

# Directional seated valve type ROLV

## Product documentation

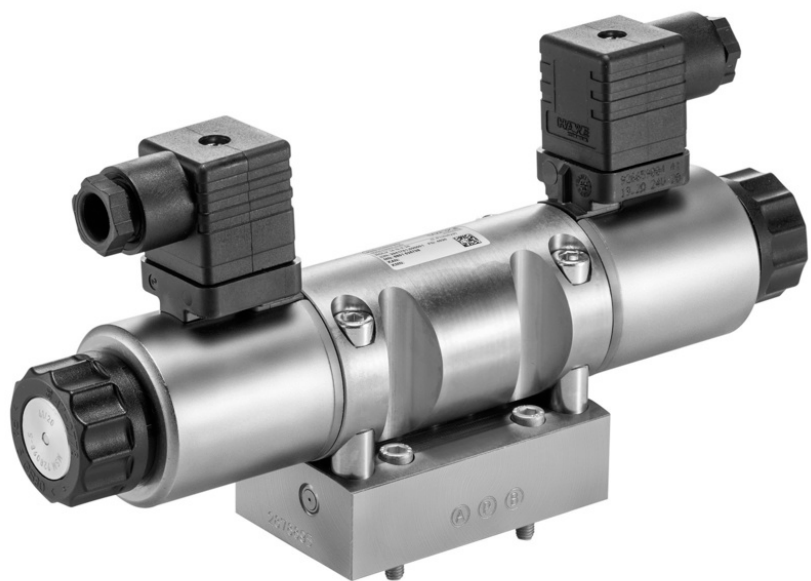


Operating pressure  $p_{\max}$ :

400 bar

Flow rate  $Q_{\max}$ :

25 l/min



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## Table of Contents

<b>1</b>	<b>Overview of directional seated valve type ROLV.....</b>	<b>4</b>
1.1	Assembly.....	5
<b>2</b>	<b>Available versions.....</b>	<b>6</b>
2.1	Complete valve for manifold mounting NG 6.....	6
2.1.1	Basic type and size.....	6
2.1.2	Circuit symbol for manifold mounting NG6.....	7
2.1.3	Single connection block for manifold mounting NG 6.....	8
2.1.4	Additional elements at port P.....	8
2.1.5	Additional elements at port A and/or B.....	9
2.1.6	Additional elements at T.....	10
2.1.7	Actuating solenoid.....	11
2.1.8	Manual override.....	11
2.1.9	Seals.....	11
2.2	Complete valve for direct pipe connection.....	12
2.2.1	Circuit symbol for direct pipe connection.....	12
2.2.2	Single connection block for direct pipe connection.....	13
2.2.3	Additional elements for plug-in sleeve for port P1 and/or P2.....	14
2.2.4	Additional elements for plug-in sleeve for port A1 and/or B1.....	15
2.2.5	Additional elements for plug-in sleeve for port T1.....	16
2.3	Individual basic valve.....	17
2.3.1	Basic valve.....	18
2.4	Individual adapter plate.....	19
2.4.1	Circuitry of adapter plate.....	19
<b>3</b>	<b>Parameters.....</b>	<b>20</b>
3.1	General data.....	20
3.2	Pressure and volumetric flow.....	20
3.3	Weight.....	21
3.4	Electrical data.....	21
3.5	Characteristic lines.....	23
<b>4</b>	<b>Dimensions.....</b>	<b>25</b>
4.1	Valve.....	25
4.2	Hole pattern of the base plate.....	29
4.3	Actuating elements.....	29
4.4	Hole pattern for producing a sub-plate or monoblock in-house.....	30
<b>5</b>	<b>Installation, operation and maintenance information.....</b>	<b>31</b>
5.1	Mounting of basic valve and adapter plate.....	31
5.2	Intended use.....	32
5.3	Assembly information.....	32
5.4	Operating instructions.....	32
5.5	Maintenance information.....	33
<b>6</b>	<b>Other information.....</b>	<b>34</b>
6.1	Manual override.....	34
6.2	Notes regarding replacement of directional seated valves type NBVP as per <a href="#">D 7765 N</a> .....	34

**1****Overview of directional seated valve type ROLV**

Directional seated valves are a type of directional valve. Their function is to direct the flow of hydraulic medium in certain directions, therefore connecting the relevant connections, or shutting off the flow with zero leakage. By this means they control the movement of the actuators in a hydraulic system.

The directional seated valve type ROLV is available as a 3/2, 4/2 or 4/3-way directional seated valve with different plug types. The patented assembly consists of two parts: a round basic valve with the valve inserts, and an adapter plate which can be designed for manifold mounting with nominal size NG 6 as the standard connection pattern, or for direct pipe connection.

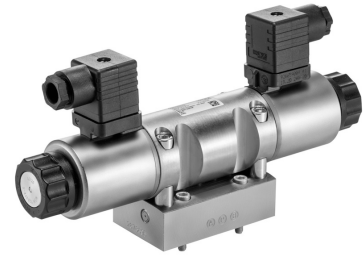
Additional elements such as a check valve, a restrictor (on the consumer side) and/or restrictor check valves can be integrated, depending on the functional requirement and adapter plate. The type ROLV can be combined in the valve bank type BA with other types of valves.

**Features and advantages**

- Dirt-resistant design with high switching reliability
- Interchangeable solenoid for greater flexibility and easy servicing

**Intended applications**

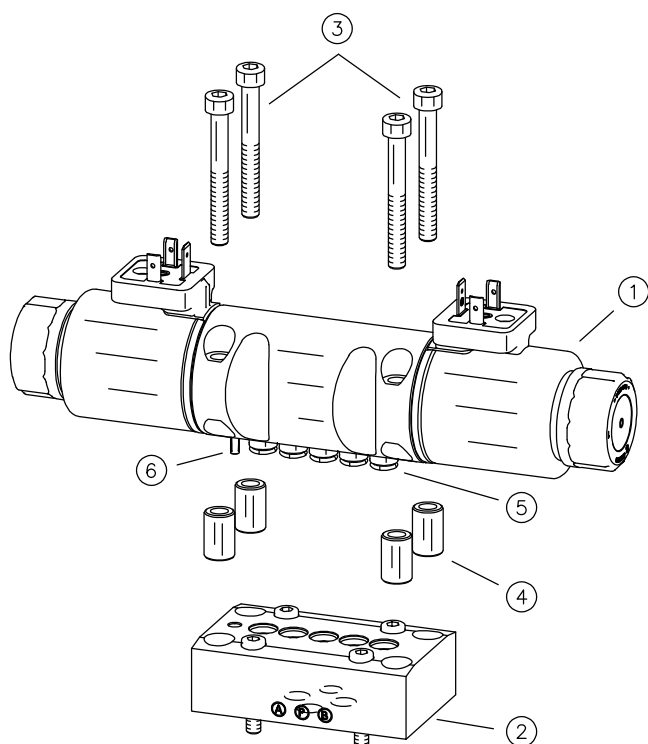
- Machine tools (cutting and non-cutting)
- Clamping tools, punching tools, fixtures
- Testing machinery
- Wind turbines



*Directional seated valve type ROLV*

## 1.1 Assembly

The directional seated valve type ROLV consists of a round basic valve (see Chapter 2.3, "Individual basic valve") and an adapter plate (see Chapter 2.1.3, "Single connection block for manifold mounting NG 6"), which offer different connection options. The valve function as per Chapter 2.1.2, "Circuit symbol for manifold mounting NG6" can be ascertained from the combination of basic valve and sub-plate. As individual components, the basic valves only provide a partial function. This must be kept in mind when mounting on in-house sub-plates.



