

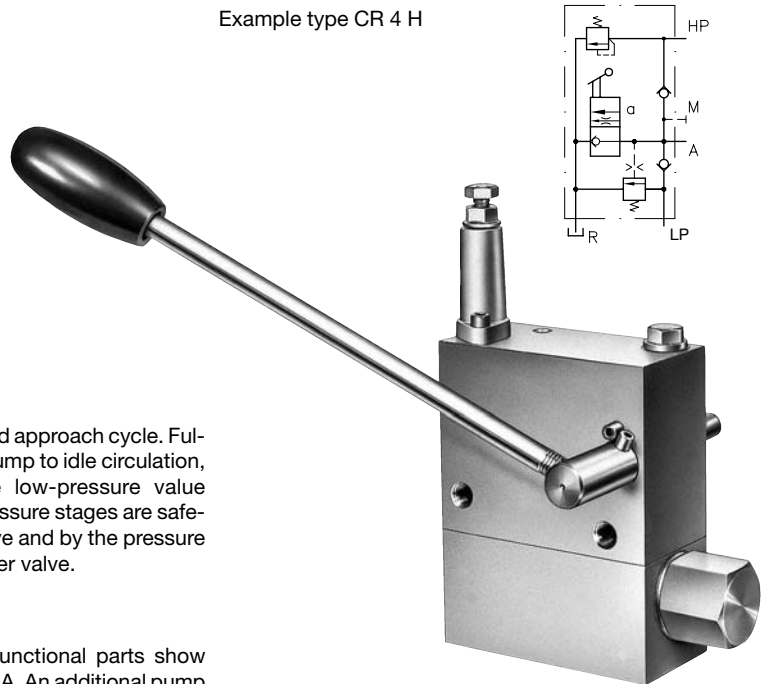
Switch unit type CR

with an automatic pre-relieving feature (shock-free decompression)
for the control of bottom-ram presses with dual stage drive
either manual or solenoid actuation

Pressure p_{\max} = 400 bar (high pressure)
= 60 bar (low pressure)

Flow Q_{\max} = 300 lpm

Example type CR 4 H



1. General information

● Compression cycle

Combines both pump delivery flows for the rapid approach cycle. Fully automatic switch-over of the low-pressure pump to idle circulation, when the pressure equals or exceeds the low-pressure value selected for the rapid approach cycle. Both pressure stages are safeguarded by a built-in high pressure limiting valve and by the pressure limiting function of the low-pressure switch-over valve.

● Maintaining the pressure

2/2-way valves, check valves and all other functional parts show zero leakage while connected to consumer port A. An additional pump is not required during the compression interval. The two-stage pump is cut-off by the pressure switch unit when the compression pressure is attained (see pamphlet 5440). Prerequisite: Press cylinders with no leakage.

● Opening the press

Type **CR 4 M**
CR 5 M

Electrical actuation of the pilot-operated solenoid valve initiates a soft pressure reduction (decompression) down to approx. 10 bar. This occurs without any pressure surges, thus protecting the unit from damage, and then passes over into a rapid and complete opening of the 2/2-way valve which also occurs without any pressure surges. Optimum lowering rates are attained from a tare or deadweight pressure of approx. 2 bar or more.

Type **CR 4 H**

When the hand lever is thrown into position **a**, the operator will first distinctly feel a straining point at which a pre-relieving valve connected in parallel to the return valve opens, thereby effecting shock-free decompression. The straining point disappears upon completion of decompression and the hand lever can be moved until it stops, thereby opening the return line completely. The deadweight pressure should be higher than 0.5 bar.

