MANNESMANN REXROTH

AA4VSE Plug-in dual displacement motor

Series 10

Axial piston swashplate design, SAE model

RE 91808/09.90

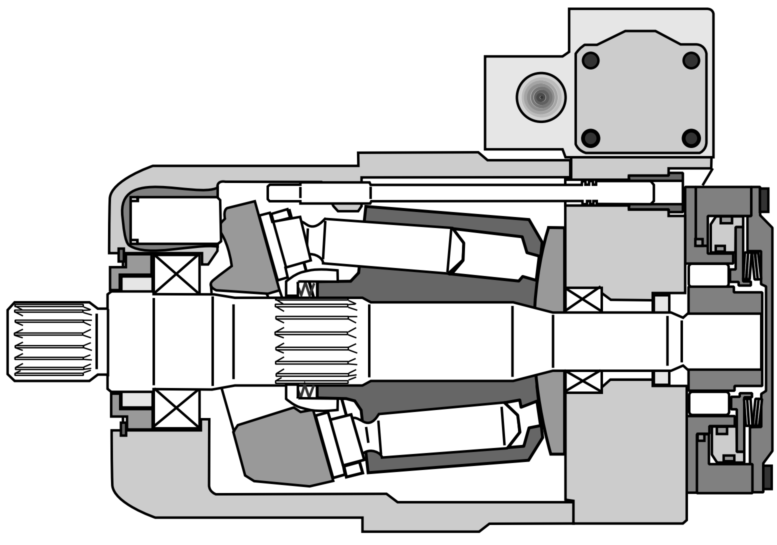
Brueninghaus Hydromatik

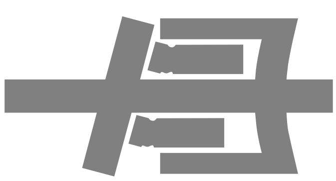
Size 250	Nominal pressure 350 bar	Peak pressure 400 bar

High pressure range

The AA4VSE plug-in dual displacement motor is an axial piston motor in swashplate design for hydrostatic drives in open and closed circuit applications.
The motor is suitable for use in mobile and industrial environments.
The motor speed is proportional to the input flow and inversely proportionate to the displacement.
A hydraulic control 3/2-way directional valve for controlling $V_{g\,max}$ and $V_{g\,min}$ is integrated in the housing.

- A4FSM base transmission system
- Sturdy bearings to ensure long service life
- High permissible motor speed
- Optimum specific weight - compact dimensions
- Mechanical and hydraulic connections to SAE specifications
- Low noise levels
- Control range 1:2.5
- Integral spool valve
- Special 4-hole flange
- Holding brake and brake valve attachment facility





AA4VSE Plug-in dual displacement motor, series 10

Ordering codes

AA4VS	E	250	HZ	/	10	W		-		S	M			

Hydraulic fluid

Mineral oil (no abbreviated code)

Axial piston motor

Swashplate design, adjustable Nominal pressure 350 bar, peak pressure 400 bar, SAE model, for industrial applications	AA4VS

Mode of operation

Plug-in motor	E

Size

Displacement $V_{g\,max}$ (cm^3)	250

Control and setting

2-point control, hydraulic HZ	HZ

Series

	10

Rotation

Viewed on shaft end	variable	W

Min. displacement

Min. displacement setting steplessly variable	$V_{g\,min}$ (cm^3) = 100 to 200

Seals

NBR (Nitrile rubber to DIN ISO 1629)	P
FPM (Fluoro rubber to DIN ISO 1629)	V

Shaft end

SAE splined profile	S

Mounting flange

Special 4 hole flange	M

Actuator ports

Port A/B	on side (same side),SAE, UNC mounting thread	60
Port A/B	on side (same side) for mounting motion control valve	68
Port A/B	on side (same side) for mounting mechanical brake	70
Port A/B	on side (same side) for mounting motion control valve and mechanical brake	71

Brake mounting

Without mechanical brake	N00
With built-on mechanical brake	B01

Valve

Without valves	0
With built-on motion control valve	8

Technical data

Hydraulic fluid

Mineral oil

For detailed information on the selection of mineral oil based hydraulic fluids and the conditions in which they are used please refer to our data sheet RE 90 220 prior to undertaking project work.

