2

The series of regenerative and hybrid directional control valves are available in four sizes:

Direct operated valve:

D3DWR	NG10	Hybrid function with adaptor plate (see chapter 12)

Pilot operated valves:

D31NWR	NG10	Hybrid function with adaptor plate (see chapter 12)
D41VWR, D41VWZ	NG16	
D91VWR, D91VWZ	NG25	
D111VWR, D111VWZ	NG32	

The innovative integrated regenerative function in the A-line allows energy saving circuits with differential cylinders. The hybrid version can switch between regenerative mode and standard mode.

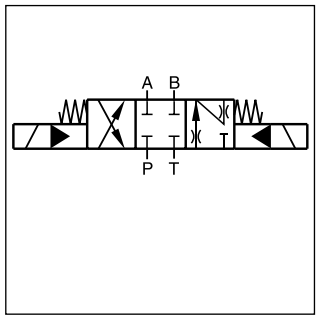
Features

- Energy saving A-regeneration
- Switchable hybrid version

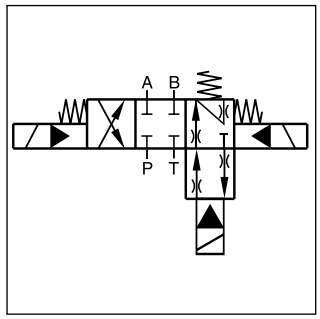
Further literature about the opportunities of energy savings and more functional details of the integrated regeneration is available on request.


