

# Honeywell



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## **STT 1 7 3**

**STT3000 Smart  
Temperature Transmitter**

**Operator Manual**

Doc. No.: 34-ST-25-26  
Revision Date: 2/06

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Revision 0 – 2/06

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## About This Document

### Abstract

This document is intended to support the installation and operation of the Model STT173 Smart Temperature Transmitter.

### Revision Notes

The following list provides notes concerning all revisions of this document.

Rev. ID	Date	Notes
0	2/06	This document is the initial Honeywell release of the STT173 Transmitter

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## Notices

### Safety Instructions

Ex installation:

For safe installation of STT173-BS in a hazardous area, the following must be observed. The module must only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.

Year of manufacture can be taken from the first two digits in the serial number.

For Ex data see section 4.3 ATEX Installation Data.

The sensor circuit is not infallibly galvanically isolated from the input circuit. However, the galvanic isolation between the circuits is capable of withstanding a test voltage of 500 Vac during 1 minute.

The transmitter must be mounted in an enclosure in order to provide a degree of ingress protection of at least IP20.

In explosive atmospheres caused by air / dust mixtures:

The transmitter may only be installed in a potentially explosive atmosphere caused by the presence of combustible dust when mounted in a metal enclosure form B according to DIN 43729 that is providing a degree of ingress protection of at least IP 6X in accordance with EN 60529, that is suitable for the application and is correctly installed.

Cable entries and blanking elements shall be used that are suitable for the application and correctly installed.

For an ambient temperature  $\geq 60^{\circ}\text{C}$ , heat resistant cables shall be used with a rating of at least 20 K above the ambient temperature.

### Special Conditions for Safe Use:

If the enclosure in which the transmitter is mounted is made of aluminium and installed in Zone 0, 1 or Zone 20, 21 or 22 it shall not contain by weight more than 6% in total of magnesium and titanium.

The additional enclosure of the apparatus shall be designed and/or installed in such a way that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.

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## Consigne de sécurité

Installation S.I. :

Pour l'installation de STT173-BS dans les zones dangereuses, conformez-vous aux consignes de sécurité suivantes : l'installation ne doit être réalisée que par du personnel qualifié connaissant la législation nationale et internationale ainsi que les directives et standards régissant ce domaine.

L'année de production ressort des deux premiers chiffres du numéro de série.

Pour les données de sécurité intrinsèque, voir section 4.3 ATEX Installation Data.

L'isolation galvanique entre le circuit du capteur et le circuit d'entrée n'est pas infallible. Cependant, l'isolation galvanique entre les circuits est capable de résister à une tension de test de 500 Vca pendant 1 minute.

Le transmetteur doit être monté dans un boîtier assurant un degré d'étanchéité d'au moins IP20.

Dans les atmosphères explosibles dues à des mélanges d'air avec des poussières :

Le transmetteur doit seulement être installé dans les atmosphères potentiellement explosibles dû à la présence de poussières combustibles quand il est monté dans un boîtier métallique DIN B conformément à DIN 43729 assurant un degré d'étanchéité d'au moins IP 6X conformément à l'EN 60529. Ce boîtier doit convenir à l'application et il doit être correctement installé.

Seulement des raccords de câble et des bouchons convenant à l'application et correctement installés doivent être utilisés.

Pour une température ambiante  $\geq 60^{\circ}\text{C}$ , il faut utiliser des câbles résistant aux températures élevées avec une capacité nominale d'au moins 20 K au dessus de la température ambiante.

### Conditions spécifiques à l'utilisation sûre :

Si le boîtier dans lequel est monté le transmetteur est fait d'aluminium et installé en zone 0, 1 ou zone 20, 21 ou 22, il ne doit contenir en poids plus que 6% en total de magnésium et de titane.

Le boîtier supplémentaire de l'appareil doit être construit et/ou installé dans une telle manière que, même dans le cas d'incidents rares, les sources d'inflammation dues aux impacts et aux étincelles de friction ne peuvent se produire.

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## Sicherheitsinstruktion

Ex-Installation:

Für sichere Installation von STT173-BS in explosionsgefährdeter Umgebung muss folgendes beobachtet werden. Die Installation muss nur von qualifizierten Personen, die mit den nationalen und internationalen Gesetze, Direktiven und Standards des Gebiets bekannt sind, vorgenommen werden.

Die ersten beiden Ziffern der Seriennummer geben das Produktionsjahr an.

Für Ex-Daten siehe Abschnitt 4.3 ATEX Installation Data.

Die galvanische Trennung zwischen dem Sensorkreis und dem Eingangskreis ist nicht unfehlbar. Allerdings ist die galvanische Trennung zwischen den Kreisen so ausgelegt, dass diese eine Testspannung von 500 Vac für eine Minute aushält.

Der Messumformer muss in einem Gehäuse montiert werden, um die Mindestanforderung des Berührungsschutzes mit dem Schutzgrad IP 20 zu erreichen.

In Explosionsfähige Atmosphären durch Staub/Luft-Gemische:

Der Messumformer darf nur in einer potentiellen explosiven Atmosphäre, basierend auf entflammaren Staub, eingesetzt werden, wenn er in einem Metallkopf Form B gemäß DIN 43729 montiert ist, welcher einen Schutzgrad von mindestens IP 6X gemäß EN 60529 besitzt und für den dementsprechenden Einsatz zugelassen ist.

Es dürfen nur Kabeleinführungen und Abdeckungen eingesetzt werden, welche für die jeweilige Anwendung zugelassen sind.

Bei einer Umgebungstemperatur  $\geq 60^{\circ}\text{C}$  müssen hitzebeständige Leitungen eingesetzt werden, welche für eine mindestens 20 K höhere Umgebungstemperatur zugelassen sind.

### Sonderbedingungen für sichere Anwendung:

Wenn das Gehäuse, in dem der Messumformer montiert ist, aus Aluminium gemacht ist und es in Zone 0, 1 oder Zone 20, 21 oder 22 installiert ist, es muss höchstens eine Totale von 6% Magnesium und Titanium einhalten.

Das zusätzliche Gehäuse des Apparats ist so zu konstruieren und herzustellen, dass Zündquellen (Stöße und Reibungsfunken) selbst bei selten auftretenden Gerätestörungen vermieden werden.

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## 1. 2-WIRE PROGRAMMABLE TRANSMITTER MODEL STT173

### 1.1 Features

- RTD, TC, Ohm, or mV Input
- Extremely high Measurement Accuracy
- 1.5 kVAC galvanic isolation
- Programmable sensor error value
- For DIN form B sensor head mounting

### 1.2 Application

- Linearised temperature measurement with Pt100 or Ni100, or thermocouple sensor.
- Conversion of linear resistance variation to a standard analogue current signal, for instance from valves or Ohmic level sensors.
- Amplification of a bipolar mV signal to a standard 4-20 mA current signal.

### 1.3 Technical Characteristics

- Within a few seconds the user can program the STT173 to measure temperatures within all RTD ranges defined by the norms.
- The RTD and resistance inputs have cable compensation for 2-, 3-, and 4-wire connection.
- Continuous check of vital stored data for safety reasons.

