

	Page
2.1 4/3, 4/2 and 3/2 directional valve with mechanical, manual operation, type WMD 6...L6X	0073-0078
2.2 4/3, 4/2 and 3/2 directional valve with mechanical, manual operation, type WMD10...L3X	0079-0084
2.3 4/3, 4/2 and 3/2 directional valve with mechanical, manual operation, type WMM6...L6X	0085-0090
2.4 4/3, 4/2 directional valve with mechanical, manual operation, type WMM10...L4X	0091-0096
2.5 4/3, and 4/2 directional valve with mechanical, manual operation, type WMM16, 25 and 32	0097-0106
2.6 4/3, 4/2 and 3/2 directional valve with mechanical, manual operation, types WMR(U)6...L6X	0107-0112
2.7 4/3, 4/2 and 3/2 directional valve with mechanical, manual operation, types WMR(U)10...L3X	0113-0118
2.8 4/3, 4/2 and 3/2 directional valve with fluidic operation, type WH6...L6X	0119-0124
2.9 4/3, 4/2 and 3/2 directional valve with fluidic operation, type WHD10...L3X	0125-0130
2.10 4/3, 4/2 and 3/2 directional valve with wet-pin AC or DC solenoid, type WE6...L6X	0131-0140
2.11 4/3, 4/2 and 3/2 directional valve with wet-pin AC or DC solenoid, type WE10...L3X	0141-0148
2.12 4/3, 4/2 and 3/2 directional valve with wet-pin AC or DC solenoid, type WE10...L5X	0149-0156
2.13 4/3, 4/2 and 3/2 directional valves of pilot operated, type WEH10,16,25 and 32	0157-0182
2.14 4/3, 4/2 and 3/2 directional valves with fluidic operation, type WH10,16,25 and 32	0183-0186
2.15 4/2 way isolator valve, type Z4WE6...L3X	0187-0192
2.16 4/3, 4/2 and 3/2 explosion-proof solenoid directional valve, type G...WE6...L6X	0193-0198
2.17 4/3, 4/2 and 3/2 explosion-proof directional valve, type G...WE10...L3X	0199-0204
2.18 4/3, 4/2 and 3/2 explosion-proof electro-hydraulic reversing valve, type GWEH10,16,25.../6B2	0205-0228
2.19 3/2 and 4/2 directional poppet valve with solenoid actuation, type M-SED6...L1X	0229-0236
2.20 3/2 and 4/2 directional poppet valve with solenoid actuation, type M-SED10...L1X	0237-0244
2.21 2/2, 3/2 and 4/2 directional poppet valve with solenoid actuation, type M-SEW6...L3X	0245-0252
2.22 2/2, 3/2 and 4/2 directional poppet valve with solenoid actuation, type M-SEW10...L1X	0253-0260

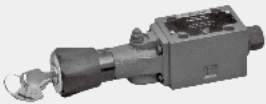


4/3, 4/2 and 3/2 directional valve with mechanical, manual operation

2.1

Type WMD6...L6X

Size 6
Up to 315 bar
Up to 60L/min



Contents

Function and configuration	02
Ordering code	02
Symbols	03
Technical data	03
Characteristic curves	04
Operating limitation	04
Unit dimensions	05

Features

- Direct operated directional spool valve
- Sub-plate mounting
- Rotary knob with or without lock
- 45 versions standard spool
- Porting pattern confirms to DIN 24 340 form A and ISO 4401

Function and configurations

Directional valves type WMD... are mechanical, manual operated directional spool valves. They control the start, stop and direction of a flow.

The rotary knob (2) operates ($2 \times 90^\circ$) the spool (1), the screw type rotation transforms into axial movement and direct acts on the spool (1). Then the spool (1) moves to the end position and gets the opening position as required.

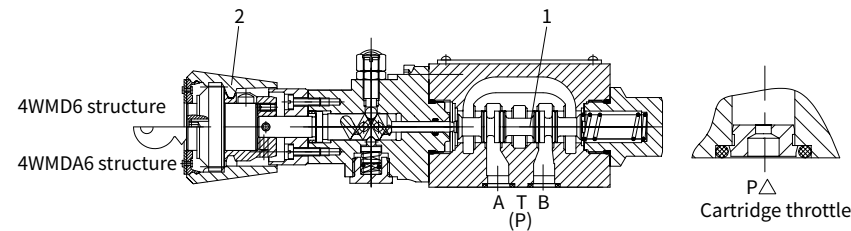
Actual switch position of spool (1) can be controlled with rotary knob (2). All the switch

positions can be orientated by locating device.

Throttle

The use of a throttle insert is required, when, operating, flows can occur during the switching processes that exceed the performance limit of the valve.

These throttles are to be inserted into the P-channel of the directional valve.



Ordering code

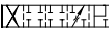
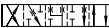
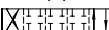
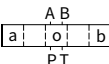
	WMD	6	- L6X / F	*
3 ways (version A) =3 4 ways =4				Further details in clear text
Rotary knob				No code = NBR seals V = FKM seals
Without lock =No code With lock = A				No code = Without cartridge throttle B08 = Throttle - $\Phi 0.8$ mm B10 = Throttle - $\Phi 1.0$ mm B12 = Throttle - $\Phi 1.2$ mm
Nominal size 6 =6				F = With detent
Symbols e.g. C, E, EA, EB etc. see below				
Series L60 to L69 (L60 to L69:unchanged installation and connection dimensions)			=L6X	

Symbols

Transition position



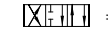
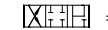
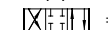
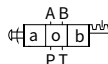
Transition position



Spool valve symbols



Spool valve symbols



=A (Port T as drain port)

=C

=D

=E

=F

=G

=H

=J

=L

=M

=P

=Q

=R

=T

=U

=V

=W

Transition position



Spool valve symbols



=EA

=FA

=GA

=HA

=JA

=LA

=MA

=PA

=QA

=RA

=TA

=UA

=VA

=WA

Transition position



Spool valve symbols



=EB

=FB

=GB

=HB

=JB

=LB

=MB

=PB

=QB

=RB

=TB

=UB

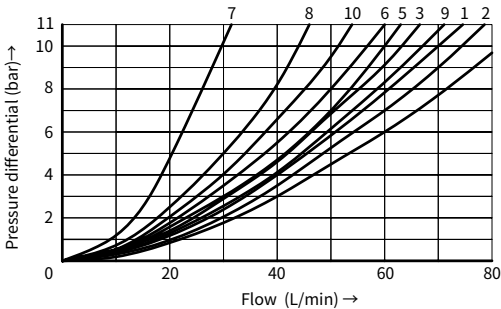
=VB

=WB

Technical data

Fluid temperature range		°C	-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Max. operating pressure	Port A,B,P	bar	315
	Port T	bar	160
Max. flow-rate		L/min	60
Flow cross section (switching neutral position)	Type Q	mm ²	for symbol Q 6% of nominal cross section
	Type W	mm ²	for symbol W 3% of nominal cross section
Fluid			Mineral oil, Phosphate ester
Viscosity range		mm ² /s	2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406
Weight		kg	1.5

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



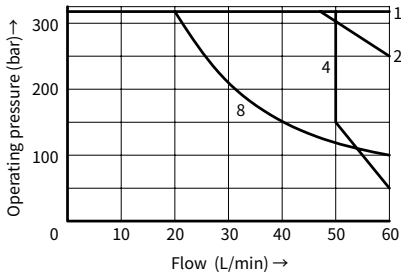
- 7 Symbol "R" in switched positions B → A
- 8 Symbol "G" and "T" in neutral position P → T
- 9 Symbol "H" in neutral position P → T

Spool symbols	Flow direction			
	P to A	P to B	A to T	B to T
AB	3	3	-	-
C	1	1	3	1
DY	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
JQ	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	-
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

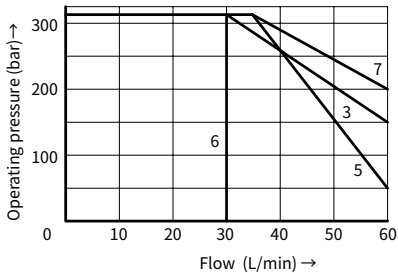
Operating limitations

The switching performance of the valves depends on the filtration. In order to achieve the specified admissible flow values, we recommend full flow filtration with 25 μm . The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table).

If only one flow direction is available, in certain cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).



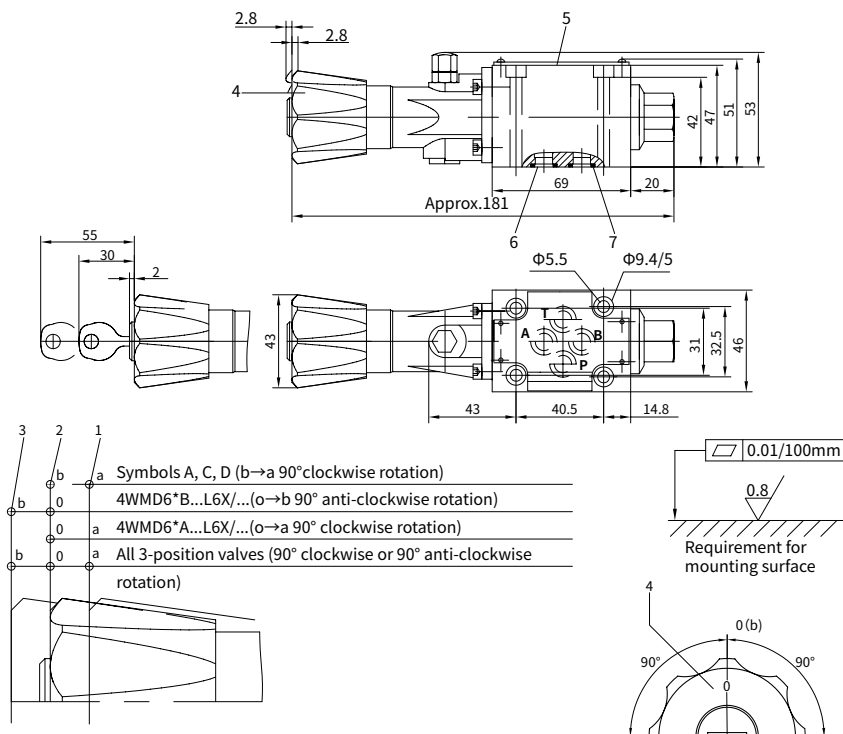
Curve	Spool symbol
1	E,M,H,C,D,Y,Q,U,W
2	J,L
4	G,P
8	T



Curve	Spool symbol
3	A,B
5	F
6	V
7	R

Unit dimensions

(Dimensions in mm)



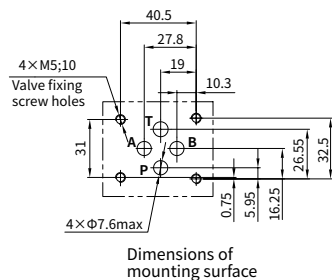
- 1 Switched position b → a, o → a
- 2 Switched position a → b, a → o, b → o
- 3 Switched position o → b
- 4 3-position valve (including spool *A and *B):
Switched position b
Operating valve 90° clockwise and 90° anti-clockwise
2-position valve (spool A, C, D):
Switched position b. Operating valve 90° clockwise
- 5 Nameplate
- 6 Fixing surface
- 7 O-ring 9.25 × 1.78 for ports A, B, P and T

**It must be ordered separately,
if connection plate is needed.**

Type: G 341/01 (G 1/4), G 341/02 (M14 × 1.5)
G 342/01 (G 3/8), G 342/02 (M18 × 1.5)
G 502/01 (G 1/2), G 502/02 (M22 × 1.5)

Valve fixing screws:

Internal hexagon screw
M5 × 50 GB/T 70.1-10.9
Tightening torque $M_A = 9\text{Nm}$
must be ordered separately



China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.

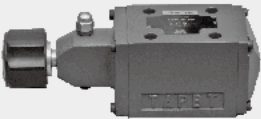


4/3, 4/2 and 3/2 directional valve with mechanical, manual operation

2.2

Type WMD10...L3X

Size 10
Up to 315 bar
Up to 120L/min



Contents

Function and configuration	02
Ordering code	02
Symbols	03
Technical data	03
Characteristic curves	04
Operating limitation	04
Unit dimensions	05

Features

- Direct operated directional spool valves with mechanical, manual operation
- For sub-plates mounting
- Rotary knob with or without lock
- 45 kinds standard spools, optional
- Porting pattern confirms to DIN 24 340 form A and ISO 4401

Function and configurations

Directional valves type WMD... are mechanical, manual operated directional spool valves. They control the start, stop and direction of a flow.

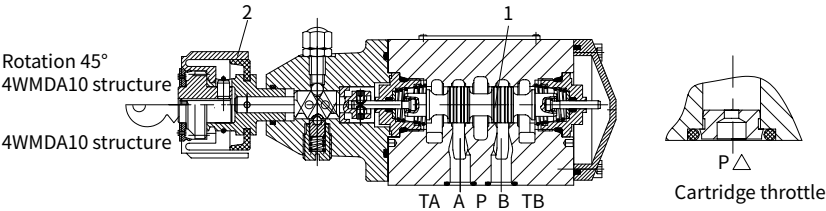
The rotary knob (2) operates ($2 \times 90^\circ$) the spool(1), the screw type rotation transforms into axial movement and direct acts on the spool(1). Then the spool (1) moves to the end position and gets the opening position as required.

Actual switch position of spool (1) can be controlled with rotary knob (2). All the switch positions can be orientated by locating device.

Cartridge throttle

The use of a throttle insert is required, when operating, flows can occur during the switching processes that exceed the performance limit of the valve.

These throttles are to be inserted into the P-channel of the directional valve.



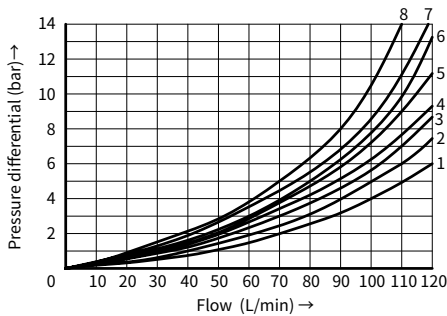
Ordering code

	WMD	10	-	L3X	/	F		*
3 ways(version A)	=3							Further details in clear text
4 ways	=4							No code = NBR seals
Rotary knob								V = FKM seals
Without lock	=No code							No code = Without cartridge throttle
With lock	= A							B08 = Throttle - $\Phi 0.8$ mm
Nominal size 10	=10							B10 = Throttle - $\Phi 1.0$ mm
Symbols e.g. C, E, EA, EB etc. see below								B12 = Throttle - $\Phi 1.2$ mm
Series L30 to L39				=L3X			F =	With detent
(L30 to L39: unchanged installation and connection dimensions)								

Symbols

Transition position	Spool valve symbols	Transition position	Spool valve symbols	Transition position	Spool valve symbols
AB	AB	AB	AB	AB	AB
PT	PT	PT	PT	PT	PT

Characteristic curves (Measured at $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



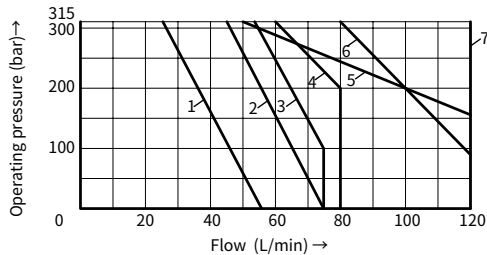
8 Symbols "G" and "T" in mid position(P → T)
8 Symbol "R" in position b (A → B)

Spool symbol	Flow direction			
	P to A	P to B	A to T	B to T
A	4	3	-	-
B	3	4	-	-
C	3	3	4	4
D	3	3	5	5
E	2	2	4	4
F	1	2	3	4
G,T	4	4	7	7
H	1	1	5	5
J	2	2	3	3
L	3	3	2	4
M	1	1	4	4
P	3	1	5	5
Q	2	2	2	2
R	3	4	3	-
U	3	3	5	2
V	2	2	3	3
W	3	3	3	3
Y	4	4	6	6

Operating limitation

The switching performance of the valves depends on the filtration. In order to achieve the specified admissible flow values, we recommend full flow filtration with 25 μm . The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table).

If only one flow direction is available, in certain cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).



Curve	Spool symbols
1	A,B
2	A/O
3	H
4	F,G,P,R,T
5	J,L,Q,U,W
6	C,D,E,M,V,Y
7	C/O,C/OF D/O,D/OF

Unit dimensions

(Dimensions in mm)

Valve fixing screws:

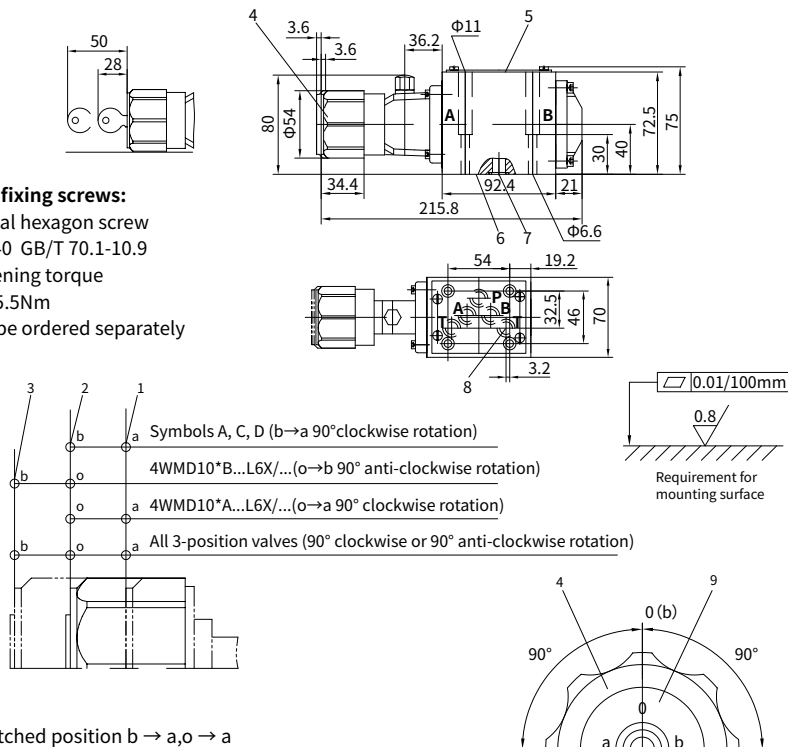
Internal hexagon screw

M6×40 GB/T 70.1-10.9

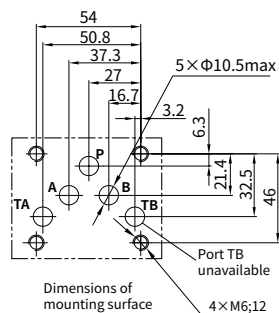
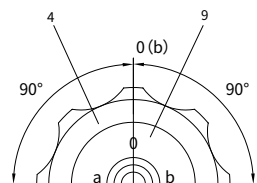
Tightening torque

 $M_A = 15.5 \text{ Nm}$

must be ordered separately



- 1 Switched position $b \rightarrow a, o \rightarrow a$
- 2 Switched position $a \rightarrow b, a \rightarrow o, b \rightarrow o$
- 3 Switched position $o \rightarrow b$
- 4 3-position valve (including spool *A and *B):
Switched position b
Operating valve 90° clockwise and 90° anti-clockwise
2-position valve (spool A, C, D): Operating valve 90° clockwise
- 5 Nameplate
- 6 Fixing surface
- 7 O-ring 12×2 for ports A, B, P and T
- 8 Additional return port when using control block
- 9 Observe the spool position through the colorful disc in the front of the rotary knob



It must be ordered separately if connection plate is needed.

Type:

G 66/01 (G 3/8), G 66/02 (M18×1.5)

G 67/01 (G 1/2), G 67/02 (M22×1.5)

G 534/01 (G 3/4), G 534/02 (M27×2)

China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.

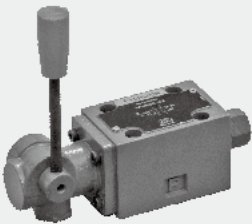


4/3, 4/2 and 3/2 directional valve with mechanical, manual operation

2.3

Type WMM6...L6X

Size 6
Up to 315 bar
Up to 60L/min



Contents

Function and configuration	02
Ordering code	03
Symbols	03
Technical data	04
Characteristic curves	04
Operating limitation	05
Unit dimensions	06

Features

- Direct operating directional spool valves
- For sub-plates mounting
- Hand lever
- Porting pattern confirms to DIN 24 340 form A, and ISO 4401

Function and configurations

Directional Valves with Mechanical and Manual Operation type WMM6...L6X, are direct operated spool valves which switch the flow fluid by rotating the handle to move the spool axially. They have 2-position, 3-position as well as various spool symbols, optional detent or return spring. And they are sub-plate mounting.

Type WWM.../

It consists of housing (1), hand lever (2), control spool (3), one or two return springs (4) and push rod (5). In the non-operated condition the control spool (3) is held in the neutral or starting position by the return springs (4). When the hand lever (2) is pushed to right or left, the hand lever (2) acts at the push rod (5) by hinge and direct controls the spool (3), at that time, the spool (3) moves to an expected position. When the handle returns to Zero position, spool returns to normal position by return spring. The switched position is operated by the hand lever.

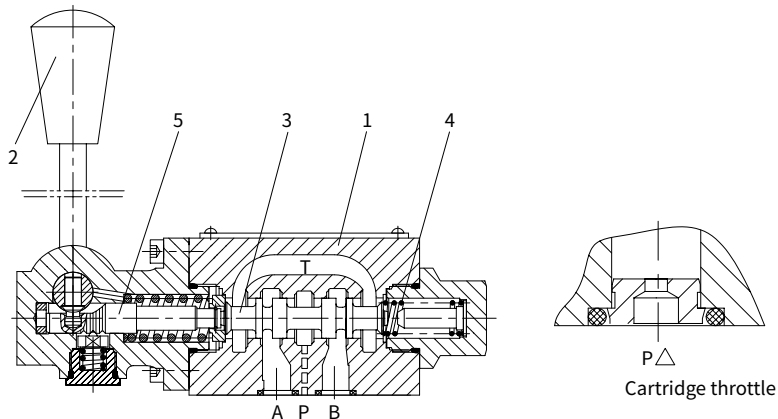
Type WWM.../F

Their operating principle is basically same as the type WWM.../, and they are fitted with 2 or 3 switched positions and a detent, so all the switched positions are fixed.

Cartridge throttle

The use of a throttle insert is required, when, due to given operating conditions, flows can occur during the switching processes that exceed the performance limit of the valve.

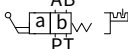
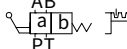
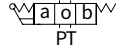
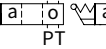
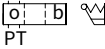
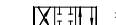
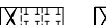
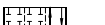
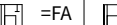
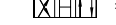
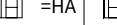
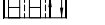
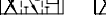
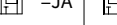
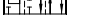
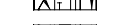
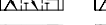
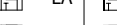
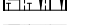
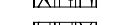
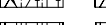
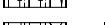
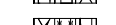
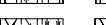
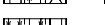
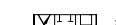
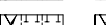
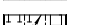
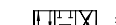
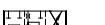
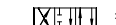
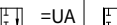
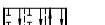
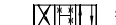
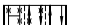
These throttles are to be inserted into the P-channel of the directional valve.



Ordering code

	WMM	6		L6X			*
3 ways (version A and B)	=3						Further details in clear text
4 ways	=4						No code = NBR seals V = FKM seals
Handle operation							No code = Without cartridge throttle B08 = Throttle - Φ 0.8 mm B10 = Throttle - Φ 1.0 mm B12 = Throttle - Φ 1.2 mm
Nominal size 6	=6						No code = Return spring F = With detent
Symbols e.g. C, E, EA, EB etc. see below							
Series L60 to L69	=L6X						
(L60 to L69:unchanged installation and connection dimensions)							

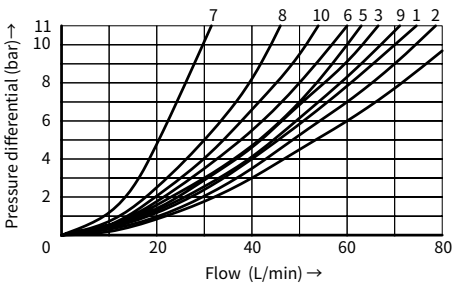
Symbols

Transition position	Spool valve symbols	Transition position	Spool valve symbols		
 PT	 PT	 PT	 PT		
	 =A (Port T as drain port)		 =B (Port T as drain port)		
	 =C		 =Y		
	 =D				
Transition position	Spool valve symbols	Transition position	Spool valve symbols	Transition position	Spool valve symbols
 PT	 PT	 PT	 PT	 PT	 PT
	 =E		 =EA		 =EB
	 =F		 =FA		 =FB
	 =G		 =GA		 =GB
	 =H		 =HA		 =HB
	 =J		 =JA		 =JB
	 =L		 =LA		 =LB
	 =M		 =MA		 =MB
	 =P		 =PA		 =PB
	 =Q		 =QA		 =QB
	 =R		 =RA		 =RB
	 =T		 =TA		 =TB
	 =U		 =UA		 =UB
	 =V		 =VA		 =VB
	=W		=WA		=WB

Technical data

Fixing position			Optional
Fluid temperature range			-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Max.operating pressure	Port A,B,P	bar	315
	Port T	bar	160
Max. flow-rate			L/min 60
Flow cross section (switching neutral position)	Type Q	mm ²	For symbol Q 6% of nominal cross section
	Type W	mm ²	For symbol W 3% of nominal cross section
Fluid			Mineral oil for NBR and FKM seal
			Phosphate ester for FKM seal
Viscosity range			mm ² /s 2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406
Weight			kg 1.6

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



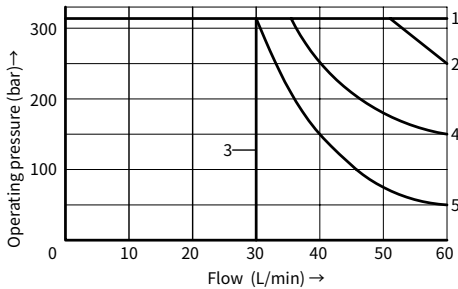
- 7 Symbol "R" in switched positions B → A
- 8 Symbol "G" and "T" in neutral position P → T
- 9 Symbol "H" in neutral position P → T

Spool symbol	Flow direction			
	P to A	P toB	A toT	B toT
AB	3	3	-	-
C	1	1	3	1
D Y	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	-
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

Operating limitations

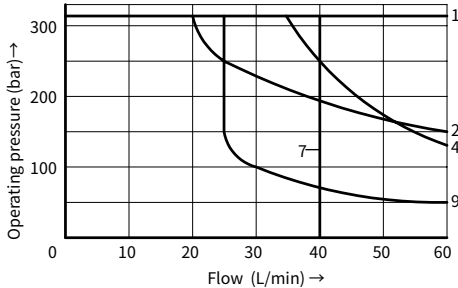
The switching function of the valves depends on the filtration. To achieve the specified admissible flow values, we recommend full flow filtration with 25 µm. The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table). If only one flow direction is available, in certain cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).

Without detent

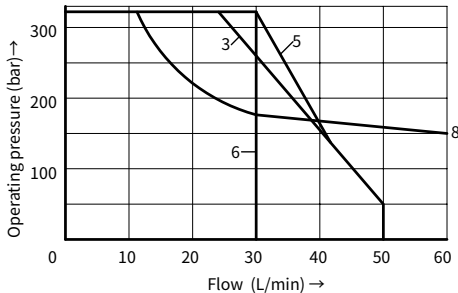


Curve		Spool symbol
Without detent	1	M E,J L,Q,U,W C,D,Y,G H,R
	2	A,B
	3	V
	4	F,P
	5	T

With detent

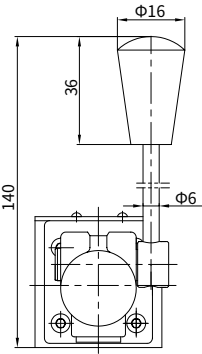
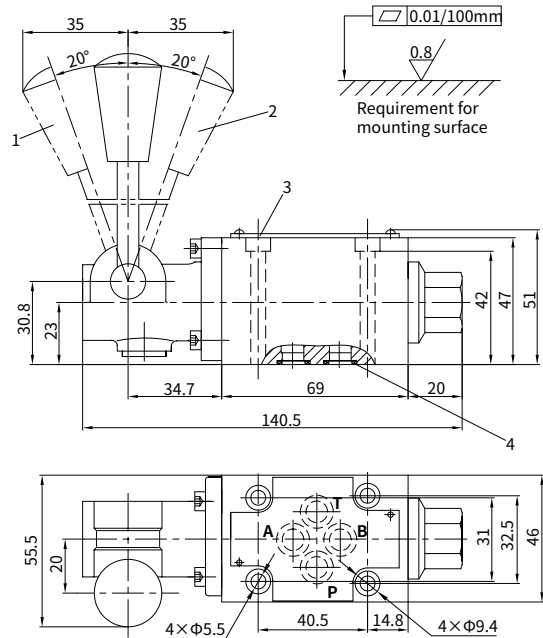


Curve		Spool symbol
With detent	1	M H,C D,Y
	2	E,J,Q,L U,W
	3	A,B
	4	G,T
	5	F
	6	V
	7	P
	8	R
	9	T



Unit dimensions

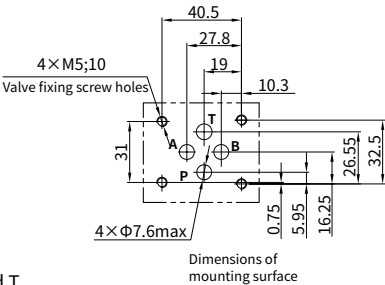
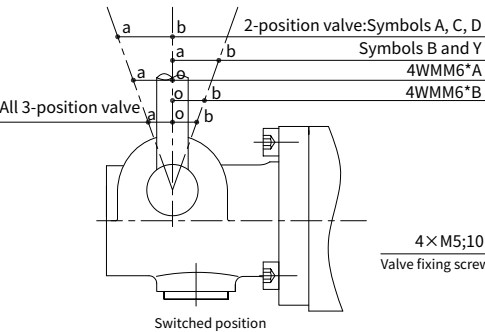
(Dimensions in mm)



Valve fixing screws:
M5×50 GB/T 70.1-10.9,
Tightening torque $M_A=9\text{ Nm}$
must be ordered separately

**It must be ordered separately
if connection plate is needed.**

Type :
G341/01(G1/4), G341/02 (M14×1.5)
G342/01(G3/8), G342/02 (M18×1.5)
G502/01(G1/2), G502/02 (M22×1.5)



- 1 Switched position $b \rightarrow a, o \rightarrow a$
- 2 Switched position $a \rightarrow b, o \rightarrow b$
- 3 Nameplate
- 4 O-ring 9.25×1.78 for ports A, B, P and T



4/3, 4/2 and 3/2 directional valve with mechanical, manual operation

2.4

Type WMM10...L4X

Size 10
Up to 315 bar
Up to 120L/min



Contents

Function and configurations	02
Ordering code	03
Symbols	03
Technical data	04
Characteristic curves	04
Operating limitations	04
Unit dimensions	05

Features

- Direct operating directional spool valves with mechanical, manual operation
- For sub-plates mounting
- Hand lever
- Porting pattern confirms to DIN 24 340 form A, and ISO 4401

Function and configurations

Directional Valves with Mechanical and Manual Operation type WMM10...L4X, are the second generation of our series 10 valves, and are direct operated spool valves which switch the flow fluid by rotating the handle to move the spool axially. They have 2-position, 3-position as well as various spool symbols, optional detent device and return spring. And they are sub-plate mounting.

Type WMM.../

These valves consist of a housing (1), hand lever (2), the control spool (3), one or two return springs (4), and a push rod (5).

In the unoperated condition the control spool (3) is held in the neutral or starting position by the return springs (4). When the hand lever (2) is pushed to right or left, the hand lever (2) acts at the push rod (5) by hinge and direct controls the spool (3), at that time, the spool (3) moves to an expected position. When the handle returns to Zero position, spool returns to normal position by return spring. The switched position is operated by the handle.

Type WMM.../F

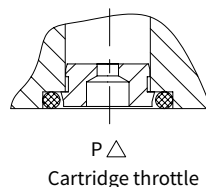
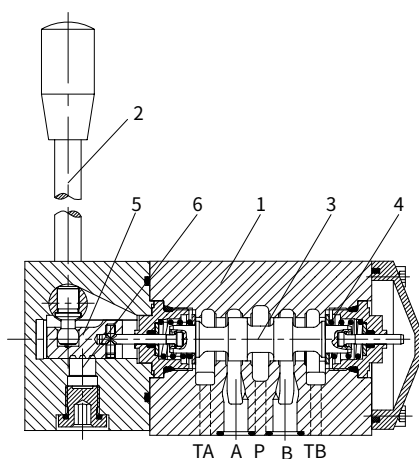
Their operating principle is the same as the type WMM.../, and they are fitted with 2 or 3 switched positions and a detent (6), so all the switched position is fixed.

Cartridge throttle

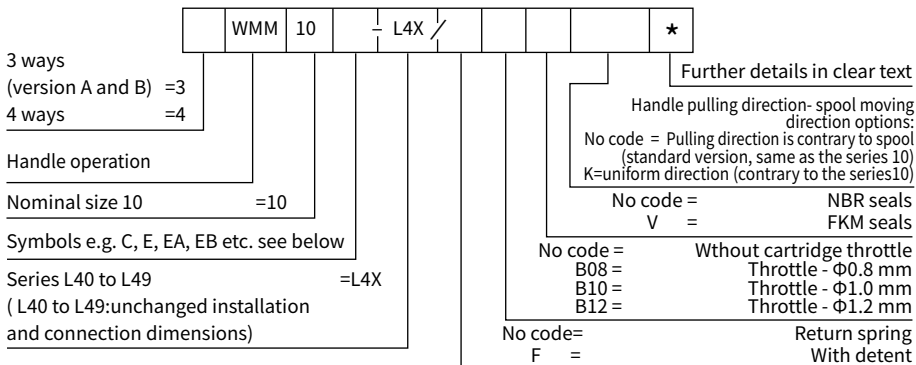
The use of a throttle insert is required, when, operating, flows can occur during the switching processes that exceed the performance limit of the valve.

These throttles are to be inserted into the P-channel of the directional valve.

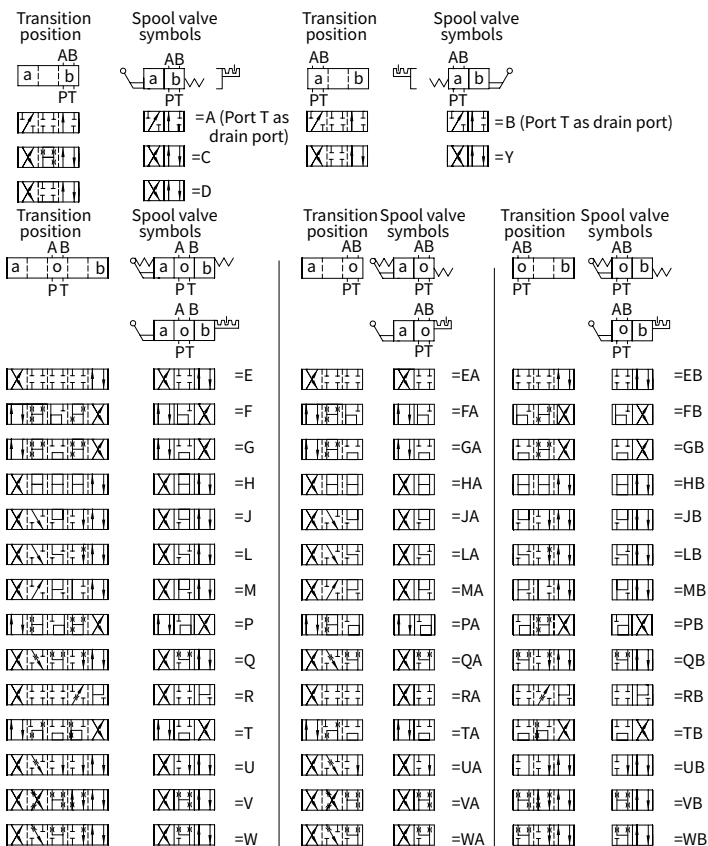
Directional valves type WMM10...L4X have two handles options with different pulling direction, the detail refer to the 'Ordering code' and 'Unit dimensions'.



Ordering code



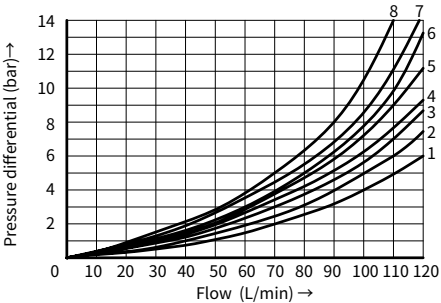
Symbols



Technical data

Fluid temperature range		°C	-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Max. operating pressure	Port A,B,P	bar	315
	Port T	bar	160
Max. flow-rate		L/min	120
Flow cross section (switching neutral position)	Type V	mm ²	For symbol V 11(A/B to T) 10.3(P to A/B)
	Type W	mm ²	For symbol W 2.5(A/B to T)
	Type Q	mm ²	For symbol Q 5.5(A/B to T)
Fluid			Mineral oil suitable for NBR and FKM seal
			Phosphate ester for FKM seal
Viscosity range		mm ² /s	2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406
Weight		kg	4.4

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



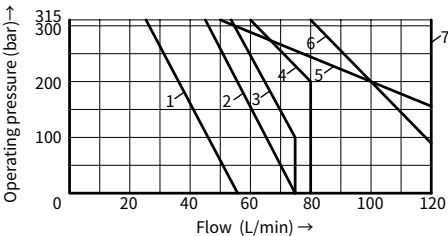
Spool symbol	Flow direction				Spool symbol	Flow direction			
	P to A	P to B	A to T	B to T		P to A	P to B	A to T	B to T
A	4	3	-	-	L	3	3	2	4
B	3	4	-	-	M	1	1	4	4
C	3	3	4	4	P	3	1	5	5
D	3	3	5	5	Q	2	2	2	2
E	2	2	4	4	R	3	4	3	-
F	1	2	3	4	U	3	3	5	2
G,T	4	4	7	7	V	2	2	3	3
H	1	1	5	5	W	3	3	3	3
J	2	2	3	3	Y	4	4	6	6

8 Symbols "G" and "T" in neutral position (P → T)
8 Symbol "R" in position (A → B)

Operating limitations

The switching performance of the valves depends on the filtration. To achieve the specified flow values, we recommend full flow filtration with 25 µm. The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table).

If only one flow direction is available, in certain cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).

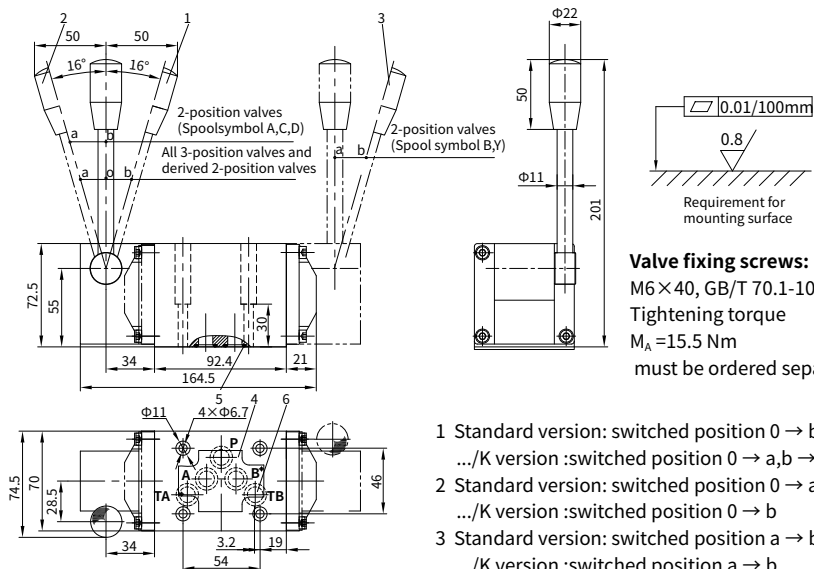


Curve	Spool symbol
1	A,B
2	A/O
3	H
4	F,G,P,R,T
5	J,L,Q,U,W
6	C,D,E,M,V,Y
7	C/O,C/OF,D/O,D/OF

Unit dimensions

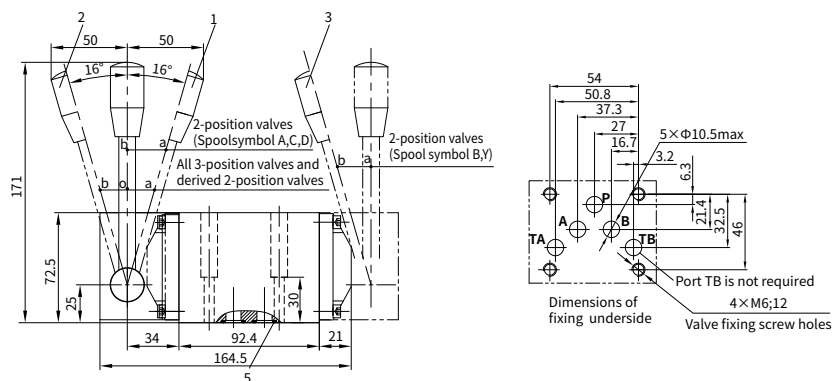
(Dimensions in mm)

WMM10...-L4X...(Standard version)



- 1 Standard version: switched position 0 → b
.../K version :switched position 0 → a,b → a
- 2 Standard version: switched position 0 → a,b → a
.../K version :switched position 0 → b
- 3 Standard version: switched position a → b
.../K version :switched position a → b
- 4 Nameplate
- 5 O-ring 12×2, for ports A, B, P, TA and TB
- 6 Additional return port when using control block

WMM10...-L4X... K (K version)



It must be ordered separately,if connection plate is needed.

Type: G 66/01 (G 3/8), G 66/02(M18×1.5)

G 67/01 (G 1/2), G 67/02(M22×1.5)

G 534/01(G 3/4), G 534/02(M27×2)

China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.

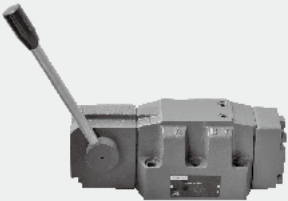


4/3, and 4/2 directional valve with mechanical, manual operation

2.5

Type WMM16, 25 and 32

Size 16 , 25 and 32
Up to 315bar
Up to 1100L/min



Contents

Function and configurations	02
Ordering code	03
Technical data	03
Symbols	04-05
Characteristic curves	06-07
Unit dimensions	08-10

Features

- Direct operating directional spool valves with mechanical,manual operation
- For sub-plates mounting
- Hand lever
- Porting pattern confirms to DIN 24 340 form A, and ISO 4401

Function and configurations

The type WMM valves are hand lever operation directional spool valves. They control the start, stop and direction of a flow.

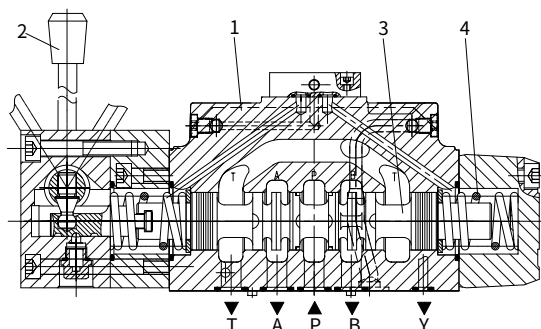
The directional valves basically comprise of a housing (1), hand lever (2), control spool (3), as well as one or two return springs (4).

In the unoperated condition the control spool (3) is held in the neutral or its initial position by the return springs (4). The control spool (3) is actuated by the hand lever (2) via a joint and a pin. The spool is thereby moved out of its initial position into switched position.

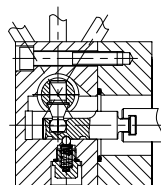
After the hand lever(2) has been returned to the zero switched position , the spool (3) is returned to the neutral position via the return springs (4).

4WMM.../F... (With the detent)

The directional valves with one detect , 2 or 3 switched position , can be orientated at any switched position.



