



**BURNS**  
ENGINEERING

Temperature Measurement Experts



# Temperature Transmitters

Rugged and reliable transmitters and indicators

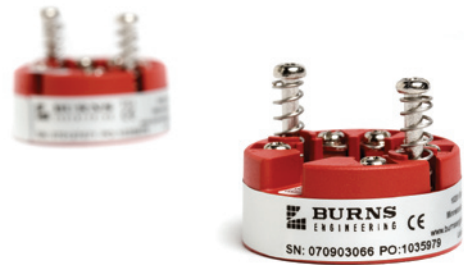


# Temperature Measurement Experts

Since 1960, Burns Engineering has been an industry leader in the design and manufacture of temperature sensors. Accuracy, reliability and consistency are hallmarks of the Burns brand. At Burns, temperature is our language. We understand the subtleties of temperature measurement and how they can impact your processes and ultimately your success. We worry about the details so you don't have to. When you select Burns you're getting more than a sensor, you're getting your own team of Temperature Measurement Experts.

## Temperature Transmitters

Our RTD and thermocouple transmitters and indicators are proven rugged and provide the flexibility your process demands. A variety of hazardous location approvals, HART communication, connection head and panel mount options, as well as sensor matching capability deliver tailored solutions to meet your specific needs.



Allow us to provide a quote! Call us at **800-328-3871** or configure your own quote through our [Web Quote system](#).

Here's how:

1. Search for the model (200A, 300L, 12001), using the search box (upper right).
2. Click on configure.
3. Select the parameters for your model.
4. Add to Quote Cart.
5. Submit Cart for Quote.

It's fast, easy and we'll get back to you within a day!

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# T51 and T55 Transmitters



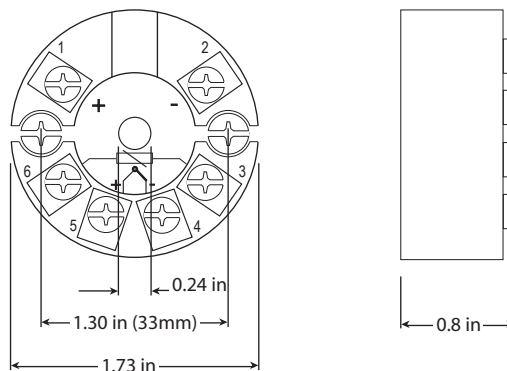
## Description

Loop powered DIN B Form RTD and thermocouple temperature transmitters for head mounting. Model T51 and T55 transmitters carry FM, CE, and CSA approvals allowing installation and use in a variety of applications.

Models T51 and T55 are easily programmed with a PC using the TP05 Interface and communication software. The T55 may also be programmed with your handheld HART® communicator and both models feature class-leading  $\pm 0.05\%$  of span accuracy.

## Features and Benefits

- Vibration and shock resistance
- Configurable to fit your application
- Provide “matching” capabilities with RTD for improved system accuracy (T55)
- HART programmable
- 0.05% accuracy
- PC programmable with TP05 interface and communication software
- Full input-output isolation
- Custom input/linearization capability
- Configurable via a PC or HART Communicator
- T/C Inputs: J, K, T, E, R, S, B, L, N, U, W3, W5, LR
- RTD inputs: Pt100, Ni100
- Outputs: 2-wire, 4-20mA
- Next day shipment available!





# T51 and T55 Transmitters

## Specifications

### T51

Operating temperature: -40°C to 85°C  
 Supply voltage, DC  
     Standard: 8.0 to 35 V  
     CE, FM and CSA: 7.2 to 30 VDC  
 Internal consumption: 25 mW to 0.8 W  
 Voltage drop: 7.2 VDC  
 Isolation voltage, test / operation: 1.5 kVAC / 50 VAC  
 Communications interface: Programming Module  
 Signal / noise ratio: Min. 60 dB  
 Response time (programmable): 1 to 60 s  
 EEPROM error check: < 3.5 s  
 Signal dynamics, input: 20 bit  
 Signal dynamics, output: 16 bit  
 Calibration temperature: 20 to 28°C  
 Accuracy: the greater of general and basic values  
     given in Tables below  
 Effect of supply voltage variation:\* < 0.005% of span/ VDC  
 Vibration: IEC 60068-2-6 Test FC  
 Lloyd's specification no. 1: 4 g / 2 to 100 Hz  
 Max. wire size: 1 x 16 AWG stranded wire  
 Humidity: < 95% RH (non-cond.)  
 Dimensions: Ø 1.73 x 0.8 in  
 Tightness (enclosure / terminal): IP68 / IP00  
 Weight: 1.8 oz.

