

The Drive & Control Company

Rexroth
Bosch Group

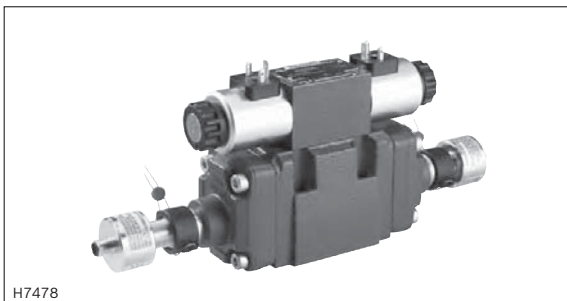
On/off valves with
spool position monitoring

Directional valves

RE 24830

Edition: 2013-05

Replaces: 02.11



H7478

► Sizes 6 ... 32

Features

- For directional seat valves type SED, SEW, SH, SP, SMM, SMR, Z4SEH
- For directional spool valves type WE, 5-.WE, Z4WE, WMM, WMM, WMR, WH, WP, W.H, WM.H, WH, WEH, Z4WEH
- Inductive position switches and proximity sensors
- Direct monitoring of the spool position
- High reliability
- Long life cycle

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General information

Inductive position switches and proximity sensors

For seat valves, contactless position switches and proximity sensors (hereinafter referred to only as position switches for short) with integrated switching amplifiers switch shortly before, for on/off valves only after the spool position to be monitored has been reached. The spool position reached is displayed by a binary signal.

Advantages of the position switches:

- ▶ Short-circuit-proof
- ▶ Available with M12 x 1 plug-in connections
- ▶ Direct monitoring of the spool position at the control spool
- ▶ Long life cycle
- ▶ High reliability due to no use of dynamic seals
- ▶ Reaction time of the switch upon operation approx. 15 ms

Attention!

Valves with inductive position switches and proximity sensors in safety-relevant controls may only be assembled and commissioned by hydraulically and electrically trained experts. Adjustment and maintenance work requires special tools and equipment. This work may only be performed by authorized specialists or in the factory!

Improper work at safety equipment leads to a risk of personal injury and damage to property!

- ▶ The essential valve components are coordinated with each other in the production plant and adjusted during assembly. They must not be interchanged. In case of valve or position switch defects, the entire valve must be exchanged!
- ▶ The factory setting of the position switch must not be changed. The position switch may only be set by the valve manufacturer.
- ▶ The position switch must be automatically monitored by the machine control to prevent initiation of a new machine cycle even in case of a failure of the position switch.
- ▶ The machine control and the selected components are to be designed so that the leaks cannot lead to an inadmissible closing movement.

Notices!

- ▶ In pilot operated directional valves, only the main valve is monitored, not the pilot control valve.
- ▶ In 4/2 directional seat valves, only the main valve is monitored, not the complete valve function.
- ▶ Position switches have an attenuating effect, i.e. the switching times specified in the basic data sheets of the valves may be increased.
- ▶ The switching times according to ISO 6403 specified in the respective valve data sheets do **not** correspond to the reaction times of the position switch (time between signal change at the solenoid and the signal change of the position switch).
Temporal query mechanisms should be set at least to 80 ... 100 ms.

Inductive position switch type QM: Electrical connection

The electricity is connected via a 4-pole mating connector (separate order, see page 42) with connection thread M12 x 1.

Connection voltage:	24 V +30%/–15%, direct voltage								
Admissible residual ripple:	≤10%								
Load capacity:	Maximum 400 mA								
Switching outputs:	PNP transistor outputs, load between switching outputs and GND								
Pinout:	<table border="1"> <tr> <td>1</td> <td>+24 V</td> </tr> <tr> <td>2</td> <td>Switching output: 400 mA</td> </tr> <tr> <td>3</td> <td>0 V, GND</td> </tr> <tr> <td>4</td> <td>Switching output: 400 mA</td> </tr> </table>	1	+24 V	2	Switching output: 400 mA	3	0 V, GND	4	Switching output: 400 mA
1	+24 V								
2	Switching output: 400 mA								
3	0 V, GND								
4	Switching output: 400 mA								

4/44 Directional valves | On/off valves with spool position monitoring

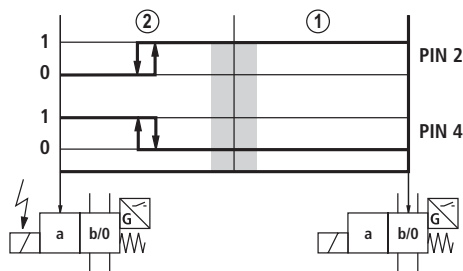
Inductive position switch type QM: Switching logics

- ▶ For directional seat valves type SED, SEW, SH, SP, SMM and SMR
- ▶ For directional spool valves type Z4SEH, WE, Z4WE, Z4WEH10.-5X

Depending on the spool position to be monitored, the switching outputs have the following function:

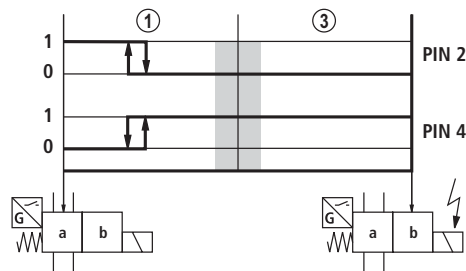
Model QMA

(position switch on side B, monitored spool position "a")



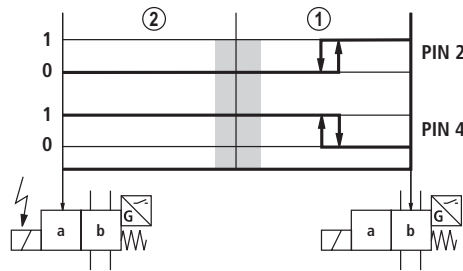
Model QMA (not for type Z4WEH10.-5X)

(position switch on side A, monitored spool position "a")



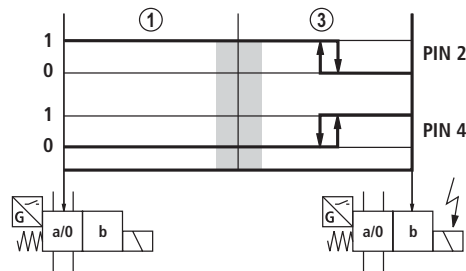
Model QMB

(position switch on side B, monitored spool position "b")



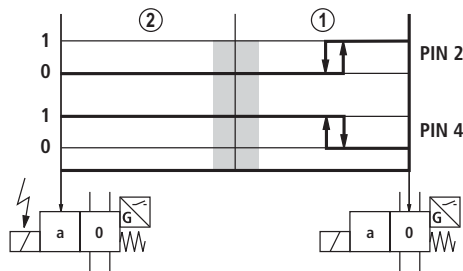
Model QMB (not for type Z4WEH10.-5X)

(position switch on side A, monitored spool position "b")



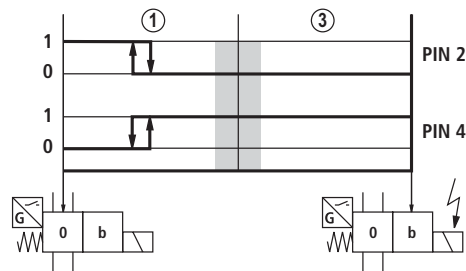
Model QM0 (not for type Z4WEH10.-5X)

(position switch on side B, monitored rest position)



Model QM0 (not for type Z4WEH10.-5X)

(position switch on side A, monitored rest position)



0 Contacts open (0 V)

1 Contacts closed (24 V)

Overlap area/hydraulic symbol change

① Rest position

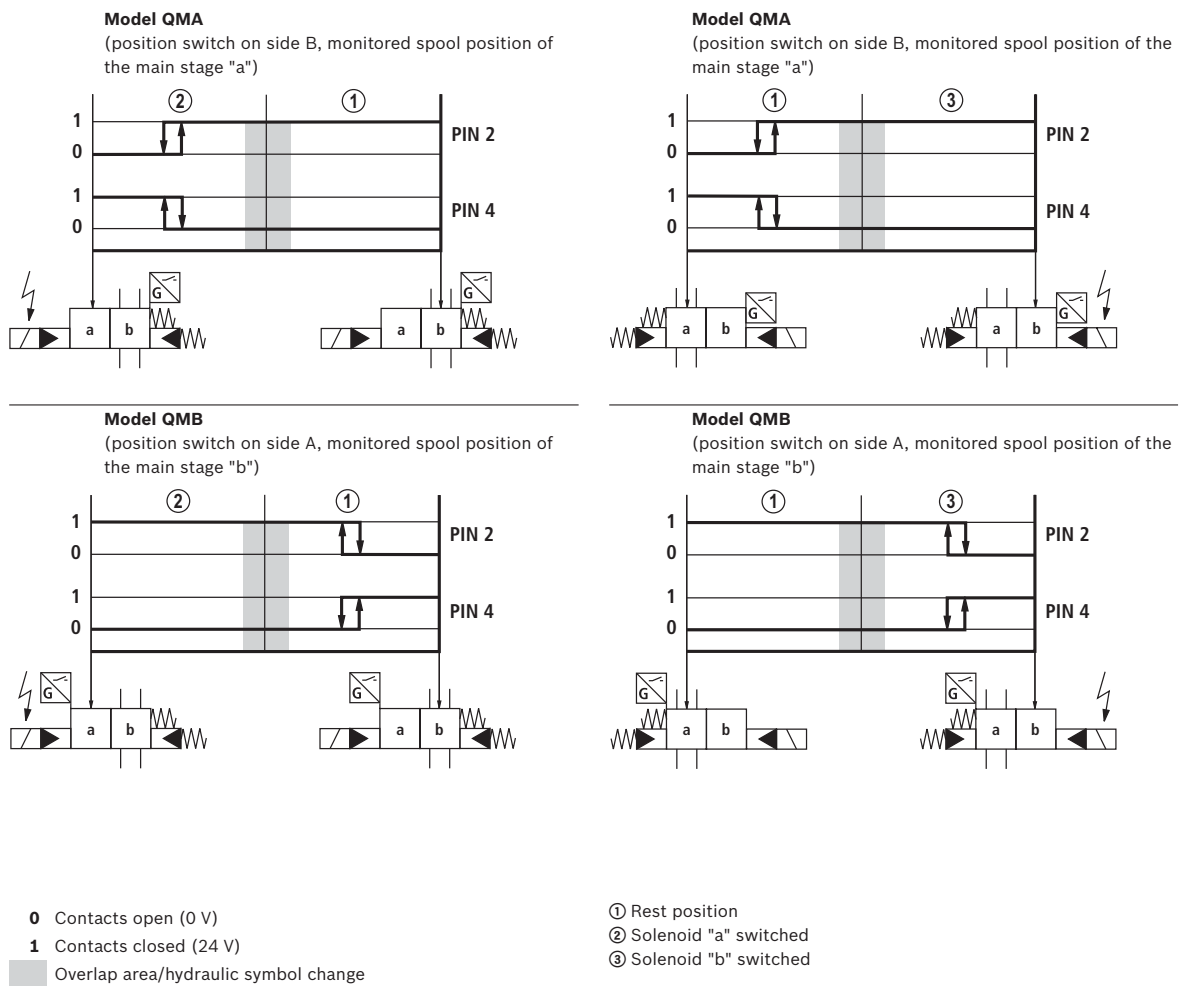
② Solenoid "a" switched

③ Solenoid "b" switched

Inductive position switch type QM: Switching logics

► For directional spool valves type WH, WEH, Z4WH, Z4WEH (except for Z4WEH10.-5X)

Depending on the spool position to be monitored, the switching outputs have the following function:

