

**MANNESMANN
REXROTH****Dual displacement motor A10VEC**Compact version for track- and wheel drive in open circuit
Series 52, Axial piston, Swash plate design**RE
91710/03.97**

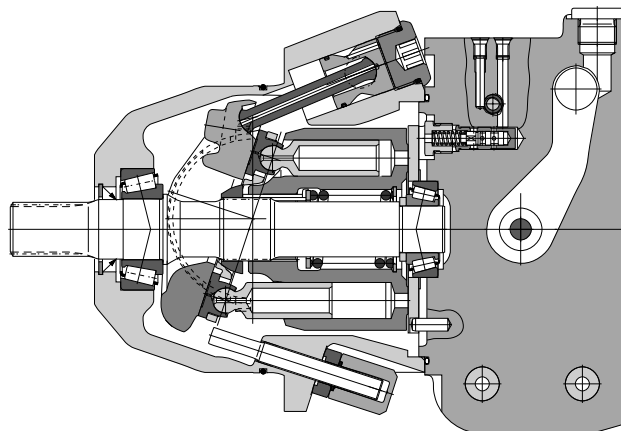
Brueninghaus Hydromatik

Size 45

Nominal pressure 280 bar Peak pressure 350 bar

Fixed displacement motor A10FM and
fixed displacement plug-in motor A10FE
see RE 91172Dual displacement motor A10VM and
plug-in motor A10VE
see RE 91703

- Proven A10-rotary group
- Heavy duty bearings for long service life
- High permissible output speed
- High power/weight ratio-compact size
- Low noise
- Hydraulic connections to SAE-standards
- Control range 1: 3,75
- External direct control supply possible
- Minimum displacement externally adjustable
- Special 2-bolt flange
- Space saving through integrated valves



Dual displacement motor A10VEC, Series 52

Ordering code

A10V	EC	45		/	52	W		-		R	F		
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Fluid

Mineral oil (no code)

Axial piston unit

Swash plate design, variable

Nom. press. 280 bar, Peak press. 350 bar **A10V****Operating**Plug-in motor, variable, compact design **EC****Size**
 $\hat{=}$ Displacement $V_{g \max}$ (cm³) **45**
Control devices

Hydraulic two-point control	HZ	HZ
Direct control pressure without pilot valve	DG	DG

Series**52****Direction of rotation**Viewed on shaft end bi-directional **W****Minimum displacement**
 stepless adjustable $V_{g \min} = 12 \text{ cm}^3$ to $V_{g \max}$
 Example 12 cm³ - please state when ordering **12**
Seals

NBR (Nitrile caoutchouk DIN ISO 1629) with shaft sealing FPM	P
FPM (Fluor caoutchouk DIN ISO 1629)	V

Shaft endSAE-splined **R****Mounting flange**Special 2-bolt mounting flange **F****Service line connections**

Ports A/B SAE-flange at side (same side), UNC-threaded bolt holes; various valves integrated, see page 7	○	71
Ports A/B SAE-flange at side (same side), metric-threaded bolt holes; various valves integrated, see page 7	●	21
Ports A/B at side (same side), SAE-O-Ring threaded ports UNF; various valves integrated, see page 7	●	81

Pressure range of pressure relief valves

280 bar	1
320 bar	2
350 bar	3

○ = in preparation

● = Available

Technical data

Fluid

For extensive information on the selection of fluids and for application conditions, please consult our data sheets RE 90220 (mineral oils) or RE 90221 (environmentally acceptable hydraulic fluids).

You might have to consider reduced operating data with environmentally acceptable hydraulic fluids. Please contact our technical department.

Operating viscosity range

In order to obtain optimum efficiency and service life, we recommend that the operating viscosity (at operating temperature) be selected from within the range:

$$v_{opt} = \text{Operating Viscosity } 16 \dots 36 \text{ mm}^2/\text{s}$$

referred to the tank temperature (open circuit).

Viscosity limits

The limiting values for viscosity are as follows:

$v_{min} = 10 \text{ mm}^2/\text{s}$
short term at a maximum permissible drain temperature of 90° C.

