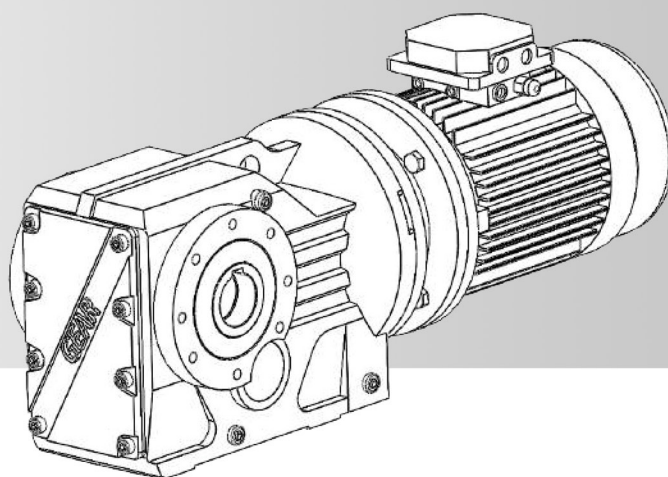
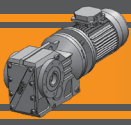


HELICAL BEVEL GEARMOTORS





Introduction

General information

Information in this manual is provided with symbols in order to understand the subject matter and data. These symbols are intended to aid the user in selecting the right gearmotors.

Input speed

- This is the input speed at the gearbox related to the type of drive unit selected.
- When different speeds are required, contact our Technical Service.

Gear ratio

- This value is strictly related to the size and number of teeth gears inside the gearbox.
- From the data given in the catalogue, the value can be calculated using the following formula:

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

Output speed

This is the gearbox output speed calculated using the formula given above:

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

Requested torque

This is the torque needed for the application and must be known when selecting a drive system. It can either be provided by the user or calculated according to the application data (if provided).

Nominal torque

This is the output torque that can be transmitted by the gearbox according to input speed n_1 and gear ratio i . It is calculated based on service with a continuous steady load corresponding to a service factor equal to 1. This value is not given in the catalogue but can be calculated approximately with the following formula between M_2 (output torque) and sf (service factor):

$$Mn_2 = M_2 \cdot sf$$

Output torque

This is the gearbox's output torque. It is strictly related to power P_1 of the motor installed, output rpm n_2 and dynamic efficiency Rd . It can be calculated with the following formula:

$$M_2 = \frac{9550 \cdot P_2 \cdot Rd}{n_2}$$

Or :

$$M_2 = \frac{9550 \cdot P_2}{n_2}$$

Where :

$$P_2 = P_1 \cdot Rd$$

Efficiency

Efficiency is calculated based on dynamic efficiency Rd of the gearboxes.

On helical gearboxes the average efficiency is 94%.

Input power

This is the power applied by the motor at the gearbox input in reference to speed n_1 .

It can be calculated with the following formula:

$$P_1 = \frac{M_2 \cdot n_2}{9550 \cdot Rd}$$

Service factor

This value indicates how a certain drive system is to be over sized in order to assure the requested service and stand up to shocks.

The tables given in the catalogue offer a wide range of drive systems with different service factors able to satisfy most types of applications. To correctly understand service factor values sf given for each item, approximate values for load classes A, B and C along with the number of hours of daily operation h/d and number of start-ups/hours need to be known.

Once the load class required for the application has been determined, locate corresponding value sf to be used when selecting the most suitable drive system.

	A - Uniform	$fa \leq 0.3$
Type of load	B - Moderate shocks	$fa \leq 3$
	C - Heavy shocks	$fa \leq 10$

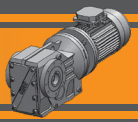
$$fa = \frac{Je}{Jm}$$

• Je (kgm^2) moment of reduced external inertia at the drive-shaft

• Jm (kgm^2) moment of inertia of motor.

If $fa > 10$ call our Technical Service.





A

Uniform load

sf									
h/d	start-up / hour								
	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

B

Moderate shock load

sf									
h/d	start-up / hour								
	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

C

Heavy shock load

sf									
h/d	start-up / hour								
	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

Radial load

Pinions, pulleys, etc applied on the output shaft of the gearboxes create radial forces that must be taken into consideration to avoid excessive stress risking damage to the gearbox itself.

External radial load R that acts on the gearbox shaft can be calculated as follows:

$$R = \frac{2000 \cdot M_2 \cdot kr}{d} \leq R_2$$

where :

- d [mm]** diameter of the pinion or pulley
- kr** coefficient in relation to type of transmission :
 - kr = 1.4** sprocket wheel
 - kr = 1.1** gear
 - kr = 1.5 - 2.5** pulley for V belts

Keep in mind that values R2 refer to loads that act on the center line of the output shaft (considering the shaft protrudes). As a result, the value should be compared under the same conditions.

Axial load

At times, along with the radial load, force A may be present that acts axially on the output shaft. In this case, keep in mind allowable axial load A2 that can be applied on the shaft is:

$$A_2 = R_2 \cdot 0.2$$

If axial load A that acts on the shaft is greater than A2, contact our Technical Service.

Selecting the gearmotors

To select the required gearmotor, perform the procedure below:

1. Determine the service factor sf for the desired application by referring to the charts given on page A4. This is to be done by considering the class of load, the operational hours/day and the number of start-ups/ hour.
2. If the required motor power output P is known, go to item 3); if the required output torque M is known, determine motor output P by using the following formulas:

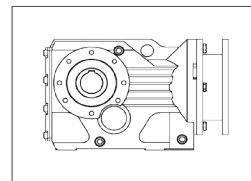
$$P = \frac{M \cdot n_2}{9550 \cdot Rd}$$

Where Rd stands for the dynamic efficiency and n2 indicates the required output rpm of the gearmotor.

3. Use the specification chart to search for the power unit where P1 is greater than or equal to P with a speed n2/n2max that approximates the desired one. Choose a power unit where the indicated service factor sf is equal to or greater than that calculated at point 1).

Lubrication

All unit sizes of ITB series are complete with mineral oil, viscosity 220.



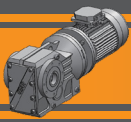
ITB

SHELL	MOBIL	KLUB
Omala S2 G 220	Mobilgear 660 XP 2	Kluberoil GEM 1-220 N

CASTROL	FUCHS	B
Tribol 1100/220 Optigear BM 220	Renolin CLP 220	Energol GR-XP 220

The tables contain the approximate amount of lubricant held and/or to be put in.

Always specify the desired installation position at the time of order.



Operating temperature

Standard temperature range

ITB	-25°C / +50°C
-----	---------------

Standard temperature range

	< -15°C	> +50°C
ITB	Output radial load halved	<ul style="list-style-type: none"> • Use Viton (FPM) oil seals • Use high temperature lubricant

For temperature <0°C refer to the following notes:

- Check if the motor is suitable for low temperature;
- Due to the high viscosity of the lubricant, check if the motor can supply high starting torque;
- Let the group run for a few minutes without load to guarantee good lubrication;

Installation and inspection

While installing the gearbox always make sure that:

- The specifications stamped on the rating plate match those indicated for the unit actually ordered;
- The mating surfaces and the shafts are thoroughly clean and free of dents;
- The surfaces where the gearbox to be mounted on are flat and strong enough;
- The machine drive shaft and the gearbox shaft are perfectly aligned;
- The required torque limiters have been installed if the machine is likely to produce shocks or blockages during operation;
- The rotary parts have been provided with the required safety guards;
- Adequate weatherproof covering has been provided if the machine is to be installed outdoor;
- The working environment is not exposed to corrosive agents (unless this has been indicated while placing the order so that the gearbox assembly can be adequately set up);
- The pinions or pulleys on the gearbox input/output shafts are properly fitted in order not to produce radial and/or axial loads that exceed the maximum allowable limits;
- All the couplings have been treated with adequate rust preventative in order to avoid oxidation provoked by contact;
- All the mounting screws have been securely tightened;
- Check the lubricant quantity depending on the mounting position on all gearboxes.

Critical applications

In these cases please contact the Technical Service

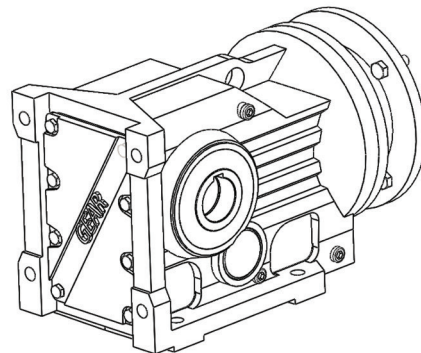
- Used to increase speed ;
- Used as a hoist;
- Used in mounting positions not shown in the catalogue;
- Use in environment pressure other than atmospheric pressure;
- Use in places with temperature <-25°C or >+50°C

Technical features

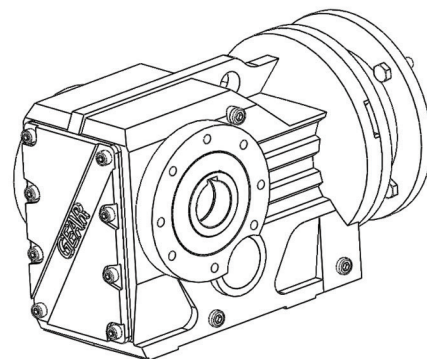
The ITB gearmotors are intended for heavy duty applications. The robust one pieces casing of the main housing and the modular design of input and output sets increase application flexibility.

The main features of ITB range are:

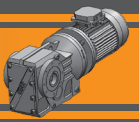
- Robust cast iron housings;
- High degree of modularity;
- Lubrication with synthetic oil;
- Coupled to motor with input coupling;
- Epoxy powder coating RAL 7016 average thickness 0,10 – 0,15 mm.



ITB

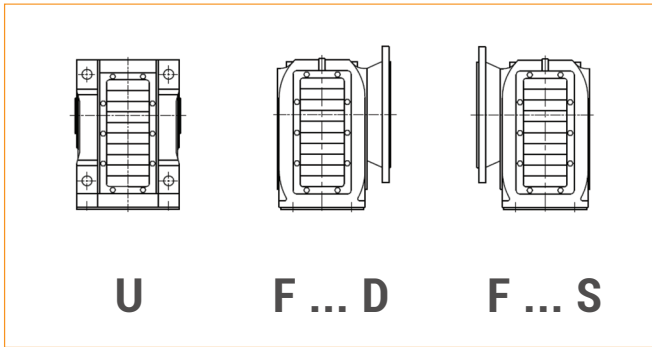


ITBA

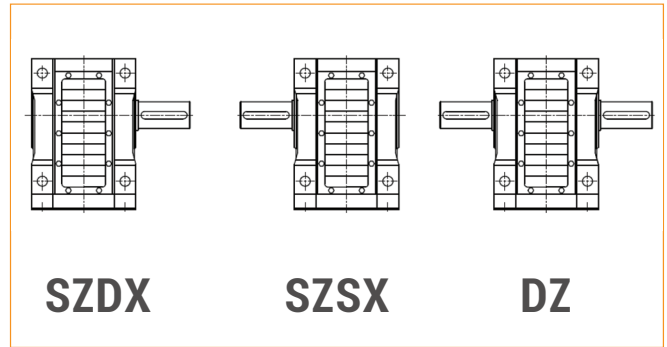


Versions

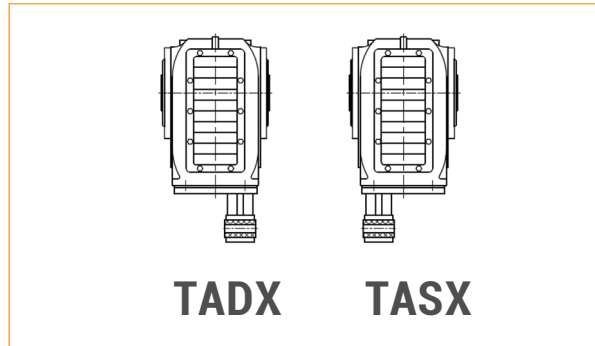
Gearbox version



Output shaft

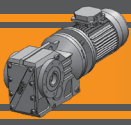


Torque arm



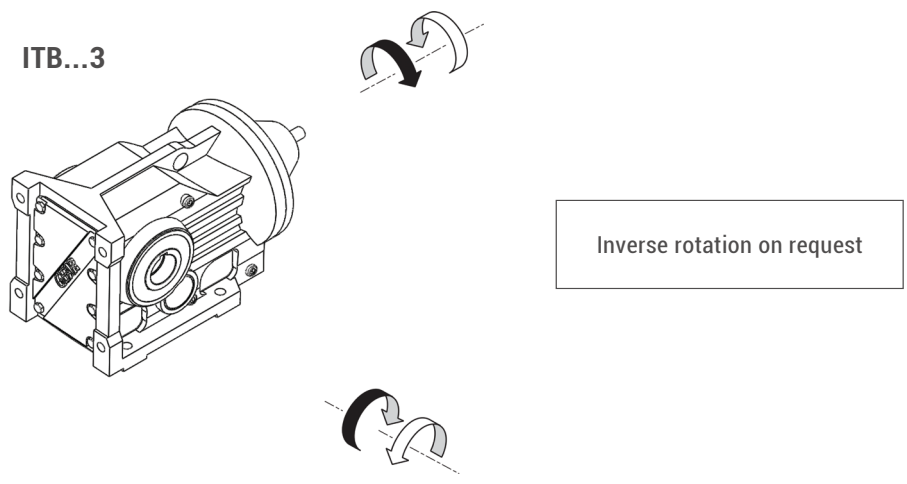
GEARBOX									
ITS	46	3	U	22.55	D90	132	B5	SZDX	M1
Type	Size	Stages	Version	Ratio	Output shaft	IEC	Version	Solid outout shaft	Mounting position
 ITB	45	3	U...	see tables	see tables	100...	B5	SZDX	M1 (B3)
	46		F ... D						M2 (V6)
	47		F ... S						M3 (B8)
48			M4 (V5)						
 ITBA					225...	B14	DZ	M5 (B7)	
									M6 (B6)