Operating viscosity range

We recommend the selection of operating viscosity (at operating temperature) in the range of

$\nu_{opt.}$ = Operating viscosity 16...36 mm²/s

in relation to circuit temperature (closed circuit).

Limit viscosity range

The following values are applicable for limit operation conditions:

ν_{min} = 10 mm²/s
short-term at max. permitted drain oil temperature of 90° C.

ν_{max} = 1000 mm²/s
short-term for cold start

Temperature range (cf: selection diagram)

t_{min} = –25° C
t_{max} = 90° C

Notes on selection of hydraulic fluid

In order to select the correct hydraulic fluid it is necessary to know the operating temperature (closed circuit) in relation to the ambient temperature.

The hydraulic fluid selected should be such that, within the operating temperature range the operating viscosity lies within the optimum range (ν_{opt}) (see selection diagram, shaded area).

We recommend that the higher viscosity grade be selected in each case.

Example:

At an ambient temperature of X° C the operating temperature in the circuit is 60° C . In the optimum operating viscosity range ($\nu_{opt.}$; shaded area) this corresponds to viscosity grades VG 46 or VG 68; VG 68 should be selected.

Please note:

The drain oil temperature is influenced by pressure and speed and is always higher than the temperature in the circuit. It must never be allowed to exceed 90° C .

If the above conditions cannot be adhered to because of extreme operational parameters or high ambient temperatures please consult us.

