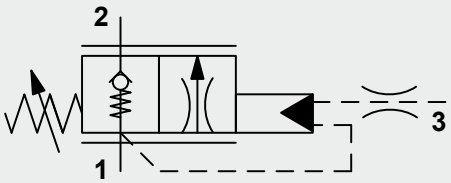
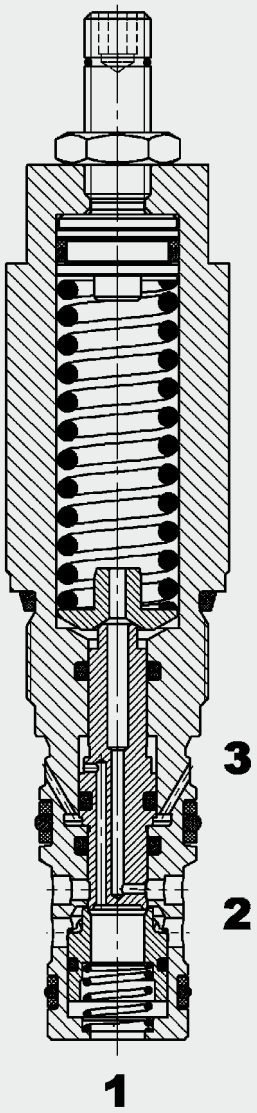


Up to 60 l/min
Up to 420 bar

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

RSM10121

FUNCTION



The counterbalance valve RSM10121 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 10121 or separately to tank in cavity 10122)
- Option: Different versions of precision control of the lowering function

SPECIFICATIONS

Operating pressure:	max. 420 bar	
Nominal flow:	max. 60 l/min	
Cracking pressure of check valve:	2 bar	
Pressure setting range:	30 to 240 bar 240 to 420 bar	
Load pressure (at port 1):	p = 0 - 350 bar (Max. pressure adjust 420 bar)	
Pressure at port 2 (pump / tank):	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 - 30 bar Note: 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 drop from port 2 to 1:	approx. 14 bar at 60 l/min (check function)	
Pressure drop from port 1 to 2:	see curve (dependent on fine control sleeve)	
Pilot ratio φ:	1:1, 2:1, 3:1, 5:1, 10:1, 0 (without pressure relief function)	
Leakage:	leak-free (max. 5 drops ≙ 0,25 cm³/min at 350 bar)	
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 Part 1 and 2	
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 (see "Conditions and instructions for valves" in brochure 5.300)	
Installation:	No orientation restrictions	
Materials:	Valve body:	Steel
	Poppet:	hardened and ground steel
	Seals:	NBR (standard) FKM (optional, media temperature range -20 °C to +120 °C) PTFE
	Back-up rings:	PTSM
Cavity:	10121 and 10122	
Weight:	0.275 kg	

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
10 = 10 : 1
0 = Version 0 – control independent of load pressure

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

Pressure range
240 = 30 to 240 bar
420 = 240 to 420 bar

Type of adjustment
V = Allen head
F = fixed setting, cannot be adjusted

Pressure setting
Pressure in bar

Standard models

Model code	Part No.
RSM10121-01-C-N-3-M240F	3487868
RSM10121-01-C-N-3-M240V	3435438
RSM10121E-01-C-N-3-M240V	3487816

Other models on request

*Standard in-line bodies

Code	Part No.	Material	Ports	Pressure
R10121-01X-01	395236	Steel, zinc-plated	G1/2, G1/4	420 bar

Seal kits

Code	Material	Part No.
SEAL KIT RSM10121...NBR	DE	3638115
SEAL KIT RSM10121...FKM	DE	3638116

CALCULATION OF CONTROL PRESSURE:

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

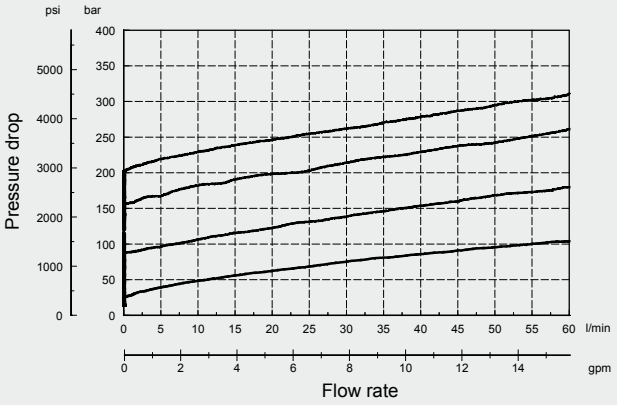
p_e = Setting pressure
p_{st} = Control pressure
p_1 = Load pressure
p_2 = Tank pressure
φ = Pilot ratio

