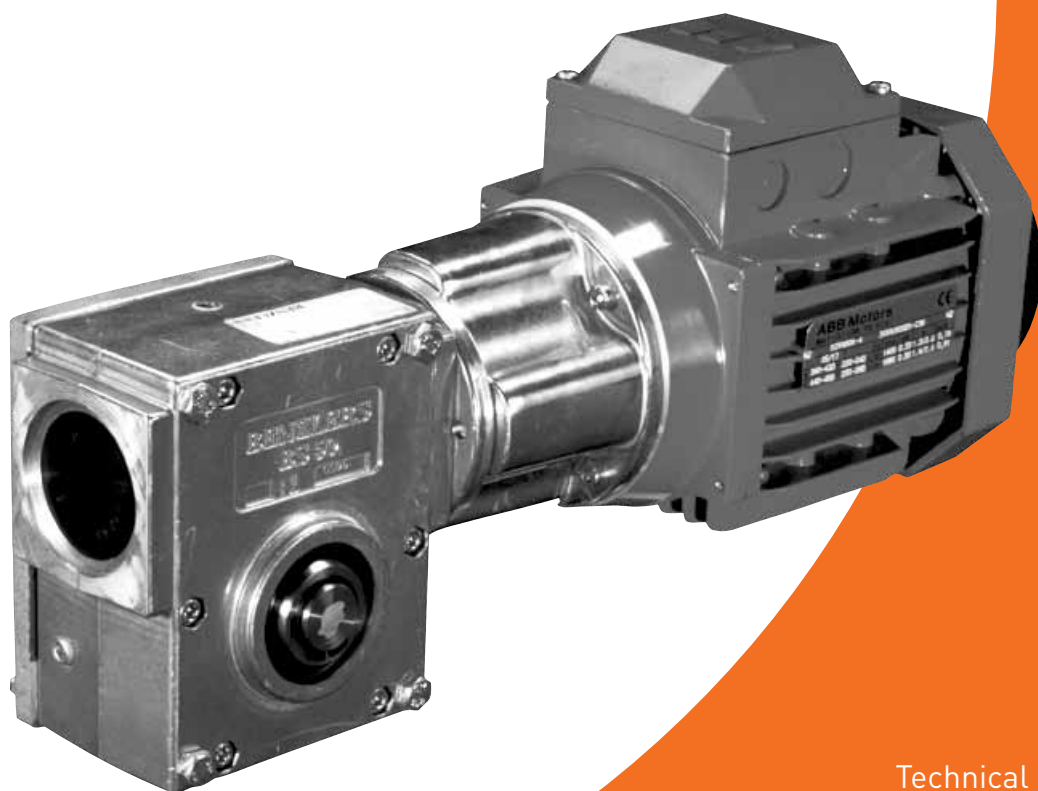


Series BS Compact Worm Gear

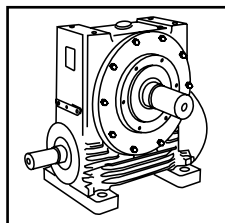


Technical
Up to - 4kW / 315 Nm

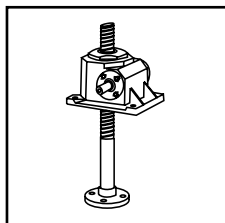
Worm Gearbox
CBS-2.00GB1211

PRODUCTS IN THE RANGE

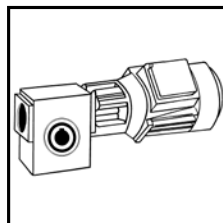
Serving an entire spectrum of mechanical drive applications from food, energy, mining and metal; to automotive, aerospace and marine propulsion, we are here to make a positive difference to the supply of drive solutions.



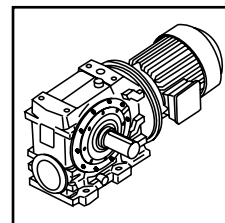
Series A
Worm Gear units
and geared motors
in single & double
reduction types



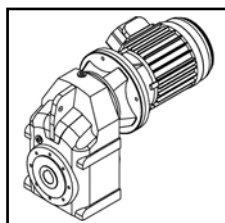
Series BD
Screwjack worm
gear unit



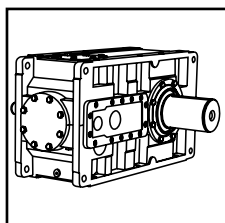
Series BS
Worm gear unit



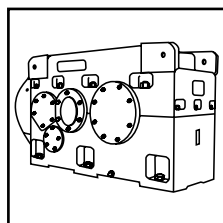
Series C
Right angle drive
helical worm geared
motors & reducers



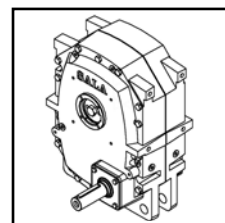
Series F
Parallel angle helical
bevel helical geared
motors & reducers



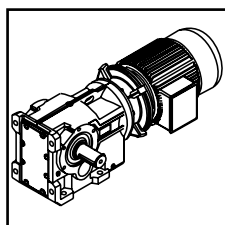
Series G
Helical parallel shaft
& bevel helical right
angle drive gear
units



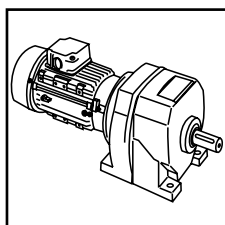
Series H
Large helical parallel
shaft & bevel helical
right angle drive units



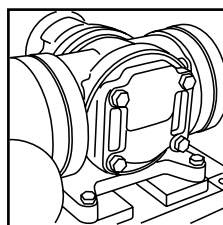
Series J
Shaft mounted
helical speed
reducers



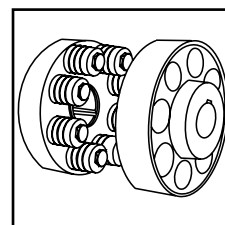
Series K
Right angle helical
bevel helical geared
motors & reducers



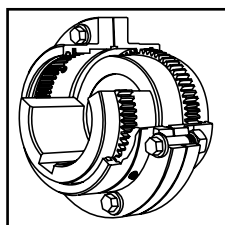
Series M
In-line helical geared
motors & reducers



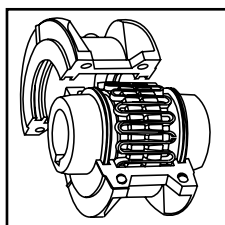
Roloid Gear Pump
Lubrication and fluid
transportation pump



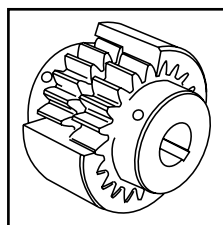
**Series X
Cone Ring**
Pin and bush
elastomer coupling



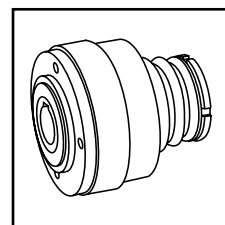
**Series X
Gear**
Torsionally rigid,
high torque coupling



**Series X
Grid**
Double flexing steel
grid coupling



**Series X
Nylon**
Gear coupling with
nylon sleeve



**Series X
Torque Limiter**
Overload protection
device



We offer a wide range of repair services and many years experience of repairing demanding and highly critical transmissions in numerous industries.

We can create custom engineered transmission solutions of any size and configuration.

ATEX Compliance Assured



Total compliance with the ATEX Directive safeguarding the use of industrial equipment in potentially explosive atmospheres is assured for users of our geared products.

Certification is available for standard gearboxes and geared motors with badging displaying the CE Mark and the Ex mark, name and location of the manufacturer, designation of series or type, serial number, year of manufacture, Ex symbol and equipment group/category.

ATEX directive 94/9/EC (also known as ATEX 95 or ATEX 100A) and the CE Marking Directive are enforced in all EC member states. Compliance is compulsory for designers, manufacturers or suppliers of electrical and non-electrical equipment for use in potentially explosive atmospheres created by the presence of flammable gases, vapours, mists or dusts.

Ex compliant standard gearboxes can be supplied against Groups 2 or 3 for surface industries in designated hazardous location Zones 1 and 2 for gases, vapours and mists; and in Zones 21 and 22 for dusts.

Technical information _____	2
Selection of worm gears and worm geared motors _____	3
Mounting positions _____	8

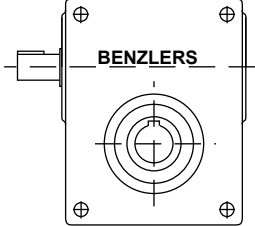
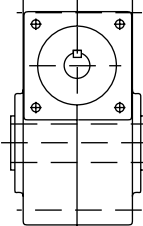
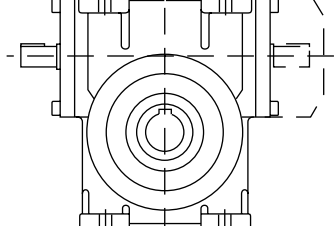
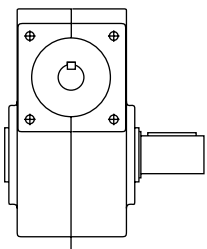
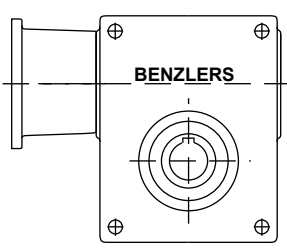
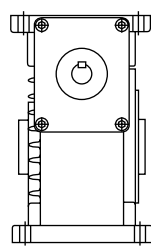
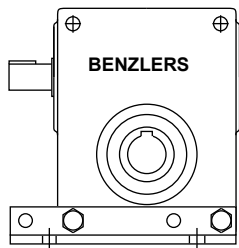
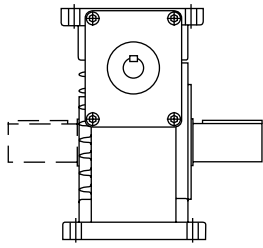
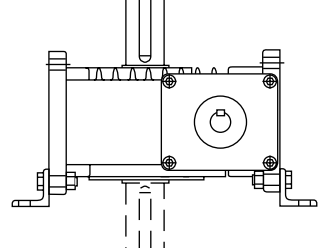
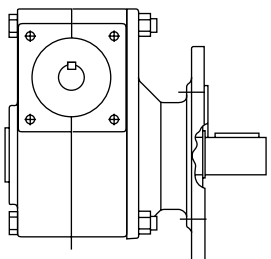
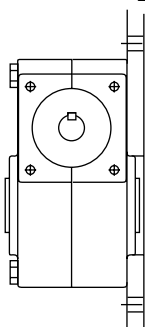
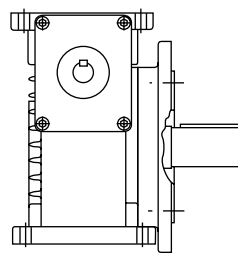
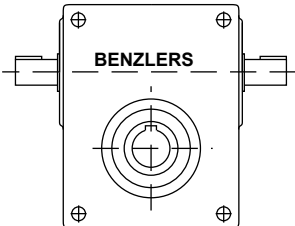
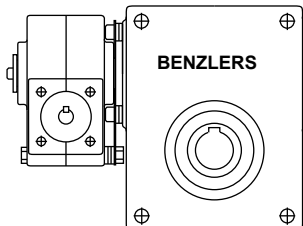
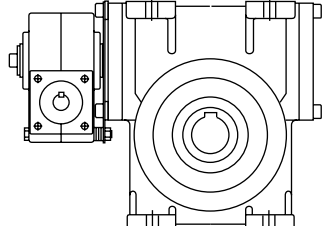
Worm Geared Motors

Power ratings - Output speeds _____	9 - 18
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Worm Gears

Power ratings - Output speeds _____	31 - 37
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Gear with Environmental classification _____	48 - 49
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THE PROGRAMME

BS 40-71  Single input shaft	BS 40-71  Hollow shaft	BS 40-71  Single input shaft
BS 40-71  Output shaft	BS 40-71  Motoflange	BS 40-71  Hollow shaft
BS 40-71  Feet	BS 40-71  Feet	BS 40-71  Horizontal
BS 40-71  Output flange	BS 40-71  Bolt the gear to a wall or foundation without feet or flange	BS 40-71  Output flange
BS 40-71  Double input shaft	BS 40-71  Double worm gear	BS 40-71  Double worm gear

TECHNICAL INFORMATION

Benzler worm gears BS 40-71 have a symmetrical gear-housing manufactured in aluminium. BS 88 and 112 have a gearhousing of cast-iron.

The worm wheel is made of centrifugal cast tinbronze and the worm screw is case-hardened and ground.

All motor connections are according to IEC-standard and for BS 40-112 with elastic coupling. This means the following advantages:

- The worm screw is mounted with two separate bearings and are not connected with the motor bearings. This means longer lifetime and a smoother drive..
- Soft start and stop with elastic coupling for size 40-112.
- No oil leakage in to the motor.
- Possibility to change motor without dismounting the gear..
- Any type of motor with IEC-flange can be used..

The worm geared motor is available for mounting on a base, flange or torque arm and can be installed in any position.

The gear can be combined with Benzlers' remaining range of helical and worm gears to provide very low output speeds. All data given in this catalogue applies to ABB standard motors and Benzlers brake motors.

Motorflanges

The motorflanges up to IEC-size 112 are made of aluminium and are available in B5 and B14, larger motorflanges are made of cast-iron and available in B5. A finished bore shaft coupling is always delivered together with the motorflange.

Feet

The feet can be mounted without modification.

Output shaft

Single or double output shaft can be mounted into the hollow shaft. The output shafts are locked into position with keys and retaining rings. BS 88-112 has as standard execution, a single output shaft or a hollow shaft.

Output flange

An output flange can easily be mounted on to the gear. The BS 40-71 gear casing can also be mounted onto a wall or foundation and bolted through the 4 bolt holes in the gear casing.

Torque arm bracket

The hollow shaft gearboxes can be supplied with torque arm bracket and torque arm.

Fan

BS 88/112 have fan as an option.

Painting

BS40-71 is normally delivered without painting. BS 40-71 can be delivered according to environmental classification M2-M3, see page 58-59.

BS88-112 is normally delivered with standardpaint, which is an alkyd paint in Benzler blue colour (RAL5015).

SELECTION OF GEARS AND GEARMOTORS

Power and torque ratings for gears on page 40-47 apply to service factor 1.0. Service factor for geared motors can be found after the output speeds. Service factor 1.0 is valid for continuous operation 8 hours/day without shocks and with 10-200 starts per hour. The inertia of the driven machine is less than 20% of the electric motor. Occasional shock loads may not exceed 1.8 times the gear rating at service factor 1.0.

Definition of sizes

1. Determine the demand power or torque, P_e or T_{2b} ratio (i) or output speed (n_2).
2. Based on type of load/driven machine, operating hours/day and number of starts/hour, select service factor f_b (page 6-7).
3. Calculate $T_2 \geq T_{2b} \times f_b$.
4. Choose gear on page 40-47 according to following: $T_2 \geq T_{2b} \times f_b$ at required ratio (i) or speed (n_2).
Note the efficiency.
For example BS40 ratio 6,67:1, code A
 $\eta = 86\%$ at $n_1 = 1430$ rpm.
5. Calculate $P_1 = P_e \times f_b \times \frac{1}{\eta}$
Choose a size larger motor $P_m \geq P_1$
For example $P_1 \geq 0,42$ kW choose 0,55 kW.
6. Choose a worm gear motor on pages 12-24.
For example BS40A with a motor size 80A4.
7. Check that occasional shock loads do not exceed 1.8 times the gear rating at service factor 1.0.
 $T_{2max} \geq T_2 \times 1,8$
8. Check that the thrust and overhung loads are not exceeded.
9. Check that maximum input speeds and thermal ratings are not exceeded.

10. For conditions other than above described, for instance extreme environments, high inertia systems or other, please contact our application engineers

Formulas:

$$T_{2b} = \frac{P_e \times 9550}{n_2} \quad (\text{Nm})$$

$$T_2 \geq T_{2b} \times f_b \quad (\text{Nm})$$

$$P_1 = P_e \times f_b \times \frac{1}{\eta} \quad (\text{kW})$$

$$P_m \geq P_1 \quad (\text{kW})$$

$$T_{2max} \geq T_2 \times 1,8 \quad (\text{Nm})$$

$$J_{e, \text{red}} = J_e \times \left(\frac{n_2}{n_1} \right)^2 \quad (\text{kgm}^2)$$

$$T_2 = \text{Output torque rating, Nm page 12-24, 40-47}$$

$$T_{2b} = \text{Demand torque, Nm}$$

$$T_{2max} = \text{Occasional maximum torque, Nm}$$

$$P_1 = \text{Demand input power, kW}$$

$$P_e = \text{Demand power driven machine, kW}$$

$$P_m = \text{Motor power}$$

$$n_1 = \text{Input speed, rpm}$$

$$n_2 = \text{Output speed, rpm}$$

$$f_b = \text{Service factor}$$

$$\eta = \text{Efficiency of the gear}$$

$$J_{e, \text{red}} = \text{Reduced inertia, kgm}^2$$

$$J_e = \text{Inertia driven machine, kgm}^2$$

$$J_m = \text{Inertia motor, kgm}^2$$

Load classification	Description Moment of inertia	Example
I	$J_{e, \text{red}} \leq 0.2 \times J_m$ Machines with uniform load and no shocks	Uniform loaded conveyors and elevators. Centrifugal pumps and fans. Agitators and mixers for liquids and semiliquids without solid particles.
I a	$J_{e, \text{red}} \leq J_m$ Machines with small shocks and small variations in load	Larger conveyors. Reciprocating pumps with 3 or more cylinders. Agitators and mixers for media with high viscosity and/or solid particles.
II	$J_{e, \text{red}} \leq 3 \times J_m$ Machines with moderate shocks and variable load	Larger conveyors. Reciprocating pumps with 3 or more cylinders. Agitators and mixers for media with high viscosity and/or solid particles
III	$J_{e, \text{red}} \leq 10 \times J_m$ Machines with very heavy shocks and large masses to be accelerated	Heavy agitators and mixers. Reciprocating pumps with 1 or 2 cylinders. Crushers, mills and presses. Vibrators and shakers

SELECTION OF GEARS AND GEARMOTORS

Service factors

Table 1. Service factor f_b

Daily operations in hours	4 hours			8 hours			16 hours			24 hours		
Starts per hour	<10	10-200	>200	<10	10-200	>200	<10	10-200	>200	<10	10-200	>200
Load classification												
I	0.8	0.9	1.0	0.9	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.5
Ia	1.1	1.2	1.3	1.1	1.3	1.5	1.3	1.5	1.6	1.4	1.6	1.8
II	1.3	1.4	1.6	1.3	1.6	1.8	1.4	1.7	1.9	1.5	1.8	2.0
III	1.5	1.6	1.8	1.6	1.8	2.0	1.7	1.9	2.1	1.8	2.0	2.2

Table 2. Ambient temperature factor f_t

For other ambient temperatures then 20° C, always multiply the thermal rating with the following factors.

°C Celsius	-40	-30	-20	-10	+/- 0	10	20	30	40	50
f_t	1.80	1.67	1.53	1.40	1.27	1.13	1.00	0.87	0.73	0.60

Table 3. Fan factor f_f

If the gearbox has no fan and the motor is not directly flanged to the gearbox, multiply the thermal rating with the following factors.

Input speed n1 (rpm)	10	100	300	750	1000	1500	3000
f_f	1	0.95	0.74	0.63	0.65	0.69	0.77

Control Points

The forces allowed on the gear shafts are determined by bearing life and strength on gear shafts and housing. Radial forces at no thrust loads. In the power ratings page 12-24 max. allowed radial force on output shaft is given for each output speed. The value is only valid if the force is applied at the centre of the output shaft. If the force is applied at another position the allowed radial force is given by the following:

Radial Forces

Bearing life: $F_{r,x} = \frac{a}{(f + x)} F_{r2}$

Strength on shaft: $F_{r,x} = \frac{c}{x} F_{r2}$

Strength on gear housing: $F_{r,x} = \frac{d}{(g + x)} F_{r2max}$

$F_{r,x}$ = Max. radial force (N)

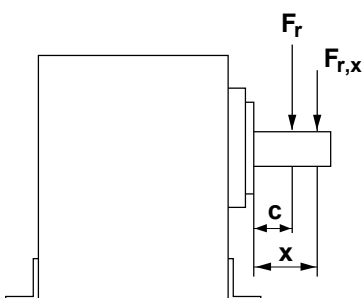
F_{r2} = Radial force acc to power ratings (N).

F_{r2max} = Upper limit, for radial force. Can not be exceeded (N)

a, d, f, g = Internal measures (mm)

x = Distance to radial force (mm)

c = Half shaft length (mm)



Type/Size	a	c	d	f	g	F_{r2max} (N)
40	90.5	18	101.5	72.5	83.5	2 000
50	96.5	21	110.0	75.5	89.0	2 700
63	107.0	29	122.0	78.0	93.0	4 000
71	127.5	29	142.5	98.5	113.5	5 000
88	152.5	41	181.0	111.5	140.0	10 000
112	175.0	41	210.5	134.0	169.5	15 000

SELECTION OF GEARS AND GEARMOTORS

Overhung load

If a sprocket, gear wheel or pulley is mounted on a shaft, a load check must be made. The overhung load in middle of the shaft may not exceed values shown in tables below. For calculation of minimum permissible diameter the following formula should be used.

$$D_{\min} = \frac{2000 \times T_{2b} \times f_e \times f_b}{F_{r2}} \text{ mm}$$

T_{2b} = Torque required (Nm)

$$T_{2b} = \frac{P_e \times 9\,550}{n_2} \text{ Nm}$$

P_e = Power kW

n_2 = Output speed (rpm)

F_{r2} = Permissible overhung load (N)

f_b = Service factor (tables page 7)

f_e = 1.10 for sprockets

= 1.30 for gearwheels

= 1.50 for pulleys

$D_{\min}$ = Minimum permissible diameter (mm)

Max overhung load in the middle of input shaft (N)

Gear	Ratio													
Fr1	A	B	C	D	E	F	Fx	G	H	I	J	K	L	M
BS 40	180	135	100	95	80	70	-	50	45	45	40	30	-	-
50	215	190	155	115	100	80	70	65	55	55	40	-	-	-
63	385	305	255	210	165	155	125	115	100	100	75	45	-	-
71	400	350	285	240	180	150	-	115	100	100	60	45	-	-
88	925	635	470	405	335	305	-	235	200	200	190	145	100	65
112	1375	930	740	580	505	425	-	340	295	295	255	160	125	105

Max thrust load on output shaft (N)

Gear	Ratio													
	A	B	C	D	E	F	Fx	G	H	I	J	K	L	M
40	2000	2000	2000	2000	2000	2000	-	2000	2000	2000	2000	2000	-	-
50	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	-	-	-
63	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	-	-
71	4500	4500	4500	4500	4500	4500	-	4500	4500	4500	4500	4500	-	-
88	7800	10000	10000	10000	10000	10000	-	10000	10000	-	10000	10000	10000	10000
112	10400	14700	15000	15000	15000	15000	-	15000	15000	-	15000	15000	15000	15000

Reversing

Dynamic self locking means that a force applied on the output shaft of the gear can not continue to drive the gear when the motor has been stopped.

Dynamic self locking is only possible at very high ratios and low output speeds. None of the worm gears produced by BENZLERS is dynamic totally self locking.

Static self locking means that a force applied on the output shaft of the gear can not start a movement.

When driving loads with high inertia care must be taken to achieve a braking time long enough to prevent overload on the gear.

When a worm gear is used in an application with short braking time a worm gear that is "dynamically reversible" is normally the best selection.

