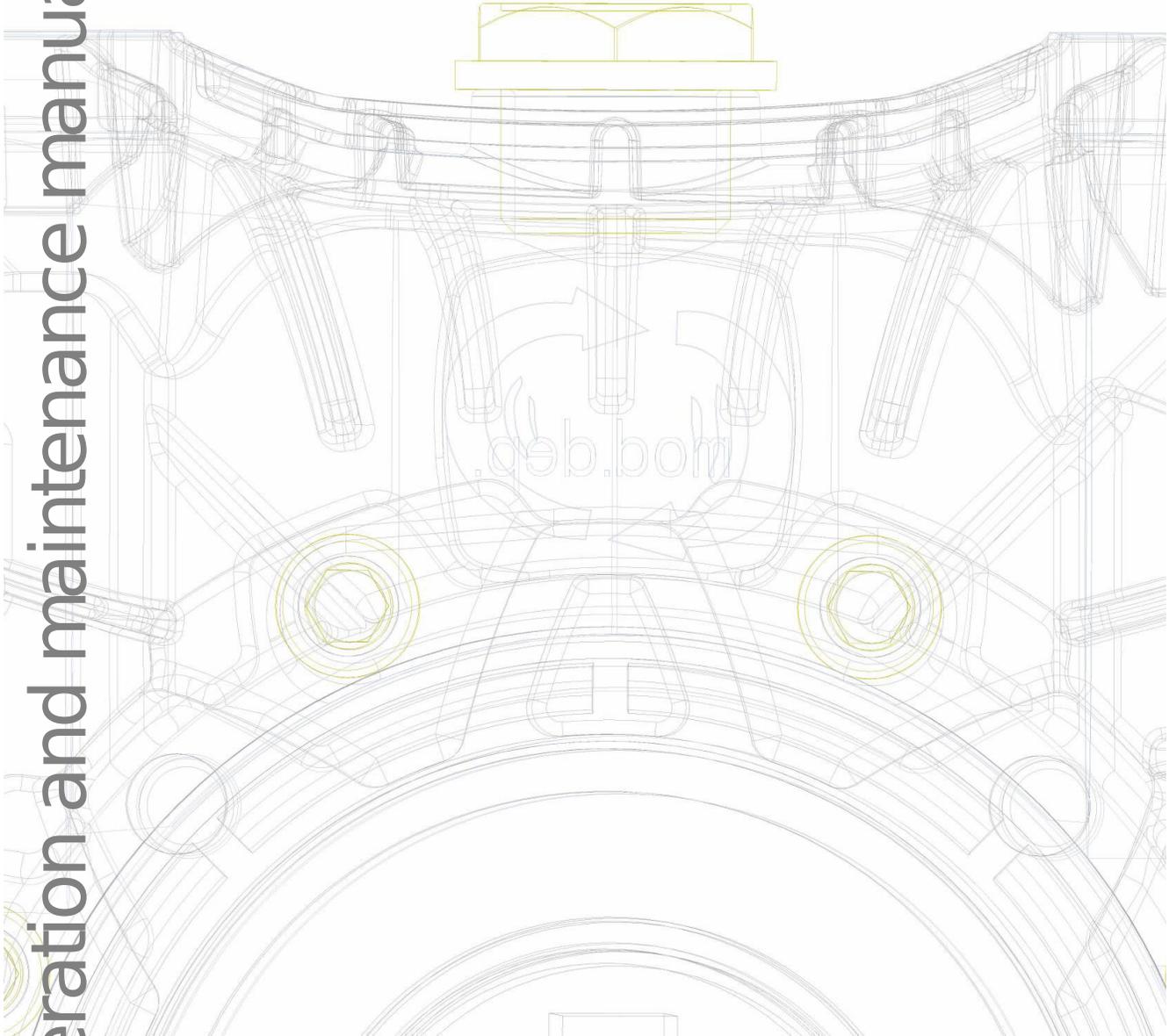


# BOX

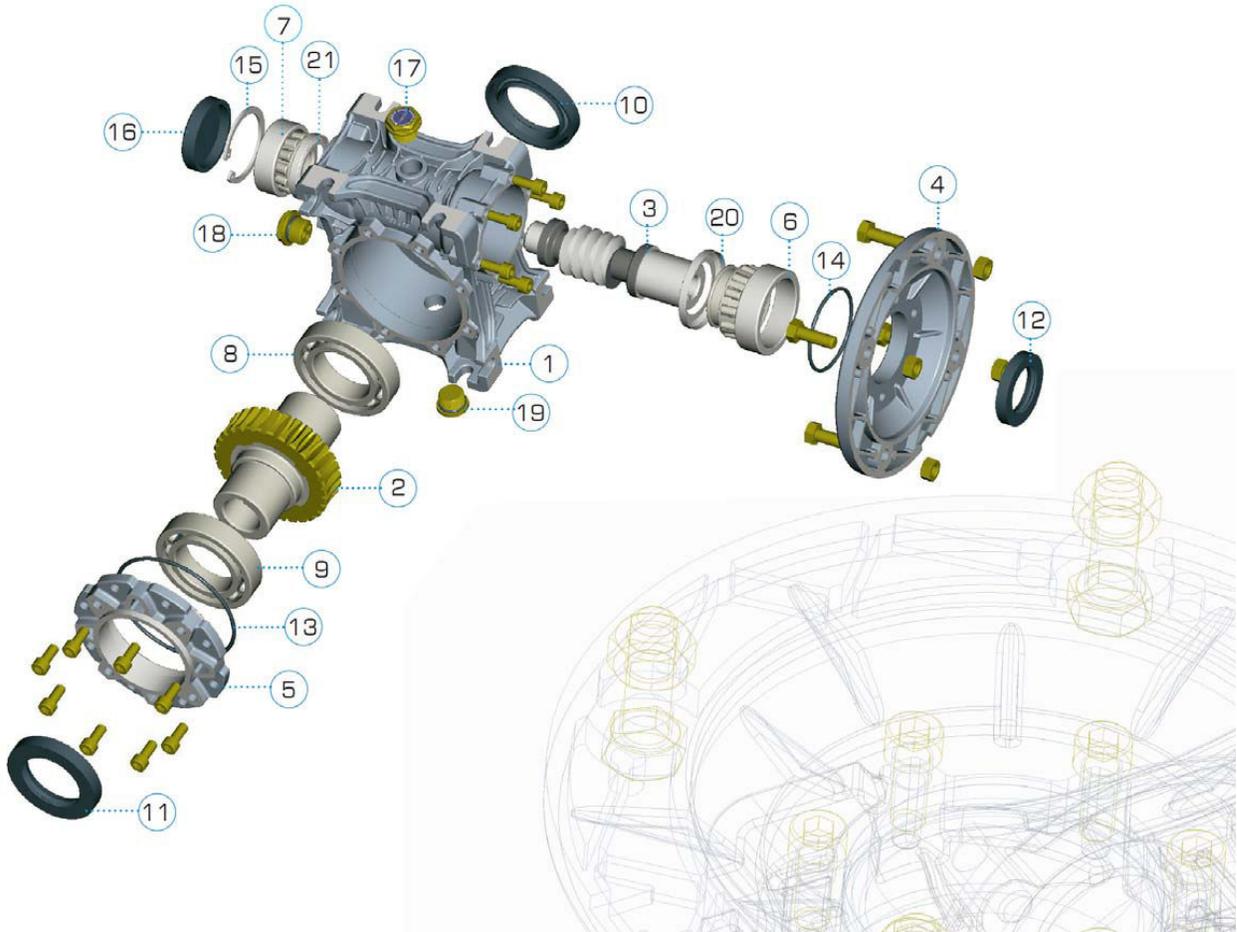
wormgear units



operation and maintenance manual



## COMPONENTS LIST



N°	CODE	N°	CODE	N°	CODE
1	BOXHOU	8	BOXB08	15	BOXSEE
2	BOXGEA	9	BOXB09	16	BOXCOV
3	BOXSHA	10	BOXB10	17	BOXBPL
4	BOXFLA	11	BOXB11	18	BOXLPL
5	BOXCAP	12	BOXB12	19	BOXFPL
6	BOXB06	13	BOXB13	20	BOXN20
7	BOXB07	14	BOXB14	21	BOXN21

## STORAGE

- Do not store outdoors, in areas exposed to weather or with excessive humidity.
- For storage periods longer than 60 days, all machined and unpainted surfaces such as flanges, bases, and shafts must be protected with a suitable anti-oxidation product
- Oil seals must be touched by the oil. Before putting them into operation restore correct quantity and type of oil.
- At intervals of 4 to 5 months, the output shaft should be rotated

## INSTALLATION

- Make sure that the BOX unit is correctly secured to avoid vibrations.
- If shocks or overloads are expected, install hydraulic couplings, clutches, electronic torque limiters, control units, etc.
- For a satisfactory gearbox performance, it is essential to align correctly the motor and the driven machine.
- Whenever possible, we suggest to interpose flexible couplings.
- Align with precision the eventual outboard bearing, because any misalignment would cause high overloads, with a subsequent rupture of a bearing or the shaft
- Before starting up the machine, make sure that the oil level is conform to the mounting position specified for the STON unit by checking the level plug
- For outdoors installation provide adequate guards in order to protect the drive from rainfalls as well as direct sun radiation.
- It is recommended to clean and lubricate the connection shafts with grease having a copper base (example Castrol Optimol Paste HT) in order to avoid fretting corrosion and seizure. Copper, in fact, being very malleable, is like a barrier against the direct contact between two similar metals. In alternative, you can use a grease having high viscosity base oil which remains particularly adhesive (example Mobilgrease XTC)
- Whenever there are outer loads, it is recommended to use pins and positive stops
- Self-locking adhesives should be used on the bolts and joining surfaces of the machine frame to prevent gearbox and driven machine to get loose
- It is recommended to avoid to fit cantilever pinions. If this is not possible, minimize the distance between pinion and output shaft to avoid excessive radial loads
- He pre-loading of belts and chains to the minimum
- Never use the hammer for mounting/dismantling of the jeyed parts, but use the tapped holes provided on the head of the shafts
- For a smooth and silent working, it is recommended the use of Motive motors

