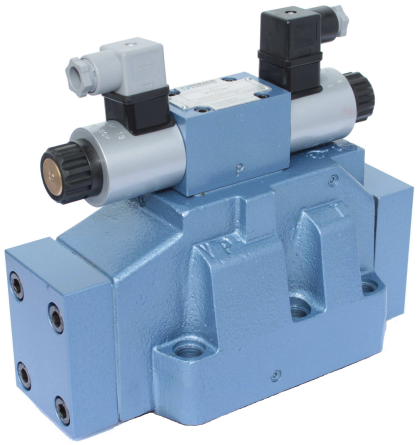
PONAR wadowice	**Directional spool valve type WEH22 electro-hydraulically operated**			**WK 460 110**
	NS22	**up to 35 MPa**	**up to 450 dm³/min**	09.2017

DATA SHEET - OPERATION MANUAL

APPLICATION

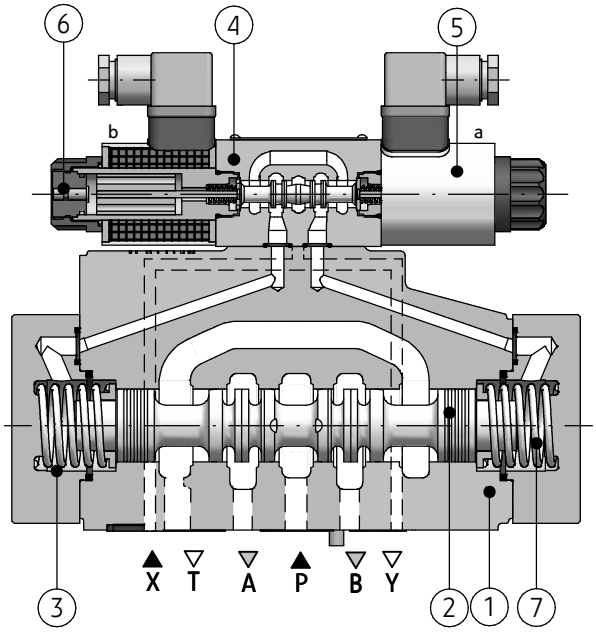
Directional spool valves type **WEH22...** electro-hydraulically operated are intended for change in direction of fluid flow in a system and thus it allows to change direction of movement of a receiver - mostly piston rod of a cylinder or hydraulic motor as well to use functions: *on* and *off*. These directional spool valves are used for subplate mounting in any position in a hydraulic system.

The product is complied with the regulations of directive 2014/35/UE

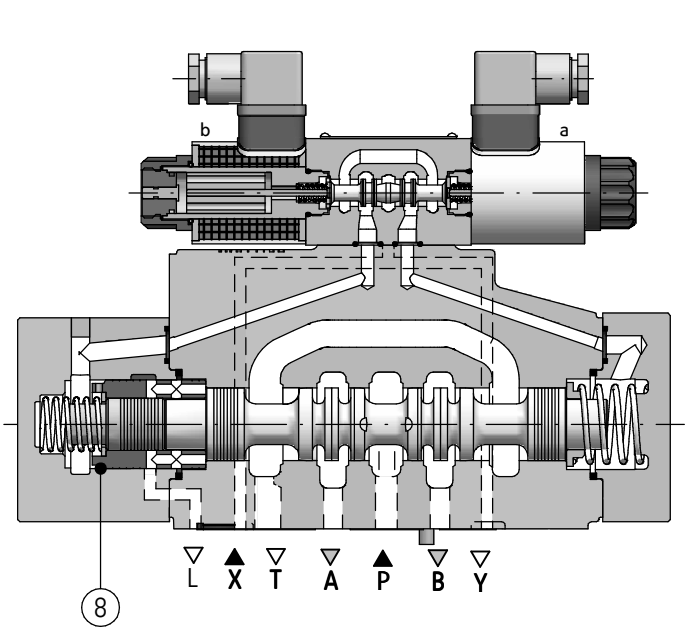


DESCRIPTION OF OPERATION

H-4WEH22E13/G24NZ4



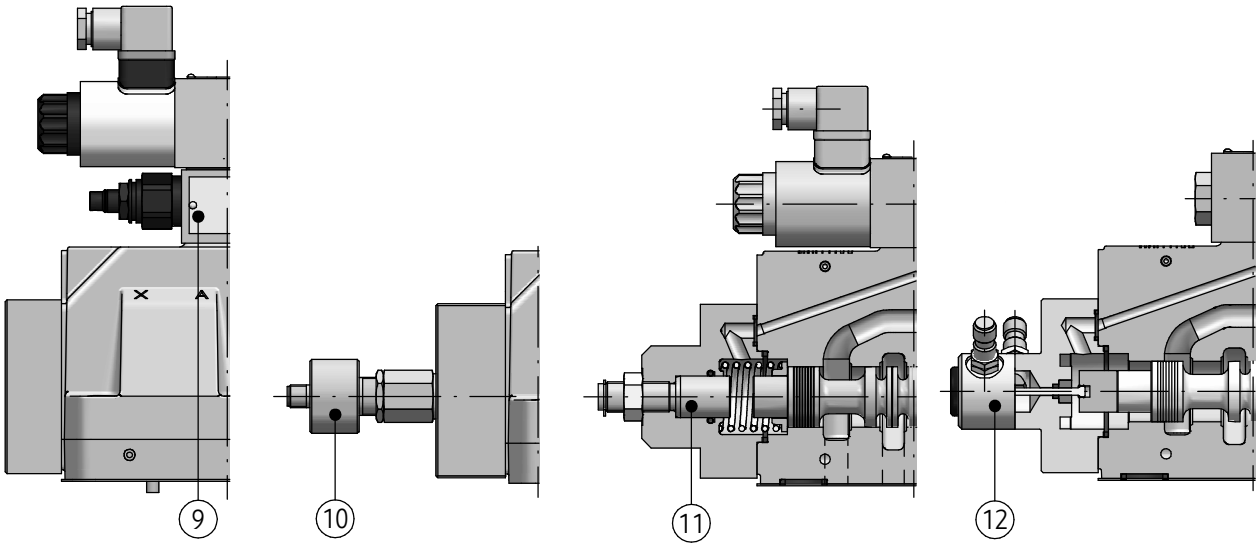
H-4WEH22HE13/G24NZ4



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**... 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). The spool (2) is centered in neutral position by means of springs (7) - version 4WEH22**...**/**...** or may be hydraulically operated by the fluid pressure from the pilot valve (4) - version 4WEH22**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

...WEH22.../...**S**... | ...WEH22.../...**M**... | ...WEH22.../...**11**... | ...4WEH22.../...**18**...



Directional spool valves may be provided with the pilot choke adjustment (9) as well as with accessories such as: spool position sensor (10), spool stroke limiter (11), spool end position monitor (12). Accessories may be mounted depending on version of directional valve like given on pages 15 - 27.

TECHNICAL DATA

Hydraulic fluid	
Hydraulic fluid	mineral oil
Required fluid cleanliness class	**ISO 4406; class 20/18/15**
Nominal fluid viscosity	37mm^2/s
Viscosity range	2,8 do 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 +50 °C
Max operating pressure	
Ports A, B, P	
• version **H4 WEH22.../...**	**35 MPa**
• version **4 WEH22.../...**	**28 MPa**
Port T	
• pilot fluid return **Y- external**	**25 MPa**
• pilot fluid return **Y-internal** (2-position and 3-position directional valve spring centred only, on 3-position version hydraulically centred with Y - internal impossible)	**21 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)	
• version **4 WEH22**... with spools **G,H,F,S,T**	0,45 MPa
• version **H-4 WEH22**.../...**D1**... with spools **G,H,F,S,T**	0,7 MPa

TECHNICAL DATA

Fluid volume required to operate the valve	
3-position spring centered directional valve	9,65 cm^3
3-position hydraulically centered directional valve	
• from ***0*** (neutral) to operated position ***a***	5,0 cm^3
• from ***0*** (neutral) to operated position ***b***	9,65 cm^3
• from operated position ***a*** to ***0*** (neutral) position	4,6 cm^3
• from operated position ***b*** to ***0*** (neutral) postion	4,6 cm^3
2-position directional spool valve	19,3 cm^3
Total time of spool shifting from neutral to end position	
3-position spring centred directional valve	
at pilot pressure p st = 5 MPa	70 ms
p st =15 MPa	60 ms
p st =25 MPa	55 ms
3-position hydraulically centred directional valve	
• solenoid **a** operation	
at pilot pressure p st = 5 MPa	65 ms
p st = 15 MPa	60 ms
p st = 25 MPa	55 ms
• solenoid **b** operation	
at pilot pressure p st = 5 MPa	70 ms
p st = 15 MPa	65 ms
p st = 25 MPa	55 ms
2-position directional valve	
at pilot pressure p st = 5 MPa	110 ms
p st = 15 MPa	90 ms
p st = 25 MPa	75 ms
Total time of spool shifting from end to neutral position	
3-position spreing centred directional valve	
at pilot pressure p st = 5; 15; 25 MPa	60 ms
3-position hydraulically centred directional valve	
• solenoid **a** operation	
at pilot pressure p st = 5 MPa	35 ms
p st = 15 MPa	30 ms
p st = 25 MPa	25 ms
• solenoid **b** operation	
at pilot pressure p st = 5 MPa	40 ms
p st = 15 MPa	35 ms
p st = 25 MPa	25 ms
2-position directional valve	
at pilot pressure p st = 5 MPa	80 ms
p st = 15 MPa	50 ms
p st = 25 MPa	45 ms
Flow cross section in the central position	
type of spool - diagrams like given on page 8	
spool **Q**	16 % nominal section
spool **V**	16 % nominal section
spool **W**	3 % nominal section

TECHNICAL DATA

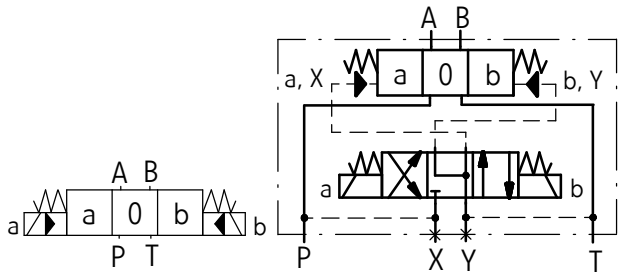
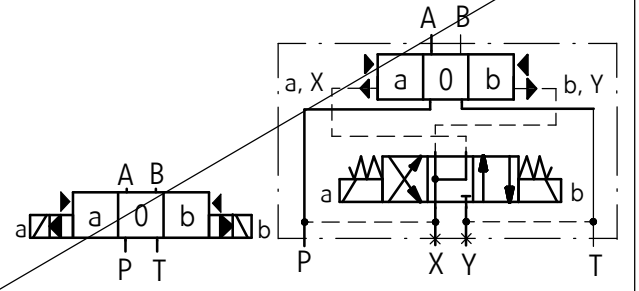
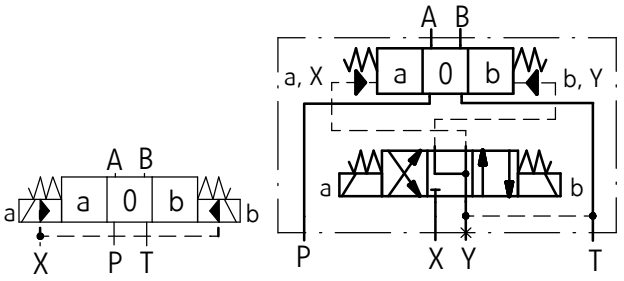
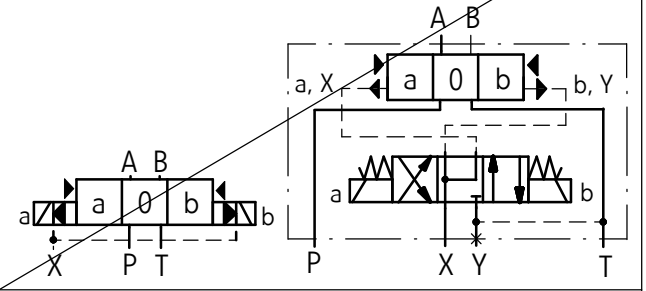
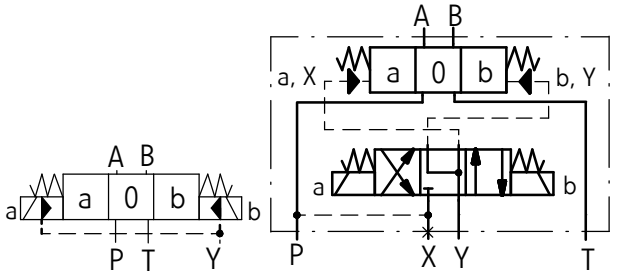
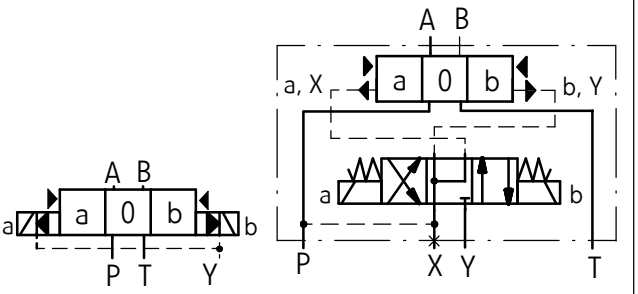
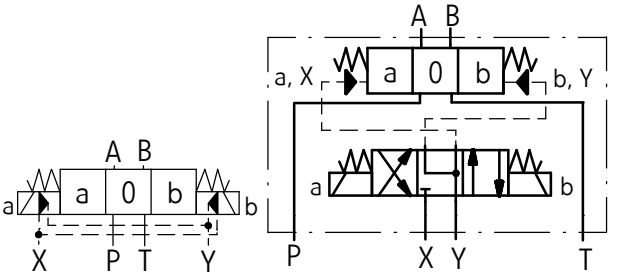
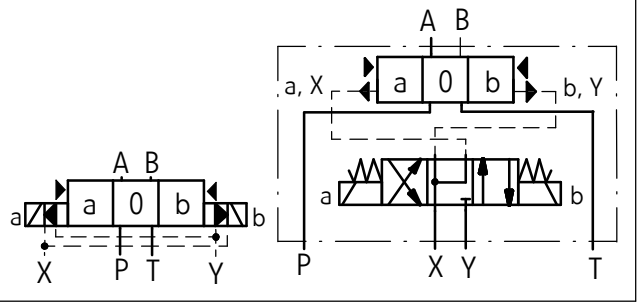
Pilot valve							
Type of pilot valve • for 3-position spring centered main directional valve • for 2-position spring centered main directional valve (**a**, **0**) • for 2-position spring centered main directional valve (**0**, **b**) • for 3-position hydraulically centered main directional valve • for 2-position hydraulically centered main directional valve (**a**, **0**) • for 2-position hydraulically centered main directional valve (**0**, **b**) • for 2-position main directional valve	4WE6 **J**... 4WE6 **JA**... 4WE6 **JB**... 4WE6 **M**... 4WE6 **MA**... 4WE6 **MB**... 4WE6 **D**... or 4WE6 **D**... /**O**... or 4WE6 **D**... /**OF**...						
Supply voltage of solenoids	**DC**			**AC** (plug-in connector with rectifier)			**AC** direct supply
	12V	**24V**	**110V**	**230V-**50Hz	**220V**- 50Hz	**110V**- 50Hz	**230V-** 50Hz
Supply voltage tolerance Power requirement (DC) **Degree of protection** Temperature of solenoid coil	±10% **30** W **IP 65** max 150 °C						
Inductive spool position sensors							
Type of sensors **Supply voltage** **Max load current** **Connection type of sensor** **Connection type of conductor** **External diameter of conductor** **Degree of protection**	**two PNP inductive proximity sensors**: **normally closed - NC** (contact breaker) + **normally opened - NO** (contact maker) **10 - 30V DC** **200 mA** sensor with **M12x1 external thread**, **male connection** plug with **M12 x 1 internal thread**, **female plug** configuration of connection according to **PN-EN-61076 -2-101** **ϕ 2,5 - 6,5 mm** (**PG7**) **IP 67**						
Weight	max 21 kg						

INSTALLATION AND OPERATION REQUIREMENTS

1. Only fully functional and operational valve, properly connected to electrical installation must directional be used. Connecting or disconnecting the valve to an electrical installation must only be carried out by qualified personnel.
2. Ground connection (⏚) must be connected with protective earth wire (PE ⏚) in supply system according to appropriate instructions.
3. Solenoid plug shall precisely adhere to socket and shall be secured with thread bolt screwed in securely in a place. It is forbidden to operate the directional valve if the tightness and suitable clamp of cable in the plug gland are not ensured.
4. For versions with the …W230 - 50… pilot valves, simultaneous joining of two solenoids of the same valve should not be permitted (partial overriding of the valve can overheat and damage the winding coils).
5. During operation must be kept fluid viscosity acc. to requirements specified in this Data Sheet - Operation Manual.
6. In order to ensure failure free and safe operation the following must be systematically checked:
   - condition of the electrical connection
   - proper working of the directional valve
   - cleanliness of the hydraulic fluid
7. Due to heating of solenoid coils to high temp., the directional valve shall be placed in such way to eliminate the risk of accidental contact with solenoid during operation or to apply suitable covers acc. to European standards: PN - EN ISO 13732-1 and PN - EN 4413
8. In order to ensure tightness of the directional valve block, one should take care of dimension of sealing rings, tightening torques and valve operation parameters specified in this Data Sheet - Operation Manual.
9. Any changes, modifications or adjustments to the versions with M type spool position sensor can be made only by the producer - see notes on page 19.
10. A person that operates the directional valve must be thoroughly familiar with the content of this Data Sheet - Operation Manual.

