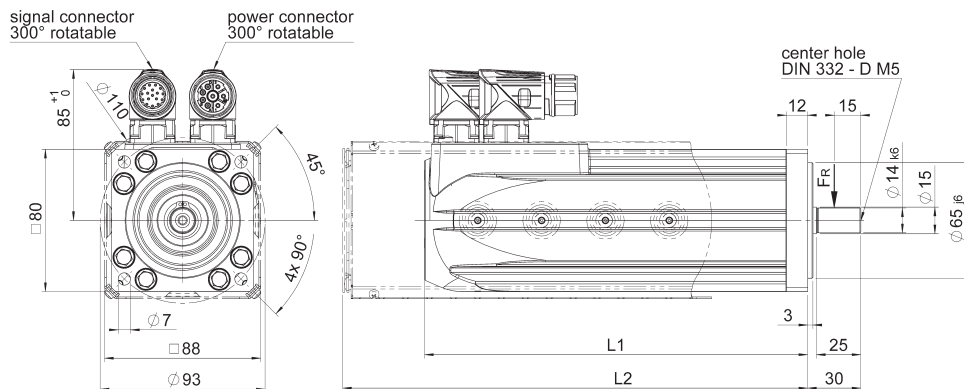
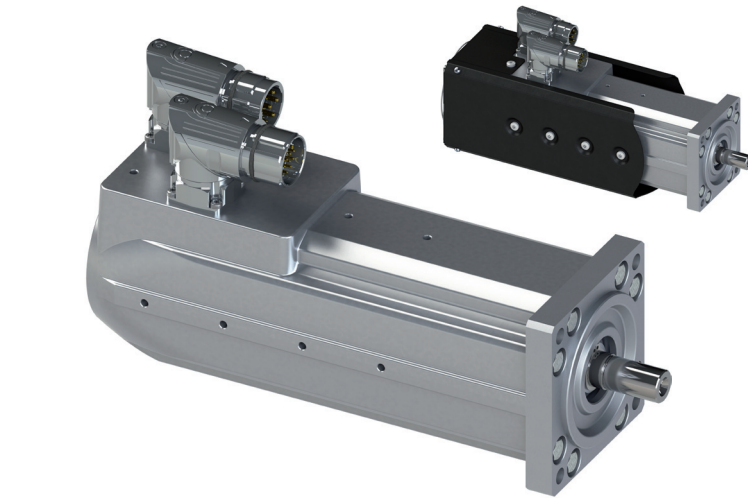


HBR 37

High-Power Synchronous Servo Motors

with permanent magnetic field

Motor series HBR 37
up to 1930 Watts output power
with brushless pancake-resolver
with or without parking brake
with or without forced ventilation

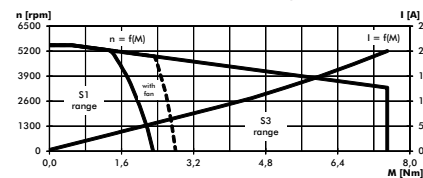


Motor type	Dimension	
	L1	L2
HBR 3760-R2	144	190
HBR 3760-R2-B7.04	180	226
HBR 37100-R2	180	226
HBR 37100-R2-B7.04	216	262
HBR 37140-R2	216	262

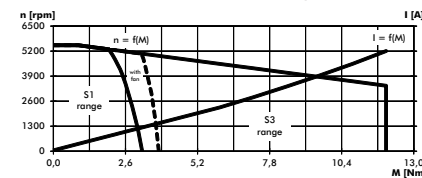
Operation characteristics:

Measured at servo-amplifier with 3-phase sinusoidal output

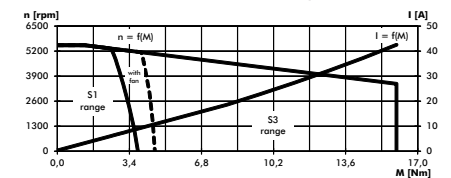
HBR 3760, 320V, 3500/4500/5500rpm



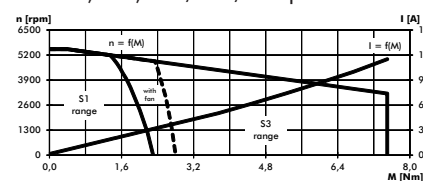
HBR 37100, 320V, 3500/4500/5500rpm



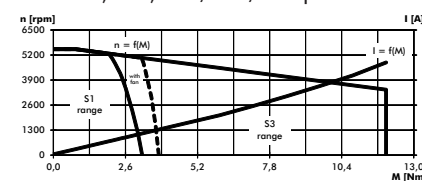
HBR 37140, 320V, 3500/4500/5500rpm



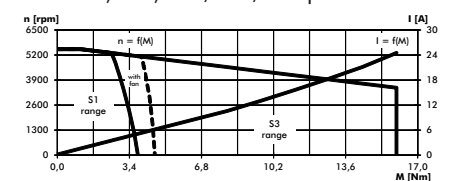
HBR 3760, 560V, 3500/4500/5500rpm



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.

The position information of the rotor will be generated using the integrated brushless pancake-resolver. Optionally, also a hall-based single resp. multiturm 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 high thermal time constant and 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
- Optional forced ventilation kit with axial fan and air guide hood

type series	HBR 3760				HBR 37100				HBR 37140			
	without	fan	without	fan	without	fan	without	fan	without	fan	without	fan
cooling	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500
max. speed rpm	320	320	560	560	320	320	560	560	320	320	560	560
bus voltage	V				V				V			
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	915	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	3,84	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	
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 weight incl. resolver and parking brake kg	3,3	4	3,3	4	4,3	5	4,3	5	-	-	-	-
connectors:												
motor flange socket	BEGA 120 NN 00 00 0200 000 (INTERNONTEC)											
resolver flange socket	AEGA 113 NN 00 00 0201 000 (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.

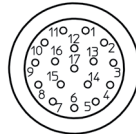
design-changes reserved

options for feedback systems

R2.4 resolver (standard feedback):

technology: pancake resolver
 measuring range: 360°, 2 pole, singletum
 transformation ratio: 0,5 ± 5 %
 electrical error: max. ± 10' el
 supply: 7 Veff 10 kHz / max. 65 mA
 connector: connector 12-pol., series 615

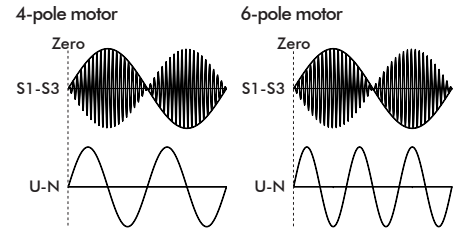
connector series 623
 17-pol., 0 coded



connecting side of connector

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

signal assignment (rotation CW)



DS1 singletum angle encoder:

technology: linear hall system, digitized
 measuring range: 360° singletum
 resolution: 12 bit (4096 steps) ≅ 0,088°
 nonlinearity: max. 0,6°
 supply: V+ = 5,5 ... 12 VDC / max. 60 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

DS2 multiturn encoder:

technology: linear hall system, digitized, multiturn, battery backed
 measuring range: 360° x 4096 turns multiturn
 resolution: 12 bit singletum + 12 bit multiturn
 nonlinearity: max. 0,6°
 supply: V+ = 5,5 ... 12 VDC / max. 60 mA
 interface: BiSS, binary coded
 24 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-

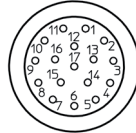
recommended cable type: Cat.5e, SF/UTP, AWG24

