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.
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
Sensor type CMF400* ***N**(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 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
EEEx d [ib] ib IIB T1–T6
EEEx de [ib] ib IIB T1–T6
EEEx d [ib] ib IIB T1–T5
EEEx 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:

\[
\text{CMF 4 0 0} \quad \text{N} \quad \text{Z} \quad \text{**}
\]

Marking without influence to the type of protection

Approvals

\[F = \text{Flameproof Terminal Compartment}\]

\[Z = \text{Increased Safety Terminal Compartment}\]

Letter for conduit connections

Letter for electronics interface

\[M = \text{Integral booster amp with 9-wire junction box}\]

\[P = \text{Remote booster amp with 9-wire junction box}\]

Case option

\[N = \text{Standard pressure containment}\]

Marking without influence to the type of protection

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](image)

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

0575  II 2 G

−40 °C ≤ Ta ≤ +60 °C

<table>
<thead>
<tr>
<th>- type</th>
<th>- type of protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMF400* <em><strong><em>(M or P)</em>(F or Z)</strong></em>*</td>
<td>EEx de [ib] IIB T1-T6</td>
</tr>
</tbody>
</table>

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 d [ib] IIB T6
When Core Processor (Model 700) is Integrally Mounted to Booster Amplifier

or

EEx de [ib] IIB T5 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)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Ui AC</td>
<td>85–265 V</td>
</tr>
<tr>
<td>Max. voltage Um AC</td>
<td>265 V</td>
</tr>
<tr>
<td>Max. current li</td>
<td>500 mA</td>
</tr>
<tr>
<td>Max. power Pi</td>
<td>50 W</td>
</tr>
</tbody>
</table>

3.2) Non intrinsically safe output circuits (drive coil)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. voltage Uo DC</td>
<td>32 V</td>
</tr>
<tr>
<td>Max. current Io</td>
<td>2 A</td>
</tr>
</tbody>
</table>

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):

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Ui DC</td>
<td>17,3 V</td>
</tr>
<tr>
<td>Current li</td>
<td>484 mA</td>
</tr>
<tr>
<td>Power Pi</td>
<td>2,1 W</td>
</tr>
<tr>
<td>Effective internal resistance Ci</td>
<td>2,2 nF</td>
</tr>
<tr>
<td>Effective internal inductance Li</td>
<td>30 μH</td>
</tr>
</tbody>
</table>
3.3.2) Input circuit, 9-wire junction box

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

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Ui</th>
<th>DC</th>
<th>Current</th>
<th>Ii</th>
<th>Power</th>
<th>Pi</th>
<th>Effective internal capacitance</th>
<th>Ci</th>
<th>Effective internal inductance</th>
<th>Li</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Ui</td>
<td>DC</td>
<td>Current</td>
<td>Ii</td>
<td>Power</td>
<td>Pi</td>
<td>Effective internal capacitance</td>
<td>Ci</td>
<td>Effective internal inductance</td>
<td>Li</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Ui</th>
<th>DC</th>
<th>Current</th>
<th>Ii</th>
<th>Power</th>
<th>Pi</th>
<th>Effective internal capacitance</th>
<th>Ci</th>
<th>Effective internal inductance</th>
<th>Li</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Ui</td>
<td>DC</td>
<td>Current</td>
<td>Ii</td>
<td>Power</td>
<td>Pi</td>
<td>Effective internal capacitance</td>
<td>Ci</td>
<td>Effective internal inductance</td>
<td>Li</td>
</tr>
<tr>
<td>Voltage</td>
<td>Ui</td>
<td>DC</td>
<td>Current</td>
<td>Ii</td>
<td>Power</td>
<td>Pi</td>
<td>Effective internal capacitance</td>
<td>Ci</td>
<td>Effective internal inductance</td>
<td>Li</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Ui</th>
<th>DC</th>
<th>Current</th>
<th>Ii</th>
<th>Power</th>
<th>Pi</th>
<th>Effective internal capacitance</th>
<th>Ci</th>
<th>Effective internal inductance</th>
<th>Li</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Ui</td>
<td>DC</td>
<td>Current</td>
<td>Ii</td>
<td>Power</td>
<td>Pi</td>
<td>Effective internal capacitance</td>
<td>Ci</td>
<td>Effective internal inductance</td>
<td>Li</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>- type</th>
<th>- type of protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booster amplifier with integrally mounted core processor (Model 700)</td>
<td>EEx d [ib] IIB T5</td>
</tr>
<tr>
<td>or</td>
<td>EEx de [ib] IIB T5</td>
</tr>
<tr>
<td>Booster amplifier with 9-wire j-box</td>
<td>EEx d [ib] IIB T6</td>
</tr>
<tr>
<td>or</td>
<td>EEx de [ib] IIB T6</td>
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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.
For the latest Micro Motion product specifications, view the PRODUCTS section of our web site at www.micromotion.com