Installation Instructions
P/N MMI-20010137, Rev. A
June 2007

ATEX Installation Instructions for Micro Motion® D and DL Sensors

For ATEX-approved sensor installations

Micro Motion®

EMERSON™
Process Management

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.

D and DL Sensors

ATEX Installation Instructions

- For installing the following Micro Motion sensors:
  - Models D150 and D300
  - Models DH25, DH38, DH100, DH150, and DH300
  - Models DT65, DT100, and DT150
  - Models DL65, DL100, and DL200

Subject:	Equipment type	**Sensor type D* *** * ****B**	
Manufactured and submitted for examination		**Micro Motion, Inc.**	
Address		**Boulder, Co. 80301, USA**	
Basis for examination:		**Annex II of Directive 94/9/EC**	
Standard basis		EN 50014:1997 +A1-A2	General requirements
		EN 50020:1994	Intrinsic safety ´i´
		EN 50281-1-1:1998	Dust Evaluation ´D´
Code for type of protection		**EEx ib IIB/IIC T1–T6**	

1) Subject and type

Sensor type D* *** * ****B

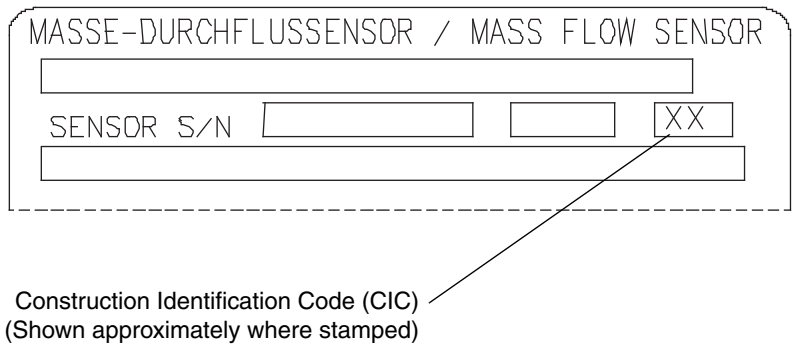
Instead of the *** letters and numerals will be inserted which characterize the following modifications:

2) Description

The flow sensor in combination with a transmitter is used for flow measurement. The flow sensor consists of magnetically excited oscillating tubes. The sensor electrical components are coils, resistors, temperature sensors, terminals and connectors.

The sensor may also be used for measurement of flammable substances, providing that the substances do not form an explosive atmosphere either permanently or frequently. If flammable substances are being measured, the sensor must be included in the recurrent pressure test.

Amendment No. 1 to the ATEX certificate DMT 02 ATEX E 156 X reflects the revised Drive Coil parameters for D*100, DL100, and D*150 for compatibility with other certified ATEX transmitters. Sensors constructed using these revised coil parameters will be identified with a Construction Identification Code (C.I.C.) of A1.



3) Parameters

3.1) Type D* *** * ****B

3.1.1) Drive circuit

Parameters for terminals 1 and 2 (red and brown wires)

	Remote Model 1700/2700 transmitter with core processor Model 700	Other Micro Motion certified transmitters
Voltage	Up to 10,5 VDC	Up to 11,4 VDC
Rated current of barrier fuse	160 mA	250 mA
Current Ii	2,45 A	1,14 A
Pi	2,54 W	1,2 W
Effective barrier capacitance	Negligible	Negligible
Effective barrier circuit resistance	4,32 ohms	10 ohms

Sensor type	Inductivity [mH]	Coil resistance @ –20 °C [Ohms]	Series resistance @ –20 °C [Ohms]
D*025	6,9	106,2	946,6
DH038	6,9	106,2	946,6
D*065	0,2	3,16	482,6
DL050X	0,2	3,16	189,3
DL065	0,2	3,16	482,6
D*100	32,8	108,7	59,3
DL100	32,8	108,7	59,3
D*150	32,8	108,7	59,3
DL200	3	35,8	9,5
D*300	3	35,8	9,5

Sensor type	Inductivity [mH]	Coil resistance @ +32 °C [Ohms]	Series resistance @ +32 °C [Ohms]
DT065	3	44	0
DT100	3	44	0
DT150	3	44	0

3.1.2) Pick-off circuit (terminals 5,9 and 6,8; green/white and blue/grey wires)

Voltage	Uo	DC	17,3	V
Current	Io		6,9	mA
Power	Po		30	mW
Capacitance	Co		Negligible	

Sensor type	Inductivity [mH]	Coil resistance @ –20 °C [Ohms]
D*025	6,9	106,2
DH038	6,9	106,2
D*065	0,2	3,16
DL050X	0,2	3,16
DL065	0,2	3,16
D*100	6,18	113,8
DL100	6,18	113,8
D*150	6,18	113,8
DL200	6,18	113,8
D*300	6,18	113,8

Sensor type	Inductivity [mH]	Coil resistance @ +32 °C [Ohms]
DT065	1,2	15,7
DT100	1,2	15,7
DT150	1,2	15,7

