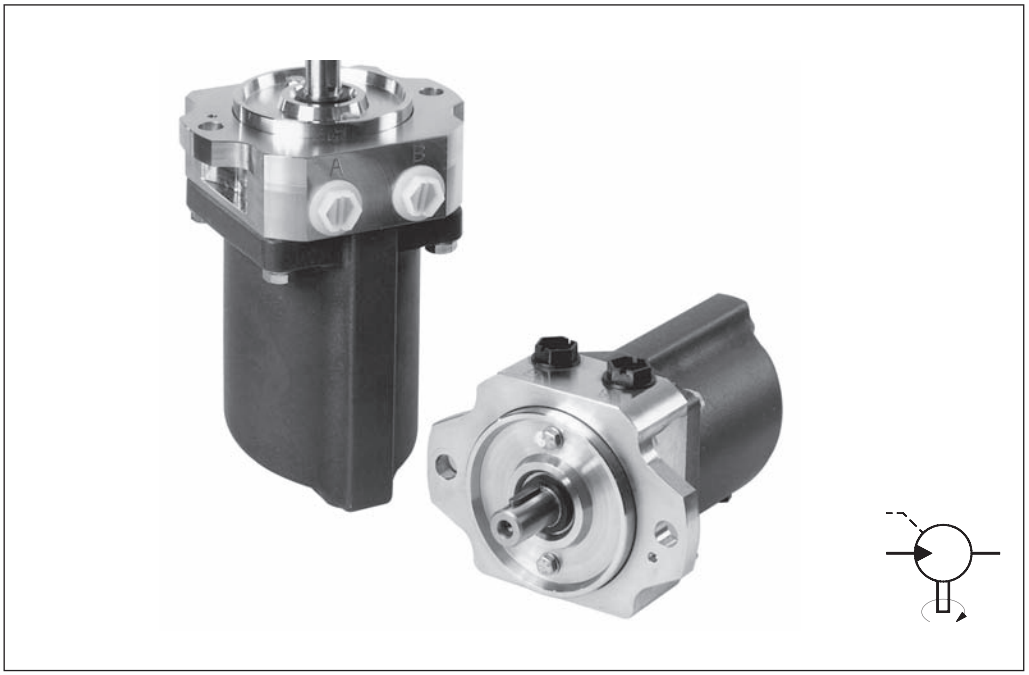
Motor, High Speed (MAH 4/5/6.3 - 10/12.5)



Application

MAH 4/5/6.3 and 10/12.5 are high-speed motors operated by water hydraulics. The hydraulic medium is ordinary tap water. The motors base on the axial piston principle that enables a light and compact design. The water lubricates all movable parts in the motor, and there is thus no need for special oil lubrication.

The motors vary in size from 4 cm3 to 12.5 cm3 per revolution (rated displacement).

The maximum operating torques vary from 8 Nm to 25 Nm and maximum outputs from 3 kW to 8 kW.

Characteristic features

- Smooth running within a large operating parameters.
- Constant torque over a wide speed range.
- High starting torque
- Long life under severe operating conditions.
- Compact design.
- For use in both open and closed systems.
- Quiet in operation.
- Few wear parts and low maintenance costs.
- No oil lubrication.
- Non-corroding materials.
- Easy-to-clean design.

Application examples

- Food industry
- Mining equipment
- Humid and wet environments
- Pharmaceutical industry
- Chemical industry
- Water treatment
- Nuclear industry

Motor variants

MAH motors are optimized for operation in one direction and are therefore available in CW and CCW versions.

Code numbers

MAH type	4	5	6,3	10	12.5
CW version	180F0100	180F0102	180F0104	180F0001	180F0003
CCW version	180F0101	180F0103	180F0105	180F0002	180F0004

Gears

Danfoss is the distributor of a complete range of planetary gears specially designed for Nessie water-hydraulic motors.

The combination of Nessie motors and planetary gears makes it possible to obtain completely smooth running at very low speeds and torques right up to 630 Nm.

Function principle

Water-hydraulic motors convert hydraulic energy (pressure, water flow) to mechanical energy (torque, speed).

Danfoss Nessie water-hydraulic motors are high-speed units with fixed displacement. A given water flow and a given pressure, determine the displacement (motor size), speed and torque. For a given displacement (motor size) speed is determined by the water flow and torque is determined by the pressure.

The motors are axial piston units which operate on the swashplate principle.

Two sizes of housing cover the entire range: One for 4, 5 and 6.3 cm^3 motors, and one for 10 and 12.5 cm motors.

The axial piston principle gives a light and compact design in relation to actual power output.

The motors are designed to ensure that all moving parts are lubricated by water.

Furthermore, the motor design is such that ordinary drinking water is used, i.e. water with no additives whatsoever.

