

ZD 051P/00/en/08.00/CCS
CSA / A 28.03.00



Control drawing (IS) 960393-2050 A

Cerabar M
PROFIBUS-PA

Endress + Hauser



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 (Ui or Vmax), the current (Ii or Imax) and the power (Pi or Pmax) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (Uo or Voc), the current (Io or Iso) and the power (Po or Pmax) levels which can be delivered by the associated apparatus considering faults and applicable factors. In addition, the maximum unprotected capacitance (C) and inductance (Li) 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 Uo (or Voc) 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
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 splices: ≤ 1 m

At each end of the trunk cable an approved inalterable 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.

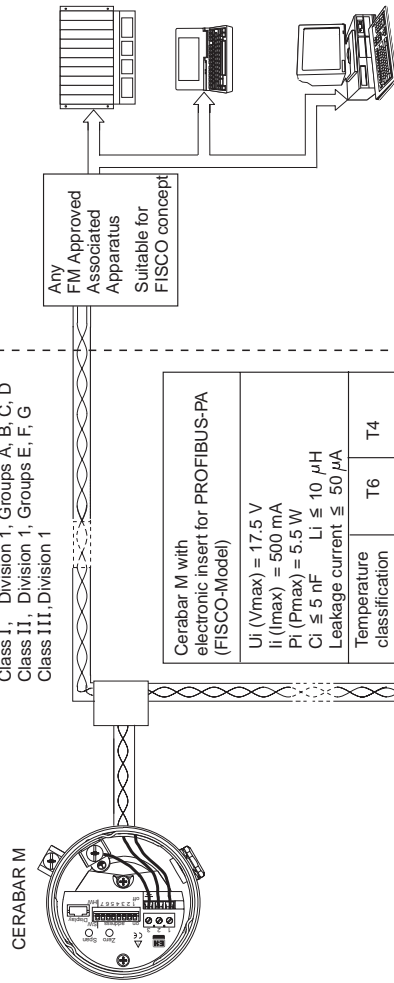
Notes:

- INTRINSICALLY SAFE CLASS I, DIV. 1, GROUPS A, B, C, D; CLASS II, DIV. 1, GROUPS E, F, G; CLASS III**
- CSA Certified apparatus must be installed in accordance with manufacturer instructions
 - CSA Certified associated apparatus must meet the following requirements:
Uo or Voc ≤ Ui (Vmax) and Io or Isc ≤ Ii (Imax) and Po or Pmax ≤ Pi (Pmax)
 - The maximum Non-Hazardous area voltage must not exceed 250 V.
 - The installation must be in accordance with the Canadian Electrical Code.
 - Multiple grounding of screen is allowed only, if high integrity equipotential system is made between the points of bonding (see drawing No. 960373-1022)
 - Caution: Use only supply wires suitable for 5 °C above surrounding temperature.
 - Warning: Substitution of components may impair intrinsic safety.
Avertissement: La substitution de composants peut compromettre la sécurité intrinsèque.
 - The polarity for connecting PA+ (1) and PA- (2) is of no importance due to an internal rectifier.
 - Note: Type of protection for PMC 45: Intrinsically safe (Ex ia) CLASS I, Div. 1, Groups A, B, C, D; CLASS II, Div. 1, Group G + coal dust; CLASS III; Ex ia IIC T6
- Suitable for: CLASS I, DIV. 2; GROUP A, B, C, D; HAZARDOUS LOCATION INSTALLATION.**
- INSTALL PER CANADIAN ELECTRICAL CODE (CEC) USING THREADED METAL CONDUIT.
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 – Ne pas débrancher tant que le circuit est sous tension, à moins qu'il s'agisse d'un emplacement non dangereux.
 - Note: Type of protection for PMC 45: suitable for CLASS I, Div. 2; Groups A, B, C, D and CLASS II, Div. 1, Group G + coal dust; CLASS III

HAZARDOUS (CLASSIFIED) LOCATION

Ex ia IIC T6
Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1

NON-HAZARDOUS LOCATION



Cerabar M with electronic insert for PROFIBUS-PA (FISCO-Model)	
Ui (Vmax) = 17.5 V	
Ii (Imax) = 500 mA	
Pi (Pmax) = 5.5 W	
Li ≤ 5 nF	Li ≤ 10 µH
Leakage current ≤ 50 µA	
Temperature classification	T6 T4
Max. ambient temperature	40 °C 70 °C 104 °F 158 °F

Any CSA Certified Termination with
R = 90 ... 100 Ω
C = 0 ... 2.2 µF