#### Accuracy General Values

Input Type	Absolute Accuracy	Temperature Coefficient
All	≤ ±0.05% of span*	≤ ±0.01% of span* / °C

#### Accuracy Basic Values

Input Type	Basic Accuracy	Temperature Coefficient
RTD	≤ ±0.2°C	≤ ±0.01°C/°C
TC Type: E, J, K, L, N, T, U	≤ ±1.0°C	≤ ±0.05°C/°C
TC Type: B, R, S, W3, W5	≤ ±2.0°C	≤ ±0.2°C/°C
EMC immunity influence.....< ±0.5% of span		
Extended EMC immunity: NAMUR NE 21, A criterion, burst.....< ±1% of span		

#### Input Range

Type	Min. Value	Min. Value	Min. Span	Standard
Pt100	-200°C	+850°C	25°C	IEC 60751
Ni100	-60°C	+250°C	25°C	DIN 43760
B	+400°C	+1820°C	200°C	IEC584
E	-100°C	+1000°C	50°C	IEC584
J	-100°C	+1200°C	50°C	IEC584
K	-180°C	+1372°C	50°C	IEC584
L	-100°C	+900°C	50°C	DIN 43710
N	-180°C	+1300°C	100°C	IEC584
R	-50°C	+1760°C	200°C	IEC584
S	-50°C	+1760°C	200°C	IEC584
T	-200°C	+400°C	50°C	IEC584
U	-200°C	+600°C	75°C	DIN 43710
W3	0°C	+2300°C	200°C	ASTM E988-90
W5	0°C	+2300°C	200°C	ASTM E988-90

### T55

Operating temperature: -40°C to 85°C  
 Supply voltage, DC  
     Standard: 8.0 to 35 V  
     CE, FM and CSA: 7.2 to 30 VDC  
 Internal consumption: 25 mW to 0.8 W  
 Voltage drop: 7.2 VDC  
 Isolation voltage, test / operation: 1.5 kVAC / 50 VAC  
 Communications interface: Programming Module and HART  
 Signal / noise ratio: Min. 60 dB  
 Response time (programmable): 1 to 60 s  
 EEPROM error check: < 10 s  
 Signal dynamics, input: 22 bit  
 Signal dynamics, output: 16 bit  
 Calibration temperature: 20 to 28°C  
 Accuracy: the greater of general and basic values  
     given in Tables below  
 Effect of supply voltage variation:\* < 0.005% of span/ VDC  
 Vibration: IEC 60068-2-6 Test FC  
 Lloyd's specification no. 1: 4 g / 2 to 100 Hz  
 Max. wire size: 1 x 16 AWG stranded wire  
 Humidity: < 95% RH (non-cond.)  
 Dimensions: Ø 1.73 x 0.8 in  
 Tightness (enclosure / terminal): IP68 / IP00  
 Weight: 1.8 oz.

#### Accuracy General Values

Input Type	Absolute Accuracy	Temperature Coefficient
All	≤ ±0.05% of span*	≤ ±0.005% of span* / °C

#### Accuracy Basic Values

Input Type	Basic Accuracy	Temperature Coefficient
RTD	≤ ±0.1°C	≤ ±0.005°C/°C
TC Type: E, J, K, L, N, T, U	≤ ±0.5°C	≤ ±0.025°C/°C
TC Type: B, R, S, W3, W5, LR	≤ ±1.0°C	≤ ±0.1°C/°C
EMC immunity influence.....< ±0.1% of span		
Extended EMC immunity: NAMUR NE 21, A criterion, burst.....< ±1% of span		