### 1.4 Installation

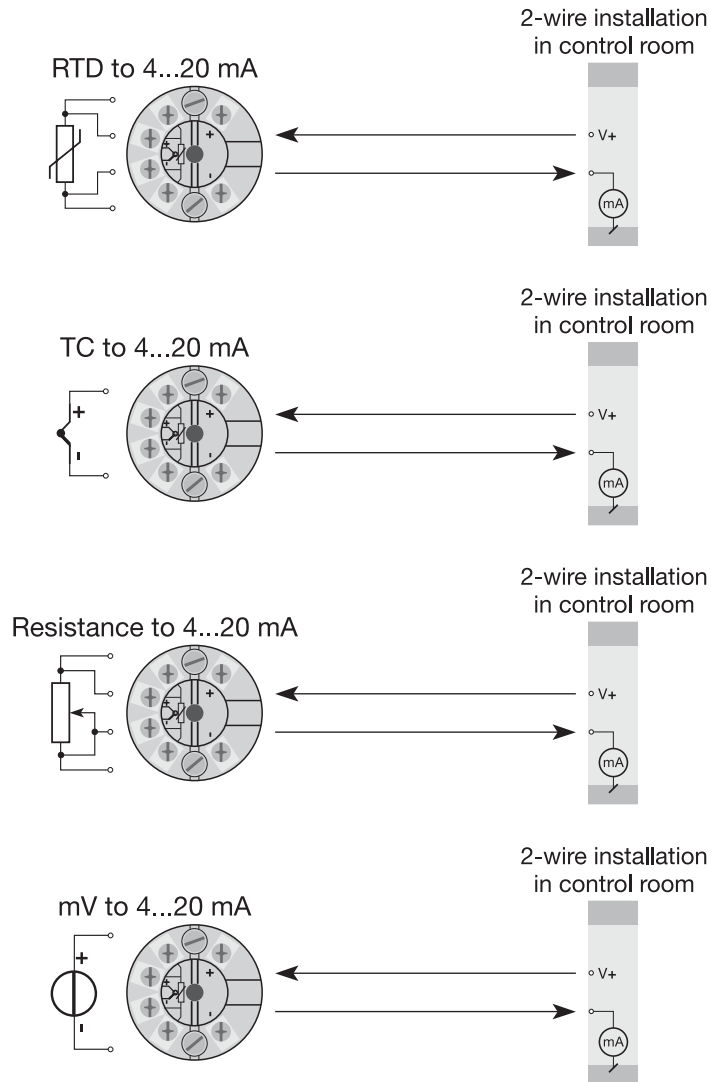


Figure 1-1 2-Wire installation in Control Room

### 1.5 Electrical Connections

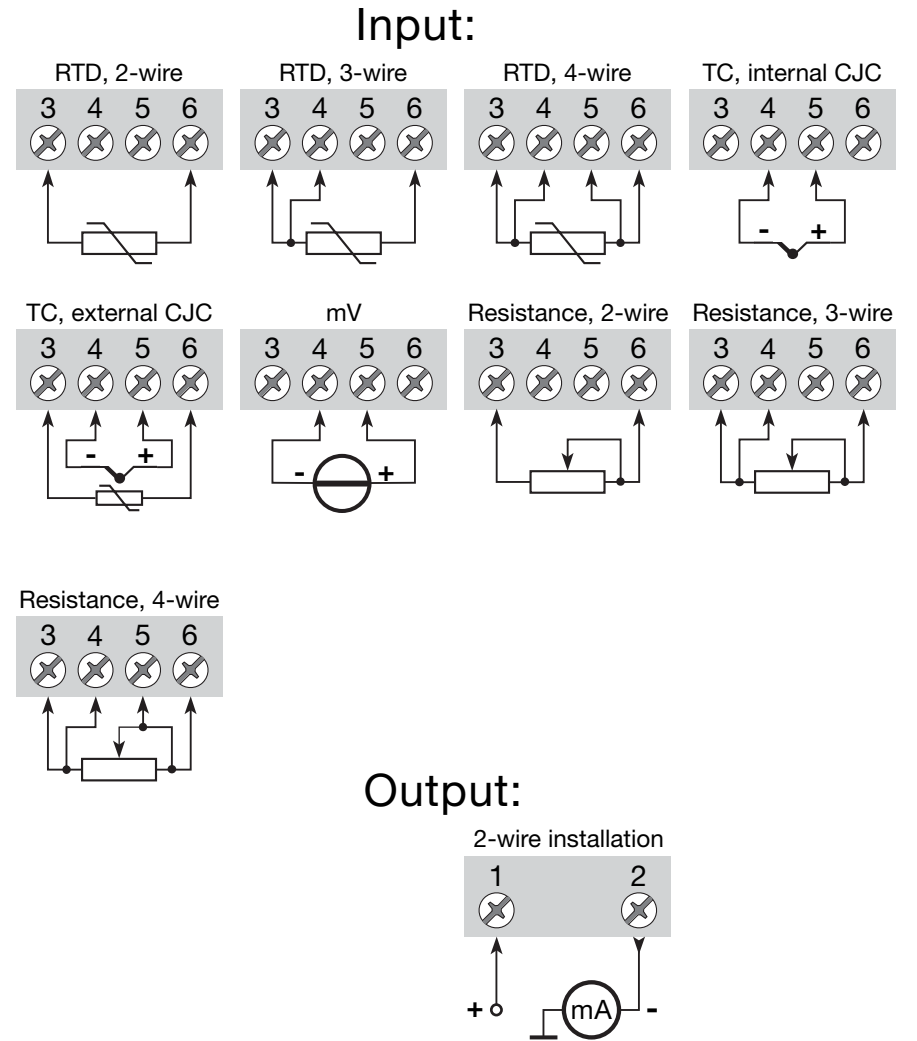


Figure 1-2 Electrical Connections

## 1.6 Block Diagram

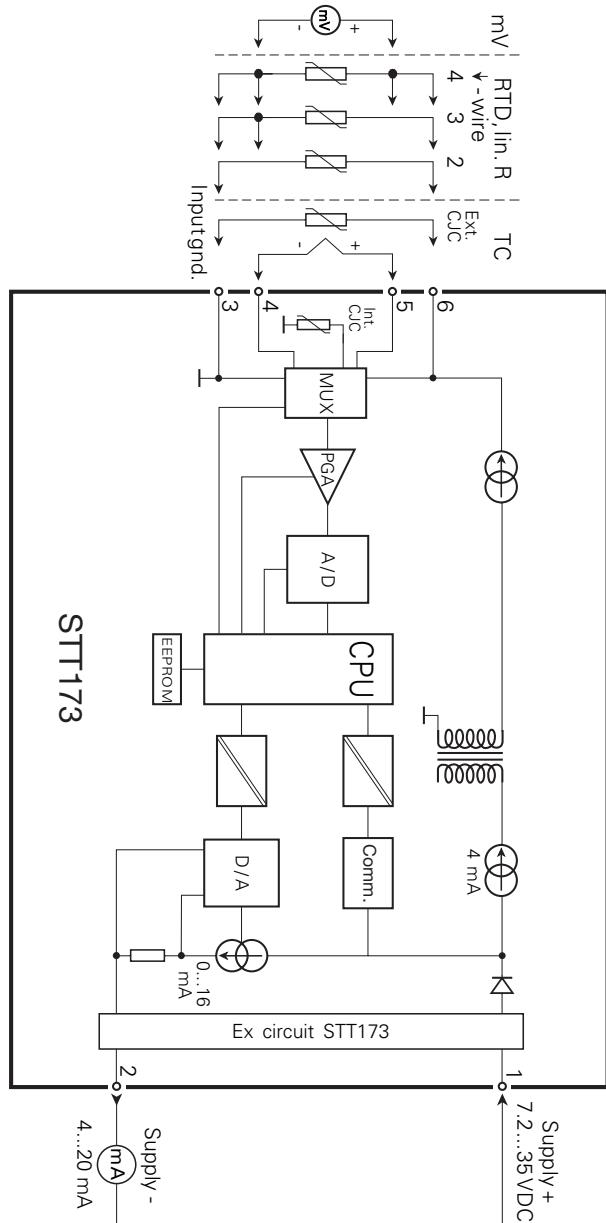


Figure 1-3 Block Diagram

## 1.7 Programming

- STT17C is a communications interface that is needed for programming the STT173.
- For programming, please refer to Figure 1-4 and the help function in STT17C.
- STT17C is not approved for communication with modules installed in hazardous (Ex) areas.

