TECHNICAL CATALOGUE

HPL SERIES

PLANETARY **GEARED**MOTORS

STANDARD **IEC**

MOTOVARIO®
HEART OF MOTION
a TECO Group company

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1.1 COMPANY PROFILE

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 m^2 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

1.1 COMPANY PROFILE

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 experienced 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.

1.2 PRODUCTS AND SOFTWARE MOTOVARIO

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.

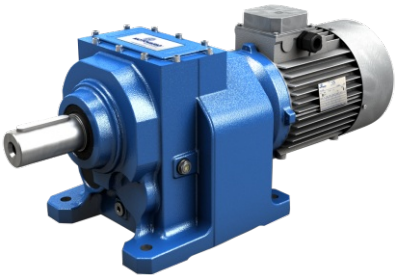
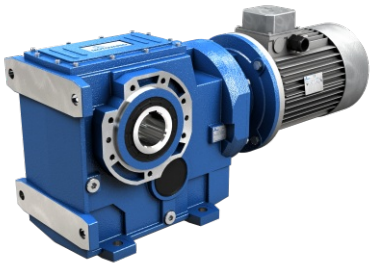
Range extension and ongoing evolution
The steady, significant growth of Motovario Group is achieved thanks to an ongoing search for new calculation and design tools, as well as to customer service. The new tools identified have led to innovation, improved product reliability as well as positive developments 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.

1.2 PRODUCTS AND SOFTWARE MOTOVARIO

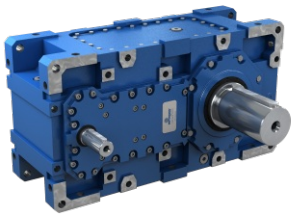
MOTOVARIO Products

HELICAL GEAR REDUCERS Cast iron or aluminum casing Output shaft up to 90 mm Mn_2 up to 8.600 Nm Reduction stages 1, 2, 3 Ratios up to 354 Atex units	
HELICAL BEVEL GEAR REDUCERS Cast iron or aluminum casing Output shaft up to 110 mm Mn_2 up to 14.000 Nm Reduction stages 2, 3 Ratios up to 443 Atex units	
SHAFT MOUNTED GEAR REDUCERS Cast iron Output shaft up to 90 mm Mn_2 up to 10.250 Nm Reduction stages 2, 3 Ratios up to 395 Atex units	
WORM GEAR REDUCERS Cast iron or aluminum casing Output shaft up to 50 mm Mn_2 up to 2.700 Nm Ratios up to 1083 Atex units	
PLANETARY GEARED UNITS Cast iron Output shaft up to 80 mm Mn_2 up to 10000 Nm Reduction stages 1, 2, 3, 4 Ratios up to 2700	

1.2 PRODUCTS AND SOFTWARE MOTOVARIO

PARALLEL HELICAL AND BEVEL HELICAL GEAR REDUCERS FOR MIDDLE HEAVY INDUSTRY

Cast iron casing
Output shaft up to 180 mm
Mn_2 up to 110.000 Nm
Reduction stages 2, 3, 4
Ratios up to 431
Atex units



MOTOVARIATORS AND MOTOVARIATOR-GEAR REDUCERS

Cast iron or aluminum casing
Mn_2 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

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	Fr	[N]	Fr_1	Fr_2
Axial load	Fa	[N]	Fa_1	Fa_2
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

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	$F = m * g (\mu * \cos\beta + \text{sen}\beta)$	
m= mass [kg]; g= gravity acceleration [m/s^2]; μ= friction coefficent; 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	$ta = (Jext+Jm)*n_n/9{,}55+(M_{peak}-Mr)$	[s]
Braking time	$ts = (Jext+Jm)*n_n/9{,}55+(M_{peak}+Mr)$	[s]
Motor rotation angle during starting	$\varphi = n_n * ta / 19{,}1$	[rad]
Motor rotation angle during braking	$\varphi = n_n * ts / 19{,}1$	[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	$P1_{60Hz} = P1_{50Hz} * V_{60Hz}/V_{50Hz}$	[kW]
If input voltage at 60 Hz (V_{60Hz}) corresponds to winding voltage at 50 Hz (V_{50Hz}), power doesn't change $P1_{60Hz} = P1_{50Hz}$ If input voltage at 60 Hz (V_{60Hz}) is 20% higher than winding voltage at 50 Hz (V_{50Hz}), power increases by 20% $P1_{60Hz} = 1{,}2\ P1_{50Hz}$		
Torque at 60Hz	$M_{60hz} = M_{50Hz} * P1_{60Hz} / (1{,}2 * P1_{50Hz})$	[Nm]
Service factor at 60Hz	$f.s._{60Hz} = f.s._{50Hz} * 1{,}175 * P1_{50Hz} / P1_{60Hz}$	-

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 **(n_1)** and the rotational output speed **(n_2).** 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 **(Mr_2)**.

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 **Pr_1** using the required torque value **Mr_2**, the speed **n_2** and dynamic efficiency value. **$Pr1=(Mr_2*n_2)/(9550*\eta_d)$.** 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 **Pn_1** exceeding the required power **Pr_1**, 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 n_2 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 **n_2** and from the input speed **n1. $i=n_1/n_2$**
3. Calculate the torque **Mc_2** for selecting the gear reducer through the torque required by the application **Mr_2** and the service factor s.f.: **$Mc_2=Mr_2*(f_s)$**
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 **Mn_2** so that: **$Mn_2 \geq Mc_2$**

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 M2max value in the table.

$M_{2\ max}$ [Nm]				
HPL 010	**HPL 020**	**HPL 030**	**HPL 050**	**HPL 080**
2400	3400	5200	8800	14900

1.4 PRODUCT SELECTION

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	4,32	5,37	7,38	9,30	11,84	87,45	187,66
M_{2max} [Nm]	790	990	1360	1710	2000	2000	2000

IHL 020	1		2	
i	7,38	9,30	11,84	14,87
M_{2max} [Nm]	1360	1710	2180	2740

IHL 030	1	2				
i	9,30	14,87	18,66	21,29	23,19	26,73
M_{2max} [Nm]	1710	2740	3440	3920	4270	4920

IHL 050	2			
i	31,90	33,22	39,64	45,69
M_{2max} [Nm]	5880	6120	7300	8420

IHL 080	2		3		
i	55,38	69,75	53,52	63,18	79,32
M_{2max} [Nm]	10200	12850	9860	11640	14620

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. **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.

D. 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 Pn1 by installed power P1. 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

1.5 SERVICE FACTOR

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 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

1.5 SERVICE FACTOR

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 INSTALLATION

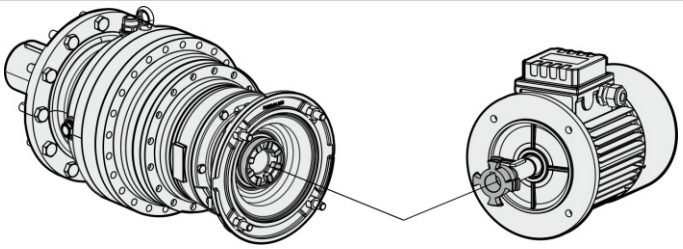
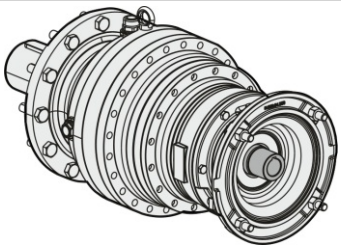
1.6.1 Installation

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.
- 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.

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.

Flexible joint	PAM Sleeve
	

2.1 DESIGN FEATURES

MOTOVARIO products are supplied with the following surface treatment characteristics:

External ring gear in nitrided steel

Sun and planetary gears in case-hardened steel

High-resistance spheroidal cast-iron struts

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.

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

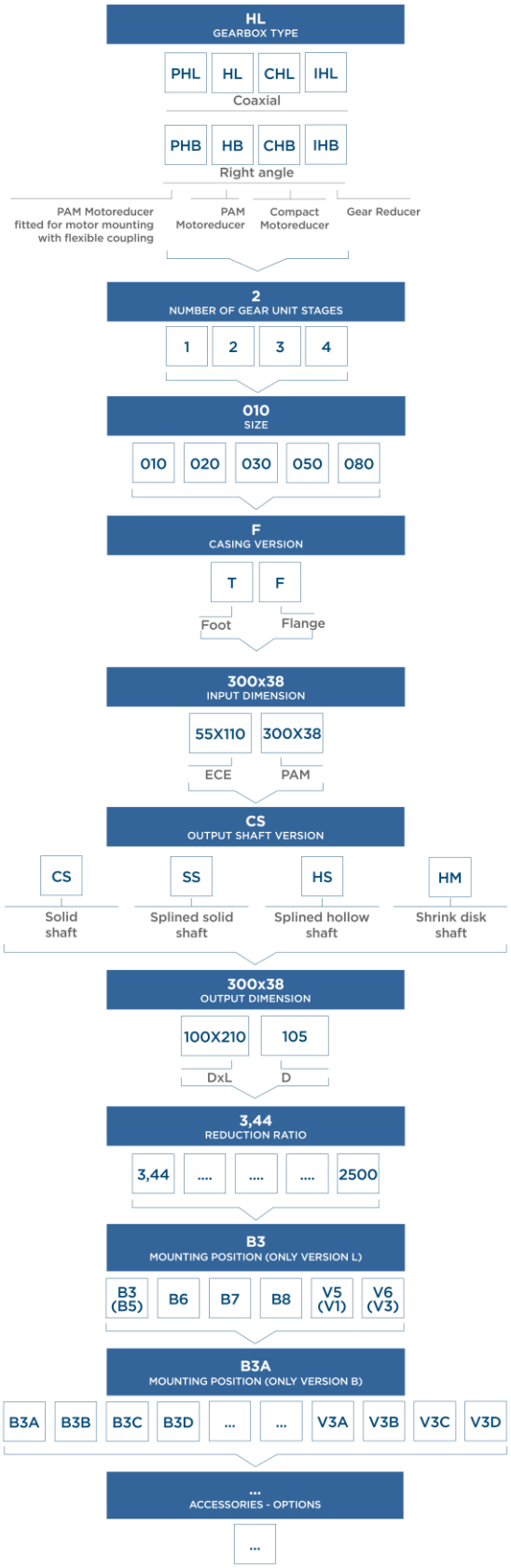
Performance:
- Loading capacity verifiable in accordance with DIN 3990, ISO 6336, AGMA 2101, ISO 10300, DIN 3991, ISO 281, DIN 743.

Dynamic η:
- The efficiency is the ratio between the output power P2 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:
HPL..1 stages = 0,97
HPL..2 stages = 0,94
HPL..3 stages = 0,91
HPL..4 stages = 0,88

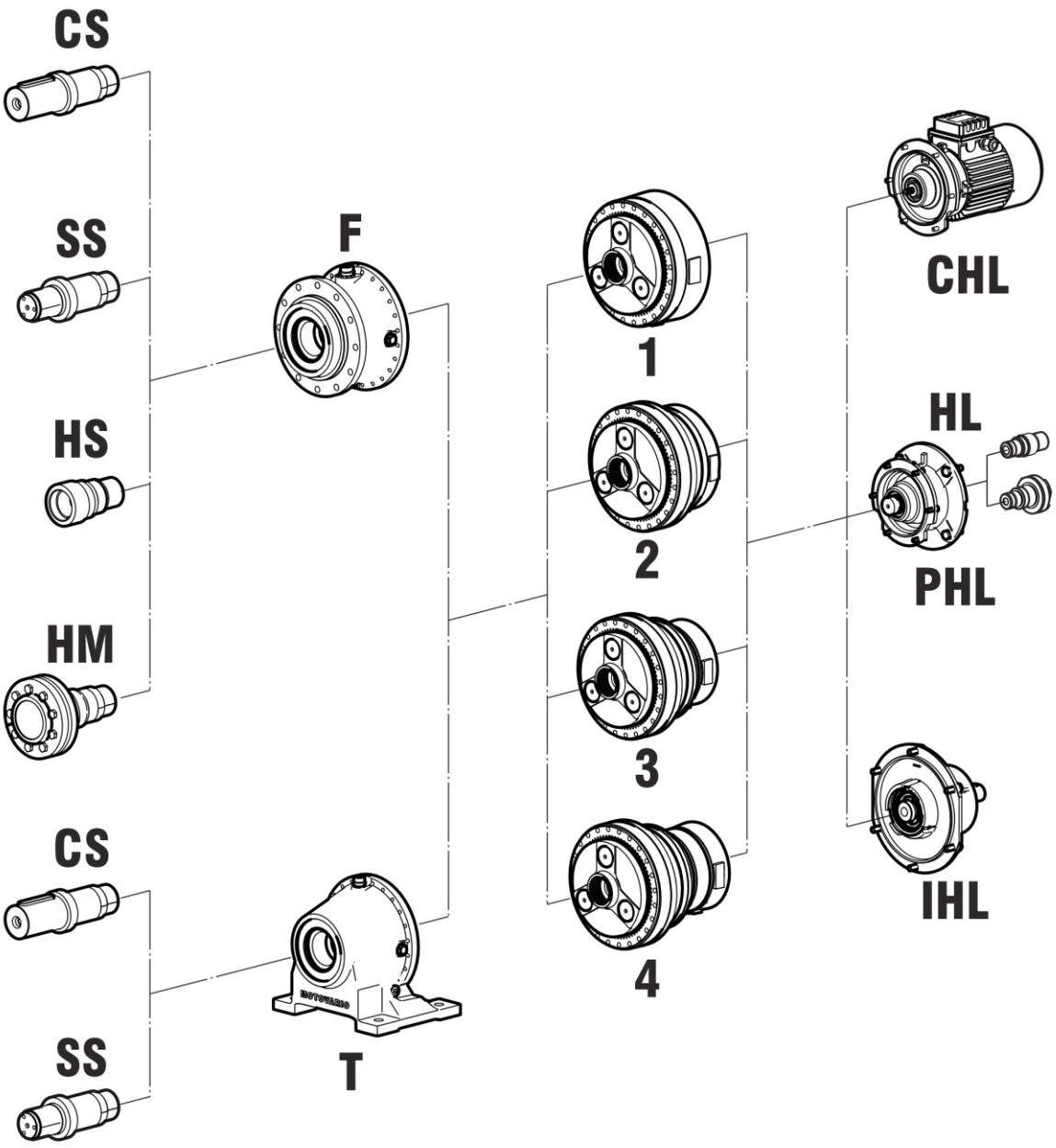
2.2 TYPOLOGY

2.2.1 Designation



2.2 TYPOLOGY

2.2.2 Versions



CS	Solid shaft
SS	Splined solid shaft
HS	Splined hollow shaft
HM	Shrink disk shaft

F	Flange
T	Foot

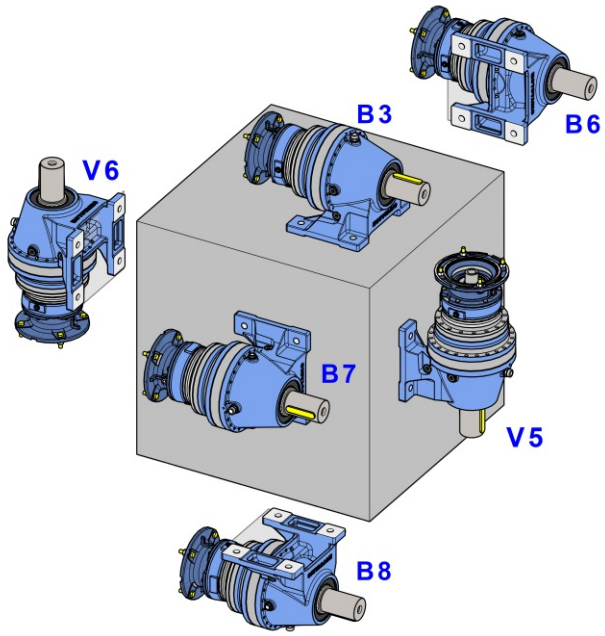
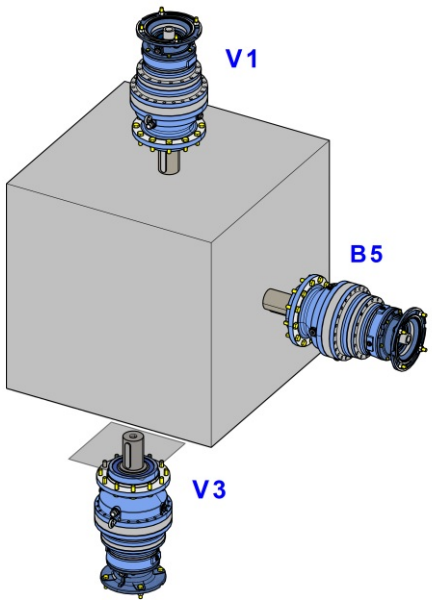
1	Number of gear unit stages
2	
3	
4	

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

2.3 MOUNTING POSITIONS

2.3.1 Mounting positions

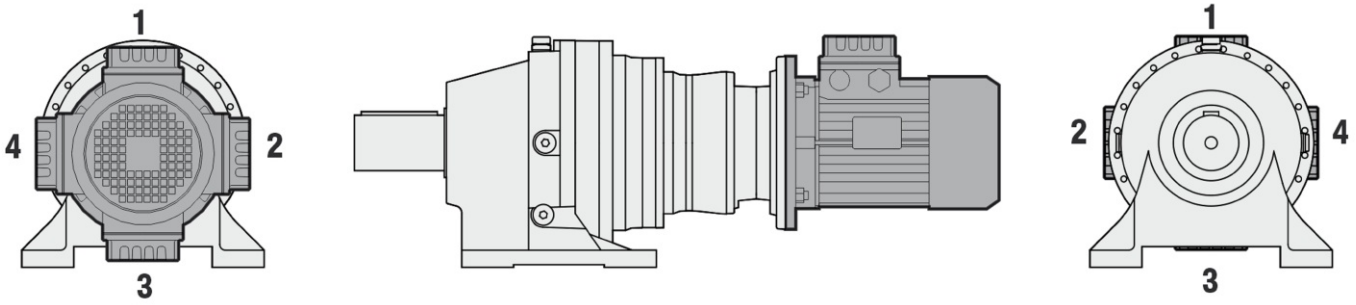
The mounting position of the gear unit identifies its space orientation. B3 mounting position, as from a technical point of view, ensures lower oil splash, better lubrication and less heating.

HL....T	HL....F
	

2.3 MOUNTING POSITIONS

2.3.2 Position of terminal box

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



2.4 THERMAL POWER

2.4.1 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°C
- sea level altitude
- air speed around the gear reducer >=1m/s
- absence of external radial and/or axial loads

n_1 = 1500rpm							
	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	11,6	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

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).

2.4.2 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 < Pth * f_ta * f_tc * f_tn * f_tv, where:

- **P_1**= installed power [kW]
- **Pth** = 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 n1 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

	Fc	% Duty per hour of operation				
		100	80	70	40	20
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 n1 correction factor

	n1 [rpm]							
ftn	500	700	900	1150	1400	1750	2250	2800
B3/B5 B6 - B7 B8	1,73	1,41	1,3	1,16	1	0,81	0,65	0,5
V5/V1 V6/V3	1,3	1,16	1	0,81	0,65	0,5	0,4	0,25

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.

2.5 CRITICAL APPLICATIONS

2.5.1 Critical applications

	HPL				
	010	020	030	050	080
n1 < 1800 rpm	✔	✔	✔	✔	✔
1800 rpm < n1 < 3000 rpm	B	B	B	B	B
n1 > 3000 rpm	A	A	A	A	A

		HPL				
		010	020	030	050	080
FS < 1,25	B3/B5-B6-B7-B8 : n2 < 0,5 rpm	A	A	A	A	A
	V5/V1 - V3/V6 : n2 < 0,3 rpm	A	A	A	A	A

✔ Verified application.
A Application not recommended.
B Check the application and/or call MOTOVARIO TECHNICAL SERVICE.

2.5.2 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).

