ATEX Installation
Drawings and Instructions

For ATEX-approved transmitter 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 3700 to remote core processor to CMF, D (except D600), DL, F, H and T sensors with junction box .................................................. 43
Model 3700 to remote core processor to D600 sensor with junction box ........................................ 44
Model 3700 to remote core processor to DT sensor with junction box ......................................... 45

Model RFT9739 Transmitters
ATEX Drawings and Installation Instructions ......................... 47
Model RFT9739R to CMF, F (except F300), H (except H300), D (except D600), and DL sensors with junction box .................................................. 53
Model RFT9739R to CMF400 sensor with booster amplifier with junction box ........................................ 54
Model RFT9739R to D600 sensor with junction box .................................................. 55
Model RFT9739R to DT sensor with junction box .................................................. 56
Model RFT9739D/E to CMF, F (except F300), H (except H300), D (except D600), and DL sensors with junction box .................................................. 57
Model RFT9739D/E to CMF400 sensor with booster amplifier with junction box ........................................ 58
Model RFT9739D/E to D600 sensor with junction box .................................................. 59
Model RFT9739D/E to DT sensor with junction box .................................................. 60

Model IFT9701/IFT9703 Transmitters
Installation Drawings and Instructions ................................. 61
Model IFT9701 to CMF (except CMF400), H (except H300) and F (except F300) sensors with junction box .................................................. 66
Model IFT9701 to D (except D600) and DL sensors with junction box .................................................. 67
Model IFT9701/IFT9703 Integral .............................................................. 68

Cable glands and adapters
ATEX Installation Instructions ............................................... 69
List of Drawings

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Revision</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>EB-20000207</td>
<td>Rev. C</td>
<td>44</td>
</tr>
<tr>
<td>EB-20000216</td>
<td>Rev. C</td>
<td>45</td>
</tr>
<tr>
<td>EB-20000222</td>
<td>Rev. C</td>
<td>38</td>
</tr>
<tr>
<td>EB-20000225</td>
<td>Rev. C</td>
<td>37</td>
</tr>
<tr>
<td>EB-20000233</td>
<td>Rev. C</td>
<td>26</td>
</tr>
<tr>
<td>EB-20000242</td>
<td>Rev. C</td>
<td>27</td>
</tr>
<tr>
<td>EB-20000248</td>
<td>Rev. C</td>
<td>20</td>
</tr>
<tr>
<td>EB-20000251</td>
<td>Rev. C</td>
<td>19</td>
</tr>
<tr>
<td>EB-20000255</td>
<td>Rev. B</td>
<td>11</td>
</tr>
<tr>
<td>EB-20000256</td>
<td>Rev. B</td>
<td>29</td>
</tr>
<tr>
<td>EB-20000271</td>
<td>Rev. C</td>
<td>40</td>
</tr>
<tr>
<td>EB-20000272</td>
<td>Rev. B</td>
<td>41</td>
</tr>
<tr>
<td>EB-20000275</td>
<td>Rev. B</td>
<td>42</td>
</tr>
<tr>
<td>EB-20000276</td>
<td>Rev. B</td>
<td>22</td>
</tr>
<tr>
<td>EB-20000277</td>
<td>Rev. B</td>
<td>23</td>
</tr>
<tr>
<td>EB-20000280</td>
<td>Rev. A</td>
<td>24</td>
</tr>
<tr>
<td>EB-20000370</td>
<td>Rev. B</td>
<td>67</td>
</tr>
<tr>
<td>EB-20000372</td>
<td>Rev. A</td>
<td>68</td>
</tr>
<tr>
<td>EB-20000373</td>
<td>Rev. C</td>
<td>61</td>
</tr>
<tr>
<td>EB-20000799</td>
<td>Rev. B</td>
<td>56</td>
</tr>
<tr>
<td>EB-20000800</td>
<td>Rev. B</td>
<td>60</td>
</tr>
<tr>
<td>EB-20000849</td>
<td>Rev. B</td>
<td>55</td>
</tr>
<tr>
<td>EB-20000850</td>
<td>Rev. B</td>
<td>59</td>
</tr>
<tr>
<td>EB-20001039</td>
<td>Rev. E</td>
<td>66</td>
</tr>
<tr>
<td>EB-20001041</td>
<td>Rev. E</td>
<td>25</td>
</tr>
<tr>
<td>EB-20001042</td>
<td>Rev. E</td>
<td>21</td>
</tr>
<tr>
<td>EB-20001043</td>
<td>Rev. D</td>
<td>43</td>
</tr>
<tr>
<td>EB-20001045</td>
<td>Rev. E</td>
<td>39</td>
</tr>
<tr>
<td>EB-20001046</td>
<td>Rev. E</td>
<td>57</td>
</tr>
<tr>
<td>EB-20001047</td>
<td>Rev. D</td>
<td>53</td>
</tr>
<tr>
<td>EB-20002011</td>
<td>Rev. A</td>
<td>54</td>
</tr>
<tr>
<td>EB-20002012</td>
<td>Rev. A</td>
<td>58</td>
</tr>
<tr>
<td>EB-20002235</td>
<td>Rev. A</td>
<td>8</td>
</tr>
<tr>
<td>EB-20002236</td>
<td>Rev. A</td>
<td>7</td>
</tr>
<tr>
<td>EB-20002237</td>
<td>Rev. A</td>
<td>6</td>
</tr>
<tr>
<td>EB-20002239</td>
<td>Rev. A</td>
<td>9</td>
</tr>
<tr>
<td>EB-20002240</td>
<td>Rev. A</td>
<td>1</td>
</tr>
<tr>
<td>EB-20003016</td>
<td>Rev. A</td>
<td>18</td>
</tr>
<tr>
<td>EB-20003017</td>
<td>Rev. A</td>
<td>36</td>
</tr>
<tr>
<td>EB-3007099</td>
<td>Rev. D</td>
<td>47</td>
</tr>
</tbody>
</table>
Model LFT Transmitters
ATEX Installation Instructions and Drawings

- For installing a Model LFT transmitter with a 4-wire connection to an LF sensor

Subject: Equipment type
Transmitter type LFT***L****

Manufactured and submitted for examination
Micro Motion, Inc.

Address
Boulder, Co. 80301, USA

Standard basis
EN 50021:1999 Non-sparking ‘n’
EN 50281-1-1:1998 Dust ‘D’

Code for type of protection
EEe nC IIB +H2 T6
EEe nC IIC T6
EEe nC [L] IIB +H2 T6
EEe nC [L] IIC T6
1) Subject and type

Transmitter type LFT***L****

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

- **Marking without influence to the type of protection**
- **Approval**
  - L = ATEX — Equipment Category 3 (Zone 2)
- **Letter for conduit connections**
- **Numeral for display**
  - 1 = Standard display; gas group IIB+H₂
  - 2 = Backlight display; gas group IIB+H₂
  - 3 = No display; gas group IIC
  - 4 = IIC display cover; gas group IIC
  - 5 = IIC display cover with backlight display; gas group IIC
- **Numeral for outputs**
  - 1 = One mA, one frequency flow only field mount EEx n C
  - 3 = One mA, one frequency multivariable field mount EEx n C
  - 4 = Two mA, two frequency configurable field mount EEx n C
  - 6 = Foundation fieldbus field mount EEx nC [L]
  - 7 = Profibus-PA field mount EEx nC [L]
2) Description

The Low Flow Transmitter (LFT) is used in combination with LF Series Sensors for measurement of mass flow and data transmission.

2.1) LFT field mount

The electrical circuitry of the transmitters is mounted inside a metal enclosure which is divided into three compartments.

In the compartment with type of protection “nC” the Terminal Board, Power Supply Board, Feature Board, and (optionally) the Display Board are mounted. When executed with display, the gas group is IIB + H₂. When it is executed without display, or with the alternative window display cover, the gas group is IIC.

The main terminal compartment with type of protection “nC” is separated into two sections. One section contains two screw terminals for supplying power to the device. The other section contains 6 terminals for general I/O. In the case of Fieldbus or Profibus, these terminals are energy limited. The enclosure is constructed with a secondary terminal compartment with type of protection “nA” for the connection of remotely operating non sparking “nA” Model LF Series sensors.

3) Field mount parameters (models LFT(1, 3, 4, 6 or 7)**L****)

3.1) Mains circuit (terminals 9–10 in main terminal compartment)

Voltage AC/DC 18–250 V
Max voltage Um AC/DC 250 V

3.2) Non energy limited input/output circuits (terminals 1–6 in main terminal compartment) only for type LFT(1, 3 or 4)**L****

Voltage Um AC/DC 60 V

3.3) Energy limited output circuits type of protection EEx nL II available in main terminal compartment marked with EEx nC [L].

3.3.1) Fieldbus circuit (terminals Fieldbus 1 and 2) only for type LFT6**L**** and type LFT7**L****

Voltage Ui DC 30 V
Current Ii 380 mA
Power Pi 5.32 W
Effective internal inductance Li Negligible
Effective internal capacitance Ci Negligible

For the connection of a Fieldbus circuit in accordance with FNICO model...
3.4) Power and signal circuits in secondary terminal compartment marked with "nC" for type LFT1**L**** or LFT3**L**** or LFT4**L**** or LFT6**L**** or LFT7**L**** (to remotely mounted LF sensor):

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Uo</th>
<th>DC</th>
<th>16,31</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>Io</td>
<td>0,396</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>5,96</td>
<td>W</td>
<td></td>
</tr>
</tbody>
</table>

3.5) Ambient temperature range

LFT(1, 3, 4, 6 or 7)(1, 2, or 3)*L**** Ta –40 °C up to +55 °C
LFT(1, 3, 4, 6 or 7)(4 or 5)*L**** Ta –20 °C up to +55 °C

4) Marking

LFT*(1, 2 or 3)*L**** –40 °C ≤ Ta ≤ +55 °C
LFT(1, 3, 4, 6 or 7)(4 or 5)*L**** –20 °C ≤ Ta ≤ +55 °C

<table>
<thead>
<tr>
<th>- type</th>
<th>- type of protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFT(1, 3, or 4)(1 or 2)<em>L</em>***</td>
<td>II 3 G Ex nC IIB + H₂ T6</td>
</tr>
<tr>
<td></td>
<td>II 3 D IP65/IP67 T65 °C</td>
</tr>
<tr>
<td></td>
<td>KEMA 04 ATEX 1273 X</td>
</tr>
<tr>
<td>LFT(6 or 7)(1 or 2)<em>L</em>***</td>
<td>II 3 G Ex nC IIB + H₂ T6</td>
</tr>
<tr>
<td></td>
<td>II 3 D IP65/IP67 T65 °C</td>
</tr>
<tr>
<td></td>
<td>KEMA 04 ATEX 1273 X</td>
</tr>
<tr>
<td>LFT(1, 3, or 4)(3, 4 or 5)<em>L</em>***</td>
<td>II 3 G Ex nC IIC T6</td>
</tr>
<tr>
<td></td>
<td>II 3 D IP65/IP67 T65 °C</td>
</tr>
<tr>
<td></td>
<td>KEMA 04 ATEX 1273 X</td>
</tr>
<tr>
<td>LFT(6 or 7)(3, 4 or 5)<em>L</em>***</td>
<td>II 3 G Ex nC IIC T6</td>
</tr>
<tr>
<td></td>
<td>II 3 D IP65/IP67 T65 °C</td>
</tr>
<tr>
<td></td>
<td>KEMA 04 ATEX 1273 X</td>
</tr>
</tbody>
</table>

After de-energizing, delay 5 minutes before opening (models LFT(1, 3, 4, 6 or 7)**L**** only).