Type 4WMM...L7X



Type 4WMM...L7X/F
(with detent)

Ordering code

4

WMM

L7X

★

4 ways

= 4

Nominal size 16

=16

Nominal size 25

=25

Nominal size 32

=32

Symbols e.g. C, E etc.

see below

Further details in clear text

No code =

V =

NBR seals

FKM seals

No code =

F =

Return spring

With detent

L7X =

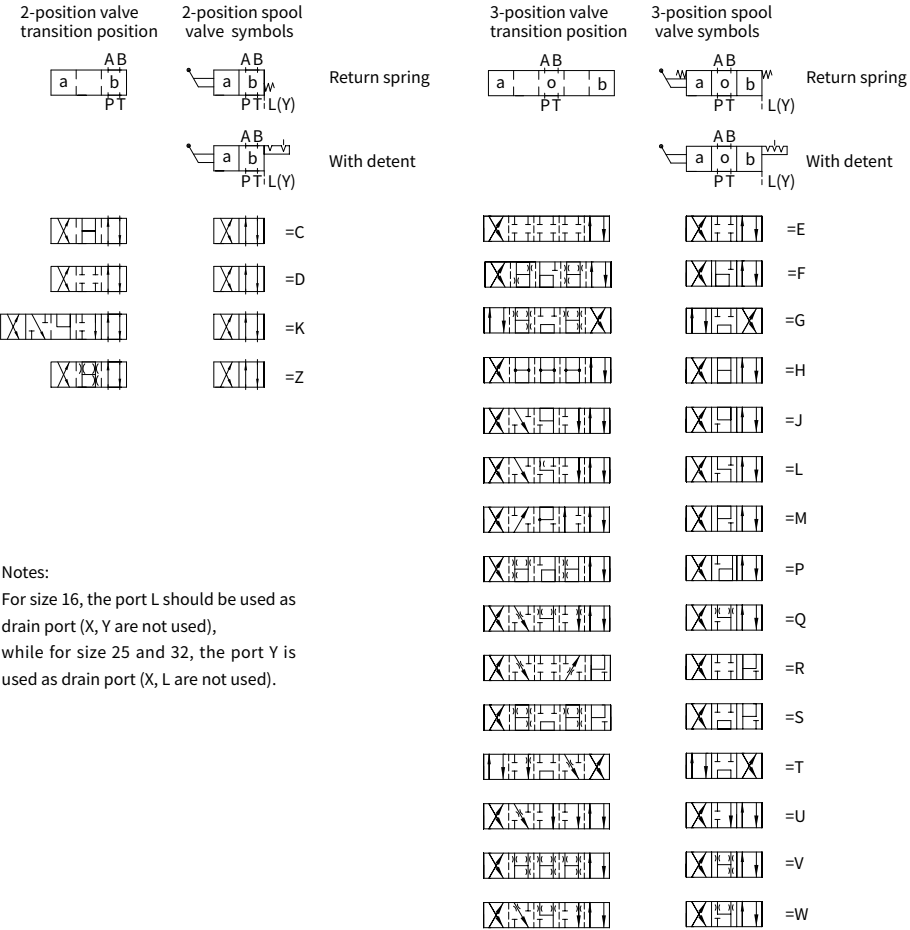
(L70 to L79: unchanged installation and connection dimensions)

Series L70 to L79

Technical data

Nominal size		16	25	32
Weight	kg	Approx.8	Approx.12.2	Approx.49
Actuation force -with spring return	N	Approx.75	Approx.105	Approx.170
-with detent	N	Approx.75	Approx.105	Approx.170
Actuation angle about the neutral postion	°	2×26°	2×32°	2×30°
Max.operating pressure port A,B,P	bar	315		
Port T	bar	250		
Fluid		Mineral oil suitable for NBR and FKM seal		
		Phosphate ester for FKM seal		
Fluid temperature range	°C	-30 to +80 (NBR seal)		
		-20 to +80 (FKM seal)		
Viscosity range	mm ² /s	2.8 to 380		
Degree of contamination		Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406		

Symbols



Notes:

For size 16, the port L should be used as drain port (X, Y are not used), while for size 25 and 32, the port Y is used as drain port (X, L are not used).

Example:

Three-position E-type can derive two-position EA and EB.

Symbols

Three-position can derive two-position(*A/*B)
Return spring and with detent

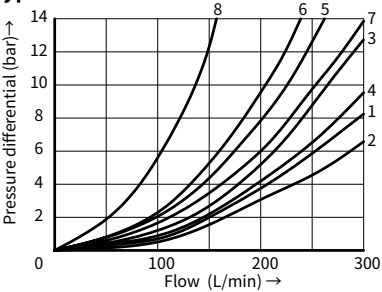
Transition position	Spool valve symbols		Transition position	Spool valve symbols	
		Return spring			Return spring
		With detent			With detent
		=EA			=EB
		=FA			=FB
		=GA			=GB
		=HA			=HB
		=JA			=JB
		=LA			=LB
		=MA			=MB
		=PA			=PB
		=QA			=QB
		=RA			=RB
		=SA			=SB
		=TA			=TB
		=UA			=UB
		=VA			=VB
		=WA			=WB

Notes:

For size 16, the port L should be used as drain port (X, Y are not used), while for size 25 and 32, the port Y is used as drain port (X, L are not used).

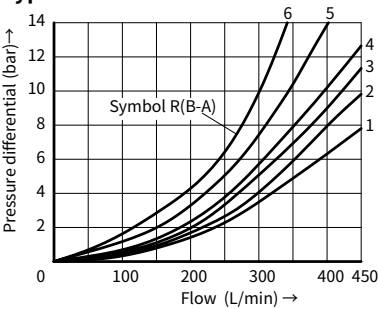
Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

Type 4MM16...



Spool symbol	Flow direction				
	P to A	P to B	A to T	B to T	P to T
E, Y, D	1	1	1	3	-
F	2	2	3	3	-
G, F	5	1	3	7	6
H, C, Q	2	2	3	3	-
J, K, L	1	1	3	3	-
M, W	2	2	4	3	-
R	2	2	4	-	-
U	1	1	4	7	-
S	4	4	4	-	8

Type 4MM25...

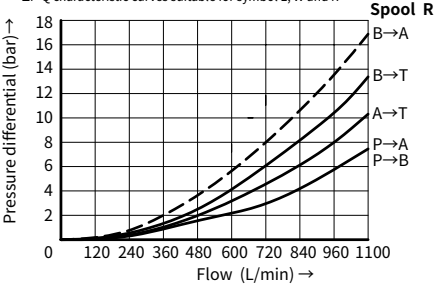


Spool symbol	Flow direction				
	P to A	P to B	A to T	B to T	P to T
E	2	2	1	4	-
F	1	2	1	2	4
G	2	2	2	4	6
H	2	2	1	3	2
J	2	2	1	3	-
L	2	2	1	2	-
M	2	2	1	4	-
P	2	2	1	4	6
Q	2	2	1	4	-
R	1	2	1	-	-
T	2	2	2	4	5
U	2	2	1	4	-
V	2	2	1	4	-
W	2	2	1	3	-

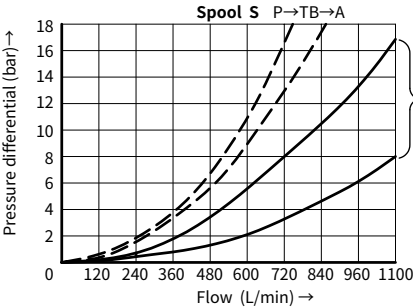
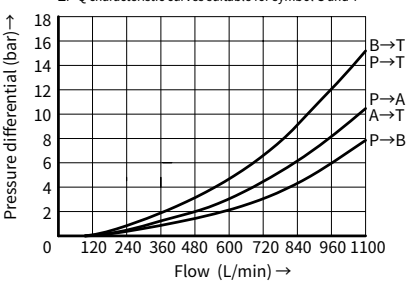
4 spools L neutral position A - T
6 spools U neutral position B - T

Type 4MM32...

ΔP -Q characteristic curves suitable for symbol E, W and R



ΔP -Q characteristic curves suitable for symbol G and T



Others symbols' characteristic curve

Characteristic curves (Measured at $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

The switching performance of the valves depends on the filtration. To achieve the specified admissible flow values, we recommend full flow filtration with 25 μm . The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table). If only one flow direction is available, in certain cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).

Nominal size 16

Allowing flow qv L/min, 2-position valve						Allowing flow qv L/min, 3-position valve					
Symbol	Operating pressure P bar					Symbol	Operating pressure P bar				
	70	140	210	280	315		70	140	210	280	315
Return spring						Return spring					
C	300	300	300	260	220	E,H,J,L,M,Q,R,U,W	300	300	300	300	300
D	300	300	210	190	160	F,P	300	300	210	190	170
K	300	300	200	150	130	G,S,T	300	300	220	210	180
Z	300	240	190	170	150	V	300	260	200	180	170
With detent						With detent					
C,D,K,Z	300	300	300	300	300	E,H,J,L,M,Q,R,U,W	300	300	300	300	300
						F,P	300	300	280	230	230
						G,S,T	300	300	230	230	230
						V	300	300	250	230	230

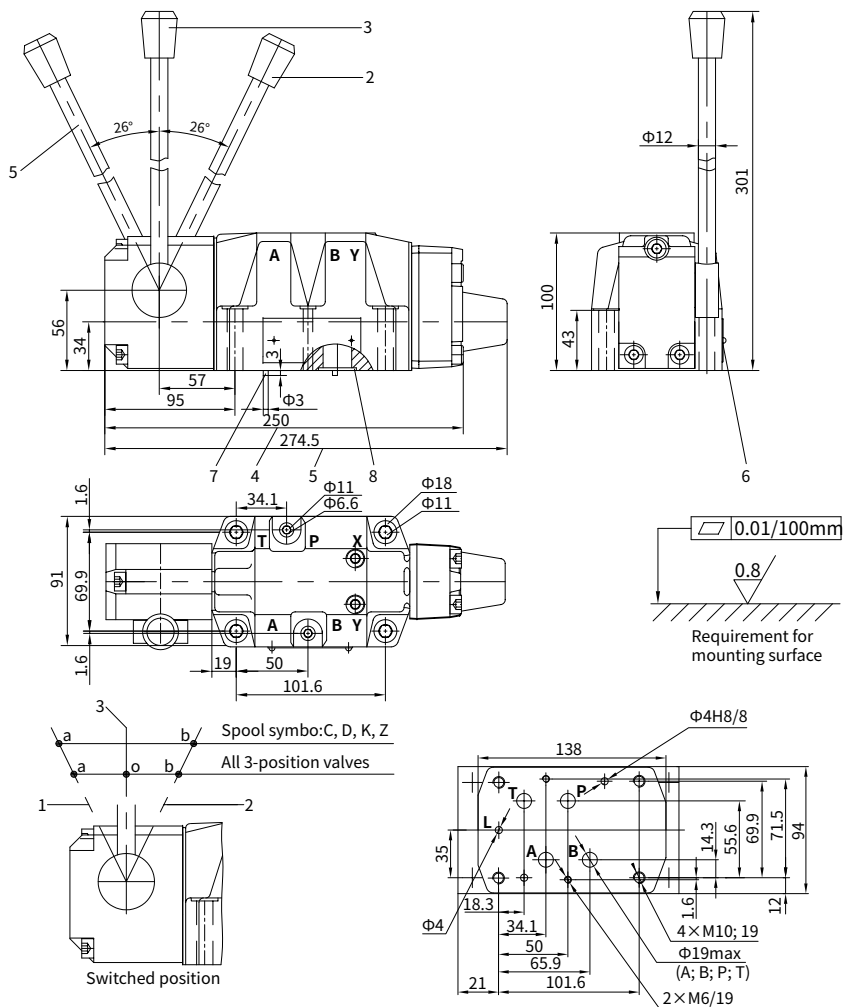
Nominal size 25

Allowing flow qv L/min, 2-position valve						Allowing flow qv L/min, 3-position valve					
Symbol	Operating pressure P bar					Symbol	Operating pressure P bar				
	70	140	210	280	315		70	140	210	280	315
Return spring						Return spring					
C	450	300	250	200	180	E,J,L,M,Q,R,U,W	450	450	450	450	450
D	350	300	275	250	200	F	450	250	200	135	110
K	200	150	140	130	120	G,T	450	330	290	230	180
Z	300	270	240	220	200	H	450	450	400	400	350
						P	450	310	240	215	150
						V	450	310	280	270	200
With detent						With detent					
C, D, K, Z	450	450	450	450	450	E, F, G, H, J, L, M, P, Q, R, T, U, W	450	450	450	450	450
						V	450	450	400	350	300

Nominal size 32

2-position and 3-position valves with spring return					
Flow L/min	When...(bar)				
Spool symbol	70	140	210	280	315
E,J,L,M,Q,R,V,U,W	1100	1050	860	750	680
F,G,H,S,T C,D,K,Z	650	450	370	320	280
2-position and 3-position valves with detent					
All symbols	1100	1050	860	750	680

Unit dimensions: nominal size 16



- 1 Switched position a
2 Switched position b
3 Switched position 0
(a and b for 2-position valve)
4 2-position and
3-position valves
with detent, 3-position
valve with spring centered

- 5 2-position valve with
return spring
6 Nameplate
7 2 locating pins 3x8
8 O-ring 22x2.5
(ports A, B, P and T)
O-ring 10x2 (port L)

It must be ordered separately, if connection plate is needed.

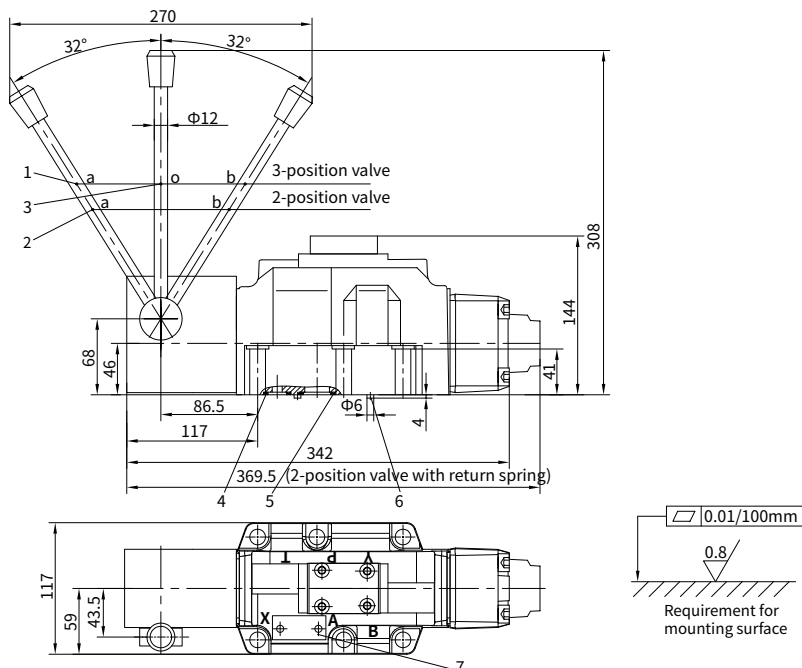
Type :

G172/01, G172/02, G174/01 G174/02, G174/08
(Port X and Y unavailable, returning directly by port L)

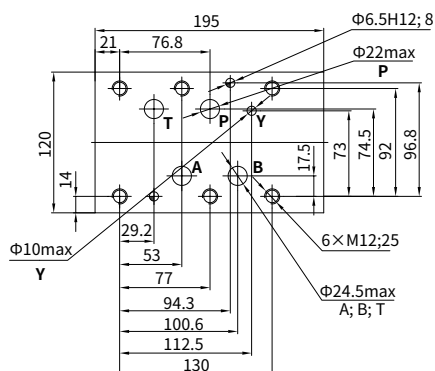
Valve fixing screws:

Internal hexagon screw, GB/T 70.1-10.9,
4-M10x60 Tightening torque $M_A = 75 \text{ Nm}$
2-M6x55 Tightening torque $M_A = 15.5 \text{ Nm}$
must be ordered separately

Unit dimensions: nominal size 25



Port X and L unavailable, port Y is used as drain port



- 1 Switched position a
- 2 Switched position b
- 3 Switched position 0
- 4 O-ring 19×3 (ports X and Y)
- 5 O-ring 27×3 (ports A, B, P and T)
- 6 2 locating pins 6×12
- 7 Nameplate

Valve fixing screws:

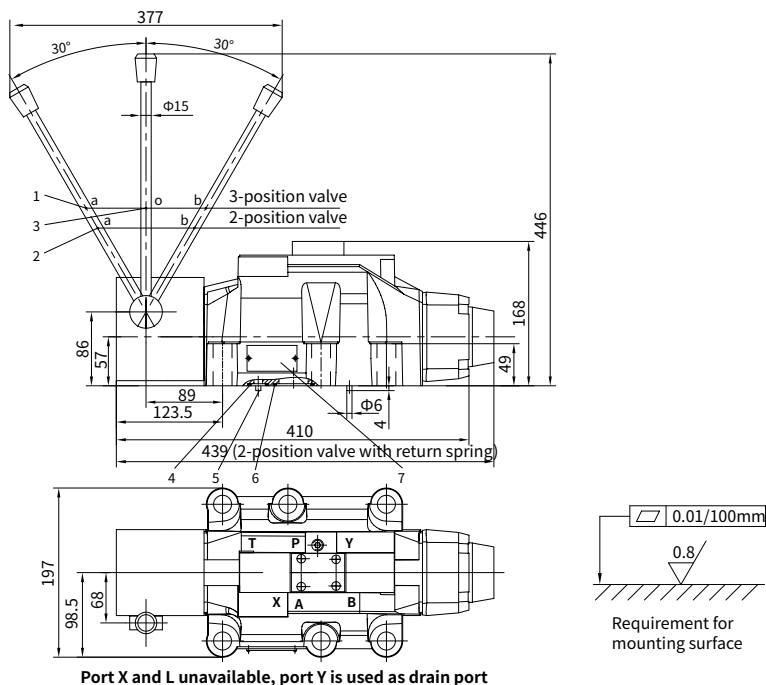
Internal hexagon screw
GB/T 70.1-10.9, 6-M12×60
Tightening torque $M_A=130\text{Nm}$
must be ordered separately

It must be ordered separately if connection plate is needed.

Type: G151/01(G1), G151/02 (M33×2)
G154/01(G1 ¼), G154/02 (M42×2)

G156/01(G1½), G156/02(M48×2)
G154/08(Flange connection)

Unit dimensions: nominal size 32



- 1 Switched position a
- 2 Switched position b
- 3 Switched position 0
- 4 O-ring 19×3 (ports X and Y)
- 5 2 locating pins 6×12
- 6 O-ring 42×3 ports A, B, P and T)
- 7 Nameplate

It must be ordered separately if connection plate is needed.

Type:

G157/01(G1 1/2), G157/02 (M48×2)

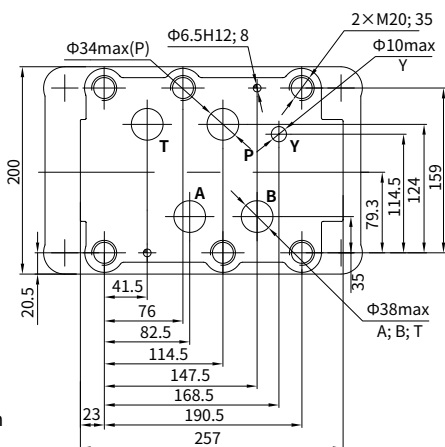
G158/10 (Flange connection)

Valve fixing screws:

Internal hexagon screw

GB/T 70.1-10.9,

6-M20×80 Tightening torque $M_A=430$ Nm must be order separately



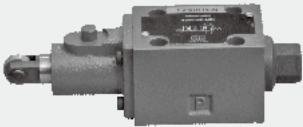


4/3, 4/2 and 3/2 directional valve with mechanical, manual operation

2.6

Type WMR(U)6...L6X

Size 6
Up to 315 bar
Up to 60L/min



Contents

Function and configuration	02
Ordering code	02
Symbols	03
Technical data	03
Operating limitation	04
Characteristic curves	04
Unit dimensions	05

Features

- Direct operated directional spool valves with mechanical, manual operation
- Roller plunger
- 19 versions of spools, optional

Function

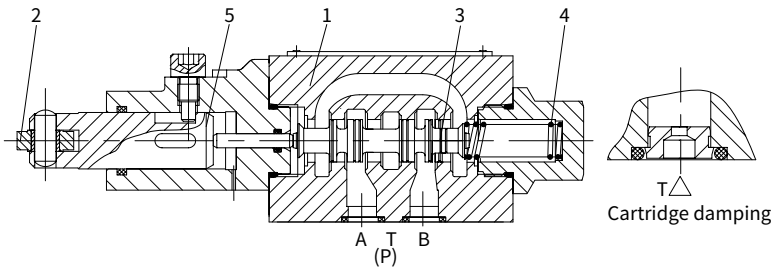
Directional valves, type WMR/U6.. are mechanical directional spool valves with roller plunger. There are 2 position 3way, 2 position 4 way and 3 position 4 way valves with many versions of spool symbols, the roller/plunger can be rotated by 90° .

The valves consist basically of the housing (1), roller/plunger (2), spool (3), return springs (4), and pushing rod (5). In the unoperated condition, the spool (3) is held in the initial position by the return spring, while in operated condition, the spool (3) is pushed to the expected position by roller/plunger (2) conquering the return springs (4).

Cartridge throttle

The use of a throttle insert is required, when, due to given operating conditions, flows can occur during the switching processes that exceed the performance limit of the valve

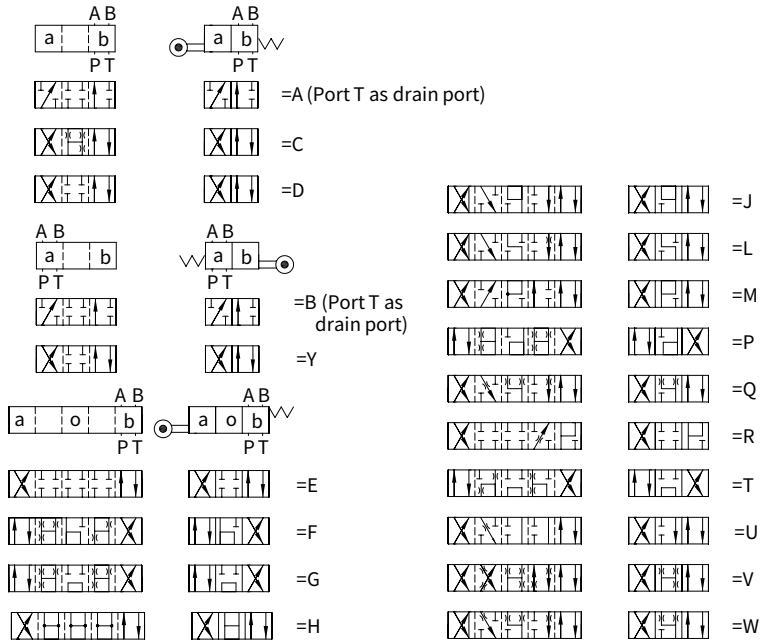
These throttles are to be inserted into the P-channel of the directional valve.



Ordering code

WM		6	-	L6X	/		*
3 ways (version A and B) =3 4 ways =4							Further details in clear text
Roller fixed horizontally=R Roller fixed vertically =U Roller and push rod see 'Unit dimensions'							No code = NBR seals V = FKM seals
Nominal size 6 =6							No code = Without cartridge throttle B08 = Throttle - Ø0.8 mm B10 = Throttle - Ø1.0 mm B12 = Throttle- Ø1.2 mm
Symbols e.g. C, E etc. see next page						L6X =	Series L60 to L69 (L60 to L69: unchanged installation and connection dimensions)

Symbols



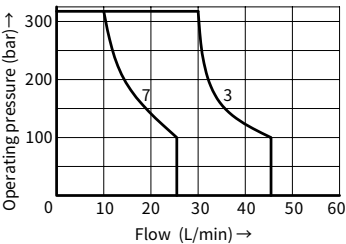
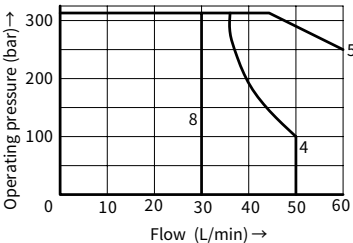
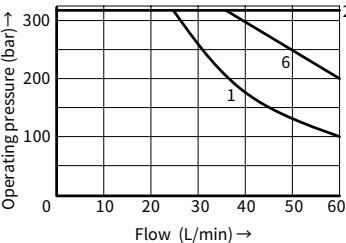
Technical data

Fluid temperature range		°C	-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Max. operating pressure	Port A,B,P	bar	315
	Port T	bar	60
Max. flow-rate		L/min	60
Flow cross section (switching neutral position)	Type Q	mm ²	For symbol Q 6% of nominal cross section
	Type W	mm ²	For symbol W 3% of nominal cross section
Fluid			Mineral oil, Phosphate ester
Viscosity range		mm ² /s	2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406
Weight		kg	1.4

Operating limitation

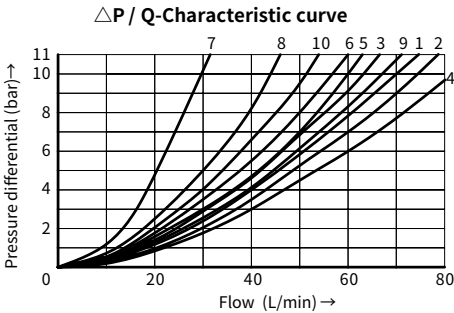
Because of the adhesive effect, the switching function of the valves depends on the filtration. In order to achieve the specified admissible flow values, we recommend full flow filtration with 25 µm. The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table).

If only one flow direction is available, in critical cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).



Curve	Spool symbol
1	A,B
2	E,M,H,C,D,Y,Q,U,W
3	F,P
4	G
5	J,L
6	R
7	T
8	V

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



- 7 Symbol "R" in switched positions B → A
- 8 Symbol "G" and "T" in neutral position P → T
- 9 Symbol "H" in neutral position P → T

Spool symbol	Flow direction			
	P to A	P to B	A to T	B to T
AB	3	3	-	-
C	1	1	3	1
DY	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	-
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.

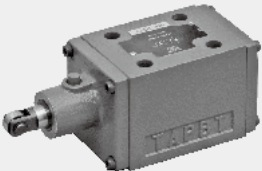


4/3, 4/2 and 3/2 directional valve with mechanical, manual operation

2.7

Type WMR(U)10...L3X

Size 10
Up to 315bar
Up to 120L/min



Contents

Function	02
Ordering code	02
Symbols	03
Technical data	03
Operating limitation	04
Characteristic curves	04
Unit dimensions	05

Features

- Direct operated directional spool valves with mechanical, manual operation
- Roller with 90° rotating
- 19 versions of spools, optional

Function

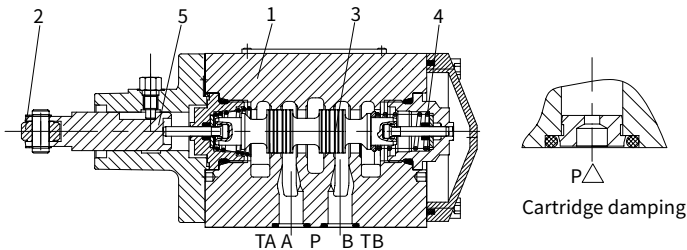
Directional valves, type WMR/U10.. are mechanical directional spool valves with roller/plunger. There are 2 position 3 way, 2 position 4 way and 3 position 4 way valves with many versions of spool symbols, and the roller/plunger can be rotated by 90° .

The valves consist basically of the housing (1), roller/plunger (2) , spool (3), return springs (4), and pushing rod (5). In the unoperated condition, the spool (3) is held in the initial position by the return spring, while in operated condition, the spool (3) is pushed to the expected position by roller/plunger (2) conquering the return springs (4).

Cartridge throttle

The use of a throttle insert is required, when, due to given operating conditions, flows can occur during the switching processes that exceed the performance limit of the valve.

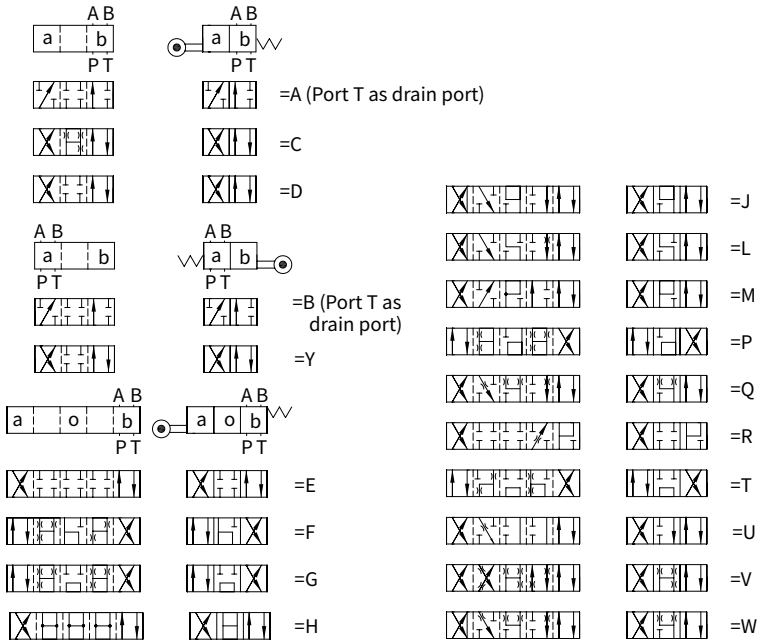
These throttles are to be inserted into the P-channel of the directional valve.



Ordering code

	WM		10	-	L3X	/		*
3 ways (version A and B) =3 4 ways =4								Further details in clear text
 Roller fixed horizontal =R  Roller fixed vertically =U Roller and push rod see 'Unit dimensions'								No code = NBR seals V = FKM seals
Nominal size 10			=10					No code = Without cartridge throttle B08 = Throttle - Φ0.8 mm B10 = Throttle - Φ1.0 mm B12 = Throttle- Φ1.2 mm
Symbols e.g. C, E etc.see next page								L3X = Series L30 to L39 (L30 to L39: unchanged installation and connection dimensions)

Symbols



Technical data

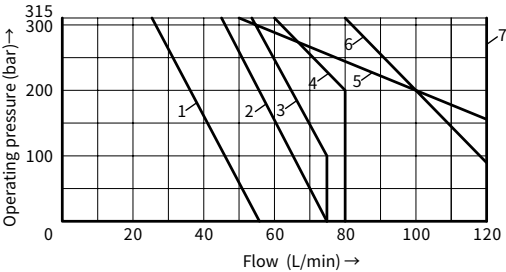
Fluid temperature range		°C	-30 to +80 (NBR seal) -20 to +80 (FKM seal)
Max. operating pressure	Port A,B,P	bar	315
	Port T	bar	60
Max. flow-rate		L/min	120
Flow cross section (switching neutral position)	Type V	mm ²	For symbol V 11(A/B to T) 10.3(P to A/B)
	Type W	mm ²	For symbol W 2.5(A/B to T)
	Type Q	mm ²	For symbol Q 5.5(A/B to T)
Fluid			Mineral oil, Phosphate ester
Viscosity range		mm ² /s	2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406
Weight		kg	4

Operating limitation

Because of the adhesive effect, the switching function of the valves depends on the filtration. In order to achieve the specified admissible flow values, we recommend full flow filtration with 25 µm. The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table).

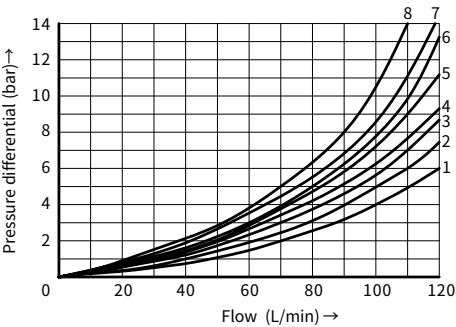
If only one flow direction is available, in critical cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).

02



Curve	Spool symbol
1	A,B
2	A/O
3	H
4	F,G,P,R,T
5	J,L,Q,U,W
6	C,D,E,M,V,Y
7	C/O,C/OF; D/O,D/OF

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

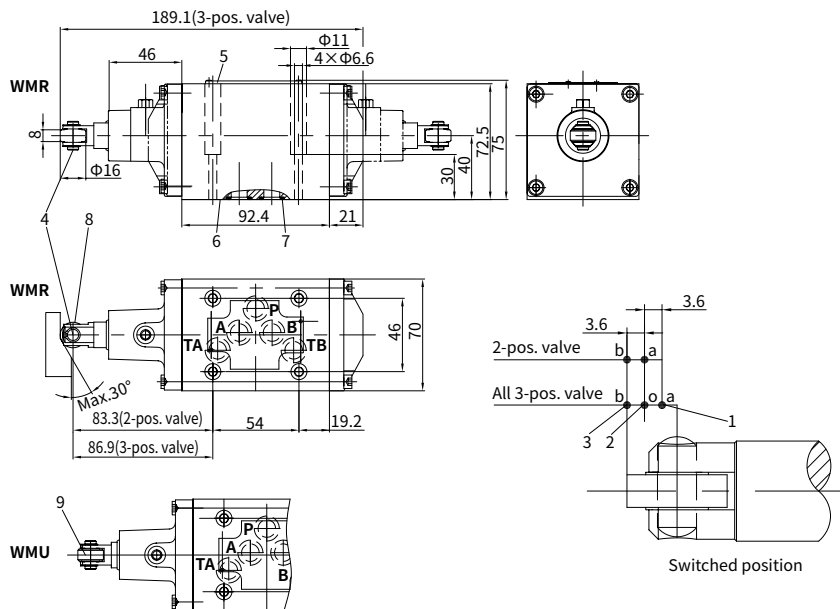


8 Symbols "G" and "T" in mid position (P → T)
8 Symbol "R" in position (A → B)

Spool symbol	Flow direction			
	P to A	P to B	A to T	B to T
A	4	3	-	-
B	3	4	-	-
C	3	3	4	4
D	3	3	5	5
E	2	2	4	4
F	1	2	3	4
G,T	4	4	7	7
H	1	1	5	5
J	2	2	3	3
L	3	3	2	4
M	1	1	4	4
P	3	1	5	5
Q	2	2	2	2
R	3	4	3	-
U	3	3	5	2
V	2	2	3	3
W	3	3	3	3
Y	4	4	6	6

Unit dimensions

(Dimensions in mm)



- 1 Switched position 0 → a
- 2 Switched position b → a, a → 0, b → 0
- 3 Switched position 0 → b, a → b
- 4 Pin
- 5 Nameplate
- 6 Mounting surface
- 7 O-ring 12×2, for ports A, B, P and T
- 8 Roller
- 9 Push rod

Valve mounting screws:

Internal hexagon screw, M6×40 GB/T 70.1-10.9

Tightening torque, $M_A=9\text{Nm}$

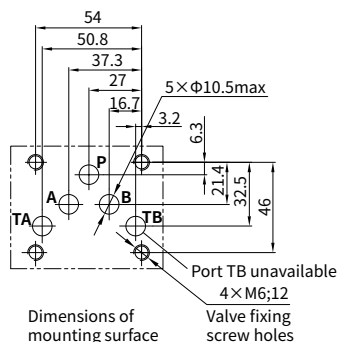
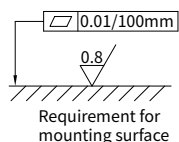
must be ordered separately

The sub-plate, if needed, must be order separately.**Type:**

G66/01(G3/8), G66/02 (M18×1.5)

G67/01(G1/2), G67/02(M22×1.5)

G534/01(G3/4), G534/02(M27×2)



China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.



2.8

4/3, 4/2 and 3/2 directional valve with fluidic operation

Type WH6...L6X

Size 6
Up to 315 bar
Up to 60L/min



Contents

Function and configuration	02
Symbols	03
Ordering code	03
Technical data	04
Characteristic curves	04
Operating limitation	05
Unit dimensions	06

Features

- Direct operated directional spool valve
- Operating methods:
 - hydraulic (WH)
- Sub-plate mounting
- Porting pattern to DIN 24 340 Form A, and ISO 4401

Function

WH valves are fluidically operated directional spool valves. They are used for the control of stop, start and direction of a flow.

The directional valves mainly consist of housing (1), the control spool (2), one or two return springs (3), cover (4).

In the non-operated condition, control spool (3) is held by return springs (4) in the central or initial position (except for impulse spools).

Control spool (3) is shifted by the actuating elements to the required spool position.

Without return spring, without detent, type..O/...

(Only for Spool Symbol A,C,D)

When actuating elements without return springs and without detent are used, a defined spool position is not provided in the on-operated condition.

With detent, type..OF/..

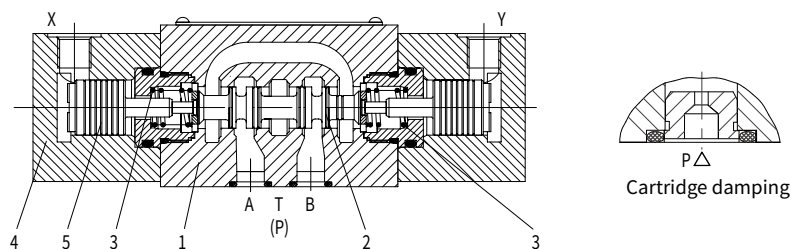
(Only for Spool Symbol A,C,D)

Directional valves with hydraulic or pneumatic actuation are also available as 2-position valves with detent. When actuating elements with detent are used, each spool position can be fixed.

Cartridge throttle

The use of a throttle insert is required when, due to the prevailing operating conditions, flows can occur during the switching process that are higher than permitted by the performance limits of the valve.

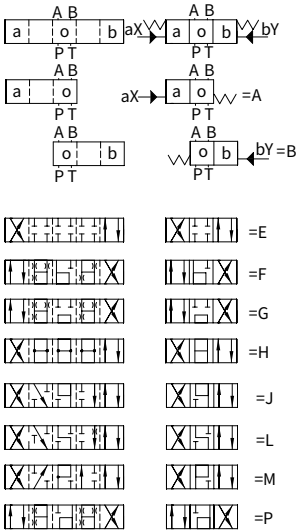
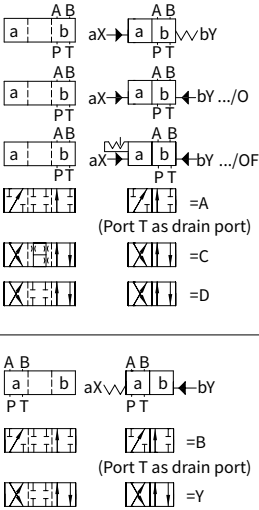
It is to be inserted in the P-channel of the directional valve.



Type 4WH 6 E-L6X...

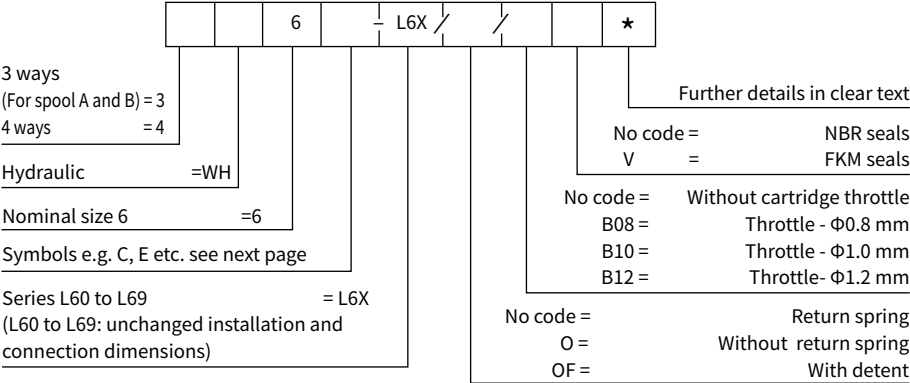
Type WH6...L6X (three-position) hydraulic directional valve With return spring

Symbols



Example: If solenoid is fixed at position 'a', the ordering code is ...EA

Ordering code

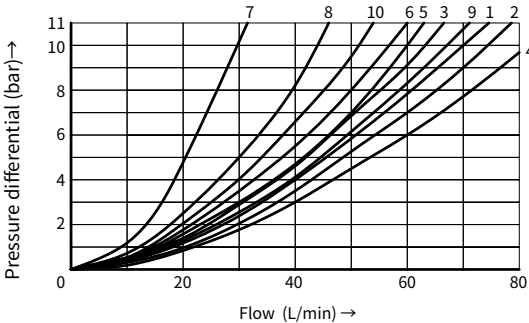


Technical data

Valve type			WH
Weight	1 operating cylinder	kg	2.0
	2 operating cylinder	kg	2.2
Fluid temperature range		°C	-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Max. operating pressure	Port A,B,P	bar	315
	Port T	bar	160
Min control pressure		bar	6-10
Max control pressure		bar	200
Max. flow-rate		L/min	60
Flow cross section (switching neutral position)	Type Q	mm ²	For symbol Q 6% of nominal cross section
	Type W	mm ²	For symbol W 3% of nominal cross section
Control pressure		bar	Min.6 to 10 > tank pressure, Max.200
Fluid			Mineral oil, Phosphate ester
Viscosity range		mm ² /s	2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406

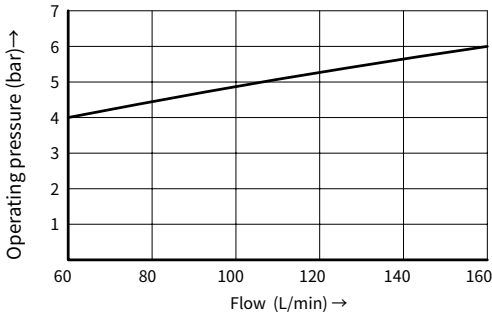
Characteristic curves

(Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



- 7 Symbol "R" in switched positions B → A
- 8 Symbol "G" and "T" in neutral position P → T
- 9 Symbol "H" in neutral position P → T

Spool	Flow direction			
	P to A	P to B	A to T	B to T
A B	3	3	-	-
C	1	1	3	1
D Y	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	-
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

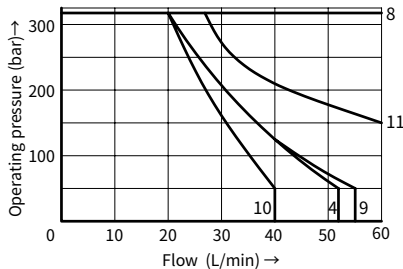
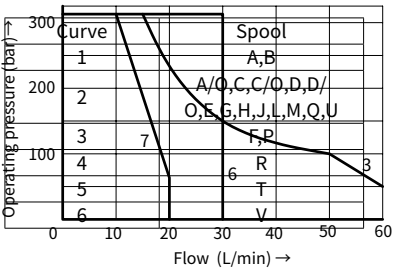
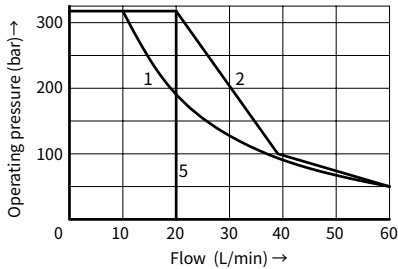


With tank pressure is increased, the minimum control pressure must be increased according to this curve.

Operating limitation

Because of the adhesive effect, the switching function of the valves depends on the filtration. In order to achieve the specified admissible flow values, we recommend full flow filtration with 25 µm. The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table).

If only one flow direction is available, in critical cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).

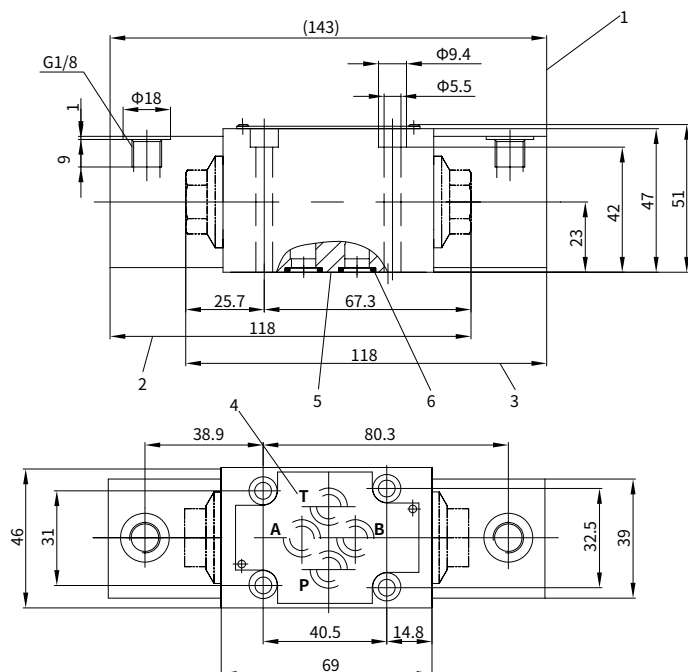


Control pressure 6bar > T-pressure		
Curve		Spool
Return spring	1	A,B
	2	C,D,Y
	3	E,J,L,U,M,Q,V,W
	4	F,P
	5	T
	6	G,H
	7	R
.../OF...	8	A,C,D
.../O...		

