PONAR wadowice	Directional spool valve type WEH16 electro-hydraulically operated			WK 499 482
	NS16	35 MPa	240 dm³/min	04.2009

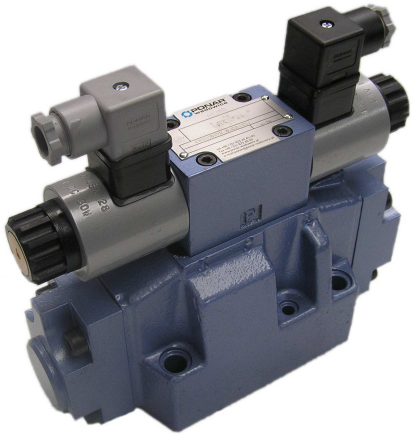
DATA SHEET - SERVICE MANUAL

APPLICATION

Directional spool valves type **WEH16...** electro-hydraulically operated are intended for change in direction of fluid flow in a system and thus it allows to change direction of movement of a receiver - mostly piston rod of a cylinder or hydraulic motor as well to use functions: *on* and *off*. These directional spool valves are used for subplate mounting in any position in a hydraulic system.

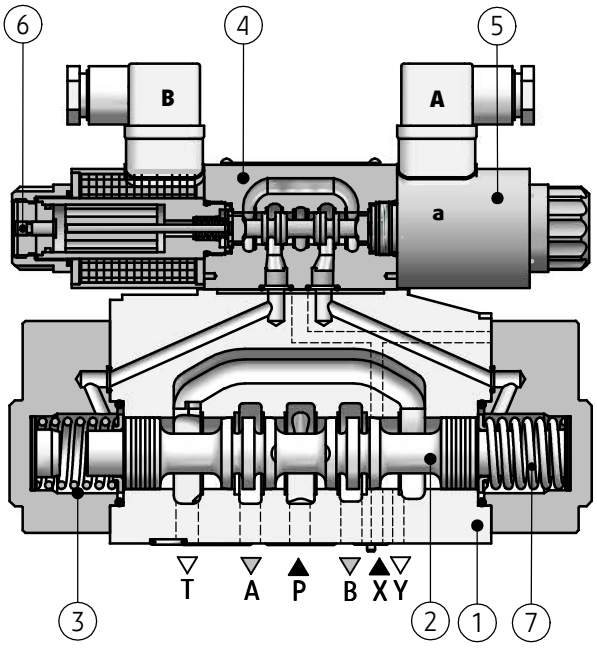
The directional spool valve type **WEH16...** is complied with the regulations of directive **2006/95/WE** for the following voltages:

- **50 – 250 V** for **AC**
- **75 – 250 V** for **DC**

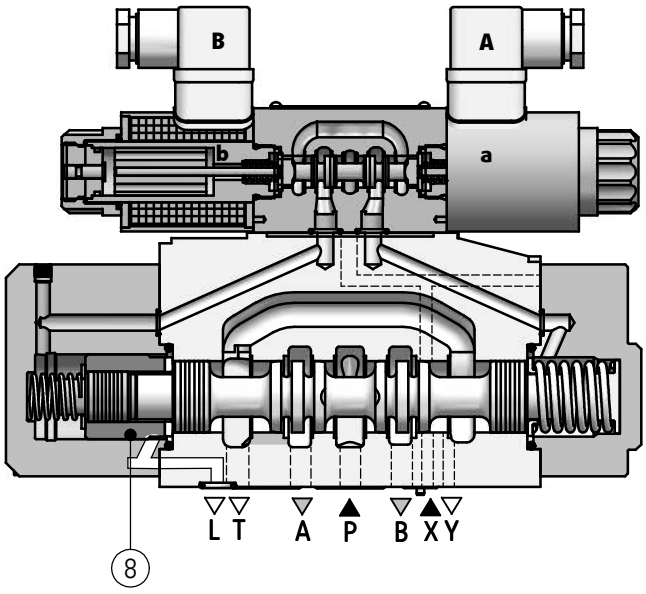


DESCRIPTION OF OPERATION

H-4WEH16E72/G24NZ4



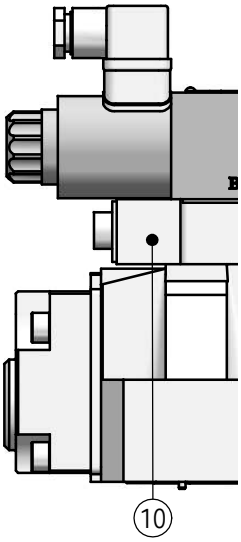
H-4WEH16HE72/G24NZ4



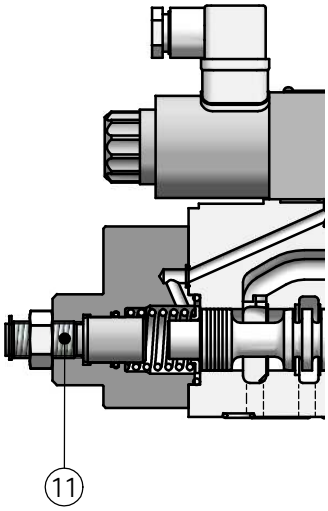
Main bore and annular ports **P**, **T**, **A**, **B** are made in the housing (1) and connected to its subplate connection. Directional valve is switched by shifting the spool (2) into one end position. Various control functions are dependent on the spool (2) which affects the change in configuration of connections among ports **P**, **T**, **A**, **B** in the housing (1). The spool (2) is shifted from its neutral position by affecting pressure of hydraulic fluid supplied via pilot valve (4) into one chamber of caps (3). The pilot valve (4) – type **WE6...12/...** according to data sheet is operated by means of solenoids (5). In case of failure, the pilot valve (4) may be shifted manually by means of manual overrides (6) – version ...4WEH16.../...**N**. The spool (2) is centered in neutral position by means of springs (7) - versions: ...4WEH16.../**...** or may be hydraulically operated by the fluid pressure from the pilot valve (4) – version ...4WEH16**H**.../... - for 3-position directional valves the centering is possible by means of the sleeve (8). Sealing of the directional valve to a subplate is secured by sealing rings.

DESCRIPTION OF OPERATION

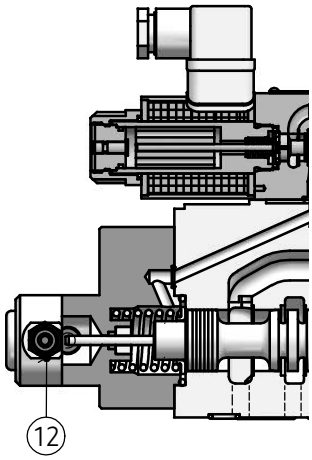
...WEH16E 72/...**S**...



...WEH16E 72/...**11**...



...WEH16E 72/...**ICZ2m**...



Directional spool valves may be provided with the pilot choke adjustment (10) as well as with accessories such as: stroke limiter of the spool (11), end position monitor of the spool (12). Accessories may be mounted depending on version of directional valve like given on pages 14 -16

TECHNICAL DATA

Hydraulic fluid	
Hydraulic fluid	mineral oil
Required filtration	**up to 16 µm**
Recommended filtration	up to 10 µm
Nominal fluid viscosity	37 mm ^{2}/s at temperature 55 °C
Viscosity range	2,8 up to 380 mm ^{2}/s
Fluid temperature range (in a tank)	recommended 40 °C up to 55 °C max -20 °C up to +70 °C
Ambient temperature range	- 20 °C up to +70 °C
Max operating pressure	
Ports **A, B, P**	
• version **H-4 WEH 16.../..**	**35 MPa**
• version **4 WEH 16.../...**	**28 MPa**
Port **T**	
• pilot fluid return **Y- external**	**25 MPa**
• pilot fluid return **Y- internal** (2-position and 3-position directional valve spring centered only, no 3-position version hydraulically centered with Y- internal	**16 MPa**
Max control pressure	**25 MPa**
Min control pressure	
Pilot fluid supply **X- external**	
• 3-position directional valve	0,8 MPa
• 2-position directional valve spring positioned	1,0 MPa
• 2-position directional valvehydraulically positioned	0,5 MPa
Pilot fluid supply **X- internal** (when pre-load valve applied or when flow rate is suitably high)	
• versions **4 WEH 16...** with spools **G,H,F,S,T**	0,45 MPa
• versions **H-4 WEH 16.../...D1...** with spools **G,H,F,S,T**	0,7 MPa

TECHNICAL DATA

Fluid capacity	
3-position directional valve spring centered	5,75 cm^3
3-position directional valve hydraulically centered	
• from ***0*** (neutral) to operated position ***a***	2,85 cm^3
• from ***0*** (neutral) to operated position ***b***	5,75 cm^3
• from operated position ***a*** to ***0*** (neutral) position	2,9 cm^3
• from operated position ***b*** to ***0*** (neutral) position	2,3 cm^3
2-position directional spool valve	11,5 cm^3
Total operating time of valve operation from neutral to operated position	
3-position directional valve spring centered	
at pilot pressure p st = 5 MPa	50 ms
p st =15 MPa	45 ms
p st =25 MPa	40 ms
3-position directional valve hydraulically centered	
• solenoid **a** operation	
at pilot pressure p st = 5 MPa	40 ms
p st = 15 MPa	40 ms
p st = 25 MPa	40 ms
• solenoid **b** operation	
at pilot pressure p st = 5 MPa	50 ms
p st = 15 MPa	45 ms
p st = 25 MPa	40 ms
2-position directional valve	
at pilot pressure p st = 5 MPa	55 ms
p st = 15 MPa	50 ms
p st = 25 MPa	45 ms
Total operating time of valve operation from operated to neutral position	
3-position directional valve spring centered	
at pilot pressure p st = 5; 15; 25 MPa	40 ms
3-position directional valve hydraulically centered	
• solenoid **a** operation	
at pilot pressure p st = 5 MPa	30 ms
p st = 15 MPa	25 ms
p st = 25 MPa	20 ms
• solenoid **b** operation	
at pilot pressure p st = 5 MPa	40 ms
p st = 15 MPa	35 ms
p st = 25 MPa	30 ms
2-position directional valve	
at pilot pressure p st = 5 MPa	35 ms
p st = 15 MPa	30 ms
p st = 25 MPa	25 ms
Inductive spool position sensor	(only for version ...WEH16...72/...**.ICZ2m**...)
Type of sensor (upon order another type available)	ICZD2CNPNPA02m
Supply voltage	**6 - 30V DC**
Max load current	**200 mA**
Weight	max 10,5 kg