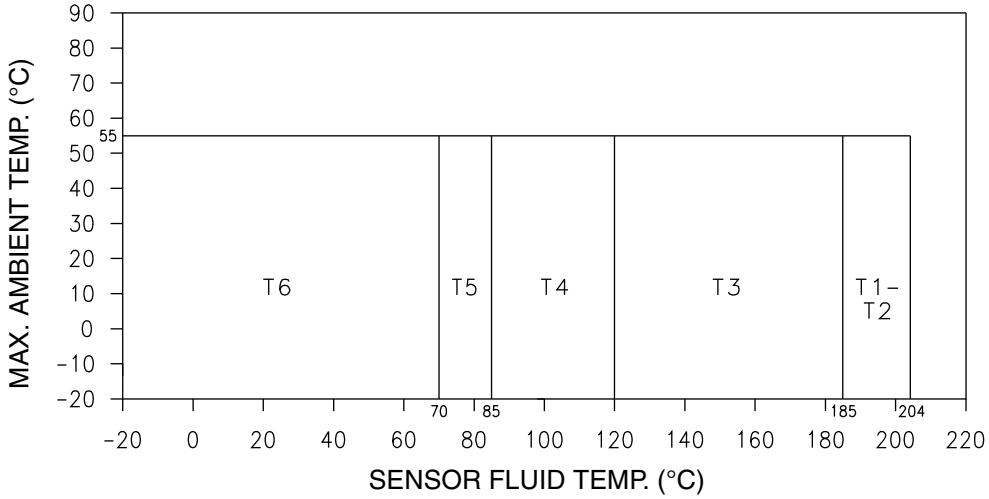
3.1.3) Temperature circuit (terminals 3, 4 and 7; orange, yellow and violet wires)

Voltage	Uo	DC	17,3	V
Current	Io		26	mA
Power	Po		112	mW
Capacitance	Co		Negligible	
Inductance	Lo		Negligible	

3.1.4) Temperature class

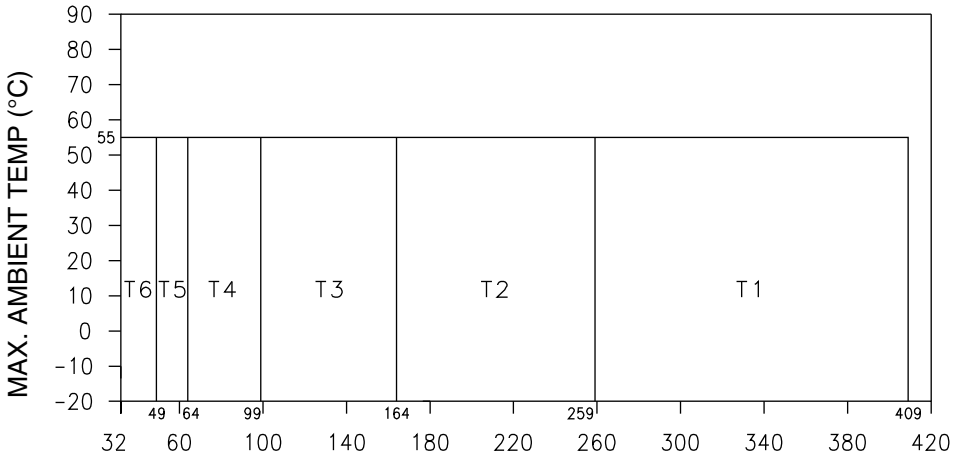
The classification into a temperature class depends on the temperature of the medium taking into account the maximum operating temperature of the sensor and is shown in the following graphs:

ATEX ALLOWABLE D100, D150 SENSOR TEMPERATURE RATING WITH INTEGRAL J-BOX BASED ON AMBIENT/FLUID TEMPERATURE



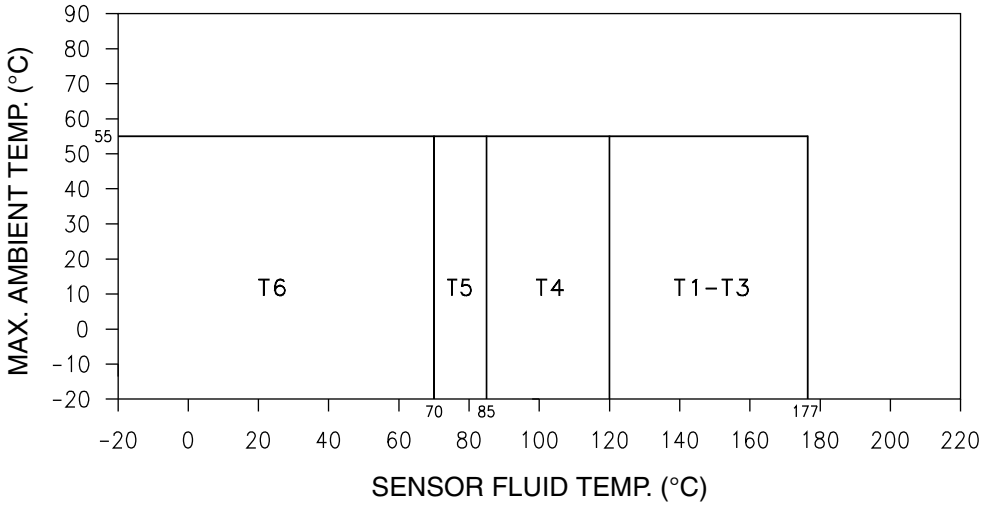
Note 1. Use the above graph to determine the temperature class for a given fluid and ambient temperature. The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 130°C, T3:T 195°C, T2 to T1:T 214°C.

