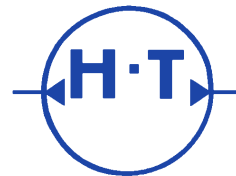


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**HYDRAULIC COMPONENTS
HYDROSTATIC TRANSMISSIONS
GEARBOXES - ACCESSORIES**

HT 16 / G / 102 / 0904 / E

Closed Loop Circuit Fixed Displacement Axial Piston Motors

MF 22 - 23 Series



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Technical Information**General Description****DESCRIPTION**

The MF 22 - MF 23 axial pistons fixed displacement motors are of swash plate design with preset displacement suitable for hydrostatic transmissions with closed loop circuit.

The output speed is proportional to the motor's input flow.

The output torque is proportional to the differential pressure applied to the main pressure ports.

The direction of motor (output) shaft rotation depends on flow input to the main pressure ports.

The MF 22 - MF 23 axial piston fixed displacement motors are well engineered and easy to handle.

The full-length shaft with a highly efficient tapered roller bearing arrangement offers a high loading capacity for external radial forces.

High case pressures can be achieved without leakage even at the lowest temperatures by using suitable shaft seals.

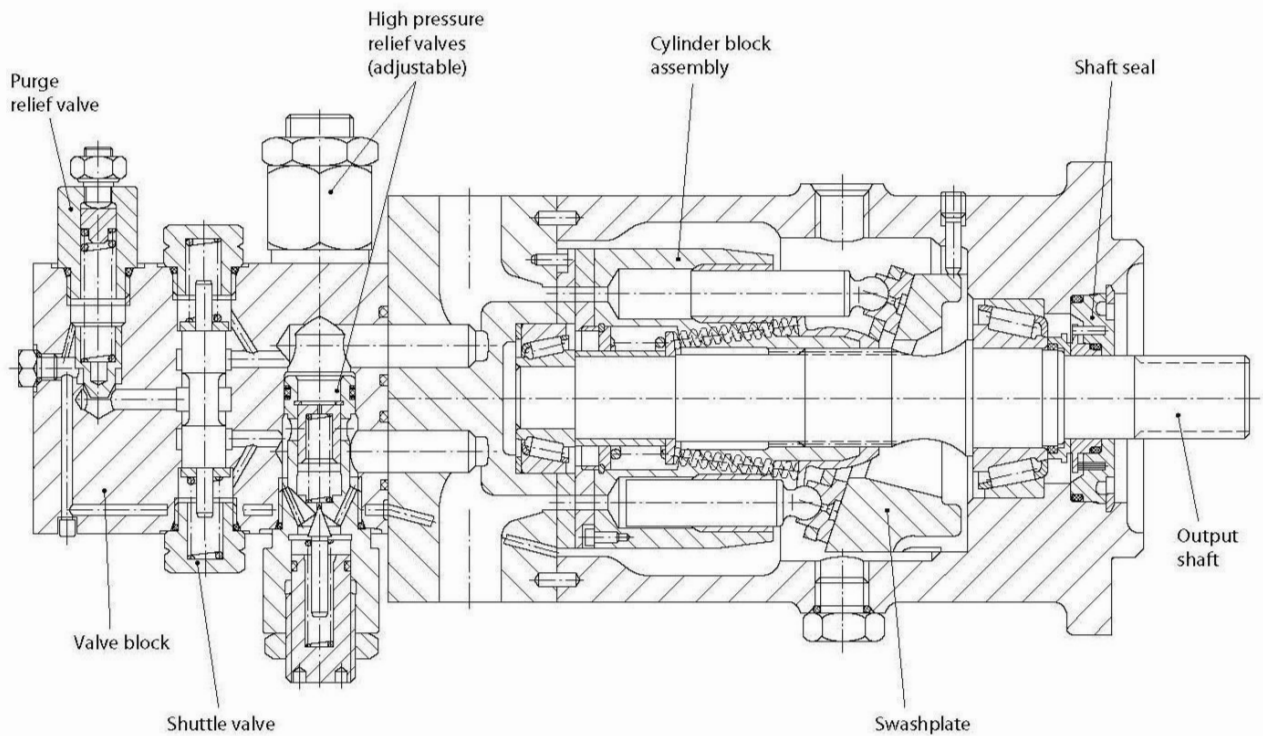
The MF 22 - MF 23 axial piston units are designed for easy servicing. Complete dismantling and reassembly can be carried out with standard hand tools, and all components or sub-assemblies are replaceable.