TECHNICAL DATA

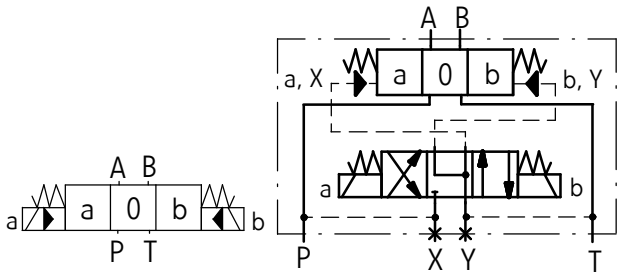
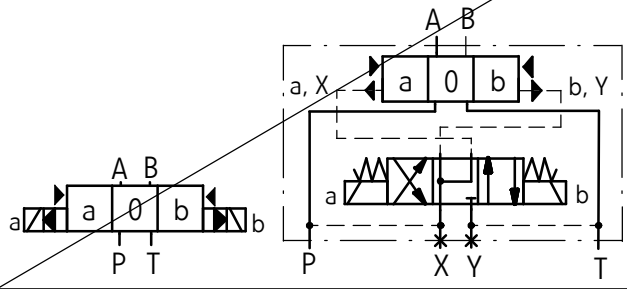
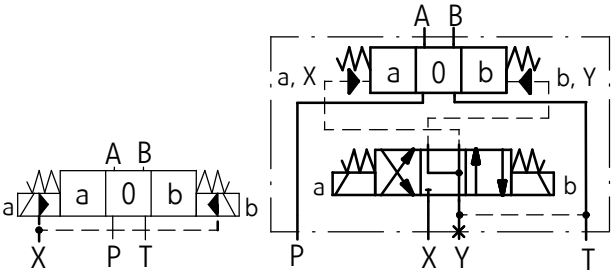
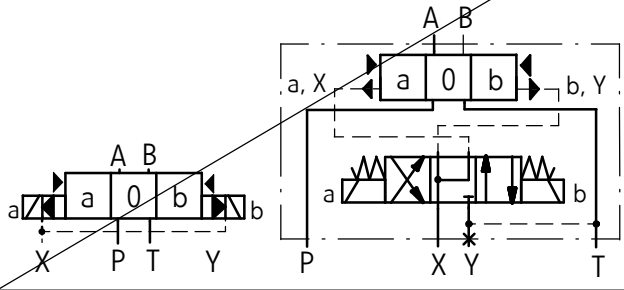
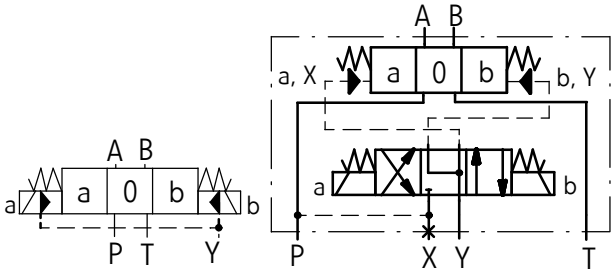
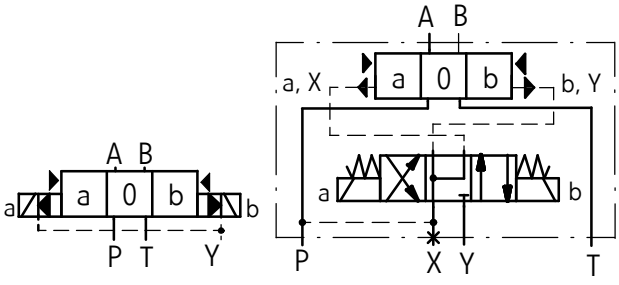
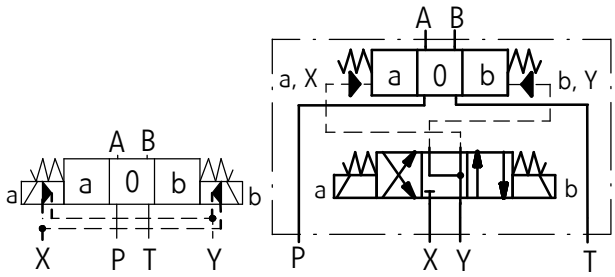
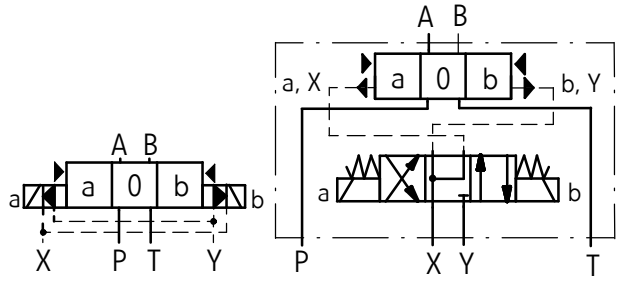
Pilot valve					
Type of pilot valve • for 3-position main directional valve spring centered	4WE6 **J** - 12/... according to data sheet **WK 499 502**				
• for 3-position main directional valve hydraulically centered	4WE6 **M** - 12/... according to data sheet **WK 499 502**				
• for 2-position main directional valve	4WE6 **D** - 12/... or 4WE6 **D** - 12/**O**... or 4WE6 **D** - 12/**OF**... according to data sheet **WK 499 502**				
Nominal supply voltage for solenoids	**DC**			**AC** (plug-in connector with rectifier)	
	12V	**24V**	**110V**	**230V - 50Hz**	**110V - 50Hz**
Supply voltage tolerance	±10%				
Power requirement (DC)	**30** W				
Insulation	**IP 65**				
Temperature of solenoid coil	max 150 °C				

ASSEMBLY AND APPLICATION REQUIREMENTS

1. Only valve working properly and suitably installed may be connected to an electric system. Only skilled workers are allowed to connect and disconnect electric system.
2. Ground connection (⏚) must be connected with protective earth wire (PE ⏚) in supply system according to appropriate instructions.
3. It is forbidden to apply directional spool valve if the supply cable in the gland of plug-in-connector is not properly tightened.
4. It is forbidden to apply directional spool valve if the plug-in-connector is not properly tightened to the solenoid socket and is not secured by screwing bolt tightly.
5. Due to heating solenoid coils, directional spool valves should be placed in order to eliminate the possibility of incidental touch while using, or, they should be equipped with the coil covers (in accordance with the European standards PN - EN ISO 13732-1 and PN - EN 982).

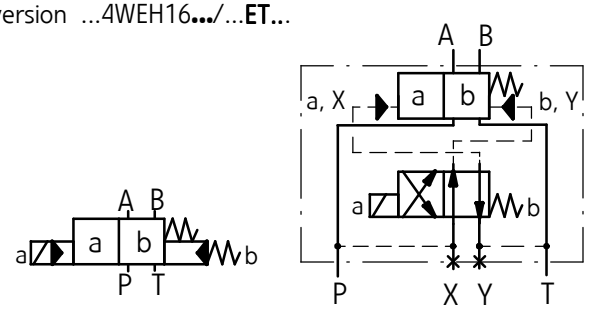
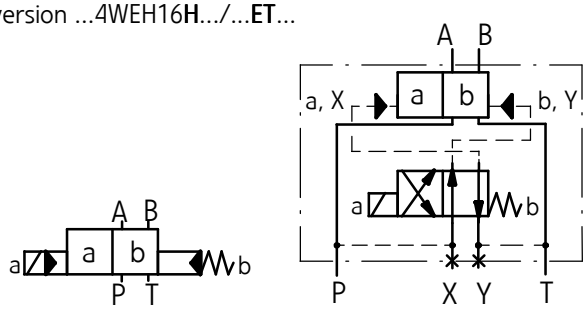
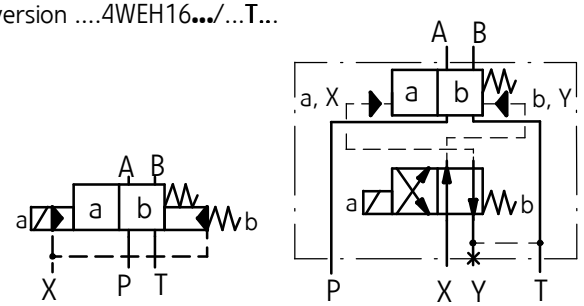
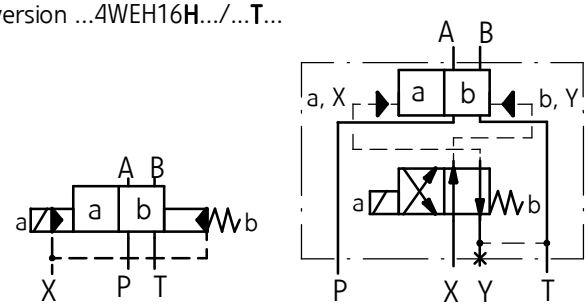
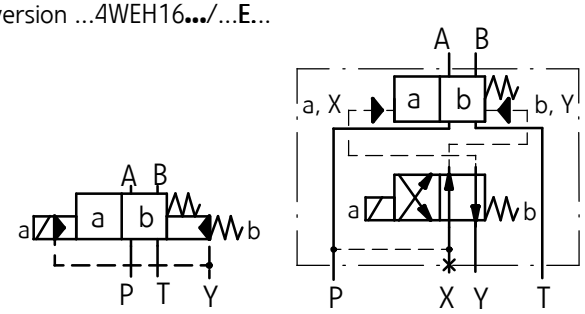
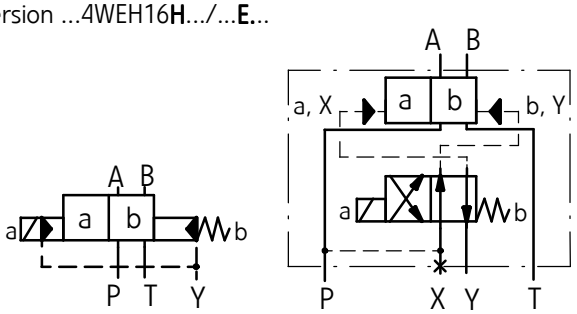
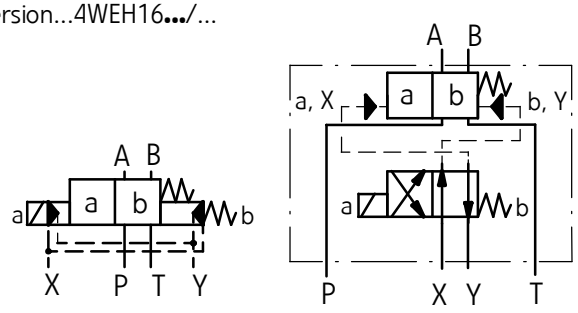
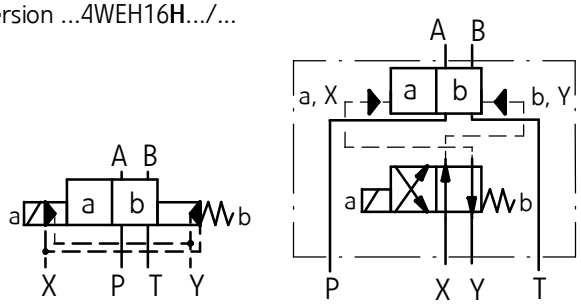
SCHEMES