Technical data

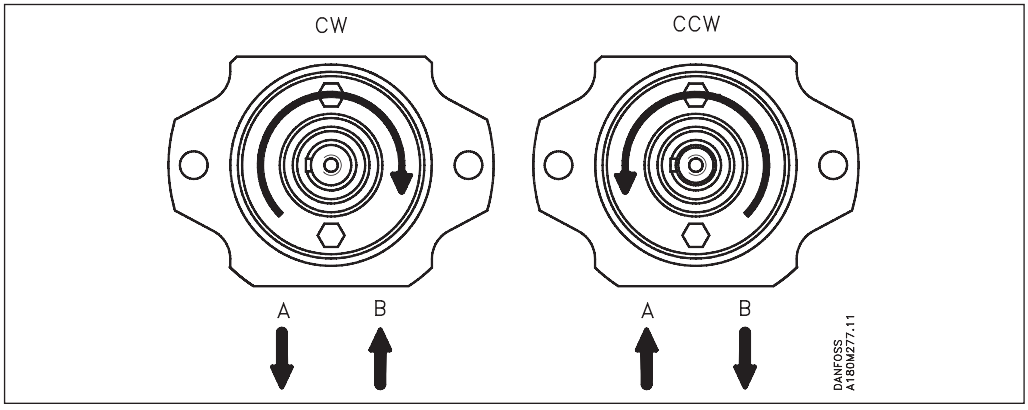
MAH type			4	5	6.3	10	12.5
Geometric displacement	(cm^3)		4	5	6.3	10	12.5
Max. speed	(min^{-1})	kont.	4000*	4000*	4000*	3000*	3000
Min. speed	(min^{-1})		300	300	300	300	300
Max. torque	(Nm)	kont	8	10	12.5	20	25
Starting torque at max. pressure drop	(Nm)	kont	2.5	3.0	3.5	10	12.5
Starting pressure at unloaded shaft	(bar)		80	80	80	50	50
Max. power at max. speed.	(kW)	kont	3.2	4.1	5.2	6.3	7.8
Max. pressure drop and inlet pressure	(bar)	kont	140*	140*	140*	140*	140
Max. waterflow	(l/min)	kont	17.5	21.5	26.8	33	40
Return line pressure at pin = 140 bar, no shaft load		(bar)	140	140	80	90	50
Return line pressure at pin = 140 bar, max. shaft load		(bar)	10	10	10	10	10
Max. system press.at serial operation, no shaft load		(bar) kont	140	140	115	125	105
Drain flow at 140 bar/1500 min^{-1}	(l/min)		< 1	< 1	< 1	< 1.5	< 1.5
Weight	kg		4.1	4.1	4.1	6.3	6.3

* MAH 4: Δp (pressure drop) up to 3000 min-1 = 140 bar, there is then a linear reduction in Δp to 120 bar at 4000 min-1
* MAH 5: Δp (pressure drop) up to 3600 min-1 = 140 bar, there is then a linear reduction in Δp to 120 bar at 4000 min-1
* MAH 6.3: Δp (pressure drop) up to 3100 min-1 = 140 bar, there is then a linear reduction in Δp to 100 bar at 4000 min-1
* MAH 10: Δp (pressure drop) up to 2200 min-1 = 140 bar, there is then a linear reduction in Δp to 80 bar at 3000 min-1

Direction of rotation

Connections and direction of rotation appear from the product label on the motors (see also the below drawing).
The motors can be reversed for shorter periods, but will run with slightly less efficiency and starting torque.

If reversible operation for longer periods is required, please contact the Danfoss Sales Department for water hydraulics.

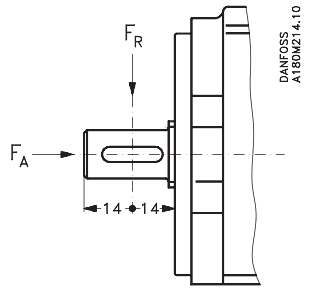


Sealing element

USIT ring, fittings with O-ring connection or similar.

Shaft load

Minimum speed at the loads stated below is 400 min^{-1}



	F_A daN	F_R daN
MAH 4/5/6,3	30	65
MAH 10/12,5	50	100

Drain line

Max. pressure = 6 bar absolute.
Drain pressure must never exceed return pressure by more than 1 bar.

Installing the drain line
The drain line/motor must be positioned so that the motor cannot empty itself during standstill.

Temperature

Fluid temperature:
Min. +3°C to max. +50°C. at max. pressure
Min. +3°C to max. +60°C. at max. 100 bar

Ambient temperature:
Min. 0°C to max. 50°C.

In case of lower operating temperatures, please contact the Danfoss Sales Organization for Water Hydraulics.

Storage temperature:
Min. -40°C to max. +70°C.