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° singletum
 resolution: 12 bit
 nonlinearity: max. 0,6°
 supply: V+ = 4,5 ... 12 VDC
 interface: open collector - H1, H2, H3 120° el (mac. 10 mA, max. 24 V)
 RS422 - channel A, B, Z
 connector: connector 12-pol., series 615

connector series 623
 17-pol., 0 coded

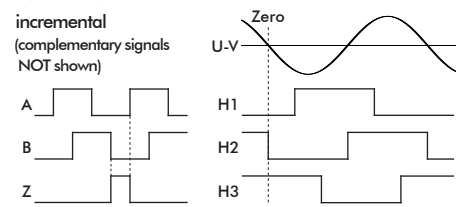


connecting side of connector

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



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 -

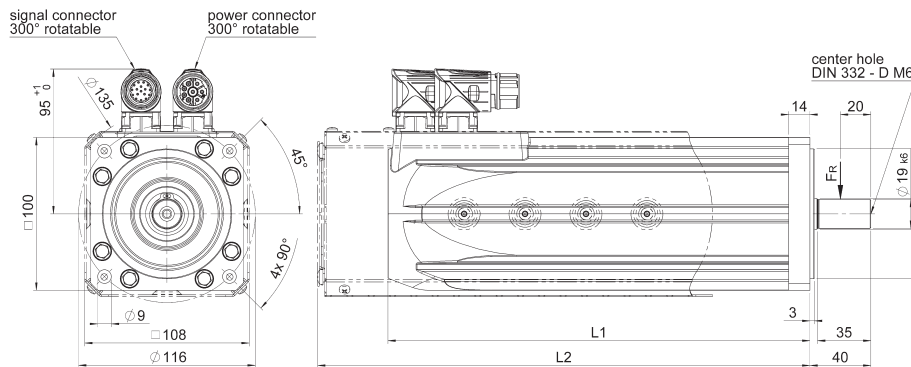
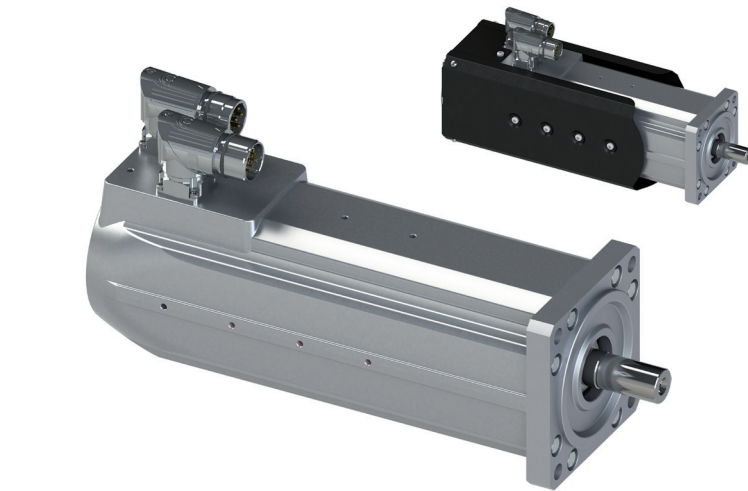
⁶⁾ Condition: Total propagation delay in the BiSS master device $t_{d(MA)} + t_{d(SL)} \leq 25$ ns.

HBR 48

High-Power Synchronous Servo Motors

with permanent magnetic field

Motor series HBR 48
up to 3690 Watts output power
with brushless pancake-resolver
with or without parking brake
with or without forced ventilation

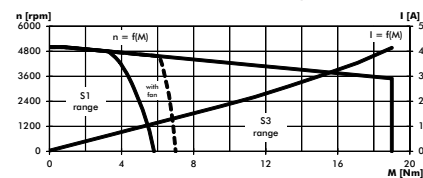


Motor type	Dimension	
	L1	L2
HBR 48100-R2	197	243
HBR 48100-R2-B7.09	237	283
HBR 48140-R2	237	283
HBR 48140-R2-B7.09	277	323
HBR 48180-R2	277	323

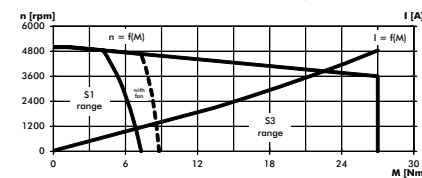
Operation characteristics:

Measured at servo-amplifier with 3-phase sinusoidal output

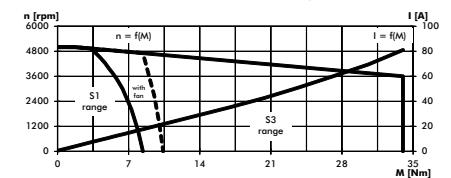
HBR 48100, 320V, 3000/4000/5000rpm



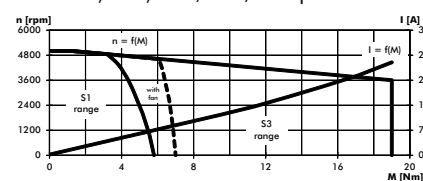
HBR 48140, 320V, 3000/4000/5000rpm



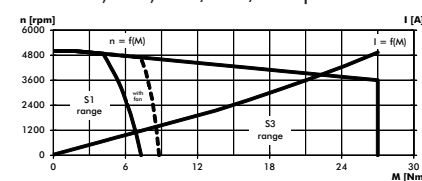
HBR 48180, 320V, 3000/4000/5000rpm



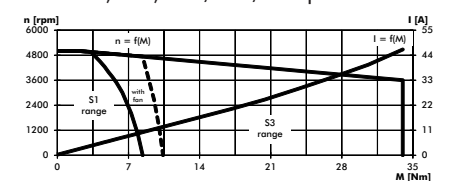
HBR 48100, 560V, 3000/4000/5000rpm



HBR 48140, 560V, 3000/4000/5000rpm



HBR 48180, 560V, 3000/4000/5000rpm



Motor design:

The High-Power Three-phase synchronous Motors of series HBR 48 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.

The position information of the rotor will be generated using the integrated brushless pancake-resolver. Optionally, also a hall-based single resp. multiturm 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 48100 and HBR 48140 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 high thermal time constant and 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
- Optional forced ventilation kit with axial fan and air guide hood

type series	HBR 48100				HBR 48140				HBR 48180			
	without	fan	without	fan	without	fan	without	fan	without	fan	without	fan
cooling	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
max. speed rpm	320	320	560	560	320	320	560	560	320	320	560	560
bus voltage	V				V				V			
nominal speed rpm	3000	4000	3000	4000	3000	4000	3000	4000	3000	4000	3000	4000
nominal current ^{1) **)} A	10	13,4	5,7	7,7	12,3	16,3	7,1	9,4	13,6	18,7	8,2	10,7
nominal current, rms A	7	9,5	4	5,4	8,7	11,6	5	6,6	9,6	13,2	5,8	7,6
nominal power ²⁾ W	1480	2640	1480	2640	1825	3225	1825	3225	2015	3690	2015	3690
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	0,24*10 ⁻³				0,34*10 ⁻³				0,42*10 ⁻³			
nominal torque ²⁾ Nm	4,7	6,3	4,7	6,3	5,8	7,7	5,8	7,7	6,4	8,8	6,4	8,8
max. continous torque at stall ²⁾ Nm	5,8	7	5,8	7	7,3	8,8	7,3	8,8	8,4	10,4	8,4	10,4
peak torque Nm	19		19		27		27		34		34	
speed regulation constant N ⁻¹ cm ⁻¹ rpm	0,31		0,31		0,21		0,21		0,16		0,16	
mechanical time constant ms	0,91		0,89		0,86		0,85		0,81		0,81	
friction torque Nm	0,16	0,2	0,16	0,2	0,2	0,25	0,2	0,25	0,24	0,3	0,24	0,3
rotor weight motor kg	1,45				1,85				2,3			
motor weight incl. resolver kg	6	7	6	7	7,5	8,5	7,5	8,5	9,9	10,8	9,9	10,8
ball bearings A/B-side	6204/6203				6204/6203				6204/6203			
F _R (allowable radial shaft load) ³⁾ N	350				350				350			
F _A (allowable axial shaft load) N	140				140				140			
electrical data:												
number of phases	3				3				3			
number of poles	8				8				8			
terminal resistance ⁴⁾ Ω	0,9		2,7		0,6		1,8		0,46		1,4	
inductance ⁴⁾ mH	4,2		13,1		2,9		8,8		2,2		6,8	
voltage constant ^{1) *)} V/1000 rpm	59		103		59		103		59		103	
torque constant ^{1) *)} Nm/A	0,488		0,852		0,488		0,852		0,488		0,852	
current at peak torque ^{1) **)} A	45,5		26		64,5		37		81		46,5	
max. peak current ^{1) 5)} A	56,5		32		80,5		46		101		58	
electrical time constant ms	4,7		4,9		4,8		4,9		4,8		4,9	
thermal data:												
max. ambient temperature °C	40				40				40			
isolation acc. to standards VDE 0530	F				F				F			
thermal time constant min	40	12	40	12	43	15	43	15	45	18	45	18
temperature-rise without/with cooling K/W	0,5	0,31	0,5	0,31	0,47	0,29	0,47	0,29	0,45	0,27	0,45	0,27
parking brake:												
type	B 7.09				B 7.09				-			
nominal voltage V=	24				24				-			
nominal current A	0,8				0,8				-			
static brake torque Nm	9				9				-			
mass moment of inertia kgm ²	0,053*10 ⁻³				0,053*10 ⁻³				-			
motor weight incl. resolver and parking brake kg	7	8	7	8	8,6	9,6	8,6	9,6	-	-	-	-
connectors:												
motor flange socket	BEGA 120 NN 00 00 0200 000 (INTERNONTEC)											
resolver flange socket	AEGA 113 NN 00 00 0201 000 (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.

