



## SAFE INSTALLATION MANUAL (ATEX APPROVAL)

# TEMPERATURE TRANSMITTER (HART communication, intrinsically safe/flameproof)

MODEL

**FRC**

### BEFORE USE ....

#### ■ SAFETY PRECAUTIONS

This manual describes important points of caution for safe use of this product in potentially explosive atmosphere. Please read this manual carefully before installing and operating the product.

#### ■ SPECIAL CONDITIONS FOR SAFE USE

- If the model FRC0 is mounted in an area where category 1 equipment is required, precautions have to be taken that the enclosure can not be charged by static electricity.
- If the model FRC1 is mounted in an area where category 1 equipment is required, it must be installed such that even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- When the model FRC0 is installed in environment requiring a higher ingress protection than IP20, it must be additionally protected by an enclosure suitable for the environment.

#### ■ MANUFACTURED DATE CODE IDENTIFICATION

The manufactured year can be identified by the serial number described on the specification label.

Serial No. x Y xxxxxxT

YEAR \_\_\_\_\_

Indicates the least significant digit of the year.

#### ■ MODEL NUMBER IDENTIFICATION

- Model No. FRC \_\_\_\_\_ 1
- 1) OUTDOOR CASE \_\_\_\_\_
    - 0 : None (module only)
    - 1 : Yes
  - 2) SAFETY APPROVAL \_\_\_\_\_
    - A : None
    - B : FM flame-proof (for FRC1)
    - C : ATEX flameproof (for FRC1)
    - D : FM intrinsically safe
    - E : ATEX intrinsically safe
  - 3) DISPLAY \_\_\_\_\_
    - 0 : None
    - 1 : LCD
  - 4) WIRING CONDUIT \_\_\_\_\_
    - 0 : None (for FRC0)
    - 1 : 1/2 NPT
    - 2 : M20 x 1.5
    - 3 : PG 13.5

### ⚠ WARNING

**Explosions could result in death or serious injury:**

- The enclosure cover must be fully engaged to meet flameproof requirements.
- Do not remove the enclosure cover in explosive atmospheres when the circuit is alive (except IS models).
- Do not connect or disconnect the LCD module in explosive atmosphere when the circuit is alive.
- When the LCD is not installed, covers shall instead be fitted at the open connectors.
- Before you remove the unit or mount it, or before you connect or disconnect the wiring, turn off the power supply and the input signal for safety. Do not disconnect unless the area is known to be non-explosive.
- Whenever you need to measure voltage across the terminals or apply a simulated input signal to the terminals, make sure that there is no danger of explosion in the atmosphere.
- Before connecting a HART communicator in an explosive atmosphere, make sure the instruments in the loop are installed in accordance with intrinsically safe field wiring practices.
- Verify the certification of the product described on the specification label on the product.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.
- Verify that the environmental temperature is within the temperature class required for the area.

**Failure to follow these installation guidelines could result in death or serious injury:**

- Make sure only qualified personnel perform the installation.

## ⚠ SAFETY FEATURES & CAUTIONS

### ■ INTRINSICALLY SAFE APPROVAL

#### • CENELEC / ATEX

EC-Type Examination Certificate: KEMA 02ATEX1179 X

⊕ II 1G EEx ia IIC T4 through T6

Zone 0

#### • IS Data

$U_i = 30V$  DC

$U_o = 6.4V$  DC

$I_i = 96mA$  DC

$I_o = 30mA$  DC

$P_i = 720mW$

$P_o = 48mW$

$C_i = 0 \mu F$

$C_o = 20 \mu F$

$L_i = 0 mH$

$L_o = 10 mH$

• Prior to installation, check that the safety class of this unit satisfies the system requirements.

• A safety barrier must be installed between the unit and its power supply. Refer to "Installation Diagram" attached at the end of this manual when selecting a safety barrier.

• The power supply and the safety barrier must be located in a non-hazardous area.

• Environmental temperature must be within the following ranges depending upon the required temperature class.

T4 :  $-40^{\circ}C \leq T_a \leq +80^{\circ}C$

T5 :  $-40^{\circ}C \leq T_a \leq +65^{\circ}C$

T6 :  $-40^{\circ}C \leq T_a \leq +50^{\circ}C$

• **DO NOT RUB** the surface of the plastic enclosure with a dry cloth. Electrostatic charge generated by the friction may cause an explosion.

