

# General Specification

## TC10 Temperature Controller

GS 05C01E81-01EN

### General

The TC10 is a compact single loop temperature controller with easy-to-read 3 dynamic colors led display. The short depth of the controller helps save instrument panel space. The TC10 supports easy configuration with codes for quick start-up.

### Features

- 3 Dynamic Colors Led Display
- Compact size: 48 x 48 mm (1/16 DIN), depth 48 mm + 14 mm (terminals)
- Universal Input: (TC, mV, V, mA, Pt100-Pt1000)
- 3 configurable alarms as absolute, deviation and band
- 4 selectable Set Point
- Serial Communication (optional): RS-485 Modbus
- PID control with single or double action with overshoot control, ON/OFF, ON/OFF Neutral Zone, Auto-tuning, Self-tuning
- Standby mode of display (selectable)
- User calibration for sensor position compensation

### Functional Specifications

#### Control Specifications

Control Mode: On/Off heating, On/Off cooling, On/Off with neutral zone (H/C), PID heating, PID cooling, PID double action (H/C)

Auto-tuning and Self-tuning algorithms, Overshoot control

#### Alarm Functions

Absolute high/low, Absolute inside/outside the band, Sensor break, Deviation high/low, Deviation inside/outside the band.

They are combined with Not active at power up, Latched, Acknowledgeable, and Not active at set point change for Deviation alarm.

#### Digital Input Functions

Alarm reset, Alarm acknowledge, Hold of the measured value, Stand-by mode, Manual mode, Heat with SP1 and Cool with SP2, Sequential set point selection, SP1/SP2 selection, Binary selection of the set point, Work in parallel with Up/down key.

#### Communication Function

Interface type: Isolated (50 V) RS-485

Protocol: Modbus RTU

Baud rate: 1200, 2400, 9600, 19200, 38400 bps

Byte format: 8bit with no parity, one stop bit.

Instrument address: 1 to 254



### Hardware Specifications

#### Display Specifications

Main display: 4 digit height 15.5 mm, 3 color red, green and amber

Secondary display: 4 digit height 7 mm, green color

Display updating time: 500 ms

#### Universal Input Specifications

TC J	-50 to +1000°C	-58 to +1832°F
TC K	-50 to +1370°C	-58 to +2498°F
TC S (°)	-50 to +1760°C	-58 to +3200°F
TC R	-50 to +1760°C	-58 to +3200°F
TC T	-70 to +400°C	-94 to +752°F
Pt100	-200 to +850°C	-328 to +1562°F
Pt1000	-200 to +850°C	-328 to +1562°F
Linear 0 to 60 mV		
Linear 12 to 60 mV		
Linear 0 to 20 mA (this selection forces Out 4 = TX)		
Linear 4 to 20 mA (this selection forces Out 4 = TX)		
Linear 0 to 5 V		
Linear 1 to 5 V		
Linear 0 to 10 V		
Linear 2 to 10 V		

Sampling time: 130 ms

Resolution: 30000 counts

Total Accuracy:  $\pm 0.5\%$  of F.S.  $\pm 1$  digit

\*:  $\pm 1.0\%$  of F.S.  $\pm 1$  digit

Resistance-temperature detector (RTD) measured current; Pt100: 150  $\mu$ A, Pt1000: 15.5  $\mu$ A

Response time: 2 second or less, 63% (10 - 90%)

(The time required for transmission output to reach 63% of the maximum excursion when PV abruptly changes from 10% to 90%)

**Output Specifications**

- OUT 1: Relay SPST - NO 4A/250 Vac or voltage to drive SSR 13V max. @1mA  
Analog output: 0/4 to 20 mA, galvanically isolated, RL max. 600Ω ±0.2% of F.S. or 0/2 to 10 V, galvanically isolated, RL min.: 500Ω ± 0.3% F.S.
- OUT 2: Relay SPST -NO 2A/250 Vac or voltage to drive SSR 13V max. @1mA, 10.5 min @15mA ±10%
- OUT 3: Relay SPST -NO 2A/250 Vac or voltage to drive SSR 13V max. @1mA, 10.5 min @15mA ±10%
- OUT 4: programmable: voltage output to drive SSR 13V max. @1mA, 10.5 min. @15mA ±10%, 12 VDC (20 mA) transmitter power supply or 2nd digital input

