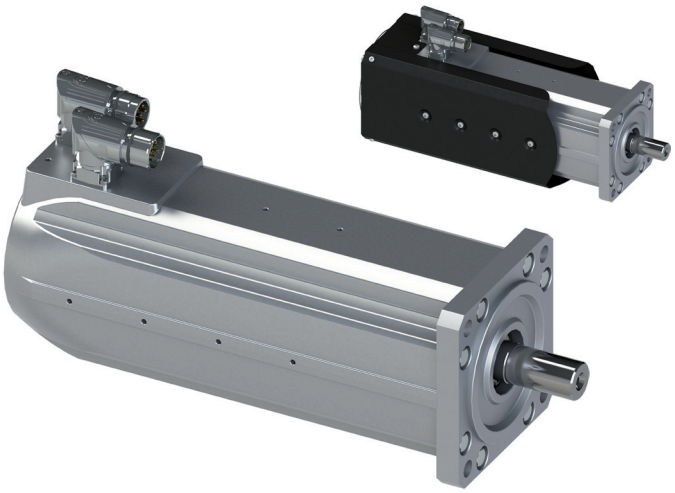
ENGEL ELEKTROANTRIEBE

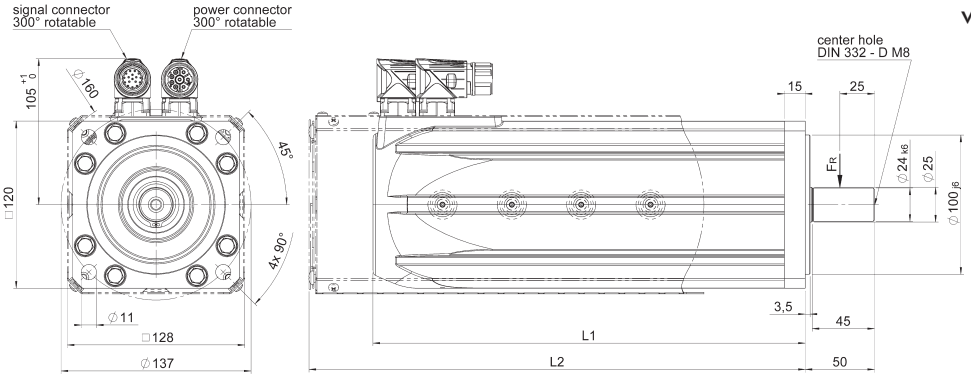


HBR 63

High-Power Synchronous Servo Motors

with permanent magnetic field

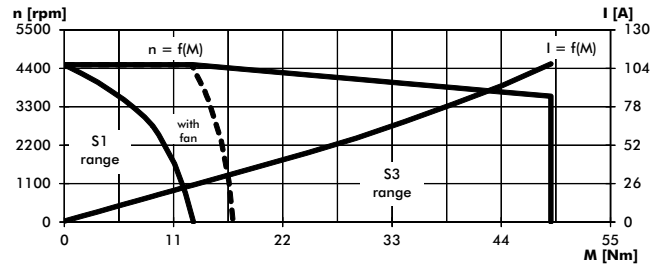
Motor series HBR 63
up to 6600 Watts output power
with different angle encoder systems
with or without parking brake
with or without forced ventilation



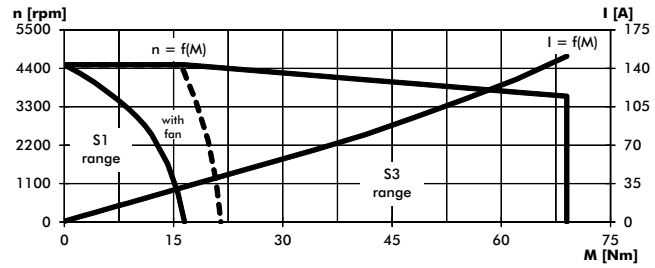
Motor type	Dimension	
	L1	L2
HBR 63150-R2	252	298
HBR 63150-R2-B7.18	312	358
HBR 63210-R2	312	358

Operation characteristics:
Measured at servo-amplifier with 3-phase sinusoidal output

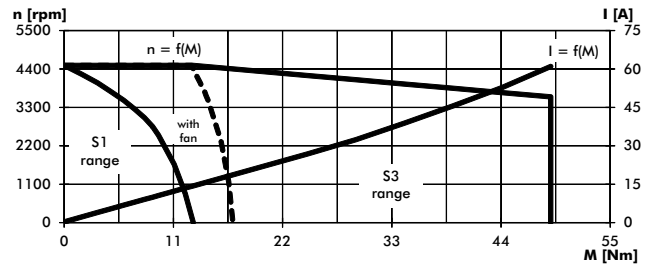
HBR 63150, 320V, 2500/3500/4500rpm



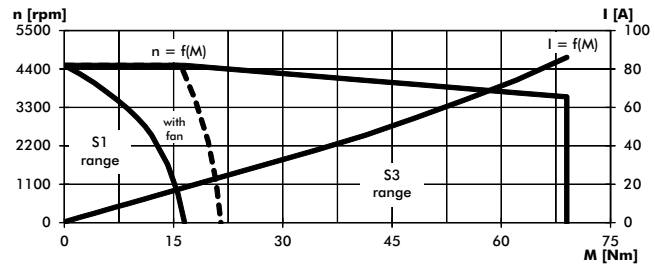
HBR 63210, 320V, 2500/3500/4500rpm



HBR 63150, 560V, 2500/3500/4500rpm



HBR 63210, 560V, 2500/3500/4500rpm



Motor design:

The High-Power Three-phase synchronous Motors of series HBR 63 are fitted with a 3-phase concentrated stator-winding system. The 8-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.

