

General Specifications

UM33A
Digital Indicator with Alarms



GS 05P03D21-01EN

Overview

The UM33A digital indicator with Alarms employ 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. Also supporting the CC-Link 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.
- Embedded CC-Link communication
Supporting easy connection with Mitsubishi Electric Corporation PLCs.
- Quick setting function
Setting only the minimum necessary parameters for operation is possible.
- Equipped with retransmission output
- LL50A Parameter Setting Software (sold separately)
The parameters of UTAdvanced digital indicating controller can be built from a PC using this software. It makes data management even easier.
- Dust-proof and drip-proof
IP66 (for front panel) (Not applicable to side-by-side close mounting.)
NEMA4 (Hose-down test only)

Functional Specifications

Signal Computation Function

Measured input computation:
Bias addition (-100.0 to 100.0% of PV input range span.), first-order lag filter (time constant off, 1 to 120 s.), and 10-segment linearizer approximation/bias
Contact input: Retains and displays maximum and minimum readings from measured variable.
Resets the maximum and minimum readings.



Alarm Functions

Types of Alarm

| | |
|----------------------|---|
| Measured value alarm | PV (measured value) high/low limit 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 | 8 |
| Number of alarm output points | Up to 9 (differs by model code) |

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 | PV peak and bottom values reset |
| | Latch release (ACK) |
| | LCD backlight ON/OFF switch |
| | PV red/white switch |
| Contact output | Message interrupt displays 1 through 4 |
| | Alarms 1 through 8 |
| | Status output |

Communication Function

| | Function | Method | Interface | Targets | Max connection | Communication Data |
|--------------------|--|------------------------|-----------|--|---|--------------------|
| Modbus (RTU/ASCII) | A standard industry protocol allowing communications between the controller and devices such as PCs, PLCs, and DCSs. | Slave | RS-485 | PLC and others, UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UM33A (*1) | 31 units | PV, ALM etc |
| PC link | The proprietary Yokogawa protocol allowing communications to PCs, PLCs and touch panels. | | | | | |
| Ladder | A protocol to communicate to PLCs. | | | | | |
| CC-Link | Used for communication between PLCs and remote I/O, enabling highspeed data transmission. | Slave | | PLC and others | Number of nodes: 42 (Remote device) | |
| | | Modbus master function | | UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UP32A/UM33A | 31 Units (Main Controller is included.) | |

*1: UT digital indication controllers can be connected.

Physical Interface

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 38400bps
 Maximum communication distance: 1200m
 Terminating resistor: 220Ω (External)

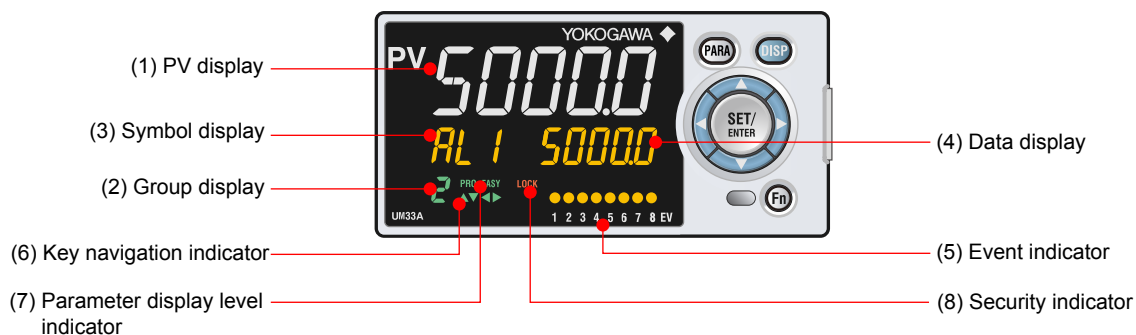
CC-Link

Supported version : Remote device (Ver.1.10, Ver.2.00)
 Baud rate : 156k, 625k, 2.5M, 5M, 10M bps
 Transmission distance : 1.2km (156k bps), 600m (625k bps), 200m (2.5M bps), 150m (5M bps), 100m (10M bps)
 When using optical repeater : 7.6 km (156k) to 4.3 km (10M)

