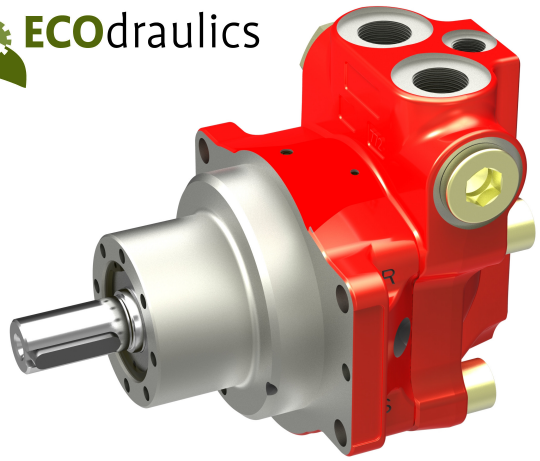
Internal Gear Motor

Series QXM42-HS

ECOdraulics



- excellent suitability for high speeds
- low hydromechanical losses
- excellent cooling providing low operating temperatures, less stress to all moving parts and prevents premature aging of the hydraulic fluid
- cost-savings in system design, assembly and maintenance
- few moving parts and the hydrodynamic bearing effect ensure an exceptionnally long life
- shaft accepts high radial loads
- very low noise level

1 Description

1.1 General

The QXM42-HS (High Speed) Internal Gear Motor was developed specifically for use at extremely high speeds.

Its high efficiency and extremely low noise levels also make a significant contribution to reducing the costs of both energy and anti noise measures.

A double row angular ball bearing designed for high external loads and an integrated anti cavitation valve guarantee a long life.

The integrated check valve prevents cavitation during unbraked spin out from maximal speed.

Thanks to the special motor flange, adapted for such applications, and the integral ports for auxiliary functions, the motor can be used in many applications without needing any further modification.

1.1.1 External loads

The QXM42-HS features a rugged integrated double-row ball bearing. Unlike the hydrodynamic bearings of the motors the ball bearing is subject to continuous wear. The lifetime of this bearing is determined by the following factors:

- Magnitude of external shaft load (radial load)
- Direction of external shaft load (axial load push or pull)
- Motor speed
- Viscosity of the fluid
- Degree of contamination of the fluid

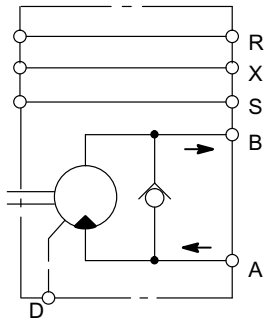
Depending on the use of the QXM42-HS certain loads and working cycles occur. In order to establish the relevant bearing life it is necessary to know the load profile and the operating conditions of the motor. Please ask Bucher Hydraulics for your specific application.

1.2 Application examples

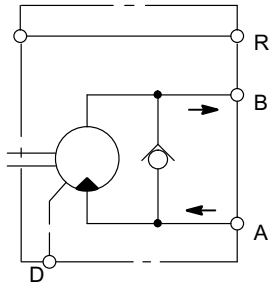
- Saw drive motor in forestry harvesters
- Saw drive motor in mobile sawmill
- Fan drives in mobile machines

2 Symbols

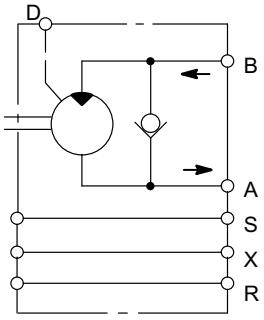
2.1 QXM42-...R-HS-.SKRG1..



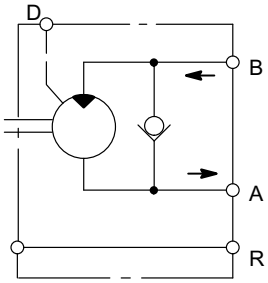
2.2 QXM42-...R-HS-.SKRF1..