## ROUTINE CHECKS

- Periodically check that the outer surfaces of the BOX unit and the cooling air passages are clean.
- Verify that the breather plug hole is clean.
- Regularly make sure that there are no lubricant leaks.
- Using the level plug window, verify periodically the correct quantity of lubricant

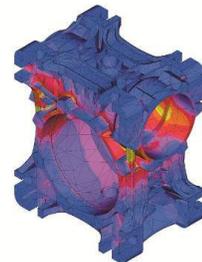
## OPERATING TEMPERATURE

The gearbox operating temperature depends on a number of factors such as the input speed, the applied torque, the environment temperature, the gearbox efficiency and ratio, the spread between the service factor offered by the gear-motor and the service factor required by the application (see catalogue).

If we have a BOX worm gearbox reduction ratio  $i:100$  (=the lowest efficiency in the range), connected to a 4p \* motor an input speed (1300-1500rpm), used with a torque load resulting into a service factor 1 (see catalogue performance charts), after 4 hours running in continuous S1 service duty\*\*, the acceptable inner temperature, to be measured making a thermal sensor dive in the oil, can be up to 65°C more than the ambient temperature. The maximum allowable inner temperature is 100°C, since the permissible operating temperature range of NBR oil seals is -40 to +100 °C (-40 to +210 °F).

\*If we use a 2 poles motor (n1 about 2800RPM), a few potential problems, like the temperature inside the gearbox, vibrations or noise, can grow. As a general rule, we recommend the use of worm gearboxes with 2 poles motors only in applications having a relatively low service factor (1.25 max.) and a very low degree of intermittency.

\*\*during the first 4 hours, you may assist to a gradual decrease of the inner temperature due to the gearbox components settling.



## MAINTENANCE

Maintenance is essentially limited to the requests reported in the charter “lubrication” and to an accurate external cleaning, usually carried out with bland solvents in order to not to damage the paint

When it is necessary to fill the oil but there is no compatibility of the new oil with the one inside the gearbox, we suggest to empty the gearbox from its oil and wash it before putting the new oil

## LUBRICATION

		BOX030	BOX040	BOX050	BOX063	BOX075	BOX090	BOX110	BOX130	BOX150
		<b>synthetic oil</b>						<b>mineral oil</b>		
T° C		-15°C ÷ +60°C						-5°C ÷ +40°C		
ISO VG...		ISO VG460						ISO VG460		
oil type	AGIP	TELIUM VSF460						BLASIA 460		
	SHELL	TIVELA OIL SC460						OMALA OIL 460		
	ESSO	S460						SPARTAN EP460		
	CASTROL	ALPHASYN PG460						ALPHASYN PG460		
	BP	ENERGOL SG-XP460						ENERGOL SG-XP460		
	oil quantity (lt)	B3	0.04	0.08	0.15	0.30	0.55	0.10	3.0	4.5
B8		2.2							3.3	5.1
V5		2.2							3.3	5.1
V6		2.2							3.3	5.1
B6-B7		2.2							3.3	5.1
Maintenance		Pre-lubricated by Rotomotive						Supplied mineral oil. Can be supplied Synthetic oil at an extra cost		
		none, lifetime lubrication						oil change after 400 working hours, Then every 4000 working hours		

Unless otherwise specified, wormgear units sizes 30 up to 90 are supplied with long-life lubrication and they don't require any maintenance.

All units are supplied with plugs for loading, discharging and checking the level of the oil. Furthermore, the units BOX063, BOX075, BOX090, BOX110, BOX130 and BOX150 are accompanied by a breather plug. Before start-up, we suggest to re-place the filler plug in the upper side of the unit with the breather plug. This operation is compulsory on

BOX110, 130 and 150.