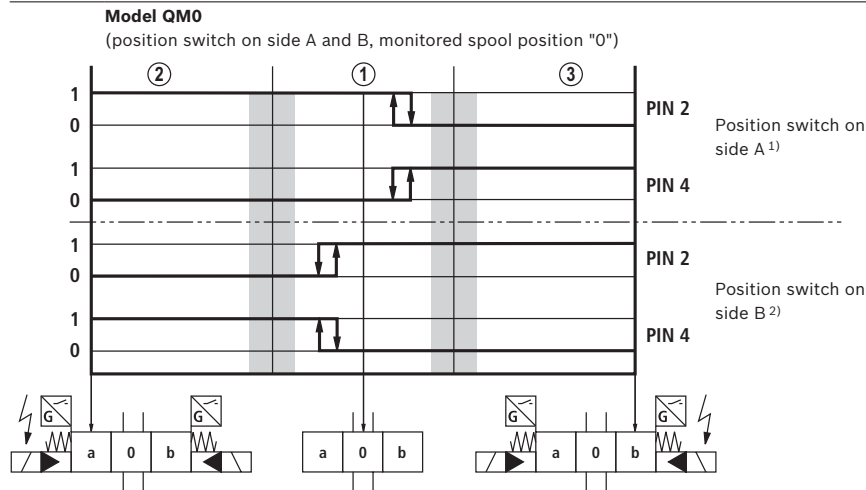
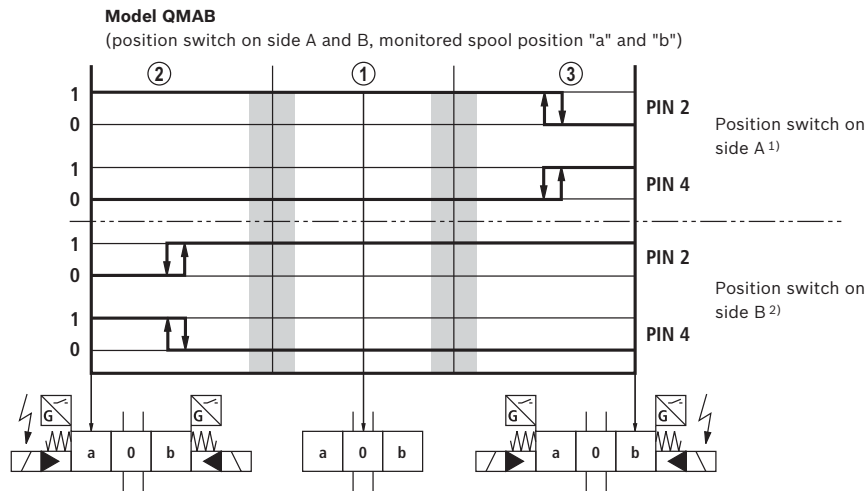


6/44 Directional valves | On/off valves with spool position monitoring

Inductive position switch type QM: Switching logics

► For directional spool valves type WH, WEH, Z4WH, Z4WEH (except for Z4WEH10.-5X)

Depending on the spool position to be monitored, the switching outputs have the following function:



- 0 Contacts open (0 V)
- 1 Contacts closed (24 V)

Overlap area/hydraulic symbol change

- ① Rest position
- ② Solenoid "a" switched
- ③ Solenoid "b" switched

1) No signal change at the position switch on side B with spool position "a"

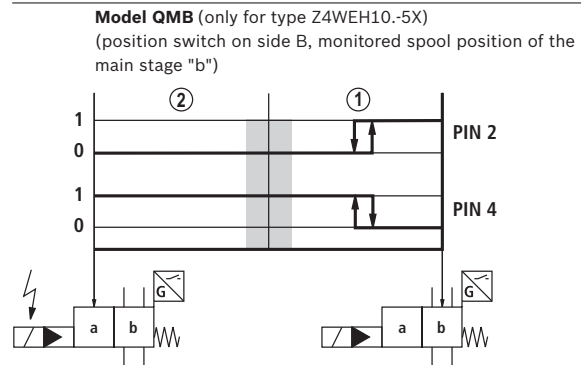
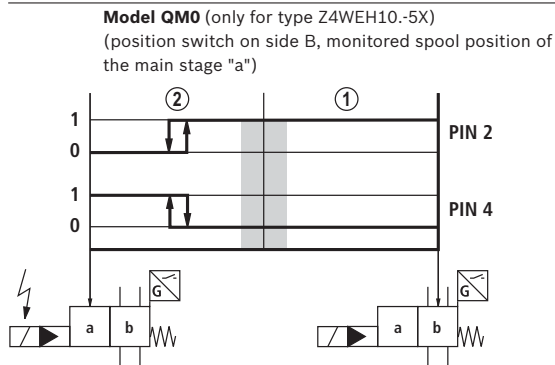
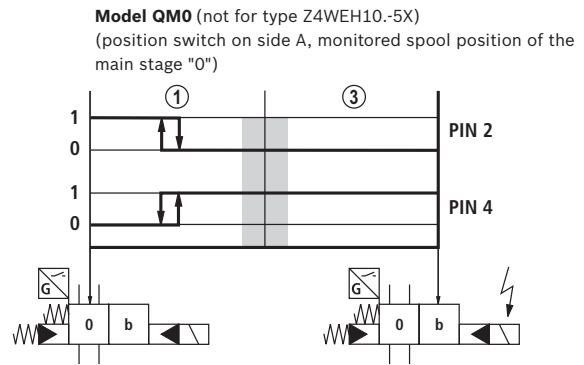
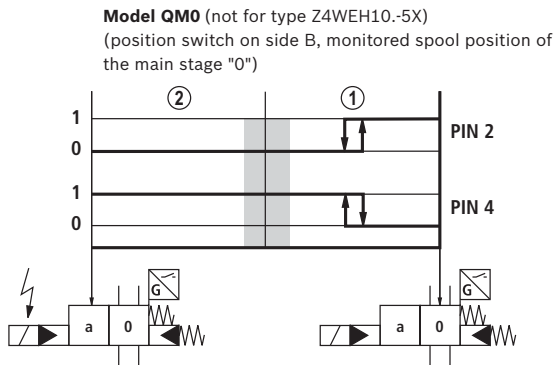
2) No signal change at the position switch on side A with spool position "b"

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Inductive position switch type QM: Switching logics

► For directional spool valves type WH, WEH, Z4WH, Z4WEH

Depending on the spool position to be monitored, the switching outputs have the following function:



0 Contacts open (0 V)

1 Contacts closed (24 V)

Overlap area/hydraulic symbol change

① Rest position

② Solenoid "a" switched

③ Solenoid "b" switched

8/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QM: Directional seat valves type SED
(dimensions in mm [*inch*])

01	02	03	04	05	06	07	08	09	10	11	12	
M	-	SED			-	1X	/	350	C		K4	/ ...

Spool position monitoring

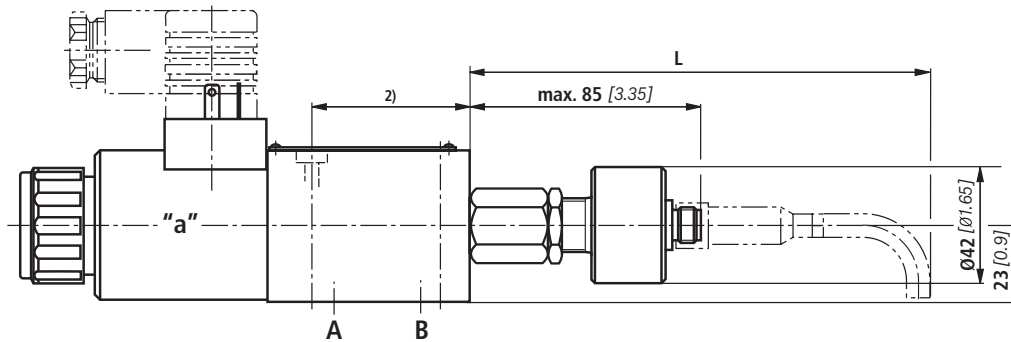
12	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24

Order example:

M-3SED 6 UK1X/350CG24N9K4QMAG24/...

Complete ordering codes can be found on the basic data sheets:

Size 6	22049
Size 10	22045



Mating connector (order separately, see page 42)	L in mm [<i>inch</i>] ¹⁾		
	Material no.	Size 6	Size 10
Mating connector straight	R900031155	186 [7.32]	183 [7.21]
Mating connector angled	R900082899	117 [4.61]	114 [4.48]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]	153 [6.02]

- 1) With mating connector, 10 mm [0.39 *inch*] removal space and minimum bending diameter for the connection line
- 2) Dimensions see basic data sheet

Pinout see page 3.

Switching logics see page 4.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

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Inductive position switch type QM: Directional seat valves type SEW
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11	12
M	-	SEW		-	/		M		K4	/	...

Spool position monitoring

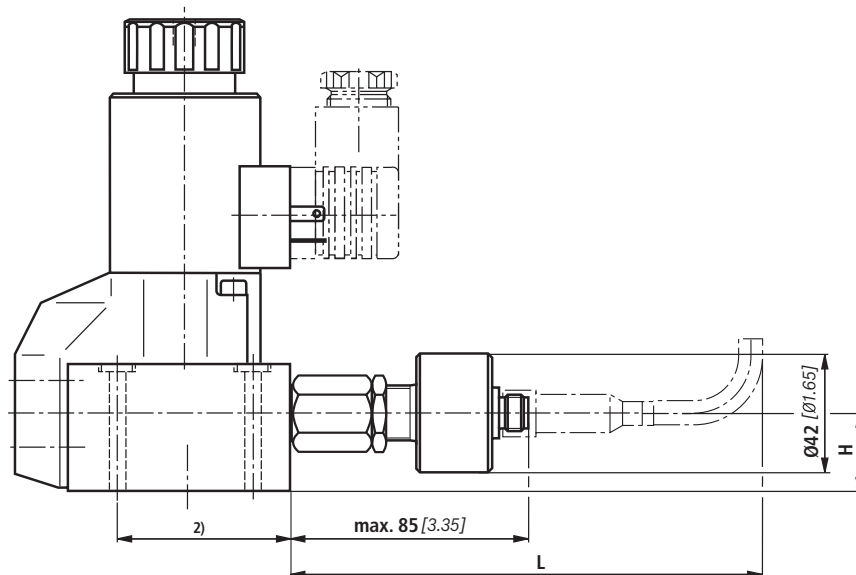
12	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24

Order example:

M-3SEW 6 U3X/420MG24N9K4QMAG24/...

Complete ordering codes can be found on the basic data sheets:

Size 6	22058
Size 10	22075



Mating connector (order separately, see page 42)	Material no.	L in mm [inch] ¹⁾		H in mm [inch]	
		Size 6	Size 10	Size 6	Size 10
Mating connector straight	R900031155	186 [7.32]	183 [7.21]	23 [0.9]	32.5 [1.28]
Mating connector angled	R900082899	117 [4.61]	114 [4.48]	23 [0.9]	32.5 [1.28]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]	153 [6.02]	23 [0.9]	32.5 [1.28]

- ¹⁾ With mating connector, 10 mm [0.39 inch] removal space and minimum bending diameter for the connection line
²⁾ Dimensions see basic data sheet

Pinout see page 3.

