

ZD099F-C/00/en/04.08  
 CCS/FM6.0  
 CSA/C 12.12.107

**CSA Control Drawing**  
**960523-2081 C**  
 Prosonic M  
 FMU40, FMU41, FMU42, FMU44  
 FISCO-Model  
 PROFIBUS PA, FOUNDATION Fieldbus

**Endress+Hauser**  
 People for Process Automation



**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  $I_{max}$ ) and 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  $I_{sc}$  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 5nF 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 ( $U_o$  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  $L_i$ : 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
- $C = C_{line} + 0.5 C_{line/screen}$ , if both lines are floating or  $C = C_{line} + C_{line/screen}$ , if the screen is connected to one line.
- $R = 90...100 Ω$ ,  $C = 0...2.2 µF$ .

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

- $R = 90...100 Ω$ ,  $C = 0...2.2 µF$ .

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.

**Notes:**

- Intrinsically Safe (Ex ia), Class I, Div. 1, Groups A, B, C, D or Ex ia IIC, Hazardous Location Installation**
- The maximum non-hazardous area voltage must not exceed 250 VRMS.
- The installation must be in accordance with the Canadian Electrical Code (CEC).
- Warning: Substitution of components may impair intrinsic safety.
- Avertissement: La substitution de composants peut compromettre la sécurité intrinsèque.
- CSA certified apparatus must be installed in accordance with manufacturer instructions.
- CSA certified associated apparatus must meet following requirements:

$U_i / V_{max}$ [V]	$I_i / I_{max}$ [mA]	$P_i / P_{max}$ [W]	$C_i$ [nF]	$L_i$ [µH]	leakage [µA]
17.5	500	5.5	≤ 5	≤ 10	≤ 50

- Prosonic FMU40, FMU41, FMU42, FMU44 with electronic insert for PROFIBUS PA or FOUNDATION Fieldbus (FISCO-Model):
- Be aware of multiple earthing of the screen. The screen must be connected in accordance with the CEC.
- Caution: Use only supply wires suitable for 5K above surrounding temperature.
- Utiliser des fils de l'alimentation qui conviennent a une température de 5 K au-dessus de la température ambiante.
- The polarity for connecting + (2) and - (1) is of no importance due to an internal rectifier.
- This version of Prosonic M may be provided with a connection to an external display unit already installed or via a set up kit. This connection is for the use of the approved display unit FHX40 only. Refer to safety instructions of the external display unit FHX40.
- In case of FMU44 avoid electrostatic charge at the sensor (e.g. do not rub with dry cloth; do not install within the filling curtain).

**Class I, Div. 2, Groups A, B, C, D or Ex nC, IIC and DIP for Class II and III, Div. 1, Groups E, F, G Hazardous Location Installation**

- Depending on Location install per Canadian Electrical Code (CEC) using wiring methods described in Rule 18-156 or Rule 18-202 or Rule 18-302. Intrinsic safety barrier not required. Max. supply voltage 32 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.

Avertissement: Risque d'explosion - Avant de déconnecter l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.  
 Warning: Explosion Hazard - Substitution of components may impair suitability for Class I, Div. 2.  
 Avertissement: Risque d'explosion - La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe I, Div. 2.

**For Class II and III, Div. 1**  
 Warning: Keep cover tight unless power has been switched off or the area is known to be non-hazardous.

**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

For installation acc. ENTITY-Concept see Control drawing no. 960523-2083

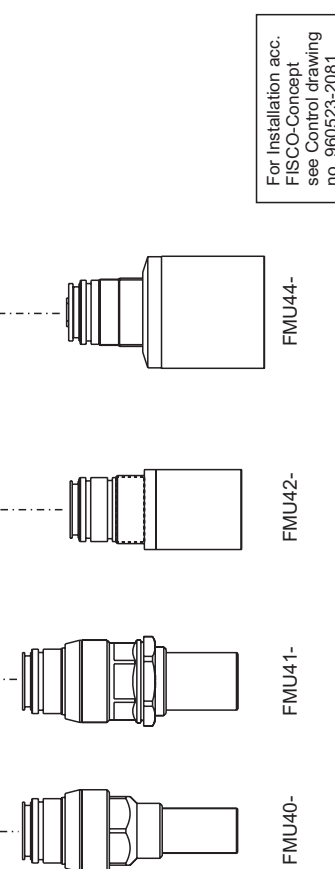
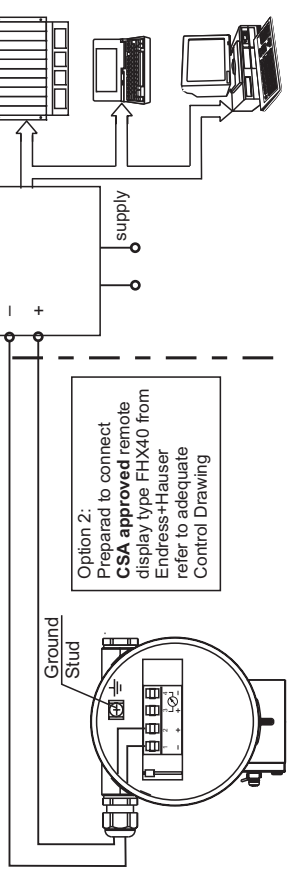
### HAZARDOUS LOCATION