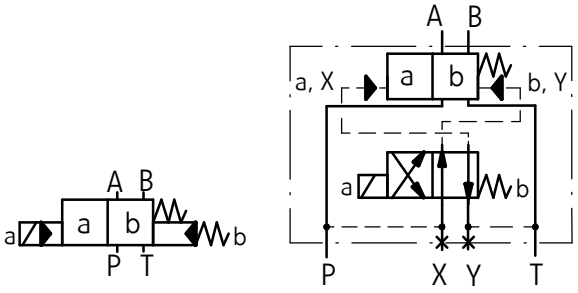
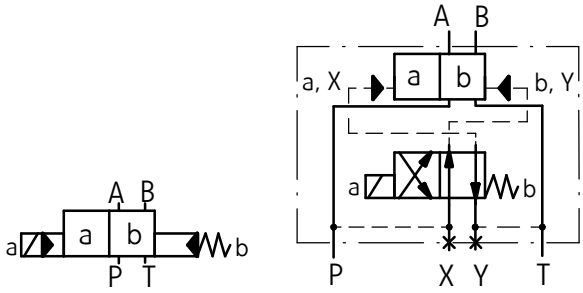
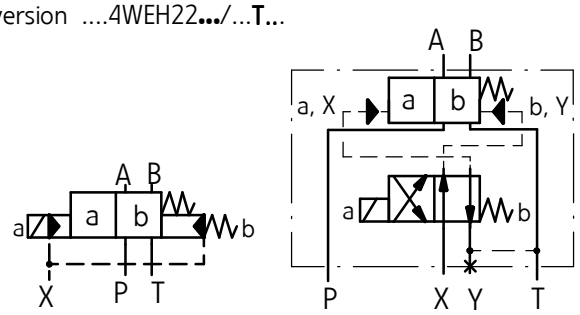
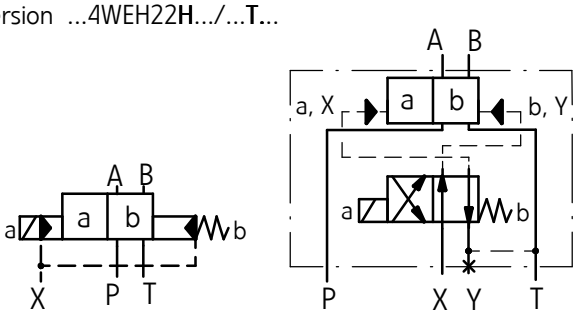
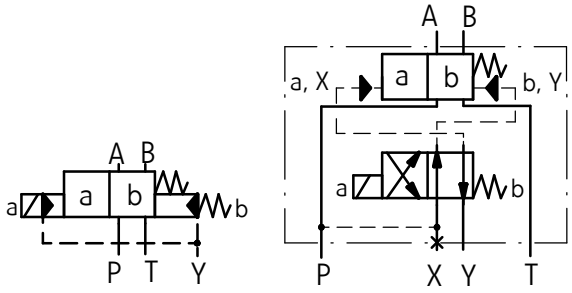
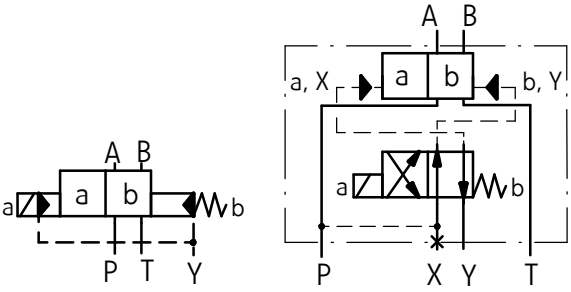
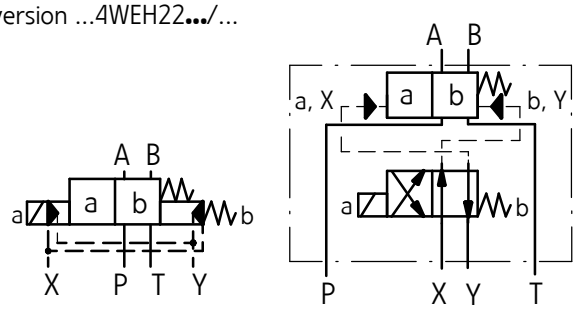
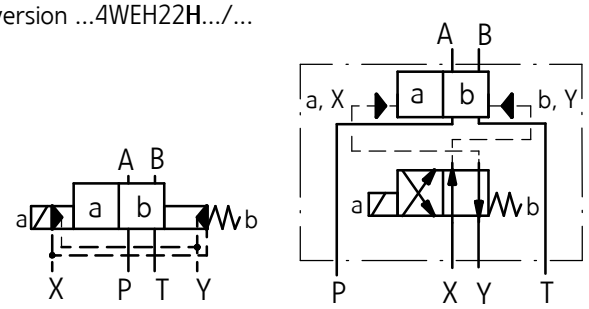
DIAGRAMS

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

3-position directional valves with spring centered spool at *0* position in main valve and pilot valve version ...4WEH22**...**/...	3-position directional valves with hydraulically centered spool at *0* position in main valve and spring centered spool in pilot valve version ...4WEH22**H**.../...
internal supply (**X**) **internal** drain (**Y**) version ...4WEH22**...**/...**ET...** 	**internal** supply (**X**) **internal** drain (**Y**) version ...4WEH22**H**.../...**ET**...- impossible 
external supply (**X**) **internal** drain (**Y**) version ....4WEH22**...**/...**T...** 	**external** supply (**X**) **internal** drain (**Y**) version ...4WEH22**H**.../...**T**..- impossible 
internal supply (**X**) **external** drain (**Y**) version ...4WEH22**...**/...**E...** 	**internal** supply (**X**) **external** drain (**Y**) version ...4WEH22**H**.../...**E...** 
external supply (**X**) **external** drain (**Y**) version ...4WEH22**...**/... 	**external** supply (**X**) **external** drain (**Y**) version ...4WEH22**H**.../... 

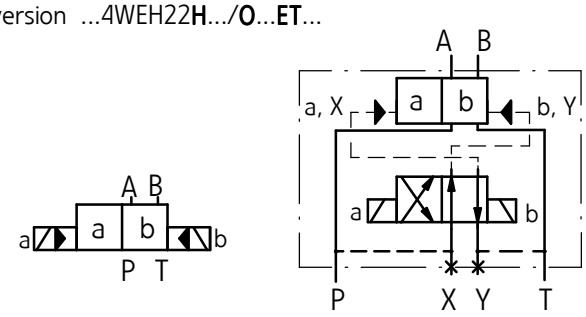
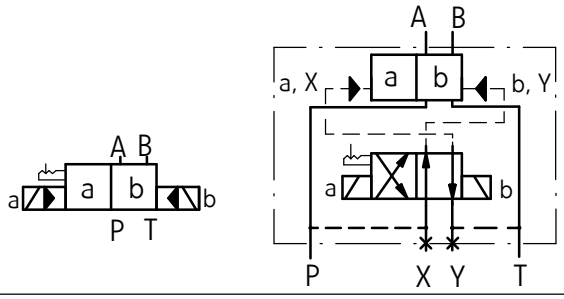
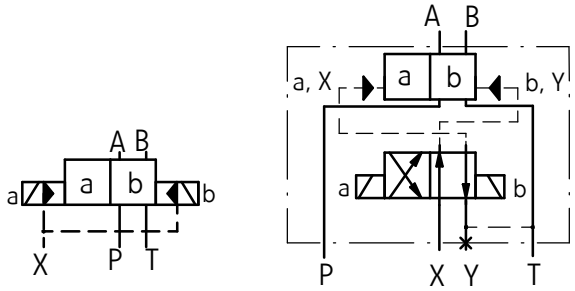
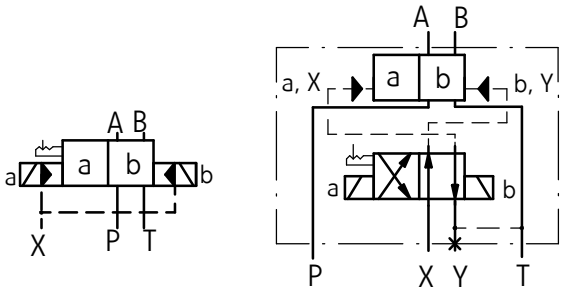
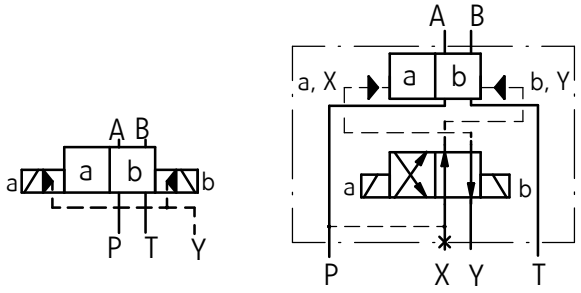
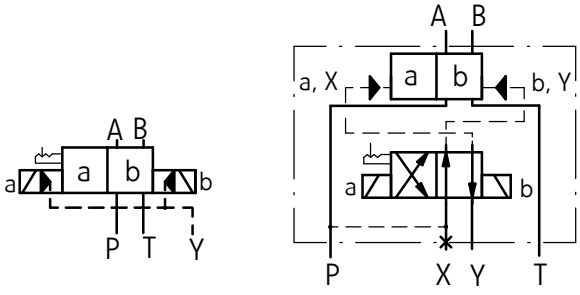
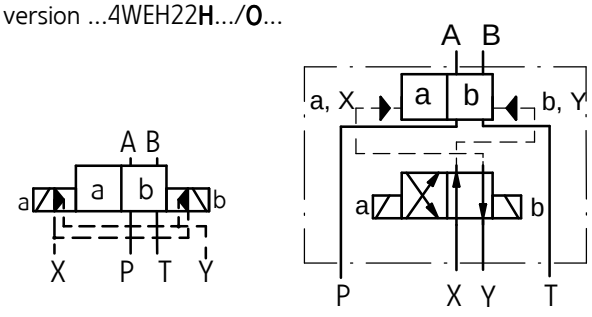
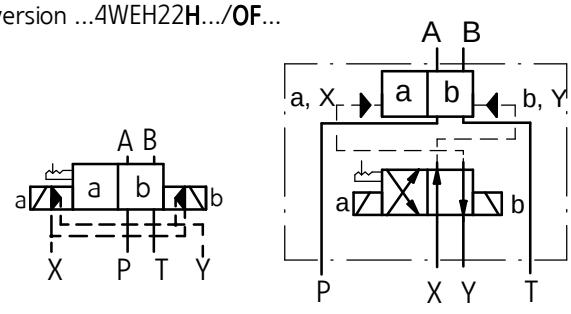
DIAGRAMS

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

2-position directional valves with spring positioned spool in main valve and pilot valve version ...4WEH22**...**/...	2-position directional valves with hydraulically positioned spool in main valve and spring positioned spool in pilot valve version ...4WEH22**H**.../...
internal supply (**X**) **internal** drain (**Y**) version ...4WEH22**...**/...**ET**... 	**internal** supply (**X**) **internal** drain (**Y**) version ...4WEH22**H**.../...**ET**... 
external supply (**X**) **internal** drain (**Y**) version ....4WEH22**...**/...**T**... 	**external** supply (**X**) **internal** drain (**Y**) version ...4WEH22**H**.../...**T**... 
internal supply (**X**) **external** drain (**Y**) version ...4WEH22**...**/...**E**... 	**internal** supply (**X**) **external** drain (**Y**) version ...4WEH22**H**.../...**E**.... 
external supply (**X**) **external** drain (**Y**) version ...4WEH22**...**/... 	**external** supply (**X**) **external** drain (**Y**) version ...4WEH22**H**.../... 

DIAGRAMS

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

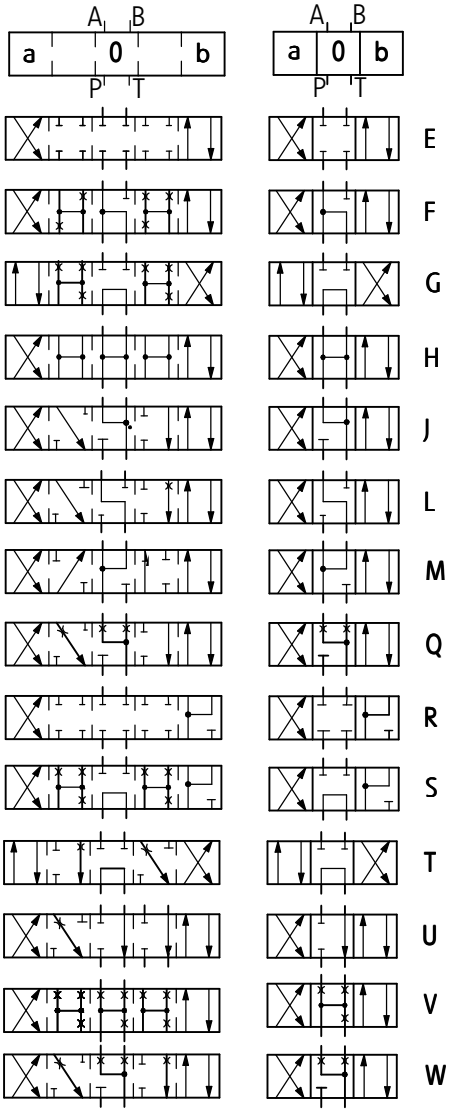
2-position directional valves with hydraulically positioned spool in main valve, pilot valve without return spring version ...4WEH22**H**.../**O**...	2-position directional valves with hydraulically positioned spool in main valve, pilot valve without return spring, with detent version ...4WEH22**H**.../**OF**...
internal supply (**X**) **internal** drain (**Y**) version ...4WEH22**H**.../**O**...**ET**... 	**internal** supply (**X**) **internal** drain (**Y**) version ...4WEH22**H**.../**OF**...**ET**... 
external supply (**X**) **internal** drain (**Y**) version ...4WEH22**H**.../**O**...**T**... 	**external** supply (**X**) **internal** drain (**Y**) version ...4WEH22**H**.../**OF**...**T**... 
internal supply (**X**) **external** drain (**Y**) version ...4WEH22**H**.../**O**...**E**... 	**internal** supply (**X**) **external** drain (**Y**) version ...4WEH22**H**.../**OF**...**E**... 
external supply (**X**) **external** drain (**Y**) version ...4WEH22**H**.../**O**... 	**external** supply (**X**) **external** drain (**Y**) version ...4WEH22**H**.../**OF**... 

