

**MANNESMANN
REXROTH****Gear pump types G2 and G3
with flow divider
and/or pressure relief valve****RE
10 046/09.97**
Replaces: 10.93

sizes 4 to 38

up to 260 bar

up to 37.6 cm³**Features**

- Simple and robust construction
- Plain bearings for high load capability
- Hydro-static clearance compensation
- Single block bearings
- Directly built-on flow divider with or without pressure relief valve
- Directly built-on pressure relief valve
- Axial pressure connections



H/A 3421/92

Type G2 – with pressure relief valve
(suction and pressure port flanges are not included within the scope of supply)



H/A 3419/92

Type G3 – with load sensing flow divider
(suction port flange is not included within the scope of supply)

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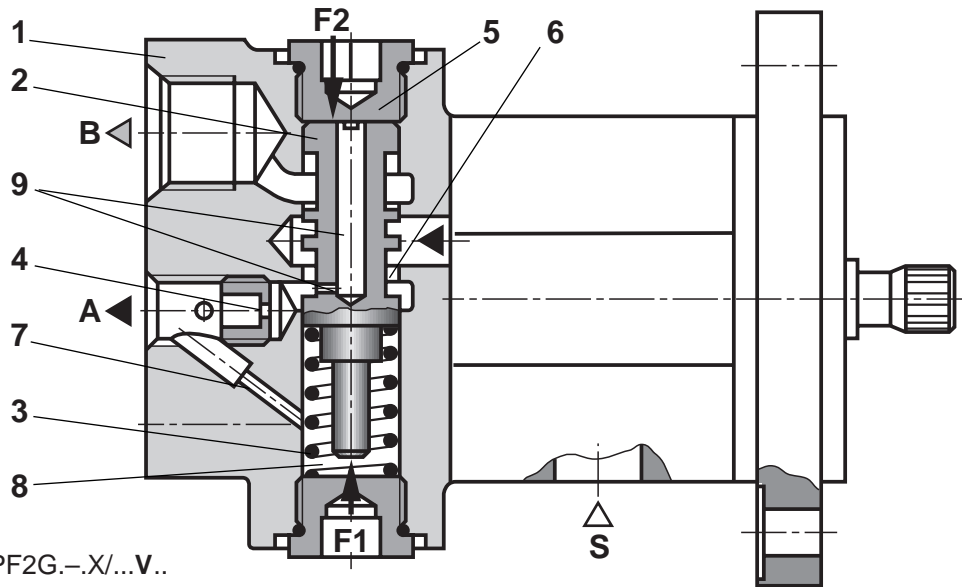


H/A 3423/92

Type G3 – with load sensing flow divider and pressure relief valve

Section, functional description: pump with built-on flow divider

Types G2 and G3 pumps are proven self-priming external gear pumps. The fact that the pump cover is designed to incorporate integral valves (flow divider, pressure relief valve) means a reduction in both pipework and space required.



Type 1PF2G...X/...V..

Pump with single acting flow divider

Pumps with a flow divider supply a constant flow which is independent of the pump speed (preferential flow) as well as a residual flow which is speed dependent (secondary flow).

This principle can be applied where a movement is to be controlled at constant velocity, independently of the pump speed.

The flow divider, which is integrated into the pump cover, basically consists of cover (1), control spool (2), compression spring (3), orifice (4) and plug (5).

The flow passes via channel (6) and orifice (4) to the preferential flow – outlet A.

In the initial position the control spool (2) is held in the position shown by spring force F_1 . The preferential flow is supplied from the pump. A pressure differential Δp develops at orifice (4) which

is dependent on the flow.

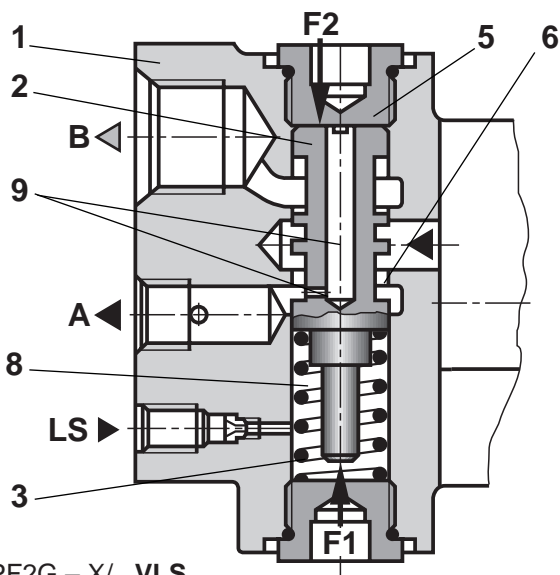
Pressure p_1 acts via drilling (7) in the compression chamber (8). Pressure p_2 acts on the end of the control spool via drilling (9) in control spool (2) and generates a force ratio of $F_1 \geq F_2$.

As the speed increases the pressure differential at orifice (4) also rises until $F_1 \leq F_2$ and the connection to the secondary flow – outlet B is opened.

The preferential flow volume is determined by the selection of orifice (4).

A pressure gauge connection enables the operating pressure in port A to be monitored.

