HAZARDOUS LOCATION

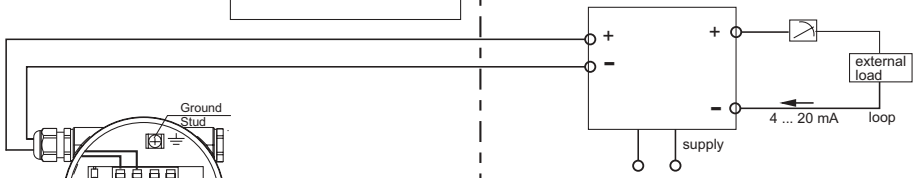
Class I, Div. 1, 2, Groups A, B, C, D
Class I, Zone 0, IIC; Zone 2, IIC
Class II, Div. 1, 2, Groups E, F, G
Class III

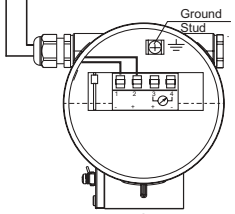
'F'-Type- Housing:
IS / I, II, III / 1 / A,B,C,D,E,F,G

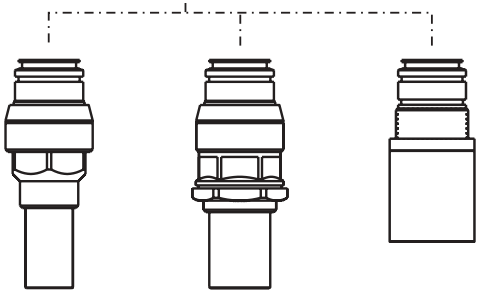
Option 1:
Preparad to connect
FM approved remote
display type LUC-Z40-Ex1*
refer to adequate
Control Drawing

NON HAZARDOUS LOCATION

Any FM approved associated apparatus or
associated nonincendive field wiring apparatus







LUC-M10- LUC-M20- LUC-M40-

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: 'F'-Type enclosure -40 ... +80 °C resp. -40 ... +176 °F

Type	Type of sensor	Operation temperature [°C resp. °F]
LUC-M10-	1½"-sensor	-40 to +80 resp. -40 to +176
LUC-M20-	2"-sensor	-40 to +80 resp. -40 to +176
LUC-M40-	3"-sensor	-40 to +80 resp. -40 to +176

Stempel der Zertifizierungsstelle

Seal of the notified body

Firmenstempel

company seal

Notes:

Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D or Zone 0 IIC Hazardous Location Installation

1. Control room equipment may not use or generate over 250 Vrms.
2. Installation should be in accordance with the National Electrical Code NFPA 70 (NEC) and ANSI / ISA RP12.06.01.
3. Warning: Substitution of components may impair intrinsic safety.
4. Use FM Approvals Entity-Approved intrinsic safety barrier with
   $U_O/V_{OC} \leq U_i/V_{max.}$, $I_O/I_{SC} \leq I_i/I_{max.}$, $C_O/C_a \geq C_i + C_{cable}$, $L_O/L_a \geq L_i + L_{cable}$
   Barrier must be incapable of delivering more than 1 Watt to a matched load.
   Transmitter entity parameters are as follows:

$U_i/V_{max.}$ (V)	$I_i/I_{max.}$ (mA)	$P_i/P_{max.}$ (W)	C_i (nF)	L_i (µH)
30	300	1.0	≤ 13	0

5. Use supply wires suitable for 5 K above surrounding ambient.
6. Intrinsic safety barrier manufacturer´s installation drawing must be followed when installing this equipment.
   The configuration of the intrinsic safety barrier(s) must be approved by FM Approvals.
7. This version of Prosonic M may be provided with a connection to an external display unit already installed or via a set up kit. This connection is for the use of the FM approved display unit LUC-Z40-Ex1* only.
   Refer to safety instructions of the external display unit LUC-Z40-Ex1*.

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 30 V. 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_O or $C_a \geq C_i + C_{cable}$, L_O or $L_a \geq L_i + L_{cable}$
   Transmitter non incendive field wiring parameters for this current controlled circuit are as follows:
   $V_{max.} = 30$ V, $C_i \leq 13$ nF, $L_i = 0$ µH, $I_{max.}$ *see note 3
3. For this current controlled circuit, the parameter $I_{max.}$ is not required and need not be aligned with parameter I_{SC} or I_O of the barrier or associated nonincendive field wiring 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: Explosion hazard - 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

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.

Functional Ratings

These ratings do not supersede Hazardous Locations Values
$V_{nom.} = 14...30$ V, $I_{nom.} = 4...20$ mA

Temperature class with / without Display VU 331	Permissible maximum medium temperature at the sensors	Permissible maximum ambient (T_a) of electronic compartment ('F'-Type enclosure)		
		LUC-M10-	LUC-M20-	LUC-M40-
T6	+60 °C	+60 °C	+60 °C	+60 °C
T5	+80 °C	+80 °C	+80 °C	+80 °C

CONFIDENTIAL acc. to ISO 16016 | scale: | date: 2005-Apr-25

PEPPERL+FUCHS
Mannheim

Control drawing F** / IS - Hart
LUC-M10-, LUC-M20, LUC-M40-.

