

TECHNICAL CATALOGUE



PLANETARY **GEARED**MOTORS

STANDARD **IEC**

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Motovario® corporate philosophy aims to promote the company's brand and products at an international level with determination and transparency, while constantly striving to offer innovative solutions for satisfying and anticipating the demand of the market. Motovario® provides technologically advanced solutions in the transmission components field for industrial and civil applications worldwide.

The company

At Formigine, the heart of Modena's industrial district, Motovario® boasts a production plant spanning 50,000 m² that employs 500 people.

1965 Foundation of Motovario

1998 Acquisition of Spaggiari Trasmissioni, an important brand in the mechanical technology sector.

2006 Motovario acquisition by a private investment fund managed by Synergo SGR, in order to guarantee its development and support its expansion throughout the world.

2014 Acquisition of Pujol.

2015 Acquisition by TECO.

At the core of Motovario® lies an evolved production process based on technological solutions that convert power into movement. Motovario® is at the heart of the production processes that drive industries worldwide. Quality and reliability are the company's fundamental assets. Motovario® is present throughout the world with branches in France, Spain, Germany, England, China, the United States and India. The sales network and customer service guarantee immediate and high-quality support to all customers. In addition, the company boasts a worldwide network of MAC (Motovario Assembly Centre). Qualified assembly centres are present, in Italy, Australia, Benelux, Bulgaria, China, Finland, France, India, Ireland, Israel, Malaysia, Poland, Portugal, South Korea, Spain, Sweden, Turkey, United Kingdom, Ukraine and USA. The company is able to offer a wide range of products: speed variators, right-angle, helical-bevel, shaft-mounted, worm gear reducers and gearmotors, electric motors, inverter and inverter drives. Maximum quality and precision are ensured by the cutting-edge technologies implemented in the production process. 170 numerical control machines, served by LGV lines for storage in automatic warehouses, ensure a high standard of efficiency for the Motovario® production department.

The highly automated assembly lines are supported by a specific computerised system. The process statistical control system manages the production process to avoid rejects, by enabling the operator to monitor all the processing phases. The annealing, tempering, hardening and carburizing treatments are carried out inside the plant. The plant operates on a 24-hour basis, including holidays. Reliability, resilience and versatility are the distinctive features of Motovario® products, the most qualified solution to any power transmission requirement.

Main fields OF APPLICATIONS

- Mechanical-electromechanical industry (car washing, pumps, barriers & automatic doors, circuit breakers)
- Ceramic industry (ovens, press feeding systems)
- Food, farming, oenology industry
- Wood, marble, glass industry
- Packaging & bottling industry
- Textile, shoes, leather industry
- Transport, logistic industry
- Construction industry
- Milling, animal husbandry, flower industry
- Machine tools & steel industry
- Mining, quarry, cement industry
- Energy industry (solar, nuclear, biomass, wind)
- Amusement industry (theatres, leisure parks, kiddy rides)
- Chemical & pharmaceuticals industry
- Paper & printing industry
- Plastic & rubber industry
- Telecommunications industry (satellite orientation systems, military radar)
- Engineering and consultant companies

Certifications

Our products can be manufactured to conform with the ATEX Directive 2014/34/UE. In addition, the safety and quality of our motors, geared motors and motovariators is guaranteed by the EAC (EurAsian Conformity) certification, an essential requirement for products exported to the Russian Federation. Our motors are UL certified, which guarantees their safety and quality requirements for the North American market.

Quality CONCEPT

Motovario® has obtained the quality certification renewal of its production system in conformity to the UNI EN ISO 9001:2008 standard. This internationally recognised certification acknowledges the company's commitment and drive geared towards constantly improving products, projects and services offered. Moreover, the company has obtained the OHSAS 18001:1999 (Occupational Health and Safety Assessment Series) certification, which defines the requirements of the workplace safety and health management system.

Research & DEVELOPMENT

Technological innovation: a crucial factor for competing in the market. In the company's 50-year history, research and change have been the pivotal factors in guaranteeing competitiveness at a global level, thanks to increasingly advanced products in terms of performance and reliability. Each year the company invests an increasing amount of its turnover in research and development, geared towards promoting the constant study and analysis of products, control processes and performance certification. In order to ensure that customers receive products that comply with the requested performance levels, the company carries out simulations on all new products, including NVH (Noise, Vibration, Harshness) tests effected in the advanced semi-anechoic chamber.

Customer CARE

Innovative instruments and software applications supporting the technical and logistic requirements of our partners worldwide guarantee a timely and customised service. The experience acquired by Motovario® has led to the creation of the new online portal MyMotovario 4.0, which allows for selecting products and exporting their 3D file. As a result, designers and engineering departments can download the three-dimensional model of the requested product and implement it directly in their own layout. In order to maximise customer service and quality, Motovario® offers all its customers the following online services: Order Tracking, which allows for monitoring the progress of an order in real time, and the Stock Availability service, through which users may check the availability (stock) of our products, both in the Italian plant and in the various branches.

Motovario chooses technological evolution.

Motovario® has chosen technological evolution and actively collaborates with the Faculty of Engineering of the University of Modena and Reggio Emilia and of the University of Bologna.

Reliability, sturdiness, versatility

These are the distinctive traits of Motovario products. A broad range of transmission products that provide a competent, innovative solution to each and every power application need. Cutting-edge tools, unrelenting research efforts and ongoing commitment to upgrading manufacturing equipment to the latest state-of-the-art enable us to offer high quality and performance standards to cater to industry requirements and the broadest variety of applications. Motovario ranks among the leading, well-reputed companies in Italy engaged in the design, manufacture and sales of transmission products for industrial and civil applications. The entire manufacturing process takes place in Formigine and Ubersetto plants, in Modena area, with an overall surface area of over 50.000 sq m. and a workforce of about 500 people. 170 numerically controlled machines and cutting-edge handling, storage and assembly automated systems ensure that all products meet high quality standards. The network includes more than 40 Motovario-certified assembly centres, with the capability to supply products in a broad range of versions, including customised versions, high service capacity and fast response. As a result, our product offering can cater to the needs of all plant engineering sectors, in all industries and for different applications, and includes: speed variators, helical, bevel-helical, parallel helical, worm gear reducers and gearmotors, electric motors and motor-inverters. All of the products we manufacture share such common features as reliability, sturdiness and versatility, topped with a high innovation content. At the heart of a company's technological innovation is the ability to develop integrated tools for computer-aided calculation simulation and management of different processes as part of product development. When simulating operating, setup and process conditions, it is also necessary to analyse and optimize the overall functional design of a product using a synergistic approach. This is achieved by implementing an exhaustive experimental plan, without using interpolation or approximation, as they frequently allow criticalities or any oversizing which is not conducive to maximising quality/cost ratio to go unnoticed.

High-efficiency method for calculation according to standards

A set of specific functions have been developed to this end. A few significant examples include functions to:

- Optimise individual reduction ratios and the combinations of the different reduction stages based on parametrisable target normal series;
- Calculate torque values and maximum permissible external forces for gear reducer units, using iterative numeric algorithms to confirm target life/safety values of components;
- Create databases for loading a FEM structural analysis model by automatically writing all reaction components of bearings under all load conditions to a specific file, with automatic selection of critical cases that need to be verified.

Another goal of the method is to create synergy between calculation according to standards and FEM structural calculation and the implementation of FEM model loading procedures, so as to simplify input data, meshing and constraint criteria

Competitiveness and operational benefits of the new method

This method offers many practical advantages over traditional calculation procedures within the company, namely:

- Iterative optimisation of project since setup stage;
- Accurate assessment of the various service factors and reliability levels for the entire gear reducer unit and for all operating conditions as per catalogue rating or customer specific requirements;
- Faster support to customers in analysing tailored product configurations;
- Integrated corporate databases that can be updated in real-time.

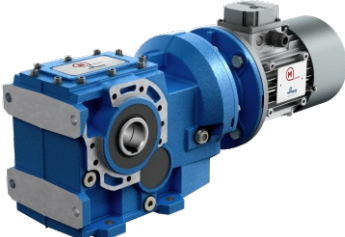
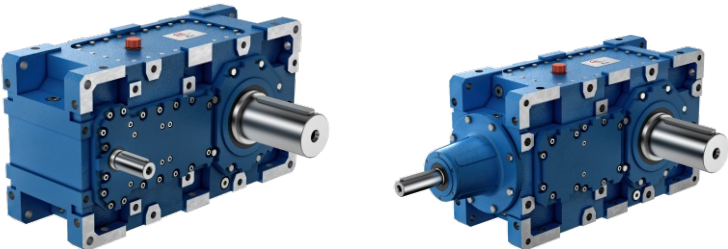
Range extension and ongoing evolution

The steady, significant growth of Motovario Group is achieved thanks to an ongoing search for new calculation and design tools, as well as to customer service. The new tools identified have led to innovation, improved product reliability as well as positive developments in market management. The following software products are used for design, calculation and management:

- Solidworks;
- Kissoft;
- Kissys;
- Ansys;
- FEM modelling analysis software;
- Circuit design and simulation software;
- Specific spreadsheets;
- SAP.

In MyMotovario 4.0 portal, PRODUCT SELECTION includes a section named APPLICATIONS where customers can enter application data and find out which gear reducer suits them best in a matter of minutes.

MOTOVARIO Products

HELICAL GEAR REDUCERS Cast iron or aluminum casing Output shaft up to 90 mm Mn₂ up to 8.600 Nm Reduction stages 1, 2, 3 Ratios up to 354 Atex gear reducers	
HELICAL BEVEL GEAR REDUCERS Cast iron or aluminum casing Output shaft up to 110 mm Mn₂ up to 14.000 Nm Reduction stages 2, 3 Ratios up to 443 Atex gear reducers	
SHAFT MOUNTED GEAR REDUCERS Cast iron Output shaft up to 60 mm Mn₂ up to 3.225 Nm Reduction stages 2, 3 Ratios up to 395 Atex gear reducers	
WORM GEAR REDUCERS Cast iron or aluminum casing Output shaft up to 50 mm Mn₂ up to 2.700 Nm Ratios up to 1083 Atex gear reducers	
PLANETARY GEARED UNITS Cast iron Output shaft up to 100 mm Mn₂ up to 18000 Nm Reduction stages 1, 2, 3, 4 Ratios up to 3190	
PARALLEL HELICAL AND BEVEL HELICAL GEAR REDUCERS FOR MIDDLE HEAVY INDUSTRY Cast iron casing Output shaft up to 180 mm Mn₂ up to 110.000 Nm Reduction stages 2, 3, 4 Ratios up to 431 Atex gear reducers	

**MOTOVARIATORS AND
MOTOVARIATOR-GEAR REDUCERS**

Cast iron or aluminum casing
 Mn₂ up to 5.000 Nm
 Atex units

**ELECTRIC MOTORS**

Power ratings up to 90 kW
 Poles 2, 4, 6
 Three-phase and single-phase, built-in brake, dual polarity
 Protection class up to IP66

**SELF POWER® SELF-STARTING
SYNCHRONOUS ELECTRIC MOTORS**

Power ratings up to 7,5 kW
 Poles 4
 Three-phase, built-in brake
 Protection class up to IP66

**DRIVES****DRIVON - motoinverter**

Three phase and single phase power supply
 High dynamics sensorless vectorial control
 Power ratings up to 5,5 kW
 Standard integrated STO
 Integrated field bus
 Optional field bus



1.3 SYMBOLS AND FORMULAS

1.3.1 Symbols

Physical dimension	Symbol	Symbol units of measure	Input	Output
Power	P	[kW]	P ₁	P ₂
Requested power	Pr	[kW]	Pr ₁	Pr ₂
Nominal power	Pn	[kW]	Pn ₁	Pn ₂
Torque	M	[Nm]	M ₁	M ₂
Nominal torque	Mn	[Nm]	/	Mn ₂
Requested torque	Mr	[Nm]	Mr ₁	Mr ₂
Speed	n	[rpm]	n ₁	n ₂
Force	F	[N]	/	/
Radial load admissible	Fr	[N]	Fr ₁	Fr ₂
Axial load admissible	Fa	[N]	Fa ₁	Fa ₂
Radial load resultant	Fre	[N]	/	/
Reduction ratio	i	[]	/	/
Dynamic efficiency	η _d	[]	/	/
Service factor	f.s.	[]	/	/
Life factor	Fh	[]	Fh ₁	Fh ₂
Corrective factor	fh	[]	fh ₁	fh ₂
Static	s	[]	/	/
Dynamic	d	[]	/	/
Calculated	c	[]	/	/
Maximum	max	[]	/	/
Minimum	min	[]	/	/
Moment of inertia	J	[kgm ²]	J ₁	J ₂
Ambient temperature	T _{amb}	[°C]	/	/
Dimension		[mm]	/	/
Angular backlash	y	[arcmin]	y ₁	y ₂
Number of screw threads	Zl	[]	/	/
Lead angle	γ	[° ' '']	/	/
Axial module	Mx	[]	/	/
Dynamic efficiency of n1= 1400 rpm	η _d (1400)	[]	/	/
Static efficiency	η _s	[]	/	/

1.3 SYMBOLS AND FORMULAS

1.3.2 Formulas

REDUCER		
Starting or stopping time	$t = v / a$	[s]
Velocity in rotary motion	$v = \pi * d * n / 60$ $v = \omega * r$	[m/s]
Speed velocity Angular velocity	$n = 60 * v / (\pi * d)$ $\omega = v / r$	[rpm] [rad/s]
Acceleration or deceleration according to a starting / stopping time	$a = v / t$	[m/s ²]
Angular acceleration	$\alpha = n / (9,55 * t)$ $\alpha = \omega / t$	[rad/s ²]
Starting or stopping distance (according to acceleration / deceleration or angular velocity)	$s = a * t^2 / 2$ $s = v * t / 2$	[m]
Horizontal translation force	$F = \mu * m * g$	[N]
Vertical translation force (lifting)	$F = m * g$	
Inclined plane translation force	$F = m * g (\mu * \cos\beta + \sin\beta)$	
m= mass [kg]; g= gravity acceleration [m/s ²]; μ= friction coefficient; β= angle of inclination		
Moment of inertia	$J = m * v^2 / \omega^2$	[kgm ²]
Torque	$M = F * d / 2$ $M = J * \omega / t$	[Nm]

MOTOR and GEARMOTOR		
Starting time	$t_a = (J_{ext} + J_m) * n_n / 9,55 + (M_{peak} - M_r)$	[s]
Braking time	$t_s = (J_{ext} + J_m) * n_n / 9,55 + (M_{peak} + M_r)$	[s]
Motor rotation angle during starting	$\varphi = n_n * t_a / 19,1$	[rad]
Motor rotation angle during braking	$\varphi = n_n * t_s / 19,1$	[rad]
Power available at the shaft of single phase motor	$P = V * I * \eta * \cos\omega$	[W]
Power available at the shaft of three phase motor	$P = 1,73 * V * I * \eta * \cos\omega$	[W]

RUNNING at 60Hz		
Speed velocity at 60Hz	$n_{60Hz} = 1,2 * n_{50Hz}$	[rpm]
Power at 60Hz	$P_{60Hz} = P_{50Hz} * V_{60Hz} / V_{50Hz}$	[kW]
If input voltage at 60 Hz (V_{60Hz}) corresponds to winding voltage at 50 Hz (V_{50Hz}), power doesn't change $P_{60Hz} = P_{50Hz}$		
If input voltage at 60 Hz (V_{60Hz}) is 20% higher than winding voltage at 50 Hz (V_{50Hz}), power increases by 20% $P_{60Hz} = 1,2 P_{50Hz}$		
Torque at 60Hz	$M_{60Hz} = M_{50Hz} * P_{60Hz} / (1,2 * P_{50Hz})$	[Nm]
Service factor at 60Hz	$f.s_{60Hz} = f.s_{50Hz} * 1,175 * P_{50Hz} / P_{60Hz}$	-

1.4 PRODUCT SELECTION

For correctly selecting a gear reducer or geared motor, several essential pieces of data are required:

1. The rotational input speed to the gear reducer (**n₁**) and the rotational output speed (**n₂**). Through these two values it is possible to calculate the reduction ratio (**i**) of the gear reducer using the following formula: $i = n_1/n_2$
2. The torque required by the application (**Mr₂**).

The geared motor or gear reducer can be selected once this data is known.

This guide helps you to select the right product in just a few steps:

Geared motor selection

1. Determine the application's actual service factor (**s.f.**). This parameter depends on the type of load of the powered machine, the number of starts per hour and the hours of operation (refer to the "Service factor" paragraph).
2. Calculate the input power **Pr₁** using the required torque value **Mr₂**, the speed **n₂** and dynamic efficiency value. $Pr_1 = (Mr_2 * n_2) / (9550 * \eta_d)$. The dynamic efficiency value depends on the type of gear reducer and on the number of gear reduction stages. (To calculate the efficiency value see its page).
3. Consult the geared motor performance tables and identify a nominal power value **Pn₁** exceeding the required power **Pr₁**, such that: $Pn_1 \geq Pr_1$
4. Once the suitable nominal power has been identified, select the geared motor capable of generating the rotational speed closest to the desired **n₂** value and with service factor s.f. greater or equal to that required by the application.

In the geared motor selection tables the combinations include 2-pole, 4-pole and 6-pole motors powered at 50Hz.

Gear reducer selection

1. Determine the application's service factor (**f_s**) (consult to the "Service factor" paragraph on its page).
2. Calculate the reduction ratio **i** from the requested output speed **n₂** and from the input speed **n₁**. $i = n_1/n_2$
3. Calculate the torque **M_{c2}** for selecting the gear reducer through the torque required by the application **Mr₂** and the service factor s.f.: $M_{c2} = Mr_2 * (f_s)$
4. Consult the Gear Reducer Performance tables looking for the reducer that, with the reduction ratio closer to the calculated one, has a nominal torque **Mn₂** so that: $Mn_2 \geq M_{c2}$

Selection of gear reducers according to number of work cycles:

1. Determine the application's actual service factor (**s.f.**). This parameter depends on the type of load of the powered machine, the number of starts per hour and the hours of operation (refer to the "Service factor" paragraph).
2. Determine the duration of operation in hours **hc** for the application and, therefore, required of the gear reducer. **hc** represents the actual operating time: the steps of the work cycle during which the gear reducer is at standstill are excluded.
3. Calculate the torque **M_{c2}** for selecting the gear reducer through the torque required by the application **Mr₂** and the service factor s.f.: $M_{c2} = Mr_2 * (f_s)$
4. Calculate the reduction ratio **i** from the requested output speed **n₂** and from the input speed **n₁**. $i = n_1/n_2$
5. Calculate the duration factor **Fh₂** = $(n_2 * hc)$, which is directly proportional to the number of work cycles, on the basis of the required output speed **n₂** and the duration of operation **hc**.
6. Consult the work cycle performance tables to find the gear reducer which, with the reduction ratio closest to the calculated one, has a rated torque **Mn₂** whereby: $Mn_2 \geq M_{c2}$ and $(n_2 * h) \geq Fh_2$. The Duty Cycle Performance tables refer to both motor flange (HL) and solid input shaft (IHL) configurations: for the latter, check the availability of the ratio and applicable **M_{2max}** value in the IHL Gear Reducer Performance tables. If the **M_{2max}** value is lower than the value in the performance tables, always use **M_{2max}** as the highest value.

1.4 PRODUCT SELECTION

Checks

Once the gear reducer or geared motor has been selected, the following checks should be performed:

A. Thermal power

The gear reducer's thermal power must be equal to or greater than the installed mechanical power, or the power required by the application according to the indications contained in the section (refer to the "Thermal power" paragraph).

B. Maximum torque

It is the value of the output torque that the gear reducer withstands under static conditions and is intended as instantaneous load or starting torque under load. Check that the starting torque and instantaneous torque do not exceed the M_{2max} value in the table.

M_{2max} [Nm]													
HPL 010 VP P613		HPL 020 VP P623		HPL 030 VP P633		HPL 050 VP P653		HPL 080 VP P983		HPL 130 VP P1133		HPL 180 VP P1183	
CS SS HS	HM	CS SS HS	HM	CS SS HS	HM	CS SS HS	HM	CS SS HS	HM	CS SS HS	HM	CS SS HS	HM
2400	2400	3400	2400	5200	5200	8800	7500	14900	11100	21000	20100	29000	29000

In the ECE gearbox version, for the ratios in the tables below the M_{2max} values are those shown.

IHL 010	1					2	3	
i	3,44	4,32	5,37	7,38	9,30	11,8	87,4	188
M_{2max} [Nm]	630	790	990	1360	1710	2000	2000	2000

IHL 020	1		2		
i	7,38	9,30	11,8	14,9	18,7
M_{2max} [Nm]	1360	1710	2120	2660	3340

IHL 030	1	2						
i	9,30	11,8	14,9	18,7	21,3	23,2	26,7	28,8
M_{2max} [Nm]	1710	2120	2660	3340	3810	4150	4780	5150

IHL 050	2				
i	26,7	31,9	33,2	39,6	45,7
M_{2max} [Nm]	4780	5700	5940	7090	8170

IHL 080	2		3		
i	55,4	69,8	53,5	63,2	79,3
M_{2max} [Nm]	9900	12470	9280	10960	13750

IHL 130	3			
i	78	94,9	104	112
M_{2max} [Nm]	13530	16450	18030	19390

IHL 180	3			
i	122	140	151	162
M_{2max} [Nm]	21120	24340	26240	28130

In the geared motor version, if the service factor is < 1.5 and the starting torque under load of the motor is > 1.5 Mn, please contact the MOTOVARIO TECHNICAL SERVICE.

C. Input maximum torque

For IHL versions that are not listed in the catalogue but geometrically feasible, check that the gear reducer input torque is always lower than the maximum allowed value, equal to $M_{1\text{ max}} = 190 \text{ Nm}$.

For HL, CHL and PHL versions, the couplings on the fast side are designed to be matched exclusively with three-phase electric motors, as indicated in the chapter of this catalogue on the performance of the geared motors.

For combinations with geometrically modular motors, gear reducers or geared motors not mentioned in the chapter on performance (some examples are not exhaustive: electric motors with double brake, brushless motors, combined gear reducers, etc.), please contact MOTOVARIO TECHNICAL SERVICE.

Other uses or combinations with other devices or couplings not included in this catalogue are not envisaged.

D. Radial loads

1. Verify that the radial loads acting on the input and/or output shafts are within with the values indicated in the catalogue. If they exceed these values, increase the size of the gear reducer or modify the external load capacity. During the checking phase, it is important to remember that the values indicated in the catalogue refer to loads acting on the mid-point of the shaft protrusion, therefore, if the load is applied to a different position, appropriate formulas must be used to calculate the admissible load in the desired position (refer to the "Radial loads" paragraph).
2. If accessory output shafts are present, make sure that the applied load is compatible with shaft size. If help is needed: contact MOTOVARIO TECHNICAL SERVICE.

E. If an electric motor is going to be fitted to the selected gear reducer, check for its applicability by referring to the configuration table (see paragraph "Motor flange availability"). From IEC 180 motors, verify if necessary to support the motor with feet. In case of need please contact MOTOVARIO TECHNICAL SERVICE.

1.5 SERVICE FACTOR

1.5.1 Service factor

The service factor required by application is defined by this formula $f_s = f_{sa} * f_{sb} * f_{sc}$ (see relevant tables).

It takes into account how heavy-duty the application is; it depends on operating conditions, inverter type and frequency of gear reducer starts. The service factor of a gear reducer is calculated by dividing its nominal power P_{n1} by installed power P_1 . The parameters that need to be taken into account in order to select the most suitable service factor are reported in tables f_{sa} , f_{sb} and f_{sc} .

Table f_{sa}

Nature of load applied	Daily operating hours [h/d]				
	2	4	8	16	24
Uniform	0,80	0,90	1,00	1,25	1,35
Moderate	1,00	1,20	1,30	1,60	1,80
Heavy	1,30	1,60	1,80	2,25	2,50

Table f_{sb}

Nature of load applied	Frequency of starts per hour [st/h]			
	< 6	6 ... 20	20 ... 60	60 ... 120
Uniform	1	1,25	1,35	1,5
Moderate	1	1,15	1,25	1,35
Heavy	1	1,05	1,15	1,25

Table f_{sc}

Type of motor used	f_{sc}
Electric motor	1,00
Reciprocating multiple-cylinder motor	1,25
Reciprocating single-cylinder motor	1,50

Table APPLICATION CLASSIFICATION

Application	Type of load
CONVEYORS (for heavy, not uniform loads)	
Scraper	Moderate
Belt	Moderate
Bucket	Moderate
Elevators (Redler)	Moderate
Roller	Moderate
For furnaces	Moderate
Reciprocating	Heavy
Oscillating	Heavy
Screw	Heavy
Application	Type of load
PUMPS	
Centrifugal	Moderate
Rotary (gear and screw) (for heavy, not uniform loads)	Uniform
Rotary (gear and screw) (variable density)	Moderate
Reciprocating	Uniform
Reciprocating double-acting multiple-cylinder	Moderate
Reciprocating single-cylinder	Heavy
Application	Type of load
MILLS	
Rotary ball	Heavy
Hammer	Heavy
Rolling	Heavy
Cement	Moderate
Application	Type of load
COMPRESSORS	
Centrifugal	Uniform
Sliding-vane positive-displacement	Moderate
Reciprocating multiple-cylinder	Moderate
Reciprocating single-cylinder	Heavy
Application	Type of load
BATCHERS	
Rotary	Moderate
Reciprocating, vibrating	Moderate

Application	Type of load
TEXTILE INDUSTRY	
Washing machines	Moderate
Rotary presses	Moderate
Carding machines	Moderate
Dyeing machines	Moderate
Looms	Moderate
Picking machines	Moderate
Spinning machines	Moderate

Application	Type of load
PAPER INDUSTRY	
Mixers (stirrers)	Moderate
Conveyor belts	Moderate
Drying cylinders	Moderate
Felt stretchers	Moderate
Rotary presses	Heavy
Presses	Heavy
Winders	Heavy

Application	Type of load
FOOD INDUSTRY	
Mixers	Moderate
Kneading machines	Moderate
Sugar beet cutters	Moderate
Meat grinders	Moderate

Application	Type of load
RUBBER AND PLASTIC MACHINES	
Mixers (palletizers)	Heavy
Rotary presses	Heavy
Mills (crushers)	Heavy
Tyre machines	Moderate

Application	Type of load
STIRRERS	
Variable-density	Moderate
Variable-density with suspended solids	Moderate

Table APPLICATION CLASSIFICATION

Application	Type of load
MACHINE TOOLS	
Punching presses	Heavy
Cutting	Heavy
Planers	Heavy
Main drives	Moderate
Auxiliary drives (feeders, workpieces, conveyor)	Uniform
Bending machines	Moderate
Application	Type of load
FANS (regular, balanced speed)	
Centrifugal	Uniform
Lightweight, small-diameter	Uniform
Cooling towers	Moderate
Large-diameter turbo fans (mining)	Moderate
Application	Type of load
CRANES AND STACKER CRANES	
Arm rotation	Uniform
Sideshifter	Moderate
Basket drive control	Heavy
Application	Type of load
CRUSHERS	
Ore	Moderate
Stone	Moderate
Application	Type of load
PACKAGING MACHINES	Uniform
Application	Type of load
WOOD WORKING	
Debarkers	Heavy

Application	Type of load
EXTRACTORS AND DREDGERS	
Rope winders	Moderate
Rail-mounted conveyors	Moderate
Pumps	Moderate
Stackers	Moderate
Material hoisting	Moderate
Bucket extractors	Heavy

Application	Type of load
METAL-WORKING	
Drawbenches	Heavy
Forging presses	Heavy
Cutting machines	Heavy
Rolling mills	Heavy

Application	Type of load
MIXERS	
Steady-density	Uniform
Variable-density	Moderate
For concrete	Moderate

Application	Type of load
ELEVATORS	
Hoists	Moderate
Lifts, ski lifts (cableways)	Heavy

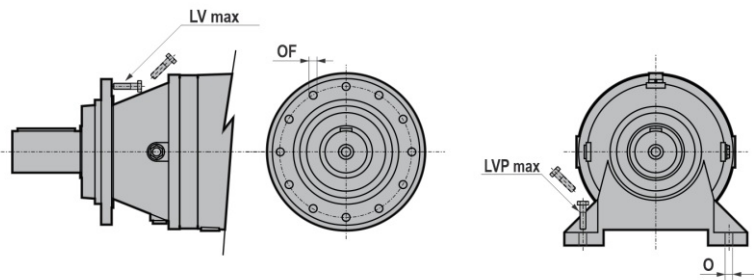
Application	Type of load
WASHING MACHINES AND PUMPS	Moderate

Application	Type of load
WATER TREATMENT	
Mud scraper machines	Moderate
Machines thickeners	Uniform
Sedimentation machines	Moderate
Machines digesters	Moderate
Machines augers	Moderate

1.6.1 Installation

To install the gear reducer it is necessary to note the following recommendations:

- Check the correct direction of rotation of the gear reducer output shaft before fitting the unit to the machine.
- In the case of particularly lengthy periods of storage (4/6 months), if the oil seal is not immersed in the lubricant inside the unit, it is recommended to change it since the rubber could stick to the shaft or may even have lost the elasticity it needs to function properly.
- Whenever possible, protect the gear reducer against solar radiation and bad weather.
- Ensure the motor cools correctly by ensuring good passage of air from the fan side.
- In the case of ambient temperatures < -15°C or > +50°C call MOTOVARIO TECHNICAL SERVICE.
- The various parts (pulleys, gear wheels, couplings, shafts, etc.) must be mounted on the solid or hollow shafts using special threaded holes or other systems that anyhow ensure correct operation without risking damage to the bearings or external parts of the units. Lubricate the surfaces in contact to avoid seizure or oxidation.
- Painting must definitely not go over rubber parts and the holes on the breather plugs, if any.
- For units equipped with oil plugs, replace the closed plug used for shipping with the special breather plug.
- Choose the most appropriate lubricant (see Lubrication chapter) and fill the gear reducer properly using the appropriate oil level plug.
- Starting must take place gradually, without immediately applying the maximum load.
- When there are parts, objects or materials under the motor drive that can be damaged by even limited spillage of oil, special protection should be fitted.
- To assemble sizes 010-130, use screws with maximum length as in the table.
- Use n°12 class 10.9 M16 screw fasteners for size 180 of the flanged version.

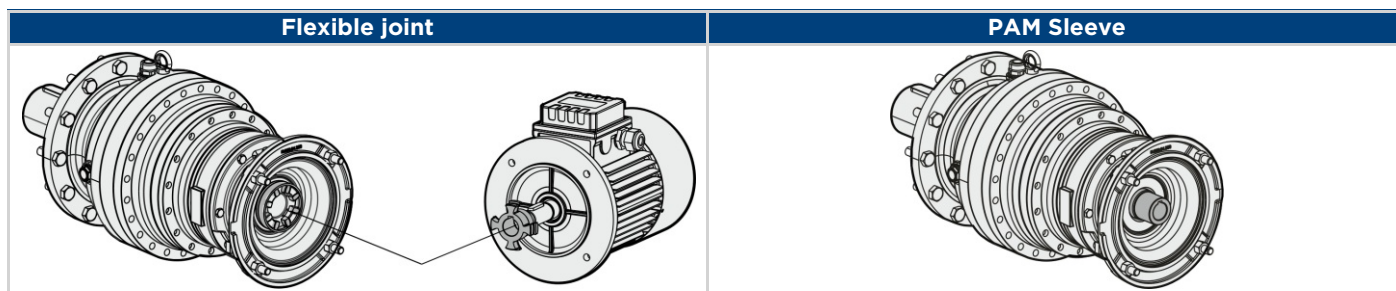


HPL	LV max	OF		LVP max	O	
010-020	M10x30	10,5	n°8	M16x75	17	n°4
030-050	M12x40	12,5	n°10	M16x90	18	n°4
080	M14x45	15	n°12	M20X70	22	n°4
130	M16x50	16,5	n°10	M24X70	26	n°4

1.6 INSTALLATION

Assembling motor on pam flange

When the unit is supplied without motor, it is necessary to follow these recommendation to ensure the correct assembly of the electric motor. Check that the tolerances for the motor shaft and flange correspond to the “standard”. Carefully clean the shaft, spigot and surfaces of the flange removing traces of paint and dirt, and confirm the key is fitted correctly. Fit the half coupling/sleeve to the motor shaft (see picture) taking care to ensure the motor shaft and bearings are not damaged by avoiding excessive force and where necessary using assembly equipment. Place the couplings elastic element onto the motor half coupling and position the motor up to the gear unit ensuring the coupling element is aligned with the driven half coupling. Complete the assembly using the fixing bolts. Key-ways with tightened tolerances.



MOTOVARIO products are supplied with the following surface treatment characteristics:

HPL - Industrial planetary gear reducers

External ring gear in nitrided steel

Sun and planetary gears in case-hardened steel

Connection rings and planet-carriers in ductile iron or structural steel, depending on the size of the gear reducer

Versions available (output modules):

- Version for flange fastening;
- Root-mounting version, integral.

High-resistance spheroidal cast-iron output module housings:

- The castings are supplied protected by an antirust primer, in Black-Grey RAL 7021.
- Hole for eyebolt on the output module for all configurations.

Input versions available:

- PAM flange for coupling with IEC motor;
- PAM flange for coupling with IEC motor with coupling;
- Compact gear motor;
- Input shaft.

Performance:

- Loading capacity verifiable in accordance with DIN 3990, ISO 6336, AGMA 2101, ISO 10300, DIN 3991, ISO 281, DIN 743.

Dynamic η :

- The efficiency is the ratio between the output power P_2 and the power absorbed by the gear reducer P_1 : $\eta = P_2/P_1$.

HPL-range helical gear reducers have an average value equal to:

HL...1 stages = 0,97

HL...2 stages = 0,94

HL...3 stages = 0,91

HL...4 stages = 0,88

VP - Planetary gear reducers combined with worm gear reducer as first stage

The following specifications refer to the worm gear reducer only.

Die-cast aluminium alloy cases for gears (sizes P613-P1183)

Die-cast materials undergo the following surface cleaning operations:

- De-burring by means of a mechanically operated shearing system.
- Accurate shot-peening.
- Washing and passivation.

Painting specifications:

- Orange-peel blue epoxy-polyester RAL 5010. Polyester resin based heat-hardening powders, altered with epoxy resins.

Mechanical properties: Tests carried out onto degreased Unichim white lattens (film thickness: 60 microns) comply with the following specifications: adherence (ISO2409).

Heat resistance: 24 HOURS AT 150°C.

Corrosion strength: ASTM B 117/97 salt fog from 100 to 500 hours depending on the support's preliminary treatment.

Performance:

- Loading capacity in accordance with: ISO 14521, DIN 3996, BS 721, AGMA 6034, ISO 6336, DIN 3990, DIN 743, ISO 281.

2.2 OUTPUT SHAFT BEARINGS

CS - SS						
HPL 010 VP 613	HPL 020 VP 623	HPL 030 VP 633	HPL 050 VP 653	HPL 080 VP 983	HPL 130 VP 1133	HPL 180 VP 1183
Standard	Standard	Standard	Standard	Standard	Standard	Standard
2	2	2	2	2	2	2

HS - HM						
HPL 010 VP 613	HPL 020 VP 623	HPL 030 VP 633	HPL 050 VP 653	HPL 080 VP 983	HPL 130 VP 1133	HPL 180 VP 1183
Standard	Standard	Standard	Standard	Standard	Standard	Standard
1	1	1	1	1	1	1

1 - Ball Bearing

2 - Roller bearings

/ - Not available

2.3 RADIAL LOAD

2.3.1 Information

The value of the admissible radial load [N] is given in the tables relating to the performance of the gear reducer at issue. It is related to the load applied on the centre line of the shaft and in the most unfavourable conditions of angle of application and direction of rotation. The admissible maximum axial loads are given in the table below for each direction of application of force. The admissible maximum value must never be exceeded. Up to 20% of the maximum axial load permitted under the conditions of application is admissible in the case of combined loads. Particular conditions of radial load higher than the limits of the catalogue may occur. In this case, call our Technical Service and provide details on the application: direction of the load, direction of rotation of the shaft, type of service. The radial load on the shaft is calculated with the following formula: **$Fr = (2000 \cdot M \cdot fz) / D \leq Fr1 \text{ or } Fr2$**

- **Fr** [N] Resulting radial load
- **M** [Nm] Torque on the shaft
- **D** [mm] Diameter of the transmission member mounted on the shaft
- **Fr1-Fr2** [N] Value of the maximum admitted radial load (see relative tables)
- **fz** = 1,1 gear pinion - 1,4 chain wheel - 1,7 v-pulley - 2,5 flat pulley

2.3.2 Input

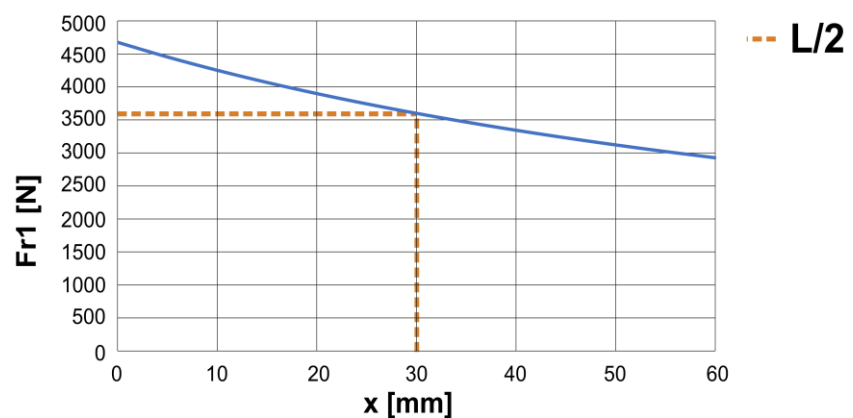
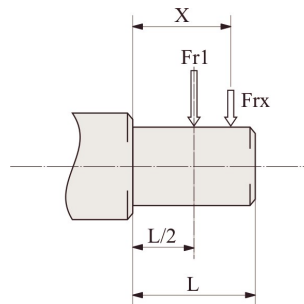
When the radial load is on the centre line of the shaft:

IHL 28x60

3600 N

When the radial load is not on the centre line of the shaft, it is necessary to limit the admissible radial load Fr1 with the following graph.

- **x** = distance from the point of application of the load to the shaft shoulder

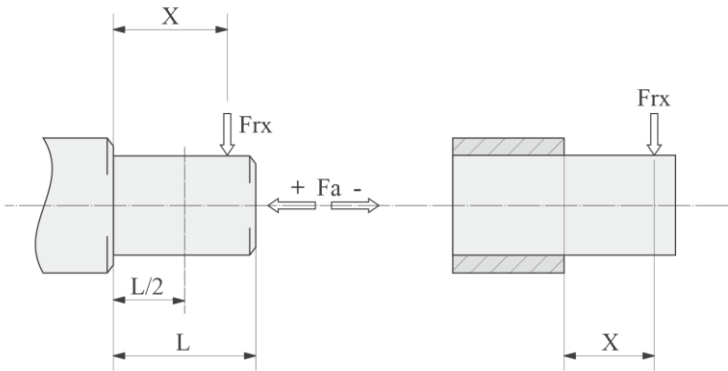


IHL 28x60

2.3.3 Output - Radial/Axial load

When the radial load is not on the centre line of the shaft, it is necessary to light the admissible radial load Fr_2 with the following graph.

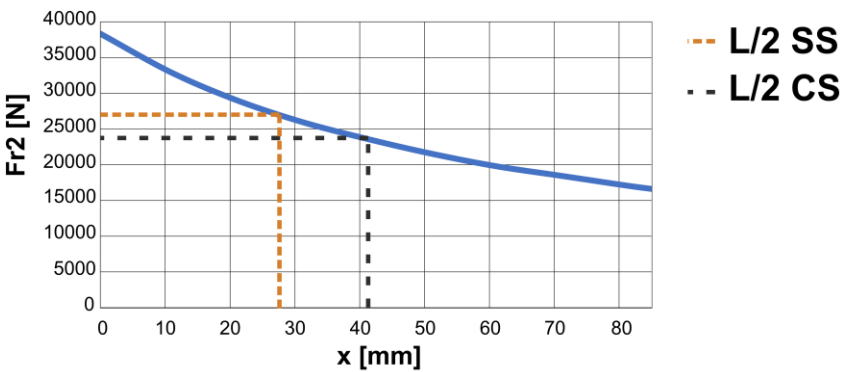
- x = distance from the point of application of the load to the shaft shoulder



The admissible radial load values are shown in the graphs, while the permissible axial load values are shown in a table according to the size of the gear reducer.

The values refer to a duration factor $Fh_2=n_2\cdot h=100.000$

HPL 010-020 - VP 613-623



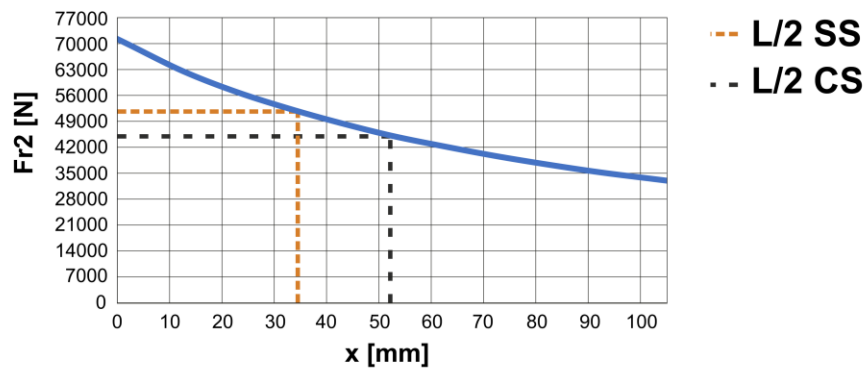
	Fa2 + [N]	Fa2 - [N]
CS - SS	20000	20000

For $Fh_2 \neq 100000$, multiply the radial or axial load by the coefficient fh_2 .

Corrective factor fh2 for overhung and axial loads on shafts							
Fh2 = n2*h	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000
CS - SS	1,15	1,14	1,13	1	0,72	0,62	0,5

2.3 RADIAL LOAD

HPL 030-050 - VP 633-653

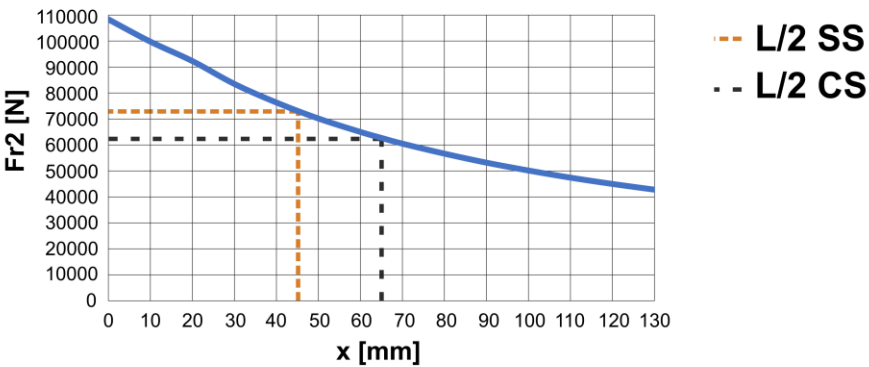


	Fa ₂ + [N]	Fa ₂ - [N]
CS - SS	27500	22000

For $F_{h2} \neq 100000$, multiply the radial or axial load by the coefficient f_{h2} .

Corrective factor f_{h2} for overhung and axial loads on shafts							
$F_{h2} = n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000
CS - SS	1,34	1,33	1,12	1	0,72	0,62	0,5

HPL 080 - VP 983



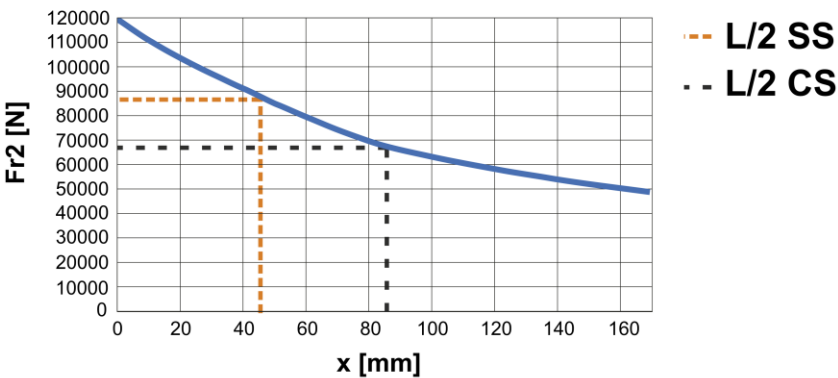
	Fa2 + [N]	Fa2 - [N]
CS - SS	60000	30000

For $F_{h2} \neq 100000$, multiply the radial or axial load by the coefficient f_{h2} .

Corrective factor f_{h2} for overhung and axial loads on shafts							
$F_{h2} = n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000
CS - SS	1,22	1,21	1,12	1	0,72	0,62	0,5

2.3 RADIAL LOAD

HPL 130 - VP 1133

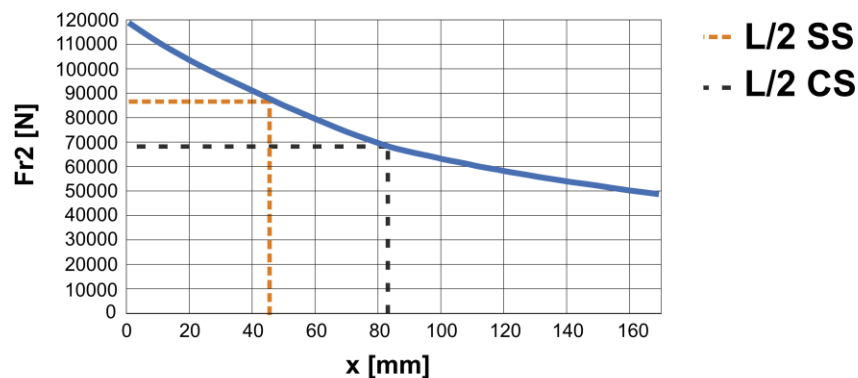


	Fa ₂ + [N]	Fa ₂ - [N]
CS - SS	80000	40000

For $F_{h2} \neq 100000$, multiply the radial or axial load by the coefficient f_{h2} .

Corrective factor f_{h2} for overhung and axial loads on shafts							
$F_{h2} = n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000
CS - SS	1,49	1,48	1,23	1	0,72	0,62	0,5

HPL 180 - VP 1183



	$F_{a2} +$ [N]	$F_{a2} -$ [N]
CS - SS	80000	40000

For $F_{h2} \neq 100000$, multiply the radial or axial load by the coefficient f_{h2} .

Corrective factor f_{h2} for overhung and axial loads on shafts							
$F_{h2} = n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000
CS - SS	1,49	1,48	1,23	1	0,72	0,62	0,5

In the case of radial loads at the outlet of the T version of the gear reducers with feet, under the following conditions:

- Mounting position B3, with load applied upwards
- Mounting position B8, with load applied downwards

it should be checked that the tipping moment (M_{Fr2}) generated by the radial load itself is less than or equal to the permissible values in the table below.

Size	$M_{Fr \max}$ [Nm]
180	6750

The formula to be used is as follows:

$$M_{Fr \max} \geq M_{Fr2} = Fr_2 \cdot (x+C)$$

Where

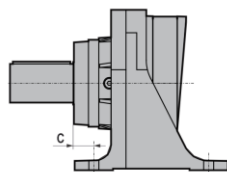
$M_{Fr \max}$ [Nm] Permissible or maximum tipping moment

M_{Fr2} [Nm] Application-generated tipping moment

Fr_2 [N] Radial load applied to the output shaft

x [mm] Distance of the load point from the shoulder of the shaft

C [mm] Distance from the shaft of the first hole for fixing the foot of the gear reducer to the shoulder of the shaft, see chapter Dimensions.



2.4.1 Information

Proper lubrication makes for:

- Lower friction;
- Less heating;
- Increased efficiency;
- Lower oil temperature;
- Less wear.

In cases of ambient temperatures not envisaged in the table, please contact MOTOVARIO TECHNICAL SERVICE. In the case of temperatures under -30°C or over 60°C it is necessary to use oil seals with special properties. For operating ranges with temperatures under 0°C it is necessary to consider the following:

1. The motors need to be suitable for operation at the envisaged ambient temperature.
2. The power of the electric motor needs to be adequate for exceeding the higher starting torques required.
3. Pay attention to impact loads since cast iron may have problems of fragility at temperatures under -15°C .
4. During the early stages of service, problems of lubrication may arise due to the high level of viscosity taken on by the oil and so it is wise to have a few minutes of rotation under no load.

For the recommended oil change frequencies, please refer to the Product Use and Maintenance Manual.

2.4.2 Lubricants

MOTOVARIO epicycloidal gear reducers in Series HPL have been designed for oil bath lubrication.

The **HPL** reducers are supplied without lubricant, whilst the initial fill of lubricant can be requested as an option when ordering.

The **VP** combined reducers are supplied without lubricant for the epicyclic part (whilst the initial fill of lubricant can be requested as an option when ordering), the worm gear reducers size NMRV/NMRV-P are supplied complete with lubricant for life.

In the event of a request for a gear reducer supplied complete with lubricant, this is to be established by MOTOVARIO and can be seen on the Order Confirmation and on the plate.

If different lubricants and/or lubricants with temperature ranges other than those recommended by MOTOVARIO are utilised, the warranty shall be void, with the exception of any authorisations provided in accordance with the applications and granted in writing.

The lubricants listed in the table must not be interpreted as a guarantee of quality, given that they are supplied by the lubricant manufacturer who remains responsible for their product.

Do not mix different synthetic lubricants with each other or even with the minerals! Additionally, lubricants with the same viscosity class yet produced by different manufacturers do not bear the same characteristics.

Choose the lubricant only after having conducted the necessary thermal check of the gear reducer (see the Thermal Power paragraph).

2.4 LUBRICATION

Specifications of LUBRICANTS RECOMMENDED BY MOTOVARIO

HPL		
	* Polyalphaolefin synthetic oil (PAO)	Mineral oil
ENI	BLASIA SX	BLASIA
SHELL	OMALA S4 GXV	OMALA S2 GX
KLUBER	Klubersynth GEM 4-...N	Kluberoil GEM 1-...N
MOBIL	SHC GEAR	MOBILGEAR XMP
CASTROL	ALPHASYN T	ALPHA SP
BP	ENERSYN EPX	ENERGOL GR-XP
TOTAL	CARTER SH	CARTER EP
ESSO	SPARTAN S-EP	SPARTAN EP

* Recommended

NMRV-P 063 ÷ 110	
	Synthetic oil
T _{amb} °C ISO	(-25) ÷ (+50) ISO VG320
** LAND OIL	GEAR SINT 320
ENI	TELIUM VSF320
SHELL	OMALA S4 WE320
KLUBER	Klubersynth GH 6-320
MOBIL	-
CASTROL	ALPHASYN PG320
BP	ENERGOL SG-XP320
PETRONAS	GEAR SYN PAG 320

** All units are supplied with LAND OIL oil, unless otherwise specified by the client.

2.4 LUBRICATION

HPL

n ₂	Oil	ISO 3448 VG	T _{amb} °C													
			-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50
n ₂ > 150 rpm	PAO	150														
	MIN	220														
n ₂ ≥ 5 rpm	PAO	220														
	PAO	320														
n ₂ < 5 rpm (*)	MIN	320														
	MIN	460														

n₂ - Output speed.

Oil - Oil type.

ISO 3448 VG - Viscosity grades.

T_{amb} °C - Ambient operating temperature.

	Unsuitable Temperature Range for typical oil viscosity: - always choose a lubricant with a declared pour point of at least 10 °C lower than the assumed minimum T_{amb}; - if this oil must be used within the unsuitable temperature range, contact Motovario Technical Assistance. Alternatively, to extend the oil temperature range, use external heating devices provided by the Customer with a suitable temperature control system to keep the gear reducer under normal operating conditions.
	Critical Temperature Range based on typical oil viscosity: - choose a lubricant with a declared pour point of at least 10 °C lower than the assumed minimum T_{amb}; - perform a soft start with partial load (do not exceed 30% of the nominal load) until the Gear Reducer Temperature Range T_{rid} equal to the Normal Ambient Temperature range T_{amb} for the chosen oil is reached; - higher power input is expected when starting.
	Normal ambient Temperature Range for typical oil viscosity.
	Critical Temperature Range for the gear reducer for typical oil viscosity: - check that the chosen oil has a kinematic viscosity of at least 30 cSt at 100 °C (usually indicated on the oil technical data sheet); - use service factor fs > 1.25 in the presence of a constant M₂ (S1), and in any case apply a safeguard against the assumed maximum load during operation in the presence of a load cycle so that M_{2peak} < M₂*1.5.

