General Specifications

GS 05P01B41-01EN

UT75A
Digital Indicating Controller

UTAdvanced™
Functional Enhancement

■ Overview

The UT75A digital indicating controllers employ an easy-to-read, 14-segment large color LCD display, along with navigation keys, thus greatly increasing the monitoring and operating capabilities. A ladder sequence function is included as standard. The short depth of the controller helps save instrument panel space. The UT75A also support open networks such as Ethernet 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.
- Ladder sequence function is included as standard.
  This function allows for creating a simple sequence control. Dedicated LL50A Parameter Setting Software (sold separatly) allows for performing programming using a ladder language.
  Multi-line ladder programs such as numerical computation can be simplified using custom ladder instructions. Custom ladder programs allow for secure management using passwords.
- Various built-in open network functions such as Ethernet are available.
  Easy connection with various vendors' PLCs is possible.
- Quick setting function
  Setting only the minimum necessary parameters for operation is possible. (For single-loop control only)
- Equipped with a multitude of functions
  Universal I/O, eight control modes (dual-loop control, cascade control, etc) and program pattern operation are included as standard. PID control, heating/cooling control, feed forward control, etc. are available.
- LL50A Parameter Setting Software (sold separately)
  The parameters and ladder programs 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

Control Specifications

(1) Control Mode

Control functions of the controller can be set as control modes.

Control mode	Function
SGL (1)	Single-loop control
CAS1 (2)	Cascade primary-loop control (*1)
CAS2 (3)	Cascade secondary-loop control (*1)
CAS (4)	Cascade control (*1)
BUM (5)	Loop control for backup (*1)
PVSW (6)	Loop control with PV switching (*1)
PVSEL (7)	Loop control with PV auto-selector (Max./Min./Ave./Diff.) (*1)
PVHD (8)	Control with PV-hold function
2LP (11)	Dual-loop control (*2)

*1: Remote (auxiliary analog) input is required.
*2: Dual-loop type ("-5" for type 1 code is required.)

2) Control period

Selectable from 50 ms (*3), 100 ms, and 200 ms

*3: Cascade control and Dual-loop control cannot be used. "Super" function or "Super 2" function cannot be used.

Table of Number of Inputs and Outputs

Model and suffix code (See the model code)	Number of analog input points	Number of analog output points
UT75A		
-00×	1	2
-01×	2	2
-02×	3	2
-03×	2	2
-10×	1	2
-11×	2	2
-12×	3	2
-13×	2	2
-50×	2	3
-51×	3	3
-52×	4	3

For the number of DI/DO, see the model and suffix codes.

■ Control Computation Function

(1) Combination of types of control and control modes

Types of control	Control mode								
	1	2	3	4	5	6	7	8	11
PID control (*5)	√	√ (*4)	√	√	√	√	√	√	√
ON/OFF control (*4)(*5)	√	N/A	N/A	N/A	N/A	√	√	N/A	√
Two-position, two-level control (*4)(*5)	√	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Heating and cooling control (*4)(*5)	√	N/A	√	√	√	√	√	√	√
Sample PI control	√	N/A	N/A	N/A	N/A	√	√	√	N/A
Batch PID control	√	N/A	N/A	N/A	N/A	√	√	√	N/A
Feedforward control	√	N/A	N/A	N/A	N/A	N/A	N/A	√	N/A

√: Available, N/A: Not Available
*4: Not selectable for Position proportional type
*5: Selectable for Dual-loop type

(2) Control Computation Function

(a) Target setting point and the number of PID parameter groups
Respectively, twenty sets of target setpoints and alarm setpoints.Sixteen sets of PID parameters can be set. For dual-loop control and cascade control, respectively, sixteen sets can be set for loop-1 (primary side) and loop-2 (secondary side).

(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. (It cannot be used in heating/cooling control.)

(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 CASCADE/AUTO/MANUAL switching REMOTE/LOCAL switching Start (P.RUN) / stop (P.STOP) of program operation Pause/cancel release of program operation (HOLD) Advance of segment (ADV)

(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
Output deadband	For heating and cooling control: -100.0 to 50.0% For position proportional control: 1.0 to 10.0%

Program Pattern Functions

The program setting function increases or decreases the value of a target setpoint (SP) according to a given program pattern that varies with time. The program pattern consists of multiple line segments (program segments). The operator sets the time interval of each program segment using the segment time. The operator can also set such instructions as the number of repeats, start/stop for a given program pattern.

Number of Program pattern	1
Number of program segment	Max. 20
Segment time	0.00 to 99.59 (hour.minute or minute. second)
Number of repeat cycles	0 to 999, CONT (limitless number of times)
Wait operation	Can be set the upper-side wait zone and the lower zone for program setpoint.

Alarm Functions

• Types of Alarm

Measured value alarm Deviation alarm Rate-of-change alarm	PV (measured value) high/low limit alarm Deviation high/low limit alarm Deviation high and low limits alarm Deviation within high and low limits alarm Analog input PV high/low limit alarm Analog input AIN4 (ROMOTE) SP high/low limit alarm Auxiliary analog input high/low limit alarm Feedback input 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 Cooling 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	8 (per loop)
Number of alarm output points	Differs by model code.