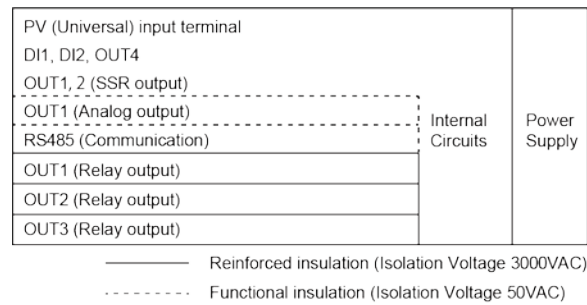
Note: Either control output or retransmission output can be used for analog output.

**Regulatory Compliance**

- CE marking, UL(USA/CANADA)
- EMC Directive:  
EN 61326-1 Class A, Table 2 (For use in industrial locations)  
EN 55011 Class A, Group 1  
(During the test, the instrument continues to operate at the measurement accuracy within specification.)
- LV Directive:  
EN 61010-1, EN 61010-2-030  
UL 61010-1 CSA 61010-1  
Installation category: II  
Pollution category: 2
- RoHS Directive:  
EN 50581

**Power Supply Specification and Isolation Voltage**

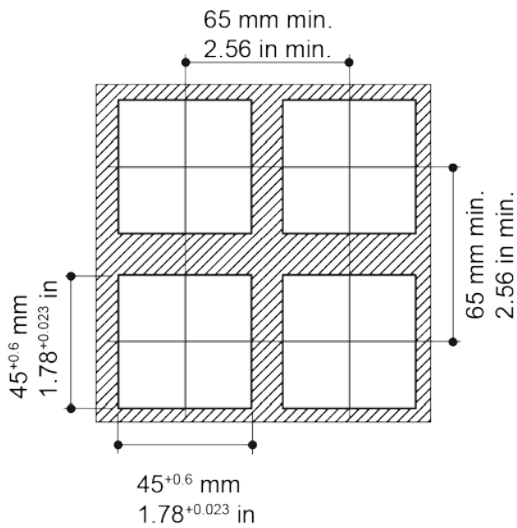
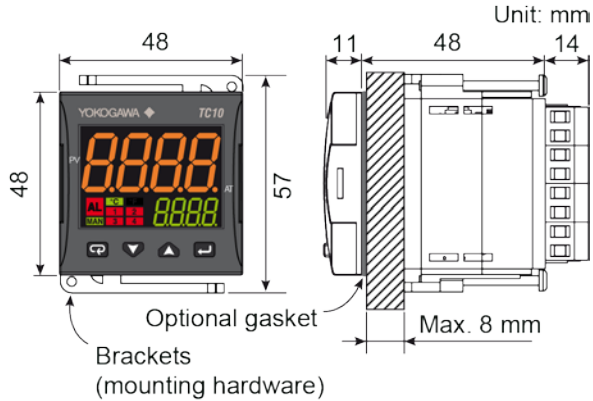
- 24 VAC/DC (±10% of the nominal value)
  - 100 to 240 VAC (-15 to +10% of the nominal value)
- Power consumption: 4.5 VA max. (24 VAC/DC)  
6.0 VA max. (100 to 240 VAC)
- Isolation Voltage  
3000 V AC for 1 minute between primary and secondary terminals  
(Primary terminals = Power (\*) and relay output terminals, Secondary terminals = Analog I/O signal terminals, contact input terminals, and communication terminals.)
- \*: Power terminals for 24 V AC/DC models are the secondary terminals.