$v_{max} = 1000 \text{ mm}^2/\text{s}$
short term on cold start

Temperature range (see selection diagram)

$t_{min} = -25^\circ \text{ C}$
 $t_{max} = 90^\circ \text{ C}$

Notes on the selection of the hydraulic fluid

In order to select the correct fluid, it is necessary to know the tank temperature (open circuit) in relation to the ambient temperature. The hydraulic fluid should be selected so that within the operating temperature range, the operating viscosity lies within the optimum range (v_{opt}) (see shaded section of the selection diagram). We recommend that the highest possible viscosity range should be chosen in each case.

Example: At an ambient temperature of X°C, the operating temperature is 60°C. Within the operating viscosity range (v_{opt} ; shaded area), this corresponds to viscosity ranges VG 46 or VG 68. VG 68 should be selected.

Important: The leakage oil (case drain oil) temperature is influenced by pressure and pump speed and is always higher than the tank temperature. However, at no point in the system may the temperature exceed 90°C.

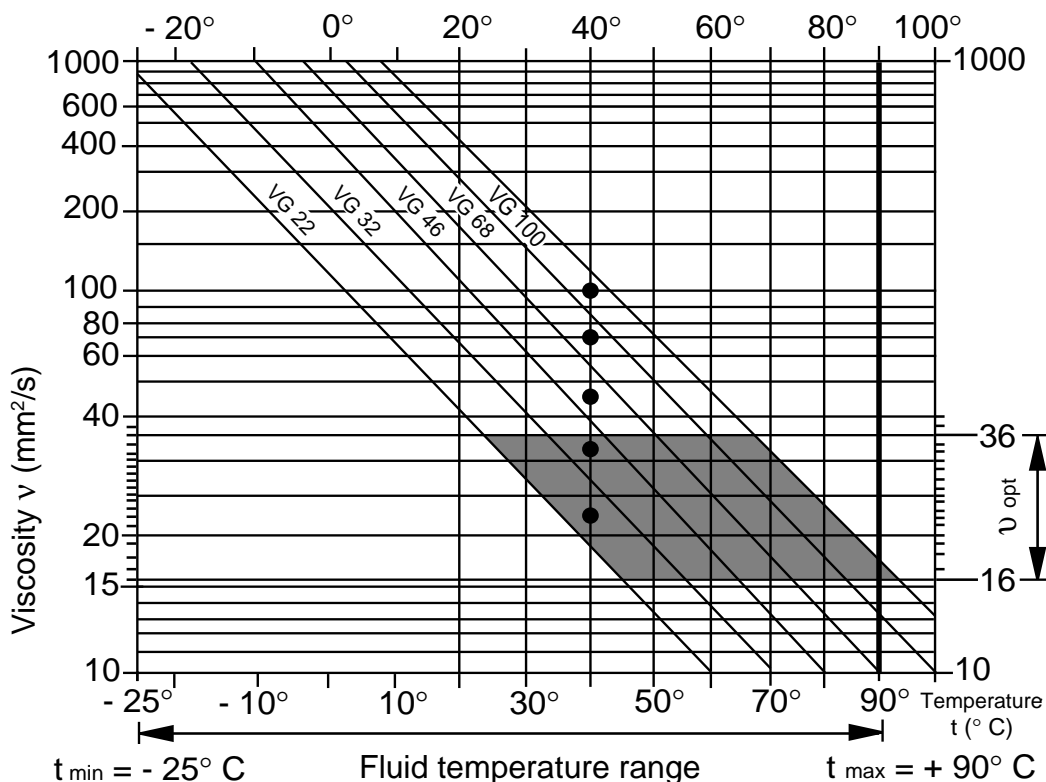
If it is not possible to comply with the above conditions because of extreme operating parameters or high ambient temperatures, please consult us.

Filtration of fluid

In order to ensure correct functioning of the unit, a minimum level of cleanliness to NAS 1638 class 9, to SAE; ASTM, AIA class 6 or to ISO/DIS 4406 class 18/15 is required.

If it is not possible to comply with the above conditions, please consult us.

Selection diagram



Dual displacement motor A10VEC, Series 52

Technical Data

Operating pressure range

Pressure at ports A or B

Nominal pressure p_N _____ 280 bar

Peak pressure p_{max} _____ 350 bar

(Pressure data to DIN 24312)

Causes drain pressure

Max. permissible pressure at ports L, L₁

$p_{abs\ max}$ _____ 2 bar

Direction of rotation

Flow B to A = Clockwise

Flow A to B = Counter-clockwise

Displacement

The minimum displacement is factory set in accordance with the ordering code.

