

# General Specifications

UT32A  
Digital Indicating Controller  
(Entry model)

UTAdvanced

Functional Enhancement

GS 05P01F31-01EN

## Overview

The UT32A entry model digital indicating controller is an easily configurable single-loop controller that can generate relay, voltage pulse, or current signals for control output. 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.
- Quick setting function  
Setting only the minimum necessary parameters for operation is possible.
- Equipped with a multitude of functions  
Universal I/O is included as standard. PID control, ON/OFF control, etc. are available.
- 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)



- (b) Selecting the PID parameter group  
The following PID parameter groups can be selected.
  - Target setpoint number (SPNO) (The PID number can be set arbitrarily.)
  - Measured input zone PID
  - Target setpoint zone PID
  - Reached target setpoint zone PID
- (c) Auto-tuning
  - Tuning results can be selected from two options, Normal or Stable.
  - Tuning output limit can be set.
- (d) "Super" function: Overshoot-suppressing function
- (e) "Super 2" function: Hunting-suppressing function
- (f) STOP preset output function
- (g) Input ERROR preset output function
- (h) MANUAL preset output function

### (3) Operation Mode Switching

Operation mode switching	AUTO/MANUAL and RUN/STOP switching
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### (4) Control Parameter Setting Range

Proportional band	0.1 to 999.9%
Integral time	1 to 6000 sec. or OFF (using manual reset)
Derivative time	1 to 6000 sec. or OFF
ON/OFF control hysteresis (one or two hysteresis points)	0.0 to 100.0% of measured input range width
Preset output value	-5.0 to 105.0% (however, 0 mA or less cannot be output)
High/low output limiter	-5.0 to 105.0% Low limit setpoint < high limit setpoint
Tight shut function	When manual control is carried out with 4 to 20 mA output, control output can be reduced to about 0 mA.
Rate-of-change limiter of output	0.1 to 100.0%/sec., OFF

## Functional Specifications

### Control Specifications

- (1) Control Mode  
Single-loop control
- (2) Control period  
200 ms

### Control Computation Function

#### (1) Types of control

- PID control
- ON/OFF control

#### (2) Control Computation Function

- (a) Target setting point and the number of PID parameter groups  
Respectively, four sets of target setpoints, alarm setpoints, and PID parameters can be set.

## Alarm Functions

### • Types of Alarm

<b>Measured value alarm</b>	PV (measured value) high/low limit alarm Deviation high/low limit alarm
<b>Deviation alarm</b>	Deviation high and low limits alarm
<b>Rate-of-change alarm</b>	Deviation within high and low limits alarm Analog input PV high/low limit alarm PV rate-of-change alarm
<b>Setpoint alarm</b>	SP (setpoint) high/low limit alarm Target SP high/low limit alarm Target SP deviation high/low limit alarm Target SP deviation high and low limits alarm Target SP deviation within high and low limits alarm
<b>Output alarm</b>	Control output high/low limit alarm
<b>Other alarms</b>	Self-diagnosis alarm FAIL

### • Alarm Functions

<b>Alarm output action</b>	Alarm stand-by action Alarm latch (forced reset) function Alarm hysteresis Alarm ON/OFF delay timer
<b>Number of alarm settings</b>	4
<b>Number of alarm output points</b>	2

## 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, UT75A/UT55A/UT52A/UT35A/UT32A/UP55A/UP35A/UP32A/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.					

\*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: 13.0 mm
- Data display  
5-digit, 11-segment color LCD (orange)
- Bar graph display  
12-segment color LCD (orange)

