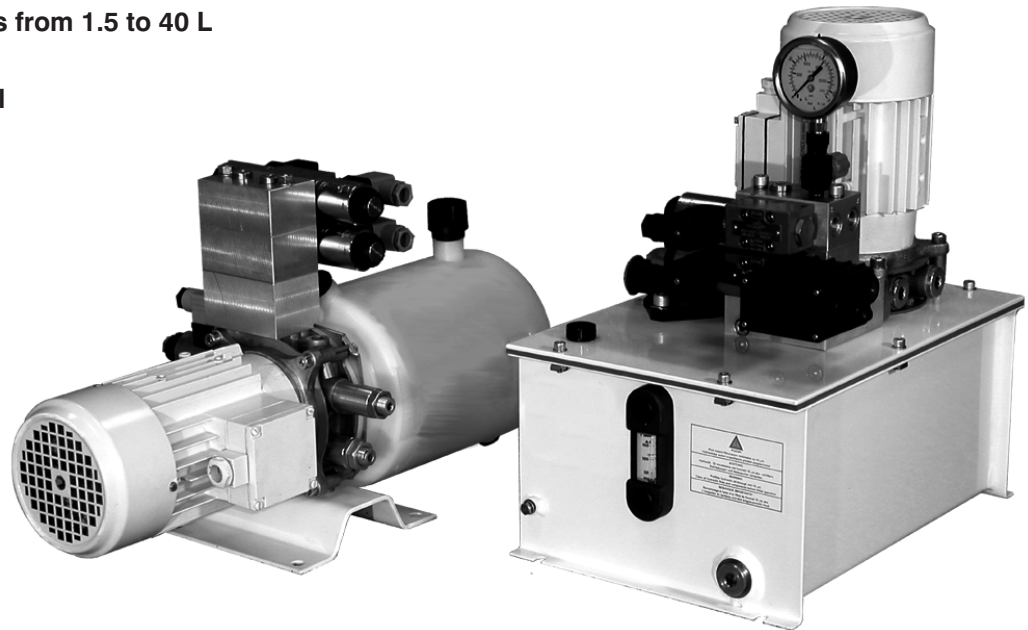


- Compact power packs for the use in lifting platforms, elevating tables, ramps, presses, machine tools, mobile applications and others
- 5 basic hydraulic circuits in the manifold
- Possibility of building up an additional circuit in the form of vertical or horizontal stacking assembly
- Tank capacities from 1.5 to 40 L
- Low noise level



## Functional Description

Compact hydraulic power packs are designed to fit into small envelope dimensions and can be used in lifting platforms, elevating tables, manipulators, small presses, machine tools and mobile applications.

Each power pack consists of an electric motor, a pump, a manifold and a tank. The aluminum body forms the base of the power pack, on which all the main components, including the hydraulic elements, are mounted. The function of the power packs is apparent from the respective hydraulic circuit diagrams. The desired combination of particular components and hydraulic elements can be defined by reference to the ordering code and the respective tables. The layout of additional circuits is defined by an application number, which determines the manufacturer.

The hydraulic circuits can be accomplished in sizes 03,

04 and 06. The size 03 is in a form of sectional directional valves (page 11, 14) and does not enable any extension by valves for controlling the flow rate and the pressure.

The mounting position of the power pack is horizontal or vertical - see the Power Pack Dimensions on pages 10 to 18. All ports have G 1/4 internal threads (the thread G3/8 is to be agreed with manufacturer).

With the standard model the connecting ports A, B of the components of the vertical stacking assembly are oriented onto one side. Orientation of ports A, B each onto another side is to be agreed with the manufacturer. The basic combinations of electric motors and pumps, as well as their code designations, are shown in tables 1, 2 and 3.

Information regarding the basic power pack surface treatment is on page 3.

# Ordering Code

**SMA 04** -  /  .  -  -   .   - **XXXX** /

**Compact power pack**

**Pump displacement in cm<sup>3</sup>**

Series X	Series P
0.32 <b>03</b>	0.8 <b>08</b>
0.40 <b>04</b>	1.2 <b>12</b>
0.50 <b>05</b>	1.6 <b>16</b>
0.63 <b>06</b>	2.1 <b>21</b>
	2.5 <b>25</b>
	3.3 <b>33</b>
	3.6 <b>36</b>
	4.4 <b>44</b>
	4.8 <b>48</b>
	5.8 <b>58</b>
	6.2 <b>62</b>
	7.9 <b>79</b>

**Code of the electric motor**  
(see tables 1, 2 and 3)

**DC electric motor**  
without switch **O**  
with switch **R**

**Single-phase electric motor**  
without starting module **O**  
with starting module **M**

**Thre-phase electric motor** **O**

**Type of hydraulic circuit**  
see table on pages 7 and 8

**Solenoid voltage**

<b>01200</b>	12V DC
<b>01400</b>	14V DC
<b>02100</b>	21V DC
<b>02400</b>	24V DC
<b>04200</b>	42V DC
<b>04800</b>	48V DC
<b>06000</b>	60V DC
<b>10200</b>	102V DC
<b>20500</b>	205V DC
<b>02450</b>	24V / 50 (60)Hz
<b>11550</b>	115V / 50 (60)Hz
<b>23050</b>	230V / 50 (60)Hz

**Number modification**  
(determined by manufacturer)

**A**  
**B**  
**C**  
**D**  
**E**  
**F**

**Type of add-on unit**

see page 10  
see page 10, 13, 17  
see page 12, 17  
see page 11  
see page 11, 14  
see page 15

**O**  
**F**  
**K**

**Power pack holder**

without holder  
low holder  
high holder

**O**  
**S**  
**R\***  
**E\***  
**M\***  
**D**

**Type of filter used**

without filter  
suction filter  
return filter without indication  
return filter with el. indication  
return filter with manometer  
pressure filter with optical indication

\* for tank codes 56 - 60 only

**Tank code**

see pages 10 - 18

## Technical Data

Flow rate	L/min	to tables 1, 2 and 3		
Working pressure	bar	to tables 1, 2 and 3		
Tank capacity	L	1.5 - 40		
Type of pump		external gear pump, left-hand rotation		
Nominal pressure / max. pressure	bar	to tables 1, 2		
Power of electric motor		to tables 1, 2 and 3		
Type of electric motor		single phase	three phase	DC
Voltage of the electric motor	V	230	230/400	12/24
Frequency	Hz	50	50	-
Electric motor enclosure type / insulation class		IP 55/F	IP 55/F	IP 43/F
Voltage of directional valves	V	12DC, 14DC, 21DC, 24DC, 42DC, 48DC, 60DC, 102DC, 205DC, 24AC, 115AC, 230AC		
Hydraulic fluid		Hydraulic oils of power classes HM, HV to CETOP RP 91 H in viscosity classes ISO VG 32, 46 and 68		
Viscosity range	mm <sup>2</sup> /s	20 ... 100		
Max. degree of fluid contamination		Class 21/18/15 to ISO 4406 (1999).		
Filtration (suction/return/pressure))	µm	60/10/18		
Fluid temperature range	°C	0 ... +70		
Fluid temperature range for a short term 10 minute max.	°C	-20 minimum +80 maximum		
Ambient temperature range	°C	-25 ... +50		
Thread of the connectiong ports P, T, A, B, M		G1/4 (A, B G3/8 - per request)		
Working position		horizontal, vertical		

## Standard Surface Treatment

Model	Material used	Surface treatment
Cylindrical sheet tank	Sheet steel	Komaxit RAL 7030
Square sheet tank/cover	Sheet steel	Komaxit RAL 7030
Cylindrical plastic tank	BOREALIS ME 8131 (transparent)	Without surface treatment
DC electric motor		Zinc coated
AC electric motor		RAL 7030

Other components to manufacturer standard

Other surface treatment - is to agreed with manufacturer.

**Tab. 1a**

Code of the electric motor			Code of the pump															
			03 X-...		04 X-...		05 X-...		06 X-...		08 P2-...		12 P2-...		16 P2-...		21 P2-...	
p <sub>max.</sub> ** [bar]			240								250							
400V	n[1/min]	p[kW]	Q/p <sub>n</sub> * [L/min] / [bar]															
9	1350	0.12	0.4	140	0.5	110	0.6	90	0.8	70	1.1	50	1.6	35	2.1	25		
10	1350	0.18	0.4	200	0.5	170	0.6	135	0.8	105	1.1	80	1.6	55	2.1	40	2.7	30
11	1350	0.25			0.5	200	0.6	185	0.8	150	1.1	110	1.6	75	2.1	55	2.7	45
12	1370	0.37							0.8	200	1.1	160	1.6	110	2.2	80	2.7	65
13	1395	0.55									1.1	200	1.7	160	2.2	120	2.8	95
14	1395	0.75											1.7	200	2.2	165	2.8	130
15	1410	1.10													2.2	200	2.8	190
16	1420	1.50																
17	1420	2.20																
18	1420	3.00																
27	2820	0.18	0.9	100	1.1	80	1.3	65	1.7	50	2.3	40	3.4	25				
28	2830	0.25	0.9	140	1.1	110	1.3	90	1.7	70	2.3	50	3.4	35	4.5	25		
29	2740	0.37	0.8	200	1.0	170	1.3	135	1.6	110	2.2	80	3.3	55	4.3	40	5.4	35
30	2800	0.55					1.3	200	1.7	160	2.3	115	3.4	80	4.4	60	5.6	45
31	2855	0.75							1.7	200	2.3	155	3.4	105	4.5	80	5.7	65
32	2845	1.10									2.3	200	3.4	155	4.5	120	5.6	95
33	2860	1.50											3.4	200	4.5	160	5.7	125
34	2880	2.20													4.5	200	5.7	185
35	2895	3.00																

**Tab. 1b**

Code of the electric motor			Code of the pump															
			25 P2-...		33 P2-...		36 P2-...		44 P2-...		48 P2-...		58 P2-...		62 P2-...		79 P2-...	
p <sub>max.</sub> ** [bar]			250						200				160					
400V	n[1/min]	p[kW]	Q/p <sub>n</sub> * [L/min] / [bar]															
9	1350	0.12																
10	1350	0.18	3.2	25														
11	1350	0.25	3.2	35	4.3	30	4.6	25										
12	1370	0.37	3.3	55	4.3	40	4.7	40	5.7	30	6.2	30	7.5	25				
13	1395	0.55	3.3	80	4.4	60	4.8	55	5.8	45	6.3	40	7.7	35	8.2	30	10.5	25
14	1395	0.75	3.3	110	4.4	80	4.8	75	5.8	60	6.3	55	7.7	45	8.2	45	10.5	35
15	1410	1.10	3.4	155	4.4	120	4.8	110	5.9	90	6.4	80	7.8	70	8.3	65	10.6	50
16	1420	1.50	3.4	200	4.5	160	4.9	150	5.9	120	6.5	110	7.8	90	8.4	85	10.6	70
17	1420	2.20			4.5	200	4.9	200	5.9	180	6.5	165	7.8	135	8.4	125	10.6	100
18	1420	3.00									6.5	200	7.8	160	8.4	160	10.6	135
27	2820	0.18																
28	2830	0.25																
29	2740	0.37	6.5	25														
30	2800	0.55	6.7	40	8.8	30	9.6	25	11.7	25								
31	2855	0.75	6.8	55	9.0	40	9.8	35	11.9	30	13.0	30	15.7	25				
32	2845	1.10	6.8	80	9.0	60	9.8	55	11.9	45	12.9	40	15.7	35	16.8	30		
33	2860	1.50	6.8	105	9.0	80	9.8	75	11.9	60	13.0	55	15.8	45	16.9	45		
34	2880	2.20	6.9	155	9.1	115	9.9	105	12.0	90	13.1	80	15.9	65	17.0	60		
35	2895	3.00	6.9	200	9.1	160	9.9	145	12.1	120	13.2	110	16.0	90	17.1	85		

\* p<sub>n</sub> - nominal pressure = the highest working pressure allowed without time restriction\*\* p<sub>max.</sub> - maximum pressure = maximum pressure allowed for a short time - max. 20s

**Tab. 2a**

Code of the electric motors			Code of the pump																				
			03 X-...				04 X-...				05 X-...				06 X-...				08 P2-...		12 P2-...		16 P2-...
p <sub>max.</sub> ** [bar]			240								250												
230V	n[1/min]	p[kW]	Q/p <sub>n.</sub> * [L/min] / [bar]																				
1	1415	0.12	0.4	130	0.5	105	0.7	85	0.8	70	1.1	50	1.7	35	2.2	25							
2	1385	0.18	0.4	200	0.5	160	0.7	130	0.8	105	1.1	80	1.7	50	2.2	40	2.7	30					
3	1400	0.25			0.5	200	0.7	180	0.8	145	1.1	110	1.7	70	2.2	55	2.8	45					
4	1400	0.37							0.8	200	1.1	160	1.7	105	2.2	80	2.8	65					
5	1415	0.55									1.1	200	1.7	155	2.2	120	2.8	95					
6	1405	0.75											1.7	200	2.2	165	2.8	130					
7	1420	1.10															2.8	190					
8	1430	1.50																					
19	2895	0.18	0.9	95	1.1	75	1.4	65	1.7	50	2.4	35	3.5	25									
20	2850	0.25	0.9	135	1.1	110	1.4	90	1.7	70	2.3	50	3.4	35	4.5	25							
21	2895	0.37	0.9	200	1.1	160	1.4	130	1.7	105	2.4	75	3.5	50	4.6	40	5.7	30					
22	2860	0.55					1.4	195	1.7	155	2.3	115	3.4	75	4.5	60	5.7	45					
23	2905	0.75							1.7	200	2.4	155	3.5	105	4.6	80	5.8	65					
24	2910	1.10									2.4	200	3.5	150	4.6	115	5.8	90					
25	2900	1.50											3.5	200	4.6	160	5.7	125					
26	2810	2.20															5.6	190					

**Tab. 2b**

Code of the electric motors			Code of the pump																
			25 P2-...			33 P2-...			36 P2-...			44 P2-...			48 P2-...		58 P2-...		62 P2-...
p <sub>max.</sub> ** [bar]			250						200						160				
230V	n[1/min]	p[kW]	Q/p <sub>n.</sub> * [L/min] / [bar]																
1	1415	0.12																	
2	1385	0.18	3.3	25															
3	1400	0.25	3.3	35	4.4	25	4.8	25											
4	1400	0.37	3.3	55	4.4	40	4.8	35	5.8	30	6.4	30	7.7	25					
5	1415	0.55	3.4	80	4.5	60	4.9	55	5.9	45	6.4	40	7.8	35	8.3	30	10.6	25	
6	1405	0.75	3.4	105	4.4	80	4.8	75	5.9	60	6.4	55	7.7	45	8.3	45	10.5	35	
7	1420	1.10	3.4	155	4.5	120	4.9	110	5.9	90	6.5	80	7.8	65	8.4	65	10.6	50	
8	1430	1.50	3.4	200	4.5	160	4.9	145	6.0	120	6.5	110	7.9	90	8.4	85	10.7	65	
19	2895	0.18																	
20	2850	0.25																	
21	2895	0.37	6.9	25															
22	2860	0.55	6.8	40	9.0	30	9.8	25											
23	2905	0.75	6.9	50	9.2	40	10.0	35	12.1	30	13.2	25	16.0	25					
24	2910	1.10	6.9	75	9.2	60	10.0	55	12.1	45	13.2	40	16.0	35	17.2	30			
25	2900	1.50	6.9	105	9.1	80	9.9	70	12.1	60	13.2	55	16.0	45	17.1	40			
26	2810	2.20	6.7	155	8.9	120	9.6	110	11.7	90	12.8	85	15.5	70	16.6	65			

\* p<sub>n.</sub> - nominal pressure = the highest working pressure allowed without time restriction