Simplified and detailed hydraulic schemes for 3-position directional valves with various pilot supply (X) and pilot drain (Y)

3-position directional valves with spool in position ***0*** at main valve and pilot valve spring centered version ...4WEH16**...**/...	3-position directional valves with spool in position ***0*** at main valve hydraulically centered and pilot valve spring centered version ...4WEH16**H**.../...
internal supply **X** ; **internal** drain **Y** version ...4WEH16**...**/...**ET...** 	**internal** supply **X** ; **internal** drain **Y** version ...4WEH16**H**.../...**ET**...- impossible 
external supply **X** ; **internal** drain **Y** version ....4WEH16**...**/...**T...** 	**external** supply **X** ; **internal** drain **Y** version ...4WEH16**H**.../...**T**...- impossible 
internal supply **X** ; **external** drain **Y** version ...4WEH16**...**/...**E...** 	**internal** supply **X** ; **external** drain **Y** version ...4WEH16**H**.../...**E...** 
external supply **X** ; **external** drain **Y** version...4WEH16**...**/... 	**external** supply **X** ; **external** drain **Y** version ...4WEH16**H**.../... 

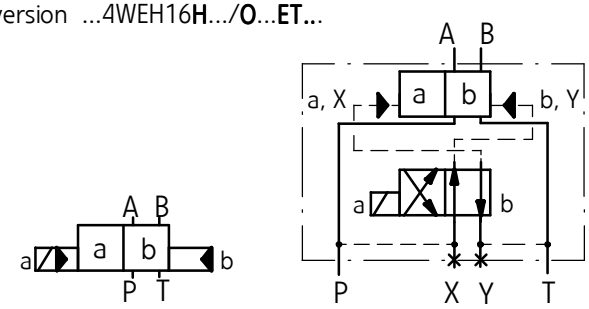
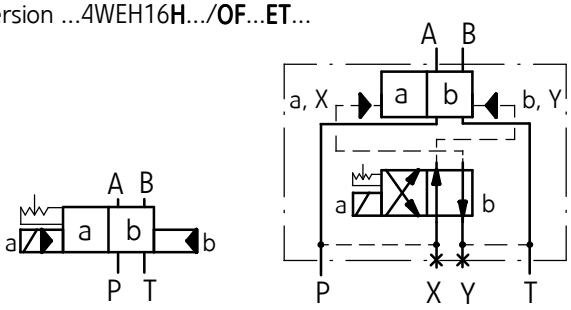
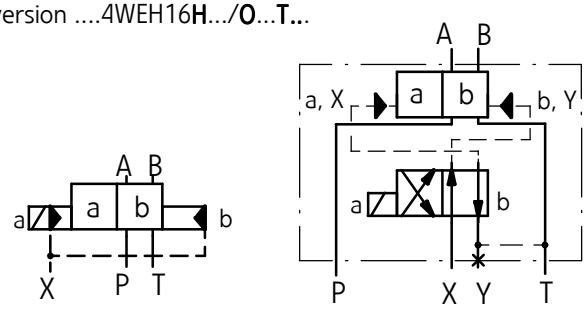
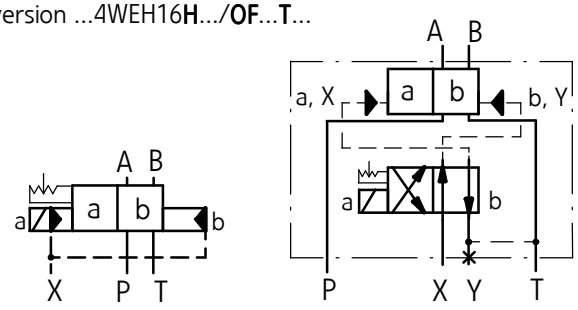
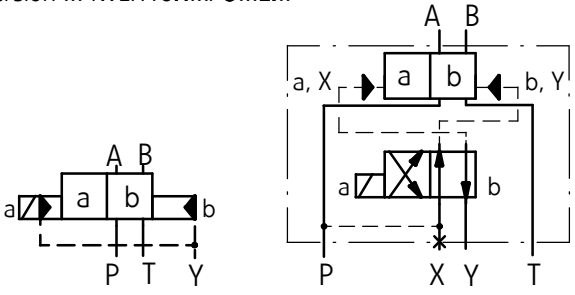
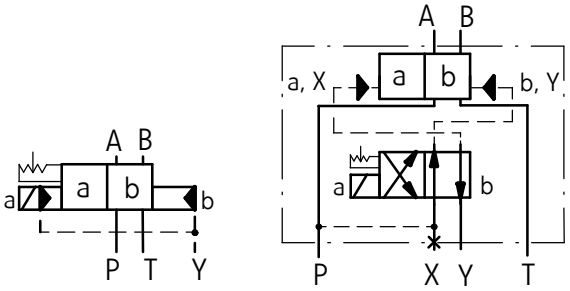
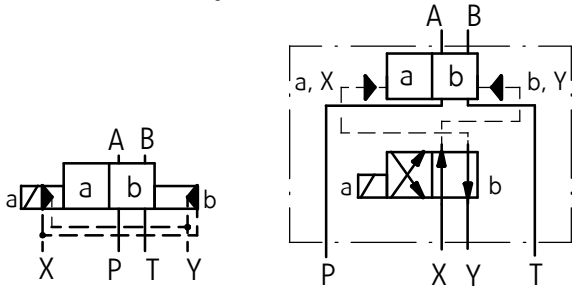
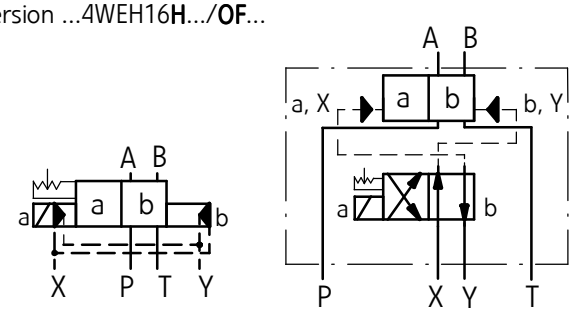
SCHEMES

Simplified and detailed hydraulic schemes for 2-position directional valves with various pilot supply (X) and pilot drain (Y)

2-position directional valves with spool at main valve and pilot valve spring centered version ...4WEH16**...**/...	2-position directional valves with spool i at main valve hydraulically positioned and pilot valve spring centered version ...4WEH16**H**.../...
internal supply **X** ; **internal** drain **Y** version ...4WEH16**...**/...**ET**... 	**internal** supply **X** ; **internal** drain **Y** version ...4WEH16**H**.../...**ET**... 
external supply **X** ; **internal** drain **Y** version ....4WEH16**...**/...**T**... 	**external** supply **X** ; **internal** drain **Y** version ...4WEH16**H**.../...**T**... 
internal supply **X** ; **external** drain **Y** version ...4WEH16**...**/...**E**... 	**internal** supply **X** ; **external** drain **Y** version ...4WEH16**H**.../...**E**... 
external supply **X** ; **external** drain **Y** version...4WEH16**...**/... 	**external** supply **X** ; **external** drain **Y** version ...4WEH16**H**.../... 