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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	AUTO/MANUAL switching
	REMOTE/LOCAL switching
	STOP/START switching
	Switching to CASCADE
	Switching to AUTO
	Switching to MANUAL
	Switching to REMOTE
	Switching to LOCAL
	Start of program operation
	Stop of program operation
	Start of hold-mode operation
	Advance of segment
	AUTO-TUNING START/STOP switching
	OUTPUT TRACKING switching
	Two-input switching
	PV Hold
	LCD backlight ON/OFF switching
	PV red/white switch
	Message interrupt displays 1 through 4
	Custom display interrupt displays 1 and 2
	SP number specification
	PID number specification
	Manual preset output number specification
	Select display
Contact output	Loop 1 alarms 1 through 8
	Loop 2 alarms 1 through 8 (for dual-loop control and cascade control)
	Status output

Ladder Sequence Function

(1) Number of I/O Points

Number of digital input points	Up to 13
Number of digital output points	Up to 8

This is limited by the number of contact I/O signal points. (See the model code.)

(2) Types of Command

	Number of commands	Remark
Number of basic instructions	15	Load, AND, OR, Timer, Counter, etc.
Number of application instructions	111	Comparison, reverse, addition/subtraction/multiplication/division, logic operation, high/low limiter, carbon potential calculation (*), etc.

*: Available when /CP option is specified.

(3) Sequence Device

	Types of device	Number of points
Digital I/O	Input relay	8 (max)
	Output relay	18 (max)
Internal device	M relay (bit data)	256
	DAT register (data)	58
	P register (parameter)	30
	K register (constant)	50
Timers	Time-out relay (bit data)	4
Timers (Holding type)	Time-out relay (bit data)	2
Counters	Count-out relay (bit data)	4
Counters (Holding type)	Count-out relay (bit data)	2
Special device	Special relay (bit data)	12

Process data and process relay can be used besides the above-mentioned.

(4) Program capacity

Max. Program capacity: 1000 steps *

*: Available number of steps differs according to the parameters, using command and control period.

(5) Ladder computation period

Ladder computation period is the same as control period.

(6) CP (carbon potential) calculation (Option /CP)

Carbon potential operation is possible. CP calculation of ladder instructions is provided. However, 1 or 2 additional aux. analog input(s) is required. (Type 2 code is “1”, “2” or “3”)

Custom Display Building Function

The contents displayed on the screen of UT75A can be customized.

LL50A parameters setting software is required.

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Communication Function

	Function	Method	Interface	Targets	Max connection	Communication Data
Modbus/TCP	A standard industry protocol allowing communications between the controller and devices such as PCs, PLCs, and DCSs.	Server	Ethernet	PLC and others	2 connections(*3)	PV, SP, OUT, ALM etc
		Gateway	Ethernet +RS-485	RS-485: UT75A/UT55A/ UT52A/UT35A/UT32A/ UP55A/UP35A/UM33A (*1)	31 units	
Modbus (RTU/ASCII)		Slave	RS-485	PLC and others, UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UP32A/UM33A(*2)	31 units	
PROFIBUS-DP	Used for communication between PLCs and remote I/O, enabling high-speed data transmission.	Slave	RS-485	PLC and others	Number of nodes: 126	
		Modbus master function	RS-485	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A	31 Units	
CC-Link		Slave	RS-485	PLC and others	Number of nodes: 42 (Remote device)	
		Modbus master function	RS-485	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UP32A/UM33A	31 Units	
DeviceNet		Slave	RS-485	PLC and others	Number of nodes: 64	
		Modbus master function	RS-485	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A	31 Units	
Peer to peer	A protocol allowing multiple controllers to send and receive data between one another. The Ladder Program is used.	Multi-drop	RS-485 (2 wire only)	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UP32A	Read/Write: 4 units Read only : 28 units	
Coordinated Communication	A protocol to coordinate the operation of two or more instruments controlling the same process.	Master/Slave	RS-485	UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UP32A (*2)	Master : 1 unit Slave : 31 units	
PC link	The proprietary Yokogawa protocol allowing communications to PCs, PLCs and touch panels.	Slave	RS-485	PC and others, UT75A/UT55A/UT52A/ UT35A/UT32A/UP55A/ UP35A/UP32A/UM33A(*2)	31units	
Ladder	A protocol to communicate to PLCs.					