TYPICAL MARKETS

- Industrial
- Mining
- Transit Mixer
- Utility Vehicles

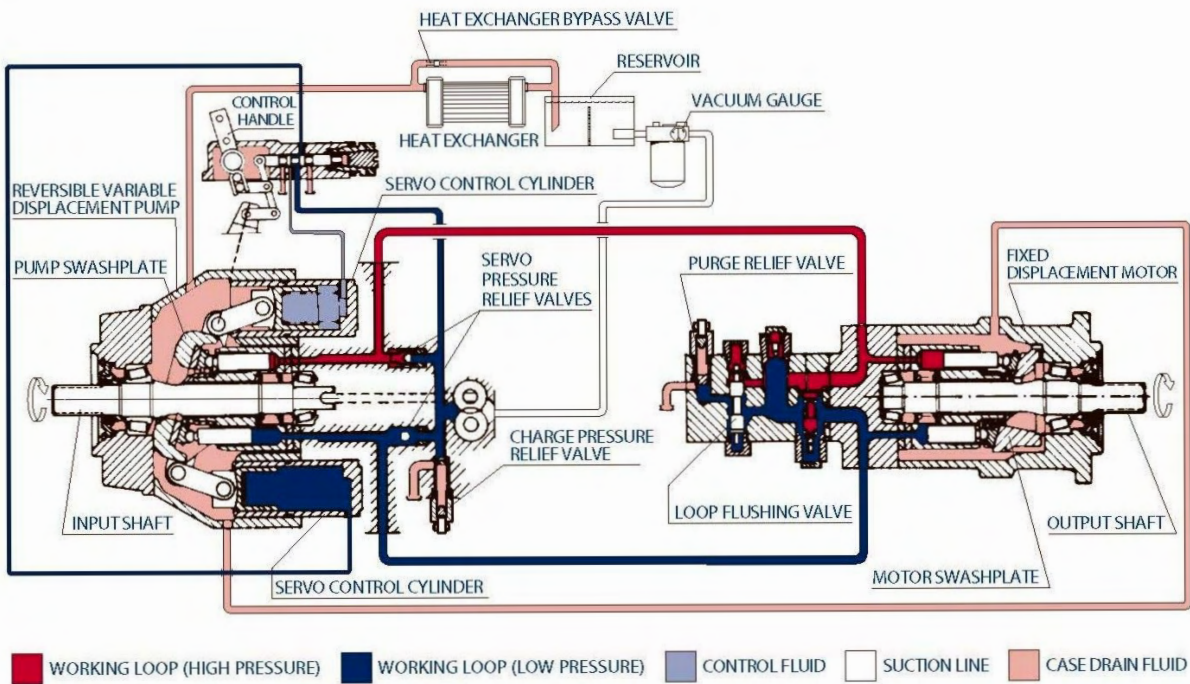
Technical Information Sectional View

AXIAL PISTON FIXED DISPLACEMENT MOTOR



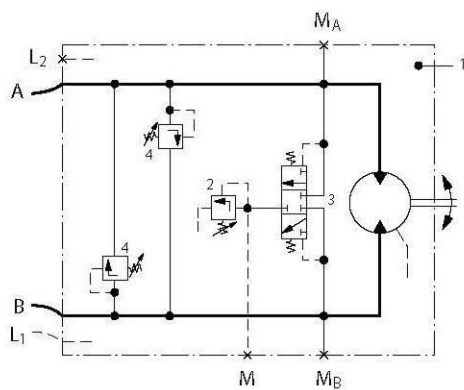
Technical Information System Circuit Description

PUMP AND MOTOR CIRCUIT DESCRIPTION



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)
- L₁, L₂ = Drain ports
- M_A = Gauge port for port **A**
- M_B = Gauge port for port **B**
- M = Gauge port - charge pressure