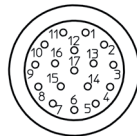
design-changes reserved

options for feedback systems

R2.4 resolver (standard feedback):

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 12-pol., series 615

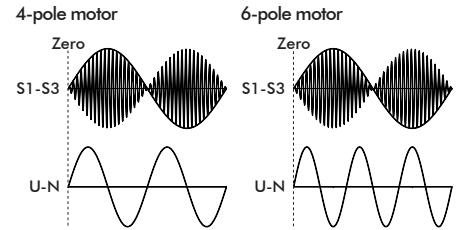
connector series 623
 17-pol., 0 coded



connecting side of connector

pin assignment
 1 - S1
 2 - S3
 3 - S2
 4 - S4
 5 - Thermo
 6 - R1
 7 - R2
 8 - Thermo
 9 - free
 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. 60 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

DS2 multiturn encoder:

technology: linear hall system, digitized, multiturn, battery backed
 measuring range: 360° x 4096 turns multiturn
 resolution: 12 bit singleturn + 12 bit multiturn
 nonlinearity: max. 0,6°
 supply: V+ = 5,5 ... 12 VDC / max. 60 mA
 interface: BiSS, binary coded
 24 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-

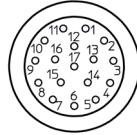
recommended cable type: Cat.5e, SF/UTP, AWG24

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
 interface: open collector - H1, H2, H3 120° el (mac. 10 mA, max. 24 V)
 RS422 - channel A, B, Z
 connector: connector 12-pol., series 615

connector series 623
 17-pol., 0 coded



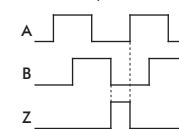
connecting side of connector

pin assignment

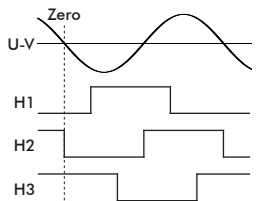
1 - Hall 1
 2 - Hall 2
 3 - Hall 3
 4 - V+
 5 - Thermo
 6 - GND
 7 - free
 8 - Thermo
 9 - 11 - free
 12 - Ch A
 13 - Ch A invers
 14 - Ch B
 15 - Ch B invers
 16 - Ch Z
 17 - Ch Z invers