DIAGRAMS

Diagrams of spools

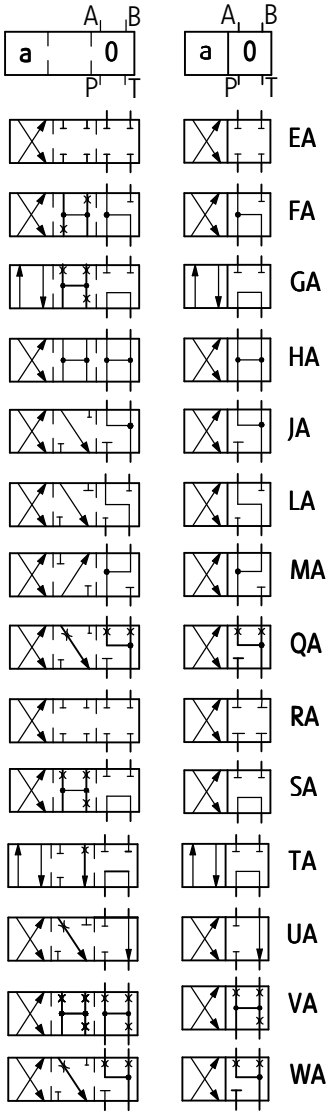
3-position
versions ...4WEH22**...**

working and indirect positions | working positions



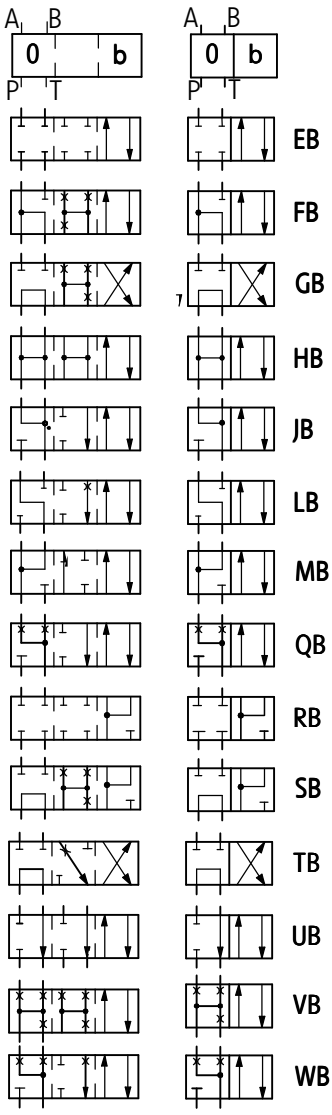
2-position (a, 0)
versions ...4WEH22...**A**...

working and indirect positions | working positions



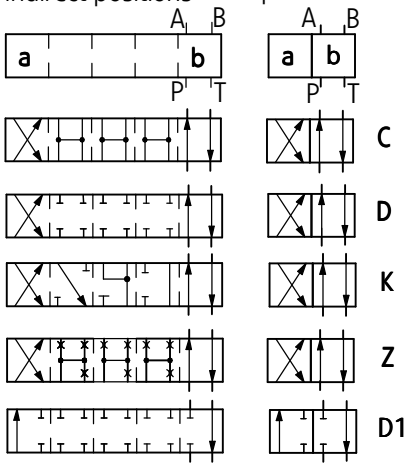
2-position (0, b)
versions ...4WEH22...**B**...

working and indirect positions | working positions



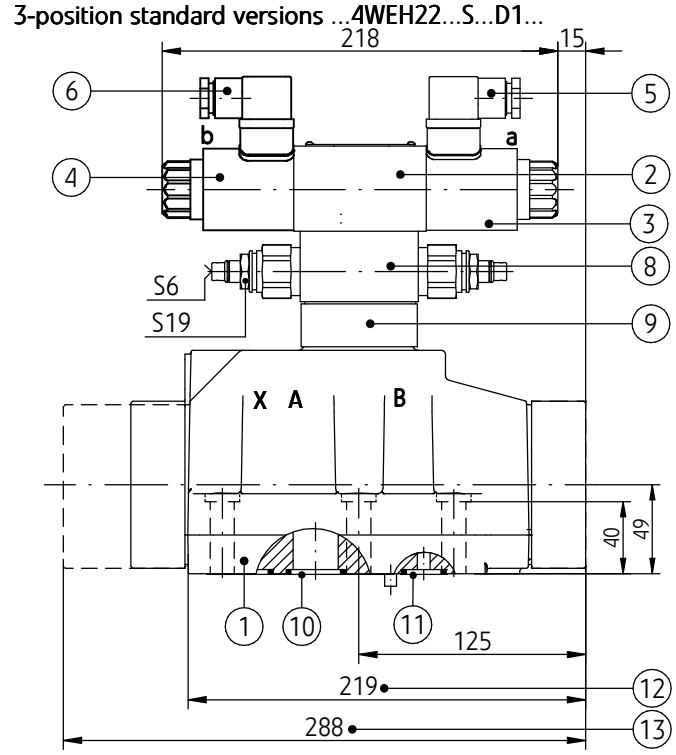
2-position (a, b)
versions ...4WEH22**...**

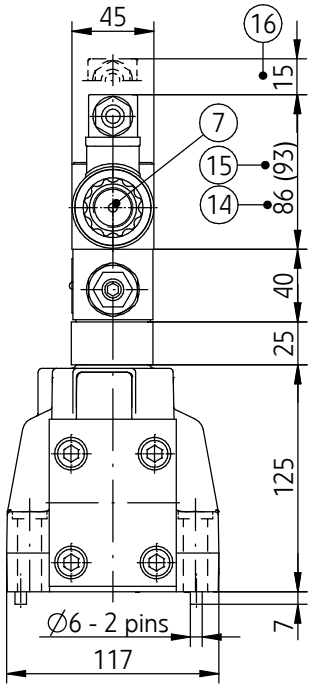
working and indirect positions | working positions

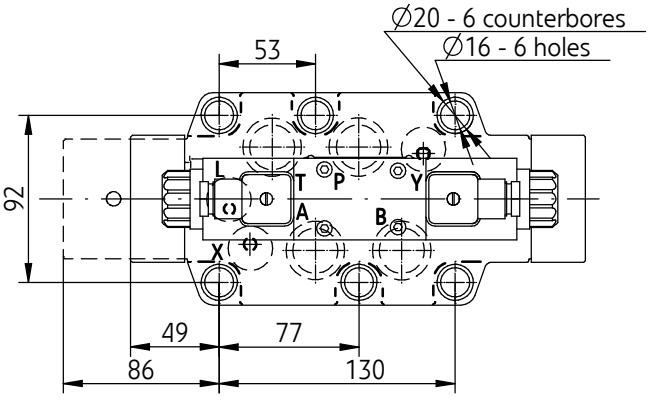


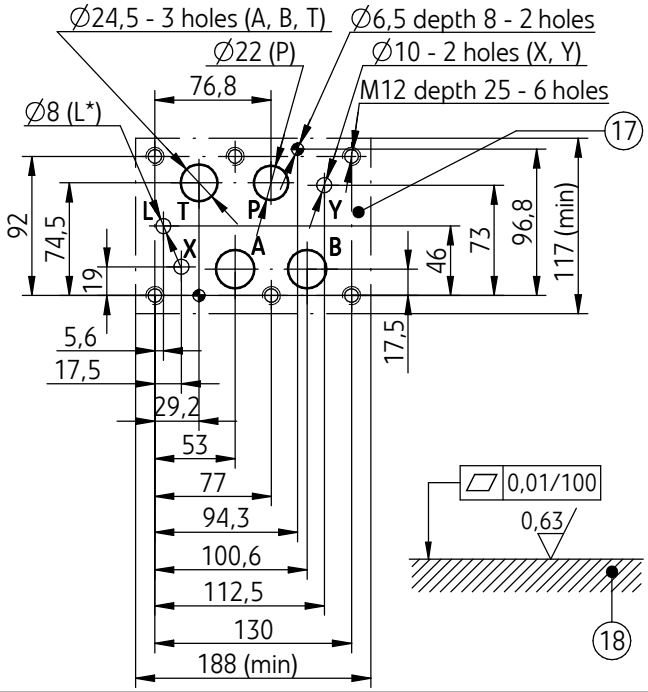
OVERALL AND CONNECTION DIMENSIONS

3-position standard versions ...4WEH22...S...D1...









1 - **3-position** main directional valve (spool diagrams: **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**... (spool types according to technical data on page 4)
3 - Solenoid on side **a**
4 - Solenoid on side **b**
5 - Plug-in connector on side **a -** type **ISO 4400** (DIN 43650 - A)
6 - Plug-in connector on side **b** - type **ISO 4400** (DIN 43650 - A)
7 - Manual override
8 - Pilot choke adjustment (optional accessories)
9 - Pressure ratio valve (optional accessories)
10 - **Square cross-section** sealing ring **27 x 3** - pcs 4/set (**P**, **T**, **A**, **B**)
11 - **Square cross-section** sealing ring **19,2 x 3** - pcs 3/set (**X**, **Y**, **L**)
12 - Dimension for directional valve with the spool position ***0*** (neutral) **spring centered** (version ...4WEH22**...**/...)
13 - Dimension for directional valve with the spool position ***0*** (neutral) **hydraulically centered** (version...4WEH22**H**.../...)
14 - Dimension for electrical connection for **DC**
15 - Dimension for electrical connection for **AC** (plug-in connector with rectifier)
16 - Space for disasembly of plug-in connector - item 5, 6
17 - Porting pattern - configuration of surface holes in subplate in accordance with the standard **ISO 4401** designation **ISO 4401**-08-07-0-94 (CETOP 08) fixing screws **M12 x 60 - 10.9 -** in accordance with **PN - EN ISO 4762** - pcs 6/set; must be ordered separately; tightening torque **Md = 105 Nm**

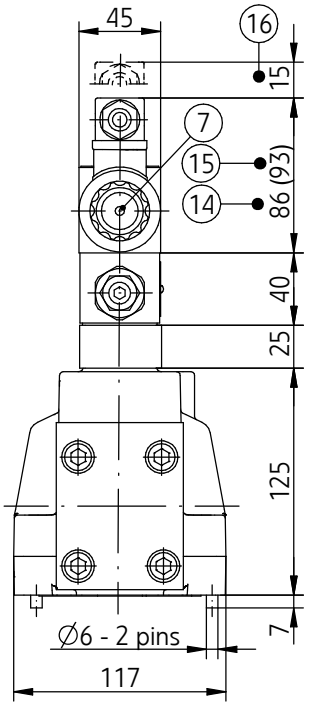
NOTE:

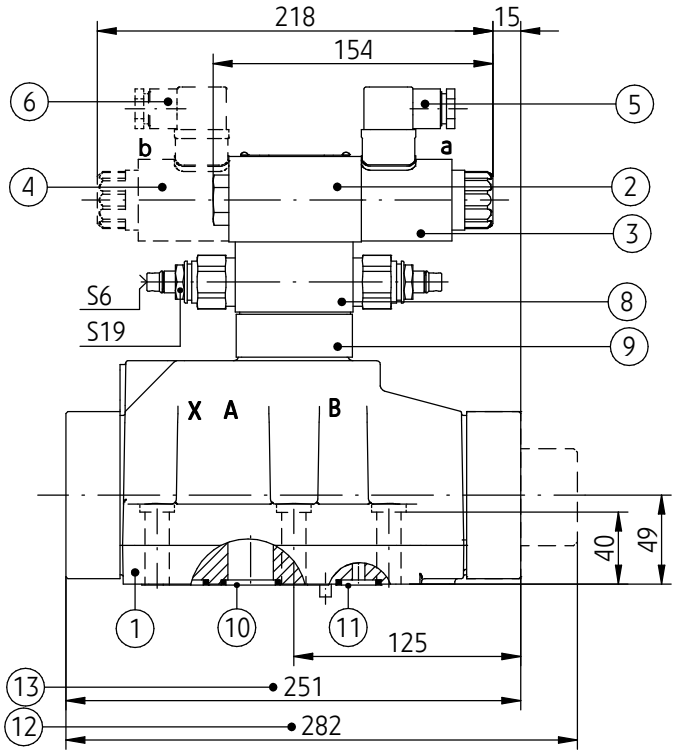
(*****) - only for **3-position** version with ***0*** (neutral) position of the spool **hydraulically centered**

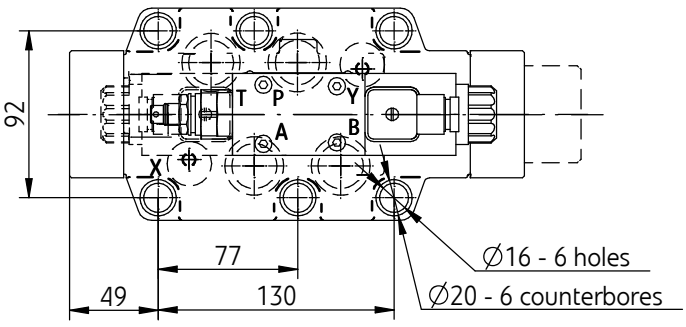
18 - Subplate surface required

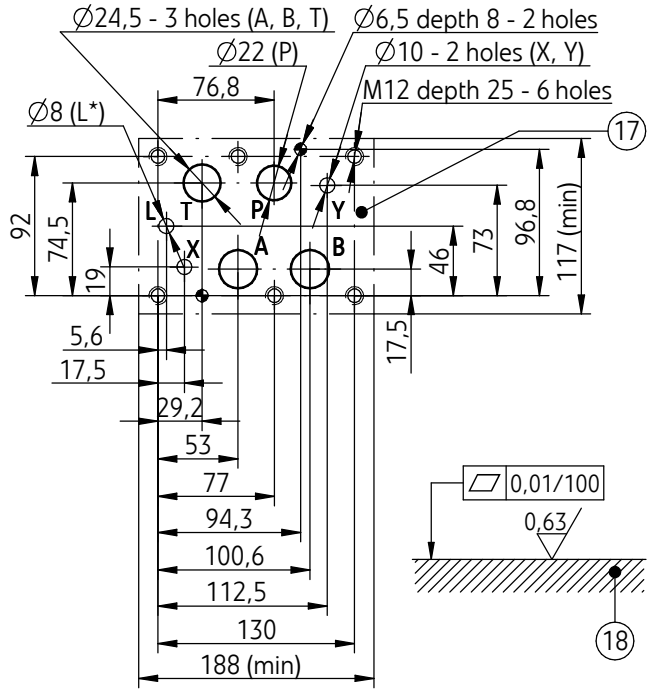
OVERALL AND CONNECTION DIMENSIONS

2-position standard versions ...4WEH22...S... D1...





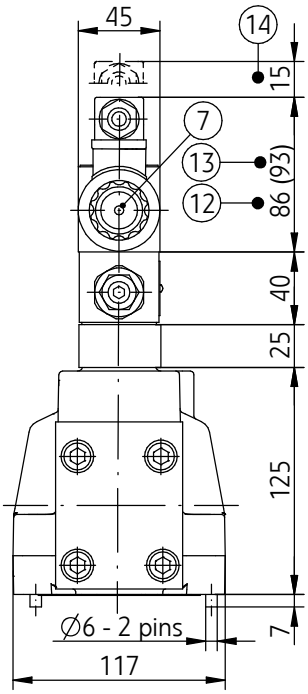


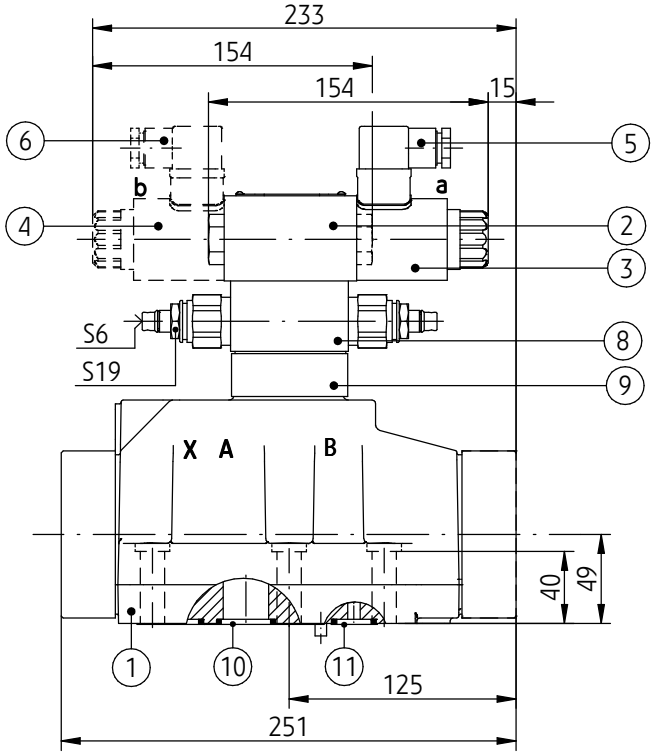


1 - **2-position** main directional valve (spool diagrams: **C**, **D**, **K**, **Z, D1** - on page 8)
2 - **2-position** directional valve (pilot valve) type **WE6...** (spool types according to technical data on page 4)
3 - Solenoid on side **a**
4 - Solenoid on side **b** - 2 solenoids (on side **a**, **b**) only for versions: ...4WEH22**H**.../**O**, ...4WEH22**H**.../**OF**...
5 - Plug-in connector on side **a -** type **ISO 4400** (DIN 43650 - A)
6 - Plug-in connector on side **b -** type **ISO 4400** (DIN 43650 - A)
7 - Manual override
8 - Pilot choke adjustment (optional accessories)
9 - Pressure ratio valve (optional accessories)
10 - **Square cross-section** sealing ring **27 x 3** - pcs 4/set (**P**, **T**, **A**, **B**)
11 - **Square cross-section** sealing ring **19,2 x 3** - pcs 3/set (**X**, **Y**, **L**)
12 - Dimension for directional valve with **spring positioned** spool (version ...4WEH22**...**/...)
13 - Dimension for directional valve with **hydraulically positioned** spool (version ...4WEH22**H**.../...)
14 - Dimension for electrical connection for **DC**
15 - Dimension for electrical connection for **AC** (plug-in connector with rectifier)
16 - Space for disasembly of plug-in connector - item 5, 6
17 - Porting pattern - configuration of surface holes in subplate in accordance with the standard **ISO 4401** designation **ISO 4401**-08-07-0-94 (CETOP 08) fixing screws **M12 x 60 - 10.9 -** in accordance with **PN - EN ISO 4762** - pcs 6/set; must be ordered separately; tightening torque **Md** = **105 Nm**
NOTE:
(*****) - only for **3-position** version with ***0*** (neutral) position of the spool **hydraulically centered**
18 - Subplate surface required

OVERALL AND CONNECTION DIMENSIONS

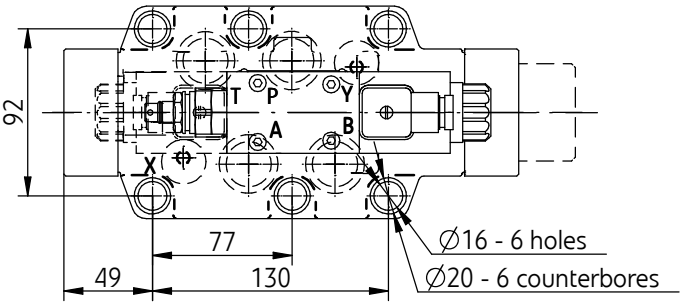
2-position standard versions: ...4WEH22...A ...S...D1...; ...4WEH22...B ...S...D1...