### ORDER: STT17C

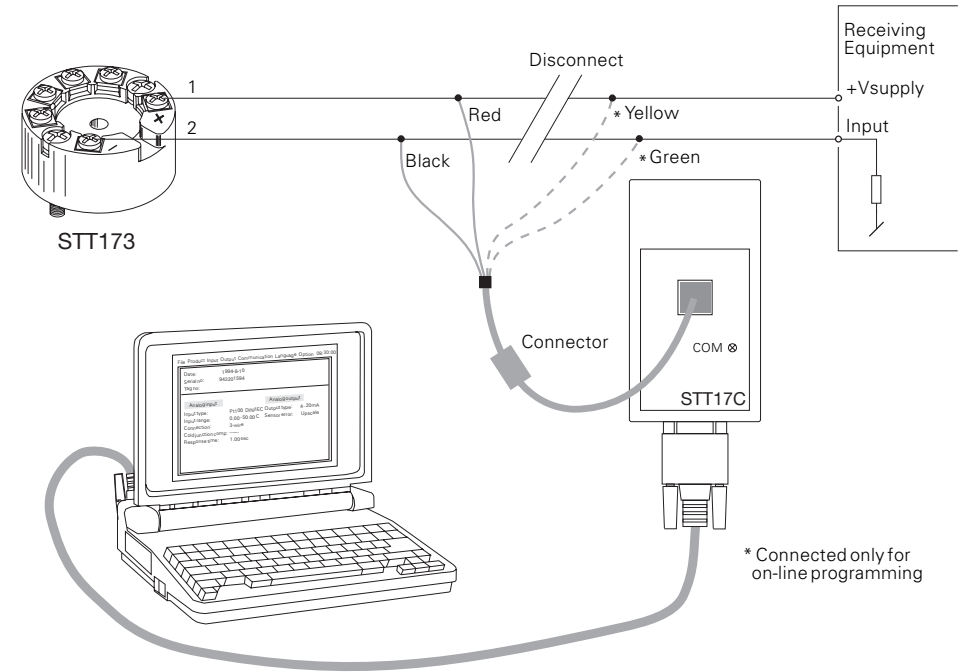


Figure 1-4 Programming



## 1.8 Mechanical Specifications

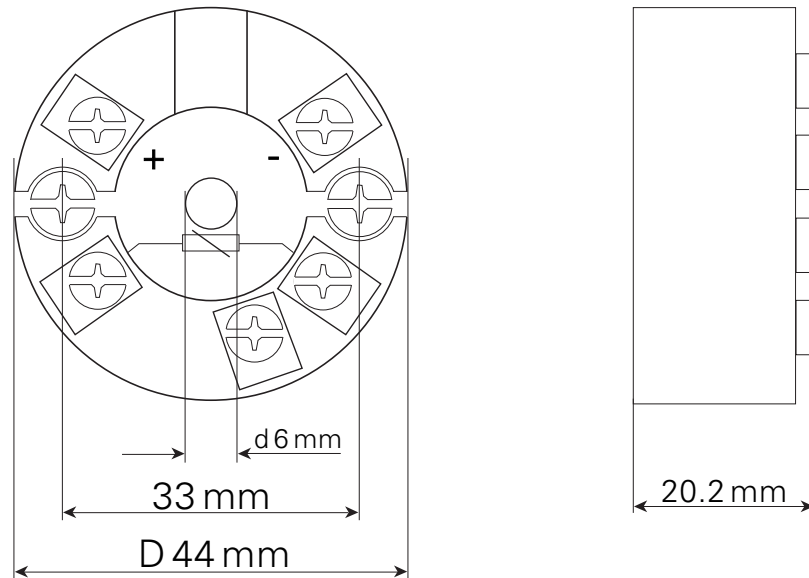
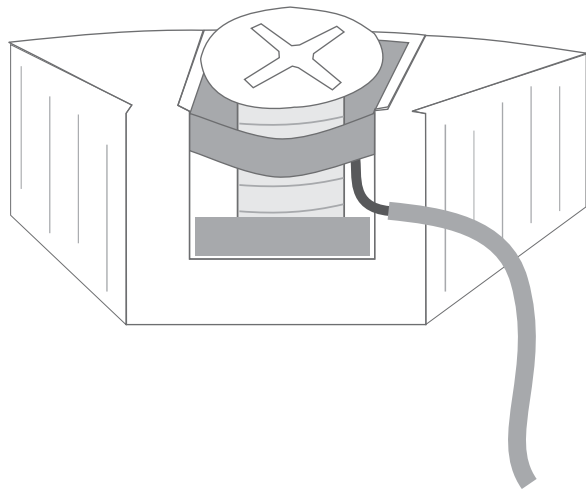


Figure 1-5 Mechanical Specifications

## 1.9 Mounting of Sensor Wires



Wires must be mounted between the metal plates

Figure 1-6 Mounting of Sensor Wires

## 2. TRANSMETTEUR 2-FILS PROGRAMMABLE STT173

### 2.1 Caractères

- Entrée RTD, TC, Ohm ou mV
- Très grande précision de mesure
- Isolation galvanique de 1,5 kVca
- Sécurité programmable
- Pour tête de sonde DIN B

### 2.2 Application

- Mesure linéarisée de la température avec un capteur Pt100, Ni100 ou de thermocouples.
- Conversion d'une résistance linéaire en un signal courant standard analogique pour mesurer par exemple le niveau ou la position d'une vanne.
- Amplification d'un signal mV bipolaire en un signal courant standard de 4-20 mA.

### 2.3 Caractéristiques techniques

- Le STT173 peut être programmé de manière simple et rapide.
- Compensation de ligne pour des entrées RTD et résistance avec un raccordement à 2, 3 et 4 fils.
- Vérification continue des données sauvegardées.