2.6 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

2.6 MOTOR FLANGE AVAILABILITY

HL 020

CHL - HL - PHL - CHB - HB - PHB 1-020				
	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

2.6 MOTOR FLANGE AVAILABILITY

HL 030

CHL - HL - PHL - CHB - HB - PHB 1-030				
	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

2.6 MOTOR FLANGE AVAILABILITY

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

2.6 MOTOR FLANGE AVAILABILITY

HL 080

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

CHL - HL - PHL - CHB - HB - 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 - HL - PHL - CHB - HB - 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 - HL - PHL - CHB - HB - 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

2.7 OUTPUT SHAFT BEARINGS

CS - SS				
HPL 010	**HPL 020**	**HPL 030**	**HPL 050**	**HPL 080**
Standard	Standard	Standard	Standard	Standard
2	2	2	2	2

1 - Ball Bearing

2 - Roller bearings

/ - Not available

2.8 RADIAL LOAD

2.8.1 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 maximum admissible axial loads are 1/5 of the value of the given radial load when they are applied in combination with the radial load. The tables relating to the output shafts give the maximum admissible value. This value must never be exceeded since it relates to the strength of the case. Particular conditions of radial load higher than the limits of the catalogue may occur. In this case, call our Technical Sevice 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: **Fre=(2000*M*fz)/D≤Fr1 or Fr2**

- **Fre** [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

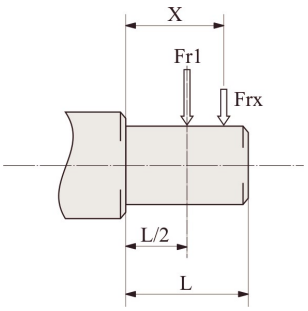
2.8.2 Input

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

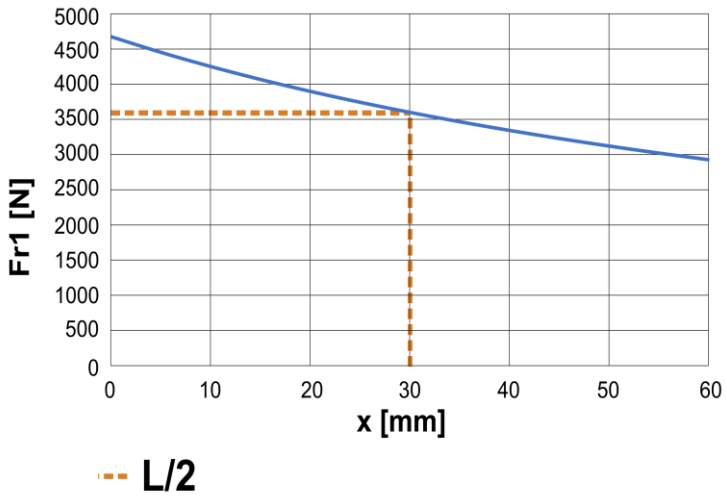
IHL 28x60	3600 N

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

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



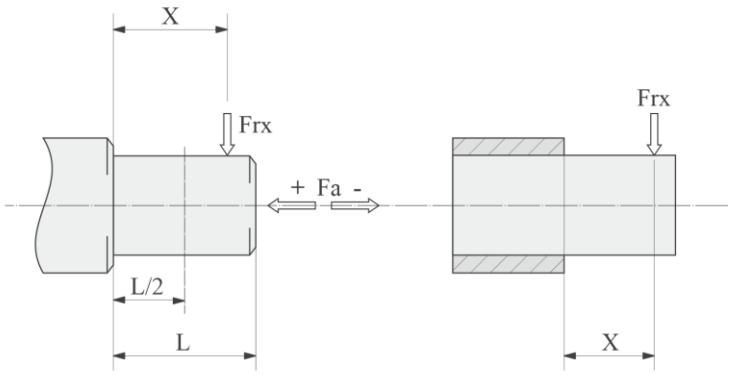
IHL 28x60



2.8.3 Output - Radial/Axial load

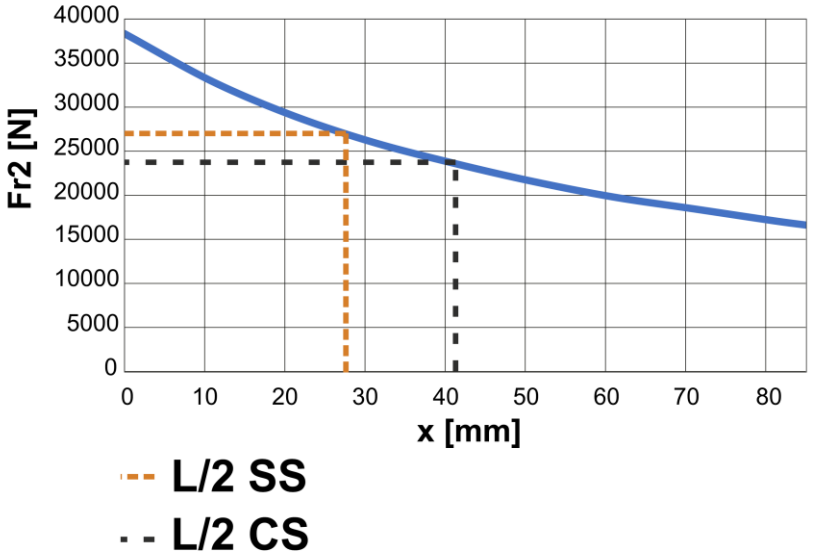
When the radial load is not on the centre line of the shaft, it is necessary to light the admissible radial load Fr2 with the following graph.

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



Allowable overhung and axial loads on the output shaft **Fh2:n2*h=100000**

010-020



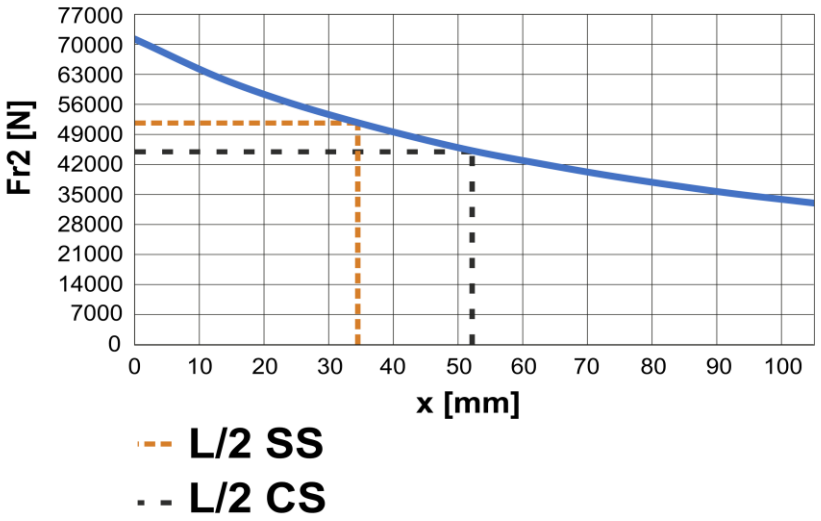
	Fa_2 + [N]	Fa_2 - [N]
CS - SS	20000	20000

For Fh2 ≠ 100000, multiply the radial or axial load by the coefficient fh2.

Corrective factor fh2 for overhung and axial loads on shafts						
Fh2 = n2*h	**10000**	**25000**	**50000**	**100000**	**500000**	**1000000**
CS - SS	1,15	1,14	1,13	1	0,62	0,5

2.8 RADIAL LOAD

030-050



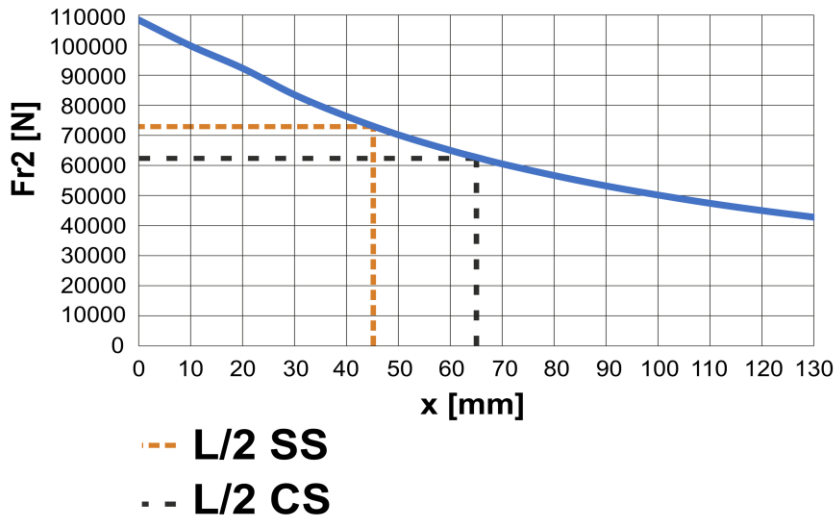
	Fa_2 + [N]	Fa_2 - [N]
CS - SS	27500	22000

For Fh2 ≠ 100000, multiply the radial or axial load by the coefficient fh2.

Corrective factor fh2 for overhung and axial loads on shafts						
Fh2 = n2*h	**10000**	**25000**	**50000**	**100000**	**500000**	**1000000**
CS - SS	1,34	1,33	1,12	1	0,62	0,5

2.8 RADIAL LOAD

080



	Fa_2 + [N]	Fa_2 - [N]
CS - SS	60000	30000

For Fh2 ≠ 100000, multiply the radial or axial load by the coefficient fh2.

Corrective factor fh2 for overhung and axial loads on shafts						
Fh2 = n2*h	10000	25000	50000	100000	500000	1000000
CS - SS	1,22	1,21	1,12	1	0,62	0,5

2.9 LUBRICATION

2.9.1 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.

2.9.2 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.

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).

Specifications of LUBRICANTS RECOMMENDED BY MOTOVARIO

	* 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**

2.9 LUBRICATION

Based on the output speed n_2, check the oil type to be used in table ISO VISCOSITY GRADES, that provides the average kinematic speed value [cSt] at 40 °C.

Table ISO VISCOSITY GRADES

n_2 [rpm]	T_{amb} °C	
	Synthetic oil	Mineral oil
	(-15) ÷ (+50)	(-5) ÷ (+40)
> 150	220	220
150 ÷ 5	320	320
< 5	460	460

2.9.3 Special lubricants

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

2.9.4 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
B3/B5 B6/B7 B8	0,69	0,82	1,21	1,35	2,63
V1/V5	0,77	0,92	1,61	1,82	2,96
V3/V6	1,04	1,04	1,64	1,63	4,03

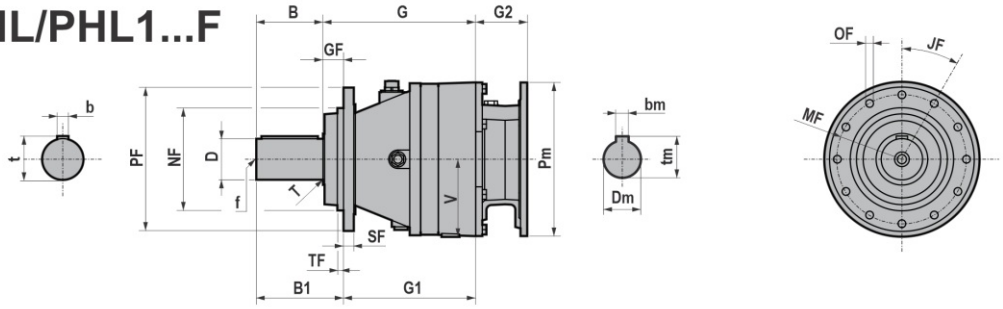
HPL-2	010	020	030	050	080
B3/B5 B6/B7 B8	0,95	1,09	1,32	1,49	2,54
V1/V5	1,31	1,44	2,09	2,21	4,19
V3/V6	1,58	1,72	1,88	1,88	3,88

HPL-3	010	020	030	050	080
B3/B5 B6/B7 B8	1,2	1,38	1,57	1,78	2,66
V1/V5	1,85	1,99	2,63	2,75	4,67
V3/V6	2,13	2,26	2,42	2,42	4,12

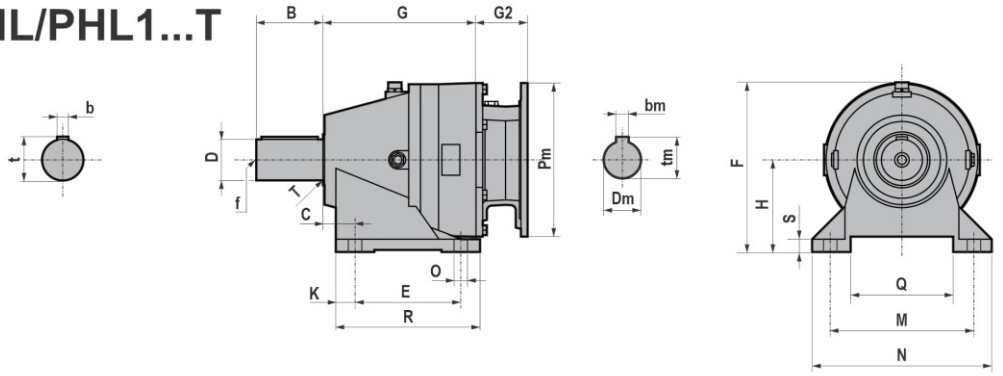
HPL-4	010	020	030	050	080
B3/B5 B6/B7 B8	1,46	1,67	1,82	2,07	2,91
V1/V5	2,39	2,53	3,21	3,29	5,17
V3/V6	2,67	2,8	2,96	2,96	4,67

3.1.1 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	105
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	105
030	60	h6	105	18	64	M20	120	231	216	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	251	236	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	152

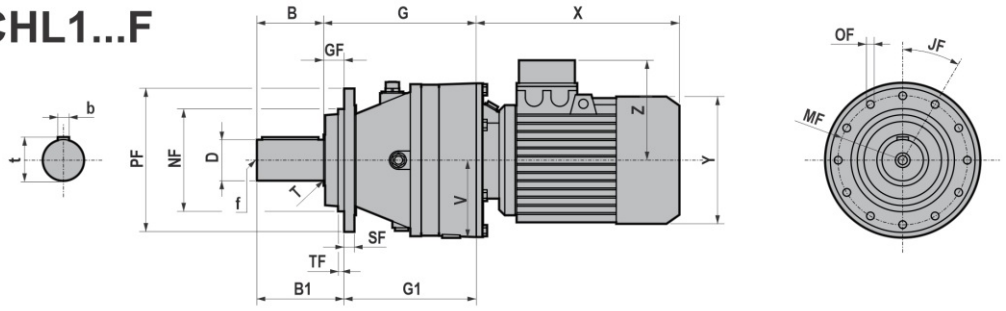
	PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12

			G2			
IEC	**Pm x Dm**	**HL/PHL 1 010**	**HL/PHL 1 020**	**HL/PHL 1 030**	**HL/PHL 1 050**	**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	/	/	/	/	/

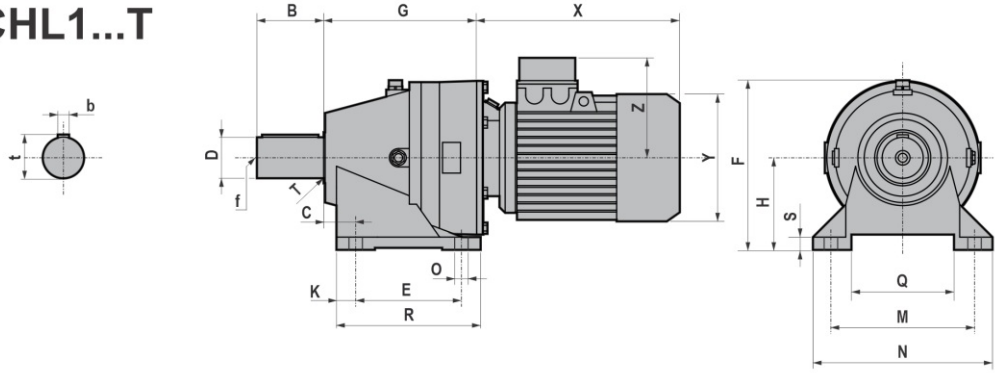
B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3
180	350	48	14	51,8
200	400	55	16	59,3
225	450	60	18	64,4

3.1.2 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	105
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	105
030	60	h6	105	18	64	M20	120	231	216	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	251	236	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126

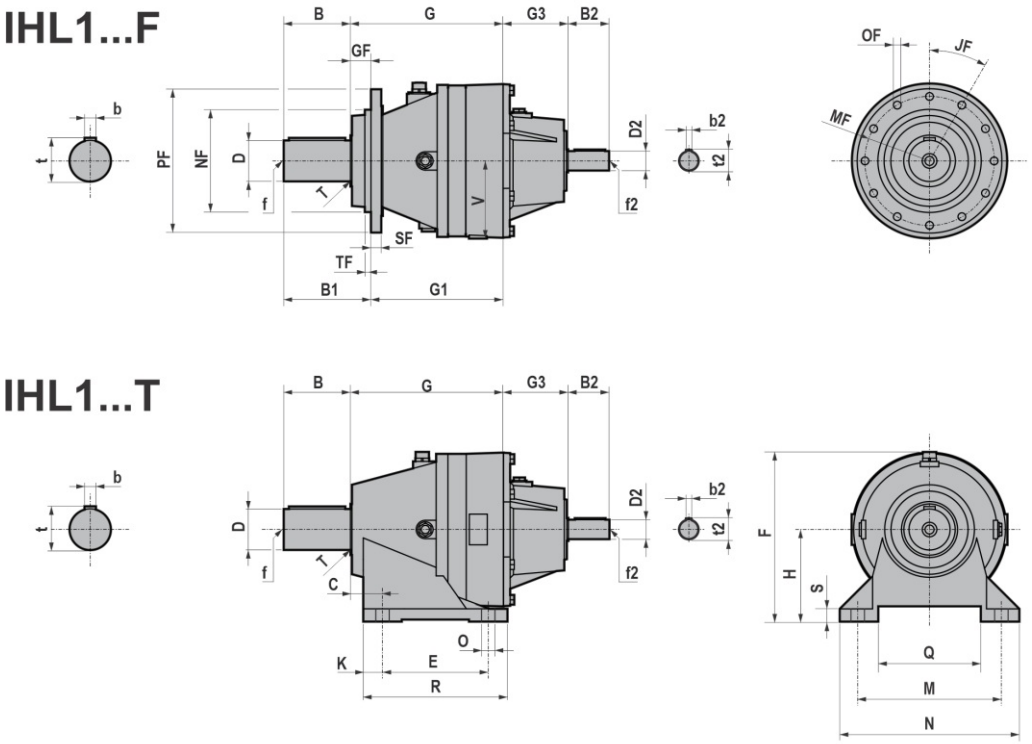
	PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13

T (IE1 - IE2 - IE3)									
		71	80	090S	090L	100	112	132S	132M/L
010/ .../050	**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	090S	090L	100	112	132S	132M/L
010/ .../050	**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

3.1.3 IHL 1



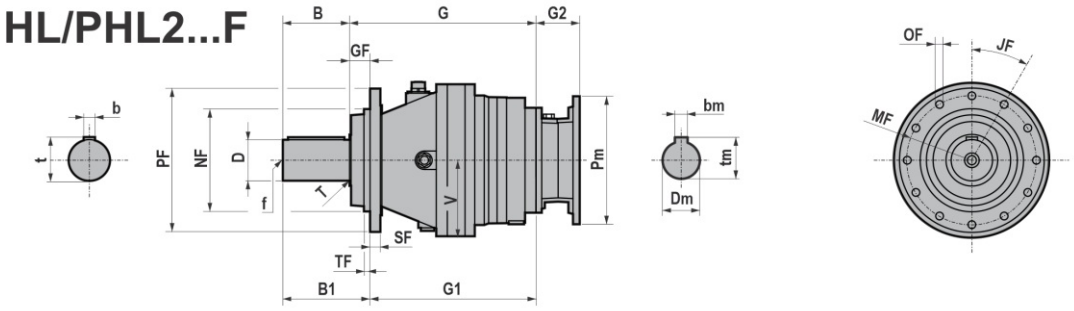
	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O		Q	R	S	T	V
010	50	h6	82	14	53,5	M16	88	183	177	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	105
020	50	h6	82	14	53,5	M16	88	197	191	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	105
030	60	h6	105	18	64	M20	120	231	216	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126

	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

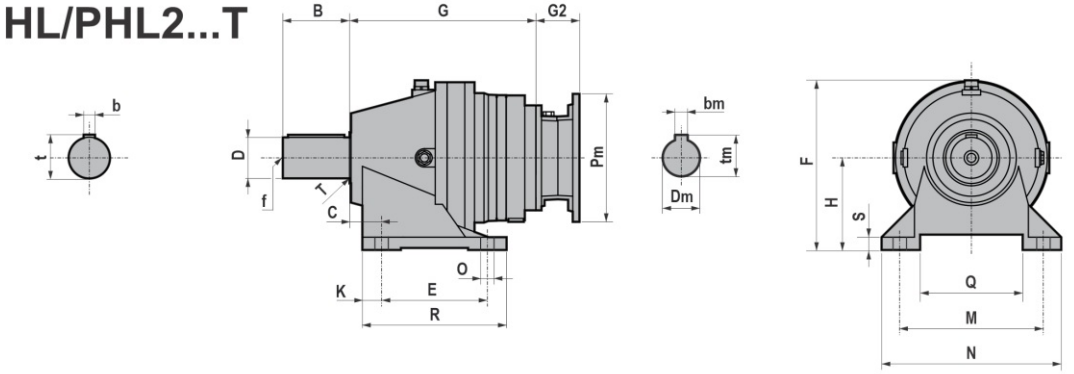
	G3	D2	B2	b2	t2	f2
010/.../030	113	28 j6	60	8	31	M10

3.1.4 HL/PHL 2

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	105
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	105
030	60	h6	105	18	64	M20	120	281	266	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	315	300	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	149

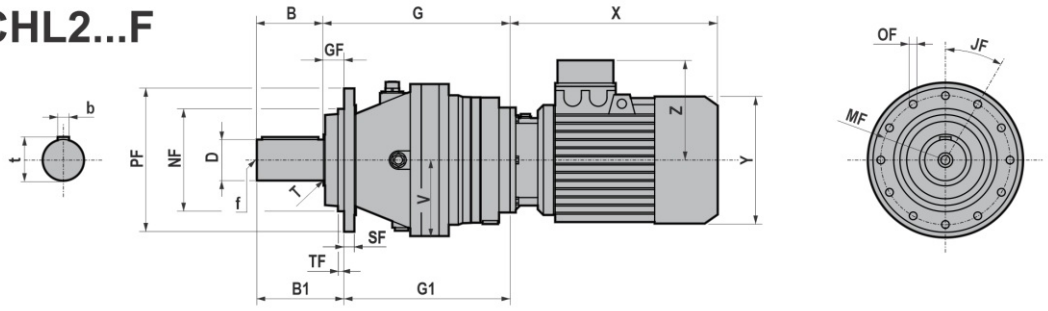
	PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12

		G2				
IEC	**Pm x Dm**	**HL/PHL 2 010**	**HL/PHL 2 020**	**HL/PHL 2 030**	**HL/PHL 2 050**	**HL/PHL 2 080**
71	160x14	49	49	49	/	/
80	200x19	70	70	70	/	/
90	200x24	70	70	70	/	/
100-112	250x28	85	85	85	85	85
132	300x38	110	110	110	110	110
160	350x42	157,5	157,5	157,5	157,5	157,5
180	350x48	/	/	/	/	/
200	400x55	/	/	/	/	/
225	450x60	/	/	/	/	/

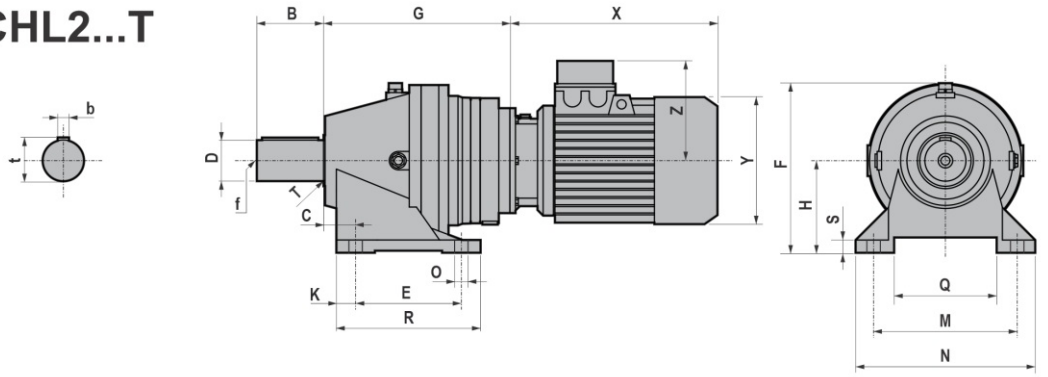
B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3
180	350	48	14	51,8
200	400	55	16	59,3
225	450	60	18	64,4

