General **Specifications**

Models UT130, UT150/UT1 52/UT155 **Temperature Controllers**



GS 05C01E02-01E

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 setpoint. 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 setpoint selection and RS485 communication are available. Each features dynamic self-tunig function for easy start up. Super Control fuzzy logic for overshoot suppression is a proven champion.

Model and Suffix Codes

Model	lel Suffix code		Description		
UT130			Temperature controller		
Control output for standard type (or for heating)	d –R –V		Relay output (time-proportional PID or on/off control) Voltage pulse output (time-proportional PID)		
Control output for cooling R V		NRV	No cooling output (standard type) Relay output (time-proportional PID or on/off control) Voltage pulse output (time-proportional PID)		
Option /RL /HBA /RS /V24		/AL /HBA /RS /V24	Alarm outputs (2 points) (Notel) Heater disconnection alarm (includes optional /AL function) (Note1) (Note2) Communication function (Note2) (Note3) Power Supply 24V DC / 24V AC		

Note1:/AL option cannot be specified when /HBA option is specified. /HBA option already includes the /AL

option. option. Note2:/HBA option cannot be specified at the same time. Note3:/HBA option cannot be specifying the /RS option, be sure to order the required number of copies of Communication Functions Instruction Manual separeately. You will not be supplied and instruction manual just because you order for the /RS option.

Model	Suffix code	Description	
UT150 UT152 UT155		Temperature controller	
Control output for standard- type (or for heating)	-R -V -A	Relay output (time-proportional PID or on/off control) Voltage pulse output (time-proportional PID) 4 to 20mA output (continuous PID) (Note1)	
Control output for cooling	N R V A	No cooling output (standard type) Relay output (time-proportional PID or on/off control) Voltage pulse output (time-proportional PID) 4 to 20mA output (continuous PID)	
/AL /HBA /EX /RET /RS /V24		Alarm outputs (2 points) (Note2) Heater disconnection alarm (includes optional AL function) (Note1) (Note2) (Note3) SPI/SP2 switching, starting of timer, and RUN/STOP switching by external contacts(Note4) PV retransmission output in 4 to 20mA (Note3) Communication function (Note4) (Note5) Power Supply 24V DC / 24V AC	

Note1:/HBA option cannot be specifed when 4 to 20 mA output (heating-side) is specifed.

Notel://HBA option cannot be specifed when 4 to 20 mA output (heating-side) is specifed.
Note2:/AL option cannot be specifed when /HBA option is specifed.
//HBA option already includes the /AL option.
Note3:/HBA option and /RET option cannot be specifed at the same time.
Note4:/EX option and /RS option cannot be specifed at the same time. (model UT150 only)
Note5:/EX option includes contact input 1 (for switching between the SP1 and SP2 target setpoints using external contacts) and contact input 1 (for switching between the SP1 and SP2 target setpoints using external contacts) and contact input 2 (for enabling the timer).
Note6:/WEn specifying the /RS option, be user to order the required number of copies of Communication Functions Instruction Manual separeately. You will not be supplied and instruction manual just because you order for the /RS option.



Measured Value Input

The UT100 series allows you to freely change the input type by software.

Table 1. UT130 Measured Input Ranges

				•	
Input Type		Range(°C)	Range Code	Range(°F)	Range Code
	K	-199 to 999°C	1	-199 to 999°F	31
ocouple		0 to 600°C	2	32 to 999°F	32
		0 to 400°C	3	32 to 750°F	33
		-199 to 200°C	4	-199 to 400°F	34
	J	-199 to 999°C	5	-199 to 999°F	35
en	Т	-199 to 400°C	6	-199 to 750°F	36
Ť	E	-199 to 999°C	7	-199 to 999°F	37
	L	-199 to 900°C	12	-199 to 999°F	42
	U	-199 to 400°C	13	-199 to 750°F	43
ΠD	Pt100	-199 to 850°C	15	-199 to 999°F	45
		-199 to 400°C	16	32 to 750°F	46
		-199 to 200°C	17	-199 to 400°F	47
æ		-199 to 999°C	18	-199 to 999°F	48
	JPt100	-199 to 500°C	19		

