




Operation Guide



UT35A/MDL, UT32A/MDL
Digital Indicating Controller (DIN Rail Mounting Type)
Operation Guide

IM 05P01D81-11EN

YOKOGAWA

«Standard Code Model»

6th Edition: Dec. 2022

Yokogawa Electric Corporation

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

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

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

Contents

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

Introduction

Thank you for purchasing the UT35A/MDL, UT32A/MDL Controller. (The UT35A and UT32A with option /MDL have no display.)

This operation guide describes the installing, wirings, setup flow, and troubleshooting of the UT35A/MDL and UT32A/MDL. The guide should be provided to the end user of this product.


Be sure to read this operation guide before using the product in order to ensure correct operation. For details of each function, refer to the electronic manual. Before using the product, refer to the table of Model and Suffix Codes to make sure that the delivered product is consistent with the model and suffix codes you ordered. Also make sure that the following items are included in the package.

- Controller (the model you ordered)x1
- Unit Label (L4502VZ)x1
- Tag Label (L4502VE)x1
- (Only when ordered.)
- Operation Guide (this document)x3 (A3 size)
- (Installation and Wiring, Initial Settings, Operations, and Parameters)

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


1. Safety Precautions

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







WARNING

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



CAUTION

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

-  **AC**
-  **AC/DC**
-  The equipment wholly protected by double insulation or reinforced insulation.
-  Functional grounding terminals
(Do not use this terminal as a protective grounding terminal).

Note

Identifies important information required to operate the instrument.


■ Warning and Disclaimer

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

- (2) The product is provided on an "as is" basis. YOKOGAWA assumes no liability to any person or entity for any loss or damage, direct or indirect, arising from the use of the product or from any unpredictable defect of the product.


■ Safety, Protection, and Modification of the Product

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



WARNING

- **Power Supply**
Ensure that the instrument's supply voltage matches the voltage of the power supply before turning ON the power.
- **Do Not Use in an Explosive Atmosphere**
Do not operate the instrument in locations with combustible or explosive gases or steam. Operation in such environments constitutes an extreme safety hazard. Use of the instrument in environments with high concentrations of corrosive gas (H₂S, SO_x, etc.) for extended periods of time may cause a failure.
- **Do Not Remove Internal Unit**
The internal unit should not be removed by anyone other than YOKOGAWA's service personnel. There are dangerous high voltage parts inside. Additionally, do not replace the fuse by yourself.
- **Damage to the Protective Construction**
Operation of the instrument in a manner not specified in the operation guide may damage its protective construction.



CAUTION

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

■ Protection of Environment



Waste Electrical and Electronic Equipment (WEEE)

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

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

■ QR Code

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

For more details, please refer to the following URL.

<https://www.yokogawa.com/qr-code>

QR Code is a registered trademark of DENSO WAVE INCORPORATED.

2. Model and Suffix Codes

■ UT35A/MDL «Standard Code Model»

Model	Suffix code					Option code	Description
UT35A						/MDL (Required)	Digital Indicating Controller (Power supply: 100-240 V AC) (provided with retransmission output or 15 V DC loop power supply, 2 DIs, and 3 DOs) (*3)
Type 1: Basic control	-0						Standard type
	-2						Heating/cooling type
Type 2: Functions	0						None
	2						5 additional DIs, 5 additional DOs
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)
	3						CC-Link communication (with Modbus master function)
	4						PROFIBUS-DP communication (with Modbus master function)
	5						DeviceNet communication (with Modbus master function)
Fixed code						-1	Temperature unit: deg C & deg F
Case color						1	Black (Light charcoal gray)
Fixed code						-00	Always "-00" (for Standard Code Model)
Option codes						/MDL (Required)	Mount on DIN rail (without the display parts and keys) (*1)
						/LP	24 V DC loop power supply (*1)
						/DC	Power supply 24 V AC/DC
						/CT	Coating (*2)
						/CV	Terminal cover

- *1: When /MDL option and /LP option is combined, only "0" can be specified for Type 2 code.
- *2: When the /CT option is specified, the UT35A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for EEA-market).
- *3: UT35A has a panel mount type (without option /MDL). Please see the Operation Guide (IM 05P01D31-11EN).

■ UT32A/MDL «Standard Code Model»

Model	Suffix code					Option code	Description
UT32A						/MDL (Required)	Digital Indicating Controller (Power supply: 100-240 V AC) (provided with retransmission output or 15 V DC loop power supply, 2 DIs, and 3 DOs) (*6)
Type 1: Basic control (*7)	-0						Standard type
	-2						Heating/cooling type
Type 2: Functions	0						None
	1						RS-485 communication (Max. 38.4 kbps, 2-wire/4-wire) (*1)
Type 3: Open networks	0						None
	3						CC-Link communication (with Modbus master function)
Fixed code			-1				Temperature unit: deg C & deg F
Case color				1			Black (Light charcoal gray)
Fixed code						-00	Always "-00" (for Standard Code Model)
Option codes						/MDL (Required)	Mount on DIN rail (without the display parts and keys) (*2) (*3)
						/LP	24 V DC loop power supply (*3)
						/HA	Heater break alarm (*4)
						/DC	Power supply 24 V AC/DC
						/CT	Coating (*5)
						/CV	Terminal cover

- *1: When /LP option is specified, the RS-485 communication of the type 2 code "1" is 2-wire system.
- *2: The /MDL option is specified, the model and suffix codes are follows:
UT32A-010-11-00/x/MDL
UT32A-003-11-00/x/MDL
UT32A-210-11-00/x/MDL
- *3: When /MDL option and /LP option is combined, "3" can not be specified for Type 3 code.
- *4: The /HA option can be specified only in the combination of Type2 code "1" and Type 3 code "0."
- *5: When the /CT option is specified, the UT32A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for EEA-market).
- *6: UT32A has a panel mount type (without option /MDL). Please see the Operation Guide (IM 05P01D31-11EN).
- *7: UT32A has also a Dual-loop type model; for information, see Manuals in Section-6.

■ Customized Product

For customized product, the product is identified by the option code of /S# (where '#' is a number).

Contact your supplier in case your instrument has option /S#, and you are not in the possession of FX1-[Model code]-S# or IM [Model code]-S# (where [Model code] means, for example, UT55A).

■ Accessories (sold separately)

The following is an accessory sold separately.

- LL50A Parameter Setting Software

Model	Suffix code	Description
LL50A	-00	Parameter Setting Software

- External Precision Resistor

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

- (*) Necessary to input the current signal to the voltage input terminal.
- Terminal Cover
For UT35A: Model UTAP001; For UT32A: Model UTAP002
 - Manuals
Note: Manuals can be downloaded from a website. URL: <https://www.yokogawa.com/ns/ut/im/>
 - Brackets
Part number: L4502TP (2 pcs for upper and lower sides)
 - Wall mount bracket
For UT32A/MDL: Model UTAP005

3. How to Install

■ 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.

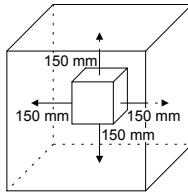
Do not mount the instrument in the following locations:

- **Outdoors**
- **Locations subject to direct sunlight or close to a heater**
Install the instrument in a location with stable temperatures that remain close to an average temperature of 23°C. Do not mount it in locations subject to direct sunlight or close to a heater. Doing so adversely affects the instrument.
- **Locations with substantial amounts of oily fumes, steam, moisture, dust, or corrosive gases**
The presence of oily fumes, steam, moisture, dust, or corrosive gases adversely affects the instrument. Do not mount the instrument in locations subject to any of these substances.
- **Areas near electromagnetic field generating sources**
Do not place magnets or tools that generate magnetism near the instrument. If the instrument is used in locations close to a strong electromagnetic field generating source, the magnetic field may cause measurement errors.
- **Areas close to flammable articles**
Absolutely do not place the instrument directly on flammable surfaces. If such a circumstance is unavoidable and the instrument must be placed close to a flammable item, provide a shield for it made of 1.43 mm thick plated steel or 1.6 mm thick unplated steel with a space of at least 150 mm between it and the instrument on the top, bottom, and sides.
- **Areas subject to being splashed with water**



