FACTORY MUTUAL | Factory Mutual System

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CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

Type PROSONIC FLOW DMU93-5bcde. Ultrasonic Flowmeter.
b=Cable glands A (PG 13.5),B (M20×1.5),C(NPT 1/2) or D(G1/2).
c=Display/programming (not safety relevant): 2 (LCD optical "touch control" keypad).
d=Power supply 1 (85-260Vac) or 2 (20-55Vac, 16-62Vdc).
e=Outputs A(Commodul Hart),B to E(Commodul RS485),F(Commodul 2 current output),T(non-IS Profibus PA),W(Non-IS Profibus DP),H(IS Profibus PA,FISCO) or N(IS Hart).

Equipment Ratings: Explosionproof for Class I, Division 1, Groups A, B, C and D; dust-ignitionproof for Class II and III, Division 1, Groups E, F and G; sensor intrinsically safe for Class I, II, III Division 1, Group A, B, C, D, E, F and G hazardous (classified) outdoor (Transmitter NEMA Type 4X, Sensor NEMA 6P) locations when connected in accordance with Control Drawing FES0008.

Type PROSONIC FLOW DMU93-Ebcde. Ultrasonic Flowmeter.
b=Cable glands A (PG 13.5),B (M20×1.5),C(NPT 1/2) or D(G1/2).
c=Display/programming (not safety relevant): 2 (LCD optical "touch control" keypad)
d=Power supply 1 (85-260Vac) or 2 (20-55Vac, 16-62Vdc).
e=Outputs A(Commodul Hart),B to E(Commodul RS485),F(Commodul 2 current output),T(non-IS Profibus PA),W(Non-IS Profibus DP),H(IS Profibus PA,FISCO) or N(IS Hart).

Equipment Ratings: Explosionproof for Class I, Division 1, Groups A, B, C and D; dust-ignitionproof for Class II and III, Division 1, Groups E, F and G; sensor intrinsically safe for Class I, II, III Division 1, Groups C, D, E, F and G hazardous (classified) outdoor (Transmitter NEMA Type 4X, Sensor NEMA 6P) locations when connected in accordance with Control Drawing FES0008.

Type PROSONIC FLOW DMU93-Cbcde. Ultrasonic Flowmeter.
b=Cable glands A (PG 13.5),B (M20×1.5),C(NPT 1/2) or D(G1/2).
c=Display/programming (not safety relevant): 2 (LCD optical "touch control" keypad)
d=Power supply 1 (85-260Vac) or 2 (20-55Vac, 16-62Vdc).
e=Outputs A(Commodul Hart),B to E(Commodul RS485),F(Commodul 2 current output),T(non-IS Profibus PA),W(Non-IS Profibus DP).

Equipment Ratings: Nonincendive for Class I, Division 2, Groups A, B, C and D; dust-ignitionproof for Class II and III, Division 1, Groups E, F and G; sensor intrinsically safe for Class I,II and III, Division 1, Groups C,D,E,F and G; sensor nonincendive for Class I, Division 2, Groups A, B, C, D; sensor suitable for Class II, III, Division 2, Groups F and G hazardous (classified) outdoor (Transmitter NEMA Type 4X, Sensor NEMA 6P) locations when connected in accordance with Control Drawing FES0008.

Type PROSONIC Flow DDU10-abcdef. Sensor.
a=sensor A(2Mhz-40C..80C DN 50..200),B(2Mhz 0C..170C DN 50..200), C (1Mhz -40C..80C DN250..2500) or D(1Mhz-0C..170C DN 250..2500).
b=Sensor support (not safety relevant): any letter or number
c=Mounting rail (not safety relevant): any letter or number
d=Sensor cable adapter (not safety relevant): any letter or number
e=Sensor cables pre-fabricated A,B,C,D,I,K,L or M.
f=Calibration (not safety relevant): any letter or number

Type DDU18-abcde PROSONIC Flow Sensor.
a=sensor A(1Mhz-40C..80C DN 50..2500),B(1Mhz 0C..170C DN 50..2500).
b=Sensor support (not safety relevant): any letter or number
c=Mounting rail (not safety relevant): any letter or number
d=Sensor cable adapter (not safety relevant): any letter or number
e=Sensor cables pre-fabricated A,B,C,D,I,K,L or M.

Equipment Ratings: Intrinsically safe for Class I, II, III, Division 1, Gas Groups per Note 1, D, E, F and G; nonincendive for Class I, Division 2, Groups A, B, C, D; suitable for Class II, III, Division 2, Groups F and G hazardous (classified) outdoor (NEMA Type 6P) locations when connected in accordance with Control Drawing FES0008.

