

General Specifications

UT100 series Temperature Controllers Model UT130, UT150, UT152, UT155

GS 5C1E01-01E

General

UT100 series temperature controllers provide only the functions and size you require for your application. 1/16, 1/8 and 1/4 DIN sizes are available. Easy-to-read displays show input and the set point. T/C or RTD inputs are standard and the output type is selectable: ON/OFF, voltage pulse or DC current. The controllers operate in an Automatic mode only. Optional alarm contact outputs, retransmission output, contact input set point selection and RS485 communication are available. Each features dynamic self-tuning function for easy start up. Super Control fuzzy logic for overshoot suppression is a proven champion.



Model and Suffix Codes

Model	Suffix code	Description
UT130		Temperature controller
Control output	-R	Relay output
	-V	Voltage pulse output
Control output for cooling	N	No cooling output
	R	Relay output
	V	Voltage pulse output
Option (note)	/AL	Alarm outputs(2 points)
	/HBA	Heater disconnection alarm
	/RS	Communication function

Note1: The /HBA option already Includes the function of /AL.

Note2: /HBA and /RS can not be specified as same time when selecting Heating & Cooling type.

Model	Suffix code	Description
UT150 UT152 UT155		Temperature controller
Control output	-R	Relay output
	-V	Voltage pulse output
	-A	4 to 20mA output
Control output for cooling	N	No cooling output
	R	Relay output
	V	Voltage pulse output
	A	4 to 20mA output
Option (note)	/AL	Alarm outputs(2 points)
	/HBA	Heater disconnection alarm
	/EX	Digital inputs (2 points)
	/RET /RS	PV retransmission output Communication function

Note1: The /HBA option already Includes the function of /AL.

Note2: /HBA and /RET can not be specified as same time when selecting one MV type. (Only for UT150)

Note3: /EX and /RS can not be specified as same time when selecting one MV type. (Only for UT150)

Note4: /RET can not be specified when selecting Heating & Cooling type.

Note5: /HBA, /EX and /RET can not be specified as same time when selecting Heating & Cooling type. (Only for UT150)

Measured Value input

- Sampling period for measured value input: 500ms
- Input: 1 point
- Input type: Universal; can be selected by software
- Input accuracy (at 23 ±2°C ambient temperature)
- Thermocouple: ±2°C

However,

- ±4°C for thermocouple input -200 to -100°C
- ±3°C for thermocouple input -100 to -0°C
- ±5°C for type R and S (±9°C for 0 to 500°C)
- ±9°C for type B (accuracy is not guaranteed for 0 to 400°C)
- RTD: ±1°C ±1digit
- Voltage(mV, V) : ±0.3%

Input Ranges for UT130

Input type		Range (deg C)	Range (deg F)
TC	K	-199 to 999	-199 to 999
		0.0 to 600	32 to 999
		0.0 to 400	32 to 750
		-199 to 200	-199 to 400
	J	-199 to 999	-199 to 999
	T	-199 to 400	-199 to 750
	E	-199 to 999	-199 to 999
	L	-199 to 900	-199 to 999
	U	-199 to 400	-199 to 750
	RTD	Pt100	-199 to 850
0 to 400			32 to 750
-199 to 200			-199 to 400
-19.9 to 99.9			-199 to 999
JPt100		-199 to 500	

Input Ranges for UT150/152/155

Input type		Range (deg C)	Range (deg F)
TC	K	-270 to 1370	-300 to 2500
		0.0 to 600.0	32.0 to 999.9
		0.0 to 400.0	32.0 to 750.0
		-199.9 to 200.0	-300 to 400
	J	-199.9 to 999.9	-300 to 2100
	T	-199.9 to 400.0	-300 to 750
	E	-199.9 to 999.9	-300 to 1800
	R	0 to 1700	32 to 3100
	S	0 to 1700	32 to 3100
	B	0 to 1800	32 to 3200
	N	-200 to 1300	-300 to 2400
	L	-199.9 to 900.0	-300 to 1600
	U	-199.9 to 400.0	-300 to 750
	Platinel 2	0 to 1390	32 to 2500
RTD	Pt100	-199.9 to 850.0	-199.9 to 999.9
		0.0 to 400.0	32.0 to 750.0
		-199.9 to 200.0	-300 to 400
		-19.9 to 99.9	-199.9 to 999.9
	JPt100	-199.9 to 500.0	
mV, V	0-100mV	0.0 to 100.0	
	0-5V	0.000 to 5.000	
	1-5V	1.000 to 5.000	
	0-10V	0.00 to 10.00	

