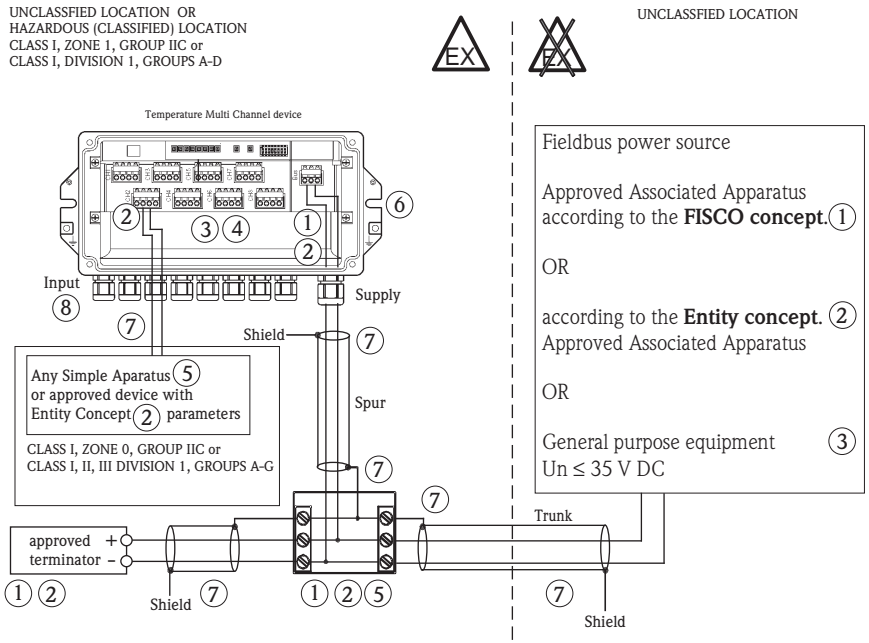

Table 1: Supply **FISCO** Parameters

(Terminals Bus + -)

Ui or Vmax = 24 V	Ii or Imax	= 380 mA	Pi or Pmax = 5.32 mW
Group A, B resp. IIC	Ci	= 0 µF	Li = 0 mH
Group C, D, E, F, G resp. IIB, IIA	Ci	= 0 µF	Li = 0 mH

Table 2: Supply **ENTITY** Parameters

(Terminals Bus + -)

Ui or Vmax = 24 V	Ii or Imax	= 380 mA	Pi or Pmax = 5.32 mW
Group A, B resp. IIC	Ci	= 0 µF	Li = 0 mH
Group C, D, E, F, G resp. IIB, IIA	Ci	= 0 µF	Li = 0 mH

Table 3: Input **ENTITY** Parameters

(Terminals CH 1 +, H, L, - to CH 8 +, H, L, -)

Uo or Voc = 7.2 V	Io or Isc	= 6.5 mA	Po = 11.7 mW
Group A, B resp. IIC	Co or Ca	= 13.5 µF	Lo or La = 100 mH
Group C, D, E, F, G resp. IIB, IIA	Co or Ca	= 240 µF	Lo or La = 100 mH

Installation Notes for TMT125

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① The **FISCO concept** allows interconnection of intrinsically safe apparatus with associated apparatus not specifically examined in such combination. The criteria for the interconnection is that the voltage (Ui or Vmax), (Ii or Imax) and (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 5nF and 10µH 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 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 for 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 connect 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':	45 ... 200 nF/km

C' = C' line/line + 0.5' 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:	≤ 60 m
Length of trunk cable:	≤ 1 km

At each end of the trunk cable an approved infallible termination with the following parameters is suitable:
R = 90 ... 100 Ω and C = 0 ... 2.2 µF

The number of passive devices connected to the bus segment is limited up to 32. If the above rules are respected, up to a total length of 1000m (sum of the length of the trunk cable and all spur cables), the inductance and capacitance of the cable will not impair the intrinsic safety of the installation.

Approved intrinsically safe apparatus with FISCO Concept parameters shall only be connected to approved Associated Apparatus with FISCO concept parameters.

② The **Entity Concept** allows interconnection of intrinsically safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of (Uo or Voc or Vt), (Io or Isc or It) and (Po) for the associated apparatus are less than or equal to (Ui or Vmax), (Ii or Imax) and (Pmax) for the intrinsically safe apparatus and the approved values of (Co or Ca) and (Lo or La) for the associated apparatus are greater than Ci + Ccable and Li + Lcable respectively, for the intrinsically safe apparatus.

