G series

Bevel helical gearmotor
G MR C3I 125 UO3A - 24 x 200 - 195 B3
HB3Z 90L 4 230.400-50 B5 ,E3 ,F1A ,L

Bevel helical gearmotor - Application given data

Product series		• G series
Measure system		Metric
Frequency	[Hz]	50
Product type		Gearmotors with motor
Input speed n_1		Motor dependent
Shaft arrangement		Bevel helical
Ratio *i*		From 167.7 to 220.35
Applied power P_1	[k W]	1.5 (2 [hp])
Service factor s_f		From 0.8 to 2.9
Loads		Constant load

Thermal power *Pt*

Max. environment temperature	[° C]	20
Air speed on the housing	[m / s]	Large, slight ventilation (air speed 1.25 [m / s])
Installation altitude	[m]	up to 1 000 [m]
Type of duty		Continuous - S1
Cooling system		Natural convection
Mounting position		B3

External loads

High speed shaft end

There are no radial loads F_{r2} applied on low speed shaft end

There are no axial loads F_{a2} applied on low speed shaft end

Configured product

Designation

Standard (catalog) product

G MR C3I 125 UO3A - 24 x 200 - 195 B3
HB3Z 90L 4 230.400-50 B5 ,E3 ,F1A ,L

Bevel helical gearmotor G series	
Input speed n_1 1 430 min^{-1}	
Coupled with motor	
Mounting position B3	

Accessories

Standard low speed shaft [AN1]	

Bevel helical gearmotor - Technical data

Designation ratio		195
Effective ratio i_{EFF}		195.31
Output speed n_2	[min^{-1}]	7.32
Input speed n_1	[min^{-1}]	1 430
Applied power P_1	[k W]	1.5
Output torque M_2	[N m]	1 814.84
Service factor s_f (installed power)		1.674
Nominal efficiency η		0.92
Gearmotor mass (without motor)	[kg]	95.89
Sound levels (to ISO/CD 8579, tolerance +3 ***dB(A)***)		
sound power level L_{WA}	[dB(A)]	79
sound pressure level L_{pA}	[dB(A)]	69
Angular backlash at a distance of 1 [m] from the low speed shaft centre		
min	[rad]	0.0017
max	[rad]	0.0034
min	[arcmin]	5.8
max	[arcmin]	12
Torsional stiffness in condition of nominal load	[N m / arcmin]	45

Lubrication

Gearmotor supplied without oil		
Approximate lubricant quantity	[l]	6.4
ISO viscosity grade		
mineral oil - Environment temperature 0 ÷ 20 [° C]	[cSt]	220
mineral oil - Environment temperature 10 ÷ 40 [° C]		320
synthetic oil - Environment temperature 0 ÷ 40 [° C]		320

Overall guide to oil-change interval (not according ATEX directive)

Oil temperature[° C]	Oil change interval [h]	
	mineral oil	synthetic oil
≤ 65	8 000	25 000
65 ÷ 80	4 000	18 000
80 ÷ 95	2 000	12 500
95 ÷ 110	-	9 000

Nominal data

Nominal input power P_{N1}	[k W]	2.54
Nominal output power P_{N2}	[k W]	2.33
Nominal thermal power P_{TN} @20°	[k W]	16
Nominal output torque M_{N2}	[N m]	3 038
Maximum output torque $M_{2\,MAX}$	[N m]	4 860

Verification

Thermal power ***Pt***

$$PT = PT_N * ft_{1a} * ft_{1b} * ft_2 * ft_3 * ft_4 * ft_5$$

where:

P_{TN}	[k W]	nominal thermal power when operating in following running conditions: • input speed n_1 = 1 400 [min^{-1}] • mounting position B3 • continuous duty S1 • maximum ambient temperature 20° [C] • maximum altitude 1 000 [m] above sea level • air speed 1.25 [m/s] (typical value in presence of a gearmotor with self-cooled motor)
ft_{1a}		thermal factor according to cooling system
ft_{1b}		thermal factor according to input speed n_1
ft_2		thermal factor according to max. ambient temperature and service / duty
ft_3		thermal factor according to mounting position, train of gears, size and nominal ratio i_N
ft_4		thermal factor according to installation altitude
ft_5		thermal factor according to air speed on housing