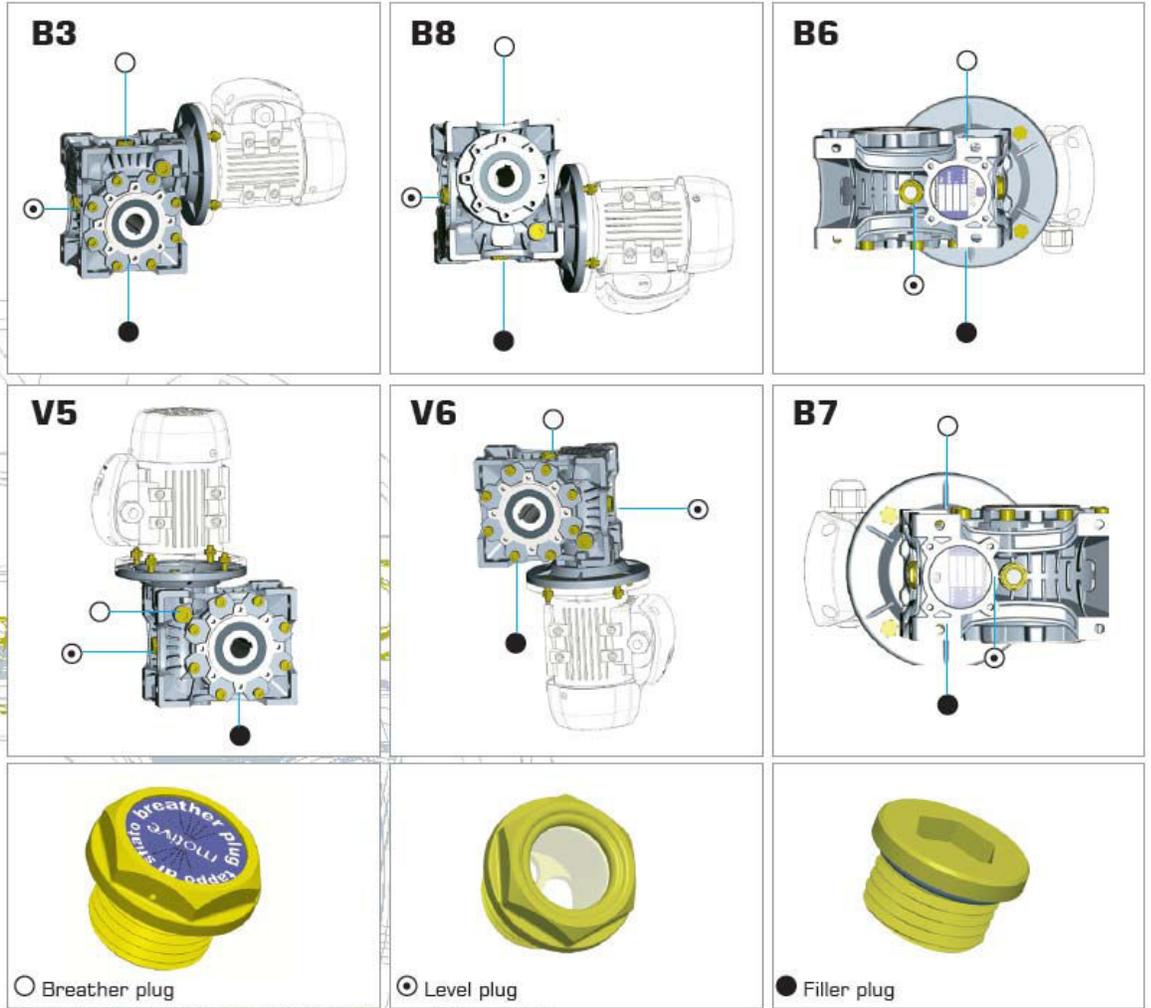
The combination on the input shaft of 2 taper roller bearings (mounted on size 75 and up to get an high resistance to the axial loads) and 2 nilos (mounted on the unit sizes 75 up to 150 to keep lubricating

grease inside the bearings even when they are not touched by the lubrication oil) or, in alternative, special 2RS shields on such taper bearings, permits the mounting of the whole BOX range, from the size 25 to the size 150, in the positions V5 and V6.

Mounting positions B6 or B7 are also permitted on all the BOX series, thanks to the adoption of 2RS auto-lubricated bearings on the output shaft



## Mounting positions

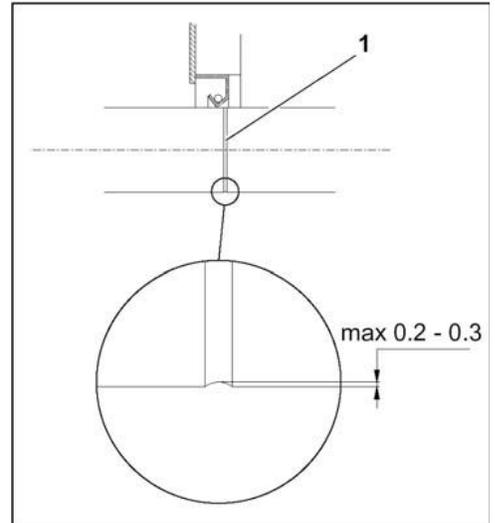


## OIL SEALS REPLACEMENT

When a shaft seal doesn't work properly, it must be replaced rapidly, in order to avoid that the oil leakage goes further on, and that the damage extends to some other components.

When fitting a new seal, the following precautions are required:

- take particular care in handling, and make sure that the seal is in good conditions, particularly if long times of stocking could have caused a premature wear, especially in presence of excessive humidity
- always check that the shaft seal seat is in good conditions, free of surface defects. If the area where the ring seal comes into contact with the shaft has worn down by more than 0,2-0,3mm, do not install a new seal
- care to prevent the new seal lip from working exactly on the same trace left by the previous one
- fit the shaft seal perpendicularly to the axis, with the lips wholly free, not curled under or pinched
- install the ring seal so that the lip faces the oil that must be kept in or the side from where the pressure is exerted
- for ring seals without a dust-tight lip, coat the outside of the lip with grease
- for ring seals provided with a dust-tight lip, fill the gap between the seal lip and dust-tight lip with grease
- lubricate the seal seat on the shaft
- do not use sealants because if they get on the seal lip or shaft surface they can cause rapid wear
- when installing the seal, press down as near as possible the outside edge
- do not block the ring seal axially or apply too much load
- always use suitable tools to avoid damaging the seal lip with threads, grooves, sharp edges or keyways
- always cover the seal lip and the seat on the shaft when repainting the gearbox
- use oil seals of the type indicated in table 1



