FM Approvals
Member of the FM Global Group

FM Approvals
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CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

PROMASS abc-defghiknop. Mass Flowmeter.
XP-IS-DIP / I,II,III / 1 / ABCDEFG / T*; XP-IS / I / 1 / IIC / T* - FES0048; Entity, FISCO; Type 4X

Special Conditions of Use:
1. For installation instructions and the Temperature Class (*) which applies to specific models, ambient temperatures (Ta), and process medium temperatures (Tmed), refer to Control Drawing FES0048.

Entity Parameters:
I/O option S and R HART Current Output or Current Output:
V_{oc} = 21.8 V, I_{sc} = 90 mA, P_o = 0.49 W, C_a = 150 nF, L_a = 4.1 mH;
V_{Max} = 30 V, I_{Max} = 10 mA, P_i = 0.3 W, C_i = 6 nF, L_i = 0.
I/O Option S and T Frequency Output:
V_{Max} = 30 V, I_{Max} = 300 mA, P_i = 0.6 W, C_i = 6 nF, L_i = 0.
I/O option T and U HART Current Output or Current Output:
V_{Max} = 30 V, I_{Max} = 100 mA, P_i = 1.25 W, C_i = 6 nF, L_i = 0.
I/O Options F and G (Entity, FISCO):
V_{Max} = 30 V, I_{Max} = 600 mA, P_i = 8.5 W, C_i = 5 nF, L_i = 10 µH.

a = Type of electronic: 40, 80, 83 or 84.
b = Type of sensor: A (with h = N).
b = Type of sensor: E (with h = N or O; (c=80) with h = P)
b = Type of sensor: F [(c = 08, 15, 25, 40, 50, 80, 1H, 1F, 2F) with h = N or O; (c = 80, 1H, 1F, 2F) with h = P].
b = Type of sensor: I [(c = 08, 15, 16, 25, 26, 40, 41, 50, 51, 80) with h = N or O; (c = 41, 50, 51, 80) with h = P].
b = Type of sensor: M [(c = 08, 15, 25, 40, 50, 80) with h = N or O; (c = 80) with h = P].
b = Type of sensor: H [(c = 08, 15, 25, 40, 50) with h = N or O; (c = 50) with h = P].
b = Type of sensor: P [(c = 08, 15, 25, 40, 50) with h = N or O; (c = 50) with h = P].
b = Type of sensor: S [(c = 08, 15, 25, 40, 50) with h = N or O; (c = 50) with h = P].
b = Type of sensor. O [(c = 80, 1H, 1F, 2F) with h = N or O; (c = 80, 1H, 1F, 2F) with h = P]
b = Type of sensor: X. [(c = 3F) with h = N or O; (c = 3F) with h = P]
c = Size: 01, 02, 04, 08, 15, 16, 25, 26, 40, 41, 50, 51, 80, 1H, 1F, 2F, 3F, XX.
d = Material of tube/high pressure version: any single number or letter.
e = Process connection with sealing for Promass M: any triple number or letter (up to 400 bar).
f = Certifications/Treatments: any single number or letter.

g = Calibration: any single number or letter.
h = Approvals: N or O(Div. 1, GP A, B, C, D, E, F, G) or P (Div. 1, GP C, D, E, F, G).
i = Version: A, E, F, J, K, L, M, N, U, V, W, 1, 4, 7 or 8.
k = Cable gland: B or X.
n = Version: 0, 1, 2, 3, 4, 5, 7, 8, 9, A, B, C, D, E, F, G, H, K, L, M, N, P, Q, R, S or X.
o = Software: any single number or letter.
p = I/O's: A, B, C, D, E, F, G, H, J, K, L, M, N, P, Q, R, S, T, U, V, W, X, 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9.

** = Option in two digits (none, two or multiple of two digits); any combination of number or letter
+, # = Signs used as indicator for optional abbreviation of extended order code