## 2.4 Installation

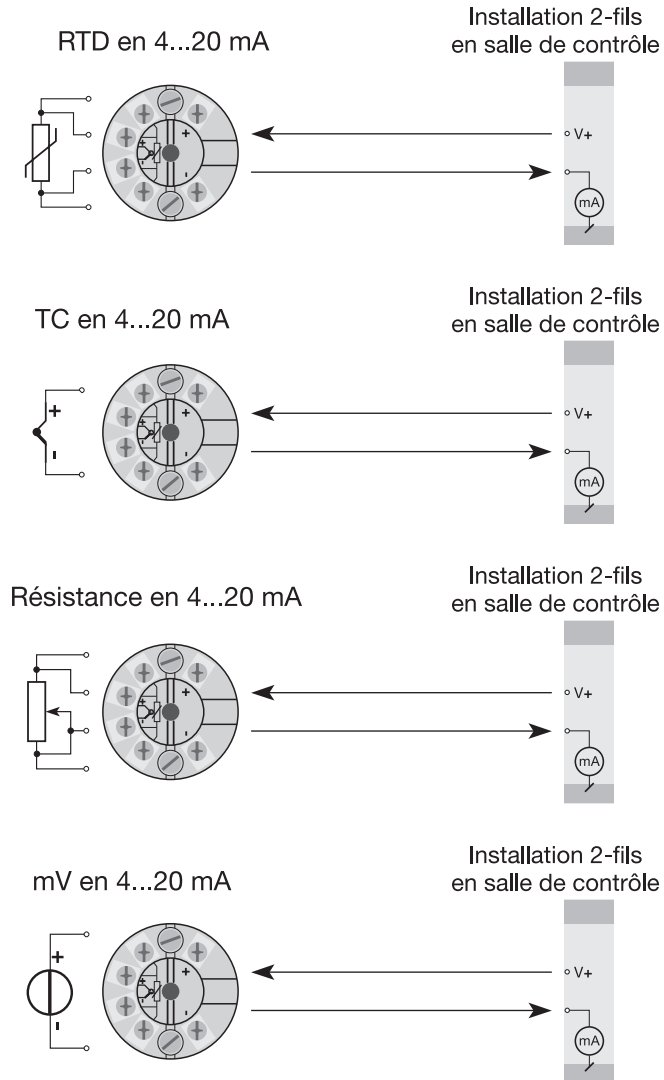


Figure 2-1 Installation 2-fils en sale de contrôle

## 2.5 Connexions

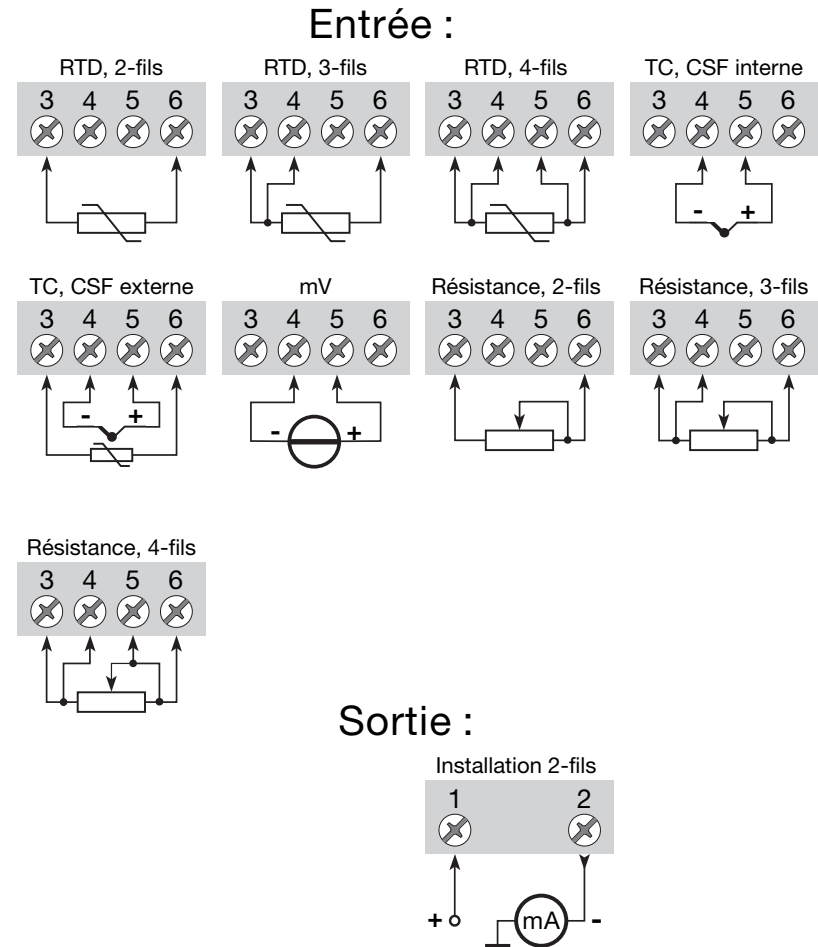


Figure 2-2 Connexions

## 2.6 Schema de Principe

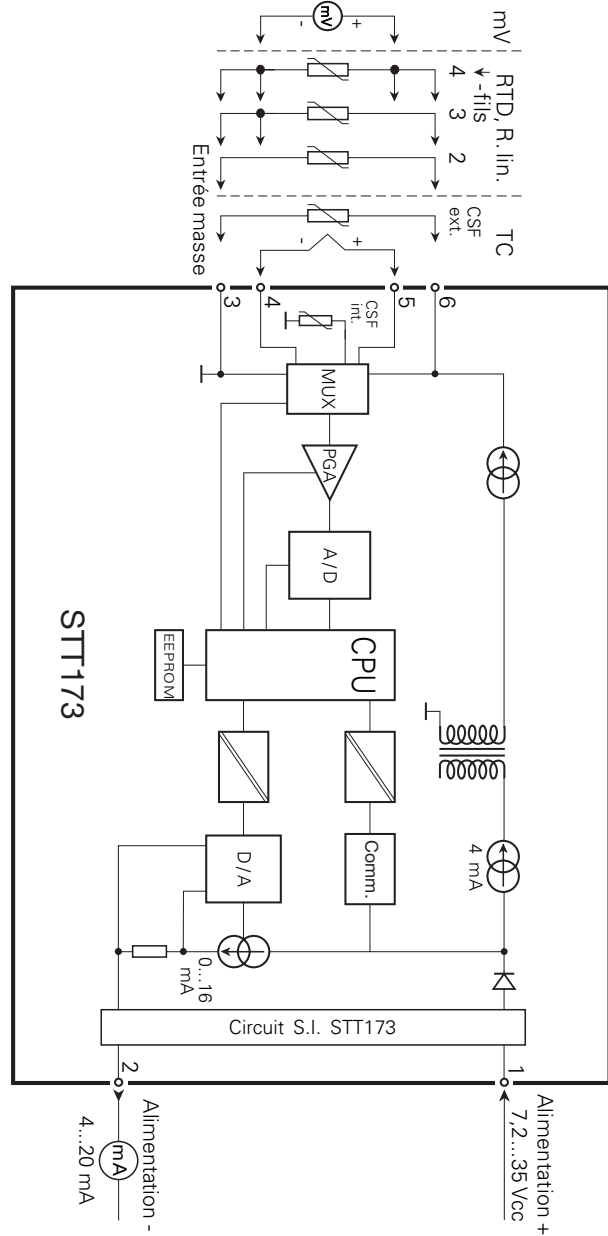


Figure 2-3 Schema de Principe

## 2.7 Programmation

- STT17C est un kit de programmation permettant de programmer le STT173.
- Pour le raccordement du STT17C, veuillez vous reporter au schéma ci-dessous et à l'aide en ligne du logiciel STT17C.
- STT17C ne doit pas être utilisé pour communication avec des modules installés en zone dangereuse.