Mounting position

Is optional. The motorhousing must be filled with oil during commissioning operation. Install drain line in such a manner that housing cannot empty during stand still, i.e. make sure drain line ends below min. fluid level. The port, located at the highest point should be used for filling the housing and for connecting the drain line.

A10VE

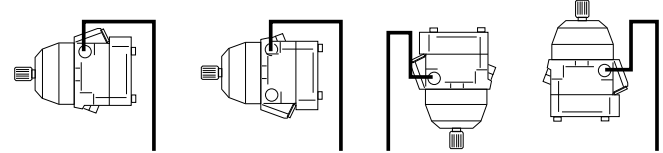
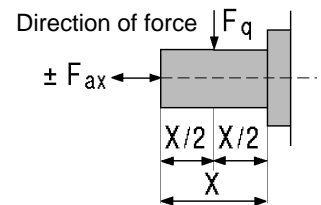
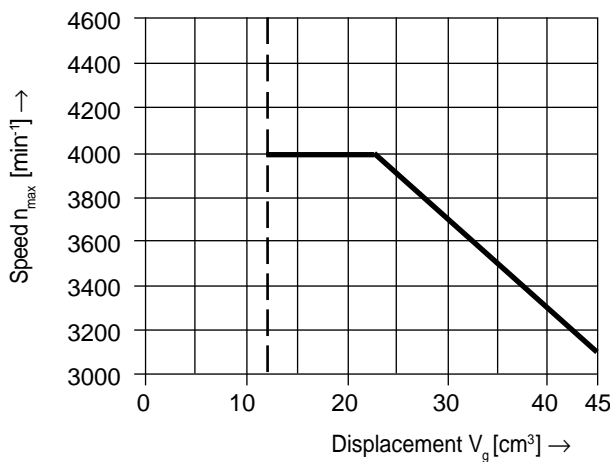


Table of values (theoretical values, without considering η_{mh} and η_v ; values rounded)

Size		45		
Displacement		$V_{g\ max}$	cm ³	45
		$V_{g\ min}$	cm ³	12
Speed ¹⁾ (see diagram)	at $V_{g\ max}$	n_{max}	min ⁻¹	3100
	at $V_{g\ min}$	n_{max1}	min ⁻¹	4000
Max. inlet flow	at n_{max} und $V_{g\ max}$	q_{Vmax}	L/min	140
Max. output power ($\Delta p = 280$ bar)	at n_{max} und $V_{g\ max}$	P_{max}	kW	65
Max. torque ($\Delta p = 280$ bar)	at $V_{g\ max}$	T_{max}	Nm	200
Moment of inertia about drive axis		J	kgm ²	0,0033
Filling volume			L	0,7
Weight		m	kg	17
Permissible loading on drive shaft	max. perm. axial load	$F_{ax\ max}$	N	1500
	max. perm. radial load	$F_{q\ max}$	N	1500
Actual starting torque ($\Delta p = 280$ bar)	at $n = 0$ min ⁻¹		Nm (approx.)	138

1) determination of n_{max}



Sizing calculation

Inlet flow	$q_v = \frac{V_g \cdot n}{1000 \cdot \eta_v}$	[L/min]	V_g = displacement [cm ³] per revolution
Output torque	$T = \frac{1,59 \cdot V_g \cdot \Delta p \cdot \eta_{mh}}{100}$	[Nm]	Δp = pressure differential [bar]
Output power	$P = \frac{T \cdot n}{9549} = \frac{q_v \cdot \Delta p \cdot \eta_t}{600}$	[kW]	n = speed [min ⁻¹]
			η_v = volumetric efficiency
			η_{mh} = mechanical-hydraulic efficiency
			η_t = overall efficiency ($\eta_t = \eta_v \cdot \eta_{mh}$)

Dual displacement motor A10VEC, Series 52

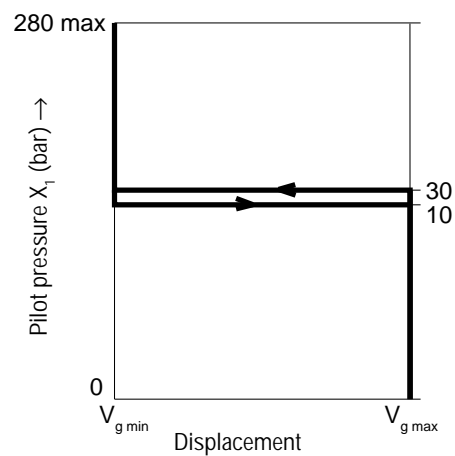
Hydraulic two-point control, HZ

Normally, the motor is at max. displacement. By applying a pilot pressure to port X, the destroking piston is pressurized and the motor switches to minimum displacement.

