

Installation Instructions

P/N MMI-20011706, Rev. A

July 2008

ATEX Installation Instructions for Micro Motion[®] Model 1500 and 2500 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.

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Model 1500/2500 Transmitters

ATEX Installation Instructions and Drawings

- For installing the following Micro Motion transmitters:
 - Model 1500/2500 with a 4-wire connection to a core processor
 - Model 1500/2500 with a remote core processor and remote sensor with a junction box



Subject: Equipment type

Manufactured and submitted
for examination

Address

Standard basis

Code for type of protection

Transmitter type *500*****

Micro Motion, Inc.

Boulder, Co. 80301, USA

EN 50014:1997 +A1-A2

EN 50020:2002

II (2) G [EEx ib] IIB/IIC

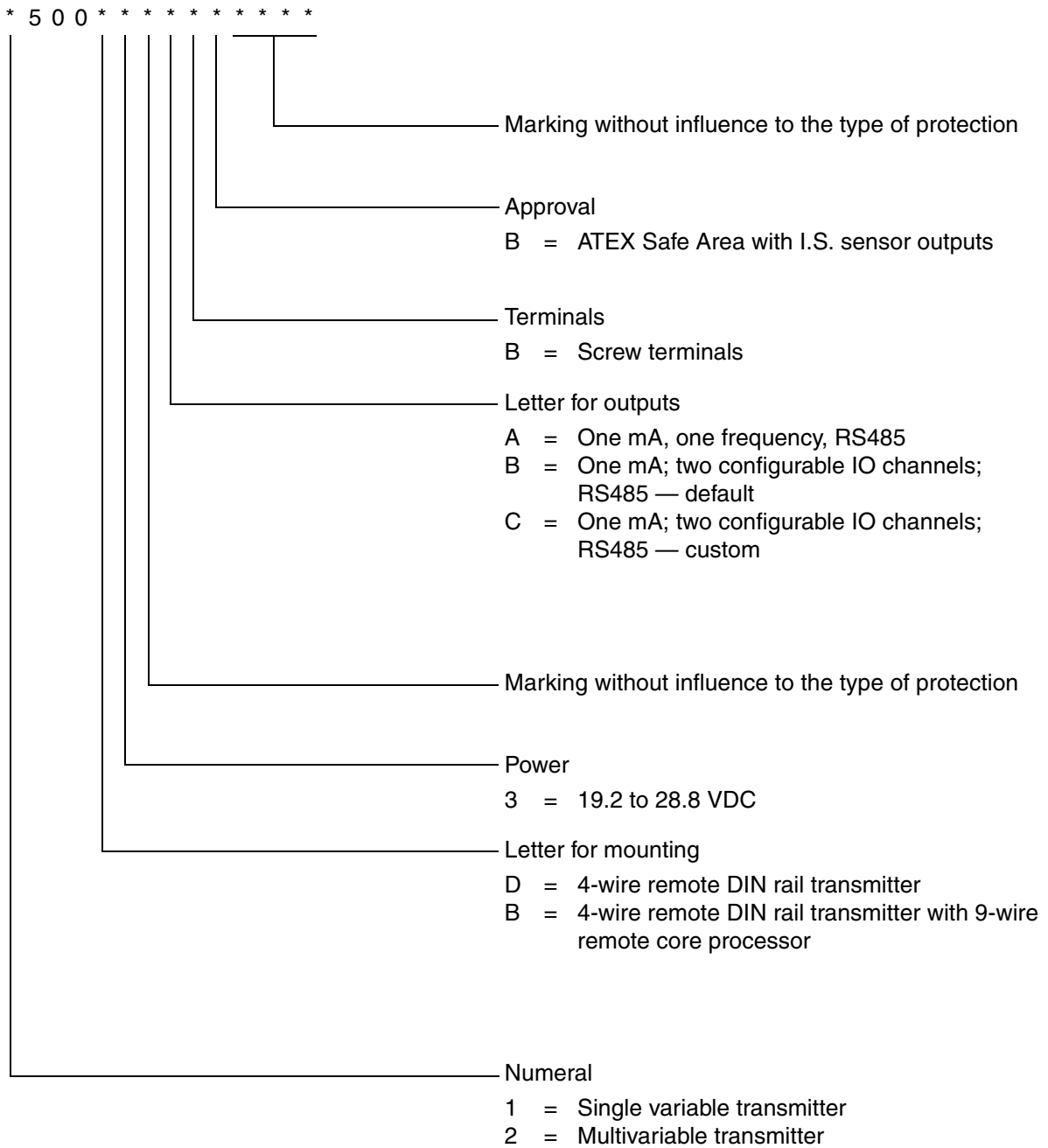
General requirements

Intrinsic safety 'i'

