Pre-load check valves type VR

Operating pressure p_{max} = 315 bar
Flow Q_{max} = 120 lpm

1. General information

These pre-load check valves type VR... block the flow in direction V → F until the specific opening pressure from approx. 3 to 15 bar is achieved. The pre-load function is not apparent in direction F → V i.e. free flow.

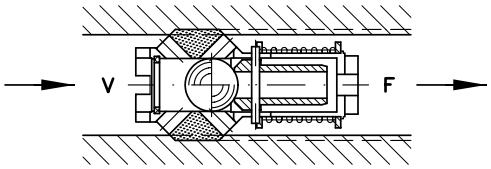
- Function: The specified back pressure Δp (opening pressure 3...15 bar) in flow direction V → F is only apparent when there is a flow. The valve does not achieve the blocked position at flow 0.

Typical application:

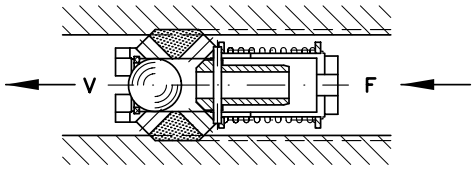
- Drop safety for fork-lift trucks. Safeguarding the lifting cylinder during lowering to prevent continued uncontrolled movement if the fork gets caught. This prevents accidents caused by the fork dropping after it has torn free.

The valves type VR.. are available as cartridge to be mounted in customer furnished bodies (e.g. cylinder bottom) or with housing to be installed directly in the pipe work.

Flow in pre-loaded direction V → F



Free flow in direction of F → V



2. Available versions, main data

Order examples:

VR 33 C Cartridge valve
VR 25 E Valve with housing
VR 4727 C Cartridge valve with metric thread [2])

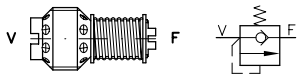
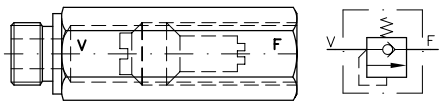
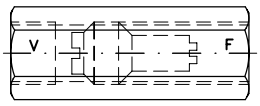
Table 1: Basic type, pre-load pressure

Basic type and size	Flow (guide line) Q_{max} (lpm)	Pre-load pressure ΔpV → F (opening pressure) (bar) 3	5	7	9	12	15
VR 1	15	**3**	**5**	**7**	**9**	**12**	**15**
VR 2	40						
VR 3	65						
VR 4	120						

Table 2: Mounting thread

Basic type	Standard ISO 228/1 (BSPP) Coding	Nom. size [1])	Version with metric fine thread DIN 13 T6 [2]) Coding	Nom. size
VR 1..	No coding	G 1/4	**14**	M14x1.5
VR 2..		G 3/8	**18**	M18x1.5
VR 3..		G 1/2	**22**	M22x1.5
VR 4..		G 3/4	**27**	M27x2

Table 3: Design

Coding	Version
C	 Cartridge valve
E	
G	 Version with housing for pipe connection

[1]) External thread G...A, internal thread G... conf. ISO 228/1 (BSPP), see also dimensional drawings in sect. 4

[2]) No version with housing available

3. Additional parameters

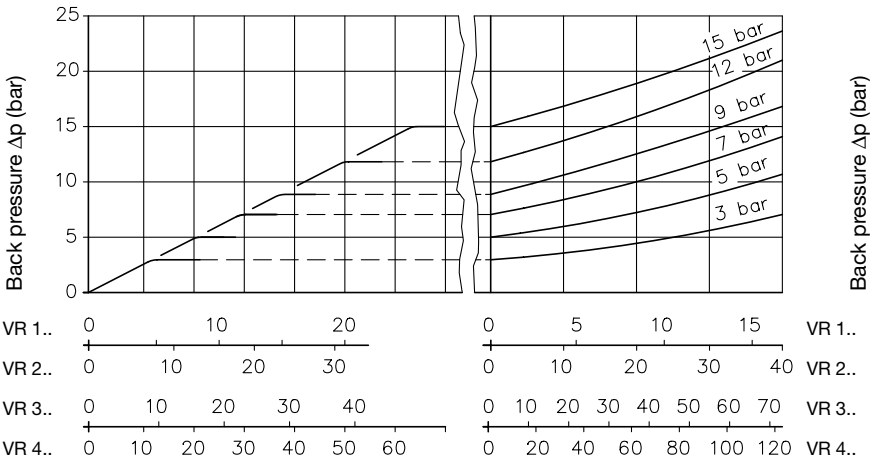
Nomenclature	Pre-load check valve (sequence valve)
Installed position	Any
Flow direction	V → F (pre-loaded), F → V (free flow)
Surface	Versions with housing E and G are zinc galvanized
Mounting	Screw-in cartridge version C and torque at the run-out of the thread. For proper torque, see sect. 4
Operating pressure	p_B = 315 bar
Static overload capacity	3 x p_B
Flow	15 ... 120 lpm, see sect. 2, table 1
Pressure fluid	Fluids acc. to DIN 51524 table 1 to 3; ISO VG 10 to 68 acc. to DIN 51519 Viscosity range: min. approx. 4; max. approx. 1500 mm²/sec; Optimal operation range: approx. 10...500 mm²/sec Also suitable are biologically degradable pressure fluids of the type HEPG (Polyalkylenglycol) and HEES (synth. Ester) at operation temperatures up to approx. +70°C.
Temperature	Ambient: approx. -40 ... +80°C; Fluid: -25 ... +80°C; take note of viscosity ranges! Start temperature down to -40°C are allowable (Pay attention to the viscosity range during start!), as long as the operation temperature during subsequent running is at least 20 K (Kelvin) higher. Biological degradable pressure fluids: Pay attention to manufacturer's information. With regard to the compatibility with sealing materials do not exceed +70°C.