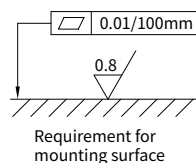
Control pressure 10bar > T-pressure		
Curve		Spool
Return spring	1	A,B
	8	C,D,Y,E,G,H,J,L
		U,M,Q,V,W
	9	F,P
	10	R
	11	T
.../OF...	8	A,C,D
.../O...		

Unit dimensions (WH)

(Dimensions in mm)



- 1 Used for 3-position valve or 2-position *O, */OF
- 2 Used for 2-position *A or A,C,D
- 3 Used for 2-position *B or B,Y
- 4 Name plate
- 5 Mounting surface
- 6 O-ring 9.25×1.78, with ports A, B, P, T

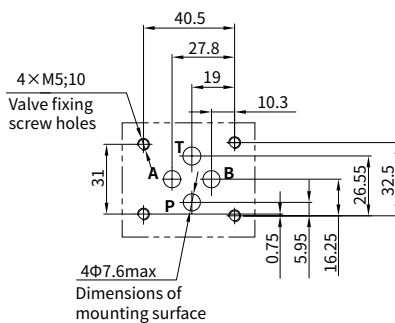
**Valve mounting screws:**

Internal hexagon screw,
M5×50 GB/T 70.1-10.9,
Tightening torque, $M_A=9\text{Nm}$

**It must be ordered separately
if connection plate is needed.**

Type:

G341/01(G1/4), G341/02(M14×1.5)
G342/01(G3/8), G342/02(M18×1.5)
G502/01(G1/2), G502/02(M22×1.5)





2.9

4/3, 4/2 and 3/2 directional valve with fluidic operation

Type WHD10...L3X

Size 10
Up to 315bar
Up to 120L/min



Contents

Function and configuration	02
Ordering code	02
Symbols	03
Technical data	03
Characteristic curves	04
Operating limitation	04
Unit dimensions	05

Features

- Direct operated directional spool valve
- Types of actuation:
 - Hydraulic (WHD)
- Sub-plate mounting
- Porting pattern to DIN 24 340 Form A, and ISO 4401

Function

Valves of type WHD are directional spool valves with fluid logics actuation. They control the start, stop and direction of a flow. The directional valves basically consist of housing (1), one or two actuation elements (2) (hydraulic, pneumatic actuation cylinder), one or two return springs (3) and control piston (4).

Type WHD.../

In the initial state, the main spool (2) remain in the intermediary civilian under the action of two return springs (3) , into the external model oil through the a port into the oil to promote the left of the piston (4) to the right, remove the signal Oil, the main spool (2) back to the middle position under the right spring force back to the middle position.If external oil from the b port, the oil push the right side of the piston (4) left, thus driving the main spool (2) left, remove the signal oil, the main spool (2) back to the middle position under the left spring force.

Without spring return, Type ..O/..
(Only for Spool Symbol A,C,D)

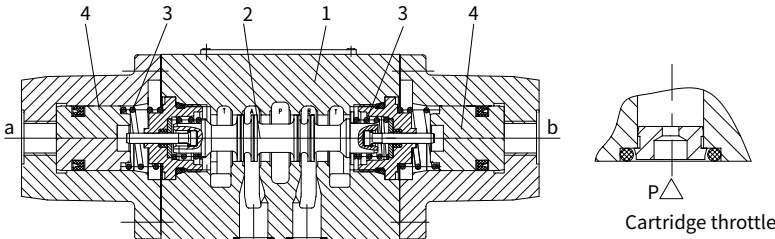
If using actuation elements without return springs and without detent, a defined spool position is not given in the de-energized condition.

Without spring return with detent,
Type ..OF/.. (Only for Spool Symbol A,C,D)

Directional valves with hydraulic or pneumatic actuation are also available as 2-spool position valve with detent. If using actuation elements with detent, every spool position can be locked.

Cartridge throttle

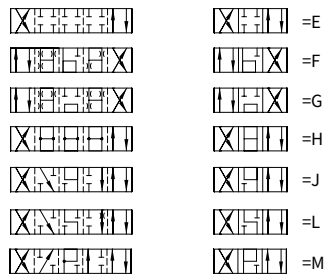
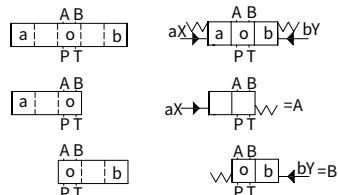
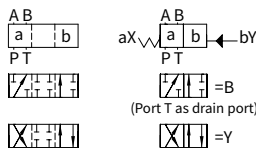
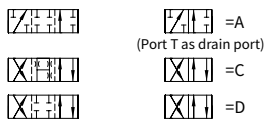
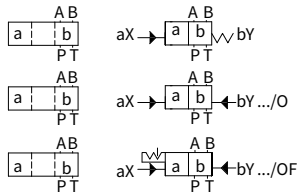
The use of a throttle insert is required when due to prevailing operating conditions, flows can occur during the switching processes, which exceed the performance limit of the valve. It is inserted in channel P of the directional valve.



Ordering code

				-	L3X	/	/			*	
3 ways (For spool A and B)	= 3										Further details in clear text
4 ways	= 4										
Hydraulic	=WHD									No code = V =	NBR seals FKM seals
Nominal size 10	=10									No code =	Without cartridge throttle
Symbols e.g. C, E etc. see next page										B08 =	Throttle- Φ0.8 mm
										B10 =	Throttle- Φ1.0 mm
										B12 =	Throttle- Φ1.2 mm
Series L30 to L39										No code=	Return spring
(L30 to L39: unchanged installation and connection dimensions)										O =	Without return spring
										OF =	With Return spring and detent

Symbols



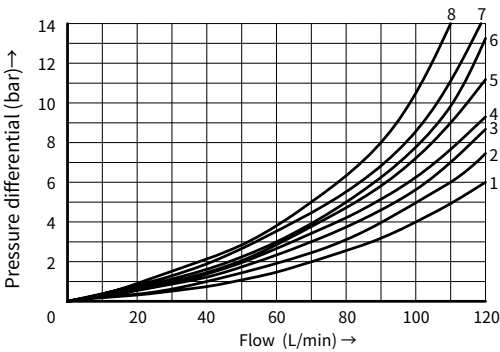
Example:

If solenoid is fixed at position 'a',
the ordering code is ...EA

Technical data

Valve type			WHD
Weight	1 operating cylinder	kg	3.0
	2 operating cylinder	kg	3.3
Fluid temperature range		°C	-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Max. operating pressure	Port A,B,P	bar	315
	Port T	bar	160
Max. flow-rate		L/min	120
Flow cross section (switching neutral position)	Type V	mm ²	For type V 11(A/B to T) 10.3(P to A/B)
	Type W	mm ²	For type W 2.5(A/B to T)
	Type Q	mm ²	For type Q 5.5(A/B to T)
Control pressure		bar	1.5 ~ 6
Fluid			Mineral oil, Phosphate ester
Viscosity range		mm ² /s	2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

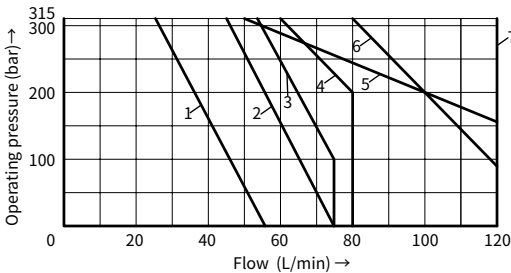


- 8 Symbols "G" and "T" in neutral position (P → T)
- 8 Symbol "R" in position b (A → B)

Spool symbol	Flow direction			
	P to A	P to B	A to T	B to T
A	4	3	-	-
B	3	4	-	-
C	3	3	4	4
D	3	3	5	5
E	2	2	4	4
F	1	2	3	4
G,T	4	4	7	7
H	1	1	5	5
J	2	2	3	3
L	3	3	2	4
M	1	1	4	4
P	3	1	5	5
Q	2	2	2	2
R	3	4	3	-
U	3	3	5	2
V	2	2	3	3
W	3	3	3	3
Y	4	4	6	6

Operating limitation

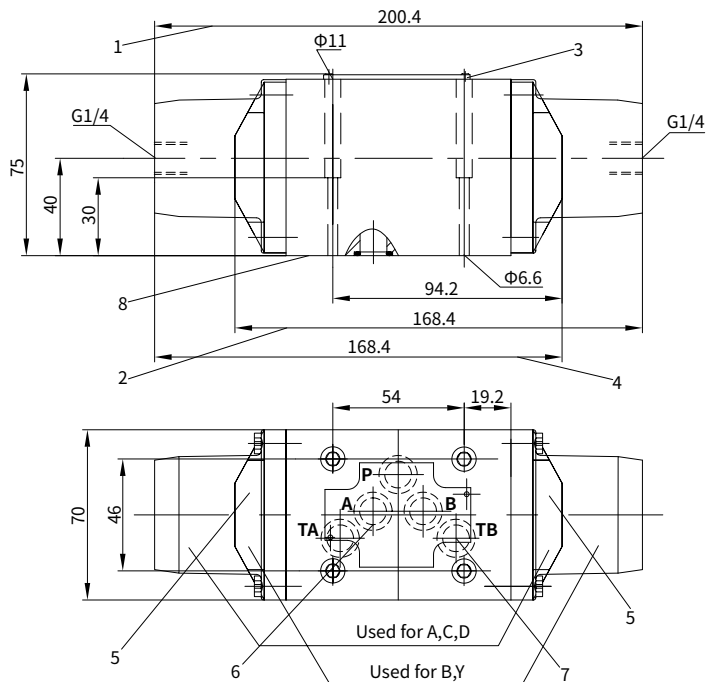
Because of the adhesive effect, the switching function of the valves depends on the filtration. In order to achieve the specified admissible flow values, we recommend full flow filtration with 25 μm . The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table).
If only one flow direction is available, in critical cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).



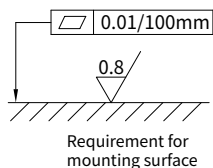
Curve	Spool symbol
1	A,B
2	A/O
3	H
4	F,G,P,R,T
5	J,L,Q,U,W
6	C,D,E,M,Y,Y
7	C/O,C/OF D/O,D/OF

Unit dimensions

(Dimensions in mm)



- 1 Used for 3-position valve or, 2-position */O, */OF
- 2 Used for 2-position valve B, Y, EB...
- 3 Name plate
- 4 2-position valve A, C, D, EA...
- 5 Valve with an actuator (2-position valve)
- 6 O-ring 12×2, with ports A, B, P, T
- 7 Port TB used for special manifold

**Valve mounting screws:**

Internal hexagon screw
 M6×40 GB/T 70.1-10.9,
 Tightening torque $M_A=15.5\text{Nm}$

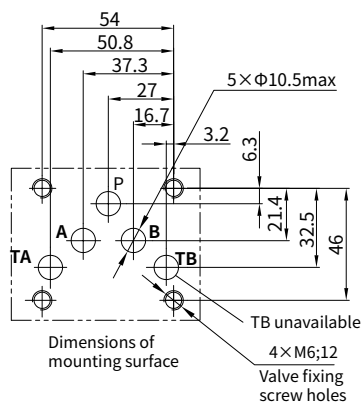
**It must be ordered separately
 if connection plate is needed.**

Type :

G 66/01 (G 3/8), G 66/02(M18×1.5)

G 67/01 (G 1/2), G 67/02(M22×1.5)

G 534/01 (G 3/4), G 534/02(M27×2)



China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.



4/3, 4/2 and 3/2 Directional Valve with Wet-pin AC or DC Solenoid

2.10

Type WE 6...L6X

Size (NG) 6
Up to 350 bar
Up to 80L/min



Contents

Function and configurations	02
Ordering code	03
Symbols	04
Characteristic curves	04
Technical data	05
Electric data	05
Performance limits	06-07
Unit dimensions	08-09

Features

- Direct operated directional solenoid valve, standard version
- Porting pattern according to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H
- Wet-pin AC or DC solenoids with detachable coil
- Pressure-tight chamber needs not to be opened for a coil change
- Electrical connection as individual or central connection

Function and configurations

Type WE valves are solenoid operated directional spool valves. They control the start, stop and direction of flow.

The directional control valves consist of housing (1), one or two solenoids (2), the control spool (3), and one or two return springs (4).

In the de-energized condition the control spool (3) is held in the neutral or initial position by means of return springs (4) (except for impulse spools).

The control spool (3) is actuated via wet pin solenoids (2).

To ensure proper operation, care must be taken that the pressure chamber of the solenoid is filled with oil.

The control spool(3) is moved to the expected position by solenoid(2) and pushing rod(5). This gives free-flow from P to A and B to T or P to B and A to T.

When solenoid (2) is de-energized, the control spool (3) is returned to its initial position by means of the return springs (4).

The solenoids may also control the control spool (3) by an optional override button(6) under the de-energized condition.

Type 4WE 6.. L6X/O...

(only for symbols A, C and D)

This version refers to directional valves with two spool positions and two solenoids without detent. In the de-energized condition, there is no defined spool position.

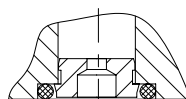
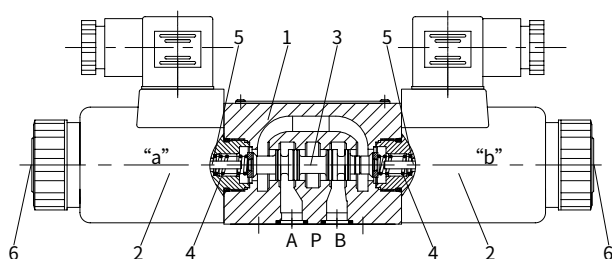
Type 4WE 6.. L6X/OF...

(impulse spool, only for symbols A, C and D)

This version refers to directional valves with two spool positions, two solenoids and a detent. Due to this, both spool positions are positively held, and a permanent energization of the solenoid is not required.

Throttle insert (type 4WE 6..L6X/.../B..)

The use of throttle inserts is required, due to prevailing operating conditions, flows can occur during switching processes that exceed the performance limit of the valve. They are inserted in the P-channel of the directional valve.



P△
Throttle insert

Ordering code

	WE	6	- L6X /					/			*
3 ways = 3 (For spool A and B)											Further details in clear text
4 ways = 4											No code=Without locating hole /60= With locating hole /62=With locating pin hole ISO 8752-3×8-St
Directional valve with wet pin solenoids											No code = NBR seals V = FKM seals
Nominal size 6 =6											No code = Without throttle insert B08 = Throttle Ø0.8 mm B10 = Throttle Ø1.0 mm B12 = Throttle Ø1.2 mm B15 = Throttle Ø1.5mm B20 = Throttle Ø2.0 mm B25 = Throttle Ø2.5 mm B30 = Throttle Ø3.0 mm
Symbols e.g. C, E etc.											Z4 = square plugs (not applicable for the integer) Z5L2 = With light and protect the diodes K4 = DIN4365 sockets without plugs K7 = Deutsch connector assembly, without plugs ¹⁾ DL = Central connection with LED lamp (M22×1.5 interface)
Series L60 to L69 =L6X (L60 to L69: unchanged installation and connection dimensions)											
With spring return = No code Without spring return =O Without spring return, and with detent =OF											
Standard solenoid =E Large-scope solenoid (Only for 12V and 24V) =N											
24V DC =G24 220V AC 50/60 Hz =W220 Plug rectification 220V =W220R 110V AC 50/60 Hz =W110 Plug rectification 110V =W110R Other voltage see technical data											
With manual override button = N											

Note:

1) K7 Deutsch connector assembly
Only for 12V and 24V.

Symbols

Transition position

Spool valve symbols

Transition position

Spool valve symbols

Transition position

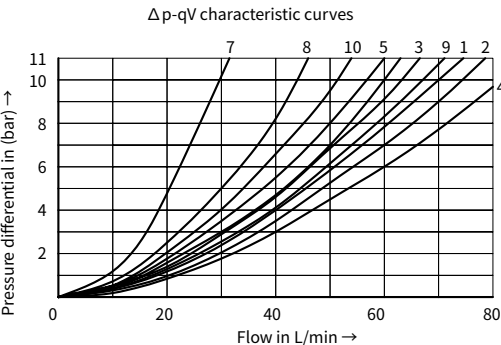
Spool valve symbols

Notes: Spool symbols A9, B9, D9, Y9 are only for type without .../O... and .../OF... and are only used as pilot valves

Example: If solenoid is fixed at position 'a', the ordering code is...EA

Characteristic curves

(Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



- 7 Symbol "R" in switched positions B → A
- 8 Symbol "G" and "T" in neutral position P → T
- 9 Symbol "H" in neutral position P → T

Spool symbol	Flow direction			
	P to A	P to B	A to T	B to T
A, B	3	3	-	-
C	1	1	3	1
D, Y	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J, Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	-
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

Technical data

Fixing position			Optional
Environment temperature range °C			-30 to +50 (NBR seal)
			-20 to +50 (FKM seal)
Weight	Single solenoid	kg	1.5
	Double solenoids	kg	2.0
Max.operating pressure	Port A,B,P	bar	350
	Port T	bar	210 (DC),160 (AC), when the operating pressure exceed the permission value, port T must be used as drain port for spool symbol A and B
Max. flow-rate L/min			80 (DC), 60 (AC)
Flow cross section (switching neutral position) mm ²			for symbol Q 6% of nominal cross section
			for symbol W 3% of nominal cross section
Fluid			Mineral oil suitable for NBR and FKM seal
			Phosphate ester for FKM seal
Fluid temperature range °C			-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Viscosity range mm ² /s			2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406

Electric data

Type of voltage			DC	AC
Usable voltage V			12,24,28 ¹ ,48,96,110,205,220	110, 127, 220
Permissible voltage (deviation) %			Standard solenoid: +10 ~ -15 Large-scope solenoid: +20~-30	
Power consumption W			Standard solenoid: 30 Large-scope solenoid: 32	
Holding power VA			-	50
Making capacity VA			-	220
Duty			Continuous working	
Switching time to ISO 6403	ON	ms	25 to 45	10 to 20
	OFF	ms	10 to 25	15 to 40
Switched frequency times/h			to 15000	to 7200
Type of protection to DIN 40050			IP65 (Z4, Z5L plug), IP67 (K7 Deutsch)	
Max. coils temperature °C			+150	+180

Caution: When connecting wires, properly connect the PE conductor (PE $\frac{1}{2}$) .
(For other type voltage please consult us.)

Performance limits (Measured at $\theta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

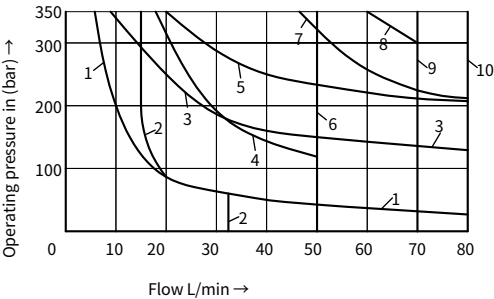
The specified switching performance limits are valid with two directions of flow (e.g. from P to A and simultaneous return flow from B to T).

Due to the flow forces acting within the valve, the permissible switching performance limit can be significantly lower with only one direction of flow (e.g. from P to A, with port B being closed)!

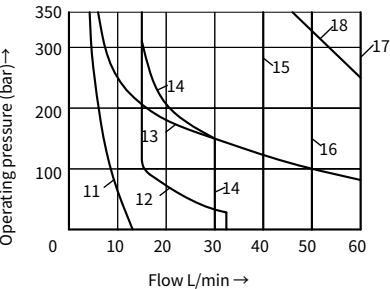
The switching performance limit was determined with the solenoid at operating temperature, at 15 % under-voltage and without tank pre-loading.

Solenoid DC		Solenoid AC-50Hz		Solenoid AC-60Hz	
Curve	Spool symbol	Curve	Spool symbol	Curve	Spool symbol
1	A, B ₁	11	A, B ₁	19	A, B ₁
2	V	12	V	20	V
3	A, B	13	A, B	21	A, B
4	F, P	14	F, P	22	F, P
5	J	15	G, T	23	G, T
6	G, H, T	16	H	24	J, L, U
7	A/O, A/OF, L, U	17	A/O, A/OF, C/O,	25	A/O, A/OF, Q, W
8	C, D, Y		C/OF, D/O, D/OF	26	C, D, Y
9	M		E, J, L, M	27	H
10	E, R ₂ , C/O, C/OF		Q, R ₂ , U, W	28	C/O, C/OF, D/O
	D/O, D/OF, Q, W	18	C, D, Y		D/OF, M, R, E, R ₂

Notes: ¹⁾ With manual override; ²⁾ Return flow from actuator to tank.

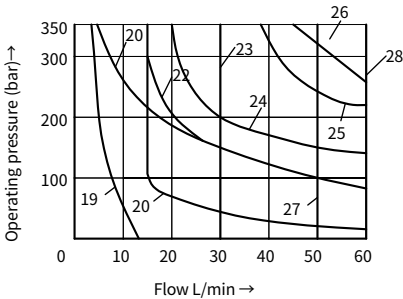


Solenoid DC	
Curve	Solenoid voltage(V)
1 to 10	12, 24, 48, 96, 205

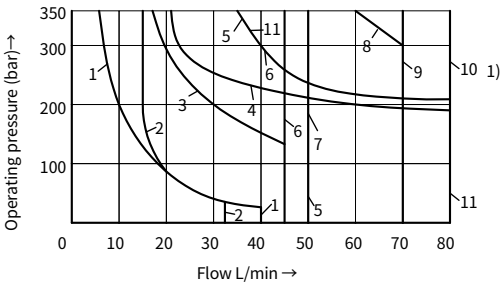


Solenoid AC		
Curve	Solenoid voltage	
11 to 18	W110	110V, 50Hz
	W127	127V, 50Hz
	W230	230V, 50Hz

Performance limits (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

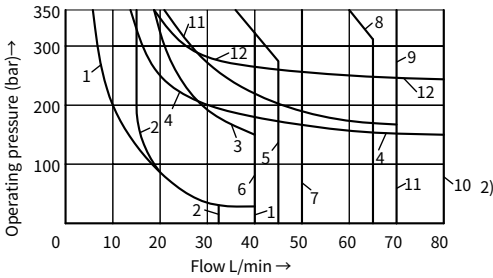


Solenoid AC		
Curve	Solenoid voltage	
19 to 28	W110	110V, 60Hz
	W230	230V, 60Hz



Solenoid DC	
Curve	Solenoid voltage
1 to 10 ₁	110, 180

Curve	Spool symbol	Curve	Spool symbol	Curve	Spool symbol
1	A,B	6	T	10 ₁	E, R, C/O, C/OF, D/O, D/OF, Q, W
2	V	7	H	10 ₂	R, C/O, C/OF, D/O, D/OF, Q, W
3	F, P	8	C,D	11	A/O, A/OF
4	J, L, U	9	M	12	E
5	G				

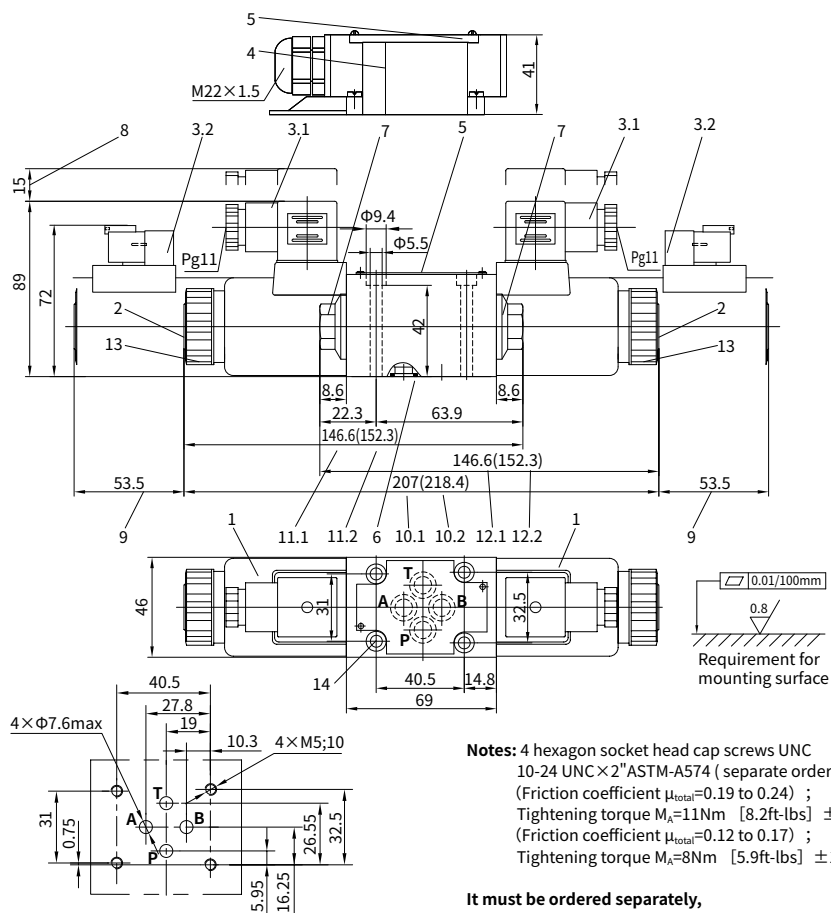


Solenoid AC	
Curve	Solenoid voltage
1 to 12, see 10 ₂	220

Unit dimensions

(Dimensions in mm)

Valve with DC or rectification AC solenoid



Notes: 4 hexagon socket head cap screws UNC 10-24 UNC x 2" ASTM-A574 (separate order)
(Friction coefficient $\mu_{\text{total}} = 0.19$ to 0.24) ;
Tightening torque $M_A = 11\text{Nm}$ [8.2ft-lbs] $\pm 15\%$
(Friction coefficient $\mu_{\text{total}} = 0.12$ to 0.17) ;
Tightening torque $M_A = 8\text{Nm}$ [5.9ft-lbs] $\pm 10\%$

It must be ordered separately, if connection plate is needed.

Type: G341/01(G1/4), G341/02 (M14 x 1.5)
G342/01(G3/8), G342/02 (M18 x 1.5)
G502/01(G1/2), G502/02 (M22 x 1.5)

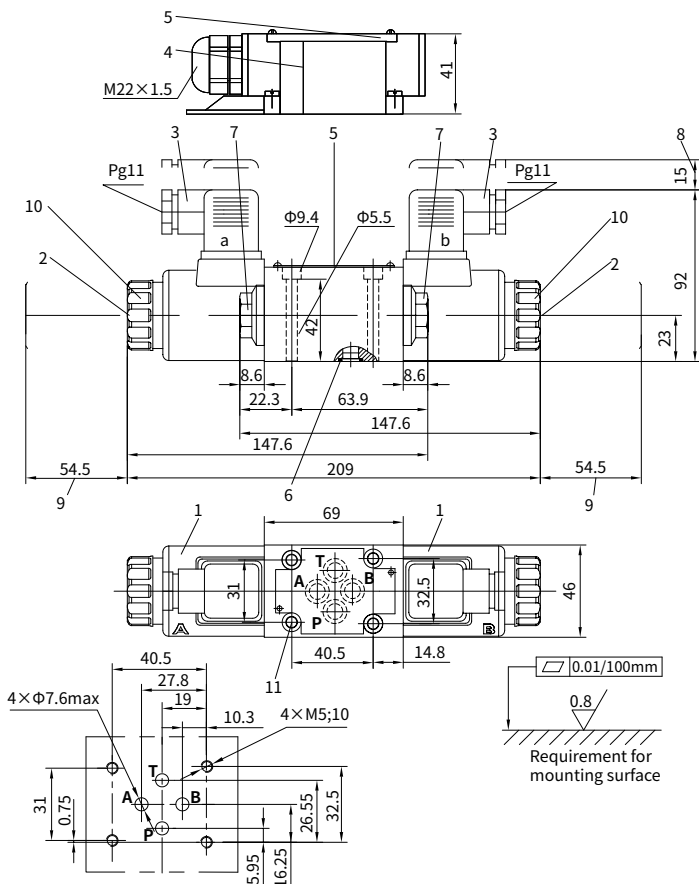
- 1 Solenoid
- 2 Manual override button
- 3.1 Plug-in connector to DIN 43 650
- 3.2 Deutsch connector assembly
- 4 Junction box with lead and light, M22 x 1.5 interface
- 5 Nameplate
- 6 O-ring: 9.25 x 1.78
- 7 Plug screw for valves with one solenoid
- 8 Space required to remove connector
- 9 Space required to remove coil
- 10.1 Dimension of 3-position valves, standard version
- 10.2 Dimension of 3-position valves, large-scope Type of voltage

- 11.1 Dimension of 2-position valves with solenoid at 'A', standard version
- 11.2 Dimension of 2-position valves with solenoid at 'A', large-scope Type of voltage
- 12.1 Dimension of 2-position valves with solenoid at 'B', standard version
- 12.2 Dimension of 2-position valves with solenoid at 'B', large-scope Type of voltage
- 13 Securing nut, tightening torque $M_A = 4\text{Nm}$
- 14 Valve fixing screws. Hexagon socket head cap screw M5 x 50 GB/T 70.1-10.9, Tightening torque $M_A = 8.9\text{Nm}$

Unit dimensions

(Dimensions in mm)

Valve with AC solenoid



- 1 Solenoid
- 2 Manual override button
- 3 Plug-in connector to DIN 43 650 (rotatable 90°)
- 4 Junction box with lead and light, M22×1.5 interface
- 5 Nameplate
- 6 Seal rings 9.25×1.78
- 7 Plug screw for valves with one solenoid
- 8 Space required to remove connector
- 9 Space required to remove coil
- 10 Securing nut, tightening torque, $M_A = 4 \text{ Nm}$
- 11 Valve fixing screws. Hexagon socket head cap screw
M5×50 GB/T 70.1-10.9,
Tightening torque $M_A = 8.9 \text{ Nm}$

Notes: 4 hexagon socket head cap screws UNC
10-24 UNC×2"ASTM-A574 (separate order)
(Friction coefficient $\mu_{\text{total}} = 0.19$ to 0.24) ;
Tightening torque $M_A = 11 \text{ Nm}$ [8.2ft-lbs] $\pm 15\%$
(Friction coefficient $\mu_{\text{total}} = 0.12$ to 0.17) ;
Tightening torque $M_A = 8 \text{ Nm}$ [5.9ft-lbs] $\pm 10\%$

**It must be ordered separately,
if connection plate is needed.**

Type:
G341/01(G1/4), G341/02 (M14×1.5)
G342/01(G3/8), G342/02 (M18×1.5)
G502/01(G1/2), G502/02 (M22×1.5)

China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.



4/3, 4/2 and 3/2 Directional Valve with Wet-pin AC or DC Solenoid

2.11

Type WE 10...L3X

Size 10
Up to 315 bar
Up to 120L/min



Contents

Function and configuration s	02
Ordering code	03
Symbols	04
Characteristic curves	04
Technical data	05
Electric data	05
Performance limits	06
Unit dimensions	07-08

Features

- Direct operated directional solenoid valve, standard version
- Porting pattern according to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H
- Wet pin DC or AC solenoids with detachable coil
- Pressure-tight chamber needs not to be opened for a coil change

Function and configuration

Type WE valves are solenoid operated directional spool valves. They control the start, stop and direction of flow.

The directional control valves consist of housing (1), one or two solenoids (2), the control spool (3), and one or two return springs (4).

In the de-energized condition the control spool (3) is held in the neutral or initial position by means of return springs (4) (except for pulse spools). The control spool (3) is actuated via wet pin solenoids (2).

To ensure proper operation, care must be taken that the pressure chamber of the solenoid is filled with oil.

The control spool(3) is moved to the expected position by solenoid(2) and pushing rod(5), and this gives free-flow from P to A and B to T or P to B and A to T.

When solenoid (2) is de-energized, the control spool (3) is returned to its neutral position by means of the return springs (4).

The solenoids may also control the control spool (3) by an optional override button(6) under the de-energized condition.

For application in voltage pulsation, solenoids with large scope voltage are recommended.

For application in high protective grade, waterproof plug should be used.

Type 4WE10.. L3X/O...

(Only for symbols A, C and D)

This Type is a 2-position directional valve with 2 solenoids without detents. The spool position, when the solenoids are de-energised, is not defined..

Type 4WE10.. L3X/OF...

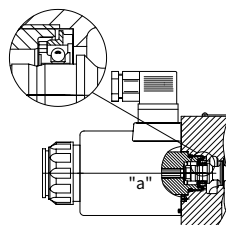
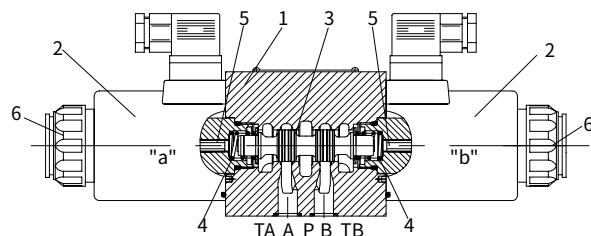
(Impulse spool, only for symbols A, C and D)

This Type is a 2-position directional valve with 2 solenoids and detents. Hence, when the solenoids are de-energized, the spool is held in the detented position then the solenoids do not need to be continuously energised.

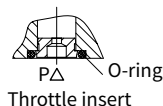
Throttle insert (type 4WE10...L3X/.../B..)

The use of a throttle insert is required if, due to the operating conditions, flows can occur during the switching process which are larger than the performance limits of the valve allow.

The orifice is to be inserted into the P channel of the directional valve.



Type 4WE10.. L3X/OF...
(Impulse spool)



Throttle insert

Ordering code

	WE	10	- L3X /			N	/		*
3 ways (For spool A and B)	= 3								Further details in clear text
4 ways	= 4								
Directional valve with wet pin solenoids									No code = NBR seals V = FKM seals
Nominal size 10	=10								No code = Without throttle insert
Symbols e.g. C, E etc.									B08 = Throttle Ø0.8 mm B10 = Throttle Ø1.0 mm B12 = Throttle Ø1.2 mm B15 = Throttle Ø1.5 mm B20 = Throttle Ø2.0 mm B25 = Throttle Ø2.5 mm B30 = Throttle Ø3.0 mm
Series L30 to L39 (L30 to L39: unchanged installation and connection dimensions)	=L3X								Z4 = square plugs (not applicable for the integer)
With spring return	= No code								Z5L = square plugs with lamps
Without spring return	= O								K4 = DIN4365 sockets without plugs
Without spring return, and with detent	= OF								K7 = Deutsch connector assembly, without plugs ¹⁾
Standard solenoid	=C								DL = Central connection with indicator lamp (M22×1.5 interface)
Large-range solenoid (Only for K4 24V DC)	=N								
24V DC	=G24								
220V AC 50/60 Hz	=W220								
Plug rectification 220V	=W220R								
110V AC 50/60 Hz	=W110								
Plug rectification 110V	=W110R								
Other voltage see next page									
With manual override button	= N								

Note: 1) K7 Deutsch connector
assembly Only for 12V and 24V.

Symbols

Transition position

Spool valve symbols

Transition position

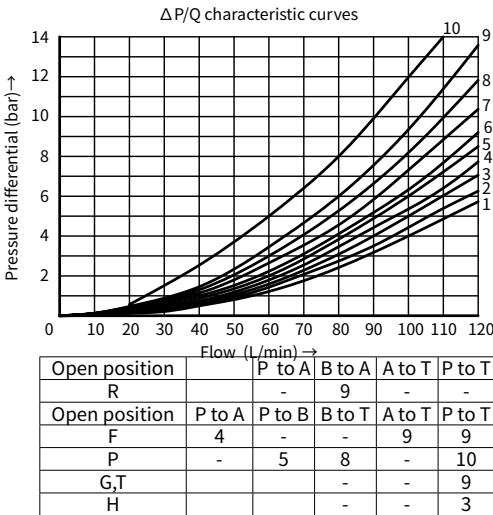
Spool valve symbols

¹⁾ Spool symbols B9,Y9 are only for type without .../O...and .../OF... .

²⁾ Example: If solenoid is fixed at position 'a', the ordering code is ...EA

Characteristic curves

(Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



Spool symbol	Flow direction			
	P to A	P to B	A to T	B to T
A,B	3	3	-	-
C	3	3	4	5
D,Y	5	5	6	6
E	1	1	4	4
F	2	3	7	4
G	3	3	6	7
H	1	1	6	7
J	1	1	3	3
L	2	2	3	5
M	1	1	4	5
P	4	2	5	7
Q	1	2	1	3
R	3	6	4	-
T	3	3	6	7
U,V	2	2	3	3
W	2	2	4	5

Technical data

Fixing position			Optional	
Environment temperature range			-30 to +50 (NBR seal)	
			-20 to +50 (FKM seal)	
Weight			Independently wiring	central monitoring station
	Single solenoid	kg	4.3(DC), 3.5(AC)	4.4(DC), 3.6(AC)
	Double solenoids	kg	5.9(DC), 4.3(AC)	6.0 (DC), 4.4(AC)
Max.operating pressure	Port A,B,P	bar	315	
	Port T	bar	210 (DC),160 (AC), when the operating pressure exceeds the permission value, spool symbol A and B must make the port T for draining.	
Max. flow-rate			L/min	120
Flow cross section (switching neutral position)	Version V	mm ²	11(A/B to T), 10.3(PtoA/B)	
	Version W	mm ²	2.5(A/B to T)	
	Version Q	mm ²	5.5(A/B to T)	
Fluid			Mineral oil suitable for NBR and FKM seal	
			Phosphate ester for FKM seal	
Fluid temperature range			-30 to +80 (NBR seal)	
			-20 to +80 (FKM seal)	
Viscosity range			mm ² /s	2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406	

Electric data

Type of voltage			DC	AC
Available voltage	V		12,24,28 ¹⁾ ,48,96,110,205,220	110,127,220
Voltage tolerance (nominal voltage)	%		Standard solenoid: +10~ -15 large-scope solenoid: +20~-30	
Power consumption	W		Standard solenoid: 35 large-scope solenoid: 42	
Holding power	VA		-	50
Making capacity	VA		-	550
Duty			Continuous working	
Switching time to ISO 6403	ON	ms	45 to 60	15 to 25
	OFF	ms	20 to 30	20 to 30
Switched frequency	times/h		to 15000	to 7200
Type of protection to DIN 40050			IP65(Z4,Z5L plug), IP67 (K7 Deutsch)	
Max. coils temperature	°C		+150	+180

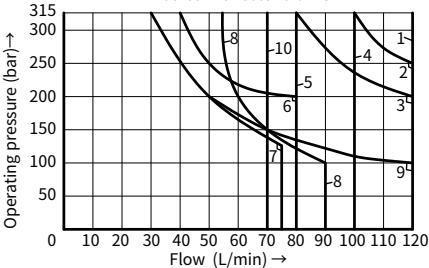
Caution: When connecting wires, properly connect the PE conductor (PE $\frac{1}{2}$).

(For other type voltage please consult us.)

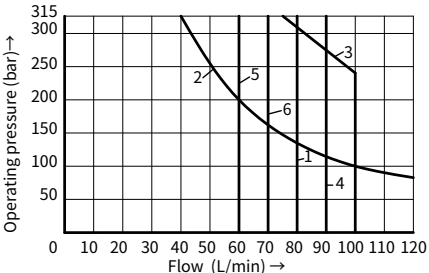
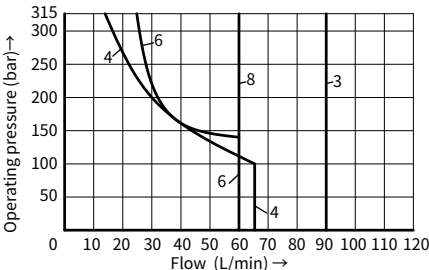
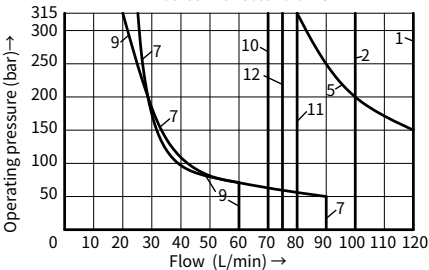
Performance limits (Measured at $\theta_{oil}=40^{\circ}C \pm 5^{\circ}C$, using HLP46)

The performance limits shown are valid when the valve is used with two directions of flow (e.g. from P to A with simultaneous return flow from B to T). Due to the flow forces occurring within the valves, the permissible switching performance limits can be significantly lower with only one direction of flow (e.g. from P to A and port B blocked)! (For these applications, please consult us.) The performance limit was determined with the solenoids at their operating temperature, 15% under voltage and with no pre-loading of the tank.

Valves with solenoid DC



Valves with solenoid AC



Curve	Spool symbol	Curve	Spool symbol
1	C, C/O, C/OF; D, D/O, D/OF; Y, M	5 ₁₎	R, L ₂₎ , U ₂₎
		6	G
2	E	7	T
3	A/O, A/OF; L, U, J, Q, W	8	F, P
		9	A, B
4	H	10	V

Notes: 1) Return flow (independent of area ratio);
2) Only suitable for neutral position

Curve	Spool symbol	Curve	Spool symbol
1	C, C/O, C/OF; D, D/O, D/OF; Y	6	G
		7	F, P
		8	V
2	E, L, U, Q, W	9	T
3	M	10	H
4	A, B	11	R
5	A/O, A/OF, J	12 ₁₎	L, U

Notes:
1) Only suitable for neutral position
48V 50Hz, 110V 50Hz, 127V 50Hz,
220V 50Hz, 230V 60Hz

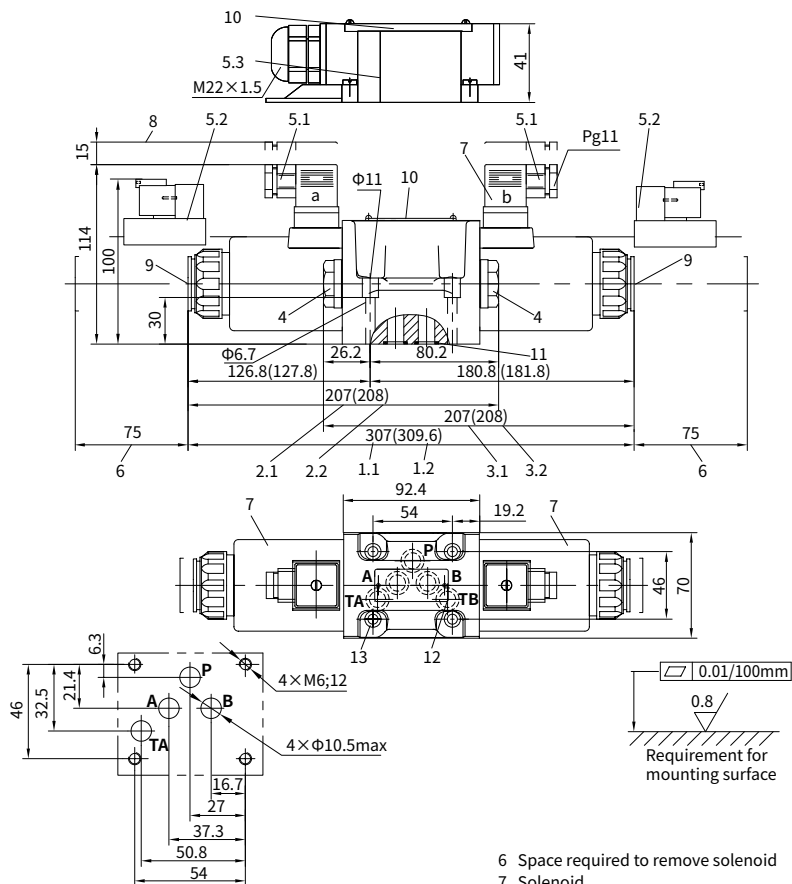
Curve	Spool symbol	Curve	Spool symbol
1	C, C/O, C/OF; D, D/O, D/OF; Y	3	E
		4	M
		5	V
2	A/O, A/OF	6	H

48V 60Hz, 110V 60Hz, 127V 60Hz, 220V 60Hz

Unit dimensions

(Dimensions in mm)

Valve with DC or rectification AC solenoid



- 1.1 Dimension of 3-position, standard version
- 1.2 Dimension of 3-position, large-scope
Type of voltage
- 2.1 Dimension of 2-position with solenoid at 'A',
standard version
- 2.2 Dimension of 2-position with solenoid at 'A',
large-scope Type of voltage
- 3.1 Dimension of 2-position with solenoid at 'B',
standard version
- 3.2 Dimension of 2-position with solenoid at 'B',
large-scope Type of voltage
- 4 Plug for valves with one solenoid
- 5.1 Plug-in connector to DIN 43 650 (rotatable 90°)
- 5.2 Deutsch connector assembly
- 5.3 Junction box with lead and light, M22×1.5 interface

- 6 Space required to remove solenoid
- 7 Solenoid
- 8 Space required to remove Plug-in connector
- 9 Fault inspection override 'N' button
- 10 Nameplate
- 11 O-ring 12×2
- 12 Fix additional port TB on the manifold
when necessary
- 13 Valve fixing screws:
M6×40 GB/T 70.1-10.9, Tightening torque
M_A=15.5Nm, must be ordered separately.

