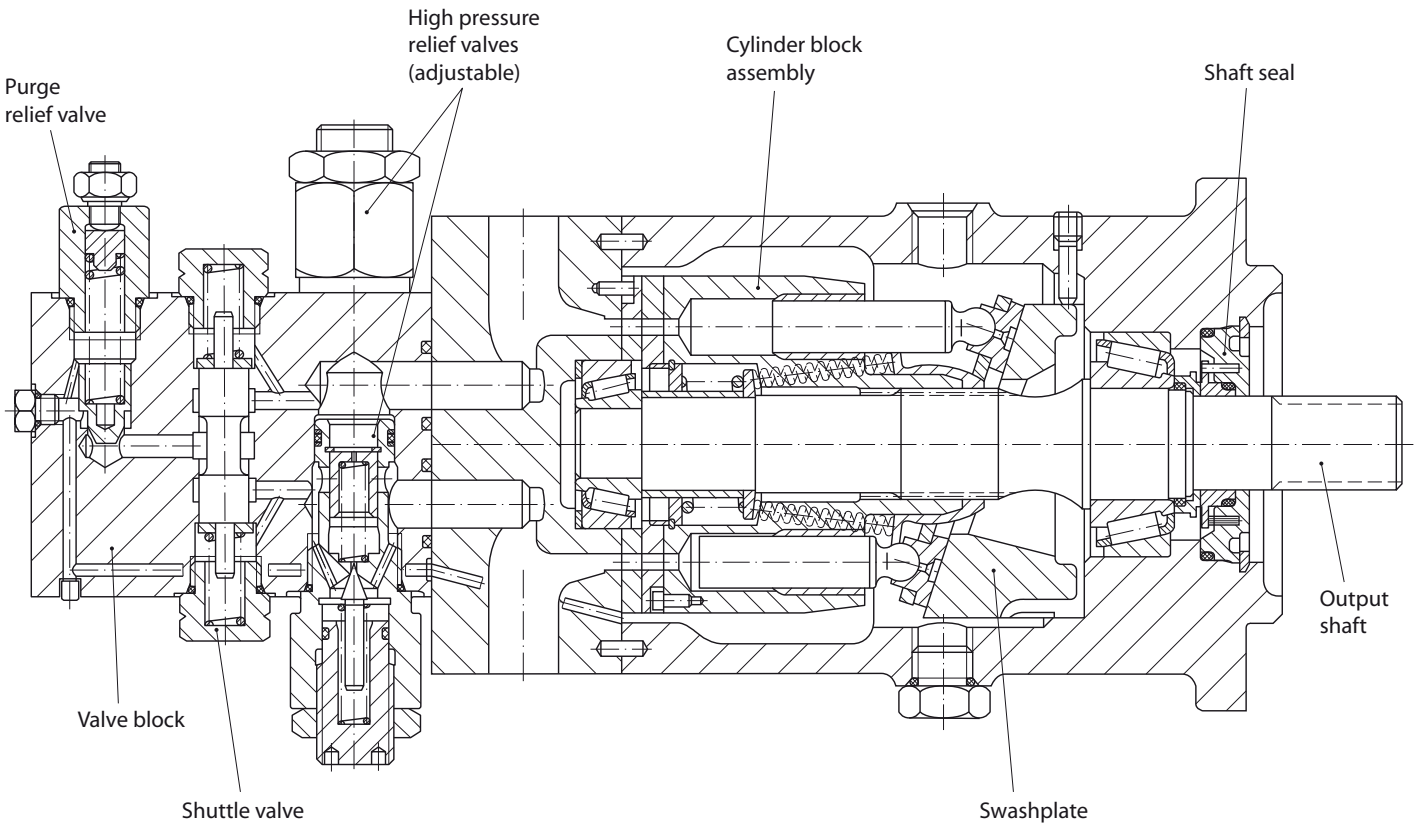




**Axial  
Piston Motors  
SHMF**

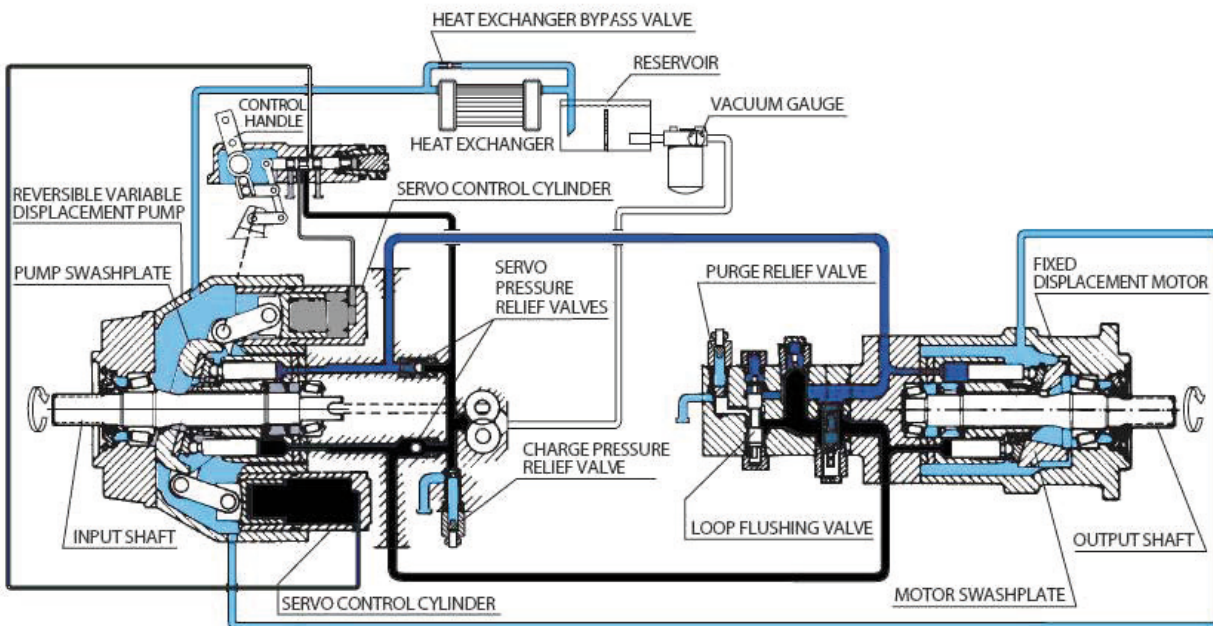
SECTIONAL VIEW



## SYSTEM CIRCUIT

### PUMP AND MOTOR CIRCUIT

- working loop (high pressure)
- working loop (low pressure)
- control fluid
- suction line
- case drain fluid



Above figure shows schematically the function of a hydrostatic transmission using an axial piston variable displacement pump and a fixed displacement motor.

