

Installation Instructions

P/N MMI-20010152, Rev. A

June 2007

ATEX Installation Instructions for Micro Motion[®] CMF400 Sensors with Booster Amplifier

For ATEX-approved sensor installations



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 CMF400 Sensors

ATEX Installation Instructions

- For installing the following Micro Motion sensors:
 - Model CMF400 with booster amplifier with ATEX certificate number KEMA 01 ATEX 2183



Subject: Equipment type

Manufactured and submitted for examination

Address

Basis for examination:

Standard basis

Code for type of protection

Sensor type CMF400* *N**(Z or F)******

Micro Motion, Inc.

Boulder, Co. 80301, USA

Annex II of Directive 94/9/EC

| | |
|-------------------|--------------------------|
| 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' |

EEx d [ib] ib IIB T1–T6

EEx de [ib] ib IIB T1–T6

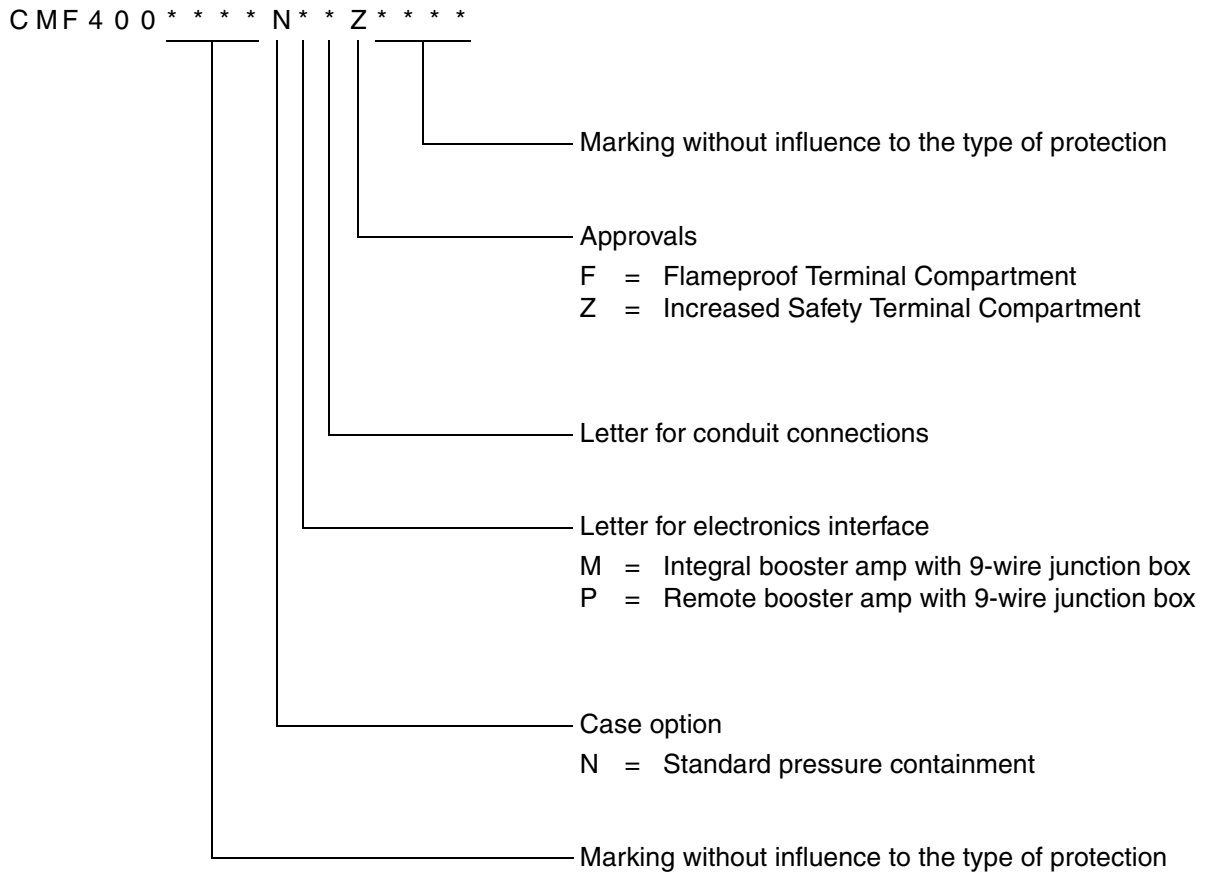
EEx d [ib] ib IIB T1–T5