*1: UT digital indicating controller, Signal conditioner JUXTA, Power monitor POWERCERT can be connected.
*2: UT digital indication controllers can be connected.
*3: Maximum number of transactions: 1 (per a connection)

Physical Interface

Ethernet
Standard : IEEE802.3 (10BASE-T, 100BASE-TX)
Max segment length : 100m
Max. Connecting Configguration : Cascade Max. 4 level (10BASE-T), Max. 2 level (100BASE-TX)

RS-485
Standard : EIA RS-485
Communication method : Two-wire harf-duplex or four-wire harf-duplex, start-stop synchoronization and non-procedural
Baud rate : 600, 1200, 2400, 4800, 9600, 19200 or 38400bps (*3)
Peer to peer communication is fixed at 19200bps
Max. communication distance: 1200m
Terminating resistor : 220Ω (External)

*3: "38400 bps" is available only for UT75A (Type 3 code = 1)

PROFIBUS-DP
Standard : Field bus (IEC61158)
Corresponding version : DP V0
Baud rate : 9.6k, 19.2k, 45.45k, 93.75k, 187.5k, 0.5M, 1.5M, 3M, 6M, 12M, AUTO (*4)
Communication distance : 1200m (9.6k to 93.75k), 1000m (187.5k), 400m (0.5M), 200m (1.5M), 100m (3M to 12M)

*4: AUTO automatically sets the baud rate to that of the host controller (PROFIBUS-DP master).

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)

DeviceNet
Field bus (IEC61158)
Baud rate: 125k, 250k, 500k bps
Transmission distance: 500m (125k bps), 250m (250k bps), 100m (500k bps)

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■ Hardware Specifications

Display Specifications

- PV display
  5-digit, 14-segment active color LCD (white/red)
  Character height: 21.5 mm
- Data display
  5-digit, 11-segment color LCD (orange)
- Bar graph display
  12-segment color LCD (orange and white)

Universal Input Specifications (PV)

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

Types of input		Instrument range °C	Instrument range °F	Accuracy
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 ±0.2% of instrument range ±1 digit for less than 0°C 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
		-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	
	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 However, ±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	-300.0 to 750.0°F	
		0.0 to 400.0°C	-200.0 to 1000.0°F	
	W (*2)	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	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 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
Resistance-temperature detector (RTD) 3-wire	JPt100	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit (*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 (*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	±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	-	
		0.00 to 10.00 V	-	
		-10.00 to 20.00 mV	-	
		0.0 to 100.0 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)

Universal Input Specifications (PV2) (Type 1 code = -5)

(3-wire or 4-wire when RTD is selected)

- Number of input points: 1 point
- Types of input, instrument range, and measurement accuracy are the same as those of universal input (standard), except for the table below.

Types of input		Instrument range °C	Instrument range °F	Accuracy
4-wire RTD	JPt100	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.5°C ±1 digit
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.2°C ±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	±0.5°C ±1 digit
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.2°C ±1 digit

*: ±0.5 °C ±1 digit in the range of -200.0 to 500.0 °C

- Input sampling period: Synchronized to control period
- Burnout detection: Same as universal input

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Auxiliary Analog Input Specifications (Type 2 code = 1, 2 or 3)

- This function can be used for remote setpoint setting, external compensating input, auxiliary input for computation, etc.
- Number of input points: see the model code table.
- For types of input, instrument range, and measurement accuracy, see the table below.

Types of input	Instrument range	Accuracy
Integrated signal	0.400 to 2.000 V	±0.2% of instrument range ±1 digit
	1.000 to 5.000 V	±0.1% of instrument range ±1 digit
DC voltage	0.000 to 2.000 V	±0.2% of instrument range ±1 digit
	0.00 to 10.00 V	±0.1% of instrument range ±1 digit
DC voltage with High input impedance	0.000 to 1.250 V	±0.1% of instrument range ±1 digit

- Input sampling period: Synchronized to control period
- Input resistance: about 1 MΩ
  However, 10 MΩ or more for high input impedance
- Burnout detection: Functions at standard signal
  Burnout is determined to have occurred if it is 0.1 V or less.

Contact Input Specifications

- Number of points: 3 points (standard)
  For the maximum number of points, see the model and suffix code table.
- Input type: no-voltage contact input or transistor contact input
- Input contact capacity: 12 V DC, 10 mA or more
  Be sure to use a contact with a minimum ON current of 1 mA or less
- ON/OFF detection
  For no-voltage contact input:
  Contact resistance 1 kΩ or less in ON state
  Contact resistance 50 kΩ or more in OFF state
  Transistor contact input:
  2 V or less in ON state
  Leak current 100 μ A or less in OFF state
- Status detection minimum hold time: control period + 50 ms
- Application: SP switching, operation mode switching, event input

Analog Output Specifications

- Number of points
  Control output: 1 point (standard), which is shared with transmission output.
  Loop-2 control output: 1 point, which is shared with transmission output.
- Output functions
  Current output or voltage pulse 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
- 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

Retransmission Output Specifications

- Number of points: 1 point (standard), which is shared with 15 V DC loop power supply
- Output function: current output
  4 to 20 mA DC or 0 to 20 mA DC/load resistance 600 Ω or less
- Current output accuracy (conversion accuracy from PV display on the set scale): ±0.1% of span (however, ±5% of span for 1 mA or less)
  The accuracy is that in the basic operating conditions: 23 ±2°C, 55 ±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.

