

Installation Instructions

P/N MMI-20011708, Rev. AA

July 2009

ATEX Installation Instructions for Micro Motion[®] Model 3350/3700 Transmitters



Note: For hazardous installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

Information affixed to equipment that complies with the Pressure Equipment Directive can be found on the internet at www.micromotion.com/library.

If you require the information given in this manual in a different language, please contact Micro Motion Customer Service.

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Model 3350/3700 Transmitters

ATEX Installation Instructions and Drawings

- For installing the following Micro Motion transmitters:
 - Model 3350/3700 with 4-wire connection to a core processor
 - Model 3350/3700 with 9-wire connection to a junction box
 - Model 3350/3700 with a remote core processor and remote sensor with a junction box

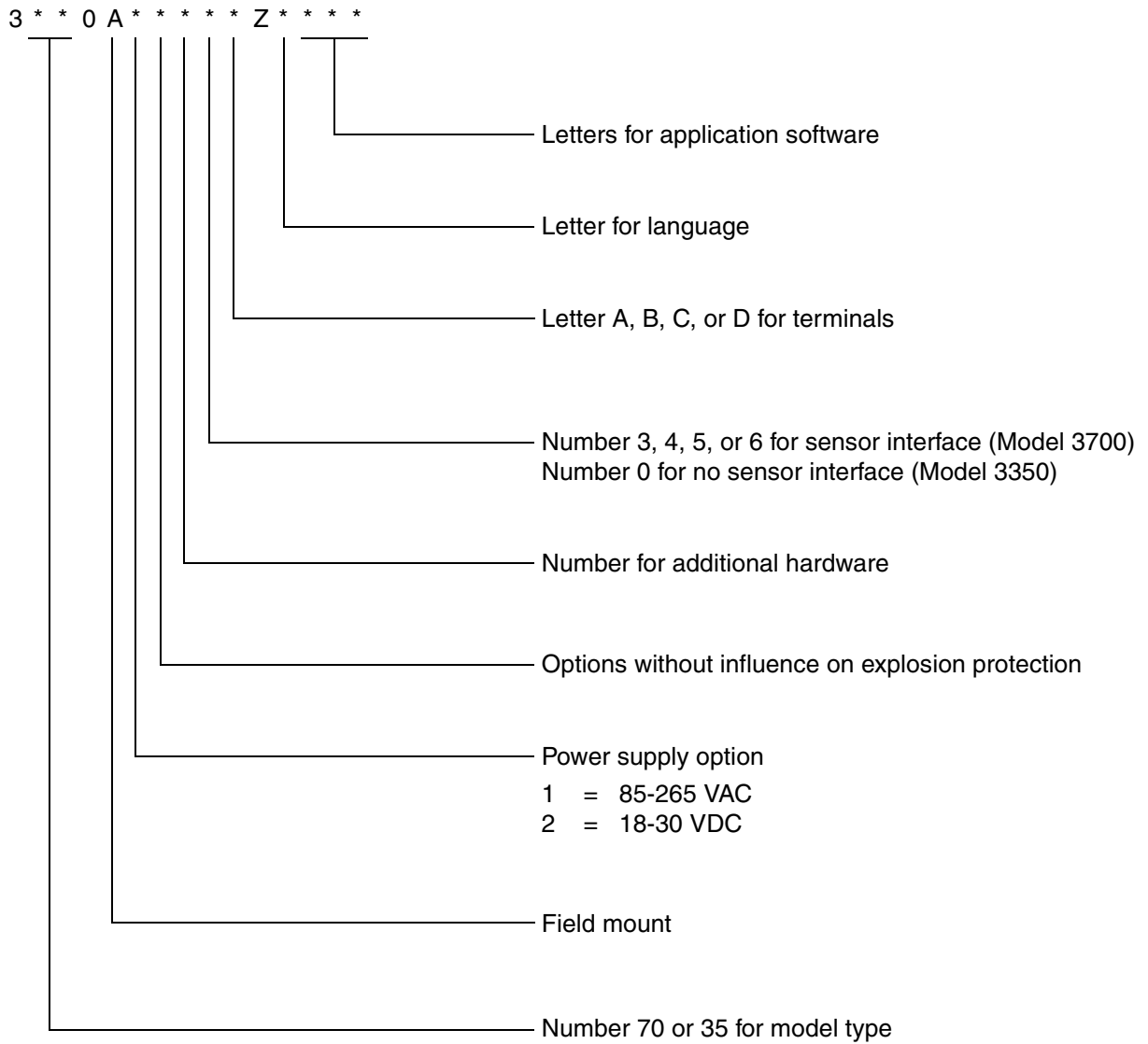


Subject:	Equipment type	Transmitter type 3**0*****Z****
Manufactured and submitted for examination		Micro Motion, Inc.
Address		Boulder, Co. 80301, USA
Standard basis	EN 60079-0:2006	General requirements
	EN 60079-1:2004	Flameproof enclosure 'd'
	EN 60079-7:2007	Increased safety 'e'
	EN 60079-11:2007	Intrinsic safety 'i'
Code for type of protection		II 2G Ex de [ib] IIB/IIC T4
EC Type Examination Certificate		DMT 02 ATEX E 252 X

1) **Subject and type**

Transmitter type 3**0*****Z****

Instead of the *** letters and numerals will be inserted which characterize the following modifications:



2) Description