- 1 Basic valve (housing + excitation system)
- 2 Adapter plate
- 3 4x fastening screws
- 4 4x sleeves
- 5 5x plug-in sleeves incl. O-ring
- 6 Pin for correct alignment

## 2 Available versions

### 2.1 Complete valve for manifold mounting NG 6

#### Ordering examples

ROLV 14	Z	-N	/B0,8			-WG 110		-
ROLV 14	W	-N	/B0,8R	/ABR2,0 BBR1,5	/S	-G 24	T	-
								2.1.9 "Seals"
								2.1.8 "Manual override"
								2.1.7 "Actuating solenoid"
								2.1.6 "Additional elements at T"
								2.1.5 "Additional elements at port A and/or B"
								2.1.4 "Additional elements at port P"
								2.1.3 "Single connection block for manifold mounting NG 6"
								2.1.2 "Circuit symbol for manifold mounting NG6"
								2.1.1 "Basic type and size"

#### 2.1.1 Basic type and size

Type	Description	Flow rate Q <sub>max</sub> (l/min)	Pressure p <sub>max</sub> (bar)
ROLV 14	Directional seated valve	25	400

## 2.1.2 Circuit symbol for manifold mounting NG6

Coding	Assembly (internal)		Description	Circuit symbol
	Basic valve	Switching Adapter plate		
G	31	101	4/3-way directional valve	
W	41	101	4/2-way directional valve	
D	51	101	4/3-way directional valve	
Z	61	101	3/2-way directional valve	
ZZ	51/P1 R /P2 R	101	4/3-way directional valve or double 3/2-way directional valve, can be used to actuate 2 consumers separately	

### NOTICE

Observe the notes regarding replacement with the directional seated valves type NBVP as per D 7765 N, see Chapter 6.2, "Notes regarding replacement of directional seated valves type NBVP as per D 7765 N"

### 2.1.3 Single connection block for manifold mounting NG 6

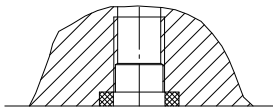
Coding	Description
- N	Manifold mounting with hole pattern NG 6 as per ISO 4401-03 (CETOP 03) or DIN 24 340-A6

### 2.1.4 Additional elements at port P

Only in the case of adapter plate - N

Coding	Description	Circuit symbol
R	Check valve type ER 13 according to D 7325	
B...	Orifice Orifice-Ø: 0.4; 0.5; 0.6; 0.7; 0.8; 0.9; 1.0; 1.1; 1.2; 1.4; 1.5; 1.8; 2.0; 2.4; 2.5; 3.0; 3.5	

#### Pump connection P



P ↑



- 1 Orifice B
- 2 Check valve R

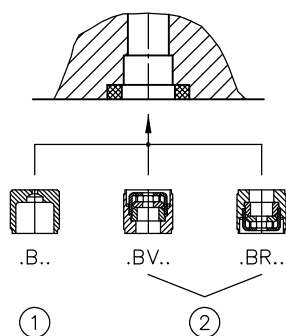


## 2.1.5 Additional elements at port A and/or B

Only adapter plate - N

Coding	Description	Circuit symbol
<b>AB...</b> <b>BB...</b>	Orifice at A and/or B  Orifice-Ø: 0.4; 0.5; 0.6; 0.7; 0.8; 0.9; 1.0; 1.2; 1.5; 2.0; 2.5	
<b>ABV...</b> <b>BBV...</b>	Restrictor check valve type EBR 14 to SK 7966 300 in A and/or B to restrict consumers  Orifice-Ø: 0.6; 0.7; 0.8; 0.9; 1.0; 1.2; 1.5; 2.0	
<b>ABR...</b> <b>BBR...</b>	Restrictor check valve type EBR 14 to SK 7966 300 in A and/or B to open consumers  Orifice-Ø: 0.6; 0.7; 0.8; 0.9; 1.0; 1.2; 1.5; 2.0	


### Consumer ports A and B



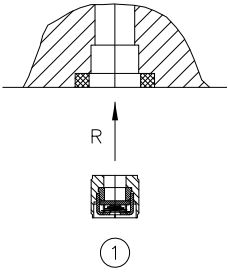
- 1 Orifice **.B.**
- 2 Restrictor check valve (observe installation position!) **.BV.**; **.BR.**

## 2.1.6 Additional elements at T

Only in the case of adapter plate - N

Coding	Description	Opening pressure (bar)	Circuit symbol
S	Return pressure stop (check valve) type ER 14 as per SK 7966 200	approx. 0.07	
S 0.2		approx. 0.2	
S 1		approx. 1.0	

### Return port T



1 Return pressure stop S..

## 2.1.7 Actuating solenoid

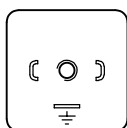
Coding	Electrical connection	Nominal voltage		Protection class
		V AC	V DC	
X(G) 12	EN 175 301-803 A		12 V DC	IP 65
X(G) 24	<ul style="list-style-type: none"> <li>▪ Coding G with line connector</li> <li>▪ Coding L with LED plug</li> <li>▪ Coding WG with rectifier in the line connector</li> <li>▪ Coding 5K with cast-on cable 5 m long</li> </ul>		24 V DC	
X(G) 48			48 V DC	
X(G) 98			98 V DC	
X(G) 205			205 V DC	
WG 24		24 V AC 50/60 Hz	24 V DC	IP 65
WG 110	110 V AC 50/60 Hz	98 V DC		
WG 230	230 V AC 50/60 Hz	205 V DC		
L 12			12 V DC	IP 65
L 24			24 V DC	
L5K 24			24 V DC	
AMP 12	AMP-Junior, 2-pin, coding 1		12 V DC	IP 65
AMP 24			24 V DC	
AMP 48			48 V DC	
DT 12	Deutsch connector, 2-pin, type DT04-2P		12 V DC	IP 68
DT 24			24 V DC	

### NOTICE

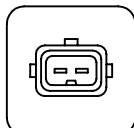
The specifications regarding the IP protection class apply for versions featuring a properly assembled male connector.

### Connection pattern

G .., X .., L .. (WG ..)



AMP ..



DT ..