Switching logics see page 4.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

10/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QM: Directional seat valves type SH, SP, SMM, SMR
(dimensions in mm [*inch*])

01	02	03	04	05	06	07	08	09	10	11	12
M	-				3X	/					*

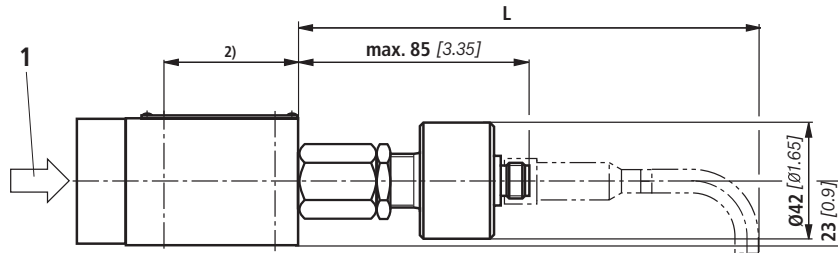
Spool position monitoring

9	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24

Order example:
M-2SMR 6 NU3X/420QMAG24...

Complete ordering codes can be found on the basic data sheets:

Size 6	22340
Size 10	



1 Types of actuation see basic data sheet 22340

Mating connector (order separately, see page 42)	Material no.	L in mm [<i>inch</i>] ¹⁾	
		Size 6	Size 10
Mating connector straight	R900031155	186 [7.32]	183 [7.21]
Mating connector angled	R900082899	117 [4.61]	114 [4.48]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]	153 [6.02]

- 1) With mating connector, 10 mm [0.39 *inch*] removal space and minimum bending diameter for the connection line
- 2) Dimensions see basic data sheet

Pinout see page 3.
Switching logics see page 4.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

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Inductive position switch type QM: Directional spool valves type WE
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11
	WE			/					/	...

Spool position monitoring

11	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored rest position	QM0G24

Order example:

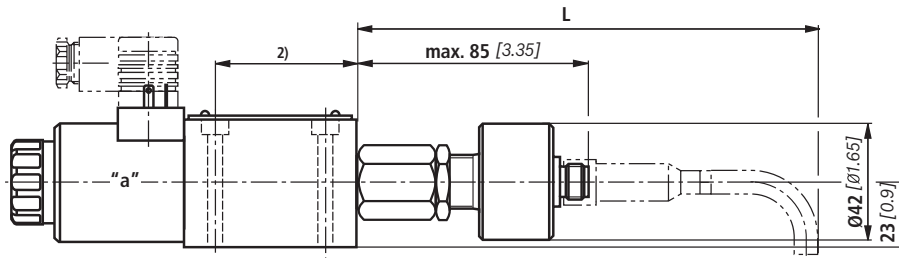
4WE 6 C6X/EG24N9K4QMAG24/...

Complete ordering codes can be found on the basic data sheets:

Size 6	23178, 23178-00
Size 10	23327

Notice!

For valves with 3 switching positions and valves with detent (models "O" and "OF"), no position switch is available!



Mating connector (order separately, see page 42)	L in mm [inch] ¹⁾		
	Material no.	Size 6	Size 10
Mating connector straight	R900031155	186 [7.32]	183 [7.21]
Mating connector angled	R900082899	117 [4.61]	114 [4.48]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]	153 [6.02]

- ¹⁾ With mating connector, 10 mm [0.39 inch] removal space and minimum bending diameter for the connection line
²⁾ Dimensions see basic data sheet

Pinout see page 3.

Switching logics see page 4.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

12/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QM: Directional spool valves type 5-.WE
(dimensions in mm [*inch*])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
	5	-		WE	10		-	5X	/		E				/				=	*

Spool position monitoring

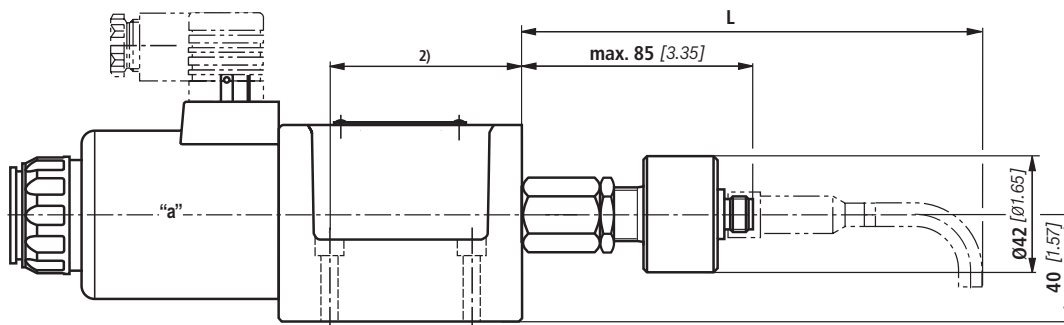
14	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored rest position	QMOG24

Order example:

5-4WE 10 C5X/EG24N9K4QMAG24/...

Complete ordering codes can be found on the basic data sheets:

23352



Mating connector (order separately, see page 42)	Material no.	L in mm [<i>inch</i>] ¹⁾
Mating connector straight	R900031155	183 [7.21]
Mating connector angled	R900082899	114 [4.48]
Mating connector with potted-in cable (3 m)	R900064381	153 [6.02]

- 1) With mating connector, 10 mm [0.39 *inch*] removal space and minimum bending diameter for the connection line
- 2) Dimensions see basic data sheet

Pinout see page 3.

Switching logics see page 4.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

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Inductive position switch type QM: Directional shut-off valves type Z4WE
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11	12
Z4WE	6	-	3X	/	E		K4				*

Spool position monitoring

11	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored rest position	QM0G24

Order example:

Z4WE 6 D24-3X/EG24N9K4QMAG24/...

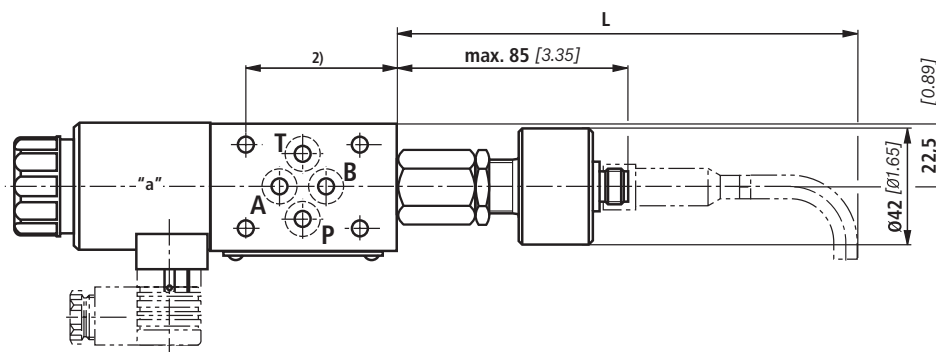
Complete ordering codes can be found on the basic data sheets:

23193



Notice!

Not available for symbol "E53"



Mating connector (order separately, see page 42)	Material no.	L in mm [inch] ¹⁾
Mating connector straight	R900031155	183 [7.21]
Mating connector angled	R900082899	114 [4.48]
Mating connector with potted-in cable (3 m)	R900064381	153 [6.02]

- 1) With mating connector, 10 mm [0.39 inch] removal space and minimum bending diameter for the connection line
2) Dimensions see basic data sheet

Pinout see page 3.

Switching logics see page 4.



Notice!

The dimensions are nominal dimensions which are subject to tolerances.

14/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QM: Directional spool valves type WMM, WMU, WMR, WMRZ
(dimensions in mm [*inch*])

01	02	03	04	05	06	07	08	09	10	11	12	13
		6		/			/					*

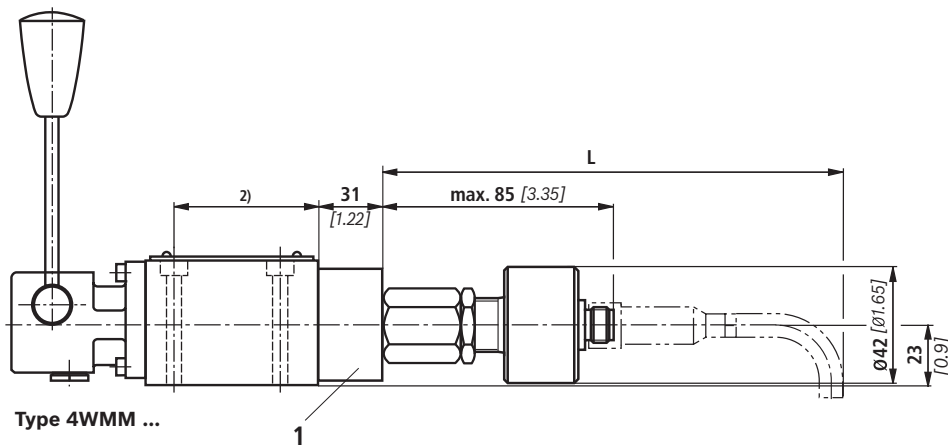
Spool position monitoring

08	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored rest position	QM0G24

Order example:
4WMM 6 LB5X/FQMBG24/...

Complete ordering codes can be found on the basic data sheets:

22280



Mating connector (order separately, see page 42)	Material no.	L in mm [<i>inch</i>] ¹⁾
Mating connector straight	R900031155	186 [7.32]
Mating connector angled	R900082899	117 [4.61]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]

1 Cover not available for type WMRZ

1) With mating connector, 10 mm [0.39 *inch*] removal space and minimum bending diameter for the connection line

2) Dimensions see basic data sheet

Pinout see page 3.

Switching logics see page 4.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

Bosch Rexroth AG, RE 24830, edition: 2013-05

On/off valves with spool position monitoring | **Directional valves** 15/44

Inductive position switch type QM: Directional spool valves type WMM
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10
H	-	4	WMM		7X	/			*

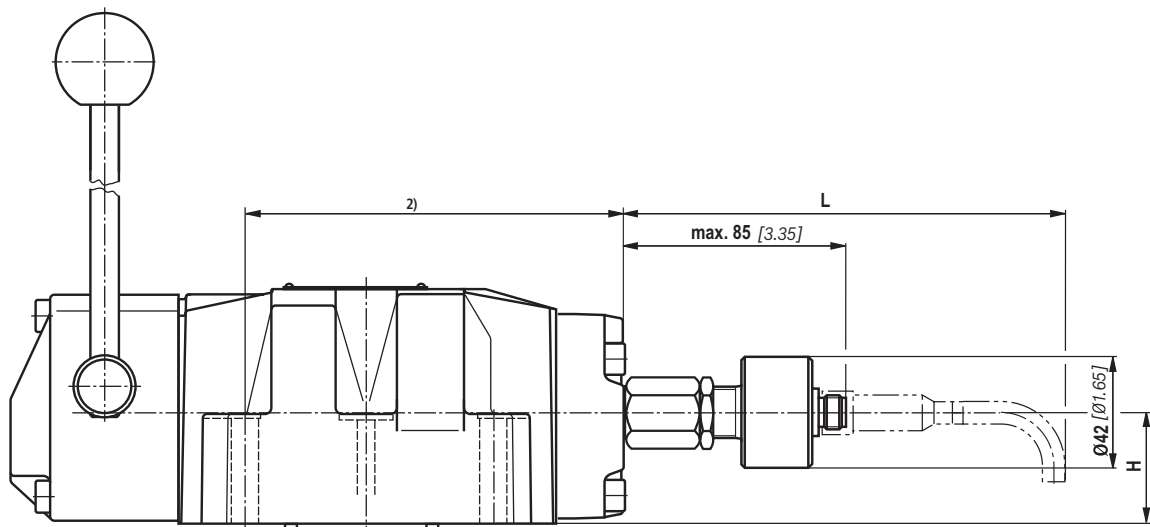
Spool position monitoring

08	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored rest position	QM0G24

Order example:
H-4WMM 16 C7X/QMBG24...