Pump with load sensing flow divider



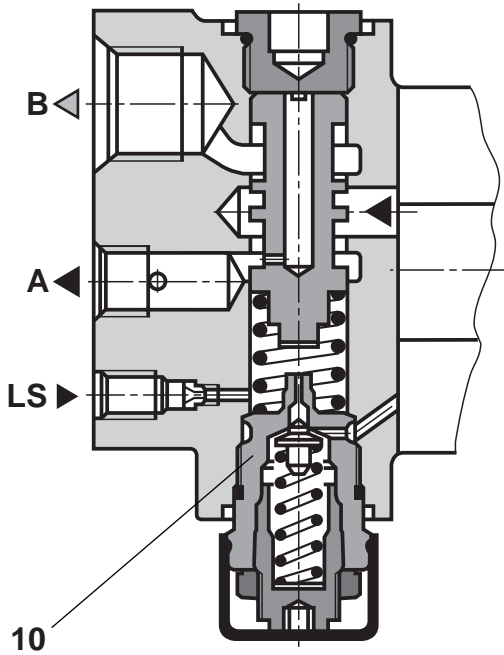
Type 1PF2G...X/...VLS

The pump with load sensing flow divider differs from the pump with a single acting flow divider by virtue of its additional load sensing control port and the fact that the orifice (4) is omitted.

The Δp from the actuator is applied to the spring chamber via the load sensing control port. This means that the preferential flow can vary depending on the actuator connected. This design makes it possible to make use of the full amount of secondary flow if no preferential flow is required.

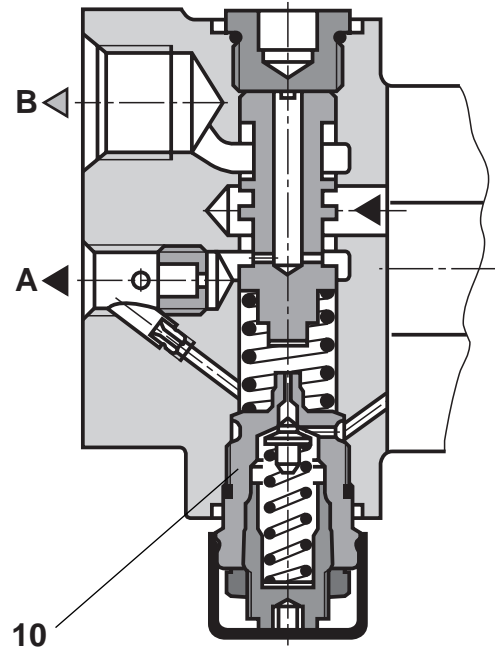
Section, functional description: pump with built-on flow divider

**Single acting flow divider
with pressure relief valve**



Type 1PF2G.-.X/...V..D..

**Load sensing flow divider
with pressure relief valve**

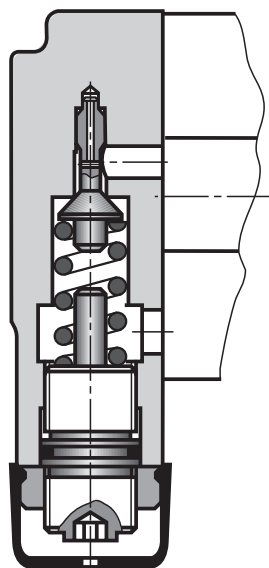


Type 1PF2G.-.X/...VLSD..

On flow dividers with a built-on pressure relief valve the preferential flow pressure (outlet A) is set via the pressure relief valve (10).

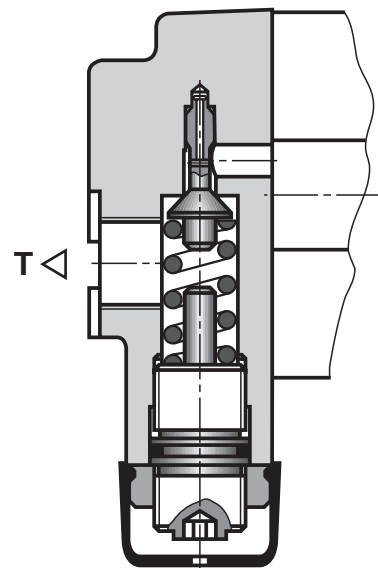
Pump with built-on pressure relief valve

Internal pressure fluid return



Type 1PF2G.-.X/...D..Y

External pressure fluid return



Type 1PF2G.-.X/...D..X

Ordering details

1 PF 2    M  *

Further details
in clear text
e.g. max. set
pressure in bar

Version

G2 = G2
G3 = G3

Series 30 to 39 (version G3) = 3X
(30 to 39, unchanged installation
and connection dimensions)

Series 40 to 49 (version G2) = 4X
(40 to 49, unchanged installation
and connection dimensions)

Nominal size

Version G2

4 cm ³	size 4	= 004
5.5 cm ³	size 5	= 005
8.2 cm ³	size 8	= 008
11 cm ³	size 11	= 011
14.1 cm ³	size 14	= 014
16.2 cm ³	size 16	= 016
19 cm ³	size 19	= 019
22.4 cm ³	size 22	= 022

Version G3

20.9 cm ³	size 20	= 020
23.4 cm ³	size 23	= 023
25.9 cm ³	size 26	= 026
30.1 cm ³	size 29	= 029
32.6 cm ³	size 32	= 032
37.6 cm ³	size 38	= 038

Direction of rotation (viewed on shaft end)

