SAMT®

Specialised Air Motors and Transmission

TONSON®

New South Wales

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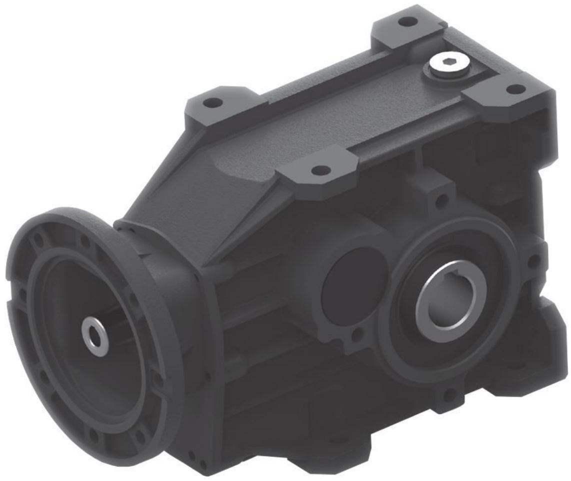

HACCP INTERNATIONAL FOOD SAFETY PROGRAMME CERTIFICATION

GHA

New line of
ANTIBACTERIAL and
HIGH CORROSION RESISTANCE gearboxes

Specialised Air Motors & Transmission (SAMT) - incorporating TONSON - was founded in 1966 and provides efficient solutions and equipment to all major industries including mining, chemical, food, paper, plastic, power transmission, manufacturing and pharmaceutical.

Our commitment to you is best service, quick lead times and very competitive prices.

Innovation & Quality

Specialised Air Motors & Transmission is committed to providing clever solutions for all hazardous environments and continues to develop smart ways to meet requirements from all different industries; our products meet CE standards ISO9002, ISO9001 and patents are registered globally including USA, Taiwan and China.

Unlike other conventional methods our products mainly use air instead of electricity as the source of power. This eliminates the chance of electricity shock and fire, which are the most crucial factors for industries involved in chemical, flammable or volatile contents.

Specialised Air Motors & Transmission products include air/electric motors, air/electric mixers and air fans which are engineered to meet the highest standards featuring 100% explosion-proof, low air consumption, light weight, high torque, reversible step less speed control, easy maintenance and various mounting methods. And can be used in very harsh conditions such as humidity, high temperature and flammable environments.

Products & Services

SAMT's other popular products include Pressure Tanks up to 200L (with and without integrated mixer), spray guns, pneumatic double diaphragm pumps, vertical pumps, magic drum carriers, non-spark drum openers, propellers, plus many more exciting and innovative products.

We also have the technical capability and expertise to provide complete power transmission solutions to meet your specific requirements, including full engineering assistance with design, selection and site installation. We also specialise in the supply of all types of Industrial gearboxes including Helical, Worm, Bevel-Helical, Bevel, screw jacks and planetary. All are interchangeable with other internationally recognised brands.

SAMT can also customise any product to suit your specific requirements and will investigate the possibilities of developing new products to satisfy your special specifications.

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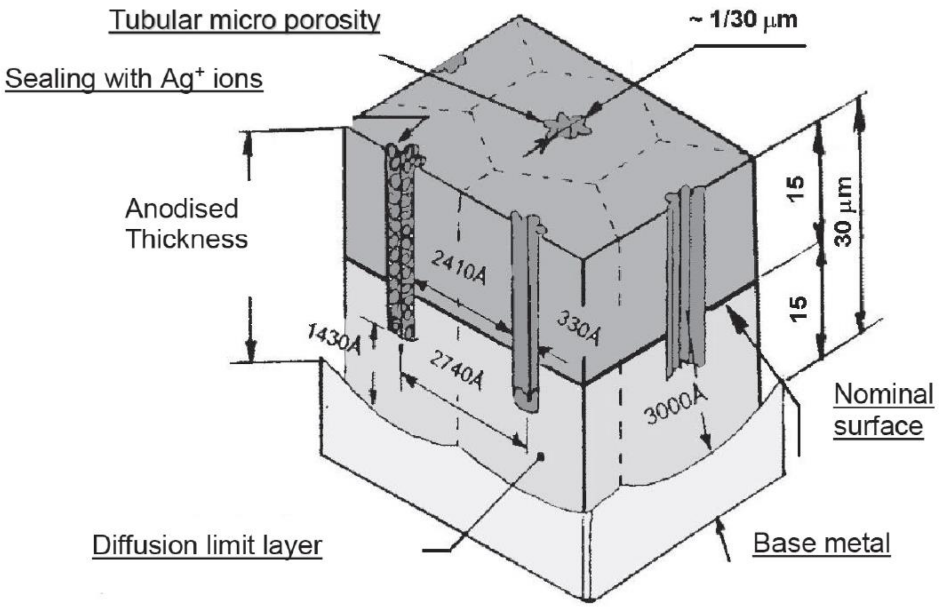
1.0 General information

What is G.H.A. ® (*)

The G.H.A. ® is the most recent and innovative technology applicable to the surface of all aluminium-base alloys. It consists of a special anodic oxidation treatment, with thickness ranging from 1 to 100 µm, followed by the sealing of the micro porosities through silver ions (Ag+).



The anodic oxidation of aluminium – base alloys is the most suitable and safe protection treatments because it's unremovable, in fact, during the galvanic process, the aluminium base is transformed into aluminium oxide (Al1O3), generating a very hard protective layer, similar to ceramic, which is heat resistant and not removable. Aluminium oxide crystals are disposed in a honeycomb structure, very hard and compact, with a capillary hole at the centre of the octahedron and nearly reaching the base of them.

These pores are also a receptacle for dirt and microorganisms so that the anodized surfaces easily get stained. For this reason, they are often treated with colouring substances to seal the pores (with black or other colours). The researches of the company SOUKEN of Kyoto studied the possibility of sealing the crystal pores of the anodic oxides by a special galvanic process using Silver ions Ag+, thereby transforming what was considered a defect (the porosity) into an advantage. In fact, these pores provide a proper reservoir for Ag+ ions, this being uniformly distributed on the surface and permanently present during the wear of the oxide layer. The G.H.A. ® process (Golden Hard Anodizing) was then patented (Patent No. EP1207220). The high hardness of anodic oxide, HV 500-600, combined with the extraordinary properties of silver ions, see Table 1, gives to the treated surface biotechnology characteristics of great practical interest, see Table 2, ranging from the pharmaceutical and food industry to the technical and scientific fields. Not to mention the high hardness and refractory heat factor that are typical of the anodic oxides.

PROPERTY OF GHA. ® TREATMENT WITH SILVER IONS Ag+ (*)						
Low coefficient of friction, self-lubrication and wear resistance.						
Corrosion resistance						
High thermal conductivity and high thermodynamic efficiency						
High antistatic capacity						
Ability to absorb heat and diffuse it as ultra-infrared waves						
High antibacterial capacity and anti-mold (Antibacterial)						
Biotechnology features						
Material	**Hardness (HV)**	**Melting temperature**	**Coefficient of friction**	**Bacteriostatic capacity**	**Corrosion resistance SST**	**Resistance to consumption**
Aluminum Alloy	70÷100	680°C	0,44	None	100h	1000h
Aluminium oxide with G.H.A. treatment	500÷550	2100°C	0,025	High	10.000h	1.000.000h
Hard oxidizing	500÷550	2100°C	0,15	None	200÷500h	1.000h

Therefore the G.H.A. ® coating, if combined with the appropriate aluminium alloy, can be considered by the designers as a real new material and can be good alternative to expensive metals such as titanium alloys, stainless steel or steel treated by expensive and well-known coatings like TIN – PVD – CVD – Hard chromium – Chemical Nickel – Nickel – Teflon etc.

ISO 22196 : 2011 – JIS z 2801 :2010 Certification

The International Organisation for Standardization (ISO) creates and advertises for international standards, requirements, guidelines and parameters in order to provide an universal and unequivocal criterion to ensure clarity and safety of work. The creation of International Standards therefore encourages the exchange of ideas and provides incentives for the market by minimizing errors and avoiding uncertainties. The regulation we referred to is ISO 22196: 2011, relating to the measurements of antibacterial activity, which in turn is based on the method of the previous JIS Z 2081: 2010. These standards set guidelines on the methods of analysis to be carried out, on the materials, as well as the evaluation criteria to interpret the results so to provide a unique criterion and a standard for analysis.

TRAMEC has performed its own test, beside those carried out by "G.H.A. Europe S.r.L "for obtaining the" ISO 22196: 2011 Certification ", which confirmed that its patented GHA gearbox fully complies with this regulation. After successfully passing these laboratory tests, TRAMEC "GHA" gearbox also obtained "ISO 22196: 2011" certification.

The tests performed by TRAMEC were carried out at the Laboratory:

CEPRA srl – Via dei Macabraccia, 8 – 40033 Casalecchio dio Reno (BO) – ITALY

C. F. And P.IVA 02002271209 Bologna Register no. 02002271209 – R.E.A. N 404040/BO

Compnay with certified quality management system UNI EN ISO 9001:2008 Nr 50 100 9099 "

Tests by G.H.A. Europe S.r.L. were carried out at the Laboratory:

3A Laboratori srl – Via A. Volta, 1/d 35020 Maserà di Padova (PD) – ITALY

C. F. And P.IVA 04296730288 Padua Business Register – R.E.A. N 378402 / PD

Accreditation ACCREDIA n. 1165, in compliance with UNI EN ISO/IEC 17025: 2005

Certification ISO 9001: 2008 at CSQA (No 14270) valid within the IQNet circuit (Certificate No. IT-29858)

Patent TRAMEC

"MECHANICAL GEARBOX TREATED WITH SILVER IONS"

TRAMEC deposited its own patent to protect the intellectual property connected with the gearbox named "GHA". The use of silver and/or silver ions applied to a gearbox in any form is legally protected by the laws in force. All rights reserved by TRAMEC.

TRAMEC will make use of these rights, if necessary, in the venues and places provided by law.

The patent filing has been cared for by:

BUGNION S.p.A. – Intellectual Property

Patent Department – Office of Bologna

Via di Corticella, 87 – Bologna (BO) ITALY

THE FIRST "ECO-FRIENDLY" GEARBOX

The "GHA" gearbox manufactured by TRAMEC could be considered as the first "ecological" gearbox, thanks to the additional characteristics summarized here below:

- Made by non-polluting and completely **recyclable** components.
- Can be **cleaned with ECO-sustainable** and Non-polluting products with pH potentially neutral, while its cleaning with highly polluting products such as "sodium hydroxide" is not recommended. See manual (USE & MAINTAINCE)
- Much **less energy is needed for the manufacturing of a "GHA" gearbox** if compared to the corresponding stainless-steel product.

1.1 Measurement units

Table 1

SYMBOL	DEFINITION	MEASUREMENT UNIT	
Fr_2	Radial Load	N	1daN = 10N
Fa_2	Axial Load	N	
	Dimension	mm	
FS’	Gearbox service factor		
FS	Application service factor		
i_n	Reduction ratio		
ir	Actual reduction ratio		
n_1	Input speed	min^{-1}	1 min^{-1} = 6.283 rad
n_2	Output speed	min^{-1}	
η	Efficiency		
IEC	Motor options		
kg	Mass	kg	
P	Motor gearbox	kW	1kW = 1.36 HP (PS)
P’	Power required at input	kW	
Pc	Corrected power	kW	
P_1	Gearmotor power	kW	
P_2	Output power	kW	
P_{tc}	Corrected thermal power	kW	
P_{t0}	Thermal power	kW	
P'	Output power	kW	
Rd	Dynamic efficiency		
Rs	Static efficiency		
Ta	Ambient temperature	°C	
T_{2M}	Gearbox torque	Nm	
T_2	Gearbox motor torque	Nm	
T_C	Torque to be used for the selection of the gearbox	Nm	
T_2'	Required Torque	Nm	

1.2 Service Factor

Service factor **FS** enables approximate qualification of the type of application, taking into account type of load (A,B,C), Length of operation h/d (hours/day) and the number of starts-up/hour. The coefficient thus calculated must be equal to or lower than the gear unit service factor Fs’ which equals the ratio between T_{2M} (gear unit rated torque reported in the catalogue) and T_2' (torque required by the application).

$$FS' = \frac{T_{2M}}{T_2'} > FS$$

FS value reported in table 2 refers to a drive unit equipped with an electric motor. If an internal combustion engine is used, a multiplication factor of 1.3 must be applied for a several cylinder engines, 1.5 for a single cylinder engine. If the electric motor is self-braking, consider twice the number of starts-up than those required.

Table 2

Load class	h/d	N. START-UP/HOUR								
A UNIFORM LOAD		**2**	**4**	**8**	**16**	**32**	**63**	**125**	**250**	**500**
	4	0.8	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.2
	8	1.0	1.0	1.1	1.1	1.3	1.3	1.3	1.3	1.3
	16	1.3	1.3	1.3	1.3	1.5	1.5	1.5	1.5	1.5
	24	1.5	1.5	1.5	1.5	1.8	1.8	1.8	1.8	1.8
	APPLICATION									
	• Pure liquid agitators • Fournace feeders • Disc feeders • Air laundry filters • Generators • Centrifugal pumps • Uniform load conveyors									

Load class	h/d	N. START-UP/HOUR								
B MODERATE SHOCK LOAD		**2**	**4**	**8**	**16**	**32**	**63**	**125**	**250**	**500**
	4	1.0	1.0	1.0	1.0	1.3	1.3	1.3	1.3	1.3
	8	1.3	1.3	1.3	1.3	1.5	1.5	1.5	1.5	1.5
	16	1.5	1.5	1.5	1.5	1.8	1.8	1.8	1.8	1.8
	24	1.8	1.8	1.8	1.8	2.2	2.2	2.2	2.2	2.2
	APPLICATION									
	• Liquid and solid agitators • Belt conveyors • Medium service winches • Stone and gravel filters • Dewatering screws • Flocculator • Vacuum filters • Bucket elevators • Cranes									

Load class	h/d	N. START-UP/HOUR								
C HEAVY SHOCK LOAD		**2**	**4**	**8**	**16**	**32**	**63**	**125**	**250**	**500**
	4	1.3	1.3	1.3	1.3	1.5	1.5	1.5	1.5	1.5
	8	1.5	1.5	1.5	1.5	1.8	1.8	1.8	1.8	1.8
	16	1.8	1.8	1.8	1.8	2.2	2.2	2.2	2.2	2.2
	24	2.2	2.2	2.2	2.2	2.5	2.5	2.5	2.5	2.5
	APPLICATION									
	• Heavy duty hoists • Extruders • Crusher rubber calenders • Brick presses • Planning machine • Ball mills									

1.3 Selection

Calculate input power P' (on the basis of the torque T_2 required by the application), using the following formula:

$$P' = \frac{T_2' \cdot n_2}{9550 \cdot \eta} \quad [kW]$$

Calculate the transmission ratio with the following equation:

$$i_n = \frac{n_1}{n_2}$$

Select the service factor FS of the application in Table 2.

Selecting a gearbox

A) $n_1 = 1400$ min^{-1}

consult the gear unit efficiency table; select a group whose ratio is close to the calculated ratio and which permits power:

$$P \geq P' \times FS$$

B) $n_1 \neq 1400$ min^{-1}

make the selection as described above but on the basis of power Pc corrected by the coefficients reported in the tables. The following equation should be checked out:

$$Pc \geq P' \times FS$$

Selecting a gearmotor

C) $n_1 = 1400$ min^{-1} and FS = 1

consult the gear motor efficiency table and select a group having power P1 corresponding to calculated *P'*.

D) $n_1 \neq 1400$ min^{-1} or FS ≠ 1

follow the instruction at point A), checking that the size of the motor to be installed is compatible with the gear unit (IEC); obviously, installed power must correspond to the required P' value.

Check-list

Check that the radial loads on the shafts fall within to the admissible value reported in the relative tables. Reported values (F_{R2} refers to load which affect the shaft at the half-way point of its projection; if the point of application is different, it is necessary to calculate the new admissible values at the desired distance (y).

In keeping with the above guidelines, axial loads should also be checked against the values reported in the relative tables.

Overloads

An emergency momentary overload up to 100% of T_2 torque is allowed during standard operation of the gearbox.

Should frequent or higher overloads be expected, it is necessary to install torque limiting devices.

Gears

Life and fatigue of the gears are calculated in compliance with ISO 6336 and ISO 10300. Calculation refers to utilization of synthetic oil.

1.4 Thermal power

The different section dedicated to each type of gearbox contains tables reporting the values of rated thermal power P_{t0} (kW). Reported values correspond to the maximum admissible power at gearbox input, on continuous duty and with ambient temperatures of 30°C, so that oil temperature does not exceed 95°C, which is the max. admissible value for standard products.