Complete ordering codes can be found on the basic data sheets:

Size 16	22371
Size 25	



Mating connector (order separately, see page 42)	Material no.	L in mm [inch] ¹⁾	Size	H in mm [inch]
Mating connector straight	R900031155	186 [7.32]	16	34 [1.34]
Mating connector angled	R900082899	117 [4.61]	25	37 [1.46]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]		

- ¹⁾ With mating connector, 10 mm [0.39 inch] removal space and minimum bending diameter for the connection line
²⁾ Dimensions see basic data sheet

Pinout see page 3.
Switching logics see page 4.



Notice!

The dimensions are nominal dimensions which are subject to tolerances.

RE 24830, edition: 2013-05, **Bosch Rexroth AG**

16/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QM: Directional spool valves type WH, WP
(dimensions in mm [*inch*])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
	W			6			/				/				*

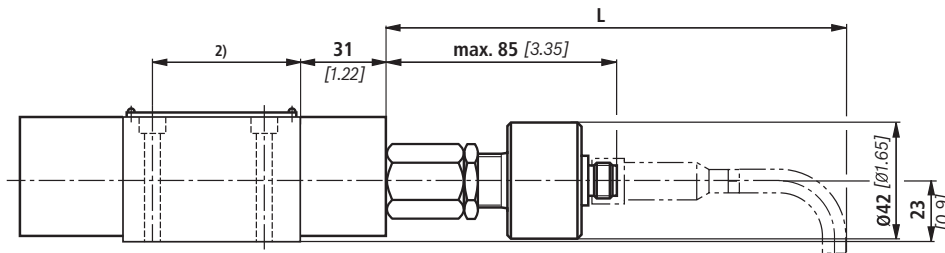
Spool position monitoring

11	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored rest position	QM0G24

Order example:
4WH 6 C5X/JQMAG24...

Complete ordering codes can be found on the basic data sheets:

22282



Mating connector (order separately, see page 42)	Material no.	L in mm [<i>inch</i>] ¹⁾
Mating connector straight	R900031155	186 [7.32]
Mating connector angled	R900082899	117 [4.61]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]

- 1) With mating connector, 10 mm [0.39 *inch*] removal space and minimum bending diameter for the connection line
- 2) Dimensions see basic data sheet

Pinout see page 3.
Switching logics see page 4.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

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On/off valves with spool position monitoring | **Directional valves** 17/44

Inductive position switch type QM: Directional spool valves type W.H, WM.H
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
							/	6				/						*

Spool position monitoring

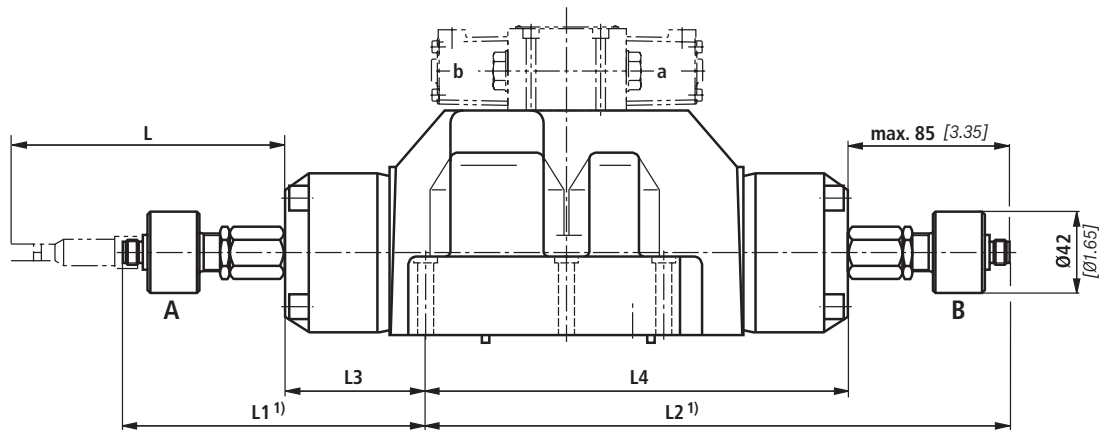
13	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored spool position "a" and "b"	QMABG24
	Monitored rest position	QM0G24

Order example:

4WHH 16 C7X/6EQMAG24/...

Complete ordering codes can be found on the basic data sheets:

Sizes 10 ... 32	24851
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Mating connector (order separately, see page 42)	Material no.	L in mm [inch] ²⁾
Mating connector straight	R900031155	186 [7.32]
Mating connector angled	R900082899	117 [4.61]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]

¹⁾ Without mating connector

²⁾ With mating connector, 10 mm [0.39 inch] removal space and minimum bending diameter for the connection line

Mounting options and dimensions see page 19 to 21.

Pinout see page 3.

Switching logics see page 5 to 7.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

RE 24830, edition: 2013-05, **Bosch Rexroth AG**

18/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QM: Directional spool valves type WH, WEH
(dimensions in mm [*inch*])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	
							/								/						*

Spool position monitoring

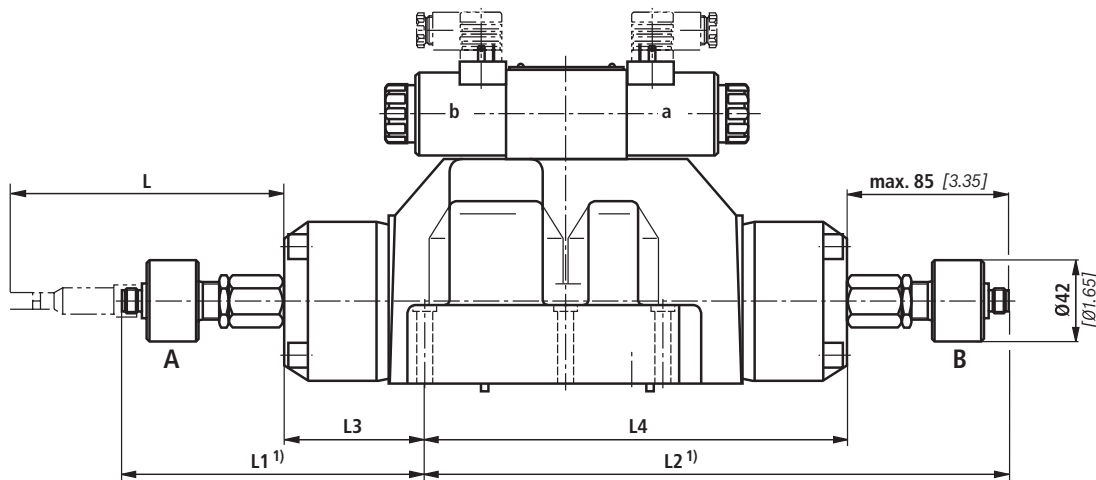
15	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored spool position "a" and "b"	QMABG24
	Monitored rest position	QMOG24

Order example:

4WEH 16 C7X/6EG24N9K4QMAG24/...

Complete ordering codes can be found on the basic data sheets:

Sizes 10 ... 32	24751
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Mating connector (order separately, see page 42)	Material no.	L in mm [<i>inch</i>] ²⁾
Mating connector straight	R900031155	186 [7.32]
Mating connector angled	R900082899	117 [4.61]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]

¹⁾ Without mating connector

²⁾ With mating connector, 10 mm [0.39 *inch*] removal space and minimum bending diameter for the connection line

Mounting options and dimensions see page 19 to 21.

Pinout see page 3.

Switching logics see page 5 to 7.



Notice!

The dimensions are nominal dimensions which are subject to tolerances.

On/off valves with spool position monitoring | **Directional valves** 19/44

Inductive position switch type QM: Directional spool valves type W.H, WM.H, WEH
(dimensions in mm [inch])

Mounting options – 2-spool position valve

Monitored spool position	Ordering code	Size	Hydraulic end position HC, HD, HK, HZ, HY 4)				Spring end position C, D, K, Z				Spring end position Y			
			L1 ³⁾	L2 ³⁾	L3	L4	L1 ³⁾	L2 ³⁾	L3	L4	L1 ³⁾	L2 ³⁾	L3	L4
"a" (position switch on side B)	QMAG24	10		211 [8.31]	57 [2.24]			211 [8.31]	57 [2.24]			211 [8.31]	57 [2.24]	
		16		259 [10.20]	55 [2.16]							259 [10.20]	55 [2.16]	
		25 ¹⁾		294 [11.58]	47 [1.85]			294 [11.58]	47 [1.85]			294 [11.58]	47 [1.85]	
		25 ²⁾		325 [12.80]	72 [2.83]							325 [12.80]	72 [2.83]	
		32		371 [14.61]	76 [2.99]							371 [14.61]	76 [2.99]	
"b" (position switch on side A)	QMBG24	10	157 [6.18]			111 [4.37]	157 [6.18]			111 [4.37]	157 [6.18]			111 [4.37]
		16	159 [6.26]			155 [6.10]	159 [6.26]			155 [6.10]				
		25 ¹⁾	149 [5.87]			192 [7.56]	149 [5.87]			192 [7.56]	149 [5.87]			192 [7.56]
		25 ²⁾	172 [6.77]			225 [8.86]	172 [6.77]			225 [8.86]				
		32	161 [6.34]			287 [11.30]	161 [6.34]			287 [11.30]				
"a" and "b" (position switch on side A and B)	QMABG24	10	157 [6.18]	211 [8.31]			157 [6.18]	211 [8.31]			157 [6.18]	211 [8.31]		
		16	159 [6.26]	259 [10.20]										
		25 ¹⁾	149 [5.87]	294 [11.58]			149 [5.87]	294 [11.58]			149 [5.87]	294 [11.58]		
		25 ²⁾	172 [6.77]	325 [12.80]										
		32	161 [6.34]	371 [14.61]										

1) Type 4WEH 22..

2) Type 4WEH 25..

3) Without mating connector

4) Only with type WEH

RE 24830, edition: 2013-05, **Bosch Rexroth AG**

20/44 Directional valves | On/off valves with spool position monitoring

Inductive position switch type QM: Directional spool valves type W.H, WM.H, WEH
(dimensions in mm [*inch*])

Mounting options – 3-spool position valve

Monitored spool position	Ordering code	Size	Spring-centered				Pressure-centered			
			L1 ³⁾	L2 ³⁾	L3	L4	L1 ³⁾	L2 ³⁾	L3	L4
"a" (position switch on side B)	QMAG24	10		211 [8.31]	57 [2.24]					
		16		259 [10.20]	55 [2.16]			259 [10.20]	81 [3.19]	
		25 ¹⁾		294 [11.58]	47 [1.85]					
		25 ²⁾		325 [12.80]	72 [2.83]			325 [12.80]	107 [4.21]	
		32		371 [14.61]	76 [2.99]			371 [14.61]	120 [4.72]	
"b" (position switch on side A)	QMBG24	10	157 [6.18]			111 [4.37]				
		16	159 [6.26]			155 [6.10]				
		25 ¹⁾	149 [5.87]			192 [7.56]				
		25 ²⁾	172 [6.77]			225 [8.86]				
		32	161 [6.34]			287 [11.30]				
"a" and "b" (position switch on side A and B)	QMABG24	10	157 [6.18]	211 [8.31]						
		16	159 [6.26]	259 [10.20]						
		25 ¹⁾	149 [5.87]	294 [11.58]						
		25 ²⁾	172 [6.77]	325 [12.80]						
		32	161 [6.34]	371 [14.61]						
Zero position (position switch on side A and B) 2 position switches	QMOG24 ⁵⁾	10	157 [6.18]	211 [8.31]						
		16	159 [6.26]	259 [10.20]						
		25 ¹⁾	149 [5.87]	294 [11.58]						
		25 ²⁾	172 [6.77]	325 [12.80]						
		32	161 [6.34]	371 [14.61]						

