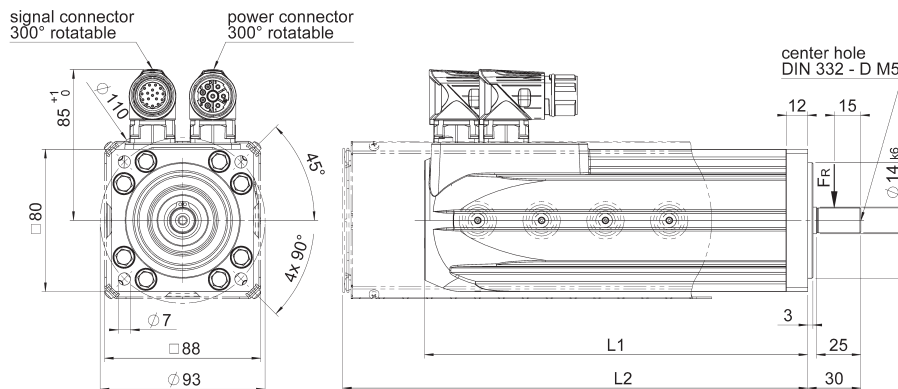


HBR 37

High-Power Synchronous Servo Motors

with permanent magnetic field

Motor series HBR 37
up to 1930 Watts output power
with different angle encoder systems
with or without parking brake
with or without forced ventilation

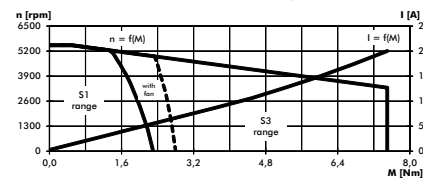


Motor type	Dimension	
	L1	L2
HBR 3760-R2	144	190
HBR 3760-R2-B7.04	180	226
HBR 37100-R2	180	226
HBR 37100-R2-B7.04	216	262
HBR 37140-R2	216	262

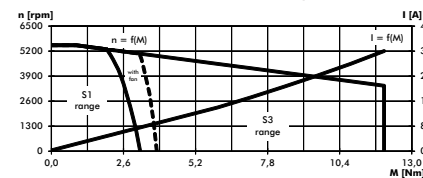
Operation characteristics:

Measured at servo-amplifier with 3-phase sinusoidal output

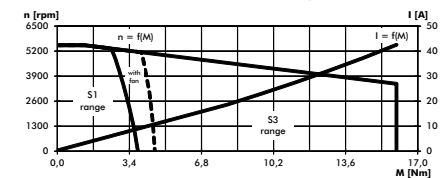
HBR 3760, 320V, 3500/4500/5500rpm



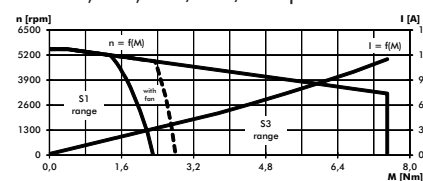
HBR 37100, 320V, 3500/4500/5500rpm



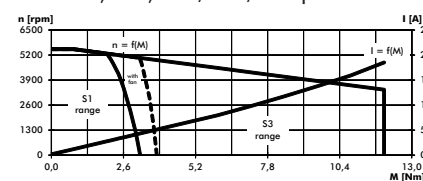
HBR 37140, 320V, 3500/4500/5500rpm



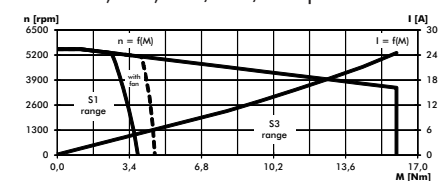
HBR 3760, 560V, 3500/4500/5500rpm



HBR 37100, 560V, 3500/4500/5500rpm



HBR 37140, 560V, 3500/4500/5500rpm



Motor design:

The High-Power Three-phase synchronous Motors of series HBR 37 are fitted with a 3-phase concentrated stator-winding system. The 6-pole rotor-magnet system is made of high-grade Neodymium Iron Boron.

The motors have a sinusoidal Back EMF. To avoid thermal overload a PTC resistor is embedded in the stator winding.

As standard, a brushless pancake-resolver is integrated. Optionally, also a hall-based singleturn angle encoder (BiSS interface) or a hall commutation sensor incl. incremental signals are available (additional information see page 3).

All motors can be equipped with optional forced ventilation for increased performance.

Types HBR 3760 and HBR 37100 are also available with integrated parking brake.