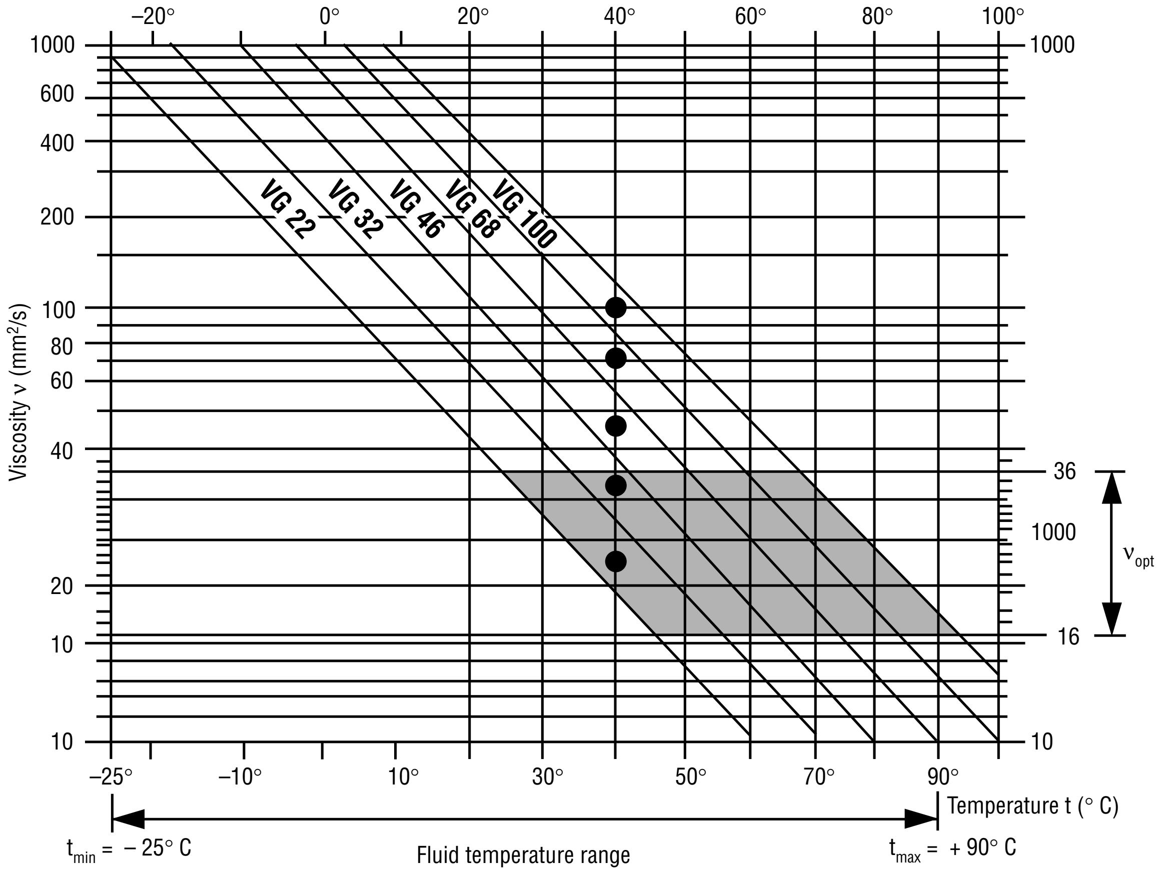
Fluid filtration

In order to ensure reliable functioning the minimum class of cleanliness that should be applied is class 9 (NAS 1638) or class 6 (SAE, ASTM, AIA).

This can be achieved by using filter type ...D020... (see RE 31278) which gives a filtration quotient of:

$\beta_{20} \geq 100$

Selection diagram



Technical data

Operating pressure range
Pressure at port A or B
Nominal pressure p_N ______ 350 bar
Peak pressure p_{max} ______ 400 bar
(Pressure information to DIN 24312)

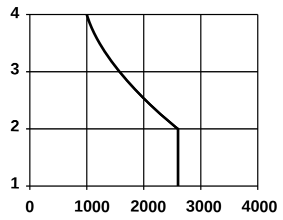
Installation position
Optional. The housing must be filled with fluid at start up and during operation.

Rotation
Pressure in port A = clockwise rotation
Pressure in port B = anti-clockwise rotation

Suitable gear units for AA4VSE
e.g. Lohmann + Stolterfoht

Displacement
Both the maximum and minimum displacement are set at the factory in compliance with the order codes (see page 2).

Drain oil pressure
Max. drain oil pressure (case pressure)
$p_{abs\ max}$ ______ 4 bar
The permitted pressure is, however, dependent on the speed and the sealing material selected.
"NBR" shaft sealing ring

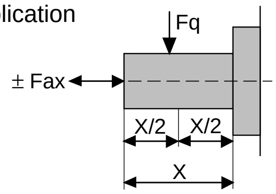


"FPM" shaft sealing ring
When using "FPM" shaft sealing rings it is possible, in contrast to the NBR sealing rings, to increase the permitted pressure to 50 % whilst maintaining the same speed.
These values are for guidance only.
Under exceptional operating conditions a reduction may become necessary.

Table of values (theoretical values, without taking into account η_{mh} and η_v; values rounded off)

Size = displacement setting		$V_{g\ max}$			**250**
		$V_{g\ min}$		100	
Displacement		V_g	cm^3	100	250
Speed		n_{max}	rpm	2600	2000
Max. input flow	at n_{max}	Q_{max}	L/min	260	500
Max. output power (Δp=350 bar)	at n_{max}	P_{max}	kW	152	292
Max. torque (Δp=350 bar)		T_{max}	Nm	556	1391
Moment of inertia about output axis		J	kgm^2	00959	0,0959
Capacity			L	7	7
Weight approx.		m	kg	125	125
Permitted load on output shaft					
Permitted axial force at housing pressure p_{max} 1 bar abs.		$\pm F_{ax\ max}$	N	3000	3000
Permitted axial force at housing pressure p_{max} 4 bar abs.		$+F_{ax\ max}$	N	1850	1850
		$-F_{ax\ max}$	N	4150	4150
Max. permitted radial force		$F_{q\ max}$	N	4000	4000
Actual starting torque (Δp=350 bar) at n = 0 rpm			Nm	417	1127

Force application



Determination of size

Input flow $Q = \frac{V_g \cdot n}{1000 \cdot \eta_v}$ (L/min)

Output drive torque $M = \frac{1{,}59 \cdot V_g \cdot \Delta p \cdot \eta_{mh}}{100}$ (Nm)

Output power $P = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p \cdot \eta_t}{600}$ (kW)

V_g = geometr. displacement volume (cm^3) per revolution
Δp = Differential pressure (bar)
n = Speed (rpm)
η_v = Volumetric efficiency
η_{mh} = Mechanical hydraulic efficiency
η_t = Overall working efficiency ($\eta_t = \eta \cdot \eta_{mh}$)

Hydraulic two-point control, HZ

Setting of displacement to $V_{g\ min}$ or $V_{g\ max}$ is achieved by connecting or disconnecting the pilot pressure to port X.

