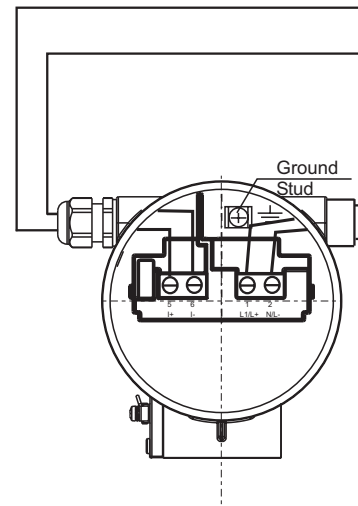


### HAZARDOUS LOCATION

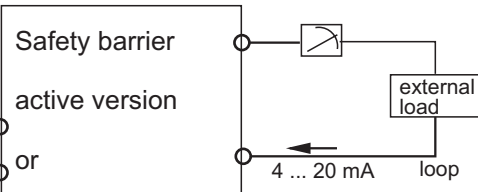
Class II, DIV. 1, GROUPS E, F, G  
Class III

F12- Housing:

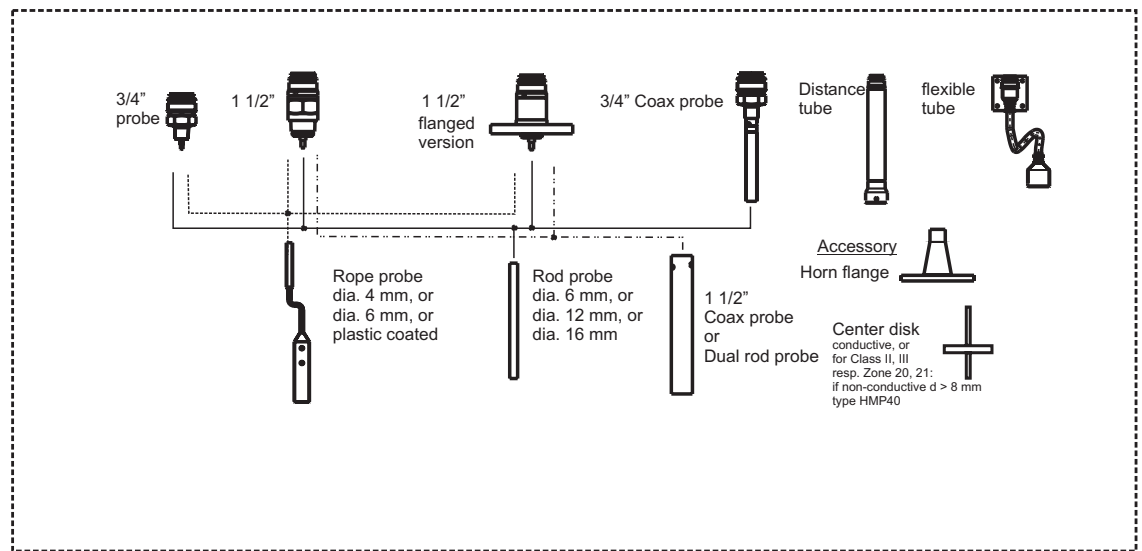
Output I.S. Class I, II, III, DIV. 1, GROUPS C,D,E,F,G or  
Class I, Zone 0, AEx ia IIB



### NON HAZARDOUS LOCATION



Power supply  
90..253 VAC 50/60 Hz  
resp.  
10.5..32 VDC  
  
check installed version



Option :  
prepared to connect FM Approved  
remote display type LTC-Z40-Ex1\*

Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection)	permissible maximum ambient of electronic compartment enclosure F12				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 1 1/2" probe, compact	LTC... with 1 1/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T4A	+80 C	80 C	80 C	80 C	80 C	80 C
	+95 C	75 C	75 C	75 C	75 C	80 C
	+130 C	70 C	75 C	70 C	75 C	80 C
	+150 C	65 C	75 C	70 C	75 C	80 C

### Notes. Class II, III, Division 1 installation

DUST IGNITION PROOF CLASS II, DIV. 1, GROUP E, F, G; CLASS III HAZARDOUS LOCATION INSTALLATION

1. Install per National Electrical Code NFPA 70 (NEC)
2. Power Supply wires shall be installed in conduit in accordance with the NEC.
3. Control room equipment may not use or generate over 250 Vrms.
4. Warning: Keep cover tight when circuit is alive unless the area is known to be non-hazardous.
5. For electronic: maximum ambient temperature = 80°C
6. Use supply wires suitable for 5 K above surrounding ambient.
7. Use dust tight seals at cable and conduit entries in Class II and III location.
8. Use FM Entity-Approved intrinsic safety barrier with  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$
9. Transmitter entity parameters are shown in table below:
10. Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...) Maximum permissible tensile force at the rope or rod 2000 N.

### Division 2 and Zone 2 installation

Class I, Div. 2, Group A, B, C, D or Class I, Zone 2 IIC Hazardous Location Installation.

1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510. Intrinsic safety barrier not required. Max. supply voltage 30V. For T-code see table.
2. 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, Division 2.

### Class II, III installation

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
2. Use a dust tight seal at the conduit entry.
3. Warning: Explosion Hazard - do not disconnect equipment 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:

Electronic:	F12 enclosure	-40... +80°C resp. -40...176°F
Probes:	LTC...	refer Technical Information

Electrical data		
Supply circuit		
voltage version	AC	DC
supply voltage	90...253 VAC 50 / 60 Hz	10.5...32 VDC.
max. power	3.5 VA	1 W
Um =	250 VAC	250 VAC
Signal circuit Intrinsically safe : AEx ia IIB resp. AEx ib IIB		
For connection to apparatus <sup>1)</sup> acc IEC 60079-14 with the maximum values		
<sup>1)</sup> for passive: associated apparatus		
LTC... as version:	active	passive
	Voc = 21.4 V Isc = 237.48 mA Po = 1.271 W Ri = 90.1 ohms	Vmax = 30 V Imax = 300 mA Pi = 1.2 W Ri = 8.7
<sup>a)</sup> internal inductance	Li = 0 µH	Li = 2 mH
<sup>a)</sup> internal capacitance	Ci = 10 nF	Ci = 10 nF
<sup>a)</sup> permissible external capacitance @ for circuitry of category „ia“	La = 0.15 mH    Ca = 1 µF La = 0.5 mH    Ca = 870 nF La = 1 mH       Ca = 840 nF La = 3 mH       Ca = 810 nF	n.a.
<sup>a)</sup> permissible external capacitance @ for circuitry of category „ib“	La = 3 mH Ca = 1.22 µF	n.a.
Note to <sup>a)</sup> : If the signal circuitry (active or passive) is installed in Class II Div.1 resp. Zone 21 or Zone 22 and if the electrical connection is mechanically protected (against shortening / opening) the values for internal and permissible external inductances and capacitances need not to be considered. The measures for energy limitation via intrinsic safety (ia or ib, in respect of usage) are unaffected.		

#### Thermal Data:

maximum surface temperature of electronic housing (F12) 115 C (thermal fused inside)

Stempel der Zertifizierungsstelle

Firmenstempel

Seal of the notified body

company seal

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CONFIDENTIAL acc. to ISO 16016	scale:	date:2004-Oct-26
 Mannheim	Control drawing	F12 / 4W - Dust
	Pulscon LTC-.....-.....-F.	respons. 16-428FM-12 b
	norm	sheet 1 of 12

CONFIDENTIAL

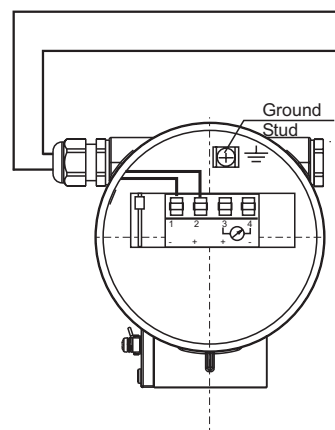
Original-Seal

## HAZARDOUS LOCATION

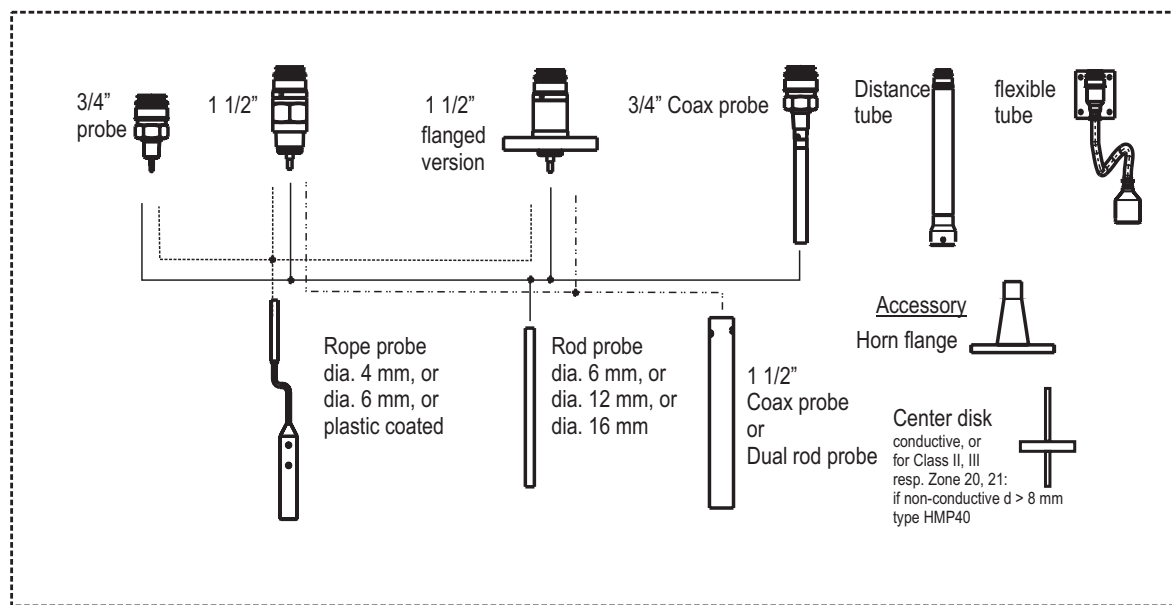
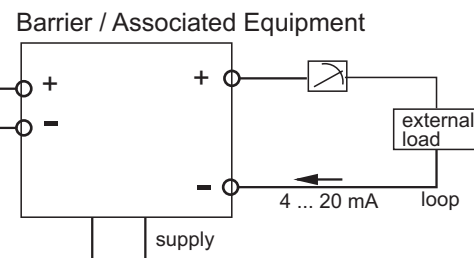
Class I, DIV. 1, GROUPS A, B, C, D  
 Class I, Zone 0, AEx ia IIC  
 Class II, DIV. 1, GROUPS E, F, G  
 Class III