### Numéro de référence: STT17C

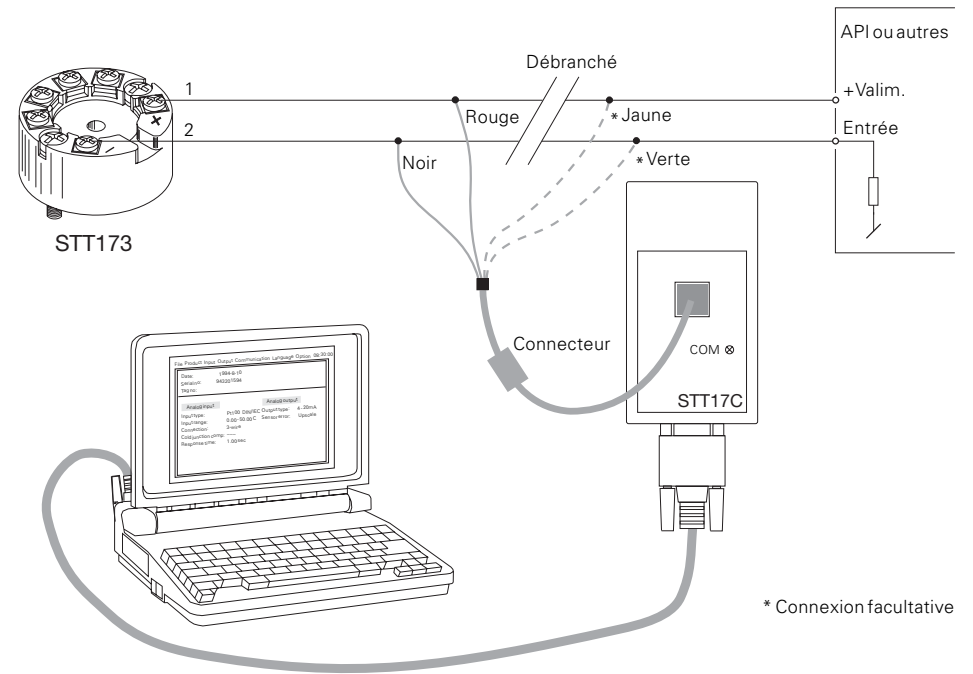


Figure 2-4 Programmation

## 2.8 Dimensions mécaniques

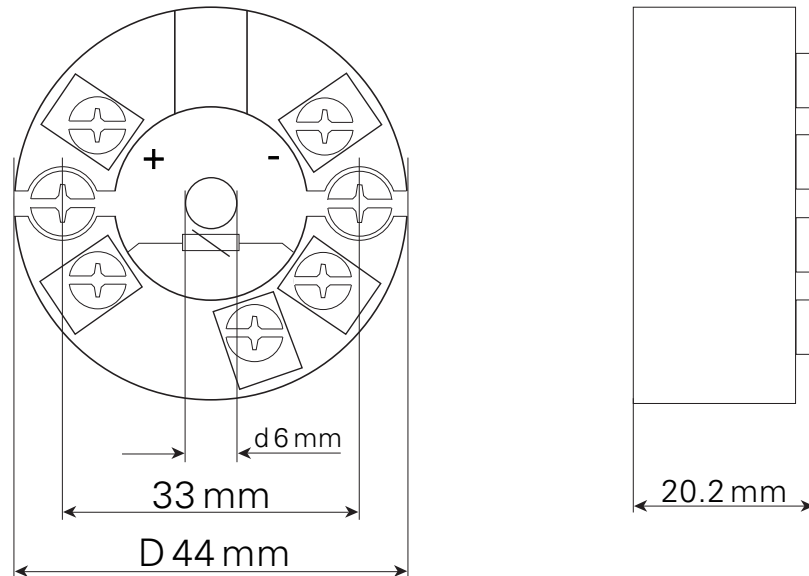
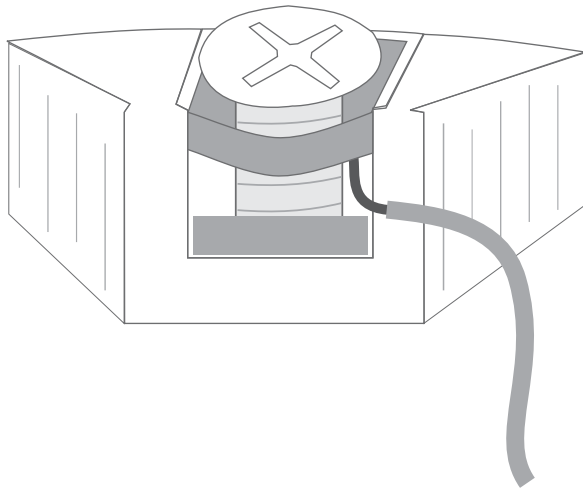


Figure 2-5 Dimensions mécaniques

## 2.9 Montage des fils du capteur



Les fils doivent être montés entre les plaques métalliques

Figure 2-6 Montage des fils du capteur

## 3. 2-DRAHT PROGRAMMIERBARER MESSUMFORMER STT173

### 3.1 Das Unterscheidungsmerkmal

- Eingang für WTH, TE,  $\Omega$  oder mV
- Extreme Messgenauigkeit
- 1,5 kVAC mit galvanische Trennung
- Programmierbare Sensorfehlanzeige
- Für Einbau in Anschlusskopf DIN Form B

### 3.2 Verwendung

- Linearisierte Temperaturmessung mit Pt100, Ni100 oder Thermoelementsensoren.
- Umwandlung von linearer Widerstandsänderung in ein analoges Standard-Stromsignal, z.B. von Ventilen oder Niveau-Messwertgeber.
- Verstärkung von bipolaren mV-Signalen zu einem standard 4-20 mA Stromsignal.

### 3.3 Technische Merkmale

- STT173 kann vom Benutzer innerhalb von wenigen Sekunden zur Messung in allen genormten WTH-Temperaturbereiche programmiert werden.
- Der WTH- und Widerstandseingang haben Leitungskompensation bei 2-, 3- oder 4-Leiter-Anschluss.
- Die gespeicherten Daten werden laufend kontrolliert.