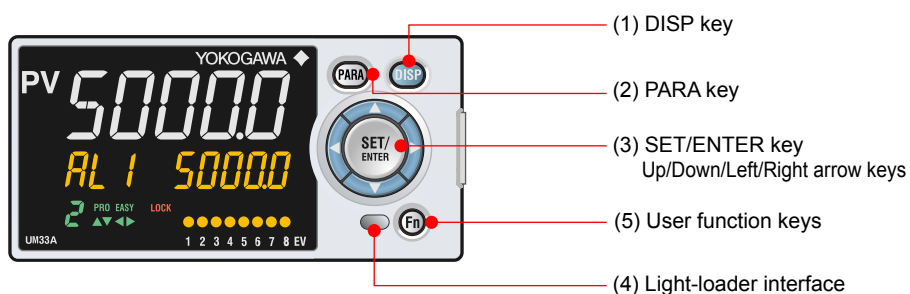
■ Hardware Specifications

Display Specifications

- PV display: 5-digit, 14-segment active color LCD (white/red)
Character height: 14.2 mm
- Data display: 5-digit, 11-segment color LCD (orange)
- Bar graph display: 12-segment color LCD (orange)



Names of Display Parts



Universal Input Specifications

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

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

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

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

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

- Input sampling period: Select from among 50, 100, and 200 ms
- Burnout detection:
Functions at TC, RTD, and standard signal
Upscale, downscale, and off can be specified.
For standard signal, burnout is determined to have occurred if it is 0.1 V or 0.4 mA or less.
- Input bias current: 0.05 µA (for TC or RTD)
- Measurement 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 or RTD input: ±10 V DC
V input: ±20 V DC
mA input: ±40 mA
- Noise rejection ratio:
Normal mode: 40 dB or more (50/60 Hz)
Common mode: 120 dB or more (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, 35 to 50°C)
- Applicable standards: JIS/IEC/DIN (ITS-90) for TC and RTD

Contact Input Specifications

- Number of inputs: 2 points
- Input type: No-voltage contact input or transistor contact input
- Input contact rating: 12 V DC, 10 mA or more
Use a contact of a minimum on-current of 1 mA or less
- ON/OFF detection:
No-voltage contact input:
Contact resistance of 1 k Ω or less is determined as "ON" and contact resistance of 50 k Ω or more as "OFF."
Transistor contact input:
Input voltage of 2 V or less is determined as "ON" and leakage current must not exceed 100 μ A when "OFF."
- Minimum status detection hold time: Input sampling period +50 ms
- Use: Event input

Retransmission Output Specifications

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

15 V DC Loop Power Supply Specifications

(Shared with retransmission output)

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

Step Response Time Specifications

Within 500 ms (when the input sampling period is 50 ms or 100 ms)

Within 1 s (when the input sampling period is 200 ms)
(63% of analog output response time when a step change of 10 to 90% of input span is applied)

Relay Contact Output Specifications

- Contact type and number of outputs:
Alarm-1 to -3 output: contact point 1a; 3 points (common is independent)
Alarm-4 output: contact point 1c; 1 point
- Contact rating:
Contact point 1a (alarm-1 to -3 output): 240 V AC, 1 A or 30 V DC, 1 A (resistance load)
Contact point 1c (alarm-4 output): 250 V AC, 3 A or 30 V DC, 3 A (resistance load)
- Use: Alarm output, FAIL output, etc.
*: The alarm-1 to -3 output should always be used with a load of 1 mA or more.
The alarm-4 output should always be used with a load of 10 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. 50 ms
- Use: Alarm output, FAIL output, etc.

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 power supply: About 30 mA (with short circuit current limiting circuit)

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,
EN 61326-2-3
*: The instrument continues to operate at a measurement accuracy of within $\pm 20\%$ of the range during testing.
EN 55011 Class A, Group 1
EN 61000-3-2 Class A
EN 61000-3-3
EMC Regulatory Arrangement in Australia and New Zealand
EN 55011 Class A, Group 1
- KC marking: Electromagnetic wave interference prevention standard, electromagnetic wave protection standard compliance