Clockwise = R
Anti-clockwise = L

Shaft end

Version G2

Conical shaft 1:5 Ø 17 mm = C
Splined shaft SAE-A 5/8", 9 teeth = R
Shaft with claw coupling for rear pump = N
Conical shaft 1:5 Ø 20 mm for front bearings = S

Version G3

Parallel shaft ISO (Ø 18 mm) = A
Conical shaft, taper 1:5, Ø 20 mm = C
Splined shaft SAE-B 7/8", 13 teeth = D
Shaft with claw coupling for rear pump = N

Suction port

Version G2

Square flange, metric fixing threads = 20

Version G3

SAE flange = 07

Ordering example:

Pump with single acting flow divider and pressure reducing valve
– average preferential flow 7 L/min
– max.set pressure : 110 bar

1PF2G2-4X/019RC20MB01V07D110

Pump with:

single acting flow divider

V..¹⁾ = without pressure relief valve
V..¹⁾D..³⁾ = with pressure relief valve

Load sensing flow divider

VLS = without pressure relief valve
VLSD..³⁾ = with pressure relief valve

Pressure relief valve

D..²⁾Y⁴⁾ = internal pressure fluid return
D..²⁾X⁴⁾ = external pressure fluid return

Pressure connection

Pump with flow divider

01 = pipe thread to ISO 228/1
12 = UNF – 2B

Pump with pressure relief valve

20 = square flange, only for G2
07 = SAE flange, only for G3

Mounting flange

Version G2

B = square flange Ø 80 mm
P = 2-hole fixing Ø 50 mm
R = SAE-A-2-hole flange Ø 82.5 mm
M = 2-hole fixing Ø 52 mm
A = front bearing Ø 80 mm
D = combination flange for rear pump built-on to G2
H = combination flange for rear pump built-on to G3

Version G3

S = square flange Ø 80 mm (standard)
B = SAE-B-2-hole flange Ø 101.6 mm
T = square flange Ø 50.8 mm
H = combination flange for rear pump

Seals

M = NBR seals up to 80 °C

Supplementary ordering details:

1) Average preferential flow in L/min

a) min. 4 L/min, max. 35 L/min
b) Tolerance = ± 10 % min. ± 0.5 L/min
max. ± 2.0 L/min

2) Pressure rating (for pressure relief valve only)

15 = ≤ 75 bar
05 = ≤ 120 bar
55 = < 210 bar

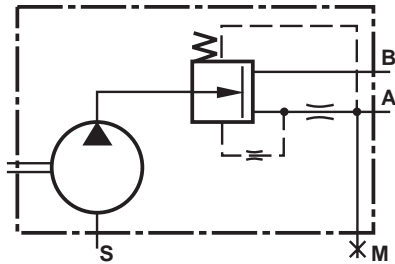
3) Max. pressure

4) Max. set pressure within the pressure rating selected (see ²⁾).

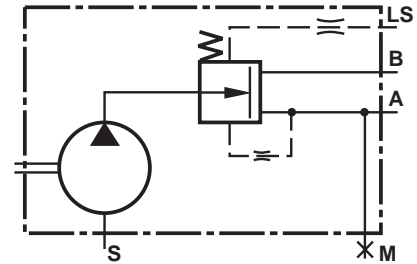
Symbols

Pump with:

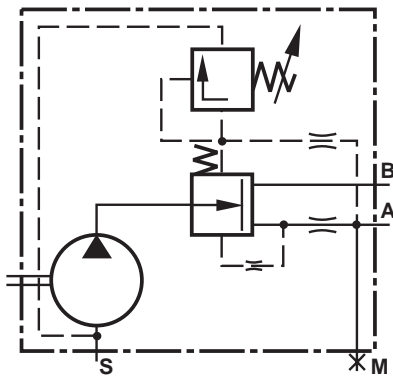
Single acting flow divider



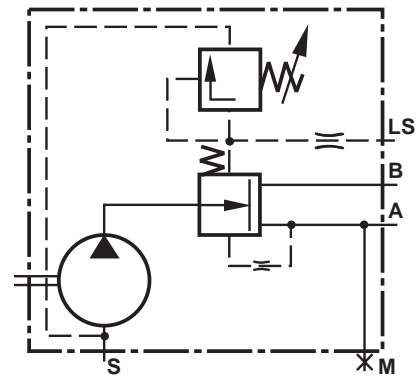
Load sensing flow divider



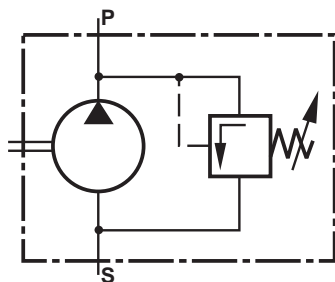
**Single acting flow divider
and built-on pressure relief valve**



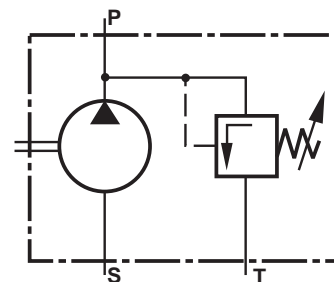
**Load sensing flow divider
and built-on pressure relief valve**



**Built-on pressure relief valve
and internal fluid return**



**Built-on pressure relief valve
and external fluid return**



S = suction port
A = port A (preferential flow)
B = port B (secondary flow)
LS = load sensing control port
P = pressure port
M = pressure gauge connection
T = tank port

Technical data (for applications outside these parameters, please consult us!)

