

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

Measured value alarm	PV (measured value) high/low limit alarm Deviation high/low limit alarm
Deviation alarm	Deviation high and low limits alarm
Rate-of-change alarm	Deviation within high and low limits alarm Analog input PV high/low limit alarm PV rate-of-change alarm
Setpoint alarm	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
Output alarm	Control output high/low limit 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	4
Number of alarm output points	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 ^(*)	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/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 measure-
ment 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

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 M Ω 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.

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/s² or less, 1 oct/min for 90 minutes each in the three axis directions
- Rapid vibration: 14.7 m/s², 15 s or less
- Impact: 98 m/s² 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

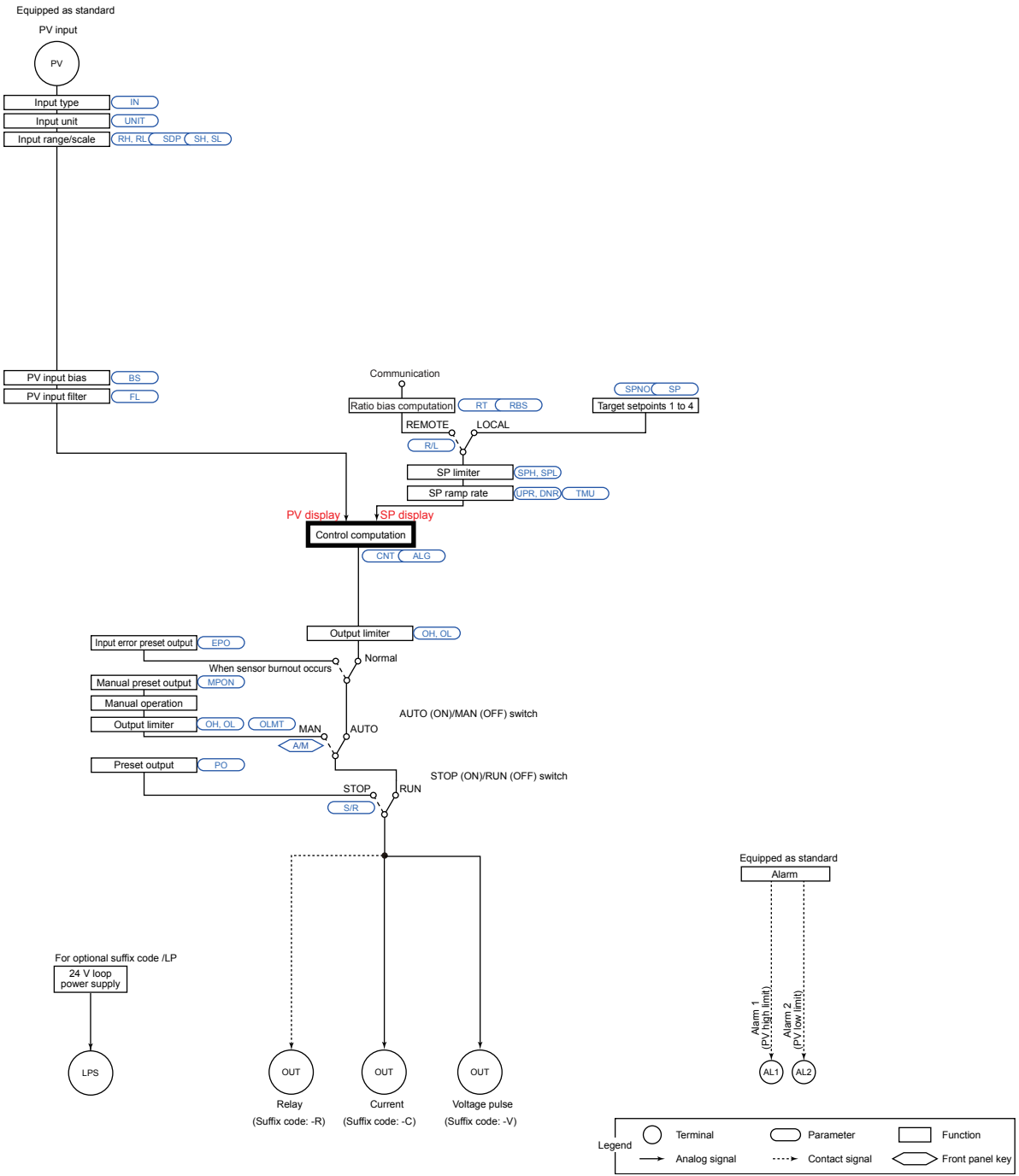
- Temperature: -25 to 70°C
- Temperature change rate: 20°C per hour or less
- Humidity: 5 to 95%RH (no condensation)