D41VWR


D41VWZ

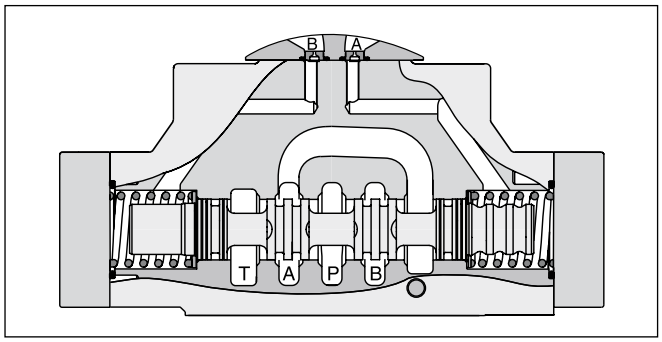


Regenerative D*1VWR

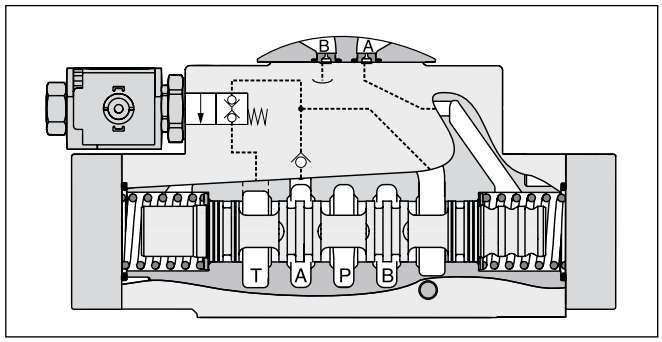


Hybrid D*1VWZ

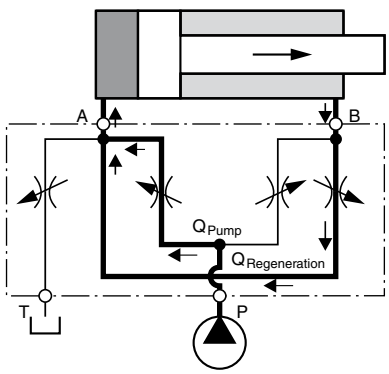
Regenerative valve D*1VWR



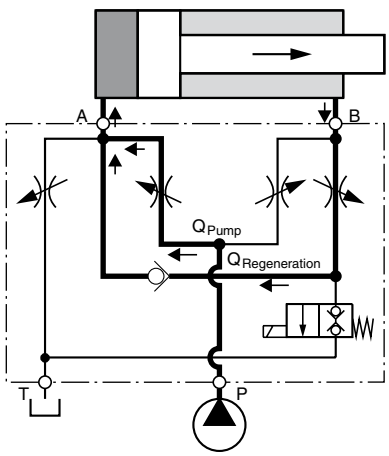
Hybrid valve D*1VWZ



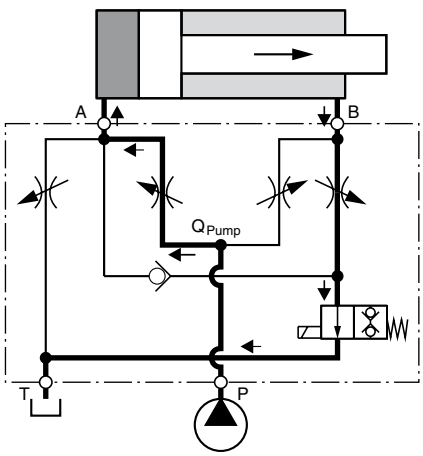
D*1VWR (regenerative valve)
Cylinder extending



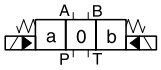
D*1VWZ (hybrid valve)
Cylinder extending
regenerative mode
(high speed)

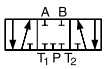
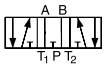
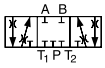
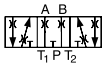


Cylinder extending
standard mode
(high force)



D3DWR

D3DW		C			J	W		
Direct operated valve NG10	**Spool type**	**3 spool position** Spring offset in position “0“. Operated in position “a“ or “b“. 	**Drain port**	**Seals**	**Solenoid voltage 24 V =**	**Connector as per EN 175301-803, without connector** (Please order plug separately)	**Solenoid options**	**Design series** (not required for ordering)

Regenerative function [1]	
Code	Spool type
R01	
R04	
R81	
R82	

Code	Drain port
omit	Standard
9	for high pressure in the connection T1 (tank) or T2 (regenerative function) the connection X and Y can be used as drain port

Code	Solenoid option
omit	manual override (Standard)
T	without manual override

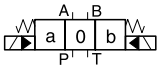
Code	Seals
N	NBR
V	FPM

[1] For regenerative and hybrid function please refer to solutions with sandwich- and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

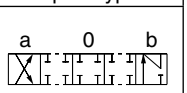
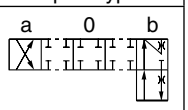
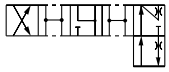
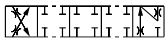
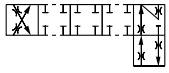
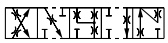
2

D31NWR, D*1VWR and D*1VWZ

Series	Spool type	3 spool position	Pilot oil supply and drain options	Seals	Solenoid voltage 24 V =	Connector as per EN 175301-803, without connector	Solenoid options	Acces-sories	Design series
		C			J	W			
		Spring offset in position "0". Operated in position "a" or "b".				(Please order plug separately)			(not required for ordering)



Code	Bore	Size
D31NW	Ø11 mm	NG10
D41VW	Ø20 mm	NG16
D91VW	Ø32 mm	NG25
D111VW	Ø50 mm	NG32

Regenerative function [2]		Hybrid function [1] [2]	
Code	Spool type	Code	Spool type
R01		Z01	
R04 [3]		Z04 [3]	
R54 [4]		Z54 [4]	
R81		Z81	
R82		Z82	

Code	Accessories
omit	Standard valve w/o accessories
3A	Pilot choke, meter-out
3B	Pilot choke, meter-in
3C	Pilot with pressure reducing valve
3D [3]	Stroke adjustment side B
3E [3]	Stroke adjustment side A
3F [3]	Stroke adjustment side A and B
3R	Meter-out + pressure reducing valve
1T	Meter-in + pressure reducing valve

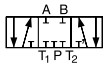
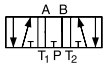
Code	Solenoid option
omit	manual override (Standard)
T	without manual override

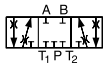
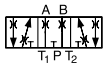
Code	Seals
N	NBR
V	FPM

Code	Inlet	Outlet
1	Internal	External
2	External	External
4	Internal	Internal
5	External	Internal

[1] Not for D31NW.

[2] For regenerative and hybrid function for D31NW (NG10) please refer to solutions with sandwich- and adaptor plates "A10-1664 / A10-1665L / H10-1662 / H10-1666L" in chapter 12.

D31NW spool type: R01  R04 

R81  R82 

[3] Not for D111VW.

[4] Only for D111VW.