The necessary control pressure is via a shuttle valve, taken out of the port A or B.

The minimum required control pressure is ≥ 20 bar.

Only max. and min. displacements are possible.

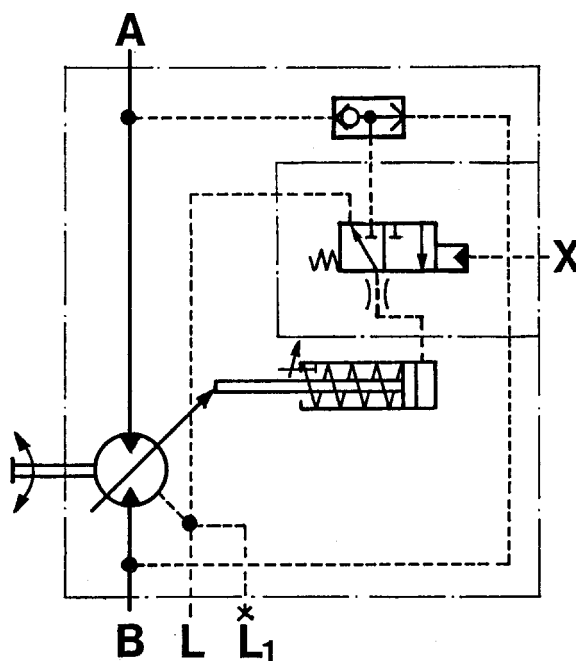


Pilot pressure in X = 0 bar = $V_{g \max}$
 Pilot pressure in X ≥ 30 bar = $V_{g \min}$

Technical data HZ

minimum pilot pressure	30 bar
maximum perm. pilot pressure	280 bar

Circuit diagram



Direct control pressure, DG

Normally, the motor is at max. displacement. By applying an external pressure to port G, the destroking piston is directly pressurized and the motor switches to minimum displacement.

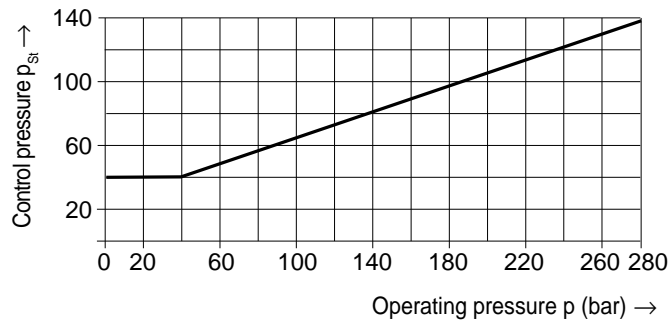
The minimum required control pressure is ≥ 40 bar.

This control pressure depends directly on the working pressure in A or B.

See control pressure diagram below.

With a control pressure above this minimum required pressure level the motor will destroke properly.

Control pressure diagram

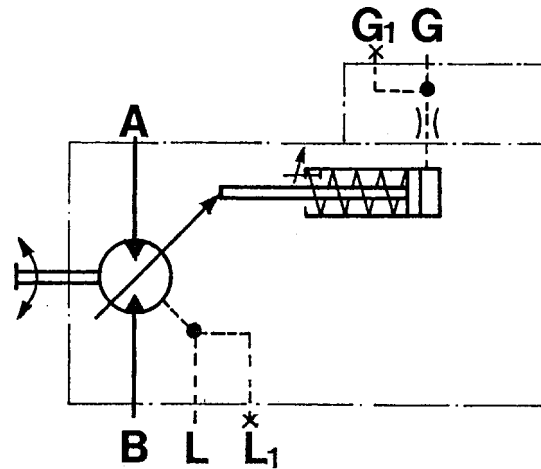


Control pressure = 0 bar = bei $V_{g \max}$

Control pressure > 40 bar = $V_{g \min}$

Max. perm control pressure amounts to $p_{st} = 280$ bar.

