

REFERENCE

IEC 584.2
ANSI MC-96.1

CERTIFICATE

ISO 9001 : 2008
ISO 14001 : 2004
BS OHSAS 18001 : 2007

1 WARNING

Warnings identify potentially dangerous situations or serious hazards. In this manual, a warning indicates an imminently hazardous situation which, if not avoided, could result in serious injury or death.

For efficient working of your Thermocouple, please read all instructions carefully before attempting to installation and Operation, using, or maintaining this product.

In hazardous area, do not power the unit until the cable gland is sealed and the enclosure cover is screwed down securely.

Do not attempt to unscrew the cover of Flame proof housing before loosening locking screw in the base housing. Always retighten the locking screw after replacing cover.

Before attempting any work on the control, be certain to pull disconnect switch or otherwise assure that electrical circuit(s) through control is deactivated, close operating medium supply valve on controls equipped with pneumatic switch mechanisms.

When in doubt about the condition or performance of a ITEC - Thermocouple, return it to the factory.

Supply voltage should not exceed thermocouple rating. For higher voltages, the use of relay circuit is recommended.

2 GENERAL

A thermocouple consists of two electrical conductors of different materials connected to one another at one end (measuring junction). The two free ends build a compensation point resp reference junction. The thermocouple can be extended by using an extension or a compensating cable. The extension or compensating cables are connected to a measuring instrument, e.g. a galvanometer or electronic measuring unit.

The thermoelectric voltage appearing at the reference junction depends on the thermocouple wire material and on the temperature difference between the measuring junction and the reference junction. For temperature measurement, the temperature of the reference junction must be kept constant or must be well known, to make an appropriate correction in mV.

Extension cables are manufactured of the same material as the corresponding thermocouple, e.g. Cu-CuNi, Fe-CuNi. Compensating cables are manufactured of special materials.

Up to 200°C compensating cables supply the same thermoelectric voltage as the thermocouples to which they are connected, the thermoelectric voltages of the thermocouples are laid down in so-called basic value series.

e.g. :	PtRh30% -PtRh6%	Type B
	Fe-CuNi	Type J
	NiCr - NiAl	Type K
	PtRh87/13% - Pt	Type R
	PtRh90/10% - Pt	Type S

and others in DIN IEC 584-1

Fe-CuNi	Type L
Cu-CuNi	Type U

These thermocouples are not more available for use in new plants (thermoelectric voltage according to DIN 43710) Basic value tables are available on request only at manufacturer site.

The compensating cable for a thermocouple must be making of a material to suit the particular type of thermocouple, so compensating leads are Color-code. For standardized compensating cable the regulations contained in DIN EN 60584 apply. Maximum temperatures indicated by manufacturer have to be considered. Most thermocouples are supplied ready for operation that is in a protective mounting to prevent damage to the thermocouple by mechanical forces or chemical attack.

INSTALLATION

The protective tubes of thermocouples must be adapted to the particular operating conditions. Precious metal thermocouples are always protected with a ceramic tube, even if the unit has a metallic protective mounting.

At high temperatures the protective tubes should be installed vertically, where possible, i.e. suspended, to avoid damage deflection to the protective tube and thermocouple through bending. If specific conditions on site make a horizontal installation unavoidable, long protective tubes have to be suitably supported.

When laying and connecting extension resp. compensating cables, care must be taken to connect the positive pole of the thermocouple to the positive terminal of the indicating instrument. If extension cables or compensating cables are used, care must be taken not to interchange positive and negative conductors. To prevent errors, the positive and negative leads bear a corresponding marking.

All connections must be absolutely clean and firmly tightened. The corresponding positive and negative terminals should have the same temperature potential.

In the negative temperature range, thermocouples can be used down to -200°C. For temperatures above 1000°C, thermocouples made of platinum and a platinum/rhodium alloys are used.

The color coding used to identify the +ve & -ve wire are given below.

ANSI Code	ANSI MC 96.1 Color Coding		Alloy Combination		Maximum T/C Grade Temp. Range	IEC 584-3 Color Coding		IEC Code
	Thermocouple Grade	Extension Grade	+ Lead	- Lead		Thermocouple Grade	Intrinsically Safe	
J			IRON Fe (magnetic)	CONSTANTAN COPPER-NICKEL Cu-Ni	-210 to 1200°C -346 to 2193°F			J
K			NICKEL-CHROMIUM Ni-Cr	NICKEL-ALUMINUM Ni-Al (magnetic)	-270 to 1372°C -454 to 2501°F			K
T			COPPER Cu	CONSTANTAN COPPER-NICKEL Cu-Ni	-270 to 400°C -454 to 752°F			T
E			NICKEL-CHROMIUM Ni-Cr	CONSTANTAN COPPER-NICKEL Cu-Ni	-270 to 1000°C -454 to 1832°F			E
N			NICROSIL Ni-Cr-Si	NISIL Ni-Si-Mg	-270 to 1300°C -450 to 2372°F			N
R	NONE ESTABLISHED		PLATINUM-13% RHODIUM Pt-13% Rh	PLATINUM Pt	-50 to 1768°C -58 to 3214°F			R
S	NONE ESTABLISHED		PLATINUM-10% RHODIUM Pt-10% Rh	PLATINUM Pt	-50 to 1768°C -58 to 3214°F			S
U	NONE ESTABLISHED		COPPER Cu	COPPER-LOW NICKEL Cu-Ni				U
B	NONE ESTABLISHED		PLATINUM-30% RHODIUM Pt-30% Rh	PLATINUM-6% RHODIUM Pt-6% Rh	0 to 1820°C 32 to 3308°F			B

4 MAINTENANCE

All the Thermocouple should be checked regularly for wear and tear, accuracy, and proper functioning. Replace all broken or damaged parts immediately.

Never leave housing cover off the control. This cover is designed to keep dust and dirt from interfering with connections / operation. In addition, it protects against damaging moisture and acts as a safety feature by keeping bare wires and terminals from being exposed. Should the housing cover become damaged or misplaced, order a replacement immediately.

ITEC Thermocouple may sometimes be exposed to excessive heat or moisture. Under such conditions, insulation on electrical wires may become brittle, eventually breaking or peeling away. The resulting "bare" wires can cause short circuits. Check wiring carefully and replace at first sign of brittle insulation. Vibration may sometimes cause terminal screws to work loose. Check all terminal connections to be certain that screws are tight. Air (or gas) operating medium lines subjected to vibration may eventually crack or become loose at connections causing leakage. Check lines and connections carefully and repair or replace, if necessary.