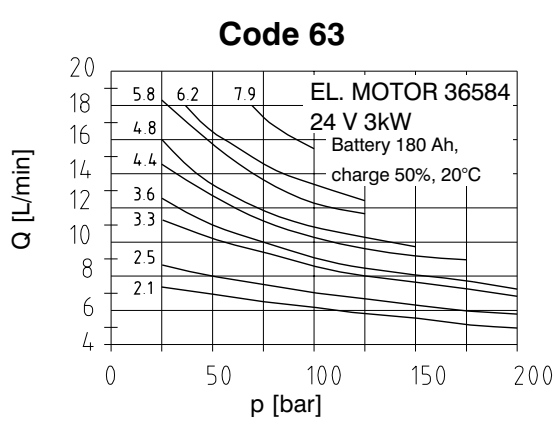
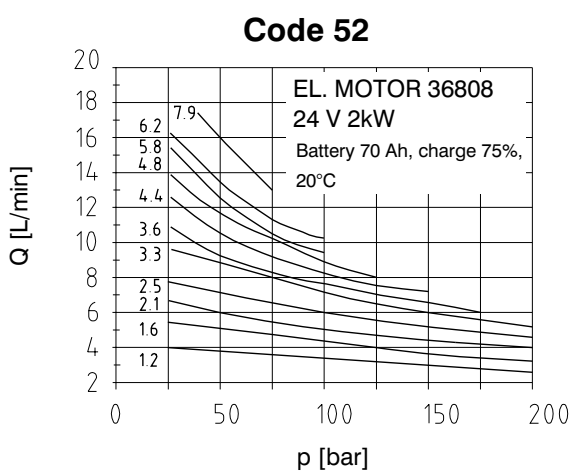
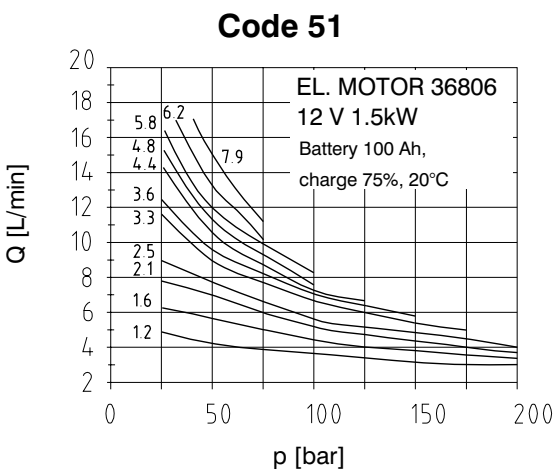
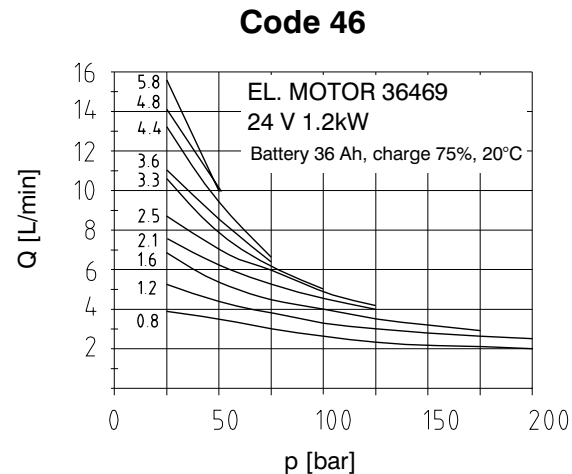
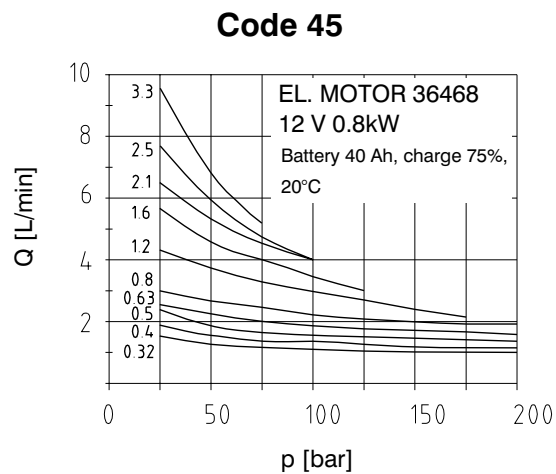
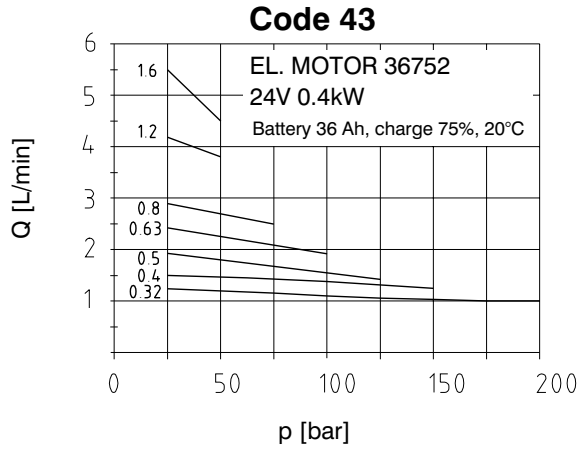
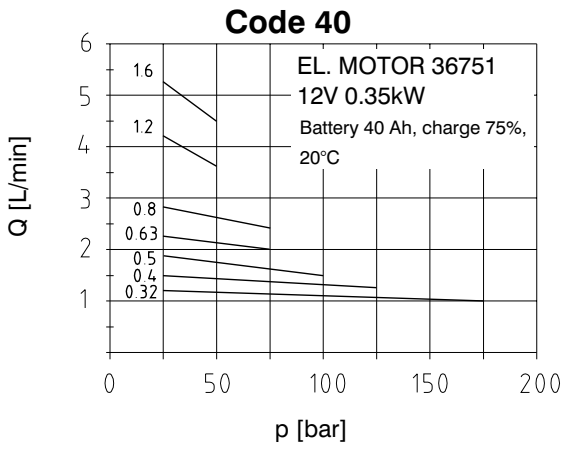
\*\* p<sub>max.</sub> - maximum pressure = maximum pressure allowed for a short time - max. 20s

**Tab. 3**

Code of the electric motor				40 - 63	
n [1/min]	12V	24V	kW	Q [L/min] / p [bar]	
3200	40	/	0.35	See characteristics on page 6	
3300	/	43	0.4		
2700	45	/	0.8		
3200	/	46	1.2		
2400	51	/	1.5		
2100	/	52	2.0		
2200	/	63	3.0		

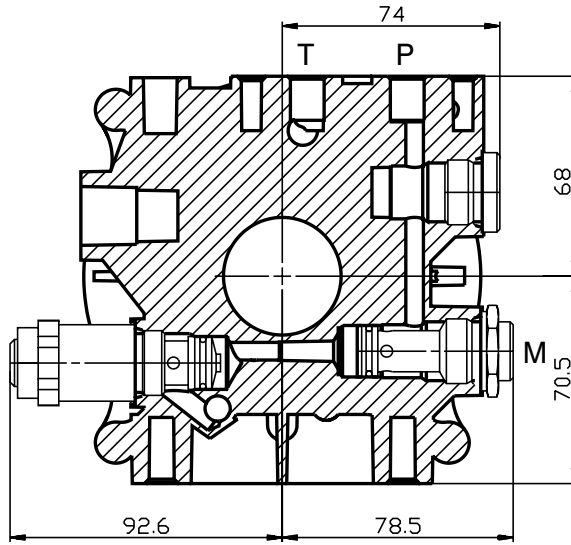
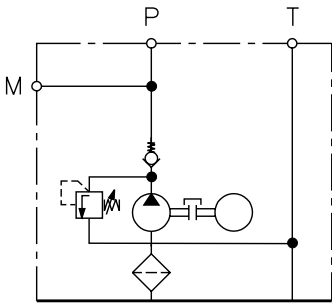
**Attention!** The DC motors must be loaded, so as to reduce the revolutions! Do not run the motors without pressure loading!

# Characteristics

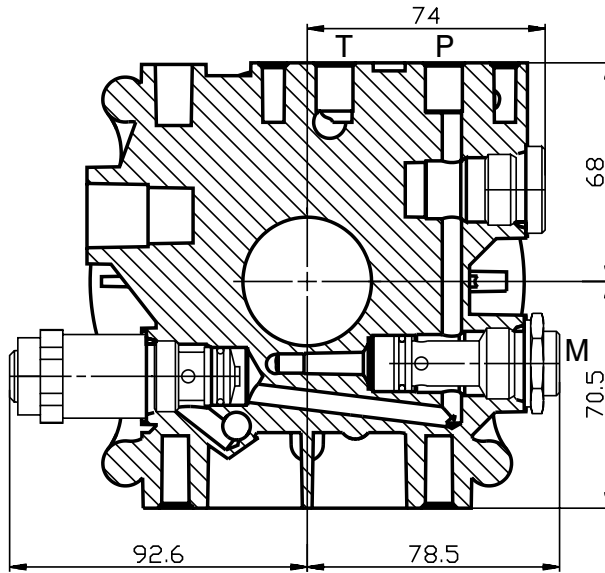
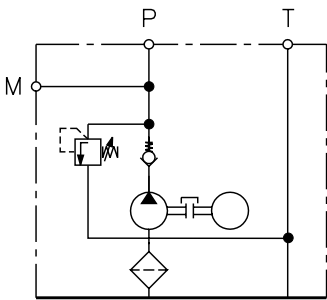


# Basic Hydraulic Circuit Diagrams

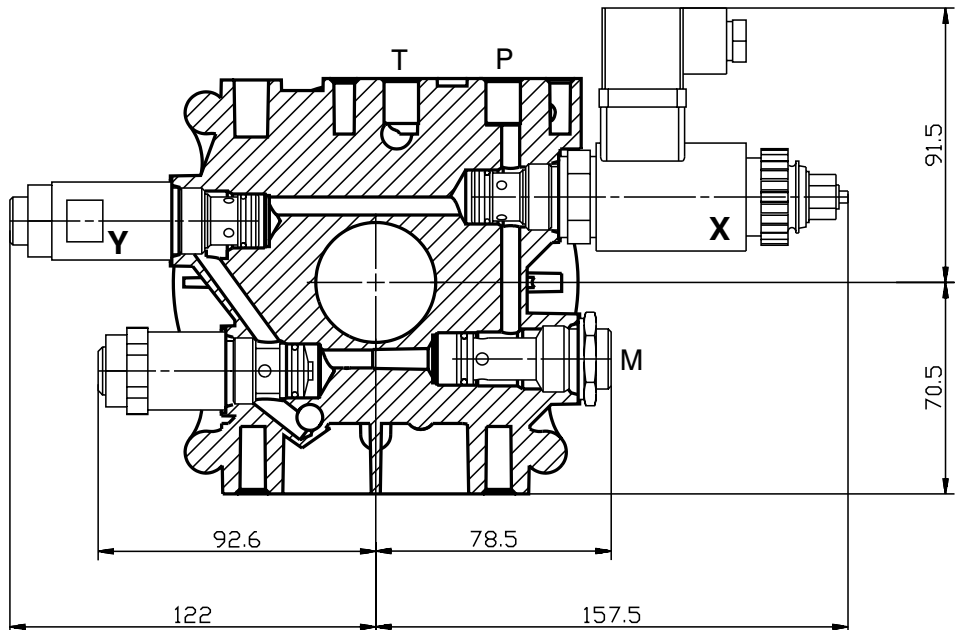
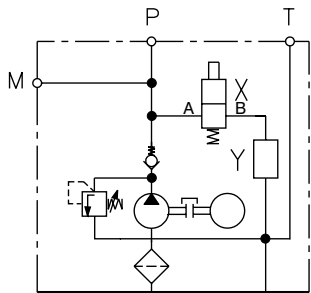
**A**



**B**

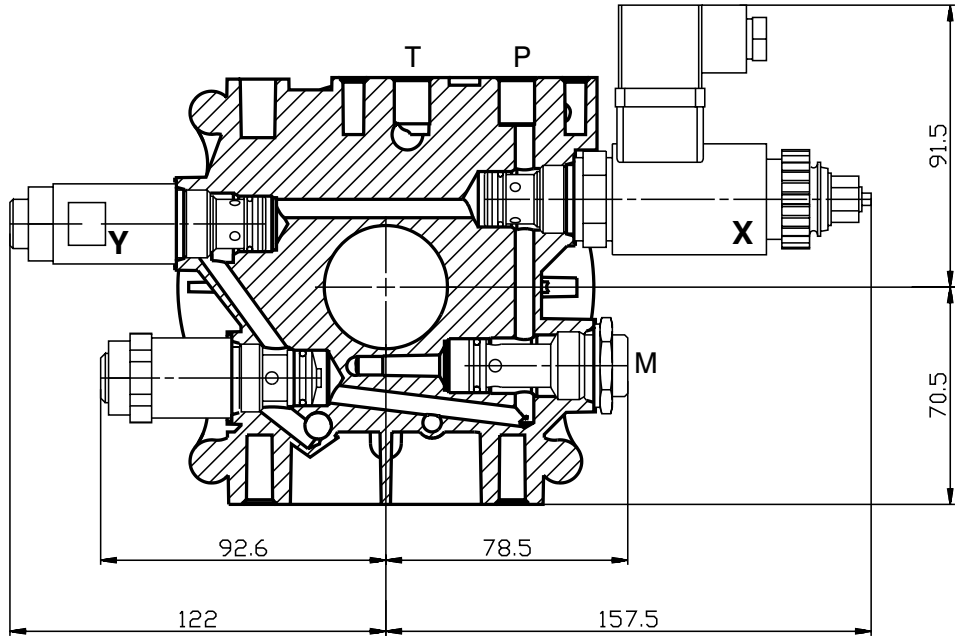
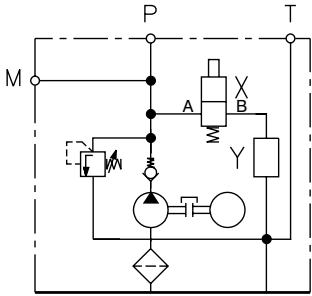


**C<sub>XY</sub>**

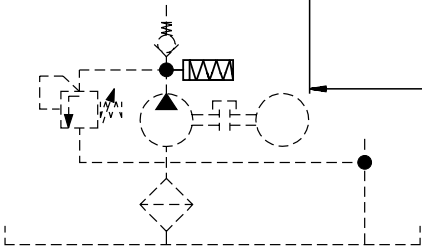
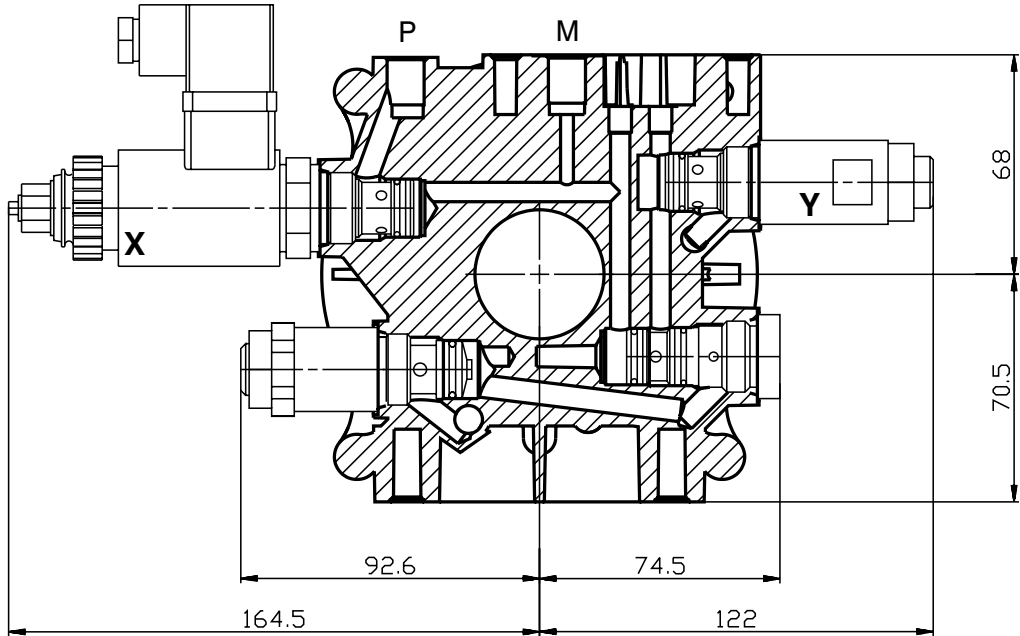
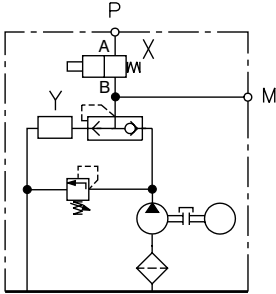


# Basic Hydraulic Circuit Diagrams

**D<sub>XY</sub>**



**E<sub>XY</sub>**



Starting module for the use of single-phase AC electric motors  
- Can be used with circuit diagram A, C, E

X	Type of the seat valve	Functional symbol	Y	Type of the throttle valve	Functional symbol
0	0	-	0	0	-
1	ROE3-042S1		1	VSV1-ZH	
2	ROE3-042S6		2	VSS3-062*	
3	ROR3-062 + handle				
4	ROR3-062 + lever without micro switch				
5	ROR3-062 + lever with micro switch				

\* The size of the throttle valve corresponds regularly with the flow rate Q of the pump used.  
Other throttle valve size on request of the customer.



