FieldQ Valve Actuator

This datasheet is for Release 1 FieldQ actuators produced until 2020. For actuators manufactured after 2020, please refer to the FieldQ Release 2 datasheet.
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FieldQ "fully integrated" actuator and control modules

General Overview

Description
The FieldQ package consists of an actuator with a module for control and position feedback and forms an integrated concept for "On/Off" valve automation.

1. Basic Actuators
The basic actuator supplies the torque, required to open and close valves and is available in various sizes (rated 47 to 1676Nm at 5.5barg or 413 to 14874 In.lb. at 80psig). Double acting and spring return executions are available. The spring return execution can be equipped with multiple spring sets to cover a pressure range from 2 to 8 barg (30 to 120 psig).

2. Control Modules
The Control Modules contain, next to the components for feedback switches, also all the pneumatic control components. Its compact and robust construction incorporates basic control and feedback functionality and is suitable for indoor and outdoor use.

1. The enclosure of the control modules are rated IP66 / NEMA 4X according IEC 60529 and are suitable for indoor and outdoor use.
2. The QC41, QC42 and QC43 Explosion proof control modules are available with FM, CSA, ATEX or IECEx approvals
3. The QC40 with AS-Interface bus communication is available with Non-Sparking Ex nA or Non Incendive approvals and is suitable for use in potentially explosive atmospheres. For this QC40 ASI module FM, ATEX or IECEx approvals are available.
4. The QC54 with Foundation Fieldbus bus communication is available with Non-Sparking Ex nA or Non Incendive or Intrinsically Safe approvals and is suitable for use in potentially explosive atmospheres. For this QC54 ASI module FM, ATEX or IECEx approvals are available.
5. Both the weather proof and certified control modules are available with the Fail-In-Last-Position control function for double acting actuators and the non intrusive switch point adjustment.

FieldQ valve actuator with Control Module

1 Basic Actuator
2 Control Module
3 Limit stop screws for "Open" and "Closed" position
4 G1/4" air connections
5 Optional: Built-in speed control
6 Visual position indication
7 Optional: Manual Control
8 Electrical entries
Actuator specifications:

Construction
- Ingress protection rated IP65 / NEMA4X and suitable for indoor and outdoor installation.

Finish
- Housing: Anodized with a polyester non-TGIC based powder coating
- Pistons: Chromate treatment.
- Pinion: Hard anodized

Lubrication
- Factory lubricated for the normal life of the actuator.

Temperature
- Depends on the Control Module used. See applicable data sheets 1.604.xxx.

European Directives
- The basic actuator complies to PED 2014/68/EU, Machinery Directive 2006/42/EC and to ATEX 2014/34/EU and is marked: II 2 GD c IIC TX
- This product is only intended for use in large-scale fixed installations excluded from the scope of Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 2).

Pressure
- Double acting: 2 to 8 bar / 30 to 120 psi
- Spring return
  - with maximum spring set: 6 to 8 bar / 87 to 120 psi
  - with reduced spring set: 3 to 8 bar / 43 to 120 psi

Operating media
- Dry air or inert gasses, filtered to 50 microns.
- The QC54 (FF) Control Modules require air filtered to 5 microns.
- Dew point 10K below operating temperature. For subzero applications take appropriate measures to protect the installation.

Torque
- 40 to 1600 Nm. (300 to 11000 lbf.in.) See sheets 1.602.01, 1.602.02 or 1.602.03.

Rotation
- Factory set at 90°±0.5°. Adjustable range: -3° to +15° and +75° to 93°
- Clockwise fail-to-close action, see sheet 1.606.04 for optional fail-to-open action (assembly codes).
- See 1.606.03 for other double acting assembly codes.
- For more info on failure modes see 1.606.02

Cycle life
- 500,000 cycles minimum

NAMUR plate
The top flange of the FieldQ actuator is equipped with a NAMUR (VDE/VDI 3845) drilling pattern. The addition of a NAMUR plate makes the FieldQ actuator suitable for mounting all kinds of NAMUR compatible control accessories like solenoids. For more info on NAMUR plate, see sheet 1.605.03.

Control Modules:
The following versions of Control modules are available. Please check the indicated data sheet for more detailed information.
- QC41 24VDC 1.604.10
- QC42 115VAC 1.604.10
- QC43 230VAC 1.604.10
- QC40 AS-Interface 1.604.11
- QC54 Foundation Fieldbus 1.604.12

Options
Speed control, Manual control, IECEx, ATEX, FM or CSA approvals, glands, quick connectors, exhaust port filters and silencers.

Functions:
Actuator range: Suitable for Q40 to Q1600
Fail-in-Last position

Pneumatic connections:
- Central air chamber: IP66 / NEMA4X
- Endcap air chambers: IP66 / NEMA4X

Breather* function:
Standard for single acting actuators
FieldQ Actuator Torque

Double Acting Actuators - Nm

<table>
<thead>
<tr>
<th>Actuator type</th>
<th>Torque (Nm)</th>
<th>Supply Pressure (bar g)</th>
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<td>2</td>
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<tr>
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<th>Supply Pressure (psig)</th>
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<td>QD 1600</td>
<td>5493</td>
<td>8307</td>
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Note:
1. Emerson recommends that the valve manufacturer supply the maximum required torque values (including any adjustments or suggested safety factors for valve service conditions or application). Additionally, the valve manufacturer must identify at which position(s) and direction(s) of rotation (Counter Clock Wise or Clock Wise) these maximum requirements occur.
2. If in doubt, or you require any assistance with sizing actuators, do not hesitate to contact your nearest Emerson’s Actuation Technologies representative.
# FieldQ Actuator Torque

## Spring Return Actuators - Nm

<table>
<thead>
<tr>
<th>Spring set nr.</th>
<th>Air Torque (Nm)</th>
<th>Spring Torque (Nm)</th>
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<td>Actuator Size</td>
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<td>D</td>
</tr>
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<td>QF 40</td>
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<td>QF 1600</td>
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### Note:
1. Emerson recommends that the valve manufacturer supply the maximum required torque values (including any adjustments or suggested safety factors for valve service conditions or application).
2. If in doubt, or you require any assistance with sizing actuators, do not hesitate to contact your nearest Emerson’s Actuation Technologies representative.

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**Spring return torque diagrams**

- **Air stroke**
- **Rotation Counter Clockwise**
- **Spring stroke**
- **Rotation Clockwise**

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## FieldQ Actuator Torque

### Spring Return Actuators - lbf.in

#### Note:
1. Emerson recommends that the valve manufacturer supply the maximum required torque values (including any adjustments or suggested safety factors for valve service conditions or application).
2. Additionally, the valve manufacturer must identify at which position(s) and direction(s) of rotation (Counter Clock Wise or Clock Wise) these maximum requirements occur.
3. If in doubt, or you require any assistance with sizing actuators, do not hesitate to contact your nearest Emerson’s Actuation Technologies representative.

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<thead>
<tr>
<th>Spring set nr.</th>
<th>Actuator Size</th>
<th>40</th>
<th>60</th>
<th>80</th>
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<td>October 2017</td>
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<table>
<thead>
<tr>
<th>Actuator Torque (lbf.in)</th>
<th>Supply pressure (psig)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>2</td>
<td>133</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
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<tr>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
</tr>
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<td>6</td>
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<table>
<thead>
<tr>
<th>FieldQ Actuator Torque diagrams</th>
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</thead>
<tbody>
<tr>
<td>Air stroke: C</td>
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<tr>
<td>Torque Rotation Counter clockwise</td>
</tr>
<tr>
<td>Spring stroke: E</td>
</tr>
</tbody>
</table>

### Spring return torque diagrams

**Spring return torque diagrams**

- **Air stroke**: C = Start  D = End
- **Rotation Counter clockwise**: E = Start  F = End

#### FieldQ

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- **Asia/Pacific**: +65 67 77 8211

---

**Spring set nr.**

- **QS 40**
- **QS 65**
- **QS 100**
- **QS 150**
- **QS 200**
- **QS 350**
- **QS 600**
- **QS 950**
- **QS 1600**

**Actuator Torque (lbf.in)**

- **C**
- **D**
- **E**
- **F**

**Supply pressure (psig)**

- **40**
- **60**
- **80**
- **90**
- **100**
- **120**

---

1. Emerson recommends that the valve manufacturer supply the maximum required torque values (including any adjustments or suggested safety factors for valve service conditions or application).
2. Additionally, the valve manufacturer must identify at which position(s) and direction(s) of rotation (Counter Clock Wise or Clock Wise) these maximum requirements occur.
3. If in doubt, or you require any assistance with sizing actuators, do not hesitate to contact your nearest Emerson’s Actuation Technologies representative.
FieldQ Valve Actuator Dimensions

Metric Actuators - ISO5211 / NAMUR plate

Note:
1. Dimensions are in mm.
2. The limit stop screws on the Q40 and Q65 are on the opposite side to those on the larger actuators.

<table>
<thead>
<tr>
<th>Dim in mm.</th>
<th>FieldQ™ actuator models</th>
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<td></td>
<td>Q40</td>
</tr>
<tr>
<td>A QD</td>
<td>145</td>
</tr>
<tr>
<td>B QS</td>
<td>202</td>
</tr>
<tr>
<td>C</td>
<td>104</td>
</tr>
<tr>
<td>D</td>
<td>20</td>
</tr>
<tr>
<td>E</td>
<td>56</td>
</tr>
<tr>
<td>F</td>
<td>16</td>
</tr>
<tr>
<td>G</td>
<td>9.5</td>
</tr>
<tr>
<td>H</td>
<td>90</td>
</tr>
<tr>
<td>I</td>
<td>75</td>
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<tr>
<td>J</td>
<td>40</td>
</tr>
<tr>
<td>K</td>
<td>33</td>
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<tr>
<td>M1</td>
<td>34.5</td>
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<tr>
<td>M2</td>
<td>-</td>
</tr>
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<td>N</td>
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<td>O min.</td>
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<td>65</td>
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<td>PCD</td>
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<td>V</td>
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<td>W1</td>
<td>M8x13</td>
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FieldQ

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FieldQ Valve Actuator Dimensions

Imperial Actuators - ISO5211 / NAMUR plate

Note:
1. Dimensions are in inches.
2. The limit stop screws on the Q40 and Q65 are on the opposite side to those on the larger actuators.

<table>
<thead>
<tr>
<th>Dim. in</th>
<th>Q40</th>
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<th>Q350</th>
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<td>10.51</td>
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<td>14.40</td>
<td>17.58</td>
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<tr>
<td>C</td>
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<td>4.59</td>
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<td>C'</td>
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<td>0.79</td>
<td>0.79</td>
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<td>E</td>
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FieldQ Valve Actuator Dimensions

Metric Actuators - DIN3337 / NAMUR plate

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**FieldQ™ actuator models**

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FieldQ

FieldQ Valve Actuator Dimensions

Metric Actuators - DIN3337 / NAMUR plate

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America’s: +1 281 477 4100 Europe: +36 22 53 0950 Asia/Pacific: +65 6777 8211
FieldQ Valve Actuator Dimensions

Metric Actuators - ISO5211

Note:
1. Dimensions are metric (mm).
2. The limit stop screws on the Q40 and Q65 are on the opposite side to those on the larger actuators.
3. Top flange according VDI/VDE 3845 (NAMUR)

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FieldQ Valve Actuator Dimensions
Imperial Actuators - ISO5211

Note:
1. Dimensions are in inches.
2. The limit stop screws on the Q40 and Q65 are on the opposite side to those on the larger actuators.
3. Top flange according VDI/VDE 3845 (NAMUR)

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<td>W1</td>
<td>5/16&quot;-18x39</td>
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</table>

PCD: F05/F07, F05/F07, F07/F10, F07/F10, F10/F12, F10/F14, F16/F25

* Notes:
1. Dimensions are in inches.
2. The limit stop screws on the Q40 and Q65 are on the opposite side to those on the larger actuators.
3. Top flange according VDI/VDE 3845 (NAMUR)
FieldQ Valve Actuator Dimensions

Metric Actuators - DIN3337

**Note:**
1. Dimensions are metric (mm).
2. The limit stop screws on the Q40 and Q65 are on the opposite side to those on the larger actuators.
3. Top flange according VDI/VDE 3845 (NAMUR)

### FieldQ actuator models

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<th>Dim in mm.</th>
<th>Q40</th>
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**Optional dimensions**

| K1         | 70  | 70  | 70   | 70   | 70   | 70   | 70   | 70   | 70    |
| L1         | 35  | 35  | 35   | 35   | 35   | 35   | 35   | 35   | 35    |
| PCD        | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0     |
| V1         | 102 | 102 | 102  | 102  | 102  | 102  | 102  | 102  | 102   |
| W1         | 102 | 102 | 102  | 102  | 102  | 102  | 102  | 102  | 102   |

**Drilling pattern**

- 4 holes of the F25

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America's: +1 281 477 4100 Europe: +36 22 53 0950 Asia/Pacific: +65 67 77 8211
FieldQ Valve Actuator Options

Drive Inserts

Description
All actuators are fitted with drive inserts. This enables actuators to be directly mounted onto suitable valves and eliminates the need for a bracket and coupling type mounting kit. The use of direct mounts significantly cuts the cost of the valve/actuator assembly.

Standard actuators are fitted with square drive inserts in accordance with ISO 5211 (or DIN 3337), but a wide variety of other inserts are also available. Special inserts may have oversize or undersize squares, double-D and shaft key way forms.

Drive inserts can be supplied on factory built actuators or as loose items and are easily replaceable at distributor or end user level.

Where direct mounts are not possible, for instance on valves with exposed gland packing, the use of inserts often simplifies the design of the mounting kit.

