

# PRODUCT BROCHURE



## ROTOR ASYNCHRONOUS MOTORS VERTICAL HOLLOW SHAFT CAGE

(Pump Motors)

Rated output: 3Kw ~ 370kW



# GENERAL INFORMATION

## ◆ APPLICATION

The ever increasing demand for water necessary for irrigation, domestic and drinking purposes is being met from underground supplies mainly by use of deep-well vertical turbine pumps. VHS motors are primarily designed and particularly suited to drive vertical turbine pumps due to ease of installation, protected construction, permanent shaft alignment, and trouble free service under arduous conditions with a minimum of maintenance.

VHS motors utilize a hollow shaft through which the pump shaft passes and are designed to carry the thrust loads of the pump. An easily accessible coupling situated at the top of the motor ( under the cowl) facilitates coupling and permits vertical adjustment of the pump shaft to position the impellers of the pump. Motors are generally fitted with 7000 series bearings which enables them to carry heavy trust loads for long periods. This document contains IP22 VHS motors.

## ◆ MECHANICAL PROTECTION

enclosure of the drip-proof motors are grade IP22 according to the TS 3209 EN 60034-5. This enclosure protects the motor against ingress of solid bodies greater than 12 mm in diameter and also against splash water from above up to 60 from vertical; therefore suitable in relatively dry environments or in sheltered positions.

Higher grade protection class can be provided on request.

Inquire for IP55 protection motors.

## ◆ VOLTAGE, FREQUENCY AND SPEED

Motors are designed for operation on 380 Volts, 3 phase, 50 Hz. Motors for the voltages and frequencies can be made on request. A voltage variation of 6% and frequency of 5% does not effect the motor performance.

The standard synchronous speeds are:

Frequency	2 poles	4 poles
50 Hz	3000 rpm	1500 rpm

60 Hz speeds are 20% lower than the synchronous speeds. All performance values are given for 50 Hz operation.

If the standard motor is connected to a 60 Hz supply the speed will increase by 20%, the torque will fall by 17% and the power will not change.

## RATING AND OUTPUT

The rated output and operating characteristics given in the tables refers to continuous duty (S1) at a rated frequency of 50 Hz, rated voltage a maximum ambient temperature 40°C and an altitude of up to 1000 m above sea level. Motors at operating temperature are capable of withstanding for 15 seconds 1.6 times the rated torque without excessive heating and impairment of use full life. For operation in ambient temperatures other than 40°C the rated output is corrected as follows.

For operations at altitude exceeding 1000m above sea level the output is corrected as follows:

Amb. Temp. [°C]	30	35	40	45	50	55	60
% Rated Output	107	104	100	95	91	86	80

Altitude above sea level [m]	1000	2000	3000	4000	5000
% of rated Output	100	94	87	80	77

## INSULATION CLASSES AND WINDINGS

Stator is wound with F or H class enameled copper wire. The wound stators are then double impregnated and furnace dried to render them resistant to moisture.

## MOUNTING

Motors have Nema Style "P" bases or IEC "A" flanges and are designed for vertical mounting only.

## ROTOR AND STATOR

Both rotor and stator packets are made from low loss silicon steel laminations. Squirrel cage in rotor is produced by aluminium pressure die casting. The complete rotor-together with the shaft and fan- is dynamically balanced.

## STARTING

All motors are wound for 380 V delta and therefore are suitable for direct on line starting, motors produce 200-300 % full load torque at start and has a starting current of 400-750% full load current. With star/delta starting both the starting torque and current drops to about 1/3 of these values.