ATEX ALLOWABLE DT SENSOR TEMPERATURE RATING WITH INTEGRAL J-BOX BASED ON AMBIENT/FLUID TEMPERATURE



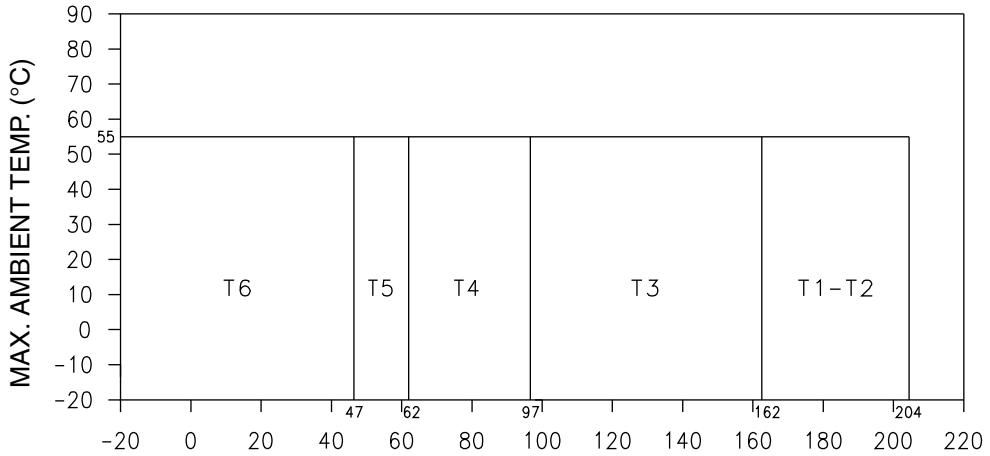
Note 1. Use the above graph to determine the temperature class for a given fluid and ambient temperature. The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 130°C, T3:T 195°C, T2:T 295°C, T1:T 440°C.

ATEX ALLOWABLE D25, D38, D65, DL25, DL50, DL65, DL100 SENSOR TEMPERATURE RATING WITH INTEGRAL J-BOX BASED ON AMBIENT/FLUID TEMPERATURE



Note 1. Use the above graph to determine the temperature class for a given fluid and ambient temperature. The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 130°C, T3 to T1:T 187°C.

ATEX ALLOWABLE D300, DL200 SENSOR TEMPERATURE RATING WITH INTEGRAL J-BOX BASED ON AMBIENT/FLUID TEMPERATURE



Note 1. Use the above graph to determine the temperature class for a given fluid and ambient temperature. The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 130°C, T3:T 195°C, T2 to T1:T 237°C.

3.1.5) Ambient temperature range

D* *** * ****B Ta –20 °C up to +55 °C

The use of the sensor at an ambient temperature higher than +55 °C is possible, provided that the ambient temperature does not exceed the maximum temperature of the medium taking into account the temperature classification and the maximum operating temperature of the sensor. Minimum medium temperature is –20 °C.

The ambient temperature of the sensor may be less than –20 °C provided the temperature of the medium is not less than 0 °C.

4) Marking

–20 °C ≤ Ta ≤ +55 °C

- type	- type of protection
D*025* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIC T1–T6 II 2 D IP65 T[1] °C
DH038* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIC T1–T6 II 2 D IP65 T[1] °C
D*065* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIC T1–T6 II 2 D IP65 T[1] °C
DL050X* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIC T1–T6 II 2 D IP65 T[1] °C
DL065* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIC T1–T6 II 2 D IP65 T[1] °C
D*100* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIB T1–T6 II 2 D IP65 T[1] °C
DL100* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIB T1–T6 II 2 D IP65 T[1] °C
D*150* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIB T1–T6 II 2 D IP65 T[1] °C
DL200* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIB T1–T6 II 2 D IP65 T[1] °C
D*300* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIB T1–T6 II 2 D IP65 T[1] °C
DT065* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIB T1–T6 II 2 D IP65 T[1] °C
DT100* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIB T1–T6 II 2 D IP65 T[1] °C
DT150* **** B	CE 0575 ⟨Ex⟩ II 2 G EEx ib IIB T1–T6 II 2 D IP65 T[1] °C

(1) For dust temperature rating, see temperature graphs.

5) Special conditions for safe use / Installation instructions

5.1) For the sensor types DT065, DT100 and DT150 the following applies: the minimum process fluid temperature is +32 °C.

5.2) When the application requires that IIB certified sensors are to be used in IIC hazardous area's, these sensors can be modified by adding an infallible series resistor in the drive coil circuitry done by the manufacturer or his representative. In this case, the modified sensor can be marked with IIC and must be marked with an identification code (so-called CEQ number). Furthermore the manufacturer or his representative must issue a Manufacturing Declaration which shows how the calcutions have been done, what resistor value is to be added and what the identification code is.

5.3) The above is also applicable when IIB or IIC certified sensors are going to be used at lower fluid temperatures than indicated in the EC Type Examination Certificate.

5.4) A combination of points 5.2 and 5.3 is also allowed.