3.1.5 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	105
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	105
030	60	h6	105	18	64	M20	120	281	266	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	315	300	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	149

	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

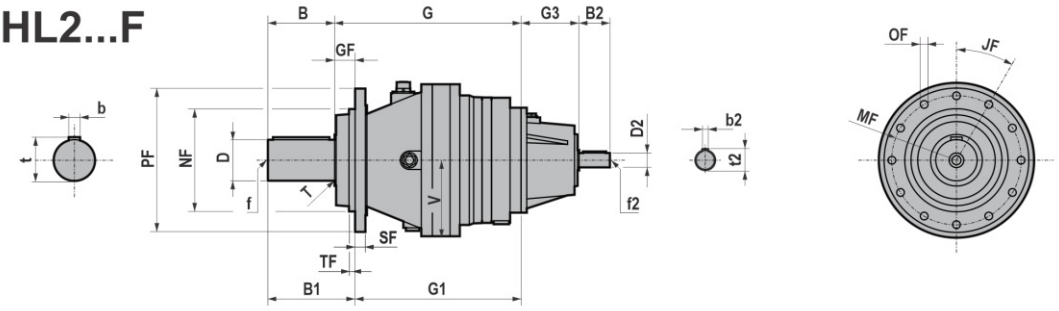
T (IE1 - IE2 - IE3)									
		71	80	090S	090L	100	112	132S	132M/L
010/ .../180	**X**	221	248	276	301	335	356	405	443
	***X**		271	309	334		380		
	Y	139	158	173	173	191	211	249	249
	Z	112	122	130	130	139	154	194	194

TB (IE1 - IE2 - IE3)									
		71	80	090S	090L	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

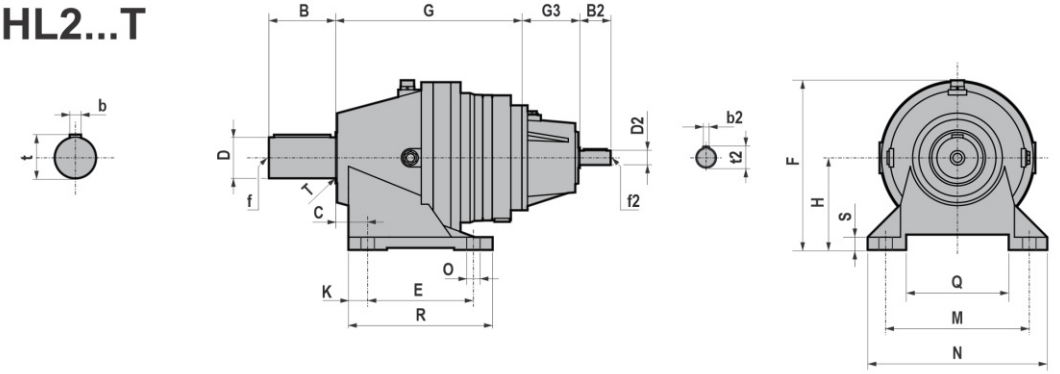
*X - TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

3.1.6 IHL 2

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	105
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	105
030	60	h6	105	18	64	M20	120	281	266	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	315	300	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	149

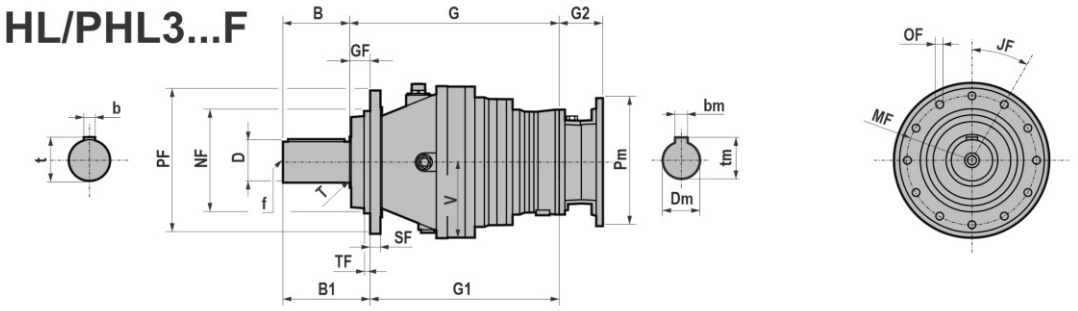
	PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12

	G3	D2	B2	b2	t2	f2
010/.../080	113	28 j6	60	8	31	M10

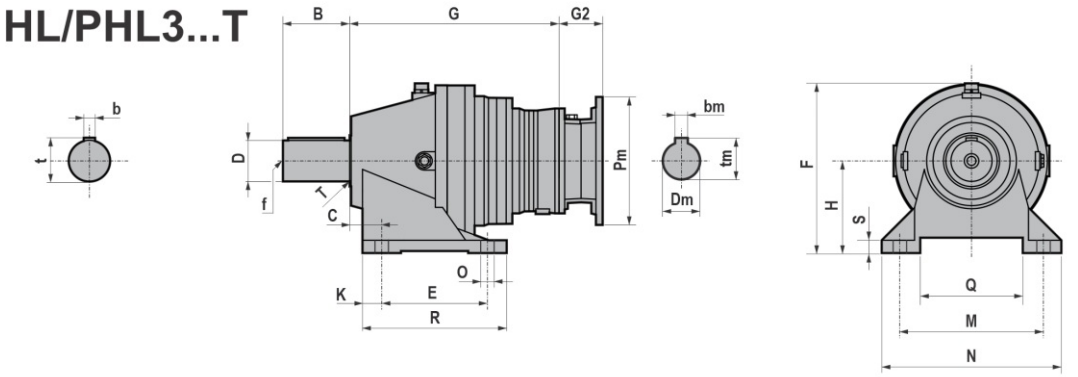
3.1 REDUCERS/GEARED MOTORS

3.1.7 HL/PHL 3

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	105
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	105
030	60	h6	105	18	64	M20	120	336	321	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	340	335	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	149

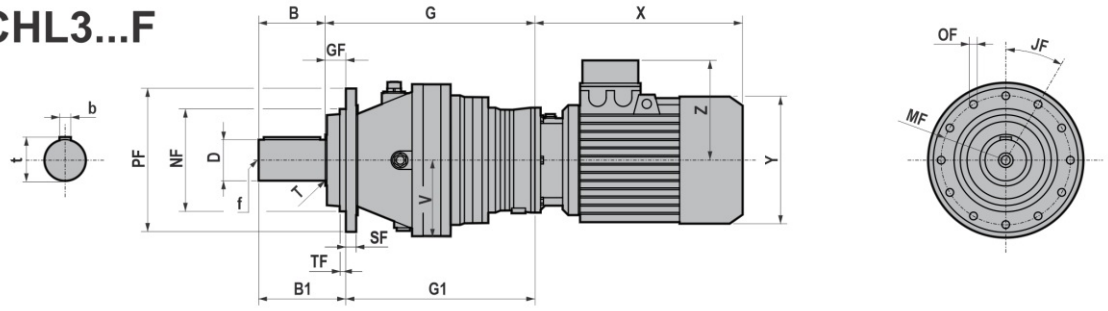
	PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12

		G2				
IEC	**Pm x Dm**	**HL/PHL 3 010**	**HL/PHL 3 020**	**HL/PHL 3 030**	**HL/PHL 3 050**	**HL/PHL 3 080**
71	160x14	49	49	49	49	49
80	200x19	70	70	70	70	70
90	200x24	70	70	70	70	70
100-112	250x28	85	85	85	85	85
132	300x38	110	110	110	110	110
160	350x42	157,5	157,5	157,5	157,5	157,5
180	350x48	/	/	/	/	/

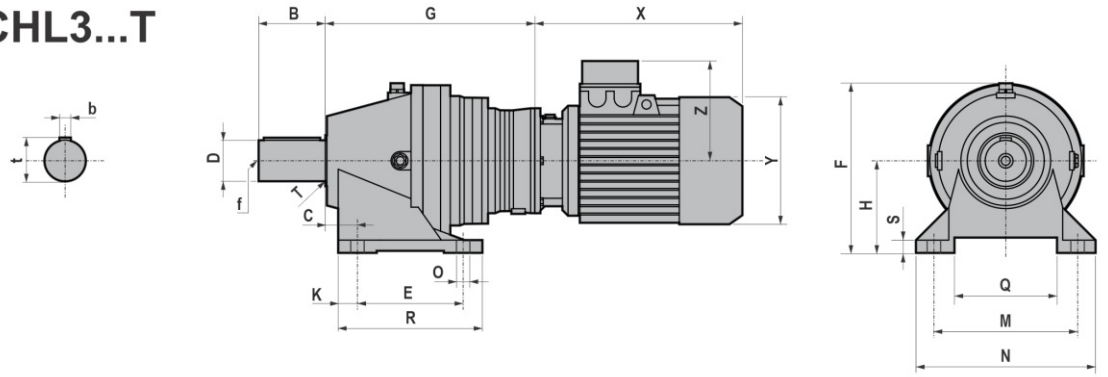
B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3
180	350	48	14	51,8

3.1.8 CHL 3

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	105
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	105
030	60	h6	105	18	64	M20	120	336	321	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	340	335	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	149

	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

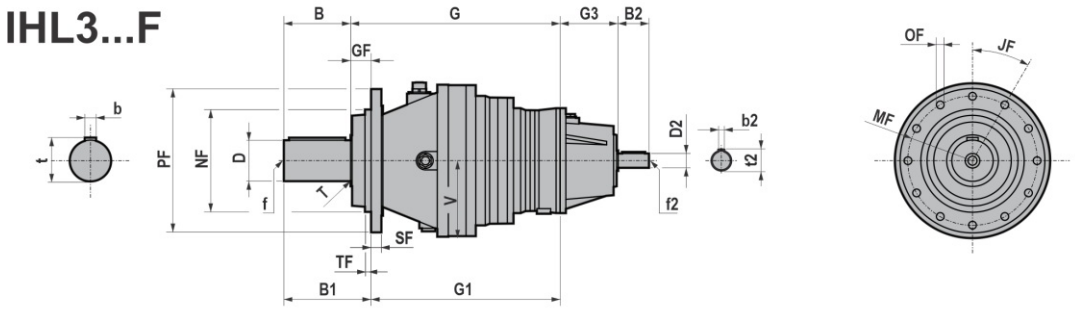
T (IE1 - IE2 - IE3)									
		71	80	090S	090L	100	112	132S	132M/L
010/ .../080	X	221	248	276	301	335	356	405	443
	*X		271	309	334		380		
	Y	139	158	173	173	191	211	249	249
	Z	112	122	130	130	139	154	194	194

TB (IE1 - IE2 - IE3)									
		71	80	090S	090L	100	112	132S	132M/L
010/ .../080	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

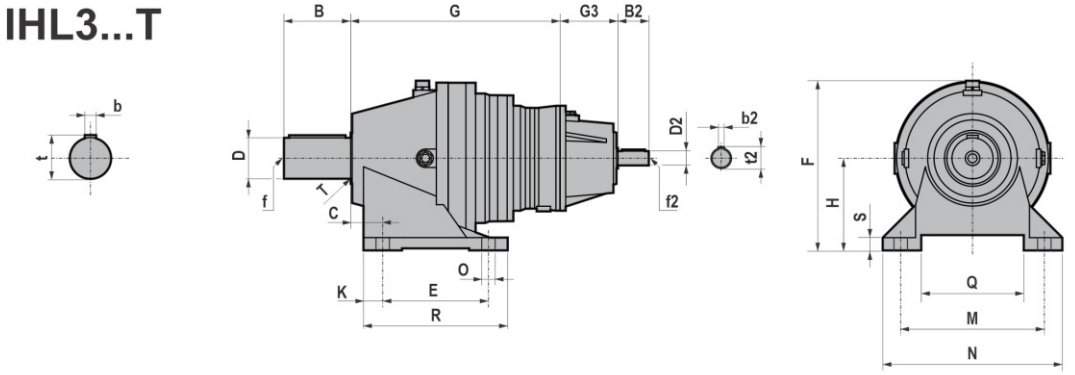
*X - TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

3.1.9 IHL 3

IHL3...F



IHL3...T



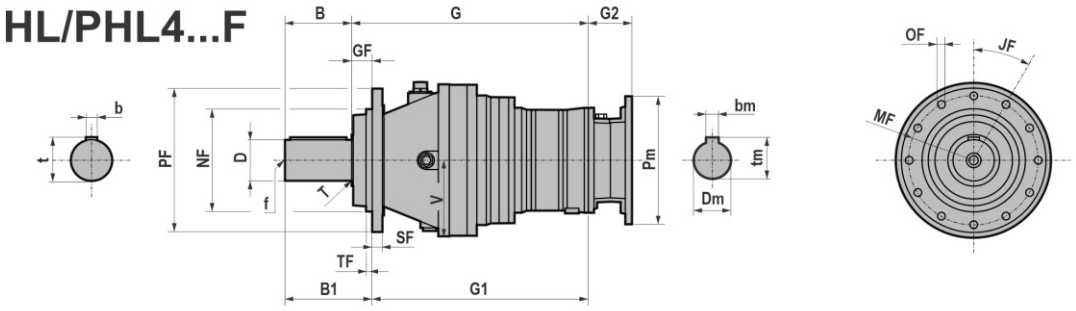
	D		B	b	t	f	B1	G	G1	C	E	F	H	K	M	N	O		Q	R	S	T	V
010	50	h6	82	14	53,5	M16	88	293	287	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	105
020	50	h6	82	14	53,5	M16	88	307	301	24	138	233	132	21	216	260	17	n°4	148	180	16	1,5	105
030	60	h6	105	18	64	M20	120	336	321	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	340	335	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	149

	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

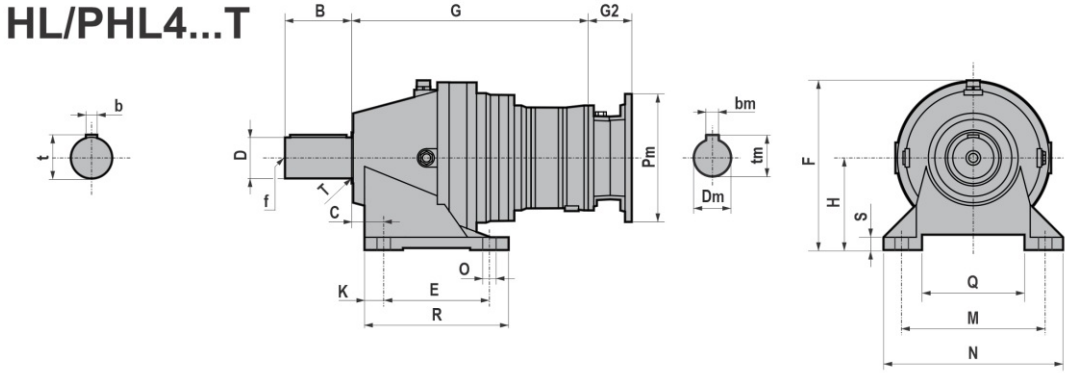
	G3	D2	B2	b2	t2	f2
010/.../080	113	28 j6	60	8	31	M10

3.1.10 HL/PHL 4

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	105
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	105
030	60	h6	105	18	64	M20	120	391	376	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	425	410	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	149

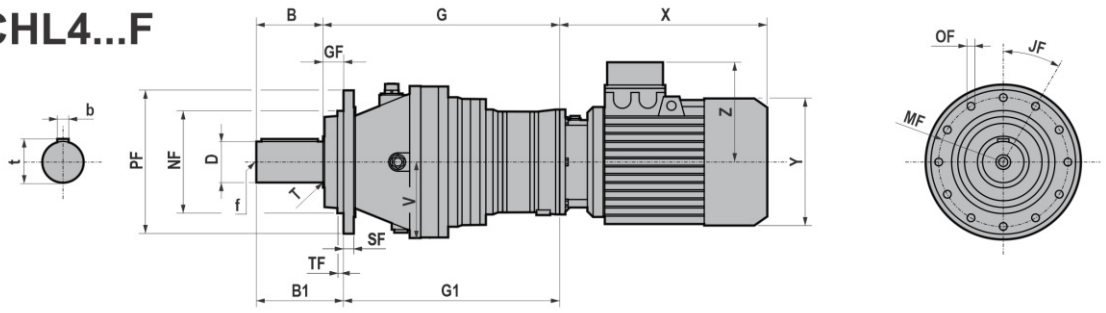
	PF	MF	NF f7	GF	JF	OF		SF	TF
010 020	186	165	110	6	45°	10,5	n°8	12	5
030 050	222	195	150	15	36°	12,5	n°10	15	13
080	280	250	200	40	30°	15	n°12	20	12

		G2				
IEC	**Pm x Dm**	**HL/PHL 4 010**	**HL/PHL 4 020**	**HL/PHL 4 030**	**HL/PHL 4 050**	**HL/PHL 4 080**
71	160x14	49	49	49	49	49
80	200x19	70	70	70	70	70
90	200x24	70	70	70	70	70
100-112	250x28	85	85	85	85	85
132	300x38	110	110	110	110	110
160	350x42	157,5	157,5	157,5	157,5	157,5

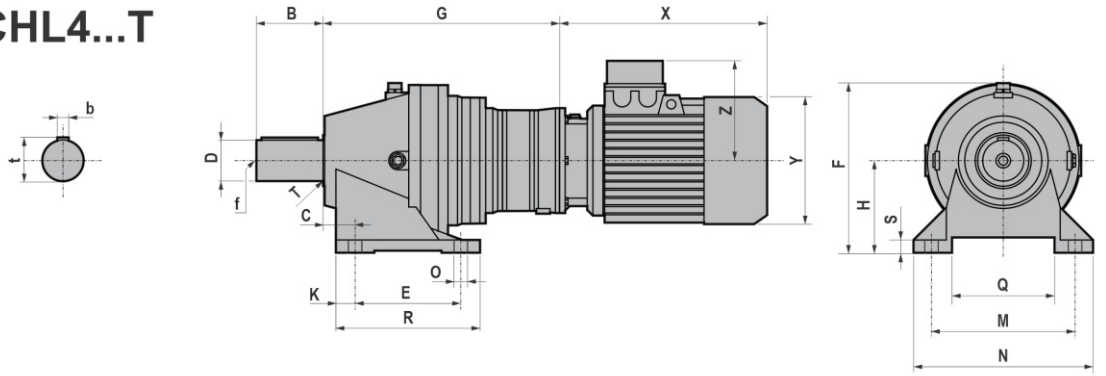
B5	Pm	Dm	bm	tm
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3

3.1.11 CHL 4

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	105
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	105
030	60	h6	105	18	64	M20	120	391	376	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	425	410	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	149

	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

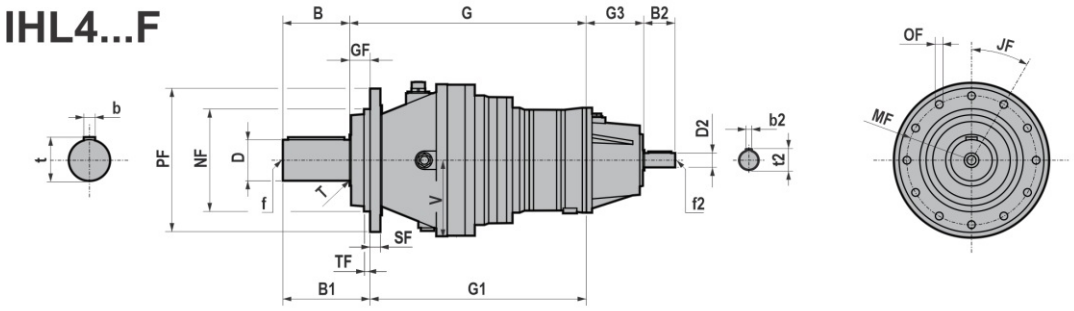
T (IE1 - IE2 - IE3)									
		71	80	090S	090L	100	112	132S	132M/L
010/ .../080	**X**	221	248	276	301	335	356	405	443
	***X**		271	309	334		380		
	Y	139	158	173	173	191	211	249	249
	Z	112	122	130	130	139	154	194	194

TB (IE1 - IE2 - IE3)									
		71	80	090S	090L	100	112	132S	132M/L
010/ .../080	**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

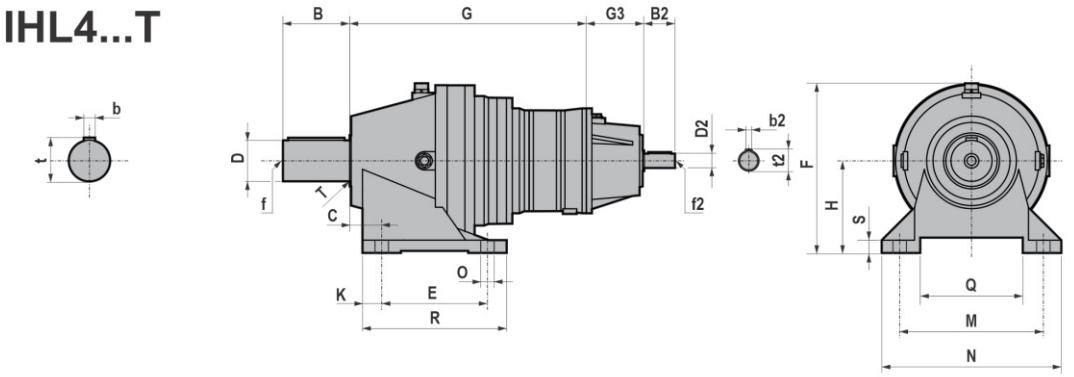
*X - TP80B4, SH80B4, HSH80B4, TP90S4, SH90S4, HSH90S4, TP90L4, SH90L4, HSH90L4, TP90S6, TP112M4, TP112M6

3.1.12 IHL 4

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	105
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	105
030	60	h6	105	18	64	M20	120	391	376	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
050	60	h6	105	18	64	M20	120	425	410	39	169	284	160	33	254	312	18	n°4	172	235	20	2	126
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	149

	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

	G3	D2	B2	b2	t2	f2
010/.../080	113	28 j6	60	8	31	M10

3.2 WEIGHTS

The values reported in the tables are referred to the weight of the gearbox without lubricant.
*Weight without motor

