GENERAL CATALOGUE

BOX SERIES WORMGEAR UNITS

rotomotive®

Vacuum Pressure Impregnation

Precise Balancing

Lean Assembly Line

Processes that ensure reliability...

Rotomotive Powerdrive India Ltd. is a Joint Venture between Rotomag Motors & Controls Pvt. Ltd., India(www.rotomag.com) and Motive S.r.l., Italy (www.motive.it)

CERTIFICATE

TÜV INDIA

Management system as per
ISO 9001 : 2000

ROTOMOTIVE POWERDRIVES INDIA LTD.
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Anand - 388 121. India

Design, Development, Manufacture, Marketing and After Sales Services of Delphi Series Asynchronous 3 Phase Motors, Delphi Series ATDC brake motors, Worm Gear Units and Custom Build Motors

TÜV INDIA Certification Body

Our Manufacturing Plant in India

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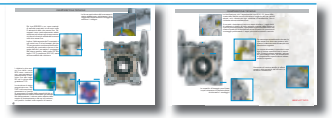

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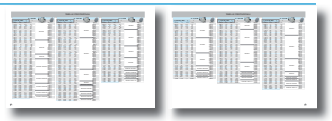

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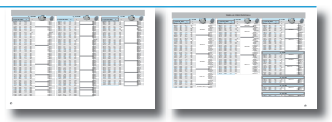

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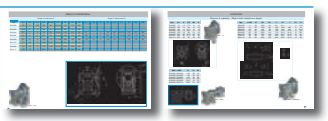

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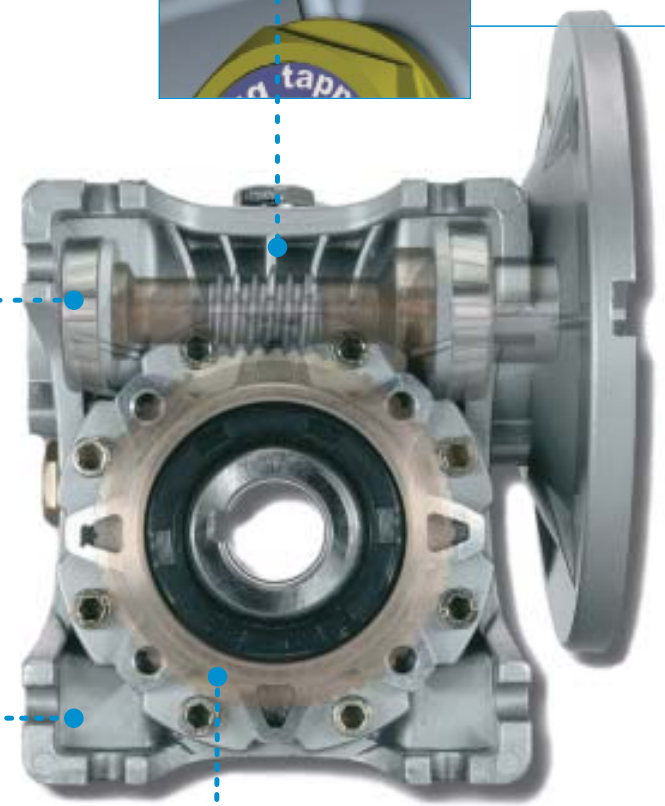
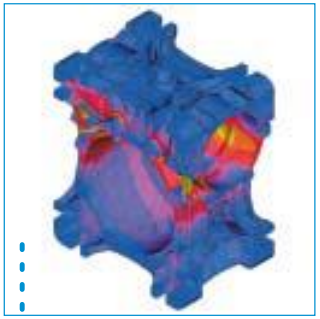
TECHNICAL CHARACTERISTICS

The housing shape has been optimized to maximize the draining of water or liquid in the event of the gearbox being subjected to splashing or washing.

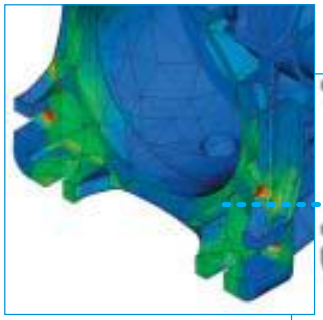
From BOX 75 and up, 2 taper roller bearings are mounted on the wormshaft improving the mechanical resistance to the axial thrust generated by the wormwheel.

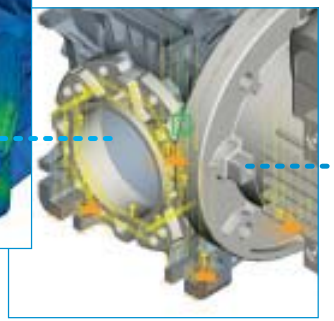
The combination of taper roller bearings and 2 nilos (mounted on the BOX sizes 75 to 150 retains the grease in the bearings even when they are not in contact with the gearbox lubricant and also permits the mounting of the whole BOX range from the size 25 to the size 150 in the positions V5 and V6 without any additional accessories.



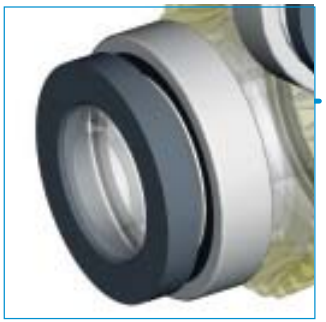


The new patented "BOX" series of worm gear units is made with die cast aluminium housing from size 25 up to 90 and is cast iron for the size 110, 130 & 150.





The housing has been designed using parametric 3D CAD software supported by systematic analysis of the thermal dissipation capacity and the structural resistance to deformation under the effect of working loads.



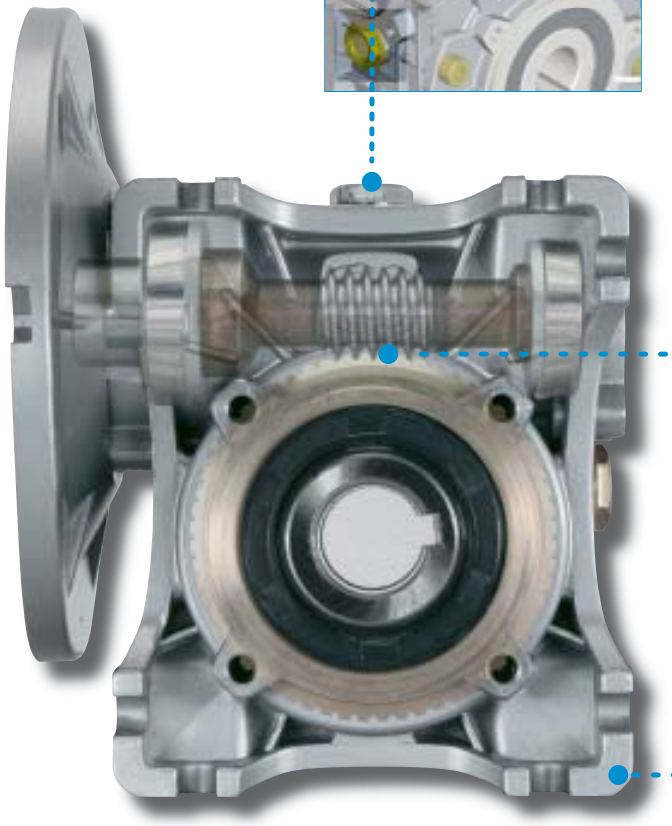
Mounting positions B6 or B7 are also permitted on all the BOX series, thanks to the adoption of 2RS auto-lubricated bearings on the output gear. In conclusion, the whole BOX series can be mounted in any position with no need of specifications in the order.

TECHNICAL CHARACTERISTICS

PATENTED

BOX units sizes 25 up to 90 are supplied with long life synthetic oil and they do not require any maintenance during their lifetime. BOX size 110-150 uses mineral oil, but synthetic oil is available on request.

Each gearbox is supplied with a full set of filler, level and breather plugs, permitting all mounting positions.

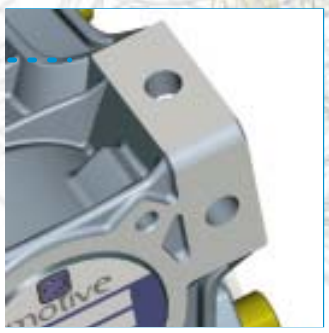


In order to reduce noise, improve efficiency and durability, the wormshaft is made of case hardened steel and profile ground, while the worm wheel is in shell cast ZCuSn12 bronze.

Before being assembled, the worm wheel is subjected to 'running in' to improve its surface finish and reduce noise.

A coat of paint seals minor surface porosities in aluminium and also protects the housing from oxidation.

Mating surface are machined for perfect perpendicularity.



2 safety plastic covers on the output are always provided to protect BOX during transportation and storage, and then the user from accidental contacts with moving parts.

EFFICIENCY

An inherent factor in the selection of worm gear boxes is the efficiency η, defined as the ratio of mechanical power available at the output shaft and the power applied at the input shaft:

$$\eta = \frac{P_{n2}}{P_{n1}}$$

In practice, efficiency depends on:

- helix angle
- materials of matching parts
- tooth form accuracy
- gear finishing
- lubrication
- gear sliding speed
- friction of seals and bearings
- load vibrations
- temperature

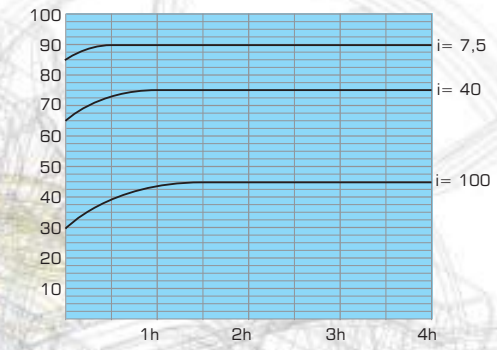
In the combined BOX units (BOX+BOX) the total efficiency value is the product of the efficiency of the two single gear boxes composing the combined unit.

Dynamic efficiency η_d

It is the efficiency value achieved after completion of the running in time of few hours. This efficiency remains almost constant during the operating life of the gearbox.

The graph 1 shows the time required to reach the maximum value of dynamic efficiency

graph 1



Static efficiency η_s

It is the efficiency obtained at start-up and is particularly important in the choice of a BOX unit on intermittent duty applications (like lifts, hoists) where due to very short operating time, the standard operating conditions are seldom reached. In such applications, the motor rating is to be suitably increased to compensate for the poor efficiency of the BOX unit while starting up ($\eta_s < \eta_d$)

IRREVERSIBILITY

Some BOX units permit the locking and holding in place the load and prevent reverse motion even when electric power is switched off.

This feature called irreversibility is inversely proportional to the efficiency and the helix angle and directly proportional to the reduction ratio.

The profile of gear teeth and the helix angle of gears has the most significant bearing on the overall efficiency of the gearbox.

In order to achieve the optimum solution for any application it is necessary to analyze the difference between static and dynamic irreversibility.

Static irreversibility:

A BOX unit has a low static reversibility when it is possible to rotate it only by driving the output shaft with a very high torque and / or vibration or twisting of the output load. The static irreversibility is inversely proportional to the static efficiency. Theoretically:

$\eta_S < 50\%$	static irreversibility
$50\% < \eta_s < 55\%$	low static reversibility
$\eta_s \geq 55\%$	good static reversibility

Dynamic irreversibility:

This is the most difficult condition to achieve. It occurs when the output shaft stops rotating as soon as the input shaft stops rotating. The dynamic irreversibility is inversely proportional to the dynamic efficiency. Theoretically:

$\eta_s < 40\%$	total dynamic irreversibility
$40\% < \eta_s < 50\%$	good dynamic irreversibility
$50\% < \eta_s < 60\%$	low dynamic reversibility
$\eta_s \geq 60\%$	good dynamic reversibility

The table 1 states an indicative condition of the different degrees of irreversibility based on the helix angle.

(Note: Whenever a total irreversibility of a BOX unit is important for safety reasons, we strongly recommend the use of brake motors of the series Delphi ATAC or ATDC.)

