TECHNICAL CATALOGUE

PBH SERIES

PARALLEL **HELICAL** AND **BEVEL** HELICAL **GEAR** REDUCERS

STANDARD **IEC**

MOTOVARIO®
HEART OF MOTION
a TECO Group company

INDEX

1. GENERAL INFORMATION

2. PRODUCT INFORMATION

3. DIMENSIONS

5. INSTALLATION

6. SYMBOLS AND FORMULAS

7. PH - PERFORMANCES

8. BH - PERFORMANCES

9. SALES CONDITIONS

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;

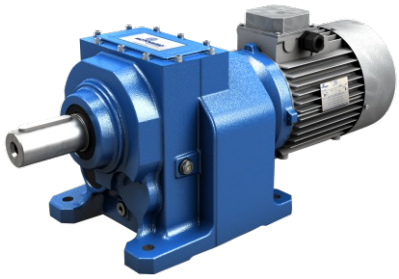
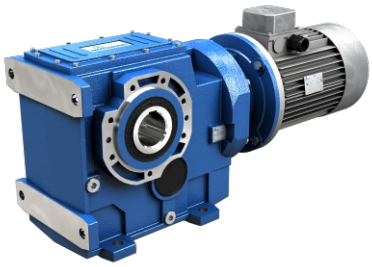
Range extension and ongoing evolution
The steady, significant growth of Motovario Group is achieved thanks to an ongoing search for new calculation and design tools, as well as to customer service. The new tools identified have led to innovation, improved product reliability as well as positive developments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

1.2 PRODUCTS AND SOFTWARE MOTOVARIO

PARALLEL HELICAL AND BEVEL HELICAL GEAR REDUCERS FOR HEAVY INDUSTRY Cast iron casing Output shaft up to 180 mm Mn_2 up to 90.000 Nm Reduction stages 1, 2, 3, 4 Ratios up to 636 Atex units	 
MOTOVARIATORS AND MOTOVARIATOR-GEAR REDUCERS Cast iron or aluminum casing Ratios infinite Mn_2 up to 5.000 Nm Atex units	

1.2 PRODUCTS AND SOFTWARE MOTOVARIO

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

LM16 - EM16 - AM16 – inverter

Compact, standard and premium/servo drive
Protection class IP20 - IP66
Torque and speed regulation
PLC integrated functions

2.1 DESIGN FEATURES

MAIN FEATURES OF THE PBH SERIES

The gear reducers of the PBH series are built according to the best design techniques and offer:

- Sturdiness and reliability.
- Low vibration and low noise.
- High torque ratings.
- High efficiency.
- Universal mounting: suitable for horizontal or vertical mounting.
- Broad customization with extensive range of catalogue options.
- Rigid cast-iron casing with large lubricant capacity for enhanced heat capacity.
- Split casing for low maintenance.
- Output shaft: solid (as standard), hollow, hollow with shrink disc, splined (hollow or solid), double-ended solid.
- Also available with double-ended input shaft.
- IEC-normalised motor adapter, also available with NEMA adapter.
- High overhung ratings both at input and output shaft ends.
- Reliable, proven high performance.
- Accurately ground helical spur gears.
- Accurately run-in Gleason bevel gear.

EFFICIENCY η Table

PARALLEL HELICAL			
P1H	P2H	P3H	P4H
0,98	0,96	0,94	0,92

BEVEL-HELICAL		
B2H	B3H	B4H
0,95	0,93	0,91

FRAME SIZES AND GEARING

- Available frame sizes: 180, 200, 225, 250, 280, 355;
- Gearing: 1, 2, 3 and 4 stages for parallel helical gear reducers; 2, 3 and 4 stages for bevel-helical gear reducers.

MATERIALS (CASING / GEARS AND SHAFTS)

- Casing: GJL200 UNI EN 1561 cast-iron;
- Gears: hardened and case-hardened 17CrNiMo6-4, 25CrMo4 and 20MnCr5 steel;
- Solid output shaft: hardened and tempered 42CrMo4 steel.
- Hollow output shaft: hardened and tempered 20MnV6 steel.

PAINT COATING

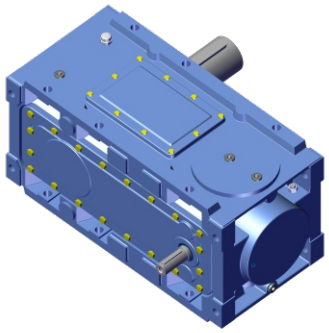
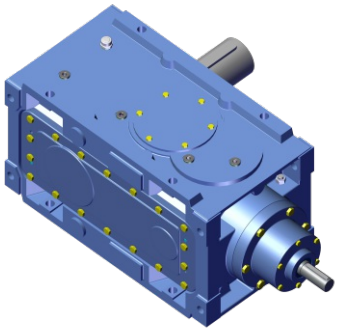
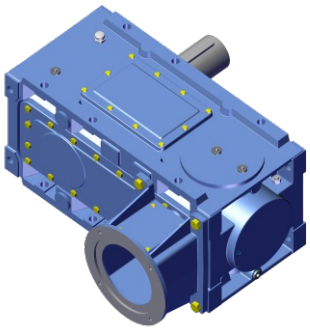
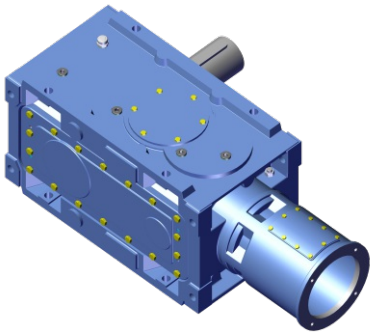
- Outer protection with two-component water-based paint, minimum coat thickness 80 microns. RAL 5010 blue textured finish

2.2 TYPOLOGY

2.2.1 Designation

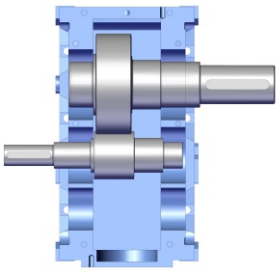
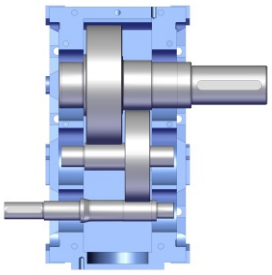
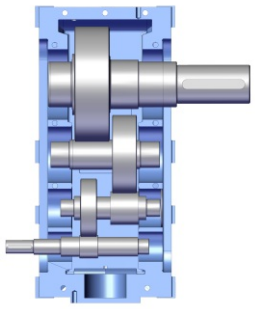
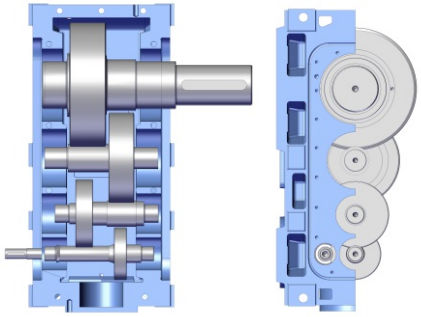
2.2 TYPOLOGY

2.2.2 Versions

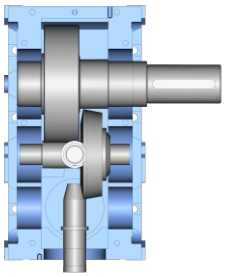
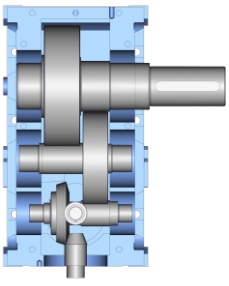
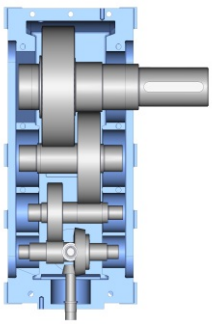
	Parallel Helical gear reducers	Bevel Helical gear reducers
Solid-shaft input		
Bell-housing input with coupling		

2.2.3 Gear train

Parallel helical gear reducers

P1H	P2H
	
P3H	**P4H**
	

Bevel helical gear reducers

B2H	B3H	B4H
		

2.2.4 Available motor mounting flanges

The tables show available coupling configurations and the matching motors.
For brake motors with frame sizes greater than IEC 180, please contact MOTOVARIO TECHNICAL SERVICE.

	MOT. IEC							
	100-112	132	160	180	200	225	250-280	315
PH180	P3H	P3H	P3H	P2H	P2H	P2H	P2H	-
	P4H	P4H		P3H	P3H			
PH200	P4H	P3H	P3H	P3H	P2H	P2H	P2H	-
		P4H	P4H	P4H	P3H	P3H		
PH225	-	P4H	P3H	P3H	P3H	P2H	P2H	-
			P4H	P4H		P3H	P3H	
PH250	-	P4H	P3H	P3H	P3H	P3H	P2H	P2H
			P4H	P4H	P4H		P3H	
PH280	-	P4H	P3H	P3H	P3H	P3H	P2H	P2H
			P4H	P4H	P4H	P4H	P3H	P3H
PH355	-	-	P4H	P4H	P4H	P3H	P3H	P2H
						P4H	P4H	P3H

	MOT. IEC							
	100-112	132	160	180	200	225	250-280	315
BH180	B3H	B3H	B2H	B2H	B2H	B2H	B2H	-
	B4H	B4H	B3H	B3H	B3H			
BH200	B4H	B3H	B3H	B3H	B2H	B2H	B2H	B2H
		B4H	B4H	B4H	B3H	B3H		
BH225	B4H	B4H	B3H	B3H	B2H	B2H	B2H	B2H
			B4H	B4H	B3H	B3H	B3H	
BH250	-	B4H	B3H	B3H	B3H	B2H	B2H	B2H
			B4H	B4H	B4H	B3H	B3H	
BH280	-	B4H	B3H	B3H	B3H	B3H	B2H	B2H
			B4H	B4H	B4H	B4H	B3H	B3H
BH355	-	-	B4H	B4H	B4H	B3H	B3H	B2H
						B4H	B4H	B3H

2.2.5 Range

The values shown have been calculated at 1400 rpm.

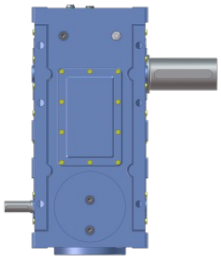
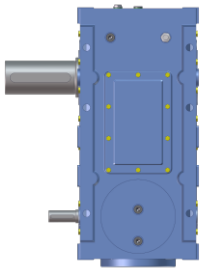
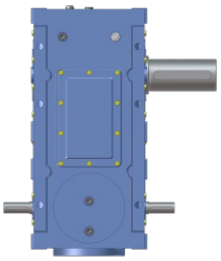
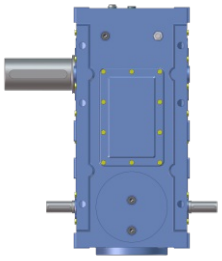
	Mn_2 [Nm]	i	
PH	**Max**	**Min**	**Max**
180	13000	2,04	604,77
200	18300	1,95	600,10
225	28000	1,96	627,06
250	35200	2,04	635,69
280	49500	1,96	625,43
355	91300	1,95	626,60

	Mn_2 [Nm]	i	
BH	**Max**	**Min**	**Max**
180	13000	5,27	592,67
200	18200	5,44	632,08
225	27900	5,41	634,03
250	35200	5,44	632,71
280	46500	5,41	622,50
355	80000	5,52	604,00

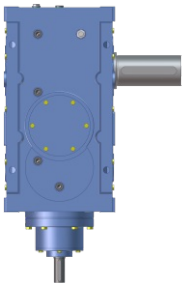
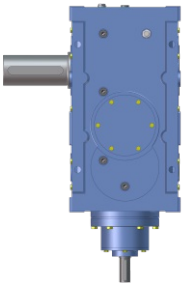
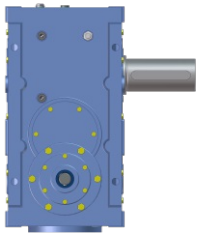
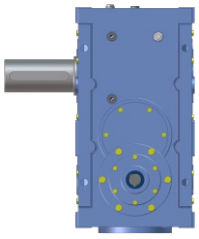
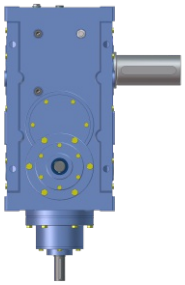
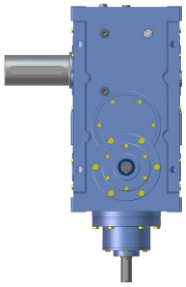
2.3 MOUNTING POSITIONS

2.3.1 Executions

Parallel helical gear reducers

AZ	AU
	
DZ	**DU**
	

Bevel helical gear reducers

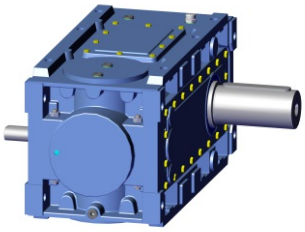
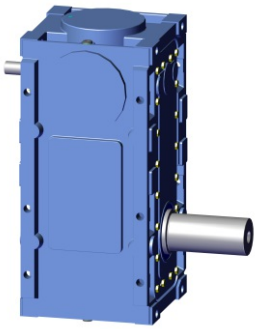
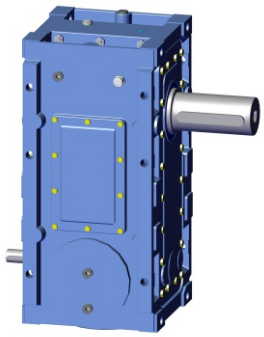
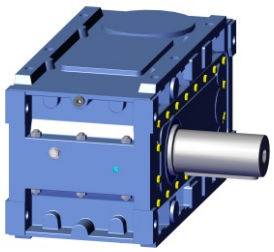
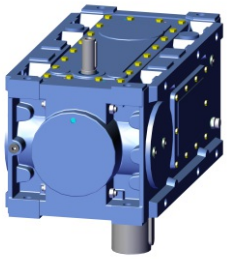
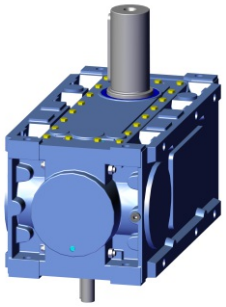
LR	LL	SR
		
SL	**DR**	**DL**
		

2.3 MOUNTING POSITIONS

2.3.2 Mounting positions

The mounting position denotes the orientation of a gear reducer. Due to technical considerations, mounting position B3 should be preferred whenever possible, as it ensure less oil splashing, improved lubrication and less heating. Unless otherwise indicated, gear reducers are supplied for the B3 mounting position.

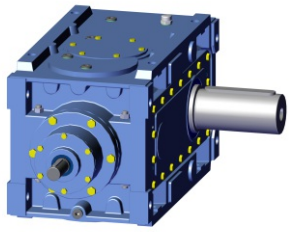
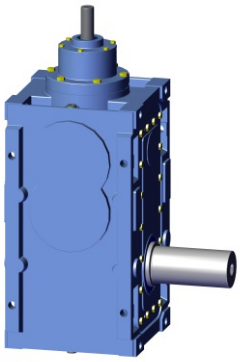
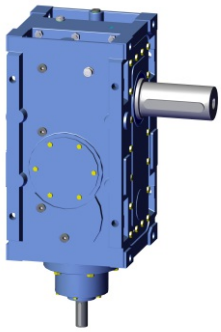
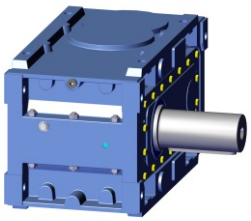
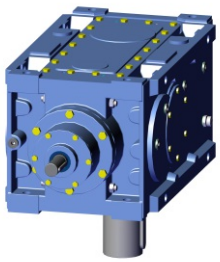
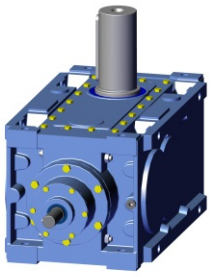
Parallel helical gear reducers

	B3	B6	B7
AZ			
	B8	**V5**	**V6**
			

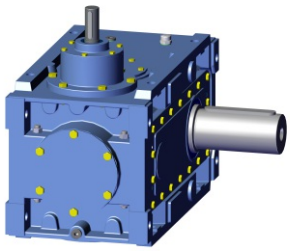
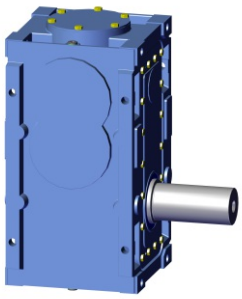
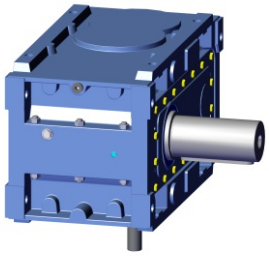
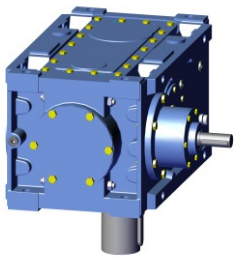
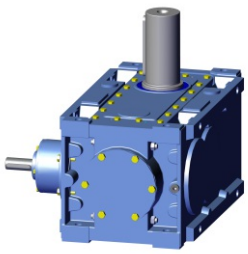
2.3 MOUNTING POSITIONS

Bevel helical gear reducers

LR

B3	B6	B7
		
B8	**V5**	**V6**
		

SR

B3	B6	B7
		
B8	**V5**	**V6**
		

2.4 PRODUCT SELECTION

Follow this procedure to select your gear reducer properly:

1. Calculate reduction ratio **$i = n_1 / n_2$**
2. Calculate output shaft torque **$M_2 = P_1 * 9550 * \eta / n_2$ [Nm]**
3. Determine the service factor fs required by the application according to:
   - Type of load (uniform, moderate, heavy)
   - Daily hours of operation
   - Number of starts per hour
   - Type of motor installed.