## 2.1.8 Manual override

Coding	Description
without coding	Series
T	with detent
T1	without detent (spring return mechanism)

## 2.1.9 Seals

Coding	Description
Without coding	Series (TPU, NBR)
	Additional seal variants available on request






Coding	Mounting (internal)		Detailed circuit symbol (for use with additional elements)	Simplified circuit symbol (without additional elements)
	Basic valve	Switching for adapter plate		
<b>D</b>	51	101		
	4/3-way directional valve			
<b>Z</b>	61	101		
	3/2-way directional valve			
<b>ZZ</b>	51/P1 R / P2 R	101		
	4/3-way directional valve or double 3/2-way directional valve, can be used to actuate 2 consumers separately			

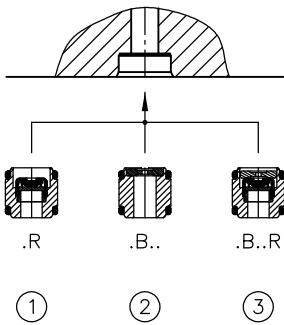
## 2.2.2 Single connection block for direct pipe connection

Coding	Description
- 3/8	Pipe connection G 3/8

## 2.2.3 Additional elements for plug-in sleeve for port P1 and/or P2

Coding	Description	Circuit symbol
P1 R P2 R	Check valve type ERV 14 in P1 and/or P2	
P1 B.. P2 B..	Orifice type EBV 14 in P1 and/or P2  Orifice Ø: 0.4; 0.5; 0.6; 0.7; 0.8; 0.9; 1.0; 1.1; 1.2; 1.4; 1.5; 1.8; 2.0; 2.4; 2.5; 3.0; 3.5	
P1 B..R P2 B..R	Combination of check valve type ERV 14 and orifice in P1 and/or P2  Orifice Ø: 0.4; 0.5; 0.6; 0.7; 0.8; 0.9; 1.0; 1.1; 1.2; 1.4; 1.5; 1.8; 2.0; 2.4; 2.5; 3.0; 3.5	

### Pump port P1 and P2

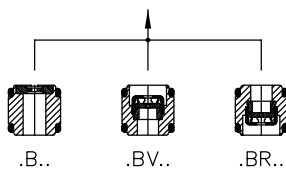


- 1 Check valve .R
- 2 Orifice .B..
- 3 Check valve and orifice .B..R

## 2.2.4 Additional elements for plug-in sleeve for port A1 and/or B1

Coding	Description	Circuit symbol
A1 B.. B1 B..	Orifice type EBV 14 in A and/or B  Orifice Ø: 0.4; 0.5; 0.6; 0.7; 0.8; 0.9; 1.0; 1.2; 1.5; 2.0; 2.5; 3.0; 3.5	
A1 BV.. B1 BV..	Restrictor check valve type EBRV 14 in A and/or B, throttling to the consumer  Orifice Ø: 0.6; 0.7; 0.8; 0.9; 1.0; 1.2; 1.5; 2.0	
A1 BR.. B1 BR..	Restrictor check valve type EBRV 14 in A and/or B, open to the consumer  Orifice Ø: 0.6; 0.7; 0.8; 0.9; 1.0; 1.2; 1.5; 2.0	

### Port A or B

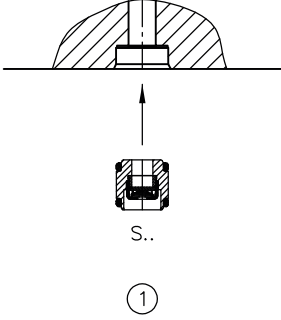


- 1 Orifice **.B..**
- 2 Restrictor check valve **.BV..**
- 3 Restrictor check valve **.BR..**

## 2.2.5 Additional elements for plug-in sleeve for port T1

Coding	Description	Opening pressure (bar)	Circuit symbol
T1 S	Return pressure stop type ERV 14 in port T1	approx. 0.07	
T1 S 0.2		approx. 0.2	
T1 S 1		approx. 1.0	

### Port T



- 1 Return pressure stop S..

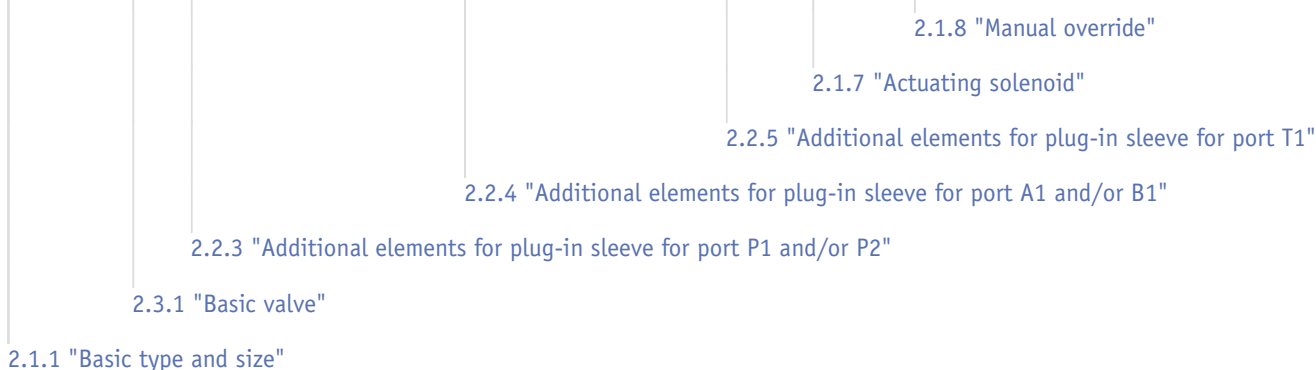


## 2.3 Individual basic valve

If your company produces adapter plates or monoblocks in-house, you can also purchase basic valves individually. When doing so, it is important to observe the relevant circuitry for the adapter plate. The correct combination of basic valve and circuitry can be found in 2.1.2 "Circuit symbol for manifold mounting NG6". The circuits can be found in 2.4.1 "Circuitry of adapter plate".

### Ordering example

ROLV 14	51				-G 24	
ROLV 14	31	/P1 R /P2 R	/B1 B1,0		-DT 24	
ROLV 14	31	/P1 B0,8 R /P2 B1,0 R	/A1 BR2,0 /B1 BR1,5	/T1 S	-X 24	T

