

# General Specifications

UM33A  
Digital Indicator with Alarms



GS 05P03D21-01EN

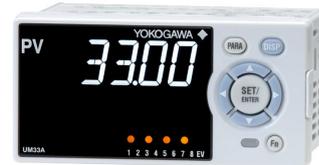
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## Overview

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

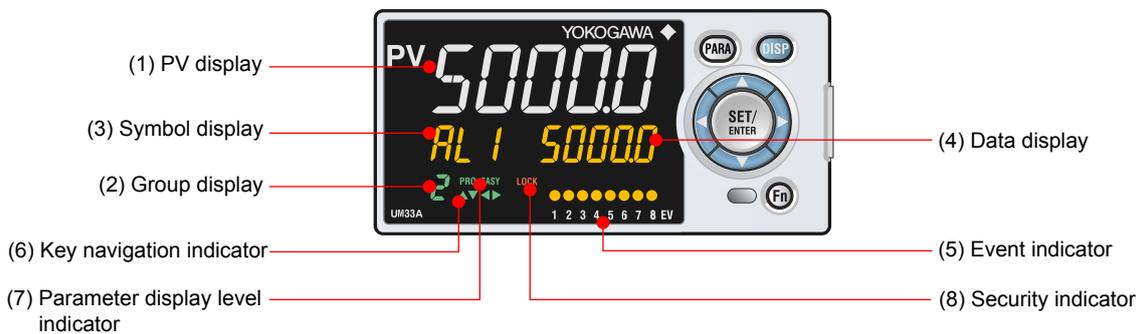
Maximum communication distance: 1200m

Terminating resistor: 220Ω (External)

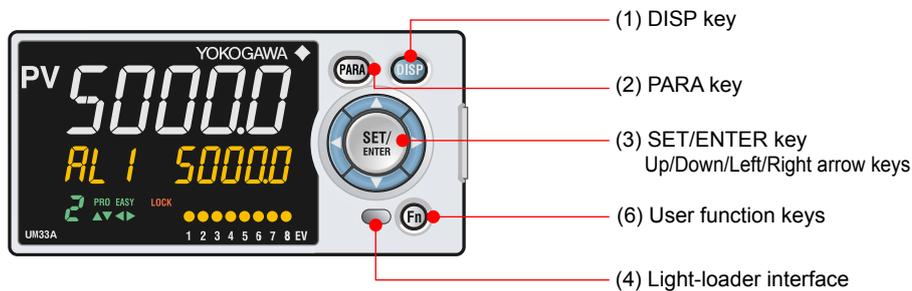
## Hardware Specifications

### 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		-200.0 to 1000.0°F
	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	
	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		
		-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  $\Omega$
- Allowable signal source resistance:  
TC or mV input: 250  $\Omega$  or less  
Effects of signal source resistance: 0.1  $\mu\text{V}/\Omega$  or less  
DC voltage input: 2 k $\Omega$  or less  
Effects of signal source resistance: About 0.01%/100  $\Omega$
- Allowable wiring resistance:  
RTD input: Max. 150  $\Omega$ /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  $35^\circ\text{C}$ )  
 $\pm 1.5^\circ\text{C}$  (-10 to  $15^\circ\text{C}$ , 35 to  $50^\circ\text{C}$ )
- 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, 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.  
Note: Cannot be used for a small load of 10 mA or less.

### Retransmission Output Specifications

- Number of outputs: Retransmission output; 1, shared with 15 V DC loop power supply
- Current output: 4 to 20 mA DC or 0 to 20 mA DC/ load resistance of 600  $\Omega$  or less
- Current output accuracy:  $\pm 0.1\%$  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.

### 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 $\Omega$  or less is determined as "ON" and contact resistance of 50 k $\Omega$  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  $\mu\text{A}$  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), approved by CAN/CSA C22.2 No.61010-1 (CSA).  
UL61010-1: Pending approval  
Installation category: CAT. II Pollution degree: 2  
Measurement category: I (CAT. I)  
Rated measurement input voltage: Max. 10 V DC  
Rated transient overvoltage: 1500 V (Note)  
Note: This is a reference safety standard value for Measurement Category I of IEC/EN/CSA/UL61010-1. This value is not necessarily a guarantee of instrument performance.

- EMC Conformity standards:  
CE marking  
EN61326-1 Class A, Table 2 (For use in industrial locations)  
EN61326-2-3  
EN 55011 Class A, Group1  
EN 61000-3-2 Class A  
EN 61000-3-3  
C-tick mark  
EN 55011 Class A, Group1  
The instrument continues to operate at a measurement accuracy of within  $\pm 20\%$  of the range during testing

### Construction, Installation, and Wiring

- Dust-proof and drip-proof: IP56 (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<sup>+0.8/0</sup> (W) × 45<sup>+0.6/0</sup> (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
  - 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.