   Please refer to the tables: Table Application classification, Table $f_s a$, Table $f_s b$ and Table $f_s c$
4. Determine the required performance of the gear reducer **$Mn_2 = M_2 * f_s$ [Nm]**
5. Select gear reducer frame size, gearing and reduction ratio according to **Mn_2, n_2** and **n_1.**

Service factor

The service factor required by application is defined by this formula **$f_s = f_s a * f_s b * f_s c$** (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 by current input. The parameters that need to be taken into account in order to select the most suitable service factor are reported in tables **$f_s a$**, **$f_s b$** and **$f_s c$.**

Verifications

a. Verify thermal capacity and ensure that the thermal capacity of the gear reducer under actual operating conditions is higher than the installed power at input shaft. See tables Pth (nominal thermal capacity), Pta (additional thermal capacity) and Fmp (factor mounting position).
b. When overloading occurs due to starts under full load, braking, high inertia loads, check that instantaneous peak loading
   (M_{2max}) is **$M_{2max} <= 1,8 * Mn_2$**
   Note: instantaneous peak loading is an overload event lasting no more than 10 seconds.
c. For radial and thrust loading on input and output shaft, please see the relevant tables.
d. For input speeds higher than n1 = 1750 rpm, please contact MOTOVARIO TECHNICAL SERVICE.

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

2.4 PRODUCT SELECTION

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

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
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

2.4 PRODUCT SELECTION

Table $f_s a$

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	1,15	1,25	1,50	1,75
Heavy	1,25	1,50	1,75	2,00	2,25

Table $f_s b$

Nature of load applied	Frequency of starts per hour [st/h]			
	< 8	8 ... 32	32 ... 64	64 ... 128
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 $f_s c$

Type of motor used	$f_s c$
Electric motor	1,00
Reciprocating multiple-cylinder motor	1,25
Reciprocating single-cylinder motor	1,50

2.5 THERMAL POWER

2.5.1 Information

Nominal thermal capacity Pth is the maximum mechanical power that a gear reducer can transmit (under continuous duty) without its internal temperature rising to such a degree as to damage gear reducer components. Thermal capacity may be increased by using seals made from special rubber and synthetic oil, or suitable cooling devices. In the event of short duty cycles followed by periods of rest long enough to allow for gear reducer to cool down appropriately, thermal capacity loses significance and may be disregarded.
The scheme below indicates the nominal thermal power capacity [kW] according to the following conditions:

- Mounting position B3;
- Continuous operation at input speed <= 1500 rpm;
- Environment temperature T_{amb}=20°C;
- Sea level altitude;
- Air speed around the gear reducer >=1m/s;
- Absence of external radial and/or axial loads;
- Lubricant oil up to 95°C (mineral oil) and 100°C (synthetic oil).

Table NOMINAL THERMAL CAPACITY Pth

	Pth [kW]					
	PH - BH 180	PH - BH 200	PH - BH 225	PH - BH 250	PH - BH 280	PH - BH 355
P1H	125	152	186	239	294	448
P2H	96	116	142	184	228	344
P3H	73	89	109	141	170	272
P4H	56	68	83	108	130	208
B2H	81	98	119	155	190	293
B3H	70	85	103	134	162	259
B4H	53	65	79	103	124	198

When a thermal capacity up to Pth is applied to the gear reducer under the reference conditions outlined above, the proper lubrication and operation of the gear reducer are guaranteed.

2.5.2 Verification

Verification of the application
The thermal limit of a gear reducer under real-life application conditions must be verified for each and every application using the following formula:
P_1 < Pth * f_ta * f_tb * f_tc * f_tn * f_ts * f_tv * Fmp, 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_tb** = cooling fan correction factor (see table);
- **f_ta** = ambient and operating temperature correction factor (see table);
- **f_tn** = input speed n1 correction factor;
- **f_tS** = cooling coil correction factor (see table);
- **f_tv** = airflow speed correction factor around the gear reducer (see table);
- **Fmp** = mounting position correction factor (see table).
  Correction factors reflect operating conditions other than the reference conditions and are obtained from the following ISO14179 tables:

Table
Correction factor f_ta

Altitude [m]	f_ta
0	1
750	0,95
1500	0,9
2250	0,85
3000	0,81

Table
Correction factor f_tb

	n1 [rpm]	f_tb
P1H P2H P3H	1500	1,7
	1000	1,5
B2H B3H	1500	1,8
	1000	1,6

Table
Correction factor f_tc

		Duty per hour of operation %				
f_tc		100	80	60	40	20
Ambient temperature °C	10	1,15	1,25	1,35	1,5	2
	20	1	1,05	1,15	1,35	1,75
	30	0,9	1	1,05	1,25	1,5
	40	0,75	0,8	0,9	1	1,35
	50	0,6	0,63	0,7	0,8	1

Table
Correction factor f_tn

	n1 [rpm]				
ftn	700	900	1140	1400	1800
P1H	1,15	1,1	1,05	1	0,8
P2H - B2H	1,1	1,07	1,05	1	0,85
P3H - P4H - B3H - B4H	1,07	1,05	1,05	1	0,95

Table
Correction factor f_ts

	f_ts
P1H - P2H B2H - B3H	2
P3H - P4H B4H	1,8

Table
Correction factor f_tv

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

Table
Fmp (Factor mounting position)

	Fmp						
	P1H	P2H	P3H	P4H	B2H	B3H	B4H
B3	1	1	1	1	1	1	1
B6	0,8	0,85	0,85	0,85	0,8	0,8	0,75
B7	0,8	0,75	0,75	0,75	0,8	0,75	0,7
B8	1	1	1	1	1	1	1
V5	0,8	0,75	0,75	0,75	0,75	0,75	0,7
V6	0,8	0,85	0,85	0,85	0,8	0,8	0,75

If unit is to operate at input speeds higher than 1800 rpm, or at ambient temperatures exceeding 40 °C, please contact MOTOVARIO TECHNICAL SERVICE.

2.5 THERMAL POWER

Application check (with cooling unit)

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* Fmp) + Pta, where:

Pta is the additional thermal capacity calculated at 20 °C water temperature and 20 °C air temperature. In the event of different water and air temperatures, please contact MOTOVARIO TECHNICAL SERVICE.

Table Pta (ADDITIONAL THERMAL CAPACITY) WATER - OIL

	Pta (max)						
URO/W	P1H	P2H	P3H	P4H	B2H	B3H	B4H
4	107	53	38	27	43	30	23
7	187	93	62	46	75	53	42
12	320	160	107	80	128	91	71
18	480	240	160	120	192	137	107
29	1087	544	362	271	435	310	241
40	1500	750	500	375	600	428	333
50	1875	937	625	469	750	535	417

Table Pta (ADDITIONAL THERMAL CAPACITY) AIR - OIL

	Pta (max)						
URO/A	P1H	P2H	P3H	P4H	B2H	B3H	B4H
4	200	100	67	50	80	57	44
7	350	175	117	87	140	100	78
12	600	300	200	150	240	171	133
18	900	450	300	225	360	257	200
29	1450	725	483	362	580	414	322
40	2000	1000	667	500	800	571	444
50	2500	1250	833	625	1000	714	556

2.6 INPUT SPEED

The value of maximum input speed n_1 max shown in the table reflects continuous duty S1 (operation under steady loading for a period long enough to achieve thermal balance). We advise against using input speeds n_1 higher than 1800 rpm in continuous duty applications. Please note that reduction ratios and mounting positions may pose a constraint on input speed n_1 and may require dedicated lubrication systems. For intermittent duty, please contact MOTOVARIO TECHNICAL SERVICE.

Table MAXIMUM PERMISSIBLE INPUT SPEED n_1 max

n_1 max [rpm]							
PH - BH	P1H	P2H	P3H	P4H	B2H	B3H	B4H
180	2800	2800	2800	2800	2800	2800	2800
200	2400	2800	2800	2800	2400	2800	2800
225	2240	2800	2800	2800	2240	2800	2800
250	2000	2400	2800	2800	2000	2400	2800
280	1800	2240	2800	2800	1800	2000	2800
355	1400	1800	2400	2800	1400	1800	2000

2.7 LUBRICATION

2.7.1 Information

Proper lubrication makes for:

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

Motovario gear reducers of the PBH series have been designed for oil bath lubrication. For mounting position V5/V6 and with vertical input shaft, pressure-fed lubrication must be provided using a mechanical pump (external, driven directly by input or intermediate shaft) or a motor pump (external, driven by electric motor), see chapter DEVICES. Unless expressly requested, gear reducers are supplied dry, (to request oil supply, see table LUBRICANTS RECOMMENDED BY MOTOVARIO). In case of unavailability, please contact MOTOVARIO TECHNICAL SERVICE. To extend lubrication intervals and ambient temperature range, or reduce oil temperature, we recommend using **polyglycol or polyalphaolefin-based synthetic oil**. Choose the most appropriate oil depending on operating conditions:

- For light, intermittent duty without significant temperature fluctuations, use **mineral oil**;
- For heavy, continuous duty with significant temperature fluctuations, use **polyalphaolefin or polyglycol-based synthetic oil** depending on the application**. Polyglycol-based synthetic oils** mix with water and are not compatible with other oils, as their lubricating properties degrade very quickly. Use them with great care.

2.7.2 Lubricants

Viscosity is the most important and distinctive characteristic of lubricants, and depends on how thick the oil film between mating surfaces is. Oil viscosity decreases with increasing temperature. The less it decreases, the greater is the ability to lubricate under all temperature conditions. A measure of such variation is provided by the VISCOSITY RATING. Viscosity being equal (and at a certain temperature), lubricants with higher VISCOSITY RATINGS ensure better surface separation even at higher temperatures.
SAE specifications lay down oil viscosity limits expressed in SAE grades.

Specifications of LUBRICANTS RECOMMENDED BY MOTOVARIO

	Mineral oil	Polyalphaolefin synthetic oil (PAO)	Polyglicol synthetic oil (PG)
ENI	BLASIA	BLASIA SX	BLASIA S
SHELL	OMALA S2 G	OMALA HD	OMALA S4 WE
KLUBER	Kluberoil GEM 1-N	Klubersynth EG 4	Klubersynth GH 6
MOBIL	MOBILGEAR 600 XP	SHC	GLYGOYLE HE
CASTROL	ALPHA SP	TRIBOL 1510	ALPHASYN PG
BP	ENERGOL GR-XP	ENERSYN EPX	ENERSYN SG-XP
ESSO	SPARTAN EP	SPARTAN S-EP	GLYCOLUBE
TOTAL	CARTER EP	CARTER SH	CARTER SY

2.7 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	
	Mineral oil	Synthetic oil
	(0) ÷ (+40)	(-10) ÷ (+50)
> 210	150	150
210 ÷ 20	150	220
20 ÷ 5	220	320
<5	320	460

2.7.3 Quantity

For the gear reducers of the PBH series, it is always necessary to specify the mounting position.
The amount of oil in the table are merely indicative only and for the proper topping up you will have to refer to the level plug or the dipstick, if any. Any deviations in level can depend on construction tolerances but also by the placement of 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 are installed.

Table OIL CAPACITIES IN LITRES ~ [l]

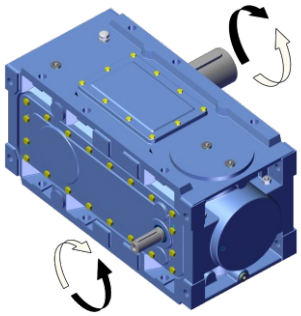
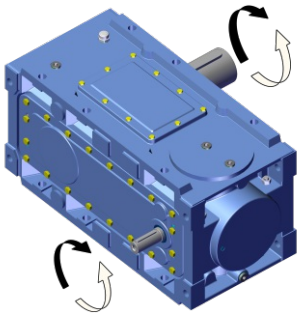
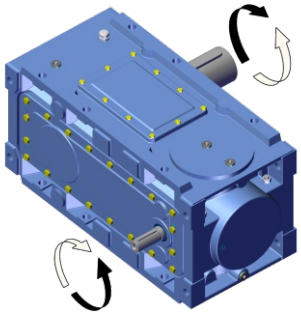
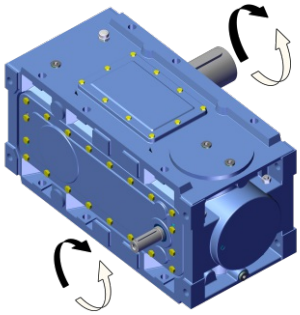
	P1H						P2H					
	180	200	225	250	280	355	180	200	225	250	280	355
B3	12	18	26	39	56	127	11	16	23	35	50	114
B8	12	18	26	39	56	127	11	16	23	35	50	114
B6	15	21	31	47	64	149	22	30	42	64	89	201
B7	21	28	37	56	94	169	19	26	33	51	85	152
V5	15	19	29	47	68	137	14	17	26	43	61	123
V6	15	19	29	47	68	137	14	17	26	43	61	123

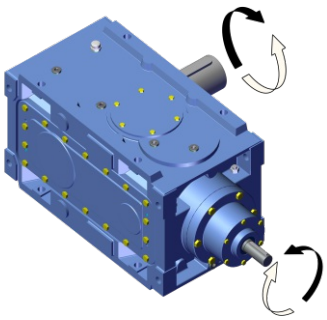
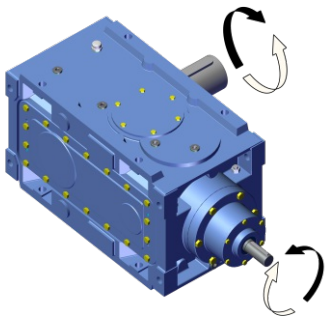
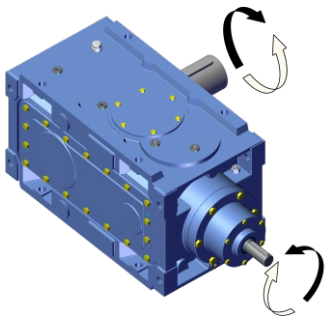
	P3H						P4H					
	180	200	225	250	280	355	180	200	225	250	280	355
B3	15	21	33	49	60	147	13	19	29	44	54	133
B8	15	21	33	49	60	147	13	19	29	44	54	133
B6	31	42	60	88	126	273	28	38	54	80	113	246
B7	27	33	49	74	99	216	24	30	44	66	89	195
V5	17	21	34	56	73	158	15	19	30	50	65	143
V6	17	21	34	56	73	158	15	19	30	50	65	143

	B2H						B3H						B4H					
	180	200	225	250	280	355	180	200	225	250	280	355	180	200	225	250	280	355
B3	13	20	28	42	61	140	12	18	26	39	56	127	16	24	36	54	66	162
B8	13	20	28	42	61	140	12	18	26	39	56	127	16	24	36	54	66	162
B6	16	23	34	51	70	164	25	33	46	71	99	224	34	46	65	97	139	301
B7	23	31	41	62	104	186	21	28	37	56	94	169	30	37	54	81	108	238
V5	17	21	32	52	74	150	15	19	29	47	68	137	19	23	37	61	80	174
V6	17	21	32	52	74	150	15	19	29	47	68	137	19	23	37	61	80	174

2.8 DIRECTION OF ROTATION

Gear reducers are supplied as “standard” with rotation as shown in the diagram.

P1H	P2H
	
P3H	**P4H**
	

B2H	B3H	B4H
		

2.9 OVERHUNG/AXIAL LOAD

2.9.1 Information

Permissible radial load [N] values are given in the performance table of the gear reducer and refer to the load applied at shaft midpoint in the worst conditions, in terms of angle of application and direction of rotation. RADIAL and THRUST LOADING tables for output shafts give the maximum permissible value according to the number of cycles of the output shaft. This value must never be exceeded as it is connected with casing strength. In the event of special conditions that exceed the ratings given in the catalogue, please contact MOTOVARIO TECHNICAL SERVICE and submit the full application data: direction of loading, direction of rotation of shaft, type of duty. For double-ended and hollow shafts, where radial loading is to be applied at both ends, maximum permissible loads must be determined according to specific operating conditions. When this is the case, please contact MOTOVARIO TECHNICAL SERVICE. Shaft radial loading is calculated by the following formula: **Fre=(2000*M*fz)/D≤Fr1 or Fr2** where:

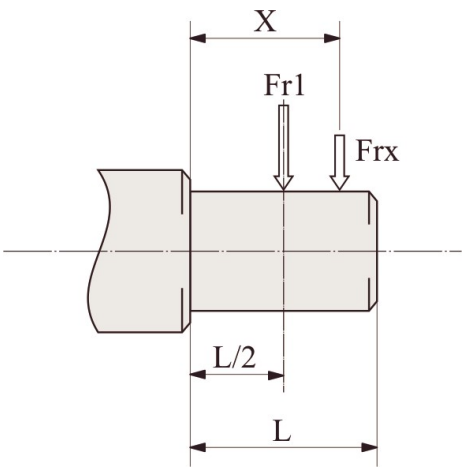
- **Fre** [N] Resultant radial load
- **M** [Nm] Shaft torque
- **D** [mm] Diameter of transmission element mounted on the shaft
- **Fr1**-**Fr2** [N] Maximum permissible radial loading (see relevant tables)
- **fz** = 1,1 gear pinion
  1,4 chain wheel
  1,7 v-pulley
  2,5 flat pulley

2.9.2 Input - Radial load

When the radial load is not on the centre line of the shaft, it is necessary to adjust the admissible radial load Fr1 with the formula:

$Frx=(Fr_1*a)/(b+x)$

- **a** , **b** = values given in the tables
- **x** = distance from the point of application of the load to the shaft shoulder ($x_{max} \leq L$)



(**Fr1) Fr1 is the permissible radial load value from the gear reducer in continuous service, applied at the centre line of the shaft, considering input speed n1 = 1400 rpm.