Material : Aluminum alloy
Finish: Anodized

<table>
<thead>
<tr>
<th>Standard available insert shapes</th>
<th>Optional available insert shapes</th>
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<tr>
<td><img src="image1" alt="Square Max." /></td>
<td><img src="image2" alt="D Max." /></td>
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<table>
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<th>Inserts with inner-square-dimensions per actuator type</th>
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<td>mm</td>
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<td>ISO5211</td>
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<th>Optional insert dimensions</th>
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<table>
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<th>Maximum insert dimensions</th>
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<tr>
<td>P1</td>
</tr>
<tr>
<td>P2</td>
</tr>
<tr>
<td>Sq max.</td>
</tr>
<tr>
<td>D max.</td>
</tr>
</tbody>
</table>
Insert Removal tool

Description
The standard FieldQ actuators are equipped with Square-Drive inserts according ISO5211. When assembled at the factory, the inserts are press-fitted on an edge in the pinion bottom. In order to be able to replace these standard inserts, these insert removal tools will help you to easily remove the standard insert from the pinion bottom.

Availability
The insert removal tools are available in two versions and can be used up to actuator size 600. For larger actuator sizes, up to size 2500, it is recommended to use a generic pulley puller.

Intended use:
These insert removal tools are intended to be used just before the installation of the actuator onto a valve and where the default insert needs to be replaced by an insert with a different size or shape.

Operation:
The insert removal tools are equipped with 3 square bits that fit exactly in the insert square of the actuator. Make sure the square bits are as high as possible on the threaded rod. Then you can insert (1) and rotated 45° (2) the tool and one of the square bits will hook under the insert.

The knob (3) on the tool can now be rotated until the insert get loose (4) and it can be removed from the pinion's bottom.

Specifications:

<table>
<thead>
<tr>
<th>Tool part nr.:</th>
<th>Squares:</th>
<th>Actuator sizes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS90.00.001</td>
<td>11, 14 and 17</td>
<td>25, 40, 65, 100, 150</td>
</tr>
<tr>
<td>VAS90.00.002</td>
<td>19, 22 and 27</td>
<td>100, 150, 200, 350, 600</td>
</tr>
</tbody>
</table>

Materials:
Body, Knob and bits: Carbon steel, Zinc Plated
FieldQ Valve Actuator Options

Position Indication - Center Plate

Visual position indicator
FieldQ valve actuators can be equipped with a large visual position indicator which allows clear indication of the valves position at almost any position.
The FieldQ indicator is designed for position indication of actuators mounted “in line” with the pipe line and mounted “cross line” with the pipe line. To do this the inner part can be removed, turned 90° and pushed back in place.
When supplied, the position indicator will be mounted “in line” as standard. See data sheet 1.606.04 for other indicator mounting options.

Specifications:
- Material disk : Nylon PA6, Black
- Material arrow : Nylon PA6, Yellow

Center plate for DIN3337 applications
FieldQ actuators can be equipped with a centre plate which takes care that actuator and valve (or valve mounting kit) are aligned when mounted. For most of the actuator sizes two center plates are available.

Specifications:
- Material plate : Nylon PA6, Black

<table>
<thead>
<tr>
<th>FieldQ™ actuator models</th>
<th>Q40</th>
<th>Q65</th>
<th>Q100</th>
<th>Q200</th>
<th>Q350</th>
<th>Q600</th>
<th>Q950</th>
<th>Q1600</th>
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<td>F07</td>
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<td>F14</td>
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<tr>
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<td>F07</td>
<td>F05</td>
<td>F07</td>
<td>-/-</td>
<td>-/-</td>
<td>-/-</td>
<td>-/-</td>
</tr>
</tbody>
</table>
FieldQ Valve Actuator Options

NAMUR Plate

Description
The top flange of the FieldQ actuator is standard equipped with a NAMUR drilling pattern. The addition of a NAMUR adaptation plate makes the FieldQ actuator suitable for mounting all kinds of NAMUR compatible control and feedback accessories like solenoids, switch boxes or positioners.

Backwards compatibility
Where the FieldQ is meant to be a integrated concept for valve automation, there are a number of reasons for also having NAMUR interfaces:

Emergency repairs
- When the Control Module requires immediate repair and the process can only be stopped for a limited time, it would be easy to mount standard available NAMUR accessories.

Future updates
- When a plant is not yet ready for digital (bus) communication, but will be upgraded in the (near) future towards this technology, it is easy to change from NAMUR accessories to a FieldQ with bus communication.

Available equipment
- NAMUR compatible accessories are easy to acquire. Many suppliers offer accessories that can be fitted to NAMUR actuator interfaces.

Construction
The NAMUR adaptation plate is fitted in front of the actuator part of the FieldQ and replaces in fact the Pneumatic Module.

Specifications:
- Material: Aluminum
- Air connection: 1/4" BSP or 1/4" NPT
- Finish: Housing: Anodized with a polyester non-TGIC based powder coating; Pistons: Chromatized
- Fasteners: Stainless Steel
- Seals: Nitrile Rubber O-rings

Optional Temperature ranges
Special selected O-ring seals and grease makes it possible to utilize the FieldQ actuator, with NAMUR plate, for various temperature ranges. Three temperature ranges are available:

- **Option code ST**: 80°C (176°F) / -20°C (-4°F)
  - O-ring seals: Nitrile rubber
  - Grease: Castrol High Temperature grease

- **Option code HT**: 120°C (248°F) / -20°C (-4°F)
  - O-ring seals: Fluoro rubber (FPM) Viton®
  - Grease: Castrol High Temperature grease

- **Option code LT**: 80°C (176°F) / -40°C (-40°F)
  - O-ring seals: Silicone MVQ 70
  - Grease: Castrol Tribol GR TT 1 PD

Note:
FieldQ actuators fitted with Pneumatic Modules and Control Modules are not available for high temperature or low temperature applications.

Detailed Dimensions
See data sheets 1.603.05, 1.603.06 and 1.603.07.
Integrated Control modules
QC41, QC42 and QC43

Features:
- Basic actuator functions for:
  - Spring return applications, or
  - Double acting applications or,
  - Double acting Fail in Last Position applications.
- Suitable for all FieldQ actuator sizes.
- Available as "Weather Proof" for indoors or outdoors use and "Explosion Proof" for areas with a potential explosion hazard.
  - The robust aluminum alloy enclosure (IP66 / NEMA4X rated), protects the IPT system, pneumatic components, the feedback switches and terminals and makes it suitable for indoor and outdoor use.
  - The Explosion Proof version is available with ATEX / IECEx Ex d approval for use in Zone 1, 2, 21 and 22 and/or FM / CSA Explosion proof approval for use in Class I, Division 1.
- Various feedback switch options available.
- Non-Intrusive switch point adjustment of the feedback switches. Allows to adjust switch points without opening the Control Module.
- Lockable Control Module cover.
- All the control and feedback connections can be wired through one single entry to the Control Module.
- One larger entry (3/4"NPT) is available for larger multi-core cables on imperial units.
Description:
These FieldQ conventionally wired control modules are the next step for the integrated concept of valve automation. Next to the components for feedback switches, also all the pneumatic control components are located inside one module housing. Its compact and robust construction incorporates basic control and feedback functionality and is suitable for indoor and outdoor use. These modules are available with ATEX and IECEx certification for use in Zone 1, 2, 21 and 22, and additionally FM and CSA certified for use in Class I, Division 1.

Construction:
The Control Module is mounted at the side of the basic actuator housing. Inside, wiring terminals are available for connecting control and feedback signals. Two cable entries are available. The pilot valves inside the control module are used to send the actuator to its open or closed position. One pneumatic connection is available to feed the control module.

General specifications:
Material housing: Aluminium alloy
Operating media: Air or inert gasses, filtered at 50µm (for QC54 5µm)
Pneumatic entry: Metric units: G1/4”
Imperial units: 1/4”NPT
Electrical connections: Pilot valve(s): 6 pole terminal strip.
Switches: 6 pole terminal strip.
Cable entries: Metric units: 2x M20x1.5
Imperial units: 1/2” and 3/4”NPT
Enclosure: Rated IP66 - NEMA4X
Switch points: Factory set at 15° before each end of travel (open and closed position).
Adjustable range: Between -3° to 15° and +75° to +93° of the end position.
Finish: Chromated, polyurethane based coating.
Temperature range: Depends on the switches inside the module and or Hazardous Area approvals (See section 'Position feedback')
Dimensions: Metric:
See data sheet BQ1.603.08
Imperial/UNC:
See data sheet BQ1.603.09
DIN 3337:
See data sheet BQ1.603.10

Electrical safety requirements:
Use: In- and outdoor.
Altitude: Operating full power available up to 2000 meter (6000 feet).
Maximum relative humidity: 80% for temperatures up to 31°C (87.8°F) decreasing linearly to 50% relative humidity at 40°C (104°F).
Mains supply fluctuation: Up to ±10% of nominal voltage
Over voltage category: II
Pollution degree: 2
(3 when the cover remains closed)
Pneumatic control

Pneumatic control variations
The Control Module contains all the necessary pneumatic components to control the actuator and control the incoming and outgoing airflow. Pneumatically the modules are available for three applications:
1. Spring return or
2. Double acting or

To achieve these functions, each Control Module can be fitted with one or two pilot valves depending on the required functionality:

1. One pilot valve is default and suitable for normal operation of double acting or spring return actuators
2. Two pilot valves are required to achieve a ‘Fail-in-Last-Position’ functionality on double acting actuators.

Table 1: Pilot valve specifications

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<thead>
<tr>
<th>Module</th>
<th>Voltages</th>
<th>Power</th>
<th>Frequency</th>
</tr>
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<td>1W</td>
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</tr>
<tr>
<td>QC42</td>
<td>115 VAC (+10%)</td>
<td>3VA</td>
<td>50/60Hz</td>
</tr>
<tr>
<td>QC43</td>
<td>230 VAC (+10%)</td>
<td>3VA</td>
<td>50/60Hz</td>
</tr>
</tbody>
</table>

One default pilot valve and wiring connections

Cable range: 0.33 - 2.5mm² or 22-12AWG

Pilot valve 1

24VDC 1W
115VAC 3VA
50/60Hz

Pilot valve 2

25VAC 3VA
50/60Hz

Wiring diagram shown, is applicable for actuators with assembly code “CW”. For actuators with assembly code “CC” (reverse acting) the “Open” and “Closed” pilot valve connections are also reversed.

Two pilot valves and wiring connections for Fail in Last Position

Cable range: 0.33 - 2.5mm² or 22-12AWG
Pneumatic components
The pneumatic components inside the module consist of one or two pilot valves and a 3/2 spool valve or 5/2 bistable spool valve. The spool valves are pneumatically operated by the pilot valves.
To assure trouble-free operation, the spool valves are equipped with big ports. This enables a large air flow and makes it less sensitive for contamination of the internals. The large air flow also fast cycle times and enables it to be utilized for the entire FieldQ actuator range.

Internal corrosion protection:
The spring return models have standard a built in "Breather" function. During the spring stroke, the exhaust air from the center chamber (A-Port) is first fed to the spring chamber (B-port) preventing air from outside from being sucked into the spring chamber. This reduces the possibility of internal corrosion and maximizes the actuators' working life.

Pneumatic options

Speed Control
The FieldQ can be supplied with a Speed Control option. One throttle is required for Spring Return actuators and up to two for Double Acting actuators.
The speed control throttle controls the air flow in and out of an air chamber and as such limits the speed of the “Opening” and “Closing” stroke simultaneously.

Silencers and vents
The exhaust ports Ra and Rb on the module are shipped from the factory with transport protection.
The module can be equipped with either silencers or vents.

Manual Control
For commissioning, emergency or maintenance purposes, the FieldQ can be supplied with Manual Control options. These options can operate the actuator when there is air pressure available, but no control signal or power supply.
- For normal operation the module should be fitted with one Manual Control.
- For Double Acting with a Fail-in-Last-Position function, two Manual Control can be fitted.

Maximum Flow rates of Q-Series modules
The maximum flow rates depends mainly on the flow rates of the FieldQ XP modules. You can use Kv 0.28 (m3/h) or Cv value of 0.28 (US gall/min 1Psi) for approximate operating speed calculations.
Position feedback

Switch cartridges
The position feedback is achieved by switch cartridges in the module. These cartridges contain switching elements which sense the open or closed position and are pre wired to the terminal strip. These easily exchangeable switch cartridges are available with various mechanical or proximity switching elements.

Non-Intrusive switch point adjustment
If required the switches can be adjusted without opening the module. This, so called, Non-Intrusive switch adjustment is located at the front of the module behind a locable (1) shield (2). Two adjustment screws are available for adjusting the Closed (3) and Open (4) position indication.

Important:
- The above ‘Closed’ and ‘Open’ marked adjustment screws will adjust the valve’s ‘Closed’ or ‘Open’ switch point, if the valve closes after a Clock Wise (CW) rotation.
- If the valve closes after a Counter Clock Wise (CCW) rotation, the ‘Closed’ marked adjustment screw will adjust the ‘Open’ switch point. Similar, the ‘Open’ marked adjustment screw will adjust the ‘Closed’ switch point.

Terminal strip position feedback switches
Switch cartridge

Non-Intrusive switch point adjustment

‘Closed’
Switch point adjustment

‘Open’
Switch point adjustment
Mechanical switches

Table 2: Mechanical switches

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option code</td>
<td>M</td>
</tr>
<tr>
<td>Option code</td>
<td>G (gold contacts)</td>
</tr>
<tr>
<td>Type</td>
<td>Mechanical</td>
</tr>
<tr>
<td>Voltage</td>
<td>M: 277 VAC or 250VDC (maximum)</td>
</tr>
<tr>
<td></td>
<td>G: 125 VAC or 30VDC (maximum)</td>
</tr>
<tr>
<td>Contacts</td>
<td>NO and NC</td>
</tr>
<tr>
<td>Temperature</td>
<td>-25°C to +65°C / -13°F to +149°F</td>
</tr>
</tbody>
</table>

For use in hazardous areas, see table 7

Table 3: Maximum currents

<table>
<thead>
<tr>
<th>Switch voltage</th>
<th>M type switch</th>
<th>G type switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 VAC</td>
<td>10 A (3 A’)</td>
<td>0.1 A²</td>
</tr>
<tr>
<td>250 VAC</td>
<td>10 A (3 A’)</td>
<td>-</td>
</tr>
<tr>
<td>30 VDC</td>
<td>0.5 A</td>
<td>0.1 A²</td>
</tr>
<tr>
<td>125 VDC</td>
<td>0.5 A</td>
<td>-</td>
</tr>
<tr>
<td>250 VDC</td>
<td>0.25 A</td>
<td>-</td>
</tr>
</tbody>
</table>

Note:
1. The mechanical (M-type) switches are rated for 3 A with inductive load.
2. The mechanical (G-type) switches have gold contacts. For applications where the benefits of gold contacts are required, the maximum current is 1 A.
3. For applications below -20°C (-4°F), the base actuator must be equipped with Low temperature seals.