**Option :**  
 prepared to connect FM Approved  
 remote display type LTC-Z40-Ex1

**F12- Housing:**  
 IS / I, II, III / 1 / A, B, C, D, E, F, G



## NON HAZARDOUS LOCATION



**Functional ratings:**  
 These ratings do not supersede Hazardous Locations values  
 $U_{nom} \leq 30 V$   
 $I_{nom} = 4...20 mA$  (max. 25 mA)

### Area of application:

The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.

### Permissible ambient temperature:

Electronic: F12 enclosure -40... +80°C resp. -40...176°F  
 Probe: LTC... refer Technical Information

### Notes:

#### Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D Hazardous Location Installation.

- Control room equipment may not use or generate over 250 Vrms.
- Use FM Approvals Entity-Approved intrinsic safety barrier with  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$  barrier must be incapable of delivering more than 1 Watt to a matched load. Transmitter entity parameters are as follows:  $V_{max} = 30V$ ;  $I_{max} = 300mA$ ;  $C_i \leq 13nF$ ;  $L_i = 0 \mu H$ ;  $P_{max} = 1Watt$
- Installation should be in accordance with ANSI / ISA RP12.06.01 Installation of intrinsically safe systems for Hazardous (Classified) locations and the National Electrical code (ANSI / NFPA 70)
- Warning: Substitution of components may impair intrinsic safety.
- Intrinsic safety barrier manufacturer's installation drawing must be followed when installing this equipment. The configuration of the intrinsic safety barrier(s) must be FM Approved.
- Use supply wires suitable for 5 K above surrounding ambient.
- Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...) Maximum permissible tensile force at the rope or rod 2000 N.

#### Division 2 and Zone 2 installation

Nonincendive. Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510. Intrinsic safety barrier not required. Max. supply voltage 30V. For T-code see table.
- 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  $V_{max} \geq V_{oc}$  or  $V_t$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$   
 Transmitter non incendive field wiring parameters for these current controlled circuit are as follows:  
 $V_{max} = 30V$ ;  $C_i \leq 13nF$ ;  $L_i = 0 \mu H$ ;  $I_{max} =$  see note 3
- For these current controlled circuit, the parameter  $I_{max}$  is not required and need not to be aligned with parameter  $I_{sc}$  and  $I_t$  of the associated nonincendive field wiring apparatus or associated apparatus.
- 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, Division 2.

#### Class II, III installation

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
- Use a dust tight seal at the conduit entry.

Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection) T <sub>med</sub>	permissible maximum ambient of electronic compartment (T <sub>a</sub> ) (enclosure F12)				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 1 1/2" probe, compact	LTC... with 1 1/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C	55 C	55 C	55 C	55 C	60 C
	+60 C	60 C	60 C	60 C	60 C	60 C
T5	+95 C	70 C	70 C	70 C	70 C	75 C
	+75 C	75 C	75 C	75 C	75 C	75 C
T4	+130 C	70 C	75 C	70 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C
T3C (functional) <sup>1)</sup>	+150 C	65 C	75 C	70 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C

note: the applicable temperature of probe must be within their specified limits

<sup>1)</sup>functional means max. permissible process temperature

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CONFIDENTIAL acc. to ISO 16016		scale:	date: 2004-Oct-26
 Mannheim	Control drawing	F12 / IS - HART	respons.
	Pulscon LTC-.....-.....-F.		approved
			norm
			16-428FM-12 b
			sheet 2 of 12

## 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  $V_t$ ), the current ( $I_o$  or  $I_{sc}$  or  $I_t$ ) 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  $\mu$ H 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  $V_t$ ) of the associated 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  $\mu$ A 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  $\Omega$ /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:  $\leq 30$  m  
 length of trunk cable:  $\leq 1$  km.  
 length of splice:  $\leq 1$  m

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

R = 90 ... 100  $\Omega$   
 C = 0 ... 2.2  $\mu$ F.

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 installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D Hazardous Location Installation.

1. FM approved apparatus must be installed in accordance with manufacturer instructions
2. FM approved associated apparatus must meet the following requirements:  
 $U_o$  or  $V_{oc}$  or  $V_t \leq U_i$  ( $V_{max}$ ) and  $I_o$  or  $I_{sc}$  or  $I_t \leq I_i$  ( $I_{max}$ ) 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 National Electrical Code NFPA 70 and ANSI/ISA RP 12.06.01 (except chapter 5).
5. Multiple earthing of screen is allowed only, if high integrity equipotential system is realised between the points of bonding (see drawing No. 16-428FM-12B / page 12)..
6. Caution: Use only supply wires suitable for 5 K above surrounding temperature
7. Warning: Substitution of components may impair intrinsic safety.
8. The polarity for connecting + (2) and - (1) is of no importance due to an internal rectifier.
9. Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...)  
 Maximum permissible tensile force at the rope or rod 2000 N.

## Division 2 and Zone 2 installation

Nonincendive, Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

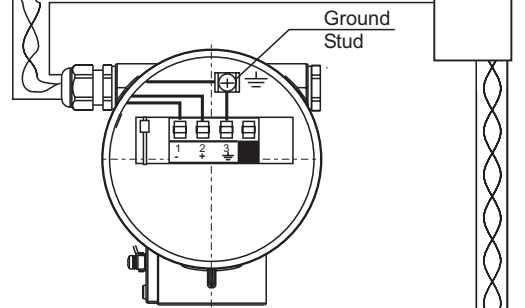
1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510 .  
 Intrinsic safety barrier not required. Max. supply voltage 33V. For T-code see table.
2. Nonincendive field wiring installation  
 The Nonincendive Field 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  $V_{max} \geq V_{oc}$  or  $V_t$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$   
 Transmitter non incendive field wiring parameters for these current controlled circuit are as follows:  
 $V_{max} = 33V$ ;  $C_i \leq 5nF$ ;  $L_i \leq 10 \mu H$ ;  $I_{max} =$  see note 3
3. For these current controlled circuit, the parameter  $I_{max}$  is not required and need not to be aligned with parameter  $I_{sc}$  and  $I_t$  of the associated nonincendive field wiring apparatus or associated apparatus.
4. 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, Division 2.

## Class II, III installation

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510 .
2. Use a dust tight seal at the conduit entry.

Option:  
 prepared to connect FM Approved remote display type LTC-Z40-Ex1\*



Any FM Approved Intrinsically Safe Apparatus suitable for FISCO Concept

Any FM Approved Termination with  
 R = 90...100  $\Omega$   
 C = 0...2.2  $\mu$ F

## HAZARDOUS (CLASSIFIED) LOCATION

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

LTC... with electronic insert for Profibus PA or Foundation Fieldbus (FISCO-Model)

$U_i$  ( $V_{max}$ ) = 17.5 V  
 $I_i$  ( $I_{max}$ ) = 500mA  
 $P_i$  ( $P_{max}$ ) = 5.5 W  
 $C_i \leq 5$  nF  $L_i \leq 10 \mu$ H  
 Leakage current  $\leq 50 \mu$ A

### Area of application:

The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.

permissible ambient temperature:

Electronic: F12 enclosure -40.... +80 °C resp. -40...176°F

Probe: LTC... refer Technical Information

For Installaion acc. -ENTITY- Concept see Control dwg. 16-428FM-12 b/page 4 (part ENTITY)

Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection) Tmed	permissible maximum ambient of electronic compartment (Ta) (enclosure F12)				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 11/2" probe, compact	LTC... with 11/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C +60 C	55 C 60 C	55 C 60 C	55 C 60 C	55 C 60 C	60 C 60 C
T5	+95 C +75 C	70 C 75 C	70 C 75 C	70 C 75 C	70 C 75 C	75 C 75 C
T4	+130 C +80 C	70 C 80 C	75 C 80 C	70 C 80 C	75 C 80 C	80 C 80 C
T3 (functional) <sup>1)</sup>	+150 C +80 C	65 C 80 C	75 C 80 C	70 C 80 C	75 C 80 C	80 C 80 C

note: the applicable temperature of probe must be within their specified limits

<sup>1)</sup>functional means max. permissible process temperature

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CONFIDENTIAL acc. to ISO 16016		scale:	date:2004-Oct-26
PEPPERL+FUCHS Mannheim	Control drawing	-FISCO-Model Profibus PA or Foundation Fieldbus	respons. approved
	Pulscon LTC-.....-F.		norm
			16-428FM-12 b sheet 3 of 12

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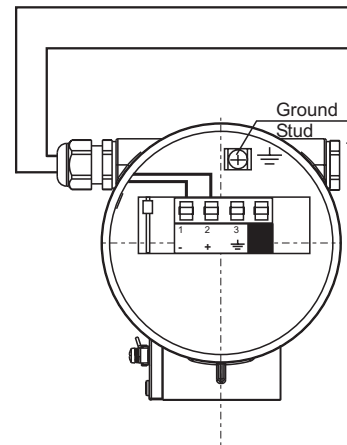
Original-Seal