- 1) Type 4WEH 22..
- 2) Type 4WEH 25..
- 3) Without mating connector
- 5) 3-spool position valve

Bosch Rexroth AG, RE 24830, edition: 2013-05

On/off valves with spool position monitoring | **Directional valves** 21/44

Inductive position switch type QM: Directional spool valves type W.H, WM.H, WEH
(dimensions in mm [inch])

Mounting options – 3-spool position valve with one solenoid

Monitored spool position	Ordering code	Size	Side A (EA, FA...) Spring-centered				Solenoids on Side B (EB, FB...) Spring-centered				Side A (EA, FA...) Pressure-centered					
			L1 ³⁾	L2 ³⁾	L3	L4	L1 ³⁾	L2 ³⁾	L3	L4	L1 ³⁾	L2 ³⁾	L3	L4		
"a" (position switch on side B)	QMAG24	10		211 [8.31]	57 [2.24]											
		16		259 [10.20]	55 [2.16]						259 [10.20]	81 [3.19]				
		25 ¹⁾		294 [11.58]	47 [1.85]											
		25 ²⁾		325 [12.80]	72 [2.83]							325 [12.80]	107 [4.21]			
		32		371 [14.61]								371 [14.61]	120 [4.72]			
"b" (position switch on side A)	QMBG24	10					157 [6.18]				111 [4.37]					
		16					159 [6.26]				155 [6.10]					
		25 ¹⁾					149 [5.87]				192 [7.56]					
		25 ²⁾					172 [6.77]				225 [8.86]					
		32					161 [6.34]				287 [11.30]					
Zero position (position switch on side A or B) 1 position switches	QM0G24 ⁶⁾	10		211 [8.31]	57 [2.24]		157 [6.18]				111 [4.37]					
		16		259 [10.20]	55 [2.16]		159 [6.26]				155 [6.10]	259 [10.20]	81 [3.19]			
		25 ¹⁾		294 [11.58]	47 [1.85]		149 [5.87]				192 [7.56]					
		25 ²⁾		325 [12.80]	72 [2.83]		172 [6.77]				225 [8.86]	325 [12.80]	107 [4.21]			
		32		371 [14.61]	76 [2.99]		161 [6.34]				287 [11.30]	371 [14.61]	120 [4.72]			

1) Type 4WEH 22..

2) Type 4WEH 25..

3) Without mating connector

6) 2-spool position valve

RE 24830, edition: 2013-05, **Bosch Rexroth AG**

22/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QM: Directional spool valves type Z4WEH
(dimensions in mm [*inch*])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
Z4	WEH	10		-	5X	/						/				*

Spool position monitoring

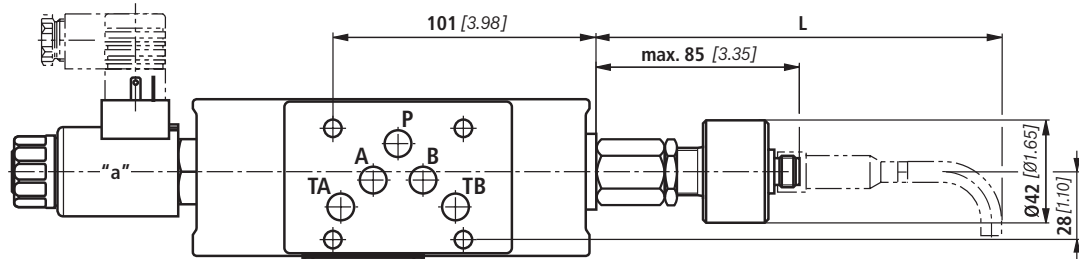
12	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored spool position "a" and "b"	QMABG24

Order example:

Z4WEH 10 D24-5X/4KEG24N9ETK4QMAG24/...

Complete ordering codes can be found on the basic data sheets:

24755



Mating connector (order separately, see page 42)	Material no.	L in mm [<i>inch</i>] ²⁾
Mating connector straight	R900031155	186 [7.32]
Mating connector angled	R900082899	117 [4.61]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]

¹⁾ With mating connector, 10 mm [0.39 *inch*] removal space and minimum bending diameter for the connection line

Pinout see page 3.

Switching logics see page 4 and 7.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

On/off valves with spool position monitoring | **Directional valves** 23/44

Inductive position switch type QM: Directional spool valves type Z4WH, Z4WEH
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
Z4		10		-	4X	/				K4							*

Spool position monitoring

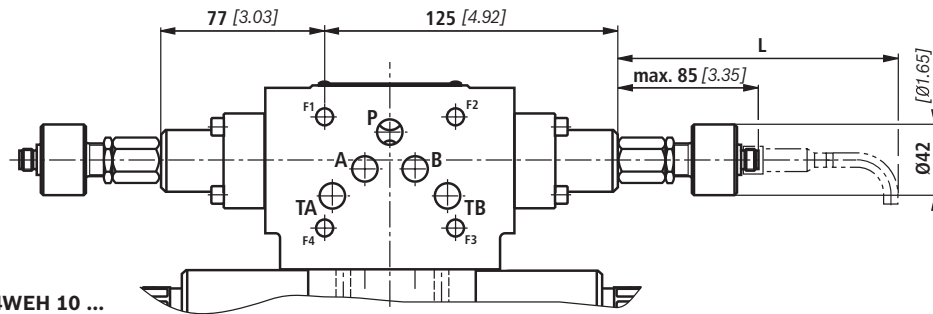
12	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored spool position "a" and "b"	QMABG24

Order example:

Z4WEH 10 D24-4X/4KEG24N9ETK4QMAG24/...

Complete ordering codes can be found on the basic data sheets:

Size 10	24753
---------	-------



Mating connector (order separately, see page 42)	Material no.	L in mm [inch] ¹⁾
Mating connector straight	R900031155	186 [7.32]
Mating connector angled	R900082899	117 [4.61]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]

¹⁾ With mating connector, 10 mm [0.39 inch] removal space and minimum bending diameter for the connection line

Pinout see page 3.

Switching logics see page 5 to 7.

Mounting options:

Monitored spool position	Ordering code	Position switch on side		
		"a"	"b"	"a" and "b"
"a"	QMAG24		X	
"b"	QMBG24	X		
"a" and "b"	QMABG24			X

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

24/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QM: Directional spool valves type Z4WH, Z4WEH
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
Z4				- 5X	/					K4							*

Spool position monitoring

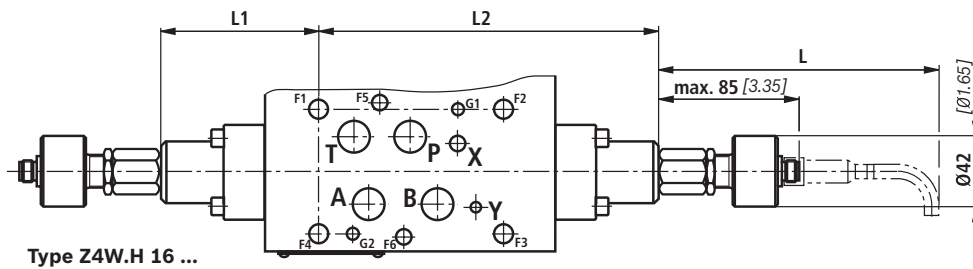
12	Without position switch	no code
	Monitored spool position "a"	QMAG24
	Monitored spool position "b"	QMBG24
	Monitored spool position "a" and "b"	QMABG24
	Monitored rest position (only with symbol "E62")	QM0G24

Order example:

Z4WEH 16 D24-5X/4KEG24N9ETK4QMAG24/...

Complete ordering codes can be found on the basic data sheets:

Size 16	24761
Size 25	24768



Type Z4W.H 16 ...

Mating connector (order separately, see page 42)	Material no.	L in mm [inch] ¹⁾
Mating connector straight	R900031155	186 [7.32]
Mating connector angled	R900082899	117 [4.61]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]

¹⁾ With mating connector, 10 mm [0.39 inch] removal space and minimum bending diameter for the connection line

L1 in mm [inch]		L2 in mm [inch]	
Size 16	Size 25	Size 16	Size 25
82 [3.23]	62 [2.44]	182 [7.17]	215 [8.46]

Mounting options:

Monitored spool position	Ordering code	Position switch on side		
		"a"	"b"	"a" and "b"
"a"	QMAG24		X	
"b"	QMBG24	X		
"a" and "b"	QMABG24			X
"0"	QM0G24			X

Pinout see page 3.

Switching logics see page 5 to 7.



Notice!

The dimensions are nominal dimensions which are subject to tolerances.

Inductive position switch type QL: Electrical connection

The electric connection is realized via a 4-pole mating connector (separate order, see page 42) with connection thread M12 x 1.

Connection voltage:	24 V +56%/–31%, direct voltage								
Admissible residual ripple:	≤10%								
Load capacity:	Maximum 25 mA								
Switching outputs:	PNP transistor outputs, load between switching outputs and GND								
Pinout:	<table border="1"> <tr> <td>1</td> <td>+24 V</td> </tr> <tr> <td>2</td> <td>Switching output: 25 mA</td> </tr> <tr> <td>3</td> <td>0 V, GND</td> </tr> <tr> <td>4</td> <td>Switching output: 25 mA</td> </tr> </table>	1	+24 V	2	Switching output: 25 mA	3	0 V, GND	4	Switching output: 25 mA
1	+24 V								
2	Switching output: 25 mA								
3	0 V, GND								
4	Switching output: 25 mA								

26/44 **Directional valves** | On/off valves with spool position monitoring

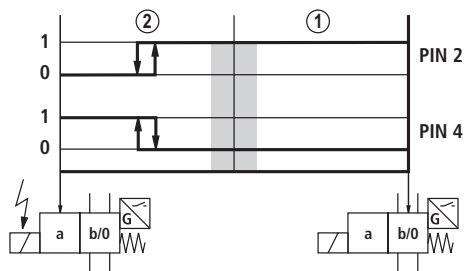
Inductive position switch type QL: Switching logics

► For directional spool valves type WE, Z4WEH10-5X

Depending on the spool position to be monitored, the switching outputs have the following function:

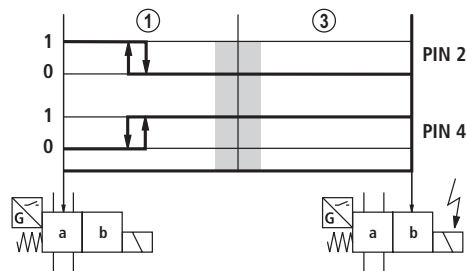
Model QLA

(position switch on side B, monitored spool position "a")



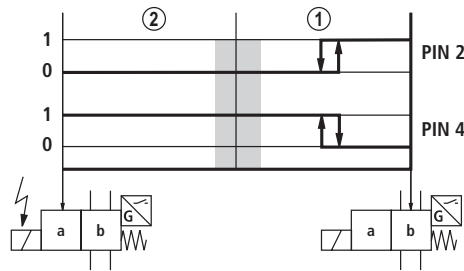
Model QLA (not for type Z4WEH10-5X)

(position switch on side A, monitored spool position "a")



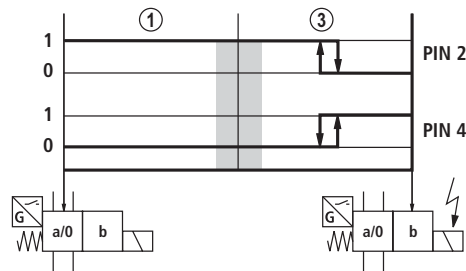
Model QLB

(position switch on side B, monitored spool position "b")