2-Wire Proximity switches

Table 4: 2-wire NAMUR proximity switches

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option code</td>
<td>N</td>
</tr>
<tr>
<td>Type</td>
<td>2-wire inductive, normally closed</td>
</tr>
<tr>
<td>Voltage</td>
<td>8 VDC nominal</td>
</tr>
<tr>
<td>Output</td>
<td>Unswitched, &gt; 3 mA</td>
</tr>
<tr>
<td></td>
<td>Switched, &lt; 1 mA</td>
</tr>
<tr>
<td>Temperature</td>
<td>-25°C to +65°C / -13°F to +149°F</td>
</tr>
</tbody>
</table>

For use in hazardous areas, see table 7

Compliant to DIN EN 60947-5-6 (NAMUR)

Table 5: 2-Wire 230V proximity switches

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option code</td>
<td>H</td>
</tr>
<tr>
<td>Voltage</td>
<td>20...250VAC / 10...300VDC</td>
</tr>
<tr>
<td></td>
<td>(50...60 Hz AC)</td>
</tr>
<tr>
<td>Current</td>
<td>Maximum</td>
</tr>
<tr>
<td></td>
<td>100 mA</td>
</tr>
<tr>
<td></td>
<td>Peak</td>
</tr>
<tr>
<td></td>
<td>0.9A (20ms / 0.5Hz)</td>
</tr>
<tr>
<td>Leakage</td>
<td>&lt; 1.7 mA</td>
</tr>
<tr>
<td>Temperature</td>
<td>-25°C to +65°C / -13°F to +149°F</td>
</tr>
</tbody>
</table>

For use in hazardous areas, see table 7

Note:
1. For applications below -20°C (-4°F), the base actuator must be equipped with Low temperature seals.

Wiring diagrams:
- Mechanical switches
- 2-Wire Proximity switches

Important:
- The above "Closed" and 'Open' marked adjustment terminals will indicate the valve’s "Closed" or 'Open' switch point, if the valve closes after a Clock Wise (CW) rotation.
- If the valve closes after a Counter Clock Wise (CCW) rotation, the 'Closed' marked adjustment terminals will indicate the "Open" switch point. Similar, the 'Open' marked adjustment terminals will indicate the "Closed" switch point.
3-Wire Proximity switches

Table 6: 3-wire proximity switches

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option code</td>
<td>O, V3 PNP</td>
</tr>
<tr>
<td>Option code</td>
<td>C, V3 NPN</td>
</tr>
<tr>
<td>Function</td>
<td>Make</td>
</tr>
<tr>
<td>Voltage</td>
<td>10 - 30V</td>
</tr>
<tr>
<td>Current</td>
<td>100 mA maximum</td>
</tr>
<tr>
<td>Off-state current</td>
<td>0 ... 0.5 mA typical</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-25°C to +65°C / -13°F to +149°F</td>
</tr>
</tbody>
</table>

Note:
1. For applications below -20°C (-4°F), the base actuator must be equipped with Low temperature seals.

Wiring diagram:
3-Wire proximity "O" type switches PNP

Wiring diagram:
3-Wire proximity "C" type switches NPN

Cable range: 0.33 - 2.5mm² or 22-12AWG

Wiring diagram for 3-Wire proximity switches

Important:
- The above "Closed" and 'Open' marked adjustment terminals will indicate the valve’s "Closed" or "Open" switch point, if the valve closes after a Clock Wise (CW) rotation.
- If the valve closes after a Counter Clock Wise (CCW) rotation, the "Closed" marked adjustment terminals will indicate the "Open" switch point. Similar, the "Open" marked adjustment terminals will indicate the "Closed" switch point.
Control Module Options
QC41, QC42 and QC43

Local Manual Control

Description
For commissioning, emergency or maintenance purposes, the FieldQ can be supplied with one or two Manual Control options. These can operate the pilot valve(s) inside the module and as such operate the actuator, when there is air pressure available, but no control signal or power supply.

Notes:
- One Local Manual Control is required for normal operation of Double acting or Spring return actuators.
- For Double acting actuator with a Fail-in-last position function, a second Local Manual Control can be mounted.
- These options can be ordered together with the Control Module or as a kit to be mounted later.
- For option ordering codes, see page 7

Speed Control

Description
The FieldQ can be supplied with a Speed Control option. One throttle is required for Spring Return actuators and up to two for Double Acting actuators.

The speed control throttle controls the air flow in and out of an air chamber and as such limits the speed of the “Opening” and “Closing” stroke simultaneously. This throttle consists of:
1. Nut cover
2. Main throttle with set screw.

Notes:
- For Spring Return actuators with one speed control throttle, it is not possible to set both the stroke cycle times to an equal time.
- Four Double Acting actuators it is possible to mount two speed control throttles.
- The actual stroke cycle times depend on the actual load on the actuator during the different strokes.
Hazardous area specifications
Modules QC41, QC42 and QC43

Below specification are applicable for QC41, QC42 and QC43 modules with a hazardous area approval.

Hazardous area product marking:

**IECEx hazardous or Classified Location:**
Ex d IIB+H2 T4/T6 Gb
Ex t IIC T80°C Db
IECEx DEK 15.0034X

**ATEX hazardous or Classified Location:**
Ex II 2G Ex db IIB+H2 T4/T6
Ex II 2D Ex tb IIC T80°C
DEKRA 15ATEX0055X

**FM hazardous or Classified Location:**

IEEE 1180
Ex d IIB+H2 T4/T6 Gb
Ex t IIC T80°C Db
FM APPROVED
Ex db IIIC T80°C Db
Ex tb IIC T80°C Db
DEKRA 15ATEX0055X

Notes:
1. Each control module is marked with the applicable ambient temperature marking.
2. Metric control modules are marked with ATEX and IECEx markings.
3. Imperial control modules are marked with ATEX, IECEx, FM and CSA markings.

Temperature rating

Table 7: Temperature rating for use in areas with a potential explosion hazard.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module type</strong></td>
<td><strong>Switch cartridge</strong></td>
</tr>
<tr>
<td>QC42, QC43 (115 or 230VAC)</td>
<td>F</td>
</tr>
<tr>
<td>QC42, QC43 (115 or 230VAC)</td>
<td>F</td>
</tr>
</tbody>
</table>

Notes:
1. 1x or 2x 24VDC pilot valves, or 1x 115/230 VAC pilot valve
2. 2x 115 or 230 VAC pilot valves

Switch cartridge
- M = Mechanical switches
- G = Mechanical switches (gold contacts)
- C = 3 wire PNP proximity switch
- O = 3 wire NPN proximity switch
- N = 2 wire proximity switch
- H = 2 wire proximity switch

Pneumatic action
- S = Spring Return (Single acting).
- D = Double acting.
- F = Double acting (Fail in Last Position)
Integrated Control modules

QC40 with AS-Interface digital bus communication.

Features

- AS-Interface digital communication.
- Up to 62 devices per segment for AS-Interface Spec. V3.0 protocol
- Basic actuator functions for:
  - Spring return applications, or
  - Double acting applications or,
  - Double acting Fail in Last Position applications.
- Suitable for all FieldQ actuator sizes both single and double acting actuators.
- Available as "Weather Proof" for indoors or outdoors use and "Non-Arcing/Non-Incendive" for areas with a potential explosion hazard.
  - The robust aluminum alloy enclosure (IP66 / NEMA4X rated), protects the IPT system, pneumatic components, the feedback switches and terminals and makes it suitable for indoor and outdoor use.
  - The hazardous area versions are available with:
    - ATEX or IECEx Ex nA approvals for use in Zone 2, 21 and 22
    - CSA or FM Non-Incendive approvals for use in Class I, Division 2.
- Operates with exchangeable position feedback switches.
- Non-intrusive switch point adjustment of the feedback switches. Allows to adjust switch points without opening the Control Module.
- LED indicators for Fail, Power, Open and Close position.
- Lockable Control Module cover.
- All the control and feedback connections can be wired through one single entry to the Control Module.
- One larger entry (3/4"NPT) is available for larger multi-core cables on imperial units.
- Modular functionality for easy update towards present and future bus systems.
Description:
This FieldQ QC40 Control Module offers an integrated concept for valve automation. Its compact and robust construction incorporates basic control and feedback functionality and communicates through the AS-Interface Spec. V3.0, V2.11 protocol.

Construction
All electrical and pneumatic control components are located inside one module housing making it a compact and robust construction incorporating basic control and feedback functionality and is suitable for indoor and outdoor use. The Control Module is mounted at the side of the basic actuator housing. Inside, wiring terminals are available for connecting the AS-Interface signals. Two cable entries are available.

One pneumatic connection is available to feed the control module. The pilot valves inside the control module are used to send the actuator to its open or closed position.

These modules are available with ATEX, IECEx certification for use in Zone 2, 21, and 22, and additionally CSA or FM certified for use in Class I, Division 2.

Fig. 2. Control module overview
General specifications:

Material housing: Aluminium alloy
Operating media: Air or inert gasses, filtered at 50µm
Pneumatic entry: Metric units: G1/4'
Imperial units: 1/4"NPT
Electrical connections: Internal terminal strip for bus signal connection
Optional quick connectors: 7/8" or M12 connector (see page 9)
Cable entries: Metric units: 2x M20x1.5
Imperial units: 1/2" and 3/4"NPT
Enclosure: Rated IP66 - NEMA4X
Switch points: Factory set at 15° before each end of travel (open and closed position).
Adjustable range: Between -3° to 15° and +75° to +93° of the end position.
Finish: Chromated with polyurethane based coating.
Temperature range: G-Type switch: -25°C to +60°C (-13°F to +140°F)
N-Type switch: -25°C to +60°C (-13°F to +140°F)

Dimensions:

Metric: See data sheet 1.603.08
Imperial/UNC: See data sheet 1.603.09
DIN 3337: See data sheet 1.603.10

Electrical safety requirements:

Use: In- and outdoor.
Altitude: Operating full power available up to 2000 meter (6000 feet).
Maximum relative humidity: 80% for temperatures up to 31°C (87.8°F) decreasing linearly to 50% relative humidity at 40°C (104°F).
Mains supply fluctuation: Up to ±10% of nominal voltage
Over voltage category: II
Pollution degree: 2 (3 when the cover remains closed)

Communication Protocol:

Protocol: AS-Interface Spec3.0
Number of devices: 31 for AS-Interface Spec. V2.11 protocol
62 for AS-Interface Spec. V3.0 protocol
Current Minimum: 34 mA at 26.5V and 25°C
Maximum: 140 mA at 26.5V and 25°C
Nominal: 101 mA at 26.5V and 25°C to 60°C
Protection: Short circuit detection

Table 1: Factory settings:

<table>
<thead>
<tr>
<th>Factory address</th>
<th>EID1</th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>EID1</td>
<td>EID2</td>
<td>E</td>
<td>A</td>
<td>00</td>
</tr>
</tbody>
</table>

Q-Series data bits Functions

<table>
<thead>
<tr>
<th>Type</th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Di's</td>
<td>Bi-directional Feedback &quot;Closed&quot;</td>
<td>Feedback &quot;Open&quot;</td>
<td>Pilot Valve 2 Control</td>
<td>Pilot Valve 1 Control</td>
</tr>
<tr>
<td>DO's</td>
<td>Not used</td>
<td>Not used</td>
<td>Not used</td>
<td>Not used</td>
</tr>
</tbody>
</table>

LED indicators for Open and Close position, Status, and Power.

- The Open and Close LED identify the position of the automated valve. These LED's are also useful for setting the switch points more accurately.
- Status feedback is provided according to the ASI standard. For more detailed information on LED indications, see Installation Guide : DOC.IG.QC40.1
- The power LED indicates if the AS-I cartridge is powered on or not.
Pneumatic control

Pneumatic control variations
The Control Module contains all the necessary pneumatic components to control the actuator and control the incoming and outgoing airflow. Pneumatically the modules are available for three applications:

1. Spring return or
2. Double acting or
3. Double Acting - "Fail-in-Last-Position".

To achieve these functions, each Control Module can be fitted with one or two pilot valves depending on the required functionality:

1. One pilot valve is default and suitable for normal operation of double acting or spring return actuators
2. Two pilot valves are required to achieve a "Fail-in-Last-Position" functionality on double acting actuators.

Fig. 4. Pilot valve and pneumatic cartridge

Fig. 5. One pilot valve and wiring connections for standard Double Acting or Spring Return applications

Fig. 6. Two pilot valves and wiring connections for Double Acting "Fail in Last Position" applications
Pneumatic components
The pneumatic components inside the module consist out of one or two pilot valves and a 3/2 spool valve or 5/2 bistable spool valve. The spool valves are pneumatically operated by the pilot valves. To assure trouble-free operation, the spool valves are equipped with big ports. This enables a large air flow and makes it less sensitive for contamination of the internals. The large air flow also fast cycle times and enables it to be utilized for the entire FieldQ Series actuator range.

Internal corrosion protection:
The spring return models have standard a built in “Breather” function. During the spring stroke, the exhaust air from the center chamber (A-Port) is first fed to the spring chamber (B-port) preventing air from outside from being sucked into the spring chamber. This reduces the possibility of internal corrosion and maximizes the actuators’ working life.

Pneumatic options

Speed Control
The QC40 control module can be supplied with a Speed Control option. One throttle is required for Spring Return actuators and up to two for Double Acting actuators. The speed control throttle controls the air flow in and out of an air chamber and as such limits the speed of the “Opening” and “Closing” stroke simultaneously.