Features:

- High acceleration because of small moments of inertia
- Large peak torques because of high allowable pulse currents
- Maintenance-free operation due to brushless design - mechanical life cycle only depends on bearing and its lubrication
- High overload range due to good dissipation of the power-losses occurred in the stator
- The very compact design allowing high power output in a very small volume
- Robust mechanical structure with aluminium cast housing
-  UL approval as „recognized component“
- Optional forced ventilation kit with axial fan and air guide hood

edition 05.18

type series		HBR 3760				HBR 37100				HBR 37140			
cooling		without	fan	without	fan	without	fan	without	fan	without	fan	without	fan
max. speed	rpm	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
bus voltage	V	320	320	560	560	320	320	560	560	320	320	560	560
nominal speed	rpm	3500	4500	3500	4500	3500	4500	3500	4500	3500	4500	3500	4500
nominal current ^{1) **)}	A	4,4	5,8	2,5	3,3	6,2	7,9	3,6	4,5	7,4	9,7	4,2	5,5
nominal current, rms	A	3,1	4,1	1,8	2,4	4,4	5,6	2,5	3,2	5,2	6,9	3	3,9
nominal power ²⁾	W	660	1130	660	1130	950	1560	950	1560	1140	1930	1140	1930
operation acc. to standards VDE 0530		S1				S1				S1			
protection acc. to standards VDE 0530		IP 54				IP 54				IP 54			
rotating direction		reversible				reversible				reversible			
structural shape acc. standards VDE 0530		IM B5 - with end plate centering				IM B5 - with end plate centering				IM B5 - with end plate centering			
kind of connection		connectors (see below)				connectors (see below)				connectors (see below)			
mechanical data:													
moment of inertia motor	kgm ²	0,071*10 ⁻³				0,115*10 ⁻³				0,15*10 ⁻³			
nominal torque ²⁾	Nm	1,8	2,4	1,8	2,4	2,6	3,3	2,6	3,3	3,1	4,1	3,1	4,1
max. continous torque at stall ²⁾	Nm	2,3	2,8	2,3	2,8	3,2	3,8	3,2	3,8	3,8	4,6	3,8	4,6
peak torque	Nm	7,5		7,5		12		12		16		16	
speed regulation constant	N ⁻¹ cm ⁻¹ rpm	1,45		1,5		0,84		0,82		0,61		0,6	
mechanical time constant	ms	1,3		1,3		1,2		1,2		1,1		1,1	
friction torque	Nm	0,11	0,12	0,11	0,12	0,12	0,14	0,12	0,14	0,12	0,15	0,12	0,15
rotor weight motor	kg	0,6				0,9				1,15			
motor weight incl. resolver	kg	2,8	3,5	2,8	3,5	3,8	4,5	3,8	4,5	4,8	5,5	4,8	5,5
ball bearings	A/B-side	6202/6201				6202/6201				6202/6201			
F _R (allowable radial shaft load) ³⁾	N	150				150				150			
F _A (allowable axial shaft load)	N	100				100				100			
electrical data:													
number of phases		3				3				3			
number of poles		6				6				6			
terminal resistance ⁴⁾	Ω	3,35		10,2		1,95		5,8		1,35		4,1	
inductance ⁴⁾	mH	11,5		35		6,8		20		4,8		14,9	
voltage constant ^{1) *)}	V/1000 rpm	53		93		53		93		53		93	
torque constant ^{1) *)}	Nm/A	0,438		0,769		0,438		0,769		0,438		0,769	
continous current at stall ^{1) **)}	A	5,3	6,4	3,0	3,7	7,3	8,7	4,2	5,0	8,7	10,5	5,0	6,0
current at peak torque ^{1) **)}	A	20		11,5		32		18,5		42,5		24,5	
max. peak current ^{1) 5)}	A	25		14,5		40		23		54		31	
electrical time constant	ms	3,4		3,4		3,5		3,5		3,6		3,6	
thermal data:													
max. ambient temperature	°C	40				40				40			
isolation acc. to standards VDE 0530		F				F				F			
thermal time constant	min	27	11	27	11	31	12	31	12	35	13	35	13
temperature-rise without/with cooling	K/W	0,64	0,41	0,64	0,41	0,62	0,41	0,62	0,41	0,6	0,39	0,6	0,39
parking brake:													
type		B 7.04				B 7.04				-			
nominal voltage	V=	24				24				-			
nominal current	A	0,55				0,55				-			
static brake torque	Nm	3,5				3,5				-			
mass moment of inertia	kgm ²	0,018*10 ⁻³				0,018*10 ⁻³				-			
motor weightincl. resolver and parking brake	kg	3,3	4	3,3	4	4,3	5	4,3	5	-			
connectors:													
motor flange socket		series 923 speedtec-ready (INTERCONTEC)											
resolver flange socket		series 623 speedtec-ready (INTERCONTEC)											

*) Tolerance - 10 %

**) Tolerance + 10 %

¹⁾ Sinusoidal-peak

²⁾ Values are for motor-assembling on a locating face of aluminium of at least 0,15 m² at a thickness of 10 mm or similar metal face.