P_{t0} value should not be taken into account in case of continuous duty for max. 1.5 hours followed by pauses which are long enough to bring the gearbox back to ambient temperature (roughly 1 – 2 hours).

In order to comply with the actual operating conditions, P_{t0} values should be corrected with the following coefficients, thus obtaining the value of corrected thermal power P_{tc}.

$$P_{tc} = P_{t0} \cdot ft \cdot fv \cdot fu \quad (kW)$$

Where:

ft = temperature coefficient (see table 3)

Tc(°C)	0	5	10	15	20	25	30	35	40	45	50
ft	1.46	1.38	1.31	1.23	1.15	1.1	1	0.92	0.85	0.77	0.69

(Tc(°C) is the ambient temperature)

fv = cooling coefficient

- fv = 1.45 forced cooling with specific fan
- fv = 1.25 forced cooling secondary to other devices (pulleys, motor fans, etc)
- fv = 1 natural cooling (standard)
- fv = 0.5 in a closed and narrow environment

fu = utilization coefficient (see table 4)

table 4

Dt (min)	10	20	30	40	50	60
Fu	1.6	1.35	1.2	1.1	1.05	1

Dt is minutes of operation per hour

1.5 Lubrication

The bearing mounted on the input shaft are supplied with FUCHS CASSIDA GREASE HTS2 , synthetic base and suitable for the food industry. The other bearings are lubricated only if the mounting position does not guarantee proper lubrication.

An optimized selection of the type of lubricant, depending on operating and environmental conditions, will allow the gearboxes to achieve excellent performances.

Performance data, as shown in the specification tables, refers to the use of synthetic oil for food industry: FUCHS CASSIDA FLUID 320 LUBRICANT

1.6 Installation

Install the gearbox so that any vibration is eliminated

Take special care with the alignment between the gear unit, the motor and the driven machine, fitting flexible or self-adjusting couplings wherever possible.

If the gearbox is subject to prolonged overloads, shocks or possible jamming, fit overload cut-outs, torque limiters, hydraulic couplings or other similar devices.

Do not exceed allowed radial and axial loads on the input and outputs shafts.

Ensure that the components to be fitted on the gear units are machined with tolerance **SHAFT ISO h6 HOLE ISO H7**

Before assembling, clean and lubricate the surfaces to prevent seizures and contact oxidation.

Assembly is to be carried out with the aid of tie-rods and extractors, using the threaded hole at the shaft ends.

All reducers and gear motors mentioned in this catalog are intended for industrial use and operation at an ambient temperature between *-20°C and +40°C*, at an altitude of max. 1000 m above sea level.

For all other instructions check the “use and maintenance manual” or find more information on our website www.SAMT.com.au

1.7 Running-in

Increase the transmitted power gradually or limit the resistant torque of the driven machine for the first few operating hours.

1.8 Maintenance

Check the lubricant level regularly and change after 12500 operating hours.

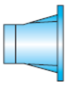
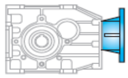
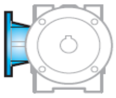
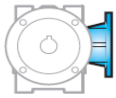
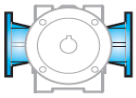
When the gearbox is left unused in a highly humid environment fill it completely with oil. Importantly the oil must be returned to the operating level before the unit is used again.

2.0 Bevel Helical Gearbox T

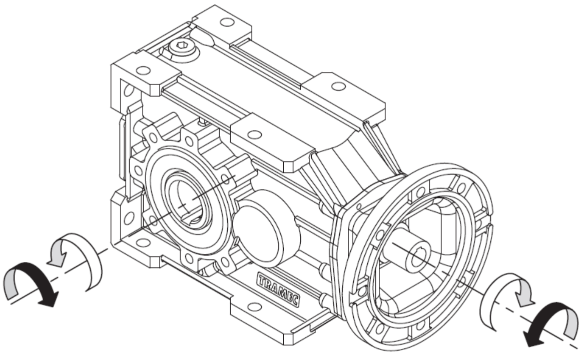
2.1 Characteristics (Bevel Helical Gearbox T)

- built in 3 sizes with 2 and 3 reduction stages.
- One input type available and suitable for the motor mounting (bell and sleeve).
- The gear unit casing is in aluminium alloy GAISi9Cu1 UNI7369/3, internally and externally ribbed to guarantee rigidity and its is machined on all surfaces for easy positioning.
- The gears are built in casehardened compound steel and have undergone case-hardening and quench-hardening treatments. In particular, the first stage consists of two GLEASON spiral bevel gears with precise ground profile, in 16NiCr4 or 18NiCrMo5 case hardened and quench-hardened steel. The helical spur gears are built in 16NiCr4, 18NiCrMo5 or 20MnCr5 UNI EN10084, quench – hardened and case – hardened steel, ground according and within Class 6 quality DIN 3962.
- Aluminium housings and flanges are sandblasted and treated in accordance with G.H.A ® technology.
- The stainless steel AISI 316 hollow shaft together with he possibility to mount an output flange on one or both sides, enhance the versatility of these gearboxes, making it easy to install.

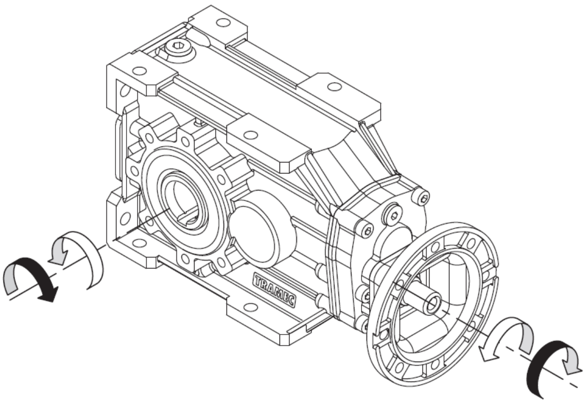
2.2 Designation (Bevel Helical Gearbox T)

Gearbox	Input type	Size	Gearing	Ratio	Motor coupling	Execution	Mounting position	Output flange
T	**F**	**63**	**B**	**10**	**P.A.M.**	**O**	**B3**	**FLS**
Bevel helical gearbox	 F	56 63 75	B 	i_n = 8 ÷ 315	56 ÷ 100	 O	B3 B6 B7 B8 VA VB	 FLS  FLD
		56 63 75	C 					 FL2

2.3 Direction of shaft rotation (Bevel Helical Gearbox T)



TF ... B



TF ... C

2.4 Efficiency (Bevel Helical Gearbox T)

The efficiency value of the gear units can be estimated sufficiently well on the basis of the number of reduction stages, ignoring non-significant variations which can be attributed to the various sizes and ratios.

η	TF..B	TF..C
	0.95	0.93

2.5 Input speed (Bevel Helical Gearbox T)

All calculations of gear unit performance are based on an input speed of 1400 min^{-1}. All gear units permit speed up to 3000 min^{-1}, nevertheless it is advisable to keep below 1400 min^{-1}, depending on application. The table below reports input power P corrective coefficients at the various speeds, with Fs = 1

Table 1

n_1 (rpm)	3000	2800	2200	1800	1400	900	700	500
Pc (kW)	P x 1.9	P x 1.8	P x 1.48	P x 1.24	P x 1	P x 0.7	P x 0.56	P x 0.42

2.6 Thermal power (Bevel Helical Gearbox T)

The following table shows the values of thermal power P_{t0} (kW) for each gearbox size on the basis of ratio and input speed. The values have been calculated considering the utilization of synthetic oil ISO 320. see chapter 1.4 for the corrective coefficients.

Thermal power P_{t0} (kW)						
	TF56B		TF63B		TF75B	
i_n	**1400**	**2800**	**1400**	**2800**	**1400**	**2800**
8						
10						
12.5						
16						
20	4	3.4	5.5	4.7	5.6	4.8
25						
31.5						
40						
50						
63	-	-			-	-
80			-	-		

Thermal power P_{t0} (kW)						
	TF56C		TF63C		TF75C	
i_n	**1400**	**2800**	**1400**	**2800**	**1400**	**2800**
40						
50						
63						
80						
100	3.3	2.8	4.2	3.6	4.3	3.7
125						
160						
200						
250						
315						
400	-	-			-	-
500			-	-		
630						

2.7 Technical data (Bevel Helical Gearbox T)

T	n₁ = 1400			TF			
	in	ir	n_2 (rpm)	T_2 (Nm)	P1 (kW)	FS'	IEC
56B	**8**	8.06	**174**	94	1.8	1.2	56 63 (B5) 71 80 90 (B5) (B14) **TF**
	10	10.17	**138**	120	1.8	1.0	
	12.5	12.31	**114**	120	1.5	1.1	
	16	15.00	**93**	107	1.1	1.3	
	20	20.33	**69**	140	1.1	1.0	
	25	24.62	**57**	140	0.9	1.0	
	31.5	30.00	**47**	107	0.55	1.3	
	40	39.38	**36**	140	0.55	1.0	
	50	48.00	**29**	115	0.37	1.2	
56C	**40**	40.28	**35**	140	0.55	1.0	56 63 (B5) 71 80 90 (B5) (B14) **TF**
	50	50.83	**28**	119	0.37	1.2	
	63	61.54	**23**	140	0.37	1.0	
	80	75.00	**19**	119	0.25	1.2	
	100	101.67	**14**	145	0.22	1.0	
	125	123.08	**11**	141	0.18	1.0	
	160	150.00	**9**	124	0.13	1.2	
	200	196.92	**7**	136	0.11	1.1	
	250	240.00	**6**	135	0.09	1.0	
63B	**8**	7.94	**176**	93	1.8	1.7	56 63 (B5) 71 80 90 (B5) (B14) **TF**
	10	10.18	**138**	119	1.8	1.4	
	12.5	12.50	**112**	146	1.8	1.3	
	16	15.88	**88**	185	1.8	1.0	
	20	20.36	**69**	200	1.5	1.0	
	25	25.00	**56**	180	1.1	1.1	
	31.5	31.00	**45**	181	0.9	1.1	
	40	40.00	**35**	194	0.75	1.0	
	50	49.60	**28**	177	0.55	1.0	
	63	60.80	**23**	146	0.37	1.0	
63C	**40**	39.71	**35**	194	0.75	1.0	56 63 (B5) 71 80 90 (B5) (B14) **TF**
	50	50.89	**28**	178	0.55	1.2	
	63	62.50	**22**	210	0.55	1.0	
	80	79.41	**18**	186	0.37	1.1	
	100	101.79	**14**	161	0.25	1.3	
	125	125.00	**11**	198	0.25	1.0	
	160	155.00	**9**	210	0.22	1.0	
	200	200.00	**7**	165	0.13	1.3	
	250	248.00	**6**	200	0.13	1.0	
	315	304.00	**5**	180	0.09	1.0	

T	n_1 = 1400			TF			
	in	ir	n_2 (rpm)	T_2 (Nm)	P1 (kW)	FS’	IEC
75B	**8**	7.87	**178**	204	4.0	1.2	71 80 90 100 112 (B5) (B14) **TF**
	10	9.82	**143**	254	4.0	1.1	
	12.5	12.67	**110**	330	4.0	1.0	
	16	15.43	**91**	299	3.0	1.1	
	20	19.38	**72**	277	2.2	1.3	
	25	25.00	**56**	356	2.2	1.0	
	31.5	30.45	**46**	355	1.8	1.1	
	40	40.00	**35**	285	1.1	1.3	
	50	48.73	**29**	344	1.1	1.1	
75C	**50**	49.08	**29**	330	1.1	1.0	63 (B5) 71 80 90 (B5) (B14) **TF**
	63	63.33	**22**	303	0.75	1.1	
	80	77.15	**18**	271	0.55	1.3	
	100	96.88	**14**	350	0.55	1.0	
	125	125.00	**11**	299	0.37	1.2	
	160	152.27	**9**	247	0.25	1.4	
	200	200.00	**7**	317	0.25	1.2	
	250	243.64	**6**	370	0.25	1.0	

2.8 Moment of inertia (Kg.cm^2) (Bevel Helical Gearbox T)

(referred to input shaft)

TF..B

	i_n		TF				
			IEC B5				
			56	**63**	**71**	**80**	**90**
56B	**8**			0.32	0.40	0.60	0.77
	10		0.29	0.29	0.37	0.56	0.74
	12.5		0.27	0.27	0.35	0.54	0.72
	16		0.25	0.26	0.33	0.53	0.71
	20		0.15	0.15	0.22	0.42	0.60
	25		0.14	0.15	0.22	0.42	0.59
	31.5		0.14	0.14	0.21	0.41	0.59
	40		0.11	0.12	0.19	0.39	0.56
	50		0.11	0.11	0.19	0.39	0.56

	i_n		TF				
			IEC B5				
			56	63	71	80	90
63B	8		0.47	0.47	0.55	0.74	0.92
	10		0.41	0.42	0.49	0.69	0.87
	12.5		0.38	0.38	0.45	0.65	0.83
	16		0.23	0.24	0.31	0.51	0.68
	20		0.22	0.22	0.29	0.49	0.67
	25		0.21	0.21	0.29	0.48	0.66
	31.5		0.20	0.21	0.28	0.48	0.65
	40		0.15	0.15	0.22	0.42	0.60
	50		0.14	0.15	0.22	0.42	0.60
	63		0.14	0.15	0.22	0.42	0.59

	i_n		TF			
			IEC B5			
			71	80	90	100-112
75B	8		1.70	2.10	2.01	3.05
	10		1.55	1.96	1.87	2.91
	12.5		1.39	1.80	1.71	2.75
	16		1.34	1.74	1.65	2.69
	20		0.71	1.11	1.02	2.06
	25		0.67	1.07	0.98	2.02
	31.5		0.65	1.06	0.97	2.01
	40		0.51	0.92	0.82	1.86
	50		0.50	0.91	0.82	1.86

TF..C

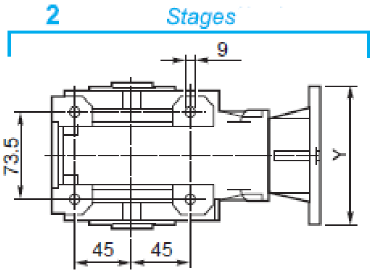
	i_n		TF				
			IEC B5				
			56	63	71	80	90
56C	40		0.136	0.139	0.212	0.410	0.588
	50		0.134	0.138	0.211	0.409	0.587
	63		0.134	0.137	0.210	0.408	0.586
	80		0.133	0.137	0.210	0.408	0.585
	100		0.129	0.132	0.205	0.403	0.581
	125		0.129	0.132	0.205	0.403	0.581
	160		0.128	0.132	0.205	0.403	0.581
	200		0.127	0.131	0.204	0.402	0.580
	250		0.127	0.131	0.204	0.402	0.580

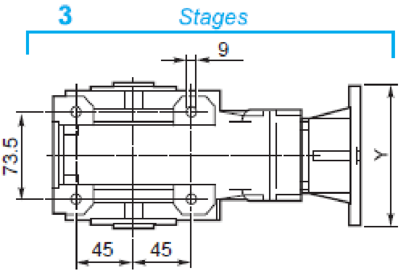
	i_n	TF IEC B5				
		56	63	71	80	90
63C	40	0.142	0.145	0.218	0.416	0.594
	50	0.139	0.143	0.216	0.414	0.592
	63	0.138	0.142	0.215	0.413	0.590
	80	0.132	0.136	0.209	0.407	0.585
	100	0.132	0.135	0.208	0.406	0.584
	125	0.131	0.135	0.208	0.406	0.584
	160	0.131	0.135	0.208	0.406	0.583
	200	0.129	0.132	0.205	0.403	0.581
	250	0.129	0.132	0.205	0.403	0.581
	315	0.129	0.132	0.205	0.403	0.581

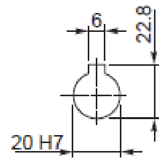
	i_n	TF IEC B5			
		63	71	80	90
75C	50	0.179	0.252	0.450	0.628
	63	0.173	0.246	0.444	0.622
	80	0.171	0.244	0.442	0.619
	100	0.145	0.219	0.417	0.594
	125	0.144	0.217	0.415	0.593
	160	0.143	0.216	0.414	0.592
	200	0.138	0.211	0.409	0.586
	250	0.137	0.210	0.408	0.586

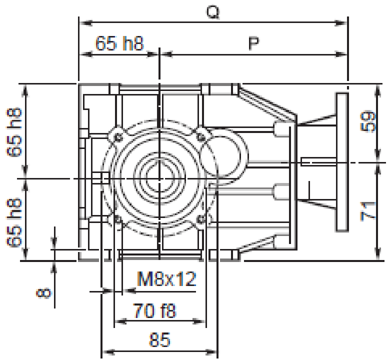
2.9 Dimension (Bevel Helical Gearbox T)