**Environmental Conditions**

- Normal Operating Conditions  
Operating temperature: 0 to 50°C (32 to 122°F)  
Humidity: 20 to 90% RH, not condensing
- Temperature Effects  
Analog input: It is part of the global accuracy  
Reference junction compensation: ±0.1°C/°C or less  
Analog output: ±0.05% of F.S./°C or less
- Storage temperature  
Storage temperature: -20 to +70°C (-4 to +158°F)  
Humidity: 20 to 95% RH, not condensing

## External Dimensions and Panel Cutout Dimensions

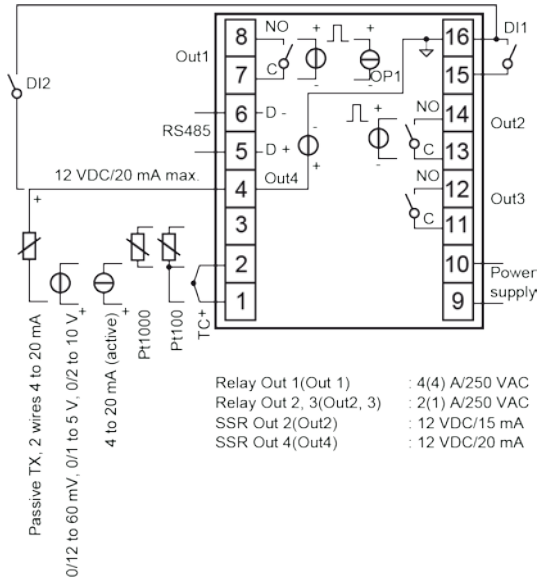


**Dimensions:** 48 x 48, depth 62 mm  
(1.89 x 1.89 x 2.87 in.)

**Panel cutout:** 45[-0, +0.6] x 45[-0, +0.6] mm  
(1.78[- 0.000, +0.023] x 1.78[- 0.000, +0.023] in.)

**Weight:** 180 g max.

## Terminal Arrangement



## Construction, Mounting, and Wiring

**Case:** Plastic, self-extinguishing degree: V-0 according to UL 94

**Front protection:** IP 65 (when the optional panel gasket is mounted) for indoor locations according to EN 60070-1

**Terminals protection:** IP 20 according to EN 60070-1

**Installation:** Panel mounting

**Terminal block:** 16 screw terminals for cables of 0.25 to 2.5 mm<sup>2</sup> (AWG22 to AWG14) with connection diagram, tightening torque 0.5 Nm;

## ■ Model and Suffix Code

Model Code	Suffix codes									Description
TC10	-N	□	C	□	□	□	D	□	F	Temperature Controller with an universal input, one logic input, and one selectable I/O
Fixed code	-N									Always "-N"
Power supply	L									24 VAC/DC (Custom order)
	H									100 to 240 VAC
Fixed code		C								Always "C"
OUT1-3			R	N	N					Relay output for On/Off control
			R	R	R					Relay output with two alarm relays, or On/Off Heat/Cool control with one alarm
			V	N	N					DCV output for SSR
			V	R	R					DCV output for SSR with two alarm relays, or DCV and Relay output for Heat/Cool control with one alarm
			V	V	R					Two DCV outputs for SSR with one relay (Custom order)
			A	R	R					Analog output with two alarm relays, or Analog output and Relay output for Heat/Cool control with one alarm
IN/OUT4(Fixed code)						D				Selectable I/O (logic input / 12V SSR drive output / 12VDC 20mA transmitter power supply)
Serial communication							S			RS-485 communication Modbus/RTU
							N			None
Fixed code								F		Always "F"
Option code									/GK	Panel gasket for IP65

## ■ Items to be specified when ordering

Model and suffix code.

## ■ Standard accessories

Brackets (mounting hardware), Quick Guide

## ■ Optional accessory

Panel gasket for IP65: A00336

## ■ User's Manual

Product user's manuals can be downloaded or viewed at the following URL.