#### Input Range

Type	Min. Value	Min. Value	Min. Span	Standard
Pt100	-200°C	+850°C	10°C	IEC 60751
Ni100	-60°C	+250°C	10°C	DIN 43760
B	+400°C	+1820°C	100°C	IEC584
E	-100°C	+1000°C	50°C	IEC584
J	-100°C	+1200°C	50°C	IEC584
K	-180°C	+1372°C	50°C	IEC584
L	-100°C	+900°C	50°C	DIN 43710
N	-180°C	+1300°C	50°C	IEC584
R	-50°C	+1760°C	100°C	IEC584
S	-50°C	+1760°C	100°C	IEC584
T	-200°C	+400°C	50°C	IEC584
U	-200°C	+600°C	50°C	DIN 43710
W3	0°C	+2300°C	100°C	ASTM E988-90
W5	0°C	+2300°C	100°C	ASTM E988-90

\*Of span = Of the presently selected range

# T51 Transmitter

## Ordering Information

**Temperature Range**

{Tmin to Tmax} Tmin = Temperature for 4mA output  
Tmax = Temperature for 20mA output

**Temperature Units**

C Degrees Celsius  
F Degrees Fahrenheit

(Leave blank if not required)

**T51**

Basic Order Codes Options

Default settings are in bold type and will be used unless another setting is specified. Include the following configuration sheet when selections other than defaults are required. The configuration sheet is available on the Burns website at [www.burnsengineering.com](http://www.burnsengineering.com), Keyword "T51\_config".

<b>Transmitter:</b>	• T51 Temperature Transmitter		
<b>Sensor Type:</b>	<input type="radio"/> <b>RTD</b>	<input type="radio"/> Thermocouple	
<b>Element Type:</b>	<input type="radio"/> <b>Pt100 (DIN/IEC)</b>	<input type="radio"/> Ni 100	
	<input type="radio"/> Type J T/C	<input type="radio"/> Type K T/C	<input type="radio"/> Type E T/C
	<input type="radio"/> Type T T/C	<input type="radio"/> Type B T/C	<input type="radio"/> Type L T/C
	<input type="radio"/> Type N T/C	<input type="radio"/> Type R T/C	<input type="radio"/> Type S T/C
	<input type="radio"/> Type U T/C	<input type="radio"/> Type W3 T/C	<input type="radio"/> Type W5 T/C
<b>RTD Connection Type:</b>	<input type="radio"/> 2 –Wire <input type="radio"/> <b>3 –Wire</b> <input type="radio"/> 4 –Wire	<input type="radio"/> Cable Offset – Consult Factory	
<b>Thermocouple Cold Junction Compensation:</b>	<input type="radio"/> <b>Internal CJC</b>	<input type="radio"/> Other – Consult Factory	
<b>Response Time:</b>	<input type="radio"/> <b>1 Second</b>	<input type="radio"/> Other – Specify 2 to 60 Seconds: _____	
<b>Output:</b>	<input type="radio"/> <b>4 to 20 mA</b> <input type="radio"/> 20 to 4 mA	<input type="radio"/> Other – Consult factory	
<b>Out of Range Limits:</b>	<input type="radio"/> Span (4 and 20 mA typical) <input type="radio"/> Max (3.5 and 23 mA) <input type="radio"/> <b>Namur NE43 (3.8 and 20.5 mA)</b>	<input type="radio"/> Other – Consult factory	
<b>Sensor Error Action:</b>	<input type="radio"/> Off <input type="radio"/> <b>Namur NE43 Upscale (23mA)</b> <input type="radio"/> Namur NE43 Downscale (3.8mA)	<input type="radio"/> Other – Consult factory	
<b>Tagging Information:</b>	<input type="radio"/> <b>No Tag Number</b> <input type="radio"/> Tag number on transmitter label and programmed into Transmitter – 15 Characters Maximum. -----		

