

DATA SHEET - OPERATION MANUAL

APPLICATION

The unloading valve with adjustable hysteresis UZOP...NHY... type is used in the hydraulic systems with pump and hydraulic accumulator (or the second pump). The task of the valve is to unload the pump flow (to drain line) when the pressure in the accumulator reaches the unloading value set at the unloading valve. When the pressure in the accumulator drops to the loading pressure value set at the unloading valve, the valve reconnects the pump with accumulator feeding line. The valve working hysteresis can be set in the range from 17% to 50%.

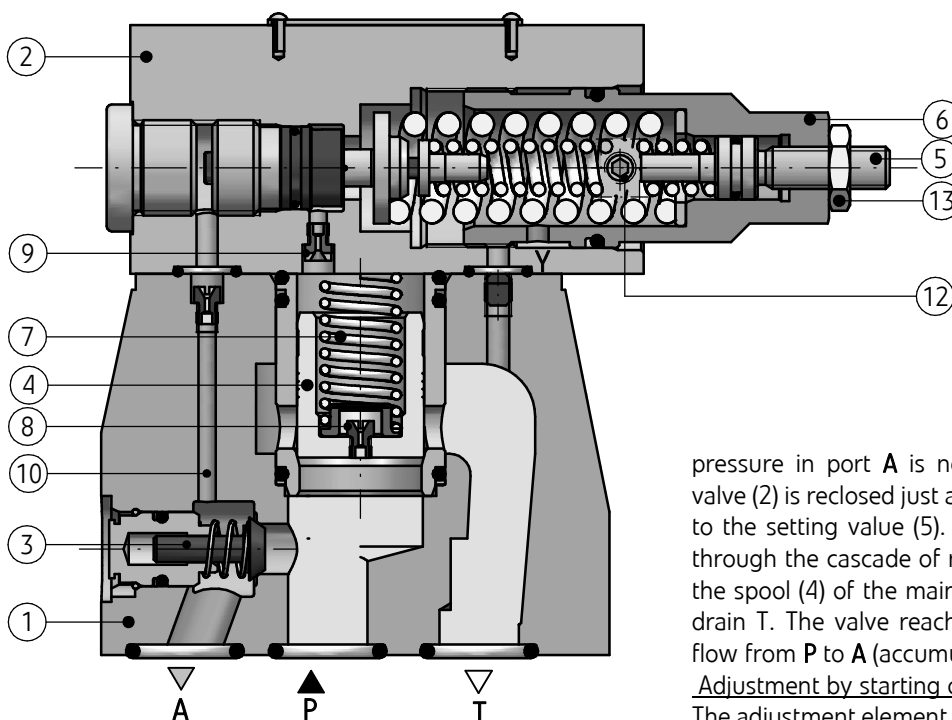
The product is compliant with the regulations of directive 2014/35/UE.



DESCRIPTION OF OPERATION

version UZOP...NHY...

UZOP10 - 2 - 53/350 NHY



Hydraulic fluid flows from the pump through port P, and then through the check valve (3) into port A (hydraulic accumulator supply). When the pressure set at the adjustment (6) is reached, the pilot valve (2) opens. The fluid flows from port P through the cascade of nozzles (8) and (9) to the external pilot oil drain Y. As a result of pressure differences acting on the spool (4) of the main valve (1), the spring is deflected (7) and the connection from port P to T opens. Check valve (3) closes and the

pressure in port A is not relieved to port T. The pilot valve (2) is reclosed just after the pressure in port A drops to the setting value (5). As a consequence pilot oil flow through the cascade of nozzles (8) and (9) is cut off, and the spool (4) of the main valve (1) closes the flow to the drain T. The valve reaches the initial position to enable flow from P to A (accumulator supply).

Adjustment by starting of the valve.

The adjustment element (5) unscrew to max end position. Set the unloading pressure (upper working pressure) by means of adjustment element (6) and set the position with countering screw (12). Then by means of the adjustment element (5) set the loading pressure (lower working pressure) and secure with lock nut (13).

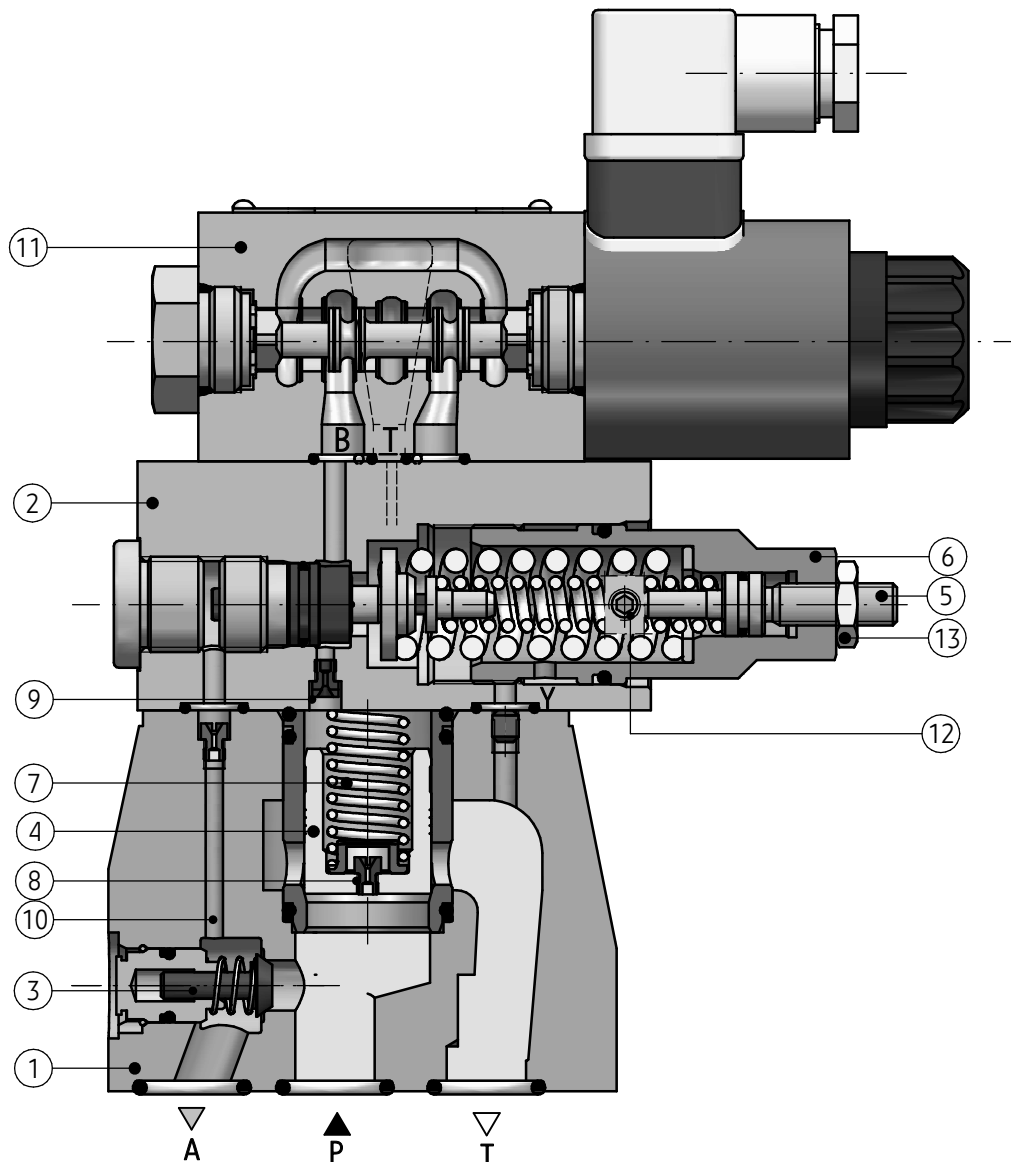
NOTE:

Pressure value set at the adjustment element (5) must be lower than the pressure value set on the adjustment (6) at least by 17%.

DESCRIPTION OF OPERATION

version UZOPW...NHY...

UZOPW10 - A2 - 53/350 NH Y G24 N Z4



The unloading valve initially operated type **UZOP...NHY...** is also available in version with electric unloading - **UZOPW...NHY** version. Pilot valve (11) enables pilot oil to flow directly to the drain line **Y** independently of the pressure value.

In relation to valve version port **P** can be unloaded in energised position - version **UZOPW...A... NHY...** or de-energised position - version **UZOPW...B...NHY...** of directional valve (11).

NOTE:

Adjustment method by valve starting is similar as in version **UZOP...NHY...** acc. to page 1.

TECHNICAL DATA

Hydraulic fluid	mineral oil				
Required fluid cleanliness class	ISO 4406 class 20/18/15				
Nominal fluid viscosity	37 mm ² /s at temperature 55 °C				
Viscosity range	2,8 up to 380 mm ² /s				
Fluid temperature range (in a tank)	recommended	40 °C do 55 °C			
	max	-20 °C do +70 °C			
Ambient temperature range	version UZOP...	- 20 °C do +70 °C			
	version UZOPW...	- 20 °C do +50 °C			
Maximum operating pressure at ports: P, A	35 MPa				
Maximum operating pressure at port T	21 MPa				
Maximum operating pressure at port Y	10 MPa *				
Minimum set presssure	2 MPa				
Maximum set pressure	35 MPa				
Maximum flow rate	nominal size	NS10	120 dm ³ /min		
		NS20	250 dm ³ /min		
		NS30	400 dm ³ /min		
Switching hysteresis	17% to 50%				
Weight	nominal size	valve version			
		UZOP...	UZOPW...	UZOPC...	UZOPWC...
	NS10	3,8 kg	5,5 kg	1,6 kg	3,2 kg
	NS20	7 kg	8,6 kg		
	NS30	13,2 kg	14,8 kg		
Nominal supply voltage for solenoid	DC			AC (plug-in connector with rectifier)	
	12V	24V	110V	230V - 50Hz	110V - 50Hz
Supply voltage tolerance	±10%				
Power requirement (DC)	30 W				
Degree of protection	IP 65				
Solenoid coil temperature	max 150 °C				

NOTES:

(*) - Operation pressure is added to the setting pressure. Switching hysteresis remains unchanged within given range of set pressure.

Drain pressure cannot be higher than supply pressure.

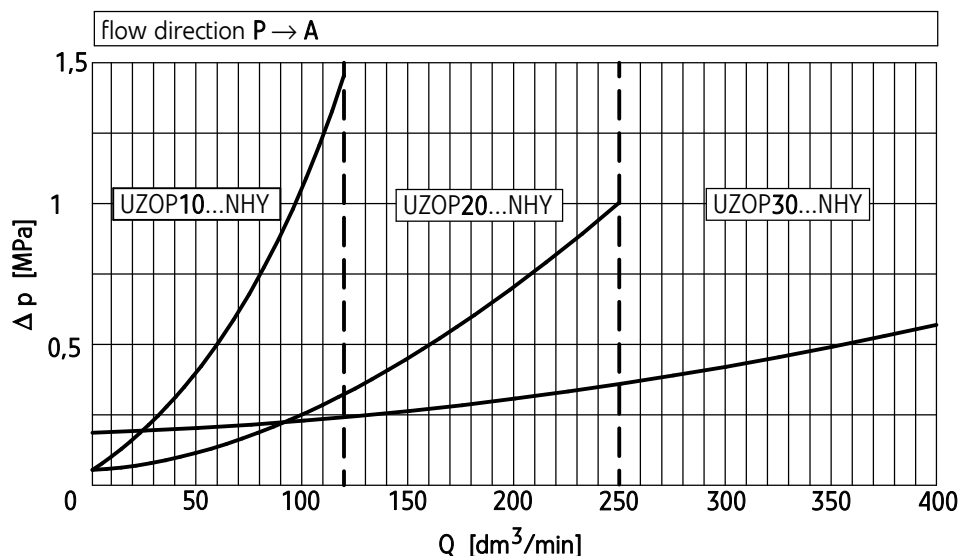
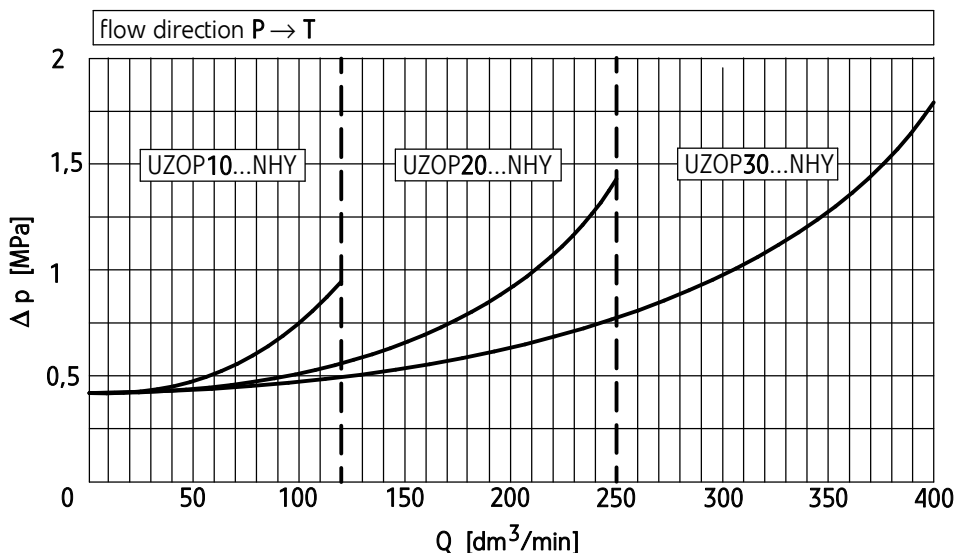
INSTALLATION AND OPERATION REQUIREMENTS