Silencers and vents
The exhaust ports Ra and Rb on the module are shipped from the factory with transport protection. The module can be equipped with either silencers or vents.

Manual Control
For commissioning, emergency or maintenance purposes, the QC40 control module can be supplied with Manual Control options. These options can operate the actuator when there is air pressure available, but no control signal or power supply.
- For normal operation the module should be fitted with one Manual Control.
- For Double Acting with a Fail-in-Last-Position function, two Manual Control can be fitted.

Maximum Flow Rates of Q-Series Modules
The maximum flow rates depends mainly on the flow rates of the FieldQ modules. You can use $K_v \approx 0.33 \text{ (m}^3/\text{h)}$ or $C_v$ value of 0.38 (US gall/min 1 Psi) for approximate operating speed calculations.
Position feedback

Switch cartridges
The position feedback is achieved by switch cartridges in the module. These cartridges contain switching elements which sense the open or closed position and are pre wired to the AS-I cartridge (see fig 5 and 6). These easily exchangeable switch cartridges are available with mechanical or proximity switching elements.

Non-Intrusive switch point adjustment
If required the switches can be adjusted without opening the module. This, so called, Non-Intrusive switch adjustment is located at the front of the module behind a locable (1) shield (2). Two adjustment screws are available for adjusting the Closed (3) and Open (4) position indication.

Important:
- The above ‘Closed’ and ‘Open’ marked adjustment screws will adjust the valve’s ‘Closed’ or ‘Open’ switch point, if the valve closes after a Clock Wise (CW) rotation.
- If the valve closes after a Counter Clock Wise (CCW) rotation, the ‘Closed’ marked adjustment screw will adjust the ‘Open’ switch point. Similar, the ‘Open’ marked adjustment screw will adjust the ‘Closed’ switch point.

Mechanical switches
Table 2: Mechanical switches

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option code</td>
<td>G (gold contacts)</td>
</tr>
<tr>
<td>Type</td>
<td>Mechanical</td>
</tr>
<tr>
<td>Contacts</td>
<td>NO and NC</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-25°C to +60°C / -13°F to +140°F</td>
</tr>
</tbody>
</table>

2-Wire Proximity switches
Table 3: 2-wire NAMUR proximity switches

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option code</td>
<td>N</td>
</tr>
<tr>
<td>Type</td>
<td>2-wire inductive, normally closed</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-25°C to +60°C / -13°F to +140°F</td>
</tr>
<tr>
<td>Compliant to</td>
<td>DIN EN 60947-5-6 (NAMUR)</td>
</tr>
</tbody>
</table>

Note:
1. The switch cartridge is internal powered by AS-i cartridge, external power/wire for switch signal is not required.
2. For applications below -20°C (-4°F), the base actuator must be equipped with Low temperature seals.
Control Module Options

Local Manual Control

Description
For commissioning, emergency or maintenance purposes, the QC40 control module can be supplied with one or two Manual Control options. These can operate the spool valve(s) inside the module and as such operate the actuator, when there is air pressure available, but no control signal or power supply.

Notes:
- One Local Manual Control is required for normal operation of Double acting or Spring return actuators.
- For Double acting actuator with a Fail-in-last position function, a second Local Manual Control can be mounted.
- These options can be ordered together with the Control Module or as a kit to be mounted later.
- For option ordering codes, see page 7

Speed Control

Description
The QC40 control module can be supplied with a Speed Control option. One throttle is required for Spring Return actuators and up to two for Double Acting actuators. The speed control throttle controls the air flow in and out of an air chamber and as such limits the speed of the “Opening” and “Closing” stroke simultaneously. This throttle consists of:

1. Nut cover
2. Main throttle with set screw.

Notes:
- For Spring Return actuators with one speed control throttle, it is not possible to set both the stroke cycle times to an equal time.
- Four Double Acting actuators it is possible to mount two speed control throttles.
- The actual stroke cycle times depend on the actual load on the actuator during the different strokes.

Fig. 10. Local Manual Control option

Fig. 11. Speed control options
Hazardous area executions

Control Module QC40 with AS-I bus communication is available with optional Non-Incendive/Non Sparking (NI) approvals as listed below:

IECEx
Certificate No.: IECEx DEK 16.0059X
Non-Sparking
Ex nA IIC T4 Gc
Ex tb IIC T80°C Db

ATEX
Certificate No.: DEKRA 16ATEX0098X
Non-Sparking
Ex nA IIC T4 Gc
Ex tb IIC T80°C Db

FM
Certificate No.: FM16US0366X
Non-Incendive
- Class I, II, III, Division 2,
  Groups ABCDEFG, T4,
- Class I, Zone 2,
  Group IIC T4

CSA
Certificate No.: CSA 17CA70125362X
Class I, Division 2, Groups A, B, C and D, T4;
Class II, Division 1, Group E, F and G, T80°C;
Class III, Division 1, T80°C
Ex nA nC IIC T4 Gc
Ex tb IIC T80°C Db

INMETRO
Certificate No.: IEx 17.0084X
Non-Sparking
Ex nA IIC T4 Gc IP66
Ex tb IIC T80 °C Db IP66

Ambient temperature:
T4 @ Ta = -25°C...+60°C  IP66/NEMA 4X
Wiring and Quick Connectors

AS-I Bus terminal wiring
The QC40 module can be connected to the system by hard wiring the module to the terminals The QC40 Module can optionally be equipped with prewired quick connectors. Two versions are available: 7/8" or M12 (male chassis part).

![Fig 12. QC40 AS-I module wiring](image)

Wiring for hazardous areas
Detailed safe area, Intrinsically safe or Non-Incendive/Non-Sparking wiring instructions, will be shipped with the product, see Installation Guide: DOC.IG.QC40.1

Quick connectors
Quick connectors, as shown are excluded for non-Incendive or non-sparking use in hazardous area's classified as Zone 2 or 22 or Cl I, II, III, Div. 2.

Wiring dimensions
Solid wire: 2.5mm² max.
Stranded wire: 0.2-3.3mm² or 24-12 AWG

Current
Minimum: 34 mA at 26.5V and 25°C
Maximum: 140 mA at 26.5V and 25°C
Nominal: 101 mA at 26.5V and 25°C to 60°C

Protection: Short circuit detection

![Fig 13. QC40 AS-I module quick connector pinouts](image)

Note:
Terminal 2 may be used for shield.
Where applicable, cut away unused wires.
Integrated Control modules

QC54 with FOUNDATION™ Fieldbus digital communication.

Features:
- Basic actuator functions for:
  - Spring return applications, or
  - Double acting applications or,
  - Double acting Fail in Last Position applications.
- Spring-return control modules come with Breather function
  - The breather function is a part of single-acting control module and provides corrosion protection of the actuator spring chamber.
- Suitable for all Q-Series actuator sizes.
- FOUNDATION™-Fieldbus digital communication.
- IPT-technology (Intelligent Position Tracking).
- Initialization by FOUNDATION™-Fieldbus or Push Button for easy setup of the actuator.
  - Press and confirm press the 'Auto-Init' button starts auto-initialization procedure.
  - Initialization sets automatically the switch points for the position feedback of the actuator.
  - Initialization checks if the actuator and control module configuration match. This procedure will detect the action type (Fail-Open, Fail-Close or Fail in last position) and generate an alert if there is a configuration issue.
- Readjustable or Reversible position feedback using the re-assignment buttons or by FOUNDATION™ Fieldbus.
- Adjustable switch points can be adjusted from 5% to 30% before the end of the stroke by FOUNDATION™ Fieldbus.
- Three indication LED’s for “Status”, “Open” and “Closed” position. Status LED indicates:
  - Initialization procedure running (blinking),
  - Successful initialization procedure (LED is on) or
  - No or failed initialization (flashing) or
  - A particular unit in the field.

Control Module can be easily mounted to the actuator
- Available as “Weather Proof” for indoors or outdoors use.
  - The robust aluminum alloy enclosure (IP66/NEMA4X rated), protects the IPT system, pneumatic components, the feedback switches and terminals and makes it suitable for indoor and outdoor use.
- The hazardous area versions are available with:
  - ATEX or IECEx Ex ia or Ex nA approvals for use in Zone 1, 2, 21 and 22
  - CSA or FM Intrinsically safe or Non-Incendive approvals for use in Class I, Division 1 or Class I, Division 2.
- Lockable Control Module cover.
- One larger entry (3/4”NPT) is available for larger multi-core cables on imperial units.
Description:
This Q-Series QC54 Control Module offers an integrated concept for valve automation. Its compact and robust construction incorporates basic control and feedback functionality and communicates through the FOUNDATION™ Fieldbus protocol.

Construction:
All electrical and pneumatic control components are located inside one module housing making it a compact and robust construction incorporating basic control and feedback functionality and is suitable for indoor and outdoor use.

The Control Module is mounted at the side of the basic actuator housing. Inside, wiring terminals are available for connecting the FOUNDATION™ Fieldbus signals. Two cable entries are available.

One pneumatic connection is available to feed the control module. The pilot valves inside the control module are used to send the actuator to its open or closed position.

These modules are available with ATEX, IECEx or Inmetro certification for use in Zone 2, 21, and 22, and additionally CSA or FM certified for use in Class I, Division 2.

Fig. 2. Control module overview
**General specifications:**

- **Material housing:** Aluminium alloy
- **Operating media:** Air or inert gases, filtered at 5µm
- **Pneumatic entry:** Metric units: G1/4"
  Imperial units: 1/4"NPT
- **Electrical connections:** Internal 3 pole terminal strip for bus signal
  Internal and external earth connection
  Optional quick connectors: 7/8" or M12 connector (see page 9)
- **Cable entries:** Metric units: 2x M20x1.5
  Imperial units: 1/2" and 3/4"NPT
- **Enclosure:** Rated IP66 - NEMA4X
- **Switch points:** Factory set at 15° before each end of travel (open and closed position).
- **Adjustable range:** Between -3° to 15° and +75° to +93° of the end position.
- **Finish:** Chromated with polyurethane based coating.
- **Temperature range:** -20°C to +50°C (-4°F to +122°F)

**Dimensions:**

- **Metric:** See data sheet 1.603.08
- **Imperial/UNC:** See data sheet 1.603.09
- **DIN 3337:** See data sheet 1.603.10

**Electrical safety requirements:**

- **Use:** In and outdoor.
- **Altitude:** Operating full power available up to 2000 meter (6000 feet).
- **Maximum relative humidity:** 80% for temperatures up to 31°C (87.8°F) decreasing linearly to 50% relative humidity at 40°C (104°F).
- **Mains supply:** Up to ±10% of nominal voltage fluctuation
- **Over voltage category:** II
- **Pollution degree:** 2 (3 when the cover remains closed)

**Communication Protocol:**

- **Protocol:** FOUNDATION™-Fieldbus
- **Transmission:** H1, IEC 61158-2
- **Maximum current:** 18mA from bus
- **Required external protection current:** Restrict the power supply to <600mA.

**Function blocks**

The Control Module provides the following function blocks:

- Resource Block (RB)
- Transducer Block (TB)
- Analog Input (AI) Function Block
- Discrete Output (DO) Function Block
- 2x Discrete Input (DI) Function Block
- PID Function Block

**Diagnostics and Alerts**

Standard FOUNDATION™-Fieldbus diagnostics and alerts provided meets Emerson PlantWeb Alerts standard. Applicable diagnostics include:

- Travel times for the Open stroke, Close stroke and Average travel times.
- Cycle Counters for Control Module, Pneumatic Module, Actuator and Valve
- Time in Position
- Various internal electronic health tests.
- Instrument temperature.

For more detailed information on diagnostics see page 10 and 11.
Pneumatic control variations

The Control Module contains all the necessary pneumatic components to control the actuator and control the incoming and outgoing airflow. Pneumatically the modules are available for three applications:

1. Spring return or
2. Double acting or
3. Double Acting - “Fail-in-Last-Position”.

To achieve these functions, each Control Module can be fitted with one or two pilot valves depending on the required functionality:

1. One pilot valve is default and suitable for normal operation of double acting or spring return actuators
2. Two pilot valves are required to achieve a “Fail-in-Last-Position” functionality on double acting actuators.

Fig. 3. Pilot valve and pneumatic cartridge

Fig. 4. One pilot valve and wiring connections for standard Double Acting or Spring Return applications

Fig. 5. Two pilot valves and wiring connections for Double Acting “Fail in Last Position” applications
**Pneumatic components**

The pneumatic components inside the module consist out of one or two pilot valves and a 3/2 spool valve or 5/2 bistable spool valve. The spool valves are pneumatically operated by the pilot valves. To assure trouble-free operation, the spool valves are equipped with big ports. This enables a large air flow and makes it less sensitive for contamination of the internals. The large air flow also fast cycle times and enables it to be utilized for the entire Q-Series Series actuator range.

**Internal corrosion protection:**

The spring return models have standard a built in “Breather” function. During the spring stroke, the exhaust air from the center chamber (A-Port) is first fed to the spring chamber (B-port) preventing air from outside from being sucked into the spring chamber. This reduces the possibility of internal corrosion and maximizes the actuators’ working life.

**Pneumatic options**

**Speed Control**

The QC54 control module can be supplied with a Speed Control option. One throttle is required for Spring Return actuators and up to two for Double Acting actuators. The speed control throttle controls the air flow in and out of an air chamber and as such limits the speed of the “Opening” and “Closing” stroke simultaneously.

**Silencers and vents**

The exhaust ports Ra and Rb on the module are shipped from the factory with transport protection. The module can be equipped with either silencers or vents.

**Manual Control**

For commissioning, emergency or maintenance purposes, the QC54 control module can be supplied with Manual Control options. These options can operate the actuator when there is air pressure available, but no control signal or power supply.

- For normal operation the module should be fitted with one Manual Control.
- For Double Acting with a Fail-in-Last-Position function, two Manual Control can be fitted.

