Quick Installation Guide
00825-0100-4810, Rev FA
October 2009

Rosemount 405 Compact Primary Element

Step 1: Primary Element Location
Step 2: Primary Element Orientation
Step 3: Primary Element Installation
Product Certifications
Quick Installation Guide
Rosemount 405 Compact Primary Element

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IMPORTANT NOTICE
This installation guide provides basic guidelines for Rosemount 405 Primary Element. It does not provide instructions for configuration, diagnostics, maintenance, service, troubleshooting, Explosion-proof, Flameproof, or intrinsically safe (I.S.) installations. Refer to the 405 reference manual (document number 00809-0100-4810) for more instruction. This manual is also available electronically on www.rosemount.com.

If the 405 primary element was ordered assembled to a Rosemount 3051S transmitter, the new assembly is the Rosemount 3051SFC Compact Orifice Flowmeter. See the following Quick Installation Guide for information on configuration and hazardous locations certifications: Rosemount 3051S Series Pressure Transmitter (document number 00825-0100-4801).

If the 405 primary element was ordered assembled to a Rosemount 3095M transmitter, the new assembly is the Rosemount 3095MFC Compact Orifice Mass Flowmeter. See the following Quick Installation Guide for information on configuration and hazardous locations certifications: Rosemount 3095M (document number 00825-0100-4716).

WARNING
Process leaks may cause harm or result in death
To avoid process leaks, only use gaskets designed to seal with the corresponding flange and o-rings to seal process connections.
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STEP 1: PRIMARY ELEMENT LOCATION
Install the 405 in the correct location within the piping branch to prevent inaccurate measurement caused by flow disturbances.

Table 1. 405C Straight Pipe Requirements\(^{(1)}\)

<table>
<thead>
<tr>
<th>Upstream (inlet) side of primary</th>
<th>Beta</th>
<th>0.40</th>
<th>0.65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducer</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Single 90° bend or tee</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Two or more 90° bends in the same plane</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Two or more 90° bends in different plane</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Up to 10° of swirl</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Butterfly valve (75% to 100% open)</td>
<td>2</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Downstream (outlet) side of primary</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. 405P Straight Pipe Requirements\(^{(1,2,3)}\)

<table>
<thead>
<tr>
<th>Upstream (inlet) side of primary</th>
<th>Beta</th>
<th>0.40</th>
<th>0.65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducer</td>
<td>5</td>
<td>12</td>
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<tr>
<td>Single 90° bend or tee</td>
<td>16</td>
<td>44</td>
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<tr>
<td>Two or more 90° bends in the same plane</td>
<td>10</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Two or more 90° bends in different plane</td>
<td>50</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Expander</td>
<td>12</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Ball / Gate valve fully open</td>
<td>12</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Downstream (outlet) side of primary</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

\(^{(1)}\) Consult an Emerson Process Management representative if disturbance is not listed.
\(^{(2)}\) Recommended lengths represented in pipe diameters per ISO 5167.
\(^{(3)}\) Refer to ISO 5167 for recommended lengths when using flow straighteners.

NOTE
Recommended lengths represented in pipe diameters. If longer lengths of straight run are available, position the 405 so 80% of the pipe run is upstream and 20% is downstream. Flow conditioners may be used to reduce the required straight run length, improving performance.

Vibration Limits
Qualified per IEC61298-3 (1998) for field with high vibration level or pipeline with high vibration level (10-60Hz 0.21mm displacement peak amplitude / 60 - 2000Hz 3g).
The weight and length of the transmitter assembly shall not exceed 5.8 lbs and 7.75-in.
STEP 2: PRIMARY ELEMENT ORIENTATION

Direct Mount

Figure 1. Gas (Horizontal)

Figure 2. Gas (Vertical)

Figure 3. Liquid and Steam (Horizontal)

Figure 4. Steam (Vertical)

Figure 5. Top Mounting for Steam (direct mount up to 400 °F (205 °C))
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STEP 2 CONTINUED...

Remote Mount
Figure 6. Gas and Top Mounting for Steam (Horizontal) Figure 7. Gas (Vertical)

Figure 8. Liquid and Steam (Horizontal) Figure 9. Liquid and Steam (Vertical)
STEP 3: PRIMARY ELEMENT INSTALLATION

1. Orient the assembly according to the guidelines provided in “Primary Element Orientation” on page 4 and 5. Ensure that the flow arrow is pointing in the same direction as the process flow.

