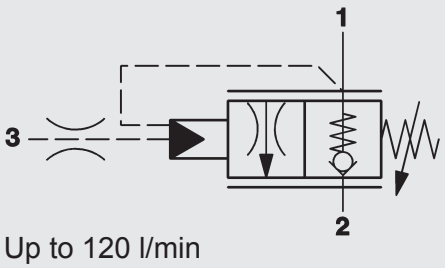
Counterbalance Valve Poppet Type, Direct-Acting Metric Cartridge – 420 bar

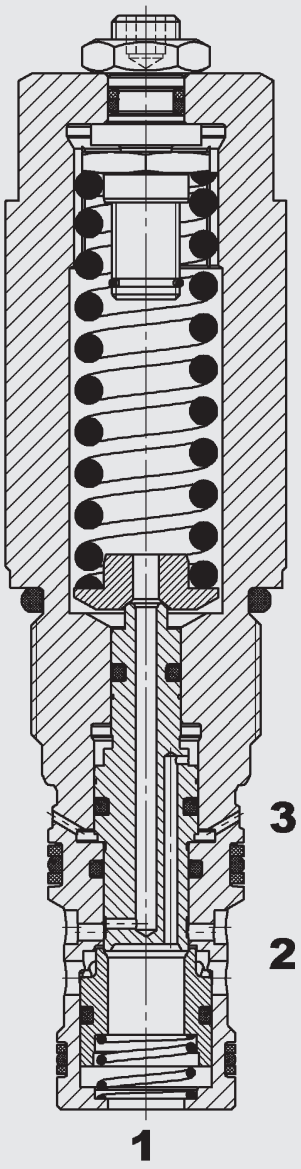
ISO

RSM12121



Up to 120 l/min
Up to 420 bar

FUNCTION



The counterbalance valve RSM12121 is a direct-acting poppet valve. Its function is to control the speed of a consumer according to the inlet flow. It also prevents the consumer from overrunning if there are pulling loads and ensures smooth action in consumers. In addition it fulfils the function of a hose-break valve.

FEATURES

- Primarily used in lift-lowering applications
- Low hysteresis over the entire pressure and flow range
- Consumer is held in position leakage-free
- Prevents overrunning of pulling loads
- Speed of consumer controlled in accordance with the inlet flow
- Hardened and ground valve components to ensure minimal wear and extend service life
- Low pressure drop due to CFD optimized flow path
- Acts as a hose-break valve to hold load if there is a leak in the control or feed line
- Restricts the load pressure to preset value (overload protection)
- Option: Model with control function which is independent of load pressure (version 0)
- Option: Model with control pressure which is independent of tank pressure (Version E can be vented to atmosphere in cavity 12121 or separately to tank in cavity 12122)
- Option: Different versions of precision control of the lowering function

SPECIFICATIONS*

Operating pressure:	max. 420 bar
Nominal flow:	max. 120 l/min
Check valve opening pressure	2 bar
Pressure setting range:	20 to 60 bar; for version φ=0 only 60 to 100 bar; for version φ=0 only 60 to 240 bar 240 to 420 bar
Operating pressure (at port 1):	p = 0 - 350 bar, p_{max} = 420 bar (max. 80 % of the pressure setting)
Pressure at port 2 (pump / reservoir):	p = 0 - 350bar Warning! Pressures at port 2 are additive to the cracking pressure! Solution: Vented version (E) of the valve
Control pressure (port 3):	p = 0 - 420 bar
Tank pressure (port 4):	p = 0 - 350 bar Warning: This port is only required if a vented version (E) of the valve is used, and the trapped oil, which collects in the spring chamber, is to be drained separately via a 4th port to the tank (cavity 10122!)
Pressure loss from 2 to 1:	approx. 16 bar at 120 l/min (check function)
Pressure loss from 1 to 2:	dependent on fine control sleeve (see curve)
Pilot ratio φ:	1:1, 2:1, 3:1, 5:1 (without pressure function)
Leakage:	< 5 drops/min at max. pressure (leakage-free)
Media-operating temperature range	min. -30 °C to max. +100 °C
Ambient temperature range:	min. -30 °C to max. +100 °C
Operating fluid:	Hydraulic oil to DIN 51524 T1 + T2
Viscosity range:	min. 2.8 mm²/s to max. 380 mm²/s
Filtration:	Class 21/19/16 according to ISO 4406 or cleaner
$MTTF_d$:	150 years
Installation:	Optional
Materials:	Valve body: free-cutting steel Piston: hardened and ground steel Seals: NBR (Standard) FPM (optional, temperature range -20 °C to +120 °C) PTFE Back-up rings: PTSM
Cavity:	12121 and 12122
Weight:	0.5 kg