### Universal Input Specifications

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

Types of input	Instrument range		Accuracy		
	°C	°F			
Thermocouple	K	-270.0 to 1370.0°C	-450.0 to 2500.0°F	±0.1% of instrument range ±1 digit for 0°C or more	
		-270.0 to 1000.0°C	-450.0 to 2300.0°F		
		-200.0 to 500.0°C	-200.0 to 1000.0°F		
	J	-200.0 to 1200.0°C	-300.0 to 2300.0°F	±0.2% of instrument range ±1 digit for less than 0°C	
		-270.0 to 400.0°C	-450.0 to 750.0°F		
	T	0.0 to 400.0°C	-200.0 to 750.0°F	However, ±2% of instrument range ±1 digit for less than -200°C of thermocouple K ±1% of instrument range ±1 digit for less than -200°C of thermocouple T	
	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	
	L	-200.0 to 900.0°C	-300.0 to 1600.0°F		
	U	-200.0 to 400.0°C	-300.0 to 750.0°F		
	Resistance-temperature detector (RTD) 3-wire	W <sup>(*)</sup>	0.0 to 2300.0°C	32 to 4200°F	±0.2% of instrument range ±1 digit
			Platinel 2	0.0 to 1390.0°C	
		PR20-40	0.0 to 1900.0°C	32 to 3400°F	±0.5% of instrument range ±1 digit for 800°C or more Accuracy not guaranteed for less than 800°C
W97 Re3-W75 Re25			0.0 to 2000.0°C	32 to 3600°F	±0.2% of instrument range ±1 digit
JPT100		-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	±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 (*)		
	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit		
Standard signal	0.400 to 2.0000 V	-	±0.1% of instrument range ±1 digit		
	1.000 to 5.000 V	-			
	4.00 to 20.00 mA	-			
DC voltage	0.000 to 2.000 V	-	±0.1% of instrument range ±1 digit		
	0.00 to 10.00 V	-			
	-10.00 to 20.00 mV	-			
DC current	0.00 to 20.00 mA	-			

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

\*1: ±0.3°C and ±1 digit in the range between 0 and 100°C  
±0.5°C ±1 digit in the range between -100 and 200°C

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

- Applicable standards: JIS, IEC and DIN (ITS-90) for thermocouples and resistance-temperature detectors (RTD)
- Input sampling period: Synchronized to control period
- Burnout detection  
Upscale and downscale of function, and OFF can be specified for the standard signal of thermocouple and resistance-temperature detector (RTD).  
For integrated signal input, 0.1 V or 0.4 mA or less is judged as a burnout.

- Input bias current: 0.05 μA (for thermocouple and resistance-temperature detector (RTD))
- Resistance-temperature detector (RTD) measured current: About 0.16 mA
- Input resistance  
1 MΩ or more for thermocouple/mV input  
About 1 MΩ for voltage input  
About 250 Ω for current input (with built-in shunt resistance)
- Allowable signal source resistance  
250 Ω or less for thermocouple/mV input  
Effect of signal source resistance: 0.1 μV/Ω or less  
2 kΩ or less for DC voltage input  
Effect of signal source resistance: about 0.01%/100 Ω
- Allowable wiring resistance  
Up to 150 Ω per line for resistance-temperature detector (RTD) input (conductor resistance between the three lines shall be equal)  
Effect of wiring resistance: ±0.1°C/10 Ω
- Allowable input voltage/current  
±10 V DC for thermocouple/mV/mA or resistance-temperature detector (RTD) input  
±20 V DC for V input  
±40 mA DC for mA input
- Noise reduction ratio  
40 dB or more (at 50/60 Hz) in normal mode  
120 dB or more (at 50/60 Hz) in common mode
- Reference junction compensation error  
±1.0°C (15 to 35°C)  
±1.5°C (-10 to 5°C and 35 to 50°C)

### Analog Output Specifications (Suffix code: -C)

- Number of points  
Control output: 1 point
- Output functions  
Current output
- Current output  
4 to 20 mA DC or 0 to 20 mA DC/load resistance 600 Ω or less
- Current output accuracy  
±0.1% of span (however, ±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

### Analog Output Specifications (Suffix code: -V)

- Number of points  
Control output: 1 point
- Output functions  
Voltage pulse output

- Current output  
4 to 20 mA DC or 0 to 20 mA DC/load resistance  
600 Ω or less
- Voltage pulse output  
Application: 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 value,  
whichever is larger