1) **Subject and type**

Transmitter type *500*****

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 measurement of mass flow and data transmission.

The electrical circuitry of the transmitters is mounted inside a plastic DIN rail enclosure.

Four terminals (terminals 1–4) provide an intrinsically safe barrier to the Micro Motion Core Processor. The remaining terminals are non-intrinsically safe inputs/outputs and input power. The intrinsically safe terminals are physically located on the opposite side of the DIN rail housing from the remaining terminals.

3) Parameters

3.1) Input Power (terminals 11–14)

Voltage		DC	24 V ± 20%	
Max voltage	Um	DC	28,8	V

3.2) Non intrinsically safe input/output circuits (terminals 21–24, 31–34)

Voltage	Um	DC	30	V
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3.3) Ambient temperature range

Models *500*****	Ta	–40 °C up to +55 °C
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3.4) Intrinsically safe power and signal circuits for type *500***** B **** (terminals 1–4)

Voltage	Uo (Vdc)	17,22
Current	Io (A)	0,484
Limited by a fuse with a nominal value of	In (A)	0,16
Power	Po (W)	2,05
Type of protection		
Max. external inductance	Lo (μH)	151
Max. external capacitance	Co (nF)	333
Max. inductance/resistance ratio	Lo/Ro (μH/Ω)	17,06
		EEx ib IIC
		EEx ib IIB
		607
		2,04
		68,2

To allow longer cable lengths than specified in EN60079-14:1999 section 12.2.5.1 the following formula can be used:

$$a_{\text{cable+coil}} = L_{\text{barrier-max}} \cdot R_{\text{cable}}^2$$

$$b_{\text{cable+coil}} = 2R_{\text{cable}} \cdot (R_{\text{barrier}} + R_{\text{coil}}) \cdot L_{\text{barrier}} - L_{\text{cable}} \cdot R_{\text{barrier}}^2$$

$$c_{\text{cable+coil}} = L_{\text{barrier-max}} \cdot (R_{\text{barrier}} + R_{\text{coil}})^2 - L_{\text{coil}} \cdot R_{\text{barrier}}^2$$

$$x_{\text{max-cable+coil}} = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

Where:

$L_{\text{barrier-max}} = 151\mu\text{H}$ (IIC) or $607\mu\text{H}$ (IIB)