MESH DATA

type	Ratio i:	7.5	10	15	20	25	30	40	50	60	80	100
BOX 025	Z_1	4	3	2	2		1	1	1	1		
	Z_2	30	30	30	40		30	40	50	60		
	β	18° 59' 59"	15° 15' 18"	10° 18' 17"	9° 27' 44"		5° 11' 40"	4° 45' 49"	3° 21' 59"	3° 21' 59"		
	m_x	1.25	1.25	1.25	1		1.25	1	0.75	0.65		
	Cr(Nm)	63.89Nm	52.18Nm	51.17Nm	47.45Nm		50.55Nm	46.96Nm	34.48Nm	32.07Nm		
	η_d (1400)	85.90%	83.20%	78.00%	75.90%		65.30%	62.50%	54.80%	53.80%		
	η_s	71.75%	68.16%	60.23%	56.67%		44.83%	41.33%	34.01%	33.26%		
BOX 030	Z_1	4	3	2	2	2	2	1	1	1	1	
	Z_2	30	30	30	40	50	30	40	50	60	80	
	β	18° 48' 58"	14° 20' 8"	9° 40' 7"	7° 42' 13"	5° 42' 38"	4° 52' 9"	3° 52' 10"	3° 15' 37"	2° 13' 37"	2° 6' 36"	
	m_x	1.44	1.44	1.44	1.10	1.75	1.44	1.10	0.90	0.70	0.56	
	Cr(Nm)	84.41Nm	82.46Nm	81.05Nm	67.95Nm	226.03Nm	80.18Nm	67.49Nm	59.58Nm	44.59Nm	46.39Nm	
	η_d (1400)	82.00%	80.70%	72.60%	72.00%	68.00%	62.00%	55.00%	52.00%	46.00%	40.00%	
	η_s	65.42%	62.00%	51.86%	47.33%	39.27%	34.68%	31.74%	25.65%	25.89%	19.60%	
BOX 040	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	24° 28' 25"	18° 50' 51"	12° 49' 17"	10° 29' 51"	8° 45' 5"	6° 29' 31"	5° 17' 36"	4° 24' 5"	3° 47' 4"	2° 56' 9"	2° 28' 53"
	m_x	2	1.5	2	1.5	2.5	2	1.5	1.25	1	0.75	0.65
	Cr(Nm)	198.24Nm	107.24Nm	185.05Nm	128.51Nm	464.41Nm	181.60Nm	126.90Nm	115.09Nm	91.13Nm	59.48Nm	56.58Nm
	η_d (1400)	87.30%	85.30%	81.00%	78.00%	75.00%	69.70%	65.00%	62.00%	56.00%	50.00%	49.0%
	η_s	71.24%	67.24%	59.27%	53.87%	50.18%	44.81%	38.77%	35.07%	29.90%	25.95%	24.77%
BOX 050	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	23° 57' 45"	18° 26' 6"	12° 31' 43"	10° 18' 17"	8° 35' 51"	6° 20' 25"	5° 11' 40"	4° 24' 5"	3° 41' 53"	2° 51' 45"	2° 17' 26"
	m_x	2.50	2	2.50	2.00	1.5	2.50	2.00	1.5	1.25	1.00	0,75
	Cr(Nm)	352.59Nm	217.36Nm	330.06Nm	285.40Nm	208.90Nm	324.18Nm	281.96Nm	207.16Nm	166.11Nm	148.02Nm	105.45Nm
	η_d (1400)	89.00%	87.50%	81.80%	80.20%	75.20%	70.60%	68.30%	61.30%	57.90%	52.80%	46.00%
	η_s	70.80%	67.15%	58.86%	55.84%	50.46%	43.14%	39.76%	34.06%	31.40%	26.90%	21.12%
BOX 063	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	25° 50' 36"	19° 57' 51"	13° 36' 49"	10° 53' 8"	8° 44' 46"	6° 30' 20"	5° 29' 32"	4° 23' 55"	3° 56' 43"	3° 5' 17"	2° 26' 1"
	m_x	3.0	2.5	3.0	2.50	2.00	3.0	2.50	2.0	1.75	1.25	1.0
	Cr(Nm)	644.41Nm	428.50Nm	596.72Nm	595.72Nm	495.36Nm	583.72Nm	587.70Nm	491.04Nm	395.47Nm	280.91Nm	227.67Nm
	η_d (1400)	89.10%	88.60%	82.40%	81.80%	79.70%	73.00%	70.60%	67.50%	64.50%	57,90%	51.10%
	η_s	71.89%	68.23%	59.57%	55.54%	52.11%	43.97%	40.34%	36.82%	34.33%	28,44%	24.05%
BOX 075	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	26° 38' 16"	20° 36' 57"	14° 4' 5"	11° 18' 36"	10° 18' 18"	7° 8' 51"	5° 42' 38"	5° 11' 40"	4° 20' 31"	3° 24' 42"	2° 51' 45"
	m_x	4.0	3.0	3.75	3.00	2.50	3,75	3.00	2.5	2.0	1.5	1.25
	Cr(Nm)	1268.82Nm	681.60Nm	1027.63Nm	859.08Nm	777.54Nm	1004.61Nm	846.60Nm	768.15Nm	516.79Nm	404.64Nm	355.85Nm
	η_d (1400)	91.00%	89.60%	85.20%	83.50%	81.90%	75.80%	73.80%	70.70%	65.50%	59.00%	56,50%
	η_s	72.60%	69.24%	61.14%	58.04%	54.26%	45.88%	43.05%	38.94%	35.27%	28.52%	26,71%
BOX 090	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	29° 11' 11"	22° 43' 48"	15° 36' 15"	13° 1' 15"	11° 18' 36"	7° 56' 58"	6° 35' 44"	5° 42' 38"	4° 45' 49"	3° 52' 55"	3° 7' 20"
	m_x	4.5	3.5	5.0	3.5	3.00	5	3.5	3.00	2.50	1.75	1.50
	Cr(Nm)	2017.81Nm	1155.1Nm	2258.08Nm	1412.23Nm	1235.76Nm	2195.95Nm	1385.09Nm	1217.80Nm	1045.59Nm	648.29Nm	603.00Nm
	η_d (1400)	91.30%	89.90%	88.20%	84.10%	83.50%	80.80%	74.00%	73.10%	69.60%	61.40%	59.00%
	η_s	74.05%	70.71%	65.64%	60.07%	57.02%	50.76%	44.40%	41.63%	38.33%	31.19%	28.00%
BOX 110	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	28° 14' 32"	21° 56' 32"	15° 1' 59"	14° 48' 14"	12° 59' 41"	7° 38' 54"	7° 31' 39"	6° 34' 55"	5° 48' 8"	4° 27' 28"	3° 52' 55"
	m_x	6	4.5	6.0	4.5	3.5	6.0	4.5	3.5	3.0	2.25	1.85
	Cr(Nm)	4344.98Nm	2321.25Nm	3963.38Nm	2646.64Nm	1846.57Nm	3862.09Nm	2581.03Nm	1811.22Nm	1645.28Nm	1179.69Nm	1101.56Nm
	η_d (1400)	92.40%	91.20%	88.40%	86.10%	83.80%	81.00%	77.20%	73.50%	72.00%	66.00%	63.00%
	η_s	73.92%	70.71%	64.76%	62.80%	58.86%	49.22%	47.51%	43.12%	40.20%	34.93%	31.80%
BOX 130	Z_1	4	3	2	2	2	1	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	29° 14' 56"	22° 46' 57"	15° 38' 32"	13° 47' 27"	11° 53' 34"	7° 58' 11"	6° 59' 48"	6° 0' 40"	5° 16' 6"	4° 23' 55"	3° 34' 35"
	m_x	7	7	7	5.4	4.37	7	5.4	4.37	3.67	2.75	2.75
	Cr(Nm)	4344.98Nm	6507.03Nm	6230.10Nm	4496.63Nm	3583.10Nm	6057.87Nm	4399.77Nm	3525.58Nm	2870.01Nm	1922.30Nm	2433.21Nm
	η_d (1400)	90.00%	86.00%	84.00%	83.00	81.00%	79.00%	75.00%	72.00%	70.00%	65.00%	62.00%
	η_s	72.00%	66.67%	61.53%	60.54%	56.89%	48.00%	46.15%	42.24%	39.09%	34.40%	31.29%
BOX 150	Z_1	6	4	3	2	2	2	1	1	1	1	1
	Z_2	30	30	30	40	50	30	40	50	60	80	100
	β	32° 54' 19"	25° 29' 51"	17° 55' 41"	13° 24' 45"	11° 18' 36"	9° 55' 34"	6° 47' 58"	5° 42' 38"	5° 0' 2"	4° 9' 35"	3° 37' 43"
	m_x	5.5	6.2	5.5	6.2	5	4.2	6.2	5	4.2	3.2	2.6
	Cr(Nm)	4411.41Nm	5214.29Nm	3892.70Nm	7027.85Nm	5617.08Nm	1961.79Nm	6884.59Nm	5535.47Nm	4562.35Nm	3469.44Nm	2900.18Nm
	η_d (1400)	90.00%	86.00%	84.00%	83.00%	81.00%	79.00%	75.00%	72.00%	70.00%	65.00%	62.00%
	η_s	72.00%	66.67%	61.53%	60.54%	56.89%	48.00%	46.15%	42.24%	39.09%	34.40%	31.29%

tab. 1

Z_1 nr of starts of the worm
Z_2 nr of wormwheel teeth = $Z_1 \cdot i$
β helix angle
m_x normal module
η_d(1400) dynamic efficiency with n_1=1400rpm
η_s static efficiency
Cr Instanteneous Static max peak torque

irreversibility	dynamic	static
β > 20°	total reversibility	
10° < β < 20°	high dynamic reversibility	almost total reversibility - quick return
8° < β < 10°	high dynamic reversibility, low irreversibility	quick return
5° < β < 8°	low dynamic reversibility, but easy in case of vibrations	good reversibility and poor self-locking
3° < β < 5°	low dynamic reversibility, good irreversibility	very low reversibility and good irreversibility
1° < β < 3°	total irreversibility	

LUBRICATION

tab. 3

		BOX025	BOX030	BOX040	BOX050	BOX063	BOX075	BOX090	BOX110	BOX130	BOX150
		synthetic oil							mineral oil		
	T°C	-5°C to + 50°C							-5°C to+50°C		
	ISO VG...	ISO Vg460							ISO Vg460		
oil type	AGIP	TELIUM VSF460							BLASIA 460		
	SHELL	TIVELA OIL Sc460							OMALA OIL 460		
	SERVO								SERVOMESH Sp460		
	MOBIL	Mobil SHC 634							MOBIL GEAR 634		
	CASTROL	ALPHASYN Pg460							ALPHA MAX 460		
	BP	ENERGOL SG - XP 460							ENERGOL GR-XP-460		
oil quantity (lt.)	B3	0.02	0.04	0.08	0.15	0.30	0.55	1.00	3	4.5	7
	B8								2.2	3.3	5.1
	V5								3	4.5	7
	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 BOX sizes 25 to 90 are supplied with long life synthetic lubrication and they do not require any maintenance. However, if any topping up is required, it can be done using the filler hole provided on the gearboxes.

BOX110, BOX130 and BOX150 however must be filled with oil prior to be operated.

The use of oil instead of grease drastically improves the lubrication effectiveness and efficiency, particularly in the "limit layer" condition as well as in highly intermittent applications.

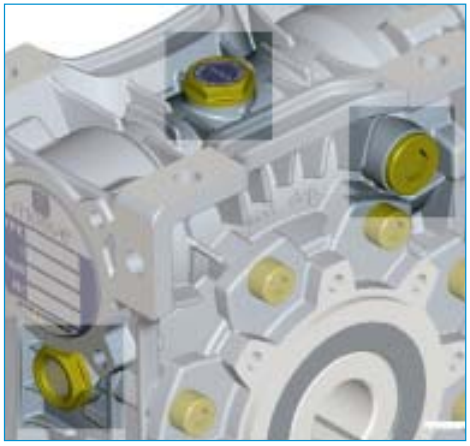
Furthermore synthetic oil lubrication assures a much wider range of low and high operating temperatures.