- 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/s<sup>2</sup> or less, 1oct/min for 90 minutes each in the three axis directions
- Short-period vibration: 14.7 m/s<sup>2</sup>, 15 seconds or less
- Shock: 98 m/s<sup>2</sup> 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**

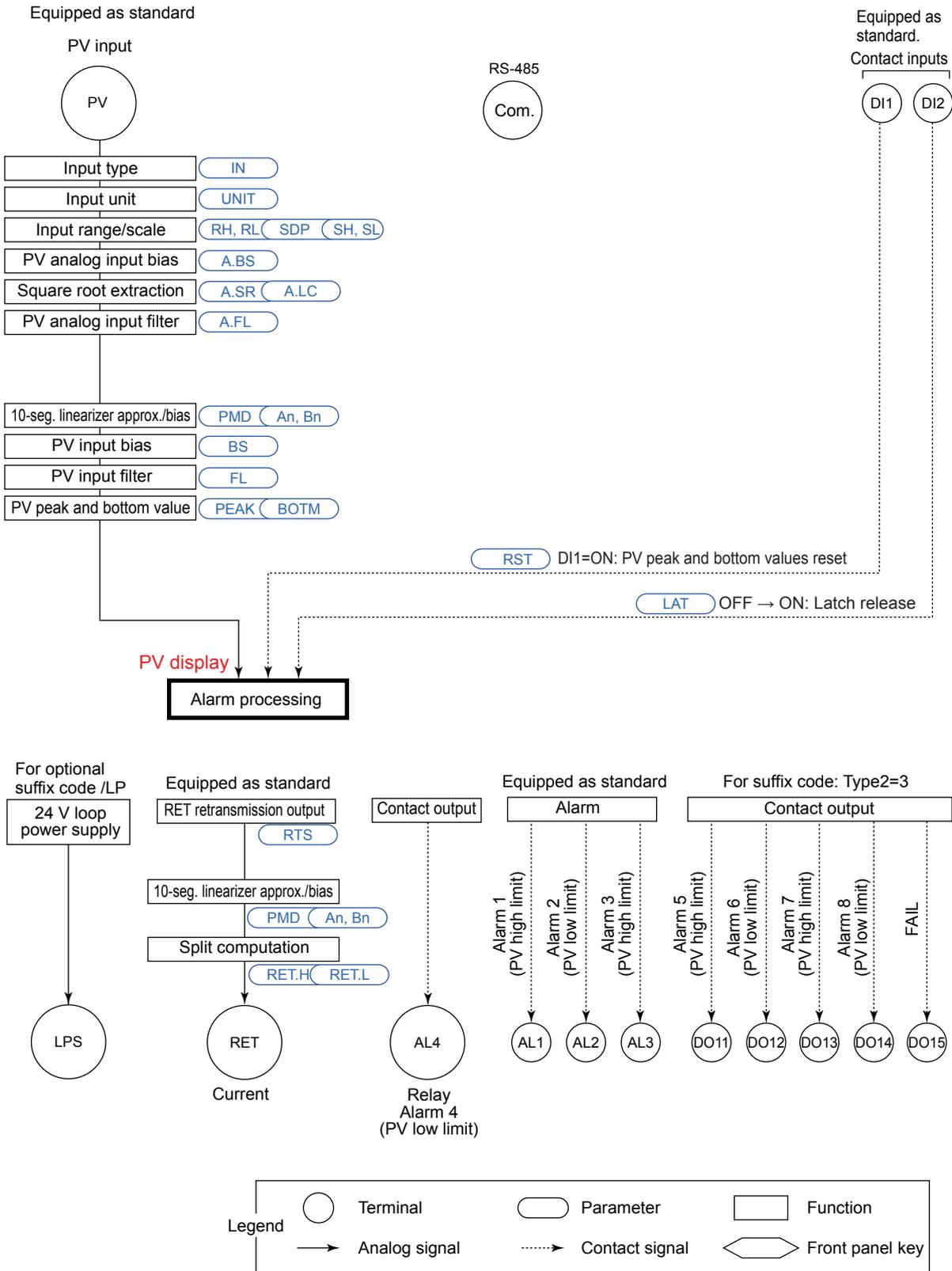
- Effect of ambient temperature:  
 Voltage or TC input: ±1 μV/°C or ±0.01% of F.S./°C, whichever is larger  
 Current input: ±0.01% of F.S./°C  
 RTD input: ±0.05°C/°C (ambient temperature) or less  
 Analog output: ±0.02% of F.S./°C or less
- Effect of power supply voltage fluctuation  
 Analog input: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