WARNING

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



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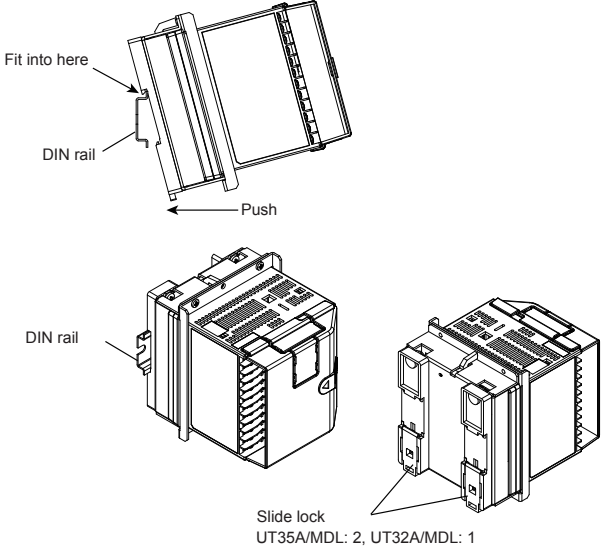


YOKOGAWA ELECTRIC CORPORATION
Network Solutions Business Division
2-9-32, Naka-cho Musashino-shi, Tokyo 180-8750 JAPAN
YOKOGAWA CORPORATION OF AMERICA
Head office and for product sales
2 Dart Road, Newnan, Georgia 30265, USA
YOKOGAWA EUROPE B.V.
Headquarters
Euroweg 2, 3825 HD Amersfoort, THE NETHERLANDS

www.yokogawa.com

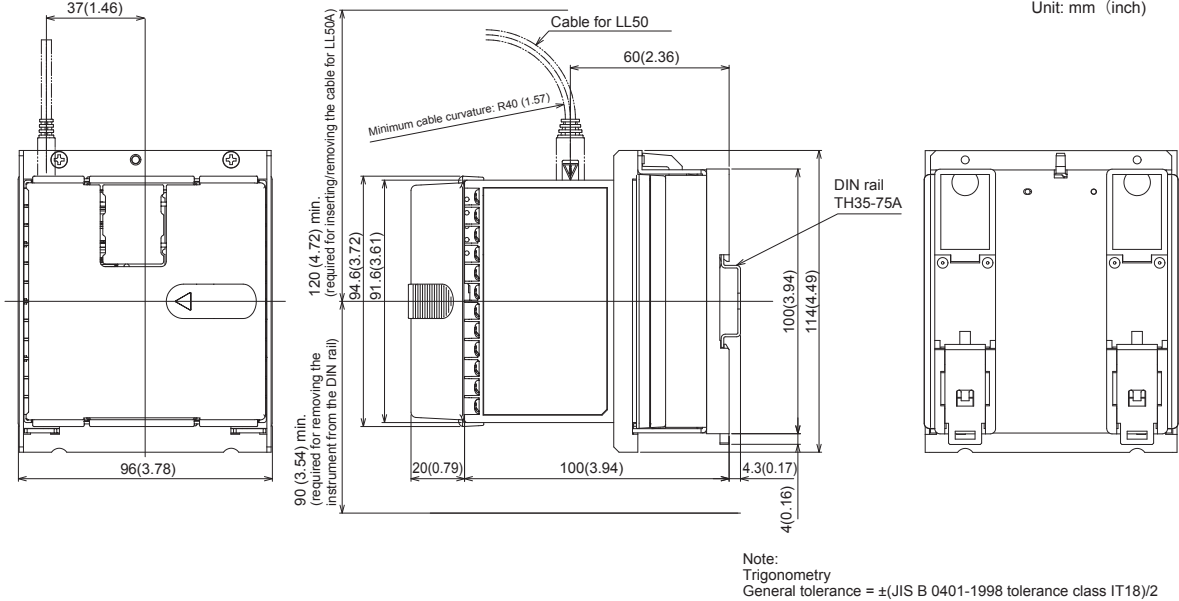
■ Mounting on a DIN Rail

Insert the DIN rail into the top area of DIN rail groove (at two locations) on the rear panel, and secure in place with the bottom slide lock.

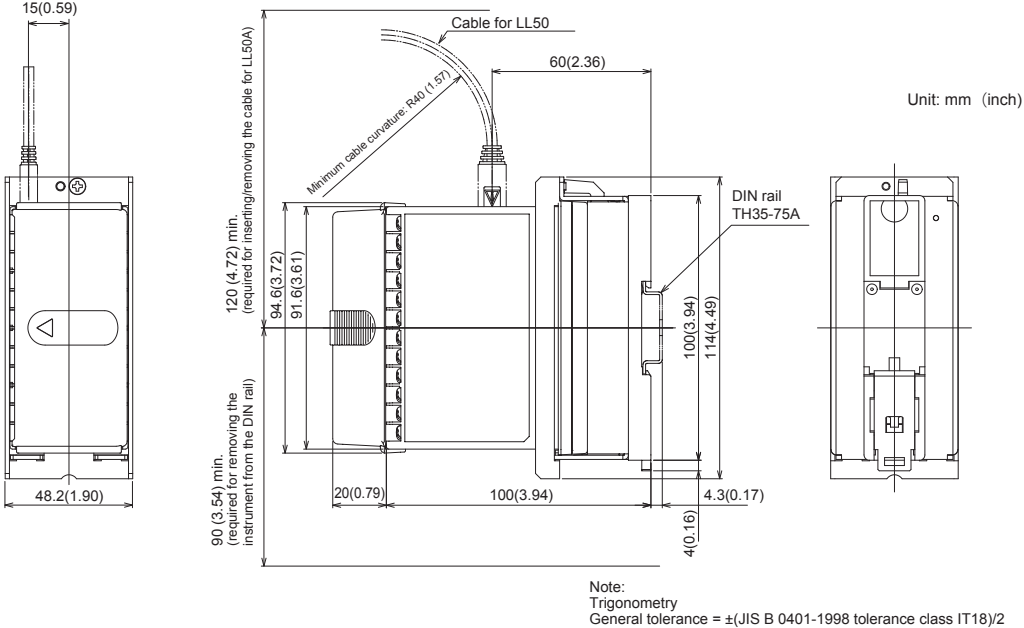


■ External Dimensions

●UT35A/MDL



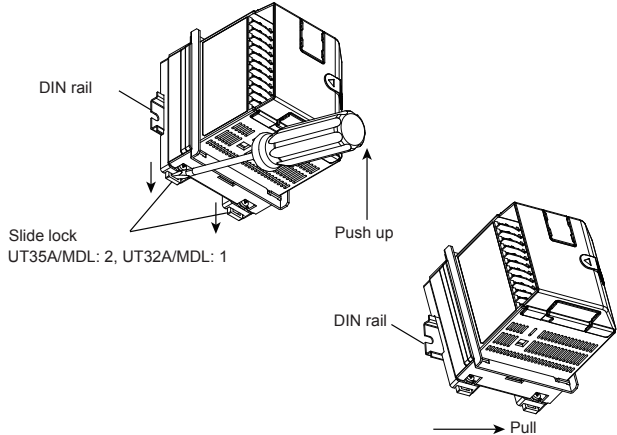
●UT32A/MDL



Make sure that foreign materials do not enter the inside of the instrument through the case's slit holes.

■ Removing from the DIN Rail

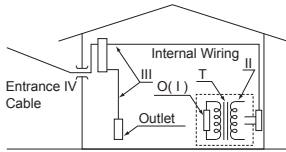
Insert a flat-blade screwdriver (guideline: 100 mm shaft length, 6 mm blade width, 0.8 mm blade thickness) into the bottom slide lock hole and pull down to release the slide lock. On the UT55A/MDL, there are two slide locks. Release the other slide lock after you release the first slide lock. When both slide locks are unlocked, the instrument can be removed from the DIN rail.