Technical Information Technical Specification

TECHNICAL PARAMETERS

Design

Axial piston motor with fixed displacement

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

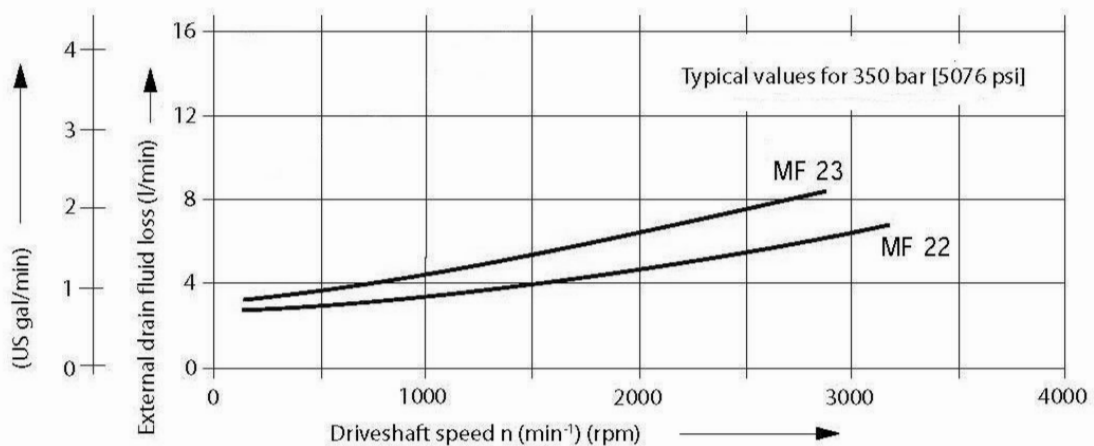
Clockwise or counterclockwise (viewing from the output shaft).

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



Technical Information Technical Specification

HYDRAULIC PARAMETERS

System pressure range, input p_1

Pressure on port A or B:

Max. operating pressure $p_1 = 350 \text{ bar [5076 psi]}$

System pressure range, output p_2

Normal setting for configuration MS and MR: 11.0 - 12.5 bar [160 - 181 psi] above case pressure.

Minimum: 8 bar, intermittent only

Case pressure

Max. rated pressure = 2.5 bar [36.3 psi]

Intermittent = 5.0 bar [72.5 psi]

Hydraulic fluid

Please use antiwear hydraulic fluid as operating fluid.

In case of using special fluid (Phosphate ester compound, water-glycol fluid, fatty acid ester compound, etc.) please consult our Technical Dpt.

Hydraulic fluid temperature range

$\vartheta_{\min} = -40 \text{ °C [-40 °F]}$

$\vartheta_{\max} = 95 \text{ °C [203 °F]}$

Viscosity range

$v_{\min} = 7 \text{ mm}^2/\text{s [49 SUS*]}$

$v_{\max} = 1000 \text{ mm}^2/\text{s [4630 SUS*]}$ (intermittent cold start)

Recommended viscosity range: 12 - 60 $\text{mm}^2/\text{s [66 - 278 SUS*]}$

*SUS (Saybolt Universal Second)

Filtration

Required cleanliness level: ISO 4406-1999 Code 22/18/13 or better.

Shaft load

The pump will accept radial and axial loads on its shaft, the maximum capacity being determined by direction and point of application of the load.

Please contact our Technical Dpt.

Technical Information Technical Specification

HYDRAULIC PARAMETERS (continued)

Technical data

		Frame size	
		MF 22	MF 23
Max. displacement	cm ³ [in ³]	69.8 [4.26]	89.0 [5.43]
Rated speed ¹	min ⁻¹ (rpm)	3000	2800
Theoretical torque	Nm/bar [in lb/1000 psi]	1.11 [677]	1.42 [867]
Mass moment of inertia of rotating group	kg m ² · 10 ⁻³ [lbf·ft ² · 10 ⁻³]	12.34 [292.8]	17.77 [421.7]

¹ for higher speeds contact our Technical Dpt.

