

# Quick Reference Guide Function Module

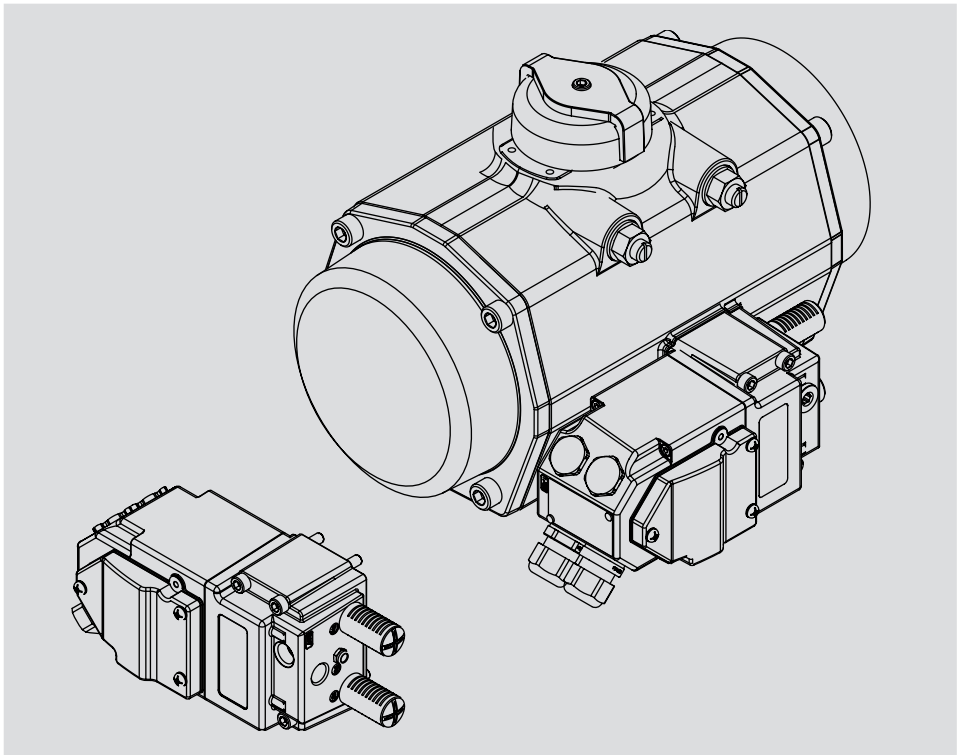
Conventional Function modules:

QM11 24VDC

QM12 115VAC

QM13 230VAC

QM14 Intrinsically Safe



DOC.FM.QM11.1 Revision: -

  
**EMERSON**  
Process Management

English

Deutsch

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## English

### 1 Before starting

- \* Be sure that the actuator is correctly mounted before connecting air supply and electrical wiring (see **Installation & Operation Manual FieldQ Valve Actuator**)
- \* Check the module label for the correct execution (see fig. 2)
- \* Check the type of actuator: single or double acting (see fig. 2).
- \* Before operation check whether the actuator and valve have the same "Open" and "Closed" positions.
- \* Be sure the valve stroke can be completed without obstruction.

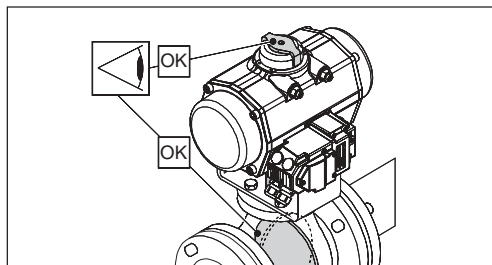


Fig. 1: Check proper mounting before connecting air supply and electrical wiring.