$R_{\text{barrier}} = 35,6 \Omega$

L_{cable} = maximum cable inductance; see cable specification

R_{cable} = maximum cable loop resistance; see cable specification

L_{coil} = field apparatus internal inductance; see field apparatus certificate

R_{coil} = field apparatus internal resistance; see field apparatus certificate

$x_{\text{max-cable+coil}}$ = maximum cable length

4) Marking

 II (2) G [EEx ib] IIB/IIC

$-40 \text{ }^\circ\text{C} \leq T_a \leq +55 \text{ }^\circ\text{C}$

- type	- type of protection
*500****B****	II (2) G [EEx ib] IIB/IIC

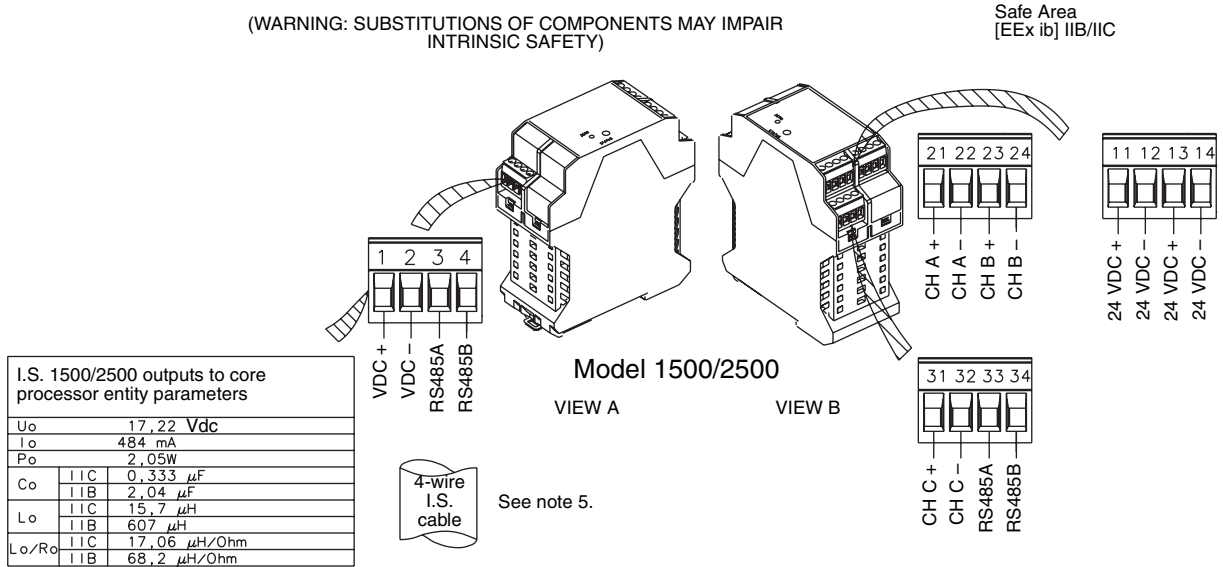
5) Special conditions for safe use / Installation instructions

- 5.1) When multiple Model 1500/2500 transmitters are stacked on a single DIN rail and the ambient temperature is above $45 \text{ }^\circ\text{C}$, the units need to be spaced at least 10 mm apart.

Model 1500/2500 installation drawings

Figure 1: Model 1500/2500 transmitter to remote core processor

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



Installation notes:

Associated apparatus parameter limits	
V _{oc}	<= V _{max}
I _{sc}	<= I _{max}
(V _{oc} x I _{sc}) / 4 <= P _{max}	
*C _o	>= C _{cable} + C _{i1} + C _{i2} + ... + C _{in}
*L _o	>= L _{cable} + L _{i1} + L _{i2} + ... + L _{in}

1. 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.
2. 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.
3. If the electrical parameters of the cable are unknown, then the following values may be used:
 Cable Capacitance = 197pF/m
 Cable Inductance = 0,66μH/m
4. This device must not be connected to any associated apparatus which uses or generates more than 250Vrms with respect to earth ground.
5. Maximum cable length determined by entity parameters and maximum cable inductance
6. When multiple 1500/2500 units are stacked on a single DIN rail and the ambient temperature is above 45 °C, the units need to be spaced at least 10 mm apart.

Reference no. EB-20003014 Rev. A

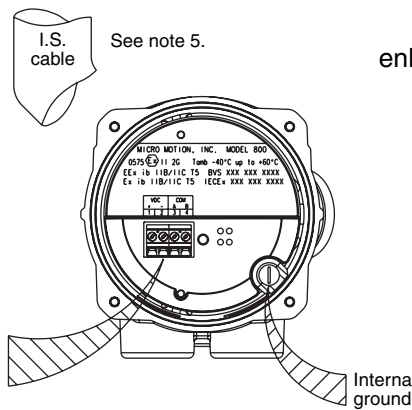
Figure 2: CMF sensor with enhanced core processor