Table 2.UT150/152/155 Measured Input Ranges

Input Type		Range(°C)	Range Code(°C)	Range(°F)	Range Code(°F)
	К	-270 to 1	370°C	1	-300 to 2500°F	31
		0.0 to 60	0.0°C	2	32.0 to 999.9°F	32
		0.0 to 40	0.0°C	3	32.0 to 750.0°F	33
		-199.9 to 20	0.0°C	4	-300.0 to 400.0°F	34
	J	-199.9 to 99	9.9°C	5	-300.0 to 2100°F	35
ple	Т	-199.9 to 40	0.0°C	6	-300.0 to 750.0°F	36
G	Е	-199.9 to 99	9.9°C	7	-300.0 to 1800.0°F	37
ê	R	0 to 1700°C		8	32 to 3100°F	38
her	S	0 to 1700°C		9	32 to 3100°F	39
-	В	0 to 1800°C		10	32 to 3200°F	40
	N	-200 to 1300°C		11	-300 to 2400°F	41
	L	-199.9 to 900.0°C		12	-300 to 1600°F	42
	U	-199.9 to 400.0°C		13	-300 to 750°F	43
	Platinel 2	0 to 1390°C		14	32 to 2500°F	44
		-199.9 to 85	0.0°C	15	-199.9 to 999.9°F	45
~	D+100	0.0 to 40	0.0°C	16	32.0 to 750.0°F	46
Ę	FILOU	-199.9 to 20	0.0°C	17	-300 to 400°F	47
		-19.9 to 99.9°C		18	-199.9 to 999.9°F	48
	JPt100	-199.9 to 50	0.0°C	19	Note:Scalling is enable in the followi	
ge	0 to100mV	0.0 to 100.0		20	4 range.	J
olta	0 to 5 V	0.000 to 5.000	N	21	-1999 to 9999,	-199.9 to 999.9,
Š	1 to 5 V	1.000 to 5.000	INOLE	22	100.00 10 00.0	5, 1.555 10 5.555
В	0 to 10 V	0.00 to 10.00		23		



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Hardware Specifications

Measured Value (PV) Input

Input: 1 point

Input type: Universal; can be selected by soft ware Input accuracy (at 23±2°C ambient temperature) • Thermocouple: ±2°C

• 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 ±1'digit • Voltage(mV, V)±0.3% Sampling period for measured value input: 500 ms Burn-out detection: Functions for thermocouple or RTD input (burn-out upscale only; can not be switched off) Input resistance:

- input (burn-out upscale only, can not be structure 2.1, **Input resistance:** 1 MΩ or greater for thermocouple or DC mV input Approx. 1 MΩ for DC V input Maximum allowable signal source resistance: 250 Ω for thermocouple or DC mV input 2 kΩ for DC V input
- input input Effect of signal source's resistance:Less than whichever is greater, $\pm 0.2 \ \mu$ V/1 Ω or $\pm 0.01\%$ / 100 Ω Maximum allowable wiring resistance for RTD input: 10 Ω /wire (The resistance values of three wires must be the correst
- 10 Ω/wire (The resistance values of three wires mustified of wiring resistance: ±0.2°C / 10Ω maximum Allowable input voltage: ±10 V DC for thermocouple or DC mV input ±20 V DC for DC V input Noise rejection ratio (50/60Hz) Thro reference junction compensation: ±1.5°C (at 05-35°C) ±2.0°C (at 05-35°C) ±2.0°C (at 05-35°C) Applicable Standards: Thermocouple and resistance temperature detector JIS/IEC/DIN (ITS90)

Control Output

- Output: 1 point (for standard type) or 2 points (for heating/cooling type) Output type: Choose one from (1) to (3) below: (1) Relay contact output Contact capacity: 3 A at 240 V AC or 3 A at 30 V DC (with resistance load) Note: The control output really cannot be replaced by users (2) Voltace pulse output [] Load resistance: ot be replaced by users load resistance: 600 Ω or greater short-circuit current:
- Note : The control output realy cann (2) Voltage pulse output On voltage:12 to 18 V DC Off voltage:0.1 V DC or less
- approx. 30 mA
- (3) Current output Output signal: 4 to 20 mA Maximum load resistance: 600 Ω Output accuracy: ±0.3% of span (at 23 ±2°C ambient temperature)

Display

Measured value and setpoint display:

Character height: See the table below.				
	UT130	UT150	UT152	UT155
PV display (mm)	17.5	13.5	13.5	20.0
SP display (mm)	N/A	9.0	9.0	9.5

	SP display	N/A	9.0	9.0	9.5	
ļ	(mm)	director lampor LEDo				
	Status indicator lamps: LEDs					

Retransmission Output

The retransmission output is provided only when the /RET option is specified, but is not available for the UT130 or a heating/cooling type. Output signal: PV(measured value) in 4 to 20 mA DC Maximum load resistance: $600 \ \Omega$ Output accuracy: $\pm 0.3\%$ of span (at 23 ± 2 'C ambient temperature)

Contact Inputs

The contact inputs are provided only when the /EX option is specified, but are not available for the UT130.

- Functions:

 (1) Switching over two setpoints (SP1 and SP2)

 (2) Starting a timer(See the following "Alarm Functions.")

 (3) RUN/STOP switching Specify two functions from the three functions using parameter DIS.

 Input: 2 points (with the shared common terminal) Input type: Non-voltage contact or transistor contact input

 Contact capacity: At least 12 V, 10 mA On/off judgment: On state for 1kΩ or less; Off state for 20 kΩ or greater

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Alarm Functions

Alarm Functions

- (Option Code /AL or /HBA) Alarm types: 22 types (Waiting action can be set by
- software): PVhigh limit, PV low limit, Deviation high limit, Devia PVhigh limit, PV low limit, Deviation high limit, Devia tion low limit, De-energized on 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, FAIL output Alarm output: 2 relay contacts Relay contact capacity: 1 A at 240 V AC or 1 A at 30 V DC (with resistance load)

Heater Disconnection Alarm Function (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 80 A 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-H or CTL-12-S36-8 (URD Co. Ltd.) To be purchased separately.