5) Special conditions for safe use / Installation instructions

5.1) For the application of the transmitter in an ambient temperature of less than –20 °C suitable cable and cable entries or conduit entries for this condition shall be used (models LFT*(1, 2 or 3)*L**** only).

5.2) When cable entries are used they shall conform to clause 7.2.6 of EN 50021.

5.3) For type LFT(6 or 7)**L**** only, the cover of the terminal compartment containing terminals 1–6 may be removed for short periods when the apparatus is in service to permit checking or adjustment of energized energy limited circuits.
5.4) A degree of ingress protection of at least IP54 according to EN 60529 will only be achieved when cable and conduit entries providing IP54 according to EN 60529 are used. For applications in explosive atmospheres caused by air/dust mixtures, a degree of ingress protection of at least IP66/IP67 according to EN 60529 will only be achieved when cable and conduit entries are used that provide a degree of ingress protection of at least IP66/IP67 according to EN 60529.

5.5) Replacement of fuses is not allowed.
Model LFT Transmitters

Model LFT field-mount mA/FO transmitter to LF sensor

Hazardous Area
No Display
EEx nC IIC T6
With Display
EEx nC IIB + H2 T6
EEx nC IIC T6

Refer to transmitter tag for complete hazardous area classification.

Model LFT Field Mount Transmitter

4-wire cable supplied with sensor
(wire termination required)

Hazardous Area
EEx nA IIC

Refer to sensor tag for complete hazardous area classification.

Micro Motion mass flowmeter system connection

Models: LF2M, LF3M, LF4M

Electronics: LFT Field Mount
Sensor: Model LF

EB-20002237 Rev. A

85–250 VAC 50/60 Hz N L
18–100 VDC - +

Brown– Black– Blue– White–
4-wire cable supplied with sensor
(cable supplied with integral molded connector for sensor termination)
Model LFT field-mount fieldbus transmitter to LF sensor

Hazardous Area
No Display
EEx nC (L) IIC T6
With Display
EEx nC (L) IIb H2 T6
EEx nC (L) IIC T6

Refer to transmitter tag for complete hazardous area classification.

Micro Motion mass flowmeter system connection

Models: LF2M, LF3M, LF4M

Electronics: LFT Field Mount Sensor: Model LF

EB-20002236 Rev. A
Model LFT Transmitters

Model LFT field-mount Profibus-PA transmitter to LF sensor

Hazardous Area
No Display
EEx nC [L] IIC T6
With Display
EEx nC [L] IIB + H2 T6
EEx nC [L] IIC T6

Refer to transmitter tag for complete hazardous area classification.

Micro Motion mass flowmeter system connection

Models: LF2M, LF3M, LF4M

EB-20002235 Rev. A
Model LFT field-mount config-I/O transmitter to LF sensor

Hazardous Area
No Display
EEEx nC IIC T6
With Display
EEEx nC IIB + H2 T6
EEEx nC IIC T6

Refer to transmitter tag for complete hazardous area classification.

Model LFT Field Mount Transmitter

4-wire cable supplied with sensor (wire termination required)

Hazardous Area
EEEx nA IIC

Refer to sensor tag for complete hazardous area classification.

Micro Motion mass flowmeter system connection

Models: LF2M, LF3M, LF4M

Electronics: LFT Field Mount
Sensor: Model LF

EB-20002239 Rev. A
Model 3500 Transmitters
ATEX Installation Instructions and Drawings

- For installing the following Micro Motion transmitters:
  - Model 3500 with 4-wire connection to a core processor
  - Model 3500 with 9-wire connection to a junction box
  - Model 3500 with a remote core processor and remote sensor with a junction box

Subject: Equipment type
Transmitter type 3500******1B****

Manufactured and submitted for examination
Micro Motion, Inc.

Address
Boulder, Co. 80301, USA

Standard basis
EN 50014:1997 +A1-A2 General requirements
EN 50020:1994 Intrinsic safety ‘i’

Code for type of protection
[EEExib] IIIB/IIC
1) **Subject and type**

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

The options denoted by * are as follows:

- Letters for application software
- Letter for language
- Letter A, B, C, D, or E for terminals
- Number 3, 4, 5, or 6 for sensor interface
- Number for additional hardware
- Letter for communications
- Power rating
  - 1 = 85–265 VAC
  - 2 = 18–30 VDC
- Letter R, P, or N for mounting
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 securely fixed in a light metal housing which is mounted outside the hazardous area. The transmitter can be purchased with one of two mounting options. The 3500R****1B**** is suitable for rack mount installation. The 3500P****1B**** is suitable for panel mount installation. The 3500N****1B**** comes with an optional fiberglass enclosure.

The 3500******1B**** transmitter comes with different sensor interface boards. The 3500****3*1B**** is for 9 wire installation to a sensor with junction box. The 3500****4*1B**** has DSP (digital signal processing) in the sensor interface board to be compatible with T***********Z***** sensors (DMT 01 ATEX E 083 X). The 3500****5*1B**** is for 4 wire installation to a sensor with integral core processor (Model 700). The 3500****6*1B**** is for connection to the remote mount core (DMT 02 ATEX E 002).

The 3500******1B**** is available with two terminal options. Model 3500******A1B**** uses solder pins for the terminal connections. Model 3500******B1B**** uses screw terminals for the connections.

Model 3500******(C,D or E) 1B**** uses I/O cables with three different lengths for the connections, only in combination with mounting option code P.

3) **Parameters**

3.1) **Mains circuit**

For type 3500*1****1B**** (terminals J3-1 and J3-3, Power Board)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>AC</th>
<th>85–265 V</th>
</tr>
</thead>
</table>

For type 3500*2****1B**** (terminals J3-1 and J3-3, Power Board)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>DC</th>
<th>18–30 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. voltage</td>
<td>Um</td>
<td>AC/DC 265 V</td>
</tr>
</tbody>
</table>

3.2) **Intrinsically safe sensor circuits for 3500****3*1B****

3.2.1) **Drive-circuit (terminals J2-A12 -C12)**

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Uo</th>
<th>DC 11,4 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (pulse)</td>
<td>Io</td>
<td>1,14 A</td>
</tr>
<tr>
<td>Limited by a fuse with a nominal value of</td>
<td>250 mA</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>1,2 W</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>27,4 μH</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>1,7 μF</td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>Lo/Ro</td>
<td>10,9 μH/Ω</td>
</tr>
</tbody>
</table>
The maximum external inductance L (sensor coil) can be calculated with the following term:

\[ L = 2 \times E \times (R_i + R_o / 1,5 \times U_o)^2 \]

Whereby \( E = 40 \, \mu J \) for group IIC and \( E = 160 \, \mu J \) for group IIB will be inserted and \( R_o \) is the total resistance (coil resistance + series resistance).

### 3.2.2) Pick-off circuits (terminals J2-A8/C8 and J2-A10/C10)

#### Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value (dc)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uo</td>
<td>DC 15,6 V</td>
</tr>
<tr>
<td>Current</td>
<td>Io</td>
<td>10 mA</td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>40 mW</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>355 mH</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>500 nF</td>
</tr>
</tbody>
</table>

#### Type of protection EEx ib IIB

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value (dc)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uo</td>
<td>DC 15,6 V</td>
</tr>
<tr>
<td>Current</td>
<td>Io</td>
<td>10 mA</td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>40 mW</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>1,4 H</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>3,03 μF</td>
</tr>
</tbody>
</table>

### 3.2.3) Temperature circuit (terminals J2-C6/A6/C4)

#### Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value (dc)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uo</td>
<td>DC 15,6 V</td>
</tr>
<tr>
<td>Current</td>
<td>Io</td>
<td>10 mA</td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>40 mW</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>355 mH</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>500 nF</td>
</tr>
</tbody>
</table>

#### Type of protection EEx ib IIB

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value (dc)</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uo</td>
<td>DC 15,6 V</td>
</tr>
<tr>
<td>Current</td>
<td>Io</td>
<td>10 mA</td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>40 mW</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>1,4 H</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>3,03 μF</td>
</tr>
</tbody>
</table>
3.3) Intrinsically safe sensor circuits for 3500****4*1B*

3.3.1) Drive-circuit (terminals J2-A12 -C12)

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uo</td>
<td>DC</td>
</tr>
<tr>
<td>Current (pulse)</td>
<td>Io</td>
<td>1,14 A</td>
</tr>
<tr>
<td>Limited by a fuse with a nominal value of</td>
<td>250 mA</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>1,2 W</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>27,4 μH</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>1,7 μF</td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>Lo/Ro</td>
<td>10,9 μH/Ω</td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIB

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uo</td>
<td>DC</td>
</tr>
<tr>
<td>Current (pulse)</td>
<td>Io</td>
<td>1,14 A</td>
</tr>
<tr>
<td>Limited by a fuse with a nominal value of</td>
<td>250 mA</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>1,2 W</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>109 μH</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>11,7 μF</td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>Lo/Ro</td>
<td>43,7 μH/Ω</td>
</tr>
</tbody>
</table>

The maximum external inductance L (sensor coil) can be calculated with the following term:

\[ L = 2 \times E \times \left(\frac{R_i + R_o}{1,5 \times U_o}\right)^2 \]

Whereby E = 40 μJ for group IIC and E = 160 μJ for group IIB will be inserted and Ro is the total resistance (coil resistance + series resistance).

