SUNSTAR

Hydronix

Thermo-Tuff

User Guide

To re-order quote part number:	HD0476
Revision:	1.0.1
Revision Date:	January 2011

1 Introduction

The Hydronix Thermo-Tuff is a fast response, linear, high precision temperature sensor for use in industrial processes, including measurement in bulk materials and mixing applications. It is especially suited to high wear environments.

1.1 Part numbers and Accessories

Part No	Description
TT01	Thermo-Tuff sensor
0310	Mounting Collar
0320	Extension Mounting Sleeve and Collar

1.2 Safety

For continued safe operation, this product should only be used for temperature measurement in a process control system and should be installed and operated as described in this document.
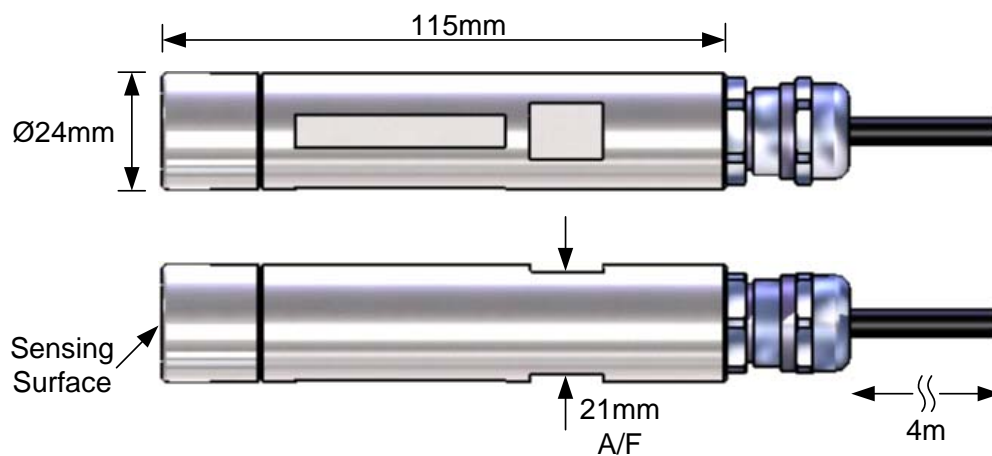
The cable screen must be connected to the system earth.

1.3 Specifications

Measurement Range: 0 - 80°C
Storage Temperature: -10 - 80°C
Voltage Range: 10 - 28v DC
                          (Reverse Polarity Protected)
IP Rating: IP68
Weight: 600g including 4m cable
Installed T90   56s

2 Mechanical Installation
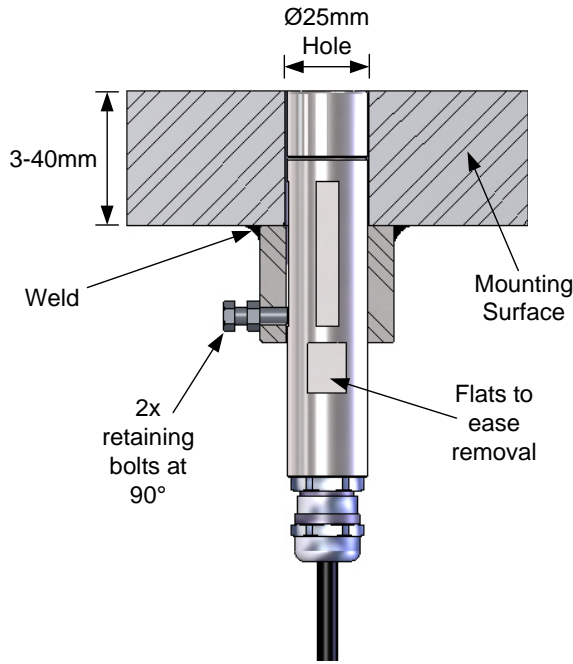
2.1 Dimensions

2.2 Installation Options

The sensor can be mounted vertically or horizontally. The sensing surface must touch the material being measured.

The Thermo-Tuff is designed to be maintenance free and does not require calibration.

## 2.2.1   Installing using the Mounting Collar

Drill a 25mm diameter hole in the mounting surface and weld the Mounting Collar centrally over it. The Thermo-Tuff is retained by tightening two bolts on to the long flat areas of the sensor.

To remove the sensor, loosen the screws and withdraw from the Mounting Collar. A spanner can be used on the two flat areas of the sensor to ease extraction of the sensor from the Mounting Collar.