Model QLB (not for type Z4WEH10-5X)

(position switch on side A, monitored spool position "b")



- 0 Contacts open (0 V)
- 1 Contacts closed (24 V)

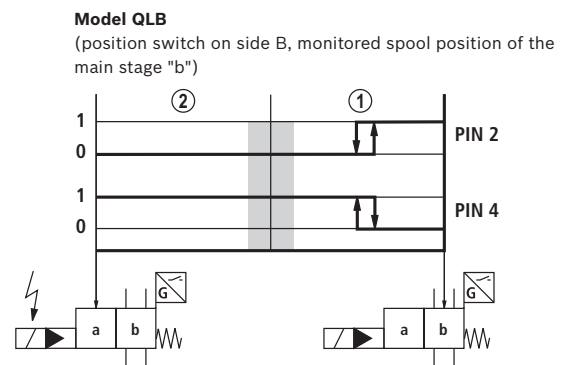
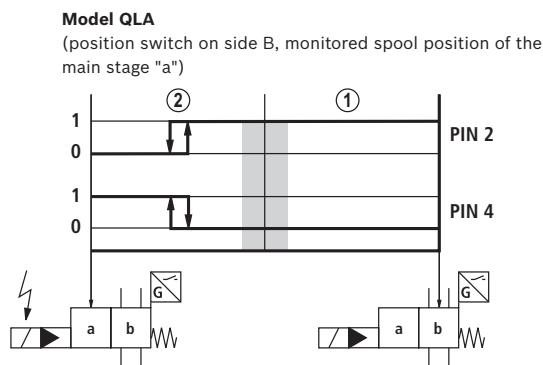
Overlap area/hydraulic symbol change

- ① Rest position
- ② Solenoid "a" switched
- ③ Solenoid "b" switched

Inductive position switch type QL: Switching logics

► For directional spool valves type Z4WEH10-5X

Depending on the spool position to be monitored, the switching outputs have the following function:



- 0 Contacts open (0 V)
- 1 Contacts closed (24 V)

Overlap area/hydraulic symbol change

- ① Rest position
- ② Solenoid "a" switched
- ③ Solenoid "b" switched

28/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QL: Directional spool valves type WE
(dimensions in mm [*inch*])

01	02	03	04	05	06	07	08	09	10	11
	WE			/					/	...

Spool position monitoring

11	Without position switch	no code
	Monitored spool position "a"	QLAG24
	Monitored spool position "b"	QLBG24

Order example:

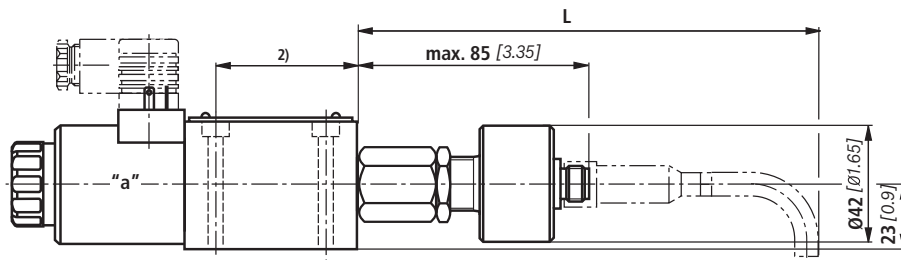
4WE 6 C6X/EG24N9K4QLAG24/...

Complete ordering codes can be found on the basic data sheets:

Size 6	23178
--------	-------

Notice!

For valves with 3 switching positions and valves with detent (models "O" and "OF"), no position switch is available!



Mating connector (order separately, see page 42)	L in mm [<i>inch</i>] ¹⁾		
	Material no.	Size 6	Size 10
Mating connector straight	R900031155	186 [7.32]	183 [7.21]
Mating connector angled	R900082899	117 [4.61]	114 [4.48]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]	153 [6.02]

- 1) With mating connector, 10 mm [0.39 *inch*] removal space and minimum bending diameter for the connection line
- 2) Dimensions see basic data sheet

Pinout see page 25.

Switching logics see page 26.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

Bosch Rexroth AG, RE 24830, edition: 2013-05

On/off valves with spool position monitoring | **Directional valves** 29/44

Inductive position switch type QL: Directional spool valves type 5-WE
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
	5	-		WE	10		-	5X	/		E			/				=	*

Spool position monitoring

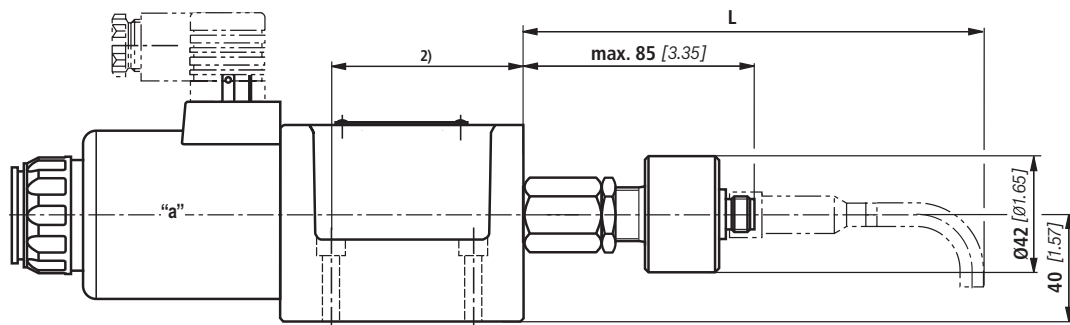
14	Without position switch	no code
	Monitored spool position "a"	QLAG24
	Monitored spool position "b"	QLBG24

Order example:

5-4WE 10 C5X/EG24N9K4QLAG24/...

Complete ordering codes can be found on the basic data sheets:

23352



Mating connector (order separately, see page 42)	Material no.	L in mm [inch] ¹⁾
Mating connector straight	R900031155	183 [7.21]
Mating connector angled	R900082899	114 [4.48]
Mating connector with potted-in cable (3 m)	R900064381	153 [6.02]

- ¹⁾ With mating connector, 10 mm [0.39 inch] removal space and minimum bending diameter for the connection line
²⁾ Dimensions see basic data sheet

Pinout see page 25.

Switching logics see page 26.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

RE 24830, edition: 2013-05, **Bosch Rexroth AG**

30/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QL: Directional spool valves type Z4WEH
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
Z4	WEH	10		-	5X	/						/				*

Spool position monitoring

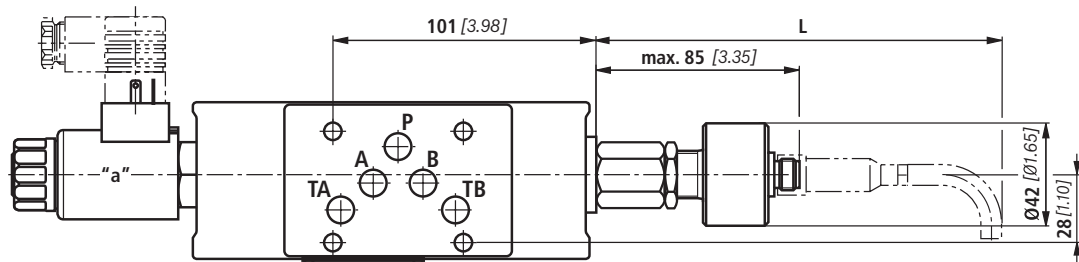
12	Without position switch	no code
	Monitored spool position "a"	QLAG24
	Monitored spool position "b"	QLBG24

Order example:

Z4WEH 10 D24-5X/4KEG24N9ETK4QLAG24/...

Complete ordering codes can be found on the basic data sheets:

24755



Mating connector (order separately, see page 42)	Material no.	L in mm [inch] ²⁾
Mating connector straight	R900031155	186 [7.32]
Mating connector angled	R900082899	117 [4.61]
Mating connector with potted-in cable (3 m)	R900064381	156 [6.14]

¹⁾ With mating connector, 10 mm [0.39 inch] removal space and minimum bending diameter for the connection line

Pinout see page 25.

Switching logics see page 26 and 27.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

Inductive position switch type QR: Electrical connection

The electric connection is realized via a 4-pole mating connector (separate order, see page 42) with connection thread M12 x 1.

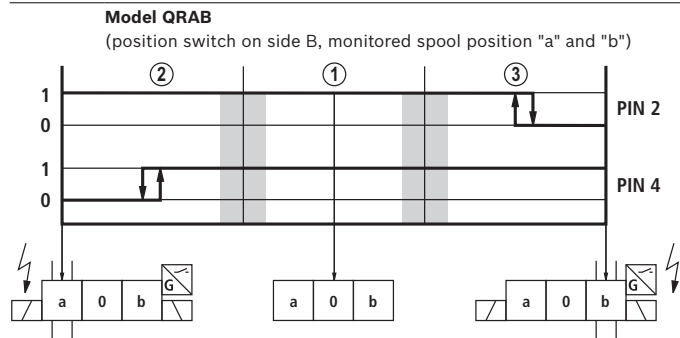
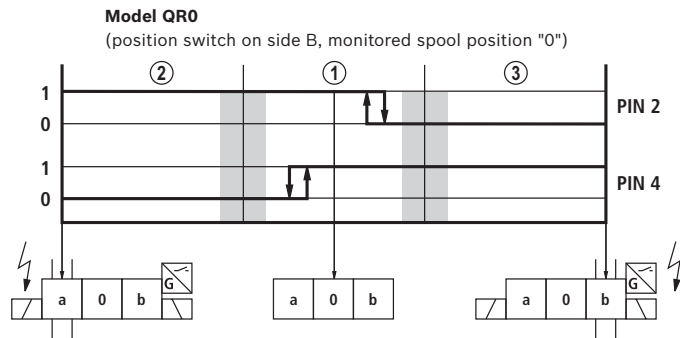
Connection voltage:	24 V +30%/–15%, direct voltage								
Admissible residual ripple:	≤10%								
Load capacity:	Maximum 400 mA								
Switching outputs:	PNP transistor outputs, load between switching outputs and GND								
Pinout:	<table border="1"> <tr> <td>1</td> <td>+24 V</td> </tr> <tr> <td>2</td> <td>Switching output: 400 mA</td> </tr> <tr> <td>3</td> <td>0 V, GND</td> </tr> <tr> <td>4</td> <td>Switching output: 400 mA</td> </tr> </table>	1	+24 V	2	Switching output: 400 mA	3	0 V, GND	4	Switching output: 400 mA
1	+24 V								
2	Switching output: 400 mA								
3	0 V, GND								
4	Switching output: 400 mA								

32/44 **Directional valves** | On/off valves with spool position monitoring

Inductive position switch type QR: Switching logics

► For directional spool valves type WE (size 6)

Depending on the spool position to be monitored, the switching outputs have the following function:



0 Contacts open (0 V)
1 Contacts closed (24 V)

Overlap area/hydraulic symbol change

① Rest position
② Solenoid "a" switched
③ Solenoid "b" switched

Bosch Rexroth AG, RE 24830, edition: 2013-05

Inductive position switch type QR: Directional spool valves type WE
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11
	WE	6		6X	/		E			/ ...