3.3.2) Pick-off circuits (terminals J2-A8/C8 and J2-A10/C10)

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uo</td>
<td>DC</td>
</tr>
<tr>
<td>Current</td>
<td>Io</td>
<td>8,45 mA</td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>45 mW</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>490 mH</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>180 nF</td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIB

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Uo</td>
<td>DC</td>
</tr>
<tr>
<td>Current (pulse)</td>
<td>Io</td>
<td>8,45 mA</td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>45 mW</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>1,9 H</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>1,24 μF</td>
</tr>
</tbody>
</table>
3.3.3) Temperature circuit (terminals J2-C6/A6/C4)

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>V</td>
<td>DC</td>
</tr>
<tr>
<td>Current</td>
<td>mA</td>
<td>17</td>
</tr>
<tr>
<td>Power</td>
<td>mW</td>
<td>90</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>mH</td>
<td>122</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>nF</td>
<td>180</td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIB

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>V</td>
<td>DC</td>
</tr>
<tr>
<td>Current (pulse)</td>
<td>mA</td>
<td>17</td>
</tr>
<tr>
<td>Power</td>
<td>mW</td>
<td>90</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>mH</td>
<td>490</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>µF</td>
<td>1,24</td>
</tr>
</tbody>
</table>

3.4) For type 3500****5*1B**** and 3500****6*1B**** (terminals J2-A4/C4 and J2-A6/C6) 4-wire board

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>V</td>
<td>DC</td>
</tr>
<tr>
<td>Current</td>
<td>mA</td>
<td>17</td>
</tr>
<tr>
<td>Power</td>
<td>mW</td>
<td>90</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>µH</td>
<td>151,7</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>µF</td>
<td>0,333</td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>µH/Ω</td>
<td>17,06</td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIB

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>V</td>
<td>DC</td>
</tr>
<tr>
<td>Current (pulse)</td>
<td>mA</td>
<td>484</td>
</tr>
<tr>
<td>Power</td>
<td>W</td>
<td>2,05</td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>µH</td>
<td>607</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>µF</td>
<td>2,04</td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>µH/Ω</td>
<td>68,2</td>
</tr>
</tbody>
</table>

3.5) Ambient temperature range

3500******1B****

Ta –20 °C up to +60 °C

4) Marking

\[\text{Ex} \quad \text{II (2) G}\]

–20 °C ≤ Ta ≤ +60 °C

<table>
<thead>
<tr>
<th>- type</th>
<th>- type of protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>3500****<strong>1B</strong>**</td>
<td>[EExib] IIB/IIC</td>
</tr>
</tbody>
</table>
5) Special conditions for safe use / Installation instructions

5.1) The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

5.2) The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

5.3) For type 3500*****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.
Model 3500 to sensor with enhanced core processor

Special conditions for safe use:

1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

**I.S. 3500 outputs to core processor entity parameters**

| Uo | 27.2 Vdc |
| Io | 4.84 mA |
| Co | 160 pF |
| Lo | 800 μH |
| Ro | 201.6 Ω/ohm |

**4-wire I.S. and non-incendive core processor entity parameters**

| U | 24 VDC |
| I | 5.64 mA |
| C | 2200 μF |
| L | 30 μH |

**4-wire I.S. and non-incendive core processor entity parameters**

| U | 24 Vdc |
| I | 5.64 mA |
| C | 2200 μF |
| L | 30 μH |

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

**Installation notes:**

- The total Ci is equal to the sum of all Ci values of all devices on the network. Ccable is the total capacitance of all cable on the network.

- The total Li is equal to the sum of all Li values of all devices on the network. Lcable 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 μH/m

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

**Electronics: 3500**

EB-20003016 Rev. A
Model 3500 Transmitters

Model 3500 to CMF, F, H, R, CNG and T sensors with core processor

Special conditions for safe use:

1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500*****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of uninsulated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

**I.S. 3500 outputs to core processor entity parameters**

| Vdc | 17.2 Vdc |
| Pa | 484 mA |
| Ci | 2.25 μF |
| La | 15 μH |

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

**Hazardous Area**
EEEx IIB / IIC

Refer to sensor tag for complete hazardous area classification.

**4-wire I.S. and non-incendive core processor entity parameters**

| Vdc | 17.3 Vdc |
| Ii | 484 mA |
| Pi | 2.18 mA |
| Li | 30 μH |

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

**Installation notes:**

- The total Ci is equal to the sum of all Ci values of all devices on the network. Ccable is the total capacitance of all cable on the network.

- The total Li is equal to the sum of all Li values of all devices on the network. Lcable 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 μH/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.**

**Electronics: 3500**

EB-20000251 Rev. C
Model 3500 to D600 sensor with core processor

Special conditions for safe use:

1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

I.S. 3500 outputs to core processor entity parameters:

| Ua | 17.2 ± Vdc |
| L1 | 484 ± mA |
| L2 | 21.1 ± μH |
| L3 | 2200 ± μF |
| L4 | 30μH |

Hazardous Area EEx de [ib] IIB

Refer to sensor tag for complete hazardous area classification.

Installation method

Conduit EEx d IIB Conduit Seal

Cable EEx d IIB Cable Gland

Conduit or Cable Increased Safety EEx e

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

For Remote Mount Booster Amplifier wiring refer to EB-1005122.

Installation notes:

- The total Ci is equal to the sum of all Ci values of all devices on the network. Ccable is the total capacitance of all cable on the network.

- The total Li is equal to the sum of all Li values of all devices on the network. Lcable 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 μH/m**

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

Associated apparatus parameter limits:

| Vdc | +Hmax |
| Vdc | +Hmax |
| Vdc | +Hmax |
| Vdc | +Hmax |

Micro Motion mass flowmeter system connection for Intrinsically safe operation.

Electronics: 3500
Sensor: D600

EB-20000248 Rev. C
Model 3500 to CMF, D (except D600), DL, F (except F300), H (except H300), and T sensors with junction box

3500 IN SAFE AREA LOCATION TO SENSOR IN HAZARDOUS LOCATION

Special conditions for safe use:

1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

Refer to sensor tag for complete hazardous area classification.

Hazardous Area

EEEx ib IIB / IIC

Micro Motion mass flowmeter system connection for intrinsically safe operation.
Model 3500 Transmitters

Model 3500 to CMF400 sensor with booster amplifier with junction box

3500 IN SAFE AREA LOCATION TO BOOSTER AMP IN HAZARDOUS LOCATION

Special conditions for safe use:

1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500*****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

MODEL 3500

Hazardous Area

<table>
<thead>
<tr>
<th>Installation method</th>
<th>Fitting required</th>
<th>Per EN 60079-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduit</td>
<td>EEx d IIB conduit seal</td>
<td></td>
</tr>
<tr>
<td>Cable</td>
<td>EEx d IIB cable gland</td>
<td></td>
</tr>
<tr>
<td>Conduit or cable increased safety</td>
<td>EEx e</td>
<td></td>
</tr>
</tbody>
</table>

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

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

MODEL CMF400

For Remote Mount Booster Amplifier wiring refer to EB-3005831

Electronics: 3500
Sensor: CMF400
EB-20000276 Rev. B

CAUTION: To maintain intrinsic safety, the intrinsically safe wiring must be installed according to EN 60079-14 Transmitter and sensor must be properly grounded.
Model 3500 to D600 sensor with junction box

3500 IN SAFE AREA LOCATION TO SENSOR IN HAZARDOUS LOCATION

Special conditions for safe use:

1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500*****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

Note: Prepare cable per the instructions provided with the cable. Maximum cable length determined by entity parameters and maximum cable inductance.

Hazardous Area EEEx [ib] IIB

<table>
<thead>
<tr>
<th>Installation method</th>
<th>Fitting required</th>
<th>Per EN60079–14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduit</td>
<td>EEEx d IIB Conduit Seal</td>
<td></td>
</tr>
<tr>
<td>Cable</td>
<td>EEEx d IIB Cable Gland</td>
<td></td>
</tr>
<tr>
<td>Conduit or Cable</td>
<td>Increased Safety</td>
<td>EEEx e</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

1/2"–14 NPT or M20 × 1.5 adapter supplied as ordered

To drive coil located in sensor

Power

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

For Remote Mount Booster Amplifier wiring refer to EB-3007062.

Micro Motion mass flowmeter system connection for intrinsically safe operation.

Electronics: 3500
Sensor: D600

EB-20000277 Rev. B
Model 3500 Transmitters

Model 3500 to DT sensor with junction box

3500 IN SAFE AREA LOCATION TO SENSOR IN HAZARDOUS LOCATION

Special conditions for safe use:

1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500*****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

Hazardous Area

\[ \text{EEx ib IIB} \]

CAUTION:
To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring, and the transmitter and sensor must be properly grounded.

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

DT sensor wire terminations to 9-wire IS cable

<table>
<thead>
<tr>
<th>Sensor wire #</th>
<th>IS cable color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
</tr>
<tr>
<td>3</td>
<td>Orange</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Green</td>
</tr>
<tr>
<td>6</td>
<td>Blue</td>
</tr>
<tr>
<td>7</td>
<td>Violet</td>
</tr>
<tr>
<td>8</td>
<td>Gray</td>
</tr>
<tr>
<td>9</td>
<td>White</td>
</tr>
</tbody>
</table>

Micro Motion mass flowmeter system connection for intrinsically safe operation.

MODEL 3500

Supplied as intrinsically safe.
Model 3500 to remote core processor to CMF, D (except D600), DL, F, H and T sensors with junction box

3500 IN SAFE AREA LOCATION TO SENSOR IN HAZARDOUS LOCATION

Special conditions for safe use:

1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

I.S. 3500 outputs to core processor entity parameters

| Ua | 17.2 Vdc |
| Is | 484 mA |
| Ps | 2.05W |
| Co | 10.533 μF |
| Lo | 185.7 μH |
| Lc | 807 μH |
| Ls | 17.06 μH/0Ωm |
| Lr | 6.3 μΩ/cm |

Installation notes:

- Maximum cable length determined by entity parameters and maximum cable inductance.
- The total Ci is equal to the sum of all Ci values of all devices on the network. Ccable is the total capacitance of all cable on the network.
- The total Li is equal to the sum of all Li values of all devices on the network. Lcable 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 = 197pF/m Cable Inductance = 0.66μH/m
- This device must not be connected to any associated apparatus which uses or generates more than 250Vrms with respect to earth ground.

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

Refer to sensor tag for complete hazardous area classification.

CAUTION:
To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring, and the transmitter and sensor must be properly grounded.