Kf (φ = 1) = 2
Kf (φ = 2) = 1.5
Kf (φ = 3) = 1.3
Kf (φ = 5) = 1.2
Kf (φ =10) = 1.1

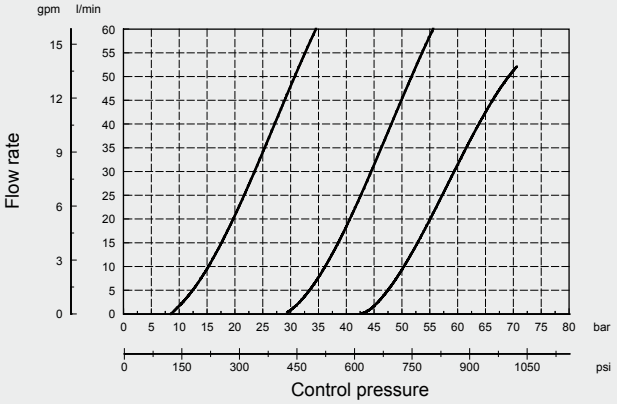
PERFORMANCE

Measured at v = 36 mm²/s, T_{oil} = 46 °C, with sleeve, φ = 3:1

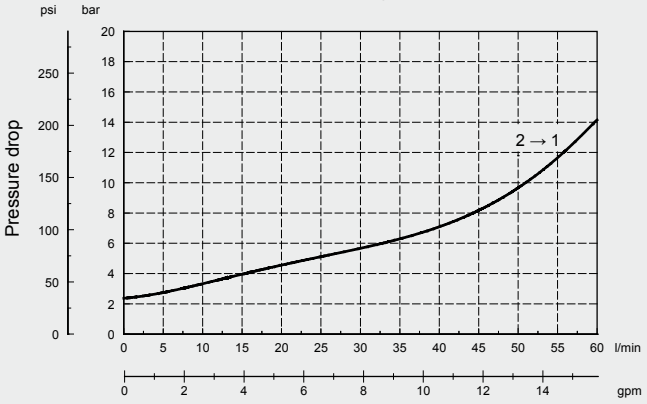
Pressure relief curve:
Pressure at port 1 against flow rate from port 1 to 2, p_3 = 0 bar
Pressure relief function protects the system in the event of overload on the consumer.



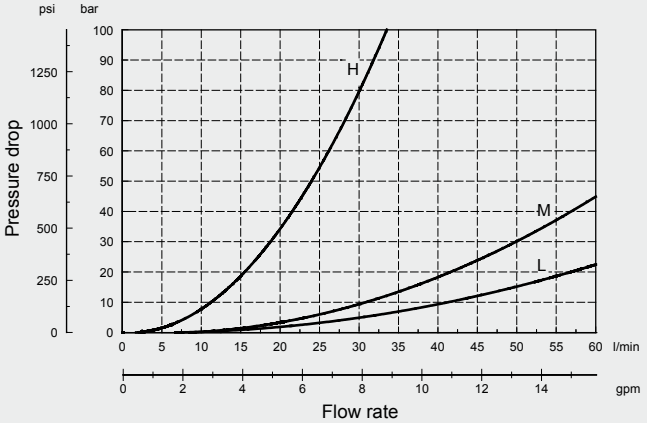
Control curve: (Pressure at port 3 against flow rate from port 1 to 2)
The control function shows the lowering speed against the control pressure.
Setting pressure: 200 bar; Load pressure: 25, 50, 85 % of set pressure



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



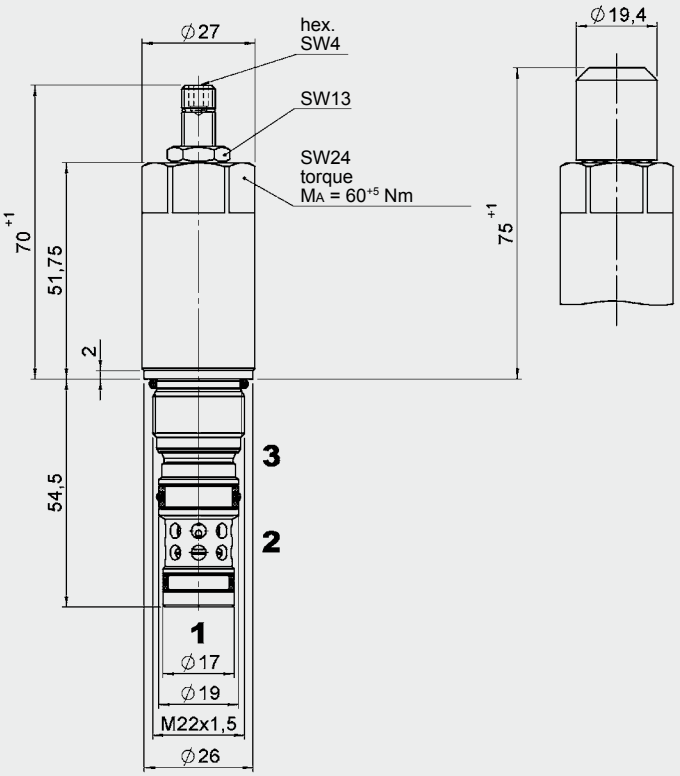
Throttle curve: Δp-Q from port 1→2 maximum control
The throttle curve shows the back-pressure against flow rate from port 1→2.
(for different settings)