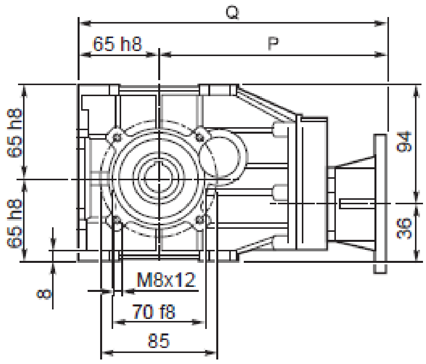
TF56B... **TF56C...**

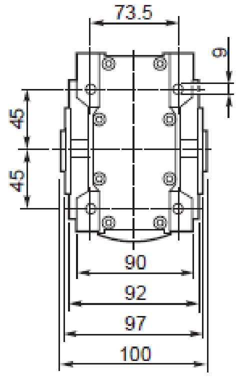


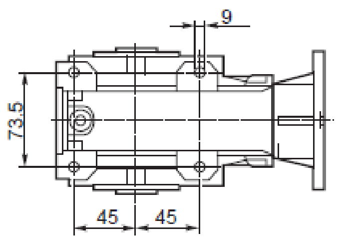


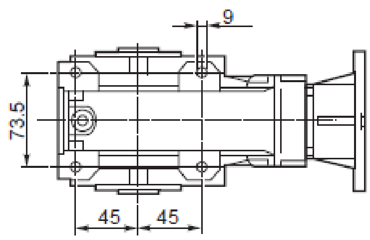


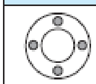
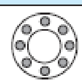










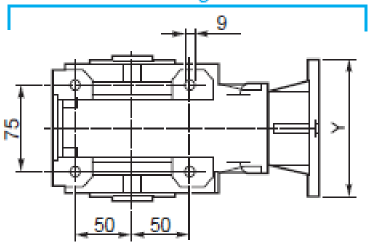
IEC	
	
	56 B5
	63 B5
71 B14	71 B5
	80 B5/B14
	90 B5/B14

B5	TF...									
	56B					56C				
IEC..	56	63	71	80	90	56	63	71	80	90
Y	120	140	160	200	200	120	140	160	200	200
P	153	156	163	183	183	187	190	197	217	217
Q	218	221	228	248	248	252	255	262	282	282
kg	4.5	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0

B14	TF...									
	56B					56C				
IEC..	56	63	71	80	90	56	63	71	80	90
Y	-	-	105	120	140	-	-	105	120	140
P	-	-	163	183	183	-	-	197	217	217
Q	-	-	228	248	248	-	-	262	282	282
kg	-	-	4.5	4.5	4.5	-	-	5.0	5.0	5.0

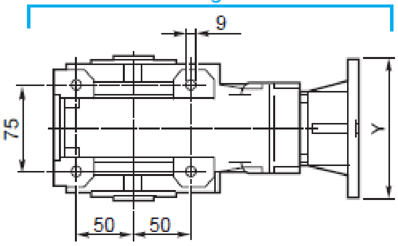
TF63B...

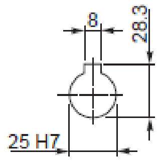
2 *Stages*

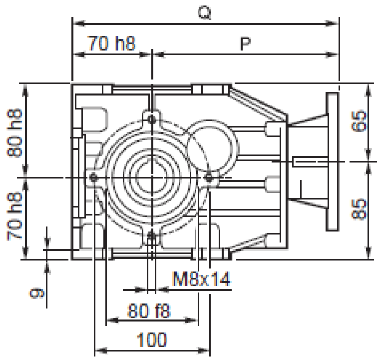


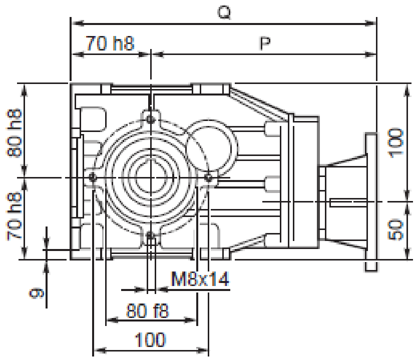
TF63C...

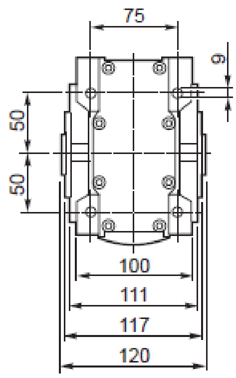
3 *Stages*

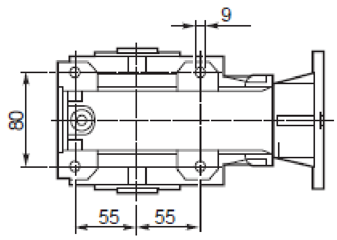


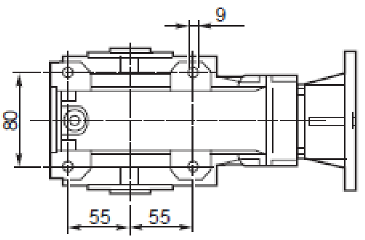


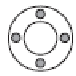
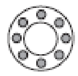










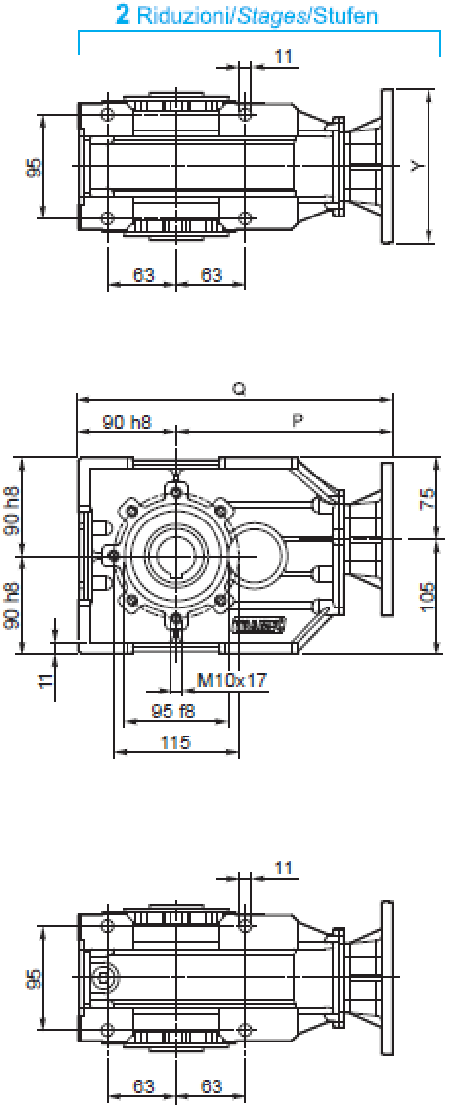
IEC	
	
	56 B5
	63 B5
71 B14	71 B5
	80 B5/B14
	90 B5/B14

B5	TF...									
	63B					63C				
IEC..	**56**	**63**	**71**	**80**	**90**	**56**	**63**	**71**	**80**	**90**
Y	120	140	160	200	200	120	140	160	200	200
P	160	163	170	190	190	194	197	204	224	224
Q	230	233	240	260	260	264	267	274	294	294
kg	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.5	6.5	6.5

B14	TF...									
	63B					63C				
IEC..	**56**	**63**	**71**	**80**	**90**	**56**	**63**	**71**	**80**	**90**
Y	-	-	105	120	140	-	-	105	120	140
P	-	-	170	190	190	-	-	204	224	224
Q	-	-	240	260	260	-	-	274	294	294
kg	-	-	6.0	6.0	6.0	-	-	6.5	6.5	6.5

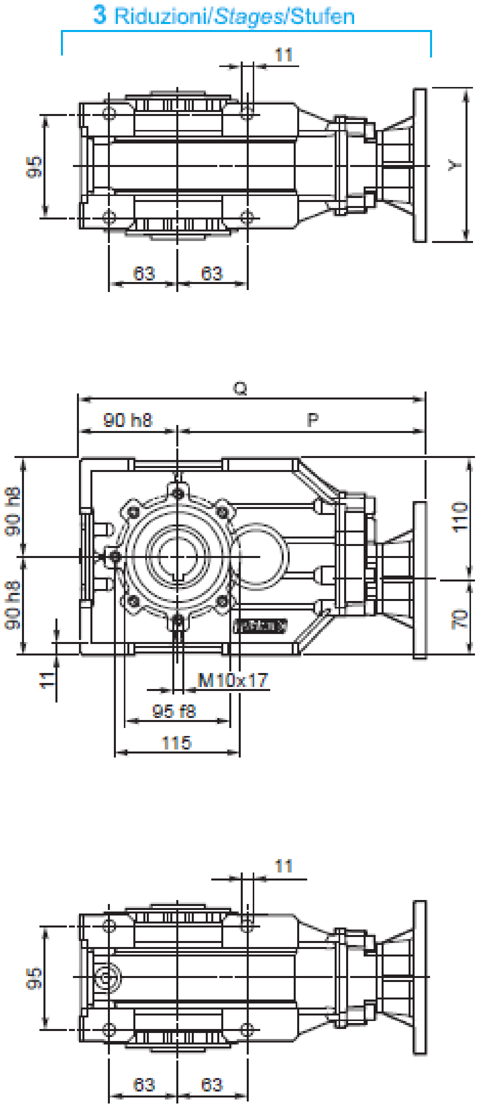
TF75B...

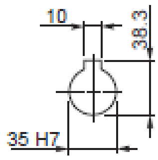
2 Riduzioni/*Stages*/Stufen

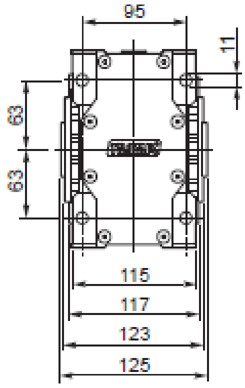


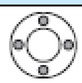
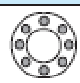
TF75C...

3 Riduzioni/*Stages*/Stufen







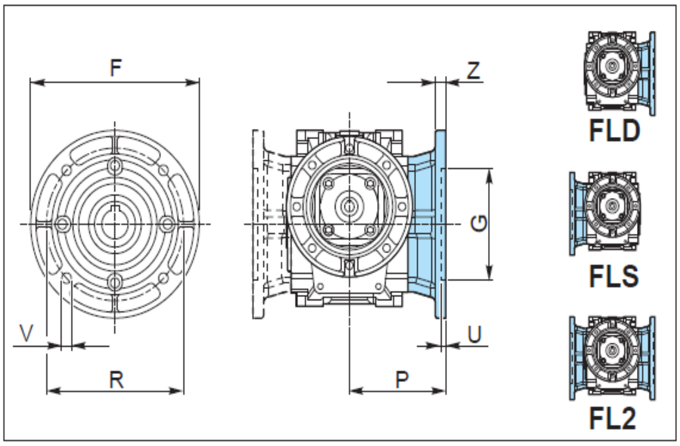
IEC	
	
	63 B5
71 B14	71 B5
	80 B5/B14
	90 B5/B14
	100 B5/B14

B5	**TF...**								
	75B					**75C**			
IEC..	**71**	**80**	**90**	**100**	**112**	**63**	**71**	**80**	**90**
Y	160	200	200	250	250	140	160	200	200
P	205.5	225.5	225.5	235.5	235.5	227	234	254	254
Q	295.5	315.5	315.5	325.5	325.5	317	324	344	344
kg	6.5	6.5	6.5	6.5	6.5	7	7	7	7

B14	**TF...**								
	75B					**75C**			
IEC..	**71**	**80**	**90**	**100**	**112**	**63**	**71**	**80**	**90**
Y	105	120	140	160	160	-	105	120	140
P	205.5	225.5	225.5	235.5	235.5	-	234	254	254
Q	295.5	315.5	315.5	325.5	325.5	-	324	344	344
kg	6.5	6.5	6.5	6.5	6.5	7	7	7	7

2.10 Accessories (Bevel Helical Gearbox T)

Output flange



	T		
	56B 56C	**63B 63C**	**75B 75C**
F	140	160	200
G_{F7}	95	110	130
R	115	130	165
P	82	91.5	97.5
U	5	5	5
V	9	9	12
Z	15	10	15
Kg	0.5	0.5	0.9

2.11 Angular backlash (Bevel Helical Gearbox T)

After having blocked the input shaft the angular backlash can be measured on the output shaft by rotating it in both directions and applying the torque which is strictly necessary to create a contact between the teeth of the gears. The applied torque should be at most 2% of the max torque guaranteed by the gearbox. (T_{2M}). The following table reports the approximate values of the angular backlash (in minutes of arc) referred to standard mounting and the values to be obtained by a more precise adjustment. The latter solution should be adopted only in case of necessity because it may raise the noise level and lessen the action of the lubricant.

	Backlash	
	Standard mounting	Mounting with reduced backlash
2 stages	16/20	12/15
3 stages	20/25	15/20

2.12 Lubrication (Bevel Helical Gearbox T)

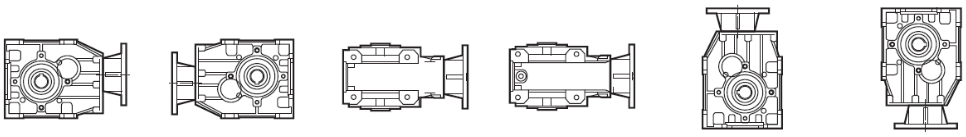
Bevel helical gearboxes type TF56, TF63 and TF75 are lubricated for life with FUCHS CASSIDA FLUID 320 oil. The grease FUCHS CASSIDA GREASE HTS2 applied on the bearings is compatible with food use.

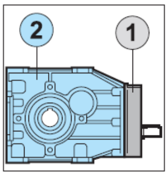
The mounting position should always be specified while ordering the gearbox

Depending on the mounting position the bearings may be lodged above the lubricant level, in this case, it is necessary to apply special grease on the bearings to improve their lubrication. A metallic ring (nilos-ring) can be fitted on the bearings, it keeps the grease in place thus prolonging the action. It is supplied on specific request.

Mounting positions and lubricant quantity (litres)

The oil quantities stated in the tables are approximate values and refers to the indicated working positions, considering operating conditions at ambient temperature and an input speed of 1400min^{-1} should the operating conditions be different, please contact the technical service.

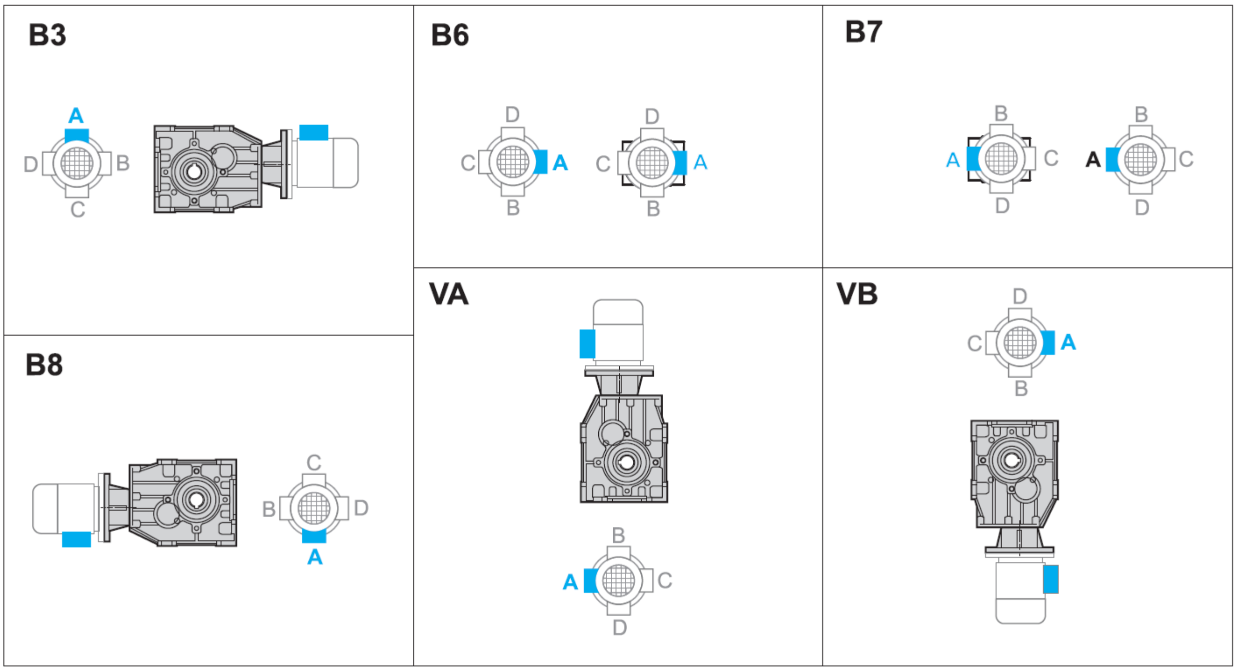




	T	B3	B8	B6	B7	VA	VB
②	**56B**	0.30				0.40	0.30
①	**56C**	0.05					
②	**56C**	0.30				0.40	0.30
②	**63B**	0.35				0.45	0.35
①	**63C**	0.05					
②	**63C**	0.35				0.45	0.35
②	**75B**	0.45					
①	**75C**	0.08					
②	**75C**	0.45					

- In mounting position B6 – B7 the breather plug is supplied complete with the dipstick.