2. Available versions, main data

Example:

CR 4 M - WG 230 - 400/60
CR 4 H

Pressure setting (bar):
 Low pressure
 High pressure

Table 1: Basic type and size

Application	Bottom-ram presses with deadweight return		
Coding	CR 4 M-...	CR 5 M-...	CR 4 H
Flow Q_{max} (lpm)	HP	8	20
	NP	80	160
	A→R	200	300
Pressure p_{max} 1) 2)	High pressure (HP): = 400 bar Low pressure (NP): = (0) ... 60 bar		
Mass (weight)	5.2 kg	10.0 kg	4.7 kg
Deadweight pressure	≥ 2 bar	≥ 2 bar	≥ 0.5 bar
Symbols			

Table 2: Actuation / mode

Electrical	Applies to CR 4 and CR 5 Solenoid, conf. VDE 0580		
Coding	M-G 24	M-WG 110	M-WG 230
Nom. voltage U_N	24V DC	110V AC	230V AC
	50 and 60 Hz		
Current I_N (A)	1.1	0.26	0.13
Power P_N (W)	26	26	26
Switching time (ms)	On	140	140
	Off	55	150
Manual	Hand lever (only for CR 4!)		
Coding	H	Only little manual force necessary	

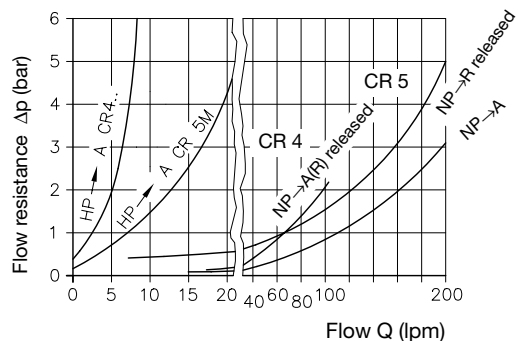
1) Available with a fixed setting only, specify the desired pressure setting when ordering; see sect. 3 for adjustability

2) Pressure range
 High pressure : (0) ... 400 bar
 Low pressure: (0) ... 30 bar
 (0) ... 60 bar

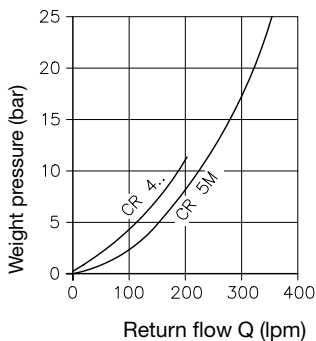
Further data

Design	2/2-way ball seated valve (main valve) with direct or indirect operation depending on the respective type, combined with ball type check valves and pressure valves. Automatic decompression when opening procedure is initiated.
Line connection	HP, NP, A, B, M = for fittings with tapped journal conf. DIN 3852, Bl. 2 shape G or F. R = for threaded pipes conf. DIN 2440 or pipe sections and elbows conf. DIN 2980
Installed position	Preferably in a vertical upright position with ports NP and R at the bottom
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 ² /s; opt. operation approx. 10... 500 mm ² /s. Also suitable are biologically 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 (observe start-viscosity!), as long as the service temperature is at least 20K higher for the following operation. Biologically degradable pressure fluids: Observe manufacturer's specifications. By consideration of the compatibility with seal material not over +70 °C.

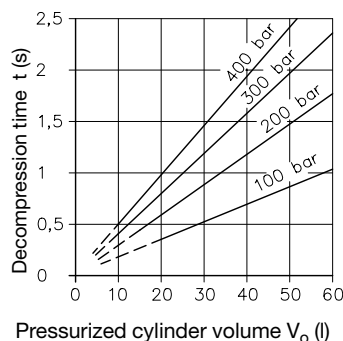
Δp-Q-Characteristics



Return flow as a function of deadweight (standard value)



Decompression time (standard value) CR 4 M.. and CR 5 M..

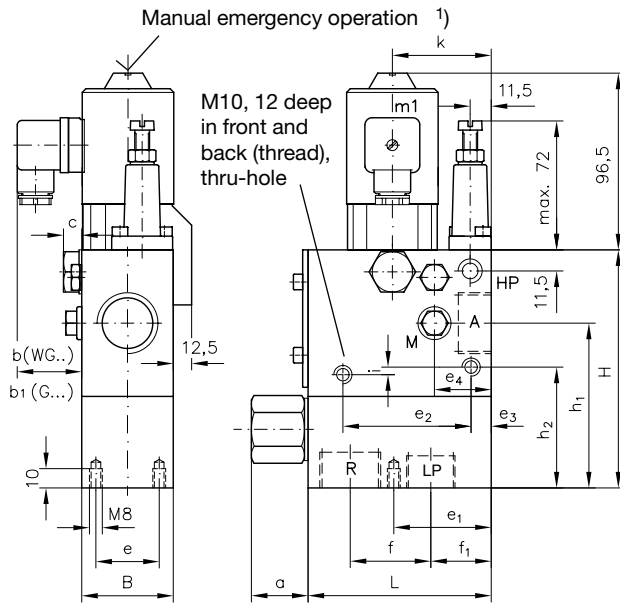


Viscosity during measurements approx. 60 mm²/s

3. Unit dimensions

All dimension in mm and subject to change without notice!