**It must be ordered separately,
if connection plate is needed.**

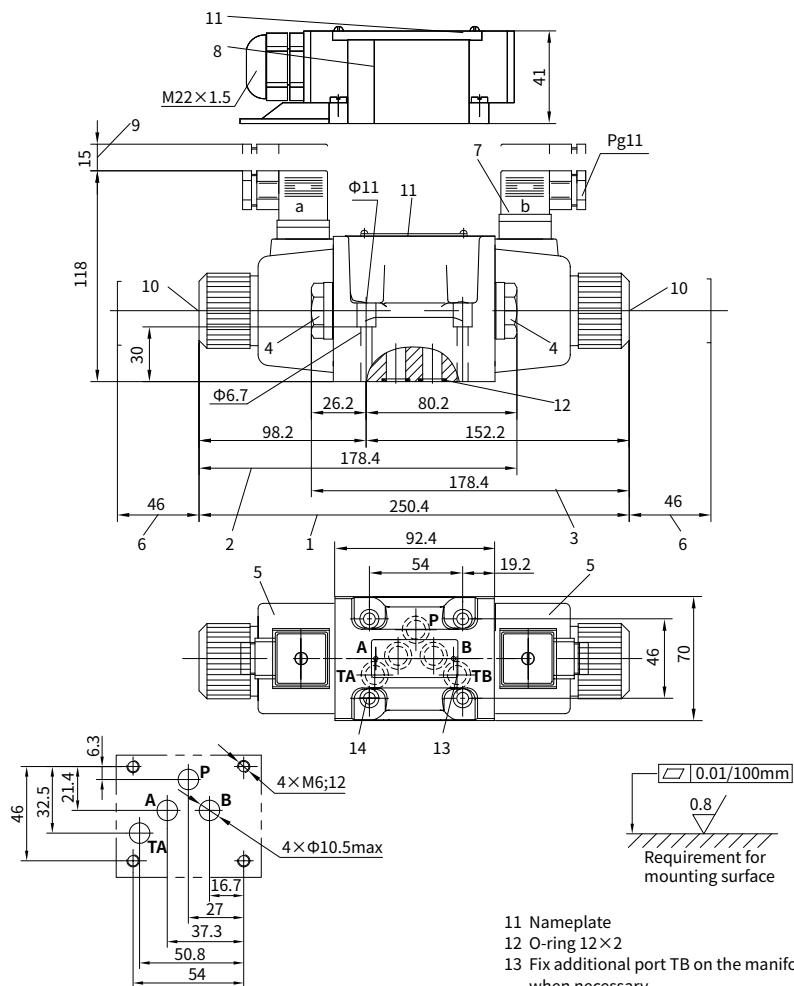
Type:

- G 66/01 (G 3/8), G 66/02(M18×1.5)
- G 67/01 (G 1/2), G 67/02(M22×1.5)
- G 534/01 (G 3/4), G 534/02(M27×2)

Unit dimensions

(Dimensions in mm)

Valve with AC solenoid



- 1 3-position valve
- 2 2-position valve with one solenoid(A,C,D,EA...)
- 3 2-position valve with one solenoid(B,Y,EB...)
- 4 Plug for valves with one solenoid
- 5 Solenoid
- 6 Space required to remove the solenoid
- 7 Plug-in connector to DIN 43 650 (Rotatable 90°)
- 8 Junction box with lead and light, M22×1.5 interface
- 9 Space required to remove Plug-in connector
- 10 Fault inspection override 'N' button

- 11 Nameplate
- 12 O-ring 12×2
- 13 Fix additional port TB on the manifold when necessary
- 14 Valve fixing screws:
M6×40 GB/T 70.1-10.9, Tightening torque
 $M_A=15.5\text{Nm}$, must be ordered separately.

**It must be ordered separately,
if connection plate is needed.**

Type:

- G 66/01 (G 3/8), G 66/02(M18×1.5)
G 67/01 (G 1/2), G 67/02(M22×1.5)
G 534/01 (G 3/4), G 534/02(M27×2)

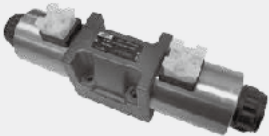


4/3, 4/2 and 3/2 Directional Valve with Wet-pin AC or DC Solenoid

2.12

Type WE 10...L5X

Size (NG) 10
Up to 350 bar
Up to 150 L/min



Contents

Function and configurations	02-03
Ordering code	04
Symbols	05
Technical data	06
Electrical data	06
Characteristic curves	07
Performance limits	07
Unit dimensions	08

Features

- Direct operated directional spool valve with solenoid operation
- Porting pattern according to DIN 24 340 Form A, ISO 4401, and CETOP-RP121H
- Wet-pin DC solenoids with detachable coil (AC voltages possible via a rectifier)
- Solenoid coil can be rotated through 90°
- The coil can be replaced without opening the pressure-tight chamber
- Adjustable spool switching time, optional

Function and configuration

WE10-L5X directional valves are solenoid operated directional spool valves. They control the start, stop and direction of flow with the additional option of adjusting the spool switching time.

These directional valves basically consist of the housing (1), one or two solenoids (2), the control spool (3), as well as one or two return springs (4).

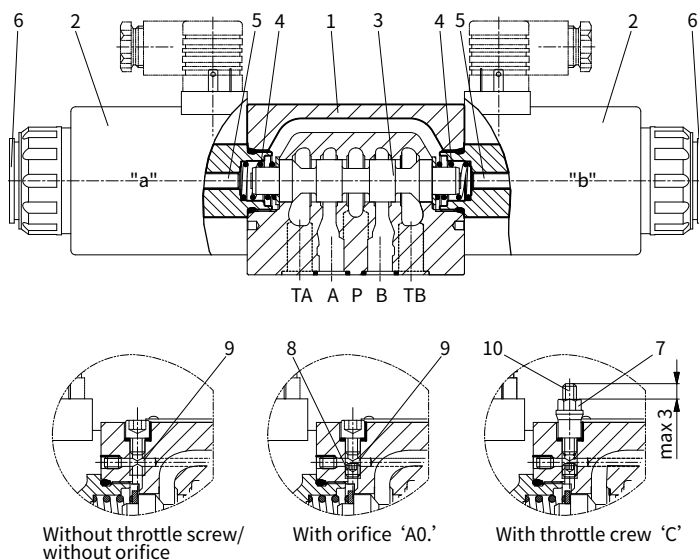
In de-energized condition, the control spool (3) is held in the central position or in the initial position by the return springs (4) (except for valves without spring "O").

If the wet-pin electronic solenoid (2) is energized, the control spool (3) moves out of its rest position into the required end position. In this way, the required direction of flow according to the selected symbol is released. After the electronic solenoid (2) has been switched off, the control spool (3) is pushed back into its central position or into its initial position (except for valves with "OF" detent and valves without type "O" spring). A manual override (6) allows for the manual switching of the valve without solenoid energization.

To ensure proper functioning, make sure that the pressure chamber of the solenoid is filled with oil.

Adjustable spool switching time (only with DC solenoids)

The optional installation of a throttle screw (7) or orifice (8) - see below - offers the possibility of increasing the switching time to 100ms or more for WE10-L5X series of 5-chamber directional valves. The switching time is influenced by factors such as pressure, flow rate and oil viscosity, depending on the situation of installation. When the main spool (3) is in the neutral or initial position, the spring chambers at both sides are filled with oil when reversing the spool, the oil in the spring chamber flows through the connecting channel (9) to move the spool forward. The adjustment time can be adjusted according to actual needs by limiting the connection channel (9) (such as screwing in the throttle screw or installing the orifice to reduce the overcurrent area).



Function and configuration

Type WE10.L5X/O...

(only possible with symbols A, C and D)

This version is a directional valve with 2 switched positions and 2 solenoids without detent. There is no defined spool position in the de-energized condition.

Type WE10.L5X/OF...(Impulse spool)

(only possible with symbols A, C and D)

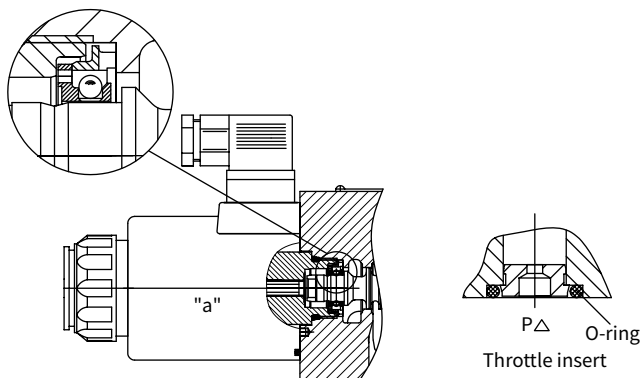
This version is a directional valve with 2 detented switched positions and 2 solenoids. Thus, the spool is held in the last switched position, permanent energization of the solenoid is not required.

Throttle insert

(Type 4WE10.L5X/.../B...)

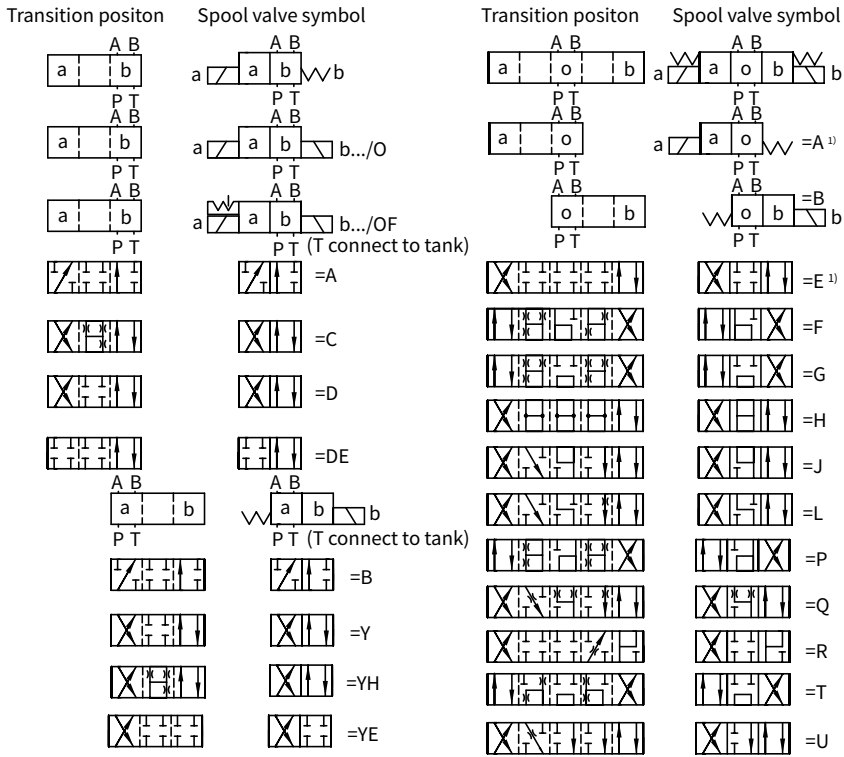
The use of a throttle insert is required, due to the operating conditions. Flows can occur during the switching process which are larger than the performance limits of the valve allow.

The orifice is to be inserted into the P channel of the directional valve.



Type:WE10.L5X/OF ... (Impulse spool)

Symbol



¹⁾ Example: Spool E with switched position “a”. Ordering detail ..EA..

Technical data

Fixing position			Optional
Ambient temperature range °C			– 30 to + 50 (with NBR seals)
			– 20 to + 50 (with FKM seals)
Weight	Valve with 1 solenoids	kg	4.3 (DC)
	Valve with 2 solenoids	kg	5.9 (DC)
Max.operating pressure	Port A,B,P	bar	350
	Port T	bar	210 (DC), With symbols A and B, port T must be used as a drain port, if the operating pressure is higher than the permissible tank pressure.
Maximum flow			L/min 150
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524, suitable for NBR and FKM
			Phosphate ester, suitable for FKM
Pressure fluid temperature range °C			– 30 to + 80 (with NBR seals)
			– 20 to + 80 (with FKM seals)
Viscosity range			mm ² /s 2.8 to 500
ISO code cleanliness class			Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (C) class 20/18/15

Electrical data

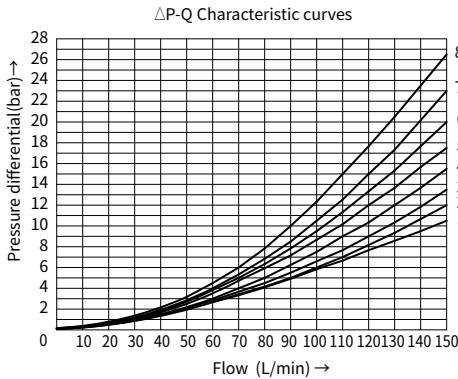
Voltage type			DC
Available voltage V			12, 24
Voltage tolerance (nominal voltage) %			Super performance solenoid: +10 ~ -15
Power consumption W			39
Duty			Continuous
Switching time to ISO 6403 (without switching time adjustment)	ON	ms	45 to 60
	OFF	ms	20 to 30
Switched frequency cycles/h			Up to 15000
Protection to DIN 40 050			Z4, Z5L, K4:IP65; K7:IP67
Maximum coil temperature °C			+150

When connecting the electrics, the protective conductor (PE $\perp$) must be connected according to the relevant regulations.

Note:

The solenoid coils must not be painted. Actuation of the manual override is only possible up to a tank pressure of approx. 50 bar [725 psi]. The simultaneous actuation of 2 solenoids of one valve must be ruled out!

Characteristic curves (Measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ [104 $\pm$ 9 ° F])

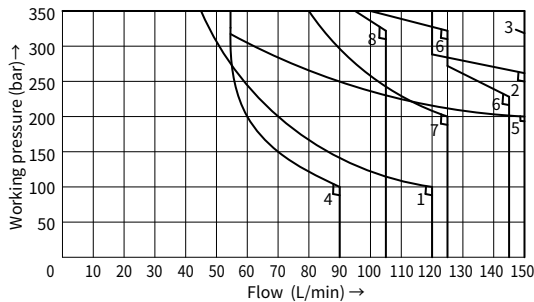


Spool symbol	Flow direction				
	P to A	P to B	A to T	B to T	P to T
A	4	4	-	-	-
B	4	5	-	-	-
C, J, Y, YH	2	3	5	7	-
D	2	2	5	7	-
E	3	3	6	7	-
F	1	3	3	8	4
G	4	5	6	8	7
H	1	1	6	8	7
L	3	3	5	7	-
P	3	1	5	6	5
R	3	4	5	6	-
U	2	2	5	7	-
DE	3	-	-	6	-
YE	-	3	6	-	-

Performance limits (Measured with HLP46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ [104 $\pm$ 9 ° F])

Due to the flow forces acting within the valves, the admissible performance limits may be considerably lower with only one direction of flow (e.g. from P to A while port B is blocked)!

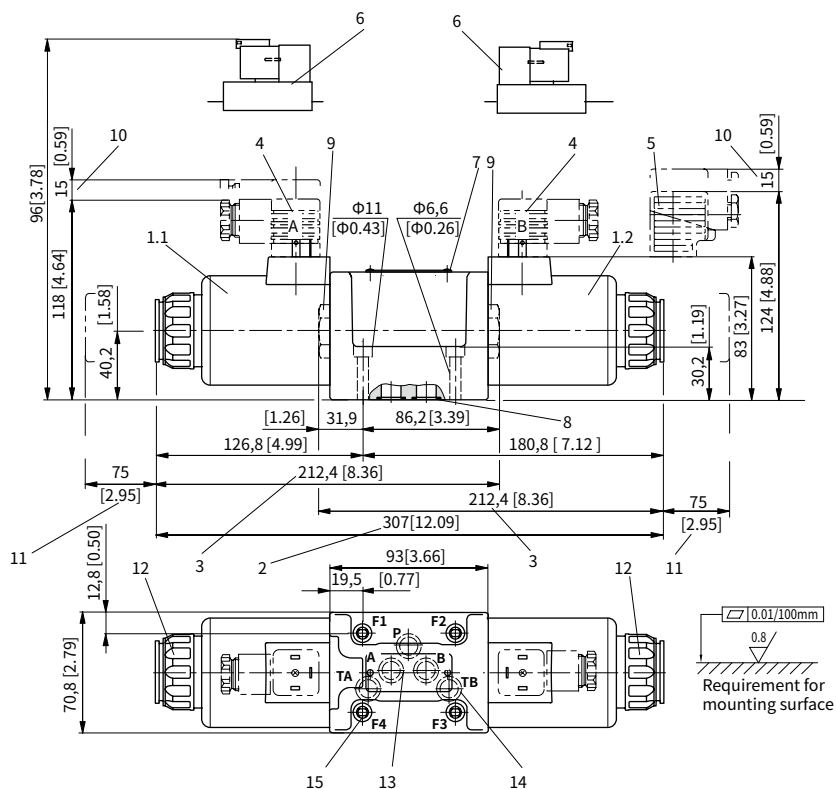
In such cases of application, please consult us! The switching performance limit was established while the solenoids were at operating temperature, at 15% undervoltage and without tank preloading.



Curve	Symbol
1	A, B
2	C, D, Y, YH
3	E
4	F, P
5	G
6	H, L, U
7	J
8	R

Unit dimensions

(Dimensions in mm)



1.1 Solenoid "a"

1.2 Solenoid "b"

2 Dimension of 3-position valves

3 Dimension of 2-position valves

4 Connector without indicator light

according to DIN EN 175301-803

5 Connector with indicator light

according to DIN EN 175301-803

6 DT04-2P Deutsch connector

7 Name plate

8 Identical seal rings for ports A, B, P, TA and TB

9 Plug screw for valves with one solenoid

10 Space required to remove connector

11 Space required to remove coil

12 Securing nut, tightening torque

 $M_A = 6+2 \text{ Nm}$ [4.43 +1.48 ft-lbs]

13 Porting pattern according to

ISO 4401-05-04-0-05 and DIN 24340 A10

14 TB can be used in connection with

separately produced bore

15 Valve fixing screws:

4 hexagon socket head cap screws, metric

ISO 4762-M6×40-10.9

Tightening torque $M_A = 15.5 \text{ Nm}$ [11.4 ft-lbs] $\pm 10 \%$

With different friction coefficients,

the tightening torques can be adjusted accordingly!

**It must be ordered separately,
if connection plate is needed. Type:**

G 66/01 (G3/8)

G 66/02 (M18×1.5)

G 67/01 (G1/2)

G 67/02 (M22×1.5)

G 534/01 (G3/4)

G 534/02 (M27×1.5)

Notice:

1. Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.

2. The dimensions are nominal dimensions which are subject to tolerances.

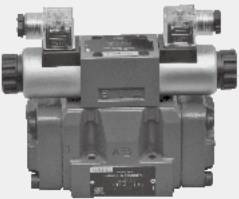


2.13

4/3, 4/2 and 3/2 directional valves of pilot operated

Type WEH 10, 16, 25 and 32

Sizes 10 ~ 32
Up to 350 bar
Up to 1100L/min



Contents

Function and configuration	02-06
Ordering code	07-08
Symbols	09-11
Technical data	12-16
Characteristic curves	17-18
Performance limit	19-20
Pilot-operated solenoid valve	21
Unit dimensions	22-25

Features

- Valves used to control the start, stop and direction of a fluid flow
- Electro-hydraulic operation (WEH)
- Porting pattern conforms to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H
- Wet pin DC or AC solenoids, optional
- Hand override, optional
- Electrical connections as an individual or central connection
- Spring centered, spring or hydraulic offset.

Function and configurations

Valves of type WEH are directional spool valves with electro-hydraulic operation. They control the start, stop and direction of a flow.

Solenoid valves used for pilot control are with wet AC or DC solenoid available; Main valves apply spring centering and spring reset or hydraulic reset; with or without Switching time adapters; with or without stroke regulators for main valves; back pressure valves may be installed in main valves; throttle may be installed; pressure reducing valves may be installed when working pressure exceeds 250bar.

The valve mainly consists of main valve body(1), main valve spool(2), one(or two)reset spring (3) with one(or two) pilot solenoid valve of solenoid. Main valve spools(2) is held in the neutral or in the initial position either by the springs or by means or pressure. Pilot solenoid valves (4) may select wet-type AC or DC solenoids(5) and pilot solenoid valves are able to control the switching of main valves.

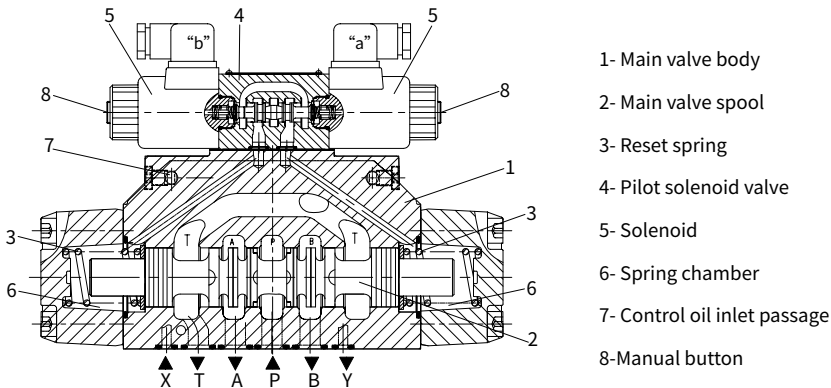
There are four patterns on supply and drain of control oil, see the function diagram.
Following are descriptions of various types of valves:

1. Main valves are 4/3-way directional valve with spring centring of the control spool.

Main valve spool(2) is held in the neutral position by means of two return springs. And two spring chambers(6) are connected with tank through pilot solenoid valves.

When one of the two ends of the main control spool (2) is pressurised with pilot pressure, the spool is moved to the switched position. The required ports in the valve are then opened to flow.

When the pilot pressure is removed, the spring on the opposite side to the pressurised spool area causes the spool to return to its neutral or initial position.



Structure chart of spring centering
electro-hydraulic directional valve

Function and configurations

2/4 way directional valves

(this kind of valve has four different structures and Types)

1. Type WEH.../...

This kind of pilot valve and main valve have a reset spring each, resetting by spring force.

2. Type WEH...H.../...

This kind of valve has a reset spring, making pilot valve spool stay in initial position. Main valve spools change directions under effect of pressure oil.

3. Type WEH...H.../O...

This kind of valve has two solenoids. There are no reset springs in pilot valves and main valves, thus using solenoids and pressure oil to make pilot valves and main valve spools change directions. Therefore, at least one solenoid shall be under working state.

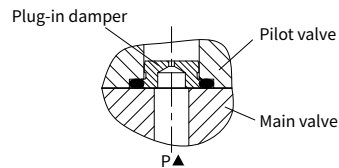
4. Type WEH...H.../OF...

This kind of valve has two solenoids and locators which makes pilot valve spools stay in working position (impulse valves). Main valve spools have no locating devices, moving downward to corresponding working positions under effect of pressure oil.

Structure 2, 3 and 4 aforesaid are hydraulic reset. Main valve spools can stay in the working position only under the effect of pressure oil.

Throttle insert:

The use of a throttle insert is required if the pilot oil supply in the P channel of the pilot valve is to be limited. This throttle is inserted in the P channel of the pilot valve.



Structure chart of plug-in dampers

Function and configurations

Pilot oil supply:

1. Type WEH10

(1) Conversion between internal supply and external supply:

P channel on the top of main valve bodies with M6 bolt(2) is external supply and with M6 bolt (2) dismantled is internal supply.

(2) Conversion between internal drain and external drain:

Dismounting plug screws(1) and installing M6 bolt(2) is external drain; dismantling M6 bolt(2) is internal drain.

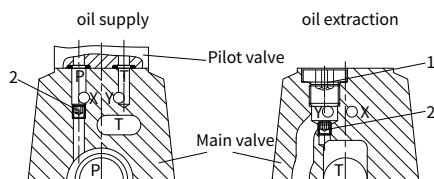
2. Type WEH16

(1) Conversion between internal supply and external supply:

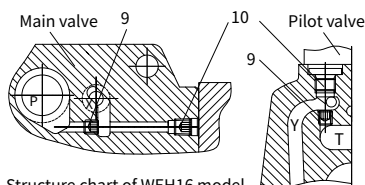
Dismounting plug screw(10) form P channel on the sidesurface of main valves and installing M6 bolt(9) is internal supply. Dismounting M6 plug bolt(9) is internal supply.

(2) Conversion between internal drain and external drain:

Dismounting plug screw(10) form T hole on the top of main valves and installing M6 plug bolt(9) is internal drain. Dismounting M6 bolt(9) is external drain.



Structure chart of WEH10 model supply and discharge



Structure chart of WEH16 model supply and discharge

3. Type WEH25

(1) Conversion between internal supply and external supply:

P channel on the top of main valve bodies with M6 bolt(6) is external supply and with M6 bolt (6) dismantled is internal supply.

(2) Conversion between internal drain and external drain:

Dismounting plug bolt(6) form T hole on the top of main valves and installing M6 plug bolt(9) is internal drain. Dismounting M6 bolt(9) is external drain.

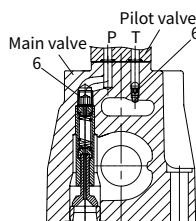
4. Type WEH32

(1) Conversion between internal supply and external supply:

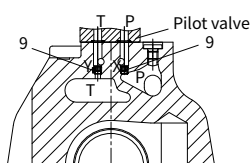
Dismounting plug screw(9) form P hole on the undersurface of main valves and installing M6 bolt(9) is internal supply. Dismounting M6 plug bolt(9) is internal supply.

(2) Conversion between internal drain and external drain:

Dismounting plug screw(9) form T hole on the top of main valves and installing M6 plug bolt(9) is internal drain. Dismounting M6 bolt(9) is external drain.



Structure chart of WEH25 model supply and discharge



Structure chart of WEH32 model supply and discharge

Attention:

X port on base plates must be blocked when internal supply occurs and Y port on base plates must be blocked when internal drain occurs.

Function and configurations

Switching time adjustment:

In order to influence the switching time of the main valve a double throttle check valve has to be fitted between pilot valves and main valves to control oil supply from pilot valves into main valve spools, thus adjusting the switching time of main valves.

Regulating bolt rotation clockwise, the time for switching of main valves is long, otherwise the time is short.

The throttle check valve has two kinds: meter-in throttling and meter-out throttling. If there is a need of changing meter-in throttling into meter-out throttling, just install the valve after rotating 180° around the longitudinal axis again and then install pilot valves.

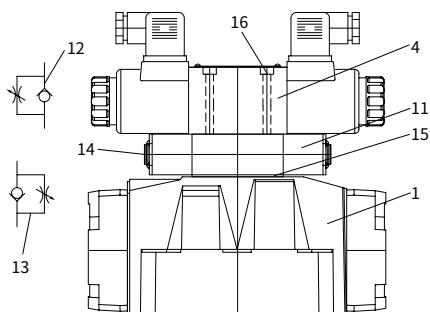


Figure of WEH.....S or S2 type commutating time regulator for valve installation

- 1- Main valve
- 4- Pilot valve
- 11- Switching time regulator(Z2FS6)
- 12- Meter-out throttling
- 13- Meter-in throttling
- 14- Adjustable bolt
- 15- Seal ring support plate
- 16- Set screw M5×L GB/T70.1-10.9 grade, the length of L is determined by height stacked, tightening torque 8.9 Nm.

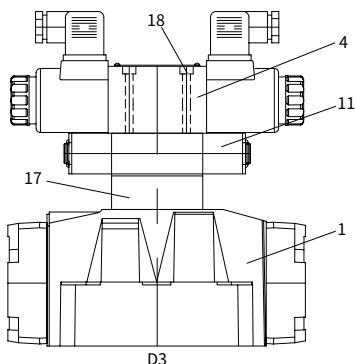
Pressure reducing valves:

The pressure reducing valve (8) must be used if the pilot pressure is higher than 250 bar (for type 4WEH 22 ...: 210 bar). Pressure reducing ratio of constant-ratio pressure reducing valves(D1)1:0.66.

Pressure reducing pressure of constant-ratio pressure reducing valves shall not exceed 40bar.

Minimum control pressure of technical specifications shall improve 1/0.66=1.515 after installing bottom plate pressure reducing valves.

Constant-ratio pressure reducing valves shall not be used when controlling internal oil drain and using back pressure valves(P0.45) with control pressure decreased to 3bar.



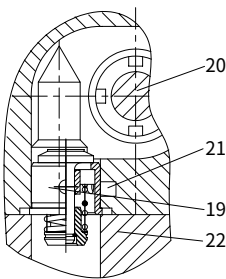
Structure chart of WEH.../...S...D1 or D3 type valve with pressure reducing valves

- 1- Main valve
- 4- Pilot valve
- 11- Switching time regulator
- 17- Pressure reducing valve
- 18- Bolt M5×L GB/T70.1-10.9

Function and configurations

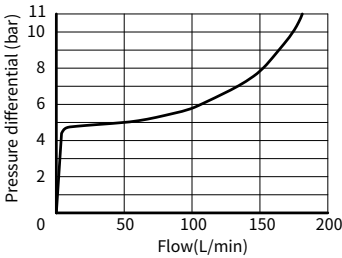
Back pressure valve:

Valves controlling oil inner supply with unloading passages, such as C, Z, G, H, P, S, T and V, In valves with zero pressure circulation and internal pilot oil supply,a back pressure valve (9) must be installed in the P-channel of the main valve to build up the minimun pilot pressure. The pressure differential of the back pressure valve must be added to the pressure differential of the main valve (see characteristic curves) in order to determine the acutal value. The opening pressure of this valve is approx. 4.5 bar. NG10 valves do not have back pressure valves.

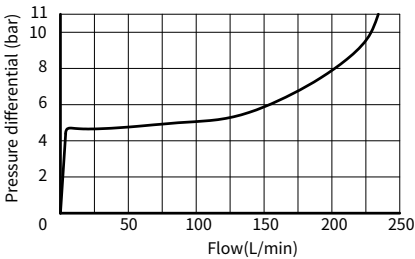


WEH16(32).../.../...PO.45 type
Structure chart of back pressure
valve of electro-hydraulic directional valve

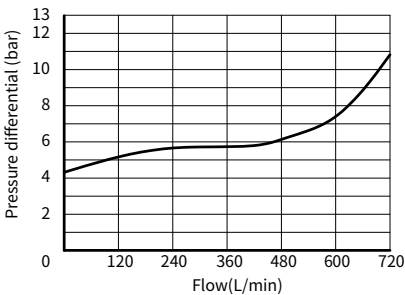
- 19- Back pressure valve
- 20- Main valve
- 21- Control oil chamber(X)
- 22- Connecting plate



Pressure loss curve of **WEH16** type electro-hydraulic directional valves passing through back pressure valves (Test condition:use HLP46, $\vartheta_{oil}=40^{\circ}C \pm 5^{\circ}C$)



Pressure loss curve of **WEH25** type electro-hydraulic directional valves passing through back pressure valves (Test condition:use HLP46, $\vartheta_{oil}=40^{\circ}C \pm 5^{\circ}C$)



Pressure loss curve of **WEH32** type electro-hydraulic directional valves passing through back pressure valves (Test condition:use HLP46, $\vartheta_{oil}=40^{\circ}C \pm 5^{\circ}C$)

Ordering code

		WEH10		-	L4X	/						/				*
Working pressure 350bar = no code																Further details in clear text
3 ways = 3 (For spool A and B) 4 ways = 4																No code = NBR seals V = FKM seals
Spring centering or reset = No code Hydraulic reset = H (only 2-position valve A, B, C, D, K, Z, Y)																No code= without pressure reducing valves D1= with constant-ratio pressure reducing valves (pressure reducing 1:0.66) D3= with constant-value pressure reducing valves
See function symbols																
Series L40 to L49 = L4X (L40 to L49: unchanged installation and connection dimensions)																No code = without cartridge dampers B08= with dampers 0.8mm B10= 1.0mm B12= 1.2mm B15= 1.5mm
When pilot valves use 2-position valves of 2 solenoid and main valves are 2-position valves of hydraulic reset, "H" shall be indicated clearly, at this time, when pilot valves Without spring return = O Without spring return with detent = OF (O and OF do not apply to B, Y)																Z4 = square plugs (not applicable for the integer) Z5L = square plugs with lamps K4 = DIN4365 sockets without plugs K7 = Deutsch connector assembly, without plugs DL = Junction boxes with lead wires and lamps (M22 × 1.5 interface)
High-performance solenoid pilot valve = 6E Low power solenoid pilot valve (only DC24V) = 6H																
DC24V = G24 The integer 110V = W110R 220V = W220R																
Other voltage see electric part																
With manual override buttons = N																No code= Without switching time adjustment S = Switching time adjustment as meter-in control S2 = Switching time adjustment as meter-out control
Control oil supply and drain Type: external supply external drain = No code internal supply external drain = E internal supply and internal drain = ET (Not available for function C, Z, F, G, H, P, T, V) external supply internal drain = T																

Note:

- For function of WEH10 such as C,Z,F,G,H,P,T,V, etc, if applying control oil internal supp, please try to use external add enough back pressure on return port T (port Y shall not have back pressure) to ensure valves can reverse properly.
- Pressure reducing valves shall be applied when control pressure exceeds 250bar.

Ordering code

	WEH		-L7X/					/				*
Working pressure 350bar =No code												Further details in clear text
3 ways = 3 (For spool A and B)												No code = NBR seals V = FKM seals
4 ways = 4												
Sizes: 16 = 16 25 = 25 32 = 32												No code= without pressure reducing valves D1= with constant-ratio pressure reducing valves (pressure reducing 1:0.66) D3= with constant-value pressure reducing valves
Main valve spring reset or centering=No code Main valve hydraulic reset =H												No code= without back pressure valves P0.45=with back pressure valves: cracking pressure 4.5bar P0.70=with back pressure valves: cracking pressure 7bar
See slide valve function marks												No code= without cartridge dampers B08= with throttle 0.8mm B10= with throttle 1.0mm B12= with throttle 1.2mm B15= with throttle 1.5mm
Series L70 to L79 = L7X (L70 to L79:unchanged installation and connection dimensions)												Z4 = square plugs (not applicable for the integer) Z5L= square plugs with lamps K7 = Deutsch connector assembly, without plugs DL = Junction boxes with lead wires and lamps (M22×1.5 interface)
When pilot valves use 2-position valves of 2 solenoid, main valves are hydraulic reset, "H" must be indicated clearly before Type code at this time when pilot valves: Without reset spring = O Without reset spring,with detent = OF (O and OF not applicable to B and Y function)												No code = Without switching time adjustment S = Switching time adjustment as meter-in control S2 = Switching time adjustment as meter-out control
High-performance solenoid pilot valve = 6E Low power solenoid pilot valve (only DC24V) = 6H												
DC24V = G24 The integer110V = W110R 220V = W220R Other voltage see electric part												
With manual override buttons = N												
Control oil supply and drain Type: external supply external drain = No code internal supply and drain = ET internal supply external drain = E external supply internal drain = T												

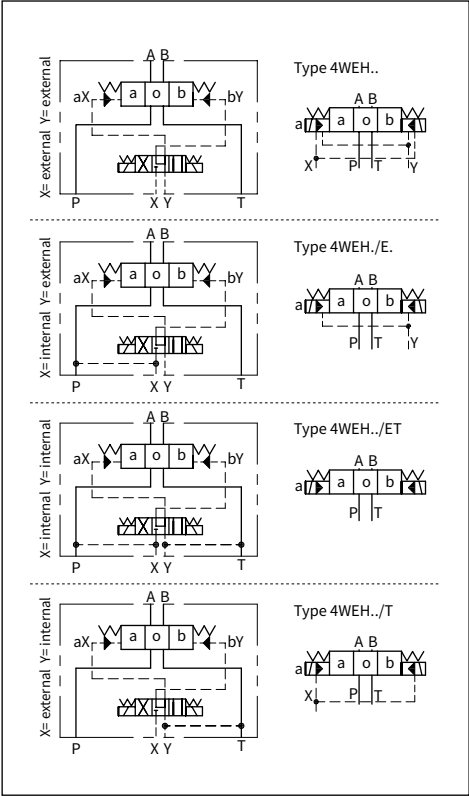
Note:

1. For function of WEH16-32 such as C, Z, F, G, H, P, T, V, etc, if applying control oil internal supp, please try to use external add enough back pressure on return port T(port Y shall not have back pressure) to ensure valves can reverse properly.
2. Pressure reducing valves shall be applied when control pressure exceeds 250bar.

Symbols

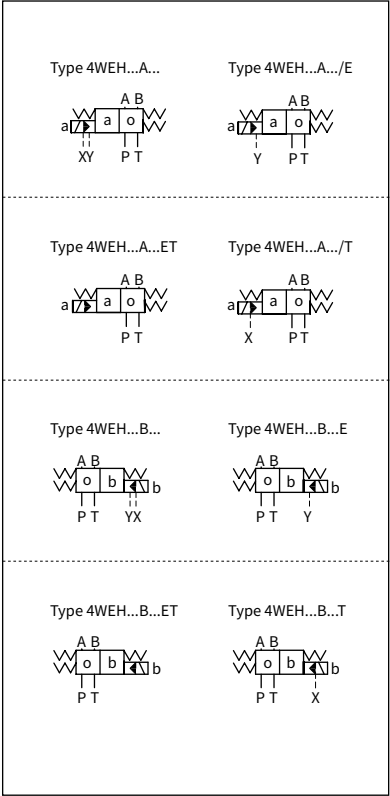
Valves with spring centred

Detailed and simplified symbols for 3-position valves



Valves with spring offset

(At position A or B of 2-position valve derived from 3-position)



Symbols

Spools of 3-position valves

3-position valve

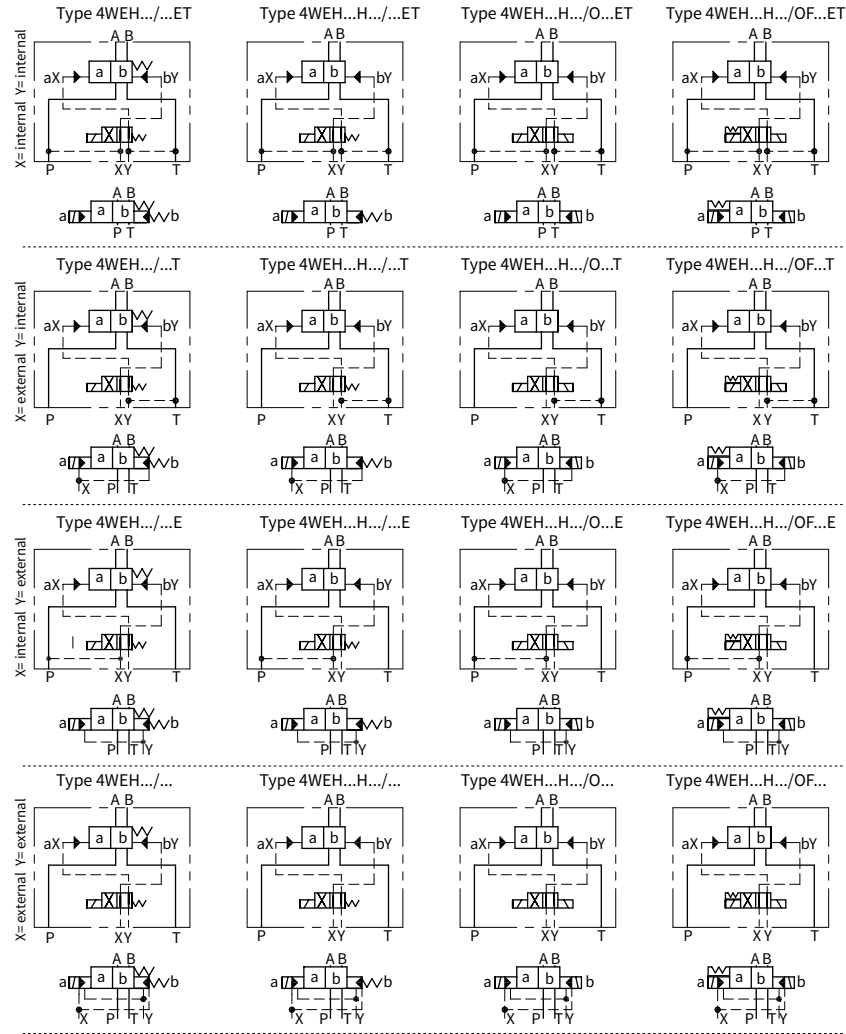
3-position valve type	Symbol	Crossover Symbol
4WEH...E.../... E		
4WEH...F.../... F		
4WEH...G.../... G		
4WEH...H.../... H		
4WEH...J.../... J		
4WEH...L.../... L		
4WEH...M.../... M		
4WEH...P.../... P		
4WEH...Q.../... Q		
4WEH...R.../... R		
4WEH...S.../... S		
4WEH...T.../... T		
4WEH...U.../... U		
4WEH...V.../... V		
4WEH...W.../... W		
4WEH...M1.../... M1		
4WEH...M2.../... M2		
4WEH...J2.../... J2		

2-positon derivative from 3-position

2-position valve type	Symbol (solenoid at A end)	2-position valve type	Symbol (solenoid at B end)
4WEH...EA.../... EA		4WEH...EB.../... EB	
4WEH...FA.../... FA		4WEH...FB.../... FB	
4WEH...GA.../... GA		4WEH...GB.../... GB	
4WEH...HA.../... HA		4WEH...HB.../... HB	
4WEH...JA.../... JA		4WEH...JB.../... JB	
4WEH...LA.../... LA		4WEH...LB.../... LB	
4WEH...MA.../... MA		4WEH...MB.../... MB	
4WEH...PA.../... PA		4WEH...PB.../... PB	
4WEH...QA.../... QA		4WEH...QB.../... QB	
4WEH...RA.../... RA		4WEH...RB.../... RB	
4WEH...SA.../... SA		4WEH...SB.../... SB	
4WEH...TA.../... TA		4WEH...TB.../... TB	
4WEH...UA.../... UA		4WEH...UB.../... UB	
4WEH...VA.../... VA		4WEH...VB.../... VB	
4WEH...WA.../... WA		4WEH...WB.../... WB	
4WEH...M1A.../... M1A		4WEH...M1B.../... M1B	
4WEH...M2A.../... M2A		4WEH...M2B.../... M2B	
4WEH...J2A.../... J2A		4WEH...J2B.../... J2B	

Symbols

Detailed and simplified symbols for 2-position valves



Spools of 2-position valves

Spools:	A	C	D,DE	K	Z	B	Y,YE
Spool symbols:	a  b Port T for draining	a  b	D a  b DE a  b	a  b	a  b	a  b Port T for draining	Y a  b YE a  b
Transition symbols:							

Technical details

1. Hydraulic section

1). WEH10 Type electro-hydraulic directional valve

Maximum working pressure:		bar	Type WEH10							
P, A, B			350							
Port T	With external pilot oil drain	bar	315							
	With internal pilot oil drain	bar	DC210, AC160							
Port Y	With external pilot oil drain	bar	DC210, AC160							
Min. control pressure	With external pilot oil supply	bar	3-position valve 10							
	With internal pilot oil supply (not apply to C, Z, F, G, H, P, T, V)		Spring-return 2-position valve 10							
	With internal pilot oil supply (apply to C, Z, F, G, H, P, T, V)		Hydraulic-return 2-position valve 7							
		bar	6.5							
Max. control pressure		bar	250							
Hydraulic fluid			Mineral oil, phosphate oil							
Temperature range of Hydraulic fluid		°C	-30 to+80 (NBR seals)							
			-20 to+80 (FKM seals)							
Viscosity range		mm ² /s	2.8 to 500							
Switching pilot oil volume		cm ³	3-position valve 2.04							
			2-position valve 4.08							
Switching times (= Valve switching time from the neutral position to the switched position) (AC and DC)										
Control pressure		bar	70		140		210		250	
			AC	DC	AC	DC	AC	DC	AC	DC
- 3-position valve		ms	30	65	25	60	20	55	15	50
- 2-position valve		ms	35	80	30	75	25	70	20	65
Switching times (= Valve switching time from the neutral position to the switched position)										
- 3-position valve		ms	30							
- 2-position valve		ms	35	40	30	35	25	30	20	25
Flow of shortest switching time		L/min	About 35							
Installation position			HC, HD, HK, HZ and HY of hydraulic return shall installed horizontally. The rest are arbitrary							
Weight	Single solenoid valve	kg	6.7							
	Double solenoid valve		7.1							
	Switching time regulator		1.0							
	Reducing valve		0.5							

Technical details

1. Hydraulic section

2). WEH16 Type electro-hydraulic directional valve

Maximum working pressure:		bar	Type WEH16						
P, A, B			350						
Port T	With external pilot oil drain	bar	250						
	With internal pilot oil drain	bar	DC210, AC160						
Port Y	With external pilot oil drain	bar	DC210, AC160						
Min. control pressure	With external pilot oil supply	bar	3-position valve 14						
	With internal pilot oil supply		Spring-return 2-position valve 14						
			Hydraulic-return 2-position valve 14						
	With internal pilot oil supply		When applying prepressing or the flow is large correspondingly ,enginery of spool valve is 4.5 as C, Z, F, G, H, P, S, T and V						
Max. control pressure		bar	250						
Hydraulic fluid			Mineral oil, phosphate oil						
Temperature range of Hydraulic fluid	°C		-30 to+80 (NBR seals)						
			-20 to+80 (FKM seals)						
Viscosity range		mm ² /s	2.8 to 500						
Switching pilot oil volume		cm ³	Spring-centering 3-position valve 5.72						
		cm ³	2-position valve 11.45						
* Switching times (= Valve switching time from the neutral position to the switched position) (AC and DC)									
Control pressure	bar	50		150		250			
		AC	DC	AC	DC	AC	DC	AC	DC
- Spring-centering 3-position valve	ms	35	65	30	60	30	58		
- 2-position valve	ms	45	65	35	55	30	50		
*Switching times (= Valve switching time from the neutral position to the switched position)									
- Spring-centering 3-position valve	ms	30							
- 2-position valve	ms	45	45	35	35	30	30		
Installation position		C, D, K, Z, Y Type hydraulic-return valves are installed horizontally, the rest can be installed arbitrarily							
Flow of shortest switching time		L/min	About 35						
Weight of the valve		kg	About 9.5						

*Switching time refers to time from drawing of solenoidof pilot valve to full opening of main valve.