General						
Design		Directional spool valve				
Actuation		Solenoid				
Series		**D3DWR**	**D31NWR**	**D41VW**	**D81/91VW**	**D111VW**
Size		NG10	NG10	NG16	NG25	NG32
Weight	[kg]	6.3	8.1	10.3	18.6	68.0
Mounting interface		DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D07	DIN 24340 A25 ISO 4401 NFPA D08	DIN 24340 A32 ISO 4401 NFPA D10
		CETOP RP 121-H				
Mounting position		unrestricted, preferably horizontal				
Ambient temperature	[°C]	-25...+60				
$MTTF_D$ value	[years]	75 / 150 (D3DWR)				
Hydraulic						
Max. operating pressure	[bar]	D3DWR: P, A B: 350; T: 210; option 9 [1] : P, A, B, T: 350; X, Y: 210 Pilot drain internal: P, A B, X: 350; T, Y: 105 Pilot drain external: P, A B, T, X: 350; Y: 105				
Fluid		Hydraulic oil according to DIN 51524				
Fluid temperature	[°C]	-20 ... +70 (NBR: -25...+70)				
Viscosity permitted	[cSt] / [mm²/s]	2.8...400				
Viscosity recommended	[cSt] / [mm²/s]	30...80				
Filtration		ISO 4406 (1999); 18/16/13				
Flow max.	[l/min]	150	170	300	700	2000
Leakage at 350 bar (per flow path) *depending on spool	[ml/min]	up to 20* (at 50 bar)	72...422*	up to 200*	up to 800*	up to 5000*
Minimum pilot supply pressure	[bar]	—	7	5		
Static / Dynamic						
Step response at 95 %	[ms]	Energized / de-energized				
DC solenoids at 65 l/min	175 bar	105 / 85	—	—	—	—
DC solenoids Pilot pressure	50 bar	—	50 / 60	95 / 65	150 / 170	470 / 390
	100 bar	—	50 / 60	75 / 65	110 / 170	320 / 390
	250 bar	—	50 / 50	60 / 65	90 / 170	210 / 390
	350 bar	—	50 / 50	60 / 65	85 / 170	200 / 390
Electrical characteristics						
Duty ratio		100 % ED; CAUTION: coil temperature up to 150 °C possible				
Protection class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)				
		D3DWR		D31NWR / D41VW / D91VW / D111VW		
Supply voltage / ripple	[V]	24 V =		24 V =		
Tolerance supply voltage	[%]	±10		±10		
Current consumption hold	[A]	1.5		1.29		
Current consumption in rush	[A]	1.5		1.29		
Power consumption hold	[W]	36		31		
Power consumption in rush	[W]	36		31		
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.				
Wiring min.	[mm²]	3 x 1.5 recommended				
Wiring length max.	[m]	50 recommended				

Electrical characteristics hybrid option

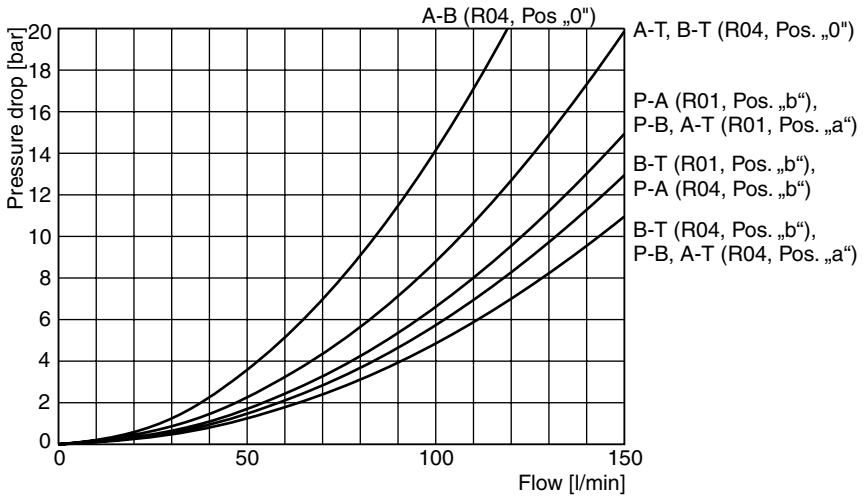
Duty ratio		100 %		
Protection class		IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)		
		D41	D91	D111
Supply voltage	[V]	24	24	24
Tolernace supply voltage	[%]	±10	±10	±10
Current consumption	[A]	1.21	0.96	1.29
Power consumption	[W]	29	23	31
Solenoid connection		Connector as per EN 175301-803		
Wiring min.	[mm²]	3 x 1.5 recommended		
Wiring length max.	[m]	50 recommended		