Micro Motion mass flowmeter system connection for intrinsically safe operation.
Model 3500 Transmitters

Model 3500 to remote core processor to D600 sensor with junction box

3500 IN SAFE AREA LOCATION TO SENSOR IN HAZARDOUS LOCATION

Special conditions for safe use:
1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500*****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

4. I.S. 3500 outputs to core processor entity parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uo</td>
<td>17.2 Vdc</td>
</tr>
<tr>
<td>Is</td>
<td>484 mA</td>
</tr>
<tr>
<td>Rs</td>
<td>2.05Ω</td>
</tr>
<tr>
<td>Co</td>
<td>7.32 μF</td>
</tr>
<tr>
<td>Lo</td>
<td>157.2 μH</td>
</tr>
<tr>
<td>L/R</td>
<td>17.06 μH/0hm</td>
</tr>
<tr>
<td>I2</td>
<td>607 μA</td>
</tr>
</tbody>
</table>

Installation notes:

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

- * The total Ci is equal to the sum of all Ci values of all devices on the network. Ccable is the total capacitance of all cable on the network.

- * The total Li is equal to the sum of all Li values of all devices on the network. Lcable 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 = 15pF/m Cable Inductance = 0.66µH/m

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

5. Refer to sensor tag for complete hazardous area classification.

6. To drive coil located in sensor

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation

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

Refer to sensor tag for complete hazardous area classification.

Hazardous Area EEx de [ib] IIB

For remote mount booster amplifier wiring refer to EB-3007062.
Model 3500 to remote core processor to DT sensor with junction box

2500 IN SAFE AREA LOCATION TO SENSOR IN HAZARDOUS LOCATION

Special conditions for safe use:

1. The transmitter has to be installed outside the hazardous area into a housing which shall at least have a degree of protection of IP 20 according to IEC Publication 529.

2. The installation of the transmitter shall be such that the clearances between bare parts of intrinsically safe circuits and metallic housing parts will be at least 3 mm and between bare parts of intrinsically safe circuits and bare parts of the non-intrinsically safe circuits be at least 6 mm.

3. For type 3500****A1B**** the terminals for connection of external intrinsically safe circuits shall be so arranged that the distance between those terminals and terminals of unisolated conductors of non-intrinsically safe circuits will be at least 50 mm or that they are separated by a barrier according to EN 50020 clause 6.4.1.

I.S. 3500 outputs to core processor entity parameters

<table>
<thead>
<tr>
<th>Ua</th>
<th>17.2 Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ia</td>
<td>0.2 mA</td>
</tr>
<tr>
<td>Ca</td>
<td>5.33 µF</td>
</tr>
<tr>
<td>Lo</td>
<td>111.7 µH</td>
</tr>
<tr>
<td>L/R</td>
<td>37.06 µH/m</td>
</tr>
<tr>
<td>I/R</td>
<td>8.74 µH/m</td>
</tr>
</tbody>
</table>

Installation notes:

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

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

Hazardous Area EEx ib IIB / IIC

4-wire IS cable: VDC+ VDC–

- Ground screw
- Red
- Blue
- Gray
- Orange
- Yellow
- Black

9-wire IS cable: VDC+ VDC–, 5 VDC

- Ground screw
- Brown
- Violet
- White

DT sensor wire terminations to IS cable

<table>
<thead>
<tr>
<th>DT sensor wire #</th>
<th>IS cable color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
</tr>
<tr>
<td>3</td>
<td>Orange</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Green</td>
</tr>
<tr>
<td>6</td>
<td>Blue</td>
</tr>
<tr>
<td>7</td>
<td>Violet</td>
</tr>
<tr>
<td>8</td>
<td>Gray</td>
</tr>
<tr>
<td>9</td>
<td>White</td>
</tr>
</tbody>
</table>

Models: DT65, DT100, DT150

Supplied as intrinsically safe

Micro Motion mass flowmeter system connection for intrinsically safe operation

Electronics: 3500
Sensor: DT

EB-20000242 Rev. C

CAUTION: To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring, and the transmitter and sensor must be properly grounded.
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 50014:1997 +A1-A2  General requirements
EN 50018:2000  Flameproof enclosure "d"
EN 50019:2000  Increased safety "e"
EN 50020:2002  Intrinsic safety "i"

Code for type of protection
EEEx de [ib] IIIB/IIC T4
1) **Subject and type**

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

The options denoted by * are as follows:

- Number 70 or 35 for model type
- Number 0, 3, 4, 5, or 6 for sensor interface
- Number for additional hardware
- Letter for future options
- Power
  - 1 = 85–265 VAC
  - 2 = 18–30 VDC
- Field mount
- Letter for language
- Letter A, B, C, or D for Conduit Connections
- Letters for application software

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 3**0A*****Z**** transmitter comes with different sensor interface boards. The 3**0A***3*Z**** is for 9 wire installation to a sensor with junction box. The 3**0A***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 3**0A***5*Z**** is for 4 wire installation to a sensor with integral core processor (Model 700). The 3**0A***6*Z**** is for connection to the remote mount core (DMT 02 ATEX E 002).
3) Parameters

3.1) Mains circuit

For type 3**0A1****Z**** (terminals J18-10 and J18-9)
Voltage
Max. voltage

For type 3**0A2****Z**** (terminals J18-9 and J18-10)
Voltage

3.2) Non-intrinsically safe data circuits

Terminals J18-1 and J18-8 and J18-11 and J18-20
Voltage

3.3) Intrinsically safe sensor circuits for 3**0A***3*Z****

3.3.1) Drive-circuit (terminals J19-11 and J19-12)

Type of protection EEx ib IIC
Voltage
Current (pulse)
Limited by a fuse with a nominal value of
Power
Max. external inductance
Max. external capacitance
Max. inductance/resistance ratio

Type of protection EEx ib IIB
Voltage
Current (pulse)
Limited by a fuse with a nominal value of
Power
Max. external inductance
Max. external capacitance
Max. inductance/resistance ratio
The maximum external inductance L (sensor coil) can be calculated with the following term:

\[ L = 2 \times E \times (R_i + R_o / 1.5 \times U_o)^2 \]

Whereby \( E = 40 \, \mu\text{J} \) for group IIC and \( E = 160 \, \mu\text{J} \) for group IIB will be inserted and \( R_o \) is the total resistance (coil resistance + series resistance).

3.3.2) Pick-off circuits (terminals J19-18/17 and J19-20/19)

<table>
<thead>
<tr>
<th>Type of protection EEx ib IIC</th>
<th>Voltage</th>
<th>Uo</th>
<th>DC</th>
<th>15.6</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>Io</td>
<td>10</td>
<td>mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>40</td>
<td>mW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>355</td>
<td>mH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>500</td>
<td>nF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of protection EEx ib IIB</th>
<th>Voltage</th>
<th>Uo</th>
<th>DC</th>
<th>15.6</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (pulse)</td>
<td>Io</td>
<td>10</td>
<td>mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>40</td>
<td>mW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>1.4</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>3.03</td>
<td>μF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3.3) Temperature circuit (terminals J19-15/16/13)

<table>
<thead>
<tr>
<th>Type of protection EEx ib IIC</th>
<th>Voltage</th>
<th>Uo</th>
<th>DC</th>
<th>15.6</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>Io</td>
<td>10</td>
<td>mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>40</td>
<td>mW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>355</td>
<td>mH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>500</td>
<td>nF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of protection EEx ib IIB</th>
<th>Voltage</th>
<th>Uo</th>
<th>DC</th>
<th>15.6</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (pulse)</td>
<td>Io</td>
<td>10</td>
<td>mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>40</td>
<td>mW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>1.4</td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>3.03</td>
<td>μF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.4) Intrinsically safe sensor circuits for 3**0A***4*Z****
3.4.1) Drive-circuit (terminals J19-11 and J19-12)

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (Uo)</td>
<td>DC 11.4 V</td>
</tr>
<tr>
<td>Current (Io)</td>
<td>1.14 A</td>
</tr>
<tr>
<td>Limited by fuse with nominal value</td>
<td>250 mA</td>
</tr>
<tr>
<td>Power (Po)</td>
<td>1.2 W</td>
</tr>
<tr>
<td>Max. external inductance (Lo)</td>
<td>27.4 μH</td>
</tr>
<tr>
<td>Max. external capacitance (Co)</td>
<td>1.7 μF</td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>10.9 μH/Ω</td>
</tr>
</tbody>
</table>

The maximum external inductance L (sensor coil) can be calculated with the following term:

\[ L = 2 \times E \times (R_i + R_o / 1.5 \times U_o)^2 \]

Whereby E = 40 μJ for group IIIC and E = 160 μJ for group IIB will be inserted and Ro is the total resistance (coil resistance + series resistance).

3.4.2) Pick-off circuits (terminals J19-18/17 and J19-20/19)

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (Uo)</td>
<td>DC 21.13 V</td>
</tr>
<tr>
<td>Current (Io)</td>
<td>8.45 mA</td>
</tr>
<tr>
<td>Power (Po)</td>
<td>45 mW</td>
</tr>
<tr>
<td>Max. external inductance (Lo)</td>
<td>490 mH</td>
</tr>
<tr>
<td>Max. external capacitance (Co)</td>
<td>180 μF</td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIB

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (Uo)</td>
<td>DC 21.13 V</td>
</tr>
<tr>
<td>Current (Io)</td>
<td>8.45 mA</td>
</tr>
<tr>
<td>Power (Po)</td>
<td>45 mW</td>
</tr>
<tr>
<td>Max. external inductance (Lo)</td>
<td>1.9 H</td>
</tr>
<tr>
<td>Max. external capacitance (Co)</td>
<td>1.24 nF</td>
</tr>
</tbody>
</table>

3.4.3) Temperature circuit (terminals J19-15/16/13)

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (Uo)</td>
<td>DC 21.13 V</td>
</tr>
<tr>
<td>Current (Io)</td>
<td>17 mA</td>
</tr>
<tr>
<td>Power (Po)</td>
<td>90 mW</td>
</tr>
<tr>
<td>Max. external inductance (Lo)</td>
<td>122 mH</td>
</tr>
<tr>
<td>Max. external capacitance (Co)</td>
<td>180 nF</td>
</tr>
</tbody>
</table>
3.5) For type 3**0A***5*Z**** and 3* *0A***6*Z**** (terminals J19-13/14 and J19-15/16) 4-wire board

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Uo</th>
<th>DC</th>
<th>17.22</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (pulse)</td>
<td>Io</td>
<td>mA</td>
<td>484</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>W</td>
<td>2.05</td>
<td></td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>μH</td>
<td>151.7</td>
<td></td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>μF</td>
<td>0.333</td>
<td></td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>Lo/Ro</td>
<td>μH/Ω</td>
<td>17.06</td>
<td></td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIB

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Uo</th>
<th>DC</th>
<th>17.22</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (pulse)</td>
<td>Io</td>
<td>mA</td>
<td>484</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Po</td>
<td>W</td>
<td>2.05</td>
<td></td>
</tr>
<tr>
<td>Max. external inductance</td>
<td>Lo</td>
<td>μH</td>
<td>607</td>
<td></td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co</td>
<td>μF</td>
<td>2.04</td>
<td></td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>Lo/Ro</td>
<td>μH/Ω</td>
<td>68.2</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Uo</th>
<th>DC</th>
<th>13.4</th>
<th>V</th>
</tr>
</thead>
</table>

3.7) Ambient temperature range

3**0******Z****

| Ta | –20 °C up to +60 °C or –30 °C up to +60 °C available with special order and factory test |

4) Marking

\[ \text{Ex} \quad \text{II} \quad 2 \quad \text{G} \]

\[ –20 °C \leq \text{Ta} \leq +60 °C \quad \text{or} \]

\[ –30 °C \leq \text{Ta} \leq +60 °C \quad \text{(available with special order and factory test)} \]

- type 3**0******Z****
- type of protection EEx 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 glands 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 4 of EN50014:1997 A1 + A2.
Model 3700 Transmitters

Model 3700 to sensor with enhanced core processor

3700 IN HAZARDOUS LOCATION

(WARNING: SUBSTITUTIONS OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY)

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.

