



**Fixed displacement  
axial piston motors**

**410 series**

**TECHNICAL CATALOGUE**

**PSM-HYDRAULICS**

**2011**

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## Ordering Code

A	B	C	D	E	F	G	H	I
4	1	0	.	.	.	.	.	.

● = standart program  
o = optional  
- = none

### A - series

code	description
410	series 410

### B - product version

code	description	410...56	410...107
0	basic	●	●
1	cartridge (build-in)	●	●

### C - displacement

code	description	410...56	410...107
56	56 ccm/rev	●	-
107	107 ccm/rev	-	●

### D - направление вращения

code	description	410...56	410...107
W	reverse	●	●

### E - rotation

code	description	410...56	410...107
A1	splined W30x2x30x14x9g DIN5480	●	-
A2	splined W35x2x30x16x9g DIN5480	●	-
A3	splined W40x2x30x18x9g DIN5480	-	●
A4	splined W45x2x30x21x9g DIN5480	-	●
Z1	parallel keyed shaft Ø30k6 8x7x50 DIN 6885	●	-
Z2	parallel keyed shaft Ø40k6 12x8x63 DIN 6885	-	●
Z3	parallel keyed shaft Ø35k6 AS10x8x50 DIN 6885	●	-
Z4	parallel keyed shaft Ø45k6 AS14x9x63 DIN 6885	-	●

### F - end cap ports and options

code	description	410...56	410...107
F 1 0	flange ports at rear side	●	●
F 2 0	flange ports at opposite side	●	●
F 2 1	flange ports at opposite site / FV	●	●
F 3 0	flange ports at same side	o	o
F 3 2	flange ports at same side / PRV	●	●
F 3 5	flange ports at same side / PRV, CV	●	●
F 6 0	2 threaded ports at side, 2 threaded ports at rear	o	o

code	description
0	none
1	loop flushing valve (FV)
2	pressure-relief valves (PRV)
5	pressure-relief valves, check valves (PRV, CV)
6	no valves, speed sensor
7	loop flushing valve (FV), speed sensor

code	description
1	ports at rear side
2	ports at opposite side
3	ports at same side
6	2 threaded ports at side, 2 threaded ports at rear

### G - special features

code	description	410...56	410...107
NN	none	●	●

### H - shaft seal

code	description	410...56	410...107
B	NBR	●	●
F	FKM	●	●

### I - climatic version and category of desposiotion

code	description	410...56	410...107
Y1	temperate climate, placing on open air	●	●
TB1	tropical climate, placing on open air	●	●

## Technical characteristics.

Size	56	107
Displacement $V_g$ , ccm/rev	56	106.7
Shaft speed $n$ , rpm		
- min $n_{min}$	50	50
- nom $n_{nom}$	1800	1200
- max $n_{max}$	5000	4000
Flow $Q$ , l/min		
- min $Q_{min}$	2.80	5.60
- nom $Q_{nom}$	100.80	128.40
- max $Q_{max}$	280.00	428.00
Input pressure $P_{in}$ , bar		
- nom $P_{nom}$	320	320
- max working $P_{max}$	450	450
Output max pressure, $P_{out max}$ , bar	250	250
Power $N$ , kW		
- nom $N_{nom}$ (at $n_{nom}$ , $P_{nom}$ )	53.76	68.48
- max $N_{max}$ (at $n_{max}$ , $P_{max}$ )	75.60	96.30
Case drain pressure max, $P_{dr}$ , bar	2	2
Torque $T$ , Nm		
- nom $T_{nom}$ (at $P_{nom}$ )	273.80	523.15
- max $T_{max}$ (at $P_{max}$ )	385.03	735.68
Volume efficiency	0.95	0.95
Weight, kg	17	29

Torgues shown at Volume efficiency=0.95

All other values - theoretical

## Determination of the nominal size range of the motor.

$$\text{Flow } Q = \frac{V_g \cdot n}{1000 \cdot \eta_v} \text{ l/min}$$

$$\text{Torque } T = \frac{V_g \cdot \Delta P \cdot \eta_{mh}}{20 \cdot \pi} \text{ N}\cdot\text{m}$$

$$\text{Power } N = \frac{Q \cdot \Delta P \cdot \eta_t}{612} \text{ kW}$$

$$\text{Shaft speed } n = \frac{Q \cdot 1000 \cdot \eta_v}{V_g} \text{ rpm}$$

where:

- Q – flow, l/min
- T – torque, N·m
- N – power, kW
- $V_g$  – displacement, ccm/rev
- n – shaft speed, rpm
- $\Delta P$  – pressure difference, bar
- $\eta_v$  – volume efficiency
- $\eta_{mh}$  – hydraulic mechanical efficiency
- $\eta_t = \eta_v \cdot \eta_{mh}$  – full efficiency coefficient

## Requirements for working fluids.

Working fluid temperature:

max constant in hydraulic tank	+85°C
max peak (output from drain hole)	+100°C
min short-term (at cold start)	- 40°C

Kinematic viscosity of working fluid:

optimal (constant)	20-35 mm <sup>2</sup> /s (cSt)
max starting	1500 mm <sup>2</sup> /s (cSt)
min short-term	10 mm <sup>2</sup> /s (cSt)

Working fluid fineness:

not lower than class 12 as per GOST 17216-71  
not lower than class 18/15 as per ISO/DIN 4406