* see "Conditions and instructions for valves" in brochure 53.000

MODEL CODE

RSM 10121 E - 01 - C - N - 3 - M 240 V 210

Basic model
Counterbalance valve
Metric

Cavity

Additional code
None = without venting (standard)
E = Version E - control pressure independent of tank pressure

Type
01 = standard

Body and ports*
C = cartridge only
Versions with bodies on request

Seals
N = NBR (standard)
V = FKM (optional)

Pilot ratio φ
1 = 1 : 1
2 = 2 : 1
3 = 3 : 1
5 = 5 : 1
0 = Version φ = 0 – control independent of load pressure (same ratio)

Resolution (fine control due to sleeve)
(Q from 1 to 2 at max. control and Δp = 30 bar)
H = 20 l/min
M = 40 l/min
L = 60 l/min
X = 120 l/min

Pressure range
60 = 20 to 60 bar (for version φ=0 only)
100 = 60 to 100 bar (for version φ=0 only)
240 = 60 to 240 bar
420 = 240 to 420 bar

Type of adjustment
V = adjustable by tool
F = fixed setting

Pressure setting
Pressure in bar - Setting on request

CALCULATION OF CONTROL PRESSURE:

standard: $p_{ctrl} = \frac{p_e - p_1}{\varphi} + K_f \times p_2$

vented: $p_{ctrl} = \frac{p_e - p_1}{\varphi}$

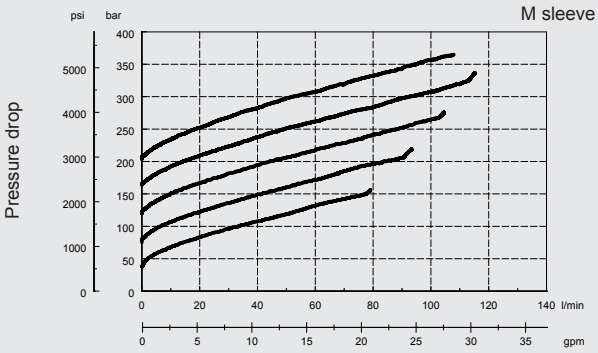
p_e = Setting pressure
p_{st} = Control pressure
p_1 = Load pressure
p_2 = Tank pressure
φ = Pilot ratio

K = Correction factor:
K_f (φ = 1) = 2
K_f (φ = 2) = 1.5
K_f (φ = 3) = 1.3
K_f (φ = 5) = 1.2

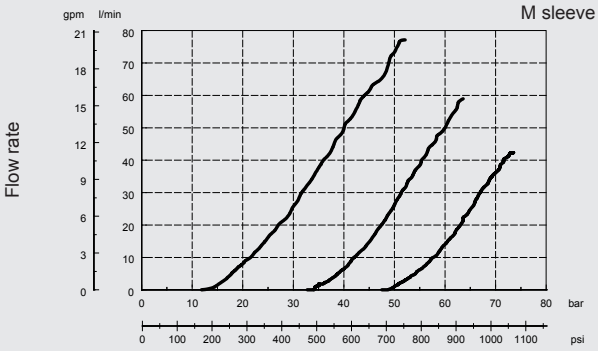
PERFORMANCE

measured at ν = 33 mm²/s, $T_{Öl}$ = 46 °C, φ = 3:1

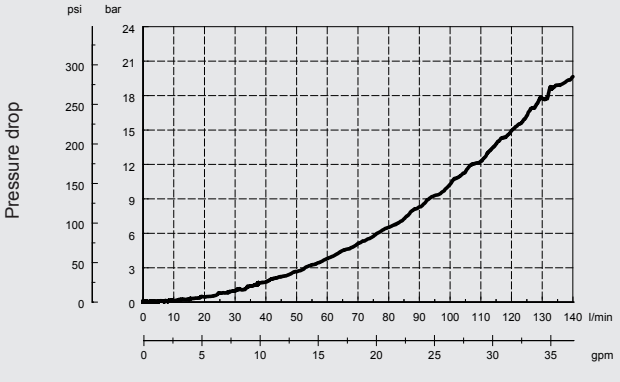
Pressure relief curve:
Pressure at port 1 against flow rate from port 1 to 2, p_3 = 0 bar
Pressure relief function protects the system in the event of overload on the consumer.