AND

PROMASS abc-defghiknop+#**#. Mass Flowmeter.
NI-ANI/I/2/ABCD/T*; NI-ANI/2/IIC/T*; DIP/II,III/1/EFG/T*; Nonincendive Sensor Field Wires and Nonincendive Fieldbus Field Wires — FES0050; Type 4X
Nonincendive Fieldbus Field Wire Parameters:
Vmax = 35V, Ci = 5nF, Li = 10 µH
Special conditions of use:
1. For installation instructions and the Temperature Class (*) which applies to specific models, ambient temperatures (Ta), and process medium temperatures (Tmed), refer to Control Drawing FES0050.
a = Type of electronic: 40, 80, 83 or 84
b = Type of sensor: A, E, F, H, I, M, P, S, O or X
c = Size: 01, 02, 04, 08, 15, 16, 25, 26, 40, 41, 50, 51, 80, 1H, 1F, 2F, 3F or XX
d = Material of tube/high pressure version: any single number or letter
e = Process connection with sealing for Promass M: any triple number or letter (up to the pressure of 400 bar)
f = Certifications/Treatments: any single number or letter
g = Calibration: any single number or letter
h = Approvals: R (Division 2)
i = Version: A, B, C, D, G, H, 1, 2, 3, 5, or 6
k = Cable gland: A, B, C, D, K, L, M, Q, R, S or X
n = Version: 0, 1, 2, 3, 4, 5, 7, 8, 9, A, B, C, D, E, F, G, H, K, L, M, N, P, Q, R, S or X
o = Software: any single number or letter
p = I/O's: A, B, C, D, E, H, I, J, K, L, M, N, P Q, V, W, X, 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9

** = Option in two digits (none, two or multiple of two digits); any combination of number or letter
+, # = Signs used as indicator for optional abbreviation of extended order code

AND

CNGmass DCI 8aFb-cdefghikno+#**#. Mass Flowmeter.
XP-IS-DIP / I,II,III / 1 / ABCDEFG / T*; XP-IS / I / 1 / IIC / T* - FES0182; Entity, FISCO; Type 4X

Special Conditions of Use:
1. For installation instructions and the Temperature Class (*) which applies to specific models, ambient temperatures (Ta), and process medium temperatures (Tmed), refer to Control Drawing FES0182.

Entity Parameters:
I/O option S and R HART Current Output or Current Output:
V_{oc} = 21.8 V, I_{sc} = 90 mA, P_o = 0.49 W, C_a = 150 nF, L_a = 4.1 mH;
V_{Max} = 30 V, I_{Max} = 10 mA, P_i = 0.3 W, C_i = 6 nF, L_i = 0.
I/O Option S and T Frequency Output:
V_{Max} = 30 V, I_{Max} = 300 mA, P_i = 0.6 W, C_i = 6 nF, L_i = 0.
I/O option T and U HART Current Output or Current Output:
V_{Max} = 30 V, I_{Max} = 100 mA, P_i = 1.25 W, C_i = 6 nF, L_i = 0.
I/O Options F and G (Entity, FISCO):
V_{Max} = 30 V, I_{Max} = 600 mA, P_i = 8.5 W, C_i = 5 nF, L_i = 10 µH.

a = Version: any single number or letter.
b = Size: 08, 15, 25, XX.
c = Material of tube/high pressure version: any single number or letter.
d = Process connection: any triple number or letter (up to 400 bar).
e = Certifications/Treatments: any single number or letter.
f = Calibration: any single number or letter.
g = Approvals: M, N or 8 (Div. 1, GP A, B, C, D, E, F, G).
h = Version: A, E, F, J, K, L, M, N, U, V, W, 1, 4, 7 or 8.
i = Cable gland: B or X.
k = Version: 0, 1, 2, 3, 4, 5, 7, 8, 9, A, B, C, D, E, F, G, H, K, L, M, N, P, Q, R, S or X.
n = Software: any single number or letter.
o = I/O's: A, B, C, D, E, F, G, H, J, K, L, M, N, P, Q, R, S, T, U, V, W, X, 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9.
** = Option in two digits (none, two or multiple of two digits); any combination of number or letter
+, # = Signs used as indicator for optional abbreviation of extended order code

AND

Cubemass DCI 8Cab-cdefghiknop+#**#. Mass Flowmeter.
XP-IS-DIP / I,II,III / 1 / ABCDEFG / T*; XP-IS / I / 1 / IIC / T* - FES0183; Entity, FISCO; Type 4X

Special Conditions of Use:
1. For installation instructions and the Temperature Class (*) which applies to specific models, ambient temperatures (Ta), and process medium temperatures (Tmed), refer to Control Drawing FES0183.