Circuit diagram



With integrated valves for motion control, crossover pressure relief - and brake release functions

Brake release function (Item 1)

The motor has a connection Bri. This connection enables the release of a gearbox - mounted parking brake. An integrated switching valve leads system pressure from "A" or "B" to a pressure reducing valve, which limits max. brake release pressure to 30 bar.

Motion control valve (Item 2)

When going downhill, the motion control valve prevents the motor from overspeeding and thus from a run-away condition. This can happen if motor operation turns into a pump, due to external forces.

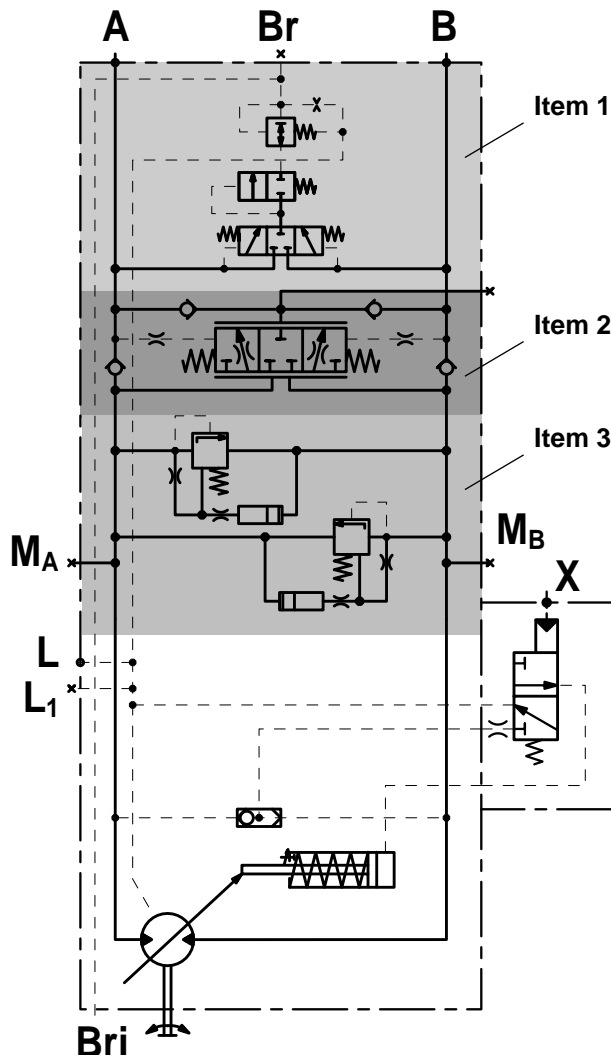
The valve spool opens only at a certain pre determined pressure in the inlet spool side of the motor and enables thus unit to start moving. If pressure on the motor inlet side should drop due to speed increases or inlet flow, the spool shifts gradually to centre position causing a braking face of mounting flange action. In centre position high pressure ports A and B are nearly closed leaving only a small residual passage. This motion control function operates in both directions of rotation.

Pressure relief valve (Item 3)

These valves limit the max. pressure, and prevent damage to the motor. Both directions of rotation each have a relief valve. Each valve opens to the opposite side of the motor (cross over valves). Dampening the valve action causes a soft operation, and avoids jerky machine movements.

Please denote the correct vave pressure setting in the ordering code, page 2.

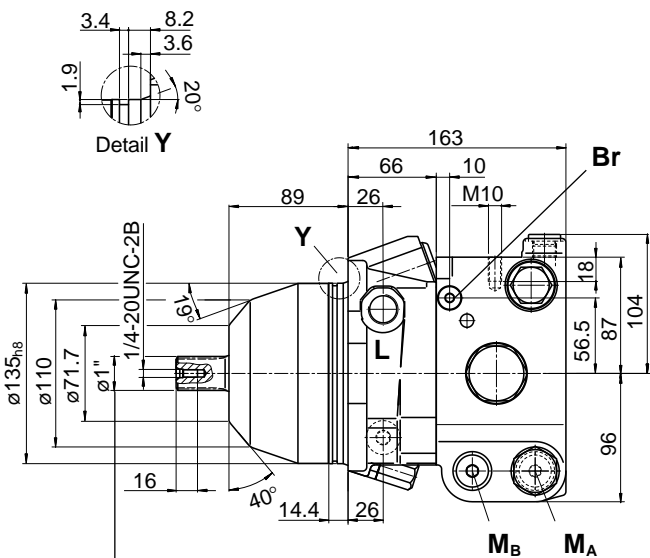
Circuit diagram A10VEC with HZ-adjustment