Construction, Installation, and Wiring

- Dust-proof and drip-proof: IP66 (for front panel)/NEMA4 *
*: Hose-down test only
- Material: Polycarbonate (Flame retardancy: UL94V-0)
- Case color: White (Light gray) or Black (Light Charcoal gray)
- Weight: 0.5 kg or less
- External dimensions (mm): 96 (W) \times 48 (H) \times 65 (depth from the panel face)
(Depth except the projection on the rear panel)
- Installation: Direct panel mounting; mounting bracket, one each for left and right mounting
- Panel cutout dimensions (mm): 92 $^{+0.8/0}$ (W) \times 45 $^{+0.6/0}$ (H)
- Mounting attitude: Up to 30 degrees above the horizontal. No downward tilting allowed.
- Wiring: M3 screw terminal with square washer (for signal wiring and power wiring)

Power Supply Specifications and Isolation

- Power supply:
Rated voltage: 100 – 240 V AC (+10%/-15%), 50/60 Hz
24 V AC/DC (+10%/-15%) (for /DC option)
- Power consumption: 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 | Internal circuits | Power supply |
| Retransmission (analog) output terminals (not isolated between the analog output terminals) | | |
| Alarm-4 relay (contact point c) 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 | | |
| CC-Link communication terminals | | |
| Contact output (transistor) terminals | | |

The circuits divided by lines are insulated mutually.

- 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.

Transportation and Storage Conditions

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

Effects of Operating Conditions

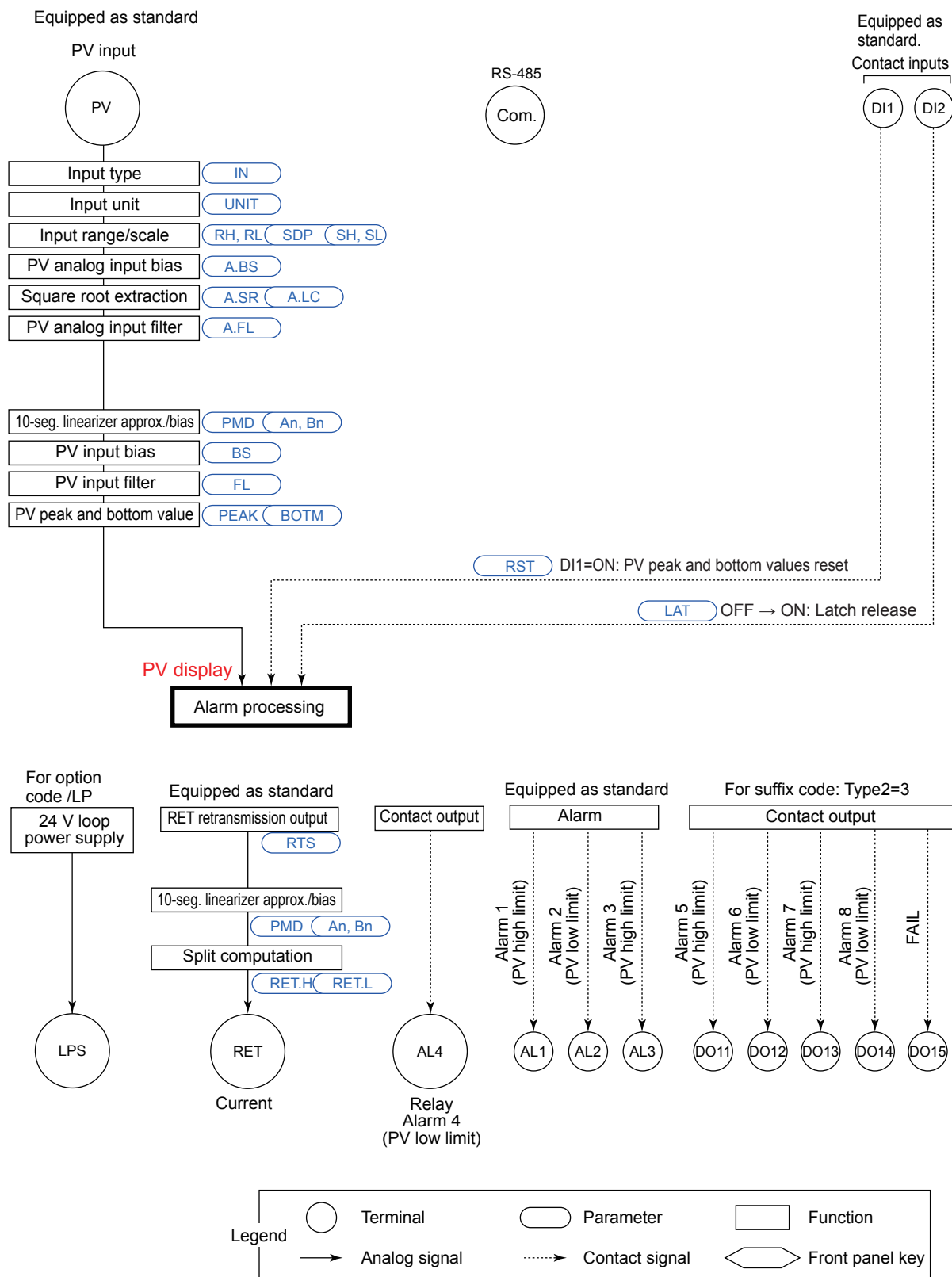
- Effect of ambient temperature:
Voltage or TC input: $\pm 1 \mu\text{V}/^\circ\text{C}$ or $\pm 0.01\%$ of F.S./ $^\circ\text{C}$, whichever is larger
Current input: $\pm 0.01\%$ of F.S./ $^\circ\text{C}$
RTD input: $\pm 0.05^\circ\text{C}/^\circ\text{C}$ (ambient temperature) or less
Analog output: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