The transmitter is, in combination with a sensor, used for mass flow measurement and for indicating as well as entering of parameters.

The electrical components of the transmitters are mounted in a light metal housing which is divided into three compartments.

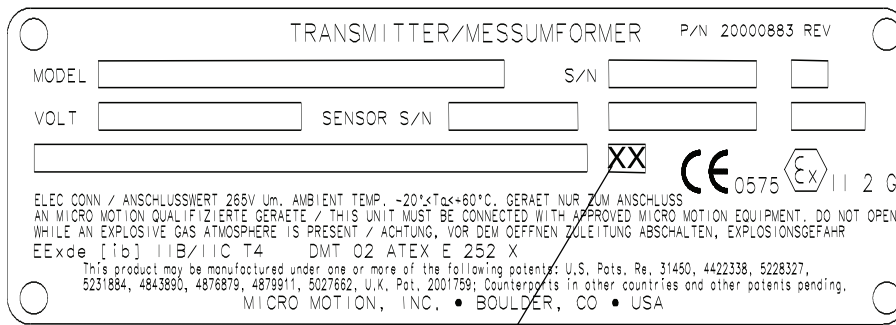
In the compartment with type of protection “flameproof enclosure” are the assemblies of the Power Board, APPS Board, PPI Barrier Board, 9-wire Sensor Interface Board, or 4-Wire Sensor Interface board.

In the compartment “Increased safety” are the terminals for intrinsically safe and non-intrinsically safe circuits securely fixed.

In the front cover of the housing are the keypad, I.S. PPI assembly, and behind a window, a securely fixed display.

The 3700A****Z**** transmitter comes with different sensor interface boards. The 3700A***3*Z**** is for 9-wire installation to a sensor with junction box. The 3700A***4*Z**** has DSP (digital signal processing) in the sensor interface board to be compatible with T*****Z**** sensors (DMT 01 ATEX E 083 X). The 3700A***5*Z**** is for 4 wire installation to a sensor with integral core processor (Model 700 or Model 800). The 3700A***6*Z**** is for connection to the remote mount core (DMT 02 ATEX E 002, Model 700C).

Amendment No. 3 to the ATEX Certificate DMT 02 ATEX E 252 X reflects the use of the revised Display Cover and a Plastic PPI Back Shield. Transmitters constructed using the revised Display Cover and Plastic PPI Back Shield will be identified with a Construction Identification Code (C.I.C.) of A1.