P1H	180	200	225	250	280	355
a	338	386	419	449	503	605
b	283	316	349	379	418	510
Fr1 (**)	10000	15000	15000	25000	28000	35000

2.9 OVERHUNG/AXIAL LOAD

(**Fr1) Fr1 is the permissible radial load value from the gear reducer in continuous service, applied at the centre line of the shaft, considering input speed n1 = 1400 rpm.

P2H	180	200	225	250	280	355
a	338	384	430	460	506	618
b	283	329	360	390	436	533
Fr1 (**)	3000	4000	5500	10000	12000	21000

P3H	180	200	225	250	280	355
a	329	363	415	448	490	608
b	289	323	360	393	420	538
Fr1 (**)	3000	4000	5000	9000	12000	20000

P4H	180	200	225	250	280	355
a	315	355	396	439	480	585
b	285	325	356	399	425	530
Fr1 (**)	2300	2500	3000	2200	3200	4500

B2H	180	200	225	250	280	355
a	249	270	318	326	334	417
b	194	215	248	256	264	332
Fr1 (**)	7000	8000	12000	13000	15000	20000

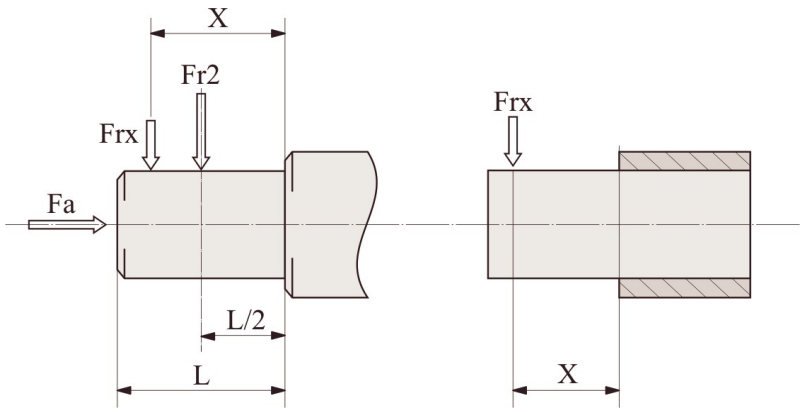
B3H	180	200	225	250	280	355
a	190	204	249	270	318	334
b	150	164	194	215	248	264
Fr1 (**)	3500	4500	11000	12000	14000	18000

B4H	180	200	225	250	280	355
a	156	154	190	204	249	318
b	126	124	150	164	194	248
Fr1 (**)	3000	3800	4500	6000	13000	17000

2.9.3 Output - Radial/Axial load

When the radial load is not on the centre line of the shaft, it is necessary to adjust the admissible radial load Fr2 with the formula:
Frx=(Fr2*a)/(b+x)

- **a** , **b** = values given in the tables
- **x** = distance from the point of application of the load to the shaft shoulder ($x_{max} \leq L$)



(**Fr2 max) Maximum permissible value for gear reducer under static conditions and/or for short periods of duty. For continuous-duty radial loading, please verify the values given in the performance tables according to casing, shaft and bearings.

If both radial and thrust loads are applied at the same time, only 20% of the thrust load given in the table is allowed.
In the event of mounting on the short side, please contact MOTOVARIO TECHNICAL SERVICE.

P1H -P2H B2H	180	200	225	250	280	355
a	352	391	430	467	518	636
b	302	336	370	402	448	546
Fr2 max (**)	67000	72000	80000	95000	125000	200000

P3H -P4H B3H - B4H	180	200	225	250	280	355
a	360	399	439	477	528	643
b	310	344	379	412	458	553
Fr2 max (**)	67000	72000	80000	95000	125000	200000

2.9 OVERHUNG/AXIAL LOAD

P1H - P2H - P3H - P4H B2H - B3H - B4H				
Size 180				
n2*Lh	Fr2_100	Fr2_75	Fr2_50	Fa_100
6300000	14200	19900	21900	9200
5000000	14500	20500	22600	9400
4000000	15000	21100	23300	9800
3150000	15800	21800	24000	10200
2500000	18000	22500	24700	10700
2000000	21000	23700	26000	11000
1600000	27800	24900	27400	11200
1250000	30000	26200	28800	11400
1000000	31800	27600	30400	11600
800000	32700	30700	33700	11900
630000	33800	34100	37500	12100
500000	35800	37900	41600	12300
400000	42200	44500	49000	13000
315000	49600	52400	57600	13600
250000	52900	58200	64000	14300

n2*Lh = Number of cycles of output shaft
Fr2_100 = Radial force with 100% M_n
Fr2_75 = Radial force with 75% M_n
Fr2_50 = Radial force with 50% M_n
Fa_100 = Thrust force with 100% M_n

(**Fr2 max) Maximum permissible value for gear reducer under static conditions and/or for short periods of duty. For continuous-duty radial loading, please verify the values given in the performance tables according to casing, shaft and bearings.

If both radial and thrust loads are applied at the same time, only 20% of the thrust load given in the table is allowed.
In the event of mounting on the short side, please contact MOTOVARIO TECHNICAL SERVICE.

2.9 OVERHUNG/AXIAL LOAD

P1H - P2H - P3H - P4H B2H - B3H - B4H				
Size 200				
n2*Lh	Fr2_100	Fr2_75	Fr2_50	Fa_100
6300000	24800	27300	29400	10000
5000000	25300	27800	30000	10200
4000000	25800	28400	30600	10500
3150000	26300	29000	31300	10700
2500000	30400	33400	36100	10900
2000000	33300	36600	42100	11100
1600000	34000	37400	40400	11300
1250000	34700	38200	41200	11600
1000000	35400	38900	42000	11800
800000	36100	39700	42900	12000
630000	36900	40500	43800	12300
500000	38100	41900	45200	12700
400000	43500	47900	51700	14500
315000	51100	56300	60800	17000
250000	61700	65400	69400	20600

n2*Lh = Number of cycles of output shaft
Fr2_100 = Radial force with 100% M_n
Fr2_75 = Radial force with 75% M_n
Fr2_50 = Radial force with 50% M_n
Fa_100 = Thrust force with 100% M_n

(**Fr2 max) Maximum permissible value for gear reducer under static conditions and/or for short periods of duty. For continuous-duty radial loading, please verify the values given in the performance tables according to casing, shaft and bearings.

If both radial and thrust loads are applied at the same time, only 20% of the thrust load given in the table is allowed.
In the event of mounting on the short side, please contact MOTOVARIO TECHNICAL SERVICE.

2.9 OVERHUNG/AXIAL LOAD

P1H - P2H - P3H - P4H B2H - B3H - B4H				
Size 225				
n2*Lh	Fr2_100	Fr2_75	Fr2_50	Fa_100
6300000	32200	34100	36200	16000
5000000	33200	35200	37300	16100
4000000	34200	36200	38400	16300
3150000	35300	37400	39600	16500
2500000	36300	38500	40800	16600
2000000	37500	39700	42100	16800
1600000	38600	40900	43400	17000
1250000	39800	42200	44700	17100
1000000	41100	43500	46100	17300
800000	42300	44900	47600	17500
630000	43600	46200	49000	17700
500000	48500	51400	54500	19400
400000	53900	57100	60500	19700
315000	59900	63400	67200	20000
250000	66200	70100	74300	22100

n2*Lh = Number of cycles of output shaft
Fr2_100 = Radial force with 100% M_n
Fr2_75 = Radial force with 75% M_n
Fr2_50 = Radial force with 50% M_n
Fa_100 = Thrust force with 100% M_n

(**Fr2 max) Maximum permissible value for gear reducer under static conditions and/or for short periods of duty. For continuous-duty radial loading, please verify the values given in the performance tables according to casing, shaft and bearings.

If both radial and thrust loads are applied at the same time, only 20% of the thrust load given in the table is allowed.
In the event of mounting on the short side, please contact MOTOVARIO TECHNICAL SERVICE.

2.9 OVERHUNG/AXIAL LOAD

P1H - P2H - P3H - P4H B2H - B3H - B4H				
Size 250				
n2*Lh	Fr2_100	Fr2_75	Fr2_50	Fa_100
6300000	39400	43400	46200	18700
5000000	40000	44000	46900	19000
4000000	40600	44700	47600	19300
3150000	41300	45400	48300	19600
2500000	43600	46300	49000	19900
2000000	44300	47000	49800	20200
1600000	45000	47700	50500	20500
1250000	45700	48400	51300	20800
1000000	46400	49100	52100	21200
800000	47100	49900	52900	21500
630000	47800	50600	53700	21800
500000	49700	59700	71600	22100
400000	53400	64100	76900	22500
315000	62200	74600	89500	22800
250000	69500	83400	91300	23200

n2*Lh = Number of cycles of output shaft
Fr2_100 = Radial force with 100% M_n
Fr2_75 = Radial force with 75% M_n
Fr2_50 = Radial force with 50% M_n
Fa_100 = Thrust force with 100% M_n

(**Fr2 max) Maximum permissible value for gear reducer under static conditions and/or for short periods of duty. For continuous-duty radial loading, please verify the values given in the performance tables according to casing, shaft and bearings.

If both radial and thrust loads are applied at the same time, only 20% of the thrust load given in the table is allowed.
In the event of mounting on the short side, please contact MOTOVARIO TECHNICAL SERVICE.

2.9 OVERHUNG/AXIAL LOAD

P1H - P2H - P3H - P4H B2H - B3H - B4H				
Size 280				
n2*Lh	Fr2_100	Fr2_75	Fr2_50	Fa_100
6300000	60900	70100	82800	20500
5000000	61900	71100	84500	20800
4000000	62800	72200	86200	21100
3150000	63800	73300	88000	21400
2500000	65300	71800	82600	21800
2000000	66300	72900	83900	22100
1600000	67300	74000	85100	22400
1250000	68300	75200	86400	22800
1000000	69400	76300	87800	23100
800000	70400	77500	89100	23500
630000	71500	78700	90400	23800
500000	78000	85800	98700	26000
400000	84500	93000	106900	28200
315000	88200	97000	111600	29400
250000	91500	109700	122700	30500

n2*Lh = Number of cycles of output shaft
Fr2_100 = Radial force with 100% M_n
Fr2_75 = Radial force with 75% M_n
Fr2_50 = Radial force with 50% M_n
Fa_100 = Thrust force with 100% M_n

(**Fr2 max) Maximum permissible value for gear reducer under static conditions and/or for short periods of duty. For continuous-duty radial loading, please verify the values given in the performance tables according to casing, shaft and bearings.

If both radial and thrust loads are applied at the same time, only 20% of the thrust load given in the table is allowed.
In the event of mounting on the short side, please contact MOTOVARIO TECHNICAL SERVICE.

2.9 OVERHUNG/AXIAL LOAD

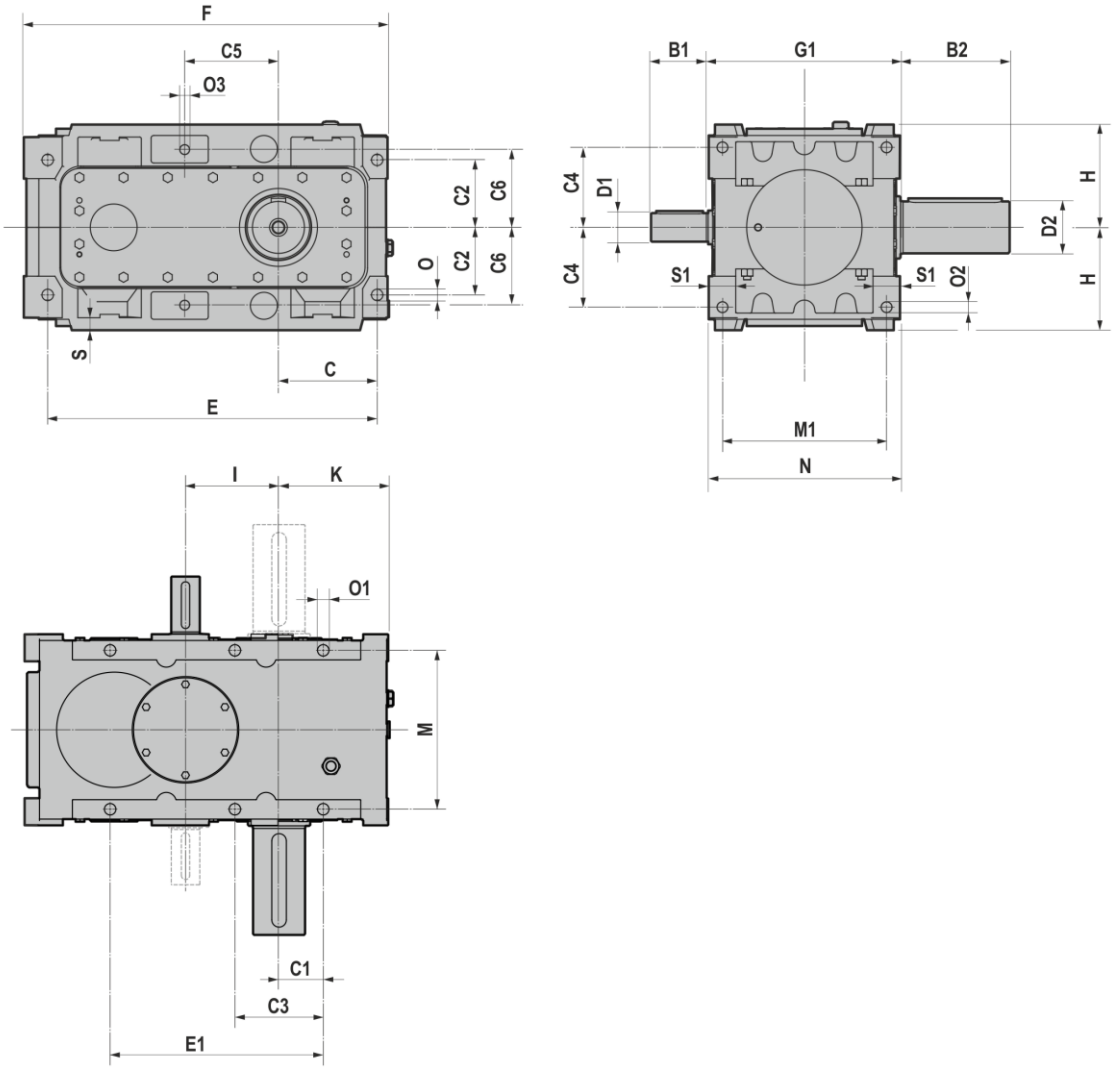
P1H - P2H - P3H - P4H B2H - B3H - B4H				
Size 355				
n2*Lh	Fr2_100	Fr2_75	Fr2_50	Fa_100
6300000	57400	68900	86100	27900
5000000	63800	76500	95700	28200
4000000	70900	85100	106300	28500
3150000	78800	94500	118100	28800
2500000	82500	99000	123800	29100
2000000	105000	126000	157500	29400
1600000	120000	128300	161000	29700
1250000	126000	131600	162600	30000
1000000	117000	135000	164300	30300
800000	120000	138500	165900	30600
630000	123500	142000	167600	30900
500000	130000	149500	176400	32500
400000	143000	164500	179900	35800
315000	149500	171900	188900	37400
250000	163800	188400	198400	41000

n2*Lh = Number of cycles of output shaft
Fr2_100 = Radial force with 100% M_n
Fr2_75 = Radial force with 75% M_n
Fr2_50 = Radial force with 50% M_n
Fa_100 = Thrust force with 100% M_n

(**Fr2 max) Maximum permissible value for gear reducer under static conditions and/or for short periods of duty. For continuous-duty radial loading, please verify the values given in the performance tables according to casing, shaft and bearings.

If both radial and thrust loads are applied at the same time, only 20% of the thrust load given in the table is allowed.
In the event of mounting on the short side, please contact MOTOVARIO TECHNICAL SERVICE.