## LIST OF BEARINGS AND OIL SEALS

**Tab.1**

	BEARINGS				OIL SEALS		
	6	7	8	9	10	11	12
BOX030	6002-2RS	61904	6005	6005	25x47x7	25x47x7	20x30x7
BOX040	6203-2RS	6005	6006	6006	30x40x7	30x40x7	25x35x7
BOX050	6204-2RS	6006	6008-2RS	6008-2RS	40x62x8	40x62x8	30x47x7
BOX063	6205-2RS	6007	6009-2RS	6009-2RS	45x65x8	45x65x8	35x52x10
BOX075	32008-RS	30206-RS	6010-2RS	6010-2RS	50x72x8	50x72x8	40x60x10
BOX090	32008-RS	30206-RS	6012-2RS	6012-2RS	60x85x10	60x85x10	40x60x10
BOX110	32010-RS	32207-RS	6013-2RS	6013-2RS	60x85x8	60x85x10	50x68x8
BOX130	32010-RS	32207-RS	6015-2RS	6015-2RS	70x90x10	70x90x10	50x68x8
BOX150	32012-RS	30209-RS	6018-2RS	6018-2RS	90x120x12	90x120x12	60x90x10

**Tab. 2**

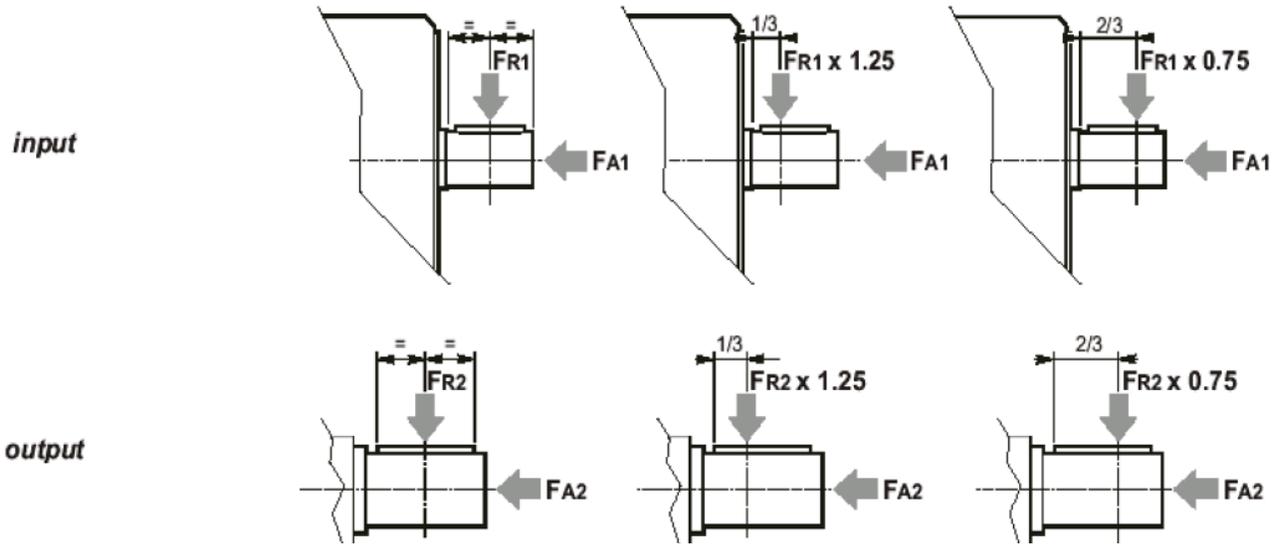
**Angular backlash on the output shaft**

BOX30	20-30'
BOX40-90	15-25'
BOX110-150	10-20'



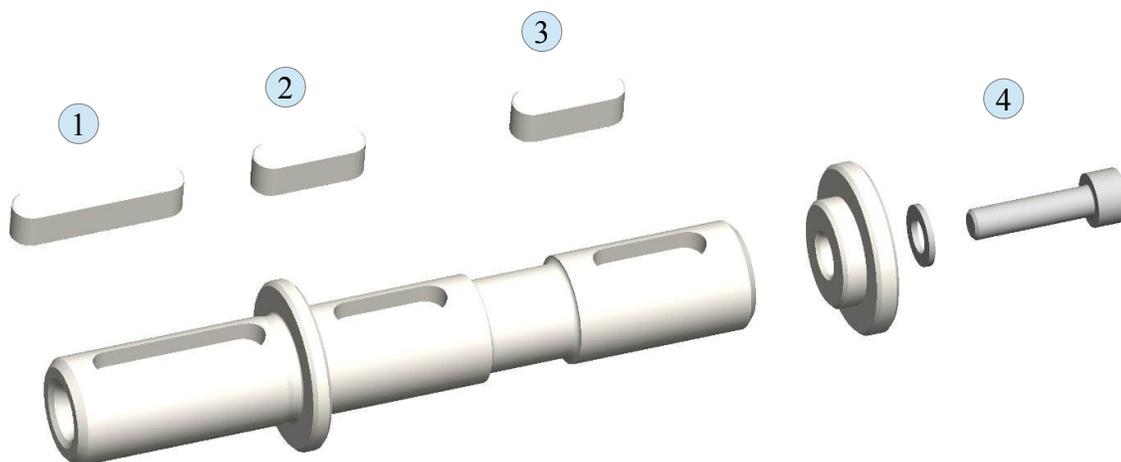
## Max radial and axial load [N]