Information regarding lead angle for BENZLERS worm gears are given on the following page.

Reversing as a function of the lead angle

γ	
$\geq 25^\circ$	Total reversing
$12^\circ - 25^\circ$	Statically reversible
$8^\circ - 12^\circ$	Variable static self locking Quick return in case of vibrations Dynamically reversible
$5^\circ - 8^\circ$	Statically self locking Return in case of vibrations Scant dynamic reversing
$3^\circ - 5^\circ$	Statically self locking Slow movement return in case of vibrations. Low dynamic reversing
$1^\circ - 3^\circ$	Statically self locking No return Low dynamic reversing

SELECTION OF GEARS AND GEARMOTORS

Benzlers Worm gear BS, Wormwheel and Wormscrew data

i = Ratio

z = Starts of worm shaft

η_s = Starting efficiency

γ = Lead angle

m = Module

η = Running efficiency n1=1430 rpm

	i	γ	z	m	η_s	η
BS 40	6.67 A	15.52	3	2.5	60	86
	10 B	16.70	3	2	62	85
	15 C	11.31	2	2	53	79
	20 D	8.53	1	3	47	75
	24 E	7.13	1	2.5	43	71
	30 F	5.71	1	2	37	67
	40 G	4.02	1	1.45	30	59
	48 H	3.58	1	1.25	27	56
	60 I	2.86	1	1	23	49
	70 J	3.03	1	0.9	24	44
	84 K	2.53	1	0.75	21	36
BS 50	8 A	17.82	3	3	63	88
	10.5 B	15.07	2	3.5	60	87
	14 C	12.19	2	2.7	55	84
	21 D	7.67	1	3.5	44	77
	24 E	7.07	1	3	39	74
	32 F	5.71	1	2.4	37	71
	37 FX	4.40	1	2	32	66
	42 G	4.29	1	1.8	31	65
	54 H	3.34	1	1.4	26	59
	64 I	2.99	1	1.2	24	55
	80 J	2.86	1	1	23	49
BS 63	7.75 A	18.43	4	3	64	90
	11 B	17.82	3	3	63	88
	14 C	15.07	2	3.5	60	87
	18 D	10.20	2	2.7	51	83
	24.5 E	9.93	2	2.1	50	81
	29 F	7.67	1	3.5	44	77
	37 FX	4.47	1	2.5	32	70
	43 G	5.71	1	2.4	37	71
	51 H	4.76	1	2	33	67
	57 I	4.29	1	1.8	31	65
	73 J	3.34	1	1.4	26	59
	104 K	2.60	1	1	22	46

	i	γ	z	m	η_s	η
BS 71	7.5 A	18.29	4	3.5	64	92
	9.33 B	19.98	3	4	65	91
	12 C	14.04	3	3	58	88
	16 D	12.34	2	3.5	55	87
	21 E	10.20	2	2.7	51	84
	28 F	6.91	1	4	42	79
	37 G	6.12	1	3	39	76
	48 H	4.73	1	2.4	33	71
	63 I	3.55	1	1.8	27	65
	82 J	2.86	1	1.4	23	58
	100 K	2.99	1	1.2	24	54
BS 88	7.25 A	21.80	4	4.5	67	94
	11.75 B	18.43	4	3	64	91
	15.67 C	14.04	3	3	58	89
	19.50 D	9.93	2	3.5	50	87
	23.50 E	9.46	2	3	49	85
	29 F	5.71	1	4.5	38	80
	39 G	5.00	1	3.5	34	77
	47 H	4.76	1	3	33	75
	58 J	4.47	1	2.5	32	72
	71 K	3.37	1	2	26	67
	82 L	3.55	1	1.8	27	66
	106 M	2.86	1	1.4	23	57
BS 112	7 A	22.48	4	6	68	94
	11.5 B	20.85	4	4	66	93
	15.3 C	15.95	3	4	61	91
	19.5 D	11.31	2	4.5	54	88
	23 E	10.78	2	4	52	88
	28 F	5.91	1	6	39	83
	39 G	5.71	1	4.5	38	80
	46 H	5.44	1	4	36	79
	63 J	4.76	1	3	33	75
	76 K	4.21	1	2.5	31	71
	95 L	3.37	1	2	26	66
	108 M	2.95	1	1.75	24	61

Efficiency

The efficiency of the gear has to be considered when a worm gear or a worm geared motor is chosen. For intermittent duties it is necessary to increase the motor power to be able to compensate for the low efficiency during start.

Also consider that the highest efficiency is reached after run-in period and under continuous duty.

All values given in the catalogue are only valid for a gear after running-in period under continuous duty with service factor 1.

If the gear is driven from the output shaft the back driving efficiency is calculated as follows:

$$\eta^{-} = 2 - \frac{1}{\eta}$$

n1, max	40	50	63	71	88	112i<60:1	112i>60:1
rpm	6000	5500	5000	4500	4000	3000	3500

QUESTIONNAIRE

To specify a drive precisely certain data are essential. The most important questions are listed in the table below. If you do not have the required data available in this form, we advice you to use a technical handbook or other suitable documentation. Should you have any question, please do not hesitate to contact us, Benzlers specialists will be pleased to assist you.

Load designation

Output power (kW): P_e	at n_{max}	at n_{min}	Motor
			Enclosure IP
Output speed (RPM):	n_{max}	n_{min}	Operating voltage
			motor (V)
			brake (V)
			frequency (Hz)
Output torque (Nm): T_e	at n_{max}	at n_{min}	Brake torque (Nm)
Overhung load (N): F_{r2e}	at output shaft	at input shaft	Ambient factors
			Ambient temperature (°C)
Axial thrust load (N): F_{a2e}	at output shaft	at input shaft	Load cycle / Duty cycle S / % ED
(away + / towards -)			Starting frequency (1/h)
Moment of inertia (kgm ²):	at output shaft	at input shaft	
Unit type and mounting position (see page 11)			

Gears and geared motors are described by a code consisting of 10 positions. Positions that aren't used are left empty. Additional information is written clearly.

Example of such information is:

Output speed, Motor power
Connecting voltage for motor and brake (if used)
Type of motor at specific request
All nonstandard executions that are not described in this catalogue.

Example on ordering text: (explanations, see page 11):

Gear						Motor			
1	2	3	4	5	6	7	8	9	10
BS	40	A	2,0H, M=115	-	4	80A4	-	180	B5
		214 rpm		0,37 kW		220-240/380-420V, 50 Hz			

Additional information:

MOUNTING POSITIONS

1 Gear type

BS (Worm gear and worm geared motor)

2 Gear size

Standard sizes 40, 50, 63, 71, 88, 112,
50/40, 63/40, 71/40, 88/50, 112/63

Other combinations and sizes can be achieved.
Check with Benzlers.

3 Ratio code

A, B, C....FA, FB, FC (2 letters for double
wormgears).

4 Mounting position

See picture *For execution - code 2 and 3 state flange
size, for example M=115, see page 55.

5 Gear Accessories

VM = distance ring for different position of terminal box

EB = brake on gear

KEB = coupling/brake unit (specify type and voltage)

F = fan on gear (only BS88 and BS112)

DP = double input shaft

6 Input design

2 = free high speed shaft (no motor or flange for
motor)

3 = prepared for motor (specify flange and shaft
diametres or IEC-standard size)

4 = with motor

7 Motor

Acc. to IEC (71A, 71B)

8 Accessories for the motor

B = Brake

TB = Thermostat protection

Th = Thermistor protection

FS = Fitted with forced cooling

TG = Tachogenerator

PG = Encoder

9 Terminal box position

Positions acc picture

10 Motorflange

B14 = Small flange

B5 = Large flange

Motor flange B5

Position of terminal box

Motor sizes

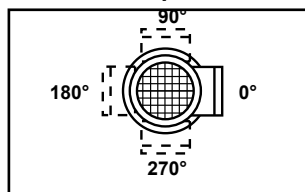
	63	71	80	90	100	112	132	160	180
Gear									
BS 40	45*	45*	45*	45*					
50		0	0	0					
63		0	0	0					
71			45+	45+	45+	45+			
88			45	45	45	45	90		
112(i<60)					45	45	90	45	
112(i>60)				45	45	45	90		

Mounting Positions

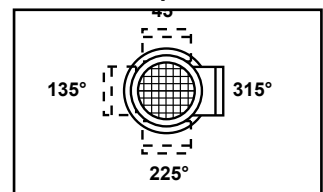
Hollow shaft gear Execution - code 0	U	O	H-A	H-B
Feet and output shaft Execution - code 1	OV	OH	OD	
Only output shaft Execution - code 8	UV	UH	UD	
Only feet Execution - code 9	VV Endast	VH Endast	VD Endast	
Code 9 only for BS40-71	BS 40-71	BS 40-71	BS 40-71	
	HU-A	HN-A	HD-A	
	HU-B	HN-B	HD-B	
Output flange and shaft Execution - code 2* State M	BS 40-71 OH	BS 40-71 OV	BS 88-112 OH	
Output flange and hollow shaft Execution - code 3* State M	BS 40-71 OH	BS 40-71 OV	BS 88-112 OH	
Double gears (prestep gear is shown on picture)	P1	P2	P3	
	P4	P5	P6	
Execution - code 4	P7	P8		
Gear with hollow shaft, torque arm and connection Execution - code 5	O	V		

Position of terminal box

Standard position 0



Standard position 45



Motor flange B14

Position of terminal box

Motor sizes

	63	71	80	90	100	112	132	160	180
Gear									
40	45*	45*	45*	45*					
50		45*	45*	45*					
63		45*	45*	45*	45				
71			0+	0+	0+	0+			
88			0	0	0	0			
112				0	0	0			

* = Can be changed to 0 with distance ring, VM

+ = Distance ring to be mounted on gear

SERIES BS

WORM GEARED MOTORS

0.12 kW

Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
0.69	1960.00 FJ	0.76	524	5.0	BS 71/40 63A-4	19	36 - 39
0.81	1680.00 FI	0.86	463	5.0			
1.01	1344.00 FH	0.99	403	5.0			
1.21	1120.00 FG	1.13	354	5.0			
1.62	840.00 FF	1.34	299	5.0			
2.02	672.00 FE	1.57	255	5.0			
2.43	560.00 FD	1.77	226	5.0			
3.24	420.00 FC	2.2	182	5.0			
4.86	280.00 FB	3	133	5.0			
2.34	580.00 FD	0.76	234	4.0	BS 63/40 63A-4	16	36 - 39
3.13	435.00 FC	0.96	189	4.0			
4.69	290.00 FB	1.33	138	4.0			
7.03	193.43 FA	1.96	95	4.0			
2.83	480.00 ED	1.3	113	2.7	BS 50/40 63A-4	14	36 - 39
3.78	360.00 EC	0.99	146	2.7			
5.67	240.00 EB	1.33	108	2.7			
8.50	160.00 EA	1.93	75	2.7			
6.44	104.00 K	1.47	73	4.0	BS 63 71 B-8	15	28 - 35
9.18	73.00 J	3.1	58	4.0			
11.75	57.00 I	3.91	49	4.0			
8.94	104.00 K	2.09	50	4.0	BS 63 71-6	13	28 - 35
8.38	80.00 J	1.24	62	2.7	BS 50 71B-8	13	28 - 35
10.47	64.00 I	1.99	51	2.7			
11.63	80.00 J	1.94	39	2.7	BS 50 71-6	11	28 - 35
14.53	64.00 I	3.03	33	2.7			
17.22	54.00 H	3.73	29	2.7			
7.98	84.00 K	0.75	48	2.0	BS 40 71B-8	11	28 - 35
9.57	70.00 J	0.87	54	2.0			
11.17	60.00 I	1.2	46	2.0			
11.07	84.00 K	0.83	42	2.0	BS 40 71-6	9	28 - 35
13.29	70.00 J	1.22	38	2.0			
15.50	60.00 I	1.66	32	2.0			
16.19	84.00 K	1.6	21	2.0	BS 40 63A-4	9	28 - 35
19.43	70.00 J	2.36	19	2.0			
22.67	60.00 I	3.21	16	2.0			
28.33	48.00 H	4.15	14	2.0			
34.00	40.00 G	4.84	12	2.0			
45.33	30.00 F	5.97	10	2.0			
56.67	24.00 E	7.07	8	2.0			
68.00	20.00 D	8.18	7	2.0			
90.67	15.00 C	10.53	6	2.0			
136.00	10.00 B	14.84	4	2.0			
203.90	6.67 A	19.52	3	1.7			

SERIES BS

WORM GEARED MOTORS

0.18 kW

Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
1.22 1.63 2.04 2.45 3.26 4.89 7.34	1120 FG 840 FF 672 FE 560 FD 420 FC 280 FB 186.76 FA	0.76 0.89 1.04 1.18 1.46 1.98 2.91	529 448 383 339 274 202 137	5.0 5.0 5.0 5.0 5.0 5.0 5.0	BS 71/40 63B-4	19	36 - 39
4.72 7.08	290 FB 193.43 FA	0.88 1.29	209 144	4.0 4.0	BS 63/40 63B-4	16	36 - 39
5.71 8.56	240 EB 160 EA	0.89 1.27	163 114	2.7 2.7	BS 50/40 63B-4	14	36 - 39
6.60	106 M	2.35	123	10.0	BS 88 80A-8	51	28 - 35
7.00 8.54 11.11	100 K 82 J 63 I	1.4 2.15 3.71	118 100 83	5.0 5.0 5.0	BS 71 80A-8	21	28 - 35
6.73 9.59	104 K 73 J	0.92 1.94	117 92	4.0 4.0	BS 63 80A-8	18	28 - 35
8.85 12.60 16.14	104 K 73 J 57 I	1.19 2.5 3.3	88 69 58	4.0 4.0 4.0	BS 63 71A-6	14	28 - 35
8.75 10.94 12.96	80 J 64 I 54 H	0.8 1.28 1.67	96 80 72	2.7 2.7 2.7	BS 50 80A-8	16	28 - 35
11.50 14.38 17.04 21.90 24.86	80 J 64 I 54 H 42 G 37 Fx	1.1 1.72 2.12 2.53 2.76	68 58 51 43 38	2.7 2.7 2.7 2.7 2.7	BS 50 71A-6	12	28 - 35
11.67	60 I	0.78	72	2.0	BS 40 80A-8	14	28 - 35
15.33 19.17	60 I 48 H	0.99 1.37	54 48	2.0 2.0	BS 40 71A-6	10	28 - 35
16.31 19.57 22.83 28.54 34.25 45.67 57.08 68.50 91.33 137.00	84 K 70 J 60 I 48 H 40 G 30 F 24 E 20 D 15 C 10 B	0.81 1.19 1.62 2.09 2.44 3.01 3.56 4.12 5.31 7.48	41 37 32 28 24 20 16 14 11 8	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	BS 40 63B-4	9	28 - 35
205.40	6.67 A	9.84	5	1.7	BS 40 63B-4	9	28 - 35
184.00 276.00 413.79	15 C 10 B 6.67 A	31.13 44.16 56.96	1 1 1	1.9 1.6 1.3	BS 40 63K-2	9	28 - 35

SERIES BS

WORM GEARED MOTORS

0.25 kW

Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
0.48	2912 FK	0.93	1433	15.0	BS 112/63 71 A-4	71	36-39
0.68	2044 FJ	1.19	1178	15.0			
0.88	1596 FI	1.40	1000	15.0			
0.98	1428 FH	1.49	942	15.0			
1.16	1204 FG	1.64	853	15.0			
1.35	1036 FFx	1.91	733	15.0			
1.72	812 FF	2.18	641	15.0			
2.04	686 FE	2.43	575	15.0			
2.78	504 FD	3.14	445	15.0			
3.57	392 FC	3.72	377	15.0			
0.75	1856 FI	0.82	976	10.0	BS 88/50 71 A-4	52	36 - 39
0.89	1566 FH	0.91	876	10.0			
1.15	1218 FG	1.05	763	10.0			
1.30	1073 FFx	1.13	707	10.0			
1.51	928 FF	1.24	643	10.0			
2.01	696 FE	1.55	516	10.0			
2.30	609 FD	1.66	481	10.0			
3.45	406 FC	2.22	360	10.0			
4.60	304.5 FB	2.77	289	10.0			
6.03	232 FA	3.48	230	10.0			
2.08	672 FE	0.77	522	5.0	BS 71/40 71 A-4	20	36 - 39
2.50	560 FD	0.86	463	5.0			
3.33	420 FC	1.07	374	5.0			
5.00	280 FB	1.45	276	5.0			
7.50	186.76 FA	2.11	190	5.0			
7.24	193.43 FA	0.94	198	4.0	BS 63/40 71A-4	17	36 - 39
8.75	160.08 EA	0.92	156	2.7	BS 50/40 71A-4	15	36-39
8.85	104 K	0.79	132	4.0	BS 63 71 B-6	15	28-35
12.60	73 J	1.67	104	4.0	BS 63 B-6	15	28-35
16.14	57 I	2.21	87	4.0			
18.04	51 H	2.29	80	4.0			
21.40	43 G	2.32	72	4.0			
13.46	104 K	1.30	77	4.0	BS 63 71A-4	14	28 - 35
19.18	73 J	2.69	60	4.0			
24.56	57 I	3.18	50	4.0			
27.45	51 H	3.46	46	4.0			
14.38	64 I	1.15	87	2.7	BS 50 71B 6	13	28 - 35
17.04	54 H	1.42	77	2.7			
17.50	80 J	1.07	66	2.7	BS 50 71A-4	12	28 - 35
21.88	64 I	1.70	55	2.7			
25.93	54 H	1.86	48	2.7			
33.33	42 G	2.23	40	2.7			
37.84	37 Fx	2.45	36	2.7			
43.75	32 F	2.75	33	2.7			
19.17	48 H	0.94	70	2.0	BS 40 71B 6	11	28 - 35
23.00	40 G	1.12	61	2.0			
20.00	70 J	0.77	57	2.0	BS 40 71A-4	10	28 - 35
23.33	60 I	1.04	50	2.0			
29.17	48 H	1.35	43	2.0			
35.00	40 G	1.57	37	2.0			
46.67	30 F	1.94	30	2.0			
58.33	24 E	2.30	25	2.0			
70.00	20 D	2.66	22	2.0			
93.33	15 C	3.43	17	2.0			
140.00	10 B	4.83	12	2.0			
209.90	6.67 A	6.35	8	1.7			
183.33	15 C	9.36	5	1.9	BS 40 63B-2	9	28 - 35
275.00	10 B	13.28	3	1.6			
412.29	6.67 A	17.13	2	1.3			

SERIES BS

WORM GEARED MOTORS

0.37 kW

Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
0.68	2044 FJ	0.80	1747	15.0	BS 112/63 71B-4	72	36-39
0.88	1596 FI	0.94	1483	15.0			
0.98	1428 FH	1.00	1398	15.0			
1.16	1204 FG	1.10	1267	15.0			
1.35	1036 FFx	1.29	1089	15.0			
1.72	812 FF	1.47	954	15.0			
2.04	686 FE	1.64	856	15.0			
2.78	504 FD	2.11	664	15.0			
2.78	504 FD	2.11	664	15.0	BS 112/63 71B-4	72	36-39
3.57	392 FC	2.49	563	15.0			
4.55	308 FB	3.08	455	15.0			
1.30	1073 FFx	0.76	1050	10.0	BS 88/50 71B-4	53	36-39
1.51	928 FF	0.84	954	10.0			
2.01	696 FE	1.04	766	10.0			
2.30	609 FD	1.12	716	10.0			
3.45	406 FC	1.49	536	10.0			
4.60	304.5 FB	1.86	431	10.0			
6.03	232 FA	2.33	344	10.0			
5.00	280 FB	0.97	411	5.0	BS 71/40 71B-4	21	36-39
7.50	186.76 FA	1.41	284	5.0			
6.48	108 M	1.92	294	15.0	BS 112 90S-8	71	28-35
7.37	95 L	2.53	271	15.0			
6.60	106 M	1.00	288	10.0	BS 88 90S-8	54.0	28-35
8.54	82 L	1.74	241	10.0			
9.86	71 K	2.38	212	10.0			
8.68	106 M	1.30	216	10.0	BS 88 80A-6	50	28-35
11.22	82 L	2.27	180	10.0			
12.96	71 K	3.15	156	10.0			
8.54	82 J	0.95	228	5.0	BS 71 90S-8	24	28-35
9.20	100 K	0.78	207	5.0	BS 71 80A-6	20	28-35
11.22	82 J	1.22	172	5.0			
14.60	63 I	1.97	143	5.0			
19.17	48 H	2.37	118	5.0			
9.59	73 J	0.85	210	4.0	BS 63 90S-8	21	28-35
12.60	73 J	1.07	163	4.0	BS 63 80A-6	17	28-35
16.14	57 I	1.41	137	4.0	BS 63 71B-4	15	28-35
18.04	51 H	1.46	126	4.0			
13.46	104 K	0.77	130	4.0			
19.18	73 J	1.60	101	4.0			
24.56	57 I	1.88	85	4.0			
27.45	51 H	2.05	78	4.0			
32.56	43 G	2.34	68	4.0			
37.84	37 Fx	2.56	57	4.0			
48.28	29 F	3.18	49	4.0			
12.96	54 H	0.76	159	2.7			
17.04	54 H	0.90	121	2.7			
21.88	64 I	1.04	89	2.7			
25.93	54 H	1.14	79	2.7			
33.33	42 G	1.37	66	2.7			
37.84	37 Fx	1.50	59	2.7			
43.75	32 F	1.68	53	2.7			
58.33	24 E	2.07	41	2.7			
66.67	21 D	2.33	37	2.7			
100.00	14 C	3.34	26	2.7			

WORM GEARED MOTORS

0.55 kW

Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
1.36 1.74 2.06 2.80 3.60 4.58 6.50	1036.00 FFx 812.00 FF 686.00 FE 504.00 FD 392.00 FC 308.00 FB 217.00 FA	0.87 0.99 1.10 1.42 1.67 2.07 2.73	1612 1412 1268 985 836 677 514	15.0 15.0 15.0 15.0 15.0 15.0 15.0	BS 112/63 80A-4	74	36-39
2.32 3.47 4.63 6.08	609.00 FD 406.00 FC 304.50 FB 232.00 FA	0.75 1.01 1.25 1.57	1060 795 639 511	10.0 10.0 10.0 10.0	BS 88/50 80A-4	55	36-39
7.55	186.76 FA	0.94	424	5.0	BS 71/40 80A-4	23	36-39
6.48 7.37 9.21	108.00 M 95.00 L 76.00 K	1.22 1.61 2.35	461 425 366	15.0 15.0 15.0	BS 112 90L-8	74	28-35
8.54 9.86	82.00 L 71.00 K	1.13 1.54	372 327	10.0 10.0	BS 88 90L-8	57	28-35
8.68 11.22 12.96 15.86	106.00 M 82.00 L 71.00 K 58.00 J	0.82 1.44 2.00 2.59	341 285 246 216	10.0 10.0 10.0 10.0	BS 88 80B-6	51	28-35
13.30 17.20 19.86 24.31	106.00 M 82.00 L 71.00K 58.00 J	1.22 2.12 2.74 3.51	221 184 159 139	10.0 10.0 10.0 10.0	BS 88 80A-4	50	28-35
11.11	63.00 I	1.07	290	5.0	BS 71 90L-8	27	28-35
11.22 14.60 19.17	82.00 J 63.00 I 48.00 H	0.78 1.26 1.52	269 223 185	5.0 5.0 5.0	BS 71 80B-6	21	28-35
17.20 22.38 29.38 38.11 50.36 67.14	82.00 J 63.00 I 48.00 H 37.00 G 28.00 F 21.00 E	1.14 1.60 1.97 2.47 2.97 3.87	177 146 119 96 76 59	5.0 5.0 5.0 5.0 5.0 4.6	BS 71 80A 4	20	28-35
16.14 18.04 21.40	57.00 I 51.00 H 43.00 G	0.91 0.94 0.96	212 195 173	4.0 4.0 4.0	BS 63 80B-6	18	28-35
19.32 24.74 27.65 32.79 38.11 48.62 57.55 78.33	73.00 J 57.00 I 51.00 H 43.00 G 37.00 Fx 29.00 F 24.50 E 18.00 D	1.00 1.18 1.28 1.46 1.60 1.99 2.33 2.92	162 136 125 109 92 78 69 51	4.0 4.0 4.0 4.0 4.0 4.0 4.0 3.9	BS 63 80A-4	17	28-35