When flush mounted, it is important to adjust the position of the sensor periodically so that the sensing face remains flush with the mounting surface and does not become damaged by any moving parts within the system. This will also prevent the build up of material around the sensor.

2.2.2   Installing using the Extension Mounting Sleeve and Collar
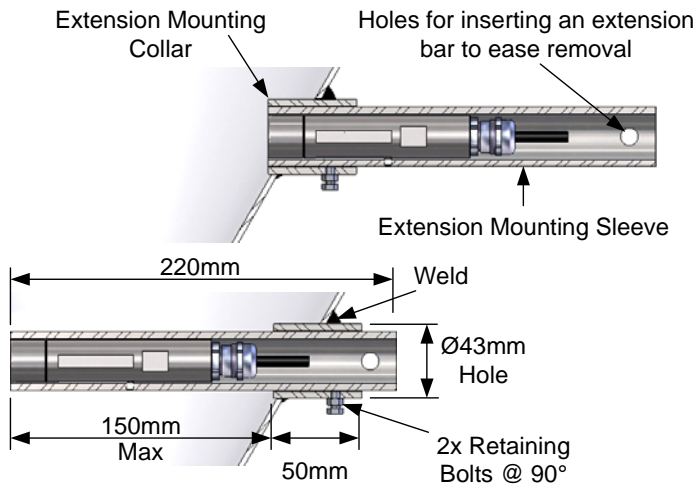
When mounting in a bin or hopper, the Extension Mounting Collar is welded into a 43mm diameter hole. The sensor should be installed into the Extension Mounting Sleeve so that it is flush with the end of the sleeve. It is retained with two grub screws. The Sleeve is then fitted in the Mounting Collar and the retaining bolts used to secure the assembly.

# 3   Electrical Installation

3.1   Power

The Thermo-Tuff is designed to be powered by the 4-20mA current loop. It does not have connections for an external power supply.

3.2   Analogue Output

The Thermo-Tuff outputs a continuous 4-20mA signal and this is scaled to read between 0 and 80°C as shown:

Temperature in °C = $(I_o - 4) \times 5$
Where I_o is the output current in mA.

Current Output	Temperature	
4mA	0 °C	32 °F
20mA	80 °C	176 °F
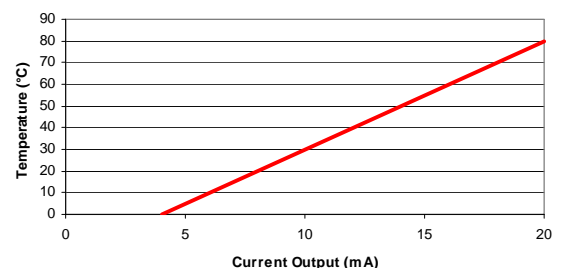
3.3   Connections

The Thermo-Tuff is supplied with a 4 metre unterminated cable. The wire colours are:

Wire Colour	Description
Red	Current Loop Positive
Blue	Current Loop Negative
Screen	Earth

When installing the Thermo-Tuff a drip loop should be used to protect the cable gland from any water ingress.

The Thermo-Tuff cable screen must be connected to a good system earth point.

3.4   Output Circuit Design
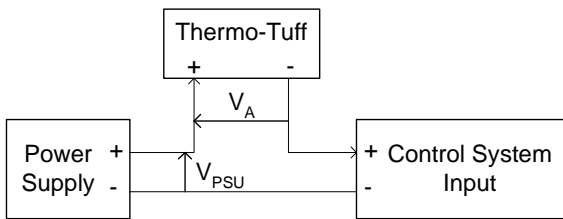
The output circuit should be designed such that V_A is between 10v and 28v DC. This can be checked by calculating the following:

$$V_A = V_{PSU} - (I*R)$$

Where I is 4mA for the maximum V_A and 20mA for the minimum V_A. R is the total resistance of the circuit including the cable.

4   Troubleshooting

Inaccurate Temperature	Check the PLC input scaling
	Check the voltage across the TT01.
Noisy Signal	Check total resistance in the loop.
No Current	Check polarity
Output clamps at less than 20mA	Check the resistance of the cable and the control system input.
	Check the voltage across TT01

5   Declaration of conformity

FC	C€	(waste electronic)
This device complies with part 18 of the FCC Rules.	This device is designed and manufactured in accordance with the following directives:	Local regulations regarding the disposal or recycling of waste electronic equipment must be followed.
	2004/108/EC The Electromagnetic Compatibility Directive and its amending directives	

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