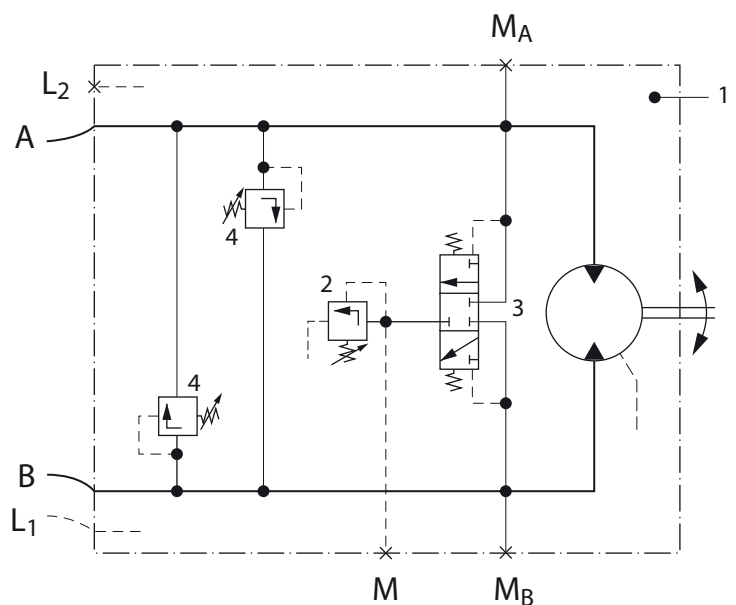
### MOTOR CIRCUIT SCHEMATIC

Designation:

- 1 = Fixed displacement motor
- 2 = Purge relief valve
- 3 = Shuttle valve
- 4 = High pressure relief valve

Ports:

- A, B = Main pressure ports (working loop)
- L<sub>1</sub>, L<sub>2</sub> = Drain ports
- M<sub>A</sub> = Gauge port for port **A**
- M<sub>B</sub> = Gauge port for port **B**
- M = Gauge port - charge pressure