Terminal board position



N.B.
Unless otherwise agreed, the motor will be supplied with the terminal board in position A.

2.13 Radial and axial loads (N)(Bevel Helical Gearbox T)

Transmissions implemented by means of chain pinions, wheels or pulleys generate radial forces (F_R) on the gear unit shafts. The entity of those forces may be calculated using the following formula:

$$F_R = \frac{K_R \cdot T}{d} \text{ [N]}$$

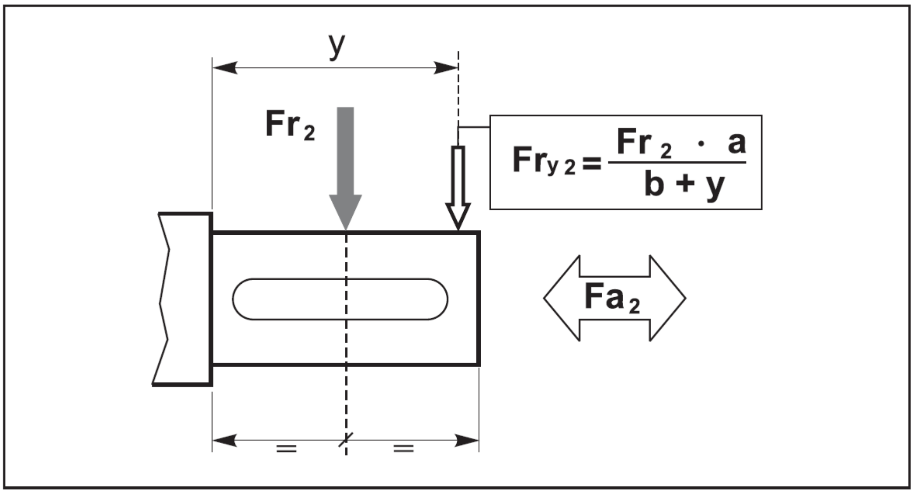
Where:
T = torque (Nm)
d = pinion or pulley diameter (mm)

K_R = 2000 for chain pinion
= 2500 for wheel
= 3000 for V-belt pulley

The values of the radial and axial loads generated by the application must always be lower than or equal to the admissible values reported in the tables.

$$F_R \geq Fr_2$$

Should the radial load affect the shaft not at the half-way point of its projection but at a different point, the value of the admissible load has to be calculated using the $Fry_{1\text{-}2}$ formula: a, b and $Fr_{1\text{-}2}$ values are reported in the radial load tables. With regards to double-projecting shafts, the load applicable at each end is 2/3 of the value given in the table, on condition that the applied loads feature same intensity and direction and that they act in the same direction. Otherwise please contact the technical department.

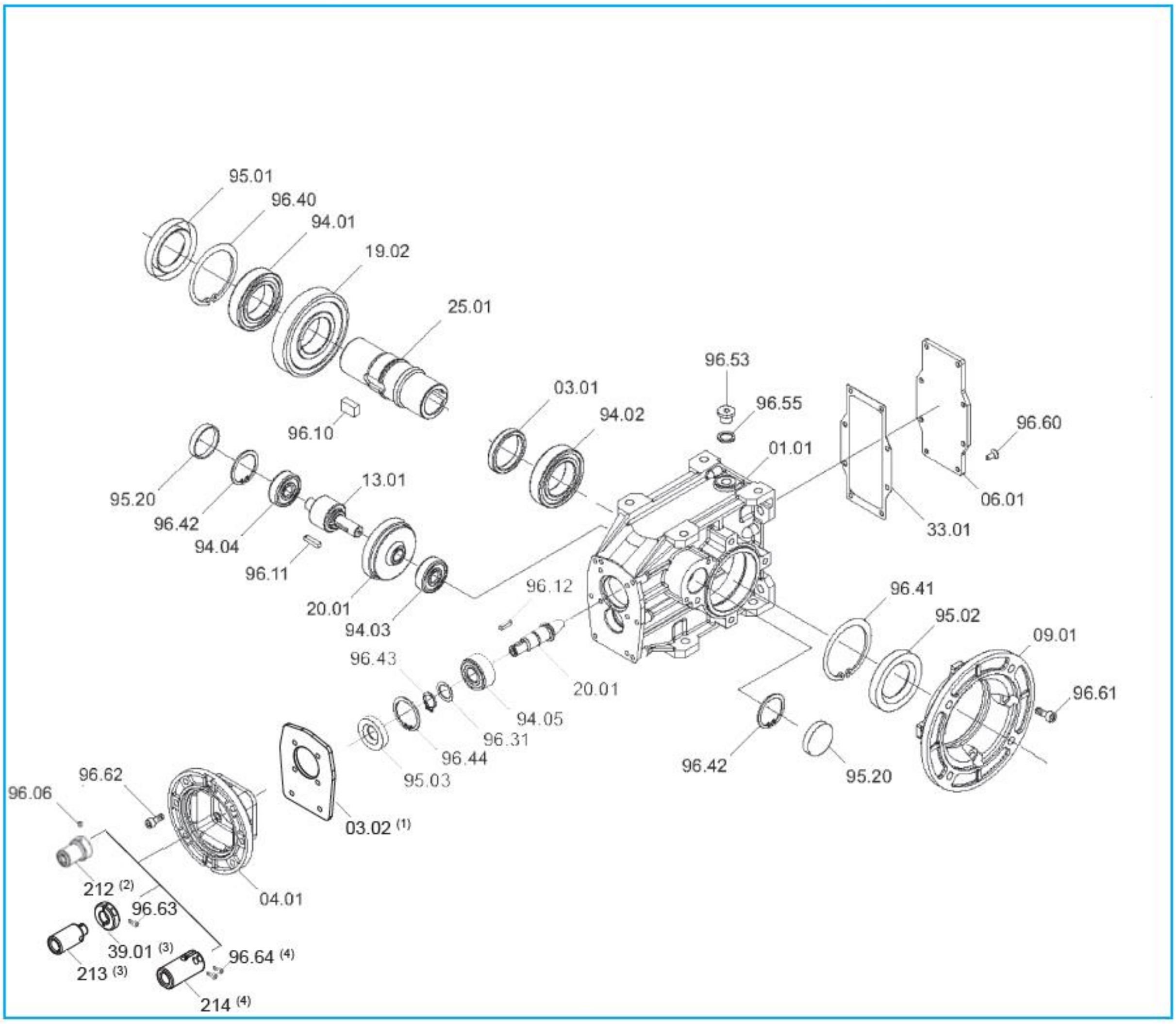


The radial loads indicated in the chart are considered to be applied at the halfway point of the shaft projection and refer to gear units operating with service factor 1.

	T 56B		T 63B		T 75B			T 56C		T 63C		T 75C	
	OUTPUT SHAFT (n_1 = 1400 min^{-1})												
	a = 106	b = 81	a = 121	b = 93.5	a = 106	b = 81	**in**	a = 106	b = 81	a = 121	b = 93.5	a = 121	b = 93.5
	Fr_2	**Fa_2**	**Fr_2**	**Fa_2**	**Fr_2**	**Fa_2**		**Fr_2**	**Fa_2**	**Fr_2**	**Fa_2**	**Fr_2**	**Fa_2**
8	1300	260	1500	300	2500	500	**40**	2300	460	2500	500	-	-
10	1300	260	1500	300	2500	500	**50**	2300	460	2500	500	3500	700
12.5	1300	260	1500	300	2500	500	**63**	2300	460	2500	500	3500	700
16	1800	360	2000	400	2500	500	**80**	2800	560	3000	600	3500	700
20	1800	360	2000	400	3000	600	**100**	2800	560	3000	600	4000	800
25	1800	360	2000	400	3000	600	**125**	2800	560	3000	600	4000	800
31.5	1800	360	2000	400	3000	600	**160**	2800	560	3000	600	4000	800
40	2300	460	2500	500	3500	700	**200**	3000	600	3500	700	4500	900
50	2300	460	2500	500	3500	700	**250**	3000	600	3500	700	4500	900
63	-	-	2500	500	-	-	**315**	-	-	3500	700	-	-

2.14 Spare parts list (Bevel Helical Gearbox T)

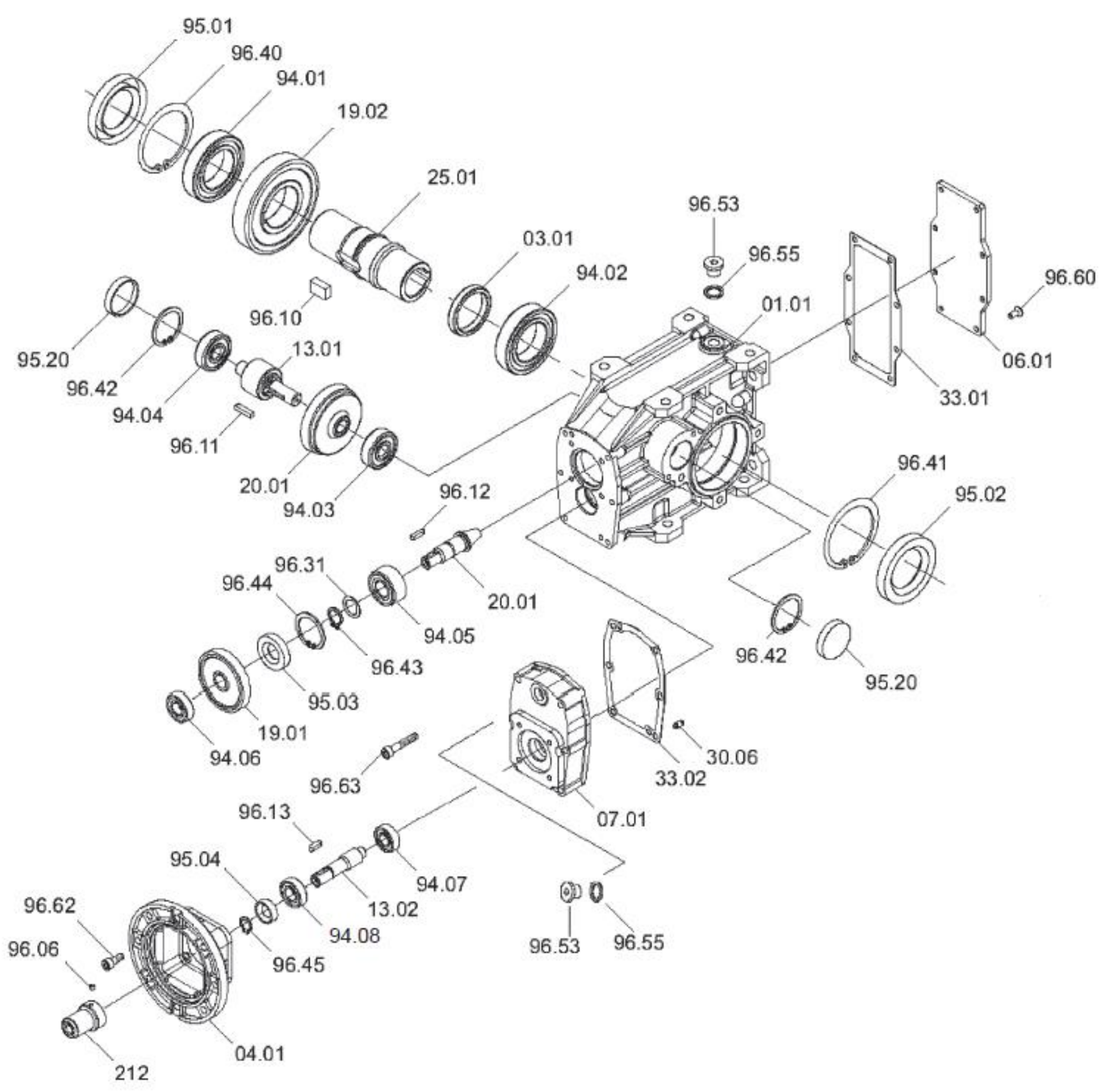
TF 56B - TF 63B - TF 75B



T	Bearings					Oil seals			Closed oil seal
	94.01	94.02	94.03	94.04	94.05	95.01	95.02	95.03	95.20
56B	**6007** 35/62/14	**6007** 35/62/14	**6201** 12/32/10	**6201** 12/32/10	**3201** 12/32/15.9	35/62/7	35/62/7	**12/32/7**	Ø 32x7
63B	**6008** 40/68/15	**6008** 40/68/15	**6301** 12/37/12	**6301** 12/37/12	**3202** 15/35/15.9	40/68/10	40/68/10	**15/35/7**	Ø 37x7
75B	**6010** 50/80/16	**6010** 50/80/16	**6203** 17/40/12	**6203** 17/40/12	**3202** 15/35/15.9	50/80/8	50/80/8	**15/35/7**	Ø 47x7

(1) Only for TF75B PAM 71, 80, 90
(2) Only for TF56B and TF63B PAM 56, 63
(3) Only for TF56B AND TF63B PAM 71, 80, 90
(4) Only for TF75B all PAM

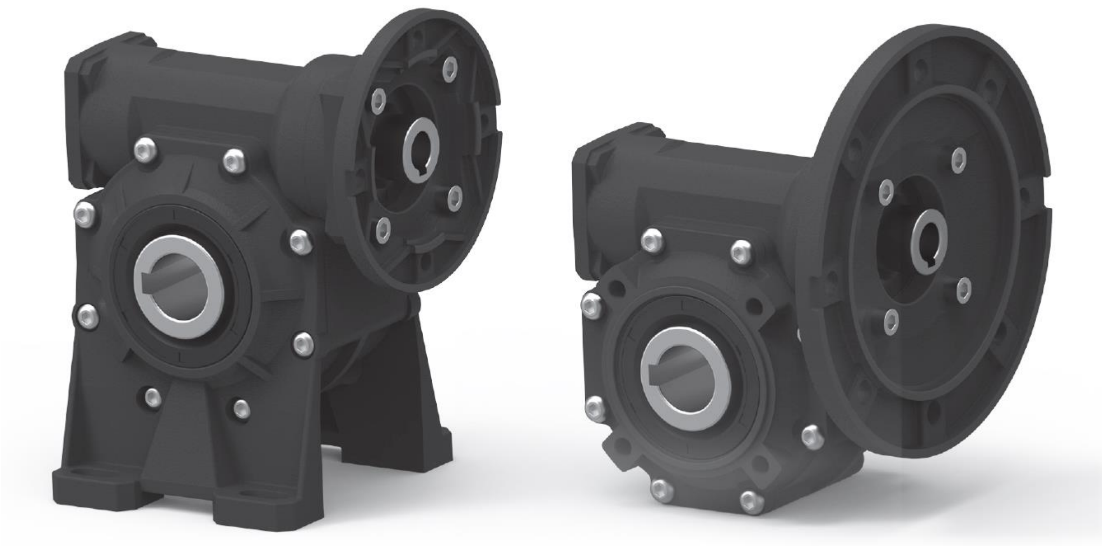
TF 56C - TF 63C - TF 75C



T	Bearings							
	94.01	94.02	94.03	94.04	94.05	94.06	94.07	94.08
56C	**6007** 35/62/14	**6007** 35/62/14	**6201** 12/32/10	**6201** 12/32/10	**3201** 12/32/15.9	6001 12/28/8	6000 10/26/8	6001 12/28/8
63C	**6008** 40/68/15	**6008** 40/68/15	**6301** 12/37/12	**6301** 12/37/12	**3202** 15/35/15.9	6001 12/28/8	6000 10/26/8	6001 12/28/8
75C	**6010** 50/80/16	**6010** 50/80/16	**6203** 17/40/12	**6203** 17/40/12	**3202** 15/35/15.9	6001 12/28/8	6000 10/26/8	6001 12/28/8

T	Oil seals				Closed oil seal
	95.01	95.02	95.03	95.04	95.20
56C	35/62/7	35/62/7	**12/32/7**	12/22/7	Ø 32x7
63C	40/68/10	40/68/10	**15/35/7**	12/22/7	Ø 37x7
75C	50/80/8	50/80/8	**15/35/7**	12/22/7	Ø 47x7

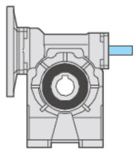
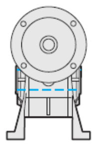
3.0 K Worm Gearboxes



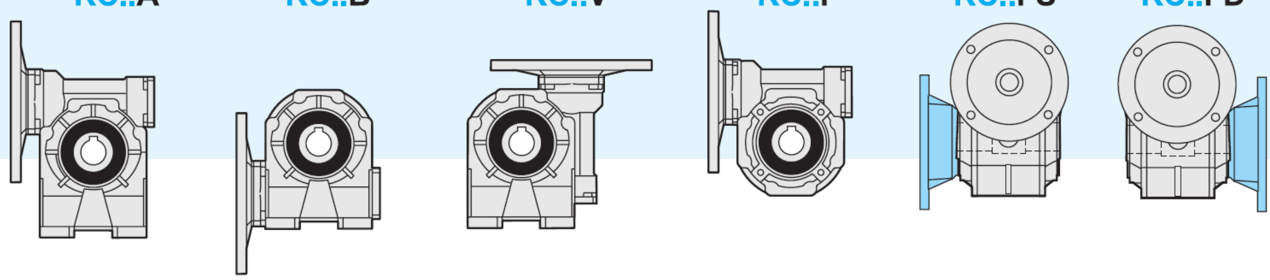
3.1 Characteristics (K Worm Gearboxes)

- The KC worm gearboxes are extremely light thanks to the compact shape of the housing which is in die-cast aluminium for all sizes.
- This series features a wide range of versions, with and without feet, which makes it extremely versatile for utilization in various applications.
- The K series is available for motor mounting version (PAM) only and not with the male input shaft.
- The worm shaft is made of hardened – bonded steel and ground.
- The worm wheel has a stainless steel AISI 316 hub with inserted cast bronze ring.
- Aluminium housings and flanges are sandblasted and treated in accordance with G.H.A ® technology.
- The hollow output shaft is supplied as standard. A broad range of accessories is available: second input, hollow shaft protection kit.

