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CCS/FM10
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71354322

FM Control Drawing
960006753-C

Cerabar S PMP7x, Deltabar S PMD75, FMD7x
PA, FF
(IS+XP, NI, DIP)

Endress+Hauser

People for Process Automation

Cerabar S/Deltabar 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 (Ui or V_{max}), the current (Ii or I_{max}) and the power (Pi or P_{max}) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (Uo or Voc or Vt), the current (Io or Isc or It) and the power (Po or P_{max}) levels which can be delivered by the associated apparatus, considering faults and applicable factors. In addition, the maximum unprotected capacitance (Ci) 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 or Vt) of the associeted apparatus has to be limited to the range of 14V to 24V 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 splice: ≤ 1 m
At each end of the trunk cable an approved infallible line termination with the following parameters is suitable:
R = 90...100 Ohm 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 lenght 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 installations intrinsically safe for Cl. I, Div.1, Group A,B,C,D; AEx ia IIC T6

1. FM Approved apparatus must be installed in accordance with manufacturer instructions.
2. FM Approved associated apparatus must meet the following requirements:
   Uo or Voc or Vt ≤ Ui (V_{max}) **and** Io or Isc or It ≤ Ii (I_{max}) **and** Po or P_{max} ≤ Pi (P_{max}).
3. The maximum non-hazardous area voltage must not exceed 250 V.
4. The installation must be in accordance with the National Electrical Code NFPA 70 and ANSI/ISA - RP 12.06.01 (except chapter 5).
5. Be aware of multiple earthing of screen. The screen must be connected in accordance with National 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 PA+ (1) and PA- (2) is of no importance due to an internal rectifier.

Division 2 and Zone 2 installation

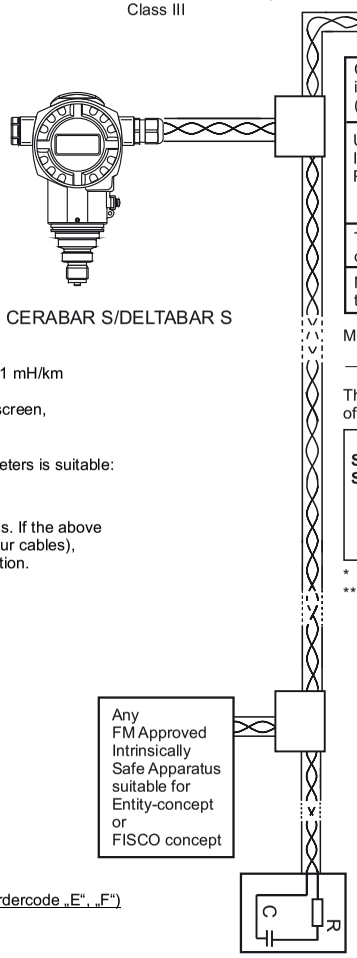
Nonincendive Cl. I, Div.2, Group A,B,C,D Hazardous Location Installation (not for approval ordercode „E“, „F“)

9. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with articles 500 to 510.
   Intrinsic safety barrier not required. Max. supply voltage 32 V. For T-code see table.
10. Nonincendive field wiring installation
    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} ≥ Voc or Vt, Ca ≥ Ci + C_{cable}, La ≥ Li + L_{cable}
    Transmitter parameters are as follows: V_{max} = 32 VDC; Ci ≤ 5 nF; Li ≤ 10 µH; I_{max} = see note 11.
11. For these current controlled circuit, the parameter I_{max} is not required and need not to be aligned with parameter Isc and It of the nonincendive field wiring or associated apparatus.
12. Warning: Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non hazardous.
    Warning: Substitution of Components may impair suitability for Class I, Div.2.

Class II, III installation

DIP for Class II and III, Div.1, Group E,F,G Hazardous Location Installation (not for approval ordercode „E“, „F“)

13. Installation of transmitter wiring according to NEC using threaded conduits or other wiring methods in accordance with articles 500 to 510.



Cerabar S/Deltabar S with electronic insert PROFIBUS PA/FOUNDATION Fieldbus	(Entity-Concept)	(FISCO-Concept)
	Ui (Vmax) = 24 V Ii (Imax) = 250 mA Pi (Pmax) = 1.2 W Ci ≦ 5 nF Li ≦ 10 µH Leakage current ≦ 50 µA	Ui (Vmax) = 17.5 V Ii (Imax) = 500 mA Pi (Pmax) = 5.5 W
Temperature classification	T6	T4
Max. ambient temperature	40°C 104°F	70°C 158°F

Min. ambient temperature: -40°C (optional -50°C)

The devices are FM Certified as Single Seal per ANSI/ISA 12.27.01 as tabulated below; therefore installation of external secondary seals is not required.

Single Seal	Model	Limited to: MWP*	Limited to: Process Temperature**
	Cerabar S: PMP71, PMP75	400 bar (5800 psi)	-40°C...+100°C
	Deltabar S: PMD75, FMD77, FMD78	420 bar (6091 psi)	-40°C...+100°C

* Limitations of the Maximum Working Pressure (MWP) are marked on the nameplate and must be considered!
** Limitations of the process temperature range depending on the used version are specified in the applicable technical information of the manufacturer and must be considered!
PMP75, FMD77, FMD78 allows higher process temperatures depending on the used diaphragm seal.
This is allowable provided the above specified process temperatures are guaranteed at the sensor close to the enclosure (location of primary seal) for these types.

This device is suitable to be installed in accordance with the wiring methods of Division 1/ Zone 0 for intrinsic safety (as defined above) or for Division 1/ Zone 1 for explosionproof protection or dust ignition proof and Division 2 for type of protection nonincendive:

For installations in accordance with the requirements of explosionproof protection the device is suitable for:

Cerabar S/Deltabar S:
XP, Cl.I, Div.1, Gp. ABCD

Conduit seals must be installed within 18 inches of enclosure.
Max. supply voltage: 32 VDC, ambient temp. range: -40°C...75°C (optional $T_{a,min}$: -50°C).

Warning:
- Changing the type of protection afterfirst installation may impair the explosion protection.
- Avoid electrostatic charge of plastic surfaces, plastic process connections or coatings.