Output speed	Oil type	Viscosity grade ISO 3448 VG	Maximum gear reducer casing temperature (T _{rid max}) [°C]	
			S1 operation	Operation for intermittent service and/or FS>1.5
n ₂ > 150 rpm	PAO	150	60	70
	MIN	220	55	70
n ₂ ≥ 5 rpm	PAO	220	70	80
	PAO	320	80	95
n ₂ < 5 rpm (*)	MIN	320	65	80
	PAO	320	65	90
	MIN	460	65	85

(*) If the gear reducer is used in continuous service (S1), check the following:

- choose an oil with a declared pour point of at least 10 °C lower than the assumed minimum T_{amb};
- perform a soft start with partial load (do not exceed 30% of the nominal torque Mn₂) until a gear reducer casing temperature range T_{rid} equal to the Normal Temperature range for the chosen oil is reached;
- higher power input is expected when starting;
- be careful of overheating in continuous operation;
- check that the chosen oil has a kinematic viscosity of at least 30 cSt at 100 °C (normally indicated on the oil technical data sheet).

2.4.3 Special lubricants

If 'special' lubricant is required please contact MOTOVARIO TECHNICAL SERVICE.

2.4.4 Quantity

For the gear reducers of the HPL series, the expected mounting position must be always specified. The amount of oil in the table are indicative only and for the proper topping up you will have to refer to the level cap or the dipstick, if any. Any deviations in level can depend on construction tolerances, transmission ratio but also on the placement on the unit or by the mounting surface at the customers' premises. For this reason it is appropriate that the customer checks and, if necessary, restores the level when the unit is installed.

Table OIL CAPACITIES IN LITRES ~ [l]

HPL-1	010	020	030	050	080	130	180							
B3/B5 B6/B7 B8	0,69	0,82	1,21	1,35	2,63	3,63	4,13							
V1/V5	0,77	0,92	1,61	1,82	2,96	5,96	6,46							
V3/V6	1,04	1,04	1,64	1,63	4,03	6,03	6,56							
HPL-2	010	020	030	050	080	130	180							
B3/B5 B6/B7 B8	0,95	1,09	1,32	1,49	2,54	3,54	4,04							
V1/V5	1,31	1,44	2,09	2,21	4,19	5,19	5,69							
V3/V6	1,58	1,72	1,88	1,88	3,88	5,88	6,38							
HPL-3	010	020	030	050	080	130	180							
B3/B5 B6/B7 B8	1,2	1,38	1,57	1,78	2,66	3,66	4,16							
V1/V5	1,85	1,99	2,63	2,75	4,67	6,67	7,17							
V3/V6	2,13	2,26	2,42	2,42	4,12	6,12	6,62							
HPL-4	010	020	030	050	080	130	180							
B3/B5 B6/B7 B8	1,46	1,67	1,82	2,07	2,91	3,91	4,41							
V1/V5	2,39	2,53	3,21	3,29	5,17	7,17	7,67							
V3/V6	2,67	2,8	2,96	2,96	4,67	6,67	7,17							
VP	P613		P623		P633		P653		P983		P1133		P1183	
	NMRV- P063	HL2 010	NMRV- P063	HL2 010	NMRV- P063	HL2 030	NMRV- P063	HL2 050	NMRV- P090	HL2 080	NMRV- P110	HL2 130	NMRV- P110	HL2 180
B3/B5 B6/B7 B8	0,33	0,95	0,33	1,09	0,33	1,32	0,33	1,49	1,15	2,54	1,6	3,54	1,6	4,04
V1/V5		1,31		1,44		2,09		2,21		4,19		5,19		5,69
V3/V6		1,58		1,72		1,88		1,88		3,88		5,88		6,38

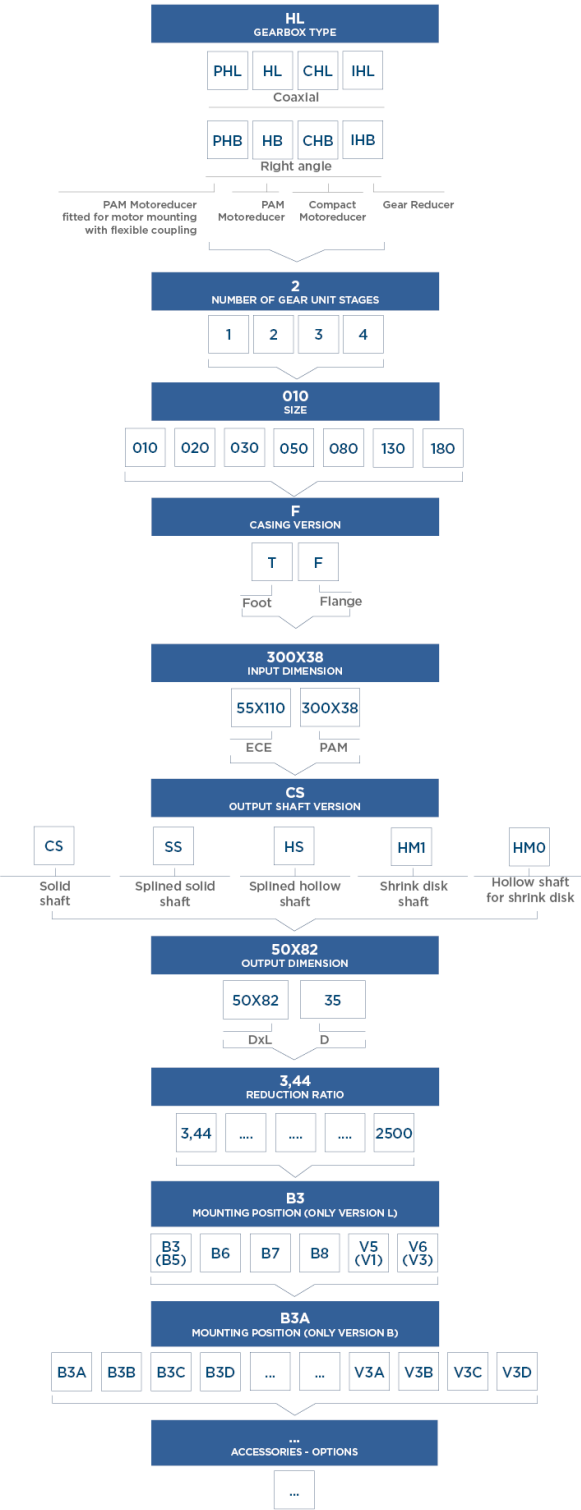
- The VP combined gear reducers contain two separate oil chambers. The NMRV-P gear reducers of the sizes 063 - 090 - 110, which are the first stage of the VP combined gear reducers, are supplied complete with life-long lubricant, consisting of oil based synthetic polyglycol LAND OIL GEAR SINT.
- For the choice of lubricant for the planetary part of the VP combined gear reducer, refer to the table in the Lubricants section.

It is recommended, after installation, to replace the closed plug used for transportation with the supplied breather plug.

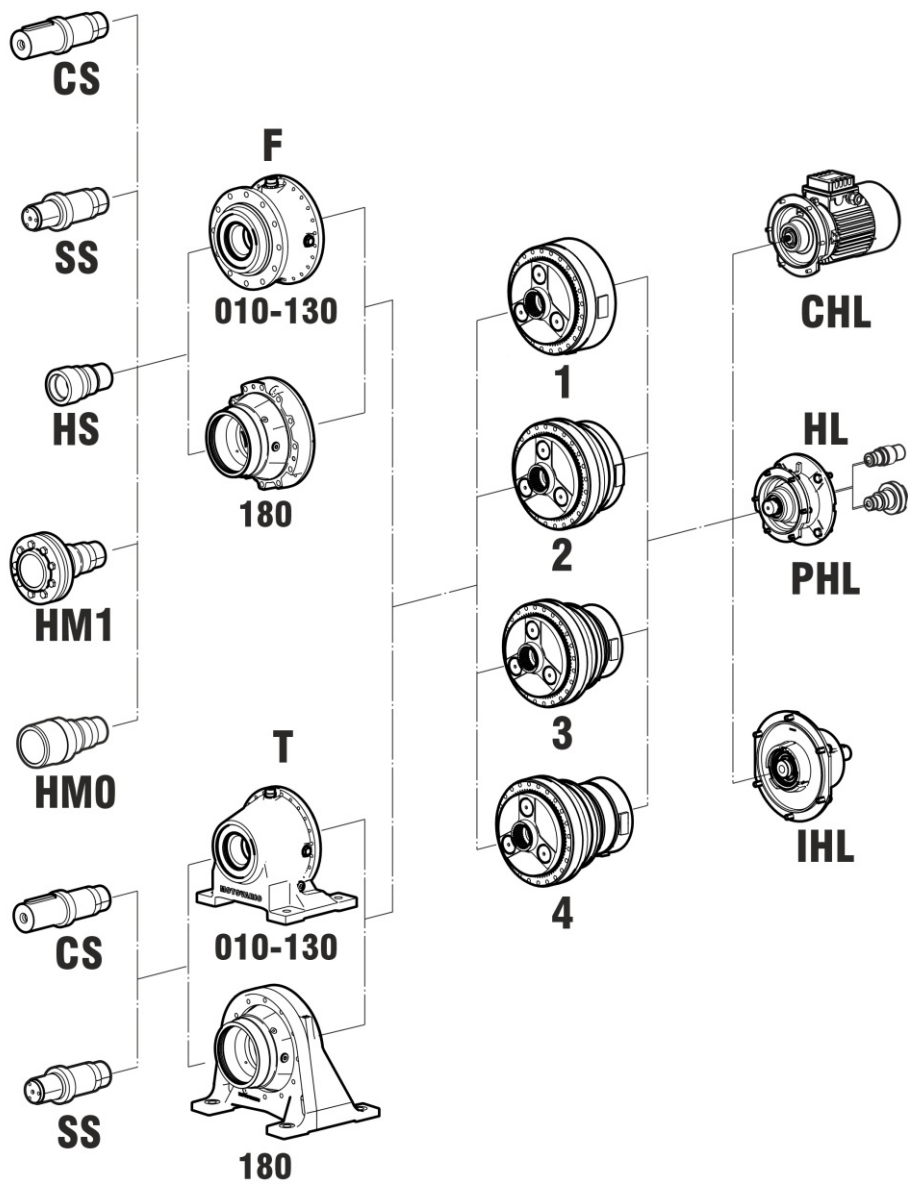
3.1 HPL - PLANETARY GEAR REDUCERS



4.1.1 Designation



4.1.2 Versions



CS	Solid shaft
SS	Splined solid shaft
HS	Splined hollow shaft
HM1	Hollow shaft with shrink disk
HMO	Hollow shaft for shrink disk

F	Flange
T	Foot

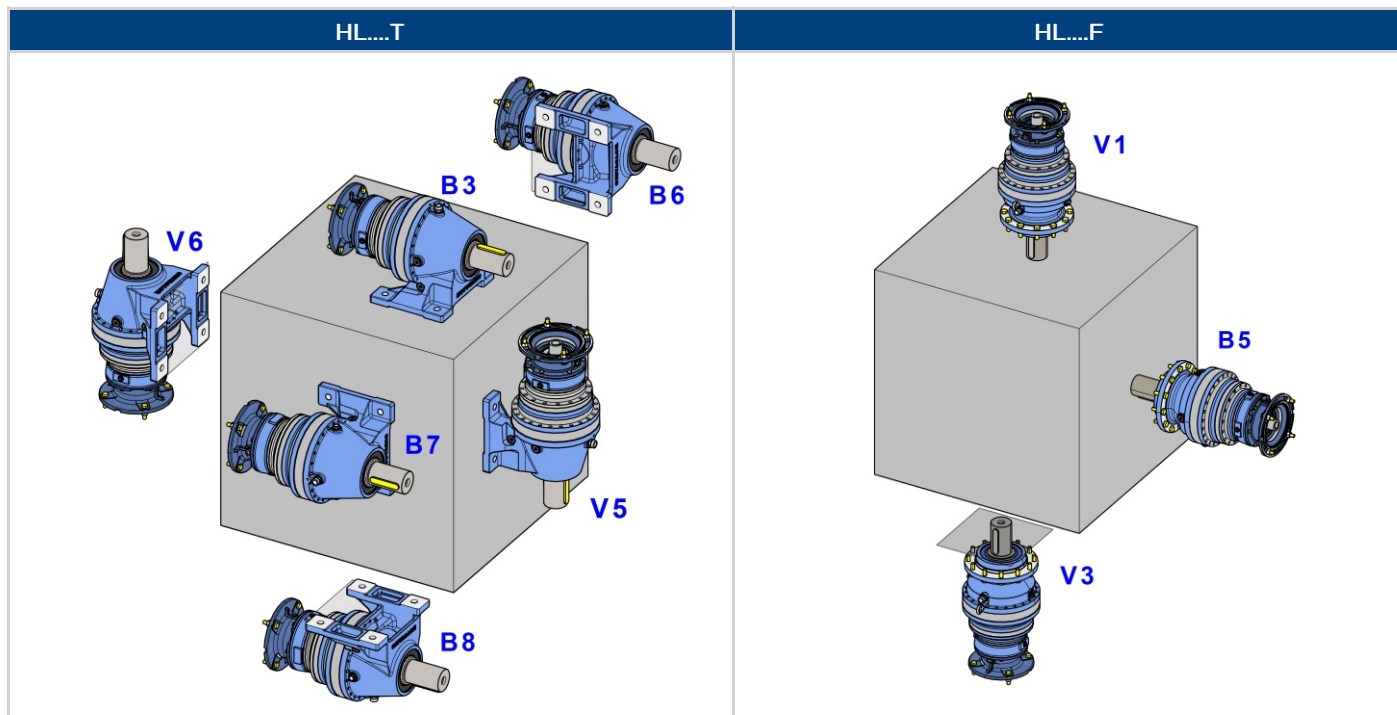
1	Number of gear unit stages
2	
3	
4	

CHL	Compact electric motor version
HL	Fitted for motor coupling version (PAM)
PHL	Fitted for motor mounting with flexible coupling
IHL	Input shaft version

4.2 MOUNTING POSITIONS

4.2.1 Mounting positions

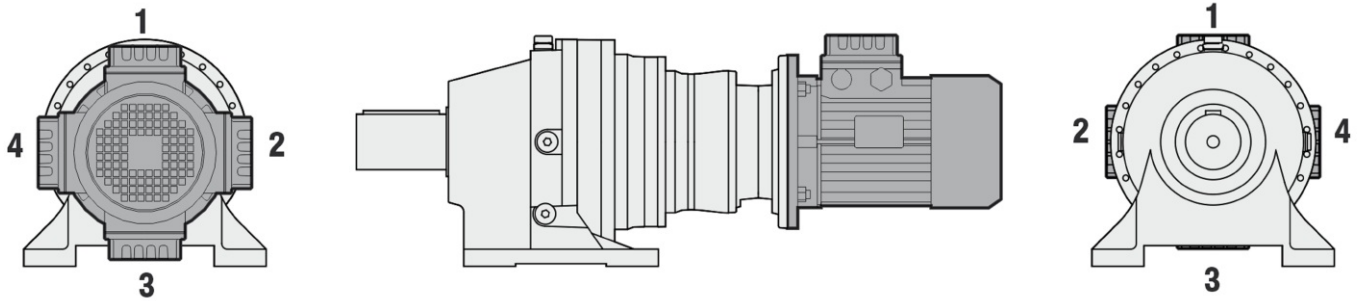
The mounting position of the gear unit identifies its space orientation. B3 mounting position, as from a technical point of view, ensures lower oil splash, better lubrication and less heating.



4.2 MOUNTING POSITIONS

4.2.2 Position of terminal box

Unless otherwise specified when ordering, the gear reducer is supplied with terminal box in position 1.



4.3 THERMAL POWER

4.3.1 Information

The scheme below indicates the nominal thermal power Pth capacity [kW] according to the following conditions:

- mounting position B3
- continuous operation at input speed ≤ 1500 rpm
- environment temperature $T_{amb}=25^{\circ}\text{C}$
- sea level altitude
- air speed around the gear reducer $\geq 1\text{m/s}$
- absence of external radial and/or axial loads

$n_1 = 1500\text{rpm}$							
	Pth [kW]		Pth [kW]		Pth [kW]		Pth [kW]
HPL 1-010	9,2	HPL 2-010	5,2	HPL 3-010	3,9	HPL 4-010	3,2
HPL 1-020	9,4	HPL 2-020	5,3	HPL 3-020	4	HPL 4-020	3,3
HPL 1-030	11,1	HPL 2-030	6,1	HPL 3-030	4,5	HPL 4-030	3,7
HPL 1-050	-	HPL 2-050	6,5	HPL 3-050	4,8	HPL 4-050	3,9
HPL 1-080	17,2	HPL 2-080	7,9	HPL 3-080	5,7	HPL 4-080	4,6
HPL 1-130	-	HPL 2-130	9,7	HPL 3-130	7	HPL 4-130	5,6
HPL 1-180	-	HPL 2-180	9,9	HPL 3-180	7,1	HPL 4-180	5,7

A correct lubrication and a proper running condition of the gearbox are guaranteed only applying an input power not exceeding Pth (at the above reference conditions)(T oil max=95°C).

4.3 THERMAL POWER

4.3.2 Verification

Verification of the application

Except for continuous operating times below two hours and successive pauses capable of bringing the gear reducer back to ambient temperature, for each application it is peremptory to verify the gear reducer's thermal limit according to the following formula:

$P_1 < P_{th} * f_{ta} * f_{tc} * f_{tn} * f_{tv}$, where:

- P_1 = installed power [kW]
- P_{th} = thermal capacity under reference conditions [kW] (see table "Nominal thermal capacity");
- f_{ta} = sea-level elevation correction factor (see table);
- f_{tc} = ambient and operating temperature correction factor (see table);
- f_{tn} = input speed n_1 correction factor;
- f_{tv} = airflow speed correction factor around the gear reducer (see table).

Correction factors reflect operating conditions other than the reference conditions and are obtained from the following ISO14179 tables:

Table f_{ta}

Sea-level elevation correction factor

Altitude [m]	f_{ta}
0 - 1000	1
1000 - 2000	0,9
2000 - 3000	0,8
> 3000	*

Table f_{tc}

Ambient and operating temperature correction factor

		% Duty per hour of operation				
		Fc	100	80	70	40
Ambient temperature °C	10	1,21	1,28	1,40	1,64	2,19
	20	1,07	1,13	1,23	1,45	1,93
	25	1,00	1,05	1,15	1,35	1,80
	30	0,93	0,98	1,07	1,25	1,67
	40	0,79	0,83	0,90	1,06	1,41
	45	0,71	0,75	0,82	0,96	1,29
	50	0,64	0,68	0,74	0,87	1,16

Table f_{tn}

Input speed n_1 correction factor

f_{tn}	n_1 [rpm]							
	500	700	900	1150	1400	1750	2250	2800
B3/B5								
B6 - B7	1,73	1,41	1,3	1,16	1	0,81	0,65	0,5
B8								
V5/V1	1,3	1,16	1	0,81	0,65	0,5	0,4	0,25
V6/V3								

Table f_{tv}

Airflow speed correction factor around the gear reducer

Ventilation correction factor	f_{tv}
Stagnant air (<0,5 m/s)	0,75
Indoor installation with slight ventilation	1
Indoor installation with good ventilation (>1,4 m/s)	1,4
Outdoor installation (>3,7 m/s)	1,9

* Please contact MOTOVARIO TECHNICAL SERVICE.

In case of operation at input speeds exceeding 1800 rpm, or ambient temperatures greater than 40°C, please contact MOTOVARIO TECHNICAL SERVICE.

4.4.1 Critical applications

HPL	n_{1max} [rpm]			
	1s	2s	3s	4s
010	4000	4000	4000	4000
020	4000	4000	4000	4000
030	3800	4000	4000	4000
050	3800	4000	4000	4000
080	3000	3800	4000	4000
130	2500	3800	4000	4000
180	2000	3800	4000	4000

4.4.2 Information

The performance indicated in the catalogue correspond to position B3 or similar. For other mounting contexts and/or particular input and output speeds, please refer to the tables highlighting the main critical situations for each gear reducer size. It is also necessary to take due consideration of and carefully assess the following applications by contacting MOTOVARIO TECHNICAL ASSISTANCE:

- Use in services that could be hazardous for people if the gear reducer fails
- Use as a lifting winch.
- Use in places with Ambient T° below -15°C or over 50°C.
- Use in chemically-aggressive environments.
- Use in a brackish environments.
- Use in radioactive environments.
- Use in environments with pressures other than atmospheric pressure.
- Applications with especially high inertia.
- Applications with high dynamic strain on the casing of the gear reducer.
- Applications where even partial immersion of the gear reducer is required.
- Mounting positions not envisaged in the catalogue.

Pay particular attention in the following conditions:

- Avoid use as multiplier.
- Do not use in an environment with an explosive or potentially-explosive atmosphere.

In the presence of overloads due to starting at full load, braking, shocks or other static and dynamic causes, check that the peak torque is always lower than the maximum torque M_{2max} (see the table in the paragraph on Product Selection).

4.5 MOTOR FLANGE AVAILABILITY

B11 = Compact electric motor versions.

These tables report all possible dimensions. Please verify service factor.

HL 010

CHL - HL - PHL - CHB - HB - PHB 1-010							
i	071	080	090	100	112	132	160
3,44		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
4,32	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
5,37	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
7,38	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
9,3	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 2-010							
i	071	080	090	100	112	132	160
11,8		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
14,9		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
18,7	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
23,2	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
28,8	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
31,9	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
39,6	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
40,2	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
49,9	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
68,7	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 3-010							
i	071	080	090	100	112	132	160
51,2		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
64,2	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
80,6	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
87,4	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
100	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
110	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
125	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
138	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
155	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
174	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
188	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
216	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
236	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
297	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
369	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 4-010							
i	071	080	090	100	112	132	160
348	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
433	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
474	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
538	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
668	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
740	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
811	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
919	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1018	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1158	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1265	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1439	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1593	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1740	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2162	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2723	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

4.5 MOTOR FLANGE AVAILABILITY

HL 020

CHL - HL - PHL - CHB - HB - PHB 1-020				
i	100	112	132	160
3,44	B5-B11	B5-B11	B5-B11	B5
4,32	B5-B11	B5-B11	B5-B11	B5
5,37	B5-B11	B5-B11	B5-B11	B5
7,38	B5-B11	B5-B11	B5-B11	B5
9,3	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 2-020							
i	071	080	090	100	112	132	160
11,8		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
14,9		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
18,7	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
23,2	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
28,8	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
31,9	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
39,6	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
40,2	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
49,9	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
68,7	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 3-020							
i	071	080	090	100	112	132	160
51,2		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
64,2	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
80,6	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
87,4	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
100	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
110	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
125	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
138	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
155	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
174	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
188	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
216	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
236	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
297	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
369	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 4-020							
i	071	080	090	100	112	132	160
348	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
433	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
474	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
538	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
668	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
740	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
811	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
919	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1018	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1158	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1265	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1439	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1593	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1740	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2162	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2723	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

4.5 MOTOR FLANGE AVAILABILITY

HL 030

CHL - HL - PHL - CHB - HB - PHB 1-030				
i	100	112	132	160
3,44	B5-B11	B5-B11	B5-B11	
4,32	B5-B11	B5-B11	B5-B11	B5
5,37	B5-B11	B5-B11	B5-B11	B5
6,19	B5-B11	B5-B11	B5-B11	B5
7,38	B5-B11	B5-B11	B5-B11	B5
9,3	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 2-030							
i	071	080	090	100	112	132	160
11,8		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
14,9		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
18,7	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
21,3		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
23,2	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
26,7	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
28,8	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
31,9	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
33,2	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
39,6	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
45,7	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
57,5	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 3-030							
i	071	080	090	100	112	132	160
51,2		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
64,2		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
73,3		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
80,6	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
92,0	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
100	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
114	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
125	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
138	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
155	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
171	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
197	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
216	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
249	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
293	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
309	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
369	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
425	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 4-030							
i	071	080	090	100	112	132	160
348	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
433	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
474	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
538	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
668	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
740	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
831	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
919	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1018	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1143	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1265	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1439	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1593	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1740	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1979	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2191	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2281	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2492	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2723	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

4.5 MOTOR FLANGE AVAILABILITY

TECHNICAL CATALOGUE

HL 050

CHL - HL - PHL - CHB - HB - PHB 2-050				
	100	112	132	160
11,8	B5-B11	B5-B11	B5-B11	B5
14,9	B5-B11	B5-B11	B5-B11	B5
18,7	B5-B11	B5-B11	B5-B11	B5
21,3	B5-B11	B5-B11	B5-B11	B5
23,2	B5-B11	B5-B11	B5-B11	B5
26,7	B5-B11	B5-B11	B5-B11	B5
28,8	B5-B11	B5-B11	B5-B11	B5
31,9	B5-B11	B5-B11	B5-B11	B5
33,2	B5-B11	B5-B11	B5-B11	B5
39,6	B5-B11	B5-B11	B5-B11	B5
45,7	B5-B11	B5-B11	B5-B11	B5
57,5	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 3-050							
i	071	080	090	100	112	132	160
51,2		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
64,2		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
73,3		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
80,6	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
92,0	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
100	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
114	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
125	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
138	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
155	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
171	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
197	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
216	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
249	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
293	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
309	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
369	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
425	B5-B11	B5-B11	B5-B11				

CHL - HL - PHL - CHB - HB - PHB 4-050							
i	071	080	090	100	112	132	160
348	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
433	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
474	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
538	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
668	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
740	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
831	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
919	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1018	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1143	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1265	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1439	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1593	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1740	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1979	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2191	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2281	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2492	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2723	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

4.5 MOTOR FLANGE AVAILABILITY

HL 080

CHL - PHL - CHB - PHB 1-080	
i	200
7,5	B5

CHL - PHL - CHB - PHB 2-080				
	100	112	132	160
12,4	B5-B11	B5-B11	B5-B11	
14,6	B5-B11	B5-B11	B5-B11	
18,4	B5-B11	B5-B11	B5-B11	B5
22,8	B5-B11	B5-B11	B5-B11	B5
26,3	B5-B11	B5-B11	B5-B11	B5
28,6	B5-B11	B5-B11	B5-B11	B5
33,0	B5-B11	B5-B11	B5-B11	B5
38,4	B5-B11	B5-B11	B5-B11	B5
45,8	B5-B11	B5-B11	B5-B11	B5
55,4	B5-B11	B5-B11	B5-B11	B5
69,8	B5-B11	B5-B11	B5-B11	B5

CHL - PHL - CHB - PHB 3-080							
i	071	080	090	100	112	132	160
53,5		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
63,2		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
79,3	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
83,5	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
90,5		B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
98,6	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
114	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
122	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
143	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
168	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
194	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
211	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
232	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
244	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
266	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
291	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
307	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
357	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
409	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - PHL - CHB - PHB 4-080							
i	071	080	090	100	112	132	160
395	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
467	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
529	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
586	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
658	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
728	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
825	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
905	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1001	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1139	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1261	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1429	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1567	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1800	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2092	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2266	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2497	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2705	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

4.5 MOTOR FLANGE AVAILABILITY

HL 130

CHL - HL - PHL - CHB - HB - PHB 2-130	
	160
38,8	B5
46,0	B5

CHL - HL - PHL - CHB - HB - PHB 3-130						
i	O80	O90	100	112	132	160
48,4			B5-B11	B5-B11	B5-B11	B5
60,8			B5-B11	B5-B11	B5-B11	B5
76,3			B5-B11	B5-B11	B5-B11	B5
78,0			B5-B11	B5-B11	B5-B11	B5
94,9			B5-B11	B5-B11	B5-B11	B5
104		B5-B11	B5-B11	B5-B11	B5-B11	B5
112			B5-B11	B5-B11	B5-B11	B5
122			B5-B11	B5-B11	B5-B11	B5
140			B5-B11	B5-B11	B5-B11	B5
151			B5-B11	B5-B11	B5-B11	B5
162	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
187	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
208	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
223	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
240	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
286		B5-B11	B5-B11	B5-B11	B5-B11	B5
340	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 4-130							
i	O71	O80	O90	100	112	132	160
330	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
358	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
410	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
449	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
509	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
564	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
633	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
701	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
812	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
899	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
964	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1132	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1237	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1407	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1558	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1771	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1936	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2509	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

4.5 MOTOR FLANGE AVAILABILITY

HL 180

CHL - HL - PHL - CHB - HB - PHB 2-180	
	160
46,0	B5

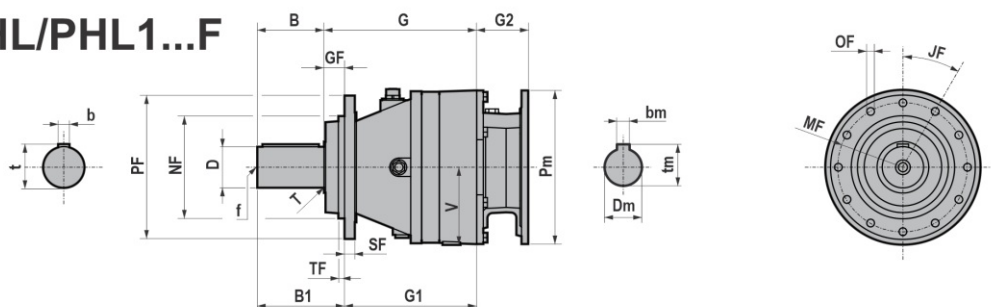
CHL - HL - PHL - CHB - HB - PHB 3-180						
i	080	090	100	112	132	160
48,4			B5-B11	B5-B11	B5-B11	B5
60,8			B5-B11	B5-B11	B5-B11	B5
76,3			B5-B11	B5-B11	B5-B11	B5
78,0			B5-B11	B5-B11	B5-B11	B5
94,9			B5-B11	B5-B11	B5-B11	B5
98,0			B5-B11	B5-B11	B5-B11	B5
112			B5-B11	B5-B11	B5-B11	B5
122			B5-B11	B5-B11	B5-B11	B5
140			B5-B11	B5-B11	B5-B11	B5
151			B5-B11	B5-B11	B5-B11	B5
162	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
174			B5-B11	B5-B11	B5-B11	B5
208	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
240	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
285	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
340	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

CHL - HL - PHL - CHB - HB - PHB 4-180							
i	071	080	090	100	112	132	160
330	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
410	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
449	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
509	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
564	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
654	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
701	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
812	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
899	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
980	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1132	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1237	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1407	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1558	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1771	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
1936	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5
2509	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5-B11	B5

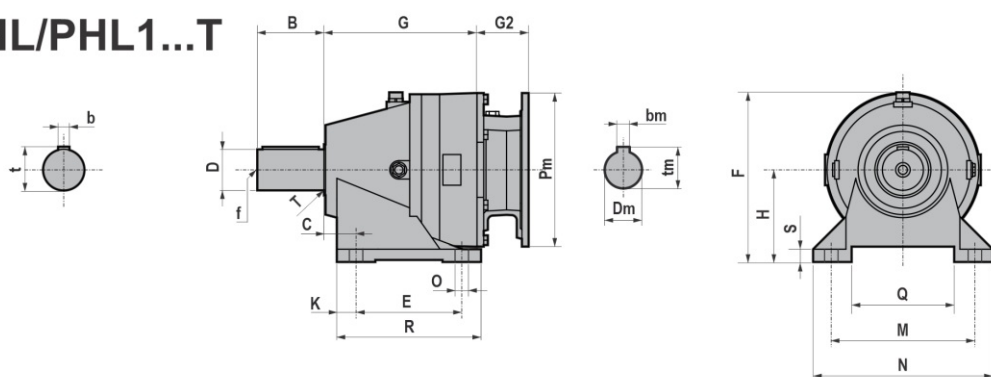
5.1 REDUCERS/GEARED MOTORS

5.1.1 HL/PHL 1

HL/PHL1...F



HL/PHL1...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	183	177	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	197	191	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	231	216	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	297,5	257,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12

*V - Max. overall dimensions

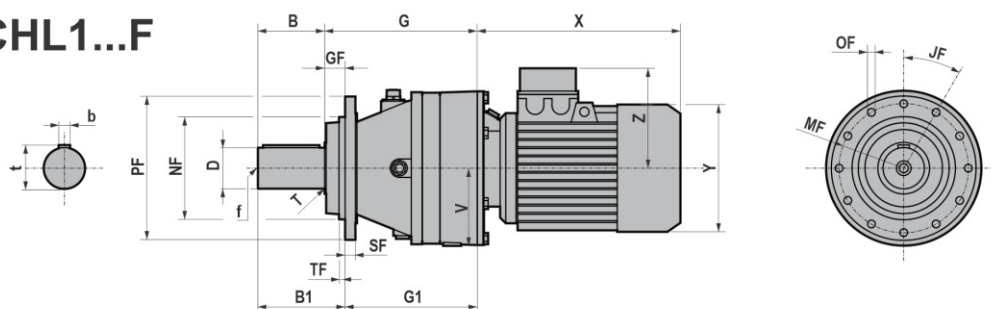
			G2		
IEC	Pm x Dm	HL/PHL 1 010	HL/PHL 1 020	HL/PHL 1 030	HL/PHL 1 080
71	160x14	49	/	/	/
80	200x19	70	/	/	/
90	200x24	70	/	/	/
100-112	250x28	85	85	85	/
132	300x38	110	110	110	/
160	350x42	157,5	157,5	157,5	/
180	350x48	/	/	/	/
200	400x55	/	/	/	185
225	450x60	/	/	/	/

B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3
180	350	48	14	51,8
200	400	55	16	59,3
225	450	60	18	64,4

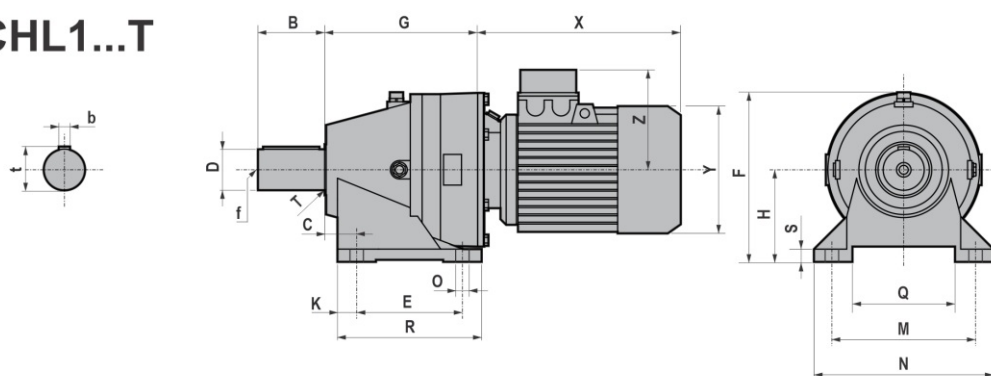
5.1 REDUCERS/GEARED MOTORS

5.1.2 CHL 1

CHL1...F



CHL1...T



	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O		Q	R	S	T	*V
010	50	h6	82	14	53,5	M16	88	183	177	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	197	191	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	231	216	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030	222	195	150	15	36°	12,5	n°10	15	13

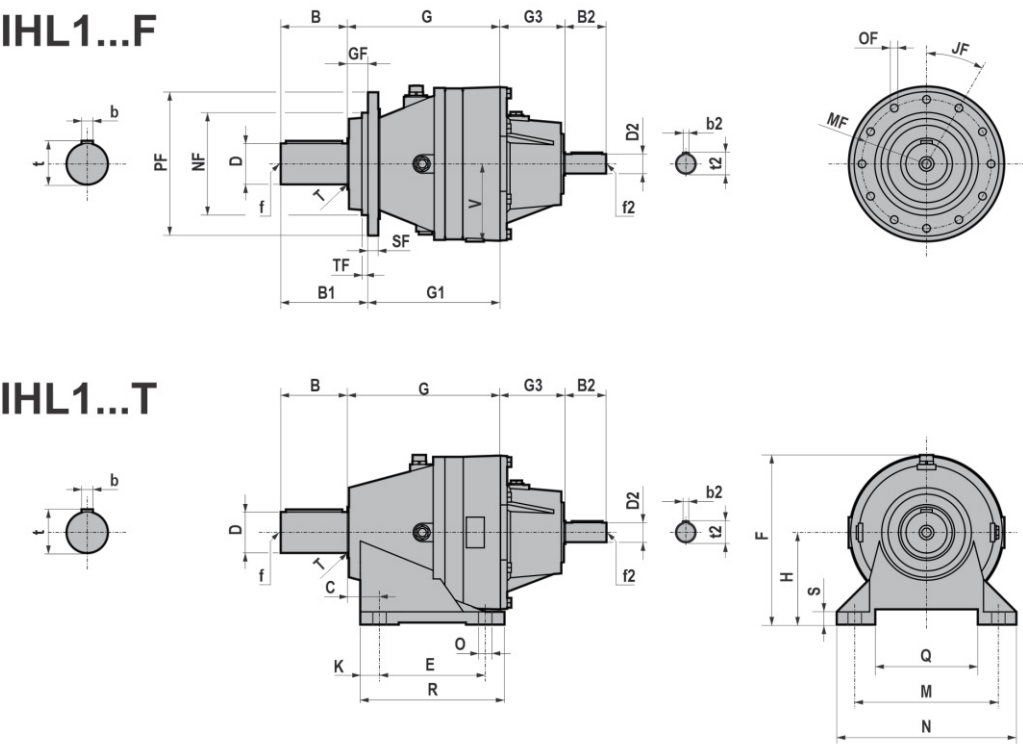
*V - Max. overall dimensions

T (IE1 - IE2 - IE3)									
	71	80	90S	90L	100	112	132S	132M/L	
010/ .../030	X	221	248	276	301	335	356	405	443
	*X		271	309	334		380		
	Y	139	158	173	173	191	211	249	249
	Z	112	122	130	130	139	154	194	194

TB (IE1 - IE2 - IE3)									
	71	80	90S	90L	100	112	132S	132M/L	
010/ .../030	X	286.5	321	353	378	417	453	505	547
	*X		344	386	411		477		
	Y	139	158	173	173	191	211	249	249
	Z	129	137	157	157	168	183	230	230

*X - TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

5.1.3 IHL 1



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	183	177	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	197	191	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	231	216	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030	222	195	150	15	36°	12,5	n°10	15	13

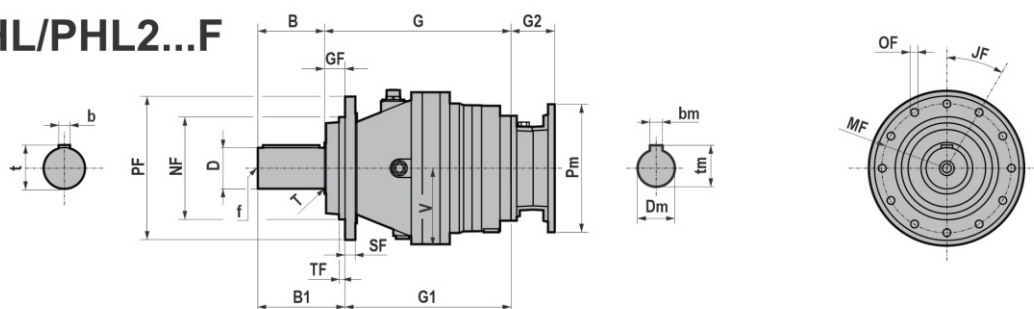
*V - Max. overall dimensions

	G3	D2	B2	b2	t2	f2
010/.../030	113	28 j6	60	8	31	M10

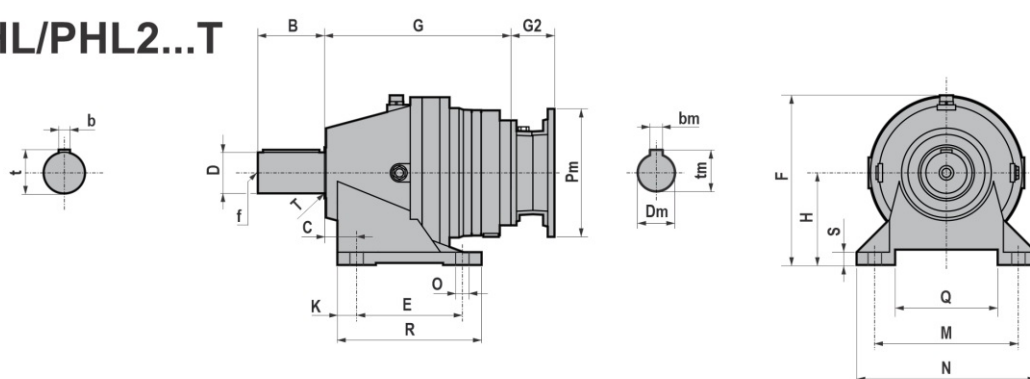
5.1 REDUCERS/GEARED MOTORS

5.1.4 HL/PHL 2 010-130

HL/PHL2...F



HL/PHL2...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	238	232	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	252	246	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	281	266	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
050	60	h6	105	18	64	M20	120	315	300	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	359,5	319,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163
130	90	h6	170	25	95	M20	206	410,5	374,5	66	219	375	200	35	318	390	26	n°4	220	289	27	-	175

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12
130	325	295	230	36	36°	16,5	n°10	25	10

*V - Max. overall dimensions

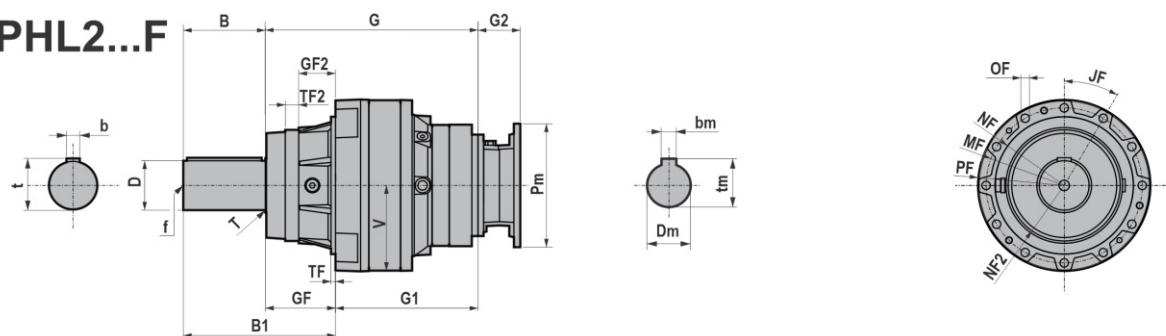
IEC	Pm x Dm	G2		
		HL/PHL 2 010/.../030	HL/PHL 2 050/080	HL/PHL 2 130
71	160x14	49	/	/
80	200x19	70	/	/
90	200x24	70	/	/
100-112	250x28	85	85	/
132	300x38	110	110	/
160	350x42	157,5	157,5	157,5

B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3

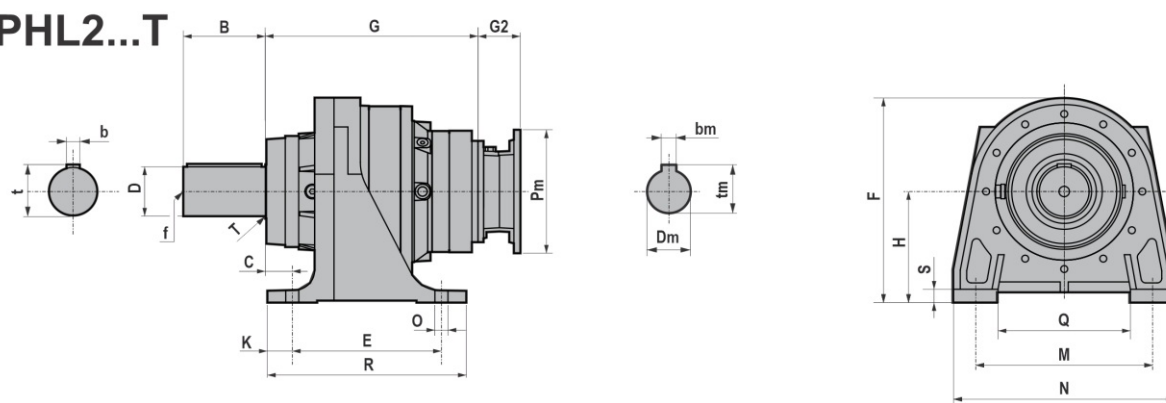
5.1 REDUCERS/GEARED MOTORS

5.1.5 HL/PHL 2 180

HL/PHL2...F



HL/PHL2...T



	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V	
180	100	m6	165	28	106	M24	306	432,5	291,5	54	300	415	225	50	356	446	26	n°4	266	400	25	-	174

	≈ PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF		TF	TF2
180	348	314	278	225	141	73,5	30°	17	n°12	7	25,5

*V - Max. overall dimensions

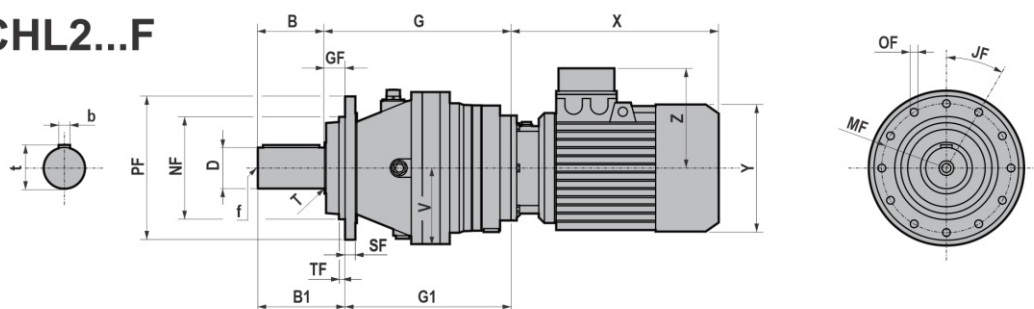
		G2
IEC	Pm x Dm	HL/PHL 2 180
71	160x14	/
80	200x19	/
90	200x24	/
100-112	250x28	/
132	300x38	/
160	350x42	157,5
180	350x48	/
200	400x55	/
225	450x60	/

B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3
180	350	48	14	51,8
200	400	55	16	59,3
225	450	60	18	64,4

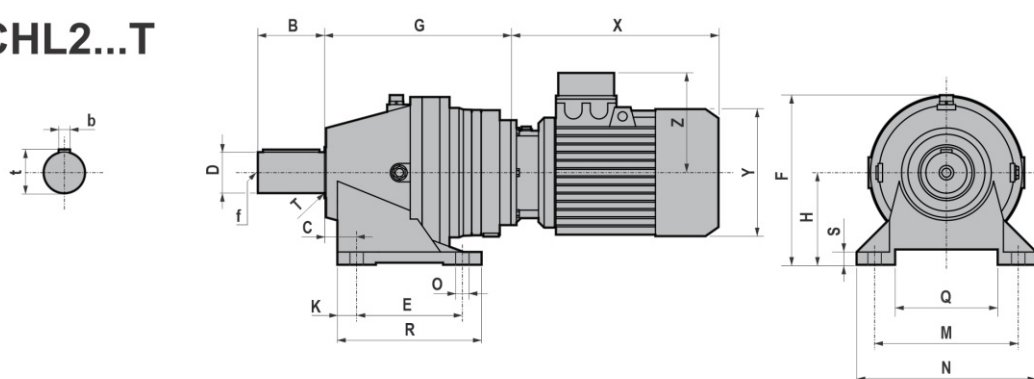
5.1 REDUCERS/GEARED MOTORS

5.1.6 CHL 2

CHL2...F



CHL2...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	238	232	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	252	246	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	281	266	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
050	60	h6	105	18	64	M20	120	315	300	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	359,5	319,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12

*V - Max. overall dimensions

T (IE1 - IE2 - IE3)									
		71	80	90S	90L	100	112	132S	132M/L
010/ .../180	X	221	248	276	301	335	356	405	443
	*X		271	309	334		380		
	Y	139	158	173	173	191	211	249	249
	Z	112	122	130	130	139	154	194	194

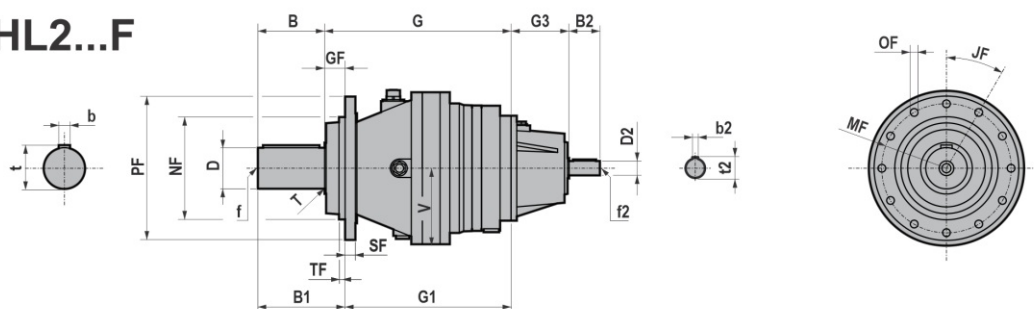
TB (IE1 - IE2 - IE3)									
		71	80	90S	90L	100	112	132S	132M/L
010/ .../180	X	286.5	321	353	378	417	453	505	547
	*X		344	386	411		477		
	Y	139	158	173	173	191	211	249	249
	Z	129	137	157	157	168	183	230	230

*X - TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

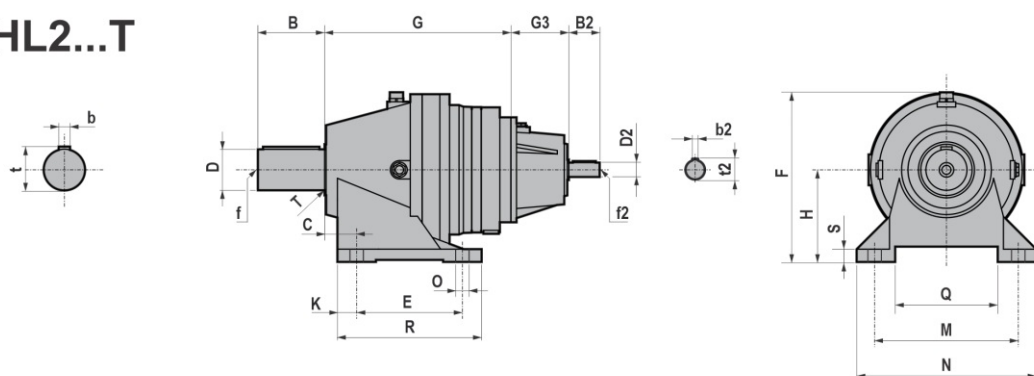
5.1 REDUCERS/GEARED MOTORS

5.1.7 IHL 2 010-130

IHL2...F



IHL2...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	238	232	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	252	246	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	281	266	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
050	60	h6	105	18	64	M20	120	315	300	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	359,5	319,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163
130	90	h6	170	25	95	M20	206	410,5	374,5	66	219	375	200	35	318	390	26	n°4	220	289	27	-	175

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12
130	325	295	230	36	36°	16,5	n°10	25	10

