AA2FM Series
Axial piston fixed motor

Product show and brief introduction

Open and closed circuits

Series 6
Sizes 56...90
Nominal pressure 40MPa
Peak pressure 45MPa
SAE version

Features

— Farge variety of available nominal sizes allows exact adjustment to the application

— High power density

— Very high total efficiency

— High starting efficiency

— Working ports SAE flange or thread

— Optional with integrated pressure relief valve

— Bent-axis design

Model Code

AA2F	M	80	/6	1	W	-V	U	D	027	F
Axial piston unit	Operating mode	Sizes	Series	Index	Direction of rotation	Seal material	Drive shaft	Mounting flange	Working ports	Speed sensors
AA2F: Bent-axis design, fixed	M: Motor	56 63 80 90	6	1	(Viewed on drive shaft) W: bidirectional	V: FKM (fluor-oelastomer)	See below	D/X: 4-hole SAE J744	See below	No code: without speed sensor F: prepared for HDD speed sensor

Drive shafts

Size		56	63	80	90
Spined shaft DIN 5480	S	√	√	/	/
	T	√	√	/	/
	U	/	/	√	√
	Q	/	/	√	√

Working ports

Size		56	63	80	90
020: SAE working ports A and B at side,opposite	without valve	√	√	√	√
027: SAE working ports A and B at side,opposite	Flushing and boost pressure valve mounted	√	√	√	√

√= available / = not available

Technical Data

Hydraulic fluid

The AA2FM fixed displacement motor is suitable for use with mineral oil

Viscosity range

We recommend that a viscosity (at operating temperature)for optimum efficiendy and service life purposes of

V_{opt} = optimum viscosity16...36mm²/s

Be chosen,taken the tank temperature(open circuit) into account.

Limits of viscosity range

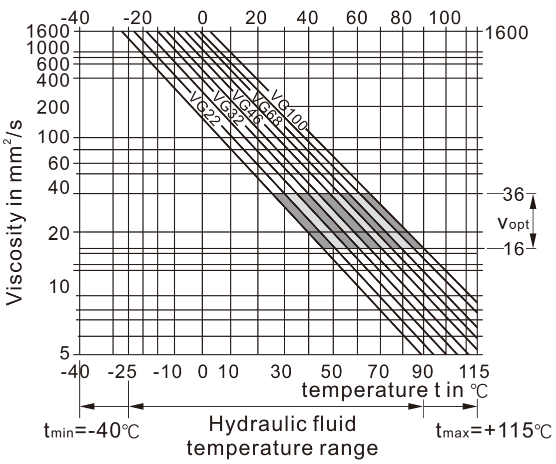
The following values apply in extreme cases:

Vmin = 5 mm²/s
short term(t < 3 min)at max.permitted temperature
tmax=115℃

Vmax = 1600 mm²/s
short term(t < 3 min) with cold start(P < 3MPa,
n≤1000rpm t_{min}=-40℃)

Note that the maximun hydraulic fluid temperature must not be exceeded locally either (e.g.bearing area).The temperature in the bearing area is-depending on pressure and speed-up to 12 K higher than the average case drain temperature.

Setlection diagram



Details regarding the choice of hydraulic fluid

The correct selection of hydraulic fluid requires knowledge of the operating temperature in relation to the ambient temperature, in an open circuit the tank temperature.

The hydraulic fluiid should be selected so that within the operating temperature range, the operating viscosity lies within the optimun 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℃ an operating temperature of 60℃ is set in the circuit. In the optimun operating viscosity range(V_{opt}; shaded area) this corresponds to the viscosity classes VG 46 or VG68; to be selected: VG 68.

Please note: The leakage fluid temperature, which is affected by pressure and rotational spaad,is always higher than the tank temperature . At no point in the system may the temperature be higher than 115℃.

Filtartion

The finer the filtration, the cleaner the fluid and the longer the service life of the axial piston unit.

To ensure proper function of the axial piston unit,the hydraulic fluid must have a cleanliness level of at least

20/18/15 according to ISO 4406.

At very high hydraulic fluid temperatures
(90℃ to max.115℃),a cleanliness level of at least

19/17/14 according to ISO 4406 is required.

Operational pressure range

maximum pressure in port A or B

size	shaft	nominal pressure	maximum pressure
56,63	S	35MPa	40MPa
	T	40MPa	45MPa
80,90	U	40MPa	45MPa
	Q	30MPa	35MPa

Direction of flow

Direction of rotation,viewed on drive shaft

clockwise	counter-clockwise
A to B	B to A

Speed range

No limit to minimum speed n_{min}.If uniformity of motion is required, speed n_{min} must not be less than 50 rpm.

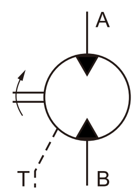
Shaft seal

Allowable load pressure.
The service life of the shaft seal is affected by the rotational speed of the motor and the case drain pressure.
The allowable value of intermittent case drain pressure depends on the speed of the motor. Short-term (t<5 min) allow the absolute pressure peak to 1MPa. The case drain pressure during average continuous operation shall not exceed 0.3MPa absolute. The pressure inside the housing must be equal to or greater than the external pressure of the shaft seal.