GEARBOX								
ITSIS	46	3	U	22.55	D90	SZDX	M1	
Type	Size	Stages	Version	Ratio	Output shaft	Solid outout shaft	Mounting position	
 ITBIS	45	3	U...	see tables	see tables	SZDX	M1 (B3)	
	46		F ... D				M2 (V6)	
	47		F ... S				M3 (B8)	
	48						M4 (V5)	
							M5 (B7)	
							M6 (B6)	



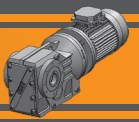
MOTOR					
5.5 kW	4p	3ph	230 / 400V	50Hz	T1
Power	Poles	Phases	Voltage	Frequency	Terminal box pos.
see tables	2p 4p 6p 8p	1ph 3ph	230 / 400V 220 / 380V ... 230V	50 Hz 60Hz	T

Direction of rotation



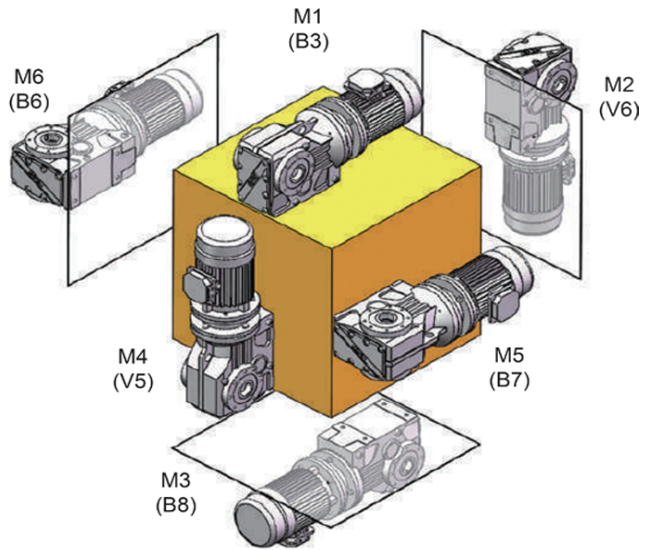
Symbols

n_1	[min ⁻¹]	Input speed	Mn_2	[Nm]	Nominal output torque referred to Pn_1
n_2	[min ⁻¹]	Output speed	sf		Service factor
i		Ratio	R_1	[N]	Permitted input radial load
P_1	[kW]	Input power	A_1	[N]	Permitted input axial load
M_2	[Nm]	Output torque referred to P_1	R_2	[N]	Permitted output radial load
Pn_1	[kW]	Nominal input power	A_2	[N]	Permitted output axial load



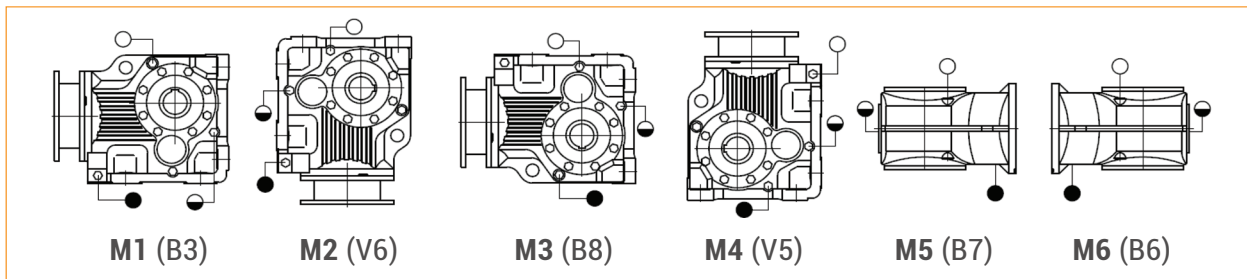
Lubrication

- ITB series gearmotors come complete with mineral oil.
- The lubricant quantity depends on mounting position.

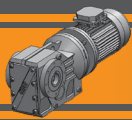


ITB	Oil quantity (litres)					
	M1 (B3)	M2 (V6)	M3 (B8)	M4 (V5)	M5 (B7)	M6 (B6)
453	7	14	15.7	20	15.7	15.5
463	10	21	25.5	33.5	24	24
473	21	41.5	44	54	40	41
483	31	62	65	90	58	62
493	33	95	105	123	85	84
4A3	53	152	167	200	143	143



ITBA	Oil quantity (litres)					
	M1 (B3)	M2 (V6)	M3 (B8)	M4 (V5)	M5 (B7)	M6 (B6)
453	7	14.7	15.7	20	15.7	15.7
463	10	20.5	24	32	24	24
473	21	41.5	43	52	40	40
483	31	66	67	87	62	62
493	33	95	105	123	85	84
4A3	53	152	167	200	143	143



- Breather and filling plug
- ◐ Oil level plug
- Oil drain plug



Technical data



P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
1.1							
90S4 1400min ⁻¹	10	969	4.17	140.28	ITB453	B5	36000
	9.1	1058	3.82	153.21	ITBA453	B5	36000
	8.1	1196	3.38	173.13		B5	36000

1.5							
90L4 1400min ⁻¹	11	1170	3.45	124.25	ITB453	B5	36000
	10	1321	3.06	140.28	ITBA453	B5	36000
	9.1	1443	2.80	153.21		B5	36000
	8.1	1630	2.48	173.13		B5	36000

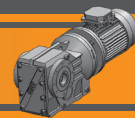
2.2							
100LA4 1400min ⁻¹	15	1323	3.06	96.8	ITB453	B5	36000
	14	1398	2.89	102.26	ITBA453	B5	36000
	11	1698	2.38	124.25		B5	36000
	10	1917	2.11	140.28		B5	36000
	9.1	2094	1.93	153.21		B5	36000
	8.1	2366	1.71	173.13		B5	36000

3							
100LB4 1400min ⁻¹	25	1054	3.83	56.55	ITB453	B5	30420
	22	1166	3.47	62.55	ITBA453	B5	32040
	20	1315	3.07	70.54		B5	33390
	18	1452	2.78	77.89		B5	34920
	16	1613	2.51	86.52		B5	36000
	15	1804	2.24	96.80		B5	36000
	14	1906	2.12	102.26		B5	36000
	11	2316	1.75	124.25		B5	36000
	10	2614	1.55	140.28		B5	36000
	9.1	2855	1.42	153.21		B5	36000
	8.1	3227	1.25	173.13		B5	36000
	12	2222	3.38	119.21	ITB463	B5	51300
	9.7	2679	2.81	143.72	ITBA463	B5	51300

4							
112M4 1400min ⁻¹	20	1747	2.31	70.54	ITB453	B5	33390
	18	1929	2.10	77.89	ITBA453	B5	34920
	16	2143	1.89	86.52		B5	36000
	15	2397	1.69	96.80		B5	36000
	14	2532	1.60	102.26		B5	36000
	11	3077	1.31	124.25		B5	36000
	10	3474	1.16	140.28		B5	36000
	9.1	3794	1.07	153.21		B5	36000
	19	1814	4.15	73.24	ITB463	B5	45450
	17	2044	3.68	82.55	ITBA463	B5	47700
	15	2251	3.34	90.88		B5	51300
	14	2493	3.02	100.67		B5	51300
	12	2803	2.68	113.18		B5	51300
	11	2952	2.55	119.21		B5	51300
	9.7	3559	2.11	143.72		B5	51300

P [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
5.5							
132S4 1400min ⁻¹	29	1621	2.49	47.93	ITB453	B5	27900
	25	1912	2.11	56.55	ITBA453	B5	30420
	22	2115	1.91	62.55		B5	32040
	20	2385	1.69	70.54		B5	33390
	18	2634	1.53	77.89		B5	34920
	16	2926	1.38	86.52		B5	36000
	15	3274	1.23	96.80		B5	36000
	14	3458	1.17	102.26		B5	36000
	11	4202	0.96	124.25		B5	36000
	17	2792	2.69	82.55	ITB463	B5	47700
	15	3073	2.45	90.88	ITBA463	B5	51300
	14	3404	2.21	100.67		B5	51300
	12	3827	1.96	113.18		B5	51300
	11	4031	1.87	119.21		B5	51300
	9.7	4860	1.55	143.72		B5	51300

7.5							
132MA4 1400min ⁻¹	41	1578	2.56	34.22	ITB453	B5	23130
	36	1809	2.23	39.23	ITBA453	B5	23130
	33	1931	2.09	41.87		B5	25470
	29	2210	1.83	47.93		B5	27900
	25	2608	1.55	56.55		B5	30420
	22	2884	1.40	62.55		B5	32040
	20	3253	1.24	70.54		B5	33390
	18	3592	1.13	77.89		B5	34920
	16	3990	1.01	86.52		B5	36000
	15	4464	0.91	96.80		B5	36000
	38	1705	3.97	36.97	ITB463	B5	33300
	33	1950	3.55	42.29	ITBA463	B5	36450
	28	2299	3.20	49.86		B5	39960
	25	2634	2.85	57.13		B5	41220
	21	3065	2.45	66.46		B5	43200
	19	3377	2.23	73.24		B5	45450
	17	3807	1.98	82.55		B5	47700
	15	4191	1.79	90.88		B5	51300
	14	4642	1.62	100.67		B5	51300
	12	5219	1.44	113.18		B5	51300
	11	5497	1.37	119.21		B5	51300
9.7	6628	1.13	143.72		B5	51300	
20	3271	3.74	70.94	ITB473	B5	63000	
17	3780	3.23	81.97		B5	66150	
16	4145	2.95	89.88		B5	71280	
13	5080	2.41	110.17		B5	71280	
11	5648	2.16	122.47		B5	71280	
10	6293	1.94	136.47		B5	71280	
9.7	6628	1.84	143.73		B5	71280	



P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
------------------------	--	------------------------	----	---	--	--	-----------------------