**Maximum Flow rates of Q-Series modules**

The maximum flow rates depends mainly on the flow rates of the FieldQ modules. You can use Kv 0.28 (m3/h) of Cv value of 0.33 (US gall/min 1Psi) for approximate operating speed calculations.

---

**Fig. 6. Pneumatic operation**
Switch point setting

The QC54 control modules are equipped with a button board that allows you to set or readjust the switch points for the position feedback.

**Auto-Initialization**

Initialization sets automatically the switch points for the position feedback of the actuator and checks if the actuator and control module configuration match. This procedure will detect the action type (Fail-Open, Fail-Close or Fail in last position) and generate an alert if there are configuration issues.

This process is done automatically, by the module, however, the user must start it and the unit must be wired and powered.

Digital communication is not required but power supply is necessary (9V to 32V DC). The initialization process can be started in one of two ways:

1. Initialization using the local buttons (see fig. 7).
2. Initialization using a bus command (see Reference manual QC54, DQC.RM.QC54.E)

**Indication LED’s**

Three indication LED’s for ‘Status’, ‘Open’ and ‘Closed’ position are available. The status LED indicates:
- Initialization procedure running (blinking),
- Successful initialization procedure (LED is on) or
- No or failed initialization (flashing)

**Recognize Function**

An additional function of the Status LED is the recognize function. To recognize a particular unit in the plant, the "Recognizing LED" function can be activated in the transducer block. When this function is activated, the Status LED will blink for 300 seconds (5 minutes).

**Changing Switch Point Setting**

**Readjustment of switch points**

When switch point re-adjustment is required but it is not allowed that the actuator/valve unit cycles, the new switch point can be set by pressing the corresponding 'Open' or 'Closed' button.

**Factory settings**

Pressing both the Open and Close reassignment buttons, while powering up, will set the module back to its factory settings.
Control Module Options

Local Manual Control

Description
For commissioning, emergency or maintenance purposes, the QC54 control module can be supplied with one or two Manual Control options. These can operate the pilot valve(s) inside the module and as such operate the actuator, when there is air pressure available, but no control signal or power supply.

Notes:
- One Local Manual Control is required for normal operation of Double acting or Spring return actuators.
- For Double acting actuator with a Fail-in-last position function, a second Local Manual Control can be mounted.
- These options can be ordered together with the Control Module or as a kit to be mounted later.
- For option ordering codes, see data sheet 1.607.01

Speed Control

Description
The QC54 control module can be supplied with a Speed Control option. One throttle is required for Spring Return actuators and up to two for Double Acting actuators.

The speed control throttle controls the air flow in and out of an air chamber and as such limits the speed of the “Opening” and “Closing” stroke simultaneously.

This throttle consists of:
1. Nut cover
2. Main throttle with set screw.

Notes:
- For Spring Return actuators with one speed control throttle, it is not possible to set both the stroke cycle times to an equal time.
- Four Double Acting actuators it is possible to mount two speed control throttles.
- The actual stroke cycle times depend on the actual load on the actuator during the different strokes.

Fig. 9. Local Manual Control option

Fig. 10. Speed control options
Wiring and Quick Connectors

**FOUNDATION™ Fieldbus terminal wiring**

The QC54 module can be connected to the system by hard wiring the module to the terminals. The QC54 Module can optionally be equipped with prewired quick connectors. Two versions are available: 7/8" or M12 (male chassis part).

<table>
<thead>
<tr>
<th>Field wiring</th>
<th>Actuator wiring</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF Power supply</td>
<td></td>
</tr>
</tbody>
</table>

**Wiring for hazardous areas**

Detailed safe area, Intrinsically safe or Non-Incendive/Non-Sparking wiring instructions, will be shipped with the product, see Installation Guide: DOC.IG.QC54.1

**Quick connectors**

Quick connectors, as shown are excluded for non-Incendive or non-sparking use in hazardous area’s classified as Zone 2 or 22 or Cl I, II, III, Div. 2.

**Wiring dimensions**

- Solid wire: 2.5mm² max.
- Stranded wire: 0.2-3.3mm² or 24-12 AWG

---

**Quick connector pinouts:**

(male chassis part)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>Green / Yellow</td>
<td>Blue</td>
</tr>
</tbody>
</table>

Quick connector Terminal

---

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- America’s: +1 281 477 4100
- Europe: +36 22 53 0950
- Asia/Pacific: +65 67 77 8211
Hazardous area executions

Control Module QC54 with FOUNDATION™ Fieldbus is available with optional intrinsically safe (IS) or Non-Incendive/Non Sparking (NI) approvals as listed below:

### IECEx
- **Certificate No.**: DEK16.0006X
- **Intrinsically safe**: Ex ia IIC T4 Ga, Ex ia IIC T80°C Da, Ex ic IIC T4 Gc
- **Non-Sparking**: Ex nA IIC T4 Gc, Ex tb IIC T80°C Db

### ATEX
- **Certificate No.**: DEKRA 16ATEX00006X
- **Intrinsically safe**: II 1 G Ex ia IIC T4 Ga, II 1 D Ex ia IIC T80°C Da, II 3 G Ex ic IIC T4 Gc
- **Non-Sparking**: II 2 D Ex tb IIC T80°C Db, II 3 G Ex nA IIC T4 Gc

### FM
- **Certificate No.**: FM16US0366X
- **Type 4X**: Intrinsically safe* - Class I, Division 1, Groups A, B, C and D, T4; Class I, Division 2, Groups A, B, C and D, T4; Class II, Division 1, Group E, F and G, T80°C; Class III, Division 1, T80°C, Ex ia IIC T4 Ga, Ex ia IIC T80°C Da, Ex ic IIC T4 Gc
- **Non Incendive**: Class I, Division 2, Groups A, B, C and D, T4; Class II, Division 1, Group E, F and G, T80°C; Class III, Division 1, T80°C, Ex nA IIC T4 Gc, Ex tb IIC T80°C Db

### CSANS
- **Certificate No.**: CSA 17CA70167494X
- **Intrinsically safe**: Class I, Division 1, Groups A, B, C and D T4; Class I, Division 2, Groups A, B, C and D, T4; Class II, Division 1, Group E, F and G, T80°C; Class III, Division 1, T80°C, Ex ia IIC T4 Ga, Ex ia IIC T80°C Da, Ex ic IIC T4 Gc
- **Non Incendive**: Class I, Division 2, Groups A, B, C and D, T4; Class II, Division 1, Group E, F and G, T80°C; Class III, Division 1, T80°C, Ex nA IIC T4 Gc, Ex tb IIC T80°C Db

### INMETRO
- **Certificate No.**: IEx 17.0085X
- **Intrinsically safe**: Ex ia IIC T4 Ga IP66, Ex ia IIC T80 °C Da IP66
- **Non Incendive**: Ex nA IIC T4 Gc IP66, Ex tb IIC T80 °C Db IP66
- **Ambient temperature**: T4 @ Ta = -20°C...+50°C IP66/nema 4x

**Note:**
- The assembly of a Q-Series Actuator with the intrinsically safe QC54 Control Module, may be used in (ATEX) classified Zones 1, 2(Gasses) and/or 21, 22 dust(Dust).

**FISCO systems**
The Q-Series QC54 is suitable for use in a FISCO system in accordance with IEC 60079-27
Diagnostics and PlantWeb Alerts

QC54 FOUNDATION™ Fieldbus

Diagnostics
The Q-Series QC54 Control Module with FOUNDATION™ Fieldbus communication has diagnostic capabilities. These process parameters can give information about communication condition, valve and/or actuator unit. It enables to predict failures in advance and makes maintenance easier to schedule. The following diagnostics are available for the QC54 control module:

1. Timer parameters:
   1. Open and Closed travel time
   2. High and low limits of Open and Closed travel time
   3. Average travel times of last 30 strokes of Open and Closed travel.
   4. High and low limits of average Open and Closed travel time.

2. Cycle Counters
   1. Control Module - Counts how many times the Control Module cycles (read only).
   2. Pneumatic Module - Counts how many times the Pneumatic Module cycles.
   3. Actuator - Counts how many times the actuator cycles.
   4. Valve - Counts how many times the valve cycles.

3. Time In Position

4. Various internal electronic health tests

PlantWeb Alerts
PlantWeb Alerts are alerts that have been predefined and categorized for the user. These device alerts can be used to help troubleshoot the instrument (see also page 4). There are three categories:

- Failed alerts
  A failed alert indicates a failure within the device that will make the device, or some part of the device, non-operational.

- Maintenance alerts
  A maintenance alert indicates that the device, or some part of the device, needs maintenance soon.

- Advisory alerts
  An advisory alert indicates a condition that does not have a direct impact on the device’s primary function. If the condition is ignored, the device will eventually fail.

These alerts, when enabled, can participate in the DeltaV alarm interface tools such as the alarm banner, alarm list, and alarm summary.
## Diagnostics and PlantWeb Alerts

### Alerts & recommended actions

<table>
<thead>
<tr>
<th>Parameter name</th>
<th>DeltaV text</th>
<th>Recommended actions</th>
<th>Advisory</th>
<th>Maintenance</th>
<th>Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal alerts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bad_position_sensor</td>
<td>Bad Position Sensor Error</td>
<td>Feedback problem, replace control module when possible</td>
<td>n</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>bad_temperature_sensor</td>
<td>Bad Temperature Sensor Error</td>
<td>Temperature sensor problem, replace Control module when possible</td>
<td>n</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>system_temperature_exceeded</td>
<td>System Temperature Exceeded</td>
<td>Take corrective actions to bring temperature within specified range.</td>
<td>n</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>software_error</td>
<td>Software Error</td>
<td>Software error has been detected, replace control module when possible.</td>
<td>n</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>travel_deviation</td>
<td>Travel Deviation</td>
<td>Lost position, Check air pressure</td>
<td>y</td>
<td>y</td>
<td>n</td>
</tr>
<tr>
<td>shutdown_is_set</td>
<td>Shutdown Is Set</td>
<td>Internal communications problem, check shutdown configuration for restart, Replace Control module.</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>pilot valve_error</td>
<td>Pilot valve error</td>
<td>Pilot valve number mismatch or pilot valve failure has been detected</td>
<td>n</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>Buttonboard_error</td>
<td>Buttonboard Error</td>
<td>Error is undefined, replace control module when possible</td>
<td>n</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td><strong>Counter alerts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cm_life_exceeded</td>
<td>Control Module Life Cycle Exceeded</td>
<td>Control module life cycle exceeded, replace control module</td>
<td>n</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>pm_life_exceeded</td>
<td>Pneumatic Module Life Cycle Exceeded</td>
<td>Pneumatic module life cycle exceeded, replace pneumatic module.</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>act_life_exceeded</td>
<td>Actuator Life Cycle Exceeded</td>
<td>Actuator life cycle exceeded, replace actuator.</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>valve_life_exceeded</td>
<td>Valve Life Cycle Exceeded</td>
<td>Valve life cycle exceeded, valve requires maintenance.</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td><strong>Timer alerts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>time_in_position_exceeded</td>
<td>Time in position exceeded</td>
<td>Time in position exceeded, take appropriate action.</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>open_travel_time_exceeded</td>
<td>Open travel timer exceeded</td>
<td>Open travel timer exceeded, check valve system.</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>close_travel_time_exceeded</td>
<td>Close travel timer exceeded</td>
<td>Close travel timer exceeded, check valve system.</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td><strong>Initialization alert</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assembly error</td>
<td>Assembly error</td>
<td>Pneumatic function mismatch, check module and actuator configuration</td>
<td>n</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>initialization_failed</td>
<td>Initialization Failure</td>
<td>Device failed initialization; Check air pressure, check actuator sizing, check valve system</td>
<td>y</td>
<td>y</td>
<td>n</td>
</tr>
</tbody>
</table>
### Alerts & recommended actions (continued)

<table>
<thead>
<tr>
<th>Alerts</th>
<th>DeltaV text</th>
<th>Recommended actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>io_failure</strong></td>
<td>Internal IO Failure</td>
<td>Internal communications are lost, device will act according to shutdown configuration.</td>
</tr>
<tr>
<td><strong>rb_NV_write_deferred</strong></td>
<td>Output Board NV Memory Failure</td>
<td>NV Write Deferred: A high number of writes has been detected to non-volatile memory. To prevent premature failure of the memory, the write operations have been deferred. The data will be saved about every 3 hours. This condition usually exists because a program has been written that writes to control block parameters not normally expected to be written to on a cyclic basis. Any such automated write sequence should be modified to write the parameter(s) only when needed. It is recommended that you limit the number of periodic writes to all static or non-volatile parameters such as HI_HI_LIM, LOW_CUT, SP, TRACK_IN_D, OUT, IO_OPTS, BIAS, STATUS_OPTS, SP_HI_LIM, and so on.</td>
</tr>
<tr>
<td><strong>PWA_simulate_active</strong></td>
<td>PWA Simulate Active</td>
<td>If PWA simulate mode has been activated. The PWA active parameters can now be written as well as the resource block detailed status parameters and the internal alerts in the Transducer Block where the PWA active alarms originate from.</td>
</tr>
</tbody>
</table>
| **rb_nv_memory_failure** | Output Board NV Memory Failure | "Output Board NV Memory Failure: Non-volatile EEPROM data corruption was detected on the Fieldbus Electronics Board. Default values were loaded into the faulty block. 
1. Check the device configuration for changes in the block parameter values.
2. Reset the device to clear the error.
3. Download a Device Configuration.**
| **rb_nv_electronics_failure** | Output Board Electronics Failure | The Device has detected a fault with an electrical component on the Fieldbus Electronics Module Assembly. Replace the Device. |
| **diag_opt_PWA_simulate** | PWA Simulate | Since the hardware simulate switch may be impractical to access, a software option is being provided. |
| **func_opt_simulate** | Simulate Switch | Since the hardware simulate switch may be impractical to access, a software option is being provided. |
| **misc_opt_base_record** | Base Record | When the base record option is enabled, operator can write/read parameters to/from the sensor board that are not available via the FF parameter list. |

### Alert default setting

<table>
<thead>
<tr>
<th>Advisory</th>
<th>Maintenance</th>
<th>Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>enable</td>
<td>mask (show)</td>
<td>enable</td>
</tr>
<tr>
<td>mask (show)</td>
<td>enable</td>
<td>mask (show)</td>
</tr>
<tr>
<td>enable</td>
<td>mask (show)</td>
<td>enable</td>
</tr>
</tbody>
</table>

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*America's:* +1 281 477 4100 *Europe:* +36 22 53 0950 *Asia/Pacific:* +65 67 77 8211
Namur NE-107 Alarms

This section describes the parameter interaction to implement a FieldQ™ QC54 Control module to the NAMUR NE-107 requirements as a parameter group in the Resource Block. There are four alarm categories defined as per the NE-107 specification, Failed, Off Specification, Maintenance, and Check function.