3.2 Designation (K Worm Gearboxes)

Gearbox	Input type	Size	Version	Ratio	Motor coupling	Mounting position	Additional input	Hollow output shaft
K	C	50	F1S	10	P.A.M	B3	SeA	H
Wormgearbox	 C	30 40 50 63 75 89	A1-A2 B1-B2 V1-V2 P F1S-F2S F3S F1D-F2D F3D	5 7.5 10 15 20 25 30 40 50 65 80 100	56 63 71 80 90 100 112	B3 B6 B7 B8 V5 V6	 SeA	 H

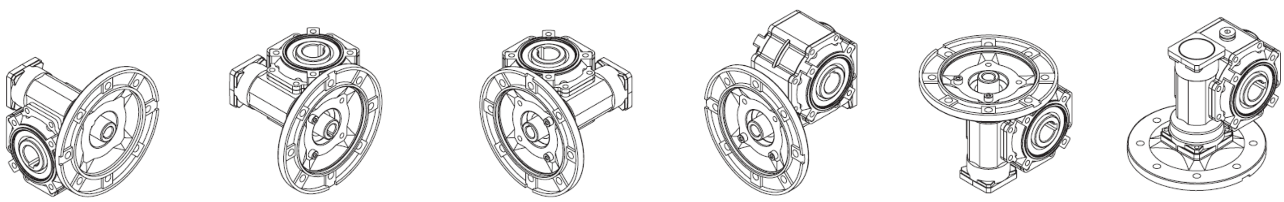
Versions



3.3 Lubrication (K Worm Gearboxes)

The K series worm gearboxes are supplied complete with synthetic lubricant for food us: FUCHS CASSIDA FLUID 320 OIL. Mounting position always to be specified when ordering.

Mounting positions

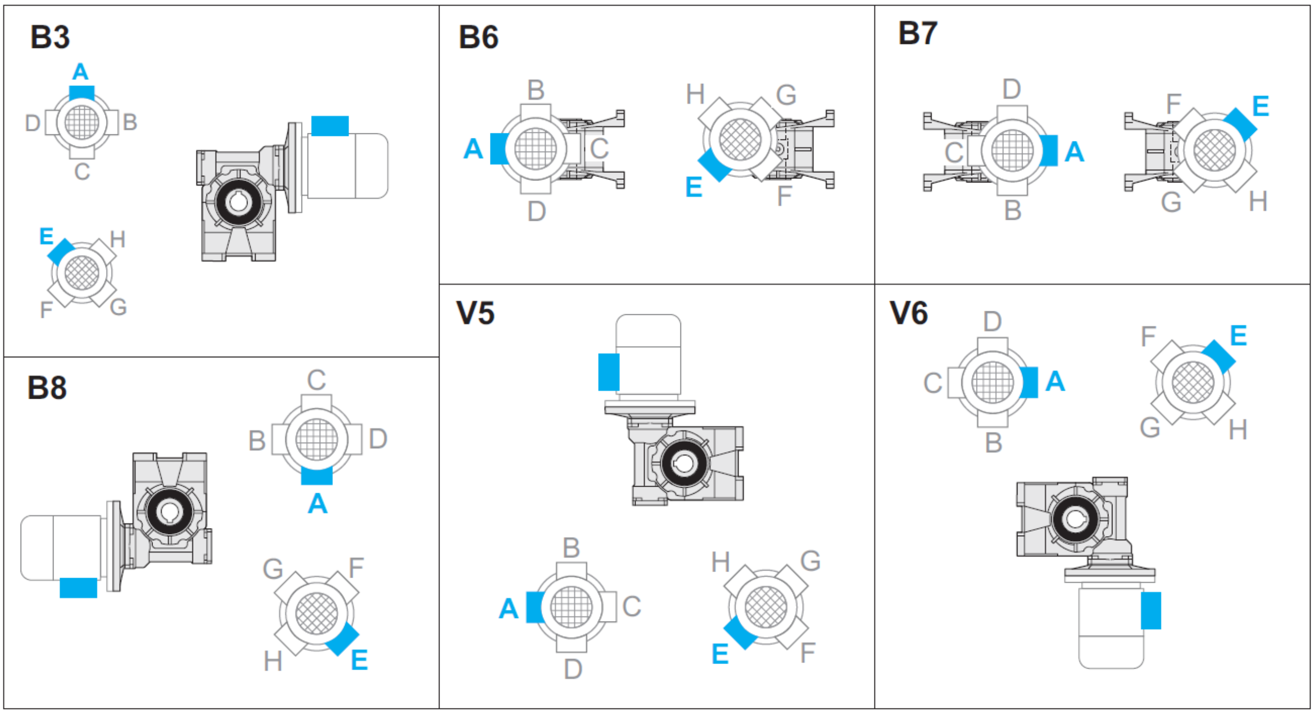


B3 B6 B7 B8 V5 V6

Aluminium housings size 30, 40, 50, 63 and 75 have one filling plug only.

		Oil quantity (lt)			
		Mounting position			
		B3	B6 – B7	B8	V5 – V6
KC	30	0.015	0.030	0.015	
	40	0.040	0.060	0.040	
	50	0.080	0.120	0.080	
	63	0.160	0.220	0.160	
	75	0.260	0.340	0.260	
	89	1	0.8	0.8	1.3

3.4 Terminal board position (K Worm Gearboxes)

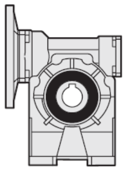


Mounting position always to be specified when ordering.

3.5 Efficiency (K Worm Gearboxes)

Rd – dynamic efficiency, defined as the ratio between P_2 output power and P_1 input power. It mainly depends on the slipping speed, the type of lubricant and the lead angle. The values reported in the table are valid when the corresponding output torque is applied. During the firs 300 operating hours under load, the value to be considered is 30% lower than that reported in the table.

Rs – static efficiency at gearbox start-up; it changed depending on the reduction ratio. Rs value is important for selecting the right gearbox for application where a steady state is never achieved, as for intermittent duty applications. Same as dynamic efficiency, static efficiency too during the running-in period will be 30% lower than the value reported in the table.



K	Rs											
	5	**7.5**	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**65**	**80**	**100**
30	0.70	0.67	0.62	0.55	0.47	0.43	0.39	0.30	0.27	0.25	0.22	0.21
40	0.69	0.67	0.63	0.55	0.52	0.45	0.40	0.35	0.29	0.26	0.25	0.23
50	0.69	0.68	0.65	0.58	0.53	0.47	0.41	0.37	0.32	0.28	0.25	0.23
63	0.70	0.68	0.65	0.57	0.55	0.50	0.47	0.38	0.33	0.29	0.28	0.23
75	/	0.68	0.65	0.58	0.55	0.51	0.43	0.39	0.35	0.31	0.28	0.24
89	/	0.68	0.65	0.58	0.55	0.52	0.45	0.39	0.36	0.32	0.29	0.25

3.6 Irreversibility (K Worm Gearboxes)

The use of external brakes is advised in case of applications where backwards motion must be hindered, and the load must be held should the feed be cut off.

Some worm gearboxes feature natural irreversibility. The higher the ratio, the higher the irreversibility, since it is strictly dependent on the relative efficiency.

In order to achieve high irreversibility, it is therefore necessary to select higher efficiency reduction ratio not to forget that the efficiency is growing during the first 500 hours life until it stabilizes to the values mentioned in the catalogue.

Static irreversibility

Static irreversibility occurs when the rotation controlled by the output shaft is hindered; possible slow returns cannot be excluded should the load be subject to vibrations.

Rs < 0.45 provides irreversibility
Rs = 0.45 ÷ 0.55 irreversibility is uncertain
Rs > 0.55 reversibility is possible

Dynamic irreversibility

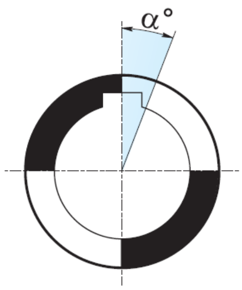
Dynamic irreversibility is characterised by still stand and hold of the load when the drive stops. It is more difficult to achieve this condition because it is influenced by dynamic efficiency, speed of rotation and possible vibrations generated by the motion direction with regard to the load.

This last condition is much more evident during the lifting: if the drive stops during the lifting of the load this has to come to a speed equals to zero (static irreversibility) before the reversal of motion rotation and its drop for gravity.

On the contrary the load during its descent gets its motion obstructed by its dynamic efficiency.

Rd < 0.45 provides irreversibility
Rd = 0.45 ÷ 0.55 irreversibility is uncertain
Rd > 0.55 reversibility is possible

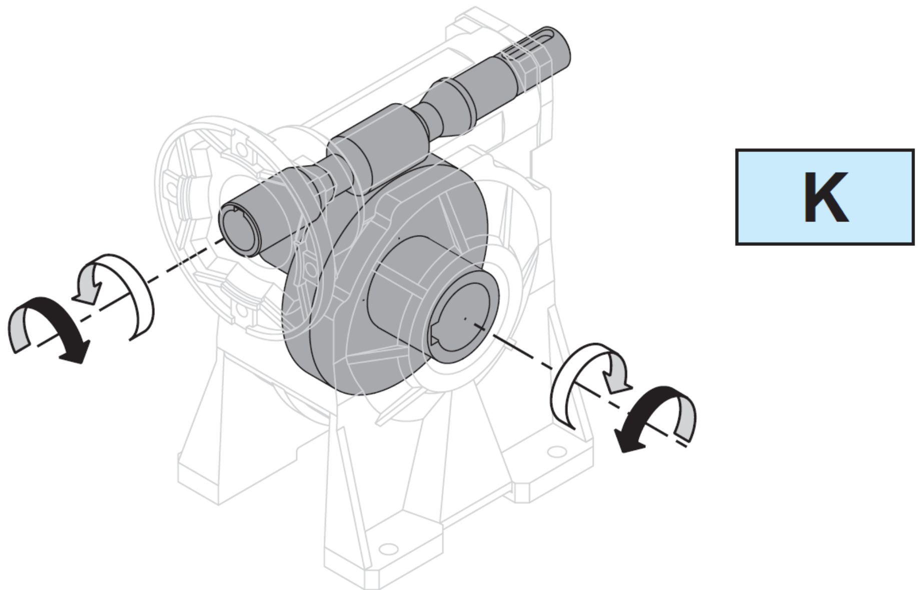
3.7 Backlash (K Worm Gearboxes)



	K											
i_n	30		40		50		63		75		89	
	Min	max	Min	max	Min	max	Min	max	Min	max	Min	Max
5	10’	16’	9’	13.5’	7.5’	10.5’	7’	10’	/		/	
7.5	10’	16’	9’	13.5	7.5’	10.5’	7’	10’	7’	10’	6.5’	9.5’
10	10’	16’	9’	13.5’	7’	10.5’	7’	10’	7’	10’	6.5’	9’
15	10’	16’	9’	13.5’	7.5’	10.5’	7’	10’	7’	10’	6.5’	9’
20	9’	14.5’	7.5’	12’	6.5’	9.5’	6.5’	8.5’	6.5’	8.5’	6’	8.5’
25	9’	14.5’	7.5’	12’	6’	9.5’	6’	8.5’	6’	8.5’	6’	8.5’
30	9’	14.5’	7.5’	12’	6’	8.5’	6’	8.5’	6’	8.5’	6’	8.5’
40	9’	14.5’	7.5’	12’	6’	9.5’	6’	8.5’	6’	8.5’	6’	8’
50	8.5’	14’	7.5’	12’	6’	9.5’	6’	8.5’	6’	8.5’	6’	8’
65	8.5’	14.5’	7.5’	12’	6’	9’	6’	8’	6’	8’	6’	8’
80	8’	13.5’	7’	11.5’	6’	9’	5.5’	7.5’	5.5’	7.5’	5.5’	7.5’
100	8’	13’	7’	11’	6’	9’	5.5’	7.5’	5.5’	7.5’	5.5’	7.5’

Angular backlash measured after having blocked the input shaft by rotating output shaft in both directions and applying the torque which is strictly necessary to create a contact between the teeth of the gears. The applied torque should be at most 2% of the max. torque (T_{2M}).

3.8 Direction of rotation (K Worm Gearboxes)



3.9 Radial load (K Worm Gearboxes)

Any transmission device coupled to the output shaft generates radial loads (Fr2)

The load values reported in the table, depending on input and output speeds, are to be considered as acting at the half-way point of the projection; if the load is applied at 1/3 of the projection, increase the values in the table by 25%; if the load is applied at 2/3, reduce the value by 25%.

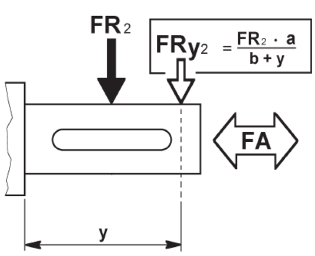
Axial loads applicable at output Fa2 are reported in the tables.

With regard to double projecting shafts, each end can sustain a radial load which equals 3/5 of the values listed in the tables on condition that they act in the same direction and have the same intensity.