Spool position monitoring

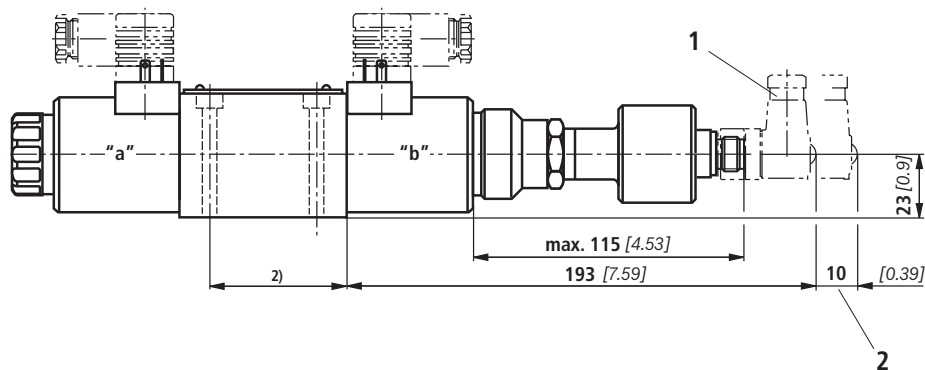
11	Without position switch	no code
	Monitored rest position	QR0G24S
	Monitored spool position "a" and "b"	QRABG24E

Order example:

4WE 6 E6X/EG24K4QR0G24S/...

Complete ordering codes can be found on the basic data sheets:

23178



- 1 Mating connector, material no. **R900082899**
(order separately, see page 42)
- 2 Space required to remove the mating connector

²⁾ Dimensions see basic data sheet

Pinout see page 31.

Switching logics see page 32.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

34/44 **Directional valves** | On/off valves with spool position monitoring

Inductive proximity sensor type QS: Electrical connection

The electric connection is realized via a 4-pole mating connector (separate order, see page 42) with connection thread M12 x 1.

Connection voltage:	24 V ± 25%, direct voltage
Admissible residual ripple:	≤15%
Load capacity:	Maximum 200 mA
Switching outputs:	PNP transistor outputs, load between switching outputs and GND
Pinout:	
	<p>1 +24 V</p> <p>2 Switching output: 200 mA</p> <p>3 0 V, GND</p> <p>4 Switching output: 200 mA</p>

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Inductive proximity sensor type QS: Electrical connection

► For directional spool valves type WE (size 6, data sheet 23178)

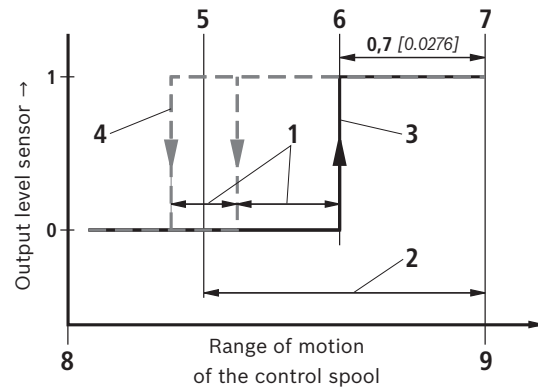


Notice!

The inductive proximity sensor type QS is set so that there is a signal change when moving the control spool to the (safe) spool position to be monitored, which is approx. 0.7 mm before the stroke end.

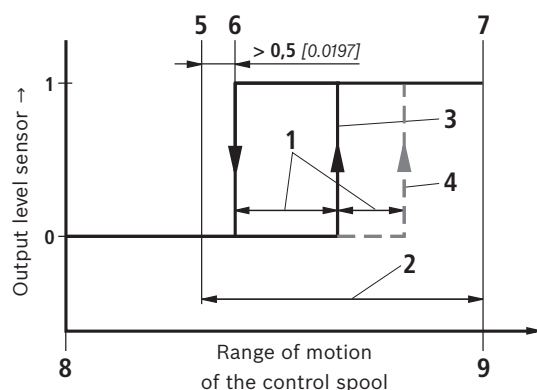
Upon switch-off, the signal change may take place outside the overlap area of control spool and housing edge due to the hysteresis and the temperature drift, if applicable.

I.e. monitoring is designed to only determine when the spool position to be monitored is reached and not when the safe area is left; see graphic on the right.



- 1 Width depending on hysteresis and temperature drift
- 2 Overlap in the monitored spool position
- 3 Signal flow (in the switching position to be monitored)
- 4 Signal flow (leaving the monitored switching position)
- 5 Beginning of the overlap
- 6 Switching point
- 7 Stroke end
- 8 Not monitored spool position
- 9 Monitored spool position

► For directional spool valves type 5-WE (size 10, data sheet 23352)



Notice!

The inductive proximity sensor type QS is set so that there is a signal change when moving the control spool to the (safe) spool position to be monitored >0.5 mm before opening.

I.e. monitoring is designed to only determine when the spool position to be monitored is left and not when the safe area is reached; see graphic on the left.

- 1 Width depending on hysteresis and temperature drift
- 2 Overlap in the monitored spool position
- 3 Signal flow (in the switching position to be monitored)
- 4 Signal flow (leaving the monitored switching position)
- 5 Beginning of the overlap
- 6 Switching point
- 7 Stroke end
- 8 Not monitored spool position
- 9 Monitored spool position

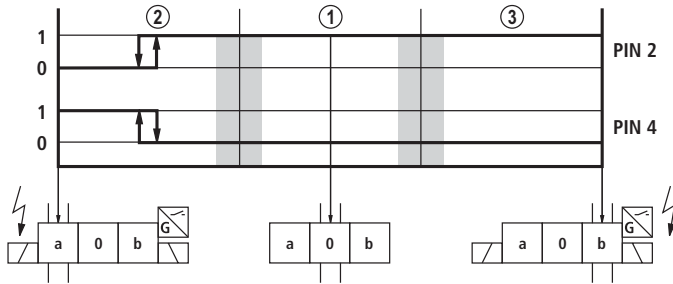
36/44 **Directional valves** | On/off valves with spool position monitoring

Inductive proximity sensor type QS: Switching logics

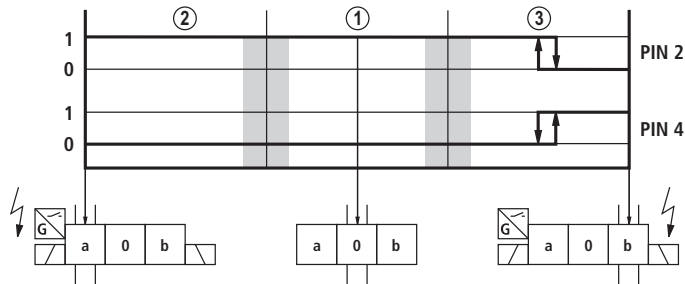
► For directional spool valves type WE (size 6 and 10)

Depending on the spool position to be monitored, the switching outputs have the following function:

Model QSAG24W (valves with 3 spool positions, e.g. symbols E, J, G, ...)
(proximity sensor on side B, monitored spool position "a")



Model QSBG24W (valves with 3 spool positions, e.g. symbols E, J, G, ...)
(proximity sensor on side A, monitored spool position "b")



- 0 Contacts open (0 V)
- 1 Contacts closed (24 V)

Overlap area/hydraulic symbol change

- ① Rest position
- ② Solenoid "a" switched
- ③ Solenoid "b" switched

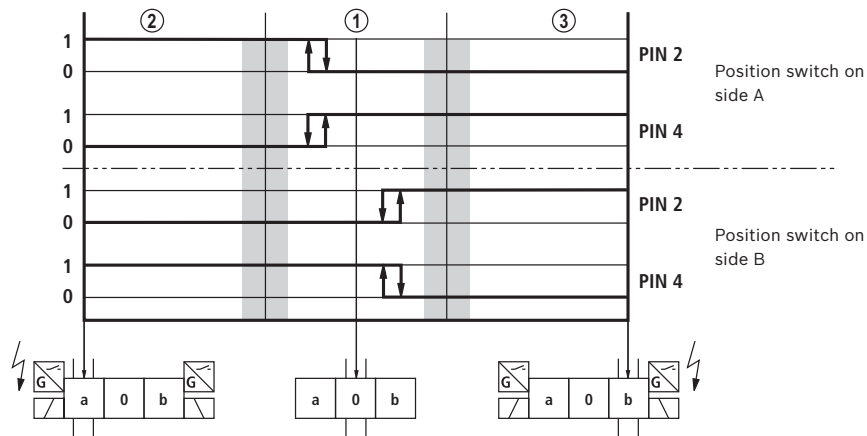
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Inductive proximity sensor type QS: Switching logics

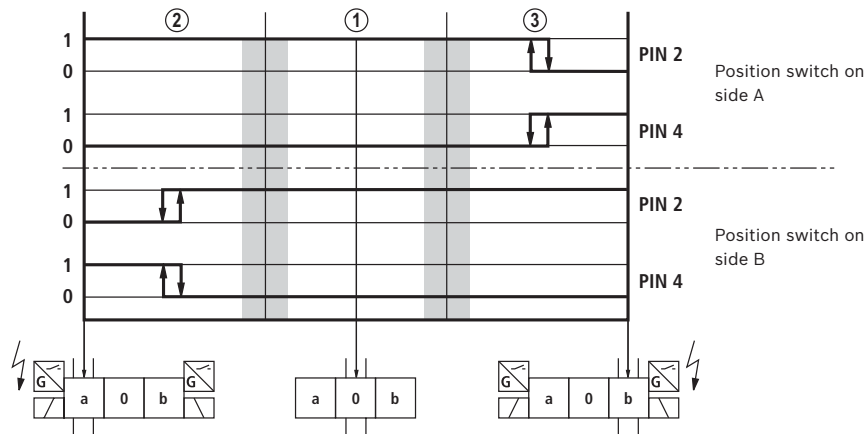
► For directional spool valves type WE (size 6 and 10)

Depending on the spool position to be monitored, the switching outputs have the following function:

Model QS0G24W (valves with 3 spool positions, e.g. symbols E, J, G, ...)
(proximity sensor on side A and B, monitored rest position)



Model QSABG24W (valves with 3 spool positions, e.g. symbols E, J, G, ...)
(proximity sensor on side A and B, monitored spool position "a" and "b")



- 0 Contacts open (0 V)
- 1 Contacts closed (24 V)

Overlap area/hydraulic symbol change

- ① Rest position
- ② Solenoid "a" switched
- ③ Solenoid "b" switched

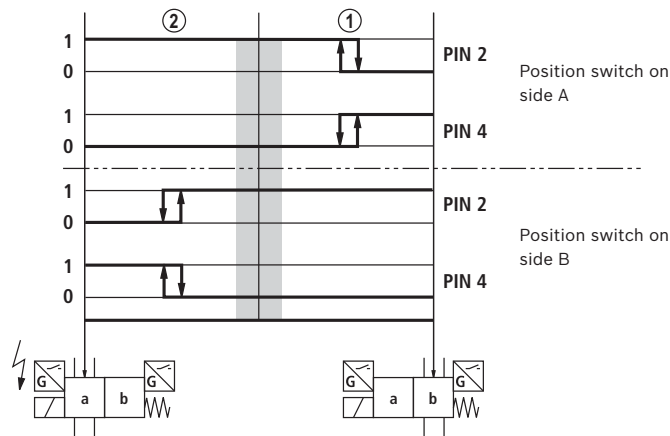
38/44 **Directional valves** | On/off valves with spool position monitoring

Inductive proximity sensor type QS: Switching logics

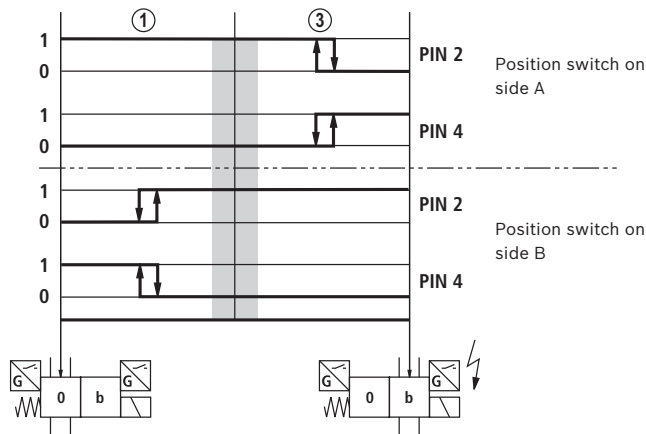
► For directional spool valves type WE (size 6 and 10)

