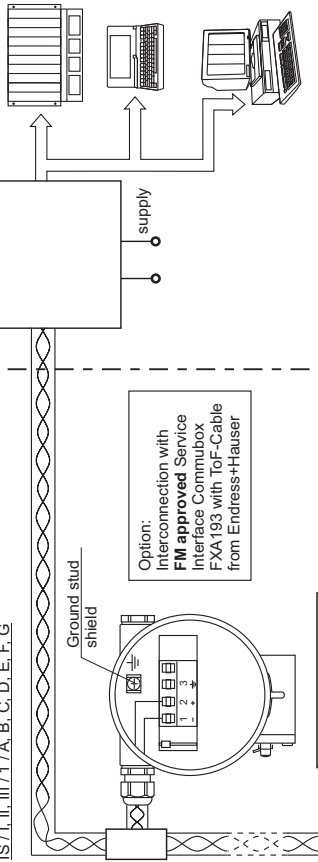


HAZARDOUS LOCATION

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

*F-type housing:

IS / T, II, III / 1/A, B, C, D, E, F, G



Option:
Interconnection with
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 Ω
C = 0...2.2 μF

For installation acc. ENTITY-Concept
see Control Drawing no. 960006277

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_0 or V_{max}), the current (I_0 or I_{max}) and the power (P_0 or P_{max}) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (U_0 or V_{oc} or V_L), the current (I_0 or I_{sc} or I_L) and the power (P_0 or P_{max}) levels which can be delivered by the associated apparatus, considering faults and applicable factors. In addition, the maximum unprotected capacitance (C_0) and inductance (L_0) 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_0 or V_{oc} or V_L) 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 : 0.4...1.0 mH/km length of trunk cable: ≤ 1 km

capacitance per unit length C_0 : 80...200 nF/km length of splice: ≤ 1 m

$C = C_{line} + 0.5 C_{intrinsic} + C_{intrinsic}^{screen}$ if the screen is connected to one line.

At each end of the trunk cable an approved inalterable line termination with the following parameters is suitable:

$R = 90...100 \Omega$, $C = 0...2.2 \mu F$

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

1. FM approved apparatus must be installed in accordance with manufacturer instructions.

2. FM approved associated apparatus must meet following requirements $U_0 / V_{oc} \leq U_L / V_{max}$ and $I_0 / I_{sc} \leq I_L / I_{max}$ and $P_0 / P_{oc} \leq P_L / P_{max}$
Prosonic FMU40/41/42/44 with electronic insert for PROFIBUS PA or FOUNDATION Fieldbus (FISCO-Model):

U_0 / V_{oc} [V]	I_0 / I_{sc} [mA]	P_0 / P_{oc} [W]	C_0 [nF]	L_0 [μH]	$I_{leakage}$ [μA]
17.5	500	5.5	≤ 5	≤ 10	≤ 50

3. The maximum non-hazardous area voltage must not exceed 250 V_{max}

4. The installation should be in accordance with the National Electrical Code NFPA 70 (NEC) and ANSI/ISA RP12.06.01 (except chapter 5).

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).

6. Caution: Use supply wires suitable for 5 K above surrounding ambient.

7. Warning: Substitution of components may impair intrinsic safety.

8. 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

1. 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 I-code see table.

2. 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:

1. Installation shall be in accordance with NEC.

2. 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_L , $C_0 \geq C_0$ or $C_0 \geq C_0$, $L_0 \geq L_0$ or $L_0 \geq L_0 + L_{cable}$

Transmitter non incendive field wiring parameters for these current controlled circuits are as follows:

$V_{max} = 33 V$, $C_0 \leq 5 nF$, $L_0 \leq 10 \mu H$, I_{max} see note 3.

3. For this current controlled circuit, the parameter I_{max} is not required and need not be aligned with parameter I_{sc} or I_0 of the barrier or associated nonincendive field wiring apparatus.

Field no.	Order code FMU4x-Sbdef	Contents
3	-	Made in Germany, 79689 Maulburg Assembled in USA
11	c = D, K, Q c = F, L, R	Assembled in India PROFIBUS PA FOUNDATION Fieldbus
50	FMU40, FMU41 FMU42, FMU44	$P_{abs} = 0.7...3 \text{ bar} / 10.15...43.5 \text{ psi}$ $P_{abs} = 0.7...2.5 \text{ bar} / 10.15...36.25 \text{ psi}$

Class II, III installation

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

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

Functional ratings

These ratings do not supersede Hazardous Locations Values

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

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, *F-type 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 (range)	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

Example nameplate:

Endress + Hauser

IP68 TYPE 4X/6P Encl.