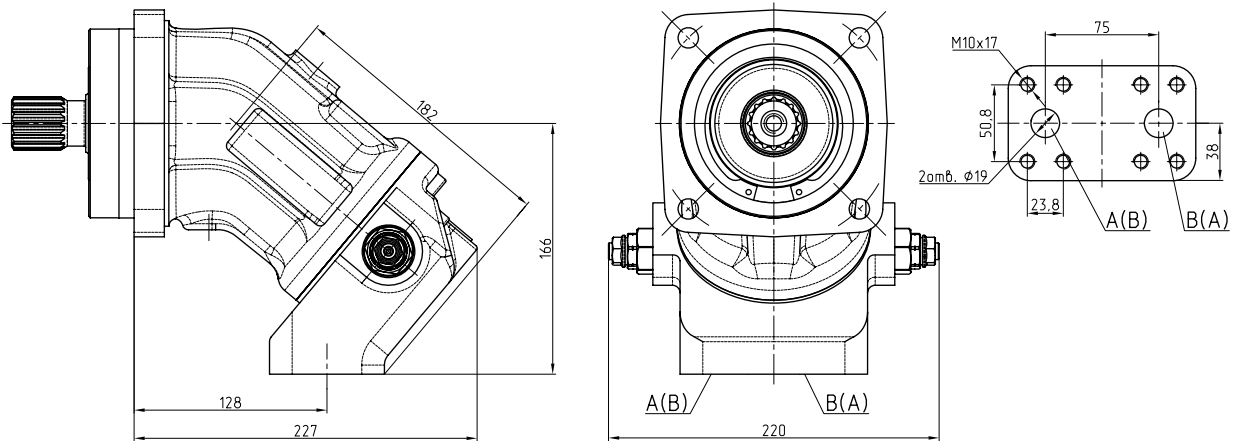


## Motors with build-in pressure-relief valves.

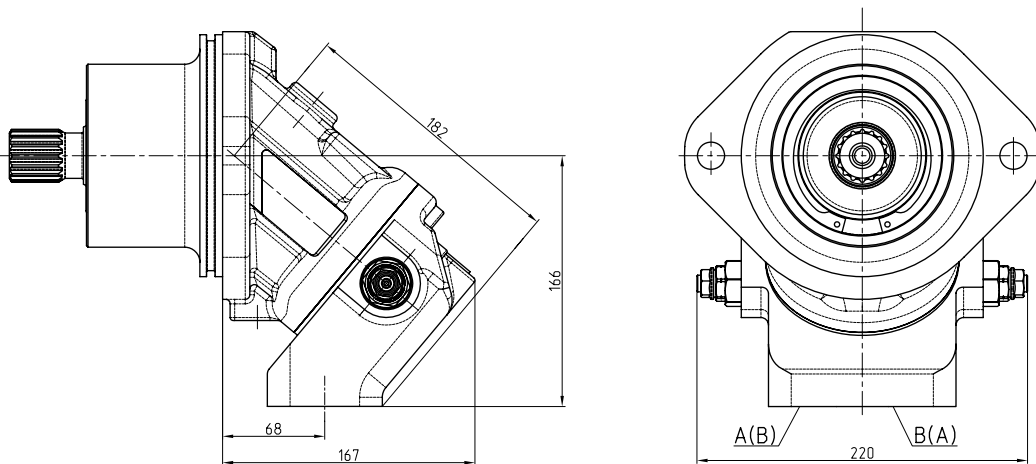
The motors has built-on two pressure-relief valves build-in in the back cap.  
Pressure-relief valves of double action are intended for the restriction of the peak pressure in working lines.

Pressure-relief valves adjustment pressure (difference)  $\Delta P = 220^{+1}$  bar (by default).  
Pressure-relief valves can be adjusted in negotiation with the consumer.

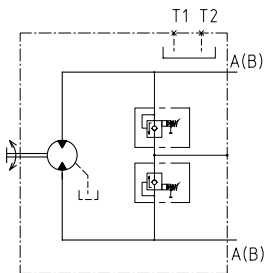
410.0.56...F32 - 2 flange at same side, pressure-relief valves.



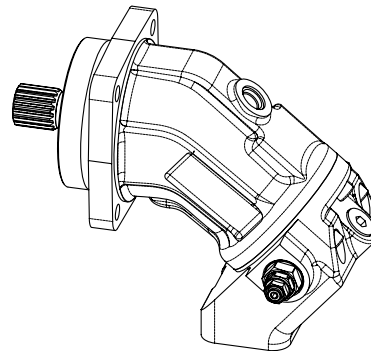
410.1.56...F32 - 2 flange at same side, pressure-relief valves.



Hydraulic circuit



General view





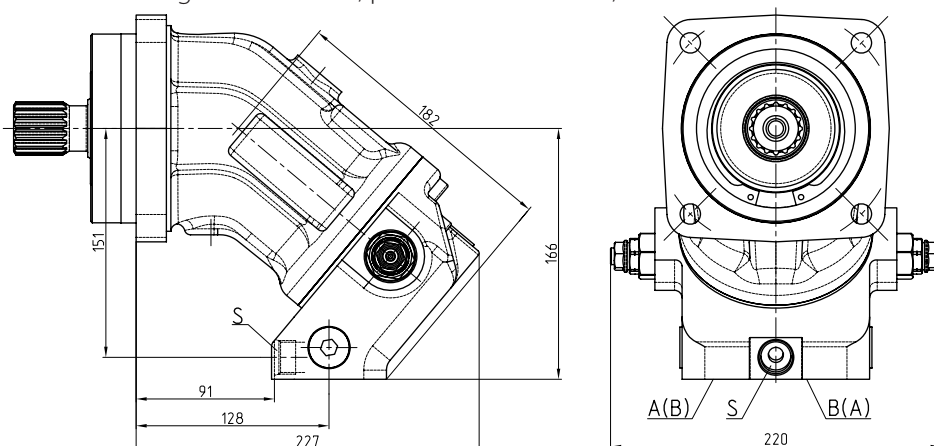
## Motors with build-in pressure-relief valves and check valves.