## Table of Dimensions

### Single-phase and three-phase motors

Code of EM	Power [kW]	Voltage [V]	Current [A]**	Speed [1/min]**	B max [mm]	C max [mm]	D [mm]
1 *	0,12	230	1,00	1415	227	121	118
2 *	0,18	230	1,57	1385	227	121	118
3 *	0,25	230	1,86	1400	239	135	139
4 *	0,37	230	2,60	1400	239	135	139
5 *	0,55	230	3,50	1415	270	127	156,5
6 *	0,75	230	4,80	1405	290	12	156,5
7 *	1,10	230	6,60	1420	302	135	173,5
8 *	1,50	230	8,70	1430	302	135	173,5
9	0,12	400	0,42	1350	227	121	118
10	0,18	400	0,56	1350	227	121	118
11	0,25	400	0,76	1350	239	135	139
12	0,37	400	1,03	1370	239	135	139
13	0,55	400	1,45	1395	270	127	156,5
14	0,75	400	1,86	1395	270	127	156,5
15	1,10	400	2,65	1410	302	135	173,6
16	1,50	400	3,45	1420	302	135	173,6
17	2,20	400	4,90	1420	362,5	148	196
18	3,00	400	6,50	1420	362,5	148	196
19 *	0,18	230	1,34	2895	227	121	118
20 *	0,25	230	1,60	2850	227	121	118
21 *	0,37	230	2,85	2895	239	135	139
22 *	0,55	230	4,15	2860	233	135	139
23 *	0,75	230	4,50	2905	270	127	156,5
24 *	1,10	230	6,25	2910	267	127	156,5
25 *	1,50	230	9,10	2900	302	135	173,5
26 *	2,20	230	13,60	2810	364	135	173,5
27	0,18	400	0,51	2820	227	121	118
28	0,25	400	0,68	2830	227	121	118
29	0,37	400	1,00	2740	239	135	139
30	0,55	400	1,36	2800	233	135	139
31	0,75	400	1,73	2855	270	127	156,5
32	1,10	400	2,40	2845	267	127	156,5
33	1,50	400	3,36	2860	302	135	173,6
34	2,20	400	4,60	2880	321	135	173,6
35	3,00	400	6,10	2895	362,5	148	196

\* Please be aware of the starting torque of the single-phase electric motors.  
On starting against pressure the starting module shall be used.

Code of EM	Motor	Power [kW]	Voltage [V]	Current [A]**	Speed [1/min]**	Load factor **		B [mm]	C [mm]	D [mm]
40	36751	0,35	12	40	3200	S2 - 10 min	S3 - 35% ED	143	96	76
43	36752	0,40	24	25	3300	S2 - 6 min	S3 - 25% ED	143	96	76
45	36468	0,80	12	135	2700	S2 - 1 min	S3 - 4% ED	165	95	80
46	36469	1,20	24	90	3200	S2 - 1min	S3 - 3% ED	165	95	80
51	36806	1,50	12	220	2400	S2 - 2 min	S3 - 7% ED	179	100	117
52	36808	2,00	24	140	2100	S2 - 3 min	S3 - 8% ED	179	100	117
63	36584	3,00	24	200	2200	S2 - 4.5 min	S3 - 10% ED	210	121	129

\*\* Valid for rated power values.

#### Load factor

##### Duty S2 (min) - short-time operation

The motor operates with constant load for a definite time, in order to reach the maximum permissible temperature Tmax., later on an idle period long enough to reach the equality between motor temperature and ambient temperature.

##### Duty S3 (%ED) - periodic operation

The operation of the motor is a continuous sequence of identical cycle, each compound from a load period and an idle period. During the load period the motor can be reach the maximum permissible temperature. S3 value shows, in percentage, the length of the load period respect to the total cycle-load period more idle period. The S3 curve quoted in the performance specifications is referred to a length's cycle of 10 minutes.

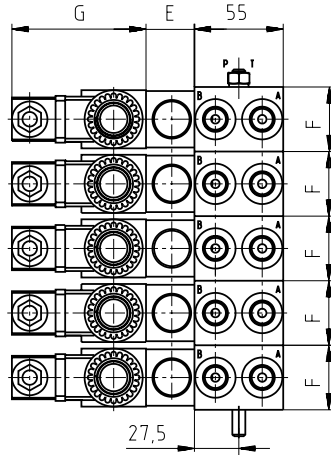
# Valve Dimensions

Dimensions in millimeters

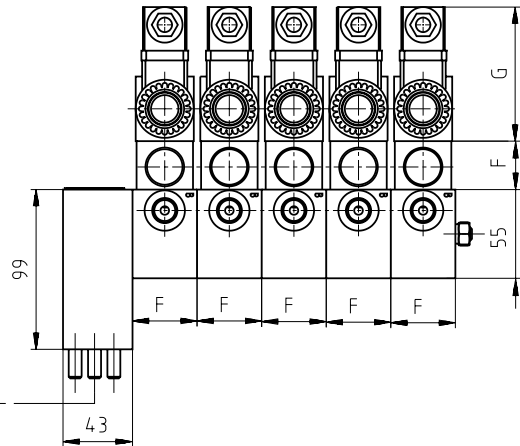
## Power pack with cylindrical sheet tank - mounting position horizontal

### Lay - out of the Block

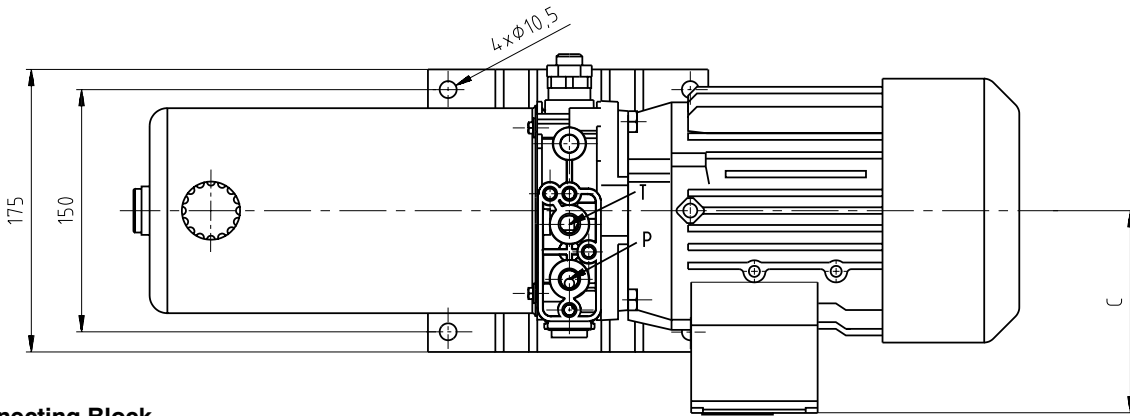
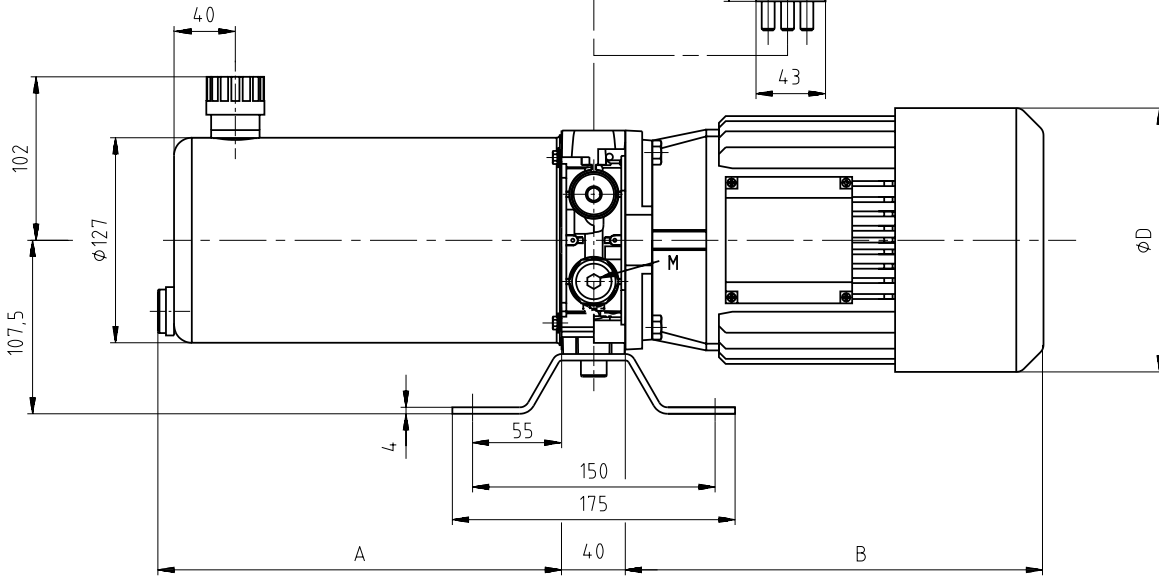
Configuration A



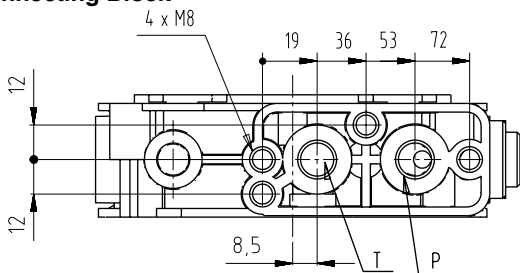
Configuration B



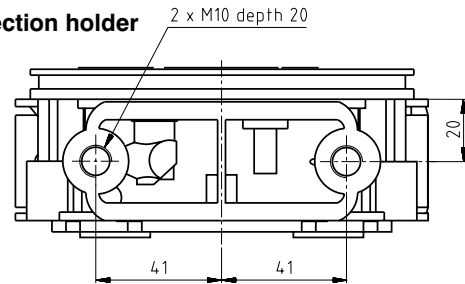
Thread of the connecting ports A, B, P, T, M - G1/4  
(A, B - G3/8)  
E - to components used  
F - Size 04 = 40 mm  
Size 06 = 50 mm  
G - Size 04 = 79 mm  
Size 06 = 92 mm



### Connecting Block



### Connection holder



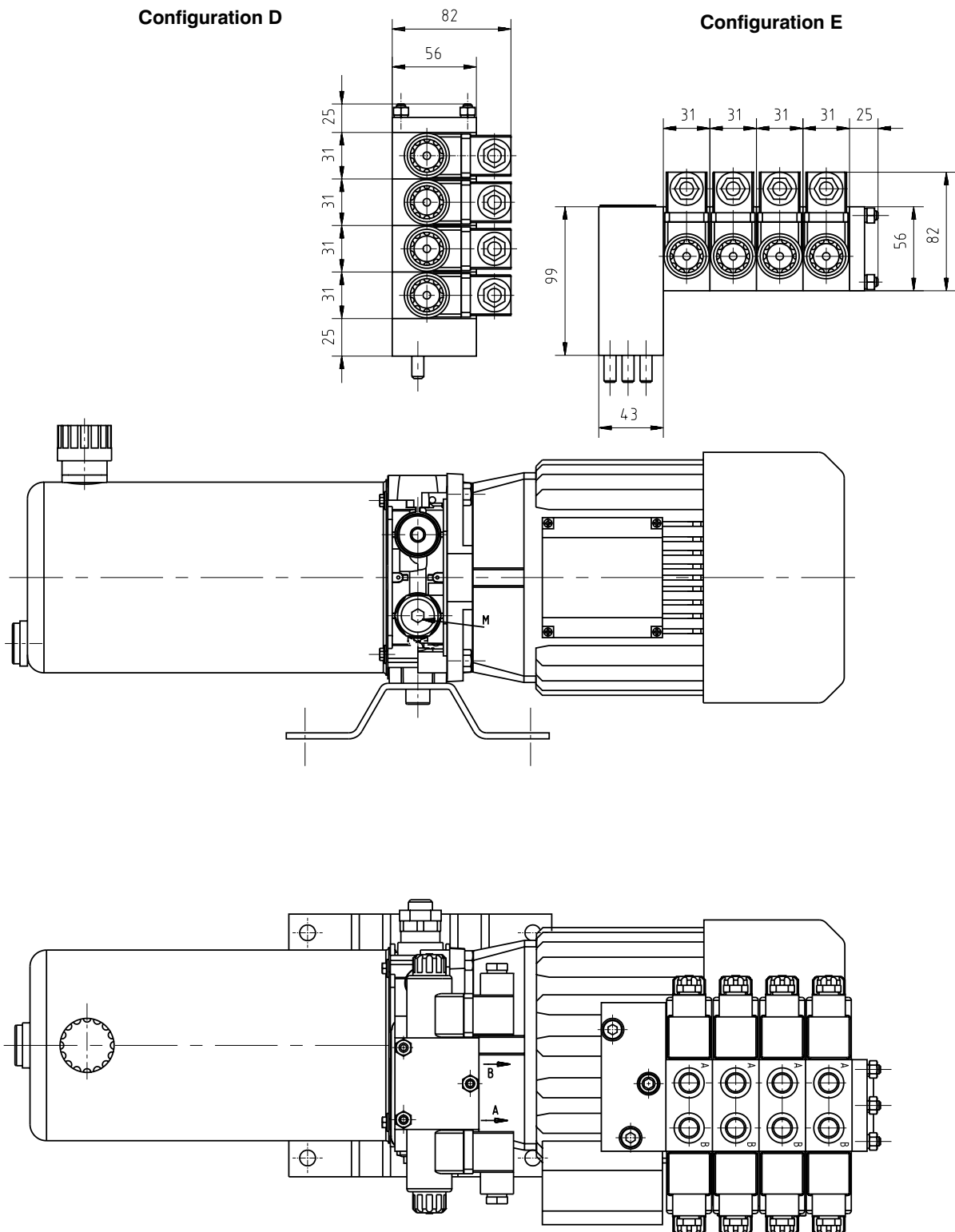
Code of the tank	Capacity in [L]	Working volume [L]	A
10 (sheet)	1.5	0.8	151
11 (sheet)	2	1.1	251
12 (sheet)	3	1.6	331
13 (sheet)	4	2	411

# Valve Dimensions

Dimensions in millimeters

## Power pack with cylindrical sheet tank and horizontal stacking assembly RPEK1-03 - mounting position horizontal

Lay - out of the Block



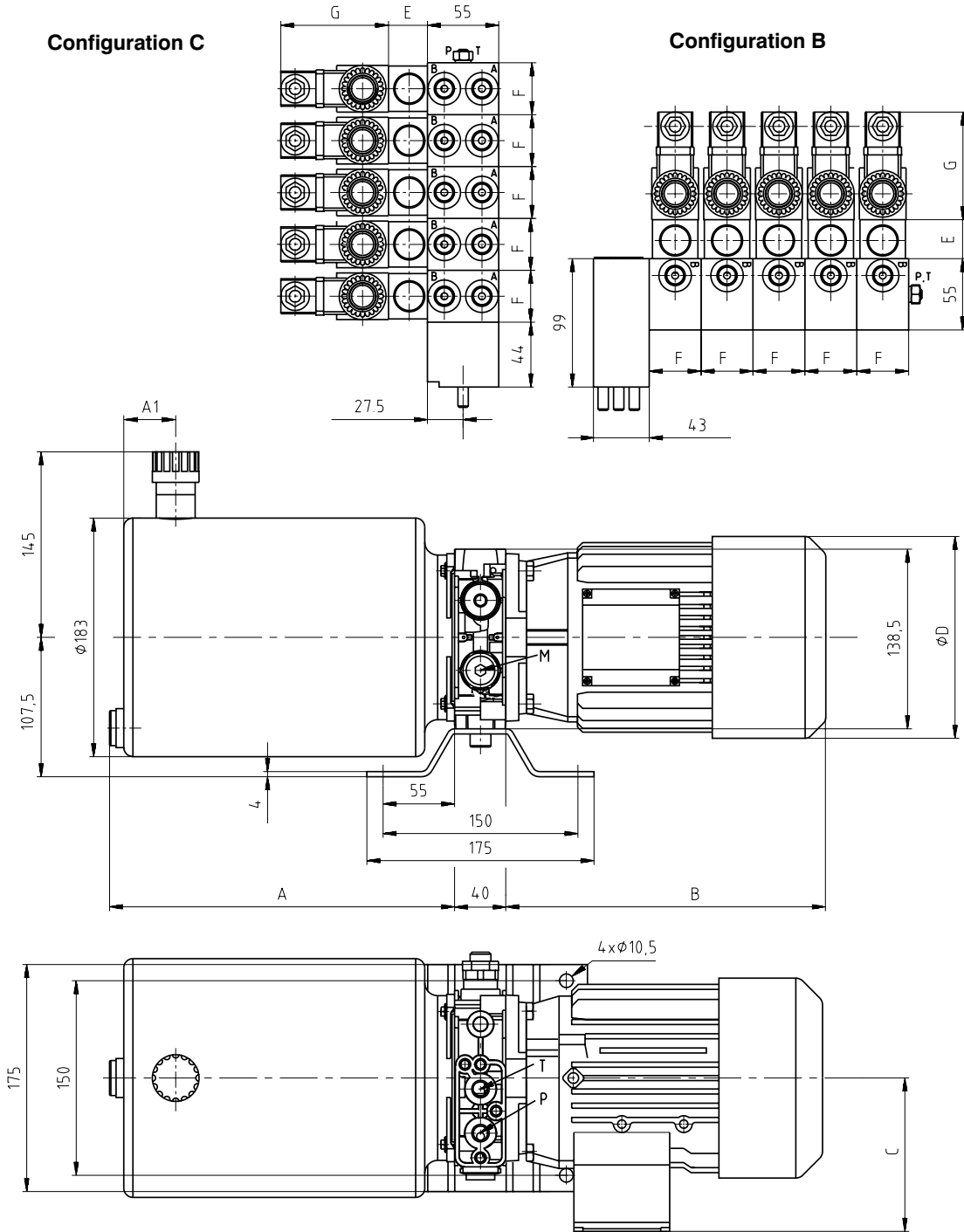
With the model RPEK1-03 of the horizontal stacking assembly the connecting ports A, B, M are only provided with threads G1/4 - orientation of ports is evident from the picture.