02

Technical details

1. Hydraulic section

3). WEH25 Type electro-hydraulic directional valve

Maximum working pressure: P, A, B		bar	Type WEH25 350							
Port T	With external pilot oil drain	bar	250							
	With internal pilot oil drain	bar	DC210, AC160							
Port Y	With external pilot oil drain	bar	DC210, AC160							
Min. control pressure	With external pilot oil supply	bar	Spring-centering 3-position valve 13							
	With internal pilot oil supply	bar	Spring-return 2-position valve 13							
		bar	Hydraulic-return 2-position valve 8							
		With internal pilot oil supply	bar	When applying prepressing or the flow is large correspondingly ,enginery of spool valve is 4.5 as C, Z, F, G, H, P, S, T and V						
Max. control pressure		bar	250							
Hydraulic fluid			Mineral oil, phosphate oil							
Temperature range of Hydraulic fluid		°C	-30 to+80 (NBR seals)							
			-20 to+80 (FKM seals)							
Viscosity range		mm ² /s	2.8 to 500							
Switching pilot oil volume		cm ³	Spring-centering 3-position valve 14.2							
		cm ³	2-position valve 28.4							
* Switching times (= Valve switching time from the neutral position to the switched position) (AC and DC)										
Control pressure		bar	50		140		210		250	
			AC	DC	AC	DC	AC	DC	AC	DC
- Spring-centering 3-position valve		ms	50	85	40	75	35	70	30	65
- Spring-return 2-position valve		ms	120	160	100	130	85	120	70	105
Switching times (= Valve switching time from the neutral position to the switched position)										
- Spring-centering 3-position valve		ms	40							
- Spring-return 2-position valve		ms	120	125	95	100	85	90	75	80
Installation position			C, D, K, Z, Y Type hydraulic-return valves are installed horizontally, the rest can be installed arbitrarily							
Flow of shortest switching time		L/min	About 35							
Weight of the valve		Kg	About 18							

*Switching time refers to time from drawing of solenoidof pilot valve to full opening of main valve.

Technical details

1. Hydraulic section

4). WEH32 Type electro-hydraulic directional valve

Maximum working pressure:			bar	Type WEH32				
P, A, B				350				
Port T	With external pilot oil drain	bar	250					
	With internal pilot oil drain	bar	DC210, AC160					
Port Y	With external pilot oil drain	bar	DC210, AC160					
Min. control pressure	With external pilot oil supply With internal pilot oil supply	bar	3-position valve 8.5					
			Spring-return 2-position valve 10					
			Hydraulic-return 2-position valve 5					
	With internal pilot oil supply	bar	When applying prepressing or the flow is large correspondingly ,enginery of spool valve is 4.5 as C, Z, F, G, H, P, S, T and V					
Max. control pressure		bar	250					
Hydraulic fluid			Mineral oil, phosphate oil					
Temperature range of Hydraulic fluid		°C	-30 to+80 (NBR seals)					
			-20 to+80 (FKM seals)					
Viscosity range		mm ² /s	2.8 to 500					
Switching pilot oil volume		cm ³	Spring-centering 3-position valve	29.4				
		cm ³	2-position valve	58.8				
* Switching times (= Valve switching time from the neutral position to the switched position) (AC and DC)								
Control pressure		bar	50		150		250	
			AC	DC	AC	DC	AC	DC
- Spring-centering 3-position valve		ms	65	80	50	90	35	105
- Spring-return 2-position valve		ms	100	130	75	100	60	115
Switching times (= Valve switching time from the neutral position to the switched position)								
- Spring-centering 3-position valve		ms	(直流: 50, 交流: 60)					
- 2-position valve		ms	115	90	35	70	65	65
Installation position			C, D, K, Z, Y Type hydraulic-return valves are installed horizontally, the rest can be installed arbitrarily					
Flow of shortest switching time		L/min	About 50					
Weight of the valve		kg	About 36					

*Switching time refers to time from drawing of solenoidof pilot valve to full opening of main valve.

02

Technical details

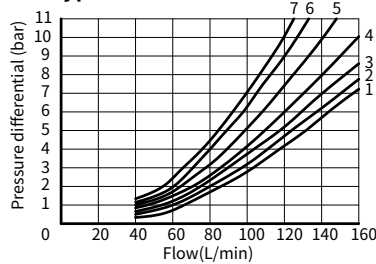
2. Electrical data

Type of voltage	Direct voltage		Alternating voltage
Voltage (allowable fluctuation of $\pm 10\%$)	12, 24, 28 ¹⁾ , 48, 96 110, 205, 220		110, 127, 220
Power(W)	High-performance solenoid valve 30	Low-powered solenoid valve 16	
Holding power (VA)			50
Starting power (VA)			220
Operating state	Continuous		
Temperature range of environment (°C)	~ +50		
Temperature range of coil (°C)	~ +150		
Protection class to DIN40050	IP65		

1) Usually used for engineering machinery.
for other voltage, please consult the company.

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

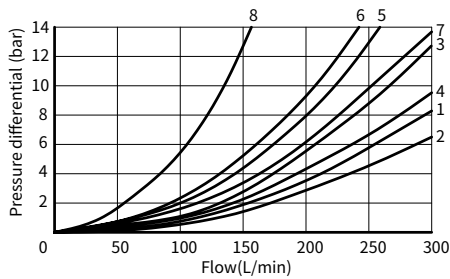
Type WEH 10...



Pressure loss curve graph of **WEH10** Type electro-hydraulic directional control valve

Enginery symbol	Switching position				Enginery symbol	Neutral position		
	P → A	P → B	A → T	B → T		A → T	B → T	P → T
E, Y, D	2	2	4	5				
F	1	4	1	4	F	3	-	6
G, T	4	2	2	6	G, T	-	-	7
H, C	4	4	1	4	H	1	3	5
J, K	1	2	1	3				
L	2	3	1	4	L	3	-	-
M	4	4	3	4				
P	4	1	3	4	P	-	7	5
Q, V, W, Z	2	2	3	5				
R	2	2	3	-				
U	3	3	3	4	U	-	4	-

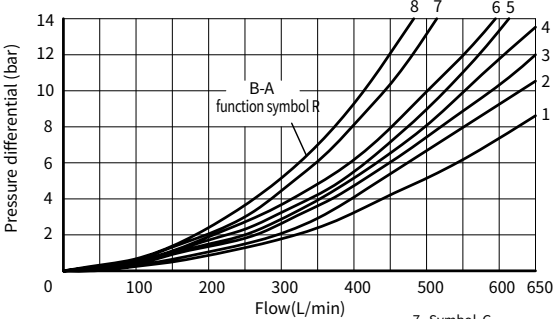
Type WEH 16...



Pressure loss curve graph of **WEH16** Type electro-hydraulic directional control valve

Symbol	Switching position				
	P → A	P → B	A → T	B → T	P → T
E, Y, D	1	1	1	3	-
F	2	2	3	3	-
G, T	5	1	3	7	6
H, C, Q, V, Z	2	2	3	3	-
J, K, L	1	1	3	3	-
M, W	2	2	4	3	-
R	2	2	4	-	-
U	1	1	4	7	-
S	4	4	4	-	8

Type WEH 25...



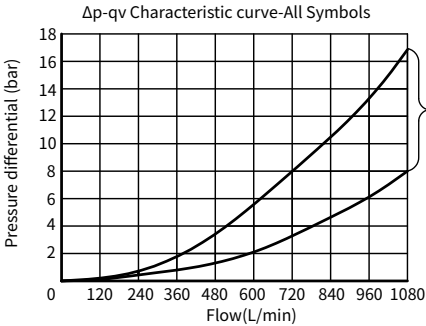
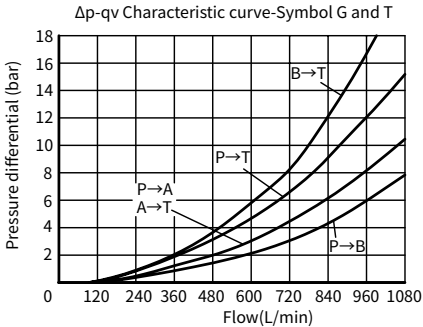
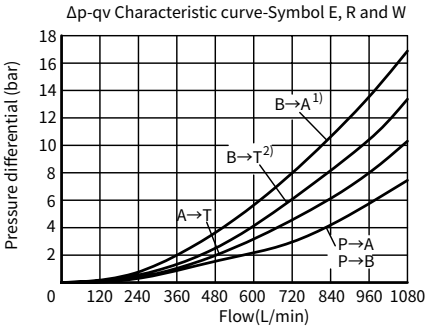
Pressure loss curve graph of **WEH25** Type electro-hydraulic directional control valve

7 Symbol G
Neutral position P-T
8 Symbol T
Neutral position P-T

Symbol	Switching position			
	P → A	P → B	A → T	B → T
E	1	1	1	3
F	1	4	3	3
G	3	1	2	4
H	4	4	3	4
J, Q	2	2	3	5
L	2	2	3	3
M	4	4	1	4
P	4	1	1	5
R	2	1	1	-
U	4	1	1	6
V	2	4	3	6
W	1	1	1	3
T	3	1	2	4

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

Type WEH 32...



Characteristic curve of other engines

- 1) Only apply to Symbol R
- 2) Not apply to Symbol R

Pressure loss curve graph of **WEH32** Type
electro-hydraulic directional control valve

When valve is at the middle position,open area of all flow directions

Size	Enginery	Open area (mm ²)			
		P → A	P → B	A → T	B → T
WEH10	Q	-	-	13	13
	V	13	13	13	13
	W	-	-	2.4	2.4
WEH16	Q	-	-	32	32
	V	32	32	32	32
	W	-	-	6	6
WEH25	Q	-	-	83	83
	V	83	83	83	83
	W	-	-	14	14
WEH32	Q	-	-	78	78
	V	73	73	84	84
	W	-	-	20	20

Performance limit

The switching function of valves depends on filtration due to adhesive effects. To achieve the specified permissible flow values, we recommend full-flow filtration with 25 µm. The flow forces acting within the valves also have an influence on the flow performance. With 4-way directional valves, the specified flow data are therefore valid for normal applications with 2 directions of flow (e.g. from P to A and simultaneous return flow from B to T) (see table).
If the fluid flows in only one direction, the permissible flow may be significantly lower in critical cases (e.g. use of a 4-way directional as 3-way directional valve with port A or B blocked).

Type: WEH10 electro-hydraulic directional control valve

3-position valve, spring centering					2-position valve, main valve without spring				
Flow(L/min)		Pressure stage(bar)			Flow(L/min)		Pressure stage(bar)		
Symbol		200	250	315	Symbol		200	250	315
E, J, L, M, Q, U, W, R, V		160			HC HD HK HZ HY		160		
H		160	150	120	HC.../O HD.../O HK.../O HZ.../O		160		
G, T		160		140	HC.../OF... HD.../OF... HK.../OF... HZ.../OF...		160		
F, P		160	140	120					
2-position valve whose main valve has a returning spring									
C, D, K, Z, Y		160							

Type: WEH16 electro-hydraulic directional control valve

Spring-centering 3-position valve						2-position valve					
Flow(L/min)	Pressure stage(bar)					Flow(L/min)	Pressure stage(bar)				
Symbol	70	140	210	280	350	Symbol	70	140	210	280	350
E, H, J, L, M, Q, U, W, R	300	300	300	300	300	C	300	300	300	300	300
F, P	300	300	270	260	250	D, Y	300	270	260	250	230
G, T	300	250	180	170	150	K	300	250	240	230	210
S	300	250	240	210	190	Z	300	260	190	180	160
V	300	300	300	250	220	Hydraulic-return 2-position valve					
	300	250	210	200	180	HC, HD, HK, HZ, HY	300	300	300	300	300
						When control oil is supplied internally and pressure valve is equipped, the flow of spool valve's enginery of H, F, P, G, T, S, V, C and Z Types reaches 160L/min.					

Performance limit

Type: WEH25 electro-hydraulic directional control valve

3-position valve of spring centering						2-position valve					
Flow(L/min)	Pressure stage(bar)					Flow(L/min)	Pressure stage(bar)				
Symbol	70	140	210	280	350	Symbol	70	140	210	280	350
E, L, M	650	650	650	650	650	G, D, K, Z, Y	650	650	650	650	650
U, W, Q						Hydraulic-return 2-position valve (main valve without spring)					
G, T	400	400	400	400	400	HC HD HK HZ HY	650	650	650	650	650
F	650	550	430	330	300	HC.../O					
H	650	650	550	400	360	HD.../O					
J	650	650	650	600	520	HK.../O					
P	650	550	430	330	300	HZ.../O	650	650	650	650	650
V	650	550	400	350	310	HC.../OF...					
R	650	650	650	650	580	HD.../OF...					
G, T	400	400	400	400	400	HK.../OF...					
						HZ.../OF...					
						When control oil is supplied internally and pressure valve is equipped, the flow of spool valve's enginery of G, Z, V, F, H, P, T Types reaches 180L/min.					

Type: WEH32 electro-hydraulic directional control valve

3-position valve of spring centering						2-position valve					
Flow(L/min)	Pressure stage(bar)					Flow(L/min)	Pressure stage(bar)				
Symbol	70	140	210	280	350	Symbol	70	140	210	280	350
E, J, L, M, R U, W, R	1100	1040	860	750	680	C, D, K, Z, Y	1100	1040	860	750	680
H, G	1100	1000	680	500	450	Hydraulic-return 2-position valve					
F, T, P	820	630	510	450	400	HC, HD, HK, HZ, HY	1100	1040	860	750	680
						When control oil is supplied internally and pressure valve is equipped, the flow of spool valve's enginery of C, G, T, F, P, H, V and Z Types reaches 180L/min.					

Pilot-operated solenoid valve

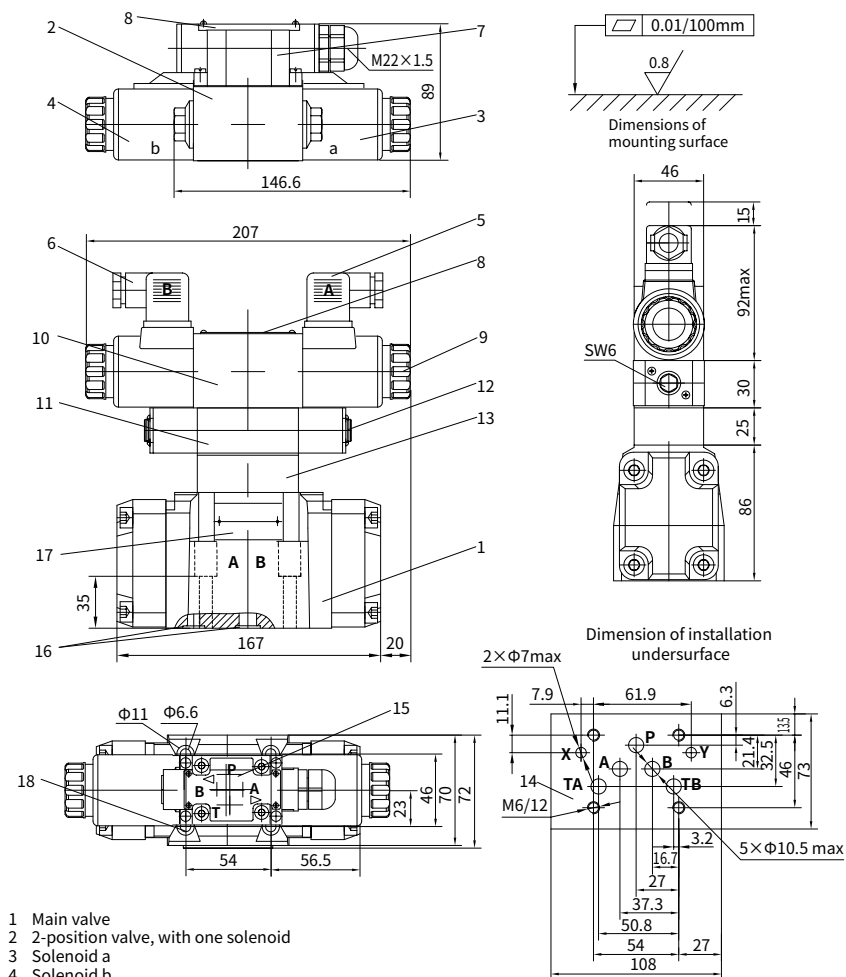
Use a four-way directional control valve with size of 6 to be a pilot valve. Spool valve is kept at the middle position or initial position by a spring and working position by the solenoid or positioner.
This valve applies wet DC or AC solenoid. Enginery of pilot-operated solenoid valve applied for main valve with different engineries are as the table below:

Main valve	Pilot-operated solenoid valve
Spring-centering 3-position valve/ transformed 2-position valve	Use 4WE6J-6X/...3-position valve/ 4WE6JA... 4WE6JB...
Structure of 2-position main valve: Y.../...and HY.../... B.../...and HB.../...	Use 4WE6Y-6X/...2-position valve
2-position valve: A, C, D, K and Z Type functions HA, HC, HD, HK, HZ Type valves	Use 2-position valve with D Type enginery Types of main valve's structure: spring return 4WE6D6X/.. No returning spring 4WE6D-6X/O... No returning spring, with a positioner 4WE6D-6X/OF..

02

Unit dimensions

Unit dimensions of WEH 10 electro-hydraulic directional control valve



- 1 Main valve
- 2 2-position valve, with one solenoid
- 3 Solenoid a
- 4 Solenoid b
- 5 Plug of solenoid a
- 6 Plug of solenoid b
- 7 Junction box with lead and light, M22×1.5 interface
- 8 Label of pilot valve
- 9 Manual button
- 10 Double-solenoid 2-position valve, double-solenoid 3-position valve
- 11 Switching time regulator
- 12 Section flow of Switching time regulator "full open"
- 13 Reducing valve
- 14 Arrangement of main valve's oil outlets (attachment face of valve)
- 15 Position of leading oil outlet
- 16 O-ring of A, B, P and T outlets: 12×2;
O-ring of X and Y: 10.82×1.78

TA and TB can be selected to be an oil returning arbitrarily

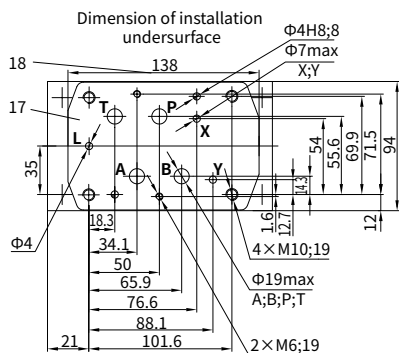
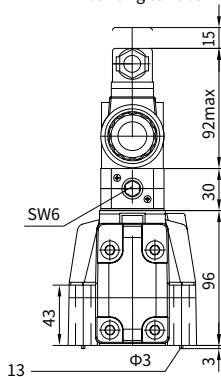
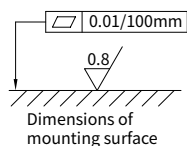
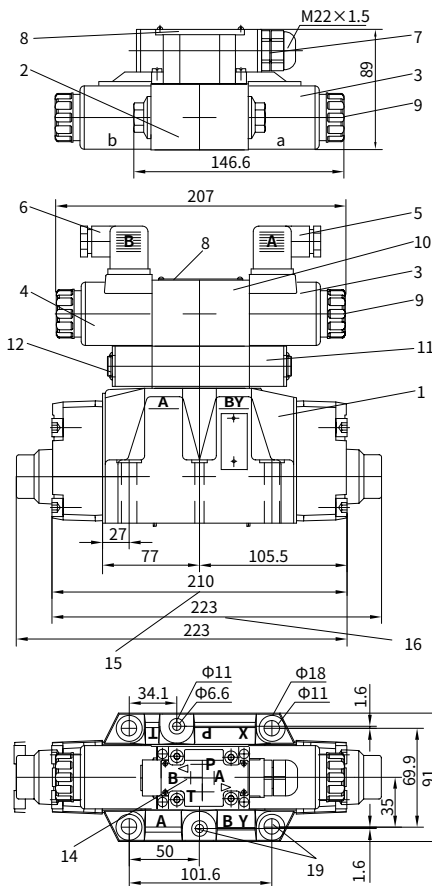
- 17 Nameplate
- 18 Bolt4-M6×45 GB/T70.1-2000-10.9 grade
Moment $M_k=15.5\text{Nm}$ (bolt of vertical stack components combined with electro-hydraulic directional valve is selected according to actual height)

If you need connecting baseplate, must order separately.

Types: G534/01; G534/02; G535/01; G535/02;
G536/01; G536/02

Unit dimensions

Unit dimensions of WEH 16 electro-hydraulic directional control valve



- 1 Main valve
- 2 2-position valve with one solenoid
- 3 Solenoid a
- 4 Solenoid b
- 5 Plug of solenoid a
- 6 Plug of solenoid a
- 7 Junction box with lead and light, M22×1.5 interface
- 8 Label of pilot valve
- 9 Manual button
- 10 Double-solenoid 2-position valve,
Double-solenoid 3-position valve
- 11 Switching time regulator
- 12 Adjustable bolt
- 13 2 locating pins
- 14 Locating diagram of connector of
pilot-operated solenoid valve
- 15 Size of spring-centering 3-position valve and
hydraulic-return 2-position valve

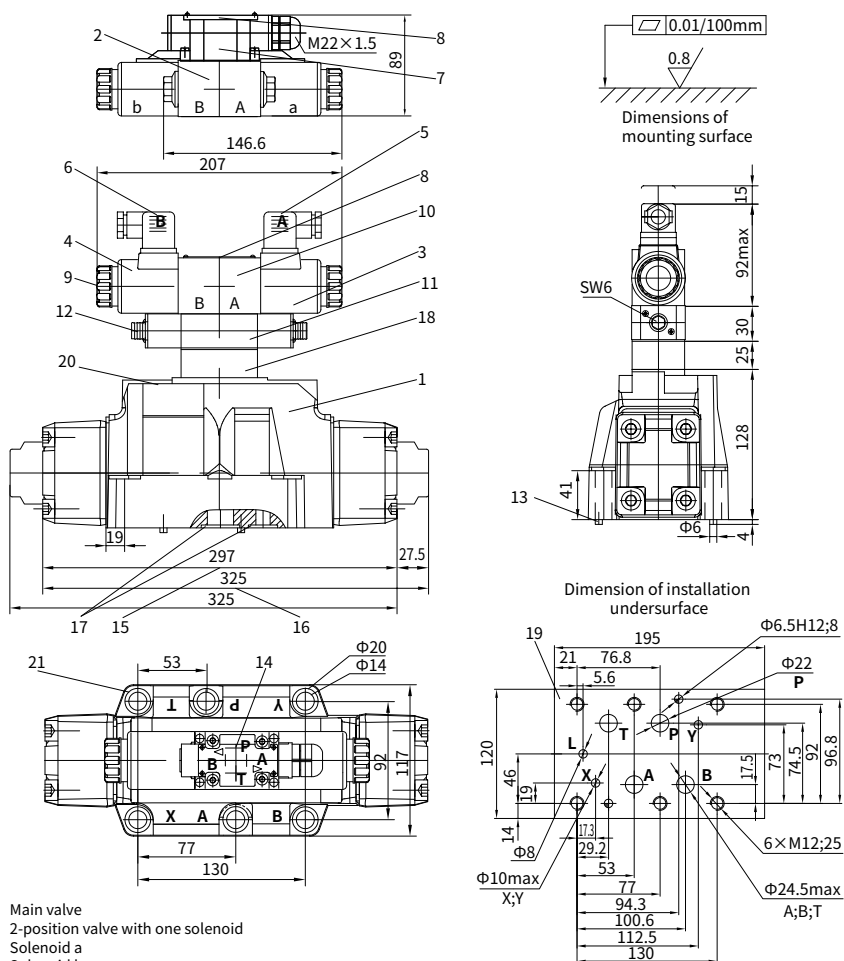
- 16 Spring-return 2-position valve
(icon sizes are C, D, K, Z engineries)
- 17 Connection diagram of main valve
- 18 Minimum size of process-required connection face of main valve
- 19 Bolt4-M10×60 GB/T70.1-2000-10.9 grade($M_n=75Nm$)
Bolt 2-M6×55 GB/T70.1-2000-10.9grade($M_n=15.5Nm$)
(bolt of vertical stack components combined with electro-hydraulic directional valve is selected according to actual height)
must order separately.
O-ring for P, T, A, B outlets: 22×2.5; O-ring for X, Y, L outlets: 10×2

**If you need connecting baseplate,
must order separately.**

Types: G172/01; G172/02/02; G174/01; G174/02; G174/08

Unit dimensions

Unit dimensions of WEH 25 electro-hydraulic directional control valve



- 1 Main valve
- 2 2-position valve with one solenoid
- 3 Solenoid a
- 4 Solenoid b
- 5 Plug of solenoid a
- 6 Plug of solenoid b
- 7 Junction box with lead and light, M22×1.5 interface
- 8 Label of pilot valve
- 9 Manual button
- 10 Double-solenoid 2-position valve, Double-solenoid 3-position valve
- 11 Switching time regulator
- 12 Adjustable bolt
- 13 2 locating pins
- 14 Locating diagram of connector of pilot
- 15 Size of spring-centering 3-position valve and hydraulic-return 2-position valve
- 16 Spring-return 2-position valve (icon sizes are C, D, K, Z functions)

- 17 O-ring: 27×3(A, B, P and T); 19×3(X, Y)
- 18 Reducing valve
- 19 Diagram of connector of main valve
- 20 Labels
- 21 Bolt6-M12×60 GB/T70.1-2000-10.9 grade ($M_n=130\text{Nm}$) (bolt of vertical stack components combined with electro-hydraulic directional valve is selected according to actual height) must order separately.

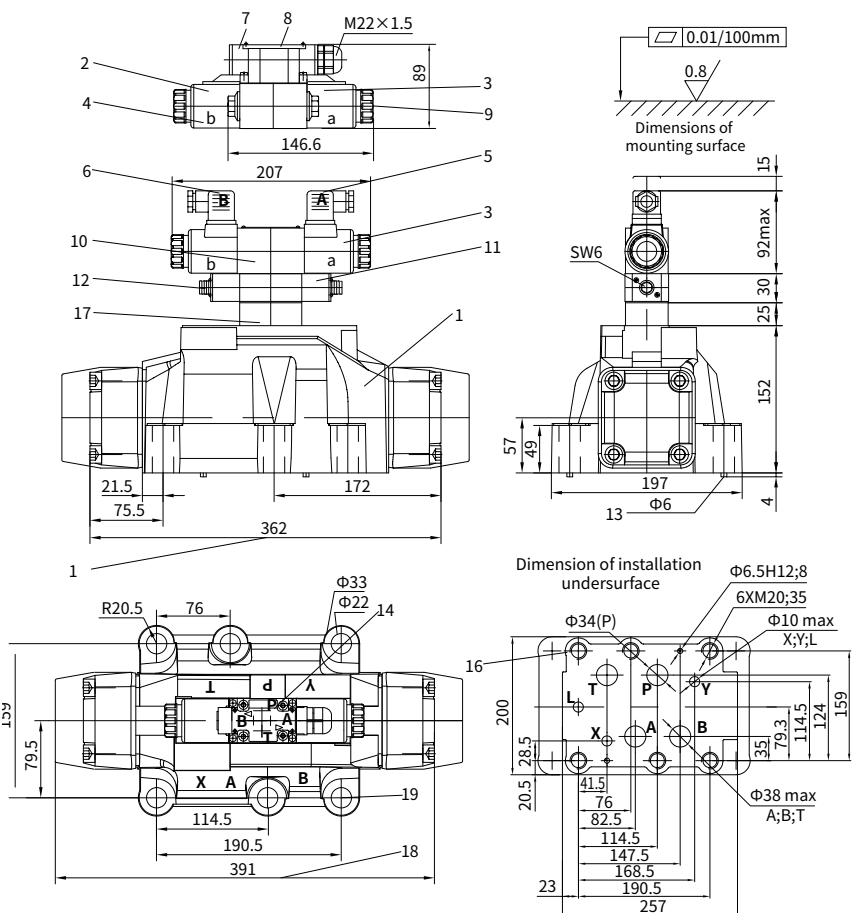
If you need connecting baseplate, must order separately.

Types:

G151/01; G151/02; G153/01; G153/02;
G154/01; G154/02; G156/01; G156/02; G154/08

Unit dimensions

Unit dimensions of WEH 32 electro-hydraulic directional control valve



- 1 Main valve
- 2 2-position valve with one solenoid
- 3 Solenoid a
- 4 Solenoid b
- 5 Plug of solenoid a
- 6 Plug of solenoid a
- 7 Junction box with lead and light, M22×1.5 interface
- 8 Label of pilot valve
- 9 Manual button
- 10 Double-solenoid 2-position valve, Double-solenoid 3-position valve
- 11 Switching time regulator
- 12 The location when section flow full open
- 13 2 locating pins
- 14 Locating diagram of connector of pilot-operated solenoid valve
- 15 Size of spring-centering 3-position valve and hydraulic-return 2-position valve

- 16 Locating diagram of connector of main valve
- 17 Reducing valve
- 18 Spring-return 2-position valve
(Icon size is Y Type enginery.
For C, D, K, Z on the right head protruding function)
- 19 Bolt-M20×80 GB/T70.1-2000-10.9 (M_s=430Nm)
(bolt of vertical stack components combined with electro-hydraulic directional valve is selected according to actual height)
P, T, A, B port O-rings: 42×3
X, Y, L port O-rings: 19×3

If you need connecting baseplate, must order separately.
Types: G157/01; G157/02; G158/10

China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.

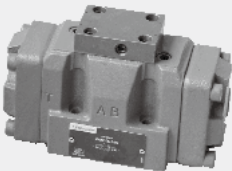


2.14

4/3, 4/2 and 3/2 directional valve with fluidic actuation

Type WH 10, 16, 25 and 32

Sizes 10 ~ 32
Up to 350 bar
Up to 1100L/min



Contents

Function and configurations	02
Ordering code	03
Symbols	04
Connection dimensions and sub-plate	04

Features

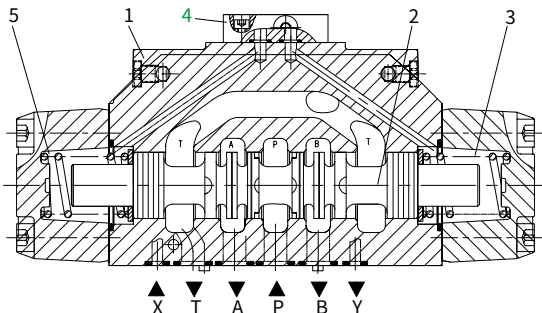
- Valves used to control the start, stop and direction of a fluid flow
- Hydraulic operation (WH)
- Porting pattern conforms o DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H

Function and configuration

Valves of type WH are directional spool valves with hydraulic operation. They control the start, stop and direction of a flow.

1.Spring-centred valve:

The main spool (2) is kept in the centre position by the return springs (3). If external control fluid enters main valve(1) from port X then enters left spring chamber(5) via cover(4), the main spool is pushed into the switching position. The oil of right spring chamber returns to tank from port Y. When the control fluid is cancelled, the main spool returns to centre position under the action of right spring force. And if the control fluid enters from port Y, then the main spring moves to left to switching direction and the oil of left spring chamber returns to tank from port X.



Structure chart of valve type WH25 with spring-centred

Switching time adjustment (see WEH)
Characteristic curve (see WEH)
Performance limits (see WEH)

Flow area when valve is in central position (see WEH)
Technical data (see hydraulic part of WEH technical data)

Ordering code

		WH			-	/		*
--	--	----	--	--	---	---	--	---

350 bar = No code

3 way = 3
(only for spool A and B)
4 way = 4

Nominal size: 10 = 10
16 = 16
25 = 25
32 = 32

Spring-centred or offset = No code
Hydraulic-centred or offset = H
(Only symbols A, B, C, D, K, Z, Y with H)

Spool symbol (see spool symbols)

Further details
in clear text

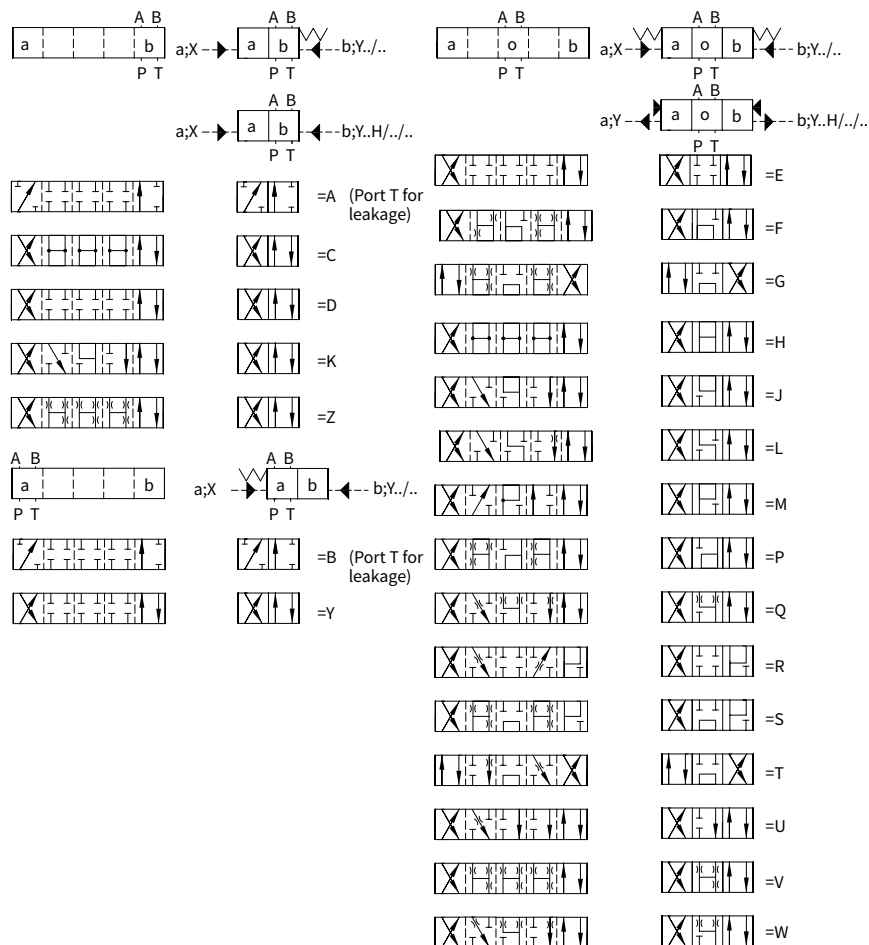
No code = NBR seals
V = FKM seals

No code = Without switching time
adjustment
S = With switching time
adjustment, meter in throttle
S2 = With switching time
adjustment, meter out throttle

L4X= Series L40 to L49 (size 10)
L7X= Series L70 to L79 (size 16, 25 and 32)

- Notes:**
- 1. All control oil are external supply and external drain.
 - 2. Control pressure in port X and port Y is not allowed to exceed 250 bar.

Symbols



Connection dimensions and sub-plate

1. The same size of type WH and type WEH share same installation, connection dimensions and sub-plate.
2. Regarding dimension, only the height of type WH is different from that of type WEH. For type WH, there is a cover (height: 12mm) on top of the main valve. Also switching time adjusted can be topped with a height of 30mm. Details see WEH.

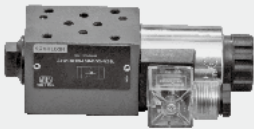


2.15

4/2 way isolator valve

Type Z4WE6...L3X

Size 6
Up to 315 bar
Up to 40 L/min



Contents

Function and configuration	02
Ordering code	02
Symbols	03
Technical data	03
Electrical data	03
Characteristic curves	04
Performance limits	04
Unit dimensions	05-06

Features

- Solenoid operated directional spool valve is the standard version
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H,
- Free-flow through ports P and T in all switched positions
- Sandwich plate valve
- Wet pin AC or DC solenoids
- Hand override, (optional)

Function and configuration

Type Z4WE6 Isolator valves are solenoid operated directional spool valves. They control the flow connection and isolating of flow.

Essentially the directional control valves consist of housing (1), one or two solenoids (2), the control spool (3), and two return springs (4).

In the de-energized condition the control spool (3) is held in the neutral or initial position by means of return springs (4) (except for pulse valves). The control spool (3) is actuated via wet pin solenoids (2).

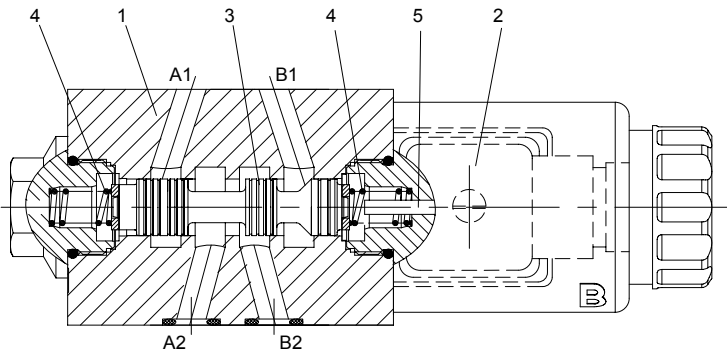
To ensure satisfactory operation care should be taken that the solenoid pressure chamber is filled

with oil.

The force of the solenoids (2) acts via the push rod (5) on the control spool (3), control spool (3) is pushed from its neutral position to the required position. Then port A1, A2, B1 and B2 can be either connected or disconnected. P and T always flow freely.

When solenoid (2) is de-energised, the control spool (3) is returned to its neutral position by means of the return springs (4).

An optional hand override allows movement of the control spool without energizing the solenoid.



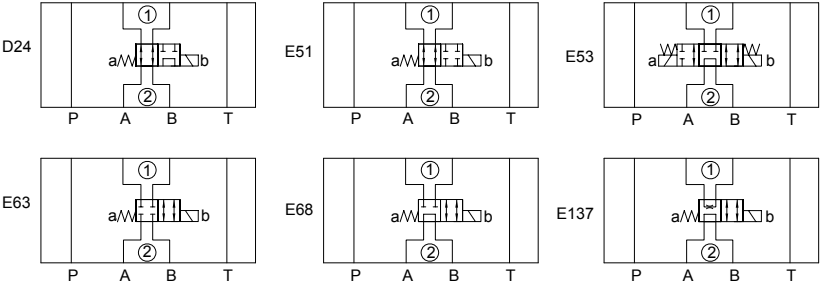
Ordering code

Z4WE		6	-	L3X	/	E			N			*		
Isolator valve													Further details in clear text	
Nominal size 6		= 6											No code = NBR seals	
Symbols e.g. D24, E63 etc.												V = FKM seals		
Series L30 to L39 (L30 to L39: unchanged installation and connection dimensions)			= L3X										Z4 = Electrical plug without lamp (Not suit rectification AC)	
High performance solenoid			=E										Z5L = Electrical plug with lamp	
										N=	With override button			
										G24 =	24V DC			
										W220R=	Plug rectification 220V			
										W110R=	Plug rectification 110V			
										Other voltage see Technical data				

Notes: If use AC electric source, the rectification AC is recommended.

Notes: If use AC electric source, the rectification AC is recommended.

Symbols (① =valve side, ② = sub-plate side)



Technical data

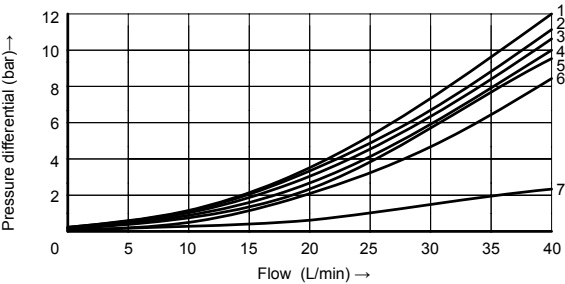
Fixing position			Optional
Environment temperature range			-30 to +50 (NBR seals)
			-20 to +50 (FKM seals)
Weight	Single solenoid	kg	1.5
	Double solenoids	kg	2.0
Max.operating pressure	Port A, B, P	bar	315
	Port T	bar	210 (DC), 160 (AC)
Max. flow			40 L/min
Fluid			Mineral oil suitable for NBR and FKM seal
			Phosphate ester for FKM seal
Fluid temperature range			-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Viscosity range			2.8 to 500 mm ² /s
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406

Electrical data

Type of voltage			DC	AC 50/60Hz
Usable voltage			V	12, 24, 96, 110, 205, 220
Voltage tolerance (nominal voltage)			%	+10~ -15
Power consumption (DC)			W	30
Holding power (AC)			VA	-
Switch-on power (AC)			VA	50
Duty				220
Switched time			ON	Continuous
			ms	20 to 45
Accord with ISO 6403			OFF	10 to 20
			ms	10 to 25
Switched frequency			times/h	15 to 40
				to 15000
Preventive grade according to DIN 40050				to 7200
				IP65

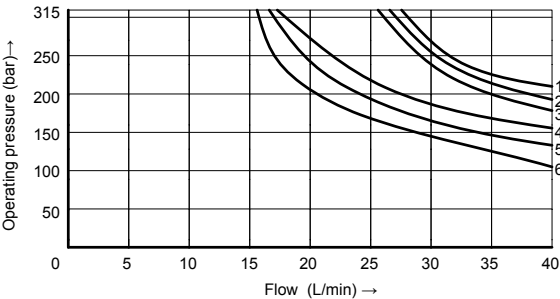
Caution: with electrical connections the protective conductor(PE $\perp$)must be connected according to the relevant regulations.