The motors has built-on two pressure-relief valves and two check valves build-in in the back cap.  
Pressure-relief valves of double action are intended for the restriction of the peak pressure in working lines.  
Check valves are intended to protect motor from cavitation.

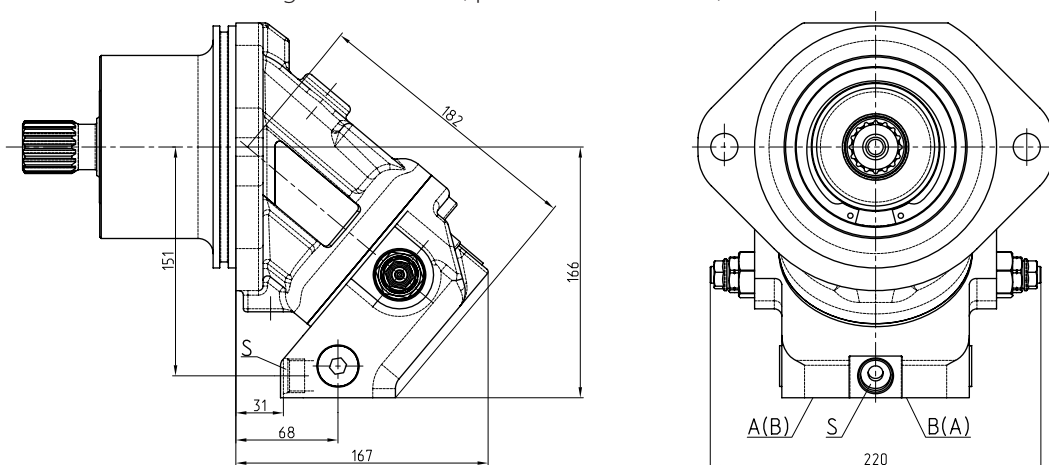
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Pressure-relief valves can be adjusted in negotiation with the consumer.

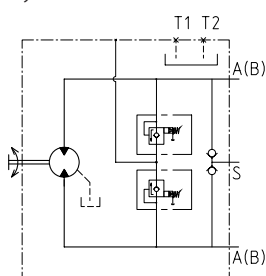
410.0.56...F35 - 2 flange at same side, pressure-relief valves, check valves.



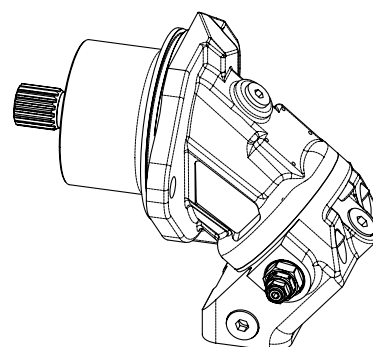
410.1.56...F35 - 2 flange at same side, pressure-relief valves, check valves.



Hydraulic circuit



General view



## Motors with loop flushing valve.

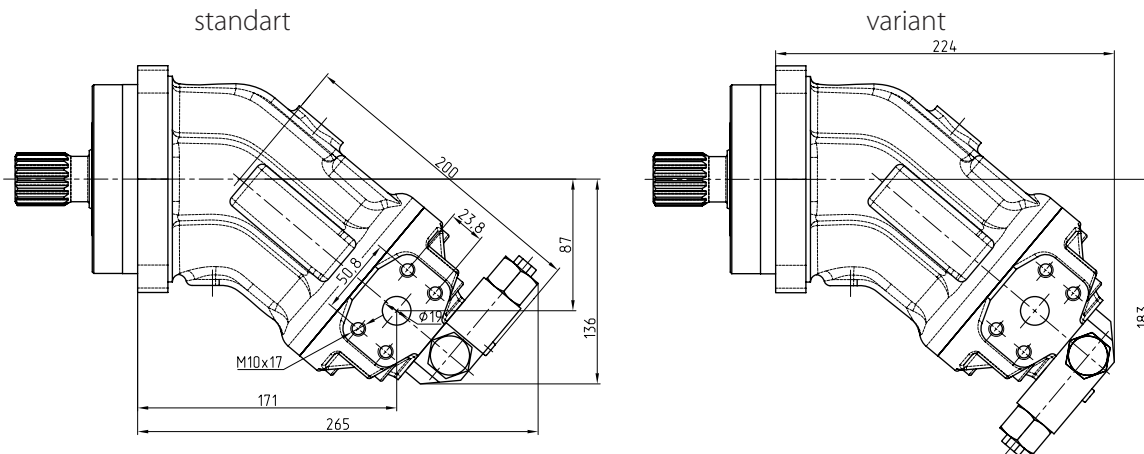
Motors are intended for operation in hydrostatic transmissions (HST), with 416 series pumps.