IEC ~[kg]								
* HL/PHL	71	80	90	100-112	132	160	180	200
1-010	24	30	30	32	35	41	/	/
1-020	27	32	32	34	37	43	/	/
1-030	/	/	/	56	59	65	/	/
1-050	/	/	/	/	/	/	/	/
1-080	/	/	/	/	/	/	/	122
2-010	32	38	38	40	43	49	/	/
2-020	35	40	40	42	46	52	/	/
2-030	56	61	61	63	67	73	/	/
2-050	/	/	/	71	74	80	/	/
2-080	/	/	/	110	113	119	/	/
3-010	44	46	46	48	51	57	/	/
3-020	47	48	48	50	54	60	/	/
3-030	68	69	69	71	75	81	/	/
3-050	72	77	77	79	82	89	/	/
3-080	112	117	117	119	123	129	/	/
4-010	52	54	54	56	59	65	/	/
4-020	55	56	56	58	62	68	/	/
4-030	76	77	77	79	83	89	/	/
4-050	84	85	85	87	91	97	/	/
4-080	124	125	125	127	131	137	/	/

	~[kg]
IHL	
1-010	35
1-020	37
1-030	59
1-050	/
1-080	/
2-010	43
2-020	45
2-030	66
2-050	74
2-080	113
3-010	51
3-020	53
3-030	74
3-050	82
3-080	122
4-010	59
4-020	61
4-030	82
4-050	90
4-080	130

3.2 WEIGHTS

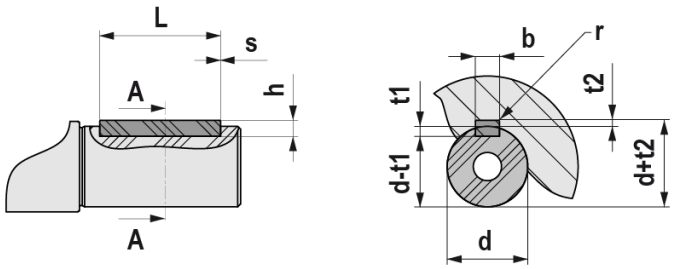
	TH ~[kg]	
CHL	71	80
1-010	33	33
1-020	/	/
1-030	/	/
1-050	/	/
1-080	/	/
2-010	41	41
2-020	43	43
2-030	64	64
2-050	/	/
2-080	/	/
3-010	49	49
3-020	51	51
3-030	72	72
3-050	80	80
3-080	120	120
4-010	57	57
4-020	59	59
4-030	80	80
4-050	88	88
4-080	128	128

	TP ~[kg]						
CHL	80	090S	090L	100	112	132S	132M
1-010	38	42	44	48	59	85	88
1-020	/	/	/	/	62	88	91
1-030	/	/	/	72	83	109	112
1-050	/	/	/	/	/	/	/
1-080	/	/	/	/	/	/	/
2-010	46	50	52	56	67	93	96
2-020	48	53	55	59	70	96	99
2-030	69	73	76	80	91	117	120
2-050	/	/	/	88	99	125	128
2-080	/	/	/	126	137	163	166
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
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

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

	TBP ~[kg]						
CHL	80	090S	090L	100	112	132S	132M
1-010	41	46	50	55	69	99	102
1-020	/	/	/	/	72	102	105
1-030	/	/	/	79	93	123	126
1-050	/	/	/	/	/	/	/
1-080	/	/	/	/	/	/	/
2-010	49	54	58	63	77	107	110
2-020	52	56	60	66	80	110	113
2-030	73	77	81	87	101	131	134
2-050	/	/	/	95	109	139	142
2-080	/	/	/	133	147	177	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
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	97	101	105	111	125	155	158
4-080	137	141	145	151	165	195	198

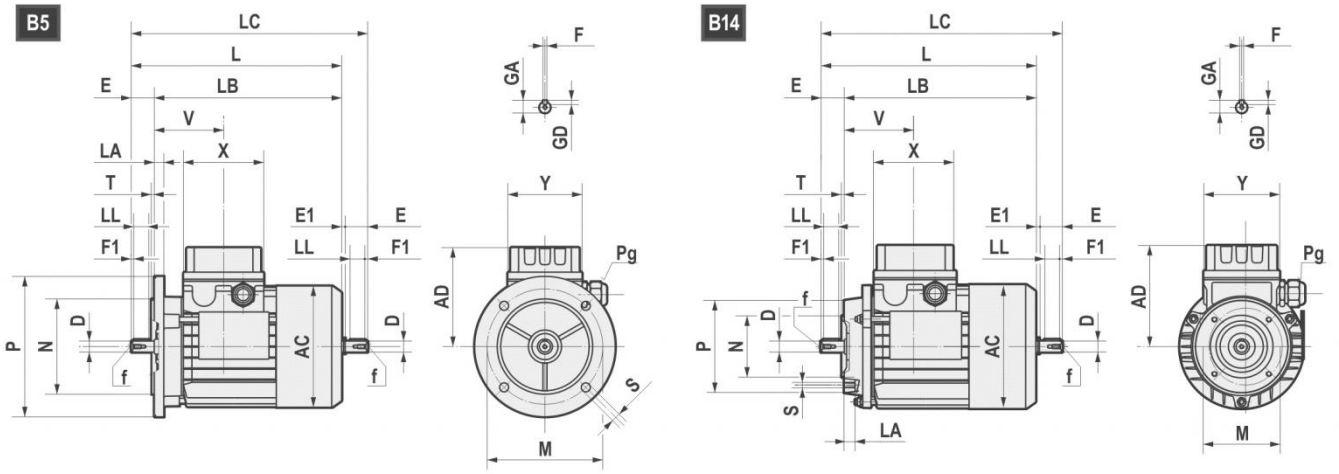
3.3 SHAFT END



UNI 6604 - DIN 6885														
d			b x h			Tol. b / h	L		s min / max	b	t1	t2	Tol. t1 / t2	r max
	6	8	2	×	2	h9 / h9	6	20	0,16 0,25	2	1,2	1	0,1 0	0,08 0,16
>	8	10	3	×	3		6	36		3	1,8	1,4		
>	10	12	4	×	4		8	45		4	2,5	1,8		
>	12	17	5	×	5		10	56	0,25 0,4	5	3	2,3		0,16 0,25
>	17	22	6	×	6		14	70		6	3	2,8		
>	22	30	8	×	7	h9 / h11	18	90		8	4	3,3	0,2 0	
>	30	38	10	×	8		22	110	0,4 0,6	10	5	3,3		0,25 0,4
>	38	44	12	×	8		28	140		12	5	3,3		
>	44	50	14	×	9		36	160		14	5,5	3,8		
>	50	58	16	×	10		45	180		16	6	4,3		
>	58	65	18	×	11		50	200		18	7	4,4		
>	65	75	20	×	12		56	110	0,6 0,8	20	7,5	4,9		0,4 0,6
>	75	85	22	×	14		63	140		22	9	5,4		
>	85	95	25	×	14		70	160		25	9	5,4		
>	95	110	28	×	16		80	180		28	10	6,4		
>	110	130	32	×	18		90	200		32	11	7,4		
>	130	150	36	×	20		100	160	1 1,2	36	12	8,4	0,3 0	0,7 1
>	150	170	40	×	22		110	180		40	13	9,4		
>	170	200	45	×	25		125	200		45	14	10,4		

3.4 ELECTRIC MOTORS

3.4.1 Electric motors



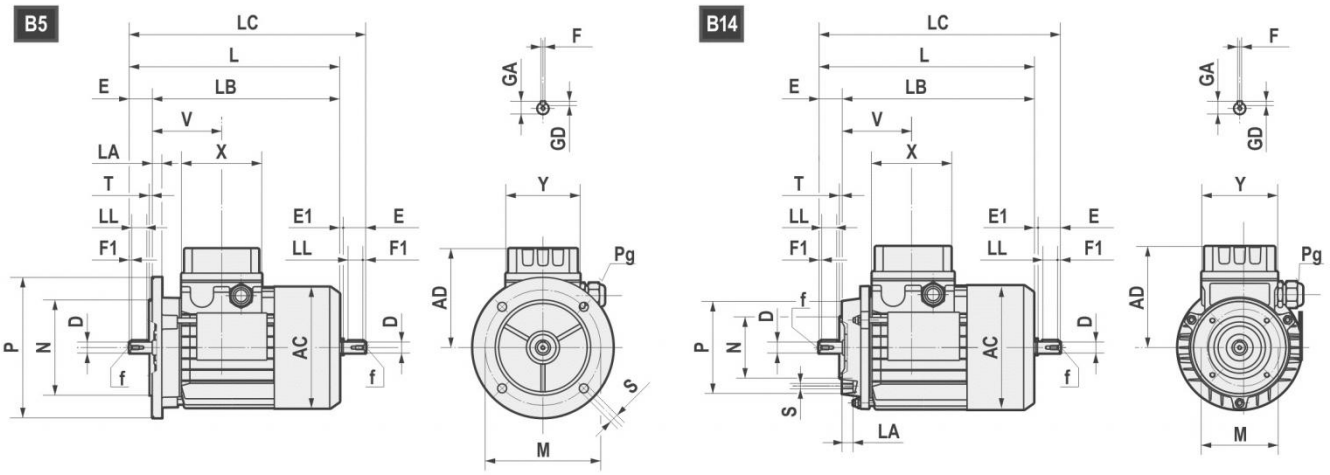
	AC	AD	L	LB	LC	X	Y	V	D	E	E1	f	F1	GA	F	GD
63	121	104	211	188	235,5	80	74	69	11 j6	23	1,5	M4x10	2,5	12,5	4	4
71	139	112	238,5	208,5	271	80	74	74,5	14 j6	30	2,5	M5x12.5	3	16	5	5
80	158	122	272,5 *296	232,5 *256	314 *337	80	74	78	19 j6	40	1,5	M6x16	5	21,5	6	6
90S	173	148	298 *331	248 *281	349,5 *381	98	98	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

3.4 ELECTRIC MOTORS



		AC	AD	L	LB	X	D	E	f	GA	F	GD	LL	Pg	
160M	2-4-6	314	251	600	490	158	42	110	M16	45	12	8	90	2-M40x1,5	1-M16x1,5
160L	2-4-6	314	251	645	535	158	42	110	M16	45	12	8	90	2-M40x1,5	1-M16x1,5
180M	2-4	355	267	680	570	158	48	110	M16	51,5	14	9	100	2-M40x1,5	1-M16x1,5
180L	4-6	355	267	720	610	158	48	110	M16	51,5	14	9	100	2-M40x1,5	1-M16x1,5
200L	2-4-6	397	300	785	675	187	55	110	M20	59	16	10	100	2-M50x1,5	1-M16x1,5
225S	4	446	325	820	680	187	60	140	M20	64	18	11	125	2-M50x1,5	1-M16x1,5
225M	2	446	325	815	705	187	55	110	M20	59	16	10	100	2-M50x1,5	1-M16x1,5
225M	4-6	446	325	845	705	187	60	140	M20	64	18	11	125	2-M50x1,5	1-M16x1,5
250M	2-4-6	485	360	910	770	238	60	140	M20	64	18	11	125	2-M63x1,5	1-M16x1,5
250M	2-4-6	485	360	910	770	238	65	140	M20	69	18	11	125	2-M63x1,5	1-M16x1,5
280S	2-4-6	547	390	970	830	238	65	140	M20	69	18	11	125	2-M63x1,5	1-M16x1,5
280S	2-4-6	547	390	970	830	238	75	140	M20	79,5	20	12	125	2-M63x1,5	1-M16x1,5
280M	2-4-6	547	390	1025	885	238	65	140	M20	69	18	11	125	2-M63x1,5	1-M16x1,5
280M	2-4-6	547	390	1025	885	238	75	140	M20	79,5	20	12	125	2-M63x1,5	1-M16x1,5

B5	M	N	P	LA	S	T
160	300	250	350	13	19	5
180	300	250	350	15	19	5
200	350	300	400	17	19	5
225	400	350	450	20	19	5
250	500	450	550	22	19	5
280	500	450	550	22	19	5

3.4.2 Standard high efficiency (TS), high (TH, SH, 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 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.

Table of Motovario commercial availability

	EFFICIENCY LEVEL		
NOMINAL POWER [kW]	IE1	IE2	IE3
Pn < 0,12	TS-TBS	-	-
0,12 ≤ Pn < 0,75	-	TH-TBH SH-HSH	TP-TBP (**)
Pn ≥ 0,75	-	SH-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.

3.4.3 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

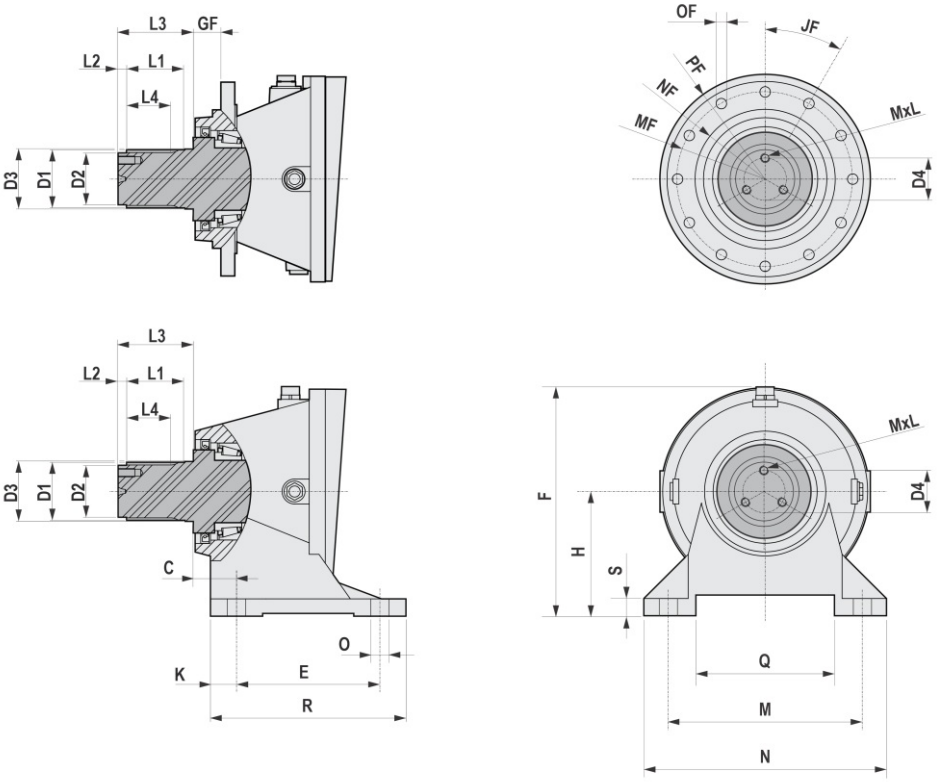
	80A		80B		90S	90L	100LR	100LA	100L	112MR	112MS	112M
P.	TH	TP	TH	TP	TP	TP	TP	TP	TP	TP	TP	TP
2	-	0,75	-	1,1	1,5	2,2	-	-	3	-	-	4
4	0,55	0,55	-	0,75	1,1	1,5	-	2,2	-	2,2	3	4
6	0,37	-	0,55	-	0,75	-	1,1	-	1,5	-	-	2,2

	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	-	-	-	-	-

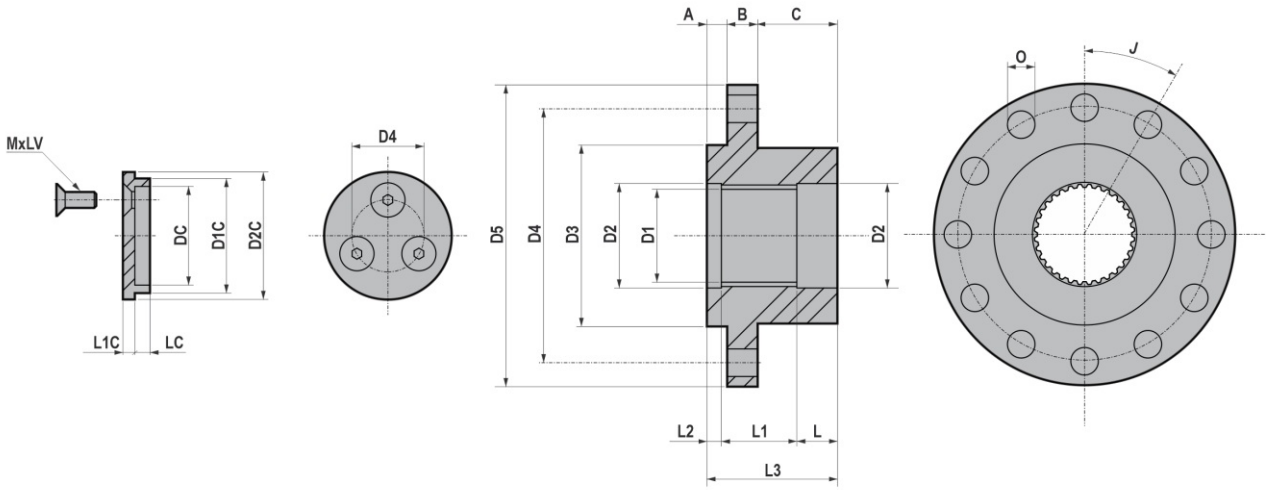
4.1 LOW SPEED SHAFTS



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

	PF	MF	NF f7	GF	JF	OF		C
010 020	186	165	110	6	45°	10,5	n°8	24
030 050	222	195	150	15	36°	12,5	n°10	39
080	280	250	200	40	30°	15	n°12	65

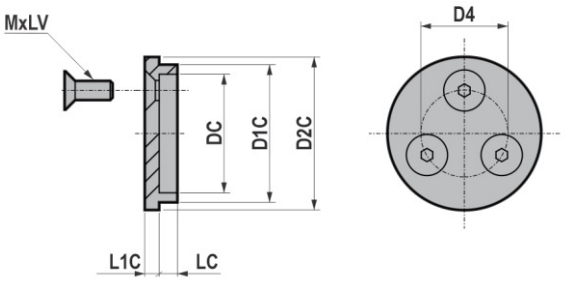
4.2 WHEEL FLANGE



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)

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)

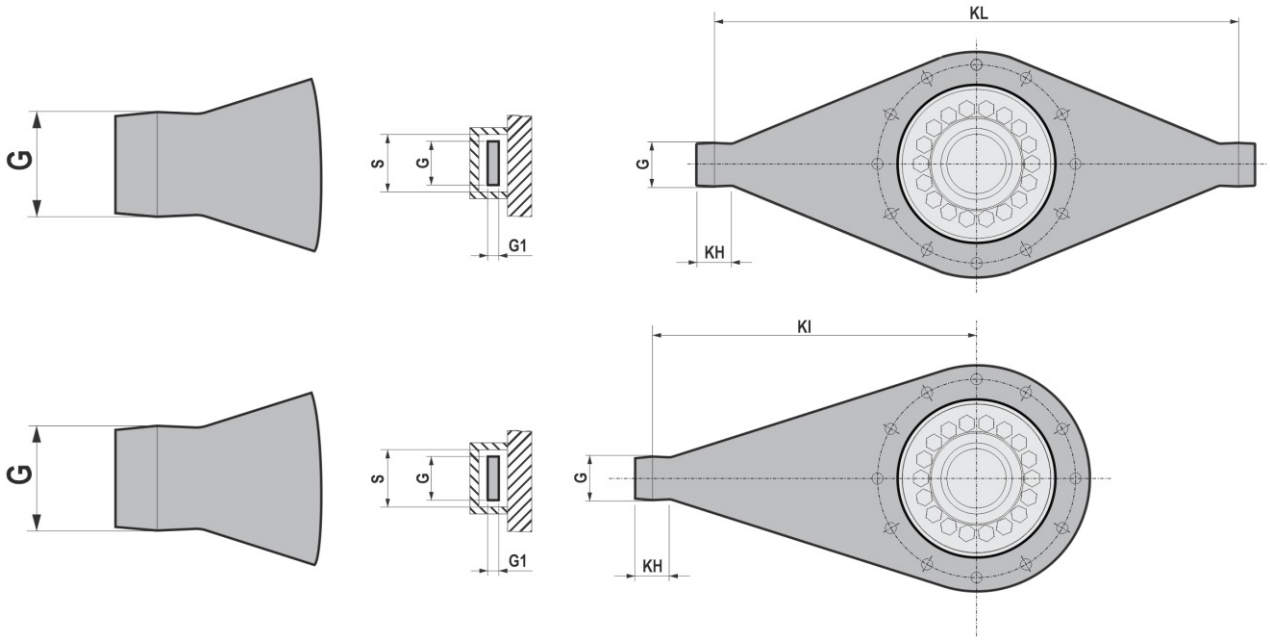
4.3 AXIAL FIXING WASHER



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)

4.4 SHAFT MOUNTING FASTENING

At customer's charge.



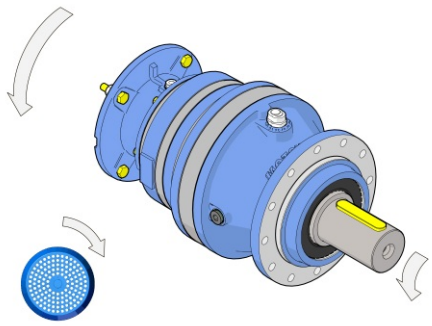
HPL	KI	KL	KH	G	G1	S
010	325	260	30	40	8	42
020	325	260	30	40	8	42
030	400	320	35	44	12	46
050	400	320	35	44	12	46
080	490	400	45	55	14	57

Suggested values.

