

# Two stage valves type NE

Operating pressure  $p_{max}$  = 700 bar (high pressure)  
 = 80 bar (low pressure)  
 Flow  $Q_{max}$  = 25 lpm (high pressure)  
 = 180 lpm (low pressure)

## 1. General information

Two stage valves are employed in hydraulic systems fed by two stage pumps (high pressure / low pressure pumps). They combine the two pumps to form a common pressure circuit, switch the low pressure stage to non-pressurized circulation upon reaching a predetermined low pressure value and safeguard both pumps from exceeding the set high/low pressure values. They are used in conjunction with 3/3- or 4/3-way directional spool valves for controlling preferably hydraulic cylinders. Bottom-ram presses or single-acting hydraulic cylinders with deadweight or independent return traverse (return springs) are expediently controlled by switch units CR to according to pamphlet 7150.



## 2. Available versions, main data

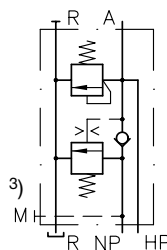
Order example: **NE 70 - 350/10**

Desired pressure setting  
 high pressure 350 bar / low pressure 10 bar

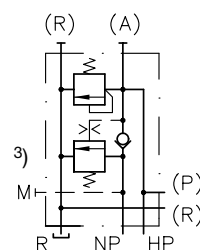
Coding	Pressure $p_{max}$ (bar) <sup>2)</sup> adjustable from ... to ...		Flow $Q_{max}$ (lpm) approx.		Mass (weight) approx. (kg)	Ports DIN ISO 228/1 (BSPP)		
	High pressure	Low pressure	High pressure	Low pressure		A and R	HP	NP
<b>NE 20</b>	20 ... 500 20 ... 700	16 ... 30 31 ... 50 51 ... 65 66 ... 80	10	40	2.1	G 1/2	G 1/4	G 1/2
<b>NE 21</b> <sup>1)</sup>	20 ... 500 20 ... 700	16 ... 30 31 ... 50 51 ... 65 66 ... 80	10	40	2.1	G 1/2	G 1/4	G 1/2
<b>NE 70</b>	(0) ... 500	(0) ... 30 (0) ... 60	16	100	3.4	G 1	G 1/4	G 3/4
<b>NE 80</b>	(0) ... 500	(0) ... 30	25	180	7.0	G 1 1/4	G 3/8	G 1

Flow pattern symbols

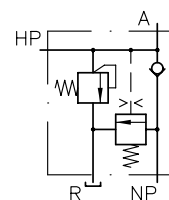
Type NE 20



Type NE 21



Type NE 70  
NE 80



<sup>1)</sup> Type NE 21 is identical to type NE 20, but enable direct mounting of directional seated valve banks type VB 11 G.. and VB 21 G.. acc. to D 7302.

Attention: Observe the max. flow ratings for type VB 11 (12 lpm) and VB 21 (25 lpm)!

<sup>2)</sup> For adjustability and notes for operation, see sect. 5.2 !

<sup>3)</sup> Low pressure side, see also sect. 5.2!