General

Model	external gear pump													
Type	G2 and G3 (for further information see RE 10 030 and RE 10 039)													
Mounting style	flange mounting													
Type of connection	flange													
Installation	optional													
Shaft loading	radial and axial forces cannot be transferred													
Direction of rotation	clockwise or anti-clockwise (viewed on shaft end)													
Model series	G2							G3						
Nominal size	4	5	8	11	14	16	19	22	20	23	26	29	32	38
Max. speed ¹⁾ n_{max} min ⁻¹	5000	4000			3500	3000	2500	3600	3200	2900	3900	3600	3100	
Min. speed ¹⁾ n_{min} min ⁻¹	1200	1000	700					700						
Weight – with flow divider kg	4.7	4.9	5.0	5.1	5.2	5.3	5.4	5.6			8.1			
– with flow divider + pressure relief valve kg	4.7	4.9	5.0	5.1	5.2	5.3	5.4	5.6			8.1			
– with pressure relief valve kg	3.8	4.0	4.1	4.2	4.3	4.4	4.5	4.7			7.2			

Hydraulic

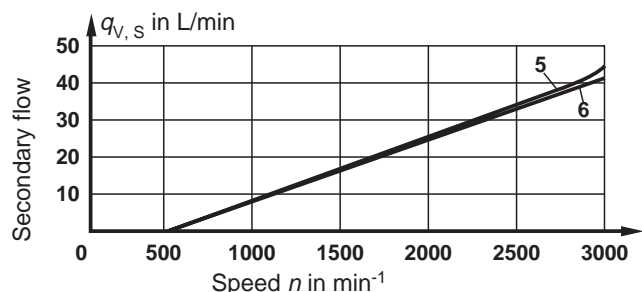
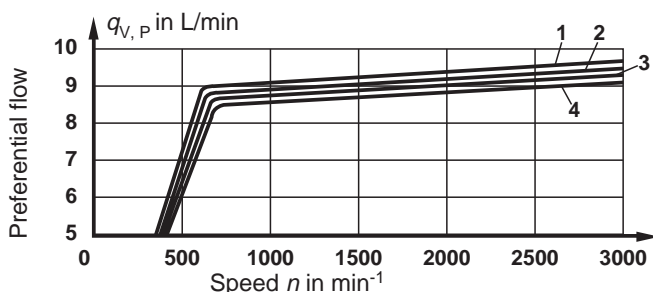
Nominal size	size	4	5	8	11	14	16	19	22	20	23	26	29	32	38	
Displacement V	cm ³	4	5.5	8.2	11	14.1	16.2	19	22.4	20.9	23.4	25.9	30.1	32.6	37.6	
Flow q_v at 10 bar and 1450 min ⁻¹	L/min	5.8	7.9	11.9	15.9	20.4	23.5	27.5	32.5	30.3	33.9	37.5	43.6	47.3	54.5	
Operating pressure, absolute																
– inlet p bar		0.7 to 3.0														
– outlet p bar							250	240	210				260	240	220	210
– peak pressure ²⁾ p bar							275	250	220				275	260	240	240
Pressure fluid		HLP mineral oil DIN 51 524 part 2. Please take into account the specifications stated in our catalogue sheet RE 07 075. Please consult our technical sales before using any other fluids.														
Pressure fluid temperature range	°C	–15 to 80, for higher temperatures please consult us														
Viscosity range	mm ² /s	10 to 300, permissible start-up viscosity 1000														
Degree of contamination		maximum permissible degree of contamination of the pressure fluid is to NAS 1638 class 10. We, therefore, recommend a filter with a minimum retention rate of $\beta_{20} \geq 75$. To ensure a long service life we recommend a maximum permissible degree of contamination of fluid to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of $\beta_{10} \geq 100$.														

¹⁾ at continuous pressure

²⁾ at 5×10^5 switch on pressure peaks

Characteristic curves (measured at $\nu = 41 \text{ mm}^2/\text{s}$ and $t = 50 \text{ °C}$), example: pump 1PF2G2-4X/019..V..

Relationship of preferential/and secondary flow to speed and pressures p_p and p_s