#### Contact Input Specifications (Suffix code: -R)

- Types of contact and number of points  
Control relay output: one, 1c-contact point
- Input type: no-voltage contact input or transistor con-  
tact input
- Contact rating  
1c-contact: 3 A at 250 V AC or 3 A at 30 V DC  
(resistance load)
- \*: The control output should always be used with a  
load of 10 mA or more.
- Application: ON/OFF output or time proportional  
output
- Time resolution for control output: 10 ms or 0.1% of  
output value, whichever is larger

#### Relay Contact Output Specifications

- Types of contact and number of points  
Alarm output: 2, 1a-contact points (Common is  
separated)
- Contact rating  
1a-contact:  
For alarm output: 1 A at 240 V AC or 1 A at  
30 V DC (resistance load)
- \*: The alarm output should always be used with a load of 1  
mA or more.
- Application: alarm output, FAIL output, etc.

#### 24 V DC Loop Power Supply Specifications (for /LP Option)

- Application: Power is supplied to the 2-wire transmitter.
- Supply voltage: 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)

#### 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 measure-  
ment category I of CSA/UL 61010-1, and for measure-  
ment category O of IEC/EN 61010-2-030. This value is  
not necessarily a guarantee of instrument performance.
- EMC standards:  
Compliant with  
CE marking  
EN 61326-1 Class A, Table 2 (For use in industrial  
locations),  
EN 61326-2-3
- \*: The instrument continues to operate at a measurement  
accuracy of within ±20% of the range during testing.

EN 55011 Class A, Group 1  
EN 61000-3-2 Class A  
EN 61000-3-3

EMC Regulatory Arrangement in Australia and New Zealand  
EN 55011 Class A, Group 1

- KC marking: Electromagnetic wave interference  
prevention standard, electromagnetic wave protection  
standard compliance

#### Power Supply Specifications and Isolation

- Power supply  
Rated voltage: 100 to 240 V AC (+10%/-15%), 50/60 Hz  
24 V AC/DC (+10%/-15%) (When the  
/DC option is specified)
- Power consumption: 15 VA (For the /DC option. DC:  
7 VA, AC: 11 VA)
- Storage: Nonvolatile memory
- Allowable power interruption time: 20 ms (at 100 V AC)
- Withstanding voltage  
2300 V AC for 1 minute between primary and  
secondary terminals (UL, CSA)  
3000 V AC for 1 minute between primary and  
secondary terminals (CE)  
1500 V AC for 1 minute between primary terminals  
500 V AC for 1 minute between secondary  
terminals  
(Primary terminals = Power (\*) and relay output  
terminals, Secondary terminals = Analog I/O signal  
terminals, communication terminals,  
and functional grounding terminals.)
- \*: Power terminals for 24 V AC/DC models are the  
secondary terminals.
- Insulation resistance  
Between power supply terminals and a grounding  
terminal: 20 MΩ or more at 500 V DC
- Isolation specifications

PV (universal) input terminal	Internal circuits	Power supply
Control (voltage pulse, analog) output terminal Control relay (c-contact) output terminal		
Alarm-1 relay (a-contact) output terminal		
Alarm-2 relay (a-contact) output terminal		
RS485 communication terminal		
24 V DC loop power supply terminal		

The circuits divided by lines are insulated mutually.

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## Environmental Conditions

### Normal operating conditions

- Ambient temperature: -10 to 50°C (-10 to 40°C for side-by-side mounting of controllers)
- Ambient humidity: 20 to 90% RH (no condensation)
- Magnetic field: 400 A/m or less
- Continuous vibration (at 5 to 9 Hz) Half amplitude of 1.5 mm or less  
(at 9 to 150 Hz) 4.9 m/s<sup>2</sup> or less, 1 oct/min for 90 minutes each in the three axis directions
- Rapid vibration: 14.7 m/s<sup>2</sup>, 15 s or less
- Impact: 98 m/s<sup>2</sup> or less, 11 msec.
- Installation altitude: 2,000 m or less above sea level
- Warm-up time: 30 minutes or more after the power is turned on
- Start-up time within 10 s