### 3. Additional parameters

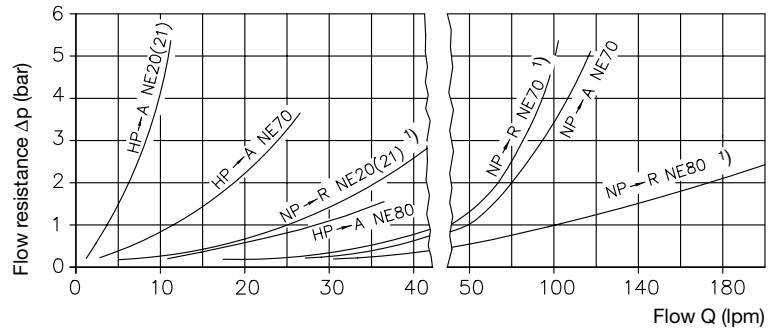
Design	Combinations of ball-type seat check valves incorporating ball-type seat and piston pressure limiting valves
Pipe connection	HP and A: Series S threaded pipe connections, DIN 2353 / ISO 8434-1 NP and R: Series L threaded pipe connections, DIN 2353 / ISO 8434-1,
Installation position	Any
Pressure fluid	Hydraulic oil conforming DIN 51524 part 1 to 3: ISO VG 10 to 68 conforming DIN 51519. Viscosity limits: min. approx. 4, max. approx. 1500 mm <sup>2</sup> /s, opt. operation approx. 10... 500 mm <sup>2</sup> /s. Also suitable for biological degradable pressure fluids types HEPG (Polyalkylenglycol) and HEES (Synth. Ester) at service temperatures up to approx. +70°C.
Temperature	Ambient: approx. -40 ... +80°C; Fluid: -25 ... +80°C; Note the viscosity range ! Permissible temperature during start: -40°C (Note start-viscosity!), as long as the service temperature is at least 20K higher for the following operation. Biological degradable pressure fluids: Note manufacturer's specifications. By consideration of the compatibility with seal material not over +70°C.

$\Delta p$ -Q - characteristics

For viscosities above approx. 500 mm<sup>2</sup>/s, greater increases in flow resistance are to be expected.

Oil viscosity during measurement 60 mm<sup>2</sup>/s

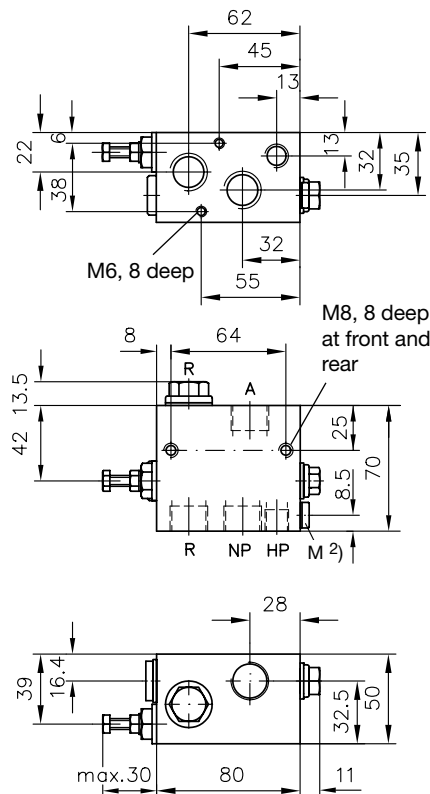
1) relieved



### 4. Dimensions

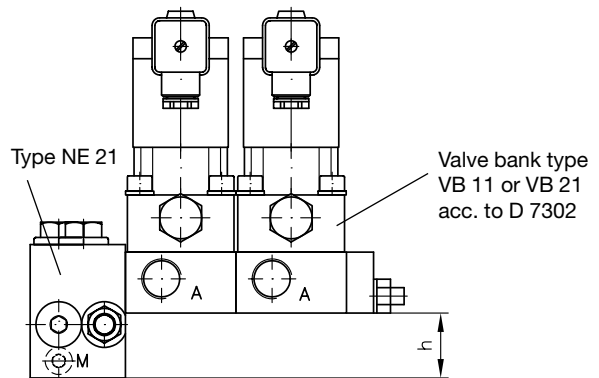
All dimensions are in mm, subject to change without notice!

**Type NE 20**

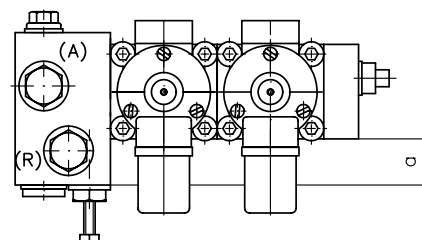


**Type NE 21**

If the NE 21 is supplied without VB 21G..- bank, all ports at the side are blocked with an end plate. If VB 21 G.. is added later, this end plate must be placed at the end of the valve bank.