Loop flushing valve is mounted at motor end cap.

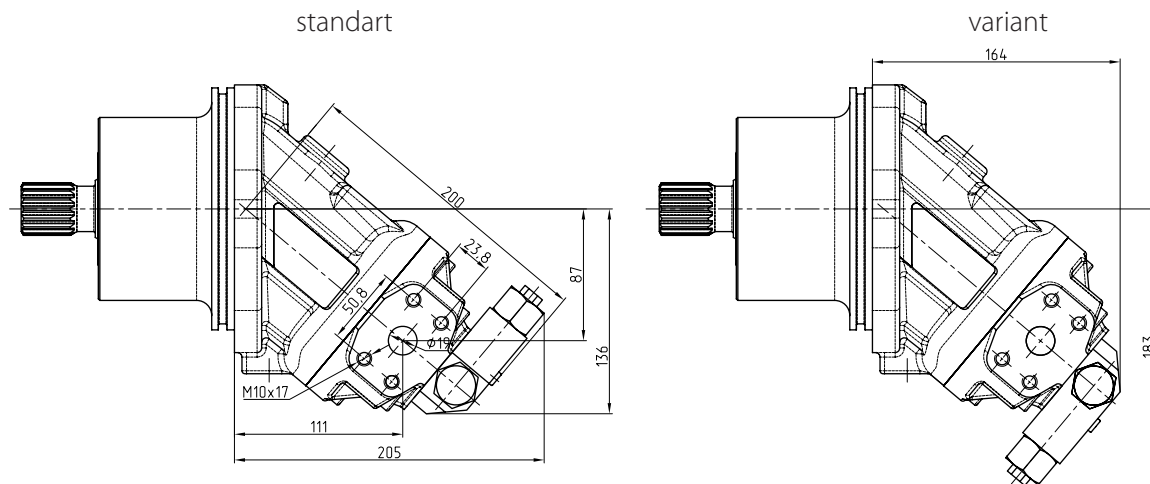
Loop flushing valve provides a compulsory exchange of a working fluid between a hydrotank and the closed circuit of hydrostatic transmission, also carrying out from closed circuit products extra earnings and deterioration in the filter and a hydrotank.

The purge relief valve adjustment pressure =  $23^{+1}$  bar (by default). Can be adjusted in negotiation with the consumer.

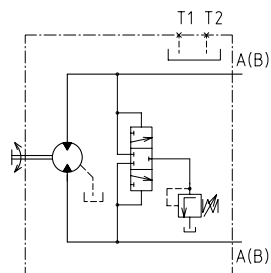
410.0.56...F21 - 2 flange at opposite side, loop flushing valve



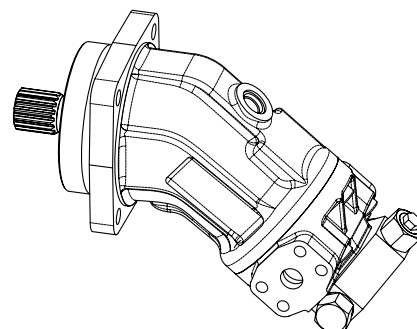
410.1.56...F21 - 2 flange at opposite side, loop flushing valve



### Hydraulic circuit



### General view



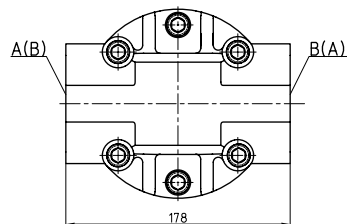
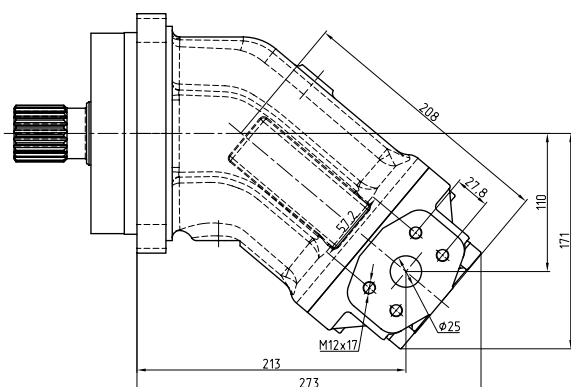
## Notes



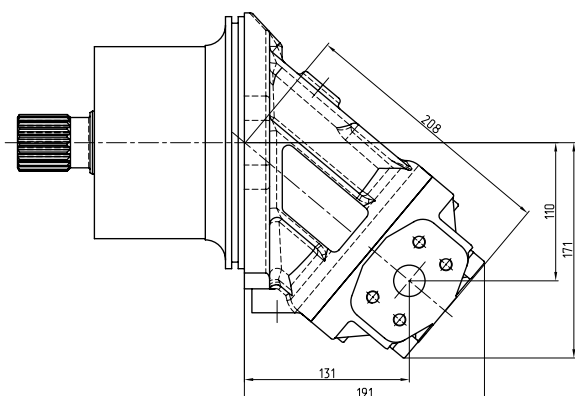


## End cap options

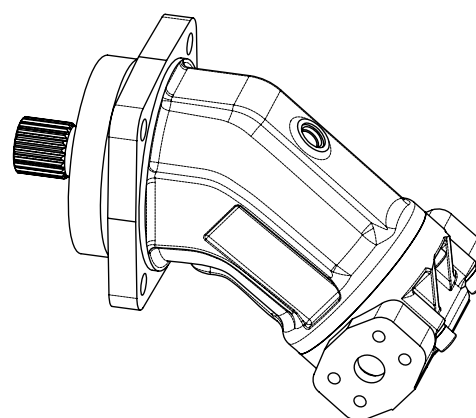
410.0.107...F20 - 2 flange at opposite side