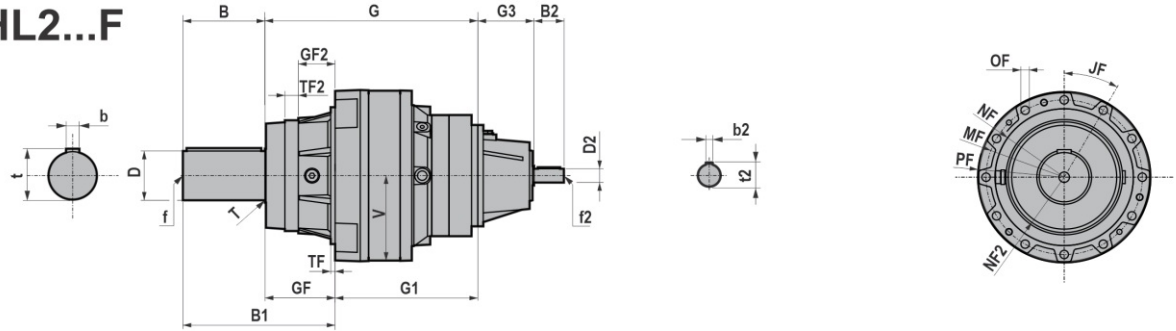
*V - Max. overall dimensions

	G3	D2	B2	b2	t2	f2
010/.../130	113	28 j6	60	8	31	M10

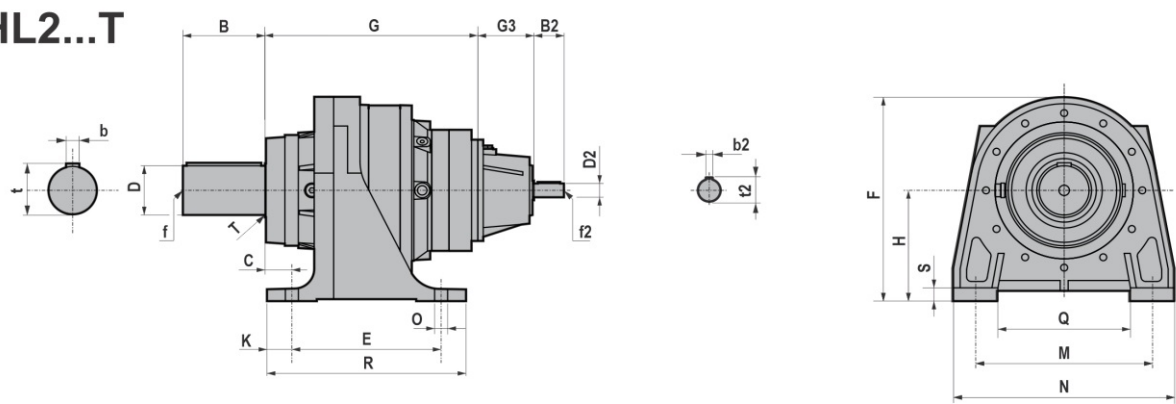
5.1 REDUCERS/GEARED MOTORS

5.1.8 IHL 2 180

IHL2...F



IHL2...T



	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V	
180	100	m6	165	28	106	M24	306	432,5	291,5	54	300	415	225	50	356	446	26	n°4	266	400	25	-	174

	≈ PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF	TF	TF2	
180	348	314	278	225	141	73,5	30°	17	n°12	7	25,5

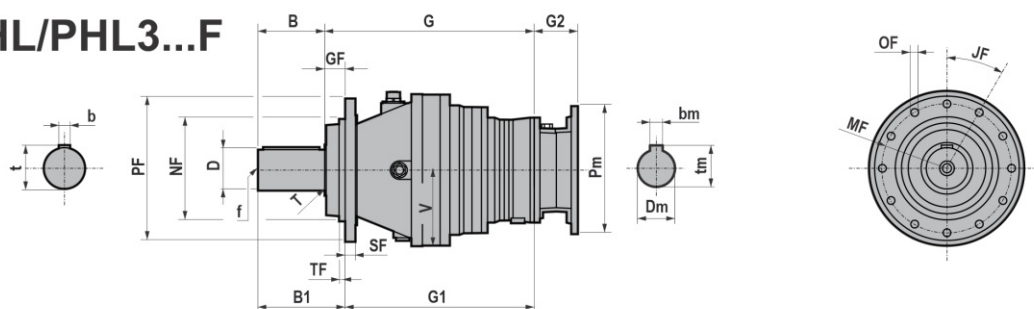
*V - Max. overall dimensions

	G3	D2	B2	b2	t2	f2
180	113	28 j6	60	8	31	M10

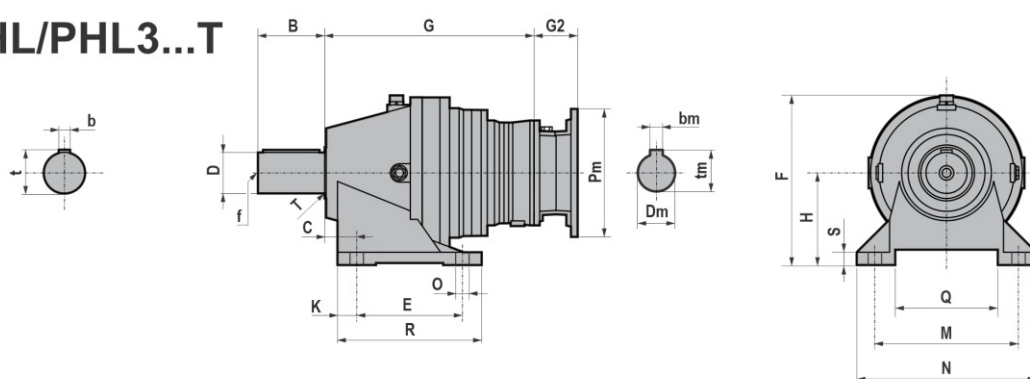
5.1 REDUCERS/GEARED MOTORS

5.1.9 HL/PHL 3 010-130

HL/PHL3...F



HL/PHL3...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	293	287	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	307	301	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	336	321	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
050	60	h6	105	18	64	M20	120	340	335	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	409,5	369,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163
130	90	h6	170	25	95	M20	206	474,5	438,5	66	219	375	200	35	318	390	26	n°4	220	289	27	-	175

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12
130	325	295	230	36	36°	16,5	n°10	25	10

*V - Max. overall dimensions

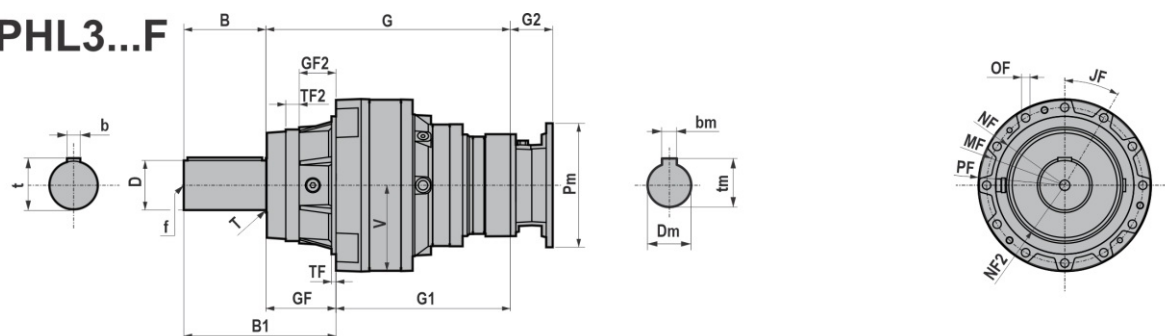
IEC	Pm x Dm	G2	
		HL/PHL 3 010/.../080	HL/PHL 3 130
71	160x14	49	/
80	200x19	70	/
90	200x24	70	70
100-112	250x28	85	85
132	300x38	110	110
160	350x42	157,5	157,5
180	350x48	/	/

B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3
180	350	48	14	51,8

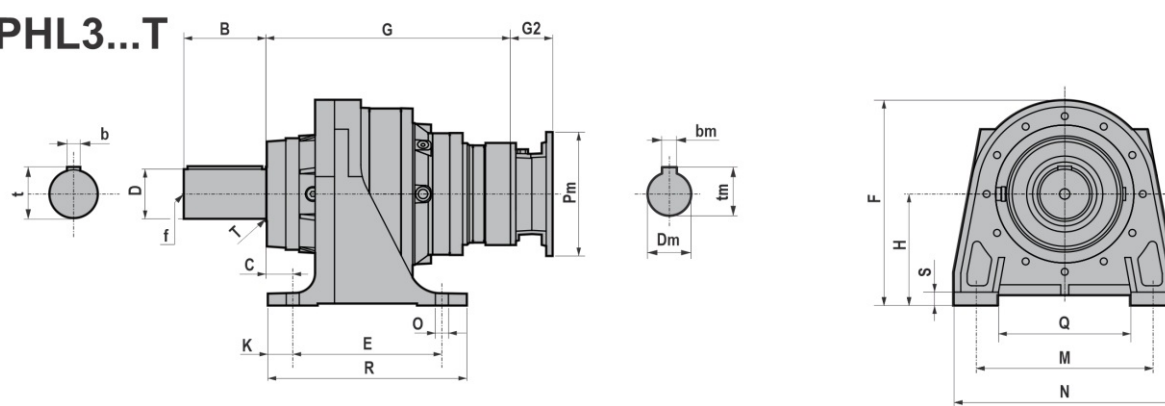
5.1 REDUCERS/GEARED MOTORS

5.1.10 HL/PHL 3 180

HL/PHL3...F



HL/PHL3...T



	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O		Q	R	S	T	°V
180	100	m6	165	28	106	M24	306	496,5	355,5	54	300	415	225	50	356	446	26	n°4	266	400	25	-	174

	≈ PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF		TF	TF2
180	348	314	278	225	141	73,5	30°	17	n°12	7	25,5

*V - Max. overall dimensions

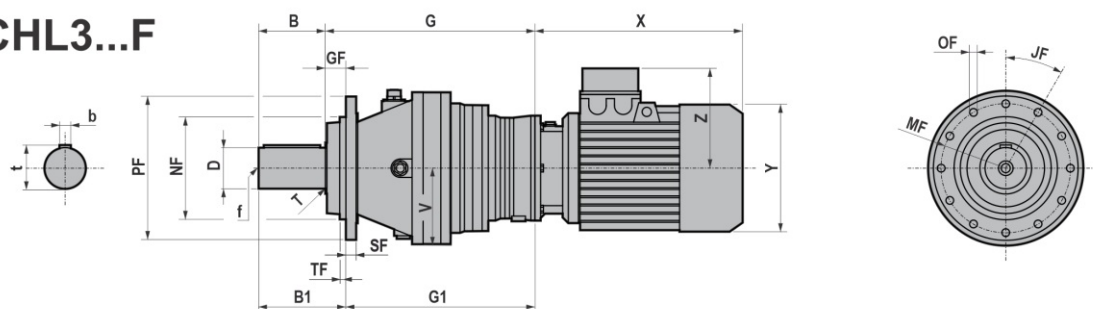
		G2
IEC	Pm x Dm	HL/PHL 3 180
71	160x14	/
80	200x19	/
90	200x24	/
100-112	250x28	85
132	300x38	110
160	350x42	157,5
180	350x48	/

B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3
180	350	48	14	51,8

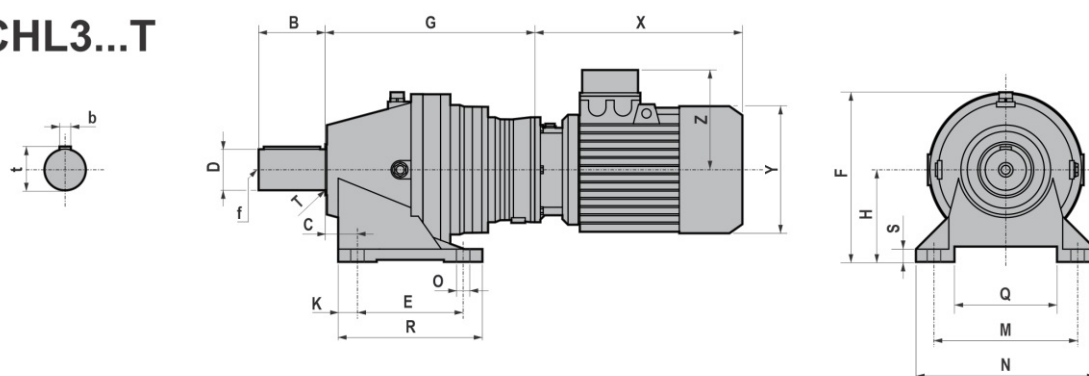
5.1 REDUCERS/GEARED MOTORS

5.1.11 CHL 3 010-130

CHL3...F



CHL3...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	293	287	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	307	301	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	336	321	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
050	60	h6	105	18	64	M20	120	340	335	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	409,5	369,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163
130	90	h6	170	25	95	M20	206	474,5	438,5	66	219	375	200	35	318	390	26	n°4	220	289	27	-	175

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12
130	325	295	230	36	36°	16,5	n°10	25	10

*V - Max. overall dimensions

T (IE1 - IE2 - IE3)									
	71	80	90S	90L	100	112	132S	132M/L	
010/ .../130	X	221	248	276	301	335	356	405	443
	*X		271	309	334		380		
	Y	139	158	173	173	191	211	249	249
	Z	112	122	130	130	139	154	194	194

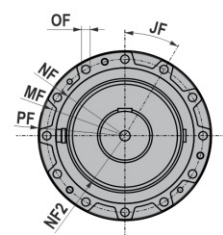
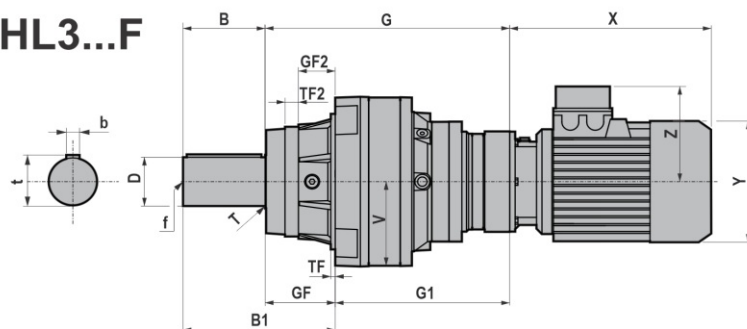
TB (IE1 - IE2 - IE3)									
	71	80	90S	90L	100	112	132S	132M/L	
010/ .../130	X	286.5	321	353	378	417	453	505	547
	*X		344	386	411		477		
	Y	139	158	173	173	191	211	249	249
	Z	129	137	157	157	168	183	230	230

*X - TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

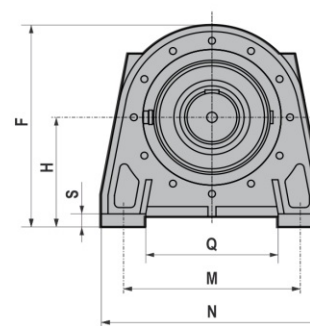
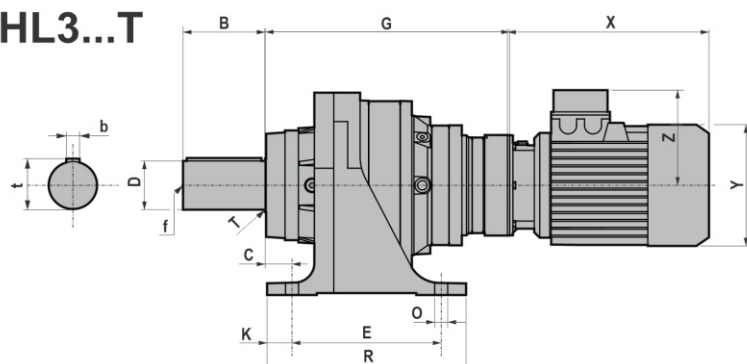
5.1 REDUCERS/GEARED MOTORS

5.1.12 CHL 3 180

CHL3...F



CHL3...T



	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O		Q	R	S	T	°V
180	100	m6	165	28	106	M24	306	496,5	355,5	54	300	415	225	50	356	446	26	n°4	266	400	25	-	174

	≈ PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF		TF	TF2
180	348	314	278	225	141	73,5	30°	17	n°12	7	25,5

*V - Max. overall dimensions

		T (IE1 - IE2 - IE3)							
180	X	71	80	90S	90L	100	112	132S	132M/L
	*X	221	248	276	301	335	356	405	443
	Y	139	158	173	173	191	211	249	249
	Z	112	122	130	130	139	154	194	194

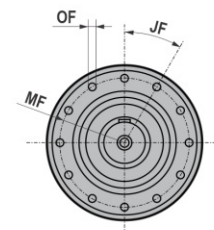
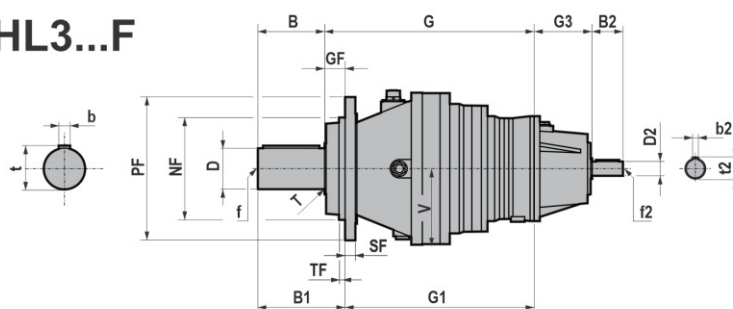
		TB (IE1 - IE2 - IE3)							
180	X	71	80	90S	90L	100	112	132S	132M/L
	*X	286.5	321	353	378	417	453	505	547
	Y	139	158	173	173	191	211	249	249
	Z	129	137	157	157	168	183	230	230

*X - TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

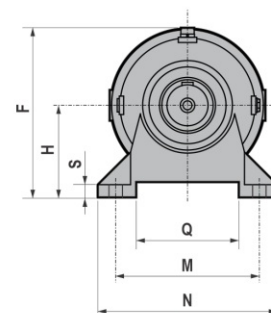
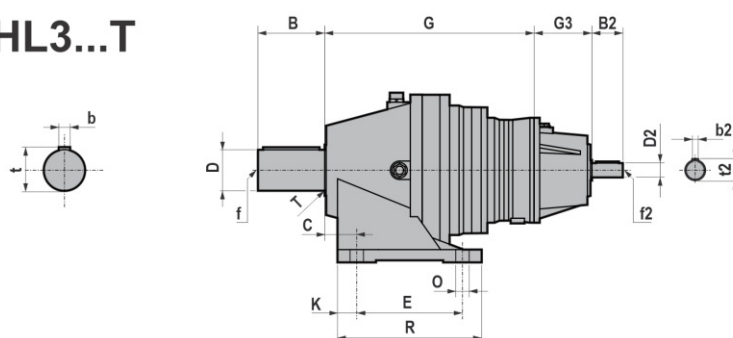
5.1 REDUCERS/GEARED MOTORS

5.1.13 IHL 3 010-130

IHL3...F



IHL3...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	293	287	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	307	301	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	336	321	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
050	60	h6	105	18	64	M20	120	340	335	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	409,5	369,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163
130	90	h6	170	25	95	M20	206	474,5	438,5	66	219	375	200	35	318	390	26	n°4	220	289	27	-	175

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12
130	325	295	230	36	36°	16,5	n°10	25	10

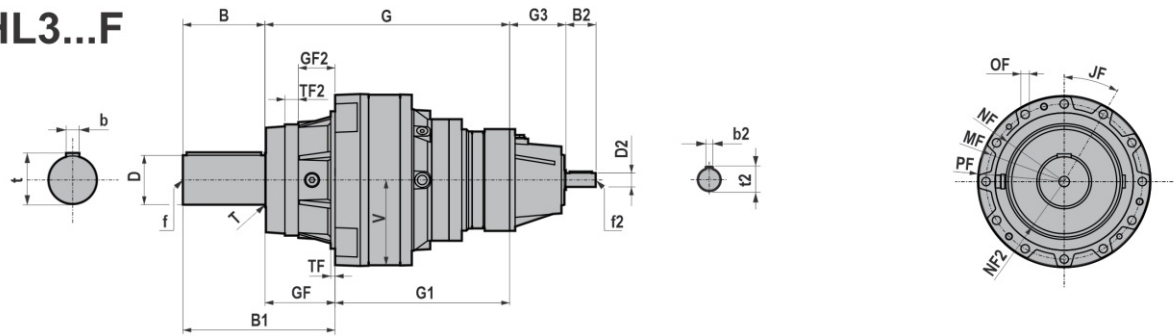
*V - Max. overall dimensions

	G3	D2	B2	b2	t2	f2
010/.../130	113	28 j6	60	8	31	M10

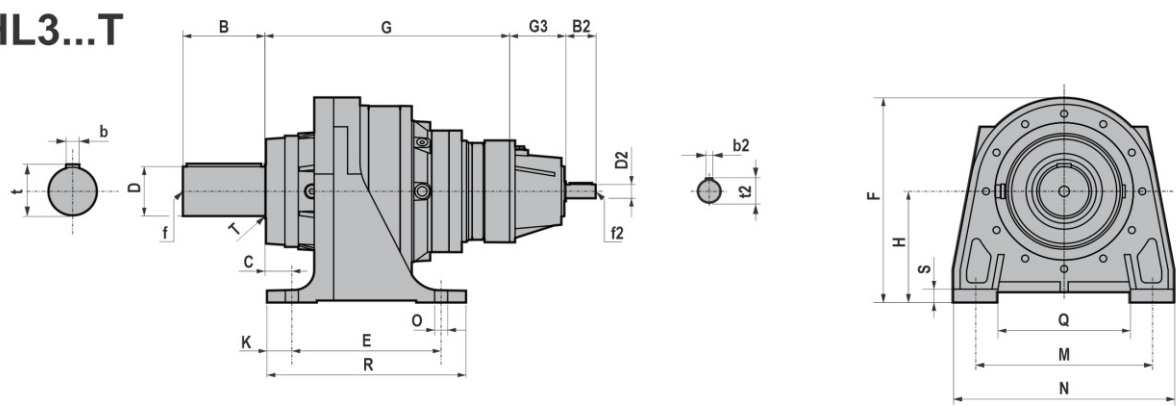
5.1 REDUCERS/GEARED MOTORS

5.1.14 IHL 3 180

IHL3...F



IHL3...T



	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V	
180	100	m6	165	28	106	M24	306	496,5	355,5	54	300	415	225	50	356	446	26	n°4	266	400	25	-	174

	≈ PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF	TF	TF2	
180	348	314	278	225	141	73,5	30°	17	n°12	7	25,5

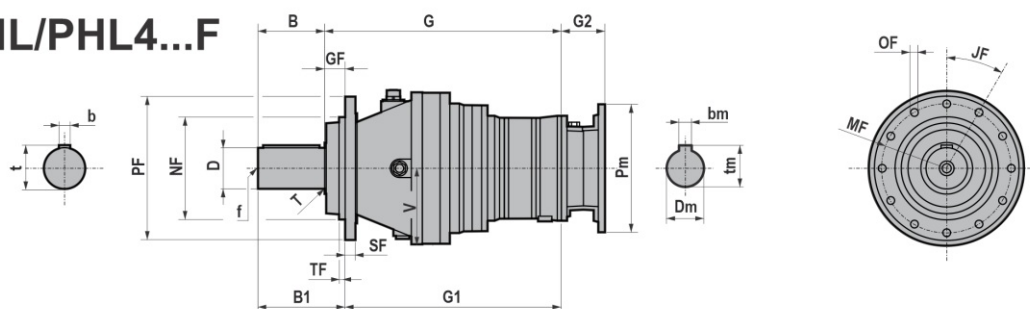
*V - Max. overall dimensions

	G3	D2	B2	b2	t2	f2
180	113	28 j6	60	8	31	M10

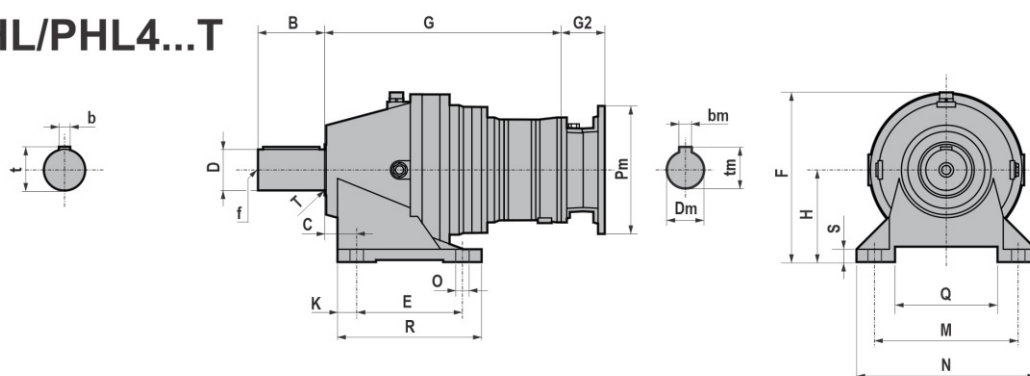
5.1 REDUCERS/GEARED MOTORS

5.1.15 HL/PHL 4 010-130

HL/PHL4...F



HL/PHL4...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	348	342	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	362	356	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	391	376	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
050	60	h6	105	18	64	M20	120	425	410	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	464,5	424,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163
130	90	h6	170	25	95	M20	206	529,5	493,5	66	219	375	200	35	318	390	26	n°4	220	289	27	-	175

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12
130	325	295	230	36	36°	16,5	n°10	25	10

*V - Max. overall dimensions

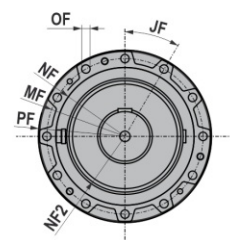
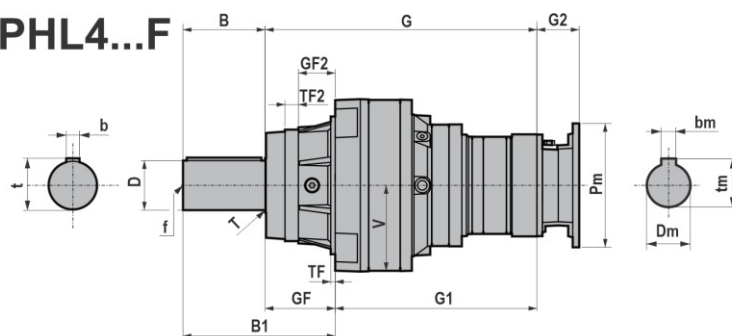
IEC	Pm x Dm	G2	
		HL/PHL 4 010/.../080	HL/PHL 4 130
71	160x14	49	49
80	200x19	70	70
90	200x24	70	70
100-112	250x28	85	85
132	300x38	110	110
160	350x42	157,5	/

B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3

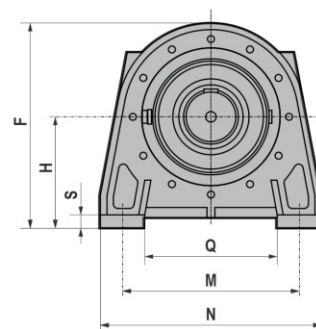
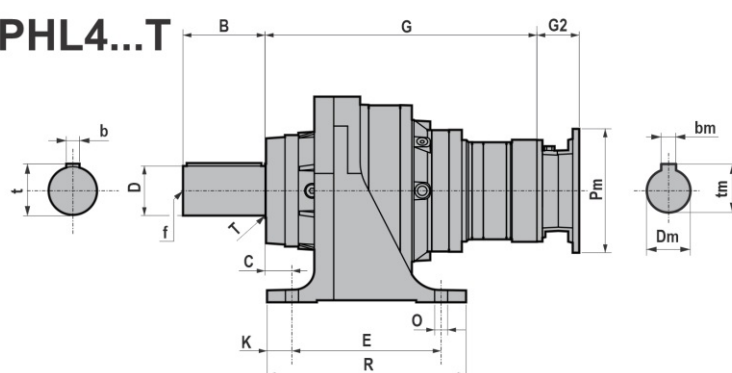
5.1 REDUCERS/GEARED MOTORS

5.1.16 HL/PHL 4 180

HL/PHL4...F



HL/PHL4...T



	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V	
180	100	m6	165	28	106	M24	306	551,5	410,5	54	300	415	225	50	356	446	26	n°4	266	400	25	-	174

	≈ PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF		TF	TF2
180	348	314	278	225	141	73,5	30°	17	n°12	7	25,5

*V - Max. overall dimensions

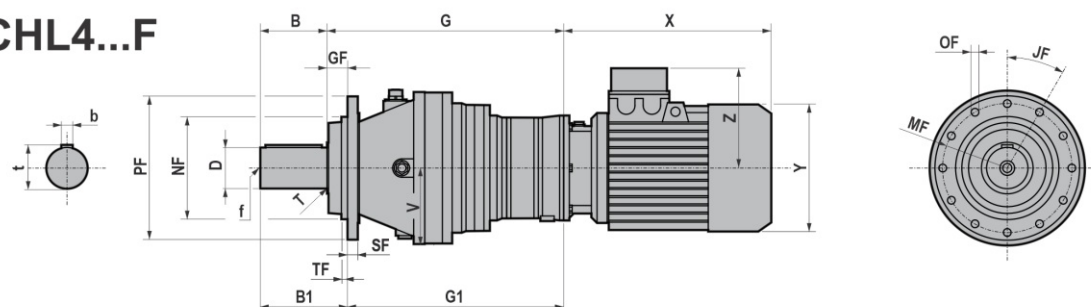
		G2
IEC	Pm x Dm	HL/PHL 4 180
71	160x14	49
80	200x19	70
90	200x24	70
100-112	250x28	85
132	300x38	110
160	350x42	/

B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3

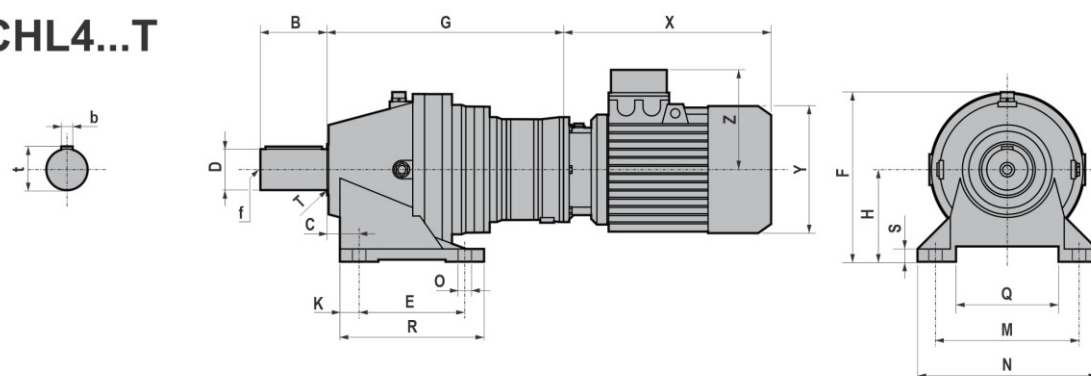
5.1 REDUCERS/GEARED MOTORS

5.1.17 CHL 4 010-130

CHL4...F



CHL4...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	348	342	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	362	356	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	391	376	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
050	60	h6	105	18	64	M20	120	425	410	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	464,5	424,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163
130	90	h6	170	25	95	M20	206	529,5	493,5	66	219	375	200	35	318	390	26	n°4	220	289	27	-	175

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12
130	325	295	230	36	36°	16,5	n°10	25	10

*V - Max. overall dimensions

T (IE1 - IE2 - IE3)									
	71	80	90S	90L	100	112	132S	132M/L	
010/ .../130	X	221	248	276	301	335	356	405	443
	*X		271	309	334		380		
	Y	139	158	173	173	191	211	249	249
	Z	112	122	130	130	139	154	194	194

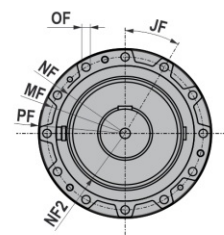
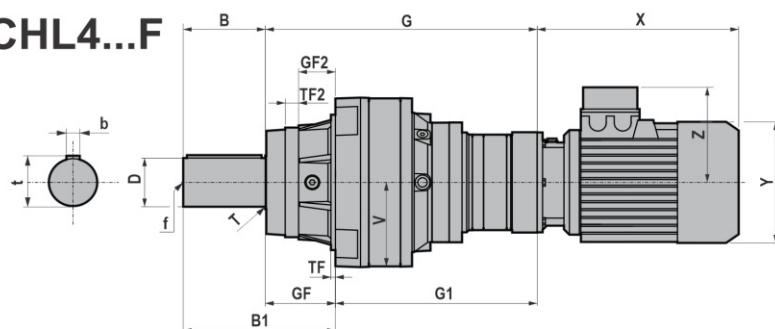
TB (IE1 - IE2 - IE3)									
	71	80	90S	90L	100	112	132S	132M/L	
010/ .../130	X	286.5	321	353	378	417	453	505	547
	*X		344	386	411		477		
	Y	139	158	173	173	191	211	249	249
	Z	129	137	157	157	168	183	230	230

*X - TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

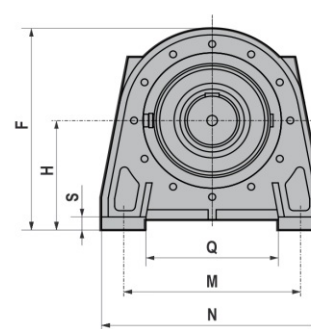
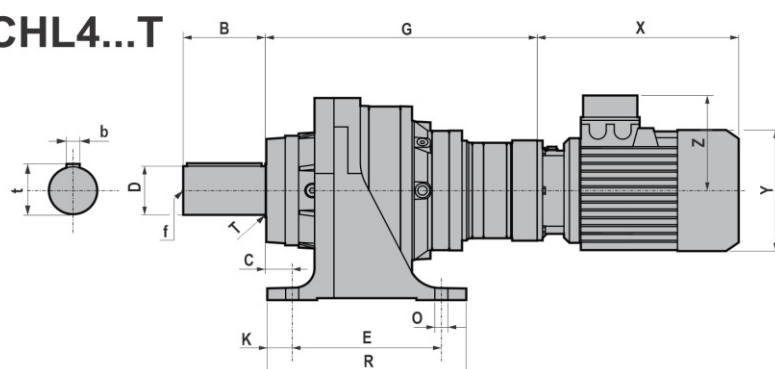
5.1 REDUCERS/GEARED MOTORS

5.1.18 CHL 4 180

CHL4...F



CHL4...T



	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V	
180	100	m6	165	28	106	M24	306	551,5	410,5	54	300	415	225	50	356	446	26	n°4	266	400	25	-	174

	≈ PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF		TF	TF2
180	348	314	278	225	141	73,5	30°	17	n°12	7	25,5

*V - Max. overall dimensions

		T (IE1 - IE2 - IE3)								
180	X	71	80	90S	90L	100	112	132S	132M/L	
	*X	221	248	276	301	335	356	405	443	
	Y	139	158	173	173	191	211			
	Z	112	122	130	130	139	154	194	194	

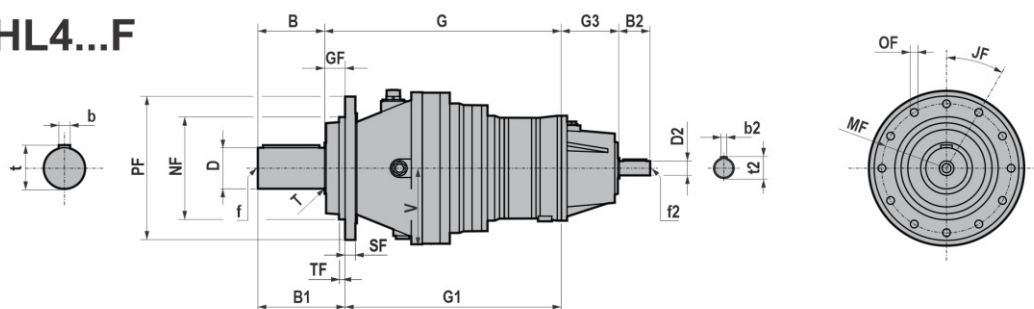
		TB (IE1 - IE2 - IE3)								
180	X	71	80	90S	90L	100	112	132S	132M/L	
	*X	286.5	321	353	378	417	453	505	547	
	Y	139	158	173	173	191	211			
	Z	129	137	157	157	168	183	230	230	

*X - TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

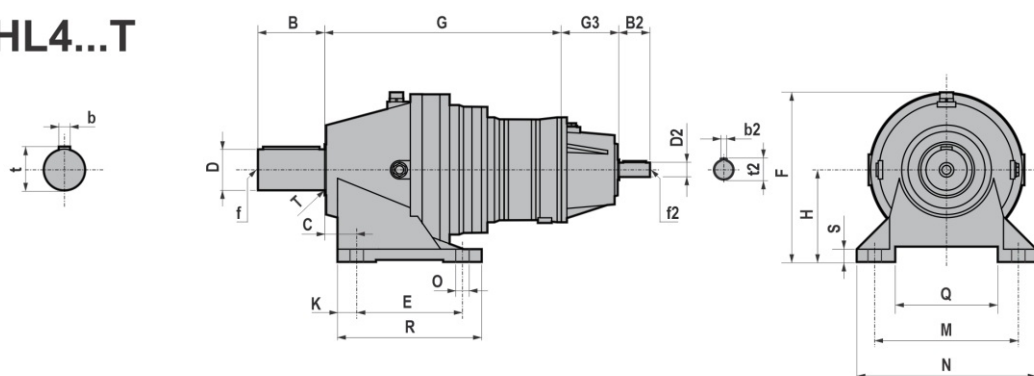
5.1 REDUCERS/GEARED MOTORS

5.1.19 IHL 4 010-130

IHL4...F



IHL4...T



	D	B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
010	50	h6	82	14	53,5	M16	88	348	342	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
020	50	h6	82	14	53,5	M16	88	362	356	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
030	60	h6	105	18	64	M20	120	391	376	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
050	60	h6	105	18	64	M20	120	425	410	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
080	80	h6	130	22	85	M20	170	464,5	424,5	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163
130	90	h6	170	25	95	M20	206	529,5	493,5	66	219	375	200	35	318	390	26	n°4	220	289	27	-	175

	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12
130	325	295	230	36	36°	16,5	n°10	25	10

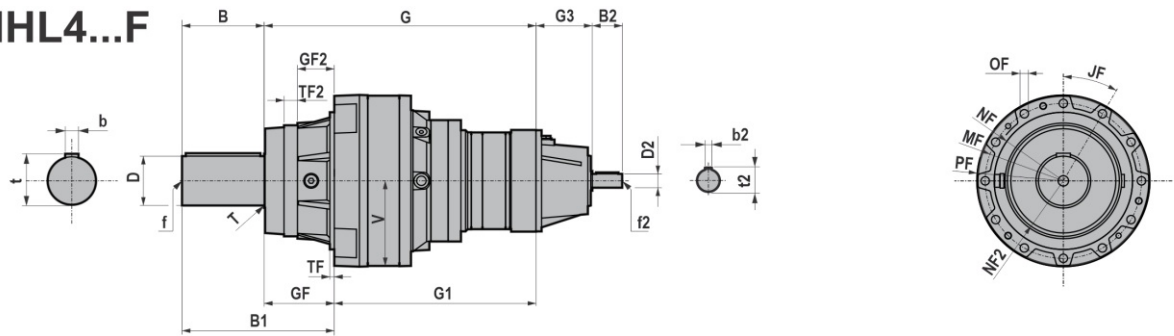
*V - Max. overall dimensions

	G3	D2	B2	b2	t2	f2
010/.../130	113	28 j6	60	8	31	M10

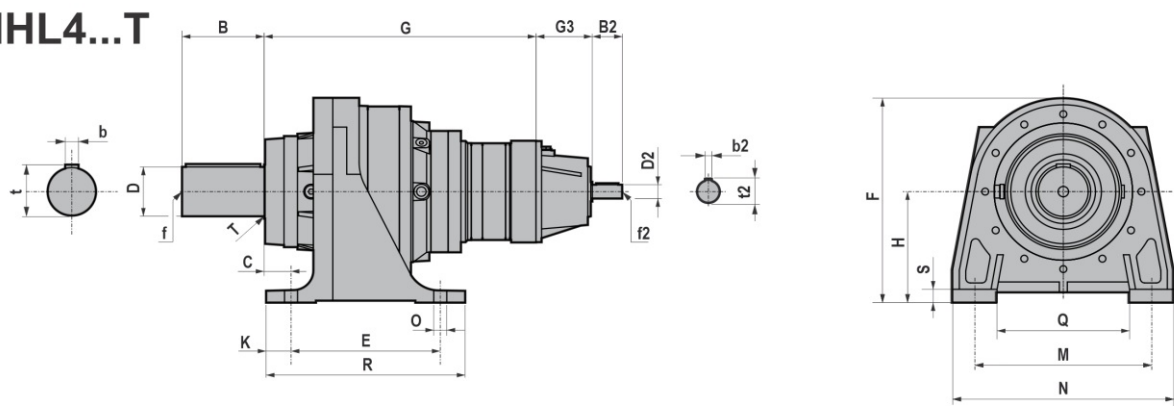
5.1 REDUCERS/GEARED MOTORS

5.1.20 IHL 4 180

IHL4...F



IHL4...T



	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O		Q	R	S	T	*V
180	100	m6	165	28	106	M24	306	551,5	410,5	54	300	415	225	50	356	446	26	n°4	266	400	25	-	174

	≈ PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF	TF	TF2	
180	348	314	278	225	141	73,5	30°	17	n°12	7	25,5

*V - Max. overall dimensions

	G3	D2	B2	b2	t2	f2
180	113	28 j6	60	8	31	M10

5.2 WEIGHTS

The tables show the indicative weights of the gear reducers without lubricant in the version of casing with feet. To calculate the weight of the corresponding flanged version, subtract the value in the table "Version F" from the weight of the gear reducer with feet.

"Version F"	
HL/PHL/IHL/CHL	-[kg]
010-020	3,75
030-050	9,32
080	13,57
130	13,71
180	32,58

*Weight without motor

IEC -[kg]									IHL	-[kg]
* HL/PHL	71	80	90	100-112	132	160	180	200		
1-010	28	30	30	32	35	41	/	/	1-010	35
1-020	30	32	32	34	37	43	/	/	1-020	37
1-030	/	/	/	56	59	65	/	/	1-030	59
1-050	/	/	/	/	/	/	/	/	1-050	/
1-080	/	/	/	/	/	/	/	122	1-080	/
1-130	/	/	/	/	/	/	/	/	1-130	/
1-180	/	/	/	/	/	/	/	/	1-180	/
2-010	36	38	38	40	43	49	/	/	2-010	43
2-020	39	40	40	42	46	52	/	/	2-020	45
2-030	60	61	61	63	67	73	/	/	2-030	66
2-050	/	/	/	71	74	80	/	/	2-050	74
2-080	/	/	/	110	113	119	/	/	2-080	113
2-130	/	/	/	/	/	154	/	/	2-130	/
2-180	/	/	/	/	/	184	/	/	2-180	/
3-010	44	46	46	48	51	57	/	/	3-010	51
3-020	47	48	48	50	54	60	/	/	3-020	53
3-030	68	69	69	71	75	81	/	/	3-030	74
3-050	76	77	77	79	82	89	/	/	3-050	82
3-080	116	117	117	119	123	129	/	/	3-080	122
3-130	/	/	152	154	158	164	/	/	3-130	157
3-180	/	/	/	185	188	194	/	/	3-180	188
4-010	52	54	54	56	59	65	/	/	4-010	59
4-020	55	56	56	58	62	68	/	/	4-020	61
4-030	76	77	77	79	83	89	/	/	4-030	82
4-050	84	85	85	87	91	97	/	/	4-050	90
4-080	124	125	125	127	131	137	/	/	4-080	130
4-130	159	160	161	162	166	/	/	/	4-130	168
4-180	189	191	191	193	196	/	/	/	4-180	196

5.2 WEIGHTS

	TH -[kg]	
CHL	71	80
1-010	33	33
1-020	/	/
1-030	/	/
1-050	/	/
1-080	/	/
1-130	/	/
1-180	/	/
2-010	41	41
2-020	43	43
2-030	64	64
2-050	/	/
2-080	/	/
2-130	/	/
2-180	/	/
3-010	49	49
3-020	51	51
3-030	72	72
3-050	80	80
3-080	120	120
3-130	/	/
3-180	/	/
4-010	57	57
4-020	59	59
4-030	80	80
4-050	88	88
4-080	128	128
4-130	163	163
4-180	193	193

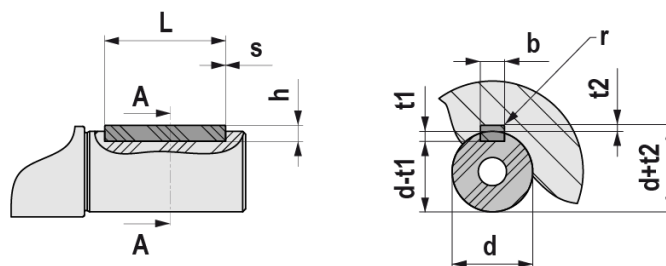
	TP -[kg]						
CHL	80	090S	090L	100	112	132S	132M
1-010	37	42	44	48	59	85	88
1-020	/	/	/	/	62	88	91
1-030	/	/	/	72	83	109	112
1-050	/	/	/	/	/	/	/
1-080	/	/	/	/	/	/	/
1-130	/	/	/	/	/	/	/
1-180	/	/	/	/	/	/	/
2-010	45	50	52	56	67	93	96
2-020	48	52	54	59	70	96	99
2-030	69	73	75	80	91	117	120
2-050	/	/	/	88	99	125	128
2-080	/	/	/	126	137	163	166
2-130	/	/	/	/	/	/	/
2-180	/	/	/	/	/	/	/
3-010	54	58	60	64	75	101	104
3-020	56	61	63	67	78	104	107
3-030	77	82	84	88	99	125	128
3-050	85	89	91	96	107	133	136
3-080	125	130	132	136	147	173	176
3-130	/	165	167	171	182	208	211
3-180	/	/	197	201	212	238	241
4-010	62	66	68	73	84	110	113
4-020	64	69	71	75	86	112	115
4-030	85	90	92	96	107	133	136
4-050	93	97	99	104	115	141	144
4-080	133	138	140	144	155	181	184
4-130	168	173	175	179	190	216	219
4-180	198	203	205	209	220	246	249

5.2 WEIGHTS

CHL	TBH ~[kg]	
	71	80
1-010	35	36
1-020	/	/
1-030	/	/
1-050	/	/
1-080	/	/
1-130	/	/
1-180	/	/
2-010	43	44
2-020	45	47
2-030	66	68
2-050	/	/
2-080	/	/
2-130	/	/
2-180	/	/
3-010	51	52
3-020	53	55
3-030	74	76
3-050	82	83
3-080	122	124
3-130	/	/
3-180	/	/
4-010	59	60
4-020	61	63
4-030	82	84
4-050	90	92
4-080	130	132
4-130	166	167
4-180	196	197

CHL	TBP ~[kg]						
	80	090S	090L	100	112	132S	132M
1-010	41	45	50	55	69	99	102
1-020	/	/	/	/	72	102	105
1-030	/	/	/	79	93	123	126
1-050	/	/	/	/	/	/	/
1-080	/	/	/	/	/	/	/
1-130	/	/	/	/	/	/	/
1-180	/	/	/	/	/	/	/
2-010	49	53	58	63	77	107	110
2-020	51	56	60	66	80	110	113
2-030	72	77	81	87	101	131	134
2-050	/	/	/	95	109	139	142
2-080	/	/	/	133	147	177	180
2-130	/	/	/	/	/	/	/
2-180	/	/	/	/	/	/	/
3-010	57	62	66	71	85	115	118
3-020	60	64	68	74	88	118	121
3-030	81	85	89	95	109	139	142
3-050	88	93	97	103	117	147	150
3-080	129	133	137	143	157	187	190
3-130	/	168	172	178	192	222	225
3-180	/	/	202	208	222	252	255
4-010	65	70	74	80	94	124	127
4-020	68	72	76	82	96	126	129
4-030	89	93	97	103	117	147	150
4-050	96	101	105	111	125	155	158
4-080	137	141	145	151	165	195	198
4-130	172	176	180	186	200	230	233
4-180	202	206	210	216	230	260	263

5.3 SHAFT END

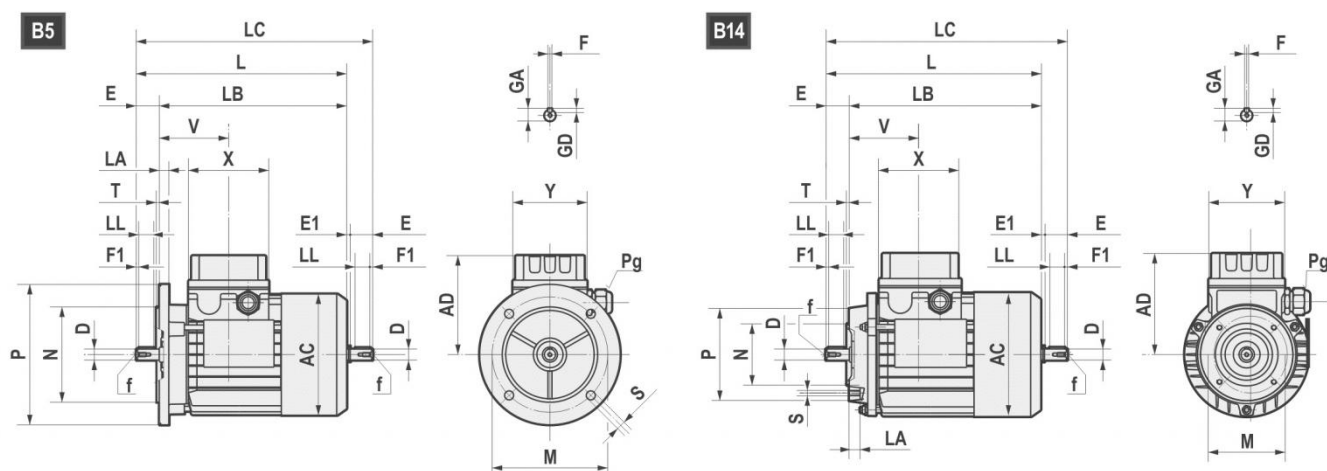


UNI 6604 - DIN 6885

d			b x h			Tol. b / h	L		$\frac{s}{\min / \max}$	b	t1	t2	Tol. t1 / t2	r max
	6	8	2	x	2	h9 / h9	6	20	0,16 0,25	2	1,2	1	0,1 0	0,08 0,16
>	8	10	3	x	3		6	36		3	1,8	1,4		
>	10	12	4	x	4		8	45		4	2,5	1,8		
>	12	17	5	x	5		10	56	5	3	2,3	0,16 0,25		
>	17	22	6	x	6		14	70	6	3	2,8			
>	22	30	8	x	7		h9 / h11	18	90	0,25 0,4	8	4		3,3
>	30	38	10	x	8	22		110	10		5	3,3		
>	38	44	12	x	8	28		140	12		5	3,3	0,4 0,6	
>	44	50	14	x	9	36		160	14	5,5	3,8			
>	50	58	16	x	10	45		180	16	6	4,3	0,4 0,6		
>	58	65	18	x	11	50		200	18	7	4,4			
>	65	75	20	x	12	56		110	20	7,5	4,9	0,2 0	0,4 0,6	
>	75	85	22	x	14	63		140	22	9	5,4			
>	85	95	25	x	14	70		160	25	9	5,4			
>	95	110	28	x	16	80		180	28	10	6,4			
>	110	130	32	x	18	90		200	32	11	7,4			
>	130	150	36	x	20	100		160	36	12	8,4		0,3 0	0,7 1
>	150	170	40	x	22	110		180	40	13	9,4			
>	170	200	45	x	25	125		200	45	14	10,4			

5.4 ELECTRIC MOTORS

5.4.1 Electric motors



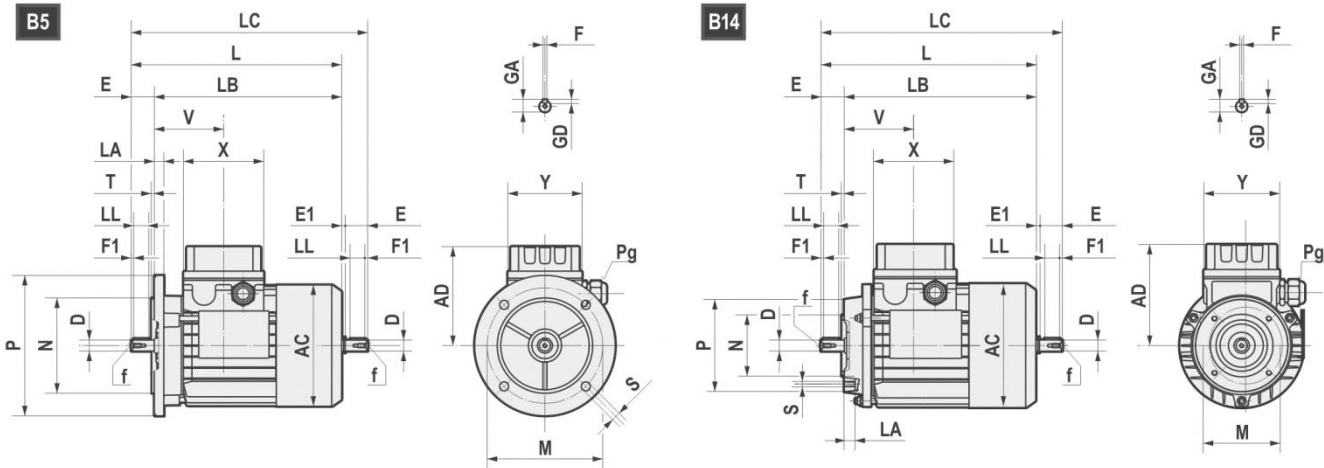
	AC	AD	L	LB	LC	X	Y	V	D	E	E1	f	F1	GA	F	GD
63	121	104	211	188	235,5	80	74	69	11 j6	23	1,5	M4x10	2,5	12,5	4	4
71	139	112	238,5	208,5	271	80	74	74,5	14 j6	30	2,5	M5x12,5	3	16	5	5
80	158	122	272,5 *296	232,5 *256	314 *337	80	74	78	19 j6	40	1,5	M6x16	5	21,5	6	6
90S	173	148	298 *331	248 *281	349,5 *381	98	98	89,5	24 j6	50	1,5	M8x19	5	27	8	7
90L	173	148	323 *356	273 *306	374,5 *408	98	98	89,5	24 j6	50	1,5	M8x19	5	27	8	7
100	191	156	368	308	431,5	98	98	97,5	28 j6	60	3,5	M10x22	7,5	31	8	7
112	211	171	382,5 *408	322,5 *348	447 *472	98	98	100	28 j6	60	3,5	M10x22	7,5	31	8	7
132S	249	195	452	372	536,5	118	118	115,5	38 k6	80	4	M12x28	10	41	10	8
132L	249	195	490	410	574,5	118	118	115,5	38 k6	80	4	M12x28	10	41	10	8
160S	249	195	520	410	/	118	118	115,5	42k6	100	/	M16x36	10	45	12	8

*TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

B5	M	N	P	LA	S	T
63	115	95	140	10	9	3
71	130	110	160	10	9,5	3,5
80	165	130	200	12	11	3,5
90	165	130	200	12	11	3,5
100	215	180	250	15	14	4
112	215	180	250	14,5	14	4
132	265	230	300	20	14	3,5
160	300	250	350	13	18,5	3,5

B14	M	N	P	LA	S	T
63	75	60	90	10	M5	2,5
71	85	70	105	10,5	M6	2,5
80	100	80	120	10,5	M6	3
90	115	95	140	11,5	M8	3
100	130	110	160	15	M8	3,5
112	130	110	160	11,5	M8	3,5
132	165	130	200	20,5	M10	3,5
160	215	180	250	-	M12	4

5.4 ELECTRIC MOTORS



		AC	AD	L	LB	X	Y	V	D	E	f	F1	GA	F	GD	LL	Pg	
160M	2-4-6	317	271	608	498	193	193	146	42	110	M16	5	45	12	8	100	2-M40x1,5	1-M20x1,5
160L	2-4-6	317	271	652	542	193	193	146	42	110	M16	5	45	12	8	100	2-M40x1,5	1-M20x1,5
180M	2-4	354	297	672	562	193	193	155	48	110	M16	5	51,5	14	9	100	2-M40x1,5	1-M20x1,5
180L	4-6	34	297	710	600	193	193	155	48	110	M16	5	51,5	14	9	100	2-M40x1,5	1-M20x1,5
200L	2-4-6	398	330	770	660	231	231	193	55	110	M20	5	59	16	10	100	2-M50x1,5	1-M20x1,5
225S	4	449	356	816	676	231	231	179,5	60	140	M20	7,5	64	18	11	125	2-M50x1,5	1-M20x1,5
225M	2	449	356	811	701	231	231	179,5	55	110	M20	5	59	16	10	100	2-M50x1,5	1-M20x1,5
225M	4-6	449	356	841	701	231	231	179,5	60	140	M20	7,5	64	18	11	125	2-M50x1,5	1-M20x1,5
250M	2	498	398	921	781	255	255	213,5	60	140	M20	7,5	64	18	11	125	2-M63x1,5	1-M20x1,5
250M	4-6	498	398	921	781	255	255	213,5	65	140	M20	7,5	69	18	11	125	2-M63x1,5	1-M20x1,5
280S	2	550	446	1037,5	897,5	255	255	238	65	140	M20	7,5	69	18	11	125	2-M63x1,5	1-M20x1,5
280S	4-6	550	446	1037,5	897,5	255	255	238	75	140	M20	7,5	79,5	20	12	125	2-M63x1,5	1-M20x1,5
280M	2	550	446	1087,5	947,5	255	255	238	65	140	M20	7,5	69	18	11	125	2-M63x1,5	1-M20x1,5
280M	4-6	550	446	1087,5	947,5	255	255	238	75	140	M20	7,5	79,5	20	12	125	2-M63x1,5	1-M20x1,5

B5	M	N	P	LA	S	T
160	300	250	350	15	18,5	5
180	300	250	350	15	18,5	5
200	350	300	400	17	18,5	5
225	400	350	450	20	18,5	5
250	500	450	550	22	18,5	5
280	500	450	550	22	18,5	5

5.4 ELECTRIC MOTORS

5.4.2 Standard high efficiency (TS), high (TH, HSH) and premium (TP) motors

Motovario, three-phase, single polarity motors are available in three different versions (IE1-IE2-IE3) in compliance with standard 60034-30-1. The efficiency value is calculated according to the method set forth in standard IEC 60034-2-1.

