

# Combination pumps

## Type SKPI

LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev

HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

### Features

- Compact design
- Self-venting
- Various combinations possible
- Self-aspiring
- Not suited for pulsating operation

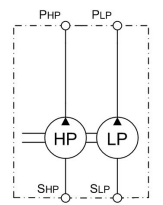


### Design

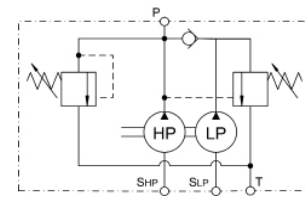
- Optionally integrated low-pressure unloading valve + integrated fail safe valve (can be used to restrict the system pressure)
- With hollow shaft for direct assembling of motor without bell housing and coupling

### Applications

- For applications that require high flow rates in the low pressure (LP) range and low flow rates in the high pressure (HP) range
- Presses
- Power units for industrial applications such as punching machines and rescue devices



without valve block



with valve block

### Technical Data

Hydraulic fluid	Mineral oil according to DIN 51524 (other fluids on request)
Fluid temperature range	-20 up to 80 °C
Ambient temperature range	-30 to 50 °C
Viscosity range	12 to 220 mm <sup>2</sup> /s
Max. operating pressure HP	700 bar
Max. operating pressure LP without valve block	250 bar
Max. operating pressure LP with valve block	100 bar (preset by producer)
Suction pressure	-0,2 bar up to +0,5 bar (relative)
Filtration (recommendation)	According to NAS 1638 class 6 resp. ISO/DIN 4406 17/15/12
Weight	See product information
Installation position	In oil reservoir (vertical shaft)
Radial force / Axial force onto driving shaft	Not allowed
Max. speed	2000 rpm
Direction of rotation	Clockwise
Suction height	Max. 400 mm
Material	Excentric shaft and valve block: steel Pump housing and gear pump: cast aluminium

## Type SKPI

LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
 HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

## Ordering code without valve block

<b>Example</b>	<b>SKPI</b>	-	<b>90</b>	-	<b>0,68</b>	-	<b>700</b>	-	<b>4,5</b>	-	<b>250</b>	-	<b>X</b>	-	<b>V</b>	-			<b>00</b>
<b>Combination pumps</b>																			
<b>For motor sizes IEC</b>	80 90 100 112																		
<b>Displacement piston pump HP</b>	0,47 [cm <sup>3</sup> /rev] 0,68 [cm <sup>3</sup> /rev] 0,85 [cm <sup>3</sup> /rev] 1,21 [cm <sup>3</sup> /rev] 1,53 [cm <sup>3</sup> /rev] 1,88 [cm <sup>3</sup> /rev] 2,16 [cm <sup>3</sup> /rev] 2,71 [cm <sup>3</sup> /rev]																		
<b>Max. operating pressure HP [bar]</b>	see product information																		
<b>Displacement gear pump LP</b>	4,5 [cm <sup>3</sup> /rev] 6,3 [cm <sup>3</sup> /rev] 8,2 [cm <sup>3</sup> /rev] 14 [cm <sup>3</sup> /rev]																		
<b>Max. operating pressure LP [bar]</b>	250 [bar]																		
<b>Valve block</b>	X (without valve block)																		
<b>Seal material</b>	V [FPM] other seal materials on request																		
	<b>Special execution</b> 01 ... 99 (00 for Standard)																		
	<b>Part index</b> Please leave blank (small letters a-z; different letters do not effect interchangeability)																		
	<b>Design revision</b> see dimension drawings (capital letters A-Z; identical letters equal same connecting dimensions)																		

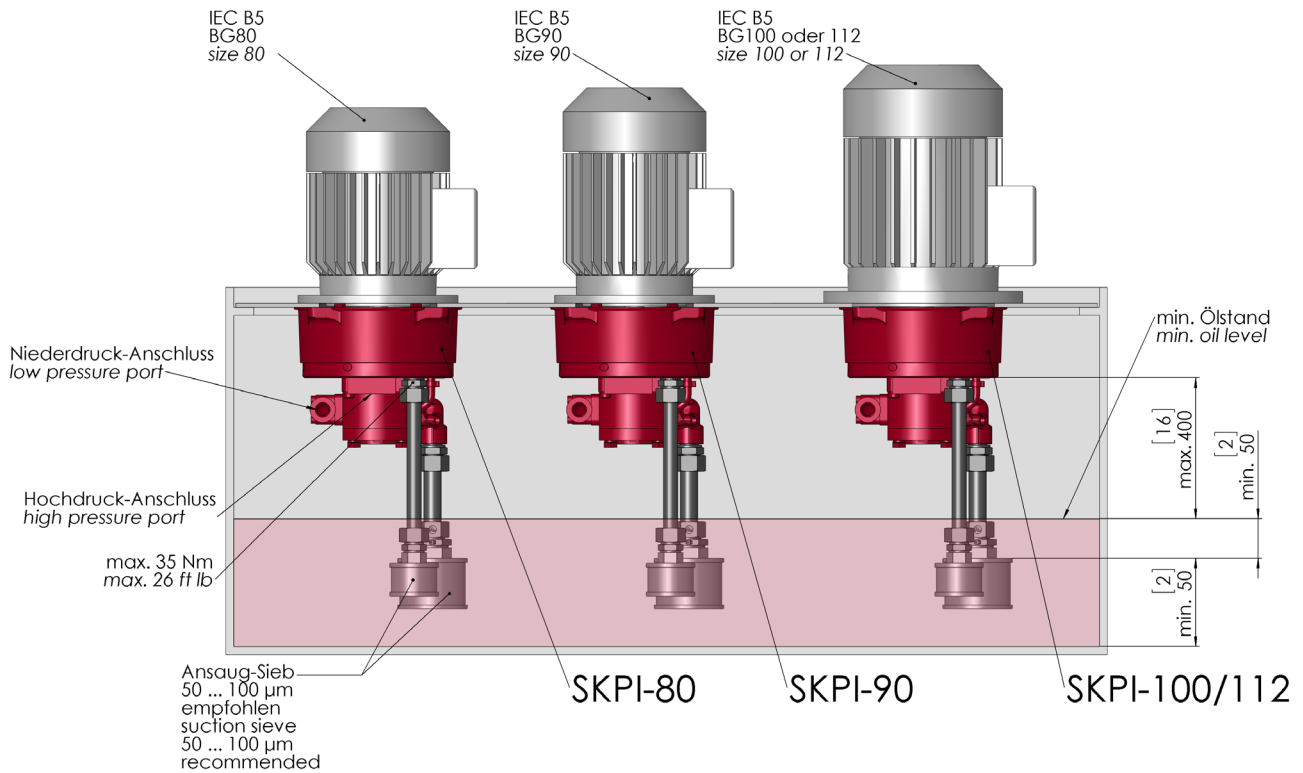
**Ordering code with valve block**

<b>Example</b>	SKPI	-	90	-	0,68	-	700	-	5,18	-	100	-	VB	-	V	-			00
<b>Combination pumps</b>																			
<b>For motor sizes IEC</b>	80 90 100 112																		
<b>Displacement piston pump HP</b>	0,47 [cm <sup>3</sup> /rev] 0,68 [cm <sup>3</sup> /rev] 0,85 [cm <sup>3</sup> /rev] 1,21 [cm <sup>3</sup> /rev] 1,53 [cm <sup>3</sup> /rev] 1,88 [cm <sup>3</sup> /rev] 2,16 [cm <sup>3</sup> /rev] 2,71 [cm <sup>3</sup> /rev]																		
<b>Max. operating pressure HP [bar]</b>	see product information																		
<b>Displacement piston pump + gear pump <math>\Sigma</math> LP + HP</b>	4,5 [cm <sup>3</sup> /rev] + HP 6,3 [cm <sup>3</sup> /rev] + HP 8,2 [cm <sup>3</sup> /rev] + HP 14 [cm <sup>3</sup> /rev] + HP																		
<b>Max. operating pressure LP [bar]</b>	see product information																		
<b>Valve block</b>	VB (with valve block)																		
<b>Seal material</b>	V [FPM] other seal materials on request																		
	<b>Special execution</b> 01 ... 99 (00 for Standard)																		
	<b>Part index</b> Please leave blank (small letters a-z; different letters do not effect interchangeability)																		
	<b>Design revision</b> see dimension drawings (capital letters A-Z; identical letters equal same connecting dimensions)																		