respons.
approved
norm

16-519FM-12

sheet 1 of 8

CONFIDENTIAL Original-Seal

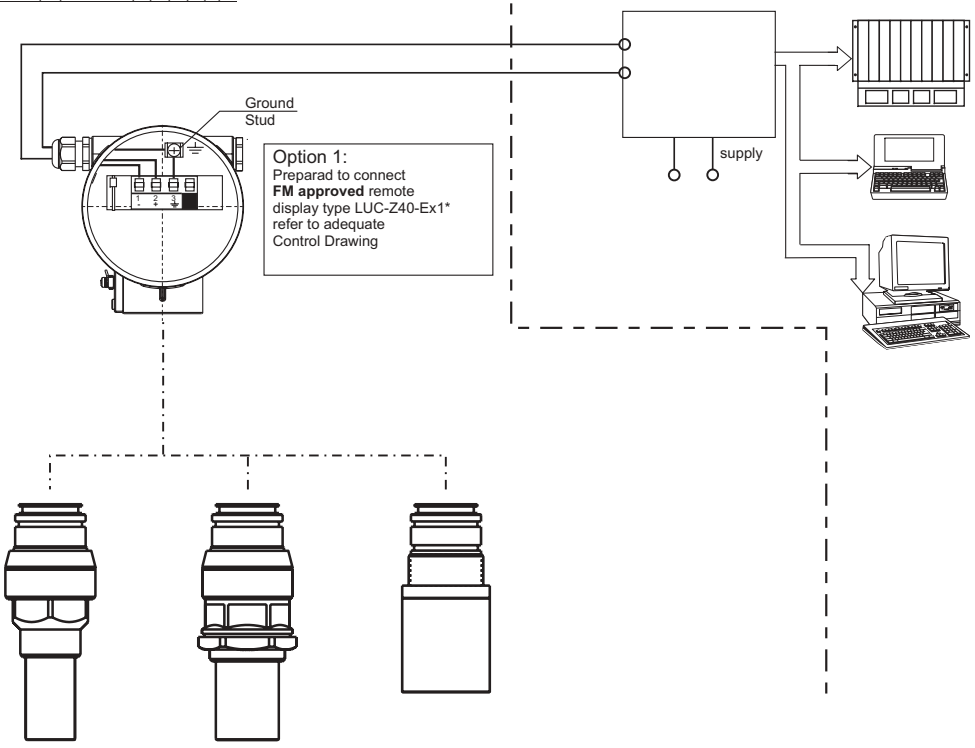
HAZARDOUS LOCATION

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

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

NON HAZARDOUS LOCATION

Any FM approved associated apparatus or associated non-incendive field wiring apparatus



LUC-M10- LUC-M20- LUC-M40-

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: 'F'-Type enclosure -40 ... +80 °C resp. -40 ... +176 °F

Type	Type of sensor	Operation temperature [°C resp. °F]
LUC-M10-	1½"-sensor	-40 to +80 resp. -40 to +176
LUC-M20-	2"-sensor	-40 to +80 resp. -40 to +176
LUC-M40-	3"-sensor	-40 to +80 resp. -40 to +176

Notes:

Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D or Zone 0 IIC Hazardous Location Installation

1. Control room equipment may not use or generate over 250 Vrms.
2. Installation should be in accordance with the National Electrical Code NFPA 70 (NEC) and ANSI / ISA RP12.06.01.
3. Warning: Substitution of components may impair intrinsic safety.
4. Use FM Approvals Entity-Approved intrinsic safety barrier with
   $U_O/V_{OC} \leq U_i/V_{max.}$, $I_O/I_{SC} \leq I_i/I_{max.}$, $C_O/C_a \geq C_i + C_{cable}$, $L_O/L_a \geq L_i + L_{cable}$
   Barrier must be incapable of delivering more than defined value ($P_{max.}$) to a matched load.
   Transmitter entity parameters are as follows:

	$U_i/V_{max.}$ (V)	$I_i/I_{max.}$ (mA)	$P_i/P_{max.}$ (W)	C_i (nF)	L_i (µH)
or	17.5	500	5.5	≤ 5	≤ 10
	24	250	1.2	≤ 5	≤ 10

5. Use supply wires suitable for 5 K above surrounding ambient.
6. Intrinsic safety barrier manufacturer´s installation drawing must be followed when installing this equipment.
   The configuration of the intrinsic safety barrier(s) must be approved by FM Approvals.
7. The polarity for connecting + (2) and - (1) is of no importance due to an internal rectifier.
8. This version of Prosonic M may be provided with a connection to an external display unit already installed or via a set up kit. This connection is for the use of the FM approved display unit LUC-Z40-Ex1* only.
   Refer to safety instructions of the external display unit LUC-Z40-Ex1*.

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 33 V. 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_O or $C_a \geq C_i + C_{cable}$, L_O or $L_a \geq L_i + L_{cable}$
   Transmitter non incendive field wiring parameters for this current controlled circuit are as follows:
   $V_{max.} = 33$ V, $C_i \leq 5$ nF, $L_i \leq 10$ µH, $I_{max.}$ *see note 3
3. For this current controlled circuit, the parameter $I_{max.}$ is not required and need not be aligned with parameter I_{SC} or I_O of the barrier or associated nonincendive field wiring 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: Explosion hazard - 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

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.

Functional Ratings

These ratings do not supersede Hazardous Locations Values
$V_{nom.} = 9...33$ V, $I_{nom.} = 15$ mA

Temperature class with / without Display VU 331	Permissible maximum medium temperature at the sensors	Permissible maximum ambient (T_a) of electronic compartment ('F'-Type enclosure)		
		LUC-M10-	LUC-M20-	LUC-M40-
T6	+60 °C	+60 °C	+60 °C	+60 °C
T5	+80 °C	+75 °C	+75 °C	+75 °C
T4	+80 °C	+80 °C	+80 °C	+80 °C

For Installation acc. -FISCO- Concept see sheet 3.