Calculation

Applied power P_1	[k W]	1.5
Thermal power *Pt*	[k W]	= 16 * 0.996 * 1 * 1 * 1 * 1 = 15.94

Thermal power verification passed

Maximum bending moment $M_{b\,MAX}$ of flange MR

$$M_{bMAX} \geq M_b = \frac{G \star (X + H_F)}{1000}$$

where:

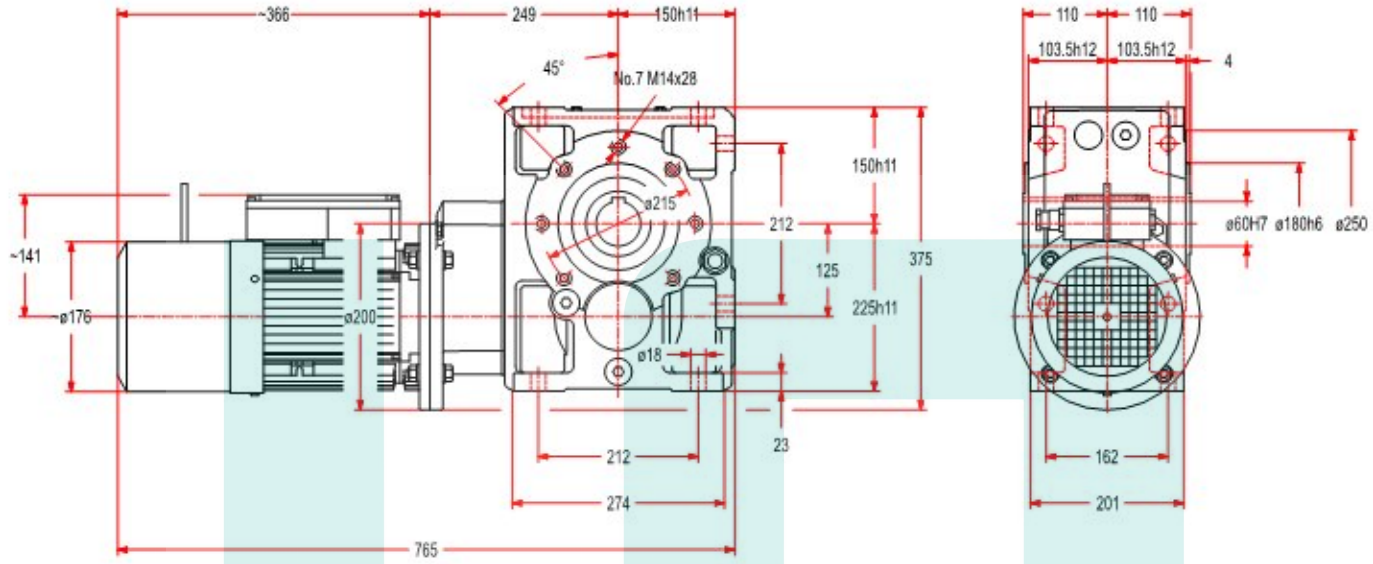
$M_{b\,MAX}$	[N m]	maximum bending moment on flange
G	[N]	is the motor weight
X		is the distance from motor center of gravity from flange surface
H_F		is a variable value according to gear reducer size and flange diameter P_1
1 000	[N m]	is a constant value

Calculation

$M_{b\,MAX}$	[N m]	= 500
M_b	[N m]	= 245.17 * (183 + 99) / 1 000 = 69.14

Maximum bending moment verification passed

Main dimensions [mm] (for accessories, see following pages)