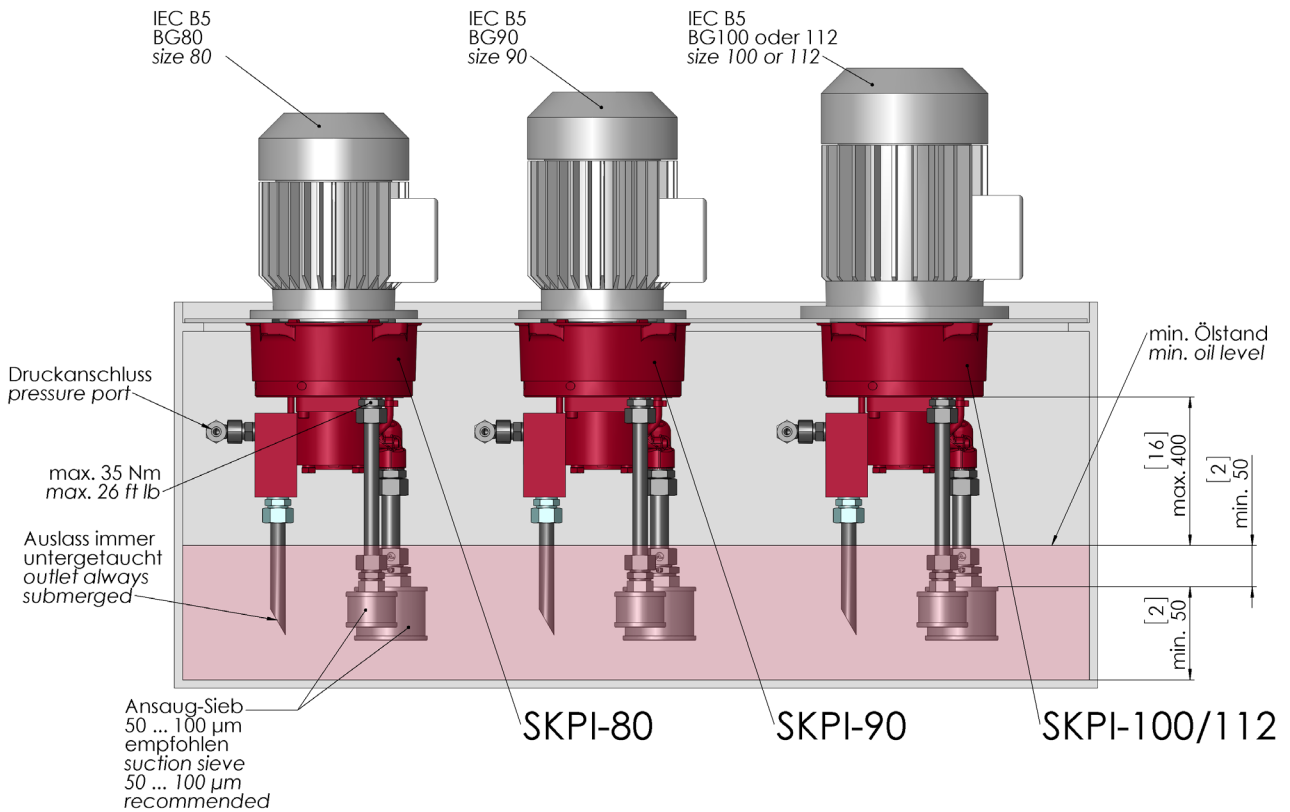
## Type SKPI

LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

### Mounting without valve block



### Mounting with valve block



**Type SKPI**

LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
 HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

**Product information****SKPI without valve block**

Type	for Motor size IEC	HP mode		LP mode		Weight ca. [kg]	Part No.
		Displacement PP* [cm <sup>3</sup> /rev]	max. operating pressure [bar]	Displacement GP [cm <sup>3</sup> /rev]	max. operating pressure [bar]		
SKPI-80-0,47-700-4,5-250-X-V-A*00	80	0,47	500	4,5	250	8,6	4142523
SKPI-90-0,68-700-4,5-250-X-V-A*00	90	0,68	700	4,5	250	8,6	4132109
SKPI-100-0,68-700-6,3-250-X-V-A*00	100	0,68	700	6,3	250	8,6	4132111
SKPI-90-1,21-700-4,5-250-X-V-A*00	90	1,21	350	4,5	250	8,6	4132112
SKPI-100-1,21-700-6,3-250-X-V-A*00	100	1,21	500	6,3	250	8,6	4132113
SKPI-100-1,21-700-8,2-250-X-V-A*00	100	1,21	700	8,2	250	8,6	4132114
SKPI-112-1,21-700-14-250-X-V-A*00	112	1,21	700	14	250	9,4	4132125
SKPI-90-1,53-700-4,5-250-X-V-A*00	90	1,53	350	4,5	250	8,6	4132126
SKPI-100-1,53-700-6,3-250-X-V-A*00	100	1,53	700	6,3	250	8,6	4132127
SKPI-100-1,53-700-8,2-250-X-V-A*00	100	1,53	700	8,2	250	8,6	4132128
SKPI-112-1,53-700-14-250-X-V-A*00	112	1,53	700	14	250	9,4	4132129
SKPI-112-1,88-700-6,3-250-X-V-A*00	112	1,88	700	6,3	250	8,6	4132130
SKPI-112-1,88-700-8,2-250-X-V-A*00	112	1,88	700	8,2	250	8,6	4132131
SKPI-112-1,88-700-14-250-X-V-A*00	112	1,88	700	14	250	9,4	4132132
SKPI-112-2,71-700-8,2-250-X-V-A*00	112	2,71	700	8,2	250	8,6	4132133
SKPI-112-2,71-700-14-250-X-V-A*00	112	2,71	700	14	250	9,4	4132134

HP max. 700 bar / LP max. 250 bar

PP: piston pump

GP: gear pump

\* Other displacements on request.

\*\* Maximal pressure, who can be achieved with the designated motor. But the pump is designed for max. 700 bar.

## Type SKPI

LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
 HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

### SKPI with valve block

Type	for Motor size IEC	HP mode		LP mode		Weight ca. [kg]	Part No.
		Displacement KP* [cm <sup>3</sup> /rev]	max. operating pressure** [bar]	Displacement GP [cm <sup>3</sup> /rev]	max. cut-out pressure*** [bar]		
SKPI-80-0,47-700-4,97-50-VB-V-A*00	80	0,47	500	4,97	50	10,82	4142521
SKPI-90-0,47-700-6,77-75-VB-V-A*00	90	0,47	700	6,77	75	10,83	4317451
SKPI-90-0,68-700-5,18-100-VB-V-A*00	90	0,68	700	5,18	100	10,82	4132159
SKPI-90-0,85-700-5,35-100-VB-V-A*00	90	0,85	700	5,35	100	10,82	4304908
SKPI-90-0,85-700-7,15-75-VB-V-A*00	90	0,85	700	7,15	75	10,83	4315660
SKPI-90-0,85-700-9,05-65-VB-V-A*00	90	0,85	700	9,05	65	10,83	4317452
SKPI-100-0,85-700-9,05-75-VB-V-A*00	100	0,85	700	9,05	75	10,83	4317453
SKPI-100-1,21-700-5,71-100-VB-V-A*00	100	1,21	700	5,71	100	10,78	4132160
SKPI-100-1,21-700-7,51-100-VB-V-A*00	100	1,21	700	7,51	100	10,83	4132161
SKPI-100-1,21-700-9,41-100-VB-V-A*00	100	1,21	700	9,41	100	10,85	4132162
SKPI-100-1,53-700-6,03-100-VB-V-A*00	100	1,53	700	6,03	100	10,78	4132163
SKPI-100-1,53-700-7,83-100-VB-V-A*00	100	1,53	700	7,83	100	10,83	4132164
SKPI-100-1,53-700-9,73-100-VB-V-A*00	100	1,53	700	9,73	100	10,85	4132166
SKPI-112-1,53-700-15,53-100-VB-V-A*00	112	1,53	700	15,53	100	11,69	4132167
SKPI-112-1,88-700-6,38-100-VB-V-A*00	112	1,88	700	6,38	100	10,78	4132168
SKPI-112-1,88-700-8,18-100-VB-V-A*00	112	1,88	700	8,18	100	10,83	4132169
SKPI-112-1,88-700-10,08-100-VB-V-A*00	112	1,88	700	10,08	100	10,85	4132170
SKPI-112-1,88-700-15,88-100-VB-V-A*00	112	1,88	700	15,88	100	11,69	4132171
SKPI-112-2,16-700-6,66-100-VB-V-A*00	112	2,16	700	6,66	100	10,85	4317565
SKPI-112-2,16-700-8,46-100-VB-V-A*00	112	2,16	700	8,46	100	10,85	4317568
SKPI-112-2,16-700-10,36-100-VB-V-A*00	112	2,16	700	10,36	100	10,85	4312998
SKPI-112-2,16-700-16,16-100-VB-V-A*00	112	2,16	700	16,16	100	10,85	4317570
SKPI-112-2,71-700-9,01-100-VB-V-A*00	112	2,71	700	9,01	100	10,83	4132172
SKPI-112-2,71-700-10,91-100-VB-V-A*00	112	2,71	700	10,91	100	10,85	4132173
SKPI-112-2,71-700-16,71-100-VB-V-A*00	112	2,71	700	16,71	100	11,69	4317571