For missing dimensions see type NE 20 or D 7302

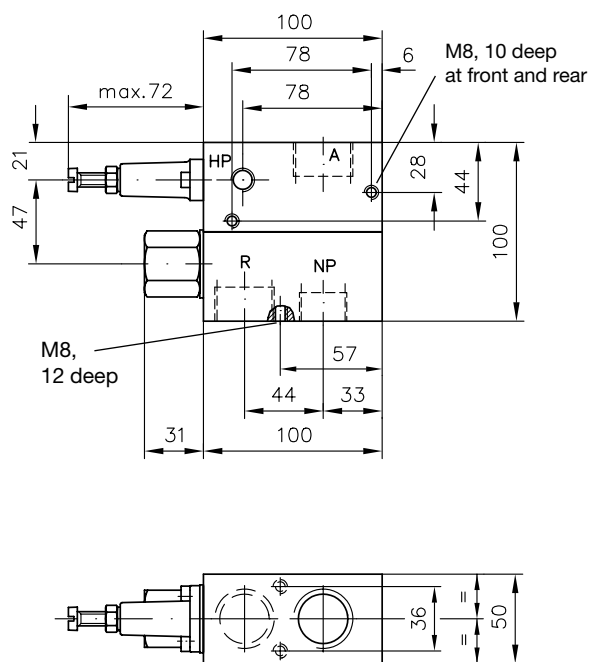


Ports	NP, A, R	HP	M 2)
Thread DIN ISO 228/1 (BSPP)	G 1/2	G 1/4	G 1/8

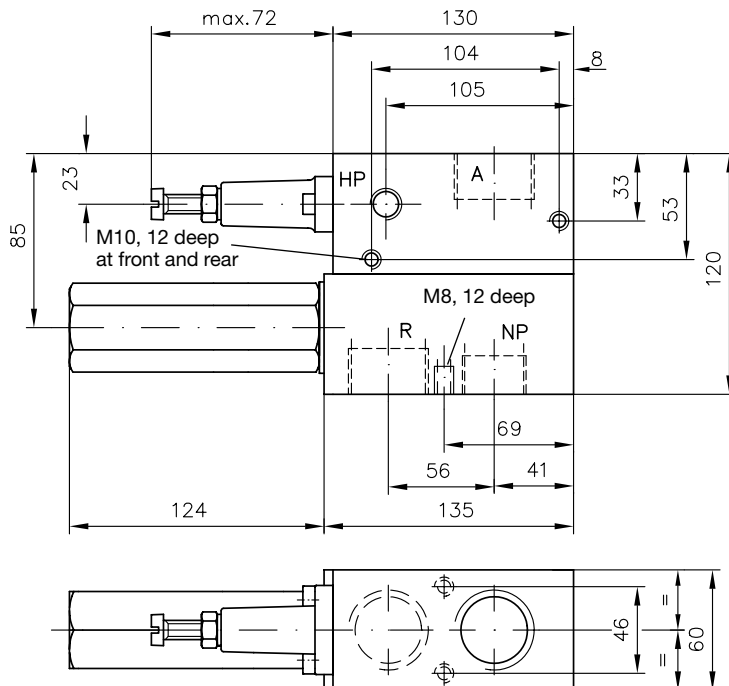
2) Low pressure side, see also sect. 5.2!

When adding to	a	h
VB 11G	---	48
VB 21G	22.5	35

**Type NE 70**



**Type NE 80**



Ports	A, R	HP	NP
Thread DIN ISO 228/1 (BSPP)	G 1	G 1/4	G 3/4

Ports	A, R	HP	NP
Thread DIN ISO 228/1 (BSPP)	G 1 1/4	G 3/8	G 1

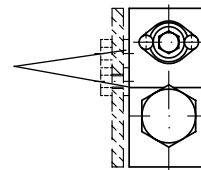
**5. Appendix**

**5.1 Attachment**

**Attachment to mounting wall (example NE 70)**

For tapped mounting holes in the housing body refer to dimensions of units, section 4

Washers to overcome any surface irregularities

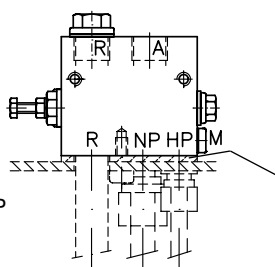


**Mounting on tank cover**

For hydraulic units available with built-on two stage valves see D 7200 H (compact hydraulic power pack type MP) and D 6910 H (hydraulic power pack type RZ).