³⁾ Middle of the shaft-extension.

⁴⁾ Measured between two phases.

⁵⁾ The mentioned values are valid for operation in temperature-ranges from 0 up to +40 °C and it is not allowed to excess them, not even for a short-time, to avoid magnet-weakening.

design-changes reserved

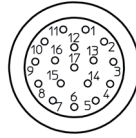
HBR 37

options for angle encoder systems

R2.4 resolver (standard encoder):

technology: pancake resolver
 measuring range: 360°, 2 pole, singleturn
 transformation ratio: 0,5 ± 5 %
 electrical error: max. ± 10' el
 supply: 7 Veff 10 kHz / max. 65 mA
 connector: connector 17-pol., series 623

connector series 623
 17-pol., 0 coded

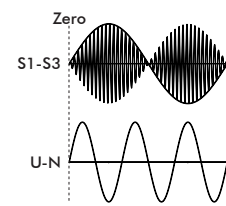


connecting side
 of connector

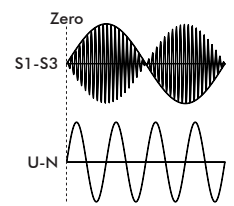
pin assignment
 1 - S1
 2 - S3
 3 - S2
 4 - S4
 5 - Thermo
 6 - R1
 7 - R2
 8 - Thermo
 9 - free
 10 - free
 11 - free
 12 - free
 13 - free
 14 - free
 15 - free
 16 - free
 17 - free

signal assignment (rotation CW)

6-pole motor



8-pole motor



DS1 singleturn angle encoder:

technology: linear hall system, digitized
 measuring range: 360° singleturn
 resolution: 12 bit (4096 steps) ± 0,088°
 nonlinearity: max. 0,6°
 supply: V+ = 5,5 ... 12 VDC / max. 120 mA
 interface: BiSS, binary coded
 12 bit data, 2 bit status, 6 bit CRC
 RS422, R_{T(MA)} = 100 Ohm
 connector: M12 connector 8-pol., A coded

M12 connector
 8-pol., A coded



connecting side
 of connector

pin assignment
 1 - V+
 2 - V-
 3 - Thermo+
 4 - MA-
 5 - SL+
 6 - MA+
 7 - Thermo-
 8 - SL-

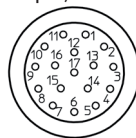
recommended cable type: Cat.5e, SF/UTP, AWG24

cable length	max. MA frequency without ⁶⁾ / with line delay compensation
2 m	2,5 MHz / 10 MHz
5 m	2,2 MHz / 10 MHz
10 m	1,7 MHz / 10 MHz
25 m	1,0 MHz / 10 MHz

RL6 commutation sensor with incremental signals:

technology: hall system
 measuring range: 360° singleturn
 resolution: 12 bit
 nonlinearity: max. 0,6°
 supply: V+ = 4,5 ... 12 VDC / max. 150 mA
 interface: open collector - H1, H2, H3 120° el
 (mac. 10 mA, max. 24 V)
 RS422 - channel A, B, Z
 connector: connector 17-pol., series 623

connector series 623
 17-pol., 0 coded

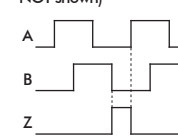


connecting side
 of connector

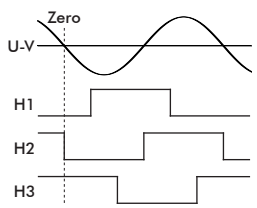
pin assignment
 1 - Hall 1
 2 - Hall 2
 3 - Hall 3
 4 - V+
 5 - Thermo
 6 - GND
 7 - free
 8 - Thermo
 9 - 11 - free
 12 - Ch A
 13 - Ch A invers
 14 - Ch B
 15 - Ch B invers
 16 - Ch Z
 17 - Ch Z invers

signal assignment

incremental
 (complementary signals
 NOT shown)

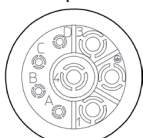


commutation (rotation CW)



pin assignment power connector

connector series 923
 8-pol.



connecting side
 of connector

pin assignment
 1 - U
 3 - W
 4 - V
 PE
 A - Brake +
 B - Brake -
 C - Fan +
 D - Fan -

⁶⁾ Condition: Total propagation delay in the BiSS master device $t_{d(MA)} + t_{d(SL)} \leq 25 \text{ ns}$.