**Maintenance** Although the output signal is valid, the wear reserve is nearly exhausted or a function will soon be restricted due to operational conditions e.g. build-up of deposits

**Off Specification** Off-spec means that the device is operating outside its specified range or an internal diagnostic indicates deviations from measured or set values due to internal problems in the device or process characteristics (e.g. bubble formation in flow metering or valve sticking).

**Check Function** Output signal temporarily invalid (e.g. frozen) due to on-going work on the device.

**Failed** Output signal invalid due to malfunction in the field device or its peripherals.

Each of these categories share 32 conditions that can be defined by the device manufacturer. Each condition may be mapped or not mapped for each category. If a condition is mapped then it is indicated in the "ACTIVE" parameter. If the condition in the "ACTIVE" parameter is not masked by the corresponding bit in the "MASK" parameter then the condition will be queued for broadcast using the corresponding "ALM" parameter at the associated priority indicated by "PRI" parameter. The 4 categories are defined below.

The conditions are not expected to identify explicitly the root cause of the condition, but rather to identify it in terms of:
- Replace the device
- Replace a part of the device
- Correct a configuration problem
- Fix something outside of the device

The above list is all that the operator needs to know to restore his process functionality and if there are more than 31 device conditions they should be grouped by definition into these bit

### Parameters

<table>
<thead>
<tr>
<th>Parameter Mnemonic</th>
<th>Obj Type</th>
<th>Data Type/Structure</th>
<th>Use/Model</th>
<th>Store</th>
<th>Size</th>
<th>Valid Range</th>
<th>Initial Value</th>
<th>Permission</th>
<th>Other Range Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD_CHECK_ACTIVE</td>
<td>S</td>
<td>Bit String</td>
<td>C/FD Active</td>
<td>D</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Read only</td>
</tr>
<tr>
<td>FD_CHECK_ALM</td>
<td>R</td>
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</table>
Find and Download EDD files

**Introduction**
For the QC54 Control Module Electronic Device Description files are available which you will need to install in your host system. Two versions of the EDD-driver files are available for the QC54 module:
- QC54 Standard DD Rev 4 - DD files for use with other Foundation FieldBus host systems and tools
- QC54 PlantWeb DD Rev 4 - DD files tailored specifically for use with Emerson PlantWeb Systems (DeltaV).

Please follow below instructions to find and download the applicable EDD files.
For installation of these files, please refer to your host systems documentation.

**Foundation FieldBus host systems**

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<thead>
<tr>
<th>Step</th>
<th>Action</th>
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<tbody>
<tr>
<td>1</td>
<td>Go to: <a href="https://fieldcommgroup.org/registered-products/">https://fieldcommgroup.org/registered-products/</a></td>
</tr>
<tr>
<td>2</td>
<td>In the search box type: FIELDQ</td>
</tr>
<tr>
<td>3</td>
<td>Click on the the FIELDQ hyperlink Field Q [D3A0]</td>
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</tbody>
</table>
| 4    | Select now the applicable revision of the driver file.  
- Revision 1, 2 and 3 are for QM/QC34 control modules.  
- Revision 4 is for the QC54 Control module. |
## DeltaV Host systems

<table>
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<tr>
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</tr>
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</tr>
<tr>
<td>3</td>
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<td></td>
</tr>
<tr>
<td>3a</td>
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# FieldQ Valve Actuator

## Parts and Materials - Actuators

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty.</th>
<th>Description</th>
<th>Specification</th>
<th>Notes</th>
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<td>PTFE + 25% C</td>
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<td>NBR</td>
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<td>EN 10270-1 SH</td>
<td>3</td>
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<td>EN AW 6082 T5</td>
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### Notes:
1. See Corrosion protection below
2. Hard anodized.
3. Deltatone® or Epoxy (black) coating.
4. Zinc plated and passivated.
5. Anodized.
6. Chromatized

### Control Modules
For material specification of the Control Modules, see page 2

### Corrosion protection
The applied paint system has passed a 1000 hour salt spray test as detailed by ASTM B117. For a detailed description of the Corrosion protection system see data sheet 1.606.05.

### Temperature ranges
The temperature range of FieldQ actuators with NAMUR plates depends on the O-ring seals and the utilized grease. For a detailed description of possible temperature ranges and applied parts, see data sheet 1.605.03

### Repair kit
Parts marked with an * are included in the repair kit.
FieldQ Valve Actuator

Parts and Materials - Control Modules

Base Materials
- Bodies: Aluminium
- Finish: 2 Component with an epoxy primer and polyurethane enamel top coating.
- Pneumatic cartridge: Aluminium
- Valve seats: NBR
- Pilot valve cartridge: Housing: Nylon PA6
- Switch cartridge: Housing: Nylon PA6
- Fasteners: Stainless Steel

External parts
1. Plug: Steel, Nickel plated
2. Exhaust: Base: Nylon PA6, Cover: Zinc, Nickel plated and transparent passivated, Option: Plastic silencer (nylon)
3. Speed Control: Stainless Steel (AISI 303)
5. Nut Covers: Nylon PA6
FieldQ valve actuator

Failure modes

Valve rotation
Valves are normally manufactured so that:

1. The valve is closed: after a clock wise rotation
2. The valve is open: after a counter clock wise rotation

*) = views from above

Position after a failure
The position of the actuator after a failure depends on:

1. Principles of operation
   - Spring Return or Double Acting
2. Actuator assembly code
   - See 1.606.03 for Double Acting
   - See 1.606.04 for Spring Return
Actuator assembly codes

Double acting assembly codes

**Standard assembly code:**

(= Clock Wise Rotation)  
CW

**Visual indicator mounted:**

(= for In line position indication)  
I

**Optional assembly code:**

(= Counter Clock Wise Rotation)  
CC

**Visual indicator mounted:**

(= for In line position indication)  
I

---

**Optional assembly code:**

(= Clock Wise Rotation)  
CW

**Visual indicator mounted:**

(= for Cross line position indication)  
C

**Optional assembly code:**

(= Counter Clock Wise Rotation)  
CC

**Visual indicator mounted:**

(= for Cross line position indication)  
C

---

A = **Pilot valve operated** in Control Module  
B = **Pilot valve not operated** in Control Module

- Central air chamber (1) pressurized  
- End cap air chambers (2) pressurized

All views are from above. Pistons are shown in inner position.
Actuator assembly codes

Single acting (Spring Return) assembly codes

**Standard assembly code:**

<table>
<thead>
<tr>
<th>CW</th>
<th>Visual indicator mounted:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(= for In line position indication)</td>
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</table>

**Optional assembly code:**

<table>
<thead>
<tr>
<th>CC</th>
<th>Visual indicator mounted:</th>
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<tbody>
<tr>
<td></td>
<td>(= for Cross line position indication)</td>
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</tbody>
</table>

**A** = Pilot valve operated in Control Module

**B** = Pilot valve not operated in Control Module

All views are from above. Pistons are shown in inner position.
FieldQ Valve Actuator

Full Stroke Adjustment Option

Description
FieldQ actuators with the Full Stroke Adjustment option are used where the maximum opening (or closing) position of the valve needs to be reduced, for instance to adjust the maximum flow capacity of a remote operated valve to 50%.

Operation
Full Stroke Adjustment screws (1) are fitted to both end caps and the screw length is such that adjustment is possible through the full outward stroke/rotation of the actuator. Screwing in the Full Stroke Adjustment screws will reduce the stroke.

Note:
- Only the outward stroke can be adjusted with the Full Stroke Adjustment screws.
  In case of assembly code CW, limit stop (3) is redundant.
  In case of assembly code CC, limit stop (2) is redundant.
- For the inward stroke the standard limit stops can be used:
  - Limit stop (2) for assembly code CW
  - Limit stop (3) for assembly code CC

Rotation
Factory set: 90°±0.5°.
Adjustable range:
(1) Full stroke adjustment screws: -3° to +93°
(2) Standard stroke adjustment screws: -3° to 15°

Sizing
Applying the stroke adjustment option will change the torque output level of spring return actuators depending on the amount of stroke adjustment. Please consult page 2 and the torque data sheets (1.602.02 Nm or 1.602.03 lbf.in) to define the torque output of a spring return actuator.

Dimensions
The dimensions of the actuator remains the same except the length of the actuator due to the longer Full Stroke Adjustment screw (see table below).

<table>
<thead>
<tr>
<th>Length Full stroke adjustment units at 90° rotation</th>
<th>Spring return</th>
<th>Double acting</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>Inch</td>
</tr>
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<td>21.30</td>
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<tr>
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<tr>
<td>QS1600</td>
<td>683</td>
<td>26.89</td>
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</table>

Fig. 1. Reducing the flow through the valve with full stroke adjustment option on the actuator.
Torque output Double Acting
For double acting actuators the torque output level will not change when adding the Full Stroke Adjustment option.

Torque output Spring Return
For spring return actuators, the torque output levels do change when adding the Full Stroke Adjustment option.

Examples torque change calculations
Starting point:
Actuator size QS150 with spring set 5 at 5 bar (80 psi)

Torque "Spring Start" at X° of stroke adjustment:
\[ T_{\text{adj.spr.st.}} = T_{\text{pub.spr.st.}} - (T_{\text{pub.spr.st.}} - T_{\text{pub.spr.end}}) \times \left(\frac{90-X^\circ}{90}\right) \]
\[ T_{\text{adj.spr.st.}} \] Torque at adjusted spring start stroke position.
\[ T_{\text{pub.spr.st.}} \] Published spring start torque value for given actuator size and spring set (see torque data sheets)
\[ T_{\text{pub.spr.end}} \] Published spring end torque value for given actuator size and spring set (see torque data sheets).
\[ X^\circ \] New rotation angle (in degrees).

Sample:
85 Nm = 119 - (119 - 73) x (90 - 22.5)/90
749 lbf.in = 1056 - (1056 - 647) x (90 - 22.5)/90

Torque "Air End" at X° of stroke adjustment:
\[ T_{\text{adj.air.end}} = T_{\text{pub.air.end}} + (T_{\text{pub.air.start}} - T_{\text{pub.air.end}}) \times \left(\frac{90-X^\circ}{90}\right) \]
\[ T_{\text{adj.air.end}} \] Torque at adjusted air end stroke position.
\[ T_{\text{pub.air.start}} \] Published air start torque value for given actuator size and spring set (see torque data sheets)
\[ T_{\text{pub.air.end}} \] Published air end torque value (see torque data sheets).
\[ X^\circ \] New rotation angle (in degrees).

Sample:
65 = 24 + (78 - 24) x (90 - 22.5)/90, at 5 bar
712 = 336 + (837 - 336) x (90 - 22.5)/90), at 80 psi

Sample torque output (Nm) for size QS150 with spring set 5 at 5 bar

<table>
<thead>
<tr>
<th>Rotation X°</th>
<th>Torque at rotation angle:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22.5°</td>
</tr>
<tr>
<td>Spring start</td>
<td>119 Nm</td>
</tr>
<tr>
<td>Spring end</td>
<td>73 Nm</td>
</tr>
<tr>
<td>Air start</td>
<td>78 Nm</td>
</tr>
<tr>
<td>Air end</td>
<td>24 Nm</td>
</tr>
</tbody>
</table>

Sample torque output (lbf.in) for size QS150 with spring set 5 at 80 psi

<table>
<thead>
<tr>
<th>Rotation X°</th>
<th>Torque at rotation angle:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22.5°</td>
</tr>
<tr>
<td>Spring start</td>
<td>1056 lbf.in</td>
</tr>
<tr>
<td>Spring end</td>
<td>647 lbf.in</td>
</tr>
<tr>
<td>Air start</td>
<td>837 lbf.in</td>
</tr>
<tr>
<td>Air end</td>
<td>336 lbf.in</td>
</tr>
</tbody>
</table>
Position feedback using the control modules

Important:
For control modules QC40, QC41, QC42 and QC43:
- The switch points cannot be set throughout the full stroke but is limited to maximum 15°.
- If the closed position is at 0°, then the module will send a closed signal as position feedback.
- Control Module QC54 (Foundation Fieldbus) does allow switch point setting throughout the stroke.

Full Stroke Adjustment setting:
1. Starting point:
   - The Full Stroke Adjustment actuators are shipped by default with a rotation of 90° +/-0.5° (See page 1)
   - For easy applying pressure during this setting procedure it is recommended to remove the control module. The NAMUR adaptation plate can stay on the actuator.
2. In order to set the Full Stroke Adjustment Screws accurately to the outward position:
   - Do not change the limit stop screws (2) and (3) located above the air connection interface.
   - Move the pistons of the actuator outwards by applying pressure to the A-port.
3. Screw in both the Full Stroke Adjustment Screws (1) until the screw touches the pistons. You will feel an obstruction.
   **Important:** Do not overtighten the screws.
   You have now set the adjustment screw to the outward (90°) position.
4. Move the pistons of the actuator inwards.
   - For Spring Return actuator is happens automatically when the actuator is vented.
   - For double acting actuators vent the A-port and apply pressure to the B-port.
5. In order to set the actuator to the required angle, use next table to define the number of revolutions which you have to turn in the Full Stroke Adjustment Screws.
6. Turn in both the adjustment screws as defined in step 5. Both the adjustment screws should be turned in with the same length or number of revolutions.