- Burn-out detection: Functions for TC or RTD input (burn-out upscale only; cannot be switched off)
- Input resistance: 1Mohm or greater for TC or DC mV input. Approx. 1Mohm for DC V input
- Maximum allowable load resistance: 250ohm for TC or DC mV input 2kohm for DC V input
- Maximum allowable wiring resistance for RTD input: 10ohm/wire (The resistance values of three wires must be the same.)
- Allowable input voltage: $\pm 10V$ DC for TC or DC mV input, $\pm 20V$ DC for DC V input
- Noise rejection ratio: Normal mode noise: Min. 40dB(50/60Hz) Common mode noise: Min. 120dB (Min. 90dB for DC V input)
- Error of RJC: $\pm 1.5^{\circ}C$ (at 15-35 $^{\circ}C$), $\pm 2.0^{\circ}C$ (at 0-50 $^{\circ}C$) The RJC cannot be switched off.
- Applicable standards: TC and resistance temperature detector JIS/IEC/DIN ITS90

Control Output

- Output: 1 point or 2 point (for heating & cooling control model)
- Output type: Choose one from (1) to (3) below:
 - (1) Relay contact output
Contact capacity: 3A at 240V AC or 3A at 30V DC (with resistance load)
 - (2) Voltage pulse output
On voltage: 12-18V DC load resistance: 600ohm or greater
Off voltage: 0.1V DC or less short-circuit current: approx. 30mA
 - (3) Current output (Except for UT130)
Output signal: 4 to 20mA
Maximum load resistance: 600ohm
Accuracy: $\pm 0.3\%$ of span (at 23 $\pm 2^{\circ}C$ ambient temperature)

Transmission Output (Except for UT130)

- The transmission output is provided only when the /RET option is specified, but is not available for the heating/cooling control model.
- Output signal: Measured value in 4-20mA DC
 - Maximum load resistance: 600ohm
 - Accuracy: $\pm 0.3\%$ of span (at 23 $\pm 2^{\circ}C$ ambient temperature)

Contact Inputs (Except for UT130)

- The contact inputs are provided only when the /EX option is specified.
- Functions:
 - (1) Switching over two setpoints (SP1 and SP2)
 - (2) Starting a timer (See the Alarm functions.)
 - Input: 2 points (with the shared common terminal)
 - Input type: Contact or transistor contact input
 - Contact capacity: At least 12V/10mA
 - On/Off threshold: On state for 1k ohm or less; Off state for 20k ohm or greater

Alarm Functions

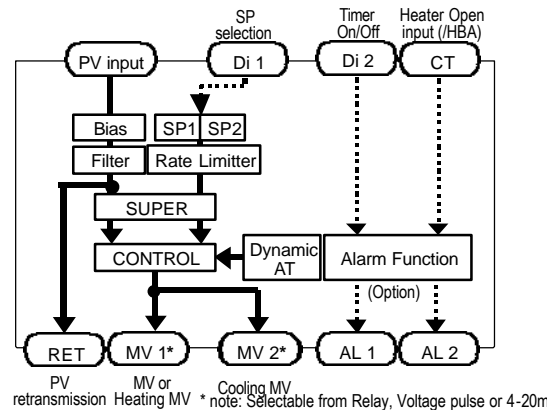
Alarm Functions (Option Code /AL or /HBA)

- Alarm types: 22 types (waiting action can be set by software) PV high limit, PV low limit, Deviation high limit, Deviation low limit, De-energized on deviation high limit, De-energized on deviation low limit, Deviation high and low limits, High and low limits within deviation, De-energized on PV high limit, De-energized on PV low limit, Self-diagnostic alarm, Failure alarm
- Alarm output: 2 relay contacts
Relay contact capacity: 1A at 240V AC or 1A at 30V DC (with resistance load)

Heater Disconnection Alarm (Option Code /HBA)

The heater disconnection alarm is available when time-proportional PID control or ON/OFF control is selected.

- Heater current setting range: 1 to 80A
 - Alarm output: 1 relay contact (The terminals are the same as those of the /AL option.)
 - On time of burn-out detection: Min. 0.2 second
 - Sensor: CTL-6-S or CTL-12-S36-8 (URD Co., Ltd.) To be purchased separately.
- Timer Function (Option Code /EX/AL or /EX/HBA)
The output contact status changes when the preset time has passed since external contact (TMR) turned on. The contact action can be selected by software from:
- (1) Make contact—the contact closes upon time-up
 - (2) Break—the contact opens upon time-up



Communication Function

The communication function is provided only when the /RS option is specified.