### Inputs:

Input Type	Min. Temp	Max. Temp	Min. Span	Standard
Pt100	-200°C	+850°C	25°C	IEC 60751
Ni100	-60°C	+250°C	25°C	DIN 43760
E T/C	-100°C	+1000°C	50°C	IEC584
J T/C	-100°C	+1200°C	50°C	IEC584
K T/C	-180°C	+1372°C	50°C	IEC584
T T/C	-200°C	+400°C	50°C	IEC584
N T/C	-180°C	+1300°C	100°C	IEC584
B T/C	+400°C	+1820°C	200°C	IEC584
L T/C	-100°C	+900°C	50°C	DIN 43710
R T/C	-50°C	+1760°C	200°C	IEC584
S T/C	-50°C	+1760°C	200°C	IEC584
U T/C	-200°C	+600°C	75°C	DIN 43710
W3	0°C	+2300°C	200°C	ASTM E988-90
W5	0°C	+2300°C	200°C	ASTM E988-90

# T55 Transmitter

## Ordering Information

**Calibration Type**

M	Transmitter and sensor matched for improved performance (Only available when ordered with a sensor assembly)
(blank)	Not matched

**Temperature Range**

{Tmin to Tmax}	Tmin = Temperature for 4mA output Tmax = Temperature for 20mA output
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**Temperature Units**

C	Degrees Celsius
F	Degrees Fahrenheit

(Leave blank if not required)

Basic Order Codes: T55 [ ] [ ] [ ]

Options: [ ]

Default settings are in bold type and will be used unless another setting is specified. Include the following configuration sheet when selections other than defaults are required. The configuration sheet is available on the Burns website at [www.burnsengineering.com](http://www.burnsengineering.com), Keyword "T55\_config".

<b>Transmitter:</b>	● T55 Temperature Transmitter		
<b>Calibration:</b>	<input type="radio"/> <b>Not Matched</b> <input type="radio"/> Matched to RTD		
<b>Sensor Type:</b>	<input type="radio"/> <b>RTD</b> <input type="radio"/> Thermocouple		
<b>Element Type:</b>	<input type="radio"/> <b>Pt100 (DIN/IEC)</b>	<input type="radio"/> Pt Custom (Matched) (Requires Sensor CVD Coefficients)	<input type="radio"/> Ni 100
	<input type="radio"/> Type J T/C	<input type="radio"/> Type K T/C	<input type="radio"/> Type E T/C
	<input type="radio"/> Type T T/C	<input type="radio"/> Type B T/C	<input type="radio"/> Type L T/C
	<input type="radio"/> Type N T/C	<input type="radio"/> Type R T/C	<input type="radio"/> Type S T/C
	<input type="radio"/> Type U T/C	<input type="radio"/> Type W3 T/C	<input type="radio"/> Type W5 T/C
<b>RTD Connection Type:</b>	<input type="radio"/> 2 –Wire <input type="radio"/> <b>3 –Wire</b> <input type="radio"/> 4 –Wire	<input type="radio"/> Average – Consult Factory <input type="radio"/> Differential – Consult Factory <input type="radio"/> Cable Offset/Resis. – Consult Factory	
<b>Thermocouple Connection Type:</b>	<input type="radio"/> <b>Standard</b>	<input type="radio"/> Average – Consult Factory <input type="radio"/> Differential – Consult Factory	
<b>Thermocouple Cold Junction Compensation:</b>	<input type="radio"/> <b>Internal CJC</b>	<input type="radio"/> Other – Consult Factory	
<b>Response Time:</b>	<input type="radio"/> <b>1 Second</b>	<input type="radio"/> Other – Specify 2 to 60 Seconds: ____	
<b>Output:</b>	<input type="radio"/> <b>4 to 20 mA</b> <input type="radio"/> 20 to 4 mA	<input type="radio"/> Other – Consult factory	
<b>Out of Range Limits:</b>	<input type="radio"/> Span (4 and 20 mA typical) <input type="radio"/> Max (3.5 and 23 mA) <input type="radio"/> <b>Namur NE43 (3.8 and 20.5 mA)</b>	<input type="radio"/> Other – Consult factory	
<b>Sensor Error Action Shorted:</b>	<input type="radio"/> <b>3.6 mA</b> <input type="radio"/> Off <input type="radio"/> Namur NE43 Upscale (23mA) <input type="radio"/> Namur NE43 Downscale (3.8mA)	<input type="radio"/> Other – Consult factory	
<b>Sensor Error Action Broken:</b>	<input type="radio"/> Off <input type="radio"/> <b>Namur NE43 Upscale (23mA)</b> <input type="radio"/> Namur NE43 Downscale (3.8mA)	<input type="radio"/> Other – Consult factory	
<b>Tagging Information:</b>	<input type="radio"/> <b>No Tag Number</b> <input type="radio"/> Tag number on transmitter label and programmed into Transmitter – 8 Characters Maximum. _____		