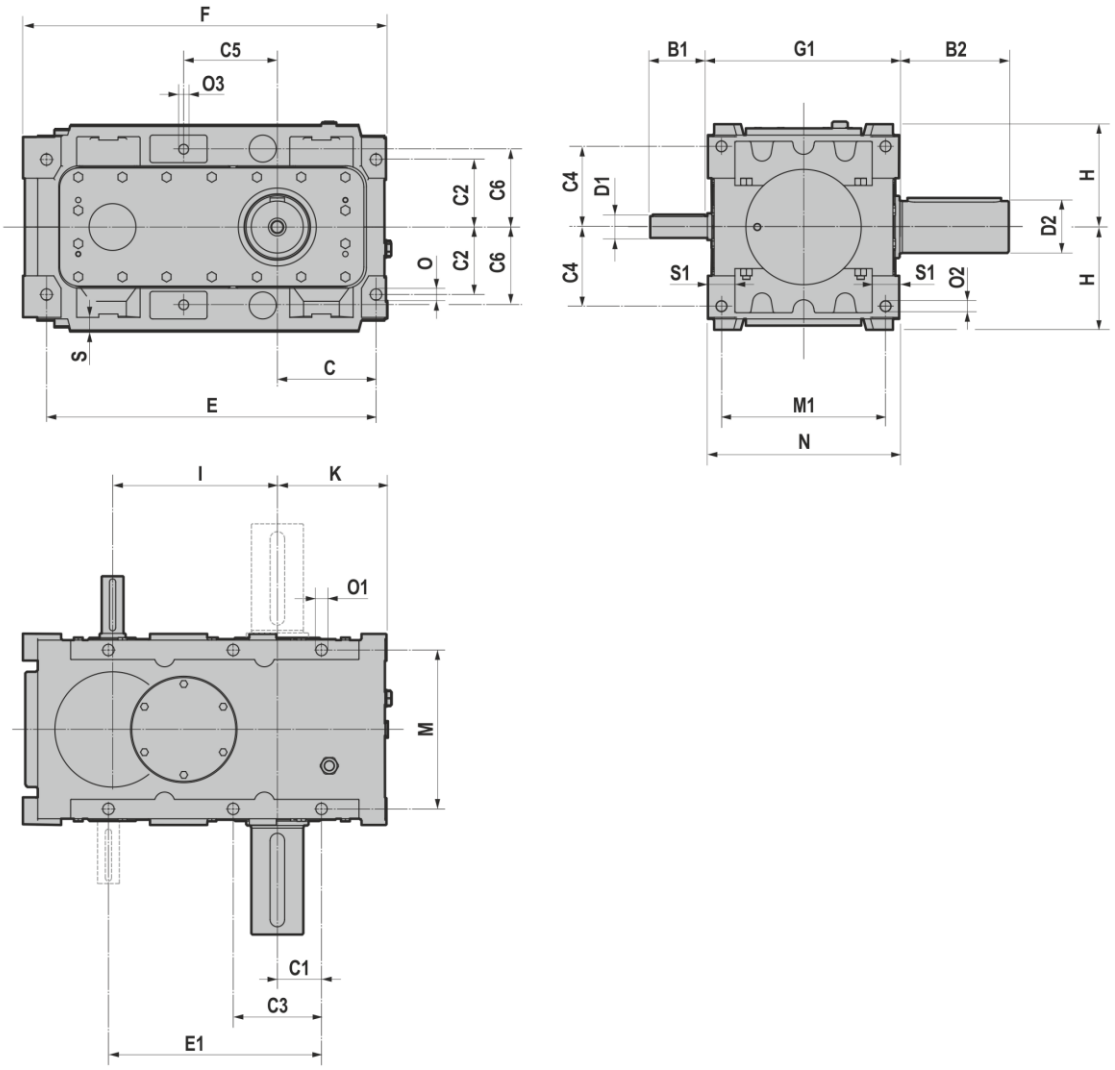
3.1.1 P1H



P1H	D2	B2	$i_n \leq 4$		$i_n > 4$		C	C1	C2	C3	C4	C5	C6	E	E1
			D1	B1	D1	B1									
180	100	210	60	140	55	110	190	85	130	-	157	180	150	634	410
200	110	210	65	140	60	140	200	95	145	190	115	190	165	674	450
225	120	210	70	140	65	140	220	100	150	200	189	205	185	753	503
250	130	250	80	170	70	140	255	125	210	250	251	220	246	830	570
280	140	250	90	170	80	170	270	135	230	270	265	270	230	966	635
355	180	300	110	190	100	190	380	200	285	400	330	365	285	1220	825

P1H	F	G1	H	I	K	M	M1	N	O	O1	O2	O3	S	S1
180	700	370	198	180	210	306	312	360	22	22	M22	M18	30	48
200	745	410	220	200	223	335	347	400	26	22	M22	M20	32	53
225	832	450	243	225	248	366	383	440	28	24	M24	M22	35	57
250	915	490	300	250	285	386	410	480	28	24	M24	M24	32	67
280	1060	540	320	280	308	430	440	530	30	26	M24	M24	34	80
355	1340	640	390	355	430	495	570	630	35	35	M33	M30	45	60

3.1.2 P2H

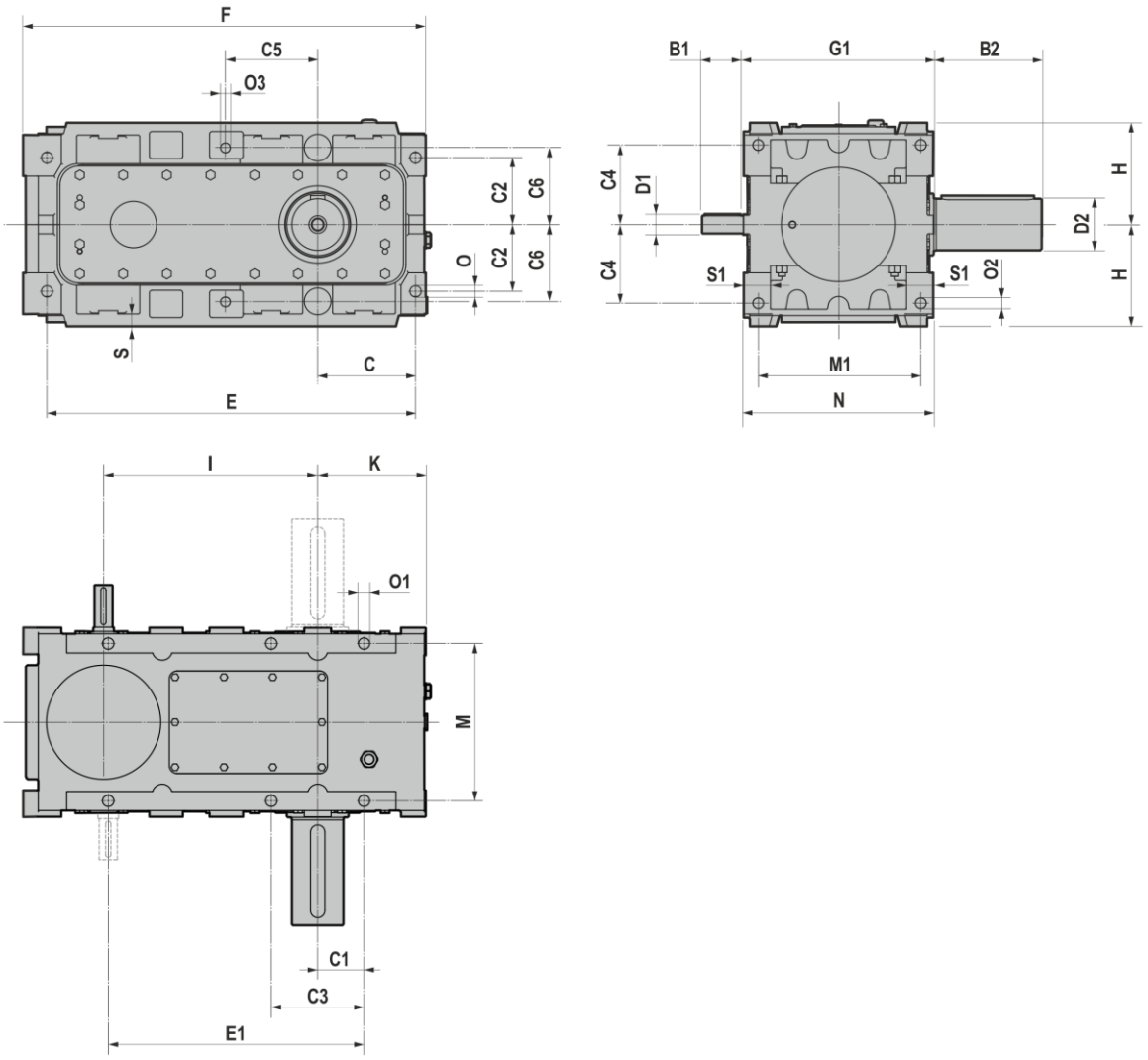


P2H	D2	B2	D1	B1	C	C1	C2	C3	C4	C5	C6	E	E1	F
180	100	210	48	110	190	85	130	-	157	180	150	634	410	700
200	110	210	55	110	200	95	145	190	115	190	165	674	450	745
225	120	210	60	140	220	100	150	200	189	205	185	753	503	832
250	130	250	65	140	255	125	210	250	251	220	246	830	570	915
280	140	250	70	140	270	135	230	270	265	270	230	966	635	1060
355	180	300	90	170	380	200	285	400	330	365	285	1220	825	1340

P2H	G1	H	I	K	M	M1	N	O	O1	O2	O3	S	S1
180	370	198	317	210	306	312	360	22	22	M22	M18	30	48
200	410	220	352	223	335	347	400	26	22	M22	M20	32	53
225	450	243	397	248	366	383	440	28	24	M24	M22	35	57
250	490	300	440	285	386	410	480	28	24	M24	M24	32	67
280	540	320	493	308	430	440	530	30	26	M24	M24	34	80
355	640	390	625	430	495	570	630	35	35	M33	M30	45	60

3.1 REDUCERS/GEARED MOTORS

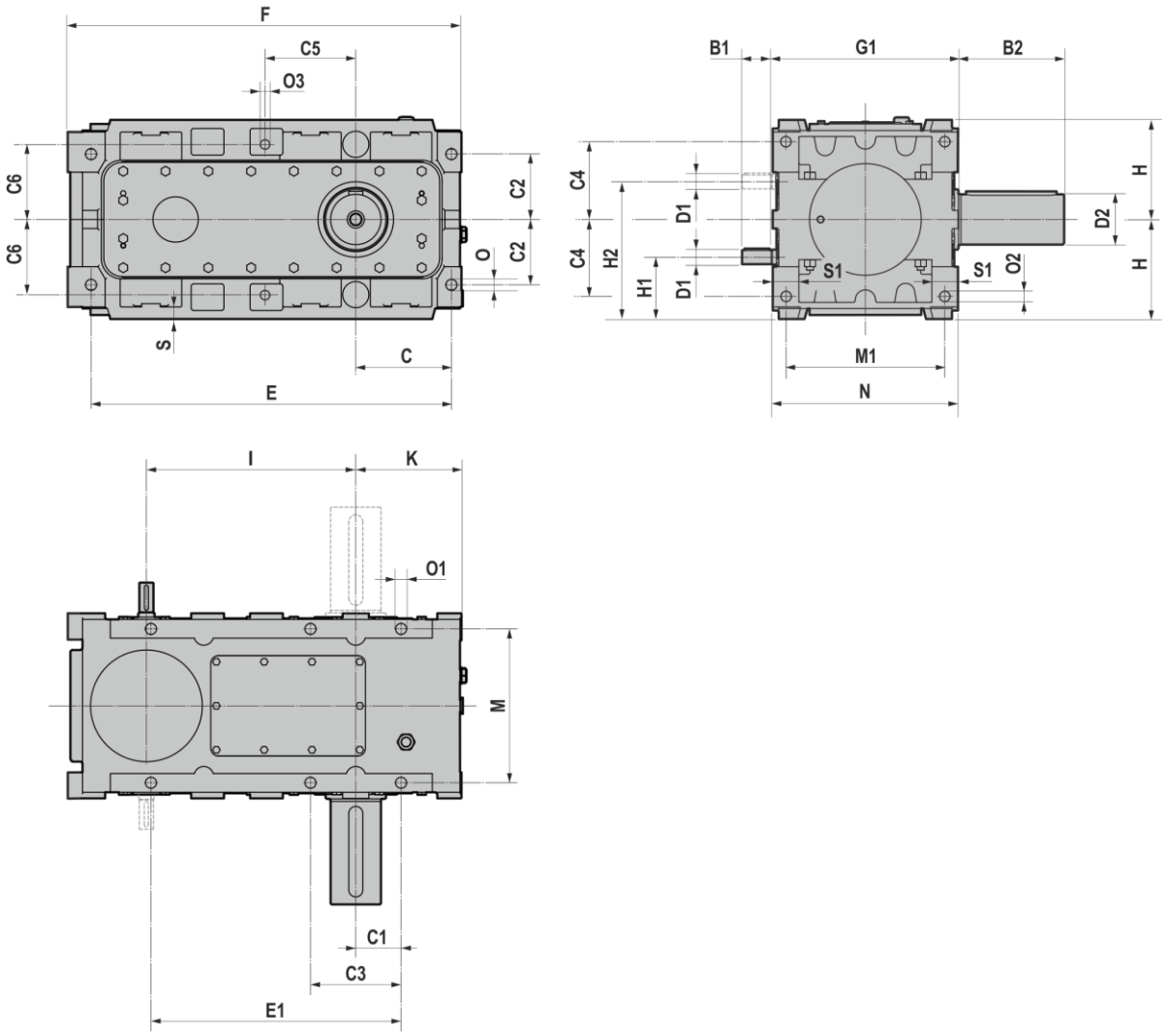
3.1.3 P3H



P3H	D2	B2	D1	B1	C	C1	C2	C3	C4	C5	C6	E	E1	F
180	100	210	38	80	190	90	130	180	157	180	150	716	497	782
200	110	210	42	110	200	95	145	190	171	190	165	785	560	855
225	120	210	48	110	220	100	150	200	189	205	185	868	618	951
250	130	250	55	110	255	125	210	270	251	220	246	970	710	1058
280	140	250	60	140	270	135	230	270	265	270	230	1070	790	1170
355	180	300	70	140	380	200	285	400	330	365	285	1395	1030	1520

P3H	G1	H	I	K	M	M1	N	O	O1	O2	O3	S	S1
180	370	198	416	210	306	312	360	22	22	M22	M18	30	48
200	410	220	462	223	335	347	400	26	22	M22	M20	32	53
225	450	243	527	248	366	383	440	28	24	M24	M22	35	57
250	490	300	577	285	386	410	480	28	24	M24	M24	32	67
280	540	320	647	308	430	470	530	30	26	M24	M24	34	60
355	640	390	820	430	495	570	630	35	35	M33	M30	45	60

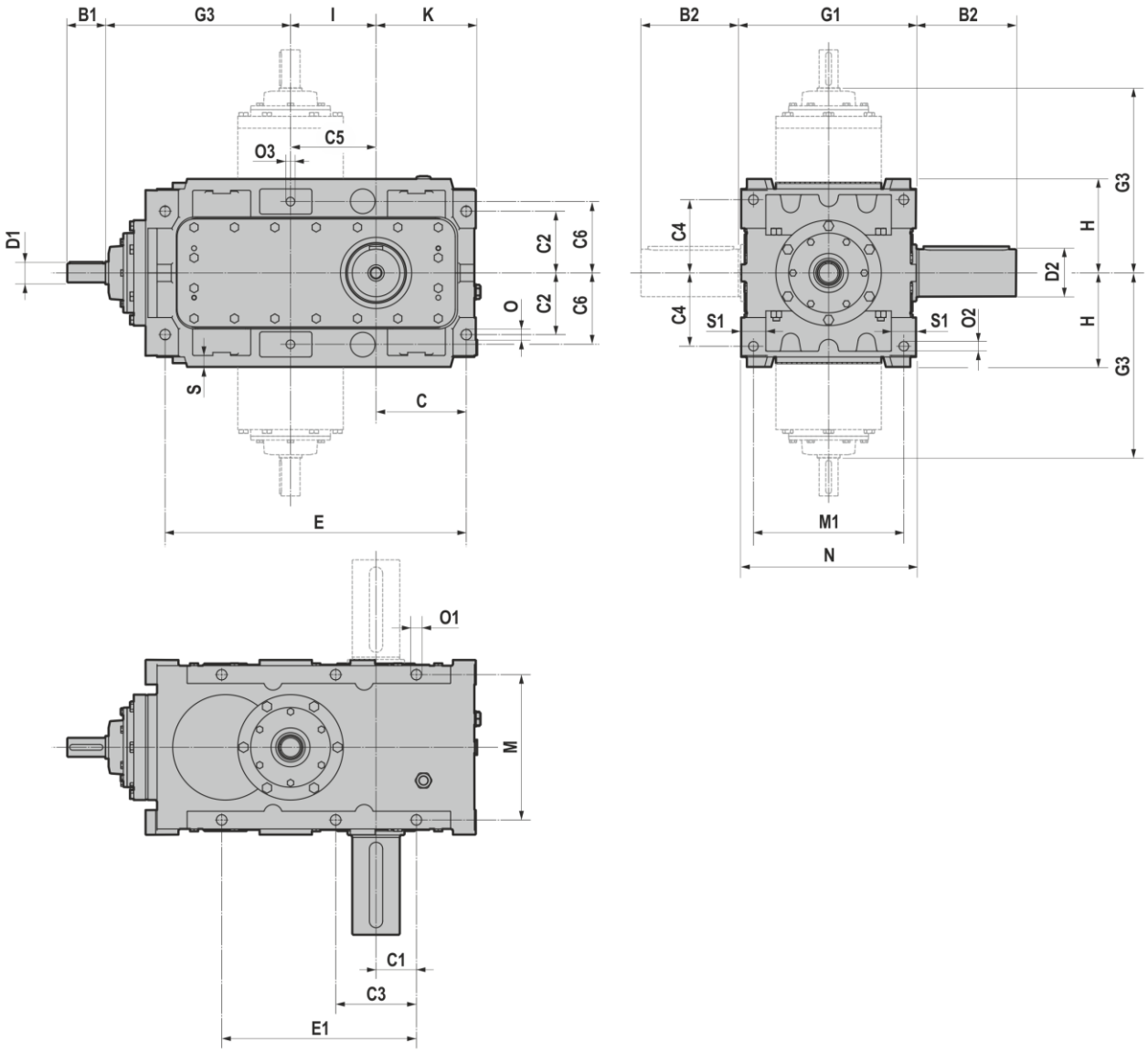
3.1.4 P4H



P4H	D2	B2	D1	B1	C	C1	C2	C3	C4	C5	C6	E	E1	F	G1
180	100	210	28	60	190	90	130	180	157	180	150	716	497	782	370
200	110	210	28	60	200	95	145	190	171	190	165	785	560	855	410
225	120	210	32	80	220	100	150	200	189	205	185	868	618	951	450
250	130	250	38	80	255	125	210	270	251	220	246	970	710	1058	490
280	140	250	42	110	270	135	230	270	265	270	230	1070	790	1170	540
355	180	300	55	110	380	200	285	400	330	365	285	1395	1030	1520	640

P4H	H	H1	H2	I	K	M	M1	N	O	O1	O2	O3	S	S1
180	198	123	273	416	210	306	312	360	22	22	M22	M18	30	48
200	220	136	304	462	223	335	347	400	26	22	M22	M20	32	53
225	243	164	340	527	248	366	383	440	28	24	M24	M22	35	57
250	300	200	400	577	285	386	410	480	28	24	M24	M24	32	67
280	320	212	428	599,5	308	430	470	530	30	26	M24	M24	34	60
355	390	254	526	759,1	430	495	570	630	35	35	M33	M30	45	60

