ZD188P-C/00/en/12.07
CCS/FM6.0
FM/ C 17.04.07
71067791

FM Control Drawing
960006703 C

Cerabar S / Deltabar S
PROFIBUS PA / FOUNDATION Fieldbus

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 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 or Vt), the current (Io or Isc or It) 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 (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 associated apparatus has to be limited to the range of 14V to 24VDC. 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; 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.

Intrinsically safe installations

Intrinsically safe for Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G; 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 (Vmax) **and** Io or Isc or It ≤ Ii (Imax) **and** Po or Pmax ≤ Pi (Pmax).
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 Class I, Div. 2, Groups A, B, C, D; Hazardous Location Installation (not for separare housing)

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. Warning: Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non hazardous.
11. 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 Vmax ≥ Voc or Vt, Ca ≥ Ci + Ccable, La ≥ Li + Lcable.
    Transmitter parameters are as follows: Vmax = 32 VDC; Ci ≤ 5 nF; Li ≤ 10 µH; Imax = see note 12.
12. For these current controlled circuit, the parameter Imax is not required and need not to be aligned with parameter Isc and It of the nonincendive field wiring or associated apparatus.
    Warning: Substitution of Components may impair suitability for Class I, Div. 2.
13. The transmitter is suitable to be installed according the FNICO concept.

Class II, III installation

DIP for Class II, III, Div. 1, Groups E, F, G; Hazardous Location Installation (not for separate housing)

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