Determination of nominal motor size

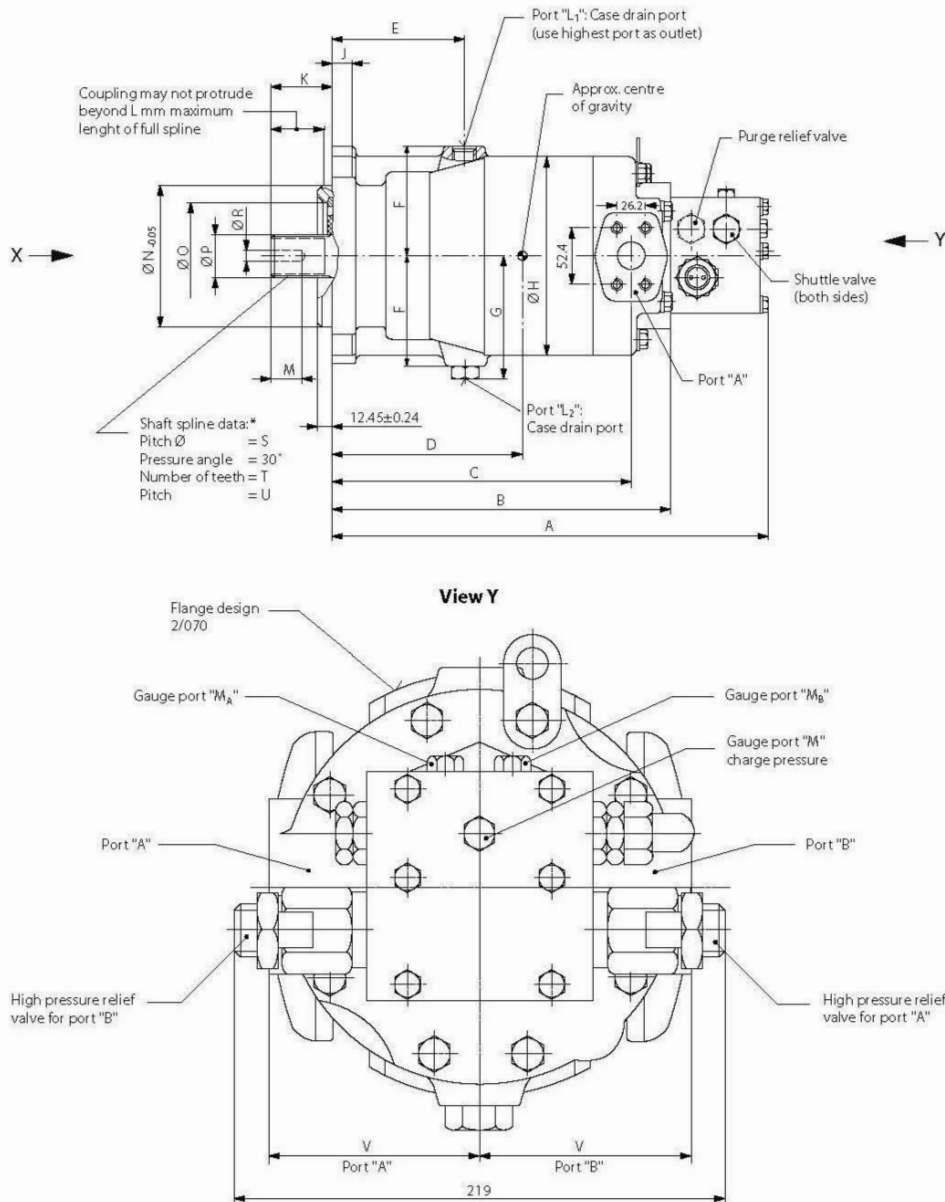
Unit:	Metric System:	Inch System
Input flow	$Q_e = \frac{V_g \cdot n}{1000 \cdot \eta_v}$ l/min	$Q_e = \frac{V_g \cdot n}{231 \cdot \eta_v}$ [gpm]
Output torque	$M_e = \frac{V_g \cdot \Delta p \cdot \eta_m}{20 \cdot \pi}$ Nm	$M_e = \frac{V_g \cdot \Delta p \cdot \eta_m}{2 \cdot \pi}$ [lbf·in]
Output 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 ⁻¹	$n = \frac{Q_e \cdot 231 \cdot \eta_v}{V_g}$ (rpm)

Efficiency characteristic curves available on request.