## HAZARDOUS LOCATION

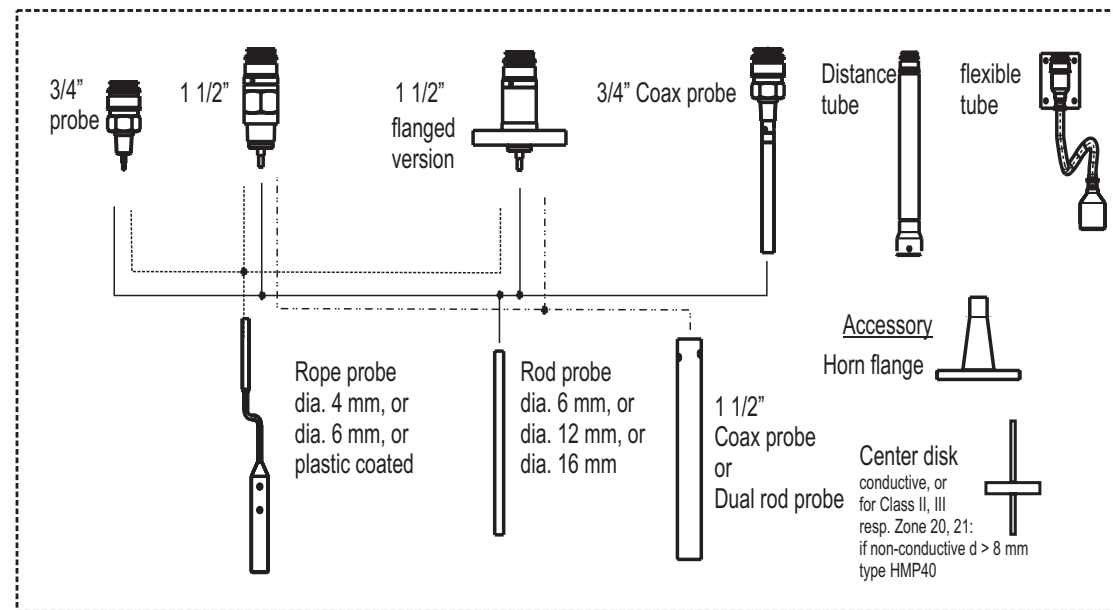
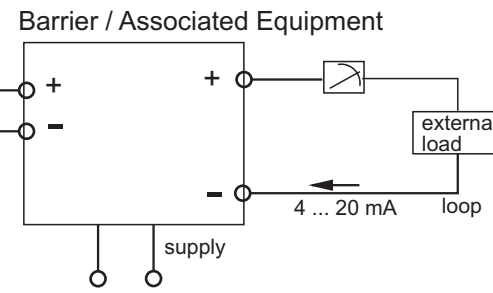
Class I, DIV. 1, GROUPS A, B, C, D  
 Class I, Zone 0, AEx ia IIC  
 Class II, DIV. 1, GROUPS E, F, G  
 Class III

F12- Housing:  
 IS / I, II, III / 1 / A, B, C, D, E, F, G



**Option :**  
 prepared to connect FM Approved remote display type LTC-Z40-Ex1\*

## NON HAZARDOUS LOCATION



### Functional ratings:

These ratings do not supersede Hazardous Locations values  
 $U_{nom} \leq 33 V$   
 $I_{nom} = 15 mA$

For Installation acc. -FISCO- Concept  
 see Control dwg.  
 16-428FM-12 b/page 3 (part FISCO)

### Area of application:

The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.

Permissible ambient temperature:

Electronic: F12 enclosure: -40.... +80°C resp. -40...176°F  
 Probes LTC...: refer Technical Information

## Notes: Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D Hazardous Location Installation.

- Control room equipment may not use or generate over 250 Vrms.
- Use FM Approvals Entity-Approved intrinsic safety barrier with  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$   
 barrier must be incapable of delivering more than defined value ( $P_{max.}$ ) to a matched load.  
 Transmitter entity parameters are as follows:
 

$V_{max.} = 17.5V$	or 24V
$I_{max.} = 500mA$	250mA
$C_i \leq 5nF$	5nF
$L_i \leq 10\mu H$	10μH
$P_{max.} = 5.5W$	1.2W

- Installation should be in accordance with ANSI / ISA RP12.06.01  
 Installation of intrinsically safe systems for Hazardous (Classified) locations and the National Electrical code (ANSI / NFPA 70)
- Warning: Substitution of components may impair intrinsic safety.
- Intrinsic safety barrier manufacturer's installation drawing must be followed when installing this equipment.  
 The configuration of the intrinsic safety barrier(s) must be FM Approvals Approved.
- Use supply wires suitable for 5 K above surrounding ambient.
- Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-.....  
 should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...). Maximum permissible tensile force at the rope or rod 2000 N.

## Division 2 and Zone 2 installation

Nonincendive, Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.  
 Intrinsic safety barrier not required. Max. supply voltage 33V. For T-code see table.
- 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  $V_{max} \geq V_{oc}$  or  $V_t$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$   
 Transmitter non incendive field wiring parameters for these current controlled circuit are as follows:  
 $V_{max.} = 33V$ ;  $C_i \leq 5nF$ ;  $L_i \leq 10 \mu H$ ;  $I_{max} =$  see note 3
- For these current controlled circuit, the parameter  $I_{max}$  is not required and need not to be aligned with parameter  $I_{sc}$  and  $I_t$  of the associated nonincendive field wiring apparatus or associated apparatus.
- 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, Division 2.

## Class II, III installation

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
- Use a dust tight seal at the conduit entry.

Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection) T <sub>med</sub>	permissible maximum ambient of electronic compartment (T <sub>a</sub> ) (enclosure F12)				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 1 1/2" probe, compact	LTC... with 1 1/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C	55 C	55 C	55 C	55 C	60 C
	+60 C	60 C	60 C	60 C	60 C	60 C
T5	+95 C	70 C	70 C	70 C	70 C	75 C
	+75 C	75 C	75 C	75 C	75 C	75 C
T4	+130 C	70 C	75 C	70 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C
T3C (functional) <sup>1)</sup>	+150 C	65 C	75 C	70 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C

note: the applicable temperature of probe must be within their specified limits

<sup>1)</sup>functional means max. permissible process temperature

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 Mannheim	Control drawing	-ENTITY- Profibus PA or Foundation Fieldbus	respons. approved
	Pulscon LTC.-.....-F.		16-428FM-12 b
			norm
			Sheet 4 of 12

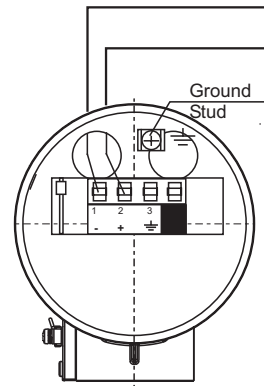
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## HAZARDOUS LOCATION

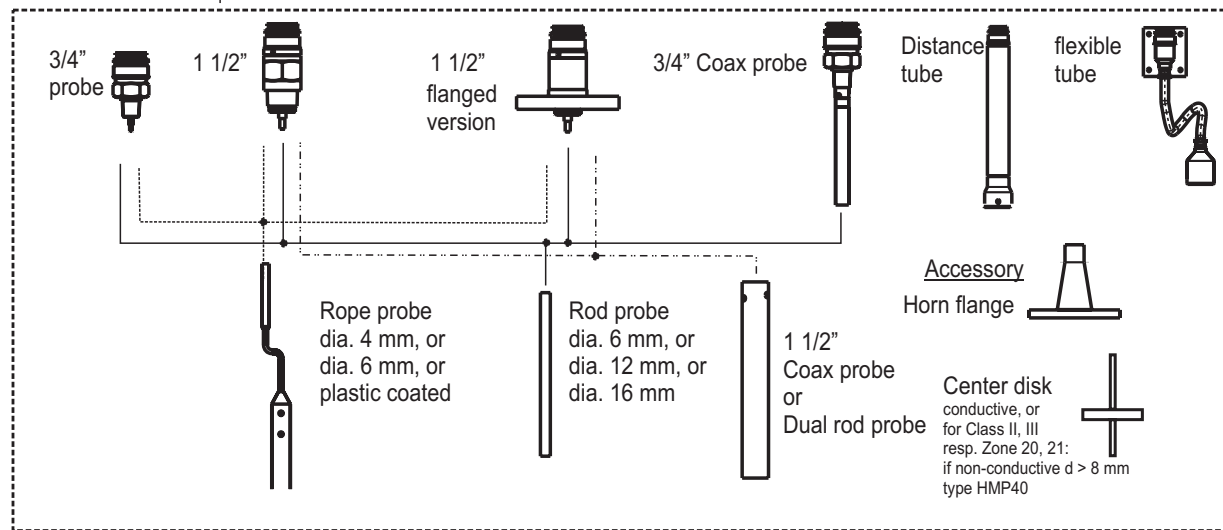
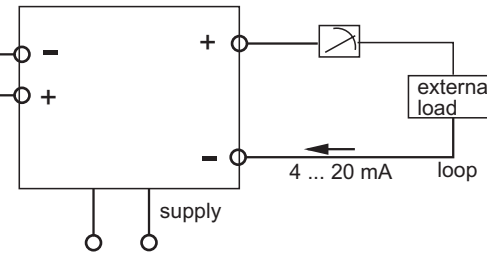
Class I, Div. 1, 2, Groups A, B, C, D  
 Class I, Zone 0, IIC  
 Class II, Div. 1, 2, Groups E, F, G  
 Class III

F23- Housing:  
 IS / I, II, III / 1 / A, B, C, D, E, F, G



## NON HAZARDOUS LOCATION

Any FM approved associated apparatus or associated nonincendive field wiring apparatus



**Option:**  
 prepared to connect FM Approved remote display type LTC-Z40-Ex1\*

### Functional ratings:

These ratings do not supersede Hazardous Locations values  
 $U_{nom} \leq 30 V$   
 $I_{nom} = 4..20 mA$  (max. 25 mA)

### Area of application:

The compact instruments are suitable for use in areas subject to explosion  
 Permissible ambient temperature:

Electronic: F23 enclosure: -40.... +80°C resp. -40...176°F  
 Probes: LTC...: refer Technical Information

Notes:

### Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D Hazardous Location Installation.

