



Member of the FM Global Group

FM Approvals
1151 Boston Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: 781 762 4300 F: 781-762-9375 www.fmapprovals.com

CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

T-mass 65Fcc-defghiklmnop. Thermal Mass Flowmeter.

T-mass 65I-ccdefghiklmnop. Thermal Mass Flowmeter.

XP-IS / I / 1 / ABCD / T6 Ta = 60°C — FES0096; Entity*; Type 4X;

XP-IS / 1 / IIC / T6 Ta = 60°C — FES0096; Entity*; Type 4X;

DIP-IS / II, III / 1 / EFG / T6 Ta = 60°C — FES0096; Entity*; Type 4X;

Provides intrinsically safe sensor circuits.

*For Entity Parameters reference relevant control drawings.

cc = Nominal diameter (Type of sensor = F, up to a size of 100 mm / 4")

or Insertion tube length (Type of sensor = I): any double number or letter

d = Material of tube / sensor:

any single number or letter (representing stainless steel or alloy C-22)

e = Process connection (T-mass F: up to a pressure of 40 bar / 580 psi, T-mass I: up to a pressure of 20 bar / 290 psi): any single number or letter

f = Seal: any single number or letter

g = Surface finishing: any single number or letter

h = Calibration: any single number or letter

i = Additional test, Certificate: any single number or letter

k = Approval: N

l = Housing: compact: A, 1, remote: G, H, J, 6, 7, 8.

m = Cable Entry: A, B, or (X - suitable for remote sensor only).

n = Power supply, display, operation: 7, 8, A, B, or (X - suitable for remote sensor only).

o = Software: any single number or letter

p = Signal outputs: A, B, C, D, E, F, G, H, J, K, L, M, N, P, Q, R, S, T, U, V, W, 0, 2, 3, 4, 5, 6, 7, 8, 9 or (X - suitable for remote sensor only).

T-mass 65Fcc-defghiklmnop. Thermal Mass Flowmeter.

T-mass 65I-ccdefghiklmnop. Thermal Mass Flowmeter.

NI-ANI / I,II,III / 2 / ABCDEFG / T4 Ta = 60°C — FES0097; NIFW*; Type 4X;

NI-ANI / I / 2 / IIC / T4 Ta = 60 °C – FES0097; NIFW*, Type 4X

* Nonincendive Field Wiring Parameters reference relevant control drawings.

cc = Nominal diameter (Type of sensor = F, up to a size of 100 mm / 4")

or Insertion tube length (Type of sensor = I): any double number or letter

d = Material of tube / sensor

any single number or letter (representing stainless steel or alloy C-22)

e = Process connection (T-mass F: up to a pressure of 40 bar / 580 psi, T-mass I: up to a pressure of 20 bar / 290 psi): any single number or letter

f = Seal: any single number or letter

g = Surface finishing: any single number or letter

h = Calibration: any single number or letter

i = Additional test, Certificate: any single number or letter

k = Approval: R.

l = Housing: compact: A, 1, remote: C, D, E, 3, 4, 5.

m = Cable Entry: A, B, C, or (X - suitable for remote sensor only).

n = Power supply, display, operation: 7, 8, A, B, or (X - suitable for remote sensor only).

o = Software: any single number or letter

p = Signal outputs: A, B, C, D, E, H, J, K, L, M, N, P, Q, V, W, 0, 2, 3, 4, 5, 6, 7, 8, 9, or (X - suitable for remote sensor only).

Special Condition of use:

1) With Nonincendive transducer elements to CL. I, Div.2, GP. A, B, C, D.

Equipment Ratings:

Evaluation for the T-mass 65F series and T-mass 65I series Thermal Mass Flowmeters as Explosionproof for use in Class I, Division 1, Group A, B, C and D; Dust-Ignitionproof for use in Class II, III, Division 1, Group E, F and G indoor/ outdoor hazardous (classified) locations, utilizing Type 4X enclosure with Intrinsically Safe connection to Class I, II, III, Division 1, Groups A, B, C, D, E, F, & G indoor/outdoor hazardous (classified) locations. The installation of the products should be in accordance with Control Drawing FES0096.