SCHEMES

Simplified and detailed hydraulic schemes for 2-position directional valves with various pilot supply (X) and pilot drain (Y)

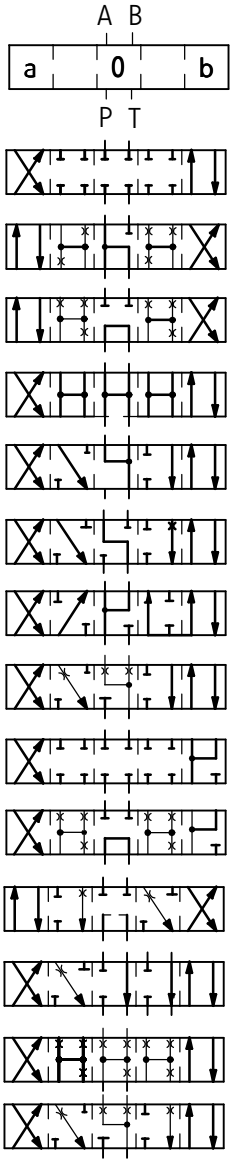
2-position directional valves with spool at main valve hydraulically positioned and at pilot valve without spring return version ...4WEH16**H**.../**O**...	2-position directional valves with spool at main valve hydraulically positioned and at pilot valve without spring return and with detent version ...4WEH16**H**.../**OF**...
internal supply **X** ; **internal** drain **Y** version ...4WEH16**H**.../**O**...**ET**... 	**internal** supply **X** ; **internal** drain **Y** version ...4WEH16**H**.../**OF**...**ET**... 
external supply **X** ; **internal** drain **Y** version ....4WEH16**H**.../**O**...**T**... 	**external** supply **X** ; **internal** drain **Y** version ...4WEH16**H**.../**OF**...**T**... 
internal supply **X** ; **external** drain **Y** version ...4WEH16**H**.../**O**...**E**... 	**internal** supply **X** ; **external** drain **Y** version ...4WEH16**H**.../**OF**...**E**... 
external supply **X** ; **external** drain **Y** version...4WEH16**H**.../**O**... 	**external** supply **X** ; **external** drain **Y** version ...4WEH16**H**.../**OF**... 

SCHEMES

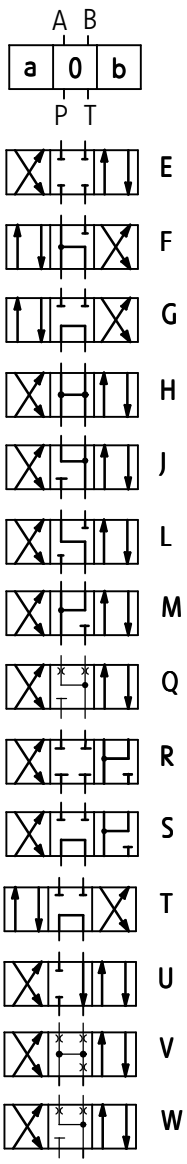
Graphic symbols for spools

3-position

working and indirect positions



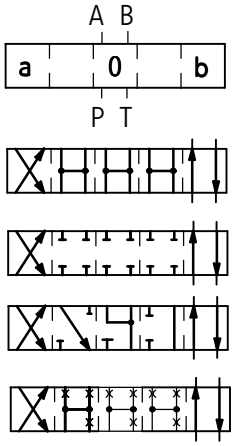
working positions



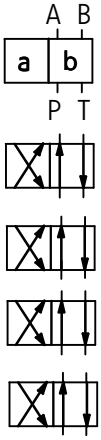
E F G H J L M Q R S T U V W

2-position

working and indirect positions



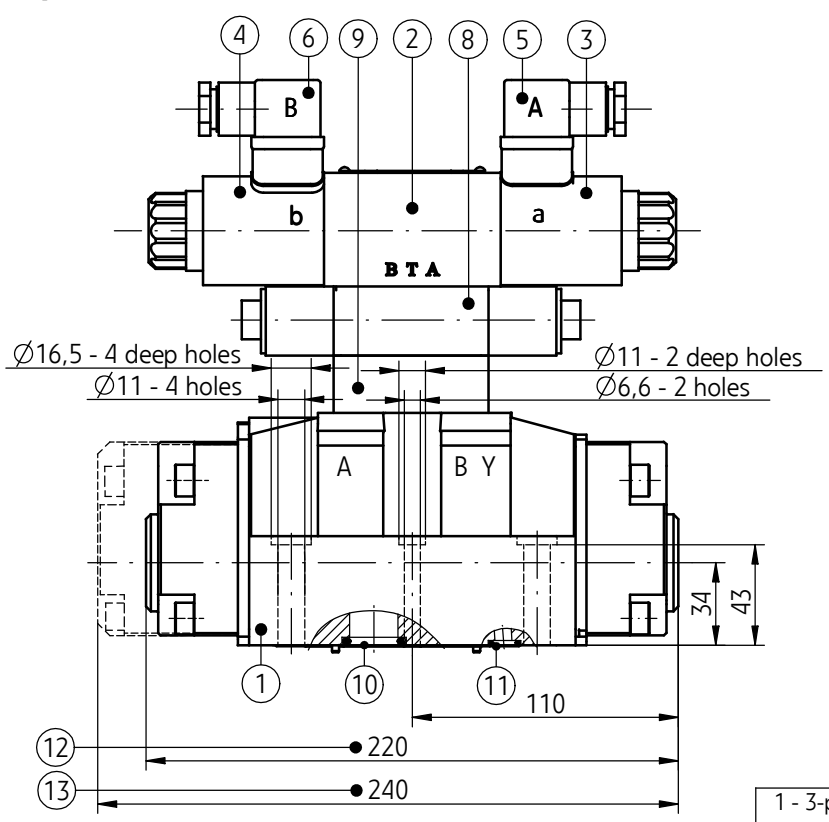
working positions

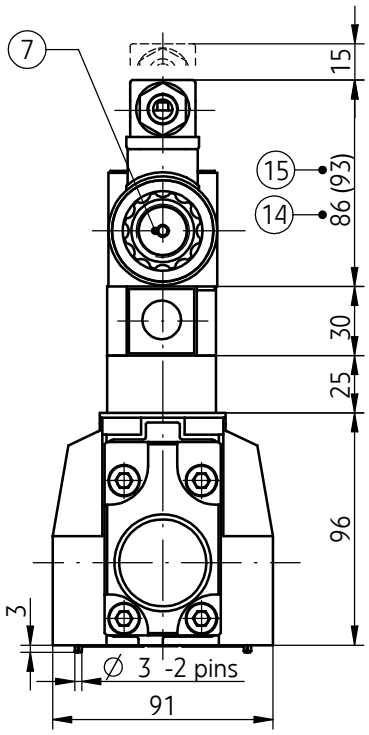


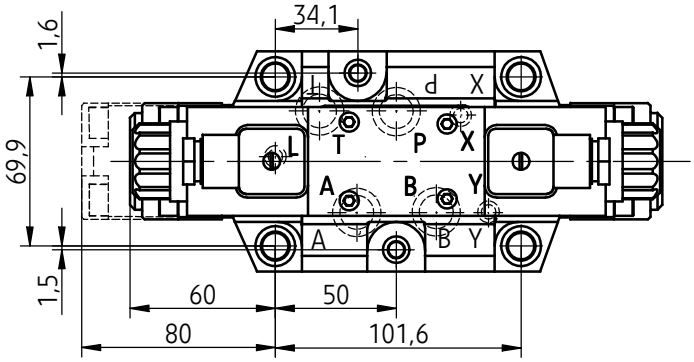
C D K Z

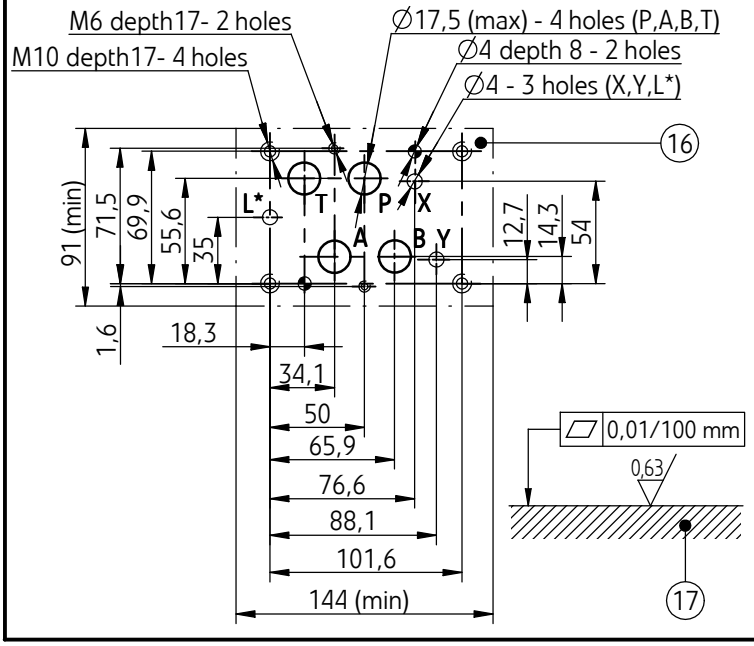
OVERALL AND CONNECTION DIMENSIONS

3-position standard versions ...*4*WEH16...7X/...S...D1...