- Control room equipment may not use or generate over 250 Vrms.
- Use FM Approvals Entity-Approved intrinsic safety barrier with  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$   
 barrier must be incapable of delivering more than 1 Watt to a matched load.  
 Transmitter entity parameters are as follows:  $V_{max} = 30V$ ;  $I_{max} = 300mA$ ;  $C_i \leq 13nF$ ;  $L_i = 0 \mu H$ ;  $P_{max} = 1Watt$
- Installation should be in accordance with ANSI / ISA RP12.06.01  
 Installation of intrinsically safe systems for Hazardous (Classified) locations and the National Electrical code (ANSI / NFPA 70)
- Warning: Substitution of components may impair intrinsic safety.
- Intrinsic safety barrier manufacturer's installation drawing must be followed when installing this equipment.  
 The configuration of the intrinsic safety barrier(s) must be FM Approved.
- Use supply wires suitable for 5 K above surrounding ambient.
- Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...)  
 Maximum permissible tensile force at the rope or rod 2000 N.

### Division 2 and Zone 2 installation

Nonincendive, Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.  
 Intrinsic safety barrier not required. Max. supply voltage 30V. For T-code see table.
- 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  $V_{max} \geq V_{oc}$  or  $V_t$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$   
 Transmitter non incendive field wiring parameters for these current controlled circuit are as follows:  
 $V_{max} = 30V$ ;  $C_i \leq 13nF$ ;  $L_i = 0 \mu H$ ;  $I_{max} =$  see note 3
- For these current controlled circuit, the parameter  $I_{max}$  is not required and need not to be aligned with parameter  $I_{sc}$  and  $I_t$  of the associated nonincendive field wiring apparatus or associated apparatus.
- 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, Division 2.

### Class II, III installation

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
- Use a dust tight seal at the conduit entry.

Temperature class with /	permissible maximum medium temperature	permissible maximum ambient of electronic compartment (Ta) (enclosure F23 (Stainless Steel))				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 1 1/2" probe, compact	LTC... with 1 1/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C +60 C	55 C 60 C	55 C 60 C	55 C 60 C	55 C 60 C	60 C 60 C
T5	+95 C +75 C	70 C 75 C	70 C 75 C	70 C 75 C	70 C 75 C	75 C 75 C
T4	+130 C +80 C	65 C 80 C	75 C 80 C	65 C 80 C	75 C 80 C	80 C 80 C
T3 (functional) <sup>1)</sup>	+150 C +80 C	55 C 80 C	75 C 80 C	55 C 80 C	75 C 80 C	80 C 80 C

note: the applicable temperature of probe must be within their specified limits  
<sup>1)</sup>functional means max. permissible process temperature

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	Pulskon LTC-.....-.....-F.		16-428FM-12 b
		norm	sheet 5 of 12

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## 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  $V_t$ ), the current ( $I_o$  or  $I_{sc}$  or  $I_t$ ) 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  $\mu$ H 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  $V_t$ ) of the associated 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  $\mu$ A 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  $\Omega$ /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:  $\leq 30$  m
- length of trunk cable:  $\leq 1$  km.
- length of splice:  $\leq 1$  m

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

$$R = 90 \dots 100 \Omega$$

$$C = 0 \dots 2.2 \mu F$$

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 installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D Hazardous Location Installation.

- FM approved apparatus must be installed in accordance with manufacturer instructions
- FM approved associated apparatus must meet the following requirements:  
 $U_o$  or  $V_o$  or  $V_t \leq U_i$  ( $V_{max}$ ) **and**  $I_o$  or  $I_{sc}$  or  $I_t \leq I_i$  ( $I_{max}$ ) **and**  $P_o$  or  $P_{max} \leq P_i$  ( $P_{max}$ )
- The maximum non-hazardous area voltage must not exceed 250 V.
- The installation must be in accordance with the National Electrical Code NFPA 70 and ANSI/ISA RP 12.06.01 (except chapter 5).
- Multiple earthing of screen is allowed only, if high integrity equipotential system is realised between the points of bonding (see drawing No. 16-428FM-12b / page 12)..
- Caution: Use only supply wires suitable for 5 K above surrounding temperature
- Warning: Substitution of components may impair intrinsic safety.
- The polarity for connecting + (2) and - (1) is of no importance due to an internal rectifier.
- Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...) Maximum permissible tensile force at the rope or rod 2000 N.

## Division 2 and Zone 2 installation

Nonincendive, Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510 . Intrinsic safety barrier not required. Max. supply voltage 33V. For T-code see table.
- 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  $V_{max} \geq V_o$  or  $V_t$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$   
Transmitter non incendive field wiring parameters for these current controlled circuit are as follows:  
 $V_{max} = 33V$ ;  $C_i \leq 5nF$ ;  $L_i \leq 10 \mu H$ ;  $I_{max} =$  see note 3
- For these current controlled circuit, the parameter  $I_{max}$  is not required and need not to be aligned with parameter  $I_{sc}$  and  $I_t$  of the associated nonincendive field wiring apparatus or associated apparatus.
- 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, Division 2.

## Class II, III installation

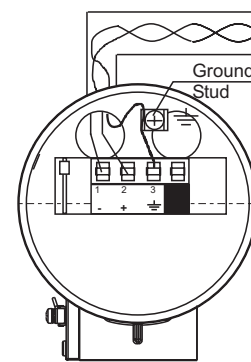
DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510 .
- Use a dust tight seal at the conduit entry.

**Option :**  
prepared to connect FM Approved remote display type LTC-Z40-Ex1\*

## 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, Division 1

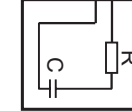


Levellflex M FMP 4x- with electronic insert for Profibus PA or Foundation Fieldbus (FISCO-Model)

$U_i$  ( $V_{max}$ ) = 17.5 V  
 $I_i$  ( $I_{max}$ ) = 500mA  
 $P_i$  ( $P_{max}$ ) = 5.5 W  
 $C_i \leq 5$  nF      $L_i \leq 10$   $\mu$ H  
Leakage current  $\leq 50$   $\mu$ A

Any FM Approved Intrinsically Safe Apparatus suitable for FISCO Concept

Any FM Approved Termination with  
 $R = 90 \dots 100 \Omega$   
 $C = 0 \dots 2.2 \mu F$



### Area of application:

The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.

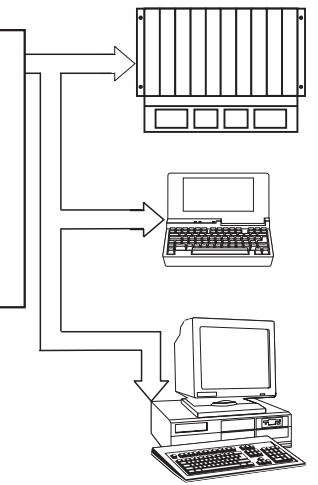
permissible ambient temperature:

Electronic: F23 enclosure: -40.... +80 °C resp. -40...176°F  
Probes: LTC ....: refer Technical Information

For Installaion acc. -ENTITY- Concept see Control dwg. 16-428FM-12b / page 7(part ENTITY)

## NONHAZARDOUS LOCATION

Any FM Approved Associated Apparatus or associated nonincendive field wiring apparatus Suitable for Fisco concept



Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection) T <sub>med</sub>	permissible maximum ambient of electronic compartment (Ta) (enclosure F23)				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 11/2" probe, compact	LTC... with 11/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C	55 C	55 C	55 C	55 C	60 C
	+60 C	60 C	60 C	60 C	60 C	60 C
T5	+95 C	70 C	70 C	70 C	70 C	75 C
	+75 C	75 C	75 C	75 C	75 C	75 C
T4	+130 C	65 C	75 C	65 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C
T3C (functional) <sup>1)</sup>	+150 C	55 C	75 C	55 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C

note: the applicable temperature of probe must be within their specified limits

<sup>1)</sup>functional means max. permissible process temperature

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	Pulscon LTC-.....-.....-F.		approved
			norm
			16-428FM-12 b
			sheet 6 of 12

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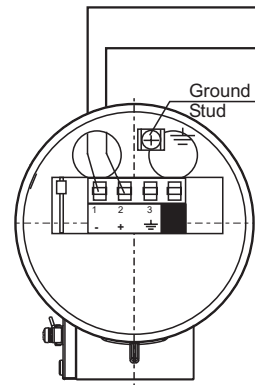


## HAZARDOUS LOCATION

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

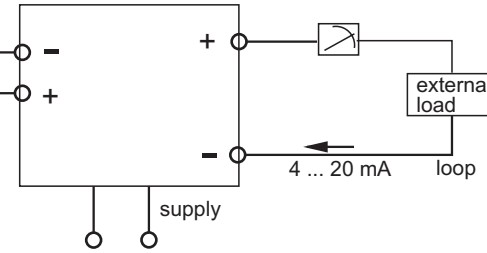
### F23- Housing:

IS / I, II, III / 1 / A, B, C, D, E, F, G

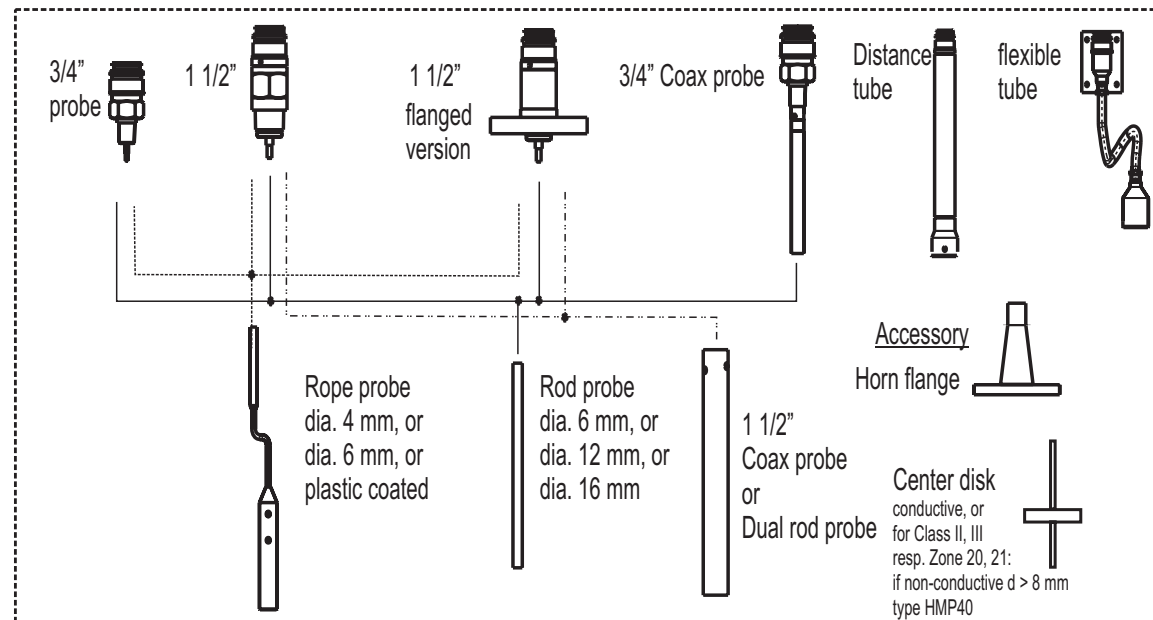


## NON HAZARDOUS LOCATION

Any FM approved associated apparatus or associated nonincendive field wiring apparatus



**Option :**  
 prepared to connect FM Approved remote display type LTC-Z40-Ex1\*



For Installaion acc. -ENTITY- Concept see Control dwg. 16-428FM-12 a/page 6 (part ENTITY)

### Functional ratings:

These ratings do not supersede Hazardous Locations values Unom ≤ 33 V, Inom = 15 mA

### Area of application:

The compact instruments are suitable for use in areas subject to explosion

### Permissible ambient temperature:

Electronic: F23 enclosure: -40... +80°C resp. -40...176°F  
 Probes: LTC...: refer Technical Information

### Notes. Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D Hazardous Location Installation.

- Control room equipment may not use or generate over 250 Vrms.
- Use FM Approvals Entity-Approved intrinsic safety barrier with  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$  barrier must be incapable of delivering more than defined value ( $P_{max}$ ) to a matched load.  
 Transmitter entity parameters are as follows:
 

$V_{max} = 17.5V$	or 24V
$I_{max} = 500mA$	250mA
$C_i \leq 5nF$	5nF
$L_i \leq 10\mu H$	10μH
$P_{max} = 5.5W$	1.2W

- Installation should be in accordance with ANSI / ISA RP12.06.01  
 Installation of intrinsically safe systems for Hazardous (Classified) locations and the National Electrical code (ANSI / NFPA 70)
- Warning: Substitution of components may impair intrinsic safety.
- Intrinsic safety barrier manufacturer's installation drawing must be followed when installing this equipment.  
 The configuration of the intrinsic safety barrier(s) must be FM Approvals Approved.
- Use supply wires suitable for 5 K above surrounding ambient.
- Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...). Maximum permissible tensile force at the rope or rod 2000 N.

### Division 2 and Zone 2 installation

Nonincendive, Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510 .  
 Intrinsic safety barrier not required. Max. supply voltage 33V. For T-code see table.
- 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  $V_{max} \geq V_{oc}$  or  $V_t$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$   
 Transmitter non incendive field wiring parameters for these current controlled circuit are as follows:  
 $V_{max} = 33V$ ;  $C_i \leq 5nF$ ;  $L_i \leq 10 \mu H$ ;  $I_{max} =$  see note 3
- For these current controlled circuit, the parameter  $I_{max}$  is not required and need not to be aligned with parameter  $I_{sc}$  and  $I_t$  of the associated nonincendive field wiring apparatus or associated apparatus.
- 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, Division 2.

### Class II, III installation

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510 .
- Use a dust tight seal at the conduit entry.

Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection) Tmed	permissible maximum ambient of electronic compartment (Ta) (enclosure F23 ( Stainless Steel))				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 1 1/2" probe, compact	LTC... with 1 1/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C	55 C	55 C	55 C	55 C	60 C
	+60 C	60 C	60 C	60 C	60 C	60 C
T5	+95 C	70 C	70 C	70 C	70 C	75 C
	+75 C	75 C	75 C	75 C	75 C	75 C
T4	+130 C	65 C	75 C	65 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C
T3 (functional) <sup>1)</sup>	+150 C	55 C	75 C	55 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C

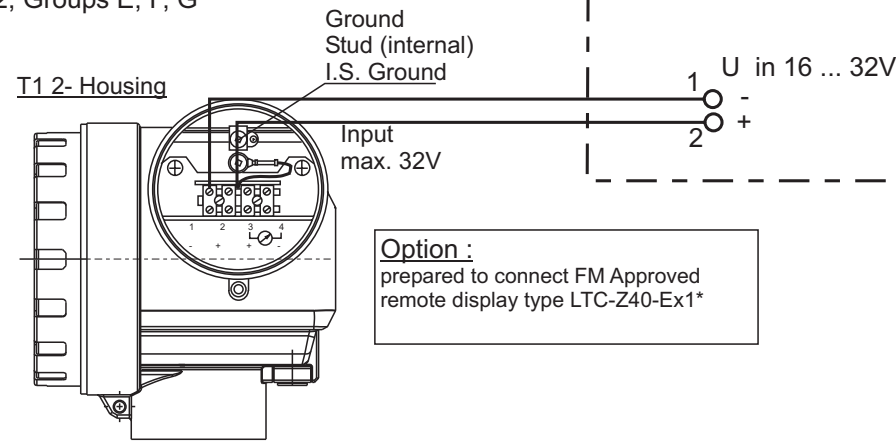
note: the applicable temperature of probe must be within their specified limits  
<sup>1)</sup>functional means max. permissible process temperature

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<b>PEPPERL+FUCHS</b> Mannheim	Control drawing	F23 -Entity Profibus PA or Foundation Fieldbus	respons. approved norm
		Pulscon LTC-.....-.....-F.	16-428FM-12 a sheet 7 of 12

## HAZARDOUS LOCATION

Class I, Div. 1, 2, Groups A, B, C, D  
 Housing: Class I, Zone 1, IIC  
 Probe: Class I, Zone 0, IIC Tx  
 Class II, Div. 1, 2, Groups E, F, G  
 Class III

## NON HAZARDOUS LOCATION



### Notes: Division 1 installation

EXPLOSION PROOF CLASS I, DIV. 1, GROUP A, B, C, D or AEx d ia IIC; CLASS II, DIV. 1, GROUP E, F, G; CLASS III  
 HAZARDOUS LOCATION INSTALLATION

1. Install per National Electrical Code NFPA 70 (NEC)
2. Supply wires shall be installed in conduit in accordance with the NEC.
3. Control room equipment may not use or generate over 250 Vrms.
4. Terminal compartment:  
Warning: Keep cover tight when circuit is alive or the area is known to be non-hazardous.
5. For electronic: maximum ambient temperature = 60°C
6. Use supply wires suitable for 5 K above surrounding ambient.
7. Ground stud shall be connected to a grounding electrode by 12 AWG wire or larger insulated conductors. Resistance between ground stud and grounding electrode shall be less than 1 Ohm.
8. Use a dust tight seal at the conduit entry in Class II and III Location.
9. Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...) Maximum permissible tensile force at the rope or rod 2000 N.