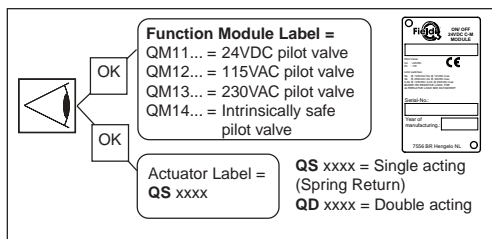


Fig. 2 Identification

### 2 Pneumatic connections

#### WARNINGS

- \* Rotating parts of the actuator/valve combination can move after connecting the air supply.
- \* The function module must be mounted properly before connecting the air supply.
- \* Check the maximum pressure :

$$P_{\max} = 8\text{bar} / 116\text{Psi}$$

#### 2.1 Operating media :

- \* Air or inert gasses
- \* Air quality according ISO 8573-1 7-5-4 Standard filtered at 50  $\mu\text{m}$ , for Intrinsically safe executions 25 $\mu\text{m}$
- \* Dew point 10 K below operating temperature
- \* For subzero applications take appropriate measures.

#### 2.2 Single acting (spring return) or Double acting actuator :

- 1 Remove the plug from the air supply port (Ps).
- 2 Connect air supply to port (Ps).

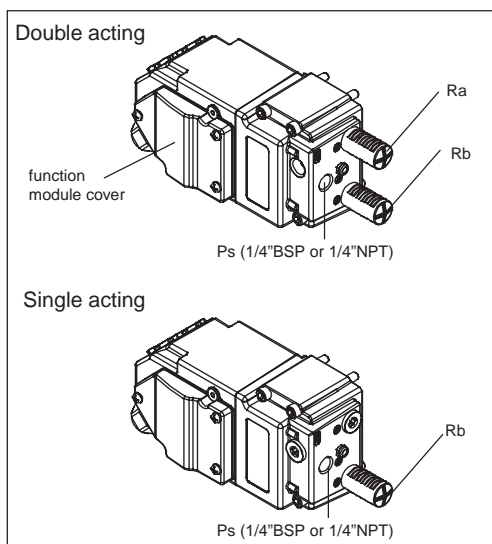


Fig. 3: Pneumatic connections

## 3 Electric Connections

The conventional function module contains a pilot valve for controlling the actuator and switches for position feedback.

### 3.1 General

- 1 Remove the cover of the function module (see fig 3.1).
- 2 Guide the cable(s) through the electrical entry/ies). Use and mount cable glands as required by national or local legislation.

### 3.2 Connecting Pilot valve (terminal number 8, 9 & 10)

1. Before connecting the pilot valve, check the voltage on the function module label.
2. Make connections as shown in table 3.1 and fig. 3.2
3. Mount the function module cover or proceed with § 3.3. Take care that the cover sealing is in place to comply to dust and water tightness according IP65 / NEMA4.

**Table 3.1 Pilot valve connections**

Function Module	Voltage	Power
QM11	24VDC ( $\pm 15\%$ )	1W
QM12	115VAC ( $\pm 10\%$ )	2W
QM13	230VAC ( $\pm 10\%$ )	2W
QM14*	See § 3.2.1	

#### 3.2.1 Hazardous area connections

For hazardous area connections see drawing:

- C0240-11 : Module QM14 - intrinsically safe with 2-wire NAMUR proximity switches.
- C0240-12 : Module QM14 - intrinsically safe with mechanical switches or hermetically sealed switches.
- C0240-13 : Module QM11, QM12 or QM13 - Non-sparking/Non incendive with hermetically sealed switches.

in document **DOC.HA.Q.1** as shipped with the function module.