Code of the tank	Capacity in [L]	Working volume [L]	A
10 (sheet)	1.5	0.8	151
11 (sheet)	2	1.1	251
12 (sheet)	3	1.6	331
13 (sheet)	4	2	411

# Valve Dimensions

Dimensions in millimeters

## Power pack with cylindrical sheet tank - mounting position horizontal



Thread of the connecting ports A, B, P, T, M - G1/4

E - to components used

F - Size 04 = 40 mm

Size 06 = 50 mm

G - Size 04 = 79 mm

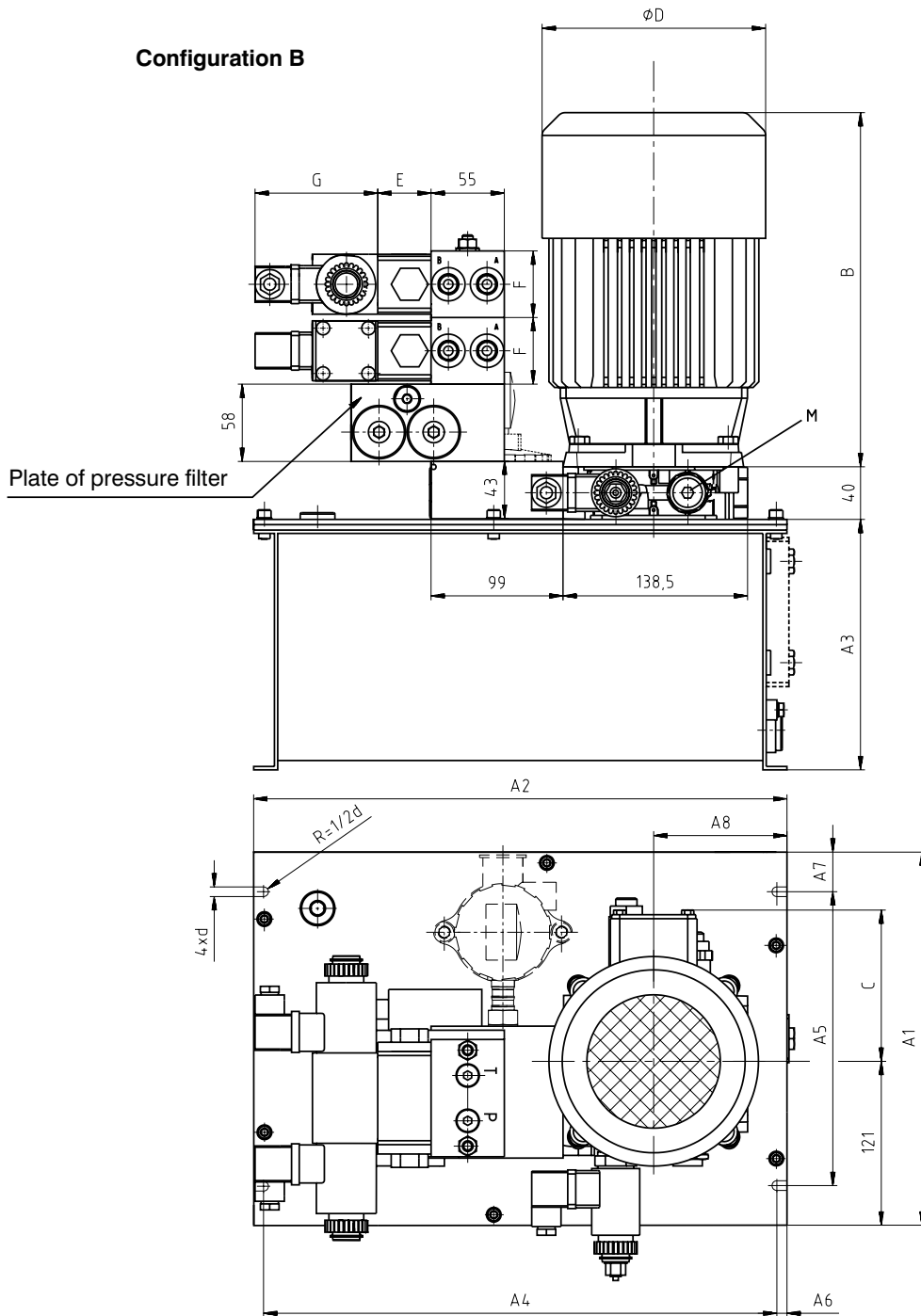
Size 06 = 92 mm

Code of the tank	Capacity in [L]	Working volume [L]	A	A1
20 (sheet)	6	3.7	269	40
22 (sheet)	8	4.9	349	155
24 (sheet)	10	6.1	429	195

# Valve Dimensions

Dimensions in millimetres

## Power pack with square sheet tank



Thread of the connecting ports A, B, P, T, M - G1/4

E - to components used  
 F - Size 04 = 40 mm  
     Size 06 = 50 mm  
 G - Size 04 = 79 mm  
     Size 06 = 92 mm

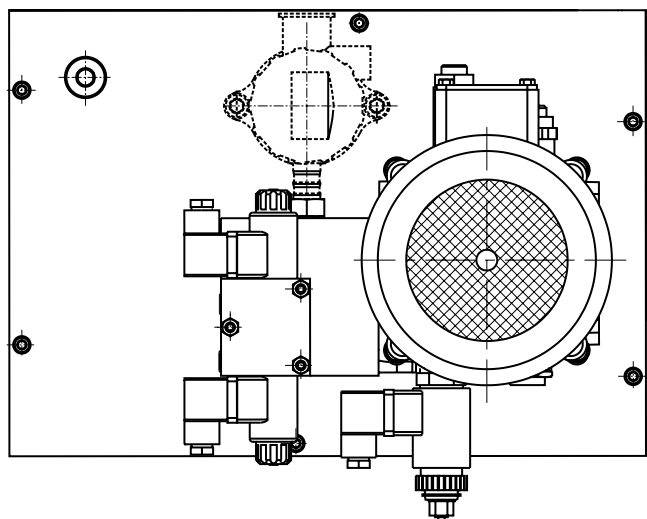
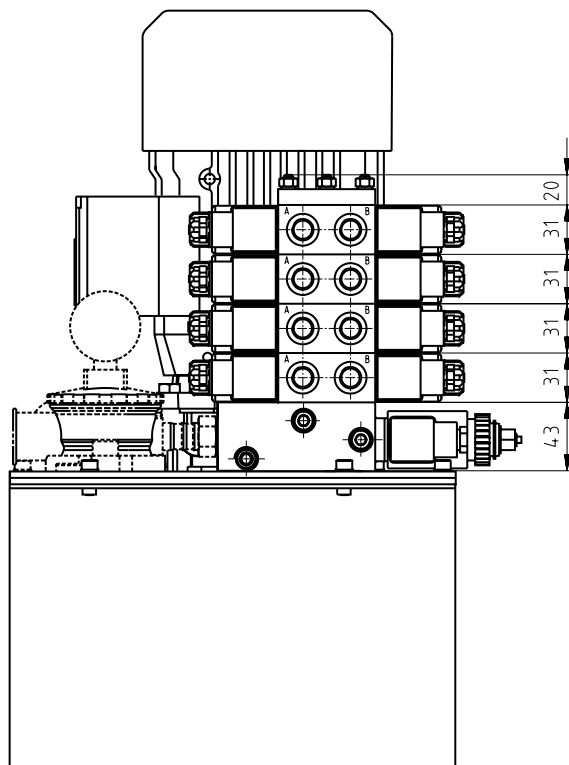
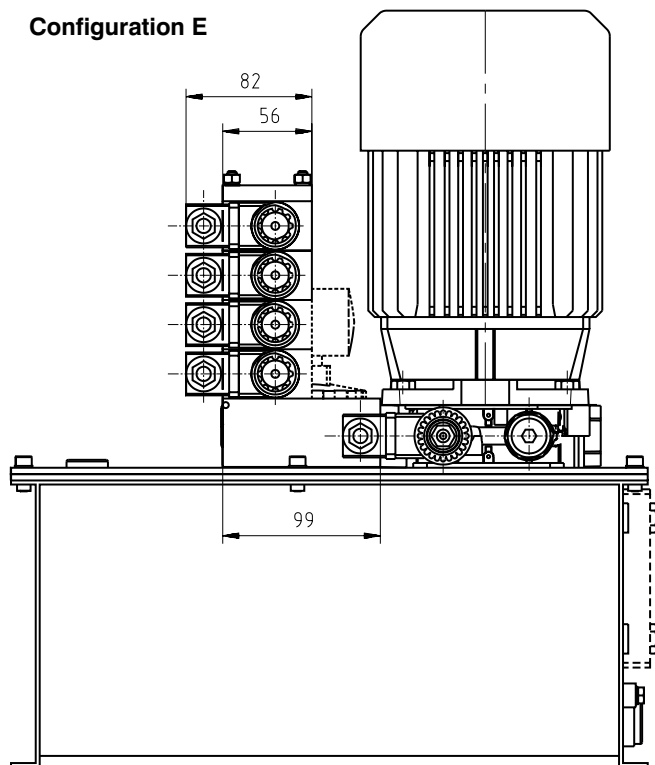
Code of the tank	Capacity in [L]	Working volume [L]	A1	A2	A3	A4	A5	A6	A7	A8	d
56 (sheet)	8	4,5	280	340	165	319	220	10,5	30	100	9
57 (sheet)	10	8	280	400	188	388	220	6	30	100	9
58 (sheet)	20	16	280	400	276	388	220	6	30	100	9
59 (sheet)	30	24	320	500	287	479	260	9,5	30	132	11
60 (sheet)	40	34	320	500	366	479	260	9,5	30	132	11

# Valve Dimensions

Dimensions in millimetres

## Power pack with square sheet tank and horizontal stacking assembly RPEK1-03

Configuration E



With the model RPEK1-03 of the horizontal stacking assembly the connecting ports A, B, M are only provided with threads G1/4 - orientation of ports is evident from the picture.

Code of the tank	Capacity in [L]	Working volume [L]	A1	A2	A3	A4	A5	A6	A7	A8	d
56 (sheet)	8	4,5	280	340	165	319	220	10,5	30	100	9
57 (sheet)	10	8	280	400	188	388	220	6	30	100	9
58 (sheet)	20	16	280	400	276	388	220	6	30	100	9
59 (sheet)	30	24	320	500	287	479	260	9,5	30	132	11
60 (sheet)	40	34	320	500	366	479	260	9,5	30	132	11

# Valve Dimensions

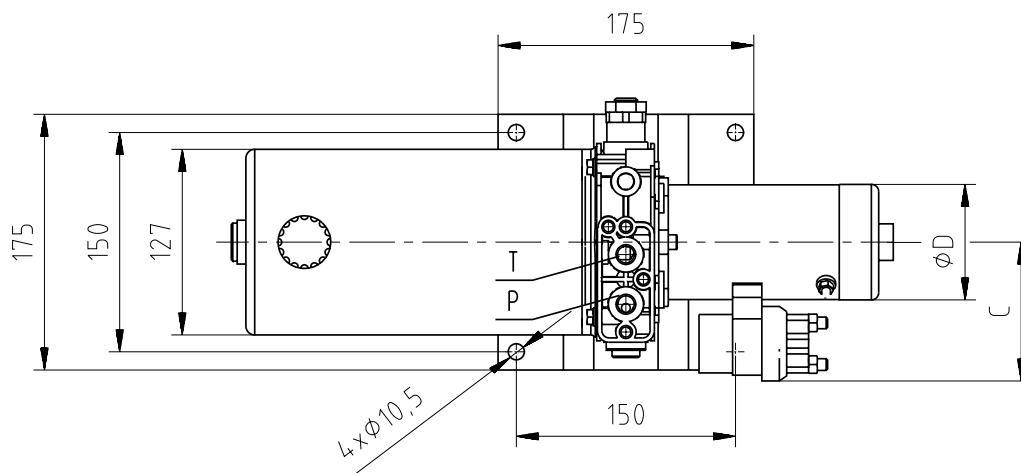
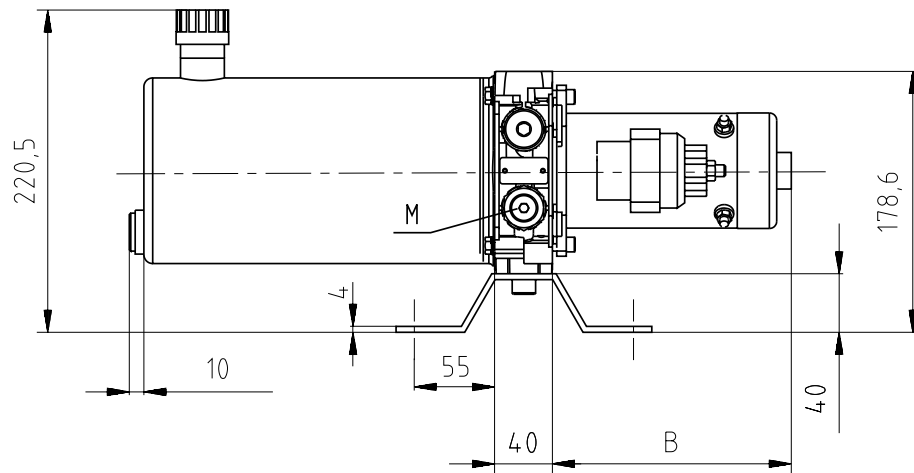
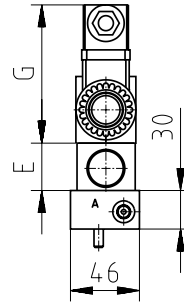
Dimensions in millimeters