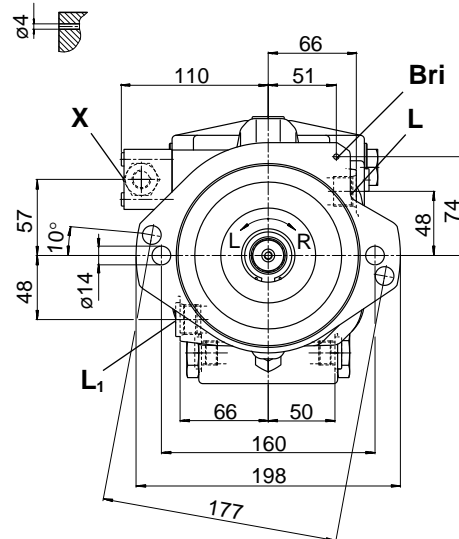
Unit dimensions

A10VEC 45 HZ /52 W XX-PRF 21 X

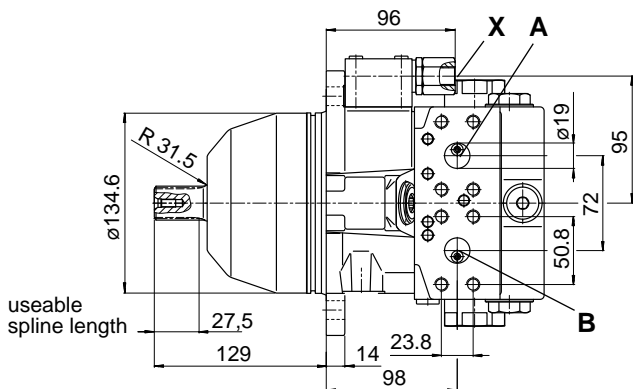
with port plate 21



Section (Bri)



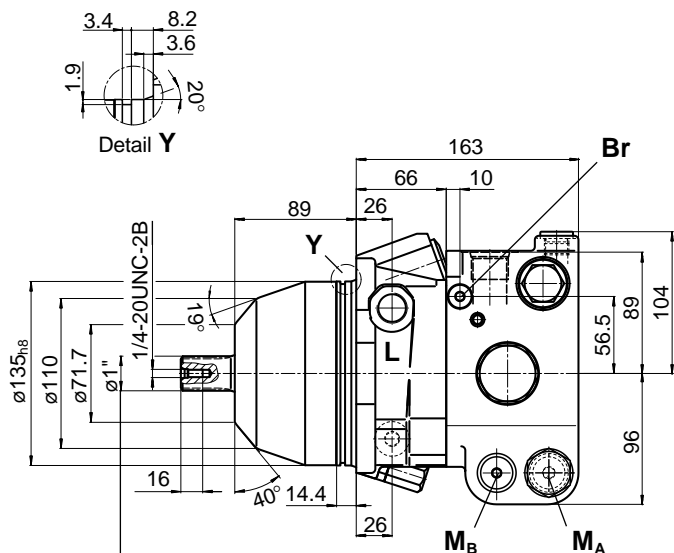
Shaft 25-4; SAE J744 OCT 83
1" dia splined shaft; 30° pressure angle;
15 teeth; 16/32 Pitch; flat base;
flank centering; Fit class 5; ANSI B92. 1a-1976