4. Hardware Specifications



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



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

■ Input Specifications

●Universal Input (Equipped as standard)

- Number of inputs: 1
- Input type, instrument range, and measurement accuracy: See the table below,

Input Type		Instrument Range		Accuracy
		°C	°F	
Thermo-couple	K	-270.0 to 1370.0°C	-450.0 to 2500.0°F	±0.1% of instrument range ±1 digit for 0°C or more
		-270.0 to 1000.0°C	-450.0 to 2300.0°F	±0.2% of instrument range ±1 digit for less than 0°C
		-200.0 to 500.0°C	-200.0 to 1000.0°F	±2% of instrument range ±1 digit for less than -200.0°C of thermocouple K
	J	-200.0 to 1200.0°C	-300.0 to 2300.0°F	±1% of instrument range ±1 digit for less than -200.0°C of thermocouple J
		-270.0 to 400.0°C	-450.0 to 750.0°F	±1% of instrument range ±1 digit for less than -200.0°C of thermocouple J
	T	0.0 to 400.0°C	-200.0 to 750.0°F	±0.15% of instrument range ±1 digit for 400°C or more
		0.0 to 1800.0°C	32 to 3300°F	±5% of instrument range ±1 digit for less than 400°C
	B	0.0 to 1700.0°C	32 to 3100°F	±0.15% of instrument range ±1 digit
	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	±0.15% of instrument range ±1 digit
	N	-200.0 to 1300.0°C	-300.0 to 2400.0°F	±0.1% of instrument range ±1 digit for less than 0°C
	E	-270.0 to 1000.0°C	-450.0 to 1800.0°F	±0.1% of instrument range ±1 digit for 0°C or more
	L	-200.0 to 900.0°C	-300.0 to 1600.0°F	±0.2% of instrument range ±1 digit for less than 0°C
	U	-200.0 to 400.0°C	-300.0 to 750.0°F	±1.5% of instrument range ±1 digit for less than -200.0°C of thermocouple E.
		0.0 to 400.0°C	-200.0 to 1000.0°F	±0.2% of instrument range ±1 digit (Note 2)
	W	0.0 to 2300.0°C	32 to 4200°F	±0.2% of instrument range ±1 digit (Note 2)
	Platinel 2	0.0 to 1390.0°C	32.0 to 2500.0°F	±0.1% of instrument range ±1 digit
PR20-40	0.0 to 1900.0°C	32 to 3400°F	±0.5% of instrument range ±1 digit for 800°C or more Accuracy is not guaranteed for less than 800°C.	
W97Re3-W75Re25	0.0 to 2000.0°C	32 to 3600°F	±0.2% of instrument range ±1 digit	
RTD	JPT100	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit (Note 1)
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.1% of instrument range ±1 digit
		-200.0 to 850.0°C	-300.0 to 1560.0°F	±0.1% of instrument range ±1 digit (Note 1)
	Pt100	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit (Note 1)
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.1% of instrument range ±1 digit
Standard signal		0.400 to 2.000 V		±0.1% of instrument range ±1 digit
		1.000 to 5.000 V		
		4.00 to 20.00 mA		
0.000 to 2.000 V				
0.00 to 10.00 V				
0.00 to 20.00 mA				
-10.00 to 20.00 mV				
0.0 to 100.0 mV				

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

Note 1: ±0.3°C ±1 digit in the range between 0 and 100°C, ±0.5°C ±1 digit in the range between -100 and 200°C.

Note 2: W: W-5% Re/W-26% Re(Hoskins Mfg.Co.). ASTM E988

- Input sampling (control) period: 200 ms
- Burnout detection:
 - Functions at TC, RTD, and standard signal.
 - Upscale, downscale, and off can be specified.
 - For standard signal, burnout is determined to have occurred if it is 0.1 V or 0.4 mA or less.
- Input bias current: 0.05 µA (for TC or RTD)
- Measured current (RTD): About 0.16 mA
- Input resistance:
 - TC or mV input: 1 MΩ or more
 - V input: About 1 MΩ
 - mA input: About 250 Ω

- Allowable signal source resistance:
 - TC or mV input: 250 Ω or less
 - Effects of signal source resistance: 0.1 µV/Ω or less
 - DC voltage input: 2 kΩ or less
 - Effects of signal source resistance: About 0.01%/100 Ω
- Allowable wiring resistance:
 - RTD input: Max. 150 Ω/wire (The conductor resistance between the three wires shall be equal.)
 - Wiring resistance effect: ±0.1°C/10 Ω
- Allowable input voltage/current:
 - TC, mV, mA and RTD input: ±10 V DC
 - V input: ±20 V DC
 - mA input: ±40 mA
- Noise rejection ratio:
 - Normal mode: 40 dB or more (at 50/60 Hz)
 - Common mode: 120 dB or more (at 50/60 Hz)
 - For 100-240 V AC, the power frequency can be set manually. Automatic detection is also available.
 - For 24 V AC/DC, the power frequency can be set manually.
- Reference junction compensation error:
 - ±1.0°C (15 to 35°C), ±1.5°C (-10 to 15°C and 35 to 50°C)
- Applicable standards: JIS/IEC/DIN (ITS-90) for TC and RTD

■ Contact Input Specifications

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

■ Analog Output Specifications

- Number of outputs:
 - Control output: 1
 - Cooling-side control output of Heating/cooling type (Retransmission output terminal): 1
- Output type: Current output or voltage pulse output
- Current output: 4 to 20 mA DC or 0 to 20 mA DC/load resistance of 600 Ω or less
- Current output accuracy (conversion accuracy from PV display on the set scale): ±0.1% of span (±5% of span for 1 mA or less)
 - The accuracy is that in the standard operating conditions: 23±2°C, 55±10%RH, and power frequency at 50/60 Hz.
- Voltage pulse output:
 - Use: Time proportional output
 - On-voltage: 12 V or more/load resistance of 600 Ω or more
 - Off-voltage: 0.1 V DC or less
 - Time resolution: 10 ms or 0.1% of output, whichever is larger

■ Retransmission Output Specifications

- Number of outputs: Retransmission output; 1, shared with 15 V DC loop power supply or Cooling-side control output.
- Current output: 4 to 20 mA DC or 0 to 20 mA DC/ load resistance of 600 Ω or less
- Current output accuracy (conversion accuracy from PV display on the set scale): ±0.1% of span (±5% of span for 1 mA or less)
 - The accuracy is that in the standard operating conditions: 23±2°C, 55±10%RH, and power frequency at 50/60 Hz.
 - This is not conversion accuracy through input and output but the performance of transmission output itself.

■ 15 V DC Loop Power Supply Specifications

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

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

■ Step Response Time Specifications

Within 1 s (63% of analog output response time when a step change of 10 to 90% of input span is applied)

■ Relay Contact Output Specifications

- Contact type and number of outputs:
Control output: contact point 1c; 1 point
Heating/cooling type: contact point 1a; 2 points for both heating and cooling sides
Alarm output: contact point 1a; 3 points (common is independent)
 - Contact rating:
Contact point 1c (control output): 250 V AC, 3 A or 30 V DC, 3A (resistance load)
Contact point 1a (control output): 240 V AC, 3A or 30 V DC, 3A (resistance load)
Contact point 1a (alarm output): 240 V AC, 1A or 30 V DC, 1 A (resistance load)
 - Use: Time proportional output, alarm output, FAIL output, etc.
 - Time resolution of control output: 10 ms or 0.1% of output, whichever is larger
- Note: The control output should always be used with a load of 10 mA or more.
The alarm output should always be used with a load of 1 mA or more.

■ Transistor Contact Output Specifications

- Number of outputs: See the table of Model and Suffix Codes.
- Output type: Open collector (SINK current)
- Output contact rating: Max. 24 V DC, 50 mA
- Output time resolution: Min. 200 ms
- Use: Alarm output, FAIL output, etc.

■ Heater Break Alarm Specifications

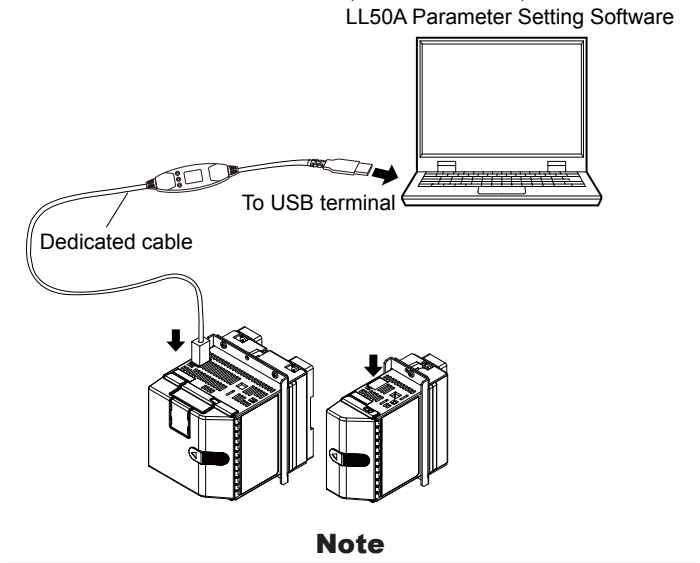
- Number of inputs: 2
- Number of outputs: 2 (transistor contact output)
- Use: Measures the heater current using an external current transformer (CT) and generates a heater break alarm when the measured value is less than the break detection value.
- Current transformer input resistance: About 9.4 Ω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

■ 24 V DC Loop Power Supply Specifications

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

■ Maintenance Port Specifications

The maintenance port is used to connect a dedicated cable when using the LL50A Parameter Setting Software (sold separately). Through this port, you can set controller parameters, download ladder programs, and so on.
For details, see the LL50A User's Manual (IM 05P05A01-02EN).