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



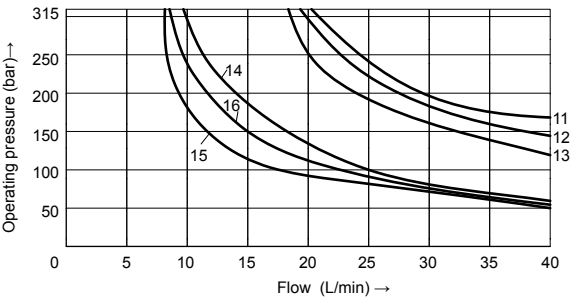
	A2 to A1	A1 to A2	B2 to B1	B1 to B2	A2 to B2	B2 to A2	T2 to T2	P2 to P1
D24	4	1	2	4	3	2	7	7
E51	3	1	1	3	-	-	7	7
E53	2	2	2	2	5	2	7	7
E63	2	5	5	3	-	-	7	7
E68	4	4	6	5	4	5	7	7
E137	1	4	3	2	5	6	7	7

Performance limit



- 1 E63 4 E51
- 2 E68 5 E137
- 3 E53 6 D24

(Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46 and 24VDC)



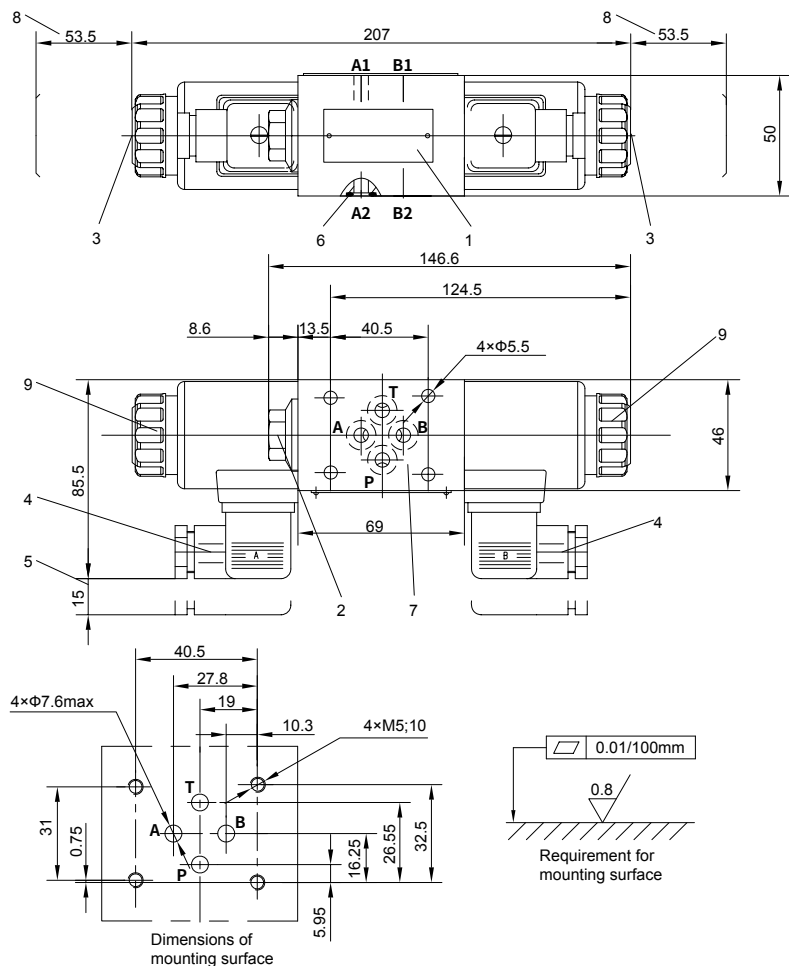
	W230-50Hz	W230-60Hz
E63	11	14
E68	12	16
E53	13	16
E137	15	15
E51	15	15
D24	15	15

(Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46 and 230VAC)

Unit dimensions

(Dimensions in mm)

Valve with DC solenoid



- 1 Nameplate
- 2 Plug for valves with one solenoid
- 3 Hand override button
- 4 Plug-in connector
- 5 Space required to remove Plug-in connector
- 6 O-ring 9.25×1.78
- 7 Porting pattern to ISO 4401 and CETOP-RP 121 H, without pin hole
- 8 Space required to remove solenoid
- 9 Securing nut, tightening torque $M_A=4Nm$

Valve fixing screws:

4-M5 GB/T 70.1-10.9, Tightening torque $M_A=8.9Nm$ must be ordered separately.

It must be ordered separately if connection plate is needed.

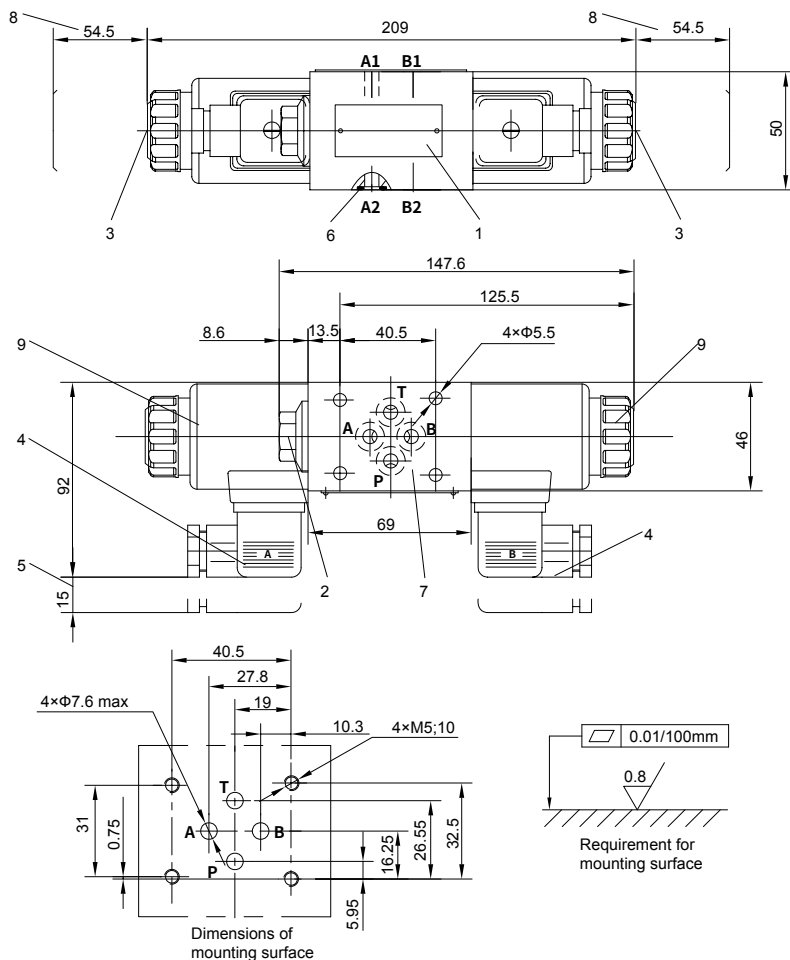
Type:

G341/01(G1/4), G341/02 (M14×1.5)
 G342/01(G3/8), G342/02(M18×1.5)
 G502/01(G1/2), G502/02(M22×1.5)

Unit dimensions

(Dimensions in mm)

Valve with AC solenoid



- 1 Nameplate
- 2 Plug for valves with one solenoid
- 3 Hand override button
- 4 Plug-in connector
- 5 Space required to remove Plug-in connector
- 6 O-ring 9.25×1.78
- 7 Porting pattern to ISO 4401 and CETOP-RP 121 H, without locating pin hole
- 8 Space required to remove solenoid
- 9 Securing nut, tightening torque $M_A=4Nm$

Valve fixing screws:

4-M5 GB/T 70.1-10.9, Tightening torque $M_A=8.9Nm$ must be ordered separately.

It must be ordered separately if connection plate is needed.

Type:

G341/01(G1/4), G341/02 (M14×1.5)
 G342/01(G3/8), G342/02(M18×1.5)
 G502/01(G1/2), G502/02(M22×1.5)



2.16

4/3, 4/2 and 3/2 explosion-proof solenoid directional valve

Type G...WE6...L6X

Size (NG) 6
Up to 350 bar
Up to 80 L/min



Contents

Function and configuration	02
Ordering code	03
Spool symbols	03
Technical data	04
Electrical data	04
Characteristic curves	05
Performance limits	05
Unit dimensions	06

Features

- Directly operated type explosion protection directional valve is used as the standard type
- DIN24 340 A type on the mounting surface
- ISO 4401 and CETOP-RP 121H
- Wet-type DC explosion protection solenoid
- 90° rotatable explosion protection solenoid
- Pressure-tight chamber does not need to be opened when coil is to be replaced

Function and configuration

GWE type directional control valve is the directional valve of explosion protection solenoid used to control start, stop and flow direction of oil fluid.

The directional control valves consist of housing (1), one or two solenoids (2), the control spool (3), and one or two return springs (4).

In the de-energised condition the control spool (3) is held in the neutral or initial position by means of return springs (4) (except for pulse spools). The control spool (3) is actuated via wet pin solenoids (2).

To guarantee satisfactory operation care should be taken to ensure that the solenoid pressure chamber is filled with oil.

The control spool (3) is moved to the expected position by solenoid (2) and pushing rod (5), and this gives free flow from P to A and B to T or P to B and A to T.

When the explosion protection solenoid (2) is powered off, control valve element (3) is pushed to the initial position by reset spring (4).

Type G4WE6...L6X/OB2...

(limited to functions A, C and D).

This type contains 2 switching positions and 2 directional control valves without locating mechanism explosion protection solenoid.

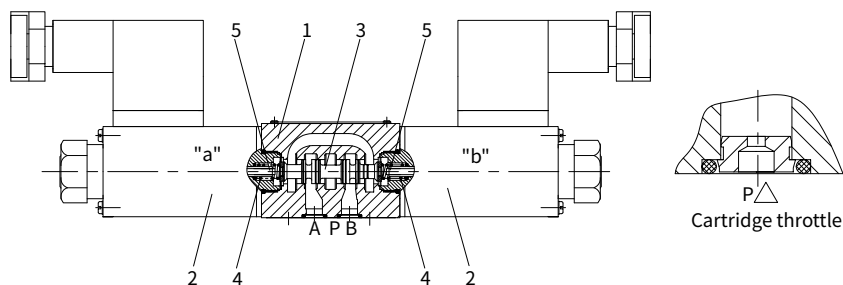
Type G4WE6...L6X/OFB2... pulse valve

(limited to functions A, C and D).

It contains 2 switching positions, 2 explosion protection solenoids and 1 directional control valve with locating mechanism. 2 switching positions are fixed separately, so it is unnecessary to continuously electrify explosion protection solenoid.

Cartridge throttle

The cartridge throttle is necessary since the actual flow may be larger than the performance limits of the valve during switching process. This cartridge throttle is inserted in the P channel of the directional control valve.



Ordering code

Explosion-resistant type I =G1 Explosion-resistant type II =G2	WE	6	L6X	B2	*	Further details in clear text
3 ways(For spool A , B) =3 4 ways =4						No code = NBR seals V = FKM seals
Directional valve with wet pin solenoids						No code = Without cartridge throttle B08 = Throttle - Φ0.8 mm B10 = Throttle - Φ1.0 mm B12 = Throttle - Φ1.2 mm B15 = Throttle - Φ1.5 mm B20 = Throttle - Φ2.0 mm B25 = Throttle - Φ2.5 mm B30 = Throttle - Φ3.0 mm
Nominal size 6 =6						
Symbols e.g. C, E etc.						
Serial number =L6X (L60-L69 have the same interior structures and mounting dimensions)						
Return spring = No code Without return spring = O Without return spring, and with detent = OF						Voltage G12 = 12VDC G24 = 24VDC G36 = 36VDC G110 = 110VDC
Threaded explosion protection solenoid =B2						

Note: G1 Explosion protection grade EX d I Mb; G2 Explosion protection grade EX d II C T4 Gb

Spool symbols

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Transition position **Spool valve symbols**

Technical data

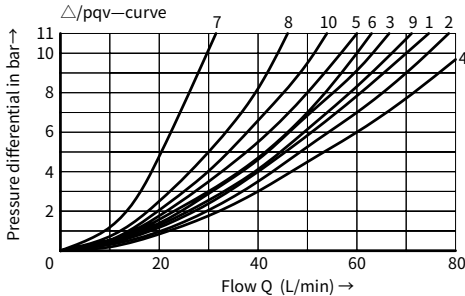
Fixing position			Optional
Environment temperature range °C			-30 to +50 (NBR seal)
			-20 to +50 (FKM seal)
Weight	Single solenoid	kg	2.6
	Double solenoids	kg	4.3
Max.operating pressure	Port P, A, B	bar	350
	Port T	bar	210
	when the operating pressure exceeds the permission value, spool symbol A and B must make the port T for draining		
Max. flow-rate			L/min 80
Flow cross section (switching neutral position)	VersionQ	mm ²	About 6% of nominal area
	VersionW	mm ²	About 3% of nominal area
Fluid			Mineral oil suitable for NBR and FKM seal
			Phosphate ester for FKM seal
Fluid temperature range °C			-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Viscosity range			mm ² /s 2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406

Electrical data

Type of voltage			DC
Available voltage	V		12, 24, 36, 110
Permissible voltage (deviation)	%		-15 to +10
Input power	W		30
Operation mode of solenoid			Continuous working
Switched time	ON	ms	25 to 45
Accord with ISO 6403	OFF	ms	10 to 25
Switched frequency		times/h	To 15000
Max. coils tamperature		°C	+150

Caution: with electrical connections the protective conductor (PE ⊥) must be connected according to the relevant regulations.

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



- 7 Function "R" of valve element is at switching position B → A
- 8 Function "G" and "T" of valve element is at neutral position P → T
- 9 Function "H" of valve element is at neutral position P → T

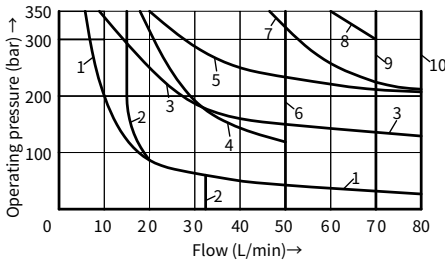
Spool symbol	Flow direction			
	P → A	P → B	A → T	B → T
AB	3	3	-	-
C	1	1	3	1
DY	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
JQ	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	-
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

Performance limits (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

The Performance limited is measured when the solenoids under working temperature, the voltage is below 15% of the standard voltage and T is free from back pressure.

The working limit given is used for flow in two directions only (such as P → A flow of B → T backflow). Due to the flow forces acting within the valves, the permissible switching power limits may be considerably lower with only one direction of flow (e.g. P → A while port B is blocked) (In such cases, please consult us!)

The switching power limit was established while the solenoids were at operating temperature, at 10 % under voltage and without tank pre-loading.

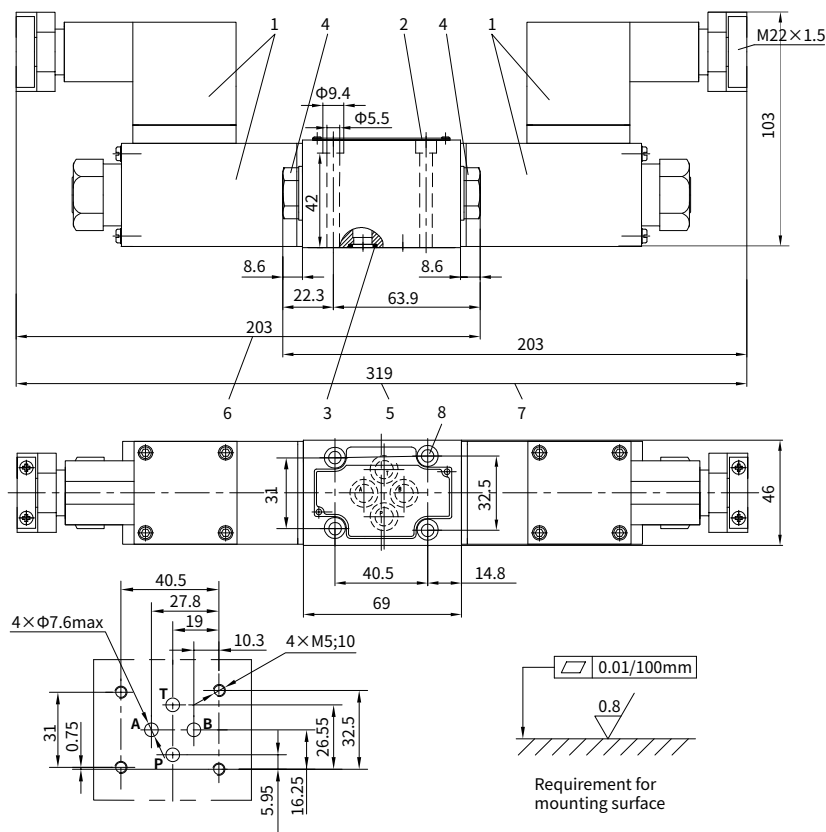


Curve	Spool symbol
1	A, B ₁
2	V
3	A, B
4	F, P
5	J
6	G, H, T
7	A/O, A/O _F , L, U
8	C, D, Y
9	M
10	E, R ₂ , C/O, C/O _F D/O, D/O _F , Q, W

Note: 1) Flow back to the fuel tank from the executive component

Unit dimensions

(Dimensions in mm)



- 1 Explosion protection solenoid
- 2 Copper nameplate
- 3 R-ring 9.81×1.5×1.78 or O-ring 9.25×1.78
- 4 End cap used for 1 electrosolenoid valve
- 5 Dimensions of 3-position valve
- 6 Dimensions of 2-position valve, solenoids at end A
- 7 Dimensions of 2-position valve, solenoids at end B

8 Valve fixing screws:

M5×50 GB/T70.1-10.9

Tightening torque, $M_A=8.9\text{Nm}$
must be ordered separately.

**It must be ordered separately,
if connection plate is needed .Type:**

G341/01(G1/4); G341/02(M14×1.5)

G342/01(G3/8); G342/02(M18×1.5)

G502/01(G1/2); G502/02(M22×1.5)

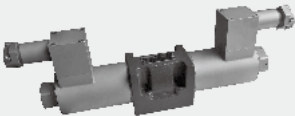


2.17

4/3, 4/2 and 3/2 explosion-proof solenoid directional valve

Type G...WE10...L3X

Size (NG) 10
Up to 315 bar
Up to 120 L/min



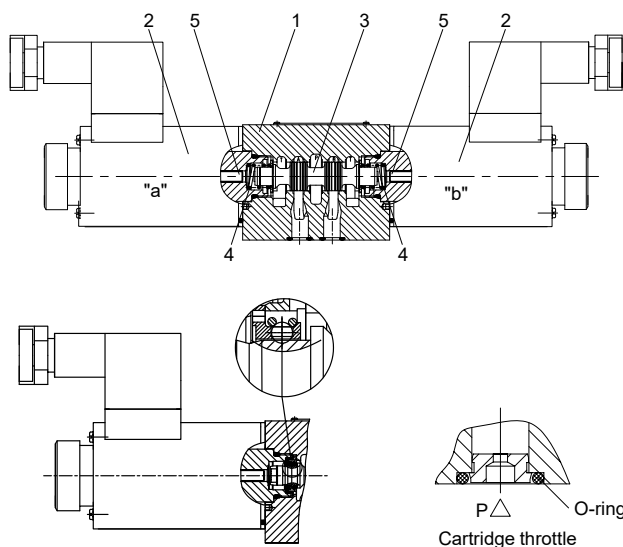
Contents

Function and configuration	02
Ordering code	03
Spool symbols	03
Technical data	04
Electrical data	04
Characteristic curves	05
Performance limits	05
Unit dimensions	06

Features

- Directly operated type explosion-resistant solenoid operation direction slide valve is used as the standard type
- DIN24 340 A type on the mounting surface ISO 4401 and CETOP-RP 121H
- Wet-type DC explosion protection solenoid
- 90° rotatable explosion protection solenoid
- Pressure-tight chamber needs not to be opened when coil is to be replaced

Function and configuration



TYPE:G...WE10...L3X/OFB2...

GWE type directional control valve is the directional valve of explosion protection solenoid used to control start, stop and flow direction of oil fluid.

The directional control valves consist of housing (1), one or two solenoids (2), the control spool (3), and one or two return springs (4).

In the de-energised condition the control spool (3) is held in the neutral or initial position by means of return springs (4) (except for pulse spools). The control spool (3) is actuated via wet pin solenoids (2).

To guarantee satisfactory operation care should be taken to ensure that the solenoid pressure chamber is filled with oil.

The control spool(3) is moved to the expected position by solenoid(2) and pushing rod(5), and this gives free-flow from P to A and B to T or P to B and A to T.

When the explosion protection solenoid(2) is powered off, control valve element (3) is pushed to the initial position by reset spring (4).

Type GWE 10 . L3X / O B2...

(Limited to valve element A, C and D)

This type is dual explosion-resistant solenoid 2-position directional valve without a locating mechanism, one of explosion protection solenoids must be powered on in any position, it has not a specific switching position under power-off position.

Type GWE 10 . L3X / OF B2...

(Limited to valve element A, C and D)

This type is dual explosion-resistant solenoid 2-position directional valve with a locator, the valve element can be held at any position and it is unnecessary to continuously electrify the solenoid.

Cartridge throttle

The cartridge throttle is necessary since actual flow may be larger than the performance limits of the valve during switching process.

This cartridge throttle is inserted in the P channel of the directional control valve.

Ordering code

		WE	10		L3X	B2			*
Explosion-resistant type I =G1									Further details in clear text
Explosion-resistant type II =G2									
3 ways(For spool A , B) =3									No code = NBR seals
4 ways =4									V = FKM seals
Directional valve with wet pin solenoids									No code =Without cartridge throttle
Nominal size 10 =10									B08 = Throttle - Φ0.8 mm
Symbols e.g. C, E etc.									B10 = Throttle - Φ1.0 mm
Serial number =L3X (L30-L39 have the same interior structures and mounting dimensions)									B12 = Throttle - Φ1.2 mm
Return spr ing =No code									B15 = Throttle - Φ1.5 mm
Without return spr ing = O									B20 = Throttle - Φ2.0 mm
Without return spr ing , and with det ent = OF									B25 = Throttle - Φ2.5 mm
Threaded explosion protection solenoid =B2									B30 = Throttle - Φ3.0 mm
									Voltage :
									G12 = 12VDC
									G24 = 24VDC
									G36 = 36VDC
									G110 = 110VDC

Note: G1 Explosion protection grade EX d I Mb; G2 Explosion protection grade EX d II C T4 Gb

Spool symbols

Transition position **Spool valve symbols** **Transition position** **Spool valve symbols**

Example:
If solenoid is fixed at position 'a',
the ordering code is...EA.

The diagram illustrates the relationship between solenoid positions and spool valve symbols for different valve types (2/2, 3/2, 4/2, 5/2). It shows how to derive an ordering code based on the solenoid's position (a, b) and the valve's configuration (PT, AB, etc.).

Transition position **Spool valve symbols**

Example:
If solenoid is fixed at position 'a',
the ordering code is...EA.

Notes: no B9, D9 and Y9.../O and.../OF...type

Technical data

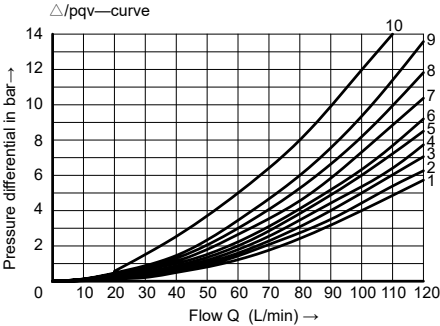
Fixing position			Optional
Environment temperature range °C			-30 to +50 (NBR seal)
			-20 to +50 (FKM seal)
Weight	Single solenoid	kg	5.9
	Double solenoids	kg	8.9
Max.operating pressure	Port P, A, B	bar	315
	Port T	bar	210
	when the operating pressure exceeds the permission value, spool symbol A and B must make the port T for draining		
Max. flow-rate			L/min 120
Flow cross section (switching neutral position)	Version V	mm ²	11(A/B → T); 10.3(P → A/B)
	Version W	mm ²	2.5(A/B → T)
	Version Q	mm ²	5.5(A/B → T)
Fluid			Mineral oil suitable for NBR and FKM seal
			Phosphate ester for FKM seal
Fluid temperature range °C			-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Viscosity range mm ² /s			2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406

Electrical data

Type of voltage			DC
Available voltages			V 12, 24, 36, 110
Voltage tolerance (nominal voltage)			% -15to+10
Power consumption			W 35
Duty cycle			Continuous
Switching time to ISO 6403	ON	ms	45 to 60
	OFF	ms	20 to 30
Switched frequency			times/h To 15000
Protection class according to DIN 40050			IP65
Max. coils tamperature			°C +150

Caution: with electrical connections the protective conductor (PE ≡) must be connected according to the relevant regulations.

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



Switching position		P → A	B → A	A → T	P → T
R		-	9	-	-
Switching position	P → A	P → B	B → T	A → T	P → T
F	4	-	-	9	9
P	-	5	8	-	10
G, T			-	-	9
H			-	-	3

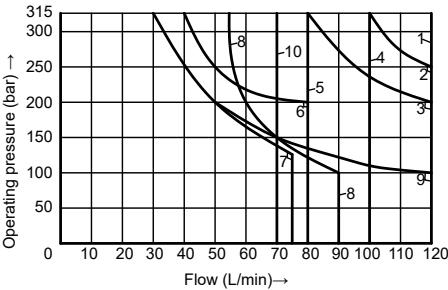
Spool symbol	Flow direction			
	P → A	P → B	A → T	B → T
A, B	3	3	-	-
C	3	3	4	5
D, Y	5	5	6	6
E	1	1	4	4
F	2	3	7	4
G	3	3	6	7
H	1	1	6	7
J	1	1	3	3
L	2	2	3	5
M	1	1	4	5
P	4	2	5	7
Q	1	2	1	3
R	3	6	4	-
T	3	3	6	7
U, V	2	2	3	3
W	2	2	4	5

Performance limits (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

The specified switching performance limits are valid for use with two directions of flow (e.g. from P → A and simultaneous return flow from B → T).

Due to the flow forces acting within the valve, the permissible switching performance limits may be significantly lower with only one direction of flow (e.g. from P → A, while port B is blocked)! In such a case, please consult us!

The switching performance limits were determined while the solenoids were at operating temperature, 10% undervoltage and without tank pre-loading.

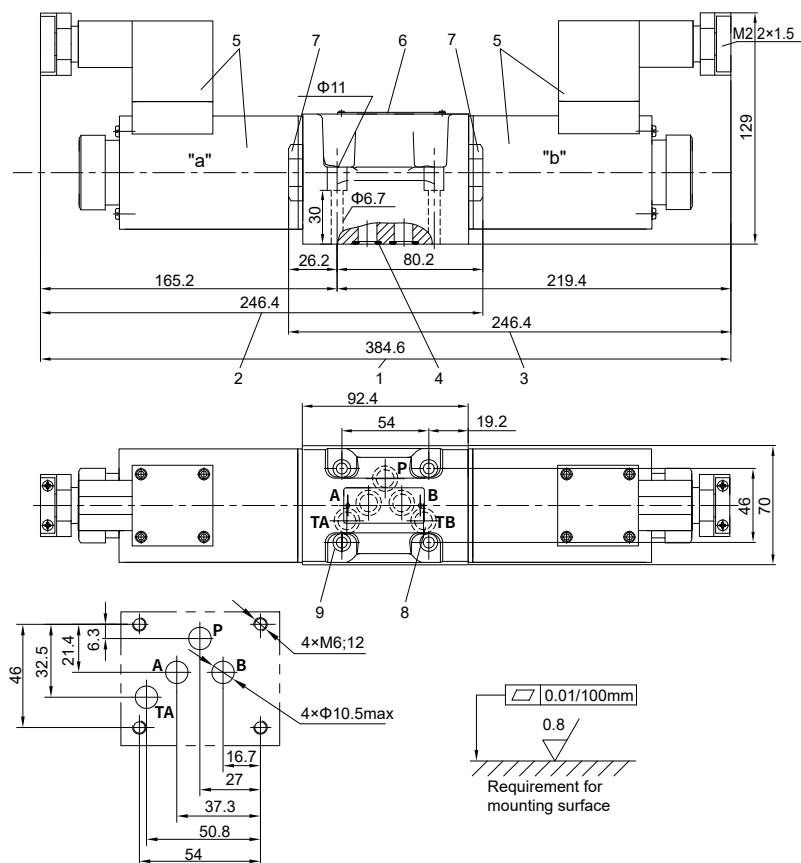


Curve	Spool symbol
1	C, C/O, C/OF
	D, D/O, D/OF
2	Y, M
	E
3	A/O, A/OF
	L, U, J, Q, W
4	H
5 1)	R, L2), U2)
6	G
7	T
8	F, P
9	A, B
10	V

- Notes:
- 1) Return flow (independent of area ratio)
 - 2) Only suitable for neutral position

Unit dimensions

(Dimensions in mm)



- 1 Dimensions of 3-position valve
- 2 Dimensions of 2-position valve, solenoids at end A
- 3 Dimensions of 2-position valve, solenoids at end B
- 4 R-shaped ring 13×1.6×2 or O-ring 12×2
- 5 Explosion protection solenoid
- 6 Copper nameplate
- 7 End cap used for 1 electrosolenoid valve
- 8 Fix additional port TB on the manifold when necessary.

- 9 Valve fixing screws: M6×40 GB/T 70.1-10.9, Tightening torque, $M_A=15.5\text{Nm}$, must be ordered separately.

It must be ordered separately, if connection plate is needed
Type:

G66/01(G3/8); G66/02(M18×1.5)
 G67/01(G1/2); G67/02(M22×1.5)
 G534/01(G3/4); G534/02(M27×2)

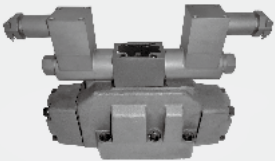


2.18

Explosion-proof electro-hydraulic directional valve

Type GWEH10, 16, 25../6B2

Sizes 10 ~ 25
Up to 350 bar
Up to 1100L/min



Contents

Function and configuration	02-06
Ordering code	07-08
Symbols	09-11
Technical data	12-15
Characteristic curves	16-17
Performance limit	18-19
Pilot-operated solenoid valve	20
Unit dimensions	21-23

Features

- Valves used to control the start, stop and direction of a fluid flow
- Electro-hydraulic operation (WEH)
- 4/2- or 4/3-way version
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H
- Pressure-tight chamber needs not to be opened for a coil change

Function and configuration

The GWEH../6B2..type explosion-proof electro-hydraulic directional valve is a directional valve taking the electro-hydraulic solenoid valve as the pilot control; it applies the plate-type connection, and the connection dimension is in accordance with the DIN 2430 and ISO 4401 standards. There are many different performances and additional devices for choice.

Valves of type GWEH../6B2.. are directional spool valves with electrohydraulic operation, using the directional explosion-resistant valve as pilot control. They control the start, stop and direction of a fluid flow.

The directional valves basically consist of the main explosion-resistant valve with housing (1), main control spool (2), one or two return springs, and the pilot explosion-resistant valve (4) with one or two solenoids.

The main control spool (2) is held in the neutral or in the initial position either by the springs or by means of pressure. Pilot explosion-resistant valve has wet DC or AC solenoids (5), optional. The main control spool is shifted by pilot explosion-resistant valve (4).

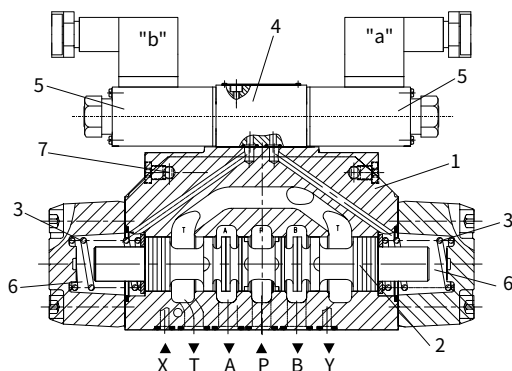
There are four patterns on supply and drain of control oil, see the function diagram.

Following are descriptions of various types of valves:

1. Main valves are spring centered-type 3-position four-way directional valves

The main control spool (2) is held in the neutral position by two return springs (3), and the two spring chambers (6) are connected to the tank via the pilot explosion-resistant valve (4). The pilot oil is supplied via the pilot line (7). When the pilot explosion-resistant valve (4) switches direction (one solenoid of the pilot explosion-resistant valve energizes), the pilot fluid acts on the one end of the main spool (2) and pushes it (2) to move and the required port is connected, thus the flow direction of the fluid is changed.

When the solenoid is de-energized, the pilot spool returns to its initial position (exception: impulse valve). The spring chambers (6) are connected to tank by pilot explosion-resistant valve (4). Under the force of spring, the spool returns to its neutral position. The oil in the spring chamber (6) flows to return line from external port Y or internal line T via the pilot valve (4).



Structural drawing of GWEH..25/6B2..type spring aligned explosive-proof electro-hydraulic directional valve

- 1- Main valve body
- 2- Main valve spool
- 3- Reset spring
- 4- Pilot Explosion protection solenoid valve
- 5- Explosion protection solenoid
- 6- Spring chamber
- 7- Control oil passage

Function and configuration

2-position four-way directional valves

(this kind of valve has four different structures and Types)

1. Type G4WEH.../6B2...

This kind of pilot valve and main valve have a reset spring each, resetting by spring force.

2. Type G4WEH...H.../6B2...

This kind of valve has a reset spring, making pilot valve spool stay in initial position. Main valve spools change directions under effect of pressure oil.

3. Type G4WEH...H.../O6B2...

This kind of valve has two solenoids. There are no reset springs in pilot valves and main valves, thus using solenoids and pressure oil to make pilot valves and main valve spools change directions. Therefore, at least one solenoid shall be under working state.

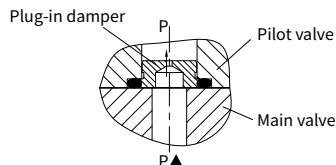
4. Type G4WEH...H.../OF6B2...

This kind of valve has two solenoids and locators which makes pilot valve spools stay in working position (impulse valves). Main valve spools have no locating devices, moving downward to corresponding working positions under effect of pressure oil.

Structure 2, 3 and 4 preceding are hydraulic reset. Main valve spools can stay in the working position only under the effect of pressure oil.

Throttle insert

The use of a throttle insert is required if the pilot oil supply in the P channel of the pilot valve is to be limited. This throttle is inserted in the P channel of the pilot valve.



Structure chart of plug-in dampers

Function and configuration

Pilot oil supply:

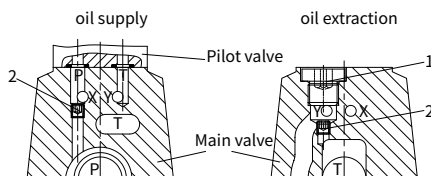
1. Type GWEH10.../6B2..

(1) Conversion between internal supply and external supply:

P hole on the top of main valve bodies with M6 bolt(2) is external supply and with M6 bolt (2)dismantled is internal supply.

(2) Conversion between internal drain and external drain:

Dismounting plug screws and installing M6 bolt(2) is external drain; Dismounting M6 bolt(2) is internal drain.



Structure chart of GWEH10.../6B2... model supply and discharge

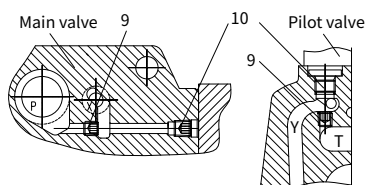
2. Type GWEH16.../6B2..

(1) Conversion between internal supply and external supply:

Dismounting plug screw(10) form P hole on the undersurface of main valves and installing M6 bolt(9) is internal supply. Dismounting M6 plug bolt(9) id internal supply.

(2) Conversion between internal drain and external drain:

10 Pilot valveDismounting plug screw(10) form T hole on the top of main valves and installing M6 plug bolt(9) is internal drain. Dismounting M6 bolt(9) is external drain.



Structure chart of GWEH16.../6B2... model supply and discharge

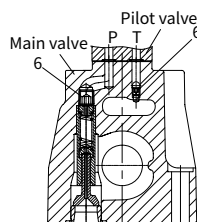
3. Type GWEH25.../6B2..

(1) Conversion between internal supply and external supply:

P hole on the top of main valve bodies with M6 bolt(6) is external supply and with M6 bolt (6)dismantled is internal supply.

(2) Conversion between internal drain and external drain:

Dismounting plug bolt(6) form T hole on the top of main vlaves. Dismounting M6 bolt(6) is external drain.



Structure chart of GWEH25.../6B2...model supply and discharge

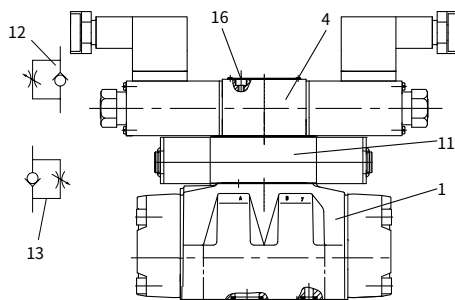
Function and configuration

Switching time adjustment:

In order to influence the switching time of the main valve a double throttle check valve has to be fitted between pilot valves and main valves to control oil supply from pilot valves into main valve spools, thus adjusting the switching time of main valves.

Regulating bolt rotation clockwise, the time for switching of main valves is long, otherwise the time is short.

The throttle check valve has two kinds: meter-in throttling and meter-out throttling. If there is a need of changing meter-in throttling into meter-out throttling, just install the valve after rotating 180° around the longitudinal axis again and then install pilot valves.



- 1- Main valve
- 4- Pilot valve
- 11- Switching time regulator(Z2FS6)
- 12- Meter-out throttling
- 13- Meter-in throttling
- 16- Set screw M5×L GB/T70.1-10.9 grade, the length of L is determined by height stacked, tightening torque 8.9 Nm.

Figure of GWEH.../6B2...S or S2 type commutating time regulator for valve installation

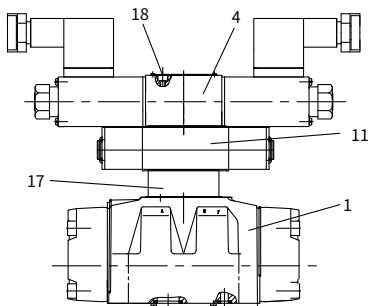
Pressure reducing valves:

The pressure reducing valve (8) must be used if the pilot pressure is higher than 250 bar. Pressure reducing ratio of constant-ratio pressure reducing valves(D1)1:0.66.

Pressure reducing pressure of constant-ratio pressure reducing valves shall not exceed 40bar.

Minimum control pressure of technical Ordering code shall improve 1/0.66=1.515 after installing bottom plate pressure reducing valves.

Constant-ratio pressure reducing valves shall not be used when controlling internal oil drain and using back pressure valves(P0.45) with control pressure decreased to 3bar.



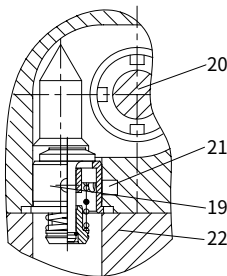
- 1- Main valve
- 4- Pilot valve
- 11- Switching time regulator
- 17- Pressure reducing valve
- 18- Bolt M5×105 GB/T70.1-10.9

Configuration of type GWEH.../6B2...S...D1 with proportional pressure reducing valve

Function and configuration

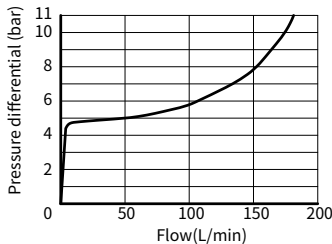
Back pressure valve:

Valves controlling oil inner supply with unloading passages, such as C, Z, G, H, P, S, T and V, In valves with zero pressure circulation and internal pilot oil supply, a back pressure valve (19) must be installed in the P-channel of the main valve to build up the minimum pilot pressure. The pressure differential of the back pressure valve must be added to the pressure differential of the main valve (see characteristic curves) in order to determine the actual value. The opening pressure of this valve is approx. 4.5 bar. NG10 valves do not have back pressure valves.