### 3.4 Installation

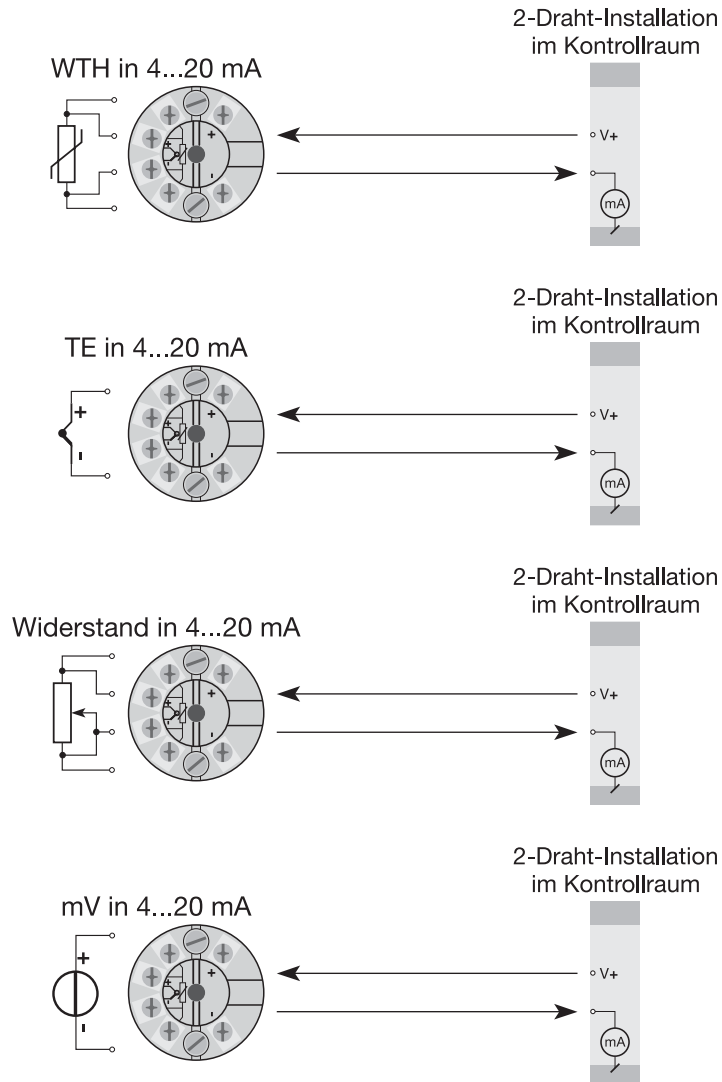


Figure 3-1 2-Draht-Installation

### 3.5 Anschlüsse

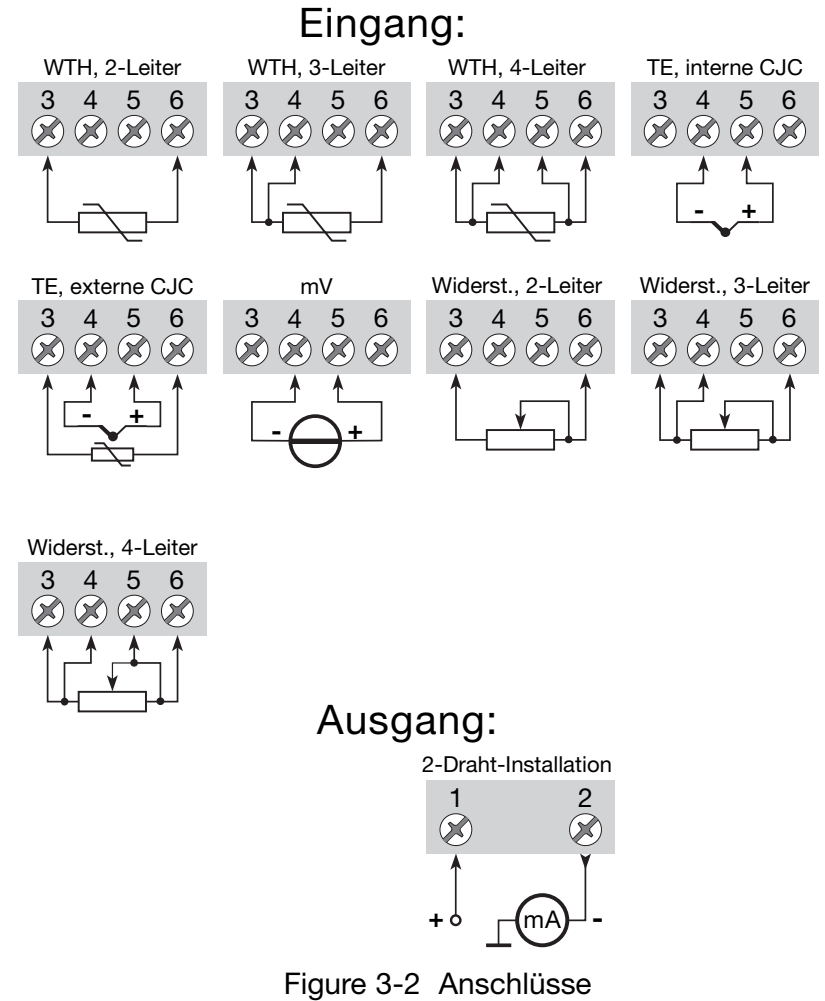


Figure 3-2 Anschlüsse

### 3.6 Blockdiagramm

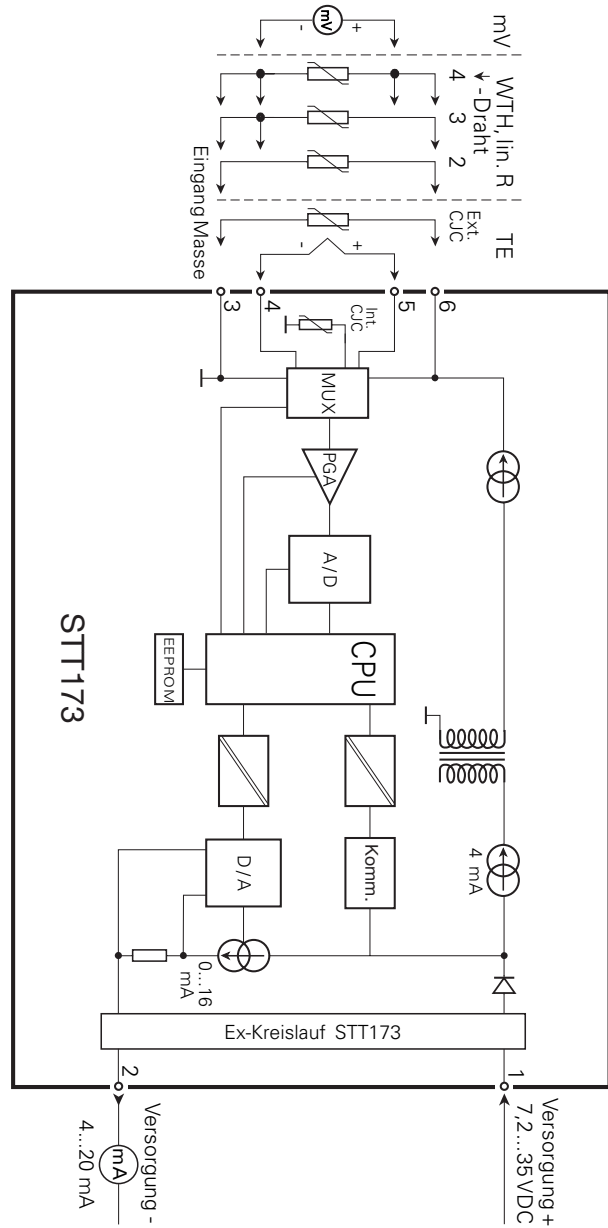


Figure 3-3 Blockdiagramm

### 3.7 Programmierung

- STT17C ist eine batteriegespeiste Schnittstelle zur Programmierung des PRetop STT173.
- Bezüglich Programmierung verweisen wir auf die nachfolgende Zeichnung und die "Hilfe"-Funktion im STT17C.
- STT17C darf nicht zur Kommunikation mit Modulen, die in Ex-gefährdeten Bereichen installiert sind, benutzt werden.