Model D600 Sensors

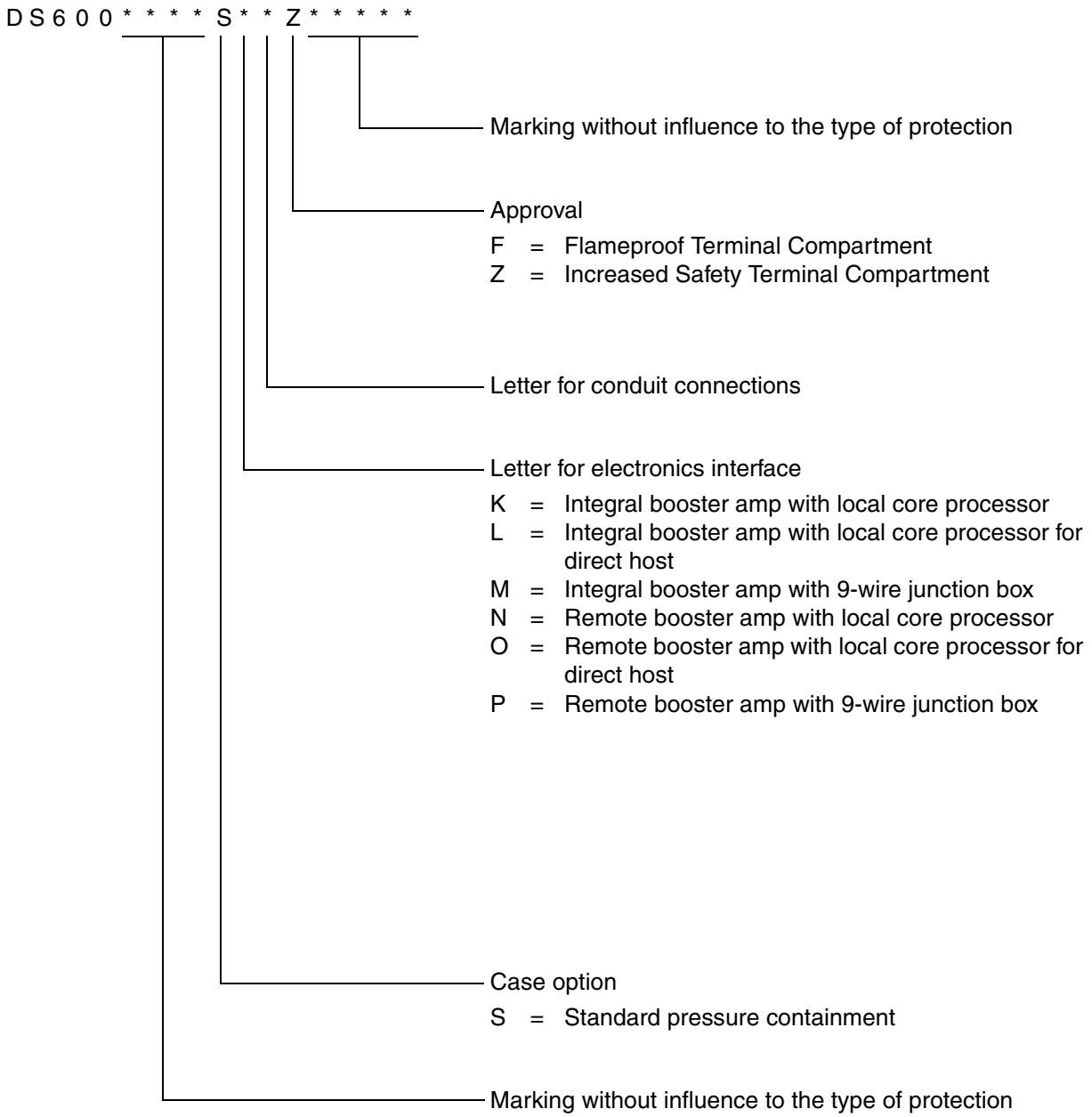
ATEX Installation Instructions

Subject:	Equipment type	**Sensor type DS600* ***S**(Z or F)*******	
Manufactured and submitted for examination		**Micro Motion, Inc.**	
Address		**Boulder, Co. 80301, USA**	
Basis for examination:		**Annex II of Directive 94/9/EC**	
Standard basis		EN 50014:1997 +A1-A2: 1999	General requirements
		EN 50018:2000 +A1: 2002	Flameproof enclosure ´d´
		EN 50019:2000	Increased safety ´e´
		EN 50020:2002	Intrinsic safety ´i´
		EN 50281-1-1:1998 +A1: 2002	Dust ´D´
Code for type of protection		**EEx de [ib] IIB T4–T6**	
		EEx de [ib] IIB T3–T6	

1) Subject and type

Sensor type DS600* ******(F or Z)*****

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



2) Description

The flow sensor DS600 in conjunction with a Micro Motion Transmitter is used for flow measurement. The flow sensor, which consists of magnetically exited oscillating tubes, contains as electrical components coils, temperature sensor, terminals, connectors and a Booster Amplifier.

The Booster Amplifier used with the Mass Flow Sensor Model D600 is certified as a component under KEMA 01 ATEX 2184 U. The Booster Amplifier may be used either integrally or remotely mounted in relation to the sensor body, depending upon the maximum fluid temperature. The Booster Amplifier is able to accept Micro Motion's 9-Wire J-Box or Core Processor (Model 700) (certified as EEx ib IIB/IIC T5 under DMT 01 ATEX E 081 U) inputs.