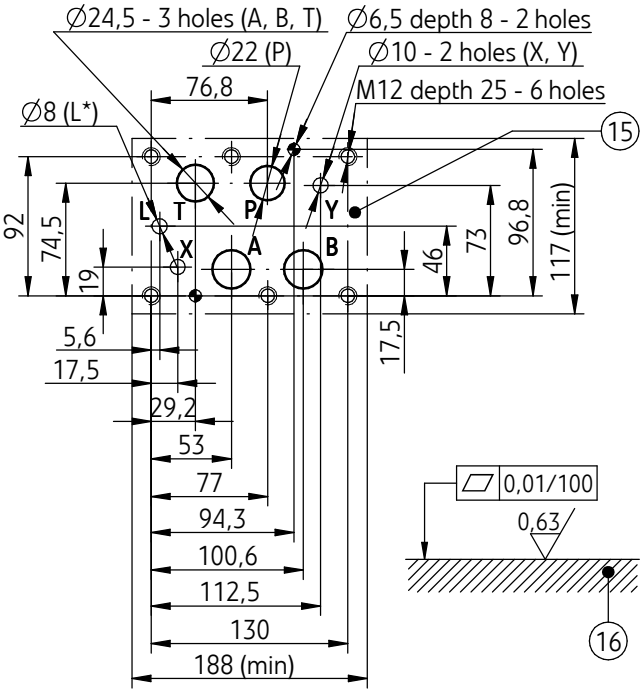




1 - **3-position** main directional valve - version:
- ...4WEH22...**A**... (spool diagrams: **EA**, **FA**, **GA**, **HA**, **JA**, **LA**, **MA**,**PA**, **QA**, **RA**, **UA**, **VA**, **WA** - on page 8)
- ...4WEH22...**B**... (spool diagrams: **EB**, **FB**, **GB**, **HB**, **JB**, **LB**, **MB**, **PB**, **QB**, **RB**, **UB**, **VB**, **WB** - on page 8)

2 - **2-position** directional valve (pilot valve) type **WE6...** (spool types according to technical data on page 4)
3 - Solenoid on side **a** - for version ...4WEH22...**A**...
4 - Solenoid on side **b** - for version ...4WEH22...**B**...
5 - Plug-in connector on side **a** - for version ...4WEH22...**A**... type **ISO 4400** (DIN 43650 - A)
6 - Plug-in connector on side **b** - for version ...4WEH22...**B**... type **ISO 4400** (DIN 43650 - A)
7 - Manual override
8 - Pilot choke adjustment (optional accessories)
9 - Pressure ratio valve (optional accessories)
10 - **Square cross-section** sealing ring **27 x 3** - pcs 4/set (**P**,**T**, **A**, **B**)
11 - **Square corss-section** sealing ring **19,2 x 3** - pcs 3/set (**X**, **Y**, **L**)
12 - Dimension for electrical connection for **DC**
13 - Dimension for electrical connection for **AC** (plug-in connector with rectifier)
14 - Space for disasembly of plug-in connector - item 5, 6
15 - Porting pattern - configuration of surface holes in subplate in accordance with the standard **ISO 4401** designation **ISO 4401**-08-07-0-94 (CETOP 08) fixing screws **M12 x 60 - 10.9 -** in accordance with **PN-EN ISO 4762** - pcs 6/set; must be ordered separately; tightening torque Md = **105 Nm**
NOTE:
(*) - only for 3-position version with *0* (neutral) position of the spool hydraulically centered
16 - Subplate surface required





ACCESSORIES FOR STANDARD VERSIONS OF THE DIRECTIONAL VALVE

Pilot choke adjustment

versions: ...4WEH22.../...**S**...
...4WEH22.../...**S2**...

Directional spool valves type ...4**WEH22**... may be optionally provided with pilot choke adjustment (throttle check valve type **Z2FS6**...), which allows to adjust switching time directional spool valve.

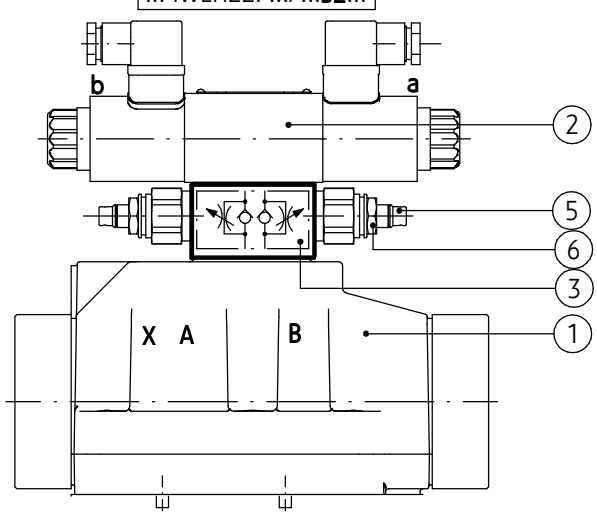
The change of adjustment method of switching time (flow throttling):

- on inlet (version ...4WEH22.../**S**...)
- on outlet (version ...4WEH22.../**S2**...)

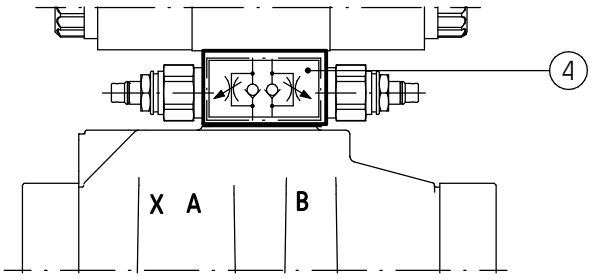
is made while mounting by rotating the pilot choke adjustment (3) o 180 degrees around its longitudinal axis. Rotation of the adjusting screw (5) clockwise increases and counterclockwise decreases the switching of the valve.

Screws **M5 x 90** - **10.9** acc. to **PN - EN ISO 4762** - pcs 4 fixing the adjustment (3) and the pilot valve (2) must be tightened with torque **Md** = **9 Nm**.

...4WEH22. .../...**S2**...



...4WEH22.../...**S**...



1 - Main valve
2 - Pilot valve
3 - Pilot choke adjustment with adjustment of switching time on outlet
4 - Assembly method of pilot choke adjustment with adjustment of switching time at the intlet
5 - Adjusting screw (socket **S6**)
6 - Locknut (**S19**)
7 - Pressure ratio valve

Pressure ratio valve

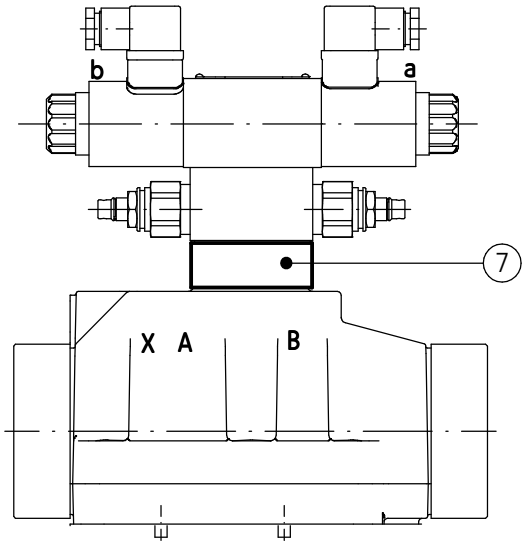
versions: 4WEH22.../...ET...**D1**...
4WEH22.../...E...**D1**...

The directional control valve ...**4WEH22**... with internal pilot oil supply - versions: ...**E**...;...**ET**...**at the pilot oil supply pressure exceeding 25 MPa must be equipped with a pressure ratio valve** (7).

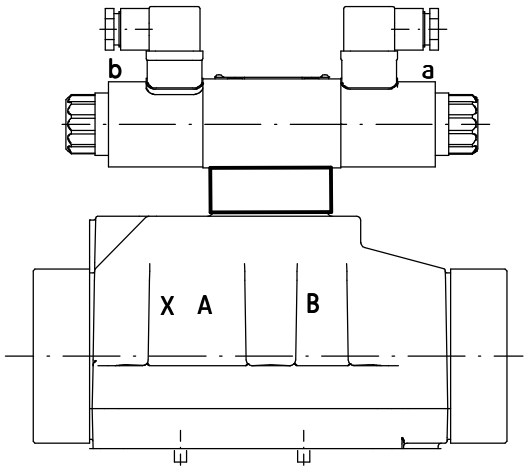
It causes the pilot pressure to be reduced at the ratio 1:0,66 = 1,515. The minimum control pressure when applying the pressure ratio valve must be increased by the ratio 1:0,66 = 1,515.

The screws **M5 x 115** - **10.9** acc. to **PN-EN ISO 4762** pcs 4 fixing the pressure ratio valve (7), the pilot choke adjustment (3) and the pilot valve (2) must be tightened with torque **Md = 9 Nm.**

...4WEH22.../...ET S...**D1**...
...4WEH22.../...E S...**D1**...



H - 4WEH22.../...ET **D1**...
H - 4WEH22.../...E **D1**...



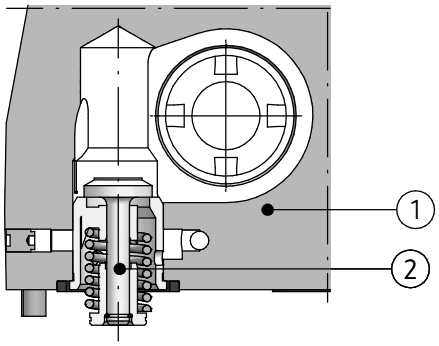
ACCESSORIES FOR STANDARD VERSIONS OF THE DIRECTIONAL VALVE

Pre-load valve

versions: ...4WEH22.../...**P4,5**...
...4WEH22.../...**P7**...

Directional valve type**...WEH22...** with internal pilot oil supply (**X**) - versions:
... 4WEH22.../...**E...**
...4WEH22.../...**ET**...
with spools with pressureless circulation 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 version **P 4.5** - **0,45 MPa**
valve version **P 7** - **0,7 MPa**
For directional valves with fixed pressure ratio valve - versions ...4WEH22.../...**D1**... the pre-load valve **P7** must be applied.

...4WEH22.../...**P**...

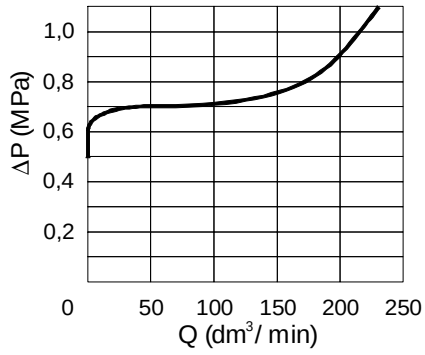


1 - Main valve body
2 - Pre-load valve

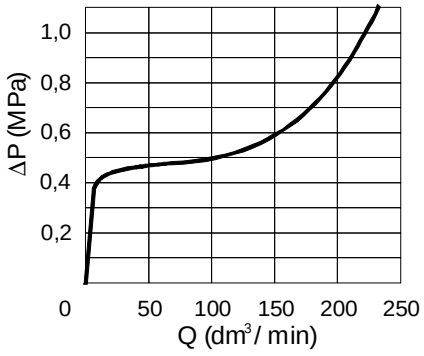
Performance curves for pre-load valves

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

version ...4WEH22.../...**P7**...



version ...4WEH22... /...**P4,5**...

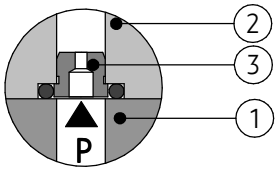


Throttle insert

version ...4WEH22.../...**B**...

Directional valves type**...WEH22...** may be equipped with throttle insert (3) in port **P** in pilot valve (2) which allows to delay switching time of the main valve.

...4WEH22.../...**B**...



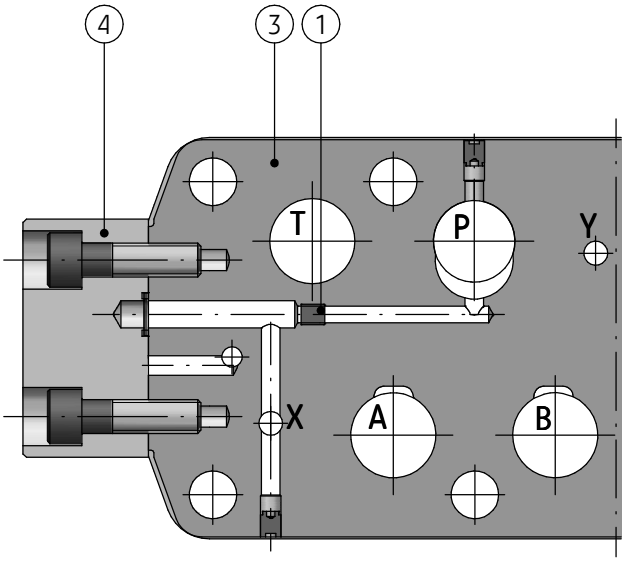
1 - Main valve body
2 - Pilot valve body
3 - Throttle insert

ACCESSORIES FOR STANDARD VERSIONS OF THE DIRECTIONAL VALVE

Pilot oil supply and pilot oil drain

Pilot oil supply (X) - **external**
pilot oil drain (Y) - **external**
version …4WEH22…/**...**

In version…4WEH22…/**...** the hole screw plugs (1) and (2) must be mounted in the position like given on the drawing.



Pilot oil supply (X) - **internal**
pilot oil drain (Y) - **external**
version …4WEH22…/…**E**…

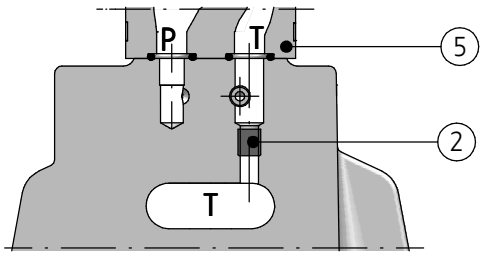
In version …4WEH22…/…**E**… the hole screw plug (1) must be dismounted whereas the hole screw plug (2), must be mounted and port **X** in a subplate should be plugged.

Pilot oil supply (X) - **internal**
pilot oil drain (Y) - **internal**
version …4WEH22…/…**ET**…

In version …4WEH22…/…**ET**… the hole screw plugs (1) and (2) must be dismounted and ports **X** and **Y** in a subplate must be plugged.

Pilot oil supply (X) - **external**
pilot oil drain (Y) - **internal**
version …4WEH22…/…**T**…

In version …4WEH22…/…**T**… the hole screw plug (1) must be mounted whereas the hole screw plug (2) must be dismounted and the port **Y** in a subplate must be plugged.



NOTES:

Versions with internal oil drain:…**ET**…; …**T**… are non-applicable for directional valves with main spool hydraulically centered (versions…4WEH22**H**…).

The hole screw plug (1) in line **X** is accessible after screwing out a side cover (4) in the main valve (3).
The hole screw plug (2) in line **Y** is accessible after dismounting the pilot valve (5).

1 - Hole screw plug **M6 - 8,8** (S3)
2 - Hole screw plug **M6 - 8,8** (S3)
3 - Main valve body
4 - Side cover
5 - Pilot valve body

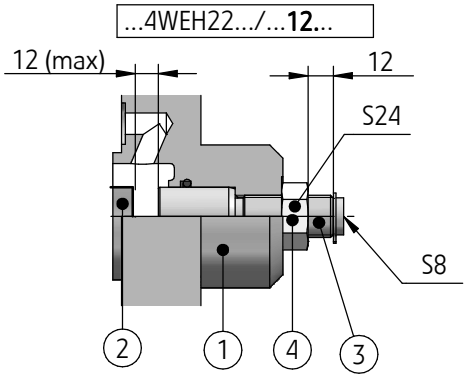
OPTIONAL ACCESSORIES FOR THE DIRECTIONAL VALVE

Stroke limiter

Stroke limiter may be mounted:

- stroke limiter at the **A** and **B** sides
  - version...4WEH22.../...**10**...
- stroke limiter at the **A** side
  - version ...4WEH22.../...**11**...
- stroke limiter at the **B** side
  - version ...4WEH22.../...**12**...

Adjustment of the stroke of the main spool is by rotating the pin (2) an d securing with locknut (3) . Rotating the pin (2) clockwise reduces the stroke of the main spool. While adjusting the stroke the control chamber must be at zero pressure.