15V DC Loop Power Supply Specifications

- Number of points: 1 point (standard), which is shared with retransmission output
  Control output (1 point) can also be used.
- Supply voltage: 14.5 to 18.0 V DC
- Maximum supply current: about 21 mA (with short-circuit current limiting circuit)

Step Response Time Specifications

Within 500 ms (for a control period of 50 ms or 100 ms)

Within 1 s (for a control period of 200 ms)

(Response time at 63% of transmission output when a change is made stepwise in the range between 10 and 90% of input span)

Relay Contact Output Specifications

- Types of contact and number of points
  Control relay output: one 1c-contact point
  Loop-2 control relay output: one 1c-contact point
  Alarm output: 3 1a-contact points (Common is separated)
- Contact rating
  1c-contact (contol output): 3 A at 250 V AC or 3 A at 30 V DC (resistance load)
  1a-contact (alarm output): 1 A at 240 V AC or 1 A at 30 V DC (resistance load)
  *: The control output should always be used with a load of 10 mA or more.
  The alarm output should always be used with a load of 1 mA or more.
- Application: time proportional output, alarm output, FAIL output, etc.
- Time resolution for control output: 10 ms or 0.1% of output value, whichever is larger

Transistor Contact Output Specifications

- Number of points: see the model and suffix code table
- Output form: open collector (sink current)
- Output contact capacity: Up to 24 V DC, 50 mA
- Output time resolution: min 50 ms
- Application: alarm output, FAIL output, etc.

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Position Proportional Output Specifications

- Position signal input
  Slide resistance: 100 Ω to 2.5 kΩ of total resistance
  100% side and slide line: with disconnection detection
  0% side: without disconnection detection
  Current input: 4 to 20 mA DC (with disconnection detection)
  Input resistance: about 330 Ω
- Sampling period: 50 ms
- Measurement resolution: 0.1% of input span
- Position proportional relay output
  Two 1a-contact points , 3 A at 250 V AC or 3A at 30 V DC (resistance load)
  *: This should always be used with a load of 10 mA or more.

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 (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: 18 VA (For the /DC option.
  24 V DC: 9 VA, 24 V AC: 14 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, contact input 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
PV2 (universal) input terminal		
Aux. analog (AIN2) input terminals		
Aux. analog (AIN4) input terminals/remote input terminals		
Control and transmission (analog) output terminal (not isolated between the analog output terminals) Valve position (feedback) input terminal		
Control relay (c-contact) output terminal		
Alarm-1 relay (a-contact) output terminal		
Alarm-2 relay (a-contact) output terminal		
Alarm-3 relay (a-contact) output terminal		
Position proportional relay output terminal		
Contact input terminal (All) RS485 communication terminal (2 ports)		
Contact output (transistor) terminal		
Ethernet/PROFIBUS-DP/CC-Link/DeviceNet communication terminal		

The circuits divided by lines are insulated mutually.

Environmental Conditions

Normal operating conditions

- Ambient temperature: -10 to 50°C (side-by-side mounting: -10 to 40 °C)
  0 to 50 °C if the CC-Link option is specified. (side-by-side mounting: 0 to 40 °C)
- 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^2 or less, 1 oct/min for 90 minutes each in the three axis directions
- Rapid vibration: 14.7 m/s^2, 15 s or less
- Impact: 98 m/s^2 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 μ V/°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)

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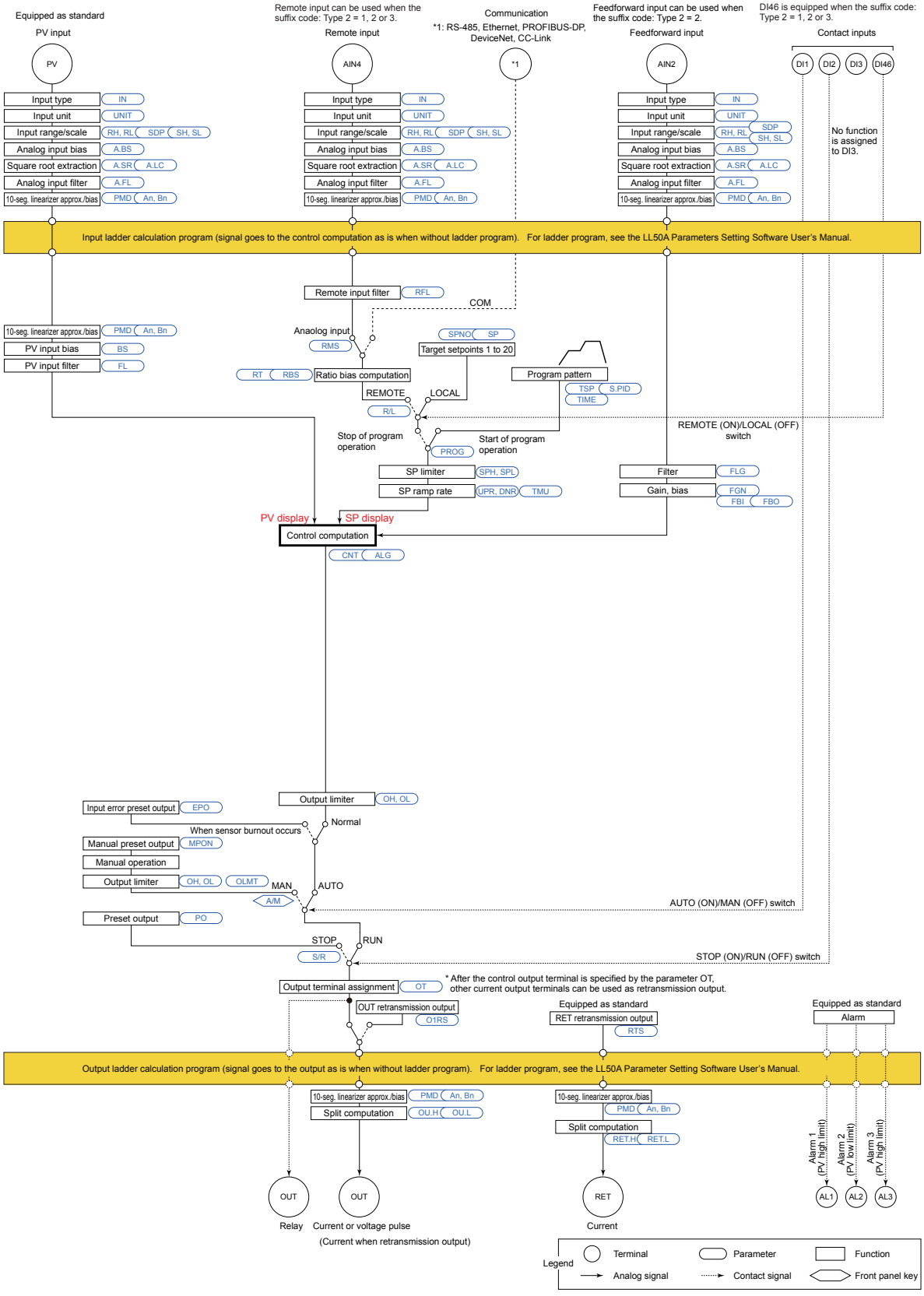
■ Block Diagram