The terminal compartment of the Booster Amplifier may be Certified as either a flame proof (EEx d) enclosure or an increased safety (EEx e) enclosure.

The Booster Amplifier additionally incorporates an intrinsically safe Junction Housing for termination and connection of the separately certified intrinsically safe transmitter and sensor wiring.

The drive coils are classified as EEx e. The pick-off coils and temperature sensor are standard designed and classified as EEx i.

By mounting the Core Processor (Model 700) directly to the Booster Amplifier the use of the unit will be modified according to the following table:

Sensor	DS600* ***S(N, O or P)*(F or Z)*****	DS600* ***S(K, L or M)*(F or Z)*****
	CE 0575 ⟨Ex⟩ II 2 G EEx de [ib] IIB T3–T6 II 2 D IP65 T[1] °C	CE 0575 ⟨Ex⟩ II 2 G EEx de [ib] IIB T4–T6 II 2 D IP65 T[1] °C

(1) For dust temperature ratings, see temperature graphs.

3) Parameters

3.1) Electrical parameters: see Booster Amplifier Section.

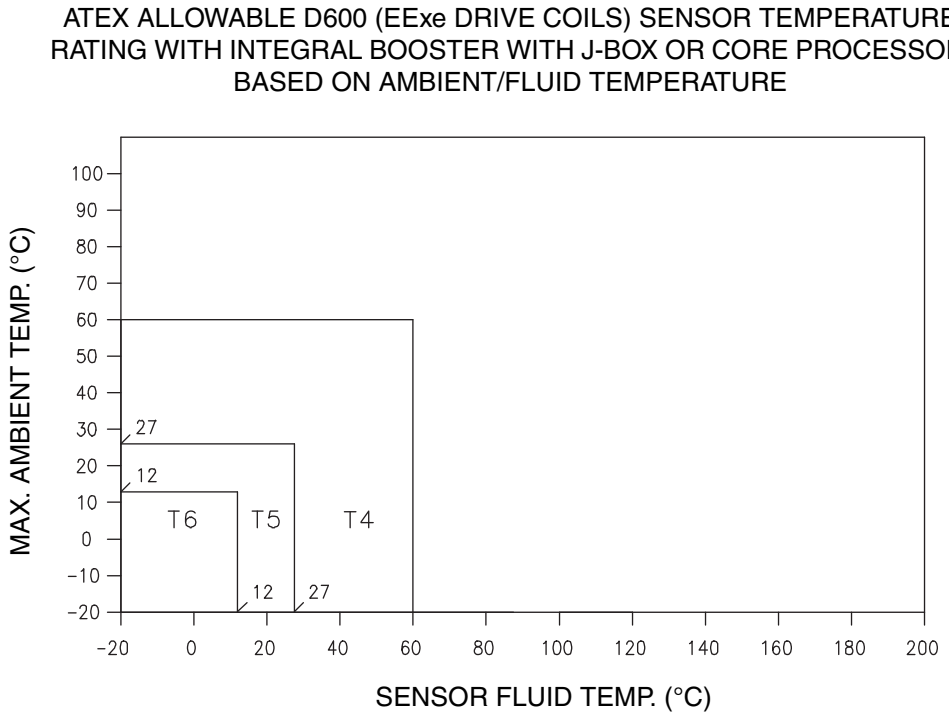
3.2) Type DS600* ***S(K, L or M)*(F or Z)*****
(Integral booster amplifier provided with 9-wire junction box or 4-wire core processor)

3.2.1) Ambient temperature range

DS600* ***S(K, L or M)*(F or Z)***** Ta –20 °C up to +60 °C

3.2.2) Temperature class

The classification into a temperature class depends on the temperature of the medium taking into account the maximum operating temperature of the sensor and is shown in the following graph:

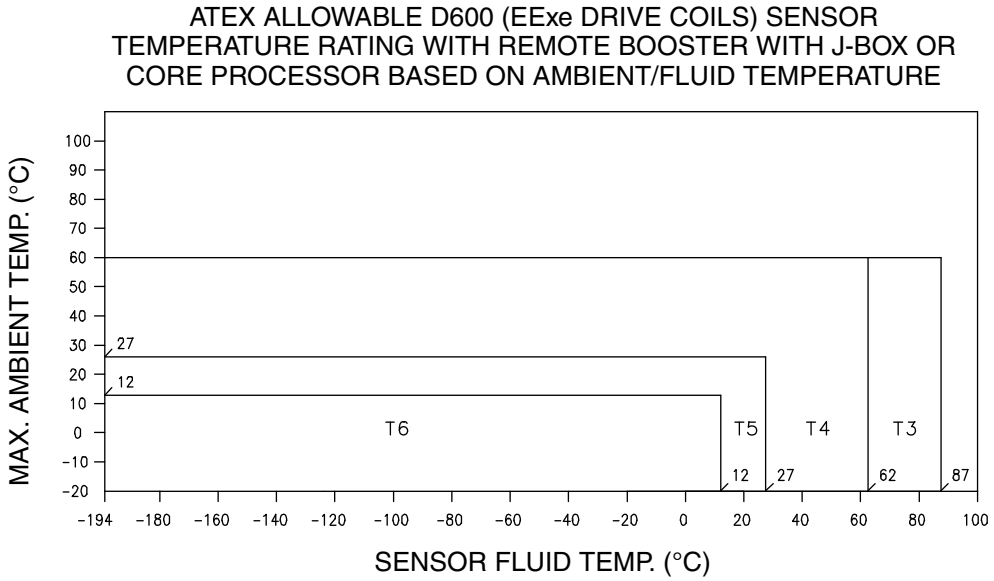


Note 1. Use the above graph to determine the temperature class for a given fluid and ambient temperature. The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 128°C.