Construction Identification Code (CIC)
(Approximate location)

Amendment No. 4 to the ATEX Certificate DMT 02 ATEX E 252 X changes the marking from EEx to Ex in compliance with the new standards and covers the revised internal printed circuit boards. This version is identified with Construction Identification Code CIC A2.

3) Parameters

3.1) Mains circuit

For type 3**0A1****Z**** (terminals J18-10 and J18-9)

Voltage	AC	85–265	V
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For type 3**0A2****Z**** (terminals J18-9 and J18-10)

Voltage	DC	18–30	V
Max voltage	Um	AC/DC	265

3.2) Non-intrinsically safe data circuits (terminals J18-1 through J18-8 and J18-11 through J18-20)

Voltage	up to	DC	29	V
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3.3) Intrinsically safe sensor circuits for 3**0A**3*Z****

		Drive circuit terminals J19-11 and J19-12	Pick-off circuits terminals J19-18/17 and J19-20/19	Temperature circuit terminals J19-15/16/13			
Voltage	Uo	11,4 Vdc	15,6 Vdc	15,6 Vdc			
Current	Io	1,14 A	10 mA	10 mA			
Limited by a fuse with a rated current of		250 mA					
Power	Po	1,2 W	40 mW	40 mW			
Group							
		IIC	IIB	IIC	IIB	IIC	IIB
Max. external inductance	Lo	27,4 µH	109 µH	355 mH	1,4 H	355 mH	1,4 H
Max. external capacitance	Co	1,7 µF	11,7 µF	500 nF	3,03 µF	500 nF	3,03 µF
Max. inductance/resistance ratio	Lo/Ro	10,9 µH/Ω	43,7 µH/Ω				

For drive circuit terminals, the maximum external inductance L (sensor coil) can be calculated with the following term:

$$L = 2 \times E \times \left(\frac{Ri + Ro}{1,5 \times Uo} \right)^2$$

Where:

E = 40 µJ for group IIC and E = 160 µJ for group IIB

Ro = Total resistance (coil resistance + series resistance)

3.4) Intrinsically safe sensor circuits for 3**0A**4*Z****

		Drive circuit terminals J19-11 and J19-12	Pick-off circuits terminals J19-18/17 and J19-20/19	Temperature circuit terminals J19-15/16/13			
Voltage	Uo	11,4 Vdc	21,13 Vdc	21,13 Vdc			
Current	Io	1,14 A	8,45 mA	17 mA			
Limited by a fuse with a rated current of		250 mA					
Power	Po	1,2 W	45 mW	90 mW			
Group							
		IIC	IIB	IIC	IIB	IIC	IIB
Max. external inductance	Lo	27,4 µH	109 µH	490 mH	1,9 H	122 mH	492 mH
Max. external capacitance	Co	1,7 µF	11,7 µF	180 nF	1,24 µF	180 nF	1,24 µF
Max. inductance/resistance ratio	Lo/Ro	10,9 µH/Ω	43,7 µH/Ω				

For drive circuit terminals, the maximum external inductance L (sensor coil) can be calculated with the following term:

$$L = 2 \times E \times \left(\frac{Ri + Ro}{1,5 \times Uo} \right)^2$$

Where:

E = 40 µJ for group IIC and E = 160 µJ for group IIB

Ro = Total resistance (coil resistance + series resistance)

3.5) For type 3**0A***5*Z**** and 3**0A***6*Z**** (terminals J19-13/14 and J19-15/16) 4-wire board

Voltage	Uo	17,22 Vdc	
Current	Io	484 mA	
Power	Po	2,05 W	
Type of protection		Ex ib IIC	Ex ib IIB
Max. external inductance	Lo	151,7 μH	607 μH
Max. external capacitance	Co	0,333 μF	2,04 μF
Max. inductance/resistance ratio	Lo/Ro	17,06 μH/Ω	68,2 μH/Ω


3.6) Circuits to the display (terminals J19-1 bis J19-4)

Voltage Uo DC 13,4 V

3.7) Ambient temperature range Ta -30 (-20) °C to +60 °C

4) Marking

-20 °C ≤ Ta ≤ +60 °C or
-30 °C ≤ Ta ≤ +60 °C (routine test required)

- type	- type of protection
3**0*****Z****	CE 0575  II 2G Ex de [ib] IIB/IIC T4

5) Special conditions for safe use / Installation instructions

5.1) The use of the transmitter at an ambient temperature under -20 °C is only admissible if the cables are suitable for that temperature and the cable entries are certified for that use.