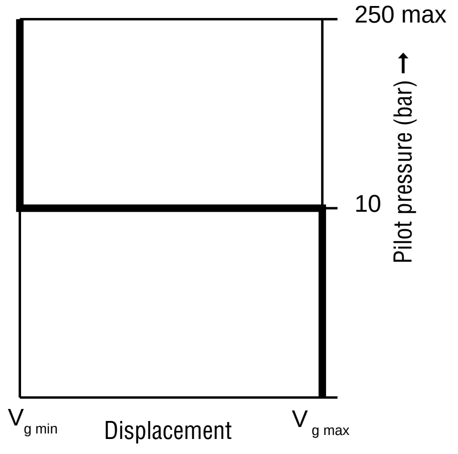
Pilot pressure in X = 0 bar = setting at $V_{g\ max}$
Pilot pressure in X ≥ 10 bar = setting at $V_{g\ min}$

Pilot pressure

p_x ______ 10 bar
$p_{x\ max}$ in X ______ 250 bar

The required control oil is taken from the high pressure side.

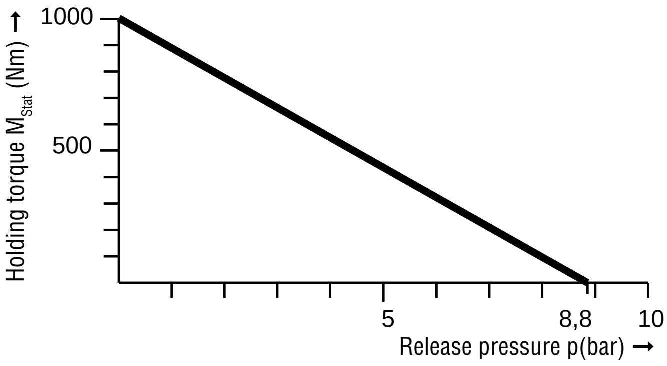
Control pressure - characteristic curve



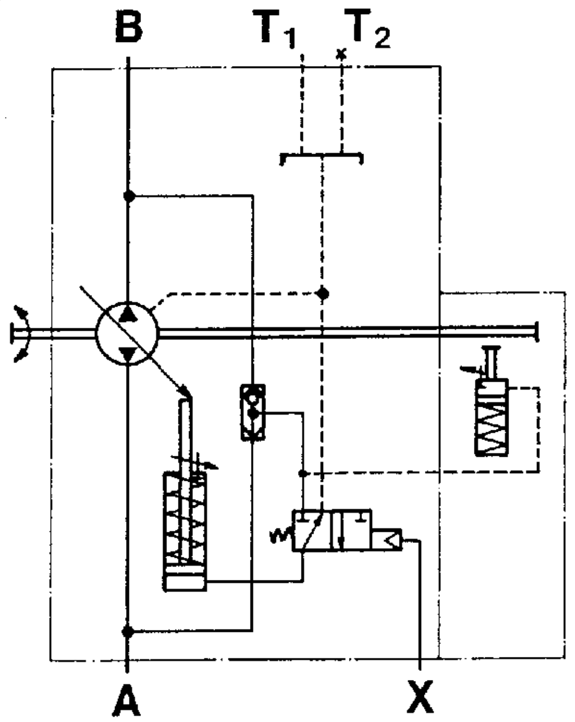
Mechanical holding brake, B01

The mechanical holding brake can be built-on as required cf: ordering code, model **B01**.
This acts as a parking brake and is automatically activated when the operating pressure (pre-set via the integrated spring package) is not reached. As soon as operating pressure in excess of the spring force has built up again the mechanical parking brake is released.