Fr2 radial loads and Fa2 axial loads on the output shaft (N)

Radial ball bearings													
n_1 = 1400 rpm		30		40		50		63		75		89	
i_n	n_2 (rpm)	a = 66.5 b = 49		a = 83.5 b = 60.5		a = 102 b = 73.5		a = 122.5 b = 93.5		a = 134 b = 100		a = 163 b = 118	
		Fr_2	Fa_2	Fr_2	Fa_2	Fr_2	Fa_2	Fr_2	Fa_2	Fr_2	Fa_2	Fr_2	Fa_2
5	**280**	700	140	1400	280	1400	300	1800	360	/		/	
7.5	**187**	750	150	1500	300	1650	330	2100	420	2500	500	2600	520
10	**140**	800	160	1600	320	1800	360	2300	460	2800	560	3000	600
15	**93**	850	170	1700	340	1950	390	2600	520	3000	600	3400	680
20	**70**	900	180	1800	360	2200	440	2800	560	3300	660	3800	760
25	**56**	950	190	1900	380	2400	480	3100	620	3700	740	4100	820
30	**47**	1000	200	2000	400	2600	520	3400	680	4000	800	4500	900
40	**35**	1050	210	2100	420	2850	570	3700	740	4400	880	4900	980
50	**28**	1100	220	2200	440	3100	620	4000	800	4850	970	5300	1060
60	**23**	1250	230	2400	480	3200	640	4200	840	5000	1000	5600	1120
63	**22**	1250	250	2500	500	3400	680	4450	890	5300	1060	5900	1180
80	**17.5**	1350	270	2700	540	3800	760	4900	980	5800	1160	6500	1300
100	**14**	1500	300	3000	600	4000	800	5400	1080	6500	1300	7000	1400
120	**11.7**	1520	304	3100	620	4100	820	5500	1100	6550	1310	7100	1420
150	**9.3**	1550	310	3150	630	4250	850	5600	1120	6600	1320	7300	1460
160	**8.8**	1570	314	3200	640	4300	860	5700	1140	6700	1340	7400	1480
≥ 200	**≤ 7.0**	1600	320	3300	660	4500	900	6000	1200	7100	1420	7900	1580

output



3.10 Technical data (K Worm Gearboxes)

	$n_1 = 2800$				KC				
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS'	Input - IEC B5/B14	
30 1.2 Kg	**5**	560	0.89	-	5.6	0.37	2.5	63	56
	7.5	373	0.86		8	0.37	2.0		
	10	280	0.84		11	0.37	1.5		
	15	187	0.81		15	0.37	1.1		
	20	140	0.76		13	0.25	1.2		
	25	112	0.74		16	0.25	1.0		
	30	93	0.71		13	0.18	1.0		
	40	70	0.65		16	0.18	1.0		
	50	56	0.62		14	0.13	1.1		
	65	43	0.57		17	0.13	1.0	-	
	80	35	0.54		13	0.09	1.0		
	100	28	0.52		16	0.09	0.8		

	$n_1 = 1400$				KC				
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS'	Input - IEC B5/B14	
30 1.2 Kg	**5**	280	0.87	0.40	6.5	0.22	2.9	63	56
	7.5	187	0.84	0.40	9	0.22	2.2		
	10	140	0.82	0.40	12	0.22	1.8		
	15	93	0.77	0.30	17	0.22	1.3		
	20	70	0.72	0.20	18	0.18	1.1		
	25	56	0.69	0.20	21	0.18	1.0		
	30	47	0.66	0.20	18	0.13	1.1		
	40	35	0.59	0.20	21	0.13	1.0		
	50	28	0.55	0.20	17	0.09	1.1		
	65	22	0.51	0.10	20	0.09	1.0	-	
	80	18	0.48	0.10	16	0.06	1.0		
	100	14	0.45	0.10	18	0.06	0.8		

	$n_1 = 900$				KC				
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS'	Input - IEC B5/B14	
30 1.2 Kg	**5**	180	0.85	-	5.9	0.13	3.9	63	56
	7.5	120	0.82		9	0.13	2.9		
	10	90	0.80		11	0.13	2.3		
	15	60	0.75		15	0.13	1.6		
	20	45	0.69		19	0.13	1.2		
	25	36	0.66		23	0.13	1.1		
	30	30	0.63		18	0.09	1.2		
	40	23	0.55		21	0.09	1.1		
	50	18	0.52		16	0.06	1.3		
	65	14	0.48		20	0.06	1.1	-	
	80	11	0.44		11	0.03	1.7		
	100	9	0.42		13	0.03	1.1		

<table>
<tr><td rowspan="14">30
1.2 Kg</td><th colspan="4">n_1 = 500</th><th colspan="5">KC</th></tr>
<tr><th>i_n</th><th>n_2 (min^{-1})</th><th>Rd</th><th>P_{t0}</th><th>T_2 (Nm)</th><th>P_1 (kW)</th><th>FS’</th><th colspan="2">Input - IEC B5/B14</th></tr>
<tr><td>5</td><td>100</td><td>0.83</td><td rowspan="12">-</td><td>-</td><td>-</td><td>-</td><td rowspan="9">63</td><td rowspan="12">56</td></tr>
<tr><td>7.5</td><td>67</td><td>0.80</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>10</td><td>50</td><td>0.77</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>15</td><td>33</td><td>0.72</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>20</td><td>25</td><td>0.66</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>25</td><td>20</td><td>0.62</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>30</td><td>17</td><td>0.59</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>40</td><td>13</td><td>0.51</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>50</td><td>10</td><td>0.48</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>65</td><td>8</td><td>0.43</td><td>-</td><td>-</td><td>-</td><td rowspan="3">-</td></tr>
<tr><td>80</td><td>6</td><td>0.40</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>100</td><td>5</td><td>0.38</td><td>-</td><td>-</td><td>-</td></tr>
</table>

<table>
<tr><td rowspan="14">40
1.2 Kg</td><th colspan="4">n_1 = 2800</th><th colspan="6">KC</th></tr>
<tr><th>i_n</th><th>n_2 (min^{-1})</th><th>Rd</th><th>P_{t0}</th><th>T_2 (Nm)</th><th>P_1 (kW)</th><th>FS’</th><th colspan="3">Input – IEC B5/B14</th></tr>
<tr><td>5</td><td>560</td><td>0.88</td><td rowspan="12">-</td><td>11.3</td><td>0.75</td><td>2.2</td><td rowspan="8">71</td><td rowspan="12">63</td><td rowspan="8">-</td></tr>
<tr><td>7.5</td><td>373</td><td>0.87</td><td>17</td><td>0.75</td><td>1.8</td></tr>
<tr><td>10</td><td>280</td><td>0.86</td><td>22</td><td>0.75</td><td>1.4</td></tr>
<tr><td>15</td><td>187</td><td>0.82</td><td>32</td><td>0.75</td><td>1.0</td></tr>
<tr><td>20</td><td>140</td><td>0.80</td><td>30</td><td>0.55</td><td>1.0</td></tr>
<tr><td>25</td><td>112</td><td>0.76</td><td>24</td><td>0.37</td><td>1.1</td></tr>
<tr><td>30</td><td>93</td><td>0.73</td><td>28</td><td>0.37</td><td>1.3</td></tr>
<tr><td>40</td><td>70</td><td>0.70</td><td>24</td><td>0.25</td><td>1.4</td></tr>
<tr><td>50</td><td>56</td><td>0.65</td><td>28</td><td>0.25</td><td>1.1</td><td rowspan="4">-</td><td rowspan="4">56</td></tr>
<tr><td>65</td><td>43</td><td>0.61</td><td>24</td><td>0.18</td><td>1.2</td></tr>
<tr><td>80</td><td>35</td><td>0.58</td><td>21</td><td>0.13</td><td>1.3</td></tr>
<tr><td>100</td><td>28</td><td>0.55</td><td>24</td><td>0.13</td><td>1.0</td></tr>
</table>

<table>
<tr><td rowspan="14">40
2.0 Kg</td><th colspan="4">n_1 = 1400</th><th colspan="6">KC</th></tr>
<tr><th>i_n</th><th>n_2 (min^{-1})</th><th>Rd</th><th>P_{t0}</th><th>T_2 (Nm)</th><th>P_1 (kW)</th><th>FS’</th><th colspan="3">Input – IEC B5/B14</th></tr>
<tr><td>5</td><td>280</td><td>0.87</td><td>0.80</td><td>16.3</td><td>0.55</td><td>2.1</td><td rowspan="8">71</td><td rowspan="12">63</td><td rowspan="8">-</td></tr>
<tr><td>7.5</td><td>187</td><td>0.85</td><td>0.80</td><td>24</td><td>0.55</td><td>1.7</td></tr>
<tr><td>10</td><td>140</td><td>0.83</td><td>0.70</td><td>31</td><td>0.55</td><td>1.3</td></tr>
<tr><td>15</td><td>93</td><td>0.79</td><td>0.50</td><td>30</td><td>0.37</td><td>1.4</td></tr>
<tr><td>20</td><td>70</td><td>0.76</td><td>0.50</td><td>38</td><td>0.37</td><td>1.0</td></tr>
<tr><td>25</td><td>56</td><td>0.72</td><td>0.40</td><td>31</td><td>0.25</td><td>1.1</td></tr>
<tr><td>30</td><td>47</td><td>0.68</td><td>0.40</td><td>35</td><td>0.25</td><td>1.2</td></tr>
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<tr><td>65</td><td>22</td><td>0.54</td><td>0.20</td><td>31</td><td>0.13</td><td>1.1</td></tr>
<tr><td>80</td><td>18</td><td>0.52</td><td>0.20</td><td>31</td><td>0.11</td><td>1.1</td></tr>
<tr><td>100</td><td>14</td><td>0.49</td><td>0.20</td><td>30</td><td>0.09</td><td>0.9</td></tr>
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Specialised Air Motors and Transmission

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<tr><td>5</td><td>180</td><td>0.85</td><td rowspan="12">-</td><td>16.7</td><td>0.37</td><td>2.5</td><td rowspan="8">71</td><td rowspan="12">63</td><td rowspan="8">-</td></tr>
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<tr><td>40</td><td>23</td><td>0.61</td><td>33</td><td>0.13</td><td>1.3</td></tr>
<tr><td>50</td><td>18</td><td>0.55</td><td>38</td><td>0.13</td><td>1.1</td><td rowspan="4">-</td><td rowspan="4">56</td></tr>
<tr><td>65</td><td>14</td><td>0.51</td><td>32</td><td>0.09</td><td>1.2</td></tr>
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<tr><td>5</td><td>100</td><td>0.83</td><td rowspan="12">-</td><td>7.1</td><td>0.09</td><td>7.1</td><td rowspan="8">71</td><td rowspan="12">63</td><td rowspan="8">-</td></tr>
<tr><td>7.5</td><td>67</td><td>0.81</td><td>10</td><td>0.09</td><td>5.5</td></tr>
<tr><td>10</td><td>50</td><td>0.79</td><td>14</td><td>0.09</td><td>4.4</td></tr>
<tr><td>15</td><td>33</td><td>0.73</td><td>19</td><td>0.09</td><td>3.1</td></tr>
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<tr><td>30</td><td>17</td><td>0.61</td><td>31</td><td>0.09</td><td>1.8</td></tr>
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<tr><td>65</td><td>8</td><td>0.46</td><td>52</td><td>0.09</td><td>0.9</td></tr>
<tr><td>80</td><td>6</td><td>0.44</td><td>61*</td><td>0.09</td><td>0.7*</td></tr>
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3.4 Kg</td><td colspan="4">n_1 = 2800</td><td colspan="6">KC</td></tr>
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<tr><td>5</td><td>560</td><td>0.89</td><td rowspan="12">-</td><td>22.8</td><td>1.5</td><td>1.9</td><td rowspan="8">80</td><td rowspan="12">71</td><td rowspan="8">-</td></tr>
<tr><td>7.5</td><td>373</td><td>0.88</td><td>34</td><td>1.5</td><td>1.5</td></tr>
<tr><td>10</td><td>280</td><td>0.86</td><td>44</td><td>1.5</td><td>1.2</td></tr>
<tr><td>15</td><td>187</td><td>0.84</td><td>47</td><td>1.1</td><td>1.2</td></tr>
<tr><td>20</td><td>140</td><td>0.81</td><td>42</td><td>0.75</td><td>1.4</td></tr>
<tr><td>25</td><td>112</td><td>0.78</td><td>50</td><td>0.75</td><td>1.0</td></tr>
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<tr><td>50</td><td>56</td><td>0.68</td><td>43</td><td>0.37</td><td>1.3</td><td rowspan="4">-</td><td rowspan="4">63</td></tr>
<tr><td>65</td><td>43</td><td>0.64</td><td>53</td><td>0.37</td><td>1.0</td></tr>
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<tr><td>100</td><td>28</td><td>0.58</td><td>35</td><td>0.18</td><td>1.3</td></tr>
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	n_1 = 1400				KC					
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS'	Input – IEC B5/B14		
50 3.4 Kg	**5**	280	0.87	1.2	26.8	0.9	2.3	80	71	-
	7.5	187	0.86	1.2	40	0.9	1.8			
	10	140	0.84	1.0	52	0.9	1.4			
	15	93	0.80	0.80	74	0.9	1.0			
	20	70	0.78	0.70	58	0.55	1.3			
	25	56	0.74	0.60	47	0.37	1.4			
	30	47	0.71	0.60	53	0.37	1.2			
	40	35	0.67	0.50	68	0.37	1.0			
	50	28	0.62	0.40	53	0.25	1.3	-		63
	65	22	0.58	0.40	64	0.25	1.0			
	80	18	0.54	0.40	53	0.18	1.1			
	100	14	0.51	0.30	45	0.13	1.2			

	n_1 = 900				KC					
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS'	Input – IEC B5/B14		
50 3.4 Kg	**5**	180	0.85	-	33.8	0.75	2.2	80	71	-
	7.5	120	0.84		50	0.75	1.6			
	10	90	0.82		66	0.75	1.3			
	15	60	0.78		68	0.55	1.3			
	20	45	0.75		59	0.37	1.5			
	25	36	0.71		70	0.37	1.1			
	30	30	0.67		79	0.37	1.0			
	40	23	0.63		67	0.25	1.1			
	50	18	0.59		78	0.25	1.0	-		63
	65	14	0.54		67	0.18	1.1			
	80	11	0.51		56	0.13	1.2			
	100	9	0.47		45	0.09	1.3			

	n_1 = 500				KC					
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS'	Input – IEC B5/B14		
50 3.4 Kg	**5**	100	0.84	-	14.3	0.18	6.4	80	71	-
	7.5	67	0.82		21	0.18	4.7			
	10	50	0.80		28	0.18	3.8			
	15	33	0.75		39	0.18	2.7			
	20	25	0.72		50	0.18	2.1			
	25	20	0.68		58	0.18	1.5			
	30	17	0.63		65	0.18	1.5			
	40	13	0.59		81	0.18	1.2			
	50	10	0.54		93	0.18	1.0	-		63
	65	8	0.50		56	0.09	1.5			
	80	6	0.46		63	0.09	1.2			
	100	5	0.43		74	0.09	0.8			

	n₁ = 2800				KC					
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS’	Input – IEC B5/B14		
	5	560	0.89		45.5	3	1.7			
	7.5	373	0.88		68	3	1.3			
	10	280	0.87		89	3	1.1			
63	**15**	187	0.84		95	2.2	1.0	90		
3.4 Kg	**20**	140	0.83		85	1.5	1.3			-
	25	112	0.81	-	76	1.1	1.2			
	30	93	0.77		87	1.1	1.3		80	
	40	70	0.74		111	1.1	1.1			
	50	56	0.70		90	0.75	1.1			
	65	43	0.67		81	0.55	1.2	-		71
	80	35	0.64		65	0.37	1.4			
	100	28	0.60		75	0.37	1.1			

	n₁ = 1400				KC					
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS’	Input – IEC B5/B14		
	5	280	0.88	1.8	54	1.8	2.0			
	7.5	187	0.87	1.8	80	1.8	1.5			
	10	140	0.85	1.6	105	1.8	1.2			
63	**15**	93	0.81	1.2	125	1.5	1.1	90		-
3.4 Kg	**20**	70	0.80	1.2	120	1.1	1.2			
	25	56	0.77	1.0	118	0.9	1.0			
	30	47	0.73	0.90	134	0.9	1.1		80	
	40	35	0.69	0.80	142	0.75	1.1			
	50	28	0.65	0.70	122	0.55	1.0			
	65	22	0.61	0.60	100	0.37	1.2	-		71
	80	18	0.58	0.60	79	0.25	1.4			
	100	14	0.53	0.50	91	0.25	1.1			

	n₁ = 900				KC					
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS’	Input – IEC B5/B14		
	5	180	0.87		69	1.5	8.3			
	7.5	120	0.85		102	1.5	5.9			
	10	90	0.83		133	1.5	4.7			
63	**15**	60	0.79		139	1.1	3.4	90		
3.4 Kg	**20**	45	0.77		123	0.75	2.8			-
	25	36	0.74		109	0.55	1.9			
	30	30	0.70	-	122	0.55	2.1		80	
	40	23	0.66		154	0.55	1.7			
	50	18	0.61		120	0.37	1.2			
	65	14	0.57		98	0.25	1.0	-		71
	80	11	0.54		115	0.25	1.1			
	100	9	0.50		95	0.18	1.6			