## Power pack with DC electric motor

Enables all combinations of tanks, valves and mounting positions

### Configuration F

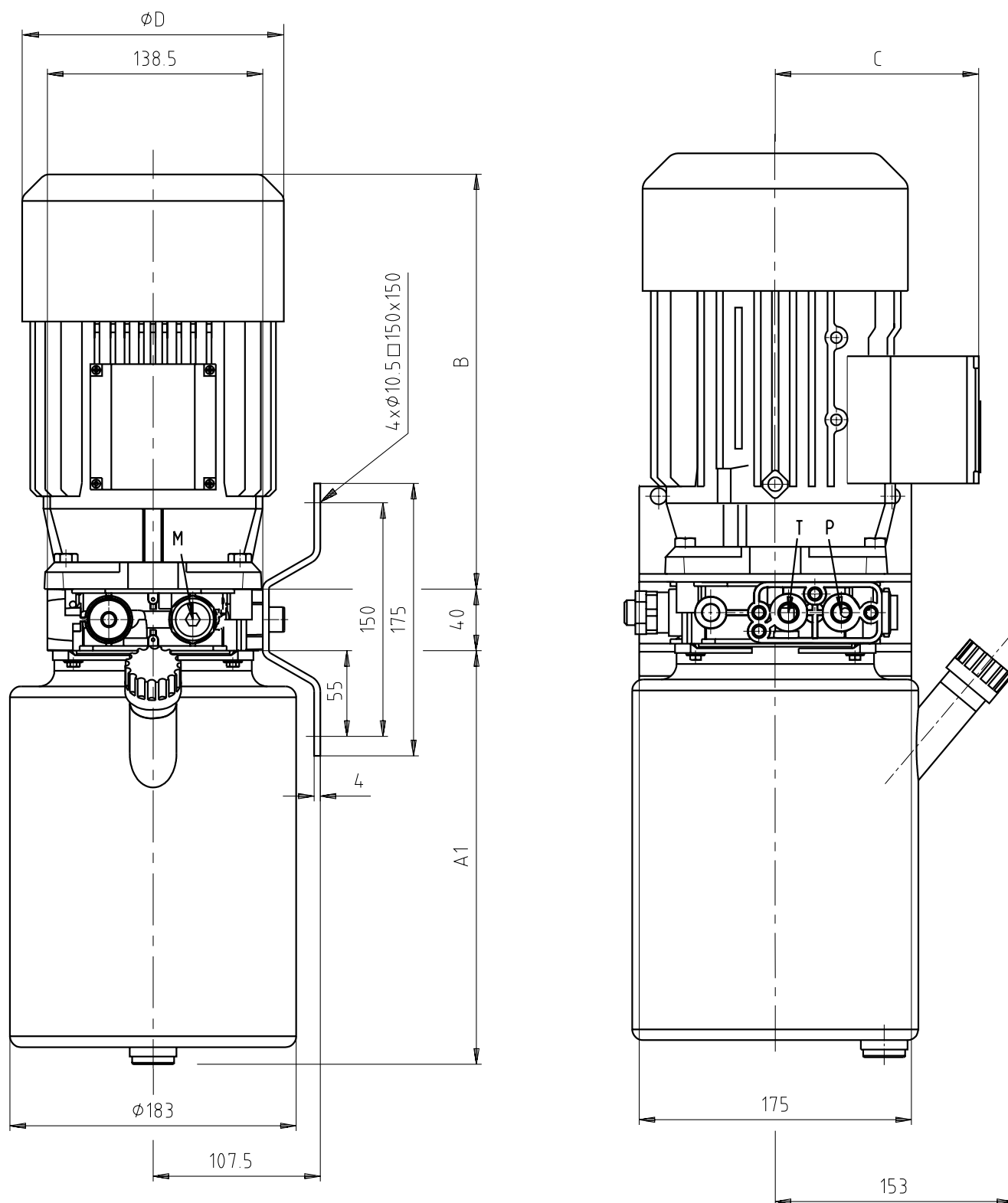
Thread of the connecting ports A, B - G1/4  
Size 04, Size 06



Thread of the connecting ports P, T, M - G1/4

**Valve Dimensions**

Dimensions in millimeters

**Power pack with cylindrical sheet tank - mounting position vertical**

Thread of the connecting ports P, T, M - G1/4

Code of the tank	Capacity in [L]	Working volume [L]	A1
51 (sheet)	6	3.4	269
53 (sheet)	8	5.4	349
55 (sheet)	10	7.4	429



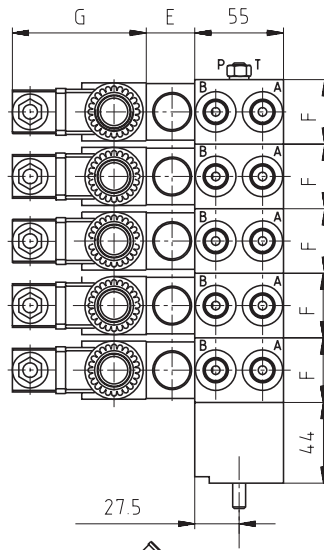
# Valve Dimensions

Dimensions in millimeters

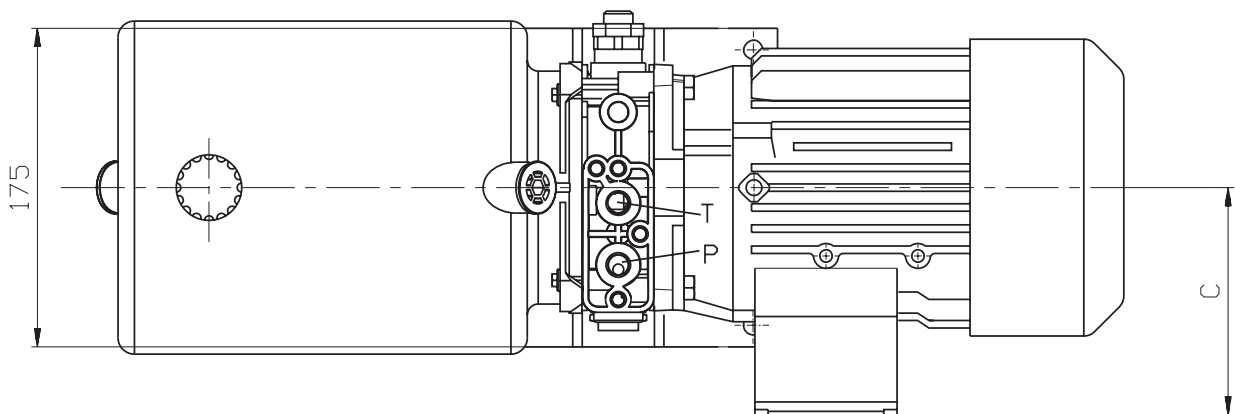
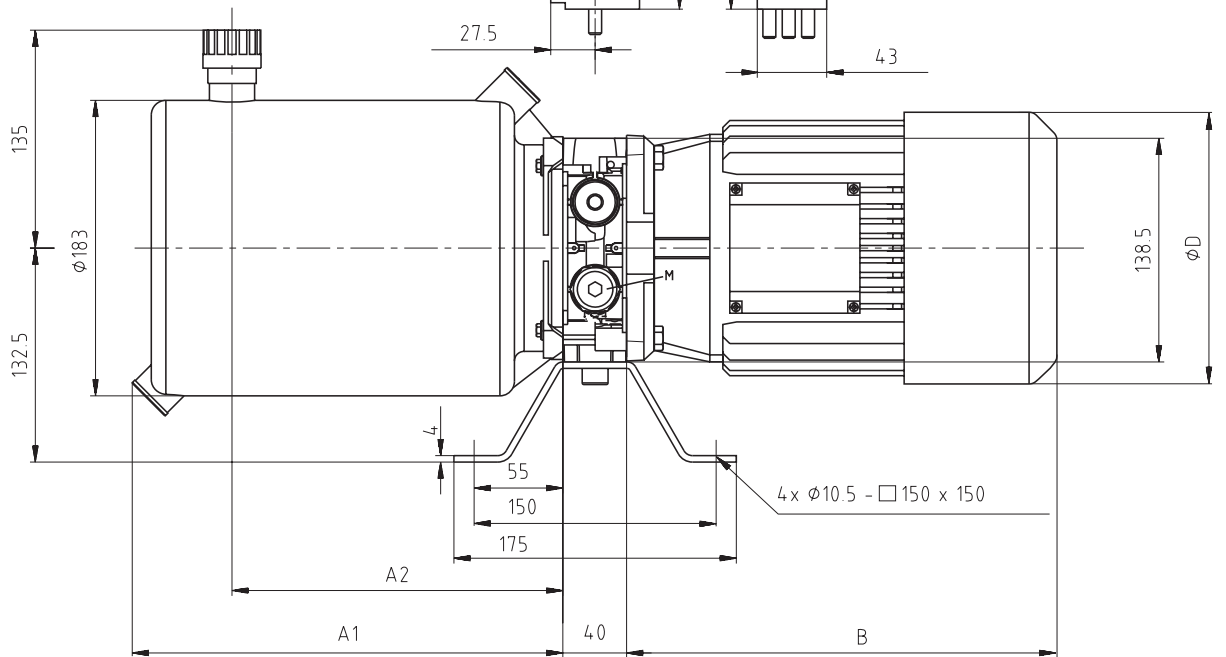
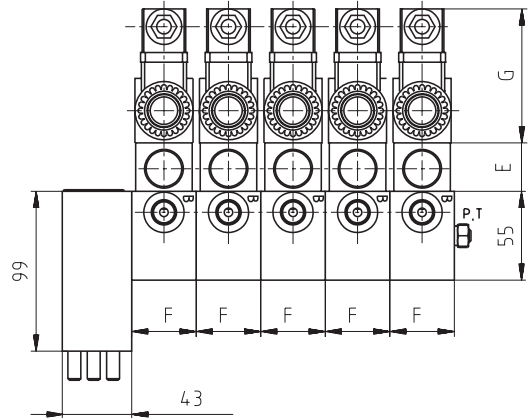
## Power pack with cylindrical plastic tank - mounting position horizontal

Lay - out of the Block

Configuration C



Configuration B



Thread of the connecting ports A, B, P, T, M - G1/4

E - to components used

F - Size 04 = 40 mm

Size 06 = 50 mm

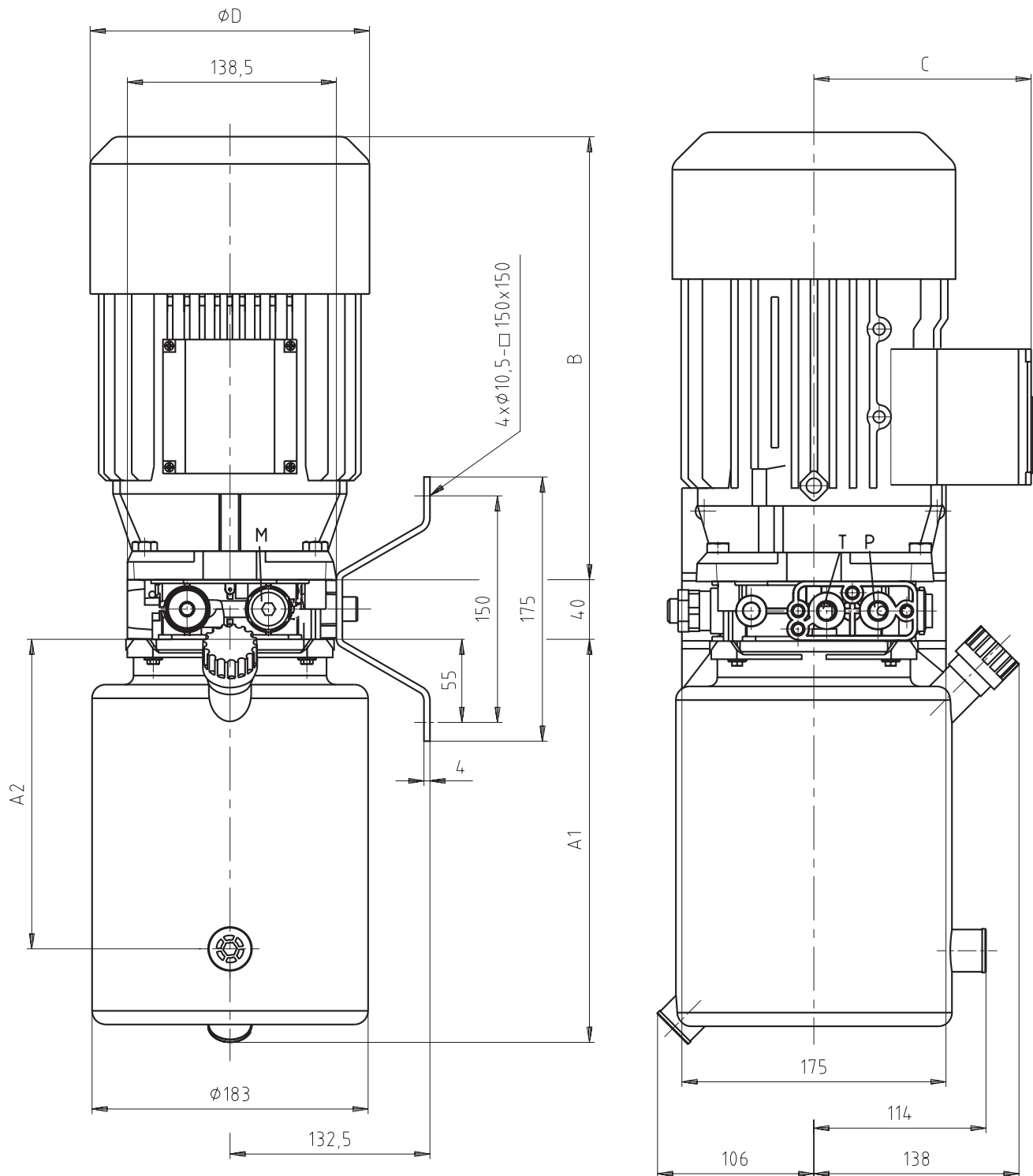
G - Size 04 = 79 mm

Size 06 = 92 mm

Code of the tank	Capacity in [L]	Working volume [L]	A1	A2
40 (plastic)	6	3.7	280	208
42 (plastic)	8	4.9	360	228

**Valve Dimensions**

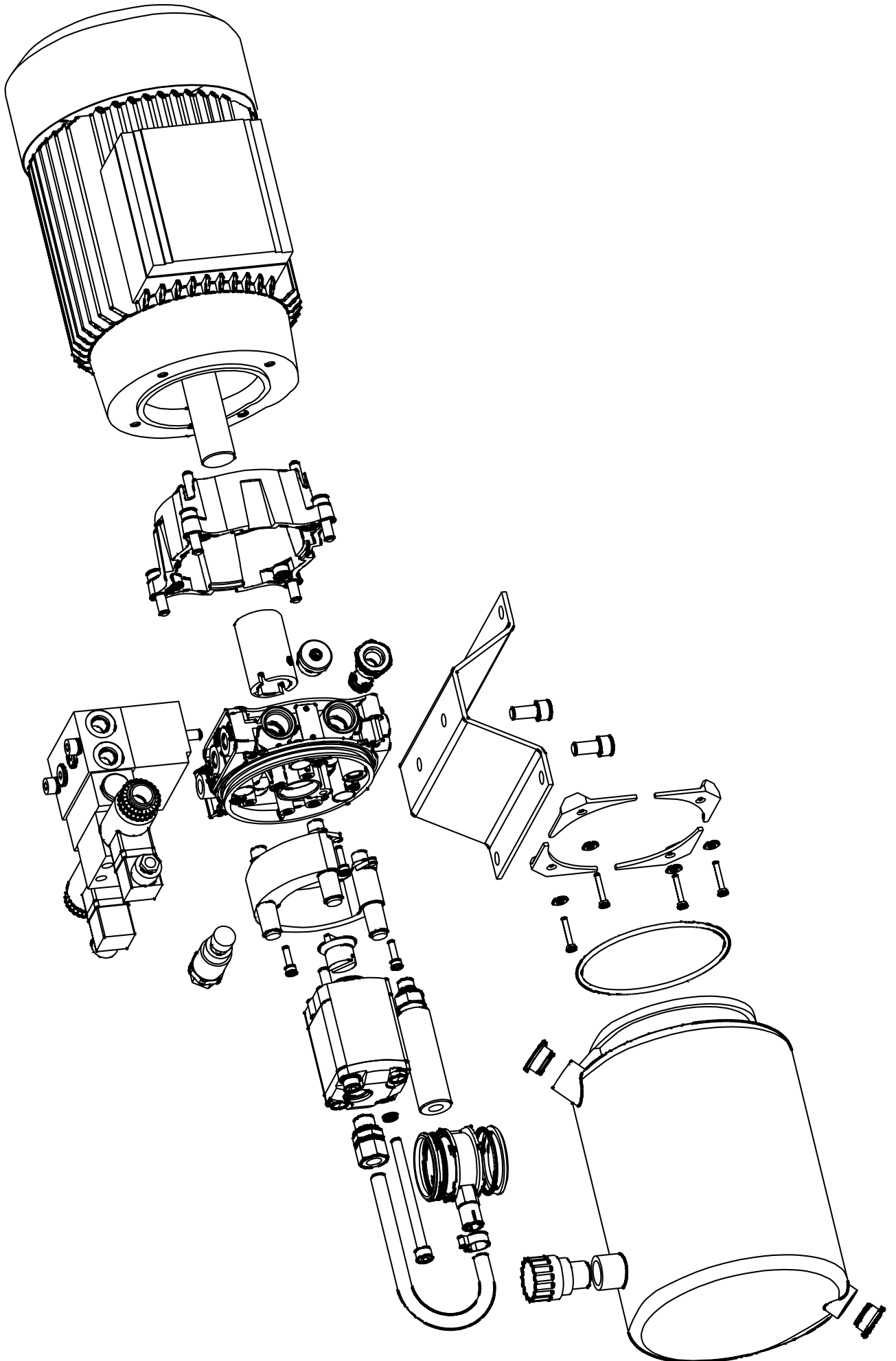
Dimensions in millimeters

**Power pack with cylindrical plastic tank - mounting position vertical**

Thread of the connecting ports P, T, M - G1/4

Code of the tank	Capacity in [L]	Working volume [L]	A1	A2
41 (plastic)	6	3.7	280	208
43 (plastic)	8	4.9	360	228