Tab. 3

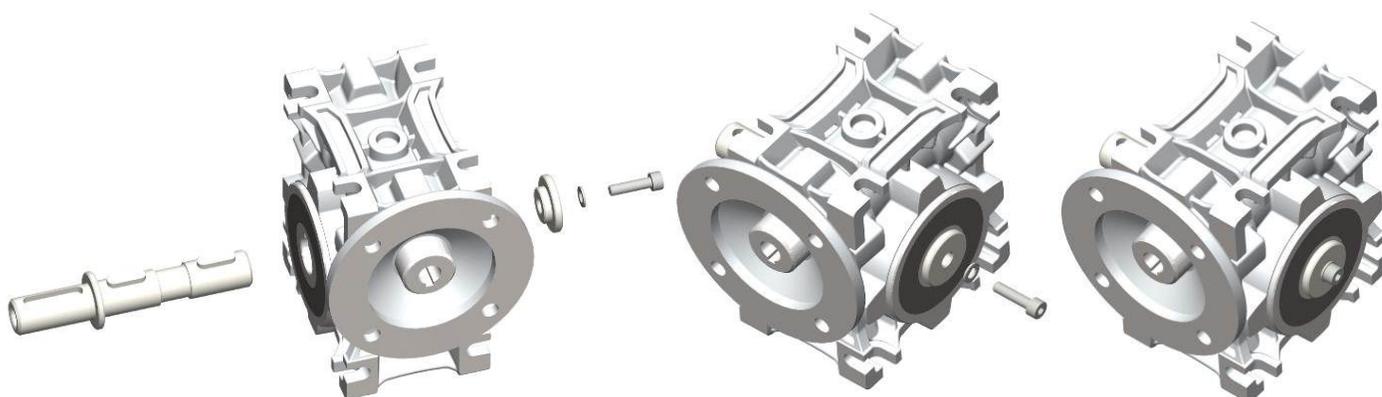


size	mm	output										input			
		i:										n <sub>1</sub> =1400 rpm			
		7,5	10	15	20	25	30	40	50	60	80	100	F <sub>r1</sub>	F <sub>a1</sub>	
BOX30	F <sub>r2</sub>	15	500	550	600	650	670	750	800	850	950	1000	1050	70	15
	F <sub>a2</sub>	15	100	110	120	130	134	150	160	170	190	200	210		
BOX40	F <sub>r2</sub>	20	1050	1150	1250	1350	1500	1600	1700	1800	1950	2100	2300	150	30
	F <sub>a2</sub>	20	210	230	250	270	300	320	340	360	390	420	460		
BOX50	F <sub>r2</sub>	25	1250	1450	1700	1900	2100	2300	2400	2600	2800	2900	3200	200	40
	F <sub>a2</sub>	25	250	290	340	380	420	460	480	520	560	580	640		
BOX63	F <sub>r2</sub>	25	2400	2500	2900	3300	3600	3900	4300	3200	5000	4200	5600	350	70
	F <sub>a2</sub>	25	480	500	580	660	720	780	860	640	1000	840	1120		
BOX75	F <sub>r2</sub>	30	2700	2900	3600	3900	4200	4500	5200	5500	5900	6300	6700	410	80
	F <sub>a2</sub>	30	540	580	720	780	840	900	1040	1100	1180	1260	1340		
BOX90	F <sub>r2</sub>	40	3300	3700	4400	4700	5400	5500	6300	6600	7100	7500	8300	580	110
	F <sub>a2</sub>	40	660	740	880	940	1080	1100	1260	1320	1420	1500	1660		
BOX110	F <sub>r2</sub>	40	3900	4150	5200	5400	5900	5700	7500	7800	8000	8800	9800	900	180
	F <sub>a2</sub>	40	780	830	1040	1080	1180	1140	1500	1560	1600	1760	1960		
BOX130	F <sub>r2</sub>	40	5100	5600	6400	7100	7600	8100	8900	9600	10200	11200	12100	1150	230
	F <sub>a2</sub>	40	1020	1120	1280	1420	1520	1620	1780	1920	2040	2240	2420		
BOX150	F <sub>r2</sub>	41	9700	7700	8750	9600	10400	11050	12150	13100	13900	15300	16500	2150	430
	F <sub>a2</sub>	41	1940	1540	1750	1920	2080	2210	2430	2620	2780	3060	3300		