Curve no.	p_p	p_s
1	10	210
2	120	10
3	120	210
4	10	10
5	10	10
6	120	210

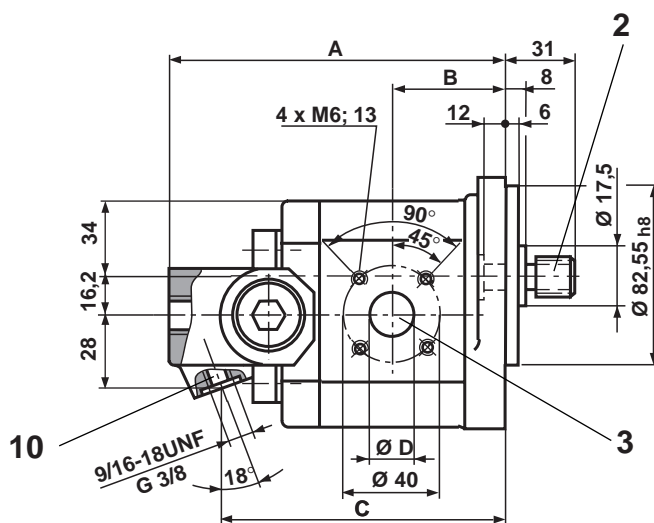
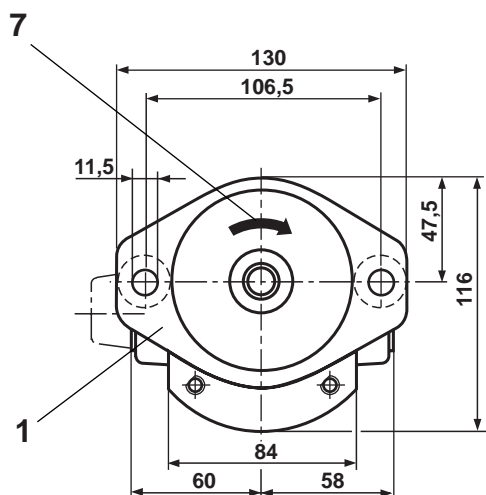
$$q_{V,P} \text{ or } q_{V,S} = f(n)$$

- $q_{V,P}$ = preferential flow
- $q_{V,S}$ = secondary flow
- p_p = pressure in preferential circuit
- p_s = pressure in secondary circuit
- n = speed

Unit dimensions: G2 with single acting and load sensing flow dividers

(Dimensions mm)

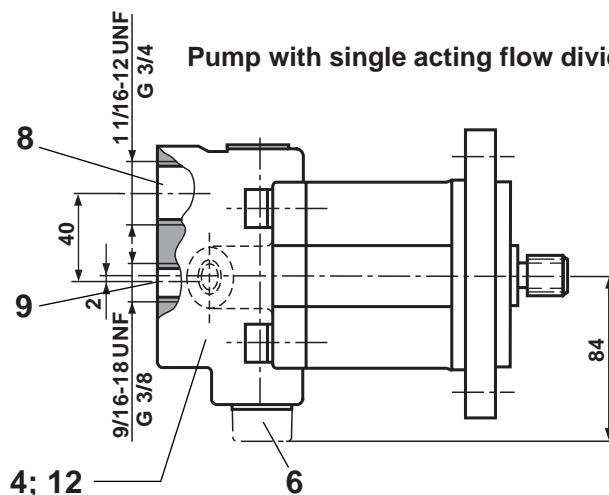
Note: The illustration shows a clockwise rotation pump; on an anti-clockwise pump the suction port is in the opposite position!



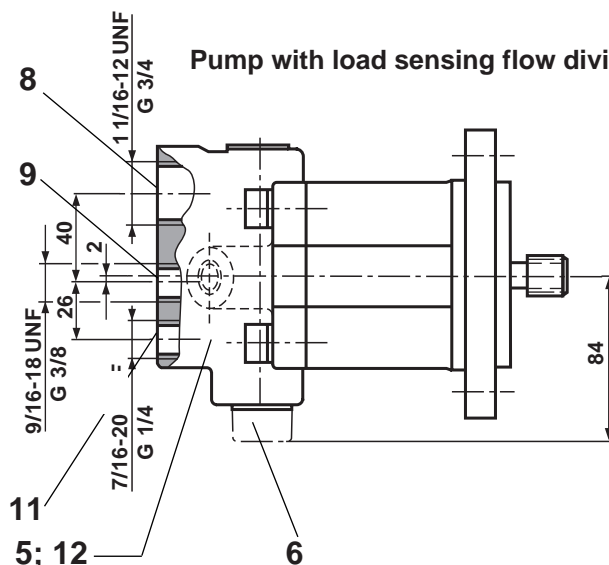
- 1 Mounting flange
SAE-A-2-hole fixing
ordering detail ...R...
(for other mounting flanges
see catalogue sheet RE 10 030)
- 2 Spined shaft
SAE-A 5/8" 9T 16/32DP,
ordering detail ...R...
(for other shaft designs
see catalogue sheet RE 10 030)
- 3 Suction port, ordering detail ...20...
- 4 Single flow divider,
ordering detail ...V...
- 5 Load sensing flow divider,
ordering detail ...VLS
- 6 Model with built-on pressure relief valve,
ordering detail ...V..D..
- 7 Clockwise rotation,
ordering detail ...R...
- 8 Secondary flow outlet B
- 9 Preferential flow outlet A
- 10 Pressure gauge port
- 11 Load sensing control port
- 12 Flow divider rotated through 180° for anti-clockwise
pump

Size	Dim.	A	B	C	Ø D
4		135	42.8	111.5	15
5		137.5	42	114	15
8		141	45.8	117.5	20
11		145	47.8	121.5	20
14		149.5	50	126	20
16		152.5	49.5	129	20
19		156.5	51.5	133	20
22		161.5	56	138	20