Depending on the spool position to be monitored, the switching outputs have the following function:

Model QSABG24W (valves with 2 spool positions, e.g. symbols A, B, D, Y, ...)
(proximity sensor on side A and B, monitored spool position "a" and "b")



Model QS0BG24W (valves with 2 spool positions, e.g. symbols EB, ...)
(proximity sensor on side A and B, monitored spool position "0" and "b")



0 Contacts open (0 V)
1 Contacts closed (24 V)

Overlap area/hydraulic symbol change

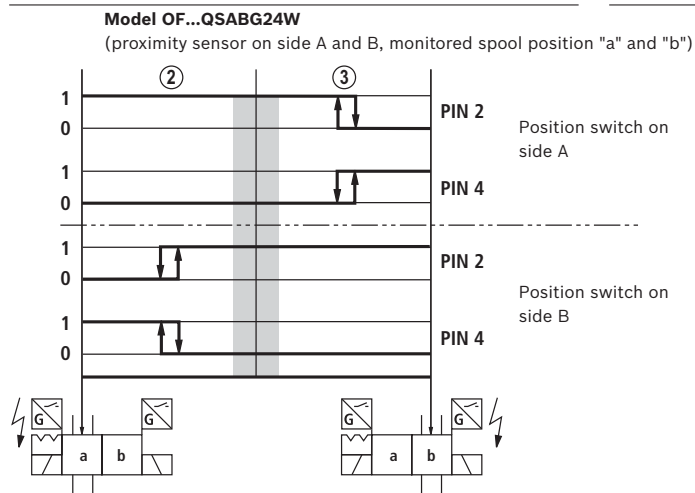
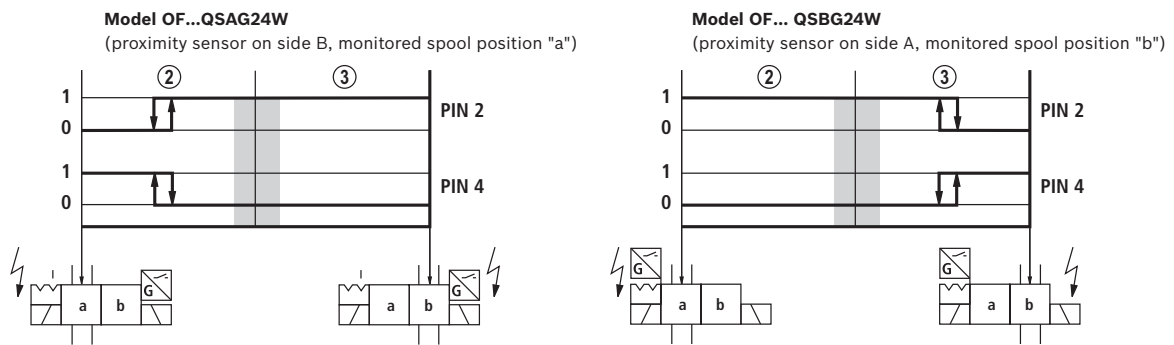
① Rest position
② Solenoid "a" switched
③ Solenoid "b" switched

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Inductive proximity sensor type QS: Switching logics

- For directional spool valves type WE (size 6 and 10)

Depending on the spool position to be monitored, the switching outputs have the following function:



- 0 Contacts open (0 V)
- 1 Contacts closed (24 V)

Overlap area/hydraulic symbol change

- ① Rest position
- ② Solenoid "a" switched
- ③ Solenoid "b" switched

40/44 **Directional valves** | On/off valves with spool position monitoring

Inductive proximity sensor type QS: Directional spool valves type WE
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11
	WE			/					/	...

Spool position monitoring

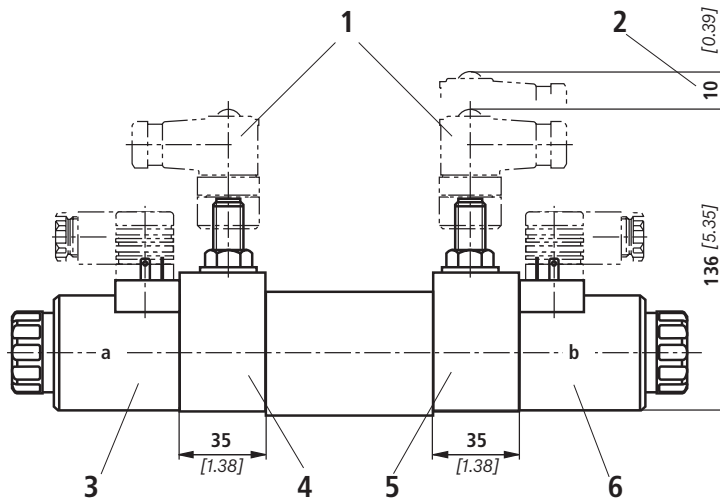
11	Without position switch	no code
	Monitored spool position "a"	QSAG24W
	Monitored spool position "b"	QSBG24W
	Monitored spool position "0"	QS0G24W
	Monitored spool position "0" and "a"	QS0AG24W
	Monitored spool position "0" and "b"	QS0BG24W
	Monitored spool position "a" and "b"	QSABG24W

Order example:

4WE 6 E6X/EG24K4QR0G24S/...

Complete ordering codes can be found on the basic data sheets:

Size 6	23178
--------	-------



- 1 Mating connector, material no. **R900082899** (order separately, see page 42)
- 2 Space required to remove the mating connector
- 3 Solenoid side "a"
- 4 Switch side "a"
- 5 Switch side "b"
- 6 Solenoid side "b"

Mounting options:

Monitored spool position	Ordering code	3-spool position valve with 2 solenoids		2-spool position valve .../O...; .../OF...	
		Switch side "a"	Switch side "b"	Switch side "a"	Switch side "b"
"a"	QSAG24W	-	X	-	X
"b"	QSBG24W	X	-	X	-
"0"	QS0G24W	X	X	-	-
"0" and "a"	QS0AG24W	X	X	-	-
"0" and "b"	QS0BG24W	X	X	-	-
"a" and "b"	QSABG24W	X	X	X	X

Pinout see page 34.
Switching logics see page 36 to 39.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

Inductive proximity sensor type QS: Directional spool valves type 5-.WE
(dimensions in mm [inch])

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	
	5	-		WE	10		-	5X	/		E			/				=		*

Spool position monitoring

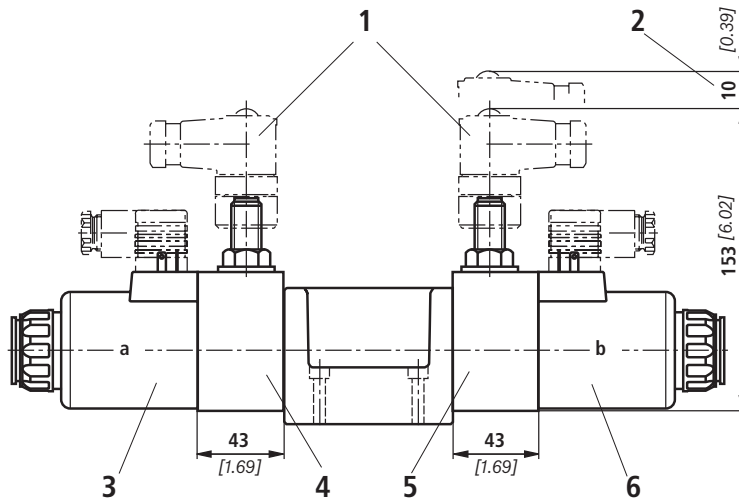
11	Without position switch	no code
	Monitored spool position "a"	QSAG24W
	Monitored spool position "b"	QSBG24W
	Monitored spool position "0"	QS0G24W
	Monitored spool position "0" and "a"	QS0AG24W
	Monitored spool position "0" and "b"	QS0BG24W
	Monitored spool position "a" and "b"	QSABG24W

Order example:

5-4WE 10 C5X/EG24N9K4QSAG24W/...

Complete ordering codes can be found on the basic data sheets:

23352



- 1 Mating connector, material no. **R900082899** (order separately, see page 42)
- 2 Space required to remove the mating connector
- 3 Solenoid side "a"
- 4 Switch side "a"
- 5 Switch side "b"
- 6 Solenoid side "b"

Mounting options:

Monitored spool position	Ordering code	3-spool position valve with 2 solenoids		2-spool position valve .../O...; .../OF...	
		Switch side "a"	Switch side "b"	Switch side "a"	Switch side "b"
"a"	QSAG24W	-	X	-	X
"b"	QSBG24W	X	-	X	-
"0"	QS0G24W	X	X	-	-
"0" and "a"	QS0AG24W	X	X	-	-
"0" and "b"	QS0BG24W	X	X	-	-
"a" and "b"	QSABG24W	X	X	X	X

Pinout see page 34.
Switching logics see page 36 to 39.

Notice!

The dimensions are nominal dimensions which are subject to tolerances.

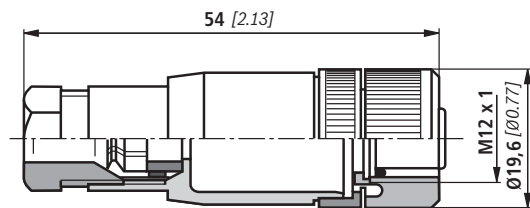
42/44 **Directional valves** | On/off valves with spool position monitoring

Mating connectors

(dimensions in mm [inch])

Mating connector suitable for K24 4-pole, M12 x 1 with screw connection, cable gland Pg 9.

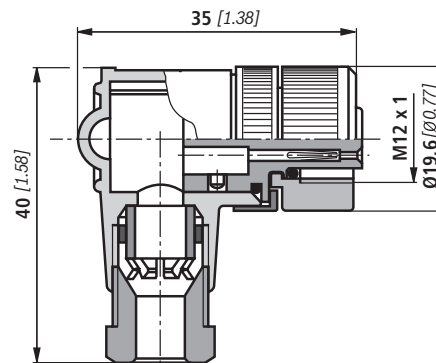
Material no. **R900031155**



Mating connector suitable for K24 4-pole, M12 x 1 with screw connection, cable gland Pg 9, angled.

Housing can be rotated by 4 x 90° in relation to the contact insert.

Material no. **R900082899**



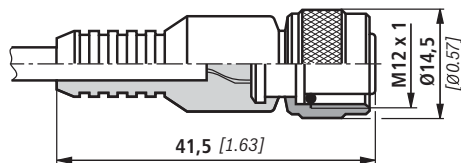
Mating connector suitable for K24-3m 4-pin, M12 x 1 with potted-in PVC cable, 3 m long.

Line cross-section: 4 x 0.34 mm²

Core marking:

1	Brown
2	White
3	Blue
4	Black

Material no. **R900064381**



For more information refer to data sheet 08006.

More information

- ▶ Mineral oil-based hydraulic fluids
- ▶ Reliability characteristics according to EN ISO 13849
- ▶ General product information on hydraulic products
- ▶ Installation, commissioning and maintenance of industrial valves
- ▶ Hydraulic valves for industrial applications
- ▶ Selection of the filters

Data sheet 90220
Data sheet 08012
Data sheet 07008
Data sheet 07300
Data sheet 07600-B
www.boschrexroth.com/filter

44/44 **Directional valves** | On/off valves with spool position monitoring

Notes

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