Combine this drawing with Figure 1

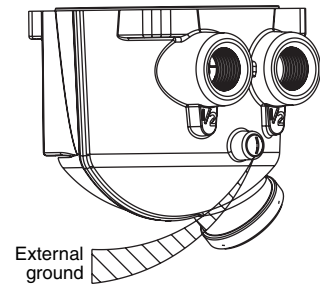
Hazardous Area
Ex ib IIC / IIB

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-20003015 Rev. A

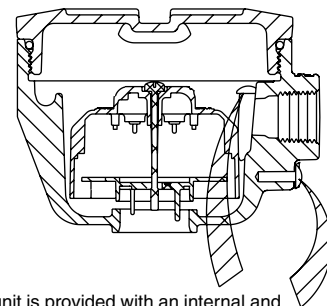
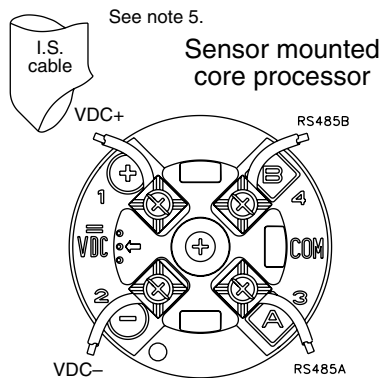
Figure 3: CMF, D (except D600), DL, F, H, R, CNG and T sensors with core processor

Combine this drawing with Figure 1

Hazardous Area
EEx 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-3600583 Rev. F

Figure 4: D600 with core processor

COMBINE THIS DRAWING WITH FIGURE 1

Hazardous Area
EEx 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	EEx d IIB Conduit Seal	
Cable	EEx d IIB Cable Gland	
Conduit or Cable Increased Safety	EEx e	

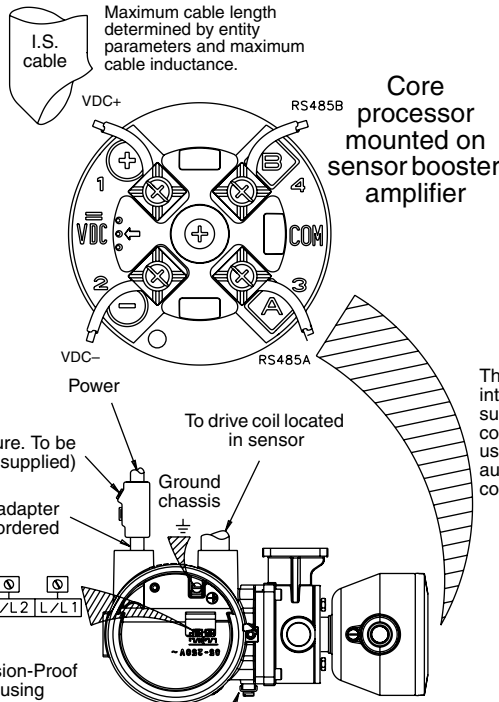
Conduit Seal Required within 18" of enclosure. To be sealed after wiring. (customer supplied)

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

85-265 VAC N/L 2 L/L 1
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.



For remote mount booster amplifier wiring see drawing EB-1005122

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.