V_g	= Motor displacement per revolution	cm ³	[in ³]
n	= Motor speed	min ⁻¹	(rpm)
Δp	= Hydraulic pressure differential	bar	[psid]
	$\Delta p = p_{HD} - p_{ND}$		
η_v	= Motor volumetric efficiency		
η_m	= Motor mechanical efficiency		
η_t	= Motor total efficiency		
p_{HD}	= High pressure	bar	[psid]
p_{ND}	= Low pressure	bar	[psid]

Technical Information Dimensions – Frame Size MF 22 - MF 23

OUTLINE DRAWING, CONFIGURATION MS



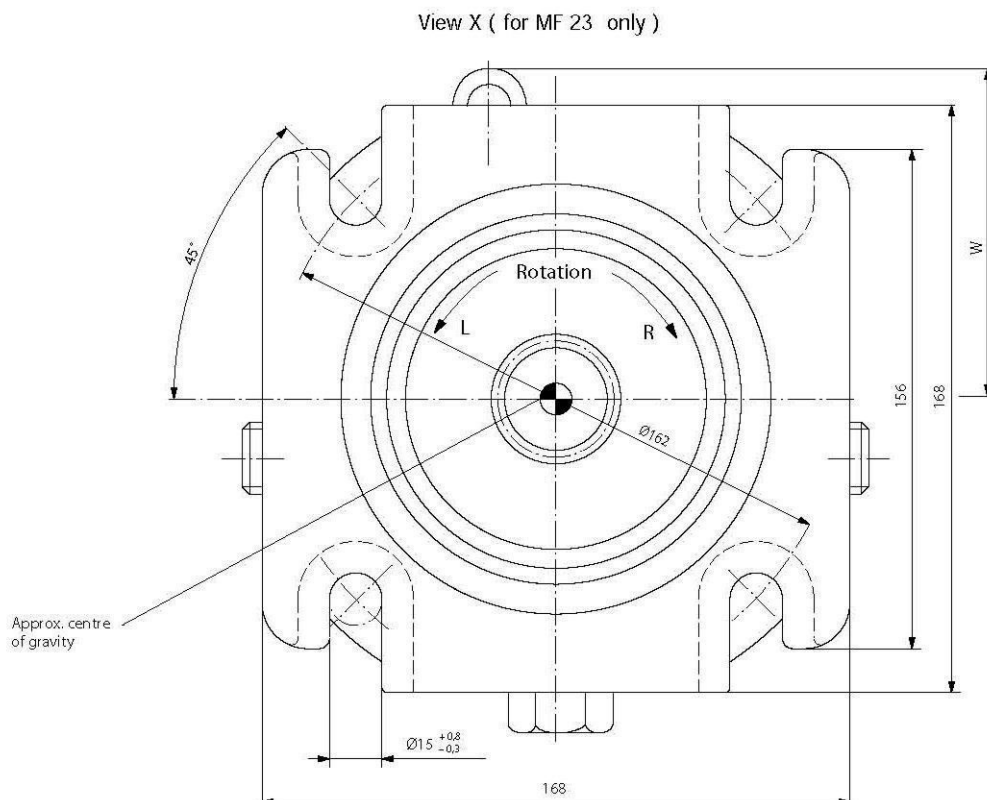
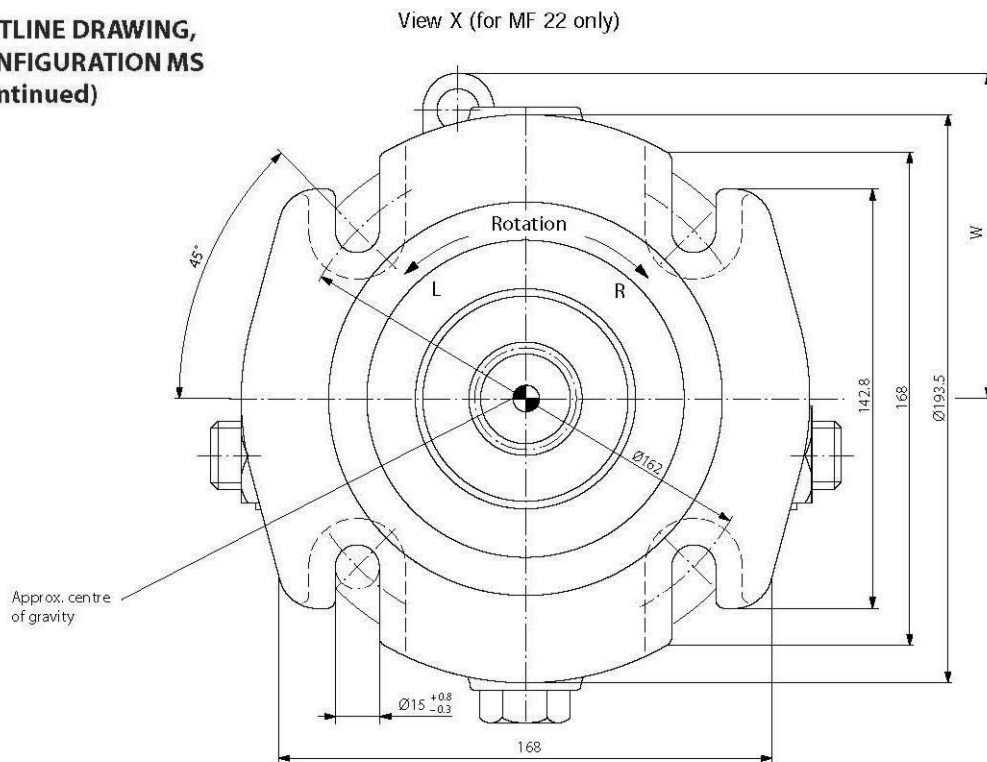
* Shaft spline data: spline shaft with involute spline, according to SAE handbook, 1963, class 1, fillet root side fit.