Connections

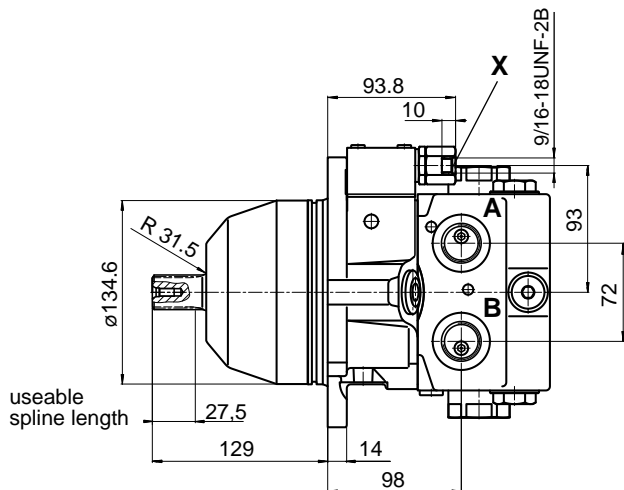
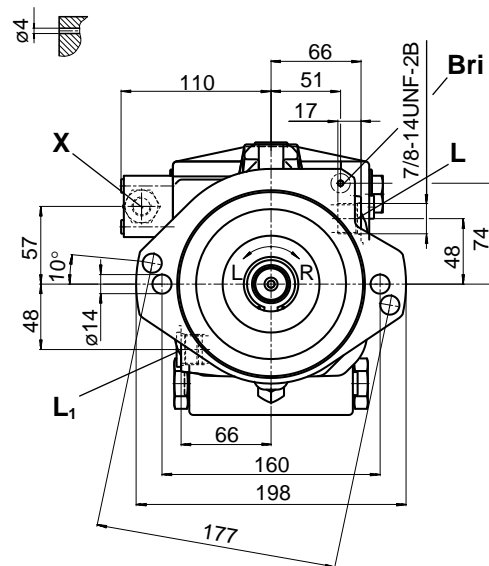
- | | | |
|---------------------------------|-------------------------------------|---------------------------------|
| A,B | Pressure port | SAE 3/4", (high pressure range) |
| L, L ₁ | Case drain port | M18 x 1,5 |
| M _A , M _B | Measuring port | M18 x 1,5 (plugged) |
| Bri | Brake release connection (internal) | ∅4 |
| Br | Brake release port (external) | M12 x 1,5 (plugged) |
| X | Pilot pressure port | M14 x 1,5 |

Unit dimensions
A10VEC 45 HZ /52 W XX-PRF 81 X
with port plate 81



Shaft 25-4; SAE J744 OCT 83
1" dia splined shaft; 30° pressure angle;
15 teeth; 16/32 Pitch; flat base;
flank centering; Fit class 5; ANSI B92. 1a-1976

Section (Bri)



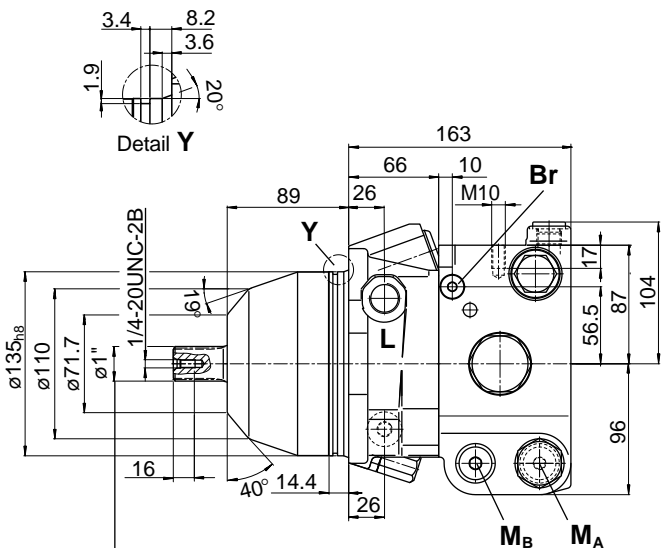
Connections

A,B	Pressure port	1 1/16-12 UN-2B
L, L ₁	Case drain port	7/8-14 UNF-2B
M _A , M _B	Measuring port	M18 x 1,5 (plugged)
Bri	Brake release connection (internal)	ø4
Br	Brake release port (external)	M12 x 1,5 (plugged)
X	Pilot pressure port	9/16-18 UNF-2B