Use LL50A with the controller turned on. (The dedicated cable must be connected. LL50A Light-loader adapter cannot be used.)
The maintenance port is not isolated from the PV input terminal. Use the port only for maintenance purposes, such as for setting the controller parameters.

■ Safety and EMC Standards

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

■ Environment Standard

EU RoHS directive: EN IEC 63000

■ Construction, Installation, and Wiring

- Construction: DIN rail mounting type
- Material: Polycarbonate (Flame retardancy: UL94V-0)
DIN rail mounting bracket material: Panel steel sheet
- Case color: Black (Light charcoal gray)
- Weight: 1 kg or less
- External dimensions (mm):
UT35A/MDL: 96 (width) x 114 (height) x 100 (depth)
UT32A/MDL: 48.2 (width) x 114 (height) x 100 (depth)
- Compatible DIN rails: TH35-7.5Fe, TH35-7.5A $\bar{\ell}$, JIS C 2812
- Mounting position: Horizontal.
- Wiring: M3 screw terminal with square washer (for signal wiring and power wiring)

■ Power Supply Specifications and Isolation

- Power supply:
Rated voltage: 100-240 V AC (+10%/ -15%), 50/60 Hz
24 V AC/DC (+10%/ -15%) (for /DC option)
- Power consumption: UT35A: 18 VA (DC:9 VA, AC: 14 VA if /DC option is specified)
UT32A: 15 VA (DC:7 VA, AC: 11 VA if /DC option is specified)
- Data backup: Nonvolatile memory
- Power holdup time: 20 ms (for 100 V AC drive)
- Withstanding voltage
Between primary terminals and secondary terminals: 2300 V AC for 1 minute (UL, CSA)
Between primary terminals and secondary terminals: 3000 V AC for 1 minute (CE)
Between primary terminals: 1500 V AC for 1 minute
Between secondary terminals: 500 V AC for 1 minute
(Primary terminals: Power* and relay output terminals; Secondary terminals: Analog I/O signal terminals, contact input terminals, communication terminals and functional grounding terminals.)
*: Power terminals for 24V AC/DC models are the secondary terminals.
- Insulation resistance: Between power supply terminals and a grounding terminal 20 MΩ or more at 500 V DC
- Isolation specifications

PV (universal) input terminals / remote input terminals		Internal circuits	Power supply
Control, retransmission (analog) output terminals (not isolated between the analog output terminals)			
Control relay (contact point c/contact point a x 2) output terminals			
Alarm-1 relay (contact point a) output terminals			
Alarm-2 relay (contact point a) output terminals			
Alarm-3 relay (contact point a) output terminals			
Contact input terminals (all)			
RS-485 communication terminals			
24 V DC loop power supply terminals			
Contact output (transistor) terminals			
Ethernet communication terminal			
PROFIBUS-DP/DeviceNet/CC-Link communication terminals			
Current transformer input terminals			

The circuits divided by lines are insulated mutually.

■ Environmental Conditions

Normal Operating Conditions:

- Ambient temperature: -10 to 50°C
If the CC-Link option is specified, 0 to 50 °C for UT35A/MDL; 0 to 40 °C for UT32A/MDL. (side-by-side mounting: 0 to 50 °C for UT55A/MDL; 0 to 40 °C for UT52A/MDL)
- Ambient humidity: 20 to 90% RH (no condensation allowed)

- Magnetic field: 400 A/m or less
- Continuous vibration at 5 to 9 Hz: Half amplitude of 1.5 mm or less, 1oct/min for 90 minutes each in the three axis directions
Continuous vibration at 9 to 150 Hz: 4.9 m/s² or less, 1oct/min for 90 minutes each in the three axis directions
- Short-period vibration: 14.7 m/s², 15 seconds or less
- Shock: 98 m/s² or less, 11 ms
- Altitude: 2000 m or less above sea level
- Warm-up time: 30 minutes or more after the power is turned on
- Startup time: Within 10 seconds

*: The LCD (a liquid crystal display) is used for a display portion of this product.
The LCD has a characteristic that the display action becomes late at the low temperature. However, the control function is not affected.

Transportation and Storage Conditions:

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

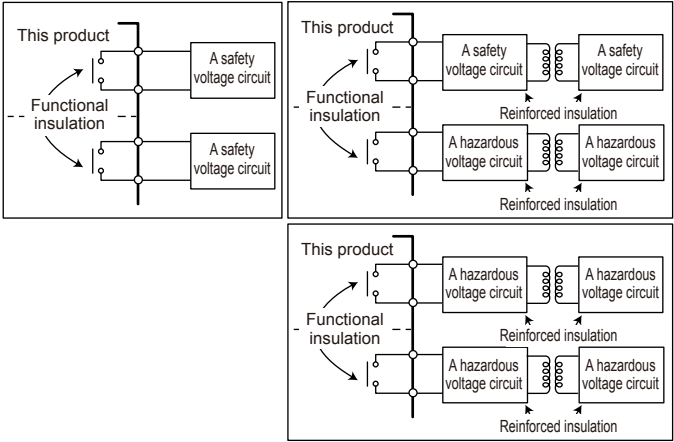
Effects of Operating Conditions

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

5. How to Connect Wires



- **Wiring work must be carried out by a person with basic electrical knowledge and practical experience.**
- **Be sure to turn OFF the power supply to the controller before wiring to avoid an electric shock. Use a tester or similar device to ensure that no power is being supplied to a cable to be connected.**
- **For the wiring cable, the temperature rating is 75 °C or more.**
- **As a safety measure, always install a circuit breaker (an IEC 60947-compatible product, 5 A, 100 V or 220 V AC) in an easily accessible location near the instrument. Moreover, provide indication that the switch is a device for turning off the power to the instrument.**
- **Install the power cable keeping a distance of more than 1 cm from other signal wires.**
- **The power cable is required to meet the IEC standards concerned or the requirements of the area in which the instrument is being installed.**
- **Wiring should be installed to conform to NEC (National Electrical Code: ANSI/NFPA-70) or the wiring construction standards in countries or regions where wiring will be installed.**
- **Since the insulation provided to each relay output terminal is Functional insulation, provide Reinforced insulation to the external of the device as necessary. (Refer to the drawing below.)**



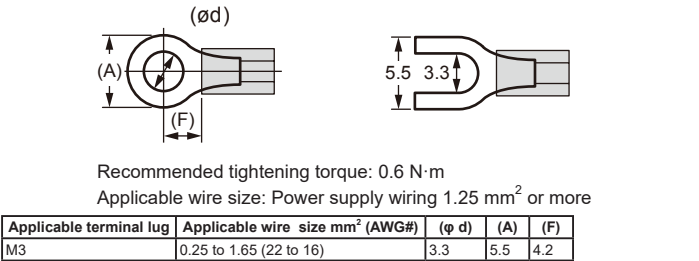
- **When connecting two or more crimp-on terminal lugs to the single terminal block, bend the crimp-on terminal lugs before tightening the screw.**
- **Note that the wiring of two or more crimp-on terminal lugs to the single high-voltage terminal of the power supply and relay, etc. does not comply with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



- **Provide electricity from a single-phase power supply. If the power is noisy, install an isolation transformer on the primary side, and use a line filter on the secondary side. When measures against noise are taken, do not install the primary and secondary power cables close to each other.**
- **If there is a risk of external lightning surges, use a lightning arrester etc.**

- **For TC input, use shielded compensating lead wires for wiring. For RTD input, use shielded wires that have low conductor resistance and cause no significant differences in resistance between the three wires.**
- **Since the control output relay has a life span (resistance load of 100,000 times), use the auxiliary relay to perform ON/OFF control.**
- **The use of inductance (L) loads such as auxiliary relays, motors and solenoid valves causes malfunction or relay failure; always insert a CR filter for use with alternating current or a diode for use with direct current, as a spark-removal surge suppression circuit, into the line in parallel with the load.**
- **After completing the wiring, the terminal cover is recommended to use for the instrument.**