1. IE1: TS series (standard efficiency) for nominal power less than 0.12 kW;
2. IE2: TH series (high efficiency) for nominal power greater than or equal to 0.12 kW and less than 0.75 kW;
3. IE3: TP series (premium efficiency) (*) 4 poles for nominal power greater than or equal to 0.12 kW, 2 and 6 poles for nominal power greater than or equal to 0.75 kW.

Motovario single-phase, single-polarity motors are available in efficiency class:

1. HSH series in IE2 efficiency class according to IEC 60034-30-1 for nominal power ratings higher than or equal to 0.12 kW and lower than or equal to 2.2 kW. The efficiency value is calculated according to the method set forth in standard IEC 60034-2-1;
2. S series is only available in discontinuous service S2=60 min and is therefore not covered by EU Regulation n°1781/2019.

Table of Motovario commercial availability

NOMINAL POWER [kW]	EFFICIENCY LEVEL		
	IE1	IE2	IE3
$P_n < 0,12$	TS-TBS	-	-
$0,12 \leq P_n < 0,75$	-	TH-TBH HSH	TP-TBP (**)
$P_n \geq 0,75$	-	HSH	TP-TBP

(*) Motor TP100LA4 2,2 kW and all TP 6 poles motors are available at 60Hz only upon request. As a consequence, these motors are in IE3 efficiency level at 50 Hz and IE2 at 60 Hz in case of bifrequency electrical design (standard 230/400-265/460V 50-60Hz and optional 200/346-220/380V 50-60Hz, 290/500-330/575V 50-60Hz and 400/690-460/800V 50-60Hz, see chapter on input voltage and frequency).

(**) Only 4 poles.

5.4 ELECTRIC MOTORS

5.4.3 Nominal power - [kW]

	63A			63B		63C	63D	71A		71B		71C
P.	TS	TH	TP	TH	TP	TH	TH	TH	TP	TH	TP	TH
2	-	0,18	-	0,25	-	0,37	-	0,37	-	0,55	-	-
4	-	0,12	0,12	0,18	0,18	-	0,25	0,25	0,25	0,37	0,37	0,55
6	0,09	-	-	0,12	-	-	-	0,18	-	0,25	-	0,37

	80A		80B		90S	90L	100LR	100LA	100L	112MR	112MS	112M
P.	TH	TP	TH	TP	TP	TP	TP	TP	TP	TP	TP	TP
2	-	0,75	-	1,1	1,5	2,2	-	-	3	-	-	4
4	0,55	0,55	-	0,75	1,1	1,5	-	2,2	-	2,2	3	4
6	0,37	-	0,55	-	0,75	-	1,1	-	1,5	-	-	2,2

	132S	132MS	132MA	132MB	132M
P.	TP	TP	TP	TP	TP
2	5,5	-	-	-	7,5
4	-	5,5	-	-	7,5
6	3	-	4	5,5	-

	160M	160MA	160MB	160L	160LA	180M	180L
P.	TP	TP	TP	TP	TP	TP	TP
2	-	11	15	18,5	-	22	-
4	-	11	-	-	15	18,5	22
6	7,5	-	-	11	-	-	15

	200L	200LA	200LB	225S	225M	250M	280S	280M
P.	TP	TP	TP	TP	TP	TP	TP	TP
2	-	30	37	-	-	-	-	-
4	30	-	-	37	45	55	75	90
6	-	18,5	22	-	-	-	-	-

6.1 LOW SPEED SHAFTS

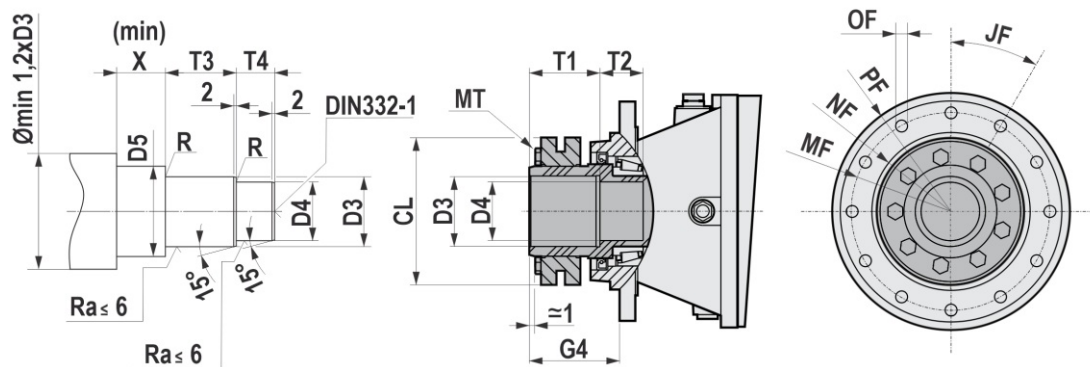
6.1.1 Shrink disk shaft HM1-HM0 010-130

Output shaft available only in version F.

Clean and degrease the surfaces of the shaft to be fitted to. Comply with the indicated tightening torque of screws (M_T).

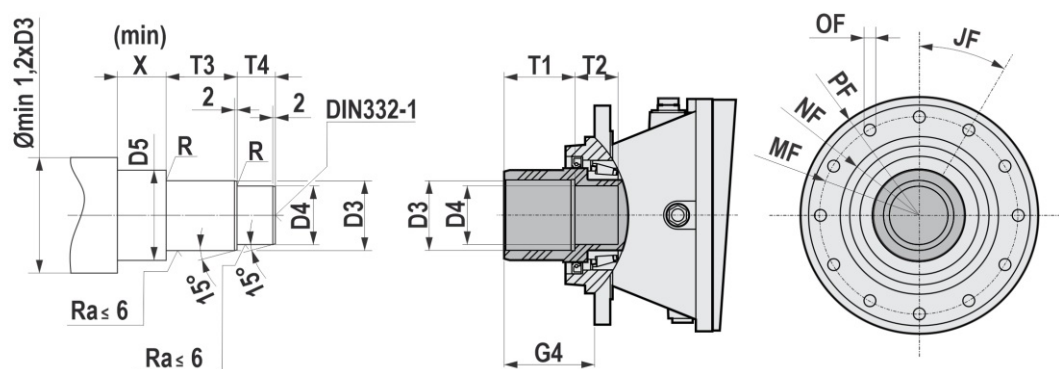
Hollow shaft with shrink disk HM1

010-130



Hollow shaft for shrink disk HM0

010-130



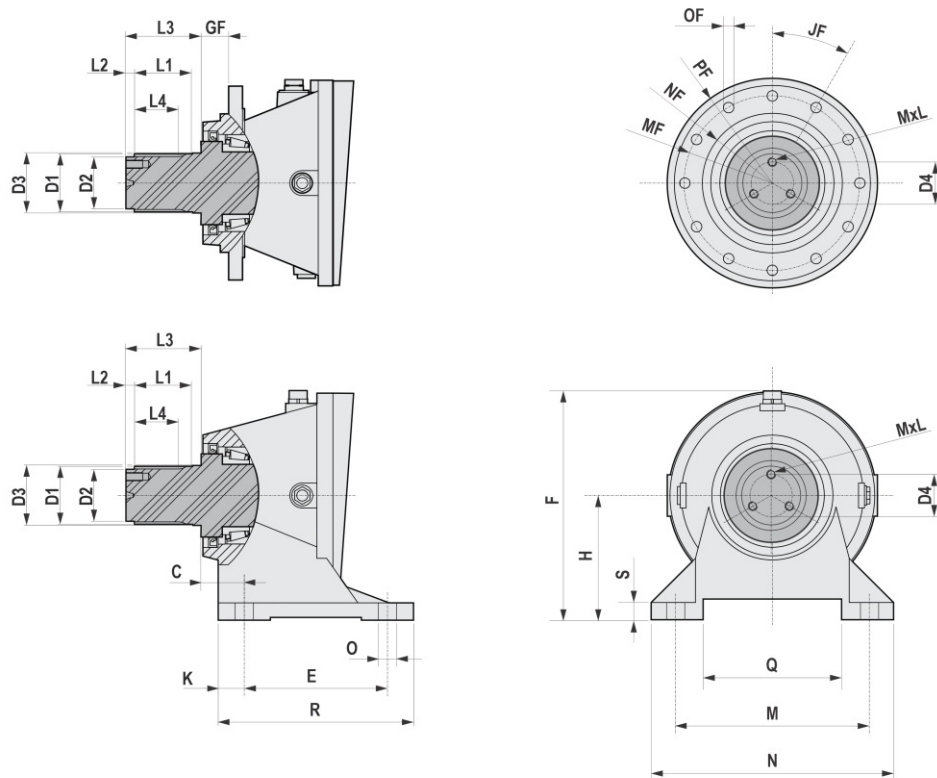
HPL	D3	D4	D5 (-0,2/-0,4)	G4	R	T1	T2	T3	T4	X (min)	CL	M_T 12,9 [Nm]
010	52 (H6/g6)	35 (H7/g6)	62	50	1,6	42	18	39	18	15	110	12
020	52 (H6/g6)	35 (H7/g6)	62	50	1,6	42	18	39	18	15	110	12
030	75 (H6/g6)	65 (H7/g6)	100	85	1,6	70	30	67	30	15	170	30
050	75 (H6/g6)	65 (H7/g6)	100	85	1,6	70	30	67	30	15	170	30
080	90 (H7/g6)	75 (H7/g6)	115	115	1,6	90	55	87	55	15	188	59
130	100 (H7/g6)	85 (H7/g6)	130	120	1,6	100	44	97	44	15	215	59

	PF	MF	NF f7	GF	JF	OF
010 020	186	165	110	6	45°	10,5
030 050	222	195	150	15	36°	12,5
080	280	250	200	40	30°	15
130	325	295	230	36	36°	16,5

6.1 LOW SPEED SHAFTS

6.1.2 Splined solid shaft SS

010-130



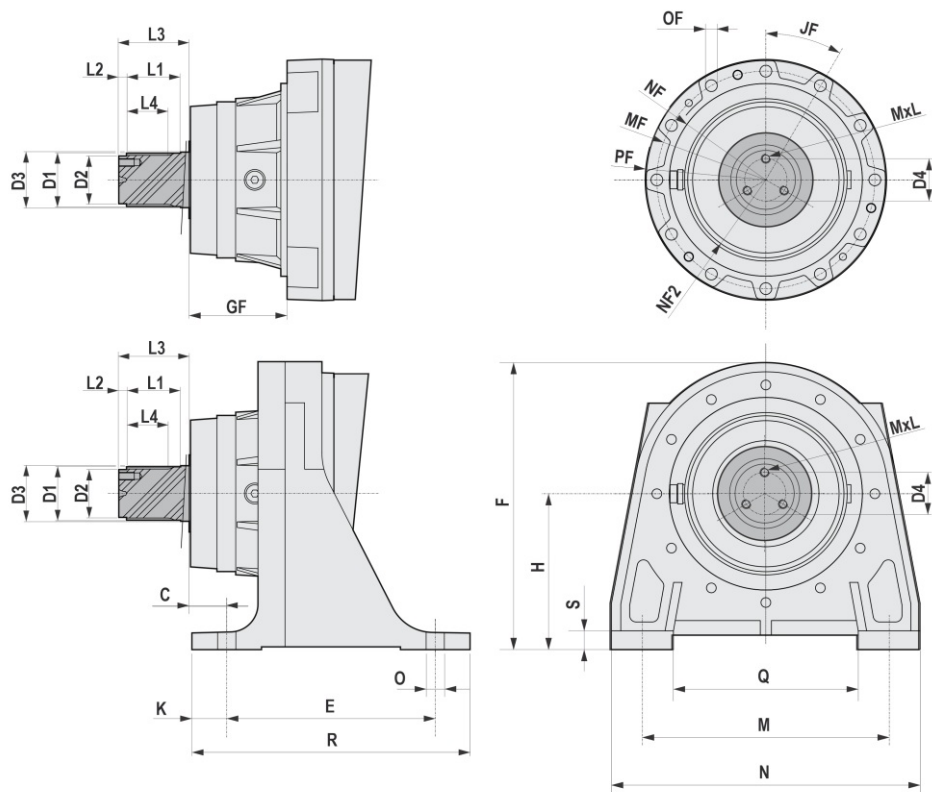
HPL	D1 (DIN5482)	D2 (f7)	D3 (f7)	D4	L1	L2	L3	L4	MxL
010	B40x36 DIN5482	35	42	24	43	5	55	31	M6x13
020	B40x36 DIN5482	35	42	24	43	5	55	31	M6x13
030	B58x53 DIN5482	50	60	32	52	8	68	38	M10x20
050	B58x53 DIN5482	50	60	32	52	8	68	38	M10x20
080	B70x64 DIN5482	62	72	45	70	10	90	53	M10x20
130	B80x74 DIN5482	70	85	45	71	9	90	50	M12x24

	C	E	F	H	K	M	N	O		Q	R	S
010	24	138	233	132	21	216	260	17	n°4	148	180	16
020	24	138	233	132	21	216	260	17	n°4	148	180	16
030	39	169	284	160	33	254	312	18	n°4	172	235	20
050	39	169	284	160	33	254	312	18	n°4	172	235	20
080	65	201	330,5	180	40	279	350	22	n°4	185	281	25
130	66	219	375	200	35	318	390	26	n°4	220	289	27

	PF	MF	NF f7	GF	JF	OF
010 020	186	165	110	6	45°	10,5 n°8
030 050	222	195	150	15	36°	12,5 n°10
080	280	250	200	40	30°	15 n°12
130	325	295	230	36	36°	16,5 n°10

6.1 LOW SPEED SHAFTS

180



HPL	D1 (DIN5482)			D2 (f7)	D3 (f7)	D4	L1	L2	L3	L4	MxL	
180	B80x74 DIN5482			70	85	45	71	9	90	50	M12x24	

	C	E	F	H	K	M	N	O		Q	R	S
180	54	300	415	225	50	356	445	26	n°4	266	400	25

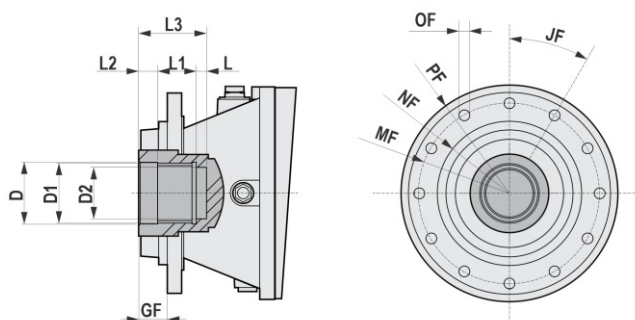
	PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF		TF	TF2
180	345	314	278	225	141	73,5	30°	17	n°12	9	25,5

6.1 LOW SPEED SHAFTS

6.1.3 Splined hollow shaft HS 010-130

Output shaft available only in version F.

010-130



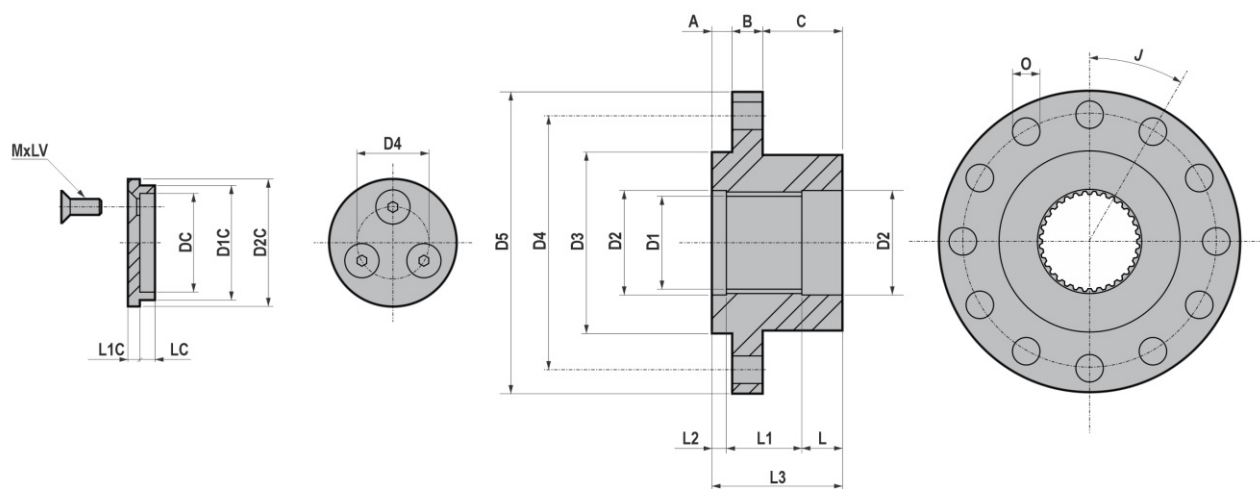
HPL	D1 (DIN5482)	D	D2 (H8)	L	L1	L2	L3
010	A40x36 DIN5482	42 H7	35	12,5	22	8	42,5
020	A40x36 DIN5482	42 H7	35	12,5	22	8	42,5
030	A58x53 DIN5482	60 H8	50	10	29	15	54
050	A58x53 DIN5482	60 H8	50	10	29	15	54
080	A70x64 DIN5482	72 H8	60	12	45	22	79
130	A80x74 DIN5482	85 H8	70	12	51	24	87

	C	E	F	H	K	M	N	O		Q	R	S
010	24	138	233	132	21	216	260	17	n°4	148	180	16
020	24	138	233	132	21	216	260	17	n°4	148	180	16
030	39	169	284	160	33	254	312	18	n°4	172	235	20
050	39	169	284	160	33	254	312	18	n°4	172	235	20
080	65	201	330,5	180	40	279	350	22	n°4	185	281	25
130	66	219	375	200	35	318	390	26	n°4	220	289	27

	PF	MF	NF f7	GF	JF	OF
010 020	186	165	110	6	45°	10,5 n°8
030 050	222	195	150	15	36°	12,5 n°10
080	280	250	200	40	30°	15 n°12
130	325	295	230	36	36°	16,5 n°10

6.2 WHEEL FLANGE

Connection accessory compatible only with integral splined shaft (SS).
Allows to directly rotate the connected component.

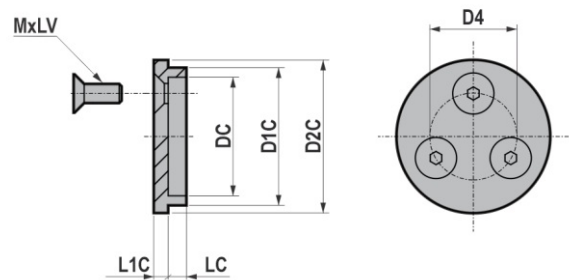


HPL	D1 (DIN5482)	D2 (H7)	D3 (f7)	D4	D5	A	B	C	L	L1	L2	L3	J	O
010	A40x36 H10 DIN 5482	42	60	125	147	8	10	37	21	29	5	55	60	10,5 (n°6)
020	A40x36 H10 DIN 5482	42	60	125	147	8	10	37	21	29	5	55	60	10,5 (n°6)
030	A58x53 H10 DIN5482	60	95	145	165	10	14	44	24	35	9	68	30	12,5 (n°12)
050	A58x53 H10 DIN5482	60	95	145	165	10	14	44	24	35	9	68	30	12,5 (n°12)
080	A70x64 H10 DIN 5482	72	125	175	208	14	21	45	28	52	10	90	30	19 (n°12)
130	A80x74 H10 DIN 5482	80	125	175	208	14	20	56	30	49	11	90	30	19 (n°12)
180	A80x74 H10 DIN 5482	80	125	175	208	14	20	56	30	49	11	90	30	19 (n°12)

HPL	DC (H7)	D1C (f7)	D2C	D4	LC	L1C	MxLV
010	35	42	52	24	4,5	4,5	M6x16 (n°3)
020	35	42	52	24	4,5	4,5	M6x16 (n°3)
030	50	62	70	32	7,5	7,5	M10x25 (n°3)
050	50	62	70	32	7,5	7,5	M10x25 (n°3)
080	62	72	80	45	8,5	7,5	M10x25 (n°3)
130	70	80	92	45	8	8	M12x25 (n°3)
180	70	80	92	45	8	8	M12x25 (n°3)

6.3 AXIAL FIXING WASHER

Connection accessory compatible only with integral splined shaft (SS).
Allows accessories to be fixed to the shaft.

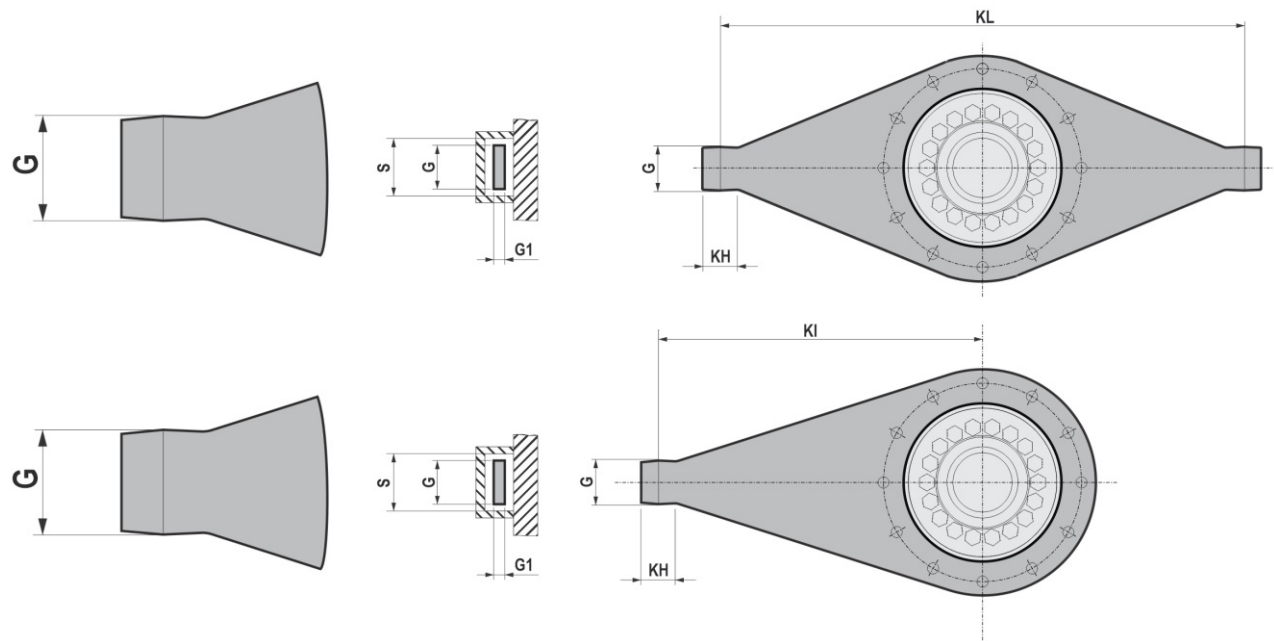


HPL	DC (H7)	D1C (f7)	D2C	D4	LC	L1C	MxLV
010	35	42	52	24	4,5	4,5	M6x16 (n°3)
020	35	42	52	24	4,5	4,5	M6x16 (n°3)
030	50	62	70	32	7,5	7,5	M10x25 (n°3)
050	50	62	70	32	7,5	7,5	M10x25 (n°3)
080	62	72	80	45	8,5	7,5	M10x25 (n°3)
130	70	80	92	45	8	8	M12x25 (n°3)
180	70	80	92	45	8	8	M12x25 (n°3)

Torque arm

Fastening system that can be applied to versions with flange output module (F).

To be set up by the customer.



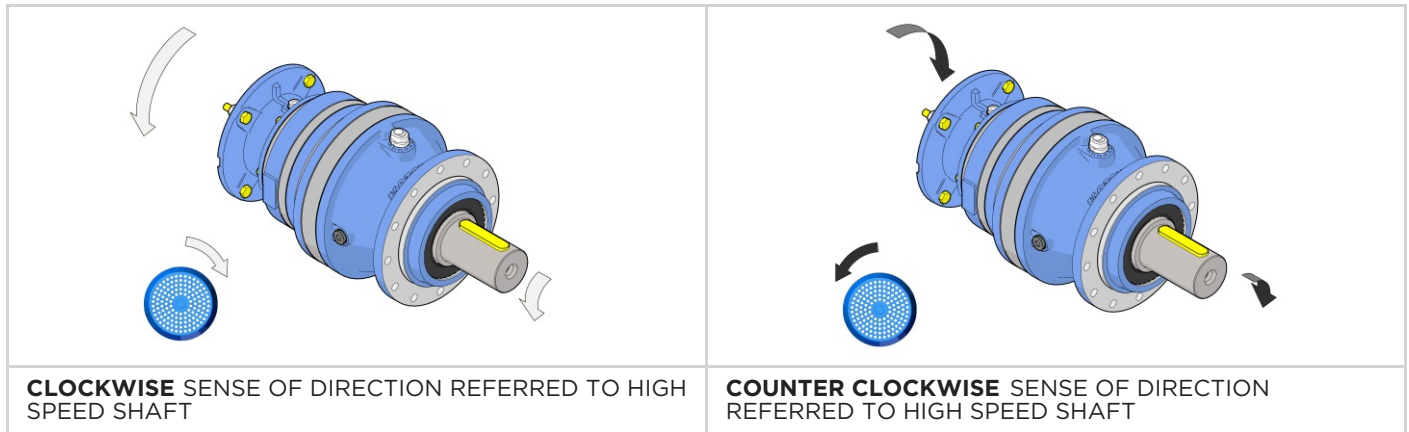
HPL	KI	KL	KH	G	G1	S
010	325	520	30	40	8	42
020	325	520	30	40	8	42
030	400	640	35	44	12	46
050	400	640	35	44	12	46
080	490	800	45	55	14	57
130	490	700	50	60	22	62
180	600	900	50	60	24	62

Suggested values.

6.5 BACKSTOP DEVICE

The gear reducer can be supplied with backstop device on input shaft. Backstop device allows output shaft rotation in only one sense of direction; according to the size, it is available in the input flange or in the motor with the same dimensions. It is important to specify the required sense of direction on the order. The backstop device is not available for mounting position V1/V5 with motor size IEC 100...225.

SENSE OF DIRECTION AVAILABLE



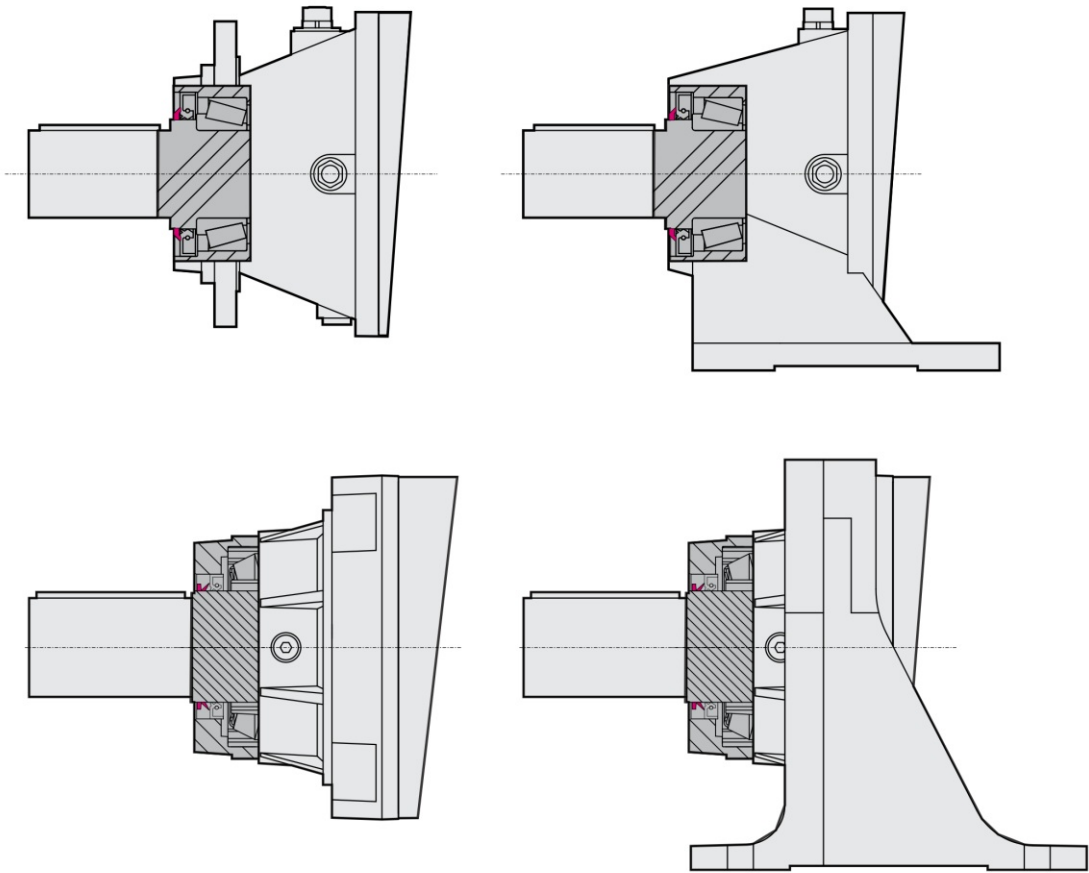
		71	80	90	100-112	132	160	180	200	225
		160x14	200x19	200x24	250x28	300x38	350x42	350x48	400x55	450x60
HL 1	010/020/030	/	/	/	B5	B5	B5	/	/	/
	050	/	/	/	/	/	B5	/	/	/
	HPL1 080	/	/	/	/	/	/	/	B5	/
	130	/	B5	B5	B5	B5	B5	B5	B5	/
	180/.../380	/	/	/	/	B5	B5	B5	B5	B5
HL 2	010	/	B5	B5	B5	B5	/	/	/	/
	020	/	B5	B5	B5	B5	B5	/	/	/
	030	/	/	B5	B5	B5	B5	/	/	/
	050/080	/	/	/	B5	B5	B5	/	/	/
	130/180	/	B5	B5	B5	B5	B5	B5	/	/
	220/380	/	B5	B5	B5	B5	B5	B5	B5	NO
HL 3	010	B5	B5	B5	/	/	/	/	/	/
	020/030	B5	B5	B5	B5	/	/	/	/	/
	050/080	/	B5	B5	B5	B5	B5	/	/	/
	130/380	B5	B5	B5	B5	B5	B5	B5	/	/
	220/380	B5	B5	B5	B5	B5	B5	B5	/	/
HL 4	020/030	B5	B5	/	/	/	/	/	/	/
	050	B5	B5	B5	/	/	/	/	/	/
	080	B5	B5	B5	B5	/	/	/	/	/
	130/.../380	B5	B5	B5	B5	B5	B5	/	/	/

6.6 REINFORCED OIL SEALS FOR OUTPUT SHAF.

TECHNICAL CATALOGUE

The reinforced seal can be done depending on the gearbox size by means through the standard oil seal with VRM ring or VR ring. The difference of the two solutions is explained on the drawings.

On request the gear reducer can be supplied with fluoroelastomer FPM (FKM) seals.



HPL	VR ring	VRM ring
010		x
020		x
030		x
050		x
080		x
130		x
180	x	

7.1 HL GEARED MOTORS

0,25 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
7,4	296	2,6	188	HL3 010	71A	4	23650	27000
6,4	341	2,8	216	HL3 010	71A	4	23650	27000
5,9	372	2,6	236	HL3 010	71A	4	23650	27000
4,7	468	2,1	297	HL3 010	71A	4	23800	27150
4,0	533	1,9	348	HL4 010	71A	4	24600	28100
3,7	582	1,5	369	HL3 010	71A	4	24700	28250
3,7	582	2,8	369	HL3 020	71A	4	24700	28250
3,2	663	1,6	433	HL4 010	71A	4	25000	28500
2,9	726	1,5	474	HL4 010	71A	4	25200	28800
2,9	726	2,8	474	HL4 020	71A	4	25200	28800
2,6	824	1,3	538	HL4 010	71A	4	25850	29300
2,6	824	2,6	538	HL4 020	71A	4	25850	29300
2,1	1024	1,1	668	HL4 010	71A	4	26200	29650
2,1	1024	2,1	668	HL4 020	71A	4	26200	29650
2,1	1024	2,8	668	HL4 030	71A	4	49750	57300
1,9	1133	1,0	740	HL4 010	71A	4	27000	30150
1,9	1133	2,0	740	HL4 020	71A	4	27000	30150
1,9	1133	2,5	740	HL4 030	71A	4	50500	58600
1,7	1242	0,9	811	HL4 010	71A	4	27300	30900
1,7	1242	1,8	811	HL4 020	71A	4	27300	30900
1,7	1272	2,1	831	HL4 030	71A	4	51400	59700
1,5	1408	1,6	919	HL4 020	71A	4	27400	31000
1,5	1408	2,0	919	HL4 030	71A	4	52150	60400
1,4	1559	1,5	1020	HL4 020	71A	4	27450	31050
1,4	1559	1,9	1020	HL4 030	71A	4	53000	61650
1,2	1773	1,4	1160	HL4 020	71A	4	27550	31200
1,2	1750	1,6	1140	HL4 030	71A	4	53600	62200
1,1	1937	1,3	1270	HL4 020	71A	4	27600	31350
1,1	1937	1,5	1270	HL4 030	71A	4	54800	63500
1,0	2204	1,3	1440	HL4 030	71A	4	55300	64200
1,0	2204	2,5	1440	HL4 050	71A	4	55300	64200
0,9	2439	1,0	1590	HL4 020	71A	4	27700	31800
0,9	2439	1,2	1590	HL4 030	71A	4	55850	65600
0,9	2439	2,4	1590	HL4 050	71A	4	55850	65600
0,8	2664	0,9	1740	HL4 020	71A	4	27800	32000
0,8	2664	1,0	1740	HL4 030	71A	4	56400	67100
0,8	2664	1,9	1740	HL4 050	71A	4	56400	67100
0,7	3031	0,9	1980	HL4 030	71A	4	56950	67750
0,7	3031	1,8	1980	HL4 050	71A	4	56950	67750
0,7	3204	2,7	2090	HL4 080	71A	4	78700	90700
0,6	3355	1,5	2190	HL4 050	71A	4	57500	68900
0,6	3494	1,3	2280	HL4 050	71A	4	57500	68900

7.1 HL GEARED MOTORS

0,25 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
0,6	3816	1,2	2490	HL4 050	71A		4	57500	68900
0,6	3471	2,9	2270	HL4 080	71A		4	79000	91100
0,6	3824	2,3	2500	HL4 080	71A		4	79000	91100
0,5	4170	1,3	2720	HL4 050	71A		4	58600	69800
0,5	4142	2,2	2710	HL4 080	71A		4	79500	91600
0,5	3843	2,9	2510	HL4 130	71A		4	95000	125000

0,37 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
10,2	317	2,8	138	HL3 010	71B		4	23200	26300
9,0	356	2,3	155	HL3 010	71B		4	23650	27000
8,1	400	2,3	174	HL3 010	71B		4	23650	27000
7,5	432	1,7	188	HL3 010	71B		4	23650	27000
6,5	497	1,9	216	HL3 010	71B		4	23650	27000
5,9	543	1,8	236	HL3 010	71B		4	23650	27000
4,7	683	1,4	297	HL3 010	71B		4	23800	27150
4,7	683	2,9	297	HL3 020	71B		4	23800	27150
4,5	712	2,8	309	HL3 030	71B		4	45550	52400
4,0	778	1,3	348	HL4 010	71B		4	24600	28100
4,0	778	2,6	348	HL4 020	71B		4	24600	28100
3,8	849	1,0	369	HL3 010	71B		4	24650	28150
3,8	849	1,9	369	HL3 020	71B		4	24650	28150
3,8	849	2,8	369	HL3 030	71B		4	46200	53650
3,3	979	2,1	425	HL3 030	71B		4	47100	54650
3,2	967	1,1	433	HL4 010	71B		4	25000	28500
3,2	967	2,1	433	HL4 020	71B		4	25000	28500
3,2	967	2,9	433	HL4 030	71B		4	47200	54800
3,0	1060	1,0	474	HL4 010	71B		4	25150	28600
3,0	1060	1,9	474	HL4 020	71B		4	25150	28600
3,0	1060	2,7	474	HL4 030	71B		4	47850	55100
2,6	1202	1,8	538	HL4 020	71B		4	25850	29300
2,6	1202	2,3	538	HL4 030	71B		4	48600	56450
2,1	1493	1,4	668	HL4 020	71B		4	26200	29650
2,1	1493	1,9	668	HL4 030	71B		4	49750	57300
1,9	1653	1,3	740	HL4 020	71B		4	27000	30150
1,9	1653	1,7	740	HL4 030	71B		4	50500	58600
1,7	1811	1,2	811	HL4 020	71B		4	27300	30900
1,7	1856	1,4	831	HL4 030	71B		4	51400	59700
1,7	1856	2,7	831	HL4 050	71B		4	51400	59700
1,5	2054	1,1	919	HL4 020	71B		4	27400	31000
1,5	2054	1,4	919	HL4 030	71B		4	52150	60400

7.1 HL GEARED MOTORS

0,37 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
1,5	2054	2,7	919	HL4 050	71B	4	52150	60400
1,4	2274	1,0	1020	HL4 020	71B	4	27450	31050
1,4	2274	1,3	1020	HL4 030	71B	4	53000	61650
1,4	2274	2,5	1020	HL4 050	71B	4	53000	61650
1,2	2587	0,9	1160	HL4 020	71B	4	27550	31200
1,2	2553	1,1	1140	HL4 030	71B	4	53600	62200
1,2	2553	2,1	1140	HL4 050	71B	4	53600	62200
1,1	2826	1,0	1270	HL4 030	71B	4	54800	63500
1,1	2826	2,0	1270	HL4 050	71B	4	54800	63500
1,0	3215	1,7	1440	HL4 050	71B	4	55300	64200
0,9	3559	1,6	1590	HL4 050	71B	4	55850	65600
0,9	3501	2,8	1570	HL4 080	71B	4	78000	90000
0,8	3887	1,3	1740	HL4 050	71B	4	56400	67100
0,8	4021	2,5	1800	HL4 080	71B	4	78300	90300
0,7	4422	1,2	1980	HL4 050	71B	4	56950	67750
0,7	4674	1,8	2090	HL4 080	71B	4	78700	90700
0,6	4895	1,0	2190	HL4 050	71B	4	57500	68900
0,6	5097	0,9	2280	HL4 050	71B	4	57500	68900
0,6	5064	2,0	2270	HL4 080	71B	4	79000	91100
0,6	5578	1,5	2500	HL4 080	71B	4	79000	91100
0,6	5606	2,0	2510	HL4 130	71B	4	92600	122000
0,5	6043	1,5	2710	HL4 080	71B	4	79500	91600

0,55 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
20,4	242	2,4	68,7	HL2 010	71C/80A	4	18400	20850
16,0	299	2,5	87,4	HL3 010	71C/80A	4	20200	22800
14,0	343	2,6	100	HL3 010	71C/80A	4	21200	24050
12,8	376	2,3	110	HL3 010	71C/80A	4	21900	24750
11,2	426	2,1	125	HL3 010	71C/80A	4	22650	25750
10,2	472	1,9	138	HL3 010	71C/80A	4	23200	26300
9,0	530	1,5	155	HL3 010	71C/80A	4	23650	27000
9,0	530	2,9	155	HL3 020	71C/80A	4	23650	27000
8,1	594	1,5	174	HL3 010	71C/80A	4	23650	27000
7,5	643	1,2	188	HL3 010	71C/80A	4	23650	27000
7,5	643	2,2	188	HL3 020	71C/80A	4	23650	27000
7,1	676	2,9	197	HL3 030	71C/80A	4	45100	51700
6,5	738	1,3	216	HL3 010	71C/80A	4	23650	27000
6,5	738	2,6	216	HL3 020	71C/80A	4	23650	27000
5,9	807	1,2	236	HL3 010	71C/80A	4	23650	27000
5,9	807	2,4	236	HL3 020	71C/80A	4	23650	27000

7.1 HL GEARED MOTORS

0,55 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Motor Size	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
5,6	851	2,3	249	HL3 030	71C/80A	4	45100	51700
4,8	1002	2,3	293	HL3 030	71C/80A	4	45300	52000
4,7	1016	0,9	297	HL3 010	71C/80A	4	23800	27150
4,7	1016	1,9	297	HL3 020	71C/80A	4	23800	27150
4,5	1058	1,9	309	HL3 030	71C/80A	4	45550	52400
4,0	1157	1,7	348	HL4 020	71C/80A	4	24600	28100
4,0	1157	2,4	348	HL4 030	71C/80A	4	46000	53450
3,8	1262	1,3	369	HL3 020	71C/80A	4	24650	28150
3,8	1262	1,9	369	HL3 030	71C/80A	4	46200	53650
3,3	1455	1,4	425	HL3 030	71C/80A	4	47100	54650
3,3	1455	2,7	425	HL3 050	71C/80A	4	47100	54650
3,2	1437	1,4	433	HL4 020	71C/80A	4	25000	28500
3,2	1437	2,0	433	HL4 030	71C/80A	4	47200	54800
3,0	1575	1,3	474	HL4 020	71C/80A	4	25150	28600
3,0	1575	1,8	474	HL4 030	71C/80A	4	47850	55100
2,6	1786	1,2	538	HL4 020	71C/80A	4	25850	29300
2,6	1786	1,6	538	HL4 030	71C/80A	4	48600	56450
2,1	2220	1,0	668	HL4 020	71C/80A	4	26200	29650
2,1	2220	1,3	668	HL4 030	71C/80A	4	49750	57300
2,1	2220	2,5	668	HL4 050	71C/80A	4	49750	57300
1,9	2457	0,9	740	HL4 020	71C/80A	4	27000	30150
1,9	2457	1,2	740	HL4 030	71C/80A	4	50500	58600
1,9	2457	2,3	740	HL4 050	71C/80A	4	50500	58600
1,7	2759	0,9	831	HL4 030	71C/80A	4	51400	59700
1,7	2759	1,8	831	HL4 050	71C/80A	4	51400	59700
1,5	3053	0,9	919	HL4 030	71C/80A	4	52150	60400
1,5	3053	1,8	919	HL4 050	71C/80A	4	52150	60400
1,4	3380	1,7	1020	HL4 050	71C/80A	4	53000	61650
1,2	3795	1,4	1140	HL4 050	71C/80A	4	53600	62200
1,2	3783	2,5	1140	HL4 080	71C/80A	4	75450	87100
1,1	4200	1,4	1270	HL4 050	71C/80A	4	54800	63500
1,1	4188	2,4	1260	HL4 080	71C/80A	4	76400	88500
1,0	4779	1,1	1440	HL4 050	71C/80A	4	55300	64200
1,0	4748	2,1	1430	HL4 080	71C/80A	4	77500	89400
0,9	5290	1,1	1590	HL4 050	71C/80A	4	55850	65600
0,9	5204	1,9	1570	HL4 080	71C/80A	4	78000	90000
0,9	5173	2,9	1560	HL4 130	71C/80A	4	86500	114400
0,8	5977	1,7	1800	HL4 080	71C/80A	4	78300	90300
0,8	5883	2,5	1770	HL4 130	71C/80A	4	88000	116100
0,7	6948	1,2	2090	HL4 080	71C/80A	4	78700	90700
0,7	6429	2,3	1940	HL4 130	71C/80A	4	89100	117800
0,6	7527	1,3	2270	HL4 080	71C/80A	4	79000	91100

7.1 HL GEARED MOTORS

0,55 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
0,6	8292	1,0	2500	HL4 080	71C/80A	4	79000	91100
0,6	8333	1,3	2510	HL4 130	71C/80A	4	92600	122000
0,6	8333	2,0	2510	HL4 180	71C/80A	4	94400	122000
0,5	8983	1,0	2710	HL4 080	71C/80A	4	79500	91600

0,75 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
28,8	234	2,9	49,9	HL2 010	80B	4	16950	19250
22,4	292	2,9	64,2	HL3 010	80B	4	18200	20550
21,0	321	1,8	68,7	HL2 010	80B	4	18350	20750
17,9	366	2,3	80,6	HL3 010	80B	4	19600	22250
16,5	397	1,8	87,4	HL3 010	80B	4	20200	22800
14,4	455	1,9	100	HL3 010	80B	4	21000	23800
13,1	498	1,7	110	HL3 010	80B	4	21700	24500
11,6	565	1,5	125	HL3 010	80B	4	22450	25500
10,4	626	1,4	138	HL3 010	80B	4	23050	26150
10,4	626	2,8	138	HL3 020	80B	4	23050	26150
9,3	702	1,1	155	HL3 010	80B	4	23650	27000
9,3	702	2,1	155	HL3 020	80B	4	23650	27000
8,3	788	1,1	174	HL3 010	80B	4	23650	27000
8,3	788	2,3	174	HL3 020	80B	4	23650	27000
7,7	852	1,6	188	HL3 020	80B	4	23650	27000
7,3	896	2,1	197	HL3 030	80B	4	45100	51700
6,7	979	0,9	216	HL3 010	80B	4	23650	27000
6,7	979	1,9	216	HL3 020	80B	4	23650	27000
6,7	979	2,7	216	HL3 030	80B	4	45100	51700
6,1	1069	1,7	236	HL3 020	80B	4	23650	27000
5,8	1128	1,7	249	HL3 030	80B	4	45100	51700
4,9	1347	1,4	297	HL3 020	80B	4	23700	27050
4,9	1329	1,7	293	HL3 030	80B	4	45200	51850
4,7	1402	1,4	309	HL3 030	80B	4	45350	52100
4,7	1402	2,6	309	HL3 050	80B	4	45350	52100
4,1	1534	1,3	348	HL4 020	80B	4	24200	27650
4,1	1534	1,8	348	HL4 030	80B	4	45900	53250
3,9	1674	0,9	369	HL3 020	80B	4	24600	28100
3,9	1674	1,4	369	HL3 030	80B	4	46100	53550
3,9	1674	2,7	369	HL3 050	80B	4	46100	53550
3,5	1857	3,0	409	HL3 080	80B	4	65100	75150
3,4	1929	1,0	425	HL3 030	80B	4	47000	54500
3,4	1929	2,0	425	HL3 050	80B	4	47000	54500
3,3	1906	1,0	433	HL4 020	80B	4	24900	28400

7.1 HL GEARED MOTORS

0,75 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
3,3	1906	1,4	433	HL4 030	80B		4	47100	54650
3,3	1906	2,8	433	HL4 050	80B		4	47100	54650
3,0	2088	0,9	474	HL4 020	80B		4	25150	28600
3,0	2088	1,3	474	HL4 030	80B		4	47850	55100
3,0	2088	2,6	474	HL4 050	80B		4	47850	55100
2,7	2368	1,2	538	HL4 030	80B		4	48450	56100
2,7	2368	2,3	538	HL4 050	80B		4	48450	56100
2,2	2943	0,9	668	HL4 030	80B		4	49500	57200
2,2	2943	1,8	668	HL4 050	80B		4	49500	57200
2,0	3205	3,0	728	HL4 080	80B		4	70300	81150
1,9	3258	1,7	740	HL4 050	80B		4	50500	58600
1,7	3657	1,4	831	HL4 050	80B		4	51400	59700
1,7	3633	2,5	825	HL4 080	80B		4	72250	83400
1,6	4048	1,3	919	HL4 050	80B		4	51800	60050
1,6	3983	2,3	905	HL4 080	80B		4	72650	83900
1,4	4481	1,2	1020	HL4 050	80B		4	53000	61650
1,4	4408	2,2	1000	HL4 080	80B		4	74600	86150
1,3	5031	1,0	1140	HL4 050	80B		4	53300	62000
1,3	5016	1,8	1140	HL4 080	80B		4	75050	86650
1,3	4986	2,8	1130	HL4 130	80B		4	82300	107700
1,2	5446	2,6	1240	HL4 130	80B		4	83000	109300
1,1	5569	1,0	1270	HL4 050	80B		4	54800	63500
1,1	5552	1,8	1260	HL4 080	80B		4	76400	88500
1,0	6294	1,5	1430	HL4 080	80B		4	77500	89400
1,0	6196	2,3	1410	HL4 130	80B		4	85100	112000
0,9	6899	1,4	1570	HL4 080	80B		4	78000	90000
0,9	6858	2,1	1560	HL4 130	80B		4	86500	114400
0,8	7924	1,2	1800	HL4 080	80B		4	78300	90300
0,8	7800	1,8	1770	HL4 130	80B		4	88000	116100
0,8	7800	2,4	1770	HL4 180	80B		4	90300	116100
0,7	9211	0,9	2090	HL4 080	80B		4	78700	90700
0,7	8523	1,7	1940	HL4 130	80B		4	89100	117800
0,7	8523	2,5	1940	HL4 180	80B		4	91200	117800
0,6	9979	1,0	2270	HL4 080	80B		4	79000	91100
0,6	11048	1,0	2510	HL4 130	80B		4	92600	122000
0,6	11048	1,5	2510	HL4 180	80B		4	94400	122000