### Inputs:

Input Type	Min. Temp	Max. Temp	Min. Span	Standard
Pt100	-200°C	+850°C	10°C	IEC 60751
Ni100	-60°C	+250°C	10°C	DIN 43760
E T/C	-100°C	+1000°C	50°C	IEC584
J T/C	-100°C	+1200°C	50°C	IEC584
K T/C	-180°C	+1372°C	50°C	IEC584
T T/C	-200°C	+400°C	50°C	IEC584
N T/C	-180°C	+1300°C	50°C	IEC584
B T/C	+400°C	+1820°C	100°C	IEC584
L T/C	-100°C	+900°C	50°C	DIN 43710
R T/C	-50°C	+1760°C	100°C	IEC584
S T/C	-50°C	+1760°C	100°C	IEC584
U T/C	-200°C	+600°C	50°C	DIN 43710
W3	0°C	+2300°C	100°C	ASTM E988-90
W5	0°C	+2300°C	100°C	ASTM E988-90

# TL21 and TL01 Transmitters



## Description

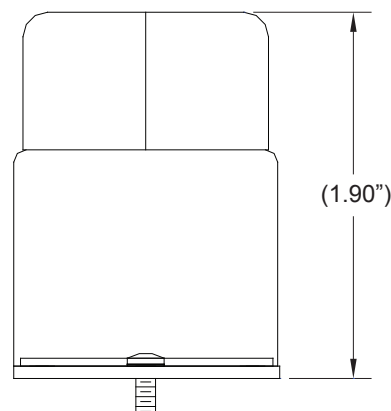
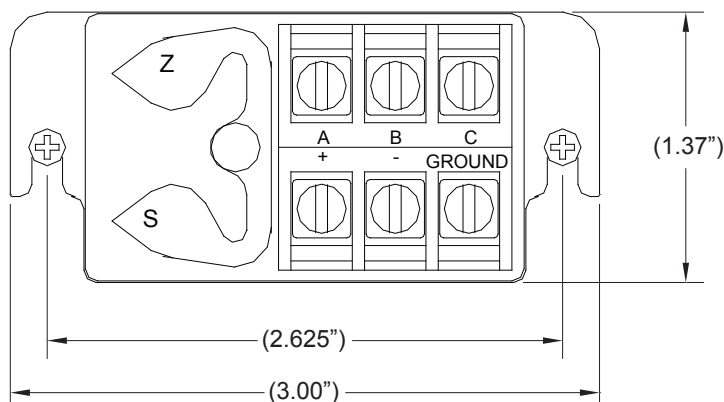
For nearly a quarter century the Model TL transmitter has been diligently monitoring and controlling temperature in processes where accuracy, stability, and repeatability are of paramount importance to product quality, efficiency and/or safety. Calibration of the device is easily accomplished through highly sensitive non-interactive zero and span potentiometers. The design has evolved over the years with improved linearity and FM approval for intrinsic safety. Large rugged terminals insure easy and secure wire connection. Although current transmitter technology has transcended this design, the model TL has proven to be a workhorse in thousands of processes across all industries and continues to be specified for new as well as replacement applications.

With .05% of span accuracy linearized with temperature, the Model TL transmitter delivers high accuracy and precise adjustability. The trim potentiometers are designed for high stability and ease of adjustment for applications where accuracy is an imperative.

The transmitter may be installed in a connection head or mounted separately from the sensor in a panel on snap-track or on a DIN rail (optional adaptor TT02).