With the use of synthetic oil the limits of temperature rise during operation are determined by the properties of the seal material as well as the thermal expansion of the gearbox case (tab 3)

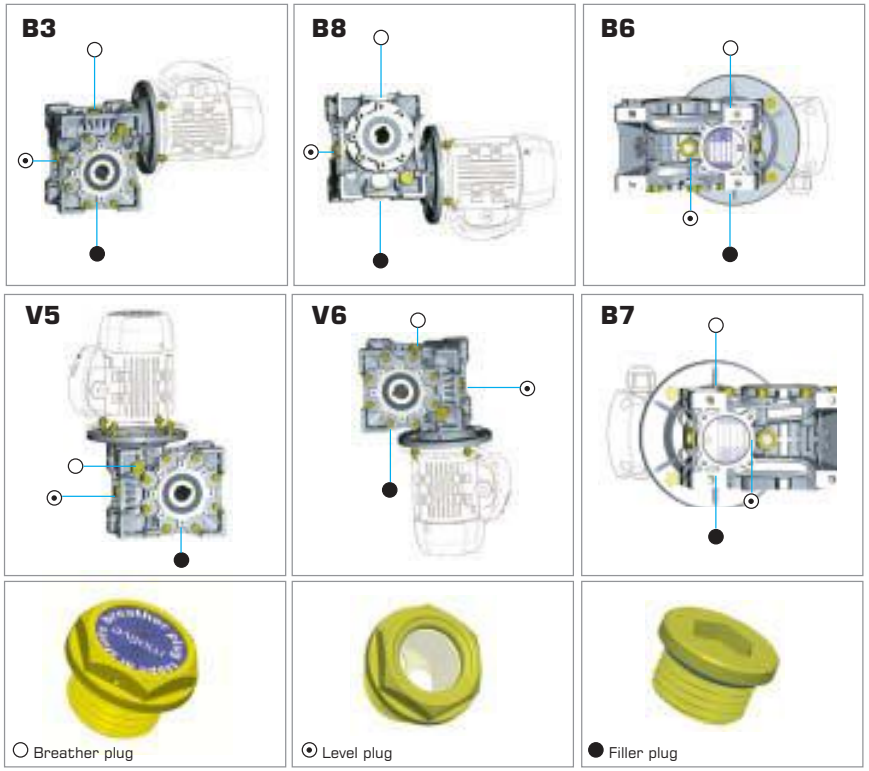
All units are supplied with plugs for filling, discharging and checking the level of the oil. Furthermore, a breather plug is also supplied with BOX63, BOX75, BOX90, BOX110 BOX130 and BOX150 .

Before start-up it is essential to replace the blind plug on the upper side of the unit with the breather plug. This operation is mandatory on BOX110, 130 and 150.

It is however advisable that solid plugs be used in ratios up to 40 as there may be some seepage of oil from the breather plug at certain speeds due to churning action of the gears.



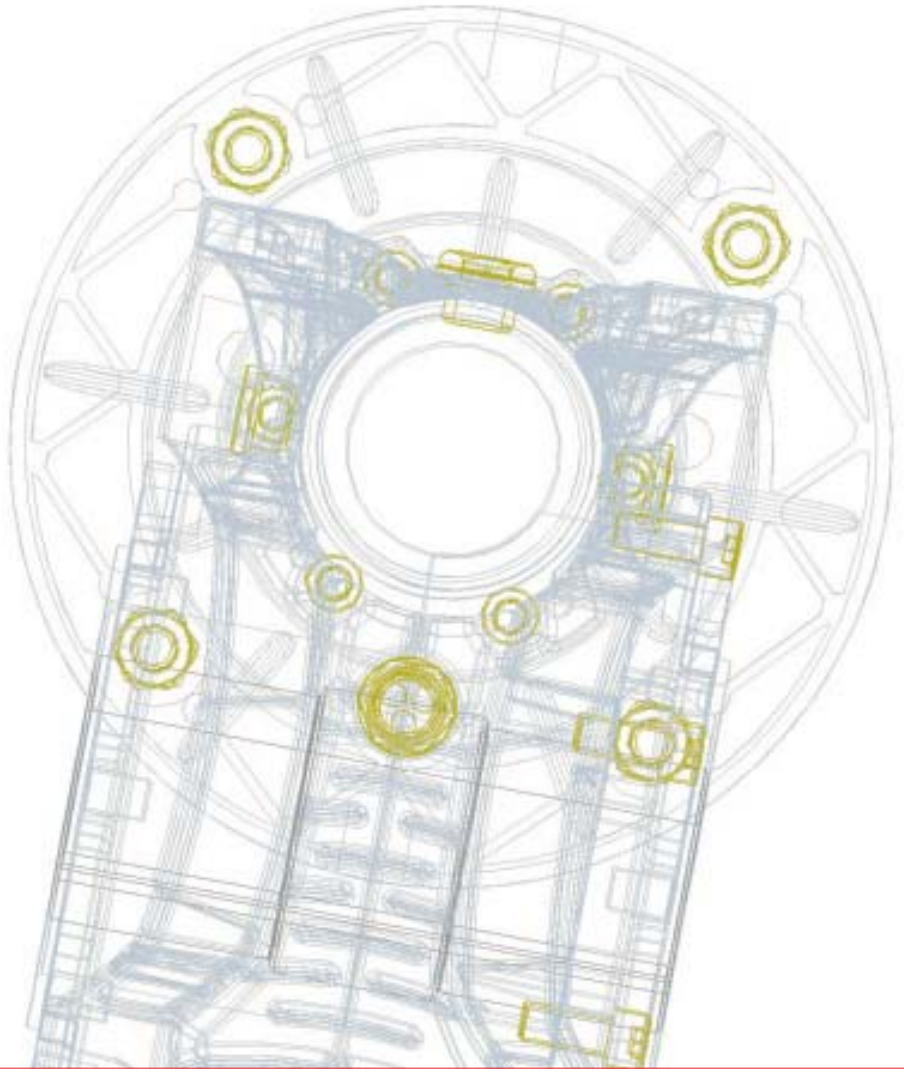
MOUNTING POSITIONS



The combination of the input shaft of 2 taper roller bearings (mounted on the BOX size 75 and up to achieve high resistance to the axial loads) and 2 nilos (mounted on the BOX sizes 75 up to 150 to keep lubricating grease inside the bearings even when they are not in contact with the lubricant inside the gear case), **permits the mounting of the whole BOX range from the size 25 to the size 150, in the positions V5 and V6.**

The mounting positions B6 or B7 of the units BOX063, BOX075, BOX090, BOX130 or BOX150 must be mentioned in the order.

graph 2



tab. 2

	load classification	application
c	Uneven operation, heavy loads, larger mass to be accelerated	Conveyors with violent jerks, compressors and alternating pumps with one or more cylinders, machinery for bricks, tiles and clay, kneaders, milling machines, lifting machines, lifting winches with buckets rotary furnaces, heavy fans or mining purposes, mixers for heavy materials, machine tools, planning machines, alternating saws, shears, tumbling barrels, vibrators, shredders
b	Starting with moderate loads uneven operating conditions, medium size mass to be accelerated	Belt conveyers with varied load with transfer for bridge trucks of light duty, leveling machines, shakers and mixers for liquid with variable density and viscosity machines for the food industry (kneading through, mincing machines, slicing machines, etc) sifting machines for sand gravel, textile industry machines, cranes, hoists, goods lifts, fertilizer scrapers, concrete mixers, folding machines, winches, crane mechanisms
a	Easy starting, smooth operation, small mass to be accelerated	Belt conveyers for light material, centrifugal pump , rotary gear pump, screw feeders for light materials, lifts, bottling machines, controls of machine tools, fans, power generators, filters, small mixers.

If, after the selection of the right $\mathbf{M_{r2}}$ and $\mathbf{n_2}$ in the following performance tables, a BOX unit whose service factor f_s is = of the requested one $\mathbf{f_{sr}}$, is not found, then it is advisable to choose a BOX unit in which $\mathbf{Mn_2 > M_{r2}}$

In order to satisfy $\mathbf{f_{sr}}$ another BOX unit whose output torque is = $\mathbf{M_{c2}}$ (required torque) can also be chosen.

$\mathbf{M_{c2}} = \mathbf{M_{r2}}\ \ \mathbf{f_{sr}}$

Note: This rule is valid only if the new BOX unit that has been selected in this way has a service factor $\mathbf{f_s}$ = 1 in the performance tables.

Essentially, the value of $\mathbf{f_s}$ in the performance tables refers to a case in which the effective torque requested by the application $\mathbf{M_{r2}}$ matches perfectly with the $\mathbf{M_{n2}}$ listed in this catalogue.

Whenever the torque indicated in the performance table is higher than the requested one. The offered service factor of the performance table can be increased according to the formula:

$$\mathbf{f_s} \text{ on the table } \frac{\mathbf{M_{n2}} \text{ on the Table}}{\mathbf{M_{r2}}}$$

The value of $\mathbf{f_s}$ calculated in this way must be = $\mathbf{f_{sr.}}$

PERFORMANCE TABLES

P_1 0,06 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
186,7	2,6	4.2	7.5	BOX025		56A-4
140,0	3,4	3,5	10			56A-4
93,3	4,9	2,5	15			56A-4
70,0	6,1	2,0	20			56A-4
46,7	8,2	1,6	30			56A-4
35,0	10	1,3	40			56A-4
28,0	12	0,9	50			56A-4
23,3	14	0,7	60			56A-4
186,7	2,6	6,9	7,5	BOX030		56A-4
140,0	3,4	5,4	10			56A-4
93,3	4,7	3,8	15			56A-4
70,0	6	3,0	20			56A-4
56,0	7	3,0	25			56A-4
46,7	8	2,5	30			56A-4
35,0	9,7	1,9	40			56A-4
28,0	11	1,5	50			56A-4
23,3	13	1,3	60			56A-4
17,5	14	0,9	80			56A-4
4,70	57	1,3	300	30X10	BOX030 + BOX040	56A-4
3,50	70	0,9	400	40X10		56A-4
2,80	96	0,6	500	25X20		56A-4
2,30	104	0,7	600	30X20		56A-4
1,90	121	0,6	750	50X15		56A-4
1,60	139	0,5	900	30X30		56A-4
1,20	166	0,4	1200	40X30		56A-4
0,90	196	0,4	1500	50X30		56A-4
0,80	218	0,3	1800	60X30		56A-4
0,58	261	0,2	2400	60X40		56A-4
0,40	300	0,2	3200	80X40		56A-4
0,40	279	0,1	4000	80X50		56A-4
0,3	324	0,1	4800	80X60		56A-4
1,60	141	1,0	900	60X15	BOX030 + BOX050	56A-4
1,20	169	0,7	1200	40X30		56A-4
0,93	199	0,7	1500	50X30		56A-4
0,8	222	0,7	1800	60X30		56A-4
0,60	266	0,5	2400	60X40		56A-4
0,48	288	1,3	4000	80X50		56A-4
0,50	307	0,4	3000	60X50		56A-4
0,3	311	0,3	4800	80X60		56A-4
0,93	204	1,1	1500	50X30	BOX030 + BOX063	56A-4
0,8	225	0,9	1800	60X30		56A-4
0,58	276	0,8	2400	60X40		56A-4
0,4	306	0,6	4000	80X50		56A-4
0,47	319	0,7	3000	60X50		56A-4
0,3	346	0,4	4800	80X60		56A-4

P_1 0,09 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
373,3	2	3,9	7,5	BOX025		56A-2
280,0	2,6	3,4	10			56A-2
186,7	3,8	2,4	15			56A-2
186,7	3,9	2,8	7,5			56B-4
140,0	4,9	1,9	20			56A-2
140,0	5,1	2,4	10			56B-4
93,3	6,7	1,3	30			56A-2
93,3	7,3	1,6	15			56B-4
70,0	8,3	1,1	40			56A-2
70,0	9,2	1,3	20			56B-4
56,0	10	0,9	50			56A-2
46,7	12	1,1	30			56B-4
35,0	15	0,9	40			56B-4
373,3	2	6,5	7,5	BOX030		56A-2
280,0	2,6	5,0	10			56A-2
186,7	3,7	3,5	15			56A-2
186,7	3,9	4,6	7,5			56B-4
140,0	4,8	2,5	20			56A-2
140,0	5	3,6	10			56B-4
112,0	5,7	2,8	25			56A-2
93,3	6,5	2,3	30			56A-2
93,3	7,1	2,5	15			56B-4
70,0	8,1	1,7	40			56A-2
70,0	9	2,0	20			56B-4
56,0	10	2,0	25			56B-4
56,0	10	1,4	50			56A-2
46,7	11	1,1	60			56A-2
46,7	12	1,7	30			56B-4
35,0	13	0,9	80			56B-4
35,0	14	1,2	40			56B-4
28,0	17	1,0	50			56B-4
23,3	19	0,9	60			56B-4
4,70	88	0,8	300	30X10	BOX030+ BOX040	56B-4
3,50	107	1,2	400	40X10	BOX030 + BOX050	56B-4
2,80	123	1,0	500	50X10		56B-4
2,30	159	0,9	600	60X10		56B-4
1,87	185	0,8	750	50X15		56B-4
1,60	212	0,7	900	60X15		56B-4
1,60	200	1,0	900	60X15	BOX030 + BOX063	56B-4
1,20	263	0,9	1200	60X20		56B-4
0,93	305	0,7	1500	50X30		56B-4