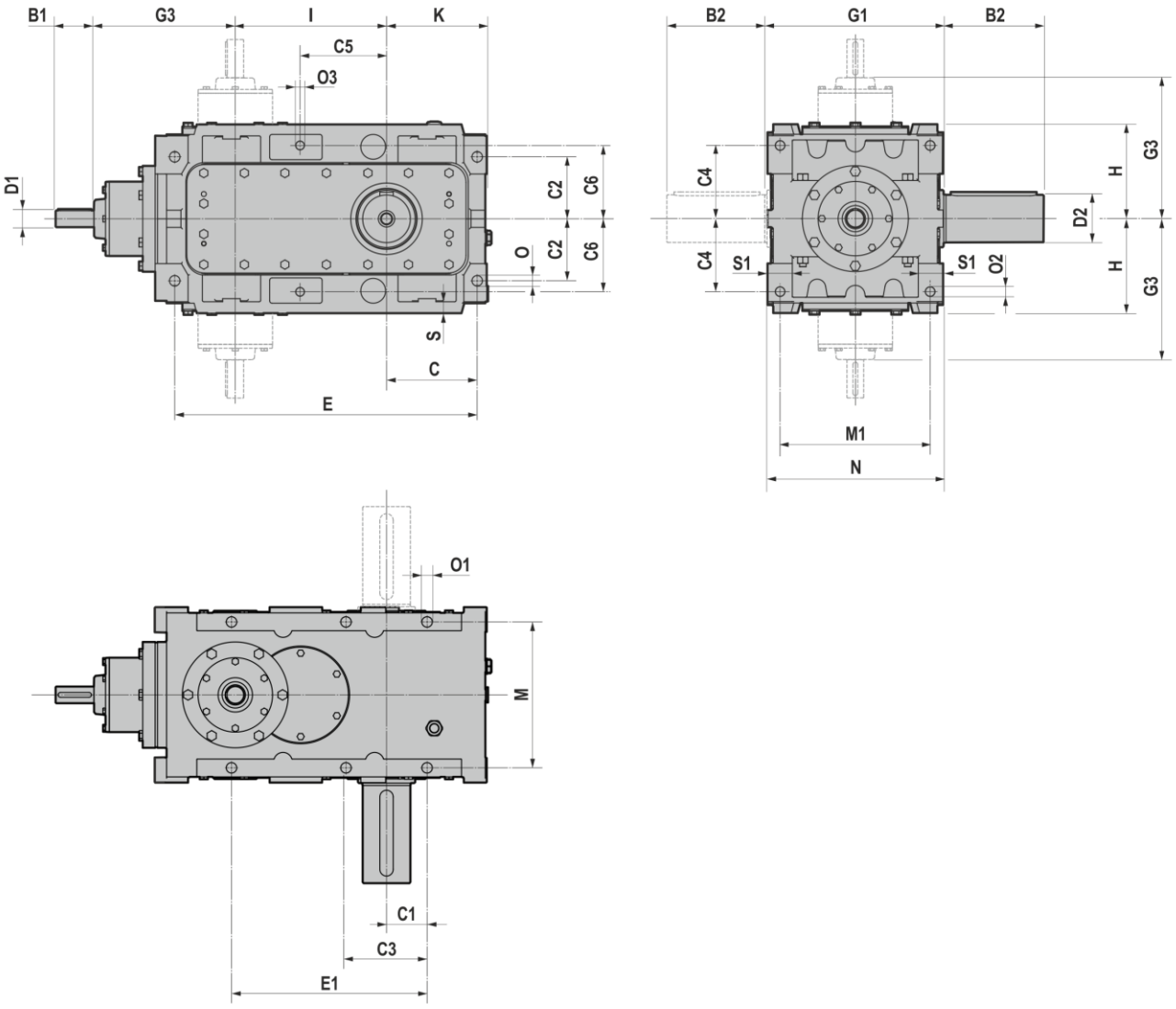
3.1.5 B2H



B2H	D2	B2	D1	B1	C	C1	C2	C3	C4	C5	C6	E	E1	G1
180	100	210	42	110	190	85	130	-	157	180	150	634	410	370
200	110	210	48	110	200	95	145	190	115	190	165	674	450	410
225	120	210	60	140	220	100	150	200	189	205	185	753	503	450
250	130	250	65	140	255	125	210	250	251	220	246	830	570	490
280	140	250	70	140	270	135	230	270	265	270	230	966	635	540
355	180	300	90	170	380	200	285	400	330	365	285	1220	825	640

B2H	G3	H	I	K	M	M1	N	O	O1	O2	O3	S	S1
180	390	198	180	210	306	312	360	22	22	M22	M18	30	48
200	453	220	200	223	335	347	400	26	22	M22	M20	32	53
225	538	243	225	248	366	383	440	28	24	M24	M22	35	57
250	556	300	250	285	386	410	480	28	24	M24	M24	32	67
280	586	320	280	308	430	440	530	30	26	M24	M24	34	60
355	710	390	355	430	495	570	630	35	35	M33	M30	45	60

3.1.6 B3H

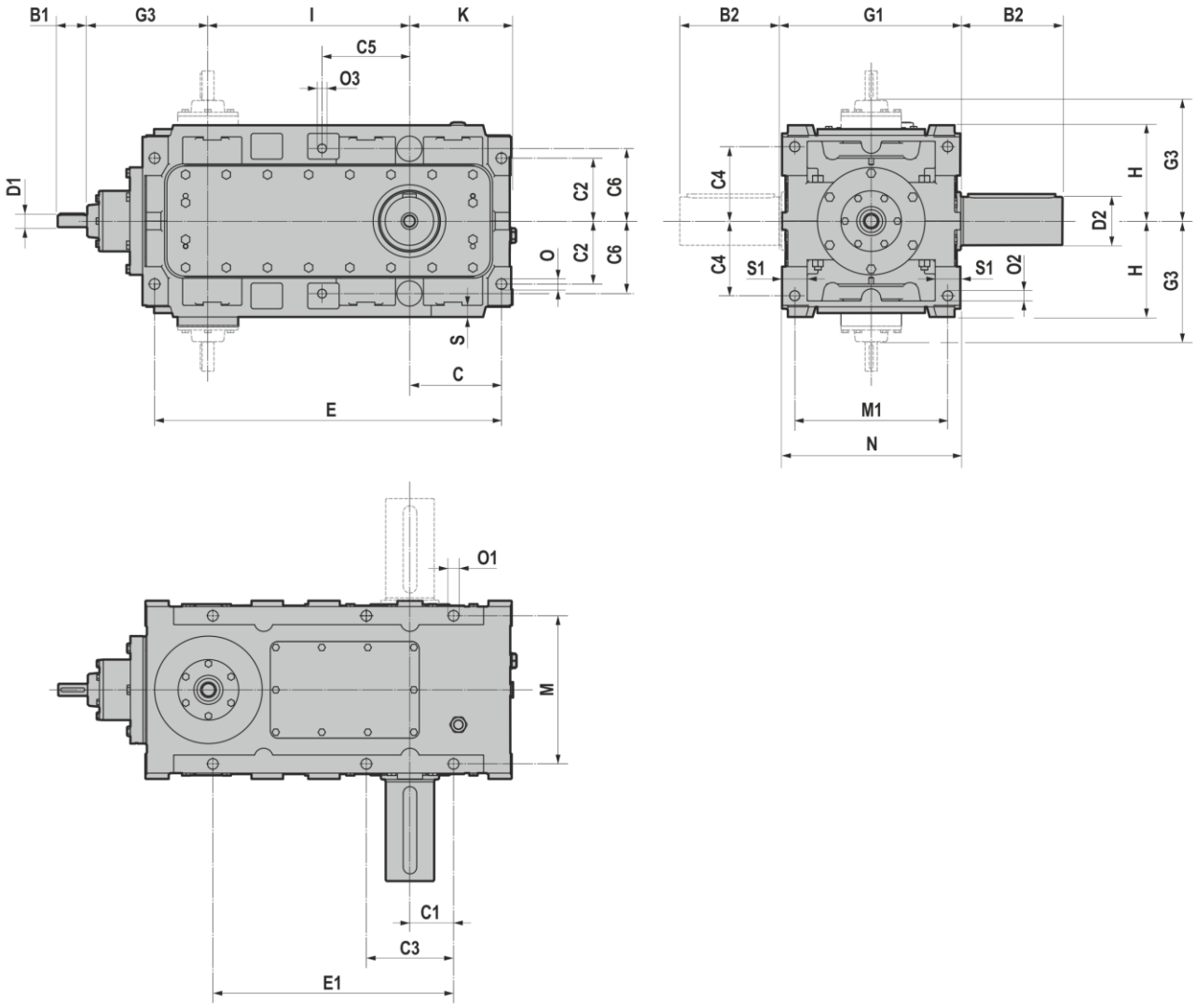


B3H	D2	B2	D1	B1	C	C1	C2	C3	C4	C5	C6	E	E1	G1
180	100	210	38	80	190	85	130	-	157	180	150	634	410	370
200	110	210	38	80	200	95	145	190	115	190	165	674	450	410
225	120	210	42	110	220	100	150	200	189	205	185	753	503	450
250	130	250	48	110	255	125	210	250	251	220	246	830	570	490
280	140	250	60	140	270	135	230	270	265	270	230	966	635	540
355	180	300	70	140	380	200	285	400	330	365	285	1220	825	640

B3H	G3	H	I	K	M	M1	N	O	O1	O2	O3	S	S1
180	297	198	317	210	306	312	360	22	22	M22	M18	30	48
200	328	220	352	223	335	347	400	26	22	M22	M20	32	53
225	390	243	397	248	366	383	440	28	24	M24	M22	35	57
250	453	300	440	285	386	410	480	28	24	M24	M24	32	67
280	538	320	493	308	430	440	530	30	26	M24	M24	34	60
355	586	390	625	430	495	570	630	35	35	M33	M30	45	60

3.1 REDUCERS/GEARED MOTORS

3.1.7 B4H



B4H	D2	B2	D1	B1	C	C1	C2	C3	C4	C5	C6	E	E1	G1
180	100	210	28	60	190	90	130	180	157	180	150	716	497	370
200	110	210	28	60	200	95	145	190	171	190	165	785	560	410
225	120	210	38	80	220	100	150	200	189	205	185	868	618	450
250	130	250	38	80	255	125	210	270	251	220	246	970	710	490
280	140	250	42	110	270	135	230	270	265	270	230	1070	790	540
355	180	300	60	140	380	200	285	400	330	365	285	1395	1030	640

B4H	G3	H	I	K	M	M1	N	O	O1	O2	O3	S	S1
180	250	198	416	210	306	312	360	22	22	M22	M18	30	48
200	253	220	462	223	335	347	400	26	22	M22	M20	32	53
225	377	243	527	248	366	383	440	28	24	M24	M22	35	57
250	328	300	577	285	386	410	480	28	24	M24	M24	32	67
280	390	320	647	308	430	470	530	30	26	M24	M24	34	60
355	538	390	820	430	495	570	630	35	35	M33	M30	45	60

3.2 WEIGHTS

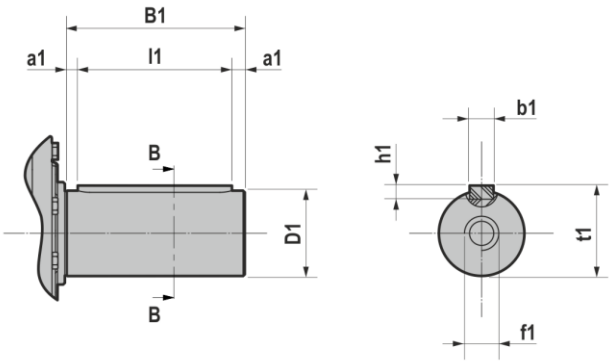
The values reported in the tables are referred to the weight of the gearbox without lubricant.

PH	[- kg]			
	P1H	P2H	P3H	P4H
180	365	385	412	475
200	390	480	475	540
225	545	625	625	710
250	750	855	1050	1170
280	910	930	1320	1455
355	1315	1865	2090	2335

BH	[- kg]		
	B2H	B3H	B4H
180	375	435	475
200	470	510	545
225	620	640	720
250	810	980	1190
280	950	1070	1470
355	1510	1970	2360

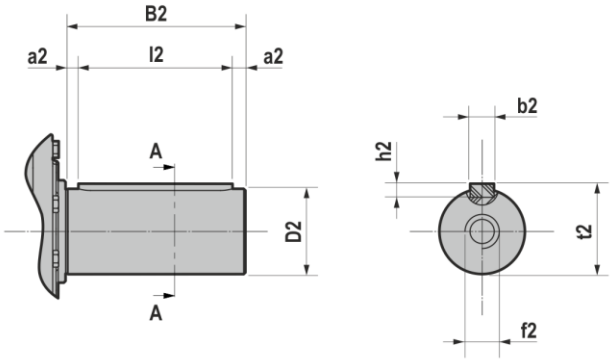
3.3 SHAFT END

3.3.1 Input shaft end



D1	B1	b1	t1	f1	b1xh1xl1	a1
28 k6	60	8	31	M10	8x7x50	5
32 k6	80	10	35	M12	10x8x70	5
38 k6	80	10	41	M12	10x8x70	5
42 k6	110	12	45	M16	12x8x100	5
48 k6	110	14	51,5	M16	14x9x100	5
55 m6	110	16	59	M20	16x10x100	5
60 m6	140	16	64	M20	16x11x130	5
65 m6	140	18	69	M20	18x11x130	5
70 m6	140	20	74,5	M20	20x12x130	5
80 m6	170	22	85	M20	22x14x150	10
90 m6	170	25	95	M24	25x14x150	10
110 m6	190	28	116	M24	28x16x160	15

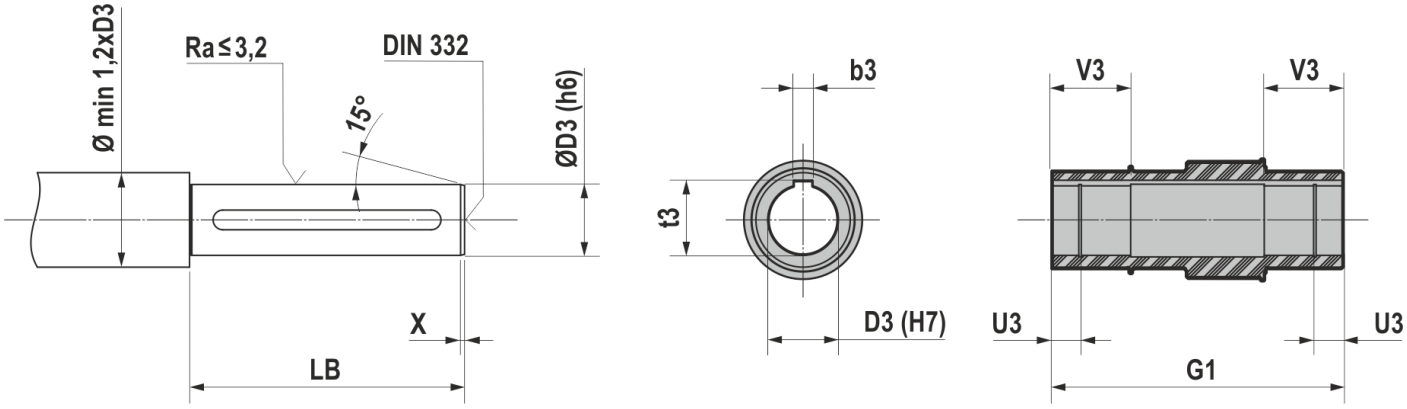
3.3.2 Output shaft end



PH - BH	D2 m6	B2	b2	t2	f2	b2xh2xl2	a2
180	100	210	28	106	M24	28x16x180	15
200	110	210	28	116	M24	28x16x180	15
225	120	210	32	127	M24	32x18x180	15
250	130	250	32	137	M24	32x18x240	5
280	140	250	36	148	M30	36x20x220	15
355	180	300	45	190	M30	45x25x250	25

Dimension also valid for double output shaft version.