Special Conditions of Use:

1. Sensor Gas Groups depend on version of Transmitter, Model DMU93.
2. Surface temperatures for product applications in Class II environments shall not exceed the lower of either the ignition temperature of the Class II environment or 165°C (329°F) in accordance with the National Electrical Code (ANSI/NFPA 70).

Manufactured by: Endress + Hauser Flowtec AG
Kagenstrasse 7
CH-4153 Reinach
Switzerland

This certifies that the equipment described has been found to comply with the following Factory Mutual Research Corporation Approval Standards:

Approval Standard Class 3600 - 1989
Approval Standard Class 3610 - 1988
Approval Standard Class 3611 - 1986
Approval Standard Class 3615 - 1989
Approval Standard Class 3810 - 1989, Supplement #1-1994

Job Identification: 3000398 dated October 27, 1998

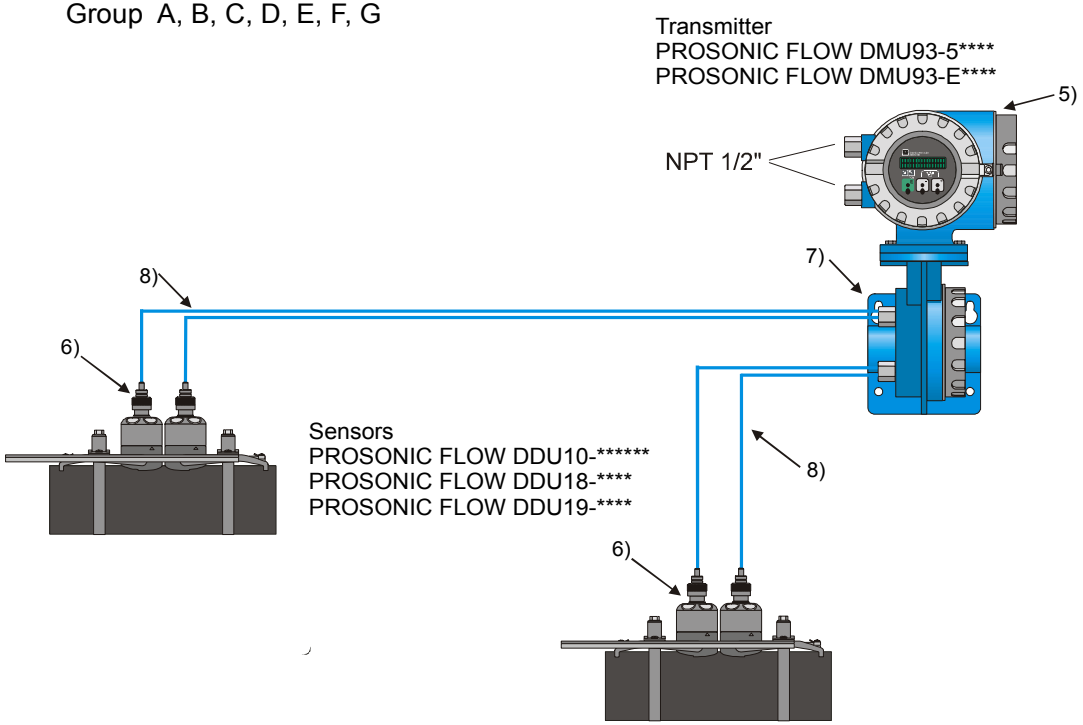
Amendments: Amendment #1 797 Revision Report Approved November 25, 1998

Factory Mutual Research Corporation

Frank J. McGowan
Manager, Instrumentation Section
Approvals Division

11/30/98
Date

Hazardous Locations Cl. I, II, III Div. 1
Group A, B, C, D, E, F, G



Temperature table Sensors

SENSORS DDU 10/ 18/ 19	max. medium temperature [°C] T6	T5	T4A	T4	T3C	T3B	T3A
at Ta = 60°C							
DDU10-A*****	80	---	---	---	---	---	---
DDU18-C***	80	---	---	---	---	---	---
DDU18-A***	80	---	---	---	---	---	---
DDU19-A***	80	---	---	---	---	---	---
at Ta = 60°C							
DDU10-B*****	80	95	115	130	155	160	170
DDU18-D***	80	95	115	130	155	160	170
DDU18-B***	80	95	115	130	155	160	170