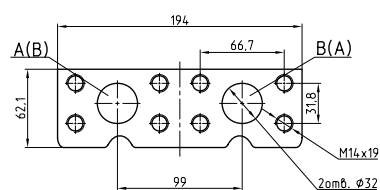
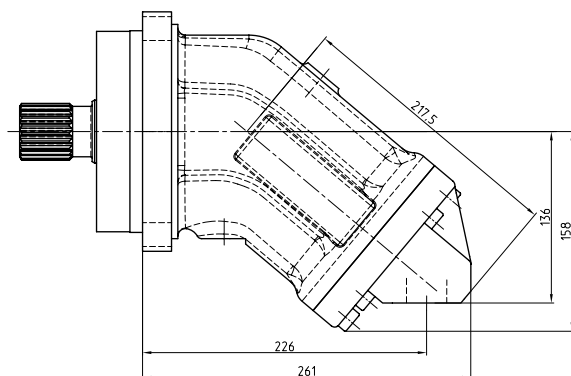
410.1.107...F20 - 2 flange at opposite side



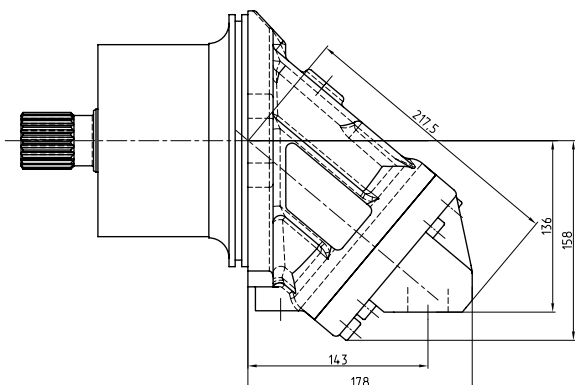
General view



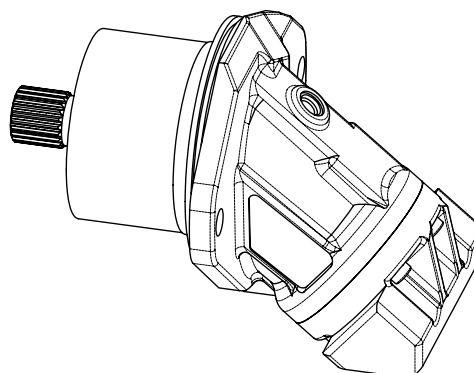
410.0.107...F30 - 2 flange at same side



410.1.107...F30 - 2 flange at same side



General view

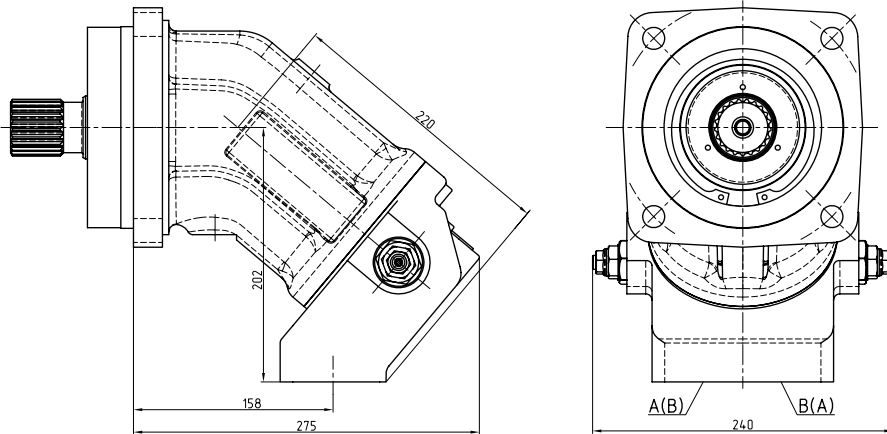


## Motors with build-in pressure-relief valves.

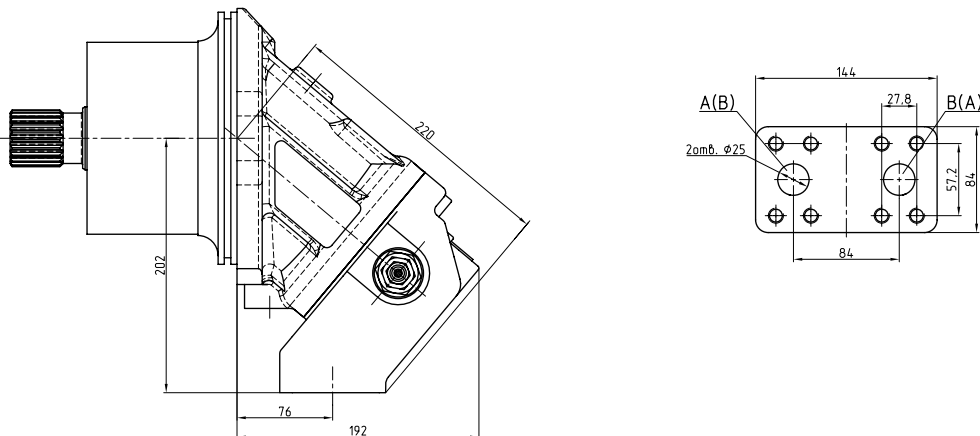
The motors has built-on two pressure-relief valves build-in in the back cap.  
Pressure-relief valves of double action are intended for the restriction of the peak pressure in working lines.