### Bestellangaben: STT17C

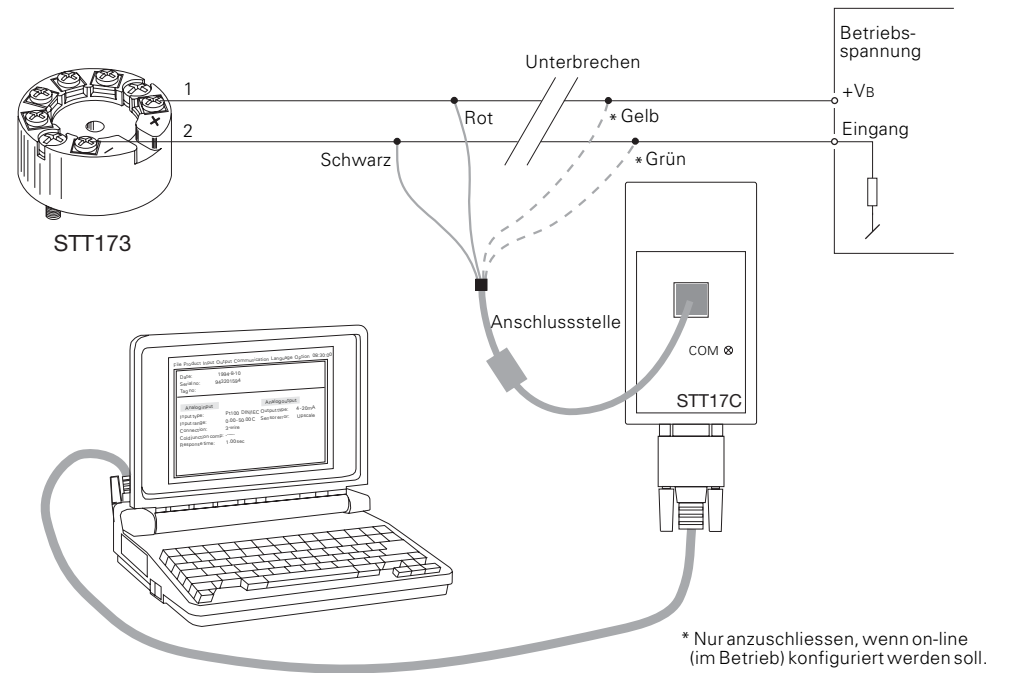


Figure 3-4 Programmierung

### 3.8 Abmessungen

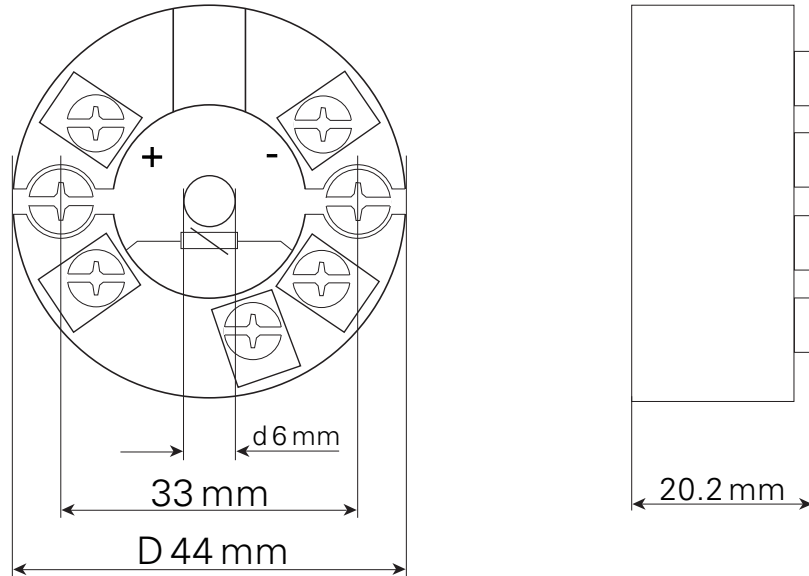
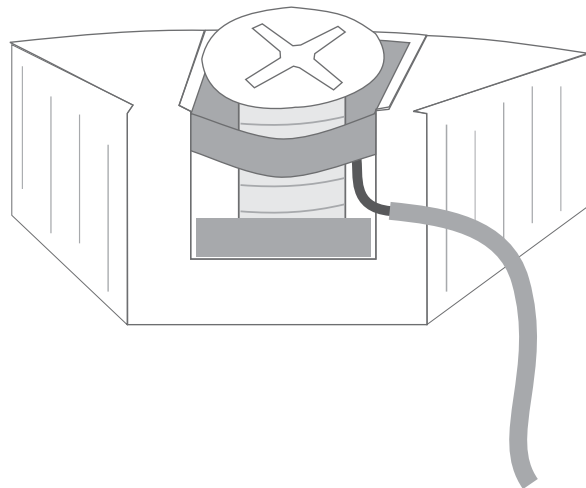


Figure 3-5 Abmessungen

### 3.9 Montage von Fühlerleitungen



Die Leitungen müssen zwischen den Metallplatten montiert werden

Figure 3-6 Montage von Fühlerleitungen

## 4. INSTALLATION DRAWINGS

### 4.1 FM Installation Drawing 50016324

#### 4.1.1 Model STT171-BS and STT173-BS

Hazardous (Classified) Location

Class I, Division 1, Groups, A, B, C, D  
Class I, Zone 0, IIC

Ambient temperature limits  
T4: -40 to + 85 deg. Celcius  
T6: -40 to + 60 deg. Celcius

Terminal 1, 2  
Vmax or Ui: 30 V  
Imax or Ii: 120 mA  
Pmax or Pi: 0.84 W  
Ci: 1 nF  
Li: 10 uH

Terminal 3, 4, 5, 6  
Only passive, or non-energy storing devices such as RTD's and Thermocouples may be connected.

Non Hazardous Location

Associated Apparatus or Barrier with entity Parameters:

$UM \leq 250V$   
 $Voc \text{ or } Uo \leq Vmax \text{ or } Ui$   
 $Isc \text{ or } Io \leq Imax \text{ or } Ii$   
 $Po \leq Pi$   
 $Ca \text{ or } Co \geq Ci + Ccable$   
 $La \text{ or } Lo \geq Li + Lcable$

This device must not be connected to any associated apparatus which uses or generates more than 250 VRMS

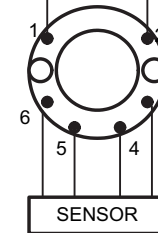


Figure 4-1 Model STT171-BS and STT173-BS [FM Installation Drawing]

### 4.1.2 The Entity Concept

The Transmitter must be installed according to National Electrical Code (ANSI-NFPA 70).

Equipment that is FM-approved for intrinsic safety may be connected to barriers based on the ENTITY CONCEPT. This concept permits interconnection of approved transmitters, meters and other devices in combinations which have not been specifically examined by FM, provided that the agency's criteria are met. The combination is then intrinsically safe, if the entity concept is acceptable to the authority having jurisdiction over the installation.

The entity concept criteria are as follows:

The intrinsically safe devices, other than barriers, must not be a source of power.

The maximum voltage  $U_i$  ( $V_{max}$ ) and current  $I_i$  ( $I_{max}$ ), and maximum power  $P_i$  ( $P_{max}$ ), which the device can receive and remain intrinsically safe, must be equal to or greater than the voltage ( $U_o$  or  $V_{OC}$  or  $V_t$ ) and current ( $I_o$  or  $I_{SC}$  or  $I_t$ ) and the power  $P_o$  which can be delivered by the barrier.

The sum of the maximum unprotected inductance ( $L_i$ ) for each intrinsically device and the interconnecting wiring must be less than the inductance ( $L_a$ ) which can be safely connected to the barrier.

The entity parameters  $U_o$ ,  $V_{OC}$  or  $V_t$  and  $I_o$ ,  $I_{SC}$  or  $I_t$ , and  $C_a$  and  $L_a$  for barriers are provided by the barrier manufacturer.