Caution:
Screwing in only one adjustment screw or un-equal setting of both the screws can lead to premature failure of the actuator.
7. Test cycle the actuator to check if the correct rotation angle is set. If required, repeat steps 3 to 6 to adjust the rotation angle to the required angle.

Actuator angle rotation per full revolution of screw

<table>
<thead>
<tr>
<th>Actuator size</th>
<th>Stroke</th>
<th>Screw</th>
<th>Actuator angle rotation per full revolution of screw</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>inch</td>
<td>Thread</td>
</tr>
<tr>
<td>40</td>
<td>18.8</td>
<td>0.74</td>
<td>M8</td>
</tr>
<tr>
<td>65</td>
<td>22.0</td>
<td>0.87</td>
<td>M8</td>
</tr>
<tr>
<td>100</td>
<td>25.1</td>
<td>0.99</td>
<td>M10</td>
</tr>
<tr>
<td>150</td>
<td>31.4</td>
<td>1.24</td>
<td>M10</td>
</tr>
<tr>
<td>200</td>
<td>37.7</td>
<td>1.48</td>
<td>M12</td>
</tr>
<tr>
<td>350</td>
<td>37.7</td>
<td>1.48</td>
<td>M12</td>
</tr>
<tr>
<td>600</td>
<td>44.0</td>
<td>1.73</td>
<td>M16</td>
</tr>
<tr>
<td>950</td>
<td>50.3</td>
<td>1.98</td>
<td>M16</td>
</tr>
<tr>
<td>1600</td>
<td>62.8</td>
<td>2.47</td>
<td>M20</td>
</tr>
</tbody>
</table>
FieldQ Valve Actuator

Corrosion Protection

**Description**

The corrosion protection system of FieldQ actuators consist of the following treatments or materials:

1. **Pretreatment**
   The actuator housings are anodized inside and outside, to give them a durable and superb protection against wear and corrosion.

2. **De-greasing.**
   All aluminum parts are de-greased before the coating is applied by washing with an alkaline solution to assure the best bonding between the aluminum surface and the coating.

3. **Finish**

   3.1 **Actuator**
      - Polyurethane powder coating for exterior use.
      - The powder coating is applied cold using automatic electrostatic spray equipment and is cured for about 10 minutes at minimum 200°C (392°F) offering excellent light and weather resistance.

   3.2 **Module**
      - Polyurethane coating for exterior use.
      - The coating offers excellent light and weather resistance.
      - Good chemical resistance against most bases, acids, solvents, alkalis and oils at normal temperatures.
      - Excellent exterior mechanical durability.

4. **High grade & hard anodized aluminum pinion.**
   Actuators with high grade & hard anodized aluminum pinions, passed a 1000 hours salt spray test.

5. **Stainless steel or coated steel parts.**
   External parts are stainless steel or coated alloy steel.

6. **Corrosion protected springs on Spring Return actuators**
   All the springs of spring return actuator are Deltatone® or epoxy (black) coated to prevent the corrosion of the springs and assure a long cycle life.

**Technical data base actuator**

- **Finish:** Polyurethane powder coating
- **Thickness:** 80 to 160 micrometer (3.1 to 6.2 mils)
- **Salt spray test:** 1000 hours (ASTM B117)
- **Color:** Yellow
- **Materials:**
  - Housing: Anodized aluminium alloy
  - Pistons: Chromatized
  - Pinion: High grade aluminum alloy, hard anodized
  - Fasteners: Stainless steel or coated alloy steel
- **Type plate:** Stainless steel

**Technical data Control Module**

- **Finish:** 2 Component with an epoxy primer and polyurethane enamel top coating
- **Thickness:** 80 to 160 micrometer (3.1 to 6.2 mils)
- **Salt spray test:** 1000 hours (ASTM B117)
- **Color:** Yellow
- **Materials:**
  - Housing: Anodized aluminium alloy
  - Fasteners: Stainless steel or coated alloy steel
- **Type plate:** Vinyl
FieldQ Valve Actuator

How to Order

FieldQ and its accessories can be ordered in different ways. Please follow below instruction to define the configuration code for ordering FieldQ Valve Operating Systems.

FieldQ with Integrated Controls

To order FieldQ two main parts have to be defined or configured:
1. The base actuator
2. The control module

Procedure:
1. Select the required Actuator Action
   • Spring Return (a.k.a. Single acting)
   • Double Acting
   • Double Acting, Fail in Last Position
2. Determine the Actuator Size
   • Use the actuator torque data sheets or approved sizing program.
3. Select additional actuator configurations/options
   See page 2 of 7
   Note: To make the actuator suitable for Control modules select "XX" in the Pneumatic interface segment.
4. Select the Required Control Module
   • Select the required Control Module functionality based on the table below:

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>See page:</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC41</td>
<td>Conventional Module + 24 VDC Pilot valve</td>
<td>3 of 7</td>
</tr>
<tr>
<td>QC42</td>
<td>Conventional Module + 110 VAC Pilot valve</td>
<td>3 of 7</td>
</tr>
<tr>
<td>QC43</td>
<td>Conventional Module + 230 VAC Pilot valve</td>
<td>3 of 7</td>
</tr>
<tr>
<td>QC40</td>
<td>ASI Module (Metric)</td>
<td>4 of 7</td>
</tr>
<tr>
<td>QC40</td>
<td>ASI Module (Imperial)</td>
<td>5 of 7</td>
</tr>
<tr>
<td>QC54</td>
<td>Foundation Fieldbus Module (Metric)</td>
<td>6 of 7</td>
</tr>
<tr>
<td>QC54</td>
<td>Foundation Fieldbus Module (Imperial)</td>
<td>7 of 7</td>
</tr>
</tbody>
</table>

5. Select additional configurations/options
   • Be sure to include the "Installed" (I) option to mount the Control Module to the FieldQ Actuator.
   • Be sure to include the IPT device with the control module. This IPT device should be the same size as the actuator size, to which the module is mounted.

You have now selected a complete FieldQ Valve Operating Systems with Integrated Controls.
## Selection Guide Q-Series Control Module

### Certifications

Below table shows the code for the protection method segment, per agency approval. Additional you can find the applicable classified hazardous area for which the product can be used. For full product marking please refer to below listed data sheets or installation guides.

<table>
<thead>
<tr>
<th>Hazardous area module approvals</th>
<th>Hazardous area classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>For full product marking see:</td>
<td></td>
</tr>
<tr>
<td>- data sheet 1.604.10</td>
<td></td>
</tr>
<tr>
<td>- installation guide DOC.JG.QC41.1</td>
<td>(1) English</td>
</tr>
<tr>
<td>Agency</td>
<td>Protection method</td>
</tr>
<tr>
<td>--------</td>
<td>------------------</td>
</tr>
<tr>
<td>ATEX, IECEx</td>
<td>Flame Proof Ex d</td>
</tr>
<tr>
<td>FM, CSA</td>
<td>Flame Proof Ex d</td>
</tr>
<tr>
<td>INMETRO/Brazil</td>
<td>Flame Proof Ex d</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QC40-AS-Interface</th>
<th>Language Code Installation guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>For full product marking, see</td>
<td></td>
</tr>
<tr>
<td>- data sheet 1.604.13</td>
<td></td>
</tr>
<tr>
<td>- installation guide DOC.JG.QC40.1</td>
<td>(1) English</td>
</tr>
<tr>
<td>Agency</td>
<td>Protection method</td>
</tr>
<tr>
<td>--------</td>
<td>------------------</td>
</tr>
<tr>
<td>ATEX, IECEx</td>
<td>Non Sparking - Ex na / Ex tb (2)</td>
</tr>
<tr>
<td>FM</td>
<td>Non Incendive N.I.</td>
</tr>
<tr>
<td>CSA</td>
<td>Non Incendive N.I. (2)</td>
</tr>
<tr>
<td>INMETRO/Brazil</td>
<td>Non Sparking Ex na / Ex tb (2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QC54-Foundation Fieldbus</th>
<th>Language Code Installation guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>For full product marking, see</td>
<td></td>
</tr>
<tr>
<td>- data sheet 1.604.12</td>
<td></td>
</tr>
<tr>
<td>- installation guide DOC.JG.QC54.1</td>
<td>(1) English</td>
</tr>
<tr>
<td>Agency</td>
<td>Protection method</td>
</tr>
<tr>
<td>--------</td>
<td>------------------</td>
</tr>
<tr>
<td>ATEX, IECEx</td>
<td>Intrinsically Safe - Ex ia</td>
</tr>
<tr>
<td>ATEX, IECEx</td>
<td>Non Sparking - Ex na / Ex tb</td>
</tr>
<tr>
<td>FM</td>
<td>Intrinsically Safe - I.S. / AEx ia</td>
</tr>
<tr>
<td>FM</td>
<td>Non Incendive N.I.</td>
</tr>
<tr>
<td>CSA</td>
<td>Intrinsically Safe - I.S. / Ex ia</td>
</tr>
<tr>
<td>CSA</td>
<td>Non Incendive N.I.</td>
</tr>
<tr>
<td>INMETRO/Brazil</td>
<td>Intrinsically Safe Ex i</td>
</tr>
<tr>
<td>INMETRO/Brazil</td>
<td>Non Sparking Ex na / Ex tb</td>
</tr>
</tbody>
</table>

### Notes:

1. For QCQ40 and QC54 Control modules: Only for class II and III.
2. For QCQ40 Control modules, switch type “G” is only available with protection code “F4” and “WP” only.
## Model String Configuration

### Base Actuator

### Actuator Type
- **QD**: Double Acting
- **QS**: Spring Return

### Actuator Size
- **0040** Size 40
- **0065** Size 65
- **0100** Size 100
- **0150** Size 150
- **0200** Size 200

### Connections
- **M**: Metric Actuator (ISO 5211)
- **U**: Imperial actuator (ISO 5211 / UNC)

### Spring Set (note 3)
- **00**: Double Acting
- **01**: Spring Set 01
- **02**: Spring Set 02
- **03**: Spring Set 03
- **04**: Spring Set 04
- **05**: Spring Set 05
- **06**: Spring Set 06

### Temperature Range (note 1)
- **ST**: Standard Temp. Range -20° to +80°C (-4° to 176°F)
- **HT**: High Temp. Range -20° to +120°C (-4° to 248°F)
- **LT**: Low Temp. Range -40° to +80°C (-40° to 176°F)

### Future Expansion
- **A**: Standard Yellow
- **CW**: Clockwise rotation (Spring to Close)
- **CC**: Counter-Clockwise rotation (Spring to Open)

### Valve Mounting
- **I**: In line with the pipe line
- **C**: Cross line with the pipe line

### Notes
1. Low and High temperature options are only available in combination with NAMUR plate option (QN)
2. The High Flow Plate cannot be used with Control modules.
3. Assembly code **CW** is 'Spring-to-Close', in combination with integrated modules.
4. Assembly code **CC** is 'Spring-to-Open', in combination with integrated modules.
5. Failure mode of FieldQ with NAMUR plate depends on what solenoid is used.

---

### Pneumatic Interface (note 2)
- **XX**: Actuator suitable for Control modules
- **QN**: Actuator with NAMUR adaptation plate
- **H1**: Actuator with 1/2" High flow plate

### Insert Size Code (note 4)
- **S10**: Square 10 mm (0.39")
- **S12**: Square 12 mm (0.47")
- **S14**: Square 14 mm (0.55")
- **S16**: Square 16 mm (0.63")
- **S17**: Square 17 mm (0.67")
- **S19**: Square 19 mm (0.75")
- **S22**: Square 22 mm (0.87")
- **S24**: Square 24 mm (0.94")
- **S27**: Square 27 mm (1.06")
- **S36**: Square 36 mm (1.42")
- **S46**: Square 46 mm (1.81")

### Valve Flange Code
- **00**: ISO 5211 (No Centerplate)
- **01**: DIN3337 F01 (Centerplate / insert @ 45°)
- **02**: DIN3337 F02 (Centerplate / insert @ 45°)
- **03**: DIN3337 F03 (Centerplate / insert @ 45°)
- **04**: DIN3337 F04 (Centerplate / insert @ 45°)
- **05**: DIN3337 F05 (Centerplate / insert @ 45°)
- **06**: DIN3337 F06 (Centerplate / insert @ 45°)
- **07**: DIN3337 F07 (Centerplate / insert @ 45°)
- **08**: DIN3337 F08 (Centerplate / insert @ 45°)
- **09**: DIN3337 F09 (Centerplate / insert @ 45°)
- **10**: DIN3337 F10 (Centerplate / insert @ 45°)
- **11**: DIN3337 F11 (Centerplate / insert @ 45°)
- **12**: DIN3337 F12 (Centerplate / insert @ 45°)
- **13**: DIN3337 F13 (Centerplate / insert @ 45°)
- **14**: DIN3337 F14 (Centerplate / insert @ 45°)
- **15**: DIN3337 F15 (Centerplate / insert @ 45°)
- **16**: DIN3337 F16 (Centerplate / insert @ 45°)

### Visual Indication Code
- **D**: Standard Indicator
- **X**: No Indicator

### Valve Mounting Code
- **I**: In line with the pipe line
- **C**: Cross line with the pipe line

---

**Model String Configuration**

Base Actuator

```
Actuator Type | Pneumatic Interface
--------------|----------------------
QD  Double Acting | XX  Actuator suitable for Control modules
QS  Spring Return  | QN  Actuator with NAMUR adaptation plate

Actuator Size
- **0040** Size 40
- **0065** Size 65
- **0100** Size 100
- **0150** Size 150
- **0200** Size 200

Connections
- **M**: Metric Actuator (ISO 5211)
- **U**: Imperial actuator (ISO 5211 / UNC)

Spring Set (note 3)
- **00**: Double Acting
- **01**: Spring Set 01
- **02**: Spring Set 02
- **03**: Spring Set 03
- **04**: Spring Set 04
- **05**: Spring Set 05
- **06**: Spring Set 06

Temperature Range (note 1)
- **ST**: Standard Temp. Range -20° to +80°C (-4° to 176°F)
- **HT**: High Temp. Range -20° to +120°C (-4° to 248°F)
- **LT**: Low Temp. Range -40° to +80°C (-40° to 176°F)

Future Expansion
- **A**: Standard Yellow
- **CW**: Clockwise rotation (Spring to Close)
- **CC**: Counter-Clockwise rotation (Spring to Open)

Notes
1. Low and High temperature options are only available in combination with NAMUR plate option (QN)
2. The High Flow Plate cannot be used with Control modules.
3. Assembly code **CW** is 'Spring-to-Close', in combination with integrated modules.
4. Failure mode of FieldQ with NAMUR plate depends on what solenoid is used.
5. For the Full Stroke Adjustment option, replace the first '0' with a '1'.
   Example: Spring set '04' with full stroke will be '14', Spring set '03' with full stroke will be '13', etc.
```
# Model String Configuration