Pressure-relief valves adjustment pressure (difference)  $\Delta P = 220^{+1}$  bar (by default).  
Pressure-relief valves can be adjusted in negotiation with the consumer.

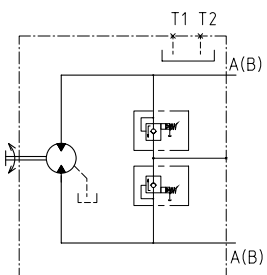
410.0.107...F32 - 2 flange at same side, pressure-relief valves



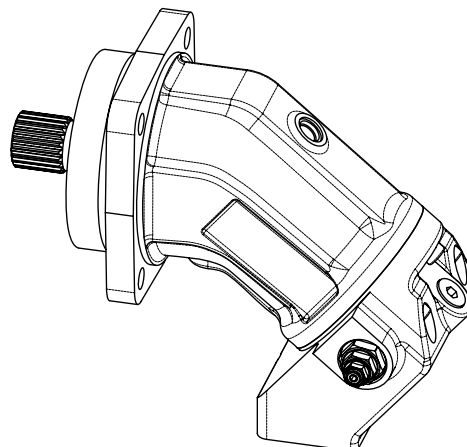
410.1.107...F32 - 2 flange at same side, pressure-relief valves



Hydraulic circuit



General view



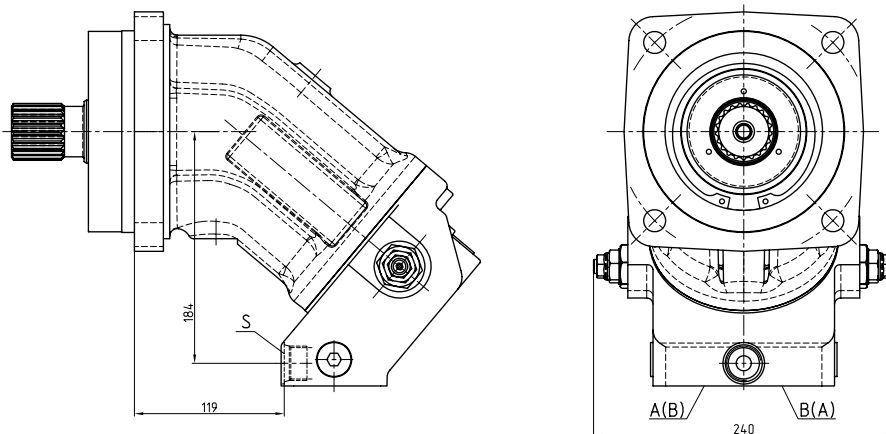
## Motors with build-in pressure-relief valves and check valves.

The motors has built-on two pressure-relief valves and two check valves build-in in the back cap. Pressure-relief valves of double action are intended for the restriction of the peak pressure in working lines. Check valves are intended to protect motor from cavitation.

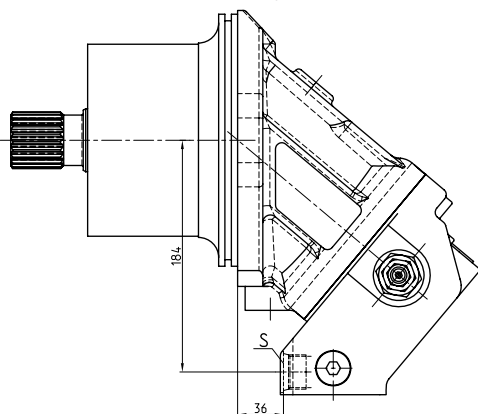
Pressure-relief valves adjustment pressure (difference)  $\Delta P = 220^{+1}$  bar (by default).

Pressure-relief valves can be adjusted in negotiation with the consumer.

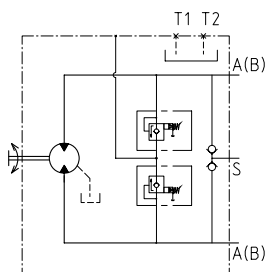
410.0.107...F35 - 2 flange at same side, pressure-relief valves, check valves.



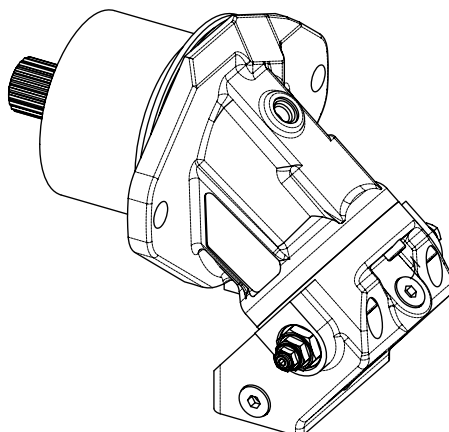
410.1.107...F35 - 2 flange at same side, pressure-relief valves, check valves.