Communication Protocol

- MODBUS communication: Used for communication with equipment featuring the MODBUS protocol.
- PC link: Used for communication with a PC, or UT link module of the FA-M3 controller (from Yokogawa Electric Corporation).
- Ladder communication: Used for communication with a ladder communication module of the FA-M3, or a PLC of other manufacturers.

Communication Interface

- Applicable standards: Complies with EIA RS-485
- Number of controllers that can be connected: Up to 31
- Maximum communication distance: 1,200m
- Communication method: Two-wire half-duplex, start-stop synchronization, non-procedural
- Communication speed: 2400, 4800, or 9600 bps

Construction, Mounting and Wiring

- Construction: Splash-proof front panel (compliant with IP65 [Models UT130 & UT150] and IP55 [Models UT152 & 155]). Splash-proof construction is not available if the controller is mounted closely side-by-side.
- Casing: ABS resin and polycarbonate, • Case color: Black
- Mounting: Flush panel mounting
- Terminals: M3.5 Screw terminals

Safety and EMC Standards

- Safety: Confirms to IEC1010-1: 1990 and EN61010-1: 1992 Approved by CSA1010 for installation category CAT II (IEC1010-1) Certified for UL508
- EMC standards: Complies with:

EN55011: Class A, Group 1 for EMI (emission)
 EN50082-2: 1995 for EMS (immunity)
 The UT100 controllers conform to the standards specified under the following conditions.
 All wires except those for the power supply and relay contact output terminals are shielded. The controller does not fluctuate more than 20% even when noise is applied.

Power Supply and Isolation

Power Supply (Common for All Models)

Power supply	Voltage	Rated at 100-240VAC ($\pm 10\%$)
	Frequency	50 or 60Hz
Maximum power consumption		8VA
Memory		Non-volatile memory
Withstanding voltage	Between primary terminals & secondary terminals (See note 1.)	1500V AC for 1 minute (See note 2.)
Insulation resistance	Between primary terminals and secondary terminals (See note 1.)	20Mohm or more at 500V DC

Note 1: The primary terminals are the power supply terminals and relay output terminals. The secondary terminals are the analog input and output terminals, the voltage pulse output terminals, and the contact input terminals.

Note 2: The withstanding voltage is specified as 2300 V AC per minute to provide a margin of safety.

Isolation

The bold lines below indicate isolation, and the fine line indicates functional isolation. The withstanding voltage for functional isolation is 500V AC, 1 minute.

• Power supply terminals	• Measured value input terminals
• Control output terminals (relay contacts)	• CT input terminals for /HBA
	• 2nd input terminal for /EX
	• Internal circuit
• Alarm output terminals (2 relay contacts)	• Control output terminals: 4-20mA or voltage pulse
	• RS-485 terminals for /RS

Environmental Conditions

Normal Operating Conditions

- Warm-up time: At least 30 minutes
- Ambient temperature: 0-50°C (0-40°C when mounted side-by-side)
- Rate of change of temperature: 10°C/h or less
- Ambient humidity: 20-90% RH (no condensation allowed)
- Magnetic field: 400A/m(AT/m) or less
- Continuous vibrations of 5-14Hz: Amplitude of 1.2mm or less
- Continuous vibrations of 14-150Hz: 4.9m/s² (0.5G) or less
- Short-period vibrations: 14.7m/s² (1.5G) for 15 seconds or less
- Shock: 147m/s² (15G) for 11 milliseconds or less
- Mounting angle: Upward incline of up to 30 degrees; downward incline is not allowed.

• Altitude: 2000m or less above sea level

Maximum Effects from Operating Conditions

(1) Temperature effects

- Thermocouple, DC mV and DC V input: $\pm 2\mu\text{V}/^\circ\text{C}$ or $\pm 0.02\%$ of F.S./°C, whichever is the larger
- Resistance temperature detector: $\pm 0.05^\circ\text{C}/^\circ\text{C}$
- Analog output: $\pm 0.05\%$ of F.S./°C

(2) Effect from fluctuation of power supply voltage (within rated voltage range)