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

End position monitor

End position monitor may be mounted:

- at the **A** side
  versions: ...4WEH22.../...**18**...(contact breaker).
  ...4WEH22.../...**22**...(contact maker)
- at the **B** side
  versions: ...4WEH22.../...**19**...(contact breaker)
  ...4WEH22.../...**23**...(contact maker)

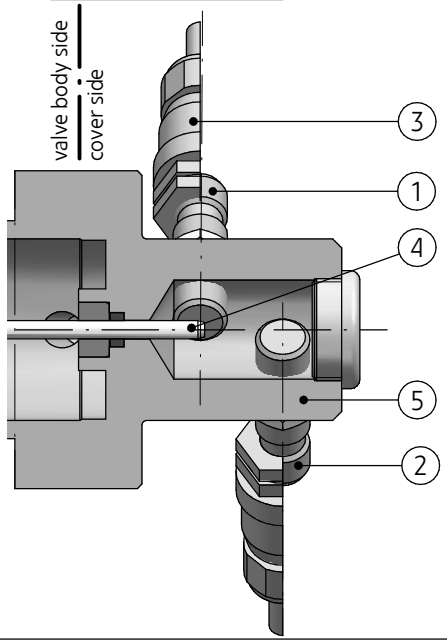
Directional valves type ...4WEH22... may be equipped with spool end position monitor, optionally **contact maker** or **contact breaker**, mounted depending on the version, in main valve cover at the **A** or **B** sides - overall dimensions on pages 24 - 27.
Detailed information concerning proximity sensors and plug-in connectors given on page 4.

signal level	**end position monitor with contact breakers** (versions 4WEH22.../...**18**...; ...**19**...)			**end position monitor with contact makers** (versions 4WEH22.../...**22**...; ...**23**...)		
	spool position			spool position		
	valve body side	central	cover side	valve body side	central	cover side
sensor (1) valve body side	0	1	1	1	0	0
sensor (2) cover side	1	1	0	0	0	1

OPTIONAL ACCESSORIES FOR THE DIRECTIONAL VALVE

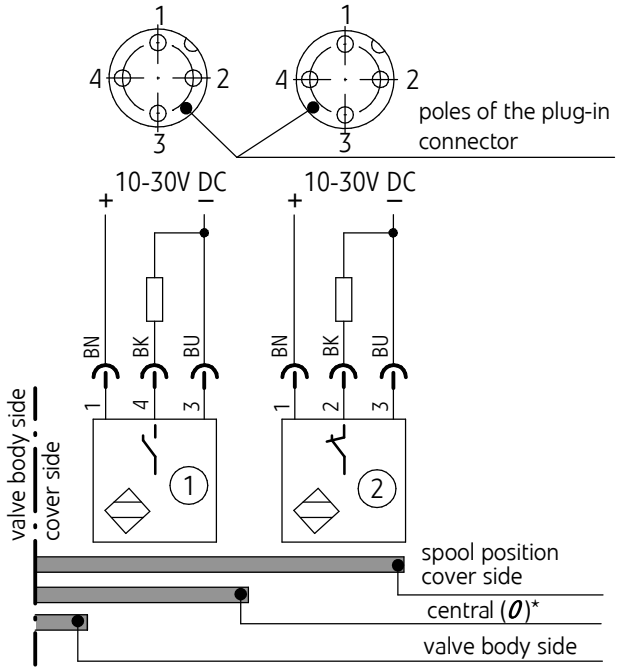
End position monitor

...4WEH22.../...**19**...



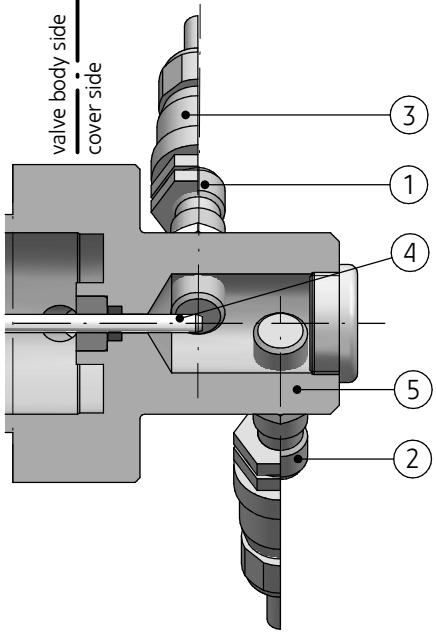
1 - Inductive sensor contact maker **PNP NO** according to page 4
2 - Inductive sensor contact breaker **PNP NC** according to page 4
3 - Plug-in cable connector (straight, female plug-in connectors - according to page 4, pcs 2 delivered with the valve)
4 - Mandrel of the main spool
5 - Sensors cover

diagram of electrical connection of sensors set contact breaker



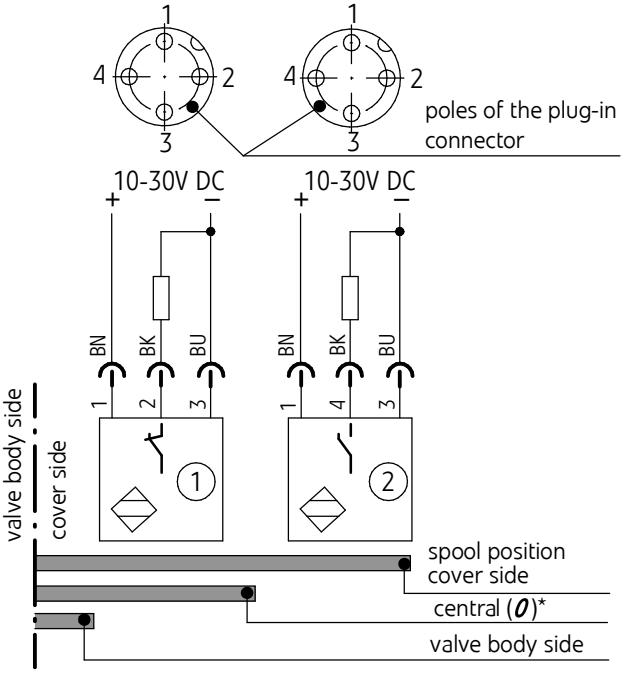
NOTE:
(*) - Only for **3-position** directional valves

...4WEH22.../...**23**...



1 - Inductive sensor contact breaker **PNP NC** according to page 4
2 - Inductive sensor contact maker **PNP NO** according to page 4
3 - Plug-in cable connector (straight, female plug-in connectors - according to page 4, pcs 2 delivered with the valve)
4 - Mandrel of the main spool
5 - Sensors cover

diagram of electrical connectrion of sensors set contact maker



NOTE:
(*) - Only for **3-position** directional valves

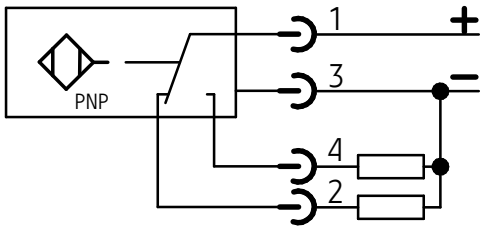
OPTIONAL ACCESSORIES FOR THE DIRECTIONAL VALVE

Spool position sensor type M

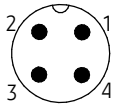
Additional Technical Data

Sensor type M	
Type of spool position sensor	a sensor with two alternative PNP type outputs: normally closed - pin 2 normally open - pin 4
Supply voltage range of the sensor	24 VDC $^{+20\%}_{-10\%}$
Max sensor load current	400 mA
Sensor connection type	external thread M12x1; 4 poles (pins)
Degree of protection	IP 65
WARNING : M type inductive sensors must not be connected serially.	

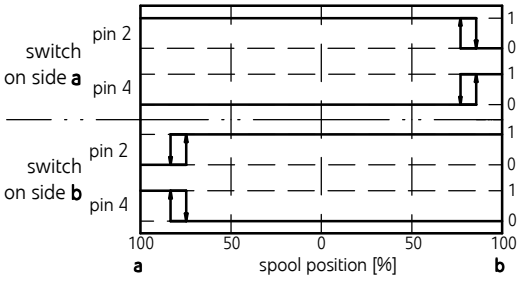
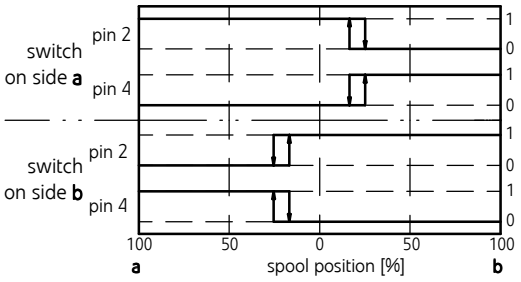
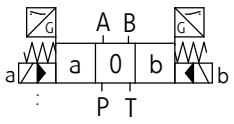
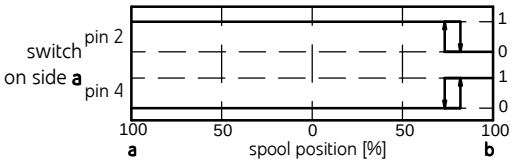
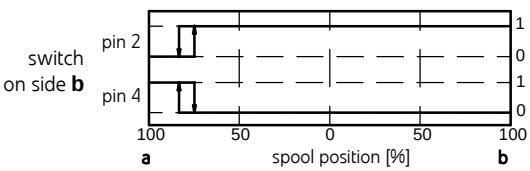
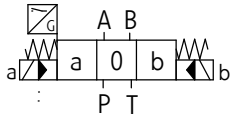
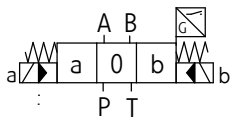
Diagram of electrical connection of inductive sensor



contact allocation (pins of sensor connector)

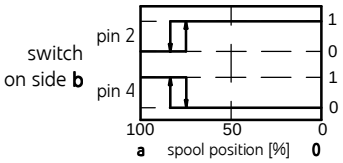
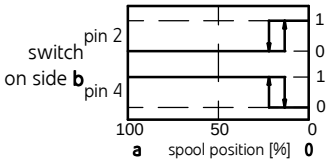
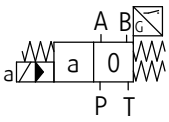
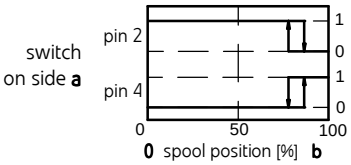
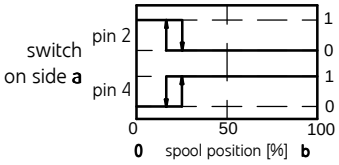
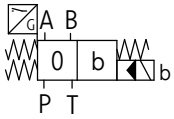
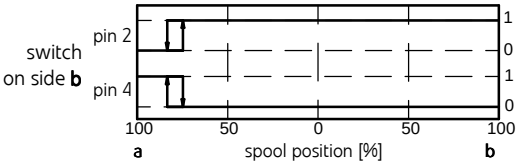
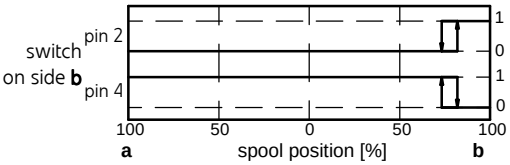
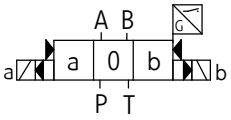
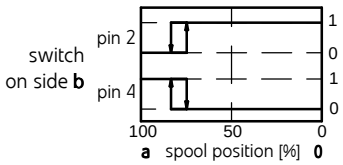
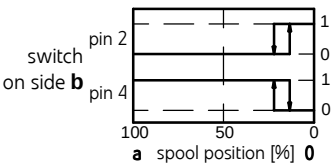
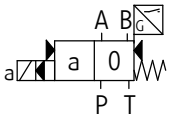
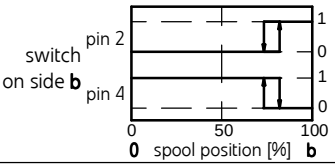
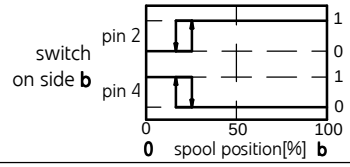
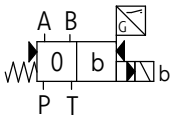
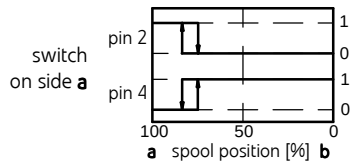
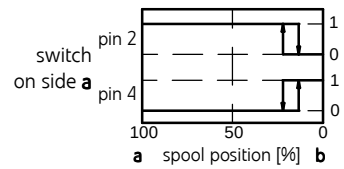
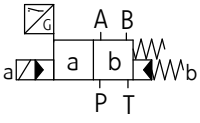


Diagrams for directional control valves and status of sensors

status of sensor type M depending on position of the spool 0 - off, neutral, potential-free state at the output contact 1 - on, voltage state at the output contact		diagram for directional control valve
3-position, spring centered versions ...MAB... a and b position monitoring (sensor at a and b side) 	3-position, spring centered versions ...M0... 0 position monitoring (sensor at a and b side) 	
3-position, spring centered versions ...MB... b position monitoring (sensor at the a side) 	3-position, spring centered versions ...MA... a position monitoring (sensor at the b side) 	 

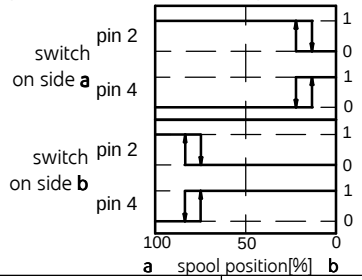
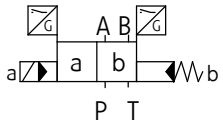
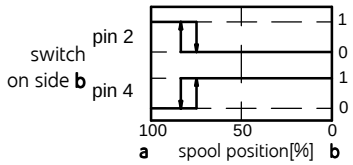
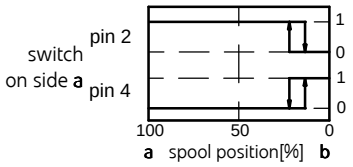
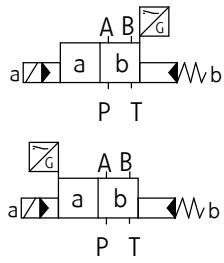
OPTIONAL ACCESSORIES FOR THE DIRECTIONAL VALVE

Diagrams for directional control valves and status of sensors

status of sensor type M depending on position of the spool 0 - **off**, **neutral**, **potential-free state** at the output contact 1 - **on**, **voltage state** at the output contact		diagram for directional control valve
2-position (**a**, **0**), **spring centered** **versions ...MA...** **a** position monitoring (sensor at the **b** side) 	**2-position** (**a**, **0**), **spring centered** **versions ...M0...** **0** position monitoring (sensor at the **b** side) 	
2-position (**0**, **b**), **spring centered** **versions ..MB...** **b** position monitoring (sensor at the **a** side) 	**2-position** (**0**, **b**), **spring centered** **versions ...M0...** **0** position monitoring (sensor at the **a** side) 	
3-position, **hydraulically centered** **versions ...MA...** **a** position monitoring (sensor at the **b** side) 	**3-position hydraulically centered** **versions ...MB...** **b** position monitoring (sensor at the **b** side) 	
2-position (**a**, **0**), **hydraulically centered** **versions ...MA...** **a** position monitoring (sensor at the **b** side) 	**2-position** (**a**, **0**), **hydraulically centered** **versions ...M0...** **0** position monitoring (sensor at the **b** side) 	
2-position (**0**, **b**), **hydraulically centered** **versions ...MB...** **b** position monitoring (sensor at the **b** side) 	**2-position** (**0**, **b**), **hydraulically centered** **versions ...M0...** **0** position monitoring (sensor at the **b** side) 	
2-position (**a**, **b**), **spring positioned** **versions ...MA...** **a** position monitoring (sensor at the **a** side) 	**2-position** (**a**, **b**) **spring positioned** **versions ...MB...** **b** position monitoring (sensor at the **a** side) 	

OPTIONAL ACCESSORIES FOR THE DIRECTIONAL CONTROL VALVE

Diagrams for directional control valves and status of sensors

status of sensor type M depending on position of the spool 0 - off, neutral, potential-free state at the output contact 1 - on, voltage state at the output contact	diagram for directional control valve
2-position (a, b), hydraulically positioned, versions ...MAB... a and b position monitoring (sensor at a and b sides) 	
2-position (a, b), hydraulically positioned versions ...MA... a position monitoring (sensor at the b side) 	**2-position (a, b), hydraulically positioned versions ...MB...** b position monitoring (sensor at the a side) 
	

OVERALL DIMENSIONS OF THE VALVE WITH OPTIONAL ACCESSORIES

NOTE: other dimensions, descriptions of elements of the valve drawing, porting pattern and required state of the connection surface - see page 9

versions with a spool position sensor type M

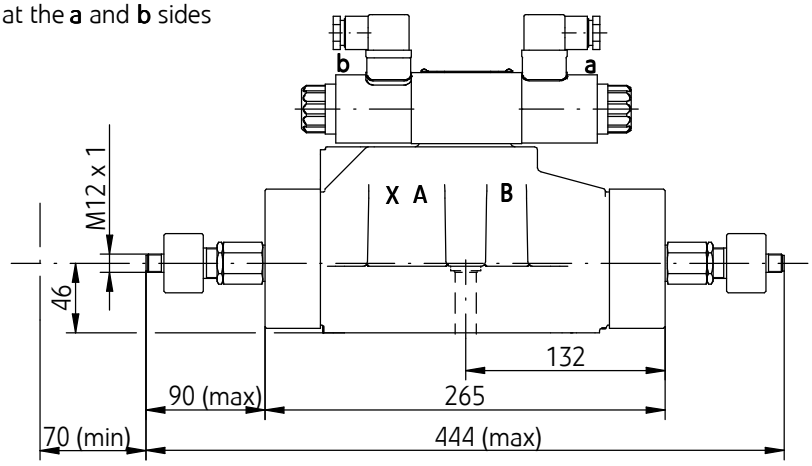
NOTE: in compliance with **PN - EN 693**, the valve should not be equipped with a manual override button.

3-position with the main spool spring centered

a, **b** or **0** position monitoring, sensor at the **a** and **b** sides

versions: ...4WEH22.../...- **MAB**...