Entity Parameters:
I/O option S and R HART Current Output or Current Output:
V_{oc} = 21.8 V, I_{sc} = 90 mA, P_o = 0.49 W, C_a = 150 nF, L_a = 4.1 mH;
V_{Max} = 30 V, I_{Max} = 10 mA, P_i = 0.3 W, C_i = 6 nF, L_i = 0.
I/O Option S and T Frequency Output:
V_{Max} = 30 V, I_{Max} = 300 mA, P_i = 0.6 W, C_i = 6 nF, L_i = 0.
I/O option T and U HART Current Output or Current Output:
V_{Max} = 30 V, I_{Max} = 100 mA, P_i = 1.25 W, C_i = 6 nF, L_i = 0.
I/O Options F and G (Entity, FISCO):
V_{Max} = 30 V, I_{Max} = 600 mA, P_i = 8.5 W, C_i = 5 nF, L_i = 10 µH.

a = Version: any single number or letter.
b = Size: 01, 02, 04, 06, XX.
c = Approvals: C3 or 84 (Div. 1, GP A, B, C, D, E, F, G).
d = I/O's: A, B, C, D, E, F, G, H, J, K, L, M, N, P, Q, R, S, T, U, V, W, X, 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9.
e = Version: 0, 1, 2, 3, 4, 5, 7, 8, 9, A, B, C, D, E, F, G, H, K, L, M, N, P, Q, R, S or X
f = Display/Operation: any single number or letter
g = Operating Language: any single number or letter.
h = Version: A, E, F, J, K, L, M, N, U, V, W, 1, 4, 7 or 8.
i = Cable gland: B or X.
k = Material of tube: any single number or letter.
n = Process connection: any single number or letter.
o = Secoundary containment: any single number or letter.
p = Calibration/Treatment: any single number or letter.
** = Option in two digits (none, two or multiple of two digits); any combination of number or letter
+, # = Signs used as indicator for optional abbreviation of extended order code

Equipment Ratings:

Explosionproof for Class I Division 1, Group A, B, C and D and Class I, Zone 1, Group IIC; dust-ignitionproof for Classes II and III Division 1, Groups E, F and G hazardous (classified) outdoor (Type 4X) locations; sensor circuits and signal output circuits (p = I/O options F, G, R, S, T, U) intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F and G and Class I Zone 1 Groups IIC when installed in accordance with FM Control Drawing FES0048 (Promass) or FES00182 (CNGmass DCI) or FES0183 (Cubemass DCI)..

Nonincendive for Class I Division 2, Group A, B, C and D and Class I, Zone 2, Group IIC; dust-ignitionproof for Classes II and III Division 1, Group E, F and G hazardous (classified) outdoor (Type 4X) locations; sensor circuits nonincendive for Class I, Division 2, Groups A, B, C and D and Class I, Zone 2, Group IIC. Nonincendive field wiring for Class I Division 2, Group A, B, C and D and Classes II and III Division 1, Group E, F and G hazardous (classified) locations when installed in accordance with FM Control Drawing FES0050 (Promass)..

FM Approved for:

Endress + Hauser Flowtec AG
Kaegenstrasse 7
CH-4153 Reinach, Switzerland

FM Approvals®

Member of the FM Global Group

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	2004
Class 3615	2006
Class 3810	2005
ANSI/NEMA 250	1991

Original Project ID: 3009083 Approval Granted: December 19, 2000

Subsequent Revision Reports / Date Approval Amended

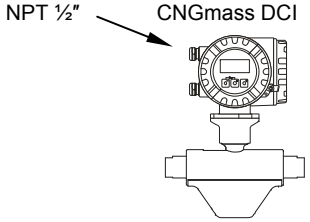
Report Number	Date	Report Number	Date
3012866	December 28, 2001		
3012691	May 7, 2002		
3015235	September 4, 2002		
3016669	February 21, 2003		
3021216	August 31, 2003		
050120	February 28, 2005		
050818	September 1, 2005		
3028484	November 20, 2006		
070130	July 25, 2007		
3030403	November 30, 2007		
070905	December 20, 2007		
071115	December 31, 2007		
3038437	June 9, 2010		
3042811	May 9, 2011		
3043873	September 21, 2011		
110930	January 27, 2011		

FM Approvals LLC

Patrick Byrne
Technical Team Manager

January 27, 2012
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



Promass FP

Temperature table	Max. medium temperature [°C]								
	T6	T5	T4A	T4	T3A	T2C	T2B	T2	T1
Ta = 60°C:									
Promass FP DN8/15	---	80	130	130	130	150	150	150	150
Promass FP DN25	---	95	130	130	150	150	150	150	150

WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Notes:

1. Control room equipment shall not use or generate more than 250 V rms.
2. Caution: Use supply wires suitable for 5 °C above ambient temperature, but at least for 80 °C / 176°F.
3. Installation of Transmitter circuit wiring according to National Electrical Code (NEC) using threaded conduit or other wiring methods in accordance with articles 500 to 510.
4. Class II Group G: The surface temperature of the apparatus cannot exceed 165 °C / 329°F. The user must limit the process temperature for Group G to 140°C.
5. Transmitter enclosures Proline G02 and G12 are 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 enclosures Proline G02 and G12 are 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, II Div.1 Groups A,B,C,D,E,F,G
8. The minimum medium temperature is -50°C or depending on version.
9. Install all Intrinsically Safe Circuits per National Electrical Code (NEC) ANSI/NFPA 70 and ISA RP 12.6 respecting the Explosionproof Integrity of the enclosure.
10. Promass FP is rated as Dual Seal Device in accordance with ANSI/ISA-12.27.01-2003.

Tm min. is -50°C for Promass FP

Communication Options	**Control Drawing**
I/O option = F,H,J,Q	see FES 0182 - 0001
I/O option = G,K	see FES 0182 - 0002
I/O option = S,T	see FES 0182 - 0004
I/O option = R,U	see FES 0182 - 0005

Aenderungen:					
	A		F		Alle gesetzlichen Urheberrechte vorbehalten. Diese Zeichnung darf ohne unsere Genehmigung weder vervielfältigt werden noch dritten Personen und Konkurrenzfirmen zugängig gemacht werden.
	B		G		
	C		H		
	D		J		
	E		K		

Ersatz für:
Ersteller: FES / **ID1090**
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FM Control Drawing Div. 1 / Zone 1
Class I Zone 1
Compact Version
CNGmass DCI

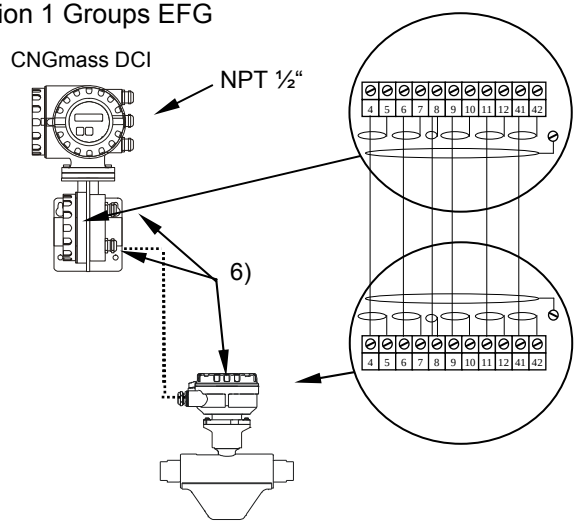
Gezeichnet	23.05.11	SCHK
Geprüft		
Ex-geprüft	23.05.11	SCHK
Gesehen		

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

FES0182 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



Promass FP

Temperature table	Max. medium temperature [°C]								
	T6	T5	T4A	T4	T3A	T2C	T2B	T2	T1
Ta = 60°C:									
Promass FP DN8/15	---	80	130	130	130	150	150	150	150
Promass FP DN25	---	95	130	130	150	150	150	150	150

Notes:

1. Control room equipment shall not use or generate more than 250 V rms.
2. Caution: Use supply wires suitable for 5 °C above ambient temperature, but at least for 80 °C / 176°F.
3. Installation of Transmitter circuit wiring according to National Electrical Code (NEC) using threaded conduit or other wiring methods in accordance with articles 500 to 510.
4. Class II Group G: The surface temperature of the apparatus cannot exceed 165 °C / 329°F. The user must limit the process temperature for Group G to 140°C.
5. Transmitter enclosures Proline G02 and G12 are 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 enclosures Proline G02 and G12 are 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. Allowed cable glands: NPT ½“, G ½“, M20x1.5 or PG13.5
9. Install all Intrinsically Safe Circuits per National Electrical Code (NEC) ANSI/NFPA 70 and ISA RP 12.6 respecting the Explosionproof Integrity of the enclosure.
10. Promass FP is rated as Dual Seal Device in accordance with ANSI/ISA-12.27.01-2003.

The ambient temperature is -40°C ... +60°C for the transmitter and -40°C ... +60°C for the sensor.

The minimum medium temperature is -50°C.

WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Aenderungen:						Ersatz für:
	A		F			Ersteller: FES / **ID1090**
	B		G			FILE M:\ZEICHNG\FES0182\0\FES0182_110523.doc
	C		H			
	D		J			
	E		K			

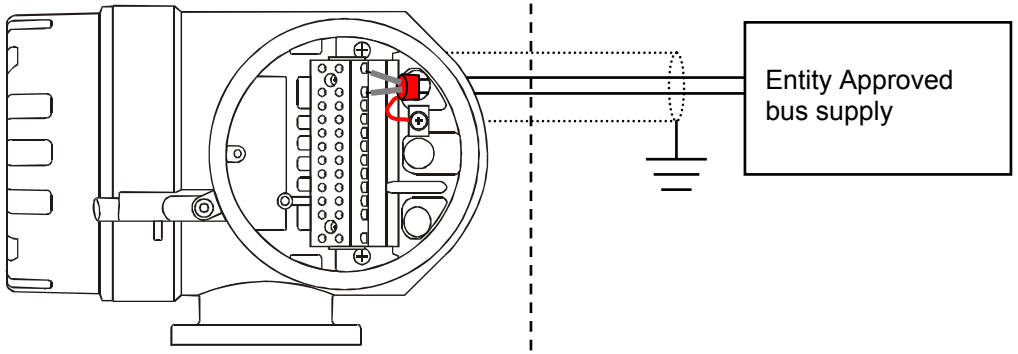
FM Control Drawing Div. 1 / Zone 1	Gezeichnet	23.05.11	SCHK
Class I Zone 1	Geprüft		
Remote Version	Ex-geprüft	23.05.11	SCHK
CNGmass DCI	Gesehen		

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

FES0182 2/2

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 safe circuits per National Electrical Code (NEC) ISA RP 12.6 or in conduit per NEC ANSI/NFPA 70.
2) **WARNING**: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
3) Control room equipment may not use or generate more than 250 V rms.

Type: CNGmass DCI * **-**********F+#**#**

Terminals: 26 (+), 27 (-) (Profibus PA):

Passive intrinsically safe PROFIBUS PA circuit:
For connecting the intrinsically safe circuit (PROFIBUS PA) according to the FISCO-CONCEPT see FES 0182-0003

Nonintrinsically safe signal output:

4) Transmitter circuit wiring in conduit in accordance with National Electrical Code (NEC) ANSI/NFPA 70 and ISA RP 12.6 respecting the Explosionproof Integrity of the enclosure.
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.

Type: CNGmass DCI * **-**********H+#**#**

Terminals 26 (+),27 (-) (PROFIBUS PA)
V 9…32V; I = 12mA

Type: CNGmass DCI * **-**********J+#**# (PROFIBUS DP)**
CNGmass DCI * **-**********Q+#**# (MODBUS RS)**

Terminals 24 (+5V),25 (GND), 26 (DPA/RSA), 27 (DPB/RSB)
Terminals: +5V, GNO, DPA, DPB
V = 5 V, I = 100 mA

Aenderungen:						Ersatz für:
	A		F			Ersteller: FES / **ID1090**
	B		G			FILE M:\ZEICHNG\FES0182\0\FES0182_110523.doc
	C		H			
	D		J			
	E		K			

FM Control Drawing Div. 1 / Zone 1
CNGmass DCI
PROFIBUS PA / IS installation
PROFIBUS PA / DP or Modbus RS non-IS installation

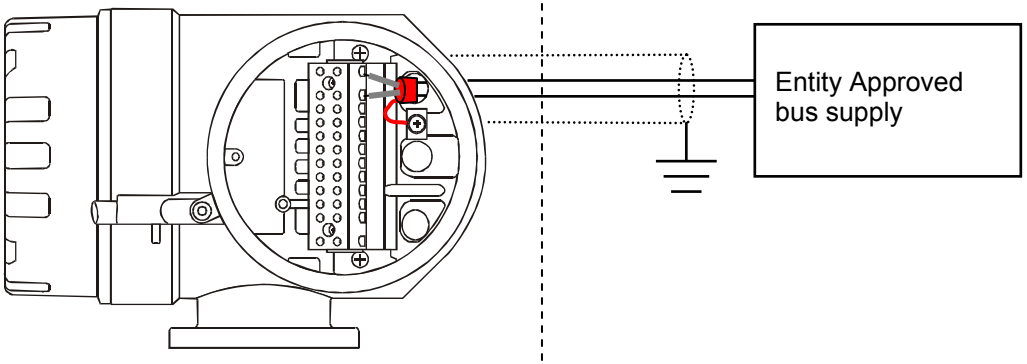
Gezeichnet	23.05.11	SCHK
Geprüft		
Ex-geprüft	23.05.11	SCHK
Gesehen		

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

FES0182-0001

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 safe circuits per National Electrical Code (NEC) ISA RP 12.6 or in conduit per NEC ANSI/NFPA 70.