HP max. 700 bar / LP max. 100 bar

PP: piston pump

GP: gear pump

\* Other displacements on request.

\*\* Maximal pressure, who can be achieved with the designated motor. But the pump is designed for max. 700 bar.

\*\*\* factory setting

## Calculation

Max. operating pressure HP: **700 bar (for ordering code)**  
 LP: **100 bar (for ordering code)**

### Calculation of driving motor torque

$$M_{tot} = M_{RP} + M_{GP}$$

$M_{RP} = \frac{p_{RP} \cdot V_{gRP}}{62,8 \cdot \eta_{RP}}$	$M_{GP} = \frac{p_{GP} \cdot V_{gGP}}{62,8 \cdot \eta_{GP}}$
--	--

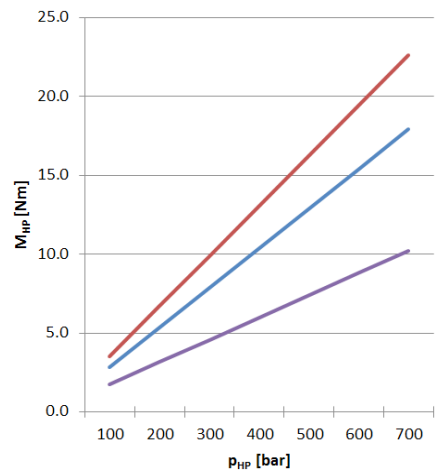
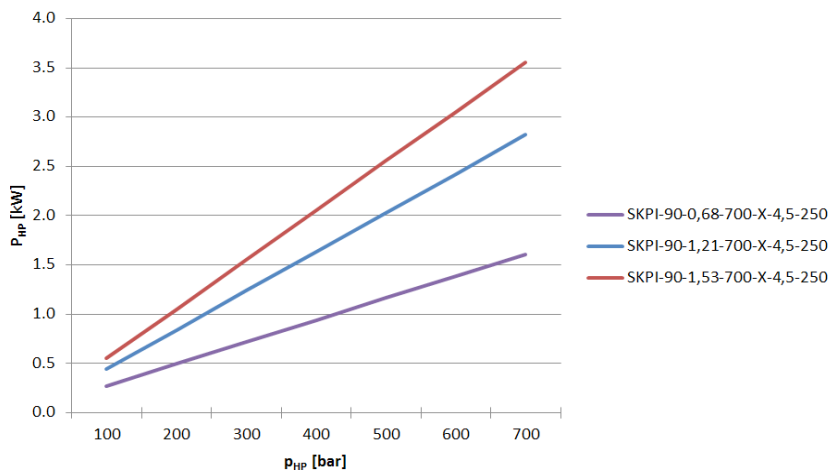
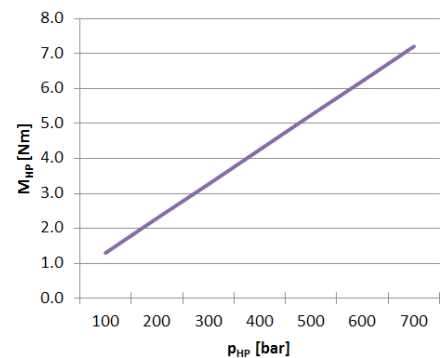
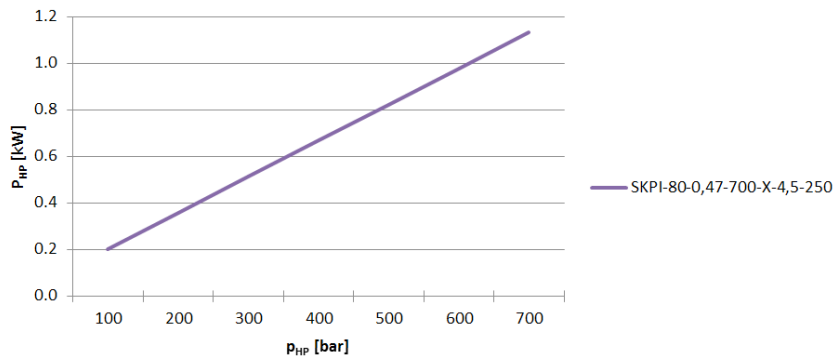
- M Torque [Nm]
- P Power [kW]
- n Rotation speed [rpm]
- V<sub>g</sub> theor. displacement [cm<sup>3</sup>/rev]
- p Operating pressure [bar]
- η<sub>RP</sub> Overall efficiency approx. 0,8
- η<sub>GP</sub> Overall efficiency approx. 0,7
- k Pulsation factor approx. 1,05

### Calculation of driving motor power

$P_{RP} = \frac{p_{RP} \cdot V_{gRP} \cdot n \cdot k}{600 \cdot 10^3 \cdot \eta_{RP}}$	$P_{GP} = \frac{p_{GP} \cdot V_{gGP} \cdot n}{600 \cdot 10^3 \cdot \eta_{GP}}$
--	--

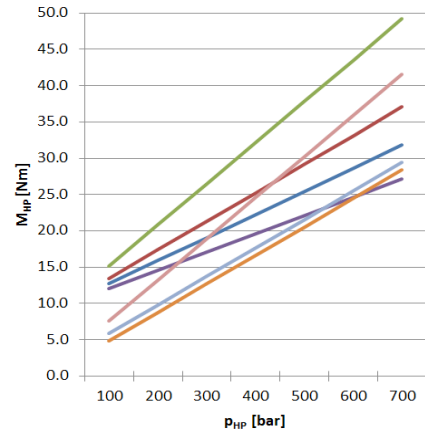
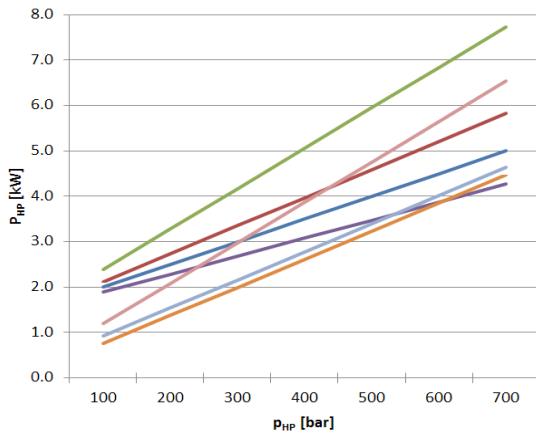
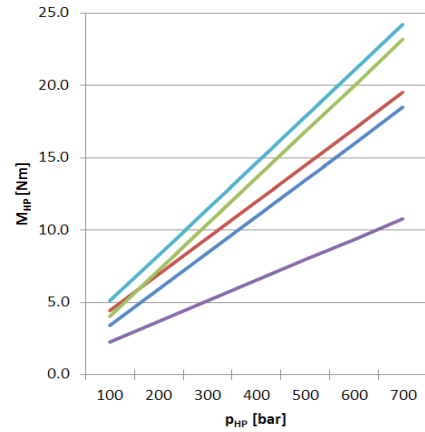
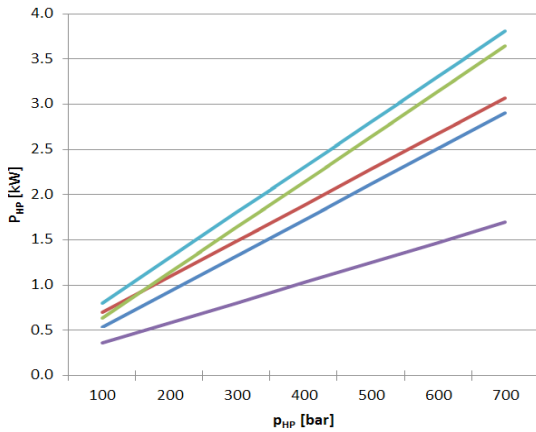
## Driving motor power at 1'500 rpm and torque