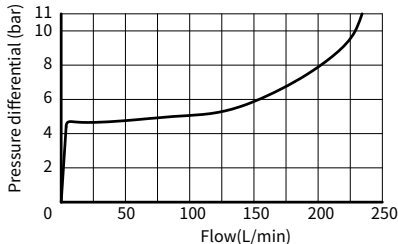


GWEH16.../.../6B2...PO.45 type
Structure chart of prepressing
valve of electro-hydraulic directional valve

- 19- Prepressing valve
- 20- Main valve
- 21- Control oil chamber(X)
- 22- Connecting plate



Pressure loss curve of **GWEH16.../6B2...** type electro-hydraulic directional valves passing through back pressure valves
(Test condition:use HLP46, $\theta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)



Pressure loss curve of **GWEH25.../6B2...** type electro-hydraulic directional valves passing through back pressure valves
(Test condition:use HLP46, $\theta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)

Ordering code

	WEH10	L4X	6B2						*
Explosion-resistant type I =G1 Explosion-resistant type II =G2									Further details in clear text
3 ways = 3 (For spool A and B) 4 ways = 4									No code=NBR seals V =FKM seals
Spool return By means of springs =No code Hydraulic return = H (only 2-position valve: spools C, D, K, Z, Y)									No code=without pressure reducing valves D1= with pressure reducing valves(pressure ratio 1:0.66) D3= with constant-value pressure reducing valves
See the function symbol of slide valve									No code=Without throttle insert B08= With throttle Φ0.8mm B10= With Throttle Φ1.0 mm B12= With Throttle Φ1.2 mm B15 = With Throttle Φ1.5 mm
Series L40 to L49 =L4X (L40 to L49: unchanged installation and connection dimensions)									No code = Without shifting time adjustment S = Switching time adjustment as meter-in control S2= Switching time adjustment as meter-out control
If pilot valve is 2 positions with 2 solenoid, main valve is 2 position with hydraulic return,'H' should be noted in front of spool. Without spring return = O Without spring return with detent = OF (not apply to B and Y for O and OF)									
Explosion protection solenoid in threaded connection=6B2									
DC 12V = G12 DC 24V = G24 DC 36V = G36 DC 110V = G110									
Pilot oil supply external, Pilot oil drain external = No code Pilot oil supply internal, Pilot oil drain external = E Pilot oil supply internal, Pilot oil drain internal = ET (exclusion: spool C, Z, F, G, H, P, T, V) Pilot oil supply external, Pilot oil drain internal = T									

Note:

- When the spools of type GWEH10../6B2.. is C, Z, F, G, H, P, T, V and so on, if the pilot oil is internal supply, the pilot oil should be external drain. And enough back pressure should be exerted on the return oil port T (must not be on the Port Y) so that the valve can change directions reliably.
- When the pilot pressure is higher than 250bar (It will be main pressure when the version is supply internal), the pressure reducing valve must be used.
- G1 Explosion protection grade EX d I Mb; G2 Explosion protection grade EX d II C T4 Gb

Ordering code

			WEH			L7X		6B2									*
Explosion-resistant type I =G1																	Further details in clear text
Explosion-resistant type II =G2																	No code=NBR seals V =FKM seals
Working pressure 350 bar = No code																	No code=without pressure reducing valves
3 ways(For spool A and B) = 3																	D1= with pressure reducing valves (pressure ratio 1:0.66)
4 ways = 4																	D3= with constant-value pressure reducing valves
Nominal size 16 = 16																	No code = Without back pressure valve
25 = 25																	P0.45= With back pressure valve, cracking pressure 4.5 bar
Spool return																	P0.70= With back pressure valve, cracking pressure 7 bar
Spring return or centered = No code																	No code= Without throttle insert
Hydraulic return = H																	B08= With throttle Ø0.8mm
See the function symbol of slide valve																	B10= Throttle Ø1.0 mm
Series L70 to L79 = L7X																	B12= Throttle Ø1.2 mm
(L70 to L79:unchanged installation and connection dimensions)																	B15= Throttle Ø1.5 mm
If pilot valve is 2 positions with 2 solenoid, main valve is hydraulic return																	No code = Without shifting time adjustment
Without spring return = O																	S = Switching time
Without spring return with detent = OF																	adjustment as meter-in control
(H should be noted in front of spools. Not applied to spool Y for O and OF)																	S2 = Switching time adjustment as meter-out control
Explosion protection solenoid in threaded connection =6B2																	
DC 12V = G12																	
DC 24V = G24																	
DC 36V = G36																	
DC 110V = G110																	
Pilot oil supply external,Pilot oil drain external = No code																	
Pilot oil supply internal,Pilot oil drain internal = ET																	
Pilot oil supply internal, Pilot oil drain external = E																	
Pilot oil supply external, Pilot oil drain internal versions = T																	

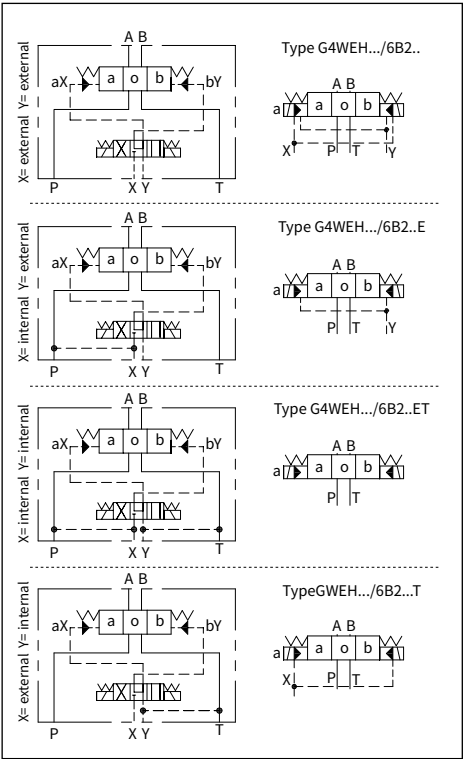
Note:

- For function of GWEH16-25 such as C, Z, F, G, H, P, T, V, etc, if applying control oil internal supp, please try to use external add enough back pressure on return port T(port Y shall not have back pressure) to ensure valves can reverse properly.
- Pressure reducing valves shall be applied when control pressure exceeds 250 bar.
- G1 Explosion protection grade EX d I Mb; G2 Explosion protection grade EX d II C T4 Gb

Symbols

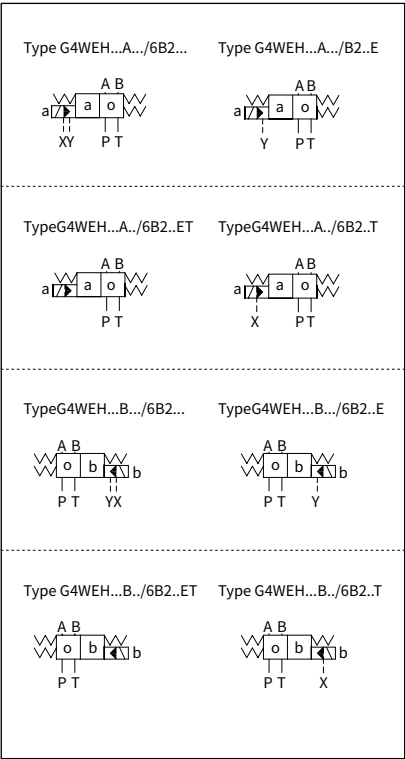
Valves with spring centred

Detailed and simplified symbols for 3-position valves



Valves with spring offset

(At position A or B of 2-position valve derived from 3-position)



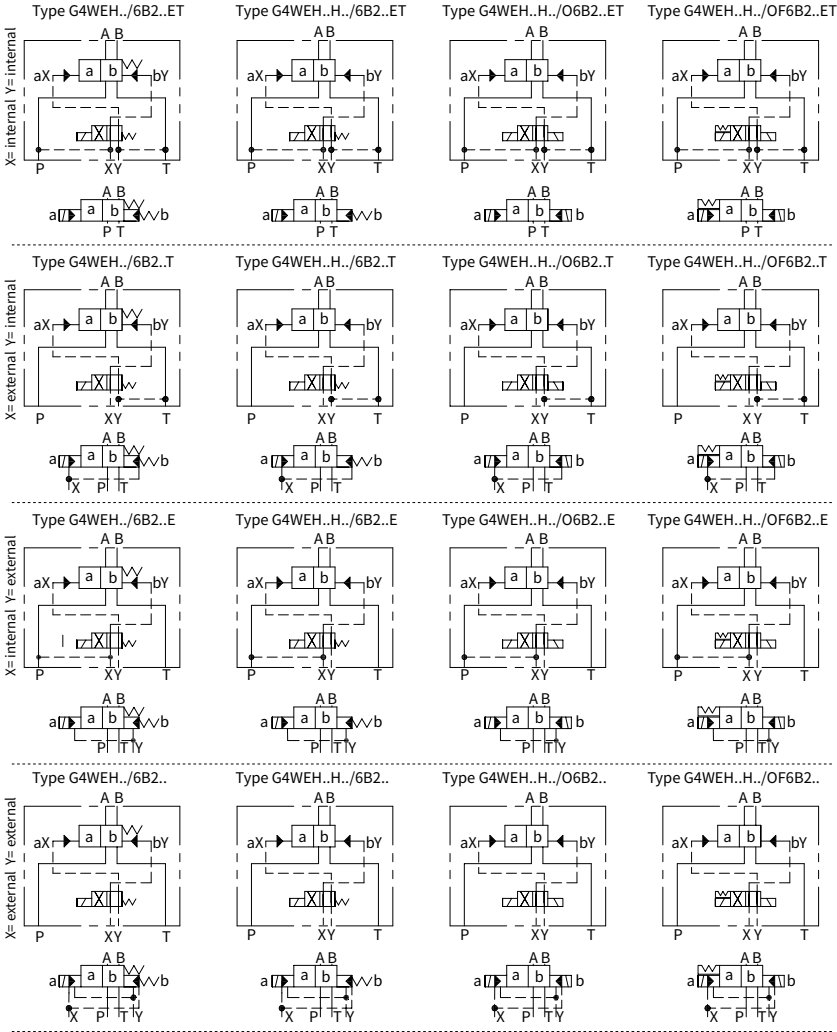
Symbols

Detailed and simplified symbols for 3-position valves

3-position valve			2-positon derivative from 3-position			
3-position valve type	Symbol	Crossover Symbol	2-position valve type	Symbol (solenoid at A end)	2-position valve type	Symbol (solenoid at B end)
G4WEH..E../6B2.. E			G4WEH..EA../6B2..		G4WEH..EB../6B2..	
G4WEH..F../6B2.. F			G4WEH..FA../6B2..		G4WEH..FB../6B2..	
G4WEH..G../6B2.. G			G4WEH..GA../6B2..		G4WEH..GB../6B2..	
G4WEH..H../6B2.. H			G4WEH..HA../6B2..		G4WEH..HB../6B2..	
G4WEH..J../6B2.. J			G4WEH..JA../6B2..		G4WEH..JB../6B2..	
G4WEH..L../6B2.. L			G4WEH..LA../6B2..		G4WEH..LB../6B2..	
G4WEH..M../6B2.. M			G4WEH..MA../6B2..		G4WEH..MB../6B2..	
G4WEH..P../6B2.. P			G4WEH..PA../6B2..		G4WEH..PB../6B2..	
G4WEH..Q../6B2.. Q			G4WEH..QA../6B2..		G4WEH..QB../6B2..	
G4WEH..R../6B2.. R			G4WEH..RA../6B2..		G4WEH..RB../6B2..	
G4WEH..S../6B2.. S			G4WEH..SA../6B2..		G4WEH..SB../6B2..	
G4WEH..T../6B2.. T			G4WEH..TA../6B2..		G4WEH..TB../6B2..	
G4WEH..U../6B2.. U			G4WEH..UA../6B2..		G4WEH..UB../6B2..	
G4WEH..V../6B2.. V			G4WEH..VA../6B2..		G4WEH..VB../6B2..	
G4WEH..W../6B2.. W			G4WEH..WA../6B2..		G4WEH..WB../6B2..	
G4WEH..M1../6B2.. M1			G4WEH..M1A../6B2..		G4WEH..M1B../6B2..	
G4WEH..M2../6B2.. M2			G4WEH..M2A../6B2..		G4WEH..M2B../6B2..	
G4WEH..J2../6B2.. J2			G4WEH..J2A../6B2..		G4WEH..J2B../6B2..	

Symbols

Detailed and simplified symbols for 2-position valves



Spools of 2-position valves

Spools:	A	C	D,DE	K	Z	B	Y,YE
Spool symbols:	a  b Port T for draining	a  b	D a  b DEa  b	a  b	a  b	a  b Port T for draining	Y a  b YE a  b
Transition symbols:							

Technical details

1. Hydraulic section

1). GWEH10.../6B2... Type explosion-proof electro-hydraulic directional valve

Maximum working pressure:		bar	315			
P, A, B						
Port T	With external pilot oil drain	bar	315			
	With internal pilot oil drain	bar	210			
Port Y	With external pilot oil drain	bar	210			
Min. control pressure	With external pilot oil supply	bar	3-position valve		10	
	With internal pilot oil supply	bar	Spring-return 2-position valve		10	
	(not apply to C, Z, F, G, H, P, T, V)	bar	Hydraulic-return 2-position valve		7	
	Control oil internal supply	bar	4.5			
(apply to C, Z, F, G, H, P, T, V)						
Max. control pressure		bar	250			
Hydraulic fluid			Mineral oil, phosphate oil			
Temperature range of Hydraulic fluid		°C	-30 to+80 (NBR seals)			
			-20 to+80 (FKM seals)			
Viscosity range		mm ² /s	2.8 to 500			
Controlled quantity in commutating process		cm ³	3-position valve		2.04	
			2-position valve		4.08	
Total commutating time of valve from zero position to switching position (DC)						
Control pressur		bar	70	140	210	250
-3-position valve		ms	65	60	55	50
- 2-position valve		ms	80	75	70	65
Total Switching time of valve from switching position to zero position						
-3-position valve		ms	30			
- 2-position valve		ms	35	40	30	25
Flow of shorter Switching time		L/min	About 35			
Installation position			HC, HD, HK, HZ and HY of hydraulic return shall be installed horizontally. The rest are arbitrary			
Weight	Single solenoid valve	kg	7.8			
	Double solenoid valve	kg	9.1			
	Switching time regulator	kg	1.0			
	Fixed ratio pressure reducing valve	kg	0.5			

Technical details

1. Hydraulic section

2). GWEH16.../6B2... Type explosion-proof electro-hydraulic directional valve

Maximum working pressure: P, A, B		bar	Type G-...WEH16../6B2... 350		
Port T	With external pilot oil drain	bar	250		
	With internal pilot oil drain	bar	210		
Port Y	With external pilot oil drain	bar	210		
Min. control pressure	With external pilot oil supply	bar	3-position valve		14
		bar	Spring-return 2-position valve		14
	With internal pilot oil supply	bar	Hydraulic-return 2-position valve		14
		bar	When applying back pressure valve or the flow is large, enginery of spool valve is 4.5 bar as C, Z, F, G, H, P, S, T and V		
Max. control pressure		bar	250		
Hydraulic fluid			Mineral oil, phosphate oil		
Temperature range of Hydraulic fluid		°C	-30 to + 80 (NBR seals)		
			-20 to + 80 (FKM seals)		
Viscosity range		mm²/s	2.8 to 500		
Switching pilot oil volume		cm³	Spring-centering 3-position valve		5.72
		cm³	2-position valve		11.45
*Switching time from '0' position to working position (DC solenoid)					
Control pressur		bar	50	150	250
- Spring-centering 3-position valve		ms	65	60	58
-2-position valve		ms	65	55	50
*Switching time from working position to "0" position					
- Spring-centering 3-position valve		ms	30		
- 2-position valve		ms	45	35	30
Installation position			C,D,K,Z,Y Type hydraulic-return valves are installed horizontally, the rest can be installed arbitrarily		
Flow of shorter switching time		L/min	About 35		
Weight of the valve		kg	About 10.6		

*Switching time refers to time from drawing of solenoid of pilot valve to full opening of main valve.

Technical details

1. Hydraulic section

3). GWEH25.../6B2... Type explosion-proof electro-hydraulic directional valve

Maximum working pressure:		bar	Type G-H-...WEH25../6B2...			
P, A, B			350			
Port T	With external pilot oil drain	bar	250			
	With internal pilot oil drain	bar	210			
Port Y	With external pilot oil drain	bar	210			
Min. control pressure	With external pilot oil supply	bar	Spring-centering 3-position valve		13	
			Spring-return 2-position valve		13	
	With internal pilot oil supply	bar	Hydraulic-return 2-position valve		8	
			When applying prepressing or the flow is large correspondingly ,enginery of spool valve is 4.5 bar as C, Z, F, G, H, P, S, T and V			
Max. control pressure		bar	250			
Hydraulic fluid			Mineral oil, phosphate oil			
Temperature range of Hydraulic fluid		°C	-30 to + 80 (NBR seals)			
			-20 to + 80 (FKM seals)			
Switching pilot oil volume		cm ³	Spring-centering 3-position valve		14.2	
		cm ³	2-position valve		28.4	
*Switching time from '0' position to working position (DC solenoid)						
Pilot control pressure		bar	50	140	210	250
- Spring-centering 3-position valve		ms	85	75	70	65
- 2-position valve		ms	160	130	120	105
*Switching time from working position to "0" position						
-Spring-centering 3-position valve		ms	40			
- 2-position valve		ms	125	100	90	80
Installation position			C, D, K, Z, Y Type hydraulic-return valves are installed horizontally, the rest can be installed arbitrarily			
Flow of shorter switching time		L/min	About 35			
Weight of the valve		kg	About 19			

*Switching time refers to time from drawing of solenoid of pilot valve to full opening of main valve.

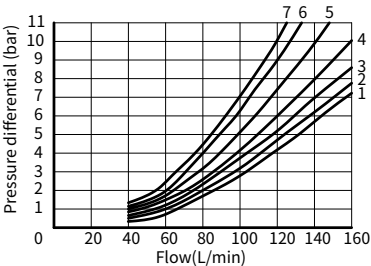
Technical details

2. Electrical data

Type of voltage		DC
Voltage (allowable fluctuation of $\pm 10\%$)		12、24V、36V、110V
Power	W	30
Duty cycle		Continuous
Temperature range of environment	°C	~ +50
Temperature range of coil	°C	~ +150
Protection class to DIN40050		IP65

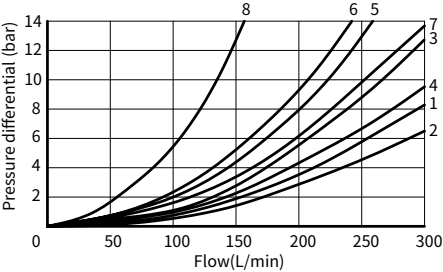
Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

Type GWEH 10../6B2..



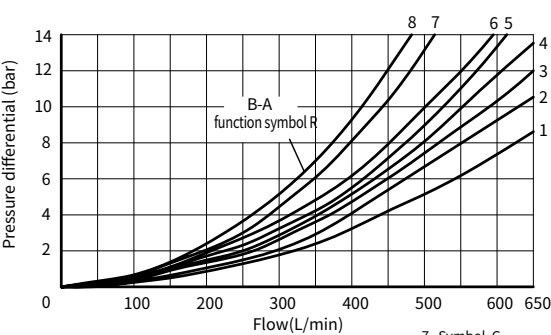
Enginery symbol	Switching position				Enginery symbol	Neutral position		
	P → A	P → B	A → T	B → T		A → T	B → T	P → T
E, Y, D	2	2	4	5				
F	1	4	1	4	F	3	-	6
G, T	4	2	2	6	G, T	-	-	7
H, C	4	4	1	4	H	1	3	5
J, K	1	2	1	3				
L	2	3	1	4	L	3	-	-
M	4	4	3	4				
P	4	1	3	4	P	-	7	5
Q, V, W, Z	2	2	3	5				
R	2	2	3	-				
U	3	3	3	4	U	-	4	-

Type GWEH 16../6B2..



Symbol	Switching position				
	P → A	P → B	A → T	B → T	P → T
E, Y, D	1	1	1	3	-
F	2	2	3	3	-
G, T	5	1	3	7	6
H, C, Q, V, Z	2	2	3	3	-
J, K, L	1	1	3	3	-
M, W	2	2	4	3	-
R	2	2	4	-	-
U	1	1	4	7	-
S	4	4	4	-	8

Type GWEH 25../6B2..



Symbol	Switching position			
	P → A	P → B	A → T	B → T
E	1	1	1	3
F	1	4	3	3
G	3	1	2	4
H	4	4	3	4
J, Q	2	2	3	5
L	2	2	3	3
M	4	4	1	4
P	4	1	1	5
R	2	1	1	-
U	4	1	1	6
V	2	4	3	6
W	1	1	1	3
T	3	1	2	4

7 Symbol G
Neutral position P-T

8 Symbol T
Neutral position P-T

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

When valve is at the middle position, open area of all flow directions.

Size	Enginery	Open area (mm ²)			
		P → A	P → B	A → T	B → T
GWEH 10../6B2..	Q	-	-	13	13
	V	13	13	13	13
	W	-	-	2.4	2.4
GWEH 16../6B2..	Q	-	-	32	32
	V	32	32	32	32
	W	-	-	6	6
GWEH 25../6B2..	Q	-	-	83	83
	V	83	83	83	83
	W	-	-	14	14

Performance limit

The switching function of valves depends on filtration due to adhesive effects. To achieve the specified permissible flow values, we recommend full-flow filtration with 25 µm. The flow forces acting within the valves also have an influence on the flow performance. With 4-way directional valves, the specified flow data are therefore valid for normal applications with 2 directions of flow (e.g. from P to A and simultaneous return flow from B to T) (see table).
If the fluid flows in only one direction, the permissible flow may be significantly lower in critical cases (e.g. use of a 4-way directional as 3-way directional valve with port A or B blocked).

Enginery limit table of GWEH 10../6B2.. Type electro-hydraulic directional control valve

3-position valve, spring centering			
Flow(L/min)	Pressure stage(bar)		
Symbol	200	250	315
E, J, L, M, Q, U, W, R, V	160		
H	160	150	120
G, T	160		140
F, P	160	140	120
2-position valve whose main valve has a returning spring			
C, D, K, Z, Y	160		

2-position valve, main valve without spring			
Flow(L/min)	Pressure stage(bar)		
Symbol	200	250	315
HC HD HK HZ HY	160		
HC.../O HD.../O	160		
HK.../O HZ.../O			
HC.../OF... HD.../OF... HK.../OF... HZ.../OF...	160		

Enginery limit table of GWEH 16../6B2.. Type electro-hydraulic directional control valve

Spring-centering 3-position valve						2-position valve					
Flow(L/min)	Pressure stage(bar)					Flow(L/min)	Pressure stage(bar)				
Symbol	70	140	210	280	350	Symbol	70	140	210	280	350
E, H, J, L, M, Q, U, W, R	300	300	300	300	300	C	300	300	300	300	300
F, P	300	250	180	170	150	D, Y	300	270	260	250	230
G, T	300	300	240	210	190	K	300	250	240	230	210
S	300	300	300	250	220	Z	300	260	190	180	160
V	300	250	210	200	180	Hydraulic-return 2-position valve					
						HC, HD, HK, HZ, HY	300	300	300	300	300
						When control oil is supplied internally and pressure valve is equipped, the flow of spool valve's enginery of H, F, P, G, T, S, V, C and Z Types reaches 160L/min.					

Performance limits

Enginery limit table of GWEH 25../6B2.. Type electro-hydraulic directional control valve

3-position valve of spring centering						2-position valve					
Flow(L/min)	Pressure stage(bar)					Flow(L/min)	Pressure stage(bar)				
Symbol	70	140	210	280	350	Symbol	70	140	210	280	350
E, L, M	650	650	650	650	650	G, D, K, Z, Y	650	650	650	650	650
U, W, Q						Hydraulic-return 2-position valve (main valve without spring)					
G, T	400	400	400	400	400	HC HD HK	650	650	650	650	650
F	650	550	430	330	300	HZ HY					
H	650	650	550	400	360	HC.../O					
J	650	650	650	600	520	HD.../O					
P	650	550	430	330	300	HK.../O	650	650	650	650	650
V	650	550	400	350	310	HZ.../O					
R	650	650	650	650	580	HC.../OF...					
						HD.../OF...					
						HK.../OF...	650	650	650	650	650
						HZ.../OF...					
						When control oil is supplied internally and pressure valve is equipped, the flow of spool valve's enginery of G, Z, V, F, H, P, T Types reaches 180L/min.					

Pilot-operated solenoid valve

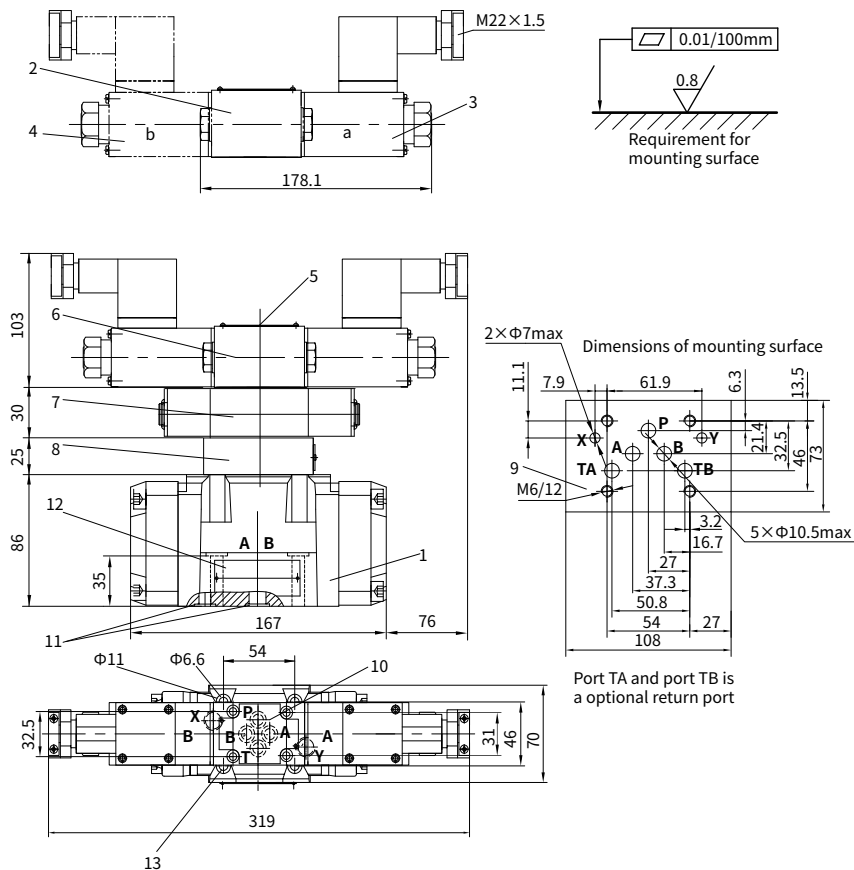
A four-way Explosion protection directional valve with NG 6 (G4WE6.../B2...) is used as the pilot valve. The slide valve is kept in the middle or the initial position by the spring, and kept on the working position through the solenoid or the locator.

The valve applies the DC solenoid, and the function of the pilot solenoid valve applied to the main valve with various functions is shown as the table below:

Main valve	Pilot-operated solenoid valve
Spring-centering 3-position valve/ transformed 2-position valve	Use G4WE6J-6X/B2...3-position valve/
Structure of 2-position main valve: Y.../...and HY.../... B.../...and HB.../...	Use G4WE6J-6X/B2...2-position valve
2-position valve : A, C, D, K and Z Type functions HA, HC, HD, HK, HZ Type valves	Use 2-position valve with D Type enginery Types of main valve's structure: Spring return G4WE6D-6X/B2... No returning spring G4WE6D-6X/OB2... No returning spring, with a positioner G4WE6D-6X/OFB2...

Unit dimensions

Unit dimension of valve type GWEH10../6B2..



It must be ordered separately, if connection plate is needed.

Type:

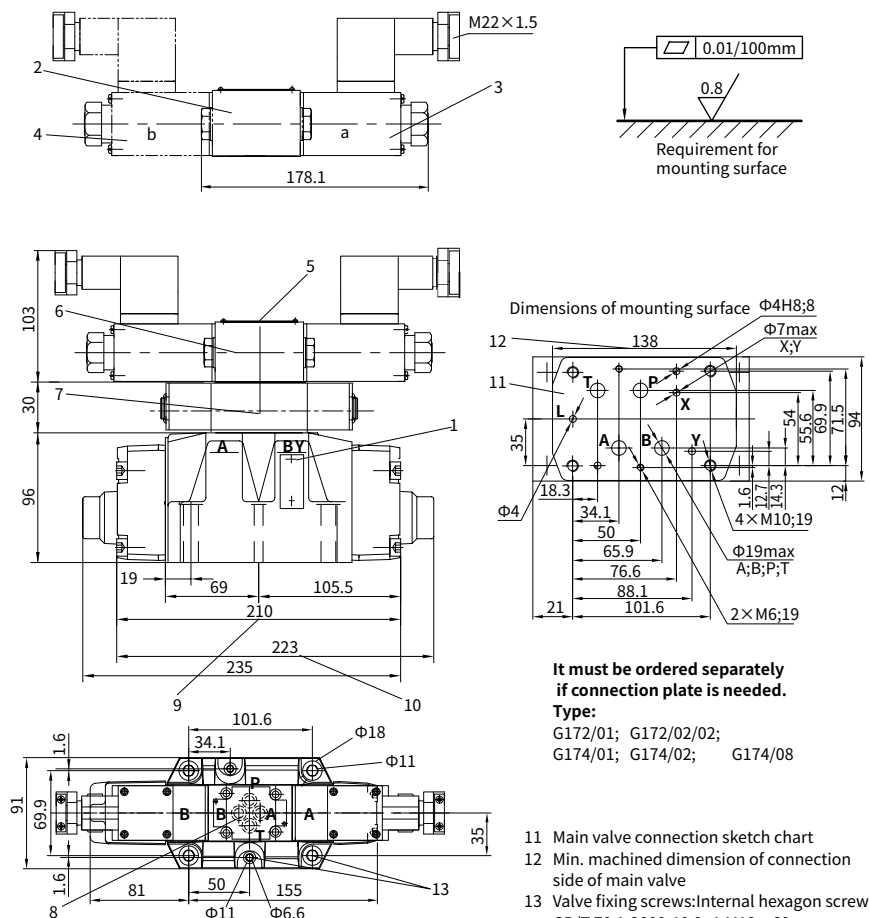
G534/01; G534/02; G535/01; G535/02;
 G536/01; G536/02

11 O-rings 13×1.6×2 (or O-rings 12×2) of port A, B, P and O-rings 11.18×1.6×1.78 (or o-rings:10.82×1.78) of port X, Y and R
 12 Nameplate for the whole valve

13 Valve fixing screws:
 Internal hexagon screw GB/T70.1-2000-10.9, 4-M6×45, Tightening torque $M_A=15.5\text{Nm}$, (length accords with all the module sandwich actual height) must be ordered separately

Unit dimensions

Unit dimension of valve type GWEH16../6B2..



It must be ordered separately if connection plate is needed.

Type:

G172/01; G172/02/02;

G174/01; G174/02; G174/08

- 1 Main valve
- 2 2-position valve with one solenoid and plug Z4
- 3 Explosion protection solenoid a
- 4 Explosion protection solenoid b
- 5 Nameplate for the pilot valve
- 6 Override button
- 7 2-position with two solenoids
- 8 3-position with two solenoids
- 9 Switching time adjustment
- 10 Dimension of 3-position with spring-centred valve and 2-position with hydraulic-offset valve
- 11 2-position with spring-offset valve (graphic presentation is spool C, D, K and Z)

- 11 Main valve connection sketch chart
- 12 Min. machined dimension of connection side of main valve
- 13 Valve fixing screws: Internal hexagon screw GB/T 70.1-2000-10.9, 4-M10×60
Tightening torque $M_A=75\text{ Nm}$,
2-M6×55 $M_A=15.5\text{ Nm}$,
(length is according to all the module sandwich actual height)
must be ordered separately.

When the P opening is provided with a back pressure valve, the P opening uses an O-ring: 27×3, A, T, B openings shall use R-shaped ring 27.8×2.6×3 (or O-ring: 27×3)

When the P opening is free from the back pressure valve, the P, T, A and B openings shall use R-shaped ring: 22.53×2.3×2.62 (or O-ring: 22×2.5), the X, Y, and L openings shall use R-shaped ring: 10×2×2 (or O-ring: 10×2)

China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.

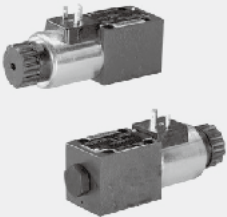


2.19

3/2 and 4/2 directional poppet valve with solenoid actuation

Type M-.SED6...L1X

Size 6
Up to 350 bar
Up to 25 L/min



Contents

Function and configuration	02
Symbols	03
Ordering code	03
Technical data	04
Electrical data	04
Characteristic curves	05
Unit dimensions	06-07

Features

- Direct operated directional poppet valve with solenoid actuation
- Mounting face as per DIN24 340 A ISO 4401 and CETOP-RP 121H
- Closed port is leak-free isolated
- Keep switch flexibility under high pressure
- Pressure-tight chamber does not need to be opened when changing of the coil
- Solenoid coil can be rotated through 90°
- With optional concealed manual override

Function and configuration

• **M-3SED6 are directional poppet valves with solenoid actuation. They control the start, stop and direction of flow.**

The directional valve mainly consist of housing (1), solenoid (2), valve seats (7) and (11) and closing element (4). With the help of manual override (6) the valves can be operated without energisation of the solenoid.

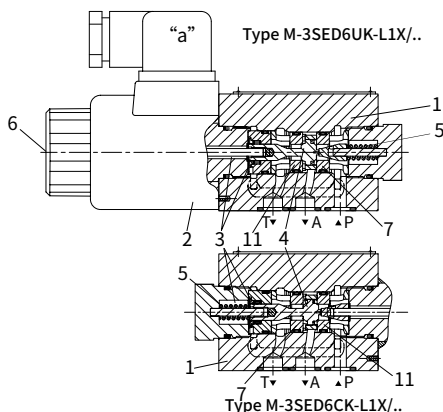
General principle (3/2 directional poppet valve):

The initial position of the valve (normally open "UK" or normally closed "CK") is determined by the arrangement of the spring (5).

Chamber (3) behind closing element (4) is connected to port P and closed towards port T. The valve is therefore pressurebalanced with regard to the actuating forces (solenoid and spring).

Due to the special closing element (4) ports P, A and T can be pressurized to the maximum operating pressure (350 bar), and the flow can be directed in both directions (see symbols)!

In the initial position, closing element (4) is pressed by the spring (5) onto seat (11), in the shifted position, it is pushed by the solenoid (2) onto seat (7). The flow is leak-free blocked.



• **M-4SEW6 4/2 directional poppet valve**

In conjunction with a sandwich plate, the Plus-1 plate, under the 3/2 directional poppet valve, the function of a 4/2 directional poppet valve can be realized.

1). Initial position:

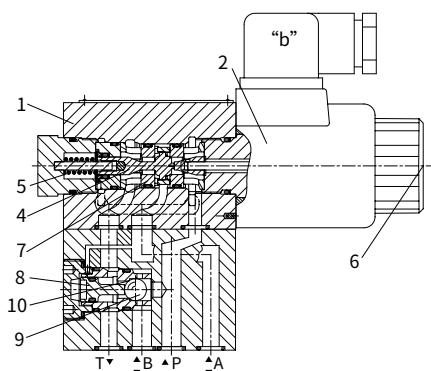
The main valve is not operated. Spring (5) holds closing element (4) on seat (11). Port P is blocked, and A is connected to T. A pilot line is provided from A to the large area of pilot spool (8), which is therefore unloaded to tank. The pressure applied via P now shifts ball (9) onto seat (10). This opens the connection from P to B and A to T.

2). Transition position:

When the main valve is operating, closing element (4) is shifted against spring (5) and pressed onto seat (10). This results in closing of port T, while P, A and B are briefly connected.

3). Switching position:

P is connected to A. Since the pump pressure acts via A on the large area of pilot spool (8), ball (9) is pressed onto seat (12). B is therefore connected to T, and P to A. Ball (9) in the Plus-1 plate has a "positive overlap".



• **Cartridge type orifice plug(model M-.SED6.L1X/...)**

For the work status of the valve during switching process, the flow may be over the value permitted by the valve performance limit curve; in this case, a cartridge orifice plug is necessary.

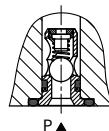
The orifice plug is installed in port P.



• **Cartridge check valve (model M-.SED6.L1X/...)**

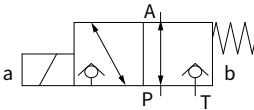
Cartridge check valve allows the oil flows from P to A freely with no leaks from A to P.

One-way valve is installed on port P.

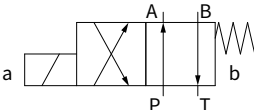


Spool symbols

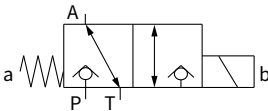
Type M-3SED6UK-L1X/..



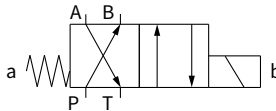
Type M-4SED6D-L1X/..



Type M-3SED6CK-L1X/..



Type M-4SED6Y-L1X/..



Ordering code

	M	—	SED	6	—	L1X	/	35	C		N	/		*
3 work ports	= 3													
4 work ports	= 4													
Poppet valve														
Size 6	=6													
Spool symbols														
L10 ~ L19series						=L1X								
Work pressure to 350bar								=35						
Wet-pin solenoid with detachable coil									=C					
12VDC									= G12					
24VDC									= G24					
110VDC									= G110					
205VDC									= G205					
220VDC									= G220					
110VAC									=W110R					
220VAC									=W220R					
With manual emergency button										=N				
Further details in clear text														
No code = NBR seals V = FKM seals														
No code = Without cartridge check valve, without cartridge restriction choke P=Without Cartridge check valve														
B12 = Orifice Φ1.2 mm B15 = Orifice Φ1.5 mm B18 = Orifice Φ1.8 mm B20 = Orifice Φ2.0 mm B22 = Orifice Φ2.2 mm														
K4 = Without plug Z4 = With square plug Z5L = Square plug with light Z5 = With rectifier plug (just for W110R and W220R)														
Note: K4, Z4, Z5L is not suitable for W110R and W220R														

Technical data

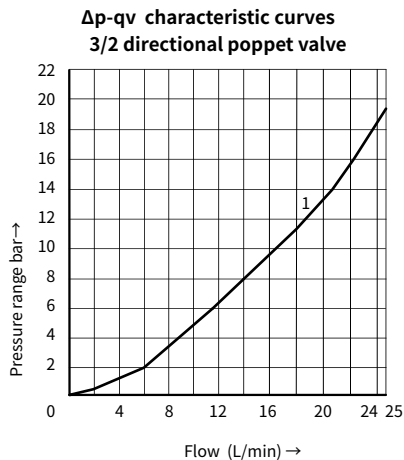
Installation position			Optional	
Environment temperature °C			-30 to +50 (NBR seal)	
			-20 to +50 (FKM seal)	
Weight	2/2,3/2 directional poppet valve	Kg	1.5	
	4/2 directional poppet valve	Kg	2.3	
Max operation pressure		bar	350	
Max flow		L/min	25	
Hydraulic fluid			Mineral oil suitable for NBR and FKM seal	
			Phosphate ester for FKM seal	
Hydraulic fluid temperature range °C			-30 to +80 (NBR seal)	
			-20 to +80 (FKM seal)	
Viscosity range		mm²/s	2.8 to 500	
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406	

Electrical data

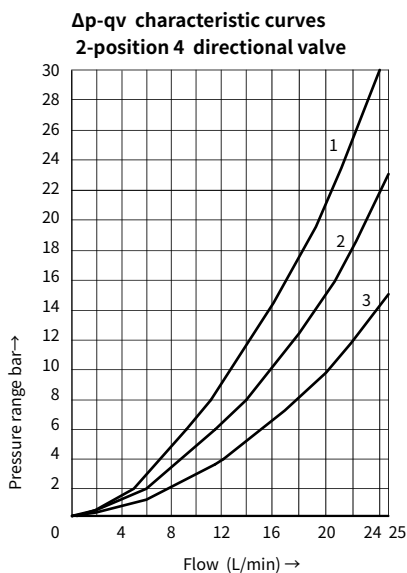
Voltage type								DC				AC			
Available voltage				V				12, 24, 110, 205, 220				110, 220 (Only by Z5 rectifier plug)			
Voltage tolerance (nominal voltage)				%				+10 ~ -15							
Power consumption				W				30							
Duty cycle				100%											
Switching time to ISO 6403 (installation position: Solenoid installed horizontally)															
Pressure bar	Flow L/min	DC								AC + rectifier					
		On/ms (without oil tank pressure)				Off/ms				On/ms (without oil tank pressure)				Off/ms	
		UK	CK	D	Y	UK, CK	D, Y	U	C	D	Y	U, C		D, Y	
70	25	45	40	50	50	10	15	45	40	45	40	40		40	
140	25	60	40	50	50	10	15	55	40	55	40	40		40	
210	25	60	45	60	50	10	15	60	45	60	45	40		40	
280	25	60	45	60	50	10	15	65	45	65	45	40		40	
315	25	65	45	65	50	10	15	65	45	65	45	40		40	
350	25	65	45	65	50	10	15	65	45	65	45	40		40	
Note: switching time is related to flow direction (P to A / A to T); there may be deviation for reverse flow															
Switching frequency				times/h				Up to 15000							
Type of protection to DIN 40050				IP65											
Max coil temperature				°C				+150							

Note: When making the electrical connection, properly connect the protective conductor(PE $\frac{1}{2}$).

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



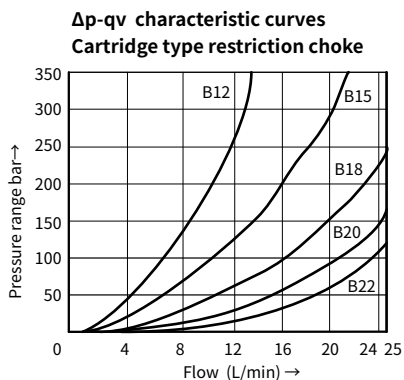
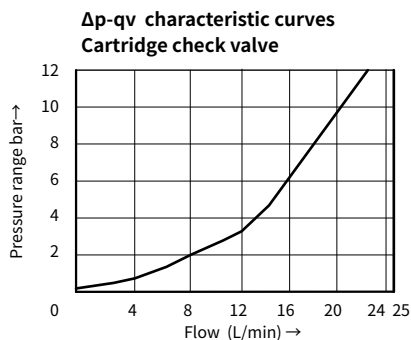
1 M-3SED6^{CK}_{UK}..., P to A and A to T



1 M-4SED6^D_Y..., A to T

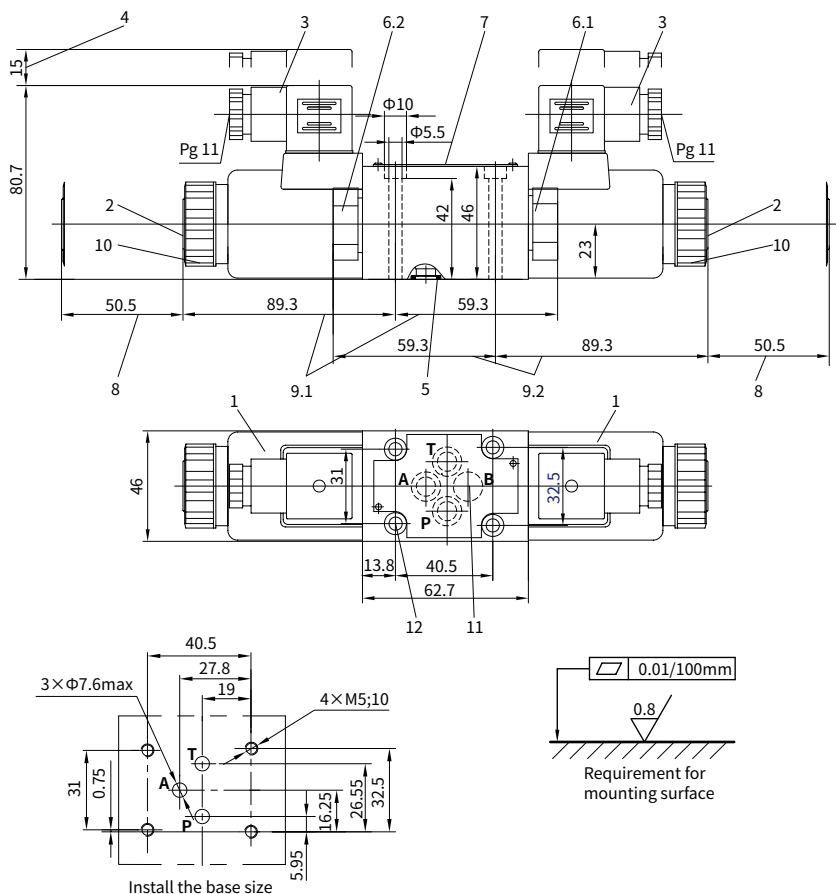
2 M-4SED6^D_Y..., P to A

3 M-4SED6^D_Y..., P to B, B to T



Unit dimensions

• M-3SED6^{CK}_{UK} -L1X/...solenoid directional poppet valve



- 1 Solenoid
- 2 Manual emergency button
- 3 Plug as per DIN43650 (can rotate for 90 degrees)
- 4 Space required to remove cable socket
- 5 O-ring 9.25×1.78 for port P, T, A and B
- 6.1 Plug for M-3SED6UK-L1X/..
- 6.2 Plug for M-3SED6CK-L1X/..
- 7 Name plate.
- 8 Space required to remove coil
- 9.1 M-3SED6UK-L1X/.. total length
- 9.2 M-3SED6CK-L1X/.. total length

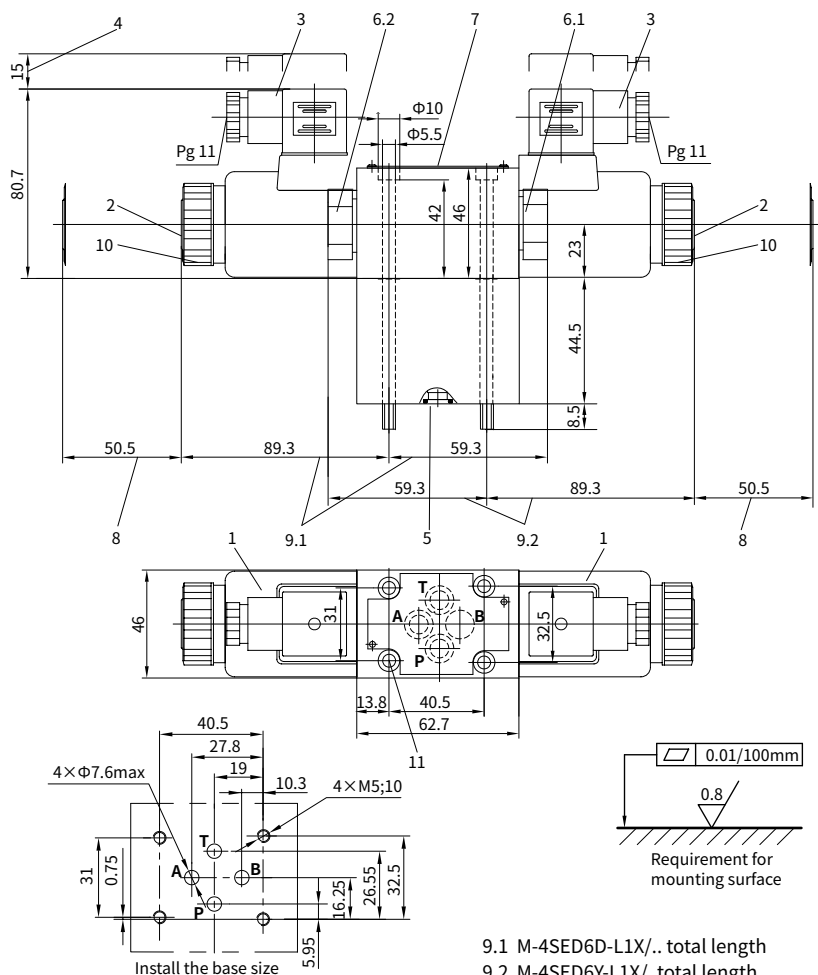
- 10 Fixing nut, Tightening torque $M_A=4Nm$
- 11 Oil port B of the valve is a blind bore.
- 12 Valve fixing screw:
M5×50 GB/T70.1-10.9
Tightening torque $M_A=8.9Nm$

It must be ordered separately, if connection plate is needed. Type:

G341/01(G1/4), G341/02(M14×1.5)
G342/01(G3/8), G342/02(M18×1.5)
G502/01(G1/2), G502/02(M22×1.5)

Unit dimensions

• M-4SED6^D_Y-L1X/..solenoid directional poppet valve



- 1 Solenoid
- 2 Manual emergency button
- 3 Plug as per DIN43650 (can rotate for 90 degrees)
- 4 Space required to remove cable socket
- 5 O-ring 9.25×1.78 for port P, T, A and B
- 6.1 Plug for M-4SED6D-L1X/..
- 6.2 Plug for M-4SED6Y-L1X/..
- 7 Name plate.
- 8 Space required to remove coil

9.1 M-4SED6D-L1X/.. total length

9.2 M-4SED6Y-L1X/..total length

10 Fixing nut, Tightening torque $M_A=4Nm$

11 Valve fixing screw:

$M5 \times 50$ GB/T70.1-10.9

Tightening torque $M_A=8.9Nm$

It must be ordered separately, if connection plate is needed. Type:

G341/01(G1/4), G341/02(M14×1.5)

G342/01(G3/8), G342/02(M18×1.5)

G502/01(G1/2), G502/02(M22×1.5)

China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.

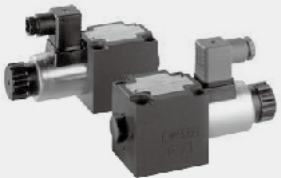


2.20

3/2- and 4/2 directional poppet valves with solenoid operation

Type M-.SED10...L1X

Size 10
Up to 350 bar
Up to 40 L/min



Contents

Function and configuration	02
Symbols	03
Ordering code	03
Technical data	04
Electrical data	04
Characteristic curves	05
Unit dimensions	06-07

Features

- Direct operated directional poppet valve with solenoid actuation
- Mounting face as per DIN24 340 A ISO 4401 and CETOP-RP 121H
- Closed port is leak-free isolated
- keep switch flexibility under high pressure
- Pressure-tight chamber does not need to be opened for a change of the coil
- Solenoid coil can be rotated through 90°
- With concealed manual override, optional

Function and configuration

• Type M-3SED10 3/2 directional poppet valve

Directional valves of the type SED are direct operated directional poppet valves with solenoid actuation. They control the start, stop and direction of flow.