1,10 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
36,1	274	2,4	39,6	HL2 010	90S		4	15900	18000
28,6	345	2,0	49,9	HL2 010	90S		4	17000	19350

7.1 HL GEARED MOTORS

1,10 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
28,0	343	2,5	51,2	HL3 010	90S	4	17150	19500
22,3	431	2,0	64,2	HL3 010	90S	4	18200	20550
20,8	475	1,2	68,7	HL2 010	90S	4	18400	20850
20,8	475	2,4	68,7	HL2 020	90S	4	18400	20850
17,7	540	1,6	80,6	HL3 010	90S	4	19600	22250
16,4	586	1,3	87,4	HL3 010	90S	4	20200	22800
16,4	586	2,4	87,4	HL3 020	90S	4	20200	22800
14,3	672	1,3	100	HL3 010	90S	4	21100	23900
14,3	672	2,6	100	HL3 020	90S	4	21100	23900
13,0	736	1,2	110	HL3 010	90S	4	21750	24600
13,0	736	2,4	110	HL3 020	90S	4	21750	24600
12,5	766	2,5	114	HL3 030	90S	4	40450	46900
11,5	835	1,0	125	HL3 010	90S	4	22500	25600
11,5	835	2,1	125	HL3 020	90S	4	22500	25600
10,4	924	0,9	138	HL3 010	90S	4	23050	26150
10,4	924	1,9	138	HL3 020	90S	4	23050	26150
10,4	924	2,8	138	HL3 030	90S	4	43350	50300
9,2	1037	1,4	155	HL3 020	90S	4	23650	27000
9,2	1037	2,1	155	HL3 030	90S	4	45100	51700
8,3	1148	2,3	171	HL3 030	90S	4	45100	51700
8,2	1164	1,5	174	HL3 020	90S	4	23650	27000
7,6	1258	1,1	188	HL3 020	90S	4	23650	27000
7,2	1323	1,5	197	HL3 030	90S	4	45100	51700
7,2	1323	2,8	197	HL3 050	90S	4	45100	51700
6,6	1446	1,3	216	HL3 020	90S	4	23650	27000
6,6	1446	1,9	216	HL3 030	90S	4	45100	51700
6,1	1579	1,2	236	HL3 020	90S	4	23650	27000
5,8	1667	1,2	249	HL3 030	90S	4	45100	51700
5,8	1667	2,2	249	HL3 050	90S	4	45100	51700
4,9	1963	1,1	293	HL3 030	90S	4	45200	51850
4,9	1963	2,2	293	HL3 050	90S	4	45200	51850
4,8	1989	1,0	297	HL3 020	90S	4	23750	27100
4,6	2071	0,9	309	HL3 030	90S	4	45450	52250
4,6	2071	1,8	309	HL3 050	90S	4	45450	52250
4,1	2265	1,2	348	HL4 030	90S	4	45900	53250
4,1	2265	2,4	348	HL4 050	90S	4	45900	53250
4,0	2392	2,8	357	HL3 080	90S	4	64600	74400
3,9	2472	0,9	369	HL3 030	90S	4	46100	53550
3,9	2472	1,8	369	HL3 050	90S	4	46100	53550
3,5	2742	2,0	409	HL3 080	90S	4	65100	75150
3,4	2849	1,3	425	HL3 050	90S	4	47000	54500
3,3	2815	1,0	433	HL4 030	90S	4	47100	54650

7.1 HL GEARED MOTORS

1,10 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
3,3	2815	1,9	433	HL4 050	90S		4	47100	54650
3,0	3084	1,7	474	HL4 050	90S		4	47850	55100
2,7	3498	1,5	538	HL4 050	90S		4	48450	56100
2,7	3441	2,8	529	HL4 080	90S		4	67750	78150
2,4	3809	2,5	586	HL4 080	90S		4	69100	79750
2,2	4276	2,1	658	HL4 080	90S		4	69600	80250
2,1	4346	1,2	668	HL4 050	90S		4	49750	57300
2,0	4733	2,0	728	HL4 080	90S		4	70300	81150
1,9	4811	1,1	740	HL4 050	90S		4	50500	58600
1,8	5282	2,5	812	HL4 130	90S		4	78300	103100
1,7	5401	0,9	831	HL4 050	90S		4	51400	59700
1,7	5366	1,7	825	HL4 080	90S		4	72250	83400
1,6	5979	0,9	919	HL4 050	90S		4	51800	60050
1,6	5882	1,6	905	HL4 080	90S		4	72650	83900
1,6	5847	2,3	899	HL4 130	90S		4	80000	104800
1,5	6267	2,4	964	HL4 130	90S		4	81000	105900
1,5	6371	2,5	980	HL4 180	90S		4	82100	105900
1,4	6511	1,5	1000	HL4 080	90S		4	74600	86150
1,3	7408	1,3	1140	HL4 080	90S		4	75050	86650
1,3	7364	1,9	1130	HL4 130	90S		4	82300	107700
1,3	7364	2,8	1130	HL4 180	90S		4	84000	107700
1,2	8043	1,8	1240	HL4 130	90S		4	83000	109300
1,2	8043	2,6	1240	HL4 180	90S		4	84900	109300
1,1	8200	1,2	1260	HL4 080	90S		4	76400	88500
1,0	9296	1,0	1430	HL4 080	90S		4	77500	89400
1,0	9151	1,6	1410	HL4 130	90S		4	85100	112000
1,0	9151	2,4	1410	HL4 180	90S		4	87100	112000
0,9	10190	0,9	1570	HL4 080	90S		4	78000	90000
0,9	10129	1,4	1560	HL4 130	90S		4	86500	114400
0,9	10129	2,1	1560	HL4 180	90S		4	88500	114400
0,8	11520	1,3	1770	HL4 130	90S		4	88000	116100
0,8	11520	1,6	1770	HL4 180	90S		4	90300	116100
0,7	12587	1,2	1940	HL4 130	90S		4	89100	117800
0,7	12587	1,7	1940	HL4 180	90S		4	91200	117800
0,6	16317	1,0	2510	HL4 180	90S		4	94400	122000

1,50 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
49,6	272	2,3	28,8	HL2 010	90L		4	14650	16550
44,8	301	2,8	31,9	HL2 010	90L		4	15050	17950
36,1	374	1,8	39,6	HL2 010	90L		4	15900	18000

7.1 HL GEARED MOTORS

1,50 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
35,6	379	2,2	40,2	HL2 010	90L	4	15900	18000
28,6	471	1,4	49,9	HL2 010	90L	4	17000	19350
28,6	471	3,0	49,9	HL2 020	90L	4	17000	19350
28,0	468	1,8	51,2	HL3 010	90L	4	17150	19500
22,3	587	1,4	64,2	HL3 010	90L	4	18200	20550
22,3	587	2,9	64,2	HL3 020	90L	4	18200	20550
20,8	647	1,8	68,7	HL2 020	90L	4	18400	20850
19,5	670	2,8	73,3	HL3 030	90L	4	35550	41300
17,7	737	1,2	80,6	HL3 010	90L	4	19600	22250
17,7	737	2,3	80,6	HL3 020	90L	4	19600	22250
16,4	799	0,9	87,4	HL3 010	90L	4	20200	22800
16,4	799	1,8	87,4	HL3 020	90L	4	20200	22800
15,5	841	2,3	92,0	HL3 030	90L	4	37900	43900
14,3	916	0,9	100	HL3 010	90L	4	21100	23900
14,3	916	1,9	100	HL3 020	90L	4	21100	23900
14,3	916	2,8	100	HL3 030	90L	4	39200	45500
13,0	1004	1,7	110	HL3 020	90L	4	21750	24600
12,5	1045	1,8	114	HL3 030	90L	4	40450	46900
11,5	1138	1,5	125	HL3 020	90L	4	22500	25600
11,5	1138	2,3	125	HL3 030	90L	4	41750	48450
10,4	1260	1,4	138	HL3 020	90L	4	23050	26150
10,4	1260	2,1	138	HL3 030	90L	4	43350	50300
9,2	1414	1,0	155	HL3 020	90L	4	23650	27000
9,2	1414	1,6	155	HL3 030	90L	4	45100	51700
8,3	1566	1,7	171	HL3 030	90L	4	45100	51700
8,2	1587	1,1	174	HL3 020	90L	4	23650	27000
7,2	1805	1,1	197	HL3 030	90L	4	45100	51700
7,2	1805	2,0	197	HL3 050	90L	4	45100	51700
6,6	1972	0,9	216	HL3 020	90L	4	23650	27000
6,6	1972	1,4	216	HL3 030	90L	4	45100	51700
6,6	1972	2,7	216	HL3 050	90L	4	45100	51700
5,8	2273	1,6	249	HL3 050	90L	4	45100	51700
4,9	2676	1,6	293	HL3 050	90L	4	45200	51850
4,7	2806	2,9	307	HL3 080	90L	4	63250	73050
4,6	2824	1,3	309	HL3 050	90L	4	45450	52250
4,2	3106	2,8	340	HL3 130	90L	4	70150	91100
4,1	3089	1,7	348	HL4 050	90L	4	45900	53250
4,0	3262	2,1	357	HL3 080	90L	4	64600	74400
3,9	3371	1,4	369	HL3 050	90L	4	46100	53550
3,6	3505	2,3	395	HL4 080	90L	4	65050	75000
3,5	3739	1,5	409	HL3 080	90L	4	65100	75150
3,4	3885	1,0	425	HL3 050	90L	4	47000	54500

7.1 HL GEARED MOTORS

1,50 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
3,3	3838	1,4	433	HL4 050	90L	4	47100	54650
3,1	4137	2,3	467	HL4 080	90L	4	66150	76300
3,0	4205	1,3	474	HL4 050	90L	4	47850	55100
2,7	4770	1,1	538	HL4 050	90L	4	48450	56100
2,7	4692	2,1	529	HL4 080	90L	4	67750	78150
2,5	5000	2,9	564	HL4 130	90L	4	75150	98300
2,4	5194	1,9	586	HL4 080	90L	4	69100	79750
2,3	5613	2,6	633	HL4 130	90L	4	75700	99600
2,2	5831	1,6	658	HL4 080	90L	4	69600	80250
2,1	5927	0,9	668	HL4 050	90L	4	49750	57300
2,0	6454	1,5	728	HL4 080	90L	4	70300	81150
2,0	6213	2,4	701	HL4 130	90L	4	77100	101600
1,8	7203	1,8	812	HL4 130	90L	4	78300	103100
1,8	7203	2,7	812	HL4 180	90L	4	80100	103100
1,7	7317	1,2	825	HL4 080	90L	4	72250	83400
1,6	8021	1,1	905	HL4 080	90L	4	72650	83900
1,6	7973	1,7	899	HL4 130	90L	4	80000	104800
1,6	7973	2,5	899	HL4 180	90L	4	81600	104800
1,5	8546	1,8	964	HL4 130	90L	4	81000	105900
1,5	8688	1,8	980	HL4 180	90L	4	82100	105900
1,4	8879	1,1	1000	HL4 080	90L	4	74600	86150
1,3	10101	0,9	1140	HL4 080	90L	4	75050	86650
1,3	10041	1,4	1130	HL4 130	90L	4	82300	107700
1,3	10041	2,1	1130	HL4 180	90L	4	84000	107700
1,2	10968	1,3	1240	HL4 130	90L	4	83000	109300
1,2	10968	1,9	1240	HL4 180	90L	4	84900	109300
1,0	12478	1,2	1410	HL4 130	90L	4	85100	112000
1,0	12478	1,7	1410	HL4 180	90L	4	87100	112000
0,9	13812	1,1	1560	HL4 130	90L	4	86500	114400
0,9	13812	1,6	1560	HL4 180	90L	4	88500	114400
0,8	15709	0,9	1770	HL4 130	90L	4	88000	116100
0,8	15709	1,2	1770	HL4 180	90L	4	90300	116100
0,7	17164	1,3	1940	HL4 180	90L	4	91200	117800

2,20 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
154,8	132	2,4	9,30	HL1 010	100LA/112MR	4	10200	11500
77,2	256	3,0	18,7	HL2 010	100LA/112MR	4	12400	14150
62,1	318	2,5	23,2	HL2 010	100LA/112MR	4	13650	15500
50,0	396	1,6	28,8	HL2 010	100LA/112MR	4	14600	16500
45,1	438	1,9	31,9	HL2 010	100LA/112MR	4	15050	17950

7.1 HL GEARED MOTORS

2,20 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Motor Size	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
36,3	544	1,2	39,6	HL2 010	100LA/112MR	4	15900	18000
36,3	544	2,5	39,6	HL2 020	100LA/112MR	4	15900	18000
35,8	551	1,5	40,2	HL2 010	100LA/112MR	4	15900	18000
35,8	551	2,4	40,2	HL2 020	100LA/112MR	4	15900	18000
31,5	627	2,9	45,7	HL2 030	100LA/112MR	4	30200	35000
28,8	685	1,0	49,9	HL2 010	100LA/112MR	4	16950	19250
28,8	685	2,0	49,9	HL2 020	100LA/112MR	4	16950	19250
28,1	681	1,2	51,2	HL3 010	100LA/112MR	4	17150	19500
28,1	681	2,4	51,2	HL3 020	100LA/112MR	4	17150	19500
25,0	790	2,4	57,5	HL2 030	100LA/112MR	4	33000	38350
22,4	855	1,0	64,2	HL3 010	100LA/112MR	4	18200	20550
22,4	855	1,9	64,2	HL3 020	100LA/112MR	4	18200	20550
22,4	855	3,0	64,2	HL3 030	100LA/112MR	4	33950	39400
21,0	943	1,2	68,7	HL2 020	100LA/112MR	4	18350	20750
19,7	976	1,9	73,3	HL3 030	100LA/112MR	4	35400	41100
17,9	1073	1,6	80,6	HL3 020	100LA/112MR	4	19600	22250
17,9	1073	2,4	80,6	HL3 030	100LA/112MR	4	37000	42900
16,5	1164	1,2	87,4	HL3 020	100LA/112MR	4	20200	22800
15,7	1225	1,5	92,0	HL3 030	100LA/112MR	4	37700	43700
15,7	1225	2,9	92,0	HL3 050	100LA/112MR	4	37700	43700
14,4	1334	1,3	100	HL3 020	100LA/112MR	4	21000	23800
14,4	1334	1,9	100	HL3 030	100LA/112MR	4	39100	45400
13,1	1462	1,2	110	HL3 020	100LA/112MR	4	21700	24500
12,6	1522	1,3	114	HL3 030	100LA/112MR	4	40300	46750
12,6	1522	2,4	114	HL3 050	100LA/112MR	4	40300	46750
11,6	1658	1,0	125	HL3 020	100LA/112MR	4	22450	25500
11,6	1658	1,6	125	HL3 030	100LA/112MR	4	41600	48300
10,4	1835	0,9	138	HL3 020	100LA/112MR	4	23050	26150
10,4	1835	1,4	138	HL3 030	100LA/112MR	4	43350	50300
10,4	1835	2,8	138	HL3 050	100LA/112MR	4	43350	50300
9,3	2060	1,1	155	HL3 030	100LA/112MR	4	45100	51700
9,3	2060	2,1	155	HL3 050	100LA/112MR	4	45100	51700
8,4	2280	1,2	171	HL3 030	100LA/112MR	4	45100	51700
8,4	2280	2,3	171	HL3 050	100LA/112MR	4	45100	51700
7,4	2586	2,9	194	HL3 080	100LA/112MR	4	62700	72500
7,3	2628	1,4	197	HL3 050	100LA/112MR	4	45100	51700
6,8	2815	2,8	211	HL3 080	100LA/112MR	4	62700	72500
6,7	2872	0,9	216	HL3 030	100LA/112MR	4	45100	51700
6,7	2872	1,8	216	HL3 050	100LA/112MR	4	45100	51700
6,2	3086	2,1	232	HL3 080	100LA/112MR	4	62700	72500
5,9	3245	2,5	244	HL3 080	100LA/112MR	4	62700	72500
5,8	3310	1,1	249	HL3 050	100LA/112MR	4	45100	51700

7.1 HL GEARED MOTORS

2,20 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Motor Size	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
5,4	3545	2,3	266	HL3 080	100LA/112MR	4	62700	72500
5,0	3873	2,1	291	HL3 080	100LA/112MR	4	62700	72500
5,0	3812	2,9	286	HL3 130	100LA/112MR	4	67500	88800
4,9	3898	1,1	293	HL3 050	100LA/112MR	4	45200	51850
4,7	4086	2,0	307	HL3 080	100LA/112MR	4	63250	73050
4,2	4524	1,9	340	HL3 130	100LA/112MR	4	70150	91100
4,2	4524	2,9	340	HL3 180	100LA/112MR	4	70700	91100
4,1	4498	1,2	348	HL4 050	100LA/112MR	4	45900	53250
4,0	4750	1,4	357	HL3 080	100LA/112MR	4	64600	74400
3,9	4909	0,9	369	HL3 050	100LA/112MR	4	46100	53550
3,6	5104	1,5	395	HL4 080	100LA/112MR	4	65050	75000
3,5	5446	1,0	409	HL3 080	100LA/112MR	4	65100	75150
3,5	5294	2,7	410	HL4 130	100LA/112MR	4	70900	93500
3,3	5590	1,0	433	HL4 050	100LA/112MR	4	47100	54650
3,2	5800	2,5	449	HL4 130	100LA/112MR	4	71800	94500
3,1	6026	1,6	467	HL4 080	100LA/112MR	4	66150	76300
2,8	6578	2,2	509	HL4 130	100LA/112MR	4	73550	96500
2,7	6834	1,4	529	HL4 080	100LA/112MR	4	67750	78150
2,6	7282	2,0	564	HL4 130	100LA/112MR	4	74450	97600
2,6	7282	2,8	564	HL4 180	100LA/112MR	4	76000	97600
2,5	7565	1,3	586	HL4 080	100LA/112MR	4	68650	79200
2,3	8175	1,8	633	HL4 130	100LA/112MR	4	75700	99600
2,2	8493	1,1	658	HL4 080	100LA/112MR	4	69600	80250
2,2	8442	2,2	654	HL4 180	100LA/112MR	4	77800	100200
2,1	9049	1,6	701	HL4 130	100LA/112MR	4	76500	100700
2,1	9049	2,3	701	HL4 180	100LA/112MR	4	78200	100700
2,0	9401	1,0	728	HL4 080	100LA/112MR	4	70300	81150
1,8	10491	1,3	812	HL4 130	100LA/112MR	4	78300	103100
1,8	10491	1,9	812	HL4 180	100LA/112MR	4	80100	103100
1,6	11613	1,2	899	HL4 130	100LA/112MR	4	80000	104800
1,6	11613	1,7	899	HL4 180	100LA/112MR	4	81600	104800
1,5	12447	1,2	964	HL4 130	100LA/112MR	4	81000	105900
1,5	12653	1,2	980	HL4 180	100LA/112MR	4	82100	105900
1,3	14625	1,0	1130	HL4 130	100LA/112MR	4	82300	107700
1,3	14625	1,4	1130	HL4 180	100LA/112MR	4	84000	107700
1,2	15974	1,3	1240	HL4 180	100LA/112MR	4	84900	109300
1,0	18174	1,2	1410	HL4 180	100LA/112MR	4	87100	112000
0,9	20117	1,1	1560	HL4 180	100LA/112MR	4	88500	114400

7.1 HL GEARED MOTORS

3,00 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
155,9	178	1,7	9,30	HL1 010	112MS		4	10200	11500
97,5	276	2,7	14,9	HL2 010	112MS		4	11700	13200
77,7	347	2,2	18,7	HL2 010	112MS		4	12350	14100
62,5	431	1,8	23,2	HL2 010	112MS		4	13600	15450
50,3	536	1,2	28,8	HL2 010	112MS		4	14600	16500
50,3	536	2,4	28,8	HL2 020	112MS		4	14600	16500
45,5	593	1,4	31,9	HL2 010	112MS		4	15050	17950
45,5	593	2,6	31,9	HL2 020	112MS		4	15050	17950
43,7	617	2,9	33,2	HL2 030	112MS		4	27750	32150
36,6	737	1,8	39,6	HL2 020	112MS		4	15850	17950
36,6	737	2,8	39,6	HL2 030	112MS		4	29350	33850
36,1	747	1,1	40,2	HL2 010	112MS		4	15900	18000
36,1	747	1,7	40,2	HL2 020	112MS		4	15900	18000
31,7	849	2,1	45,7	HL2 030	112MS		4	30150	34950
29,0	928	1,5	49,9	HL2 020	112MS		4	16950	19250
28,3	922	0,9	51,2	HL3 010	112MS		4	17100	19450
28,3	922	1,8	51,2	HL3 020	112MS		4	17100	19450
28,3	922	2,7	51,2	HL3 030	112MS		4	31600	36650
25,2	1070	1,7	57,5	HL2 030	112MS		4	33000	38350
22,6	1158	1,4	64,2	HL3 020	112MS		4	17900	20300
22,6	1158	2,2	64,2	HL3 030	112MS		4	33850	39250
19,8	1321	1,4	73,3	HL3 030	112MS		4	35300	41000
19,8	1321	2,7	73,3	HL3 050	112MS		4	35300	41000
18,0	1454	1,1	80,6	HL3 020	112MS		4	19600	22250
18,0	1454	1,7	80,6	HL3 030	112MS		4	36900	42800
15,8	1659	1,1	92,0	HL3 030	112MS		4	37700	43700
15,8	1659	2,1	92,0	HL3 050	112MS		4	37700	43700
14,5	1807	1,0	100	HL3 020	112MS		4	21000	23800
14,5	1807	1,4	100	HL3 030	112MS		4	39000	45300
14,5	1807	2,7	100	HL3 050	112MS		4	39000	45300
12,7	2061	0,9	114	HL3 030	112MS		4	40250	46650
12,7	2061	1,7	114	HL3 050	112MS		4	40250	46650
11,6	2245	1,1	125	HL3 030	112MS		4	41600	48300
11,6	2245	2,3	125	HL3 050	112MS		4	41600	48300
10,5	2485	1,0	138	HL3 030	112MS		4	43100	50050
10,5	2485	2,1	138	HL3 050	112MS		4	43100	50050
10,2	2571	3,0	143	HL3 080	112MS		4	62150	71850
9,4	2790	1,5	155	HL3 050	112MS		4	45100	51700
8,6	3038	2,8	168	HL3 080	112MS		4	62700	72500
8,5	3088	1,7	171	HL3 050	112MS		4	45100	51700
7,5	3502	2,1	194	HL3 080	112MS		4	62700	72500
7,3	3559	1,0	197	HL3 050	112MS		4	45100	51700

7.1 HL GEARED MOTORS

3,00 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
7,0	3753	2,8	208	HL3 130	112MS		4	67500	88800
6,9	3813	2,1	211	HL3 080	112MS		4	62700	72500
6,7	3889	1,3	216	HL3 050	112MS		4	45100	51700
6,5	4023	3,0	223	HL3 130	112MS		4	67500	88800
6,3	4179	1,6	232	HL3 080	112MS		4	62700	72500
6,0	4394	1,8	244	HL3 080	112MS		4	62700	72500
6,0	4326	2,5	240	HL3 130	112MS		4	67500	88800
5,4	4801	1,7	266	HL3 080	112MS		4	62700	72500
5,1	5162	2,1	286	HL3 130	112MS		4	67500	88800
5,1	5134	2,5	285	HL3 180	112MS		4	69000	88800
5,0	5244	1,5	291	HL3 080	112MS		4	62700	72500
4,7	5534	1,5	307	HL3 080	112MS		4	63250	73050
4,4	5769	2,5	330	HL4 130	112MS		4	68800	90500
4,3	6127	1,4	340	HL3 130	112MS		4	69000	90700
4,3	6127	2,1	340	HL3 180	112MS		4	70500	90700
4,1	6433	1,0	357	HL3 080	112MS		4	64400	74200
4,1	6257	2,3	358	HL4 130	112MS		4	70250	91500
3,7	6912	1,1	395	HL4 080	112MS		4	64950	74900
3,5	7169	2,0	410	HL4 130	112MS		4	70900	93500
3,5	7169	2,7	410	HL4 180	112MS		4	72550	93500
3,2	7855	1,8	449	HL4 130	112MS		4	71800	94500
3,2	7855	2,5	449	HL4 180	112MS		4	73500	94500
3,1	8161	1,2	467	HL4 080	112MS		4	66150	76300
2,8	8909	1,6	509	HL4 130	112MS		4	73550	96500
2,8	8909	2,3	509	HL4 180	112MS		4	75150	96500
2,7	9255	1,0	529	HL4 080	112MS		4	67750	78150
2,6	9861	1,5	564	HL4 130	112MS		4	74450	97600
2,6	9861	2,1	564	HL4 180	112MS		4	76000	97600
2,5	10245	0,9	586	HL4 080	112MS		4	68650	79200
2,3	11071	1,3	633	HL4 130	112MS		4	75700	99600
2,2	11433	1,6	654	HL4 180	112MS		4	77800	100200
2,1	12254	1,2	701	HL4 130	112MS		4	76500	100700
2,1	12254	1,7	701	HL4 180	112MS		4	78200	100700
1,8	14207	0,9	812	HL4 130	112MS		4	78300	103100
1,8	14207	1,4	812	HL4 180	112MS		4	80100	103100
1,6	15726	1,2	899	HL4 180	112MS		4	81600	104800
1,5	17136	0,9	980	HL4 180	112MS		4	82100	105900
1,3	19805	1,0	1130	HL4 180	112MS		4	84000	107700
1,2	21633	1,0	1240	HL4 180	112MS		4	84900	109300

7.1 HL GEARED MOTORS

4,00 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
196,4	189	2,3	7,38	HL1 010	112M	4	9400	10650
155,9	238	1,3	9,30	HL1 010	112M	4	10200	11500
155,9	238	2,6	9,30	HL1 020	112M	4	10200	11500
122,4	294	2,3	11,8	HL2 010	112M	4	10900	12300
97,5	368	2,0	14,9	HL2 010	112M	4	11700	13200
77,7	463	1,6	18,7	HL2 010	112M	4	12350	14100
62,5	575	1,4	23,2	HL2 010	112M	4	13600	15450
62,5	575	2,5	23,2	HL2 020	112M	4	13600	15450
54,2	663	2,7	26,7	HL2 030	112M	4	25700	29950
50,3	714	1,8	28,8	HL2 020	112M	4	14600	16500
50,3	714	2,9	28,8	HL2 030	112M	4	26200	30400
45,5	791	1,0	31,9	HL2 010	112M	4	15050	17950
45,5	791	2,0	31,9	HL2 020	112M	4	15050	17950
45,5	791	2,3	31,9	HL2 030	112M	4	27400	31750
43,7	823	2,2	33,2	HL2 030	112M	4	27750	32150
36,6	983	1,4	39,6	HL2 020	112M	4	15850	17950
36,6	983	2,1	39,6	HL2 030	112M	4	29350	33850
36,1	996	1,3	40,2	HL2 020	112M	4	15900	18000
31,7	1133	1,6	45,7	HL2 030	112M	4	30150	34950
29,0	1237	1,1	49,9	HL2 020	112M	4	16950	19250
28,3	1230	1,3	51,2	HL3 020	112M	4	17100	19450
28,3	1230	2,0	51,2	HL3 030	112M	4	31600	36650
25,2	1426	1,3	57,5	HL2 030	112M	4	33000	38350
25,2	1426	2,5	57,5	HL2 050	112M	4	33000	38350
22,6	1544	1,1	64,2	HL3 020	112M	4	17900	20300
22,6	1544	1,6	64,2	HL3 030	112M	4	33850	39250
22,6	1544	3,0	64,2	HL3 050	112M	4	33850	39250
20,8	1729	3,0	69,8	HL2 080	112M	4	49900	57600
19,8	1762	1,1	73,3	HL3 030	112M	4	35300	41000
19,8	1762	2,0	73,3	HL3 050	112M	4	35300	41000
18,0	1938	1,3	80,6	HL3 030	112M	4	36900	42800
18,0	1938	2,5	80,6	HL3 050	112M	4	36900	42800
15,8	2211	1,6	92,0	HL3 050	112M	4	37700	43700
14,5	2409	1,1	100	HL3 030	112M	4	39000	45300
14,5	2409	2,0	100	HL3 050	112M	4	39000	45300
12,8	2731	2,7	114	HL3 080	112M	4	57200	65950
12,7	2748	1,3	114	HL3 050	112M	4	40250	46650
11,8	2945	2,9	122	HL3 080	112M	4	58250	67200
11,6	2993	1,7	125	HL3 050	112M	4	41600	48300
10,5	3313	1,5	138	HL3 050	112M	4	43100	50050
10,2	3427	2,2	143	HL3 080	112M	4	62150	71850
9,6	3638	2,9	151	HL3 130	112M	4	67500	88800

7.1 HL GEARED MOTORS

4,00 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
9,4	3720	1,1	155	HL3 050	112M		4	45100	51700
8,6	4051	2,1	168	HL3 080	112M		4	62700	72500
8,5	4118	1,3	171	HL3 050	112M		4	45100	51700
7,5	4669	1,6	194	HL3 080	112M		4	62700	72500
7,0	5004	2,1	208	HL3 130	112M		4	67500	88800
6,9	5083	1,5	211	HL3 080	112M		4	62700	72500
6,7	5186	1,0	216	HL3 050	112M		4	45100	51700
6,5	5364	2,2	223	HL3 130	112M		4	67500	88800
6,3	5572	1,2	232	HL3 080	112M		4	62700	72500
6,0	5859	1,4	244	HL3 080	112M		4	62700	72500
6,0	5767	1,9	240	HL3 130	112M		4	67500	88800
6,0	5767	2,8	240	HL3 180	112M		4	69000	88800
5,4	6402	1,2	266	HL3 080	112M		4	62700	72500
5,1	6883	1,6	286	HL3 130	112M		4	67500	88800
5,1	6845	1,8	285	HL3 180	112M		4	69000	88800
5,0	6993	1,2	291	HL3 080	112M		4	62700	72500
4,7	7379	1,1	307	HL3 080	112M		4	63250	73050
4,4	7692	1,9	330	HL4 130	112M		4	68800	90500
4,4	7692	2,5	330	HL4 180	112M		4	70300	90500
4,3	8169	1,1	340	HL3 130	112M		4	69000	90700
4,3	8169	1,6	340	HL3 180	112M		4	70500	90700
4,1	8343	1,7	358	HL4 130	112M		4	70250	91500
3,5	9558	1,5	410	HL4 130	112M		4	70900	93500
3,5	9558	2,0	410	HL4 180	112M		4	72550	93500
3,2	10473	1,4	449	HL4 130	112M		4	71800	94500
3,2	10473	1,9	449	HL4 180	112M		4	73500	94500
2,8	11878	1,2	509	HL4 130	112M		4	73550	96500
2,8	11878	1,7	509	HL4 180	112M		4	75150	96500
2,6	13148	1,1	564	HL4 130	112M		4	74450	97600
2,6	13148	1,5	564	HL4 180	112M		4	76000	97600
2,3	14761	1,0	633	HL4 130	112M		4	75700	99600
2,2	15244	1,2	654	HL4 180	112M		4	77800	100200
2,1	16339	1,3	701	HL4 180	112M		4	78200	100700
1,8	18943	1,0	812	HL4 180	112M		4	80100	103100
1,6	20969	0,9	899	HL4 180	112M		4	81600	104800

5,50 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
273,8	186	2,6	5,37	HL1 010	132MS		4	8750	9900
199,1	256	1,7	7,38	HL1 010	132MS		4	9350	10600
199,1	256	2,9	7,38	HL1 020	132MS		4	9350	10600

7.1 HL GEARED MOTORS

5,50 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
158,1	322	0,9	9,30	HL1 010	132MS	4	10200	11500
158,1	322	1,9	9,30	HL1 020	132MS	4	10200	11500
158,1	322	2,2	9,30	HL1 030	132MS	4	19300	22350
124,1	398	1,7	11,8	HL2 010	132MS	4	10900	12300
124,1	398	2,9	11,8	HL2 020	132MS	4	10900	12300
98,9	500	1,4	14,9	HL2 010	132MS	4	11650	13200
98,9	500	2,6	14,9	HL2 020	132MS	4	11650	13200
78,8	627	1,2	18,7	HL2 010	132MS	4	12300	14050
78,8	627	2,2	18,7	HL2 020	132MS	4	12300	14050
69,0	716	2,4	21,3	HL2 030	132MS	4	24300	28100
63,4	780	1,0	23,2	HL2 010	132MS	4	13500	15350
63,4	780	1,8	23,2	HL2 020	132MS	4	13500	15350
63,4	780	2,6	23,2	HL2 030	132MS	4	24950	28950
55,0	899	1,9	26,7	HL2 030	132MS	4	25600	29850
51,0	969	1,3	28,8	HL2 020	132MS	4	14550	16450
51,0	969	2,1	28,8	HL2 030	132MS	4	26050	30300
46,1	1072	1,4	31,9	HL2 020	132MS	4	15000	16900
46,1	1072	1,7	31,9	HL2 030	132MS	4	27250	31600
46,1	1072	2,9	31,9	HL2 050	132MS	4	27250	31600
44,3	1117	1,6	33,2	HL2 030	132MS	4	27600	32000
37,1	1333	1,0	39,6	HL2 020	132MS	4	15850	17950
37,1	1333	1,6	39,6	HL2 030	132MS	4	29150	33650
37,1	1333	2,9	39,6	HL2 050	132MS	4	29150	33650
36,6	1351	0,9	40,2	HL2 020	132MS	4	15850	17950
32,2	1536	1,2	45,7	HL2 030	132MS	4	28900	34750
32,2	1536	2,3	45,7	HL2 050	132MS	4	28900	34750
28,7	1668	1,0	51,2	HL3 020	132MS	4	17000	19350
28,7	1668	1,5	51,2	HL3 030	132MS	4	31450	36350
28,7	1668	2,6	51,2	HL3 050	132MS	4	31450	36350
26,5	1862	2,7	55,4	HL2 080	132MS	4	45850	52850
25,5	1934	0,9	57,5	HL2 030	132MS	4	32950	38300
25,5	1934	1,8	57,5	HL2 050	132MS	4	32950	38300
22,9	2094	1,2	64,2	HL3 030	132MS	4	33700	39050
22,9	2094	2,2	64,2	HL3 050	132MS	4	33700	39050
21,1	2345	2,1	69,8	HL2 080	132MS	4	49650	57350
20,1	2389	1,5	73,3	HL3 050	132MS	4	35200	40950
18,2	2629	0,9	80,6	HL3 030	132MS	4	36700	42600
18,2	2629	1,8	80,6	HL3 050	132MS	4	36700	42600
17,6	2722	2,6	83,5	HL3 080	132MS	4	51450	59400
16,2	2951	2,4	90,5	HL3 080	132MS	4	52800	61000
16,0	2999	1,2	92,0	HL3 050	132MS	4	37650	43650
14,9	3214	2,6	98,6	HL3 080	132MS	4	54700	63200

7.1 HL GEARED MOTORS

5,50 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
14,7	3267	1,5	100	HL3 050	132MS	4	38800	45050
14,1	3390	2,9	104	HL3 130	132MS	4	60950	80200
13,2	3645	2,8	112	HL3 130	132MS	4	62050	81700
12,9	3727	1,0	114	HL3 050	132MS	4	40100	46550
12,9	3704	1,9	114	HL3 080	132MS	4	57150	65900
12,1	3970	2,5	122	HL3 130	132MS	4	63700	83850
12,0	3994	2,1	122	HL3 080	132MS	4	58000	66850
11,8	4060	1,2	125	HL3 050	132MS	4	41400	48000
10,7	4494	1,1	138	HL3 050	132MS	4	42650	49550
10,5	4576	2,2	140	HL3 130	132MS	4	66600	87600
10,3	4649	1,6	143	HL3 080	132MS	4	61900	71500
9,7	4934	2,1	151	HL3 130	132MS	4	67500	88800
9,1	5288	2,5	162	HL3 130	132MS	4	67500	88800
9,1	5288	2,9	162	HL3 180	132MS	4	69000	88800
8,7	5494	1,6	168	HL3 080	132MS	4	62700	72500
8,6	5585	0,9	171	HL3 050	132MS	4	45100	51700
8,4	5687	2,8	174	HL3 180	132MS	4	69000	88800
7,9	6095	2,2	187	HL3 130	132MS	4	67500	88800
7,6	6332	1,2	194	HL3 080	132MS	4	62700	72500
7,1	6787	1,6	208	HL3 130	132MS	4	67500	88800
7,1	6787	2,3	208	HL3 180	132MS	4	69000	88800
7,0	6895	1,1	211	HL3 080	132MS	4	62700	72500
6,6	7275	1,6	223	HL3 130	132MS	4	67500	88800
6,1	7822	1,4	240	HL3 130	132MS	4	67500	88800
6,1	7822	2,0	240	HL3 180	132MS	4	69000	88800
6,0	7946	1,0	244	HL3 080	132MS	4	62700	72500
5,5	8683	0,9	266	HL3 080	132MS	4	62700	72500
5,2	9284	1,3	285	HL3 180	132MS	4	69000	88800
5,1	9336	1,2	286	HL3 130	132MS	4	67500	88800
4,5	10432	1,4	330	HL4 130	132MS	4	68600	90300
4,5	10432	1,8	330	HL4 180	132MS	4	70050	90300
4,3	11080	1,1	340	HL3 180	132MS	4	70500	90700
4,1	11315	1,3	358	HL4 130	132MS	4	70250	91500
3,6	12964	1,1	410	HL4 130	132MS	4	70700	93100
3,6	12964	1,5	410	HL4 180	132MS	4	72300	93100
3,3	14205	1,0	449	HL4 130	132MS	4	71600	94200
3,3	14205	1,4	449	HL4 180	132MS	4	73100	94200
2,9	16110	1,2	509	HL4 180	132MS	4	74700	96200
2,6	17833	1,1	564	HL4 180	132MS	4	76000	97600
2,2	20675	0,9	654	HL4 180	132MS	4	77800	100200
2,1	22161	0,9	701	HL4 180	132MS	4	78200	100700

7.1 HL GEARED MOTORS

7,50 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
424,3	164	2,9	3,44	HL1 010	132M	4	7550	8550
338,0	206	2,5	4,32	HL1 010	132M	4	8050	9100
272,0	255	1,9	5,37	HL1 010	132M	4	8800	9950
197,7	351	1,2	7,38	HL1 010	132M	4	9400	10650
197,7	351	2,1	7,38	HL1 020	132M	4	9400	10650
157,0	443	1,4	9,30	HL1 020	132M	4	10200	11500
157,0	443	1,6	9,30	HL1 030	132M	4	19350	22400
123,3	547	1,2	11,8	HL2 010	132M	4	10900	12300
123,3	547	2,1	11,8	HL2 020	132M	4	10900	12300
123,3	547	2,9	11,8	HL2 030	132M	4	20650	23900
98,2	686	1,1	14,9	HL2 010	132M	4	11650	13200
98,2	686	1,9	14,9	HL2 020	132M	4	11650	13200
98,2	686	2,9	14,9	HL2 030	132M	4	22300	25850
78,2	861	1,6	18,7	HL2 020	132M	4	12350	14100
78,2	861	2,4	18,7	HL2 030	132M	4	23500	27300
68,6	983	1,8	21,3	HL2 030	132M	4	24350	28200
63,0	1070	1,4	23,2	HL2 020	132M	4	13550	15400
63,0	1070	1,9	23,2	HL2 030	132M	4	25000	29000
54,6	1234	1,4	26,7	HL2 030	132M	4	25650	29900
54,6	1234	2,8	26,7	HL2 050	132M	4	25650	29900
50,7	1330	1,0	28,8	HL2 020	132M	4	14550	16450
50,7	1330	1,5	28,8	HL2 030	132M	4	26100	30350
45,8	1472	1,0	31,9	HL2 020	132M	4	15000	16900
45,8	1472	1,2	31,9	HL2 030	132M	4	27350	31700
45,8	1472	2,1	31,9	HL2 050	132M	4	27350	31700
44,0	1533	1,2	33,2	HL2 030	132M	4	27700	32100
44,0	1533	2,2	33,2	HL2 050	132M	4	27700	32100
36,8	1830	1,1	39,6	HL2 030	132M	4	29300	33800
36,8	1830	2,1	39,6	HL2 050	132M	4	29300	33800
32,0	2109	1,7	45,7	HL2 050	132M	4	28950	34800
31,9	2113	2,9	45,8	HL2 080	132M	4	43300	50050
28,5	2290	1,1	51,2	HL3 030	132M	4	31550	36450
28,5	2290	1,9	51,2	HL3 050	132M	4	31550	36450
27,3	2396	2,9	53,5	HL3 080	132M	4	45450	52500
26,4	2556	2,0	55,4	HL2 080	132M	4	45900	52900
25,4	2656	1,3	57,5	HL2 050	132M	4	32950	38300
23,1	2829	2,9	63,2	HL3 080	132M	4	48250	55700
22,7	2875	1,6	64,2	HL3 050	132M	4	33800	39200
20,9	3219	1,6	69,8	HL2 080	132M	4	49800	57550
19,9	3280	1,1	73,3	HL3 050	132M	4	35350	41050
18,7	3494	2,8	78,0	HL3 130	132M	4	55900	73700
18,4	3551	2,4	79,3	HL3 080	132M	4	51050	59000

7.1 HL GEARED MOTORS

7,50 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
18,1	3609	1,3	80,6	HL3 050	132M	4	36800	42700
17,5	3738	1,9	83,5	HL3 080	132M	4	51550	59550
16,1	4051	1,8	90,5	HL3 080	132M	4	52900	61100
15,4	4248	2,8	94,9	HL3 130	132M	4	59300	78100
14,8	4413	1,9	98,6	HL3 080	132M	4	54950	63450
14,6	4485	1,1	100	HL3 050	132M	4	38900	45200
14,0	4654	2,1	104	HL3 130	132M	4	61100	80400
13,1	5005	2,0	112	HL3 130	132M	4	62200	81850
13,1	5005	3,0	112	HL3 180	132M	4	63650	81850
12,9	5086	1,4	114	HL3 080	132M	4	57150	65900
12,0	5451	1,9	122	HL3 130	132M	4	63850	84150
12,0	5451	2,8	122	HL3 180	132M	4	65400	84150
11,9	5484	1,5	122	HL3 080	132M	4	58150	67000
11,7	5574	0,9	125	HL3 050	132M	4	41500	48150
10,4	6283	1,6	140	HL3 130	132M	4	66800	87850
10,4	6283	2,5	140	HL3 180	132M	4	68150	87850
10,2	6383	1,2	143	HL3 080	132M	4	62150	71850
9,6	6774	1,5	151	HL3 130	132M	4	67500	88800
9,6	6774	2,3	151	HL3 180	132M	4	69000	88800
9,0	7261	1,8	162	HL3 130	132M	4	67500	88800
9,0	7261	2,1	162	HL3 180	132M	4	69000	88800
8,7	7543	1,1	168	HL3 080	132M	4	62700	72500
8,4	7808	2,0	174	HL3 180	132M	4	69000	88800
7,8	8369	1,6	187	HL3 130	132M	4	67500	88800
7,0	9318	1,1	208	HL3 130	132M	4	67500	88800
7,0	9318	1,7	208	HL3 180	132M	4	69000	88800
6,5	9988	1,2	223	HL3 130	132M	4	67500	88800
6,1	10740	1,0	240	HL3 130	132M	4	67500	88800
6,1	10740	1,5	240	HL3 180	132M	4	69000	88800
5,1	12746	1,0	285	HL3 180	132M	4	69000	88800
4,4	14323	1,0	330	HL4 130	132M	4	68800	90500
4,4	14323	1,3	330	HL4 180	132M	4	70300	90500
4,1	15536	0,9	358	HL4 130	132M	4	70250	91500
3,6	17799	1,1	410	HL4 180	132M	4	72300	93100
3,3	19503	1,0	449	HL4 180	132M	4	73100	94200
2,9	22119	0,9	509	HL4 180	132M	4	74700	96200

11,00 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
428,6	238	2,0	3,44	HL1 010	160MA	4	7500	8550
341,4	298	1,7	4,32	HL1 010	160MA	4	8000	9050

7.1 HL GEARED MOTORS

11,00 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
274,8	371	1,3	5,37	HL1 010	160MA	4	8750	9900
274,8	371	2,5	5,37	HL1 020	160MA	4	8750	9900
199,7	510	1,4	7,38	HL1 020	160MA	4	9350	10600
199,7	510	2,3	7,38	HL1 030	160MA	4	17850	20650
158,6	642	0,9	9,30	HL1 020	160MA	4	10200	11500
158,6	642	1,1	9,30	HL1 030	160MA	4	19300	22350
124,6	793	1,5	11,8	HL2 020	160MA	4	10900	12300
124,6	793	2,0	11,8	HL2 030	160MA	4	20600	23850
99,2	996	1,3	14,9	HL2 020	160MA	4	11600	13150
99,2	996	2,0	14,9	HL2 030	160MA	4	22250	25800
79,0	1250	1,1	18,7	HL2 020	160MA	4	12300	14050
79,0	1250	1,7	18,7	HL2 030	160MA	4	23450	27250
79,0	1250	2,9	18,7	HL2 050	160MA	4	23450	27250
69,3	1427	1,2	21,3	HL2 030	160MA	4	24250	28050
69,3	1427	2,3	21,3	HL2 050	160MA	4	24250	28050
63,6	1554	0,9	23,2	HL2 020	160MA	4	13500	15350
63,6	1554	1,3	23,2	HL2 030	160MA	4	24950	28950
63,6	1554	2,5	23,2	HL2 050	160MA	4	24950	28950
55,2	1791	1,0	26,7	HL2 030	160MA	4	25600	29850
55,2	1791	1,9	26,7	HL2 050	160MA	4	25600	29850
51,2	1931	1,1	28,8	HL2 030	160MA	4	26050	30300
51,2	1931	2,1	28,8	HL2 050	160MA	4	26050	30300
46,2	2138	1,4	31,9	HL2 050	160MA	4	27250	31600
44,7	2211	3,0	33,0	HL2 080	160MA	4	39200	45300
44,4	2226	1,5	33,2	HL2 050	160MA	4	27600	32000
38,4	2571	2,4	38,4	HL2 080	160MA	4	41250	47650
37,2	2656	1,4	39,6	HL2 050	160MA	4	29150	33650
32,3	3062	1,1	45,7	HL2 050	160MA	4	28900	34750
32,2	3068	2,0	45,8	HL2 080	160MA	4	43200	49900
32,1	3083	2,6	46,0	HL2 130	160MA	4	47750	62800
28,8	3325	1,3	51,2	HL3 050	160MA	4	31450	36350
27,6	3478	2,0	53,5	HL3 080	160MA	4	45300	52350
26,6	3711	1,3	55,4	HL2 080	160MA	4	45800	52800
25,6	3856	0,9	57,5	HL2 050	160MA	4	32950	38300
24,3	3953	2,7	60,8	HL3 130	160MA	4	51700	68100
23,3	4106	2,0	63,2	HL3 080	160MA	4	48100	55550
23,0	4174	1,1	64,2	HL3 050	160MA	4	33700	39050
21,1	4674	1,1	69,8	HL2 080	160MA	4	49650	57350
19,3	4962	2,3	76,3	HL3 130	160MA	4	55450	73000
19,3	4962	2,9	76,3	HL3 180	160MA	4	56650	73000
18,9	5073	1,9	78,0	HL3 130	160MA	4	55750	73450
18,9	5073	2,8	78,0	HL3 180	160MA	4	57000	73450

7.1 HL GEARED MOTORS

11,00 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
18,6	5155	1,6	79,3	HL3 080	160MA		4	51000	58900
17,7	5427	1,3	83,5	HL3 080	160MA		4	51350	59300
16,3	5882	1,2	90,5	HL3 080	160MA		4	52700	60900
15,5	6166	1,9	94,9	HL3 130	160MA		4	59200	77950
15,5	6166	2,5	94,9	HL3 180	160MA		4	61150	77950
15,1	6368	2,3	98,0	HL3 180	160MA		4	61300	78550
15,0	6406	1,3	98,6	HL3 080	160MA		4	54500	62950
14,2	6757	1,4	104	HL3 130	160MA		4	60800	80000
13,2	7266	1,4	112	HL3 130	160MA		4	62050	81700
13,2	7266	2,0	112	HL3 180	160MA		4	63500	81700
13,0	7384	1,0	114	HL3 080	160MA		4	57050	65800
12,1	7914	1,3	122	HL3 130	160MA		4	63700	83850
12,1	7914	1,9	122	HL3 180	160MA		4	65150	83850
12,0	7961	1,1	122	HL3 080	160MA		4	58000	66850
10,5	9121	1,1	140	HL3 130	160MA		4	66600	87600
10,5	9121	1,7	140	HL3 180	160MA		4	68000	87600
9,7	9834	1,0	151	HL3 130	160MA		4	67500	88800
9,7	9834	1,6	151	HL3 180	160MA		4	69000	88800
9,1	10541	1,2	162	HL3 130	160MA		4	67500	88800
9,1	10541	1,4	162	HL3 180	160MA		4	69000	88800
8,5	11335	1,4	174	HL3 180	160MA		4	69000	88800
7,9	12149	1,1	187	HL3 130	160MA		4	67500	88800
7,1	13528	1,2	208	HL3 180	160MA		4	69000	88800
6,1	15592	1,0	240	HL3 180	160MA		4	69000	88800

15,00 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor	Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
428,6	324	1,4	3,44	HL1 010	160LA		4	7500	8550
428,6	324	2,6	3,44	HL1 020	160LA		4	7500	8550
341,4	407	1,1	4,32	HL1 010	160LA		4	8000	9050
341,4	407	2,3	4,32	HL1 020	160LA		4	8000	9050
274,8	506	0,9	5,37	HL1 010	160LA		4	8750	9900
274,8	506	1,8	5,37	HL1 020	160LA		4	8750	9900
274,8	506	2,8	5,37	HL1 030	160LA		4	16150	18650
238,4	583	2,3	6,19	HL1 030	160LA		4	16900	19600
199,7	696	1,1	7,38	HL1 020	160LA		4	9350	10600
199,7	696	1,7	7,38	HL1 030	160LA		4	17850	20650
124,6	1082	1,1	11,8	HL2 020	160LA		4	10900	12300
124,6	1082	1,4	11,8	HL2 030	160LA		4	20600	23850
124,6	1082	2,6	11,8	HL2 050	160LA		4	20600	23850
99,2	1358	1,0	14,9	HL2 020	160LA		4	11600	13150