SERIES BS

WORM GEARED MOTORS

0.55 kW

Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
33.57 38.11 44.06 58.75 67.14 100.71 134.29 176.25 201.43	42 G 37 Fx 32 F 24 E 21 D 14 C 10.5 B 8 A 14 C	0.87 0.96 1.07 1.32 1.49 2.13 2.74 3.40 3.82	103 92 84 65 59 41 32 24 17	2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.4 2.5	BS 50 80A-4	15	28-35
58.75	24 E	0.90	65	2.0	BS 50 71B-2 BS 40 80A-4	13	28-35
70.50 94.00 141.00 211.39	20 D 15 C 10 B 6.67 A	1.04 1.34 1.89 2.48	56 43 30 20	2.0 2.0 2.0 1.7	BS 40 80A-4	13	28-35
188.00 282.00 422.79	15 C 10 B 6.67 A	2.40 3.41 4.40	18 13 8	1.9 1.6 1.3	BS 40 71B-2	11	28-35

0.75 kW

2.06 2.80 3.60 4.58 6.50	686 FE 504 FD 392 FC 308 FB 217 FA	0.81 1.04 1.22 1.51 1.99	1733 1347 1144 928 705	15.0 15.0 15.0 15.0 15.0	BS 112/63 80B-4	75	36-39
4.63 6.08	304.5 FB 232 FA	0.92 1.14	874 699	10.0 10.0	BS 88/50 80B-4	56	36-39
6.48 7.37 9.21	108 M 95 L 76 K	0.87 1.15 1.67	647 596 513	15.0 15.0 15.0	BS 112 100LA 8	80	28-35
8.52 9.68 12.11 14.60	108 M 95 L 76 K 63 J	1.10 1.46 2.19 2.96	497 457 393 339	15.0 15.0 15.0 15.0	BS 112 90S-6	71	28-35
8.54 9.86	82 L 71 K	0.81 1.11	518 455	10.0 10.0	BS 88 100LA-8	62	28-35
11.22 12.96 15.66	82 L 71 K 58 J	1.02 1.42 1.84	400 347 304	10.0 10.0 10.0	BS 88 90S-6	54	28-35
13.30 17.20 19.86 24.31 30.00 36.15	106 M 82 L 71 K 58 J 47 H 39 G	0.85 1.48 1.91 2.44 3.06 3.76	318 264 229 200 166 140	10.0 10.0 10.0 10.0 10.0 10.0	BS 88 80B-4	51	28-35
14.58	48 H	0.91	339	5.0	BS 71 100LA-8	31	28-35
19.17	48 H	1.09	259	5.0	BS 71 90S-6	24	28-35
17.20 22.38 29.38 38.11 50.36 67.14 88.13	82 J 63 I 48 H 37 G 28 F 21 E 16 D	0.80 1.13 1.38 1.74 2.09 2.72 3.40	251 207 169 137 108 85 66	5.0 5.0 5.0 5.0 5.0 4.6 4.0	BS 71 80B-4	21	28-35

SERIES BS

WORM GEARED MOTORS

0.75 kW

Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
24.74 27.65 32.79 38.11 48.62 57.55 78.33 100.71 128.18	57 I 51 H 43 G 37 Fx 29 F 24.5 E 18 D 14 C 11 B	0.83 0.90 1.03 1.13 1.40 1.64 2.06 2.64 3.22	193 177 155 130 111 97 72 58 46	4.0 4.0 4.0 4.0 4.0 4.0 3.9 3.4 3.0	BS 63 80B-4	18	28-35
158.33 44.06	18 D 32 F	3.59 0.76	31 118	3.1 2.7	BS 63 80A-2 BS 50 80B-4	17 16	28-35 28-35
58.75 67.14 100.71 134.29 176.25	24 E 21 D 14 C 10.5 B 8 A	0.94 1.06 1.51 1.95 2.41	91 82 58 45 34	2.7 2.7 2.7 2.7 2.4			
203.57 271.43	14 C 10.5 B	2.58 3.31	26 20	2.5 2.2	BS 50 80A-2	15	28-35
94.00 141.00 211.39	15 C 10 B 6.67 A	0.95 1.34 1.76	61 43 28	2.0 2.0 1.7	BS 40 80B-4	14	28-35
190.00 285.00 427.29	15 C 10 B 6.67 A	1.62 2.30 2.97	27 19 12	1.9 1.6 1.3	BS 40 80A-2	13	28-35

1.1 kW

3.60 4.58 6.50	392 FC 308 FB 217 FA	0.83 1.03 1.35	1683 1366 1039	15.0 15.0 15.0	BS 112/63 90S-4	78	36-39
7.37 9.21	95 L 76 K	0.76 1.11	895 770	15.0 15.0	BS 112 100LB-8	83	28-35
9.68 12.11	95 L 76 K	0.96 1.45	692 594	15.0 15.0	BS 112 90L-6	74	28-35
14.60	63 J	1.96	513	15.0	BS 112 90L-6	74	28-35
13.06 14.84 18.55 22.38	108 M 95 L 76 K 63 J	1.06 1.40 2.17 2.65	495 454 383 330	15.0 15.0 15.0 15.0	BS 112 90S-4	71	28-35
12.96 15.86	71 K 58 J	0.94 1.22	522 458	10.0 10.0	BS 88 90L-6	57	28-35
17.20 19.86 24.31 30.00 36.15 48.62 60.00	82 L 71 K 58 J 47 H 39 G 29 F 23.5 E	0.97 1.25 1.60 2.00 2.46 3.18 3.39	404 350 306 254 213 165 141	10.0 10.0 10.0 10.0 10.0 9.7 9.0	BS 88 90S-4	54	28-35
29.38 38.11 50.36 67.14 88.13 117.50 151.13	48 H 37 G 28 F 21 E 16 D 12 C 9.33 B	0.91 1.14 1.38 1.79 2.24 2.84 3.62	257 208 163 128 100 76 60	5.0 5.0 5.0 4.6 4.0 3.5 3.0	BS 71 90S 4	24	28-35
48.62 57.55 78.33 100.71 128.18 181.94	29 F 24.5 E 18 D 14 C 11 B 7.75 A	0.92 1.08 1.35 1.74 2.12 2.68	169 148 110 88 70 50	4.0 4.0 3.9 3.4 3.0 2.6	BS 63 90S-4	21	28-35
158.33 203.57 259.09	18 D 14 C 11.00 B	2.22 2.86 3.51	50 40 32	3.1 2.7 2.4	BS 63 80B-2	18	28-35

SERIES BS

WORM GEARED MOTORS

1.1 kW

Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
100.71 134.29 176.25	14 C 10.5 B 8 A	1.00 1.29 1.60	88 67 52	2.7 2.7 2.4	BS 50 90S-4	19	28-35
203.57 271.43 356.25	14 C 10.5 B 8 A	1.63 2.09 2.59	41 31 24	2.5 2.2 1.9	BS 50 80B-2	16	28-35
285.00 427.29	10 B 6.67 A	1.45 1.87	30 20	1.6 1.3	BS 40 80B-2	14	28-35

1.5 kW

4.61 6.54	308 FB 217 FA	0.76 0.99	1853 1411	15.0 15.0	BS 112/63 90L 4	81	36-39
9.08	76 K	0.79	1080	15.0	BS 112 112M-8	91	28-35
12.37 14.92	76 K 63 J	1.07 1.44	807 697	15.0 15.0	BS 112 100L-6	83	28-35
13.15 14.95 18.68 22.54 30.87 36.41	108 M 95 L 76 K 63 J 46 H 39 G	0.76 1.00 1.55 1.89 2.78 3.19	692 635 536 462 350 300	15.0 15.0 15.0 15.0 15.0 15.0	BS 112 90L-4	74	28-35
16.21	58 J	0.90	620	10.0	BS 88 100L-6	65	28-35
20.00 24.48 30.21 36.41 48.97 60.43 72.82 90.62	71 K 58 J 47 H 39 G 29 F 23.5 E 19.5 D 15.67 C	0.90 1.15 1.44 1.77 2.30 2.44 3.01 3.56	485 424 352 296 228 196 165 135	10.0 10.0 10.0 10.0 9.7 9.0 8.2 7.4	BS 88 90L-4	57	28-35
50.71 67.62 88.75 118.33 152.20 189.33	28 F 21 E 16 D 12 C 9.33 B 7.5 A	1.00 1.30 1.62 2.05 2.62 2.97	225 177 138 105 83 68	5.0 4.6 4.0 3.5 3.0 2.7	BS 71 90L-4	27	28-35
238.33	12 C	3.25	49	2.9	BS 71 90S-2	24	28-35
57.96 78.89 101.43 129.09 183.23	24.5 E 18 D 14 C 11 B 7.75 A	0.78 0.98 1.26 1.54 1.94	204 152 122 97 69	4.0 3.9 3.4 3.0 2.6	BS 63 90L-4	24	28-35
158.89 204.29 260.00 369.03	18 D 14 C 11 B 7.75 A	1.55 2.00 2.46 3.11	71 57 46 32	3.1 2.7 2.4 2.1	BS 63 90S-2	21	28-35
135.24 177.50	10.5 B 8 A	0.94 1.16	93 71	2.7 2.4	BS 50 90L-4	22	28-35
204.29 272.38 357.50	14 C 10.5 B 8 A	1.15 1.48 1.83	57 44 34	2.5 2.2 1.9	BS 50 90S-2	19	28-35

WORM GEARED MOTORS

2.2 Kw

Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
14.76	63 J	0.96	1048	15.0	BS 112 112M-6	91	28-35
18.82	76 K	1.04	802	15.0	BS 112 100LA-4	81	28-35
22.70	63 J	1.26	691	15.0			
31.09	46 H	1.86	524	15.0			
36.67	39 G	2.13	450	15.0			
51.07	28 F	2.70	331	15.0			
62.17	23 E	3.23	288	13.6			
30.43	47 H	0.97	523	10.0	BS 88 100LA-4	63	28-35
36.67	39 G	1.19	440	10.0			
49.31	29 F	1.54	339	9.7			
60.85	23.5 E	1.64	291	9.0			
73.33	19.5 D	2.03	245	8.2			
91.26	15.67 C	2.39	201	7.4			
121.70	11.75 B	3.18	154	6.3	BS 71 100LA-4	32	28-35
89.38	16 D	1.10	204	4.0			
119.17	12 C	1.39	155	3.5			
153.27	9.33 B	1.77	123	3.0			
190.67	7.5 A	2.01	100	2.7	BS 71 90L-2	27	28-35
239.17	12 C	2.13	75	2.9			
307.61	9.33 B	2.74	60	2.4			
382.67	7.5 A	3.15	48	2.2	BS 63 100LA-4	29	28-35
102.14	14 C	0.85	181	3.4			
130.00	11 B	1.04	144	3.0			
184.52	7.75 A	1.31	102	2.6	BS 63 90L-2	24	28-35
205.00	14 C	1.31	88	2.7			
260.91	11 B	1.61	70	2.4			
370.32	7.75 A	2.04	50	2.1	BS 50 90L-2	22	28-35
358.75	8 A	1.21	51	1.9			

3 kW

22.70	63 J	0.91	957	15.0	BS 112 100LB-4	84	28-35
31.09	46 H	1.34	726	15.0			
36.67	39 G	1.54	623	15.0			
51.07	28 F	1.95	458	15.0			
62.17	23 E	2.33	398	13.6			
73.33	19.5 D	2.70	338	12.8			
93.46	15.3 C	3.42	274	11.0			
60.85	23.5 E	1.19	402	9.0	BS 88 100LB-4	66	28-35
73.33	19.5 D	1.47	337	8.2			
91.26	15.67 C	1.74	277	7.4			
121.70	11.75 B	2.31	212	6.3			
197.24	7.25 A	3.35	134	5.0	BS 88 100L-2	63	28-35
245.96	11.75 B	3.58	103	5.1			
153.27	9.33 B	1.29	170	3.0	BS 71 100LB-4	35	28-35
190.67	7.5 A	1.46	138	2.7			
240.83	12 C	1.54	104	2.9	BS 71 100L-2	32	28-35
309.75	9.33 B	1.97	83	2.4			
385.33	7.5 A	2.27	66	2.2			
184.52	7.75 A	0.95	141	2.6	BS 63 100LB-4	32	28-35
262.73	11 B	1.16	96	2.4	BS 63 100L-2	29	28-35
372.90	7.75 A	1.47	69	2.1			
30.98	46 H	0.99	981	15.0	BS 112 112M-4	91	28-35
36.54	39 G	1.14	842	15.0			
50.89	28 F	1.44	619	15.0			
61.96	23 E	1.72	538	13.6			
73.08	19.5 D	2.00	456	12.8			
93.14	15.3 C	2.53	370	11.0			
123.91	11.5 B	3.17	281	9.5	BS 88 112M-4	73	28-35
73.08	19.5 D	1.09	455	8.2			
90.94	15.67 C	1.29	374	7.4			
121.28	11.75 B	1.71	286	6.3			
196.55	7.25 A	2.49	180	5.0			

SERIES BS

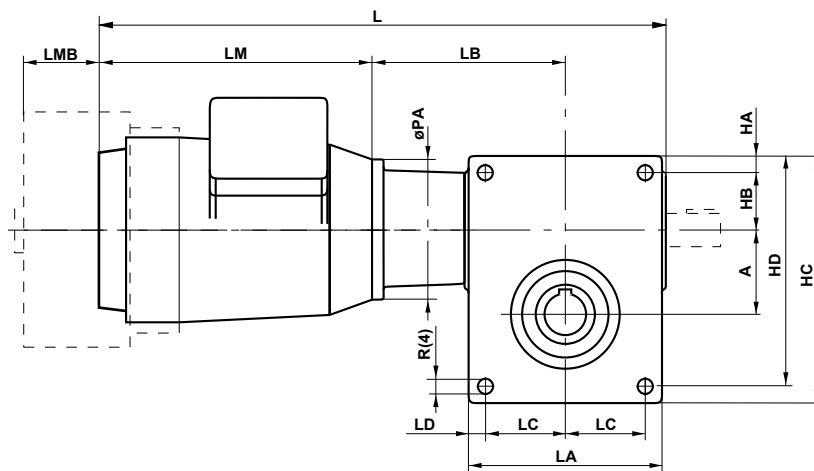
WORM GEARED MOTORS

3 kW	Output speed n ₂ rpm	Ratio i	Service factor f _{bp}	Output torque T ₂ Nm	Permissible overhung load Fr ₂ kN	Size	Weight kg	Dim. page
	241.70	11.75 B	2.59	142	5.1	BS 88 112M-2	72	28-35
	304.39 378.67	9.33 B 7.5 A	1.43 1.65	114 92	2.4 2.2	BS 71 112M-2	41	28-35
4 kW	30.98	46 H	0.99	981	15.0	BS 112 112M-4	91	28-35
	36.54	39 G	1.14	842	15.0			
	50.89	28 F	1.44	619	15.0			
	61.96	23 E	1.72	538	13.6			
	73.08	19.5 D	2.00	456	12.8			
	93.14	15.3 C	2.53	370	11.0			
	123.91	11.5 B	3.17	281	9.5			
	73.08	19.5 D	1.09	455	8.2	BS 88 112M-4	73	28-35
	90.94	15.67 C	1.29	374	7.4			
	121.28	11.75 B	1.71	286	6.3			
	196.55	7.25 A	2.49	180	5.0			
	241.70	11.75 B	2.59	142	5.1	BS 88 112M-2	72	28-35
	304.39 378.67	9.33 B 7.5 A	1.43 1.65	114 92	2.4 2.2	BS 71 112M-2	41	28-35
5.5 kW	50.89	28 F	1.04	858	15.0	BS 112 132S-4	107	28-35
	61.96	23 E	1.24	746	13.6			
	73.08	19.5 D	1.44	633	12.8			
	93.14	15.3 C	1.82	513	11.0			
	123.91	11.5 B	2.29	390	9.5			
	203.57	7 A	3.36	240	7.6			
	249.13	11.5 B	3.72	190	7.5	BS 112 132SA-2	109	28-35
	121.28	11.75 B	1.24	396	6.3	BS 88 132S-4	90	28-35
	196.55	7.25 A	1.80	250	5.0			
	243.83	11.75 B	1.87	197	5.1	BS 88 132SA-2	92	28-35
	395.17	7.25 A	2.92	123	4.0			
	62.17	23 E	0.91	1020	13.6	BS 112 132M-4	117	28-35
	73.33	19.5 D	1.05	865	12.8			
	93.46	15.3 C	1.33	701	11.0			
	124.35	11.5 B	1.67	533	9.5			
	204.29	7 A	2.46	328	7.6			
	249.57	11.5 B	2.70	263	7.5	BS 112 132SB-2	109	28-35
	410.00	7 A	3.75	162	6.2			
	197.24	7.25 A	1.32	341	5.0	BS 88 132M-4	100	28-35
	244.26	11.75 B	1.36	271	5.1	BS 88 132SB-2	92	28-35
7.5 kW	73.33	19.5 D	0.88	1041	12.8	BS 112 132MD-4	129	28-35
	93.46	15.3 C	1.11	844	11.0			
	124.35	11.5 B	1.39	641	9.5			
	204.29	7 A	2.04	394	7.6			
	256.96	11.5 B	2.30	308	7.5	BS 112 132ME-2	132	28-35
	422.14	7 A	3.20	190	6.2			
	251.49	11.75 B	1.16	317	5.1	BS 88 132ME-2	115	28-35
	407.59	7.25 A	1.81	198	4.0			

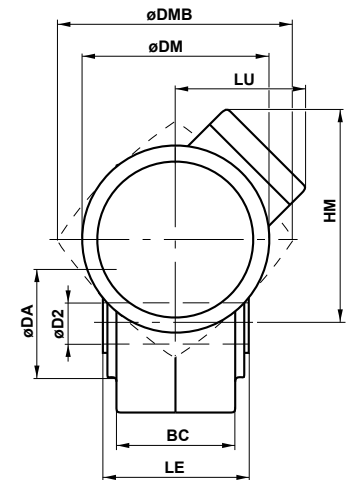
SERIES BS

DIMENSIONS

Worm geared motors BS40-112 Shaftmounted



BS 40-71



Mounting position O, hollow shaft

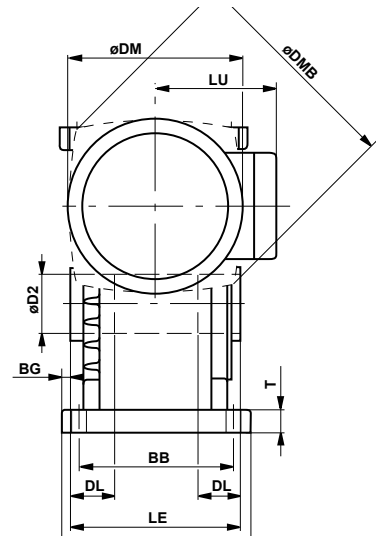
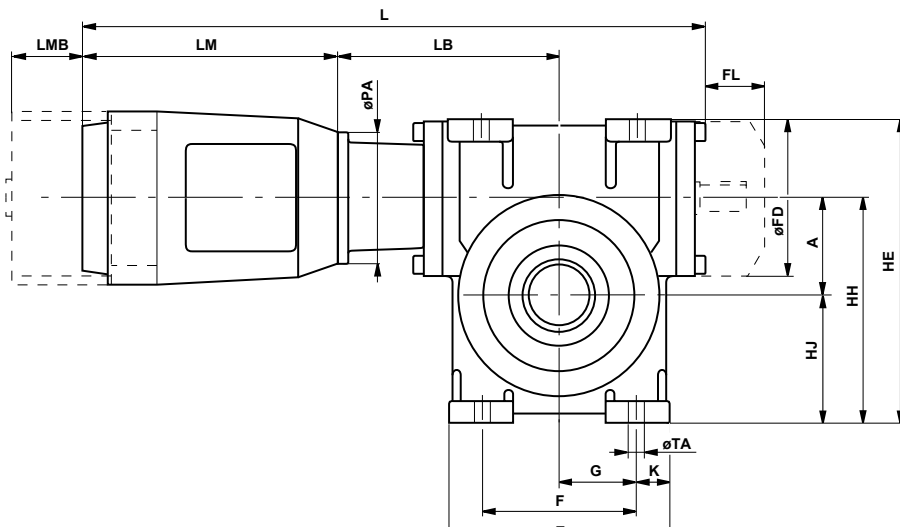
Position of terminal box, see page 11

Shaft tolerance, see page 57

BS	Motor-size	Motor dimensions				Gear unit dimensions												øR
		B14		B5		A	BC	øDA	HA	HB	HC	HD	HE	HH	HJ	LA	LC	
		L	LB	L	LB													
40	63	355	112	355	112													
	71	388	118	388	118													
	80	420	128	420	128	40	73	58	10	36	140	130				100	40	8.3
	90 S	443	138	443	138													
	90 L	468	138	468	138													
50	71	421	140	421	140													
	80	453	150	463	160													
	90 S	476	160	476	160	50	78	68	10	38	155	145				124	52	8.3
	90 L	501	160	501	160													
63	71	443	151	443	151													
	80	475	161	485	171													
	90 S	498	171	498	171	63	82	80	10	43	183	173				146	63	10.3
	90 L	523	171	523	171													
	100	561.5	181.5	561.5	181.5													
71	80	495	177	505	187													
	90 S	518	187	518	187													
	90L	543	187	543	187	71	101.4	92	14	49	209	195				165	68.5	12.3
	100	581.5	197.5	581.5	197.5													
	112	595.5	197.5	595.5	197.5													
88	80 (i>55)	577	213	587	223													
	90 S	600	223	600	223													
	90 L	625	223	625	223	88							275	203	115			
	100	664	233.5	664	233.5													
	112	678	233.5	678	233.5													
	132 (i<55)			779	266													
112	90 S (i>60)	642	244	642	244													
	90 L (i>60)	667	244	667	244													
	100 (i>60)	705	254.5	705	254.5													
	100	718	267	718	267	112							340	252	140			
	112 (i>60)	720	254.5	720	254.5													
	112	732	267	732	267													
	132			821	287													
	160			956	317													

