services.
Please allow us to serve you best by completing the product registration form accessible from our homepage.

http://www.yokogawa.com/ns/reg/

Introduction

Thank you for purchasing the UT35A-L digital indicating controller (hereinafter referred to as UT35A-L).
This manual describes how to use UT35A-L functions other than UT35A-L's communication function. Please read through this user's manual carefully before using the product.

- **Printed manual**

Manual Name	Manual Number	Description
UT35A/UT32A Operation Guide «Standard Code Model»	IM 05P01D31-11EN	This manual describes the basic operation method.
UT35A/UT32A Operation Guide «Detailed Code Model»	IM 05P01D31-15EN	This manual describes the basic operation method.
UT35A/MDL, UT32A/MDL Controller (DIN Rail Mounting Type) Operation Guide «Standard Code Model»	IM 05P01D81-11EN	This manual describes the basic operation method.
UT32A-D Digital Indicating Controller (Dual-loop type) Operation Guide «Standard Code Model»	IM 05P08D31-11EN	This manual describes the basic operation method.
UT32A-D/MDL Digital Indicating Controller (Dual-loop, DIN Rail Mounting Type) Operation Guide «Standard Code Model»	IM 05P08D81-11EN	This manual describes the basic operation method.
UT35A/RSP, UT32A/RSP Digital Indicating Controller (Non-isolated Remote Input Type) Operation Guide «Standard Code Model»	IM 05P01D31-81EN	This manual describes the remote input.
UT35A-L Operation Guide	IM 05P04D41-11EN	This manual describes the basic operation method.
UT32A Digital Indicating Controller Operation Guide «Entry Model»	IM 05P01F31-11EN	This manual describes the basic operation method.
Precautions on the Use of the UTAdvanced Series	IM 05P01A01-11EN	This manual is always delivered even if 'without manuals' was selected.

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- **Electronic manuals**

Manual Name	Manual Number	Description
UT35A/UT32A Operation Guide «Standard Code Model»	IM 05P01D31-11EN	This is identical to the printed manual.
UT35A/UT32A Operation Guide «Detailed Code Model»	IM 05P01D31-15EN	This is identical to the printed manual.
UT35A/MDL, UT32A/MDL Controller (DIN Rail Mounting Type) Operation Guide «Standard Code Model»	IM 05P01D81-11EN	This manual describes the basic operation method.
UT35A-L Operation Guide	IM 05P04D41-11EN	This is identical to the printed manual.
UT32A-D Digital Indicating Controller (Dual-loop type) Operation Guide «Standard Code Model»	IM 05P08D31-11EN	This manual describes the basic operation method.
UT32A-D/MDL Digital Indicating Controller (Dual-loop, DIN Rail Mounting Type) Operation Guide «Standard Code Model»	IM 05P08D81-11EN	This manual describes the basic operation method.
UT35A/RSP, UT32A/RSP Digital Indicating Controller (Non-isolated Remote Input Type) Operation Guide «Standard Code Model»	IM 05P01D31-81EN	This manual describes the remote input.
UT32A Digital Indicating Controller Operation Guide «Entry Model»	IM 05P01F31-11EN	This manual describes the basic operation method.
UT35A/UT32A User's Manual	IM 05P01D31-01EN	This manual. It describes the usage of all functions except the ladder sequence and communication functions.
UT35A-L User's Manual	IM 05P04D41-01EN	This manual. It describes the usage of all functions except the communication functions.
UT32A-D, UT32A-D/MDL Digital Indicating Controller Controller User's Manual	IM 05P08D31-01EN	This manual. It describes the usage of all functions except the ladder sequence and communication functions.
UTAdvanced Series Communication Interface (RS-485, Ethernet) User's Manual	IM 05P07A01-01EN	This manual describes how to use UT35A/UT32A in Ethernet and serial communications. For communication wiring, see the Operation Guide or User's Manual.
UTAdvanced Series Communication Interface (Open Network) User's Manual	IM 05P07A01-02EN	This manual describes how to use UT35A in PROFIBUS-DP/DeviceNet/ CC-Link communications. For communication wiring, see the Operation Guide or User's Manual.
LL50A Parameter Setting Software Installation Manual	IM 05P05A01-01EN	This manual describes how to install and uninstall the LL50A.
LL50A Parameter Setting Software User's Manual	IM 05P05A01-02EN	This manual describes how to use the LL50A, ladder sequence function, peer-to-peer communication, and network profile creating function.
Precautions on the Use of the UTAdvanced Series	IM 05P01A01-11EN	This manual is always delivered even if 'without manuals' was selected.

* User's Manual can be downloaded from a website.

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

- **General Specifications**

General Specification Name	GS Number
UT35A/UT32A Digital Indicating Controller	GS 05P01D31-01EN
UT35A/MDL, UT32A/MDL Digital Indicating Controller (DIN Rail Mounting Type)	GS 05P01D81-01EN
UT35A-L Digital Indicating Controller (Limit Control Type)	GS 05P04D41-01EN
UT32A-D Digital Indicating Controller (Dual-loop type)	GS 05P08D31-01EN
UT32A-D/MDL Digital Indicating Controller (Dual-loop, DIN Ral Mounting Type)	GS 05P08D81-01EN
LL50A Parameter Setting Software	GS 05P01A01-01EN

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

- **Authorised Representative in the EEA**

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

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.

Notice

- The contents of this manual are subject to change without notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention, however, please inform Yokogawa Electric's sales office or sales representative.
- Under no circumstances may the contents of this manual, in part or in whole, be transcribed or copied without our permission.

Trademarks

- Our product names or brand names mentioned in this manual are the trademarks or registered trademarks of Yokogawa Electric Corporation (hereinafter referred to as YOKOGAWA).
- Adobe, Acrobat, and Postscript are either registered trademarks or trademarks of Adobe Systems Incorporated.
- Modbus is a registered trademark of Schneider Electric.
- We do not use the TM or ® mark to indicate these trademarks or registered trademarks in this user's manual.
- All other product names mentioned in this user's manual are trademarks or registered trademarks of their respective companies.

Safety Precautions

This instrument is a product of Installation Category II of IEC/EN/CSA/UL61010-1, IEC/EN61010-2-201, IEC/EN61010-2-030 Safety Standards and Class A of EN61326-1, EN55011 (EMC Standards).

CAUTION

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

The instrument is a product rated Measurement Category O (other).

* Measurement Category O (other)
This category applies to electric equipment that measures a circuit connected to a low-voltage facility and receives power from stationary equipment such as electric switchboards.

To use the instrument properly and safely, observe the safety precautions described in this user's manual when operating it. Use of the instrument in a manner not prescribed herein may compromise protection features inherent in the device. We assume no liability for or warranty on a fault caused by users' failure to observe these instructions.
This instrument is designed to be used within the scope of Measurement Category O (other) and is dedicated for indoor use.

Notes on the User's Manual

- This user's manual should be readily accessible to the end users so it can be referred to easily. It should be kept in a safe place.
- Read the information contained in this manual thoroughly before operating the product.
- The purpose of this user's manual is not to warrant that the product is well suited to any particular purpose, but rather to describe the functional details of the product.

This manual is an essential part of the product; keep it in a safe place forfuture reference.
This manual 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.

Safety, Protection, and Modification of the Product

The following symbols are used in the product and user's manuals to indicate safety precautions:


"Handle with Care" (This symbol is attached to the part(s) of the product to indicate that the user's manual should be referred to in order to protect the operator and the instrument from harm.)


AC


AC/DC


The equipment wholly protected by double insulation or reinforced insulation.


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

- 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 this 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.
- 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.
- Be sure to use the spare parts approved by YOKOGAWA when replacing parts or consumables.
- 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.
- Modification of the product is strictly prohibited.
- This product is intended to be handled by skilled/trained personnel for electric devices.
- This product is UL Recognized Component. In order to comply with UL standards, end-products are necessary to be designed by those who have knowledge of the requirements.

WARNING

- Power Supply
  Ensure that the instrument's supply voltage matches the voltage of the power supply before turning ON the power.
- Do Not Use in an Explosive Atmosphere
  Do not operate the instrument in locations with combustible or explosive gases or steam. Operation in such environments constitutes an extreme safety hazard. Use of the instrument in environments with high concentrations of corrosive gas (H_2S, SO_X, etc.) for extended periods of time may cause a failure.
- Do Not Remove Internal Unit
  The internal unit should not be removed by anyone other than YOKOGAWA's service personnel. There are dangerous high voltage parts inside. Additionally, do not replace the fuse by yourself.
- Damage to the Protective Construction
  Operation of the instrument in a manner not specified in this user's manual may damage its protective construction.

Warning and Disclaimer

- YOKOGAWA makes no warranties regarding the product except those stated in the WARRANTY that is provided separately.
- 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.

Notes on Software

- YOKOGAWA makes no warranties, either expressed or implied, with respect to the software’s merchantability or suitability for any particular purpose, except as specified in the terms of the separately provided warranty.
- This software may be used on one specific machine only.
- To use the software on another machine, the software must be purchased again separately.
- It is strictly prohibited to reproduce the product except for backup purposes.
- All reverse-engineering operations, such as reverse compilation or the reverse assembly of the product are strictly prohibited.
- No part of the product’s software may be transferred, converted, or sublet for use by any third party, without prior written consent from YOKOGAWA.

Handling Precautions for the Main Unit

- The instrument comprises many plastic components. To clean it, wipe it with a soft, dry cloth. Do not use organic solvents such as benzene or thinner for cleaning, as discoloration or deformation may result.
- Keep electrically charged objects away from the signal terminals. Not doing so may cause the instrument to fail.
- Do not apply volatile chemicals to the display area, operation keys, etc. Do not leave the instrument in contact with rubber or PVC products for extended periods. Doing so may result in failure.
- If the equipment emits smoke or abnormal smells or makes unusual noises, turn OFF the instrument’s power immediately and unplug the device. In such an event, contact your sales representative.

Checking the Contents of the Package

Unpack the box and check the contents before using the product. If the product is different from that which you have ordered, if any parts or accessories are missing, or if the product appears to be damaged, contact your sales representative.

UT35A-L Main Unit

The UT35A-L main units have nameplates affixed to the side of the case.
Check the model and suffix codes inscribed on the nameplate to confirm that the product received is that which was ordered.

No. (Instrument number)

When contacting your sales representative, inform them of this number, too.

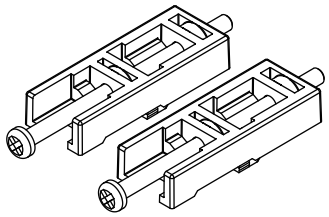
Model and Suffix Codes of UT35A-L

Model	Suffix code	Optional suffix code	Description
UT35A			Digital Indicating Controller (provided with retransmission output, 2 DIs, and 3 DOs) (Power supply: 100-240 V AC)
Type 1: Basic control	**-L**		Limit control type
Type 2: Functions	**0**		Always “0”
Type 3: Open networks	**0**		None
	1		RS-485 communication (Max.38.4 kbps, 2-wire/4-wire)
	2		Ethernet communication (with serial gateway function)
Display language	**-1**		English
Case color	**0**		White (Light gray)
	1		Black (Light charcoal gray)
Fixed code	**-00**		Always "-00"
		/DC	Power supply 24 V AC/DC

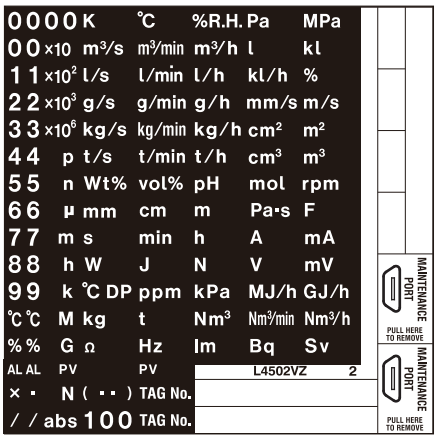
Accessories

The product is provided with the following accessories according to the model and suffix codes. Check that none of them are missing or damaged.

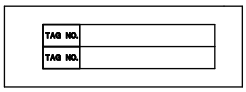
1



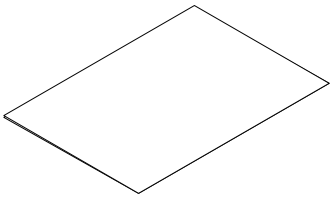
2



3



4



No.	Product Name	Quantity	Remark
1	Brackets	2	Part number: L4502TP (For fixing the upper and lower parts)
2	Unit label	1	Part number: L4502VZ
3	Tag label	1	Part number: L4502VE (Only when ordered.)
4	Operation Guide	1	A3 size, x 5 (Standard model only)

Accessory (sold separately)

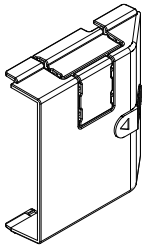
The following lists an accessory sold separately.

• LL50A Parameter Setting Software

Model	Suffix code	Description
LL50A	-00	Parameter Setting Software

• Terminal cover

Model: UTAP001



• Brackets

Part number L4502TP (2 pieces for fixing the upper and lower parts)

• User's Manual (A4 size)

* User's Manual can be downloaded from a website.

Symbols Used in This Manual

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

WARNING

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

CAUTION

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

Note

Identifies important information required to operate the instrument.

▶

Indicates related operations or explanations for the user's reference.

[ ]

Indicates a character string displayed on the display.

Setting Display

Indicates a setting display and describes the keystrokes required to display the relevant setting display.

Setting Details

Provides the descriptions of settings.

Description

Describes restrictions etc. regarding a relevant operation.

How to Use This Manual

This user's manual is organized into Chapters 1 to 18 as shown below.

Chapter	Title and Description
1	**Introduction to Functions** Describes the main functions of the UT35A-L.
2	**UT35A-L Operating Procedures** Describes the flow from unpacking to regular operations.
3	**Part Names** Describes part names and functions on the front panel.
4	**Basic Operation** Describes basic operation of the UT35A-L.
5	**Quick Setting Function** Describes the minimum necessary settings for operation.
6	**Monitoring and Control of Regular Operations** Describes monitoring displays of regular operations and operation.
7	**Input (PV) Functions** Describes PV input.
8	**Function Block Diagram** Provides function block diagrams.
9	**Auxiliary Control Functions** Describes auxiliary control functions
10	**Retransmission Output Functions** Describes output functions.
11	**Alarm Functions** Describes alarm output and status output.
12	**Contact Input Functions** Describes contact input functions.
13	**Display, Key, and Security Functions** Describes display, user function key and security functions.
14	**Parameter Initialization** Describes the initialization to factory default values and to user default values.
15	**Power Failure Recovery Processing / Power Frequency Setting / Other Settings** Describes operations performed after momentary power interruption and power failures.
16	**Troubleshooting, Maintenance, and Inspections** Describes troubleshooting, maintenance, periodic inspections, and disposal.
17	**Installation and Wiring** Describes installation and wiring.
18	**Parameters** Provides parameter maps.
GS	**Specifications** Provides the UT35A-L specifications.

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Appendix Input and Output Table .....

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Revision Information

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1.1 Quick Setting Function

The Quick setting function is a function to easily set the basic function of the controller.

Buy and Unpacking

Check the contents.

Installation and Wiring

Installation and Wiring: Chapter 17
Install and wire a controller, and then turn on the power.

Setup

Q: What should I do to perform operate immediately? First, I want to set the input and output.

A: Use the Quick setting function to perform the setup easily.
Quick setting function: Chapter 5

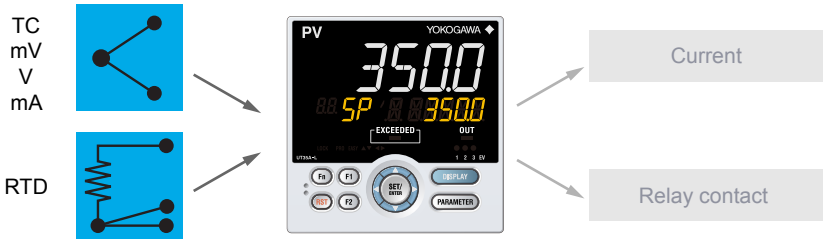
Operation

1.2 Input/Output Functions

PV Input (equipped as standard)

PV input is a universal input to arbitrarily set the type and range for the thermocouple (TC), resistance-temperature detector (RTD), and DC voltage/current.

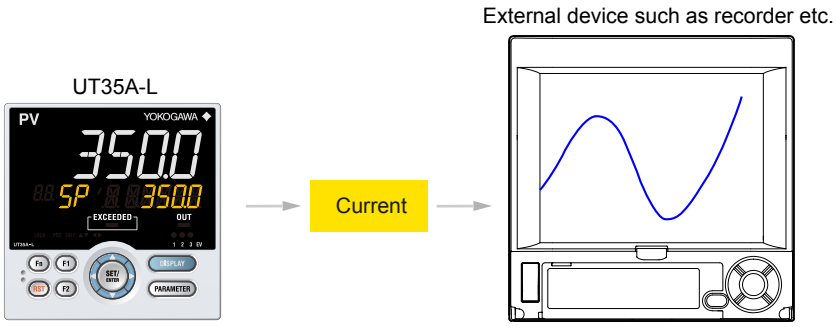
► Chapter 7 Input (PV) Functions



Retransmission Output

Retransmission output outputs a PV input value (PV), target setpoint (SP), and the like as an analog signal to, for example, the recorder.

► Chapter 10 Retransmission Output Functions



Contact Input

Two contact inputs are incorporated in UT35A-L.

► Chapter 12 Contact Input Functions

Contact Output

Three contact outputs are incorporated in UT35A-L. Contact output can output events such as alarms.

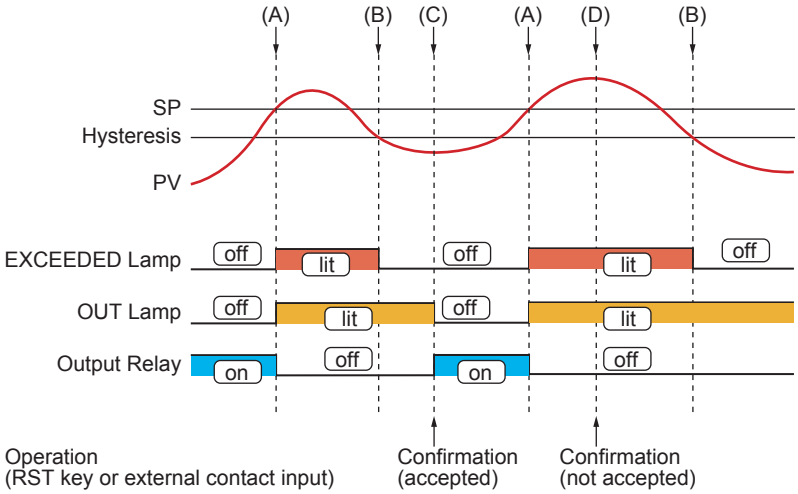
For details, see the table of Model and Suffix Codes.

► Chapter 11 Alarm Functions

1.3 Limit Control Functions

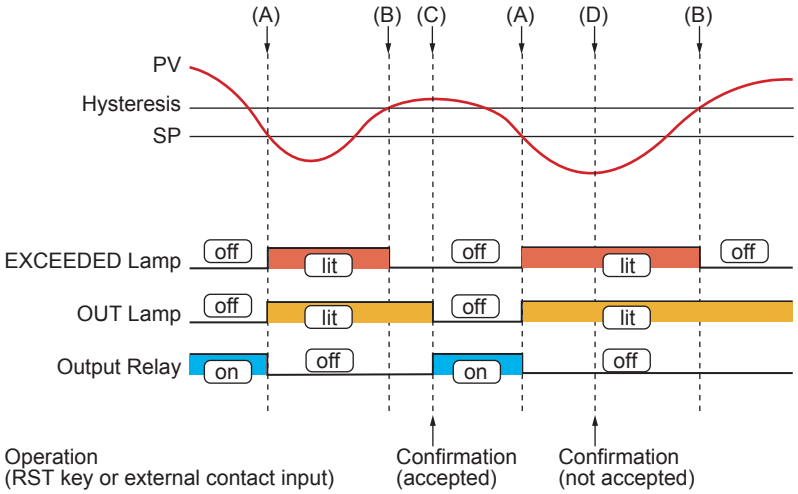
In Case of High Limit Control

When PV exceeds a setpoint (SP), "EXCEEDED" lamp lights, and "OUT" lamp turns ON (point A). The limit control output relay is de-energized then.
"EXCEEDED" lamp turns off when PV goes into normal condition, while "OUT" lamp stays on as it is (point B). "OUT" lamp turns off when a confirming operation is done by an operator (point C). The way to confirm is pushing the "RST" key (or by an exeternal contact, according to the setting of setup parameter CNF). The confirming operation is not accepted during PV exceeds SP (point D). State of output relay is deenergized whenever "OUT" lamp is on. (NC terminal: CLOSE, NO terminal: OPEN)



In Case of Low Limit Control

When PV exceeds a setpoint (SP), “EXCEEDED” lamp lights, and “OUT” lamp turns ON (point A). The limit control output relay is de-energized then.
“EXCEEDED” lamp turns off when PV goes into normal condition, while “OUT” lamp stays on as it is (point B). “OUT” lamp turns off when a confirming operation is done by an operator (point C). The way to confirm is pushing the “RST” key (or by an exeternal contact, according to the setting of setup parameter CNF). The confirming operation is not accepted during PV exceeds SP (point D). State of output relay is deenergized whenever “OUT” lamp is on. (NC terminal: CLOSE, NO terminal: OPEN)



Power on Status

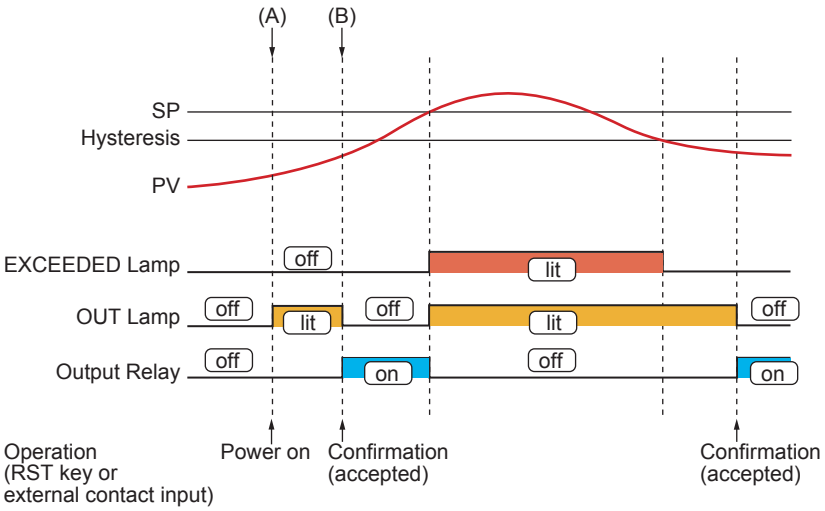
The state of output relay at power-on can be set by a setup parameter restart mode R.MD.
Restart mode R.MD:

0: Limit output relay is de-energized at power on.
1: Limit output relay is energized at power on.

When parameter R.MD is set to 0.

The limit output relay is always de-energized at power on, even if PV doesn't exceed SP (point A). (NC terminal: CLOSE, NO terminal: OPEN). "OUT" lamp is lit. After the confirmation, state of output relay is energized (NC terminal: OPEN, NO terminal: CLOSE) and "OUT" lamp turns off, if the PV doesn't exceed SP (point B).

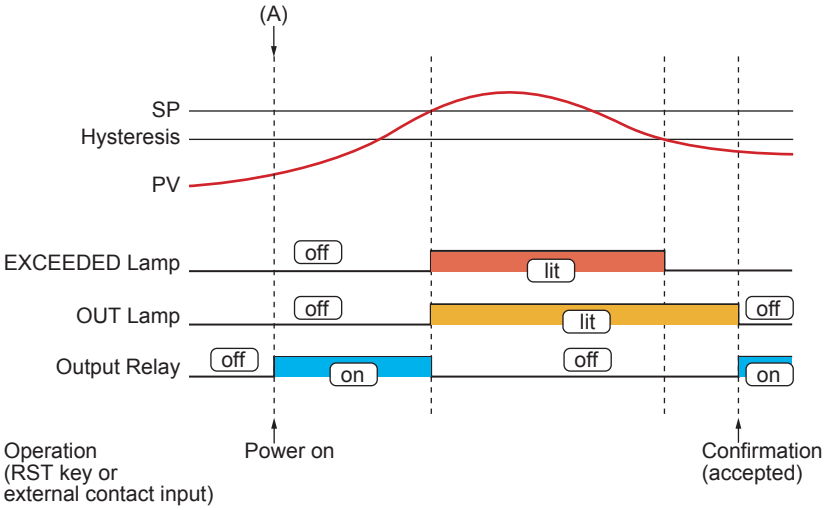
In Case of High Limit Control



When parameter R.MD is set to 1.

The limit output relay is always energized at power on (point A) (NC terminal: OPEN, NO terminal: CLOSE) and "OUT" lamp is off, except when PV exceeds SP at power on.

In Case of High Limit Control



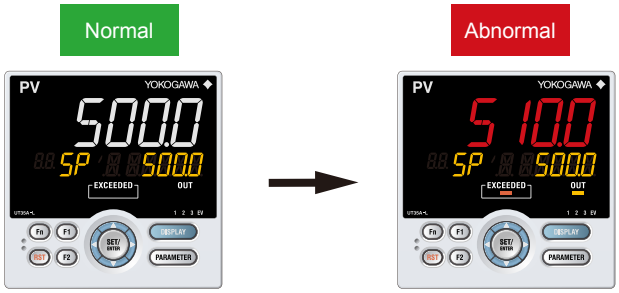
1.4 Display and Key Functions

Employing a 14-segment, active color LCD greatly increases the monitoring and operating capabilities.

Active Color PV Display (display color change)

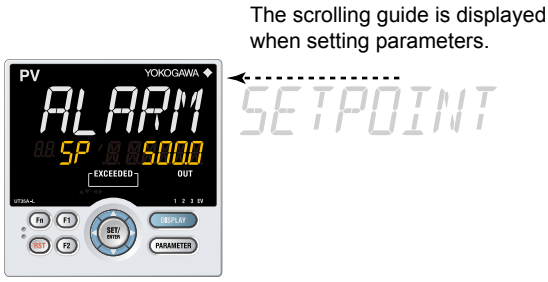
The active color PV display function changes the PV display color (red or white) when abnormality occurs in PV etc.

► 13.1.1 Setting Active Color PV Display Function



Guide Display

The guide is displayed on PV display when setting parameters. This guide can be turned on/off with the Fn key.



Parameter Display Level

To intended use of the operator, the display level of the parameter can be set.

► Chapter 18 Parameters

User Function Keys

The UT35A-L has user function keys (F1, F2, and Fn).
Assign a function to a user function key to use it as an exclusive key.

► 13.2 Assigning Function to User Function Key

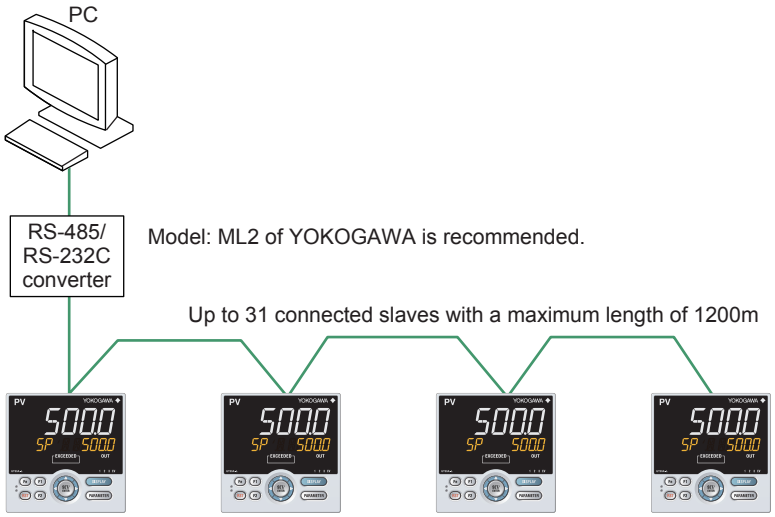
1.5 Communication Functions

The UT35A-L can use RS-485 communication and Ethernet communication specifying the suffix code and optional suffix code for each communication.

► UTAdvanced Series Communication Interface (RS-485, Ethernet) User's Manual

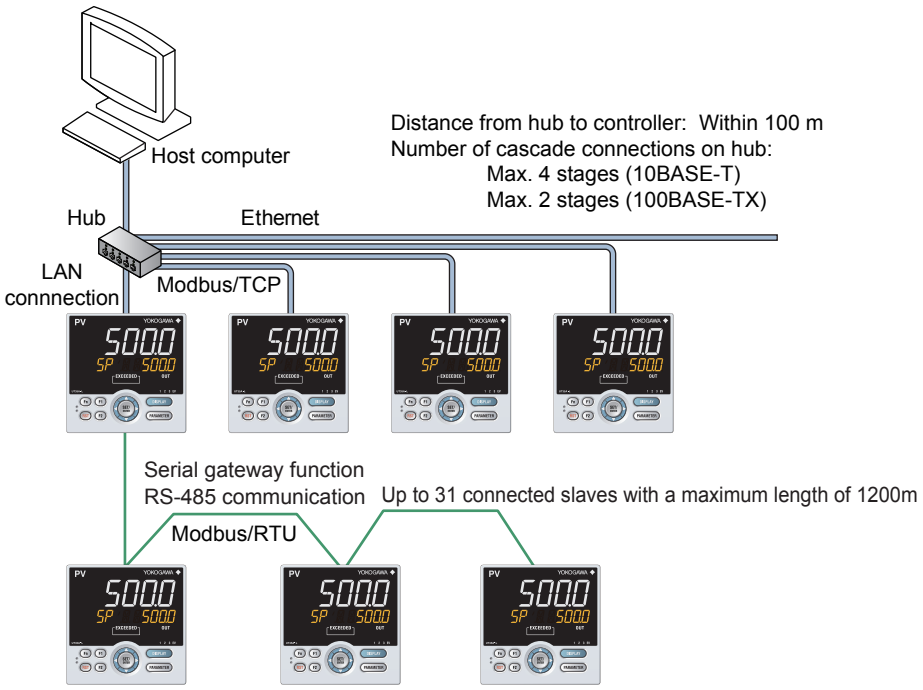
RS-485 Communication (Modbus communication, PC link communication, and Ladder communication)

The UT35A-L can communicate with PCs, PLCs, touch panels, and other devices.



Ethernet Communication (Modbus/TCP)

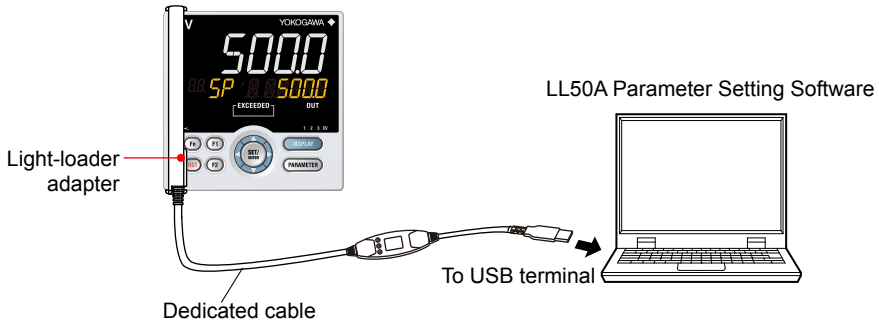
The UT35A-L can be connected to IEEE802.3-compliant network (10BASE-T/100BASE-TX). A serial gateway function can increase the number of connected controllers.