**TECHNICAL SPECIFICATION**
**HYDRAULIC PARAMETERS**

		Frame size							
		20	21	22	23	24	25	26	27
Maximum displacement per revolution of the variable displacement motor	cm <sup>3</sup>	33,3	51,6	69,8	89,0	118,7	165,8	227,3	333,7
	[in <sup>3</sup> ]	[2,03]	[3,15]	[4,26]	[5,43]	[7,24]	[10,12]	[13,87]	[20,36]
Maximum flow	cm <sup>3</sup>	119,54	159,96	196,14	230,51	278,94	348,18	429,59	557,28
	min <sup>-1</sup>								
Maximum pressure	bar	420							
	[psi]	[6092]							
Maximum pressure in case	bar	2,5 continuous — 5,0 intermittent							
	[psi]	[36,3 continuous — 72,5 intermittent]							
Maximum speed	min <sup>-1</sup>	3590	3100	2810	2590	2350	2100	1890	1670
Minimum speed	min <sup>-1</sup>	500							
Nominal speed	min <sup>-1</sup>	1500							
Kinematic viscosity range of working fluid:									
	• starting	min <sup>2</sup> s <sup>-1</sup> 1000							
	• operating	min <sup>2</sup> s <sup>-1</sup> 12-600							
• optimum	min <sup>2</sup> s <sup>-1</sup> 25-35								
Kind of working fluid		mineral oil							
Operating temperature	°C	-40 to +50							
Maximum temperature of working fluid	°C	80							
Purity of working fluid	µm	10							
Direction of shaft rotation		clockwise or counterclockwise							
Maximum swash plate angle	°	± 18							
Weight	kg	30	35	40	47	70	124	152	197
	[lb]	[66]	[77]	[88]	[104]	[154]	[273]	[335]	[434]



## TECHNICAL SPECIFICATION

### DETERMINATION OF NOMINAL PUMP SIZE

Unit:	Metric system:	Inch system:
Input flow	$Q_e = \frac{V_g \cdot n}{1000 \cdot \eta_v}$ l/min	$Q_e = \frac{V_g \cdot n}{231 \cdot \eta_v}$ [gpm]
Input torque	$M_e = \frac{V_g \cdot \Delta p \cdot \eta_m}{20 \cdot \pi}$ Nm	$M_e = \frac{V_g \cdot \Delta p \cdot \eta_m}{2 \cdot \pi}$ [lbf · in]
Input power	$P_e = \frac{Q_e \cdot \Delta p \cdot \eta_t}{600}$ kW	$P_e = \frac{V_g \cdot n \cdot \Delta p \cdot \eta_t}{396\,000}$ [hp]
Speed	$n = \frac{Q_e \cdot 1000 \cdot \eta_v}{V_g}$ min <sup>-1</sup>	$n = \frac{Q_e \cdot 231 \cdot \eta_v}{V_g}$ (rpm)

Efficiency characteristic curves available on request.

$V_g$	= Motor displacement per revolution	cm <sup>3</sup>	[in <sup>3</sup> ]
$n$	= Motor speed	min <sup>-1</sup>	(rpm)
$\Delta p$	= Hydraulic pressure differential $\Delta p = p_{HD} - p_{ND}$	bar	[psi]
$\eta_v$	= Motor volumetric efficiency		
$\eta_m$	= Motor mechanical efficiency		
$\eta_t$	= Motor total efficiency		
$p_{HD}$	= High pressure	bar	[psi]
$p_{ND}$	= Low pressure	bar	[psi]

## TECHNICAL SPECIFICATION

### TECHNICAL PARAMETERS

#### Design

AAxial piston motor with fixed displacement and swash plate design.

#### Type of mounting

SAE four bolt flanges.

#### Pipe connections

Main pressure ports: SAE split flange

Remaining ports: SAE O-ring boss

#### Direction of rotation and flow

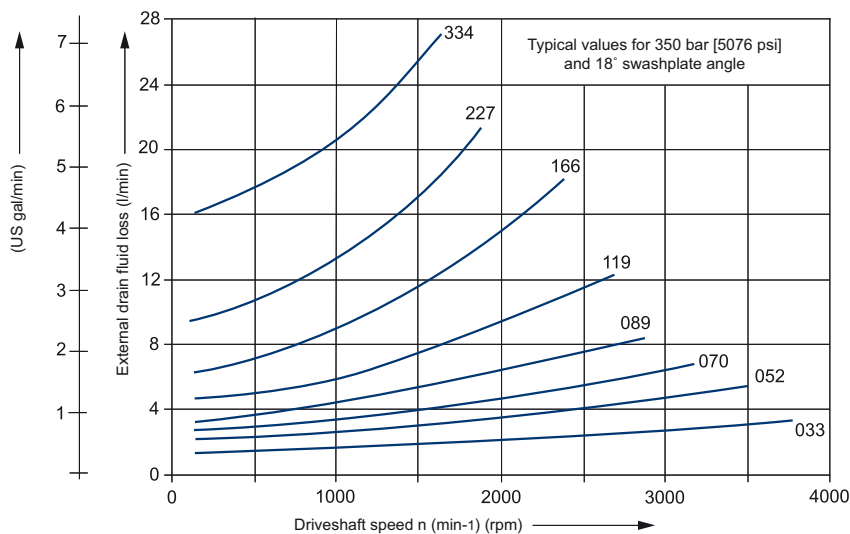
Clockwise or counterclockwise (viewing from the output shaft).