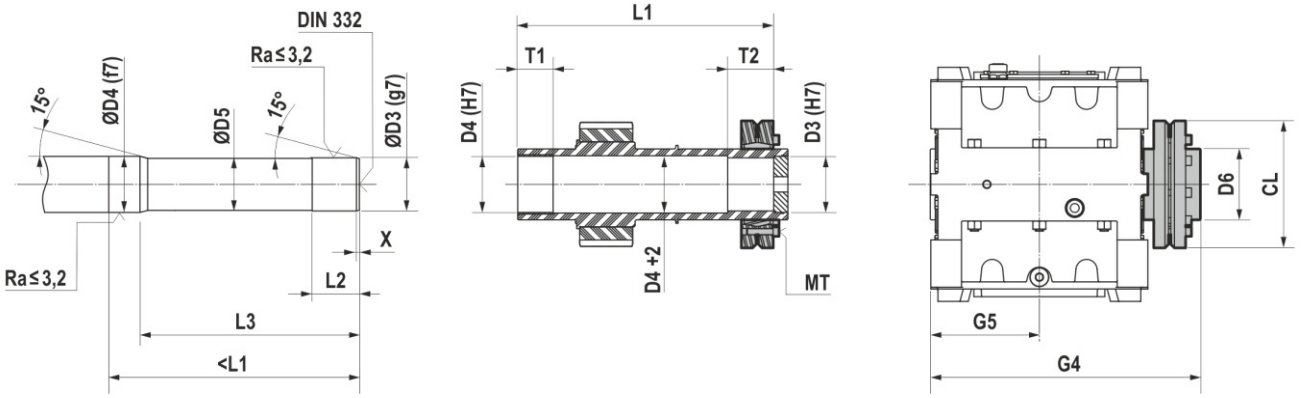
4.1.1 Hollow output shaft with keyway



PH - BH	D3 (H7/h6)	b3	t3	G1	U3	V3	LB	X
180	90	25	95,4	370	34	80	368	5
200	100	28	106,4	410	40	95	408	5
225	115	32	122,4	450	44	102	448	5
250	125	32	132,4	490	44	105	488	5
280	140	36	148,4	540	50	122	538	5
355	170	40	179,4	640	55	150	638	5

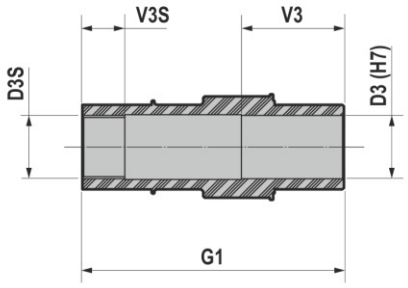
4.1.2 Hollow output shaft with shrink disc

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



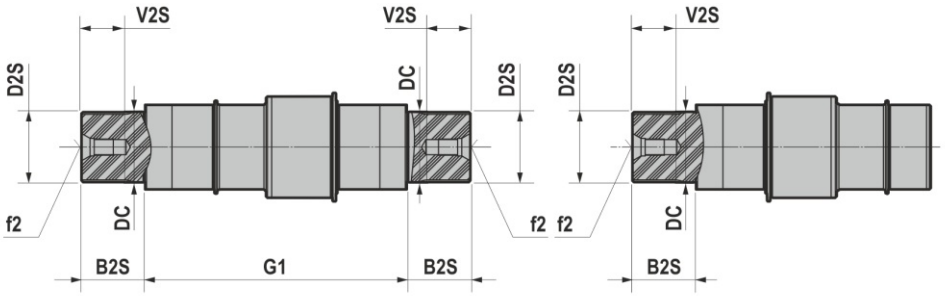
PH - BH	D3 (H7/g7)	D4 (H7/f7)	D5	D6	CL	G4	G5	L1	L2	L3	T1	T2	X	M_T 12.9 [Nm]
180	90	95	88	115	188	458	185	434	80	372	60	78	5	70
200	105	106	103	125	215	494	205	469	80	389	75	76	5	117
225	110	112	108	140	230	564	225	537	85	452	80	82	5	117
250	120	122	118	155	265	622	245	592	120	492	80	110	5	117
280	130	132	128	170	290	660	270	630	120	530	80	110	5	293
355	170	174	152	220	350	780	320	750	160	640	90	140	5	293

4.1.3 Splined hollow output shaft



PH - BH	D3S (DIN5480)	D3	G1	V3	V3S
180	90x3x28	90	370	145	60
200	100x3x32	100	410	160	70
225	110x4x26	115	450	184	80
250	120x4x28	125	490	185	95
280	140x5x26	140	540	223	110
355	160x5x30	170	640	260	150

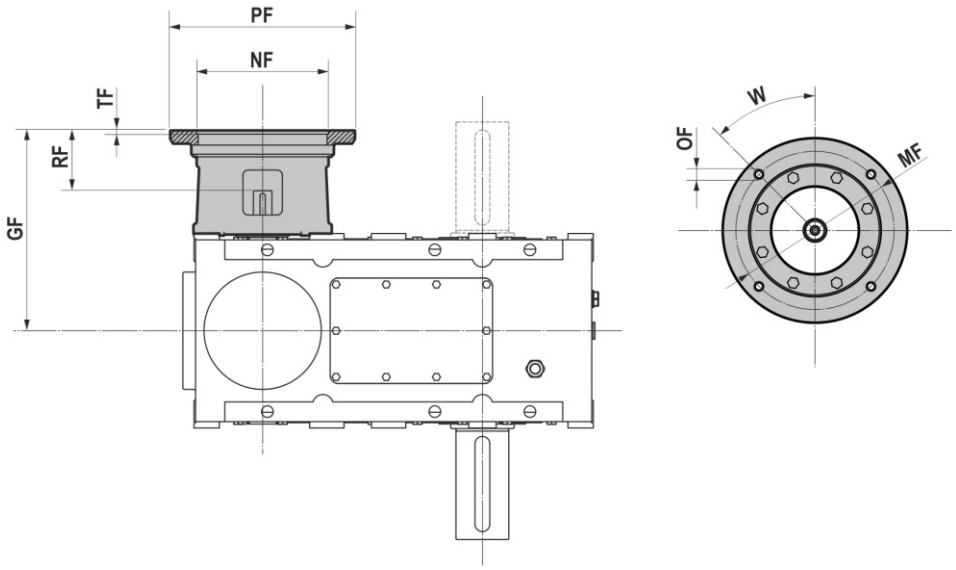
4.1.4 Splined output shaft



PH - BH	D2S (DIN5480)	DC f7	B2S	f2	G1	V2S
180	100x3x32	100	90	M24	370	60
200	110x3x35	110	100	M24	410	70
225	120x4x28	120	110	M24	450	80
250	130x4x31	130	120	M24	490	90
280	150x5x28	150	135	M24	540	100
355	180x8x21	180	180	M30	640	140

4.2 INPUT FLANGES

4.2.1 Motor mounting flanges - PH



P2H	dm (1)	PF	GF	NF	MF	TF	RF	OF	W
180	48	350	409	250	300	7	114	M16 (n° 4)	45°
	55	400	439	300	350	7	144	M16 (n° 4)	45°
	60	450	439	350	400	7	144	M16 (n° 8)	22°30′
	65	550	439	450	500	7	144	M16 (n° 8)	22°30′
200	55	400	467	300	350	7	152	M16 (n° 4)	45°
	60	450	467	350	400	7	152	M16 (n° 8)	22°30′
	65 - 75	550	467	450	500	7	152	M16 (n° 8)	22°30′
225	60	450	509	350	400	7	144	M16 (n° 8)	22°30′
	65 - 75	550	512	450	500	7	147	M16 (n° 8)	22°30′
250	65 - 75	550	535	450	500	7	150	M16 (n° 8)	22°30′
	80	660	559	550	600	8	174	M16 (n° 8)	22°30′
280	60 - 65 - 75	550	584	450	500	7	174	M16 (n° 8)	22°30′
	65 - 80	660	584	550	600	8	174	M16 (n° 8)	22°30′
355	80	660	664	550	600	8	174	M16 (n° 8)	22°30′

(1) Motor shaft diameter.

4.2 INPUT FLANGES

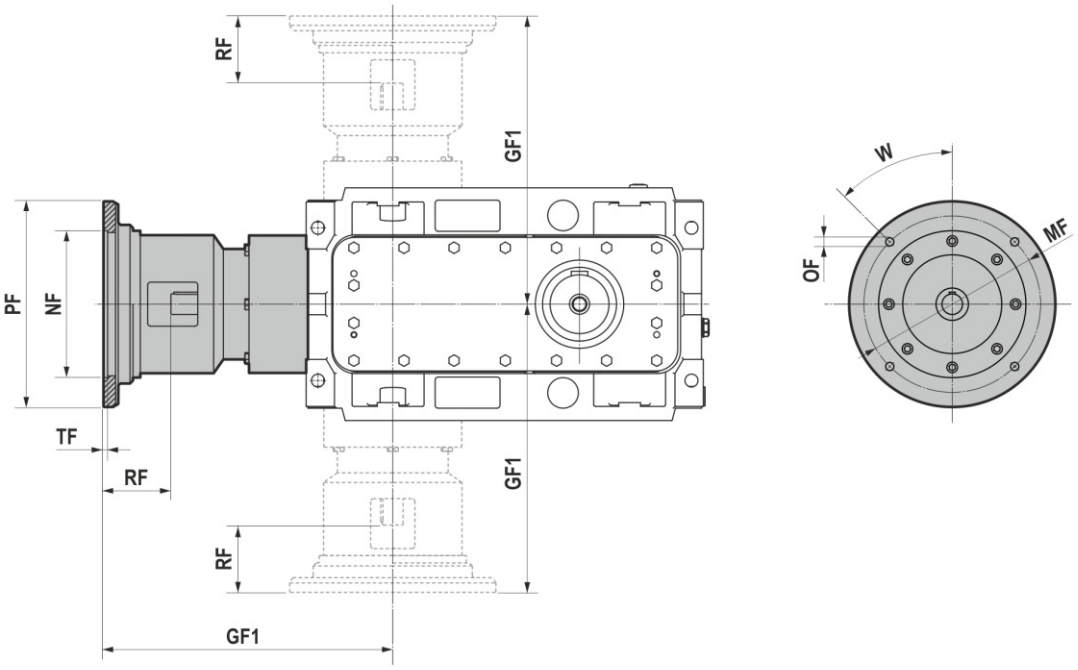
P3H	dm (1)	PF	GF	NF	MF	TF	RF	OF	W
180	28	250	329	180	215	6	64	M12 (n° 4)	45°
	38	300	350	230	265	6	85	M12 (n° 4)	45°
	42 - 48	350	379	250	300	7	114	M16 (n° 4)	45°
	55	400	379	300	350	7	114	M16 (n° 4)	45°
200	38	300	399	230	265	6	84	M12 (n° 4)	45°
	42 - 48	350	429	250	300	7	114	M16 (n° 4)	45°
	55	400	429	300	350	7	114	M16 (n° 4)	45°
	60	450	459	350	400	7	144	M16 (n° 8)	45°
225	42 - 48	350	457	250	300	7	122	M16 (n° 4)	45°
	55	400	483	300	350	7	148	M16 (n° 4)	45°
	60	450	486	350	400	7	151	M16 (n° 8)	22°30′
	65 - 75	550	490	450	500	7	155	M16 (n° 8)	22°30′
250	42 - 48	350	472	250	300	7	117	M16 (n° 4)	45°
	55	400	501	300	350	7	146	M16 (n° 4)	45°
	60	450	502	350	400	7	147	M16 (n° 8)	22°30′
	65 - 75	550	527	450	500	7	172	M16 (n° 8)	22°30′
280	42 - 48	350	528	250	300	7	118	M16 (n° 4)	45°
	55	400	528	300	350	7	118	M16 (n° 4)	45°
	60	450	558	350	400	7	148	M16 (n° 8)	22°30′
	65 - 75	550	558	450	500	7	148	M16 (n° 8)	22°30′
	80	660	588	550	600	8	178	M16 (n° 8)	22°30′
355	60	450	608	350	400	7	148	M16 (n° 8)	22°30′
	65 - 75	550	608	450	500	7	148	M16 (n° 8)	22°30′
	80	660	638	550	600	8	178	M16 (n° 8)	22°30′

P4H	dm (1)	PF	GF	NF	MF	TF	RF	OF	W
180	28	250	309	180	215	6	64	M12 (n° 4)	45°
	38	300	330	230	265	6	85	M12 (n° 4)	45°
200	28	250	329	180	215	6	64	M12 (n° 4)	45°
	38	300	350	230	265	6	85	M12 (n° 4)	45°
	42 - 48	350	379	250	300	7	114	M16 (n° 4)	45°
225	38	300	423	230	265	7	118	M12 (n° 4)	45°
	42 - 48	350	423	250	300	7	118	M16 (n° 4)	45°
250	38	300	443	230	265	7	118	M12 (n° 4)	45°
	42 - 48	350	443	250	300	7	118	M16 (n° 4)	45°
	55	400	443	300	350	7	118	M16 (n° 4)	45°
280	38	300	498	230	265	7	118	M12 (n° 4)	45°
	42 - 48	350	498	250	300	7	118	M16 (n° 4)	45°
	55	400	498	300	350	7	118	M16 (n° 4)	45°
	60	450	528	350	400	7	148	M16 (n° 8)	22°30′
355	42 - 48	350	548	250	300	7	118	M16 (n° 4)	45°
	55	400	548	300	350	7	118	M16 (n° 4)	45°
	60	450	578	350	400	7	148	M16 (n° 8)	22°30′
	65	550	578	450	500	7	148	M16 (n° 8)	22°30′

(1) Motor shaft diameter.

4.2 INPUT FLANGES

4.2.2 Motor mounting flanges - BH



B2H	dm (1)	PF	GF1	NF	MF	TF	RF	OF	W
180	42 - 48	350	409	250	300	7	114	M16 (n° 4)	45°
	55	400	409	300	350	7	114	M16 (n° 4)	45°
	60	450	439	350	400	7	144	M16 (n° 8)	22°30′
	65 - 75	550	439	450	500	7	144	M16 (n° 8)	22°30′
200	55	400	429	300	350	7	114	M16 (n° 4)	45°
	60	450	459	350	400	7	144	M16 (n° 8)	22°30′
	65 - 75	550	459	450	500	7	144	M16 (n° 8)	22°30′
	80	660	489	550	600	8	174	M16 (n° 8)	22°30′
225	55	400	509	300	350	7	144	M16 (n° 4)	45°
	60	450	509	350	400	7	144	M16 (n° 8)	22°30′
	65 - 75	550	539	450	500	7	174	M16 (n° 8)	22°30′
	80	660	539	550	600	8	174	M16 (n° 8)	22°30′
250	60	450	529	350	400	7	144	M16 (n° 8)	22°30′
	65 - 75	550	559	450	500	7	174	M16 (n° 8)	22°30′
	80	660	559	550	600	8	174	M16 (n° 8)	22°30′
280	65 - 75	550	584	450	500	7	174	M16 (n° 8)	22°30′
	80	660	584	550	600	8	174	M16 (n° 8)	22°30′
355	80	660	664	550	600	8	174	M16 (n° 8)	22°30′

(1) Motor shaft diameter.

4.2 INPUT FLANGES

B3H	dm (1)	PF	GF1	NF	MF	TF	RF	OF	W
180	28	250	329	180	215	6	64	M12 (n° 4)	45°
	38	300	350	230	265	6	85	M12 (n° 4)	45°
	42 - 48	350	379	250	300	7	114	M16 (n° 4)	45°
	55	400	379	300	350	7	114	M16 (n° 4)	45°
200	38	300	369	230	265	6	84	M12 (n° 4)	45°
	42 - 48	350	399	250	300	7	114	M16 (n° 4)	45°
	55	400	399	300	350	7	114	M16 (n° 4)	45°
	60	450	429	350	400	7	144	M16 (n° 8)	22°30′
225	42 - 48	350	450	250	300	7	115	M16 (n° 4)	45°
	55	400	478	300	350	7	143	M16 (n° 4)	45°
	60	450	478	350	400	7	143	M16 (n° 8)	22°30′
	65 - 75	550	478	450	500	7	143	M16 (n° 8)	22°30′
250	42 - 48	350	499	250	300	7	144	M16 (n° 4)	45°
	55	400	528	300	350	7	173	M16 (n° 4)	45°
	60	450	528	350	400	7	173	M16 (n° 8)	22°30′
	65 - 75	550	528	450	500	7	173	M16 (n° 8)	22°30′
280	42 - 48	350	524	250	300	7	114	M16 (n° 4)	45°
	55	400	559	300	350	7	149	M16 (n° 4)	45°
	60	450	559	350	400	7	149	M16 (n° 8)	22°30′
	65 - 75	550	557	450	500	7	147	M16 (n° 8)	22°30′
	80	660	559	550	600	8	149	M16 (n° 8)	22°30′
355	60	450	609	350	400	7	149	M16 (n° 8)	22°30′
	65 - 75	550	609	450	500	7	149	M16 (n° 8)	22°30′
	80	660	609	550	600	8	149	M16 (n° 8)	22°30′

B4H	dm (1)	PF	GF1	NF	MF	TF	RF	OF	W
180	28	250	309	180	215	6	64	M12 (n° 4)	45°
	38	300	330	230	265	6	85	M12 (n° 4)	45°
200	28	250	329	180	215	6	64	M12 (n° 4)	45°
	38	300	350	230	265	6	85	M12 (n° 4)	45°
	42 - 48	350	379	250	300	7	114	M16 (n° 4)	45°
225	28	250	369	180	215	6	64	M12 (n° 4)	45°
	38	300	390	230	265	6	85	M12 (n° 4)	45°
	42 - 48	350	419	250	300	7	114	M16 (n° 4)	45°
250	38	300	409	230	265	7	84	M12 (n° 4)	45°
	42 - 48	350	439	250	300	7	114	M16 (n° 4)	45°
	55	400	439	300	350	7	114	M16 (n° 4)	45°
280	38	300	464	230	265	7	84	M12 (n° 4)	45°
	42 - 48	350	494	250	300	7	114	M16 (n° 4)	45°
	55	400	494	300	350	7	114	M16 (n° 4)	45°
	60	450	524	350	400	7	144	M16 (n° 8)	22°30′
355	42 - 48	350	574	250	300	7	114	M16 (n° 4)	45°
	55	400	574	300	350	7	114	M16 (n° 4)	45°
	60	450	604	350	400	7	144	M16 (n° 8)	22°30′
	65	550	604	450	500	7	144	M16 (n° 8)	22°30′

(1) Motor shaft diameter.