Prosonic M
Order code: FMU4x-Sbdef
Ser. no.: 12345678901234

3

50

11

2-wire

Ta > 70 °C (158 °F)

960006275

X = if modification see sep. label

Date: _____

Patents →

XA01141F-E/00/EN/02.19
CCS/FM10
FM/E 10.06.19



71462010

FM Control Drawing 960006275 E

Prosonic M
FMU40, FMU41, FMU42, FMU44
PROFIBUS PA, FOUNDATION Fieldbus
FISCO-installation

Endress + Hauser

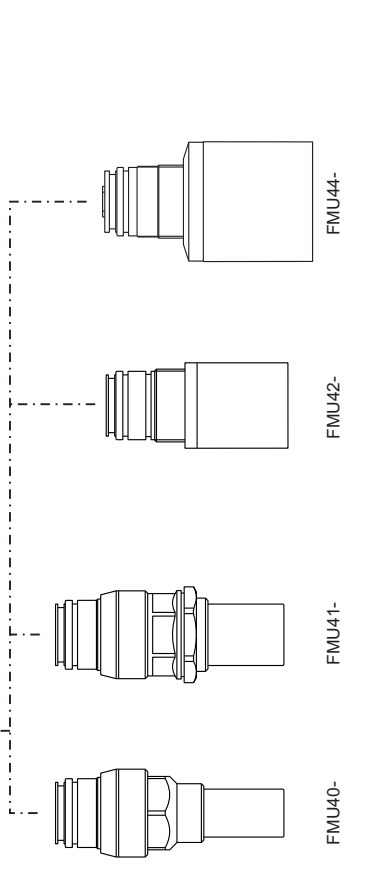
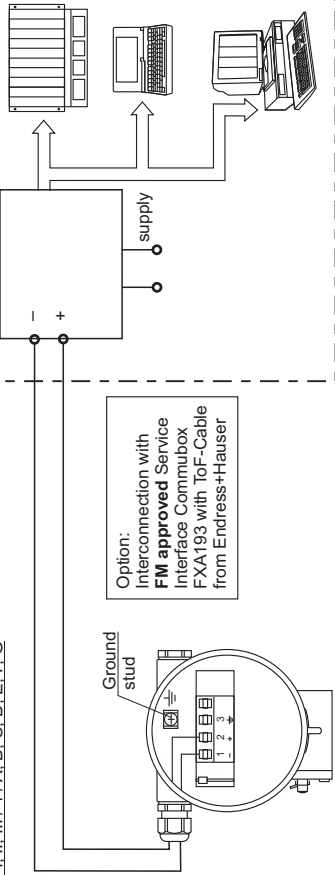
People for Process Automation



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

NON HAZARDOUS LOCATION

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



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, F-type 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 RPT12.06.01.
 - Warning: Substitution of components may impair intrinsic safety.
 - Use FM Approvals Entity-Approved intrinsic safety barrier with $U_0 / V_{oc} \leq U_0 / V_{max}$, $I_0 / I_{sc} \leq I_0 / I_{max}$, $C_0 / C_a \geq C_0 + C_{cable}$, L_0 / L_p , $L_0 / L_s \geq L_0 + L_{cable}$. Barrier must be incapable of delivering more than defined value (P_{max}) to a matched load. Transmitter entity parameters are as follows:

U_0 / V_{max} [V]	I_0 / I_{max} [mA]	P_0 / P_{max} [W]	C_0 [nF]	L_0 [μ H]
17.5	500	5.5	≤ 5	≤ 10
24.0	250	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.

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_0 / V_{oc} or $C_0 / C_a \geq C_0 + C_{cable}$, L_0 or $L_p \geq L_0 + L_{cable}$. Transmitter non incendive field wiring parameters for these current controlled circuits are as follows:
 $V_{max} = 33$ V, $C_0 \leq 5$ nF, $L_0 \leq 10$ μ 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_{sc} or I_0 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
 $V_{nom} = 9...33$ V, $I_{nom} = 15$ mA

For Installation acc. FISCO-Concept see Control Drawing no. 960006275