TC CD   SMART Digital Temperature Controller

1   Application

The digital electronic temperature controller TC CD 'SMART CONTROLLER' has been designed to regulate the temperature of instruments or the air temperature in instrument enclosures and protective cabinets. In addition, it electronically limits the surface temperature of the heater.
It can be connected to the following:

- INTERTEC Heater CP ... THERM
- All explosion-proof electric heaters
- Series constant watt heating cables in connection with a temperature sensor and limiter

The TC CD temperature controller is particularly well suited for sophisticated heating applications in hazardous (potentially explosive) atmospheres and has been specifically designed for high temperature maintenance of analyzing equipment.

2   Special Features

- If an INTERTEC CP ...THERM HI heater is connected, the surface temperature of the heater will be redundantly limited both electronically and by a safety fuse mounted directly next to the heater element. This patented principle ensures safe operation and at the same time guarantees a high level of safety for explosion protection.
- A digital PID controller provides accurate and precise temperature control.
- The light weight external semiconductor temperature sensor can exactly measure and control the temperature of instruments or equipment (e.g. of a manifold).
- The RS 485 interface allows networking in fieldbus networks and setting parameters at the PC.
- Extensive fault monitoring.
- Long life solid state controller with no mechanical switching elements. The calculated failure probability with uninterrupted operation of 10 years is less than 5%.
- Negligible network regeneration through phase group control with no voltage triac switching.
- The temperature setpoint can be adjusted continuously.
- Industrial design inside a solid aluminum housing.

3   Function

- PID controller, with either the integrated or the external temperature sensor serving as actual value sensor.
- Electronic temperature limiter.
- Proportional actuator, consisting of an integrated zero voltage switch and a triac as switching element.

4   Technical Data

CSA Certificate	1655545 (LR43674)
CSA Type of Protection	Cl. 1, Div. 1, Grp ABCD T4
Ingress Protection	IP65
Nominal voltage	120 V AC
Min./ max. power	30 W to 1200 W
Rated current	10 A
Ambient Temperature	-58°F to +176°F/ -50°C to +80°C
Conduit connection	½" NPT
Height x width x depth	4.3"x5.1"x5.1"/110x130x130mm
Material	seawater proof aluminium; coated

5   Options

E (Standard)	Intrinsically safe external sensor
Additional conduit entry for fieldbus connection	
3M	Length of intrinsic safe sensor cable in meters (any length)

Further options upon request, e.g.

- Other designs of sensor (2 mm diameter),
- IEC, ATEX, GOST Explosion protection certificate

6   Parameter

For factory programming, please specify the following parameters when placing an order:

Parameter	Default value
Setpoint	122°F/ +50 °C
Temperature class of the heater	T3, T4
Address in the RS485 network	0
Power frequency	50 Hz, 60 Hz

7   Temperature

7.1 If a temperature higher than +176°F (+80°C) is to be controlled in the housing, the controller must be installed outside the housing. If the temperature is lower than -13°F (–25°C) the controller should be installed in separate enclosure with a small heater

7.2 When the SMART circuit board goes below -13°F (-25°C), the SMART controller switches into the 'cold start mode'. The output goes to 100% until the circuit board is above -13°F (-25°C). If the ambient temperature can be below -13°F (-25°C) please make sure, that the heater heats up the controller as well.

INTERTEC Instrumentation - Sarnia, Ontario - Houston, Texas - Phone: 1-888-875-8756

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8   Description

The digital electronic temperature controller TC D consists of an electronic section with microprocessor, completely encapsulated in silicone, and a terminal section with EEX e terminals. The controller has three analogue inputs:
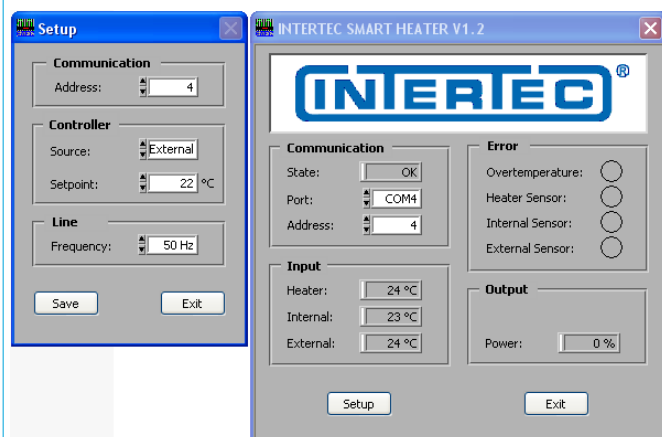
- An integrated temperature sensor at the housing for the room temperature.
- A temperature sensor in the heating cartridge of the heater serving as temperature limiter.
- Optionally: an intrinsically safe external temperature sensor.
- 100% factory tested/ regarding function and safety prior to shipment

9   Software
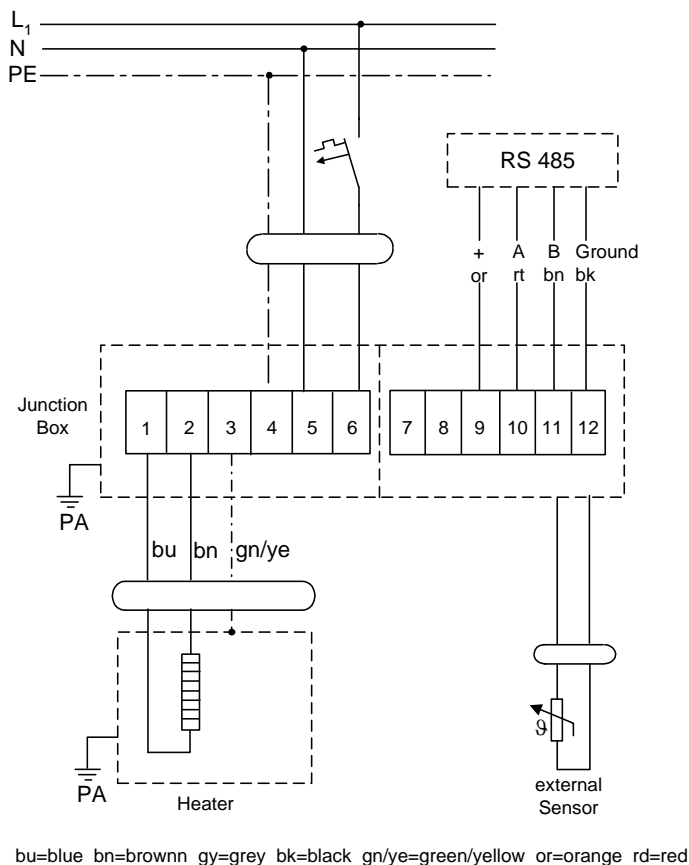
The "SMART HEATER Software Set" consists of:

- Interface converter RS232 to RS485 with power supply
- Or Interface converter USB to RS485
- CD-ROM with software.

With your PC or laptop, the actual states and values of the TC D can be shown and some parameters be changed:

Up to 31 TC D controllers can be connected to the RS485 interface. All controllers can be operated and monitored from a PC.

10 Electric Wiring

bu=blue bn=brownn gy=grey bk=black gn/ye=green/yellow or=orange rd=red

11 Warning!!!   Sensor cable

Do not pull/ tug on, or carry by cable or sensor as damage could result