Environmental Conditions

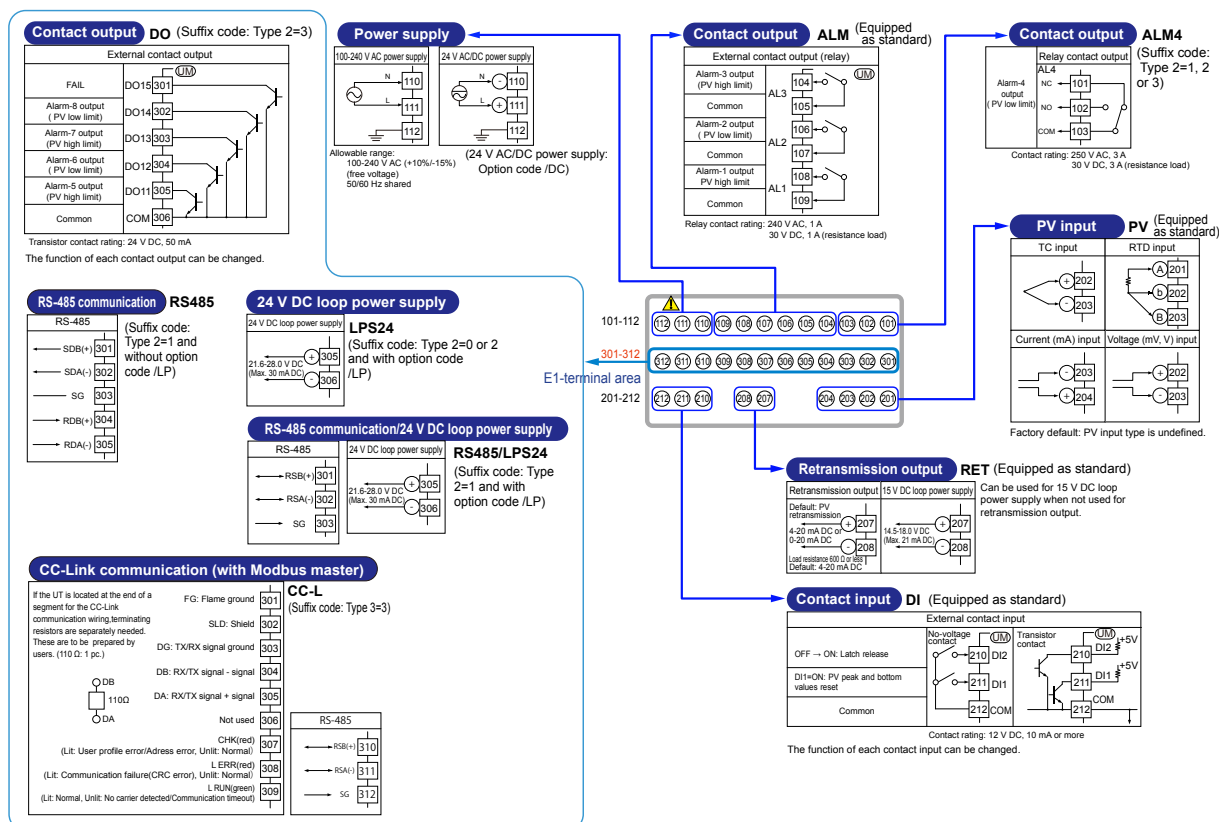
Normal Operating Conditions

- Ambient temperature: -10 to 50°C
If the CC-Link option is specified, 0 to 40 °C for UM33A.
- 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