SERIES BS

DIMENSIONS



BS 88-112

Mounting position O, hollow shaft

Position of terminal box, see page 11

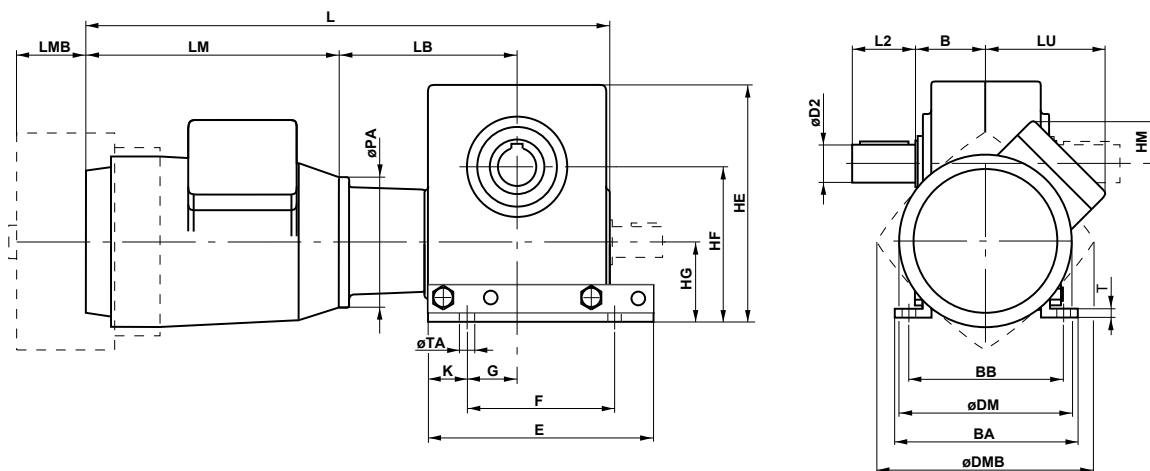
Shaft tolerance, see page 57

														Shaft-dimensions				Fan		Motor dimensions								With brake motor	
BA	BB	BG	E	F	G	K	T	øTA	øD2	LE	DL	FD	FL	DM	HM	LM	LU	PA-B14	PA-B5	DMB	LMB								
170	140	8	200	140	70	30	20	14	45	154	45	140	55	120	125	183	92	90	140										
														140	140	210	102	105	160	185	73								
														158	152	232	113	120	200	201	72								
														178	161	245	122	140	200	220	75								
														178	161	270	122	140	200	220	75								
														140	150	210	102	105	160	185	73								
														158	162	232	113	120	200	201	72								
														178	172	245	122	140	200	220	75								
														178	172	270	122	140	200	220	75								
														140	163	210	102	105	160	185	73								
														158	175	232	113	120	200	201	72								
														178	184	245	122	140	200	220	75								
														178	184	270	122	140	200	220	75								
														198	204	298	136	160	250	255	106								
														158	183	232	113	120	200	201	72								
														178	192	245	122	140	200	220	75								
														178	192	270	122	140	200	220	75								
														198	212	298	136	160	250	255	106								
														221	231	312	155	160	250	278	109								
														170	140	8	200	140	70	30	20	14	45	154	45	140	55	158	200
178	209	245	122	140	200	220	75																						
178	209	270	122	140	200	220	75																						
198	229	298	136	160	250	255	106																						
221	248	312	155	160	250	278	109																						
248	255	381	165	300	317	135																							
178	233	245	122	140	200	220	75																						
178	233	270	122	140	200	220	75																						
198	253	298	136	160	250	255	106																						
198	253	298	136	160	250	255	106																						
210	175	18	250	175	87.5	37.5	23	18	55	174	50	140	55	221	272	312	155	160	250	278	109								
														221	272	312	155	160	250	278	109								
														248	279	381	165	300	317	135									
														310	332	486	210	350	375	170									

SERIES BS

DIMENSIONS

Worm geared motors BS40-112 Footmounted



BS 40-71

Mounting position OV, OH, OD

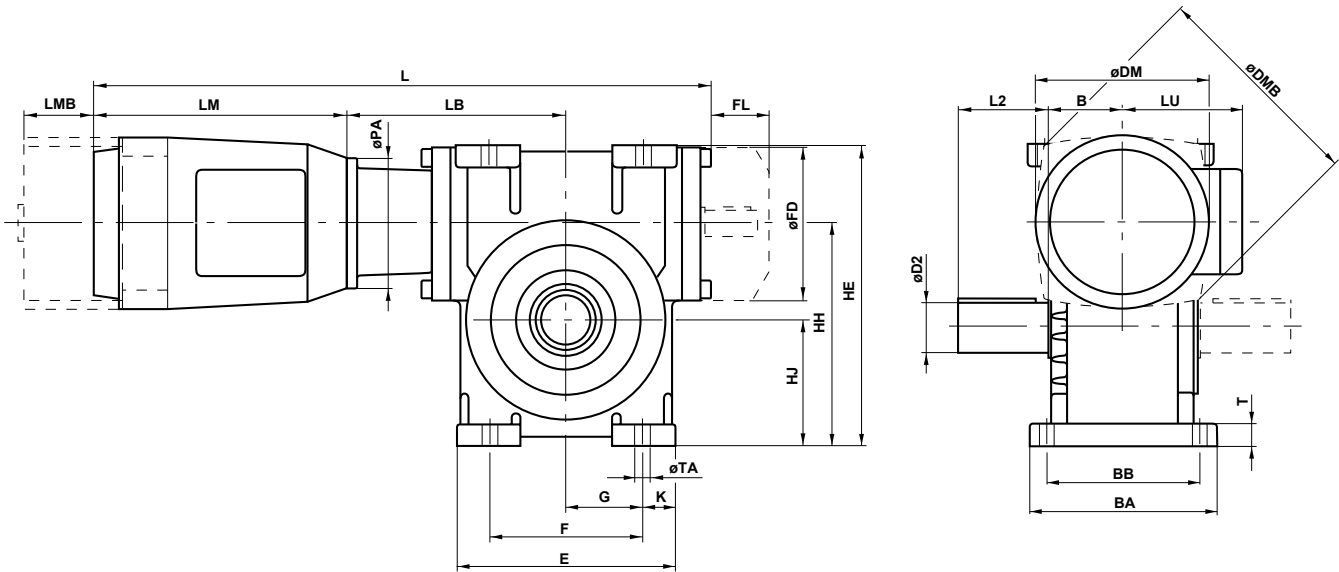
Position of terminal box, see page 11

Shaft tolerance, see page 57

BS	Motor-size	B14		B5		Gear unit dimensions											
		Motor dimensions		L	LB	B	HE	HH	HJ	BA	BB	E	F	G	K	T	TA
L	LB																
40	63	355	112	355	112												
	71	388	118	388	118												
	80	420	128	420	128	47	152	106	66	133	108	140	80	20	30	5	8.5
	90 S	443	138	443	138												
	90 L	468	138	468	138												
50	71	421	140	421	140												
	80	453	150	463	160												
	90 S	476	160	476	160	50	167	119	69	138	113	155	104	36.5	25.5	5	8.5
	90 L	501	160	501	160												
63	71	443	151	443	151												
	80	475	161	485	171												
	90 S	498	171	498	171	52	195	142	79	146	121	183	126	44.5	28.5	7	10.5
	90 L	523	171	523	171												
	100	561.5	181.5	561.5	181.5												
71	80	495	177	505	187												
	90 S	518	187	518	187												
	90L	543	187	543	187	62.5	216.5	153.5	82.5	170	144	209	137	46.5	36	8	12.5
	100	581.5	197.5	581.5	197.5												
	112	595.5	197.5	595.5	197.5												
88	80 (i>55)	577	213	587	223												
	90 S	600	223	600	223												
	90 L	625	223	625	223	70	275	203	115	170	140	140	200	70	30	20	14
	100	664	233.5	664	233.5												
	112	678	233.5	678	233.5												
	132 (i<55)			779	266												
112	90 S (i>60)	642	244	642	244												
	90 L (i>60)	667	244	667	244												
	100 (i>60)	705	254.5	705	254.5												
	100	718	267	718	267	82	340	252	140	210	175	175	250	87.5	37.5	23	18
	112 (i>60)	720	254.5	720	254.5												
	112	732	267	732	267												
	132			821	287												
	160			956	317												

SERIES BS

DIMENSIONS



BS 88-112

Mounting position OV, OH, OD

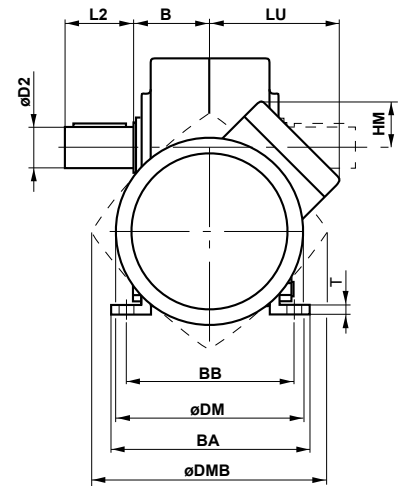
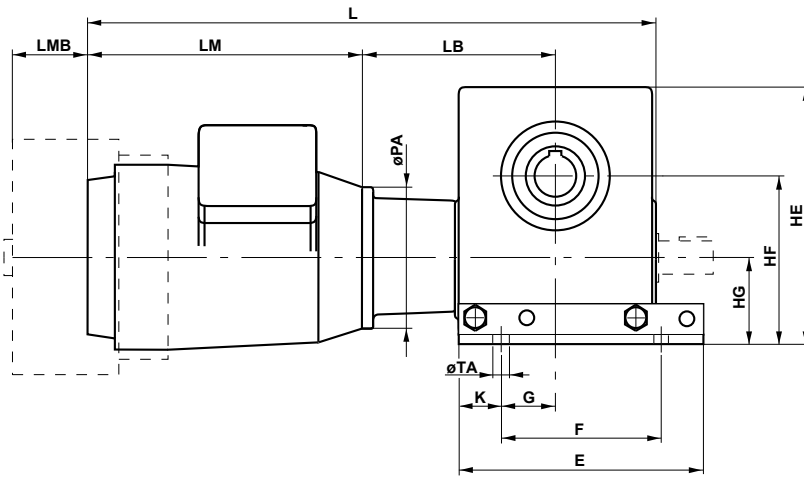
Position of terminal box, see page 11
Shaft tolerance, see page 57

Shaft-dimensions		Fan		Motor dimensions				With brake motor			
D2	L2	FD	FL	DM	HM	LM	LU	PA-B14	PA-B5	DMB	LMB
20	36			120	125	183	85	90	140		
				140	140	210	100	105	160	185	73
				158	152	232	112	120	200	201	72
				178	161	245	121	140	200	220	75
				178	161	270	121	140	200	220	75
25	42			140	135	210	100	105	160	185	73
				158	150	232	112	120	200	201	72
				178	171	245	121	140	200	220	75
				178	171	270	121	140	200	220	75
30	58			140	163	210	100	105	160	185	73
				158	175	232	112	120	200	201	72
				178	184	245	121	140	200	220	75
				178	184	270	121	140	200	220	75
				198	204	298	141	160	250	255	106
35	58			158	183	232	112	120	200	201	72
				178	192	245	121	140	200	220	75
				178	192	270	121	140	200	220	75
				198	212	298	141	160	250	255	106
				221	231	312	160	160	250	278	109
45	82	140	55	158		232	112	120	200	201	72
				178		245	121	140	200	220	75
				178		270	121	140	200	220	75
				198		298	136	160	250	255	106
				221		312	156	160	250	278	109
55	82	140	55	248		381	167		300	317	135
				178		245	121	140	200	220	75
				178		270	121	140	200	220	75
				198		298	136	160	250	255	106
				198		298	136	160	250	255	106
				221		312	156	160	250	278	109
				221		312	156	160	250	278	109
				248		381	167		300	317	135
				310		486	210		350	375	170

SERIES BS

DIMENSIONS

Worm geared motors BS40-112 Footmounted



BS 40-71

Mounting position UV, UH, UD

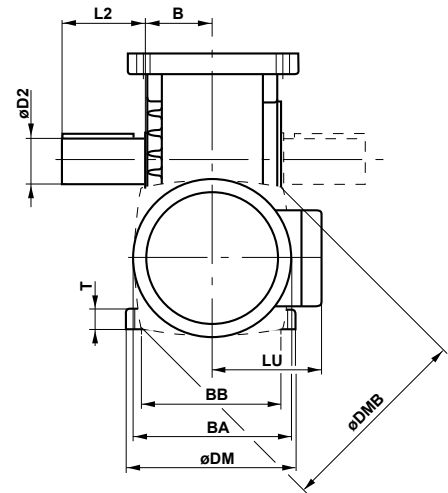
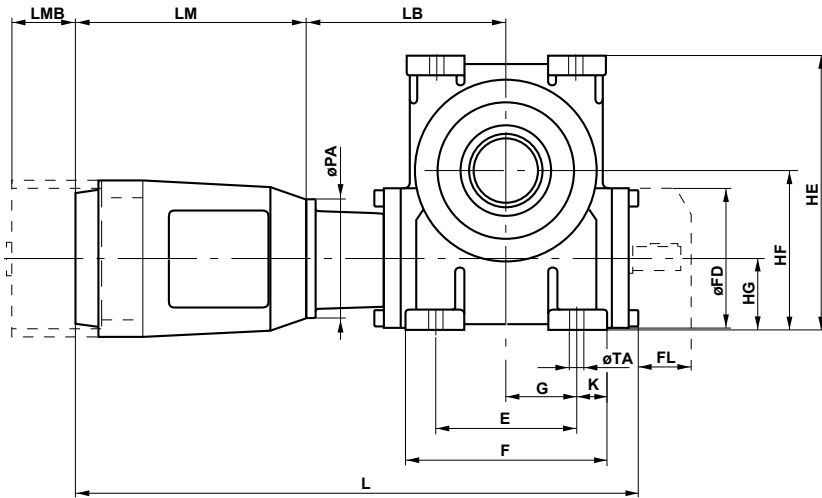
Position of terminal box, see page 11

Shaft tolerance, see page 57

BS	Motor-size	Motor dimensions				Gear unit dimensions											TA
		B14		B5		B	HE	HF	HG	BA	BB	E	F	G	K	T	
40	63	355	112	355	112												
	71	388	117	388	118												
	80	420	128	420	128	47	152	98	58	133	108	140	80	20	30	5	8.5
	90 S	443	138	443	138												
	90 L	468	138	468	138												
50	71	421	140	421	140												
	80	453	150	463	160												
	90 S	476	160	476	160	50	167	110	60	138	113	155	104	36.5	25.5	5	8.5
	90 L	501	160	501	160												
63	71	443	151	443	151												
	80	475	161	485	171												
	90 S	498	171	498	171	52	195	128	65	146	121	183	126	44.5	28.5	7	10.5
	90 L	523	171	523	171												
	100	561.5	181.5	561.5	181.5												
71	80	495	177	505	187												
	90 S	518	187	518	187												
	90 L	543	187	543	187	62.5	216.5	141.5	70.5	169.4	143.4	209	137	46.5	36	8	12.5
	100	581.5	197.5	581.5	197.5												
	112	595.5	197.5	595.5	197.5												
88	80 (i>55)	577	213	587	223												
	90 S	600	223	600	223												
	90 L	625	223	625	223	70	275	160	72	170	140	140	200	70	30	20	14
	100	664	233.5	664	233.5												
	112	678	233.5	678	233.5												
	132 (i<55)			779	266												
112	90 S (i>60)	642	244	642	244												
	90 L (i>60)	667	244	667	244												
	100 (i>60)	705	254.5	705	254.5												
	100	718	267	718	267	82	340	200	88	210	175	175	250	87.5	37.5	23	18
	112 (i>60)	720	254.5	720	254.5												
	112	732	267	732	267												
	132			821	287												
	160			956	317												

SERIES BS

DIMENSIONS



BS 88-112

Mounting position UV, UH, UD

Position of terminal box, see page 11

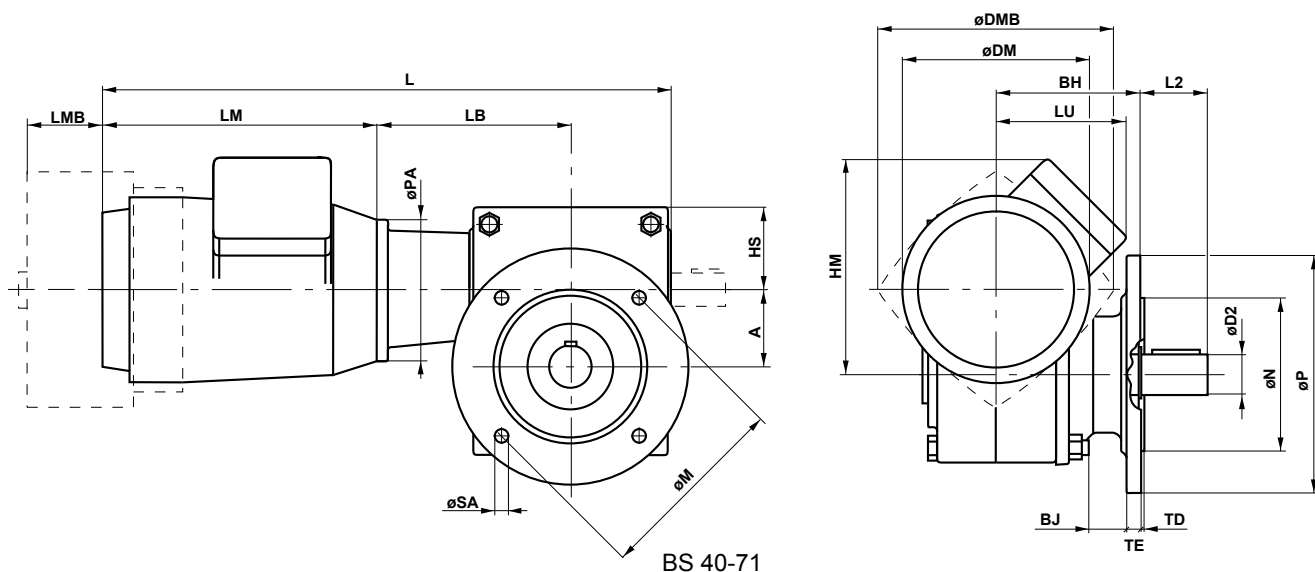
Shaft tolerance, see page 57

Shaft-dimensions		Fan		Motor dimensions						With brake motor	
D2	L2	FD	FL	DM	HM	LM	LU	PA-B14	PA-B5	DMB	LMB
20	36			120	45	183	85	90	140		
				140	60	210	100	105	160	185	73
				158	72	232	112	120	200	201	72
				178	81	245	121	140	200	220	75
				178	81	270	121	140	200	220	75
25	42			140	50	210	100	105	160	185	73
				158	62	232	112	120	200	201	72
				178	71	245	121	140	200	220	75
				178	71	270	121	140	200	220	75
30	58			140	37	210	100	105	160	185	73
				158	49	232	112	120	200	201	72
				178	58	245	121	140	200	220	75
				178	58	270	121	140	200	220	75
				198	78	298	141	160	250	255	106
35	58			158	41	232	112	120	200	201	72
				178	50	245	121	140	200	220	75
				178	50	270	121	140	200	220	75
				198	70	298	141	160	250	255	106
				221	89	312	160	160	250	278	109
45	82	140	55	158		232	112	120	200	201	72
				178		245	121	140	200	220	75
				178		270	121	140	200	220	75
				198		298	136	160	250	255	106
				221		312	156	160	250	278	109
55	82	140	55	248		381	167		300	317	135
				178		245	121	140	200	220	75
				178		270	121	140	200	220	75
				198		298	136	160	250	255	106
				198		298	136	160	250	255	106
				221		312	156	160	250	278	109
				221		312	156	160	250	278	109
				248		381	167		300	317	135
				310		486	210		350	375	170

SERIES BS

DIMENSIONS

Worm geared motors BS40-112 Flangemounted



Mounting position OH

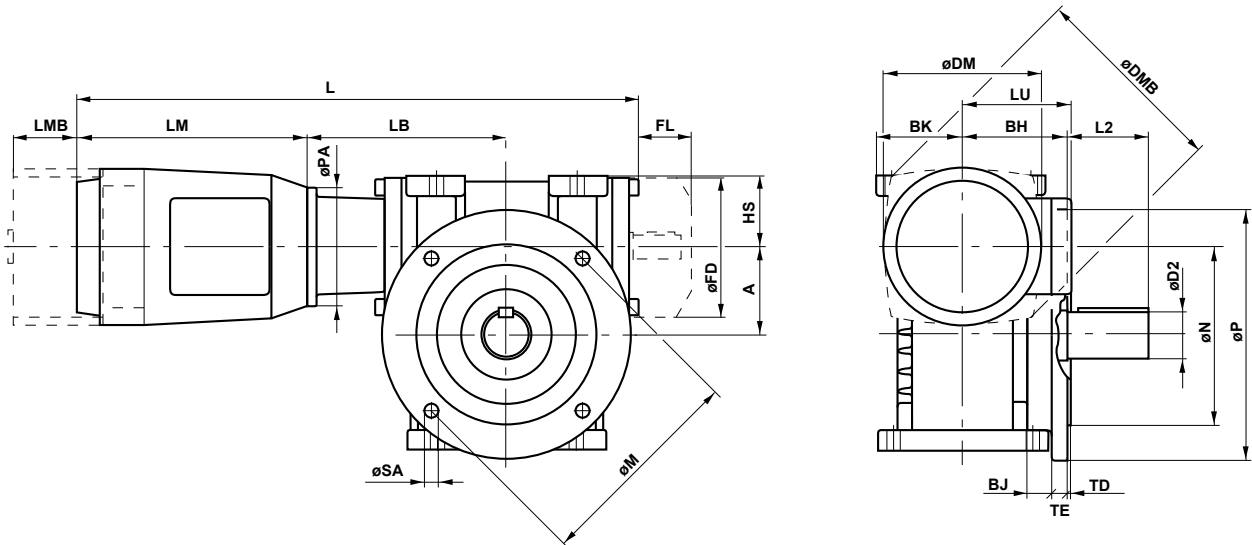
Position of terminal box, see page 11

Shaft tolerance, see page 57

BS	Motor-size	Motor dimensions				Gear unit dimensions									
		B14		B5		A	HS	BJ	M	N	P	øSA	TE	TD	BH
40	63	355	112	355	112										
	71	388	117	388	118				100	80	118				
	80	420	128	420	128	40	46	28	1151)	951	1401)	9	10	3	91.5
	90 S	443	138	443	138				130	110	160				
	90 L	463	138	468	138				165	130	200				
50	71	421	140	421	140				100	80	118				
	80	453	150	463	160				115	95	140				
	90 S	476	160	476	160	50	48	28	1301)	1101)	1601)	9	10	3.5	99
	90 L	501	160	501	160				165	130	200				
63	71	443	151	443	151										
	80	475	161	485	171				130	110	160				
	90 S	498	171	498	171	63	53	35	1651)	1301)	2001)	11	12	3.5	106
	90 L	523	171	523	171										
	100	561.5	181.5	561.5	181.5										
71	80	495	177	505	187										
	90 S	518	187	518	187										
	90L	543	187	543	187	71	63	32	165	130	200	11	12	3.5	122.4
	100	581.5	197.5	581.5	197.5										
	112	595.5	197.5	595.5	197.5										
88	80 (i>55)	577	213	587	223										
	90 S	600	223	600	223										
	90 L	625	223	625	223	88	72	24	215	180	250	14	15	4	105
	100	664	233.5	664	233.5										
	112	678	233.5	678	233.5										
	132 (i<55)			779	266										
112	90 S (i>60)	642	244	642	244										
	90 L (i>60)	667	244	667	244										
	100 (i>60)	705	254.5	705	254.5										
	100	718	267	718	267	112	88	32	265	230	300	14	15	4	125
	112 (i>60)	720	254.5	720	254.5										
	112	732	267	732	267										
	132			821	287										
	160			956	317										