11							
160M4 1400min ⁻¹	63	1503	2.69	22.37	ITB453	B5	19800
	57	1662	2.43	24.74	ITBA453	B5	19800
	50	1874	2.16	27.90		B5	22050
	45	2070	1.95	30.81		B5	23130
	41	2299	1.76	34.22		B5	23130
	36	2635	1.53	39.23		B5	23130
	33	2812	1.44	41.87		B5	25470
	29	3220	1.26	47.93		B5	27900
	25	3799	1.06	56.55		B5	30420
	22	4202	0.96	62.55		B5	32040
	20	4738	0.85	70.54		B5	33390
	48	1942	3.48	28.91	ITB463	B5	31500
	45	2100	3.04	31.26	ITBA463	B5	33300
	43	2189	3.09	32.58		B5	33300
	38	2483	2.73	36.97		B5	33300
	33	2841	2.44	42.29		B5	36450
	28	3350	2.20	49.86		B5	39960
	25	3837	1.96	57.13		B5	41220
	21	4465	1.68	66.46		B5	43200
	19	4920	1.53	73.24		B5	45450
	17	5545	1.36	82.55		B5	47700
	15	6105	1.23	90.88		B5	51300
	14	6762	1.11	100.67		B5	51300
	12	7603	0.99	113.18		B5	51300
	20	4766	2.56	70.94	ITB473	B5	63000
	17	5506	2.22	81.97		B5	66150
	16	6038	2.02	89.88		B5	71280
	13	7401	1.65	110.17		B5	71280
	11	8227	1.49	122.47		B5	71280
	10	9167	1.33	136.47		B5	71280
	15	6154	2.75	91.62	ITB483	B5	88200
	14	6730	2.51	100.18		B5	88200
	11	8219	2.06	122.35		B5	88200
	9.2	10246	1.65	152.52		B5	88200

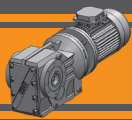
15							
160M4 1400min ⁻¹	85	1517	2.66	16.56	ITB453	B5	16020
	74	1737	2.33	18.96	ITBA453	B5	17190
	63	2049	1.97	22.37		B5	19800
	57	2266	1.78	24.74		B5	19800
	50	2556	1.58	27.90		B5	22050
	45	2822	1.43	30.81		B5	23130
	41	3135	1.29	34.22		B5	23130
	36	3594	1.12	39.23		B5	23130
	33	3835	1.05	41.87		B5	25470
	29	4391	0.92	47.93		B5	27900
	48	2648	2.55	28.91	ITB463	B5	31500
	45	2863	2.23	31.26	ITBA463	B5	33300
	43	2985	2.27	32.58		B5	33300
	38	3386	2.00	36.97		B5	33300
	33	3874	1.79	42.29		B5	36450
	28	4568	1.61	49.86		B5	39960
	25	5233	1.44	57.13		B5	41220
	21	6088	1.23	66.46		B5	43200
	19	6709	1.12	73.24		B5	45450
	17	7562	1.00	82.55		B5	47700
	15	8325	0.90	90.88		B5	51300



P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
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

15							
160M4 1400min ⁻¹	29	4380	2.79	47.82	ITB473	B5	52200
	26	4952	2.47	54.06		B5	53910
	22	5734	2.13	62.60		B5	60930
	20	6498	1.88	70.94		B5	63000
	17	7509	1.63	81.97		B5	66150
	16	8233	1.48	89.88		B5	71280
	13	10092	1.21	110.17		B5	71280
	11	11219	1.09	122.47		B5	71280
	10	12501	0.98	136.47		B5	71280
	18	7303	2.32	79.72	ITB483	B5	82710
	15	8392	2.02	91.62		B5	88200
	14	9177	1.84	100.18		B5	88200
	11	11207	1.51	122.35		B5	88200
	9.2	13971	1.21	152.52		B5	88200
	10	12365	2.43	134.99	ITB493	B5	135000
	8.5	15069	2.00	164.50		B5	135000



18.5							
160L4 1400min ⁻¹	117	1355	2.70	11.99	ITB453	B5	14470
	101	1565	2.58	13.85	ITBA453	B5	15300
	85	1871	2.16	16.56		B5	16020
	74	2142	1.89	18.96		B5	17190
	63	2527	1.60	22.37		B5	19800
	57	2795	1.45	24.74		B5	19800
	50	3152	1.28	27.90		B5	22050
	45	3481	1.16	30.81		B5	23130
	41	3866	1.05	34.22		B5	23130
	36	4432	0.91	39.23		B5	23130
	33	4730	0.85	41.87		B5	25470
	84	1886	3.51	16.70	ITB463	B5	21240
	71	2224	3.04	19.68	ITBA463	B5	26010
	62	2548	2.66	22.55		B5	28800
	53	2964	2.28	26.24		B5	29700
	48	3266	2.07	28.91		B5	31500
	45	3531	1.81	31.26		B5	33300
	43	3681	1.84	32.58		B5	33300
	38	4176	1.62	36.97		B5	33300
	33	4778	1.45	42.29		B5	36450
	28	5633	1.31	49.86		B5	39960
	25	6454	1.17	57.13		B5	41220
	21	7509	1.00	66.46		B5	43200
	19	8274	0.91	73.24		B5	45450
	51	3125	3.91	27.66	ITB473	B5	38700
	45	3542	3.45	31.35		B5	44460
	39	4092	2.99	36.22		B5	44460
	35	4540	2.69	40.19		B5	48600
	29	5402	2.26	47.82		B5	52200
	26	6108	2.00	54.06		B5	53910
	22	7072	1.73	62.60		B5	60930
	20	8015	1.52	70.94		B5	63000
	17	9261	1.32	81.97		B5	66150
	16	10154	1.20	89.88		B5	71280
	13	12446	0.98	110.17		B5	71280
	37	4294	3.94	38.00	ITB483	B5	54000
	30	5284	3.20	46.78		B5	65250





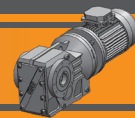


P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
18.5							
160L4 1400min ⁻¹	26	6131	2.76	54.27	ITB483	B5	67410
	23	6891	2.46	60.99			71100
	20	7948	2.13	70.35			79200
	18	9007	1.88	79.72			82710
	15	10351	1.63	91.62			88200
	14	11318	1.49	100.18	B5	88200	
	11	13822	1.22	122.35	B5	88200	
	16	9926	3.03	87.86	ITB493	B5	135000
	13	12408	2.42	109.83			135000
	10	15251	1.97	134.99			135000
	11	14652	3.21	129.69	ITB4A3	B5	152910
	9.7	16335	2.88	144.59			152910
	8.5	18665	2.52	165.21			152910
	7.8	20320	2.31	179.86			152910

P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]		
22									
180L4 1400min ⁻¹	37	5106	3.31	38.00	ITB483	B5	54000		
	30	6284	2.69	46.78			65250		
	26	7291	2.32	54.27			67410		
	23	8195	2.06	60.99			71100		
	20	9452	1.79	70.35			79200		
	18	10711	1.58	79.72			B5	82710	
	15	12309	1.37	91.62			B5	88200	
	14	13460	1.26	100.18			B5	88200	
	11	16437	1.03	122.35			B5	88200	
	18	10498	2.87	78.14			ITB493	B5	126090
	16	11804	2.55	87.86					135000
	13	14756	2.04	109.83	135000				
	10	18136	1.66	134.99	B5	135000			
	11	17424	2.70	129.69	ITB4A3	B5	152910		
9.7	19426	2.42	144.59	152910					
8.5	22196	2.12	165.21	152910					
7.8	24164	1.95	179.86	152910					

P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
22							
180L4 1400min ⁻¹	161	1170	2.14	8.71	ITB453	B5	14220
	134	1399	1.93	10.41			ITBA453
	117	1611	2.27	11.99	B5	B5	14470
	101	1861	2.17	13.85	B5	B5	15300
	85	2225	1.82	16.56	B5	B5	16020
	74	2547	1.59	18.96	B5	B5	17190
	63	3005	1.34	22.37	B5	B5	19800
	57	3324	1.22	24.74	B5	B5	19800
	50	3748	1.08	27.90	B5	B5	22050
	45	4139	0.98	30.81	B5	B5	23130
	141	1333	2.95	9.93	ITB463	B5	23220
	120	1572	2.57	11.70			ITBA463
	104	1801	2.24	13.41	B5	B5	19710
	96	1960	3.30	14.59	B5	B5	19710
84	2243	2.95	16.70	B5	B5	21240	
71	2644	2.56	19.68	B5	B5	26010	
62	3030	2.23	22.55	B5	B5	28800	
53	3525	1.92	26.24	B5	B5	29700	
48	3884	1.74	28.91	B5	B5	31500	
45	4199	1.52	31.26	B5	B5	33300	
43	4378	1.55	32.58	B5	B5	33300	
38	4966	1.36	36.97	B5	B5	33300	
33	5682	1.22	42.29	B5	B5	36450	
28	6699	1.10	49.86	B5	B5	39960	
25	7675	0.98	57.13	B5	B5	41220	
66	2839	4.30	21.13	ITB473	B5	34200	
59	3210	3.81	23.89			36900	
51	3716	3.29	27.66			38700	
45	4212	2.90	31.35			44460	
39	4867	2.51	36.22			44460	
35	5399	2.26	40.19			48600	
29	6424	1.90	47.82			52200	
26	7263	1.68	54.06			53910	
22	8410	1.45	62.60			60930	
20	9531	1.28	70.94			63000	
17	11013	1.11	81.97			66150	
16	12076	1.01	89.88	B5	71280		

P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]	
30								
200L4 1400min ⁻¹	161	1590	1.57	8.71	ITB453	B5	14220	
	134	1901	1.42	10.41			ITBA453	B5
	117	2189	1.67	11.99	B5	B5	14470	
	101	2529	1.60	13.85	B5	B5	15300	
	85	3024	1.34	16.56	B5	B5	16020	
	74	3462	1.17	18.96	B5	B5	17190	
	63	4084	0.99	22.37	B5	B5	19800	
	57	4517	0.89	24.74	B5	B5	19800	
	161	1584	2.42	8.68	ITB463	B5	22140	
	141	1812	2.17	9.93			ITBA463	B5
	120	2137	1.89	11.70	B5	B5	25200	
	104	2448	1.65	13.41	B5	B5	19710	
	96	2664	2.43	14.59	B5	B5	19710	
	84	3048	2.17	16.70	B5	B5	21240	
71	3594	1.88	19.68	B5	B5	26010		
62	4117	1.64	22.55	B5	B5	28800		
53	4790	1.41	26.24	B5	B5	29700		
48	5279	1.28	28.91	B5	B5	31500		
45	5707	1.12	31.26	B5	B5	33300		
43	5949	1.14	32.58	B5	B5	33300		
38	6749	1.00	36.97	B5	B5	33300		
33	7722	0.90	42.29	B5	B5	36450		
59	4362	2.80	23.89	ITB473	B5	36900		
51	5051	2.42	27.66			38700		
45	5724	2.13	31.35			44460		
39	6614	1.85	36.22			44460		
35	7337	1.67	40.19			48600		
29	8730	1.40	47.82			52200		
26	9870	1.24	54.06			53910		
22	11429	1.07	62.60			60930		
20	12953	0.94	70.94			63000		
45	5718	2.96	31.32			ITB483	B5	54000
37	6939	2.44	38.00					54000

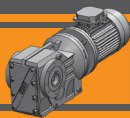


P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]			
30										
200L4 1400min ⁻¹	30	8540	1.98	46.78	ITB483	B5	65250			
	26	9908	1.71	54.27			67410			
	23	11136	1.52	60.99			71100			
	20	12845	1.32	70.35			79200			
	18	14556	1.16	79.72			82710			
	15	16728	1.01	91.62			88200			
	14	18292	0.92	100.18	88200					
	23	11090	2.71	60.74	ITB493	B5	114300			
		12428	2.42	68.07			126000			
		14267	2.11	78.14			126090			
		16042	1.88	87.86			135000			
		20053	1.50	109.83			135000			
		16	16067	2.93			88.00	ITB4A3	B5	143100
			18653	2.52			102.16			152910
	20559		2.29	112.60	152910					
	23679		1.98	129.69	152910					
	26400		1.78	144.59	152910					
	8.5	30165	1.56	165.21	B5	152910				
	7.8	32839	1.43	179.86	B5	152910				



P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]			
37										
225S4 1400min ⁻¹	27	11618	2.59	51.77	ITB493	B5	108000			
	23	13632	2.21	60.74			114300			
	21	15277	1.97	68.07			126090			
	18	17537	1.72	78.14			126090			
	16	19718	1.53	87.86			135000			
	13	24649	1.22	109.83			135000			
	16	19749	2.38	88.00			ITB4A3	B5	143100	
		14	22927	2.05					102.16	152910
		12	25270	1.86					112.60	152910
		11	29106	1.61					129.69	152910
		9.7	32450	1.45	144.59	152910				
		8.5	37077	1.27	165.21	152910				
	7.8	40365	1.16	179.86	B5	152910				