PEPPERL+FUCHS Mannheim	Control drawing F** - ENTITY - Model Profibus PA or Foundation Fieldbus LUC-M10- , LUC-M20- , LUC-M40-	respons.	scale:	date: 2005-Apr-25
		approved		16-519FM-12
		norm		sheet 2 of 8

FISCO-Concept

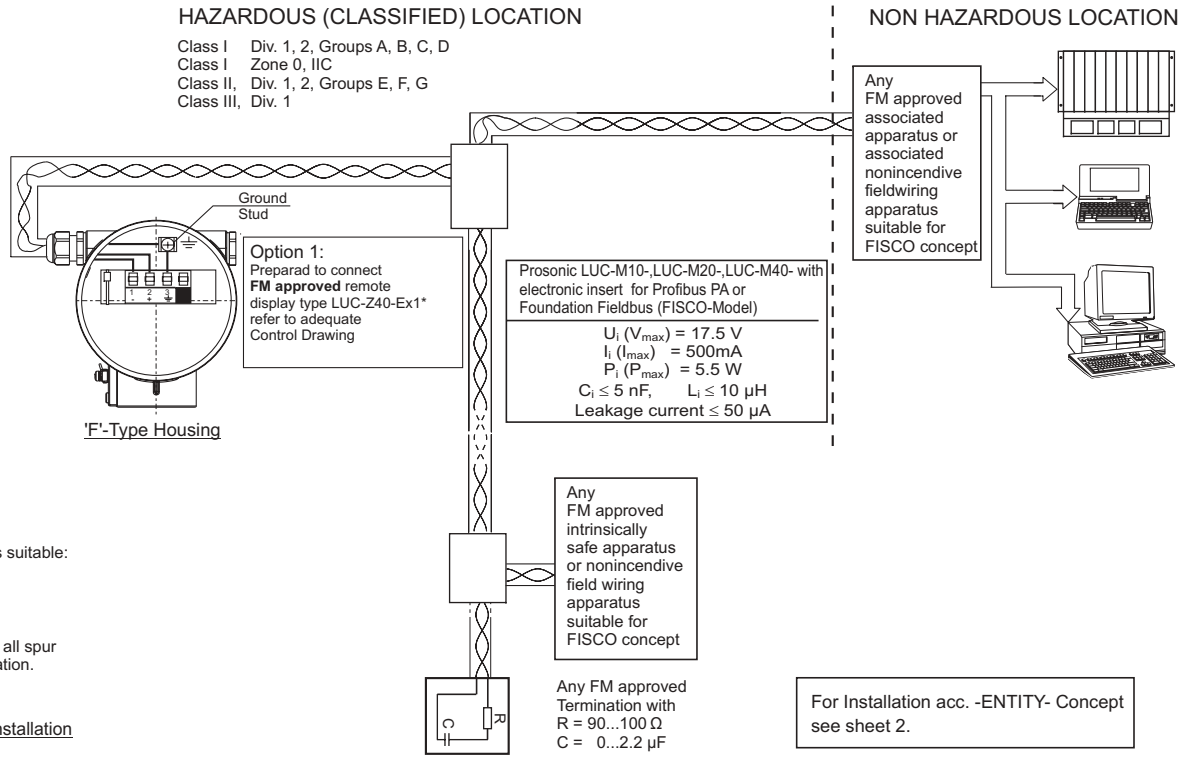
The FISCO Concept allows interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criteria for interconnection is that the voltage (U_i or V_{max}), the current (I_i or I_{max}) and the power (P_i or P_{max}) which intrinsically safe apparatus 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 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_t) 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 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 intergrated 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 installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D or Zone 0 IIC Hazardous Location Installation

1. FM approved apparatus must be installed in accordance with manufacturer instructions.
2. FM approved associated apparatus must meet following requirements:
   U_O or V_{OC} or $V_t \le U_i$ (V_{max}) and I_O or I_{SC} or $I_t \le I_i$ (I_{max}) and P_O or $P_{max} \le P_i$ (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 (NEC) and ANSI / ISA RP12.06.01 (except chapter 5).
5. Multiple earthing of the screen is allowed only if high integrity equipotential system is realised between the points of bonding (see sheet 8).
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. This version of Prosonic M may be provided with a connection to an external display unit already installed or via a set up kit.
   This connection is for the use of the FM approved display unit LUC-Z40-Ex1* only. Refer to safety instructions of the external display unit LUC-Z40-Ex1*.

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 33 V. 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 $V_{max} \ge V_{OC}$ or V_t, C_O or $C_a \ge C_i + C_{cable}$, L_O or $L_a \ge L_i + L_{cable}$
   Transmitter non incendive field wiring parameters for this current controlled circuit are as follows:
   $V_{max.} = 33$ V, $C_i \le 5$ nF, $L_i \le 10$ µH, $I_{max.}$ *see note 3
3. For these current controlled circuits, the parameter $I_{max.}$ is not required and need not be aligned with parameter I_{SC} or I_O of the barrier or associated nonincendive field wiring 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: Explosion hazard - 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

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.

Functional Ratings

These ratings do not supersede Hazardous Locations Values
$V_{nom.} = 9...33$ V, $I_{nom.} = 15$ 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: 'F'-Type enclosure -40 ... +80 °C resp. -40 ... +176 °F