• **DO NOT APPLY** physical impact or friction onto the FRC1 enclosure.

• Be sure to secure the terminal cover after wiring (model FRC0).

• The wiring method must be in accordance with the electrical parameters described in this manual.

• Be sure to earth the unit (model: FRC1).

• The intrinsic safety approval of the model FRC1 is applied to the combination of the outdoor enclosure and the transmitter. The transmitter must not be separated or replaced.

• Substitution of components may impair suitability for the hazardous location and may cause an explosion.

• When metal particles are present in the air, install the model FRC0 inside an outdoor enclosure.

• For installing the FRC0 in an environment with a high relative humidity exceeding 0 to 95% RH or in a condensing atmosphere, install the unit inside an outdoor enclosure.

### ■ Model FRC1 FLAMEPROOF APPROVAL (Pending)

#### • CENELEC / ATEX

EC-Type Examination Certificate: KEMA XXXXXX

⊕ II 2G EEx d IIC T4 through T6

Zone 1

• Prior to installation, check that the safety class of this unit satisfies the system requirements.

• Environmental temperature must be within the following ranges depending upon the required temperature class.

T4 :  $-40^{\circ}C \leq T_a \leq +80^{\circ}C$

T5 :  $-40^{\circ}C \leq T_a \leq +65^{\circ}C$

T6 :  $-40^{\circ}C \leq T_a \leq +50^{\circ}C$

• Use suitable heat resistant cable for ambient temperatures  $\geq 70^{\circ}C$

• Before wiring, make sure there is no danger of explosion in the atmosphere.

• Before opening the enclosure, wait at least for 60 seconds after the power is removed.

• The cable entry device and stopping plugs for unused apertures shall be of a certified flameproof type, suitable for the conditions of use and correctly installed.

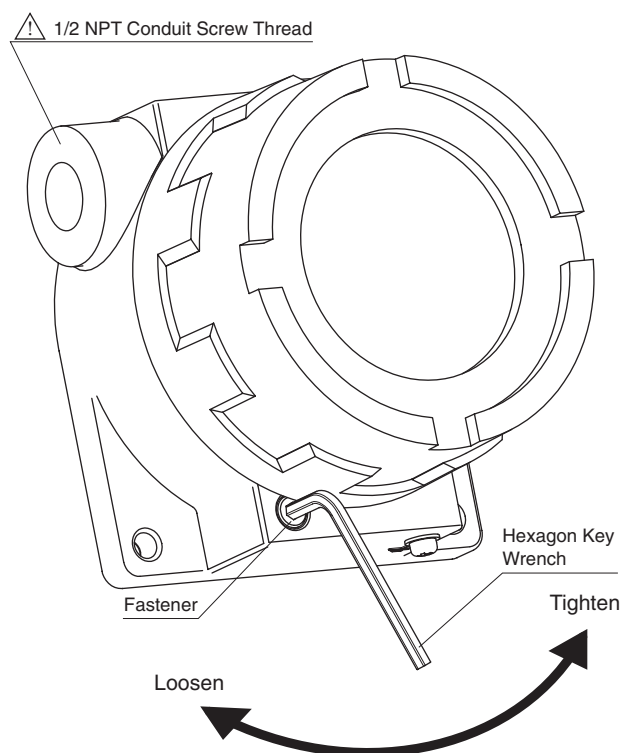
• The cable entry conduit is 1/2 NPT threaded and with the  $\triangle$  mark, or M20  $\times$  1.5 threaded with no marking.

• Six or more cable entry threads must be engaged.

• Squeeze the cable entry and stopping plug into the conduit with the proper tool.

• Before turning the power supply on, be sure to close the enclosure cover tightly and tighten the fastener as shown in Figure 1 using a hexagon key wrench. When opening the enclosure, loosen the fastener first.

Figure 1. Enclosure fastener



• **DO NOT RUB** the surface of the plastic enclosure with a dry cloth. Electrostatic charge generated by the friction may cause an explosion.