NOTE
An ANSI alignment ring is provided standard with the 405. If a DIN or JIS alignment ring is required, it must be ordered as an option. Contact an Emerson Process Management sales representative for additional information.

NOTE
For ease of installation, the gasket may be secured to the flange face with small pieces of tape. Be sure the gasket or tape does not protrude into the pipe.

2. If using an alignment ring with through holes, proceed to step 9.
3. Insert two studs through the flange holes located opposite the head of the 405.
4. Place the alignment ring on the 405 body (see Figure 10).
5. Insert gaskets.
6. Insert the 405 between the flanges so that the indentations on the alignment ring contact the installed studs. The studs must contact the alignment ring in the indentation marked with the appropriate flange rating to ensure proper alignment.
7. Install remaining studs and nuts (hand tight). Ensure that three of the studs are in contact with the alignment ring.
8. Lubricate studs and tighten nuts in a cross pattern to the appropriate torque per local standards.

Steps 9-12 are for use with alignment rings that have through holes.
9. Place the alignment ring on the 405 body (see Figure 1).
10. Insert the 405 between the flanges. Starting on the side opposite the 405 head, rotate the alignment ring such that the radius corresponding to the alignment ring marking matches that of the application flange rating. Insert one stud through both the upstream and downstream flanges and allow the ring to rest on the bolt. This will ensure proper alignment.
11. Repeat step 10 for the installation of the remaining bolts that will contact the alignment ring.
12. Insert gaskets.
13. Install remaining studs and nuts (hand tight). Ensure that three of the studs are in contact with the alignment ring.
14. Lubricate studs and tighten nuts in a cross pattern to the appropriate torque per local standards.

NOTE
Standard \( \frac{1}{16} \)-in. gaskets are recommended for use with the 405. Using other gaskets could potentially caused a bias shift in the measurement.
Recommended Insulation Guidelines

For flowmeters with integral temperature assembly:

It is recommended for the meter to be insulated when the process ambient temperature is greater than 30 °F (-1 °C).

1. For line sizes $\frac{1}{2}$-in. (15 mm) to 4-in. (100 mm), it is recommended to have 4-in. (100 mm) of insulation of at least a 4.35 R-factor.

2. For line sizes 6-in. (150 mm) to 12-in. (300 mm), it is recommended to have 5-in. (125 mm) of insulation of at least a 4.35 R-factor.

The full thickness stated above may not be necessary for the entire flowmeter, but is required for the temperature sensor area at a minimum. Insulation is needed to ensure meeting our specified temperature measurement accuracy.

Figure 10.  Rosemount 405 Installation
PRODUCT CERTIFICATIONS

Approved Manufacturing Locations
Rosemount Inc. — Chanhassen, Minnesota USA

European Directive Information
The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www.rosemount.com. A hard copy may be obtained by contacting our local sales office.

European Pressure Equipment Directive (PED) (97/23/EC)

405 Compact Primary Element
— Sound Engineering Practice (SEP)
Pressure Transmitter
— See appropriate Pressure Transmitter QIG

Hazardous Locations Certifications
For information regarding the electronics product certification, see the appropriate transmitter QIG:
• Rosemount 3051SF Series Flowmeter Electronics with HART Protocol (document number 00825-0100-4801)
• Rosemount 3095MF Mass Flowmeter Electronics (document number 00825-0100-4716)
EC Declaration of Conformity
No: DSI 1000 Rev. E

We,
Emerson Process Management
Heath Place - Bognor Regis
West Sussex PO22 9SH
England

declare under our sole responsibility that the products,

manufactured by,
Dieterich Standard, Inc.
5601 North 71st Street
Boulder, CO 80301
USA

to which this declaration relates, is in conformity with the provisions of the European Community Directives as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Community notified body certification, as shown in the attached schedule.