7.1 HL GEARED MOTORS

15,00 kW

n ₂ [rpm]	M ₂ [Nm]	f _s	i	Gear reducer	Size	Motor Pole	Fr ₂ CS [N]	Fr ₂ SS [N]
99,2	1358	1,4	14,9	HL2 030	160LA	4	22250	25800
99,2	1358	2,5	14,9	HL2 050	160LA	4	22250	25800
79,0	1705	1,2	18,7	HL2 030	160LA	4	23450	27250
79,0	1705	2,2	18,7	HL2 050	160LA	4	23450	27250
69,3	1946	1,7	21,3	HL2 050	160LA	4	24250	28050
64,6	2085	2,8	22,8	HL2 080	160LA	4	35000	40450
63,6	2119	0,9	23,2	HL2 030	160LA	4	24950	28950
63,6	2119	1,8	23,2	HL2 050	160LA	4	24950	28950
56,1	2403	2,3	26,3	HL2 080	160LA	4	36750	42500
55,2	2442	1,4	26,7	HL2 050	160LA	4	25600	29850
51,5	2616	2,5	28,6	HL2 080	160LA	4	37550	43400
51,2	2633	1,5	28,8	HL2 050	160LA	4	26050	30300
46,2	2915	1,1	31,9	HL2 050	160LA	4	27250	31600
44,7	3015	2,2	33,0	HL2 080	160LA	4	38950	45100
44,4	3035	1,1	33,2	HL2 050	160LA	4	27600	32000
38,4	3505	1,8	38,4	HL2 080	160LA	4	41250	47650
38,0	3542	2,6	38,8	HL2 130	160LA	4	45300	59600
37,2	3622	1,1	39,6	HL2 050	160LA	4	29150	33650
32,2	4183	1,5	45,8	HL2 080	160LA	4	43200	49900
32,1	4204	1,9	46,0	HL2 130	160LA	4	47750	62800
32,1	4204	2,8	46,0	HL2 180	160LA	4	48800	62800
30,4	4294	2,4	48,4	HL3 130	160LA	4	48350	63550
30,4	4294	2,6	48,4	HL3 180	160LA	4	49350	63550
28,8	4534	1,0	51,2	HL3 050	160LA	4	31450	36350
27,6	4743	1,4	53,5	HL3 080	160LA	4	45300	52350
26,6	5061	1,0	55,4	HL2 080	160LA	4	45800	52800
24,3	5390	2,0	60,8	HL3 130	160LA	4	51700	68100
24,3	5390	2,5	60,8	HL3 180	160LA	4	52900	68100
23,3	5600	1,4	63,2	HL3 080	160LA	4	48100	55550
19,3	6767	1,7	76,3	HL3 130	160LA	4	55450	73000
19,3	6767	2,2	76,3	HL3 180	160LA	4	56650	73000
18,9	6917	1,4	78,0	HL3 130	160LA	4	55750	73450
18,9	6917	2,0	78,0	HL3 180	160LA	4	57000	73450
18,6	7030	1,2	79,3	HL3 080	160LA	4	51000	58900
17,7	7400	0,9	83,5	HL3 080	160LA	4	51350	59300
15,5	8409	1,4	94,9	HL3 130	160LA	4	59200	77950
15,5	8409	1,8	94,9	HL3 180	160LA	4	61150	77950
15,1	8684	1,7	98,0	HL3 180	160LA	4	61300	78550
15,0	8736	0,9	98,6	HL3 080	160LA	4	54500	62950
14,2	9214	1,1	104	HL3 130	160LA	4	60800	80000
13,2	9908	1,0	112	HL3 130	160LA	4	62050	81700
13,2	9908	1,5	112	HL3 180	160LA	4	63500	81700

7.1 HL GEARED MOTORS

15,00 kW

n_2 [rpm]	M_2 [Nm]	f_s	i	Gear reducer	Size	Motor	Pole	Fr_2 CS [N]	Fr_2 SS [N]
12,1	10791	0,9	122	HL3 130	160LA		4	63700	83850
12,1	10791	1,4	122	HL3 180	160LA		4	65150	83850
10,5	12438	1,2	140	HL3 180	160LA		4	68000	87600
9,7	13410	1,2	151	HL3 180	160LA		4	69000	88800
9,1	14374	0,9	162	HL3 130	160LA		4	67500	88800
9,1	14374	1,1	162	HL3 180	160LA		4	69000	88800
8,5	15456	1,0	174	HL3 180	160LA		4	69000	88800

30,00 kW

n_2 [rpm]	M_2 [Nm]	f_s	i	Gear reducer	Size	Motor	Pole	Fr_2 CS [N]	Fr_2 SS [N]
196,7	1413	2,7	7,50	HL1 080	200L		4	25100	29000

7.2 IHL GEAR REDUCER - 1750 rpm

IHL1 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
470	3,44	25,80	508,5	7150	8100	630
530	4,32	23,18	405,1	7650	8670	790
490	5,37	17,24	326,0	8110	9190	990
440	7,38	11,26	237,0	9160	10370	1360
310	9,30	6,30	188,2	9570	10820	1710

IHL1 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
740	9,30	15,03	188,2	18200	21050	1710

IHL1 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
760	7,38	19,44	237,0	9160	10370	1360
610	9,30	12,39	188,2	9570	10820	1710

7.2 IHL GEAR REDUCER - 1750 rpm

IHL2 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
670	11,8	11,02	147,8	10300	11700	2000
730	14,9	9,56	117,7	11100	12550	2400
760	18,7	7,93	93,8	11950	13550	2400
790	23,2	6,63	75,5	12600	14300	2400
640	28,8	4,33	60,7	13750	15600	2400
830	31,9	5,07	54,9	13850	15650	2400
660	39,6	3,24	44,1	15050	16950	2400
850	40,2	4,12	43,6	15100	17100	2400
670	49,9	2,61	35,1	16000	18200	2400
580	68,7	1,64	25,5	17500	19900	2400

IHL2 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1570	11,8	25,82	147,8	19550	22750	2120
1970	14,9	25,81	117,7	21100	24550	2660
2120	18,7	22,12	93,8	22450	26100	3340
1820	21,3	16,65	82,2	23250	27000	3810
2050	23,2	17,22	75,5	23600	27450	4150
1820	26,7	13,26	65,5	24650	28500	4780
2120	28,8	14,33	60,7	25250	29350	5150
1840	31,9	11,23	54,9	25650	29900	5200
1820	33,2	10,67	52,7	25850	30100	5200
2150	39,6	10,56	44,1	27650	32050	5200
1860	45,7	7,93	38,3	29000	33500	5200
1860	57,5	6,30	30,4	31100	36100	5200

IHL2 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
5070	55,4	17,83	31,6	43400	50150	9900
5210	69,8	14,55	25,1	46850	54000	12470

IHL2 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1170	11,8	19,24	147,8	10300	11700	2120
1340	14,9	17,56	117,7	11100	12550	2660
1380	18,7	14,40	93,8	11950	13550	3340
1450	23,2	12,18	75,5	12600	14300	3400
1290	28,8	8,72	60,7	13750	15600	3400
1540	31,9	9,40	54,9	13850	15650	3400
1350	39,6	6,63	44,1	15050	16950	3400
1300	40,2	6,30	43,6	15100	17100	3400
1400	49,9	5,46	35,1	16000	18200	3400
1170	68,7	3,32	25,5	17500	19900	3400

IHL2 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
3500	26,7	25,50	65,5	24650	28500	4780
3180	31,9	19,42	54,9	25650	29900	5700
3550	33,2	20,82	52,7	25850	30100	5940
3960	39,6	19,46	44,1	27650	32050	7090
3610	45,7	15,39	38,3	29000	33500	8170
3630	57,5	12,29	30,4	31100	36100	8800

7.2 IHL GEAR REDUCER - 1750 rpm

IHL3 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
860	51,2	3,38	34,2	16150	18350	2400
860	64,2	2,69	27,2	17200	19550	2400
860	80,6	2,14	21,7	18300	20650	2400
750	87,4	1,72	20,0	18550	21050	2000
870	100	1,74	17,5	19700	22300	2400
870	110	1,59	15,9	20300	22950	2400
880	125	1,42	14,1	21150	24000	2400
880	138	1,28	12,7	21950	24800	2400
810	155	1,05	11,3	22600	25700	2400
880	174	1,02	10,1	23400	26650	2400
750	188	0,80	9,3	23650	27000	2000
900	216	0,84	8,1	23650	27000	2400
920	236	0,78	7,4	23650	27000	2400
950	297	0,64	5,9	23650	27000	2400
850	369	0,46	4,7	23800	27150	2400

IHL3 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2580	51,2	10,13	34,2	29700	34250	5200
2600	64,2	8,13	27,2	32750	38050	5200
1920	73,3	5,26	23,9	33350	38700	5200
2610	80,6	6,50	21,7	34400	39900	5200
1930	92,0	4,21	19,0	35850	41700	5200
2620	100	5,25	17,5	37300	43250	5200
1950	114	3,43	15,3	38200	44250	5200
2630	125	4,24	14,1	39400	45700	5200
2640	138	3,85	12,7	40250	46650	5200
2240	155	2,91	11,3	42000	48750	5200
2650	171	3,11	10,2	43800	50800	5200
1970	197	2,00	8,9	45100	51700	5200
2700	216	2,51	8,1	45100	51700	5200
1970	249	1,59	7,0	45100	51700	5200
2290	293	1,57	6,0	45100	51700	5200
1970	309	1,28	5,7	45100	51700	5200
2300	369	1,25	4,7	45350	52100	5200
2010	425	0,95	4,1	45900	53250	5200

IHL3 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1660	51,2	6,52	34,2	16150	18350	3400
1710	64,2	5,35	27,2	17200	19550	3400
1710	80,6	4,26	21,7	18300	20650	3400
1430	87,4	3,28	20,0	18550	21050	3400
1730	100	3,47	17,5	19700	22300	3400
1770	110	3,24	15,9	20300	22950	3400
1780	125	2,87	14,1	21150	24000	3400
1780	138	2,59	12,7	21950	24800	3400
1500	155	1,95	11,3	22600	25700	3400
1780	174	2,06	10,1	23400	26650	3400
1430	188	1,53	9,3	23650	27000	3400
1840	216	1,71	8,1	23650	27000	3400
1870	236	1,59	7,4	23650	27000	3400
1920	297	1,30	5,9	23650	27000	3400
1600	369	0,87	4,7	23800	27150	3400

IHL3 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
4500	51,2	17,66	34,2	29700	34250	8800
4640	64,2	14,51	27,2	32750	38050	8800
3640	73,3	9,98	23,9	33350	38700	8800
4740	80,6	11,81	21,7	34400	39900	8800
3650	92,0	7,97	19,0	35850	41700	8800
4920	100	9,86	17,5	37300	43250	8800
3680	114	6,46	15,3	38200	44250	8800
5080	125	8,19	14,1	39400	45700	8800
5160	138	7,52	12,7	40250	46650	8800
4410	155	5,72	11,3	42000	48750	8800
5300	171	6,21	10,2	43800	50800	8800
3750	197	3,81	8,9	45100	51700	8800
5340	216	4,97	8,1	45100	51700	8800
3750	249	3,03	7,0	45100	51700	8800
4460	293	3,06	6,0	45100	51700	8800
3750	309	2,44	5,7	45100	51700	8800
4470	369	2,43	4,7	45350	52100	8800
3820	425	1,81	4,1	45900	53250	8800

7.2 IHL GEAR REDUCER - 1750 rpm

IHL3 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
6880	53,5	25,81	32,7	43000	49650	9280
7950	63,2	25,27	27,7	45250	52250	10960
8450	79,3	21,39	22,1	48950	56550	13750
7170	83,5	17,24	21,0	49750	57450	14480
7500	90,5	16,64	19,3	50700	58550	14900
8460	98,6	17,23	17,8	51250	59200	14900
7500	114	13,26	15,4	53750	61950	14900
8740	122	14,33	14,3	56100	64800	14900
7810	143	11,00	12,3	57550	66350	14900
8870	168	10,57	10,4	61700	71300	14900
7670	194	7,93	9,0	62700	72500	14900
8060	211	7,65	8,3	62700	72500	14900
6800	232	5,89	7,6	62700	72500	14900
8120	244	6,69	7,2	62700	72500	14900
8150	266	6,15	6,6	62700	72500	14900
8200	291	5,66	6,0	62700	72500	14900
8210	307	5,37	5,7	62700	72500	14900
6670	357	3,75	4,9	62900	72700	14900
5580	409	2,74	4,3	64050	73850	14900

IHL3 180

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
15400	122	25,31	14,4	62000	79500	21120
15700	140	22,39	12,5	64400	82900	24340
15900	151	21,03	11,6	66100	84950	26240
15700	162	19,45	10,8	67450	86800	28130
16200	174	18,64	10,0	69000	88800	29000
16400	208	15,82	8,4	69000	88800	29000
16500	240	13,83	7,3	69000	88800	29000
13000	285	9,17	6,1	69000	88800	29000
13000	340	7,68	5,2	69000	88800	29000

IHL3 130

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
10000	78,0	25,83	22,4	52950	69600	13530
11900	94,9	25,19	18,4	56100	73900	16450
10100	104	19,43	16,8	57800	75950	18030
10400	112	18,65	15,7	59000	77700	19390
10500	122	17,28	14,4	60550	79500	21000
10600	140	15,17	12,5	63000	82900	21000
10600	151	14,09	11,6	64550	84950	21000
13300	162	16,50	10,8	65950	86800	21000
13700	187	14,70	9,4	67500	88800	21000
10900	208	10,52	8,4	67500	88800	21000
12300	223	11,07	7,8	67500	88800	21000
11000	240	9,21	7,3	67500	88800	21000
11100	286	7,80	6,1	67500	88800	21000
8700	340	5,14	5,2	67500	88800	21000

7.2 IHL GEAR REDUCER - 1750 rpm

IHL4 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
950	348	0,56	5,0	23650	27000	2400
1000	433	0,48	4,0	24600	28100	2400
1010	474	0,44	3,7	24700	28250	2400
1020	538	0,39	3,3	24900	28400	2400
1070	668	0,33	2,6	25850	29300	2400
1070	740	0,30	2,4	25900	29350	2400
1070	811	0,27	2,2	26100	29550	2400
1110	919	0,25	1,9	27000	30150	2400
1130	1020	0,23	1,7	27300	30900	2400
1160	1160	0,21	1,5	27400	31000	2400
1170	1260	0,19	1,4	27450	31050	2400
970	1440	0,14	1,2	27550	31200	2400
1220	1590	0,16	1,1	27600	31350	2400
1250	1740	0,15	1,0	27650	31550	2400
1000	2160	0,10	0,8	27800	32000	2400
1000	2720	0,08	0,6	28700	32200	2400

IHL4 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2810	348	1,67	5,0	45100	51700	5200
2810	433	1,34	4,0	46000	53450	5200
2810	474	1,23	3,7	46550	54000	5200
2810	538	1,08	3,3	47100	54650	5200
2810	668	0,87	2,6	48600	56450	5200
2820	740	0,79	2,4	49000	56850	5200
2540	831	0,63	2,1	49750	57300	5200
2830	919	0,64	1,9	50500	58600	5200
2840	1020	0,58	1,7	51400	59700	5200
2620	1140	0,47	1,5	52150	60400	5200
2880	1260	0,47	1,4	53000	61650	5200
2710	1440	0,39	1,2	53600	62200	5200
2940	1590	0,38	1,1	54800	63500	5200
2560	1740	0,30	1,0	55300	64200	5200
2800	1980	0,29	0,9	55850	65600	5200
2560	2190	0,24	0,8	56400	67100	5200
2440	2280	0,22	0,8	56400	67100	5200
2440	2490	0,20	0,7	56950	67750	5200
2800	2720	0,21	0,6	56950	68900	5200

IHL4 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1950	348	1,16	5,0	23650	27000	3400
1990	433	0,95	4,0	24600	28100	3400
2010	474	0,88	3,7	24700	28250	3400
2010	538	0,77	3,3	24900	28400	3400
2140	668	0,66	2,6	25850	29300	3400
2140	740	0,60	2,4	25900	29350	3400
2150	811	0,55	2,2	26100	29550	3400
2220	919	0,50	1,9	27000	30150	3400
2240	1020	0,46	1,7	27300	30900	3400
2280	1160	0,41	1,5	27400	31000	3400
2320	1260	0,38	1,4	27450	31050	3400
1770	1440	0,25	1,2	27550	31200	3400
2410	1590	0,31	1,1	27600	31350	3400
2460	1740	0,29	1,0	27650	31550	3400
1830	2160	0,18	0,8	27800	32000	3400
1830	2720	0,14	0,6	28700	32200	3400

IHL4 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
5480	348	3,26	5,0	45100	51700	8800
5480	433	2,62	4,0	46000	53450	8800
5490	474	2,40	3,7	46550	54000	8800
5490	538	2,11	3,3	47100	54650	8800
5500	668	1,70	2,6	48600	56450	8800
5510	740	1,54	2,4	49000	56850	8800
5010	831	1,25	2,1	49750	57300	8800
5540	919	1,25	1,9	50500	58600	8800
5560	1020	1,13	1,7	51400	59700	8800
5150	1140	0,93	1,5	52150	60400	8800
5640	1260	0,92	1,4	53000	61650	8800
5310	1440	0,76	1,2	53600	62200	8800
5760	1590	0,75	1,1	54800	63500	8800
5070	1740	0,60	1,0	55300	64200	8800
5470	1980	0,57	0,9	55850	65600	8800
5070	2190	0,48	0,8	56400	67100	8800
4610	2280	0,42	0,8	56400	67100	8800
4610	2490	0,38	0,7	56950	67750	8800
5470	2720	0,42	0,6	56950	68900	8800

7.2 IHL GEAR REDUCER - 1750 rpm

IHL4 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
8030	395	4,21	4,4	63850	73650	14900
9850	467	4,37	3,8	64850	74750	14900
9850	529	3,85	3,3	65700	75800	14900
9850	586	3,48	3,0	66350	76550	14900
9240	658	2,91	2,7	67750	78150	14900
9860	728	2,80	2,4	69100	79750	14900
9230	825	2,32	2,1	69850	80500	14900
9360	905	2,14	1,9	70700	81750	14900
9920	1000	2,05	1,7	72250	83400	14900
9400	1140	1,71	1,5	73050	84350	14900
10000	1260	1,64	1,4	74600	86150	14900
9690	1430	1,40	1,2	75450	87100	14900
9480	1570	1,25	1,1	76400	88500	14900
9950	1800	1,14	1,0	77500	89400	14900
8630	2090	0,85	0,8	78300	90300	14900
9950	2270	0,91	0,8	78300	90300	14900
8630	2500	0,72	0,7	78700	90700	14900
8840	2700	0,68	0,6	79000	91100	14900

IHL4 130

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
14800	330	9,28	5,3	67500	88800	21000
14900	358	8,62	4,9	68100	89000	21000
14900	410	7,52	4,3	69000	90700	21000
14900	449	6,86	3,9	70350	92100	21000
14900	509	6,05	3,4	71100	93900	21000
14900	564	5,47	3,1	72100	95100	21000
14900	633	4,87	2,8	73550	96500	21000
14900	701	4,40	2,5	75150	98300	21000
13100	812	3,33	2,2	76000	100200	21000
13300	899	3,05	1,9	77100	102300	21000
15200	964	3,26	1,8	78300	103100	21000
13800	1130	2,52	1,5	81000	105900	21000
14000	1240	2,34	1,4	81600	106500	21000
14300	1410	2,10	1,2	83000	109300	21000
14600	1560	1,94	1,1	84200	110800	21000
14800	1770	1,73	1,0	85100	112000	21000
14800	1940	1,59	0,9	86500	114400	21000
11000	2510	0,91	0,7	89100	117800	21000

IHL4 180

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
18800	330	11,81	5,3	69000	88800	29000
19500	410	9,86	4,3	70500	90700	29000
19800	449	9,11	3,9	71500	92100	29000
20200	509	8,19	3,4	72800	93900	29000
20500	564	7,52	3,1	73900	95100	29000
18900	654	5,97	2,7	75600	96800	29000
21000	701	6,21	2,5	76500	98300	29000
19500	812	4,97	2,2	77800	100200	29000
19800	899	4,55	1,9	79550	102300	29000
15400	980	3,25	1,8	80100	103100	29000
20400	1130	3,73	1,5	82100	105900	29000
20700	1240	3,47	1,4	83100	106500	29000
21200	1410	3,11	1,2	84900	109300	29000
21600	1560	2,87	1,1	85800	110800	29000
19100	1770	2,23	1,0	87100	112000	29000
22000	1940	2,35	0,9	88500	114400	29000
17000	2510	1,40	0,7	91200	117800	29000

7.3 IHL GEAR REDUCER - 1400 rpm

IHL1 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
540	4,32	18,89	324,1	8130	9210	790
500	5,37	14,08	260,8	8900	10080	990
450	7,38	9,21	189,6	9520	10770	1360
320	9,30	5,20	150,5	10200	11510	1710

IHL1 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
770	7,38	15,76	189,6	9520	10770	1360
630	9,30	10,24	150,5	10200	11510	1710

IHL1 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
760	9,30	12,35	150,5	19500	22720	1710

7.3 IHL GEAR REDUCER - 1400 rpm

IHL2 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
710	11,8	9,34	118,2	11100	12550	2000
760	14,9	7,97	94,2	11800	13350	2400
790	18,7	6,60	75,0	12500	14250	2400
820	23,2	5,51	60,4	13750	15600	2400
650	28,8	3,51	48,6	14750	16650	2400
850	31,9	4,15	43,9	15100	17100	2400
670	39,6	2,63	35,3	16000	18200	2400
860	40,2	3,34	34,8	16050	18250	2400
690	49,9	2,15	28,0	17150	19500	2400
590	68,7	1,34	20,4	18400	20850	2400

IHL2 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2190	18,7	18,28	75,0	23650	27500	3340
1820	21,3	13,32	65,8	24650	28500	3810
2100	23,2	14,11	60,4	25300	29400	4150
1820	26,7	10,61	52,4	25850	30100	4780
2140	28,8	11,57	48,6	26500	30700	5150
1890	31,9	9,23	43,9	27700	32100	5200
1850	33,2	8,68	42,1	28300	32600	5200
2170	39,6	8,53	35,3	29600	34000	5200
1890	45,7	6,45	30,6	31000	36000	5200
1920	57,5	5,20	24,3	33100	38450	5200

IHL2 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
5210	55,4	14,66	25,3	46750	53900	9900
5290	69,8	11,82	20,1	50400	58200	12470

IHL2 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1220	11,8	16,05	118,2	11100	12550	2120
1380	14,9	14,46	94,2	11800	13350	2660
1450	18,7	12,11	75,0	12500	14250	3340
1510	23,2	10,14	60,4	13750	15600	3400
1320	28,8	7,14	48,6	14750	16650	3400
1610	31,9	7,86	43,9	15100	17100	3400
1400	39,6	5,50	35,3	16000	18200	3400
1340	40,2	5,20	34,8	16050	18250	3400
1430	49,9	4,46	28,0	17150	19500	3400
1180	68,7	2,68	20,4	18400	20850	3400

IHL2 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
3230	31,9	15,78	43,9	27700	32100	5700
3590	33,2	16,84	42,1	28300	32600	5940
4010	39,6	15,76	35,3	29600	34000	7090
3630	45,7	12,38	30,6	31000	36000	8170
3640	57,5	9,86	24,3	33100	38450	8800

7.3 IHL GEAR REDUCER - 1400 rpm

IHL3 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
860	51,2	2,70	27,4	17150	19500	2400
860	64,2	2,15	21,8	18250	20600	2400
870	80,6	1,73	17,4	19800	22400	2400
750	87,4	1,38	16,0	20200	22800	2000
880	100	1,41	14,0	21200	24050	2400
880	110	1,29	12,8	21900	24750	2400
880	125	1,14	11,2	22650	25750	2400
880	138	1,03	10,2	23200	26300	2400
820	155	0,85	9,0	23650	27000	2400
900	174	0,83	8,1	23650	27000	2400
750	188	0,64	7,5	23650	27000	2000
940	216	0,70	6,5	23650	27000	2400
950	236	0,65	5,9	23650	27000	2400
950	297	0,51	4,7	23800	27150	2400
860	369	0,37	3,8	24650	28150	2400

IHL3 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2600	51,2	8,16	27,4	32650	37900	5200
2610	64,2	6,53	21,8	34350	39850	5200
1930	73,3	4,23	19,1	35750	41600	5200
2620	80,6	5,22	17,4	37350	43300	5200
1950	92,0	3,41	15,2	38300	44400	5200
2630	100	4,22	14,0	39500	45800	5200
1960	114	2,75	12,2	40900	47400	5200
2650	125	3,42	11,2	42100	48900	5200
2650	138	3,09	10,2	43800	50800	5200
2260	155	2,35	9,0	45100	51700	5200
2700	171	2,53	8,2	45100	51700	5200
1970	197	1,60	7,1	45100	51700	5200
2760	216	2,06	6,5	45100	51700	5200
1970	249	1,27	5,6	45100	51700	5200
2300	293	1,26	4,8	45300	52000	5200
2000	309	1,04	4,5	45550	52400	5200
2390	369	1,04	3,8	46200	53650	5200
2030	425	0,77	3,3	47100	54650	5200

IHL3 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1710	51,2	5,37	27,4	17150	19500	3400
1710	64,2	4,28	21,8	18250	20600	3400
1730	80,6	3,45	17,4	19800	22400	3400
1430	87,4	2,63	16,0	20200	22800	3400
1780	100	2,85	14,0	21200	24050	3400
1780	110	2,60	12,8	21900	24750	3400
1780	125	2,30	11,2	22650	25750	3400
1780	138	2,07	10,2	23200	26300	3400
1510	155	1,57	9,0	23650	27000	3400
1840	174	1,70	8,1	23650	27000	3400
1430	188	1,22	7,5	23650	27000	3400
1900	216	1,42	6,5	23650	27000	3400
1920	236	1,31	5,9	23650	27000	3400
1950	297	1,06	4,7	23800	27150	3400
1620	369	0,71	3,8	24650	28150	3400

IHL3 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
4640	51,2	14,57	27,4	32650	37900	8800
4740	64,2	11,86	21,8	34350	39850	8800
3650	73,3	8,00	19,1	35750	41600	8800
4920	80,6	9,80	17,4	37350	43300	8800
3680	92,0	6,43	15,2	38300	44400	8800
5080	100	8,15	14,0	39500	45800	8800
3720	114	5,23	12,2	40900	47400	8800
5250	125	6,77	11,2	42100	48900	8800
5300	138	6,18	10,2	43800	50800	8800
4430	155	4,60	9,0	45100	51700	8800
5340	171	5,01	8,2	45100	51700	8800
3750	197	3,05	7,1	45100	51700	8800
5400	216	4,02	6,5	45100	51700	8800
3750	249	2,42	5,6	45100	51700	8800
4470	293	2,45	4,8	45300	52000	8800
3800	309	1,98	4,5	45550	52400	8800
4650	369	2,03	3,8	46200	53650	8800
3900	425	1,47	3,3	47100	54650	8800

7.3 IHL GEAR REDUCER - 1400 rpm

IHL3 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
8710	79,3	17,64	17,7	51350	59300	13750
7330	83,5	14,10	16,8	52250	60400	14480
7500	90,5	13,31	15,5	53450	61700	14900
8660	98,6	14,11	14,2	56200	64900	14900
7500	114	10,61	12,3	57550	66350	14900
8830	122	11,58	11,4	58850	67850	14900
7960	143	8,97	9,8	62700	72500	14900
8950	168	8,53	8,3	62700	72500	14900
7790	194	6,44	7,2	62700	72500	14900
8150	211	6,19	6,6	62700	72500	14900
6800	232	4,71	6,0	62700	72500	14900
8210	244	5,41	5,7	62700	72500	14900
8260	266	4,98	5,3	62700	72500	14900
8330	291	4,60	4,8	63100	72900	14900
8420	307	4,41	4,6	63450	73250	14900
6910	357	3,11	3,9	64800	74600	14900
5700	409	2,24	3,4	65450	75550	14900

IHL3 180

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
16200	140	18,53	10,0	69000	88800	24340
16300	151	17,31	9,3	69000	88800	26240
15900	162	15,76	8,6	69000	88800	28130
16500	174	15,15	8,0	69000	88800	29000
16700	208	12,85	6,7	69000	88800	29000
16800	240	11,26	5,8	69000	88800	29000
13100	285	7,36	4,9	69200	89000	29000
13400	340	6,31	4,1	71000	91500	29000

IHL3 130

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
10200	104	15,76	13,5	61750	81300	18030
10600	112	15,23	12,5	63000	82900	19390
10600	122	14,01	11,5	64650	85100	21000
10800	140	12,35	10,0	67500	88800	21000
10800	151	11,47	9,3	67500	88800	21000
13800	162	13,70	8,6	67500	88800	21000
14100	187	12,10	7,5	67500	88800	21000
11100	208	8,53	6,7	67500	88800	21000
12300	223	8,86	6,3	67500	88800	21000
11200	240	7,49	5,8	67500	88800	21000
11300	286	6,36	4,9	68100	89000	21000
8930	340	4,22	4,1	70250	91500	21000

7.3 IHL GEAR REDUCER - 1400 rpm

IHL4 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1000	348	0,48	4,0	24600	28100	2400
1020	433	0,39	3,2	25000	28500	2400
1040	474	0,36	3,0	25150	28600	2400
1070	538	0,33	2,6	25850	29300	2400
1070	668	0,27	2,1	26200	29650	2400
1110	740	0,25	1,9	27000	30150	2400
1130	811	0,23	1,7	27300	30900	2400
1160	919	0,21	1,5	27400	31000	2400
1170	1020	0,19	1,4	27450	31050	2400
1200	1160	0,17	1,2	27550	31200	2400
1220	1260	0,16	1,1	27600	31350	2400
1000	1440	0,12	1,0	27650	31550	2400
1250	1590	0,13	0,9	27700	31800	2400
1250	1740	0,12	0,8	27800	32000	2400
1000	2160	0,08	0,6	28700	32200	2400
1000	2720	0,06	0,5	29600	32500	2400

IHL4 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2810	348	1,34	4,0	46000	53450	5200
2810	433	1,08	3,2	47200	54800	5200
2810	474	0,98	3,0	47850	55100	5200
2810	538	0,87	2,6	48600	56450	5200
2830	668	0,70	2,1	49750	57300	5200
2830	740	0,63	1,9	50500	58600	5200
2580	831	0,51	1,7	51400	59700	5200
2840	919	0,51	1,5	52150	60400	5200
2880	1020	0,47	1,4	53000	61650	5200
2710	1140	0,39	1,2	53600	62200	5200
2940	1260	0,38	1,1	54800	63500	5200
2800	1440	0,32	1,0	55300	64200	5200
2970	1590	0,31	0,9	55850	65600	5200
2560	1740	0,24	0,8	56400	67100	5200
2800	1980	0,23	0,7	56950	67750	5200
2560	2190	0,19	0,6	57500	68900	5200
2440	2280	0,18	0,6	57500	68900	5200
2440	2490	0,16	0,6	57500	68900	5200
2800	2720	0,17	0,5	58600	69800	5200

IHL4 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1990	348	0,95	4,0	24600	28100	3400
2010	433	0,77	3,2	25000	28500	3400
2040	474	0,71	3,0	25150	28600	3400
2140	538	0,66	2,6	25850	29300	3400
2150	668	0,53	2,1	26200	29650	3400
2220	740	0,50	1,9	27000	30150	3400
2240	811	0,46	1,7	27300	30900	3400
2280	919	0,41	1,5	27400	31000	3400
2320	1020	0,38	1,4	27450	31050	3400
2370	1160	0,34	1,2	27550	31200	3400
2410	1260	0,32	1,1	27600	31350	3400
1830	1440	0,21	1,0	27650	31550	3400
2460	1590	0,26	0,9	27700	31800	3400
2460	1740	0,23	0,8	27800	32000	3400
1830	2160	0,14	0,6	28700	32200	3400
1830	2720	0,11	0,5	29600	32500	3400

IHL4 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
5480	348	2,61	4,0	46000	53450	8800
5490	433	2,10	3,2	47200	54800	8800
5490	474	1,92	3,0	47850	55100	8800
5500	538	1,69	2,6	48600	56450	8800
5530	668	1,37	2,1	49750	57300	8800
5540	740	1,24	1,9	50500	58600	8800
5090	831	1,01	1,7	51400	59700	8800
5610	919	1,01	1,5	52150	60400	8800
5640	1020	0,92	1,4	53000	61650	8800
5310	1140	0,77	1,2	53600	62200	8800
5760	1260	0,75	1,1	54800	63500	8800
5470	1440	0,63	1,0	55300	64200	8800
5800	1590	0,60	0,9	55850	65600	8800
5070	1740	0,48	0,8	56400	67100	8800
5470	1980	0,46	0,7	56950	67750	8800
5070	2190	0,38	0,6	57500	68900	8800
4610	2280	0,33	0,6	57500	68900	8800
4610	2490	0,31	0,6	57500	68900	8800
5470	2720	0,33	0,5	58600	69800	8800

7.3 IHL GEAR REDUCER - 1400 rpm

IHL4 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
8060	395	3,38	3,5	65100	75150	14900
9850	467	3,50	3,0	66350	76550	14900
9850	529	3,08	2,6	68200	78700	14900
9860	586	2,79	2,4	69100	79750	14900
9320	658	2,35	2,1	69850	80500	14900
9900	728	2,25	1,9	70700	81750	14900
9320	825	1,87	1,7	72250	83400	14900
9400	905	1,72	1,5	73050	84350	14900
10000	1000	1,66	1,4	74600	86150	14900
9470	1140	1,38	1,2	75450	87100	14900
10200	1260	1,35	1,1	76400	88500	14900
9950	1430	1,15	1,0	77500	89400	14900
9700	1570	1,03	0,9	78000	90000	14900
9950	1800	0,92	0,8	78300	90300	14900
8630	2090	0,68	0,7	78700	90700	14900
9950	2270	0,73	0,6	79000	91100	14900
8630	2500	0,57	0,6	79000	91100	14900
8840	2700	0,54	0,5	79500	91600	14900

IHL4 130

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
14900	330	7,48	4,2	70150	91100	21000
14900	358	6,89	3,9	70350	92100	21000
14900	410	6,02	3,4	71100	93900	21000
14900	449	5,49	3,1	72100	95100	21000
14900	509	4,84	2,7	74000	96800	21000
14900	564	4,37	2,5	75150	98300	21000
15000	633	3,92	2,2	76000	100200	21000
15100	701	3,57	2,0	77100	101600	21000
13500	812	2,75	1,7	79000	104000	21000
13800	899	2,54	1,6	80000	104800	21000
15400	964	2,65	1,5	81000	105900	21000
14300	1130	2,09	1,2	83000	109300	21000
14600	1240	1,95	1,1	84200	110800	21000
14800	1410	1,75	1,0	85100	112000	21000
14800	1560	1,58	0,9	86500	114400	21000
14800	1770	1,39	0,8	88000	116100	21000
14800	1940	1,27	0,7	89100	117800	21000
11000	2510	0,73	0,6	92600	122000	21000

IHL4 180

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
19500	330	9,80	4,2	70700	91100	29000
20200	410	8,15	3,4	72800	93900	29000
20500	449	7,55	3,1	73900	95100	29000
20800	509	6,77	2,7	75600	96800	29000
21000	564	6,18	2,5	76500	98300	29000
19500	654	4,94	2,1	78200	100700	29000
21200	701	5,01	2,0	79000	101600	29000
20100	812	4,09	1,7	80800	104000	29000
20400	899	3,75	1,6	81600	104800	29000
16000	980	2,70	1,4	83100	106500	29000
21200	1130	3,09	1,2	84900	109300	29000
21600	1240	2,89	1,1	85800	110800	29000
22000	1410	2,59	1,0	87100	112000	29000
22000	1560	2,34	0,9	88500	114400	29000
19100	1770	1,79	0,8	90300	116100	29000
22000	1940	1,88	0,7	91200	117800	29000
17000	2510	1,12	0,6	94400	122000	29000

7.4 IHL GEAR REDUCER - 900 rpm

IHL1 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
580	4,32	13,04	208,3	9280	10520	790
550	5,37	9,95	167,6	10160	11510	990
490	7,38	6,45	121,9	10870	12300	1360
350	9,30	3,66	96,8	11640	13140	1710

IHL1 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
860	9,30	8,98	96,8	22380	25940	1710

IHL1 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
870	7,38	11,45	121,9	10870	12300	1360
670	9,30	7,00	96,8	11640	13140	1710

7.4 IHL GEAR REDUCER - 900 rpm

IHL2 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
730	11,8	6,17	76,0	12650	14350	2000
820	14,9	5,53	60,5	13750	15600	2400
840	18,7	4,51	48,2	14800	16700	2400
850	23,2	3,67	38,8	15700	17800	2400
680	28,8	2,36	31,2	16850	19000	2400
860	31,9	2,70	28,2	17150	19500	2400
710	39,6	1,79	22,7	17900	20300	2400
860	40,2	2,14	22,4	18200	20550	2400
740	49,9	1,48	18,0	19600	22250	2400
600	68,7	0,88	13,1	21700	24500	2400

IHL2 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2430	18,7	13,04	48,2	26550	30750	3340
1850	21,3	8,70	42,3	28150	32550	3810
2300	23,2	9,93	38,8	28900	33400	4150
1880	26,7	7,05	33,7	29800	34350	4780
2180	28,8	7,58	31,2	30250	35050	5150
2050	31,9	6,44	28,2	31600	36650	5200
1910	33,2	5,76	27,1	32800	38150	5200
2200	39,6	5,56	22,7	33800	39200	5200
1930	45,7	4,23	19,7	35400	41100	5200
1950	57,5	3,39	15,6	37750	43750	5200

IHL2 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
5330	55,4	9,64	16,2	52700	60900	9900
5400	69,8	7,75	12,9	57150	65900	12470

IHL2 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1330	11,8	11,25	76,0	12650	14350	2120
1510	14,9	10,17	60,5	13750	15600	2660
1580	18,7	8,48	48,2	14800	16700	3340
1620	23,2	7,00	38,8	15700	17800	3400
1420	28,8	4,94	31,2	16850	19000	3400
1710	31,9	5,37	28,2	17150	19500	3400
1450	39,6	3,66	22,7	17900	20300	3400
1470	40,2	3,67	22,4	18200	20550	3400
1470	49,9	2,95	18,0	19600	22250	3400
1200	68,7	1,75	13,1	21700	24500	3400

IHL2 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
3650	31,9	11,46	28,2	31600	36650	5700
3640	33,2	10,98	27,1	32800	38150	5940
4380	39,6	11,07	22,7	33800	39200	7090
3650	45,7	8,00	19,7	35400	41100	8170
3680	57,5	6,41	15,6	37750	43750	8800

7.4 IHL GEAR REDUCER - 900 rpm

IHL3 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
870	51,2	1,76	17,6	19600	22250	2400
880	64,2	1,42	14,0	21200	24050	2400
880	80,6	1,13	11,2	22650	25750	2400
750	87,4	0,89	10,3	23150	26250	2000
900	100	0,93	9,0	23650	27000	2400
900	110	0,85	8,2	23650	27000	2400
920	125	0,76	7,2	23650	27000	2400
940	138	0,70	6,5	23650	27000	2400
840	155	0,56	5,8	23650	27000	2400
950	174	0,57	5,2	23650	27000	2400
750	188	0,41	4,8	23750	27100	2000
1000	216	0,48	4,2	24200	27650	2400
1000	236	0,44	3,8	24650	28150	2400
1040	297	0,36	3,0	25150	28600	2400
880	369	0,25	2,4	25900	29350	2400

IHL3 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2620	51,2	5,29	17,6	37300	43250	5200
2630	64,2	4,23	14,0	39500	45800	5200
1960	73,3	2,76	12,3	40800	47250	5200
2650	80,6	3,39	11,2	42100	48900	5200
1970	92,0	2,21	9,8	45100	51700	5200
2670	100	2,75	9,0	45100	51700	5200
1970	114	1,78	7,9	45100	51700	5200
2730	125	2,26	7,2	45100	51700	5200
2760	138	2,07	6,5	45100	51700	5200
2290	155	1,53	5,8	45100	51700	5200
2800	171	1,69	5,3	45100	51700	5200
2000	197	1,05	4,6	45450	52250	5200
2810	216	1,35	4,2	45800	53000	5200
2020	249	0,84	3,6	46900	54300	5200
2460	293	0,87	3,1	47350	54900	5200
2050	309	0,69	2,9	48250	55300	5200
2520	369	0,71	2,4	49000	56850	5200
2160	425	0,52	2,1	49750	57300	5200

IHL3 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1730	51,2	3,49	17,6	19600	22250	3400
1780	64,2	2,86	14,0	21200	24050	3400
1780	80,6	2,28	11,2	22650	25750	3400
1430	87,4	1,69	10,3	23150	26250	3400
1830	100	1,89	9,0	23650	27000	3400
1840	110	1,73	8,2	23650	27000	3400
1880	125	1,56	7,2	23650	27000	3400
1900	138	1,42	6,5	23650	27000	3400
1580	155	1,05	5,8	23650	27000	3400
1950	174	1,16	5,2	23650	27000	3400
1430	188	0,79	4,8	23750	27100	3400
1990	216	0,95	4,2	24200	27650	3400
2000	236	0,88	3,8	24650	28150	3400
2030	297	0,71	3,0	25150	28600	3400
1650	369	0,46	2,4	25900	29350	3400

IHL3 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
4920	51,2	9,93	17,6	37300	43250	8800
5080	64,2	8,17	14,0	39500	45800	8800
3720	73,3	5,24	12,3	40800	47250	8800
5250	80,6	6,72	11,2	42100	48900	8800
3750	92,0	4,21	9,8	45100	51700	8800
5320	100	5,48	9,0	45100	51700	8800
3750	114	3,39	7,9	45100	51700	8800
5370	125	4,45	7,2	45100	51700	8800
5400	138	4,05	6,5	45100	51700	8800
4460	155	2,98	5,8	45100	51700	8800
5470	171	3,30	5,3	45100	51700	8800
3800	197	1,99	4,6	45450	52250	8800
5480	216	2,62	4,2	45800	53000	8800
3880	249	1,61	3,6	46900	54300	8800
4820	293	1,70	3,1	47350	54900	8800
3940	309	1,32	2,9	48250	55300	8800
5000	369	1,40	2,4	49000	56850	8800
4100	425	1,00	2,1	49750	57300	8800

7.4 IHL GEAR REDUCER - 900 rpm

IHL3 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
9440	79,3	12,29	11,3	59150	68200	14620
7860	83,5	9,72	10,8	60500	69850	14900
7630	90,5	8,71	9,9	62700	72500	14900
9510	98,6	9,96	9,1	62700	72500	14900
7750	114	7,04	7,9	62700	72500	14900
8990	122	7,58	7,3	62700	72500	14900
8170	143	5,92	6,3	62700	72500	14900
9070	168	5,56	5,3	62700	72500	14900
7960	194	4,23	4,6	63450	73250	14900
8490	211	4,15	4,3	64050	73850	14900
6800	232	3,03	3,9	64800	74600	14900
8730	244	3,70	3,7	64950	74900	14900
8830	266	3,42	3,4	65450	75550	14900
8530	291	3,03	3,1	66150	76300	14900
9010	307	3,03	2,9	66800	77350	14900
7370	357	2,13	2,5	68650	79200	14900
6050	409	1,53	2,2	69600	80250	14900

IHL3 180

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
16700	140	12,27	6,4	69000	88800	24340
16800	151	11,45	5,9	69000	88800	26240
17400	162	11,07	5,5	69000	88800	28130
16900	174	10,00	5,2	69000	88800	29000
17400	208	8,63	4,3	70500	90700	29000
17800	240	7,66	3,8	72100	92400	29000
13900	285	5,05	3,2	73500	94500	29000
14300	340	4,35	2,6	76000	97600	29000

IHL3 130

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
11000	112	10,12	8,1	67500	88800	19390
11000	122	9,33	7,4	67500	88800	21000
11100	140	8,15	6,4	67500	88800	21000
11200	151	7,61	5,9	67500	88800	21000
14700	162	9,35	5,5	67500	88800	21000
14900	187	8,23	4,8	68400	89400	21000
11600	208	5,76	4,3	69000	90700	21000
12300	223	5,69	4,0	70300	91800	21000
11900	240	5,11	3,8	70500	92400	21000
12300	286	4,42	3,1	72100	95100	21000
9530	340	2,90	2,6	74450	97600	21000

7.4 IHL GEAR REDUCER - 900 rpm

IHL4 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1070	348	0,33	2,6	25850	29300	2400
1070	433	0,26	2,1	26200	29650	2400
1110	474	0,25	1,9	27000	30150	2400
1130	538	0,22	1,7	27300	30900	2400
1170	668	0,19	1,3	27500	31100	2400
1200	740	0,17	1,2	27550	31200	2400
1220	811	0,16	1,1	27600	31350	2400
1250	919	0,14	1,0	27650	31550	2400
1250	1020	0,13	0,9	27700	31800	2400
1250	1160	0,11	0,8	27800	32000	2400
1250	1260	0,11	0,7	28200	32100	2400
1000	1440	0,07	0,6	28700	32200	2400
1250	1590	0,08	0,6	28700	32200	2400
1250	1740	0,08	0,5	29600	32500	2400
1000	2160	0,05	0,4	31000	34000	2400
1000	2720	0,04	0,3	31000	34000	2400

IHL4 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2810	348	0,86	2,6	48600	56450	5200
2830	433	0,70	2,1	49750	57300	5200
2830	474	0,64	1,9	50500	58600	5200
2840	538	0,56	1,7	51400	59700	5200
2880	668	0,46	1,3	53300	62000	5200
2910	740	0,42	1,2	53600	62200	5200
2760	831	0,35	1,1	54800	63500	5200
2970	919	0,34	1,0	55300	64200	5200
2970	1020	0,31	0,9	55850	65600	5200
2800	1140	0,26	0,8	56400	67100	5200
2970	1260	0,25	0,7	56950	67750	5200
2800	1440	0,21	0,6	57500	68900	5200
2970	1590	0,20	0,6	57500	68900	5200
2560	1740	0,16	0,5	58600	69800	5200
2800	1980	0,15	0,5	58600	69800	5200
2560	2190	0,12	0,4	61000	73100	5200
2440	2280	0,11	0,4	61000	73100	5200
2440	2490	0,10	0,4	61000	73100	5200
2800	2720	0,11	0,3	62500	74000	5200

IHL4 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2140	348	0,65	2,6	25850	29300	3400
2150	433	0,53	2,1	26200	29650	3400
2220	474	0,50	1,9	27000	30150	3400
2240	538	0,44	1,7	27300	30900	3400
2330	668	0,37	1,3	27500	31100	3400
2370	740	0,34	1,2	27550	31200	3400
2410	811	0,32	1,1	27600	31350	3400
2460	919	0,28	1,0	27650	31550	3400
2460	1020	0,26	0,9	27700	31800	3400
2460	1160	0,23	0,8	27800	32000	3400
2460	1260	0,21	0,7	28200	32100	3400
1830	1440	0,14	0,6	28700	32200	3400
2460	1590	0,16	0,6	28700	32200	3400
2460	1740	0,15	0,5	29600	32500	3400
1830	2160	0,09	0,4	31000	34000	3400
1830	2720	0,07	0,3	31000	34000	3400

IHL4 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
5500	348	1,68	2,6	48600	56450	8800
5530	433	1,36	2,1	49750	57300	8800
5540	474	1,24	1,9	50500	58600	8800
5570	538	1,10	1,7	51400	59700	8800
5650	668	0,90	1,3	53300	62000	8800
5710	740	0,82	1,2	53600	62200	8800
5410	831	0,69	1,1	54800	63500	8800
5800	919	0,67	1,0	55300	64200	8800
5800	1020	0,61	0,9	55850	65600	8800
5470	1140	0,51	0,8	56400	67100	8800
5800	1260	0,49	0,7	56950	67750	8800
5470	1440	0,40	0,6	57500	68900	8800
5800	1590	0,39	0,6	57500	68900	8800
5070	1740	0,31	0,5	58600	69800	8800
5470	1980	0,29	0,5	58600	69800	8800
5070	2190	0,25	0,4	61000	73100	8800
4610	2280	0,22	0,4	61000	73100	8800
4610	2490	0,20	0,4	61000	73100	8800
5470	2720	0,21	0,3	62500	74000	8800

7.4 IHL GEAR REDUCER - 900 rpm

IHL4 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
8140	395	2,19	2,3	69350	80000	14900
9900	467	2,26	1,9	70700	81750	14900
9920	529	2,00	1,7	72250	83400	14900
9970	586	1,81	1,5	73050	84350	14900
9440	658	1,53	1,4	74600	86150	14900
10200	728	1,49	1,2	75450	87100	14900
9830	825	1,27	1,1	76400	88500	14900
9700	905	1,14	1,0	77500	89400	14900
10200	1000	1,11	0,9	78000	90000	14900
9700	1140	0,91	0,8	78300	90300	14900
10200	1260	0,88	0,7	78700	90700	14900
9950	1430	0,74	0,6	79000	91100	14900
9700	1570	0,66	0,6	79000	91100	14900
9950	1800	0,59	0,5	79500	91600	14900
8630	2090	0,44	0,4	83200	96000	14900
9950	2270	0,47	0,4	83200	96000	14900
8630	2500	0,37	0,4	83200	96000	14900
8840	2700	0,35	0,3	86600	100000	14900

IHL4 130

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
14900	330	4,81	2,7	74000	96800	21000
14900	358	4,43	2,5	75150	98300	21000
15000	410	3,89	2,2	76000	100200	21000
15100	449	3,58	2,0	77100	101600	21000
15200	509	3,18	1,8	78300	103100	21000
15300	564	2,89	1,6	80000	104800	21000
15400	633	2,59	1,4	81600	106500	21000
15500	701	2,36	1,3	82300	107700	21000
14700	812	1,92	1,1	84200	110800	21000
14800	899	1,76	1,0	85100	112000	21000
15700	964	1,73	0,9	86500	114400	21000
14800	1130	1,40	0,8	88000	116100	21000
14800	1240	1,28	0,7	89100	117800	21000
14800	1410	1,12	0,6	92600	122000	21000
14800	1560	1,01	0,6	92600	122000	21000
14800	1770	0,89	0,5	95000	125000	21000
14800	1940	0,82	0,5	95000	125000	21000
11000	2510	0,47	0,4	98500	129600	21000

IHL4 180

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
20800	330	6,72	2,7	75600	96800	29000
21100	410	5,48	2,2	77800	100200	29000
21200	449	5,02	2,0	79000	101600	29000
21300	509	4,45	1,8	80100	103100	29000
21400	564	4,05	1,6	81600	104800	29000
20800	654	3,39	1,4	83100	106500	29000
21700	701	3,30	1,3	84000	107700	29000
21600	812	2,83	1,1	85800	110800	29000
22000	899	2,60	1,0	87100	112000	29000
17000	980	1,85	0,9	88500	114400	29000
22000	1130	2,07	0,8	90300	116100	29000
22000	1240	1,89	0,7	91200	117800	29000
22000	1410	1,66	0,6	94400	122000	29000
22000	1560	1,50	0,6	94400	122000	29000
19100	1770	1,15	0,5	97200	125000	29000
22000	1940	1,21	0,5	97200	125000	29000
17000	2510	0,72	0,4	100400	129600	29000

7.5 IHL GEAR REDUCER - 500 rpm

IHL1 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
630	5,37	6,33	93,1	12120	13730	990
530	7,38	3,87	67,7	12970	14670	1360
370	9,30	2,15	53,8	13880	15670	1710

IHL1 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
730	9,30	4,24	53,8	13880	15670	1710

IHL1 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
860	9,30	4,99	53,8	25750	30000	1710

7.5 IHL GEAR REDUCER - 500 rpm

IHL2 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
730	11,8	3,43	42,2	15100	17100	2000
860	14,9	3,22	33,6	16200	18400	2400
860	18,7	2,56	26,8	17250	19600	2400
860	23,2	2,06	21,6	18300	20650	2400
740	28,8	1,43	17,3	20100	22650	2400
870	31,9	1,52	15,7	20600	23250	2400
800	39,6	1,12	12,6	22000	24800	2400
880	40,2	1,22	12,4	22050	24850	2400
820	49,9	0,91	10,0	23650	27000	2400
600	68,7	0,49	7,3	23650	27000	2400

IHL2 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1920	21,3	5,02	23,5	33600	38950	3810
2610	23,2	6,26	21,6	34500	40000	4150
1930	26,7	4,02	18,7	36250	42100	4780
2220	28,8	4,29	17,3	37400	43350	5150
2220	31,9	3,87	15,7	37700	43700	5200
1950	33,2	3,27	15,1	38400	44500	5200
2240	39,6	3,14	12,6	40300	46750	5200
1960	45,7	2,39	10,9	42200	49050	5200
1970	57,5	1,91	8,7	45100	51700	5200

IHL2 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
5500	55,4	5,53	9,0	62700	72500	9900
5500	69,8	4,39	7,2	62700	72500	12470

IHL2 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1430	11,8	6,72	42,2	15100	17100	2120
1660	14,9	6,21	33,6	16200	18400	2660
1710	18,7	5,10	26,8	17250	19600	3340
1710	23,2	4,10	21,6	18300	20650	3400
1470	28,8	2,84	17,3	20100	22650	3400
1770	31,9	3,09	15,7	20600	23250	3400
1500	39,6	2,11	12,6	22000	24800	3400
1550	40,2	2,15	12,4	22050	24850	3400
1510	49,9	1,68	10,0	23650	27000	3400
1200	68,7	0,97	7,3	23650	27000	3400