SMA 04

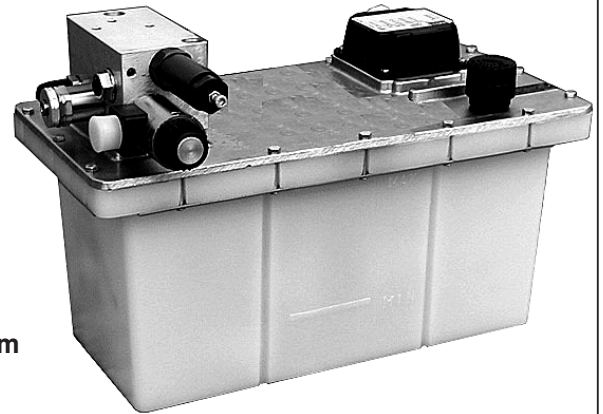


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www.argo-hytos.com

- Small compact power packs used in lifting platforms, ramps and other applications
- 3 basic hydraulic circuits
- Low noise level
- High power ratio in relation to envelope dimensions
- Tank capacities from 7 to 30 L
- Possibility of building up an addition circuit in the form of horizontal stacking assembly of the size 04 or 06

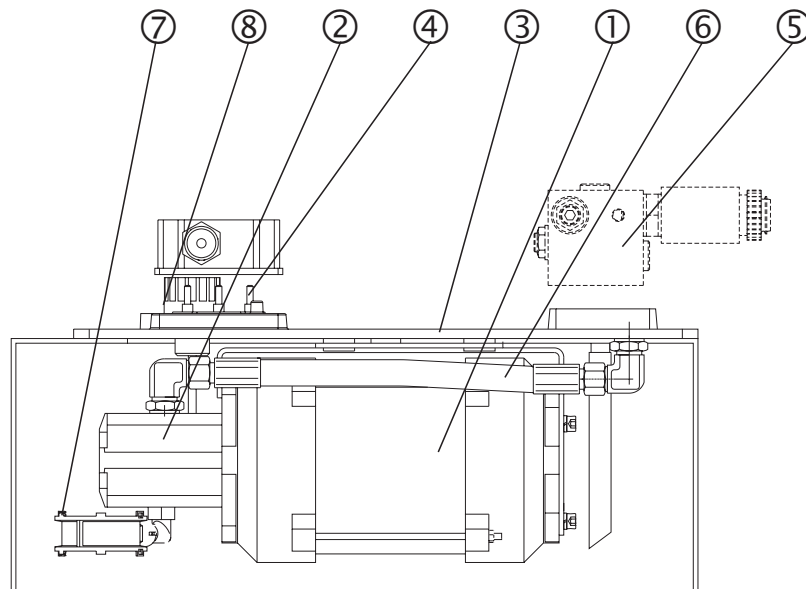
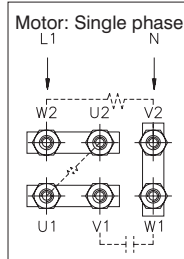
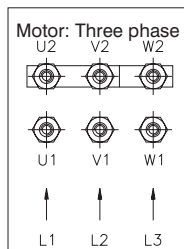


## Functional Description

The under oil power packs are designed for applications which require low noise level as well as small envelope dimensions. They are supposed to work only occasionally, thus being suitable mainly for the use in lifting platforms, elevating tables and handling devices. The electric motor (1) and the pump (2) are connected through a cross coupling. The electric connection of the electric motor with the power pack terminal board is realized through a tight bushing (4) which is fixed to the tank cover. The whole drive (electric motor + pump) is flexibly suspended by means of holder on the lower side of the tank cover.

Mounted on a lug, which is situated on the upper side of the tank cover, is block (5). The fluid under pressure delivered by the pump is led to this block by hose (6). The filtration of the fluid is provided by suction filter (7). The air is filtered by an air filter which is integrated into the filling plug (10). The filling plug serves also as the scale for measuring the oil level. The block according to the hydraulic circuit S11 forms the base, on which the connecting plates of the horizontal stacking assembly (size 04 or 06) can be mounted.

### PHASE - CONNECTIONS FOR CORRECT DIRECTION OF MOTOR ROTATION



## Ordering Code

SPA 01 -  /  -  -  - **XXXX** /

Under oil power pack

Displacement of the pump  
in cm<sup>3</sup>

0,8	<b>08</b>
1,2	<b>12</b>
1,6	<b>16</b>
2,1	<b>21</b>
2,5	<b>25</b>
3,3	<b>33</b>
3,6	<b>36</b>
4,4	<b>44</b>
4,8	<b>48</b>
5,8 cm <sup>3</sup> /Um.	<b>58</b>
6,2 cm <sup>3</sup> /Um.	<b>62</b>
7,9 cm <sup>3</sup> /Um.	<b>79</b>

Code of the electric motor - see Tab. 1

Type of the block - see page 3

Solenoid voltage

<b>01200</b>	12V DC
<b>01400</b>	14V DC
<b>02100</b>	21V DC
<b>02400</b>	24V DC
<b>04200</b>	42V DC
<b>04800</b>	48V DC
<b>06000</b>	60V DC
<b>10200</b>	102V DC
<b>20500</b>	205V DC
<b>02450</b>	24V / 50 (60)Hz
<b>11550</b>	115V / 50 (60)Hz
<b>23050</b>	230V / 50 (60)Hz

Type No. - determined by manufactured

Code of the tank

<b>7</b>	7 L
<b>10</b>	10 L
<b>20</b>	20 L
<b>30</b>	30 L

## Technical Data

Flow rate	L/min	Tab. 1	
Working pressure	bar	Tab. 1	
Max. working/peak pressure	bar	Tab. 1	
Tank capacity	L	7,10, 20, 30	
Type of the pump		external gear pump	
Power of the electric motor	kW	0,55 to 3	
Load factor of the electric motor	%	20	
Type of the electric motor		single phase	three phase
Voltage of the electric motor	V	230	400
Frequency	Hz	50	50
Enclosure type of the electric motor		IP 54	
Hydraulic fluid		Hydraulic oils of power classes HM, HV to CETOP RP 91 H in viscosity classes ISO VG 32, 46 and 68	
Viscosity range	mm <sup>2</sup> /s	20 ... 100	
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406 (1999).	
Fluid temperature range	°C	-30 ... +80	
Ambient temperature max.	°C	up to 50	
Thread of the connecting ports P, T, M, (A, B)		G 1/4	
Working position		horizontal	

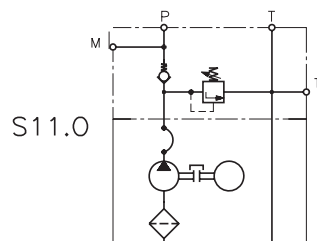
Tab. 1

Code of the electric motor			Code of the pump					
			08 P2..	12 P2..	16 P2..	21 P2..	25 P2..	33 P2..
	$p_{max.}^{**}$ [bar]		250					
R.P.M.	400 V	kW	$Q / p_n * [l/min] / [bar]$					
1500	13	0.55		1.5/175	2.0/130	2.6/100	3.1/85	4.2/65
	14	0.75			1.9/190	2.5/145	3.0/120	3.9/90
	15	1.1			2.1/200	2.8/190	3.3/160	4.4/120
	16	1.5					3.2/200	4.2/170
	17	2.2						
	18	3.0						
3000	30	0.55	2.2/120	3.2/80	4.3/60	5.6/45	6.7/40	8.9/30
	31	0.75	2.2/160	3.2/110	4.3/80	5.6/65	6.7/55	8.9/40
	32	1.10	2.2/200	3.2/165	4.3/120	5.6/95	6.7/80	8.9/60
	33	1.50		3.2/200	4.3/165	5.6/130	6.7/110	8.9/80
	34	2.20			4.2/200	5.5/190	6.6/160	8.7/120
	35	3.00					6.4/200	8.5/170
Um./min	230 V	kW	$Q / p_n * [l/min] / [bar]$					
1500	5	0.55		1.6/165	2.1/125	2.7/100	3.2/80	4.3/60
	6	0.75		1.6/200	2.1/170	2.8/130	3.3/110	4.4/80
	7	1.10				2.8/190	3.3/160	4.4/120
	8	1.50					3.3/200	4.4/165
Code of the electric motor			36 P2..	44 P2..	48 P2..	58 P2..	62 P2..	79 P2..
	$p_{max.}^{**}$ [bar]		250			200		
R.P.M.	400 V	kW	$Q / p_n * [l/min] / [bar]$					
1500	13	0.55	4.5/60	5.5/50	6.0/45	7.3/35	7.8/35	9.9/25
	14	0.75	4.3/85	5.2/70	5.7/65	6.9/50	7.4/50	9.4/40
	15	1.10	4.8/110	5.8/90	6.3/85	7.7/70	8.2/65	10.4/50
	16	1.50	4.6/155	5.6/130	6.2/115	7.4/100	8.0/90	10.1/70
	17	2.20		5.0/200	5.5/190	6.6/160	7.1/150	9.0/120
	18	3.30			5.9/200	7.1/200	7.6/190	9.7/150
3000	30	0.55						
	31	0.75	9.7/35					
	32	1.10	9.7/55	11.8/45	12.9/40	15.6/35		
	33	1.50	9.7/75	11.8/60	12.9/55	15.6/45	16.7/40	
	34	2.20	9.5/110	11.6/90	12.7/85	15.3/70	16.4/65	20.9/50
	35	3.00	9.3/155	11.3/125	12.4/115	15.0/95	16.0/90	20.4/70
R.P.M.	230 V	kW	$Q / p_n * [l/min] / [bar]$					
1500	5	0.55	4.7/55	5.7/45	6.2/40	7.5/35	8.0/30	10.2/25
	6	0.75	4.8/75	5.9/60	6.4/55	7.7/45	8.3/45	10.5/35
	7	1.10	4.8/110	5.9/90	6.4/80	7.7/70	8.5/65	10.5/50
	8	1.50	4.8/150	5.9/120	6.4/110	7.7/95	8.5/85	10.5/70

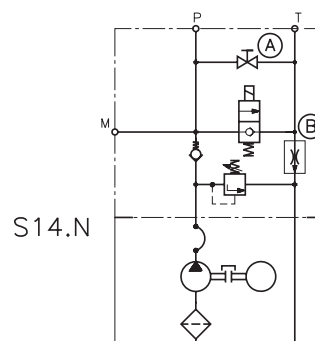
\*  $p_n$  - nominal pressure = the highest working pressure allowed without time restriction

\*\*  $p_{max.}$  - maximum pressure = maximum pressure allowed for a short time - max. 20s

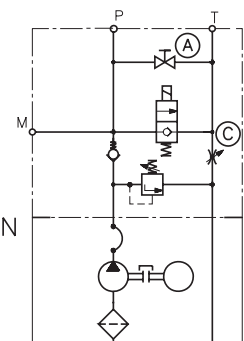
## Type of the hydraulic circuit



S11.0



S14.N



S24.N

**The hydraulic circuit S11.0** enables the power pack to be used as a simple pressure supply for general applications with the possibility to build up additional hydraulic circuits in the form of horizontal stacking assemblies of the size 04 or 06. Should the power pack be run for longer time periods, it is necessary to take the load factor of the electric motor into account.

**The hydraulic circuit S14.N and S24.N** enable the power pack to be used as pressure supply for lifting platforms and other devices, in which the mass of the system provides returning into the basic position. The shut-off valve (A) enables emergency lowering of the device, should a disconnection of the supply voltage occur.

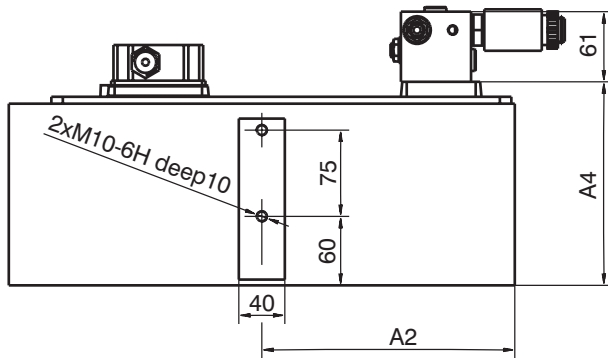
**The hydraulic circuit S14.N** comprises a flow control valve VSK2 (B) which is adjustable only in a certain range (see catalogue VSK2 - HA 5121). The valve is accessible after removing the block from the tank cover. If not otherwise required, a valve VSK2 is mounted into the block. The stabilized flow rate of this valve corresponds with the respective flow rate of the power pack (see Tab. 1).

**The hydraulic circuit S24.N** comprises a throttle valve VSV1-06 (C) without pressure compensation. This valve is accessible from outside of the block.