Pumps without valve block (radial piston pump only, gear pump at 0 bar)

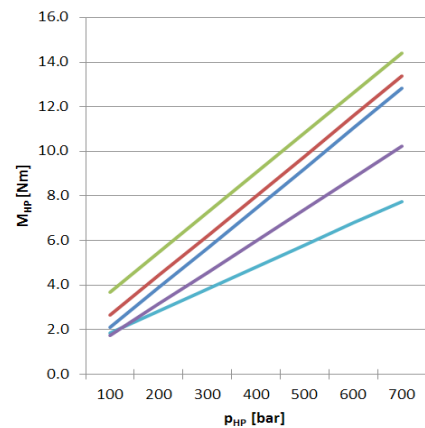
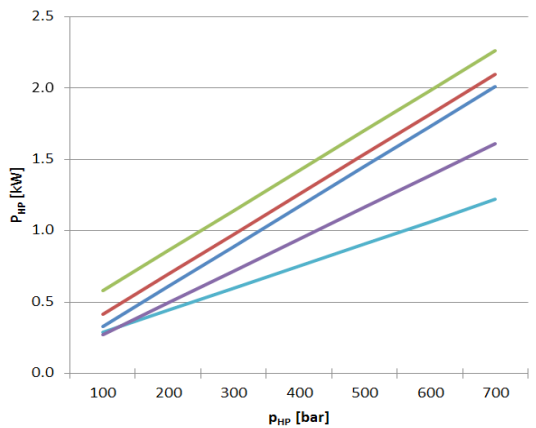
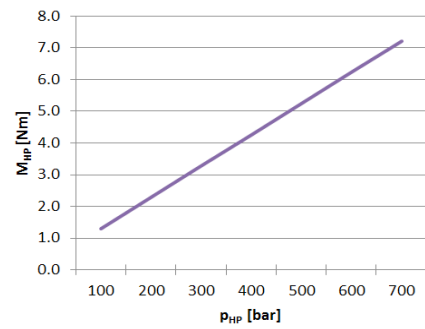
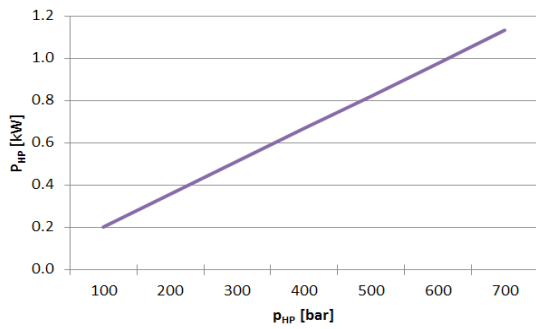


## Type SKPI

LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
 HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

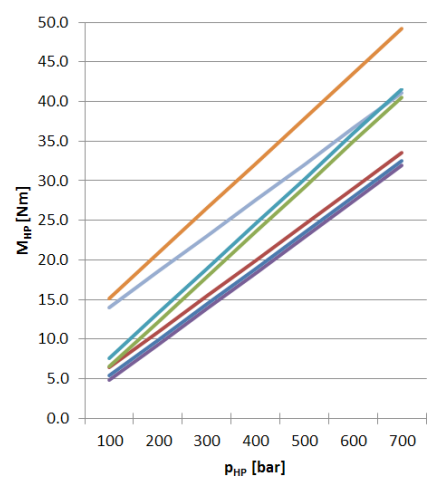
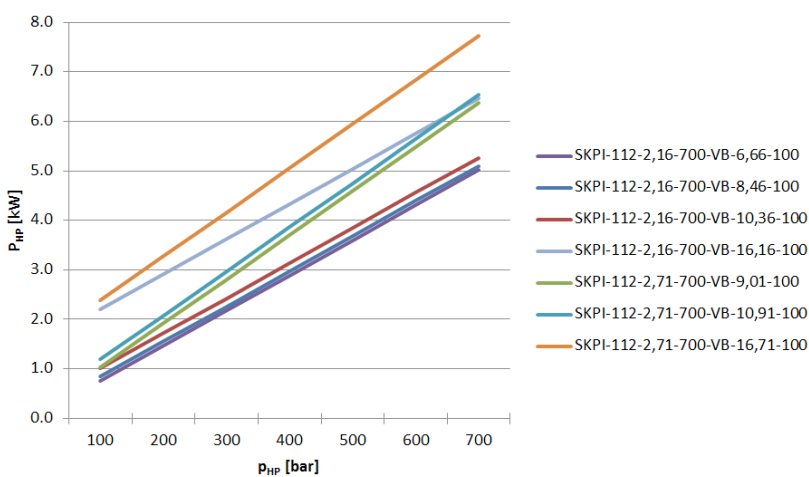
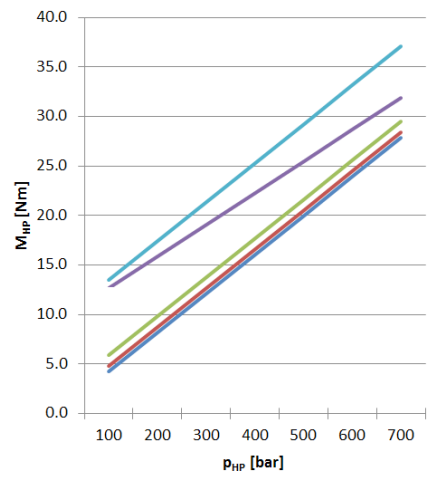
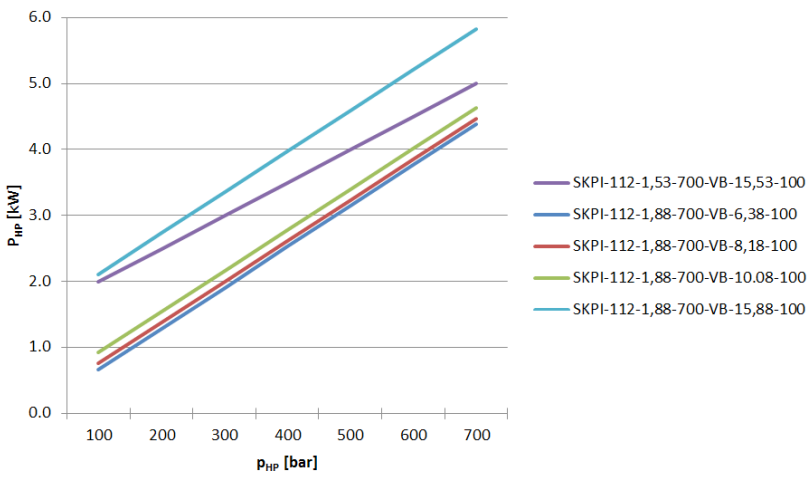
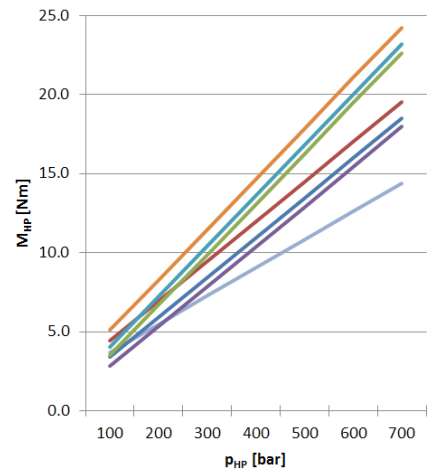
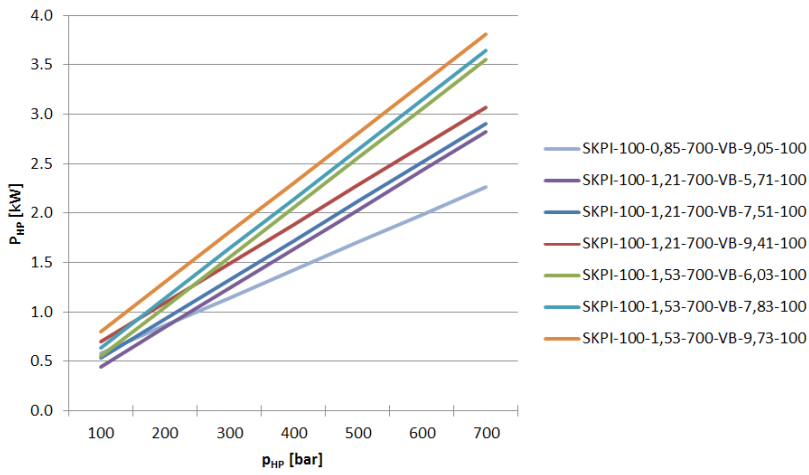