P_1 0,13 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
373,3	2,7	3,0	7,5	BOX025		56B-2
280,0	3,5	2,6	10			56B-2
186,7	5	1,8	15			56B-2
140,0	6,5	1,4	20			56B-2
93,3	9	1,0	30			56B-2
70,0	11	0,8	40			56B-2
186,7	5,2	3,4	7,5	BOX030		63A-4
140,0	6,7	2,7	10			63A-4
93,3	9,5	1,9	15			63A-4
70,0	12	1,5	20			63A-4
56,0	14	1,5	25			63A-4
46,7	16	1,3	30			63A-4
35,0	19	0,9	40			63A-4
28,0	23	0,8	50			63A-4
46,7	17	2,6	30	BOX040		63A-4
35,0	21	1,9	40			63A-4
28,0	25	1,5	50			63A-4
23,3	28	1,3	60			63A-4
17,5	34	1,0	80			63A-4
14,0	38	0,8	100			63A-4
23,3	29	2,3	60	BOX050		63A-4
17,5	35	1,9	80			63A-4
14,0	40	1,4	100			63A-4
4,70	119	1,2	300	30X10	BOX030 + BOX050	63A-4
3,50	142	0,9	400	40X10		63A-4
2,80	164	0,7	500	50X10		63A-4
2,80	171	1,3	500	50X10	BOX030 + BOX063	63A-4
2,30	208	1,1	600	60X10		63A-4
1,87	241	0,9	750	50X15		63A-4
1,60	325	1,2	900	60X15	BOX030+ BOX063	63A-4
1,20	399	0,9	1200	60X20		63A-4
0,78	547	0,9	1800	60X30	BOX040+ BOX090	63A-4
0,58	695	0,9	2400	80X30		63A-4
0,35	784	1,0	4000	100X40	BOX050 + BOX110	63A-4
0,47	884	1,2	3000	100X30		63A-4
0,28	928	0,8	5000	100X50		63A-4

PERFORMANCE TABLES

P_1 0,18 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
373,3	4	3,2	7,5	BOX030		63A-2
280,0	5,2	2,5	10			63A-2
186,7	7,5	1,7	15			63A-2
186,7	7,8	2,3	7,5			63B-4
140,0	10	1,8	10			63B-4
140,0	10	1,3	20			63A-2
112,0	11	1,4	25			63A-2
93,3	13	1,1	30			63A-2
93,3	14	1,3	15			63B-4
70,0	16	0,9	40			63A-2
70,0	18	1,0	20			63B-4
56,0	21	1,0	25			63B-4
46,7	24	0,8	30			63B-4
93,3	14	2,4	30	BOX040		63A-2
70,0	18	1,8	40			63A-2
70,0	19	2,0	20			63B-4
56,0	21	1,4	50			63A-2
56,0	23	1,7	25			63B-4
46,7	26	1,7	30			63B-4
45,0	29	1,5	20			71A-6
35,0	32	1,3	40			63B-4
36,0	34	1,3	25			71A-6
30,0	38	1,3	30			71A-6
28,0	38	1,0	50			63B-4
23,3	43	0,8	60			63B-4
22,5	47	1,0	40			71A-6
46,7	24	2,1	60	BOX050		63A-2
35,0	30	1,5	80			63A-2
35,0	33	2,3	40			63B-4
28,0	34	1,2	100			63A-2
28,0	39	1,9	50			63B-4
23,3	43	1,6	60			63B-4
17,5	52	1,2	80			63B-4
18,0	56	1,4	50			71A-6
14,0	60	0,9	100			63B-4
15,0	63	1,1	60			71A-6
11,2	75	0,9	80			71A-6
4,70	210	1,1	300	30X10	BOX030 + BOX063	63B-4
3,50	222	1,0	400	40X10		63B-4
2,80	257	0,8	500	50X10		63B-4
3,50	271	0,8	400	40X10		63B-4
2,30	362	1,1	600	60X10	BOX040 + BOX075	63B-4
1,90	435	0,9	750	100X7.5		63B-4
1,60	487	0,8	900	60X15		63B-4
1,20	629	1,0	1200	60X20	BOX040+ BOX090	63B-4
0,93	735	0,8	1500	50X30		63B-4
0,78	861	1,5	1800	60X30	BOX050+ BOX110	63B-4
0,58	1113	1,1	2400	80X30		63B-4

P_1 0,25 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
373,3	5,6	2,3	7,5	BOX030		63B-2
280,0	7,2	1,8	10			63B-2
186,7	10	1,3	15			63B-2
140,0	13	0,9	20			63B-2
112,0	16	1,0	25			63B-2
93,3	18	0,8	30			63B-2
186,7	11	3,6	7,5	BOX040		71A-4
140,0	14	2,8	10			71A-4
120,0	17	2,6	7,5			71B-6
93,3	21	1,9	15			71A-4
90,0	22	2,0	10			71B-6
70,0	27	1,5	20			71A-4
60,0	31	1,4	15			71B-6
56,0	32	1,2	25			71A-4
46,7	36	1,3	30			71A-4
45,0	40	1,1	20			71B-6
35,0	44	0,9	40			71A-4
36,0	48	0,9	25			71B-6
30,0	53	0,9	30			71B-6
70,0	27	2,7	20	BOX050		71A-4
56,0	32	2,2	25			71A-4
46,7	37	2,3	30			71A-4
45,0	40	1,9	20			71B-6
35,0	42	1,1	80			63B-2
35,0	46	1,7	40			71A-4
28,0	48	0,8	100			63B-2
36,0	48	1,5	25			71B-6
30,0	54	1,7	30			71B-6
28,0	54	1,4	50			71A-4
23,3	60	1,1	60			71A-4
22,5	67	1,2	40			71B-6
17,5	72	0,9	80			71A-4
18,0	78	1,0	50			71B-6
15,0	88	0,8	60			71B-6
28,0	56	2,4	50	BOX063		71A-4
23,3	63	2,0	60			71A-4
17,5	78	1,6	80			71A-4
18,0	81	1,8	50			71B-6
14,0	87	1,4	100			71A-4
15,0	92	1,5	60			71B-6
11,3	110	1,2	80			71B-6
9,0	125	1,0	100			71B-6
7,00	159	1,4	400	40X10	BOX030+ BOX063	63B-2
5,60	185	1,2	500	50X10		63B-2
3,50	336	1,1	400	40X10	BOX040+ BOX075	71A-4
2,80	384	0,8	500	50X10		71A-4
2,30	512	1,2	600	60X10	BOX040 + BOX090	71A-4
1,90	598	0,9	750	100X7.5		71A-4
1,60	667	0,8	900	60X15		71A-4
1,20	943	1,3	1200	60X20	BOX050 + BOX110	71A-4
0,93	1064	1,2	1500	100X15		71A-4
0,78	1195	1,1	1800	60X30		71A-4

P_1 0,37 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
373,3	8,4	3,3	7,5	BOX040		71A-2
280,0	11	2,6	10			71A-2
186,7	16	1,9	15			71A-2
186,7	16	2,4	7,5			71B-4
140,0	21	1,9	10			71B-4
140,0	21	1,4	20			71A-2
112,0	25	1,1	25			71A-2
93,3	31	1,3	15			71B-4
70,0	39	1,0	20			71B-4
56,0	47	0,8	25			71B-4
46,7	53	0,8	30			71B-4
140,0	22	3,3	10	BOX050		71B-4
112,0	25	2,0	25			71A-2
120,0	25	3,3	7,5			80A-6
93,3	29	2,2	30			71A-2
93,3	31	2,4	15			71B-4
90,0	33	2,5	10			80A-6
70,0	37	1,6	40			71A-2
70,0	40	1,8	20			71B-4
56,0	44	1,2	50			71A-2
60,0	47	1,8	15			80A-6
56,0	48	1,5	25			71B-4
46,7	50	1,0	60			71A-2
46,7	55	1,5	30			71B-4
45,0	60	1,3	20			80A-6
35,0	62	0,7	80			71A-2
35,0	68	1,1	40			71B-4
36,0	72	1,0	25			80A-6
30,0	80	1,1	30			80A-6
28,0	80	0,9	50			71B-4
23,3	89	0,8	60			71B-4
45,0	60	2,4	20	BOX063		80A-6
35,0	71	2,1	40			71B-4
36,0	74	1,9	25			80A-6
30,0	82	2,1	30			80A-6
28,0	83	1,6	50			71B-4
23,3	94	1,4	60			71B-4
22,5	102	1,6	40			80A-6
17,5	115	1,1	80			71B-4
18,0	120	1,2	50			80A-6
14,0	129	0,9	100			71B-4
15,0	137	1,0	60			80A-6
18,0	126	1,8	50	BOX075		80A-6
15,0	144	1,5	60			80A-6
11,3	173	1,2	80			80A-6
9,0	196	1,0	100			80A-6
9,30	181	1,3	300	30X10	BOX030+ BOX063	71A-2
7,00	236	1,0	400	40X10		71A-2
4,70	405	1,0	300	30X10	BOX040+ BOX075	71B-4
3,50	498	0,7	400	40X10		71B-4
4,70	402	1,5	300	30X10	BOX040 + BOX090	71B-4
3,50	523	1,2	400	40X10		71B-4
2,80	611	0,9	500	50X10		71B-4
2,30	757	0,8	600	60X10		71B-4
1,90	950	1,3	750	100X7.5	BOX050 + BOX110	71B-4
1,60	1079	1,2	900	60X15		71B-4
1,20	1396	0,8	1200	60X20		71B-4

PERFORMANCE TABLES

P_1 0,55 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
373,3	13	2,2	7,5	BOX040		71B-2
280,0	17	1,8	10			71B-2
186,7	24	1,3	15			71B-2
140,0	31	0,9	20			71B-2
112,0	37	0,8	25			71B-2
186,7	25	2,9	7,5	BOX050		80A-4
140,0	31	1,7	20			71B-2
140,0	32	2,2	10			80A-4
112,0	38	1,4	25			71B-2
120,0	38	2,2	8			80B-6
93,3	43	1,5	30			71B-2
93,3	46	1,6	15			80A-4
90,0	49	1,7	10			80B-6
70,0	55	1,1	40			71B-2
70,0	59	1,2	20			80A-4
56,0	65	0,8	50			71B-2
60,0	69	1,2	15			80B-6
56,0	71	1,0	25			80A-4
46,7	74	0,7	60			71B-2
46,7	81	1,0	30			80A-4
45,0	89	0,9	20			80B-6
70,0	56	1,9	40	BOX063		71B-2
70,0	61	2,2	20			80A-4
56,0	67	1,5	50			71B-2
60,0	71	2,2	15			80B-6
56,0	73	1,8	25			80A-4
46,7	77	1,2	60			71B-2
46,7	83	1,9	30			80A-4
45,0	90	1,6	20			80B-6
35,0	95	0,9	80			71B-2
35,0	105	1,4	40			80A-4
28,0	109	0,7	100			71B-2
36,0	109	1,3	25			80B-6
30,0	123	1,4	30			80B-6
28,0	124	1,1	50			80A-4
23,3	140	0,9	60			80A-4
22,5	152	1,1	40			80B-6
35,0	108	2,0	40	BOX075		80A-4
30,0	128	2,0	30			80B-6
28,0	129	1,6	50			80A-4
23,3	146	1,4	60			80A-4
22,5	159	1,5	40			80B-6
17,5	180	1,1	80			80A-4
18,0	187	1,2	50			80B-6
14,0	206	0,9	100			80A-4
15,0	214	1,0	60			80B-6
17,5	189	1,5	80	BOX090		80A-4
18,0	198	2,0	50			80B-6
14,0	221	1,2	100			80A-4
15,0	224	1,6	60			80B-6
11,3	275	1,1	80			80B-6
9,0	315	0,9	100			80B-6
17,5	201	2,6	80	BOX110		80A-4
14,0	236	2,0	100			80A-4
11,3	294	1,9	80			80B-6
9,0	338	1,5	100			80B-6
9,30	306	2,0	300	30X10	BOX040+ BOX090	71B-2
7,00	403	1,5	400	40X10		71B-2
5,60	470	1,2	500	50X10		71B-2
4,70	639	2,0	300	30X10	BOX050 + BOX110	80A-4
3,50	826	1,4	400	40X10		80A-4
2,80	984	1,1	500	50X10		80A-4
2,30	1181	1,0	600	60X10		80A-4
1,90	1411	0,9	750	100X7.5		80A-4