<table>
<thead>
<tr>
<th>4-wire I.S. and non-incendive core processor entity parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>U</strong></td>
</tr>
<tr>
<td><strong>I</strong></td>
</tr>
<tr>
<td><strong>Ic</strong></td>
</tr>
<tr>
<td><strong>C</strong></td>
</tr>
<tr>
<td><strong>L</strong></td>
</tr>
</tbody>
</table>

Hazardous Area
EEEx de [ib] IIB / IIC

Refer to sensor tag for complete hazardous area classification.

4-wire I.S. cable

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

Installation notes:

- The total C is equal to the sum of all Ci values of all devices on the network. Ccable is the total capacitance of all cable on the network.
- The total L is equal to the sum of all Li values of all devices on the network. Lcable 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 μH/m

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

Electronics: 3700

EB-20003017 Rev. A
Model 3700 Transmitters

Model 3700 to CMF, F, H, R, CNG and T sensors with core processor

3700 IN HAZARDOUS LOCATION

(WARNING: SUBSTITUTIONS OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY)

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.

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

4. 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. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

Installation notes:

- Associated apparatus parameter limits

| $V_{oc} < V_{max}$ |
| $I_{oc} < I_{lim}$ |
| $(V_{oc} \times I_{oc}) / 4 < I_{max}$ |
| $C_{c} > (C_{oc} + C_{1} + C_{2} + \ldots + C_{n})$ |
| $L_{o} > (L_{oc} + L_{1} + L_{2} + \ldots + L_{n})$ |

- The total $C_1$ is equal to the sum of all $C_i$ values of all devices on the network. $C_{oc}$ 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. $L_{oc}$ 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 μH/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.

Electronics: 3700

EB-20000225 Rev. C
Model 3700 to D600 sensor with core processor

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.

Electronics: 3700
Sensor: D600

EB-20000222 Rev. C
Model 3700 to CMF, F (except F300), H (except H300), D (except D600), and DL sensors with junction box

3700 IN HAZARDOUS LOCATION TO SENSOR IN HAZARDOUS LOCATION

(WARNING: SUBSTITUTIONS OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY)

Hazardous Area
EEx de [ib] IIB/IIC

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.

3. Refer to sensor tag for complete hazardous area classification.

CAUTION: To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring, and the Transmitter and Sensor must be properly grounded.

Electronics: 3700

Micro Motion mass flowmeter system connection for intrinsically safe operation.

EB-20001045 Rev. E
Model 3700 Transmitters

Model 3700 to CMF400 sensor with booster amplifier with junction box

3700 IN HAZARDOUS LOCATION TO BOOSTER AMP IN HAZARDOUS LOCATION

(WARNING: SUBSTITUTIONS OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY)

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.

Hazardous Area
EEx de [ib] IIB / IIC

3700 Intrinsically safe terminals (color: blue)
3700 Non-intrinsically safe terminals (color: gray)

NOTE: Prepare cable per the instructions provided with the cable.

9-wire IS cable
300 m maximum cable length

NOTE: Prepare cable per the instructions provided with the cable.

9-wire IS cable
300 m maximum cable length

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

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation

For Remote Mount Booster Amplifier wiring refer to EB-3005831

Electronics: 3700
Sensor: CMF400

EB-20000271 Rev. C
Model 3700 Transmitters

Model 3700 to D600 sensor with junction box

Conditions for safe use:
1. The use of the transmitter at an ambient temperature under –20 ºC 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.

3700 IN HAZARDOUS LOCATION TO SENSOR IN HAZARDOUS LOCATION

(WARNING: SUBSTITUTIONS OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY)

Hazardous Area
EEx de [ib] IIB

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

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

NOTE: Prepare cable per the instructions provided with the cable.

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

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation.

For Remote Mount Booster Amplifier wiring refer to EB-3007062.
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.

NOTE: Prepare cable per the instructions provided with the cable. Maximum cable length determined by entity parameters and maximum cable inductance.

CAUTION: To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring, and the transmitter and sensor must be properly grounded.

DT sensor wire terminations to 9-wire IS cable

<table>
<thead>
<tr>
<th>Sensor wire #</th>
<th>IS cable color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
</tr>
<tr>
<td>3</td>
<td>Orange</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Green</td>
</tr>
<tr>
<td>6</td>
<td>Blue</td>
</tr>
<tr>
<td>7</td>
<td>Violet</td>
</tr>
<tr>
<td>8</td>
<td>Gray</td>
</tr>
<tr>
<td>9</td>
<td>White</td>
</tr>
</tbody>
</table>

Micro Motion mass flowmeter system connection for intrinsically safe operation.

Supplied as intrinsically safe.

Hazardous Area
EEEx de [ib] IIB/IIC

Electronics: 3700
Sensor: DT

EB-20000275 Rev. B
3700 IN HAZARDOUS LOCATION TO SENSOR IN HAZARDOUS LOCATION

(WARNING: SUBSTITUTIONS OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY)

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.

**CAUTION:** To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring, and the transmitter and sensor must be properly grounded.

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

Hazardous Area EEx lb IIB / IIC

**Ground screw**

Black

Red

Yellow

Green

Gray

Blue

Violet

White

CAUTION: 
To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring, and the transmitter and sensor must be properly grounded.

Refer to sensor tag for complete hazardous area classification.

Micro Motion mass flowmeter system connection for intrinsically safe operation.

Model 3700 Transmitters

Model 3700 to remote core processor to CMF, D (except D600), DL, F, H and T sensors with junction box

Refer to sensor tag for complete hazardous area classification.

Sensor junction box

Chassis ground

Green

White

Brown

Red

Orange

Gray

Blue

Violet

Yellow

Micro Motion mass flowmeter system connection for intrinsically safe operation.
Model 3700 to remote core processor to D600 sensor with junction box

**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.

---

**I.S. 3700 outputs to core processor entity parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vdc</td>
<td>+24V</td>
</tr>
<tr>
<td>Is</td>
<td>58mA</td>
</tr>
<tr>
<td>Co</td>
<td>0.47pF</td>
</tr>
<tr>
<td>Lo</td>
<td>108µH</td>
</tr>
<tr>
<td>Ci</td>
<td>0.1µF</td>
</tr>
<tr>
<td>Lcable</td>
<td>0.6µH</td>
</tr>
<tr>
<td>Rcable</td>
<td>6.8µΩ</td>
</tr>
</tbody>
</table>

**Installation notes:**

- The total Ci is equal to the sum of all Ci's of all devices on the network. Ccable is the total capacitance of all cable on the network.
- The total Li is equal to the sum of all Li's of all devices on the network. Lcable 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 = 197pF/m Cable Inductance = 0.66µH/m
- This device must not be connected to any associated apparatus which uses or generates more than 250Vrms with respect to earth ground.

**4-wire IS cable**

- VDC+
- VDC–
- RS485A
- RS485B

**5-wire IS cable**

- VDC+
- VDC–
- RS485A
- RS485B
- Power

**Hazardous Area**

EEEx ib IIB / IIC

**Remote core processor**

- Ground screw
- Hazardous Area
- 9-wire IS cable

**Micro Motion mass flowmeter system**

**Sensor booster amplifier**

Electronics: 3700
Sensor: D600

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

**To achieve potential equalization**

The ground terminal must be connected to the appropriate ground terminal within the hazardous area using a potential equalizing line.
3700 IN HAZARDOUS LOCATION TO SENSOR IN HAZARDOUS LOCATION

(WARNING: SUBSTITUTIONS OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY)

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.

I.S. 3700 outputs to core processor entity parameters

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

Installation notes:
- The total Ci is equal to the sum of all Ci values of all devices on the network. Ccable is the total capacitance of all cable on the network.
- The total Li is equal to the sum of all Li values of all devices on the network. Lcable 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 = 197pF/m Cable Inductance = 0.66µH/m
- This device must not be connected to any associated apparatus which uses or generates more than 250Vrms with respect to earth ground.

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

Hazardous Area EEx ib IIB / IIC

Models: DT65, DT100, DT150
Supplied as intrinsically safe

Micro Motion mass flowmeter system connection for intrinsically safe operation

CAUTION: To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring, and the transmitter and sensor must be properly grounded.
Model RFT9739 Transmitters
ATEX Drawings and Installation Instructions

- For installing the following Micro Motion transmitters with 9-wire connections:
  - Model RFT9739R
  - Model RFT9739D/E

Subject: Equipment type
Transmitter type RFT9739**E****
Manufactured and submitted
for examination
Micro Motion, Inc.
Address
Boulder, Co. 80301, USA
Standard basis
EN 50014:1997 +A1-A2 General requirements
EN 50018:2000 Flameproof enclosure ´d´
EN 50020:1994 Intrinsic safety ´i´
Code for type of protection
EEx d [ib] IIC T6
[EEx ib] IIC
1) Subject and type

Transmitter type RFT9739**E****

The options denoted by * are as follows:

R F T 9 7 3 9 * * E * * *

- Letter for factory options
- Language
- Letter for conduit connections
- Approval
  - Y = ATEX intrinsically safe sensor outputs
  - W = ATEX intrinsically safe sensor outputs flameproof transmitter (only for RFT9739E)
- Power rating
  - 1 = 110/115 VAC (only for RFT9739R)
  - 2 = 220/230 VAC (only for RFT9739R)
  - 3 = 12–30 VCD (only for RFT9739R)
  - 4 = 85–250 VAC (only for RFT9739D and E)
  - 5 = 12–30 VCD (only for RFT9739D and E)
- Type
  - D = Field-mount transmitter with display
  - E = Field-mount transmitter without display
  - R = Rack-mount transmitter

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 flameproof metal enclosure type RFT9739E.