● Recommended Crimp-on Terminal Lugs



● Cable Specifications and Recommended Cables

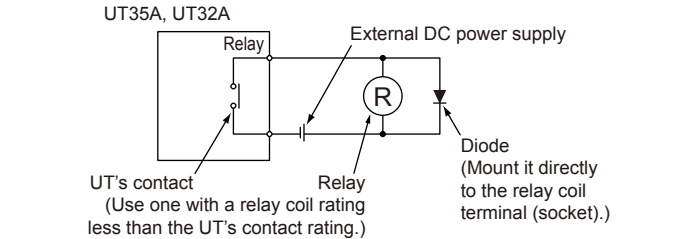
Purpose	Name and Manufacturer
Power supply, relay contact outputs	600 V Grade heat-resistant PVC insulated wires, JIS C 3317(HiV), 0.9 to 2.0 mm ²
Thermocouple	Shielded compensating lead wires, JIS C 1610 For thermocouple input (PV input and remote input with direct input), shielded compensating lead wire of cross-sectional area less than or equal to 0.75 mm ² is recommended. If the cross-sectional area is wide, the reference junction compensation error may be large.
RTD	Shielded wires (three/four conductors), UL2482 (Hitachi Cable)
Other signals (other than contact input/output)	Shielded wires
Other signals (contact input/output)	Unshielded wires
RS-485 communication	Shielded wires
Ethernet communication	100 BASE-TX (CAT-5)/10 BASE-T
PROFIBUS-DP communication	Dedicated cable for PROFIBUS-DP (Shielded two-wires)
DeviceNet communication	Dedicated cable for DeviceNet (Shielded five-wires)
CC-Link communication	Dedicated cable for CC-Link (Shielded three-wires)

PROFIBUS-DP/CC-Link Connector (wiring side) (Part number: A1987JT)

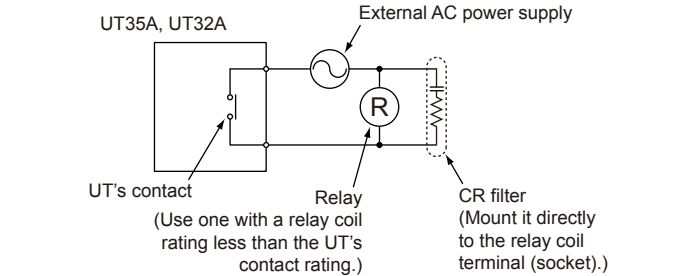
DeviceNet Connector (wiring side) (Part number: L4502BW)

Recommended tightening torque: 0.5 to 0.6 N·m

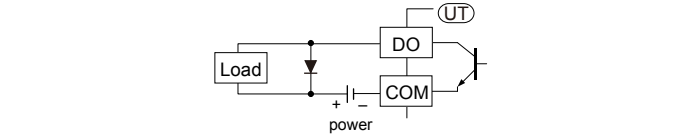
DC Relay Wiring



AC Relay Wiring



Transistor Output Wiring

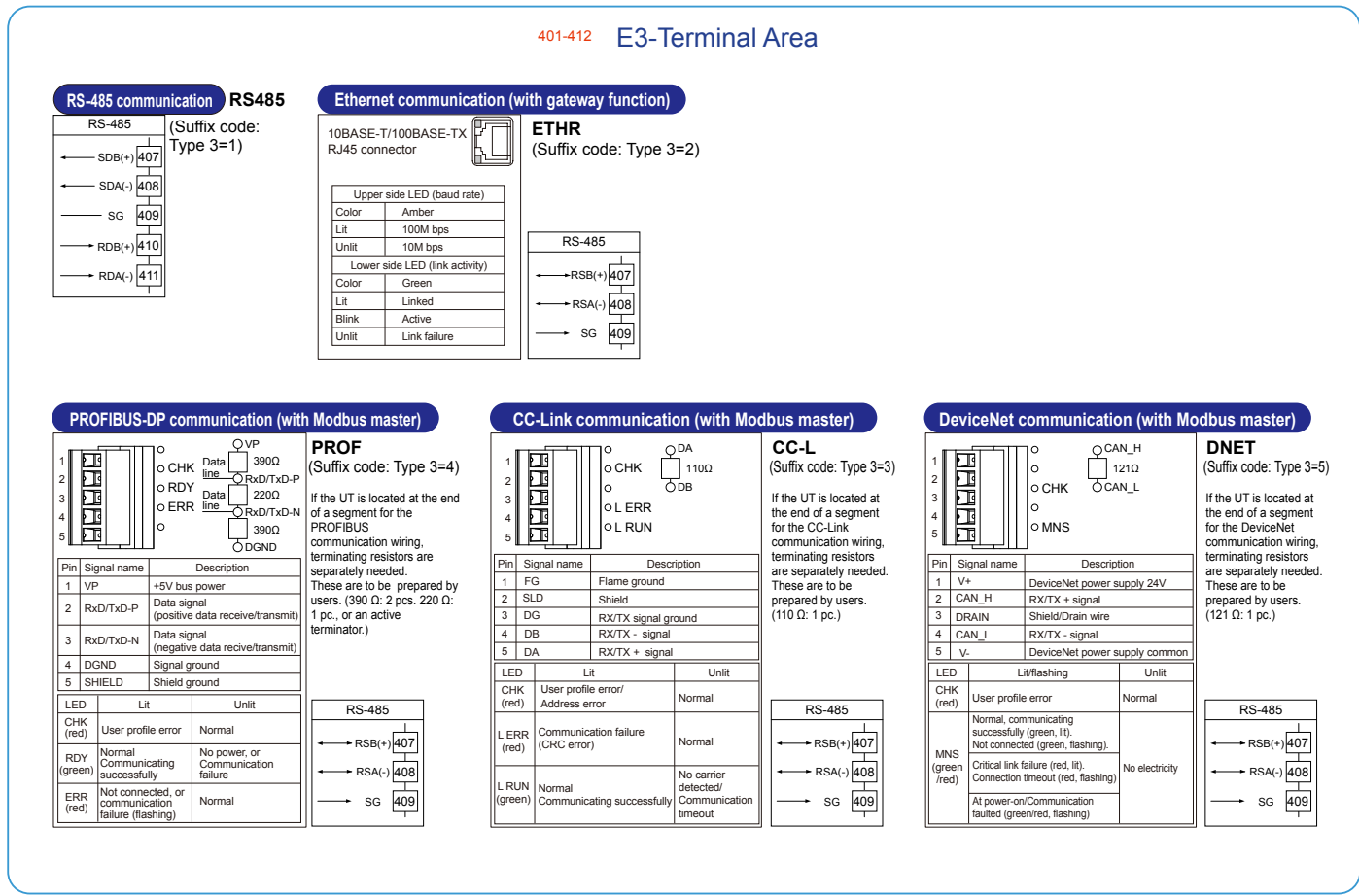
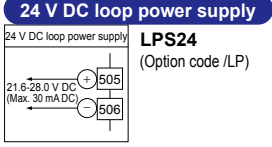
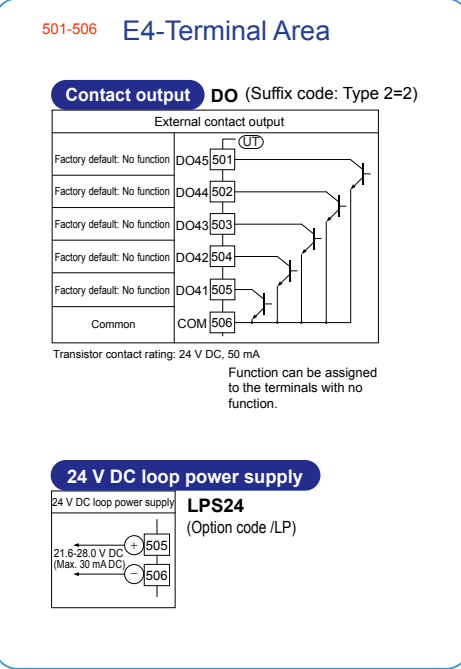
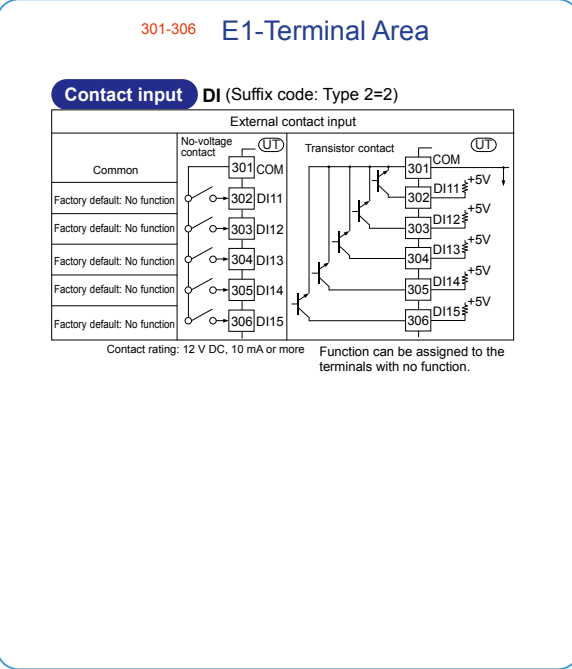
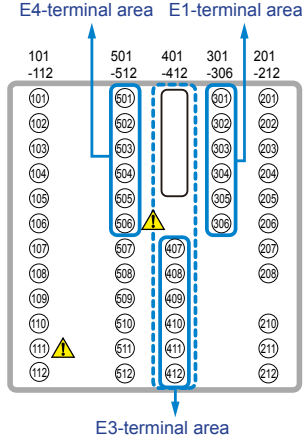
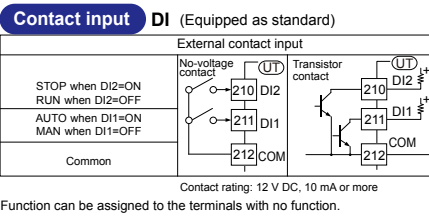
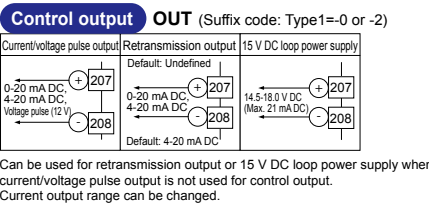
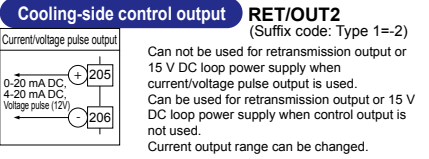
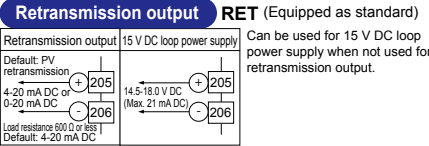
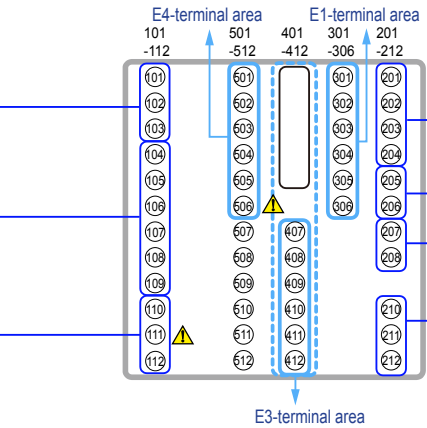
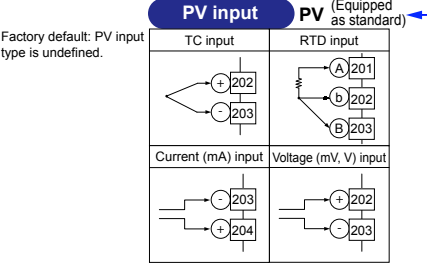
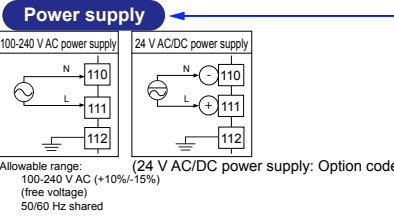
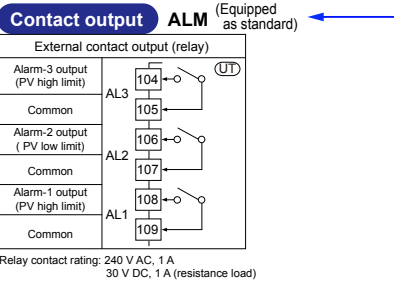
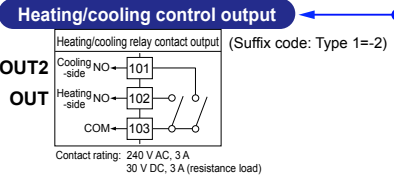
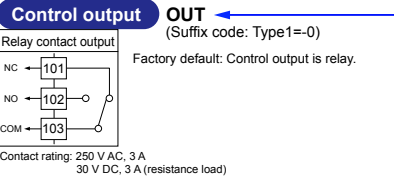