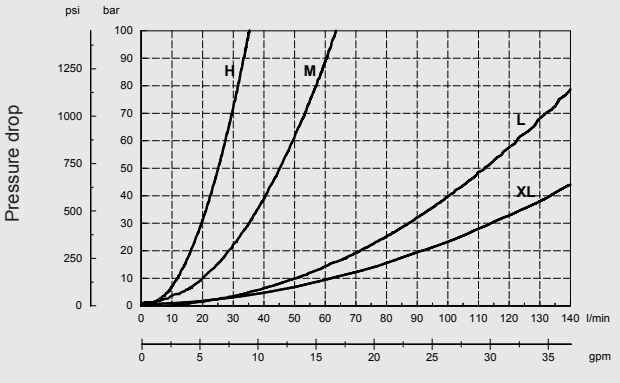
Control curve: (Pressure at port 3 against flow rate from port 1 to 2)
The control function shows the lowering speed against the control pressure.
Setting pressure: 200 bar; Load pressure: 25, 50, 85 % of set pressure



Throttle curve: Δp-Q from port 2→1
The throttle curve shows the back-pressure against flow rate from port 2→1.



Throttle curve: Δp-Q from port 1→2 maximum control
The throttle curve shows the back-pressure against flow rate from port 1→2.
(for different settings)



Important!
The differential pressure from port 1→2 on a fully controlled valve is dependent on the resolution of the fine control sleeve.
When the resolution of the pilot function is higher, the back pressure increases.

Standard models

Code	Part No.
RSM12121-01-C-N-3-M240V	3499471
RSM12121-01-C-N-3-M420V	3499473
RSM12121E-01-C-N-3-M240V	3499472
RSM10121-01-C-N-0-H110V	3744913
RSM10121-01-C-N-0-M060V	3673315
RSM10121-01-C-N-0-M110V	3673328
RSM10121-01-C-N-0-S-060V	3885535
RSM10121E-01-C-N-0-H060V	3746788
RSM10121E-01-C-N-0-M060V	3673320
RSM10121E-01-C-N-0-M110V	3673387
RSM12121-01-C-N-0-M060V	3673455
RSM12121-01-C-N-0-M100V	3673473
RSM12121E-01-C-N-0-M060V	3673467
RSM12121E-01-C-N-0-M100V	3673601
RSM16121-01-C-N-0-M070V	3919385
RSM16121E-01-C-N-0-M070V	3919388

Other models on request

Standard inline bodies

1) Inline connection housing

Code	Part No.	Material	Ports	Pressure
FH-R12121-01-S B4/2	3130704	Steel, zinc-plated	G3/4, G1/4	420 bar
With unload port:				
FH-R12122-01-S B6/2	3736252	Steel, zinc-plated	G3/4, G1/4	420 bar

2) Cross port housing (2 valves with two-way pilot control)

Designation	Part No.	Material	Ports	Pressure
FH-S12121-01-S B6	3736207	Steel, zinc-plated	G3/4	420 bar

3) Sandwich plate housing acc. to ISO4401-05

Code	Part No.	Material	Ports	Pressure
FHWV-ZA/B12121-01-S C5	3795963	Steel, zinc-plated	ISO 4401-05	420 bar
FHWV-ZB/A12121-01-S C5	3795965	Steel, zinc-plated	ISO 4401-05	420 bar
FHWV-ZAB12121-01-S C5	3795967	Steel, zinc-plated	ISO 4401-05	420 bar
FHWV-ZA/BT12122-01-S C5	3795970	Steel, zinc-plated	ISO 4401-05	420 bar
FHWV-ZB/AT12122-01-S C5	3795972	Steel, zinc-plated	ISO 4401-05	420 bar
FHWV-ZAB/T12122-01-S C5	3795974	Steel, zinc-plated	ISO 4401-05	420 bar

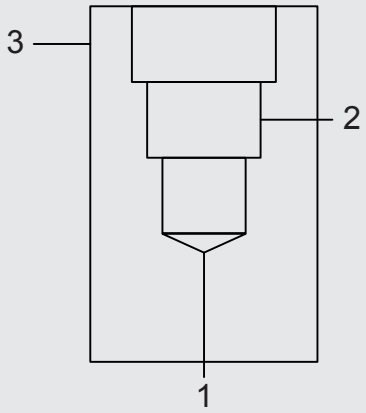
Seal kits

Code	Material	Part No.
SEAL KIT 12121-NBR	NBR	3269389
SEAL KIT 12121-FPM	FPM	3269390