Hydraulic circuit



General view



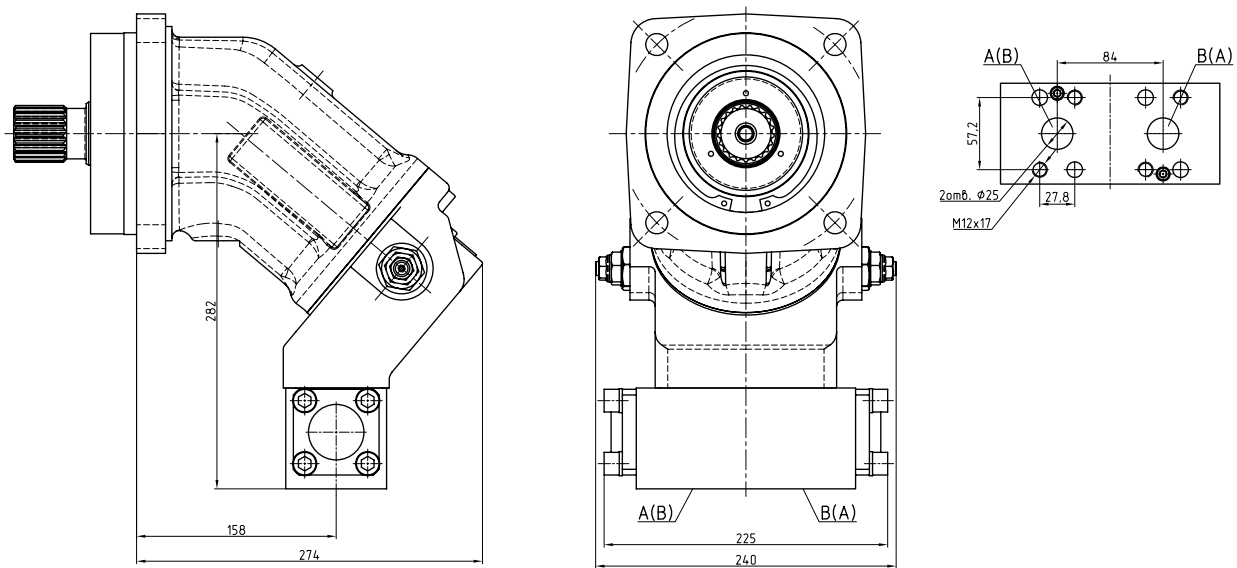
## Motors with build-in pressure-relief valves and counterbalance valve GKP0.25.

The motors has built-on two pressure-relief valves build-in in the back cap.  
Counterbalance valve is mounted at motor end cap.

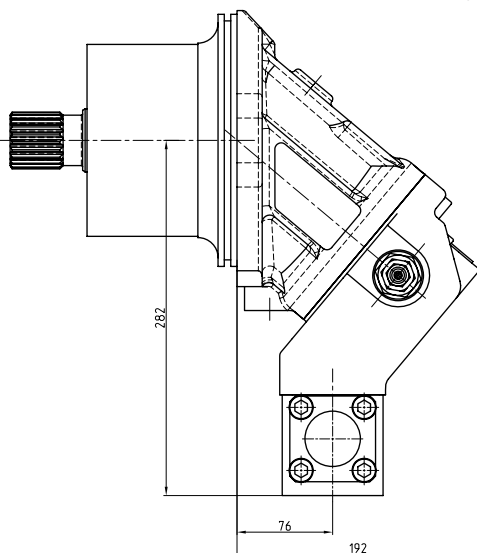
Pressure-relief valves of double action are intended for the restriction of the peak pressure in working lines.  
Counter balance hydraulic valves are intended to support the constant previously adjusted hydraulic motor shaft rotation speed under the same direction load in hydraulic systems open circuits.

Pressure-relief valves adjustment pressure (difference)  $\Delta P = 220^{+1}$  bar (by default).  
Pressure-relief valves can be adjusted in negotiation with the consumer.

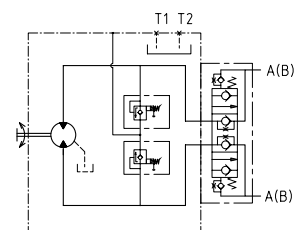
410.0.107...F32... + GKP0.25 - 2 flange at same side, pressure-relief valves, counterbalance valve



410.1.107...F32... + GKP0.25 - 2 flange at same side, pressure-relief valves, counterbalance valve



Hydraulic circuit





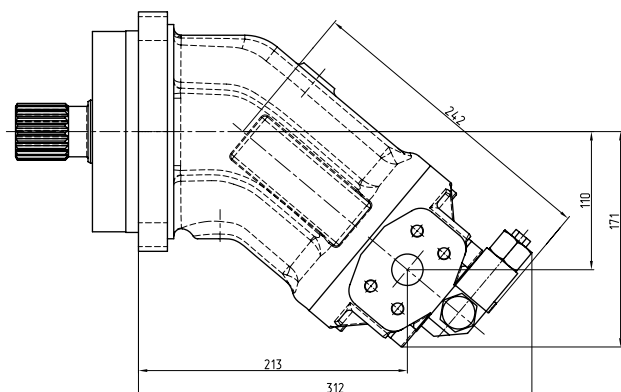
## Motors with loop flushing valve.

Motors are intended for operation in hydrostatic transmissions (HST), with 416 series pumps.  
Loop flushing valve is mounted at motor end cap.