1. Only fully functional and operational valve, properly connected to electrical installation must be used.
Connecting or disconnecting the valve to an electrical installation must only be carried out by qualified personnel.
2. Ground connection ($\frac{\perp}{\text{PE}}$) must be connected with protective earth wire (PE $\frac{\perp}{\text{PE}}$) 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 valve if the tightness and suitable clamp of cable in the plug gland are not ensured.
4. During the period of operation must be kept fluid viscosity acc. to requirements defined in this Data Sheet - Operation Manual
5. In order to ensure failure free and safe operation the following must be checked:
 - condition of the electrical connection
 - proper working of the valve
 - cleanliness of the hydraulic fluid
6. Due to heating of solenoid coils to high temp., the 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.
7. In order to provide proper tightness of the valve connection to the hydraulic system, one should keep the dimensions of the sealing rings, tightening torques values and valve operation parameters, specified in this Data Sheet - Operation Manual.
8. A person that operates the valve must be thoroughly familiar with this Data Sheet - Operation Manual.

PERFORMANCE CURVES

measured at viscosity $\nu = 41 \text{ mm}^2/\text{s}$ and temperature $t = 50^\circ\text{C}$

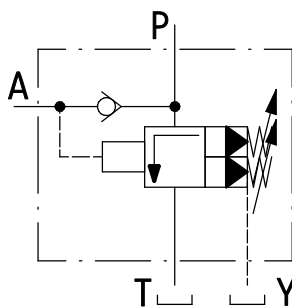
Flow resistance curves



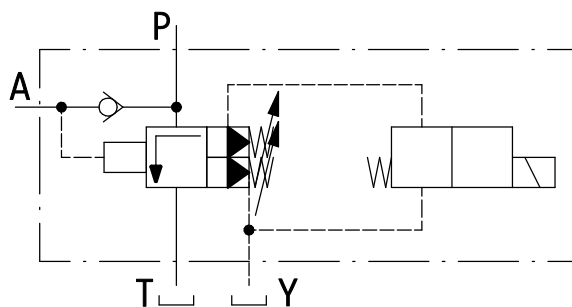
DIAGRAMS

Hydraulic diagrams of complete valves
versions: UZOP...NHY; UZOPW...NHY...

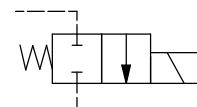
version UZOP...NHY...



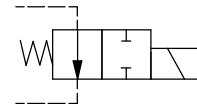
version UZOPW...NHY...



UZOPW...A.../...Y...
(normally closed)

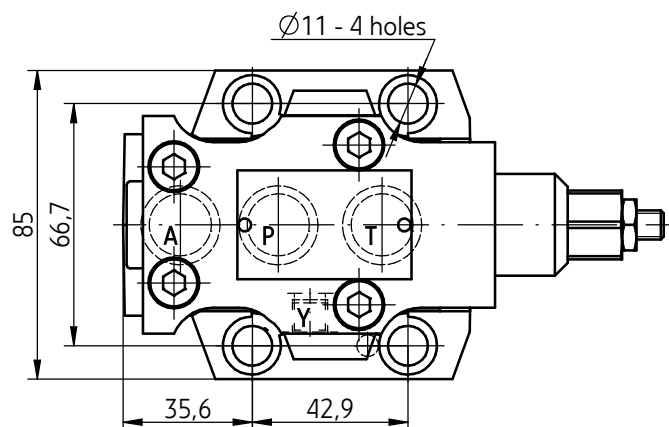
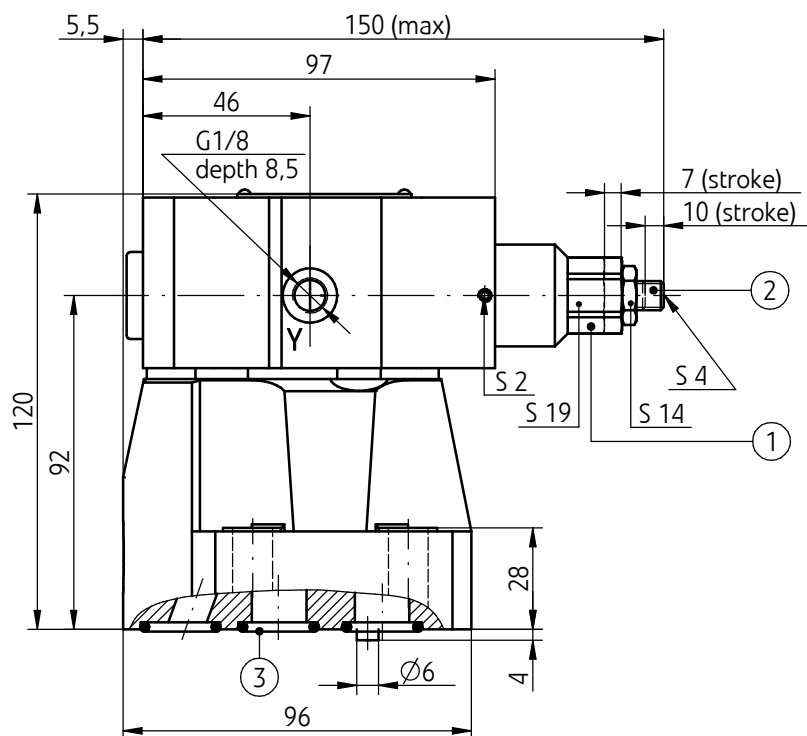


UZOPW...B.../...Y...
(normally open)



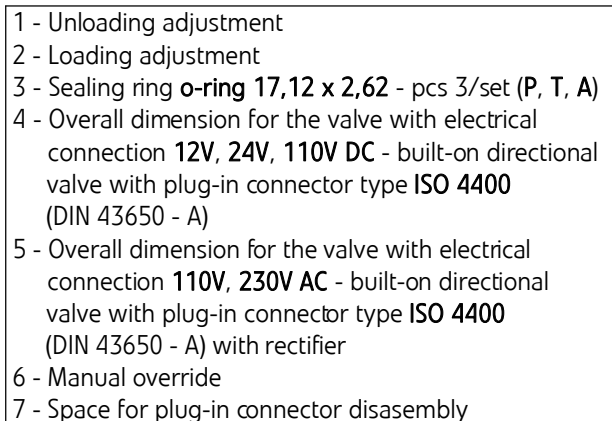
OVERALL AND CONNECTION DIMENSIONS

version UZOP10...NHY...