5.2) The keypad in the front cover of the enclosure was tested in accordance with the low risk of mechanical danger (4 Joule) according to Table 8 of EN60079-0:2006.

5.3) External source of heating or cooling:

When mounting the transmitter to a process pipeline or a process vessel, the process temperature shall be between -20 °C and +60 °C.

5.4) Ex e terminals wiring instructions:

Torque value: 0,5 Nm
Wire size: 0,34mm² to 4 mm²
One solid conductor: 2,5 mm² to 4 mm²
Two solid conductor: 2,5 mm² to 4 mm²
One stranded conductor: 0,34 mm² to 2,5 mm²
Two stranded conductor: 0,34 mm² to 2,5 mm²
Stripping length: 3 mm

Model 3350/3700 installation drawings

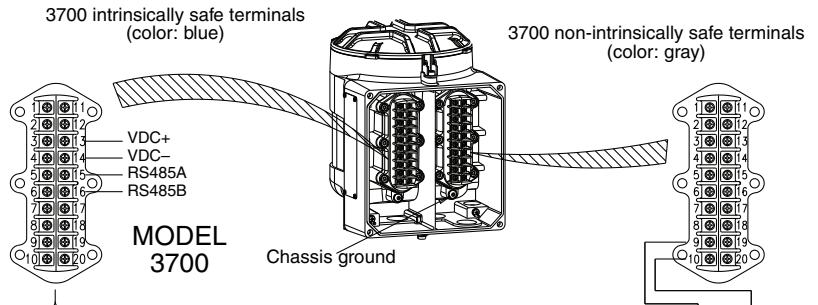
Figure 1: Model 3700 transmitter to remote core processor

COMBINE THIS DRAWING WITH ONE OF FIGURE 2, 3, 4, OR 5

Conditions for safe use:

1. The use of the transmitter at an ambient temperature under $-20\text{ }^{\circ}\text{C}$ is only admissible if the cables are suitable for that temperature and the cable entries are certified for that use.
2. Using a dry cloth to clean the display cover can cause static discharge, which could result in an explosion in an explosive atmosphere. To prevent an explosion, use a clean, damp cloth to clean the display cover in an explosive atmosphere.

Hazardous Area
Ex de [ib] IIB / IIC



I.S. 3700 outputs to core processor entity parameters		
U_o		17,22 Vdc
I_o		484 mA
P_o		2,05W
C_o	IIC	0,333 μF
	IIB	2,04 μF
L_o	IIC	15,7 μH
	IIB	607 μH
L_o/R_o	IIC	17,06 $\mu\text{H}/\Omega\text{hm}$
	IIB	68,2 $\mu\text{H}/\Omega\text{hm}$

4-wire IS cable
Maximum cable length determined by entity parameters and maximum cable inductance.

This unit is provided with an internal and external terminal for supplementary bonding connection. This terminal is for use where local codes or authorities permit or require such connection.

	9	10
85-265 VAC	L/L2	N/L1
18-30VDC	+	-

Installation notes:

Associated apparatus parameter limits	
$V_{oc} < = V_{max}$	
$I_{sc} < = I_{max}$	
$(V_{oc} \times I_{sc}) / 4 < = P_{max}$	
$*C_o > = C_{cable} + C_{i1} + C_{i2} + \dots + C_{in}$	
$*L_o > = L_{cable} + L_{i1} + L_{i2} + \dots + L_{in}$	

- * The total C_i is equal to the sum of all C_i values of all devices on the network. C_{cable} is the total capacitance of all cable on the network.
- * The total L_i is equal to the sum of all L_i values of all devices on the network. L_{cable} is the total inductance of all cable on the network.