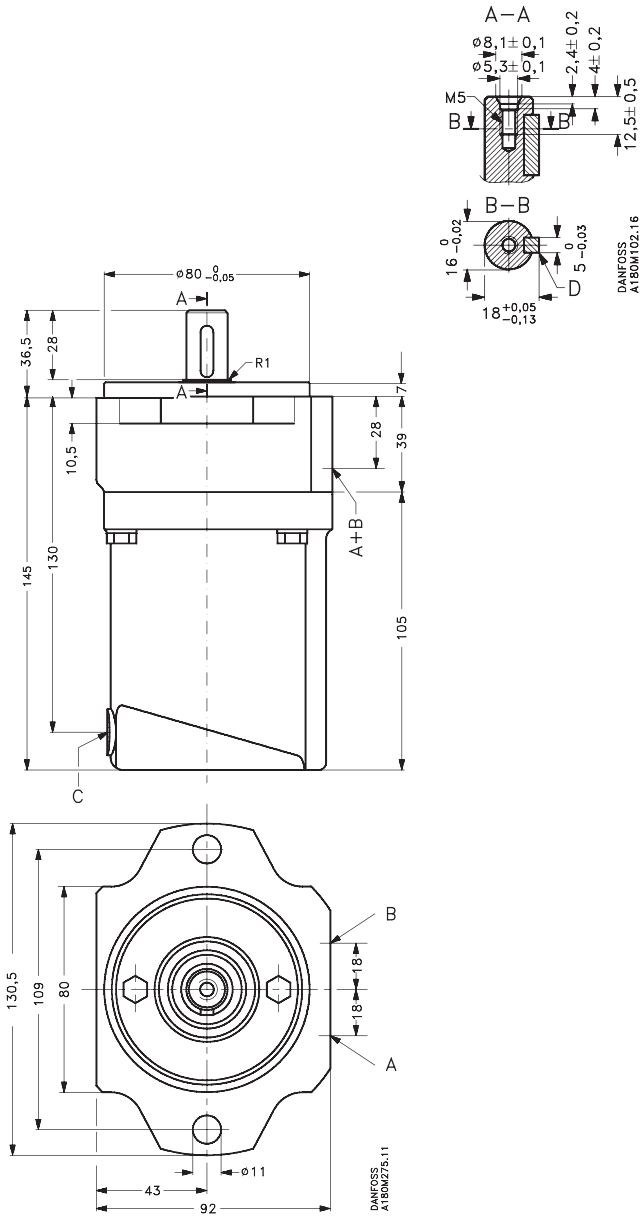
Filtration

The water supplied to the valve must be filtered: 10 µm absolute, $ß_{10}$-value > 5000 filter is recommended.

For further information on filters, please contact the Danfoss sales department for water hydraulics.

Dimensions

MAH 4/5/6.3



A: Port G 1/4, 12 deep
B: Port G 1/4, 12 deep
C: Drain G 1/8, 11deep
D: Parallel key 5 × 5 × 15, DIN 6885

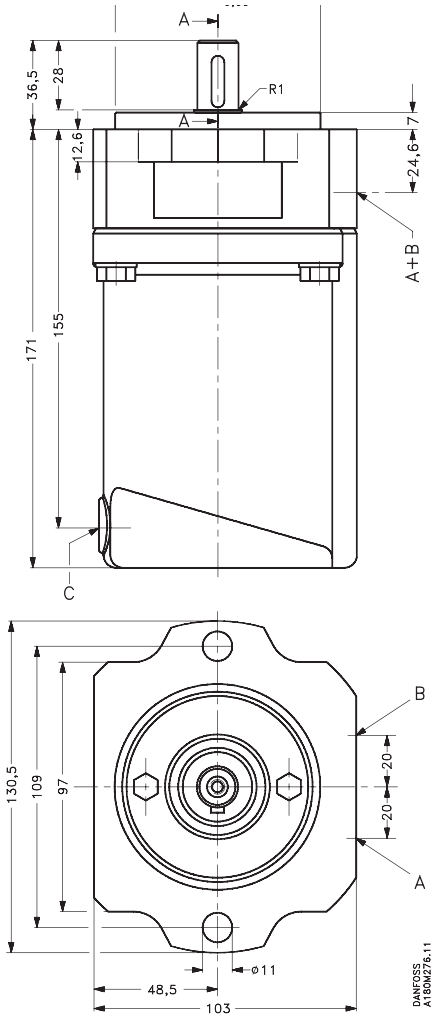
MAH 10/12.5

Shaft

to ISO R 755
with internal thread to DIN 332 part 2. Form 1.

Flange

to ISO 3019/2 - 80 A2 H



A: Port G 3/8, 13 deep
B: Port G 3/8, 13 deep
C: Drain G 1/4, 13deep
D: Parallel key 5 × 5 × 15, DIN 6885

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