P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]				
45											
225M4 1400min ⁻¹	161	2368	1.62	8.68	ITB463	B5	22140				
	141	2709	1.45	9.93			ITB4A63	B5	23220		
	120	3194	1.27	11.70					B5	25200	
	104	3659	1.10	13.41					B5	19710	
	96	3983	1.63	14.59					B5	19710	
	84	4557	1.45	16.70					B5	21240	
	71	5372	1.26	19.68					B5	26010	
	62	6155	1.10	22.55					B5	28800	
	53	7161	0.95	26.24					B5	29700	
	48	7891	0.86	28.91					B5	31500	
	158	2418	2.81	8.86	ITB473	B5			29700		
		128	2994	2.51			10.97	B5	30510		
		107	3565	2.25			13.06	B5	28620		
		98	3915	2.91			14.34	B5	12100		
		79	4847	2.52			17.76	B5	31500		
		66	5768	2.12			21.13	B5	34200		
		59	6521	1.87			23.89	B5	36900		
		51	7550	1.62			27.66	B5	38700		
		45	8557	1.43			31.35	B5	44460		
		39	9887	1.24			36.22	B5	44460		
	35	10969	1.11	40.19	ITB483	B5	48600				
		29	13051	0.94			47.82	52200			
		76	5016	3.37			18.38	ITB483	B5	38800	
			66	5819			2.91			21.32	42300
			56	6792			2.49			24.88	48600
			51	7544			2.24			27.64	48600
			45	8549			1.98			31.32	54000
			37	10373			1.63			38.00	54000
			30	12767			1.33			46.78	65250
			26	14812			1.14			54.27	67410
	23		16648	1.02	60.99	71100					
	20		19203	0.88	70.35	79200					
33	11707	2.57	42.89	ITB493	B5	96660					
	27	14131	2.13			51.77	108000				
	23	16579	1.81			60.74	114300				
	21	18580	1.62			68.07	126000				
	18	21328	1.41			78.14	126090				
	16	23981	1.25			87.86	135000				
	13	29978	1.00			109.83	135000				

P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]				
37											
225S4 1400min ⁻¹	161	1947	1.97	8.68	ITB463	B5	22140				
	141	2228	1.77	9.93			ITB4A63	B5	23220		
	120	2626	1.54	11.70					B5	25200	
	104	3009	1.34	13.41					B5	19710	
	96	3275	1.98	14.59					B5	19710	
	84	3747	1.77	16.70					B5	21240	
	71	4417	1.53	19.68					B5	26010	
	62	5061	1.34	22.55					B5	28800	
	53	5888	1.15	26.24					B5	29700	
	48	6488	1.04	28.91					B5	31500	
	45	7015	0.91	31.26	ITB473	B5			33300		
		43	7313	0.93			32.58	33300			
		38	8296	0.82			36.97	33300			
		158	1988	3.42			8.86	ITB473	B5	29700	
			128	2462			3.05			10.97	30510
			107	2931			2.74			13.06	28620
			98	3219			3.53			14.34	12100
			79	3985			3.07			17.76	31500
			66	4742			2.58			21.13	34200
			59	5361			2.28			23.89	36900
	51		6208	1.97	27.66	38700					
	45		7036	1.74	31.35	44460					
	39		8129	1.50	36.22	44460					
	35	9019	1.35	40.19	ITB483	B5	48600				
		29	10731	1.14			47.82	52200			
		26	12132	1.01			54.06	53910			
		22	14048	0.87			62.60	60930			
		45	7029	2.41			31.32	ITB483	B5	54000	
			37	8529			1.98			38.00	54000
			30	10498			1.61			46.78	65250
			26	12179			1.39			54.27	67410
			23	13689			1.24			60.99	71100
20			15789	1.07			70.35			79200	
18	17892		0.95	79.72	82710						
15	20562		0.82	91.62	88200						





ITB Helical bevel gearmotors

P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
45							
225M4 1400min ⁻¹	19	20187	2.33	73.96	ITB4A3	B5	132300
	16	24020	1.96	88.00			143100
	14	27885	1.69	102.16			152910
	12	30734	1.53	112.60			152910
	11	35399	1.33	129.69			152910
	9.7	39466	1.19	144.59			152910
	8.5	45094	1.04	165.21			152910
	7.8	49093	0.96	179.86			152910

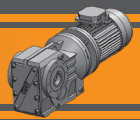
55							
250M4 1400min ⁻¹	158	2956	2.30	8.86	ITB473	B5	29700
	128	3660	2.05	10.97			30510
	107	4357	1.84	13.06			28620
	98	4785	2.38	14.34			12100
	79	5924	2.06	17.76			31500
	66	7049	1.73	21.13			34200
	59	7970	1.53	23.89			36900
	51	9228	1.32	27.66			38700
	45	10458	1.17	31.35			44460
	39	12084	1.01	36.22			44460
	35	13406	0.91	40.19	48600		
	ITB483	111	4224	3.78	12.66	B5	32600
		94	4981	3.40	14.93	B5	32600
		76	6130	2.76	18.38	B5	38800
		66	7112	2.38	21.32	B5	42300
		56	8301	2.04	24.88	B5	48600
		51	9220	1.84	27.64	B5	48600
		45	10448	1.62	31.32	B5	54000
		37	12679	1.33	38.00	B5	54000
		30	15604	1.08	46.78	B5	65250
26		18104	0.93	54.27	B5	67410	
23	20348	0.83	60.99	B5	71100		
ITB493	38	12213	2.46	36.61	B5	89730	
	33	14308	2.10	42.89	B5	96660	
	27	17271	1.74	51.77	B5	108000	
	23	20263	1.48	60.74	B5	114300	
	21	22708	1.32	68.07	B5	126000	
	18	26068	1.15	78.14	B5	126090	
	16	29311	1.03	87.86	B5	135000	
	ITB4A3	22	21364	2.20	64.04	B5	130500
		19	24673	1.90	73.96	B5	132300
		16	29357	1.60	88.00	B5	143100
14		34081	1.38	102.16	B5	152910	
12		37564	1.25	112.60	B5	152910	
11		43265	1.09	129.69	B5	152910	
9.7		48236	0.97	144.59	B5	152910	



75							
280S4 1400min ⁻¹	158	4017	1.69	8.86	ITB473	B5	29700
	128	4974	1.51	10.97			30510
	107	5921	1.35	13.06			28620
	98	6503	1.75	14.34			12100
	79	8051	1.52	17.76			31500



P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]	
75								
280S4 1400min ⁻¹	66	9580	1.28	21.13	ITB483	B5	34200	
	59	10831	1.13	23.89			36900	
	51	12541	0.97	27.66			38700	
	45	14213	0.86	31.35			44460	
	111	5741	2.78	12.66			B5	32600
	94	6769	2.50	14.93			B5	32600
	76	8331	2.03	18.38			B5	38800
	66	9666	1.75	21.32			B5	42300
	56	11282	1.50	24.88			B5	48600
	51	12531	1.35	27.64			B5	48600
ITB493	45	14200	1.19	31.32	B5	54000		
	37	17231	0.98	38.00	B5	54000		
	57	11117	2.71	24.52	B5	73500		
	49	13044	2.31	28.77	B5	81900		
	43	14622	2.06	32.25	B5	89730		
	38	16598	1.81	36.61	B5	89730		
	33	19446	1.55	42.89	B5	96660		
	27	23472	1.28	51.77	B5	108000		
	23	27539	1.09	60.74	B5	114300		
	21	30862	0.97	68.07	B5	126000		
ITB4A3	18	35427	0.85	78.14	B5	126090		
	31	20629	2.28	45.50	B5	113400		
	26	24193	1.94	53.36	B5	113490		
	22	29035	1.62	64.04	B5	130500		
	19	33532	1.40	73.96	B5	132300		
	16	39898	1.18	88.00	B5	143100		
	14	46318	1.01	102.16	B5	152910		
	12	51051	0.92	112.60	B5	152910		
	11	58799	0.80	129.69	B5	152910		



90									
280M4 1400min ⁻¹	158	4820	1.41	8.86	ITB473	B5	29700		
	128	5968	1.26	10.97			30510		
	107	7105	1.13	13.06			28620		
	98	7803	1.46	14.34			12100		
	79	9661	1.26	17.76			31500		
	66	11496	1.06	21.13			34200		
	59	12997	0.94	23.89			36900		
	51	15050	0.81	27.66			38700		
	45	17056	0.72	31.35			44460		
	ITB483	111	6889	2.32			12.66	B5	32600
		94	8123	2.08			14.93	B5	32600
		76	9998	1.69			18.38	B5	38800
		66	11599	1.46			21.32	B5	42300
		56	13539	1.25			24.88	B5	48600
51		15037	1.13	27.64	B5	48600			
45		17040	0.99	31.32	B5	54000			
37		20677	0.82	38.00	B5	54000			
ITB493		81	9434	3.19	17.34	B5	66600		
		69	11055	2.72	20.32	B5	69750		
	57	13340	2.25	24.52	B5	73500			
	49	15653	1.92	28.77	B5	81900			











P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
90							
280M4 1400min ⁻¹	43	17546	1.71	32.25	ITB493	B5	89730
	38	19918	1.51	36.61			89730
	33	23335	1.29	42.89			96660
	27	28166	1.07	51.77			108000
	23	33046	0.91	60.74			114300
	21	37034	0.81	68.07			126000
	36	20984	2.24	38.57	ITB4A3	B5	92700
	33	23128	2.03	42.51			101430
	31	24755	1.90	45.50			113400
	26	29031	1.62	53.36			113490
	22	34842	1.35	64.04			130500
	19	40239	1.17	73.96			132300
	16	47877	0.98	88.00			143100
	14	55581	0.85	102.16			152910

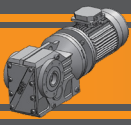
P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
132							
315M4 1400min ⁻¹	81	13709	2.84	17.18	ITB4A3	B5	74700
	69	16079	2.57	20.15			76770
	58	19295	2.32	24.18			78120
	50	22279	2.11	27.92			85050
	42	26516	1.77	33.23			92700
	36	30777	1.53	38.57			92700
	33	33921	1.39	42.51	B5	101430	
	31	36307	1.29	45.50	B5	113400	
	26	42579	1.10	53.36	B5	113490	
	22	51101	0.92	64.04	B5	130500	
	19	59017	0.80	73.96	B5	132300	

P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
110							
315S4 1400min ⁻¹	111	8420	1.90	12.66	ITB483	B5	32600
	94	9928	1.70	14.93			32600
	76	12219	1.38	18.38			38800
	66	14176	1.19	21.32			42300
	56	16547	1.02	24.88			48600
	81	11530	2.61	17.34			ITB493
	69	13512	2.23	20.32	69750		
	57	16305	1.84	24.52	73500		
	49	19131	1.57	28.77	81900		
	43	21445	1.40	32.25	89730		
	38	24344	1.24	36.61	89730		
	33	28520	1.05	42.89	96660		
	27	34425	0.87	51.77	108000		
	50	18566	2.53	27.92	ITB4A3	B5	85050
	42	22097	2.13	33.23			92700
	36	25648	1.83	38.57			92700
	33	28268	1.66	42.51			101430
	31	30256	1.55	45.50			113400
	26	35482	1.32	53.36			113490
	22	42584	1.10	64.04			130500
	19	49181	0.96	73.96			132300
	16	58517	0.80	88.00			143100

P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
160							
315LA4 1400min ⁻¹	81	16772	1.79	17.34	ITB493	B5	66600
	69	19654	1.53	20.32			69750
	57	23716	1.27	24.52			73500
	49	27827	1.08	28.77			81900
	43	31193	0.96	32.25			89730
	38	35410	0.85	36.61			89730
	81	16617	2.34	17.18	ITB4A3	B5	74700
	69	19489	2.12	20.15			76770
	58	23387	1.91	24.18			78120
	50	27005	1.74	27.92			85050
	42	32141	1.46	33.23			92700
	36	37306	1.26	38.57			92700
	33	41116	1.14	42.51			101430
	31	44008	1.07	45.5			113400
	26	51611	0.91	53.36			113400