2.3 QXM42-...L-HS-.SKRG1..



2.4 QXM42-...L-HS-.SKRF1..



3 Technical data

3.1 General

Characteristics	Description, value, unit
Installation attitude	unrestricted
Mounting method	4-hole set back motor flange
Direction of rotation	right or left (clockwise or counter clockwise)
Motor drive method	chain pinion direct on the motor shaft or coupling
Ports	A/B = working lines, D = external drain line, R/S/X = ports for auxiliary functions
Fluids	HLP-mineral oil DIN 51524 part 2; HEES synthetic ester
Minimum fluid cleanliness	NAS 1638, class 9 or ISO 4406, code 20/18/15
Viscosity category	VG32, VG46, VG68
Viscosity range	70 - 300 S.U.S. (15 - 60 mm^2/s) for saw operation 4700 S.U.S. (1000 mm^2/s) for cold at max. 5000 rpm and 1450 PSI (100 bar) max. pressure
Fluid temperature range	Operating: allowed 50 ... 176 °F (+10 ... +80 °C) ideal 86 ... 140 °F (+30 ... +60 °C) start temperature min. -22 °F (-30 °C)
Total restriction	port A + port B < continuous-/ intermediate pressure
Max. pressure in drain line	see sect. 4.2 , Maximum shaft seal pressure
Motor weight	32 ibs (14.5 kg)

3.2 Displacement

The operating data are valid for mineral oils with a viscosity of 200 S.U.S. (42 mm^2/s)

Type	Displacement effective in3/rev (cm^3/rev)	Motor speed in rpm		Continuous pressure PSI (bar)	Maximum intermediate pressure PSI (bar) max. 2 s
		Maximum speed max. 2 s	Minimum speed 1)		
QXM42-020.-HS-.	1.24 (20,3)	10500	100	3500 (240)	4000 (280)
QXM42-025.-HS-.	1.53 (25,1)	9500	100	3500 (240)	4000 (280)
QXM42-032.-HS-.	1.97 (32,3)	8500	100	3500 (240)	4000 (280)

Type	Output torque 2) ib-in (Nm)	Maximum output power HP (kW) max. 2 s	Moment of inertia [$10^{-3}kgm^2$]
QXM42-020.-HS-.	510 (58)	87 (65)	0,93
QXM42-025.-HS-.	620 (70)	87 (65)	1,15
QXM42-032.-HS-.	780 (88)	87 (65)	1,48

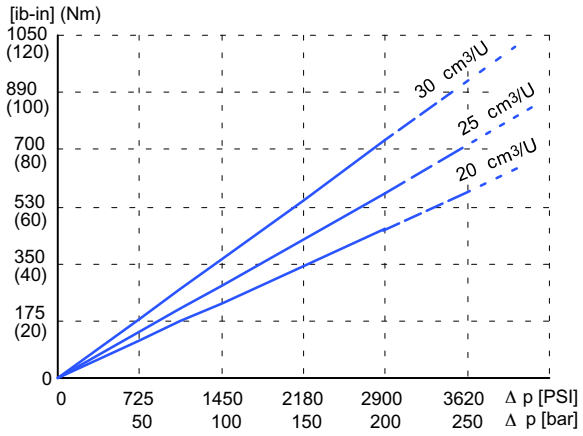
1) for intermittent operation only (continuous speed please ask Bucher Hydraulics)

2) at Δp= 2900 PSI (200 bar) / n= 5000 min^{-1}

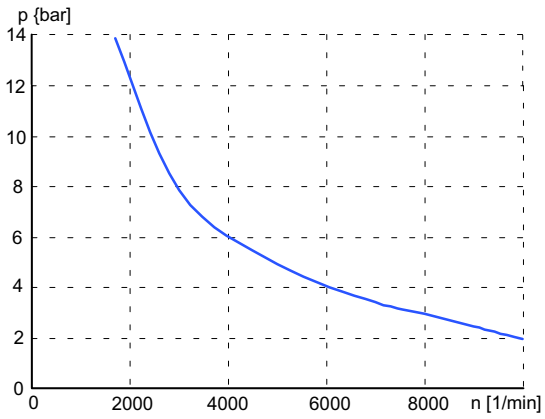
4 Performance graphs

Values are valid for mineral oil HLP 46 at an oil temperature (reservoir) of 110°F (43°C)