### Pumps with valve block (in high pressure mode, gear pump switched to tank)





**Type SKPI**  
 LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
 HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

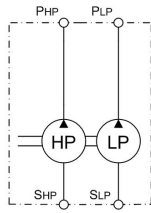


## Type SKPI

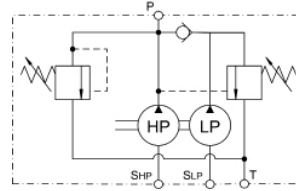
LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
 HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

### Hydraulic schematics

without valve block

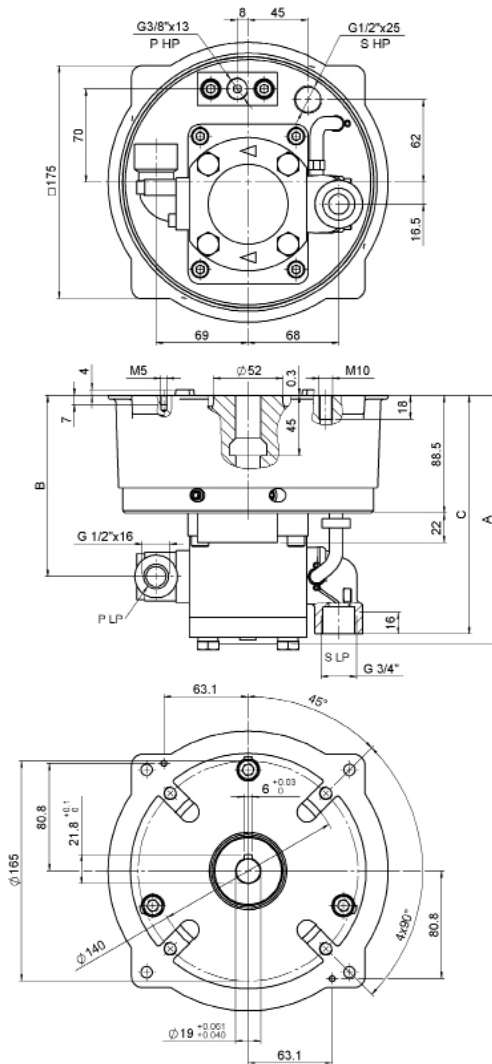


with valve block



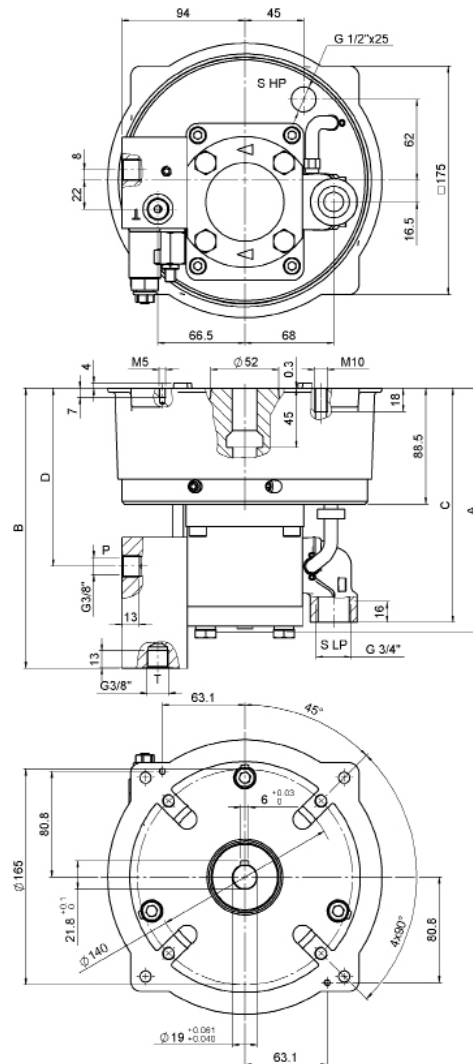
### Dimensional drawings

Size SKPI for electric motor IEC-size 80



Installation dimensions without valve block

Displacement [cm <sup>3</sup> /rev]	A	B	C
	[mm]		
4.5	171.5	128.3	171.3
6.3	174.5	129.5	172.5
8.2	177.4	131.6	174.9
14	186.9	136	179



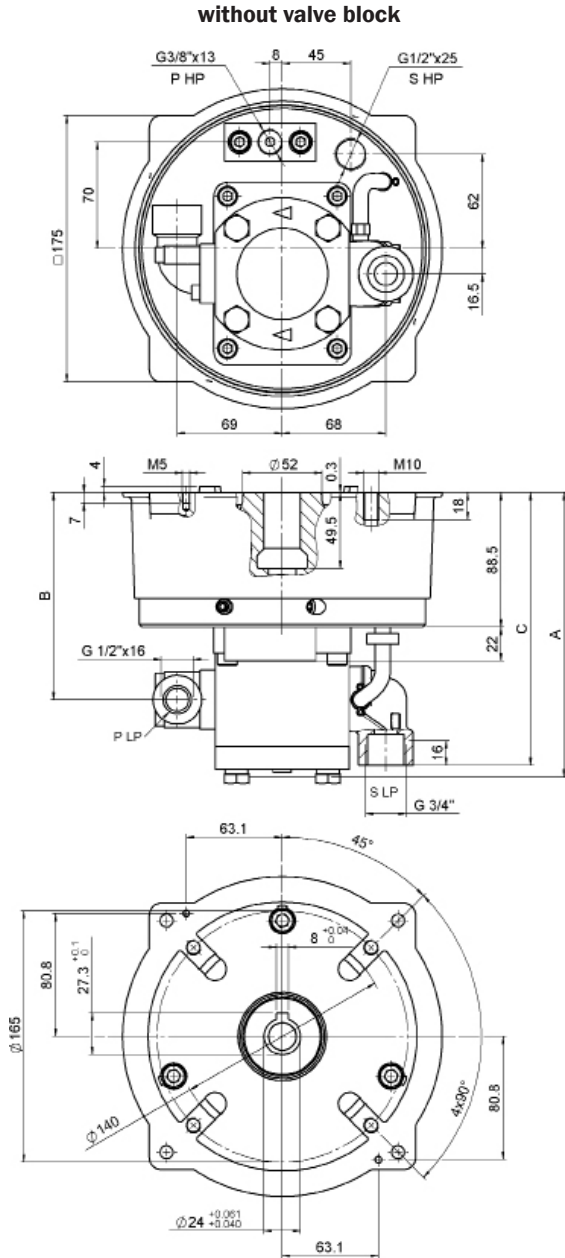
Installation dimensions without valve block

Displacement [cm <sup>3</sup> /rev]	A	B	C	D
	[mm]			
4.5	171.5	206.3	171.3	128.3
6.3	174.5	207.5	172.5	129.5
8.2	177.4	209.6	174.9	131.6
14	186.9	214	179	136