If the electrical parameters of the cable are unknown, then the following values may be used:
 Cable Capacitance = 197 pF/m
 Cable Inductance = 0,66 $\mu\text{H}/\text{m}$

This device must not be connected to any associated apparatus which uses or generates more than 250Vrms with respect to earth ground.

Micro Motion mass flowmeter system connection for intrinsically safe operation.

Reference no. EB-20003017 Rev. AA

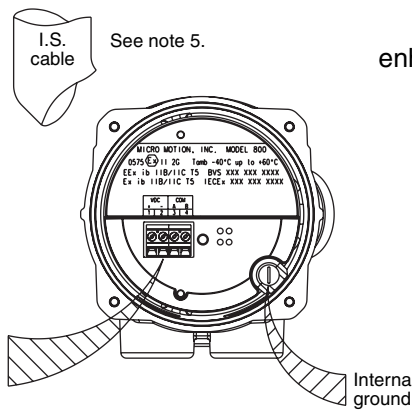
Figure 2: Sensor with enhanced core processor

COMBINE THIS DRAWING WITH FIGURE 1

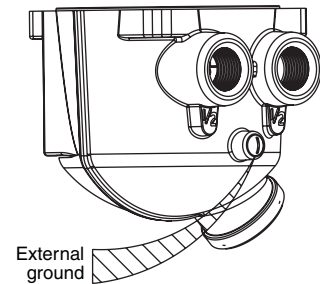
Hazardous Area
Ex ib IIC / IIB

Refer to sensor tag for complete hazardous area classification.

4-wire I.S. and non-incendive core processor entity parameters	
U _i	17,3 Vdc
I _i	484 mA
P _i	2,1W
C _i	2200pF
L _i	30μH



Sensor mounted enhanced core processor



5. Maximum cable length determined by entity parameters and maximum cable inductance.

Reference no. EB-20003017 Rev. AA

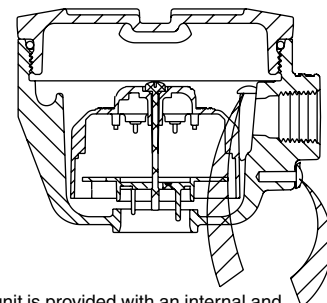
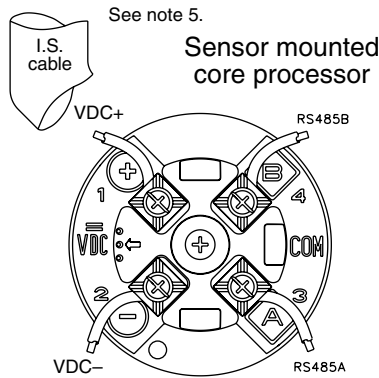
Figure 3: CMF, D (except D600), DL, F, H, R, CNG and T sensors with core processor

COMBINE THIS DRAWING WITH FIGURE 1

Hazardous Area
Ex ib IIC / IIB

Refer to sensor tag for complete hazardous area classification.

4-wire I.S. and non-incendive core processor entity parameters	
U _i	17,3 Vdc
I _i	484 mA
P _i	2,1W
C _i	2200pF
L _i	30μH



This unit is provided with an internal and external terminal for supplementary bonding connection. This terminal is for use where local codes or authorities permit or require such connection.

5. Maximum cable length determined by entity parameters and maximum cable inductance.

Reference no. EB-20000225 Rev. CA

Figure 4: D600 with core processor

COMBINE THIS DRAWING WITH FIGURE 1

Hazardous Area
Ex de [ib] IIB T4

Refer to sensor and booster amplifier tags for complete hazardous area classification.

