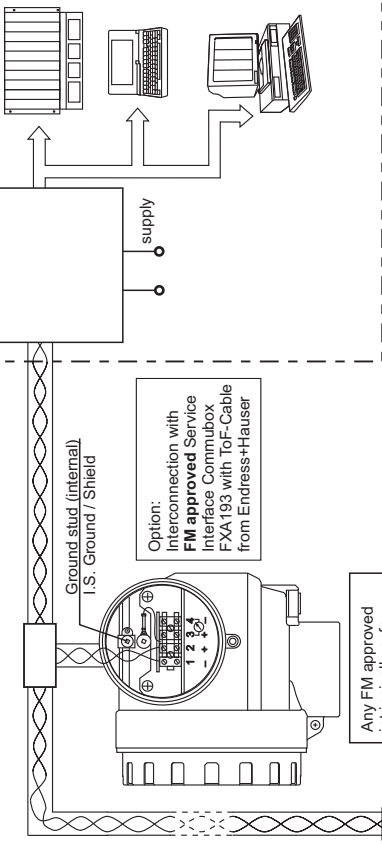


HAZARDOUS LOCATION

Class I, Div. 1, 2, Groups A, B, C, D
 Class I, Zone 0, IIC
 Class II, Div. 1, 2, Groups E, F, G
 Class III

T12-OVP housing:
 IS / I, II, III / I / A, B, C, D, E, F, G



Option:
 FM approved Service Interface, Commubox FXA193 with ToF-Cable from Endress+Hauser

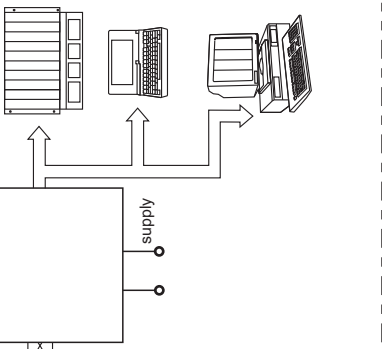
Any FM approved intrinsically safe apparatus or non-incendive field wiring apparatus suitable for FISCO concept

Any FM approved Termination with
 $R = 90...100 \Omega$
 $C = 0...2.2 \mu F$

For installation acc. ENTITY-Concept see Control Drawing no. 960006287

NON HAZARDOUS LOCATION

Any FM approved associated apparatus or associated nonincendive field wiring apparatus suitable for FISCO concept



FISCO-Concept

The FISCO Concept allows interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criteria for interconnection is that the voltage (U_i or V_{max}), the current (I_i or I_{max}), the power (P_i or P_{max}) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (U_o or V_o or V_i), the current (I_o or I_o or I_i) and the power (P_o or P_{max}) levels which can be delivered by the associated apparatus, considering faults and applicable factors. In addition, the maximum unprotected capacitance (C_i) and inductance (L_i) of each apparatus (other than the termination) connected to the fieldbus must be less than or equal to 5 nF and 10 µH respectively. In each segment only one active device, normally the associated apparatus, is allowed to provide the necessary energy for the fieldbus system. The voltage (U_i or V_o or V_i) of the associated apparatus has to be limited to the range of 14 V to 24 V d.c. All other equipment connected to the bus cable has to be passive, meaning that they are not allowed to provide energy to the system, except to a leakage current of 50 µA for each connected device. Separately powered equipment needs a galvanic isolation to assure that the intrinsically safe fieldbus circuit remains passive. The cable used to interconnect the devices needs to have the parameters in the following range:

- loop resistance R: 15...150 Ω/km
- length of spur cable: ≤ 30 m
- inductance per unit length L: 0.4...1.0 mH/km
- length of trunk cable: ≤ 1 km
- capacitance per unit length C: 80...200 nF/km
- length of splice: ≤ 1 m
- $C = C_{line} + 0.5 C_{intrinsic} + C_{intrinsic} + C_{intrinsic}$ if both lines are floating or $C = C_{intrinsic} + C_{intrinsic}$ if the screen is connected to one line.
- $R = 90...100 \Omega$, $C = 0...2.2 \mu F$

At each end of the trunk cable an approved inflexible line termination with the following parameters is suitable:
 One of the allowed terminations might already be integrated in the associated apparatus. The number of passive devices connected to the bus segment is not limited due to I.S. reasons. If the above rules are respected, up to a total length of 1000 m (sum of the length of trunk cable and all spur cables), the inductance and capacitance of the cable will not impair the intrinsic safety of the installation.