- Analog input: $\pm 0.2\mu\text{V}/\text{V}$ or $\pm 0.002\%$ of F.S./V, whichever is

the large

- Analog output: $\pm 0.05\%$ of full scale/V

Transportation and Storage Conditions

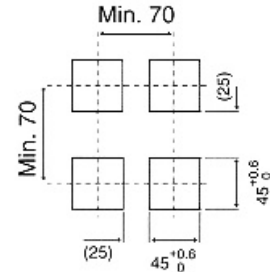
- Temperature: -25 to 70°C
- Humidity: 5 to 95% RH (no condensation allowed)
- Shock: Package drop height 90cm (when packed in the dedicated package)

Panel Cutout Dimensions

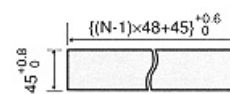
UT130 & UT150

Unit: mm

General Mounting



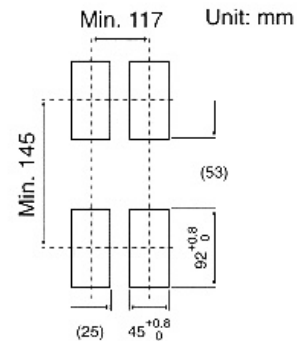
Side-by-side Close Mounting



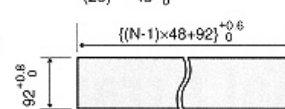
N is the number of controllers.
 If $N \geq 5$, then measure the actual length.

UT152

General Mounting



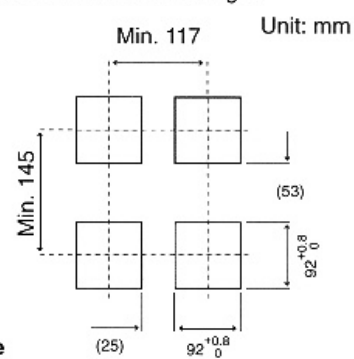
Side-by-side Close Mounting



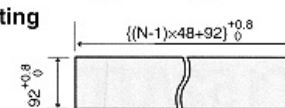
N is the number of controllers.
 If $N \geq 5$, then measure the actual length.