Single Loop Control (For the block diagrams of other control modes, see the user's manual)



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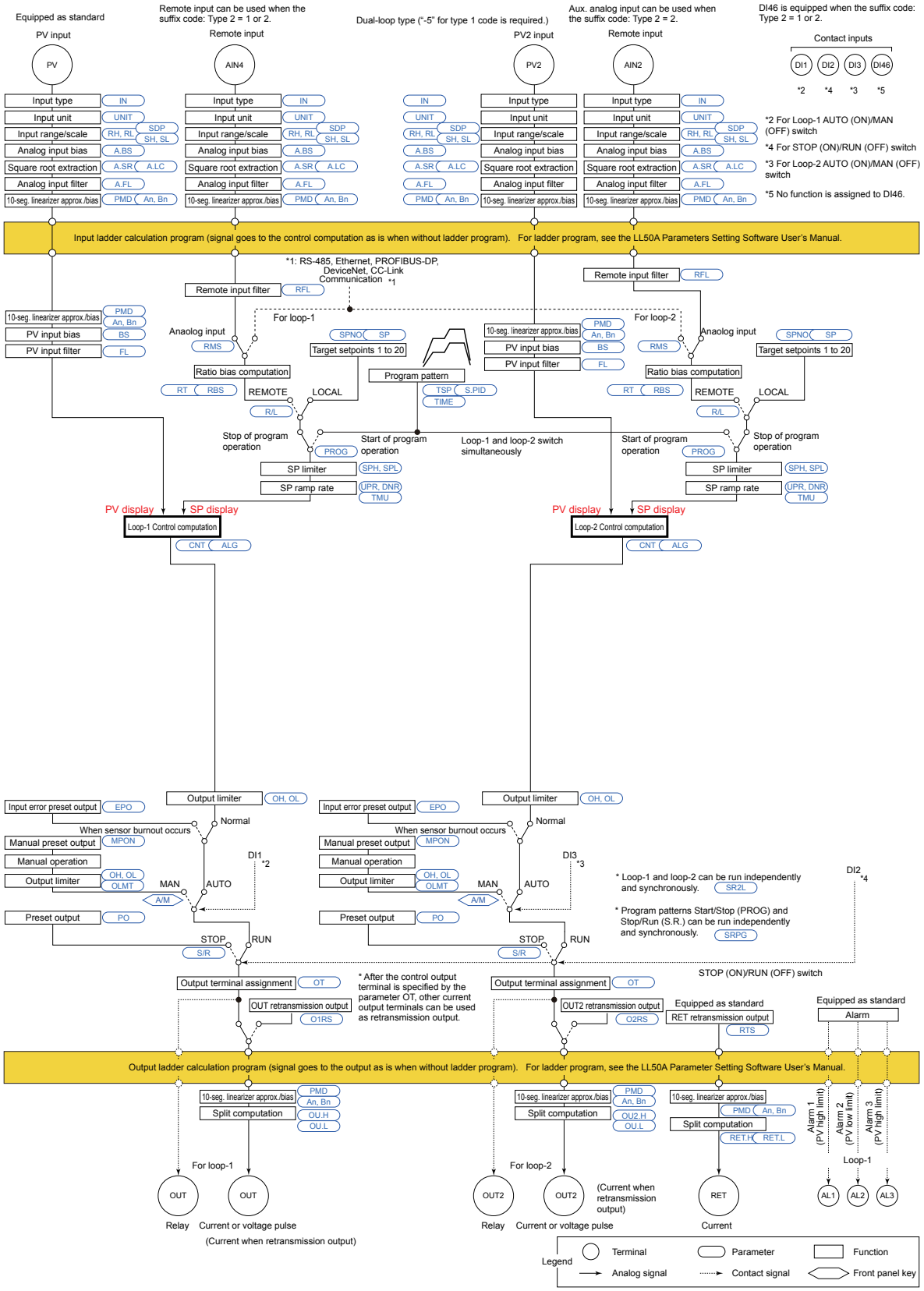
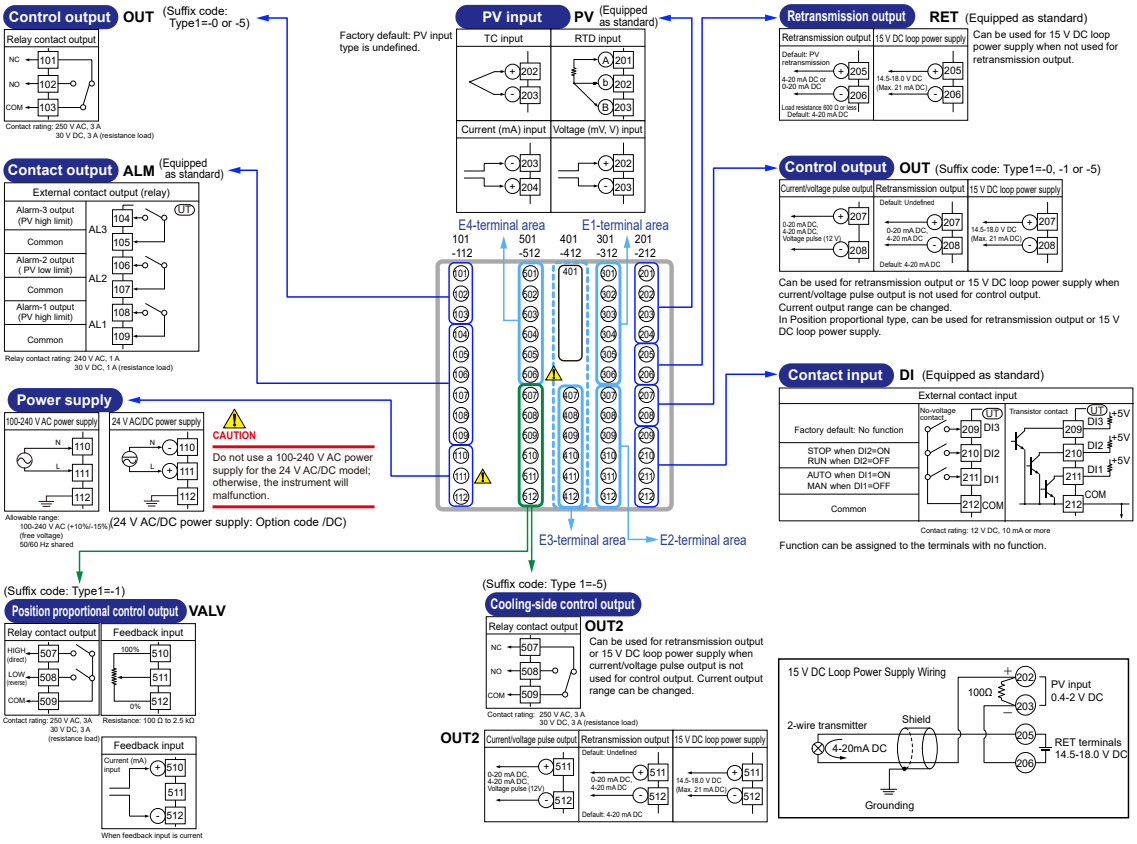
Dual-Loop Control (For the block diagrams of other control modes, see the user's manual)



■ Terminal Arrangement

Terminal Arrangement for UT75A Single Loop Control (for the terminal arrangements of other control modes, see the user's manual.)