Mass (weight) approx. g

	VR 1..	VR 2..	VR 3..	VR 4..
VR..C	15	25	40	80
VR..G	110	140	240	370
VR..E	123	160	280	400

Δp-Q-curve

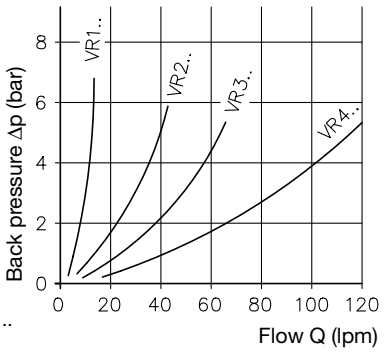
Flow direction V → F



Leakage (cm³/min)
below the opening pressure; guide line (share via thread approx. 30%)

Flow Q (lpm)
(pre-loaded - above the opening pressure)

Flow direction F → V
(free flow)

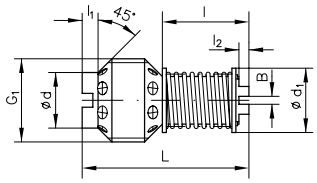


Fluid viscosity during measurement approx. 50 mm²/sec

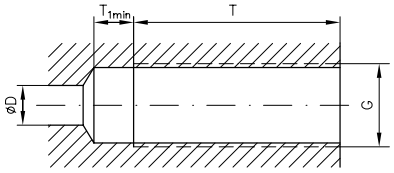
4. Unit dimensions

All dimensions in mm, subject to change without notice!

Type VR...C



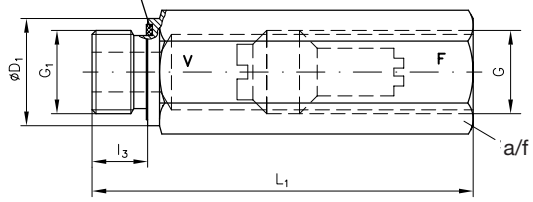
Mounting hole



Note:
Screw-in the cartridge version C and torque at the run-out of the thread, see torque in table below.

Type VR...E

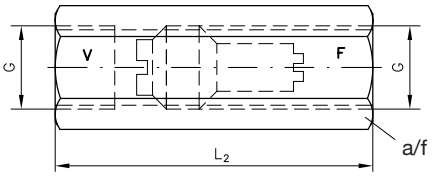
Fitting seal:
DRV 100 116-NB 650 (VR 1..)
DRV 100 147-NB 650 (VR 2..)
DRV 100 185-NB 650 (VR 3..)
DRV 100 239-NB 650 (VR 4..)



Type	ISO 228/1 (BSPP)								
	G	G1	B	D	D1	L	L1	L2	T
VR 1..	G 1/4	G 1/4A	1.2	5	11	31	78	66	40
VR 2..	G 3/8	G 3/8A	1.2	8	22	36	82	70	46
VR 3..	G 1/2	G 1/2A	2	12	27	42	96	80	53
VR 4..	G 3/4	G 3/4A	2	16	32	54	106	100	66

Type	T1	d	d1	l	l1	l2	l3	a/f	Max. torque (Nm)
VR 1..	7	8.5	10.5	16	4	2	11.5	19	5
VR 2..	8	11	13	19	4	2	12	22	6
VR 3..	10	14	16.2	22	4	2.5	14	27	10
VR 4..	12	17	20	26	7	3.5	16	32	15

Type VR...G



Order coding for housing alone

Type	Threads conf. ISO 228/1 (BSPP) E	G
VR 1..	6920 130/1	7340 050
VR 2..	7340 065	7340 060
VR 3..	6920 008/2	7340 070
VR 4..	7340 085	7340 080