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

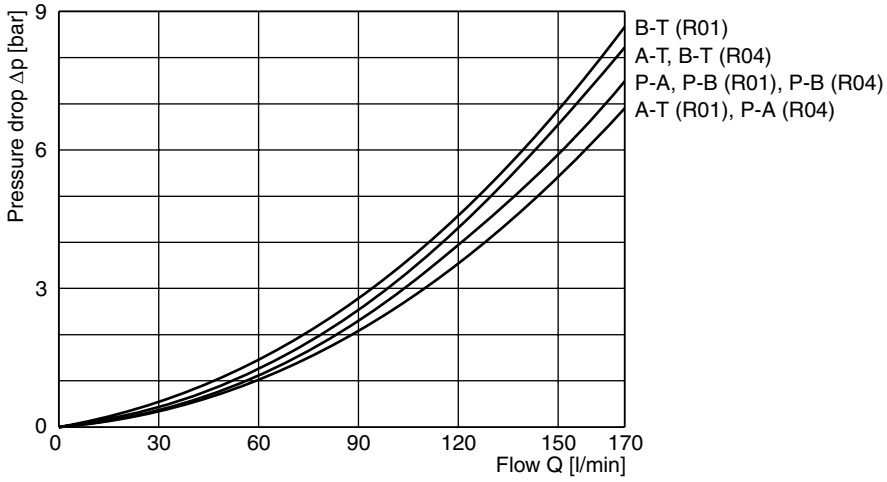
[1] Bolts are not designed for simultaneous loading of all ports with maximum pressure.
The total pressure profile has to be adapted to the tensile strength of the bolts.