SERIES BS

DIMENSIONS



BS 88-112

Mounting position OH

Position of terminal box, see page 11

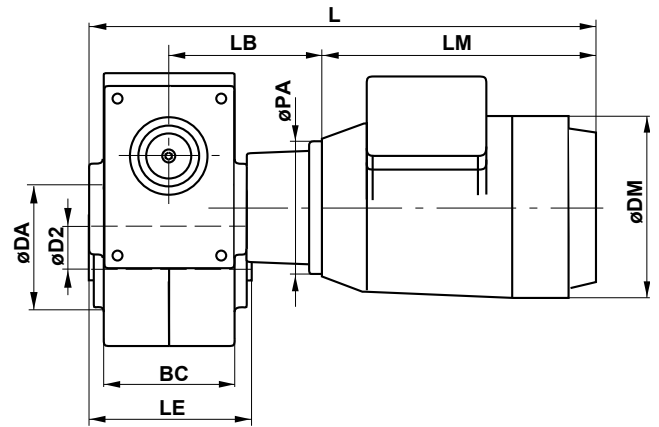
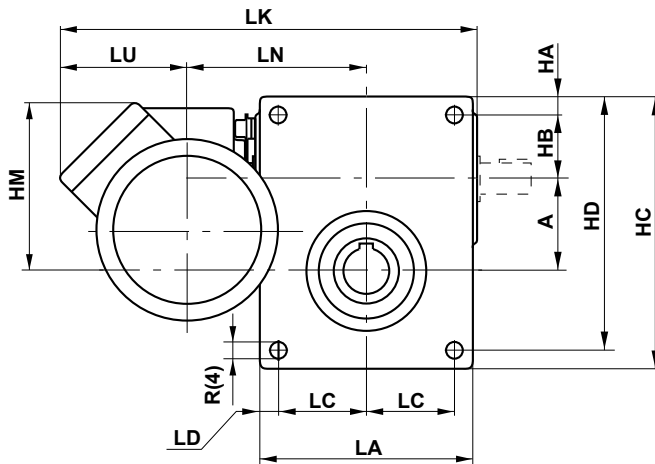
Shaft tolerance, see page 57

Shaft- dimensions		Fan		Motor		With brake motor					
D2	L2	FD	FL	DM	HM	LM	LU	PA-B14	PA-B5	DMB	LMB
20	36	140	55	120	125	183	85	90	140		
				140	140	210	100	105	160	185	73
				158	152	232	112	120	200	201	72
				178	161	245	121	140	200	220	75
				178	161	270	121	140	200	220	75
25	42			140	150	210	100	105	160	185	73
				158	162	232	112	120	200	201	72
				178	171	245	121	140	200	220	75
				178	171	270	121	140	200	220	75
30	58			140	163	210	100	105	160	185	73
				158	175	232	112	120	200	201	72
				178	184	245	121	140	200	220	75
				178	184	270	121	140	200	220	75
				198	204	298	141	160	250	255	106
35	58	158	183	232	112	120	200	201	72		
		178	192	245	121	140	200	220	75		
		178	192	270	121	140	200	220	75		
		198	212	298	141	160	250	255	106		
		221	231	312	160	160	250	278	109		
45	82	158		232	112	120	200	201	72		
		178		245	121	140	200	220	75		
		178		270	121	140	200	220	75		
		198		298	136	160	250	255	106		
		221		312	156	160	250	278	109		
55	82	248		381	167		300	317	135		
		178		245	121	140	200	220	75		
		178		270	121	140	200	220	75		
		198		298	136	160	250	255	106		
		198		298	136	160	250	255	106		
		221		312	156	160	250	278	109		
		221		312	156	160	250	278	109		
		248		381	167		300	317	135		
		310		486	210		300	375	170		

SERIES BS

DIMENSIONS

Worm geared motors BS 50/40 - BS112/63 Shaftmounted



BS 50/40 - 71/40

Mounting position OV - P7

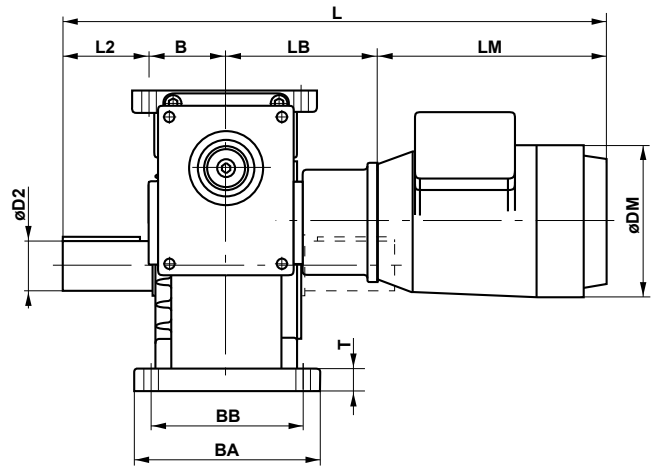
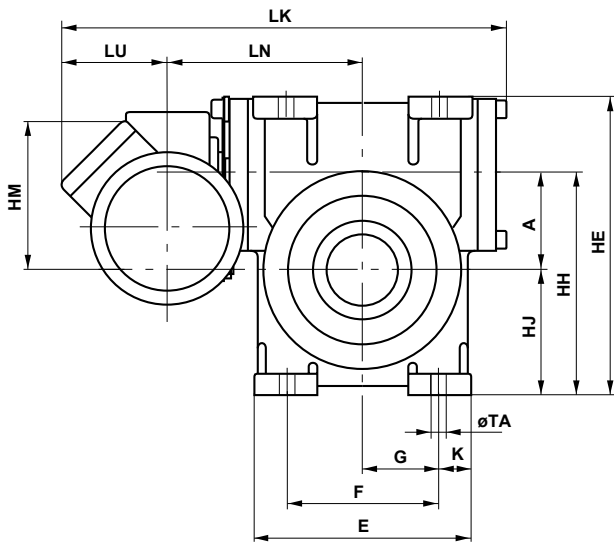
Mounting position O, U -P7

Position of terminal box, see page 11
Shaft tolerance, see page 57

BS	Motor-size	L	Motor dimensions					Gear unit dimensions													LN	R
			B14 LK	LB	L	B5 LK	LB	A	BC	DA	HA	HB	HC	HD	HE	HH	HJ	LA	LC			
50/40	63	355	280	112	355	280	112															
	71	387	295	118	388	295	118	50	78	68	10	38	155	145				124	52	124	8.3	
	80	420	307	128	420	307	128															
63/40	63	355	302	112	355	302	112															
	71	387	317	118	388	317	118	63	82	80	10	43	183	173				146	63	135	8.3	
	80	420	329	128	420	329	128															
71/40	63	355	310	112	355	310	112															
	71	387	325	118	388	325	118	71	101.4	92	14	49	209	195				165	68.5	139	10.3	
	80	420	337	128	420	337	128															
88/50	71	435	412	140	435	412	140															
	80	467	424	150	477	424	160	88							275	203	115			180	12.3	
	90 S	490	433	160	490	433	160															
	90 L	515	433	160	515	433	160															
112/63	71	466	453	151	466	453	151															
	80	498	465	161	508	465	171	112							340	252	140			200		
	90 S	521	474	171	521	474	171															
	90 L	546	474	171	546	474	171															
	100	585	494	181.5	585	494	181.5															

SERIES BS

DIMENSIONS



BS 88/50 - 112/63

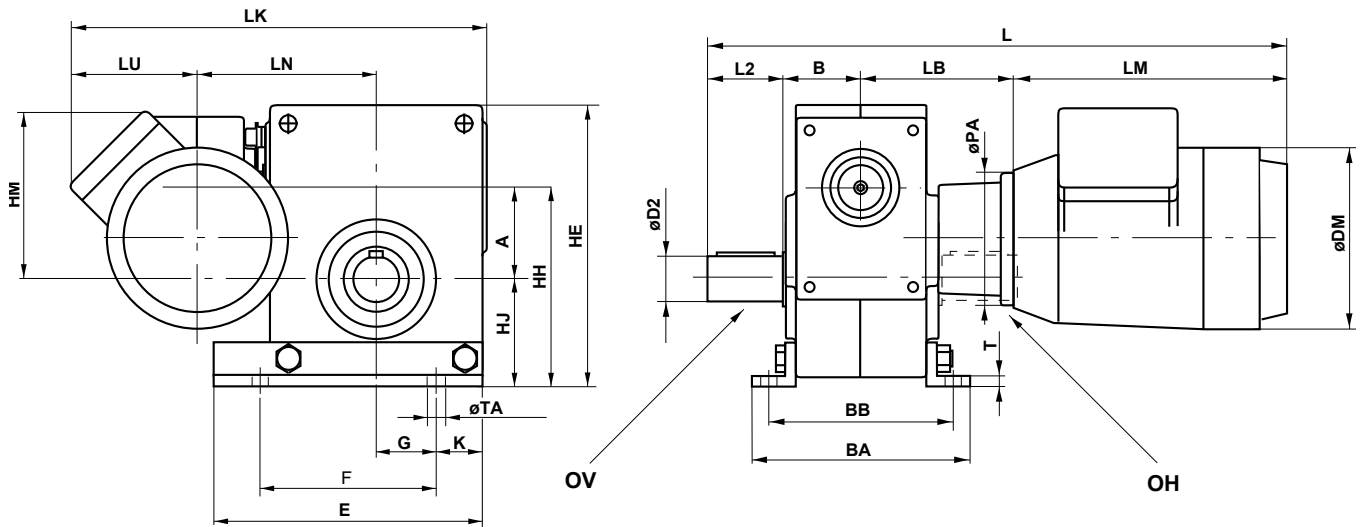
Position of terminal box, see page 11
Shaft tolerance, see page 57

BA	BB	E	F	G	K	T	TA	Shaft- dimensions		Motor- dimensions		LM	LU	PA
								D2	L2	DM	HM			
138	113	155	104	36.5	25.5	4	8.5	25	42	120	95	183	85	90
										140	110	210	100	105
										158	122	232	112	120
146	121	183	126	44.5	28.5	5	11	30	58	120	108	183	85	90
										140	123	210	100	105
										158	135	232	112	120
170	144	209	137	46.5	36	6	12.5	35	58	120	116	183	85	90
										140	131	210	100	105
										158	143	232	112	120
170	140	200	140	70	30	20	14	45	82	140	138	210	100	105
										158	150	232	112	120
										178	159	245	121	140
										178	159	270	121	140
210	175	250	175	87.5	37.5	23	18	55	82	140	149	210	100	105
										158	161	232	112	120
										178	170	245	121	140
										178	170	270	121	140
										198	190	298	141	160

SERIES BS

DIMENSIONS

Worm geared motors BS50/40 - BS 112/63 Footmounted



Mounting position OV, OH, OO - P7

BS 50/40 - 71/40

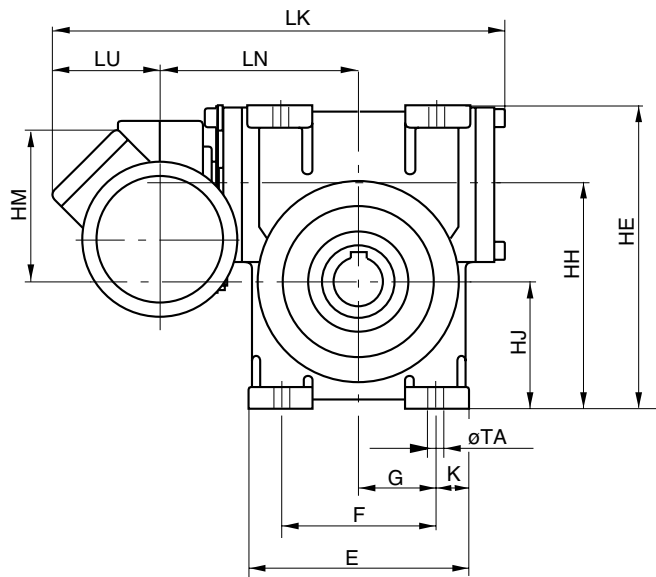
Mounting position OV - P7

Position of terminal box, see page 11
Shaft tolerance, see page 57

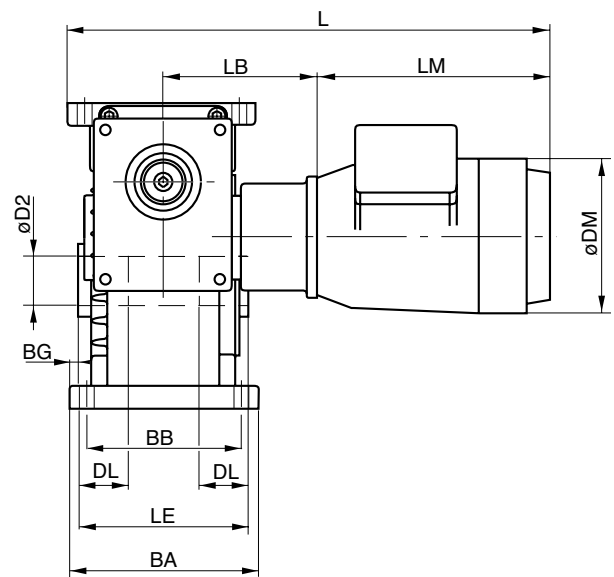
BS	Motor-size	Motor dimensions				Gear unit dimensions								
		L	B14 LK	LB	L	B5 LK	LB	A	B	HE	HH	HJ	LN	
50/40	63	387	280	112	387	280	112	50	50	167	119	69	124	
	71	420	295	118	420	295	118							
	80	452	307	128	452	307	128							
63/40	63	405	302	112	405	302	112	63	52	195	142	79	135	
	71	438	317	118	438	317	118							
	80	470	329	128	470	329	128							
71/40	63	415.5	310	112	415.5	310	112	71	62.5	216.5	153.5	82.5	139	
	71	448.5	325	118	448.5	325	118							
	80	480.5	337	128	480.5	337	128							
88/50	71	502	412	140	502	412	140	88	70	275	203	115	180	
	80	536	424	150	536	424	160							
	90 S	557	433	160	557	433	160							
90 S	90 L	582	433	160	582	433	160	112	82	340	252	140	200	
	112/63	71	525	453	151	525	453							151
	80	557	465	161	557	465	171							
90 S	580	474	171	580	474	171	171	112	82	340	252	140	200	
	90 L	605	474	171	605	474	171							
	100	643.5	494	181.5	643.5	494	181.5							

SERIES BS

DIMENSIONS



BS 88/50 - 112/63



Mounting position OV - P7

Position of terminal box, see page 11
Shaft tolerance, see page 57

BA	BB	BG	E	F	G	K	T	TA	Shaft-dimensions			Motor-dimensions			LM	LU	PA
									D2	LE	DL	DM	HM				
170	140	8	200	140	70	30	20	14	45	154	45	120	95	183	85	90	
												140	110	210	100	105	
												158	122	232	112	120	
												120	108	183	85	90	
												140	123	210	100	105	
												158	135	232	112	120	
												120	116	183	85	90	
												140	131	210	100	105	
												158	143	232	112	120	
												140	138	210	100	105	
												158	150	232	112	120	
												178	159	245	121	140	
												178	159	270	121	140	
210	175	18	250	175	87.5	37.5	23	18	55	174	50	140	149	210	100	105	
												158	161	232	112	120	
												178	170	245	121	140	
												178	170	270	121	140	
												198	190	298	141	160	

BS 40 POWER RATINGS

Ratio and code	Input speed	Output speed	Input power	Output torque	Efficiency	Thermal rating 1)		Overhung load
i	n1 rpm	n2 rpm	P1 kW	T2 Nm	η %	Shaft-mount kW	Shaft-mount kW	Fr2 N
6.67 (20/3) A	2860	429	1.9	37	85	.89	1.2	1300
	1430	214	1.3	50	86	1.1	1.3	1700
	930	139	.99	59	87	.84	1.0	1900
	730	109	.87	66	86	.73	.92	2000
10 (20/2) B	2860	286	1.5	43	83	.86	1.1	1600
	1430	143	1.0	57	85	1.0	1.2	2000
	930	93	.78	69	85	.79	.99	2000
	730	73	.68	76	85	.69	.86	2000
15 (30/2) C	2860	191	1.1	44	78	.65	.87	1900
	1430	95	.73	58	79	.75	.92	2000
	930	62	.56	70	80	.58	.73	2000
	730	49	.50	77	79	.51	.64	2000
20 (20/1) D	2860	143	.91	44	72	.53	.70	2000
	1430	72	.58	58	75	.60	.73	2000
	930	46	.45	70	75	.47	.58	2000
	730	36	.40	78	74	.41	.52	2000
24 (24/1)	2860	119	.80	44	69	.47	.62	2000
	1430	60	.51	58	71	.53	.65	2000
	930	39	.39	70	72	.41	.51	2000
	730	30	.35	78	71	.36	.45	2000
30 (30/1) F	2860	95	.69	44	64	.41	.53	2000
	1430	48	.44	59	67	.45	.54	2000
	930	31	.34	70	67	.35	.44	2000
	730	24	.30	78	66	.31	.39	2000
40 (40/1) G	2860	72	.57	43	56	.34	.44	2000
	1430	36	.37	58	59	.36	.44	2000
	930	23	.28	69	60	.28	.35	2000
	730	18	.25	76	58	.25	.31	2000
48 (48/1) H	2860	60	.52	44	52	.32	.41	2000
	1430	30	.32	58	56	.33	.40	2000
	930	19	.24	66	56	.26	.33	2000
	730	15	.21	71	55	.23	.29	2000
60 (60/1) I	2860	48	.45	42	46	.29	.37	2000
	1430	24	.26	52	49	.29	.35	2000
	930	16	.18	54	49	.23	.29	2000
	730	12	.15	56	47	.21	.26	2000
70 (70/1) J	2860	41	.39	40	43	.29	.36	2000
	1430	20	.21	44	44	.29	.35	2000
	930	13	.14	46	46	.23	.28	2000
	730	10	.11	47	44	.20	.25	2000
84 (84/1) K	2860	34	.32	31	34	.27	.33	2000
	1430	17	.16	33	36	.27	.32	2000
	930	11	.10	35	38	.21	.26	2000
	730	8.7	.09	36	37	.19	.23	2000

1) Gearbox with fan or motor motor with fan, flange mounted on the gearbox.

SERIES BS

BS 50 POWER RATINGS

Ratio and code	Input speed n1 rpm	Output speed n2 rpm	Input power P1 kW	Output torque T2 Nm	Efficiency η %	Thermal rating 1)		Overhung load Fr2 N
						Shaft- mount kW	Shaft- mount kW	
8 (24/3) A	2860	358	2.6	62	88	1.7	2.2	1900
	1430	179	1.7	83	88	1.7	2.1	2400
	930	116	1.4	99	88	1.3	1.6	2700
	730	91	1.2	110	88	1.1	1.4	2700
10.5 (21/2) B	2860	272	2.1	65	86	1.4	1.8	2200
	1430	136	1.4	87	87	1.4	1.7	2700
	930	89	1.1	103	85	1.1	1.4	2700
	730	70	.97	114	85	.94	1.2	2700
14 (28/2) C	2860	204	1.7	66	82	1.2	1.5	2500
	1430	102	1.1	88	84	1.2	1.5	2700
	930	66	.88	105	83	.91	1.1	2700
	730	52	.77	117	83	.78	.97	2700
21 (21/1) D	2860	136	1.2	66	76	.86	1.1	2700
	1430	68	.80	87	77	.84	1.0	2700
	930	44	.63	104	76	.64	.80	2700
	730	35	.56	116	75	.56	.69	2700
24 (24/1) E	2860	119	1.1	63	73	.74	.93	2700
	1430	60	.71	85	74	.72	.87	2700
	930	39	.57	102	72	.55	.69	2700
	730	30	.49	112	72	.48	.60	2700
32 (32/1) F	2860	89	.92	68	69	.69	.86	2700
	1430	45	.59	90	71	.65	.79	2700
	930	29	.47	108	69	.50	.62	2700
	730	23	.41	120	69	.43	.54	2700
37 (37/1) Fx	2860	77	.82	66	65	.59	.73	2700
	1430	39	.53	88	66	.56	.67	2700
	930	25	.43	106	64	.43	.53	2700
	730	20	.37	116	64	.37	.47	2700
42 (42/1) G	2860	68	.76	68	63	.57	.70	2700
	1430	34	.49	90	65	.54	.65	2700
	930	22	.40	109	63	.42	.51	2700
	730	17	.34	120	63	.36	.45	2700
54 (54/1) H	2860	53	.66	68	57	.49	.61	2700
	1430	26	.42	90	59	.46	.55	2700
	930	17	.34	109	57	.35	.43	2700
	730	14	.30	120	57	.31	.38	2700
64 (64/1) I	2860	45	.60	69	53	.46	.56	2700
	1430	22	.39	93	55	.42	.51	2700
	930	15	.28	100	53	.33	.40	2700
	730	11	.23	102	53	.29	.36	2700
80 (80/1) J	2860	36	.50	66	49	.44	.53	2700
	1430	18	.27	71	49	.40	.47	2700
	930	12	.19	75	47	.31	.38	2700

1) Gearbox with fan or motor motor with fan,
flange mounted on the gearbox.

BS 63 POWER RATINGS

Ratio and code	Input speed	Output speed	Input power	Output torque	Efficiency	Thermal rating 1)		Overhung load
i	n1 rpm	n2 rpm	P1 kW	T2 Nm	η %	Shaft-mount kW	Shaft-mount kW	Fr2 N
7.75 (31/4) A	2860	369	4.3	101	91	2.8	3.5	2100
	1430	185	2.9	134	90	2.6	3.2	2600
	930	120	2.3	162	90	2.0	2.4	2900
	730	94	2.0	178	89	1.7	2.1	3200
11 (33/3) B	2860	260	3.4	112	89	2.6	3.2	2400
	1430	130	2.3	149	88	2.3	2.8	3000
	930	85	1.8	178	88	1.7	2.1	3400
	730	66	1.6	197	88	1.5	1.8	3700
14 (28/2) C	2860	204	2.8	115	87	2.2	2.7	2700
	1430	102	1.9	154	87	2.0	2.4	3400
	930	66	1.3	160	86	1.5	1.8	4000
	730	52	1.0	160	85	1.2	1.6	4000
18 (36/2) D	2860	159	2.2	111	82	1.7	2.1	3100
	1430	79	1.5	149	83	1.5	1.8	3900
	930	52	1.2	178	83	1.1	1.4	4000
	730	41	1.0	196	81	.97	1.2	4000
24.5 (49/2) E	2860	117	1.8	119	80	1.5	1.9	3500
	1430	58	1.2	160	81	1.4	1.6	4000
	930	38	.81	162	79	1.0	1.3	4000
	730	30	.64	162	79	.87	1.1	4000
29 (29/1) F	2860	99	1.6	117	77	1.3	1.6	3800
	1430	49	1.0	156	77	1.1	1.4	4000
	930	32	.82	188	77	.86	1.1	4000
	730	25	.67	192	75	.74	.92	4000
37 (37/1) Fx	2860	77	1.3	109	69	.92	1.1	4000
	1430	39	.85	147	70	.81	.97	4000
	930	25	.67	175	68	.62	.77	4000
	730	20	.60	194	67	.54	.67	4000
43 (43/1) G	2860	67	1.2	121	70	1.0	1.2	4000
	1430	33	.78	160	71	.89	1.1	4000
	930	22	.53	166	70	.67	.82	4000
	730	17	.43	165	68	.57	.71	4000
51 (51/1) H	2860	56	1.1	121	67	.89	1.1	4000
	1430	28	.69	160	67	.78	.93	4000
	930	18	.53	184	66	.59	.73	4000
	730	14	.42	183	65	.51	.63	4000
57 (57/1) I	2860	50	.98	121	64	.83	1.0	4000
	1430	25	.64	160	65	.73	.87	4000
	930	16	.51	193	64	.55	.68	4000
	730	13	.41	193	62	.47	.59	4000
73 (73/1) J	2860	39	.85	121	58	.72	.87	4000
	1430	20	.56	162	59	.61	.74	4000
	930	13	.40	174	58	.47	.57	4000
	730	10	.33	179	56	.41	.51	4000
104 (104/1) K	2860	28	.56	92	47	.61	.73	4000
	1430	14	.31	100	46	.52	.62	4000
	930	8.9	.21	105	47	.40	.49	4000
	730	7	.17	107	45	.35	.43	4000

1) Gearbox with fan or motor motor with fan, flange mounted on the gearbox.