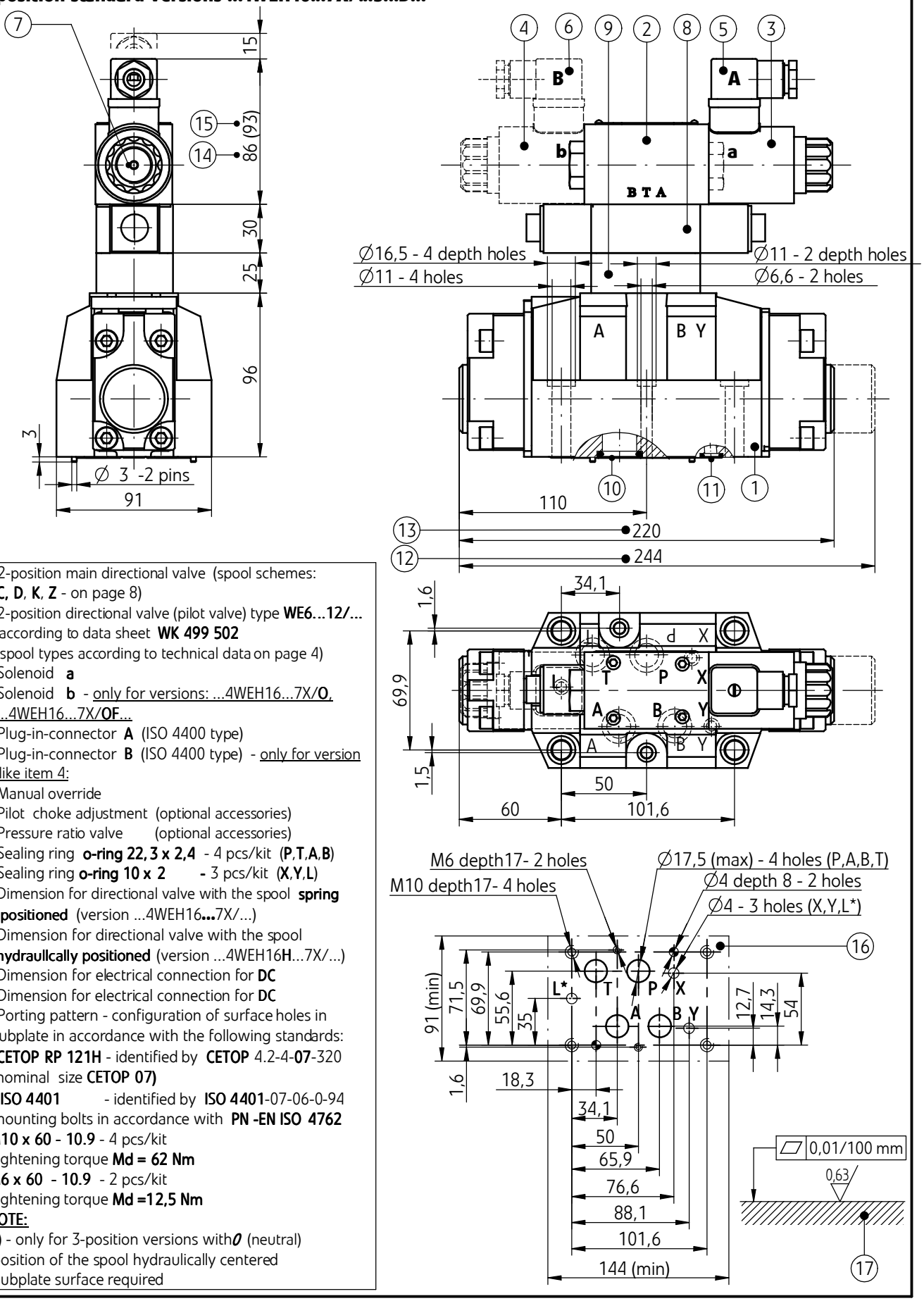


1 - 3-position main directional valve (spool schemes: **E**, **F**, **G**, **H**, **J**, **L**, **M**, **P**, **Q**, **R**, **U**, **V**, **W** - on page 8)
2 - 3-position directional valve (pilot valve) type **WE6...12/...** according to data sheet **WK 499 502** (spool types according to technical data on page 4)
3 - Solenoid **a**
4 - Solenoid **b**
5 - Plug-in-connector **A** (ISO 4400 type)
6 - Plug-in-connector **B** (ISO 4400 type)
7 - Manual override
8 - Pilot choke adjustment (optional accessories)
9 - Pressure ratio valve (optional accessories)
10 - Sealing ring **o-ring 22,3 x 2,4** - 4 pcs/kit (**P**,**T**,**A**,**B**)
11 - Sealing ring **o-ring 10 x 2** - 3 pcs/kit (**X**,**Y**,**L**)
12 - Dimension for directional valve with the spool position ***O*** (neutral) **spring centered** (version ...4WEH16**...**7X/...)
13 - Dimension for directional valve with the spool position ***O*** (neutral) **hydraulically centered** (version ...4WEH16**H**...7X/...)
14 - Dimension for electrical connection for **DC**
15 - Dimension for electrical connection for **AC** (plug-in-connector with rectifier)
16 - Porting pattern - configuration of surface holes in subplate in accordance with the following standards:
- **CETOP RP 121H** - identified by **CETOP** 4.2-4-**07**-320 (nominal size **CETOP 07)**
- **ISO 4401** - identified by **ISO 4401**-07-06-0-94 mounting bolts in accordance with **PN -EN ISO 4762**
  M10 x 60 - 10.9 - 4 pcs/kit
  tightening torque **Md = 62 Nm**
  M6 x 60 - 10.9 - 2 pcs/kit
  tightening torque **Md =12,5 Nm**

NOTE:
(*****) - only for 3-position versions with ***O*** (neutral) position of the spool hydraulically centered
17 - Subplate surface required

OVERALL AND CONNECTION DIMENSIONS

2-position standard versions ...*4*WEH16...7X/...S...D...



1 - 2-position main directional valve (spool schemes: **C, D**, **K**, **Z** - on page 8)
2 - 2-position directional valve (pilot valve) type **WE6...12/...** according to data sheet **WK 499 502** (spool types according to technical data on page 4)
3 - Solenoid **a**
4 - Solenoid **b** - only for versions: ...4WEH16...7X/**O**, ...4WEH16...7X/**OF**...
5 - Plug-in-connector **A** (ISO 4400 type)
6 - Plug-in-connector **B** (ISO 4400 type) - only for version like item 4:
7 - Manual override
8 - Pilot choke adjustment (optional accessories)
9 - Pressure ratio valve (optional accessories)
10 - Sealing ring **o-ring 22, 3 x 2,4** - 4 pcs/kit (**P**,**T**,**A**,**B**)
11 - Sealing ring **o-ring 10 x 2** - 3 pcs/kit (**X**,**Y**,**L**)
12 - Dimension for directional valve with the spool **spring positioned** (version ...4WEH16**...**7X/...)
13 - Dimension for directional valve with the spool **hydraullcally positioned** (version ...4WEH16**H**...7X/...)
14 - Dimension for electrical connection for **DC**
15 - Dimension for electrical connection for **DC**
16 - Porting pattern - configuration of surface holes in subplate in accordance with the following standards:
- **CETOP RP 121H** - identified by **CETOP** 4.2-4-**07**-320 (nominal size **CETOP 07)**
- **ISO 4401** - identified by **ISO 4401**-07-06-0-94

mounting bolts in accordance with **PN -EN ISO 4762**
M10 x 60 - 10.9 - 4 pcs/kit
tightening torque **Md = 62 Nm**
M6 x 60 - 10.9 - 2 pcs/kit
tightening torque **Md =12,5 Nm**

NOTE:
(*) - only for 3-position versions with ***0*** (neutral) position of the spool hydraulically centered
17- Subplate surface required

ACCESSORIES FOR STANDARD DIRECTIONAL VALVE

Pilot choke adjustment

versions: ...4WH16...72/...**S**...
...4WH16...72/...**S2**...

Directional spool valves type **WEH16...** may be optionally provided with pilot choke adjustment (throttle check valve type **Z2FS6...** according to data sheet **WK 450 232**) which allows to adjust switching time of directional spool valve.

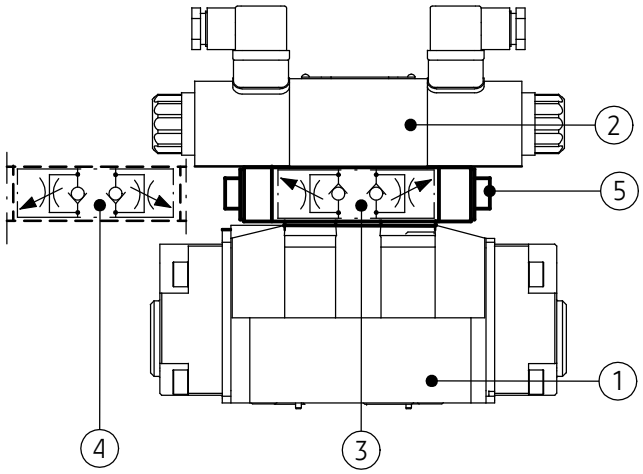
The change of adjustment method of switching time (flow throttling):
- on inlet - version ...WEH16...72/…**S**...
- on outlet - version ...WEH16...72/…**S2**...

is made while mounting by rotating the pilot choke adjustment (3) by 180 degrees around its longitudinal axis.

Rotation of the adjusting screw (5) to the right increases and to the left decreases switching time of the valve.

The pilot choke adjustment (3) is fixed by means of 4 bolts **M5 x 80 - 10.9** - 4 pcs/kit in accordance with **PN - EN ISO 4762** with tightening torque of **Md = 5 Nm**.

...4WEH16. ...72/...**S2**... | ...4WEH16. ...72/...**S**...



1 - Main valve
2 - Pilot valve
3 - Pilot choke adjustment with adjustment of switching time on inlet
4 - Assembly method of pilot choke adjustment with adjustment of switching time on outlet
5 - Adjusting screw
6 - Pressure ratio valve

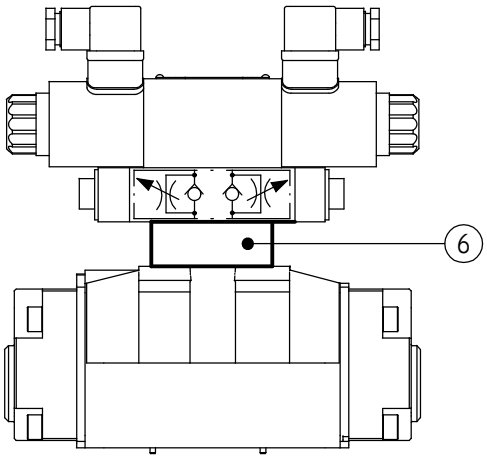
Pressure ratio valve

versions: H- 4WEH16....72/...ET...**D1**...
H- 4WEH16....72/...E...**D1**...