4.1 Starting torques M

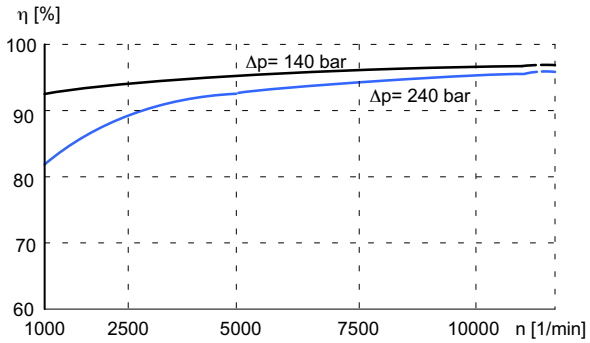


4.2 Maximum shaft seal pressure

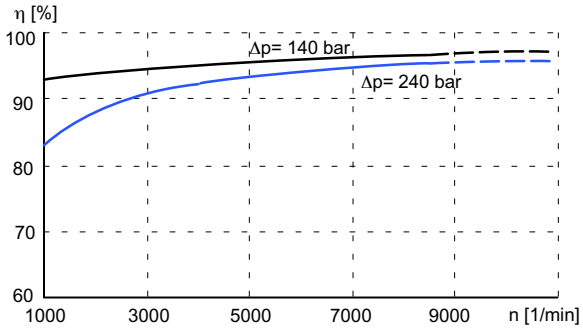


4.3 Volumetric efficiency

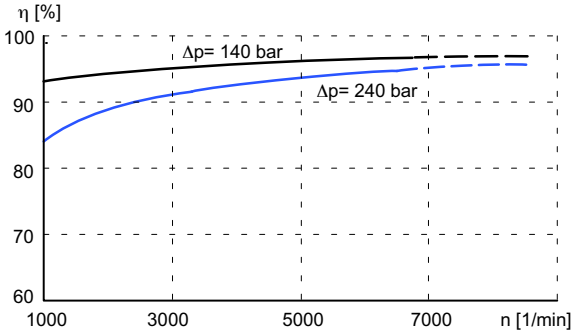
4.3.1 Type QXM42-020.-HS-...