Temperature Specification

Transmitter

PROSONIC FLOW DMU93-5**** or DMU93-E**** Transmitter installed in Cl. I Div. 1 inside PRO-LINE explosionproof enclosure (Note 5) T6 at Tamb = 60 °C

Notes:

1. Control room equipment may not use or generate over 250 Vrms.
2. Sensor circuit wiring may be installed as intrinsically safe wiring per ISA RP 12.6 or in conduit in accordance with the NEC ANSI/NFPA 70.
3. Caution: Use supply wires suitable for 5 °C above surrounding temperature.
4. For Class II Group G the surface temperature of the apparatus cannot exceed 165 °C. The user must limit the process temperature for Group G to 140 °C.
5. PRO-LINE Explosionproof enclosure for use in Cl. I Div. 1 Groups A, B, C, D and Dust-ignitionproof for Cl. II, III Div .1Groups E, F ,G
6. Sensor circuits intrinsically safe for Cl.I,II,III, Div. 1:
   Transmitter: DMU93-5**** for Gas Groups A, B, C, D, E, F, G
   Transmitter: DMU93-E**** for Gas Groups C, D, E, F, G
7. Allowed cable glands: NPT ½“
8. Cable Type for all Sensors: Use only prefabricated Endress+Hauser Cable type Habia RGT316, Huber+Suhner G02332 and Örebro RG316T.
   For Safety reasons the maximum allowed cable length is 30 m per Sensor - determined by sales order.

Keine Änderungen ohne vorherige Factory Mutual Genehmigung

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	B	14.10.99 Dom	G			
	C		H			
	D		J			
	E		K			

FM CONTROL DRAWING
Class I, Division 1
PROSONIC FLOW DMU 93

Massstab	%

Gezeichnet	21.09.98	Dom
Geprüft		
Ex-geprüft	14.10.99	Dom
Gesehen		

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

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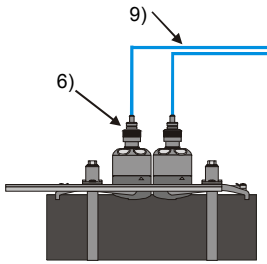
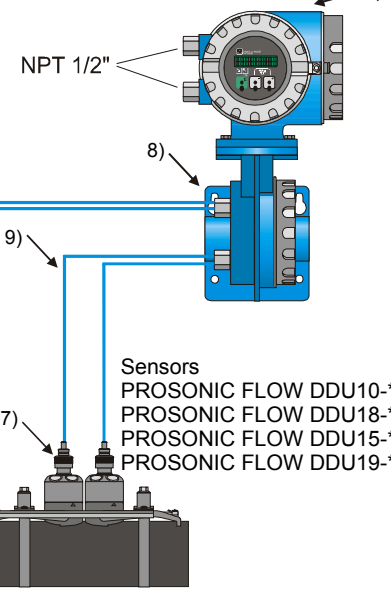
Hazardous Locations Cl. I, II, III Div. 1
Group A, B, C, D, E, F, G

Sensors
PROSONIC FLOW DDU10-******
PROSONIC FLOW DDU18-****
PROSONIC FLOW DDU19-****



Hazardous Locations Cl. I Div. 2 Group A,B,C, D,
and Cl. II, III Div. 1 Group E, F, G

Transmitter
PROSONIC FLOW DMU93-C****



Sensors
PROSONIC FLOW DDU10-******
PROSONIC FLOW DDU18-****
PROSONIC FLOW DDU15-*********
PROSONIC FLOW DDU19-****

Notes:

1. Control room equipment may not use or generate over 250 Vrms.
2. Sensor circuit wiring may be installed as intrinsically safe wiring per ISA RP 12.6 or in conduit in accordance with the NEC ANSI/NFPA 70.
3. Caution: Use supply wires suitable for 5 °C above surrounding temperature
4. For Class II Group G the surface temperature of the apparatus cannot exceed 165 °C. The manufacturer must limit the process temperature for Group G to 140 °C.
5. PRO-LINE standard enclosure for use in Cl. I Div. 2 Group A, B, C, D and dust-ignitionproof for Cl. II, III Div .1 Group E, F and G
6. Sensor circuits intrinsically safe for Cl.I,II,III, Div. 1:
   Sensor Gas Groups depend on Version of Transmitter see Control drawing FES0008 Page 1/4 Note 6
7. Sensor circuits nonincendive for Cl.I, Div. 2 Group A,B,C,D; Sensors suitable for Cl. II, III Div .1 Group E, F and G
8. Allowed cable glands: NPT 1/2“
9. Cable Type for all Sensors: Use only prefabricated Endress+Hauser Cable type Habia RGT316, Huber+Suhner G02332 and Örebro RG316T.
   For Safety reasons the maximum allowed cable length is 30 m per Sensor - determined by sales order.

