

General Specifications

UM33A
Digital Indicator with Alarms



GS 05P03D21-01EN

[Style: S9]

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.



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.
- Dedicated LL50A Parameter Setting Software (sold separately) allows for setting parameters.
- Quick setting function
Setting only the minimum necessary parameters for operation is possible.

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.

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 |

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) |

Communication Function

| Function | Method | Interface | Targets | Max connection | Communication Data |
|--------------------|--------|-----------|--|----------------|--------------------|
| Modbus (RTU/ASCII) | Slave | RS-485 | PLC and others, UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UM33A (*1) | 31 units | PV, ALM etc |
| PC link | | | | | |
| Ladder | | | | | |

*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

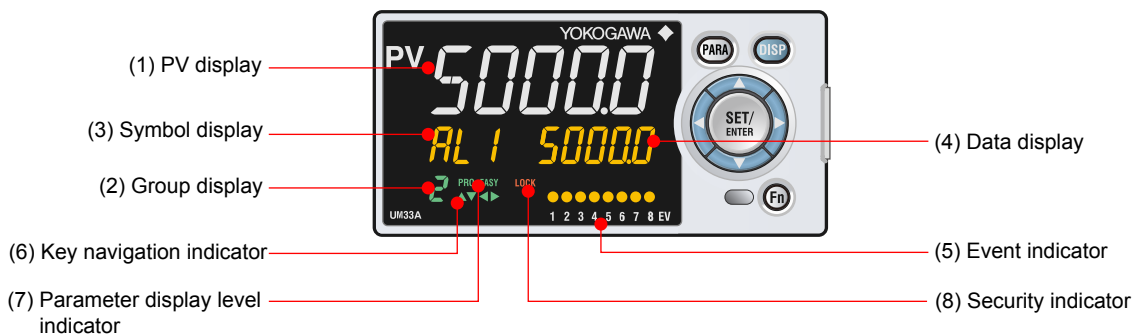
Maximum communication distance: 1200m

Terminating resistor: 220Ω (External)

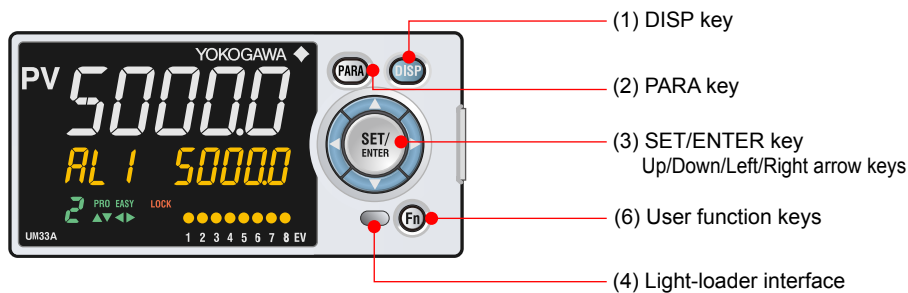
Hardware Specifications

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 ±0.2% of instrument range ±1 digit for less than 0°C ±2% of instrument range ±1 digit for less than -200.0°C of thermocouple K ±1% of instrument range ±1 digit for less than -200.0°C of thermocouple T | |
| | | -270.0 to 1000.0°C | -450.0 to 2300.0°F | | |
| | | -270.0 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 ±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 | | |
| | | | 0.0 to 400.0°C | | |
| | W | 0.0 to 2300.0°C | 32 to 4200°F | | |
| 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 | |
| | Pt100 | -200.0 to 850.0°C | -300.0 to 1560.0°F | ±0.1% of instrument range ±1 digit (Note 1) | |
| | | -200.0 to 500.0°C | -300.0 to 1000.0°F | ±0.1% of instrument range ±1 digit | |
| | | -150.00 to 150.00°C | -200.0 to 300.0°F | | |
| 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 | | | | |
| 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 $\mu\text{V}/\Omega$ or less
DC voltage input: 2 k Ω or less
Effects of signal source resistance: About 0.01%/100 Ω
- Allowable wiring resistance:
RTD input: Max. 150 Ω /wire (The conductor resistance between the three wires shall be equal.)
Wiring resistance effect: $\pm 0.1^\circ\text{C}/10 \Omega$
- Allowable input voltage/current:
TC, mV, mA or RTD input: $\pm 10 \text{ V DC}$
V input: $\pm 20 \text{ V DC}$
mA input: $\pm 40 \text{ mA}$
- 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:
 $\pm 1.0^\circ\text{C}$ (15 to 35°C)
 $\pm 1.5^\circ\text{C}$ (-10 to 15°C , 35 to 50°C)
- Applicable standards: JIS/IEC/DIN (ITS-90) for TC and RTD

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, 1A or 30 V DC, 1 A (resistance load)
Contact point 1c (alarm-4 output): 250 V AC, 3 A or 30 V DC, 3A (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.