Pump with single acting flow divider



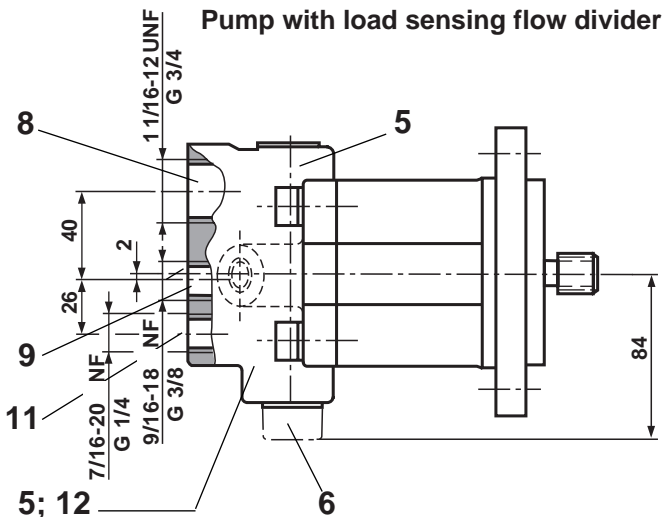
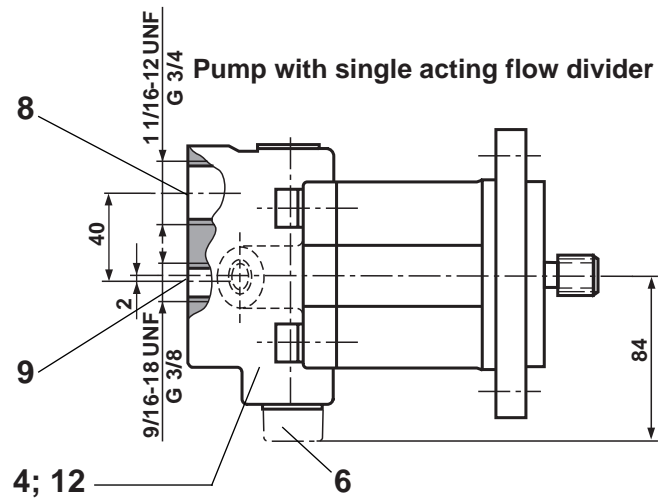
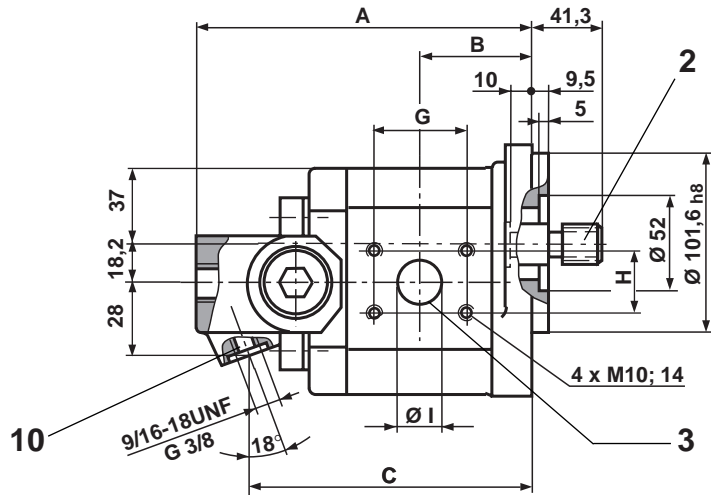
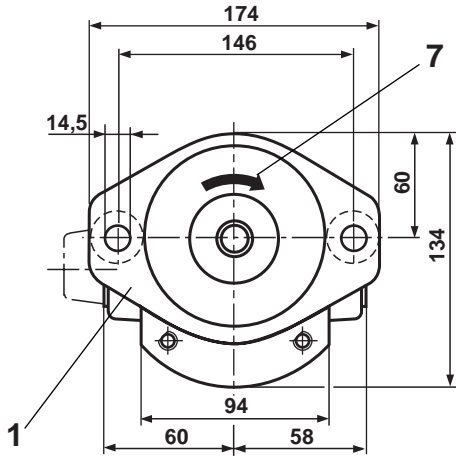
Pump with load sensing flow divider



Unit dimensions: G3 with single and load sensing flow divider

(Dimensions in mm)

Note: The illustration shows a clockwise rotation pump; on an anti-clockwise pump the suction port is in the opposite position!