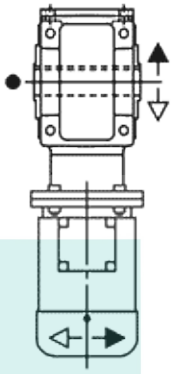


Information

Screws UNI 5737: M 16 x 55

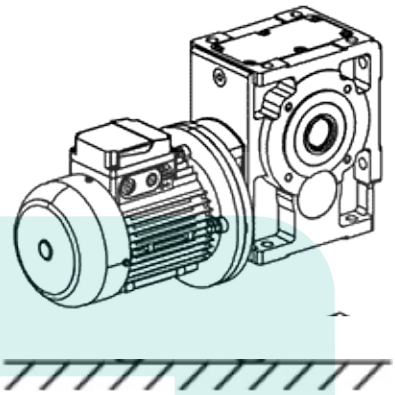
Bolts UNI 5588: M 16

Design: UO3A

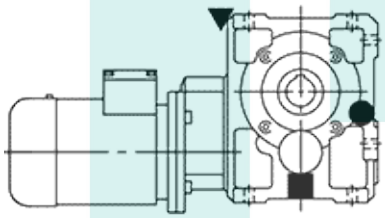


● groove side

Mounting position: B3



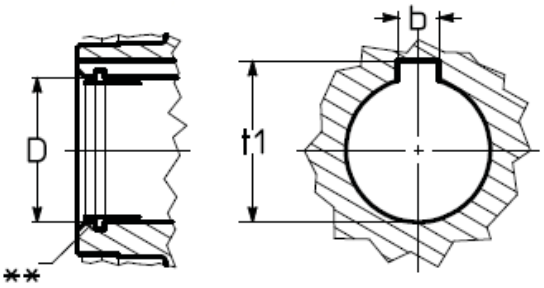
Plugs position (supplied without oil as standard)



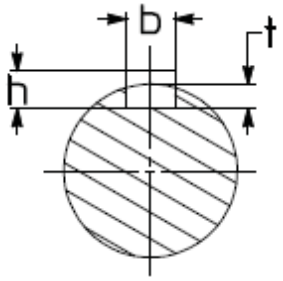
▼ Oil filler plug
● Oil level plug
■ Oil drain plug

Terminal box position: TB0

Hollow low speed shaft



Gear reducer hollow shaft

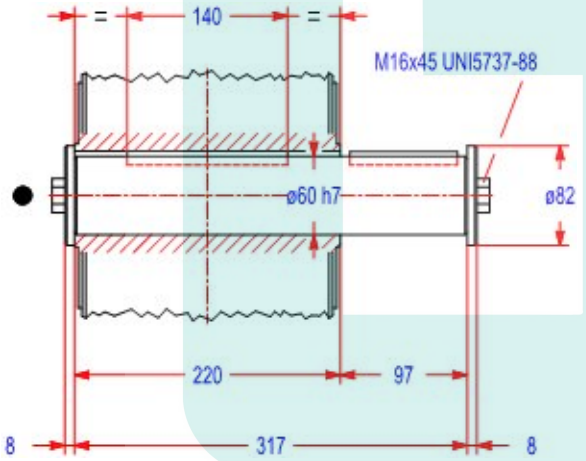


Machine shaft

Hole D Ø H7**	Parallel Key b x h x l* h9 h11	Keyway b H9 hub N9 shaft	Keyway t shaft	Keyway t_1 hub
60	18 x 11 x 140	18	7	64,4