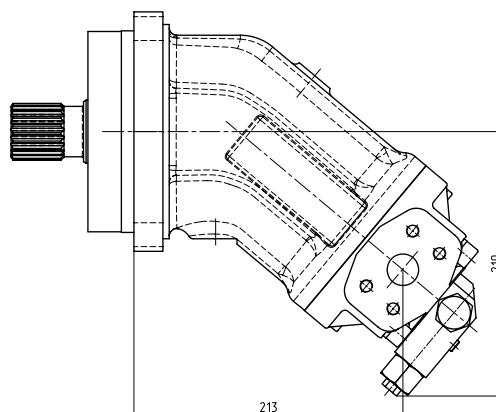
Loop flushing valve provides a compulsory exchange of a working fluid between a hydrotank and the closed circuit of hydrostatic transmission, also carrying out from closed circuit products extra earnings and deterioration in the filter and a hydrotank.

The purge relief valve adjustment pressure =  $23^{+1}$  bar (by default). Can be adjusted in negotiation with the consumer.

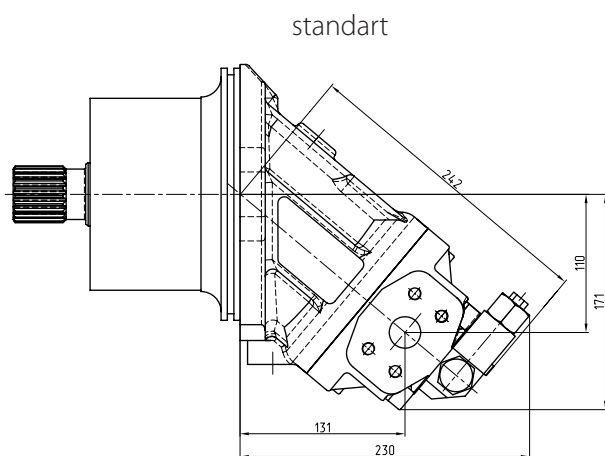
410.0.107....F21 - 2 flange at opposite side, loop flushing valve  
standart



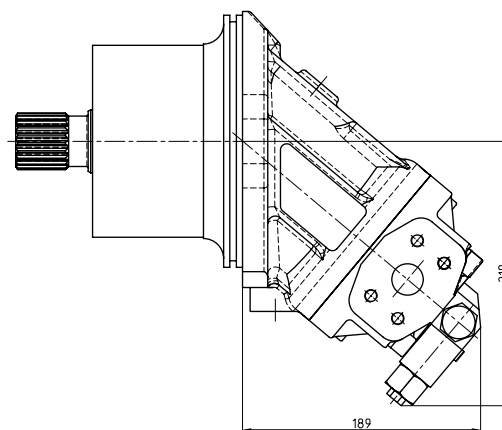
variant



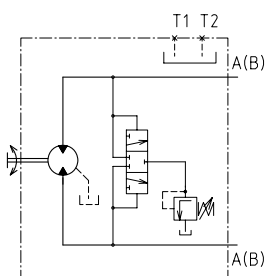
410.1.107....F21 - 2 flange at opposite side, loop flushing valve  
standart



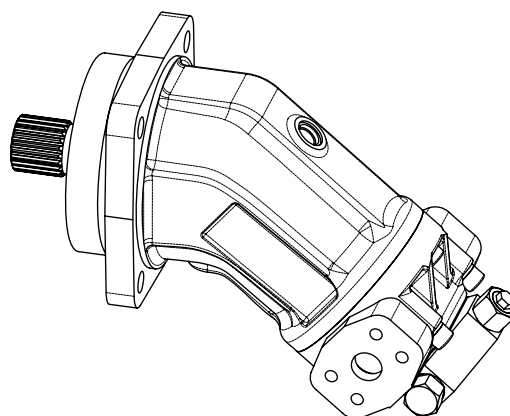
variant



Hydraulic circuit



General view



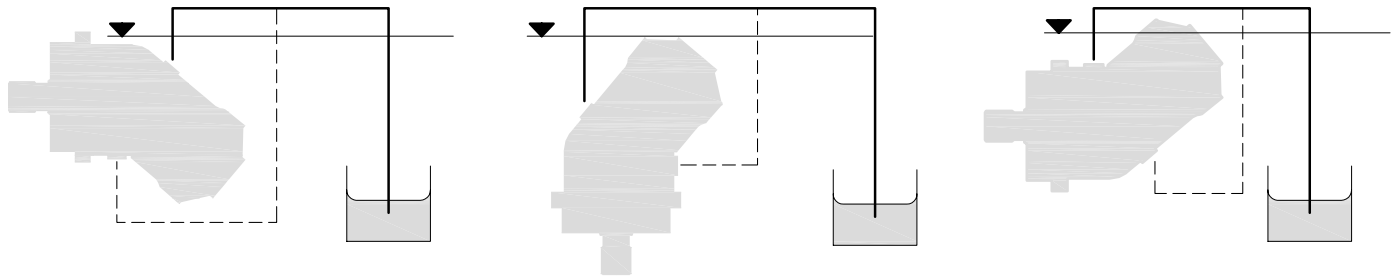
## Hydraulic motor direction and drain pipe mounting scheme.

Any hydraulic motor direction of mounting is possible.

Hydraulic motor drain chamber is to be connected with hydraulic system drain line.

The drain chamber is recommended to be connected through the hydraulic motor housing upper hole.

The drain line should be located according to the schemes given on the Fig. in order to avoid the hydraulic motor housing natural pressure from the tank.



## Notes