Evaluation for the T-mass 65F series and T-mass 65I series Thermal Mass Flowmeters Nonincendive Apparatus for use in Class I, II, III, Division 2, Group A, B, C, D, E, F, & G indoor/ outdoor hazardous (classified) locations, utilizing Type 4X enclosure with Nonincendive Field Wiring connections to Class I, II, III, Division 2, Groups A, B, C, D, E, F, & G indoor/outdoor hazardous (classified) locations. The installation of the products should be in accordance with Control Drawing FES0097. With Nonincendive transducer elements to Class I, Division 2, Group A, B, C, D,

FM Approved for:

Endress + Hauser Flowtec AG
Kägenstraße 7
CH-4153 Reinach BL 1
Switzerland

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3600	1998
Class 3610	2010
Class 3611	1999
Class 3615	1989
Class 3810	1989
Including Supplement #1	1995
NEMA 250	1991
ANSI/ISA 12.27.01	2003

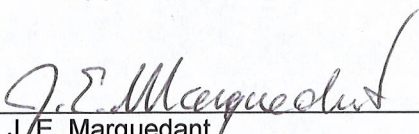
Original Project ID: 3024788

Approval Granted: December 23, 2005

Subsequent Revision Reports / Date Approval Amended

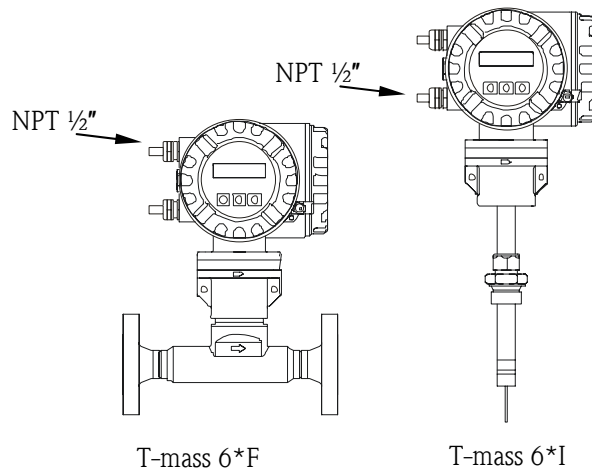
Report Number	Date	Report Number	Date
3041673	April 21, 2011		
131004	November 15, 2013		

FM Approvals LLC


J.E. Marquedant
Group Manager, Electrical

15 November 2013
Date

Hazardous Locations
Class I Division 1 Groups ABCD or Class I Zone 1 Groups IIC
and Class II and III Division 1 Groups EFG



Temperature table	max. medium temperature [°C]					
	T6	T5	T4	T3	T2	T1
Ta = 60 °C:						
T-mass F	—	—	80	80	80	80
T-mass I	—	—	80	80	80	80

The ambient temperature range depends the version . It is either from -20°C ... +60°C or from -40°C ... +60°C (see your nameplate).

WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Notes:

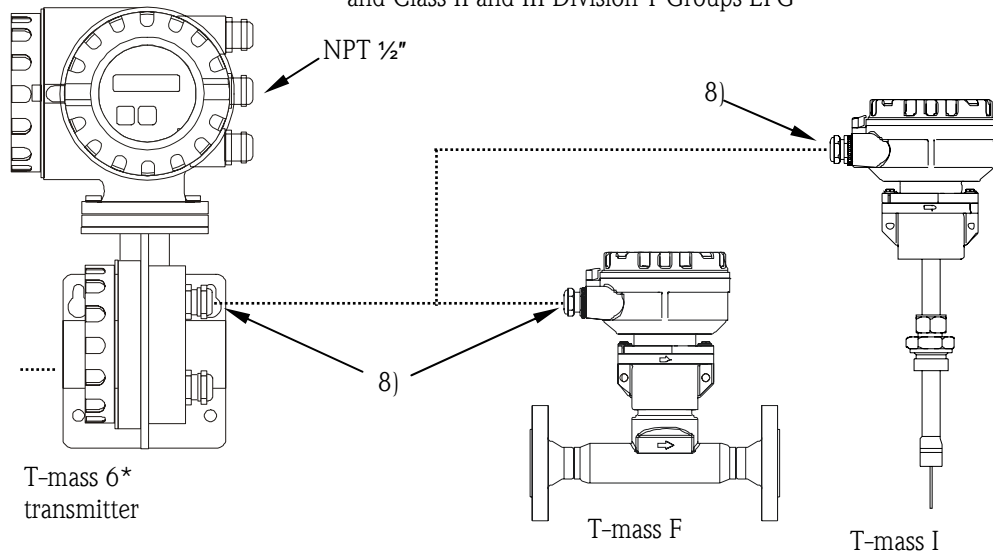
1. Install per NEC ANSI/NFPA 70.
2. Control room equipment shall not use or generate more than 250 V rms.
3. Caution: Use supply wires suitable for 5 °C above ambient temperature, but at least for 80 °C / 176°F.
4. Class II Group G: The surface temperature of the apparatus cannot exceed 165 °C / 329°F.
5. Transmitter enclosure PROline G02 explosionproof for use in Cl. I Div. 1 Groups A, B, C, D and dust-ignitionproof for Cl. II, Div. 1 Groups E, F, G, Class III
6. Transmitter enclosure PROline G02 is factory sealed for use in Cl. I Div. 1 Groups A, B, C, D. A conduit seal is not required.
7. Sensor circuits intrinsically safe for Cl. I, II, III Div.1 Gps. A, B, C, D, E, F, G.
8. Sensors T-mass 6* F and T-mass 6* I for Class I / Zone 1 are Dual Seal devices in accordance with ANSI/ISA-12.27.01-2003.
9. The service interface FXA 193 can be connected to the service port of T-mass 6* F/I if the area is known to be non-hazardous. A hazardous atmosphere may be present only inside the measuring tube.