Light-loader Communication

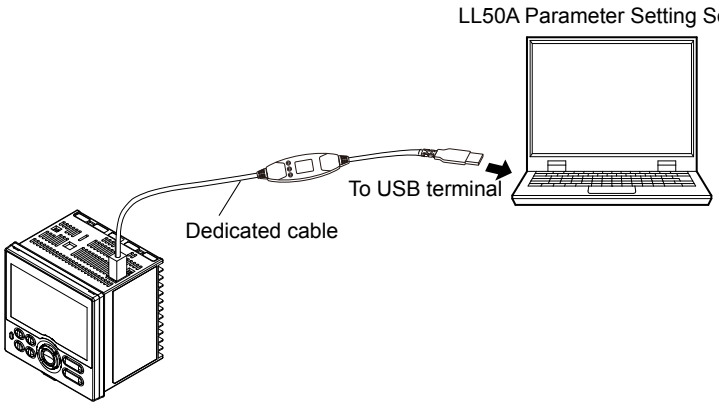
Use the LL50A to set parameters. Attach the adapter to the front of the controller to communicate.

► Light-loader function: LL50A Parameter Setting Software User's Manual



Maintenance Port Communication (Power supply is not required for the UT35A-L)

Maintenance port is used to connect with the dedicated cable when using LL50A Parameter Setting Software (sold separately). The parameters can be set without supplying power to the UT35A-L.



CAUTION

When using the maintenance port, do not supply power to the controller. Otherwise, the controller does not work normally.
If power is supplied to the controller while the cable is connected, or the cable is connected to the controller already turned on, unplug the cable and turn on the controller again. The controller returns to the normal condition.

1.6 Definition of Main Symbols and Terms

Main Symbol

PV: Measured input value
SP: Target setpoint
OUT: Limit control output

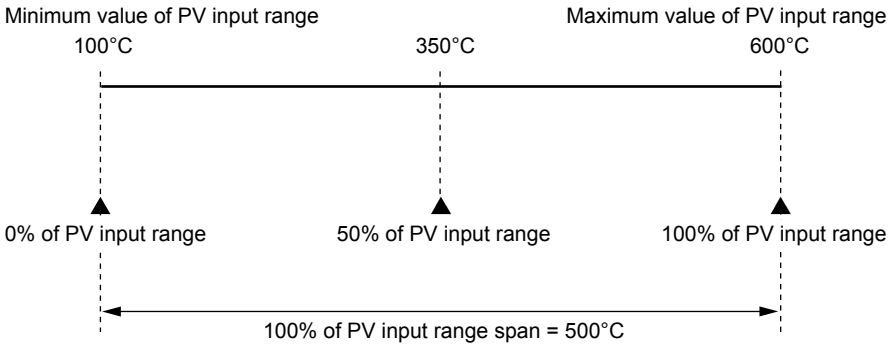
E3: Terminal areas
► 17.4 Wiring

Engineering Units

Input range (scale): the PV range low limit is set to 0%, and the high limit is set to 100% for conversion.
Input range (scale) span: the PV range span is set to 100% for conversion.

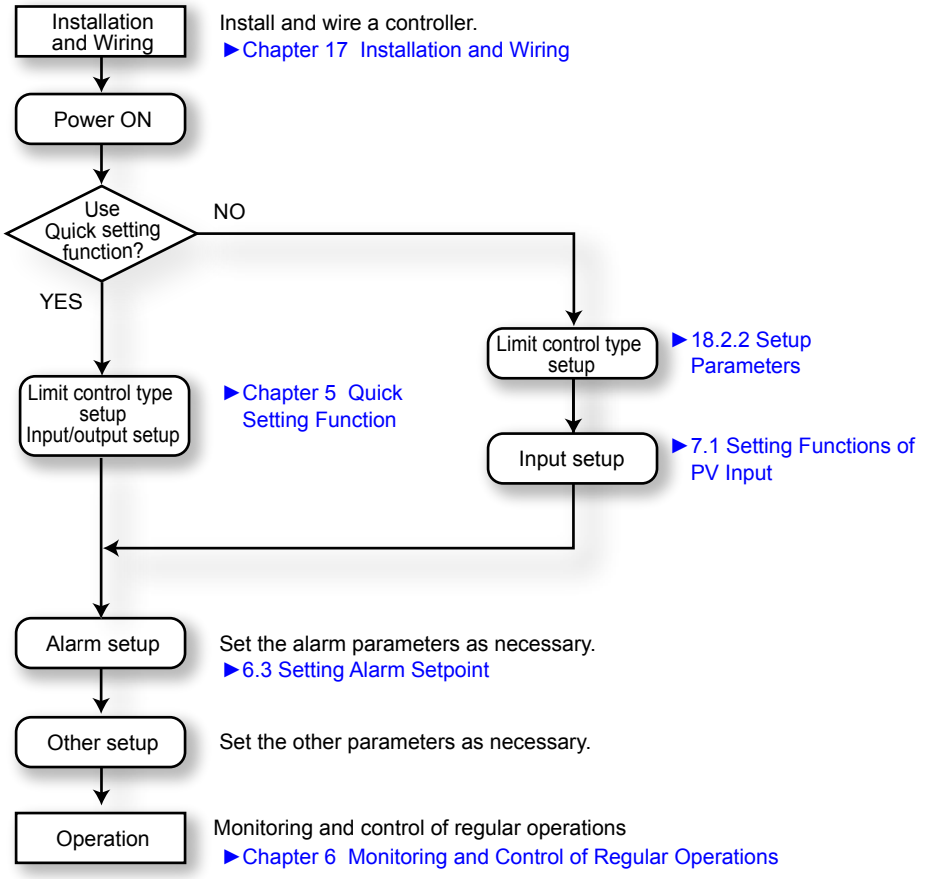
In this manual, the parameter setting range is described as the “input range” and “input range span.” This means that engineering units are required to be set. Set a temperature for temperature input.

The following describes a conversion example.
When the PV input range is 100 to 600°C, 0% of the PV range is equivalent to 100°C, 50% of the PV range is equivalent to 350°C, and 100% of the PV range is equivalent to 600°C.
100% of the PV range span is equivalent to 500°C.
20% of the PV range span is equivalent to 100°C.



The above applies to the scale for voltage and current input.

2.1 UT35A-L Operating Procedures



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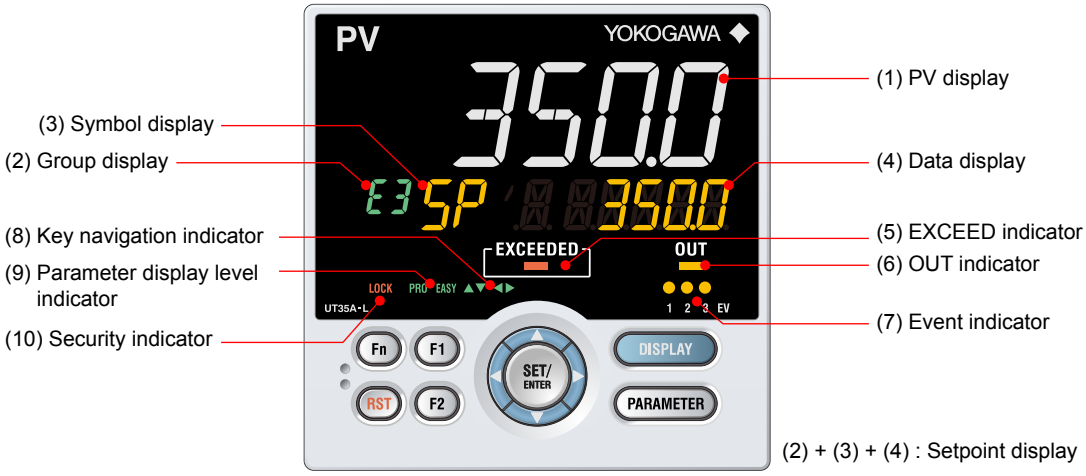
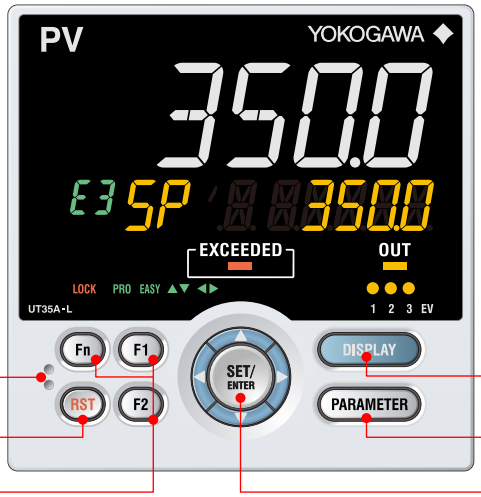
3.1 Names and Functions of Display Parts



No. in figure	Name	Description
(1)	**PV display (white or red)**	Displays PV. Displays an error code if an error occurs. Displays the scrolling guide in the Menu Display and Parameter Setting Display when the guide display ON/OFF is set to ON.
(2)	**Group display (green)**	Displays terminal area (E3). E3 is displayed in the Parameter Setting Display.
(3)	**Symbol display (orange)**	Displays a parameter symbol.
(4)	**Data display (orange)**	Displays a parameter setpoint and menu symbol.
(5)	**EXCEED indicator (red)**	Light to indicate the exceeded status of PV. Lights while PV exceeds SP.
(6)	**OUT indicator (orange)**	Light to indicate the output status. Lights while the relay output is OFF.
(7)	**Event indicator (orange)**	Lit when the alarms 1 to 3 occur. Event displays other than alarms can be set by the parameter.
(8)	**Key navigation indicator (green)**	Lit or blinks when the Up/Down or Left/Right arrow key operation is possible.
(9)	**Parameter display level indicator (green)**	Displays the setting conditions of the parameter display level function.
(10)	**Security indicator (red)**	Lit if a password is set. The setup parameter settings are locked.

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

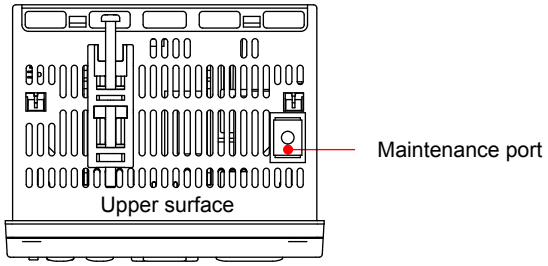
3.2 Names and Functions of Keys



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 setting (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 to the adapter cable when setting and storing parameters via PC. The LL50A Parameter Setting Software (sold separately) is required.
(5)	**RST key**	Used to confirm and reset the limit output and related parameters.
(6)	**User function keys**	The user can assign a function to the key. The function is set by the parameter.

Maintenance Port (Power supply is not required for the UT35A-L).

The maintenance port is used to connect with the dedicated cable when using LL50A Parameter Setting Software (sold separately). The parameters can be set without supplying power to the UT35A-L.



UT35A-L

CAUTION

When using the maintenance port, do not supply power to the controller. Otherwise, the controller does not work normally.
If power is supplied to the controller while the cable is connected, or the cable is connected to the controller already turned on, unplug the cable and turn on the controller again. The controller returns to the normal condition.

3.3 List of Display Symbols

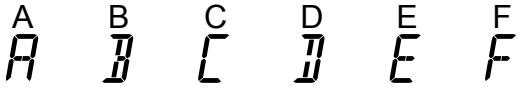
The following shows the parameter symbols, menu symbols, alphanumeric of guide, and symbols which are displayed on the UT35A-L.

Figure (common to all display area)

0 1 2 3 4 5 6 7 8 9

PV display (14 segments): Alphabet

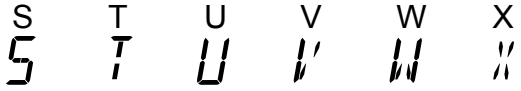
A B C D E F



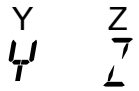
G H I J K L

M N O P Q R

S T U V W X

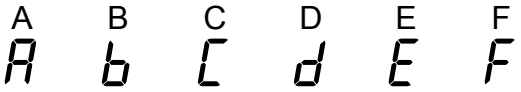


Y Z



Symbol display and Data display (11 segments): Alphabet

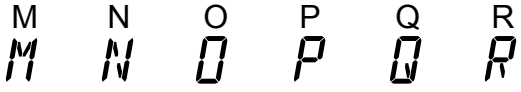
A B C D E F



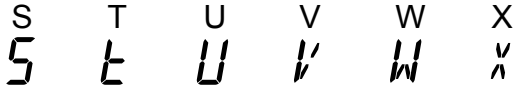
c (lower-case)

G H I J K L

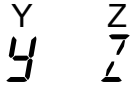
M N O P Q R



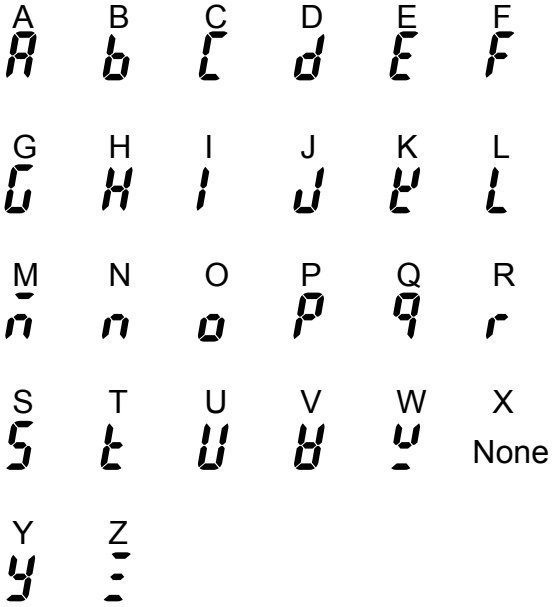
S T U V W X



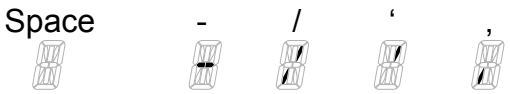
Y Z



Group display (7 segments): Alphabet



PV display (14 segments): Symbol



3.4 Brief Description of Setting Details (Parameters)

This manual describes the Setting Details as follows in addition to the functional Description.

Setting Details

(Display Example)

Parameter symbol	Name	Display level	Setting range	Menu symbol
A1 to A3	Alarm-1 to -3 setpoint	EASY	Set a display value of setpoint of PV alarm, SP alarm, deviation alarm, or velocity alarm. -19999 to 30000 (Set a value within the input range.) Decimal point position depends on the input type	SP Ope

(1) Parameter symbol: Symbol displayed on Symbol display on the front panel.

(2) Name: Parameter name

(3) Display level: Indicates the parameter display level.

(4) Setting range: Parameter setting range

(5) Menu symbol: Indicates the menu to which the parameter belongs.
Ope: Operation parameter
Set: Setup parameter

Parameter Display Level

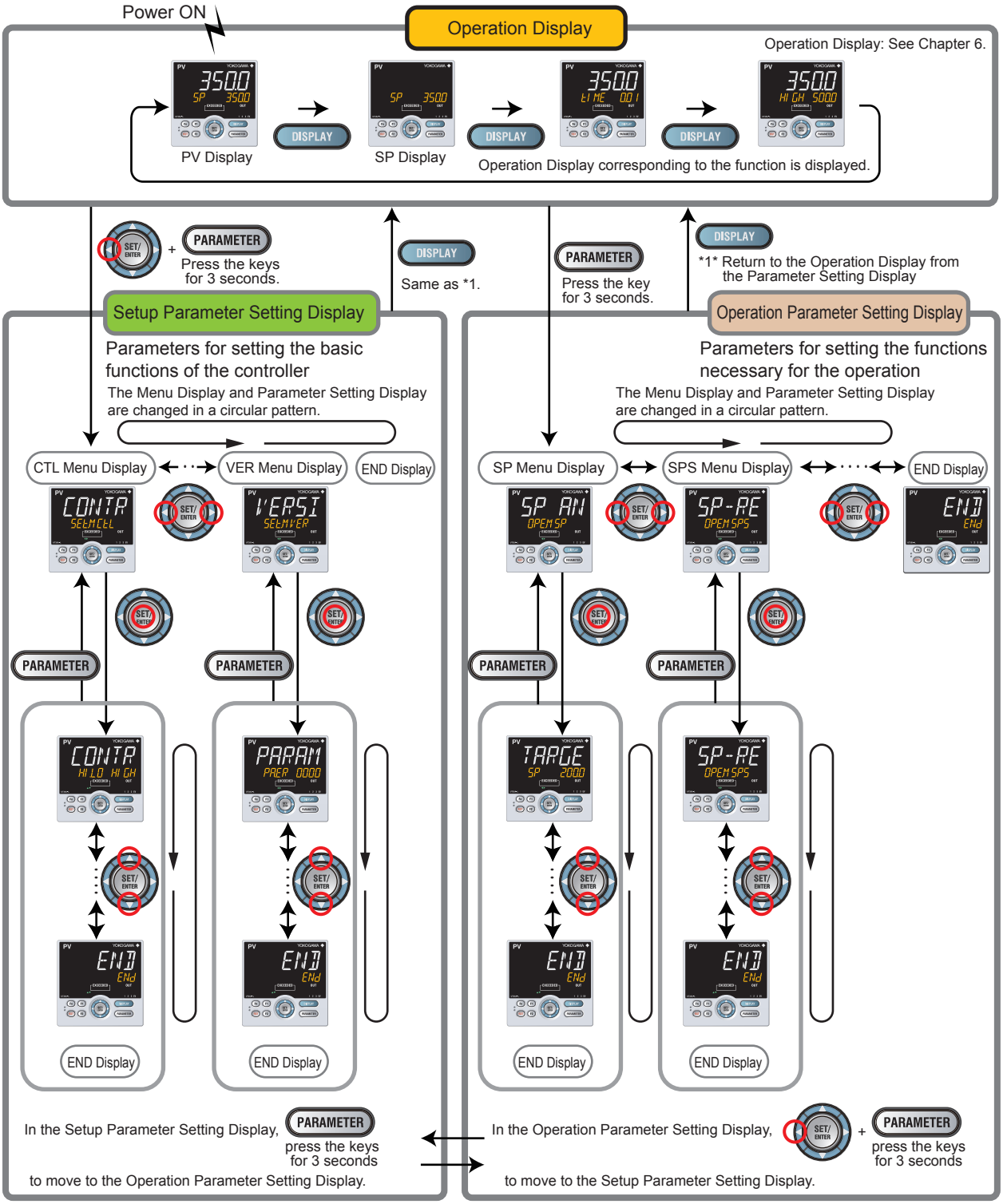
Display level		Description
EASY	Easy setting mode: The minimum necessary parameters are displayed.	Corresponding parameters are displayed in all modes.
STD	Standard setting mode: The wider range of parameters than those shown in Easy setting mode are displayed.	Corresponding parameters are displayed only in Standard setting mode and Professional setting mode. Parameter display level indicators "EASY" and "PRO" are unlit in Standard setting mode. *: "STD" is the symbol used in this manual only.
PRO	Professional setting mode: All parameters are displayed.	Corresponding parameters are displayed only in Professional setting mode.

Note

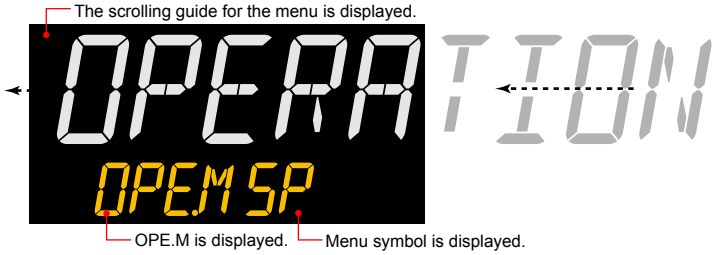
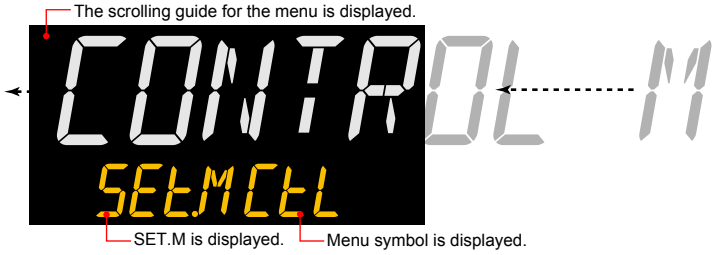
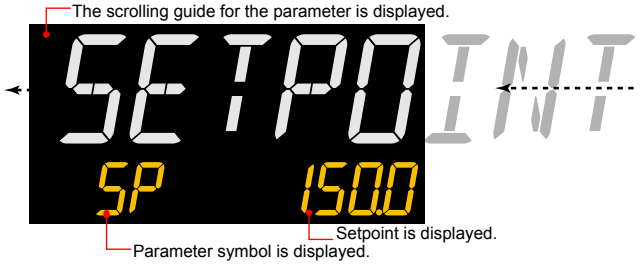
For more intelligible display operation of parameters and the references, see Chapter 18, "Parameter Map."

4.1 Overview of Display Switch and Operation Keys

The following shows the transition of Operation Display, Operation Parameter Setting Display, and Setup Parameter Setting Display.
The “Operation Parameter Setting Display” has the parameters for setting the functions necessary for the operation.
The “Setup Parameter Setting Display” has the parameters for setting the basic functions of the controller.

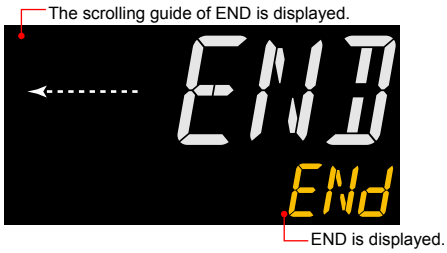


The display pattern of the UT35A-L is as follows; the Menu Display and Parameter Setting Display.
For the Operation Display, see Chapter 6, “Monitoring and Control of Regular Operations.”

Display	Description
Menu Display	The Menu Display is segmented by the function and optional terminal position. The scrolling guide for the menu is displayed on PV display. The guide display can be turned on/off with the Fn key. Menu Display of Operation Parameter  Menu Display of Setup Parameter 
Parameter Setting Display	The following is the Display for displaying and setting a parameter. The parameters have three types of display levels; Easy setting mode, Standard setting mode, and Professional setting mode. The parameters to be displayed can be limited according to the setting of the parameter display level. The scrolling guide for the parameter is displayed on PV display. The guide display can be turned on/off with the Fn key. Parameter Setting Display (Example of Operation Parameter Setting Display) 

Display Shown at the End (the Lowest Level) of the Parameter Setting Display

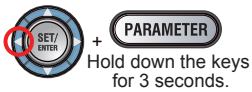
As shown in the figure below, the END Display is shown to indicate the end of the Menu Display and Parameter Setting Display. There are no setting items.



Basic Key Operation Sequence

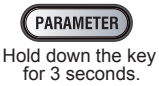
- **To move to the Setup Parameter Setting Display**

Hold down the PARAMETER (or PARA) key and the Left arrow key simultaneously for 3 seconds.



- **To move to the Operation Parameter Setting Display**

Hold down the PARAMETER (or PARA) key for 3 seconds.



- **To move to the Operation Display**

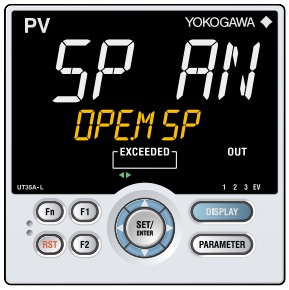
Press the DISPLAY (or DISP) key once.

4.2 How to Set Parameters

The following operating procedure describes an example of setting alarm setpoint (A1).

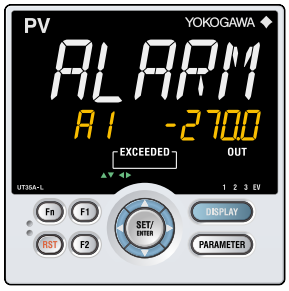
Operation

1. Hold down the **PARAMETER** key for 3 seconds in the Operation Display to call up the [**SP**] Menu Display.

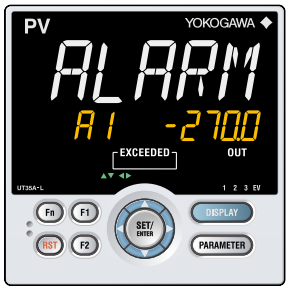


2. Press the **SET/ENTER** key to display the [**SP**] Parameter Setting Display.

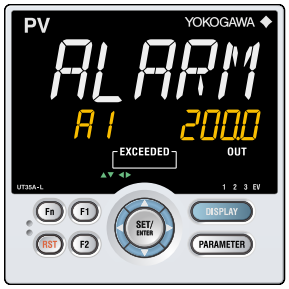
3. Press the **Down arrow** key to display the [**A1**] Parameter Setting Display.



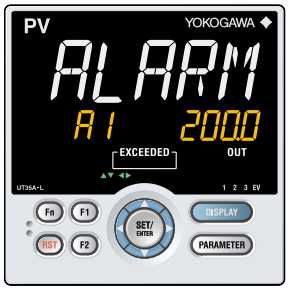
4. Press the **SET/ENTER** key to blink the setpoint.



5. Press the **Up** or **Down arrow** key to change the setpoint.
(Change the setpoint using the Up/Down arrow keys to increase and decrease the value and the Left/Right arrow keys to move between digits.)



6. Press the **SET/ENTER** key to register the setpoint (the setpoint stops blinking).



7. Press the **PARAMETER** key once to return to the Menu Display. Press the **DISPLAY** key once to return to the Operation Display.

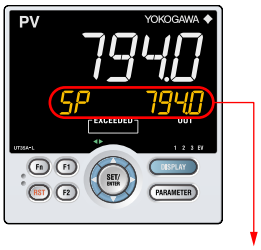
This completes the setting procedure.

How to Cancel Parameter Setting

To cancel parameter setting when a parameter is being set (setpoint is blinking), press the **PARAMETER** key once.

How to Set Parameter Setpoint

Numeric Value Setting



1. Display the Parameter Setting Display.

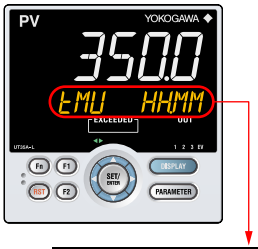
2. Press the SET/ENTER key to move to the setting mode (the setpoint blinks).

3. Press the Left arrow key to move one digit to the left. (Press the Right arrow key to move one digit to the right.)

4. Press the Up or Down arrow key to change the setpoint.
Press the Up arrow key when 9 is displayed to move one digit to the left.
Press the Down arrow key when 0 is displayed to move one digit to the right.

5. Press the SET/ENTER key to register the setpoint.

Selection Data Setting



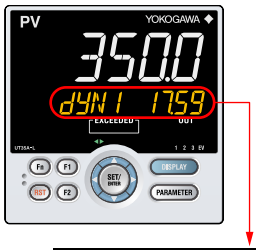
1. Display the Parameter Setting Display.

2. Press the SET/ENTER key to move to the setting mode (the setpoint blinks).

3. Press the Up arrow key to change the setpoint (press the Down arrow key to change the setpoint).

4. Press the SET/ENTER key to register the setpoint.

Time (minute.second) Setting



Example of 17 minutes 59 seconds

1. Display the Parameter Setting Display.

2. Press the SET/ENTER key to move to the setting mode (the setpoint blinks).

3. Press the Left arrow key to move one digit to the left. (press the Right arrow key to move one digit to the right.)

4. Press the Up or Down arrow key to change the setpoint.
Press the Up arrow key when 5 is displayed to move one digit to the left.
Press the Down arrow key when 0 is displayed to move one digit to the right.

5. Press the SET/ENTER key to register the setpoint.

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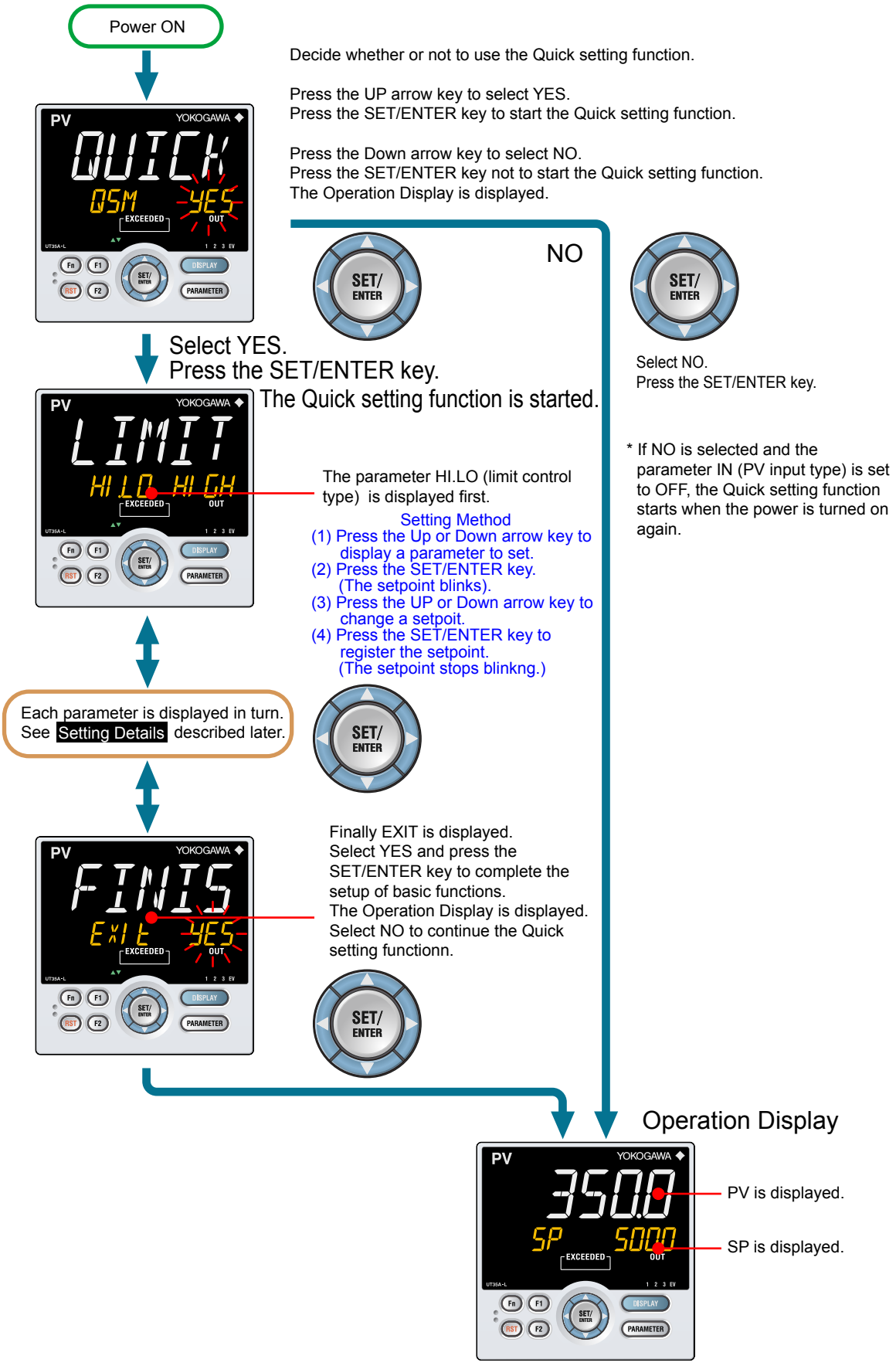
5.1 Setting Using Quick Setting Function

Description

The Quick setting function is a function to easily set the basic function of the controller.
The Quick setting function starts when the power is turned on after wiring.

The following lists the items to set using the Quick setting function.
(1) Limit control type (High or low)
(2) Input function (PV input, range, scale (at voltage/current input), etc.)

Flowchart of Quick Setting Function



Setting Example

Set the following parameters to set to high limit control and thermocouple Type K (range: 0.0 to 500.0ºF). No need to change the parameters other than the following parameters.

Set QSM = YES to enter the quick setting mode.

(1) Set HI.LO = HIGH.
(2) Set IN = K1.
(3) Set UNIT = F.
(4) Set RH = 500.0.
(5) Set RL = 0.0.

Set EXIT = YES to quit the quick setting mode.
The Operation Display is shown.