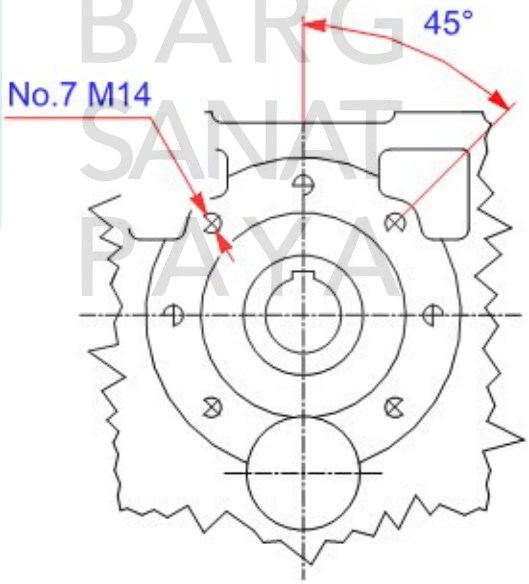
* Recommended length.
** Each hollow shaft type (standard, stepped, with shrink disc) has a slightly oversized diameter D (at the input) to facilitate the assembly of gear reducer on machine shaft end: this, however, does not affect the connection reliability.

Standard low speed shaft - AN1 (size 125)



Fastening tapped holes (size 125)

The relevant through holes to be realized on the driven machine must be all of equal diameter for sizes 140, 200 and 250 (Ø 15, Ø 21 and Ø 25, respectively) as the 2 holes of smaller diameter are not in the position of 22° 30'



Configured motor

Designation

HB3Z 90L 4 230.400-50 B5 ,E3 ,F1A ,L

Brake motor with d.c. brake catalog TX

Pn 1.5 kW (2 hp)

Motor specifications

- 5 voltage values stated on nameplate:
  220.380 @50Hz
  230.400 @50Hz
  240.415 @50Hz
  265.460 @60Hz
  277.480 @60Hz

Motor mounting position (IM) B5

Self-cooling and encoder Push Pull HTL-LD HTL 10-30V dc [,E3]

Separate brake supply 110 ÷ 440 V a.c. [,F1A]

Hand lever for manual release with automatic return L [,L]

Electric motor technical data TX catalog

Type		HB3Z 90 L 4
Size		90
Poles		4
Coupling dimensions Ø D x E - Ø P		Ø24 x 50 Ø200
Power supply	[V - Hz]	230.400 - 50
Nominal input power P_{N1}	[k W]	1.5
Nominal speed n_N	[min^{-1}]	1 430
Motor mass	[kg]	25
Directive		Motor ErP
Efficiency class		IE3
Power factor cosφ		0.78
Moment of inertia J_0	[Kg m^2]	0.0047
Overtemperature class		B
Insulation class		F
Protection		IP 55
Type of duty		S1
Synchronous speed	[min^{-1}]	1 500

Efficiency

100 %	85.30
75 %	86.10
50 %	85.00

Nominal data

Nominal torque M_N	[N m]	10.10
Nominal starting torque M_s / M_n		3.10
Maximum torque M_{MAX} / M_n		3.70
Starting current ratio i_s / i_n		6.70
Rated current I_n @230 [V]	[A]	5.70
Rated current I_n @400 [V]	[A]	3.30

Construction features

Motor size	Bearing D-E	Bearing N-D-E	Housing	Flange B5	End-shield N-D-E	Terminal box cover	Seal rings D-E	Terminal block (4)	Cable glands	Fan cover	Cooling fan
90 L	6205 2Z	6205 2RS	LL	LL	LL	LL	LL	25 × 46 × 7	M5	Painted sheet	Plastic