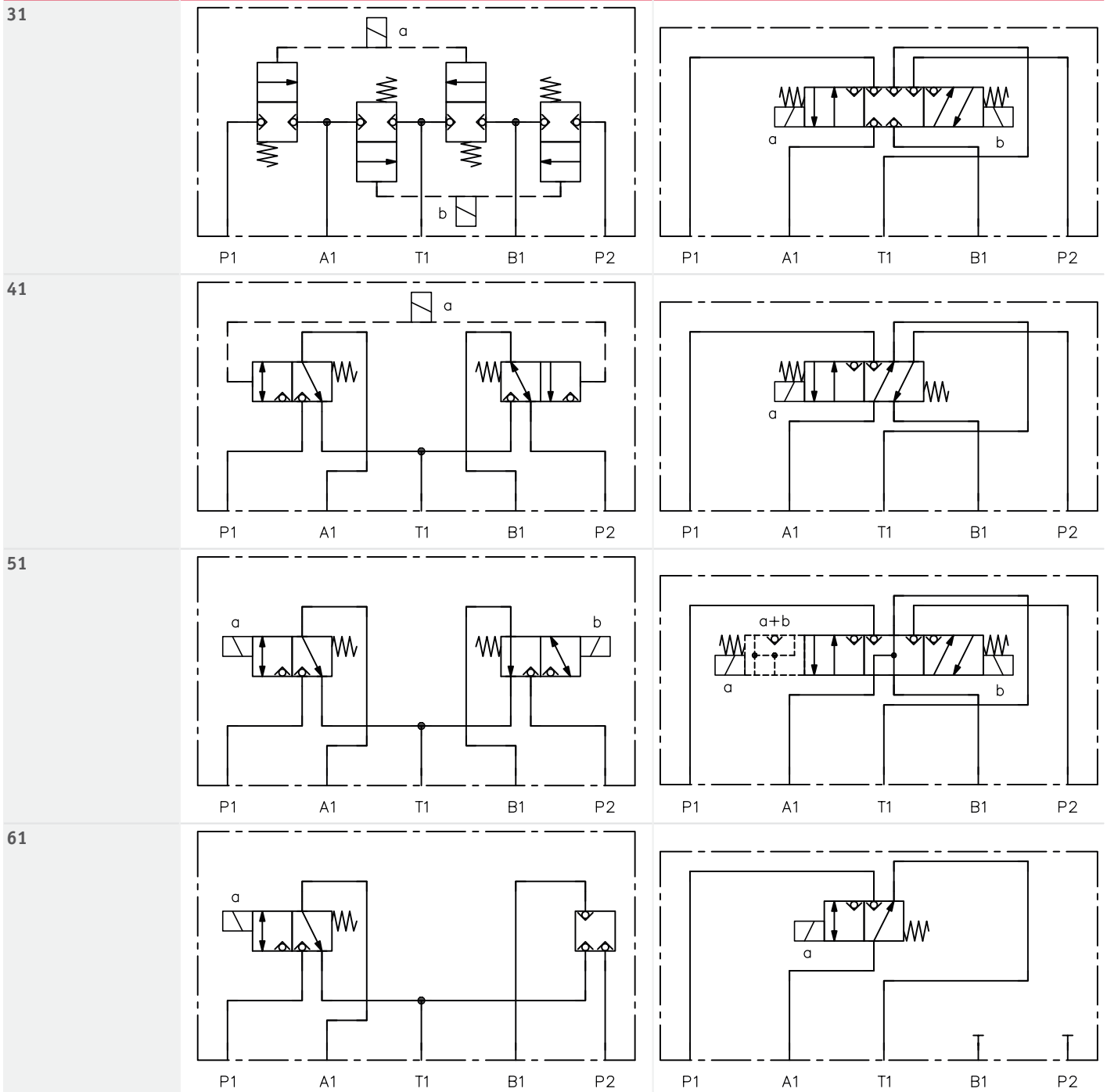


### 2.3.1 Basic valve

Coding

Detailed circuit diagram  
(without sub-plate)

Simplified circuit diagram  
(without sub-plate)



**NOTICE**

The complete circuit symbol is not produced until combined with an appropriate adapter plate, see Chapter 2.4, "Individual adapter plate"

**NOTICE**

Observe the assembly information, see Chapter 5, "Installation, operation and maintenance information"

## 2.4 Individual adapter plate

### Ordering examples

ROLV 14	101	-N
ROLV 14	101	-3/8
ROLV 14	101	-N

**Port** 2.1.3 "Single connection block for manifold mounting NG 6"  
2.2.2 "Single connection block for direct pipe connection"

2.4.1 "Circuitry of adapter plate"

2.1.1 "Basic type and size"

### 2.4.1 Circuitry of adapter plate

Coding	Description	Circuitry
101	For manifold mounting NG 6 (standard) Coding -N	
	For pipe connection Coding -3/8	

## 3 Parameters

### 3.1 General data

<b>Designation</b>	Directional seated valve type ROLV
<b>Model</b>	Cone-seated valve
<b>Material</b>	Steel, zinc-nickel coated
<b>Installation position</b>	As desired
<b>Overlap for symbol Z, W, D</b>	Negative. During switching, all passages are briefly connected to each other.
<b>Hydraulic fluid</b>	Hydraulic fluid, according to DIN 51 524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: 4 - 800 mm <sup>2</sup> /s Optimal operating range: approx. 10 - 500 mm <sup>2</sup> /s Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.
<b>Cleanliness level</b>	<b>ISO 4406</b> <u>21/18/15...19/17/13</u>
<b>Temperatures</b>	Environment: approx. -40 to +80 °C, hydraulic fluid: -25 to +80 °C, pay attention to the viscosity range. Start temperature: down to -40 °C is permissible (take account of the start viscosities!), as long as the steady-state temperature is at least 20 K higher during subsequent operation. Biologically degradable hydraulic fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.

### 3.2 Pressure and volumetric flow

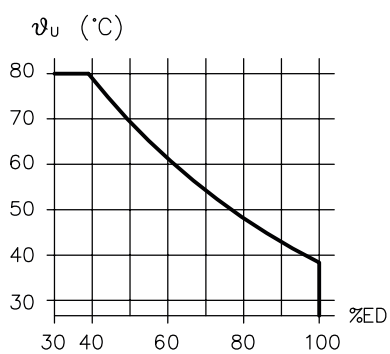
<b>Operating pressure</b>	$p_{\max P} = 400 \text{ bar}$ $p_{\max T} = 50 \text{ bar}$
<b>Flow rate</b>	$Q_{\max} = 25 \text{ l/min}$
<b>Power characteristics diagram</b>	<p>The diagram is a line graph with pressure <math>p</math> (bar) on the vertical axis and flow rate <math>Q</math> (l/min) on the horizontal axis. The vertical axis ranges from 0 to 400 with major ticks every 100 units. The horizontal axis ranges from 0 to 25 with major ticks at 0, 15, and 25. The graph shows a constant pressure of 400 bar from 0 to 15 l/min. From 15 l/min to 25 l/min, the pressure decreases linearly from 400 bar to 300 bar. A dashed vertical line is drawn at <math>Q = 15</math> l/min, and a dashed horizontal line is drawn at <math>p = 300</math> bar, intersecting the graph at the point (15, 300). Below the graph, the text reads: "Q flow rate (l/min); p pressure (bar)".</p>

### 3.3 Weight

#### Circuit symbol Coding

G, D	= 2.7 kg
W, Z	= 2.2 kg

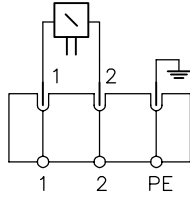
### 3.4 Electrical data

Coding	X 12	AMP 12 DT 12	X 24 AMP 24 DT 24	X 48 AMP 48	X 98	X 205
Nominal voltage $U_N$	12 V DC	12 V DC	24 V DC	48 V DC	98 V DC	205 V DC
Nominal power $P_N$	27 W	29 W	30 W	33 W	30 W	30 W
Switching times (reference value)	I <sub>100%</sub> < 60 ms (direct current) I <sub>100%</sub> < 200 ms (direct current)					
Switching operations	Approx. 2000/h approximately evenly distributed					
Contact temperature	120 °C at 20 °C ambient temperature					
Insulation material class	F					
Relative duty cycle	 <p><math>\vartheta_U</math> (°C)</p> <p>%ED</p> <p>%ED-5 min rel. duty cycle; <math>\vartheta_U</math> ambient temperature (°C)</p>					
	<p><b>!</b> <b>NOTICE</b></p> <p>The thermal load of the coil can be reduced by means of an economy circuit, for example.</p>					
Protection class	Depending on the actuating solenoid see Chapter 2.1.7, "Actuating solenoid"					
Electrical connection	Depending on the actuating solenoid see Chapter 2.1.7, "Actuating solenoid"					

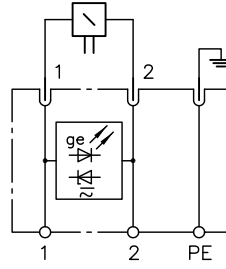
**Circuit diagrams**

DC voltage

G .., X ..

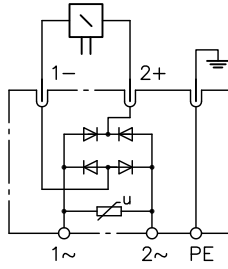


L ..