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.

DIMENSIONS

RSM10121-01-V **RSM10121-01-F**



millimeter
subject to technical modifications

FUNCTION PRINCIPLE

With the counterbalance valve RSM 10121, to raise a load, flow is permitted from pump port 2 to consumer port 1 via the built-in check valve.

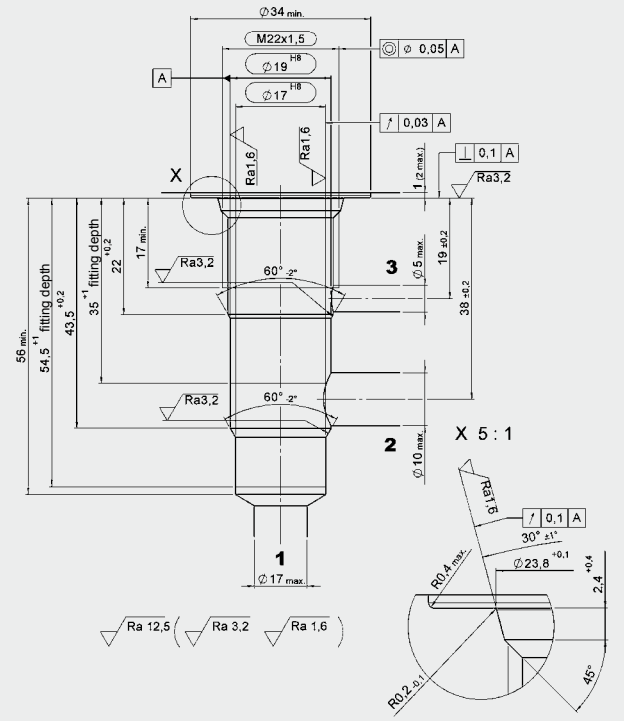
To hold the load, the check valve piston is pressed against its seat by the load pressure at port 1 and seals leakage-free (control port 3 must be released of pressure!).

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.

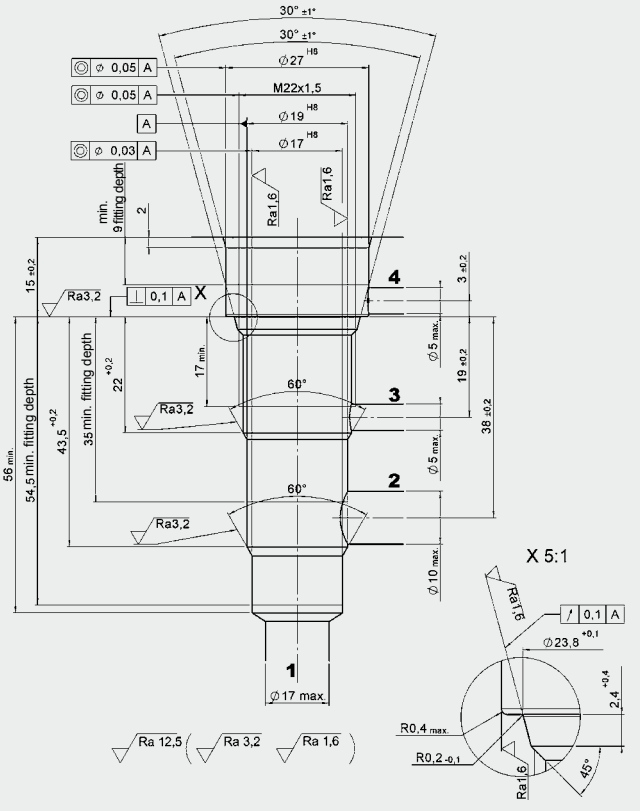
CAVITY

10121



Version E

10122



Form tools

Tool	Part No.
Countersink MK4	163910
Reamer MK2	163911

millimeter
subject to technical modifications

Note

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

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