LL = Light alloy

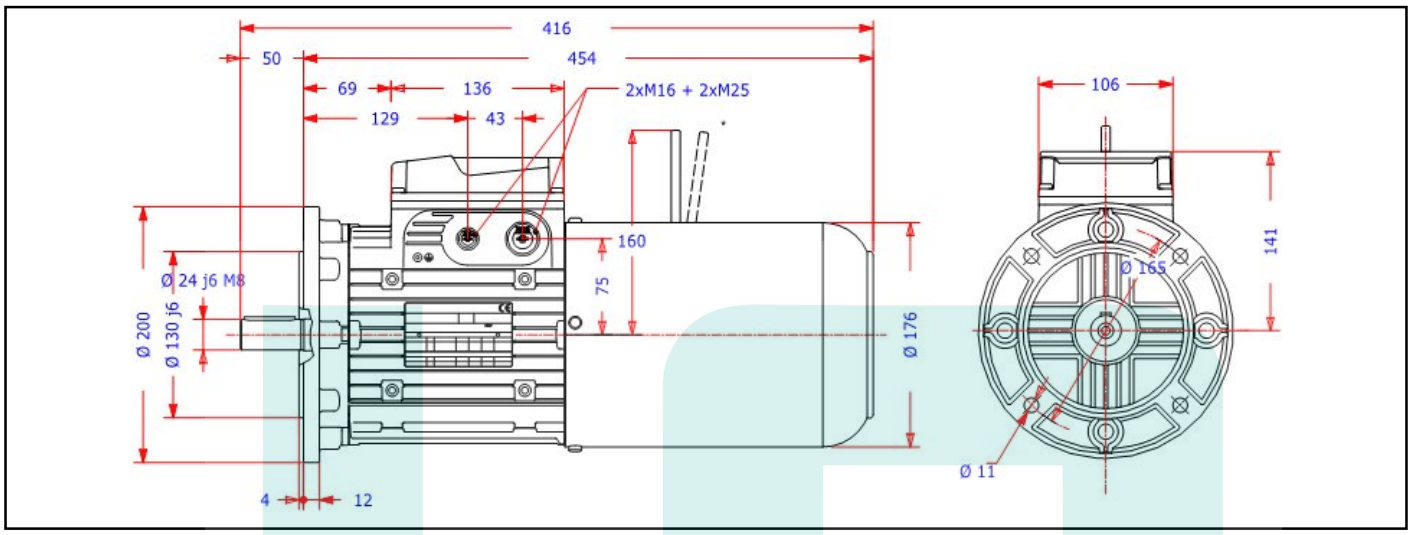
(4) Terminal block with 6 terminals for cable terminal connection

Table of main functional specifications of brake

Brake size	Rectifier (1)	Motor size	Brake torque M_f [N m] ± 12% Spring No#			Absorption			Delay of (2)			Air-gap [mm]		W_1 (5) [MJ / mm] brakings / hour nominal	C_{MAX}(6) [mm]	W_{MAX}(7) [J]		
									release	braking		[mm]						
			2	4	6	[V] c.a.	[A] c.a. max	W	t_1 [ms] (3)	t_2 [ms]	t_1 c.c. [ms] (4)		max		10	100	1000	
BZ 05	RM2	90 L	13	27	40	110 ÷ 440	0.26	24	63	220	15	0.30	0.45	160	5	10 000	2 500	355

(1) Standard rectifier, supplied as standard; stop time must be 2.5 ***s*** ÷ 3.5 ***s***. If necessary, consult us
(2) Values valid with $M_{f\,MAX}$, mean air-gap and nominal value of supply voltage
(3) Release time of brake obtained with standard rectifier and, for RM1, with supply voltage ≥ 200 V c.a.
(4) Braking delay obtained by separate brake supply and coil disconnection on a.c. side of rectifier (t_2) or on a.c. and d.c. side (t_2 d.c.). With direct supply from motor terminal block, the values of t_2 increase of approx. 2.5 times the ones of table
(5) Friction work for brake disk wear of 1 mm (minimum value for heavy duty; real value is usually greater).
(6) Maximum brake disk wear
(7) Maximum friction work for each braking

Motor main dimensions [mm]



G series

Bevel helical gearmotor
G MR ICI 81 UO3A - 24 x 200 - 33,3 B7
HB3 100LA 4 230.400-50 B5R

Bevel helical gearmotor - Application given data

Product series		• G series
Measure system		Metric
Frequency	[Hz]	50
Product type		Gearmotors with motor
Input speed n_1		Motor dependent
Shaft arrangement		Bevel helical
Ratio *i*		From 31.635 to 34.965
Applied power P_1	[k W]	2.2 (3 [hp])
Service factor s_f		From 0.7 to 2.8
Loads		Constant load