**Environmental Conditions**

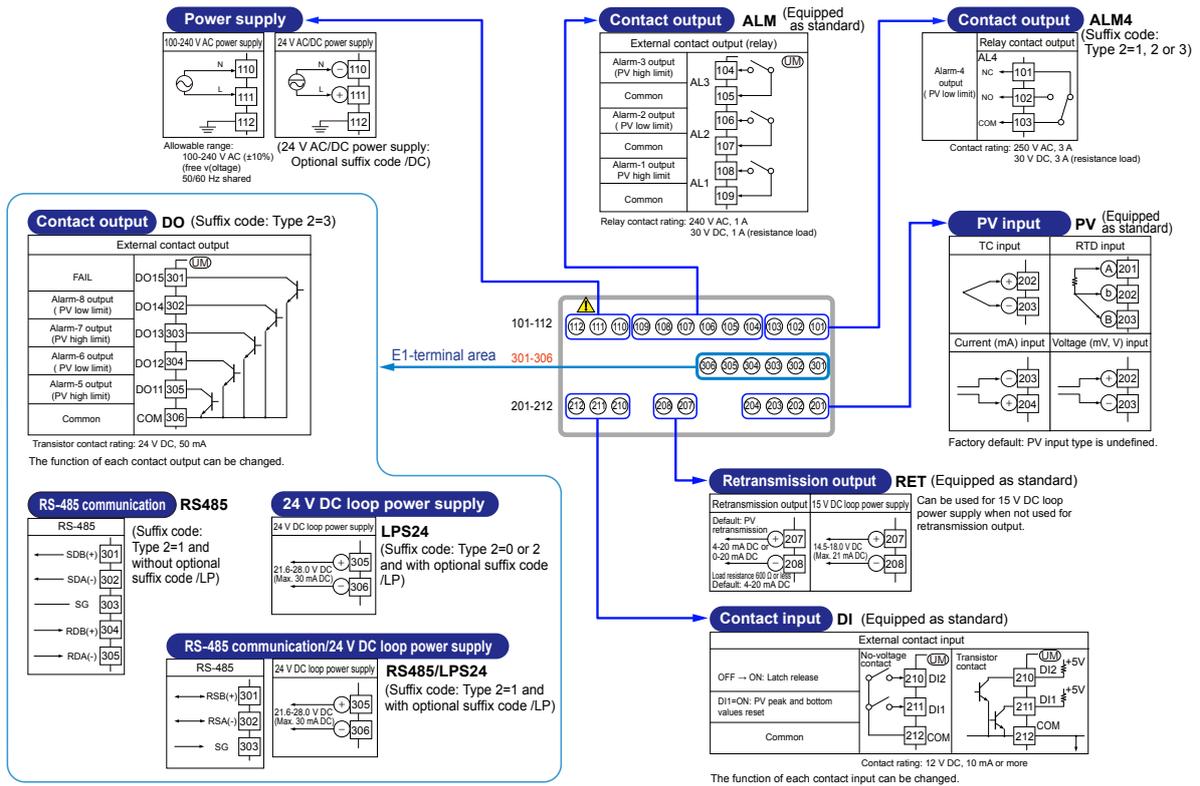
**Normal Operating Conditions**

- Ambient temperature: -10 to 50°C
- Ambient humidity: 20 to 90% RH (no condensation allowed)
- Magnetic field: 400 A/m or less

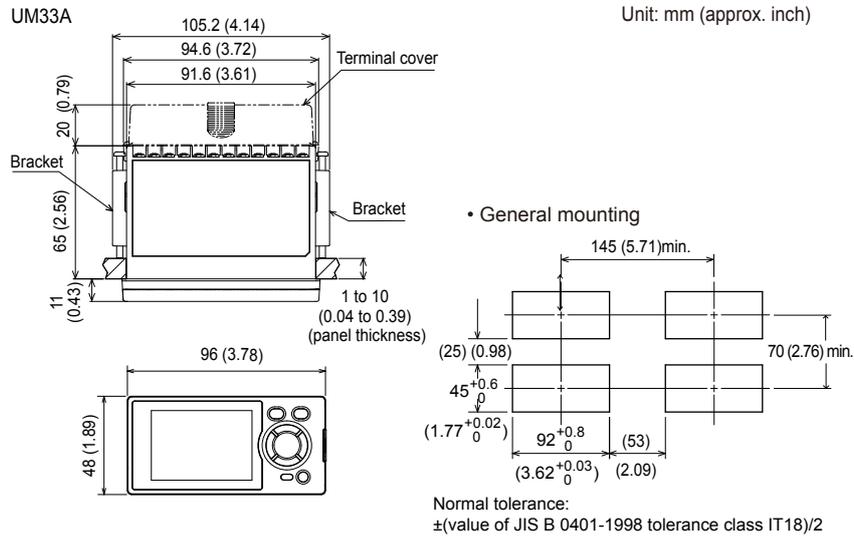
## ■ Block Diagram



## Terminal Arrangement



## External Dimensions and Panel Cutout Dimensions



## ■ Model and Suffix Code

Model	Suffix code	Optional suffix code	Description
<b>UM33A</b>			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

## ■ Accessory

Brackets (mounting hardware), Unit label, Operation Guide

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

## ■ Special Order Items

Model code	Suffix code	Description
LL50A	-00	Parameter Setting Software