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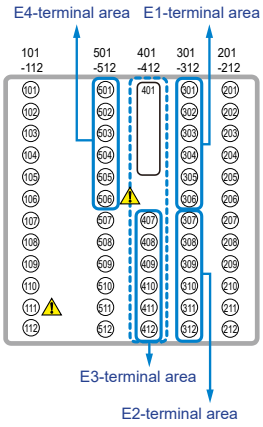
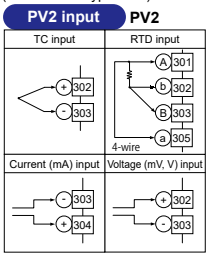


301-306 E1-Terminal Area

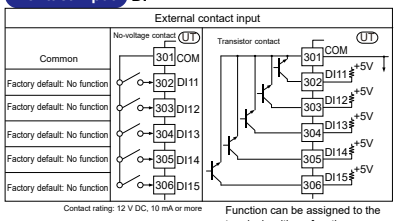
(Suffix code: Type 1=-5)

PV2 input **PV2**



(Suffix code: Type 2=3)

Contact input **DI**

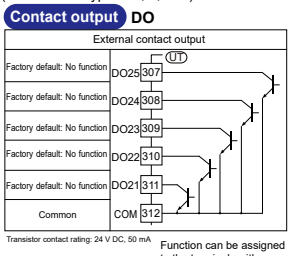


Function can be assigned to the terminals with no function.