2) **WARNING**: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
3) Control room equipment may not use or generate more than 250 Vrms.

Type: CNGmass DCI *** **-**********G+#**#

Terminals: 26, 27 (Foundation Fieldbus):
Iintrinsically 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	≤ 5 nF	≤ 10 µH

Connect to entity approved associated apparatus with
I_{SC} or $I_O \leq$ Imax or I_i and
V_{OC} or $U_O \leq$ Vmax or U_i
($P_O \leq$ Pmax or P_i)
Cable parameters for Intrinsic Safety:
$C_{cable} \leq C_a / C_O - \Sigma C_i$
$L_{cable} \leq L_a / L_O - \Sigma L_i$ or
$L/R_{cable} \leq L/R_{Associated\ Apparatus}$ and Li of each I.S. apparatus ≤ 10 µH

Alternatively the intrinsically safe circuit (Fieldbus Foundation) can be Connected accoeding to the FISCO-Concept (see FES 0182-0003).

Nonintrinsically safe signal output:

4) Wire all intrinsically safe circuits per National Electrical Code (NEC) ANSI/NFPA 70 and ISA RP 12.6 respecting the Explosionproof Integrity of the enclosure.
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.

Type: CNGmass DCI *** **-**********K+#**#

Terminals 26,27 (FIELDBUS FOUNDATION NON I.S.)
V 9…32V; I = 12mA

Aenderungen:						Ersatz für:
	A		F			Ersteller: FES / **ID1090**
	B		G			FILE M:\ZEICHNG\FES0182\0\FES0182_110523.doc
	C		H			
	D		J			
	E		K			

FM Control Drawing Div. 1 / Zone 1	Gezeichnet	23.05.11	SCHK
CNGmass DCI	Geprüft		
Fieldbus Foundation IS installation	Ex-geprüft	23.05.11	SCHK
Fieldbus Foundation non-IS installation	Gesehen		

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

FES0182-0002

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 (Ui or V_{max}), the current (Ii or I_{max}), and the power (Pi or P_{max}) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (Uo or Voc), the current (Io or Isc) and the power (Po or P_{max}) 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 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 50µA for each connected device. Separatly 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' :	80...200 nF

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 trunk cable:	≤ 1000 m
Length of spur cable:	≤ 30 m
Length of splice:	≤ 1 m