# Valve Dimensions

Dimensions in millimeters

## Steel tank



## Example of horizontal stacking assembly

- possible only with hydraulic circuit S11.0

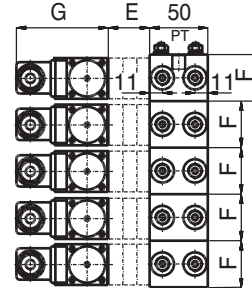
E - according to the elements used,  
see datasheet 5021, 5023, 5051, 5091

F - Size 04=40 mm

Size 06=50 mm

G - Size 04=79 mm

Size 06=92 mm

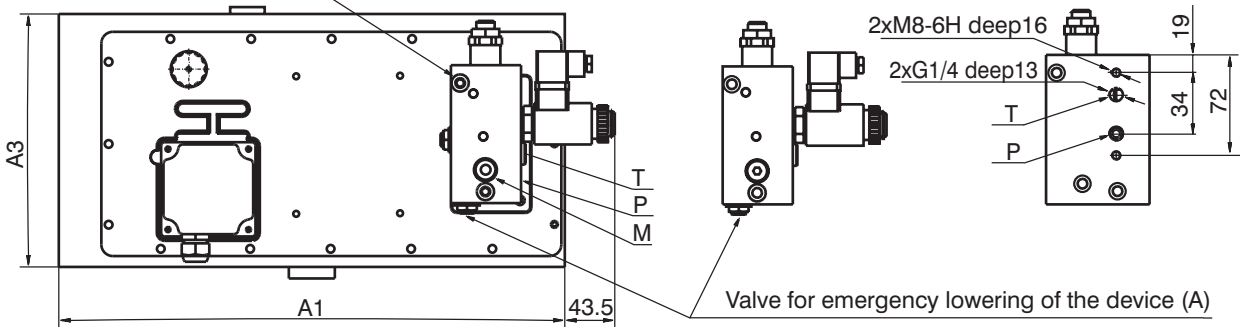


Throttle valve VSV1-06 (C)

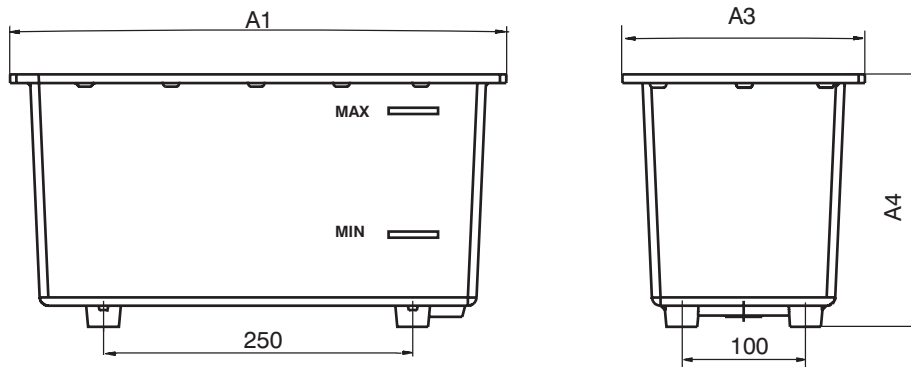
Block S24.N

Block S14.N

Block S11



## Plastic tank



Code of the tank	Tank capacity in L	A1 mm	A2 mm	A3 mm	A4 mm
10 (sheet)	10	440	220	220	175
20 (sheet)	20	500	220	260	214
30 (sheet)	30	500	220	260	294
7 (plastic)	7	401	-	196	223

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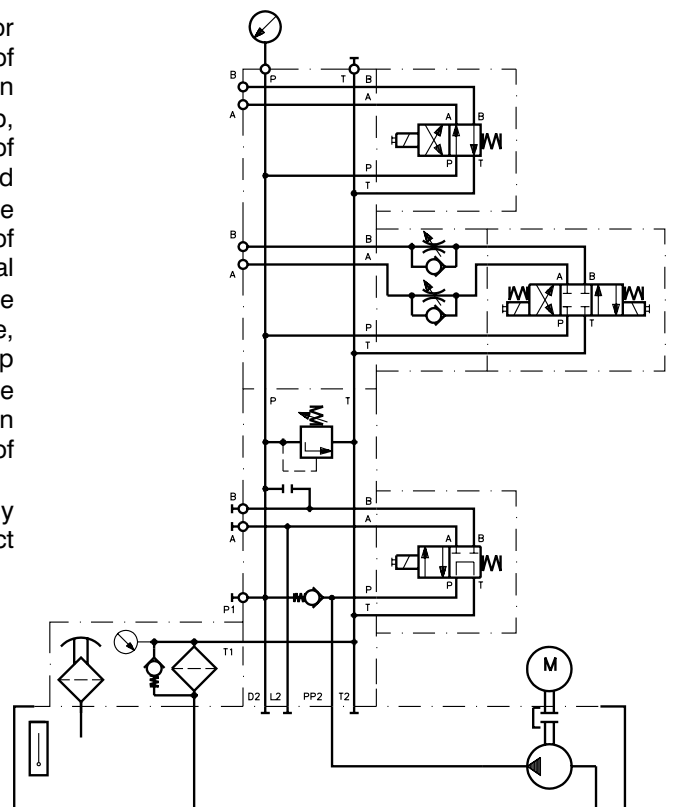
- Building of customized power packs using standardized sub-assemblies
- Tank capacities from 10 to 250 L
- Drives with gear or piston pumps Selection of a wide range of flow rates Vertical lay out with pump immersed in oil
- Versatile pressure and flow control possibilities
- Enable building of hydraulic circuits as vertical or horizontal stacking assemblies Connection of up to 8 horizontal sections possible
- Design and accessories according to customer specification

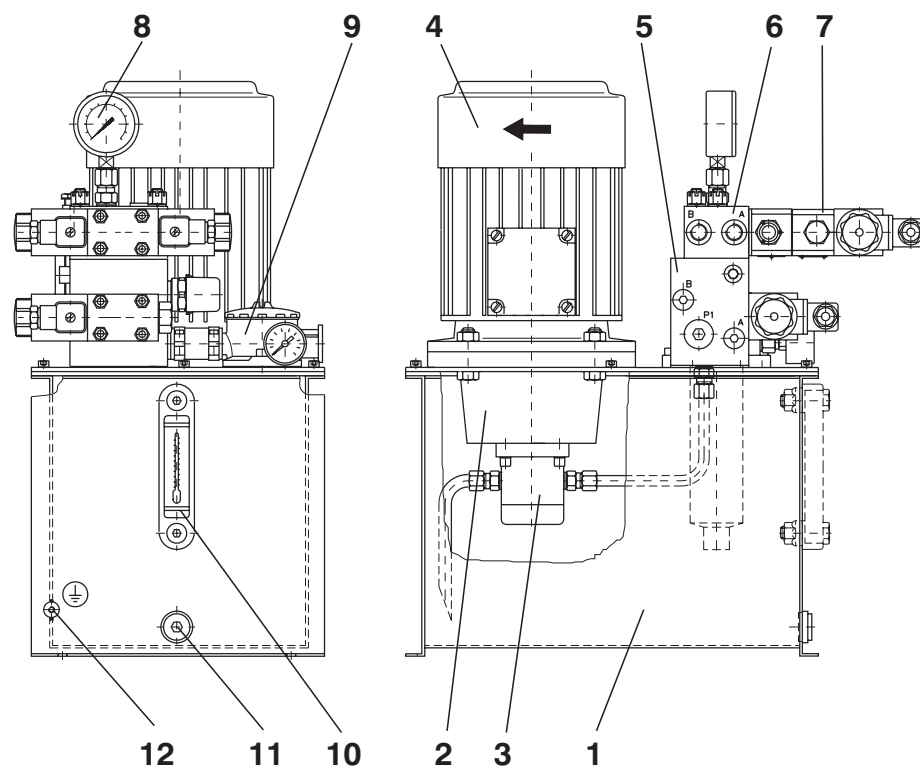


## Functional Description

This technical information serves as a basic summary for building of hydraulic power packs designed of standeized sub-assemblies. Table 1 enables selection of the required combination (tank capacity, type of pump, flow rate, pressure, size of the electric motor, type of pressure control etc.).If you cannot find the required solution using the components shown below, please consult us. We can offer special tanks, remote control of components, drives with double pumps, special connection of componets etc. On request, also the separate components can be delivered. A questionnaire, which is enclosed to this information, also the should help you to specify your requirements. Please enclose also the respective circuit diagram, the required installation dimensions, as well as the size and orientation of connecting ports.

So as we can offer you a power pack, which will comply completely with your requirements, we need exact information about your system.





- 1 Tank
- 2 Drive/ Bell housing
- 3 Pump
- 4 Electric motor
- 5 Base block (safety block of the accumulator)
- 6 Horizontal stacking assembly
- 7 Vertical stacking assembly
- 8 Pressure gauge
- 9 Return filter with by-pass, integrated air breather/filler and clogging indicator
- 10 Continuous level gauge
- 11 Magnetic drain plug
- 12 Earthing point

**Tab. 1**

Type of the power pack	Tank capacity [L]	Type of the pump	Flow rate [L/min]	Working pressure [bar]	Size of the electric motor	Q/p Table No.	Type of the control
SA4-10C	10	gear pump	0.5 - 10.5	250	80, 90	3	14
SA4-20C	20	gear pump	0.5 - 21.8	250	80, 90, 100, 112	3	14, 16
SA4-30C	30	gear pump	1.9 - 23.6	250	80, 90, 100, 112	2 - 3	14, 15, 16
SA4-40C	40	gear pump	1.9 - 23.6	250	80, 90, 100, 112	2 - 3	14, 15, 16
SA4-45U	45	gear pump	1.9 - 23.6	250	80, 90, 100, 112	2-3	14, 15, 16
SA4-60H	60	gear pump	6 - 36	250	80, 90, 100, 112, 132	2 - 4	14, 15, 16
		variable piston pump	up to 29			5	17, 18
SA4-60U	60	gear pump	6 - 36	250	80, 90, 100, 112, 132	2 - 4	14, 15, 16
		variable piston pump	up to 29			5	17, 18
SA4-100H	100	gear pump	6 - 42	250	90, 100, 112, 132	2 - 4	14, 15, 16
		variable piston pump	up to 29			5	17, 18
SA4-250H	250	gear pump	up to 50	250	80, 90, 100, 112, 132	2 - 4	14, 15, 16
		variable piston pump	up to 50			5	17, 18

# Design of the power pack from the standardized sub-assemblies

## 1 Location

Clear description of the working environment of the power pack.

## 2 Working conditions

Stating of the power pack working cycle (service character).

## 3 Working pressure p [bar]

Pressure which is necessary to ensure the required forces and torques.

## 4 Flow rate Q [L/min]

Flow rate which is necessary to ensure the required velocities and revolutions.

## 5 Type of the pump

To be determined after evaluation of the points mentioned above.

The following pumps are available: - gear pumps  
- variable piston pumps

## 6 Pump displacement

See point 7.

## 7 Electric motor

By the use of table 1 and 2 to 5 and according to the required flow rate and pressure, the respective displacement of the pump, as well as the power and revolutions of the electric motor are to be determined. These data are to be put down into the questionnaire, together with the information regarding the network voltage and frequency, type of enclosure, climatic endurance etc.

The tables also include the basic drive dimensions - diameter of the flange and the total height of the electric motor including the flange thickness or the thickness of the damping ring (Fig. 2 and 3). The damping rubber ring is normally delivered with the drives with the variable piston pump. On request, it can also be delivered with the gear pumps.

## 8 Lay out of the drive

**Vertical** - with all types of gear pumps and with axial piston pumps with pressure control (Fig. 2 and 3).

**Horizontal** - only for special applications and after consultation with us.

Fig. 2

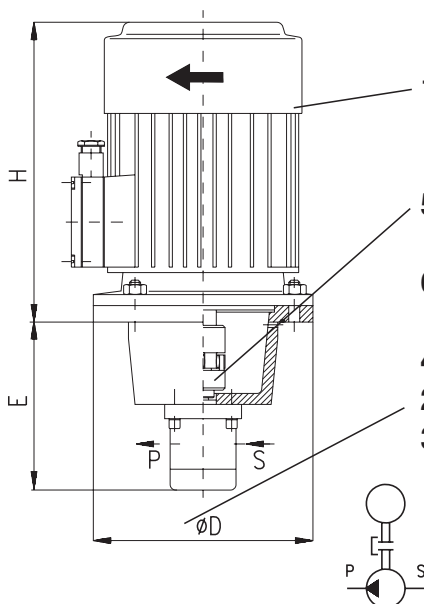
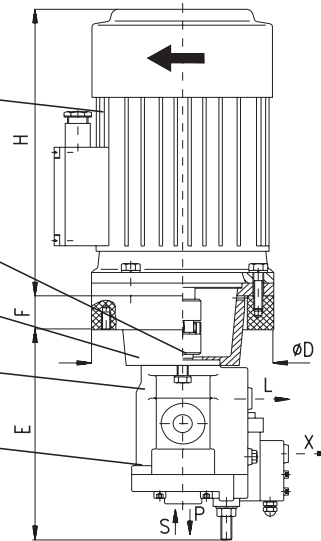
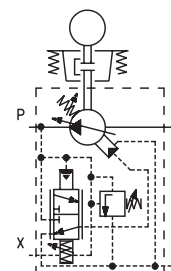


Fig. 3



- 1 Electric motor
- 2 Gear pump
- 3 Variable piston pump
- 4 Flange
- 5 Coupling
- 6 Damping rubber ring

- S - suction line
- P - pressure line
- L - leakage
- X - control



<b>Tab. 2a Gear pumps size 1 - series P2</b>																	
Data of the electric motor			Displacement of the pump [cm <sup>3</sup> ]											Dimension of the drive			
			0,8		1,2		1,6		2,1		2,5		3,3				
Size	n [min <sup>-1</sup> ]	p [kW]	Q/p [L/min]/[bar]											∅ D [mm]	H [mm]	E max. [mm]	
80	1395	0.55	1.1	200	1.6	170	2.1	125	2.8	95	3.3	80	4.4	60	200	248	174
80	1395	0.75			1.6	200	2.1	170	2.8	130	3.3	110	4.4	80	200	248	174
90	1410	1.10					2.1	200	2.8	190	3.3	160	4.4	120	200	296	174
90	1410	1.50							2.8	200	3.3	200	4.4	165	200	296	174
100	1420	2.20											4.4	200	250	328	192
100	1420	3.00															
71	2790	0.55	2.1	125	3.1	85	4.2	60	5.6	45	6.6	40	8.7	30	160	225	157
80	2850	0.75	2.2	165	3.2	110	4.3	85	5.7	65	6.8	55	8.9	40	200	248	174
80	2835	1.10	2.2	200	3.2	160	4.3	125	5.7	95	6.7	80	8.9	60	200	248	174
90	2860	1.50			3.2	200	4.3	165	5.7	125	6.8	105	9.0	80	200	296	174
90	2850	2.20					4.3	200	5.7	185	6.8	155	8.9	120	200	296	174
100	2895	3.00											9.1	160	250	328	192

<b>Tab. 2b Gear pumps size 1 - series P2</b>																	
Data of the electric motor			Displacement of the pump [cm <sup>3</sup> ]											Dimension of the drive			
			3,6		4,4		4,8		5,8		6,2		7,9				
Size	n [min <sup>-1</sup> ]	p [kW]	Q/p [L/min]/[bar]											∅ D [mm]	H [mm]	E max. [mm]	
80	1395	0.55	4.8	55	5.8	45	6.4	40	7.7	35	8.2	30	10.5	25	200	248	174
80	1395	0.75	4.8	75	5.8	60	6.4	55	7.7	45	8.2	45	10.5	35	200	248	174
90	1410	1.10	4.8	110	5.9	90	6.4	80	7.8	70	8.3	65	10.6	50	200	296	174
90	1410	1.50	4.8	150	5.9	120	6.4	110	7.8	95	8.3	85	10.6	70	200	296	174
100	1420	2.20	4.8	200	5.9	180	6.5	165	7.8	135	8.4	125	10.7	100	250	328	192
100	1420	3.00			5.9	200	6.5	200	7.8	160	8.4	160	10.7	135	250	328	192
71	2790	0.55	9.5	30	11.7	25	12.7	20	15.4	20	16.4	15	20.9	15	160	225	157
80	2850	0.75	9.7	35	11.9	30	13.0	30	15.7	25	16.8	20	21.4	15	200	248	174
80	2835	1.10	9.7	55	11.9	45	12.9	40	15.6	35	16.7	30	21.3	25	200	248	174
90	2860	1.50	9.7	75	11.9	60	13.0	55	15.8	45	16.8	45	21.5	35	200	296	174
90	2850	2.20	9.7	110	11.9	90	13.0	80	15.7	65	16.8	65	21.4	50	200	296	174
100	2895	3.00	9.9	145	12.0	120	13.2	110	16.0	90	17.1	85	21.7	65	250	328	192

<b>Tab. 3a Gear pumps size 2 - series T2</b>																
Data of the electric motor			Displacement of the pump [cm <sup>3</sup> ]											Dimension of the drive		
			4		5		6,3		8		10					
Size	n [min <sup>-1</sup> ]	p [kW]	Q/p [L/min]/[bar]											∅ D [mm]	H [mm]	E max. [mm]
90	1410	1.1	5.4	100	6.7	80	8.5	65	10.8	50	13.5	40	200	296	222	
90	1410	1.5	5.4	135	6.7	110	8.5	85	10.8	65	13.5	55	200	296	222	
100	1420	2.2	5.4	195	6.7	155	8.5	125	10.8	100	13.5	80	250	328	228	
100	1420	3.0	5.4	270	6.7	215	8.5	170	10.8	135	13.5	105	250	328	228	
112	1440	4.0			6.8	270	8.6	225	11.0	175	13.8	140	250	348	228	
132	1455	5.5							11.0	240	13.8	190	300	389	248	
132	1455	7.5									13.8	250	300	389	248	

<b>Tab. 3b Gear pumps size 2 - series T2</b>																
Data of the electric motor			Displacement of the pump [cm <sup>3</sup> ]											Dimension of the drive		
			12,5		16		20		25							
Size	n [min <sup>-1</sup> ]	p [kW]	Q/p [L/min]/[bar]											∅ D [mm]	H [mm]	E max. [mm]
90	1410	1.1	16.9	30	21.6	25	27.0	20	33.7	15	200	296	222			
90	1410	1.5	16.9	45	21.6	35	27.0	25	33.7	20	200	296	222			
100	1420	2.2	16.9	65	21.6	50	27.0	40	33.7	30	250	328	228			
100	1420	3.0	16.9	85	21.6	65	27.5	55	33.7	45	250	328	228			
112	1440	4.0	17.3	110	22.1	90	27.5	70	34.6	55	250	348	228			
132	1455	5.5	17.3	155	22.1	120	27.5	95	34.6	75	300	389	248			
132	1455	7.5	17.3	210	22.1	165	27.5	130	34.6	105	300	389	248			