When connected according to the entity concept only one single approved associated apparatus shall be used. The intrinsically safe connections of the associated apparatus must be suitable for the hazardous (classified) location in which the intrinsically safe apparatus is mounted and be approved for connection to approved intrinsically safe apparatus according to the entity concept.

	Approved	Date (yyyy-mm-dd)	Drawing No.	Dwg.rev.	Revision no.	Revision date (yyyy-mm-dd)	Name	Material	
	Pfanzelt	2006-06-16	14 26 00 111					71032400	
								ZD059R/09/en/08.06	Endress+Hauser
Volume (mm³)	Designed	Date (yyyy-mm-dd)	Unit	Scale	Title			Series	
	Pfanzelt	2006-06-13	TMT125	1:1	CONTROL DRAWING FM				
Refer to protection notice ISO 16016	Edge of working parts ISO 13715	Geometrical tolerancing ISO 2768-mH-E	Part No. -	Format A4				Objekt version	Sheet 1 of 3

Endress + Hauser Wetzer GmbH+Co. KG Nesselwang / Germany

For a system that has a single-channel associated apparatus connected to more than one intrinsically safe apparatus, the interconnection is intrinsically safe if:

Vmax (or Ui) ≥ Voc (or Uo) for each intrinsically safe apparatus
Imax (or Ii) ≥ Isc (or Io) for each intrinsically safe apparatus
Pi ≥ Po
Ca (or Co) ≥ (Citot + Ccable) where Citot = sum of individual Ci values
La (or Lo) ≥ (Litot + Lcable) where Litot = sum of individual Li values

Approved Intrinsically safe apparatus with Entity Concept parameters shall only be connected to approved Associated Apparatus with Entity Concept parameters.

(3) The Temperature Multi Channel Device must be installed in UNCLASSIFIED LOCATION if powered through a general purpose equipment.

(4) Temperature Multi Cannel Device type TMT125-**1*** must be mounted in an enclosure which is suitable for the location in which it is installed and with a minimum ingress protection of IP 20.

(5) Simple Apparatus is defined as an electrical component or combination of components of simple construction with well defined electrical parameters that does not generate more than 1.5 volts, 100 milliamps, and 25 milliwatts, or a passive component that does not dissipate more than 1.3 watts and is compatible with the intrinsic safety of the circuit in which it is used.

Example for simple apparatus: Resistance temperature devices or thermocouples

(6) Enclosure is conductive and must be grounded in accordance with the Electrical Code of the country in use.

(7) Wiring methods must be in accordance with the Electrical Code of the country in use.

(8) To prevent summation of currents, install each analog input as a separate intrinsically safe circuit.

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Volume (mm³)	Designed	Date (yyyy-mm-dd)	Unit	Scale	Title			Series	
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Endress + Hauser Wetzer GmbH+Co. KG Nesselwang / Germany

UNCLASSFIED LOCATION OR
HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, ZONE 2, GROUP IIC or
CLASS I, DIVISION 2, GROUPS A-D

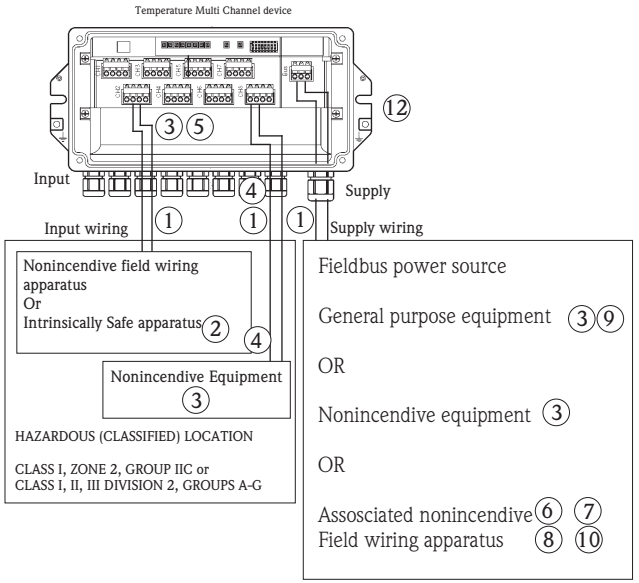

Table 1: Supply

(Terminals Bus + -)