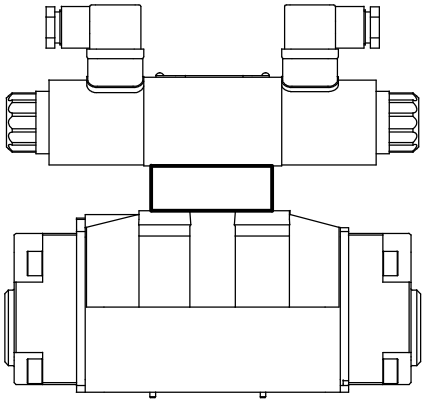
When pilot pressure exceeds 25 MPa, the directional valves type ...**WEH16...**must be equipped with pressure ratio valve (6). It causes the pilot pressure is reduced in the ratio 1: 0,66 = 1,515. Directional valves in the following versions: **H** - 4WEH16.../...**ET**...; **H** - 4WEH16.../...**E**... are provided with the pressure ratio valve (6). The pressure ratio valve (6) and pilot choke adjustment (3) must be fixed by means of 4 bolts **M5 x 105 - 10.9** in accordance with **PN - EN ISO 4762** with tightening torque of **Md = 5 Nm**.

.

...4WEH16...72/...ET S...**D1**...
...4WEH16...72/...E S...**D1**...



H - 4WEH16...72/...ET...**D1**...
H - 4WEH16...72/...E...**D1**...



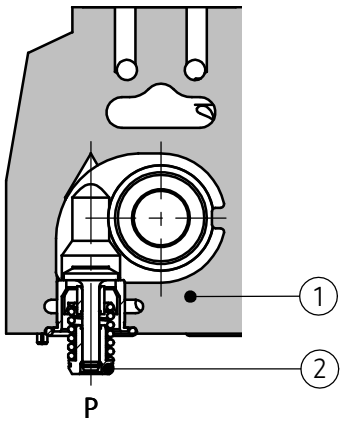
ACCESSORIES FOR STANDARD DIRECTIONAL VALVE

Pre-load valve

versions: ...4WEH16...72/...**P4,5.**..
...4WEH16...72/...**P7**...

Directional valves type **...WEH16...** with internal pilot oil supply (**Y**) – versions:
...4WEH16...72/...**E**
...4WEH16...72/...**ET**...
with spools with unpressurised bypass of hydraulic fluid **must be equipped with the pre-load valve (2) fixed in port P of the main valve (1).**
Cracking pressure for pre-load valves:
valve **P 4,5 - 0,45 MPa**
valve **P 7 - 0,7 MPa**
For directional valves with fixed pressure ratio valve – versions:...4WEH16...72/...**D**...the pre-load valve **P7** must be applied.

...4WEH16...72/...**P**...

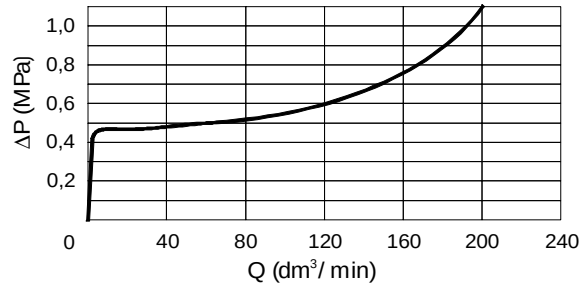


1 - Main valve
2 - Pre-load valve

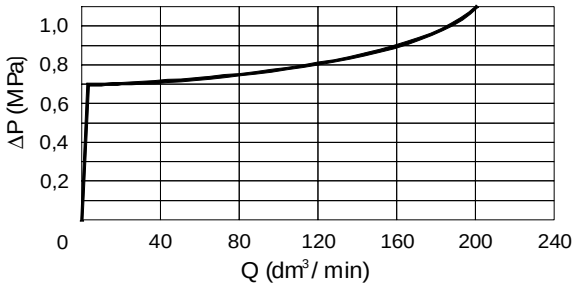
Performance curves for pre-load valves

measured at viscosity ν = 41 mm^2/s and temperature t = 50°C

version ...4WEH16...72 /...**P4,5**...



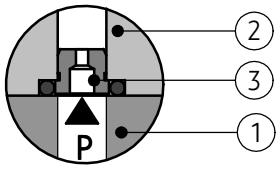
version ...4WEH16...72/...**P7**...



Throttle insert

versions ...4WEH16...72/...**B.**..

Directional valves type **...WEH16...** may be equipped with throttle insert (3) in port **P** in pilot valve (2) which allows to **delay switching time** of the main valve.



1 - Main valve
2 - Pilot valve
3 - Throttle insert

ACCESSORIES FOR STANDARD DIRECTIONAL VALVE

Pilot oil supply and pilot oil drain

Pilot oil supply **X** – **external**
pilot oil drain **Y** – **external**
version …4WEH16…72/**...**

In version…4WEH16…72/**...** the hole screw plugs (3) and (5) and plugs (4) and (6) must be mounted in the position like given on the drawing.

Pilot oil supply **X** – **internal**
pilot oil drain **Y** – **external**
version …4WEH16…72/…**E**…

In version …4WEH16…72/…**E**… the hole screw plug (3) must be dismounted whereas the hole screw plug (5), plugs (4) and (6) must be mounted and port **X** in a subplate should be stopped.

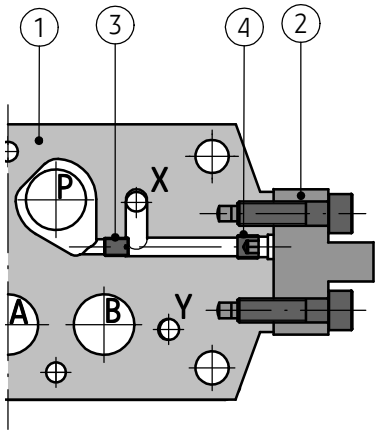
Pilot oil supply **X** – **internal**
pilot oil drain **Y** – **internal**
version …4WEH16…72/…**ET**…

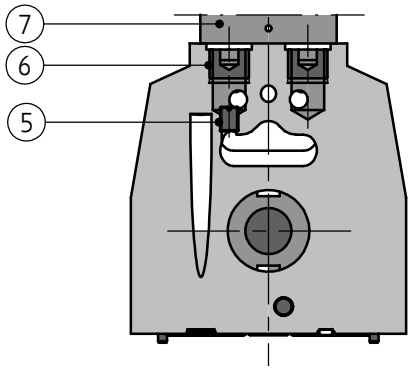
In version …4WEH16…72/…**ET**… the hole screw plugs (3) and (5) must be dismounted whereas the plugs (4) and (6) must be mounted and ports **X** and **Y** in a subplate must be stopped.

Pilot oil supply **X** – **external**
pilot oil drain **Y** – **internal**
version …4WEH16…72/…**T**…

In version …4WEH16…72/…**T**… the hole screw plug (3) must be mounted whereas the hole screw plug (5) must be dismounted. The plugs (4) and (6) must be mounted and the port **Y** in a subplate must be stopped.

…4WEH16…72/**...**





NOTES:

Versions with internal oil drain:…**ET**…; …**T**… are non-applicable for directional valves with main spool hydraulically centered (versions…4WEH16**H**…).

The hole screw plug (3) in port **X** is available after screwing out a side cover (2) in the main valve (1).
The hole screw plug (5) in port **Y** is available after dismounting the pilot valve (7).

1 - Body of main valve
2 - Side cover
3 - Hole screw plug **M6 - 8,8** (S3)
4 - Plug
5 - Hole screw plug **M6 - 8,8** (S3)
6 - Plug
7 - Pilot valve

OPTIONAL ACCESSORIES FOR DIRECTIONAL VALVE

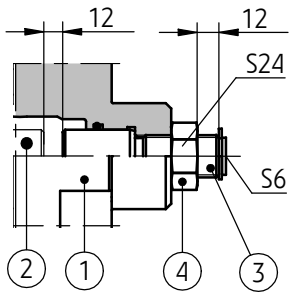
Stroke limiter

Stroke limiter of the spool may be mounted:

- stroke limiter on valve ends **A** and **B**
  version ...4WEH16...72/...**10**...
- stroke limiter on valve end **A**
  version ...4WEH16...72/...**11**...
- stroke limiter on valve end **B**
  version ...4WEH16...72/...**12**...

Adjustment of the stroke of the main spool is by rotating the pin (3) and securing with locknut (4). Rotating the pin (3) to the right reduces the stroke of the main spool. While adjusting the stroke the control chamber must be at zero pressure.

...4WEH16...72/...**12**...



1 - Stroke limiter body (on valve end **B**)
2 - Spool of the main valve
3 - Pin
4 - Locknut

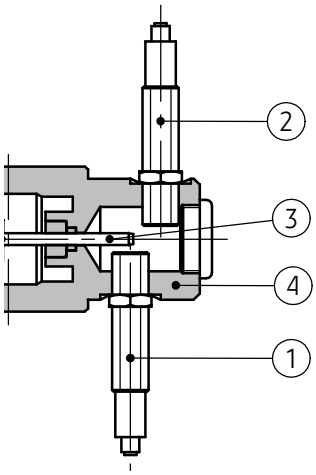
End position monitoring

End position monitoring may be mounted:

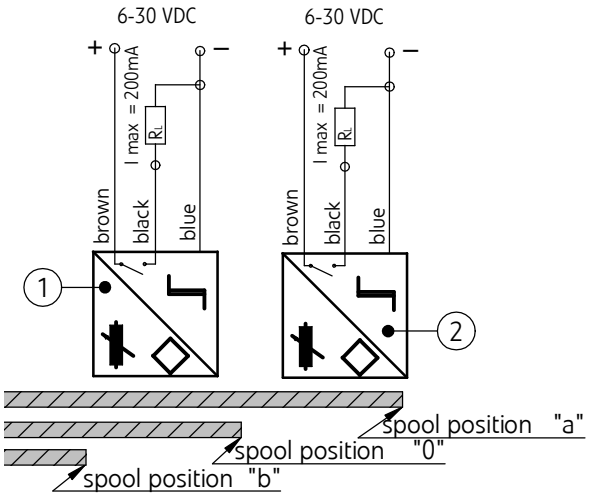
- end position monitor on valve end **A**
  version ...4WEH16...72/...**ICZ2m**...
- end position monitor on valve end **B**
  version ...4WEH16...72/...**ICZ2m**...