Communication Options	Control Drawing
I/O option = F, H	see FES 0096 - 0001
I/O option = G, K	see FES 0096 - 0002
I/O option = S, T	see FES 0096 - 0004
I/O option = R, U	see FES 0096 - 0005

Aenderungen:	A	23.03.07/BDA	F	Alle gesetzlichen Urheberrechte vorbehalten. Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt werden noch dritten Personen und Konkurrenzfirmen zugänglich gemacht werden.	Mat. Nr.: 71062971 Ersteller: FES / ID 1167 FILE: M:\Zeichng\FES0096\A\FES0096_070323.doc			
	B		G					
	C		H					
	D		J					
	E		K					
FM Control Drawing Div. 1 / Zone 1					Masstab	Gezeichnet	05.08.2005	UD
Class I Zone 1						Geprüft		
Compact Version						Ex-geprüft	23.03.2007	BDA
T-mass 6* F / I						Gesehen		
 Flowtec AG, Kägenstrasse 7, CH-4153 Reinach BL1, Postfach					FES0096 A 1/2			

Hazardous Locations

Class I Division 1 Groups ABCD or Class I Zone 1 Groups IIC
and Class II and III Division 1 Groups EFG



Notes:

1. Install per NEC ANSI/NFPA 70. For intrinsically safe sensor circuits respect NEC ANSI/NFPA 70 and ISA RP 12.06.01.
2. Control room equipment shall not use or generate more than 250 V rms.
3. Caution: Use supply wires suitable for 5 °C above ambient temperature, but at least for 80 °C / 176°F.
4. Class II Group G: The surface temperature of the apparatus cannot exceed 165 °C / 329°F.
5. Transmitter enclosure PROline G02 explosionproof for use in Cl. I Div. 1 Groups A, B, C, D and dust-ignitionproof for Cl. II, III Div. 1 Groups E, F, G
6. Transmitter enclosure PROline G02 is factory sealed for use in Cl. I Div. 1 Groups A, B, C, D. A conduit seal is not required.
7. Sensor circuits intrinsically safe for Cl. I, II, III Div. 1 Groups A, B, C, D, E, F, G
8. Intrinsically safe field wiring when installed with a cable not exceeding the following cable parameters: $L_C = 90 \mu H$ and $C_C = 100 nF$. The maximum allowed cable length is 100 m.
9. Allowed cable entries: NPT 1/2", G 1/2" or M20x1.5.
10. Sensors T-mass 6* F and T-mass 6* I for Class I / Zone 1 are Dual Seal devices in accordance with ANSI/ISA-12.27.01-2003.
11. The service interface FXA 193 can be connected to the service port of T-mass 6* F/I if the area is known to be non-hazardous. A hazardous atmosphere may be present only inside the measuring tube.

Temperature table	max. medium temperature [°C]					
	T6	T5	T4	T3	T2	T1
Ta = 60 °C:						
T-mass F	—	—	80	80	80	80
T-mass I	—	—	80	80	80	80

The ambient temperature range depends the version . It is either from -20°C ... +60°C or from -40°C ... +60°C (see your nameplate).

WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Änderungen:	A	23.03.07/BDA	F		Alle gesetzlichen Urheberrechte vorbehalten.	Mat. Nr.: 71062971			
	B		G		Diese Zeichnung darf ohne unsere				
	C		H		Genehmigung weder vervielfältigt werden noch				
	D		J		dritten Personen und Konkurrenzfirmen				
	E		K		zugänglich gemacht werden.				
FM Control Drawing Div. 1 / Zone 1						Massstab	Gezeichnet	05.08.05	UD
Class I Zone 1							Geprüft		
Remote Version							Ex-geprüft	23.03.2007	BDA
T-mass 6* F / I							Gesehen		
 Flowtec AG, Kägenstrasse 7, CH-4153 Reinach BL1, Postfach						FES0096 A 2/2			

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

The diagram illustrates a power distribution unit with the following components and connections:

- Fieldbus:** A terminal block with terminals labeled 26, 27, and a ground symbol. It is connected to a dashed box labeled "FM Approved Associated Apparatus".
- Power Supply:** A terminal block with terminals labeled L1, N, PE, and a ground symbol. It is connected to a dashed box labeled "FM Approved Associated Apparatus".
- Grounding:** A ground symbol is shown connected to the PE terminal and the ground terminal of the Fieldbus.
- External Connections:** A dashed box labeled "FM Approved Associated Apparatus" is connected to the unit via a cable.

- 1) Wire intrinsically safe circuits per ISA RP 12.06.01 or in conduit per NEC ANSI/NFPA 70 respecting the Explosionproof Integrity of the transmitter enclosure.
- 2) **WARNING:** SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
- 3) Control room equipment may not use or generate more than 250 V rms.

For connecting the intrinsically safe circuit (PROFIBUS PA) according to the FISCO-CONCEPT see FES 0096-0003

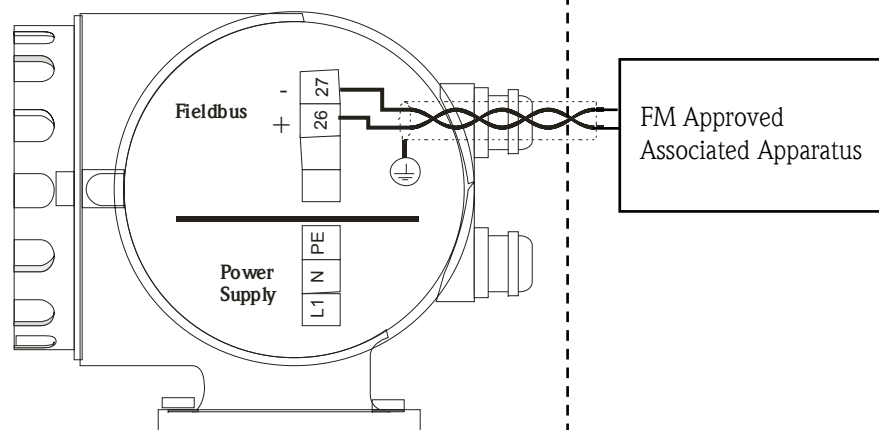
- 4) Install all non intrinsically safe cricuits per NEC ANSI/NFPA 70.
- 5) **WARNING:** EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 1.
- 6) Control room equipment may not use or generate over 250 Vrms.

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	B		G					
	C		H					
	D		I					
	E		K					
FM Control Drawing Div. 1 / Zone 1						Massstab		
T-mass 6* F / I								
PROFIBUS PA / IS installation								
PROFIBUS PA / DP or MODBUS RS non-IS installation								
						Gezeichnet	05.08.2005	UD
						Geprüft		
						Ex-geprüft	23.03.2007	BDA
						Gesehen		
 Flowtec AG, Kägenstrasse 7, CH-4153 Reinach BL1, Postfach						FES0096-0001 A		

HAZARDOUS LOCATIONS

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

NON HAZARDOUS LOCATIONS



Notes:

Intrinsically safe signal output:

- 1) Wire all intrinsically circuits per ISA RP 12.06.01 or in conduit per NEC ANSI/NFPA 70 respecting the Explosionproof Integrity of the transmitter enclosure.
- 2) **WARNING:** SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
- 3) Control room equipment may not use or generate more than 250 Vrms.