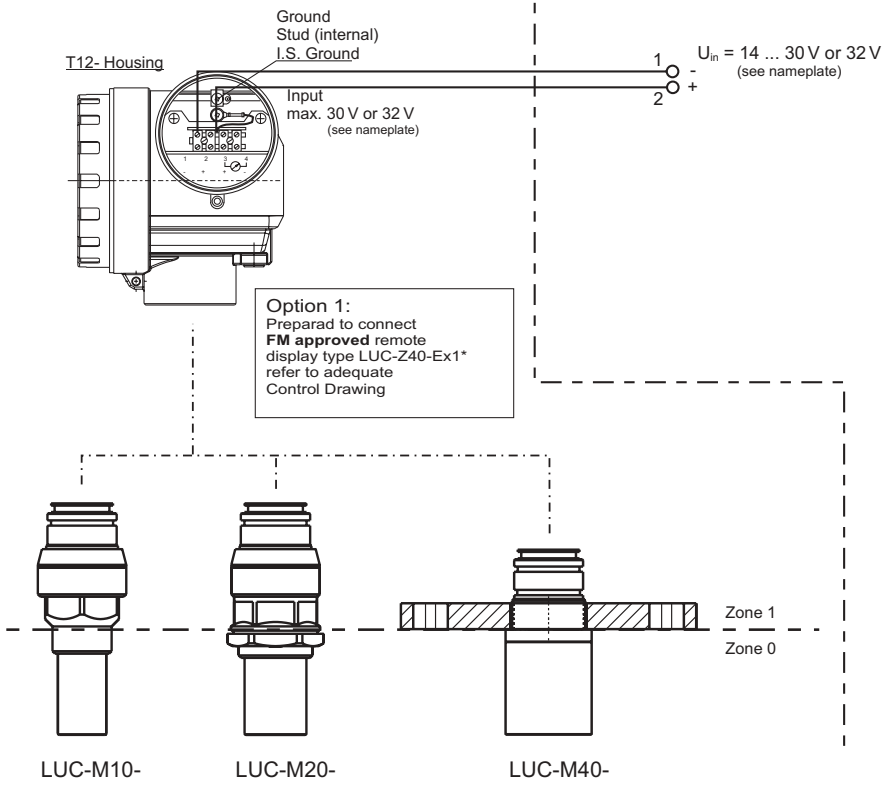
Type	Type of sensor	Operation temperature [°C resp. °F]
LUC-M10-	1½"-sensor	-40 to +80 resp. -40 to +176
LUC-M20-	2"-sensor	-40 to +80 resp. -40 to +176
LUC-M40-	3"-sensor	-40 to +80 resp. -40 to +176

Temperature class with / without Display VU 331	Permissible maximum medium temperature at the sensors	Permissible maximum ambient (T_a) of electronic compartment ('F'-Type enclosure)		
		LUC-M10-	LUC-M20-	LUC-M40-
T6	+60 °C	+60 °C	+60 °C	+60 °C
T5	+80 °C	+75 °C	+75 °C	+75 °C
T4	+80 °C	+80 °C	+80 °C	+80 °C

HAZARDOUS LOCATION

Class I, Div. 1, 2, Groups A, B, C, D
Housing: Class I, Zone 1, IIC
Sensor: Class I, Zone 0, IIC
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 Zone 1/0 IIC Hazardous Location Installation

1. Control room equipment may not use or generate over 250 Vrms.
2. Installation should be in accordance with the National Electrical Code NFPA 70 (NEC).
3. Supply wires shall be installed in conduit in accordance with the NEC.
4. Terminal compartment:
   Warning: Keep cover tight when circuit is alive unless the area is known to be non-hazardous.
5. Use supply wires suitable for 5 K above surrounding ambient.
6. For electronics: maximum ambient temperature = 60 °C.
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 Ω.
8. This version of Prosonic M may be provided with a connection to an external display unit already installed or via a set up kit. This connection is for the use of the FM approved display unit LUC-Z40-Ex1* only.
   Refer to safety instructions of the external display unit LUC-Z40-Ex1*.

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 30 V or 32 V (see nameplate). 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: Explosion hazard - 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

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 sensors	Permissible maximum ambient (T_a) of electronic compartment (enclosure T12)		
		LUC-M10-	LUC-M20-	LUC-M40-
T6	+60 °C	+60 °C	+60 °C	+60 °C
T5	+80 °C	+60 °C	+60 °C	+60 °C
T4	+80 °C	+60 °C	+60 °C	+60 °C

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 -40 ... +60 °C resp. -40 ... +140 °F

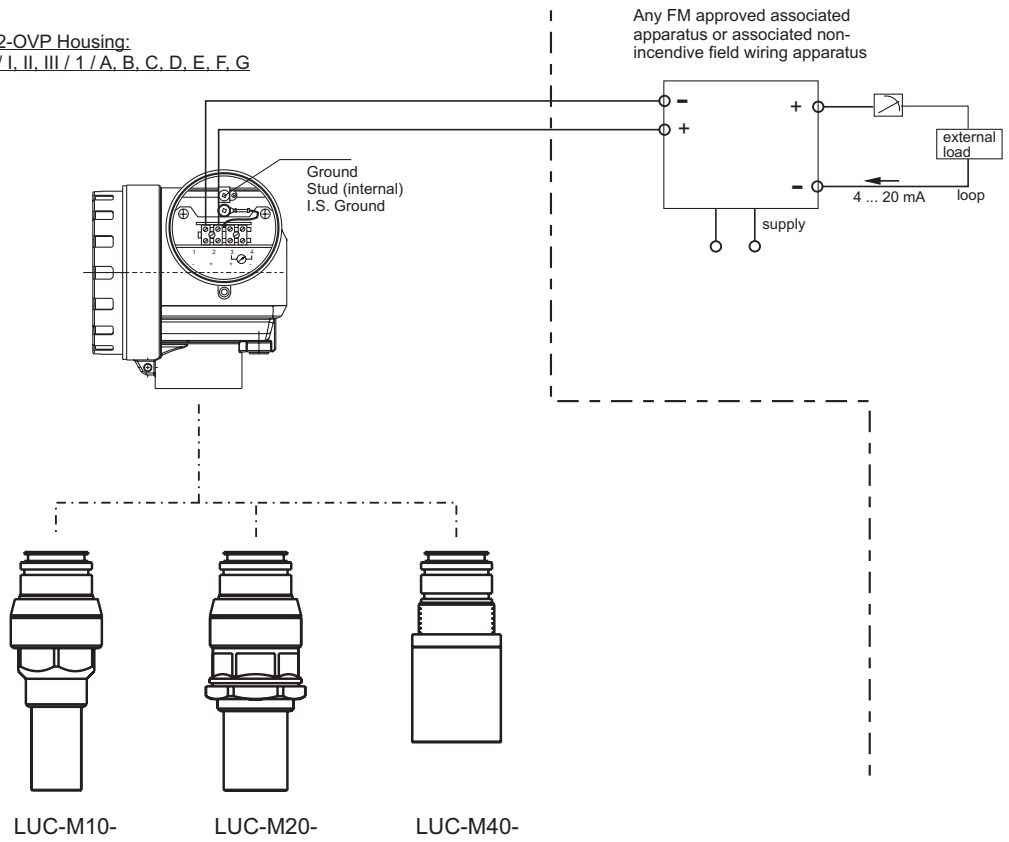
Type	Type of sensor	Operation temperature [°C resp. °F]
LUC-M10-	1½"-sensor	-40 to +80 resp. -40 to +176
LUC-M20-	2"-sensor	-40 to +80 resp. -40 to +176
LUC-M40-	3"-sensor	-40 to +80 resp. -40 to +176