P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
132							
315M4 1400min ⁻¹	111	10104	1.58	12.66	ITB483	B5	32600
	94	11914	1.42	14.93			32600
	76	14663	1.15	18.38			38800
	66	17012	0.99	21.32			42300
	56	19856	0.85	24.88			48600
	81	13837	2.17	17.34			ITB493
	69	16214	1.86	20.32	69750		
	57	19566	1.54	24.52	73500		
	49	22957	1.31	28.77	81900		
	43	25734	1.17	32.25	89730		
	38	29213	1.03	36.61	89730		
	33	34224	0.88	42.89	96660		

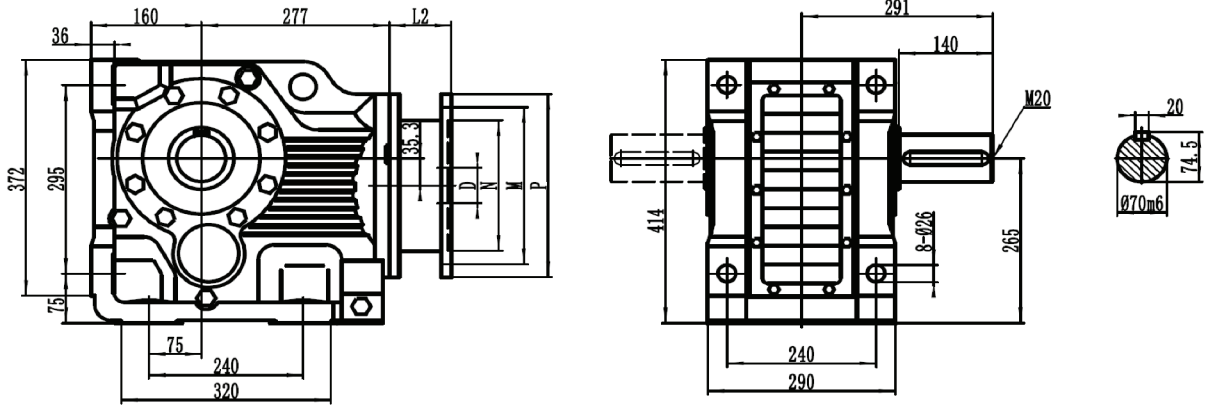
P ₁ [kw]	n ₂ [min ⁻¹]	M ₂ [Nm]	sf	i			R ₂ [N]
200							
315LB4 1400min ⁻¹	81	20771	1.87	17.18	ITB4A3	B5	74700
	69	24362	1.69	20.15			76770
	58	29234	1.53	24.18			78120
	50	33756	1.39	27.92			85050
	42	40176	1.17	33.23			92700
	36	46632	1.01	38.57			92700
	33	51396	0.91	42.51	B5	101430	
	31	55011	0.85	45.5	B5	113400	



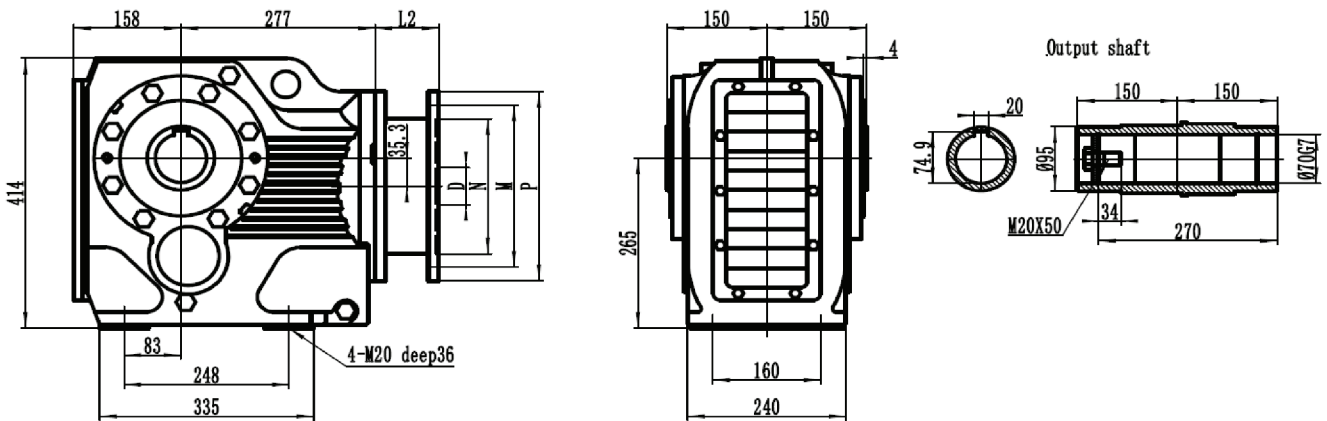
Dimensions

ITB 453

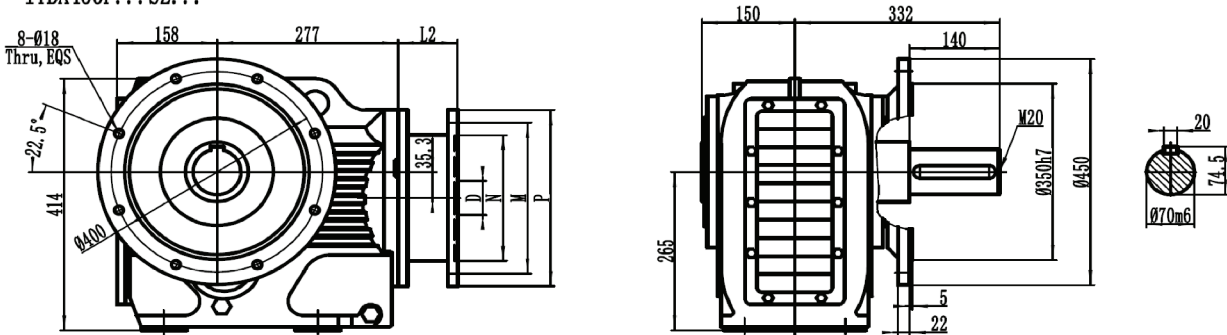
ITB 453 U...SZ...

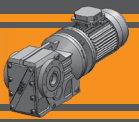


ITBA 453 U



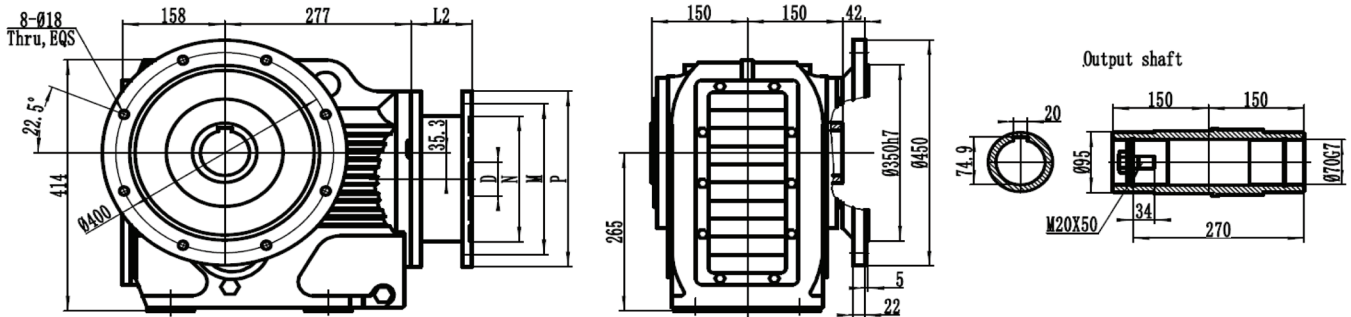
ITBA453F...SZ...



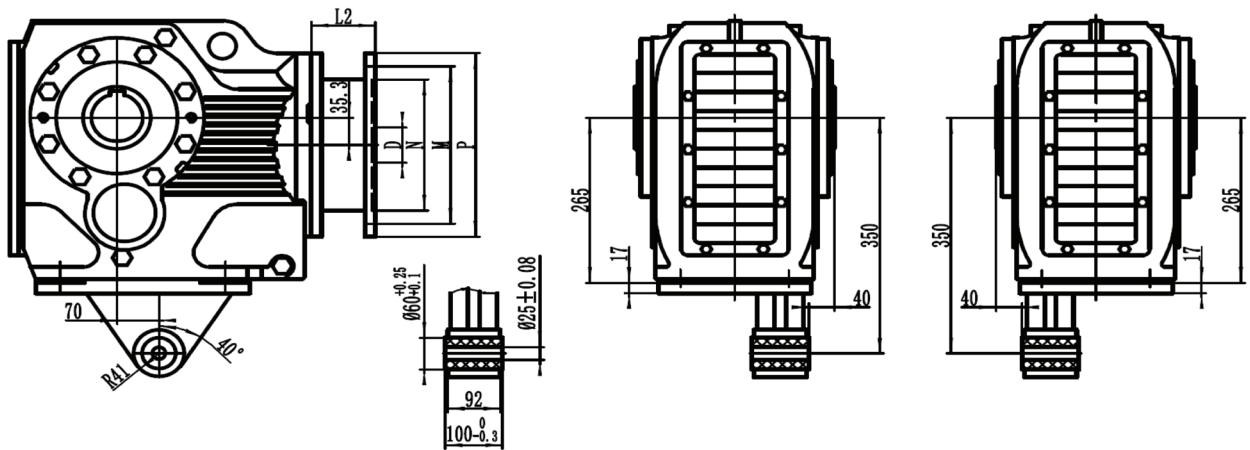


ITB 453

ITBA453F...



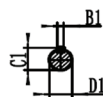
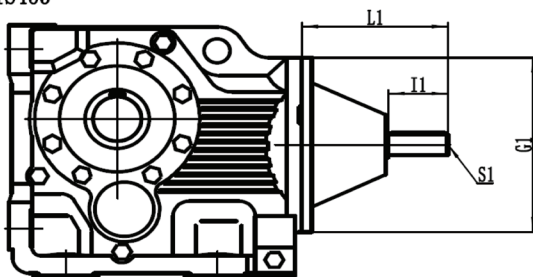
ITBA453U...TA...



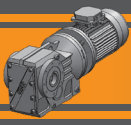
IEC Dimensions

	90B5	100B5	112B5	132B5	160B5	180 B5	200 B5
L2	50	50	50	92	113	113	123
N	130	180	180	230	250	250	300
M	165	215	215	265	300	300	350
P	200	250	250	300	350	350	400
D	24	28	28	38	42	48	55