Directional valves type **WEH16...**- only for 3-position directional valves may be equipped with inductive spool position sensors type **ICZD2CNPNPA02m**. Depending on the version, it may be mounted on valve ends **A** or **B**.
Other sensor types may be mounted upon order and if agreed with the manufacturer.

...4WEH16...72/...**ICZ2m**...



Scheme for electrical connection of inductive proximity sensor type ICZD2CNPNPA02m



sensor signal	spool position		
	a	*0*	*b*
sensor - item (1)	1	1	0
sensor - item (2)	1	0	0

1, 2 - Inductive proximity spool sensor **normally open** with the cable of 2 m length type **ICZD2CNPNPA02m**
3 - Pin of the main spool
4 - Cover of the main valve (on valve end **B**)

OVERALL DIMENSIONS OF DIRECTIONAL VALVE WITH OPTIONAL ACCESSORIES

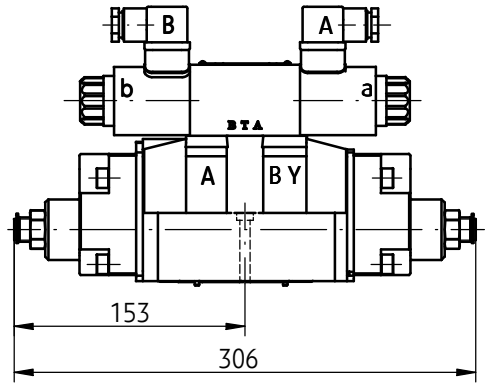
Directional valves with stroke limiter

3-position directional valves with the main spool spring centered

Stroke limiter may be mounted:

- on valve end **A** - version ...4WH16...72/...**11**...
- on valve end **B** - version ...4WH16...72/...**12**...
- on valve ends **A** and **B** - version ...4WH16...72/...**10**...

...4WEH16...72/...**10**...

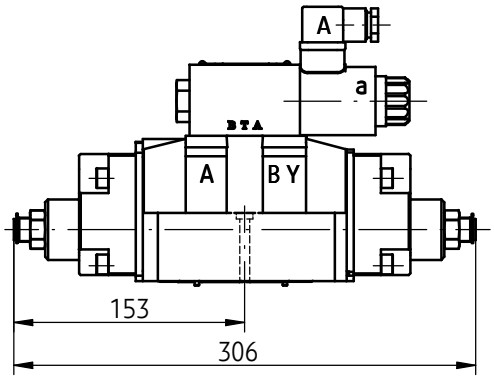


2-position directional valves with the main spool hydraulically positioned

Stroke limiter may be mounted:

- on valve end **A** - version ...4WEH16**H**...72/...**11**...
- on valve end **B** - version ...4WEH16**H**...72/...**12**...
- on valve end **A** and **B** - version ...4WEH16**H**...72/...**10**...

...4WEH16**H**...72/...**10**...

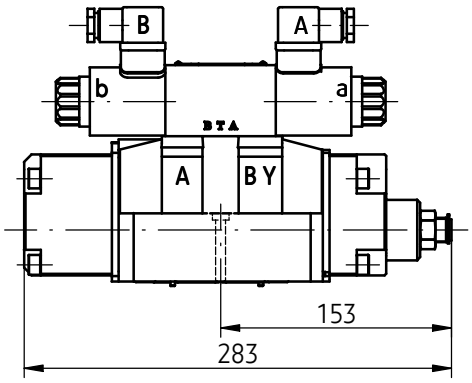


3-position directional valves with the main spool hydraulically centered

Stroke limiter may be mounted:

- on valve end **B** - version ...4WEH16**H**...72/...**12**...

...4WEH16**H**...72/...**12**...

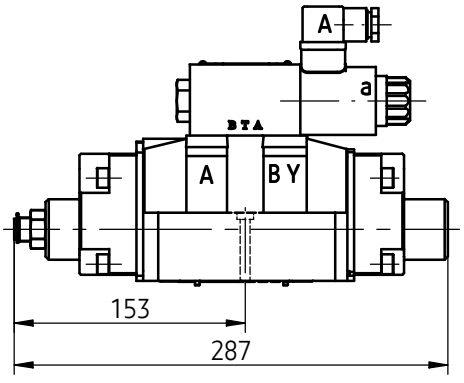


2-position directional valves with the main spool spring positioned

Stroke limiter may be mounted:

- on valve end **A** - version ...4WEH16...72/...**11**...

...4WEH16...72/...**11**...

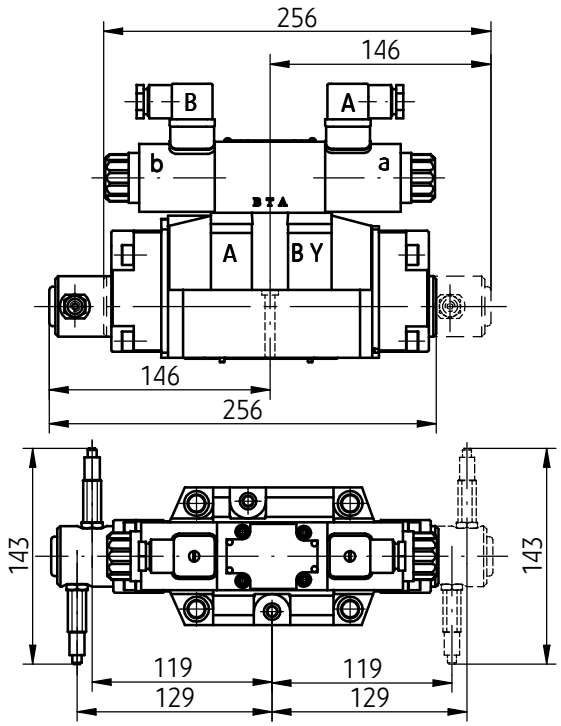


OVERALL DIMENSIONS OF DIRECTIONAL VALVE WITH OPTIONAL ACCESSORIES

Directional valves with end position monitoring

3-position directional valves with the main spool spring centered. End position monitoring may be mounted:

- on valve end **A** - version ...4WEH16...72/... **ICZ2m**...
- on valve end **B** - version ...4WEH16...72/... **ICZ2m**...

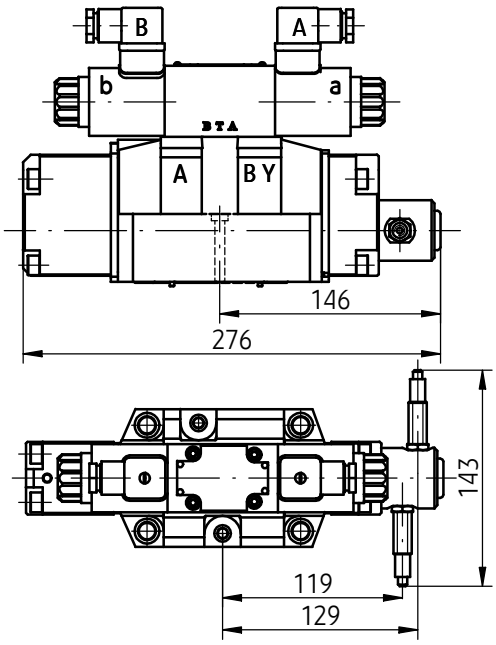


...4WEH16...72/... **ICZ2m** | ...4WEH16...72/... **ICZ2m**

3-position versions with the main spool hydraulically centered

End position monitoring may be mounted:

- on valve end **B** - version ...4WEH16**H**...72/... **ICZ2m**...



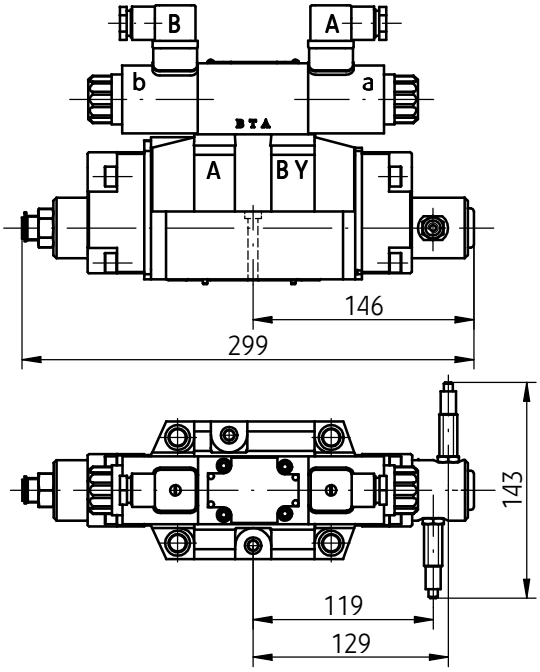
...4WEH16H...72/... **ICZ2m**

Directional valves with stroke limiter and end position monitoring

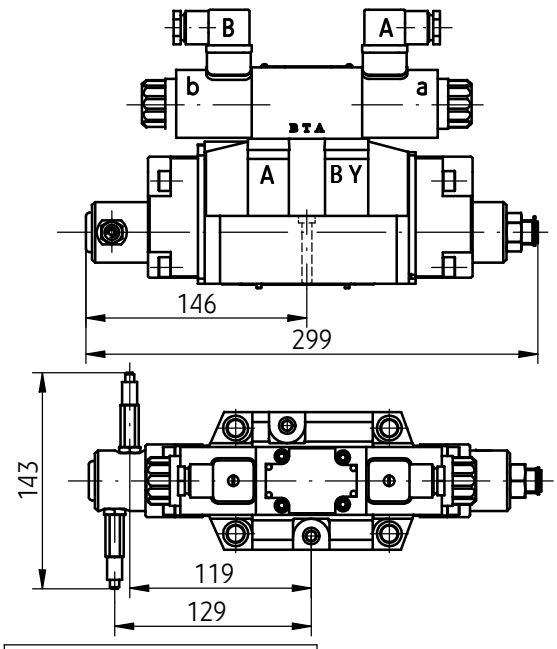
3-position directional valves with the main spool spring centered

Stroke limiter and end position monitoring may be mounted:

- stroke limiter on valve end **A** and end position monitoring on valve end **B** - version ...4WEH16...72/...**11 ICZ2m**...
- stroke limiter on valve end **B** and end position monitoring on valve end **A** - version ...4WEH16...72/...**12 ICZ2m**...