Type: T-mass 6*F **_*****G

T-mass 6*I -*****G

Terminals: 26, 27 (Foundation Fieldbus):

Intrinsically safe circuit:

$V_{\max} / U_i$	$I_{\max} / I_i$	$P_{\max} / P_i$	C_i	L_i
30 V	600 mA	8.5 W	$\leq 5 \text{ nF}$	$\leq 10 \text{ } \mu\text{H}$

Connect to entity approved associated apparatus with

I_{SC}, I_t or $I_O \leq I_{\max}$ or I_i and

V_{OC}, V_t or $U_O \leq V_{\max}$ or U_i

($P_O \leq P_{\max}$ or P_i)

Cable parameters for Intrinsic Safety:

$C_{\text{cable}} \leq C_a / C_O - \Sigma C_i$

$L_{\text{cable}} \leq L_a / L_O - \Sigma L_i$ or

$L/R_{\text{cable}} \leq L/R_{\text{Associated Apparatus}}$ and L_i of each I.S. apparatus $\leq 10 \text{ } \mu\text{H}$

Alternatively the intrinsically safe circuit (Fieldbus Foundation) can be connected according to the FISCO – Concept (see FES 0096–0003).

Non intrinsically safe circuits:

- 4) Install all non intrinsically safe circuits per NEC ANSI/NFPA 70.
- 5) **WARNING:** EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 1.
- 6) Control room equipment may not use or generate over 250 Vrms.

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	B		G					
	C		H					
	D		J					
	E		K					
FM Control Drawing Div. 1 / Zone 1						Massstab		
T-mass 6* F / I								
Fieldbus Foundation IS installation								
Fieldbus Foundation non-IS installation								
 Flowtec AG, Kägenstrasse 7, CH-4153 Reinach BL1, Postfach						Gezeichnet	05.08.2005	UD
						Gepüft		
						Ex-geprüft	23.03.2007	BDA
						Gesehen		
						FES0096-0002 A		

FISCO CONCEPT

The FISCO Concept allows interconnection of intrinsically safe apparatus to associated apparatus not specially 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 , V_o or V_t), the current (I_o , I_s 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 μ 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 is limited to a range of 14V to 24Vd.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 a leakage current of 50 μ 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 parameter in the following range:

Loop Resistance R' :	15...150 Ohm/km
Inductance per unit length L' :	0.4...1 mH/km
Capacitance per unit length C' :	45...200 nF

$C' = C' \text{ line/line} + 0.5 C' \text{ line/screen}$, if both lines are floating, or
$C' = C' \text{ line/line} + C' \text{ line/screen}$, if the screen is connected to one line
Length of trunk cable: ≤ 1000 m
Length of spur cable: ≤ 60 m
Length of splice: ≤ 1 m

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

$$R = 90...102 \text{ Ohm} \quad C = 0...2.2 \text{ } \mu\text{F}$$

One of the allowed terminations might already be integrated in the associated apparatus. The number of passive apparatus 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 trunk and all spur cables), the inductance and the capacitance of the cable will not impair the intrinsic safety of the installation.

Notes:

Intrinsically safe Class I, Div.1, Groups A, B, C, D

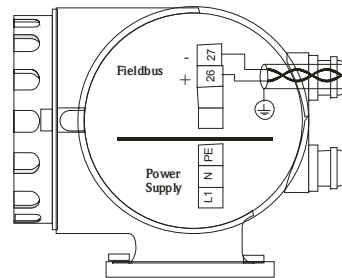
- Approved associated apparatus must be installed in accordance with manufacturers instructions.
- FM approved associated apparatus must meet the following parameters:
 U_o or V_o or $V_t \leq U_i$ (V_{max}) and I_o or I_s or $I_t \leq I_i$ (I_{max}) and P_o or $P_{max} \leq P_i$ (P_{max})
- The maximum non-hazardous area voltage must not exceed 250V
- The installation must be in accordance with the National Electrical Code NFPA 70, and ANSI/ISA-Rp 12.6. (except chapter 5).
- Multiple earthing of screen is allowed only, if high integrity equipotential system is realized between the points of bonding (see drawing No. FES 0014).
- Caution: Use only supply wires suitable for 5°C above surrounding temperature.
- Warning : Substitution of components may impair intrinsic safety.
- The polarity for connection PA+ (26) and PA- (27) is of no importance due to an internal rectifier.