...4WEH22.../...- **M0**...



...4WEH22.../...- **MAB**...

...4WEH22.../...- **M0**...

NOTES:

- **the valve with the spool position sensor has been factory calibrated, any further adjustments with in the valve can be made only by the producer**
- **in case of any defect of the sensor or the valve, the whole valve should be replaced**

NOTE:

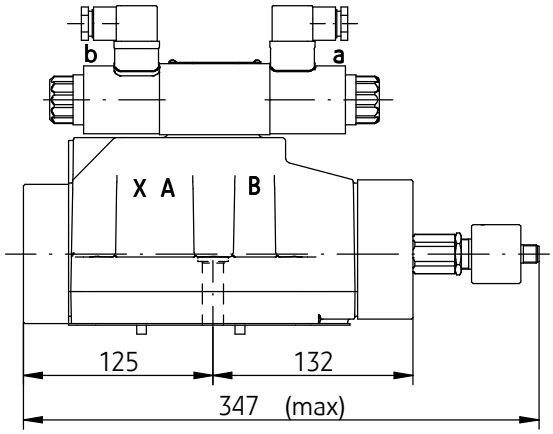
(*) - distance for mounting the plug-in connector and the sensor cable (the plugs not shown on the drawing, supplied on a separate order acc. to data sheet **WK 499 963**).

OVERALL DIMENSIONS OF THE VALVE WITH OPTIONAL ACCESSORIES

versions with a spool position sensor type M

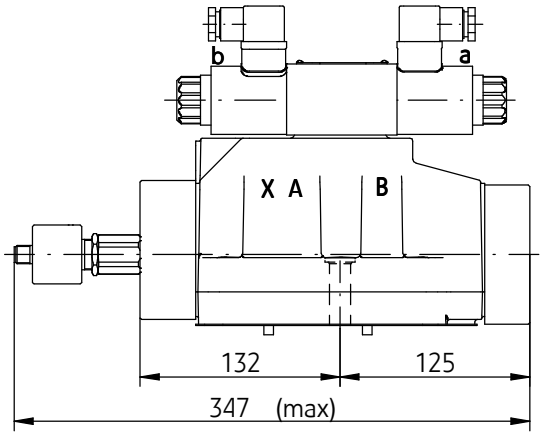
NOTE: other dimensions, description of elements of the valve drawing, porting pattern and required state of the connection surface - see page 9, 19

3-position with the main spool spring centered
a position monitoring, sensor at the **B** side
version ...4WEH22.../...- **MA**...



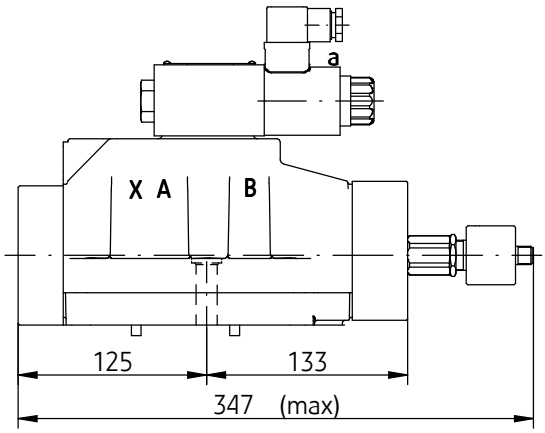
...4WEH22.../...**- MA**...

3-position with the main spool spring centered
b position monitoring, sensor at the **A** side
version ...4WEH22.../...- **MB...**



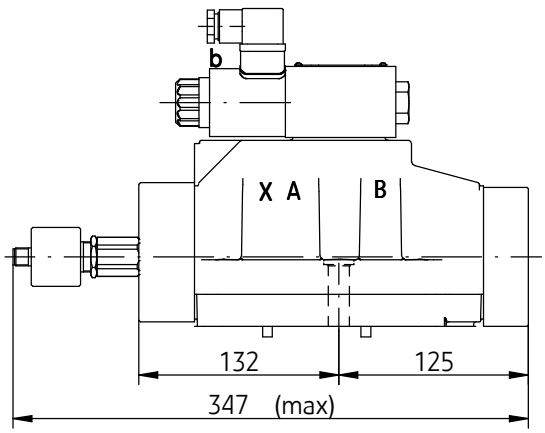
...4WEH22.../...**- MB**...

2-position (**a**, **0**) with the main spool spring positioned
a or **0** position monitoring, sensor at the **B** side
versions: ...4WEH22.../...- **MA**...;
...4WEH22.../...- **M0...**



...4WEH22...**A**.../...**- MA**...
...4WEH22...**A**.../...**- M0**...

2-position (**0**, **b**), with the main spool spring positioned
b or **0** position monitoring, sensor at the **A** side
versions: ...4WEH22.../...- **MB**...;
...4WEH22.../...- **M0**...



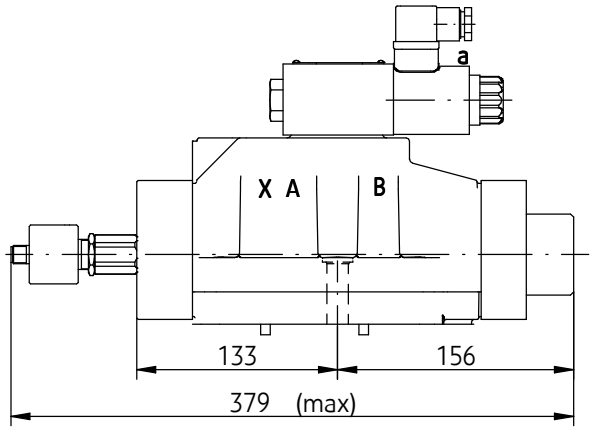
...4WEH22...**B**.../...**- MB**...
...4WEH22...**B**.../...**- M0**...

OVERALL DIMENSIONS OF THE VALVE WITH OPTIONAL ACCESSORIES

versions with a spool position sensor type M

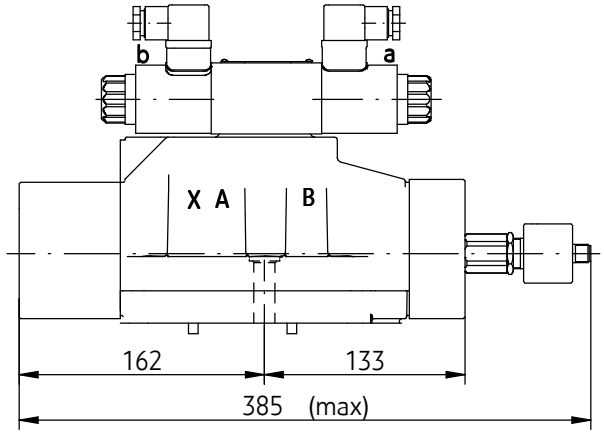
NOTE: other dimensions, description of elements of the valve drawing, porting pattern and required state of the connection surface - see page 9, 19

2-position (**a**, **b**) with the main spool spring positioned
a or **b** position monitoring, sensor at the **A** side
versions: ...4WEH22.../...- **MA**...;
...4WEH22.../...**- MB**...



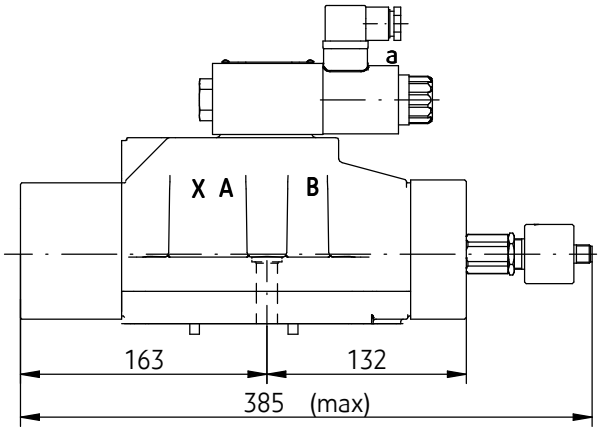
...4WEH22**C**;...**D**...;...**K**...;...**Z**...;...**D1**.../...- **MA**...
...4WEH22**C**;...**D**...;...**K**...;...**Z**...;...**D1**.../...- **MB**...

3-position with the main spool hydraulically centered
a or **b** position monitoring, sensor at the **B** side
versions: ...4WEH22.../...- **MA**...;
...4WEH22.../...- **MB...**



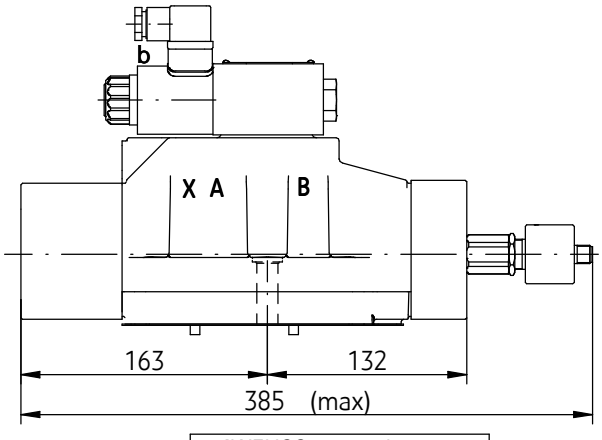
...4WEH22**H**.../...**- MA**...
...4WEH22**H**.../...- **MB**...

2-position (**a**, **0**) with the main spool hydraulically positioned
a or **0** position monitoring, sensor at the **A** side
versions: ...4WEH22...**A**.../...- **MA**...
...4WEH22...**A**.../...- **M0**...



...4WEH22**H**...**A**.../...**- MA**...
...4WEH22**H**...**A**.../...**- M0**...

2-position (**0**, **b**) with the main spool hydraulically positioned
b or **0** position monitoring, sensor at the **B** side
versions: ...4WEH22...**B**.../...- **MB...**
...4WEH22...**B**.../...- **M0...**



...4WEH22**H**...**B**.../...- **MB**...
...4WEH22**H**...**B**.../...- **M0**...

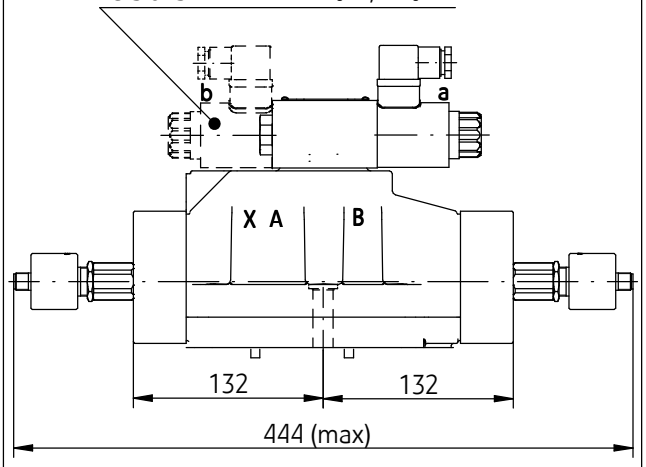
OVERALL DIMENSIONS OF THE VALVE WITH OPTIONAL ACCESSORIES

versions with a spool position sensor type M

NOTE: other dimensions, description of elements of the valve drawing, porting pattern and required state of the connection surface - see page 9, 19

2-position (**a**, **b**) with the main spool hydraulically positioned

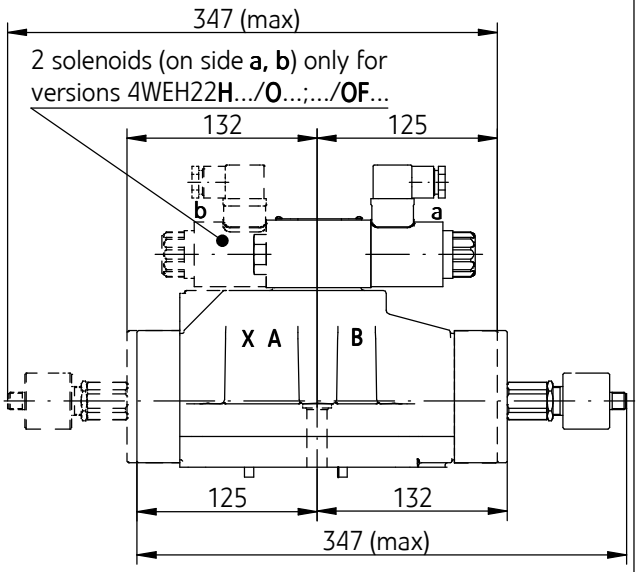
a and **b** position monitoring, sensor at the **A** and **B** side
version ...4WEH22...- **MAB**...



...4WEH22**H**.../...**- MAB**...
...4WEH22**H**.../**O**...**- MAB**...
...4WEH22**H**.../**OF**...**- MAB**...

2-position (**a**, **b**) with the main spool hydraulically positioned

- **a** position monitoring, sensor at the **b** side
version ...4WEH22...- **MA**...
- **b** position monitoring, sensor at the **a** side
version ...4WEH22...- **MB**...



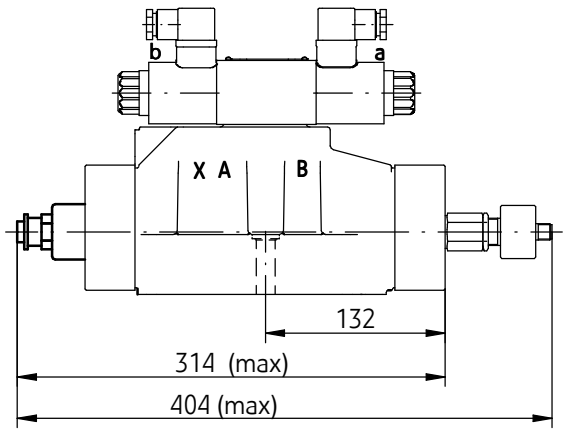
...4WEH22**H**.../...**- MA**...
...4WEH22**H**.../**O**...**- MA**...
...4WEH22**H**.../**OF**...**- MA**...
...4WEH22**H**.../...**- MB**...
...4WEH22**H**.../**O**...**- MB**...
...4WEH22**H**.../**OF**...**- MB**...

versions with a spool position sensor type M and stroke limiter

NOTE: other dimensions, description of elements of the valve drawing, porting pattern and required state of the connection surface - see page 9, 19

3-position with the main spool spring centered

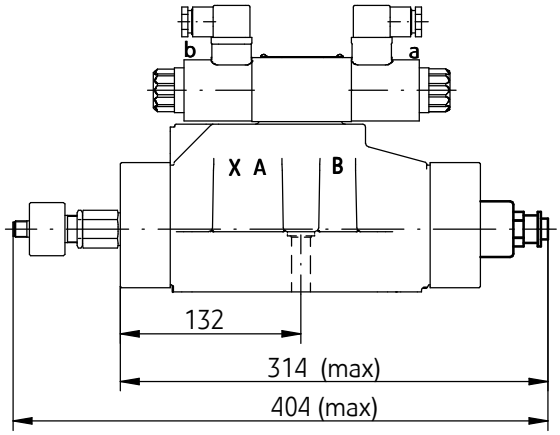
a position monitoring, sensor at the **B** side
and a spool stroke limiter at the **A** side
version ...4WEH22.../...- **MA11**...



...4WEH22.../...**- MA11**...

3-position with the main spool spring centered

b position monitoring, sensor at the **A** side
and a spool stroke limiter at the **B** side
version ...4WEH22.../...- **MB12**...

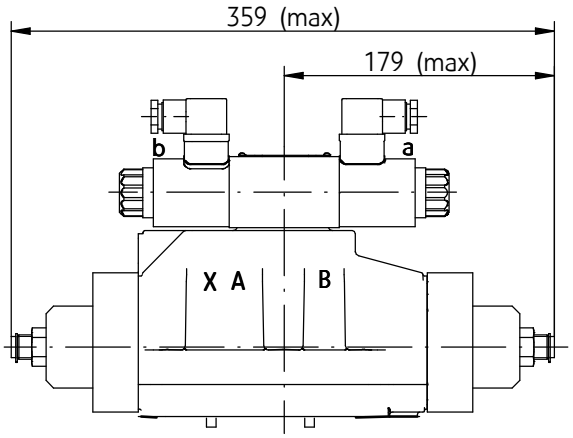


...4WEH22.../...**- MB12**...

OVERALL DIMENSIONS OF DIRECTIONAL VALVE WITH OPTIONAL ACCESSORIES

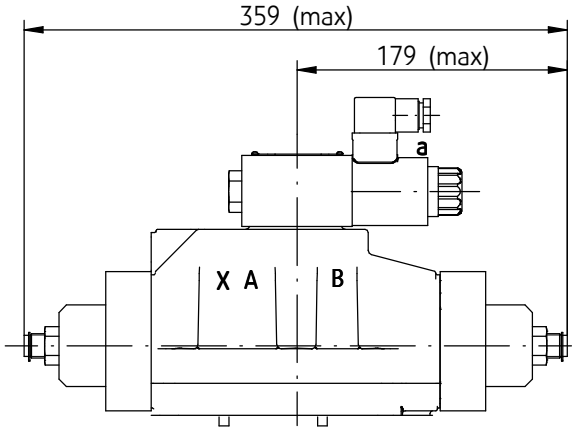
versions with stroke limiter

3-position with the main spool spring centered
stroke limiter may be mounted:
at the **A** side - version ...4WEH22.../...**11**...
at the **B** side - version ...4WEH22.../...**12**...
at the **A** and **B** sides - version ...4WEH22.../...**10**...