2

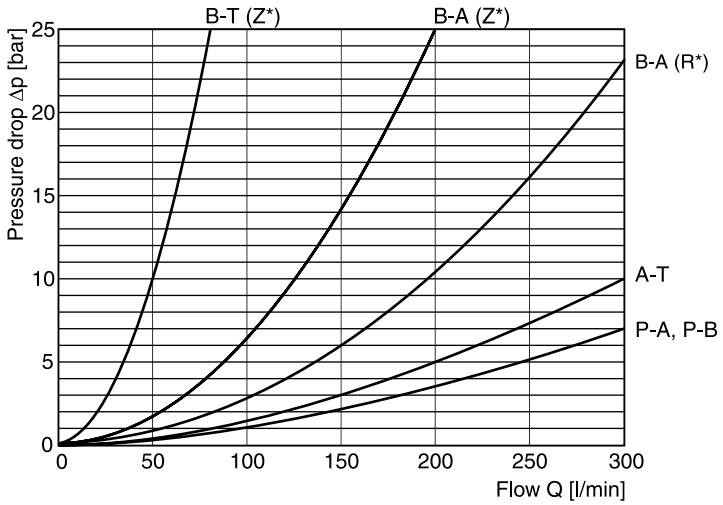
D3DWR



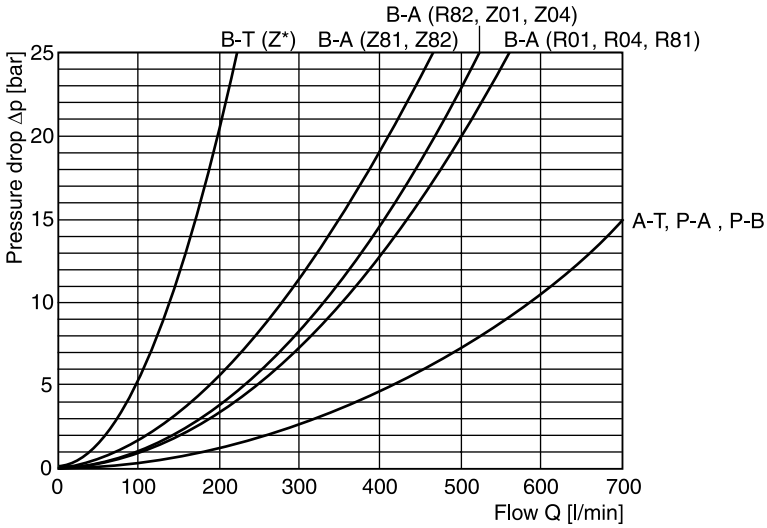
D31NWR



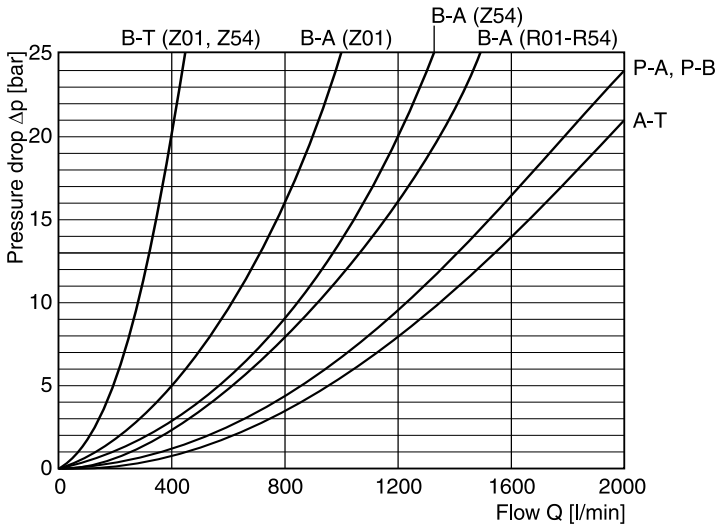
D41VW



D91VW



D111VW



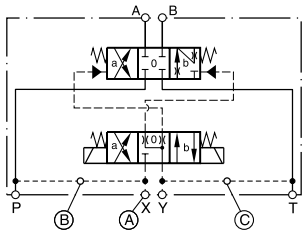
D31NW on request.

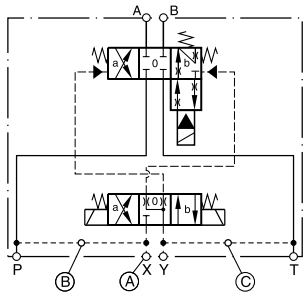
2

Pilot oil inlet (supply) and outlet (drain)