HAZARDOUS (CLASSIFIED) LOCATION

Class I, Division 1, Groups A,B,C,D
Class II, Division 1, Groups E,F,G
Class III, Division 1

NONHAZARDOUS LOCATION

T-mass 6*F **-*F/G
T-mass 6*I -*F/G



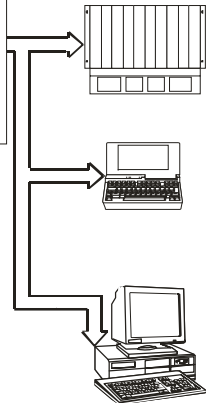
Any
FM Approved
Intrinsically
Safe Apparatus
suitable for
FISCO

Keine Änderungen
ohne vorherige
Factory Mutual
Genehmigung

Any FM Approved
Termination with
 $R = 90...102 \text{ } \Omega$
 $C = 0...2.2 \text{ } \mu\text{F}$

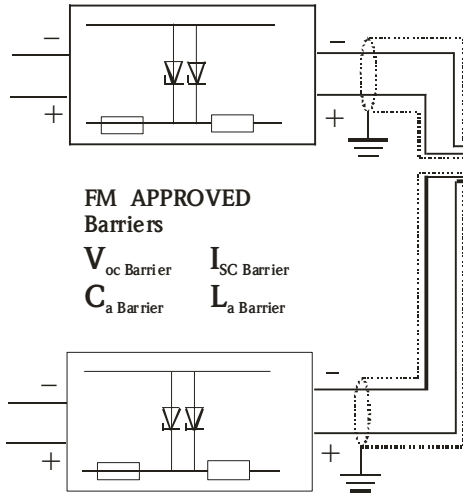
T-mass 6*F **-*F/G T-mass 6*I -*F/G Terminal 26 (+) Terminal 27 (-) (FISCO-Model)	
U_i (V_{max}) = 30 V	$C_i \leq 5$ nF
I_i (I_{max}) = 600 mA	$L_i \leq 10$ μ H
P_i (P_{max}) = 8.5 W	
Leakage current : $\leq 50 \mu\text{A}$	
Apparatus provides galvanic isolation up to 250V rms between fieldbus circuit and any other circuit	
Temperature Classification: T4	
Max. ambient Temperature: 60°C / 140°F	

Any
FM Approved
Associated
Apparatus
Suitable for
Fisco



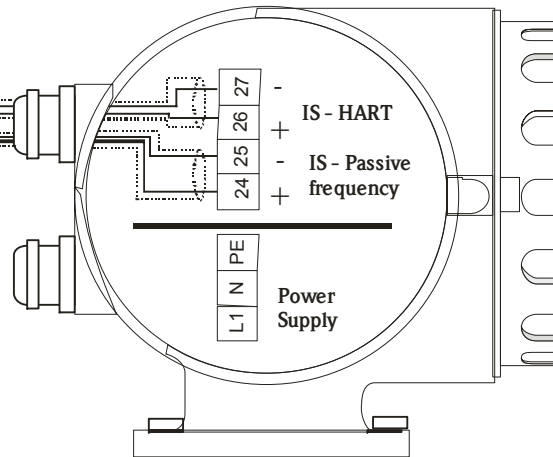
Änderungen:	A	23.03.07/BDA	F	Alle gesetzlichen Urheberrechte vorbehalten. Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt werden noch dritten Personen und Konkurrenzfirmen zugänglich gemacht werden.	Mat. Nr.: 71062971 Ersatz für: Ersteller: FES / ID 1167 FILE: M:\Zeichng\FES0096\A\FES0096_070323.doc			
	B		G					
	C		H					
	D		J					
	E		K					
FM Control Drawing Div. 1 / Zone 1					Massstab	Gezeichnet	05.08.2005	UD
T-mass 6* F / I Intrinsically safe PROFIBUS PA Foundation Fieldbus FISCO-Concept  Flowtec AG, Kägenstrasse 7, CH-4153 Reinach BL1, Postfach						Geprüft		
						Ex-geprüft	23.03.2007	BDA
						Gesehen		
					FES0096-0003 A			

NON HAZARDOUS LOCATION



HAZARDOUS LOCATION

Cl. I, Zone 1 IIC
Cl. I, II, III Div. 1 Group A,B,C,D,E,F,G or
Cl. I Div. 2 Group A,B,C,D, and Cl.II,III Div.1 Group E,F,G