HAZARDOUS LOCATION

Class I, Div. 1, 2, Groups A, B, C, D
Class I, Zone 0, IIC, Zone 2, 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



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

Type	Type of sensor	Operation temperature [°C resp. °F]
LUC-M10-	1½"-sensor	-40 to +80 resp. -40 to +176
LUC-M20-	2"-sensor	-40 to +80 resp. -40 to +176
LUC-M40-	3"-sensor	-40 to +80 resp. -40 to +176

Notes:

Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D or Zone 0 IIC Hazardous Location Installation

1. Control room equipment may not use or generate over 250 Vrms.
2. Installation should be in accordance with the National Electrical Code NFPA 70 (NEC) and ANSI / ISA RP12.06.01.
3. Warning: Substitution of components may impair intrinsic safety.
4. Use FM Approvals Entity-Approved intrinsic safety barrier with
   $U_O/V_{OC} \le U_i/V_{max.}$, $I_O/I_{SC} \le I_i/I_{max.}$, $C_O/C_a \ge C_i + C_{cable}$, $L_O/L_a \ge L_i + L_{cable}$
   Barrier must be incapable of delivering more than 1 Watt to a matched load.
   Transmitter entity parameters are as follows:

$U_i/V_{max.}$ (V)	$I_i/I_{max.}$ (mA)	$P_i/P_{max.}$ (W)	C_i (nF)	L_i (µH)
30	273	1.0	≤ 13	0

5. Use supply wires suitable for 5 K above surrounding ambient.
6. Intrinsic safety barrier manufacturer´s installation drawing must be followed when installing this equipment.
   The configuration of the intrinsic safety barrier(s) must be approved by FM Approvals.
7. The surge protection device (OVP) fulfils the requirements of EN/IEC 60079-14 clause 12.3.

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 30 V. 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
   $V_{max} \ge V_{OC}$ or V_t, C_O or $C_a \ge C_i + C_{cable}$, L_O or $L_a \ge L_i + L_{cable}$
   Transmitter non incendive field wiring parameters for this current controlled circuit are as follows:
   $V_{max.} = 30$ V, $C_i \le 13$ nF, $L_i = 0$ µH, $I_{max.}$ *see note 3
3. For this current controlled circuit, the parameter $I_{max.}$ is not required and need not be aligned with parameter I_{SC} or I_O of the barrier or associated nonincendive field wiring 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: Explosion hazard - 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

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.

Functional Ratings

These ratings do not supersede Hazardous Locations Values
$V_{nom.} = 14...30$ V, $I_{nom.} = 4...20$ mA

Temperature class with / without Display VU 331	Permissible maximum medium temperature at the sensors	Permissible maximum ambient (T_a) of electronic compartment (T12 enclosure with integrated OVP)		
		LUC-M10-	LUC-M20-	LUC-M40-
T6	+60 °C	+60 °C	+60 °C	+60 °C
T5	+80 °C	+75 °C	+75 °C	+75 °C
T4	+80 °C	+80 °C	+80 °C	+80 °C

CONFIDENTIAL acc. to ISO 16016			scale:	date: 2005-Apr-25
PEPPERL+FUCHS	Control drawing T12-OVP / IS-HART	respons.		16-519FM-12
Mannheim	LUC-M10-, LUC-M20-, LUC-M40-	approved		
		norm		sheet 5 of 8

FISCO-Concept

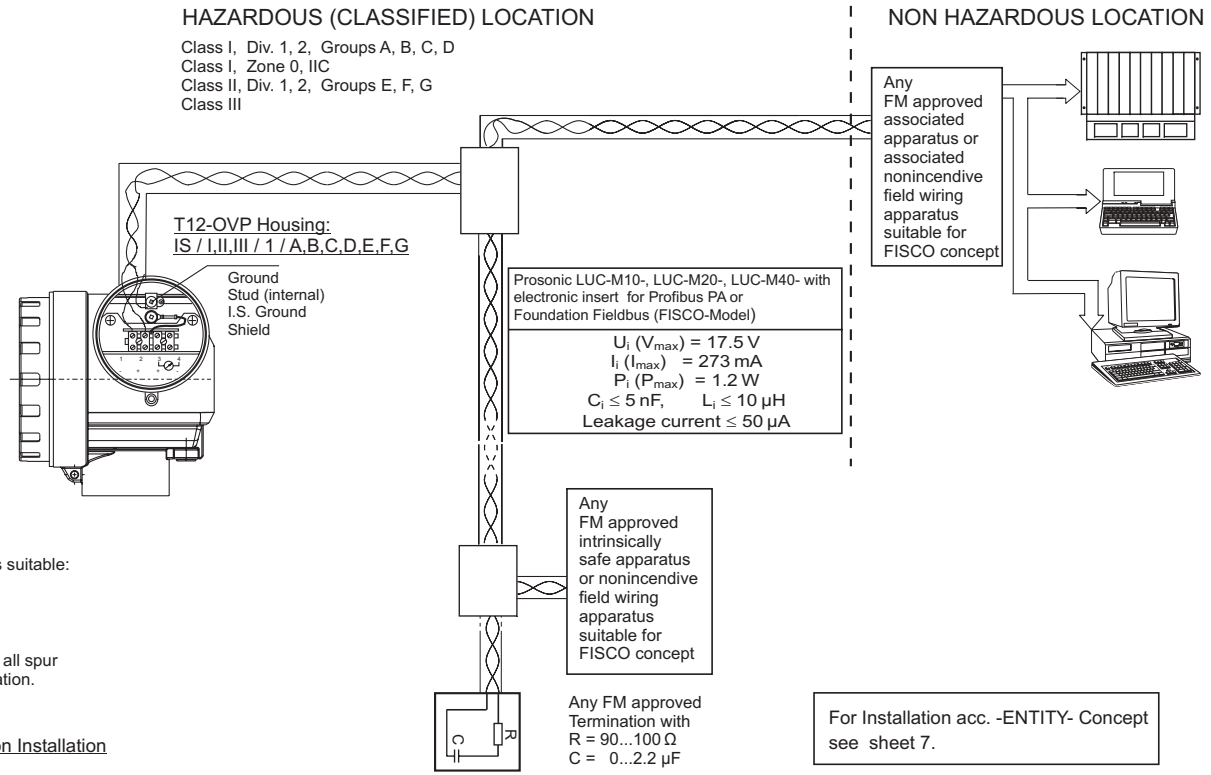
The FISCO Concept allows interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criteria for interconnection is that the voltage (U_i or V_{max}), the current (I_i or I_{max}) and the power (P_i or P_{max}) which intrinsically safe apparatus 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 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_t) 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 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 intergrated 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.