### Division 2 and Zone 2 installation

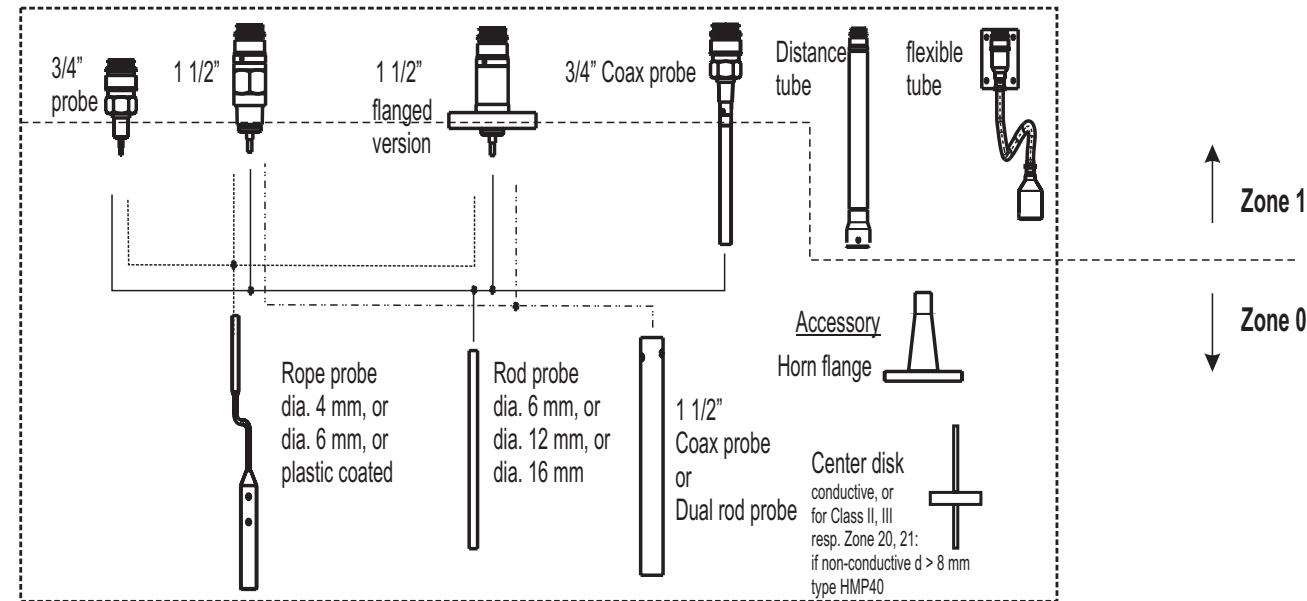
Nonincendive, Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510. Intrinsic safety barrier not required. Max. supply voltage 32V. For T-code see table.
2. 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, Division 2.

### Class II, III installation

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
2. Use a dust tight seal at the conduit entry.



Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection) Tmed	permissible maximum ambient of electronic compartment (Ta) (enclosure T12)				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 1 1/2" probe, compact	LTC with 1 1/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C	55 C	55 C	55 C	55 C	60 C
	+60 C	60 C	60 C	60 C	60 C	60 C
T5	+95 C	55 C	55 C	55 C	55 C	60 C
	+60 C	60 C	60 C	60 C	60 C	60 C
T4	+130 C	50 C	55 C	50 C	55 C	60 C
	+60 C	60 C	80 C	60 C	60 C	60 C
T3C (functional) <sup>1)</sup>	+150 C	45 C	55 C	50 C	55 C	60 C
	+60 C	60 C	60 C	60 C	60 C	60 C

note: the applicable temperature of probe must be within their specified limits  
<sup>1)</sup>functional means max. permissible process temperature

#### Area of application:

The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.

#### Permissible ambient temperature:

Electronic: T12 enclosure  
 Probes: LTC...

-40.... +60°C resp. -40...140°F  
 refer Technical Information

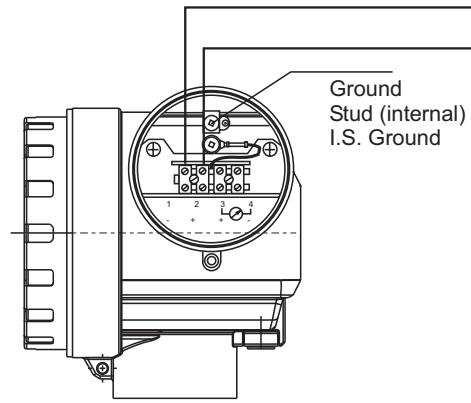
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	Pulscon LTC-.....-.....-F.		approved
			norm
			16-428FM-12 b sheet 8 of 12



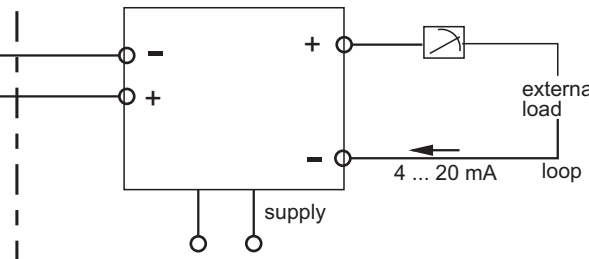
## HAZARDOUS LOCATION

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

**T12-OVP - Housing:**  
IS / I, II, III / 1 / A, B, C, D, E, F, G



## NON HAZARDOUS LOCATION



### Notes: Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D Hazardous Location Installation.

- Control room equipment may not use or generate over 250 Vrms.
- Use FM Approvals Entity-Approved intrinsic safety barrier with  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$  barrier must be incapable of delivering more than 1 Watt to a matched load. Transmitter entity parameters are as follows:  $V_{max} = 30V$ ;  $I_{max} = 273mA$ ;  $C_i \leq 13nF$ ;  $L_i = 0 \mu H$ ;  $P_{max} = 1Watt$
- Installation should be in accordance with ANSI / ISA RP12.06.01  
 Installation of intrinsically safe systems for Hazardous (Classified) locations and the National Electrical code (ANSI / NFPA 70)
- Warning: Substitution of components may impair intrinsic safety.
- Intrinsic safety barrier manufacturer's installation drawing must be followed when installing this equipment.  
 The configuration of the intrinsic safety barrier(s) must be FM Approved.
- Use supply wires suitable for 5°K above surrounding ambient.
- The surge protection device (OVP) fulfills the requirements of IEC 60079-14 clause 12.3.
- Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...). Maximum permissible tensile force at the rope or rod 2000 N.

### Division 2 and Zone 2 installation

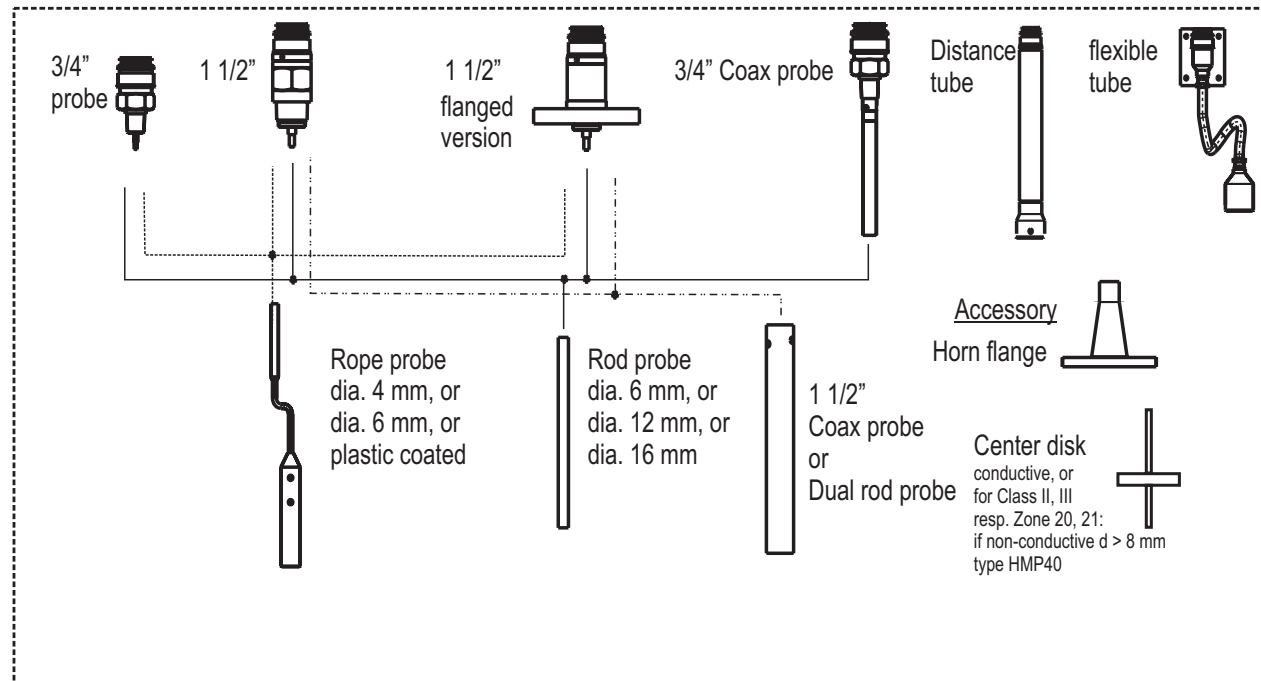
Nonincendive, Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510. Intrinsic safety barrier not required. Max. supply voltage 30V. For T-code see table.
- 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  $V_{max} \geq V_{oc}$  or  $V_t$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$   
 Transmitter non incendive field wiring parameters for these current controlled circuit are as follows:  
 $V_{max} = 30V$ ;  $C_i \leq 13nF$ ;  $L_i = 0 \mu H$ ;  $I_{max} = \text{see note 3}$
- For these current controlled circuit, the parameter  $I_{max}$  is not required and need not to be aligned with parameter  $I_{sc}$  and  $I_t$  of the associated nonincendive field wiring apparatus or associated apparatus.
- 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, Division 2.

### Class II, III installation

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
- Use a dust tight seal at the conduit entry.



#### Functional ratings:

These ratings do not supersede Hazardous Locations values  
 $U_{nom} \leq 30 V$   
 $I_{nom} = 4...20 mA$  (max. 25 mA)

#### Area of application:

The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.

#### Permissible ambient temperature:

Electronic: T12 OVP enclosure (with integrated surge protection) -40.... +80°C resp. -40...176°F  
 Probes: LTC.... refer Technical Information

Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection) Tmed	permissible maximum ambient of electronic compartment (Ta) (enclosure T12-OVP (integrated surge protection))				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 1 1/2" probe, compact	LTC... with 1 1/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C +60 C	55 C 60 C	55 C 60 C	55 C 60 C	55 C 60 C	60 C 60 C
T5	+95 C +75 C	70 C 75 C	70 C 75 C	70 C 75 C	70 C 75 C	75 C 75 C
T4	+130 C +80 C	70 C 80 C	75 C 80 C	70 C 80 C	75 C 80 C	80 C 80 C
T3 (functional) <sup>1)</sup>	+150 C +80 C	65 C 80 C	75 C 80 C	70 C 80 C	75 C 80 C	80 C 80 C

note: the applicable temperature of probe must be within their specified limits  
<sup>1)</sup>functional means max. permissible process temperature

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CONFIDENTIAL acc. to ISO 16016		scale:	date: 2004-Oct-26
Mannheim	Control drawing	T12-OVP /IS-HART	respons.
	Pulscon LTC.-.....-F.		approved
			norm
			16-428FM-12 b
			sheet 9 of 12

**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 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 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.