3.3) Type DS600* ***S(N, O or P)*(F or Z)*****
(Remote booster amplifier provided with 9-wire junction box or 4-wire core processor)

3.3.1) Temperature class

The classification into a temperature class depends on the temperature of the medium taking into account the maximum operating temperature of the sensor and is shown in the following graph:



Note 1. Use the above graph to determine the temperature class for a given fluid and ambient temperature. The maximum surface temperature for dust is as follows: T6:T 80°C, T5:T 95°C, T4:T 130°C, T3:T 155°C.

3.3.2) Ambient temperature range

Type DS600* ***S(N, O or P)*(F or Z)***** Ta –20 °C up to +60 °C

4) Marking

–20 °C ≤ Ta ≤ +60 °C

- type	**- type of protection**
DS600 * *** S (K, L or M) * (F or Z) * * * * *	CE 0575 ⟨Ex⟩ II 2 G EEx de [ib] IIB T4–T6 II 2 D IP65 T[1] °C
DS600 * *** S (N, O or P) * (F or Z) * * * * *	CE 0575 ⟨Ex⟩ II 2 G EEx de [ib] IIB T3–T6 II 2 D IP65 T[1] °C

(1) For dust temperature ratings, see temperature graphs.

5) Special conditions for safe use / Installation instructions

5.1) For certified conduit installations a customer supplied Conduit Seal Fitting is required within 18″ of the enclosure.

5.2) Risk of Ignition of Hazardous Atmospheres — Disconnect equipment from supply circuit and wait 30 minutes before opening. Keep assembly tightly closed when in operation.

5.3) Explosion Hazard — Substitution of components may impair Intrinsic Safety.

5.4) For installation only with Micro Motion Booster Amplifier and Transmitters.

Booster Amplifier

ATEX Installation Drawings and Instructions

- For installing a booster amplifier to the following sensors:
  - Booster amplifier with 4-wire core processor to D600 sensor
  - Booster amplifier with 9-wire junction box to D600 sensor

Subject:	Equipment type	**Booster amplifier**	
Manufactured and submitted for examination		**Micro Motion, Inc.**	
Address		**Boulder, Co. 80301, USA**	
Basis for examination:		**Annex II of Directive 94/9/EC**	
Standard basis		EN 50014:1997	General requirements
		EN 50018:2000	Flameproof enclosure ´d´
		EN 50019:2000	Increased safety ´e´
		EN 50020:1994	Intrinsic safety ´i´
		EN 50281-1-1:1998	Dust ´D´
Code for type of protection		**EEx d [ib] IIB T5** or **EEx de [ib] IIB T5**	When Core Processor (Model 700) is Integrally Mounted to Booster Amplifier
		EEx d [ib] IIB T6 or **EEx de [ib] IIB T6**	When 9-Wire J-Box is Mounted on Booster Amp

1) Subject and type

Booster amplifier

2) Description

The Booster Amplifier is used with the Micro Motion Mass Flow Sensor model DS600S and a Micro Motion transmitter to form a Mass Flow Meter system. The Booster Amplifier may be integrally or remotely mounted in relation to the sensor body, depending on the maximum process temperature. The Booster Amplifier is able to accept Micro Motion's 9-Wire J-Box or Core Processor (Model 700) inputs.

The terminal compartment of the Booster Amplifier may be Certified as either a flame proof (EEx d) enclosure or an increased safety (EEx e) enclosure.

The Booster Amplifier additionally incorporates an intrinsically safe Junction Housing for termination and connection of intrinsically safe transmitter and sensor wiring.

The temperature class is T5 when the Core Processor (Model 700) is used; otherwise the temperature class is T6.

3) Parameters

3.1) Non intrinsically safe input circuit (mains circuit)

Voltage	Ui	AC	85–265	V
Max. voltage	Um	AC	265	V
Max. current	Ii		500	mA
Max. power	Pi		50	W

3.2) Non intrinsically safe output circuits (drive coil)

Max. voltage	Uo	DC	32	V
Max. current	Io		2	A

3.3) For intrinsic safety EEx [ib] IIB only connect to certified intrinsically safe circuits, with the following maximum values:

3.3.1) Input circuit, Model 700 core processor (terminals 1–4):

Voltage	Ui	DC	17,3	V
Current	Ii		484	mA
Power	Pi		2,1	W
Effective internal resistance	Ci		2,2	nF
Effective internal inductance	Li		30	μH

3.3.2) Input circuit, 9-wire junction box

3.3.2.1) Drive coil circuit (brown and red insulated wires)

Voltage	Ui	DC	11,4	V
Current	Ii		2,45	A
Power	Pi		2,54	W
Effective internal capacitance	Ci		Negligible	
Effective internal inductance	Li		Negligible	