4.3.2 Type QXM42-025.-HS-...

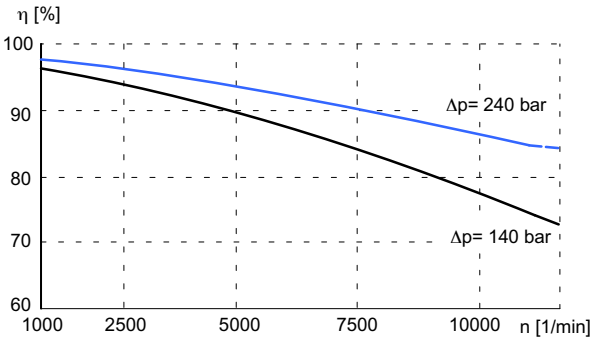


4.3.3 Type QXM42-032.-HS-...

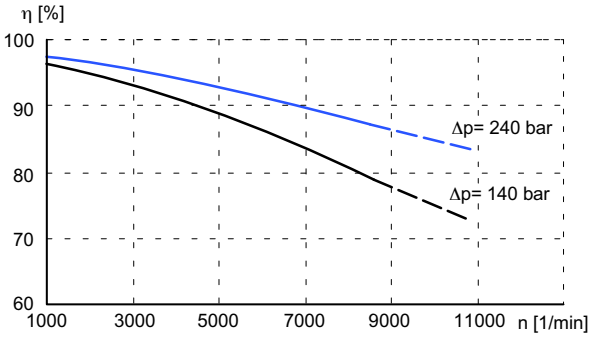


4.4 Hydromecanical efficiency

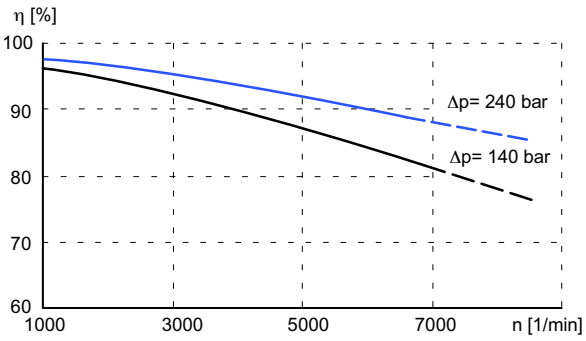
4.4.1 Type QXM42-020.-HS-...