Frame size	Port A and B	Port L ₁ and L ₂	Port M _a and M _b	Port M
MF 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	
MF 23	3/8-16 UNC-2B 18 deep			

Technical Information

Dimensions – Frame Size MF 22 - MF 23

**OUTLINE DRAWING,
CONFIGURATION MS
(continued)**



Technical Information

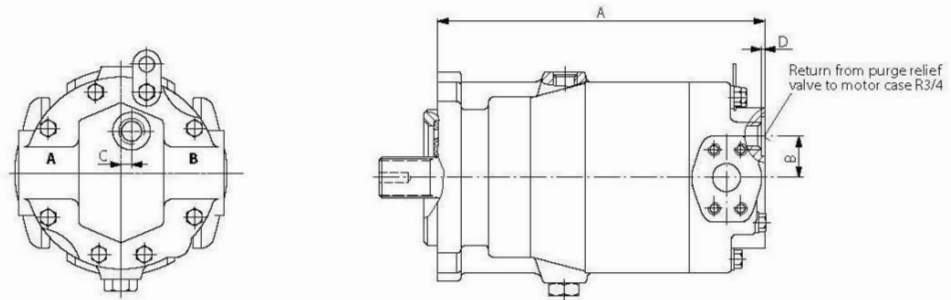
Dimensions – Frame Size MF 22 - MF 23

OUTLINE DRAWING, CONFIGURATION MS (continued)

Dimensions

Frame size	A mm [in]	B mm [in]	C mm [in]	D mm [in]	E mm [in]	F mm [in]	G mm [in]	Ø H mm [in]	J mm [in]	K mm [in]	L mm [in]	M mm [in]
MF 22	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]
MF 23	395 [15.551]	307 [12.087]	273 [10.748]	170 [6.693]	118 [4.646]	96.0 [3.780]	107 [4.213]	181 [7.126]	18 [0.709]	56 [2.205]	48 [1.890]	28.4 [1.118]
Frame size	Ø N mm [in]	Ø O mm [in]	Ø P mm [in]	Ø R mm [in]	Ø S mm [in]	T mm [in]	U mm [in]	V mm [in]	W mm [in]	Diameter for shaft coupling mm [in]	Weight kg [lb]	
MF 22	127 [5.000]	84 [3.307]	34.50 ^{-0.17} [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 ^{+0.062} [1.250 ^{+0.0024}]	40 [88]	
MF 23	127 [5.000]	98 [3.858]	37.68 ^{-0.17} [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 ^{+0.062} [1.376 ^{+0.0024}]	47 [104]	