**Intrinsically safe installation**

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D Hazardous Location Installation.

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. Multiple earthing of screen is allowed only, if high integrity equipotential system is realised between the points of bonding (see drawing No. 16-428FM-12b / page 12)..
6. Caution: Use only supply wires suitable for 5 K above surrounding temperature
7. Warning: Substitution of components may impair intrinsic safety.
8. The polarity for connecting + (2) and - (1) is of no importance due to an internal rectifier.
9. The surge protection device (OVP) fulfills the requirements of IEC 60079-14 clause 12.3.
10. Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...) Maximum permissible tensile force at the rope or rod 2000 N.

**Division 2 and Zone 2 installation**

Nonincendive, Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510 . Intrinsic safety barrier not required. Max. supply voltage 33V. For T-code see table.
2. 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 non incendive field wiring parameters for these current controlled circuit are as follows:  
Vmax = 33V; Ci ≤ 5nF; Li ≤ 10 µH; Imax = see note 3
3. For these current controlled circuit, the parameter Imax is not required and need not to be aligned with parameter Isc and It of the associated nonincendive field wiring apparatus or associated apparatus.
4. 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, Division 2.

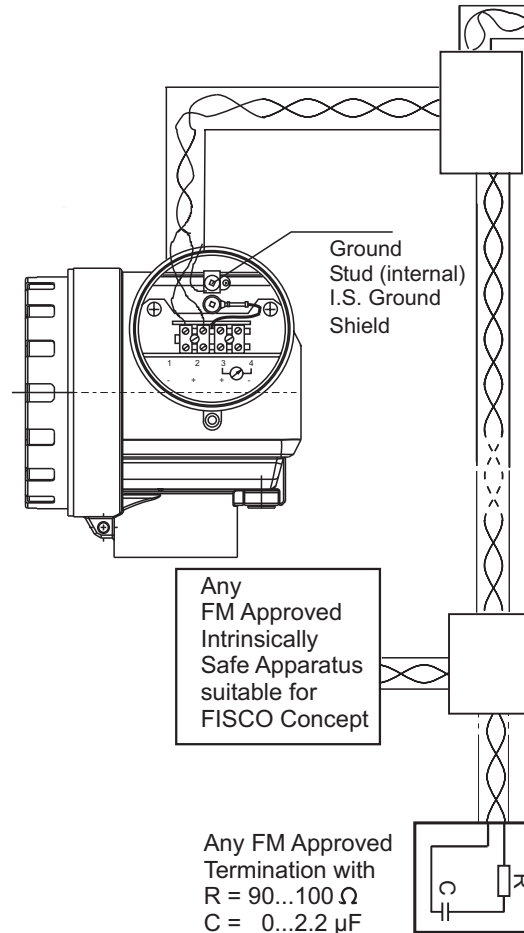
**Class II, III installation**

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

1. Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510 .
2. Use a dust tight seal at the conduit entry.

**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, Division 1



Levelflex M FMP 4x- with electronic insert for Profibus PA or Foundation Fieldbus (FISCO-Model)  
 Ui (Vmax) = 17.5 V  
 Ii (Imax) = 273 mA  
 Pi (Pmax) = 1.2 W  
 Ci ≤ 5 nF    Li ≤ 10 µH  
 Leakage current ≤ 50 µA

**Area of application:**  
 The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.  
 permissible ambient temperature:  
 Electronic: T12 OVP enclosure (with integrated surge protection) -40... +80 °C resp. -40...176°F  
 Probes: LTC... refer Technical Information

For Installation acc. -ENTITY- Concept see Control dwg. 16-428FM-12b / page 11 (part ENTITY)

Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection) Tmed	permissible maximum ambient of electronic compartment (Ta) (enclosure T12 -OVP- / with integrated surge protection device)				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 1 1/2" probe, compact	LTC... with 1 1/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C	55 C	55 C	55 C	55 C	60 C
	+60 C	60 C	60 C	60 C	60 C	60 C
T5	+95 C	70 C	70 C	70 C	70 C	75 C
	+75 C	75 C	75 C	75 C	75 C	75 C
T4	+130 C	70 C	75 C	70 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C
T3C (functional) <sup>1)</sup>	+150 C	65 C	75 C	65 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C

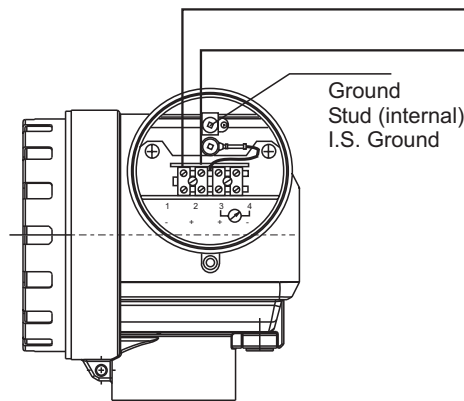
note: the applicable temperature of probe must be within their specified limits  
<sup>1)</sup>functional means max. permissible process temperature

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CONFIDENTIAL acc. to ISO 16016		scale:	date: 2004-Oct-26
Mannheim	Control drawing	T12 - OVP / FISCO	respons. approved norm
		Pulscon LTC.-.....-.....-F.	16-428FM-12 b
			sheet 10 of 12

# HAZARDOUS LOCATION

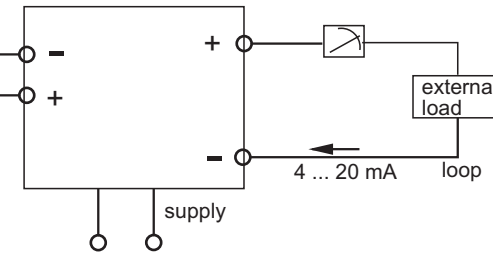
Class I, Div. 1, 2, Groups A, B, C, D  
 Class I, Zone 0, IIC  
 Class II, Div. 1, 2, Groups E, F, G  
 Class III

T12 - OVP Housing:  
 IS / I, II, III / 1 / A, B, C, D, E, F, G



# NON HAZARDOUS LOCATION

Any FM approved associated apparatus or associated nonincendive field wiring apparatus



## Notes: Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D Hazardous Location Installation.

- Control room equipment may not use or generate over 250 Vrms.
- Use FM Approvals Entity-Approved intrinsic safety barrier with  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$  barrier must be incapable of delivering more than defined value ( $P_{max.}$ ) to a matched load.

Transmitter entity parameters are as follows:

$V_{max.}$	= 17.5V	or 24V
$I_{max.}$	= 273mA	250mA
$C_i$	5nF	5nF
$L_i$	10µH	10µH
$P_{max.}$	= 1.2W	1.2W

- Installation should be in accordance with ANSI / ISA RP12.06.01  
 Installation of intrinsically safe systems for Hazardous (Classified) locations and the National Electrical code (ANSI / NFPA 70)
- Warning: Substitution of components may impair intrinsic safety.
- Intrinsic safety barrier manufacturer's installation drawing must be followed when installing this equipment.  
 The configuration of the intrinsic safety barrier(s) must be FM Approvals Approved.
- Use supply wires suitable for 5 K above surrounding ambient.
- The surge protection device (OVP) fulfills the requirements of IEC 60079-14 clause 12.3.
- Probes made out of special materials like Alloy C22 marked as LTC6-..... or LTC7-..... should be used only in liquids or lightweight solids (e.g. plastic granulate, fly-ash, ...). Maximum permissible tensile force at the rope or rod 2000 N.

## Division 2 and Zone 2 installation

Nonincendive, Class I, Div. 2, Group A, B, C, D Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510. Intrinsic safety barrier not required. Max. supply voltage 33V. For T-code see table.
- 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  $V_{max} \geq V_{oc}$  or  $V_t$ ,  $C_a \geq C_i + C_{cable}$ ,  $L_a \geq L_i + L_{cable}$

Transmitter non incendive field wiring parameters for these current controlled circuit are as follows:

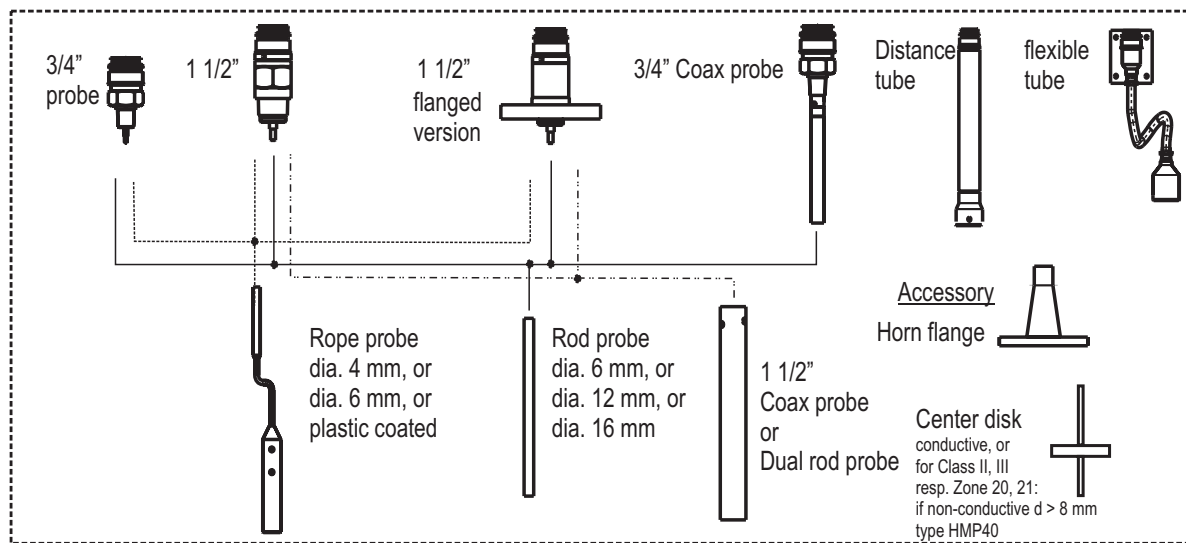
$V_{max.} = 33V$ ;  $C_i \leq 5nF$ ;  $L_i \leq 10 \mu H$ ;  $I_{max} =$  see note 3

- For these current controlled circuit, the parameter  $I_{max}$  is not required and need not to be aligned with parameter  $I_{sc}$  and  $I_t$  of the associated nonincendive field wiring apparatus or associated apparatus.
- 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, Division 2.