307-312 E2-Terminal Area

(Suffix code: Type 2=0, 1, or 3)

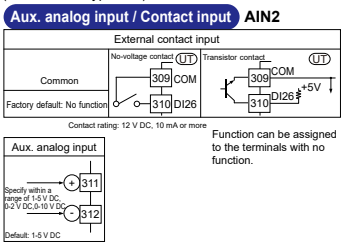
Contact output **DO**



Function can be assigned to the terminals with no function.

(Suffix code: Type 2=2)

Aux. analog input / Contact input **AIN2**



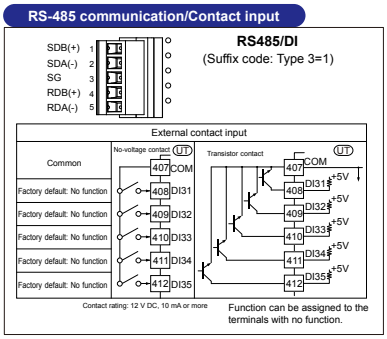
Function can be assigned to the terminals with no function.

Aux. analog input can be used for feedforward input in Single-loop control and Single-loop position proportional control.

401-412 E3-Terminal Area

RS-485 communication/Contact input

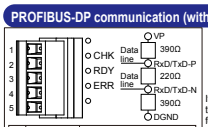
RS485/DI
(Suffix code: Type 3=1)



Function can be assigned to the terminals with no function.

PROFIBUS-DP communication (with Modbus master)

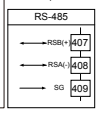
PROF
(Suffix code: Type 3=4)



If the UT is located at the end of a segment for the PROFIBUS communication wiring, terminating resistors are separately needed.
These are to be prepared by users. (390 Ω: 2 pcs. 220 Ω: 1 pc., or an active terminator.)

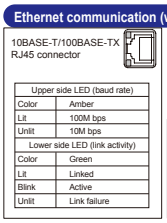
Pin	Signal name	Description
1	VP	+5V bus power
2	RxD/TxD-P	Data signal (positive data receive/transmit)
3	RxD/TxD-N	Data signal (negative data recive/transmit)
4	DGND	Signal ground
5	SHIELD	Shield ground

LED	Lit	Unlit
CHK (red)	User profile error	Normal
RDY (green)	Normal Communicating successfully	No power, or Communication failure
ERR (red)	Not connected, or communication failure (flashing)	Normal

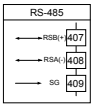


Ethernet communication (with gateway function)

ETHR
(Suffix code: Type 3=2)

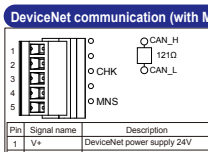


Upper side LED (baud rate)	
Color	Amber
Lit	100M bps
Unlit	10M bps
Lower side LED (link activity)	
Color	Green
Lit	Linked
Blink	Active
Unlit	Link failure



DeviceNet communication (with Modbus master)

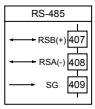
DNET
(Suffix code: Type 3=5)



If the UP is located at the end of a segment for the DeviceNet communication wiring, terminating resistors are separately needed.
These are to be prepared by users. (121 Ω: 1 pc.)

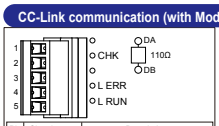
Pin	Signal name	Description
1	V+	DeviceNet power supply 24V
2	CAN_H	RX/TX + signal
3	DRAIN	Shield/Drain wire
4	CAN_L	RX/TX - signal
5	V-	DeviceNet power supply common

LED	Lit/flashing	Unlit
CHK (red)	User profile error	Normal
MNS (green/ red)	Normal. Communicating successfully (green, lit). Not connected (green, flashing).	No electricity
	Critical link failure (red, lit). Communication timeout (red, flashing)	
	At power-on/Communication faulted (green/red, flashing)	



CC-Link communication (with Modbus master)

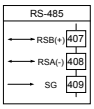
CC-L
(Suffix code: Type 3=3)



If the UT is located at the end of a segment for the CC-Link communication wiring, terminating resistors are separately needed.
These are to be prepared by users. (110 Ω: 1 pc.)

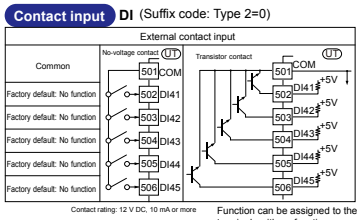
Pin	Signal name	Description
1	FG	Frame ground
2	SLD	Shield
3	DG	RX/TX signal ground
4	DB	RX/TX - signal
5	DA	RX/TX + signal

LED	Lit	Unlit
CHK (red)	User profile error/ Address error	Normal
L ERR (red)	Communication failure (CRC error)	Normal
L RUN (green)	Normal Communicating successfully	No carrier detected/ Connection timeout



501-506 E4-Terminal Area

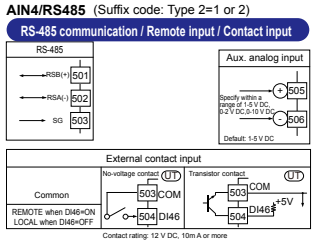
Contact input **DI** (Suffix code: Type 2=0)



Function can be assigned to the terminals with no function.