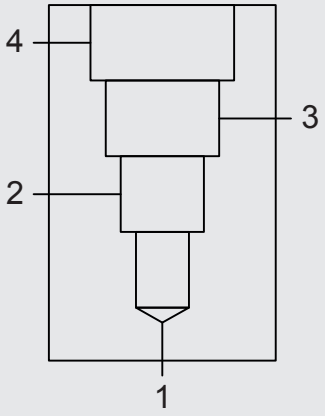
Additional housing on request

HOUSINGS

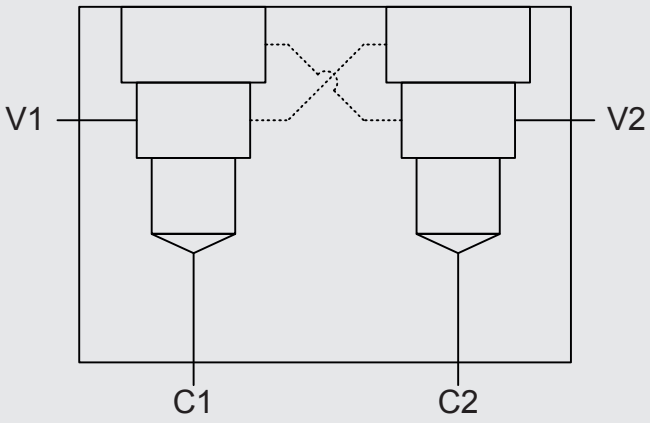
R housing



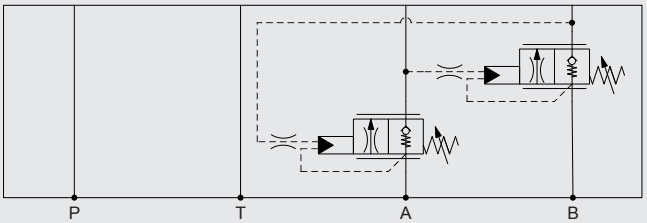
R housing with drain



Cross port housing

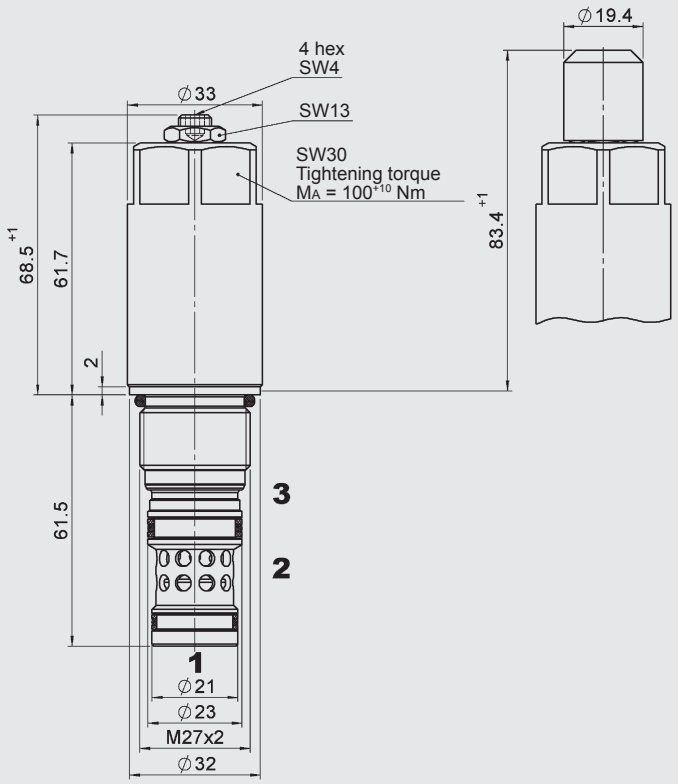


Sandwich plate housing A-B



DIMENSIONS

RSM12121-01-V **RSM12121-01-F**



millimetre
subject to technical modifications

FUNCTION PRINCIPLE

With the counterbalance valve RSM 12121, to raise a load, flow is permitted from pump port 2 to consumer port 1 via the built-in check valve.