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

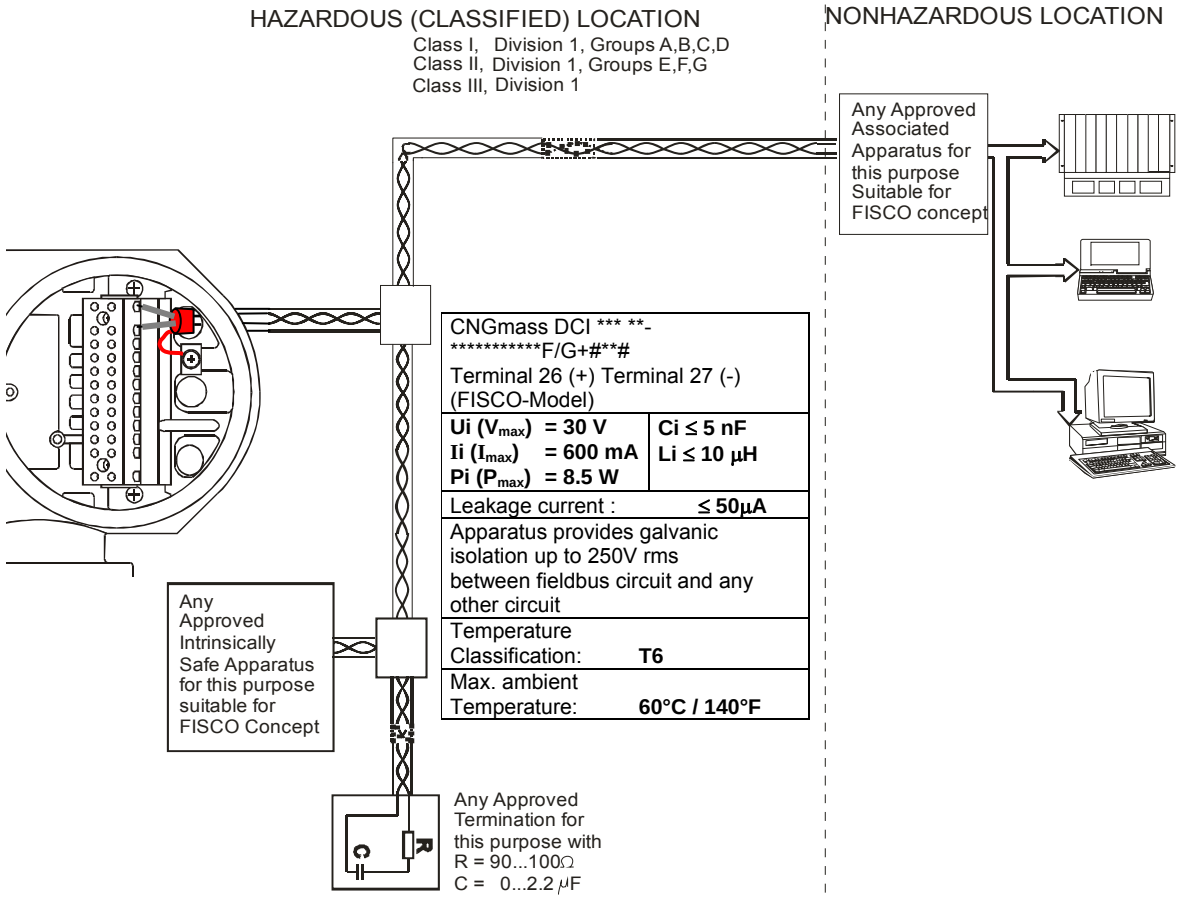
R = 90...100 Ohm C = 0...2.2 µF

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 lenght 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

1. Approved associated apparatus must be installed in accordance with manufacturers instructions.
2. Approved associated apparatus must meet the following parameters: Uo or Voc ≤ Ui (V_{max}) and Io or Isc ≤ Ii (I_{max}) and Po or P_{max} ≤ Pi (P_{max})
3. The maximum non-hazardous area voltage must not exceed 250V
4. Wire all intrinsically safe circuits per National Electrical Code (NEC) ANSI/NFPA 70 and ISA RP 12.6 respecting the Explosionproof Integrity of the enclosure.
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).
6. Caution: Use only supply wires suitable for 5°C above surrounding temperature.
7. Warning : Substitution of components may impair intrinsic safety.
8. The polarity for connection PA+ (26) and PA- (27) is of no importance due to an internal rectifier.



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	D		J			
	E		K			

FM Control Drawing Div. 1 / Zone 1
CNGmass DCI
Intrinsically safe PROFIBUS PA
Foundation Fieldbus
FISCO-Concept

Gezeichnet	23.05.11	SCHK
Geprüft		
Ex-geprüft	23.05.11	SCHK
Gesehen		

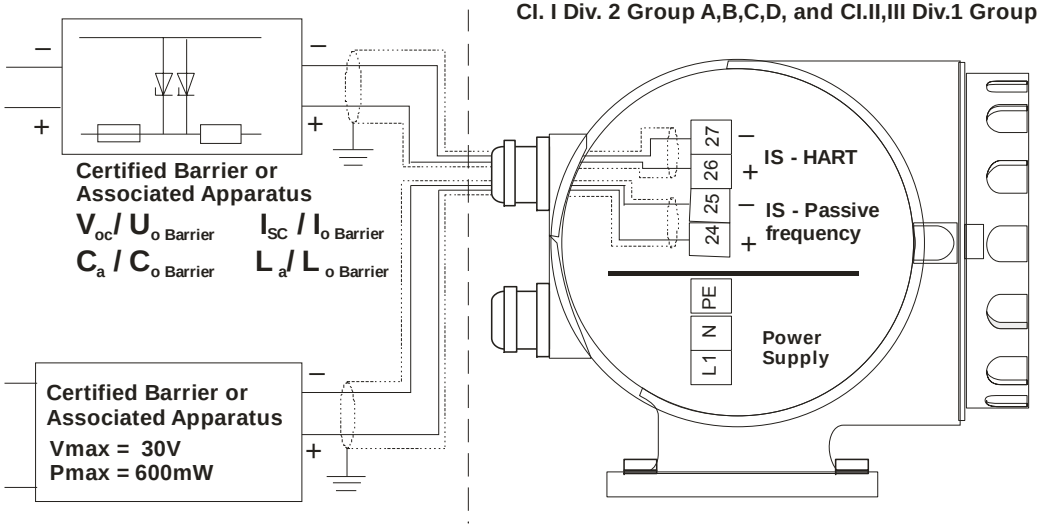
Flowtec AG, Kägenstrasse 7, CH-4153 Reinach BL1, Postfach

FES0182-0003

NON HAZARDOUS LOCATION

HAZARDOUS LOCATION

Class 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

Intrinsically safe signal output:

2) Install all intrinsically safe cricuits per National Electrical Code (NEC) ISA RP 12.6 or in conduit per NEC ANSI/NFPA 70.
3) **WARNING**: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4) Control room equipment may not use or generate more than 250 Vrms.