6. Terminal Wiring Diagrams

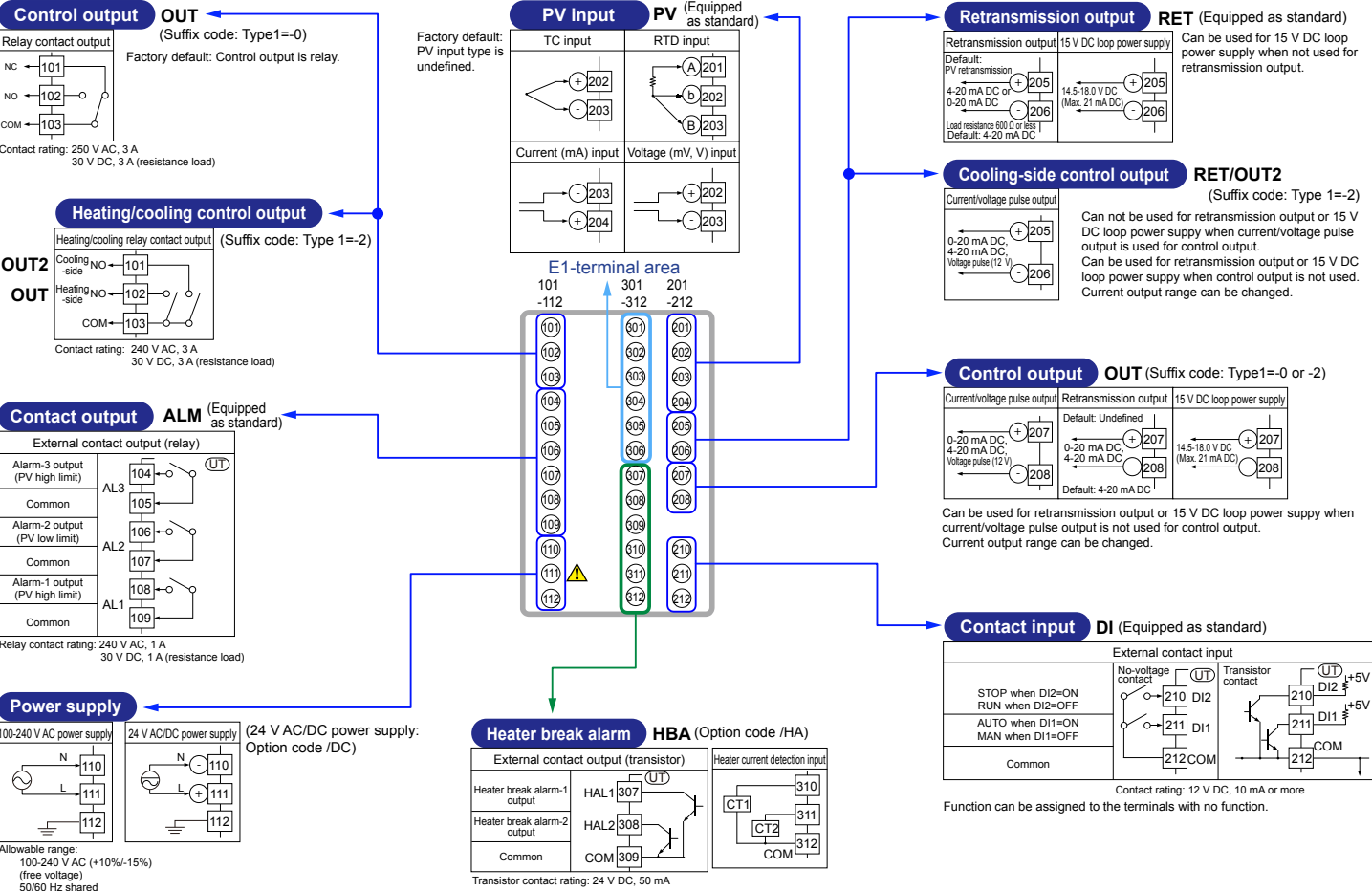


- Do not use an unassigned terminal as the relay terminal.
- Do not use a 100-240 V AC power supply for the 24 V AC/DC model; otherwise, the instrument will malfunction.