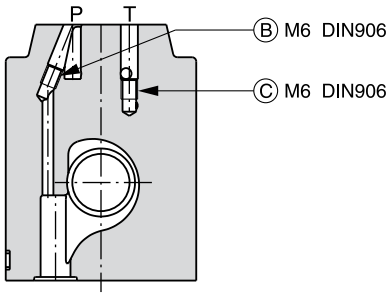
○ open, ● closed

Pilot oil Inlet	Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

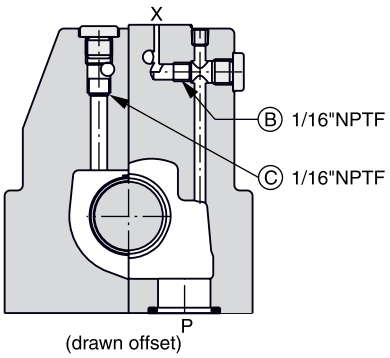




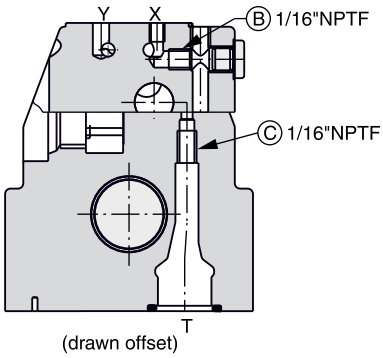
D31NWR



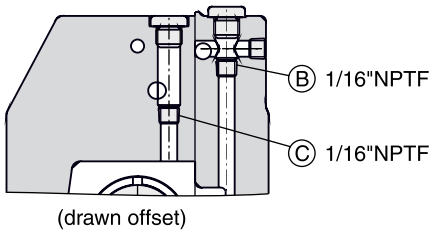
D41VWR



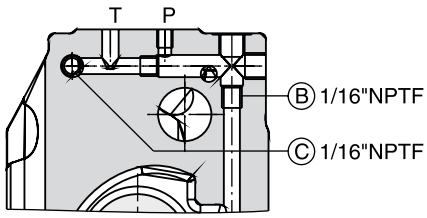
D41VWZ



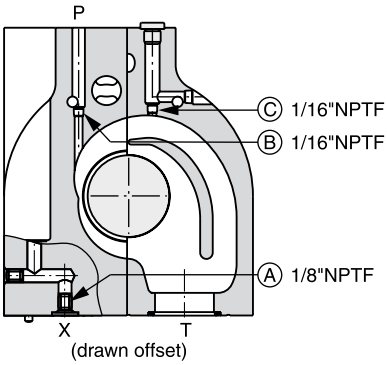
D91VWR



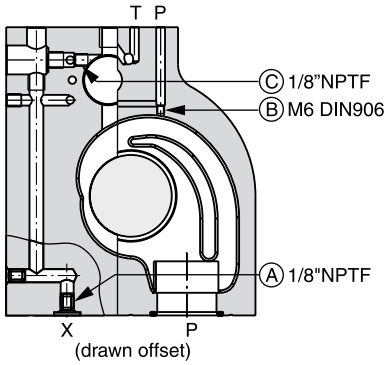
D91VWZ



D111VWR



D111VWZ

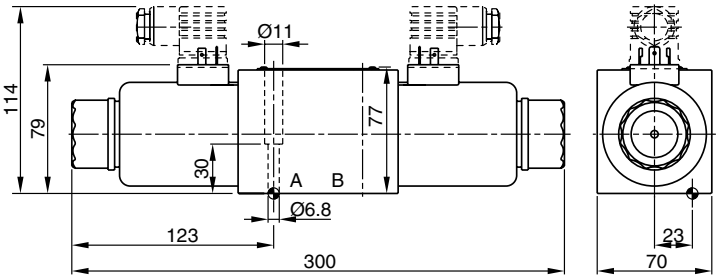


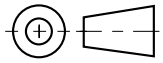
○ open, ● closed

Pilot oil Inlet	Outlet	A	B	C
internal	external	○	Orifice Ø1.5	●
external	external	Orifice Ø1.5	●	●
internal	internal	○	Orifice Ø1.5	○
external	internal	Orifice Ø1.5	●	○

D3DWR

Regenerative and hybrid function with additional plate ”H10-1666L / H10-1662 / A10-1664 / A10-1665L“, see chapter 12





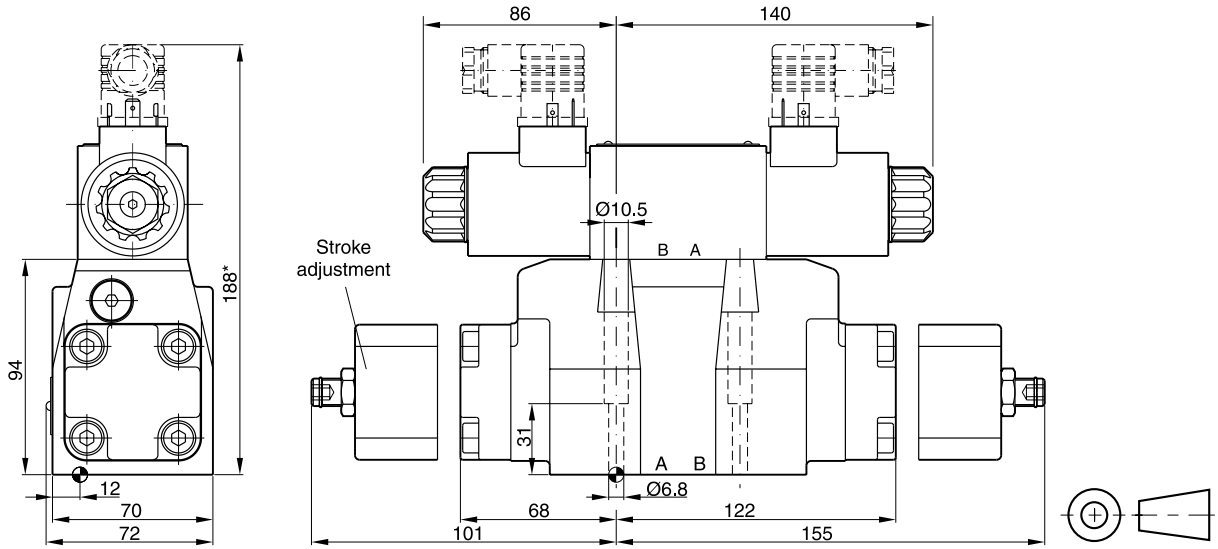
Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	**NBR: SK-D3W-30** FPM: SK-D3W-V-30