Setting Details

Control Type

Parameter symbol	Name	Display level	Setting range	Menu symbol
HI.LO	Limit control type	EASY	LOW: Low limit control HIGH: High limit control	CTL Set

Input Function

Parameter symbol	Name	Display level	Setting range	Menu symbol
IN	PV input type	EASY	OFF: Disable K1: -270.0 to 1370.0 °C / -450.0 to 2500.0 °F K2: -270.0 to 1000.0 °C / -450.0 to 2300.0 °F K3: -200.0 to 500.0 °C / -200.0 to 1000.0 °F J: -200.0 to 1200.0 °C / -300.0 to 2300.0 °F T1: -270.0 to 400.0 °C / -450.0 to 750.0 °F T2: 0.0 to 400.0 °C / -200.0 to 750.0 °F B: 0.0 to 1800.0 °C / 32 to 3300 °F S: 0.0 to 1700.0 °C / 32 to 3100 °F R: 0.0 to 1700.0 °C / 32 to 3100 °F N: -200.0 to 1300.0 °C / -300.0 to 2400.0 °F E: -270.0 to 1000.0 °C / -450.0 to 1800.0 °F L: -200.0 to 900.0 °C / -300.0 to 1600.0 °F U1: -200.0 to 400.0 °C / -300.0 to 750.0 °F U2: 0.0 to 400.0 °C / -200.0 to 1000.0 °F W: 0.0 to 2300.0 °C / 32 to 4200 °F PL2: 0.0 to 1390.0 °C / 32.0 to 2500.0 °F P2040: 0.0 to 1900.0 °C / 32 to 3400 °F WRE: 0.0 to 2000.0 °C / 32 to 3600 °F JPT1: -200.0 to 500.0 °C / -300.0 to 1000.0 °F JPT2: -150.0 to 150.0 °C / -200.0 to 300.0 °F PT1: -200.0 to 850.0 °C / -300.0 to 1560.0 °F PT2: -200.0 to 500.0 °C / -300.0 to 1000.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F 0.4-2V: 0.400 to 2.000 V 1-5V: 1.000 to 5.000 V 4-20: 4.00 to 20.00 mA 0-2V: 0.000 to 2.000 V 0-10V: 0.00 to 10.00 V 0-20 : 0.00 to 20.00 mA -1020: -10.00 to 20.00 mV 0-100: 0.0 to 100.0 mV	PV Set
UNIT	PV input unit	EASY	-: No unit C: Degree Celsius -: No unit - -: No unit - - -: No unit F: Degree Fahrenheit	
RH	Maximum value of PV input range	EASY	Depends on the input type. - For temperature input - Set the temperature range that is actually controlled. (RL<RH) - For voltage / current input - Set the range of a voltage / current signal that is applied. The scale across which the voltage / current signal is actually controlled should be set using the maximum value of input scale (SH) and minimum value of input scale (SL). (Input is always 0% when RL=RH.)	
RL	Minimum value of PV input range	EASY		

Note1: W:W-5% Re/W-26% Re(Hoskins Mfg. Co.). ASTM E988
WRE: W97Re3-W75Re25

Input Function (Continued)

Parameter symbol	Name	Display level	Setting range	Menu symbol
SDP	PV input scale decimal point position	EASY	0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places 4: Four decimal places	PV Set
SH	Maximum value of PV input scale	EASY	-19999 to 30000, (SL<SH), | SH - SL | ≤ 30000	
SL	Minimum value of PV input scale	EASY		

► Input setting: 7.1 Setting Functions of PV Input

5.2 Restarting Quick Setting Function

Once functions have been built using the Quick setting function, the Quick setting function does not start even when the power is turned on. The following methods can be used to restart the Quick setting function.

- Set the parameter QSM (Quick setting mode) to ON and turn on the power again.
- Set the parameter IN (PV input type) to OFF and turn on the power again.

CAUTION

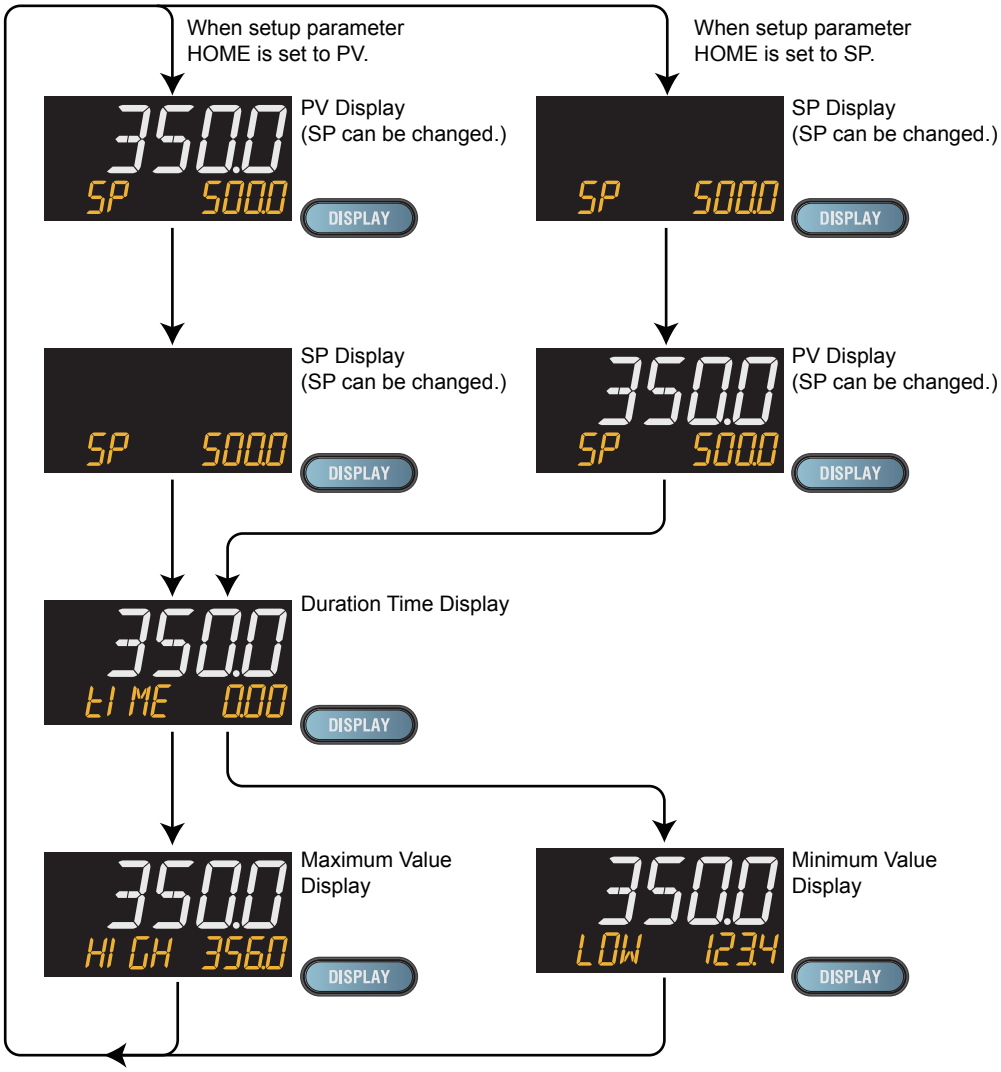
The parameters related to the range or scale are initialized if the PV input type is changed.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
IN	PV input type	EASY	OFF: Disable	PV Set
QSM	Quick setting mode	EASY	OFF: Disable ON: Enable	SYS Set

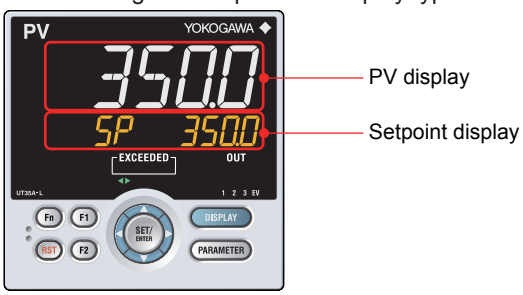
6.1 Monitoring and Control of Operation Displays

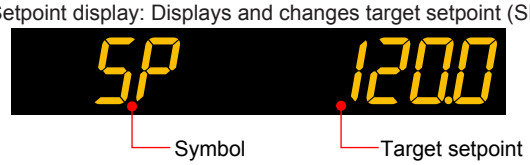
6.1.1 Operation Display Transitions.



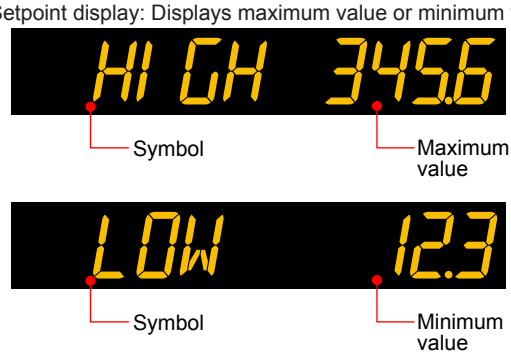
Details of the Operation Display

The following is the Operation Display types and each display and operation description.



Operation Display	Display and operation description
SP Display	PV display: Displays measured input value (PV). Setpoint display: Displays and changes target setpoint (SP).  **[SP Change Operation]** (1) Press the SET/ENTER key to move to the setting mode (the setpoint blinks). (2) Use the Left or Right arrow key to move between digits (the setpoint blinks). (3) Use the UP or Down arrow key to change the value (the setpoint blinks). (4) Press the SET/ENTER key to register the setpoint. (the setpoint stops blinking). * Only Up or Down arrow key operation is also possible.
Duration Time Display	PV display: Displays measured input value (PV). Setpoint display: Displays duration time. The time while PV exceeds SP is counted and stored in the memory. It is displayed in the “TIME” display in the confirmation display.  Display time range: 0.00 to 99.59 Unit of time is be either “hour.minute” or “minute.second”, and can be set by operation parameter TMU.

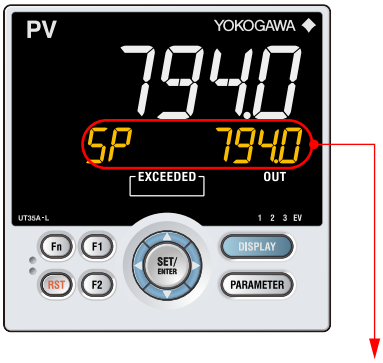
(Continued)

Operation Display	Display and operation description
Maximum/ Minimum Value Display	PV display: Displays measured input value (PV). Setpoint display: Displays maximum value or minimum value.  The maximum value or minimum value of PV is stored in the memory and display in the “HIGH” or “LOW” display in the confirmation display. When the control type is specified as high limit control, the maximum value is displayed in the “HIGH” display, and control type is specified as low limit control, the minimum value is displayed in the “LOW” display. When the PV exceeds SP and then returns to the normal status, Maximum / Minimum Value is retained as it is , but when PV exceeds SP again, it is automatically reset and starts taking new value for its minimum / maximum value.

6.2 Setting Target Setpoint

Operation in the Operation Display

Operation



1. Bring the SP Display into view.

2. Press the SET/ENTER key to move to the setting mode (the setpoint blinks).

3. Press the Left arrow key to move one digit to the left. (Press the Right arrow key to move one digit to the right.)

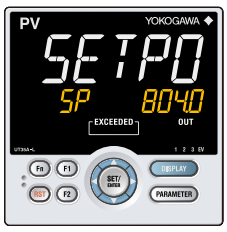
4. Press the Up or Down arrow key to change a setpoint. Press the Up arrow key when 9 is displayed to move one digit to the left. Press the Down arrow key when 0 is displayed to move one digit to the right.

5. Press the SET/ENTER key to register the setpoint. Control with the new setpoint.

Operation in Parameter Setting Display

Setting Display

Parameter Setting Display



Operation Display > **PARAMETER** key for **3 seconds** (to [**SP**] Menu Display) > **SET/ENTER** key (The setting parameter is displayed.)

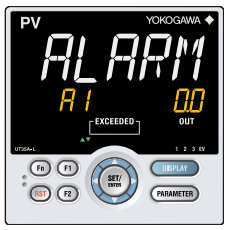
Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
SP	Target setpoint	EASY	0.0 to 100.0% of PV input range (EU) (Setting range: SPL to SPH)	SP Ope

6.3 Setting Alarm Setpoint

Setting Display

Parameter Setting Display



Operation Display > **PARAMETER** key for **3 seconds** (to [**SP**] Menu Display) > **SET/ENTER** key (The setting parameter is displayed.) > **Down arrow** key (The setting parameter is displayed.)

In the setting Display for the alarm parameters, Displays can be arbitrarily switched using the Up, Down, Left or Right arrow key. Pressing the Left or Right arrow key changes the group. (The group number is displayed on Group display.)

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
A1 to A3	Alarm-1 to -3 setpoint	EASY	Set a display value of setpoint of PV alarm, SP alarm, deviation alarm, or velocity alarm. -19999 to 30000 (Set a value within the input range.) Decimal point position depends on the input type	SP Ope

Description

Each alarm type has three alarm setpoints.

Alarm-related parameter	Number of settings
Alarm type	3 (number of settings)
PV velocity alarm time setpoint	3 (number of settings)
Alarm hysteresis	3 (number of settings)
Alarm delay timer	3 (number of settings)
Alarm setpoint	3 (number of settings)

► Alarm type: Chapter 11 Alarm Functions

6.4 Releasing On-State (Latch) of Alarm Output

Description

Alarm latch can be released by any of the following.

(1) User function key
(2) Communication
(3) Contact input

For the switching operation by using the above, the last switching operation is performed.

Releasing the alarm latch function releases all of the latched alarm outputs.
By factory default, the function is not assigned to the user function key and contact input.
Assign and use the function in accordance with the reference sections below.

► Release by user function key: 13.2 Assigning Function to User Function Key
► Release by contact input: 12.1 Setting Contact Input Function
► Release via communication: UTAdvanced Series Communication Interface User's Manual

7.1 Setting Functions of PV Input

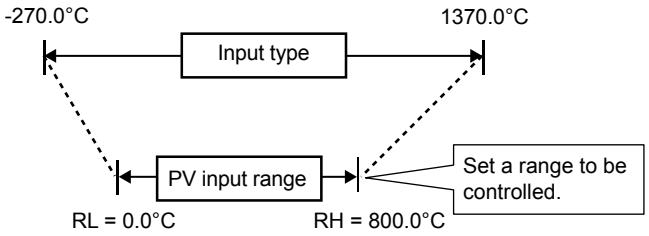
7.1.1 Setting Input Type, Unit, Range, Scale, and Decimal Point Position

Description

The figure below describes the case of PV input.

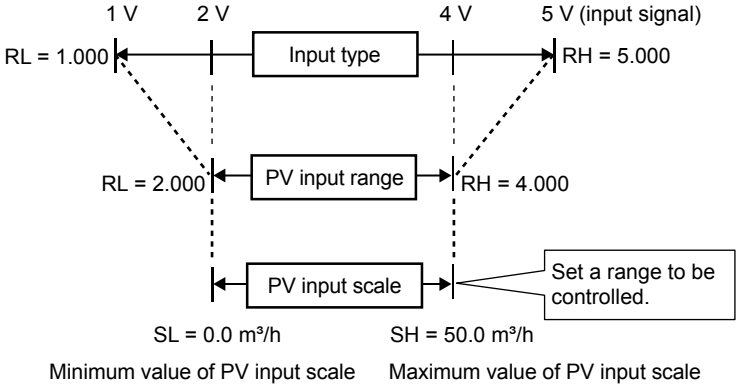
Example of Temperature Input

The figure below is an example of setting Type K thermocouple and a measurement range of 0.0 to 800.0 ºC.



Example of Voltage and Current Inputs

The figure below is an example of setting 2-4 V DC and a scale of 0.0 to 50.0 m³/h.



When using 1-5 V DC signal as is, set RH = 5.000 V, RL = 1.000 V, SDP=1, and SH = 50.0, and SL=0.0.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
IN	PV input type	EASY	OFF: Disable K1: -270.0 to 1370.0 °C / -450.0 to 2500.0 °F K2: -270.0 to 1000.0 °C / -450.0 to 2300.0 °F K3: -200.0 to 500.0 °C / -200.0 to 1000.0 °F J: -200.0 to 1200.0 °C / -300.0 to 2300.0 °F T1: -270.0 to 400.0 °C / -450.0 to 750.0 °F T2: 0.0 to 400.0 °C / -200.0 to 750.0 °F B: 0.0 to 1800.0 °C / 32 to 3300 °F S: 0.0 to 1700.0 °C / 32 to 3100 °F R: 0.0 to 1700.0 °C / 32 to 3100 °F N: -200.0 to 1300.0 °C / -300.0 to 2400.0 °F E: -270.0 to 1000.0 °C / -450.0 to 1800.0 °F L: -200.0 to 900.0 °C / -300.0 to 1600.0 °F U1: -200.0 to 400.0 °C / -300.0 to 750.0 °F U2: 0.0 to 400.0 °C / -200.0 to 1000.0 °F W: 0.0 to 2300.0 °C / 32 to 4200 °F (Note1) PL2: 0.0 to 1390.0 °C / 32.0 to 2500.0 °F P2040: 0.0 to 1900.0 °C / 32 to 3400 °F WRE: 0.0 to 2000.0 °C / 32 to 3600 °F JPT1: -200.0 to 500.0 °C / -300.0 to 1000.0 °F JPT2: -150.0 to 150.0 °C / -200.0 to 300.0 °F PT1: -200.0 to 850.0 °C / -300.0 to 1560.0 °F PT2: -200.0 to 500.0 °C / -300.0 to 1000.0 °F PT3: -150.00 to 150.00 °C / -200.0 to 300.0 °F 0.4-2V: 0.400 to 2.000 V 1-5V: 1.000 to 5.000 V 4-20: 4.00 to 20.00 mA 0-2V: 0.000 to 2.000 V 0-10V: 0.00 to 10.00 V 0-20 : 0.00 to 20.00 mA -1020: -10.00 to 20.00 mV 0-100: 0.0 to 100.0 mV	PV Set
UNIT	PV input unit	EASY	-: No unit C: Degree Celsius -: No unit - -: No unit - - -: No unit F: Degree Fahrenheit	PV Set
RH (Physical quantity)	Maximum value of PV input range	EASY	Depends on the input type. - For temperature input - Set the temperature range that is actually controlled. (RL<RH) - For voltage / current input - Set the range of a voltage / current signal that is applied. The scale across which the voltage / current signal is actually controlled should be set using the maximum value of input scale (SH) and minimum value of input scale (SL). (Input is always 0% when RL = RH.)	PV Set
RL (Physical quantity)	Minimum value of PV input range	EASY	Same as RH	PV Set

Note1: W: W-5% Re/W-26% Re(Hoskins Mfg. Co.). ASTM E988
WRE: W97Re3-W75Re25

(Continued)

Parameter symbol	Name	Display level	Setting range	Menu symbol
SDP (Scaling)	PV input scale decimal point position	EASY	0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places 4: Four decimal places	PV Set
SH (Scaling)	Maximum value of PV input scale	EASY	-19999 to 30000, (SL<SH), | SH - SL | ≤ 30000	PV Set
SL (Scaling)	Minimum value of PV input scale	EASY	-19999 to 30000, (SL<SH), | SH - SL | ≤ 30000	PV Set

When changing the PV decimal point position or the digit of the indicated value, can be set by the following parameters.

Example: PV input type= K1 (-270.0 to 1370.0ºC), the digit is without decimal point for "0 to 1000ºC".

P.UNI=C

P.DP=0

P.RH=1000

P.RL=0

Parameter symbol	Name	Display level	Setting range	Menu symbol
P.UNI	Control PV input unit	STD	-: No unit C: Degree Celsius -: No unit - -: No unit - - -: No unit F: Degree Fahrenheit	MPV Set
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	
P.RH	Maximum value of control PV input range		-19999 to 30000, (P.RL<P.RH), | P.RH - P.RL | ≤ 30000	
P.RL	Minimum value of control PV input range			

7.1.2 Setting Burnout Detection for Input

Description

The input value when input burnout occurs can be determined.
The input value is 105.0% of the input range when the upscale is set, and -5.0% of the input range when the downscale is set.
Burnout detection is activated for TC, RTD, and standard signal (0.4–2 V or 1–5 V).
For standard signal, burnout is determined to have occurred if it is 0.1 V or less for the range of 0.4–2 V and 1–5V, or if it is 0.4 mA or less for the range of 4–20 mA.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
BSL	PV input burnout action	STD	OFF: Disable UP: Upscale DOWN: Downscale	PV Set

7.1.3 Setting Reference Junction Compensation (RJC) or External Reference Junction Compensation (ERJC)

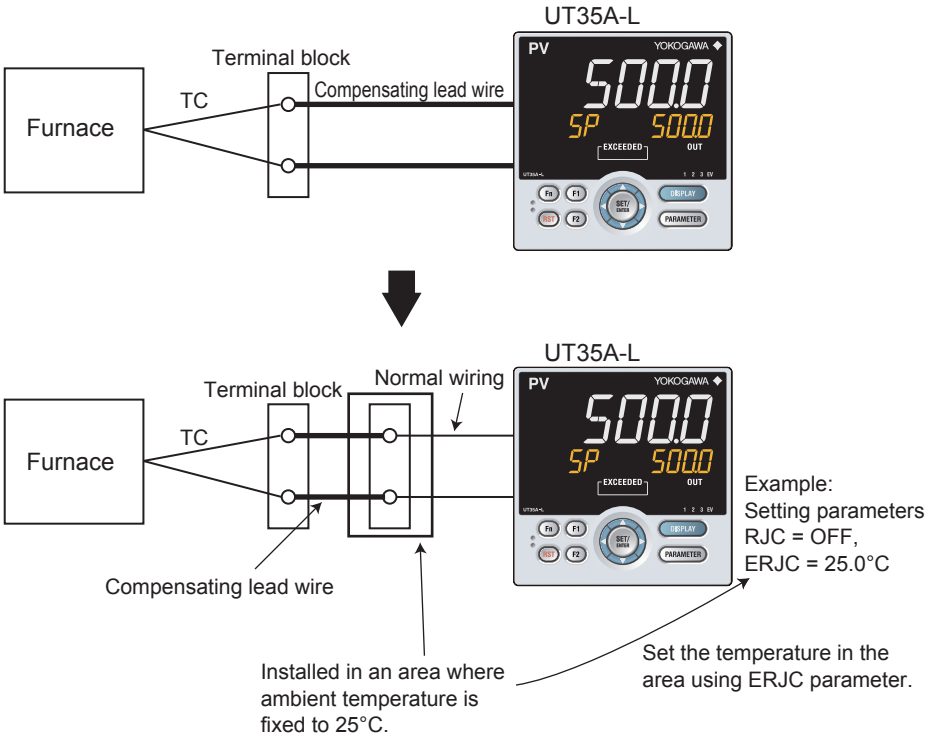
Description

Reference Junction Compensation (RJC)

When TC input is selected, presence/absence of input reference junction compensation can be set.
Usually input values are compensated with the RJC function provided for the controller. However, if it is necessary to rigorously compensate the values with a device other than the function of the controller, for example with a zero-compensator, the RJC function of the controller can be turned off.

External Reference Junction Compensation (ERJC)

For TC input, a temperature compensation value for external device can be set.
The external RJC can be used only when RJC = OFF.



Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
RJC	PV input reference junction compensation	PRO	OFF: RJC OFF ON: RJC ON	PV Set
ERJC	PV input external RJC setpoint	PRO	-10.0 to 60.0°C or 14.0 to 140.0°F	PV Set

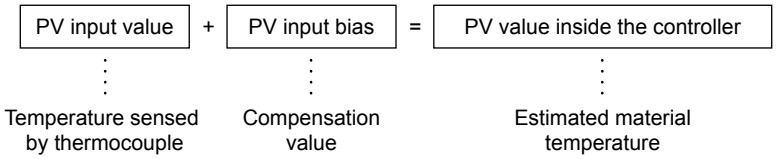
7.1.4 Correcting Input Value

Setting Bias and Filter

Description

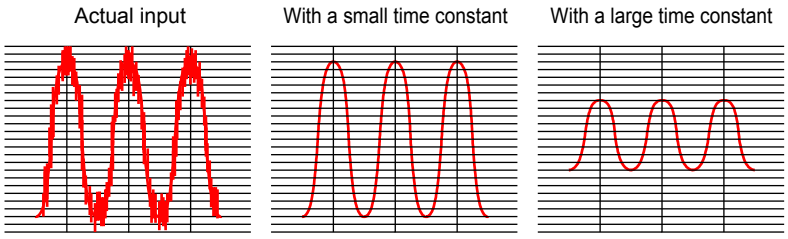
PV Input Bias

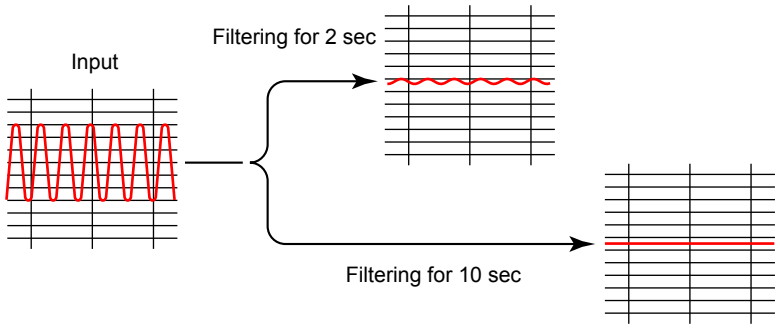
The PV input bias allows bias to be summed with input to develop a measured value for display and control use inside the controller.
This function can also be used for fine adjustment to compensate for small inter-instrument differences in measurement reading that can occur even if all are within the specified instrument accuracies.
PV input bias is used for normal operation.



PV Input Filter

If input noise or variations cause the low-order display digits to fluctuate so that the displayed value is difficult to read, a digital filter can be inserted to smooth operation.
This filter provides a first-order lag calculation, which can remove more noise the larger the time constant becomes. However, an excessively large time constant will distort the waveform.
PV input filter is used for normal operation.





Analog Input Bias

Analog input bias is used to correct sensor-input characteristics, compensating lead wire errors, and so on.

Analog Input Filter

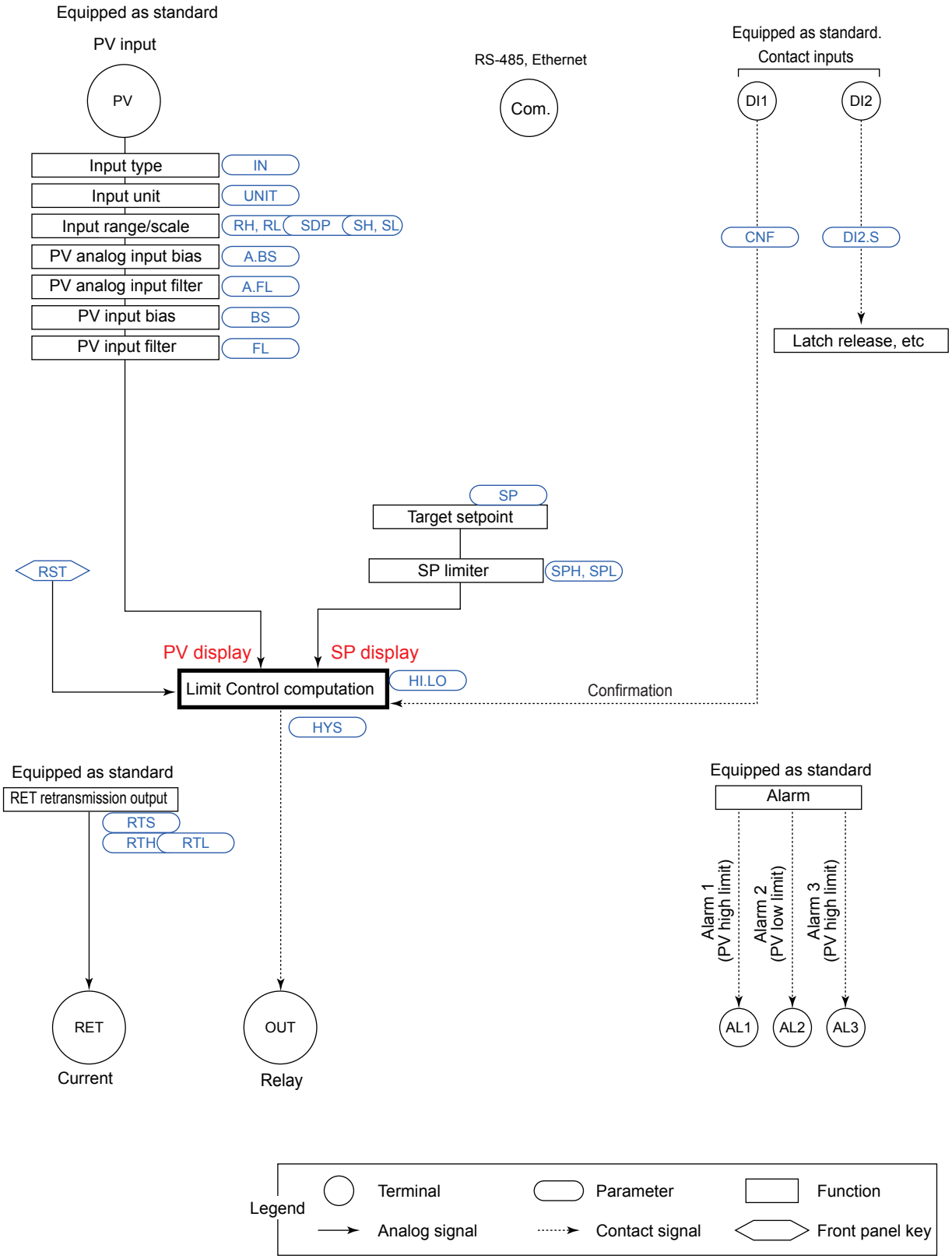
The analog input filter is used to remove noise from an input signal. This filter provides a first-order lag calculation, which can remove more noise the larger the time constant becomes. However, an excessively large time constant will distort the waveform.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
BS	PV input bias	EASY	-100.0 to 100.0% of PV input range span (EUS)	PVS Ope
FL	PV input filter	EASY	OFF, 1 to 120 s	

Parameter symbol	Name	Display level	Setting range	Menu symbol
A.BS	PV analog input bias	STD	-100.0 to 100.0% of each input range span (EUS)	PV Set
A.FL	PV analog input filter	STD	OFF, 1 to 120 s	PV Set

8.1 Function Block Diagram



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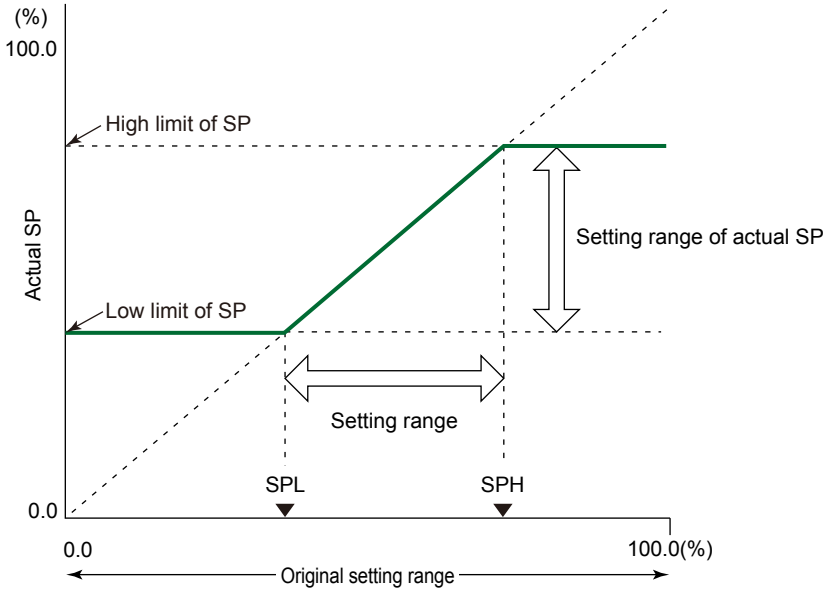
9.1 Setting SP Limiter

Description

The SP high and low limits can be set to restrict the SP to the range between those limits. They works to the SP of all SP groups.



Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
SPH	SP high limit	STD	0.0 to 100.0% of PV input range (EU), (SPL<SPH)	MPV Set
SPL	SP low limit	STD		

9.2 Setting Controller Action at Power ON (Restart Mode)

Description

The state of output relay at power-on can be set by a setup parameter restart mode R.MD. For details, see Chapter 15, “Power Failure Recovery Processing.”

Setting Details

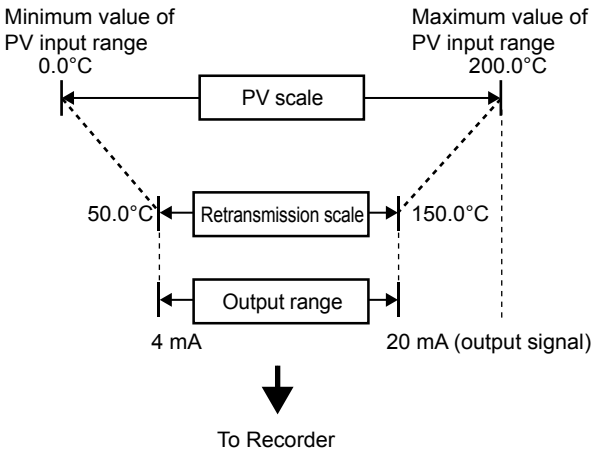
Parameter symbol	Name	Display level	Setting range	Menu symbol
R.MD	Restart Mode	STD	0: Limit output is ON at power on in any cases. 1: Limit output is OFF at power on when PV doesn’t exceed SP.	SYS Set

10.1 Setting Retransmission Output Terminal, Type, and Scales

Description

The retransmission output can be used when the control output is not assigned to the analog output terminal. Confirm the output type selection (OT) before setting the retransmission output. The range can be changed.

► Current output range: 10.2 Changing Current Output Range



Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
RTS	Retransmission out type of RET	EASY	OFF: Disable PV1: PV SP1: SP	OUT Set
RTH	Maximum value of retransmission output scale of RET	STD	When RTS = PV1, SP1 RTL + 1 digit to 30000 -19999 to RTH - 1 digit Decimal point position: When RTS=PV1 or SP1, decimal point position is same as that of PV input.	
RTL	Minimum value of retransmission output scale of RET	STD		

Parameters and Corresponding Terminals

RTS, RTH, RTL	RET terminal

10.2 Changing Current Output Range

Description

The analog output type can be selected from among 4 to 20, 0 to 20, 20 to 4, or 20 to 0 mA.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
RET.A	RET current output range	STD	4-20: 4 to 20 mA, 0-20: 0 to 20 mA, 20-4: 20 to 4 mA, 20-0: 20 to 0 mA	OUT Set

Parameters and Corresponding Terminals

RET.A	RET terminal

11.1 Setting Alarm Type

Description

The alarm-related parameters consist of the alarm type (type, stand-by action, energized/de-energized, and latch function), PV velocity alarm time setpoint, alarm hysteresis, alarm (On-/Off-) delay timer, and alarm setpoint.

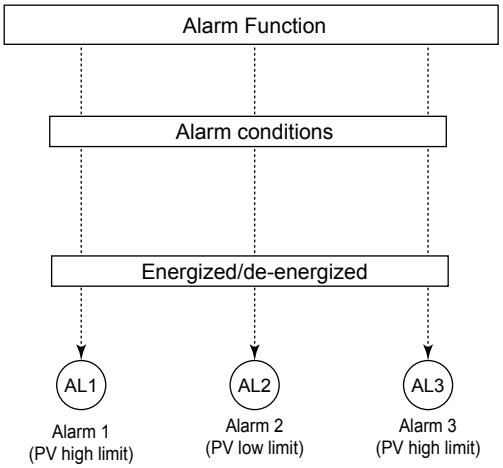
Alarm-related parameter	Number of settings
Alarm type	3 (number of settings)
PV velocity alarm time setpoint	3 (number of settings)
Alarm hysteresis	3 (number of settings)
Alarm (on-/off-) delay timer	3 (number of settings)
Alarm setpoint	3 (number of settings)

► Alarm hysteresis: 11.2 Setting Hysteresis to Alarm Operation
► Alarm delay timer: 11.3 Delaying Alarm Output (Alarm Delay Timer)
► Alarm setpoint: 6.3 Setting Alarm Setpoint

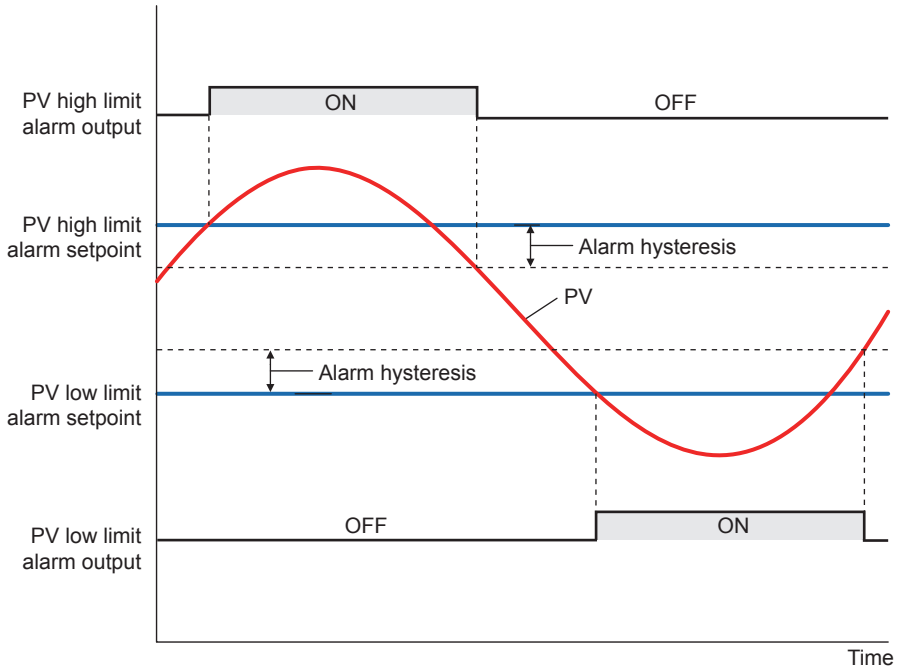
Factory default: Only three groups of alarm-related parameters are displayed.

► Terminal function: 17.4.5 Contact Output Wiring

To read the conditions of alarms, outputs, or latches via communication, see Communication Interface User's Manual.

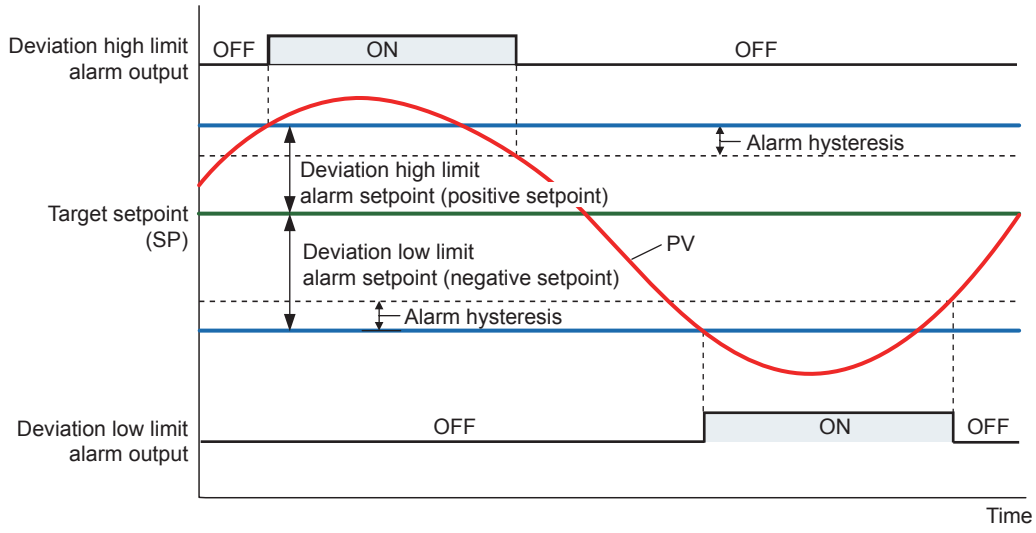


PV High Limit Alarm and PV Low Limit Alarm



Contact type in the figure above: Energized when an event occurs (factory default).

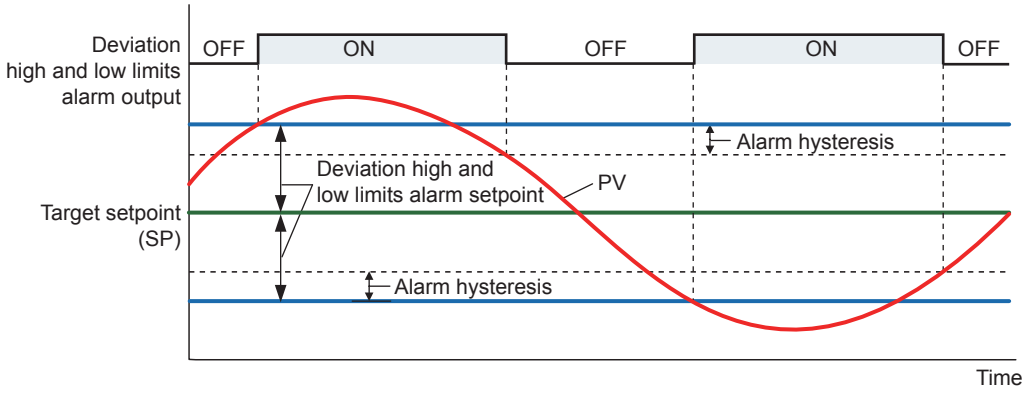
Deviation High Limit Alarm and Deviation Low Limit Alarm



Contact type in the figure above: Energized when an event occurs (factory default).

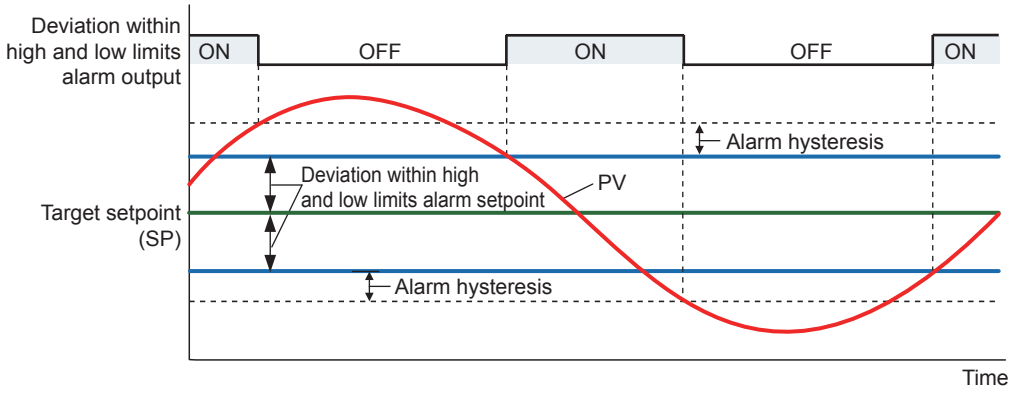
When a negative setpoint is set for the deviation high limit alarm setpoint, the deviation setpoint will be lower than the SP.
Moreover, when a positive setpoint is set for the deviation low limit alarm setpoint, the deviation setpoint will be higher than the SP.

Deviation High and Low Limits Alarm



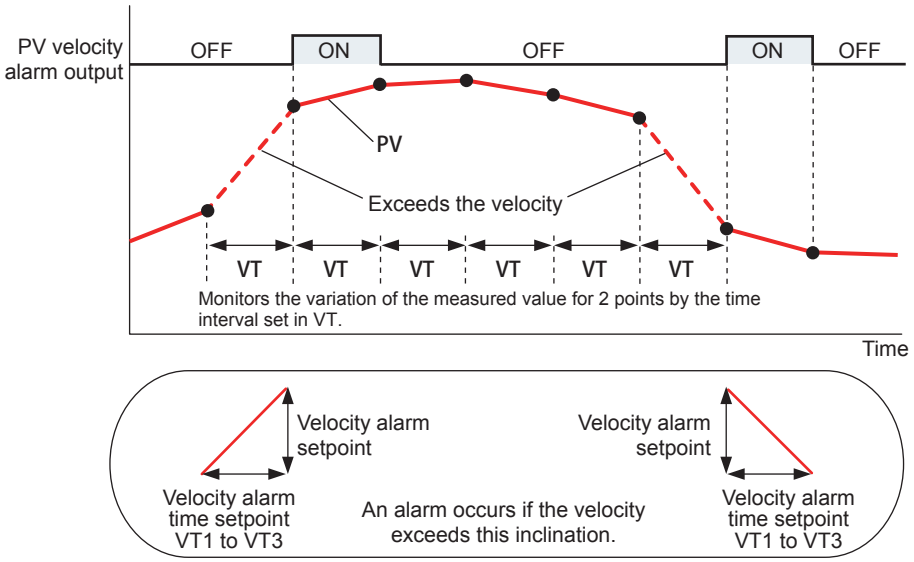
Contact type in the figure above: Energized when an event occurs (factory default).

Deviation within High and Low Limits Alarm



Contact type in the figure above: Energized when an event occurs (factory default).

PV Velocity Alarm



Contact type in the figure above: Energized when an event occurs (factory default).

The PV velocity alarm function does not work the alarm hysteresis, the stand-by action and the alarm delay timer functions.

Fault diagnosis Alarm

The function outputs an alarm signal in the following cases.
The corresponding event (EV) lamp is lit and the contact output turns on (when the contact type is energized).

- Burnout of PV input
- ADC failure of PV input
- Reference junction compensation (RJC) error of PV input

The fault diagnosis alarm does not work the stand-by action functions.

FAIL output

When the FAIL condition is caused (faulty MCU or system data error), DO (alarm output) turned off regardless of contact type.
The FAIL output does not work the alarm latch, the energized/de-energized and the stand-by action functions.

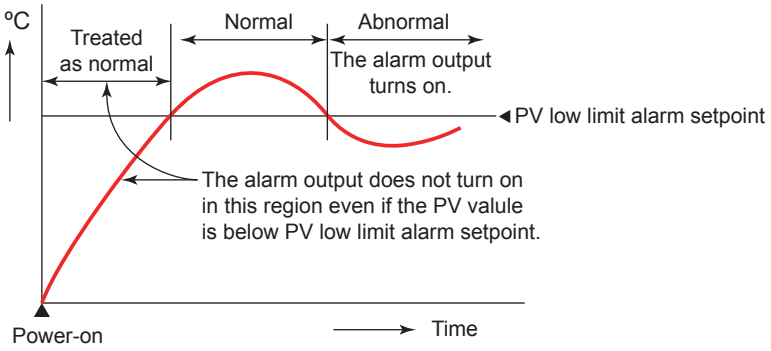
Stand-by Action

The stand-by action is a function for ignoring the alarm condition and keeps the alarm off until the alarm condition is removed. Once the alarm condition is removed, the stand-by action is cancelled.

It is effective in the following cases where;

- The power is turned on
- SP is changed
- The alarm type is changed
- Forced stand-by via communication

The following shows the behavior of an alarm with the stand-by action at power ON.



Alarm Latch Function

The alarm latch function is a function for keeping the alarm output (keeping the alarm output on) after entering the alarm condition (alarm output is turned on) until an order to release the alarm latch is received.

The alarm latch function has the following four types of action.

Latch 1

Cancels the alarm output when an order to release the alarm latch is received. (Alarm output OFF.)
However, an order to release the alarm latch is ignored if the order is received during alarm condition.

Latch 2

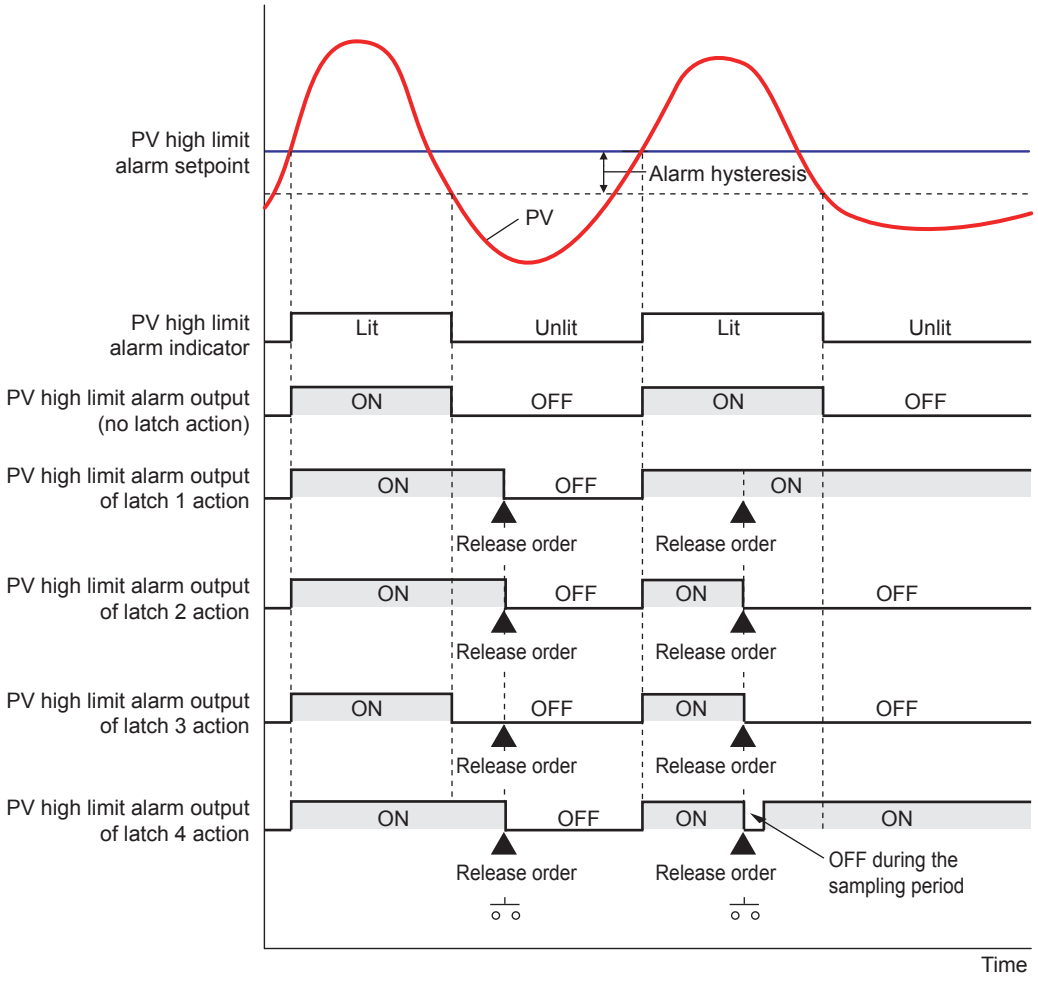
Always forces cancelling of the alarm output when an order to release the alarm latch is received. (Alarm output OFF)

Latch 3

Cancels the alarm output when an order to release the alarm latch is received or when the alarm condition is removed. (Alarm output OFF.)

Latch 4

Cancels the alarm output when an order to release the alarm latch is received. (Alarm output OFF.)
However, cancels the alarm output for the duration of the sampling period (control period) if an order to release the alarm latch is received during alarm condition. (Alarm output OFF)

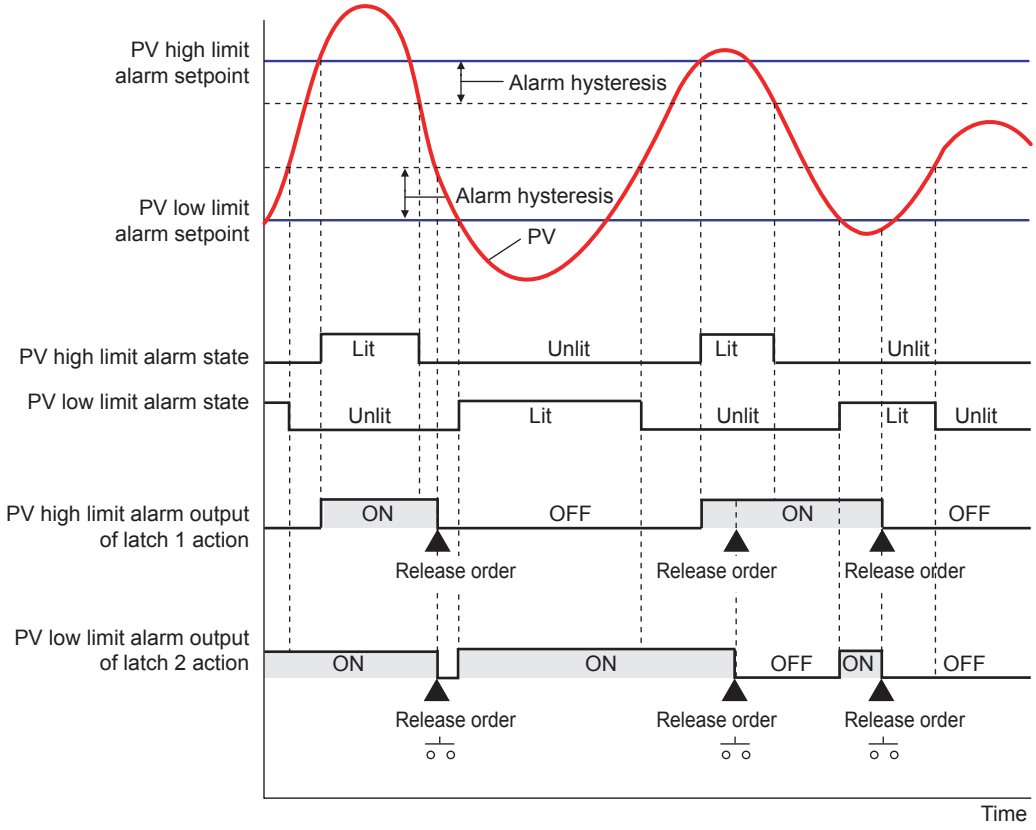


Contact type in the figure above: Energized when an event occurs (factory default).

Release of Alarm Latch

The alarm latch function can be cancelled by the user function key or by contact input. Cancelling the alarm latch function cancels all latched alarm outputs.

- ► Release by user function key: 13.2 Assigning Function to User Function Key
- ► Release by contact input: 12.1.1 Setting Contact Input Function
- ► Release via communication: UTAdvanced Series Communication Interface User's Manual



Contact type in the figure above: Energized when an event occurs (factory default).

Operation of Alarm Output and Display Lamp (EV)

The contact output and display lamp (EV) are usually output and displayed according to the setpoint of the alarm type. However, the alarm conditions (operations) of the normal action, and latch action can be assigned to the contact output and display lamp (EV), regardless of the setpoint of the alarm type. (Two operations can be assigned simultaneously.)

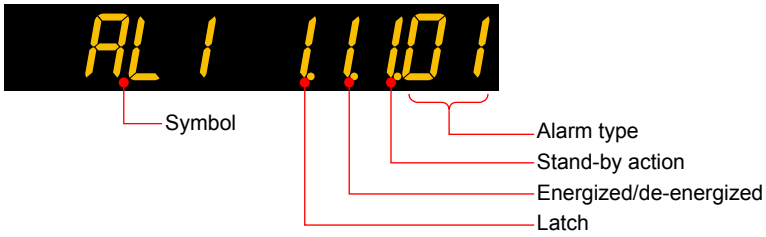
- ► Display lamp action: 13.1 Setting Display Functions

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
AL1 to AL3	Alarm-1 to -3 type	EASY	See the table below.	ALRM Ope
VT1 to VT3	PV velocity alarm time setpoint 1 to 3	EASY	00.01 to 99.59 (minute.second)	

Note1: The initial values of the parmeters AL1 to AL3 and VT1 to VT3 are "3".

The following shows the example of setting PV high limit (01), With stand-by action (1), De-energized (1), and Latch 1 action (1).



Name	Latch action (Note 1)	Energized (0) / de-energized (1)	Stand-by action Without (0) / with (1)	Alarm type
Disable	- (Note 2)	- (Note 2)	- (Note 2)	00
PV high limit	0 / 1 / 2 / 3 / 4	0 / 1	0 / 1	01
PV low limit	0 / 1 / 2 / 3 / 4	0 / 1	0 / 1	02
Deviation high limit	0 / 1 / 2 / 3 / 4	0 / 1	0 / 1	05
Deviation low limit	0 / 1 / 2 / 3 / 4	0 / 1	0 / 1	06
Deviation high and low limits	0 / 1 / 2 / 3 / 4	0 / 1	0 / 1	07
Deviation within high and low limits	0 / 1 / 2 / 3 / 4	0 / 1	0 / 1	08
PV velocity	0 / 1 / 2 / 3 / 4	0 / 1	- (Note 2)	29
Fault diagnosis	0 / 1 / 2 / 3 / 4	0 / 1	- (Note 2)	30
FAIL	- (Note 2)	- (Note 2)	- (Note 2)	31

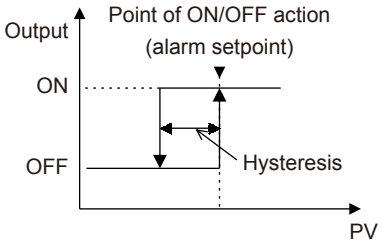
Note 1: 0: No latch function, 1: Latch 1, 2: Latch 2, 3: Latch 3, 4: Latch 4
Note 2: -: Alarm function doesn't work even if any value is set.

11.2 Setting Hysteresis to Alarm Operation

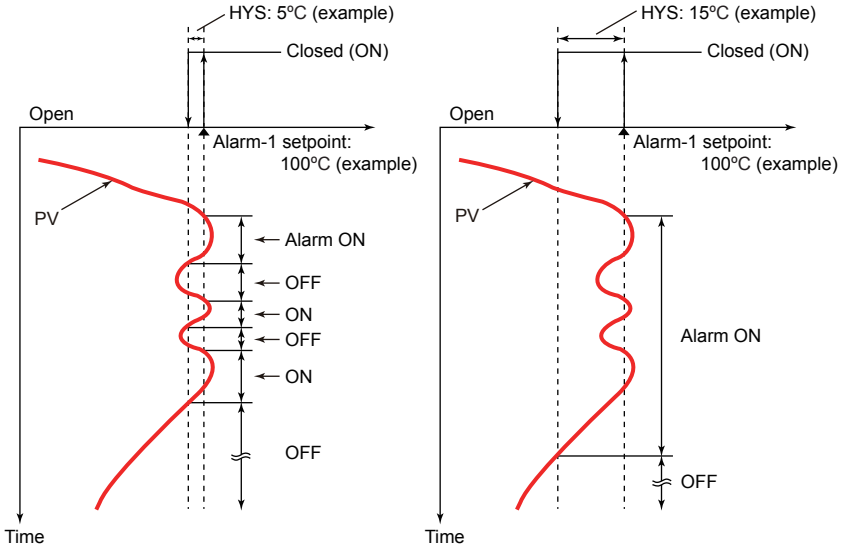
Description

If the On/Off switch of the alarm output is too busy, you can alleviate the busyness by increasing the alarm hysteresis.

Hysteresis for PV High Limit Alarm



When Setting Hysteresis of 5ºC and 15ºC for PV High Limit Alarm



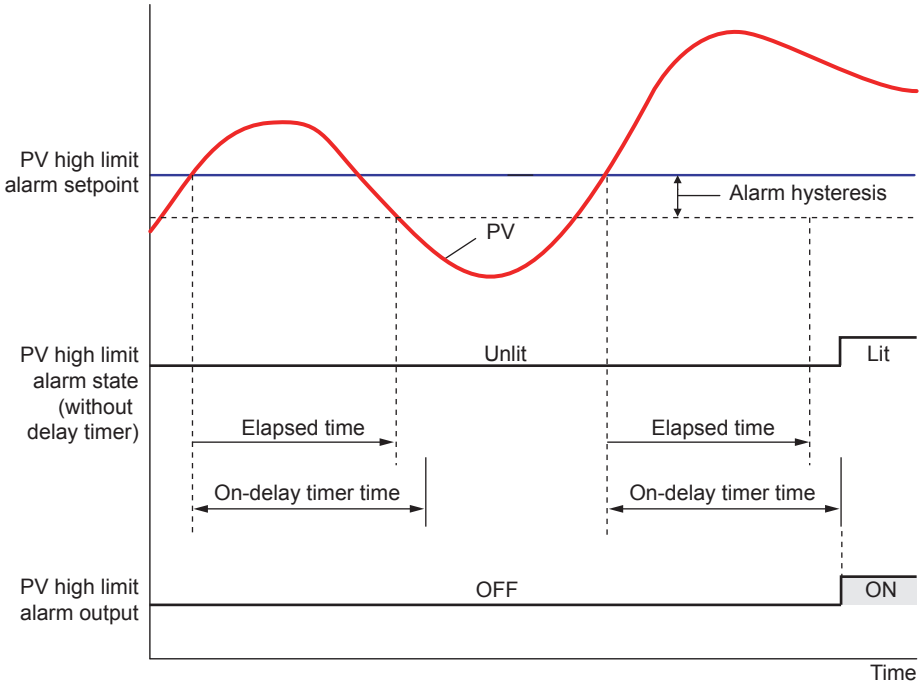
Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
HY1 to HY3	Alarm-1 to -3 hysteresis	EASY	Sets the hysteresis setpoint as a display value. -19999 to 30000 (set it within the input range) The decimal point position depends on the input type.	ALRM Ope

11.3 Delaying Alarm Output (Alarm Delay Timer)

Description

The alarm on-delay timer is a function for turning on the alarm when the alarm condition occurs, and the timer starts and the set time elapses.
The timer is reset if the alarm condition is removed while the timer is running. No alarm is generated.
The figure below shows the example of the On-delay timer



Contact type in the figure above: Energized when an event occurs (factory default).

The alarm Off-delay timer is a function for turning off the alarm when the alarm condition is removed (normal condition), and the timer starts and the set time elapses.
The timer is reset if the alarm condition occurs again while the timer is running. The alarm is not cancelled.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
DYN1 to DYN3	Alarm-1 to -3 On-delay timer	STD	0.00 to 99.59 (minute.second)	ALRM Ope
DYF1 to DYF3	Alarm-1 to -3 Off-delay timer	PRO		

12.1 Setting Contact Input Function

12.1.1 Setting Contact Input Function

Description

The contact input (DI2) function works by setting the DI2.S parameter to functions such as the operation mode.

Latch Release (LAT)

Latch can be released using contact input. (Switch by the rising edge)

Contact status	Operation	Remark
OFF→ON	Releases the latch	–
ON→OFF	Maintains the current operation status	–

Releasing the latch function releases all latched contact (alarm) outputs.

LCD Backlight ON/OFF Switch (LCD)

LCD backlight ON/OFF can be switched using contact input. (Switch by the rising edge and the falling edge)

Contact status	Operation	Remark
OFF→ON	Turns off the LCD backlight	–
ON→OFF	Turns on the LCD backlight	–

Message Display Interruption 1 to 4 (MG 1 to 4)

The message set using LL50A Parameter Setting Software can be interrupt-displayed on PV display using contact input. The messages are limited to 20 alphanumeric characters. A maximum of four displays can be registered. (Switch by the rising edge)

► Message: LL50A Parameter Setting Software User's Manual

Contact status	Operation	Remark
OFF→ON	Interrupt-displays the message	Pressing the DISPLAY key erases the message.
ON→OFF	Displays the current PV	–

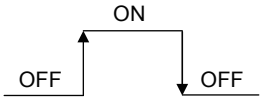
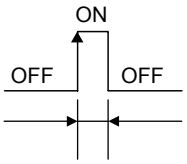
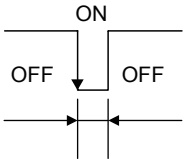
PV Red/white Switch (PVRW)

PV color can be switched using contact input. (Status switch)

Contact status	Operation	Remark
ON	Red color	–
OFF	White color	–

Set "10" to the parameter PCMD.