Symbol

Connections

A, B	Work port
T	Drain ports



Technical Data

Teble of values (the oretical values, ignoring η_{min} and η_v; values rounded)

Size				56	63	80	90
Displacement		V_g	mL/r	56.1	63	80.4	90.0
Maximum speed		n_{max}	min^{-1}	5000	5000	4500	4500
		n_{max} 1)	min^{-1}	5500	5500	5000	5000
Maximum flow	at n_{max}	q_{vmax}	L/min	280	315	360	405
Equivalent torque		T_k	Nm/MPa	8.9	10	12.7	14.3
Torque	△P=35 MPa	T	Nm	312	350	445	501
	△P=40 MPa	T	Nm	356	400	508	572
Case volume			L	0.45	0.45	0.55	0.55
Inertia moment of drive shaft		J	kgm^2	0.0042	0.0042	0.0072	0.0072
Weight（approx.）			kg	18	18	23	23

1) Intermittent maximum speed:overspeed for unload and overhauling processes,t＜5s and △P＜15 Mpa.

Determining the size

Flow $$q_v = \frac{V_g \times n}{1000 \times \eta_v} \quad \text{(L/min)}$$

Output speed $$n = \frac{q_v \times 1000 \times \eta_v}{V_g} \quad \text{(min-1)}$$

Torque $$T = \frac{V_g \times \triangle P \times \eta_{mh}}{20\pi} \quad \text{(Nm)}$$

Power $$P = \frac{2\pi \times T \times n}{60000} = \frac{T \times n}{9549} = \frac{q_v \times \triangle P}{600 \times \eta_t} \quad \text{(kW)}$$

V_g = Displacement per revolution in mL/r

T = Torque in Nm

△P. = Differential pressure in MPa

n = Speed in rpm

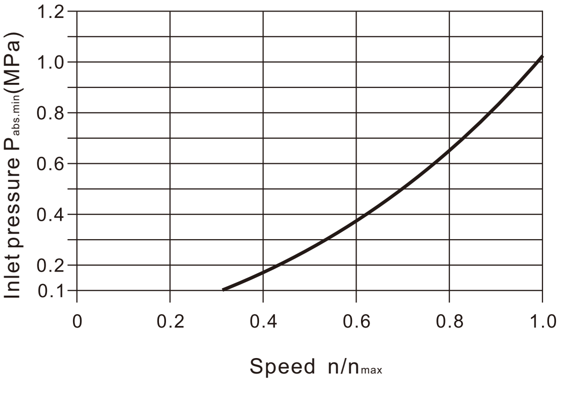
η_v = Volumetric efficiency

η_{mh} = Mechanical-hydraulic efficiency

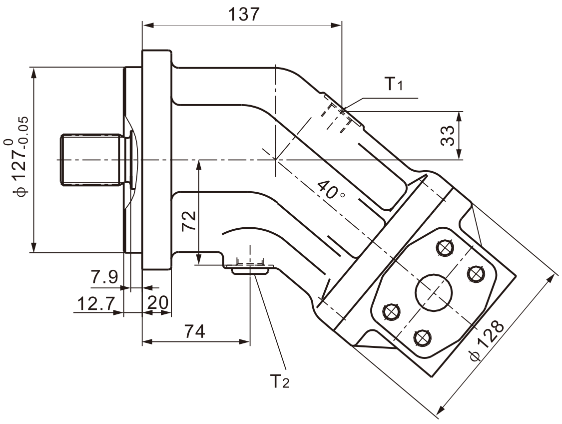
η_t = Overall efficiency

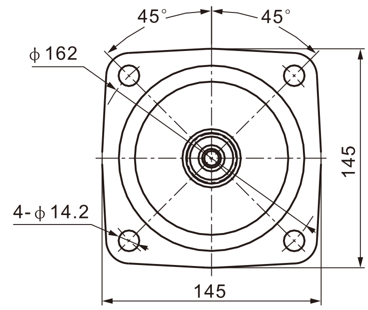
Minimum inlet pressure for A(B)

To avoid damage to the motor, it must be ensured that there is a minimum inlet pressure in the oil inlet area, which is related to the speed of the motor.