The RFT9739D and RFT9739R are not flameproof enclosures.
3) Parameters

3.1) Mains circuit (See document EB-3007165 or EB-3008013 for terminals)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>AC/DC</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td></td>
<td>12–250  V</td>
</tr>
<tr>
<td>Max. voltage</td>
<td>Um</td>
<td>250     V</td>
</tr>
</tbody>
</table>

3.2) Intrinsically safe circuits type of protection EEx ib IIC / EEx ib IIB

The circuits designed for connecting sensors are classified initially in Group IIC. However, when certain sensors are connected, they can also be assigned to Group IIB.

3.2.1) Drive circuit (see document EB-3007165 or EB-3008013 for terminals)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>DC</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Umax</td>
<td>11,4   V</td>
</tr>
<tr>
<td>Current</td>
<td>Imax</td>
<td>1,14   A</td>
</tr>
<tr>
<td>Nominal fuse</td>
<td></td>
<td>250    mA</td>
</tr>
<tr>
<td>Power</td>
<td>Pmax</td>
<td>1,2    W</td>
</tr>
<tr>
<td>Internal resistance</td>
<td>RI</td>
<td>10     Ω</td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIC

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. external inductance</td>
<td>Lo 27,4 μH</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co 1,7 μF</td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>Lo/Ro 10,9 μH/Ω</td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIB

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. external inductance</td>
<td>Lo 109 μH</td>
</tr>
<tr>
<td>Max. external capacitance</td>
<td>Co 11,7 μF</td>
</tr>
<tr>
<td>Max. inductance/resistance ratio</td>
<td>Lo/Ro 43,7 μH/Ω</td>
</tr>
</tbody>
</table>

The maximum external inductance L (sensor coil) can be calculated with the following term:

\[ L = 2 \times E \times (R_i + R_o / 1,5 \times U_o)^2 \]

Whereby \( E = 40 \, \mu J \) for group IIC and \( E = 160 \, \mu J \) for group IIB will be inserted and Ro is the total resistance (coil resistance + series resistance).
### 3.2.2) Pick-off circuits (see document EB-3007165 or EB-3008013 for terminals)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>U\text{max}</th>
<th>DC</th>
<th>7.6</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>I\text{max}</td>
<td></td>
<td>4.75</td>
<td>mA</td>
</tr>
<tr>
<td>Power</td>
<td>P\text{max}</td>
<td></td>
<td>18</td>
<td>mW</td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIC

- Max. external inductance: Lo 1.5 H
- Max. external capacitance: Co 10.4 μF

Type of protection EEx ib IIB

- Max. external inductance: Lo 6.3 H
- Max. external capacitance: Co 160 μF

### 3.2.3) Temperature circuit (see document EB-3007165 or EB-3008013 for terminals)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>U\text{max}</th>
<th>DC</th>
<th>14</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>I\text{max}</td>
<td></td>
<td>7</td>
<td>mA</td>
</tr>
<tr>
<td>Power</td>
<td>P\text{max}</td>
<td></td>
<td>25</td>
<td>mW</td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIC

- Max. external inductance: Lo 725 mH
- Max. external capacitance: Co 0.73 μF

Type of protection EEx ib IIB

- Max. external inductance: Lo 2.9 H
- Max. external capacitance: Co 4.6 μF

### 3.3) Ambient temperature range

- **RFT9739R*E****
  - Ta: –20 °C to +55 °C
- **RFT9739(D or E)*E****
  - Ta: –30 °C to +45 °C or
  - Ta: –40 °C to +45 °C (routine test required, only for RFT9739E*EW****)
4) Marking

\[\textbf{Ex} \quad \text{II 2 G or II (2) G}\]

\(-20 \, ^\circ\text{C} \leq Ta \leq +55 \, ^\circ\text{C}\) for RFT9739R
\(-30 \, ^\circ\text{C} \leq Ta \leq +45 \, ^\circ\text{C}\) for RFT9739(D or E)*E**** or
\(-40 \, ^\circ\text{C} \leq Ta \leq +45 \, ^\circ\text{C}\) (routine test required, only for RFT9739E*EW****)

<table>
<thead>
<tr>
<th>- type</th>
<th>- type of protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFT9739E<em>EW</em>***</td>
<td>EEx d[ib] IIC T6</td>
</tr>
<tr>
<td>RFT9739E<em>EY</em>***</td>
<td>[EEx ib] IIC</td>
</tr>
<tr>
<td>RFT9739D<em>EY</em>***</td>
<td>[EEx ib] IIC</td>
</tr>
<tr>
<td>RFT9739R<em>EY</em>***</td>
<td>[EEx ib] IIC</td>
</tr>
</tbody>
</table>

5) Special conditions for safe use / Installation instructions for RFT9739E*EW****.

5.1) For the application of the transmitter in an ambient temperature of less than \(-20 \, ^\circ\text{C}\) suitable cable and cable entries or conduit entries certified for this condition shall be used.

5.2) If certified conduit entries are used for the connection of the transmitter enclosure, the associated stopping boxes shall be installed immediately at the enclosure.

5.3) The transmitter shall only be installed within the intended hazardous area if metal cable entries (with 3/4"–14 NPT threading) are used which are classified as EEx d IIC and are for enclosures with >2dm³ and are certified by an authorized test station.

5.4) Entry holes which are not being used must be sealed with blanking plugs and which are classified as EEx d IIC and are certified by an authorized test station.

5.5) For installation outside the hazardous area, it is allowed to use cable entry fittings that are not flameproof.

5.6) To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

5.7) The non-intrinsically safe end of the transmitter must only be connected to devices where there are no voltages higher than 250V.

5.8) After de-energizing the flameproof RFT9739, delay 5 minutes before opening the cover.
6) Special conditions for safe use / Installation instructions for RFT9739(R or D or E)*EY***.

6.1) The transmitter must be installed outside the hazardous area in such a way that it meets a degree of protection of at least IP20 according to EN60529.

6.2) To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

6.3) The non-intrinsically safe end of the transmitter must only be connected to devices where there are no voltages higher than 250V.
Model RFT9739R to CMF, F (except F300), H (except H300), D (except D600), and DL sensors with junction box

**MODEL RFT9739R TRANSMITTER IN SAFE AREA TO SENSOR IN HAZARDOUS LOCATION**

**Voltage label**

**Equipment ground**

**Non-intrinsically safe outputs**

**For installation in safe area:**

[EEEx ib] IIB / IIC

**Equipment ground**

**Non-intrinsically safe outputs**

**Special conditions for safe use/installation instructions for RFT9739R**

The transmitter must be installed outside the hazardous area to meet at least IP20 requirements according to IEC529.

To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

The non-intrinsically safe end of the transmitter must not connect to devices with voltages higher than 250V.

**Non-hazardous area**

**Hazardous Area**

[EEEx ib] IIB / IIC

Refer to sensor tag for complete hazardous area classification

**Hazardous Area**

[EEEx ib] IIB / IIC

Refer to sensor tag for complete hazardous area classification

**Models**

<table>
<thead>
<tr>
<th>Models</th>
<th>CMF</th>
<th>F (except F300 and F300A)</th>
<th>H (except H300)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplied as intrinsically safe</td>
<td>Supplied as intrinsically safe</td>
<td>Supplied as intrinsically safe</td>
<td>Supplied as intrinsically safe</td>
</tr>
</tbody>
</table>
Model RFT9739 Transmitters

Model RFT9739R to CMF400 sensor with booster amplifier with junction box

MODEL RFT9739R TRANSMITTER IN SAFE AREA TO BOOSTER AMP IN HAZARDOUS LOCATION

Voltage label

Equipment ground

IS barrier ground

For installation in safe area: [EEx ib] IIB / IIC

Special conditions for safe use/installation instructions for RFT9739R

The transmitter must be installed outside the hazardous area to meet at least IP20 requirements according to IEC529.

To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

The non-intrinsically safe end of the transmitter must not connect to devices with voltages higher than 250V.

Intrinsically safe outputs

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

Hazardous Area EEx de [ib] ib IIB

Installation Method | Fitting Required
--- | ---
Conduit | EEx d IIB Conduit Seal
Cable | EEx d IIB Cable Gland
Conduit or Cable Increased Safety | EEx e

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

Per EN 60079-14

300 m maximum cable length

Micro Motion mass flowmeter system connection for intrinsically safe operation

For Remote Mount Booster Amplifier wiring refer to EB-3005831.

Electronics: RFT9739R
Sensor: CMF400

Model CMF400

Model RFT9739R

9-wire IS cable

300 maximum cable length

Green
White
Brown
Violet
Yellow
Orange
Blue
Gray
Red

85–265 VAC N/L2 L/L1
50–60 HZ

Power

Ground chassis

To drive coil located in sensor

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

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation

For Remote Mount Booster Amplifier wiring refer to EB-3005831.

Electronics: RFT9739R
Sensor: CMF400

Model CMF400

9-wire IS cable

300 m maximum cable length

Green
White
Brown
Violet
Yellow
Orange
Blue
Gray
Red

85–265 VAC N/L2 L/L1
50–60 HZ

Power

Ground chassis

To drive coil located in sensor

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

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation

For Remote Mount Booster Amplifier wiring refer to EB-3005831.

Electronics: RFT9739R
Sensor: CMF400

Model CMF400

9-wire IS cable

300 m maximum cable length

Green
White
Brown
Violet
Yellow
Orange
Blue
Gray
Red

85–265 VAC N/L2 L/L1
50–60 HZ

Power

Ground chassis

To drive coil located in sensor

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

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation

For Remote Mount Booster Amplifier wiring refer to EB-3005831.

Electronics: RFT9739R
Sensor: CMF400

Model CMF400

9-wire IS cable

300 m maximum cable length

Green
White
Brown
Violet
Yellow
Orange
Blue
Gray
Red

85–265 VAC N/L2 L/L1
50–60 HZ

Power

Ground chassis

To drive coil located in sensor

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

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation

For Remote Mount Booster Amplifier wiring refer to EB-3005831.

Electronics: RFT9739R
Sensor: CMF400

Model CMF400

9-wire IS cable

300 m maximum cable length

Green
White
Brown
Violet
Yellow
Orange
Blue
Gray
Red

85–265 VAC N/L2 L/L1
50–60 HZ

Power

Ground chassis

To drive coil located in sensor

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

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation

For Remote Mount Booster Amplifier wiring refer to EB-3005831.