Type CR 4 M.. and CR 5 M..

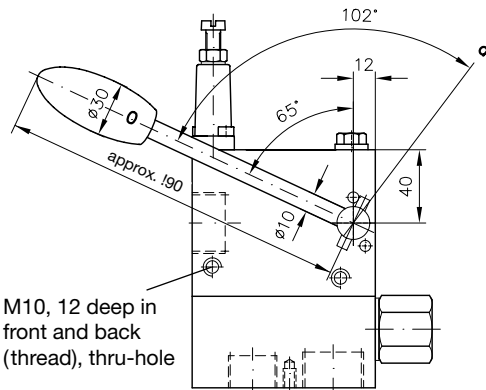


Type	L	B	H	a	b	b1	c	e	e1	e2	e3	e4
CR 4 M	100	50	130	31	34	31	9.5	36	57	70	11	31
CR 5 M	135	63	160	124	24	21	0	46	69	100	10	36

Type	Ports DIN ISO 228/1 (BSPP)									
	f	f1	h1	h2	i	k	A a. R	HP	NP	M
CR 4 M	44	33	90	66	6	54	G 1	G 1/4	G 3/4	G 1/4
CR 5 M	56	41	112	86	9	70	G 1 1/4	G 3/8	G 1	G 1/4

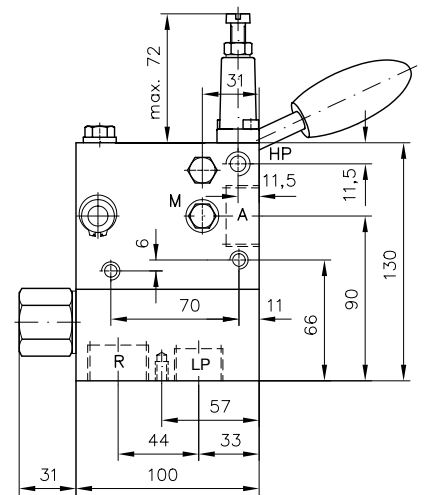
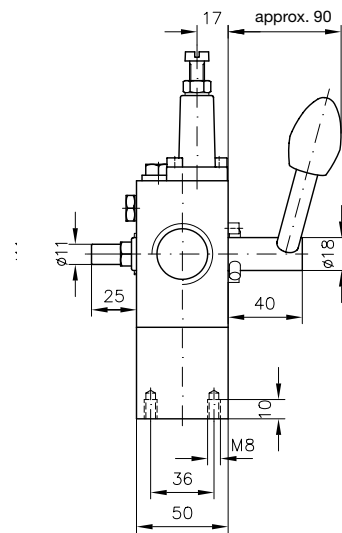
1) Press the emerg. bolt inwardly with an appropriate tool (screw driver, etc.), max. operating force is 150 Nm.
The manual emergency function can be put out of commission by inserting a screw M3 x 5 DIN 921

Type CR 4 H



Ports DIN ISO 228/1 (BSPP):

A, R	HP	NP	M
G 1	G 1/4	G 3/4	G 1/4

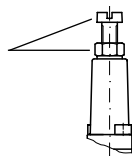


Subsequent pressure adjustment

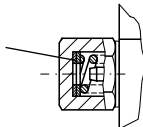
(always check using a manometer) monitored by a pressure gange and pumps running

High pressure adjustment possible after loosening the lock nut.

Clock-wise rotation = pressure increase.
1 turn ≈ 80 bar.