Thermal power *Pt*

Max. environment temperature	[° C]	20
Air speed on the housing	[m / s]	Large, slight ventilation (air speed 1.25 [m / s])
Installation altitude	[m]	up to 1 000 [m]
Type of duty		Continuous - S1
Cooling system		Natural convection
Mounting position		B7

External loads

High speed shaft end

There are no radial loads F_{r2} applied on low speed shaft end

There are no axial loads F_{a2} applied on low speed shaft end

Configured product

Designation

Standard (catalog) product

G MR ICI 81 UO3A - 24 x 200 - 33,3 B7
HB3 100LA 4 230.400-50 B5R

Bevel helical gearmotor G series
Input speed n_1 1 440 min^{-1}
Coupled with motor
Mounting position B7

Accessories

Fluorinated seal rings on high-low speed shaft [TV3]
Metal plugs [TM2]

Bevel helical gearmotor - Technical data

Designation ratio		33.3
Effective ratio i_{EFF}		33.33
Output speed n_2	[min^{-1}]	43.2
Input speed n_1	[min^{-1}]	1 440
Applied power P_1	[k W]	2.2
Output torque M_2	[N m]	457.47
Service factor s_f (installed power)		1.517
Nominal efficiency η		0.94
Gearmotor mass (without motor)	[kg]	30.47
Sound levels (to ISO/CD 8579, tolerance +3 ***dB(A)***)		
sound power level L_{WA}	[dB(A)]	75
sound pressure level L_{pA}	[dB(A)]	66
Angular backlash at a distance of 1 [m] from the low speed shaft centre		
min	[rad]	0.0025
max	[rad]	0.0050
min	[arcmin]	8.6
max	[arcmin]	17
Torsional stiffness in condition of nominal load	[N m / arcmin]	21.2

Lubrication

Gearmotor supplied with oil		
Approximate lubricant quantity	[l]	1.6
ISO viscosity grade		
mineral oil - Environment temperature 0 ÷ 20 [° C]	[cSt]	150
mineral oil - Environment temperature 10 ÷ 40 [° C]		220
synthetic oil - Environment temperature 0 ÷ 40 [° C]		220

Overall guide to oil-change interval (not according ATEX directive)

Oil temperature[° C]	Oil change interval [h]	
	mineral oil	synthetic oil
≤ 65	8 000	25 000
65 ÷ 80	4 000	18 000
80 ÷ 95	2 000	12 500
95 ÷ 110	-	9 000

Nominal data

Nominal input power P_{N1}	[k W]	3.34
Nominal output power P_{N2}	[k W]	3.14
Nominal thermal power P_{TN} @20°	[k W]	9.5
Nominal output torque M_{N2}	[N m]	694
Maximum output torque $M_{2\,MAX}$	[N m]	1 111

Verification

Thermal power ***Pt***

$$PT = PT_N * ft_{1a} * ft_{1b} * ft_2 * ft_3 * ft_4 * ft_5$$

where:

P_{TN}	[k W]	nominal thermal power when operating in following running conditions: • input speed n_1 = 1 400 [min^{-1}] • mounting position B3 • continuous duty S1 • maximum ambient temperature 20° [C] • maximum altitude 1 000 [m] above sea level • air speed 1.25 [m/s] (typical value in presence of a gearmotor with self-cooled motor)
ft_{1a}		thermal factor according to cooling system
ft_{1b}		thermal factor according to input speed n_1
ft_2		thermal factor according to max. ambient temperature and service / duty
ft_3		thermal factor according to mounting position, train of gears, size and nominal ratio i_N
ft_4		thermal factor according to installation altitude
ft_5		thermal factor according to air speed on housing

Calculation

Applied power P_1	[k W]	2.2
Thermal power *Pt*	[k W]	= 9.5 * 0.995 * 1 * 1 * 1 * 1 = 9.45

Thermal power verification passed

Maximum bending moment $M_{b\,MAX}$ of flange MR

$$M_{bMAX} \geq M_b = \frac{G \star (X + H_F)}{1000}$$

where:

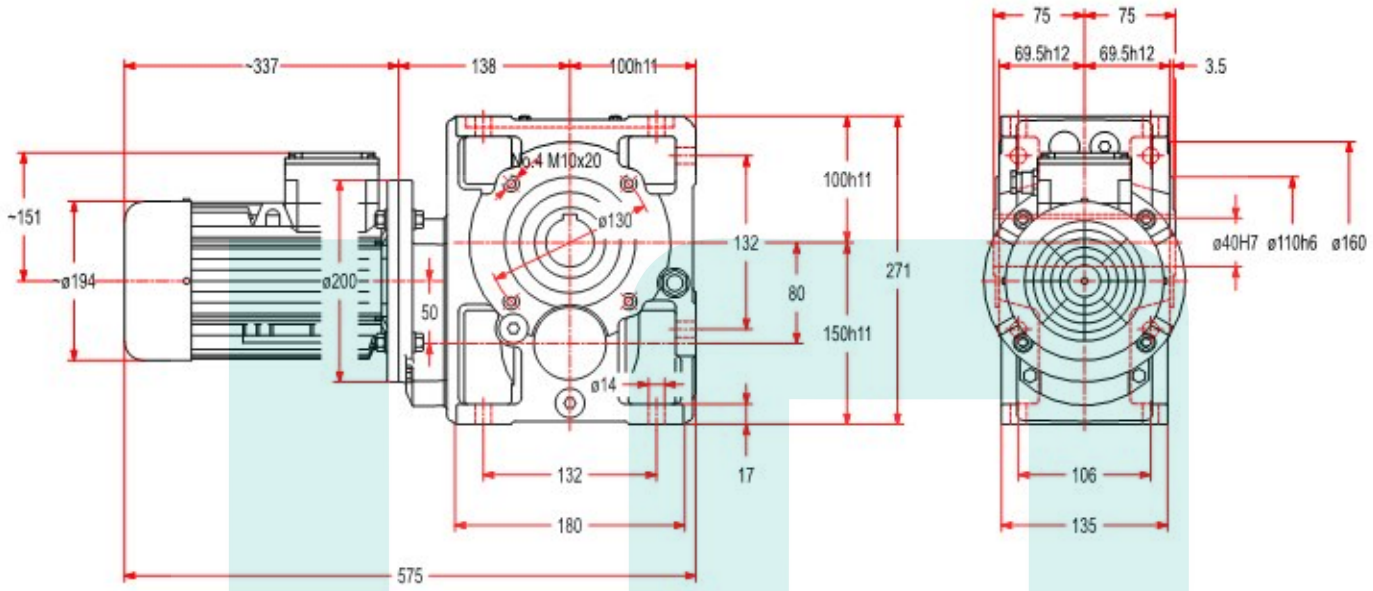
$M_{b\,MAX}$	[N m]	maximum bending moment on flange
G	[N]	is the motor weight
X		is the distance from motor center of gravity from flange surface
H_F		is a variable value according to gear reducer size and flange diameter P_1
1 000	[N m]	is a constant value

Calculation

$M_{b\,MAX}$	[N m]	= 112
M_b	[N m]	= 254.97 * (168.5 + 38) / 1 000 = 52.65

Maximum bending moment verification passed

Main dimensions [mm] (for accessories, see following pages)