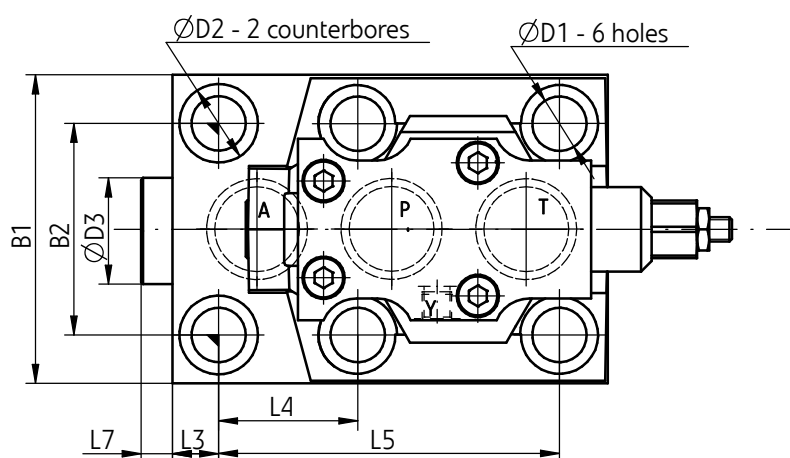
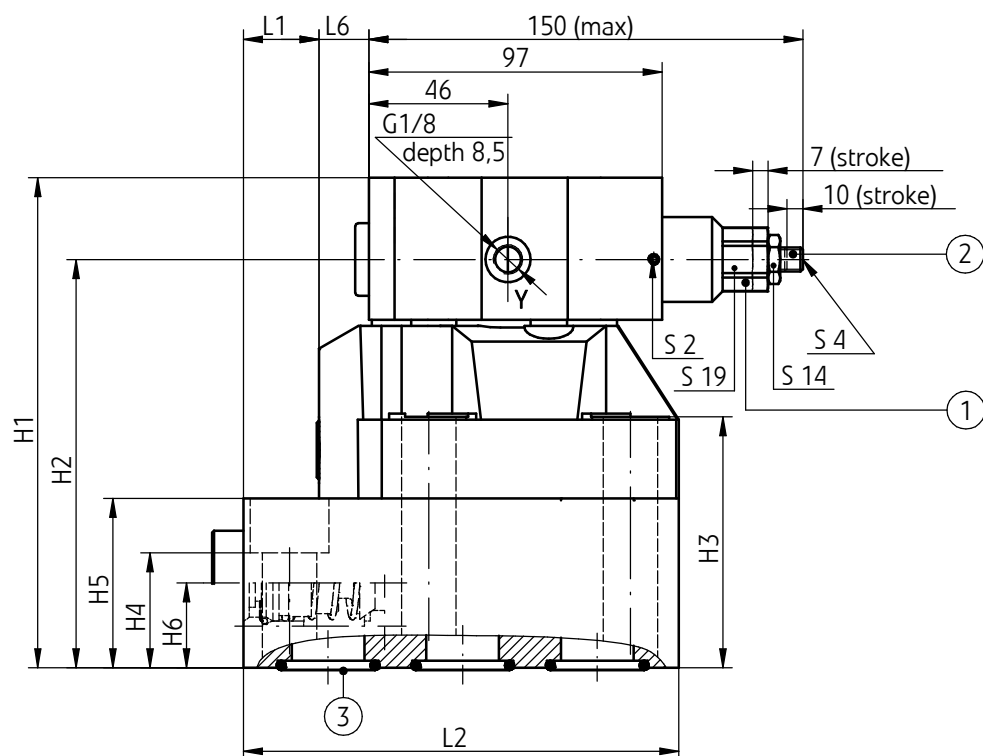
- 1 - Unloading adjustment
- 2 - Loading adjustment
- 3 - Sealing ring o-ring 17,12 x 2,62 - pcs 3/set (P, T, A)

version UZOPW10...NHY...



OVERALL AND CONNECTION DIMENSIONS

versions: UZOP20...NHY...; ...30...NHY...