AC voltage

WG ..

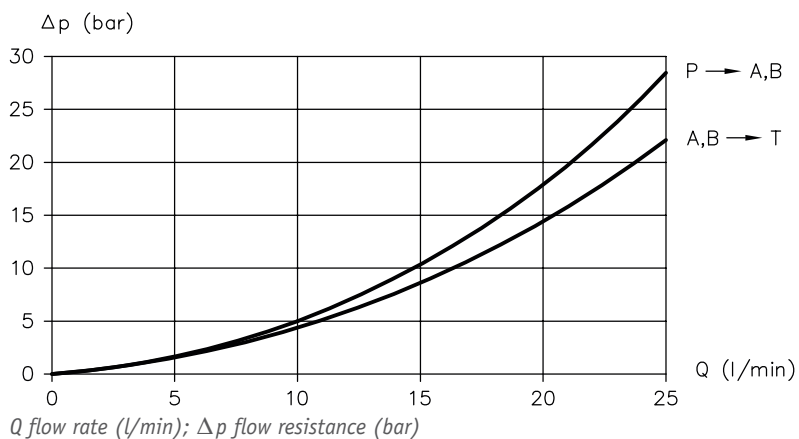


### 3.5 Characteristic lines

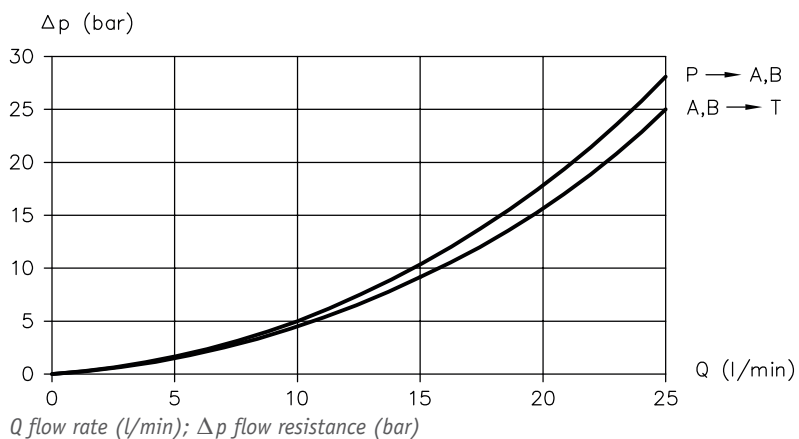
Viscosity of the hydraulic fluid approx. 60 mm<sup>2</sup>/s

#### Dynamic pressure characteristic curve

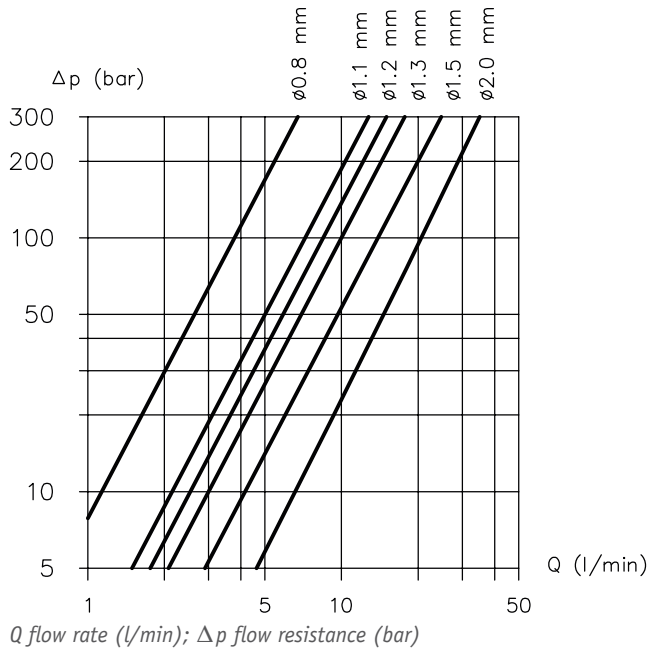
##### ROLV 14 G



##### ROLV 14 W, ROLV 14 D, ROLV 14 Z



**Additional orifices**



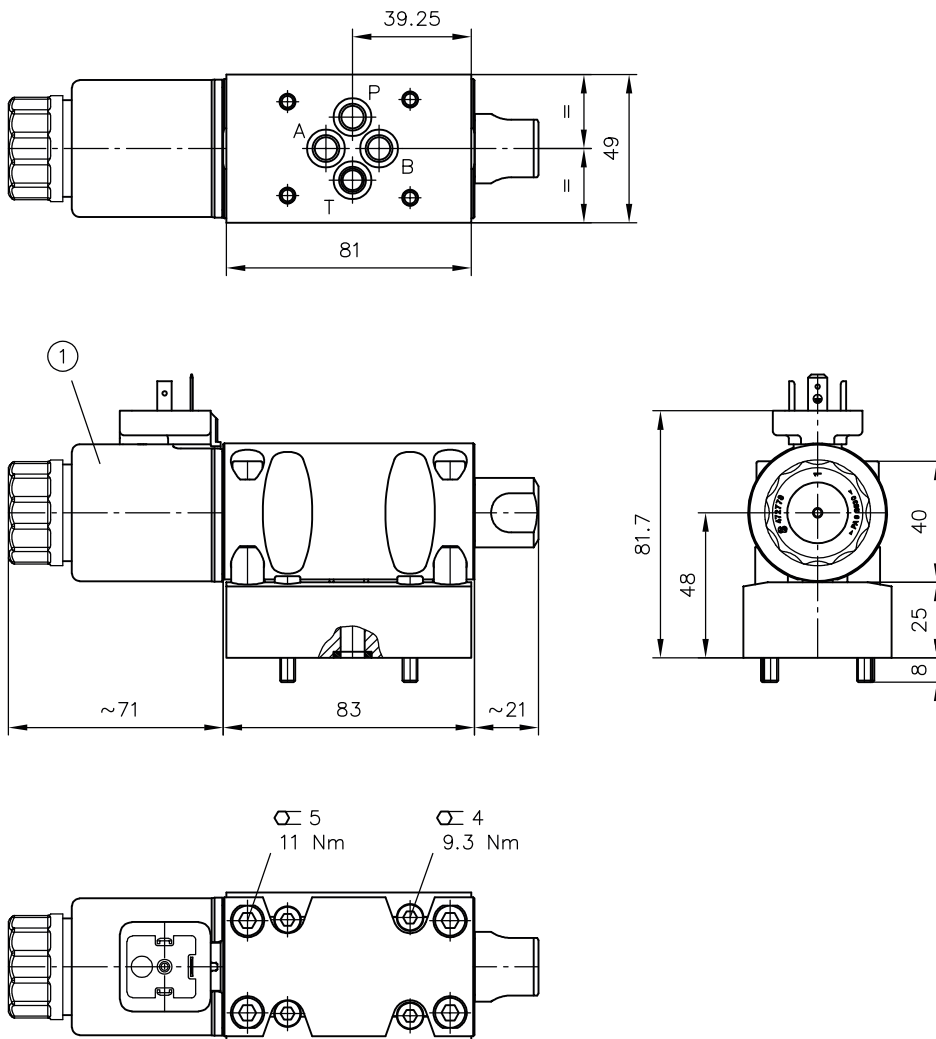


## 4 Dimensions

All dimensions in mm, subject to change.