Unit dimensions

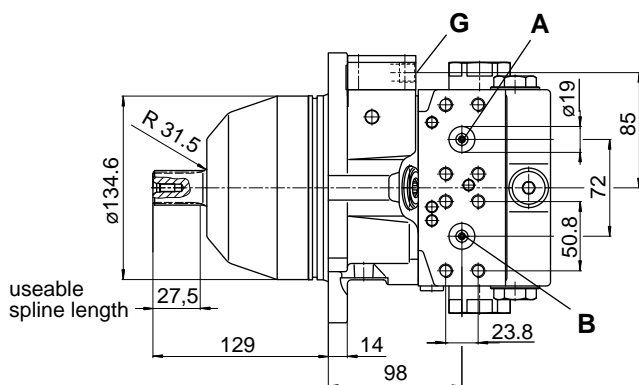
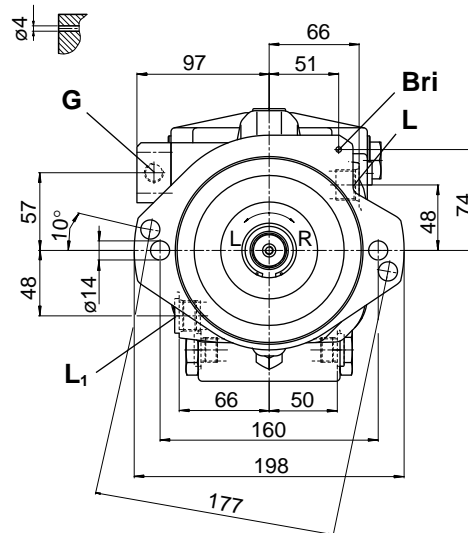
A10VEC 45 DG /52 W XX-PRF 21 X

with port plate 21



Shaft 25-4; SAE J744 OCT 83
1" dia splined shaft; 30° pressure angle;
15 teeth; 16/32 Pitch; flat base;
flank centering; Fit class 5; ANSI B92. 1a-1976

Section (Bri)

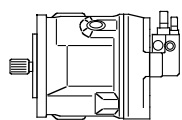


Connections

- | | | |
|---------------------------------|-------------------------------------|---------------------------------|
| A,B | Pressure port | SAE 3/4", (high pressure range) |
| L, L ₁ | Case drain port | M18 x 1,5 |
| M _A , M _B | Measuring port | M18 x 1,5 (plugged) |
| Bri | Brake release connection (internal) | ø4 |
| Br | Brake release port (external) | M12 x 1,5 (plugged) |
| G | Displacement control | M14 x 1,5 |

Dual displacement motor A10VEC, Series 52

Notes on other items in the medium pressure A10 range:

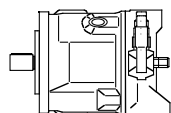


RE 92701

Variable pump A10VO series 31

Size:28 cm³ 45 cm³ 71 cm³ 100 cm³ 140 cm³**Control devices:**

DG Two-point control, direct control
 DR Pressure control
 DRT Pilot pressure dependent pressure regulator
 DFR Pressure and flow control
 DFLR Pressure/flow and power control
 DFSR Pressure/flow and summary power control
 FHD Pilot pressure dependent flow control with pressure cut-off
 FE1 Electronic flow control
 DFE1 Electronic pressure and flow control
 DS Speed control, secondary control (RE 92715)

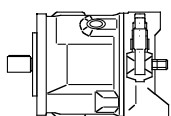


RE 92711

Variable pump A10VSO series 31

Size:16 cm³**Control devices:**

DR Pressure control
 DFR Pressure and flow control
 DFR1 Pressure and flow control orifice in X-port plugged
 DFE1 Electronic pressure and flow control

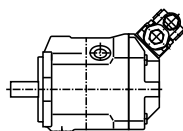


RE 92712

Variable pump A10VSO series 31

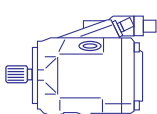
Size:10 cm³**Control devices:**

DR Pressure control
 DRG Pressure control, remote control
 DFR1 Pressure and flow control orifice in X-port plugged



RE 92713

Variable pump A10VSO series 52

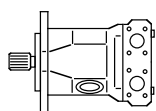


RE 92703

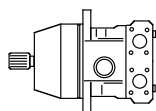
Variable pump A10VO series 52

Size:28 - 60 cm³**Control devices:**

DR Pressure control
 DFR Pressure and flow control



Fixed displacement motor A10FM series 30



RE 91172

Fixed displacement plug-in motor A10FE series 30

Size:23 cm³ 28 cm³ 37 cm³ 45 cm³