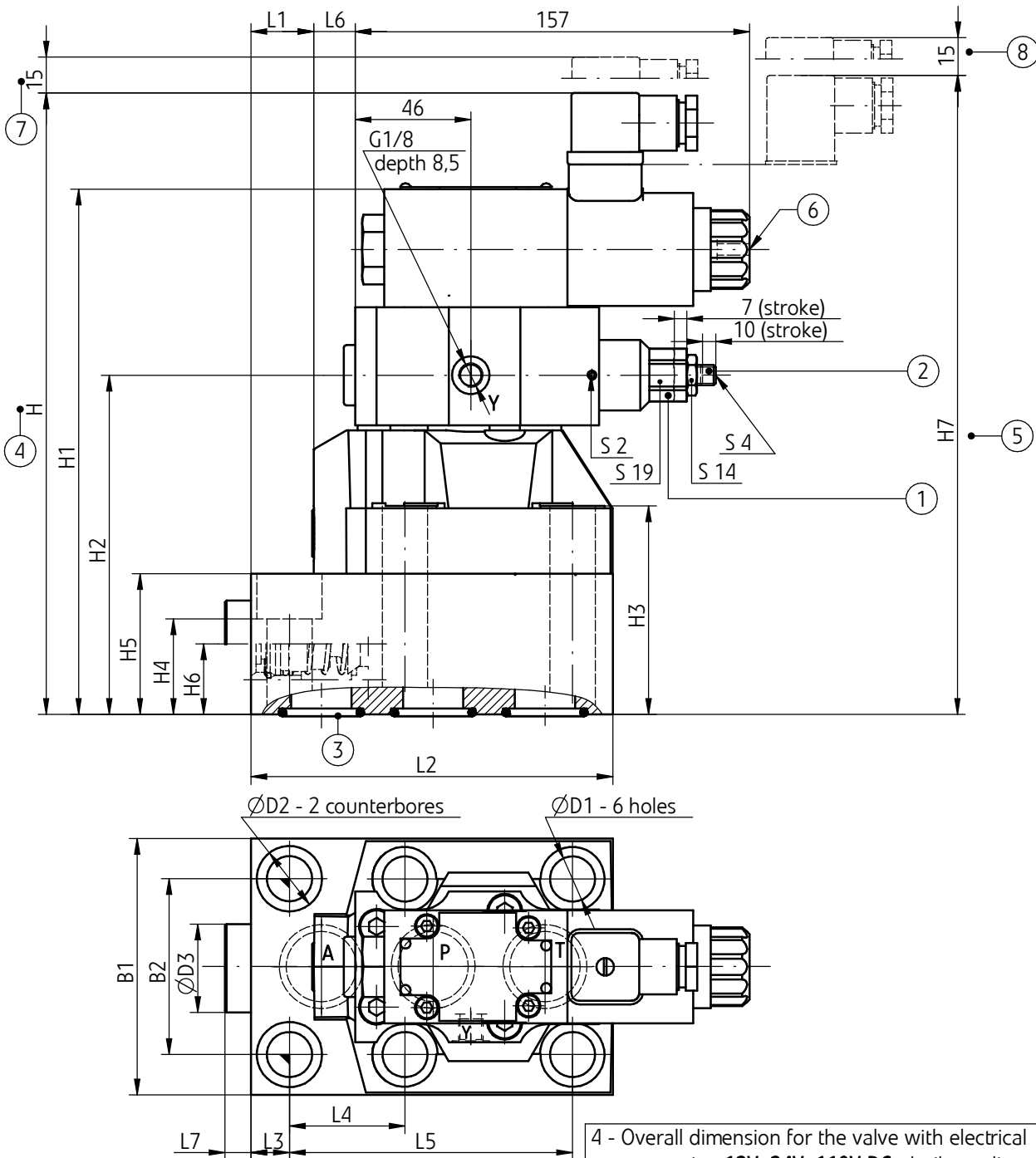


- 1 - Unloading adjustment
- 2 - Loading adjustment
- 3 - Sealing ring **o-ring** - pcs 3/set (P, T, A):
 - version UZOP20...NHY... - o-ring 28,17 x 2,62
 - version UZOP30...NHY... - o-ring 34,5 x 3,5

valve version	L1	L2	L3	L4	L5	L6	L7	B1	B2	H1	H2	H3	H4	H5	H6	ØD1	ØD2	ØD3
UZOP20...NHY...	25	144	15,3	46	112,7	16,5	—	102	70	162	135	83	38	56	28	18	26	—
UZOP30...NHY...	58,5	205	49,3	50,8	139,7	24,5	16,5	115	82,5	182	155	103	56	76	38	20	30	55

OVERALL AND CONNECTION DIMENSIONS

versions: UZOPW20...NH...; ...30...NH...



- 1 - Unloading adjustment
- 2 - Loading adjustment
- 3 - Sealing ring **o-ring** - pcs 3/set (P, T, A):
 - version UZOP20...NH... - **o-ring 28,17 x 2,62**
 - version UZOP30...NH... - **o-ring 34,5 x 3,5**

- 4 - Overall dimension for the valve with electrical connection **12V, 24V, 110V DC** - built-on directional valve with plug-in connector type **ISO 4400** (DIN 43650 - A)
- 5 - Overall dimension for the valve with electrical connection **110V, 230V AC** - built-on directional valve with plug-in connector type **ISO 4400** (DIN 43650 - A) with rectifier
- 6 - Manual override
- 7, 8 - Space for plug-in connector disassembly

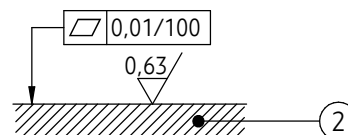
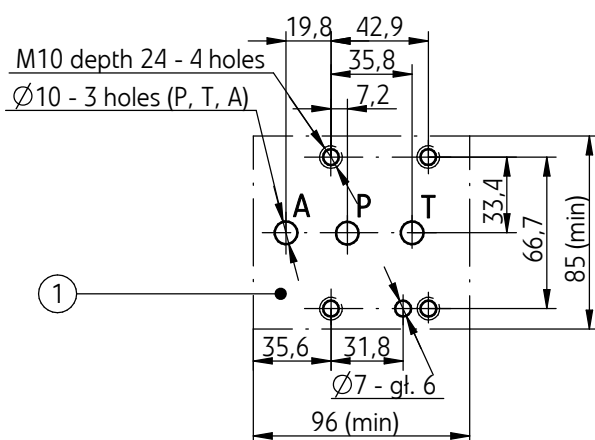
valve version	L1	L2	L3	L4	L5	L6	L7	B1	B2	H	H1	H2	H3	H4	H5	H6	H7	ØD1	ØD2	ØD3
UZOPW20...NH	25	144	15,3	46	112,7	16,5	—	102	70	248	209	135	83	38	56	28	255	18	26	—
UZOPW30...NH	58,5	205	49,3	50,8	139,7	24,5	16,5	115	82,5	268	229	155	103	56	76	38	275	20	30	55

OVERALL AND CONNECTION DIMENSIONS

versions for subplate mounting: UZOP10...; ...20...; ...30...NHY...; UZOPW10...; ...20...; ...30...NHY...

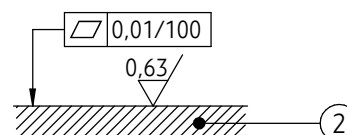
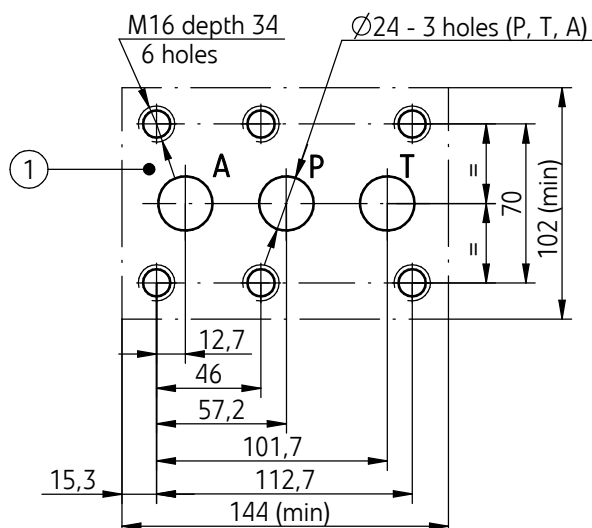
porting pattern on a subplate

versions: UZOP10...NHY...; UZOPW10...NHY...