For Installation acc. -ENTITY- Concept see sheet 7.

Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D or Zone 0 IIC Hazardous Location Installation

1. FM approved apparatus must be installed in accordance with manufacturer instructions.
2. FM approved associated apparatus must meet following requirements:
   U_O or V_{OC} or $V_t \le U_i$ (V_{max}) and I_O or I_{SC} or $I_t \le I_i$ (I_{max}) and P_O or $P_{max} \le P_i$ (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 (NEC) and ANSI / ISA RP12.06.01 (except chapter 5).
5. Multiple earthing of the screen is allowed only if high integrity equipotential system is realised between the points of bonding (see sheet 8).
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) fulfils the requirements of EN/IEC 60079-14 clause 12.3.

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 33 V. 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 $V_{max} \ge V_{OC}$ or V_t, C_O or $C_a \ge C_i + C_{cable}$, L_O or $L_a \ge L_i + L_{cable}$
   Transmitter non incendive field wiring parameters for this current controlled circuit are as follows:
   $V_{max.} = 33$ V, $C_i \le 5$ nF, $L_i \le 10$ µH, $I_{max.}$ *see note 3
3. For this current controlled circuit, the parameter $I_{max.}$ is not required and need not be aligned with parameter I_{SC} or I_O of the barrier or associated nonincendive field wiring 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: Explosion hazard - 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

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.

Functional Ratings

These ratings do not supersede Hazardous Locations Values
$V_{nom.} = 9...33$ V, $I_{nom.} = 15$ 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 enclosure with integrated surge protection (OVP) -40 ... +80 °C resp. -40 ... +176 °F

Type	Type of sensor	Operation temperature [°C resp. °F]
LUC-M10-	1½"-sensor	-40 to +80 resp. -40 to +176
LUC-M20-	2"-sensor	-40 to +80 resp. -40 to +176
LUC-M40-	3"-sensor	-40 to +80 resp. -40 to +176

Temperature class with / without Display VU 331	Permissible maximum medium temperature at the sensors	Permissible maximum ambient (T_a) of electronic compartment ('F'-Type enclosure)		
		LUC-M10-	LUC-M20-	LUC-M40-
T6	+60 °C	+60 °C	+60 °C	+60 °C
T5	+80 °C	+75 °C	+75 °C	+75 °C
T4	+80 °C	+80 °C	+80 °C	+80 °C

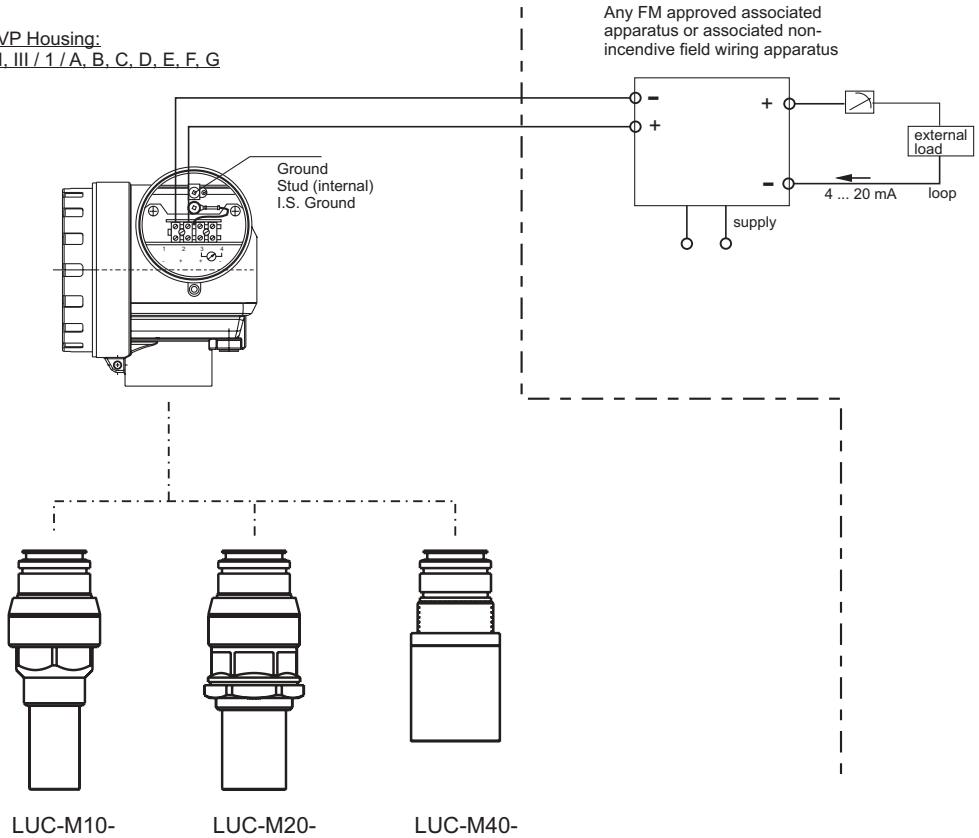
CONFIDENTIAL acc. to ISO 16016			scale:	date: 2005-Apr-25
PEPPERL+FUCHS Mannheim	Control drawing: T12-OVP- FISCO - Model Profibus PA or Foundation Fieldbus LUC-M10- , LUC-M20- , LUC-M40-	respons.		16-519FM-12
		approved		
		norm		sheet 6 of 8