OUTLINE DRAWING, BASIC MODEL

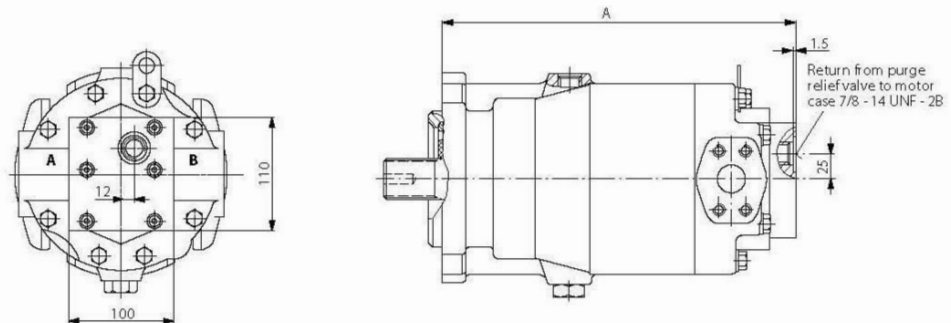


Dimensions

Frame size	A mm [in]	B mm [in]	C mm [in]	D mm [in]	Weight kg [lb]
MF 22	290 [11.417]	30 [1.181]	12 [0.472]	2 [0.079]	34 [75]
MF 23	307 [12.087]	44 [1.732]	6 [0.236]		41 [90]

For further dimensions see previous pages.

OUTLINE DRAWING, MOTOR CONFIGURATION AM 01000



Dimensions

Frame size	A mm [in]	Weight ¹ kg [lb]
MF 22	315 [12.402]	36 [79]
MF 23	332 [13.071]	43 [95]

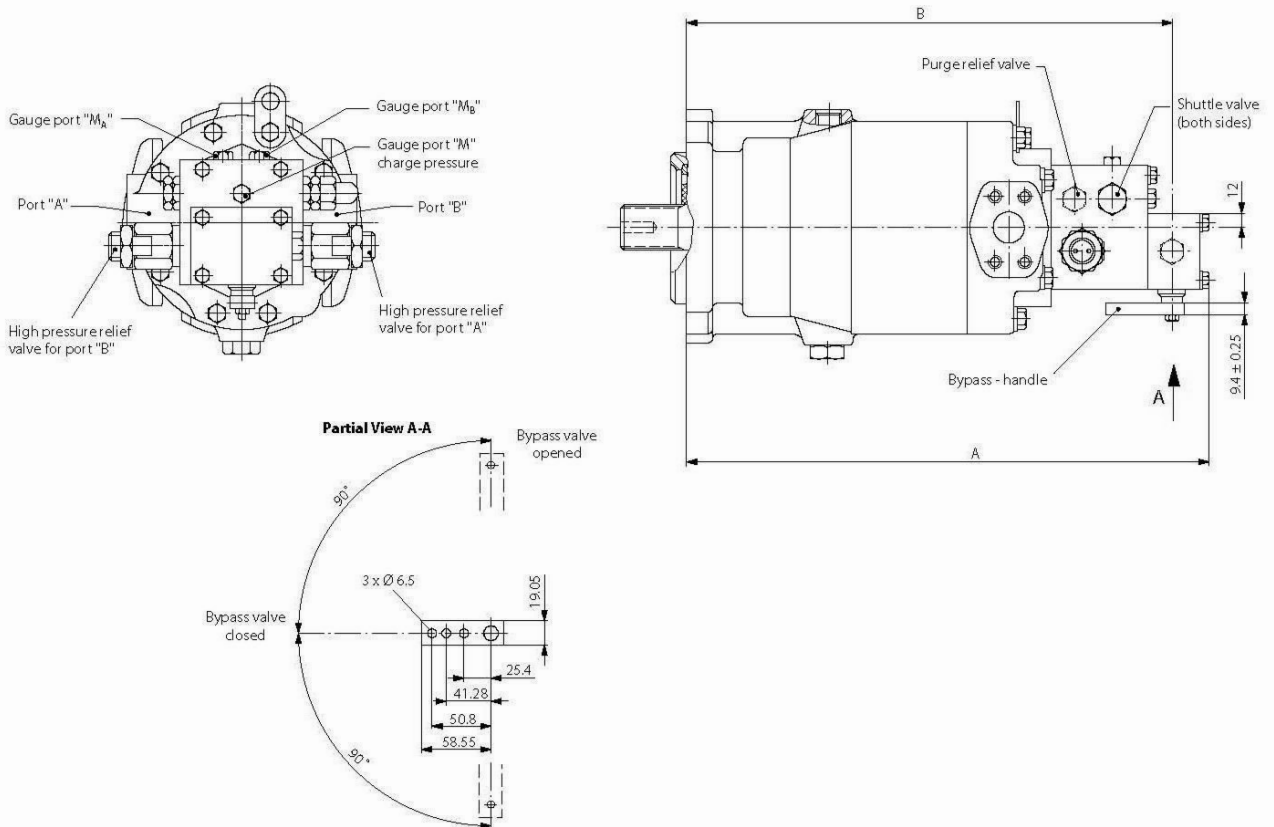
¹ Light weight and short options available on request

For further dimensions see previous pages.