4-wire I.S. and non-incendive core processor entity parameters	
U _i	17,3 Vdc
I _i	484 mA
P _i	2,1W
C _i	2200pF
L _i	30μH

Installation method	Fitting required	Per EN60079-14
Conduit	Ex d IIB Conduit Seal	
Cable	Ex d IIB Cable Gland	
Conduit or Cable Increased Safety	Ex e	

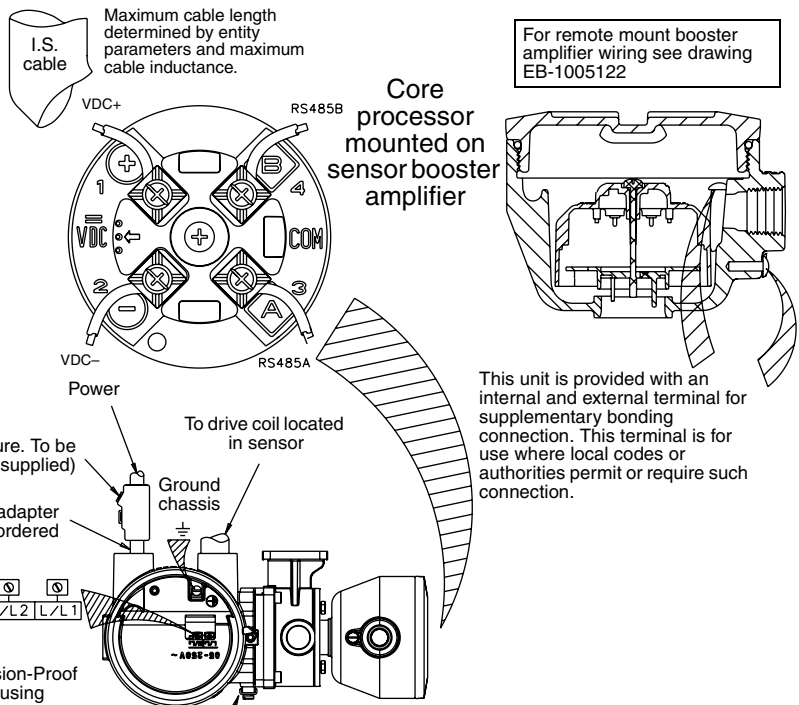
Conduit Seal Required within 18" of enclosure. To be sealed after wiring. (customer supplied)

1/2"-14 NPT or M20 x 1,5 adapter supplied as ordered

85-265 VAC N/L2 L/L1
50-60 HZ

Explosion-Proof housing

To achieve potential equalization the ground terminal must be connected to the appropriate ground terminal within the hazardous area using a potential equalizing line.



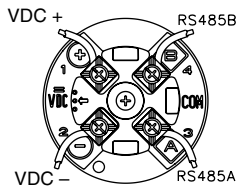
Reference no. EB-20000222 Rev. CA

Figure 5: Remote core processor with remote transmitter

COMBINE THIS DRAWING WITH FIGURE 1 AND ALSO WITH ONE OF FIGURE 7, 8, OR 9

Maximum cable length determined by entity parameters and maximum cable inductance.

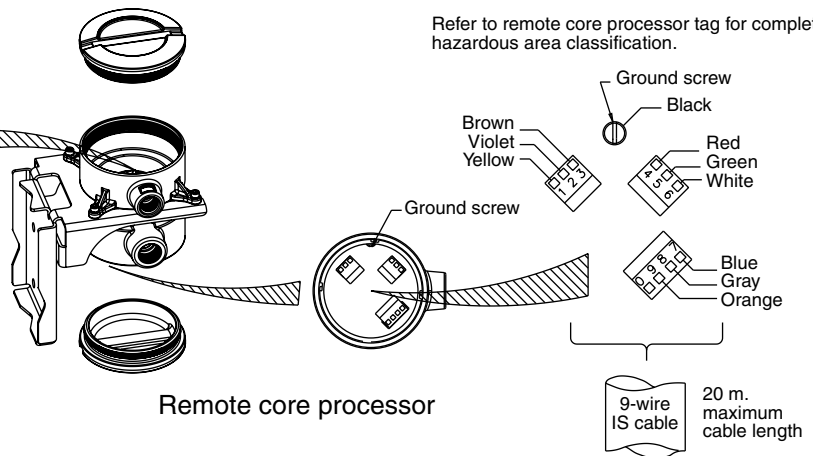
4-wire IS cable



4-wire and non-incendive core processor entity parameters	
U _i	17,3 Vdc
I _i	484 mA
P _i	2,1W
C _i	2200pF
L _i	30μH