Type: T-mass 6*F **_*****T

T-mass 6*I _*****T

Terminals: 26, 27 (HART current output):

Passive intrinsically safe circuit:

V_{max} / U_i	I_{max} / I_i	P_{max} / P_i	C_i	L_i
30 V	100 mA	1.25 W	6 nF	negligible

Connect to entity approved Barrier with

V_{OC}, V_t or $U_O \leq V_{max}$

I_{SC}, I_t or $I_O \leq I_{max} / I_i$

Cable parameters for Intrinsic Safety:

$C_{cable} \leq C_a$ Barrier or C_o Barrier - 6 nF

$L_{cable} \leq L_a$ Barrier or L_o Barrier

Terminals 24, 25 (Passive intrinsically safe circuit):

V_{max} / U_i	I_{max} / I_i	P_{max} / P_i	C_i	L_i
30 V	300 mA	600mW	6 nF	0

Entity approved apparatus must meet the folloing requirements:

V_{OC}, V_t or $U_O \leq V_{max}$

P_{max} or $P_O \leq P_{max} / P_i$

Cable parameters for Intrinsic Safety:

$C_{cable} \leq C_a (C_O) - 6$ nF

$L_{cable} \leq L_a (L_O)$

Notes:

1) Use supply wires suitable for 5 °C above surrounding ambient, but at least for 80°C / 176°F

Intrinsically safe signal output:

2) Install all intrinsically safe cricuits per NEC ANSI/NFPA 70 and ISA RP 12.06.01 respecting the Explosionproof Integrity of the enclosure

3) **WARNING:** SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

4) Control room equipment may not use or generate more than 250 Vrms.

Type: T-mass 6*F **_*****S

T-mass 6*I _*****S

Terminals: 26, 27 (HART current output):

Active intrinsically safe circuit:

V_{oc} / U_o	I_{sc} / I_o	P_{max} / P_o	C_a / C_o	L_a / L_o
21.8 V	90 mA	490 mW	0.15 μ F	4.1 mH
V_{max} / U_i	I_{max} / I_i	P_{max} / P_i	C_i	L_i
30 V	10 mA	300 mW	6 nF	0

Cable parameters for Intrinsic Safety:

$C_{cable} \leq 0.15 \mu F$ if V_{oc} (of Barrier) ≤ 21.8 V

$C_{cable} \leq C_a$ Barrier - 6 nF if V_{oc} (of Barrier) ≥ 21.8 V

$L_{cable} \leq 4.1$ mH

Terminals 24, 25 (Passive intrinsically safe circuit):

V_{max} / U_i	I_{max} / I_i	P_{max} / P_i	C_i	L_i
30 V	300 mA	600mW	6 nF	0

Entity approved supply must meet the following requirements:

V_{OC}, V_t or $U_O \leq V_{max}$

P_{max} or $P_O \leq P_{max} / P_i$

Cable parameters for Intrinsic Safety:

$C_{cable} \leq C_a (C_O) - 6$ nF

$L_{cable} \leq L_a (L_O)$

Änderungen:

A	23.03.07/BDA	F	
B		G	
C		H	
D		I	
E		K	

Alle gesetzlichen Urheberrechte vorbehalten.
Diese Zeichnung darf ohne unsere
Genehmigung weder vervielfältigt werden noch
dritten Personen und Konkurrenzfirmen
zugänglich gemacht werden.

Mat. Nr.: 71062971

Ersatz für:

Ersteller: FES / ID 1167

FILE: M:\Zeichng\FES0096\A\FES0096_070323.doc

FM CONTROL DRAWING Cl.1, Div. 1

T-mass 6* F / I

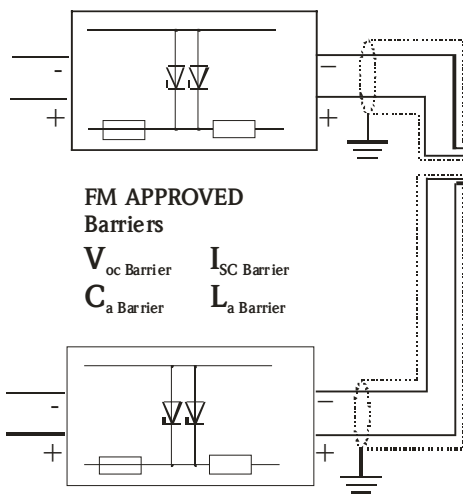
Entity concept Commodul HART IS (Option S/T)