Intrinsically safe installation
 Intrinsically safe (entity), Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III or Class I, Zone 0 AEx ia IIC, Hazardous Location Installation

- FM approved apparatus must be installed in accordance with manufacturer instructions.
- FM approved associated apparatus must meet following requirements: $U_o / V_{oc} \leq U_i / V_{max}$ and $I_o / I_{oc} \leq I_i / I_{max}$ and $P_o / P_{oc} \leq P_i / P_{max}$
 Prosonic FMU40/41/42/44 with electronic insert for PROFIBUS PA or FOUNDATION Fieldbus (FISCO-Model):

U_i / V_{max} [V]	I_i / I_{max} [mA]	P_i / P_{max} [W]	C_i [nF]	L_i [µH]	$I_{leakage}$ [µA]
17.5	273	1.2	≤ 5	≤ 10	≤ 50

- The maximum non-hazardous area voltage must not exceed 250 V_{max}.
- The installation should be in accordance with the National Electrical Code NFPA 70 (NEC) and ANSI/ISA RP12.06.01 (except chapter 5).
- Multiple earthing of the screen is allowed only if high integrity equipotential system is realised between the points of bonding (see drawing no. 960373-1022 A).
- Caution: Use supply wires suitable for 5 K above surrounding ambient.
- Warning: Substitution of components may impair intrinsic safety.
- The polarity for connecting + (2) and - (1) is of no importance due to an internal rectifier.

Division 2 Installation

- Nonincendive Class I, Div. 2, Groups A, B, C, D, Hazardous Location Installation
- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510. Intrinsic safety barrier not required. Max. supply voltage 33 V. For T-code see table.
- Warning: Explosion hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Warning: Explosion hazard - Substitution of components may impair suitability for Class I, Div. 2.

Nonincendive Field Wiring Installation:

- Installation shall be in accordance with NEC.
- The Nonincendive Field Wiring Circuit Concept allows interconnection of nonincendive field wiring apparatus with associated nonincendive field wiring apparatus or associated apparatus not specifically examined in combination as a system using any of the wiring methods permitted for unclassified locations, when $V_{max} \geq V_{oc}$ or V_i, C_i or $C_a \geq C_i + C_{cable}$, $L_o \geq L_i + L_{cable}$
 Transmitter non incendive field wiring parameters for these current controlled circuits are as follows:
 $V_{max} = 33 V$, $C_i \leq 5 nF$, $L_i = 10 \mu H$, I_{max} *see note 3.
- For this current controlled circuit, the parameter I_{max} is not required and need not be aligned with parameter I_{oc} or I_o of the barrier or associated nonincendive field wiring apparatus.

Example nameplate:

Endress+Hauser

Prosonic M

Order code: FMU4x-Sbodef

Ser. no.: 12345678901234

(at 20 °C / 68 °F)

50

11

2-wire

Ta > 70 °C (> 158 °F)

IP68 TYPE 4X/6P Encl.

FMU4xSxxxx
 FISCO
 IS CL.I, III, DIV.1, GP A-G T6...T4
 DIP CL.I, III, DIV.1, GP E-G
 NI CL.I, DIV.2, GP A,B,C,D T6...T4
 CL.I, ZN 0, AEx ia IIC T6...T4 Ga
 Temperature class per control drawing

960006286

X = If modification see sep. label

Patents →

Date:

XA01146F-D/00/EN/02.19
 CCS/FM10
 FM/D 10.06.19



71462016

FM Control Drawing
960006286 D
 Prosonic M
 FMU40, FMU41, FMU42, FMU44
 PROFIBUS PA, FOUNDATION Fieldbus
 FISCO-installation / T12-OVP