3.3.2.2) Pick-off coils (green and white, blue and grey, insulated wires)

Voltage	Ui	DC	30	V
Current	Ii		215	mA
Power	Pi		1,6	W
Effective internal capacitance	Ci		Negligible	
Effective internal inductance	Li		Negligible	
when connected to D600	Li		6,18	mH

3.3.2.3) Temperature pass through wiring (violet, orange and yellow insulated wires)

Voltage	Ui	DC	30	V
Current	Ii		253	mA
Power	Pi		1,9	W
Effective internal capacitance	Ci		Negligible	
Effective internal inductance	Li		Negligible	

3.4) Ambient temperature range

Booster amplifier	Ta	–40 °C up to +60 °C
Maximum surface temperature for Dust	Td	+80 °C

4) Marking

0575 ⟨Ex⟩ II 2 G D

T80 °C — Maximum surface temperature for Dust

–40 °C ≤ Ta ≤ +60 °C

- type	**- type of protection**
Booster amplifier with integrally mounted core processor (Model 700)	EEx d [ib] IIB T5 **or** EEx de [ib] IIB T5
Booster amplifier with 9-wire j-box	EEx d [ib] IIB T6 **or** EEx de [ib] IIB T6

5) Special conditions for safe use / Installation instructions

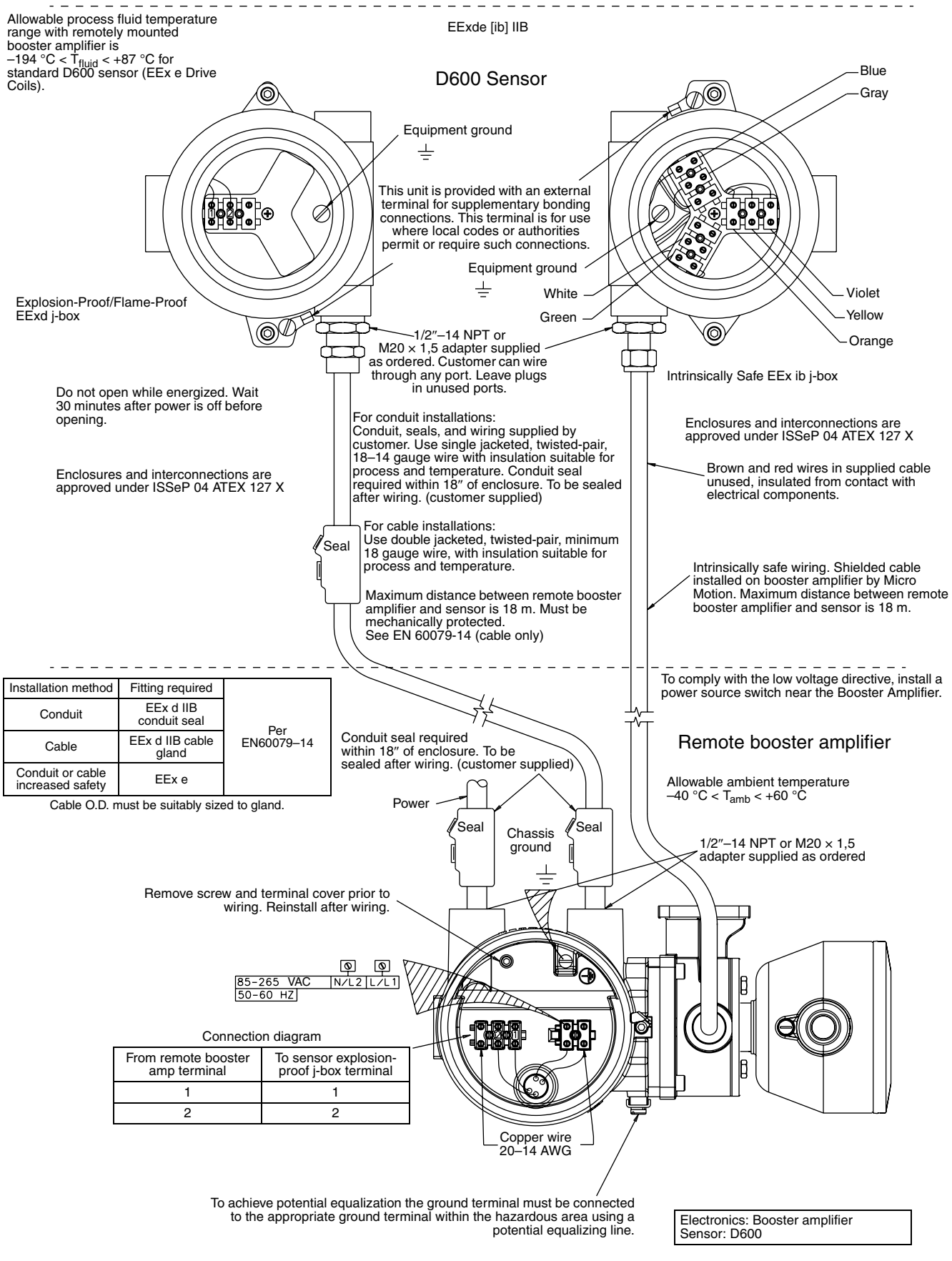
5.1) For certified conduit installations a customer supplied Conduit Seal Fitting is required within 18″ of the enclosure.