P_1 0,75 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
373,3	17	3.0	7,5	BOX040		80A-2
280,0	23	2.4	10			80A-2
186,7	32	1.7	15			80A-2
373,3	17	3,0	7,5	BOX050		80A-2
280,0	23	2,4	10			80A-2
186,7	33	1,7	15			80A-2
186,7	34	2,1	7,5			80B-4
140,0	42	1,3	20			80A-2
140,0	44	1,6	10			80B-4
112,0	51	1,0	25			80A-2
93,3	58	1,1	30			80A-2
93,3	63	1,2	15			80B-4
70,0	81	0,9	20			80B-4
140,0	43	2,3	20	BOX063		80A-2
112,0	52	1,8	25			80A-2
120,0	52	2,9	7,5			90S-6
93,3	60	2,0	30			80A-2
93,3	64	2,2	15			80B-4
90,0	68	2,3	10			90S-6
70,0	77	1,4	40			80A-2
70,0	83	1,6	20			80B-4
56,0	91	1,1	50			80A-2
60,0	97	1,6	15			90S-6
56,0	100	1,3	25			80B-4
46,7	104	0.9	60			80A-2
46,7	114	1,4	30			80B-4
45,0	123	1,2	20			90S-6
35,0	143	1,0	40			80B-4
36,0	149	0,9	25			90S-6
30,0	167	1,0	30			90S-6
60,0	98	2,4	15	BOX075		90S-6
56,0	102	2,0	25			80B-4
46,7	109	1,3	60			80A-2
46,7	117	2,0	30			80B-4
45,0	126	1,9	20			90S-6
35,0	147	1,5	40			80B-4
36,0	153	1,4	25			90S-6
28,0	156	0,8	100			80A-2
30,0	174	1,5	30			90S-6
28,0	177	1,2	50			80B-4
23,3	200	1,0	60			80B-4
22,5	216	1,1	40			90S-6
35,0	141	1,6	80	BOX090		80A-2
28,0	166	1,2	100			80A-2
30,0	179	2,6	30			90S-6
28,0	184	1,8	50			80B-4
23,3	212	1,5	60			80B-4
22,5	226	1,8	40			90S-6
17,5	258	1,1	80			80B-4
18,0	271	1,4	50			90S-6
14,0	302	0,9	100			80B-4
15,0	306	1,1	60			90S-6
17,5	274	1,9	80	BOX110		80B-4
14,0	322	1,5	100			80B-4
15,0	325	2,1	60			90S-6
11,3	401	1,4	80			90S-6
9,0	462	1,1	100			90S-6
7,00	549	1,1	400	40X10	BOX040+ BOX090	80A-2
5,60	642	0,9	500	50X10		80A-2
9,30	446	2,8	300	30X10	BOX050 + BOX110	80A-2
7,00	563	2,1	400	40X10		80A-2
5,60	687	1,6	500	50X10		80A-2
4,70	871	1,5	300	30X10		80B-4
3,50	1126	1,1	400	40X10		80B-4

P_1 1,1 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
373,3	25	2,1	7,5	BOX050		80B-2
280,0	33	1,6	10			80B-2
186,7	48	1,2	15			80B-2
140,0	62	0,9	20			80B-2
186,7	48	2,1	15	BOX063		80B-2
186,7	50	2,6	7,5			90S-4
140,0	63	1,6	20			80B-2
140,0	65	2,0	10			90S-4
120,0	76	2,0	7,5			90L-6
112,0	77	1,2	25			80B-2
93,3	88	1,4	30			80B-2
93,3	93	1,5	15			90S-4
90,0	99	1,5	10			90L-6
70,0	113	1,0	40			80B-2
70,0	122	1,1	20			90S-4
60,0	142	1,1	15			90L-6
56,0	146	0,9	25			90S-4
46,7	167	1,0	30			90S-4
45,0	180	0,8	20			90L-6
112,0	78	1,9	25	BOX075		80B-2
93,3	90	1,9	30			80B-2
93,3	96	2,1	15			90S-4
90,0	100	2,3	10			90L-6
70,0	116	1,4	40			80B-2
70,0	123	1,7	20			90S-4
56,0	139	1,1	50			80B-2
60,0	144	1,6	15			90L-6
56,0	150	1,3	25			90S-4
46,7	160	0,9	60			80B-2
46,7	171	1,3	30			90S-4
45,0	184	1,3	20			90L-6
35,0	216	1,0	40			90S-4
36,0	225	1,0	25			90L-6
30,0	256	1,0	30			90L-6
35,0	207	1,1	80	BOX090		80B-2
35,0	225	1,6	40			90S-4
36,0	231	1,6	25			90L-6
28,0	244	0,8	100			80B-2
30,0	263	1,8	30			90L-6
28,0	270	1,3	50			90S-4
23,3	311	1,0	60			90S-4
22,5	331	1,2	40			90L-6
18,0	397	1,0	50			90L-6
15,0	448	0,8	60			90L-6
28,0	281	2,3	50	BOX110		90S-4
23,3	324	1,9	60			90S-4
22,5	345	2,3	40			90L-6
17,5	402	1,3	80			90S-4
18,0	414	1,8	50			90L-6
14,0	473	1,0	100			90S-4
15,0	476	1,4	60			90L-6
11,3	588	1,0	80			90L-6
9,30	654	1,9	300	30X10	BOX050 + BOX110	80B-2
7,00	845	1,4	400	40X10		80B-2
5,60	1007	1,1	500	50X10		80B-2
17,5	408	2,1	80	BOX130		90S-4
14,0	480	1,5	100			90S-4
11,6	598	1,4	80			90L-6
9,0	689	1,1	100			90L-6

PERFORMANCE TABLES

P_1 1,5 kW

n_2 [rpm]	M_2 [Nm]	f_s	i			
373,3	35	2,7	7,5	BOX063		90S-2
280,0	46	2,1	10			90S-2
186,7	66	1,6	15			90S-2
186,7	68	1,9	7,5			90L-4
140,0	86	1,2	20			90S-2
140,0	89	1,5	10			90L-4
112,0	105	0,9	25			90S-2
93,3	120	1,0	30			90S-2
93,3	127	1,1	15			90L-4
70,0	166	0,8	20			90L-4
280,0	46	3,1	10	BOX075		90S-2
186,7	67	2,2	15			90S-2
140,0	87	1,8	20			90S-2
140,0	90	2,2	10			90L-4
120,0	105	2,0	7,5			100LA-6
112,0	106	1,4	25			90S-2
93,3	123	1,4	30			90S-2
93,3	130	1,5	15			90L-4
90,0	137	1,7	10			100LA-6
70,0	158	1,0	40			90S-2
70,0	168	1,3	20			90L-4
56,0	189	0,8	50			90S-2
60,0	196	1,2	15			100LA-6
56,0	205	1,0	25			90L-4
46,7	218	0,7	60			90S-2
46,7	233	1,0	30			90L-4
90,0	138	2,7	10	BOX090		100LA-6
70,0	172	2,1	20			90L-4
56,0	194	1,4	50			90S-2
60,0	201	2,1	15			100LA-6
56,0	210	1,6	25			90L-4
46,7	227	1,1	60			90S-2
46,7	239	1,7	30			90L-4
45,0	258	1,5	20			100LA-6
35,0	307	1,2	40			90L-4
36,0	314	1,2	25			100LA-6
30,0	358	1,3	30			100LA-6
28,0	368	0,9	50			90L-4
23,3	424	0,8	60			90L-4
46,7	236	2,0	60	BOX110		90S-2
45,0	264	2,7	20			100LA-6
35,0	299	1,3	80			90S-2
35,0	319	2,2	40			90L-4
36,0	322	2,4	25			100LA-6
28,0	353	1,0	100			90S-2
30,0	363	2,3	30			100LA-6
28,0	384	1,7	50			90L-4
23,3	442	1,4	60			90L-4
22,5	471	1,7	40			100LA-6
17,5	548	0,9	80			90L-4
18,0	565	1,3	50			100LA-6
15,0	649	1,1	60			100LA-6
9,3	891	1,4	300	30X10	BOX050+ BOX110	90S-2
7,0	1153	1,0	400	40X10		90S-2
5,6	1373	0,8	500	50X10		90S-2
22,5	478	2,3	40	BOX130		100LA-6
18,0	573	1,8	50			100LA-6
17,5	557	1,5	80			90L-4
15,0	659	1,4	60			100LA-6
14,0	655	1,1	100			90L-4
11,3	815	1,1	80			100LA-6

P_1 2,2 kW

n_2 [rpm]	M_2 [Nm]	f_s	i		
373,3	51	1,8	7,5	BOX063	90L-2
280,0	67	1,5	10		90L-2
186,7	97	1,1	15		90L-2
373,3	51	2,5	7,5	BOX075	90L-2
280,0	68	2,1	10		90L-2
186,7	98	1,5	15		90L-2
186,7	100	1,8	7,5		100LA-4
140,0	128	1,3	20		90L-2
140,0	132	1,5	10		100LA-4
112,0	156	1,0	25		90L-2
93,3	180	0,9	30		90L-2
93,3	191	1,0	15		100LA-4
186,7	101	2,9	7,5	BOX090	100LA-4
140,0	131	2,0	20		90L-2
140,0	134	2,3	10		100LA-4
120,0	156	2,2	7,5		112M-6
112,0	159	1,6	25		90L-2
93,3	185	1,7	30		90L-2
93,3	194	1,9	15		100LA-4
90,0	203	1,8	10		112M-6
70,0	237	1,2	40		90L-2
70,0	252	1,4	20		100LA-4
56,0	285	0,9	50		90L-2
60,0	294	1,4	15		112M-6
56,0	308	1,1	25		100LA-4
46,7	351	1,2	30		100LA-4
45,0	378	1,0	20		112M-6
112,0	163	3,1	25	BOX110	90L-2
93,3	187	3,0	30		90L-2
90,0	205	3,5	10		112M-6
70,0	246	2,1	40		90L-2
70,0	255	2,5	20		100LA-4
56,0	296	1,7	50		90L-2
60,0	298	2,6	15		112M-6
56,0	315	2,2	25		100LA-4
46,7	347	1,4	60		90L-2
46,7	356	2,0	30		100LA-4
45,0	388	1,9	20		112M-6
35,0	468	1,5	40		100LA-4
36,0	473	1,6	25		112M-6
30,0	532	1,6	30		112M-6
28,0	563	1,2	50		100LA-4
23,3	648	1,0	60		100LA-4
36,0	479	2,2	25	BOX130	112M-6
35,0	468	2,2	40		100LA-4
35,0	438	1,3	80		90L-2
30,0	546	2,1	30		112M-6
28,0	563	1,7	50		100LA-4
28,0	525	1,0	100		90L-2
23,3	648	1,4	60		100LA-4
22,5	700	1,6	40		112M-6
18,0	840	1,2	50		112M-6
17,5	816	1,0	80		100LA-4
15,0	966	1,0	60		112M-6
28,0	570	2,5	50	BOX150	100LA-4
23,3	657	1,9	60		100LA-4
17,5	816	1,4	80		100LA-4
14,0	960	1,0	100		100LA-4