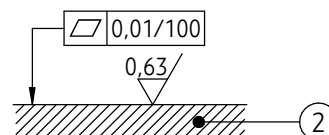
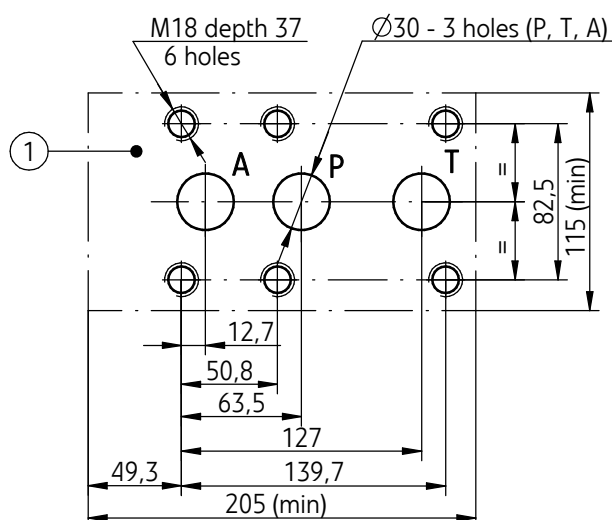
- 1 - Connection holes configuration on a subplate
fixing screws **M10 x 50 - 10.9** acc. to PN - EN ISO 4762
pcs 4/set; tightening torque **Md = 75 Nm**
- 2 - Subplate surface required

versions: UZOP20...NHY...; UZOPW20...NHY...



- 1 - Connection holes configuration on a subplate
fixing screws:
 - **M16 x 100 - 10.9** acc. to PN - EN ISO 4762 - pcs 4/set
tightening torque **Md = 310 Nm**.
 - **M16 x 60 - 10.9** acc. to PN - EN ISO 4762 - pcs 2/set
tightening torque **Md = 310 Nm**
- 2 - Subplate surface required

versions: UZOP30...NHY...; UZOPW30...NHY...

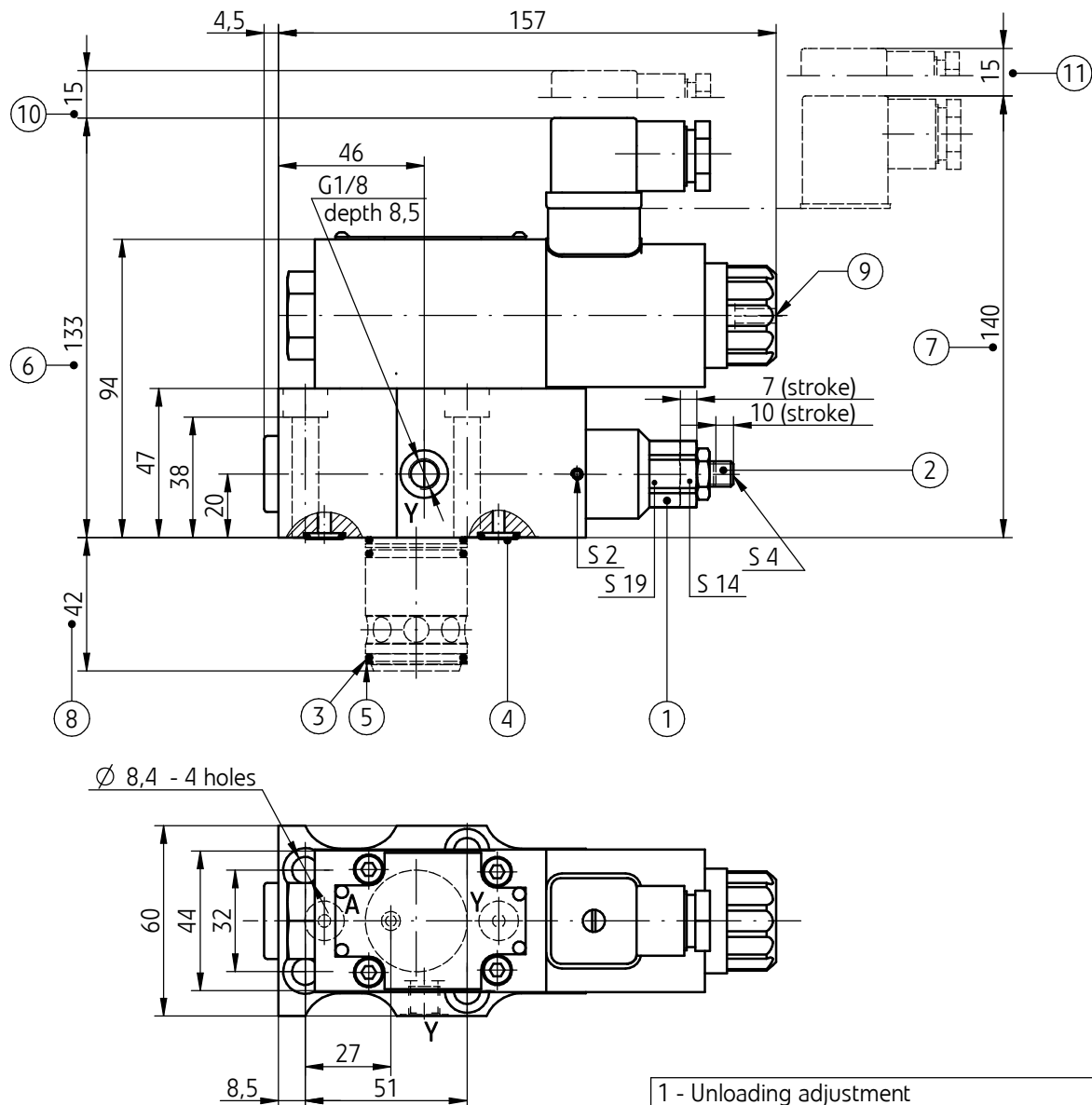


- 1 - Connection holes configuration on a subplate
fixing screws:
 - **M18 x 120 - 10.9** acc. to PN - EN ISO 4762 - pcs 4/set
tightening torque **Md = 430 Nm**.
 - **M18 x 80 - 10.9** acc. to PN - EN ISO 4762 - pcs 2/set
tightening torque **Md = 430 Nm**
- 2 - Subplate surface required

OVERALL AND CONNECTION DIMENSIONS

pilot valve with main spool - version UZOPWC30...NHY...