Contact Action

Type	Operation	Description
Status		Receiving a contact input signal changes the status to the specified operation, and a release changes the status back to the original action.
Rising edge	Rising edge  Detection time: 250 ms	Receiving an OFF-to-ON contact input signal changes the status to the specified operation. The minimum detection time is 250 ms.
Falling edge	Falling edge  Detection time: 250 ms	Receiving an ON-to-OFF contact input signal changes the status to the specified operation. The minimum detection time is 250 ms.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
DI2.S	DI2 function switch	STD	DI2 function selection OFF: No function LAT: Latch release LCD: LCD backlight ON/OFF switch PVPW: PV red/white switch MG1: Message display interruption 1 MG2: Message display interruption 2 MG3: Message display interruption 3 MG4: Message display interruption 4	DI.SL Set

13.1 Setting Display Functions

13.1.1 Setting Active Color PV Display Function

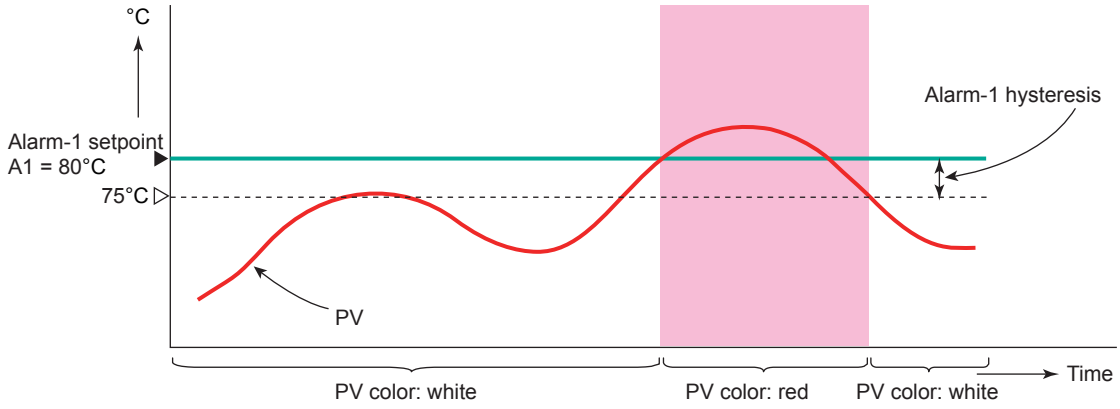
The active color PV display function changes the PV display color when an event occurs.

Description

Link to Alarm

The PV display color changes by linking to the alarm 1 or alarm 2.

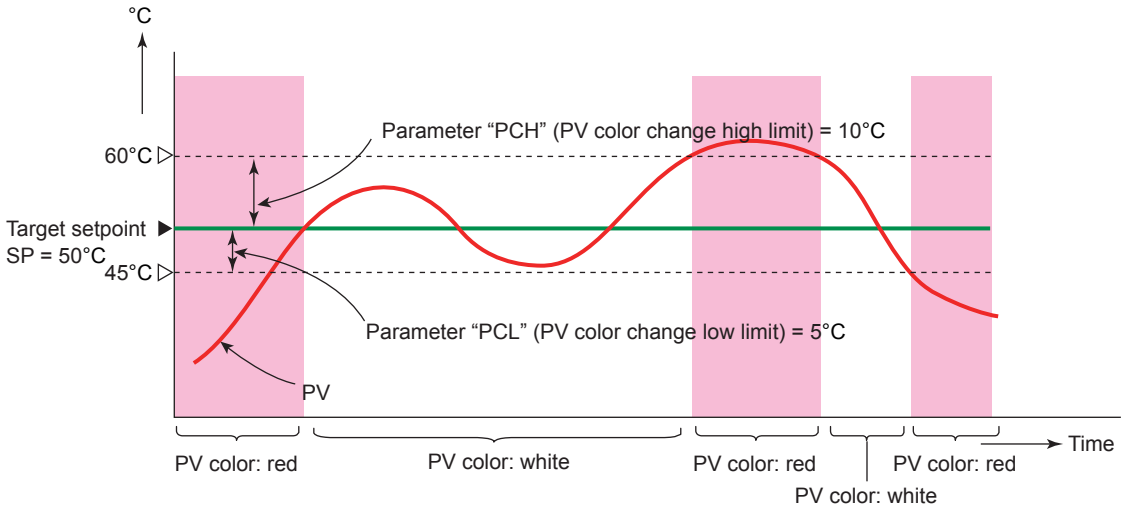
The following is an example of operation linking to alarm 1.
Set the alarm-1 type to “PV high limit alarm” and alarm-1 setpoint to “80°C.”
When the active color PV display switch is set to”2,” PV display color changes from white to red if PV exceeds the alarm-1 setpoint.
The red-to-white switching action can be set.



Change by Deviation

The PV display color changes by deviation (PV – SP).

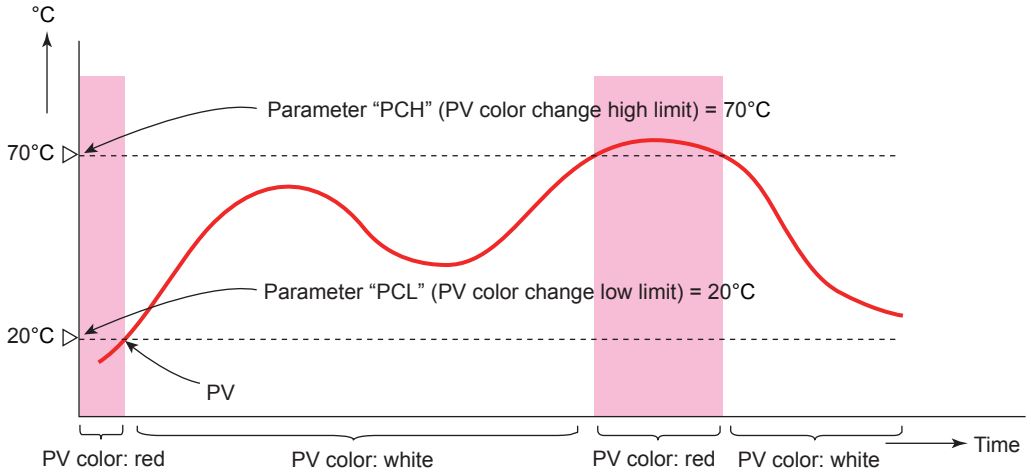
Set the PV color change high limit to “10°C” and the PV color change low limit to “5°C” as deviation band for the current target setpoint “50°C.” PV display color changes from white to red if PV is out of the deviation.
The red-to-white switching action can be set. There is no hysteresis.



Link to PV

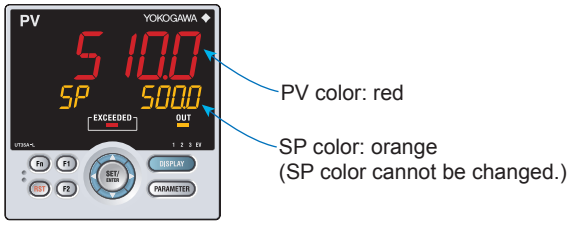
The PV display color changes by linking to PV.

Set the PV color change high limit to “70°C” and the PV color change low limit to “20°C.”
PV display color changes from white to red if PV is out of the range.
The red-to-white switching action can be set. There is no hysteresis.



Use in Fixed Color

PV display color can be fixed in red. It can also be fixed in white.



Link to DI

The PV display color changes by linking to DI (ON/OFF).

The following is an example for changing the display color by a state of DI2.
Set the parameter PCMD=10, and DI2.S=PVRW.
PV display color is red when DI2=ON, and is white when DI2=OFF.

PVRW: PV red/white switch (Menu: DI.SL)

Setting Details

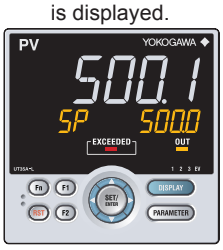
Parameter symbol	Name	Display level	Setting range	Menu symbol
PCMD	Active color PV display switch	EASY	0: Fixed in white 1: Fixed in red 2: Link to alarm 1 (Alarm OFF: white, Alarm ON: red) 3: Link to alarm 1 (Alarm OFF: red, Alarm ON: white) 4: Link to alarm 1 or 2 (Alarm OFF: white, Alarm ON: red) 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) 10: Link to DI2 (ON: red, OFF: white) (*) 11: Link to EXCEEDED lamp (Unlit: hite, lit: red) 12: Link to OUT lamp (Unlit: white, lit: red) *: Set the parameter DI2.S = PVRW	DISP Set
PCH	PV color change high limit	EASY	Set a display value when in PV limit or SP deviation. -19999 to 30000 (Set a value within the input range.) Decimal point position depends on the input type.	
PCL	PV color change low limit	EASY		

13.1.2 Masking Least Significant Digit of PV Display

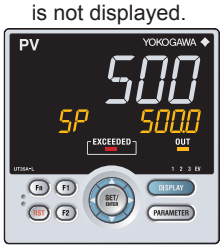
Description

With and without least significant digit of the PV in the Operation Display can be set. When without least significant digit is set, the value of the least significant digit is truncated and not displayed.
The internal value is not changed depending on whether with or without least significant digit (the value is for display only). This parameter does not function for the PV without decimal point.

Least significant digit is displayed.



Least significant digit is not displayed.



The following shows the example of with and without least significant digit

PV display	
With least significant digit	**Without least significant digit**
1.4999	1.499
1.5000	1.500
1.9999	1.999
2.0000	2.000
3000.0	3000
3000.9	3000
3001.0	3001

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
MLSD	Least significant digital mask of PV display	STD	OFF: With least significant digit ON: Without least significant digit	DISP Set

13.1.3 Setting Economy Mode

Description

The LCD backlight ON/OFF can be set in the following methods.
Setting the LCD backlight to OFF saves energy.

User Function Keys

The LCD backlight ON/OFF switch can be assigned to the user function key.

► User function key: 13.2 Assigning Function to User Function Key

Backlight OFF timer

The backlight OFF timer sets the economy mode parameter to ON.
If no keys are pressed for 30 minutes, the LCD backlight goes off automatically.
The backlight OFF can be set to turn off the backlight for the whole display or a display other than the PV display.
To turn on the LCD backlight, press any key.

Contact Input

The LCD backlight ON/OFF switch can be assigned to the contact input

► Contact input: 12.1 Setting Contact Input Function

In the following cases, the LCD backlight does not go off.

- When an alarm occurs.
- When an error at power-on or a hardware malfunction error occurs.
- When EXCEED lamp and OUT lamp turn on.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
ECO	Economy mode	STD	OFF: Disable 1: Economy mode ON (All indications except PV display OFF) 2: Economy mode ON (All indications OFF) 3: Brightness 10 % (all indications)	DISP Set

13.1.4 Selecting the Initial Operation Display that Appears at Power ON

Description

The initial Operation Display that appears when the power is turned on can be set.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
HOME	Home Operation Display setting	PRO	PV: PV Display SP: SP Display	DISP Set

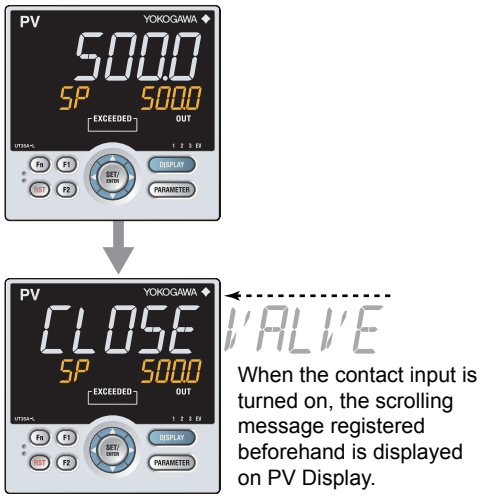
13.1.5 Setting Message Function

Description

Using the message function and turning the contact input on/off, the message registered beforehand can be displayed on PV display by interrupt.
The message is registered using LL50A Parameter Setting Software.
The messages are limited to 20 alphanumeric characters. A maximum of four messages can be registered.
If a number of messages occur simultaneously, the priority is as follows:
(high) MG1>MG2>MG3>MG4 (low)

► Message registration: LL50A Parameter Setting Software User's Manual
► Registration of contact input: 12.1.1 Setting Contact Input Function
► Registration symbols: 3.3 List of Display Symbols

Operation Display



When the contact input is turned on, the scrolling message registered beforehand is displayed on PV Display.

13.1.6 Changing Guide Scroll Speed

Description

The scroll speed can be changed when the guide for the parameter or menu is displayed.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
SPD	Scroll speed	PRO	(Slow) 1 to 8 (Quick)	DISP Set

13.1.7 Turning Guide Display ON/OFF

Description

The guide display that appears when the parameter or the menu is displayed can be switched.
The guide display can be turned on and off by the Fn key in the Menu Display and Parameter Setting Display.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
GUID	Guide display ON/OFF	STD	OFF: Nondisplay ON: Display	DISP Set

13.1.8 Setting Automatic Return to Operation Display

Description

The Display will automatically revert to the Operation Display if no keys are pressed for 5 minutes in Menu Display or Parameter Setting Display.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
OP.JP	Automatic return to Operation Display	PRO	ON: Automatically returned to the Operation Display. OFF: Not automatically returned to the Operation Display.	DISP Set

13.1.9 Setting Brightness and Contrast Adjustment of LCD and Display Update Cycle

Description

The brightness and contrast can be adjusted.
The LCD has a characteristic that the display action becomes late at the low temperature. This can be solved by adjusting the display update cycle (D.CYC).

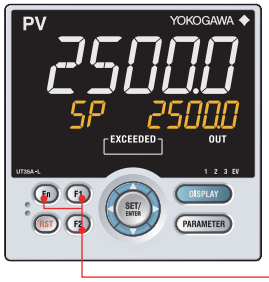
Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
BRI	Brightness	EASY	(Dark) 1 to 5 (Bright)	DISP Set
B.PVW	White brightness adjustment of PV display	PRO	Adjusts the white brightness of PV display. (Dark) -4 to 4 (Bright)	
B.PVR	Red brightness adjustment of PV display	PRO	Adjusts the red brightness of PV display. (Dark) -4 to 4 (Bright)	
B.SP	Brightness adjustment of Setpoint display	PRO	Adjusts the brightness of SP display. (Dark) -4 to 4 (Bright)	
B.BAR	Brightness adjustment of Bar-graph display	PRO	Adjusts the brightness of EXCEED lamp and OUT lamp. (Dark) -4 to 4 (Bright)	
B.STS	Brightness adjustment of Status indicator	PRO	Adjusts the brightness of Status indicator. (Dark) -4 to 4 (Bright)	
D.CYC	Display update cycle	PRO	1: 100 ms 2: 200 ms 3: 500 ms 4: 1 s 5: 2 s	

13.2 Assigning Function to User Function Key

Description

The UT35A-L has three user function keys on the front panel.
Various functions can be assigned to the user function key. Press the user function key to perform the assigned function.
The User function key is available only on the Operation Display.
The assigned function does not work on the Parameter Setting Display. However, the Fn key can be used to turn on/off the guide display.



Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
F1 to Fn	User function key action setting	EASY	See the table below	KEY Set

Setpoint	Function	Action	Availability (Note 1)		
			F1	F2	Fn
OFF	Unassigned	–	√	√	√
LTUP	LCD brightness UP	The current brightness gradually increases every time the function key is pressed.	√	√	√
LTDN	LCD brightness DOWN	The current brightness gradually decreases every time the function key is pressed.	√	√	√
BRI	Adjust LCD brightness	The current brightness gradually increases every time the function key is pressed. Pressing the function key after reaching the maximum brightness changes to the minimum brightness. Thereafter, minimum brightness→maximum brightness→maximum brightness is repeated.	√	√	√
LCD	LCD Backlight ON/OFF switch	The LCD backlight turns on and off every time the user function key is pressed.	√	√	√
LAT	Latch release	Latch 1 to latch 3 are released every time the user function key is pressed.	√	√	√

Note 1: √ indicates available, – indicates unavailable, and √√ indicates initial value.

Status of user function key

The status of the user function key can be identified by communication.
“1” can be read while the user function key is held down, and “0” can be read when the user function key is released. (Initial value: 0)
► Reading via communication: UTAdvanced Series Communication Interface User’s Manual

Fn key operation in the Parameter Setting Display

In the Menu Display and Parameter Setting Display, the guide is displayed on PV display. At this time, use the Fn key to turn on and off the guide display on PV display. A measured input value (PV) is displayed in the ON state.

13.3 Setting Security Functions

13.3.1 Setting a Password

Description

The password function can prevent inadvertent changes to the parameter settings.
If a password is set, the checking is required when moving to the Setup Parameter Setting Display. When the password is verified, can be changed to the Setup Parameter Setting Display. The parameters in the following menus can be set only when the password is verified.
CTL, PV, MPV, OUT, R485, ETHR, KEY, DISP, KLOC, MLOC, DI.SL, I/O, SYS, INIT, VER, and LVL.

Always remember your password when using the password function.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
PASS	Password setting	EASY	0 (No password) to 65535	SYS Set

13.3.2 Setting Parameter Display Level

Description

Parameter display level can be set according to the setting level.
► Parameter display level: Chapter 18 Parameters

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
LEVL	Parameter display level	EASY	EASY: Easy setting mode STD: Standard setting mode PRO: Professional setting mode	LVL Set

13.3.3 Locking (Hiding) Parameter Menu Display

Description

The parameter menu display lock function hides the following Parameter Menu Displays.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
CTL	[CTL] menu lock	PRO	OFF: Display ON: Nondisplay	MLOC Set
PV	[PV] menu lock	PRO		
MPV	[MPV] menu lock	PRO		
OUT	[OUT] menu lock	PRO		
R485	[R485] menu lock	PRO		
ETHR	[ETHR] menu lock	PRO		
KEY	[KEY] menu lock	PRO		
DISP	[DISP] menu lock	PRO		
KLOC	[KLOC] menu lock	PRO		
DI.SL	[DI.SL] menu lock	PRO		
I/O	[I/O] menu lock	PRO		
SYS	[SYS] menu lock	PRO		
INIT	[INIT] menu lock	PRO		
VER	[VER] menu lock	PRO		
LVL	[LVL] menu lock	PRO		
SP	[SP] menu lock	PRO		
SPS	[SPS] menu lock	PRO		
ALRM	[ALRM] menu lock	PRO		
PVS	[PVS] menu lock	PRO		

13.3.4 Key Lock

Description

The key lock function locks the key on the front panel to prohibit key operation.
It can prohibit the operation mode switch or parameter setting change.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
DATA	Front panel parameter data key lock	STD	OFF: Unlock ON: Lock	KLOCK Set

13.3.5 Prohibiting Writing via Communication

Description

Writing data to each register via all communication methods can be permitted or prohibited. However, writing data via light-loader (front) or maintenance port (upper) is possible using LL50A Parameter Setting Software.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
COM.W	Communication write enable/ disable	STD	OFF: Enable ON: Disable	KLOC Set

Displayed only in cases where the communication is specified.

13.4 Confirmation of Key and I/O Condition and Version

13.4.1 Confirmation of Key and I/O Condition

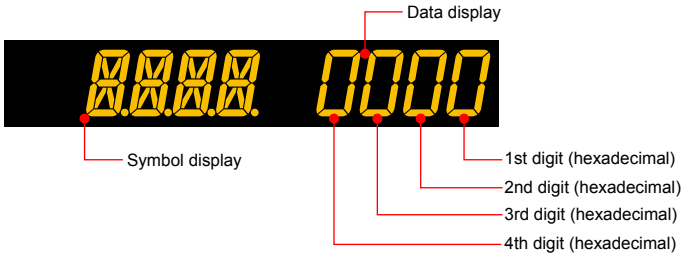
Description

Can be confirm the Key and I/O condition.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
KEY	Key status	PRO	Read only.	I/O Set
X000	DI1-DI2 status (equipped as standard)	PRO		
Y000	AL1-AL3 status (equipped as standard)	PRO		

Key confirmation parameters are displayed in hexadecimal.
When the error occurs, "1" is set on the bit of corresponding error , and the bit data is displayed in hexadecimal.



Parameter KEY

Displayed digit	bit	Description
1st digit	0	PARAMETER (or PARA) key (0: OFF, 1: ON)
	1	DISPLAY (or DISP) key (0: OFF, 1: ON)
	2	RIGHT arrow key (0: OFF, 1: ON)
	3	DOWN arrow key (0: OFF 1: ON)
2nd digit	4	SET/ENTER key (0: OFF, 1: ON)
	5	UP arrow key (0: OFF, 1: ON)
	6	LEFT arrow key (0: OFF, 1: ON)
	7	F2 key (0: OFF, 1: ON)
3rd digit	8	F1 key (0: OFF, 1: ON)
	9	RST key (0: OFF, 1: ON)
	10	Fn key (0: OFF, 1: ON)
	11	–
4th digit	12	–
	13	–
	14	–
	15	–

Parameter X000

Displayed digit	bit	Description
1st digit	0	DI1 status (0: OFF, 1: ON)
	1	DI2 status (0: OFF, 1: ON)
	2	–
	3	–
2nd digit	4	–
	5	–
	6	–
	7	–
3rd digit	8	–
	9	–
	10	–
	11	–
4th digit	12	–
	13	–
	14	–
	15	–

Parameter Y000

Displayed digit	bit	Description
1st digit	0	AL1 status (0: OFF, 1: ON)
	1	AL2 status (0: OFF, 1: ON)
	2	AL3 status (0: OFF, 1: ON)
	3	–
2nd digit	4	–
	5	–
	6	–
	7	–
3rd digit	8	–
	9	–
	10	–
	11	–
4th digit	12	–
	13	–
	14	–
	15	–

13.4.2 Confirmation of Version

Description

Can be confirm the version of the controller.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
MCU	MCU version	EASY	Read only.	VER Set
DCU	DCU version	EASY		
ECU3	ECU-3 version	EASY		
PARA	Parameter version	EASY		
H.VER	Product version	EASY		
SER1	Serial number 1	EASY		
SER2	Serial number 2	EASY		
MAC1	MAC address 1	EASY		
MAC2	MAC address 2	EASY		
MAC3	MAC address 3	EASY		

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14.1 Initializing Parameter Settings to Factory Default Values

Description

Parameter settings can be initialized to the factory default values.
Use the key or LL50A Parameter Setting Software to execute it.

Note

The user setting values (defaults) are not initialized even if the parameter setting values are initialized to the factory default values.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
F.DEF	Initialization to factory default value	PRO	-12345: Initialization, automatically returned to "0" after initialization.	INIT Set

14.2 Registering and Initializing User Default Values

14.2.1 Registering as User Setting (Default) Values

Description

The user default values can be registered as parameter default values.
Use the LL50A Parameter Setting Software to register user setting (default) values.

CAUTION

Before registering the user default value, make sure that the user setting value is set to the parameter.

14.2.2 Initializing to User Setting (Default) Values

Description

Parameter settings can be initialized to the user setting (default) values.
Use the LL50A Parameter Setting Software to execute it.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
U.DEF	Initialization to user default value	PRO	12345: Initialization, automatically returned to "0" after initialization.	INIT Set

15.1 Remedies if Power Failure Occurs during Operations

Description

All functions of the controller cannot be operated for about 10 seconds after recovery. However, the case of instantaneous power failure is excepted.

- 100–240 V AC: Instantaneous power failure of 20 ms or less
- 24 V AC/DC: Instantaneous power failure of 1 ms

A power failure is not detected. Normal operation continues.

The following shows effects caused in “settings” and “operation status.”

Alarm action	Does not continue. Alarm with stand-by function will enter stand-by status. Alarm latch will be initialized.
Setting parameter	Set contents of each parameter are retained.

Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
R.MD	Restart mode	EASY	0: Limit output relay is de-energized at power on. 1: Limit output relay is energized at power on.	SYS Set

15.2 Power Frequency Setting

Description

The power frequency can be set by automatic detection or manually.
However, when the /DC option is specified, only manual setting is available. Set the range to the commercial frequency of the installation location.

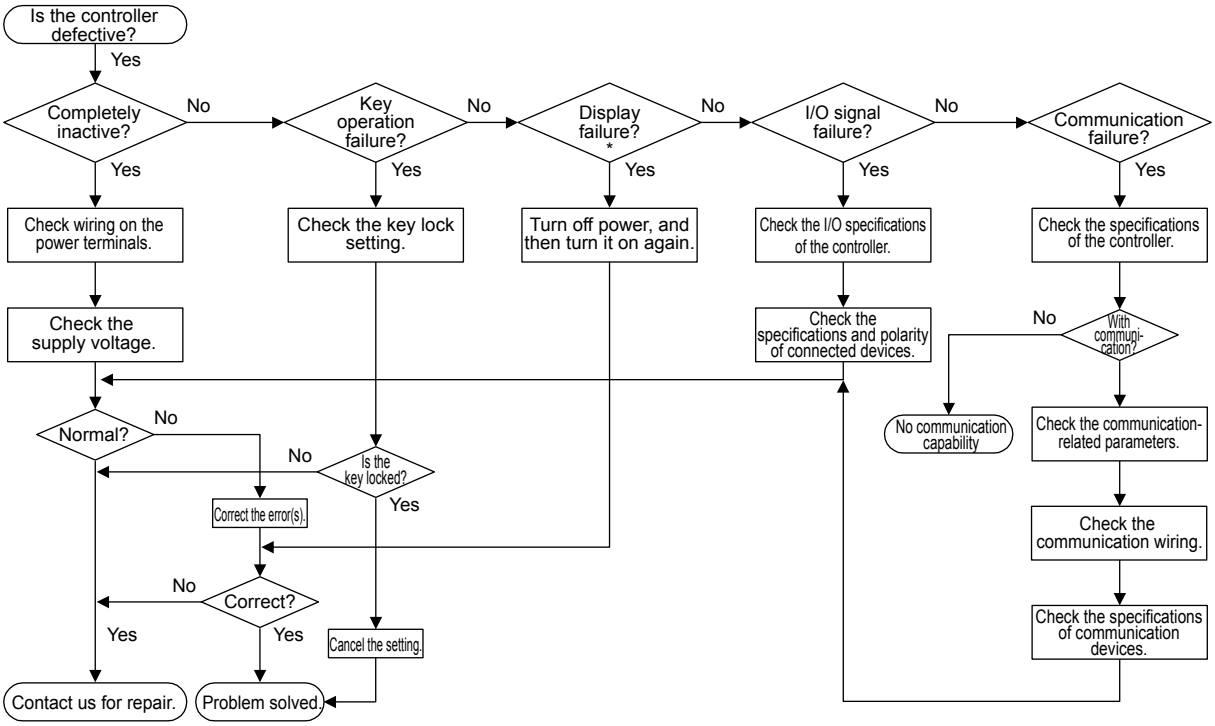
Setting Details

Parameter symbol	Name	Display level	Setting range	Menu symbol
FREQ	Power frequency	EASY	AUTO 60: 60 Hz 50: 50 Hz	SYS Set

16.1 Troubleshooting

16.1.1 Troubleshooting Flowchart

If the Operation Display does not appear after turning on the controller's power, follow the measures in the procedure below.
If a problem appears complicated, contact our sales representative.



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

16.1.2 Errors at Power On

The errors shown below may occur in the fault diagnosis when the power is turned on.

PV display (Operation Display)	Setpint display (Operation Display)	Status indicator (Operation Display)	Parameter that displays error details	Error description	Cause and diagnosis	Remedy
Indication off	Indication off	–	–	Faulty MCU RAM / MCU ROM	MCU RAM / MCU ROM are failed.	Faulty. Contact us for repair.
ERR	SYS -----	–	–	System data error	System data is corrupted.	Faulty. Contact us for repair.
	PAR 0004 (for user default value error only)		Setup parameter (PA.ER)	User (parameter) default value error	User parameter is corrupted. Initialized to factory default value.	Check and reconfigure the initialized parameters. Error indication is erased when the power is turned on again.
	PAR 0010 (for setup parameter error only)			Setup parameter error	Setup parameter data is corrupted. Initialized to factory default value.	
	PAR 0020 (for operation parameter error only)			Operation parameter error	Operation parameter data is corrupted. Initialized to user default value.	
	SLOT 0004 (0004: Error occurs to all hardware of E3-terminal areas.)		Setup parameter (OP.ER)	Non responding hardware of extended function (E3-terminal areas)	Inconsistence of system data and hardware of extended function. Non responding communication between hardware of extended function (E3-terminal areas).	Faulty. Contact us for repair.
Normal indication	Normal indication	Rightmost decimal point on PV display blinks.	Setup parameter (PA.ER)	Calibration value error	Initialized to calibrated default value because of corrupted factory default value.	Faulty. Contact us for repair.
		Right most decimal point on Symbol display blinks.		Faulty FRAM	Writing (storing) data to FRAM is impossible.	

16.1.3 Errors during Operation

The errors shown below may occur during operation.

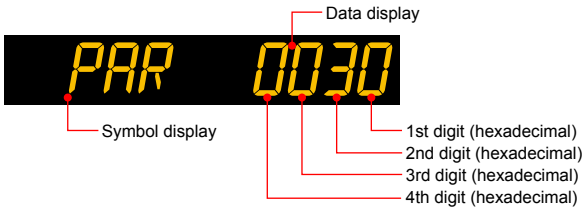
PV display (Operation Display)	Setpoint display (Operation Display)	Status indicator (Operation Display)	Parameter that displays error details	Error description	Cause and diagnosis	Remedy
AD.ERR	Normal indication (Note)	–	Setup parameter (AD1.E)	Analog input terminal ADC error • PV input	Analog input 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.
B.OUT	Normal indication (Note)	–	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.
			Setup parameter (PV1.E)	PV input burnout error)	Burnout of analog input connected to PV	Check wiring and sensor of connected analog input terminal. 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%.	Check analog input value.
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.
Undefined	Undefined	–	–	Faulty MCU	MCU is corrupted.	Faulty Contact us for repair.
Undefined	Undefined	–	–	Faulty DCU (ROM/RAM error, corrupted)	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.

Hexadecimal Display on Setpoint Display (Operation Display)

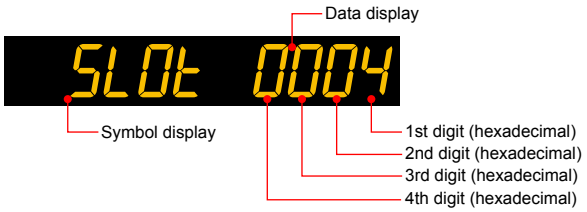
Some error codes are displayed in hexadecimal.
When the error occurs, "1" is set on the bit of corresponding error, and the bit data is displayed in hexadecimal.

If the setup parameter error or the operation parameter errors occur, it is displayed as follows:



Displayed digit	bit	Description
1st digit	0	System data error
	1	Calibration value error
	2	User (parameter) default value error
	3	–
2nd digit	4	Setup parameter error
	5	Operation parameter error
	6	–
	7	–
3rd digit	8	Faulty FRAM
	9	–
	10	Control parameter error
	11	–
4th digit	12	–
	13	–
	14	–
	15	–

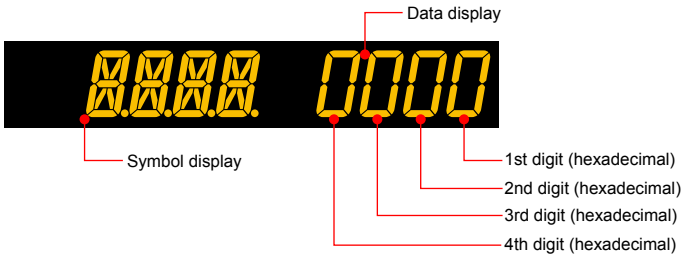
If the hardware in E3-terminal area does not respond, it is displayed as follows:



Displayed digit	bit	Description
1st digit	0	–
	1	–
	2	Non responding hardware in E3-terminal area
	3	–
2nd digit	4	–
	5	–
	6	–
	7	–
3rd digit	8	–
	9	–
	10	Communication error in E3-terminal area
	11	–
4th digit	12	–
	13	–
	14	–
	15	–

Hexadecimal Display of the Parameter which Shows the Error Details

Error confirmation parameters are displayed in hexadecimal.
When the error occurs, "1" is set on the bit of corresponding error.