...4WEH16...72/...**11 ICZ2m**



...4WEH16...72/...**12 ICZ2m**

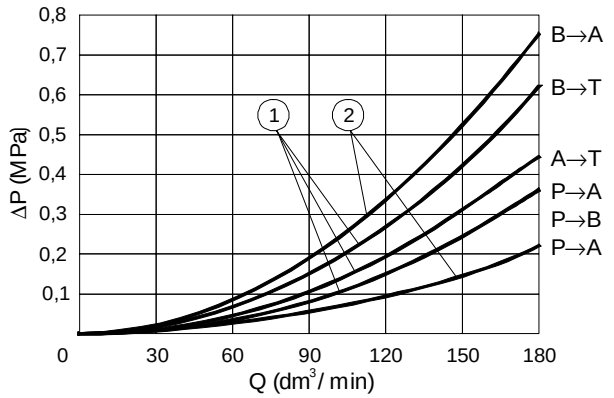
PERFORMANCE CURVES

measured at viscosity ν = 41 mm^2/s and temperature t = 50°C

Flow resistance curves

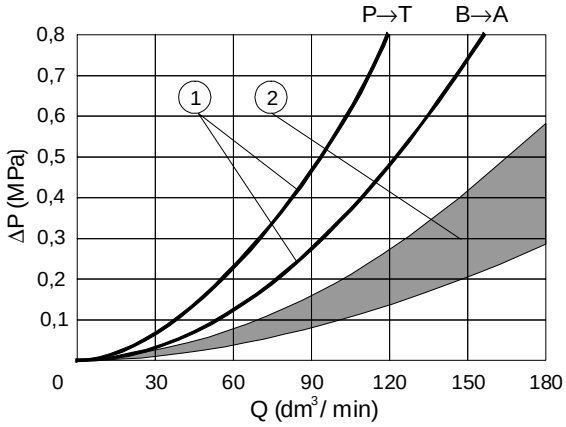
Flow curves **Δp (Q)** for directional valves type **...WEH16...** with spools **E** and **R**

1 - spools: **E**, **R**
2 - spool **R**- flow direction **P→A** and **B → A**

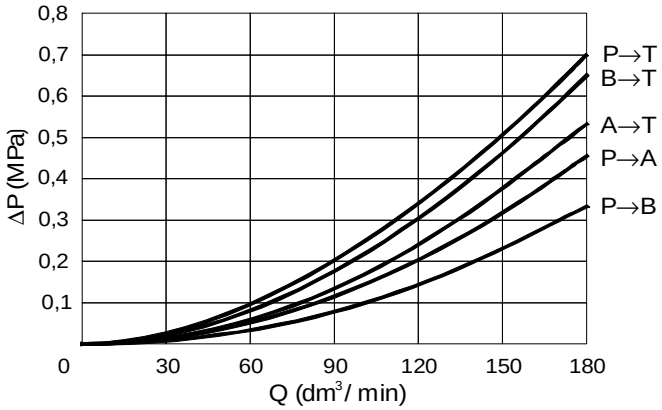


Flow curves **Δp (Q)** for directional valves type **WEH16...** with spools: **F**,**H**,**J**,**L**,**M**,**Q**,**S**,**U**,**V**,**W**,**C**,**D**,**K**,**Z**

1 - spool **S**
2 - spools: **F**, **H**, **J**, **L**, **M**, **Q**, **U**, **V**, **W**, **C**, **D**, **K**, **Z**



Flow curves **Δp (Q)** for directional valves type **...WEH16...** with spools **G** and **T**



Flow limits

Charakteristic curves **p - Q** for directional valves type **...WEH16...** for 2-positions and 3-position directional valves spring centered with various spools

spools	pressure **p** [MPa]				
	7	14	21	28	35
	flow **Q** [dm^3/min]				
E, **J**, **L**, **M**, **Q**, **R**, **U**, **V**, **W**, **C**, **D**, **K**, **Z**	240	240	205	180	170
F	200	145	115	100	90
G, **H**, **S**, **T**	220	160	130	110	100

NOTES:

Above flow limits are related to standard application of 4-way directional spool valve i.e. using two flow directions: **P** to **A** and at the same time **B** to **T**. In case 4-way directional spool valve with only one flow direction – **P** to **A** (**B** plugged) or **A** to **T** (**B** plugged) is applied then actual flow limit rates are significantly lower.

HOW TO ORDER

	4	WEH				/					

Version
normal pressure
up to 28 MPa = **no designation**
high pressure
up to 35 MPa = **H**

Number of service ports
4-way = **4**

Nominal size (NS)
NS16 = **16**

Centering/ spool positioning of the main valve
spring centering = **no designation**
hydraulic off -set = H

Spool type
spool schemes - according to **page 8**

Series number
(70-79) - installation and connection dimensions unchanged = 7X
series 72 = **72**

Spool positioning of the pilot valve
(applicable only to 2-position valves WEH16**HC**... / ...**HD**... / ...**HK**... / ...**HZ**...)
with spring return (solenoid **a**) = **no designation**
without spring return (solenoid **a** and **b**) = O
without spring return with detent (solenoid **a** and **b**) = OF

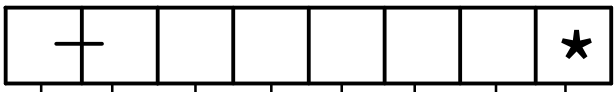
Supply voltage for solenoids at pilot valve
12 V DC = G 12
24 V DC = **G 24**
110 V DC = G 110
110 V AC 50 Hz (plug-in-connector with rectifier) = W 110 R
230 V AC 50 Hz (plug-in-connector with rectifier) = **W 230 R**

Manual override
solenoids without manual override = no designation
solenoids with manual override = **N**

Pilot oil supply and pilot oil drain
external pilot oil supply, **external pilot oil drain** = **no designation**
internal pilot oil supply, external pilot oil drain = E
internal pilot oil supply, internal pilot oil drain = ET
external pilot oil supply, internal pilot oil drain = T

Switching time adjustment
without switching time adjustment = **no designation**
switching time adjustment as meter-in control = S
switching time adjustment as meter-out control = S2

HOW TO ORDER



Further requirements in clear text
(to be agreed with the manufacturer)

Sealing

NBR (for fluids on mineral oil base)	= **no designation**
FPM (for fluids on phosphate ester base)	= V

Pressure ratio valve

without pressure ratio valve	= **no designation**
with pressure ratio valve	= D1

Pre-load valve

without pre-load valve	= **no designation**
pre-load valve with cracking pressure 0,45 MPa	= P 4,5
pre-load valve with cracking pressure 0,7 MPa	= P 7

Throttle insert in port P in the pilot valve

without throttle insert	= **no designation**
throttle insert ϕ 0,8	= B 08
throttle insert ϕ 1,0	= B 10
throttle insert ϕ 1,2	= B 12

End position monitoring
(applicable only to3-position valves, end position monitoring mounted on valve end **A** or **B** according to page 16 - to be agreed with the manufacturer)

inductive spool position sensor with the cable of 2 m length	= ICZ 2m
another type of sensor (to be agreed with the manufacturer)	= to be specified

Accessories

without accessories	= **no designation**
stroke limiter on valve ends **A** and **B**	= 10
stroke limiter on valve end **A**	= 11
stroke limiter on valve end **B**	= 12

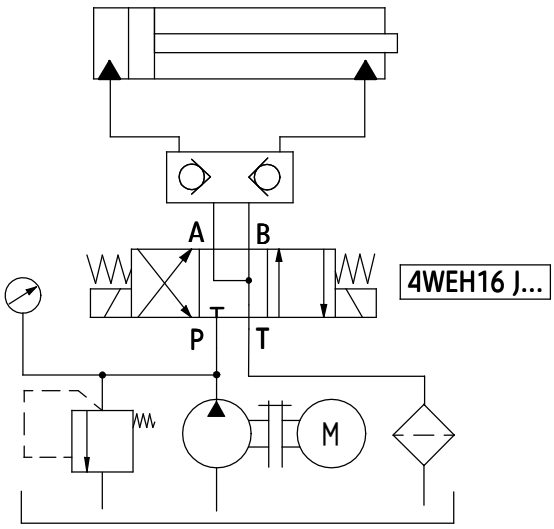
Electrical connection

plug-in-connector ISO 4400 type without LED	= **Z4**
plug-in-connector ISO 4400 type with LED	= Z4L

NOTES:

The directional spool valve should be ordered according to the above coding.
The symbols in bold are preferred versions in short delivery time.
Coding example: H- 4 WEH16 E 72/G24 N ET Z4L

EXAMPLE OF APPLICATION IN HYDRAULIC SYSTEM



SUBPLATES AND MOUNTING BOLTS

Subplates for directional spool valve type **WEH16...** must be ordered according to data sheet **WK 450 788**.
Subplate types:

G174/01 - threaded connections **P, T, A, B - G 1**
X, Y, L - G1/4
G174/02 - threaded connections **P, T, A, B - M33 x 2**
X, Y, L - M14 x 1,5
G172/01 - threaded connections **P, T ,A, B - G3/4**
X, Y, L - G1/4
G172/02 - threaded connections **P, T, A, B - M27 x 2**
X, Y, L - M14 x 1,5

Subplates and bolts for mounting directional spool valve in accordance with **PN-EN ISO 4762**:
M10 x 60 -10,9 - 4 pcs/kit
M 6 x 60 -10.9 - 2 pcs/kit
must be ordered separately.
Tightening torques for bolts:
M10 x 60 - Md = 62 Nm
M 6 x 60 - Md = 12,5 Nm

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