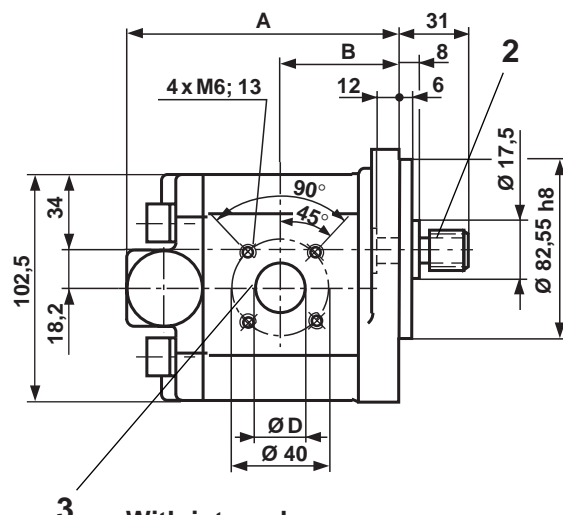
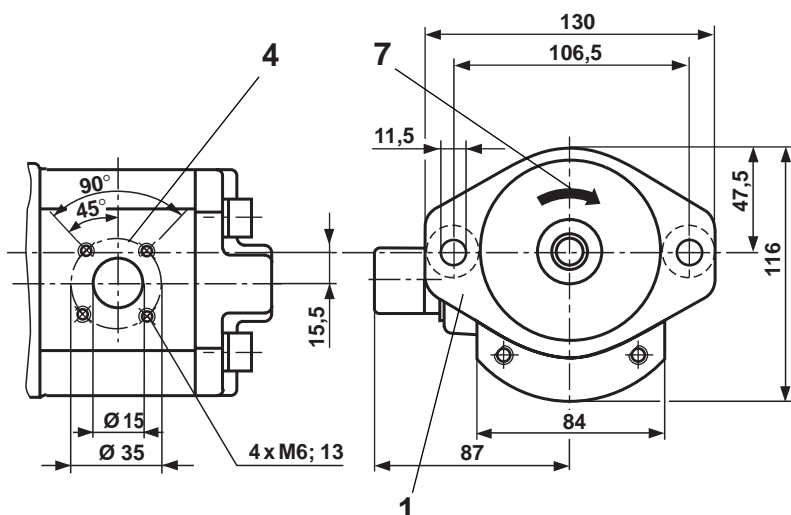
- 1 Mounting flange
SAE-B-2-hole fixing,
ordering detail ...**B**...
(for other mounting flanges
see catalogue sheet RE 10 039)
- 2 Splined shaft
SAE-B 7/8"-13T 16/32DP,
ordering detail ...**D**...
(for the shaft designs
see catalogue sheet RE 10 039)
- 3 Suction port, ordering detail ...**07**...
- 4 Single acting flow divider,
ordering detail ...**V**..
- 5 Load sensing flow divider,
ordering detail ...**VLS**
- 6 Model with built-on pressure relief valve,
ordering detail ...**V..D**..
- 7 Clockwise rotation,
ordering detail ...**R**...
- 8 Secondary flow outlet B
- 9 Preferential flow outlet A
- 10 Pressure gauge port
- 11 Load sensing control port
- 12 Flow divider rotated through 180° for anti-clockwise
pump

Dim. Size	A	B	C	G	H	Ø I
20	172.5	61.5	149	52.5	26.2	25
23						
26						
29	186.5	68.5	163	58.8	30.2	32
32						
38						

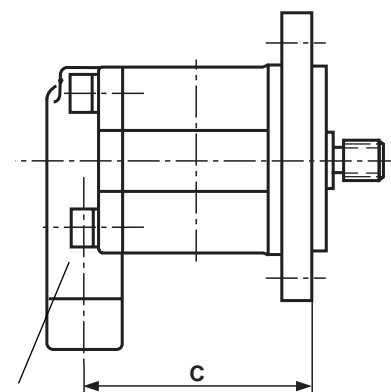
Unit dimensions: G2 with built-on pressure relief valve

(Dimensions in mm)

Note: The illustration shows a clockwise rotation pump; on an anti-clockwise pump the suction port is in the opposite position!

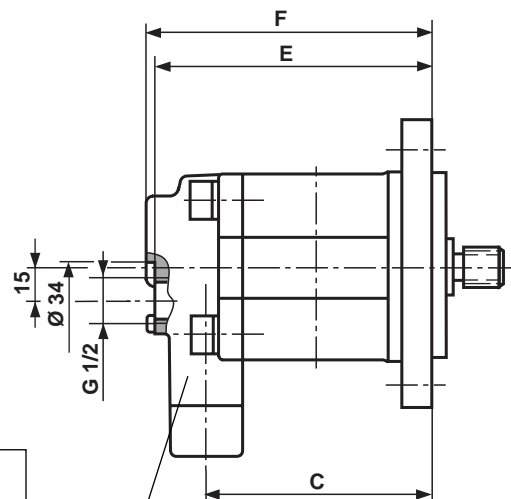


With internal hydraulic fluid return



6.1; 12

With external hydraulic fluid return



6.2; 12

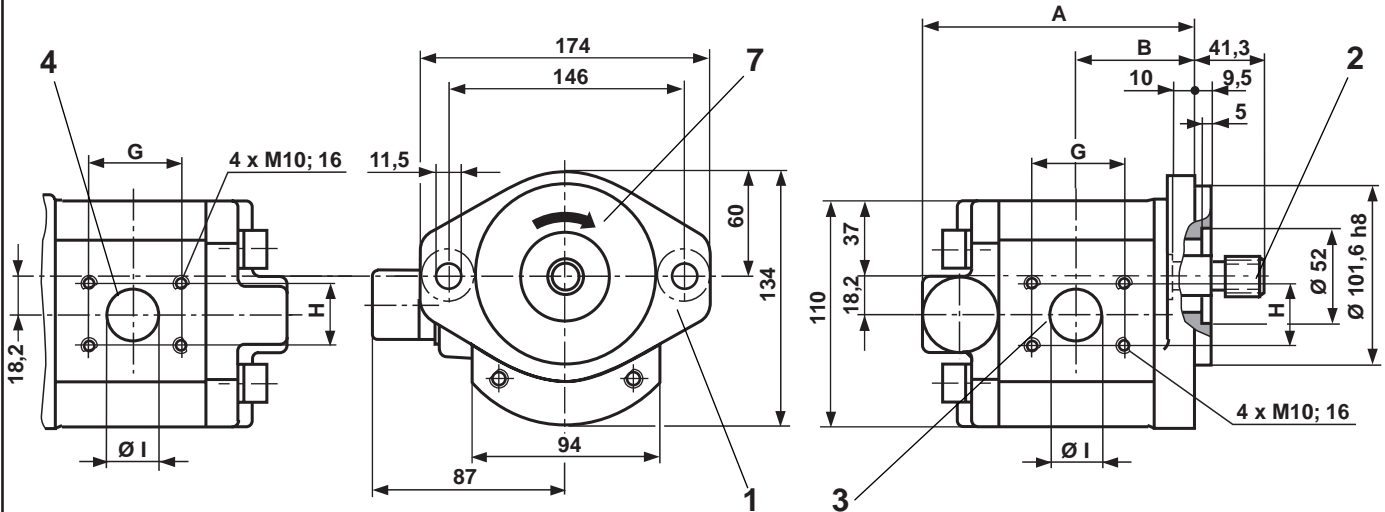
- 1** Mounting flange
SAE-A-2-hole fixing,
ordering detail ...R...
(for other mounting flanges
see catalogue sheet RE 10030)
- 2** Splined shaft
SAE-A 5/8"-9T 16/32DP,
ordering detail ...R...
(for other shaft designs
see catalogue sheet RE 10030)
- 3** Suction port, ordering detail ...20...
- 4** Pressure port, ordering detail ...20...
- 6.1** Pressure relief valve with internal
hydraulic fluid return,
ordering detail ...D..Y
- 6.2** Pressure relief valve with external
hydraulic fluid return,
ordering detail ...D..X
- 7** Clockwise rotation, ordering detail ...R...,
for the anti-clockwise model the suction
and pressure ports are interchanged,
ordering detail ...L...
- 12** Pressure relief valve,
on anti-clockwise pump rotated through 180°