Sensor: CTL-6-S-H OI CIL To be purchased separately

Timer Function (Option Code /EX/AL or /EX/HBA) Timer Function (Option Code /EX/AL or /EX/HBA). The output contact status changes when the preset time has passed since "TMR" contact 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. Input contact type: See "Contact Inputs" above.

Communication Function

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

Communication Protocol

Personal computer link: Used for communication with a personal computer, or UT link module of the FA-M3 controller (from Yokogawa Electric Corpora

- FA-M3 controller (non rowgan-tion). Ladder communication: Used for communication with a ladder communication module of the FA-M3, or a programmable controller of other manufacturers. MODBUS communication: Used for communication with equipment featuring the MODBUS protocol.

Communication Interface Applicable standards: Complies with EIA RS-485 Number of controllers that can be connected: Up to 31

Maximum communication distance:1,200 m Communication method: Two-wire half-duplex, startstop synchronigation, non-procedural Baud rate: 2400, 4800, or 9600 bps

Safety and EMC Standards

- Safety: Confirms to IEC1010-1: 1990 and EN61010-1:1992 Approved by CSA1010 for installation category CAT II (IEC1010-1) Cirtified for UL508

- Cirtified for UL508 UL, CSA, and CE mark for controllers with 24V power supply are in preparation. EMS standards: Complies with: ENS5011: Class A, Group 1 for EMI (emission) ENS5082-2: 1995 for EMS (immunity) 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.

Construction, Mounting, and Wiring

- Construction: Only the front panel is drip-proof protection. (IP65:UT130/UT150 IP55:UT152/UT155)
- Terminals: Screw terminals

Power Supply and Isolation

Power Supply (Common for All Models)

Power supply	Voltage	Rated at 100-240 V AC 24 V AC/DC when "/V24" is speci- fied		
	Frequency	50 or 60 Hz		
Maximum pov	ver consumption	8 VA maximum(4W maximum) when"/V24" is specified : 3W maximum		
Memory		Non-volatile memory		
Withstanding	Between primary terminals	1500 V AC for 1 minute		
vonage	(See Notes 1 and 3.)	(Note 2)		
Insulation resistance	Between primary terminals and secondary terminals (See Notes 1 and 3.)	20M Ω or more at 500 V DC		

2

Note 1 : The primary terminals are the power supply ter-minals and relay output terminals. The secondary termi-nals 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. Note 3 : 24V power supply is the secondary terminal.

Isolation The bold lines below indicate reinforced isolation, and the broken line indicates functional isolation.



Note 1: The /EX option is not available for the UT130. Note 2: Neither the measured value input terminals, CT input terminals for the /HBA option, nor input terminals for the /EX option are isolated from the internal circuit. internal circuit. Note 3: The UT130 does not have the 4 to 20 mA DC output.

Environmental Conditions

Normal Operating Conditions Warm-up time: At least 30 minutes Ambient temperature: 0 to 50°C (0 to 40°C when

mounted side-by-side) Rate of change of temperature: 10°C/h or less Ambient humidity: 20 to 90% RH (no conden sation al-lowed)

- Ambient humidity: 20 to 90% RH (no conden sation a lowed) Magnetic field: 400 A/m or less Continuous vibrations of 5 to 14 Hz: Amplitude of 1.2 mm or less Continuous vibrations of 14 to 150 Hz: 4.9 m/s' (0.5G) or less Short-period vibrations: 14.7 m/s² (1.5G) for 15 seconds or less Shock: 98 m/s² (10G) 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

Analog output: ±0.25% of F.S./V

Maximum Effects from Operating Conditions (1) Temperature effects Thermocouple, DC mV and DC V input: $\pm 2 \mu V/C$ or $\pm 0.02\%$ of F.S. /'C, whichever is the larger Resistance temperature detector: ± 0.05 C/C or less Analog output: $\pm 0.05\%$ of F.S./'C

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

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

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Function Block Diagram



Panel Cutout Dimensions



UT130 Terminal Arrangement



Note 1: The heater current detection input terminals (option code:/HBA)are defined as terminals 1 and 2 for a standard type and as terminals 3 and 4 for a heating/cooling type. Note 2: For a heating/cooling model, you are not allowed to specify both the/HBA and/RS options at the same time.

UT150 Terminal Arrangement



Note 1:The heater current detection input terminals(option code:/HBA)are defined as terminals 1 and 2 for a standard model, and as terminals 3 and 4 for a heating/cooling model. When the / RET option is specified, these terminals are defined as terminals 3 and 4.

UT152/UT155 Terminal Arrangement



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