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

2

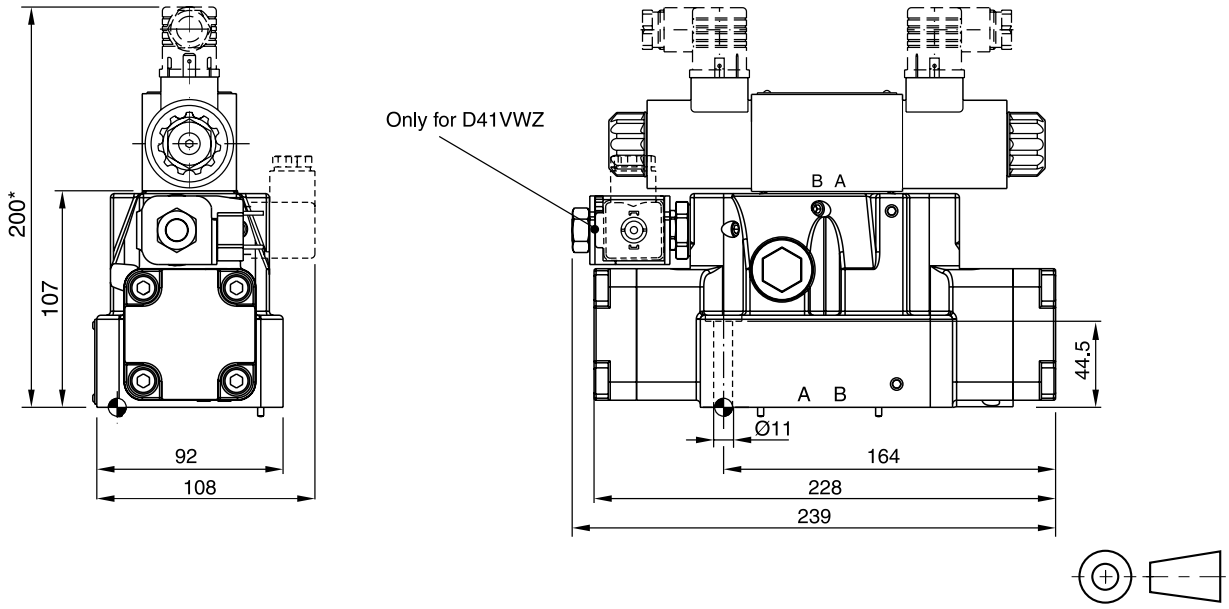
D31NWR

Regenerative and hybrid function with additional plate "H10-1666L / H10-1662 / A10-1664 / A10-1665L", see chapter 12



Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ±15 %	**NBR: SK-D31NW-N-91** FPM: SK-D31NW-V-91