The directional poppet valves consist of housing(1), the solenoid(2), the valve seat(7) and (11) and the control spool(4).

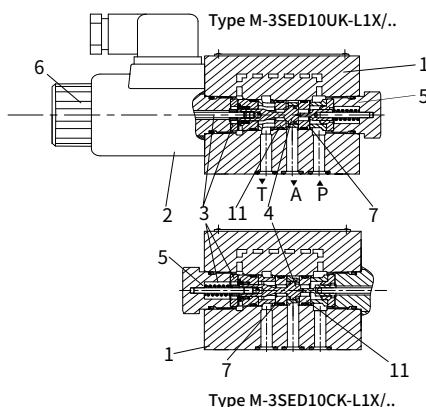
The manual override(6) allows for the switching of the valve without solenoid energization.

General principle (3/2 directional poppet valve):

The initial position of the valve (normally open "UK" or normally closed "CK") is determined by the arrangement of the spring(5). The chamber(3) behind the control spool(4) is connected to port P and sealed against port T. Thus, the valve is pressure-compensated in relation to the actuating forces (solenoid and spring).

By means of the control spool(4), the port P, A and T can be loaded with maximum operating pressure (350bar) and the flow can be directed in both directions (see symbols).

In the initial position, the control spool(4) is pressed onto the seat(11) by the spring(5), in spool position, it is pressed onto the seat(7) by the solenoid(2). The flow is blocked.



• Type M-4SED10 4/2 directional poppet valve

With a sandwich plate, the Plus-1 plate, under the 3/2 directional poppet valves, the function of a 4/2 directional poppet valve is achieved.

1). Initial position:

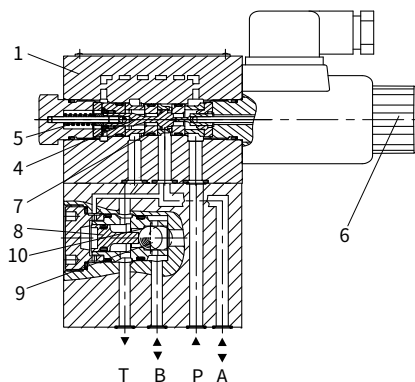
the main valve is not actuated. The spring(5) holds the control spool(4) on the seat(11). Port P is blocked and A is connected to T. Apart from that, one control line is connected from A to the large area of the control spool(8), which is thus unloaded to the tank. The pressure applied via P now pushes the ball(9) onto the seat(10). Now, P is connected to B, and A to T.

2). Transition position:

When the main valve is actuated, the control spool(4) is shifted against the spring(5) and pressed onto the seat(7). During this, port T is blocked, P, A, and B are briefly connected to each other.

3). Spool position:

P is connected to A. As the pump pressure acts via A on the large area of the control spool(8), the ball(9) is pressed onto the seat(12). Thus, B is connected to T, and P to A. The ball(9) in the Plus-1 plate has a "positive spool overlap".



• Throttle insert:

The use of a throttle insert is required, if, due to the operating conditions, flows are to be expected during the switching procedure, which are higher than the started maximum performance limits of the valve.

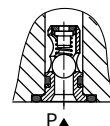
The throttle is inserted into port P of the valve.



• Cartridge check valve:

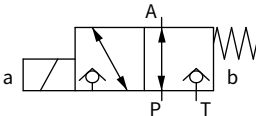
The cartridge check valve allows free flow from P to A and provides leak-free closed from A to P.

The cartridge check valve is inserted into port P of the valve.

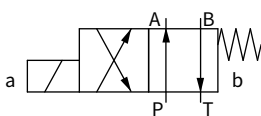


Spool symbols

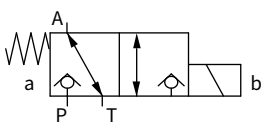
Type M-3SED10UK-L1X/..



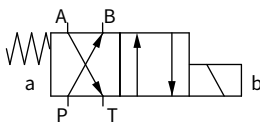
Type M-4SED10D-L1X/..



Type M-3SED10CK-L1X/..



Type M-4SED10Y-L1X/..



Ordering code

M	SED	10	L1X	35	C	N			
3 service port	= 3								
4 service port	= 4								
Poppet valve									No code = NBR seals V = FKM seals
Size 10		=10							No code = Without cartridge check valve, without throttle insert
Spool symbols									P = With cartridge check valve
Series L10 to L19 (L10 to L19: unchanged installation and connection dimensions)			=L1X						B12 = Throttle Φ 1.2 mm B15 = Throttle Φ 1.5 mm B18 = Throttle Φ 1.8 mm B20 = Throttle Φ 2.0 mm B22 = Throttle Φ 2.2 mm
Operating pressure 350 bar				=35					K4 = Din4365 sockets without plug Z4 = Square plug Z5L = Square plug with lamps Z5 = Rectification plug (only suitable for W110R and W220R) Note: K4, Z4, Z5L is not suitable for W110R and W220R
Wet-pin solenoid with detachable coil					=C				
12VDC					= G12				
24VDC					= G24				
110VDC					= G110				
205VDC					= G205				
220VDC					= G220				
Plug rectification 110V					=W110R				
Plug rectification 220V					=W220R				
With manual override						=N			

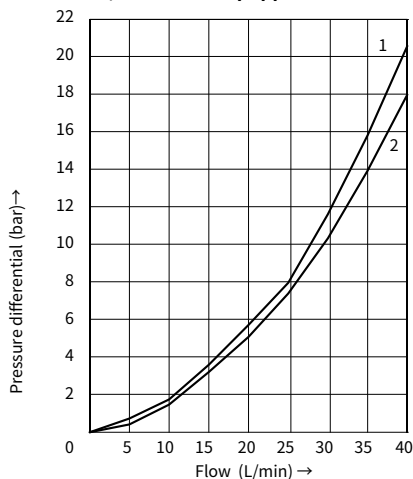
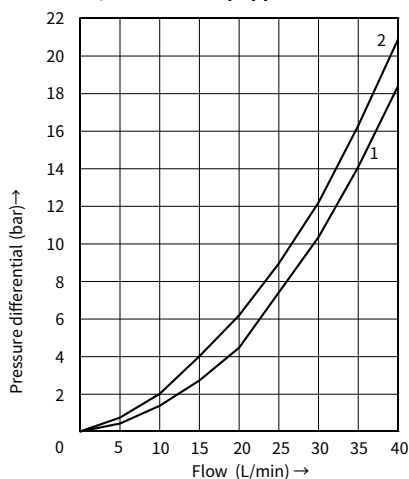
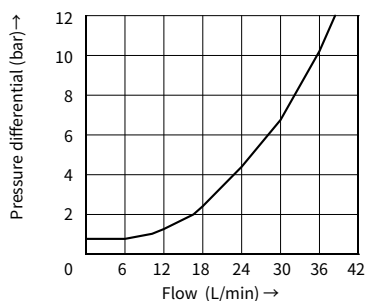
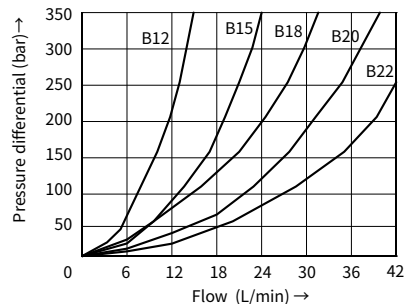
Technical data

Installation position			Optional
Environment temperature		°C	-30 to +50 (NBR seal)
			-20 to +50 (FKM seal)
Weight	Two tee Solenoidic directional valve	Kg	2.6
	Two four-way Solenoidic directional valve	Kg	3.9
Max operation pressure		bar	350
Max flow		L/min	40
Hydraulic fluid			Mineral oil suitable for NBR and FKM seal Phosphate ester for FKM seal
Fluid temperature range		°C	-30 to +80 (NBR seal)
			-20 to +80 (FKM seal)
Viscosity range		mm²/s	2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406

Electrical data

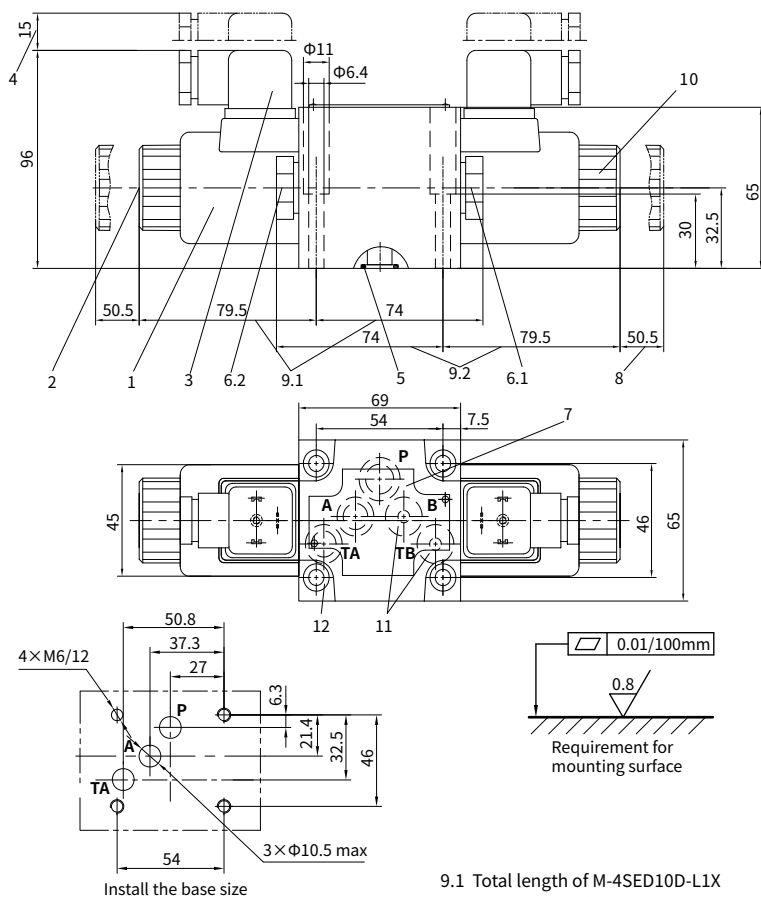
Voltage type								DC				AC+ rectifier			
Voltage version								V				12, 24, 110, 205, 220 110,220 (only possible via Z5 rectifier)			
Permissible voltage(deviation)								%				+10 ~ -15			
Input power								W				30			
Continuous power-on time								Continuous							
Switching time to ISO 6403															
Pressure bar	Flow L/min	DC solenoid							AC + rectifier						
		On/ms (without oil tank pressure)				Off/ms			On/ms (without oil tank pressure)				Off/ms		
		UK	CK	D	Y	UK, CK	D, Y		UK	CK	D	Y	UK, CK	D, Y	
70	40	40	30	40	35	10	10	35	30	40	35	40	40		
140	40	40	30	40	35	10	10	40	30	40	35	40	40		
210	40	45	35	45	35	10	10	45	35	45	35	40	40		
280	40	45	35	45	35	10	10	45	35	45	35	40	40		
315	40	50	35	50	35	10	10	50	40	50	35	40	40		
350	40	50	45	50	45	10	10	50	45	50	45	40	40		
Note: The switching types relate to a flow of P to A and A to T. With reversed flows deviations are possible.															
Switching frequency								Cycles/h				to 15000			
IP rating as per DIN 40050								IP65							
Max coil temperature								°C				+150			

Note: for electrical connection, protective wire (PE ⊥) shall be earthed as required.

Characteristic curves(Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46) **Δp - q_v characteristic curves
3/2 directional poppet valve**1 M-3SED10^{CK}_{UK} ..., P to A2 M-3SED10^{CK}_{UK} ..., P to A **Δp - q_v characteristic curves
4/2 directional poppet valve**1 M-4SED10^D_V ..., P to B, A to T2 M-4SED10^D_V ..., B to T, P to A **Δp - q_v characteristic curves
Cartridge check valve** **Δp - q_v characteristic curves
Throttle insert**

Unit dimensions

• M-3SED10^{CK}_{UK} -L1X/...solenoid directional poppet valve



- 1 Solenoid
- 2 Manual override
- 3 Plug-in connector to DIN 43650 (rotatable 90°)
- 4 Space required to remove the Plug-in connector
- 5 O-rings 12 $\times$ 2 for ports A,B,TA,TB
O-rings 14 $\times$ 2 for port P
- 6.1 Plug for M-4SED10D-L1X/
- 6.2 Plug for M-4SED10Y-L1X/
- 7 Name plate
- 8 Space required to remove the coil

- 9.1 Total length of M-4SED10D-L1X
- 9.2 Total length of M-4SED10Y-L1X
- 10 Plus-1 Plate
- 11 Securing nut tightening torque $M_A = 4 \text{ Nm}$
- 12 Port TB is a blind counterbore
- 13 Valve fixing screws
Internal hexagon screw: M6 $\times$ 40 GB/T 70.1-10.9,
tightening torque $M_A = 15.5 \text{ Nm}$

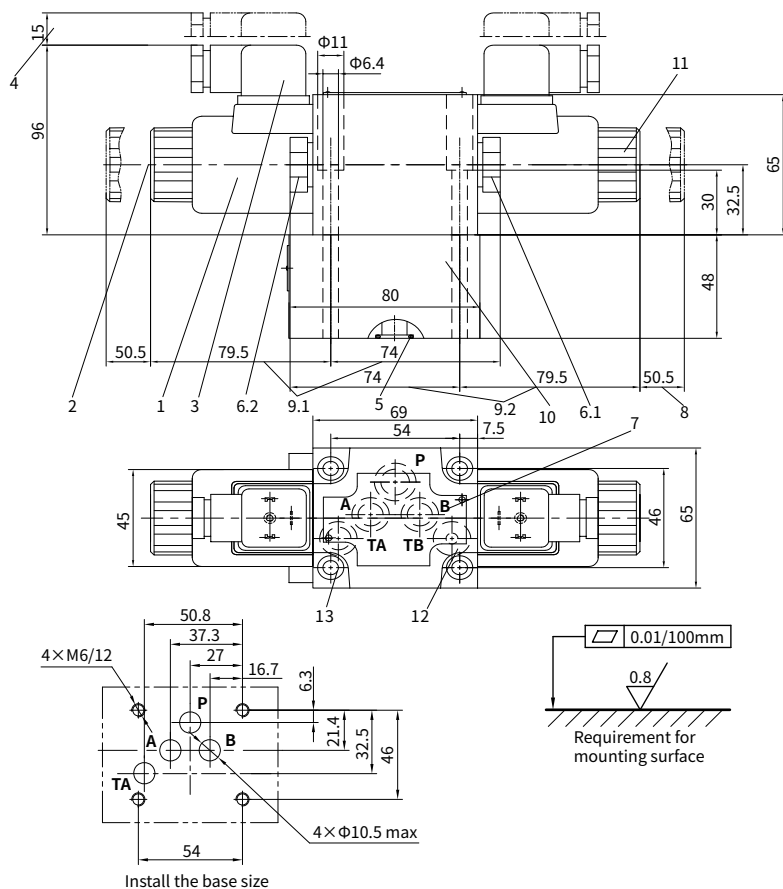
**It must be ordered separately,
if connection plate is needed.**

Type:

G 66/01 (G 3/8), G 66/02 (M18 $\times$ 1.5)
G 67/01 (G 1/2), G 67/02 (M22 $\times$ 1.5)

Unit dimensions

• M-4SED10^D_V -L1X/...solenoid directional poppet valve



- 1 Solenoid
- 2 Manual override
- 3 Plug-in connector to DIN 43650 (rotatable 90°)
- 4 Space required to remove the Plug-in connector
- 5 O-rings 12×2 for ports A,B,TA,TB
O-rings 14×2 for port P
- 6.1 Plug for M-3SED10UK-L1X/
- 6.2 Plug for M-3SED10CK-L1X/
- 7 Name plate
- 8 Space required to remove the coil

- 9.1 Total length of M-3SED10UK-L1X/
- 9.2 Total length of M-3SED10CK-L1X/
- 10 Securing nut tightening torque $M_A = 4\text{Nm}$
- 11 Ports B and TB are a blind counterbore
- 12 Valve fixing screws
Internal hexagon screw: M6×40 GB/T 70.1-10.9,
tightening torque $M_A = 15.5\text{ Nm}$

**It must be ordered separately,
if connection plate is needed.Type:**

G 66/01 (G 3/8), G 66/02 (M18×1.5)
G 67/01 (G 1/2), G 67/02 (M22×1.5)

China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.



2.21

2/2, 3/2 and 4/2 directional poppet valve with solenoid actuation

Type M-.SEW6...L3X

Size 6

Up to 420 bar

Up to 25 L/min



Contents

Function and configuration	02
Symbols	03
Ordering code	03
Technical data	04
Electrical data	04
Characteristic curves	05
Unit dimensions	06-07

Features

- Direct-acting solenoid direction shut-off valve
- Mounting face as per DIN24 340 A
- ISO 4401 and CETOP-RP 121H
- Free of leakage
- Switching flexibility in high-pressure state
- Replace the coil, can take pressure operation
- Solenoid coil can rotate for 90 degrees
- Manual emergency operation available

Function and configuration

M-SEW6 direction valve is a solenoid shut-off directional poppet valve for control oil opening, stop and flow direction.

Two-position TEE solenoid directional poppet valve consists of valve body (1), Solenoid (2), and valve element (3). Connect a superposition plate below the two-position TEE solenoid directional poppet valve to connect valve body (4), it becomes into two-position four-way direction poppet valve. The manual emergency button (5) can be used to operate the valve when the Solenoid is not powered on.

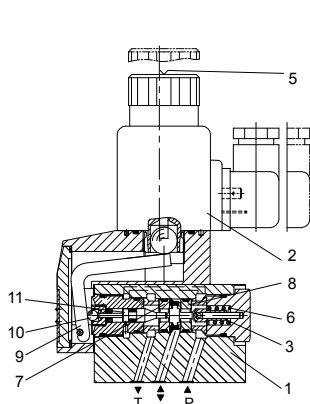
• M-3SEW6 two-position TEE solenoid directional poppet valve

1). Initial position:

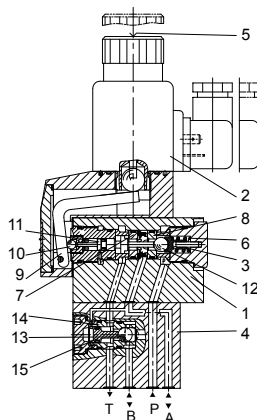
when the Solenoid is not energized, pretention of spring (6) keeps valve element (3) on valve seat (7) on the left, so that oil port P is connected to A and oil port T is closed.

2). Switching position:

after the Solenoid is energized, through angular lever (9) and ball (10), the force of Solenoid (2) acts on push rod (11) of the two-side seal, thus to push valve element (3) and maintain it on right valve seat (8), causing oil port P closed and oil port A connected to port T. Since push rod (11) and valve element (3), acted by the inlet pressure, is in a balance state of axial hydraulic pressure, the valve can be used when pressure is up to 420bar.



M-3SEW6 two-position TEE solenoid directional poppet valve



M-4SEW6 2-position 4-way solenoid directional poppet valve

• M-4SEW6 2-position 4-way solenoid directional poppet valve

1). Initial position:

when the Solenoid is not energized, pretention of spring (6) keeps valve element (12) on valve seat (8) on the right, oil port P is closed and port A connected to T; pressure oil supplied from oil port P push steel ball (13) to valve seat (14), upon which oil port P is connected to B and A connected to T; besides, a control oil line is connected from oil port A acts on the big area of control piston (15), which can be used for unloading to oil tank.

2). Switching position:

after the Solenoid is energized, oil port P is connected to A; pressure oil from the pump goes through the control oil line connected from port A and acts on the big area of control piston (15); steel ball (13) is pushed to the other side of valve seat (14), thus oil port P is connected to A and B connected to T.

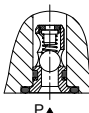
• Cartridge restriction choke (model M-.SEW6.L3X/.../B...)

To restrict flow through the valve, a restriction choke can be installed. Restriction choke is installed on port P.

• Cartridge type one-way valve (model M-.SEW6.L3X/.../P)

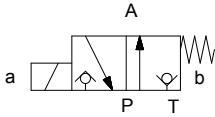
Cartridge type one-way valve allows oil flow in from port P and it is closed for reverse flowing.

One-way valve installed on port P.

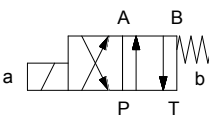


Spool symbols

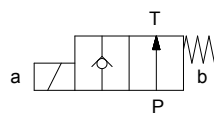
Type M-3SEW6U-L3X/..



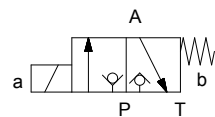
Type M-4SEW6D-L3X/..



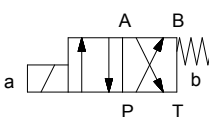
Type M-2SEW6P-L3X/..



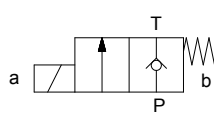
Type M-3SEW6C-L3X/..



Type M-4SEW6Y-L3X/..



Type M-2SEW6N-L3X/..



Ordering code

M SEW 6 - L3X / 42 M N /										Further details in clear text	
2 work ports = 2		3 work ports = 3		4 work ports = 4		Solenoid directional poppet valve		Diameter 6 = 6		No code = NBR seals	
Spool symbols		L30 ~ L39series = L3X		Work pressure to 420bar = 42		Coil replaceable (air gap type) Solenoid = M		No code = Without cartridge one-way valve, without cartridge restriction choke		V = FKM seals	
12VDC = G12		24VDC = G24		110VDC = G110		205VDC = G205		220VDC = G220		P= Without Cartridge check valve	
110VAC (Need to take rectifying plug Z5) = W110R		220VAC (Need to take rectifying plug Z5) = W220R		B12 = Orifice Φ1.2 mm		B15 = Orifice Φ1.5 mm		B18 = Orifice Φ1.8 mm		B20 = Orifice Φ2.0 mm	
With manual emergency button = N								B22 = Orifice Φ2.2 mm		K4 = Without plug	
								Z4 = With square plug		Z5L= Square plug with light	
								Z5 = With rectifier plug (just for W110R and W220R)		Note: K4, Z4, Z5L is not suitable for W110R and W220R	

Technical data

Installation position			Optional
Environment temperature			-30 to +50 (NBR seal)
			-20 to +50 (FKM seal)
Weight	Two two-way Solenoidic directional valve	Kg	1.5
	Two three-way Solenoidic directional valve	Kg	1.5
	Two four-way Solenoidic directional valve	Kg	2.3
Max operation pressure	Port P, A, B	bar	420
	Port T		100
Max flow		L/min	25
Fluid			Mineral oil suitable for NBR and FKM seal
			Phosphate ester for FKM seal
Fluid temperature range		°C	-30 to +50 (NBR seal)
			-20 to +50 (FKM seal)
Viscosity range		mm ² /s	2.8 to 500
Degree of contamination		Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406	

Electrical data

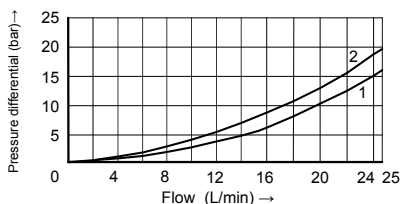
Voltage type								DC				AC					
Available voltage								V		12, 24, 110, 205, 220				110, 220 (Only by Z5 rectifier plug)			
Allowed voltage (deviation)								%		+10 ~ -15							
Required power								W		30							
Continuous power-on time								%		100							
Switching time in compliance with ISO 6403																	
Pressure bar	Flow L/min	DC						AC50HZ									
		on/ms (without oil tank pressure)				off/ms		on/ms (without oil tank pressure)				off/ms					
		U	C	D	Y	U, C	D, Y	U	C	D	Y	U, C	D, Y				
140	25	25	30	25	30	10	10	30	40	30	40	35	35				
280	25	25	30	25	30	10	10	35	45	35	45	40	40				
320	25	25	35	25	35	10	10	35	50	35	50	40	40				
420	25	25	35	25	35	10	10	40	50	40	50	50	50				
Switching frequency						Time/h		Up to 15000									
IP rating as per DIN 40050						IP65											
Max coil temperature						°C		+150									

Note: for electrical connection, protective wire (PE $\perp$) shall be earthed as required.

Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

Δp - q_v characteristic curves

2-position 2-way solenoid directional poppet valve

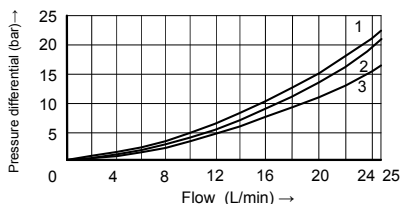


1 M-2SEW6N ..., P to T

2 M-2SEW6P ..., P to T

Δp - q_v characteristic curves

2-position 3-way solenoid directional poppet valve



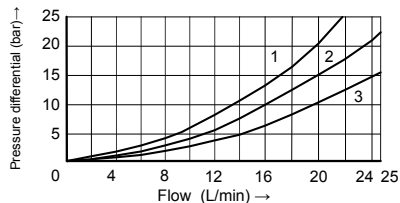
1 M-3SEW6^U_C ..., A to T

2 M-3SED6U ..., P to A

3 M-3SED6C ..., P to A

Δp - q_v characteristic curves

2-position 4-way solenoid directional poppet valve



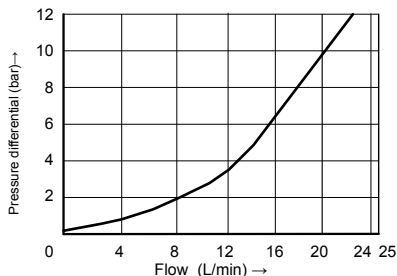
1 M-4SEW6^D_Y ..., A to T

2 M-4SEW6^D_Y ..., P to A

3 M-4SEW6^D_Y ..., P to B, B to T

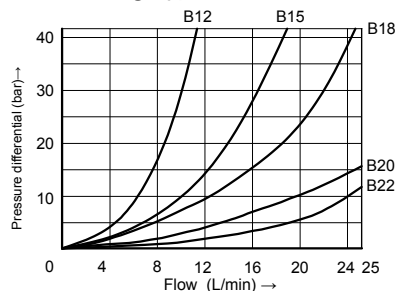
Δp - q_v characteristic curves

Cartridge check valve



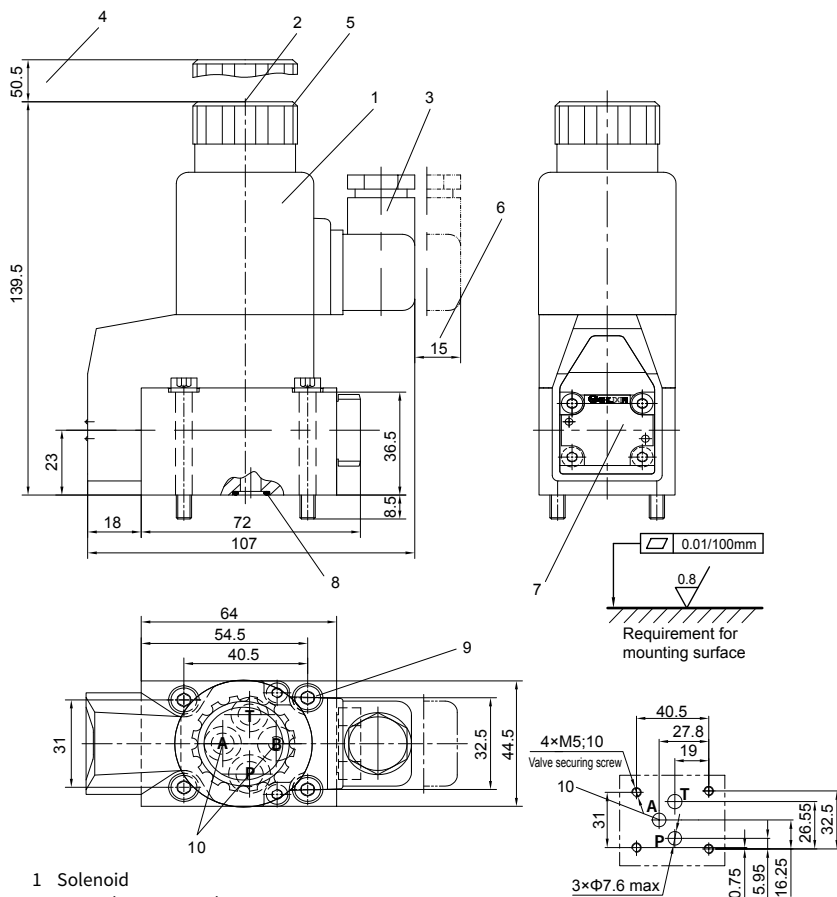
Δp - q_v characteristic curves

Cartridge type restriction choke



Unit dimensions

· 2-position 2-way, 2-position 3-way solenoid directional poppet valve



China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.



2.22

2/2, 3/2 and 4/2 directional poppet valve with solenoid actuation

Type M-.SEW10...L1X

Size 10
Up to 420 bar
Up to 40 L/min



Contents

Function and configuration	02
Symbols	03
Ordering code	03
Technical data	04
Electrical data	04
Characteristic curves	05
Unit dimensions	06-07

Features

- Direct-acting solenoid direction shut-off valve
- Mounting face as per DIN24 340 A
- ISO 4401 and CETOP-RP 121H
- Free of leakage
- Keeping switching flexibility in high-pressure state
- DC Solenoid of removable coil
- Solenoid coil can rotate for 90 degrees
- Optional manual emergency operation

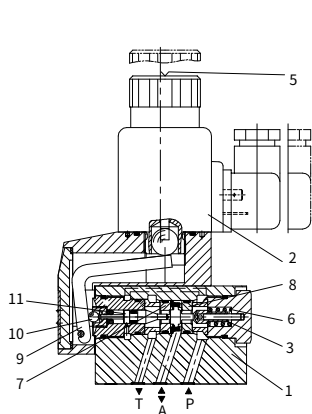
Function and configuration

M-SEW10 directional valve is a solenoid shut-off directional poppet valve for control oil opening, stop and flow direction. Two-position three-way solenoid directional poppet valve main consists of valve body (1), Solenoid (2), and valve element (3). Connect a superposition plate below the two-position three-way solenoid directional poppet valve to connect valve body (4), it becomes into two-position four-way direction poppet valve. Manual emergency button (5) can be used to operate the valve when the solenoid is not powered on.

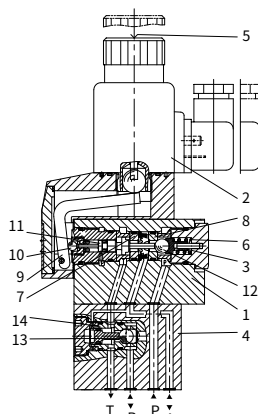
• M-3SEW10 two-position TEE solenoid directional poppet valve

1). Initial position: when the solenoid is not energized, pretention of spring (6) keeps valve element (3) on valve seat (7) on the left, so that oil port P is connected to A and oil port T is closed.

2). Switching position: after the solenoid is energized, through angular lever (9) and ball (10), the force of Solenoid (2) acts on push rod (11) of the two-side seal, thus to push valve element (3) and maintain it on right valve seat (8), causing oil port P closed and oil port A connected to port T. Since push rod (11) and valve element (3), acted by the inlet pressure, is in a balance state of axial hydraulic pressure, therefore, the valve can be used when pressure is up to 420bar.



M-3SEW10 two-position TEE solenoid directional poppet valve



M-4SEW10 2-position 4-way solenoid directional poppet valve

• M-4SEW10 2-position 4-way solenoid directional poppet valve

1). Initial position:

when the Solenoid is not energized, pretention of spring (6) keeps valve element (12) on valve seat (8) on the right, oil port P is closed and port A connected to T; pressure oil supplied from oil port P push steel ball (13) to valve seat (14), upon which oil port P is connected to B and A connected to T; control oil line is connected from oil port A acts on the larger area of control piston (12), which can be used for unloading to oil tank.

2). Switching position:

after the Solenoid is energized, oil port P is connected to A; pressure oil from the pump goes through the control oil line connected from port A and acts on the larger area of control piston (12); steel ball (13) is pushed to the other side of valve seat (14), thus oil port P is connected to A and B connected to T.

• Cartridge restriction choke (model M-.SEW10.L1X/..B...)

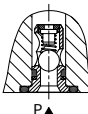
To restrict flow through the valve, a restriction choke can be installed. Restriction choke is installed on port P.



• Cartridge type one-way valve (model M-.SEW10.L1X/..P)

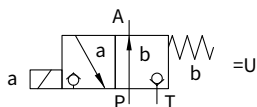
Cartridge type one-way valve allows oil flow in from port P and it is closed for reverse flowing.

One-way valve installed on port P.

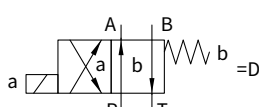


Spool symbols

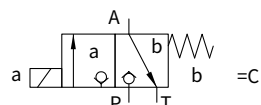
Type M-3SEW10U-L1X/..



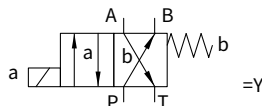
Type M-4SEW10D-L1X/..



Type M-3SEW10C-L1X/..



Type M-4SEW10Y-L1X/..



02

Ordering code

M	SEW	10	-	L1X	/	42	M		N	/		*
3 work ports 4 work ports	= 3 = 4											
Solenoid directional poppet valve												Further details in clear text
Nominal size 10	=10											No code = NBR seals V = FKM seals
Spool symbols												No code = Without cartridge one-way valve, without cartridge restriction choke
L10 ~ L19series (L10 to L19: unchanged installation and connection dimensions)				=L1X								P= Without Cartridge check valve
Work pressure to 420bar				=42								B12 = Orifice Φ1.2 mm B15 = Orifice Φ1.5 mm B18 = Orifice Φ1.8 mm B20 = Orifice Φ2.0 mm B22 = Orifice Φ2.2 mm
Replaceable coil (air gap type) Solenoid							=M					K4 = Without plug Z4 = With square plug Z5L = Square plug with light Z5 = With rectifier plug (for W110R and W220R only)
12VDC 24VDC 110VDC 205VDC 220VDC 110VAC 220VAC							= G12 = G24 = G110 = G205 = G220 =W110R =W220R					Note: K4, Z4, Z5L is not suitable for W110R and W220R
With manual override								=N				

Technical data

Installation position			Optional	
Environment temperature		°C	-30 to +50 (NBR seal)	
			-20 to +50 (FKM seal)	
Weight	Two tee Solenoidic directional valve		Kg	2.0
	Two four-way Solenoidic directional valve			3.5
Max operation pressure		Port P, A, B	bar	420
		Port T		100
Max flow			L/min	40
Fluid			Mineral oil suitable for NBR and FKM seal	
			Phosphate ester for FKM seal	
Fluid temperature range		°C	-30 to +50 (NBR seal)	
			-20 to +50 (FKM seal)	
Viscosity range			mm ² /s	2.8 to 500
Degree of contamination			Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406	

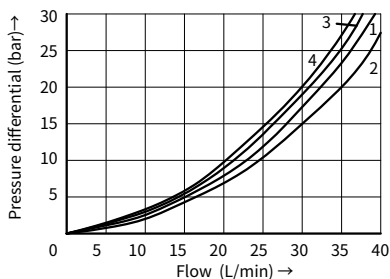
Electrical data

Voltage type								DC				AC							
Available voltage								V				12, 24, 110, 205, 220				110, 220 (Only by Z5 rectifier plug)			
Allowed voltage (deviation)								%				+10 ~ -15							
Required power								W				30							
Continuous power-on time								%				100							
Switching time in compliance with ISO 6403																			
Pressure bar	Flow L/min	DC								AC50HZ									
		On/ms (without oil tank pressure)						Off/ms		On/ms (without oil tank pressure)				Off/ms					
		U	C	D	Y	U, C	D, Y	U	C	D	Y	U	C	D	Y				
140	40	20	40	20	40	12	17	20	40	20	40	60	45	40	50				
280	40	25	45	20	45	12	17	20	45	25	45	60	45	45	55				
320	40	25	45	20	45	12	17	25	45	25	45	60	45	45	55				
420	40	30	45	20	50	12	17	25	45	25	50	60	45	45	55				
Switching frequency								Time/h				Up to 15000							
IP rating as per DIN 40050								IP65											
Max coil temperature								°C				+150							

Note: for electrical connection, protective wire (PE ⊥) shall be earthed as required.

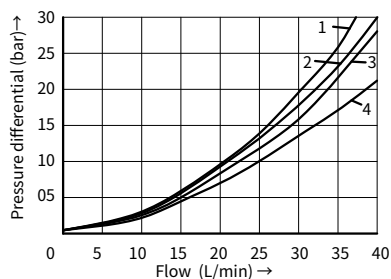
Characteristic curves (Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)

Δp - q_v characteristic curves
3/2 directional poppet valve



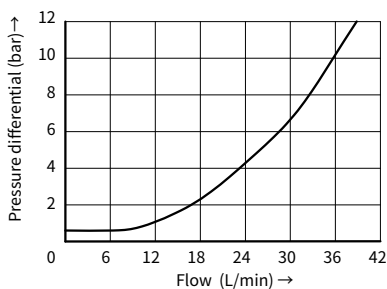
- 1 M-3SEW 10 C ..., P to A
- 2 M-3SEW 10 C ..., A to T
- 3 M-3SEW 10 U ..., P to A
- 4 M-3SEW 10 U ..., A to T

Δp - q_v characteristic curves
2-position 4-way solenoid directional poppet valve

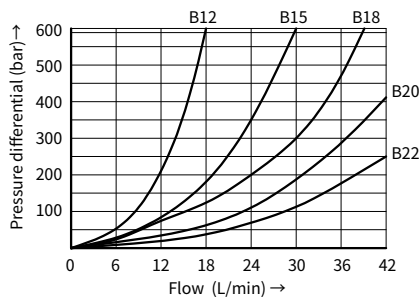


- 1 M-4SEW 10 $\frac{D}{V}$..., A to T
- 2 M-4SEW 10 $\frac{D}{V}$..., P to A
- 3 M-4SEW 10 $\frac{D}{V}$..., P to B
- 4 M-4SEW 10 $\frac{D}{V}$..., B to T

Δp - q_v characteristic curves
Cartridge check valve

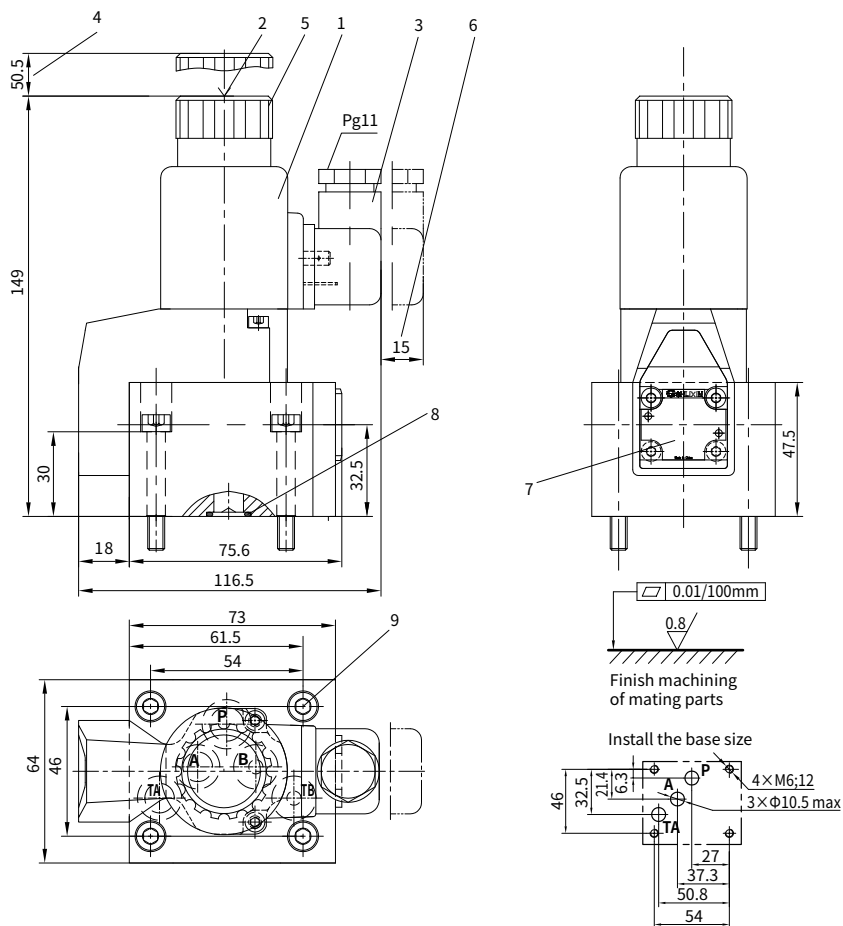


Δp - q_v characteristic curves
Cartridge type restriction choke



Unit dimensions

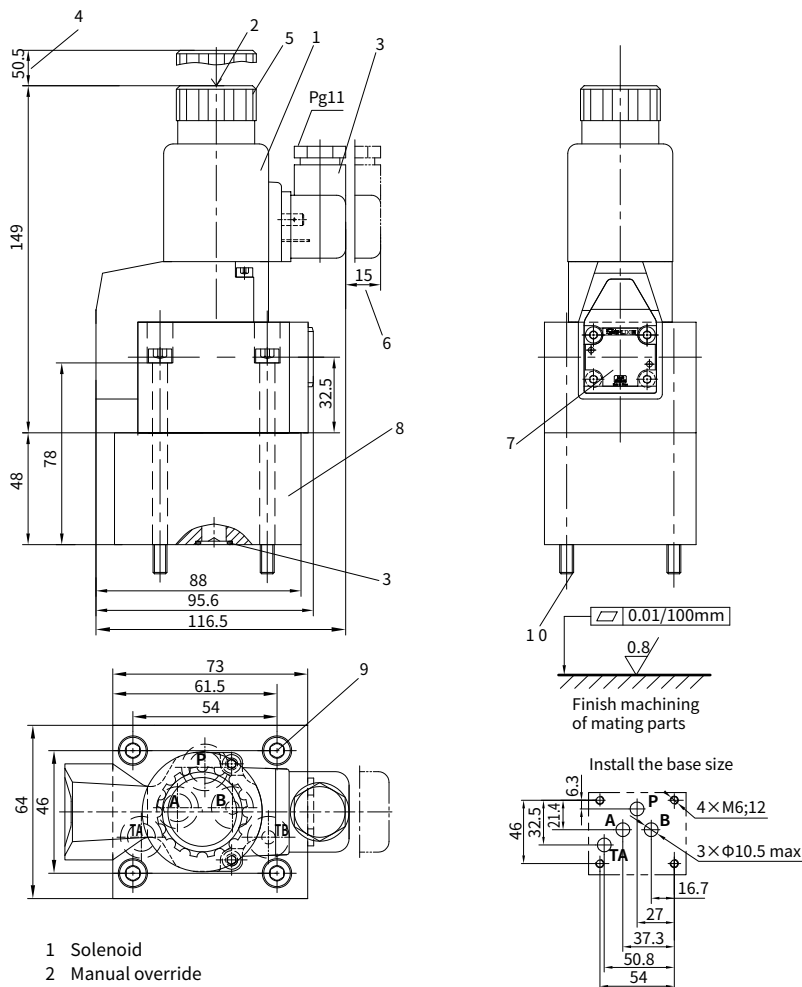
•2-position 3-way solenoid directional poppet valve



- 1 Solenoid
- 2 Manual override
- 3 Plug as per DIN43650 (can rotate for 90 degrees)
- 4 Remove space needed for Solenoid coil
- 5 Lock nut, tightening torque $M_A=4Nm$
- 6 Remove space
- 7 Name plate
- 8 Oil port A, B, TA use O-ring 12×2 , Oil port P uses O-ring 14×2
- 9 Valve securing screw, M6 $\times$ 40 GB/T70.1- class 10.9, Tightening torque $M_A=15.5Nm$

Unit dimensions

• 2-position 4-way solenoid directional poppet valve



China +86 400 101 8889	America +01 630 995 3674
Germany +49 172 3683463	Japan +81 03 6809 1696



© This brochure can be reproduced, edited, reproduced or transmitted electronically without the authorization of Hengli Hydraulic Company. Due to the continuous development of the product, the information in this brochure is not specific to the specific conditions or applicability of the industry, thus, Hengli does not take any responsibility for any incomplete or inaccurate description.