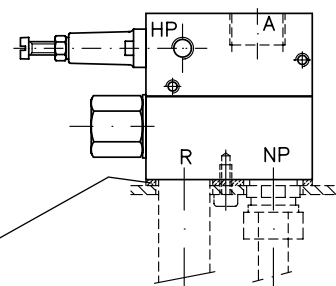
**Type NE 20, NE 21**

Ports R, NP and HP enter directly from below

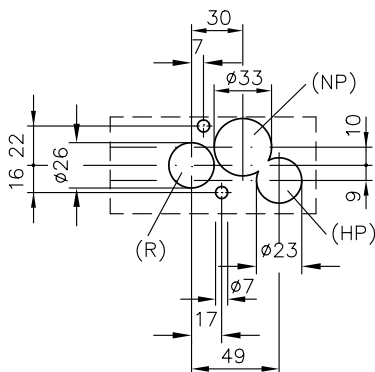


**Type NE 70 and NE 80 (example NE 70)**

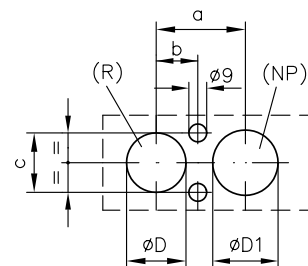
Lead the high pressure line through the tank cover to the HP connection on the side by means of a bulk-head screw coupling



ABIL-seal  
 NE 20: Order No. 7223 050  
 NE 70: Order No. 7161 050  
 NE 80: Order No. 7181 050



Hole pattern at the cover plate for passage openings for the pipe connections (top view)



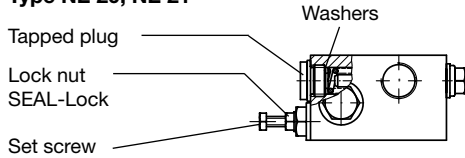
Type	D	D1	a	b	c
NE 70	36	38.5	44	20	26
NE 80	48.5	55	31	46	

## 5.2 Subsequent pressure adjustment

Do not make any subsequent pressure settings of adjustments without checking the pressure with a pressure gauge!  
 The pressure adjustment values per revolution or per millimeter of set length on the setting spindle are only approximate values giving a rough indication of the desired operating position.

**Caution:** For perfect functioning of the low pressure switch-over circuitry, take care that the high pressure setting must always be above the low pressure setting. This also applies when, for example, the hydraulic installation is not initially to be operated at the high pressure planned. Before adjusting the low pressure setting, always check the high pressure setting with a pressure gauge to ensure that it lies above the low pressure setting!

### Type NE 20, NE 21



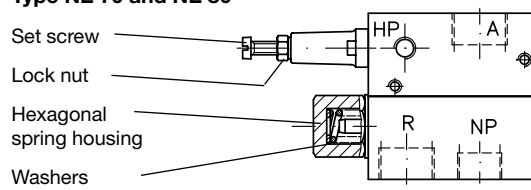
#### High pressure adjustment:

Loosen lock nut (min. 1 1/2 turns in order to free the vulcanized sealing lip from the threads)  
 Turn set screw with a screw driver:  
 clockwise = pressure increases  
 1 turn ≈ 100 bar (pressure range 20 ... 500 bar)  
 1 turn ≈ 170 bar (pressure range 20 ... 700 bar)  
 and relock with lock nut.

#### Low pressure adjustment:

Undo tapped plug and either add or remove washers  
 Ø16xØ10x1  
 1 mm ≈ 2.5 bar (pressure range 16 ... 30 bar)  
 1 mm ≈ 5 bar (pressure range 31 ... 50 bar)  
 1 mm ≈ 9 bar (pressure range 51 ... 65 bar)  
 1 mm ≈ 11 bar (pressure range 66 ... 80 bar)  
 Switching point can be checked at M using a pressure gauge.