IHL2 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
3680	33,2	6,17	15,1	38400	44500	5940
4410	39,6	6,19	12,6	40300	46750	7090
3750	45,7	4,57	10,9	42200	49050	8170
3750	57,5	3,63	8,7	45100	51700	8800

7.5 IHL GEAR REDUCER - 500 rpm

IHL3 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
880	51,2	0,99	9,8	23650	27000	2400
900	64,2	0,80	7,8	23650	27000	2400
940	80,6	0,67	6,2	23650	27000	2400
750	87,4	0,49	5,7	23650	27000	2000
950	100	0,54	5,0	23650	27000	2400
970	110	0,51	4,6	24100	27550	2400
1000	125	0,46	4,0	24600	28100	2400
1010	138	0,42	3,6	24800	28350	2400
870	155	0,32	3,2	25000	28500	2400
1050	174	0,35	2,9	25200	28800	2400
770	188	0,24	2,7	25600	29100	2000
1070	216	0,28	2,3	26000	29450	2400
1070	236	0,26	2,1	26200	29650	2400
1130	297	0,22	1,7	27300	30900	2400
960	369	0,15	1,4	27450	31050	2400

IHL3 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2650	51,2	2,97	9,8	45100	51700	5200
2710	64,2	2,42	7,8	45100	51700	5200
1970	73,3	1,54	6,8	45100	51700	5200
2770	80,6	1,97	6,2	45100	51700	5200
1970	92,0	1,23	5,4	45100	51700	5200
2810	100	1,61	5,0	45100	51700	5200
2000	114	1,00	4,4	45650	52600	5200
2810	125	1,29	4,0	46000	53450	5200
2810	138	1,17	3,6	46900	54300	5200
2440	155	0,90	3,2	47200	54800	5200
2810	171	0,94	2,9	48250	55300	5200
2100	197	0,61	2,5	48900	56750	5200
2820	216	0,75	2,3	49250	57050	5200
2180	249	0,50	2,0	50100	57950	5200
2580	293	0,51	1,7	51400	59700	5200
2250	309	0,42	1,6	51800	60050	5200
2670	369	0,42	1,4	53000	61650	5200
2370	425	0,32	1,2	53600	62200	5200

IHL3 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1780	51,2	2,00	9,8	23650	27000	3400
1850	64,2	1,65	7,8	23650	27000	3400
1910	80,6	1,36	6,2	23650	27000	3400
1430	87,4	0,94	5,7	23650	27000	3400
1950	100	1,12	5,0	23650	27000	3400
1970	110	1,03	4,6	24100	27550	3400
1990	125	0,92	4,0	24600	28100	3400
2010	138	0,84	3,6	24800	28350	3400
1650	155	0,61	3,2	25000	28500	3400
2050	174	0,68	2,9	25200	28800	3400
1430	188	0,44	2,7	25600	29100	3400
2140	216	0,57	2,3	26000	29450	3400
2150	236	0,52	2,1	26200	29650	3400
2240	297	0,43	1,7	27300	30900	3400
1750	369	0,27	1,4	27450	31050	3400

IHL3 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
5300	51,2	5,94	9,8	45100	51700	8800
5360	64,2	4,79	7,8	45100	51700	8800
3750	73,3	2,94	6,8	45100	51700	8800
5410	80,6	3,85	6,2	45100	51700	8800
3750	92,0	2,34	5,4	45100	51700	8800
5480	100	3,14	5,0	45100	51700	8800
3800	114	1,91	4,4	45650	52600	8800
5480	125	2,53	4,0	46000	53450	8800
5490	138	2,29	3,6	46900	54300	8800
4780	155	1,77	3,2	47200	54800	8800
5490	171	1,84	2,9	48250	55300	8800
4000	197	1,16	2,5	48900	56750	8800
5510	216	1,47	2,3	49250	57050	8800
4140	249	0,96	2,0	50100	57950	8800
5080	293	1,00	1,7	51400	59700	8800
4280	309	0,79	1,6	51800	60050	8800
5240	369	0,82	1,4	53000	61650	8800
4490	425	0,61	1,2	53600	62200	8800

7.5 IHL GEAR REDUCER - 500 rpm

IHL3 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
9770	79,3	7,07	6,3	62700	72500	14620
7970	83,5	5,48	6,0	62700	72500	14900
7920	90,5	5,02	5,5	62700	72500	14900
9850	98,6	5,73	5,1	62700	72500	14900
7960	114	4,02	4,4	63850	73650	14900
9150	122	4,29	4,1	64400	74200	14900
8800	143	3,54	3,5	65100	75150	14900
9240	168	3,15	3,0	66350	76550	14900
8080	194	2,39	2,6	68200	78700	14900
9210	211	2,50	2,4	69100	79750	14900
6890	232	1,71	2,2	69600	80250	14900
9240	244	2,18	2,1	69850	80500	14900
9250	266	1,99	1,9	70700	81750	14900
8640	291	1,70	1,7	72250	83400	14900
9360	307	1,75	1,6	72650	83900	14900
7920	357	1,27	1,4	74600	86150	14900
6730	409	0,94	1,2	75450	87100	14900

IHL3 130

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
11500	112	5,90	4,5	68600	90300	19390
11700	122	5,51	4,1	70250	91500	21000
12000	140	4,89	3,6	70700	93100	21000
12200	151	4,61	3,3	71600	94200	21000
14900	162	5,27	3,1	72100	95100	21000
14900	187	4,57	2,7	74000	96800	21000
12800	208	3,53	2,4	75400	98900	21000
12300	223	3,16	2,2	76000	100200	21000
13100	240	3,13	2,1	76500	100700	21000
13500	286	2,71	1,7	79000	104000	21000
10400	340	1,76	1,5	81000	105900	21000

IHL3 180

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
17900	140	7,32	3,6	72300	93100	24340
18200	151	6,90	3,3	73100	94200	26240
17500	162	6,19	3,1	73900	95100	28130
18600	174	6,12	2,9	74700	96200	29000
19200	208	5,29	2,4	76700	98900	29000
19100	240	4,57	2,1	78200	100700	29000
15500	285	3,11	1,8	80100	103100	29000
15800	340	2,67	1,5	82100	105900	29000

7.5 IHL GEAR REDUCER - 500 rpm

IHL4 010

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
1170	348	0,20	1,4	27450	31050	2400
1210	433	0,17	1,2	27550	31200	2400
1230	474	0,15	1,1	27600	31350	2400
1250	538	0,14	0,9	27700	31800	2400
1250	668	0,11	0,7	28200	32100	2400
1250	740	0,10	0,7	28200	32100	2400
1250	811	0,09	0,6	28700	32200	2400
1250	919	0,08	0,5	29600	32500	2400
1250	1020	0,07	0,5	29600	32500	2400
1250	1160	0,06	0,4	31000	34000	2400
1250	1260	0,06	0,4	31000	34000	2400
1000	1440	0,04	0,3	31000	34000	2400
1250	1590	0,05	0,3	31000	34000	2400
1250	1740	0,04	0,3	31000	34000	2400
1000	2160	0,03	0,2	31000	34000	2400
1000	2720	0,02	0,2	31000	34000	2400

IHL4 030

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2860	348	0,49	1,4	53000	61650	5200
2930	433	0,40	1,2	53600	62200	5200
2960	474	0,37	1,1	54800	63500	5200
2970	538	0,33	0,9	55850	65600	5200
2970	668	0,26	0,7	56950	67750	5200
2970	740	0,24	0,7	56950	67750	5200
2800	831	0,20	0,6	57500	68900	5200
2970	919	0,19	0,5	58600	69800	5200
2970	1020	0,17	0,5	58600	69800	5200
2800	1140	0,14	0,4	61000	73100	5200
2970	1260	0,14	0,4	61000	73100	5200
2800	1440	0,12	0,3	62500	74000	5200
2970	1590	0,11	0,3	62500	74000	5200
2560	1740	0,09	0,3	62500	74000	5200
2800	1980	0,08	0,3	62500	74000	5200
2560	2190	0,07	0,2	64000	74000	5200
2440	2280	0,06	0,2	64000	74000	5200
2440	2490	0,06	0,2	64000	74000	5200
2800	2720	0,06	0,2	64000	74000	5200

IHL4 020

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
2310	348	0,39	1,4	27450	31050	3400
2390	433	0,33	1,2	27550	31200	3400
2430	474	0,30	1,1	27600	31350	3400
2460	538	0,27	0,9	27700	31800	3400
2460	668	0,22	0,7	28200	32100	3400
2460	740	0,20	0,7	28200	32100	3400
2460	811	0,18	0,6	28700	32200	3400
2460	919	0,16	0,5	29600	32500	3400
2460	1020	0,14	0,5	29600	32500	3400
2460	1160	0,13	0,4	31000	34000	3400
2460	1260	0,12	0,4	31000	34000	3400
1830	1440	0,08	0,3	31000	34000	3400
2460	1590	0,09	0,3	31000	34000	3400
2460	1740	0,08	0,3	31000	34000	3400
1830	2160	0,05	0,2	31000	34000	3400
1830	2720	0,04	0,2	31000	34000	3400

IHL4 050

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
5630	348	0,96	1,4	53000	61650	8800
5740	433	0,78	1,2	53600	62200	8800
5760	474	0,72	1,1	54800	63500	8800
5800	538	0,64	0,9	55850	65600	8800
5800	668	0,51	0,7	56950	67750	8800
5800	740	0,46	0,7	56950	67750	8800
5470	831	0,39	0,6	57500	68900	8800
5800	919	0,37	0,5	58600	69800	8800
5800	1020	0,34	0,5	58600	69800	8800
5470	1140	0,28	0,4	61000	73100	8800
5800	1260	0,27	0,4	61000	73100	8800
5470	1440	0,22	0,3	62500	74000	8800
5800	1590	0,22	0,3	62500	74000	8800
5070	1740	0,17	0,3	62500	74000	8800
5470	1980	0,16	0,3	62500	74000	8800
5070	2190	0,14	0,2	64000	74000	8800
4610	2280	0,12	0,2	64000	74000	8800
4610	2490	0,11	0,2	64000	74000	8800
5470	2720	0,12	0,2	64000	74000	8800

7.5 IHL GEAR REDUCER - 500 rpm

IHL4 080

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
8430	395	1,26	1,3	75050	86650	14900
10300	467	1,31	1,1	76400	88500	14900
10400	529	1,16	0,9	78000	90000	14900
10400	586	1,05	0,9	78000	90000	14900
9700	658	0,87	0,8	78300	90300	14900
10400	728	0,85	0,7	78700	90700	14900
9950	825	0,71	0,6	79000	91100	14900
9700	905	0,63	0,6	79000	91100	14900
10200	1000	0,62	0,5	79500	91600	14900
9700	1140	0,50	0,4	83200	96000	14900
10200	1260	0,49	0,4	83200	96000	14900
9950	1430	0,41	0,3	86600	100000	14900
9700	1570	0,37	0,3	86600	100000	14900
9950	1800	0,33	0,3	86600	100000	14900
8630	2090	0,24	0,2	92400	106600	14900
9950	2270	0,26	0,2	92400	106600	14900
8630	2500	0,20	0,2	92400	106600	14900
8840	2700	0,19	0,2	92400	106600	14900

IHL4 180

Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
21500	330	3,85	1,5	82100	105900	29000
21700	410	3,14	1,2	84900	109300	29000
21700	449	2,86	1,1	85800	110800	29000
21700	509	2,52	1,0	87100	112000	29000
21700	564	2,28	0,9	88500	114400	29000
22000	654	1,99	0,8	90300	116100	29000
21700	701	1,84	0,7	91200	117800	29000
22000	812	1,60	0,6	94400	122000	29000
22000	899	1,45	0,6	94400	122000	29000
17000	980	1,03	0,5	97200	125000	29000
22000	1130	1,15	0,4	100400	129600	29000
22000	1240	1,05	0,4	100400	129600	29000
22000	1410	0,92	0,4	100400	129600	29000
22000	1560	0,83	0,3	105600	136000	29000
19100	1770	0,64	0,3	105600	136000	29000
22000	1940	0,67	0,3	105600	136000	29000
17000	2510	0,40	0,2	108800	140000	29000

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Mn ₂ [Nm]	i	Pn ₁ [kW]	n ₂ [rpm]	Fr ₂ CS [N]	Fr ₂ SS [N]	M _{2max} [Nm]
15400	330	2,75	1,5	81000	105900	21000
15400	358	2,55	1,4	81600	106500	21000
15600	410	2,24	1,2	83000	109300	21000
15600	449	2,05	1,1	84200	110800	21000
15700	509	1,82	1,0	85100	112000	21000
15700	564	1,64	0,9	86500	114400	21000
15700	633	1,47	0,8	88000	116100	21000
15700	701	1,32	0,7	89100	117800	21000
14800	812	1,08	0,6	92600	122000	21000
14800	899	0,98	0,6	92600	122000	21000
15700	964	0,96	0,5	95000	125000	21000
14800	1130	0,78	0,4	98500	129600	21000
14800	1240	0,71	0,4	98500	129600	21000
14800	1410	0,62	0,4	98500	129600	21000
14800	1560	0,56	0,3	102700	136000	21000
14800	1770	0,50	0,3	102700	136000	21000
14800	1940	0,45	0,3	102700	136000	21000
11000	2510	0,26	0,2	106400	140000	21000

7.6 WORKING CYCLES - $n_2 \cdot h$

HL1 / IHL1 010

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
3,44	780	770	750	750	740	730	730	620	550	520	470
4,32	1250	1070	950	880	860	840	750	640	570	540	510
5,37	1000	880	850	820	680	650	630	550	500	490	460
7,38	750	650	600	600	580	550	510	450	440	430	390
9,30	550	460	400	400	390	370	350	310	280	260	240

HL1 / IHL1 020

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
3,44	1490	1430	1430	1430	1430	1430	1300	1130	980	920	850
4,32	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
5,37	1830	1650	1600	1510	1430	1320	1240	1070	970	910	830
7,38	1340	1250	1200	1200	1170	1150	940	780	760	750	720
9,30	920	780	730	730	730	730	670	620	560	520	470

HL1 / IHL1 030

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
5,37	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
6,19	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
7,38	2100	1870	1710	1650	1650	1650	1500	1250	1230	1150	1060
9,30	1250	1150	1070	1000	900	860	860	750	690	660	600

HL1 / IHL1 080

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
7,50	7000	5900	5500	5500	5100	4810	4430	4100	3900	3680	3430

7.6 WORKING CYCLES - $n_2 \cdot h$

HL2 / IHL2 010

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
11,8	780	770	750	750	740	730	730	620	550	520	470
14,9	1250	1070	950	880	860	840	750	640	570	540	510
18,7	1250	1070	950	880	860	840	750	640	570	540	510
23,2	1250	1070	950	880	860	840	750	640	570	540	510
28,8	1000	880	850	820	680	650	630	550	500	490	460
31,9	1250	1070	950	880	860	840	750	640	570	540	510
39,6	1000	880	850	820	680	650	630	550	500	490	460
40,2	1250	1070	950	880	860	840	750	640	570	540	510
49,9	1000	880	850	820	680	650	630	550	500	490	460
68,7	750	650	600	600	580	550	510	450	440	430	390

HL2 / IHL2 020

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
11,8	1490	1430	1430	1430	1430	1430	1300	1130	980	920	850
14,9	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
18,7	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
23,2	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
28,8	1830	1650	1600	1510	1430	1320	1240	1070	970	910	830
31,9	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
39,6	1830	1650	1600	1510	1430	1320	1240	1070	970	910	830
40,2	1730	1680	1680	1590	1370	1220	1010	940	940	940	860
49,9	1830	1650	1600	1510	1430	1320	1190	1070	970	910	830
68,7	1340	1250	1200	1200	1170	1150	940	780	760	750	720

HL2 / IHL2 030

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
11,8	2410	2310	2310	2310	2260	2210	1740	1540	1420	1310	1210
14,9	2970	2810	2810	2650	2590	2420	2050	1750	1580	1410	1280
18,7	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
21,3	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
23,2	2970	2810	2810	2650	2470	2180	2010	1750	1580	1410	1280
26,7	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
28,8	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
31,9	2560	2520	2470	2350	2040	1840	1730	1490	1460	1410	1280
33,2	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
39,6	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
45,7	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
57,5	2400	2100	1970	1970	1860	1630	1360	1340	1340	1330	1240

7.6 WORKING CYCLES - $n_2 \cdot h$

HL2 / IHL2 050

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
11,8	4700	4490	4490	4470	4260	3840	3090	2710	2500	2290	2170
14,9	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
18,7	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
21,3	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
23,2	5800	5500	5480	5300	4590	4280	3630	2960	2680	2430	2200
26,7	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
28,8	5470	5000	4470	4420	4330	4280	3490	2880	2620	2400	2160
31,9	5070	5030	4940	4820	3600	3220	3150	2850	2680	2430	2200
33,2	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
39,6	5470	5000	4470	4420	4220	3950	3490	2880	2620	2400	2160
45,7	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
57,5	4380	4000	3750	3750	3630	3180	2700	2640	2580	2340	2130

HL2 / IHL2 080

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
22,8	9700	9270	9100	8900	7670	6680	5480	4620	4190	3780	3390
26,3	8250	8120	7920	7630	6850	5890	5380	4500	4080	3690	3310
28,6	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
33,0	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
38,4	8630	7370	6650	6600	6470	6460	5480	4670	4230	3910	3520
45,8	8630	7370	6650	6600	6470	6460	5480	4670	4230	3910	3520
55,4	7000	5900	5500	5500	5100	4810	4430	4100	3900	3680	3430
69,8	7000	5900	5500	5500	5100	4740	4120	4100	3900	3680	3430

HL2 / IHL2 130

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
38,8	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
46,0	11000	9600	8700	8700	8390	8240	7490	6280	5690	5140	4620

HL2 / IHL2 180

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
46,0	17000	14400	13000	13000	12400	12000	10300	8620	7810	7090	6390

7.6 WORKING CYCLES - $n_2 \cdot h$

HL3 / IHL3 010

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
51,2	1250	1070	950	880	860	840	750	640	570	540	510
64,2	1250	1070	950	880	860	840	750	640	570	540	510
80,6	1250	1070	950	880	860	840	750	640	570	540	510
87,4	780	770	750	750	740	730	730	620	550	520	470
100	1250	1070	950	880	860	840	750	640	570	540	510
110	1250	1070	950	880	860	840	750	640	570	540	510
125	1250	1070	950	880	860	840	750	640	570	540	510
138	1250	1070	950	880	860	840	750	640	570	540	510
155	1000	880	850	820	680	650	630	550	500	490	460
174	1250	1070	950	880	860	840	750	640	570	540	510
188	780	770	750	750	740	730	730	620	550	520	470
216	1250	1070	950	880	860	840	750	640	570	540	510
236	1250	1070	950	880	860	840	750	640	570	540	510
297	1250	1070	950	880	860	840	750	640	570	540	510
369	1000	880	850	820	680	650	630	550	500	490	460

HL3 / IHL3 020

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
51,2	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
64,2	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
80,6	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
87,4	1490	1430	1430	1430	1430	1430	1300	1130	980	920	850
100	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
110	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
125	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
138	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
155	1830	1650	1600	1510	1430	1320	1240	1070	970	910	830
174	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
188	1490	1430	1430	1430	1430	1430	1300	1130	980	920	850
216	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
236	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
297	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
369	1830	1650	1600	1510	1430	1320	1240	1070	970	910	830

7.6 WORKING CYCLES - $n_2 \cdot h$

HL3 / IHL3 030

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
51,2	2970	2810	2810	2650	2590	2420	2050	1750	1580	1410	1280
64,2	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
73,3	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
80,6	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
92,0	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
100	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
114	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
125	2970	2810	2810	2650	2470	2180	2010	1750	1580	1410	1280
138	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
155	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
171	2970	2810	2810	2650	2470	2180	2010	1750	1580	1410	1280
197	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
216	2970	2810	2810	2650	2470	2180	2010	1750	1580	1410	1280
249	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
293	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
309	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
369	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
425	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240

HL3 / IHL3 050

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
51,2	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
64,2	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
73,3	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
80,6	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
92,0	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
100	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
114	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
125	5800	5500	5480	5300	4590	4280	3630	2960	2680	2430	2200
138	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
155	5470	5000	4470	4420	4330	4280	3490	2880	2620	2400	2160
171	5800	5500	5480	5300	4590	4280	3630	2960	2680	2430	2200
197	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
216	5800	5500	5480	5300	4590	4280	3630	2960	2680	2430	2200
249	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
293	5470	5000	4470	4420	4220	3950	3490	2880	2620	2400	2160
309	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
369	5470	5000	4470	4420	4220	3950	3490	2880	2620	2400	2160
425	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130

7.6 WORKING CYCLES - n₂•h

HL3 / IHL3 080

n ₂ •h	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
53,5	8740	8130	8000	7870	7130	6120	4970	4140	3750	3390	3040
63,2	10400	9850	9850	9600	7850	6880	5580	4660	4230	3810	3410
79,3	10400	9850	9850	9600	7850	6880	5580	4660	4230	3810	3410
83,5	8740	8130	8000	7870	6880	6120	4970	4140	3750	3390	3040
90,5	8250	8120	7920	7630	6850	5890	5380	4500	4080	3690	3310
98,6	10400	9850	9850	9330	7850	6880	5580	4660	4230	3810	3410
114	8250	8120	7920	7630	6850	5890	5380	4500	4080	3690	3310
122	9700	9270	9100	8900	7670	6680	5480	4620	4190	3780	3390
143	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
168	9700	9270	9100	8900	7670	6680	5480	4620	4190	3780	3390
194	8250	8120	7920	7630	6850	5890	5380	4500	4080	3690	3310
211	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
232	7240	6800	6800	6800	5900	5400	4750	4240	3870	3490	3110
244	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
266	9950	9200	8300	7400	5970	5970	5780	4790	4370	3980	3560
291	8840	8530	8300	7950	6770	6360	5480	4790	4370	3980	3560
307	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
357	8630	7370	6650	6600	6470	6460	5480	4670	4230	3910	3520
409	7000	5900	5500	5500	5100	4810	4430	4100	3900	3680	3430

HL3 / IHL3 130

n ₂ •h	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
48,4	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
60,8	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
76,3	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
78,0	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
94,9	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
104	15700	14900	13800	11300	9950	8740	7770	6510	5900	5330	4790
112	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
122	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
140	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
151	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
162	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
187	15200	14900	14500	13500	10700	9560	7770	6510	5900	5330	4790
208	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
223	12500	12300	12300	12300	10200	9050	7770	6510	5900	5330	4790
240	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
286	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
340	11000	9600	8700	8700	8390	8240	7490	6280	5690	5140	4620

7.6 WORKING CYCLES - $n_2 \cdot h$

HL3 / IHL3 180

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
48,4	17800	17700	17200	16000	11700	10500	8910	7600	6820	6100	5420
60,8	21700	21000	19000	17700	13400	11500	9310	7660	6920	6200	5510
76,3	21700	21000	19000	17700	13400	11500	9310	7660	6920	6200	5510
78,0	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
94,9	21700	21000	19000	17700	13400	11500	9310	7660	6920	6200	5510
98,0	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
112	19100	18900	16900	16200	13900	12800	10400	8720	7900	7170	6460
122	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
140	19100	18900	16900	16200	13900	12800	10400	8720	7900	7170	6460
151	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
162	18300	17500	17400	15900	13300	11200	9090	7560	6810	6100	5430
174	19100	18900	16900	16200	13900	12800	10400	8720	7900	7170	6460
208	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
240	19100	18900	16900	16200	13900	12800	10400	8720	7900	7170	6460
285	17000	14400	13000	13000	12400	12000	10300	8620	7810	7090	6390
340	17000	14400	13000	13000	12400	12000	10300	8620	7810	7090	6390

HL4 / IHL4 010

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
348	1250	1070	950	880	860	840	750	640	570	540	510
433	1250	1070	950	880	860	840	750	640	570	540	510
474	1250	1070	950	880	860	840	750	640	570	540	510
538	1250	1070	950	880	860	840	750	640	570	540	510
668	1250	1070	950	880	860	840	750	640	570	540	510
740	1250	1070	950	880	860	840	750	640	570	540	510
811	1250	1070	950	880	860	840	750	640	570	540	510
919	1250	1070	950	880	860	840	750	640	570	540	510
1020	1250	1070	950	880	860	840	750	640	570	540	510
1160	1250	1070	950	880	860	840	750	640	570	540	510
1260	1250	1070	950	880	860	840	750	640	570	540	510
1440	1000	880	850	820	680	650	630	550	500	490	460
1590	1250	1070	950	880	860	840	750	640	570	540	510
1740	1250	1070	950	880	860	840	750	640	570	540	510
2160	1000	880	850	820	680	650	630	550	500	490	460
2720	1000	880	850	820	680	650	630	550	500	490	460

7.6 WORKING CYCLES - $n_2 \cdot h$

HL4 / IHL4 020

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
348	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
433	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
474	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
538	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
668	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
740	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
811	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
919	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
1020	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
1160	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
1260	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
1440	1830	1650	1600	1510	1430	1320	1240	1070	970	910	830
1590	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
1740	2460	2140	1950	1780	1690	1580	1370	1170	1060	960	860
2160	1830	1650	1600	1510	1430	1320	1240	1070	970	910	830
2720	1830	1650	1600	1510	1430	1320	1240	1070	970	910	830

HL4 / IHL4 030

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
348	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
433	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
474	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
538	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
668	2970	2810	2810	2650	2470	2180	2010	1750	1580	1410	1280
740	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
831	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
919	2970	2810	2810	2650	2470	2180	2010	1750	1580	1410	1280
1020	2970	2810	2810	2650	2590	2430	2090	1750	1580	1410	1280
1140	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
1260	2970	2810	2810	2650	2470	2180	2010	1750	1580	1410	1280
1440	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
1590	2970	2810	2810	2650	2470	2180	2010	1750	1580	1410	1280
1740	2560	2520	2470	2350	2040	1840	1730	1490	1460	1410	1280
1980	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270
2190	2560	2520	2470	2350	2040	1840	1730	1490	1460	1410	1280
2280	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
2490	2440	2100	1970	1970	1890	1820	1820	1510	1380	1330	1240
2720	2800	2520	2300	2250	2180	2140	2030	1670	1520	1400	1270

7.6 WORKING CYCLES - $n_2 \cdot h$

HL4 / IHL4 050

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
348	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
433	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
474	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
538	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
668	5800	5500	5480	5300	4590	4280	3630	2960	2680	2430	2200
740	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
831	5470	5000	4470	4420	4330	4280	3490	2880	2620	2400	2160
919	5800	5500	5480	5300	4590	4280	3630	2960	2680	2430	2200
1020	5800	5500	5480	5300	4590	4410	3630	2960	2680	2430	2200
1140	5470	5000	4470	4420	4330	4280	3490	2880	2620	2400	2160
1260	5800	5500	5480	5300	4590	4280	3630	2960	2680	2430	2200
1440	5470	5000	4470	4420	4330	4280	3490	2880	2620	2400	2160
1590	5800	5500	5480	5300	4590	4280	3630	2960	2680	2430	2200
1740	5070	5030	4940	4820	3600	3220	3150	2850	2680	2430	2200
1980	5470	5000	4470	4420	4330	4280	3490	2880	2620	2400	2160
2190	5070	5030	4940	4820	3600	3220	3150	2850	2680	2430	2200
2280	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
2490	4610	4000	3750	3750	3630	3550	3460	2840	2580	2340	2130
2720	5470	5000	4470	4420	4220	3950	3490	2880	2620	2400	2160

HL4 / IHL4 080

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
395	8740	8130	8000	7870	7130	6120	4970	4140	3750	3390	3040
467	10400	9850	9850	9600	7850	6880	5580	4660	4230	3810	3410
529	10400	9850	9850	9330	7850	6880	5580	4660	4230	3810	3410
586	10400	9850	9850	9600	7850	6880	5580	4660	4230	3810	3410
658	9700	9270	9100	8900	7670	6680	5480	4620	4190	3780	3390
728	10400	9850	9850	9330	7850	6880	5580	4660	4230	3810	3410
825	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
905	9700	9270	9100	8900	7670	6680	5480	4620	4190	3780	3390
1000	10200	9690	8820	7790	6680	6020	5580	4660	4230	3810	3410
1140	9700	9270	9100	8900	7670	6680	5480	4620	4190	3780	3390
1260	10200	9690	8820	7790	6680	6020	5580	4660	4230	3810	3410
1430	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
1570	9700	9270	9100	8900	7670	6680	5480	4620	4190	3780	3390
1800	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
2090	8630	7370	6650	6600	6470	6460	5480	4670	4230	3910	3520
2270	9950	9200	8300	7950	7180	6810	5780	4790	4370	3980	3560
2500	8630	7370	6650	6600	6470	6460	5480	4670	4230	3910	3520
2700	8840	8530	8300	7950	6770	6360	5480	4790	4370	3980	3560

7.6 WORKING CYCLES - $n_2 \cdot h$

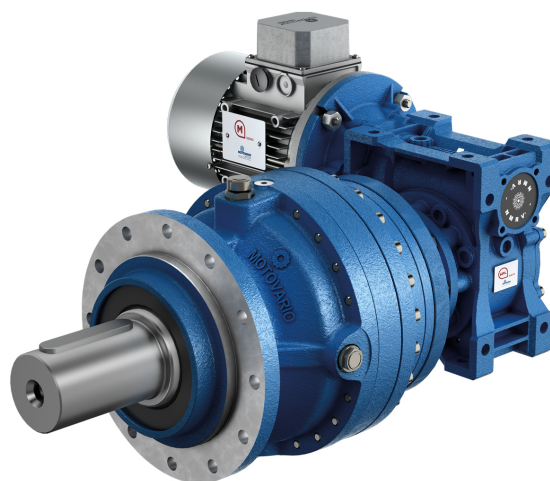
HL4 / IHL4 130

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
330	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
358	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
410	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
449	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
509	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
564	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
633	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
701	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
812	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
899	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
964	15700	14900	14900	13500	10700	9560	7770	6510	5900	5330	4790
1130	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
1240	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
1410	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
1560	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
1770	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
1940	14800	12700	11300	10800	9800	9340	7590	6360	5760	5210	4680
2510	11000	9600	8700	8700	8390	8240	7490	6280	5690	5140	4620

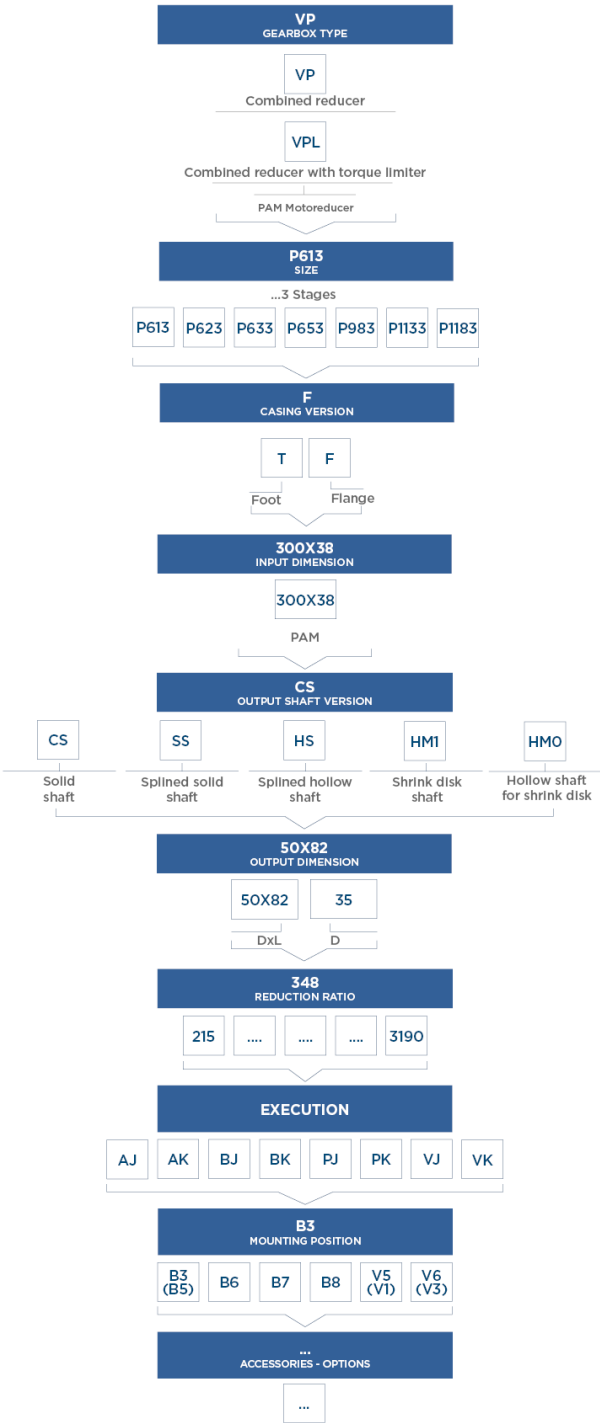
HL4 / IHL4 180

$n_2 \cdot h$	10.000	25.000	50.000	100.000	300.000	500.000	1.000.000	1.800.000	2.500.000	3.500.000	5.000.000
i	Mn ₂ [Nm]										
330	21700	21000	19000	17700	13400	11500	9310	7660	6920	6200	5510
410	21700	21000	19000	17700	13400	11500	9310	7660	6920	6200	5510
449	21700	21000	19000	17700	13400	11500	9310	7660	6920	6200	5510
509	21700	21000	19000	17700	13400	11500	9310	7660	6920	6200	5510
564	21700	21000	19000	17700	13400	11500	9310	7660	6920	6200	5510
654	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
701	21700	21000	19000	17700	13400	11500	9310	7660	6920	6200	5510
812	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
899	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
980	17000	14400	13000	13000	12400	12000	10300	8620	7810	7090	6390
1130	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
1240	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
1410	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
1560	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
1770	19100	18900	16900	16200	13900	12800	10400	8720	7900	7170	6460
1940	22000	19100	16900	16200	13900	12800	10400	8720	7900	7170	6460
2510	17000	14400	13000	13000	12400	12000	10300	8620	7810	7090	6390

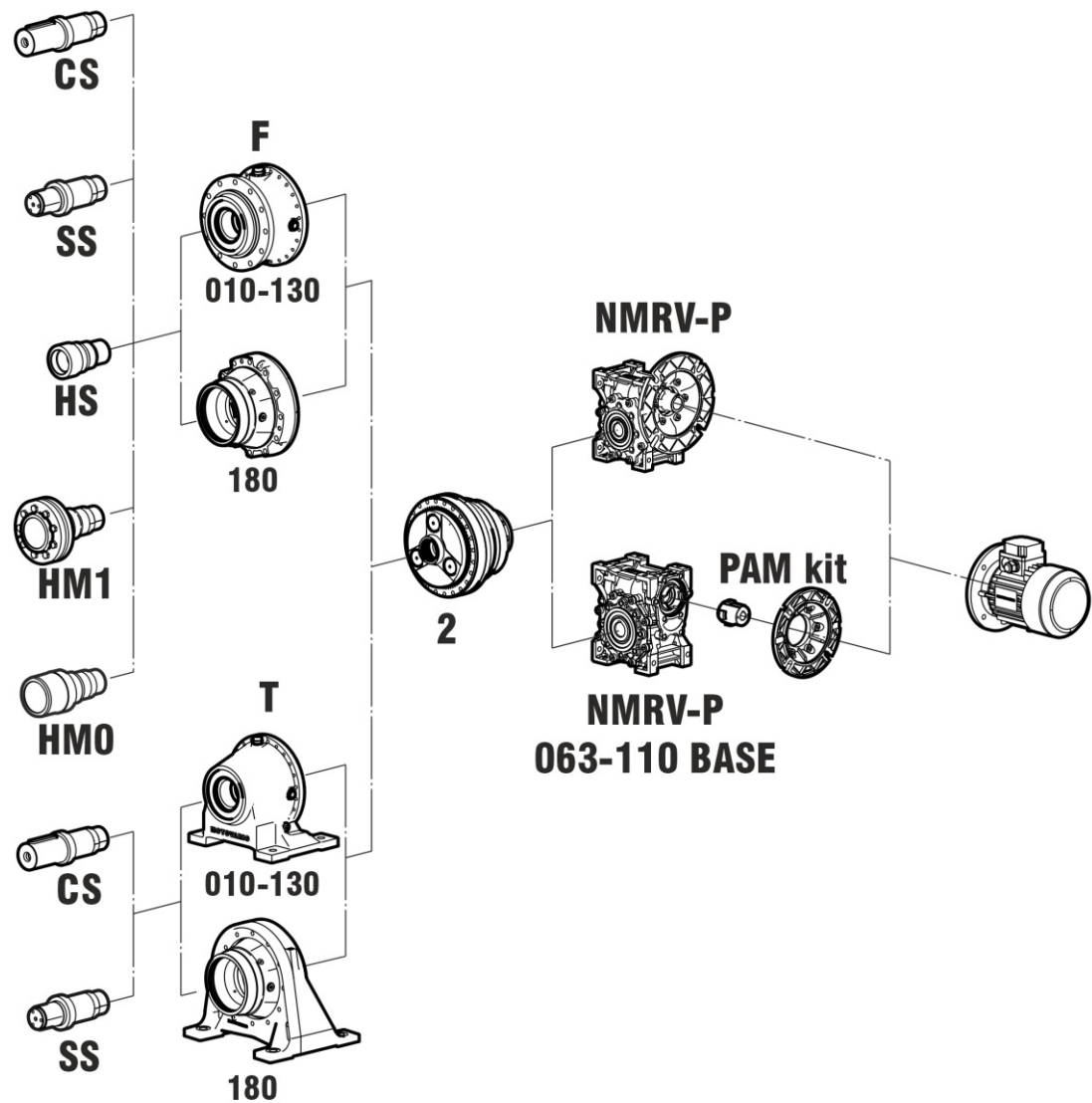
8.1 VP - GEAR REDUCERS COMBINED



9.1.1 Designation



9.1.2 Modularity



CS	Solid shaft
SS	Splined solid shaft
HS	Splined hollow shaft
HM1	Hollow shaft with shrink disk
HMO	Hollow shaft for shrink disk

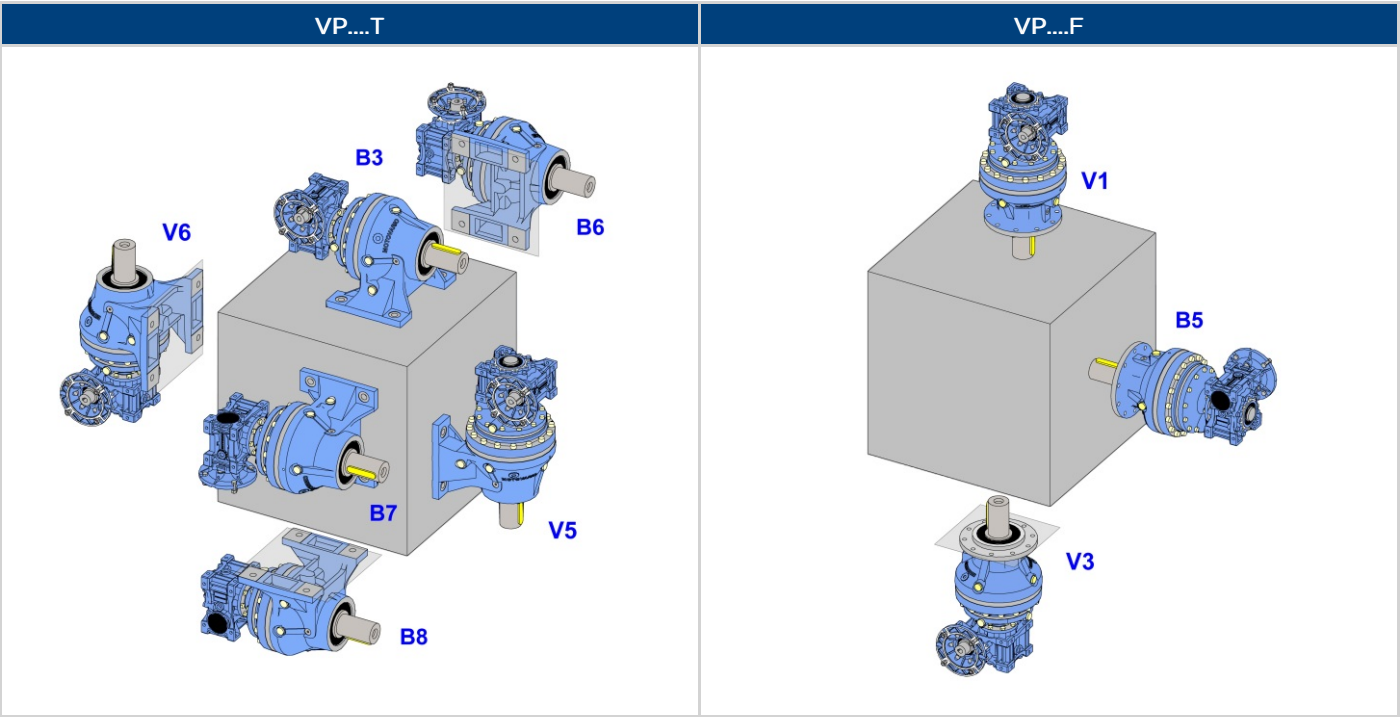
F	Flange
T	Foot

2	Reduction stage planetary gear
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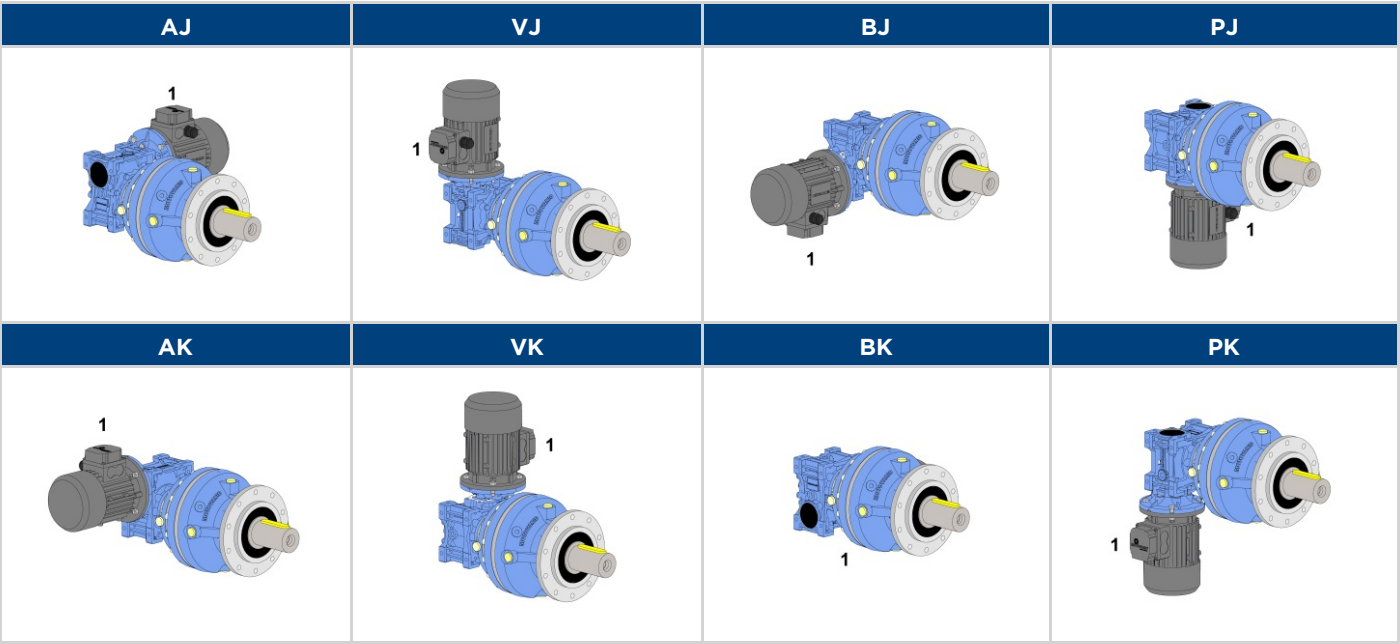
NMRV NMRV-P	Worm geared motor
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9.2.1 Mounting positions

The mounting position of the gear unit identifies its space orientation. Unless specified otherwise, the standard positions are B3/AK. B3 mounting position, as from a technical point of view, ensures lower oil splash, better lubrication and less heating.



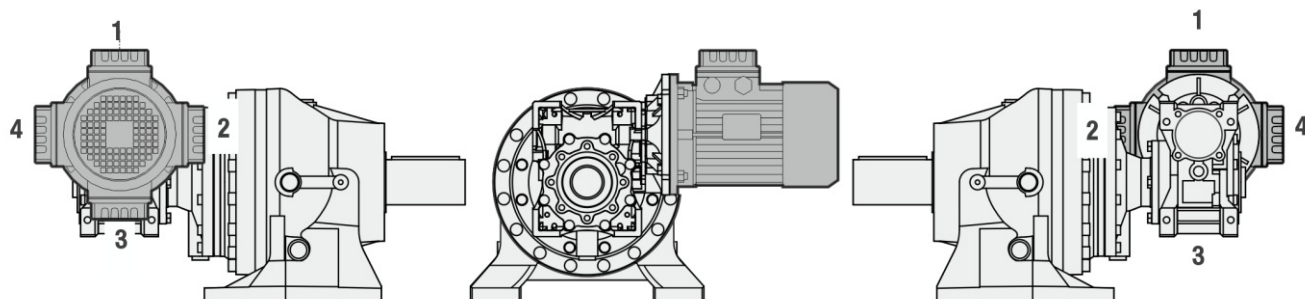
Executions



9.2 MOUNTING POSITIONS

9.2.2 Position of terminal box

In the case of specific requirements, when ordering, specify the position of the terminal box as shown in the diagram. Unless otherwise specified, the gear reducer is supplied with terminal box in position 1.



9.3.1 Efficiency

The efficiency of the VP combined gear reducer shall be calculated by taking into account the efficiency of the first stage with worm gear and the efficiency of the next two planetary stages, according to the following formula:

$$\eta_{VP} = \eta_{VSF} * 0,94$$

9.3.2 Irreversibility

η_d	DYNAMIC IRREVERSIBILITY
>0.6	dynamic reversibility
0.5÷0.6	low dynamic reversibility
0.4÷0.5	good dynamic irreversibility
<0.4	dynamic irreversibility

η_s	STATIC IRREVERSIBILITY
>0.55	static reversibility
0.5÷0.55	low static reversibility
<0.5	static irreversibility

The table shows approximate irreversibility classes.

The irreversibility condition of combined gear reducers is given by the units with the lowest efficiency.

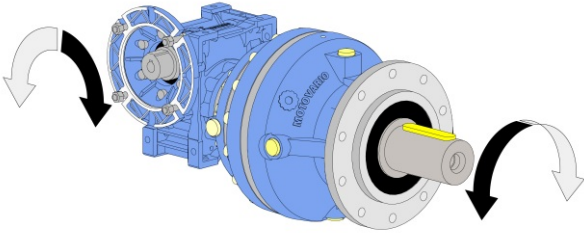
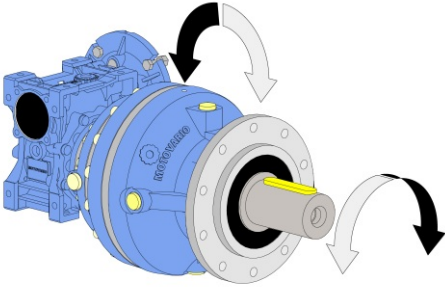
9.4 MESH DATA

VP	i	7,5	10	15	20	25	30	40	50	60	80	100
P613 P623 P633 P653	ηδ(1400)	0,89	0,87	0,84	0,82	0,79	0,75	0,71	0,67	0,63	0,58	0,52
	ηs	0,71	0,67	0,6	0,55	0,51	0,45	0,4	0,36	0,33	0,28	0,24
P983	ηδ(1400)	0,9	0,89	0,87	0,85	0,83	0,79	0,76	0,73	0,7	0,64	/
	ηs	0,73	0,7	0,64	0,6	0,56	0,49	0,45	0,41	0,38	0,32	/
P1133 P1183	ηδ(1400)	/	0,89	0,87	0,86	0,85	0,8	0,79	0,76	0,73	0,68	/
	ηs	/	0,69	0,63	0,62	0,59	0,48	0,48	0,44	0,41	0,36	/

9.5 DIRECTION OF ROTATION

The worm screw rotation is right-handed.

DIRECTION OF ROTATION - HIGH SPEED SHAFT

AJ-VJ-BJ-PJ	AK-VK-BK-PK
	

9.6.1 Critical applications

VP	P613-P623 P633-P653	P983	P1133 P1183
VS1-VS2: 1500 < n1 < 3000	B	B	B
n1 > 3000	B	A	A
PS1-PS2	B	B	B

✓ Verified application

A Application not recommended

B Check the application and/or call MOTOVARIO TECHNICAL SERVICE.

9.6.2 Information

The performance given in the catalogue correspond to mounting position B3 or similar, when the first stage is not entirely immersed in oil. For other mounting positions and/or particular input speeds, refer to the tables that highlight different critical situations for each size of gear reducer. It is also necessary to take due consideration of and carefully assess the following applications by calling MOTOVARIO TECHNICAL SERVICE:

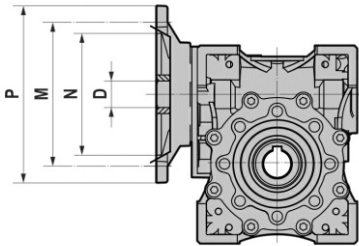
- To avoid the use as multiplier.
- Use in services that could be hazardous for people if the gear reducer fails.
- Applications with especially high inertia.
- Use as a lifting winch.
- Applications with high dynamic strain on the case of the gear reducer.
- In places with T_{amb} under -15°C or over 50°C .
- Use in chemically aggressive environments.
- Use in a salty environment.
- Mounting positions not envisaged in the catalogue.
- Use in radioactive environments.
- Use in environments pressures other than atmospheric pressure.

Avoid applications where even partial immersion of the reducer is required.

In the presence of overloading due to full load, braking, shocks or other static and dynamic causes, please verify that the peak torque is less than $2 \cdot M_{n2}$.

9.7 MOTOR FLANGE AVAILABILITY

9.7.1 VP Motor flange availability



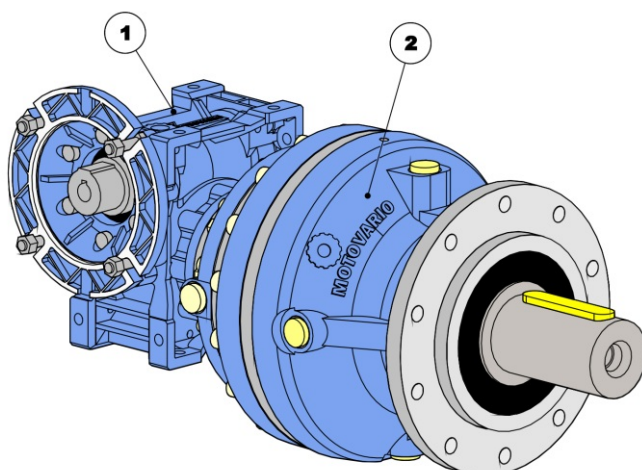
(*) Low profile key supplied by Motovario.
(•) Motor-ratio combination feasible.
(**) Motor-ratio combination not feasible.
(+) Motor-ratio combination not to be used, out of warranty terms.
The table report possible configurations strictly based on geometric criteria. To determine the compatibility of a motor-gear unit assembly in terms of mechanical factors, double check the selected configuration against the rating charts performances.

VP	PAM IEC	N	M	P	D	i											
						5	7,5	10	15	20	25	30	40	50	60	80	100
P613 P623 P633 P653	90B5	130	165	200	24	**	•	•	•	•	•	•	•	+	+	+	+
	90B14	95	115	140	24												
	80B5	130	165	200	19	**	•	•	•	•	•	•	•	•	•	•	+
	80B14	80	100	120	19												
	71B5	110	130	160	14	**	•	•	•	•	•	•	•	•	•	•	•
	71B14	70	85	105	14												
P983	100/112B5	180	215	250	28	**	•	•	•	•	•	•	•	+	+	+	+
	100/112B14	110	130	160	28												
	90B5	130	165	200	24	**	•	•	•	•	•	•	•	•	•	•	+
	90B14	95	115	140	24												
	80B5	130	165	200	19	**	•	•	•	•	•	•	•	•	•	•	•
	80B14	80	100	120	19												
P1133 P1183	132B5	230	265	300	38	**	•	•	•	•	•	•	•	+	+	+	+
	100/112B5	180	215	250	28	**	•	•	•	•	•	•	•	•	•	+	+
	100/112B14	110	130	160	28												
	90B5	130	165	200	24	**	•	•	•	•	•	•	•	•	•	•	•
	90B14	95	115	140	24												
	80B5	130	165	200	19	**	•	•	•	•	•	•	•	•	•	•	•
80B14	80	100	120	19													

9.7 MOTOR FLANGE AVAILABILITY

9.7.2 Ratios VP

The table report possible configurations strictly based on geometric criteria. To determine the compatibility of a motor-gear unit assembly in terms of mechanical factors, double check the selected configuration against the rating charts performances.