4.4.2 Type QXM42-025.-HS-...

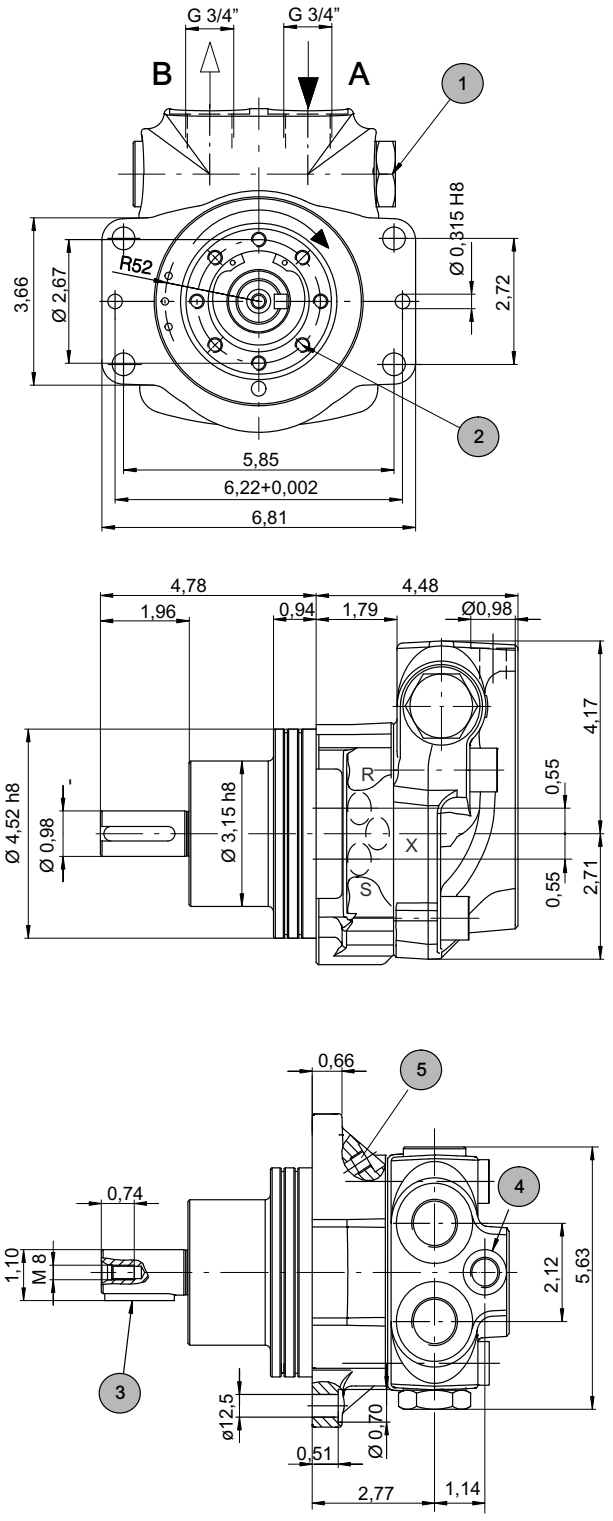


4.4.3 Type QXM42-032.-HS-...

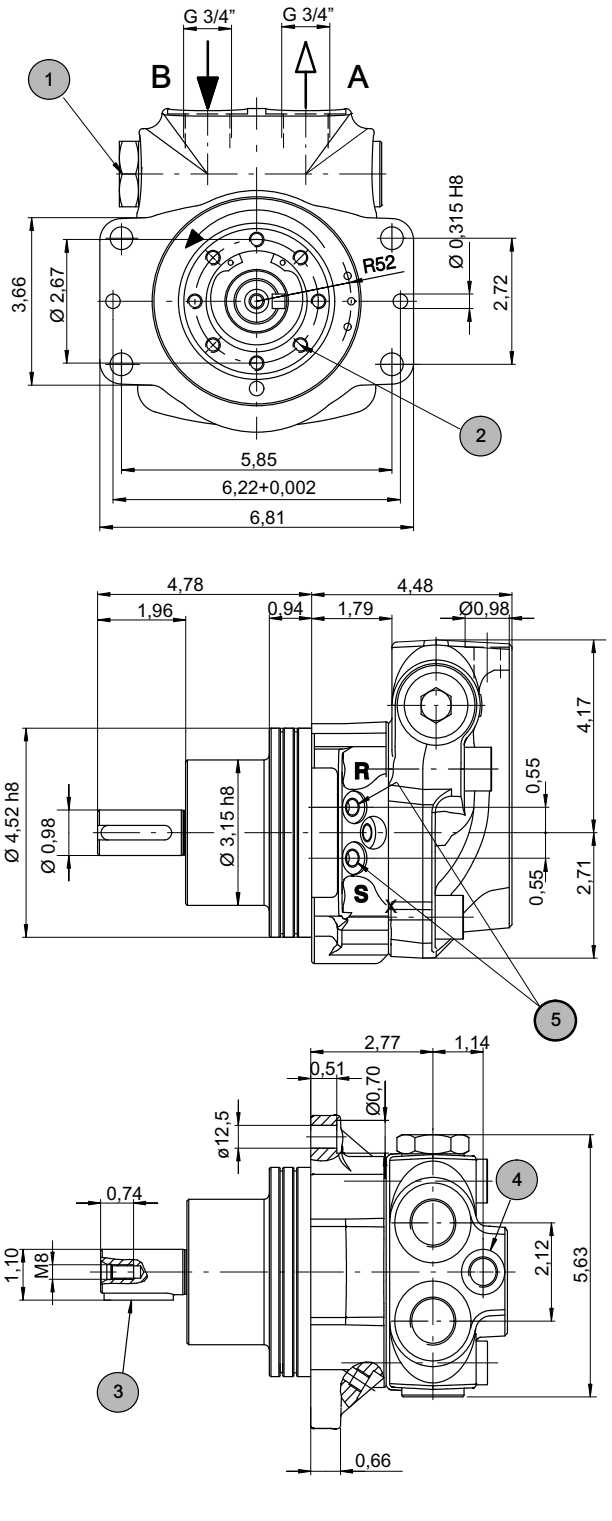


5 Dimensions

5.1 QXM42-...R-HS-.SKRG1..