Electronics: RFT9739R
Sensor: CMF400

Model CMF400

9-wire IS cable

300 m maximum cable length

Green
White
Brown
Violet
Yellow
Orange
Blue
Gray
Red

85–265 VAC N/L2 L/L1
50–60 HZ

Power

Ground chassis

To drive coil located in sensor

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

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation

For Remote Mount Booster Amplifier wiring refer to EB-3005831.

Electronics: RFT9739R
Sensor: CMF400

Model CMF400

9-wire IS cable

300 m maximum cable length

Green
White
Brown
Violet
Yellow
Orange
Blue
Gray
Red

85–265 VAC N/L2 L/L1
50–60 HZ

Power

Ground chassis

To drive coil located in sensor

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

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

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

Micro Motion mass flowmeter system connection for intrinsically safe operation

For Remote Mount Booster Amplifier wiring refer to EB-3005831.
Model RFT9739R to D600 sensor with junction box

Special conditions for safe use/installation instructions for RFT9739R

The transmitter must be installed outside the hazardous area to meet at least IP20 requirements according to IEC529.

To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

The non-intrinsically safe end of the transmitter must not connect to devices with voltages higher than 250V.

Non-hazardous area
Model RFT9739R to DT sensor with junction box

For installation in safe area:
[EEex ib] IIB / IIC

Special conditions for safe use/installation instructions for RFT9739R
The transmitter must be installed outside the hazardous area to meet at least IP20 requirements according to IEC529.
To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.
The non-intrinsically safe end of the transmitter must not connect to devices with voltages higher than 250V.

Micro Motion mass flowmeter system connection for intrinsically safe operation

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

Sensor: DT

DT sensor wire terminations to 9-wire IS cable

<table>
<thead>
<tr>
<th>Sensor wire</th>
<th>IS cable color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
</tr>
<tr>
<td>3</td>
<td>Orange</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Green</td>
</tr>
<tr>
<td>6</td>
<td>Blue</td>
</tr>
<tr>
<td>7</td>
<td>Violet</td>
</tr>
<tr>
<td>8</td>
<td>Gray</td>
</tr>
<tr>
<td>9</td>
<td>White</td>
</tr>
</tbody>
</table>

Models
DT065, DT100, DT150

Micro Motion mass flowmeter system connection for intrinsically safe operation

Electronics: RFT9739R
Sensor: DT

EB-20000799 Rev. B
Model RFT9739D/E to CMF, F (except F300), H (except H300), D (except D600), and DL sensors with junction box

**RFT9739D OR RFT9739E IN HAZARDOUS LOCATION OR SAFE AREA TO SENSOR IN HAZARDOUS LOCATION**

---

**Without module installed**

To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalization line.

<table>
<thead>
<tr>
<th>85–250 VAC</th>
<th>50/60 Hz</th>
<th>L</th>
<th>N</th>
<th>+</th>
<th>–</th>
</tr>
</thead>
<tbody>
<tr>
<td>12–30 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Prepare cable per RFT9739 transmitter cable prep instructions provided with the sensor.

---

**For installation in Hazardous Area EEx ib IIC T6**

(RFT9739E with flameproof cable glands)

When ambient temperature is less than –20 °C, cable and cable entries or conduit entries certified for this condition shall be used.

To prevent ignition of hazardous atmospheres, disconnect from supply circuit before opening enclosure. Keep tightly closed when circuits are alive.

If certified conduit entries are used, the associated stopping boxes shall be installed immediately at the transmitter enclosure. The transmitter shall only be installed within the intended hazardous area if metal cable entries (with 3/4”–NPT threading) are used and are for enclosures with > 2dm3 which are classified as EEx d II C and are certified by an authorized test station. Unused entry holes must be sealed with blanking plugs that are classified as EEx d II C and certified by an authorized test station.

---

**For installation in Safe Area EEx ib IIC**

(RFT9739D without flameproof cable glands)

(RFT9739E without flameproof cable glands)

For installation outside the hazardous area, cable entry fittings that are not flameproof are allowed.

---

**For installation outside the hazardous area, cable entry fittings that are not flameproof are allowed.**

---

**Hazardous Area EEx ib IIB / IIC**

Refer to sensor tag for complete hazardous area classification

---

**Sensor junction box**

300m maximum cable length

---

**Hazardous Area EEx ib IIB / IIC**

Refer to sensor tag for complete hazardous area classification

---

**Sensor junction box**

---

**Models**

<table>
<thead>
<tr>
<th>CMF</th>
<th>F (except F300 and F300A)</th>
<th>H (except H300)</th>
</tr>
</thead>
</table>

Supplied as intrinsically safe

---

**Electronics:** RFT9739D or E

Sensor: CMF, F, D, DL, H

EB-20001046 Rev. E
Model RFT9739 Transmitters

Model RFT9739D/E to CMF400 sensor with booster amplifier with junction box

RFT9739D OR RFT9739E IN HAZARDOUS LOCATION OR SAFE AREA TO BOOSTER AMP IN HAZARDOUS LOCATION

Without module installed

To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

Power terminals

- 85–250 VAC 50/60 HZ L N
- 12–30 VDC

CAUTION: Power supply voltage must agree with the voltage stated.

For installation in Hazardous Area (RFT9739E with flameproof cable glands)

When ambient temperature is less than –20 °C, cable and cable entries or conduit entries certified for this condition shall be used.

To prevent ignition of hazardous atmospheres disconnect from supply circuit before opening enclosures. Keep tightly closed when circuits are alive.

If certified conduit entries are used, the associated stopping boxes shall be installed immediately at the transmitter enclosure.

The transmitter shall only be installed within the intended hazardous area if metal cable entries (with 3/4"–14 NPT threading) are used which are classified as EEx d IIC, are for enclosures with > 2 dm³, and are certified by an authorized test station.

Unused entry holes must be sealed with blanking plugs that are classified as EEx d IIC and certified by an authorized test station.

For installation outside the hazardous area, it is allowed to use cable entry fittings that are not flameproof.

For installation in Safe Area (RFT9739D without flameproof cable glands)

(RFT9739E without flameproof cable glands)

For installation in Safe Area (EEx lb IIC)

For Remote Mount Booster Amplifier wiring refer to EB-3005831.

Electronics: RFT9739D or E Sensor: CMF400

EB-20002012 Rev. A

Micro Motion mass flowmeter system connection for intrinsically safe operation
To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

Power terminals
85–250 VAC  50/60 HZ
12–30 VDC

CAUTION: Power supply voltage must agree with the voltage stated.

For installation in Hazardous Area
EEExd [ib] IIC T6
(RFT9739E with flameproof cable glands).

When ambient temperature is less than –20 °C, cable and cable entries or conduit entries certified for this condition shall be used.

To prevent ignition of hazardous atmospheres disconnect from supply circuit before opening enclosure. Keep tightly closed when circuits are alive.

If certified conduit entries are used, the associated stopping boxes shall be installed immediately at the transmitter enclosure. The transmitter shall only be installed within the intended hazardous area if metal cable entries (with 3/4”–14 NPT threading) are used which are classified as EEx d IIC and are for enclosures with > 2dm³, and are certified by an authorized test station. Unused entry holes must be sealed with blanking plugs that are classified as EEx d IIC and certified by an authorized test station.

Hazardous Area
EEEx de [ib] IIB

Installation method | Fitting required
--- | ---
Conduit | EEx d IIB conduit seal
Cable | EEx d IIB cable gland
Conduit or cable increased safety | EEx e

Per EN 60079-14

300 m maximum cable length

To achieve potential equalization the ground terminal must be connected to the appropriate grounding terminal within the hazardous area using a potential equalizing line.
Model RFT9739 Transmitters

Model RFT9739D/E to DT sensor with junction box

To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

Power terminals:
- 85–250 VAC 50/60 HZ
- 12–30 VDC

CAUTION: Power supply voltage must agree with the voltage stated.

For installation in Hazardous Area EEx d [ib] IIC T6
(RFT9739E with flameproof cable glands)

When ambient temperature is less than –20 °C, cable and cable entries or conduit entries certified for this condition shall be used.

To prevent ignition of hazardous atmospheres disconnect from supply circuit before opening enclosure. Keep tightly closed when circuits are alive.

If certified conduit entries are used, the associated stopping boxes shall be installed immediately at the transmitter enclosure. The transmitter shall only be installed within the intended hazardous area if metal cable entries (with 3/4”–14 NPT threading) are used which are classified as EEx d IIC, are for enclosures with > 2dm³, and are certified by an authorized test station. Unused entry holes must be sealed with blanking plugs that are classified as EEx d IIC and are certified by an authorized test station.

For installation outside the hazardous area, it is allowed to use cable entry fittings that are not flameproof.

Special conditions for safe use for sensor models DT065, DT100, and DT150:
- The minimum medium temperature is +32 °C.
- Micro Motion mass flowmeter system connection for intrinsically safe operation

Micro Motion mass flowmeter system connection for intrinsically safe operation

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

DT sensor wire terminations to 9-wire IS cable

<table>
<thead>
<tr>
<th>Sensor wire #</th>
<th>IS cable color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
</tr>
<tr>
<td>3</td>
<td>Orange</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Green</td>
</tr>
<tr>
<td>6</td>
<td>Blue</td>
</tr>
<tr>
<td>7</td>
<td>Violet</td>
</tr>
<tr>
<td>8</td>
<td>Gray</td>
</tr>
<tr>
<td>9</td>
<td>White</td>
</tr>
</tbody>
</table>

MODELS
- DT065, DT100, DT150

Electronics: RFT9739D or E
Sensor: DT

EB-20000800 Rev. B
Model IFT9701/IFT9703 Transmitters
Installation Drawings and Instructions

- For installing the following Micro Motion transmitters:
  - Model IFT9701
  - Model IFT9703

Subject: Equipment type
Transmitter type IFT9701****** and IFT9703*C******

Manufactured and submitted for examination
Micro Motion, Inc.

Address
Boulder, Co. 80301, USA

Standard basis
EN 50014:1997 +A1-A2 General requirements
EN 50018:2000 Flameproof enclosure “d”
EN 50019:2000 Increased safety “e”
EN 50020:2002 Intrinsic safety “i”

Code for type of protection
[EExib] IIB/IIC
EEx de [ib] IIB/IIC T6
1) **Subject and type**

Transmitter type IFT9701******

The options denoted by * are as follows:

```
I F T 9 7 0 1 * * * * *
```

- Letter for factory options
- Letter for language
- Approval
  - Y = ATEX intrinsically safe sensor outputs
  - W = ATEX intrinsically safe sensor outputs flameproof transmitter
- Letter for conduit connections
- Display
  - N = No display
  - D = LCD display
- Power rating
  - 3 = 20–30 VDC
  - 6 = 85–250 VAC
- Letter code for mounting

Transmitter type IFT9703******

The options denoted by * are as follows:

```
I F T 9 7 0 3 * C * * * * *
```

- Letter for factory options
- Letter for language
- Approval
  - W = ATEX intrinsically safe sensor outputs flameproof transmitter
- Letter for conduit connections
- Display
  - N = No display
  - D = LCD display
- Power rating
  - 3 = 20–30 VDC
  - 6 = 85–250 VAC
- Letter code for mounting
2) Description

The transmitter is, in combination with a sensor, used for measurement of mass flow and data transmission. For the transmitter two variations are available:

1. Mounted inside the hazardous area type IFT9701**N*W** and IFT9703*C*N*W**.
2. Mounted outside the hazardous area type IFT9701**(N or D)*Y** and IFT9703*C*(N or D)*Y**.