Direction of rotation	Port A	Port B
Clockwise (R)	Output	Input
Counterclockwise (L)	Input	Output

#### Installation position

Optional; motor housing must be always filled with hydraulic fluid.

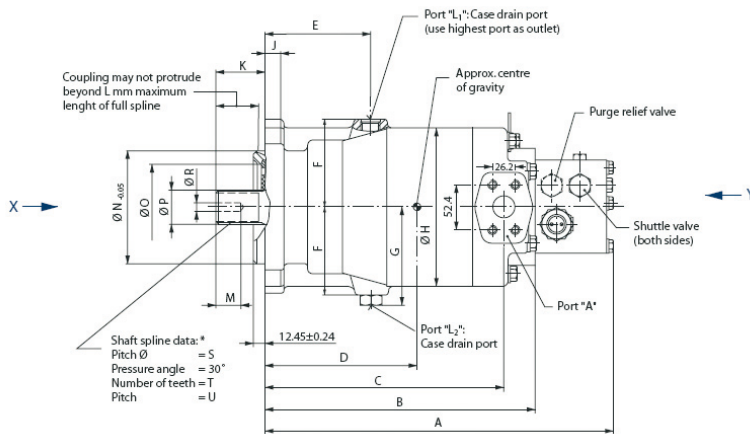
#### External drain fluid loss



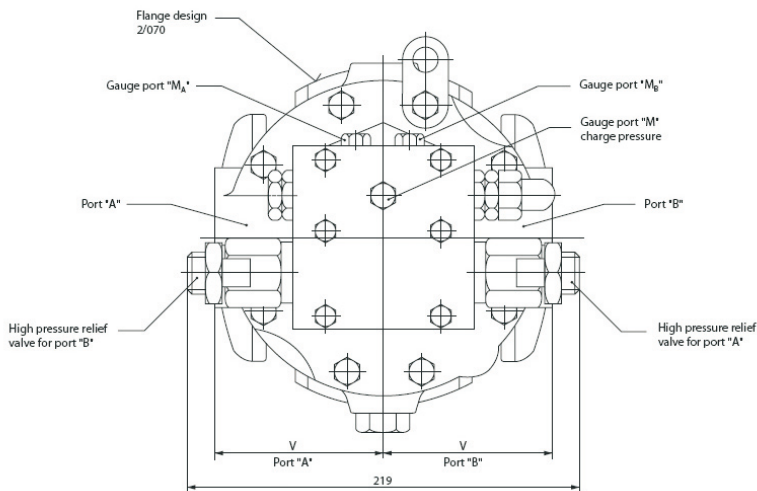
DRAWINGS

FRAME SIZE 22 AND 23

View Z



View Y



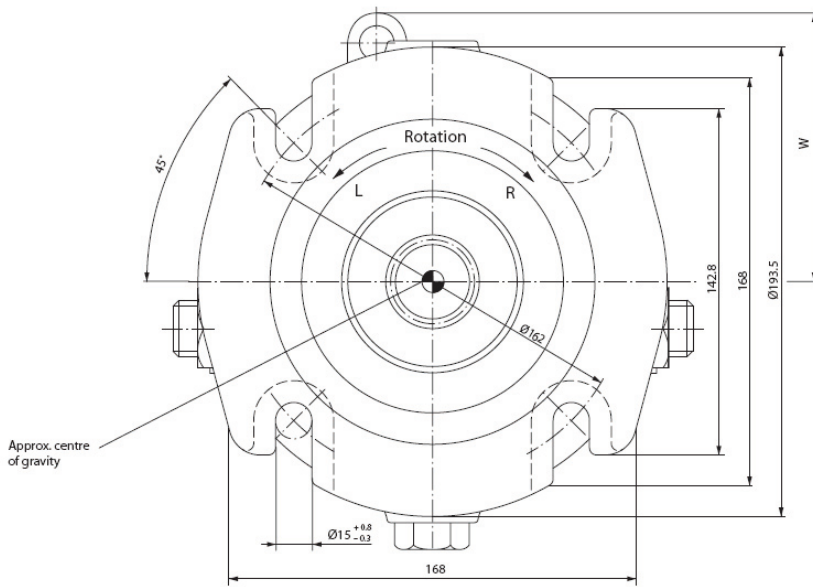
\* Shaft spline data: spline shaft with involute spline, according to SAE handbook, 1963, class 1, fillet root side fit.