Parameter PA.ER

Displayed digit	bit	Description
1st digit	0	System data error
	1	Calibration value error
	2	User (parameter) default value error
	3	–
2nd digit	4	Setup parameter error
	5	Operation parameter error
	6	–
	7	–
3rd digit	8	Faulty FRAM
	9	–
	10	Control parameter error
	11	–
4th digit	12	–
	13	–
	14	–
	15	–

Parameter OP.ER

Displayed digit	bit	Description
1st digit	0	–
	1	–
	2	Non responding hardware in E3-terminal area
	3	–
2nd digit	4	–
	5	–
	6	–
	7	–
3rd digit	8	–
	9	–
	10	Communication error in E3-terminal area
	11	–
4th digit	12	–
	13	–
	14	–
	15	–

Parameter AD1.E

Displayed digit	bit	Description
1st digit	0	ADC error of PV input
	1	–
	2	–
	3	–
2nd digit	4	–
	5	RJC error of PV input
	6	–
	7	–
3rd digit	8	PV input burnout error
	9	–
	10	–
	11	–
4th digit	12	–
	13	–
	14	–
	15	–

Parameter PV1.E

Displayed digit	bit	Description
1st digit	0	PV input burnout error
	1	–
	2	–
	3	–
2nd digit	4	PV input over-scale
	5	PV input under-scale
	6	–
	7	–
3rd digit	8	–
	9	–
	10	–
	11	–
4th digit	12	–
	13	–
	14	–
	15	–

16.2 Maintenance

16.2.1 Cleaning

The front panel and operation keys should be gently wiped with a cloth soaked with water and squeezed firmly.

CAUTION

In order to prevent LCD from static electricity damage, do not wipe with dry cloth.
(When LCD is electrified, it returns to normal in several minutes.)
Do not use alcohol, benzene, or any other solvents.

16.2.2 Packaging when Shipping the Product for Repair

Should the instrument break down and need to be shipped to our sales representative for repair, handle it as noted below:

CAUTION

Write down the settings of parameters for a repair request.

WARNING

Prior to shipping the instrument, put it into an antistatic bag and repackage it using the original internal packaging materials and packaging container.

16.2.3 Replacing Parts

Do not replace any parts inside the unit.

16.3 Periodic Maintenance

Check the operating condition periodically to use this instrument with good condition.

16.4 Disposal

When disposing of this instrument, arrange for appropriate disposal as industrial waste according to the rules of a country, the area, or a local government.

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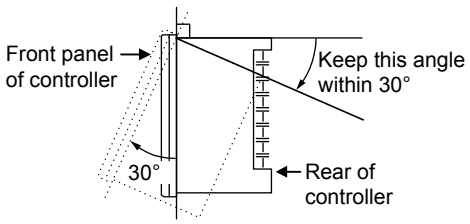
17.1 Installation Location

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

- Instrumented enclosure
  This instrument is designed to be mounted in an instrumented enclosure. Mount the instrument in a location where its terminals will not inadvertently be touched.
  Be sure to mount the instrument in an enclosure with a door.
- 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 which follow. If mounting other instruments adjacent to the instrument, comply with these external 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.

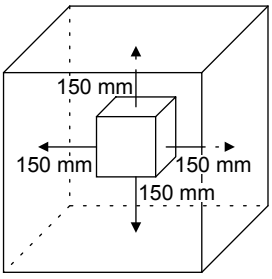


Note

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, ultrared rays, ultraviolet rays, 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 and LCD.
- 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

17.2 Mounting Method

WARNING

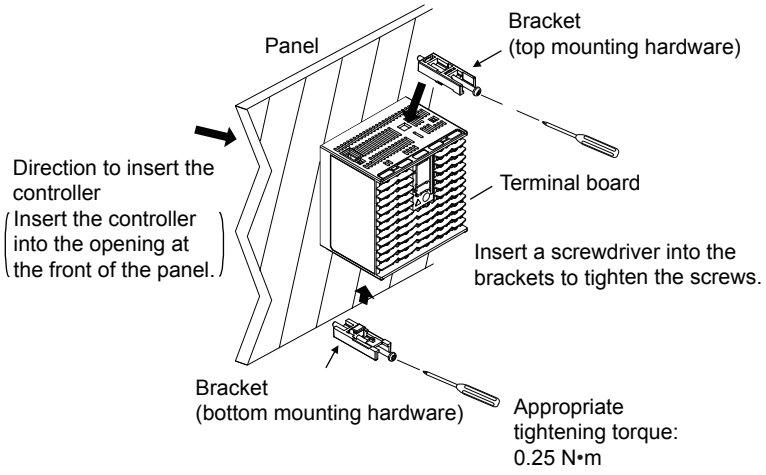
Be sure to turn OFF the power supply to the controller before installing it on the enclosure to avoid an electric shock.

Mounting the Instrument Main Unit

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

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

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



To uninstall the controller, perform the procedure in the reverse order.

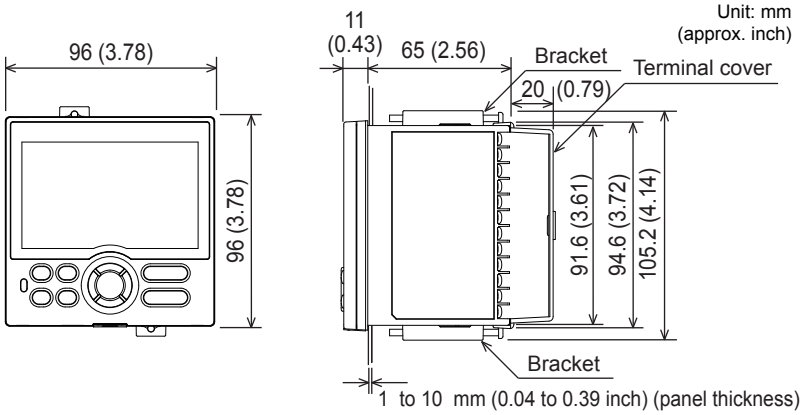
CAUTION

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

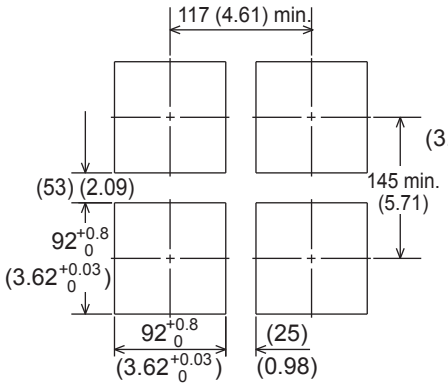
17.3 External Dimensions and Panel Cutout Dimensions

UT35A-L

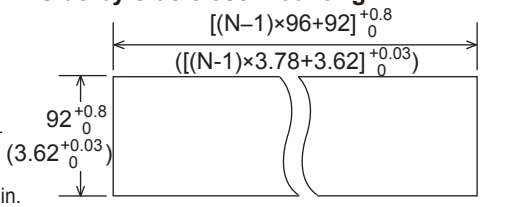
Unit: mm
(approx. inch)



General mounting



Side-by-side close mounting



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

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

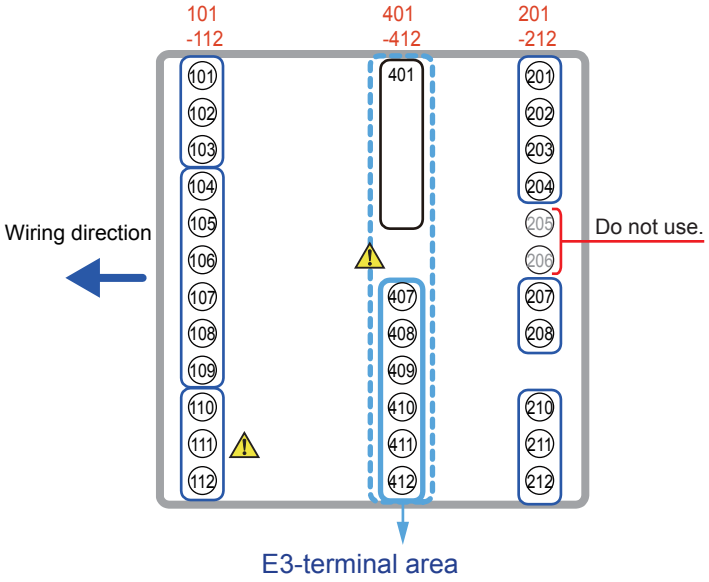
17.4 Wiring

17.4.1 Important Information on Wiring

WARNING

1) 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.
2) Wiring work must be carried out by a person with basic electrical knowledge and practical experience.
3) For the wiring cable, the temperature rating is 75 °C or more.

UT35A-L Terminal Block Diagram



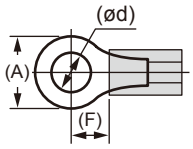
CAUTION

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

CAUTION

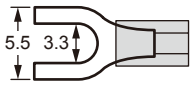
Do not use an unassigned terminal as the relay terminal.

Recommended Crimp-on Terminal Lugs



Recommended tightening torque: 0.6 N·m
Applicable wire size: Power supply wiring 1.25 mm^2 or more

Applicable terminal lug	Applicable wire size mm^2 (AWG#)	(ød)	(A)	(F)
M3	0.25 to 1.65 (22 to 16)	3.3	5.5	4.2



Cable Specifications

Purpose	Name and Manufacturer
Power supply, relay contact output	600 V Grade heat-resistant PVC insulated wires, JIS C 3317(HIV), 0.9 to 2.0 mm^2
Thermocouple	Shielded compensating lead wire JISC1610
RTD	Shielded wire (three/four conductors) UL2482 (Hitachi Cable)
Other signals (other than contact input/output)	Shielded wires
Other signals (contact input/output)	Non shielded wires
RS485 communication	Shielded wires
Ethernet communication	100 BASE-TX (CAT-5) / 10 BASE-T

Recommended tightening torque: 0.5 to 0.6 N·m

Note

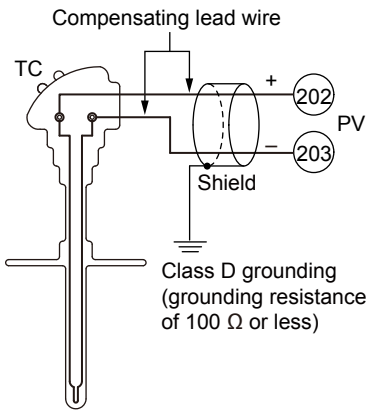
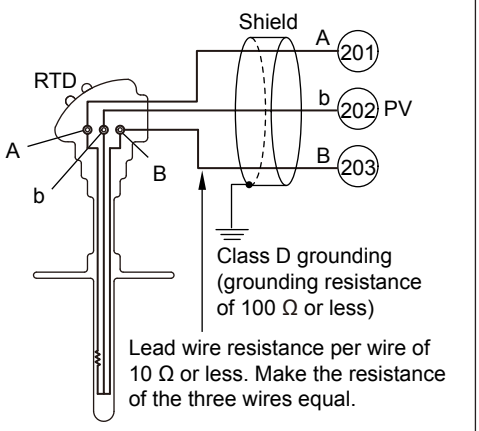
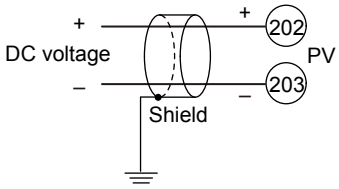
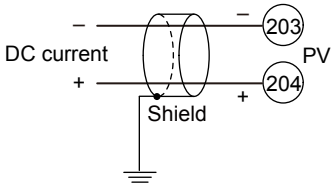
Communication wires of cross-sectional area less than or equal to 0.34 mm^2 may not be secured firmly to the terminals.
Check that the wire is firmly connected to the terminal by folding the conductor of the wire connected to the climp-on lug.
Recommended length of the stripped wire: 7 mm

17.4.2 PV Input Wiring

CAUTION

1) Be careful of polarity when wiring inputs. Reversed polarity can damage the UT.
2) Keep the PV input signal line as far away as possible from the power supply circuit and ground circuit.
3) 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.
4) If there is a risk of external lightning surges, use a lightning arrester etc.

UT35A-L

<table>
<tr><th>TC Input</th><th>RTD Input (3-wire system)</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><th>DC Voltage (mV, V) Input</th><th>DC Current (mA) Input</th></tr>
<tr><td> 
</td><td> 
</td></tr>
</table>

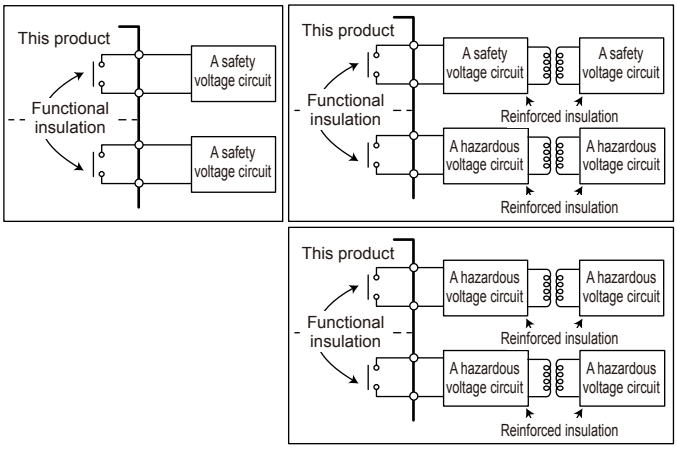
Use

PV input is used for PV input.

17.4.3 Limit Control Output (Relay) Wiring

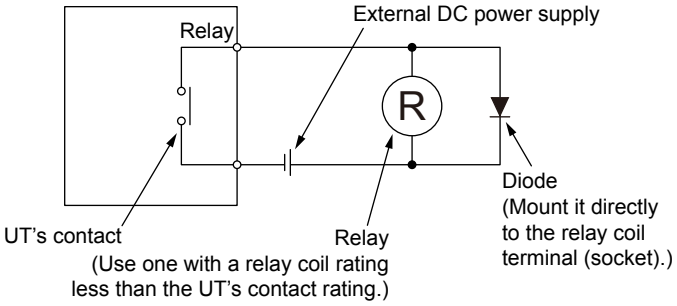
CAUTION

1) 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.
2) If there is a risk of external lightning surges, use a lightning arrester etc.
3) Relays cannot be used for a small load of 10 mA or less.
4) 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.)



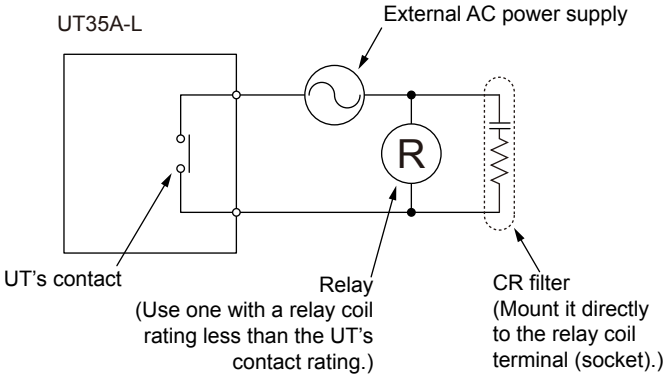
DC Relay Wiring

UT35A-L



AC Relay Wiring

UT35A-L



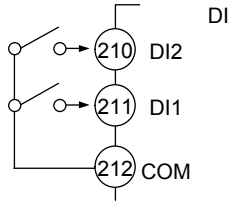
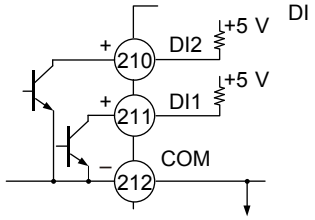
17.4.4 Contact Input Wiring

CAUTION

1) Use a no-voltage contact (relay contact etc.) for external contacts.
2) Use a no-voltage contact which has ample switching capacity for the terminal's OFF voltage (approx. 5V) and ON current (approx 1mA).
3) When using a transistor contact, the voltage at both terminals must be 2 V or less when the contact is ON and the leakage current must be 100 µA or less when it is OFF.
4) If there is a risk of external lightning surges, use a lightning arrester etc.

UT35A-L

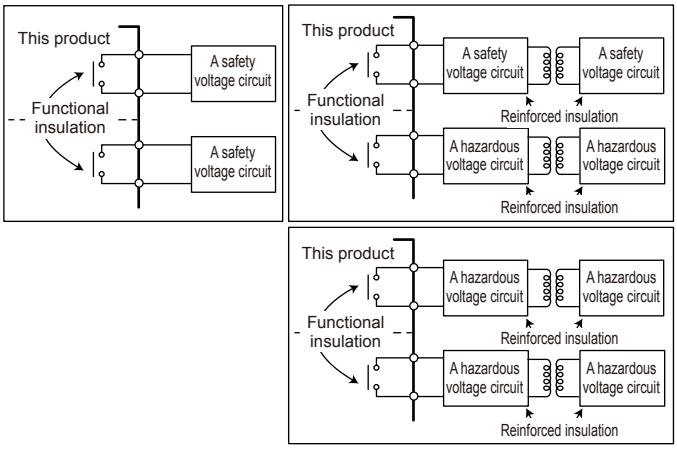
Contact Input Equipped as Standard

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

17.4.5 Contact Output Wiring

CAUTION

1) Use an auxiliary relay for load-switching if the contact rating is exceeded.
2) Connect a bleeder resistor when a small current is used, so that a current exceeding 1 mA can be supplied.
3) The output relay has a limited service life. Be sure to connect a CR filter (for AC) or diode (for DC) to the load.
4) If there is a risk of external lightning surges, use a lightning arrester etc.
5) 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.)

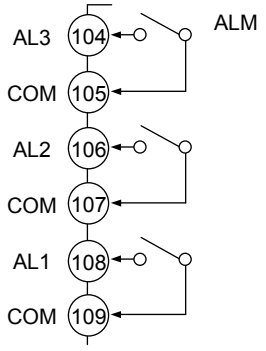


► When using auxiliary relay: 17.4.3 Limit Control Output (Relay) Wiring

UT35A-L

Contact Output Equipped as Standard

Relay contact



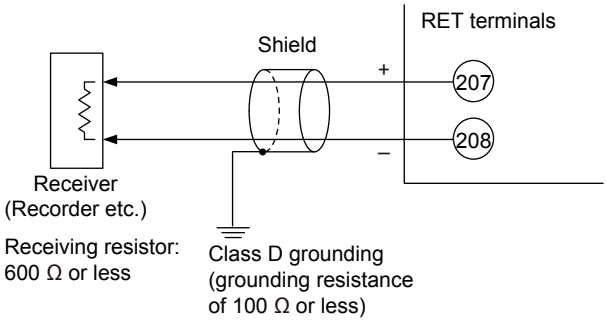
Contact rating: 240 V AC, 1 A
30 V DC, 1 A (resistance load)

The following table shows the initial status.

AL1 terminal	AL2 terminal	AL3 terminal
Alarm 1 (PV high limit)	Alarm 2 (PV low limit)	Alarm 3 (PV high limit)

17.4.6 Retransmission Output Wiring

The current output range can be changed.



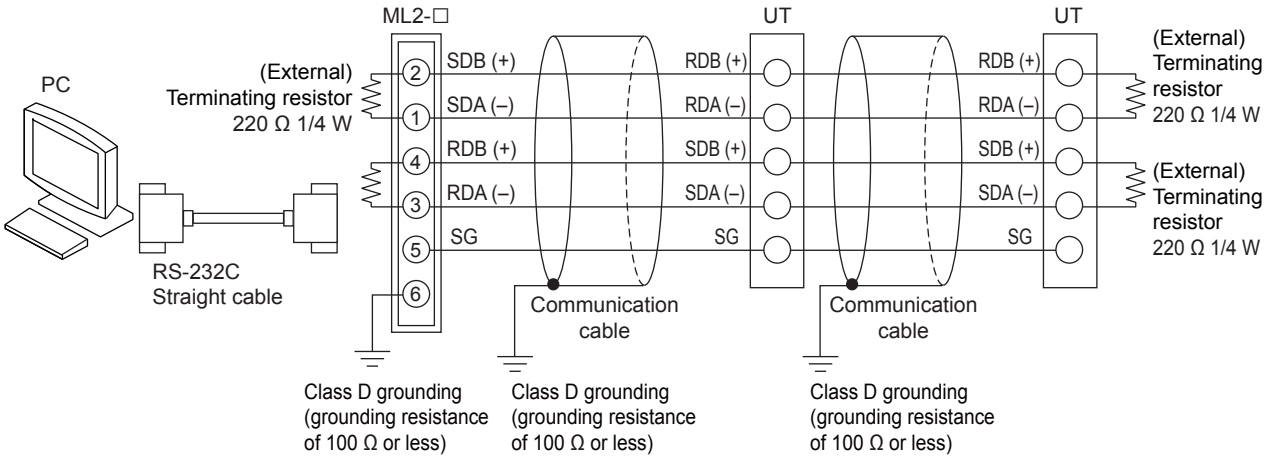
17.4.7 RS-485 Communication Interface Wiring

Wire as follows for Modbus communication, PC link communication, or ladder communication.

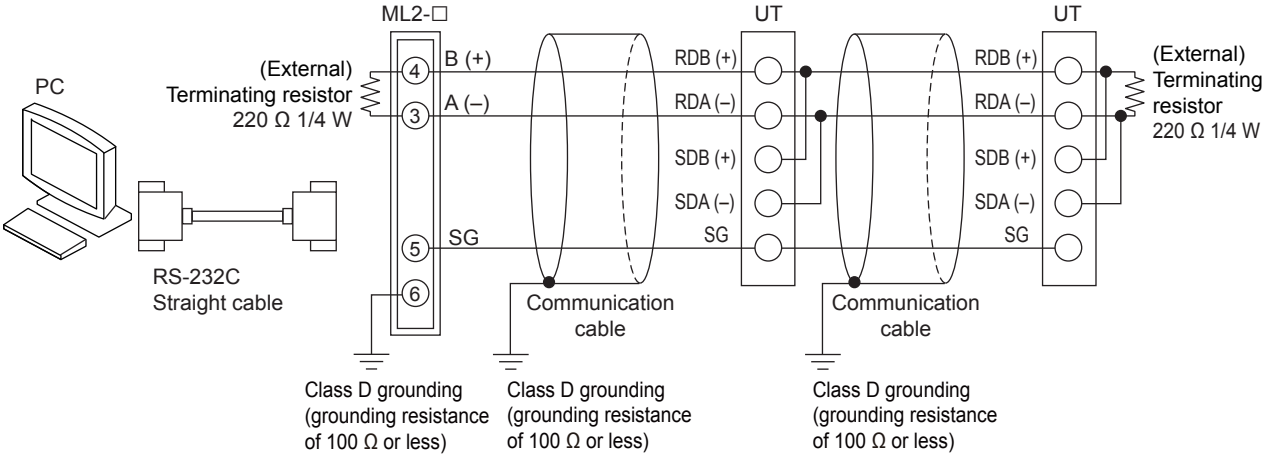
Always connect a terminating resistor to the station at the end of the communication line.

► Details of communication parameter settings and communication functions: UTAdvanced Series Communication Interface (RS-485, Ethernet) User's Manual

4-wire Wiring



2-wire Wiring of 4-wire Terminal



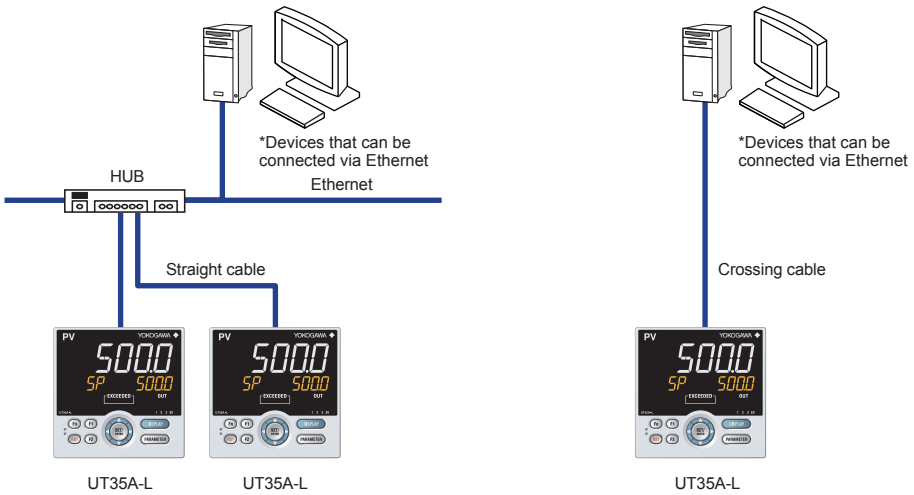
UT35A-L

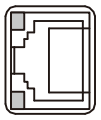
Terminal symbol above	UT35A-L (For Standard model) Suffix code: Type 3 = "1"
RDB (+)	410
RDA (–)	411
SDB (+)	407
SDA (–)	408
SG	409

Note

ML2-x indicates a converter of YOKOGAWA. Other than this, RS232C/RS485 converters can also be used. If another converter is to be used, check the electrical specifications of the converter before using it.

17.4.8 Ethernet Communication Interface Wiring





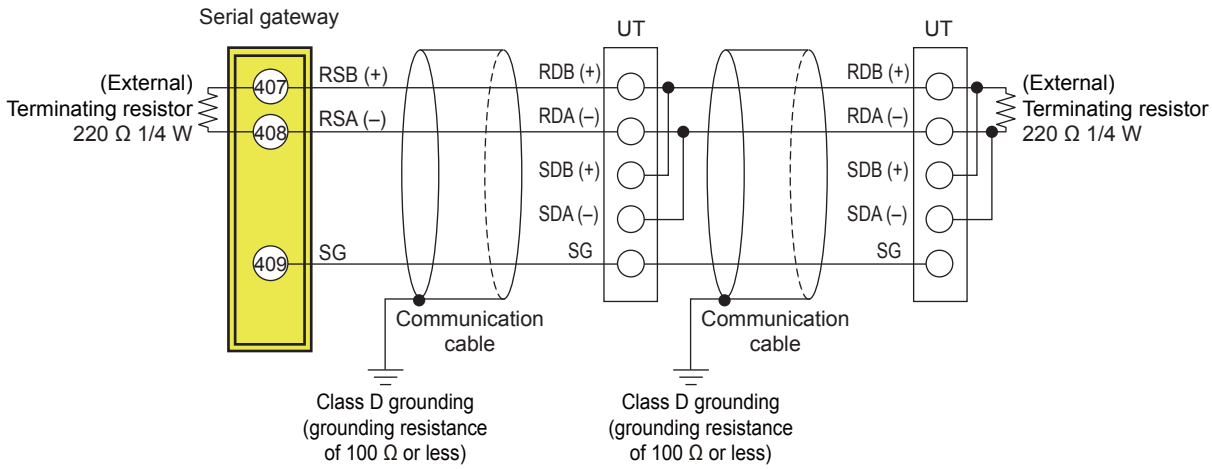
Upper side LED (baud rate)		Lower side LED (link activity)	
Color	Amber	Color	Green
Lit	100M bps	Lit	Linked
Unlit	10M bps	Blink	Active
		Unlit	Link failure

CAUTION

Be sure to connect a lightning arrester for Ethernet (100BASE-TX/10BASE-T) in an environment where a surge voltage may be induced by a lightning discharge.

RS-485 communication wiring for the serial gateway function is as follows.

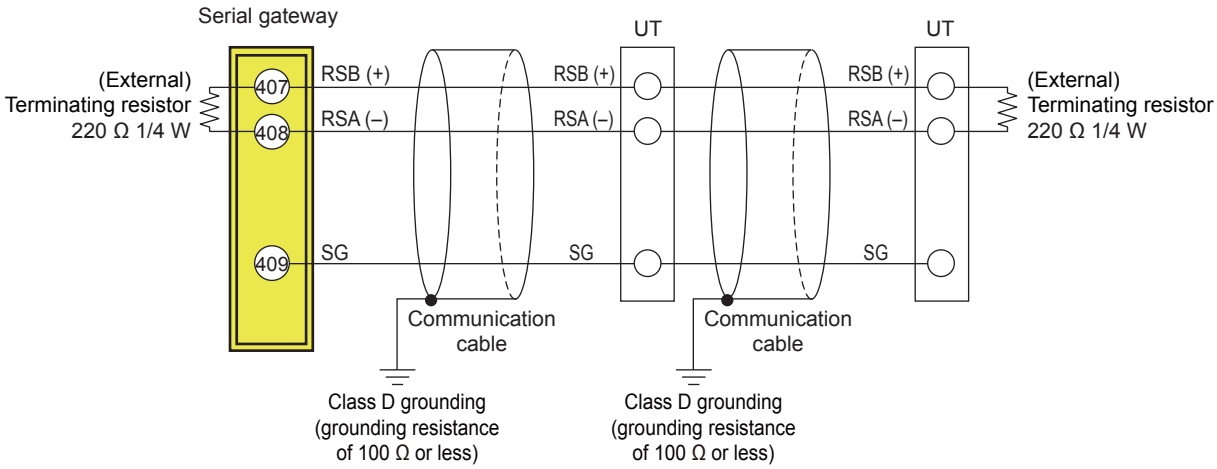
2-wire Wiring of 4-wire Terminal



Slave terminals

Terminal symbol above	UT35A-L (For Standard model) Suffix code: Type 3 = "1" (For Detailed model) Optional suffix code: /CH3
RDB (+)	410
RDA (–)	411
SDB (+)	407
SDA (–)	408
SG	409

2-wire Wiring



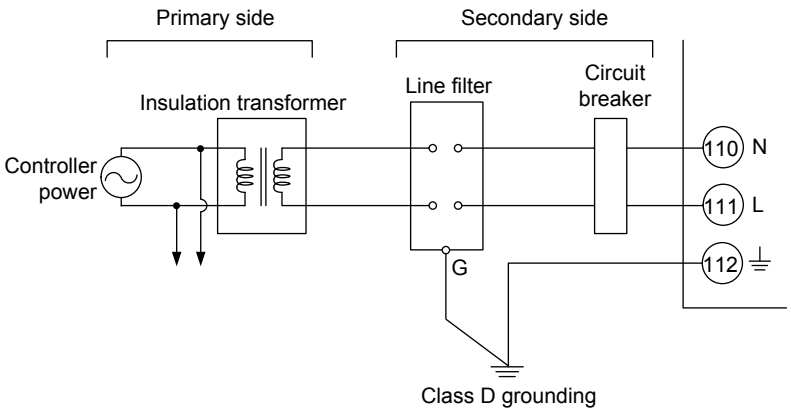
17.4.9 Power Supply Wiring

WARNING

1) Wiring work must be carried out by a person with basic electrical knowledge and practical experience.
2) 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.
3) 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.
4) Install the power cable keeping a distance of more than 1 cm from other signal wires.
5) The power cable is required to meet the IEC standards concerned or the requirements of the area in which the instrument is being installed.
6) 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.

CAUTION

1) 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.
2) If there is a risk of external lightning surges, use a lightning arrester etc.