Temperature table Sensors

SENSORS DDU 10/15/18/19	max. medium temperature [°C] T6	T5	T4A	T4	T3C	T3B	T3A
at Ta = 60°C							
DDU10-A*****	80	---	---	---	---	---	---
DDU18-C***	80	---	---	---	---	---	---
DDU18-A***	80	---	---	---	---	---	---
DDU19-A***	80	---	---	---	---	---	---
DDU15S-***A*****	80	---	---	---	---	---	---
DDU15D-***A*****	80	---	---	---	---	---	---
at Ta = 60°C							
DDU10-B*****	80	95	115	130	155	160	170
DDU18-D***	80	95	115	130	155	160	170
DDU18-B***	80	95	115	130	155	160	170

Temperature Specification
Transmitter

PROSONIC FLOW DMU93-C**** Transmitter installed in Cl. I Div. 2 inside PRO-LINE standard enclosure (Note 5)
T4 at Ta = 60 °C

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	D		J			
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FM CONTROL DRAWING
Class I, Division 1 and 2
PROSONIC FLOW DMU 93

Massstab %

Gezeichnet	21.09.98	Dom
Geprüft		
Ex-geprüft	14.10.99	Dom
Gesehen		

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

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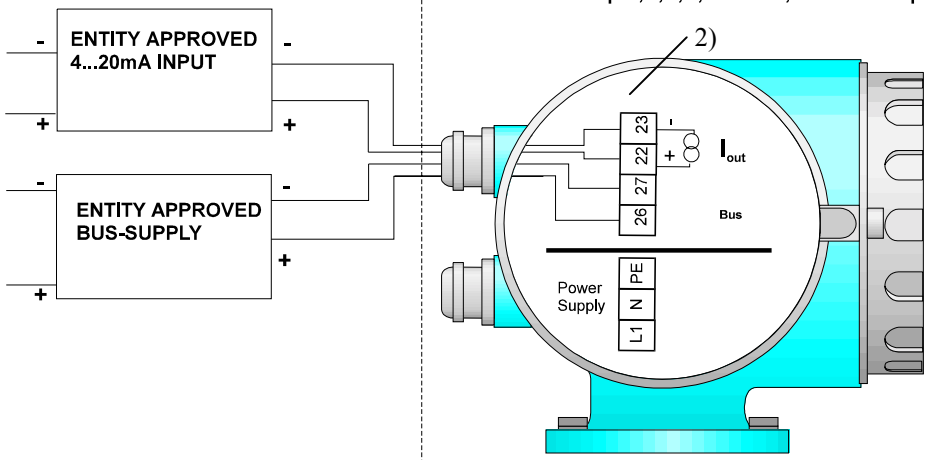
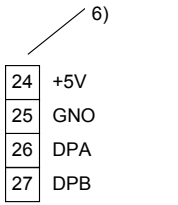
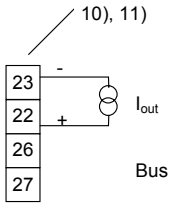
NON HAZARDOUS LOCATION

HAZARDOUS LOCATION

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







Keine Änderungen
ohne vorherige
Factory Mutual
Genehmigung

Notes:

Relevant Information's for PROSONIC FLOW Transmitters and Sensors see FM Control Drawing FES0008-F00 Page 1/3

Intrinsically safe installation PROFIBUS PA:

General: Transmitter circuit wiring in accordance with the NEC ANSI/NFPA 70.

PROSONIC DMU93-****H

1) Wire all intrinsically circuits per ISA RP 12.6. or in conduit per NEC ANSI/NFPA 70

2) Use entity approved equipment or other associated equipment that satisfy the following conditions:

V_{oc} or $V_t \le V_{max}$, I_{sc} or $I_t \le I_{max}$, $C_a \ge C_i$, $L_a \ge L_i$ transmitter entity parameters are as follows:

Bus-Connection 26, 27:

V_{max}	I_{max}	C_i	L_i
30 V	80 mA	0	0

4...20mA Output 22, 23:

V_{max}	I_{max}	C_i	L_i
21 V	64 mA	9,4 nF	0,2 mH

Cable parameters:
Group A and B: Lo < 2,5mH, Co < 70nF
Group C and D: Lo < 10mH, Co < 300nF

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

Nonintrinsically safe installation PROFIBUS DP:

PROSONIC DMU93-****W

4) Transmitter circuit wiring in conduit in accordance with the NEC ANSI/NFPA 70.