## NON-REVERSE BACK STOP

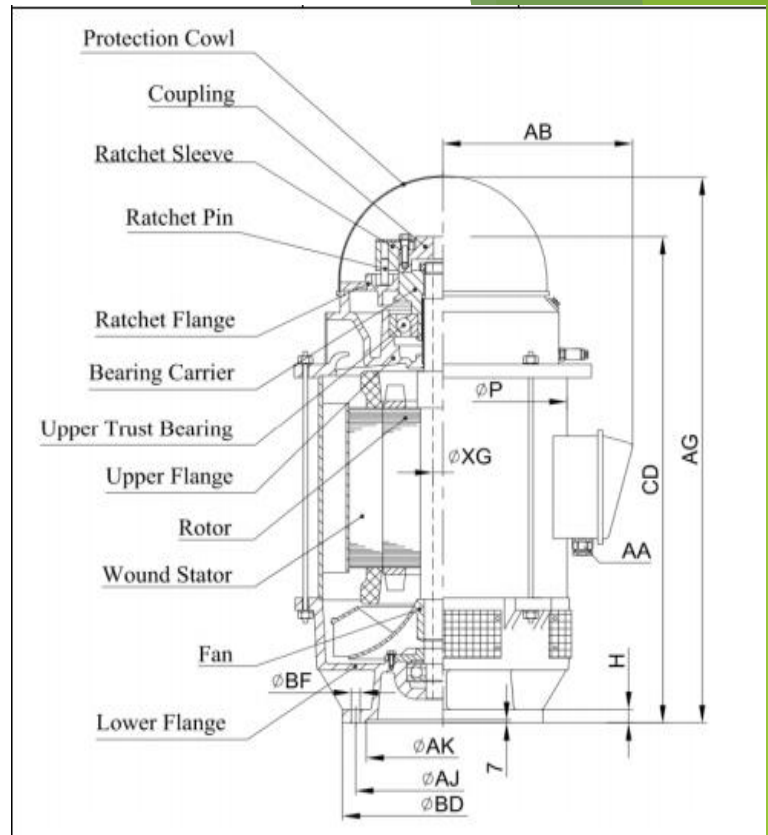
The standard VHS motors are designed for anti-clockwise rotation viewed from coupling end. The back stop protects the pump against damage caused by accidental reversal of backspin caused by the head of water draining back through the pump.

## BEARING AND BEARING LIFE

Motors are provided with bearings having ample trust capacity which are capable of withstanding the entire trust loads of rotor, pump shaft assembly and the column of water.

All motors are fitted with 72-73 or 29 series bearings at the top end for trust and radial loads, and 62-63 series single row deep groove ball bearings at the bottom end for radial guiding. The bearing types and lubrication methods and permissible trust loads are shown in the following pages. The bearings are so chosen as to give a minimum bearing life of 10000 hours at the quoted down thrust loads. Reducing the trust load will increase the bearing life.

## MOTOR SKETCH



VERTICAL HOLLOW SHAFT  
CAGE ROTOR  
ASYNCHRONOUS MOTORS  
(3 PHASE)  
Ingress Protection Rating  
Insulation class

IP23  
H

10	132	110	90	75	55	45	37	30	18.5	15	Rated output (kW)
8	180	150	125	100	75	60	50	40	25	20	Rated output (PS)
60	1475	1475	1475	1470	1465	1460	1450	1445	1450	1450	Rated speed (RPM)
M-S /4	DPKM-S 132/4	DPKM-S 110/4	DPKM-S 90/4	DPKM-S 75/4	DPKM-G 55/4	DPKM-S 45/4	DPKM-S 37/4	DPKM-S 30/4	DPKM-G 18.5/4	DPKM-G 15/4	Type
25	3434	3434	3434	3360	3360	2211	2211	2211	1624	1624	Thrust Load [kgf]
7.3	256.3	213.6	172.8	148.8	110.4	88.3	74.3	60.9	39.4	31.9	Rated Current (A)
2.4	854.6	712.2	582.7	487.2	358.5	294.3	243.7	198.3	121.8	98.8	Rated Torque MN (Nm)
0.87	0.86	0.86	0.86	0.87	0.86	0.88	0.87	0.86	0.83	0.83	Power Factor (Cos) 100%
0.83	0.83	0.83	0.81	0.81	0.81	0.83	0.85	0.83	0.79	0.79	Power Factor (Cos) 75%
0.75	0.75	0.75	0.73	0.73	0.73	0.75	0.78	0.75	0.7	0.7	Power Factor (Cos) 50%
91	91	92	88	88	88	87	87	86	86	86	Efficiency (%) 100%
93	93	94	90	90	90	89	89	88	88	88	Efficiency (%) 75%
90	90	91	87	87	87	86	86	85	85	85	Efficiency (%) 50%
6.85	7.1	5.54	5.76	6.25	6.6	6.64	6.16	6.6	6.21	6.21	Starting current IK/IN
2.07	1.89	2.07	2.16	2.61	2.61	2.79	2.61	2.7	2.61	2.61	Starting Torque MK/NK
2.16	2.07	2.52	1.98	2.52	2.25	2.43	2.7	2.61	2.79	2.79	Breakdown Torque MD/MN
343	343	343	343	343	343	343	343	343	209.55	209.55	Lower Flange [mm]
45	45	45	38.5	38.5	33.5	33.5	33.5	33.5	33.5	33.5	Shaft Hole [mm]
42.9	42.9	48.2	38.2	38.2	30.2	30.2	30.2	25.4	25.4	25.4	Coupling Hole [mm]

PERFORMANCE DATA (FULL LOAD)