Flowtec AG, Kägenstrasse 7, CH-4153 Reinach BL1, Postfach

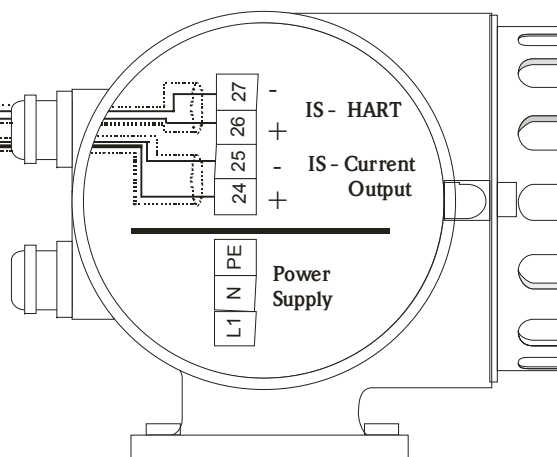
FES0096-0004 A

NON HAZARDOUS LOCATION



HAZARDOUS LOCATION

Cl. I, Zone 1 IIC
Cl. I, II, III Div. 1 Group A,B,C,D,E,F,G or
Cl. I Div. 2 Group A,B,C,D, and Cl.II,III Div.1 Group E,F,G



Notes:

- 1) Use supply wires suitable for 5 °C above surrounding ambient, but at least for 80°C / 176°F
- 2) **Intrinsically safe signal output:**
Install all intrinsically safe circuits per NEC ANSI/NFPA 70 and ISA RP 12.06.01 respecting the Explosionproof Integrity of the enclosure
- 3) **WARNING:** SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
- 4) Control room equipment may not use or generate more than 250 Vrms.

Type: T-mass 6*F **_*****R

T-mass 6*I _*****R

Terminals: 26, 27 (HART current output):

Terminals: 24, 25 (current output):

Active:

V_{oc} / U_o	I_{sc} / I_o	P_{max} / P_o	C_a / C_o	L_a / L_o
21.8 V	90 mA	490 mW	0.15 μ F	4.1 mH

V_{max} / U_i	I_{max} / I_i	P_{max} / P_i	C_i	L_i
30 V	10 mA	300 mW	6 nF	0

Cable parameters for Intrinsic Safety:

$$C_{cable} \leq 0.15 \mu F \quad \text{if } V_{oc} \text{ (of Barrier)} \leq 21.8 V$$

$$C_{cable} \leq C_a \text{ Barrier} - 6 nF \quad \text{if } V_{oc} \text{ (of Barrier)} \geq 21.8 V$$

$$L_{cable} \leq 4.1 mH$$

Type: T-mass 6*F **_*****U

T-mass 6*I _*****U

Terminals: 26, 27 (HART current output)

Terminals: 24, 25 (current output)

Passive:

V_{max} / U_i	I_{max} / I_i	P_{max} / P_i	C_i	L_i
30 V	100 mA	1.25 W	6 nF	negligible

Connect to entity approved Barrier with

$$V_{OC}, V_t \text{ or } U_o \leq V_{max} / U_i$$

$$I_{SC}, I_t \text{ or } I_o \leq I_{max} / I_i$$

Cable parameters for Intrinsic Safety:

$$C_{cable} \leq C_a \text{ Barrier or } C_o \text{ Barrier} - 6 nF$$

$$L_{cable} \leq L_a \text{ Barrier or } L_o \text{ Barrier}$$

Aenderungen:	A	23.03.07/BDA	F		Alle gesetzlichen Urheberrechte vorbehalten. Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt werden noch dritten Personen und Konkurrenzfirmen zugänglich gemacht werden.	Mat. Nr.: 71062971 Ersatz für: Ersteller: FES / ID 1167 FILE: M:\Zeichng\FES0096\A\FES0096_070323.doc		
	B		G					
	C		H					
	D		J					
	E		K					
FM CONTROL DRAWING Cl.1, Div. 1						Massstab		
T-mass 6* F / I								
Entity concept Commodul HART IS (Option R/U)								
 Flowtec AG, Kägenstrasse 7, CH-4153 Reinach BL1, Postfach						Gezeichnet	05.08.2005	UD
						Geprüft		
						Ex-geprüft	23.03.2007	BDA
						Gesehen		
						FES0096-0005 A		