P_1 3 kW

n_2 [rpm]	M_2 [Nm]	f_s	i		
373,3	70	1,9	7,5	BOX075	100L-2
280,0	92	1,6	10		100L-2
186,7	137	1,4	7,5		100LB-4
140,0	180	1,1	10		100LB-4
93,3	261	0,8	15		100LB-4
373,3	71	3,0	7,5	BOX090	100L-2
280,0	92	2,6	10		100L-2
186,7	138	2,1	7,5		100LB-4
140,0	182	1,7	10		100LB-4
93,3	264	1,4	15		100LB-4
70,0	344	1,0	20		100LB-4
56,0	420	0,8	25		100LB-4
46,7	479	0,9	30		100LB-4
120,0	212	3,1	7,5	BOX110	132S-6
93,3	264	2,5	15		100LB-4
90,0	280	2,5	10		132S-6
70,0	348	1,9	20		100LB-4
60,0	406	1,9	15		132S-6
56,0	430	1,6	25		100LB-4
46,7	485	1,5	30		100LB-4
45,0	528	1,4	20		132S-6
35,0	638	1,1	40		100LB-4
28,0	767	0,9	50		100LB-4
90,0	280	3,4	10	BOX130	132S-6
60,0	406	2,6	15		132S-6
56,0	430	2,2	25		100LB-4
46,7	491	2,1	30		100LB-4
45,0	535	1,9	20		132S-6
36,0	653	1,6	25		132S-6
35,0	638	1,6	40		100LB-4
30,0	745	1,6	30		132S-6
28,0	767	1,3	50		100LB-4
23,3	884	1,0	60		100LB-4
22,5	955	1,2	40		132S-6
17,5	1113	0,8	80		100LB-4
28,0	778	1,8	50	BOX150	100LB-4
23,3	896	1,4	60		100LB-4
17,5	1113	1,0	80		100LB-4
14,0	1310	0,8	100		100LB-4

PERFORMANCE TABLES

P_1 4 kW

n_2 [rpm]	M_2 [Nm]	f_s	i		
373,3	93	1,4	7,5	BOX075	112M-2
280,0	123	1,2	10		112M-2
186,7	182	1,0	7,5		112M-4
140,0	240	0,8	10		112M-4
373,3	94	2,2	7,5	BOX090	112M-2
280,0	123	1,9	10		112M-2
186,7	184	1,6	7,5		112M-4
140,0	243	1,3	10		112M-4
93,3	352	1,0	15		112M-4
70,0	458	0,8	20		112M-4
140,0	243	2,5	10	BOX110	112M-4
120,0	283	2,3	7,5		132M-6
93,3	352	1,9	15		112M-4
90,0	374	1,9	10		132M-6
70,0	464	1,4	20		112M-4
60,0	541	1,4	15		132M-6
60,0	573	1,2	25		112M-4
46,7	647	1,1	30		112M-4
120,0	287	3,1	7,5	BOX130	132M-6
90,0	374	2,6	10		132M-6
60,0	541	2,0	15		132M-6
56,0	573	1,6	25		112M-4
46,7	655	1,6	30		112M-4
45,0	713	1,5	20		132M-6
36,0	870	1,2	25		132M-6
35,0	851	1,2	40		112M-4
28,0	1023	1,0	50		112M-4
23,3	1179	0,8	60		112M-4
28,0	982	1,7	50	BOX150	100LB-4
23,3	1146	1,3	60		100LB-4
17,5	1418	0,9	80		100LB-4
14,0	1691	0,7	100		100LB-4

P_1 5,5 kW

n_2 [rpm]	M_2 [Nm]	f_s	i		
186,7	253	2,2	7,5	BOX110	132S-4
140,0	334	1,8	10		132S-4
93,3	484	1,4	15		132S-4
70,0	638	1,0	20		132S-4
140,0	334	2,5	10	BOX130	132S-4
93,3	490	1,9	15		132S-4
70,0	645	1,4	20		132S-4
56,0	788	1,2	25		132S-4
46,7	900	1,2	30		132S-4
35,0	1171	0,9	40		132S-4
70,0	645	2,0	20	BOX150	132S-4
56,0	788	1,5	25		132S-4
46,7	934	1,3	30		132S-4
35,0	1171	1,3	40		132S-4
28,0	1426	1,0	50		132S-4
23,3	1643	0,8	60		132S-4

P_1 7,5 kW

n_2 [rpm]	M_2 [Nm]	f_s	i		
186,7	345	1,6	7,5	BOX110	132M-4
140,0	455	1,3	10		132M-4
93,3	660	1,0	15		132M-4
186,7	349	2,1	7,5	BOX130	132M-4
140,0	455	1,8	10		132M-4
93,3	668	1,4	15		132M-4
70,0	880	1,0	20		132M-4
56,0	1074	0,9	25		132M-4
46,7	1228	0,8	30		132M-4
35,0	1596	0,7	40		132M-4
70,0	880	1,5	20	BOX150	132M-4
56,0	1074	1,1	25		132M-4
46,7	1274	0,9	30		132M-4
35,0	1596	1,0	40		132M-4

P_1 9,2 kW

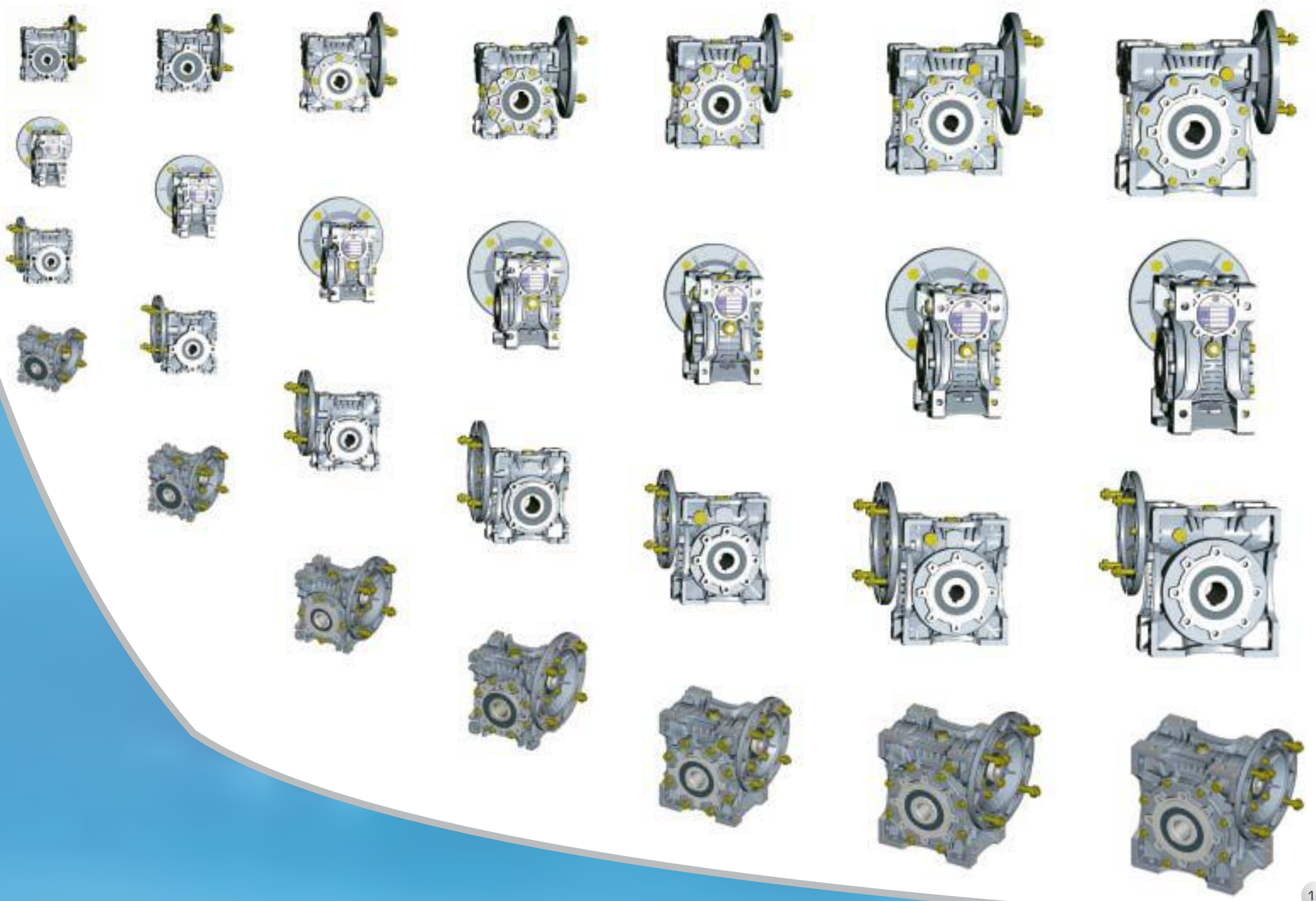
n_2 [rpm]	M_2 [Nm]	f_s	i		
186,7	424	1,3	7,5	BOX110	132M-4
186,7	428	1,8	7,5	BOX130	132M-4
140,0	559	1,5	10		132M-4
93,3	819	1,1	15		132M-4
70,0	1079	0,8	20		132M-4
56,0	1318	0,7	25		132M-4
70,0	1079	1,2	20	BOX150	132M-4
56,0	1318	0,9	25		132M-4
46,7	1563	0,8	30		132M-4
35,0	1958	0,8	40		132M-4

P_1 11 kW

n_2 [rpm]	M_2 [Nm]	f_s	i		
186,7	424	2,3	7,5	BOX150	160M-4
140,0	675	1,8	10		160M-4
93,3	990	1,3	15		160M-4
70,0	1291	1,0	20		160M-4
56,0	1576	0,8	25		160M-4

P_1 15 kW

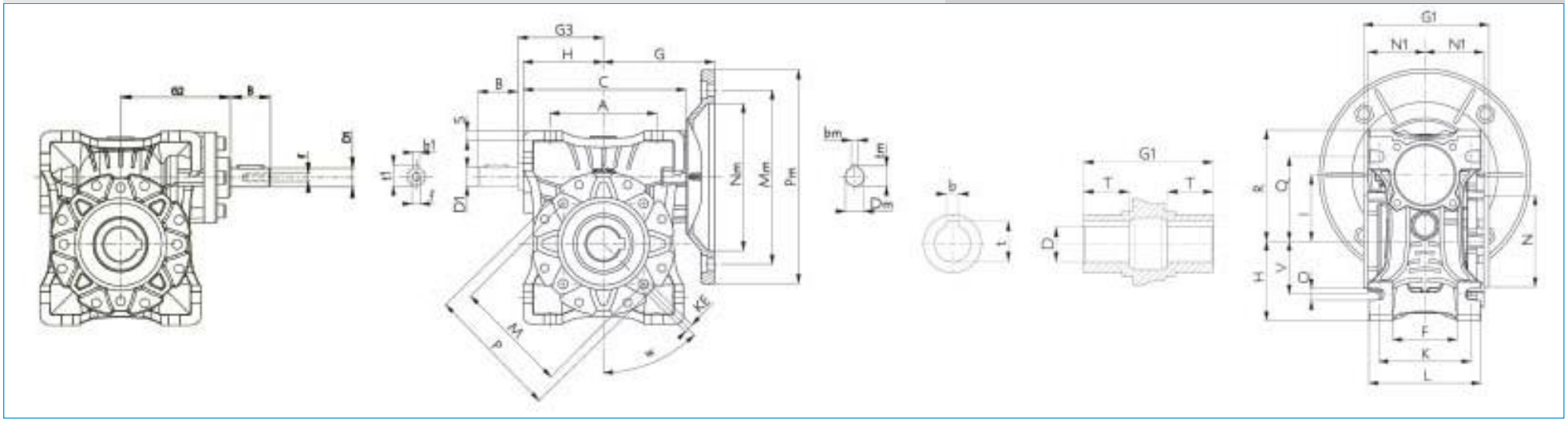
n_2 [rpm]	M_2 [Nm]	f_s	i		
186,7	698	1,7	7,5	BOX150	160L-4
140,0	921	1,3	10		160L-4
93,3	1351	0,9	15		160L-4
70,0	1760	0,7	20		160L-4