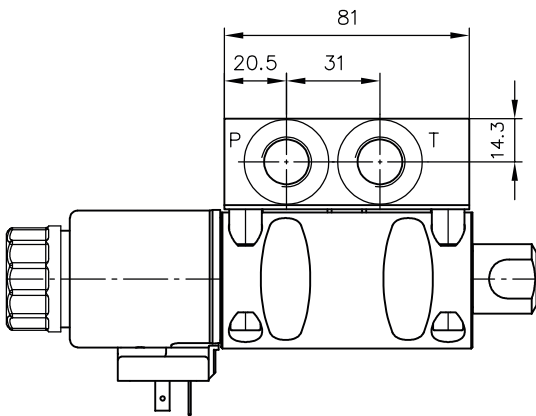
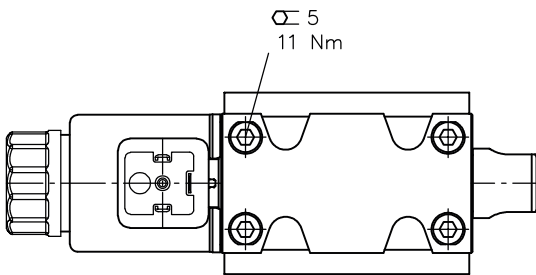
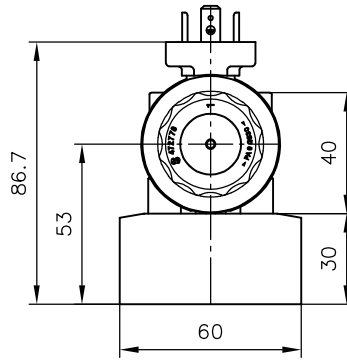
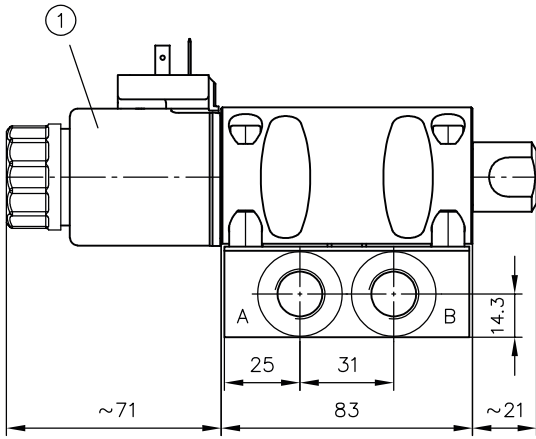
### 4.1 Valve

Circuit symbol **W**, **Z** with adapter plate - N



1 Solenoid turned in any direction

Circuit symbol W, Z with adapter plate - 3/8"



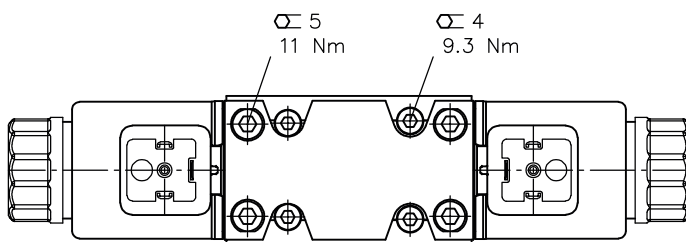
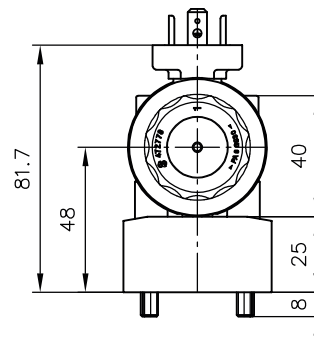
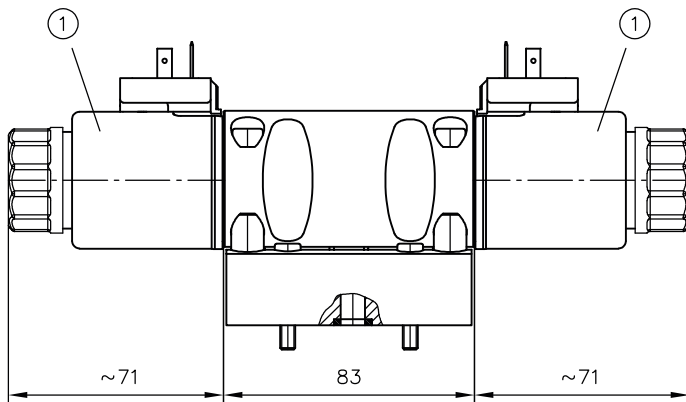
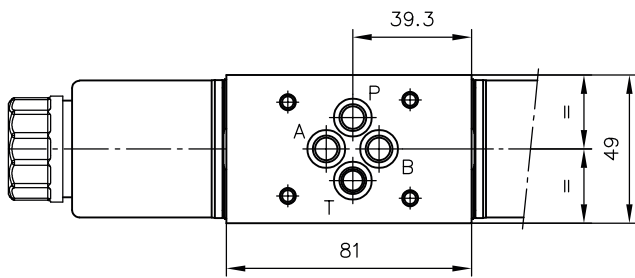
1 Solenoid turned in any direction

**Ports (ISO 228-1)**

A, B, P, T

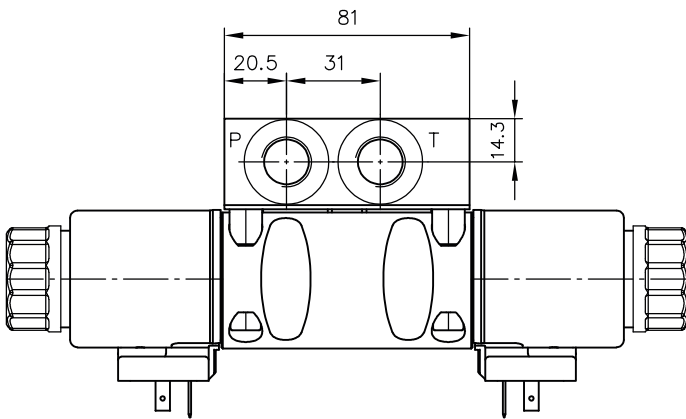
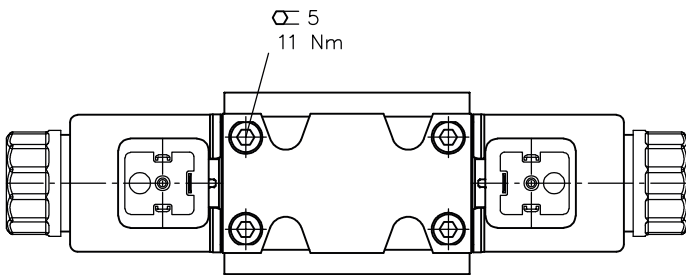
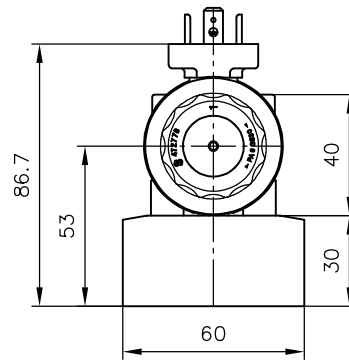
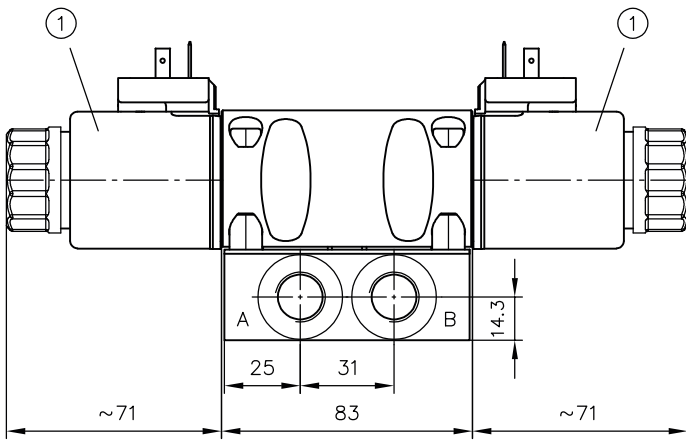
G 3/8