## Features and Benefits

- High accuracy: .05% of span
- Non-interactive wide range zero and span adjustment
- Outstanding ambient temperature range
- Low temperature coefficient
- FM intrinsic Safety rating
- EMI/RFI protected
- Metal foil pots
- Snap track and remote mounting





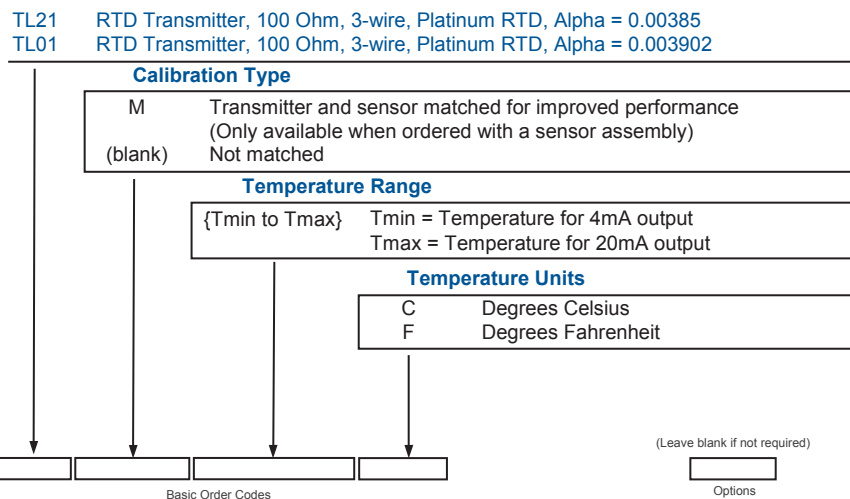
# TL21 and TL01 Transmitter

## Specifications

Accuracy:	±0.05%
Linearity:	Included above
Temperature Range Zero:	-200 to 400°C
Temperature Range Span:	50 to 700°C
Temperature Range Absolute:	-200 to 500°C
Drift:	±0.01% of span or ±0.01°C per °C change in ambient temperature
Adjustment Range Zero:	±25°C
Adjustment Range Span:	±25% (rangeable -200 to 600°C)
Ambient Temp. Range:	-40 to 85°C
Sensor Burnout Indication:	Upscale
Supply Voltage Min:	10V
Supply Voltage Max:	40V
Output Limits High:	33mA
Output Limits Low:	3.2mA
EMI/RFI Immunity:	Input/output filtering
Power Supply Effect:	±0.005%

# TL21 and TL01 Transmitter

## Ordering Information



# Enclosures with LED Indicator

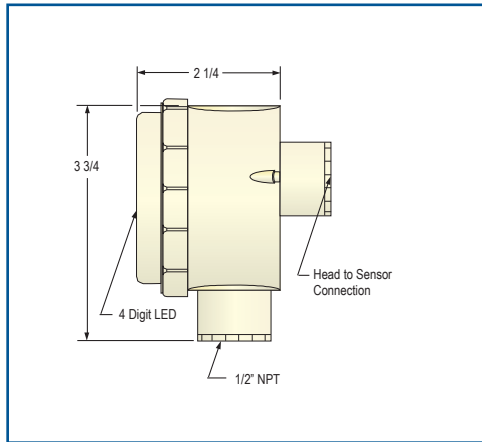
## Specifications

- 4 digit LED display
- Output: 4 to 20 mA
- Loop Powered
- Three push button setup
- Single channel function
- Simple menu structure
- Works with T51 and T55
- For use with single sensing elements
- Mounted in same head as transmitter
- Can function from separate 4-20 input