Class I, Div. 1, Groups A, B, C, D  
 Class I, Zone 0, Ex ia IIC T6  
 Class II, Div. 1, Groups E, F, G  
 Class III

"F"-Type-Housing:  
 IS / I, II, III / 1 /  
 A, B, C, D, E, F, G

Option 1:  
 Interconnection with  
**CSA approved** Service  
 Interface Commubox  
 FXA193 with ToF-Cable  
 from Endress+Hauser

Option 2:  
 Prepared to connect  
**CSA approved** remote  
 display type FHX40 from  
 Endress+Hauser  
 refer to adequate  
 Control Drawing



For Installation acc.  
 FISCO-Concept  
 see Control drawing  
 no. 960523-2081

### 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

### NON HAZARDOUS LOCATION

#### Notes:

#### Intrinsically safe installation

Intrinsically Safe (Ex ia), Class I, Div. 1, Groups A, B, C, D or Ex ia IIC Hazardous Location Installation

- Control room equipment may not use or generate over 250 V<sub>relis</sub>.
- The installation must be in accordance with the Canadian Electrical Code (CEC).
- Warning: Substitution of components may impair intrinsic safety.
- Avertissement: La substitution de composants peut compromettre la sécurité intrinsèque.
- Ex ia / IS is defined as intrinsically safe / sécurité intrinsèque.
- For entity installation use CSA certified safety barrier or other associated equipment that satisfy the following conditions: with  $U_0 / V_{OC} \leq U_i / V_{max}$ ,  $I_0 / I_{SC} \leq I_i / I_{max}$ ,  $C_0 / C_A \geq C_i + C_{cable}$ ,  $L_0 / L_{sp} \geq L_i + L_{cable}$

	$U_i / V_{max}$ [V]	$I_i / I_{max}$ [mA]	$P_i / P_{max}$ [W]	$C_i$ [nF]	$L_i$ [ $\mu$ H]
	17.5	500	5.5	$\leq 5$	$\leq 10$
or	24	250	1.2	$\leq 5$	$\leq 10$

6. For system installations use CSA certified safety barriers as follows:

- 28V / 300 $\Omega$  + Ground or
- 28V / 300 $\Omega$  + 28V / Diode or
- 28V / 300 $\Omega$  + 10V / 50 $\Omega$

7. Caution: Use only supply wires suitable for 5K above surrounding temperature.

Utiliser des fils de l'alimentation qui conviennent à une température de 5 K au-dessus de la température ambiante.

8. Install barrier / associated apparatus in accordance with manufacturer's instructions.

9. The polarity for connecting + (2) and - (1) is of no importance due to an internal rectifier.

10. This version of Prosonic M may be provided with a connection to an external display unit already installed or via a set up kit. This connection is for the use of the CSA certified display unit FHX40 only. Refer to safety instructions of the external display unit FHX40.

11. In case of FMU44 avoid electrostatic charge at the sensor (e.g. do not rub with dry cloth; do not install within the filling curtain).

#### Class I, Div. 2, Groups A, B, C, D or Ex nC IIC, and DIP for Class II and III, Div. 1, Groups E, F, G Hazardous Location Installation

- Depending on Location install per Canadian Electrical Code (CEC) using wiring methods described in Rule 18-156 or Rule 18-202 or Rule 18-302. Intrinsic safety barrier not required. Max. supply voltage 32 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.

Avertissement : Risque d'explosion - Avant de déconnecter l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.

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

Avertissement : Risque d'explosion - La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe I, Div. 2.

#### For Class II and III, Div. 1

Warning: Keep cover tight unless power has been switched off or the area is known to be non-hazardous.