ITBIS453

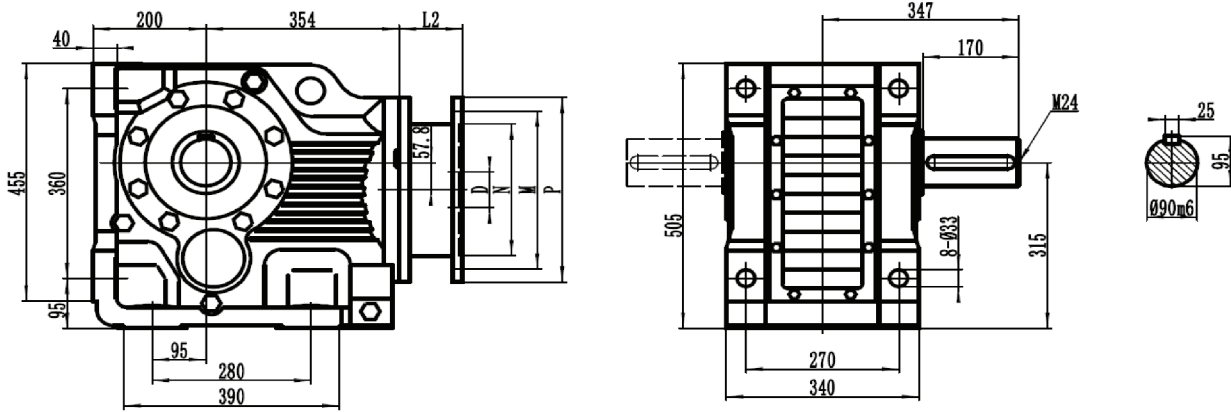


D1	L1	I1	S1	C1	B1	G1
Ø38k6	220	80	M12	41	10	Ø300
Ø42k6	220	80	M16	45	12	Ø300
Ø48k6	220	80	M16	51.5	14	Ø300

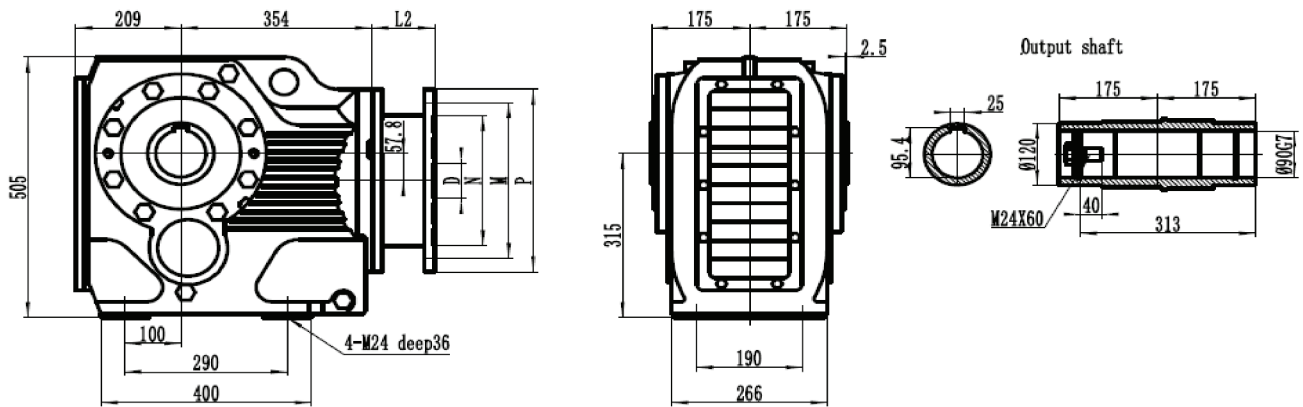


ITB 463

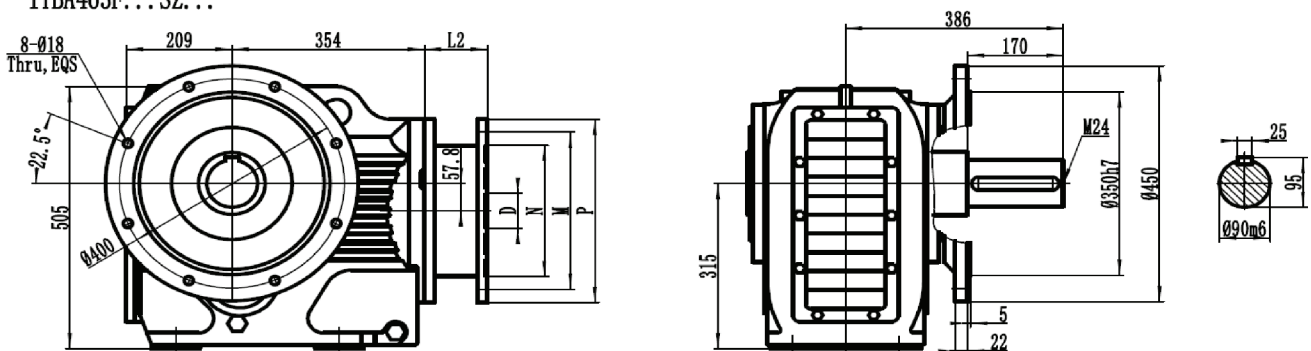
ITB 463 U...SZ...

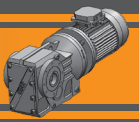


ITBA 463 U



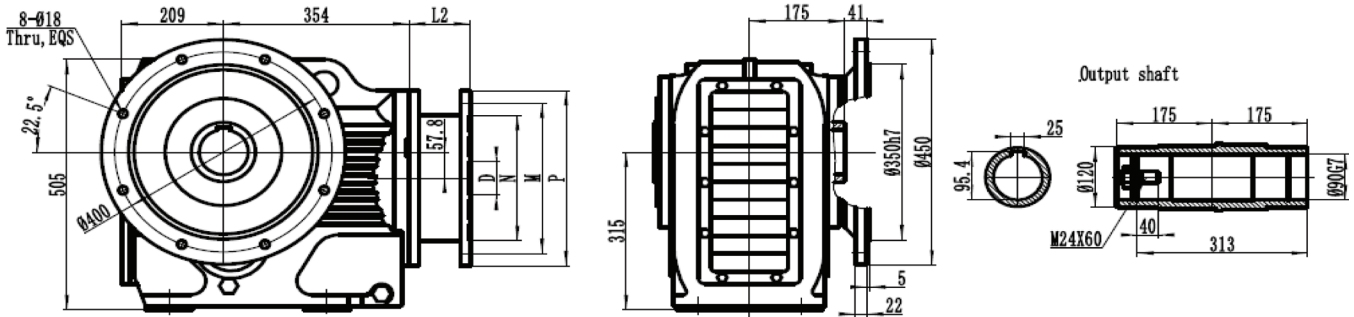
ITBA463F...SZ...



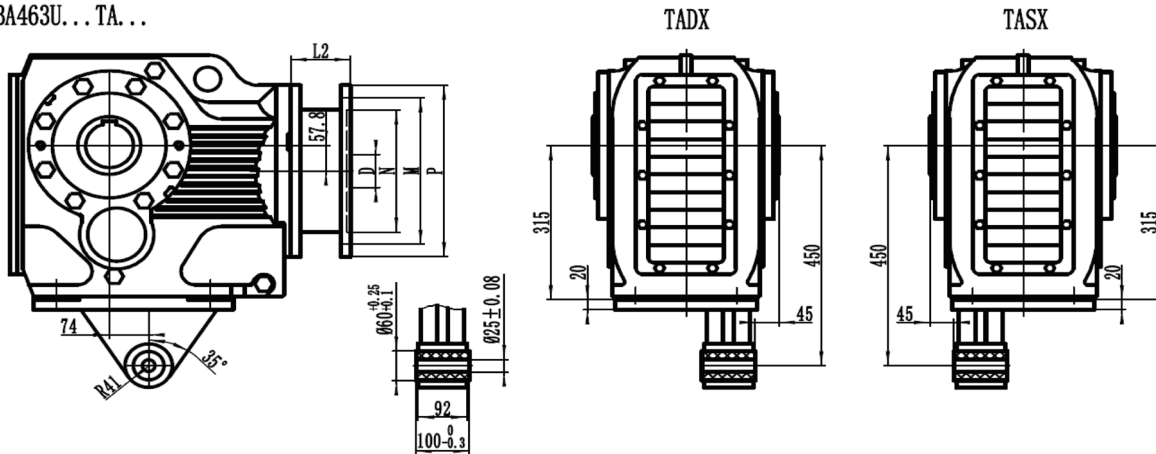


ITB 463

ITBA463F...



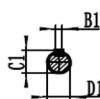
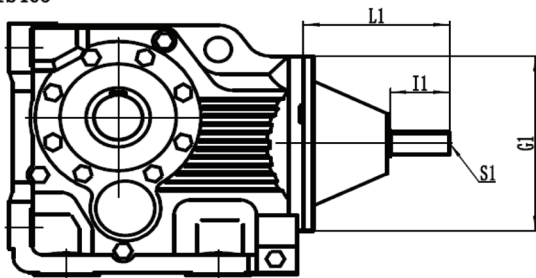
ITBA463U...TA...



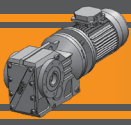
IEC Dimensions

	100 B5	112 B5	132 B5	160 B5	180 B5	200 B5	225 B5
L2	55	55	76	112	112	130	151
N	180	180	230	250	250	300	350
M	215	215	265	300	300	350	400
P	250	250	300	350	350	400	450
D	28	28	38	42	48	55	60

ITBIS463

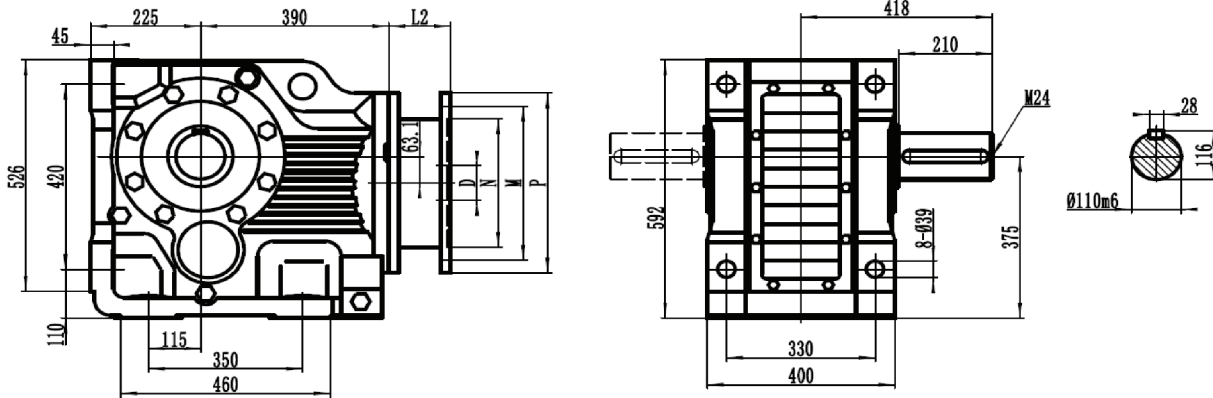


D1	L1	I1	S1	C1	B1	G1
Ø42k6	270	110	M16	45	12	Ø350
Ø48k6	270	110	M16	51.5	14	Ø350

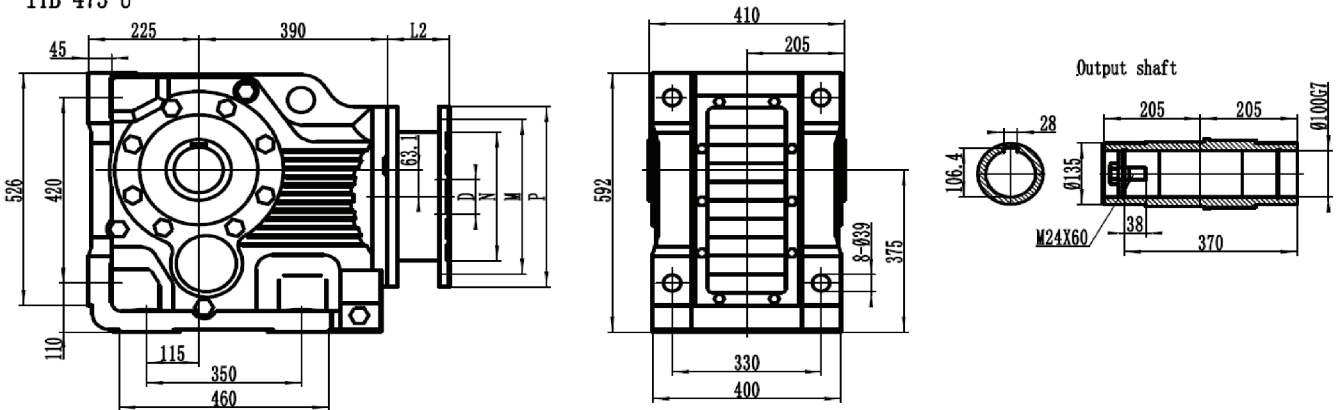


ITB 473

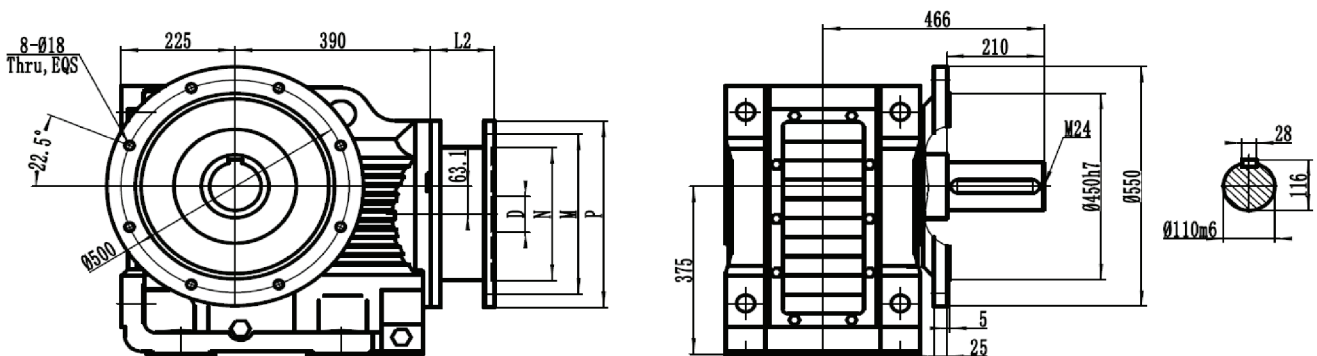
ITB 473 U...SZ...