<table>
<tr><th rowspan="14">63
3.4 Kg</th><th colspan="4">n_1 = 500</th><th colspan="6">KC</th></tr>
<tr><th>i_n</th><th>n_2 (min^{-1})</th><th>Rd</th><th>P_{t0}</th><th>T_2 (Nm)</th><th>P_1 (kW)</th><th>FS’</th><th colspan="3">Input – IEC B5/B14</th></tr>
<tr><td>5</td><td>100</td><td>0.85</td><td rowspan="12">-</td><td>20</td><td>0.25</td><td>8.3</td><td rowspan="8">90</td><td rowspan="12">80</td><td rowspan="8">-</td></tr>
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<tr><td>7.5</td><td>373</td><td>0.89</td><td rowspan="11">-</td><td>125</td><td>5.5</td><td>1.0</td><td rowspan="7">112
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<tr><td>7.5</td><td>187</td><td>0.87</td><td>2.5</td><td>178</td><td>4</td><td>1.0</td><td rowspan="7">112
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<tr><td>10</td><td>140</td><td>0.86</td><td>2.3</td><td>176</td><td>3</td><td>1.1</td></tr>
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<tr><td>20</td><td>70</td><td>0.81</td><td>1.7</td><td>199</td><td>1.8</td><td>1.1</td></tr>
<tr><td>25</td><td>56</td><td>0.78</td><td>1.5</td><td>100</td><td>1.5</td><td>1.0</td></tr>
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<tr><td>65</td><td>22</td><td>0.63</td><td>0.9</td><td>154</td><td>0.55</td><td>1.3</td></tr>
<tr><td>80</td><td>18</td><td>0.60</td><td>0.80</td><td>180</td><td>0.55</td><td>1.0</td></tr>
<tr><td>100</td><td>14</td><td>0.56</td><td>0.70</td><td>210</td><td>0.55</td><td>0.8</td></tr>
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	n_1 = 900				KC					
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS'	Input – IEC B5/B14		
75 3.4 Kg	**7.5**	120	0.86	-	205	3	1.0	112 110	90	-
	10	90	0.84		197	2.2	1.2			
	15	60	0.81		231	1.8	1.0			
	20	45	0.78		250	1.5	1.1			
	25	36	0.76		221	1.1	1.1			
	30	30	0.71		249	1.1	1.0			
	40	23	0.67		214	0.75	1.3			
	50	18	0.64		186	0.55	1.3	-		80
	65	14	0.59		151	0.37	1.5			
	80	11	0.56		177	0.37	1.2			
	100	9	0.52		203	0.37	0.9			

	n_1 = 500				KC					
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS'	Input – IEC B5/B14		
75 3.4 Kg	**7.5**	67	0.84	-	90	0.75	2.9	112 110	90	-
	10	50	0.82		118	0.75	2.4			
	15	33	0.78		167	0.75	1.7			
	20	25	0.75		216	0.75	1.5			
	25	20	0.72		260	0.75	1.1			
	30	17	0.67		288	0.75	1.1			
	40	13	0.63		265	0.55	1.2			
	50	10	0.59		210	0.37	1.3	-		80
	65	8	0.55		251	0.37	1.0			
	80	6	0.52		197	0.25	1.2			
	100	5	0.47		161	0.18	1.3			

	n_1 = 2800				KC					
	i_n	n_2 (min^{-1})	Rd	P_{t0}	T_2 (Nm)	P_1 (kW)	FS'	Input – IEC B5/B14		
89 3.4 Kg	**7.5**	373	0.89	-	171	7.5	1.2	112 110	90	-
	10	280	0.88		165	5.5	1.3			
	15	187	0.86		241	5.5	1.0			
	20	140	0.84		230	4	1.2			
	25	112	0.83		212	3	1.2			
	30	93	0.79		243	3	1.1			
	40	70	0.77		230	2.2	1.3			
	50	56	0.74		278	2.2	1.0	-		80
	65	43	0.71		235	1.5	1.1			
	80	35	0.68		205	1.1	1.2			
	100	28	0.64		163	0.75	1.3			

<table>
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3.4 Kg</td><td colspan="4">n_1 = 1400</td><td colspan="6">KC</td></tr>
<tr><td>i_n</td><td>n_2
(min^{-1})</td><td>Rd</td><td>P_{t0}</td><td>T_2
(Nm)</td><td>P_1
(kW)</td><td>FS'</td><td colspan="3">Input – IEC
B5/B14</td></tr>
<tr><td>7.5</td><td>187</td><td>0.88</td><td>3.0</td><td>247</td><td>5.5</td><td>1.2</td><td rowspan="7">112
100</td><td rowspan="11">90</td><td rowspan="7"></td></tr>
<tr><td>10</td><td>140</td><td>0.86</td><td>2.5</td><td>236</td><td>4</td><td>1.3</td></tr>
<tr><td>15</td><td>93</td><td>0.84</td><td>2.2</td><td>256</td><td>3</td><td>1.2</td></tr>
<tr><td>20</td><td>70</td><td>0.82</td><td>2.0</td><td>334</td><td>3</td><td>1.1</td></tr>
<tr><td>25</td><td>56</td><td>0.80</td><td>1.8</td><td>299</td><td>2.2</td><td>1.1</td></tr>
<tr><td>30</td><td>47</td><td>0.76</td><td>1.5</td><td>240</td><td>2.2</td><td>1.0</td></tr>
<tr><td>40</td><td>35</td><td>0.72</td><td>1.3</td><td>255</td><td>1.8</td><td>1.1</td></tr>
<tr><td>50</td><td>28</td><td>0.69</td><td>1.1</td><td>253</td><td>1.5</td><td>1.0</td><td rowspan="4">-</td><td rowspan="4">80</td></tr>
<tr><td>65</td><td>22</td><td>0.65</td><td>1.0</td><td>317</td><td>1.1</td><td>1.0</td></tr>
<tr><td>80</td><td>18</td><td>0.63</td><td>1.0</td><td>309</td><td>0.9</td><td>1.0</td></tr>
<tr><td>100</td><td>14</td><td>0.58</td><td>0.80</td><td>217</td><td>0.55</td><td>1.2</td></tr>
</table>

<table>
<tr><td rowspan="13">89
3.4 Kg</td><td colspan="4">n_1 = 900</td><td colspan="6">KC</td></tr>
<tr><td>i_n</td><td>n_2
(min^{-1})</td><td>Rd</td><td>P_{t0}</td><td>T_2
(Nm)</td><td>P_1
(kW)</td><td>FS'</td><td colspan="3">Input – IEC
B5/B14</td></tr>
<tr><td>7.5</td><td>120</td><td>0.86</td><td rowspan="11">-</td><td>206</td><td>3</td><td>1.7</td><td rowspan="7">112
110</td><td rowspan="11">90</td><td rowspan="7">-</td></tr>
<tr><td>10</td><td>90</td><td>0.85</td><td>270</td><td>3</td><td>1.3</td></tr>
<tr><td>15</td><td>60</td><td>0.82</td><td>286</td><td>2.2</td><td>1.3</td></tr>
<tr><td>20</td><td>45</td><td>0.79</td><td>371</td><td>2.2</td><td>1.1</td></tr>
<tr><td>25</td><td>36</td><td>0.77</td><td>369</td><td>1.8</td><td>1.0</td></tr>
<tr><td>30</td><td>30</td><td>0.73</td><td>416</td><td>1.8</td><td>1.0</td></tr>
<tr><td>40</td><td>23</td><td>0.69</td><td>440</td><td>1.5</td><td>1.0</td></tr>
<tr><td>50</td><td>18</td><td>0.66</td><td>384</td><td>1.1</td><td>1.0</td><td rowspan="4">-</td><td rowspan="4">80</td></tr>
<tr><td>65</td><td>14</td><td>0.62</td><td>319</td><td>0.75</td><td>1.1</td></tr>
<tr><td>80</td><td>11</td><td>0.59</td><td>274</td><td>0.55</td><td>1.2</td></tr>
<tr><td>100</td><td>9</td><td>0.54</td><td>313</td><td>0.55</td><td>1.0</td></tr>
</table>

<table>
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3.4 Kg</td><td colspan="4">n_1 = 500</td><td colspan="6">KC</td></tr>
<tr><td>i_n</td><td>n_2
(min^{-1})</td><td>Rd</td><td>P_{t0}</td><td>T_2
(Nm)</td><td>P_1
(kW)</td><td>FS'</td><td colspan="3">Input – IEC
B5/B14</td></tr>
<tr><td>7.5</td><td>67</td><td>0.84</td><td rowspan="11">-</td><td>91</td><td>0.75</td><td>4.7</td><td rowspan="7">112
110</td><td rowspan="11">90</td><td rowspan="7">-</td></tr>
<tr><td>10</td><td>50</td><td>0.83</td><td>118</td><td>0.75</td><td>3.7</td></tr>
<tr><td>15</td><td>33</td><td>0.79</td><td>169</td><td>0.75</td><td>2.7</td></tr>
<tr><td>20</td><td>25</td><td>0.76</td><td>219</td><td>0.75</td><td>2.3</td></tr>
<tr><td>25</td><td>20</td><td>0.74</td><td>265</td><td>0.75</td><td>1.7</td></tr>
<tr><td>30</td><td>17</td><td>0.68</td><td>294</td><td>0.75</td><td>1.6</td></tr>
<tr><td>40</td><td>13</td><td>0.65</td><td>371</td><td>0.75</td><td>1.4</td></tr>
<tr><td>50</td><td>10</td><td>0.61</td><td>439</td><td>0.75</td><td>1.1</td><td rowspan="4">-</td><td rowspan="4">80</td></tr>
<tr><td>65</td><td>8</td><td>0.57</td><td>388</td><td>0.55</td><td>1.1</td></tr>
<tr><td>80</td><td>6</td><td>0.54</td><td>305</td><td>0.37</td><td>1.3</td></tr>
<tr><td>100</td><td>5</td><td>0.49</td><td>344</td><td>0.37</td><td>1.0</td></tr>
</table>

3.11 Moment of inertia (Kg.com²) (K Worm Gearboxes)

(referred to input shaft)

	i_n		 KC	
			B5 – B14	
			IEC 56	IEC 63
K30	5		0.130	0.127
	7.5		0.112	0.109
	10		0.103	0.100
	15		0.097	0.094
	20		0.095	0.092
	25		0.094	0.091
	30		0.093	0.090
	40		0.093	0.090
	50		0.092	0.089
	65		0.079	-
	80		0.079	-
	100		0.078	-

	i_n		 KC		
			B5 – B14		
			IEC 56	IEC 63	IEC 71
K40	5		-	0.391	0.463
	7.5		-	0.321	0.356
	10		-	0.272	0.347
	15		-	0.266	0.340
	20		-	0.263	0.338
	25		-	0.262	0.337
	30		-	0.262	0.337
	40		-	0.261	0.336
	50		0.182	0.261	-
	65		0.182	0.261	-
	80		0.182	0.261	-
	100		0.182	0.261	-

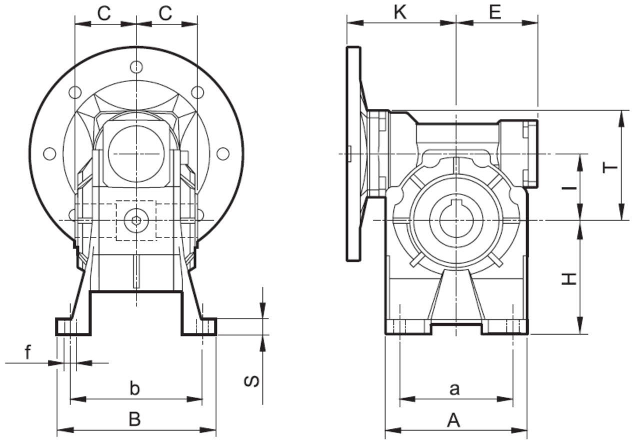
	i_n		KC 		
			B5 – B14		
			IEC 63	**IEC 71**	**IEC 80**
K50	**5**		-	0.922	1.046
	7.5		-	0.684	0.935
	10		-	0.602	0.853
	15		-	0.543	0.794
	20		-	0.523	0.774
	25		-	0.513	0.764
	30		-	0.508	0.759
	40		0.315	0.503	-
	50		0.313	0.501	-
	65		0.311	0.499	-
	80		0.310	0.498	-
	100		0.309	0.498	-

	i_n		KC 		
			B5 – B14		
			IEC 71	**IEC 80**	**IEC 63**
K63	**5**		-	2.431	2.671
	7.5		-	1.949	2.269
	10		-	1.744	2.063
	15		-	1.597	1.916
	20		-	1.545	1.864
	25		-	1.514	1.833
	30		-	1.508	1.828
	40		0.966	1.495	-
	50		0.959	1.488	-
	65		0.955	1.484	-
	80		0.953	1.482	-
	100		0.952	1.481	-

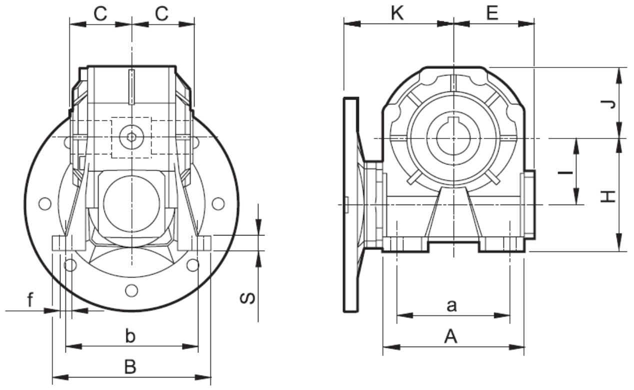
K75	i_n		KC		
			B5 – B14		
			IEC 80	IEC 90	IEC 100-112
	7.5		-	3.712	4.462
	10		-	3.234	3.984
	15		-	2.893	3.643
	20		-	2.774	3.523
	25		-	2.709	3.458
	30		-	2.689	3.458
	40		1.595	2.659	-
	50		1.578	2.642	-
	65		1.569	2.633	-
	80		1.565	2.629	-
	100		1.562	2.626	-

K89	i_n		KC		
			B5 – B14		
			IEC 80	IEC 90	IEC 100-112
	7.5			6.898	7.671
	10		-	5.875	6.648
	15		-	5.144	5.917
	20		-	3.398	5.661
	25		-	3.256	5.520
	30		-	3.215	5.479
	40		-	3.151	-
	50		-	3.115	-
	65		2.024	3.096	-
	80		2.014	3.087	-
	100		2.008	3.080	-

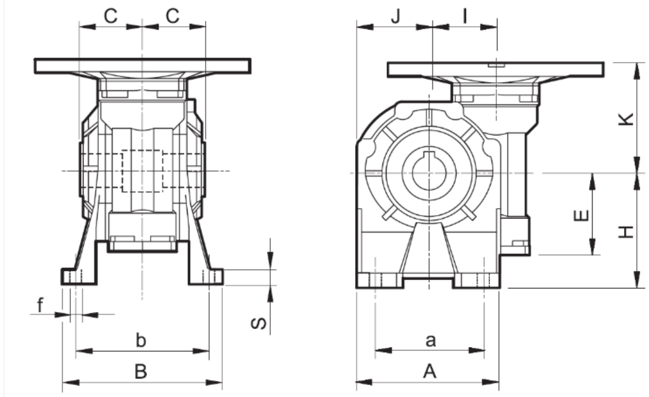
3.12 Dimensions (K Worm Gearboxes)



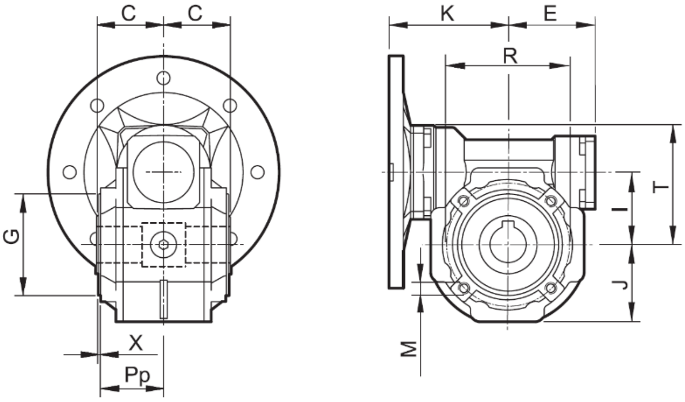
KC..A



KC..B

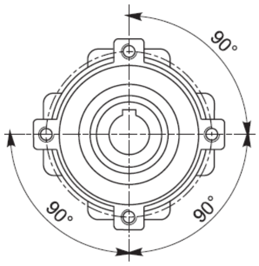


KC..V



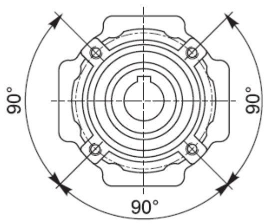
Side cover for shaft mounting

30



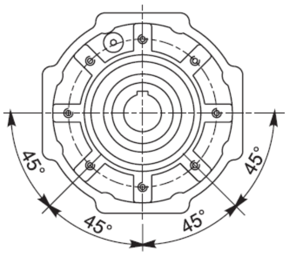
4
Holes

40 - 50

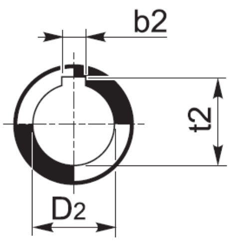


4
Holes

63 - 75 - 89



8
Holes

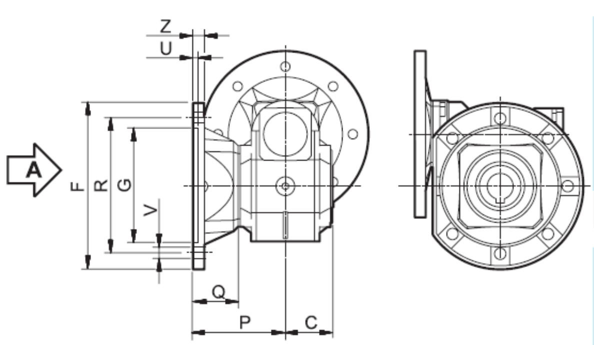


Hollow output shaft

	30	40	50	63	75	89
b2	**5**	**6**	**8**	**8**	**8**	**10**
C	31.5	39	46	56	60	70
D2 H8	**14**	**18**	**25**	**25**	**28**	**35**
E	41	51	60	71	85	103
G h8	55	60	70	80	95	110
I	31.5	40	50	63	75	90
J	37.5	43.5	53.5	64	78	100
K	57	75	82	97	114	122
M	M6x8	M6x10	M8x10	M8x14	M8x14	M10x8
Pp	29	36.5	43.5	53	57	67
R	65	75	85	95	115	130
T	52.5	68.5	82.5	100.5	116.5	131.5
T2	16.3	20.8	28.3	28.3	31.3	38.3
X	1.5	1.5	1.5	2	2	2