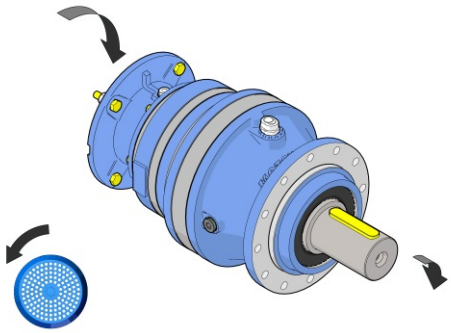
4.5 BACKSTOP DEVICE

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



CLOCKWISE SENSE OF DIRECTION REFERRED TO HIGH SPEED SHAFT

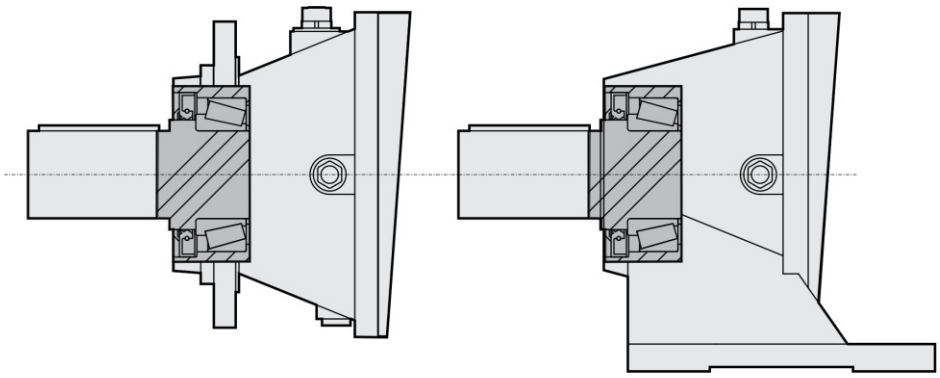


COUNTER CLOCKWISE SENSE OF DIRECTION REFERRED TO HIGH SPEED SHAFT

		71	80	90	100-112	132	160	180	200
		160x14	200x19	200x24	250x28	300x38	350x42	350x48	400x55
HL 1	010/020/030	/	/	/	B5	B5	B5	/	/
	050	/	/	/	/	/	B5	/	/
	080	/	/	/	/	/	/	/	B5
HL2	010	/	B5	B5	B5	B5	/	/	/
	020	/	B5	B5	B5	B5	B5	/	/
	030	/	/	B5	B5	B5	B5	/	/
	050/080	/	/	/	B5	B5	B5	/	/
HL 3	010	B5	B5	B5	/	/	/	/	/
	020/030	B5	B5	B5	B5	/	/	/	/
	050/080	/	B5	B5	B5	B5	B5	/	/
HL 4	020/030	B5	B5	/	/	/	/	/	/
	050	B5	B5	B5	/	/	/	/	/
	080	B5	B5	B5	B5	/	/	/	/

4.6 REINFORCED OIL SEALS FOR OUTPUT SHAF..

The reinforced seal can be done through the standard oil seal with VRM ring.
On request the gear reducer can be supplied with fluoroelastomer FPM (FKM) seals.



HPL	VRM ring
010	x
020	x
030	x
050	x
080	x

5.1 HL GEARED MOTORS

0,25 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
7,4	296	2,6	188	HL3 010	71A	4	23750	27100
6,4	341	2,7	216	HL3 010	71A	4	23750	27100
5,9	372	2,5	236	HL3 010	71A	4	23750	27100
4,7	468	2,0	297	HL3 010	71A	4	23750	27100
4,0	533	1,9	348	HL4 010	71A	4	24100	27200
3,7	582	1,5	369	HL3 010	71A	4	24500	27800
3,7	582	2,8	369	HL3 020	71A	4	24500	27800
3,2	663	1,5	433	HL4 010	71A	4	24750	28000
2,9	726	1,4	474	HL4 010	71A	4	25200	28500
2,9	726	2,8	474	HL4 020	71A	4	25200	28500
2,6	824	1,3	538	HL4 010	71A	4	25950	29400
2,6	824	2,6	538	HL4 020	71A	4	25950	29400
2,1	1024	1,1	668	HL4 010	71A	4	26300	29750
2,1	1024	2,1	668	HL4 020	71A	4	26300	29750
2,1	1024	2,8	668	HL4 030	71A	4	49950	58000
1,9	1133	1,0	740	HL4 010	71A	4	27100	30650
1,9	1133	2,0	740	HL4 020	71A	4	27100	30650
1,9	1133	2,5	740	HL4 030	71A	4	50700	58850
1,7	1242	0,9	811	HL4 010	71A	4	27400	30700
1,7	1242	1,8	811	HL4 020	71A	4	27400	30700
1,7	1272	2,0	831	HL4 030	71A	4	51600	59950
1,5	1408	1,6	919	HL4 020	71A	4	27500	30800
1,5	1408	2,0	919	HL4 030	71A	4	52350	60650
1,4	1559	1,5	1020	HL4 020	71A	4	27550	30900
1,4	1559	1,9	1020	HL4 030	71A	4	53200	61900
1,2	1773	1,4	1160	HL4 020	71A	4	27600	31200
1,2	1750	1,4	1140	HL4 030	71A	4	53800	62450
1,2	1750	2,8	1140	HL4 050	71A	4	53800	62450
1,1	1937	1,3	1270	HL4 020	71A	4	27700	31450
1,1	1937	1,6	1270	HL4 030	71A	4	55000	63750
1,0	2204	1,2	1440	HL4 030	71A	4	55500	64450
1,0	2204	2,3	1440	HL4 050	71A	4	55500	64450
0,9	2439	1,0	1590	HL4 020	71A	4	27800	31900
0,9	2439	1,2	1590	HL4 030	71A	4	56050	65850
0,9	2439	2,4	1590	HL4 050	71A	4	56050	65850
0,8	2664	1,0	1740	HL4 030	71A	4	56600	67350
0,8	2664	1,8	1740	HL4 050	71A	4	56600	67350
0,7	3031	0,9	1980	HL4 030	71A	4	57150	68000
0,7	3031	1,8	1980	HL4 050	71A	4	57150	68000
0,7	3204	2,2	2090	HL4 080	71A	4	78600	90700
0,6	3355	1,4	2190	HL4 050	71A	4	57700	69150
0,6	3494	1,2	2280	HL4 050	71A	4	57700	69150

5.1 HL GEARED MOTORS

0,25 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
0,6	3816	1,1	2490	HL4 050	71A	4	58250	69700
0,6	3471	2,6	2270	HL4 080	71A	4	78700	91000
0,6	3824	1,9	2500	HL4 080	71A	4	78900	91400
0,5	4170	1,1	2720	HL4 050	71A	4	58800	70050
0,5	4142	2,1	2710	HL4 080	71A	4	79300	91800

0,37 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
11,2	287	3,0	125	HL3 010	71B	4	22650	25750
10,2	317	2,7	138	HL3 010	71B	4	23200	26300
9,0	356	2,3	155	HL3 010	71B	4	23650	27000
8,1	400	2,2	174	HL3 010	71B	4	23650	27000
7,5	432	1,7	188	HL3 010	71B	4	23650	27000
7,5	432	2,9	188	HL3 020	71B	4	23650	27000
6,5	497	1,8	216	HL3 010	71B	4	23650	27000
5,9	543	1,7	236	HL3 010	71B	4	23650	27000
4,7	683	1,3	297	HL3 010	71B	4	23650	27000
4,7	683	2,7	297	HL3 020	71B	4	23650	27000
4,5	712	2,8	309	HL3 030	71B	4	45550	52400
4,0	778	1,3	348	HL4 010	71B	4	24000	27100
4,0	778	2,5	348	HL4 020	71B	4	24000	27100
3,8	849	1,0	369	HL3 010	71B	4	24400	27700
3,8	849	1,9	369	HL3 020	71B	4	24400	27700
3,8	849	2,8	369	HL3 030	71B	4	46200	53650
3,3	979	2,0	425	HL3 030	71B	4	46400	54050
3,2	967	1,0	433	HL4 010	71B	4	24650	27900
3,2	967	2,1	433	HL4 020	71B	4	24650	27900
3,2	967	2,9	433	HL4 030	71B	4	47200	54750
3,0	1060	1,0	474	HL4 010	71B	4	25100	28400
3,0	1060	1,9	474	HL4 020	71B	4	25100	28400
3,0	1060	2,7	474	HL4 030	71B	4	47850	55450
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	57750
1,9	1653	1,3	740	HL4 020	71B	4	27000	30550
1,9	1653	1,7	740	HL4 030	71B	4	50500	58600
1,7	1811	1,2	811	HL4 020	71B	4	27300	30600
1,7	1856	1,3	831	HL4 030	71B	4	51400	59700
1,7	1856	2,6	831	HL4 050	71B	4	51400	59700
1,5	2054	1,1	919	HL4 020	71B	4	27400	30700

5.1 HL GEARED MOTORS

0,37 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
1,5	2054	1,4	919	HL4 030	71B	4	52150	60400
1,5	2054	2,7	919	HL4 050	71B	4	52150	60400
1,4	2274	1,0	1020	HL4 020	71B	4	27450	30800
1,4	2274	1,3	1020	HL4 030	71B	4	53000	61650
1,4	2274	2,4	1020	HL4 050	71B	4	53000	61650
1,2	2587	0,9	1160	HL4 020	71B	4	27500	31100
1,2	2553	1,0	1140	HL4 030	71B	4	53600	62200
1,2	2553	1,9	1140	HL4 050	71B	4	53600	62200
1,1	2826	1,1	1270	HL4 030	71B	4	54800	63500
1,1	2826	2,0	1270	HL4 050	71B	4	54800	63500
1,0	3215	1,6	1440	HL4 050	71B	4	55300	64200
1,0	3194	2,8	1430	HL4 080	71B	4	77500	89400
0,9	3559	1,6	1590	HL4 050	71B	4	55850	65600
0,9	3501	2,9	1570	HL4 080	71B	4	77800	89700
0,8	3887	1,2	1740	HL4 050	71B	4	56400	67100
0,8	4021	2,2	1800	HL4 080	71B	4	78000	90000
0,7	4422	1,2	1980	HL4 050	71B	4	56950	67750
0,7	4674	1,5	2090	HL4 080	71B	4	78300	90300
0,6	4895	0,9	2190	HL4 050	71B	4	57500	68900
0,6	5064	1,7	2270	HL4 080	71B	4	78400	90600
0,6	5578	1,3	2500	HL4 080	71B	4	78600	91000
0,5	6043	1,4	2710	HL4 080	71B	4	79000	91400

0,55 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
20,4	242	2,5	68,7	HL2 010	71C/80A	4	18400	20850
16,0	299	2,4	87,4	HL3 010	71C/80A	4	20000	22700
14,0	343	2,5	100	HL3 010	71C/80A	4	21200	24050
12,8	376	2,3	110	HL3 010	71C/80A	4	21900	24750
11,2	426	2,0	125	HL3 010	71C/80A	4	22650	25750
10,2	472	1,8	138	HL3 010	71C/80A	4	23200	26300
9,0	530	1,5	155	HL3 010	71C/80A	4	23650	27000
9,0	530	2,8	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	1,9	188	HL3 020	71C/80A	4	23650	27000
7,1	676	2,9	197	HL3 030	71C/80A	4	45100	51700
6,5	738	1,2	216	HL3 010	71C/80A	4	23650	27000
6,5	738	2,5	216	HL3 020	71C/80A	4	23650	27000
5,9	807	1,1	236	HL3 010	71C/80A	4	23650	27000
5,9	807	2,3	236	HL3 020	71C/80A	4	23650	27000

5.1 HL GEARED MOTORS

0,55 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor 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	45100	51700
4,7	1016	1,8	297	HL3 020	71C/80A	4	23650	27000
4,5	1058	1,9	309	HL3 030	71C/80A	4	45550	52400
4,0	1157	1,7	348	HL4 020	71C/80A	4	24000	27100
4,0	1157	2,4	348	HL4 030	71C/80A	4	46000	53450
3,8	1262	1,3	369	HL3 020	71C/80A	4	24400	27700
3,8	1262	1,9	369	HL3 030	71C/80A	4	46200	53650
3,3	1455	1,4	425	HL3 030	71C/80A	4	46400	54050
3,3	1455	2,6	425	HL3 050	71C/80A	4	46400	54050
3,2	1437	1,4	433	HL4 020	71C/80A	4	24650	27900
3,2	1437	2,0	433	HL4 030	71C/80A	4	47200	54750
3,0	1575	1,3	474	HL4 020	71C/80A	4	25100	28400
3,0	1575	1,8	474	HL4 030	71C/80A	4	47850	55450
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	57750
2,1	2220	2,5	668	HL4 050	71C/80A	4	49750	57750
1,9	2457	0,9	740	HL4 020	71C/80A	4	27000	30550
1,9	2457	1,2	740	HL4 030	71C/80A	4	50500	58600
1,9	2457	2,2	740	HL4 050	71C/80A	4	50500	58600
1,7	2759	1,7	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	1,6	1020	HL4 050	71C/80A	4	53000	61650
1,4	3325	2,9	1000	HL4 080	71C/80A	4	74600	86150
1,2	3795	1,3	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	1,9	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	77800	89700
0,8	5977	1,5	1800	HL4 080	71C/80A	4	78000	90000
0,7	6948	1,0	2090	HL4 080	71C/80A	4	78300	90300
0,6	7527	1,2	2270	HL4 080	71C/80A	4	78400	90600
0,5	8983	0,9	2710	HL4 080	71C/80A	4	79000	91400

5.1 HL GEARED MOTORS

0,75 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
28,8	234	2,7	49,9	HL2 010	80B	4	16950	19250
22,4	292	2,8	64,2	HL3 010	80B	4	18050	20350
21,0	321	1,8	68,7	HL2 010	80B	4	18200	20600
17,9	366	2,3	80,6	HL3 010	80B	4	19150	21750
16,5	397	1,8	87,4	HL3 010	80B	4	19800	22450
16,5	397	2,9	87,4	HL3 020	80B	4	19800	22450
14,4	455	1,8	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	1,3	138	HL3 010	80B	4	23000	26050
10,4	626	2,7	138	HL3 020	80B	4	23000	26050
9,3	702	1,1	155	HL3 010	80B	4	23450	26750
9,3	702	2,1	155	HL3 020	80B	4	23450	26750
8,3	788	1,1	174	HL3 010	80B	4	23450	26750
8,3	788	2,2	174	HL3 020	80B	4	23450	26750
7,7	852	1,4	188	HL3 020	80B	4	23450	26750
7,3	896	2,1	197	HL3 030	80B	4	44650	51200
6,7	979	0,9	216	HL3 010	80B	4	23450	26750
6,7	979	1,8	216	HL3 020	80B	4	23450	26750
6,7	979	2,7	216	HL3 030	80B	4	44700	51250
6,1	1069	1,7	236	HL3 020	80B	4	23450	26750
5,8	1128	1,7	249	HL3 030	80B	4	44650	51200
4,9	1347	1,3	297	HL3 020	80B	4	23450	26750
4,9	1329	1,7	293	HL3 030	80B	4	44650	51200
4,7	1402	1,4	309	HL3 030	80B	4	45100	51900
4,7	1402	2,6	309	HL3 050	80B	4	45100	51900
4,1	1534	1,3	348	HL4 020	80B	4	23800	26850
4,1	1534	1,8	348	HL4 030	80B	4	45550	52950
3,9	1674	0,9	369	HL3 020	80B	4	24200	27450
3,9	1674	1,4	369	HL3 030	80B	4	45750	53150
3,9	1674	2,6	369	HL3 050	80B	4	45750	53150
3,5	1857	3,0	409	HL3 080	80B	4	64900	74900
3,4	1929	1,0	425	HL3 030	80B	4	46000	53600
3,4	1929	1,9	425	HL3 050	80B	4	46000	53600
3,3	1906	1,0	433	HL4 020	80B	4	24450	27650
3,3	1906	1,4	433	HL4 030	80B	4	46750	54250
3,3	1906	2,8	433	HL4 050	80B	4	46750	54250
3,0	2088	0,9	474	HL4 020	80B	4	24900	28150
3,0	2088	1,3	474	HL4 030	80B	4	47400	54950
3,0	2088	2,6	474	HL4 050	80B	4	47400	54950
2,7	2368	1,2	538	HL4 030	80B	4	48150	55950
2,7	2368	2,3	538	HL4 050	80B	4	48150	55950

5.1 HL GEARED MOTORS

0,75 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
2,2	2943	0,9	668	HL4 030	80B	4	49300	57250
2,2	2943	1,8	668	HL4 050	80B	4	49300	57250
2,0	3205	3,0	728	HL4 080	80B	4	70100	81050
1,9	3258	1,6	740	HL4 050	80B	4	50050	58100
1,7	3657	1,3	831	HL4 050	80B	4	50950	59200
1,7	3633	2,2	825	HL4 080	80B	4	71650	82700
1,6	4048	1,3	919	HL4 050	80B	4	51700	59900
1,6	3983	2,3	905	HL4 080	80B	4	72450	83650
1,4	4481	1,2	1020	HL4 050	80B	4	52550	61150
1,4	4408	2,1	1000	HL4 080	80B	4	73950	85400
1,3	5031	0,9	1140	HL4 050	80B	4	53150	61700
1,3	5016	1,9	1140	HL4 080	80B	4	74800	86350
1,1	5569	1,0	1270	HL4 050	80B	4	54350	63000
1,1	5552	1,7	1260	HL4 080	80B	4	75750	87750
1,0	6294	1,4	1430	HL4 080	80B	4	76850	88650
0,9	6899	1,4	1570	HL4 080	80B	4	77150	88950
0,8	7924	1,1	1800	HL4 080	80B	4	77350	89250

1,10 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
36,1	274	2,3	39,6	HL2 010	90S	4	15600	17700
35,6	278	3,0	40,2	HL2 010	90S	4	15900	18100
28,6	345	1,8	49,9	HL2 010	90S	4	17000	19350
28,0	343	2,4	51,2	HL3 010	90S	4	17000	19350
22,3	431	1,9	64,2	HL3 010	90S	4	18100	20450
20,8	475	1,2	68,7	HL2 010	90S	4	18250	20700
20,8	475	2,4	68,7	HL2 020	90S	4	18250	20700
17,7	540	1,5	80,6	HL3 010	90S	4	19200	21850
16,4	586	1,2	87,4	HL3 010	90S	4	19850	22550
16,4	586	2,0	87,4	HL3 020	90S	4	19850	22550
14,3	672	1,3	100	HL3 010	90S	4	21050	23900
14,3	672	2,5	100	HL3 020	90S	4	21050	23900
13,0	736	1,1	110	HL3 010	90S	4	21750	24600
13,0	736	2,3	110	HL3 020	90S	4	21750	24600
12,5	766	2,5	114	HL3 030	90S	4	40600	47200
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	43500	50450
9,2	1037	1,4	155	HL3 020	90S	4	23500	26850

5.1 HL GEARED MOTORS

1,10 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
9,2	1037	2,1	155	HL3 030	90S	4	44800	51350
8,3	1148	2,3	171	HL3 030	90S	4	44800	51350
8,2	1164	1,5	174	HL3 020	90S	4	23500	26850
7,6	1258	1,0	188	HL3 020	90S	4	23500	26850
7,2	1323	1,5	197	HL3 030	90S	4	44800	51350
7,2	1323	2,7	197	HL3 050	90S	4	44800	51350
6,6	1446	1,2	216	HL3 020	90S	4	23500	26850
6,6	1446	1,8	216	HL3 030	90S	4	44800	51350
6,1	1579	1,1	236	HL3 020	90S	4	23500	26850
5,8	1667	1,2	249	HL3 030	90S	4	44800	51350
5,8	1667	2,2	249	HL3 050	90S	4	44800	51350
4,9	1963	1,1	293	HL3 030	90S	4	44800	51350
4,9	1963	2,2	293	HL3 050	90S	4	44800	51350
4,8	1989	0,9	297	HL3 020	90S	4	23500	26850
4,6	2071	0,9	309	HL3 030	90S	4	45250	52050
4,6	2071	1,8	309	HL3 050	90S	4	45250	52050
4,1	2265	1,2	348	HL4 030	90S	4	45700	53100
4,1	2265	2,3	348	HL4 050	90S	4	45700	53100
4,0	2392	2,6	357	HL3 080	90S	4	64350	74100
3,9	2472	0,9	369	HL3 030	90S	4	45900	53300
3,9	2472	1,8	369	HL3 050	90S	4	45900	53300
3,6	2570	2,7	395	HL4 080	90S	4	64650	74650
3,5	2742	2,0	409	HL3 080	90S	4	65000	75050
3,4	2849	1,3	425	HL3 050	90S	4	46100	53700
3,3	2815	1,0	433	HL4 030	90S	4	46900	54400
3,3	2815	1,9	433	HL4 050	90S	4	46900	54400
3,0	3084	1,7	474	HL4 050	90S	4	47550	55100
2,7	3498	1,5	538	HL4 050	90S	4	48300	56100
2,7	3441	2,8	529	HL4 080	90S	4	67200	77600
2,4	3809	2,5	586	HL4 080	90S	4	68650	79250
2,2	4276	2,2	658	HL4 080	90S	4	69400	80000
2,1	4346	1,2	668	HL4 050	90S	4	49450	57400
2,0	4733	2,0	728	HL4 080	90S	4	70250	81250
1,9	4811	1,1	740	HL4 050	90S	4	50200	58250
1,7	5366	1,5	825	HL4 080	90S	4	71800	82900
1,6	5979	0,9	919	HL4 050	90S	4	51850	60050
1,6	5882	1,6	905	HL4 080	90S	4	72600	83850
1,4	6511	1,5	1000	HL4 080	90S	4	74150	85650
1,3	7408	1,3	1140	HL4 080	90S	4	75000	86600
1,1	8200	1,2	1260	HL4 080	90S	4	75950	88000
1,0	9296	0,9	1430	HL4 080	90S	4	77050	88900
0,9	10190	1,0	1570	HL4 080	90S	4	77350	89200