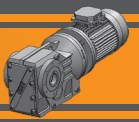


ITB 473 U



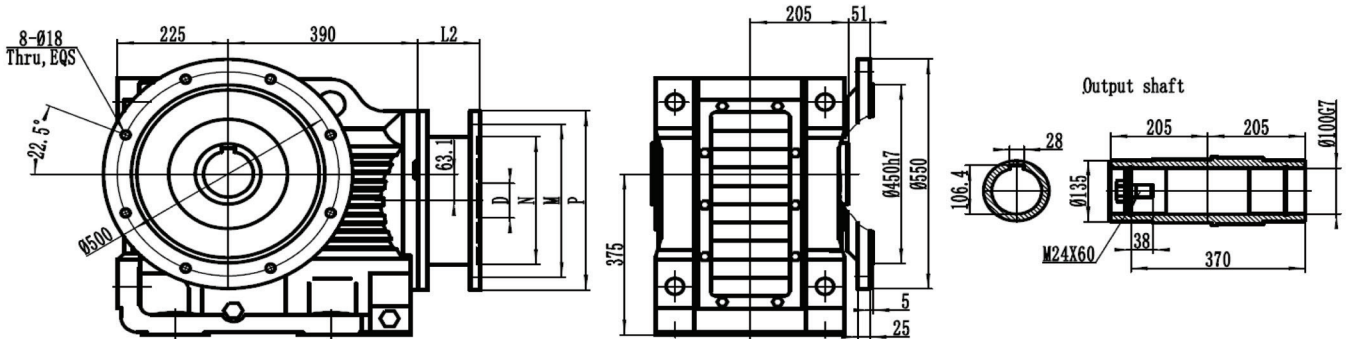
ITB 473F...SZ...



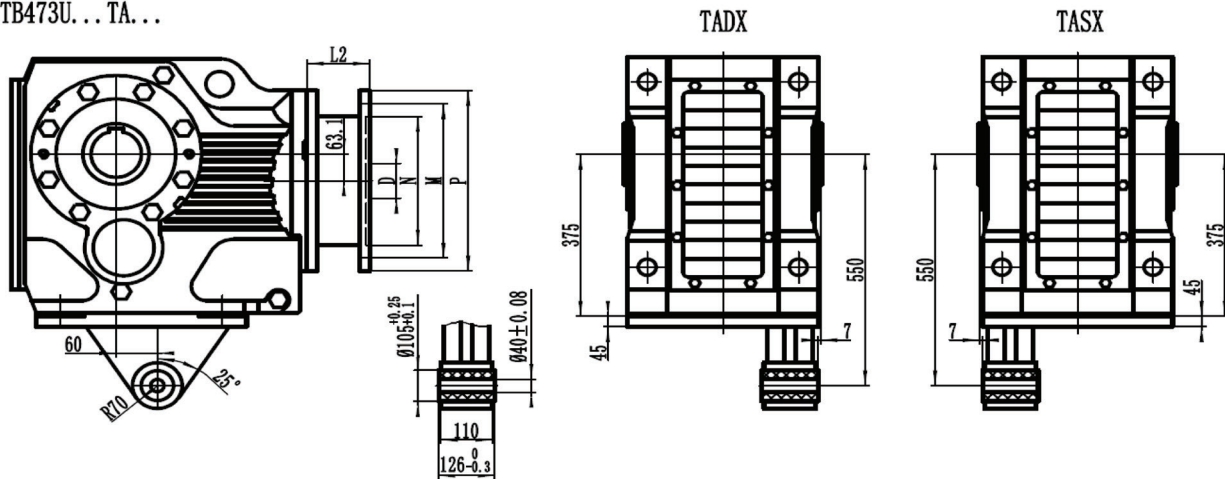


ITB 473

ITB473F...



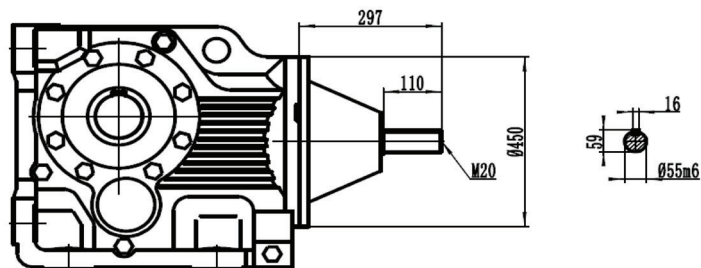
ITB473U... TA...

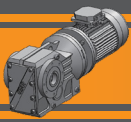


IEC Dimensions

	132 B5	160 B5	180 B5	200 B5	225 B5	250 B5	280 B5
L2	78	112	112	130	135	139	139
N	230	250	250	300	350	450	450
M	265	300	300	350	400	500	500
P	300	350	350	400	450	550	550
D	38	42	48	55	60	65	75

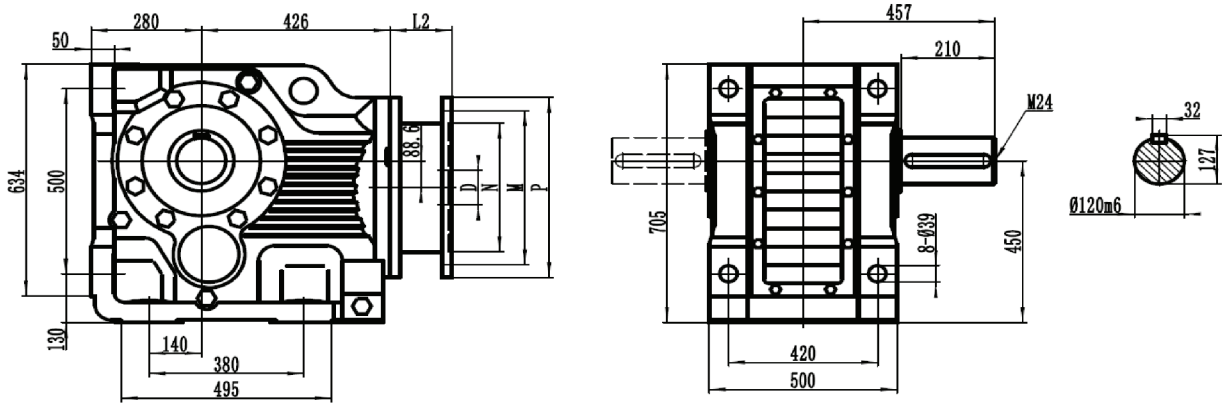
ITBIS473



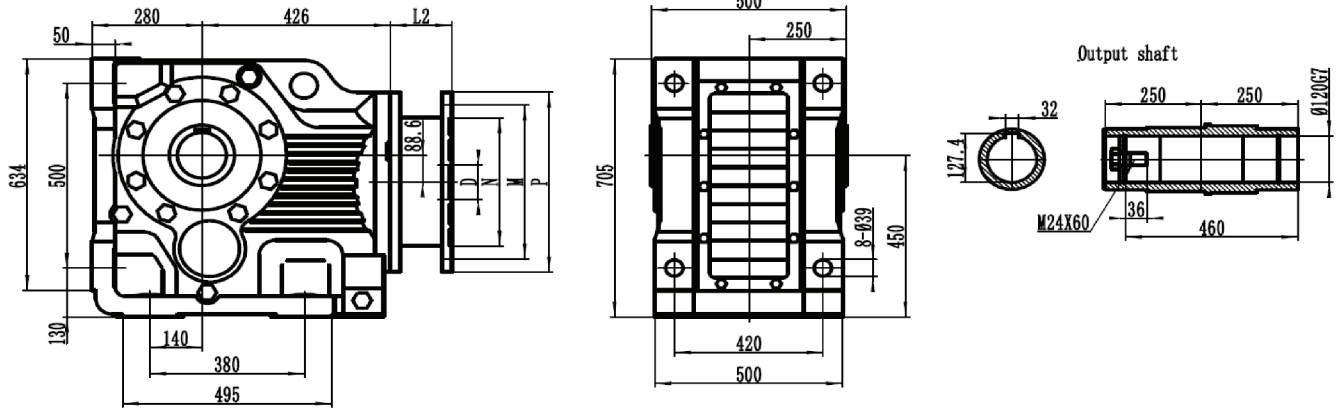


ITB 483

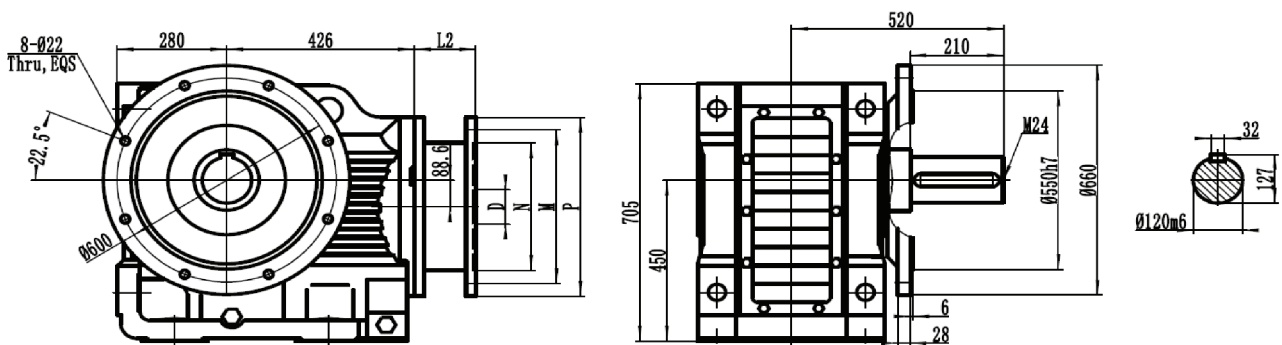
ITB 483 U...SZ...

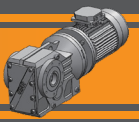


ITB 483 U



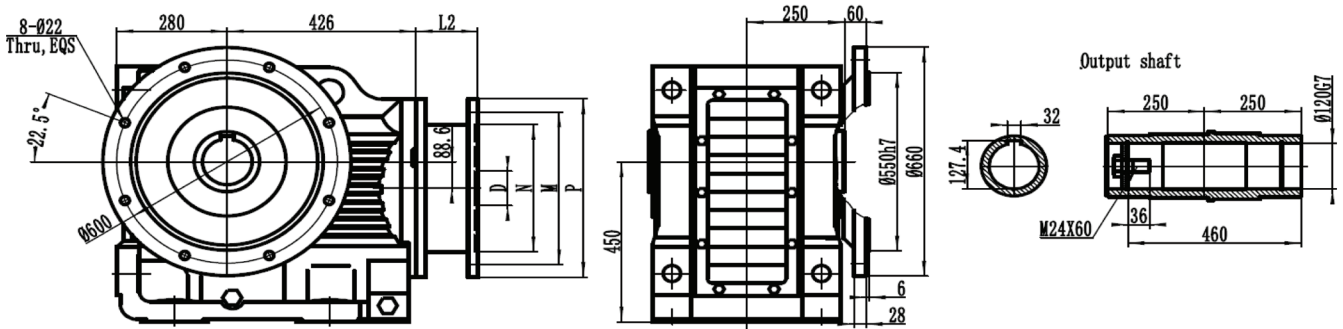
ITB 483F...SZ...