SERIES BS

BS 71 POWER RATINGS

Ratio and code i	Input speed n1 rpm	Output speed n2 rpm	Input power P1 kW	Output torque T2 Nm	Efficiency η %	Thermal rating 1)		Overhung load Fr2 N
						Shaft- mount kW	Shaft- mount kW	
7.5 (30/4) A	2860	381	6.5	151	92	3.2	4.4	2200
	1430	191	4.3	201	92	3.6	3.8	2700
	930	124	3.4	242	91	2.4	2.9	3100
	730	97	3.0	267	91	2.0	2.5	3300
9.33 (28/3) B	2860	307	5.7	163	91	3.4	4.2	2400
	1430	153	3.8	218	91	3.1	3.7	3000
	930	100	3.0	260	90	2.3	2.8	3400
	730	78	2.6	288	89	1.9	2.4	3600
12 (36/3) C	2860	238	4.5	160	89	2.7	3.3	2900
	1430	119	3.0	215	88	2.4	2.9	3500
	930	78	2.3	255	88	1.8	2.2	4000
	730	61	2.0	282	87	1.5	1.9	4300
16 (32/2) D	2860	179	3.6	169	87	2.3	2.8	3300
	1430	89	2.4	224	87	2.0	2.5	4000
	930	58	1.9	269	85	1.5	1.9	4600
	730	46	1.7	297	85	1.3	1.6	5000
21 (42/2) E	2860	136	2.9	173	84	2.0	2.4	3700
	1430	68	1.9	230	84	1.7	2.0	4600
	930	44	1.5	276	83	1.3	1.6	5000
	730	35	1.4	305	82	1.1	1.4	5000
28 (28/1) F	2860	102	2.2	168	80	1.5	1.8	4200
	1430	51	1.5	225	79	1.3	1.5	5000
	930	33	1.2	267	77	.97	1.2	5000
	730	26	1.0	298	77	.83	1.0	5000
37 (37/1) G	2860	77	1.9	178	76	1.3	1.6	4700
	1430	39	1.3	238	76	1.1	1.3	5000
	930	25	1.0	283	74	.84	1.0	5000
	730	20	.89	315	73	.72	.89	5000
48 (48/1) H	2860	60	1.5	175	71	1.1	1.3	5000
	1430	30	1.0	234	71	.93	1.1	5000
	930	19	.82	281	69	.70	.86	5000
	730	15	.72	310	68	.60	.75	5000
63 (63/1) I	2860	45	1.3	175	66	.89	1.1	5000
	1430	23	.85	234	65	.76	.91	5000
	930	15	.69	281	63	.58	.71	5000
	730	12	.61	310	61	.51	.63	5000
82 (82/1) J	2860	35	1.1	178	60	.77	.92	5000
	1430	17	.62	201	58	.66	.79	5000
	930	11	.45	211	56	.50	.61	5000
	730	8.9	.37	216	54	.44	.54	5000
100 (100/1) K	2860	29	.77	143	56	.76	.91	5000
	1430	14	.42	154	54	.64	.77	5000
	930	9.3	.30	162	49	.49	.60	5000
	730	7.3	.25	166	43	.43	.53	5000

1) Gearbox with fan or motor motor with fan,
flange mounted on the gearbox.

BS 88 POWER RATINGS

Ratio and code	Input speed	Output speed	Input power	Output torque	Efficiency	Thermal rating 1)		Overhung load
i	n ₁ rpm	n ₂ rpm	P ₁ kW	T ₂ Nm	η %	Shaft-mount kW	Shaft-mount kW	F _{r2} N
7.25 (29/4) A	2860	394	15.6	358	94	9.3	11.3	4000
	1430	197	9.9	449	94	6.7	8.4	5000
	930	128	7.5	518	93	4.5	5.9	5800
	730	101	6.4	560	92	3.6	4.9	6300
11.75 (47/4) B	2860	243	10.1	368	93	7.6	9.3	5100
	1430	122	6.8	490	91	5.4	6.8	6300
	930	79	5.1	564	90	3.6	4.8	7300
	730	62	4.4	611	90	2.9	4.0	7900
15.67 (47/3) C	2860	183	7.7	364	90	6.1	7.4	6000
	1430	91	5.1	481	89	4.3	5.4	7400
	930	59	3.9	562	88	2.9	3.8	8500
	730	47	3.4	610	87	2.3	3.2	9200
19.5 (39/2) D	2860	147	6.6	377	88	4.7	5.7	6600
	1430	73	4.4	496	87	3.3	4.2	8200
	930	48	3.4	578	85	2.3	3.0	9400
	730	37	2.9	627	84	1.8	2.5	10000
23.5 (47/2) E	2860	122	5.4	367	86	4.4	5.3	7200
	1430	61	3.6	479	85	3.1	3.9	9000
	930	40	2.7	556	84	2.1	2.7	10000
	730	31	2.3	602	83	1.7	2.3	10000
29 (29/1) F	2860	99	5.2	413	82	3.0	3.7	8800
	1430	49	3.3	524	80	2.2	2.7	10000
	930	32	2.6	604	78	1.5	2.0	10000
	730	25	2.2	654	77	1.2	1.7	10000
39 (39/1) G	2860	73	3.9	406	79	2.7	3.2	9600
	1430	37	2.6	525	77	1.9	2.4	10000
	930	24	2.0	606	74	1.3	1.7	10000
	730	19	1.7	654	73	1.1	1.5	10000
47 (47/1) H	2860	61	3.2	396	77	2.5	3.0	10000
	1430	30	2.1	508	75	1.8	2.2	10000
	930	20	1.7	585	73	1.2	1.6	10000
	730	16	1.4	630	72	.99	1.3	10000
58 (58/1) J	2860	49	2.7	383	74	2.3	2.8	10000
	1430	25	1.7	488	72	1.7	2.1	10000
	930	16	1.3	560	69	1.1	1.5	10000
	730	13	1.2	602	68	.92	1.2	10000
71 (71/1) K	2860	40	2.1	343	69	1.9	2.3	10000
	1430	20	1.4	437	67	1.4	1.7	10000
	930	13	1.1	492	64	.95	1.2	10000
	730	10	.86	505	63	.78	1.0	10000
82 (82/1) L	2860	35	1.8	341	68	1.9	2.3	10000
	1430	17	1.1	390	66	1.4	1.7	10000
	930	11	.77	409	62	.94	1.2	10000
	730	8.9	.64	420	61	.77	1.0	10000
106 (106/1) M	2860	27	1.2	248	59	1.6	2.0	10000
	1430	13	.66	269	57	1.2	1.5	10000
	930	8.8	.47	281	55	.81	1.1	10000
	730	6.9	.39	289	54	.67	.90	10000

1) Gearbox with fan or motor motor with fan, flange mounted on the gearbox.

BS 112 POWER RATINGS

Ratio and code	Input speed	Output speed	Input power	Output torque	Efficiency	Thermal rating 1)		Overhung load
i	n1 rpm	n2 rpm	P1 kW	T2 Nm	η %	Shaft-mount kW	Shaft-mount kW	Fr2 N
7 (28/4) A	2860	409	27.3	607	95	20.0	24.1	6200
	1430	204	18.3	806	94	13.9	17.2	7600
	930	133	13.8	929	93	9.3	12.2	8900
	730	104	11.7	1006	93	7.4	10.0	9500
11.5 (46/4) B	2860	249	19.7	709	93	17.5	21.0	7500
	1430	124	12.5	891	93	11.8	14.6	9500
	930	81	9.4	1026	92	7.8	10.2	10900
	730	63	8.1	1111	91	6.2	8.4	11800
15.3 (46/3) C	2860	187	14.9	705	92	14.0	16.8	8900
	1430	93	10.0	936	91	9.4	11.6	11000
	930	61	7.6	1078	90	6.3	8.2	12700
	730	48	6.5	1167	90	5.0	6.7	13800
19.5 (39/2) D	2860	147	11.8	691	89	10.6	12.7	10300
	1430	73	7.9	912	88	7.2	9.0	12800
	930	48	6.0	1064	87	4.8	6.3	14800
	730	37	5.2	1155	87	3.8	5.2	15000
23 (46/2) E	2860	124	10.3	708	89	10.0	11.9	10900
	1430	62	6.8	928	88	6.7	8.3	13600
	930	40	5.3	1080	86	4.5	5.9	15000
	730	32	4.5	1171	85	3.6	4.8	15000
28 (28/1) F	2860	102	8.6	679	84	6.5	7.7	12100
	1430	51	5.7	893	83	4.5	5.5	15000
	930	33	4.5	1041	80	3.1	4.0	15000
	730	26	3.9	1129	79	2.5	3.3	15000
39 (39/1) G	2860	73	6.9	741	82	5.9	7.1	13700
	1430	37	4.6	960	80	4.1	5.0	15000
	930	24	3.5	1111	78	2.8	3.6	15000
	730	19	3.0	1200	77	2.2	3.0	15000
46 (46/1) H	2860	62	6.1	755	81	5.6	6.7	14600
	1430	31	4.0	974	79	3.8	4.7	15000
	930	20	2.1	1124	77	2.6	3.4	15000
	730	16	1.8	1212	75	2.1	2.8	15000
63 (63/1) J	2860	45	4.2	684	77	4.8	5.8	15000
	1430	23	2.7	874	75	3.3	4.1	15000
	930	15	3.1	1003	73	2.2	2.9	15000
	730	12	2.7	1065	71	1.8	2.4	15000
76 (76/1) K	2860	38	3.5	654	73	4.4	5.2	15000
	1430	19	2.3	831	71	3.0	3.7	15000
	930	12	1.6	861	69	2.0	2.6	15000
	730	9.6	1.3	858	68	1.6	2.2	15000
95 (95/1) L	2860	30	2.7	587	69	3.7	4.4	15000
	1430	15	1.5	636	66	2.5	3.1	15000
	930	9.8	1.1	667	63	1.7	2.2	15000
	730	7.7	.89	684	62	1.4	1.9	15000
108 (108/1) M	2860	26	2.1	484	64	3.4	4.0	15000
	1430	13	1.2	524	61	2.3	2.9	15000
	930	8.6	.83	549	59	1.6	1.7	15000
	730	6.8	.69	563	58	1.3	1.7	15000

1) Gearbox with fan or motor motor with fan, flange mounted on the gearbox.

SERIES BS

DOUBLE WORM GEARS

POWER RATINGS

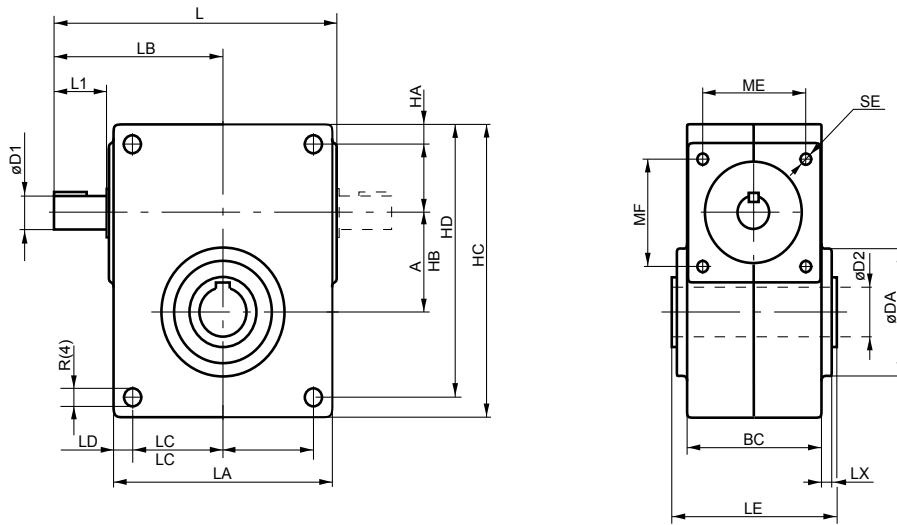
Ratio and code	Input speed	Output speed	Input power	Output torque	Efficiency	Thermal rating 1)		Overhung load
Code i	n ₁ rpm	n ₂ rpm	P ₁ kW	T ₂ Nm	η %	Shaft-mount kW	Shaft-mount kW	F _{r2} N
BS 50/40								
EA 160	1430	8.9	.31	150	45	.30	.38	2700
EB 240	1430	6	.24	150	39	.27	.34	2700
EC 360	1430	4	.20	150	32	.25	.31	2700
ED 480	1430	3	.17	150	28	.23	.30	2700
EE 576	1430	2.5	.16	150	25	.23	.29	2700
EF 720	1430	2	.14	150	22	.22	.28	2700
EG 960	1430	1.5	.13	150	18	.21	.27	2700
EH 1152	1430	1.2	.12	150	16	.21	.27	2700
EI 1440	1430	1	.12	150	13	.20	.26	2700
EJ 1680	1430	0.9	.12	150	12	.20	.26	2700
EK 2016	1430	0.7	.11	150	10	.20	.26	2700
BS 63/40								
FA 193	1430	7.4	.40	250	48	.44	.56	4000
FB 290	1430	4.9	.31	250	42	.40	.51	4000
FC 435	1430	3.3	.25	250	34	.36	.46	4000
FD 580	1430	2.5	.23	250	29	.35	.44	4000
FE 696	1430	2.1	.21	250	26	.33	.42	4000
FF 870	1430	1.6	.18	250	23	.32	.41	4000
FG 1160	1430	1.2	.17	250	19	.31	.39	4000
FH 1392	1430	1	.16	250	16	.30	.39	4000
FI 1740	1430	0.8	.15	250	14	.29	.35	4000
FJ 2030	1430	0.7	.15	250	12	.29	.35	4000
FK 2436	1430	0.6	.14	250	11	.27	.32	4000
BS 71/40								
FA 187	1430	7.7	.58	400	55	.50	.63	5000
FB 280	1430	5.1	.43	400	50	.44	.56	5000
FC 420	1430	3.4	.33	400	42	.40	.51	5000
FD 560	1430	2.6	.28	400	38	.38	.48	5000
FE 672	1430	2.1	.26	400	34	.37	.47	5000
FF 840	1430	1.7	.23	400	31	.35	.45	5000
FG 1120	1430	1.3	.20	400	26	.34	.43	5000
FH 1344	1430	1.1	.18	400	24	.33	.40	5000
FI 1680	1430	0.9	.17	400	21	.29	.35	5000
FJ 1960	1430	0.7	.16	400	19	.29	.35	5000
FK 2352	1430	0.6	.15	400	17	.27	.32	5000
BS 88/50								
FA 232	1430	6.2	.92	800	56	.61	.89	10000
FB 304	1430	4.7	.75	800	52	.57	.82	10000
FC 406	1430	3.5	.62	800	47	.53	.77	10000
FD 609	1430	2.3	.47	800	41	.48	.69	10000
FE 696	1430	2.1	.45	800	38	.47	.68	10000
FF 928	1430	1.5	.37	800	34	.44	.64	10000
FFX 1073	1430	1.3	.35	800	32	.43	.63	10000
FG 1218	1430	1.2	.32	800	30	.43	.62	10000
FH 1566	1430	0.9	.29	800	26	.42	.55	10000
FI 1856	1430	0.8	.27	800	24	.41	.51	10000
FJ 2320	1430	0.6	.23	800	22	.40	.47	10000
BS 112/63								
FA 217	1430	6.6	1.6	1400	61	1.2	1.7	15000
FB 308	1430	4.6	1.2	1400	56	1.1	1.6	15000
FC 392	1430	3.6	1.0	1400	53	1.0	1.5	15000
FD 504	1430	2.8	.86	1400	48	.95	1.4	15000
FE 686	1430	2.1	.68	1400	44	.89	1.3	15000
FF 812	1430	1.8	.62	1400	41	.85	1.2	15000
FFX 1036	1430	1.4	.56	1400	36	.81	.97	15000
FG 1204	1430	1.2	.49	1400	35	.79	1.1	15000
FH 1428	1430	1.0	.45	1400	32	.77	.93	15000
FI 1596	1430	0.9	.42	1400	30	.73	.87	15000
FJ 2044	1430	0.7	.37	1400	27	.61	.74	15000
FK 2912	1430	0.5	.31	1400	22	.52	.62	15000

1) Gearbox with fan or motor motor with fan, flange mounted on the gearbox.

SERIES BS

DIMENSIONS

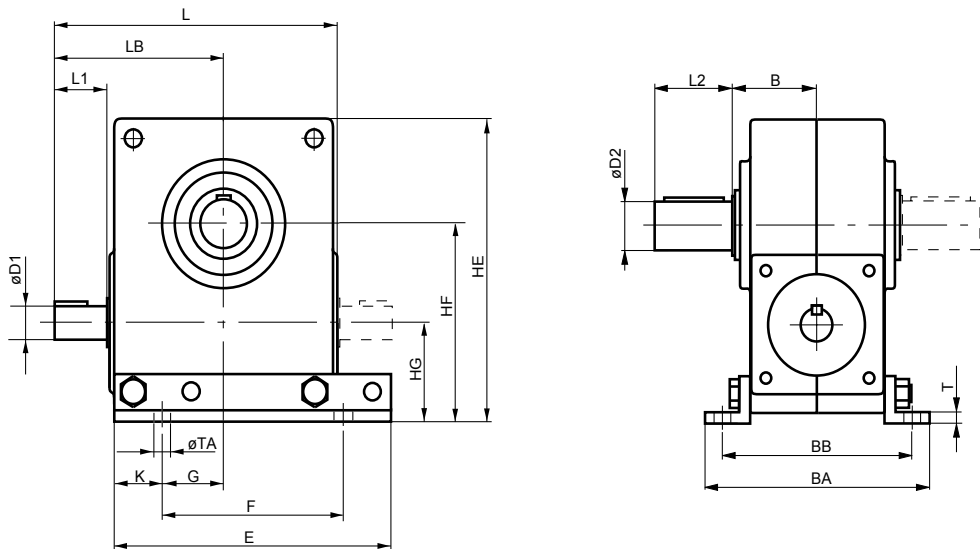
Standard execution BS40-71



Mounting position O, hollow shaft

BS	A	BC	D1	D2	DA	HA	HB	HC	HD	L	L1	LA	LB	LC	LD	LE	LX	ME	MF	ϕR	SE	Kgs
40	40	73	14	20	58	10	36	140	130	146	25	100	86	40	10	92	8.5	46	46	8.1	M8x12	3.0
50	50	78	19	25	68	10	38	155	145	179	35	124	108	52	10	98	8	56.6	56.6	8.3	M8x12	4.8
63	63	82	19	30	80	10	43	183	173	200.5	35	146	118.5	63	10	101	7	56.6	56.6	10.3	M8x12	6.5
71	71	101.4	24	35	92	14	49	209	195	214	40	165	128	68.5	14	122	7.3	76.4	76.4	12.5	M8x14	9.6

Underdriven worm gear with feet and output shaft



Mounting position UV, UH, UD

Mounting position UV

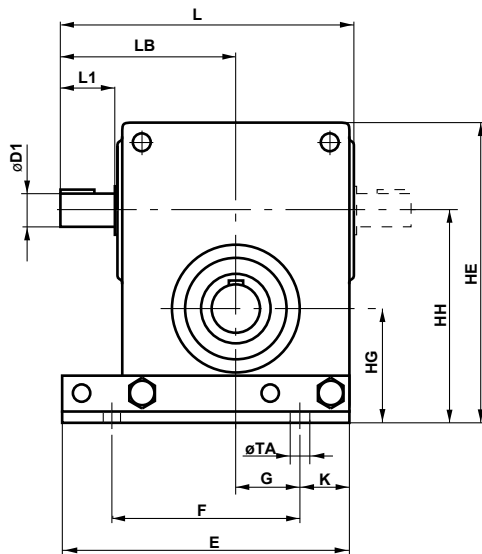
BS	B	BA	BB	D1	D2	E	F	G	HE	HF	HG	K	L	L1	L2	LB	T	TA	Kgs
40	47	133	108	14	20	140	80	20	152	98	58	30	146	25	36	86	5	8.5	3.0
50	50	138	113	19	25	155	104	36.5	167	110	60	25.5	179	35	42	108	5	8.5	4.8
63	52	146	121	19	30	183	126	44.5	195	128	65	28.5	200.5	35	58	118.5	7	10.5	6.5
71	62.5	169.4	143.4	24	35	209	137	46.5	216.5	141.5	70.5	36	214	40	58	128	8	12.5	9.6

Shaft tolerance, see page 57

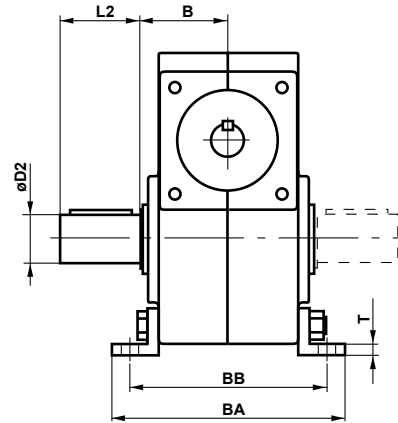
SERIES BS

DIMENSIONS

Overdriven worm gear with feet and output shaft



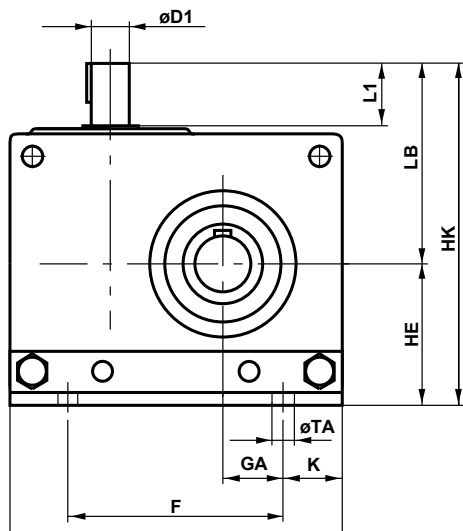
Mounting position OV, OH, OD



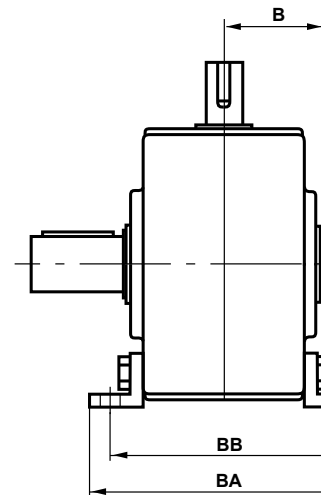
Mounting position OV

BS	B	BA	BB	D1	D2	E	F	G	HE	HH	HG	K	L	L1	L2	LB	T	TA	Kgs
40	47	133	108	14	20	140	80	20	152	106	66	30	146	25	36	86	5	8.5	3.0
50	50	138	113	19	25	155	104	36.5	167	119	69	25.5	179	35	42	108	5	8.5	4.8
63	52	146	121	19	30	183	126	44.5	195	142	79	28.5	200.5	35	58	118.5	7	10.5	6.5
71	62.5	169.4	143.4	24	35	209	137	46.5	216.5	153.5	82.5	36	214	40	58	128	8	12.5	9.6