Dim. Size	A	B	C	Ø D	E	F
4	101	42.8	84	15	107	110
5	103.5	42	86.5	15	109.5	112.5
8	107	45.8	90	20	113	116
11	111	47.8	94	20	117	120
14	115.5	50	98.5	20	121.5	124.5
16	118.5	49.5	101.5	20	124.5	127.5
19	122.5	51.5	105.5	20	128.5	131.5
22	127.5	56	110.5	20	133.5	136.5

Unit dimensions: G3 with built-on pressure relief valve

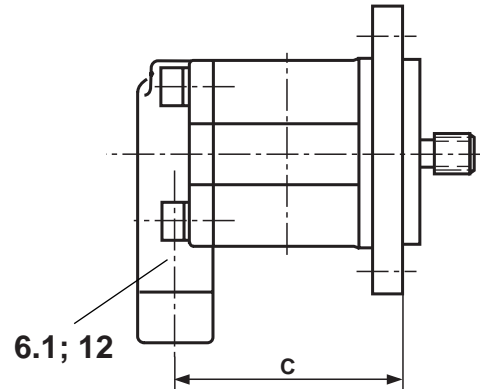
(Dimensions in mm)

Note: The illustration shows a clockwise rotation pump; on an anti-clockwise pump the suction port is on the opposite side!

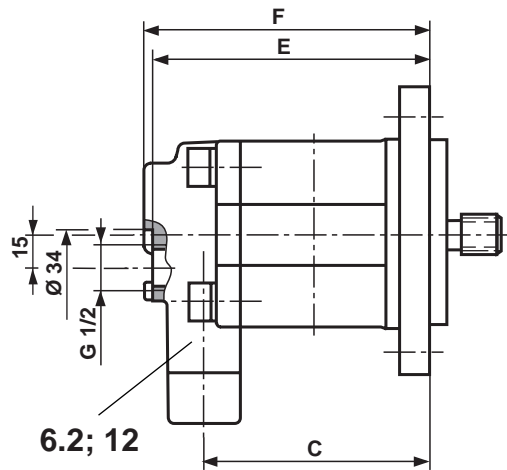


- 1 Mounting flange
SAE-B-2-hole fixing,
ordering detail ...**B**...
(for other mounting flanges
see catalogue sheet RE 10 039)
- 2 Splined shaft
SAE-B 7/8"-13T 16/32DP,
ordering detail ...**D**...
(for other shaft designs
see catalogue sheet RE 10 039)
- 3 Suction port, ordering detail ...**07**...
- 4 Pressure port, ordering code ...**07**...
- 6.1 Pressure relief valve with **internal**
hydraulic fluid return, ordering detail ...**D..Y**
- 6.2 Pressure relief valve with **external**
hydraulic fluid return, ordering detail ...**D..X**
- 7 Clockwise rotation, ordering detail ...**R**...
for the anti-clockwise model suction and
pressure ports are interchanged,
ordering detail ...**L**...
- 12 Pressure relief valve on anti-clockwise pump rotated
through 180°

With internal hydraulic fluid return



With external hydraulic fluid return



Dim. Size	A	B	C	E	F	G	H	Ø I
20	138.5	61.5	121.5	144.5	147.5	52,4	26.2	25
23								
26								
29	152.5	68.5	135.5	158.5	161.5	58.8	30.2	32
32								
38								

Mannesmann Rexroth AG
D-97813 Lohr am Main
Jahnstraße 3-5 • D-97816 Lohr am Main
Telefon 0 93 52 / 18-0 • Telefax 0 93 52 / 18-10 40
Telex 6 89 418

Mannesmann Rexroth Limited
Cromwell Road, St. Neots,
Huntingdon, Cambs. PE19 2ES
Tel: (01480) 476041
Fax: (01480) 219052