VP	1	2
	NMRV-P	HPL
P613	063	2 010
P623	063	2 020
P633	063	2 030
P653	063	2 050
P983	090	2 080
P1133	110	2 130
P1183	110	2 180

i	VP	i1	i2
348	VP P613	15	23,2
464		20	23,2
580		25	23,2
696		30	23,2
798		25	31,9
928		40	23,2
1160		50	23,2
1391		60	23,2
1595		50	31,9
1914		60	31,9
2319		100	23,2
3190		100	31,9

i	VP	i1	i2
348	VP P623	15	23,2
464		20	23,2
580		25	23,2
696		30	23,2
798		25	31,9
928		40	23,2
1160		50	23,2
1391		60	23,2
1595		50	31,9
1914		60	31,9
2319		100	23,2
3190		100	31,9

i	VP	i1	i2
297	VP P633	7,5	39,6
396		10	39,6
432		15	28,8
479		15	31,9
595		15	39,6
793		20	39,6
991		25	39,6
1189		30	39,6
1586		40	39,6
1982		50	39,6
2379		60	39,6
3171		80	39,6

i	VP	i1	i2
297	VP P653	7,5	39,6
396		10	39,6
432		15	28,8
479		15	31,9
595		15	39,6
793		20	39,6
991		25	39,6
1189		30	39,6
1586		40	39,6
1982		50	39,6
2379		60	39,6
3171		80	39,6

i	VP	i1	i2
215	VP P983	7,5	28,6
286		10	28,6
342		15	22,8
429		15	28,6
456		20	22,8
573		20	28,6
684		30	22,8
716		25	28,6
859		30	28,6
913		40	22,8
1145		40	28,6
1432		50	28,6
2302		60	38,4
3069		80	38,4

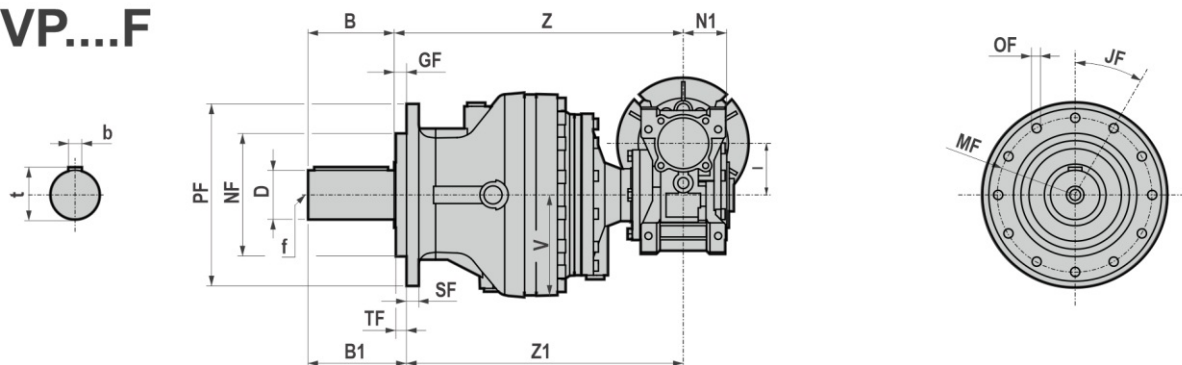
i	VP	i1	i2
329	VP P1133	15	22,0
380		15	25,3
439		20	22,0
506		20	25,3
633		25	25,3
759		30	25,3
1266		50	25,3
1519		60	25,3
2025		80	25,3
2326		60	38,8
3102		80	38,8

i	VP	i1	i2
325	VP P1183	10	32,5
423		15	28,2
487		15	32,5
650		20	32,5
705		25	28,2
846		30	28,2
975		30	32,5
1624		50	32,5
1949		60	32,5
2313		60	38,6
3084		80	38,6

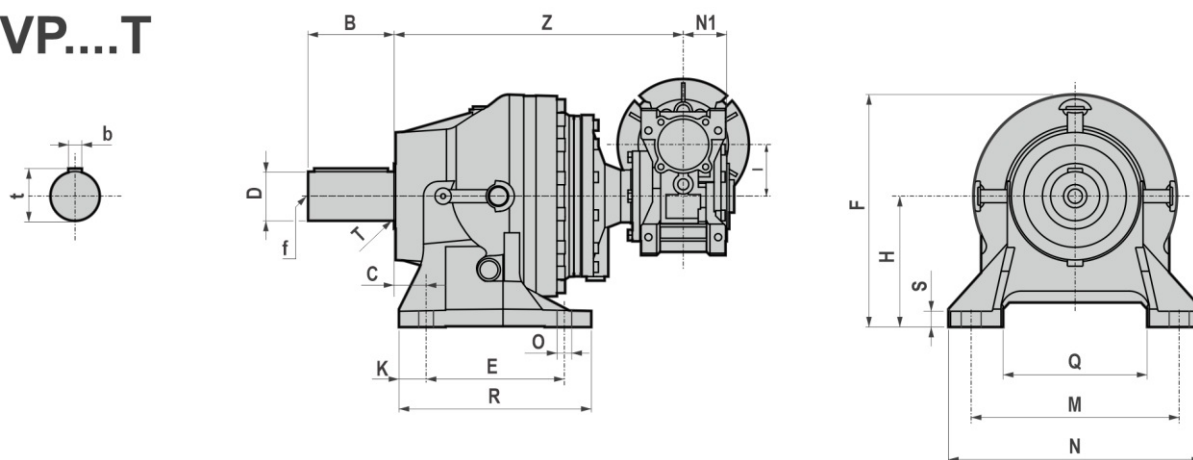
10.1 REDUCERS/GEARED MOTORS

VP P613-P1133

VP....F



VP....T



VP	Z	Z1
P613	309,5	303,5
P623	323,5	317,5
P633	352,5	337,5
P653	386,5	371,5
P983	457,5	417,5
P1133	515,5	479,5

VP	D	B	b	t	f	B1	C	E	F	H	K	M	N	O	Q	R	S	T	*V		
P613	50	h6	82	14	53,5	M16	88	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
P623	50	h6	82	14	53,5	M16	88	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	111
P633	60	h6	105	18	64	M20	120	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
P653	60	h6	105	18	64	M20	120	39	169	284	160	33	254	312	18	n°4	172	235	20	2	128
P983	80	h6	130	22	85	M20	170	65	201	330,5	180	40	279	350	22	n°4	185	281	25	2	163
P1133	90	h6	170	25	95	M20	206	66	219	375	200	35	318	390	26	n°4	220	289	27	-	175

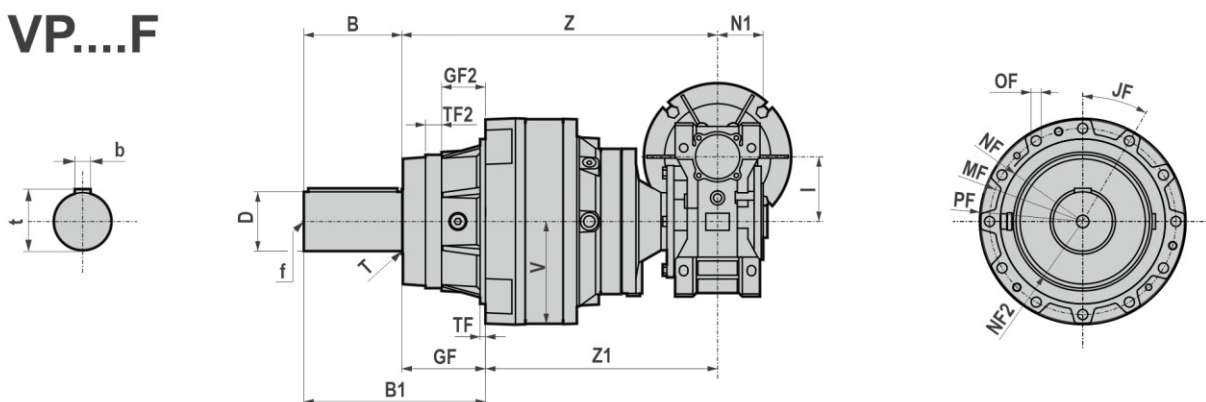
VP	≈ PF	MF	NF f7	GF	JF	OF		SF	TF
P613 P623	186	165	110	6	45°	10,5	n°8	12	5
P633 P653	222	195	150	15	36°	12,5	n°10	15	13
P983	280	250	200	40	30°	15	n°12	20	12
P1133	325	295	230	36	36°	16,5	n°10	25	10

*V - Max. overall dimensions

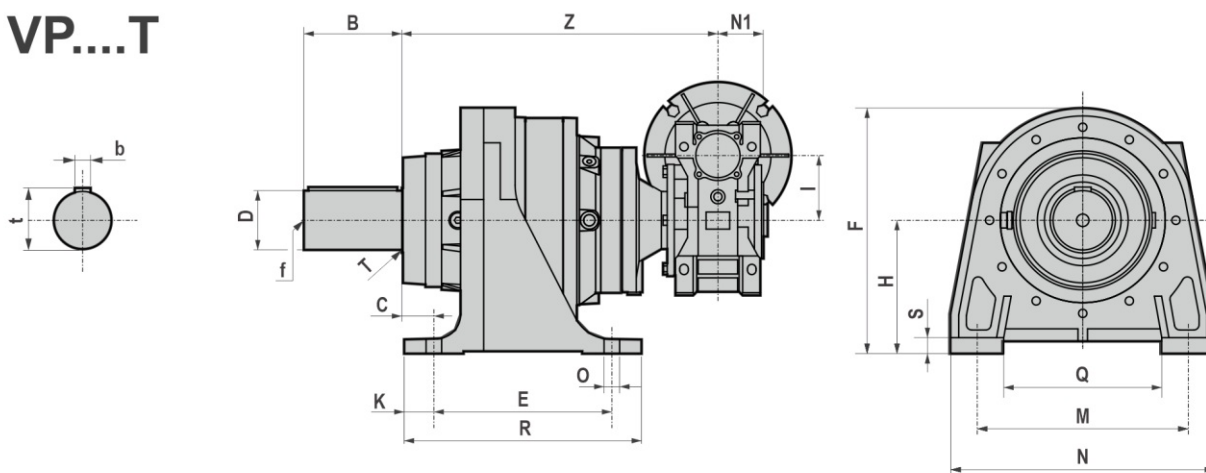
10.1 REDUCERS/GEARED MOTORS

VP P1183

VP....F



VP....T



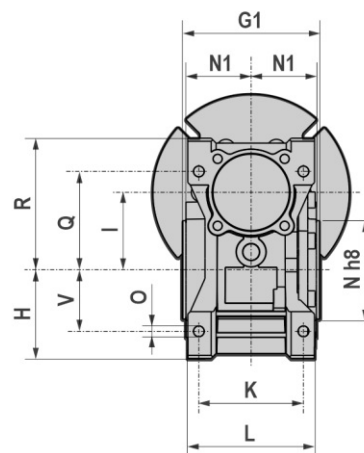
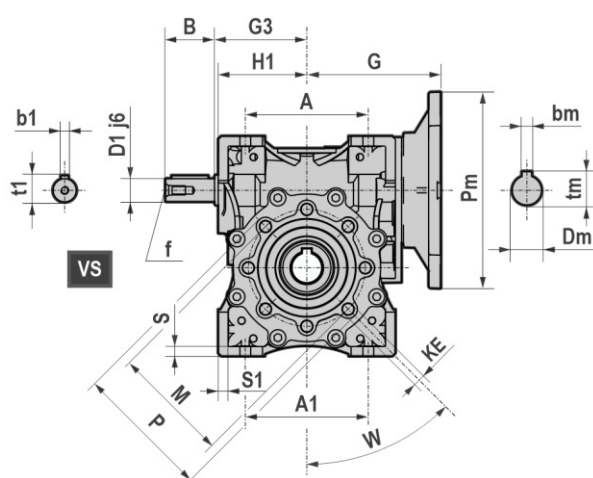
VP	Z										Z1									
P1183	537,5										396,5									

VP	D		B	b	t	f	B1	C	E	F	H	K	M	N	O		Q	R	S	T	*V
P1183	100	m6	165	28	106	M24	306	54	300	415	225	50	356	446	26	n°4	266	400	25	-	174

VP	≈ PF	MF	NF f7	NF2 f7	GF	GF2	JF	OF		TF	TF2
P1183	348	314	278	225	141	73,5	30°	17	n°12	7	25,5

*V - Max. overall dimensions

10.1 REDUCERS/GEARED MOTORS



	P613 P623 P633 P653	P983	P1133 P1183
A	100	140	170
A1	100	140	164 - 170
B	40	50	60
D1 j6	19	24	28
G	109	145	185,5 (PAM 132) 168 (PAM 080/112)
G1	112	140	155
G3	75	108	135
H	72	103	127,5
H1	72	103	127,5
I	63	90	110
K	85	100	115
KE	M8*14	M10*18	M10*18
L	103	130	144
M	95	130	165
N	80	110	130
N1	53	67	74
O	8,5	13	14
P	110	160	200
Q	80	102	125
R	107	144	167,5
S	8	11	14,5
S1	8	11	14,5
V	50	70	82 - 85
W	45	45	45
b1	6	8	8
t1	21,5	27	31
fl	M6	M8	M10

B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3

B14	Pm	Dm	bm	tm
071	105	14	5	16,3
080	120	19	6	21,8
090	140	24	8	27,3
100	160	28	8	31,3
112	160	28	8	31,3

10.2 WEIGHTS

The weight considered is in the standard delivery condition, with only lubricant for the worm screw stage.

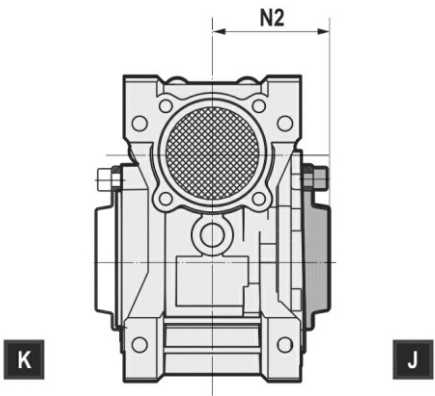
*Weight without motor.

Version T	
VP	-[kg]
P613	38,5
P623	41
P633	62
P653	69,7
P983	115,3
P1133	157,8
P1183	188,2

Version F	
VP	-[kg]
P613	34,7
P623	37,2
P633	52,7
P653	60,4
P983	101,7
P1133	144,1
P1183	155,6

11.1.1 Shaft cover

The protective cover is included in the standard configuration of the VP combination gear reducer. The protective cover cannot be mounted on the VPL version with torque limiter.



VP	N2
P613 P623 P633 P653	68,5
P983	85,5
P1133 P1183	94

	Executions
J	AK-VK-BK-PK
K	AJ-VJ-BJ-PJ

11.1.2 Other Accessories, Devices and Options

For other accessories, refer to the relevant paragraph in the HPL section:

- Output shafts;
- Wheel flange;
- Axial fixing washer;
- Shaft mounting systems;
- Output shaft reinforced seals.

Backstop device not available for VP combined gear reducers.

12.1.1 Description

The torque limiter is a mechanical device designed to protect the transmission from movement caused by accidental overloads or irregularities. It is applied to the output of the worm gear reducers and it works as an internal friction applied on the output shaft, which can be adjusted manually through an external locking ring nut. Compared to electronic or external mechanical devices, this solution presents the following advantages:

- Limited additional dimensions compared to the version without the torque limiter;
- Quick action directly on the transmission that must be protected;
- It has been designed for oil-bath operation, therefore wear-free and reliable;
- Manual adjustment of the slip torque;
- Over the slip torque, the torque limiter is still “on hold”, ensuring the automatic machine restart without external intervention;
- Using the torque limiter, it ‘s possible also to rotate the worm gear reducers shaft by loosening the external locking ring nut, for example in case of mechanical locks due to worm irreversibility.

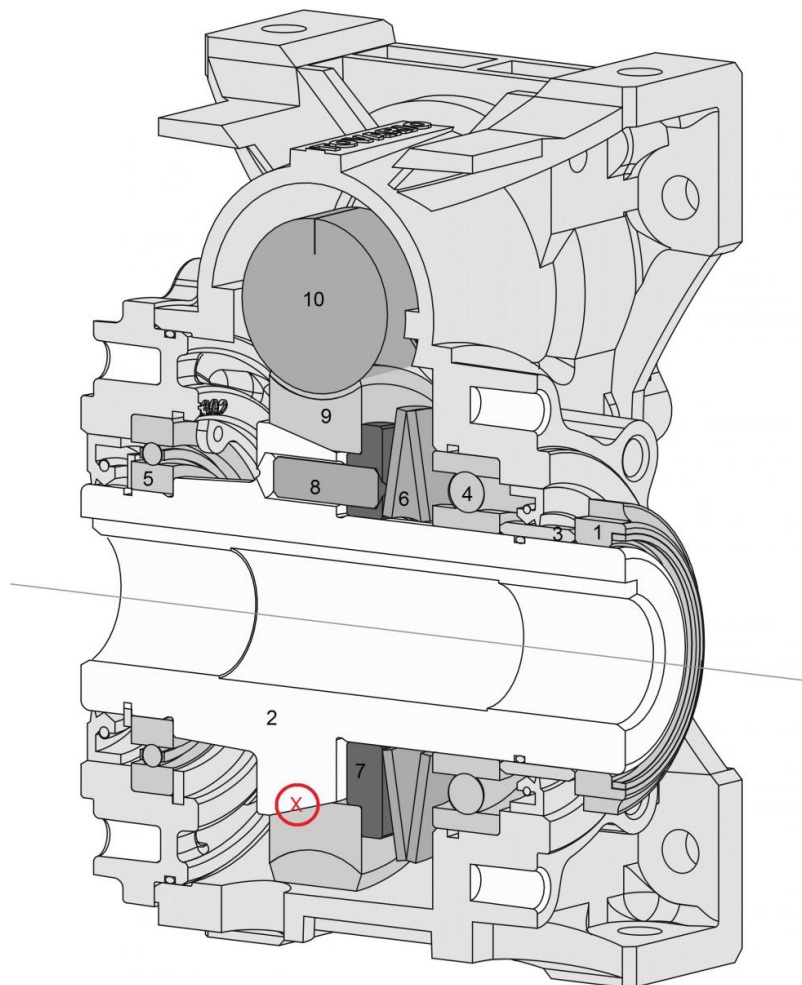
The torque limiter device must to be installed as a protection system for accidental events and not as protection of wrong gearbox selection (for example after selecting a gearbox with a low service factor compared with the real needs of the application). The torque limiter (VPL version) is available for the sizes P613, P623, P633 and P653 of the VP combined gear reducers. Depending on the needs, the torque limiter can be applied in all VP executions.

12.1.2 Operating principle

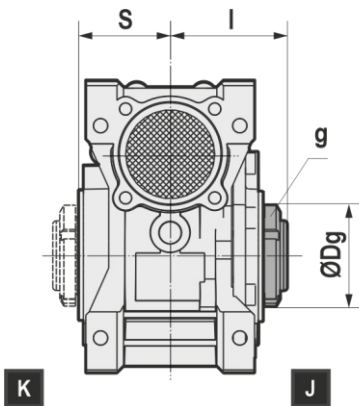
In this mechanical device the transmission of movement takes place by means of friction between the driving surface (input shaft (10)) and the driven surface (wormwheel (9)). These are subject of a determined compression created by the plate (7) which is generated by two belleville washers (6), arranged in series. The belleville washers action is generated by the bushing (3), driven by the external locking ring nut (1) which is screwed on the output shaft. The shift (X) is guaranteed by the connection between the two conical elements of the hub (2) and the worm wheel.

The transmission of movement has a standard operation up to a maximum admissible torque value (slip torque); over this value the torque limiter starts to work generating a slip between the worm wheel, which continues to spin conducted by the input shaft, and the hub which remains still. Over the slip torque expected from the regulation, the torque limiter is still "on hold": it transmits the set value and it doesn't transmit higher values. This ensures to the machine to restart automatically without external action.

For safety reasons it isn't recommended to install this device in lifting equipment: in case of overloads or irregularities, during the shift, the weight could not be maintained in suspension.



12.1.3 Dimensions



	VPL	
	P613 P623 P633 P653	P983
I	74	89,5
S	56	70
Dg	62	80
g	M45x1,5	M60x2

12.1.4 Slip torque setting

A slip torque setting is easily adjustable from the outside through the rotation of the locking ring nut, characterized by 4 marks to define the number of turns (each mark is equivalent to ¼ of a turn). The device is preliminary set during the assembly phase. The following factors may affect the setting: temperature and period of adjustment. It is therefore recommended, during the installation, to actually verify the slip torque limit, in according to the real needs of the application.

The standard direction of rotation for the registration of the ring nut is clockwise, defined when looking frontally, from the ring nut side, at the slow shaft of the worm gear unit with the motor on the right when the ring nut is mounted in position J or with the motor on the left when the ring nut is mounted in position K.

It's recommended for long stops, even if the machine restarts automatically, to return the ring nut to its original position and to set it again.

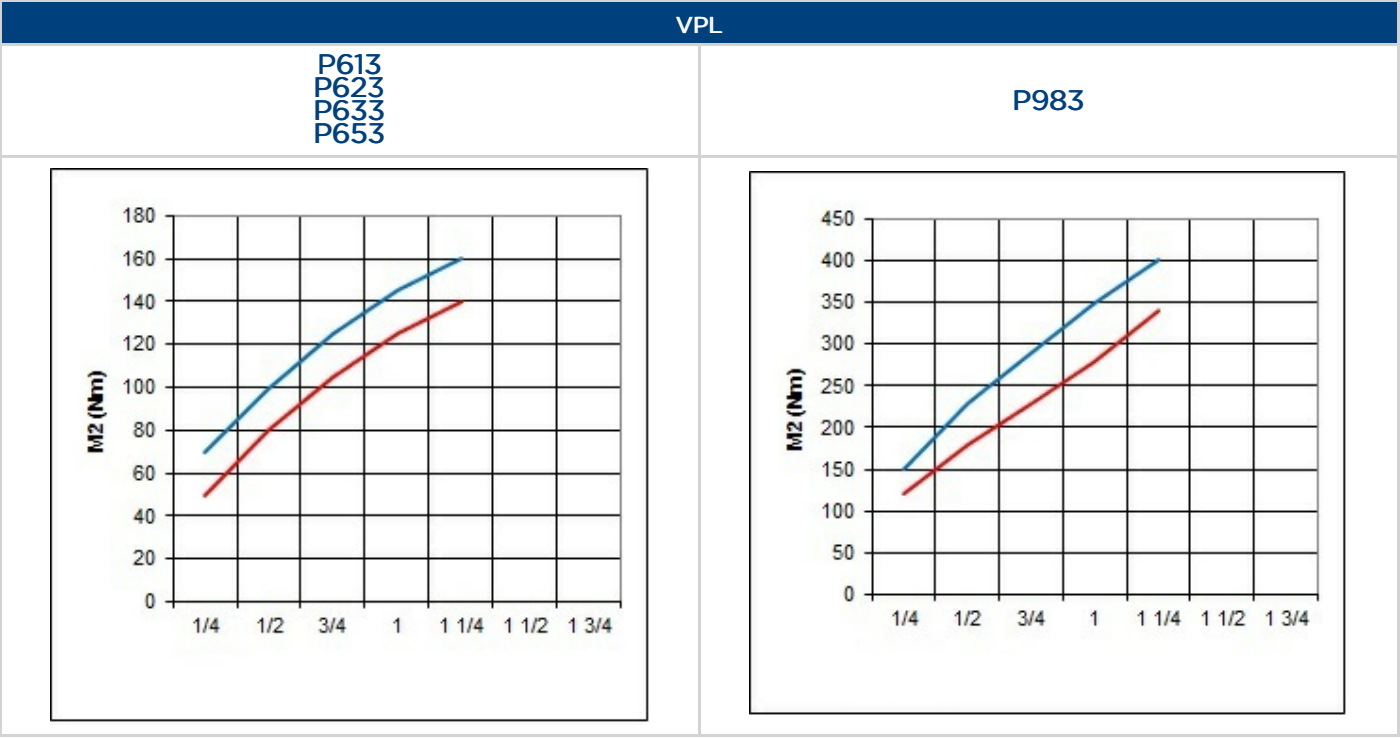
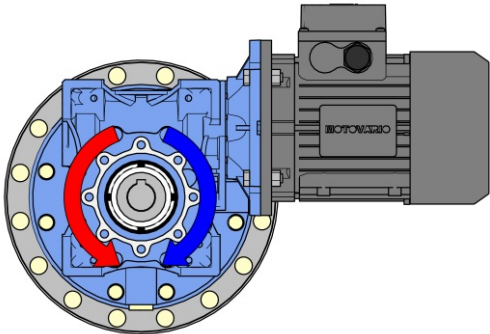
As previously mentioned, for each reducers size (O63-O90) the slip torque range depends by the ratio and the direction of rotation of the gearbox, which affects the tolerances between the two conical components that generate the slip (there is an axial component which tends to approach or move their away). Therefore in the setting diagrams are shown two lines which represent the approximate limits within the provided slip torque could change. The slip torque setting must be always checked afterward to determine if the number of turns of the ring nut guarantees the desired slip torque value.

VPL	Ring nut rotation
P613 P623 P633 P653	3/4 (turn)
P983	1 (turn)

12.1 TORQUE LIMITER

12.1.5 Adjustment graphs

IMP: the values ($\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$...) correspond to the center of the column.



13.1 VP GEARED MOTORS

0,25 kW

n_2 [rpm]	M2 [Nm]	M2n [Nm]	fs	i_{VSF}	i_{HPL}	i_{tot}	Gear reducer	Motor	Fr ₂ CS [N]	Fr ₂ SS [N]
2,4	747	1076	1,4	25	23,2	580	VP P613	TH71A4	26000	29450
2,4	747	2151	2,9	25	23,2	580	VP P623	TH71A4	26000	29450
1,7	1028	1124	1,1	25	31,9	798	VP P613	TH71A4	27300	30900
1,7	1028	2235	2,2	25	31,9	798	VP P623	TH71A4	27300	30900
1,5	1077	1141	1,1	40	23,2	928	VP P613	TH71A4	27450	31050
1,5	1077	2267	2,1	40	23,2	928	VP P623	TH71A4	27450	31050
1,4	1277	2520	2,0	25	39,6	991	VP P633	TH71A4	53000	61650
1,4	1277	5204	4,1	25	39,6	991	VP P653	TH71A4	53000	61650
1,2	1275	1163	0,9	50	23,2	1160	VP P613	TH71A4	27600	31350
1,2	1275	2305	1,8	50	23,2	1160	VP P623	TH71A4	27600	31350
1,0	1429	2460	1,7	60	23,2	1391	VP P623	TH71A4	27650	31550
0,9	1841	2800	1,5	40	39,6	1586	VP P633	TH71A4	55850	65600
0,9	1841	5470	3,0	40	39,6	1586	VP P653	TH71A4	55850	65600
0,9	1754	2460	1,4	50	31,9	1595	VP P623	TH71A4	27700	31800
0,7	1965	2460	1,3	60	31,9	1914	VP P623	TH71A4	27800	32000
0,7	2179	2800	1,3	50	39,6	1982	VP P633	TH71A4	57500	68900
0,7	2179	5470	2,5	50	39,6	1982	VP P653	TH71A4	57500	68900
0,6	1956	2460	1,3	100	23,2	2319	VP P623	TH71A4	29600	32500
0,6	2442	2800	1,1	60	39,6	2379	VP P633	TH71A4	57500	68900
0,6	2442	5470	2,2	60	39,6	2379	VP P653	TH71A4	57500	68900
0,4	3006	2800	0,9	80	39,6	3171	VP P633	TH71A4	58600	69800
0,4	3006	5470	1,8	80	39,6	3171	VP P653	TH71A4	58600	69800
0,4	2691	2460	0,9	100	31,9	3190	VP P623	TH71A4	31000	34000

0,37 kW

n_2 [rpm]	M2 [Nm]	M2n [Nm]	fs	i_{VSF}	i_{HPL}	i_{tot}	Gear reducer	Motor	Fr ₂ CS [N]	Fr ₂ SS [N]
3,0	903	998	1,1	20	23,2	464	VP P613	TH71B4	25150	28600
3,0	903	2025	2,2	20	23,2	464	VP P623	TH71B4	25150	28600
2,4	1097	1076	1,0	25	23,2	580	VP P613	TH71B4	25900	29350
2,4	1097	2151	2,0	25	23,2	580	VP P623	TH71B4	25900	29350
2,0	1248	2202	1,8	30	23,2	696	VP P623	TH71B4	26200	29650
1,8	1544	2520	1,6	20	39,6	793	VP P633	TH71B4	51400	59700
1,8	1544	5138	3,3	20	39,6	793	VP P653	TH71B4	51400	59700
1,8	1509	2235	1,5	25	31,9	798	VP P623	TH71B4	27300	30900
1,5	1570	2267	1,4	40	23,2	928	VP P623	TH71B4	27400	31000
1,4	1875	2520	1,3	25	39,6	991	VP P633	TH71B4	53000	61650
1,4	1875	5204	2,8	25	39,6	991	VP P653	TH71B4	53000	61650
1,2	1850	2305	1,2	50	23,2	1160	VP P623	TH71B4	27550	31200
1,2	2133	2520	1,2	30	39,6	1189	VP P633	TH71B4	54800	63500
1,2	2133	5249	2,5	30	39,6	1189	VP P653	TH71B4	54800	63500
1,0	2086	2460	1,2	60	23,2	1391	VP P623	TH71B4	27600	31350

13.1 VP GEARED MOTORS

0,37 kW

n_2 [rpm]	M2 [Nm]	M2n [Nm]	f_s	i_{VSF}	i_{HPL}	i_{tot}	Gear reducer	Motor	Fr_2 CS [N]	Fr_2 SS [N]
0,9	2684	2800	1,0	40	39,6	1586	VP P633	TH71B4	55850	65600
0,9	2684	5470	2,0	40	39,6	1586	VP P653	TH71B4	55850	65600
0,9	2545	2460	1,0	50	31,9	1595	VP P623	TH71B4	27700	31800
0,7	3162	5470	1,7	50	39,6	1982	VP P653	TH71B4	56950	67750
0,6	3567	5470	1,5	60	39,6	2379	VP P653	TH71B4	57500	68900
0,4	4376	5470	1,3	80	39,6	3171	VP P653	TH71B4	58600	69800

0,55 kW

n_2 [rpm]	M2 [Nm]	M2n [Nm]	f_s	i_{VSF}	i_{HPL}	i_{tot}	Gear reducer	Motor	Fr_2 CS [N]	Fr_2 SS [N]
4,0	1025	973	0,9	15	23,2	348	VP P613	TH71C4	24600	28100
4,0	1025	1987	1,9	15	23,2	348	VP P623	TH71C4	24600	28100
3,2	1274	2300	1,8	15	28,8	432	VP P633	TH71C4	47100	54650
3,2	1274	4474	3,5	15	28,8	432	VP P653	TH71C4	47100	54650
3,0	1345	2025	1,5	20	23,2	464	VP P623	TH71C4	25150	28600
2,9	1410	2470	1,8	15	31,9	479	VP P633	TH71C4	47850	55100
2,9	1410	4953	3,5	15	31,9	479	VP P653	TH71C4	47850	55100
2,4	1623	2151	1,3	25	23,2	580	VP P623	TH71C4	25900	29350
2,4	1752	2520	1,4	15	39,6	595	VP P633	TH71C4	49250	57050
2,4	1752	5027	2,9	15	39,6	595	VP P653	TH71C4	49250	57050
2,0	1836	2202	1,2	30	23,2	696	VP P623	TH71C4	26200	29650
1,8	2300	2520	1,1	20	39,6	793	VP P633	TH71C4	51400	59700
1,8	2300	5138	2,2	20	39,6	793	VP P653	TH71C4	51400	59700
1,8	2232	2235	1,0	25	31,9	798	VP P623	TH71C4	27300	30900
1,6	2413	9351	3,9	40	22,8	913	VP P983	TH80A4	73050	84350
1,5	2328	2267	1,0	40	23,2	928	VP P623	TH71C4	27400	31000
1,4	2774	2520	0,9	25	39,6	991	VP P633	TH71C4	53000	61650
1,4	2774	5204	1,9	25	39,6	991	VP P653	TH71C4	53000	61650
1,2	3028	9583	3,2	40	28,6	1145	VP P983	TH80A4	75450	87100
1,2	3139	5249	1,7	30	39,6	1189	VP P653	TH71C4	54800	63500
1,0	3639	9950	2,7	50	28,6	1432	VP P983	TH80A4	77500	89400
0,9	3921	15150	3,9	60	25,3	1519	VP P1133	TH80A4	85100	112000
0,9	3979	5470	1,4	40	39,6	1586	VP P653	TH71C4	55850	65600
0,7	5033	19100	3,8	60	32,5	1949	VP P1183	TH80A4	90300	116100
0,7	4672	5470	1,2	50	39,6	1982	VP P653	TH71C4	56950	67750
0,7	4790	13492	2,8	80	25,3	2025	VP P1133	TH80A4	88000	116100
0,6	5973	17000	2,8	60	38,6	2313	VP P1183	TH80A4	94400	122000
0,6	6006	14840	2,5	60	38,8	2326	VP P1133	TH80A4	92600	122000
0,6	5293	5470	1,0	60	39,6	2379	VP P653	TH71C4	57500	68900
0,5	6833	8630	1,3	80	38,4	3069	VP P983	TH80A4	83200	96000
0,5	7296	17000	2,3	80	38,6	3084	VP P1183	TH80A4	97200	125000
0,5	7337	14840	2,0	80	38,8	3102	VP P1133	TH80A4	95000	125000

13.1 VP GEARED MOTORS

0,75 kW

n_2 [rpm]	M2 [Nm]	M2n [Nm]	fs	i_{VSF}	i_{HPL}	i_{tot}	Gear reducer	Motor	Fr ₂ CS [N]	Fr ₂ SS [N]
4,8	1222	2300	1,9	7,5	39,6	297	VP P633	TP80B4	45200	51850
4,8	1222	4501	3,7	7,5	39,6	297	VP P653	TP80B4	45200	51850
4,1	1365	1987	1,5	15	23,2	348	VP P623	TP80B4	24200	27650
3,6	1630	2300	1,4	10	39,6	396	VP P633	TP80B4	46900	54300
3,6	1630	4626	2,8	10	39,6	396	VP P653	TP80B4	46900	54300
3,3	1697	2300	1,4	15	28,8	432	VP P633	TP80B4	47100	54650
3,3	1697	4474	2,6	15	28,8	432	VP P653	TP80B4	47100	54650
3,1	1777	2025	1,1	20	23,2	464	VP P623	TP80B4	25000	28500
3,0	1878	2470	1,3	15	31,9	479	VP P633	TP80B4	47350	54900
3,0	1878	4953	2,6	15	31,9	479	VP P653	TP80B4	47350	54900
2,5	2145	2151	1,0	25	23,2	580	VP P623	TP80B4	25900	29350
2,4	2334	2520	1,1	15	39,6	595	VP P633	TP80B4	49000	56850
2,4	2334	5027	2,2	15	39,6	595	VP P653	TP80B4	49000	56850
2,1	2537	9348	3,7	30	22,8	684	VP P983	TP80B4	69850	80500
2,1	2449	2202	0,9	30	23,2	696	VP P623	TP80B4	26200	29650
2,0	2782	9363	3,4	25	28,6	716	VP P983	TP80B4	69850	80500
1,8	3038	5138	1,7	20	39,6	793	VP P653	TP80B4	50500	58600
1,7	3184	9461	3,0	30	28,6	859	VP P983	TP80B4	72250	83400
1,6	3240	9351	2,9	40	22,8	913	VP P983	TP80B4	73050	84350
1,5	3667	5204	1,4	25	39,6	991	VP P653	TP80B4	53000	61650
1,3	4066	9583	2,4	40	28,6	1145	VP P983	TP80B4	75450	87100
1,2	4186	5249	1,3	30	39,6	1189	VP P653	TP80B4	53600	62200
1,1	4494	15031	3,3	50	25,3	1266	VP P1133	TP80B4	84200	110800
1,0	4896	9950	2,0	50	28,6	1432	VP P983	TP80B4	76400	88500
0,9	5251	15150	2,9	60	25,3	1519	VP P1133	TP80B4	85100	112000
0,9	5260	5470	1,0	40	39,6	1586	VP P653	TP80B4	55300	64200
0,9	5767	19100	3,3	50	32,5	1624	VP P1183	TP80B4	88500	114400
0,7	6738	19100	2,8	60	32,5	1949	VP P1183	TP80B4	90300	116100
0,7	6433	13492	2,1	80	25,3	2025	VP P1133	TP80B4	88000	116100
0,6	7528	8630	1,1	60	38,4	2302	VP P983	TP80B4	78700	90700
0,6	7997	17000	2,1	60	38,6	2313	VP P1183	TP80B4	94400	122000
0,6	8042	14840	1,8	60	38,8	2326	VP P1133	TP80B4	92600	122000
0,5	9176	8630	0,9	80	38,4	3069	VP P983	TP80B4	83200	96000
0,5	9798	17000	1,7	80	38,6	3084	VP P1183	TP80B4	97200	125000
0,5	9853	14840	1,5	80	38,8	3102	VP P1133	TP80B4	95000	125000

1,10 kW

n_2 [rpm]	M2 [Nm]	M2n [Nm]	fs	i_{VSF}	i_{HPL}	i_{tot}	Gear reducer	Motor	Fr ₂ CS [N]	Fr ₂ SS [N]
4,8	1828	2300	1,3	7,5	39,6	297	VP P633	TP90S4	45200	51850
4,8	1828	4501	2,5	7,5	39,6	297	VP P653	TP90S4	45200	51850
4,1	2029	1987	1,0	15	23,2	348	VP P623	TP90S4	24200	27650

13.1 VP GEARED MOTORS

1,10 kW

n ₂ [rpm]	M2 [Nm]	M2n [Nm]	fs	i _{VSF}	i _{HPL}	i _{tot}	Gear reducer	Motor	Fr ₂ CS [N]	Fr ₂ SS [N]
3,6	2387	2300	1,0	10	39,6	396	VP P633	TP90S4	46900	54300
3,6	2387	4626	1,9	10	39,6	396	VP P653	TP90S4	46900	54300
3,3	2522	2300	0,9	15	28,8	432	VP P633	TP90S4	47100	54650
3,3	2522	4474	1,8	15	28,8	432	VP P653	TP90S4	47100	54650
3,1	2684	9166	3,4	20	22,8	456	VP P983	TP90S4	66150	76300
3,0	2792	4953	1,8	15	31,9	479	VP P653	TP90S4	47850	55100
2,5	3368	9217	2,7	20	28,6	573	VP P983	TP90S4	69100	79750
2,4	3469	5027	1,4	15	39,6	595	VP P653	TP90S4	49000	56850
2,1	3735	9348	2,5	30	22,8	684	VP P983	TP90S4	69850	80500
2,0	4095	9363	2,3	25	28,6	716	VP P983	TP90S4	70700	81750
1,8	4476	5138	1,1	20	39,6	793	VP P653	TP90S4	50500	58600
1,7	4688	9461	2,0	30	28,6	859	VP P983	TP90S4	72250	83400
1,6	4787	9351	2,0	40	22,8	913	VP P983	TP90S4	73050	84350
1,4	5409	5204	1,0	25	39,6	991	VP P653	TP90S4	53000	61650
1,2	6008	9583	1,6	40	28,6	1145	VP P983	TP90S4	75450	87100
1,1	6645	15031	2,3	50	25,3	1266	VP P1133	TP90S4	84200	110800
1,0	7220	9950	1,4	50	28,6	1432	VP P983	TP90S4	77500	89400
0,9	7764	15150	2,0	60	25,3	1519	VP P1133	TP90S4	85100	112000
0,9	8528	19100	2,2	50	32,5	1624	VP P1183	TP90S4	88500	114400
0,7	9964	19100	1,9	60	32,5	1949	VP P1183	TP90S4	90300	116100
0,7	9527	13492	1,4	80	25,3	2025	VP P1133	TP90S4	88000	116100
0,6	11826	17000	1,4	60	38,6	2313	VP P1183	TP90S4	94400	122000
0,6	11892	14840	1,2	60	38,8	2326	VP P1133	TP90S4	92600	122000
0,5	14510	17000	1,2	80	38,6	3084	VP P1183	TP90S4	97200	125000
0,5	14592	14840	1,0	80	38,8	3102	VP P1133	TP90S4	95000	125000

1,50 kW

n ₂ [rpm]	M2 [Nm]	M2n [Nm]	fs	i _{VSF}	i _{HPL}	i _{tot}	Gear reducer	Motor	Fr ₂ CS [N]	Fr ₂ SS [N]
5,0	2408	8320	3,5	10	28,6	286	VP P983	TP90L4	62700	72500
4,8	2482	2300	0,9	7,5	39,6	297	VP P633	TP90L4	45200	51850
4,8	2482	4501	1,8	7,5	39,6	297	VP P653	TP90L4	45200	51850
4,2	2814	9131	3,2	15	22,8	342	VP P983	TP90L4	64050	73850
3,6	3260	4626	1,4	10	39,6	396	VP P653	TP90L4	46900	54300
3,3	3531	8613	2,4	15	28,6	429	VP P983	TP90L4	65450	75550
3,3	3420	4474	1,3	15	28,8	432	VP P653	TP90L4	47100	54650
3,3	3570	14638	4,1	20	22,0	439	VP P1133	TP90L4	71800	94500
3,1	3645	9166	2,5	20	22,8	456	VP P983	TP90L4	66150	76300
3,0	3786	4953	1,3	15	31,9	479	VP P653	TP90L4	47850	55100
2,8	4115	14659	3,6	20	25,3	506	VP P1133	TP90L4	73550	96500
2,5	4575	9217	2,0	20	28,6	573	VP P983	TP90L4	69100	79750
2,4	4704	5027	1,1	15	39,6	595	VP P653	TP90L4	49000	56850

13.1 VP GEARED MOTORS

1,50 kW

n_2 [rpm]	M2 [Nm]	M2n [Nm]	f_s	i_{VSF}	i_{HPL}	i_{tot}	Gear reducer	Motor	Fr_2 CS [N]	Fr_2 SS [N]
2,3	5061	14911	2,9	25	25,3	633	VP P1133	TP90L4	76000	100200
2,2	5281	18962	3,6	20	32,5	650	VP P1183	TP90L4	77800	100200
2,1	5095	9348	1,8	30	22,8	684	VP P983	TP90L4	69850	80500
2,0	5635	19659	3,5	25	28,2	705	VP P1183	TP90L4	79000	101600
2,0	5591	9363	1,7	25	28,6	716	VP P983	TP90L4	70700	81750
1,9	5723	14951	2,6	30	25,3	759	VP P1133	TP90L4	78300	103100
1,7	6373	20046	3,1	30	28,2	846	VP P1183	TP90L4	80800	104000
1,7	6394	9461	1,5	30	28,6	859	VP P983	TP90L4	72250	83400
1,6	6545	9351	1,4	40	22,8	913	VP P983	TP90L4	73050	84350
1,5	7345	19008	2,6	30	32,5	975	VP P1183	TP90L4	83100	106500
1,2	8213	9583	1,2	40	28,6	1145	VP P983	TP90L4	75450	87100
1,1	9058	15031	1,7	50	25,3	1266	VP P1133	TP90L4	84200	110800
1,0	9845	9950	1,0	50	28,6	1432	VP P983	TP90L4	77500	89400
0,9	10596	15150	1,4	60	25,3	1519	VP P1133	TP90L4	85100	112000
0,9	11625	19100	1,6	50	32,5	1624	VP P1183	TP90L4	88500	114400
0,7	13598	19100	1,4	60	32,5	1949	VP P1183	TP90L4	90300	116100
0,7	12984	13492	1,0	80	25,3	2025	VP P1133	TP90L4	88000	116100
0,6	16138	17000	1,1	60	38,6	2313	VP P1183	TP90L4	94400	122000
0,6	16228	14840	0,9	60	38,8	2326	VP P1133	TP90L4	92600	122000

2,20 kW

n_2 [rpm]	M2 [Nm]	M2n [Nm]	f_s	i_{VSF}	i_{HPL}	i_{tot}	Gear reducer	Motor	Fr_2 CS [N]	Fr_2 SS [N]
6,7	2649	8072	3,0	7,5	28,6	215	VP P983	TP100LA4	62700	72500
5,0	3505	8320	2,4	10	28,6	286	VP P983	TP100LA4	62700	72500
4,8	3633	4501	1,2	7,5	39,6	297	VP P653	TP100LA4 B5R	45200	51850
4,4	3940	14890	3,8	15	22,0	329	VP P1133	TP100LA4	69000	90700
4,2	4093	9131	2,2	15	22,8	342	VP P983	TP100LA4	64050	73850
3,8	4541	14585	3,2	15	25,3	380	VP P1133	TP100LA4	70500	92400
3,6	4735	4626	1,0	10	39,6	396	VP P653	TP100LA4 B5R	46900	54300
3,4	5056	17656	3,5	15	28,2	423	VP P1183	TP100LA4	72800	93900
3,4	5137	8613	1,7	15	28,6	429	VP P983	TP100LA4	65450	75550
3,3	4985	4474	0,9	15	28,8	432	VP P653	TP100LA4 B5R	47100	54650
3,3	5192	14638	2,8	20	22,0	439	VP P1133	TP100LA4	71800	94500
3,2	5330	9166	1,7	20	22,8	456	VP P983	TP100LA4	66150	76300
3,0	5518	4953	0,9	15	31,9	479	VP P653	TP100LA4 B5R	47350	54900
3,0	5828	17791	3,1	15	32,5	487	VP P1183	TP100LA4	73900	95100
2,8	5984	14659	2,4	20	25,3	506	VP P1133	TP100LA4	73550	96500
2,5	6688	9217	1,4	20	28,6	573	VP P983	TP100LA4	68650	79200
2,3	7379	14911	2,0	25	25,3	633	VP P1133	TP100LA4	76000	100200
2,2	7679	18962	2,5	20	32,5	650	VP P1183	TP100LA4	77800	100200
2,1	7419	9348	1,3	30	22,8	684	VP P983	TP100LA4	69850	80500

13.1 VP GEARED MOTORS

2,20 kW

n ₂ [rpm]	M2 [Nm]	M2n [Nm]	fs	i _{VSF}	i _{HPL}	i _{tot}	Gear reducer	Motor	Fr ₂ CS [N]	Fr ₂ SS [N]
2,0	8217	19659	2,4	25	28,2	705	VP P1183	TP100LA4	79000	101600
2,0	8160	9363	1,1	25	28,6	716	VP P983	TP100LA4	69850	80500
1,9	8349	14951	1,8	30	25,3	759	VP P1133	TP100LA4	78300	103100
1,7	9296	20046	2,2	30	28,2	846	VP P1183	TP100LA4	80800	104000
1,7	9310	9461	1,0	30	28,6	859	VP P983	TP100LA4	72250	83400
1,6	9530	9351	1,0	40	22,8	913	VP P983	TP100LA4	73050	84350
1,5	10715	19008	1,8	30	32,5	975	VP P1183	TP100LA4	83100	106500
1,1	13198	15031	1,1	50	25,3	1266	VP P1133	TP100LA4	84200	110800
0,9	15421	15150	1,0	60	25,3	1519	VP P1133	TP100LA4	85100	112000
0,9	16937	19100	1,1	50	32,5	1624	VP P1183	TP100LA4	88500	114400
0,7	19790	19100	1,0	60	32,5	1949	VP P1183	TP100LA4	90300	116100

3,00 kW

n ₂ [rpm]	M2 [Nm]	M2n [Nm]	fs	i _{VSF}	i _{HPL}	i _{tot}	Gear reducer	Motor	Fr ₂ CS [N]	Fr ₂ SS [N]
6,8	3583	8072	2,3	7,5	28,6	215	VP P983	TP112MS4	62700	72500
5,1	4741	8320	1,8	10	28,6	286	VP P983	TP112MS4	62700	72500
4,5	5380	17216	3,2	10	32,5	325	VP P1183	TP112MS4	70050	90300
4,4	5331	14890	2,8	15	22,0	329	VP P1133	TP112MS4	68600	90300
4,2	5539	9131	1,6	15	22,8	342	VP P983	TP112MS4	64050	73850
3,8	6145	14585	2,4	15	25,3	380	VP P1133	TP112MS4	70350	92100
3,4	6842	17656	2,6	15	28,2	423	VP P1183	TP112MS4	72800	93900
3,4	6951	8613	1,2	15	28,6	429	VP P983	TP112MS4	65450	75550
3,3	7026	14638	2,1	20	22,0	439	VP P1133	TP112MS4	71600	94200
3,2	7213	9166	1,3	20	22,8	456	VP P983	TP112MS4	66150	76300
3,0	7886	17791	2,3	15	32,5	487	VP P1183	TP112MS4	73900	95100
2,9	8098	14659	1,8	20	25,3	506	VP P1133	TP112MS4	73550	96500
2,5	9052	9217	1,0	20	28,6	573	VP P983	TP112MS4	68650	79200
2,3	10003	14911	1,5	25	25,3	633	VP P1133	TP112MS4	76000	100200
2,2	10392	18962	1,8	20	32,5	650	VP P1183	TP112MS4	77800	100200
2,1	10047	9348	0,9	30	22,8	684	VP P983	TP112MS4	69850	80500
2,1	11138	19659	1,8	25	28,2	705	VP P1183	TP112MS4	79000	101600
1,9	11289	14951	1,3	30	25,3	759	VP P1133	TP112MS4	77100	101600
1,7	12570	20046	1,6	30	28,2	846	VP P1183	TP112MS4	80800	104000
1,5	14488	19008	1,3	30	32,5	975	VP P1183	TP112MS4	83100	106500

4,00 kW

n ₂ [rpm]	M2 [Nm]	M2n [Nm]	fs	i _{VSF}	i _{HPL}	i _{tot}	Gear reducer	Motor	Fr ₂ CS [N]	Fr ₂ SS [N]
6,8	4795	8072	1,7	7,5	28,6	215	VP P983	TP112M4	62700	72500
5,1	6304	8320	1,3	10	28,6	286	VP P983	TP112M4	62700	72500

13.1 VP GEARED MOTORS

4,00 kW

n_2 [rpm]	M2 [Nm]	M2n [Nm]	f_s	i_{VSF}	i_{HPL}	i_{tot}	Gear reducer	Motor	Fr_2 CS [N]	Fr_2 SS [N]
4,5	7152	17216	2,4	10	32,5	325	VP P1183	TP112M4	70050	90300
4,4	7109	14890	2,1	15	22,0	329	VP P1133	TP112M4	68600	90300
4,2	7385	9131	1,2	15	22,8	342	VP P983	TP112M4	64050	73850
3,8	8193	14585	1,8	15	25,3	380	VP P1133	TP112M4	70350	92100
3,4	9123	17656	1,9	15	28,2	423	VP P1183	TP112M4	72800	93900
3,4	9267	8613	0,9	15	28,6	429	VP P983	TP112M4	65450	75550
3,3	9361	14638	1,6	20	22,0	439	VP P1133	TP112M4	71600	94200
3,2	9618	9166	1,0	20	22,8	456	VP P983	TP112M4	66150	76300
3,0	10515	17791	1,7	15	32,5	487	VP P1183	TP112M4	73900	95100
2,9	10789	14659	1,4	20	25,3	506	VP P1133	TP112M4	73550	96500
2,3	13338	14911	1,1	25	25,3	633	VP P1133	TP112M4	76000	100200
2,2	13846	18962	1,4	20	32,5	650	VP P1183	TP112M4	77800	100200
2,1	14851	19659	1,3	25	28,2	705	VP P1183	TP112M4	79000	101600
1,9	15052	14951	1,0	30	25,3	759	VP P1133	TP112M4	77100	101600
1,7	16760	20046	1,2	30	28,2	846	VP P1183	TP112M4	80800	104000
1,5	19317	19008	1,0	30	32,5	975	VP P1183	TP112M4	83100	106500

ATTENTION!

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