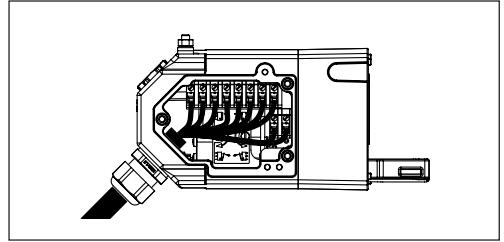


Fig. 3.1 Installing electrical wiring

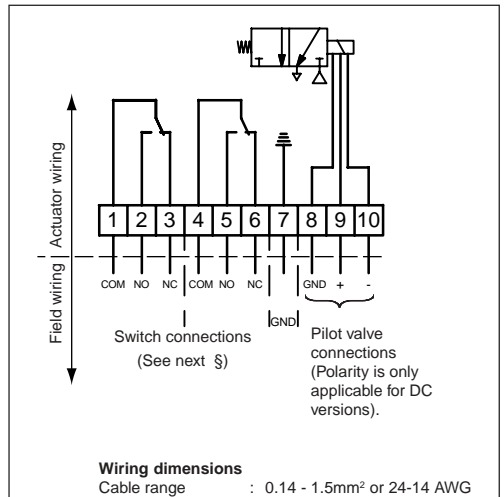


Fig. 3.2 Pilot valve connections

#### 3.2.2 Tools

- Tool for terminals : Screw driver 0.6 x 3.5
- Tool for cover : Screw driver for cross slotted Phillips screws nr. 2

### 3.3 Feedback switch connections

#### 3.3.1 Mechanical switches / Hermetically sealed switches

- Before connecting the switches, check the model code on the function module label.  
QMXXX.xxxxxMx = Mechanical switches  
QMXXX.xxxxxDx = Hermetically sealed switches
- Make connections as shown in table 3.2 and figure 3.2
- For connecting the pilot valve see §3.2
- Mount the function module cover. Take care that the cover sealing is in place to comply to dust and water tightness according IP65 / NEMA4.

#### Important

Both switches have gold contacts. For applications where the benefits of gold contacts are required, the maximum current is 100mA. When the current is higher than 100mA, the switch functionality will be unchanged, although the golden surface will be lost.

#### Hazardous area connections

For hazardous area connections see drawing:

- C0240-12 : Module QM14 - intrinsically safe with mechanical switches or hermetically sealed switches.
- C0240-13 : Module QM11, QM12 or QM13 - Non-sparking/Non incensive with hermetically sealed switches.

in document **DOC.HA.Q.1** as shipped with the function module.

Contact	Switch operation	Switch signal
Normally Open Contacts	Switched Unswitched	
Normally Closed Contacts	Switched Unswitched	
Normally Closed Contacts	Switched Unswitched	

Fig 3.1 Switch characteristics

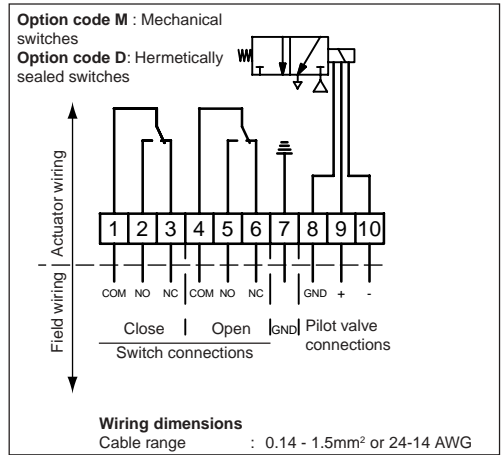


Fig 3.2 Wiring diagram mechanical and hermetically sealed switches

Table 3.2 Maximum currents:

Load :	Mechanical switch		Hermetically Sealed switch	
	Non Inductive	Inductive	Non Inductive	Inductive
125 VAC	5 A	3 A	5 A	5 A
250 VAC	3 A	2 A	5 A	5 A
30 VDC	4 A	3 A	5 A	5 A
125 VDC	0.4 A	0.4 A	0.5 A	0.06 A
250 VDC	0.2 A	0.2 A	0.25 A	0.03 A

### 3.3.2 “2-Wire NAMUR” proximity switches

1. Before connecting the switches, check the model code on the function module label.  
 QMXXX.xxxxxN $x$  = 2-Wire NAMUR” proximity switches
2. Make connections as shown in figure 3.2  
 Voltage : 8 VDC nominal  
 Output : Unswitched,  $\geq 3\text{mA}$   
           : Switched,  $\leq 1\text{mA}$
3. For connecting the pilot valve see §3.2.
4. Mount the function module cover. Take care that the cover sealing is in place to comply to dust and water tightness according IP65 / NEMA4.