HAZARDOUS LOCATION

Class I, Div. 1, 2, Groups A, B, C, D
Class I, Zone 0, IIC; Zone 2, 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



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

Type	Type of sensor	Operation temperature [°C resp. °F]
LUC-M10-	1½"-sensor	-40 to +80 resp. -40 to +176
LUC-M20-	2"-sensor	-40 to +80 resp. -40 to +176
LUC-M40-	3"-sensor	-40 to +80 resp. -40 to +176

Notes:

Intrinsically safe installation

Intrinsically safe (entity), Class I, Div. 1, Group A, B, C, D or Zone 0 IIC Hazardous Location Installation

1. Control room equipment may not use or generate over 250 Vrms.
2. Installation should be in accordance with the National Electrical Code NFPA 70 (NEC) and ANSI / ISA RP12.06.01.
3. Warning: Substitution of components may impair intrinsic safety.
4. Use FM Approvals Entity-Approved intrinsic safety barrier with
   $U_O/V_{OC} \le U_i/V_{max.}$, $I_O/I_{SC} \le I_i/I_{max.}$, $C_O/C_a \ge C_i + C_{cable}$, $L_O/L_a \ge L_i + L_{cable}$
   Barrier must be incapable of delivering more than defined value ($P_{max.}$) to a matched load.
   Transmitter entity parameters are as follows:

	$U_i/V_{max.}$ (V)	$I_i/I_{max.}$ (mA)	$P_i/P_{max.}$ (W)	C_i (nF)	L_i (µH)
or	17.5	273	1.2	≤ 5	≤ 10
	24	250	1.2	≤ 5	≤ 10

5. Use supply wires suitable for 5 K above surrounding ambient.
6. Intrinsic safety barrier manufacturer´s installation drawing must be followed when installing this equipment.
   The configuration of the intrinsic safety barrier(s) must be approved by FM Approvals.
7. The polarity for connecting + (2) and - (1) is of no importance due to an internal rectifier.
8. The surge protection device (OVP) fulfils the requirements of EN/IEC 60079-14 clause 12.3.

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 33 V. 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
   $V_{max} \ge V_{OC}$ or V_t, C_O or $C_a \ge C_i + C_{cable}$, L_O or $L_a \ge L_i + L_{cable}$
   Transmitter non incendive field wiring parameters for this current controlled circuit are as follows:
   $V_{max.} = 33$ V, $C_i \le 5$ nF, $L_i \le 10$ µH, $I_{max.}$ *see note 3
3. For this current controlled circuit, the parameter $I_{max.}$ is not required and need not be aligned with parameter I_{SC} or I_O of the barrier or associated nonincendive field wiring 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: Explosion hazard - 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

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.

Functional Ratings

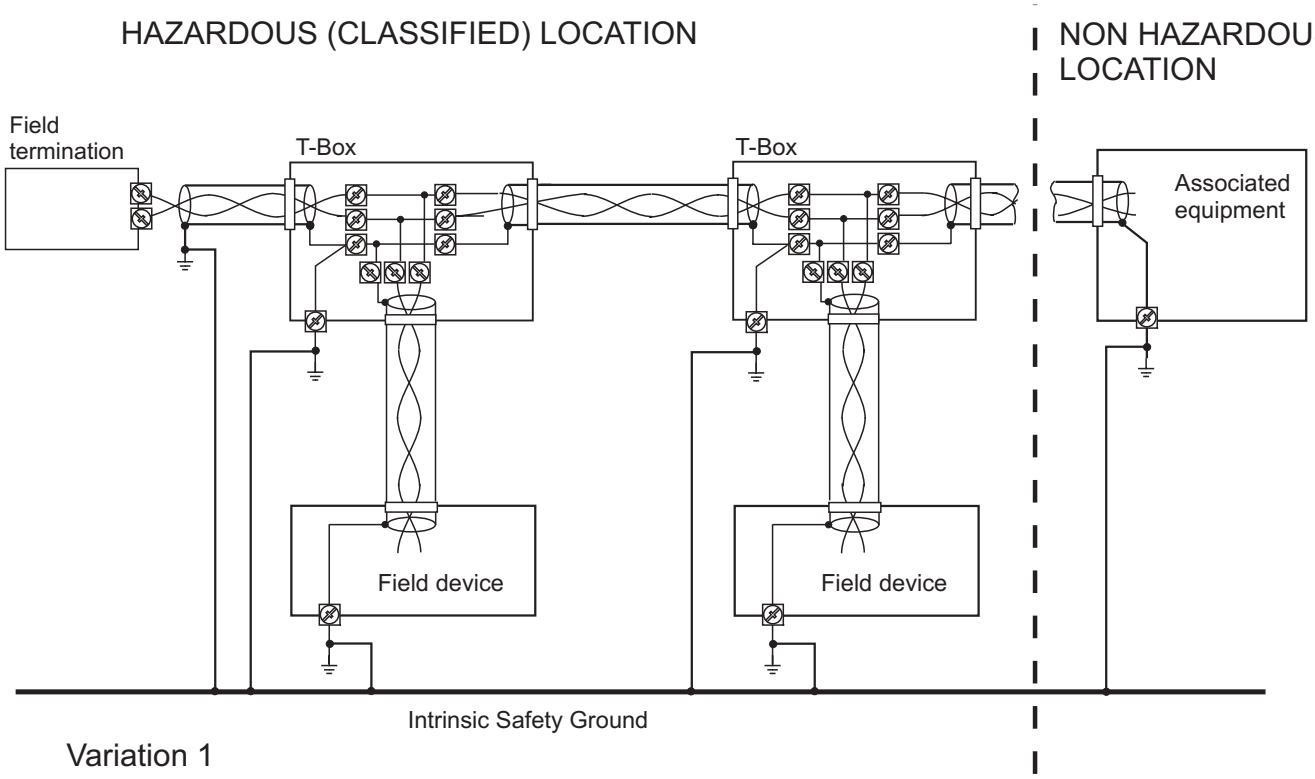
These ratings do not supersede Hazardous Locations Values
$V_{nom.} = 9...33$ V, $I_{nom.} = 15$ mA