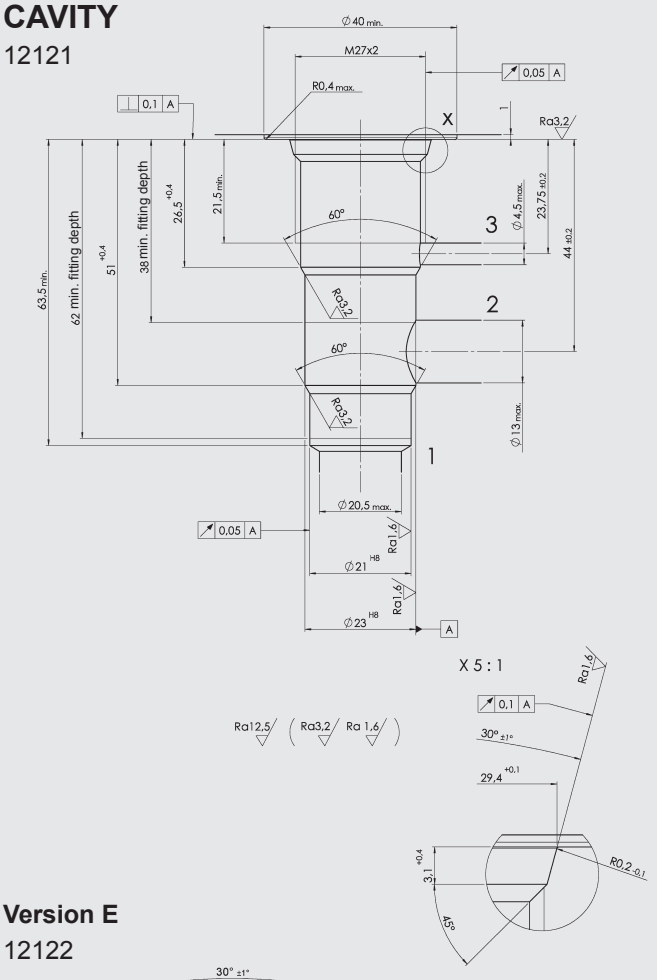
To hold the load, the check valve piston is pressed against its seat by the load pressure at port 1 and seals leakage-free (control port 3 must be released of pressure!).

To lower the load, a combination of load- and control pressure is applied to control port 3 which controls the valve. The higher the load pressure, the lower the necessary control pressure. Flow is now permitted from consumer port 1 to port 2. The load cannot therefore overrun because the load flow rate is controlled at the metering edge of the control piston according to the inlet pressure of the consumer (control port 3 must be connected directly to the cylinder – not externally).

An additional restriction of the load pressure is provided in that the consumer pressure (load pressure) at port 1 acts on a control piston within the valve and therefore against the force of the adjustment spring. When the spring tension is exceeded, the control piston moves away from the check valve piston, and this opens the flow path from port 1 to port 2 – the resulting flow limits the load pressure to the pre-set value.

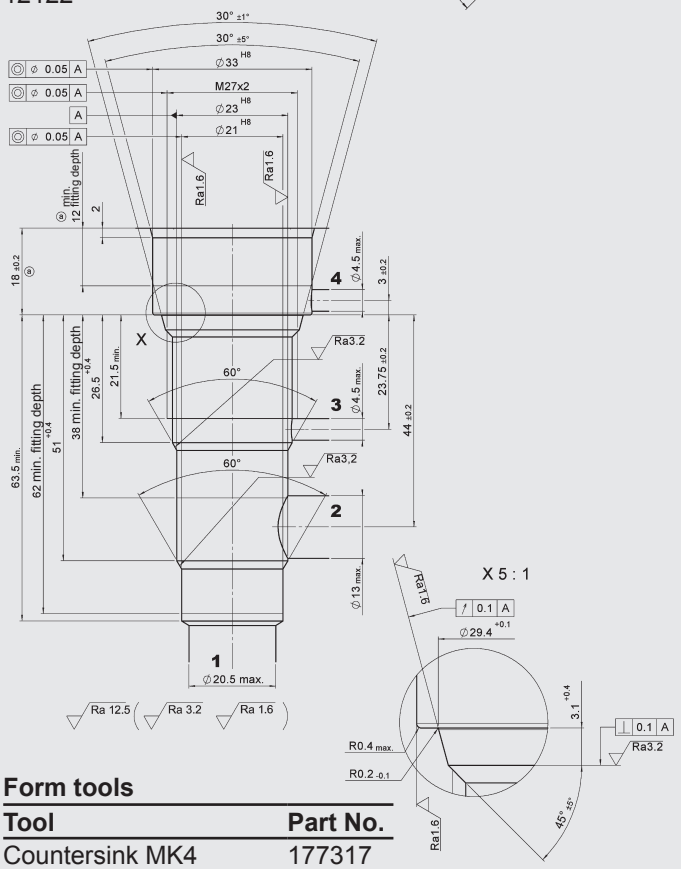
CAVITY

12121



Version E

12122



Form tools

Tool	Part No.
Countersink MK4	177317
KK countersink	162128
Reamer MK2	175021

millimetre
subject to technical modifications

Note

The information in this brochure relates to the operating conditions and applications described. For applications and / or operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

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