## Plastic Connection Head with LED Indicator

- Burns #20 connection head
- plastic enclosure
- 1/2" NPT sensor connection

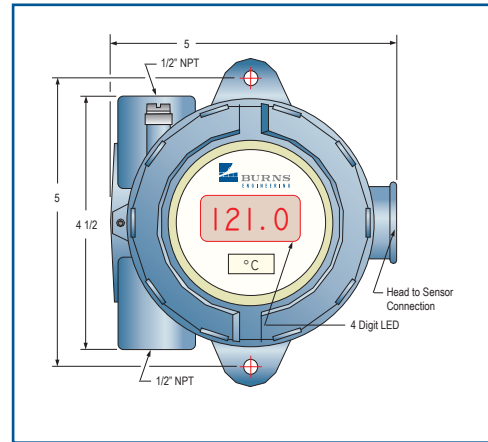
Ordering Code: /HD20P04



## Aluminum Connection Head with LED Indicator

- Burns #19 connection head
- Aluminum
- 1/2" NPT sensor connection
- FM approved enclosure:
  - Class I, Div 1, Group A,B,C,D: Class II, Div 1, Group E,F,G: Class III, Div 1, NEMA 4X

Ordering Code: /HD19P04



## Mounting Options

### Pipe Mount for Remote Head

Ordering Codes:

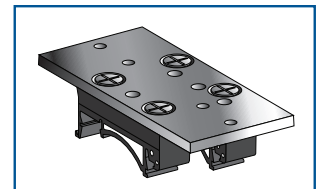
/HM01A	/HM01C	/HM01E	/HM01G
/HM01B	/HM01D	/HM01F	/HM01H

Code	Nominal Pipe Size
HM01A	3/8" - 1/2"
HM01B	3/4"
HM01C	1"
HM01D	1 1/4"
HM01E	1 1/2"
HM01F	2"
HM01G	3"
HM01H	3 1/2"

### DIN Rail Mounting Plate

Ordering Code:

/TT02



# TP05

## USB Communications Interface

TP05 is a USB communications interface for configuration and monitoring of Burns PC-programmable T51 and T55 transmitters.

### Communication via USB Port

Using TP05, the communication between the programming unit and the PC is now carried out by way of a USB port. TP05 is fully compatible with PCs running Windows 98 SE, ME, 2000 or XP operating systems.

### Quick Set-Up

The programming module is simple and quick to use. Once the driver has been installed, the user only needs to connect the module to the PC and programming can start. Power is supplied from the USB port.

### Online Programming

Either transmitter model can be configured independent of the process or, alternatively, directly in the process while connected to your control system. T51 and T55 are programmed by way of modular cable with 4 EZ-Mini-Hooks on one end. Configuration can be carried out online as the transmitter is only put in hold mode for as long as it takes to receive the new set-up. As soon as communication is complete, the transmitter operates with the new configuration.

### TP05 Package Includes

- Interface Device
- Software with drivers
- Communication cable



## Custom solutions designed for your specific needs.

Burns Engineering has a long history of designing and building temperature sensors to meet the measurement needs of unique and varied applications. The products in this catalog were specifically developed to meet field requirements and allow for configured-to-order flexibility. Not sure what product is right for your application? Our application engineering group is here to help you select, configure, and/or custom design the right product for your specific needs.

Burns Engineering is a leading supplier of temperature measurement solutions for all your process and metrology applications.

Your processes require advanced temperature measurement solutions that you can depend on. We understand that measurement accuracy, reliability and consistency are important to your success.

Temperature measurement is our business.

Turn to Burns as your  
Temperature Measurement Expert.

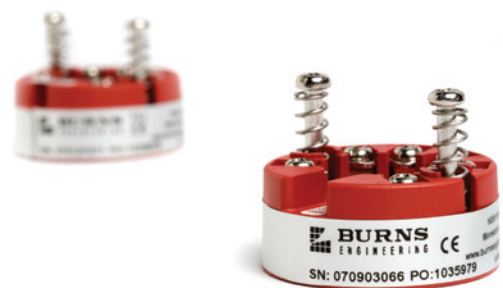
We know the issues.

We have the answers.

Let's talk!

What will your solution BE?

### TEMPERATURE TRANSMITTERS



Burns Engineering | 10201 Bren Rd. E. Minnetonka, MN 55343 | email: [info@burnsengineering.com](mailto:info@burnsengineering.com)  
Phone Toll Free: 800-328-3871 | Phone (Local): 952-935-4400 | Fax: 952-935-8782