5.1 HL GEARED MOTORS

1,50 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor 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	2,7	31,9	HL2 010	90L	4	15000	17000
36,1	374	1,7	39,6	HL2 010	90L	4	15600	17700
35,6	379	2,2	40,2	HL2 010	90L	4	15900	18100
28,6	471	1,4	49,9	HL2 010	90L	4	17000	19350
28,6	471	2,7	49,9	HL2 020	90L	4	17000	19350
28,0	468	1,8	51,2	HL3 010	90L	4	17000	19350
22,3	587	1,4	64,2	HL3 010	90L	4	18100	20450
22,3	587	2,8	64,2	HL3 020	90L	4	18100	20450
20,8	647	0,9	68,7	HL2 010	90L	4	18250	20700
20,8	647	1,7	68,7	HL2 020	90L	4	18250	20700
19,5	670	2,8	73,3	HL3 030	90L	4	35500	41300
17,7	737	1,1	80,6	HL3 010	90L	4	19200	21850
17,7	737	2,2	80,6	HL3 020	90L	4	19200	21850
16,4	799	1,5	87,4	HL3 020	90L	4	19850	22550
15,5	841	2,3	92,0	HL3 030	90L	4	38050	44100
14,3	916	0,9	100	HL3 010	90L	4	21050	23900
14,3	916	1,8	100	HL3 020	90L	4	21100	23900
14,3	916	2,8	100	HL3 030	90L	4	39650	46100
13,0	1004	1,7	110	HL3 020	90L	4	21750	24600
12,5	1045	1,8	114	HL3 030	90L	4	40600	47200
11,5	1138	1,5	125	HL3 020	90L	4	22500	25600
11,5	1138	2,2	125	HL3 030	90L	4	41850	48600
10,4	1260	1,4	138	HL3 020	90L	4	23050	26150
10,4	1260	2,1	138	HL3 030	90L	4	43500	50450
9,2	1414	1,0	155	HL3 020	90L	4	23500	26850
9,2	1414	1,6	155	HL3 030	90L	4	44800	51350
8,3	1566	1,7	171	HL3 030	90L	4	44800	51350
8,2	1587	1,1	174	HL3 020	90L	4	23500	26850
7,2	1805	1,1	197	HL3 030	90L	4	44800	51350
7,2	1805	2,0	197	HL3 050	90L	4	44800	51350
6,6	1972	0,9	216	HL3 020	90L	4	23500	26850
6,6	1972	1,4	216	HL3 030	90L	4	44800	51350
6,6	1972	2,5	216	HL3 050	90L	4	44800	51350
5,8	2273	1,6	249	HL3 050	90L	4	44800	51350
5,4	2434	2,9	266	HL3 080	90L	4	62300	72050
4,9	2676	1,6	293	HL3 050	90L	4	44800	51350
4,9	2659	2,7	291	HL3 080	90L	4	62300	72050
4,7	2806	2,5	307	HL3 080	90L	4	62950	72700
4,6	2824	1,3	309	HL3 050	90L	4	45250	52050
4,1	3089	1,7	348	HL4 050	90L	4	45700	53100
4,0	3262	1,9	357	HL3 080	90L	4	64350	74100

5.1 HL GEARED MOTORS

1,50 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
3,9	3371	1,3	369	HL3 050	90L	4	45900	53300
3,6	3505	2,0	395	HL4 080	90L	4	64650	74650
3,5	3739	1,5	409	HL3 080	90L	4	65000	75050
3,4	3885	1,0	425	HL3 050	90L	4	46100	53700
3,3	3838	1,4	433	HL4 050	90L	4	46900	54400
3,1	4137	2,3	467	HL4 080	90L	4	65950	76050
3,0	4205	1,3	474	HL4 050	90L	4	47550	55100
2,7	4770	1,1	538	HL4 050	90L	4	48300	56100
2,7	4692	2,1	529	HL4 080	90L	4	67200	77600
2,4	5194	1,9	586	HL4 080	90L	4	68650	79250
2,2	5831	1,6	658	HL4 080	90L	4	69400	80000
2,1	5927	0,9	668	HL4 050	90L	4	49450	57400
2,0	6454	1,5	728	HL4 080	90L	4	70250	81250
1,7	7317	1,1	825	HL4 080	90L	4	71800	82900
1,6	8021	1,2	905	HL4 080	90L	4	72600	83850
1,4	8879	1,1	1000	HL4 080	90L	4	74150	85650
1,3	10101	0,9	1140	HL4 080	90L	4	75000	86600

2,20 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
154,8	132	2,4	9,30	HL1 010	100LA/112MR	4	10100	11400
77,2	256	2,8	18,7	HL2 010	100LA/112MR	4	12400	14150
62,1	318	2,4	23,2	HL2 010	100LA/112MR	4	13650	15450
50,0	396	1,6	28,8	HL2 010	100LA/112MR	4	14650	16500
45,1	438	1,9	31,9	HL2 010	100LA/112MR	4	15000	16950
36,3	544	1,2	39,6	HL2 010	100LA/112MR	4	15550	17650
36,3	544	2,3	39,6	HL2 020	100LA/112MR	4	15550	17650
35,8	551	1,5	40,2	HL2 010	100LA/112MR	4	15900	18100
35,8	551	2,4	40,2	HL2 020	100LA/112MR	4	15900	18100
31,5	627	2,8	45,7	HL2 030	100LA/112MR	4	30700	35700
28,8	685	0,9	49,9	HL2 010	100LA/112MR	4	16950	19250
28,8	685	1,8	49,9	HL2 020	100LA/112MR	4	16950	19250
28,1	681	1,2	51,2	HL3 010	100LA/112MR	4	17000	19350
28,1	681	2,3	51,2	HL3 020	100LA/112MR	4	17000	19350
25,0	790	2,2	57,5	HL2 030	100LA/112MR	4	32800	38150
22,4	855	1,0	64,2	HL3 010	100LA/112MR	4	18050	20350
22,4	855	1,9	64,2	HL3 020	100LA/112MR	4	18050	20350
22,4	855	2,9	64,2	HL3 030	100LA/112MR	4	34050	39500
21,0	943	1,2	68,7	HL2 020	100LA/112MR	4	18200	20600
19,7	976	1,9	73,3	HL3 030	100LA/112MR	4	35450	41250
17,9	1073	1,5	80,6	HL3 020	100LA/112MR	4	19150	21750

5.1 HL GEARED MOTORS

2,20 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
17,9	1073	2,3	80,6	HL3 030	100LA/112MR	4	36200	42000
16,5	1164	1,0	87,4	HL3 020	100LA/112MR	4	19800	22450
15,7	1225	1,5	92,0	HL3 030	100LA/112MR	4	38000	44050
15,7	1225	2,9	92,0	HL3 050	100LA/112MR	4	38000	44050
14,4	1334	1,2	100	HL3 020	100LA/112MR	4	21000	23800
14,4	1334	1,9	100	HL3 030	100LA/112MR	4	39550	46000
13,1	1462	1,2	110	HL3 020	100LA/112MR	4	21700	24500
12,6	1522	1,2	114	HL3 030	100LA/112MR	4	40550	47100
12,6	1522	2,3	114	HL3 050	100LA/112MR	4	40550	47100
11,6	1658	1,0	125	HL3 020	100LA/112MR	4	22450	25500
11,6	1658	1,5	125	HL3 030	100LA/112MR	4	41750	48500
11,6	1658	3,0	125	HL3 050	100LA/112MR	4	41750	48500
10,4	1835	0,9	138	HL3 020	100LA/112MR	4	23000	26050
10,4	1835	1,4	138	HL3 030	100LA/112MR	4	43450	50350
10,4	1835	2,7	138	HL3 050	100LA/112MR	4	43450	50350
9,3	2060	1,1	155	HL3 030	100LA/112MR	4	44700	51250
9,3	2060	2,1	155	HL3 050	100LA/112MR	4	44700	51250
8,4	2280	1,2	171	HL3 030	100LA/112MR	4	44700	51250
8,4	2280	2,2	171	HL3 050	100LA/112MR	4	44700	51250
7,4	2586	2,8	194	HL3 080	100LA/112MR	4	62150	71900
7,3	2628	1,4	197	HL3 050	100LA/112MR	4	44650	51200
6,8	2815	2,8	211	HL3 080	100LA/112MR	4	62150	71900
6,7	2872	0,9	216	HL3 030	100LA/112MR	4	44700	51250
6,7	2872	1,7	216	HL3 050	100LA/112MR	4	44700	51250
6,2	3086	2,1	232	HL3 080	100LA/112MR	4	62150	71900
5,9	3245	2,5	244	HL3 080	100LA/112MR	4	62150	71900
5,8	3310	1,1	249	HL3 050	100LA/112MR	4	44650	51200
5,4	3545	2,0	266	HL3 080	100LA/112MR	4	62150	71900
5,0	3873	1,8	291	HL3 080	100LA/112MR	4	62150	71900
4,9	3898	1,1	293	HL3 050	100LA/112MR	4	44650	51200
4,7	4086	1,7	307	HL3 080	100LA/112MR	4	62800	72550
4,1	4498	1,2	348	HL4 050	100LA/112MR	4	45550	52950
4,0	4750	1,3	357	HL3 080	100LA/112MR	4	64250	73950
3,6	5104	1,4	395	HL4 080	100LA/112MR	4	64550	74500
3,5	5446	1,0	409	HL3 080	100LA/112MR	4	64900	74900
3,3	5590	1,0	433	HL4 050	100LA/112MR	4	46750	54250
3,1	6026	1,6	467	HL4 080	100LA/112MR	4	65800	75900
2,7	6834	1,4	529	HL4 080	100LA/112MR	4	67100	77450
2,5	7565	1,3	586	HL4 080	100LA/112MR	4	68500	79100
2,2	8493	1,1	658	HL4 080	100LA/112MR	4	69250	79800
2,0	9401	1,0	728	HL4 080	100LA/112MR	4	70100	81050

5.1 HL GEARED MOTORS

3,00 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
196,4	142	2,8	7,38	HL1 010	112MS	4	9400	10650
155,9	178	1,7	9,30	HL1 010	112MS	4	10100	11400
122,4	220	2,9	11,8	HL2 010	112MS	4	11000	12400
97,5	276	2,5	14,9	HL2 010	112MS	4	11700	13200
77,7	347	2,1	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	2,3	28,8	HL2 020	112MS	4	14600	16500
45,5	593	1,4	31,9	HL2 010	112MS	4	14950	16900
45,5	593	2,6	31,9	HL2 020	112MS	4	14950	16900
45,5	593	2,8	31,9	HL2 030	112MS	4	27400	31750
43,7	617	2,8	33,2	HL2 030	112MS	4	28600	33250
36,6	737	1,7	39,6	HL2 020	112MS	4	15550	17600
36,6	737	2,8	39,6	HL2 030	112MS	4	29300	34000
36,1	747	1,1	40,2	HL2 010	112MS	4	15900	18050
36,1	747	1,7	40,2	HL2 020	112MS	4	15900	18050
31,7	849	2,1	45,7	HL2 030	112MS	4	30700	35600
29,0	928	1,4	49,9	HL2 020	112MS	4	16950	19300
28,3	922	1,7	51,2	HL3 020	112MS	4	16950	19300
28,3	922	2,4	51,2	HL3 030	112MS	4	32300	37500
25,2	1070	1,6	57,5	HL2 030	112MS	4	32750	38050
22,6	1158	1,4	64,2	HL3 020	112MS	4	18050	20400
22,6	1158	2,1	64,2	HL3 030	112MS	4	34000	39450
19,8	1321	1,4	73,3	HL3 030	112MS	4	35400	41150
19,8	1321	2,7	73,3	HL3 050	112MS	4	35400	41150
18,0	1454	1,1	80,6	HL3 020	112MS	4	19150	21750
18,0	1454	1,7	80,6	HL3 030	112MS	4	36100	41900
15,8	1659	1,1	92,0	HL3 030	112MS	4	37900	43950
15,8	1659	2,1	92,0	HL3 050	112MS	4	37900	43950
14,5	1807	0,9	100	HL3 020	112MS	4	21000	23800
14,5	1807	1,4	100	HL3 030	112MS	4	39500	45900
14,5	1807	2,7	100	HL3 050	112MS	4	39500	45900
12,7	2061	0,9	114	HL3 030	112MS	4	40450	47000
12,7	2061	1,7	114	HL3 050	112MS	4	40450	47000
11,6	2245	1,1	125	HL3 030	112MS	4	41650	48400
11,6	2245	2,2	125	HL3 050	112MS	4	41650	48400
10,5	2485	1,0	138	HL3 030	112MS	4	43350	50250
10,5	2485	2,0	138	HL3 050	112MS	4	43350	50250
10,2	2571	3,0	143	HL3 080	112MS	4	62050	71750
9,4	2790	1,5	155	HL3 050	112MS	4	44650	51150
8,6	3038	2,5	168	HL3 080	112MS	4	62050	71750
8,5	3088	1,6	171	HL3 050	112MS	4	44650	51150

5.1 HL GEARED MOTORS

3,00 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
7,5	3502	2,1	194	HL3 080	112MS	4	62050	71750
7,3	3559	1,0	197	HL3 050	112MS	4	44650	51150
6,9	3813	2,1	211	HL3 080	112MS	4	62050	71750
6,7	3889	1,2	216	HL3 050	112MS	4	44650	51150
6,3	4179	1,5	232	HL3 080	112MS	4	62050	71750
6,0	4394	1,8	244	HL3 080	112MS	4	62050	71750
5,4	4801	1,5	266	HL3 080	112MS	4	62050	71750
5,0	5244	1,3	291	HL3 080	112MS	4	62050	71750
4,7	5534	1,3	307	HL3 080	112MS	4	62700	72400
4,1	6433	0,9	357	HL3 080	112MS	4	64100	73800
3,7	6912	1,0	395	HL4 080	112MS	4	64400	74350
3,1	8161	1,2	467	HL4 080	112MS	4	65650	75750
2,7	9255	1,0	529	HL4 080	112MS	4	66950	77300
2,5	10245	0,9	586	HL4 080	112MS	4	68400	78900

4,00 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
196,4	189	2,1	7,38	HL1 010	112M	4	9400	10650
155,9	238	1,3	9,30	HL1 010	112M	4	10100	11400
155,9	238	2,6	9,30	HL1 020	112M	4	10100	11400
122,4	294	2,1	11,8	HL2 010	112M	4	11000	12400
97,5	368	1,9	14,9	HL2 010	112M	4	11700	13200
77,7	463	1,6	18,7	HL2 010	112M	4	12350	14100
77,7	463	2,8	18,7	HL2 020	112M	4	12350	14100
62,5	575	1,3	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	25600	29800
50,3	714	1,8	28,8	HL2 020	112M	4	14600	16500
50,3	714	2,7	28,8	HL2 030	112M	4	26200	30400
45,5	791	1,0	31,9	HL2 010	112M	4	14950	16900
45,5	791	1,9	31,9	HL2 020	112M	4	14950	16900
45,5	791	2,1	31,9	HL2 030	112M	4	27400	31750
43,7	823	2,1	33,2	HL2 030	112M	4	28600	33250
36,6	983	1,3	39,6	HL2 020	112M	4	15550	17600
36,6	983	2,1	39,6	HL2 030	112M	4	29300	34000
36,1	996	1,3	40,2	HL2 020	112M	4	15900	18050
31,7	1133	1,6	45,7	HL2 030	112M	4	30700	35600
29,0	1237	1,0	49,9	HL2 020	112M	4	16950	19300
28,3	1230	1,3	51,2	HL3 020	112M	4	16950	19300
28,3	1230	1,8	51,2	HL3 030	112M	4	32300	37500
25,2	1426	1,2	57,5	HL2 030	112M	4	32750	38050

5.1 HL GEARED MOTORS

4,00 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
25,2	1426	2,4	57,5	HL2 050	112M	4	32750	38050
22,6	1544	1,0	64,2	HL3 020	112M	4	18050	20400
22,6	1544	1,6	64,2	HL3 030	112M	4	34000	39450
22,6	1544	3,0	64,2	HL3 050	112M	4	34000	39450
20,8	1729	2,7	69,8	HL2 080	112M	4	49850	57600
19,8	1762	1,1	73,3	HL3 030	112M	4	35400	41150
19,8	1762	2,0	73,3	HL3 050	112M	4	35400	41150
18,0	1938	1,3	80,6	HL3 030	112M	4	36100	41900
18,0	1938	2,4	80,6	HL3 050	112M	4	36100	41900
15,8	2211	1,6	92,0	HL3 050	112M	4	37900	43950
14,5	2409	1,0	100	HL3 030	112M	4	39500	45900
14,5	2409	2,0	100	HL3 050	112M	4	39500	45900
12,8	2731	2,6	114	HL3 080	112M	4	56950	65650
12,7	2748	1,3	114	HL3 050	112M	4	40450	47000
11,8	2945	2,6	122	HL3 080	112M	4	58250	67150
11,6	2993	1,6	125	HL3 050	112M	4	41650	48400
10,5	3313	1,5	138	HL3 050	112M	4	43350	50250
10,2	3427	2,2	143	HL3 080	112M	4	62050	71750
9,4	3720	1,2	155	HL3 050	112M	4	44650	51150
8,6	4051	1,9	168	HL3 080	112M	4	62050	71750
8,5	4118	1,2	171	HL3 050	112M	4	44650	51150
7,5	4669	1,6	194	HL3 080	112M	4	62050	71750
6,9	5083	1,5	211	HL3 080	112M	4	62050	71750
6,7	5186	0,9	216	HL3 050	112M	4	44650	51150
6,3	5572	1,1	232	HL3 080	112M	4	62050	71750
6,0	5859	1,3	244	HL3 080	112M	4	62050	71750
5,4	6402	1,1	266	HL3 080	112M	4	62050	71750
5,0	6993	1,0	291	HL3 080	112M	4	62050	71750
4,7	7379	1,0	307	HL3 080	112M	4	62700	72400

5,50 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
273,8	186	2,4	5,37	HL1 010	132MS	4	8750	9950
199,1	256	1,5	7,38	HL1 010	132MS	4	9400	10600
199,1	256	2,8	7,38	HL1 020	132MS	4	9400	10600
158,1	322	0,9	9,30	HL1 010	132MS	4	10050	11350
158,1	322	1,9	9,30	HL1 020	132MS	4	10050	11350
158,1	322	2,2	9,30	HL1 030	132MS	4	19300	22400
124,1	398	1,6	11,8	HL2 010	132MS	4	10950	12350
124,1	398	2,5	11,8	HL2 020	132MS	4	10950	12350
98,9	500	1,4	14,9	HL2 010	132MS	4	11650	13150

5.1 HL GEARED MOTORS

5,50 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
98,9	500	2,4	14,9	HL2 020	132MS	4	11650	13150
78,8	627	1,1	18,7	HL2 010	132MS	4	12300	14050
78,8	627	2,1	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	13550	15400
63,4	780	1,8	23,2	HL2 020	132MS	4	13550	15400
63,4	780	2,6	23,2	HL2 030	132MS	4	24950	28950
55,0	899	1,9	26,7	HL2 030	132MS	4	25500	29650
51,0	969	1,3	28,8	HL2 020	132MS	4	14550	16450
51,0	969	2,0	28,8	HL2 030	132MS	4	26100	30250
46,1	1072	1,4	31,9	HL2 020	132MS	4	14900	16850
46,1	1072	1,5	31,9	HL2 030	132MS	4	27300	31650
46,1	1072	2,8	31,9	HL2 050	132MS	4	27300	31650
44,3	1117	1,6	33,2	HL2 030	132MS	4	28500	33100
37,1	1333	0,9	39,6	HL2 020	132MS	4	15450	17550
37,1	1333	1,5	39,6	HL2 030	132MS	4	29150	33850
37,1	1333	2,9	39,6	HL2 050	132MS	4	29150	33850
36,6	1351	0,9	40,2	HL2 020	132MS	4	15800	18000
32,2	1536	1,1	45,7	HL2 030	132MS	4	30550	35500
32,2	1536	2,2	45,7	HL2 050	132MS	4	30550	35500
28,7	1668	0,9	51,2	HL3 020	132MS	4	16900	19200
28,7	1668	1,3	51,2	HL3 030	132MS	4	32200	37350
28,7	1668	2,3	51,2	HL3 050	132MS	4	32200	37350
26,5	1862	2,4	55,4	HL2 080	132MS	4	46050	53100
25,5	1934	1,7	57,5	HL2 050	132MS	4	32600	37900
22,9	2094	1,1	64,2	HL3 030	132MS	4	33850	39250
22,9	2094	2,2	64,2	HL3 050	132MS	4	33850	39250
21,1	2345	1,9	69,8	HL2 080	132MS	4	49650	57350
20,1	2389	1,5	73,3	HL3 050	132MS	4	35250	41000
18,2	2629	0,9	80,6	HL3 030	132MS	4	35950	41750
18,2	2629	1,8	80,6	HL3 050	132MS	4	35950	41750
17,6	2722	2,4	83,5	HL3 080	132MS	4	51500	59500
16,2	2951	2,4	90,5	HL3 080	132MS	4	52700	60800
16,0	2999	1,2	92,0	HL3 050	132MS	4	37750	43750
14,9	3214	2,6	98,6	HL3 080	132MS	4	55400	64000
14,7	3267	1,5	100	HL3 050	132MS	4	39300	45750
12,9	3727	0,9	114	HL3 050	132MS	4	40300	46800
12,9	3704	1,9	114	HL3 080	132MS	4	56700	65400
12,0	3994	1,9	122	HL3 080	132MS	4	58000	66850
11,8	4060	1,2	125	HL3 050	132MS	4	41500	48200
10,7	4494	1,1	138	HL3 050	132MS	4	43150	50050
10,3	4649	1,6	143	HL3 080	132MS	4	61800	71450

5.1 HL GEARED MOTORS

5,50 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
8,7	5494	1,4	168	HL3 080	132MS	4	61800	71450
7,6	6332	1,1	194	HL3 080	132MS	4	61800	71450
7,0	6895	1,1	211	HL3 080	132MS	4	61800	71450
6,0	7946	1,0	244	HL3 080	132MS	4	61800	71450

7,50 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
424,3	164	2,8	3,44	HL1 010	132M	4	7550	8550
338,0	206	2,3	4,32	HL1 010	132M	4	8050	9100
272,0	255	1,8	5,37	HL1 010	132M	4	8800	9950
197,7	351	1,1	7,38	HL1 010	132M	4	9400	10650
197,7	351	2,0	7,38	HL1 020	132M	4	9400	10650
157,0	443	1,4	9,30	HL1 020	132M	4	10050	11350
157,0	443	1,6	9,30	HL1 030	132M	4	19350	22720
123,3	547	1,1	11,8	HL2 010	132M	4	10950	12400
123,3	547	1,8	11,8	HL2 020	132M	4	10950	12400
123,3	547	2,9	11,8	HL2 030	132M	4	20850	24550
98,2	686	1,0	14,9	HL2 010	132M	4	11650	13200
98,2	686	1,8	14,9	HL2 020	132M	4	11650	13200
98,2	686	2,7	14,9	HL2 030	132M	4	22150	26100
78,2	861	1,5	18,7	HL2 020	132M	4	12350	14050
78,2	861	2,2	18,7	HL2 030	132M	4	23350	27500
68,6	983	1,8	21,3	HL2 030	132M	4	24350	28500
63,0	1070	1,3	23,2	HL2 020	132M	4	13600	15400
63,0	1070	1,9	23,2	HL2 030	132M	4	25000	29400
54,6	1234	1,4	26,7	HL2 030	132M	4	25550	30100
54,6	1234	2,7	26,7	HL2 050	132M	4	25550	30100
50,7	1330	0,9	28,8	HL2 020	132M	4	14550	16450
50,7	1330	1,4	28,8	HL2 030	132M	4	26150	30700
50,7	1330	2,8	28,8	HL2 050	132M	4	26150	30700
45,8	1472	1,0	31,9	HL2 020	132M	4	14900	16900
45,8	1472	1,1	31,9	HL2 030	132M	4	27350	32100
45,8	1472	2,1	31,9	HL2 050	132M	4	27350	32100
44,0	1533	1,1	33,2	HL2 030	132M	4	28550	33600
44,0	1533	2,2	33,2	HL2 050	132M	4	28550	33600
36,8	1830	1,1	39,6	HL2 030	132M	4	29250	34350
36,8	1830	2,1	39,6	HL2 050	132M	4	29250	34350
32,0	2109	1,6	45,7	HL2 050	132M	4	30600	35550
31,9	2113	2,8	45,8	HL2 080	132M	4	43550	50300
28,5	2290	0,9	51,2	HL3 030	132M	4	32250	37900
28,5	2290	1,7	51,2	HL3 050	132M	4	32250	37900