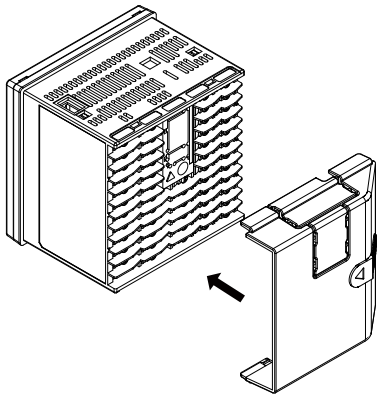


17.5 Attaching and Detaching Terminal Cover

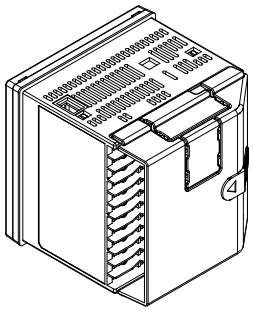
After completing the wiring, the terminal cover is recommended to use for the instrument.

Attaching Method

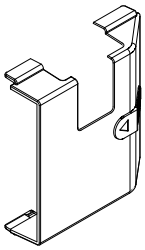
(1) Attach the terminal cover to the rear panel of the main unit horizontally.



(2) The following figure is a mounting image.

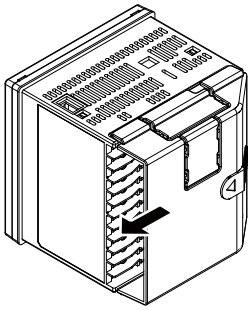


When Ethernet communication is specified, cut and use a terminal cover as follows.
Cut the cover carefully using nippers etc. so that sharp edge does not remain.



Detaching Method

(1) Slide the terminal cover to the direction of the printed arrow.



18.1 Parameter Map

Brief Description of Parameter Map

Group Display

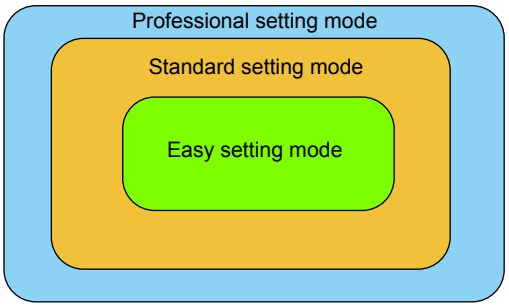
"E3" appearing in the parameter map are displayed on Group display (7 segments, 2 digits) while the menu or parameter is displayed.

E3: indicates the parameter in E3-terminal area

Parameter Display Level

The marks below appearing next to the menu symbol and parameter symbol in the parameter map indicate the display/non-display level.

Mark	Display	Display level	Description
None	EASY	Easy setting mode: Displays the minimum parameters.	Corresponding parameters are displayed in all modes.
Ⓢ	STD	Standard setting mode: Displays a wider range of parameters than displayed in the Easy setting mode.	Corresponding parameters are displayed only in Standard setting mode and Professional setting mode. Parameter display level indicators "EASY" and "PRO" are unlit in Standard setting mode. *: "STD" is the symbol used in this manual only.
Ⓟ	PRO	Professional setting mode: Displays all parameters.	Corresponding parameters are displayed only in Professional setting mode.



► Display level: 13.3.2 Setting Parameter Display Level

Function of Each Menu

The parameters in the menu of the following table indicate the parameters to set the functions necessary for operation.

Menu symbol	Function
SP	SP and alarm setpoint
SPS	SP-related function
ALRM	Alarm function
PVS	PV-related function

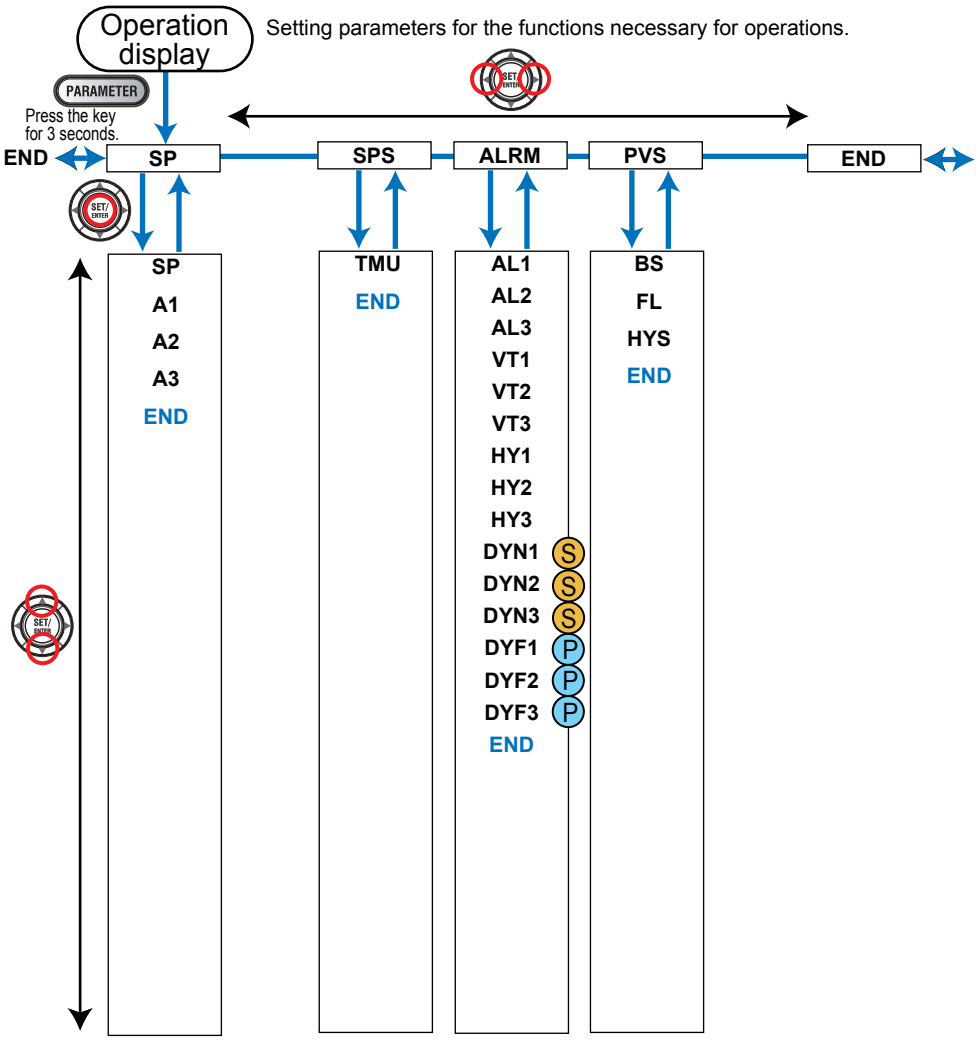
The parameters in the menu of the following table indicate the parameters to set the basic functions of the controller. The symbol in parentheses are shown on Group display.

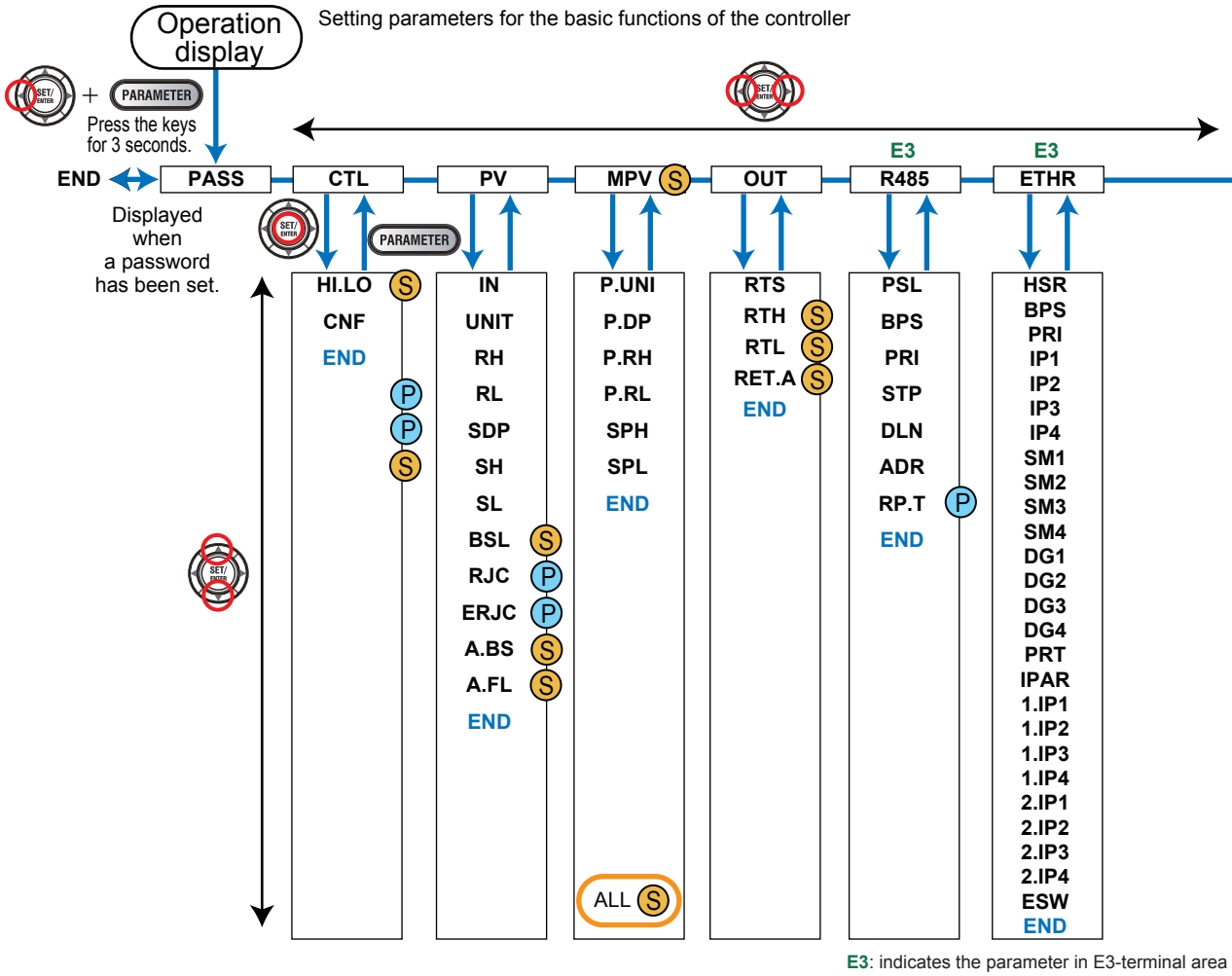
Menu symbol	Functions
PASS	Password setting (Displayed only when the password has been sent.)

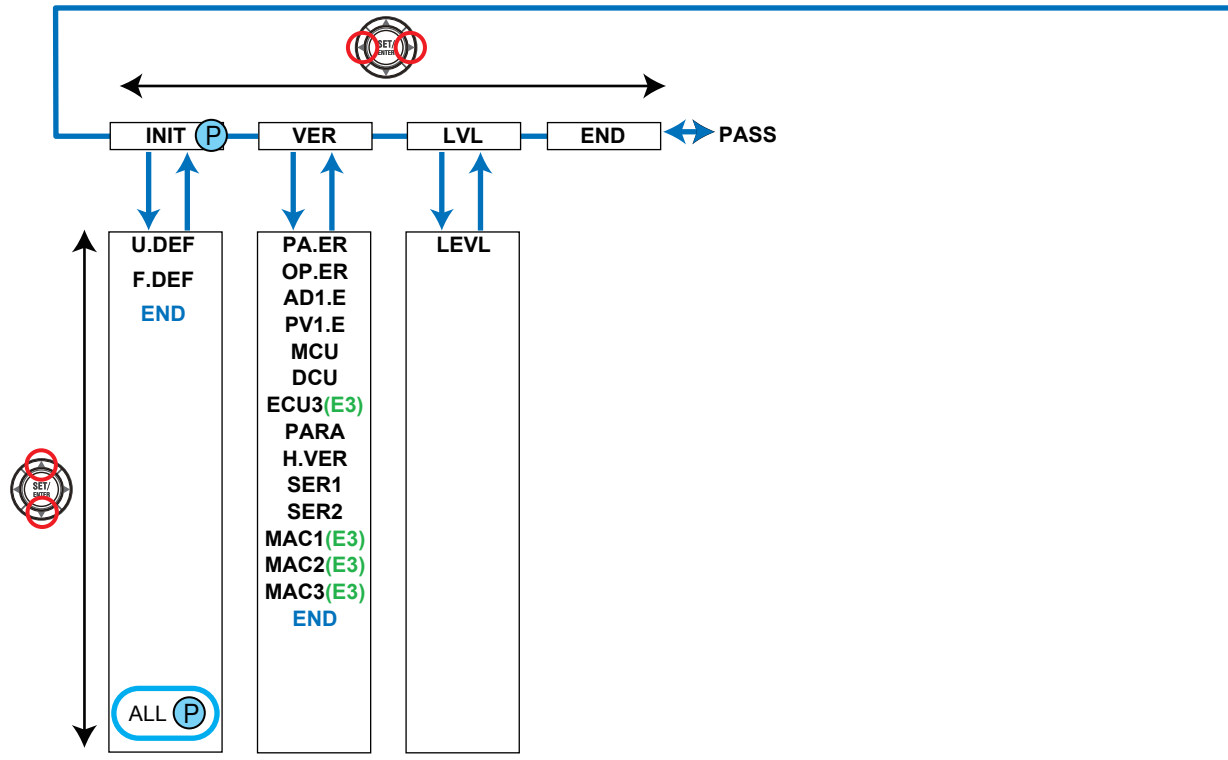
Menu symbol	Functions
CTL	Limit control type, the way of confirming operation
PV	PV input type, range, scale, etc
MPV	Input range, SP limiters
OUT	Retransmission output
R485 (E3)	RS-485 communication (E3-terminal area)
ETHR (E3)	Ethernet communication, gateway setting, IP access restriction, etc. (E3-terminal area)
KEY	Function of User function key
DISP	Display functions
KLOC	Key lock
MLOC	Parameter menu lock
DI.SL	Contact input function
I/O	Input / output data display
SYS	Action setting when recovering from a power failure, password setting, etc
INIT	Initialization of parameter
VER	Error status, version, MAC address, etc
LVL	Parameter display level

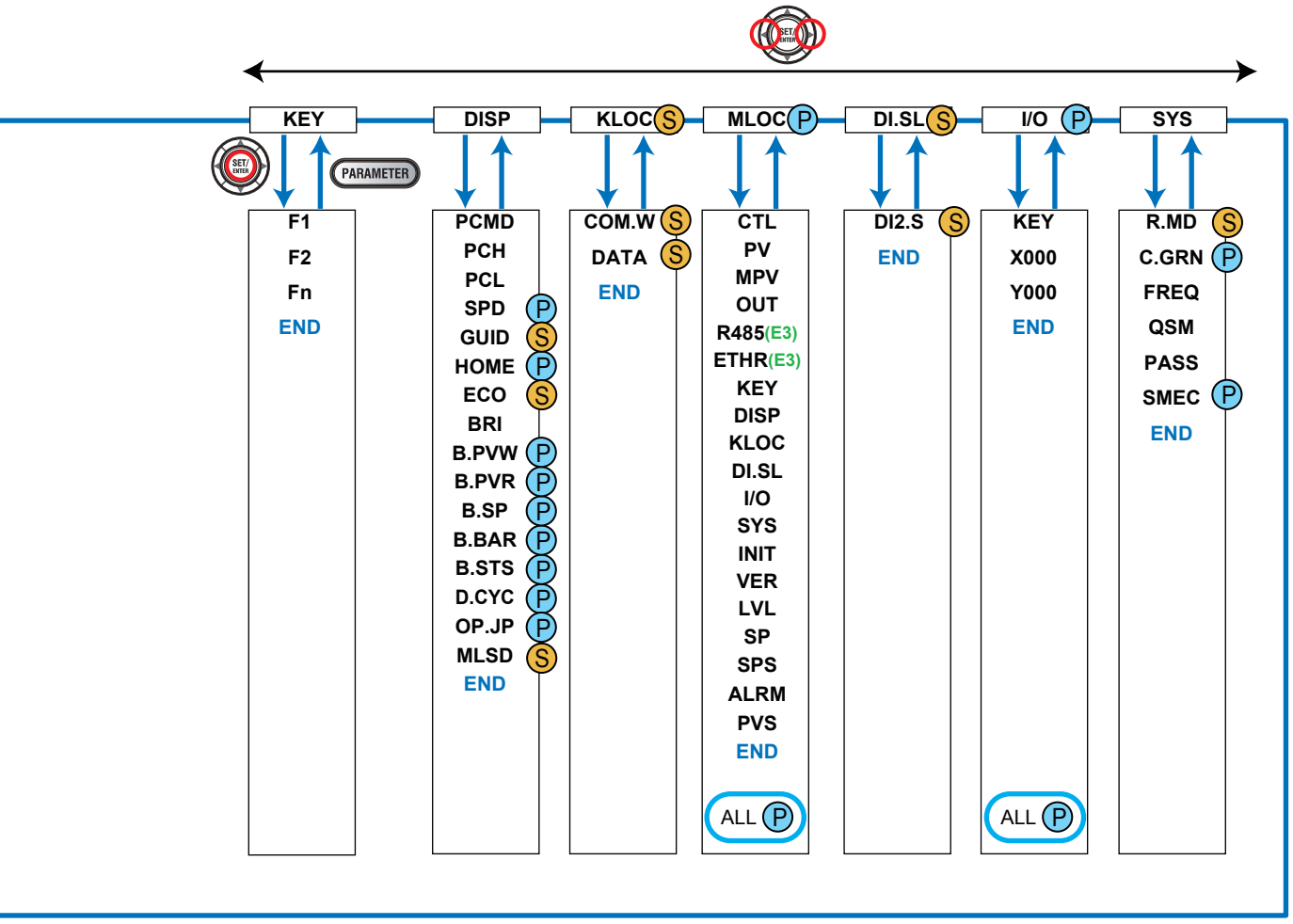
Note

Some parameters are not displayed according to the setting such as input and output.


Operation display
Setting parameters for the functions necessary for operations.
PARAMETER
Press the key for 3 seconds.
END
SP
SPS
ALRM
PVS
END
SET/ ENTER
SP
A1
A2
A3
END
TMU
END
AL1
AL2
AL3
VT1
VT2
VT3
HY1
HY2
HY3
DYN1 S
DYN2 S
DYN3 S
DYF1 P
DYF2 P
DYF3 P
END
BS
FL
HYS
END


Operation display
Setting parameters for the basic functions of the controller
PARAMETER
Press the keys for 3 seconds.
END
PASS
CTL
PV
MPV
OUT
R485
ETHR
E3
E3
Displayed when a password has been set.
PARAMETER
HI.LO
CNF
END
IN
UNIT
RH
RL
SDP
SH
SL
BSL
RJC
ERJC
A.BS
A.FL
END
P.UNI
P.DP
P.RH
P.RL
SPH
SPL
END
ALL
RTS
RTH
RTL
RET.A
END
PSL
BPS
PRI
STP
DLN
ADR
RP.T
END
HSR
BPS
PRI
IP1
IP2
IP3
IP4
SM1
SM2
SM3
SM4
DG1
DG2
DG3
DG4
PRT
IPAR
1.IP1
1.IP2
1.IP3
1.IP4
2.IP1
2.IP2
2.IP3
2.IP4
ESW
END
E3: indicates the parameter in E3-terminal area


INIT
VER
LVL
END
PASS
U.DEF
F.DEF
END
ALL
PA.ER
OP.ER
AD1.E
PV1.E
MCU
DCU
ECU3(E3)
PARA
H.VER
SER1
SER2
MAC1(E3)
MAC2(E3)
MAC3(E3)
END
LEVL


KEY
DISP
KLOC S
MLOC P
DI.SL S
I/O P
SYS
SET/ ENTER
PARAMETER
F1
F2
Fn
END
PCMD
PCH
PCL
SPD P
GUID S
HOME P
ECO S
BRI
B.PVW P
B.PVR P
B.SP P
B.BAR P
B.STS P
D.CYC P
OP.JP P
MLSD S
END
COM.W S
DATA S
END
CTL
PV
MPV
OUT
R485(E3)
ETHR(E3)
KEY
DISP
KLOC
DI.SL
I/O
SYS
INIT
VER
LVL
SP
SPS
ALRM
PVS
END
ALL P
DI2.S S
END
KEY
X000
Y000
END
ALL P
R.MD S
C.GRN P
FREQ
QSM
PASS
SMEC P
END

18.2 List of Parameters

18.2.1 Operation Parameters

SP and Alarm Setpoint Setting Menu (Menu: SP)

Parameter symbol	Name	Display level	Setting range	Initial value
SP	Target setpoint	EASY	0.0 to 100.0% of PV input range (EU) (Setting range: SPL to SPH)	SPH
A1 to A3	Alarm-1 to -3 setpoint	EASY	Set a display value of setpoint of PV alarm, deviation alarm, or velocity alarm. -19999 to 30000 (Set a value within the input range.) Decimal point position depends on the input type.	0

SP-related Setting Menu (Menu: SPS)

Parameter symbol	Name	Display level	Setting range	Initial value
TMU	Time unit for duration time	EASY	HH.MM: Hour and minute MM.SS: Minute and second	HH.MM

Alarm Function Setting Menu (Menu: ALRM)

Parameter symbol	Name	Display level	Setting range	Initial value
AL1 to AL3	Alarm-1 to -3 type	EASY	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 chapter 11. Alarm type: 2 digits 00: Disable 01: PV high limit 02: PV low limit 05: Deviation high limit 06: Deviation low limit 07: Deviation high and low limits 08: Deviation within high and low limits 29: PV velocity 30: Fault diagnosis 31: FAIL	AL1, AL3: PV high limit (01) Without Stand-by action (0) Energized (0) Latch action (0) AL2: PV low limit (02) Without Stand-by action (0) Energized (0) Latch action (0)
VT1 to VT3	PV velocity alarm time setpoint 1 to 3	EASY	0.01 to 99.59 (minute.second)	1.00
HY1 to HY3	Alarm-1 to -3 hysteresis	EASY	Set a display value of setpoint of hysteresis. -19999 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
DYN1 to DYN3	Alarm-1 to -3 On-delay timer	STD	0.00 to 99.59 (minute.second)	0.00
DYF1 to DYF3	Alarm-1 to -3 Off-delay timer	PRO		0.00

PV-related Setting Menu (Menu: PVS)

Parameter symbol	Name	Display level	Setting range	Initial value
BS	PV input bias	EASY	-100.0 to 100.0% of PV input range span (EUS)	0.0 % of PV input range span
FL	PV input filter	EASY	OFF, 1 to 120 s	OFF
HYS	Limit control output hysteresis	EASY	0.0 to 100.0% of PV input range span (EUS)	0.5% of PV input range span

18.2.2 Setup Parameters

Control Function Setting Menu (Menu: CTL)

Parameter symbol	Name	Display level	Setting range	Initial value
HI.LO	Limit control type	EASY	LOW: Low limit control HIGH: High limit control	HIGH
CNF	The way of confirming operation	EASY	KEY: By key operation DI: By DI	KEY

PV Input Setting Menu (Menu: PV)

Parameter symbol	Name	Display level	Setting range	Initial value
IN	PV input type	EASY	OFF: Disable K1: -270.0 to 1370.0 (°C) / -450.0 to 2500.0 (°F) K2: -270.0 to 1000.0 (°C) / -450.0 to 2300.0 (°F) K3: -200.0 to 500.0 (°C) / -200.0 to 1000.0 (°F) J: -200.0 to 1200.0 (°C) / -300.0 to 2300.0 (°F) T1: -270.0 to 400.0 (°C) / -450.0 to 750.0 (°F) T2: 0.0 to 400.0 (°C) / -200.0 to 750.0 (°F) B: 0.0 to 1800.0 (°C) / 32 to 3300 (°F) S: 0.0 to 1700.0 (°C) / 32 to 3100 (°F) R: 0.0 to 1700.0 (°C) / 32 to 3100 (°F) N: -200.0 to 1300.0 (°C) / -300.0 to 2400.0 (°F) E: -270.0 to 1000.0 (°C) / -450.0 to 1800.0 (°F) L: -200.0 to 900.0 (°C) / -300.0 to 1600.0 (°F) U1: -200.0 to 400.0 (°C) / -300.0 to 750.0 (°F) U2: 0.0 to 400.0 (°C) / -200.0 to 1000.0 (°F) W: 0.0 to 2300.0 (°C) / 32 to 4200 (°F) PL2: 0.0 to 1390.0 (°C) / 32.0 to 2500.0 (°F) P2040: 0.0 to 1900.0 (°C) / 32 to 3400 (°F) WRE: 0.0 to 2000.0 (°C) / 32 to 3600 (°F) JPT1: -200.0 to 500.0 (°C) / -300.0 to 1000.0 (°F) JPT2: -150.00 to 150.00 (°C) / -200.0 to 300.0 (°F) PT1: -200.0 to 850.0 (°C) / -300.0 to 1560.0 (°F) PT2: -200.0 to 500.0 (°C) / -300.0 to 1000.0 (°F) PT3: -150.00 to 150.00 (°C) / -200.0 to 300.0 (°F) 0.4-2V: 0.400 to 2.000 V 1-5V: 1.000 to 5.000 V 4-20: 4.00 to 20.00 mA 0-2V: 0.000 to 2.000 V 0-10V: 0.00 to 10.00 V 0-20: 0.00 to 20.00 mA -1020: -10.00 to 20.00 mV 0-100: 0.0 to 100.0 mV Note: W: W-5% Re/W-26% Re (Hoskins Mfg. Co.), ASTM E988 WRE: W97Re3-W75Re25	OFF
UNIT	PV input unit	EASY	-: No unit C: Degree Celsius -: No unit --: No unit ---: No unit F: Degree Fahrenheit	C
RH	Maximum value of PV input range	EASY	Depends on the input type. - For temperature input - Set the temperature range that is actually controlled. (RL<RH) - For voltage / current input - Set the range of a voltage / current signal that is applied. The scale across which the voltage / current signal is actually controlled should be set using the maximum value of input scale (SH) and minimum value of input scale (SL). (Input is always 0% when RL = RH.)	Depends on the input type
RL	Minimum value of PV input range	EASY		Depends on the input type

PV Input Setting Menu (Menu: PV) (Continued from previous page)

Parameter symbol	Name	Display level	Setting range	Initial value
SDP	PV input scale decimal point position	EASY	0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places 4: Four decimal places	Depends on the input type
SH	Maximum value of PV input scale	EASY	-19999 to 30000, (SL<SH), | SH - SL | ≤ 30000	Depends on the input type
SL	Minimum value of PV input scale	EASY		Depends on the input type
BSL	PV input burnout action	STD	OFF: Disable UP: Upscale DOWN: Downscale	Depends on the input type
RJC	PV input reference junction compensation	PRO	OFF: RJC OFF ON: RJC ON	ON
ERJC	PV input external RJC setpoint	PRO	-10.0 to 60.0 (°C) or 14.0 to 140.0 (°F)	0.0
A.BS	PV analog input bias	STD	-100.0 to 100.0% of PV input range span (EUS)	0.0 % of PV input range span
A.FL	PV analog input filter	STD	OFF, 1 to 120 s	OFF

Input Range / SP Limiter Setting Menu (Menu: MPV)

Parameter symbol	Name	Display level	Setting range	Initial value
P.UNI	Control PV input unit	STD	-: No unit C: Degree Celsius -: No unit --: No unit ---: No unit F: Degree Fahrenheit	Same as PV input unit
P.DP	Control PV input decimal point position	STD	0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places 4: Four decimal places	1
P.RH	Maximum value of control PV input range	STD	-19999 to 30000, (P.RL<P.RH), | P.RH - P.RL | ≤ 30000	Depends on the input type
P.RL	Minimum value of control PV input range	STD		Depends on the input type
SPH	SP high limit	STD	0.0 to 100.0% of PV input range (EU), (SPL<SPH)	100.0 % of PV input range
SPL	SP low limit	STD		0.0 % of PV input range

Output Setting Menu (Menu: OUT)

Parameter symbol	Name	Display level	Setting range	Initial value
RTS	Retransmission output type of RET	EASY	OFF: Disable PV1: PV SP1: SP	PV1
RTH	Maximum value of retransmission output scale of RET	STD	When RTS = PV1, SP1 RTL + 1 digit to 30000 -19999 to RTH - 1 digit Decimal point position: When RTS=PV1 or SP1 decimal point position is same as that of PV input. When RTS=PV, decimal point position is same as that of PV input scale.	100 % of PV input range
RTL	Minimum value of retransmission output scale of RET	STD		0 % of PV input range
RET.A	RET current output range	STD	4-20: 4 to 20 mA 0-20: 0 to 20 mA 20-4: 20 to 4 mA 20-0: 20 to 0 mA	4-20

RS-485 Communication Setting Menu (Menu: R485) (E3 terminal area)

Parameter symbol	Name	Display level	Setting range	Initial value
PSL	Protocol selection	EASY	PCL: PC link communication PCLSM: PC link communication (with checksum) LADR: Ladder communication MBASC: Modbus (ASCII) MBRTU: Modbus (RTU)	MBRTU
BPS	Baud rate	EASY	600: 600 bps 1200: 1200 bps 2400: 2400 bps 4800: 4800 bps 9600: 9600 bps 19200: 19.2k bps 38400: 38.4k bps	19200
PRI	Parity	EASY	NONE: None EVEN: Even ODD: Odd	EVEN
STP	Stop bit	EASY	1: 1 bit, 2: 2 bits	1
DLN	Data length	EASY	7: 7 bits, 8: 8 bits	8
ADR	Address	EASY	1 to 99	1
RP.T	Minimum response time	PRO	0 to 10 (x10ms)	0

When each parameter is displayed, the terminal area (E3) is displayed on Group display.
• Parameter: PSL, BPS, STP, DLN, ADR, RP.T

Ethernet Communication Setting Menu (Menu: ETHR) (E3 terminal area)

Parameter symbol	Name	Display level	Setting range	Initial value
HSR	High-speed response mode	EASY	OFF, 1 to 8	1
BPS	Baud rate	EASY	9600: 9600 bps 19200: 19.2k bps 38400: 38.4k bps	38400
PRI	Parity	EASY	NONE: None EVEN: Even ODD: Odd	EVEN
IP1 to IP4	IP address 1 to 4	EASY	0 to 255 Initial value: 192.168.1.1	See left
SM1 to SM4	Subnet mask 1 to 4	EASY	0 to 255 Initial value: 255.255.255.0	See left
DG1 to DG4	Default gateway 1 to 4	EASY	0 to 255 Initial value: 0.0.0.0	See left
PRT	Port number	EASY	502, 1024 to 65535	502
IPAR	IP access restriction	EASY	OFF: Disable, ON: Enable	OFF
1.IP1 to 1.IP4	Permitted IP address 1-1 to 1-4	EASY	0 to 255 Initial value: 255.255.255.255	See left
2.IP1 to 2.IP4	Permitted IP address 2-1 to 2-4	EASY	0 to 255 Initial value: 255.255.255.255	See left
ESW	Ethernet setting switch	EASY	OFF, ON Setting this parameter to “ON” enables the Ethernet communication parameter settings. * The parameter ESW automatically returns to “OFF” after “ON” is set.	OFF

When each parameter is displayed, the terminal area (E3) is displayed on Group display.