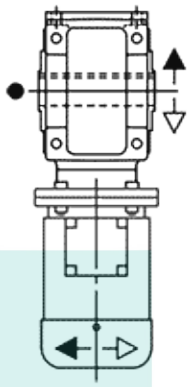


Information

Screws UNI 5737: M 12 x 40

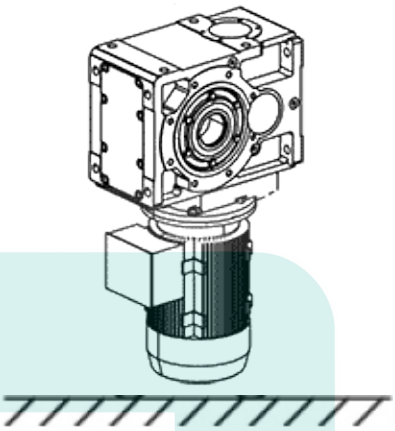
Bolts UNI 5588: M 12

Design: UO3A

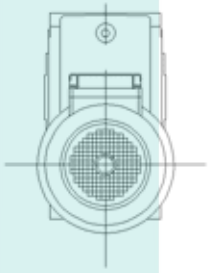


● groove side

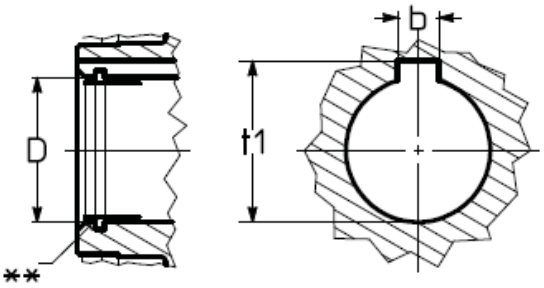
Mounting position: B7



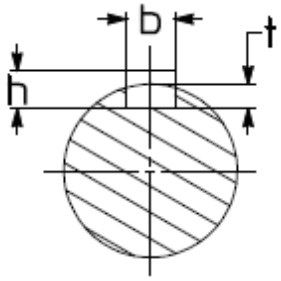
Terminal box position: TB0



Hollow low speed shaft



Gear reducer hollow shaft



Machine shaft

Hole	Parallel Key	Keyway		
D Ø H7**	b x h x l* h9 h11	b H9 hub N9 shaft	t shaft	t_1 hub
40	12 x 8 x 90	12	5	43,3

* Recommended length.
** Each hollow shaft type (standard, stepped, with shrink disc) has a slightly oversized diameter D (at the input) to facilitate the assembly of gear reducer on machine shaft end: this, however, does not affect the connection reliability.

Configured motor

Designation

HB3 100LA 4 230.400-50 B5R

Motor catalog TX

Pn 2.2 kW (3 hp)

Motor specifications

- 5 voltage values stated on nameplate:
  220.380 @50Hz
  230.400 @50Hz
  240.415 @50Hz
  265.460 @60Hz
  277.480 @60Hz

Motor mounting position (IM) B5R

Electric motor technical data TX catalog

Type		HB3 100 LA 4
Size		100
Poles		4
Coupling dimensions Ø D x E - Ø P		Ø24 x 50 Ø200
Power supply	[V - Hz]	230.400 - 50
Nominal input power P_{N1}	[k W]	2.2
Nominal speed n_N	[min^{-1}]	1 440
Motor mass	[kg]	26
Directive		Motor ErP
Efficiency class		IE3
Power factor cosφ		0.76
Moment of inertia J_0	[Kg m^2]	0.0076
Overtemperature class		B
Insulation class		F
Protection		IP 55
Type of duty		S1
Synchronous speed	[min^{-1}]	1 500

Efficiency

100 %	86.70
75 %	87.20
50 %	85.50

Nominal data

Nominal torque M_N	[N m]	14.60
Nominal starting torque M_s / M_n		3.50
Maximum torque M_{MAX} / M_n		4.40
Starting current ratio i_s / i_n		7.40
Rated current I_n @230 [V]	[A]	8.30
Rated current I_n @400 [V]	[A]	4.80

Construction features

Motor size	Bearing D-E	Bearing N-D-E	Housing	Flange B5R	End-shield N-D-E	Terminal box cover	Seal rings D-E	Terminal block (4)	Cable glands	Fan cover	Cooling fan
100 LA	6206 2Z	6206 2Z	LL	LL	LL	LL	LL	30 × 50 × 7	M5	Painted sheet	Plastic

LL = Light alloy

(4) Terminal block with 6 terminals for cable terminal connection

Motor main dimensions [mm]