#### Hazardous area connections

For hazardous area connections see drawing:

- C0240-11 : QM14 - intrinsically safe with 2-wire NAMUR proximity switches in document DOC.HA.Q.1 as shipped with the function module.

#### Functions

- Short circuit monitoring :  $\geq 6\text{mA}$
- Line break detection :  $\leq 0.2\text{mA}$   
 (IEC 60947 part 5-6)

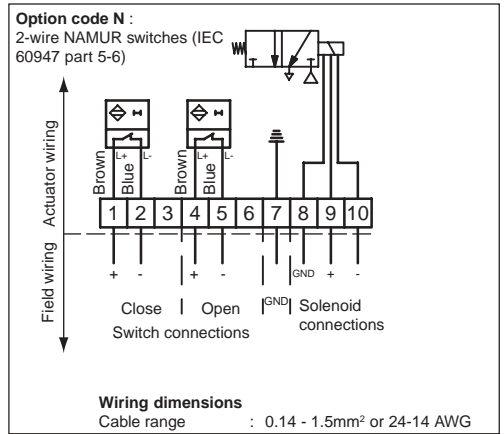


Fig 3.3 Wiring diagram 2-Wire NAMUR proximity switches

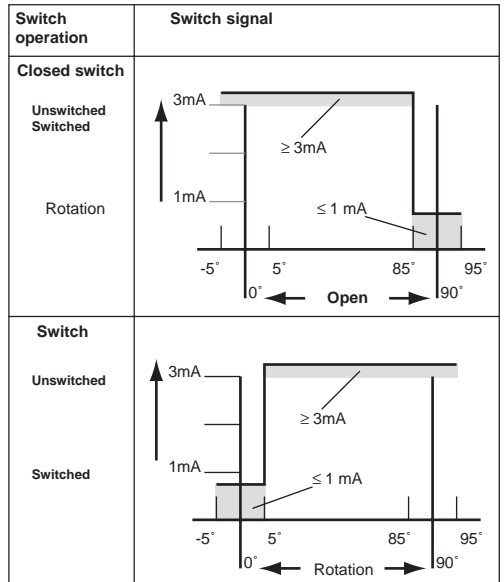


Fig 3.4 Switch characteristics

### 3.3.3 “3-Wire” proximity switches

1. Before connecting the switches, check the model code on the function module label.  
 QMXXX.xxxxxxOx = PNP 3-wire Proximity switch, make function.  
 QMXXX.xxxxxxCx = NPN 3-wire Proximity switch, make function.
2. Make connections as shown in figure 3.2 or 3.3  
 Voltage : 10 - 30 V  
 Current : 100 mA maximum
3. For connecting the pilot valve see §3.2
4. Mount the function module cover. Take care that the cover sealing is in place to comply to dust and water tightness according IP65 / NEMA4.

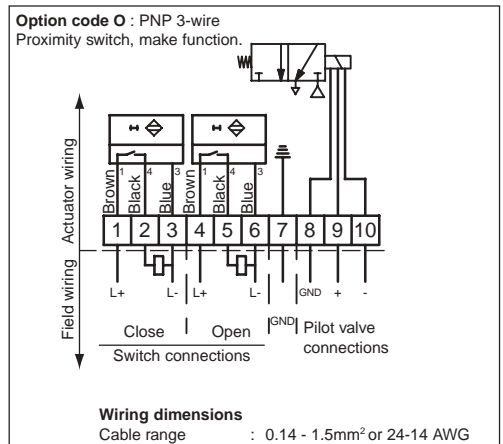


Fig 3.5 Wiring diagram PNP 3-wire Proximity switch, make function.