## “SOS Single output shaft”



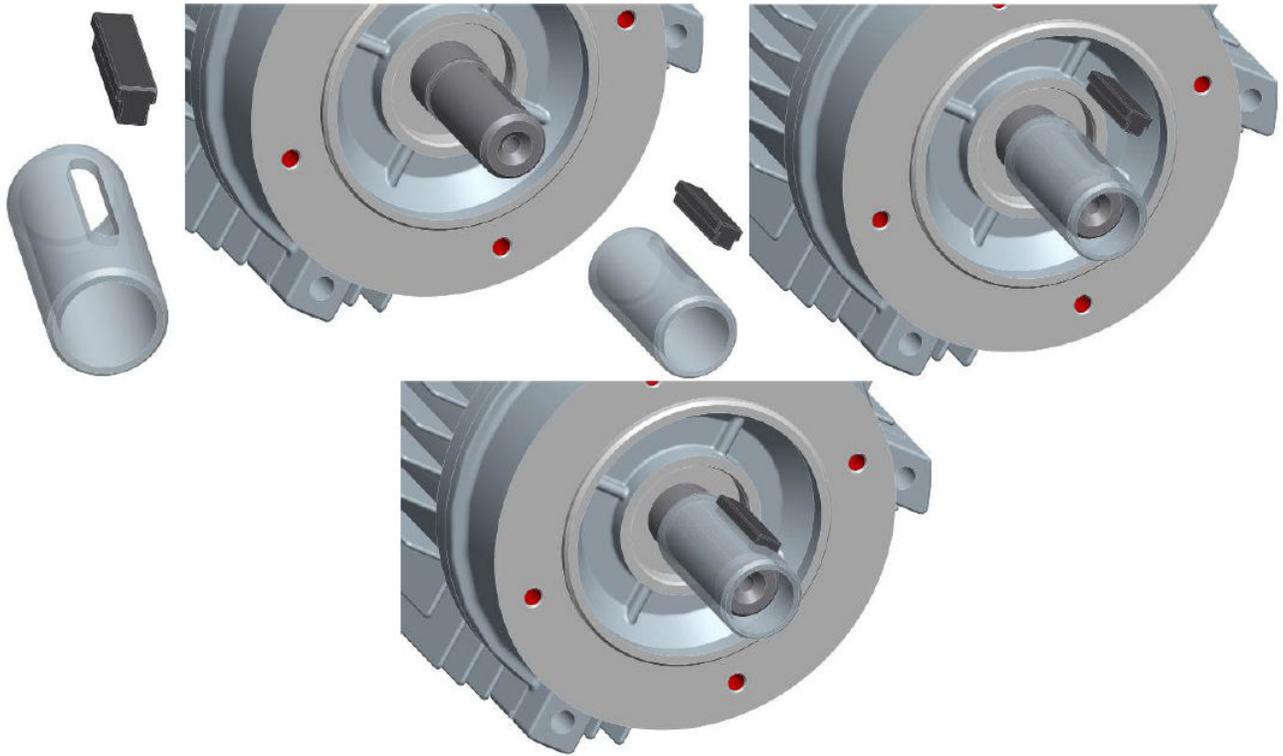
	1	2	3	4
BOX30	5x5x23	5x5x15	5x5x15	M4x16
BOX40	6x6x35	6x6x20	6x6x20	M5x16
BOX50	8x7x40	8x7x25	8x7x25	M8x20
BOX63	8x7x40	8x7x35	8x7x35	M8x20
BOX75	8x7x40	8x7x40	8x7x40	M10x25
BOX90	10x8x72	10x8x45	10x8x45	M10x25
BOX110	10x8x72	10x8x50	10x8x50	M10x25
BOX130	14x9x70	14x9x60	14x9x60	M10x25
BOX150	14x9x70	14x9x65	14x9x65	M10x25



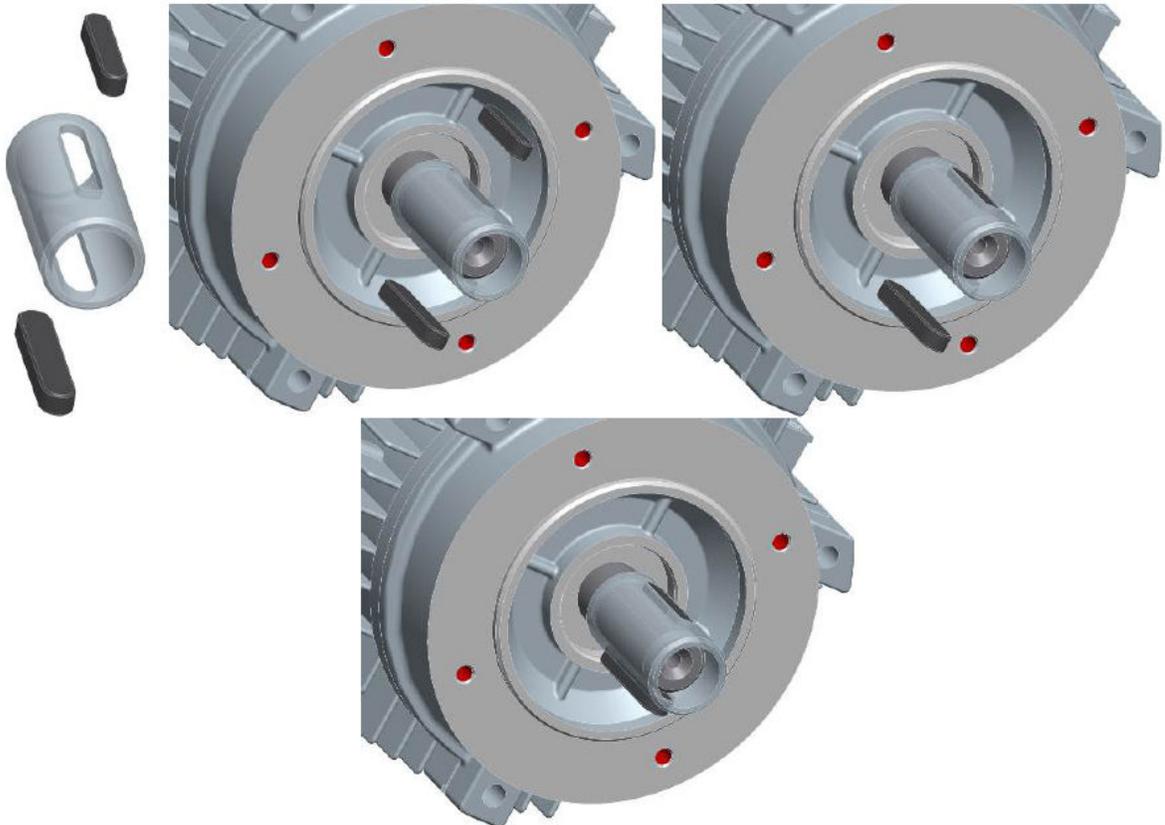
**adapters for input shaft diameter change**

