

Liquiphant M/S is suitable for the connection to a PROFIBUS PA/FOUNDATION Fieldbus system according to the Entity- or FISCO-concept (as described below).

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_{oc} 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 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_o (or V_{oc} or V_i) of the associated apparatus has to be limited to the range of 14 V to 24 V DC. 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
- inductance per unit length L: 0.4...1 mH/km
- capacitance per unit length C: 80...200 nF/km
- C = C line/line + 0.5 C line/screen, if both lines are floating or
- C = C line/line + C line/screen, if the screen is connected to one line
- length of spur cable: ≤ 30 m
- length of trunk cable: ≤ 1 km
- length of splice: ≤ 1 m
- At each end of the trunk cable an approved infallible line termination with the following parameters is suitable:
 $R = 90...100 \text{ Ohm}$
 $C = 0...2.2 \text{ µF}$

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:

1. CSA certified apparatus must be installed in accordance with manufacturer instructions.
2. CSA certified associated apparatus must meet the following requirements:
 U_o or V_{oc} or $V_i \leq U_i$ (V_{max}) and I_o or I_{sc} or $I_i \leq I_i$ (I_{max}) and P_o or $P_{max} \leq P_i$ (P_{max}).
3. The maximum non-hazardous area voltage must not exceed 250 V.
4. The installation must be in accordance with the Canadian Electrical Code.
5. Be aware of multiple earthing of screen. The screen must be connected in accordance with Canadian Electrical Code.
6. Caution: Use only supply wires suitable for 5°C above surrounding temperature.
7. Warning: Substitution of components may impair intrinsic safety.
8. The polarity for connecting is of no importance due to an internal rectifier.
9. Type of protection for Liquiphant M/S with electronic insert FEL50A:
 Intrinsically safe (Ex ia); Class I, Div. 1 Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Ex ia IIC T6.

Suitable for Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G

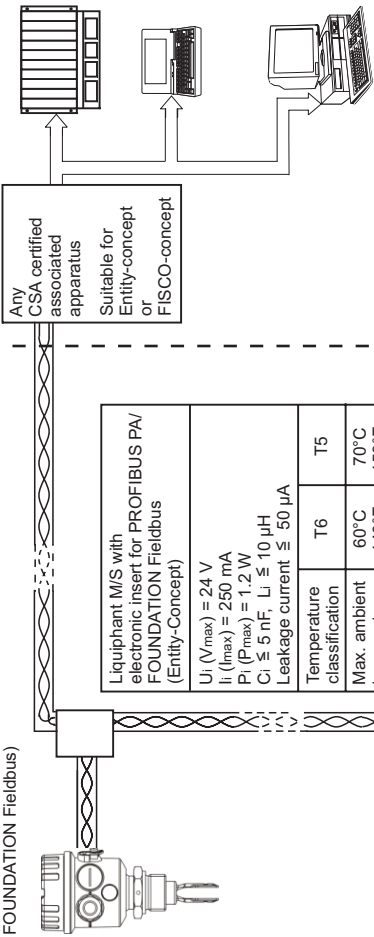
Hazardous Location Installation

1. Install per Canadian Electrical Code (CEC)
- Intrinsic safety barrier not required. Max. supply voltage 32 V. For T-code see table.
 is known to be non hazardous.
 Avertissement : Risque d'explosion - Ne pas débrancher tant que le circuit est sous tension, à moins qu'il s'agisse d'un emplacement non dangereux.
 Warning: Explosion Hazard - Substitution of Components may impair suitability for Class I, Div. 2.
 Avertissement : Risque d'explosion - La substitution de composant peut rendre ce matériel inacceptable pour les emplacements de Class I, Div. 2.
2. Warning: Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area

HAZARDOUS (CLASSIFIED) LOCATION

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

Liquiphant M/S with electronic insert FEL50A (PROFIBUS PA / FOUNDATION Fieldbus)



Liquiphant M/S with electronic insert for PROFIBUS PA/ FOUNDATION Fieldbus (Entity-Concept)	
U_i (V_{max}) = 24 V	Temperature classification T6 T5 Max. ambient temperature 60°C 140°F 70°C 158°F Min. ambient temp.: -40°C (optional -50°C)
I_i (I_{max}) = 250 mA	
P_i (P_{max}) = 1.2 W	
$C_i \leq 5 \text{ nF}$, $L_i \leq 10 \text{ µH}$ Leakage current $\leq 50 \text{ µA}$	

Liquiphant M/S with electronic insert for PROFIBUS PA/ FOUNDATION Fieldbus (FISCO-Concept)	
U_i (V_{max}) = 17.5 V	Temperature classification T6 T5 Max. ambient temperature 60°C 140°F 70°C 158°F Min. ambient temp.: -40°C (optional -50°C)
I_i (I_{max}) = 500 mA	
P_i (P_{max}) = 5.5 W	
$C_i \leq 5 \text{ nF}$, $L_i \leq 10 \text{ µH}$ Leakage current $\leq 50 \text{ µA}$	



NON HAZARDOUS LOCATION

Any CSA certified associated apparatus Suitable for Entity-concept or FISCO-concept

CSA Control Drawing
960009587 -

Liquiphant M, Liquiphant S
 (cCSAus / IS)
 PROFIBUS PA, FOUNDATION Fieldbus