## Type SKPI

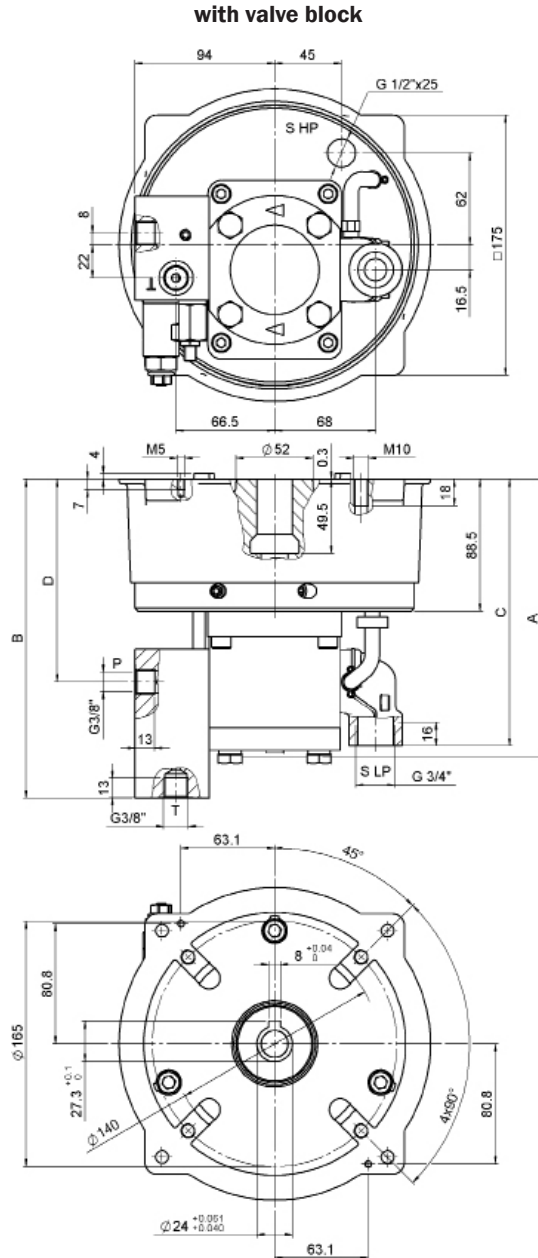
LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
 HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

### Size SKPI for electric motor IEC-size 90



Installation dimensions without valve block

Displacement [cm <sup>3</sup> /rev]	A B C		
	[mm]		
4.5	171.5	128.3	171.3
6.3	174.5	129.5	172.5
8.2	177.4	131.6	174.6
14	186.9	136	179

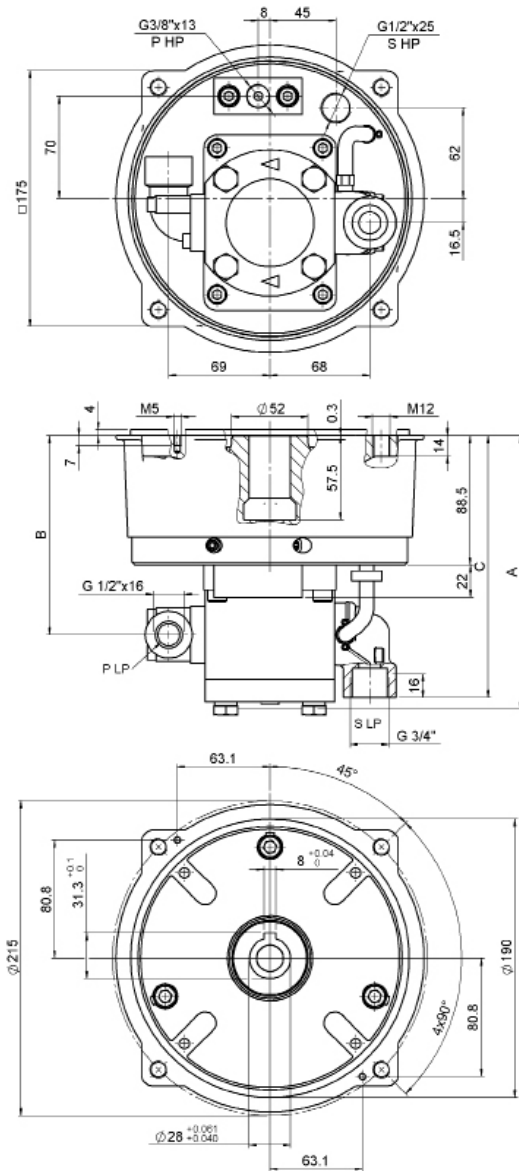


Installation dimensions without valve block

Displacement [cm <sup>3</sup> /rev]	A B C D			
	[mm]			
4.5	171.5	206.3	171.3	128.3
6.3	174.5	207.5	172.5	129.5
8.2	177.4	209.6	174.6	131.6
14	186.9	214	179	136

**Size SKPI for electric motor IEC-size 100 or IEC-size 112**

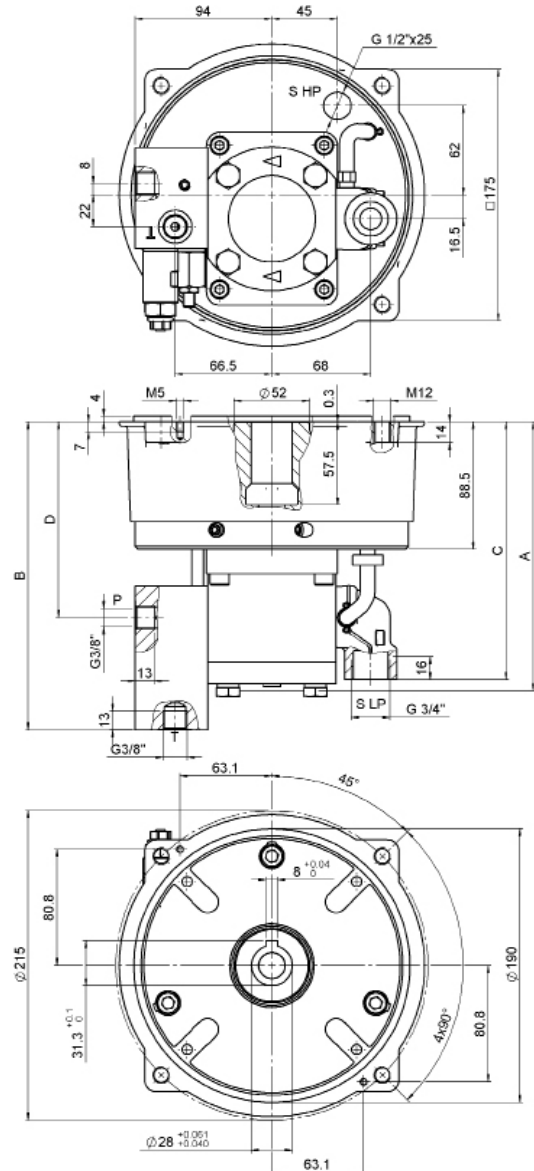
**without valve block**



**Installation dimensions without valve block**

Displacement [cm <sup>3</sup> /rev]	A B C		
	[mm]		
4.5	171.5	128.3	171.3
6.3	174.5	129.5	172.5
8.2	177.4	131.6	174.6
14	186.9	136	179