4.3.1 Cooling and heating unit

On request the gear reducer can be supplied with:

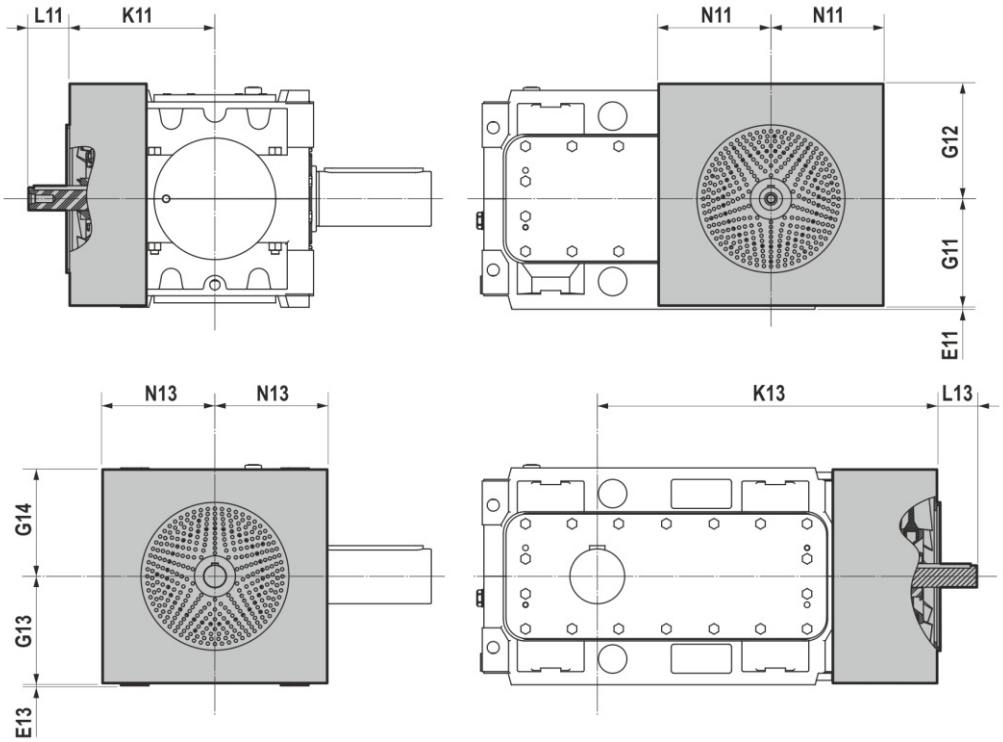
- Cooling fan;
- Cooling coil with or without valve thermostatic;
- Air-oil or water-oil cooling unit;
- Oil heater.

4.3.2 Lubrication and monitoring unit

On request the gear reducer can be supplied with:

- Bearings lubrication pump;
- Bearings lubrication motor pump;
- Bimetal thermal protectors;
- Pressure switch;
- Oil level sensor with float;
- Oil temperature sensor and bearing temperature sensor PT100 .

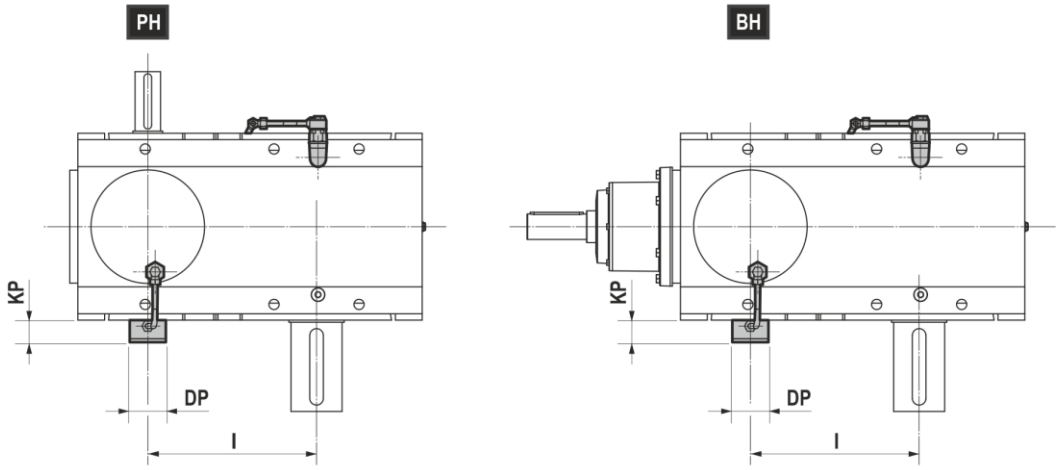
4.3.3 Cooling fan



	P1H						P2H					
PH	**E11**	**G11**	**G12**	**L11**	**K11**	**N11**	**E11**	**G11**	**G12**	**L11**	**K11**	**N11**
180	5	193	210	105	220	196	5	193	210	75	220	180
200	10	210	245	101	244	245	10	210	245	71	244	180
225	8	235	265	85	280	255	8	235	265	85	280	197
250	10	290	325	85	300	260	10	290	325	85	300	200
280	12	308	345	110	305	310	12	308	345	105	305	254
355	15	375	415	120	390	400	15	375	415	100	390	295

	B2H						B3H					
BH	**E13**	**G13**	**G14**	**L13**	**K13**	**N13**	**E13**	**G13**	**G14**	**L13**	**K13**	**N13**
180	5	193	195	73	607	203	5	193	195	53	641	203
200	5	215	235	73	690	226	5	215	235	53	707	226
225	10	233	275	98	805	248	10	233	275	73	824	248
250	10	290	310	98	848	278	10	290	310	73	930	278
280	15	305	330	98	908	320	15	305	330	98	1073	320
355	20	370	400	123	1112	340	20	370	400	98	1253	340

4.3.4 Bearings lubrication pump



P1H - B2H	DP	KP	I
180	85	52	180
200	85	52	200
225	85	52	225
250	85	52	250
280	85	52	280
355	85	52	355

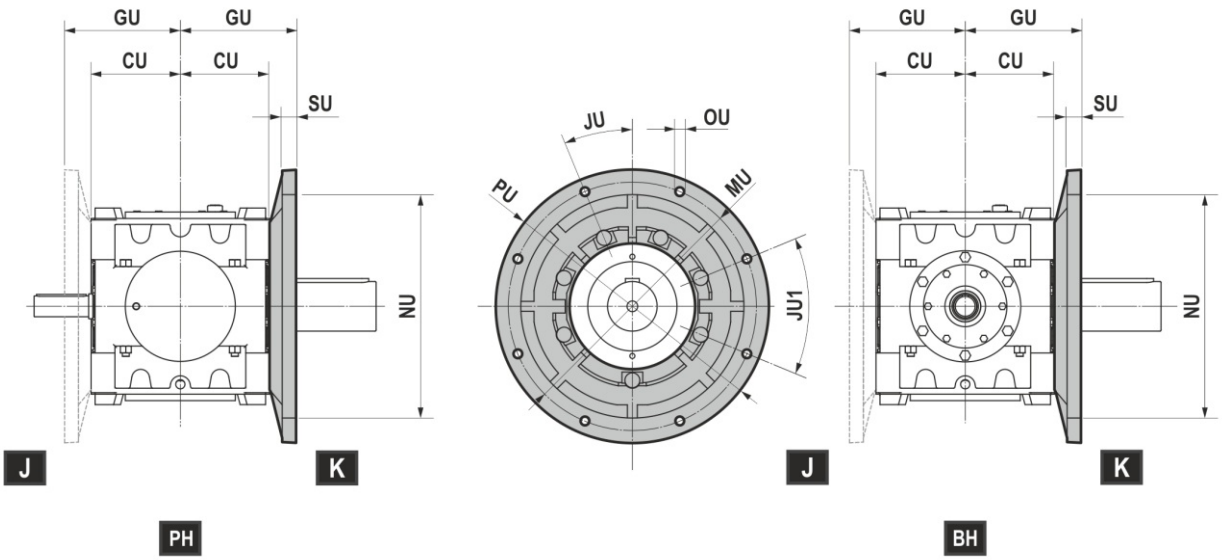
P2H - B3H	DP	KP	I
180	85	52	317
200	85	52	352
225	85	52	397
250	85	52	440
280	85	52	493
355	85	52	625

P3H - B4H	DP	KP	I
180	85	52	416
200	85	52	462
225	85	52	527
250	85	52	577
280	85	52	647
355	85	52	820

P4H	DP	KP	I
180	85	52	416
200	85	52	462
225	85	52	527
250	85	52	577
280	85	52	599,5
355	85	52	759,1

4.4.1 Output flange

Unless otherwise specified, gear reducers are supplied with the flange in pos. K as per mounting position B3.
Flange is not available on gear reducers of the PH series with input shaft on the flange side.

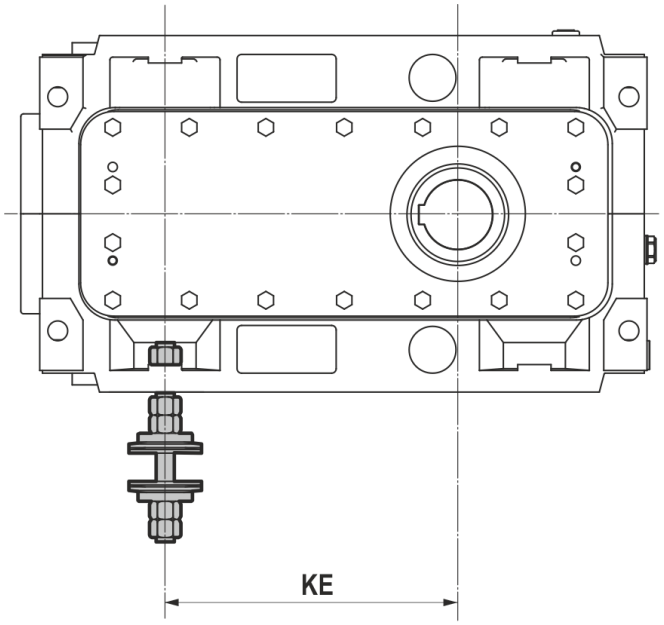


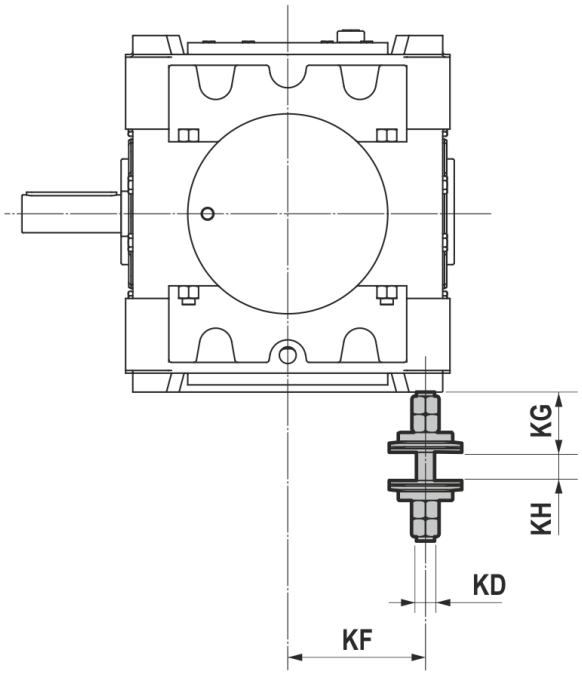
PH - BH	PU	MU	NU G6	SU	OU	JU	JU1	CU	GU
180	550	500	450	35	M16 (n°18)	22°30′	45°	175	215
200	600	550	500	40	M20 (n°22)	22°30′	45°	195	240
225	660	600	550	44	M20 (n°22)	22°30′	45°	215	264
250	760	700	650	46	M22 (n°24)	22°30′	45°	235	286
280	820	750	700	50	M24 (n°26)	22°30′	45°	260	315
355	1080	1000	950	60	M33 (n°35)	22°30′	45°	310	375

4.4 ACCESSORIES

4.4.2 Reaction bolt

Use reaction bolt in the event of shaft mounting.



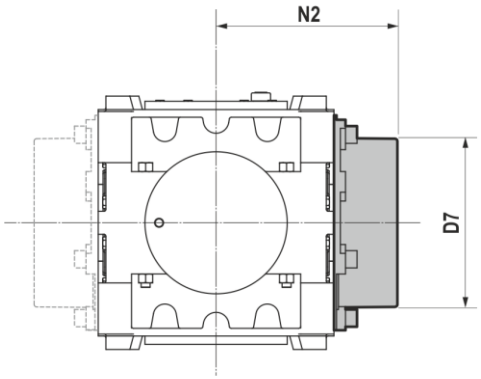


PH - BH	KE		KD	KF	KG	KH
	P1H P2H B2H B3H	P3H P4H B4H				
180	410	497	M20	153	56	104
200	450	560	M20	167,5	56	102
225	503	618	M22	183	68	104
250	570	710	M22	193	68	107
280	635	790	M24	215	75	149,5
355	825	1030	M33	247,5	100	176

4.4.3 Backstop device

Gear reducers may be equipped with backstop (on the input shaft for PH, on bevel gear shaft for BH). The backstop allows shafts to rotate in one direction only, depending on size. It is essential that while ordering you specify the direction of free rotation of the output shaft, according to the white or black arrow. Please see relevant paragraph "DIRECTION OF ROTATION. For P1H, P2H, B2H, please contact MOTOVARIO TECHNICAL SERVICE to verify overall dimensions of backstop.

4.4.4 Output shaft cover

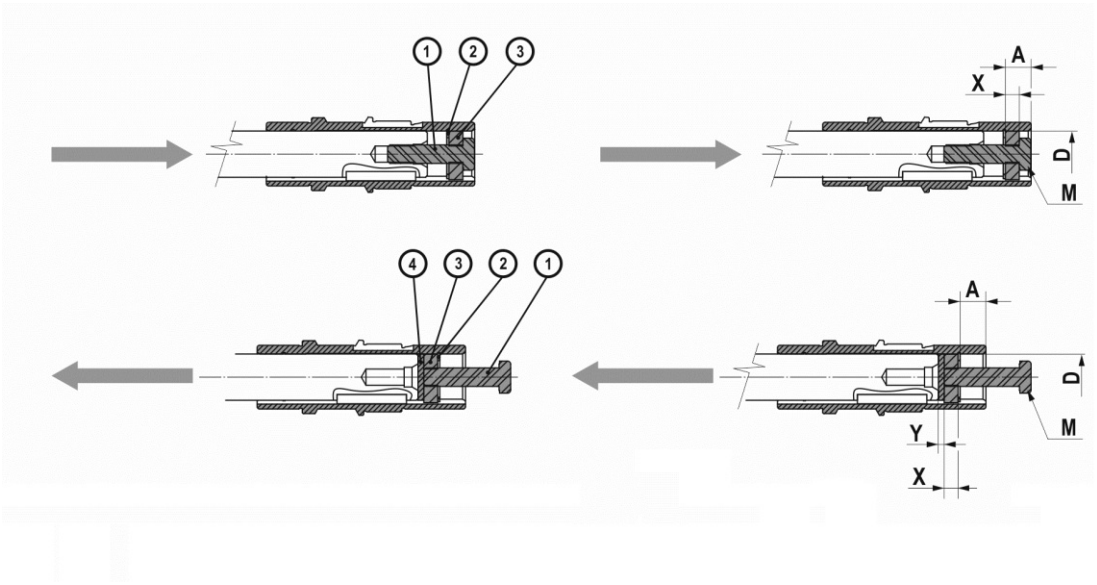


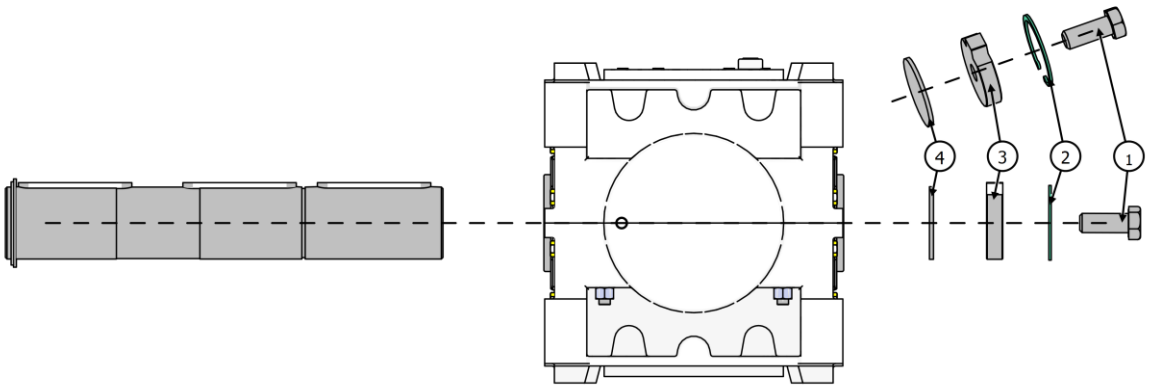
PH - BH	D7	N2
180	226	285
200	232	298
225	246	355
250	300	387
280	305	400
355	370	470

4.4.5 Assembling/disassembling kit

Mounting/dismounting kit for hollow shaft gear reducers with keyway. On request delivery includes:

1. Retaining bolt
2. Circlip
3. Fixed nut
4. Forcing washer





PH - BH	D	A	X	Y	M
180	90	34	20	5	M24
200	100	40	20	5	M24
225	115	44	24	8	M24
250	125	44	24	8	M24
280	140	50	24	10	M30
355	170	55	27	10	M30

4.4 ACCESSORIES

4.4.6 Optional seals

On request the gear reducer can be supplied with:

- Labyrinth seal with grease nipple. Recommended for dust and aggressive environments. Overall dimensions of shaft in an axial direction may differ from standard dimensions. Please contact MOTOVARIO TECHNICAL SERVICE.
- Sealing rings in FPM (FKM) fluorinated rubber. Recommended for ambient temperatures above 40 °C, in aggressive industrial environments and with high input speeds. Do not use at ambient temperatures below 10 °C.
- Dual seal. Available both on input and output shaft, in NBR rubber as well as in FPM (FKM) fluorinated rubber.

4.4.7 Other Accessories and Options

On request the gear reducer can be supplied with:

- Filling plug with filter;
- Special painting with C4, C5I and C5M corrosive classes according to UNI EN ISO 12944;
- NEMA motor flange adapter.