Ui or Vmax = 35 V	Ii or Imax = unlimited	Ci = 0 µF	Li = 0 mH

Table 2: Input **ENTITY** Parameters

(Terminals CH 1 +, H, L, - to CH 8 +, H, L, -)

Uo or Voc = 7.2 V	Io or Isc	= 6.5 mA	
Group A, B resp. IIC	Co or Ca	= 13.5 µF	Lo or La = 100 mH
Group C, D, E, F, G resp. IIB, IIA	Co or Ca	= 240 µF	Lo or La = 100 mH

Installation Notes:

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① Wiring methods must be in accordance with the Electrical Code of the country in use.
② Input connections utilize the Nonincendive / energy - limited field wiring concept (See information Note 12), which allows interconnection of nonincendive field wiring apparatus or intrinsically safe apparatus with an associated nonincendive field wiring apparatus (Temperature Multi Channel) not specifically examined in combination as a system when Vmax (Ui) ≥ Voc (U_o); Ca (Co) ≥ Ci + Ccable; La (Lo) ≥ Li + Lcable as specified in Table 2.
③ These devices are rated "Nonincendive". If the devices are intended to be mounted in a Division 2 / Zone 2 location, they must have an enclosure or be mounted in an enclosure with a minimum ingress protection of IP 2X that can accept the Division 2 / Zone 2 wiring methods. A temperature rating of T4 applies to all nonincendive rated devices.
④ If equipment installed in a Division 2 location is provided with removable connectors (i.e. 7/8" connector) and is not installed using the nonincendive field wiring concept, each removable connectors must be fitted with a suitable locking clamp.
Use of removable connectors in zone 2 installations is limited to installations the utilizing energy – limited / nonincendive field wiring concept (see notes 7 and 12)
⑤ To maintain the integrity of the Type 4X and IP5X enclosure ratings, Temperature Multi Channel Device type TMT125-**2*** shall be mounted upon a solid plate or panel.
In Division 2 / Zone 2 installations Temperature Multi Channel device type TMT125-**1*** must be mounted in an enclosure capable of accepting Class 1 Division2 / Zone 2 wiring methods as specified by the Electrical Code of the country in use.
⑥ An approved Certified fieldbus power source suitable for the location in which it is installed with nonincendive / energy - limited field wiring outputs approved / certified for the Division 2 / Zone 2 location in which the Temperature Multi Channel Device is installed. Install fieldbus power source in accordance with manufacturer's hazardous location installation drawing.
⑦ Multiple loads are permitted to be connected (including multiple Temperature Multi Channel Devices) using the nonincentive / energy - limited field wiring concept (See Information Note 12). The nonincendive / energy - limited field wiring concept allows interconnection of equipment not specifically examined in combination as a system when:

Vmax (Ui) of the Temperature Multi Channel Device and all other loads connected to an Input ≥ Voc (Uo) of the asscociated nonincendive / energy - limited apparatus;

Ca (Co) of the asscociated nonincendive / energy - limited apparatus ≥ Ccable + sum of Ci for all other loads connected to an Input
La (Lo) of the asscociated nonincendive / energy - limited apparatus ≥ Lcable + sum of Li for all other loads connected to an Input
⑧ Refer to Table 1 for Temperature Multi Channel Device nonincendive / energy - limited field wiring parameters. The Temperature Multi Channel Device is both, a nonincendive / energy - limited field wiring apparatus and an associated nonincendive / energy - limited apparatus.
⑨ General purpose equipment is restricted to installation in unclassified locations.
⑩ The nonincendive / energy - limited field wiring concept may only be utilized when all devices connected to an Input are approved / certified for connection using the nonincendive field wiring concept and are installed in accordance with the manufacturers instructions for nonincendive field wiring installations.
⑪ Enclosure is conductive and must be grounded in accordance with the Electrical Code of the country in use.
⑫ When installed properly, the nonincendive / energy - limited field wiring concept allows the live connection and disconnection of instruments without regards to the Division 2 / Zone 2 hazardous location and eliminates the need for using a Division 2 / Zone 2 wiring method.

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Volume (mm³)	Designed	Date (yyyy-mm-dd)	Unit	Scale	Title			ZD059R/09/en/08.06	
	Pfanzelt	2006-06-13	TMT125	1:1	CONTROL DRAWING FM			Series	
Refer to protection notice ISO 16016	Edge of working parts ISO 13715	Geometrical tolerancing ISO 2768-mH-E	Part No. -	Format A4				Objekt version	Sheet 3 of 3

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