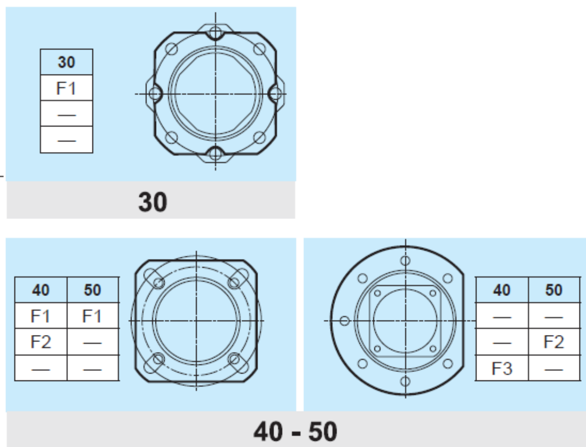
	Feet	30	40	50	63	75	89
A	1	67	86.5	106	127.5	155.5	190
	2	67	86.5	1.6			190
a	1	40-52	70	63-85	95	120	140
	2	40-52	52	63-85			140
B	1	78	98	119	136	140	168
	2	78	98	119			168
b	1	66	84	99	111	115	140
	2	66	81	99			146
f	1	6.5	7	9	11	11	13
	2	6.5	8.5	9			11
H	1	52	71	85	100	115	135
	2	55	72	82			142
S	1	5	9	11	12	12	14
	2	8	10	8			14

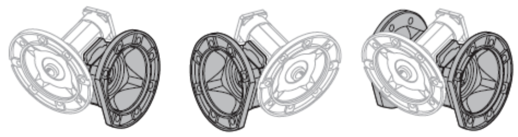
Output flange



KC..F

View from A

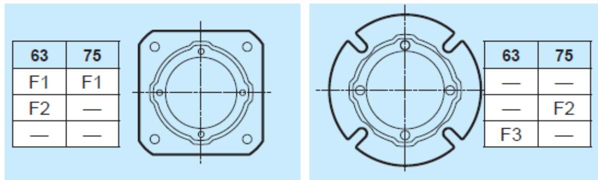




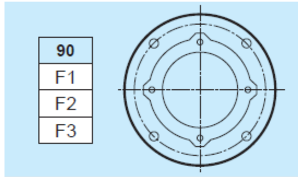
F...D
Standard

F...S

F...2



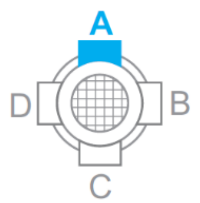
63 - 75



89

KC		C	F (round)	F (square)	G H8	P	Q	R	U	V (4 holes)	V (7 holes)	Ø	Z
30	**F1**	31.5		66	50	54.5	23	68	4	n°4		6.5	6
	F2												
	F3												
40	**F1**	39		85	60	67	28	75-90	4	n°4		9	8
	F2			85	60	97	58	75-90	4	n°4		9	8
	F3		140		95	80	41	115	5		n°7	9	10
50	**F1**	46		94	70	90	44	85-100	5	n°4		11	10
	F2		160		110	89	43	130	5		n°7	11	11
	F3												
63	**F1**	56		142	115	82	26	150	5	n°4		11	11
	F2			142	115	112	56	150	5	n°4		11	11
	F3		160		110	80.5	24.5	130	5	n°4		11	12
75	**F1**	60		160	130	111	51	165	5	n°4		13	12
	F2		160		110	90	30	130	6	n°4		11	13
	F3												
89	**F1**	70	200		152	111	41	175	5	n°4		13	12
	F2		200		152	151	81	175	5	n°4		13	13
	F3		200		130	110	40	165	6	n°4		11	11

Input flange



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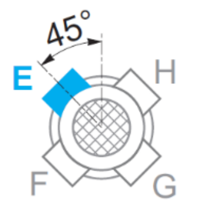

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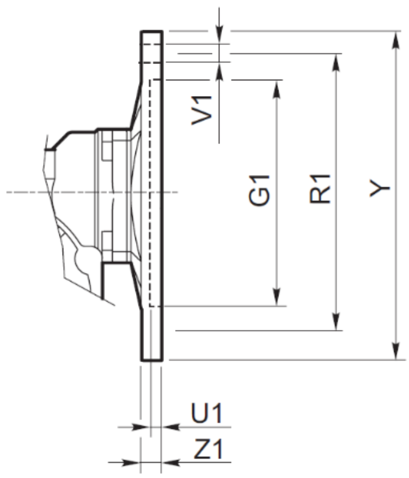
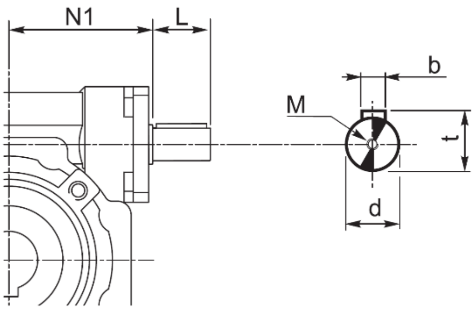


KC	IEC	G1	PM		R_1	U_1	V_1			Y	Z_1	HOLES DIAMETER IEC											
			1	2			Ø					5	7.5	10	15	20	25	30	40	50	65	80	100
30	56 B5	80	.	.	100	4	7	8		120	8	9	9	9	9	9	9	9	9	9	9	9	9
	56 B14	50	.	.	65	3.5	6	8		80	8	9	9	9	9	9	9	9	9	9	9	9	9
	63 B5	95	.	.	115	4	9	8		140	8	11	11	11	11	11	11	11	11	11	/	/	/
	63 B14	60	.	.	75	4	6	8		90	8	11	11	11	11	11	11	11	11	11	/	/	/
40	56 B5	80	.	.	100	4	7	8		120	9	/	/	/	/	/	/	/	/	9	9	9	9
	56 B14	50		.	65	3.5	6		4	80	8	/	/	/	/	/	/	/	/	9	9	9	9
	63 B5	95	.	.	115	5	9	8		140	9	11	11	11	11	11	11	11	11	11	11	11	11
	63 B14	60		.	75	3.5	6		4	90	8	11	11	11	11	11	11	11	11	11	11	11	11
	71 B5	110	.	.	130	4.5	9	8		160	10	14	14	14	14	14	14	14	14	/	/	/	/
	71 B14	70	.	.	85	3.5	7	8		105	8	14	14	14	14	14	14	14	14	/	/	/	/
50	63 B5	95	.	.	115	4	9	8		140	9	/	/	/	/	/	/	/	11	11	11	11	11
	63 B14	60		.	75	3.5	6		4	90	8	/	/	/	/	/	/	/	11	11	11	11	11
	71 B5	110	.	.	130	4.5	9	8		160	10	14	14	14	14	14	14	14	14	14	14	14	14
	71 B14	70		.	85	3.5	7	(n° 8)*	4	105	8	14	14	14	14	14	14	14	14	14	14	14	14
	80 B5	130	.	.	165	4.5	11	8		200	10	19	19	19	19	19	19	19	19	/	/	/	/
	80 B14	80	.	.	100	4	7	8		120	10	19	19	19	19	19	19	19	19	/	/	/	/
63	71 B5	110	.	.	130	4.5	9	8		160	10	/	/	/	/	/	/	/	14	14	14	14	14
	71 B14	70		.	85	3.5	7		4	105	10	/	/	/	/	/	/	/	14	14	14	14	14
	80 B5	130	.	.	165	4.5	11	8		200	10	19	19	19	19	19	19	19	19	19	19	19	19
	80 B14	80		.	100	4	7		4	120	10	19	19	19	19	19	19	19	19	19	19	19	19
	90 B5	130	.	.	165	4.5	11	8		200	10	24	24	24	24	24	24	24	/	/	/	/	/
	90 B14	95	.	.	115	4	8.5	8		140	10	24	24	24	24	24	24	24	/	/	/	/	/
75	80 B5	130	.	.	165	4.5	11	8		200	10	/	/	/	/	/	/	19	19	19	19	19	19
	80 B14	80		.	100	4	7		4	120	11	/	/	/	/	/	/	19	19	19	19	19	19
	90 B5	130	.	.	165	4.5	11	8		200	10	/	24	24	24	24	24	24	24	24	24	24	24
	90 B14	95		.	115	4	9		4	140	11	/	24	24	24	24	24	24	24	24	24	24	24
	100/112 B5	180	.	.	215	5	14	8		250	13	/	28	28	28	28	28	28	/	/	/	/	/
	100/112 B14	110	.	.	130	4.5	9	8		160	11	/	28	28	28	28	28	28	/	/	/	/	/
89	80 B5	130	.	.	165	4.5	11	8		200	10	/	/	/	/	/	/	/	/	/	19	19	19
	80 B14	80		.	100	4	7		4	120	11	/	/	/	/	/	/	/	/	/	19	19	19
	90 B5	130	.	.	165	4.5	11	8		200	10	/	24	24	24	24	24	24	24	24	24	24	24
	90 B14	95		.	115	4	9		4	140	11	/	24	24	24	24	24	24	24	24	24	24	24
	100/112 B5	180	.	.	215	5	14	8		250	13	/	28	28	28	28	28	28	/	/	/	/	/
	100/112 B14	110	.	.	130	4.5	9	8		160	11	/	28	28	28	28	28	28	/	/	/	/	/

N.B.: STD mounting of P_M=2 only if STD mounting of P_M=1 is not possible.
N.B.: it is possible to create hybrid combinations with he existing flanges.

3.8 Additional input (K Worm Gearboxes)

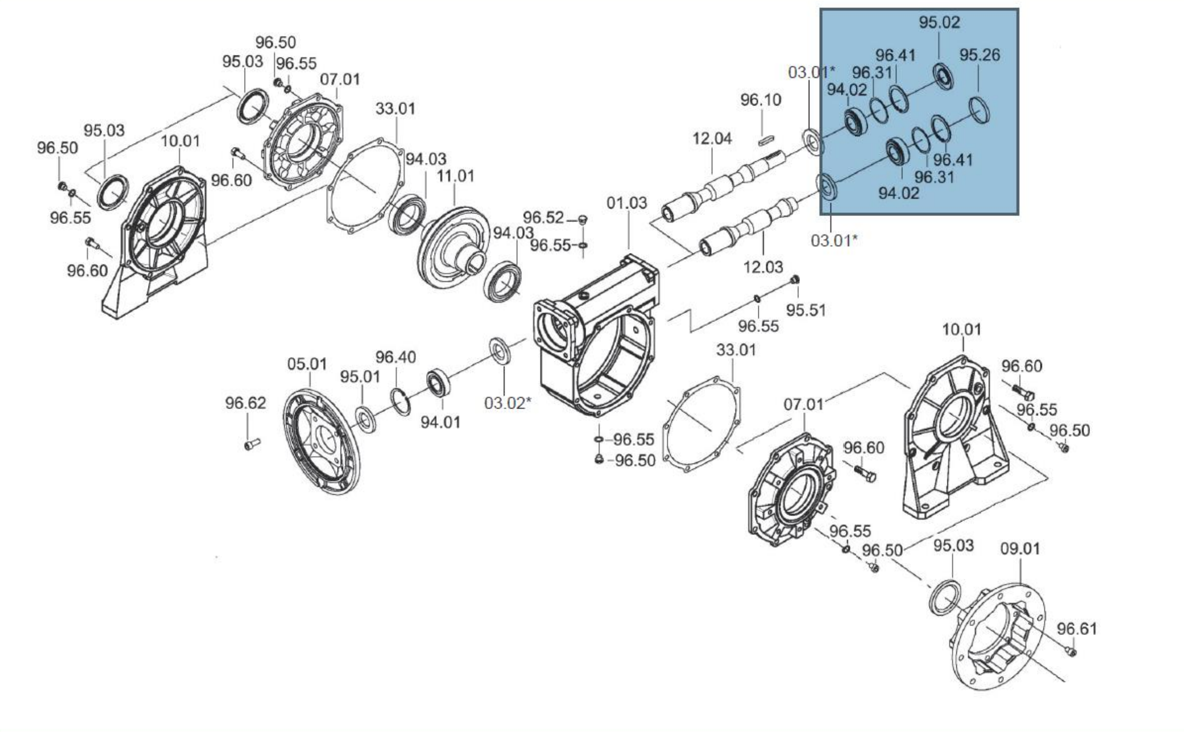
(Double extended shaft)



KC	D J6	L	M	N1	B	T
30	9	15	M4x10	42.5	3	10.2
40	11	20	M4x12	52.5	4	12.5
50	14	25	M5x13	62.5	5	16
63	19	30	M8x20	72.5	6	21.5
75	24	40	M8x20	89	8	27
89	24	40	M8x20	108	8	27

3.13 Spare parts list (K Worm Gearboxes)

KC



KC	IEC	Bearings			Oil seals			Closed Oil seals
		94.01	94.02	94.03	95.01	95.02	95.03	95.26
30	56	**61804** (20x32x7)	**6000** 10x26x8	**6005** 25x47x12	20/32/7	10/26/7	25/40/7	Ø 26x7
	63	**61804** (20x32x7)			20/32/7			
40	56	**6303** (17x47x14)	**6201** 12x32x10	**6006** 30x55x13	17/47/7	12/32/7	30/47/7	Ø 32x7
	63	**6204** (20x47x14)			30x55x17			
	71	**6005** (5x47x12)			25/47/7			
50	63	**6204** (20x47x140	**6203** 17x40x12	**6008** 40x68x15	20/47/7	17/40/7	40/62/8	Ø 40x7
	71	**6005** (25x47X12)			35/47/7			
	80	**6006** (30x55x13)			30/55/7			
63	71	**6305** (25x62x17)	**6204** 20x47x14	**6008** 40x68x15	25/62/7	20/47/7	40/62/8	Ø 47x7
	80	**6206** (30x62x16)			30/62/7			
	90	**6007** (35x62x14)			35/62/7			
75	80	**6206** (30x62x16)	**6205** 25x52x15	**6010** 50x80x16	30/62/7	25/52/7	50/72/8	Ø 52x7
	90	**6007** (35X62X140			35/62/7			
	100/112	**6008** (40x68x15)			40/68/10			
89	80	**6206** (30x62x16)	**6205** 25x52x15	**6010** 50x80x16	30/62/7	25/52/7	50/71/8	Ø 52x7
	90	**6007** (35x62x14)			35/62/7			
	100/112	**6008** (40x68x15)			40/68/10			

4.0 Terms and conditions of sale

4.1 purpose

The present "General Conditions of Sale" (hereinafter referred to as "Conditions of Sale"), shall apply and shall govern all supplies of "TRAMEC" products with "TRAMEC" label and / or directly commercialized by "TRAMEC", and cancel any clause or term agreed upon by the Customer which have not been accepted by prior consent in writing by "TRAMEC SRL".

4.1.1 Modification of the condition of sale

"TRAMEC SRL" reserves the right to modify, add, delete any part of these "Condition of Sale", which will be deemed to apply to all orders received after the date of Customer's notification.

4.2 General definitions

For a better understanding of these Conditions of Sale, we define the following terms:

- "Products": All goods manufactured, assembled, commercialized and / or sold by TRAMEC SrL.
- "Customers" : All companies legally established and / or legal entities buying goods, products or services from TRAMEX SRL
- "Orders" : Each offer to purchase goods, products or services sent by the Customer to TRAMEC SrL and confirmed for acceptance with an "order confirmation" directly from TRAMEC SrL.
- "Trademarks" : All trademarks owned or of which TRAMEC SrL is licnesee.
- "Patents and Intellectual Property" : all rights related to the protection of their own know – how, covered with Italian and international patents for inventions, trademarks, models, designs and products for which TRAMEC SRL holds and owns the rights, whether registered or under registration, including any other form prescribed by the international laws.

4.3 References

This document is an integral part of the "PRICE LIST of TRAMEC", for more information please head to our website www.SAMT.com.au

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