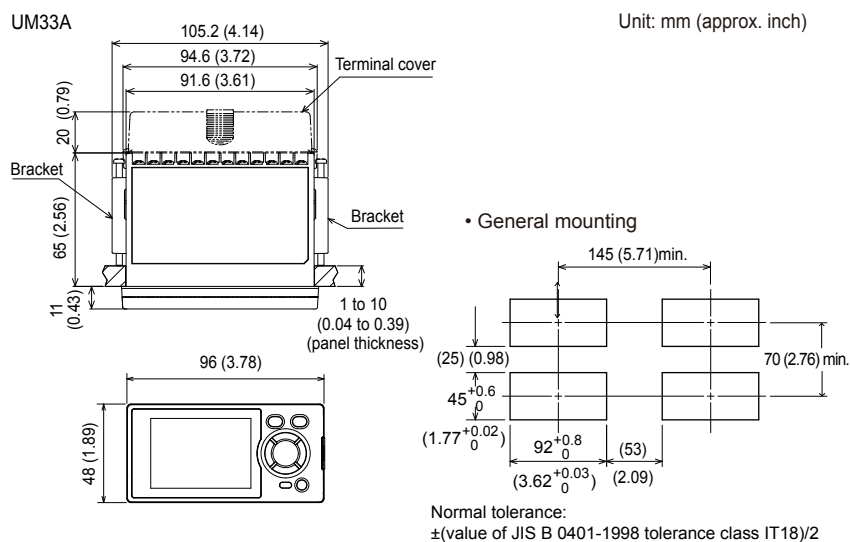
■ Block Diagram



■ Terminal Arrangement



■ External Dimensions and Panel Cutout Dimensions



■ Model and Suffix Code

| Model | Suffix code | Option code | Description |
|----------------------------------|-------------|-------------|--|
| UM33A | | | Digital Indicator with Alarms (Power supply: 100-240 V AC) (provided with retransmission output or 15 V DC loop power supply, 2 DIs, and 3 DOs) |
| Type 1: Basic | -0 | | Standard type |
| | -S | | Dedicated to SENCOM HMI (provided with SENCOM smart adapter Interface and retransmission output) (please see the General Specifications GS 05P09D21-01EN.) |
| Type 2: Functions | 0 | | None |
| | 1 | | 1 additional DO (c-contact relay), RS-485 communication (Max.38.4 kbps, 2-wire/4-wire) ^{(*)1} |
| | 2 | | 1 additional DO (c-contact relay) |
| | 3 | | 6 additional DOs (c-contact relay; 1 point and open collector; 5 points) |
| Type 3: Open networks | 0 | | None |
| | 3 | | CC-Link communication (with Modbus master function) ^{(*)2} |
| Display language ^{(*)3} | -1 | | English (Default. Can be switched to other language by the setting.) |
| | -2 | | German (Default. Can be switched to other language by the setting.) |
| | -3 | | French (Default. Can be switched to other language by the setting.) |
| | -4 | | Spanish (Default. Can be switched to other language by the setting.) |
| Case color | 0 | | White (Light gray) |
| | 1 | | Black (Light charcoal gray) |
| Option codes | /LP | | 24 V DC loop power supply ^{(*)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: Type 3 code "3" can be specified only when the Type 2 code is "0" or "2".

*3: English, German, French, and Spanish are available for the guide display.

*4: The /LP option can be specified only when the code for Type 2 code is any of "0", "1" or "2", and the Type 3 code is "0".

*5: When the /CT option is specified, the UM33A does not conform to the safety standards (UL and CSA) and CE marking (Products with /CT option are not intended for countries which require CE marking.).

■ 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

■ Special Order Items

| Model code | Suffix code | Description |
|------------|---|----------------------------|
| LL50A | -00 | Parameter Setting Software |
| X010 | See the General Specifications (GS X010-01EN) | Resistance Module (*) |

*: Necessary to input the current signal to the voltage input terminal.

| Name | Model |
|--------------------|---------|
| Terminal cover | UTAP002 |
| User's Manual (CD) | UTAP003 |

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/>