Endress+Hauser

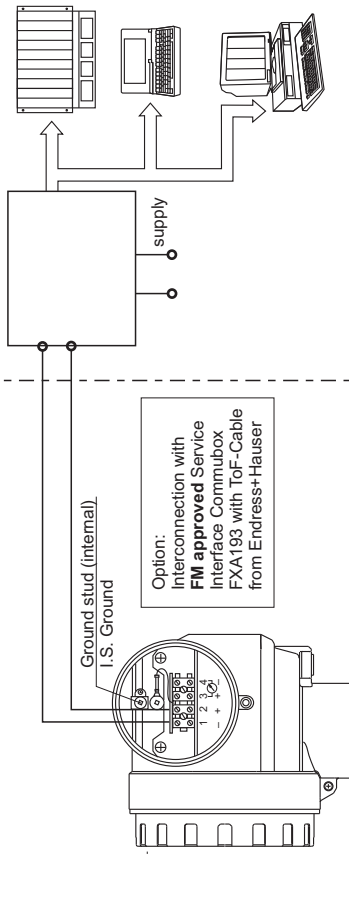


People for Process Automation

HAZARDOUS LOCATION

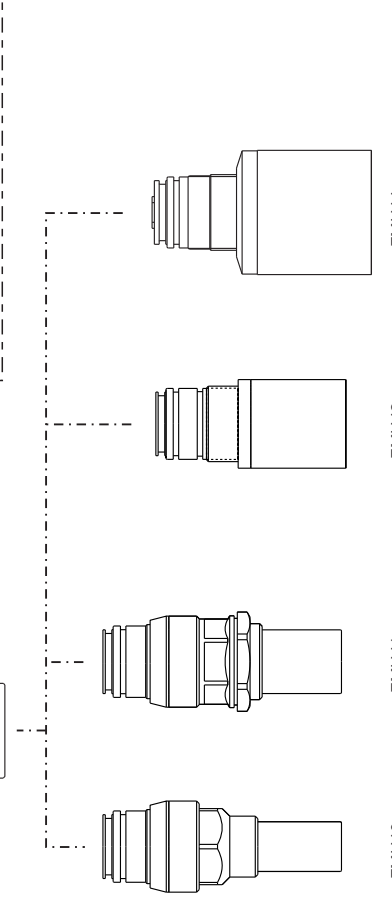
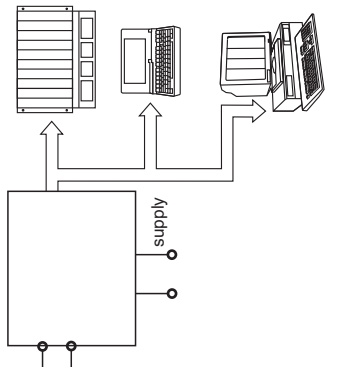
Class I, Div. 1, 2, Groups A, B, C, D
Class I, Zone 0, IIC
Class II, Div. 1, 2, Groups E, F, G
Class III

T12-OVP housing:
IS / I, II, III / I / A, B, C, D, E, F, G



NON HAZARDOUS LOCATION

Any FM approved associated apparatus or associated nonincendive field wiring apparatus



Area of application

The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.

Permissible ambient temperature:

Electronics: intrinsically safe, T12-OVP enclosure: -40...+80 °C (-40...+176 °F)
Sensors: (FMU40, FMU41, FMU42, FMU44): -40...+80 °C (-40...+176 °F)

Permissible process / ambient temperature and temperature code:

Temperature code of FMU40/41/42/44	Permissible medium temperature (flange)	Permissible ambient temperature of electronics compartment as a function of medium temperature (sensor)
T6	+60 °C	+60 °C
T5	+80 °C	+75 °C
T4	+80 °C	+80 °C

Notes:

Intrinsically safe installation
Intrinsically safe (entity), Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III or Class I, Zone 0 AEx ia IIC Hazardous Location Installation

- Control room equipment may not use or generate over 250 V_{RMS}.
- Installation should be in accordance with the National Electrical Code NFPA 70 (NEC) and ANSI/ISA RP 12.06.01.
- Warning: Substitution of components may impair intrinsic safety.
- Use FM Approvals Entity-Approved intrinsic safety barrier with

$$U_o / V_{oc} \leq U_i / V_{max} \times I_i / I_{sc} \leq I_i / I_{max} \times C_o / C_a \geq C_i + C_{cable} \times L_o / L_a, L_o / L_a \geq L_i + L_{cable}$$

Barrier must be incapable of delivering more than defined value (P_{max}) to a matched load.
Transmitter entity parameters are as follows:

U _i / V _{max} [V]	I _i / I _{max} [mA]	P _i / P _{max} [W]	C _i [nF]	L _i [μH]
17.5	273	1.2	≤ 5	≤ 10
or	24.0	1.2	≤ 5	≤ 10

- Use supply wires suitable for 5 K above surrounding ambient.
- Intrinsic safety barrier manufacturer's installation drawing must be followed when installing this equipment. The configuration of the intrinsic safety barrier(s) must be approved by FM Approvals.
- The polarity for connecting + (2) and - (1) is of no importance due to an internal rectifier.

Division 2 installation

Nonincendive Class I, Div. 2, Groups A, B, C, D, Hazardous Location Installation

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510. Intrinsic safety barrier not required. Max. supply voltage 33 V. For T-code see table.

Warning: Explosion hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Warning: Explosion hazard - Substitution of components may impair suitability for Class I, Div. 2.

Nonincendive Field Wiring installation:

- Installation shall be in accordance with NEC.
- The Nonincendive Field Wiring Circuit Concept allows interconnection of nonincendive field wiring apparatus with associated nonincendive field wiring apparatus or associated apparatus not specifically examined in combination as a system using any of the wiring methods permitted for unclassified locations, when $V_{max} \geq V_{oc}$ or V_i, C_o or $C_a \geq C_i + C_{cable} \times L_o$, or $L_a \geq L_i + L_{cable}$
Transmitter nonincendive field wiring parameters for these current controlled circuits are as follows:
 $V_{max} = 33 \text{ V}, C_i \leq 5 \text{ nF}, L_i \leq 10 \text{ μH}, I_{max}$ *see note 3.

- For this current controlled circuit, the parameter I_{max} is not required and need not be aligned with parameter I_{sc} or I_o of the barrier or associated nonincendive field wiring apparatus.

Class II, III Installation

DIP for Class II and III, Div. 1, Groups E, F, G Hazardous Location Installation

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
- Use a dust tight seal at the conduit entry.

Functional ratings

These ratings do not supersede Hazardous Locations Values

$$V_{nom} = 9...33 \text{ V}, I_{nom} = 15 \text{ mA}$$

For installation acc. FISCO-Concept see Control Drawing no. 960006286