■ UT35A/MDL



■ UT32A/MDL



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

Model	Description
UT35A, UT32A Digital Indicating Controller (Panel Mounting Type) Operation Guide «Standard Code Model»	IM 05P01D31-11EN
UT35A, UT32A Digital Indicating Controller (Panel Mounting Type) Operation Guide «Detailed Code Model»	IM 05P01D31-15EN
UT35A/MDL, UT32A/MDL Digital Indicating Controller (DIN Rail Mounting Type) Operation Guide «Standard Code Model»	IM 05P01D81-11EN
UT32A-D Digital Indicating Controller (Dual-loop, Panel Mounting Type) Operation Guide «Standard Code Model»	IM 05P08D31-11EN
UT32A-D/MDL Digital Indicating Controller (Dual-loop, DIN Rail Mounting Type) Operation Guide «Standard Code Model»	IM 05P08D81-11EN
UT35A/RSP, UT32A/RSP Digital Indicating Controller (Non-isolated Remote Input, Panel Mounting Type) Operation Guide «Standard Code Model»	IM 05P01D31-81EN
UT32A Digital Indicating Controller Operation Guide «Entry Model»	IM 05P01F31-11EN
Precautions on the Use of the UTAdvanced Series	IM 05P01A01-11EN
UTAP005 Wall Mount Bracket User's Manual	IM 05P06A31-02Z1

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

Model	Description
UT35A, UT32A Digital Indicating Controller (Panel Mounting Type) Operation Guide «Standard Code Model»	IM 05P01D31-11EN
UT35A, UT32A Digital Indicating Controller (Panel Mounting Type) Operation Guide «Detailed Code Model»	IM 05P01D31-15EN
UT35A/MDL, UT32A/MDL Digital Indicating Controller (DIN Rail Mounting Type) Operation Guide «Standard Code Model»	IM 05P01D81-11EN
UT35A/UT32A Digital Indicating Controller User's Manual	IM 05P01D31-01EN
UT32A-D Digital Indicating Controller (Dual-loop, Panel Mounting Type) Operation Guide «Standard Code Model»	IM 05P08D31-11EN
UT32A-D/MDL Digital Indicating Controller (Dual-loop, DIN Rail Mounting Type) Operation Guide «Standard Code Model»	IM 05P08D81-11EN
UT32A-D, UT32A-D/MDL Digital Indicating Controller User's Manual	IM 05P08D31-01EN
UT35A/RSP, UT32A/RSP Digital Indicating Controller (Non-isolated Remote Input, Panel Mounting Type) Operation Guide «Standard Code Model»	IM 05P01D31-81EN
UT32A Digital Indicating Controller Operation Guide «Entry Model»	IM 05P01F31-11EN
UT32A Digital Indicating Controller User's Manual «Entry Model»	IM 05P01F31-01EN
UTAdvanced Series Communication Interface (RS-485, Ethernet) User's Manual	IM 05P07A01-01EN
UTAdvanced Series Communication Interface (Open Network) User's Manual	IM 05P07A01-02EN
LL50A Parameter Setting Software Installation Manual	IM 05P05A01-01EN
LL50A Parameter Setting Software User's Manual	IM 05P05A01-02EN
Precautions on the Use of the UTAdvanced Series	IM 05P01A01-11EN
UTAP005 Wall Mount Bracket User's Manual	IM 05P06A31-02Z1

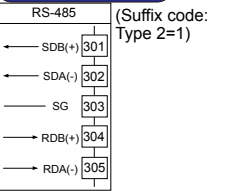
• General Specification

Model	Description
UT35A, UT32A Digital Indicating Controller (Panel Mounting Type)	GS 05P01D31-01EN
UT35A/MDL, UT32A/MDL Digital Indicating Controller (DIN Rail Mounting Type)	GS 05P01D81-01EN
UT32A-D Digital Indicating Controller (Dual-loop, Panel Mounting Type)	GS 05P08D31-01EN
UT32A-D/MDL Digital Indicating Controller (Dual-loop, DIN Rail Mounting Type)	GS 05P08D81-01EN
LL50A Parameter Setting Software	GS 05P05A01-01EN

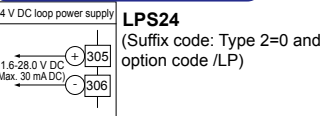
* The last two characters of the manual number and general specification number indicate the language in which the manual is written.

301-306 E1-Terminal Area

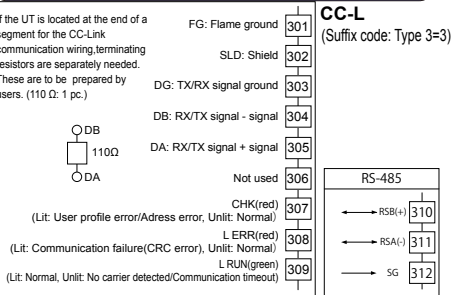
RS-485 communication RS485



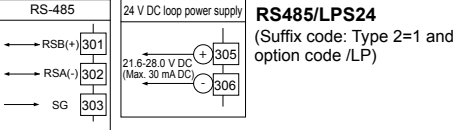
24 V DC loop power supply LPS24



CC-Link communication (with Modbus master) CC-L



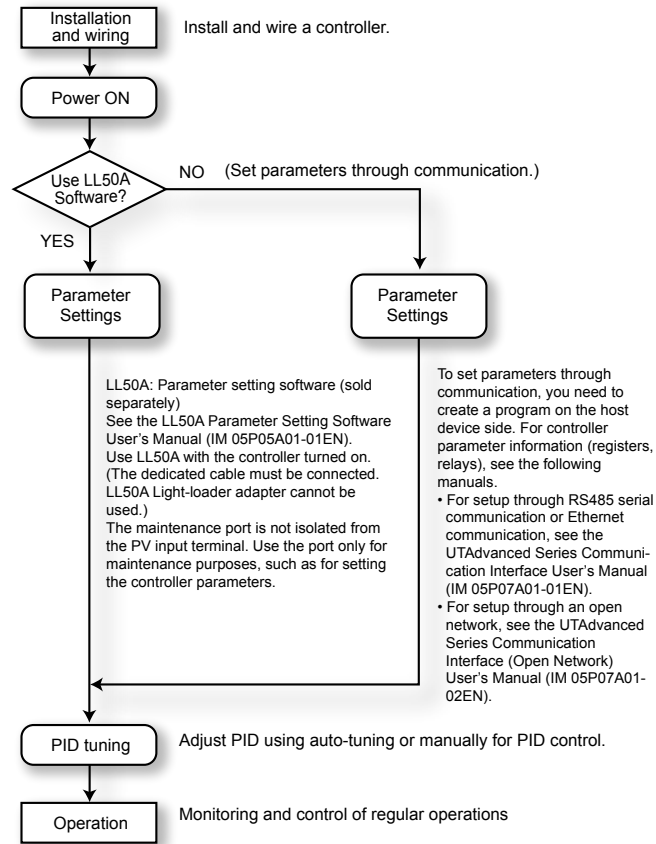
RS-485 communication/24 V DC loop power supply RS485/LPS24



7. Setup Procedure

The following flowchart shows the setup procedure for UT35A/MDL and UT32A/MDL.

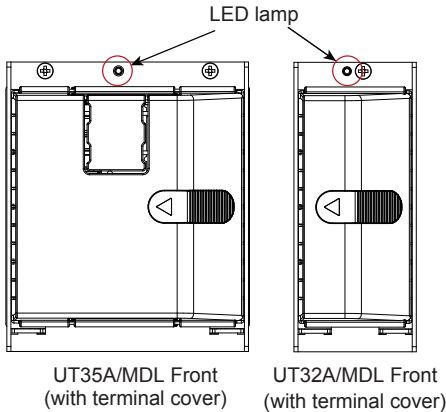
Perform setup through communication or the LL50A Parameter Setting Software (sold separately).



8. Operations

The controller status can be verified with the LED.