5.1 HL GEARED MOTORS

7,50 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
27,3	2396	2,8	53,5	HL3 080	132M	4	45400	52350
26,4	2556	1,8	55,4	HL2 080	132M	4	46150	53250
25,4	2656	1,3	57,5	HL2 050	132M	4	32700	37950
23,1	2829	2,6	63,2	HL3 080	132M	4	48250	55750
22,7	2875	1,6	64,2	HL3 050	132M	4	33900	39350
20,9	3219	1,4	69,8	HL2 080	132M	4	49750	57450
19,9	3280	1,1	73,3	HL3 050	132M	4	35300	41100
18,4	3551	2,3	79,3	HL3 080	132M	4	50700	58550
18,1	3609	1,3	80,6	HL3 050	132M	4	36050	41850
17,5	3738	1,8	83,5	HL3 080	132M	4	51600	59650
16,1	4051	1,8	90,5	HL3 080	132M	4	52800	60950
14,8	4413	1,9	98,6	HL3 080	132M	4	55500	64100
14,6	4485	1,1	100	HL3 050	132M	4	39400	45800
12,9	5086	1,4	114	HL3 080	132M	4	56850	65500
11,9	5484	1,4	122	HL3 080	132M	4	58100	67000
10,2	6383	1,2	143	HL3 080	132M	4	61900	71600
8,7	7543	1,0	168	HL3 080	132M	4	61900	71600

11,00 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
428,6	238	1,9	3,44	HL1 010	160MA	4	7500	8550
341,4	298	1,6	4,32	HL1 010	160MA	4	8000	9050
341,4	298	2,8	4,32	HL1 020	160MA	4	8000	9050
274,8	371	1,2	5,37	HL1 010	160MA	4	8750	9900
274,8	371	2,4	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	10050	11350
158,6	642	1,1	9,30	HL1 030	160MA	4	19300	22350
124,6	793	1,3	11,8	HL2 020	160MA	4	10950	12350
124,6	793	2,0	11,8	HL2 030	160MA	4	20750	24150
99,2	996	1,2	14,9	HL2 020	160MA	4	11600	13150
99,2	996	1,8	14,9	HL2 030	160MA	4	22100	25700
79,0	1250	1,0	18,7	HL2 020	160MA	4	12300	14050
79,0	1250	1,5	18,7	HL2 030	160MA	4	23300	27050
79,0	1250	2,8	18,7	HL2 050	160MA	4	23300	27050
69,3	1427	1,2	21,3	HL2 030	160MA	4	24250	28050
69,3	1427	2,2	21,3	HL2 050	160MA	4	24250	28050
63,6	1554	0,9	23,2	HL2 020	160MA	4	13550	15350
63,6	1554	1,3	23,2	HL2 030	160MA	4	24900	28950
63,6	1554	2,4	23,2	HL2 050	160MA	4	24900	28950

5.1 HL GEARED MOTORS

11,00 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
55,2	1791	1,0	26,7	HL2 030	160MA	4	25450	29650
55,2	1791	1,9	26,7	HL2 050	160MA	4	25450	29650
51,2	1931	1,0	28,8	HL2 030	160MA	4	26100	30200
51,2	1931	1,9	28,8	HL2 050	160MA	4	26100	30200
46,2	2138	1,4	31,9	HL2 050	160MA	4	27250	31600
44,7	2211	2,9	33,0	HL2 080	160MA	4	39200	45300
44,4	2226	1,5	33,2	HL2 050	160MA	4	28450	33100
38,4	2571	2,3	38,4	HL2 080	160MA	4	41050	47300
37,2	2656	1,4	39,6	HL2 050	160MA	4	29150	33800
32,3	3062	1,1	45,7	HL2 050	160MA	4	30500	35450
32,2	3068	1,9	45,8	HL2 080	160MA	4	43400	50150
28,8	3325	1,2	51,2	HL3 050	160MA	4	32150	37300
27,6	3478	1,9	53,5	HL3 080	160MA	4	45300	52150
26,6	3711	1,2	55,4	HL2 080	160MA	4	46000	53050
23,3	4106	1,8	63,2	HL3 080	160MA	4	48100	55550
23,0	4174	1,1	64,2	HL3 050	160MA	4	33800	39250
21,1	4674	1,0	69,8	HL2 080	160MA	4	49600	57300
18,6	5155	1,5	79,3	HL3 080	160MA	4	50550	58400
17,7	5427	1,2	83,5	HL3 080	160MA	4	51450	59450
16,3	5882	1,2	90,5	HL3 080	160MA	4	52600	60750
15,0	6406	1,3	98,6	HL3 080	160MA	4	55350	63900
13,0	7384	1,0	114	HL3 080	160MA	4	56650	65300
12,0	7961	0,9	122	HL3 080	160MA	4	57950	66800

15,00 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor 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	2,5	3,44	HL1 020	160LA	4	7500	8550
341,4	407	1,1	4,32	HL1 010	160LA	4	8000	9050
341,4	407	2,1	4,32	HL1 020	160LA	4	8000	9050
274,8	506	1,7	5,37	HL1 020	160LA	4	8750	9900
274,8	506	2,8	5,37	HL1 030	160LA	4	8750	9900
238,4	583	2,3	6,19	HL1 030	160LA	4	16900	19600
199,7	696	1,0	7,38	HL1 020	160LA	4	9350	10600
199,7	696	1,7	7,38	HL1 030	160LA	4	17850	20650
124,6	1082	0,9	11,8	HL2 020	160LA	4	10950	12350
124,6	1082	1,4	11,8	HL2 030	160LA	4	20750	24150
124,6	1082	2,6	11,8	HL2 050	160LA	4	20750	24150
99,2	1358	1,3	14,9	HL2 030	160LA	4	22100	25700
99,2	1358	2,5	14,9	HL2 050	160LA	4	22100	25700
79,0	1705	1,1	18,7	HL2 030	160LA	4	23300	27050

5.1 HL GEARED MOTORS

15,00 kW

n_2 [rpm]	M_2 [Nm]	fs	i	Gear reducer	Motor Size	Motor Pole	Fr_2 CS [N]	Fr_2 SS [N]
79,0	1705	2,0	18,7	HL2 050	160LA	4	23300	27050
69,3	1946	1,6	21,3	HL2 050	160LA	4	24250	28050
64,6	2085	2,8	22,8	HL2 080	160LA	4	35000	40400
63,6	2119	0,9	23,2	HL2 030	160LA	4	24900	28950
63,6	2119	1,8	23,2	HL2 050	160LA	4	24900	28950
56,1	2403	2,5	26,3	HL2 080	160LA	4	36600	42350
55,2	2442	1,4	26,7	HL2 050	160LA	4	25450	29650
51,5	2616	2,4	28,6	HL2 080	160LA	4	37450	43300
51,2	2633	1,4	28,8	HL2 050	160LA	4	26100	30200
46,2	2915	1,0	31,9	HL2 050	160LA	4	27250	31600
44,7	3015	2,2	33,0	HL2 080	160LA	4	39200	45300
44,4	3035	1,1	33,2	HL2 050	160LA	4	28450	33100
38,4	3505	1,7	38,4	HL2 080	160LA	4	41050	47300
37,2	3622	1,0	39,6	HL2 050	160LA	4	29150	33800
32,2	4183	1,4	45,8	HL2 080	160LA	4	43400	50150
27,6	4743	1,4	53,5	HL3 080	160LA	4	45300	52150
23,3	5600	1,3	63,2	HL3 080	160LA	4	48100	55550
18,6	7030	1,1	79,3	HL3 080	160LA	4	50550	58400
15,0	8736	1,0	98,6	HL3 080	160LA	4	55350	63900

30,00 kW

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

5.2 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]
490	4,32	17,14	324,1	8130	9210	790
470	5,37	13,23	260,8	8900	10080	990
410	7,38	8,39	189,6	9520	10770	1360
320	9,30	5,20	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]
750	9,30	12,19	150,5	19600	22720	1710

IHL1 020

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
750	7,38	15,35	189,6	9520	10770	1360
630	9,30	10,24	150,5	10200	11510	1710

5.2 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]
650	11,8	8,55	118,2	11100	12550	2000
720	14,9	7,55	94,2	11800	13350	2400
750	18,7	6,26	75,0	12500	14250	2400
800	23,2	5,37	60,4	13750	15600	2400
650	28,8	3,51	48,6	14750	16650	2400
840	31,9	4,10	43,9	15100	17100	2400
650	39,6	2,55	35,3	15700	17800	2400
840	40,2	3,26	34,8	16050	18250	2400
650	49,9	2,03	28,0	17150	19500	2400
600	68,7	1,36	20,4	18400	20850	2400

IHL2 020

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
1050	11,8	13,82	118,2	11100	12550	2180
1280	14,9	13,42	94,2	11800	13350	2740
1360	18,7	11,35	75,0	12500	14250	3400
1490	23,2	10,01	60,4	13750	15600	3400
1300	28,8	7,03	48,6	14750	16650	3400
1580	31,9	7,72	43,9	15100	17100	3400
1300	39,6	5,11	35,3	15700	17800	3400
1340	40,2	5,20	34,8	16050	18250	3400
1300	49,9	4,06	28,0	17150	19500	3400
1150	68,7	2,61	20,4	18400	20850	3400

IHL2 030

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
1920	14,9	20,13	94,2	22450	26100	2740
2020	18,7	16,86	75,0	23650	27500	3440
1820	21,3	13,32	65,8	24650	28500	3920
2100	23,2	14,11	60,4	25300	29400	4270
1820	26,7	10,61	52,4	25850	30100	4920
2000	28,8	10,81	48,6	26500	30700	5200
1740	31,9	8,50	43,9	27700	32100	5200
1820	33,2	8,54	42,1	28900	33600	5200
2150	39,6	8,45	35,3	29600	34350	5200
1820	45,7	6,21	30,6	31000	36000	5200
1820	57,5	4,93	24,3	33100	38450	5200

IHL2 050

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
3200	31,9	15,63	43,9	27700	32100	5880
3560	33,2	16,70	42,1	28900	33600	6120
4000	39,6	15,72	35,3	29600	34350	7300
3560	45,7	12,14	30,6	31000	36000	8420
3540	57,5	9,59	24,3	33100	38450	8800

IHL2 080

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
4750	55,4	13,36	25,3	46750	53900	10200
4800	69,8	10,72	20,1	50400	58200	12850

5.2 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]
850	51,2	2,67	27,4	17150	19500	2400
850	64,2	2,13	21,8	18250	20600	2400
850	80,6	1,69	17,4	19350	22000	2400
720	87,4	1,32	16,0	20000	22700	2000
860	100	1,38	14,0	21200	24050	2400
860	110	1,26	12,8	21900	24750	2400
860	125	1,11	11,2	22650	25750	2400
860	138	1,00	10,2	23200	26300	2400
820	155	0,85	9,0	23650	27000	2400
880	174	0,81	8,1	23650	27000	2400
750	188	0,64	7,5	23650	27000	2000
910	216	0,68	6,5	23650	27000	2400
910	236	0,62	5,9	23650	27000	2400
910	297	0,49	4,7	23650	27000	2400
850	369	0,37	3,8	24400	27700	2400

IHL3 020

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
1630	51,2	5,12	27,4	17150	19500	3400
1650	64,2	4,13	21,8	18250	20600	3400
1670	80,6	3,33	17,4	19350	22000	3400
1200	87,4	2,20	16,0	20000	22700	3400
1700	100	2,73	14,0	21200	24050	3400
1740	110	2,55	12,8	21900	24750	3400
1750	125	2,26	11,2	22650	25750	3400
1750	138	2,04	10,2	23200	26300	3400
1500	155	1,56	9,0	23650	27000	3400
1800	174	1,67	8,1	23650	27000	3400
1250	188	1,07	7,5	23650	27000	3400
1820	216	1,36	6,5	23650	27000	3400
1820	236	1,24	5,9	23650	27000	3400
1850	297	1,00	4,7	23650	27000	3400
1600	369	0,70	3,8	24400	27700	3400

IHL3 030

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
2250	51,2	7,07	27,4	32650	37900	5200
2510	64,2	6,28	21,8	34350	39850	5200
1920	73,3	4,21	19,1	35750	41600	5200
2560	80,6	5,10	17,4	36500	42350	5200
1950	92,0	3,41	15,2	38300	44400	5200
2580	100	4,14	14,0	39900	46400	5200
1950	114	2,74	12,2	40900	47500	5200
2600	125	3,35	11,2	42100	48900	5200
2650	138	3,09	10,2	43800	50800	5200
2250	155	2,34	9,0	45100	51700	5200
2700	171	2,53	8,2	45100	51700	5200
1970	197	1,60	7,1	45100	51700	5200
2720	216	2,03	6,5	45100	51700	5200
1970	249	1,27	5,6	45100	51700	5200
2300	293	1,26	4,8	45100	51700	5200
1970	309	1,02	4,5	45550	52400	5200
2350	369	1,02	3,8	46200	53650	5200
2000	425	0,76	3,3	46400	54050	5200

IHL3 050

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
4100	51,2	12,87	27,4	32650	37900	8800
4750	64,2	11,88	21,8	34320	39850	8800
3650	73,3	8,00	19,1	35750	41600	8800
4900	80,6	9,76	17,4	36500	42350	8800
3650	92,0	6,37	15,2	38300	44400	8800
5030	100	8,06	14,0	39900	46400	8800
3650	114	5,13	12,2	40900	47500	8800
5050	125	6,52	11,2	42100	48900	8800
5180	138	6,04	10,2	43800	50800	8800
4450	155	4,62	9,0	45100	51700	8800
5200	171	4,88	8,2	45100	51700	8800
3650	197	2,97	7,1	45100	51700	8800
5000	216	3,72	6,5	45100	51700	8800
3750	249	2,42	5,6	45100	51700	8800
4500	293	2,47	4,8	45100	51700	8800
3750	309	1,95	4,5	45550	52400	8800
4500	369	1,96	3,8	46200	53650	8800
3800	425	1,44	3,3	46400	54050	8800

5.2 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]
7000	53,5	21,01	26,2	46000	53000	9860
7700	63,2	19,58	22,2	48850	56450	11640
8350	79,3	16,91	17,7	51350	59300	14620
6890	83,5	13,26	16,8	52250	60400	14900
7410	90,5	13,15	15,5	53450	61700	14900
8900	98,6	14,50	14,2	56200	64900	14900
7410	114	10,48	12,3	57550	66350	14900
7790	122	10,22	11,4	58850	67850	14900
7900	143	8,90	9,8	62700	72500	14900
7900	168	7,53	8,3	62700	72500	14900
7500	194	6,20	7,2	62700	72500	14900
8110	211	6,16	6,6	62700	72500	14900
6520	232	4,52	6,0	62700	72500	14900
8180	244	5,39	5,7	62700	72500	14900
7300	266	4,40	5,3	62700	72500	14900
7300	291	4,03	4,8	62700	72500	14900
7300	307	3,82	4,6	63350	73150	14900
6300	357	2,84	3,9	64800	74600	14900
5670	409	2,23	3,4	65450	75550	14900

5.2 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	24000	27100	2400
1010	433	0,39	3,2	24650	27900	2400
1020	474	0,36	3,0	25100	28400	2400
1060	538	0,33	2,6	25850	29300	2400
1070	668	0,27	2,1	26200	29650	2400
1110	740	0,25	1,9	27000	30550	2400
1130	811	0,23	1,7	27300	30600	2400
1160	919	0,21	1,5	27400	30700	2400
1170	1020	0,19	1,4	27450	30800	2400
1200	1160	0,17	1,2	27500	31100	2400
1220	1270	0,16	1,1	27600	31350	2400
880	1440	0,10	1,0	27600	31550	2400
1250	1590	0,13	0,9	27700	31800	2400
1250	1740	0,12	0,8	27800	32000	2400
860	2160	0,07	0,6	28700	32200	2400
1000	2720	0,06	0,5	29600	32500	2400

IHL4 020

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
1980	348	0,94	4,0	24000	27100	3400
2000	433	0,77	3,2	24650	27900	3400
2040	474	0,71	3,0	25100	28400	3400
2110	538	0,65	2,6	25850	29300	3400
2150	668	0,53	2,1	26200	29650	3400
2220	740	0,50	1,9	27000	30550	3400
2240	811	0,46	1,7	27300	30600	3400
2290	919	0,41	1,5	27400	30700	3400
2320	1020	0,38	1,4	27450	30800	3400
2370	1160	0,34	1,2	27500	31100	3400
2400	1270	0,31	1,1	27600	31350	3400
1700	1440	0,20	1,0	27600	31550	3400
2400	1590	0,25	0,9	27700	31800	3400
2000	1740	0,19	0,8	27800	32000	3400
1720	2160	0,13	0,6	28700	32200	3400
1720	2720	0,10	0,5	29600	32500	3400

IHL4 030

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
2790	348	1,33	4,0	46000	53450	5200
2810	433	1,08	3,2	47200	54750	5200
2810	474	0,98	3,0	47850	55450	5200
2810	538	0,87	2,6	48600	56450	5200
2810	668	0,70	2,1	49750	57750	5200
2830	740	0,63	1,9	50500	58600	5200
2450	831	0,49	1,7	51400	59700	5200
2830	919	0,51	1,5	52150	60400	5200
2880	1020	0,47	1,4	53000	61650	5200
2500	1140	0,36	1,2	53600	62200	5200
2970	1270	0,39	1,1	54800	63500	5200
2550	1440	0,29	1,0	55300	64200	5200
2970	1590	0,31	0,9	55850	65600	5200
2750	1740	0,26	0,8	56400	67100	5200
2800	1980	0,23	0,7	56950	67750	5200
2750	2190	0,21	0,6	57500	68900	5200
2200	2280	0,16	0,6	57500	68900	5200
2200	2490	0,15	0,6	58050	69450	5200
2700	2720	0,16	0,5	58600	69800	5200

IHL4 050

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
5400	348	2,57	4,0	46000	53450	8800
5490	433	2,10	3,2	47200	54750	8800
5490	474	1,92	3,0	47850	55450	8800
5500	538	1,69	2,6	48600	56450	8800
5500	668	1,36	2,1	49750	57750	8800
5520	740	1,24	1,9	50500	58600	8800
4800	831	0,96	1,7	51400	59700	8800
5520	919	0,99	1,5	52150	60400	8800
5570	1020	0,91	1,4	53000	61650	8800
4850	1140	0,70	1,2	53600	62200	8800
5750	1270	0,75	1,1	54800	63500	8800
5100	1440	0,59	1,0	55300	64200	8800
5800	1590	0,60	0,9	55850	65600	8800
4700	1740	0,45	0,8	56400	67100	8800
5400	1980	0,45	0,7	56950	67750	8800
4500	2190	0,34	0,6	57500	68900	8800
4000	2280	0,29	0,6	57500	68900	8800
4000	2490	0,27	0,6	58050	69450	8800
4500	2720	0,27	0,5	58600	69800	8800

5.2 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]
7100	395	2,98	3,5	65100	75150	14900
9850	467	3,50	3,0	66350	76550	14900
9850	529	3,08	2,6	67650	78100	14900
9850	586	2,78	2,4	69100	79750	14900
9500	658	2,39	2,1	69850	80500	14900
9850	728	2,24	1,9	70700	81750	14900
8350	825	1,68	1,7	72250	83400	14900
9550	905	1,75	1,5	73050	84350	14900
9700	1000	1,60	1,4	74600	86150	14900
9600	1140	1,40	1,2	75450	87100	14900
9850	1260	1,29	1,1	76400	88500	14900
8900	1430	1,03	1,0	77500	89400	14900
10100	1570	1,07	0,9	77800	89700	14900
8900	1800	0,82	0,8	78000	90000	14900
7000	2090	0,55	0,7	78300	90300	14900
8800	2270	0,64	0,6	78400	90600	14900
7000	2500	0,46	0,6	78600	91000	14900
8500	2710	0,52	0,5	79000	91400	14900

5.3 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]
560	4,32	12,60	208,3	9280	10520	790
530	5,37	9,59	167,6	10160	11510	990
460	7,38	6,05	121,9	10870	12300	1360
340	9,30	3,55	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]
850	9,30	8,88	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]
850	7,38	11,18	121,9	10870	12300	1360
710	9,30	7,42	96,8	11640	13140	1710

5.3 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]
690	11,8	5,84	76,0	12650	14350	2000
790	14,9	5,32	60,5	13450	15250	2400
820	18,7	4,40	48,2	14250	16250	2400
840	23,2	3,63	38,8	15700	17800	2400
650	28,8	2,26	31,2	16850	19000	2400
850	31,9	2,67	28,2	17250	19500	2400
650	39,6	1,64	22,7	17900	20300	2400
850	40,2	2,12	22,4	18300	20850	2400
650	49,9	1,30	18,0	19600	22250	2400
600	68,7	0,88	13,1	21000	23800	2400

IHL2 020

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
1140	11,8	9,64	76,0	12650	14350	2180
1440	14,9	9,70	60,5	13450	15250	2740
1530	18,7	8,21	48,2	14250	16250	3400
1600	23,2	6,91	38,8	15700	17800	3400
1350	28,8	4,69	31,2	16850	19000	3400
1620	31,9	5,09	28,2	17250	19500	3400
1350	39,6	3,41	22,7	17900	20300	3400
1510	40,2	3,76	22,4	18300	20850	3400
1350	49,9	2,71	18,0	19600	22250	3400
1200	68,7	1,75	13,1	21000	23800	3400