DIMENSIONAL TABLES

general data

Box type	A	C	G	H	I	K	KE	L	M	N(h8)	N1	O	P	Q	R	S	V	W	output T	output G1	output D(H7)	output b	output t	MB/MF B	MB/MF D1(j6)	MB/MF G2	MB/MF G3	MB/MF b1	MB/MF t1	MB/MF f	Kgs
BOX025	45	70	40	35	25	34	M6.5(n°3)	42	55	45(h9)	22,5	6	-	35.5	48	5	22.5	-	16	50	11	4	12.8	-	-	-	-	-	-		0.8
BOX030	54	80	55	40	30	44	M6x11(n°4)	56	65	54	29	6.5	75	44	57	5.5	27	-	20	63	14	5	16.3	20	9	51	45	3	10.5	M4	1.3
BOX040	70	101	71	50	40	60	M6x10(n°4)	71	75	60	36.5	6.5	87	56	70.5	6.5	35	45°	23	78	18(19)	6	20.8(21.8)	23	11	61	53	4	12.5	M4	2.7
BOX050	80	121.5	80	60	50	70	M8x10(n°4)	85	85	70	43.5	8.5	100	64	84	7	40	45°	30	92	25(24)	8	28.3(27.3)	30	14	76	64	5	16	M5	3.6
BOX063	100	147.5	95	72	63	85	M8x14(n°8)	103	95	80	53	8.5	110	80	102	8	50	45°	40	112	25(28)	8	28.3(31.3)	40	19	95	75	6	21.5	M8	7.8
BOX075	120	174	112.5	86	75	90	M8x14(n°8)	113	115	95	57	11	140	93	119	10	60	45°	50	120	28(30)	8(10)	31.3(38.3)	50	24	107	90	8	27	M8	9
BOX090	140	208	129.5	103	90	100	M10x18(n°8)	130	130	110	67	13	160	102	135	11	70	45°	50	140	35(38)	10	38.3(41.3)	50	24	125	108	8	27	M8	14
BOX110	170	252.5	160	127.5	110	115	M10x18(n°8)	142	165	130	74	14	200	125	167.5	15	85	45°	60	155	42	12	45.3	60	28	142	135	8	31	M10	35
BOX130	200	292.5	180	147.5	130	120	M12x21(n°8)	155	215	180	81	16	250	140	187.5	15.5	100	45°	60	170	45	14	48.3	-	-	-	-	-	-	-	52
BOX150	240	340	210	170	150	145	M12x21(n°8)	185	215	180	96	18	250	180	230	18	120	45°	72.5	200	50	14	53.8	-	-	-	-	-	-	-	91



BOX

BOX+MF

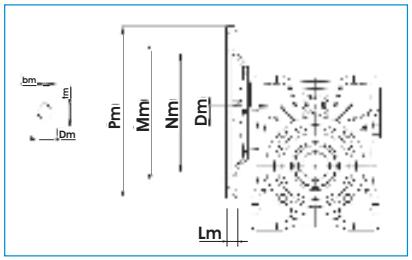
BOX+MB

BOX+DEL

DIMENSIONAL TABLES

input and combinations

BOX type	motor	type	Nm	Mm	Pm	Dm	Lm	tm	bm	7.5	10	15	20	25	30	40	50	60	80	100
BOX025	56	B14	50	65	80	9	6	10.4	3	■	■	■	■		■	■	■	■		
BOX030	56	B14(*)	50	65	80	9	6	10.4	3	■	■	■	■	■	■	■	■	■	■	
		B5(*)	80	100	120	9	7	10.4	3	■	■	■	■	■	■	■	■	■	■	
	63	B5	95	115	140	11	8	12.8	4	■	■	■	■	■	■	■	■			
		B14	60	75	90		11 .5			■	■	■	■	■	■	■	■			
	71	B5	110	130	160	14	10	16.3	5	■	■	■	■	■	■	■	■	■		
BOX040	63	B5	95	115	140	11	12	12.8	4	■	■	■	■	■	■	■	■	■	■	■
		B14(*)	60	75	90	11	11			■	■	■	■	■	■	■	■	■	■	■
	71	B5	110	130	160	14	10	16.3	5	■	■	■	■	■	■	■	■			
		B14(*)	70	85	105	14	6.5			■	■	■	■	■	■	■	■			
BOX050	63	B5	95	115	140	11	12	12.8	4							■	■	■	■	■
	71	B5	110	130	160	14	11	16.3	5	■	■	■	■	■	■	■	■	■	■	
		B14(*)	70	85	105	14	8.5			■	■	■	■	■	■	■	■	■	■	
	80	B5	130	165	200	19	13	21.8	6	■	■	■	■	■	■	■				
		B14(*)	80	100	120	19	8			■	■	■	■	■	■	■				
BOX063	71	B5	110	130	160	14	12	16.3	5							■	■	■	■	■
		B14(*)	70	85	105	14	8									■	■	■	■	■
	80	B5	130	165	200	19	13	21.8	6	■	■	■	■	■	■	■	■	■		
		B14(*)	80	100	120	19	7			■	■	■	■	■	■	■	■	■		
	90	B5	130	165	200	24	13	27.3	8	■	■	■	■	■	■	■				
		B14(*)	95	115	140	24	11			■	■	■	■	■	■	■				
BOX075	71	B5	110	130	160	14	12	16.2	5							■	■	■	■	■
	80	B5	130	165	200	19	11	21.8	6							■	■	■	■	■
		B14(*)	80	100	120	19	11									■	■	■	■	■
	90	B5	130	165	200	24	11	27.3	8	■	■	■	■	■	■	■	■	■		
		B14(*)	95	115	140	24	11			■	■	■	■	■	■	■	■	■		
	100	B5	180	215	250	28	11	31.3	8	■	■	■	■	■	■					
		B14(*)	110	130	160	28	13			■	■	■	■	■	■					
	112	B5	180	215	250	28	12			■	■	■	■	■	■					
BOX090	80	B5	130	165	200	19	11	21.8	6	■	■	■	■	■	■	■	■	■	■	■
	90	B5				24	11	27.3	8	■	■	■	■	■	■	■	■	■	■	
	100	B5	180	215	250	28	13	31.3	8	■	■	■	■	■	■	■	■			
		B14(*)	110	130	160	28	12			■	■	■	■	■	■	■	■			
	112	B5	180	215	250	28	13			■	■	■	■	■	■	■	■			
BOX110	90	B5	130	165	200	24	12	27.3	8					■	■	■	■	■	■	■
	100	B14(*)	110	130	160	28	12	31.3	8	■	■	■	■	■	■	■	■	■	■	■
	100	B5	180	215	250	28	14			■	■	■	■	■	■	■	■	■		
	112	B5								■	■	■	■	■	■	■	■	■		
	132	B5	230	265	300	38	16	41.3	10	■	■	■	■	■						
BOX130	90	B5	130	165	200	24	12	27.3	8										■	■
	100/112	B5	180	215	250	28	14	31.3	8	■	■	■	■	■	■	■	■	■	■	■
	132	B5	230	265	300	38	16	41.3	10								■	■	■	■
BOX150	100/112	B5	180	215	250	28	14	31.3	8								■	■	■	■
	132	B5	230	265	300	38	16	41.3	10				■	■	■	■	■	■		
	160	B5	250	300	350	42		45	12	■	■	■	■	■						

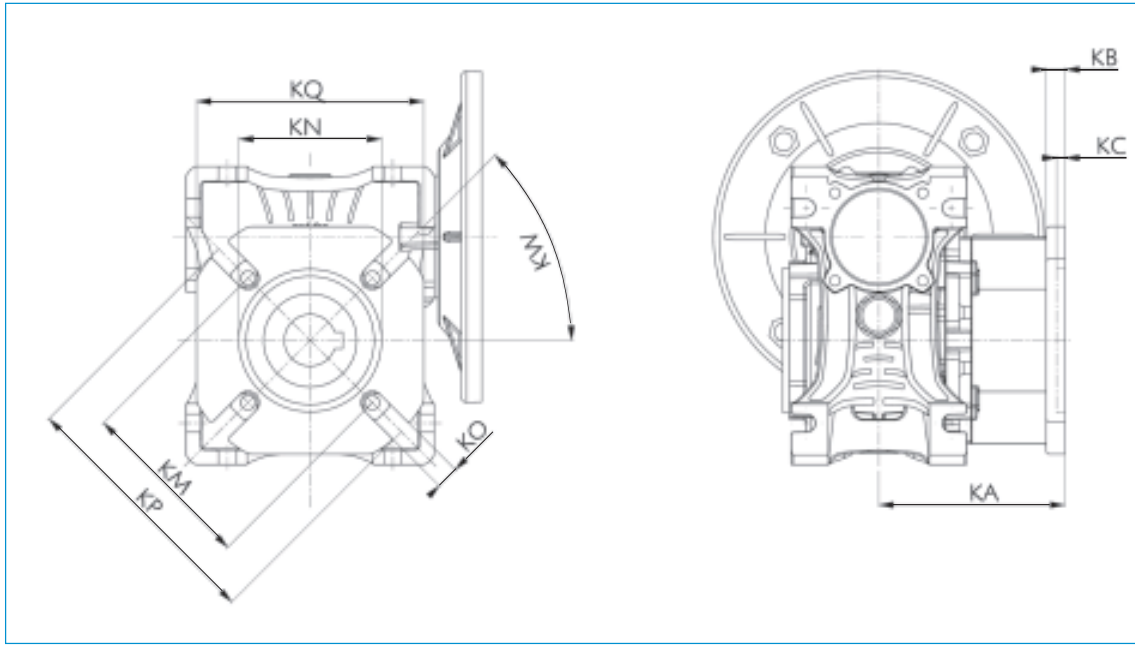


(*) Available as a special case. Check availability/lead times before ordering.

DIMENSIONAL TABLES

	output flange F									output flange FL								
type	KA	KB	KC	KM	KN (H8)	KO	KP	KQ	KW	KA	KB	KC	KM	KN	KO	KP	KQ	KW
BOX025	45	6	2.5	55	40	6,5 (n°4)	75	70	45°	-	-	-	-	-	-	-	-	-
BOX030	54.5	6	4	68	50	6.5 (n°4)	80	70	45°	-	-	-	-	-	-	-	-	-
BOX040	67	7	4	75	60	9 (n°4)	110	95	45°	97	7	4	75	60	9 (n° 4)	110	95	45°
BOX050	90	9	5	85	70	11 (n°4)	125	110	45°	120	9	5	85	70	11 (n°4)	125	110	45°
BOX063	82	10	6	150	115	11 (n°4)	180	142	45°	112	10	6	150	115	11 (n°4)	180	142	45°
BOX075	111	13	6	165	130	14 (n°4)	200	170	45°	-	-	-	-	-	-	-	-	-
BOX090	111	13	6	175	152	14 (n°4)	210	200	45°	-	-	-	-	-	-	-	-	-
BOX110	139	15	6	230	170	14 (n°4)	280	260	45°	-	-	-	-	-	-	-	-	-
BOX130	140	15	6	255	180	16 (n°8)	290	290	22.5°	-	-	-	-	-	-	-	-	-
BOX150	155	15	6	255	180	16 (n°8)	290	290	22.5°	-	-	-	-	-	-	-	-	-