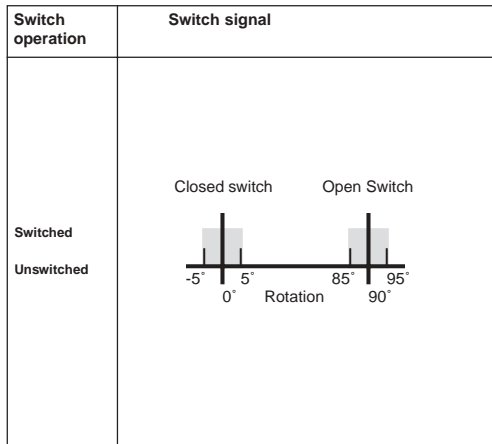


Fig 3.7 Switch characteristics

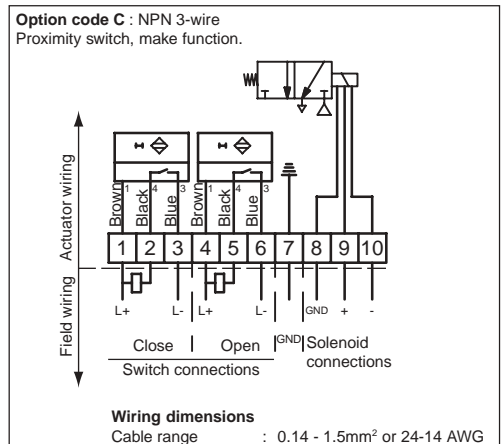


Fig 3.6 Wiring diagram NPN 3-wire Proximity switch, make function.

## 4 Limit switch setting

### 4.1 Factory settings

Mechanical stroke :  $90^{\circ} \pm 0.5^{\circ}$   
 Limit switches :  $5^{\circ}$  before each end of stroke (open and closed position, see fig 4.2).

If required the mechanical stroke and the limit switch setting can be adjusted. For mechanical stroke adjustment please see document DOC.IOM.Q, available from [www.FieldQ.com](http://www.FieldQ.com). For adjusting the limit switches see procedure below.

### 4.2 Before adjusting the limit switches.

#### 4.2.1 Assembly code

The position feedback of the function module depends on the way the actuator is mounted on the valve:

1. In line, assembly code A and D.
2. Across line, assembly code B and C.  
Please check the part number on the actuator label for the applicable assembly code:

QXXXXX.xAxxx.xxxxx = code A

#### 4.2.2 Mechanical/Electrical stroke

\* **Set the Mechanical stroke before setting the limit switches.**

\* **Set limit switches approximately  $5^{\circ}$  before each end of the mechanical stroke (see fig. 4.2)**

#### 4.2.3 Pneumatic and electrical connections

Make pneumatic and electrical connections before adjusting the limit switch setting. See chapter 2 and 3.