The electrical components of the transmitter are securely fixed in a light metal housing.

In the variation type IFT9701**N*W** and IFT9703*C*N*W**, the housing consists of a junction box with type of protection “Increased Safety” for the connection of the non intrinsically safe power supply and signal circuits, a compartment with type of protection “Flameproof Enclosure” and a junction box for the connection of the intrinsically safe sensor circuits.

3) Parameters

3.1) Mains circuit (terminals 7 and 8)

for type IFT9701*3***** and IFT9703*C3*****  
Voltage DC 20–30 V  
Max. voltage Um DC 30 V

for type IFT9701*6***** and IFT9703*C6*****  
Voltage AC 85–250 V  
Max. voltage Um AC 250 V

3.2) Non intrinsically safe outputs

for type IFT9701****** and IFT9703*C******  
mA terminals (terminals 6 and 5)  
Voltage Um DC 20 V

Frequency output terminals (terminals 2 and 1)  
Max. voltage Um DC 30 V

3.3) Intrinsically safe circuits type of protection EEEx ib IIC / EEEx ib IIB

The circuits designed for connecting sensors are classified initially in Group IIC. However, when certain sensors are connected, they can also be assigned to Group IIB.

3.3.1) Drive circuit (terminals 1 and 2)

Max. voltage Um DC 11,4 V  
Max. current Im 1,14 A  
Nominal fuse 250 mA  
Max. power Pm 1,2 W  
Internal resistance Ri 10 Ω
Model IFT9701/IFT9703 Transmitters

Type of protection EEx ib IIC
Max. external inductance $\text{Lo}$ 27.4 $\mu$H
Max. external capacitance $\text{Co}$ 1.7 $\mu$F
Max. inductance/resistance ratio $\text{Lo/} \text{Ro}$ <10.9 $\mu$H/$\Omega$

Type of protection EEx ib IIB
Max. external inductance $\text{Lo}$ 109 $\mu$H
Max. external capacitance $\text{Co}$ 11.7 $\mu$F
Max. inductance/resistance ratio $\text{Lo/} \text{Ro}$ <43.7 $\mu$H/$\Omega$

The maximum external inductance $L$ (sensor coil) can be calculated with the following term:

$$L = 2 \times E \times (\text{Ri} + \text{Ro} / 1.5 \times \text{Uo})^2$$

Whereby $E = 40 \mu J$ for group IIC and $E = 160 \mu J$ for group IIB and $\text{Ri} = 10 \Omega$ and $\text{Uo} = 11.4 \text{ V}$ will be inserted and $\text{Ro}$ is the total resistance (coil resistance + series resistance).

3.3.2) Pick-off circuits (terminals 5, 9 and 6, 8)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>$U_{\text{max}}$</th>
<th>DC</th>
<th>15,6</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>$I_{\text{max}}$</td>
<td>mA</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>$P_{\text{max}}$</td>
<td>mW</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIC
Max. external inductance $\text{Lo}$ 355 mH
Max. external capacitance $\text{Co}$ 500 nF

Type of protection EEx ib IIB
Max. external inductance $\text{Lo}$ 1.4 H
Max. external capacitance $\text{Co}$ 3.03 $\mu$F

3.3.3) Temperature circuit (terminals 3, 4, 7)

<table>
<thead>
<tr>
<th>Voltage</th>
<th>$U_{\text{max}}$</th>
<th>DC</th>
<th>15,6</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>$I_{\text{max}}$</td>
<td>mA</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>$P_{\text{max}}$</td>
<td>mW</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

Type of protection EEx ib IIC
Max. external inductance $\text{Lo}$ 355 mH
Max. external capacitance $\text{Co}$ 500 nF

Type of protection EEx ib IIB
Max. external inductance $\text{Lo}$ 1.4 H
Max. external capacitance $\text{Co}$ 3.03 $\mu$F

3.4) Ambient temperature range

IFT9701****** $\quad \text{Ta} \quad -40 \, ^\circ \text{C up to } +55 \, ^\circ \text{C}$
IFT9703*C****** $\quad \text{Ta} \quad -40 \, ^\circ \text{C up to } +55 \, ^\circ \text{C}$
4) **Marking**

\[ \text{Ex II 2 G or II (2) G} \]

\[-40 \, ^\circ\text{C} \leq T_a \leq +55 \, ^\circ\text{C}\]

<table>
<thead>
<tr>
<th>- type</th>
<th>- type of protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFT9701**N!<em>W</em>*</td>
<td>EEx de [ib] IIB/IIC T6</td>
</tr>
<tr>
<td>IFT9701**(N or D)!<em>Y</em>*</td>
<td>[EEx ib] IIB/IIC</td>
</tr>
<tr>
<td>IFT9703*C!<em>N!<em>W</em></em></td>
<td>EEx de [ib] IIB/IIC T6</td>
</tr>
<tr>
<td>IFT9703<em>C</em>(N or D)<em>Y</em>*</td>
<td>[EEx ib] IIB/IIC</td>
</tr>
</tbody>
</table>

5) **Special conditions for safe use / Installation instructions for IFT9701 or IFT9703.**

5.1) For the application of the transmitter in an ambient temperature of less than -20°C suitable cable and cable entries or conduit entries certified for this condition shall be used.

5.2) For installation outside the hazardous area, it is allowed to use cable entry fittings that are not increased safety EEx e.

5.3) To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

5.4) The non-intrinsically safe end of the transmitter must only be connected to devices where there are no voltages higher than 250V.

5.5) For types IFT9701**N\!*W** and IFT9703*C\!*N\!*W**

Warning — Do not open EEx d within 2 minutes after power is disconnected.
Model IFT9701 to CMF (except CMF400), H (except H300) and F (except F300) sensors with junction box

IFT9701 IN HAZARDOUS AREA OR SAFE AREA TO SENSOR IN HAZARDOUS LOCATION

Equipment ground

External equipment ground
To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

VAC
VDC
Brown
Red
Orange
Yellow
Green
Blue
Violet
Gray
White
9-wire I.S. cable

300 m maximum cable length

CAUTION:
To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring and the IFT9701 transmitter and sensor must be properly grounded.

POWER NON-I.S.

For installation in Hazardous Area
EEx de[b] IIB/IIC T6

Model IFT9701

(IF9701 with increased safety (EExe) cable glands)

For type IFT9701**N**W**
transmitter in an ambient temperature of less than
Below –20 °C ambient, use cable and cable entries or conduit entries certified for that temperature.

For type IFT9701*6N*W**
WARNING: Do not open EEx d within 2 minutes after power is disconnected.

Refer to sensor tag for complete hazardous area classification.

Hazardous Area
EEx ib IIB / IIC

Refer to sensor tag for complete hazardous area classification.

MODELS

<table>
<thead>
<tr>
<th></th>
<th>CMF</th>
<th>F (except F300 and F300A)</th>
<th>H (except H300)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplied as intrinsically safe</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Electronics: IFT9701
Sensor: CMF, F, H

EB-20001039 Rev. E
Model IFT9701 to D (except D600) and DL sensors with junction box

IFT9701 IN HAZARDOUS AREA OR SAFE AREA TO SENSOR IN HAZARDOUS LOCATION

To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

CAUTION:
To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring and the IFT9701 transmitter and sensor must be properly grounded.

Model IFT9701

(IFT9701 with increased safety (EExe) cable glands)
For type IFT9701*"N"W** transmitter in an ambient temperature of less than -20 °C ambient, use cable and cable entries or conduit entries certified for that temperature.

For type IFT9701*6N"W** WARNING: Do not open EEx d within 2 minutes after power is disconnected.
Refer to sensor tag for complete hazardous area classification.

Model IFT9701

(IFT9701 with industrial cable glands)
For installation outside the hazardous area, it is allowed to use cable entry fittings that are not increased safety EExe.

Hazardous Area EEx ib IIB / IIC
Refer to sensor tag for complete hazardous area classification.

MODELS
D, DL
Supplied as intrinsically safe

Electronics: IFT9701
Sensor: D, DL
EB-20000370 Rev. B
To achieve potential equalization, the conductor for the transmitter grounding terminal must be connected to the appropriate grounding terminal inside the hazardous area using a potential equalizing line.

**Active Passive**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>4-20 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{dc}</td>
<td>20 V</td>
</tr>
<tr>
<td>I_{sc}</td>
<td>5 mA</td>
</tr>
<tr>
<td>C_{r}</td>
<td>0.75 µF</td>
</tr>
<tr>
<td>L_{o}</td>
<td>100 mH</td>
</tr>
</tbody>
</table>

**Non-I.S.**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{max}</td>
<td>30 V</td>
<td></td>
</tr>
<tr>
<td>I_{max}</td>
<td>128 mA</td>
<td></td>
</tr>
<tr>
<td>C_{l}</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>L_{l}</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**CAUTION:**
To maintain intrinsic safety, the intrinsically safe wiring must be separated from all other wiring and the IFT9701 transmitter and sensor must be properly grounded.

**POWER NON-I.S.**

(IFT9701 with industrial cable glands)
(IFT9703 with industrial cable glands)

For installation outside the hazardous area, it is allowed to use cable entry fittings that are not increased safety EEEx.

**WARNING:** Do not open EEEx within 2 minutes after power is disconnected.

Refer to sensor tag for complete hazardous area classification.

---

(IFT9701 with increased safety (EEEx) cable glands)
(IFT9703 with increased safety (EEEx) cable glands)

For type IFT9701**N**W** or IFT9703**N**W**
Below –20 ºC ambient, use cable and cable entries or conduit entries certified for that temperature.

For type IFT9701**6N**W** or IFT9703**6N**W**
WARNING. Do not open EEEx d within 2 minutes after power is disconnected.

Refer to sensor tag for complete hazardous area classification.

---

**ELECTRONICS:** Integral IFT9701/IFT9703

EB-20000372 Rev. A
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.