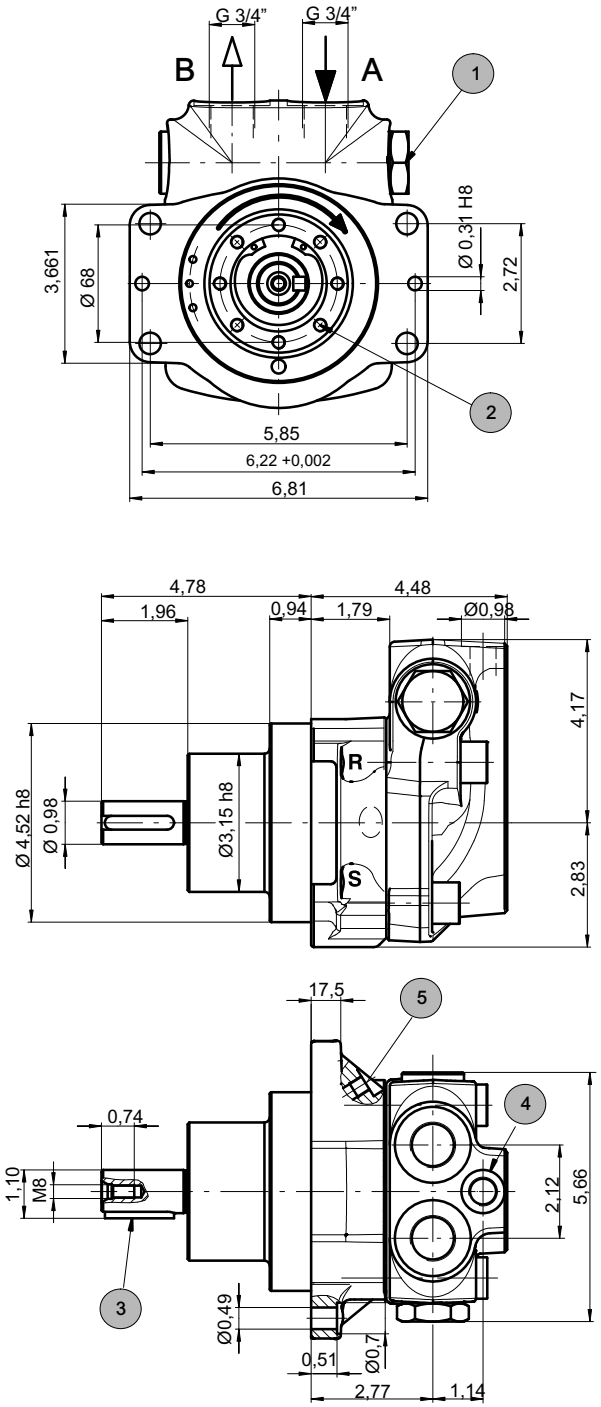
5.2 QXM42-...L-HS-.SKRG1..



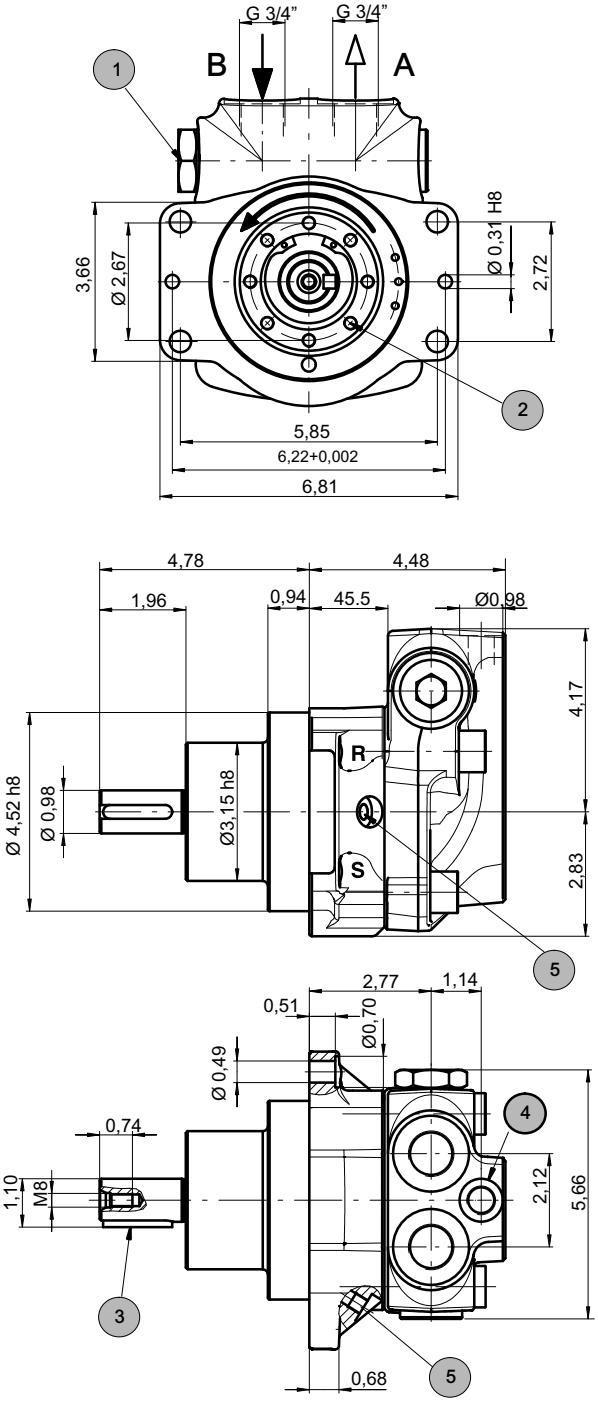
1	Anti cavitation valve
2	8 x M8; depth 0,472
3	DIN 6885 A8 x 7 x 40