Type HBR 63150 is 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
- c UL us UL approval as „recognized component" (560V versions)
- Optional forced ventilation kit with axial fan and air guide hood

edition 05.18

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type		HBR 63150				HBR 63210			
series		-				-			
cooling		without	fan	without	fan	without	fan	without	fan
max. speed	rpm	4500	4500	4500	4500	4500	4500	4500	4500
bus voltage	V	320	320	560	560	320	320	560	560
nominal speed	rpm	2500	3500	2500	3500	2500	3500	2500	3500
nominal current [1] [**]	A	18,6	28,2	10,6	16,1	23,5	35	13,4	20
nominal current, rms	A	13,1	20	7,5	11,4	16,6	24,8	9,5	14,2
nominal power [2]	W	2490	5320	2490	5320	3150	6600	3150	6600
operation acc. to standards VDE 0530		S1				S1			
protection acc. to standards VDE 0530		IP 54				IP 54			
rotating direction		reversible				reversible			
structural shape acc. standards VDE 0530		IM B5 - with end plate centering				IM B5 - with end plate centering			
kind of connection		connectors (see below)				connectors (see below)			
mechanical data:									
moment of inertia motor	kgm^2	$1,05*10^{-3}$				$1,35*10^{-3}$			
nominal torque [2]	Nm	9,5	14,5	9,5	14,5	12	18	12	18
max. continous torque at stall [2]	Nm	13	17	13	17	16,5	21,5	16,5	21,5
peak torque	Nm	49		49		69		69	
speed regulation constant	$N^{-1}\ cm^{-1}$ rpm	0,075		0,075		0,05		0,05	
mechanical time constant	ms	0,95		1		0,82		0,8	
friction torque	Nm	0,3	0,4	0,3	0,4	0,4	0,5	0,4	0,5
rotor weight motor	kg	3,2				4,3			
motor weight incl. resolver	kg	12,5	13,7	12,5	13,7	17	18,2	17	18,2
ball bearings	A/B-side	6205/6203				6205/6203			
F_R (allowable radial shaft load) [3]	N	500				500			
F_A (allowable axial shaft load)	N	200				200			
electrical data:									
number of phases		3				3			
number of poles		8				8			
terminal resistance [4]	Ω	0,25		0,78		0,17		0,52	
inductance [4]	mH	1,6		5,1		1,3		4,1	
voltage constant [1] [*]	V/1000 rpm	64		112		64		112	
torque constant [1] [*]	Nm/A	0,529		0,926		0,529		0,926	
continous current at stall [1] [**]	A	24,6	32,1	14	18,4	31,2	40,6	17,8	23,2
current at peak torque [1] [**]	A	107		61		151		86	
max. peak current [1] [5]	A	134		75		189		105	
electrical time constant	ms	6,4		6,5		7,7		7,9	
thermical data:									
max. ambient temperature	°C	40				40			
isolation acc. to standards VDE 0530		F				F			
thermal time constant	min	68	22	68	22	75	25	75	25
temperature-rise without/with cooling	K/W	0,4	0,2	0,4	0,2	0,4	0,2	0,4	0,2
parking brake:									
type		**B 7.18**				-			
nominal voltage	V=	24				-			
nominal current	A	1				-			
static brake torque	Nm	18				-			
mass moment of inertia	kgm^2	$0,157*10^{-3}$				-			
motor weightincl. resolver and parking brake	kg	14	15,2	14	15,2	-			
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 m^2 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

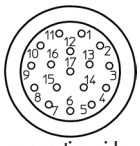
HBR 63

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

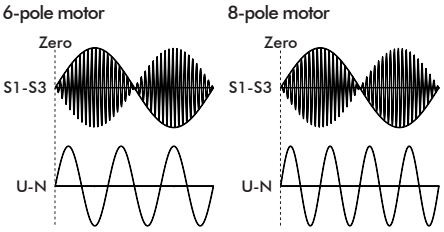


connecting side
of connector

pin assignment

1 - S1
2 - S3
3 - S2
4 - S4
5 - Thermo
6 - R1
7 - R2
8 - Thermo
9 ⋮ 17 - free

signal assignment (rotation CW)



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–

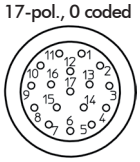
recommended cable type: Cat.5e, SF/UTP, AWG24

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



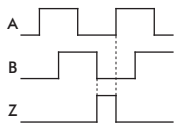
connecting side
of connector

pin assignment

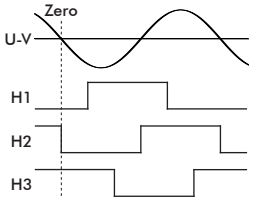
1 - Hall 1
2 - Hall 2
3 - Hall 3
4 - V+
5 - Thermo
6 - GND
7 - free
8 - Thermo
9 - 11 - free
12 - Ch A
13 - Ch A invers
14 - Ch B
15 - Ch B invers
16 - Ch Z
17 - Ch Z invers

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 $t_{d(MA)} + t_{d(SL)} \leq 25$ ns.

design-changes reserved