### Transportation and Storage Conditions

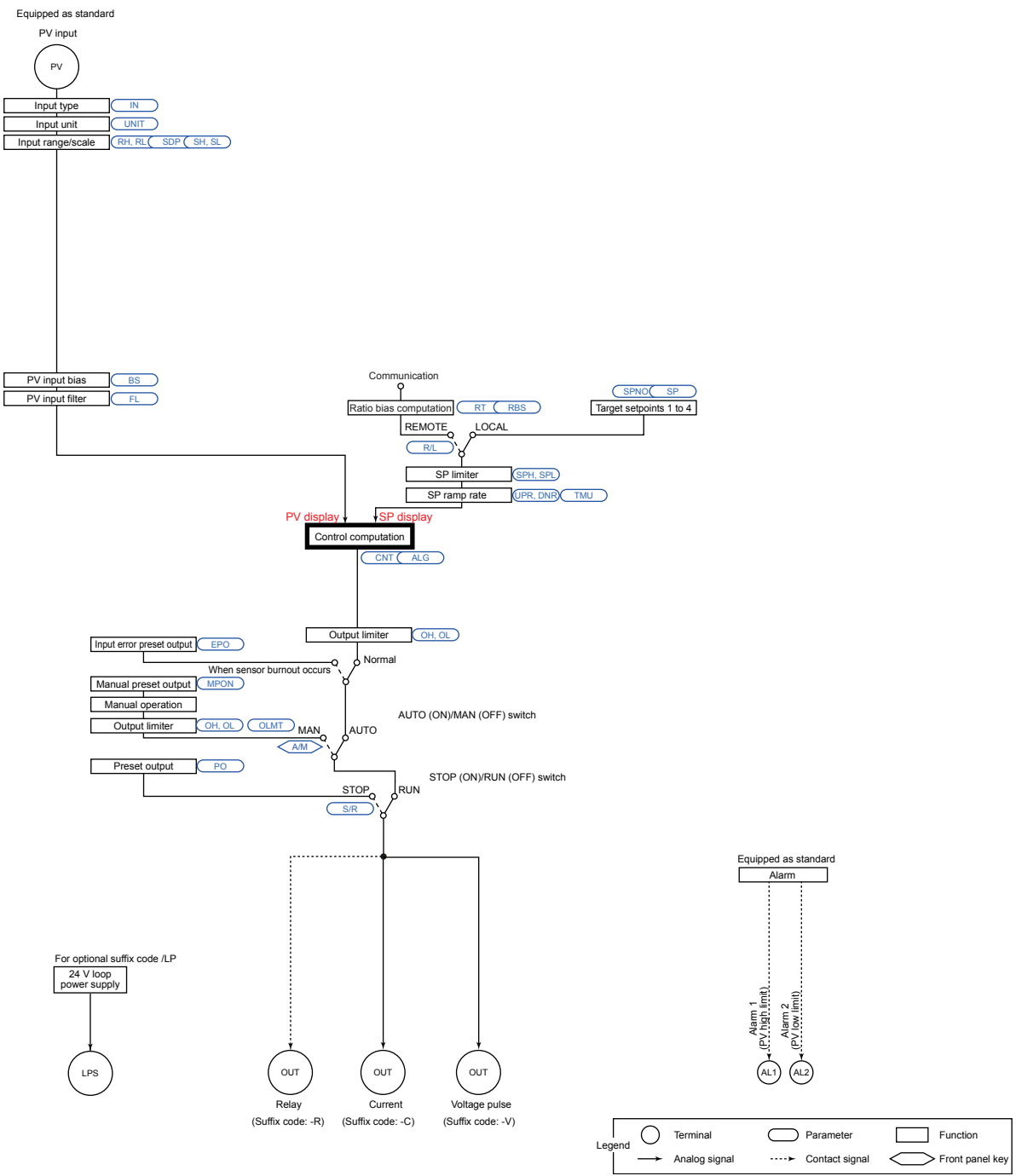
- Temperature: -25 to 70°C
- Temperature change rate: 20°C per hour or less
- Humidity: 5 to 95%RH (no condensation)