4	Drain port G3/8"
5	Port R, S and X: G1/8"; depth 10 (X = without identification)

5.3 QXM42-...R-HS-.SKRF1..



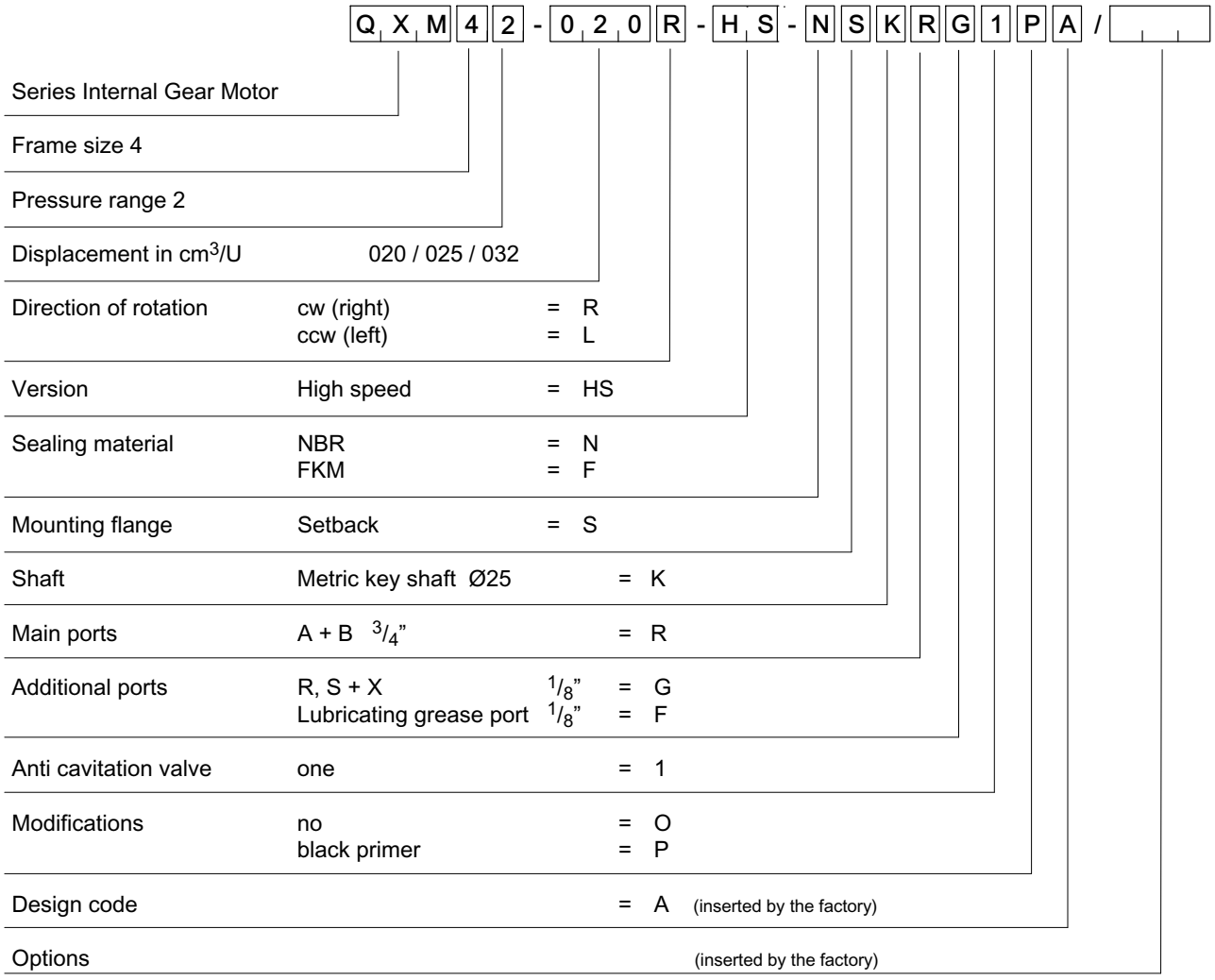
5.4 QXM42-...L-HS-.SKRF1..