Type: CNGmass DCI *** **-**********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 µF	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} / U_o (of Barrier) ≤ 21.8 V
$C_{cable} \leq C_a$ / $C_{o\ Barrier}$ - 6 nF if V_{oc} / U_o (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} or $U_O \leq V_{max}$ / U_i P_{max} or $P_O \leq P_{max}$ / P_i
Cable parameters for Intrinsic Safety:
$C_{cable} \leq C_a$ (C_O) - 6nF $L_{cable} \leq L_a$ (L_O)

Type: CNGmass DCI *** **-**********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} or $U_O \leq V_{max}$ / U_i
I_{SC} 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 follwoing requirements:
V_{OC} 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)

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FM Control Drawing Div. 1 / Zone 1
CNGmass DCI
Entity concept Commodul HART IS (Option S/T)

Gezeichnet	23.05.11	SCHK
Geprüft		
Ex-geprüft	23.05.11	SCHK
Gesehen		

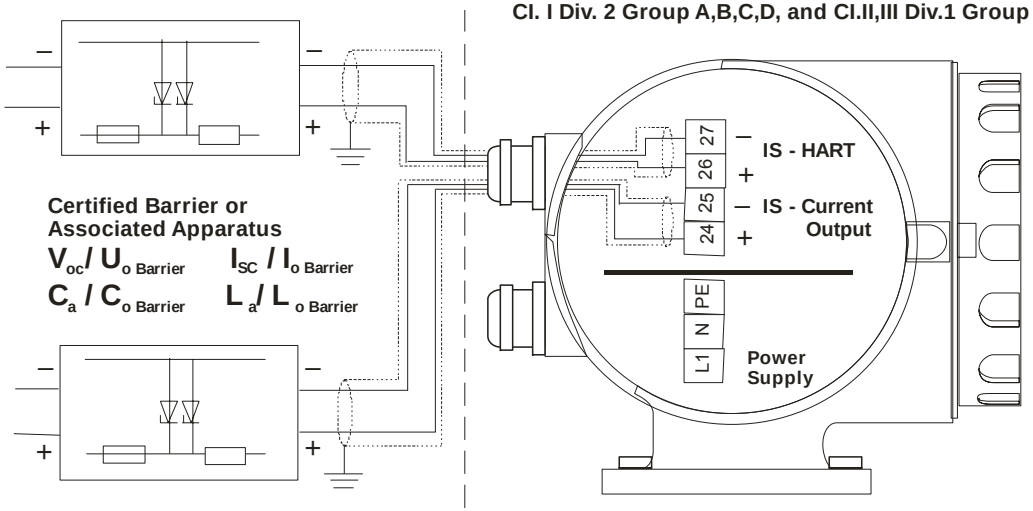
Flowtec AG, Kägenstrasse 7, CH-4153 Reinach BL1, Postfach

FES0182-0004

NON HAZARDOUS LOCATION

HAZARDOUS LOCATION

Class 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

Intrinsically safe signal output:

2) Install all intrinsically safe cricuits per National Electrical Code (NEC) ISA RP 12.6 or in conduit per NEC ANSI/NFPA 70
3) **WARNING**: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4) Control room equipment may not use or generate more than 250 Vrms.

Type: CNGmass DCI *** **-**********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 µF	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} / U_o (of Barrier) ≤ 21.8 V
$C_{cable} \leq C_a$ / $C_{o\ Barrier}$ - 6 nF if V_{oc} / U_o (of Barrier) ≥ 21.8 V
$L_{cable} \leq 4.1$ mH

Type: CNGmass DCI *** **-**********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} or $U_O \leq V_{max}$ / U_i
I_{SC} 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 $L_{o\ Barrier}$

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FM Control Drawing Div. 1 / Zone 1
CNGmass DCI
Entity concept Commodul HART IS (Option R/U)

Gezeichnet	23.05.11	SCHK
Geprüft		
Ex-geprüft	23.05.11	SCHK
Gesehen		

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

FES0182-0005