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: $23 \pm 2^\circ\text{C}$, $55 \pm 10\% \text{RH}$, 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)

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 more
- 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 μA when "OFF."
- Minimum status detection hold time: Input sampling period +50 ms
- Use: Event input

Transistor Contact Output Specifications

- Number of outputs: See the table of Model and Suffix Codes.
- Output type: Open collector (SINK current)
- Output contact rating: Max. 24 V DC, 50 mA
- Output time resolution: Min. 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/EN61010-1 (CE), IEC/EN61010-2-030 (CE), approved by CAN/CSA C22.2 No. 61010-1 (CSA), approved by UL61010-1.
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 IEC/EN/CSA/UL61010-1. This value is not necessarily a guarantee of instrument performance.
- EMC standards:
Compliant with
CE marking
EN 61326-1 Class A, Table 2 (For use in industrial locations),
EN 61326-2-3
*: The instrument continues to operate at a measurement accuracy of within $\pm 20\%$ of the range during testing.
EN 55011 Class A, Group 1
EN 61000-3-2 Class A
EN 61000-3-3

EMC Regulatory Arrangement in Australia and New Zealand
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)
- 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) × 48 (H) × 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) × 45^{+0.6/0} (H)
- Mounting attitude: Up to 30 degrees above the horizontal. No downward titling allowed.
- Wiring: M3 screw terminal with square washer (for signal wiring and power wiring)

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 | | |
| Contact output (transistor) terminals | | |

The circuits divided by lines are insulated mutually.

Environmental Conditions

Normal Operating Conditions

- Ambient temperature: -10 to 50°C
- Ambient humidity: 20 to 90% RH (no condensation allowed)
- Magnetic field: 400 A/m or less
- Continuous vibration at 5 to 9 Hz: Half amplitude of 1.5 mm or less, 1oct/min for 90 minutes each in the three axis directions
Continuous vibration at 9 to 150 Hz: 4.9 m/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.