1	Anti cavitation valve
2	8 x M8; depth 0,47
3	DIN 6885 A8 x 7 x 40

4	Drain port G3/8”
5	Lubricating grease port: G1/8”; depth 0,394

6 Ordering code



7 Operation instructions

7.1 Temperature and viscosity

The temperature should not exceed 70 °C in the main circuit.

At operating temperature, the viscosity of the hydraulic fluid should be above 15 mm^2/s. At start-up, the viscosity should not exceed 1000 mm^2/s.

Up to the operating viscosity the motor must not be loaded.

7.2 Cold start

The majority of hydraulic motor breakdowns are caused during the first minutes of a cold start. The lifetime of a hydraulic motor may be drastically reduced when during the cold start phase the shaft speed exceeds 5,000 rpm and the pressure at the motor is in excess of 100 bar.

TIP: For runing the system up (cold start) use a log with a dia. of < 15cm to make min. 20
short cuts each < 1 sec. and after each cut pause the procedure for min. 2 secs.

8 Fluid

QXM42-HS Motors require fluid with a minimum cleanliness level of NAS 1638, Class 9 or ISO 4406, code 20/18/15.
We recommend the use of fluids that contain anti-wear additives for mixed-friction operating conditions. Fluids without appropriate additives can reduce the service life of pumps and motors. The user is responsible for maintaining, and regularly checking, the fluid quality. Bucher Hydraulics recommends a load capacity of $\geq$ 30 N/mm^2 to Brugger DIN 51347-2.

9 Fluid cleanliness class

Cleanliness class (RK) onto ISO 4406 and NAS 1638

Code ISO 4406	Number of particles / 100 ml			
	≥ 4 µm	≥ 6 µm	≥ 14 µm	NAS 1638
23/21/18	8000000	2000000	250000	12
22/20/18	4000000	1000000	250000	-
22/20/17	4000000	1000000	130000	11
22/20/16	4000000	1000000	64000	-
21/19/16	2000000	500000	64000	10
20/18/15	1000000	250000	32000	9
19/17/14	500000	130000	16000	8
18/16/13	250000	64000	8000	7
17/15/12	130000	32000	4000	6
16/14/12	64000	16000	4000	-
16/14/11	64000	16000	2000	5
15/13/10	32000	8000	1000	4
14/12/9	16000	4000	500	3
13/11/8	8000	2000	250	2

10 Operational reliability

To guarantee the reliable operation and a long service life of the QXM42-HS Internal Gear Motors, a maintenance schedule must be prepared for the power unit, machine or system. The maintenance schedule must make sure that the provided or permissible operating conditions of the pump are adhered to over the period of use.
In particular, compliance with the following operating parameters must be ensured:
– The required oil cleanliness
– The operating temperature range
– The fluid level
Moreover, the motor and the system must be inspected at regular intervals for changes in the following parameters:
– Vibration
– Noise
– Differential temperature of pump – fluid in the tank
– Foaming in the tank
– Leak tightness
Changes in these parameters indicate wear of components (e.g. drive motor, coupling, pump, etc.). The cause must be immediately pinpointed and eliminated.

11 Note

This catalogue is intended for users with specialist knowledge. The user must check the suitability of the equipment described herein in order to ensure that all of the conditions necessary for the safety and proper functioning of the system are fulfilled. If you have any doubts or questions concerning the use of these pumps, please consult Bucher Hydraulics.

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