D41VWR/Z

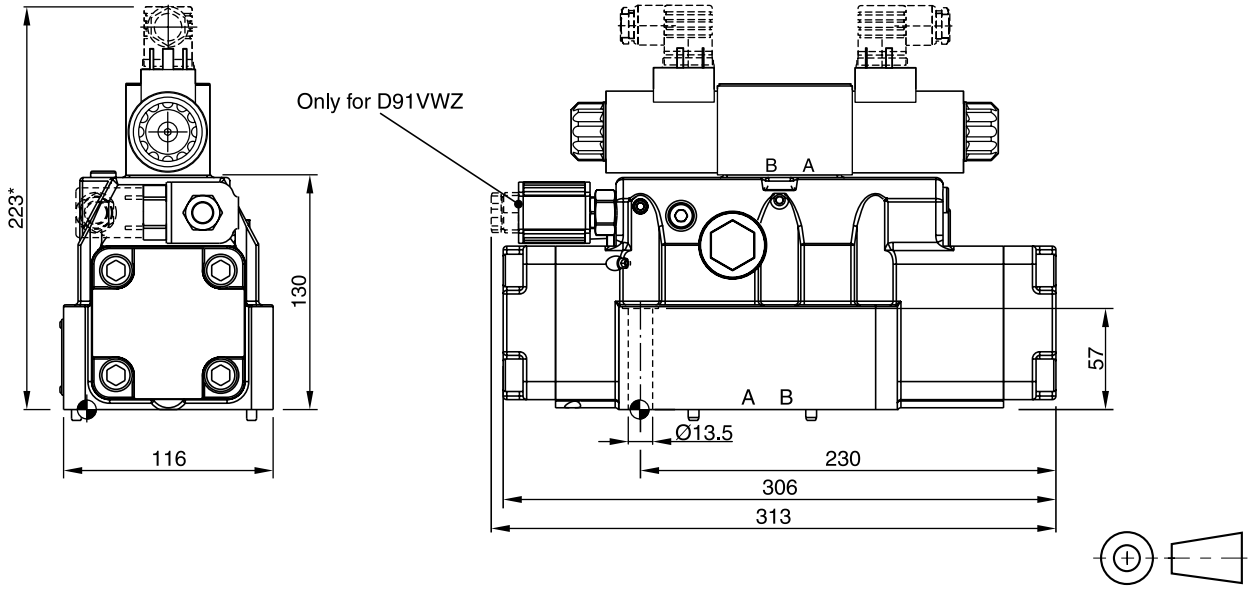


Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK320	4x M10x60 2x M6x55 ISO 4762-12.9	63 Nm ±15 % 13.2 Nm ±15 %	**NBR: SK-D41VW-N-91** FPM: SK-D41VW-V-91

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

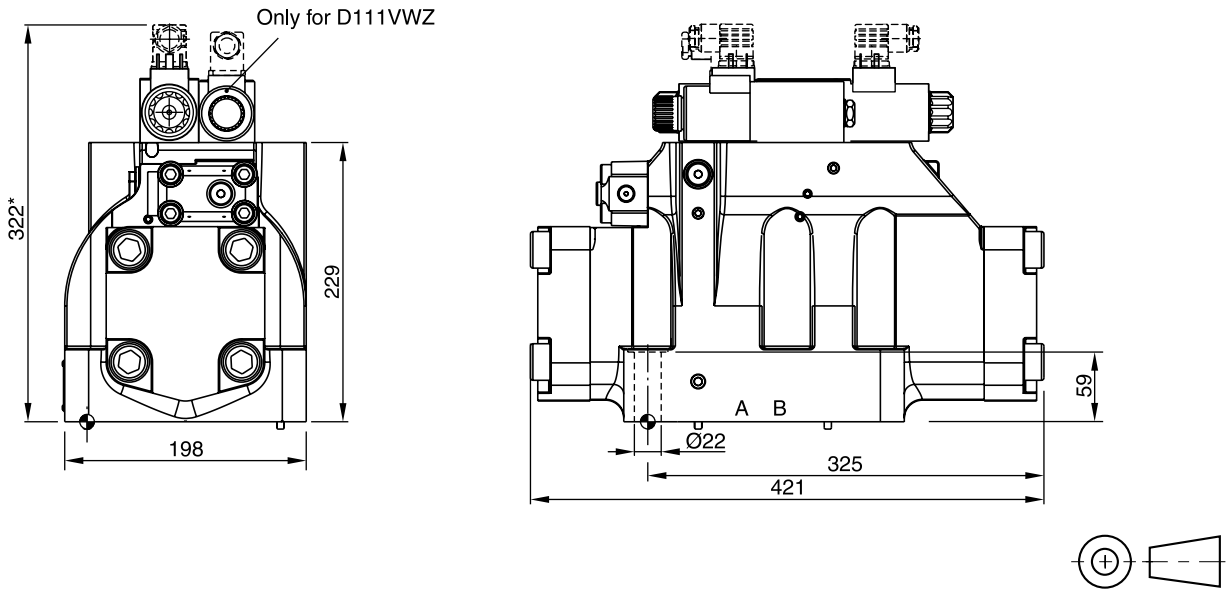
* Please add for each sandwich plate +40 mm (pressure reducing valve, choke valve meter-in/-out).

D91VWR/Z



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK360	6x M12x75 ISO 4762-12.9	108 Nm ±15 %	**NBR: SK-D81VW-N-91 / SK-D91VW-N-91** FPM: SK-D81VW-V-91 / SK-D91VW-V-91

D111VW



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK386	6x M20x90 ISO 4762-12.9	517 Nm ±15 %	**NBR: SK-D111VW-N-91** FPM: SK-D111VW-V-91

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

* Please add for each sandwich plate +40 mm (pressure reducing valve, choke valve meter-in/-out).

Notes