Frame size	Port A and B	Port L1 and L2	Port MA and MB	Port M
22	SAE flange, size 1 SAE split flange boss 5000 psi 4 threads	7/8-14 UNF-2B SAE straight thread O-ring boss	7/16-20 UNF-2B SAE straight thread O-ring boss	
23	3/8-16 UNC-2B 18 deep			

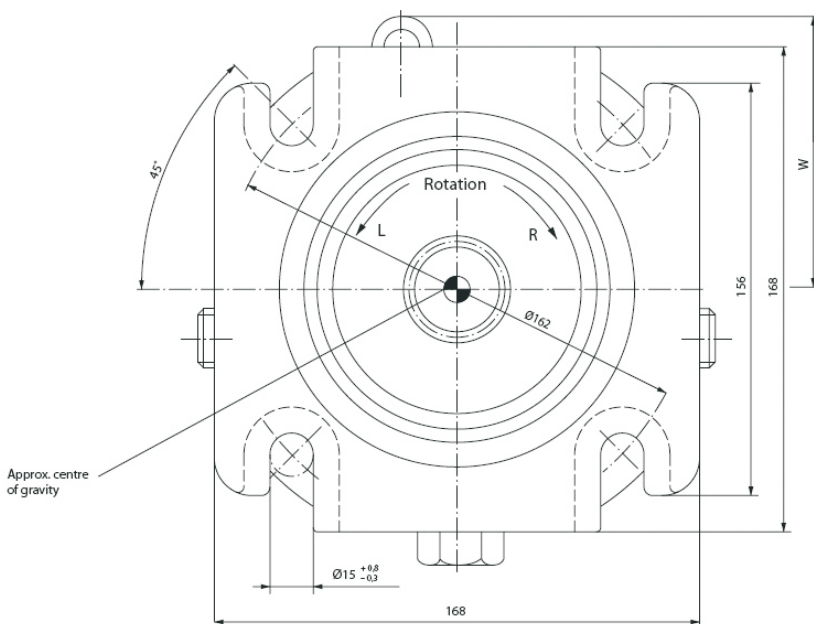
DRAWINGS

FRAME SIZE 22 AND 23

View X (frame size 22)



View X (frame size 23)





## DRAWINGS

### FRAME SIZE 22 AND 23

Dimensions:

Frame size	A mm [in]	B mm [in]	C mm [in]	D mm [in]	E mm [in]	F mm [in]	G mm [in]	ØH mm [in]	J mm [in]	K mm [in]	L mm [in]	M mm [in]
<b>22</b>	378 [14.882]	290 [11.417]	255 [10.039]	165 [6.496]	108 [4.252]	86.5 [3.406]	98 [3.858]	161 [6.339]	16 [0.630]	56 [2.205]	48 [1.890]	28.4 [1.118]

Frame size	ØN mm [in]	ØO mm [in]	ØP mm [in]	ØR mm [in]	ØS mm [in]	T mm [in]	U mm [in]	V mm [in]	W mm [in]	diameter for shaft coupling mm [in]	Weight kg [lb]
<b>22</b>	127 [5.000]	84 [3.307]	34.50 <sup>-0.17</sup> [1.358 -0.0067]	8.5 [0.335]	33.338 [1.313]	21 [0.827]	16/32	85.8 [3.378]	101 [3.976]	31.75 <sup>+0.062</sup> [1.250 +0.0024]	40 [88]
<b>23</b>	127 [5.000]	98 [3.858]	37.68 <sup>-0.17</sup> [1.483 -0.0067]	8.5 [0.335]	36.513 [1.438]	23 [0.906]	16/32	95.2 [3.748]	114 [4.488]	34.95 <sup>+0.062</sup> [1.376 +0.0024]	47 [104]

Information contained in this catalogue is accurate as of the publication date and is subject to change without notice.

Performance values are typical values. Customers are responsible for selecting products for their applications using normal engineering methods.



# SMIT

hydraulics

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**(International market)**