Worm gear with vertical worm screw, feet and output shaft



Mounting position VV, VH, VD



Mounting position VV

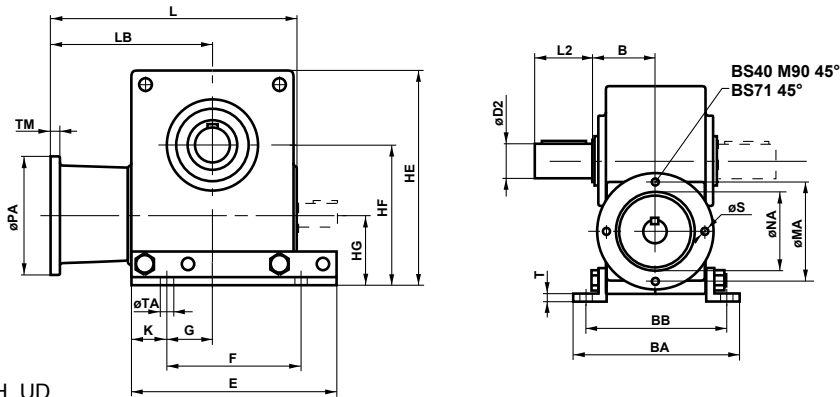
BS	B	BA	BB	D1	D2	E	F	GA	HE	HK	K	L1	L2	LB	T	TA	Kgs
40	47	133	108	14	20	140	80	24	62	148	30	25	36	86	5	8.5	3.9
50	50	138	113	19	25	155	104	31.5	74	182	25.5	35	42	108	5	8.5	6.1
63	52	146	121	19	30	183	126	38.5	85	203.5	28.5	35	58	118.5	7	10.5	8.3
71	62.5	169.4	143.4	24	35	209	137	39	90	218	36	40	58	128	8	12.5	12.0

Shaft tolerance, see page 57

SERIES BS

DIMENSIONS

Underdriven worm gear with feet, output shaft and motorflange

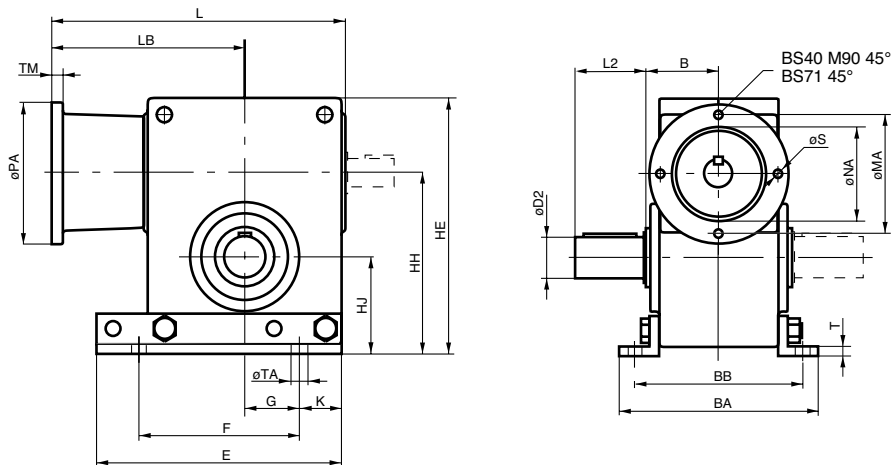


Mounting position UV, UH, UD

Mounting position UV

Size	Motor- size	Flange type	B	BA	BB	D2	E	F	G	HE	HF	HG	K	L	L2	LB	MA	NA	PA	TA	TM	S	T
40	63	B14												172		112	75	60	92		8	6	
	B14	47	133	108	20	140	80	20	152	98	58	30	178	36	118	85	70	102	8.5	9	7	5	
	80	B14												188		128	100	80	118		10	7	
	90	B14												198		138	115	95	140		10	9	
50	71	B14												211		140	85	70	108		10	7	
	B14	50	138	113	25	155	104	36.5	167	110	60	25.5	221	42	150	100	80	118	8.5	10	7	5	
	90	B14												231		160	115	95	140		12	9	
	71	B14												233		151	85	70	108		10	7	
63	80	B14	52	146	121	30	183	126	44.5	195	128	65	28.5	243	58	161	100	80	118	10.5	10	7	7
	90	B14												253		171	115	95	140		12	9	
	100	B14												263.5		181.5	130	110	160		12	9	
	80	B14												263		177	100	80	118		10	7	
71	90	B14	62.5	169.4	143.4	35	209	137	46.5	217	142	71	36	273	58	187	115	95	140	12.5	12	9	8
	100/112	B14												283.5		197.5	130	110	160		12	9	

Overdriven worm gear with feet, output shaft and motorflange



Mounting position OV

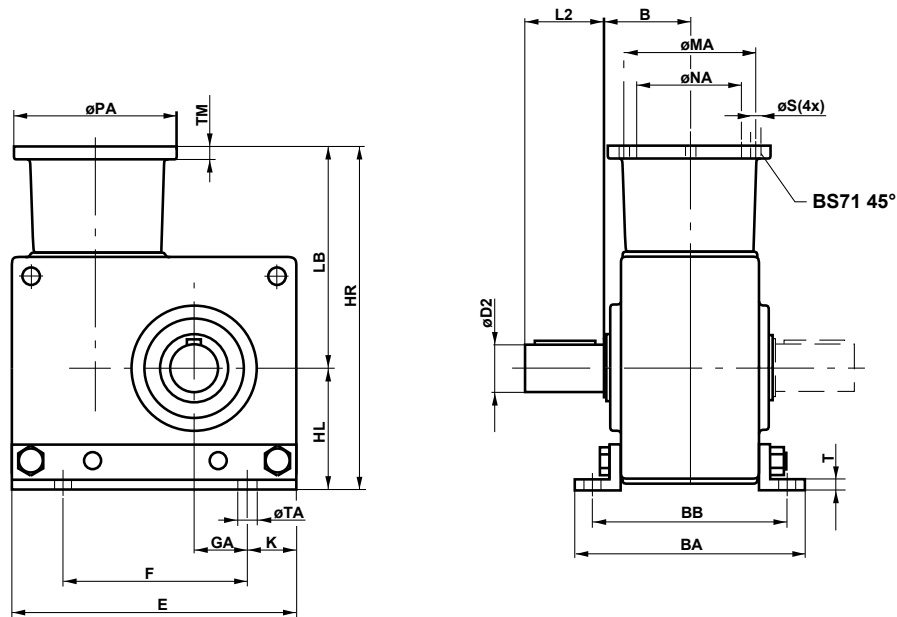
Size	Motor- size	Flange type	B	BA	BB	D2	E	F	G	HE	HH	HJ	K	L	L2	LB	MA	NA	PA	S	T	TA	TM
40	63	B14												172		112	75	60	92	6			8
	71	B14	47	133	108	20	140	80	20	152	106	66	30	178	36	118	85	70	102	7	5	8.5	9
	80	B14												188		128	100	80	118	7			10
	90	B14												198		138	115	95	140	9			10
50	71	B14												211		140	85	70	108	7			10
	B14	50	138	113	25	155	104	36.5	167	110	60	25.5	221	42	150	100	80	118	7	5	8.5	10	
	90	B14												231		160	115	95	140	9			12
	71	B14												233		151	85	70	108	7			10
63	80	B14	52	146	121	30	183	126	44.5	195	142	79	28.5	243	58	161	100	80	118	7	5	10.5	12
	90	B14												253		171	115	95	140	9			12
	100	B14												263.5		181.5	130	110	160	9			12
	80	B14												263		177	100	80	118	7			10
71	90	B14	62.5	169.4	143.4	35	209	137	46.5	216.5	153.5	82.5	36	273	58	187	115	95	140	9	8	12.52	1

Shaft tolerance, see page 57

SERIES BS

DIMENSIONS

Worm gear with vertical worm screw, feet, output shaft and motorflange



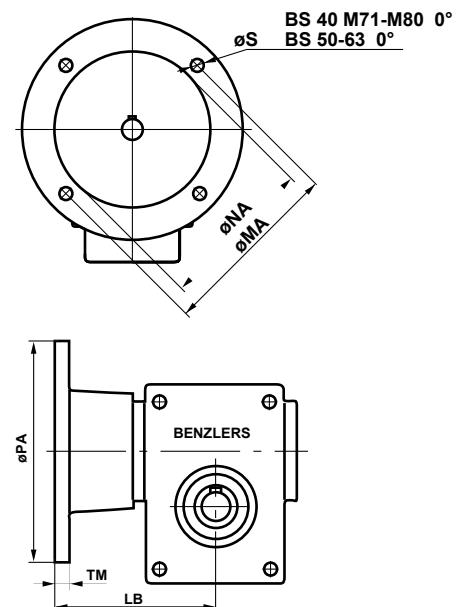
Mounting position VV, VH, VD

Mounting position VV

Size	Motor-size	Flange type	B	BA	BB	D2	E	F	GA	HR	HL	K	L2	LB	MA	NA	PA	S	T	TA	TM	Vikt
40	63	B14									174			112	75	60	92	6			8	4.5
	71	B14	47	133	108	20	140	80	24	180	62	30	36	118	85	70	102	7	5	8.5	9	4.5
	80	B14								190				128	100	80	118	7			10	4.5
	90	B14								200				138	115	95	140	9			10	4.5
	71	B14								214				140	85	70	108	7			10	6.8
7.0	50	80	B14	50	138	113	25	155	104	31.5	224	74	25.5	42	150	100	80	118	7	5	8.5	10
	90	B14								234				160	115	95	140	9			12	7.2
	71	B14								236				151	85	70	108				10	9.0
63	80	B14	52	146	121	30	183	126	38.5	246	85	28.5	58	161	100	80	118	7		10.5	10	9.2
	90	B14								256				171	115	95	140	9	7		12	9.4
	100	B14								266.5				181.5	130	110	160	9			12	9.6
71	80	B14								267				177	100	80	118	7			10	13.0
	90	B14	62.5	169.4	143.4	35	209	137	39	277	90	36	58	187	115	95	140	9	8	12.5	12	13.0
	100/112	B14								287.5				197.5	130	110	160	9			12	13.4

Motorflange type B5

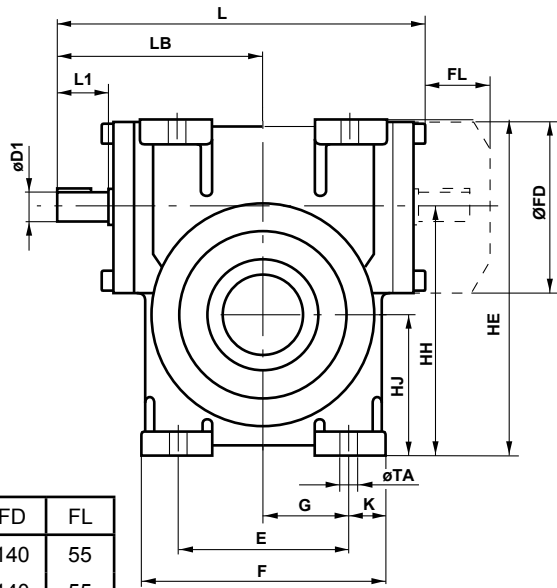
Size	Motor size	LB	MA	NA	PA	S	TM
BS 40	63	112	115	95	140	9	9
	71	118	130	110	160	9	9
	80	128	165	130	200	11.5	10
	90	138	165	130	200	11.5	10
BS 50	71	140	130	110	160	9	10
	80	160	165	130	200	11.5	12
	90	160	165	130	200	11.5	12
BS 63	71	151	130	110	160	9	10
	80	171	165	130	200	11.5	12
	90	171	165	130	200	11.5	12
	100	181.5	215	180	250	14	12
BS 71	80	187	165	130	200	11.5	12
	90	187	165	130	200	11.5	12
	100/112	197.5	215	180	250	14	12



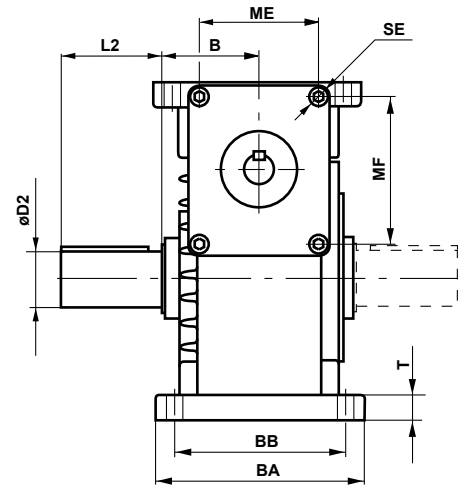
SERIES BS

DIMENSIONS

BS 88-112 Worm gear with feet and output shaft



Size	FD	FL
BS 88	140	55
BS 112	140	55

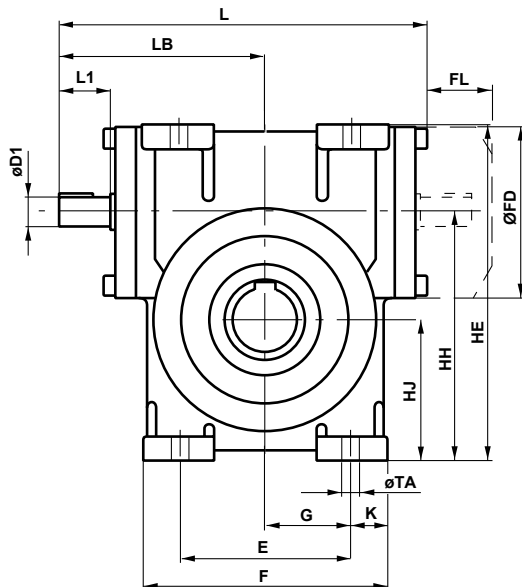


Mounting position OV, OH, OD

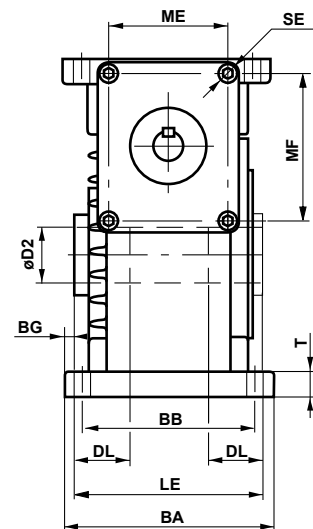
Mounting position OV

Size	Ratio	BB	BA	B	E	K	F	G	D2	D1	L2	L1	HH	T	HJ	HE	L	LB	TA	SE	ME	MF	Kgs
BS 88	<55	140	170	70	140	30	200	70	45	28	82	42	203	20	115	275	300	168	14	M10x18	95	120	40
	>55	140	170	70	140	30	200	70	45	24	82	42	203	20	115	275	300	168	14	M10x18	95	120	40
BS 112	<60	175	210	82	175	37.5	250	87.5	55	35	82	58	252	23	140	340	355	202	18	M10x20	95	120	57
	>60	175	210	82	175	37.5	250	87.5	55	28	82	42	252	23	140	340	339	186	18	M10x20	95	120	57

BS 88-112 Worm gear with hollow shaft



Mounting position O-hollow shaft



Mounting position O-hollow shaft

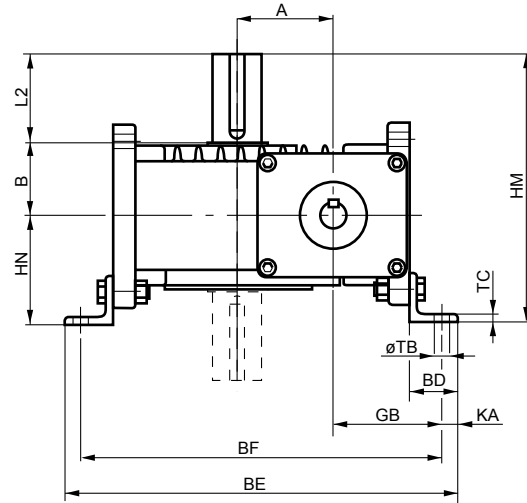
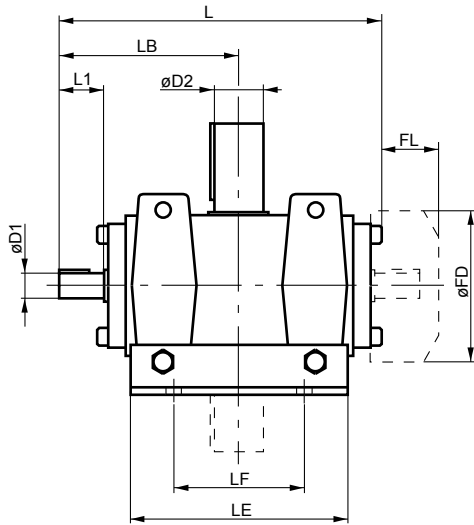
Size	Ratio	BB	BA	BG	D2	D1	DL	E	F	G	HH	HJ	HE	K	L	L1	LB	LE	T	TA	SE	ME	MF	Kgs
BS 88	<55	140	170	8	45	28	45	140	200	70	203	115	275	30	300	42	168	154	20	14	M10x18	95	120	39
	>55	140	170	8	45	24	45	140	200	70	203	115	275	30	300	42	168	154	20	14	M10x18	95	120	39
BS 112	<60	175	210	18	55	35	50	175	250	87.5	252	140	340	37.5	355	58	202	174	23	18	M10x20	95	120	56
	>60	175	210	18	55	28	50	175	250	87.5	252	140	340	37.5	339	42	186	174	23	18	M10x20	95	120	56

Shaft tolerance, see page 57

SERIES BS

DIMENSIONS

Worm gear BS88-112 with horizontal input shaft and feet

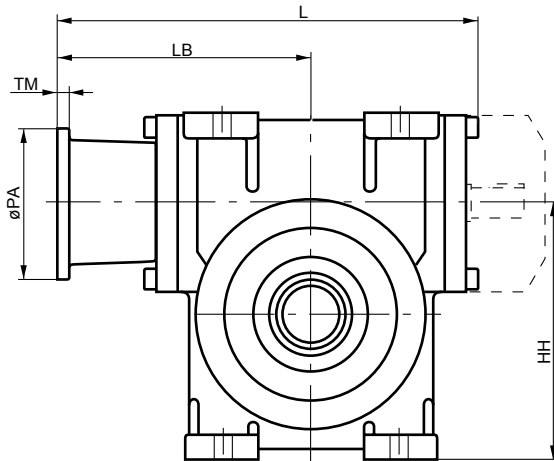


Mounting position HU, HN, HD. Also state position of input shaft ☐ A or ☐ B.

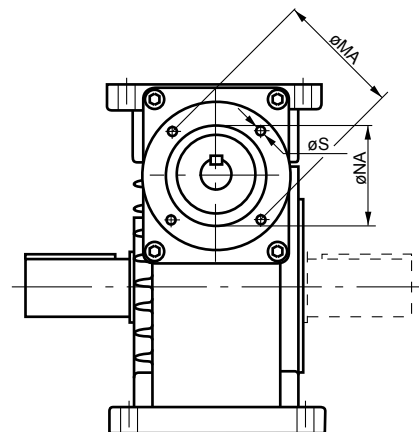
Mounting position HU-A

Size	Ratio	A	B	BD	BF	BE	D1	D2	L2	L1	FD	FL	GB	HM	HN	L	LB	LF	LE	KA	TB	TC	Kgs	Oil (lit)
BS	<55	88	70	45	335	365	28	45	82	42	140	55	102	252	100	300	168	120	200	15	14	7	40	1.5
88	>55	88	70	45	335	365	24	45	82	42	140	55	102	252	100	300	168	120	200	15	14	7	40	1.5
BS	<60	112	82	60	420	460	35	55	82	58	140	55	128	289	125	355	202	135	250	20	18	10	57	1.6
112	>60	112	82	60	420	460	28	55	82	42	140	55	128	289	125	339	186	135	250	20	18	10	57	1.6

BS 88-112 Motorflange



Mounting position OH, OV, OD



Mounting position OV

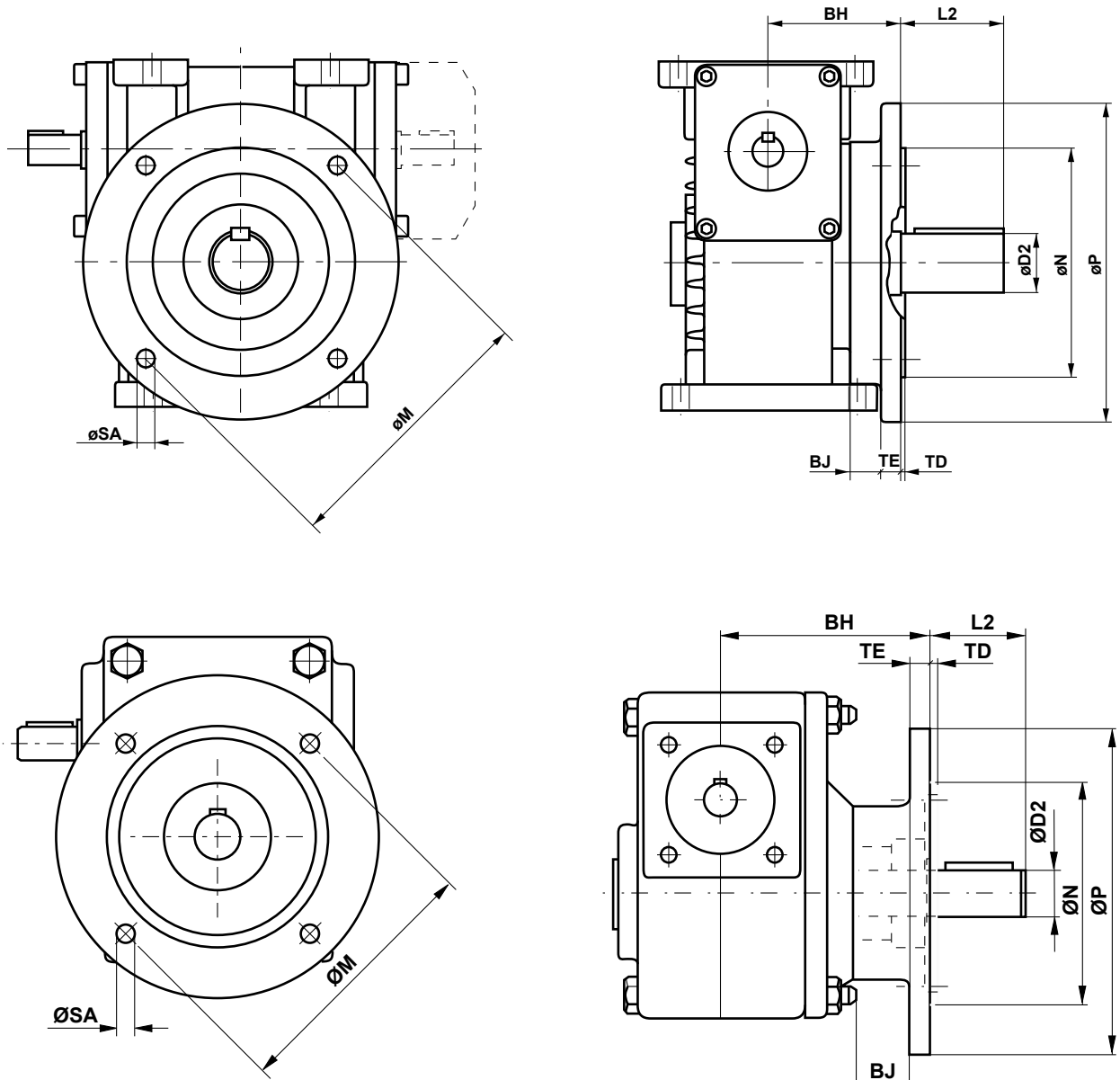
Size	Motor size	B14 Flange									B5 Flange								
		HH	L	LB	MA	NA	PA	S	TM	L	LB	MA	NA	PA	S	TM	Vikt		
BS	i>55	80	203	345	213	100	80H7	118	7	10	355	223	165	130H7	200	11.5	12	41	
		90	203	355	233	115	95H7	140	9	12	355	223	165	130H7	200	11.5	12	41	
		100/112	203	365	233.5	130	110H7	160	9	12	365	233.5	215	180H7	250	14	12	42	
	i<55	132	203								398	266	265	230H7	300	14	13	50	
BS	i>60	90	252	397	244	115	95H7	140	9	12	397	244	165	130H7	200	11.5	12	58	
	i>60		252	408	254.5	130	110H7	160	9	12	408	254.5	215	180H7	250	14	12	59	
		100/112	252	420	267	130	110H7	160	9	12	420	267	215	180H7	250	14	12	61	
		132	252								440	287	265	230H7	300	14	13	67	