### Effects of Operating Conditions

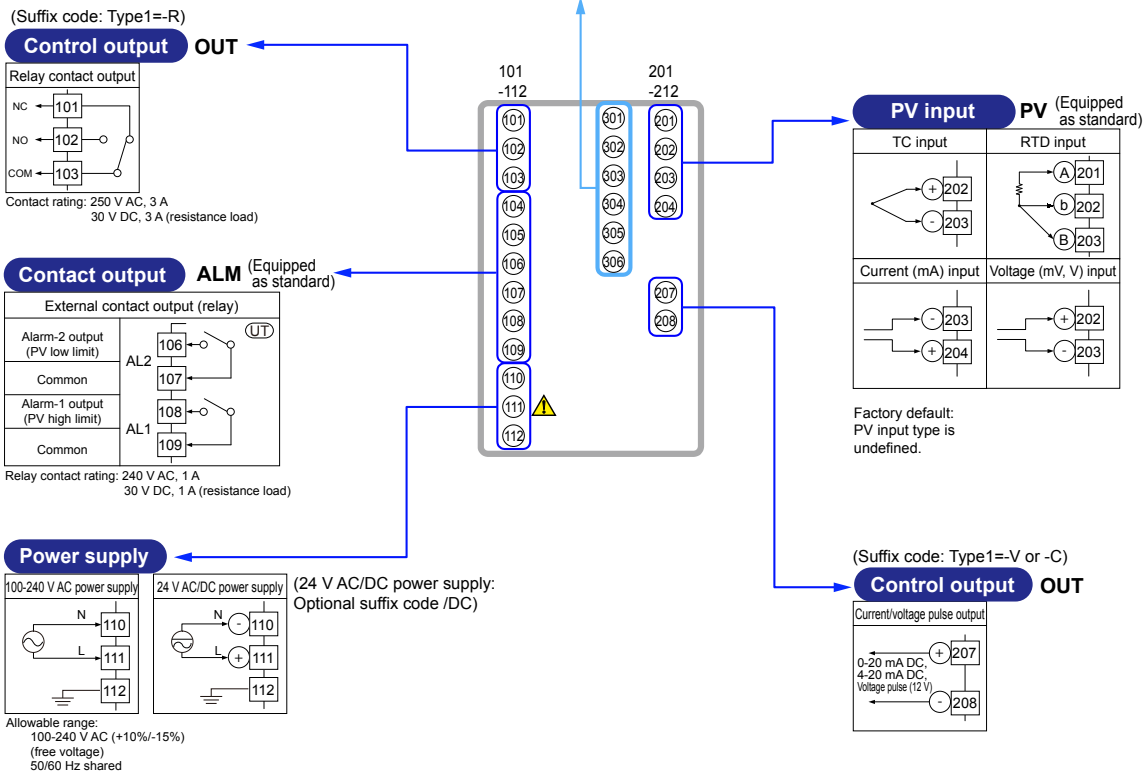
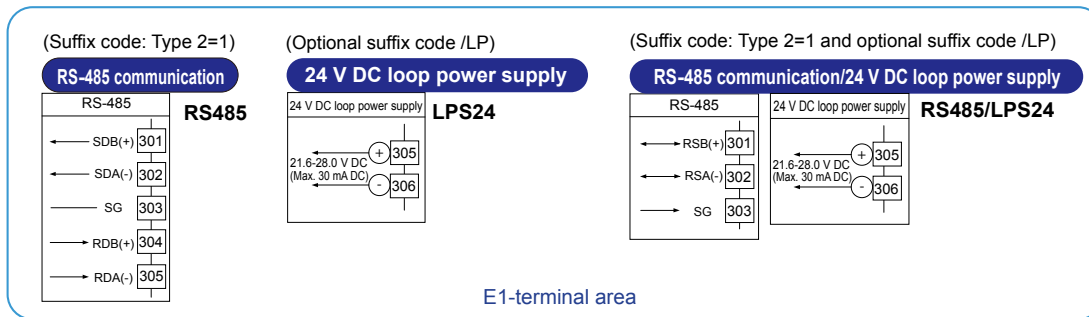
- Effect of ambient temperature  
For voltage or TC input:  
±1 μV/°C or ±0.01% of F.S. (instrument range)/°C, whichever is greater  
For RTD input:  
±0.05°C/°C (ambient temperature) or less  
For current input:  
±0.01% of F.S. (instrument range)/°C  
For analog output:  
±0.02% of F.S./°C or less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