**with valve block**



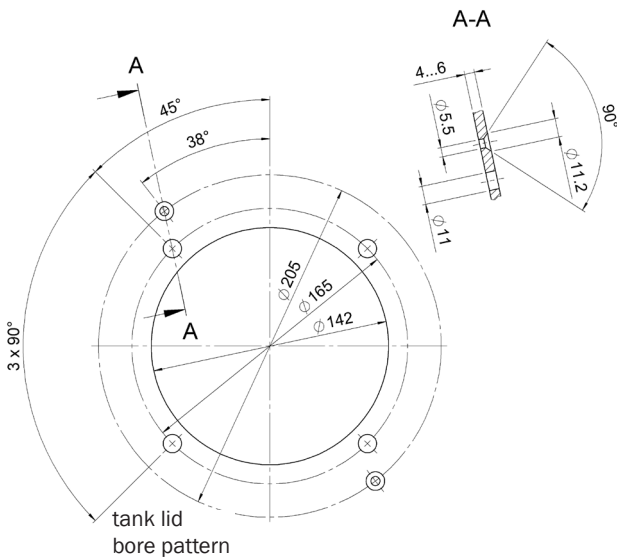
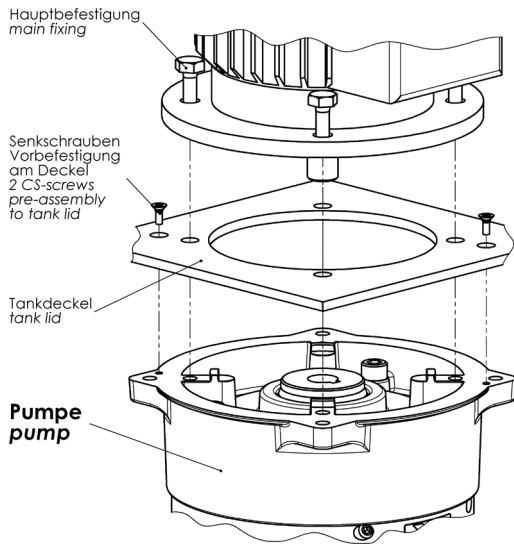
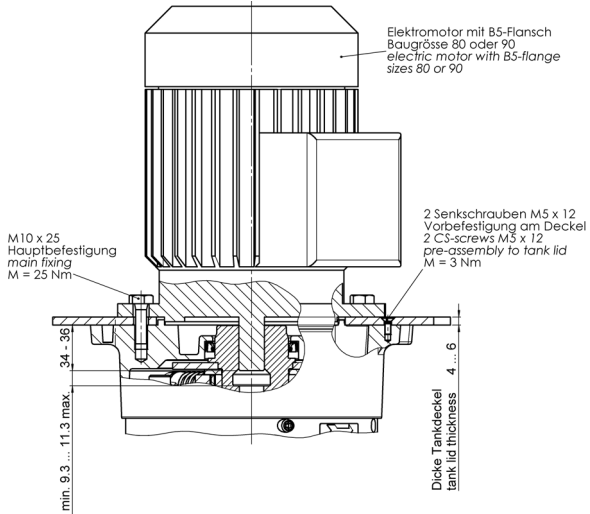
**Installation dimensions without valve block**

Displacement [cm <sup>3</sup> /rev]	A B C D			
	[mm]			
4.5	171.5	206.3	171.3	128.3
6.3	174.5	207.5	172.5	129.5
8.2	177.4	209.6	174.6	131.6
14	186.9	214	179	136

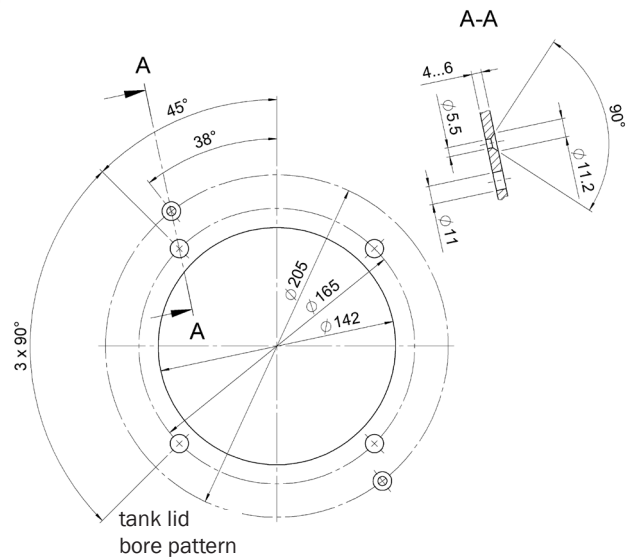
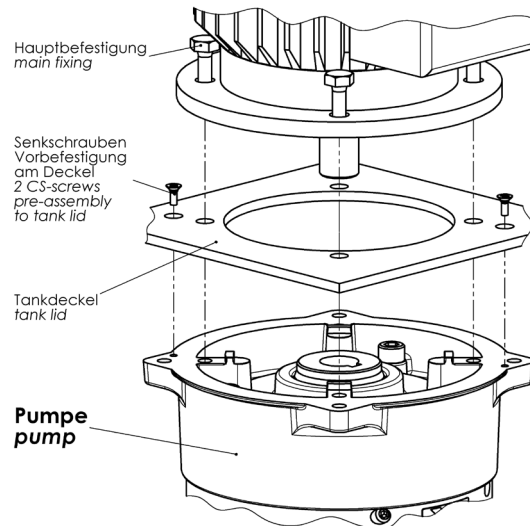
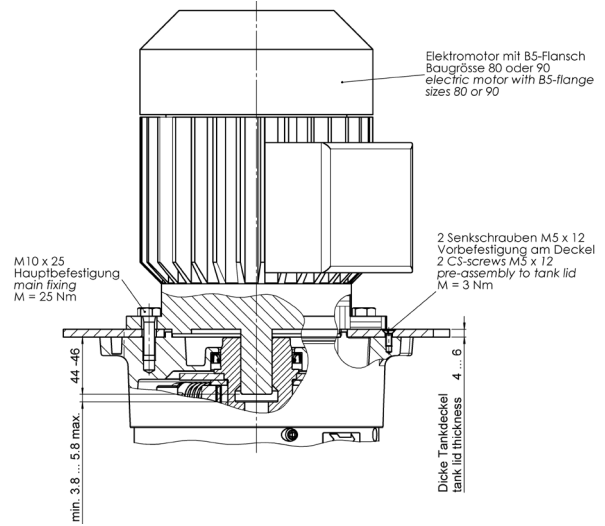
# Type SKPI

LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
 HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

## Size SKPI for electric motor IEC-size 80

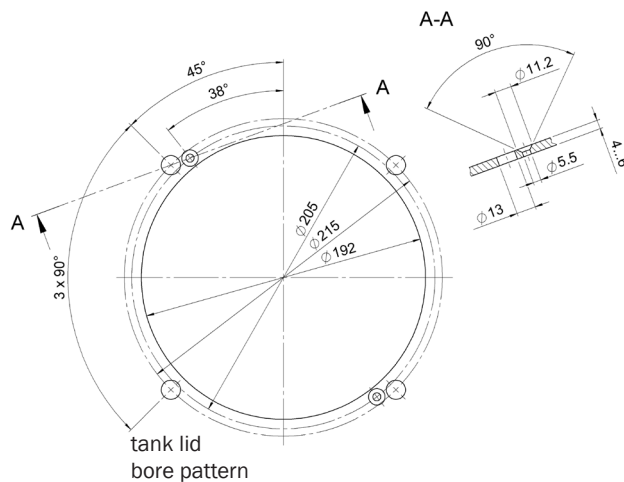
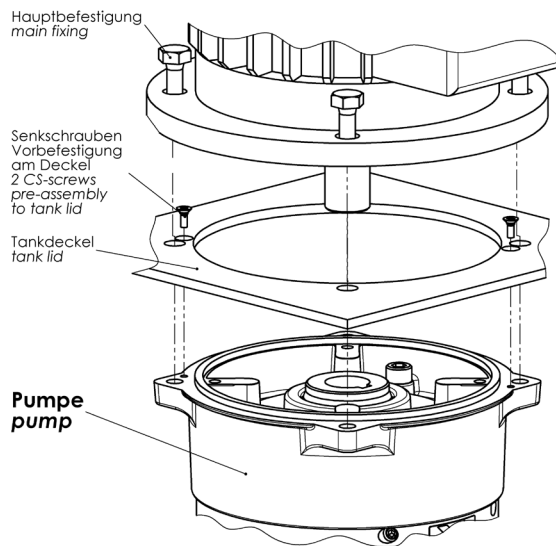
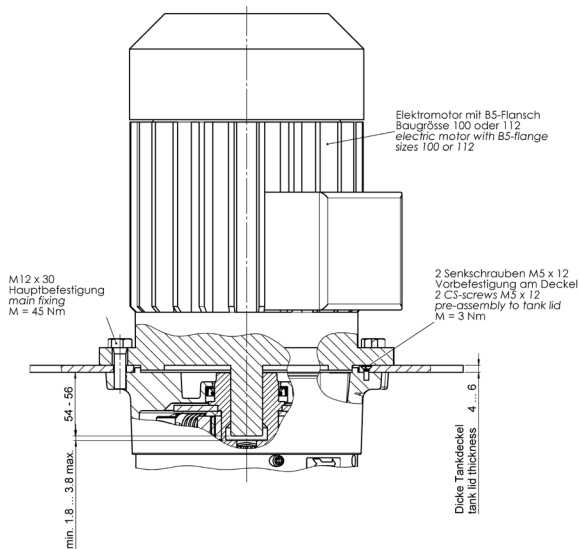


## Size SKPI for electric motor IEC-size 90



Motor and screws not included in scope of supply!