BOX + F/FL

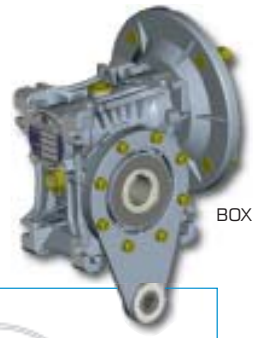


DIMENSIONAL TABLES

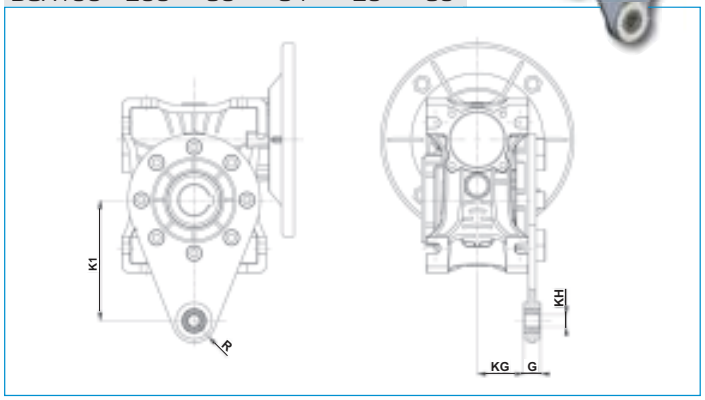
Accessories

Torque arm

Tipo	K1	G	KG	KH	R
BOX025	70	14	17,5	8	15
BOX030	85	14	24	8	15
BOX040	100	14	31,5	10	18
BOX050	100	14	38,5	10	18
BOX063	150	14	49	10	18
BOX075	200	25	47,5	20	30
BOX090	200	25	57,5	20	30
BOX110	250	30	62	25	35
BOX130	250	30	69	25	35
BOX150	250	30	84	25	35

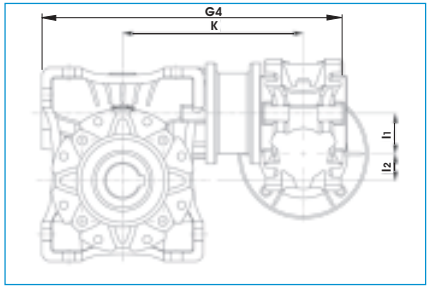


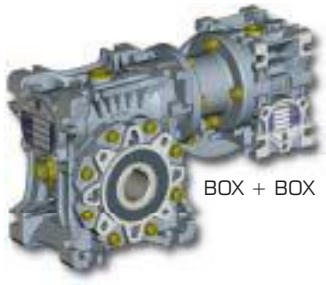
BOX + TA



Combined

BOX + BOX	K	I1	I2	G4
BOX030+BOX040	122	30	10	201
BOX030+BOX050	132	30	20	221
BOX030+BOX063	145	30	63	246
BOX040+BOX075	167,5	40	35	290
BOX040+BOX090	184,5	40	50	324
BOX050+BOX110	226	50	60	397

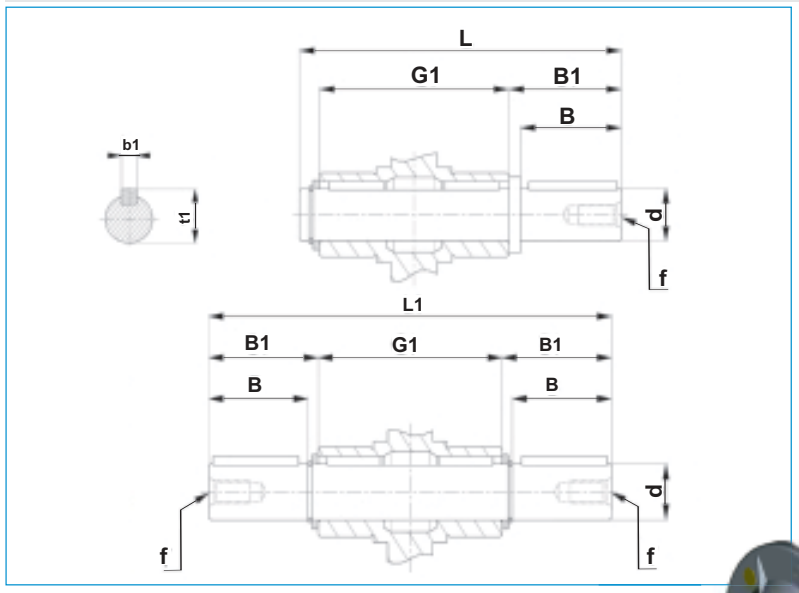


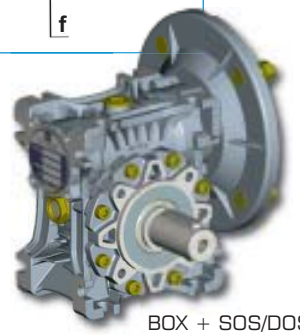


BOX + BOX

Single and double output shaft

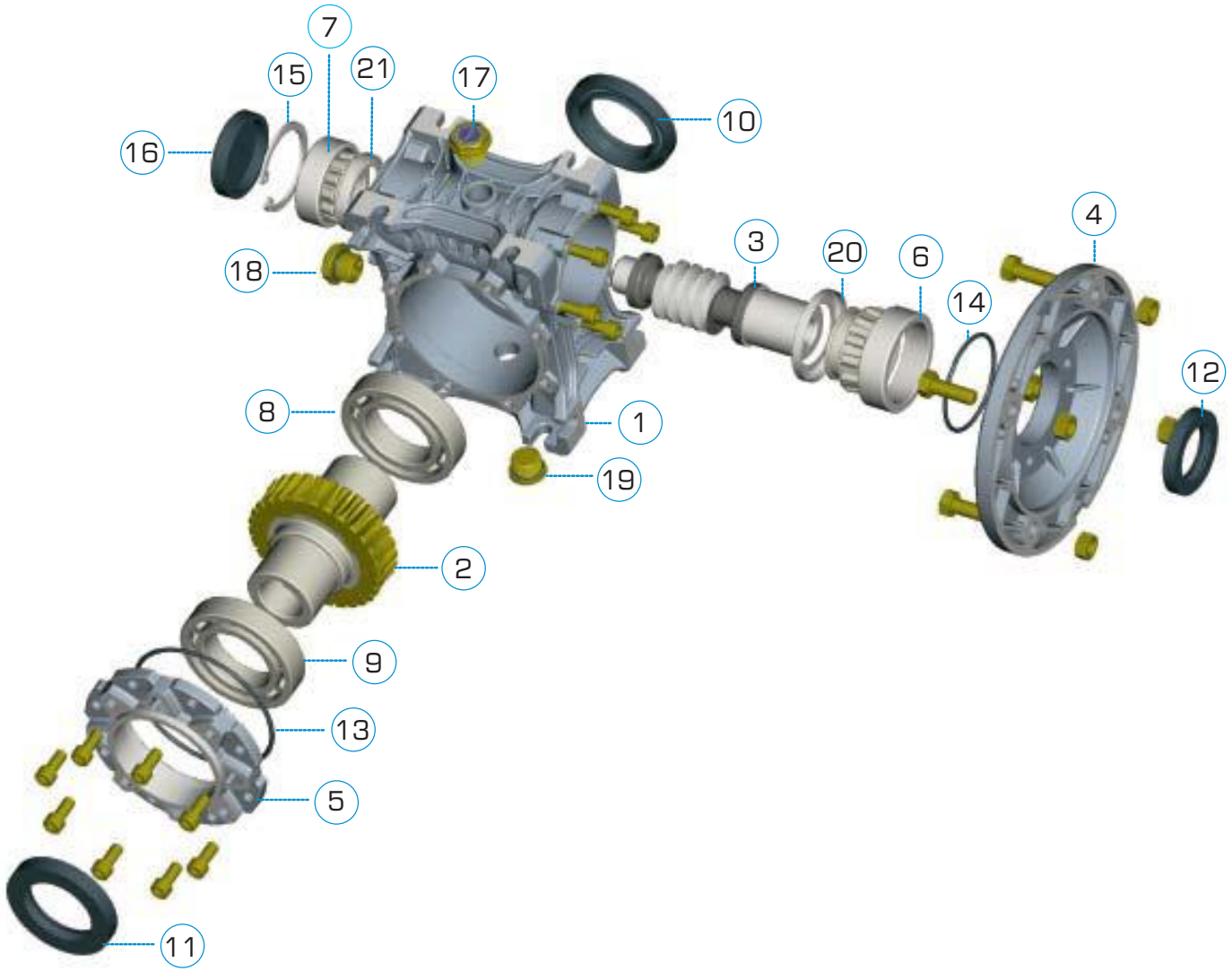
type	d (h6)	B	B1	G1	L	L1	f	b1	t1
BOX025	11	23	25,5	50	81	101	-	4	12,5
BOX030	14	30	32,5	63	102	128	M5	5	16
BOX040	18	40	43	78	128	164	M6	6	20,5
BOX050	25	50	53,5	92	153	199	M10	8	28
BOX063	25	50	53,5	112	173	219	M10	8	28
BOX075	28	60	63,5	120	192	247	M10	8	31
BOX090	35	80	84	140	234	308	M12	10	38
BOX110	42	80	84,5	155	249	324	M16	12	45
BOX130	45	80	85	170	265	340	M16	14	48.5
BOX150	50	82	87	200	297	374	M16	14	53.5





BOX + SOS/DOS

COMPONENTS LIST



N°	CODE
1	BOXHOU
2	BOXGEA
3	BOXSHA
4	BOXFLA
5	BOXCAP
6	BOXB06
7	BOXB07
8	BOXB08
9	BOXB09
10	BOXS10
11	BOXS11
12	BOXS12
13	BOXS13
14	BOXS14
15	BOXSEE
16	BOXCOV
17	BOXBPL
18	BOXLPL
19	BOXFPL
20	BOXN20
21	BOXN21

OIL SEAL RINGS AND BEARINGS LIST

BOX025

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	6000-2RS (12×10×8)	61803 (17×26×5)	61904 (20×37×9)	16004 (20×37×9)	20×32×6	20×42×6	16×24×7
B7							
V5							
V6							
other							

BOX030

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	6002-2RS (15×32×9)	61904 (20×37×9)	6005 (25×47×12)	6005 (25×47×12)	25×47×7	25×47×7	20×30×7
B7							
V5							
V6							
other							

BOX040

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	6203-2RS (17×40×12)	6005 (25×47×12)	6006 (30×55×13)	6006 (30×55×13)	30×40×7	30×40×7	25×35×7
B7							
V5							
V6							
other							

BOX050

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	6204-2RS (20×47×14)	6006 (30×55×13)	6008 • 2RS (40x68x15)	6008 • 2RS (40x68x15)	40×62×10 OR 40×62×8	40×62×10 OR 40×62×8	30×47×7
B7			6008 (40x68x15)	6008 (40x68x15)			
V5							
V6							
other							

BOX063

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	6205-2RS (25×52×15)	6007 (32×62×14)	6009 • 2RS (45x75x16)	6009 • 2RS (45x75x16)	45×65×10 OR 45×65×8	45×65×10 OR 45×65×8	35×52×10
B7			6009 (45x75x16)	6009 (45x75x16)			
V5							
V6							
other							

BOX075

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	32008 (40×68×19)	30206 (30×62×17.25)	6010 • 2RS (50x80x16)	6010 • 2RS (50x80x16)	50x72x8	50x72x8	40x60x10
B7			6010 (50x80x16)	6010 (50x80x16)			
V5							
V6							
other							

BOX090

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	32008-RS (40×68×19)	30206-RS (30×62×17.25)	6012 • 2RS (80x95x18)	6012 • 2RS (80x95x18)	60x85x10	60x85x10	40x60x10
B7			6012 (80x95x18)	6012 (80x95x18)			
V5							
V6							
other							

BOX110

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	32010 (50×80×20)	32207 (35×72×24.25)	6013 • 2RS (65x100x18)	6013 • 2RS (65x100x18)	60x85x8	60x85x8	50x68x8
B7			6012 (65x100x18)	6012 (65x100x18)			
V5							
V6							
other							

BOX130

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	32010-RS (50×80×20)	32207-RS (35×72×24.25)	6015-2RS (75x115x20)	6015-2RS (75x115x20)	70x90x10	70x90x10	50x68x8
B7							
V5							
V6							
other							

BOX150

mounting position	bearings				oil seals rings		
	6	7	8	9	10	11	12
B6	30212-RS (60×110×23.75)	30209-RS (45×85×20.75)	6018-2RS (90x140x24)	6018-2RS (90x140x24)	90x120x12	90x120x12	60x90x10
B7							
V5							
V6							
other							

NOTES

Motor Type Testing

Brake Motor Testing

Geared Motor Testing

Testing to ensure consistent quality...

All information and data presented in this catalogue have been checked with greatest care. We however do not assume responsible for any unintended errors and ommissions. Our designs are being continuously improved, so please reconfirm specifications and dimensions prior to ordering.

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