Characteristic curve - holding torque



HZ model with holding brake



Motion control valve with pressure relief valve, 8

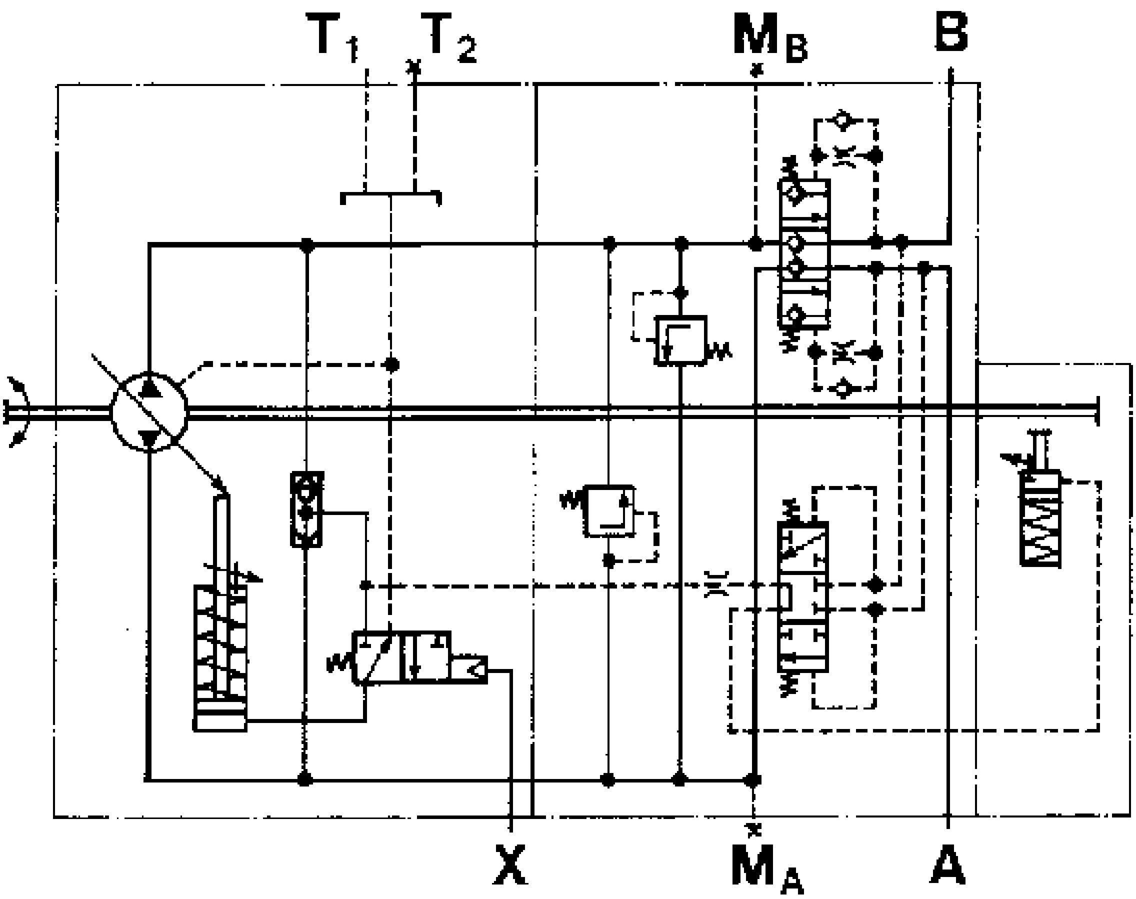
A motion control valve can be built on as required, cf: ordering code, model **8**.
Motion control valves prevent cavitation of hydraulic motors operated in open circuit during downhill travel or when decelerating the vehicle e.g. in the track drive of a mobile excavator. Cavitation of hydraulic motors occurs as soon as the mechanically imposed speed exceeds the speed at which the motor would rotate due to the flow of hydraulic fluid.

Motion control valves do not replace vehicle brakes.

In the neutral position of the pressure spool the motor ports are blocked with the exception of a residual opening. This residual opening gives rise to a gentle deceleration of the motor.

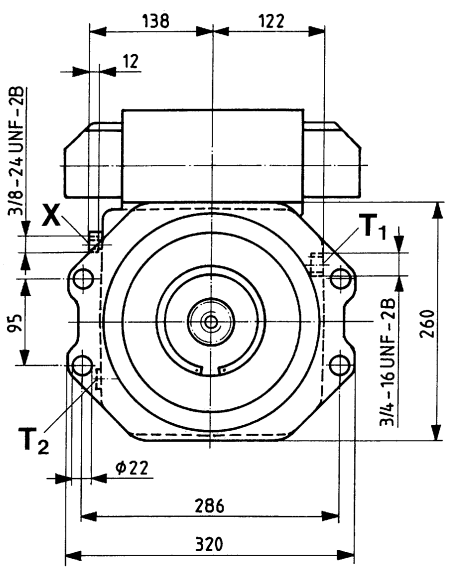
Pressure relief valves protect the hydraulic motor against over-pressure. The given pressure values are set in accordance with information given by the customer.