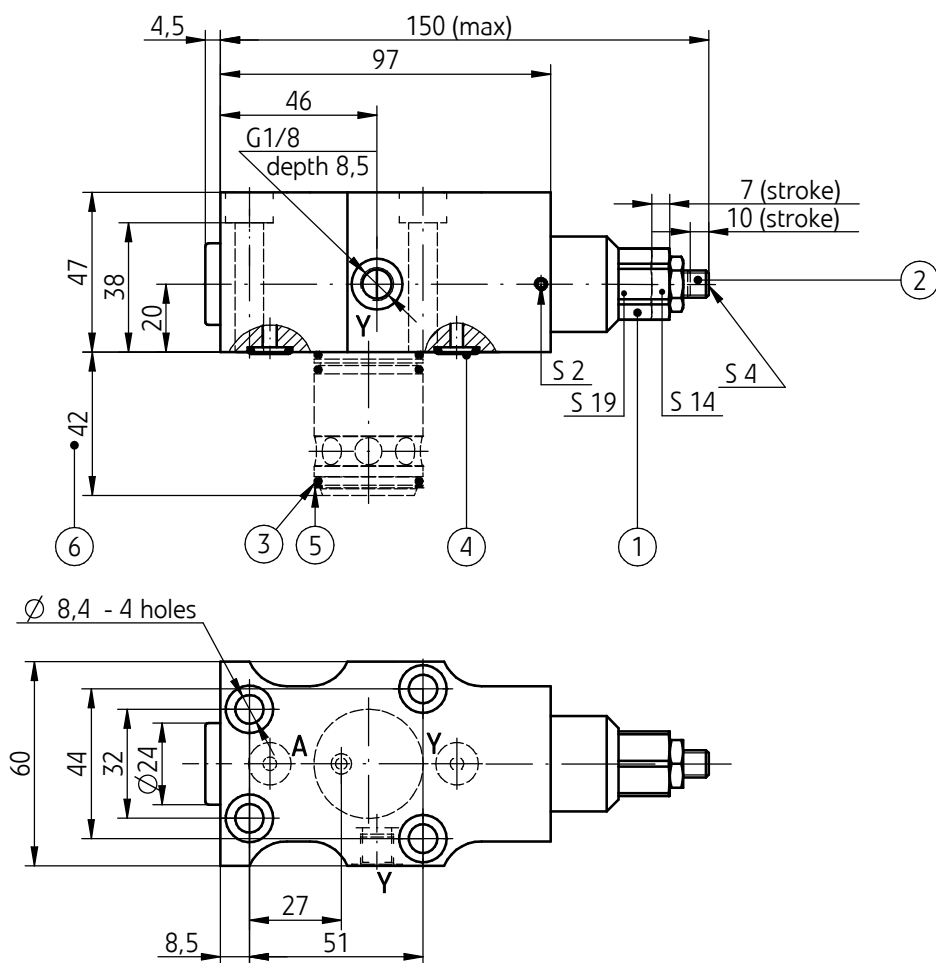
pilot valve without main spool - version UZOPWC...NHY...



- 1 - Unloading adjustment
- 2 - Loading adjustment
- 3 - Sealing ring **o-ring** 27,3 x 2,4 - pcs 3/set
- 4 - Sealing ring **o-ring** 17,12 x 2,62 - pcs 2/set (A, Y)
- 5 - Back-up ring PEP 28,4 x 32 x 0,8 - pc 1/set
- 6 - Overall dimension for the valve with electrical connection 12V, 24V, 110V DC - built-on directional valve with plug-in connector type ISO 4400 (DIN 43650 - A)
- 7 - Overall dimension for the valve with electrical connection 110V, 230V AC - built-on directional valve with plug-in connector type ISO 4400 (DIN 43650 - A) with rectifier
- 8 - Overall dimension for the valve **with main spool** - applied to valves nominal size NS30 only - version UZOPWC30...
- 9 - Manual override
- 10, 11 - Space for plug-in connector disassembly

OVERALL AND CONNECTION DIMENSIONS

pilot valve with main spool - version UZOPC30...NHY...
pilot valve without main spool - version UZOPC...NHY...



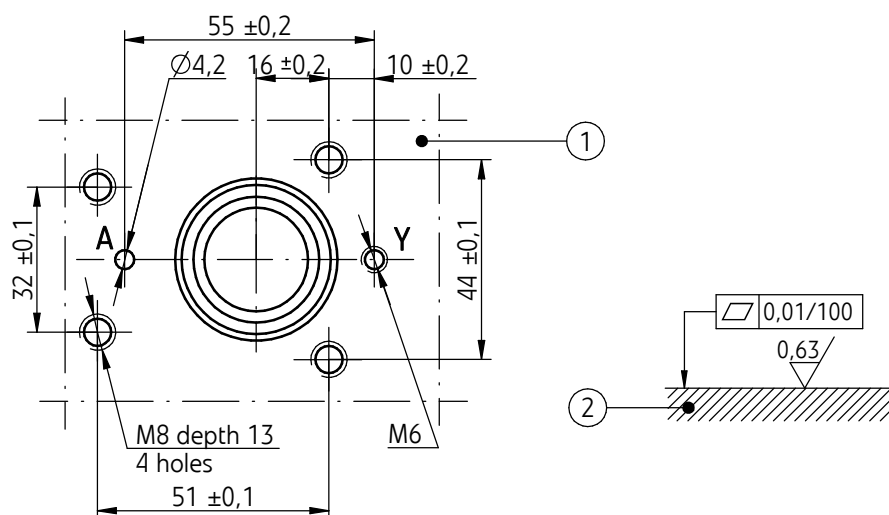
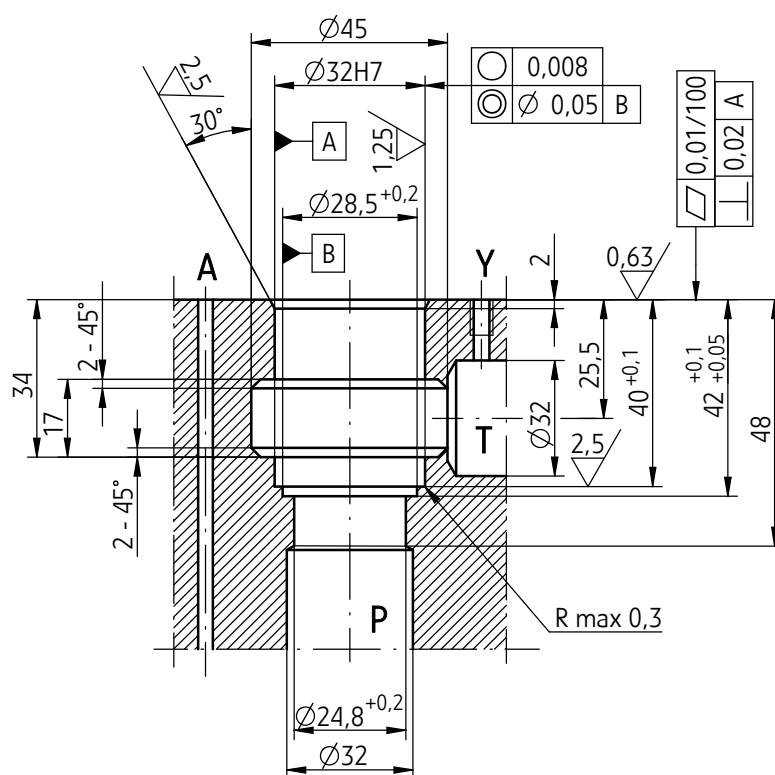
- 1 - Unloading adjustment
- 2 - Loading adjustment
- 3 - Sealing ring **o-ring** 27,3 x 2,4 - pcs 3/set
- 4 - Sealing ring **o-ring** 17,12 x 2,62 - pcs 2/set (A, Y)
- 5 - Back-up ring PEP 28,4 x 32 x 0,8 - pc 1/set
- 6 - Overall dimension for the valve **with main spool** -
applied to valves nominal size **NS30** only - version
UZOPC30...