EEx de [ib] ib IIB T1–T5

1) Subject and type

Sensor type CMF400 ****N**(Z or F)****

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



2) Description

The Booster Amplifier used in the range of Mass Flow Sensor Models CMF400....NB1 and Models CMF400....NB2 has been redesigned and certified as a component under KEMA 01 ATEX 2184 U (see Booster Amp section). The Booster Amplifier may be used either integrally or remotely mounted in relation to the sensor body, depending upon the maximum process temperature. The redesigned Booster Amplifier is able to accept Micro Motion's 9-Wire J-Box.

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.

3) Parameters

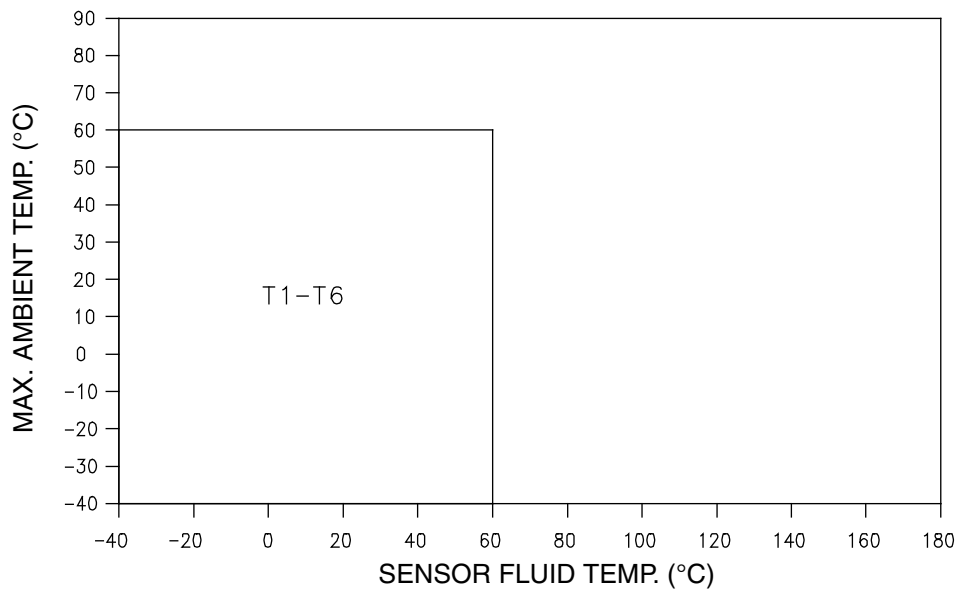
3.1) Electrical parameters: see Booster Amplifier Section.

3.2) Type CMF400* ****M*(F or Z)****
(Integral booster amplifier provided with 9-wire j-box)

3.2.1) 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:

ATEX ALLOWABLE CMF400 SENSOR TEMPERATURE RATING WITH INTEGRAL J-BOX BASED ON AMBIENT/FLUID TEMPERATURE



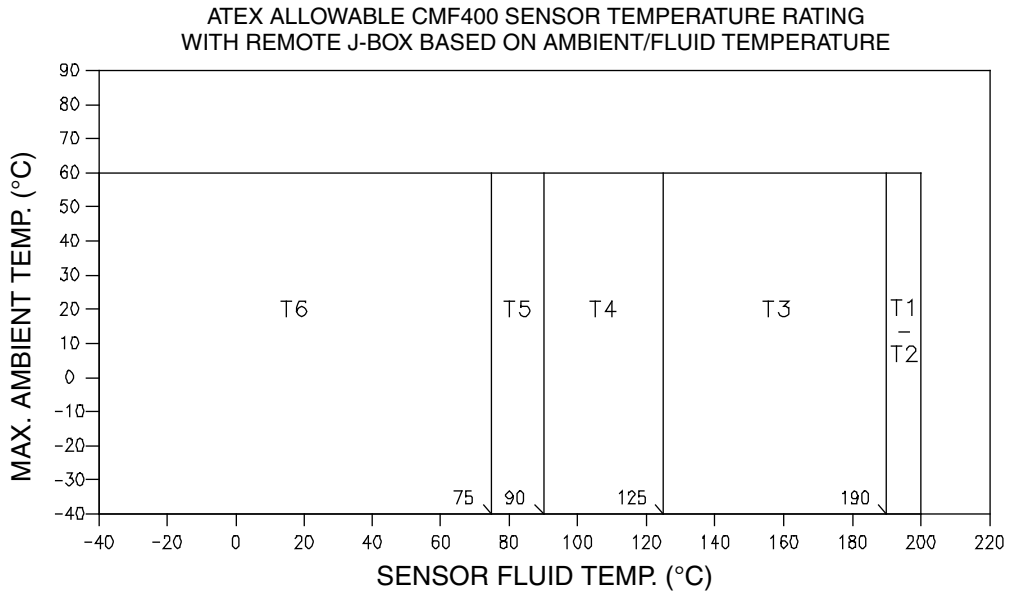
3.2.2) Ambient temperature range

CMF400* ****M*(F or Z)**** Ta -40 °C up to +60 °C

3.3) Type CMF400* ****P*(F or Z)****
(Remote booster amplifier provided with 9-wire j-box)

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:



3.3.2) Ambient temperature range

CMF400* ****P*(F or Z)**** Ta -40 °C up to +60 °C

4) Marking

CE 0575  II 2 G

-40 °C ≤ Ta ≤ +60 °C

| - type | - type of protection |
|-----------------------------------|--------------------------|
| CMF400* ****(M or P)*(F or Z)**** | EEx de [ib] ib IIB T1-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 Booster Amplifier and Transmitters.

Booster Amplifier

ATEX Installation Instructions

- For installing a booster amplifier with 9-wire junction box to CMF400 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 |

Booster Amplifier

1) Subject and type

Booster amplifier

2) Description

The Booster Amplifier is used with the Micro Motion Mass Flow Sensor model CMF400 (with ATEX Certificate Number: KEMA 01ATEX 2183) 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 | li | | 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 | li | | 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 | U _i | DC | 11,4 | V |
| Current | i _i | | 2,45 | A |
| Power | P _i | | 2,54 | W |
| Effective internal capacitance | C _i | | Negligible | |
| Effective internal inductance | L _i | | Negligible | |

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

| | | | | |
|--------------------------------|----------------|----|------------|----|
| Voltage | U _i | DC | 30 | V |
| Current | i _i | | 215 | mA |
| Power | P _i | | 1,6 | W |
| Effective internal capacitance | C _i | | Negligible | |
| Effective internal inductance | L _i | | Negligible | |
| when connected to CMF400 | L _i | | 6,9 | mH |


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

| | | | | |
|--------------------------------|----------------|----|------------|----|
| Voltage | U _i | DC | 30 | V |
| Current | i _i | | 253 | mA |
| Power | P _i | | 1,9 | W |
| Effective internal capacitance | C _i | | Negligible | |
| Effective internal inductance | L _i | | Negligible | |

3.4) Ambient temperature range

| | | |
|--------------------------------------|----------------|---------------------|
| Booster amplifier | T _a | -40 °C up to +60 °C |
| Maximum surface temperature for Dust | T _d | +80 °C |

4) Marking

0575  II 2 G D

T80 °C

Maximum surface temperature for Dust

-40 °C ≤ T_a ≤ +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 CMF400 with ATEX Certificate Number: KEMA 01ATEX 2183.

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.

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