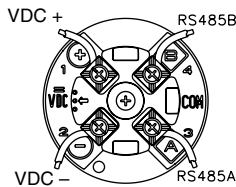
Reference no. EB-1005121 Rev. C

Figure 5: Remote core processor with remote transmitter

Combine this drawing with Figure 1 and also with one of figure 6, 7, or 8

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

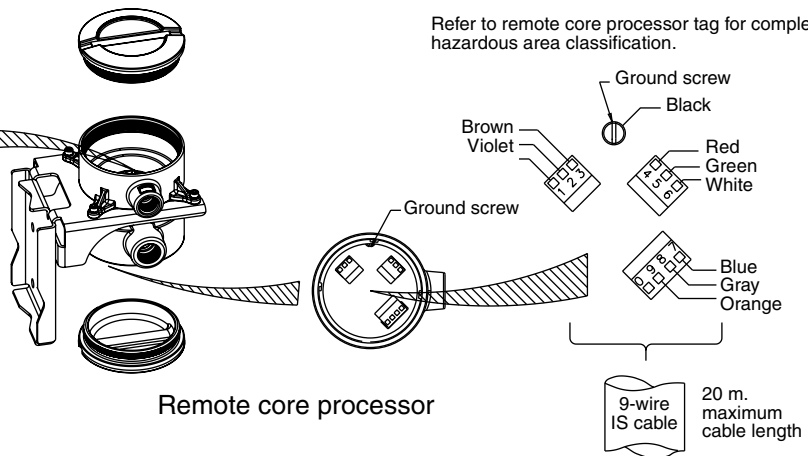
4-wire IS cable



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 EEx ib IIB / IIC

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



Reference no. EB-20001040 Rev. C

Figure 6: CMF, D (except D600), DL, F, H, and T sensor with junction box

Combine this drawing with figure 5

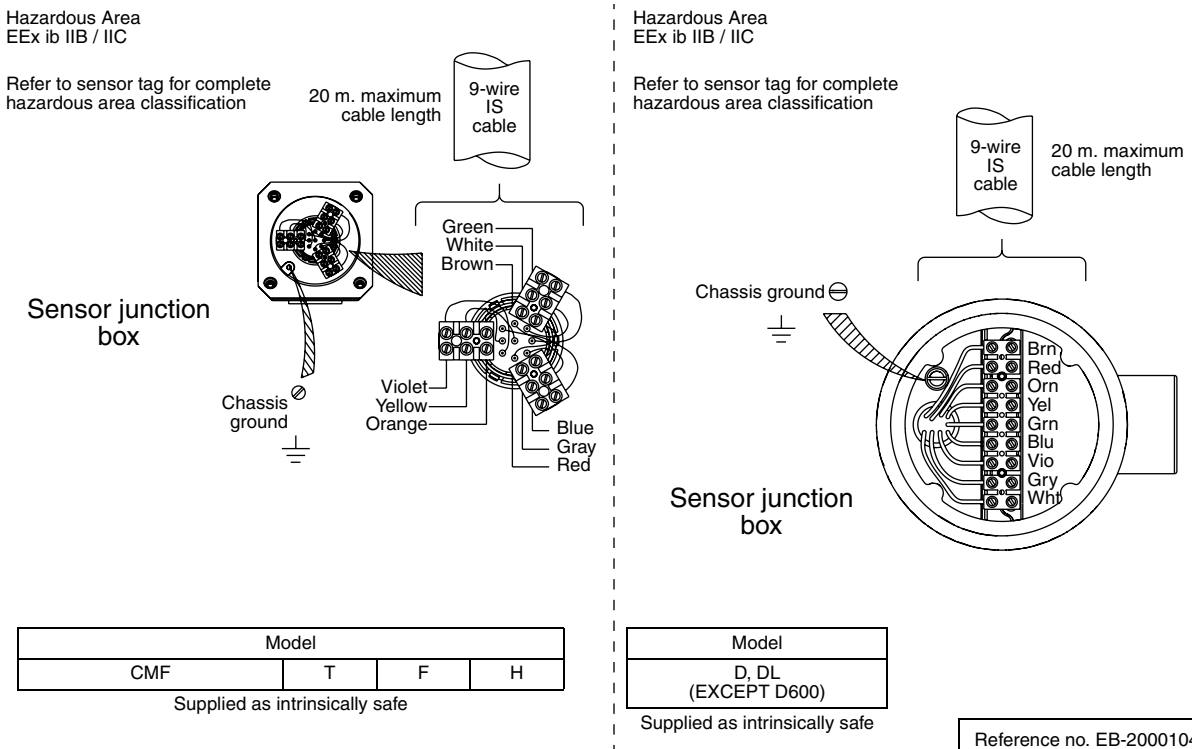


Figure 7: D600 with junction box

Combine this drawing with figure 5

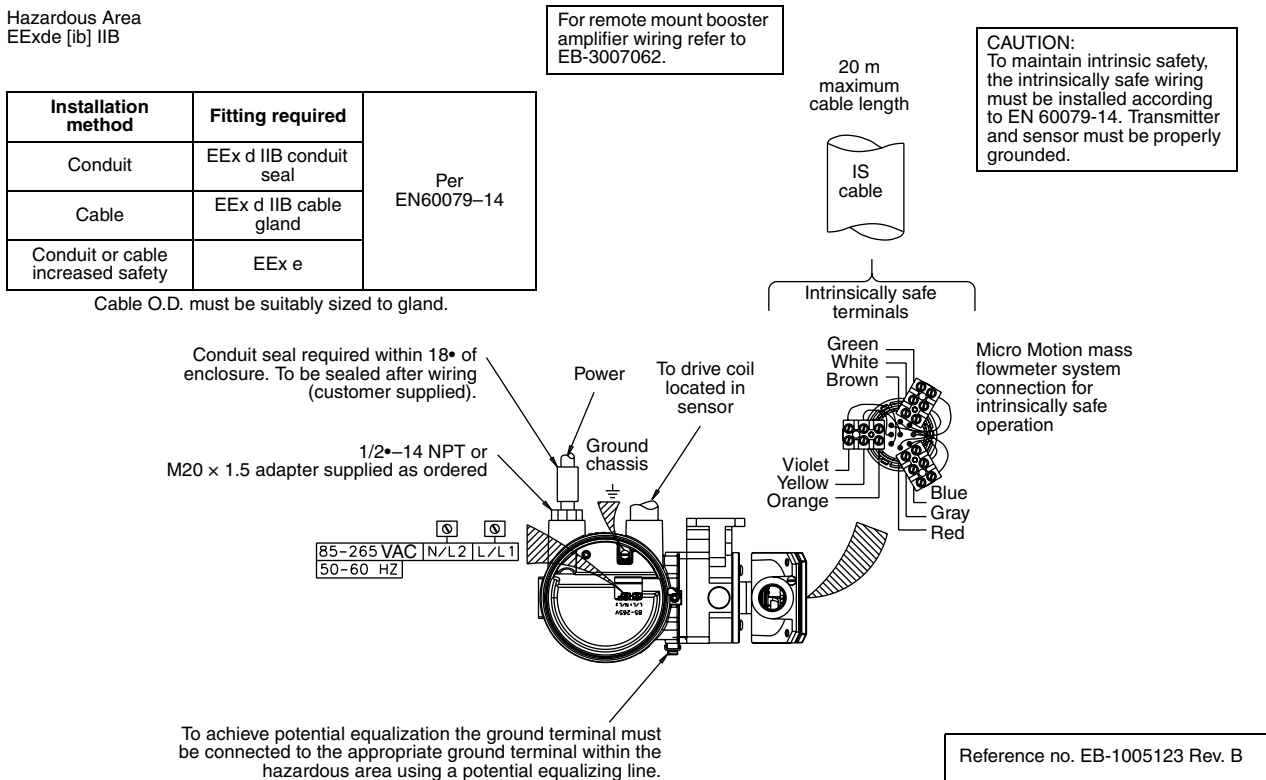
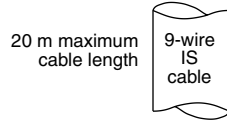


Figure 8: DT with junction box

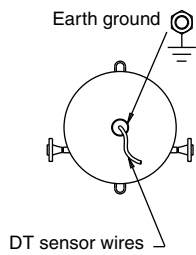
Combine this drawing with figure 5

Hazardous Area
EEx 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.



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

Models: DT65, DT100, DT150

Micro Motion mass flowmeter system connection for intrinsically safe operation

Reference no. EB-20000081 Rev. B

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Micro Motion Inc. USA
Worldwide Headquarters
7070 Winchester Circle
Boulder, Colorado 80301
T +1 303-527-5200
+1 800-522-6277
F +1 303-530-8459

Micro Motion Europe
Emerson Process Management
Neonstraat 1
6718 WX Ede
The Netherlands
T +31 (0) 318 495 555
F +31 (0) 318 495 556

Micro Motion United Kingdom
Emerson Process Management Limited
Horsfield Way
Bredbury Industrial Estate
Stockport SK6 2SU U.K.
T +44 0870 240 1978
F +44 0800 966 181

Micro Motion Asia
Emerson Process Management
1 Pandan Crescent
Singapore 128461
Republic of Singapore
T +65 6777-8211
F +65 6770-8003

Micro Motion Japan
Emerson Process Management
1-2-5, Higashi Shinagawa
Shinagawa-ku
Tokyo 140-0002 Japan
T +81 3 5769-6803
F +81 3 5769-6844