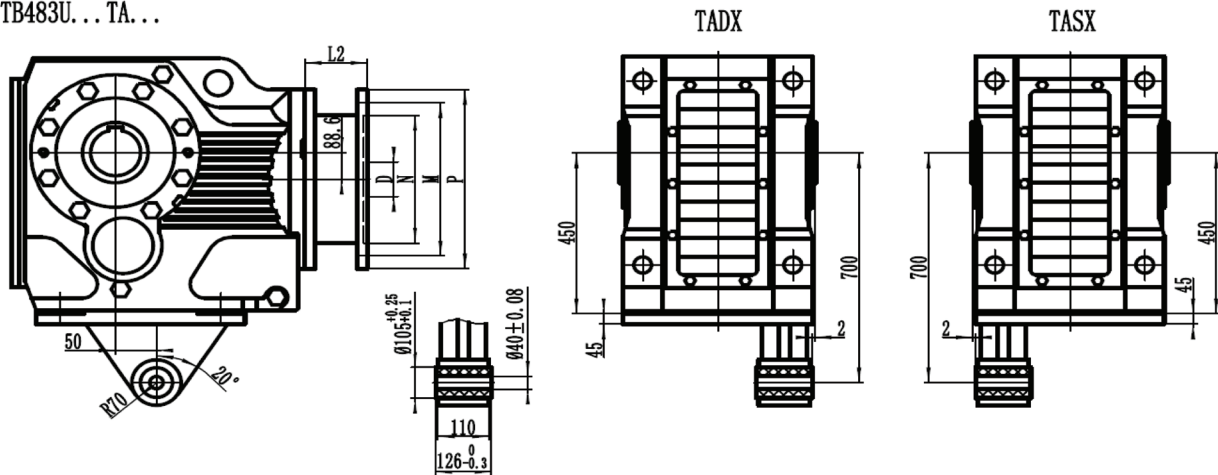


ITB 483

ITB483F...



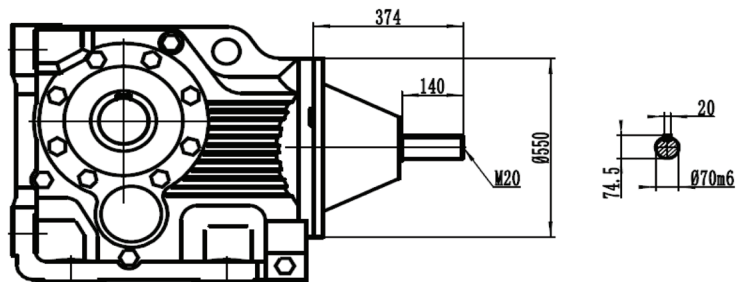
ITB483U... TA...

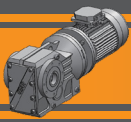


IEC Dimensions

	160 B5	180 B5	200 B5	225 B5	250 B5	280 B5	315 B5
L2	101	101	111	116	120	120	170
N	250	250	300	350	450	450	550
M	300	300	350	400	500	500	600
P	350	350	400	450	550	550	660
D	42	48	55	60	65	75	80

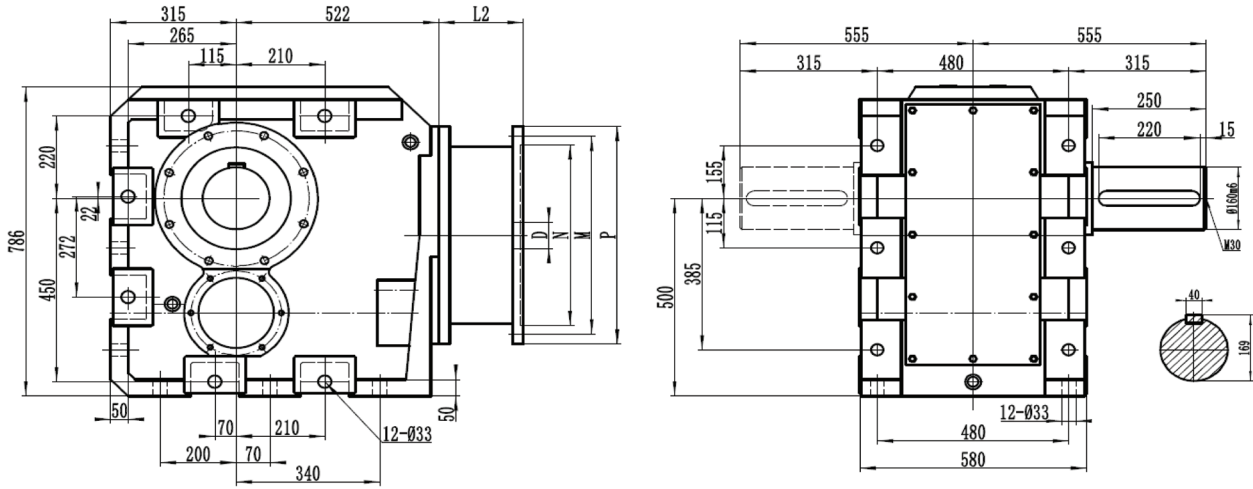
ITBIS483



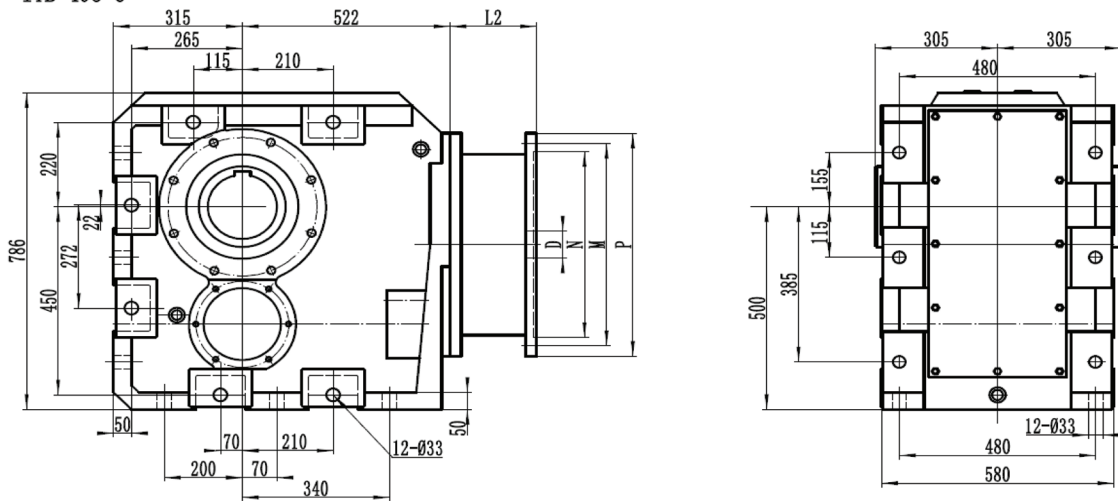


ITB 493

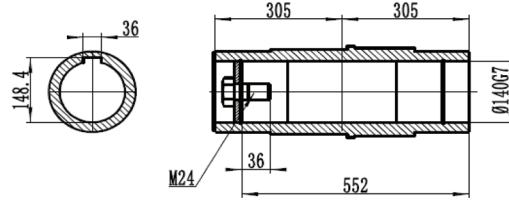
ITB 493 U...SZ...



ITB 493 U

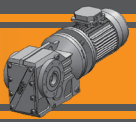


Output shaft



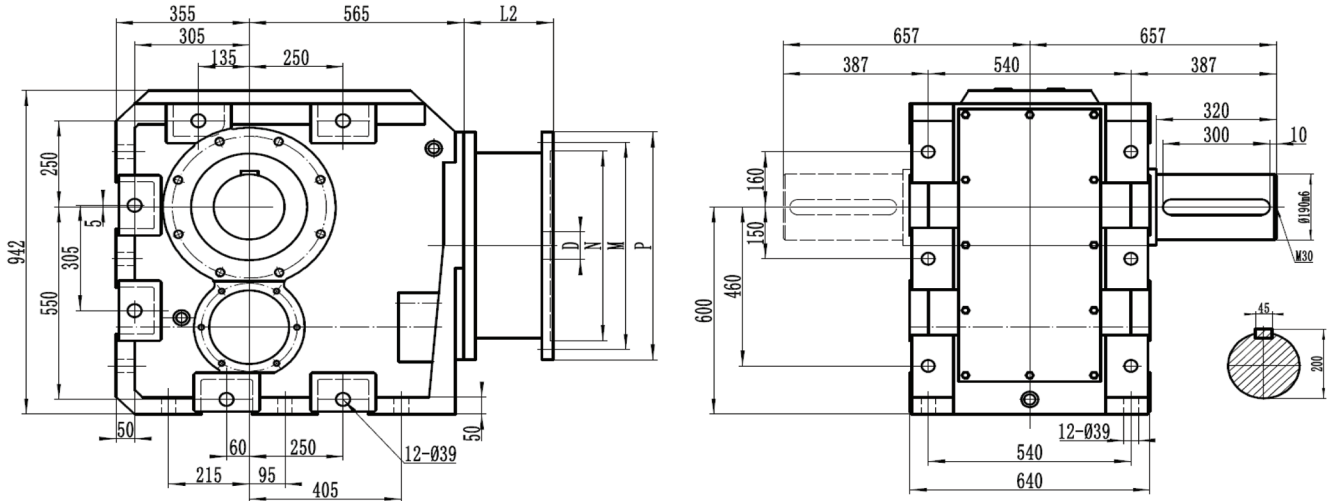
IEC Dimensions

	160 B5	180 B5	200 B5	225 B5	250 B5	280 B5	315 B5
L2	101	101	111	116	120	120	170
N	250	250	300	350	450	450	550
M	300	300	350	400	500	500	600
P	350	350	400	450	550	550	660
D	42	48	55	60	65	75	80

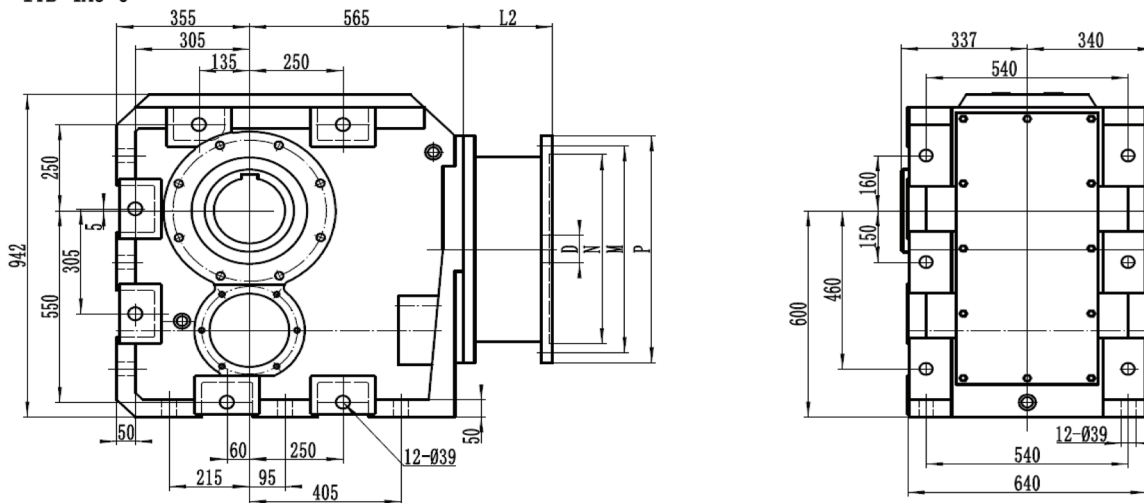


ITB 493

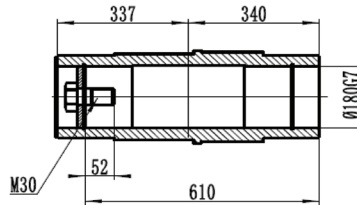
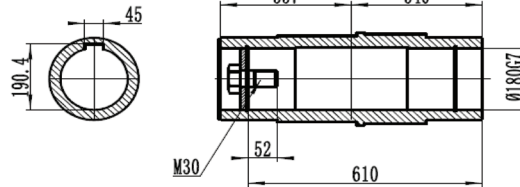
ITB 4A3 U...SZ...



ITB 4A3 U



Output shaft



IEC Dimensions

	180 B5	200 B5	225 B5	250 B5	280 B5	315 B5
L2	101	111	116	120	120	170
N	250	300	350	450	450	550
M	300	350	400	500	500	600
P	350	400	450	550	550	660
D	48	55	60	65	75	80