### Type NE 70 and NE 80



#### High pressure adjustment:

Loosen lock nut  
 Turn set screw with a screw driver:  
 clockwise = pressure increases  
 1 turn ≈ 80 bar and relock with lock nut

#### Low pressure adjustment:

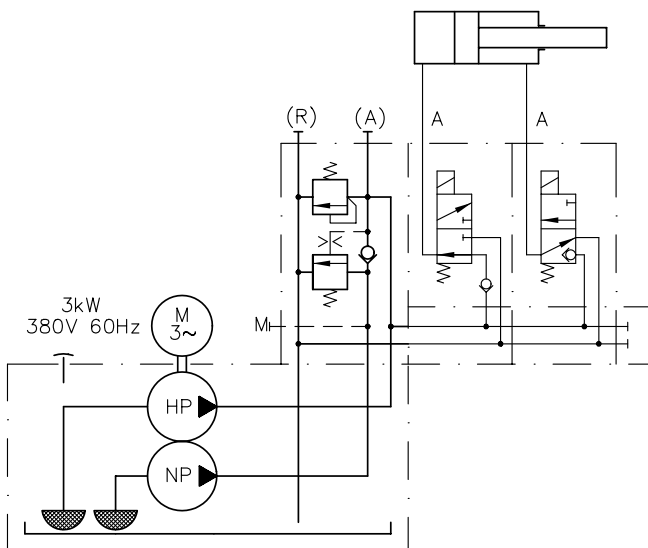
Undo spring housing. Remove ring plates as necessary = pressure decreases or add them = pressure increases

Type	Coding for washers	Pressure change per washer
NE 70	5650 005 (0.5 mm thick)	approx. 4 bar
NE 80	Washer 13 DIN 125 (2.5 mm thick)	approx. 2.5 bar

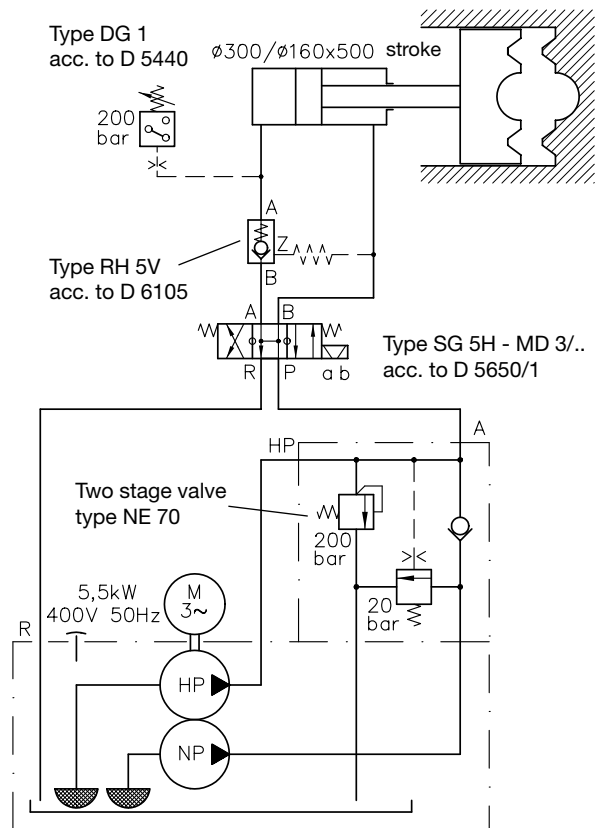
## 5.3 Example of application

Type NE 21 with valve bank VB 21 G.. (D 7302); directly mounted on to compact hydraulic power pack type MP (D 7200 H)

Example: MP 44A - H1,4 Z16 / B55 - NE 21-700/20 - VB 21GM - RH-3-G 24e



The use of a NE 70 in a hydraulic die clamp



Type RZ 8,3/59 / B100-V5,5 - NE 70-200/20 acc. to D 6910 H