UT155

General Mounting

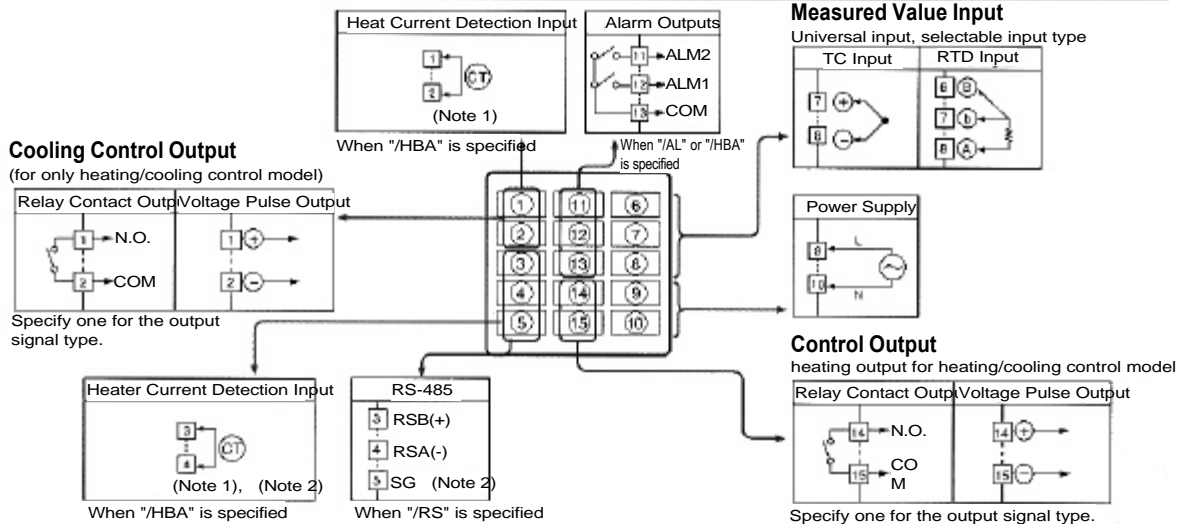


Side-by-side Close Mounting

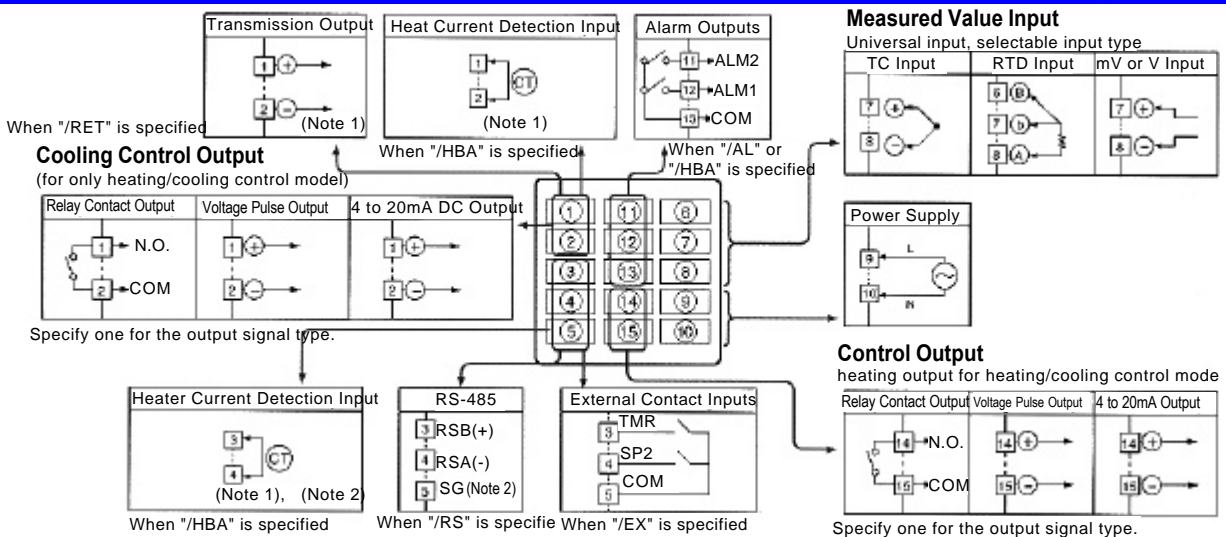


N is the number of controllers.
 If $N \geq 5$, then measure the actual length.

Model UT130 Terminal Arrangement

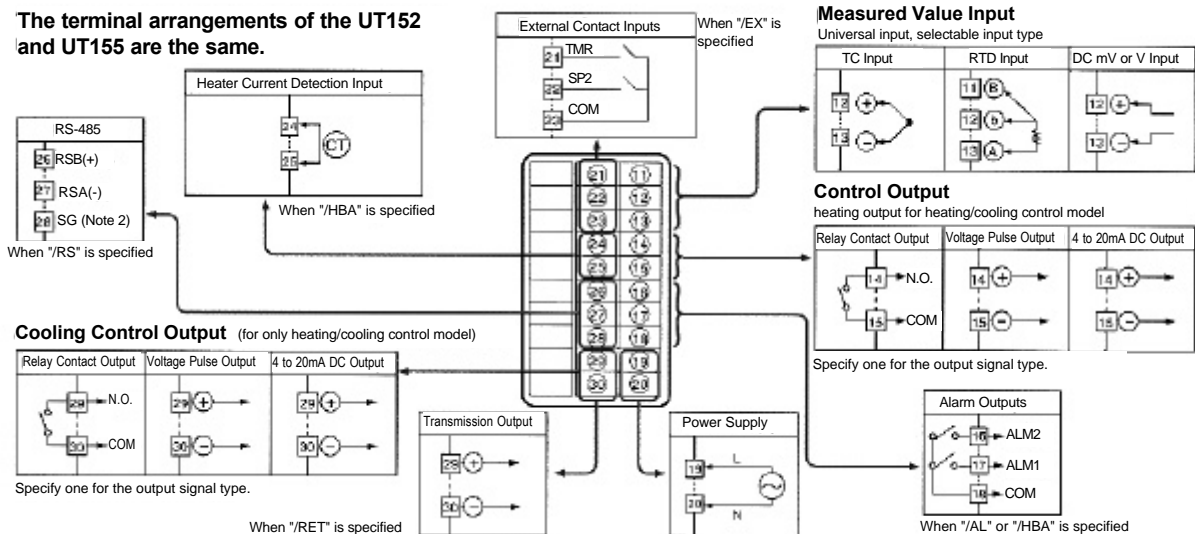


Model UT150 Terminal Arrangement



Model UT155 Terminal Arrangement

The terminal arrangements of the UT152 and UT155 are the same.



Note 1: The heater current detection input terminals (option code /HBA) are defined as terminals 1 and 2 for a standard model and as terminal 3 and 4 for a heating/cooling model.

Note 2: For a heating/cooling model, you are not allowed to specify both the /HBA and /RS options at the same time.