Status	LED	Lit/Blinks	Description
Normal	Green	Lit	
Communication error	Green	Blinks	Check the communication wiring and settings.
Instrument failure	Red	Lit	Parameter error/Hardware failure/Ladder program corruption.
Input error	Red	Blinks	Sensor burnout, input over Check the input wiring and settings.

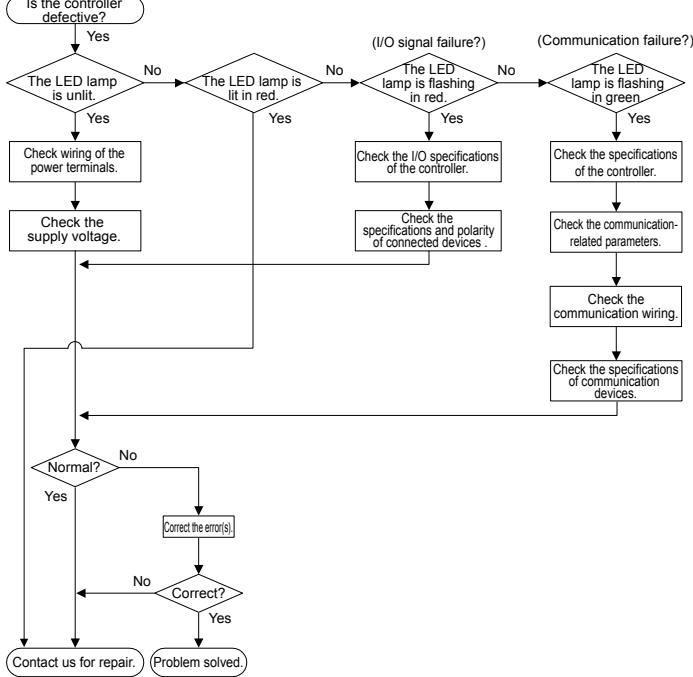


Check the operating status (run/stop, auto/manual, remote/local, etc.) of the controller through communication or the LL50A Parameter Setting Software (sold separately).

For details, see the (1) UT35A/UT32A Digital Indicating Controller User's Manual (IM 05P01D31-01EN), (2) UTAdvanced Series Communication Interface (RS-485, Ethernet) User's Manual (IM 05P07A01-01EN), and (3) LL50A Parameter Setting Software User's Manual (IM 05P05A01-02EN).

9. Troubleshooting

If a problem appears to be complicated, contact our sales representatives.



■ Errors at Power On

The errors shown below may occur in the fault diagnosis when the power is turned on. (For details of Setpoint display and input/output action when each error occurs, see User's Manual (IM 05P01D31-01EN).)

You can view the details of each error through communication or the LL50A Parameter Setting Software (sold separately). (View on the register monitor.)

For details on each register, see the UTAdvanced Series Communication Interface (RS485, Ethernet) User's Manual (IM 05P07A01-01EN).

LED display	Register that displays error details	Error description	Cause and diagnosis	Remedy
Unlit	—	Faulty MCU RAM / MCU ROM	MCU RAM / MCU ROM are failed.	Faulty. Contact us for repair.
Red, lit	Setup parameter (PA.ER) (Register no.: 2068) Bit 0=1	System data error	System data is corrupted.	Faulty. Contact us for repair.
	Setup parameter (PA.ER) (Register no.: 2068) Bit 1=1	Calibration value error	Initialized to calibrated default value because of corrupted factory default value.	Faulty. Contact us for repair.
	Setup parameter (PA.ER) (Register no.: 2068) Bit 2=1	User (parameter) default value error	User parameter is corrupted. Initialized to factory default value.	Check and reconfigure the initialized setting parameters. Error indication is erased when the power is turned on again.
	Setup parameter (PA.ER) (Register no.: 2068) Bit 4=1	Setup parameter error	Setup parameter data is corrupted. Initialized to user default value.	
	Setup parameter (PA.ER) (Register no.: 2068) Bit 5=1	Operation parameter error	Operation parameter data is corrupted. Initialized to user default value.	
	Setup parameter (PA.ER) (Register no.: 2068) Bit 8=1	Faulty FRAM	Data writing (storing) to FRAM is impossible.	Faulty. Contact us for repair.
	Setup parameter (OP.ER) (Register no.: 2070) E1-terminal: Bit 0=1 E2-terminal: Bit 1=1 E3-terminal: Bit 2=1 E4-terminal: Bit 4=1	Nonresponding hardware of extended function (E1 to E4-terminal areas)	Inconsistence of system data and hardware of extended function. Nonresponding communication between hardware of extended function (E1 to E4-terminal areas).	Faulty. Contact us for repair.
	Setup parameter (LA.ER) (Register no.: 2012) Bit 0=1	Corrupted ladder program	Ladder program is corrupted. Operates without ladder program.	Download the ladder program again.
	Setup parameter (OP.ER) (Register no.: 2070) Bit 10=1	User profile error	User profile is corrupted.	Download the user profile again.

■ Errors during Operation

The errors shown below may occur during operation. (For input/output action when each error occurs, see User's Manual (IM 05P01D31-01EN).)

You can view the details of each error through communication or the LL50A Parameter Setting Software (sold separately). (View on the register monitor.)

For details on each register, see the UTAdvanced Series Communication Interface (RS485, Ethernet) User's Manual (IM 05P07A01-01EN).

LED display	Register that displays error details	Error description	Cause and diagnosis	Remedy
Red, lit	Setup parameter (AD1.E) (Register no.: 2001) Bit 0=1	Analog input terminal ADC error •PV input	Analog input terminal AD value error	Faulty. Contact us for repair.
	Setup parameter (AD1.E) (Register no.: 2001) Bit 5=1	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.
Red, blinks	Setup parameter (AD1.E) (Register no.: 2001) Bit 8=1	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) (Register no.: 2002) Bit 0=1	PV input burnout error	Burnout of analog input connected to PV	Check wiring and sensor of connected analog input terminals. Error indication is erased in normal operation.
	Setup parameter (PV1.E) (Register no.: 2002) Over-scale: Bit 4=1 Under-scale: Bit 5=1	PV input over-scale PV input under-scale (PV values out of -5 to 105%)	PV input is out of -5 to 105%. Also occurs when the data out of range which is the ladder calculation result is input.	Check analog input value or ladder program.
Check the error in LL50A software.	Setup parameter (LA.ER) (Register no.: 2012) Overflow: Bit 1=1 Ladder program error: Bit 1=1 Load factor over 100%: Bit 4=1 Load factor over 200%: Bit 5=1	Ladder calculation overflow	Floating point computation for ladder calculation is infinite.	Check the ladder program.
		Load factor over 100%	Computation does not end within the control period (load factor is 100% or more).	Change the control period or reduce the number of steps for the ladder program.
		Load factor over 200% (Forced end)	Computation does not end within the control period (load factor is 200% or more).	Change the control period or reduce the number of steps for the ladder program.
		Ladder program error	Ladder program is corrupted.	Download the ladder program again. If the error indication is still not erased, there is a fault. Contact us for repair.
Green, blinks	Setup parameter (OP.ER) (Register no.: 2070) E1-terminal: Bit 8=1 E3-terminal: Bit 10=1 E4-terminal: Bit 12=1	Peer-to-peer communication error	Peer-to-peer communication error	Check that the target devices are connected correctly. Recovery at normal receipt.
Check the error in LL50A software.	Setup parameter (PV1.E) (Register no.: 2002) Bit 14=1	Auto-tuning time-out	Auto-tuning does not end even when 24 hours have elapsed after the start of tuning.	Check the process. Hold down any key to erase the error indication
Green, blinks	Setup parameter (OP.ER) (Register no.: 2070) E1-terminal: Bit 8=1 E3-terminal: Bit 10=1 E4-terminal: Bit 12=1	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.
		Communication error (coordinated operation)	Inconsistence of loop between coordinated master and slaves	Check the communication parameters. Recovery at normal receipt. Change from remote to local mode to stop blinking.
		User profile error	Communication from coordinated master is interrupted for 2 seconds.	When the mode is changed from remote to local, SP tracking does not work even if it is set to ON.
Red, lit	Setup parameter (PA.ER) (Register no.: 2068) Bit 8=1	Faulty FRAM	Writing (storing) data to FRAM is impossible.	Download the user profile again.
Unlit	—	Faulty MCU / DCU (ROM / RAM error, corrupted)	MCU / DCU is corrupted.	Faulty. Contact us for repair.