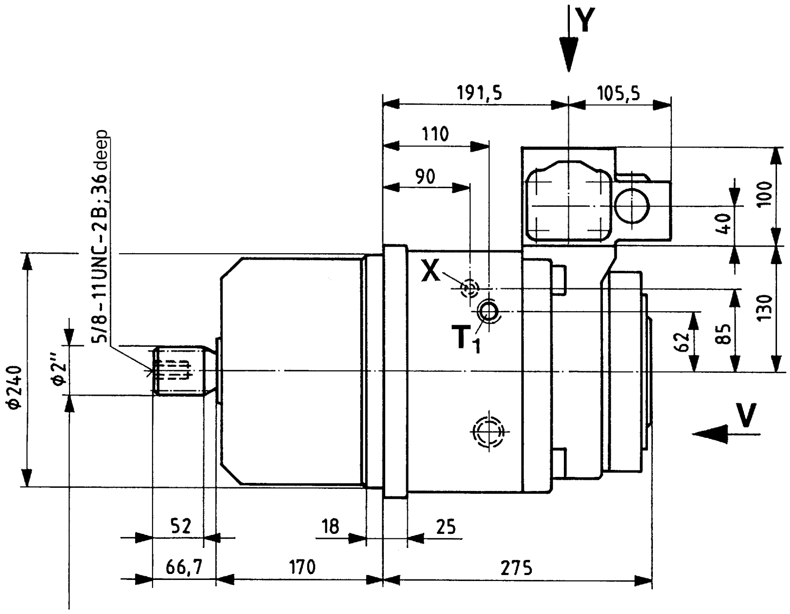
HZ model with holding brake and Motion control valve



Unit dimensions

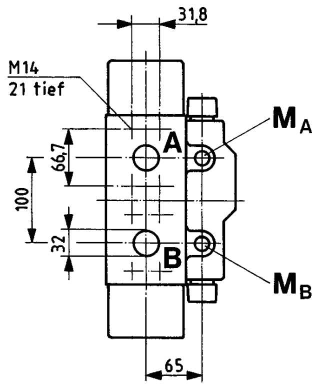
HZ hydraulic 2-point control,
shown with B01 mechanical holding brake and
and motion control valve 8



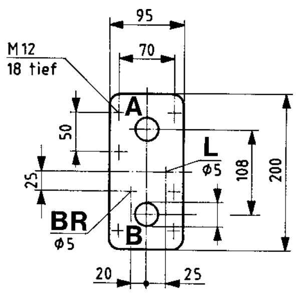


2" spline length; 30° angle of mesh; 15 teeth ;
8/16 pitch; flat root; side fit; tolerance
classification 5; ANSI B 92.1a-1976

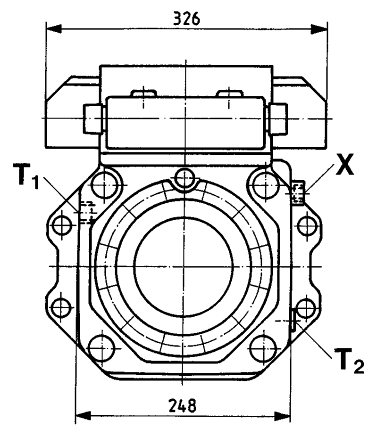
View Y
with motion
control valve



View Y
without motion
control valve



View V



Ports

A,B	Pressure port	SAE 1 1/4", high pressure series
T_1	Bleed point and case drain port	3/4 - 16 UNF - 2B
T_2	Oil drain, tank	7/8 - 14 UNF - 2B
X	Pilot pressure port	3/8 - 24 UNF - 2B, 12 deep
M_A,M_B	Test port	9/16 - 18 UNF - 2B

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