Low pressure adjustment up to 30 resp. 60 bar possible by adding or removing washers

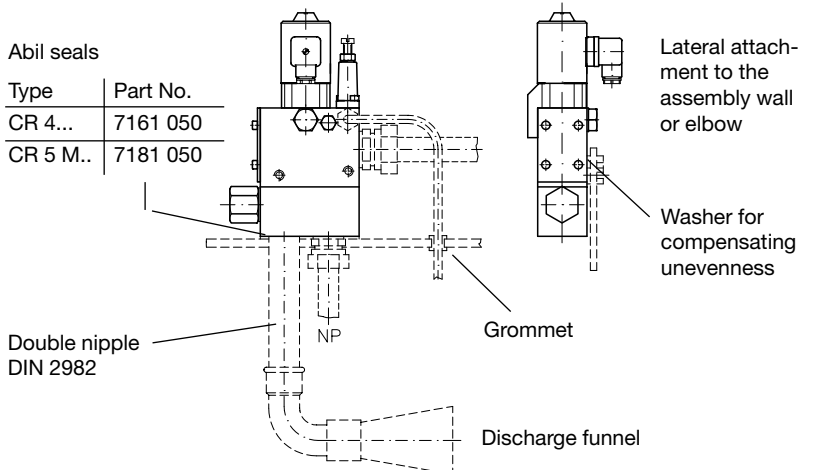


CR 4...: Washer $\varnothing 18 \times \varnothing 10.5 \times 0.5$
Part No. 5650 005 (1 mm ≈ 8 bar)

CR 5 M...: Washer $\varnothing 13$ (1 mm ≈ 1 bar)

Possible attachments (Example CR 4 M..)

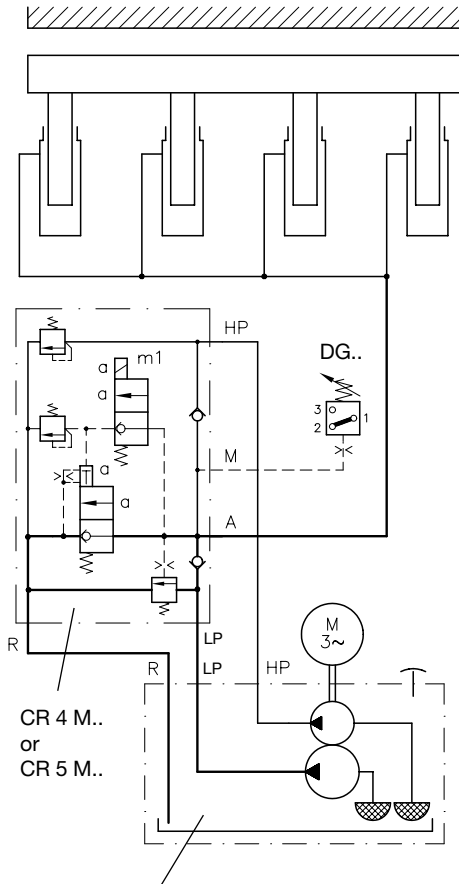
Attachment to tank cover; Low pressure enters directly from below, high pressure enters through cover, for example by means of a rubber grommet



4. Typical circuit diagrams

4.1. Bottom-ram press with CR 4 M.- or CR 5 M.- control

(CR 4 H analogously)



Two-stage pump
 Type RZ acc. to D 6910 H
 Type MP acc. to D 7200 H

Cycle chart for this circuit

Cycle	Platen movement	Pump M3~	CR 4 M.. CR 5 M.. m1	Pressure switch DG..	Remarks
1	↑ Closure (rapid approach)	on	de-energized	1 - 2	Start by pushing button
2	↑ Pressure build-up	on	de-energized	final press. 1 - 3 ← M off	Automatic relief of low pressure pump
3	↑ Pressure mainten.	off	de-energized	1 - 3	Pressure switch in cycle 2 - end, e.g. also starts timer for cycle 3
4	↓ Decompr. a. opening	off	energized	1 - 2	By pressing a button or expiration of timer
5	↓ Open, stop	off	de-energized	1 - 2	By limit switch, button release, etc.

In the CR 4 H control, cycles 1 (hand lever in "close" position) to 3 are identical. Cycle 4 is started by throwing the lever to the "open" position and in cycle 5-end or cycle 1-start, this lever must again be moved to the "close" position. Pressure switch e.g. type DG 1 acc. to D 5440.