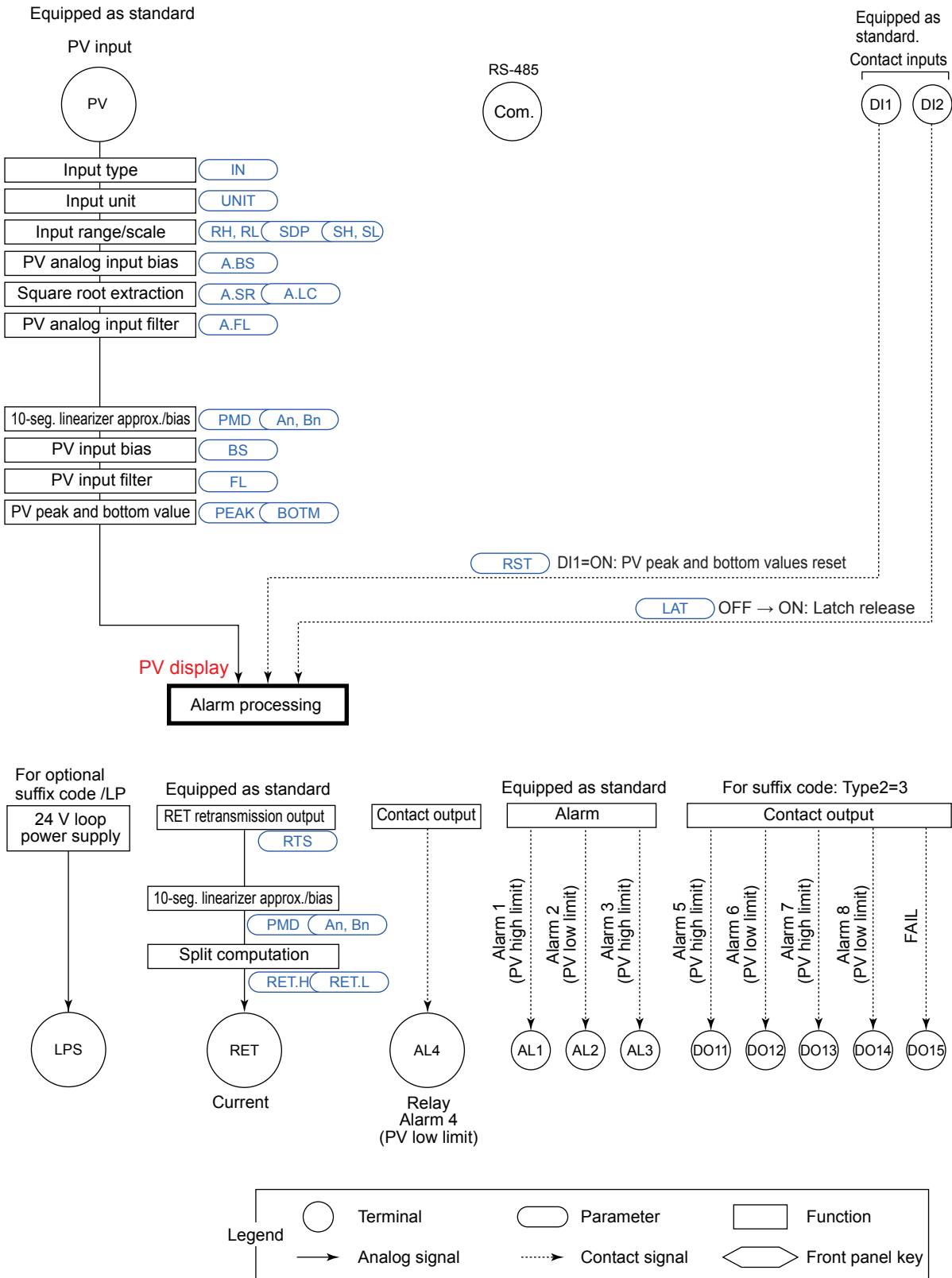
Transportation and Storage Conditions

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

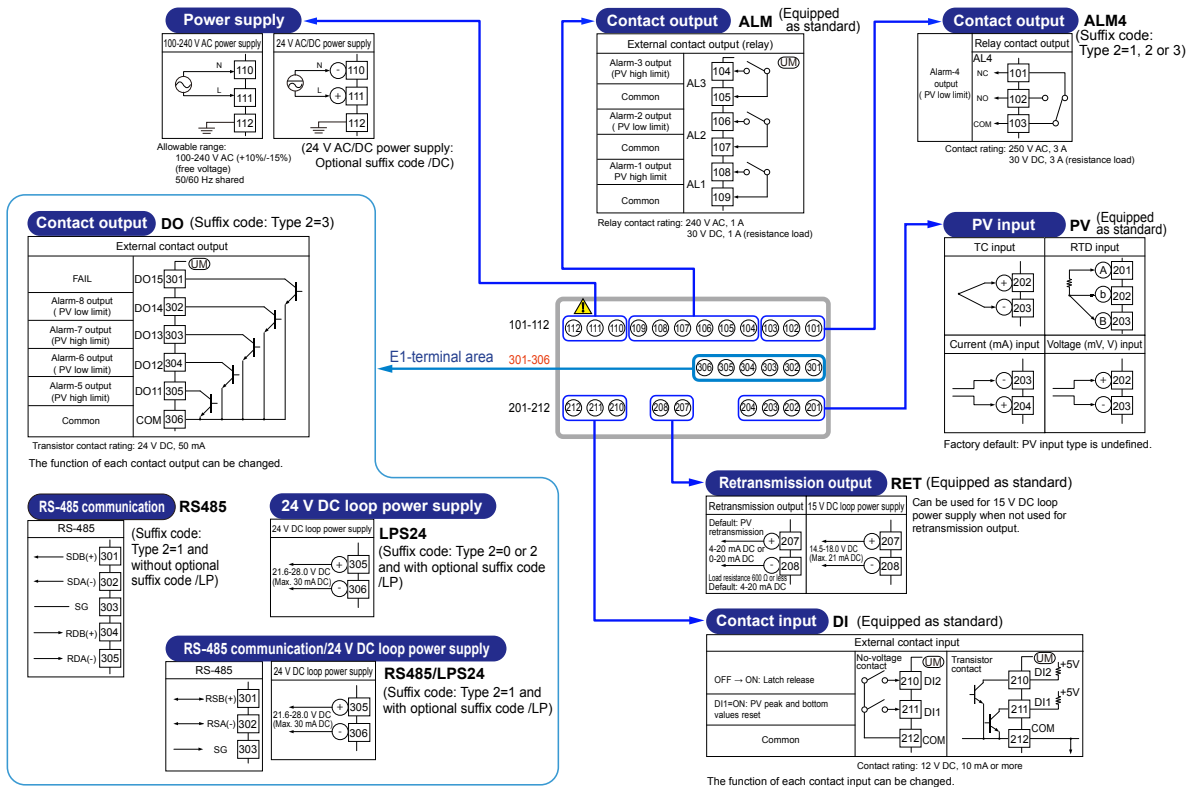
Effects of Operating Conditions

- 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)

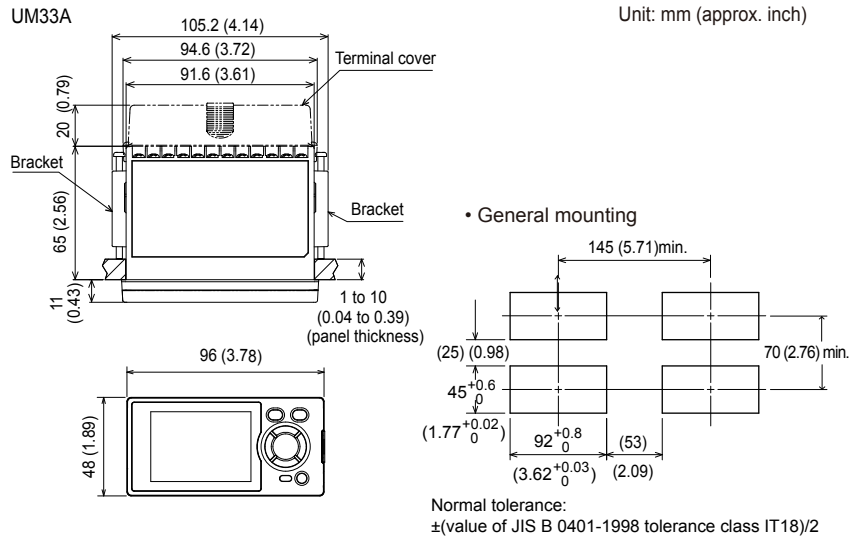
■ Block Diagram



Terminal Arrangement



External Dimensions and Panel Cutout Dimensions



■ Model and Suffix Code

| Model | Suffix code | Optional suffix code | Description |
|-----------------------|-------------|----------------------|---|
| UM33A | | | Digital Indicator with Alarms (provided with retransmission output or 15 V DC loop power supply, 2 DIs, and 3 DOs) (Power supply: 100-240 V AC) |
| Type 1: Basic | -0 | | Standard type |
| Type 2: Functions | 0 | | None |
| | 1 | | 1 additional DO (c-contact relay), RS-485 communication (Max.38.4 kbps, 2-wire/4-wire) |
| | 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 |
| Display language (*1) | -1 | | English |
| | -2 | | German |
| | -3 | | French |
| | -4 | | Spanish |
| Case color | 0 | | White (Light gray) |
| | 1 | | Black (Light charcoal gray) |
| Optional suffix codes | | /LP | 24 V DC loop power supply (*2) |
| | | /DC | Power supply 24 V AC/DC |
| | | /CT | Coating (*3) |

*1: English, German, French, and Spanish can be displayed as the guide display.

*2: The /LP option can be specified only when the code for Type 2 is "0", "1" or "2." Additionally, the RS-485 communication for "1" of the Type 2 code is 2-wire system.

*3: When the /CT option is specified, the UM33A does not conform to the safety standards (UL and CSA) and 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 (*) | Resistance Module |

*: Necessary to input current signal to 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/>