Circuit symbol **G, D, ZZ** with adapter plate - N



1 Solenoid turned in any direction

Circuit symbol **G, D, ZZ** with adapter plate - 3/8"



1 Solenoid turned in any direction

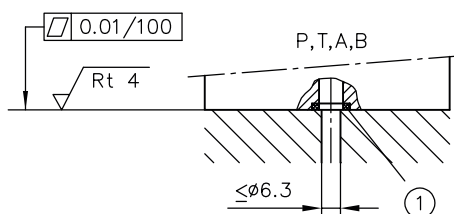
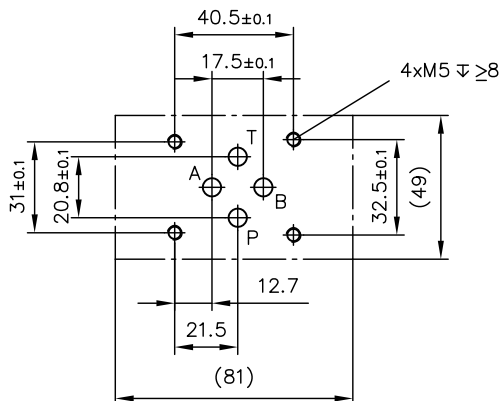
**Ports (ISO 228-1)**

A, B, P, T

G 3/8

## 4.2 Hole pattern of the base plate

Base plate hole pattern for adapter plate - N  
as per ISO 4401-03 (CETOP 03)

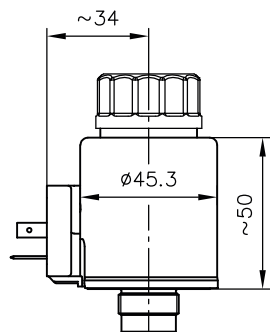


1 O-ring

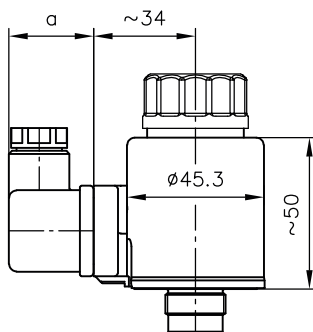
## 4.3 Actuating elements

### Electrical actuation

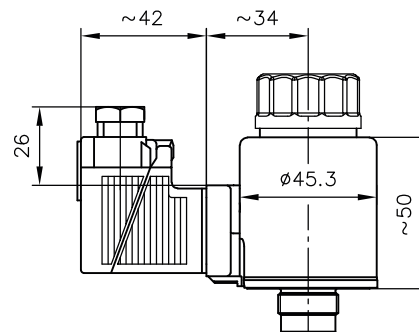
Coding X



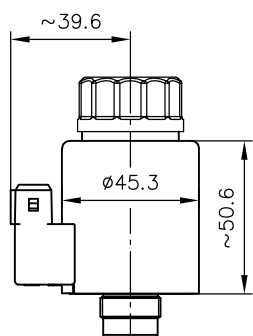
Coding G, WG



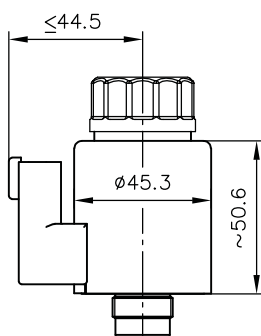
Coding L



Coding AMP



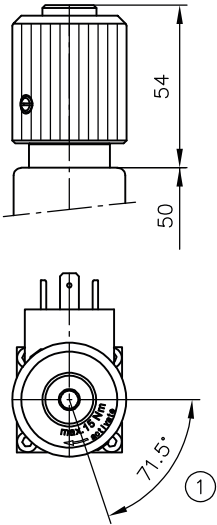
Coding DT



Version	a
G	28
WG	~35

**Solenoid additions**

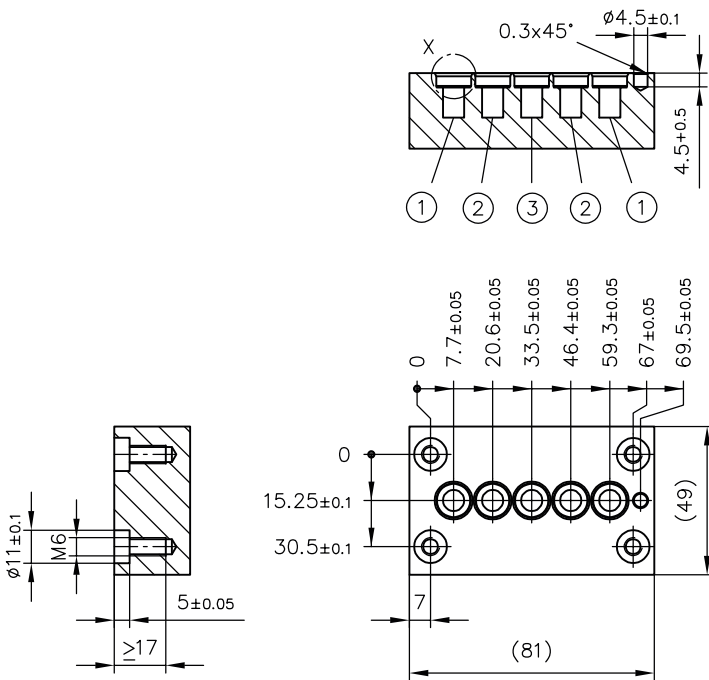
- .. T, - .. T1



1 Maximum adjustment torque 15 Nm

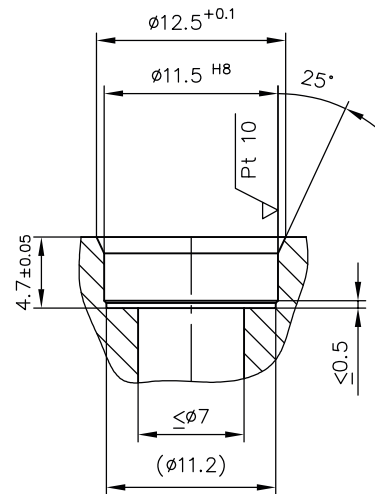
**4.4 Hole pattern for producing a sub-plate or monoblock in-house**