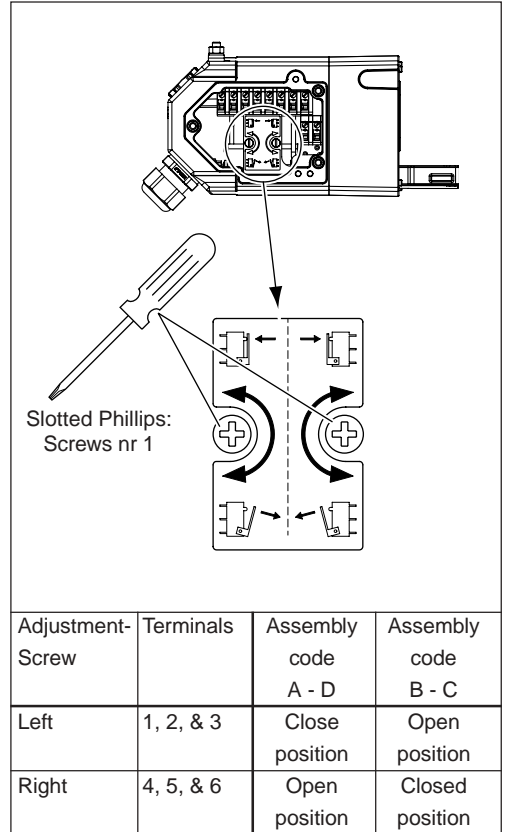


Fig. 4.1 Adjustment screw and terminal assignment

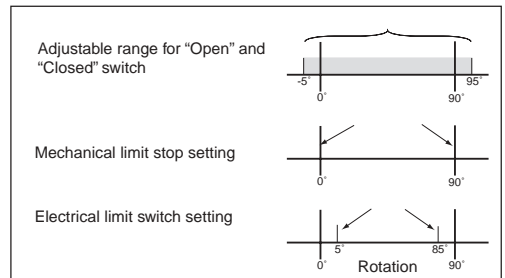


Fig. 4.2 Adjustable range and factory settings

## 4.3 Setting procedure

### Important (see fig. 4.1)

- To indicate the switch point, use a multimeter, connected to the switch terminals, to measure a voltage change on the switch point.
- For the proximity switches, use a proximity switch tester.
- This setting procedure is applicable for actuator with assembly code A or D. For assembly code B or C the switch assignment is reversed.
- This procedure is based on the factory settings of the limit switches (5° before each end of stroke).

1. Remove the cover from the function module.
2. Move the actuator to the closed position by removing the voltage from terminal 9 and 10 (see § 3.2).
3. Turn the **left** screw maximal 13 turns clockwise or until it blocks.
4. Turn the **left** screw counter clockwise until the switch trip.
5. Make an extra 3/4 turns (counter clockwise) to set switch point at  $\pm 5^\circ$  before mechanical end position.
6. Move the actuator to the open position by applying the applicable voltage to terminal 9 and 10 (see § 3.2).
7. Turn the **right** screw maximal 13 turns counter clockwise or until it blocks.
8. Turn the **right** screw clockwise until the switch trip.
9. Make an extra 3/4 turns (clockwise) to set switch point at  $\pm 5^\circ$  before mechanical end position.

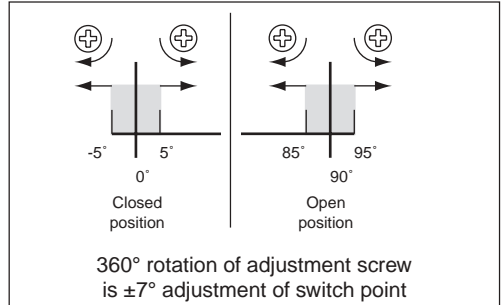


Fig. 4.3 Switch point setting

## 4.4 Check operation.

- 1 Connect a voltage to terminals (8,) 9 and 10 according § 3.2.
- 2 Actuator moves to "Open" position. "Open" limit switch is activated and "Closed" limit switch is deactivated.
- 3 Remove voltage from terminals 9 and 10
- 4 Actuator moves to "Closed" position. "Closed" limit switch is activated and "Open" limit switch is deactivated.
- 6 Mount the function module cover to the housing (see fig. 4).

## 5 Local Manual Control (option)

In case of an emergency or for maintenance purposes, the FieldQ can be operated locally.

To operate the optional local manual control, use a screwdriver and turn it 90°. It is possible to rotate the screw multiple cycles. The unit will toggle every 90° between "Open" and "Closed".

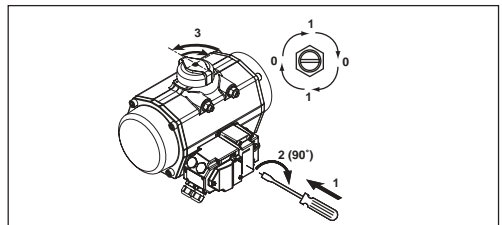


Fig. 9 Local Manual Control (option)







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