Key Action Setting Menu (Menu: KEY)

Parameter symbol	Name	Display level	Setting range	Initial value
F1 to F2	User function key-1, -2 action setting	EASY	OFF: Disable LTUP: LCD brightness UP LTDN: LCD brightness DOWN BRI: Adjust LCD brightness LCD: LCD backlight ON/OFF switch LAT: Latch release	OFF
Fn	User function key-n action setting	EASY		

Display Function Setting Menu (Menu: DISP)

Parameter symbol	Name	Display level	Setting range	Initial value
PCMD	Active color PV display switch	EASY	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: 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) 10: Link to DI2 (ON: red, OFF: white) (*) 11: Link to EXCEEDED lamp (Unlit: white, lit: red) 12: Link to OUT lamp (Unlit: white, lit: red) *: Set the parameter DI2.S=PVRW	0
PCH	PV color change high limit	EASY	Set a display value when in PV limit or SP deviation. -19999 to 30000 (Set a value within the input range.) Decimal point position depends on the input type.	0
PCL	PV color change low limit	EASY		0
SPD	Scroll speed	PRO	(Slow) 1 to 8 (Quick)	4

Display Function Setting Menu (Menu: DISP) (Continued from previous page)

Parameter symbol	Name	Display level	Setting range	Initial value
GUID	Guide display ON/OFF	STD	OFF: Nondisplay ON: Display	ON
HOME	Home Operation Display setting	PRO	PV: PV Display SP: SP Display	SP
ECO	Economy mode	STD	OFF: Disable 1: Economy mode ON (All indications except PV display OFF) 2: Economy mode ON (All indications OFF) 3: Brightness 10 % (All indications)	OFF
BRI	Brightness	EASY	(Dark) 1 to 5 (Bright)	3
B.PVW	White brightness adjustment of PV display	PRO	Adjusts the white brightness of PV display. (Dark) -4 to 4 (Bright)	0
B.PVR	Red brightness adjustment of PV display	PRO	Adjusts the red brightness of PV display. (Dark) -4 to 4 (Bright)	0
B.SP	Brightness adjustment of Setpoint display	PRO	Adjusts the brightness of SP display. (Dark) -4 to 4 (Bright)	0
B.BAR	Brightness adjustment of Bar-graph display	PRO	Adjusts the brightness of EXCEED lamp and OUT lamp. (Dark) -4 to 4 (Bright)	0
B.STS	Brightness adjustment of Status indicator	PRO	Adjusts the brightness of Status indicator. (Dark) -4 to 4 (Bright)	0
D.CYC	Display update cycle	PRO	1: 100 ms 2: 200 ms 3: 500 ms 4: 1 s 5: 2 s	2
OP.JP	Autoreturn to operation display	PRO	Automatically returned to the Operation Display when there has been no keystroke operation for 5 minutes. OFF, ON	ON
MLSD	Least significant digital mask of PV display	STD	OFF: With least significant digit ON: Without least significant digit	OFF

Key Lock Setting Menu (Menu: KLOC)

Parameter symbol	Name	Display level	Setting range	Initial value
COM.W	Communication write enable/ disable	STD	OFF: Enable, ON: Disable	OFF
DATA	Front panel parameter data key lock	STD	OFF: Unlock ON: Lock	OFF

Menu Lock Setting Menu (Menu: MLOC)

Parameter symbol	Name	Display level	Setting range	Initial value
CTL	[CTL] menu lock	PRO	OFF: Display ON: Nondisplay	OFF
PV	[PV] menu lock	PRO		
MPV	[MPV] menu lock	PRO		
OUT	[OUT] menu lock	PRO		
R485	[R485] menu lock	PRO		
ETHR	[ETHR] menu lock	PRO		
KEY	[KEY] menu lock	PRO		
DISP	[DISP] menu lock	PRO		
KLOC	[KLOC] menu lock	PRO		
DI.SL	[DI.SL] menu lock	PRO		
I/O	[I/O] menu lock	PRO		
SYS	[SYS] menu lock	PRO		
INIT	[INIT] menu lock	PRO		
VER	[VER] menu lock	PRO		
LVL	[LVL] menu lock	PRO		
MODE	[MODE] menu lock	PRO	OFF: Display ON: Nondisplay	OFF
SP	[SP] menu lock	PRO		
SPS	[SPS] menu lock	PRO		
ALRM	[ALRM] menu lock	PRO		
PVS	[PVS] menu lock	PRO		

When each parameter is displayed, the terminal area (E3) is displayed on Group display.
• Parameter: R485, ETHR

DI Function Registration Menu (Menu: DI.SL)

Parameter symbol	Name	Display level	Setting range	Initial value
DI2.S	DI2 function selection	STD	OFF: No function LAT: Latch release LCD: LCD backlight ON/OFF switch PVRW: PV red/white switch (*) MG1: Message display interruption 1 MG2: Message display interruption 2 MG3: Message display interruption 3 MG4: Message display interruption 4 *: Set the parameter PCMD=10.	OFF

I/O Display Menu (Menu: I/O)

Parameter symbol	Name	Display level	Read only
KEY	Key status	PRO	See 13.4.1 Confirmation of Key and I/O Condition.
X000	DI1-DI2 status (equipped as standard)	PRO	
Y000	AL1-AL3 status (equipped as standard)	PRO	

System Setting Menu (Menu: SYS)

Parameter symbol	Name	Display level	Setting range	Initial value
R.MD	Restart mode	STD	0: Limit output is ON at power on in any cases. 1: Limit output is OFF at power on when PV doesn't exceed SP.	0
C.GRN	Response as GREEN Series	PRO	OFF: Works as UTAdvanced Series in communication of device information response or broadcasting. ON: Works as GREEN Series in communication of device information response or broadcasting.	OFF
FREQ	Power frequency	EASY	AUTO, 60: 60 Hz, 50: 50 Hz	AUTO
QSM	Quick setting mode	EASY	OFF: Disable ON: Enable	ON
PASS	Password setting	EASY	0 (No password) to 65535	0
SMEC	Sampling period error counter	PRO	0 to 65535 (display only)	0 when power is turned on.

Initialization Menu (Menu: INIT)

Parameter symbol	Name	Display level	Setting range	Initial value
U.DEF	Initialization to user default value	PRO	12345: Initialization, automatically returned to "0" after initialization.	0
F.DEF	Initialization to factory default value	PRO	-12345: Initialization, automatically returned to "0" after initialization.	0

Error and Version Confirmation Menu (Menu: VER)

Parameter symbol	Name	Display level	Read only
PA.ER	Parameter error status	EASY	See 16.1 Troubleshooting.
AD1.E	A/D converter error status 1	EASY	
PV1.E	PV input error status	EASY	
MCU	MCU version	EASY	See 13.4.2 Confirmation of Version.
DCU	DCU version	EASY	
ECU3	ECU-3 version	EASY	
PARA	Parameter version	EASY	
H.VER	Product version	EASY	
SER1	Serial number 1	EASY	
SER2	Serial number 2	EASY	
MAC1	MAC address 1	EASY	
MAC2	MAC address 2	EASY	
MAC3	MAC address 3	EASY	

When the following parameters are displayed, the terminal area (E3) is displayed on Group display.
• Parameter: ECU3, MAC1, MAC2 and MAC3

Parameter Display Level Menu (Menu: LVL)

Parameter symbol	Name	Display level	Setting range	Initial value
LEVL	Parameter display level	EASY	EASY: Easy setting mode STD: Standard setting mode PRO: Professional setting mode	STD

General Specifications

UT35A-L
Digital Indicating Controller
(Limit Control Type)

UTAdvanced

GS 05P04D41-01EN

■ Overview

The UT35A-L is a Limit Control Type Digital Indicating Controller that can be configured either as a high limit or as a low limit controller by a user. The UT35A-L complies with FM approval.

The UT35A-L features universal input, three alarm outputs, retransmission output, a timer to count the total time the setpoint is exceeded, and a register to retain the maximum temperature reached. The UT35A-L controller employs an easy-to-read, 14-segment large color LCD display, along with navigation keys, thus greatly increasing the monitoring and operating capabilities. The short depth of the controller helps save instrument panel space. The UT35A-L also support RS-485 and Ethernet communication.

■ Features

- A 14-segment, active (PV display color changing function) color LCD display is employed.
  Two five-digit, high-resolution displays are possible.
  Alphabet letters can be displayed in an easy-to-read manner. The guide display shows parameter names.
- Easy to operate
  Navigation keys (SET/ENTER and Up/Down/Left/Right arrow keys) are employed to facilitate making settings.
- 65 mm depth
  The small depth enables the mounting in a thin and small instrumented panel.
- Quick setting function
  Setting only the minimum necessary parameters for operation is possible.

■ Functional Specifications

Limit Control Function

Setpoint : 1

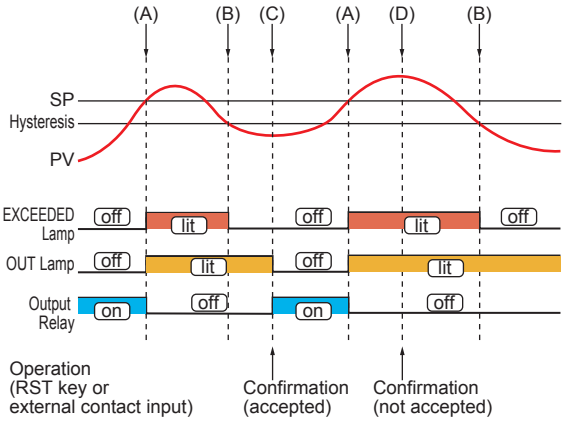
Control type : high limit or low limit

Limit action : latching

High Limit Control

When PV exceeds a setpoint (SP), "EXCEEDED" lamp lights, and "OUT" lamp turns ON (point A). The limit control output relay is de-energized then.

"EXCEEDED" lamp turns off when PV goes into normal condition, while "OUT" lamp stays on as it is (point B). "OUT" lamp turns off when a confirming operation is done by an operator (point C). The way to confirm is pushing the "RST" key (or by an external contact, according to the setting of setup parameter CNF). The confirming operation is not accepted during PV exceeds SP (point D). State of output relay is de-energized whenever "OUT" lamp is on. (NC terminal: CLOSE, NO terminal: OPEN)



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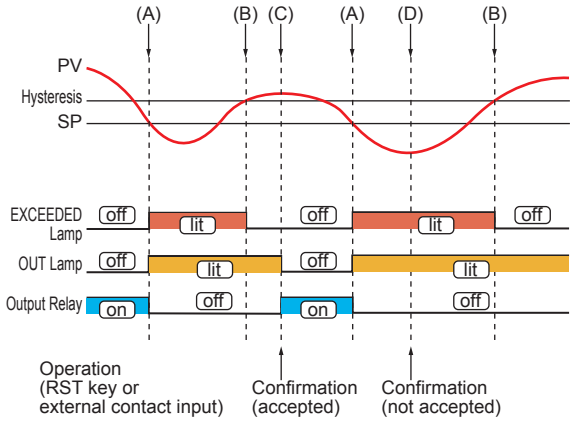
Low Limit Control

When PV exceeds a setpoint (SP), “EXCEEDED” lamp lights, and “OUT” lamp turns ON (point A). The limit control output relay is de-energized then.

“EXCEEDED” lamp turns off when PV goes into normal condition, while “OUT” lamp stays on as it is (point B). “OUT” lamp turns off when a confirming operation is done by an operator (point C). The way to confirm is pushing the “RST” key (or by an external contact, according to the setting of setup parameter CNF). The confirming operation is not accepted during PV exceeds SP (point D). State of output relay is de-energized whenever “OUT” lamp is on. (NC terminal: CLOSE, NO terminal: OPEN)



■ Control Computation Function

Alarm Functions

• Types of Alarm

Measured value alarm **Deviation alarm** **Rate-of-change alarm**	PV (measured value) high/low limit alarm Deviation high/low limit alarm Deviation high and low limits alarm Deviation within high and low limits alarm PV rate-of-change alarm
Other alarms	Self-diagnosis alarm FAIL

• Alarm Functions

Alarm output action	Alarm stand-by action Alarm latch (forced reset) function Alarm hysteresis Alarm ON/OFF delay timer
Number of alarm settings	3
Number of alarm output points	3

Contact I/O Function

This function allows for allocating the input error condition, operation condition, alarm condition or other conditions to the contact input and contact output.

Contact input	Limit output confirmation (RESET) (DI1 fixed)
	Alarm Latch release
	PV red/white switching
	LCD backlight ON/OFF switching
	Message interrupt displays 1 through 4
Contact output	Alarms 1 through 3

Communication Function

	Function	Method	Interface	Targets	Max connection	Communication Data
Modbus/TCP	A standard industry protocol allowing communications between the controller and devices such as PCs, PLCs, and DCSs.	Server	Ethernet	PLC and others	2 connections	PV, SP, ALM, etc
		Gateway	Ethernet +RS-485	RS-485: UT55A/UT52A/ UT35A/UT32A/ UP55A/UP35A/ UM33A (*1)	31 units	
Modbus (RTU/ASCII)		Slave	RS-485	PLC and others, UT55A/UT52A/ UT35A/UT32A/ UP55A/UP35A/ UM33A (*2)	31 units	
PC link	The proprietary Yokogawa protocol allowing communications to PCs, PLCs and touch panels.	Slave	RS-485	PC and others, UT55A/UT52A / UT35A/UT32A/ UP55A/UP35A/ UM33A(*2)	31 units	
Ladder	A protocol to communicate to PLCs.					

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

Physical interface

Ethernet
Standard : IEEE802.3 (10BASE-T, 100BASE-TX)
Max segment length : 100m
Max. Connecting Configuration : Cascade Max. 4 level (10BASE-T), Max. 2 level (100BASE-TX)

RS-485
Standard : EIA RS-485
Communication method : Two-wire half-duplex or four-wire half-duplex, start-stop synchronization, and non-procedural
Baud rate : 600,1200,2400,4800,9600,19200 or 38400 bps
Maximum communication distance : 1200 m
Terminating resistor : 220Ω (External)

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■ Hardware Specifications

Display Specifications

- PV display
  5-digit, 14-segment active color LCD (white/red)
  Character height: 21.5 mm
- Data display
  5-digit, 11-segment color LCD (orange)

Universal Input Specifications

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

Types of input		Instrument range °C	Instrument range °F	Accuracy
Thermocouple	K	-270.0 to 1370.0°C	-450.0 to 2500.0°F	±0.1% of instrument range ±1 digit for 0°C or more ±0.2% of instrument range ±1 digit for less than 0°C However, ±2% of instrument range ±1 digit for less than -200°C of thermocouple K ±1% of instrument range ±1 digit for less than -200°C of thermocouple T
		-270.0 to 1000.0°C	-450.0 to 2300.0°F	
		-200.0 to 500.0°C	-200.0 to 1000.0°F	
	J	-200.0 to 1200.0°C	-300.0 to 2300.0°F	
	T	-270.0 to 400.0°C	-450.0 to 750.0°F	
		0.0 to 400.0°C	-200.0 to 750.0°F	
	B	0.0 to 1800.0°C	32 to 3300°F	±0.15% of instrument range ±1 digit for 400°C or more ±5% of instrument range ±1 digit for less than 400°C
	S	0.0 to 1700.0°C	32 to 3100°F	±0.15% of instrument range ±1 digit
	R	0.0 to 1700.0°C	32 to 3100°F	
	N	-200.0 to 1300.0°C	-300.0 to 2400.0°F	±0.1% of instrument range ±1 digit ±0.25% of instrument range ±1 digit for less than 0°C
	E	-270.0 to 1000.0°C	-450.0 to 1800.0°F	±0.1% of instrument range ±1 digit for 0°C or more ±0.2% of instrument range ±1 digit for less than 0°C However, ±1.5% of instrument range ±1 digit for less than -200.0°C of thermocouple E
	L	-200.0 to 900.0°C	-300.0 to 1600.0°F	
	U	-200.0 to 400.0°C	-300.0 to 750.0°F	
		0.0 to 400.0°C	-200.0 to 1000.0°F	
	W (*2)	0.0 to 2300.0°C	32 to 4200°F	±0.2% of instrument range ±1 digit
	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 not guaranteed for less than 800°C
	W97 Re3-W75 Re25	0.0 to 2000.0°C	32 to 3600°F	±0.2% of instrument range ±1 digit
Resistance-temperature detector (RTD) 3-wire	JPt100	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit (*1)
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.1% of instrument range ±1 digit
	Pt100	-200.0 to 850.0°C	-300.0 to 1560.0°F	±0.1% of instrument range ±1 digit (*1)
		-200.0 to 500.0°C	-300.0 to 1000.0°F	
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.1% of instrument range ±1 digit
Standard signal		0.400 to 2.0000 V		±0.1% of instrument range ±1 digit
		1.000 to 5.000 V		
		4.00 to 20.00 mA		
DC voltage		0.000 to 2.000 V		
		0.00 to 10.00 V		
		-10.00 to 20.00 mV		
DC current		0.00 to 20.00 mA		

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

*1: ±0.3°C and ±1 digit in the range between 0 and 100°C
±0.5°C ±1 digit in the range between -100 and 200°C
*2: W-5% Re/W-26% Re (Hoskins Mfg.Co.), ASTM E988

- Applicable standards: JIS, IEC and DIN (ITS-90) for thermocouples and resistance-temperature detectors (RTD)
- Input sampling period: Synchronized to control period
- Burnout detection
  Upscale and downscale of function, and OFF can be specified for the standard signal of thermocouple and resistance-temperature detector (RTD).
  For integrated signal input, 0.1 V or 0.4 mA or less is judged as a burnout.
- Input bias current: 0.05 μA (for thermocouple and resistance-temperature detector (RTD))
- Resistance-temperature detector (RTD) measured current: About 0.16 mA
- Input resistance
  1 MΩ or more for thermocouple/mV input
  About 1 MΩ for voltage input
  About 250 Ω for current input (with built-in shunt resistance)
- Allowable signal source resistance
  250 Ω or less for thermocouple/mV input
  Effect of signal source resistance: 0.1 μV/Ω or less
  2 kΩ or less for DC voltage input
  Effect of signal source resistance: about 0.01%/100 Ω
- Allowable wiring resistance
  Up to 150 Ω per line for resistance-temperature detector (RTD) input (conductor resistance between the three lines shall be equal)
  Effect of wiring resistance: ±0.1°C/10 Ω
- Allowable input voltage/current
  ±10 V DC for thermocouple/mV/mA or resistance-temperature detector (RTD) input
  ±20 V DC for V input
  ±40 mA DC for mA input
- Noise reduction ratio
  40 dB or more (at 50/60 Hz) in normal mode
  120 dB or more (at 50/60 Hz) in common mode
- Reference junction compensation error
  ±1.0°C (15 to 35°C)
  ±1.5°C (-10 to 5°C and 35 to 50°C)

Relay Contact Output Specifications

- Types of contact and number of points
  Limit control relay output: one 1 c-contact point
  Alarm output: 3 1a-contact points (Common is separated)
- Contact rating
  1c-contact: 3 A at 250 V AC or 3 A at 30 V DC (resistance load)
  1a-contact: 1 A at 240 V AC or 1 A at 30 V DC (resistance load)
  *: The control output should always be used with a load of 10 mA or more.
  The alarm output should always be used with a load of 1 mA or more.
- Application: alarm output, FAIL output, etc.
- Time resolution for limit control output: 10 ms or 0.1% of output value, whichever is larger

Step Response Time Specifications

1 s

(Response time at 63% of transmission output when a change is made stepwise in the range between 10 and 90% of input span)

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Retransmission Output Specifications

- Number of points: 1 point
- Output function: current output
  4 to 20 mA DC or 0 to 20 mA DC/load resistance 600 Ω or less
- Current output accuracy (conversion accuracy from PV display on the set scale): ±0.1% of span (however, ±5% of span for 1 mA or less)
  The accuracy is that in the basic operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz
  This is not conversion accuracy through input and output but the performance of transmission output itself.

Contact Input Specifications

- Number of points: 2 points
- Input type: no-voltage contact input or transistor contact input
- Input contact capacity: 12 V DC, 10 mA or more
  Be sure to use a contact with a minimum ON current of 1 mA or less
- ON/OFF detection
  No-voltage contact input:
  Contact resistance 1 kΩ or less in ON state
  Contact resistance 50 kΩ or more in OFF state
  Transistor contact input:
  2 V or less in ON state
  Leak current 100 μ A or less in OFF state
- Status detection minimum hold time: 250 ms
- Application: Confirmation operation, etc.

Safety and EMC Standards

- Safety:
  Compliant with IEC/EN 61010-1 (CE), IEC/EN 61010-2-201 (CE), IEC/EN 61010-2-030 (CE), approved by CAN/CSA C22.2 No. 61010-1 (CSA), approved by UL 61010-1. Certified for FM-3810 and FM-3545.
  Installation category: II
  Pollution degree: 2
  Measurement category: I (CAT I) (UL, CSA)
  O (Other) (CE)
  Rated measurement input voltage: Max. 10 V DC
  Rated transient overvoltage: 1500 V (*)
  *: This is a reference safety standard value for measurement category I of CSA/UL 61010-1, and for measurement category O of IEC/EN 61010-2-030. This value is not necessarily a guarantee of instrument performance.
- EMC standards:
  Compliant with
  CE marking
  EN 61326-1 Class A, Table 2 (For use in industrial locations),
  EN 61326-2-3
  *: The instrument continues to operate at a measurement accuracy of within ±20% of the range during testing.
  EN 55011 Class A, Group 1
  EN 61000-3-2 Class A
  EN 61000-3-3
  EMC Regulatory Arrangement in Australia and New Zealand
  EN 55011 Class A, Group 1

Power Supply Specifications and Isolation

- Power supply
  Rated voltage: 100 to 240 V AC (+10%/-15%), 50/60 Hz
  24 V AC/DC (+10%/-15%) (When the /DC option is specified)
- Power consumption: 18 VA (For the /DC option. DC: 9 VA, AC: 14 VA)
- Storage: Nonvolatile memory
- Allowable power interruption time: 20 ms (at 100 V AC)
- Withstanding voltage
  2300 V AC for 1 minute between primary and secondary terminals (UL, CSA)
  3000 V AC for 1 minute between primary and secondary terminals (CE)
  1500 V AC for 1 minute between primary terminals
  500 V AC for 1 minute between secondary terminals
  (Primary terminals = Power (*) and relay output terminals, Secondary terminals = Analog I/O signal terminals, contact input terminals, communication terminals, and functional grounding terminals.)
  *: Power terminals for 24 V AC/DC models are the secondary terminals.
- Insulation resistance
  Between power supply terminals and a grounding terminal: 20 MΩ or more at 500 V DC
- Isolation specifications

PV (universal) input terminals	Internal circuits	Power supply
Retransmission (analog) output terminals		
Control relay (c-contact) output terminals		
Alarm-1 relay (a-contact) output terminals		
Alarm-2 relay (a-contact) output terminals		
Alarm-3 relay (a-contact) output terminals		
Contact input terminals RS485 communication terminals		
Ethernet communication terminal		

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 mounting of controllers)
- Ambient humidity: 20 to 90% RH (no condensation)
- Magnetic field: 400 A/m or less
- Continuous vibration (at 5 to 9 Hz) Half amplitude of 1.5 mm or less
  (at 9 to 150 Hz) 4.9 m/s^2 or less, 1 oct/min for 90 minutes each in the three axis directions
- Rapid vibration: 14.7 m/s^2, 15 s or less
- Impact: 98 m/s^2 or less, 11 msec.
- Installation altitude: 2,000 m or less above sea level
- Warm-up time: 30 minutes or more after the power is turned on
- Start-up time within 10 s

Transportation and Storage Conditions

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

Effects of Operating Conditions

- Effect of ambient temperature
  For voltage or TC input:
  ±1 μ V/°C or ±0.01% of F.S. (instrument range)/°C, whichever is greater
  For RTD input:
  ±0.05°C/°C (ambient temperature) or less
  For current input:
  ±0.01% of F.S. (instrument range)/°C
  For analog output:
  ±0.02% of F.S./°C or less
- Effect of power supply fluctuation:
  For analog input: ±0.05% of F.S. (instrument range) or less
  For analog output: ±0.05% of F.S. or less
  (Each within rated voltage range)

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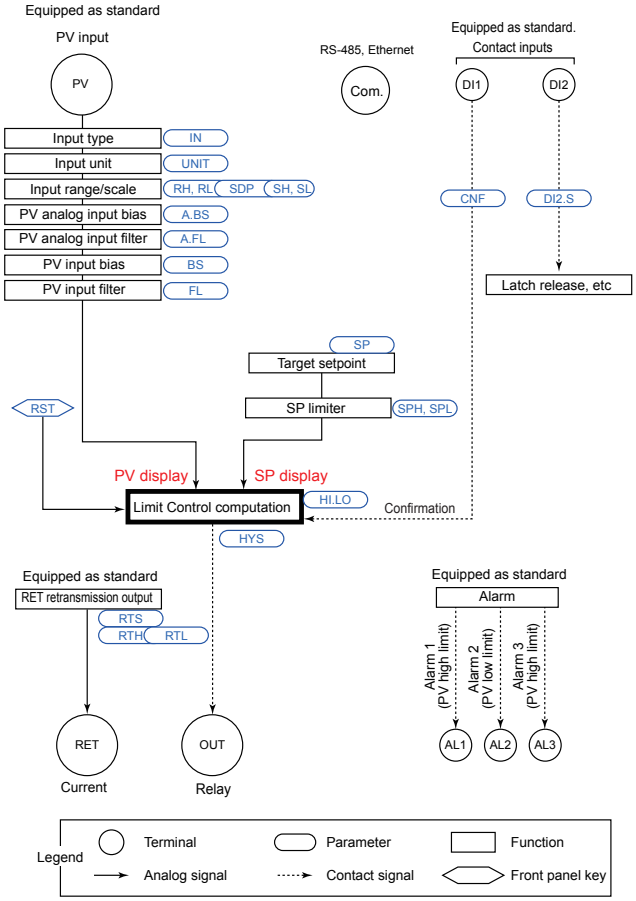
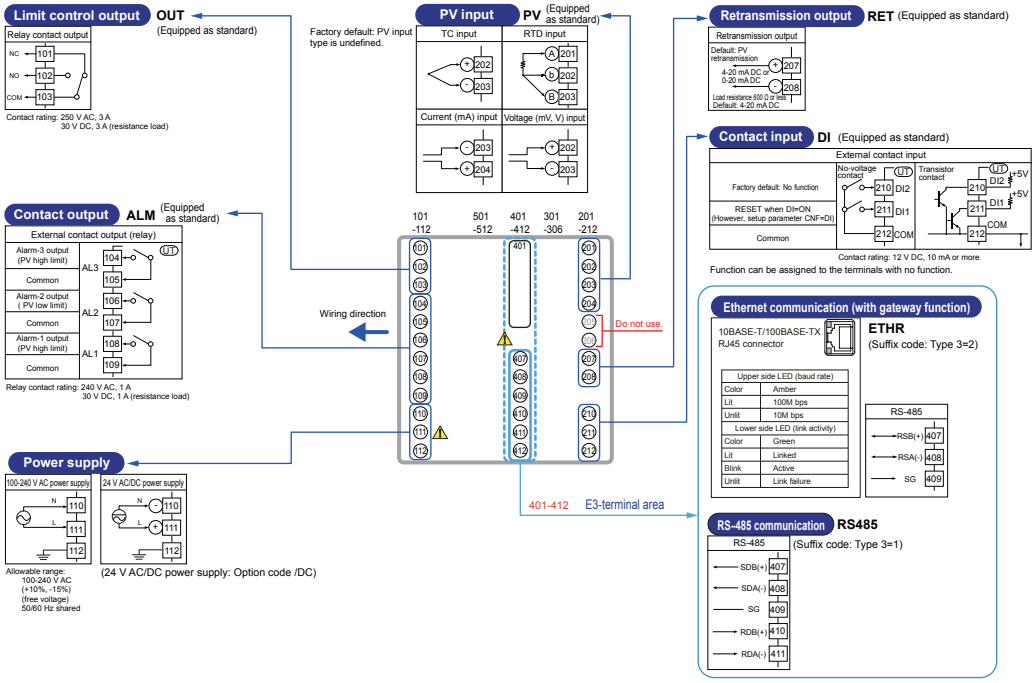
■ Block Diagram



■ Terminal Arrangement



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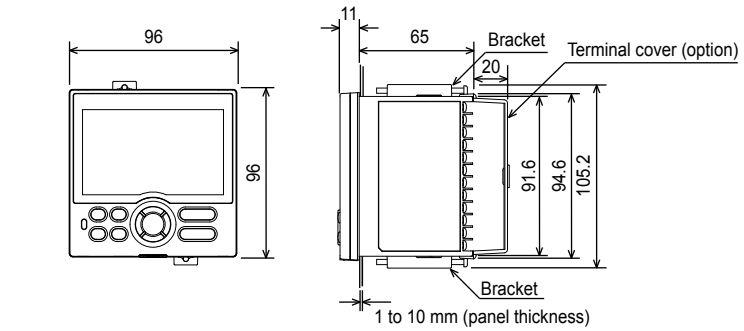
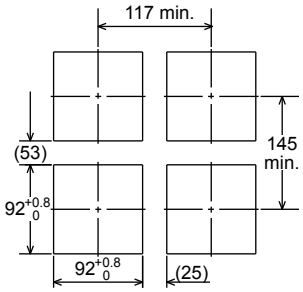
■ External Dimensions and Panel Cutout Dimensions

UT35A-L

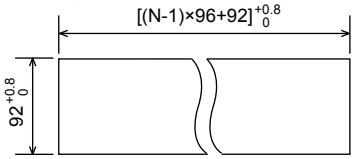
Unit: mm



• General mounting



• Side-by-side close mounting



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

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

■ Construction, Mounting, and Wiring

- Degree of protection provided by Enclosure: IP66 (for front panel) (Not available for side-by-side close mounting.)
- Material: Polycarbonate resin (Flame retardancy: UL94 V-0)
- Case color: Light gray or Light charcoal gray
- Weight: 0.5 kg or less
- External dimensions (mm): 96 (width) x 96 (height) x 65 (depth from the panel surface)
- Mounting: Direct panel mounting; mounting bracket, one each for upper and lower mounting
- Panel cutout dimensions (mm): $92^{+0.8/0}$ (width) x $92^{+0.8/0}$ (height)
- Mounting position: Up to 30 degrees above the horizontal. No downward titling allowed.
- Wiring: M3 screw terminal with square washer (signal wiring and power)

■ Model and Suffix Code

Model	Suffix code						Option code	Description
UT35A								Digital Indicating Controller (provided with retransmission output, 2 DIs, and 3 DOs) (Power supply: 100-240 V AC)
Type 1: Basic control	**-L**							Limit control type
Type 2: Functions		**0**						Always "0"
Type 3: Open networks			**0**					None
			1					RS-485 communication (Max.38.4 kbps, 2-wire/4-wire)
			2					Ethernet communication (with serial gateway function)
Display language				**-1**				English
Case color					**0**			White (Light gray)
					1			Black (Light charcoal gray)
Fixed code						**-00**		Always "-00" (for Standard Code Model)
Option codes							**/DC**	Power supply 24 V AC/DC

■ Items to be specified when ordering

Model and suffix codes, whether User's Manual and QIC required.

■ Standard accessories

Brackets (mounting hardware), Unit label, Operation Guide

■ Accessory

Name	Model
Terminal cover	UTAP001
User's Manual (CD)	UTAP003

■ Special Order Items

Model code	Suffix code	Description
LL50A	-00	Parameter Setting Software

User's Manual

Product user's manuals can be downloaded or viewed at the following URL. To view the user's manual, you need to

use Adobe Reader 7 or later by Adobe Systems.

URL: http://www.yokogawa.com/ns/ut/im/

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Appendix 1 Input and Output Table

UT35A Model and Suffix Codes

Model	Suffix code					Optional suffix code	INPUT	OUT	DI		DO			
							PV	RET	DI1	DI2	AL1	AL2	AL3	OUT
UT35A	-x	x	x	-xx	-00	/x	●	●	●	●	●	●	●	●
Type 1: Basic control	-L													
Type 2: Functions	0													
Type 3: Open networks	x													
Display language/Case color	-xx													
Fixed code	-00													
Optional suffix codes	/x													

●: Equipped

Description of symbol

PV: Measured input
RET: Retransmission output
DI1 to DI2: Contact input
AL1 to AL3: Alarm output
OUT: Limit control output

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Revision Information

- Title : UT35A-L Digital Indicating Controller (Limit Control Type) User's Manual
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