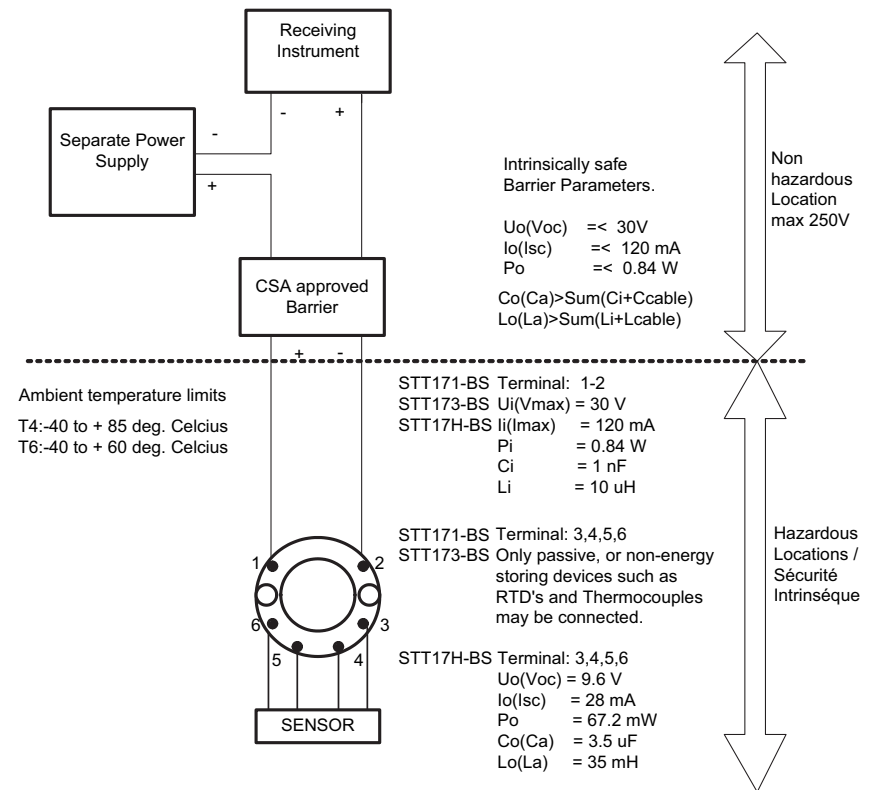
## 4.2 CSA Installation Drawing 50016326

### 4.2.1 Model STT171-BS, STT173-BS and STT17H-BS

Model STT171-BS, STT173-BS and STT17H-BS transmitters are approved as intrinsically safe in Zone 0 Group IIC or Class I, Division 1, Group A,B,C,D when installed according to this Installation Drawing.

#### 1. Connections with separate power supply and receiver.

Output: Standard 4 - 20 mA loop



#### Warning:

Substitution of components may impair intrinsic safety.

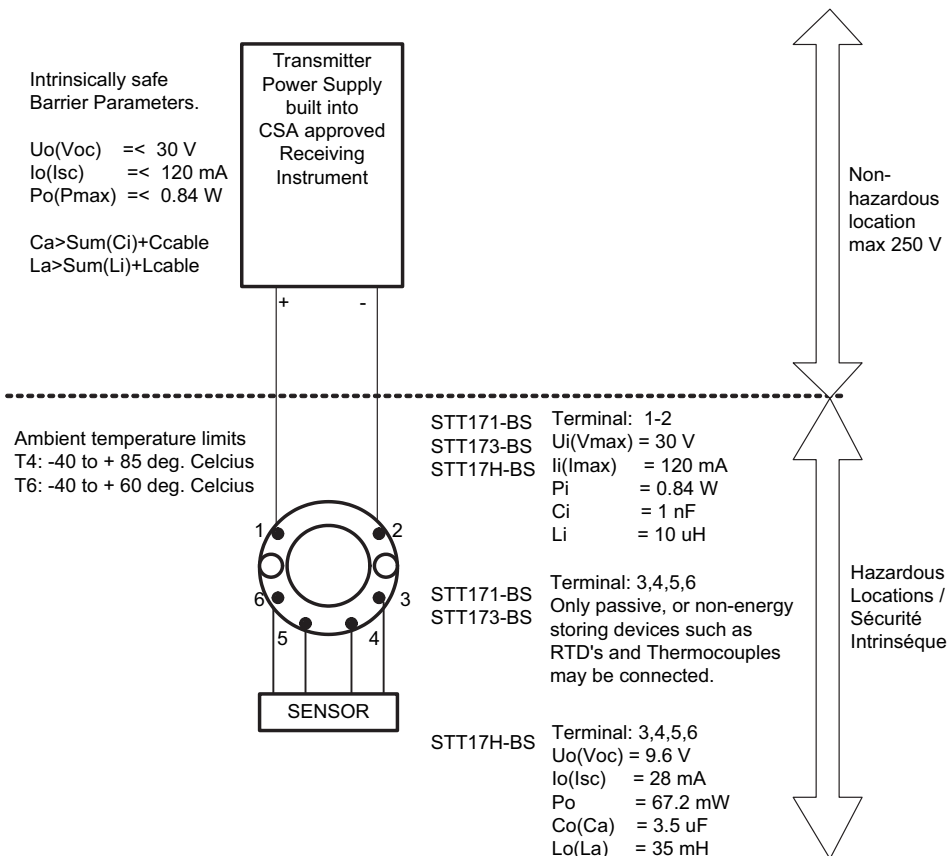
The transmitters must be installed in a suitable enclosure to meet installation codes stipulated in the Canadian Electrical Code (CEC).

Figure 4-2 Model STT171-BS, STT173-BS and STT17H-BS  
 [Connections with separate power supply and receiver]



**2. Connections with power supply and barrier built into receiver.**

**Output:** Standard 4 - 20 mA loop



**Warning:**

Substitution of components may impair intrinsic safety.  
 The transmitters must be installed in a suitable enclosure to meet installation codes stipulated in the Canadian Electrical Code (CEC).

Figure 4-3 Model STT171-BS, STT173-BS and STT17H-BS  
 [Connections with power supply and barrier built into receiver]

**4.3 ATEX Installation Data**

**EEx / I.S. approval STT173-BS:**

KEMA 06ATEX0063 X.....  $\text{Ex}$  II 1 GD, T80°C...T105°C

EEx ia IIC T6 / T4

Max. amb. temp. for T1...T4 ..... 85°C

Max. amb. temp. for T5 and T6 .... 60°C

ATEX, applicable in zone..... 0, 1, 2, 20, 21 or 22

**Ex / I.S. data:**

Signal output / supply, terminal 1 to 2:

$U_i$  ..... : 30 VDC

$I_i$  ..... : 120 mADC

$P_i$  ..... : 0.84 W

$L_i$  ..... : 10  $\mu\text{H}$

$C_i$  ..... : 1.0 nF

Sensor input, terminal 3, 4, 5 and 6:

$U_o$  ..... : 9.6 VDC

$I_o$  ..... : 25 mA

$P_o$  ..... : 60 mW

$L_o$  ..... : 33 mH

$C_o$  ..... : 2.4  $\mu\text{F}$

## 5. DECLARATION OF CONFORMITY

We declare under our sole responsibility that the following product in the STT 3000 Temperature Transmitter series:

### **STT173 Smart Temperature Transmitter**

is in conformity with the following directives and standards:

EMC directive 2004/108/EC and later amendments

#### **EN 61326**

This declaration is issued in compliance with article 10, subclause 1 of the EMC directive. For specification of the acceptable EMC performance level, refer to the electrical specifications for the module.

The ATEX directive 94/9/EC and later amendments

**EN 50014, EN 50020, EN 50284,**

**IEC 61241-0 and IEC 61241-11**

**ATEX certificate: KEMA 06ATEX0063 X (STT173-BS)**

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Frederick M. Kent  
Product Safety & Approvals Engineering  
Issue Date: 18 April 2006

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