## Block Diagram

### Single Loop Control



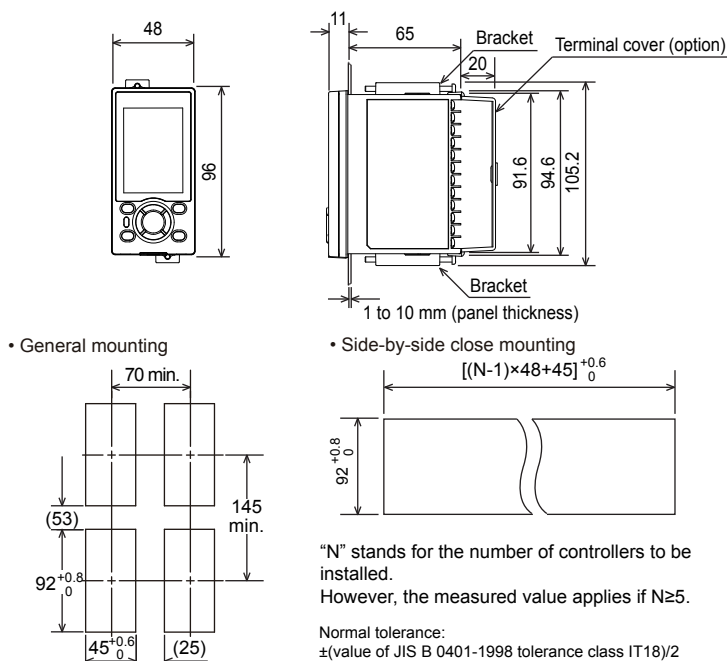
## Terminal Arrangement





## External Dimensions and Panel Cutout Dimensions

Unit: mm



## Construction, Mounting, and Wiring

- Dust-proof and drip-proof: IP66 (Front panel) (Except for side-by-side close mounting)/NEMA4 \*
  - \*: Hose-down test only
- Material: Polycarbonate resin (Flame retardancy: UL94 V-0)
- Case color: White (Light gray) or Black (Light Charcoal gray)
- Weight: 0.5 kg or less
- External dimensions (mm): 48 (width) x 96 (height) x 65 (depth from the panel surface)
- Mounting: Direct panel mounting; mounting bracket, one each for upper and lower mounting
- Panel cutout dimensions (mm): 45<sup>+0.6/0</sup> (width) x 92<sup>+0.8/0</sup> (height)
- Mounting position: Up to 30 degrees above the horizontal. No downward tilting allowed.
- Wiring: M3 screw terminal with square washer (signal wiring and power)

## Model and Suffix Code

Model	Suffix code	Optional suffix code	Description
<b>UT32A</b>			Digital Indicating Controller (Power supply: 100-240 V AC) (provided with 2 DOs)
Type 1: Basic control	-V		Voltage pulse output type
	-C		Current output type
	-R		Relay output type
Type 2:Functions	0		None
	1		RS-485 communication (Max. 38.4 kbps, 2-wire/4-wire) <sup>(*)</sup>
Type 3:Fixed code	0		None
Display language <sup>(**)</sup>	-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)
Fixed code		-00	Always "-00"
Optional suffix codes		/LP	24 V DC loop power supply
		/DC	Power supply 24 V AC/DC
		/CT	Coating <sup>(***)</sup>
		/CV	Terminal cover

\*1: When the /LP option is specified, the RS-485 communication of the Type 2 code "1" is 2-wire system.

\*2: English, German, French, and Spanish are available for the guide display.

\*3: 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).



## ■ 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 the current signal to the voltage input terminal.

Name	Model
Terminal cover (for UT32A)	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/>