There are 2 kinds of adapters

**Type 1:**



**Type 2:**



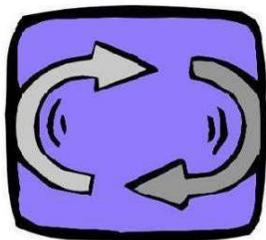


PROBLEM	POSSIBLE CAUSES	REMEDY (1)	REMEDY (2)
the motor doesn't start	a)problems in the power supply. b)faulty electrical wiring. c) faulty motor. d)wrong size of the motor	check the connections and the power supply	replace the motor.
the current absorption of the electric motor is too high	a) wrong motor size. b) motor faulty.	check the installation/application	replace the motor and eventually also the gearbox
the temperature of the motor frame is too high	a)wrong motor size. b)motor faulty. c) Wrong evaluation of the surface temperature	check the installation/application	replace the motor and eventually also the gearbox
the temperature of the gearbox housing is too high	a)Wrong gearbox size. b)Wrong mounting position. c) Not enough lubricant d)Defective bearing	check the installation/application	correct the mounting position or the lubricant level replace the bearing
output speed is different from expected	a)wrong reduction ratio. b)wrong motor polarity.	a)verify the reduction ratio. b)verify the motor polarity	replace the gearbox and/or the electric motor
oil leaks from the shafts	a)defective seals. b)seal seats on the shafts	a)replace the seals. b)replace the seals and install them in a very slightly different position or replace the shafts.	send the unit to Rotomotive
oil leaks from the seals	a)flanges are not tightened properly. b)defective seals or damaged during the transport	a)tighten the flanges. b)replace the seals, verifying that the seals seats are perfectly worked.	send the unit to Rotomotive
the output shaft turns in the wrong sense	wrong electric motor wiring	invert the position of the 2 phases of the electrical motor power supply	send the unit to Rotomotive if the noise is important in the specific application
cyclical noise in the gearbox	damaged gears	no practical problem if the noise is not important in the specific application.	send the unit to Rotomotive if the noise is important in the specific application
not cyclical noise inside the gearbox	dirty inside the gearbox	no practical problem if the noise is not important in the specific application, or if it disappears after 3 working hours	send the unit to Rotomotive if the noise is important in the specific application
a whistling noise is coming from the gearbox	a)defective bearings or not correctly assembled. b)defective gears. c) not enough lubricant	a) reassemble or replace the bearings b) replace the gears c) put the correct quantity of lubricant	send the unit to Rotomotive
vibrations of the electric motor	coupling geometrical errors	a)check the geometrical tolerances of the electric motor flange. Eventually replace b)check geometry and tolerances of the electric motor shaft key. Eventually replace c) Check the motor vibration	replace the motor with a Rotomotive one.

**ALL INFORMATION AND DATA PRESENTED IN THIS INSTRUCTION MANUAL HAS**

**BEEN CHECKED WITH MAXIMUM CARE. WE HOWEVER DO NOT ASSUME RESPONSIBILITY FOR ANY UNINTENDED ERRORS AND OMISSIONS.**

**ROTOMOTIVE RESERVES THE RIGHT TO CHANGE THE SPECIFICATIONS OF ITS PRODUCTS AT ANY TIME.**



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Rotomotive Powerdrives India Ltd.  
223, Napa Talpad,  
Gana-Borsad Road, Tal : Borsad, Anand  
Gujarat – 388 560, INDIA.  
Ph. : +91 – 9227110030  
Fax: +91 – 2692 – 235209  
E-Mail: [info@rotomotive.com](mailto:info@rotomotive.com)  
Web site : [www.rotomotive.com](http://www.rotomotive.com)