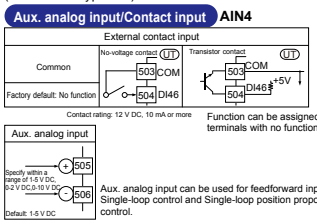
AIN4/RS485 (Suffix code: Type 2=1 or 2)

RS-485 communication / Remote input / Contact input



(Suffix code: Type 2=3)

Aux. analog input/Contact input **AIN4**



Function can be assigned to the terminals with no function.

Aux. analog input can be used for feedforward input in Single-loop control and Single-loop position proportional control.

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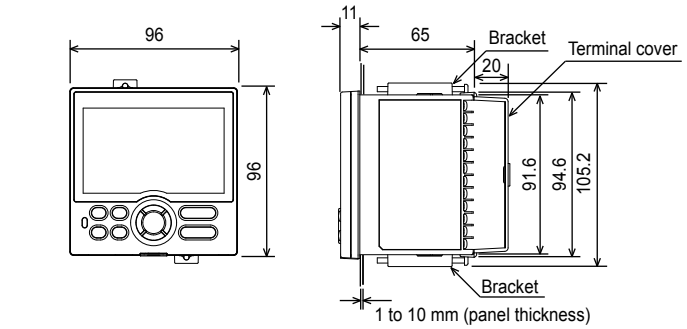
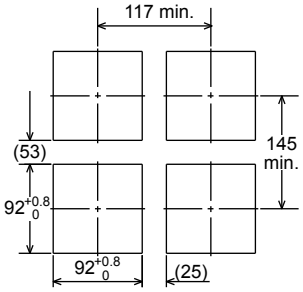
■ External Dimensions and Panel Cutout Dimensions

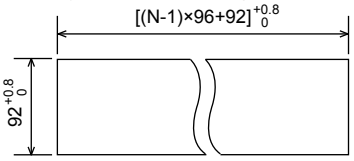
Unit: mm



• General mounting



• Side-by-side close mounting



"N" stands for the number of controllers to be installed.
However, the measured value applies if N≥5.

Normal tolerance:
±(value of JIS B 0401-1998 tolerance class IT18)/2

■ 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): 96 (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): $92^{+0.8/0}$ (width) x $92^{+0.8/0}$ (height)
- Mounting position: Up to 30 degrees above the horizontal. No downward titling allowed.
- Wiring: M3 screw terminal with square washer (signal wiring and power)

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■ Model and Suffix Code

Model	Suffix code	Option code	Description
UT75A			Digital Indicating Controller (provided with retransmission output or 15 V DC loop power supply , 3 DIs, and 3 DOs) (Power supply 100-240 V AC)
Type 1: Basic control	**-0**		Standard type
	-1		Position proportional type
	-5		Dual-loop type
Type 2: Functions	**0**		5 additional DIs and 5 additional DOs
	1		Remote (1 additional aux. analog) input, RS485 communication (Max.19.2 kbps, 2-wire), 1 additional DI, and 5 additional DOs
	2		Remote (2 additional aux. analog) inputs, RS485 communication (Max.19.2 kbps, 2-wire), 2 additional DIs
	3		Remote (1 additional aux. analog) input, 6 additional DIs, 5 additional DOs (*1)
Type 3: Open networks	**0**		None
	1		RS-485 communication (Max.38.4 kbps, 2-wire/4-wire) and 5 additional DIs
	2		Ethernet communication (with serial gateway function)
	3		CC-Link communication (with Modbus master function)
	4		PROFIBUS-DP communication (with Modbus master function)
	5		DeviceNet communication (with Modbus master function)
Display language (*2)	**-1**		English (Default. Can be switched to Spanish by the setting.)
	-2		German (Customized order)
	-3		French (Customized order)
	-4		Spanish (Default. Can be switched to English by the setting.)
Case color	**0**		White (Light gray)
	1		Black (Light charcoal gray)
Fixed code	**-00**		Always “-00”
Option codes		**/DC**	Power supply 24 V AC/DC
		/CP	Carbon potential calculation function (*3)
		/CT	Coating (*4)

*1: When Type 1 code is “-5”, “3” cannot be specified for Type 2 code.

*2: English and Spanish are available for the guide display. (German and French guide displays are customized. Contact our representatives for inquiries.)

*3: Only when Type 2 code is “1”, “2” or “3”, the /CP option can be specified.

*4: When the /CT option is specified, the UT75A 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

Terminal cover, Brackets (mounting hardware), Unit label, Operation Guide for Single-loop Control.

■ 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	**UTAP001**
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/

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