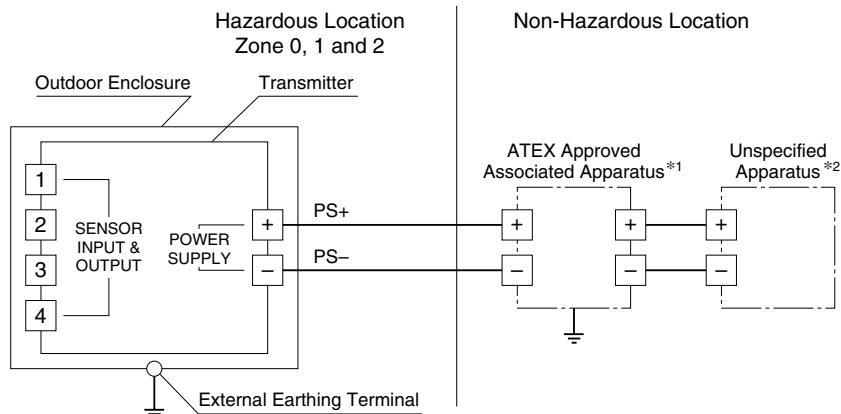
• Be sure to earth the unit.

• For external earthing or bonding connection a cable lug shall be used so that the conductor is secured against loosening and twisting and that contact pressure is maintained.

• The flameproof approval of this unit is applied to the combination of the outdoor enclosure and the transmitter. The transmitter must not be separated or replaced.

• Substitution of components may impair suitability for the hazardous location and may cause an explosion.

## INSTALLATION DIAGRAM for ATEX INTRINSICALLY SAFE MODEL



### ELECTRICAL DATA

#### Power Supply (+ and -)

Maximum Input Voltage  $U_i$  : 30 V  
 Maximum Input Current  $I_i$  : 96 mA  
 Maximum Input Power  $P_i$  : 0.72 W  
 Maximum Internal Capacitance  $C_i$  : 0  $\mu$ F  
 Maximum Internal Inductance  $L_i$  : 0 mH

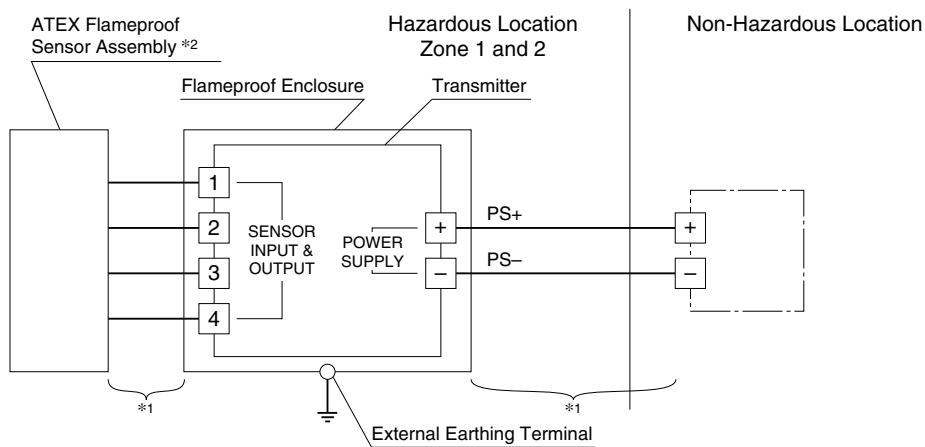
#### Sensor Circuit (1 to 4)

Maximum Output Voltage  $U_o$  : 6.4 V  
 Maximum Output Current  $I_o$  : 30 mA  
 Maximum Output Power  $P_o$  : 48 mW  
 Maximum External Capacitance  $C_o$  : 20  $\mu$ F  
 Maximum External Inductance  $L_o$  : 10 mH

### NOTES

- \*1 : In any safety barrier, the output current of the barrier must be limited by a resistor 'R' such that  $I_o = U_o / R$ .  
 The safety barrier must be certified by an EEC approved certification body to EEx ia IIC.  
 In case of isolated barrier, the earth is not required.
- \*2 : Apparatus which is unspecified except that it must not be supplied from nor contain under normal or abnormal conditions a source of potential with respect to earth in excess of 250 Volts RMS.

## INSTALLATION DIAGRAM for ATEX FLAMEPROOF MODEL



### ELECTRICAL DATA

#### Power Supply (+ and -)

Supply Voltage : 12 to 28 V  
 Output Current : 4 to 20 mA  
 (Burnout Current : 24 mA)

#### Sensor Circuit (1 to 4)

Input Signal : 1.0 V max

### NOTES

- \*1 : Install per local installation codes.  
ATEX approved cable entries or stopping plugs required.
- \*2 : Sensor assembly must be ATEX approved for appropriate hazardous location.