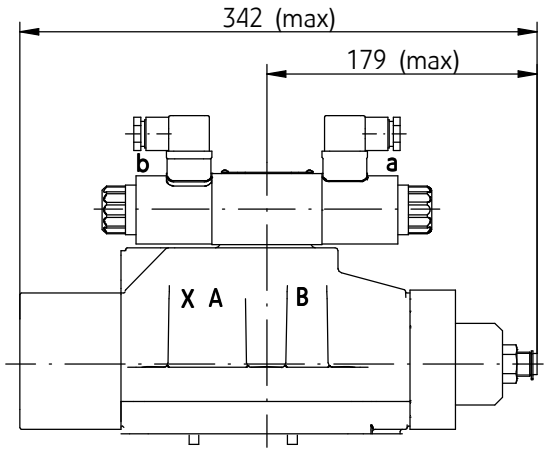
...4WEH22.../...**10**...

2-position with the main spool hydraulically positioned
stroke limiter may be mounted:
at the **A** side - version ...4WEH22**H**.../...**11**...
at the **B** side - version ...4WEH22**H**.../...**12**...
at the **A** and **B** sides - version ...4WEH22**H**.../...**10**...



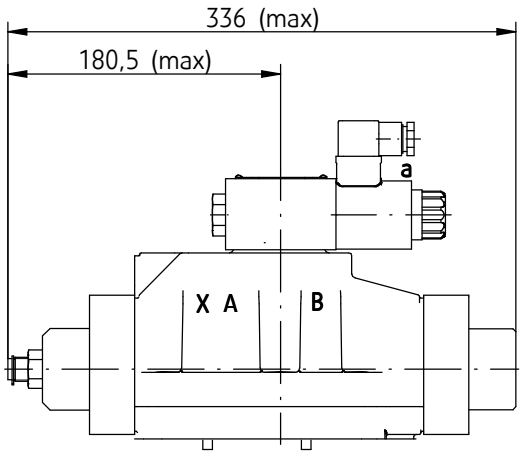
...4WEH22**H**.../...**10**...

3-position with the main spool hydraulically centered
stroke limiter may be mounted:
at the **B** side - version ...4WEH22**H**.../...**12**...



...4WEH22**H**.../...**12**...

2-position with the main spool spring positioned
stroke limiter may be mounted:
at the **A** side - version ...4WEH22.../...**11**...



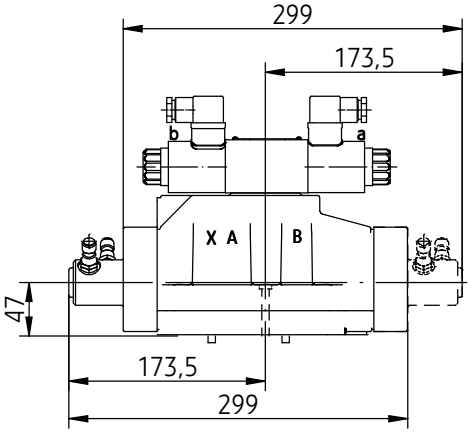
...4WEH22.../...**11**...

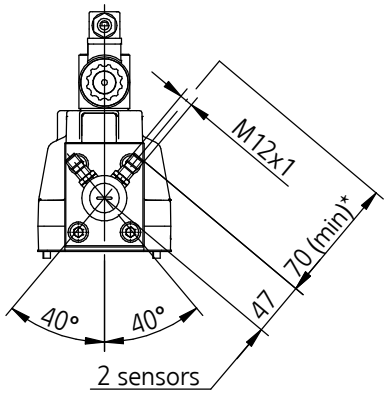
OVERALL DIMENSIONS OF DIRECTIONAL VALVE WITH OPTIONAL ACCESSORIES

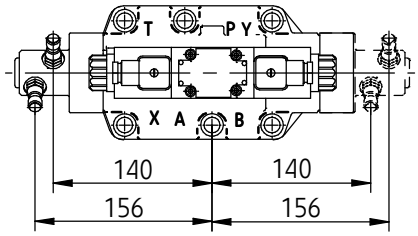
version with end position monitor

3-position with the main spool spring centered
end position monitor may be mounted:

- at the **A** side
  versions: ...4WEH22.../...**18**...(contact breaker) ;...**22**...(contact maker)
- at the **B** side
  versions: ...4WEH22.../...**19**...(contact breaker) ;...**23**...(contact maker)







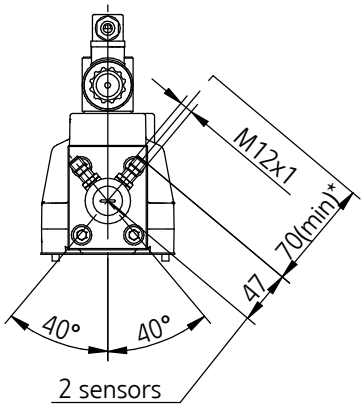
...4WEH22.../...**18**... | ...4WEH22.../...**19**...
...4WEH22.../...**22**... | ...4WEH22.../...**23**...

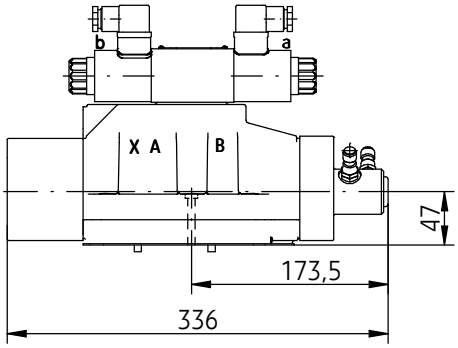
NOTE:
(*) - Distance for mounting plug-in connector and cable of sensor (plug-in connectors according to page 4 -pcs 2, not shown on drawing, delivered with the valve)

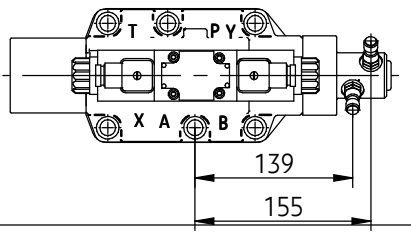
3-position with the main spool hydraulically centered
end position monitor may be mounted:

- at the **B** side - versions: ...4WEH22**H**.../...**19**... (contact breaker)
  ...4WEH22**H**.../...**23**... (contact maker)

...4WEH22**H**.../...**19**...
...4WEH22**H**.../...**23**...







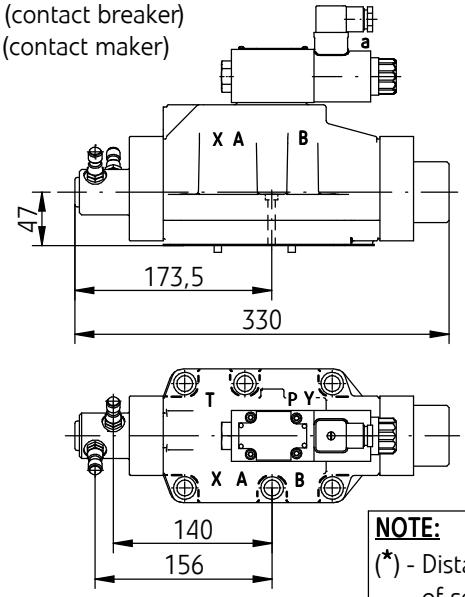
NOTE:
(*) - Distance for mounting plug-in connector and cable of sensor (plug-in connectors according to page 4 - pcs 2, not shown on drawing, delivered with the valve)

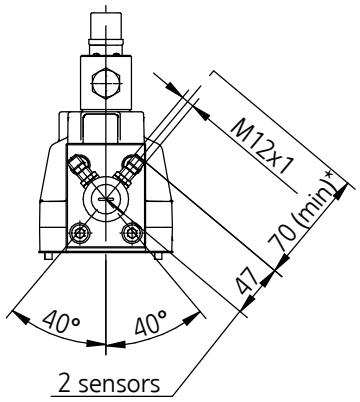
OVERALL DIMENSIONS OF DIRECTIONAL VALVE WITH OPTIONAL ACCESSORIES

versions with end position monitor

2-position with the main spool spring positioned
end position monitor may be mounted:

- at the **A** side
  versions: ...4WEH22.../...**18**... (contact breaker)
  ...4WEH22.../...**22**... (contact maker)





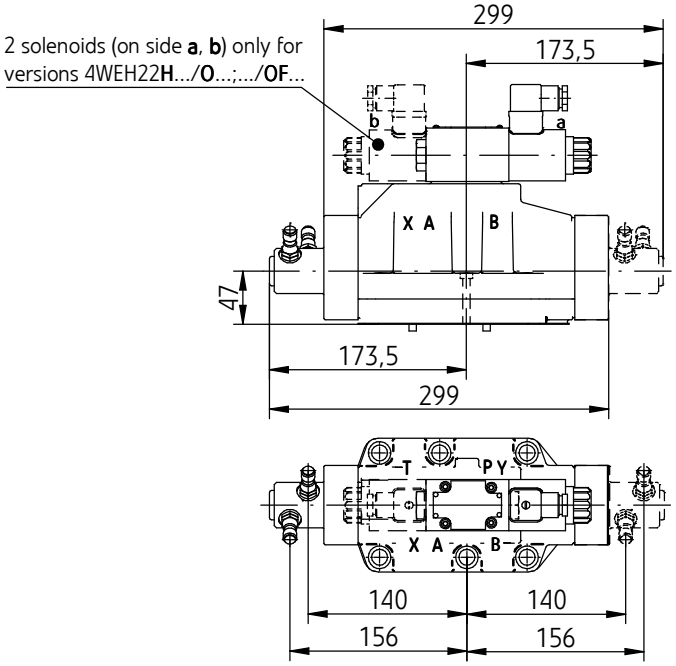
...4WEH22.../...**18**...

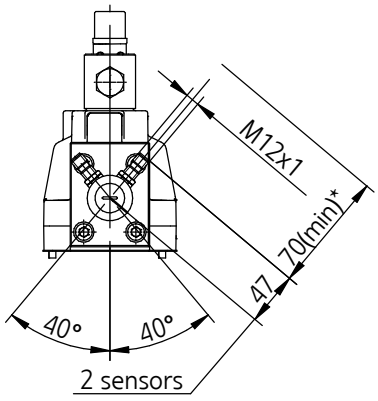
...4WEH22.../...**22**...

NOTE:
(*) - Distance for mounting plug-in connector and cable of sensor (plug-in connectors according to page 4 - pcs 2, not shown on drawing, delivered with the valve)

2-position with the main spool hydraulically positioned
end position monitor may be mounted:

- at the **A** side
  versions: ...4WEH22**H**.../...**18**...(contact breaker) ;...**22**...(contact maker)
- at the **B** side
  versions: ...4WEH22**H**.../...**19**...(contact breaker) ;...**23**...(contact maker)





...4WEH22**H**.../...**18**...

...4WEH22**H**.../...**22**...

...4WEH22**H**.../...**19**...

...4WEH22**H**.../...**23**...

NOTE:
(*) - Distance for mounting plug-in connector and cable of sensor (plug-in connectors according to page 4 - pcs 2, not shown on drawing, delivered with the valve)

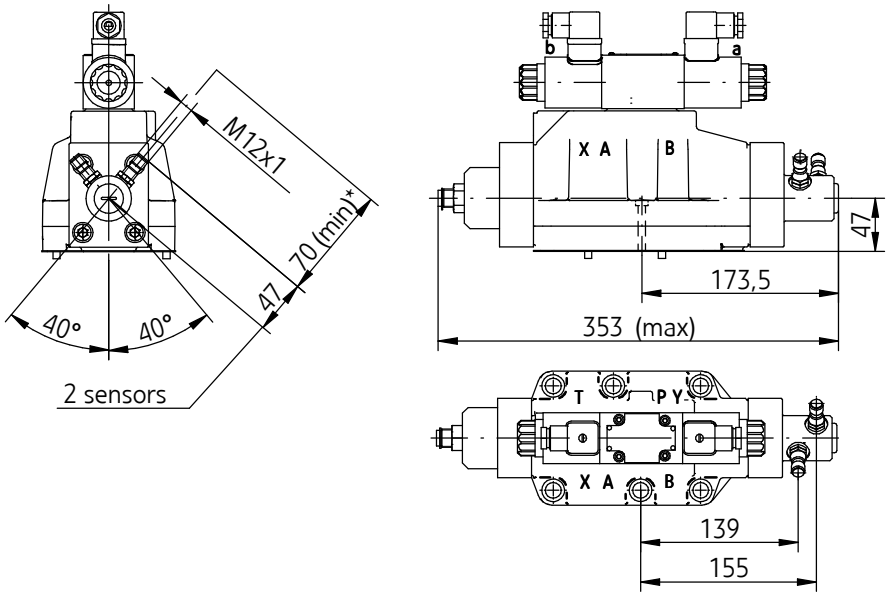
OVERALL DIMENSIONS OF DIRECTIONAL VALVE WITH OPTIONAL ACCESSORIES

versions with stroke limiter and end position monitor

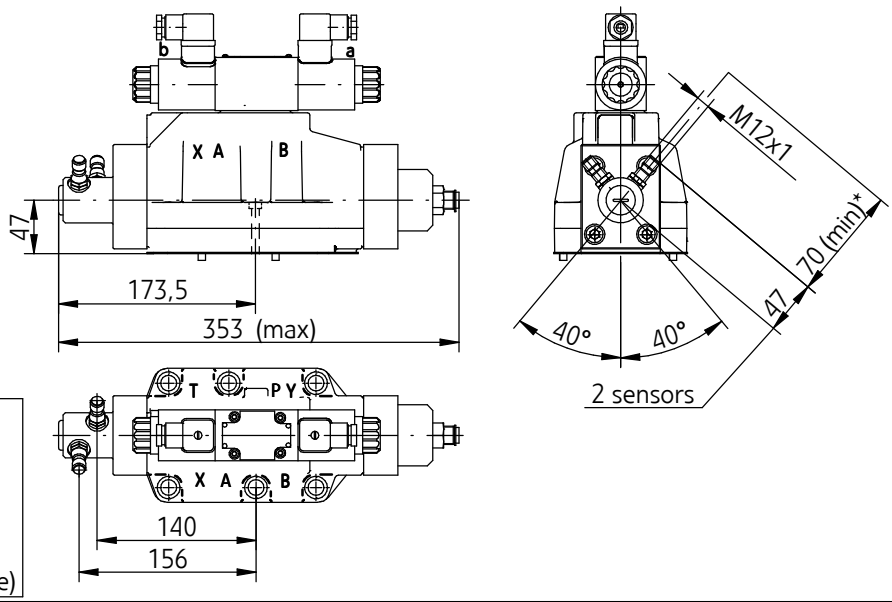
3-position with the main spool spring centered
stroke limiter and end position monitor may be mounted:

- stroke limiter at the **A** side and end position monitor **contact breaker** at the **B** side
  version ...4WEH22.../...**20**...
- stroke limiter at the **A** and end position monitor **contact maker** at the **B** side
  version ...4WEH22.../...**24**...
- stroke limiter at the **B** and end position monitor **contact breaker** at the **A** side
  version ...4WEH22.../...**21**...
- stroke limiter at the **B** and end position monitor **contact maker** at the **A** side
  version ...4WEH22.../...**25**...

...4WEH22.../...**20**...
...4WEH22.../...**24**...



...4WEH22.../...**21**...
...4WEH22.../...**25**...