IHL2 030

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
2280	18,7	12,24	48,2	27000	31400	3440
1850	21,3	8,70	42,3	28150	32550	3920
2210	23,2	9,55	38,8	28900	33550	4270
1850	26,7	6,93	33,7	29500	34350	4920
2100	28,8	7,30	31,2	30250	35050	5200
1900	31,9	5,97	28,2	31600	36650	5200
1850	33,2	5,58	27,1	33000	38350	5200
2220	39,6	5,61	22,7	33800	39200	5200
1850	45,7	4,06	19,7	35400	41100	5200
1850	57,5	3,22	15,6	37800	43900	5200

IHL2 050

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
3600	31,9	11,30	28,2	31600	36650	5880
3600	33,2	10,86	27,1	33000	38350	6120
4240	39,6	10,71	22,7	33800	39200	7300
3600	45,7	7,89	19,7	35400	41100	8420
3600	57,5	6,27	15,6	37800	43900	8800

IHL2 080

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
5000	55,4	9,04	16,3	53400	61550	10200
5100	69,8	7,32	12,9	57550	66450	12850

5.3 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]
860	51,2	1,74	17,6	19600	22250	2400
860	64,2	1,38	14,0	20850	23500	2400
860	80,6	1,10	11,2	22100	25100	2400
750	87,4	0,89	10,3	22800	25900	2000
900	100	0,93	9,0	23650	27000	2400
900	110	0,85	8,2	23650	27000	2400
900	125	0,75	7,2	23650	27000	2400
900	138	0,67	6,5	23650	27000	2400
870	155	0,58	5,8	23650	27000	2400
950	174	0,57	5,2	23650	27000	2400
750	188	0,41	4,8	23650	27000	2000
990	216	0,47	4,2	24150	27550	2400
990	236	0,43	3,8	24350	27800	2400
990	297	0,34	3,0	25050	28600	2400
900	369	0,25	2,4	25850	29350	2400

IHL3 020

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
1670	51,2	3,37	17,6	19600	22250	3400
1690	64,2	2,72	14,0	20850	23500	3400
1710	80,6	2,19	11,2	22100	25100	3400
1240	87,4	1,46	10,3	22800	25900	3400
1740	100	1,79	9,0	23650	27000	3400
1780	110	1,67	8,2	23650	27000	3400
1810	125	1,50	7,2	23650	27000	3400
1810	138	1,36	6,5	23650	27000	3400
1550	155	1,03	5,8	23650	27000	3400
1890	174	1,12	5,2	23650	27000	3400
1290	188	0,71	4,8	23650	27000	3400
1910	216	0,91	4,2	24150	27550	3400
1910	236	0,84	3,8	24350	27800	3400
1940	297	0,68	3,0	25050	28600	3400
1650	369	0,46	2,4	25850	29350	3400

IHL3 030

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
2310	51,2	4,66	17,6	37300	43250	5200
2570	64,2	4,13	14,0	39200	45500	5200
1950	73,3	2,75	12,3	40800	47500	5200
2640	80,6	3,38	11,2	41650	48350	5200
1980	92,0	2,22	9,8	43700	50700	5200
2660	100	2,74	9,0	45100	51700	5200
1980	114	1,79	7,9	45100	51700	5200
2680	125	2,22	7,2	45100	51700	5200
2700	138	2,02	6,5	45100	51700	5200
2280	155	1,52	5,8	45100	51700	5200
2720	171	1,64	5,3	45100	51700	5200
2000	197	1,05	4,6	45100	51700	5200
2750	216	1,32	4,2	46000	52750	5200
2000	249	0,83	3,6	46900	53750	5200
2400	293	0,85	3,1	47350	54300	5200
2030	309	0,68	2,9	48300	55550	5200
2400	369	0,67	2,4	49000	56850	5200
2100	425	0,51	2,1	49200	57300	5200

IHL3 050

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
4290	51,2	8,66	17,6	37300	43250	8800
4980	64,2	8,01	14,0	39200	45500	8800
3700	73,3	5,21	12,3	40800	47500	8800
5200	80,6	6,66	11,2	41650	48350	8800
3700	92,0	4,15	9,8	43700	50700	8800
5310	100	5,47	9,0	45100	51700	8800
3700	114	3,34	7,9	45100	51700	8800
5310	125	4,40	7,2	45100	51700	8800
5310	138	3,98	6,5	45100	51700	8800
4570	155	3,05	5,8	45100	51700	8800
5320	171	3,21	5,3	45100	51700	8800
3700	197	1,94	4,6	45100	51700	8800
5170	216	2,48	4,2	46000	52750	8800
3800	249	1,58	3,6	46900	53750	8800
4670	293	1,65	3,1	47350	54300	8800
3900	309	1,30	2,9	48300	55550	8800
4690	369	1,31	2,4	49000	56850	8800
4000	425	0,97	2,1	49200	57300	8800

5.3 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]
9090	79,3	11,83	11,3	58650	67700	14620
7310	83,5	9,04	10,8	59650	68950	14900
8000	90,5	9,13	9,9	61000	70450	14900
9610	98,6	10,07	9,1	62700	72500	14900
8000	114	7,27	7,9	62700	72500	14900
8050	122	6,79	7,3	62700	72500	14900
8120	143	5,88	6,3	62700	72500	14900
8120	168	4,98	5,3	62700	72500	14900
8000	194	4,25	4,6	62700	72500	14900
8330	211	4,07	4,3	63350	73200	14900
6650	232	2,96	3,9	63950	73950	14900
8550	244	3,62	3,7	64600	74700	14900
7540	266	2,92	3,4	65200	75400	14900
7540	291	2,68	3,1	65850	76150	14900
7540	307	2,54	2,9	67150	77550	14900
6460	357	1,87	2,5	68700	79100	14900
5910	409	1,49	2,2	69400	80100	14900

5.3 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	25450	28700	2400
1100	433	0,27	2,1	26100	29550	2400
1110	474	0,25	1,9	26600	30100	2400
1130	538	0,22	1,7	27400	31050	2400
1150	668	0,18	1,3	27750	31450	2400
1200	740	0,17	1,2	28600	32400	2400
1220	811	0,16	1,1	28950	32450	2400
1250	919	0,14	1,0	29050	32550	2400
1250	1020	0,13	0,9	29100	32650	2400
1250	1160	0,11	0,8	29150	32950	2400
1250	1270	0,11	0,7	29250	33250	2400
940	1440	0,07	0,6	29250	33450	2400
1250	1590	0,08	0,6	29350	33700	2400
1250	1740	0,08	0,5	29450	33900	2400
900	2160	0,04	0,4	30400	34000	2400
1000	2720	0,04	0,3	31000	34000	2400

IHL4 020

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
2120	348	0,65	2,6	25450	28700	3400
2140	433	0,53	2,1	26100	29550	3400
2180	474	0,49	1,9	26600	30100	3400
2250	538	0,45	1,7	27400	31050	3400
2290	668	0,36	1,3	27750	31450	3400
2360	740	0,34	1,2	28600	32400	3400
2390	811	0,31	1,1	28950	32450	3400
2440	919	0,28	1,0	29050	32550	3400
2460	1020	0,26	0,9	29100	32650	3400
2460	1160	0,23	0,8	29150	32950	3400
2460	1270	0,21	0,7	29250	33250	3400
1720	1440	0,13	0,6	29250	33450	3400
2460	1590	0,16	0,6	29350	33700	3400
2000	1740	0,12	0,5	29450	33900	3400
1720	2160	0,08	0,4	30400	34000	3400
1720	2720	0,07	0,3	31000	34000	3400

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	48750	56650	5200
2830	433	0,70	2,1	50000	58050	5200
2840	474	0,64	1,9	50700	58800	5200
2870	538	0,57	1,7	51500	59850	5200
2870	668	0,46	1,3	52750	61200	5200
2870	740	0,41	1,2	53550	62100	5200
2600	831	0,33	1,1	54500	63300	5200
2870	919	0,33	1,0	55300	64000	5200
2920	1020	0,31	0,9	56200	65350	5200
2650	1140	0,25	0,8	56800	65950	5200
2970	1270	0,25	0,7	58100	67300	5200
2700	1440	0,20	0,6	58600	68050	5200
2970	1590	0,20	0,6	59200	69550	5200
2800	1740	0,17	0,5	59800	71150	5200
2850	1980	0,15	0,5	60400	71800	5200
2800	2190	0,14	0,4	61000	73050	5200
2250	2280	0,11	0,4	61000	73050	5200
2250	2490	0,10	0,4	61550	73600	5200
2750	2720	0,11	0,3	62100	74000	5200

IHL4 050

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
5440	348	1,66	2,6	48750	56650	8800
5530	433	1,36	2,1	50000	58050	8800
5530	474	1,24	1,9	50700	58800	8800
5610	538	1,11	1,7	51500	59850	8800
5610	668	0,89	1,3	52750	61200	8800
5610	740	0,81	1,2	53550	62100	8800
5050	831	0,65	1,1	54500	63300	8800
5610	919	0,65	1,0	55300	64000	8800
5610	1020	0,59	0,9	56200	65350	8800
5100	1140	0,48	0,8	56800	65950	8800
5800	1270	0,49	0,7	58100	67300	8800
5350	1440	0,40	0,6	58600	68050	8800
5800	1590	0,39	0,6	59200	69550	8800
4900	1740	0,30	0,5	59800	71150	8800
5600	1980	0,30	0,5	60400	71800	8800
4700	2190	0,23	0,4	61000	73050	8800
4200	2280	0,20	0,4	61000	73050	8800
4200	2490	0,18	0,4	61550	73600	8800
4600	2720	0,18	0,3	62100	74000	8800

5.3 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]
7400	395	1,99	2,3	69000	79650	14900
9910	467	2,26	1,9	70300	81150	14900
9910	529	1,99	1,7	71700	82800	14900
9930	586	1,80	1,5	73250	84550	14900
9650	658	1,56	1,4	74050	85350	14900
9950	728	1,46	1,2	74950	86650	14900
8700	825	1,12	1,1	76600	88400	14900
9720	905	1,14	1,0	77450	89400	14900
9900	1000	1,05	0,9	79100	91300	14900
9740	1140	0,91	0,8	80000	92350	14900
10100	1260	0,85	0,7	81000	93800	14900
9050	1430	0,67	0,6	82150	94750	14900
10100	1570	0,69	0,6	82500	95100	14900
9050	1800	0,54	0,5	82700	95400	14900
7100	2090	0,36	0,4	83000	95700	14900
8900	2270	0,42	0,4	83100	96050	14900
7100	2500	0,30	0,4	83300	96450	14900
8500	2710	0,33	0,3	83750	96900	14900

5.4 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	26700	30940	1710

5.4 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]
690	11,8	3,24	42,2	15100	17100	2000
840	14,9	3,14	33,6	16050	18200	2400
850	18,7	2,53	26,8	17000	19400	2400
850	23,2	2,04	21,6	18750	21250	2400
670	28,8	1,29	17,3	20100	22650	2400
860	31,9	1,50	15,7	20600	23250	2400
670	39,6	0,94	12,6	21350	24200	2400
860	40,2	1,19	12,4	21800	24850	2400
670	49,9	0,75	10,0	23650	27000	2400
600	68,7	0,49	7,3	23650	27000	2400

IHL2 020

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
1200	11,8	5,64	42,2	15100	17100	2180
1620	14,9	6,06	33,6	16050	18200	2740
1630	18,7	4,86	26,8	17000	19400	3400
1660	23,2	3,98	21,6	18750	21250	3400
1450	28,8	2,80	17,3	20100	22650	3400
1680	31,9	2,93	15,7	20600	23250	3400
1450	39,6	2,04	12,6	21350	24200	3400
1550	40,2	2,15	12,4	21800	24850	3400
1500	49,9	1,67	10,0	23650	27000	3400
1200	68,7	0,97	7,3	23650	27000	3400

IHL2 030

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
2000	21,3	5,23	23,5	33600	38850	3920
2460	23,2	5,90	21,6	34500	40000	4270
2000	26,7	4,16	18,7	35200	40950	4920
2200	28,8	4,25	17,3	36100	41800	5200
2230	31,9	3,89	15,7	37700	43700	5200
2000	33,2	3,35	15,1	39350	45750	5200
2290	39,6	3,21	12,6	40300	46750	5200
2000	45,7	2,44	10,9	42200	49050	5200
2000	57,5	1,93	8,7	45100	51700	5200

IHL2 050

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
3900	33,2	6,53	15,1	39350	45750	6120
4380	39,6	6,15	12,6	40300	46750	7300
3900	45,7	4,75	10,9	42200	49050	8420
3900	57,5	3,77	8,7	45100	51700	8800

IHL2 080

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
5400	55,4	5,43	9,0	62700	72500	10200
5500	69,8	4,39	7,2	62700	72500	12850

5.4 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]
870	51,2	0,98	9,8	23650	27000	2400
900	64,2	0,80	7,8	23650	27000	2400
930	80,6	0,66	6,2	23650	27000	2400
770	87,4	0,51	5,7	23650	27000	2000
960	100	0,55	5,0	23650	27000	2400
970	110	0,51	4,6	24100	27550	2400
990	125	0,46	4,0	24600	28100	2400
1010	138	0,42	3,6	24800	28350	2400
900	155	0,33	3,2	25550	29150	2400
1050	174	0,35	2,9	25800	29450	2400
770	188	0,24	2,7	26000	29700	2000
1090	216	0,29	2,3	26550	30300	2400
1090	236	0,27	2,1	26800	30600	2400
1090	297	0,21	1,7	27550	31450	2400
930	369	0,14	1,4	28450	32300	2400

IHL3 020

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
1740	51,2	1,95	9,8	23650	27000	3400
1780	64,2	1,59	7,8	23650	27000	3400
1830	80,6	1,30	6,2	23650	27000	3400
1290	87,4	0,85	5,7	23650	27000	3400
1910	100	1,09	5,0	23650	27000	3400
1950	110	1,02	4,6	24100	27550	3400
1980	125	0,91	4,0	24600	28100	3400
2010	138	0,84	3,6	24800	28350	3400
1650	155	0,61	3,2	25550	29150	3400
2090	174	0,69	2,9	25800	29450	3400
1340	188	0,41	2,7	26000	29700	3400
2100	216	0,56	2,3	26550	30300	3400
2100	236	0,51	2,1	26800	30600	3400
2120	297	0,41	1,7	27550	31450	3400
1750	369	0,27	1,4	28450	32300	3400

IHL3 030

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
2510	51,2	2,81	9,8	45100	51700	5200
2700	64,2	2,41	7,8	45100	51700	5200
2100	73,3	1,64	6,8	45100	51700	5200
2750	80,6	1,96	6,2	45100	51700	5200
2100	92,0	1,31	5,4	45100	51700	5200
2790	100	1,60	5,0	45550	52200	5200
2100	114	1,05	4,4	46000	52750	5200
2800	125	1,29	4,0	46450	53250	5200
2800	138	1,17	3,6	47350	54300	5200
2380	155	0,88	3,2	47800	54800	5200
2820	171	0,94	2,9	48250	55300	5200
2100	197	0,61	2,5	49150	56350	5200
2820	216	0,75	2,3	50600	58050	5200
2150	249	0,50	2,0	51600	59150	5200
2450	293	0,48	1,7	52100	59750	5200
2200	309	0,41	1,6	53100	61100	5200
2450	369	0,38	1,4	53900	62550	5200
2200	425	0,30	1,2	54100	63050	5200

IHL3 050

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
4490	51,2	5,04	9,8	45100	51700	8800
5360	64,2	4,79	7,8	45100	51700	8800
3950	73,3	3,09	6,8	45100	51700	8800
5410	80,6	3,85	6,2	45100	51700	8800
3950	92,0	2,46	5,4	45100	51700	8800
5480	100	3,14	5,0	45550	52200	8800
3950	114	1,98	4,4	46000	52750	8800
5480	125	2,53	4,0	46450	53250	8800
5480	138	2,28	3,6	47350	54300	8800
4670	155	1,73	3,2	47800	54800	8800
5480	171	1,84	2,9	48250	55300	8800
3950	197	1,15	2,5	49150	56350	8800
5370	216	1,43	2,3	50600	58050	8800
4000	249	0,92	2,0	51600	59150	8800
4790	293	0,94	1,7	52100	59750	8800
4100	309	0,76	1,6	53100	61100	8800
4900	369	0,76	1,4	53900	62550	8800
4150	425	0,56	1,2	54100	63050	8800

5.4 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]
9750	79,3	7,05	6,3	62700	72500	14620
7650	83,5	5,26	6,0	62700	72500	14900
8450	90,5	5,36	5,5	62700	72500	14900
9850	98,6	5,73	5,1	63300	73250	14900
8500	114	4,29	4,4	63950	73950	14900
8910	122	4,17	4,1	64600	74700	14900
8500	143	3,42	3,5	65800	76150	14900
9030	168	3,07	3,0	66450	76850	14900
8550	194	2,53	2,6	68950	79750	14900
8700	211	2,36	2,4	69700	80500	14900
7700	232	1,91	2,2	70350	81350	14900
8730	244	2,06	2,1	71050	82150	14900
8420	266	1,81	1,9	71700	82950	14900
8420	291	1,66	1,7	72450	83750	14900
8420	307	1,57	1,6	73850	85300	14900
7300	357	1,17	1,4	75550	87000	14900
6650	409	0,93	1,2	76350	88100	14900

5.4 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	28000	31550	2400
1190	433	0,16	1,2	28700	32500	2400
1230	474	0,15	1,1	29250	33100	2400
1250	538	0,14	0,9	30150	34000	2400
1250	668	0,11	0,7	30550	34000	2400
1250	740	0,10	0,7	31000	34000	2400
1250	811	0,09	0,6	31000	34000	2400
1250	919	0,08	0,5	31000	34000	2400
1250	1020	0,07	0,5	31000	34000	2400
1250	1160	0,06	0,4	31000	34000	2400
1250	1270	0,06	0,4	31000	34000	2400
1100	1440	0,05	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 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	28000	31550	3400
2350	433	0,32	1,2	28700	32500	3400
2420	474	0,30	1,1	29250	33100	3400
2460	538	0,27	0,9	30150	34000	3400
2460	668	0,22	0,7	30550	34000	3400
2460	740	0,20	0,7	31000	34000	3400
2460	811	0,18	0,6	31000	34000	3400
2460	919	0,16	0,5	31000	34000	3400
2460	1020	0,14	0,5	31000	34000	3400
2460	1160	0,13	0,4	31000	34000	3400
2460	1270	0,12	0,4	31000	34000	3400
1900	1440	0,08	0,3	31000	34000	3400
2460	1590	0,09	0,3	31000	34000	3400
2000	1740	0,07	0,3	31000	34000	3400
1720	2160	0,05	0,2	31000	34000	3400
1720	2720	0,04	0,2	31000	34000	3400

IHL4 030

Mn_2 [Nm]	i	Pn_1 [kW]	n_2 [rpm]	Fr_2 CS [N]	Fr_2 SS [N]	M_{2max} [Nm]
2900	348	0,49	1,4	53650	62300	5200
2950	433	0,40	1,2	55000	63850	5200
2970	474	0,37	1,1	55800	64700	5200
2970	538	0,33	0,9	56650	65850	5200
2970	668	0,26	0,7	58000	67300	5200
2970	740	0,24	0,7	58900	68300	5200
2700	831	0,19	0,6	59950	69650	5200
2970	919	0,19	0,5	60800	70400	5200
2970	1020	0,17	0,5	61800	71900	5200
2700	1140	0,14	0,4	62500	72550	5200
2970	1270	0,14	0,4	63900	74000	5200
2750	1440	0,11	0,3	64000	74000	5200
2970	1590	0,11	0,3	64000	74000	5200
2800	1740	0,10	0,3	64000	74000	5200
2850	1980	0,09	0,3	64000	74000	5200
2800	2190	0,08	0,2	64000	74000	5200
2250	2280	0,06	0,2	64000	74000	5200
2250	2490	0,05	0,2	64000	74000	5200
2750	2720	0,06	0,2	64000	74000	5200

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	53650	62300	8800
5760	433	0,79	1,2	55000	63850	8800
5760	474	0,72	1,1	55800	64700	8800
5800	538	0,64	0,9	56650	65850	8800
5800	668	0,51	0,7	58000	67300	8800
5800	740	0,46	0,7	58900	68300	8800
5200	831	0,37	0,6	59950	69650	8800
5800	919	0,37	0,5	60800	70400	8800
5800	1020	0,34	0,5	61800	71900	8800
5250	1140	0,27	0,4	62500	72550	8800
5800	1270	0,27	0,4	63900	74000	8800
5450	1440	0,22	0,3	64000	74000	8800
5800	1590	0,22	0,3	64000	74000	8800
5000	1740	0,17	0,3	64000	74000	8800
5600	1980	0,17	0,3	64000	74000	8800
4000	2190	0,11	0,2	64000	74000	8800
4200	2280	0,11	0,2	64000	74000	8800
4200	2490	0,10	0,2	64000	74000	8800
4600	2720	0,10	0,2	64000	74000	8800

5.4 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]
7850	395	1,17	1,3	75900	87600	14900
10300	467	1,31	1,1	77350	89250	14900
10300	529	1,15	0,9	78850	91100	14900
10300	586	1,04	0,9	80550	93000	14900
9800	658	0,88	0,8	81450	-93900	14900
10300	728	0,84	0,7	82450	95300	14900
9150	825	0,66	0,6	84250	97250	14900
9850	905	0,64	0,6	85200	98350	14900
10100	1000	0,60	0,5	8700	100450	14900
9870	1140	0,51	0,4	88000	101600	14900
10100	1260	0,47	0,4	89100	103200	14900
9600	1430	0,40	0,3	90350	104250	14900
10100	1570	0,38	0,3	90750	104600	14900
9600	1800	0,32	0,3	90950	104950	14900
7150	2090	0,20	0,2	91300	105250	14900
8950	2270	0,23	0,2	91400	105650	14900
7150	2500	0,17	0,2	91600	106100	14900
8500	2710	0,19	0,2	92450	106700	14900

6.1 SALES CONDITIONS

ATTENTION!

The revised data and information, shown in this technical catalogue, replaces the data of the previous editions. Old data is now obsolete. All technical data, dimensions, weights in this catalogue are subject to changes without warning. Illustrations are not binding. You can find the above mentioned data and information on our site www.motovario.com; please periodically consult the technical documentation on the web site to be always updated about possible modifications of performances and characteristics of the product.

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NOTES

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