Temperature class with / without Display VU 331	Permissible maximum medium temperature at the sensors	Permissible maximum ambient (T_a) of electronic compartment (T12 enclosure with integrated OVP)		
		LUC-M10-	LUC-M20-	LUC-M40-
T6	+60 °C	+60 °C	+60 °C	+60 °C
T5	+80 °C	+75 °C	+75 °C	+75 °C
T4	+80 °C	+80 °C	+80 °C	+80 °C

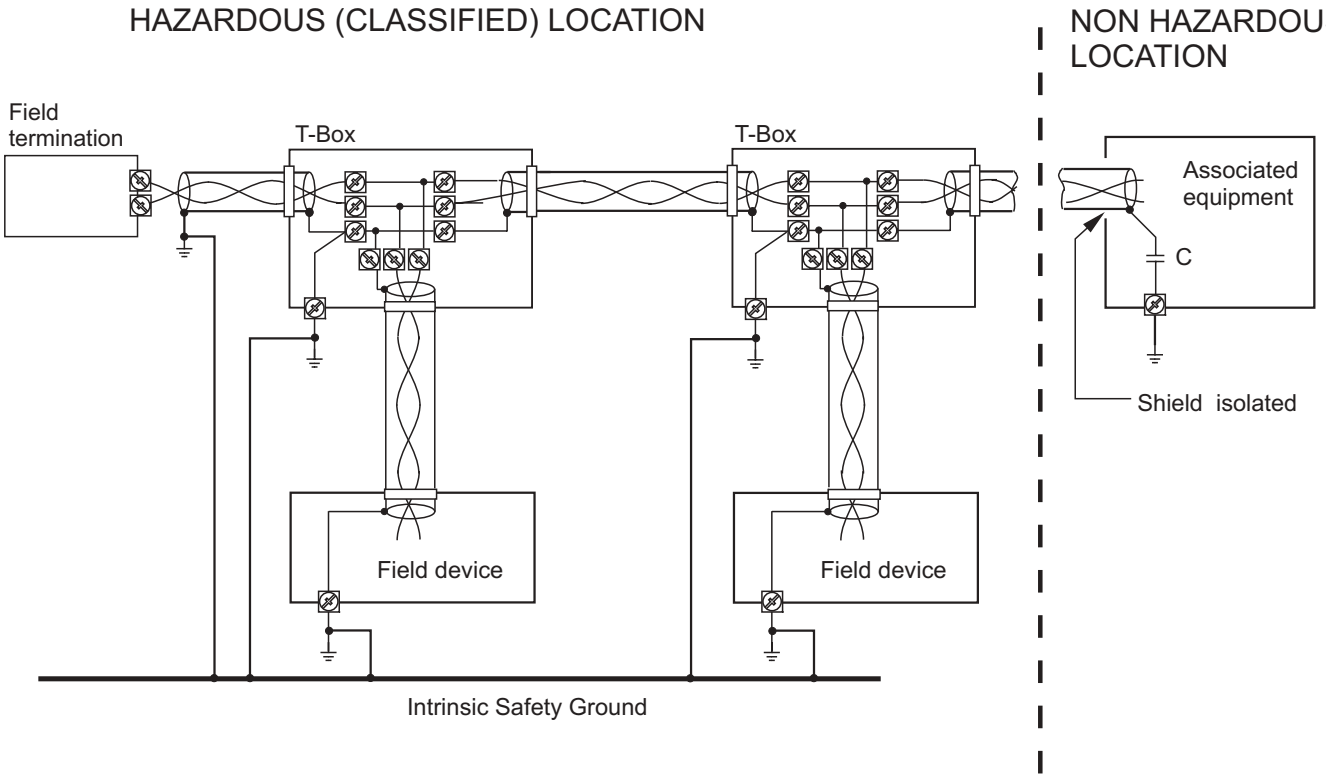
For Installation acc. -FISCO- Concept see sheet 6.

CONFIDENTIAL acc. to ISO 16016			scale:	date: 2005-Apr-25
PEPPERL+FUCHS Mannheim	Control drawing T12-OVP- ENTITY - Model Profibus PA or Foundation Fieldbus LUC-M10- , LUC-M20- , LUC-M40-	respons.		16-519FM-12
		approved		
		norm		sheet 7 of 8

Multiple Earthing of the Screen



Variation 1



Variation 2

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

CONFIDENTIAL acc. to ISO 16016		scale: –	date: 2005-Apr-25
PEPPERL+FUCHS Mannheim	Control drawing LUC-M10- , LUC-M20- , LUC-M40- .		16-519FM-12
			sheet 8 of 8