## Class II, III installation

DIP for Class II and III, Div.1, Group E, F, G Hazardous Location Installation.

- Installation shall be in accordance with NEC using threaded conduits or other wiring methods in accordance with Article 500 through Article 510.
- Use a dust tight seal at the conduit entry.



### Functional ratings:

These ratings do not supersede Hazardous Locations values  $U_{nom} \leq 33 V$ ,  $I_{nom} = 15 mA$

For Installaion acc. -ENTITY- Concept see Control dwg. 16-428FM-12 b/page 10 (part ENTITY)

### Area of application:

The compact instruments are suitable for use in areas subject to explosion caused by gases, vapours or mists.

Permissible ambient temperature:

Electronic: T12 OVP enclosure -40.... +80°C resp. -40...176°F  
 (with integrated surge protection)

Probes: LTC.... refer Technical Information

Temperature class with / without Display VU 331	permissible maximum medium temperature at the probe (process connection) $T_{med}$	permissible maximum ambient of electronic compartment ( $T_a$ ) (enclosure T12 – OVP / with integrated surge protection device)				
		LTC... with 3/4" probe, compact	LTC... with 3/4" probe Remote electronic with distance tube	LTC... with 1 1/2" probe, compact	LTC... with 1 1/2" probe, Remote electronic with distance tube	LTC... with Remote electronic with flexible tube
T6	+80 C	55 C	55 C	55 C	55 C	60 C
	+60 C	60 C	60 C	60 C	60 C	60 C
T5	+95 C	70 C	70 C	70 C	70 C	75 C
	+75 C	75 C	75 C	75 C	75 C	75 C
T4	+130 C	70 C	75 C	70 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C
T3C (functional) <sup>1)</sup>	+150 C	65 C	75 C	70 C	75 C	80 C
	+80 C	80 C	80 C	80 C	80 C	80 C

note: the applicable temperature of probe must be within their specified limits

<sup>1)</sup>functional means max. permissible process temperature

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This document contains safety-relevant information. It must not be altered without the authorization of the norm expert!			
CONFIDENTIAL acc. to ISO 16016		scale:	date:2004-Oct-26
 Mannheim	Control drawing	T12 - OVP-ENTITYI Profibus PA or Foundation Fieldbus	respons.
		Pulskon LTC-.....-.....-F.	approved
			norm
			16-428FM-12 b sheet 11 of 12

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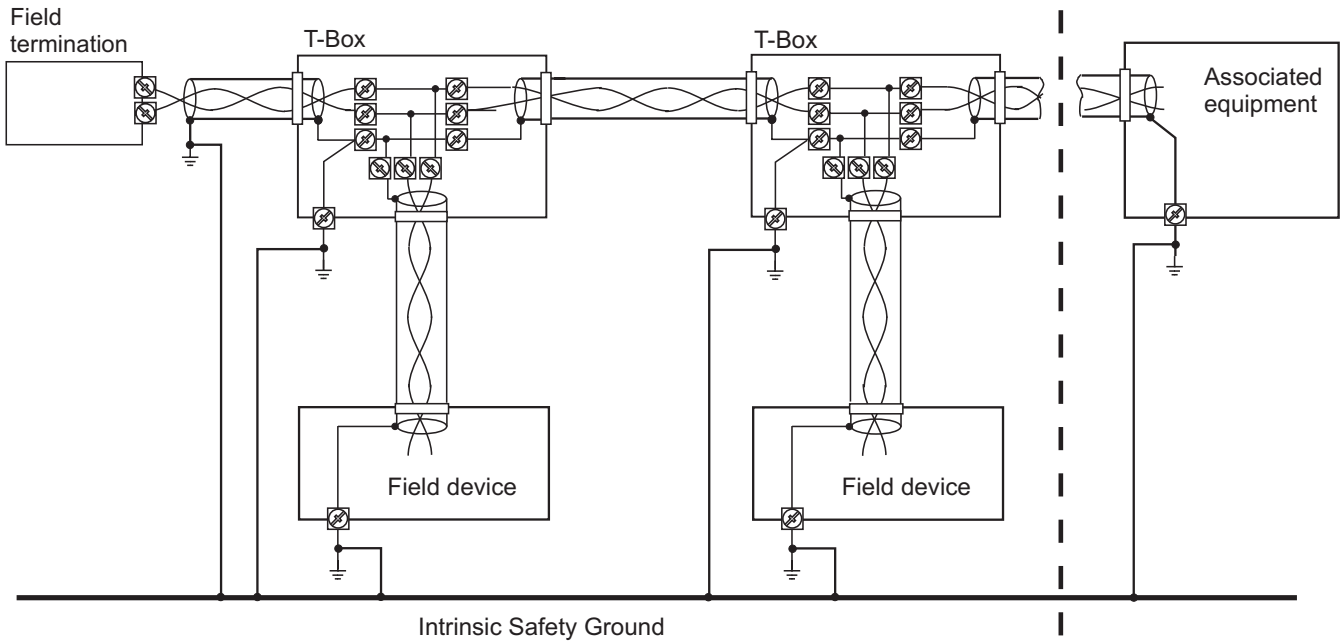
Original-Seal



# Multiple Earthing of the Screen

HAZARDOUS (CLASSIFIED) LOCATION

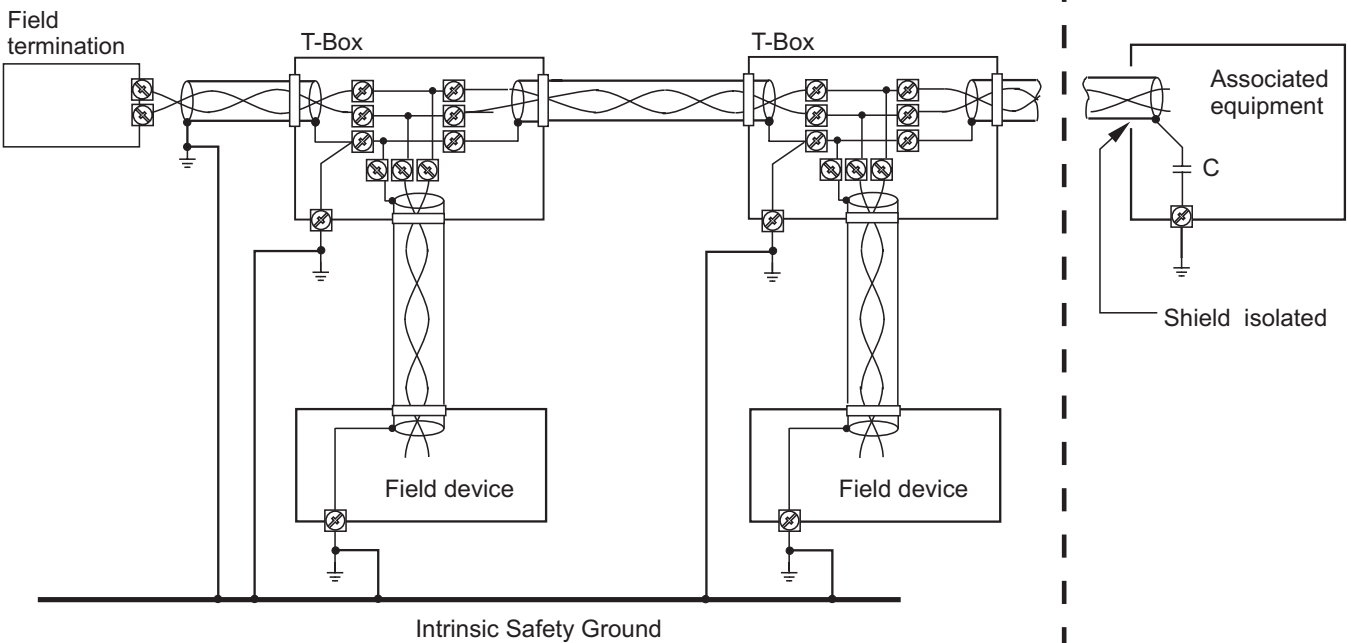
NON HAZARDOUS LOCATION



Variation 1

HAZARDOUS (CLASSIFIED) LOCATION

NON HAZARDOUS LOCATION



Variation 2

Small capacitors (e.g. 1nF, 1500V, ceramic) to be used  
Capacitance connected to shield should not exceed 10nF in total.

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scale: -

date: 2004-Oct-26

**PEPPERL+FUCHS**

Control drawing

Pulscon LTC-.....-F.

16-428FM-12 b

Mannheim

sheet 12 of 12

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Original-Seal