Installation dimensions Size 56,63

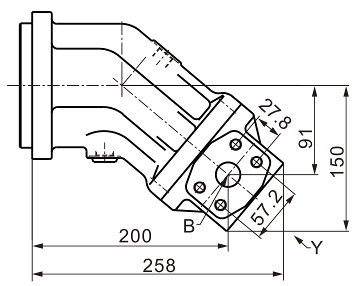




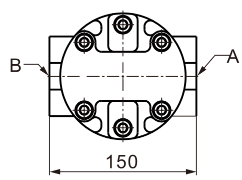
Ports
A,B Service line ports (see port plates)
T_1,T_2 Case drain ports (T_1 plugged) M18×1.5

Port plates

020 SAE flange ports,at side



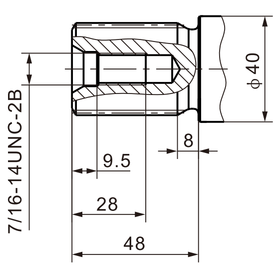
View Y



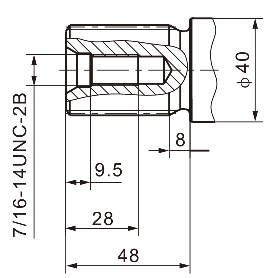
A,B Service line ports(high pressure series) SAE 1"
Fastening screws M12,17 deep

Shaft ends

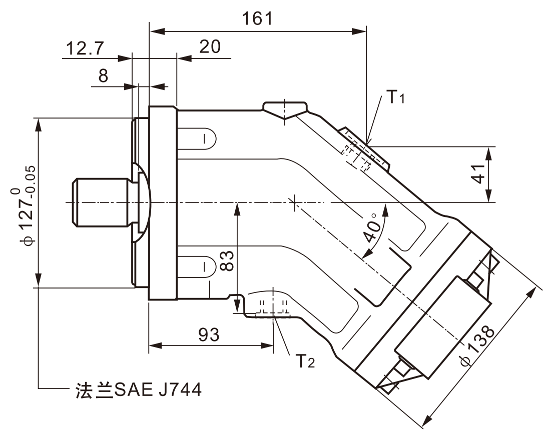
S Splined shaft
1 1/4" 14T 12/24DP
P_N = 35 MPa

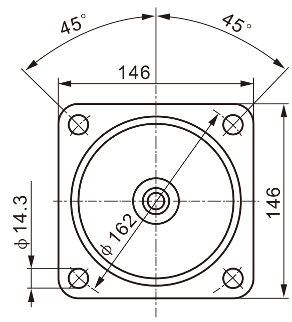


S Splined shaft
1 3/8" 21T 16/32DP
P_N = 40 MPa



Installation dimensions Size 80,90





Ports

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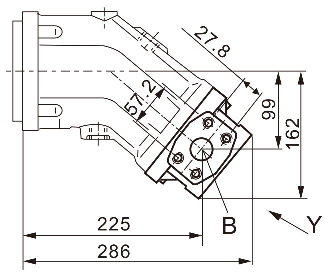
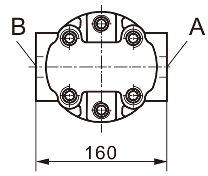


View Y



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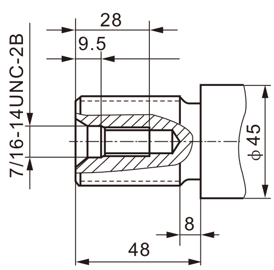
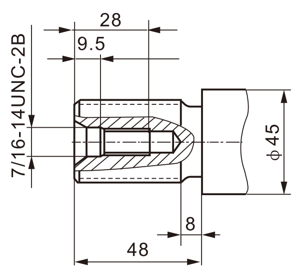
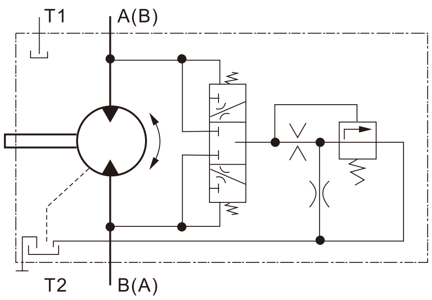


Q Splined shaft
1 1/4" 14T 12/24DP
P_N = 30 MPa



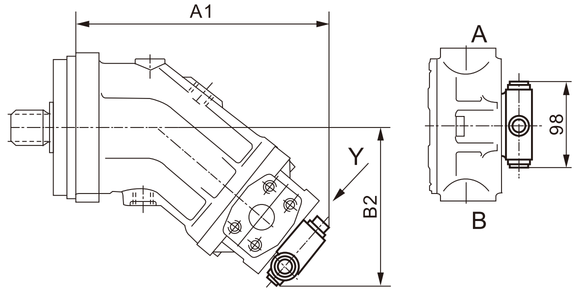
Flushing and boost pressure valve

Circuit diagram



Port plates

027 SAE flange ports,at side



size	A1	B2
56,63	263	159
80,90	297	173.5

Overview

The flushing and boost pressure valve is used in closed circuits for the removal of heat and to ensure a minimum boost pressure level.
Hydraulic fluid is directed from the respective low pressure side into the motor housing.This is then fed into the reservoir,together with the leakage.The removed hydraulic fluid must be replaced by cooled hydraulic fluid from the boost pump.
When setting the charging pressure of the pump in a closed circuit, the opening pressure of the charging valve must be considered (1.6MPa, fixed set value)

Flushing flow (at low pressure △P=2. 5MPa)

size	flushing flow
56,63	3.5L/min
80,90	5L/min

The flushing flows deviating from the values in the table,please state the required flushing flow when ordering.
The flushing flow without orifice is approx.12 to 14 L/min.