Technical Information

Dimensions – Frame Size MF 22 - MF 23

OUTLINE DRAWING, MOTOR CONFIGURATION MR



Dimensions

Frame size	A mm [in]	B mm [in]	Weight kg [lb]	Port M _A and M _B	Port M
MF 22	426 [16.772]	391 [15.394]	42 [93]	7/16-20 UNF-2B SAE straight thread O-ring boss	
MF 23	443 [17.441]	408 [16.063]	49 [108]		

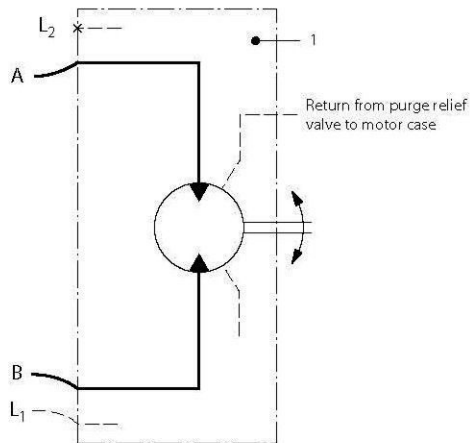
For further dimensions see previous pages.

Technical Information

Dimensions – Frame Size MF 22 - MF 23

CIRCUIT DIAGRAMS

Basic model and motor configuration AM 01000



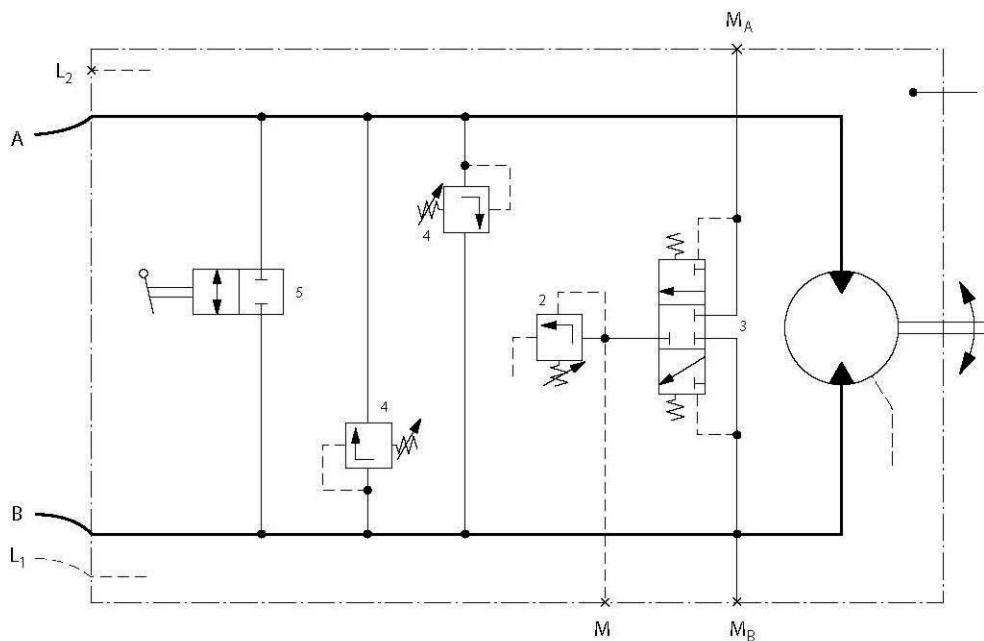
Designation:

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

Ports:

- A,B = Main pressure ports (working loop)
- L₁, L₂ = Drain ports
- M_A = Gauge port for port A
- M_B = Gauge port for port B
- M = Gauge port - charge pressure

Configuration MR



As HANSA-TMP has a very extensive range of products and some products have a variety of applications, the information supplied may often only apply to specific situations.

If the catalogue does not supply all the information required, please contact HANSA-TMP. In order to provide a comprehensive reply to queries we may require specific data regarding the proposed application.

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