Coding 101



- 1 Pump connection P
- 2 Consumer ports A and B
- 3 Tank connection T

Unit 5x X



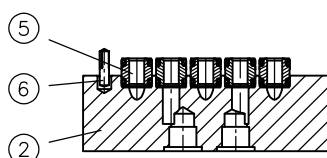
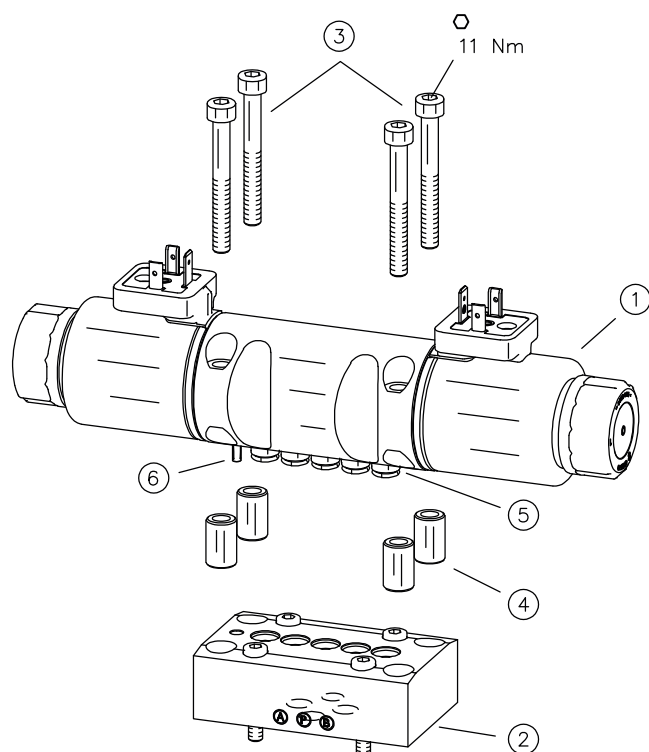
**NOTICE**

Accordingly, when producing a monoblock only the distances of the plug-in sleeves and mounting holes must be observed.

## 5 Installation, operation and maintenance information

Observe the document B 5488 "General operating instructions for assembly, commissioning, and maintenance."

### 5.1 Mounting of basic valve and adapter plate



Connecting the hydraulic connections using plug-in sleeves

Basic valve and adapter plates can be purchased individually. Instead of the adapter plates that are available as standard, individual adapter plates can also be used. In this case, it is essential to ensure the correct circuitry (holes) in the block.

**When carrying out the mounting work, check the following:**

1. Before mounting the basic valve and adapter plate, slightly oil the 5 holes for the hydraulic connection.
2. Place the sleeves on the adapter plate.
3. Position the basic valve on the sleeves. The retaining pin will specify the correct alignment.
4. Use the cylinder screws to screw the basic valve onto the adapter plate/your own blocks.  
When doing so, tighten the screws crosswise, alternating until the specified torque is reached, in order to prevent the basic valve from tipping too much.

- 1 Basic valve (housing + excitation system)
- 2 Adapter plate
- 3 4x fastening screws
- 4 4x sleeves
- 5 5x plug-in sleeves incl. O-ring
- 6 Pin for correct alignment

## 5.2 Intended use

This product is intended exclusively for hydraulic applications (fluid technology).

The user must observe the safety measures and warnings in this document.

### Essential requirements for the product to function correctly and safely:

- ▶ All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- ▶ The product must only be assembled and put into operation by specialist personnel.
- ▶ The product must only be operated within the specified technical parameters described in detail in this document.
- ▶ All components must be suitable for the operating conditions when using an assembly.
- ▶ The operating instructions for the components, assemblies and the specific complete system must also always be observed.

### If the product can no longer be operated safely:

1. Remove the product from operation and mark it accordingly.
  - ✓ It is then not permitted to continue using or operating the product.

## 5.3 Assembly information

The product must only be installed in the complete system with standard and compliant connection components (screw fittings, hoses, pipes, fixtures etc.).

The product must be shut down correctly prior to disassembly (in particular in combination with hydraulic accumulators).

### DANGER

#### Sudden movement of the hydraulic drives when disassembled incorrectly

Risk of serious injury or death

- ▶ Depressurise the hydraulic system.
- ▶ Perform safety measures in preparation for maintenance.

## 5.4 Operating instructions

Observe product configuration and pressure/flow rate.

The statements and technical parameters in this document must be strictly observed.

The instructions for the complete technical system must also always be followed.

### NOTICE

- ▶ Read the documentation carefully before usage.
- ▶ The documentation must be accessible to the operating and maintenance staff at all times.
- ▶ Keep documentation up to date after every addition or update.

### CAUTION

#### Overloading components due to incorrect pressure settings.

Risk of minor injury. Parts may burst or fly off, and uncontrolled leakage of hydraulic fluid.

- Pay attention to the maximum operating pressure of the pump, valves and fittings.
- Always monitor the pressure gauge when setting and changing the pressure.

## Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of the product. Contamination can cause irreparable damage.



**Examples of fine contamination include:**

- Swarf
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

**! NOTICE**

**New hydraulic fluid from the manufacturer may not have the required purity.**

Damage to the product is possible.

- ▶ Filter new hydraulic fluid to a high quality when filling.
- ▶ Do not mix hydraulic fluids. Always use hydraulic fluid that is from the same manufacturer, of the same type, and with the same viscosity properties.

For smooth operation, pay attention to the cleanliness level of the hydraulic fluid (cleanliness level [see Chapter 3, "Parameters"](#)).

Additionally applicable document: [D 5488/1](#) oil recommendations

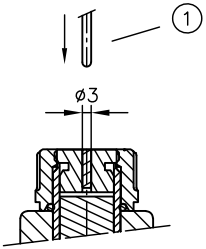
## 5.5 Maintenance information

Check regularly (at least once a year) by visual inspection whether the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the surface of the device regularly (at least once a year) (dust deposits and dirt).

## 6 Other information

### 6.1 Manual override



- 1 Auxiliary tool for actuation  
(do not use any parts with sharp edges)

To actuate the valve:

- Use a steel pin or screwdriver etc. to depress the brass bolt (visible on the upper face).

#### **!** NOTICE

The pressure at port T generates a load on the brass bolt acting on the area of  $\varnothing 3$  mm; at 50 bar this is approx. 40 N!  
Manual override with coding T or T1 is recommended for higher system pressures.

### 6.2 Notes regarding replacement of directional seated valves type NBVP as per D 7765 N

#### **Circuit symbol G:**

Consumer ports A and B have changed places in comparison with their positions on predecessor model type NBVP 16 G. Spacer plate type NZP AB-BA as per D 7788 Z can be used to swap the ports over.

Unlike type NBVP 16 G, type ROLV 14 G does not provide a 4th switching position. A de-energised pause is therefore necessary when switching over directly from solenoid a to solenoid b.

#### **Circuit symbol W:**

Consumer ports A and B have changed places in comparison with their positions on predecessor model type NBVP 16 W. Spacer plate type NZP AB-BA as per D 7788 Z can be used to swap the ports over.

## References

### Additional versions

- Directional seated valve type NBVP 16: D 7765 N
- Valve bank (nominal size 6) type BA: D 7788
- Intermediate plate type NZP: D 7788 Z
- Valve bank type BNG: D 7788 BNG
- Valve bank (directional seated valve) type BVH: D 7788 BV