Shaft tolerance, see page 57

SERIES BS

DIMENSIONS

Execution with output flange and shaft BS40-112



1) Standard execution,
others on request

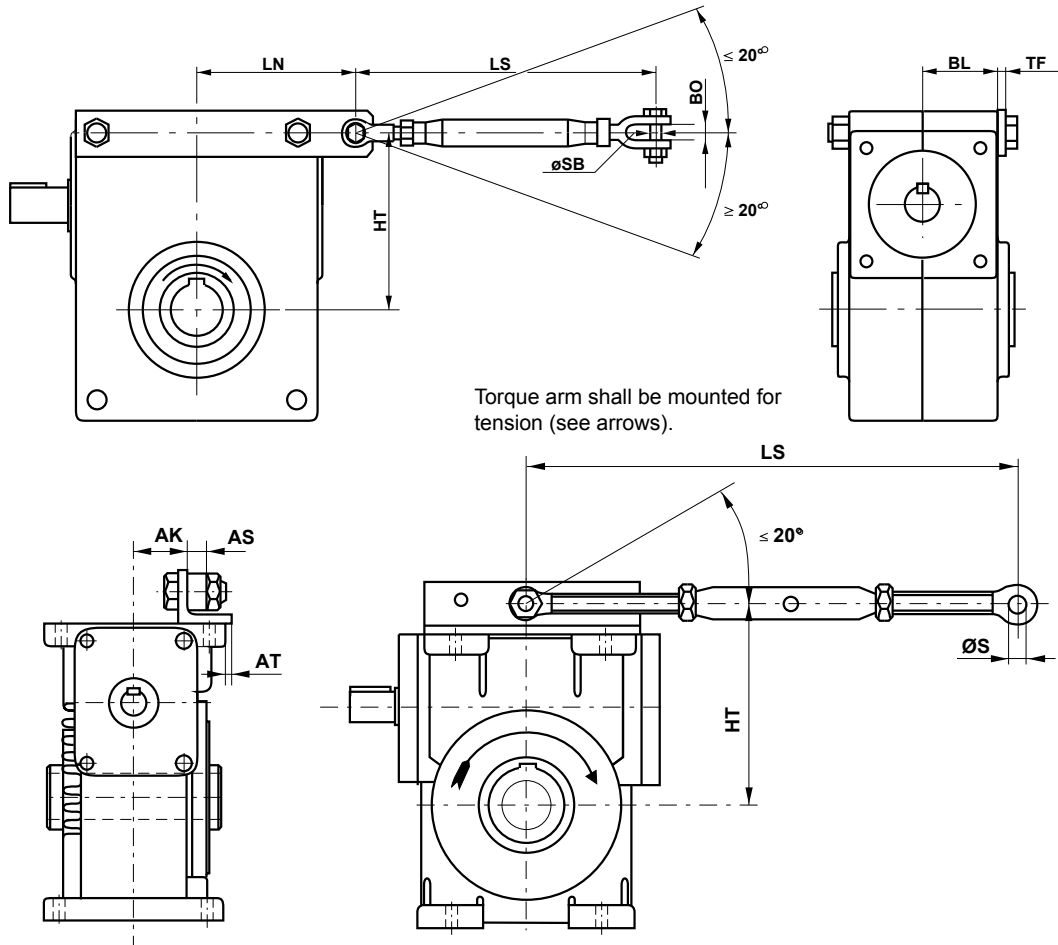
Size	BH	D2	L2	BJ	M	N	P	SA	TE	TD	Vikt
BS 40	91.5	20	36	28	100	80h7	118	7	10	3	4.1
					1151	95h71	1401	9			
					130	110h7	160	9			
					165	130h7	200	11			
BS 50	99	25	42	28	100	80h7	118	7	10	3.5	6.6
					115	95h7	140	9			
					1301	110h71	1601	9			
					165	130h7	200	11			
BS 63	106	30	58	35	130	110h7	160	9	12	3.5	9.3
					1651	130h71	2001	11			
BS 71	122.4	35	58	32	165	130h7	200	11	12	3.5	13.9
BS 88	105	45	82	24	215	180j6	250	14	15	4	47
BS 112	125	55	82	32	265	230j6	300	14	15	4	69

Shaft tolerance, see page 57

SERIES BS

DIMENSIONS

Execution with torque arm

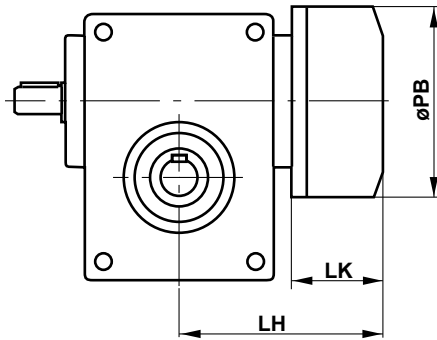


Size	AK	AS	AT	BO	HT	BL	LN	LS min/max	S	SB	TF	Kgs
BS 40	-	-	-	9	76	36.5	70	165/245	-	8	4	4.0
BS 50	-	-	-	9	88	39	85	165/245	-	8	5	5.8
BS 63	-	-	-	11	106	41	103	190/290	-	3/8"	5	7.5
BS 71	-	-	-	11	120	50.7	107.5	190/290	-	3/8"	5	10.7
BS 88	47	18	-	-	190	-	-	460/600	16	-	-	40.0
BS 112	60	18	5	-	240	-	-	480/600	16	-	-	57

SERIES BS

DIMENSIONS

Execution with electromagnetic brake



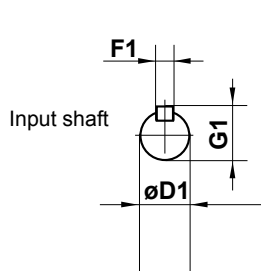
Size	Brake size	Brake torque Nm	øPB	LH	LK	Vikt
BS 40	02	3	85	115	55	4.6
	03	5.7	100	120	60	5.2
	04	12.6	116	126	66	6.3
BS 50	03	6.4	100	131	60	7
	04	14.4	116	137	66	8.1
	05	24	137	146	75	10.4
BS 63	03	6.4	100	142	60	8.7
	04	14.4	116	148	66	9.8
	05	24	137	157	75	12.1
BS 71	04	16	116	160	74	12.3
	05	26	137	161	75	14.3

Shaft bushings

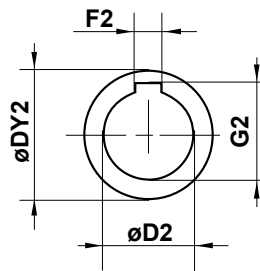
Size	Hollow shaft mm			
	Standard	Bushing		
BS 88	45	40	35	-
BS 112	55	50	45	40

Key and locking screws are supplied with each set of bushes.

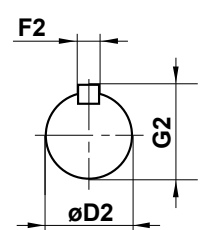
Shaft dimensions and tolerances



Hollow shaft



Output shaft



Size	Input shaft			Hollow shaft			Output shaft			
	D1	F1	G1	DY2	D2	F2	G2	D2	F2	G2
BS 40	14j6	5h9	16	37d9	20H7	6JS9	22.8	20j6	6h9	22.5
BS 50	19j6	6h9	21.5	40d9	25H7	8JS9	28.3	25j6	8h9	28.0
BS 63	19j6	6h9	21.5	45d9	30H7	8JS9	33.3	30j6	8h9	33.0
BS 71	24j6	8h9	27	50d9	35H7	10JS9	38.3	35j6	10h9	38.0
BS 88 i<60	28j6	Sh9	31	65d9	45H7	14D10	48.8	45k6	14h9	48.5
BS 88 i>60	24j6	8h9	27							
BS 112 i<60	35j6	10h9	38	80d9	55H7	16D10	59.3	55k6	16h9	59.0
BS 112 i>60	28j6	8h9	31							

Keyway acc. to SMS 2305

Maximum input speed n1

	Size						
	40	50	63	71	88	112i<60:1	112i>60:1
n1, max rpm	6000	5500	5000	4500	4000	3000	3500

SERIES BS

WORM GEAR

WITH ENVIRONMENTAL CLASSIFICATION

With BS (size 40-71) classified acc to environmental class we are able to recommend the gears for installation in ambient conditions where normally only materials in stainless steel are accepted. The gears are classified acc to environ-mental class M2-M3, Swedish standard stBK-N4.



SERIES BS

WORM GEAR

WITH ENVIRONMENTAL CLASSIFICATION

Advantages:

- No corrosion
- Low weight (aluminium)
- High rating
- IEC-standard
- High surface finish
- Modern design
- No maintenance
- Easy handling
- Large number of motor alternatives

Product specification

- coated gear case, flanges and feet
- stainless steel bolts in gear housing
- stainless steel hollow shaft (SS 2346 alt. 2382)
- stainless steel output shaft
- surface for seal ring protected by stainless steel sleeve (SS 2333)
- Seal rings of viton
- ratings acc to catalogue
- high resistance against corrosion
- very hard and resistant against wear
- low tendency to be sticky
- hygienic

Application examples

- food industry
- paper and cellulose industry
- pharmaceutical industry
- chemical industry
- defence industry
- marine and mobile installations
- all outdoor installations

Type of coating

The coating is a recently developed surface coating method for aluminium.

The coating means that the material surface is, by a chemical process, converted into an aluminium oxide, which gives a very hard, ceramic, surface finish.

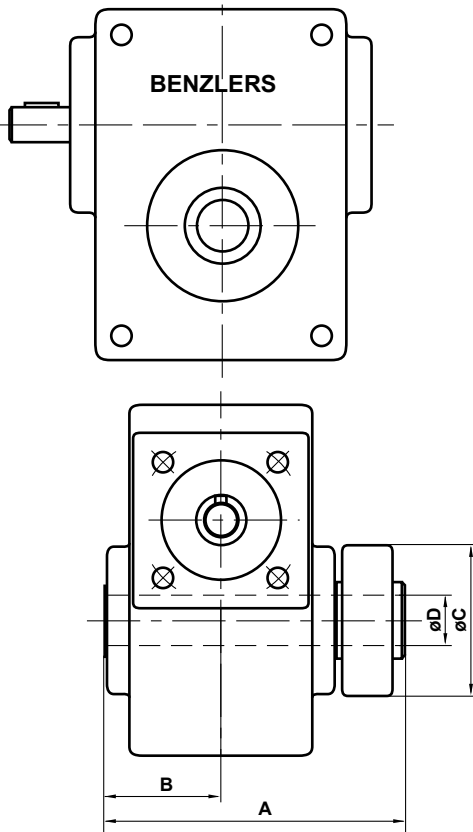
The oxide layer is then impregnated and coated with plastic. With heat treatment a very strong and resistant connection between oxide and plastic is created.

Unique coating qualities:

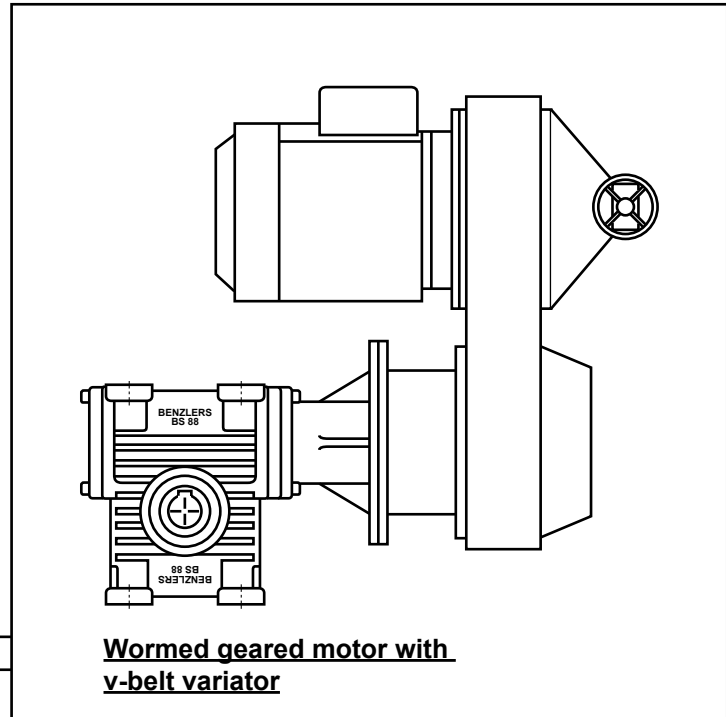
Gear		BS 40	BS 50	BS 63	BS 71
Catalogue rating, Nm	max min	78 31	120 62	197 92	315 143
Output speed, rpm	max min	429 9	358 9	369 7	381 7
Max static load, Nm		93	150	250	400
Radial force on output shaft, N		2000	2700	4000	5000
Thrust load on output shaft, N		2000	2500	3500	4500

APPLICATIONS

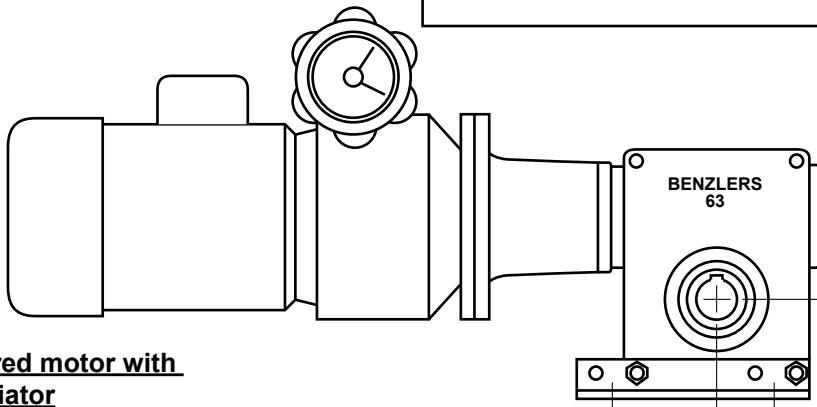
Worm gear with shrink fit



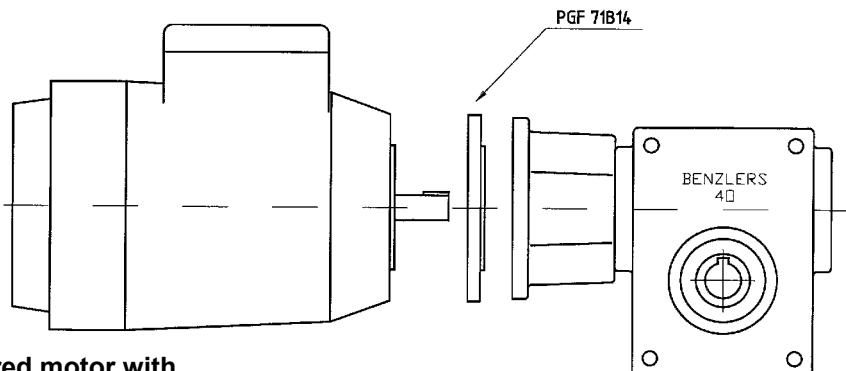
Size	Shrink disc	A	B	ϕC	ϕD	Nm
BS 40	HSD 30-22	119	46	60	20	155
BS 50	HSD 36-22	128	49	72	25	350
BS 63	HSD 44-22	133	50.5	80	30	440
BS 71	HSD 44-22	154	61	80	35	770



Wormed geared motor with v-belt variator



Wormed geared motor with planetary variator



Wormed geared motor with planetary variator

General:

1. The gear should be placed on a flat and solid foundation.
2. Sprocket, pulley or coupling on shaft can not be mounted with force. This will damage the gear.
3. To avoid increasing load on shafts and bearings, the gear and the driven machine should be carefully aligned, even if an elastic coupling is used.
4. If sprockets are used on the output shaft the preferable direction of pull should be such that the gear housing will be pressed towards the foundation.
5. When situated outdoors or working under adverse conditions as heat, dust or damp, the gear must be provided with sufficient protection, but the cooling air circulation must not be unduly restricted.

Lubrication

Before delivery BS40-112 are filled with synthetic oil - Mobil SHC 634. This type of lubrication is extra suitable for worm gears.

Maintenance

1. Benzler worm gears are lubricated for life with synthetic oil/grease and are therefore maintenance free.
2. Check that there are no leakage.

Running in

1. The gear should be run under low load conditions during the first 10-30 hours. Then the load should gradually be increased to full load.
2. The length of the running-in period depends on the size of the gear and the actual working conditions.

Hollow shaft gears

1. The gear is normally mounted on a shaft with tolerance js6. The hollow shaft has tolerance H7.

Grease the shaft with Molykote BR2 or equivalent before the gear is mounted. The gear shall not be mounted with force.

The gear shall be locked against axial movement. Set screws in hollow shaft can be used for BS88 and 112.

At normal condition the oil/grease never needs to be changed.

Ambient temperature -30°C - +30°C.

3. The worm gears shall under no circumstances be entirely filled with oil or grease.

3. When increasing the load the temperature of the gear can exceed the ambient temperature by 60-70° C. Oil- and gear temperatures of 95-100° C are harmless and have no influence on the function of the gear. When the temperature exceeds 100° C special sealings must be used.
4. Gears which are not used for a long period should be run for short periods, approximately every third month.

QUESTIONNAIRE

Advantages:

To specify a drive precisely, certain data are essential. The most important questions are listed in the table below. If you do not have the required data available in this form, we advise you to use a technical handbook or other suitable documentation. Should you have any question, please do not hesitate to contact us, Benzlers specialists will be pleased to assist you.

Load designation

Output power (kW): P_e at n_{max} at n_{min}

Output speed (RPM): n_{max} n_{min}

Output torque (Nm): T_e at n_{max} at n_{min}

Overhung load (N): F_{r2e} at output shaft at input shaft

Axial thrust load (N): F_{a2e} at output shaft at input shaft

(away + / towards -)

Moment of inertia (kgm^2): at output shaft at input shaft

Unit type and mounting position (see page 11)

Motor
Enclosure IP

Operating voltage motor (V) brake (V) frequency (Hz)

Brake torque (Nm)

Ambient factors
Ambient temperature ($^{\circ}C$)

Load cycle / Duty cycle S / % ED

Starting frequency (1/h)

Additional information:

IMPORTANT

Product Safety Information

General - The following information is important in ensuring safety. It must be brought to the attention of personnel involved in the selection of power transmission equipment, those responsible for the design of the machinery in which it is to be incorporated and those involved in its installation, use and maintenance.

Our equipment will operate safely provided it is selected, installed, used and maintained properly. As with any power transmission equipment proper precautions must be taken as indicated in the following paragraphs, to ensure safety.

Potential Hazards - these are not necessarily listed in any order of severity as the degree of danger varies in individual circumstances. It is important therefore that the list is studied in its entirety:-

- 1) Fire/Explosion
 - (a) Oil mists and vapour are generated within gear units. It is therefore dangerous to use naked lights in the proximity of gearbox openings, due to the risk of fire or explosion.
 - (b) In the event of fire or serious overheating (over 300 oC), certain materials (rubber, plastics, etc.) may decompose and produce fumes. Care should be taken to avoid exposure to the fumes, and the remains of burned or overheated plastic/rubber materials should be handled with rubber gloves.
- 2) Guards - Rotating shafts and couplings must be guarded to eliminate the possibility of physical contact or entanglement of clothing. It should be of rigid construction and firmly secured.
- 3) Noise - High speed gearboxes and gearbox driven machinery may produce noise levels which are damaging to the hearing with prolonged exposure. Ear defenders should be provided for personnel in these circumstances. Reference should be made to the Department of Employment Code of Practice for reducing exposure of employed persons to noise.
- 4) Lifting - Where provided (on larger units) only the lifting points or eyebolts must be used for lifting operations (see maintenance manual or general arrangement drawing for lifting point positions). Failure to use the lifting points provided may result in personal injury and/or damage to the product or surrounding equipment. Keep clear of raised equipment.
- 5) Lubricants and Lubrication
 - (a) Prolonged contact with lubricants can be detrimental to the skin. The manufacturer's instruction must be followed when handling lubricants.
 - (b) The lubrication status of the equipment must be checked before commissioning. Read and carry out all instructions on the lubricant plate and in the installation and maintenance literature. Heed all warning tags. Failure to do so could result in mechanical damage and in extreme cases risk of injury to personnel.
- 6) Electrical Equipment - Observe hazard warnings on electrical equipment and isolate power before working on the gearbox or associated equipment, in order to prevent the machinery being started.
- 7) Installation, Maintenance and Storage
 - (a) In the event that equipment is to be held in storage, for a period exceeding 6 months, prior to installation or commissioning, we must be consulted regarding special preservation requirements. Unless otherwise agreed, equipment must be stored in a building protected from extremes of temperature and humidity to prevent deterioration.
The rotating components (gears and shafts) must be turned a few revolutions once a month (to prevent bearings brinelling).
 - (b) External gearbox components may be supplied with preservative materials applied, in the form of a "waxed" tape overwrap or wax film preservative. Gloves should be worn when removing these materials. The former can be removed manually, the latter using white spirit as a solvent.
Preservatives applied to the internal parts of the gear units do not require removal prior to operation.
 - (c) Installation must be performed in accordance with the manufacturer's instructions and be undertaken by suitably qualified personnel.
 - (d) Before working on a gearbox or associated equipment, ensure that the load has been removed from the system to eliminate the possibility of any movement of the machinery and isolate power supply. Where necessary, provide mechanical means to ensure the machinery cannot move or rotate. Ensure removal of such devices after work is complete.
 - (e) Ensure the proper maintenance of gearboxes in operation. Use only the correct tools and our approved spare parts for repair and maintenance. Consult the Maintenance Manual before dismantling or performing maintenance work.
- 8) Hot Surfaces and Lubricants
 - (a) During operation, gear units may become sufficiently hot to cause skin burns. Care must be taken to avoid accidental contact.
 - (b) After extended running the lubricant in gear units and lubrication systems may reach temperatures sufficient to cause burns. Allow equipment to cool before servicing or performing adjustments.
- 9) Selection and Design
 - (a) Where gear units provide a backstop facility, ensure that back-up systems are provided if failure of the backstop device would endanger personnel or result in damage.
 - (b) The driving and driven equipment must be correctly selected to ensure that the complete machinery installation will perform satisfactorily, avoiding system critical speeds, system torsional vibration, etc.
 - (c) The equipment must not be operated in an environment or at speeds, powers, torques or with external loads beyond those for which it was designed.
 - (d) As improvements in design are being made continually the contents of this catalogue are not to be regarded as binding in detail, and drawings and capacities are subject to alterations without notice.

The above guidance is based on the current state of knowledge and our best assessment of the potential hazards in the operation of the gear units.

Any further information or clarification required may be obtained by contacting our Application Engineers.