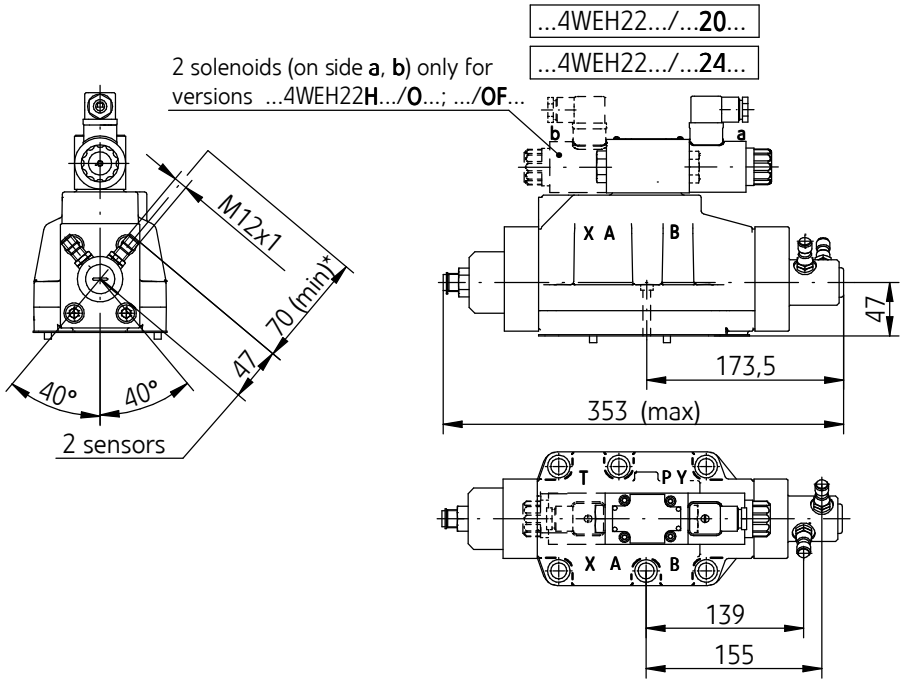
NOTE:
(*) - Distance for mounting plug-in connector and cable of sensor (plug-in connectors according to page 4 - pcs 2, not shown on drawing, delivered with the valve)

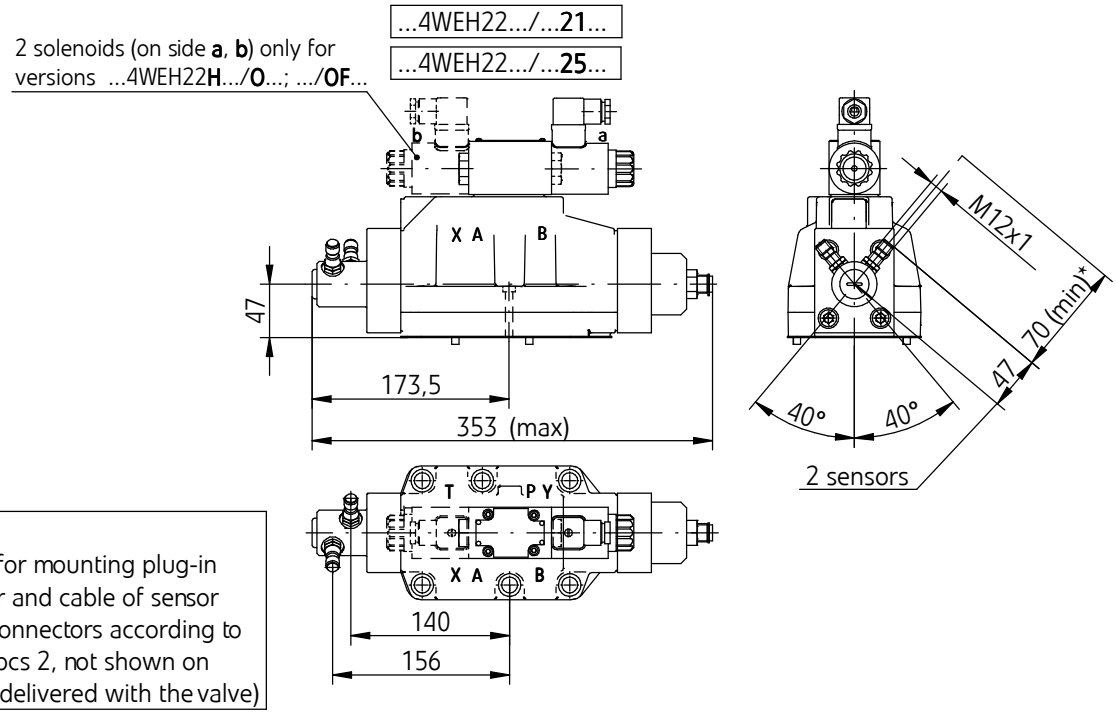
OVERALL DIMENSIONS OF DIRECTIONAL VALVE WITH OPTIONAL ACCESSORIES

versions with stroke limiter and end position monitor

2-position with the main spool hydraulically positioned
stroke limiter and end position monitor may be mounted:

- stroke limiter at the **A** side and end position monitor **contact breaker** at the **B** side
  version ...4WEH22**H**.../...**20**...
- stroke limiter at the **A** and end position monitor **contact maker** at the **B** side
  version ...4WEH22**H**.../...**24**...
- stroke limiter at the **B** and end position monitor **contact breaker** at the **A** side
  version ...4WEH22**H**.../...**21**...
- stroke limiter at the **B** and end position monitor **contact maker** at the **A** side
  version ...4WEH22**H**.../...**25**...



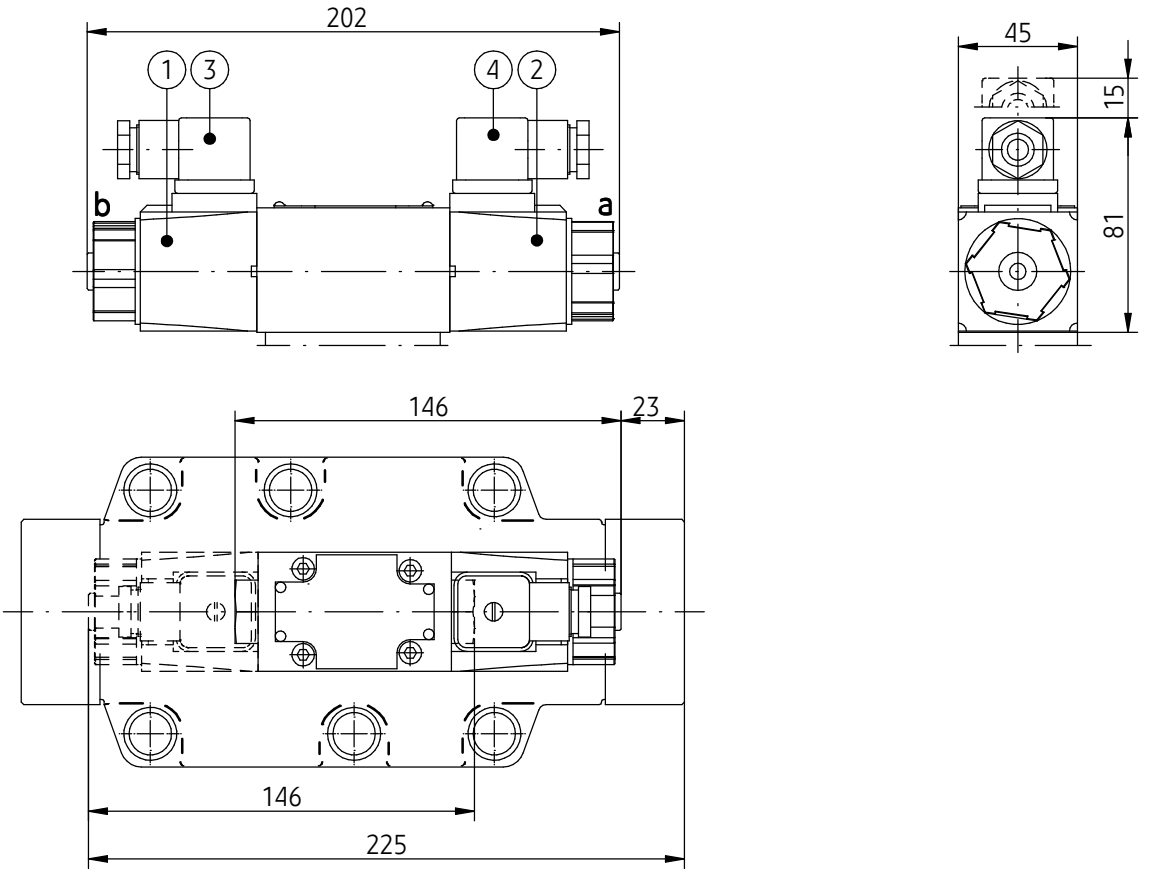


NOTE:

(*) - Distance for mounting plug-in connector and cable of sensor (plug-in connectors according to page 4 - pcs 2, not shown on drawing, delivered with the valve)

OVERALL AND CONNECTION DIMENSIONS

option of supply voltage for solenoids at pilot valve
version ...4WEH22.../...W230 - 50...Z4...
(230V AC solenoids; electrical connection type ISO 4400)



NOTES:
- other dimensions, description of other elements of the valve drawing; porting pattern and requirements of the surface state of the subplate - as in version ...4WEH16.../...Z4... with DC solenoids, see page 9 - 12 and 14 - 27
- simultaneous joining of two solenoids of the same pilot valve should not be permitted (partial overriding of the valve can overheat and damage the winding coils)

1 - 230V AC solenoid (with direct supply) at the b side
2 - 230V AC solenoid (with direct supply) at the a side
3 - Plug-in-connector at the b side - type ISO 4400 (DIN 43650 - A)
4 - Plug-in-connector at the a side - type ISO 4400 (DIN 43650 - A)

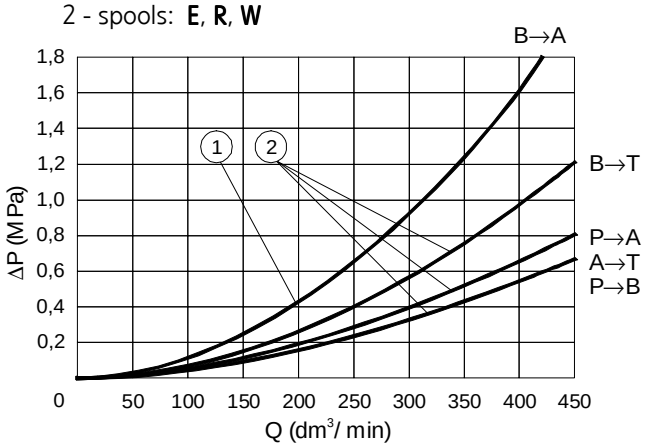
PERFORMANCE CURVES

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

Flow resistance curves

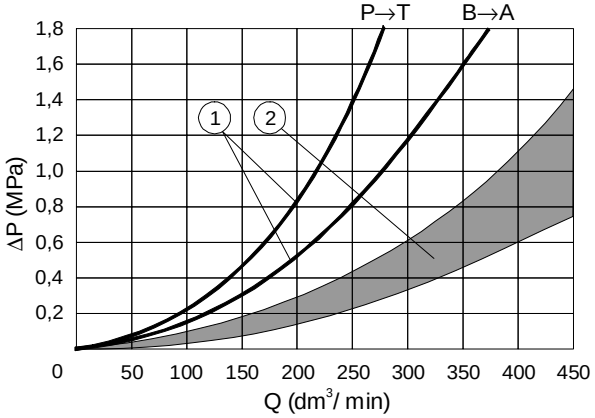
Performance curves **Δp (Q)** for directional valves type ...**4WEH22**... with spools: **E**, **R**, **W**

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

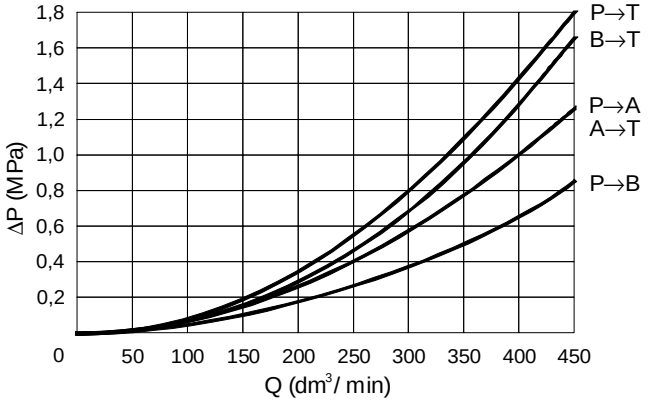


Performance curves **Δp (Q)** for directional valves type ...**4WEH22**... with spools: **F**, **H**, **J**, **L**, **M**, **Q**, **S**, **U**, **V**, **W**, **D**, **K**, **Z**, **D1**

1 - spool **S**
2 - spools: **F**, **H**, **J**, **L**, **M**, **Q**, **U**, **V**, **W**, **C**, **D**, **K**, **Z, D1**



Performance curves **Δp (Q)** for directional valves type ...**4WEH22**... with spools: **G**, **T**



Operating limits

2- and 3- position, spring centered versions					
spool type (diagrams see page 8)	**pressure p [MPa]**				
	7	14	21	28	35
	flow rate Q [dm^3/min]				
E, **J**, **L**, **M**, **Q**, **R**, **U**, **F, V**, **W**, **C**, **D**, **K**, **Z**	450	450	370	320	300
G, **H**, **S**, **T**, **D1**	360	250	210	180	160

NOTE :
Above flow limits are relate d to standard application of 4-way directional control valve using two flow directions, e.g: **P** to **A** and simultaneously **B** to **T**. When 4-way directional control valve with only one flow direction is used, e.g. **P** to **A** (**B** plugged) or **A** dt **T** (**B** plugged), then the actual flow limits are considerably lower.

HOW TO ORDER

	4 WEH	22			/						

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

Nominal size (NS)
NS22 = **22**

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

Type of the main spool
spool diagrams - according to **page 8**

Series number
(10-19) - installation and connection dimensions unchanged = 1X
series 13 = **13**

Centering/positioning of spool of the pilot valve
(applicable only to 2-position valves:
...4WEH22**HC**... / ...**HD**... /**...HD1**.../ ...**HK**... / ...**HZ**...)

by means of spring	(solenoid **a**)	= **no designation**
without spring	(2 solenoids - **a** and **b**)	= O
without spring, with detent	(2 solenoids - **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**
230 V AC 50 Hz (direct supply with AC current)	= W 230-50

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

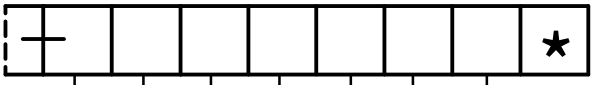
Switching time adjustment

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

Electrical connection

plug-in connector type ISO 4400 (DIN 43650 - A) **without LED**	= **Z4**
plug-in connector type ISO 4400 (DIN 43650 - A) with LED	= Z4

HOW TO ORDER



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

Sealing

NBR (for fluids on mineral oil base)	= **no designation**
FKM (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 of 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

Accessories

NOTE: versions with **M** type spool position sensor available only with options: ...**11**... and ...**12**...
(see page 22)

without accessories	= **no designation**
stroke limiter at the **A** and **B** side	= 10
stroke limiter at the **A** * side	= 11
stroke limiter at the **B** ** side	= 12
end position monitor contact creaker at the **A** side	= 18
end position monitor contact breaker at the **B** side (not applicable for 2-position valvves with spring positioning)	= 19
stroke limiter at the **A** side and end position monitor contact breaker at the **B** side	= 20
stroke limiter at the **B** side and end position monitor contact breaker at the **A** side	= 21
end position monitor contact maker at the **A** side	= 22
end position monitor contact maker at the **B** side (not applicable for 2-position valves with spring positioning)	= 23
stroke limiter at the **A** side and end position monitor contact maker at the **B** side	= 24
stroke limiter at the **B** side and end position monitor contact maker at the **A** side	= 25

M type spool position sensor

without position sensor	= **no designation**
0 position monitoring - zero *(3-position versions, spring centered and 2-position versions (**a**, **0**) or (**0**, **b**))*	= M0
a *position monitoring (3-position versions with **a** single sensor at the **b** side and 2-position versions (**a**, **0**) or (**a**, **b**))*	= MA
b position monitoring *(3-position versions with one sensor and 2-position versions (**0**, **b**) or (**a**, **b**))*	= MB
a and **b** position monitoring *(3-position spring centered versions) and 2-position hydraulically positioned versions with two sensors at the **a** and **b** side*	= MAB

NOTES:

The directional valve should be ordered according to the above coding.

The symbols in bold indicate the preferred versions, available in short delivery time.

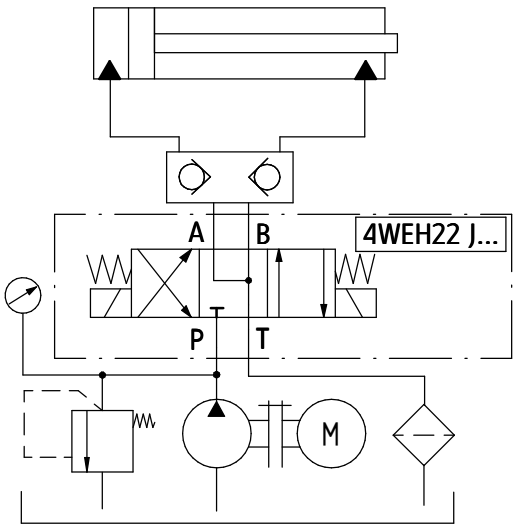
Optional accessories for versions with **M** type sensor:

(*) - option ...**11**... available only for ...**MA**... in a 3-position version (sensor at the side of port **B**; **a** position monitoring)

(**) - option ...**12**... available only for ...**MB**... in a 3-position version (sensor at the side of port **A**; **b** position monitoring)

Coding example: H- 4 WEH22 E 13/G24 N ET Z4

EXAMPLE OF APPLICATION IN HYDRAULIC SYSTEM



SUBPLATES AND FIXING SCREWS

Subplates must be ordered according to data sheet **WK 491 800**. Subplate types:

G151/01 - threaded connections P, T, A, B - G 1
X, Y ,L - G1/4
G151/02 - threaded connections P, T, A, B - M33 x 2
X, Y ,L - M14 x 1,5
G154/01 - threaded connections P, T, A, B - G 1 1/4
X, Y ,L - G1/4
G154/02 - threaded connections P, T, A, B - M42 x 2
X, Y ,L - M14 x 1,5
G156/01 - threaded connections **P, T, A, B - G1 1/2**
X, Y, L - G1/4
G156/02 - threaded connections P, T, A, B - M48 x 2
X, Y ,L - M14 x 1,5

NOTE:
Subplate symbol in bold is the preferred version available in short delivery time.

Subplates and fixing screws **M12 x 60 - 10,9** in accordance with **PN - EN ISO 4762** - pcs 6/set must be ordered separately.
Tightening torque **Md** = **105 Nm**

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