Hazardous Area Ex ib IIB / IIC

Refer to remote core processor tag for complete hazardous area classification.



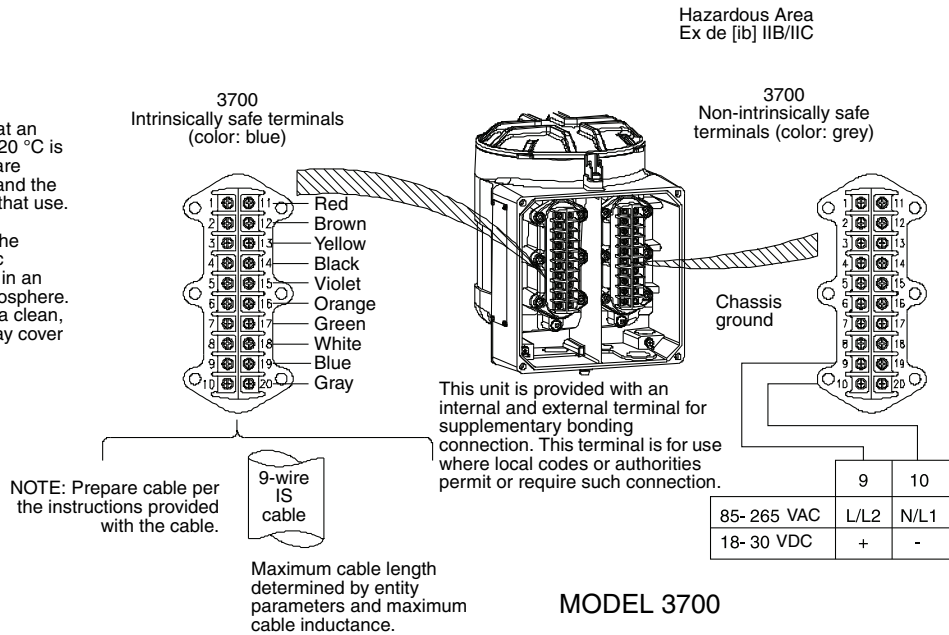
Reference no. EB-20001043 Rev. DA

Figure 6: Model 3700 transmitter to remote junction box

COMBINE THIS DRAWING WITH ONE OF FIGURE 7, 8, OR 9

Conditions for safe use:

1. The use of the transmitter at an ambient temperature under -20°C is only admissible if the cables are suitable for that temperature and the cable entries are certified for that use.
2. Using a dry cloth to clean the display cover can cause static discharge, which could result in an explosion in an explosive atmosphere. To prevent an explosion, use a clean, damp cloth to clean the display cover in an explosive atmosphere.