OVERALL AND CONNECTION DIMENSIONS

pilot valve with main spool

versions: UZOPC30...; UZOPWC30...NHY...

cavity



- 1 - Porting pattern - mounting holes configuration on the cavity facing surface; fixing screws **M8 x 50 -10.9** in accordance with **PN - EN ISO 4762** - pcs 4/set; tightening torque **Md = 37 Nm**
- 2 - Required cavity facing surface condition

HOW TO ORDER

UZOP			+	2	+	/		NH	Y
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Design version
without unloading = no designation
with unloading = **W**

Valve version
complete valve = no designation

pilot valve with the main spool = **C ...**

state nominal size - NS30 only

in the next step

pilot valve without the main spool = **C**

do not state nominal size in the next step

Nominal size (NS)

NS10 = **10**

NS20 = **20**

NS30 = **30**

Type of unloading (applied to version UZOPW... only)

directional valve in de-energized position closed = **A**

directional valve in de-energized position opened = **B**

Adjustment element

set screw with hexagon socket = **2**

Series number

(51-59) - connection and installation dimensions unchanged = **5X**

series 53 = **53**

Settable pressure range

from 2MPa to 12 MPa = **100**

from 8 to 21 MPa = **200**

from 10 to 35 MPa = **350**

Percentage difference between switching off and switching on pressure values

adjustable hysteresis = **NH**

Pilot oil drain

external oil drain via independent port Y = **Y**

HOW TO ORDER

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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

Electrical connection (only for version UZOPW...)

plug-in connector type ISO 4400 (DIN 43650 - A) **without LED** = **Z4**
plug-in connector type ISO 4400 (DIN 43650 - A) with LED = Z4L

Manual override for solenoid (only for version UZOPW...)

solenoid without manual override = no designation
solenoid with manual override = **N**

Supply voltage for solenoid (only for version UZOPW...)

12V DC = G12
24V DC = **G24**
110V DC = G110
110V AC 50Hz (plug-in connector with rectifier) = W110R
230V AC 50Hz (plug-in connector with rectifier) = **W230R**

NOTES:

The valve should be ordered according to the above coding.

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

Coding example: UZOPW10 - A2 - 53/350 NH Y G24 N Z4

SUBPLATES AND FIXING SCREWS

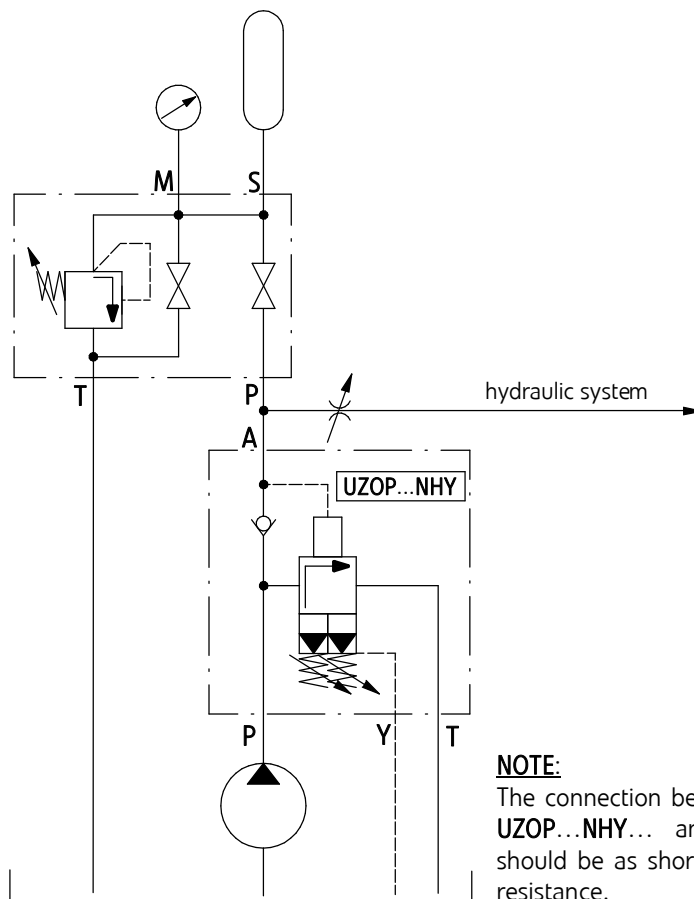
Subplate types for different valve versions, threaded connections dimensions for pipes and fixing screws are listed in the table below. In order, the subplate

symbol according to the table must be stated.

Subplates and fixing screws must be ordered separately.

Valve version	Subplate type	Threaded connections	Fixing screws
UZOP10...NHY... UZOPW10...NHY...	G468/01	A, P, T - G 1/2	M10 x 50 - 10.9 according to PN - EN ISO 4762 pcs 4/set; tightening torque Md = 75 Nm
UZOP20...NHY... UZOPW20...NHY...	G470/01	A, P, T - G 1	M16 x 100 - 10.9 according to PN - EN ISO 4762 pcs 4/set; tightening torque Md = 310 Nm M16 x 60 - 10.9 according to PN - EN ISO 4762 pcs 2/set; tightening torque Md = 310 Nm
UZOP30...NHY... UZOPW30...NHY...	G472/01	A, P, T - G 1 1/2	M18 x 120 - 10.9 according to PN - EN ISO 4762 pcs 4/set; tightening torque Md = 430 Nm M18 x 80 - 10.9 according to PN - EN ISO 4762 pcs 2/set; tightening torque Md = 430 Nm

EXAMPLE OF APPLICATION IN HYDRAULIC SYSTEM



NOTE:

The connection between the unloading valve type UZOP...NHY... and the hydraulic accumulator should be as short as possible and with low flow resistance.

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