Size SKPI for electric motor IEC-size 100 or IEC-size 112

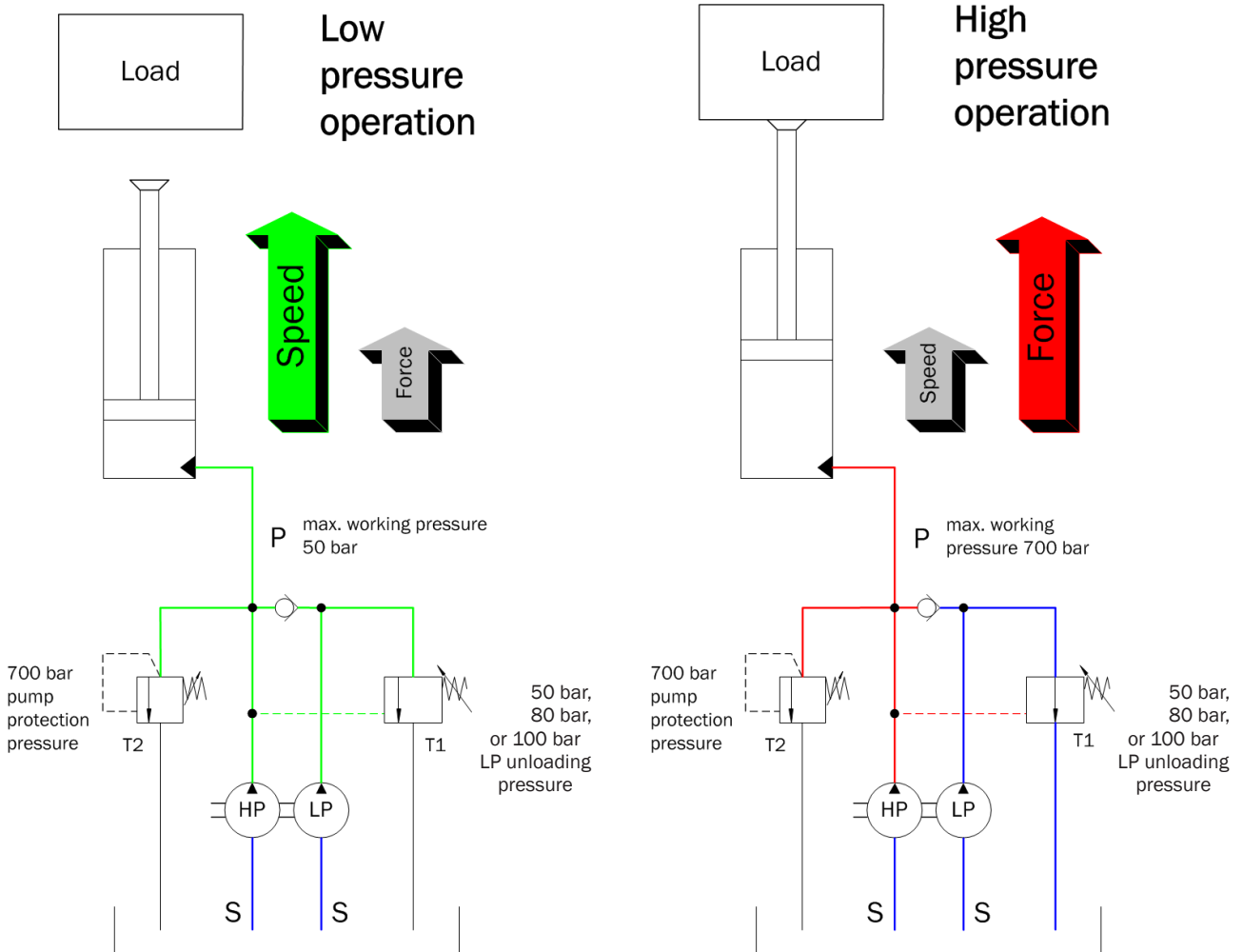


Motor and screws not included in scope of supply!

**Type SKPI**

LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

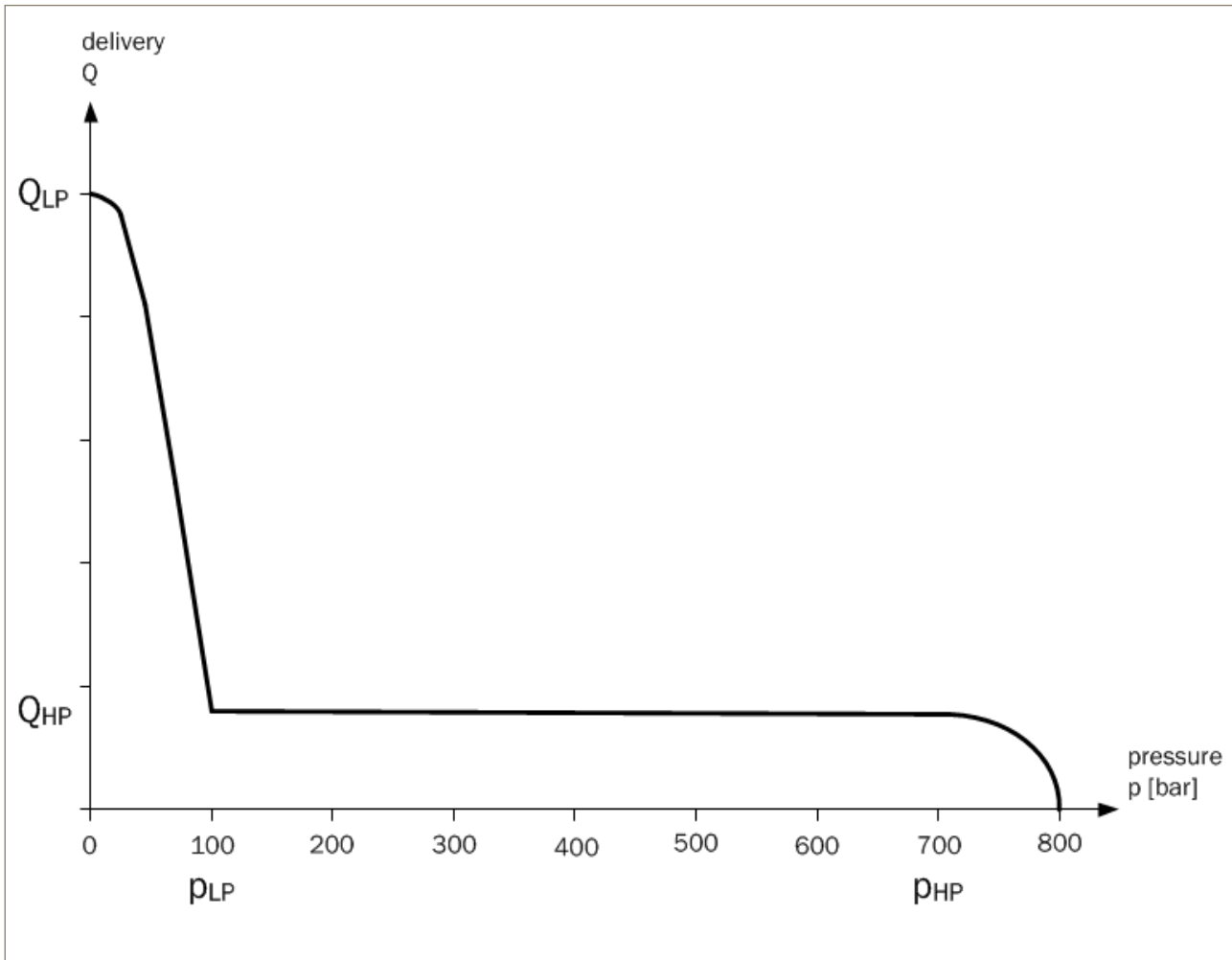
**Functional schematic with valve block**



## Type SKPI

LP: 250 bar/4,5 to 14 cm<sup>3</sup>/rev  
HP: 700 bar/0,47 to 2,71 cm<sup>3</sup>/rev

### Pressure diagram with valve block



#### Bieri Hydraulik AG

Könizstrasse 274  
CH-3097 Liebefeld  
Tel. +41 31 970 09 09 | Fax +41 31 970 09 10  
info@bierihydraulics.com | www.bierihydraulics.com

The information in this brochure relates to the operating conditions and applications described.

For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.