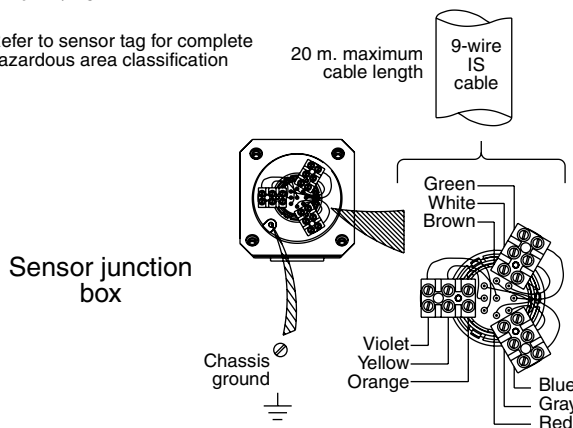
Reference no. EB-20001045 Rev. EA

Figure 7: CMF, D (except D600), DL, F, H, and T sensor with junction box

COMBINE THIS DRAWING WITH FIGURE 5 OR 6

Hazardous Area
Ex ib IIB / IIC

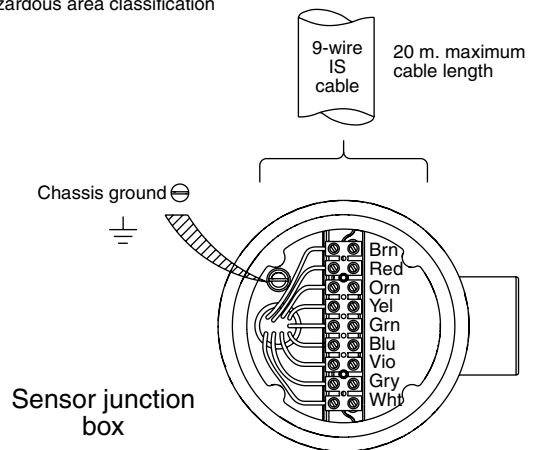
Refer to sensor tag for complete hazardous area classification



Model			
CMF	T	F	H
Supplied as intrinsically safe			

Hazardous Area
Ex ib IIB / IIC

Refer to sensor tag for complete hazardous area classification



Model
D, DL (EXCEPT D600)
Supplied as intrinsically safe

Reference no. EB-20001045 Rev. EA

Figure 8: D600 with junction box

COMBINE THIS DRAWING WITH FIGURE 5 OR 6

Hazardous Area
Exde [ib] IIB

For remote mount booster amplifier wiring refer to EB-3007062.

CAUTION:
To maintain intrinsic safety, the intrinsically safe wiring must be installed according to EN 60079-14. Transmitter and sensor must be properly grounded.

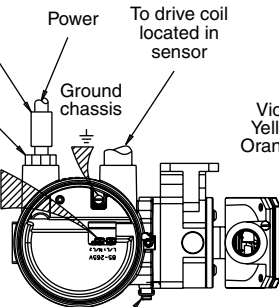
Installation method	Fitting required	Per EN60079-14
Conduit	Ex d IIB conduit seal	
Cable	Ex d IIB cable gland	
Conduit or cable increased safety	Ex e	

Cable O.D. must be suitably sized to gland.

Conduit seal required within 18" of enclosure. To be sealed after wiring (customer supplied).

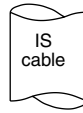
1/2"-14 NPT or M20 x 1.5 adapter supplied as ordered

85-265 VAC | N/L2 | L/L1
50-60 HZ



To achieve potential equalization the ground terminal must be connected to the appropriate ground terminal within the hazardous area using a potential equalizing line.

20 m maximum cable length



Intrinsically safe terminals

Micro Motion mass flowmeter system connection for intrinsically safe operation

Reference no. EB-20000272 Rev. BA

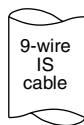
Figure 9: DT with junction box

COMBINE THIS DRAWING WITH FIGURE 5 OR 6

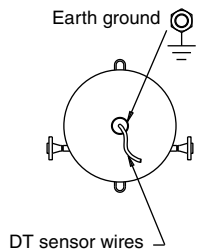
Hazardous Area
Ex ib IIB

Special conditions for safe use:
For the sensor types DT065, DT100, and DT150 the following applies: The minimum medium temperature is +32 °C.

20 m maximum cable length



DT sensor wires must be connected to IS cable using customer supplied terminal block and junction box.



DT sensor wire terminations to IS cable	
DT sensor wire #	IS cable color
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Violet
8	Gray
9	White

Micro Motion mass flowmeter system connection for intrinsically safe operation

Models: DT65, DT100, DT150

Reference no. EB-20000275 Rev. BA

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