**Tab. 4 Gear pumps size 3 - series Q**

Data of the electric motor			Displacement of the pump [cm <sup>3</sup> ]								Dimension of the drive		
			10		17		27		34				
Size	n [min <sup>-1</sup> ]	p [kW]	Q/p [L/min]/[bar]								∅ D [mm]	H [mm]	E max. [mm]
100	1420	3.0	13.5	105	22.9	65	36.9	40	45.9	30	250	328	255
112	1440	4.0	13.8	140	23.3	85	36.9	50	46.5	40	250	348	255
132	1455	5.5	13.8	190	23.5	110	37.3	70	47.0	55	300	389	275
132	1455	7.5			23.5	155	37.3	95	47.0	75	300	389	275

**Tab. 5 Variable pistons pumps**

Data of the electric motor			Displacement of the pump [cm <sup>3</sup> ]						Dimension of the drive			
			PV 6		PV 10		PV 15*					
Size	n [min <sup>-1</sup> ]	p [kW]	max. Q/p [L/min]/[bar]						∅ D [mm]	H [mm]	F [mm]	E max. [mm]
			14.4		21.1		34.2					
100	1420	2.2	19.7	60	28.8	40			250	328	45	283
100	1420	3.0	19.5	85	28.6	60			250	328	45	283
112	1440	4.0	19.7	110	28.8	75			250	348	45	283
132	1455	5.5	19.8	155	29.0	105	47.2	56	300	389	50	296
132	1455	7.5	19.8	210	29.0	140	47.2	76	300	389	50	296

**9 Tank capacity**

The following are our recommendation as to determination of the capacity:

- hydraulic circuits with fixed pumps - from 3 up to 6 multiple of the pump flow rate [L/min].
- hydraulic circuits with variable pumps - from 2 up to 4 multiple of the pump flow rate [L/min]

Tanks normally delivered:

Fig. 4  
Tank models 10C, 20C, 30C, 40C

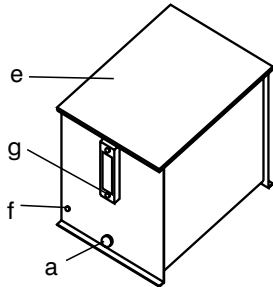


Fig. 5  
Tank models 45U, 60U

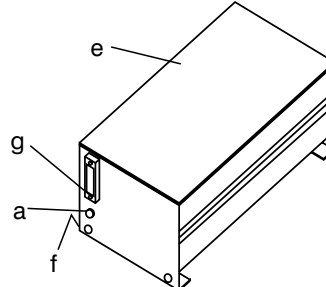
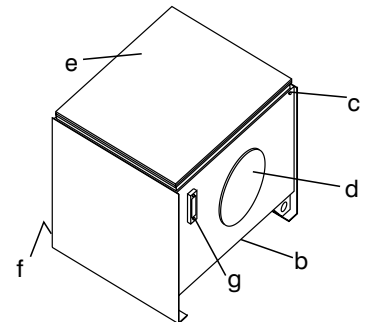


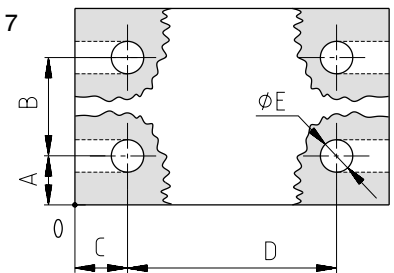
Fig. 6  
Tank models 60H, 100H, 250H



**Parts delivered with a tank (Fig.4, 5, 6):**

- a) Drain plug on the front side of the tank - with capacities 10H, 20H, 30H, 40H, 45U, 60U
- b) Drain plug on the bottom of the tank - with capacities 60H, 100H, 250H
- c) Leakage drain plug on the through collector at the upper side of the tank - with capacities 60H, 100H, 250H
- d) Cleaning cover on the side of the tank - with capacities 60H, 100H, 250H
- e) Bolt mounted cover sealad against dust penetration
- f) Earthing bolt
- g) Continuous level gauge

Fig. 7



Tank designation	Tank capacity [L]	Tank dimension Length x width x height [mm]	Dimensions of fix slots [mm] (Fig. 7)				
			A	B	C	D	∅ E
10C	10	400 x 280 x 186	30	220	6	388	9 (slot)
20C	20	400 x 280 x 274	30	220	6	388	9 (slot)
30C	30	500 x 320 x 285	30	260	10,5	479	11 (slot)
40C	40	500 x 320 x 364	30	260	10,5	479	11 (slot)
45U	45	700 x 370 x 329	35	300	25	650	11
60U	60	700 x 370 x 394	35	300	25	650	11
60H	60	600 x 470 x 485	35	400	30	540	14
100H	100	700 x 550 x 565	25	500	30	640	14
250H	250	1006 x 610 x 680	20	570	47	912	14

## 10 Painting

The following are the standard paintings of the outside surface of the tank:

- top coat - RAL 7030 KOMAXIT (stone gray)
- aluminum parts - without surface treatment
- hydraulic components - manufacturer's standard painting

Other paints or special surface treatment on request.

## Component assembly on the tank cover

In addition to drive unit, also the base block and filtering unit are usually situated on the tank cover. The base block is connected to the pump output. It comprises a check valve and pressure valve (or some other components) according to the pressure control system used (see the circuit diagrams in Fig. 14 to 18). It also enables other components of the hydraulic circuit to be connected, e.g.:

- oil filter
- subplates or connecting plates with the respective components
- accumulator

## 11 Pressure control

- **Pressure relief valve VT** (Fig. 14) - used with all types of gear pumps.
- **Unloading valve VO** (Fig. 15) - used in combination of a gear pump, an accumulator and a check valve. When the pressure set at the unloading valve is reached, the valve loads the pump. The accumulator provides for holding the pressure in the circuit behind the check valve. Pressure valve VP works as the safety valve of the accumulator.
- **Switching** (Fig. 16) - used in combination of a gear pump, an accumulator, a check valve and pressure switch **TS**. When the pressure in the system reaches the pressure set at the pressure switch, the respective circuit switches off the electric motor. The accumulator provides for holding the pressure in the circuit behind the check valve. Pressure valve VP works as the safety valve of the accumulator.
- **Remote control with the pressure relief valve VT** (Fig. 17) - used only with piston pumps with pressure control. Pressure valve VP protects the circuits against pressure peaks.
- Pressure valve on the pump - used with piston pumps with pressure control. Pressure is adjusted by means of the screw **STR** which is fixed to the pump. Pressure valve VP protects the circuit against pressure peaks.

## 12 Oil filtration

Preferably the return filters with visual (Fig. 8) or electric (Fig. 9) clogging indication are used. These filters can also be used (after removing the cover) as the filling filters. They usually also comprise an integrated air breather.

Type of the filter	Type of the insert	Flow rate [L/min]	By-pass $\Delta p$ [bar]	Absolute filtration [ $\mu m$ ]
FR 043 - 166	V3 . 0510 - 56	25	2.5	10
FR 072 - 166	V3 . 0520 - 56	50	2.5	10
E 103 - 676	V3 . 0620 - 56	75	2.5	10

Fig. 8

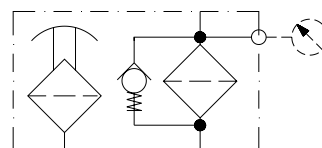
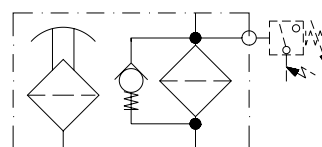


Fig. 9



## 13 Size of the components

The hydraulic components are assembled into a hydraulic circuit by means of connecting or modular plates PD06 (catalogue HA 0006). These plates enable building of hydraulic systems as horizontal or vertical stacking assemblies representing compact system without connecting pipes or hoses. Up to 8 section can be connected in a horizontal stacking assembly. The installation dimension of the components size 06 correspond with ISO 4401- Ab-03-4 and DIN 24340-A6.

The working ports are provided with pipe threads as follows:

- a) base block type ZB 06 x - xx
  - A, B - G3/8"
  - P, P1, T - G1/2"
- b) in-line modular plates PD 06 xx - AL
  - A, B, P - G3/8"
  - T - G1/2"

## 14 Control voltage

of the electro-hydraulic components used must be determined with regard to the safety and protection of health. On request, the components with the following Dc control voltages can be delivered: 12, 14, 21, 24, 42, 48, 60, 102 and 205 V. The available Ac voltages are 24, 115 and 230V / 50 (60)Hz.

## 15 Accumulators

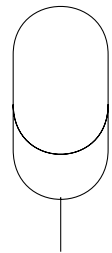
The gas bar or membrane accumulators are being used (Fig. 10). The required capacity in L is to be determined. Preferably the accumulators from those suppliers are being used, who can ensure the international certification (**at least the certification from the German Testing Laboratory TÜV**).

When filling in the wrong again, please give the country in which your machine with our power pack is going to be used. The accumulator is a pressure tank which must comply with the regulations regarding the safety of work. These regulations differ in the particular countries. The accumulator must be provided with the certificate of the respective country it is going to be used in!

Smaller accumulators (up to 4 L) are mounted directly onto the cover of the tank or onto a short block (max. with 2 sections of control components above the base block). Larger larger accumulators are mounted only onto the tank cover. Together with an accumulator also the filling and checking equipment can be delivered (including the pressure gauge for filling the accumulator with nitrogen).

We recommend the use of the accumulator to be discussed with our technicians.

Fig. 10



## 16 Accumulator block

The function of the safety block is provided by the base block (see Fig. 15 and 16).

The use of another block is to be consulted with us.

## 17, 18 Thermometer, thermostat, oil level transducer

These instruments can be mounted onto the tank cover. The **thermometer** (Fig. 11) and the **thermostat** (Fig. 12) provide for checking the oil temperature. The **oil level transducer** (Fig. 13).

Fig. 11

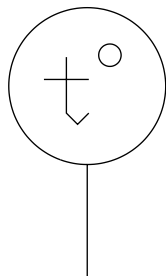


Fig. 12

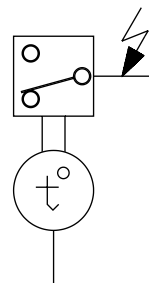
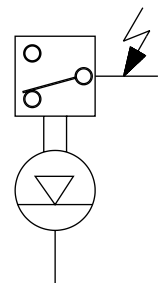


Fig. 13



## 19 Electric equipment

Power packs delivered without electric equipment are standard. The electric circuit diagram of the electric motor is on the lower side of the cover of the motor terminal box. On request, the electric boxes (including terminals, circuit breakers etc.) can be delivered.

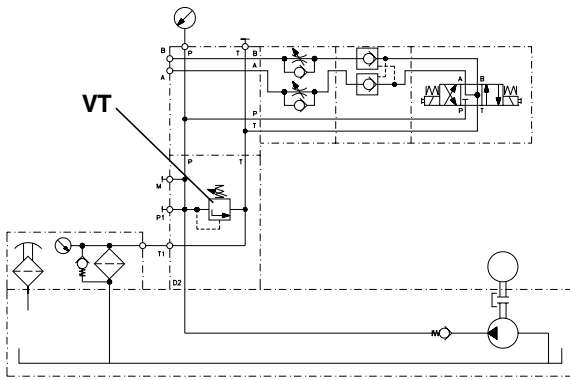
## 20 Hydraulic fluid

The hydraulic power packs are designed to operate with mineral oils of the power classes HM and HV according to the European specification CETOP RP 91 H and with the bio-degradable hydraulic fluids of the groups HTG and HE according to DIN-proposal.

## 21 Special equipment

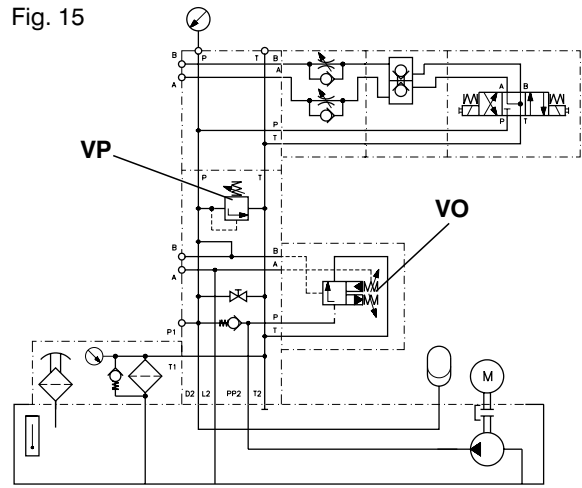
Special requirements regarding the power pack equipment, such as oil cooling and heating, power pack covering etc., are to be consulted with our technicians.

Fig. 14



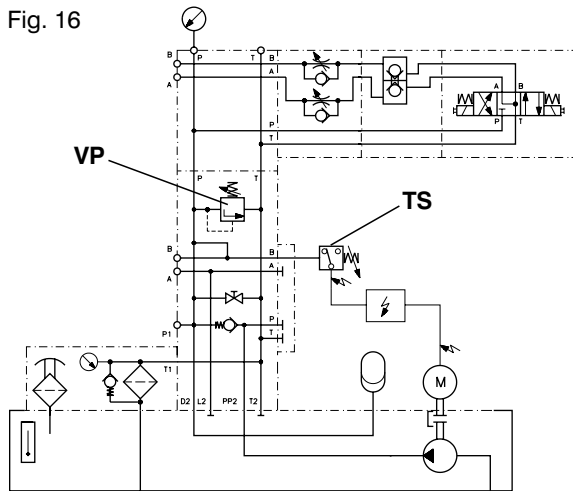
Power pack with gear pump - pressure in hydraulic system is controlled by pressure relief valve VT. (usable with tank capacities)

Fig. 15



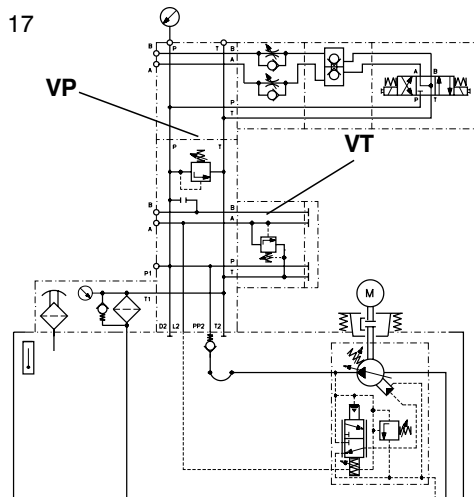
Power pack with gear pump - pressure in the system held by accumulator and check valve, pump pressure unloaded through unloading valve VO. Pressure relief valve VP works as the safety valve of the accumulator (for tank capacities from 40 up to 250 L and accumulators capacities from 2.5 up to 10 L).

Fig. 16



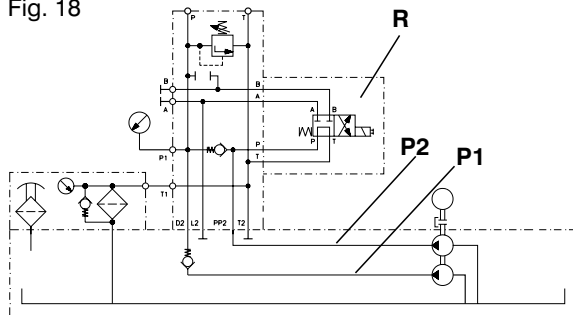
Power pack with gear pump and pressure switch TS controlling the switching-off of the electric motor. Pressure relief valve VP works as the safety valve of the accumulator (for tank capacities from 20 up to 60 L and accumulators capacities from 2.5 up to 10 L).

Fig. 17



Power pack with piston pump with pressure control - remote pressure control through pressure relief valve VT. Pressure relief valve VP protects the system against pressure peaks (for tank capacities from 60 up to 250 L).

Fig. 18



Double gear pump hydraulic power unit with two pressure ports P1 and P2. P2 pressure port is unloaded by 4/2 solenoid operated directional valve R (for tank capacities from 40 up to 250 L).

### Caution!

- The packing foil is recyclable.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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