5) **WARNING**: EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 1.

6) **Bus-connection 24,25,26,27**
Terminals: +5V, GNO, DPA, DPB
V = 30V, I = 250mA

7) Control room equipment may not use or generate over 250 Vrms.

Nonintrinsically safe installation PROFIBUS PA:

PROSONIC DMU93- ****T

7) Transmitter circuit wiring in conduit in accordance with NEC ANSI/NFPA 70.

8) **WARNING**: EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 1.

9) **Bus-connection 26,27**
V = 30V, I = 10mA

10) **4 ... 20mA Output-connection 22,23**
V = 21V, I = 64mA

11) Control room equipment may not use or generate over 250 Vrms.

Class II.III Div.1 Installation:

12) Transmitter circuit wiring in conduit in accordance with NEC ANSI/NFPA 70.

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FM CONTROL DRAWING Cl. I Div. 1
PROSONIC FLOW DMU 93
Field Bus Entity concept

Massstab: %

Gezeichnet	21.09.98	Dom.
Geprüft		
Ex-geprüft	14.10.99	Dom.
Gesehen		

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

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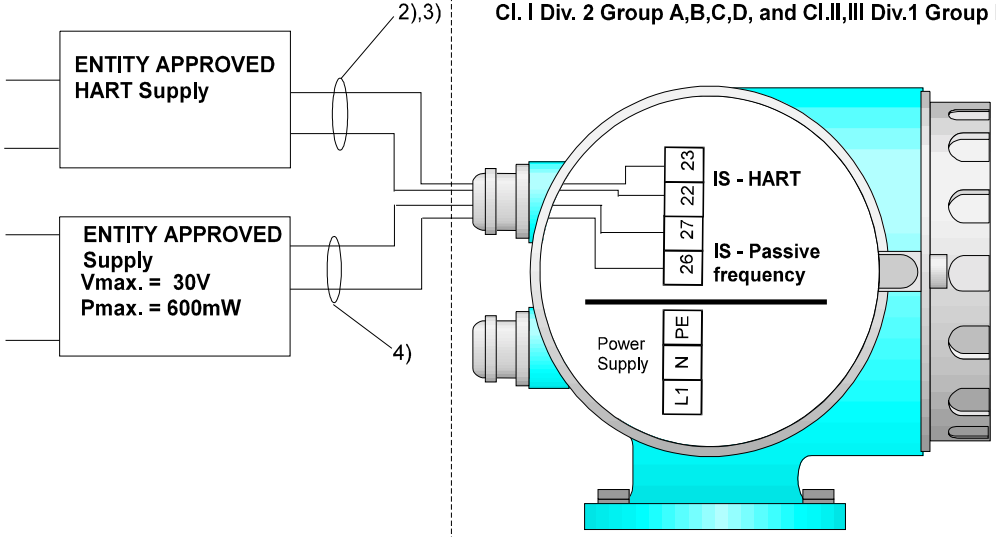
NON HAZARDOUS LOCATION

HAZARDOUS LOCATION

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:

Relevant Information's for PROSONIC FLOW Transmitters and Sensors
see FM Control Drawing FES0008-F00 Page 1/3

Intrinsically safe installation HART current:

PROSONIC DMU93-****N

1) Wire all intrinsically circuits per ISA RP 12.6. or in conduit per NEC ANSI/NFPA 70

2) Use entity approved equipment or other associated equipment that satisfy the following conditions:

V_{oc} or $V_t \le V_{max}$, I_{sc} or $I_t \le I_{max}$, $C_a \ge C_i$, $L_a \ge L_i$ transmitter entity parameters are as follows:

Active intrinsically safe circuit:
Terminals: 22, 23:

V_{oc}	I_{sc}	C_a	L_a
21.8V	98.3mA	0.135µF	3.8mH
V_{max}	I_{max}	C_i	L_i
21.8V	98.3mA	10.6nF	0.24mH

3) Cable parameters Intrinsic Safety:

$Ci + C_{cable} \le 0.135\mu F$
$Li + L_{cable} \le 0.50mH$

4) Passive intrinsically safe circuit:
Terminals 26, 27:

V_{max}	P_{max}	C_i	L_i
30 V	600mW	3 nF	0

5) WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Keine Änderungen ohne vorherige Factory Mutual Genehmigung

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FM CONTROL DRAWING Cl. I Div. 1
PROSONIC FLOW DMU93
Entity concept Commodul HART IS

Massstab

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Gesehen		

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