5.2) Risk of Ignition of Hazardous Atmospheres — Disconnect equipment from supply circuit and wait 30 minutes before opening. Keep assembly tightly closed when in operation.

5.3) Explosion Hazard — Substitution of components may impair Intrinsic Safety.

5.4) For installation only with Micro Motion Mass Flow Sensor type D*600.

Booster amplifier with core processor to D600 sensor



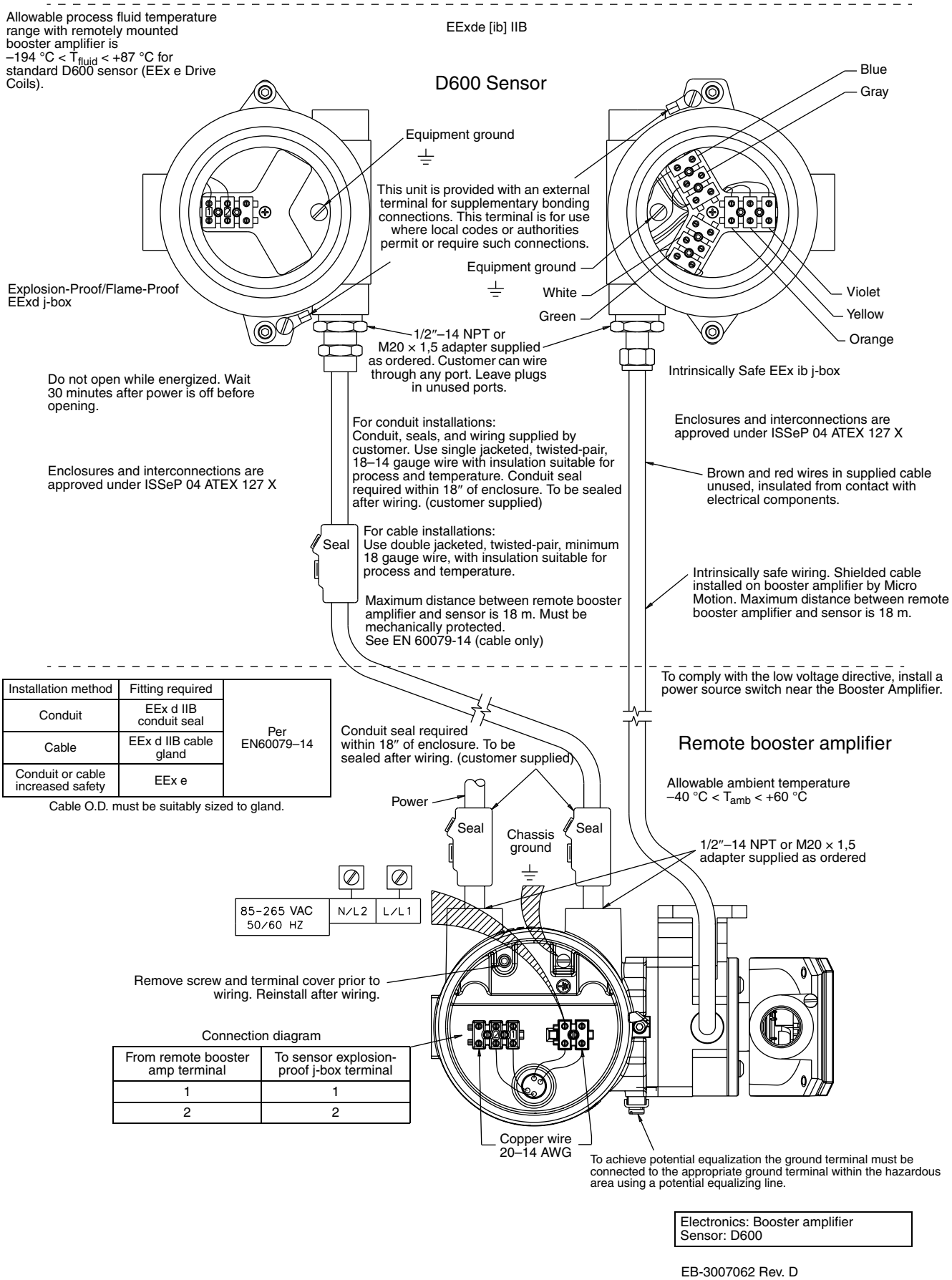
Installation method	Fitting required	
Conduit	EEx d IIB conduit seal	Per EN60079–14
Cable	EEx d IIB cable gland	
Conduit or cable increased safety	EEx e	

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

Connection diagram

From remote booster amp terminal	To sensor explosion-proof j-box terminal
1	1
2	2

Booster amplifier with junction box to D600 sensor



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

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

Connection diagram

From remote booster amp terminal	To sensor explosion-proof j-box terminal
1	1
2	2

Electronics: Booster amplifier
Sensor: D600

EB-3007062 Rev. D

Cable glands and adapters

ATEX Installation Instructions

1) ATEX certification requirement

All sensor and transmitter cable glands and adapters are required to be ATEX certified. Refer to the specific manufacturer's website for installation instructions.

For the latest Micro Motion product specifications, view the PRODUCTS section of our web site at www.micromotion.com

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

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 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

Micro Motion®

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Process Management