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 -

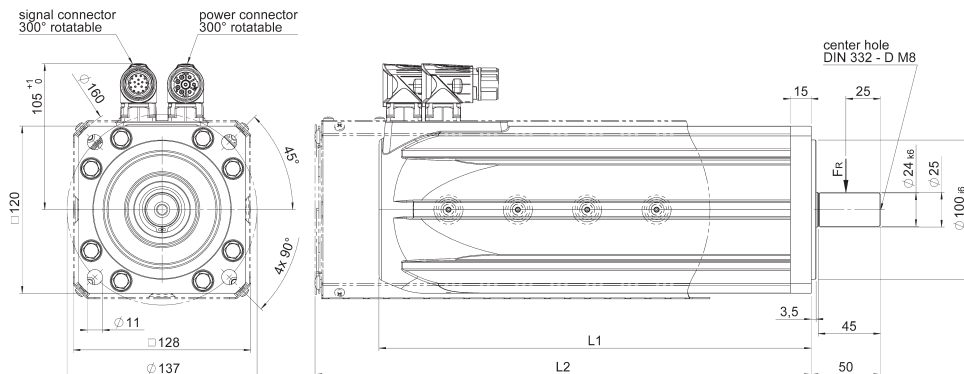
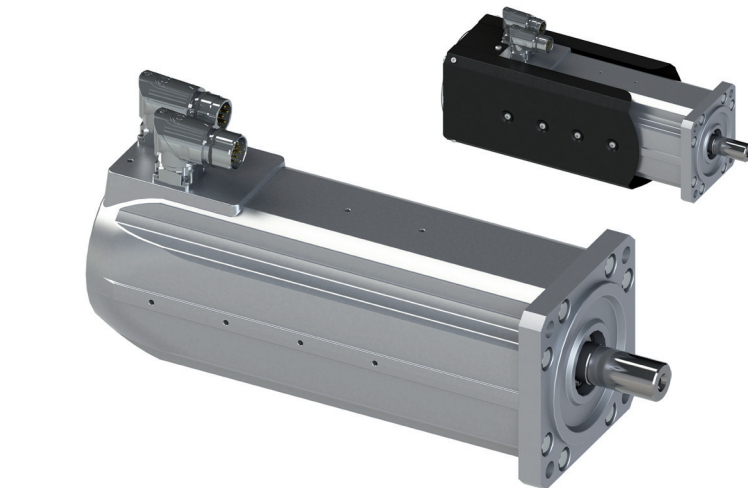
⁶⁾ Condition: Total propagation delay in the BiSS master device $t_{d(MA)} + t_{d(SL)} \leq 25$ ns.

HBR 63

High-Power Synchronous Servo Motors

with permanent magnetic field

Motor series HBR 63
up to 6600 Watts output power
with brushless pancake-resolver
with or without parking brake
with or without forced ventilation

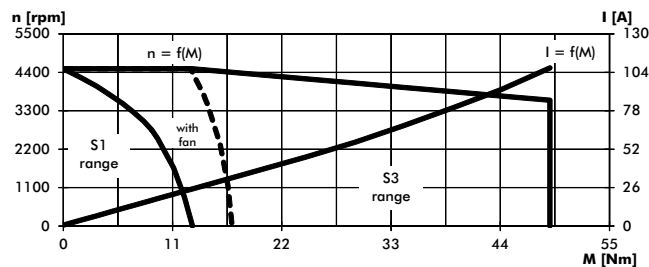


Motor type	Dimension	
	L1	L2
HBR 63150-R2	252	298
HBR 63150-R2-B7.18	312	358
HBR 63210-R2	312	358

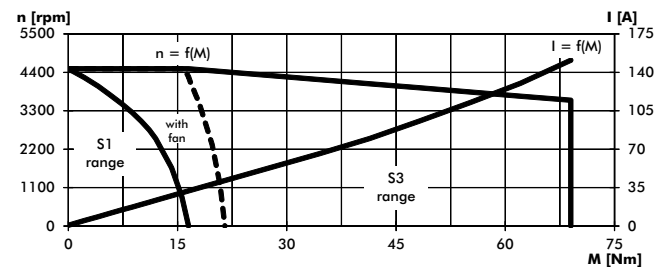
Operation characteristics:

Measured at servo-amplifier with 3-phase sinusoidal output

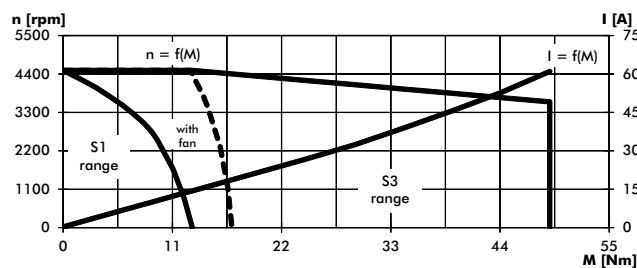
HBR 63150, 320V, 2500/3500/4500rpm



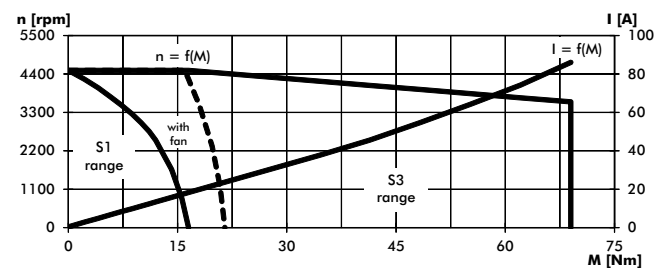
HBR 63210, 320V, 2500/3500/4500rpm



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



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



Motor design:

The High-Power Synchronous Servo 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.

The position information of the rotor will be generated using the integrated brushless pancake-resolver. Optionally, also a hall-based single resp. multiturm 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 high thermal time constant and 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
- Optional forced ventilation kit with axial fan and air guide hood

edition 02.16

type series		HBR 63150				HBR 63210			
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. continuous 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	
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	
thermal 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 weight incl. resolver and parking brake	kg	14	15,2	14	15,2	-			
connectors:									
motor flange socket		BEGA 120 NN 00 00 0200 000 (INTERNONTEC)							
resolver flange socket		AEGA 113 NN 00 00 0201 000 (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 exceed them, not even for a short-time, to avoid magnet-weakening.

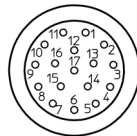
design-changes reserved

options for feedback systems

R2.4 resolver (standard feedback):

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 12-pol., series 615

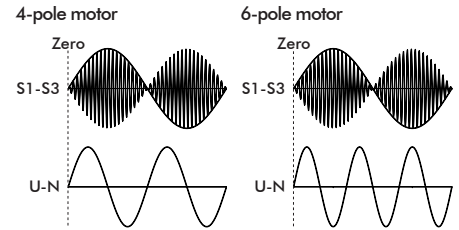
connector series 623
 17-pol., 0 coded



connecting side of connector

pin assignment
 1 - S1
 2 - S3
 3 - S2
 4 - S4
 5 - Thermo
 6 - R1
 7 - R2
 8 - Thermo
 9 - free
 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. 60 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

DS2 multiturn encoder:

technology: linear hall system, digitized, multiturn, battery backed
 measuring range: 360° x 4096 turns multiturn
 resolution: 12 bit singleturn + 12 bit multiturn
 nonlinearity: max. 0,6°
 supply: V+ = 5,5 ... 12 VDC / max. 60 mA
 interface: BiSS, binary coded
 24 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-

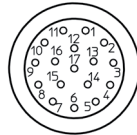
recommended cable type: Cat.5e, SF/UTP, AWG24

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
 interface: open collector - H1, H2, H3 120° el (mac. 10 mA, max. 24 V)
 RS422 - channel A, B, Z
 connector: connector 12-pol., series 615

connector series 623
 17-pol., 0 coded



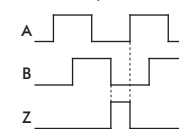
connecting side of connector

pin assignment

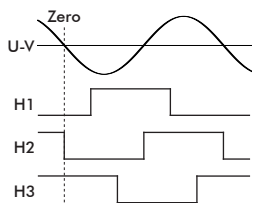
1 - Hall 1
 2 - Hall 2
 3 - Hall 3
 4 - V+
 5 - Thermo
 6 - GND
 7 - free
 8 - Thermo
 9 - 11 - free
 12 - Ch A
 13 - Ch A invers
 14 - Ch B
 15 - Ch B invers
 16 - Ch Z
 17 - Ch Z invers

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.