R. V. MIGLIORENI
Vice President Sales and Marketing EMA
Schedule
EC Declaration of Conformity DSI 1000 Rev. E

EMC Directive (89/336/EEC)
3051SFA / 3051SFC / 3051SFP / 3095MFA / 3095MFC / 3095MFP
EN 50081-1: 1992; EN 50082-2: 1995; EN 61326-1: 1997 – Industrial

PED Directive (97/23/EC)
Models: Refer to sheet 3 of 4 for Pressure Equipment Classification
Module H & HI Conformity Assessment

All other models not listed
Sound Engineering Practice

ATEX Directive (94/9/EC)
3051SFA / 3051SFC / 3051SFP
BAS01ATEX1303X – Intrinsically Safe Certificate
BAS01ATEX1304X – Type n Certificate
EN50021: 1999
BAS01ATEX1374X – Dust Certificate
EN50281-1-1: 1998
KEMA00ATEX2143X – Flameproof Certificate
EN50014: 1997; EN50018: 1994; EN50284: 1999

3095MFA / 3095MFC / 3095MFP
BAS98ATEX1359X – Intrinsically Safe Certificate
BAS01ATEX3360X – Type n Certificate
EN50021: 1998
KEMA02ATEX2321X – Dust Certificate
EN50014: 1997; EN50281-1-1: 1998
KEMA00ATEX2143X – Flameproof Certificate
## Dieterich Standard, Inc. Pressure Equipment Classification

### Pressure Equipment Directive 97/23/EC

### Summary of Classifications

<table>
<thead>
<tr>
<th>Model/Range</th>
<th>PED Category</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>FloTap - Diamond II: 1500# &amp; 2500# All Lines</td>
<td>III</td>
<td>SEP</td>
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<tr>
<td>FloTap - Diamond II: 25 150# to 62 Line</td>
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<td>SEP</td>
<td></td>
</tr>
<tr>
<td>FloTap - Diamond II: 25 150# to 62 Line</td>
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<td>FloTap - Diamond II: 45 150# to 54 Line</td>
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<tr>
<td>FloTap - Diamond II: 45 150# to 72 Line</td>
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</tr>
<tr>
<td>FloTap - Diamond II: 45 150# to 72 Line</td>
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<tr>
<td>FloTap - Diamond II: 45 600# to 72 Line</td>
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<td>MSL46 - 2500# All Lines</td>
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<td>MSR 150# &amp; 2500#</td>
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<td>MSR 150# &amp; 2500#</td>
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<tr>
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<td>1195, 3051SFP, 3095MFP: 1-1/2” Threaded &amp; Welded</td>
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<td>1496 Flange Union</td>
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<td>1497 Meter Section</td>
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<td>SEP</td>
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<td>DNF - 1500# 1-1/4”, 1-1/2” &amp; 2”</td>
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<td>SEP</td>
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<td>Flangeline - 485/3051SFA/3095MFA: 1500# &amp; 2500# All Lines</td>
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<tr>
<td>FloTap - 485/3051SFA/3095MFA: Sensor Size 2 1500# to 24 Line</td>
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<td>FloTap - 485/3051SFA/3095MFA: Sensor Size 2 2000# to 24 Line</td>
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<td>SEP</td>
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<td>FloTap - 485/3051SFA/3095MFA: Sensor Size 2 2000# to 44 Line</td>
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<td>SEP</td>
<td></td>
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<tr>
<td>FloTap - 485/3051SFA/3095MFA: Sensor Size 2 2000# to 72 Line</td>
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<td>SEP</td>
<td></td>
</tr>
<tr>
<td>FloTap - 485/3051SFA/3095MFA: Sensor Size 3 300# to 12 Line</td>
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<td>SEP</td>
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<tr>
<td>FloTap - 485/3051SFA/3095MFA: Sensor Size 3 300# to 24 Line</td>
<td>III</td>
<td>SEP</td>
<td></td>
</tr>
<tr>
<td>FloTap - 485/3051SFA/3095MFA: Sensor Size 3 300# to 44 Line</td>
<td>III</td>
<td>SEP</td>
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</tr>
<tr>
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<td>III</td>
<td>SEP</td>
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</tbody>
</table>
ATEX Notified Bodies for EC Type Examination Certificate

KEMA Registered Quality B.V.
KEMA Registered Quality [Notified Body Number: 0344]
Utrechtseweg 310, 6812 AR Arnhem
PO Box 9035, 6800 ET Arnhem
The Netherlands
Postbank 6794687

BASEEFA Limited
BASEEFA Limited [Notified Body Number: 1180]
Harpur Hill
Buxton, Derbyshire
United Kingdom

Pressure Equipment Directive (93/27/EC):

Plant Safety Limited
Plant Safety Limited [Notified Body Number: 0041]
Parklands, Wilmslow Road, Dukinfield
Manchester M20 2RE
United Kingdom

Certificate No.: CE-41-PED-H1-RMT-001-04-USA