Effects of Operating Conditions

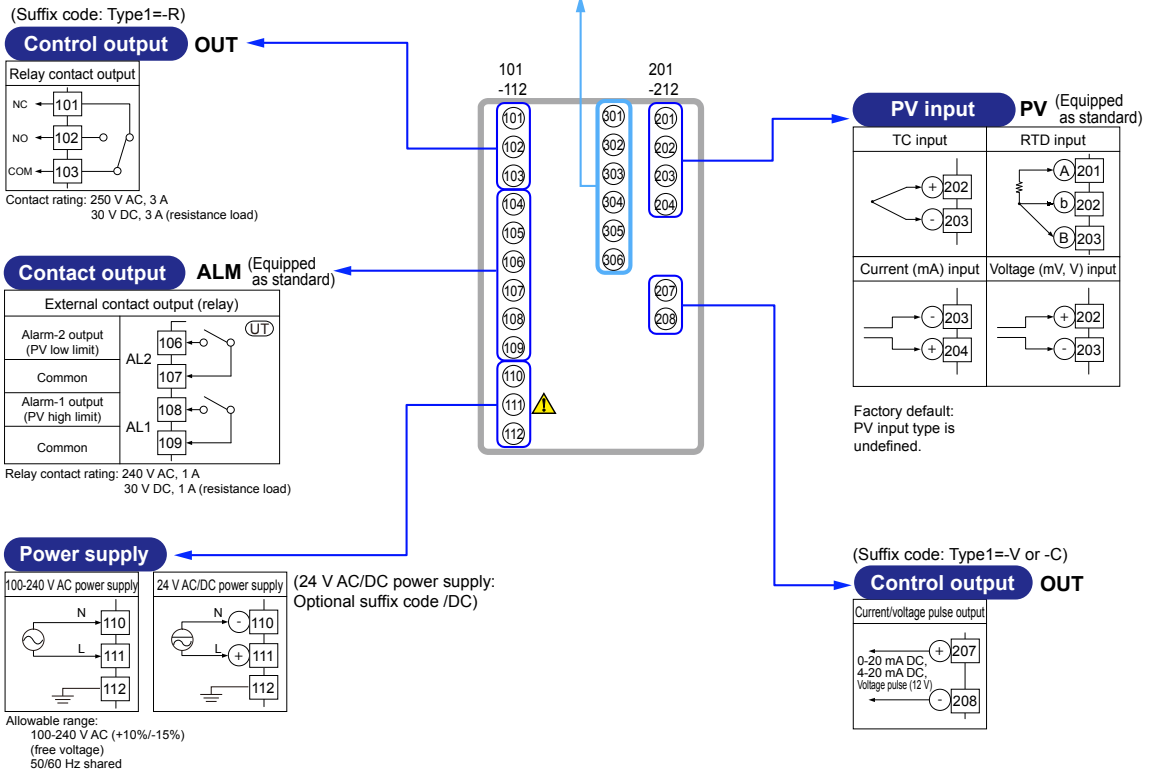
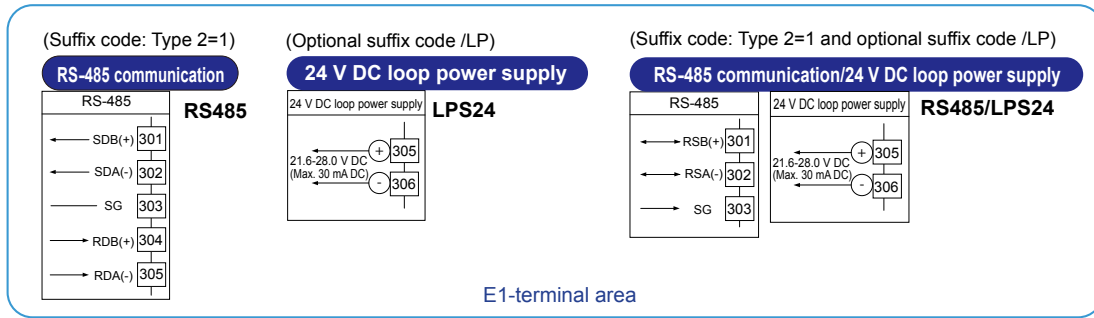
- Effect of ambient temperature
For voltage or TC input:
±1 μV/°C or ±0.01% of F.S. (instrument range)/°C, whichever is greater
For RTD input:
±0.05°C/°C (ambient temperature) or less
For current input:
±0.01% of F.S. (instrument range)/°C
For analog output:
±0.02% of F.S./°C or less
- Effect of power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

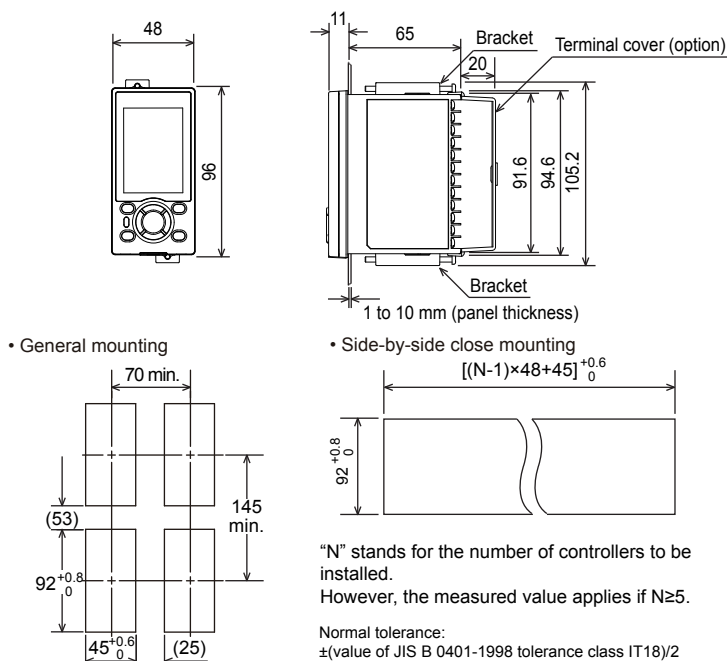


Terminal Arrangement



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^{+0.6/0} (width) x 92^{+0.8/0} (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
UT32A			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) ^{(*)1}
Type 3:Fixed code	0		None
Display language ^{(*)2}	-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 ^{(*)3}
		/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/>