## Conventional Wired Control Module

### Control module options

<table>
<thead>
<tr>
<th>Control module options (position feedback)</th>
<th>IPT Device size for actuator:</th>
</tr>
</thead>
<tbody>
<tr>
<td>M Mechanical switch</td>
<td>0040 Q40 actuator</td>
</tr>
<tr>
<td>G Mechanical switch (Gold Plated)</td>
<td>0065 Q65 actuator</td>
</tr>
<tr>
<td>O 3-wire prox. switch PNP</td>
<td>0100 Q100 actuator</td>
</tr>
<tr>
<td>C 3-wire prox. switch NPN</td>
<td>0150 Q150 actuator</td>
</tr>
<tr>
<td>N 2-wire prox. switch (NAMUR)</td>
<td>0200 Q200 actuator</td>
</tr>
<tr>
<td>H 2-wire prox. switch (20-140 VAC/10-140 VDC)</td>
<td>0350 Q350 actuator</td>
</tr>
</tbody>
</table>

### Connections

- **M** Metric: Conduit: 2x M20x1.5 - Pneumatic: 1/4" BSP
- **U** Imperial - Conduit: Top: 3/4" NPT; Bottom: 1/2" NPT
  - Pneumatic entry 1/4" NPT

### Protection method (note 1)

- **WP** Weather Proof IP66/NEMA4X
- **P5** Flame Proof Ex d - ATEX, IECEx
- **F5** Explosion Proof XP or Flame Proof Ex d - FM & CSA
- **BS** Flame Proof Ex d - INMETRO/Brazil

### Control module options (position feedback)

- **S** Single acting (Spring Return)
- **D** Double acting
- **F** Double acting Fail 'In Last Position'

### Future Expansions Code

- **K** Standard Yellow

### Language Code

- **1** English
- **2** Portuguese

### Notes:

1. For more detailed information on hazardous area protection methods, certification agencies and suitable hazardous area see section Selection guide Q-Series Control Module certifications on page 2.
2. 2x Manual Control are only required in case of Double acting with Fail in Last Position function.
3. For QC41, QC42 and QC43: The Glands & Plugs options are a responsibility of the installer. Appropriate instructions can be found in the Installation Guide DOC.IG.QC41.1.
4. No separate pneumatic module required. Pneumatic function is integrated in the module.
5. For applications below -20°C (-4°F), the base actuator must be fitted with Low Temperature seals. For use in atmospheres with a potential explosion hazard, the minimum temperature is -25°C / -13°F.
## Metric Model String Configuration

**QC40 with ASI Digital Bus Communication**

<table>
<thead>
<tr>
<th>Control module</th>
<th>IPT Device size for actuator:</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC40</td>
<td>Q40 actuator</td>
</tr>
<tr>
<td>Connections</td>
<td>0040</td>
</tr>
<tr>
<td>M</td>
<td>0065</td>
</tr>
<tr>
<td>P4, B4</td>
<td>0150</td>
</tr>
<tr>
<td>F4</td>
<td>0200</td>
</tr>
<tr>
<td>C4</td>
<td>0350</td>
</tr>
<tr>
<td>Control module options (position feedback)</td>
<td>0000 No IPT probe</td>
</tr>
<tr>
<td>G</td>
<td>Mechanical switch (Gold Plated)</td>
</tr>
<tr>
<td>N</td>
<td>2-wire prox. switch (NAMUR)</td>
</tr>
<tr>
<td>Action</td>
<td>S Single acting (Spring Return)</td>
</tr>
<tr>
<td></td>
<td>D Double acting</td>
</tr>
<tr>
<td></td>
<td>F Double acting Fail 'In Last Position'</td>
</tr>
<tr>
<td>Future Expansions Code</td>
<td>K Standard Yellow</td>
</tr>
<tr>
<td>Language Code</td>
<td>1 English</td>
</tr>
<tr>
<td></td>
<td>2 Portuguese</td>
</tr>
<tr>
<td></td>
<td>3 French</td>
</tr>
</tbody>
</table>

### Notes:

1. For more detailed information on hazardous area protection methods, certification agencies and suitable hazardous area see section Selection guide Q-Series Control Module certifications on page 2.
2. For QC40 and QC54 control modules: CSA Approval only for class II and III.
3. For QC40 control modules: Switch type "G" is only available with protection code "F4" and "WP".
4. No separate pneumatic module required. Pneumatic function is integrated in the module.
5. For applications below -20°C (-4°F), the base actuator must be fitted with Low Temperature seals.
6. For use in atmospheres with a potential explosion hazard, the minimum temperature is -25°C / -13°F.
Imperial Model String Configuration
QC40 with ASI Digital Bus Communication

<table>
<thead>
<tr>
<th>Control module</th>
<th>IPT Device size for actuator:</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC40 Control module with AS-I communication</td>
<td>0040 QC40 actuator</td>
</tr>
<tr>
<td>Connections</td>
<td></td>
</tr>
<tr>
<td>Imperial - Conduit: Top: 3/4”NPT; Bottom 1/2”NPT</td>
<td></td>
</tr>
<tr>
<td>Pneumatic entry 1/4”NPT</td>
<td></td>
</tr>
<tr>
<td>Protection method</td>
<td></td>
</tr>
<tr>
<td>WP Weather Proof IP66/NEMA4X</td>
<td></td>
</tr>
<tr>
<td>P4 Non Sparking - Ex nA / Ex tb - ATEX, IECEx</td>
<td></td>
</tr>
<tr>
<td>B4 Non Sparking Ex nA / Ex tb - INMETRO/Brazil</td>
<td></td>
</tr>
<tr>
<td>F4 Non Incendive N.I. - FM</td>
<td></td>
</tr>
<tr>
<td>C4 Non Incendive N.I. - CSA</td>
<td></td>
</tr>
<tr>
<td>Connection options (position feedback)</td>
<td></td>
</tr>
<tr>
<td>G   Mechanical switch (Gold Plated)</td>
<td></td>
</tr>
<tr>
<td>N   2-wire prox. switch (NAMUR)</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>S   Single acting (Spring Return)</td>
<td></td>
</tr>
<tr>
<td>D   Double acting</td>
<td></td>
</tr>
<tr>
<td>F   Double acting Fail &quot;In Last Position&quot;</td>
<td></td>
</tr>
<tr>
<td>Future Expansions Code</td>
<td></td>
</tr>
<tr>
<td>K   Standard Yellow</td>
<td></td>
</tr>
<tr>
<td>Language Code</td>
<td></td>
</tr>
<tr>
<td>1   English</td>
<td></td>
</tr>
<tr>
<td>2   Portuguese</td>
<td></td>
</tr>
<tr>
<td>3   French</td>
<td></td>
</tr>
<tr>
<td>Manual Control</td>
<td></td>
</tr>
<tr>
<td>N   No Speed Control</td>
<td></td>
</tr>
<tr>
<td>Speed control</td>
<td></td>
</tr>
<tr>
<td>N1  Spring Return (1x throttle)</td>
<td></td>
</tr>
<tr>
<td>N2  Double acting (2x throttle)</td>
<td></td>
</tr>
<tr>
<td>Pneumatic exhaust</td>
<td></td>
</tr>
<tr>
<td>IP  IP65/NEMA4 rated exhaust</td>
<td></td>
</tr>
<tr>
<td>IN  Non metalic exhaust / Check valve</td>
<td></td>
</tr>
<tr>
<td>Bottom conduit (Glands &amp; Plugs, note 3)</td>
<td></td>
</tr>
<tr>
<td>0   Transport plug</td>
<td></td>
</tr>
<tr>
<td>1   Metal blind plug</td>
<td></td>
</tr>
<tr>
<td>2   Eurofast (M12)</td>
<td></td>
</tr>
<tr>
<td>4   Minifast (7/8&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. For more detailed information on hazardous area protection methods, certification agencies and suitable hazardous area see section Selection guide Q-Series Control Module certifications on page 2.
2. 2x Manual Control are only required in case of Double acting with Fail in Last Position function.
3. For QC40 and QC54, Quick Connector options are only available with QC40 (ASI) and QC54 (FF). Prices for Glands & Plugs are per piece.
4. No separate pneumatic module required. Pneumatic function is integrated in the module.
5. For applications below -20°C (-4°F), the base actuator must be fitted with Low Temperature seals.
   For use in atmospheres with a potential explosion hazard, the minimum temperature is -25°C / -13°F.
Metric Model String Configuration
QC54 with Foundation Fieldbus™ Bus Communication

Control module
Conduit connections
Protection method
Control module options
Action
Future Expansions
Language

Control module IPT Device size for actuator:
QC54 Control module with Foundation Fieldbus communication 0040 Q40 actuator
Connections
M Metric: Conduit: 2x M20x1.5 - Pneumatic: 1/4" BSP 0065 Q65 actuator
Protection method
WP Weather Proof IP66/NEMA4X 0100 Q100 actuator
P1 Intrinsically Safe - Ex ia - ATEX, IECEx 0150 Q150 actuator
P4 Non Sparking - Ex nA / Ex tb - ATEX, IECEx 0200 Q200 actuator
F1 Intrinsically Safe - I.S. / AEx ia - FM 0250 Q250 actuator
F4 Non Incendive N.I. - FM 0300 Q300 actuator
C1 Intrinsically Safe - I.S. / Ex ia - CSA 0350 Q350 actuator
C4 Non Incendive N.I. - CSA 0400 Q400 actuator
B1 Intrinsically Safe Ex i - INMETRO/Brazil 0450 Q450 actuator
B4 Non Sparking Ex nA / Ex tb - INMETRO/Brazil 0500 Q500 actuator

Control module options
Action
S Standard configuration 0000 No IPT probe
D Double acting
F Double acting Fail "In Last Position"

Future Expansions Code
K Standard Yellow

Language Code
1 English
2 Portuguese
3 French

Pneumatic exhaust
IP IP65/NEMA4 rated exhaust
IN Non metallic exhaust / Check valve

Notes:
1. For more detailed information on hazardous area protection methods, certification agencies and suitable hazardous area see section Selection guide Q-Series Control Module certifications on page 2.
2. For QCQ40 and QC54 control modules: CSA Approval only for class II and III.
3. For QC40 and QC54: Quick Connector options are only available with QC40 (ASI) and QC54 (FF). Prices for Glands & Plugs are per piece.
4. No separate pneumatic module required. Pneumatic function is integrated in the module.
5. For applications below -20°C (-4°F), the base actuator must be fitted with Low Temperature seals.

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## Imperial Model String Configuration

**QC54 with Foundation Fieldbus™ bus communication**

<table>
<thead>
<tr>
<th>Control module</th>
<th>IPT Device size for actuator:</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC54</td>
<td></td>
</tr>
</tbody>
</table>

### Connections
- **U**: Imperial - Conduit: Top: 3/4"NPT; Bottom 1/2"NPT
  - Pneumatic entry 1/4"NPT
- **WP**: Weather Proof IP66/NEMA4X
- **P1**: Intrinsically Safe - Ex ia - ATEX, IECEx
- **P4**: Non Sparking - Ex nA / Ex tb - ATEX, IECEx
- **F1**: Intrinsically Safe - I.S. / AEx ia - FM
- **F4**: Non Incendive N.I. - FM
- **C1**: Intrinsically Safe - I.S. / Ex ia - CSA
- **C4**: Non Incendive N.I. - CSA
- **B1**: Intrinsically Safe Ex i - INMETRO/Brazil
- **B4**: Non Sparking Ex nA / Ex tb - INMETRO/Brazil

### Protection method
- **0065**: 065 actuator
- **0100**: Q100 actuator
- **0150**: Q150 actuator
- **0200**: Q200 actuator
- **0350**: Q350 actuator
- **0600**: Q600 actuator
- **0950**: Q950 actuator
- **1600**: Q1600 actuator
- **0000**: No IPT probe

### Control module options
- **S**: Standard configuration
- **D**: Double acting
- **F**: Double acting Fail in Last Position

### Action
- **S**: Single acting (Spring Return)
- **N1**: Spring Return (1x throttle)
- **N2**: Double acting (2x throttle)

### Future Expansions Code
- **K**: Standard Yellow
- **T**: Transport plug
- **M**: Metal blind plug
- **IP**: IP65/NEMA4X rated exhaust
- **IN**: Non metalic exhaust / Check valve

### Language Code
- **1**: English
- **2**: Portuguese
- **3**: French

### Notes:
1. For more detailed information on hazardous area protection methods, certification agencies and suitable hazardous area see section Selection guide Q-Series Control Module certifications on page 2.
2. For QC40 and QC54 control modules: CSA Approval only for class II and III
3. 2x Manual Control are only required in case of Double acting with Fail in Last Position function.
4. For QC40 and QC54: Quick Connector options are only available with QC40 (ASI) and QC54 (FF). Prices for Glands & Plugs are per piece.
5. The Quick Connectors, as listed, are excluded from areas with a potential explosion hazard caused by gasses, dust or fibers.
6. No separate pneumatic module required. Pneumatic function is integrated in the module.
7. For applications below -20°C (-4°F), the base actuator must be fitted with Low Temperature seals. For use in atmospheres with a potential explosion hazard, the minimum temperature is -25°C / -13°F.
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