5.1 INSTALLATION

Pay special attention to the installation conditions as these are the principal cause of damage and downtime. When choosing the motor, consider the mounting position and presence, below the motor itself, of parts, things or materials which may be damaged by oil leaks, however limited in amount. The unit can only be mounted in the mounting position indicated on the nameplate: a different mounting position must be authorized by MOTOVARIO.
Unless expressly requested, gear reducers are supplied dry, and it is the customer's responsibility to top up with oil up to the correct level. This should be done with the unit in the selected mounting position (using a filter with 25 µm grain) paying attention not to damage the seal when refitting it (or when smearing it with fresh sealing compound). If necessary, top up with oil of the same type up to correct level (see table LUBRICANTS RECOMMENDED BY MOTOVARIO). In case of unavailability, please contact MOTOVARIO TECHNICAL SERVICE. For possible use of different oil (after checking with the MOTOVARIO TECHNICAL SERVICE), replace completely and, in case of synthetic oil, only after washing the inside of the gear reducer. If you are using pressure-fed lubrication, fill the oil circuit and check oil level after gear reducer has been running for a short period. If there is an oil leak, find the cause before restoring the lubricant level. Do not dump the lubricant in the environment, adopt all the necessary environmental safety measures, dispose of the lubricant in compliance with the current regulations.

Before the commissioning of the unit, carry out the following operations:

- Check the nameplate data of the unit and/or electric motor;
- Make sure the equipment supplied corresponds to the equipment ordered;
- Fixing to the structure of the machine must be stable, vibration-free. The structure shall not be subject to torsional movements, must ensure a continuity of transmission of any electrical and electrostatic discharges. Otherwise provide a grounding system, via a cable securely attached to the mounting areas, making sure to remove any paint in the contact area and using conductors of adequate cross section;
- For fixing use the fixing screws of minimum 8.8 quality and be careful not to buckle the casings due to improper fixing, making sure that the support surface is coplanar to the fixing surface;
- Do not install the unit in mounting positions other than those stated in the order, since different positions provide different positions of the loading, unloading and oil level plugs, in addition to a different amount of lubricant;
- Check the position of the level plug. If the casing is provided with a hole with closed plug symmetric with respect to the level plug itself, if necessary, for level visibility, reverse their positions. Check the accessibility to oil loading/unloading plugs.
- Check the correct quantity of oil, according to the mounting position required. If the oil level of the unit is restored, do it according to the plug diagram and use oil of the same type indicated on the label.
- Replace, if any, the closing plug with the vent plug provided in the supplied kit, in the suitable mounting position indicated in the relevant drawings.
- Check for any leakage of lubricant;
- Eliminate, if possible, any traces of dirt from the shafts and from the areas around the sealing rings;
- Lubricate the contact surfaces to prevent oxidation or seizure;
- Check the static seals and the bolted joints;
- Do not install the unit in an environment with fumes or abrasive and/or corrosive dust;
- Install all the protections designed for the rotary organs so as to ensure the system safety according to the current rules;
- Check the correct rotation direction of the output shaft of the unit;
- In case of shaft mounting configuration it is recommended to use the torque arms that can be supplied by MOTOVARIO, specially designed;
- Ensure proper cooling of the motor through a good flow of air from the fan side;
- Avoid solar radiation or other heat sources, the cooling air temperature must never exceed 40 °C;
- Check that the assembly of the various parts (pulleys, sprockets, couplings, etc.) on shafts is performed by using the proper threaded holes or any other systems able to ensure a correct operation without risking damage to the bearings or the outer parts of the units.

For the operating fields with temperatures below 0 °C, please consider the following:

- The motors must be suitable for operation with the expected ambient temperature:
- The electric motor power must be adjusted when exceeding the higher starting torques required;
- For the gear reducers, please contact MOTOVARIO TECHNICAL SERVICE beforehand.
- For gear reducers with cast-iron casing, be sure to avoid shock loading as cast-iron may become brittle at temperatures below -15 °C.
- Right after start-up, the oil will be thick and this may lead to lubrication issues; dry-run the unit for several minutes

In case of ambient temperature not listed in the table LUBRICANTS RECOMMENDED BY MOTOVARIO, please contact MOTOVARIO TECHNICAL SERVICE. If the temperature is lower than -30 °C or higher than 60 °C use special mixture seal rings.

Change the oil as specified in table OIL CHANGE INTERVAL; first bring gear reducer to a surface temperature lower than 40 °C (this will make it easier to drain oil, when you take all necessary precautions to avoid scalding).

- Locate the loading and unloading caps (the loading cap can match the vent cap or the dipstick); place a container of suitable capacity under the gear reducer at the unloading cap;
- Unscrew the loading and unloading caps paying attention to progressively reduce any internal overpressure;

5.1 INSTALLATION

- Completely drain the oil and collect it in the underlying container;
- Replace the seal of the unloading cap and tighten it again by applying the appropriate tightening torque (see table “OIL CAPS TIGHTENING TORQUE”);
- Fill the gear reducer with new oil until the level reaches the centre line of the indicator cap or the top notch on the dipstick;
- Replace the seal of the loading cap and tighten it again by applying the appropriate tightening torque (see table “OIL CAPS TIGHTENING TORQUE”);
- After about 30 minutes check the correctness of the level (if necessary, provide to its restoration) and any oil leaks. Clean the surface of the gear reducer with materials that do not generate electrostatic discharges;
- Dispose of used oil in accordance with current regulations.

Table OIL CHANGE INTERVAL

Oil type	Oil temperature [°C]		
	< 65°	80°	95°
Mineral oil	8000 h	4000 h	2000 h
Synthetic oil	25000 h	18000 h	12500 h

Table of OIL PLUGS TIGHTENING TORQUE with aluminum gasket and hexagonal wrench

Plug	Torque [Nm]
GAS 1/2″	60
GAS 3/4″	70
GAS 1″	70

Table of OIL PLUGS TIGHTENING TORQUE with aluminum gasket and allen key

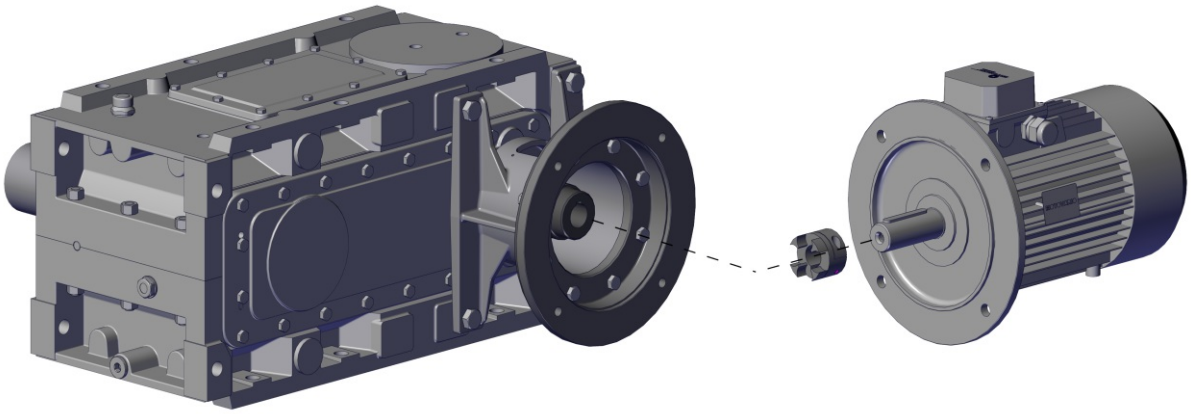
Plug	Torque [Nm]
GAS 1/2″	30
GAS 3/4″	40
GAS 1″	50

Plug	PH - BH
GAS 1/2″	180 - 200
GAS 3/4″	225 - 250 - 280
GAS 1″	355

5.1 INSTALLATION

Assembling motor on PAM flange

If 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 hal coupling 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 reducer ensuring the coupling element is aligned with the driven half coupling. Complete the assembly using the fixing bolts. Key-ways with tightened tolerances.



6.1 SYMBOLS AND FORMULAS

6.1.1 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
Nominal thermal power	Pth	[kW]		
Torque	M	[Nm]	M_1	M_2
Nominal torque	Mn	[Nm]		Mn_2
Peak torque	M_{max}	[Nm]		M_{2max}
Requested torque	Mr	[Nm]	Mr_1	Mr_2
Speed	n	[rpm]	n_1	n_2
Load	F	[N]		
Radial load	Fr	[N]	Fr_1	Fr_2
Axial load	Fa	[N]	Fa_1	Fa_2
Reduction ratio	i			
Nominal Reduction ratio	i_n			
Efficiency	η			
Service factor	f_s			
Correction service factor to account for type of load and daily operating hours	f_sa			
Correction service factor to account for number of starts per hours	f_sb			
Correction service factor to account for type of motor	f_sc			
Correction thermal factor to account for ambient temperature and run-to-rest ratio	f_ta			
Correction thermal factor to account for cooling systems	f_tb			
Correction factor to account for ambient and operating temperature	f_tc			
Correction factor to account for airflow speed around gear reducer	f_tv			
Correction factor to account for input speed n1	f_tn			
Correction thermal factor to account for cooling coil	f_ts			
Additional thermal capacity Water/Oil and Air/Oil	Pta	[kW]		
Correction factor to account for mounting position	Fmp			
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]		
Surface temperature of gear reducer	T_s	[°C]		
Oil temperature	T_o	[°C]		
Dimension		[mm]		

6.1 SYMBOLS AND FORMULAS

6.1.2 Formulas

GEAR 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	$a = v / t$	[m/s^2]
Angular acceleration	$\alpha = n / (9{,}55 * t)$ $\alpha = \omega / t$	[rad/s^2]
Starting or stopping distance (according to acceleration)	$s = a * t^2 / 2$	[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= gravitational 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 i.e. $P1_{60Hz} = P1_{50Hz}$ If input voltage at 60 Hz (V_{60Hz}) is 20% higher than winding voltage at 50 Hz (V_{50Hz}), power increases by 20% i.e. $P1_{60Hz} = 1{,}2\ P1_{50Hz}$		
Torque at 60Hz	$M_{60hz} = M_{50Hz} * P1_{60Hz} / (1{,}2 * P1_{50Hz})$	[Nm]
Service factor at 60Hz	$f.s._{60Hz} = f.s._{50Hz} * 1{,}175 * P1_{50Hz} / P1_{60Hz}$	-

7.1 PH GEAR REDUCER - 1750 rpm

P1H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
7760	2,04	711	858
8130	2,18	697	803
8050	2,55	590	686
8010	2,83	529	618
8150	3,12	488	561
7980	3,60	414	486
7840	4,00	366	438
7420	4,38	317	400
6860	4,92	261	356

P1H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10500	1,95	1010	897
11100	2,25	923	778
10900	2,55	801	686
10800	2,76	730	634
10300	3,11	621	563
10300	3,57	538	490
10200	4,00	475	438
10200	4,46	428	392
9110	4,92	346	356

P1H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
15200	1,96	1450	894
17000	2,24	1420	782
16700	2,53	1240	693
16400	2,78	1100	630
16100	3,19	944	549
16100	3,56	845	491
15500	3,93	735	445
14800	4,58	602	382
12600	5,09	461	344

P1H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
17900	2,04	1640	856
18800	2,25	1560	778
19500	2,50	1460	700
19800	2,82	1310	620
19700	3,27	1130	536
19500	3,60	1010	486
19700	3,93	936	445
19500	4,36	839	402
18000	4,91	686	356

P1H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24100	1,96	2310	894
24200	2,24	2020	782
24400	2,48	1850	707
24800	2,79	1660	627
25200	3,11	1520	564
25700	3,59	1340	488
24900	3,93	1180	445
24600	4,54	1020	386
24600	5,08	903	344

P1H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
42000	1,95	4020	895
44700	2,29	3650	766
47500	2,48	3580	707
48600	2,83	3200	618
47800	3,13	2860	560
48200	3,56	2530	491
48100	3,93	2290	445
48300	4,42	2050	396
48400	4,92	1840	355

7.1 PH GEAR REDUCER - 1750 rpm

P2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10100	5,66	341	309
9450	6,53	276	268
9330	7,26	245	241
8820	7,96	212	220
9490	8,57	211	204
9880	9,90	190	177
9840	11,0	171	159
9310	12,1	147	145
9250	15,0	117	116
9630	16,7	110	105
9110	18,3	95,0	95,6
8820	20,6	81,9	85,1
8660	22,8	72,6	76,9
9470	25,0	72,4	70,1

P2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
13600	5,52	469	317
13000	6,35	390	276
13800	7,11	369	246
13200	7,84	322	223
13900	9,01	294	194
13700	9,66	270	181
14200	11,1	244	158
13600	12,4	209	141
12900	14,1	175	125
14000	15,7	170	111
13200	17,6	143	99,7
12700	19,4	125	90,4
13000	23,1	108	75,9
12400	25,4	92,7	68,8

P2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
15900	5,62	539	312
17200	6,20	529	282
17600	7,23	466	242
20000	8,02	477	218
19500	8,85	420	198
20300	10,1	383	173
19900	11,2	340	157
18800	13,0	275	134
18700	14,5	246	120
19000	16,0	226	109
18000	18,7	183	93,7
17700	19,7	172	89,0
18400	22,9	153	76,4
15900	25,5	119	68,8

P2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
23500	5,68	791	308
23500	6,20	725	282
23200	6,87	643	255
24500	8,06	580	217
26100	8,79	566	199
26500	10,4	485	168
26700	11,4	448	154
25300	12,6	383	139
27600	14,7	358	119
27800	16,0	331	109
26300	17,8	282	98,5
25100	20,0	239	87,5
26300	22,2	226	78,9
22800	25,0	174	70,0

P2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
35500	5,82	1170	301
33200	6,37	994	275
33900	7,36	880	238
36000	8,20	837	213
34300	8,98	729	195
36200	10,2	680	172
35700	11,1	612	157
35800	12,9	532	136
36600	14,1	495	124
36200	15,5	447	113
35400	17,9	378	98,0
34300	20,0	327	87,5
36400	23,1	301	75,7
32600	25,9	241	67,6

P2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
58800	5,70	1970	307
59800	6,29	1820	278
61300	7,07	1650	248
62700	8,02	1490	218
64700	8,84	1400	198
66600	10,1	1260	173
67600	11,1	1160	157
68600	12,5	1050	140
70600	14,0	961	125
72000	15,5	890	113
73500	17,4	808	101
70400	19,4	694	90,4
73500	22,8	615	76,7
72000	25,4	541	68,8

7.1 PH GEAR REDUCER - 1750 rpm

P3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10500	28,8	71,0	60,7
10300	32,0	62,4	54,7
9790	35,1	54,4	49,9
11000	39,8	53,6	43,9
10300	43,6	45,8	40,1
11300	51,1	43,2	34,2
10700	56,0	37,3	31,2
10400	62,9	32,1	27,8
10900	69,7	30,4	25,1
10200	80,4	24,8	21,8
11200	88,1	24,8	19,9
10000	98,9	19,7	17,7
9680	110	17,1	15,9
10600	121	17,1	14,5

P3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14200	27,8	99,9	63,0
15200	30,6	96,7	57,3
14400	34,2	82,0	51,1
15500	38,6	78,1	45,3
14500	43,3	65,2	40,4
15700	51,5	59,6	34,0
14600	57,7	49,2	30,3
13700	63,1	42,4	27,7
15500	71,2	42,4	24,6
14700	79,8	35,9	21,9
15800	89,0	34,5	19,7
14800	105	27,5	16,7
16400	117	27,3	15,0
13900	129	21,0	13,6

P3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
17800	28,6	121	61,1
19600	31,6	121	55,4
20400	36,2	110	48,4
20700	39,9	101	43,8
19900	46,5	83,5	37,6
20500	51,9	77,1	33,7
21600	57,3	73,6	30,6
20600	63,6	63,2	27,5
22100	70,2	61,4	24,9
22500	81,5	53,8	21,5
20800	90,5	44,8	19,3
22900	100,0	44,7	17,5
22400	116	37,5	15,0
20900	129	31,5	13,5

P3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
25900	28,0	180	62,6
28300	30,5	181	57,3
28800	36,2	155	48,4
28400	39,5	140	44,3
28100	43,8	125	40,0
29000	50,9	111	34,4
28600	55,6	100	31,5
29100	63,6	89,3	27,5
28800	69,4	80,7	25,2
28900	82,8	68,0	21,1
29100	91,8	61,9	19,1
29000	103	54,7	16,9
29300	115	49,8	15,3
28600	129	43,2	13,6

P3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
35700	29,2	238	59,9
39700	32,0	242	54,7
39000	37,0	206	47,4
40700	39,7	200	44,1
39900	45,8	170	38,2
38800	50,3	150	34,8
42200	55,0	149	31,8
41400	63,6	127	27,5
43400	71,3	119	24,6
42600	82,3	101	21,3
42900	87,6	95,5	20,0
45000	98,2	89,3	17,8
43500	113	74,8	15,4
40200	127	61,7	13,8

P3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
72700	28,3	500	61,8
74700	31,2	466	56,0
76700	35,7	419	49,1
78700	39,3	390	44,5
80700	44,2	356	39,6
82700	49,5	325	35,3
84700	54,6	302	32,1
85700	65,0	257	26,9
87600	71,7	238	24,4
87600	80,6	212	21,7
85700	89,2	187	19,6
89600	98,4	178	17,8
89600	111	158	15,8
85300	123	135	14,2

7.1 PH GEAR REDUCER - 1750 rpm

P4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10200	128	15,9	13,7
11300	142	15,8	12,3
11700	164	14,2	10,7
12300	179	13,7	9,75
10900	201	10,8	8,69
11500	225	10,1	7,79
11600	246	9,38	7,10
10900	277	7,88	6,33
11000	317	6,90	5,53
11200	353	6,34	4,96
12300	387	6,33	4,52
11200	435	5,15	4,03
11500	495	4,62	3,54
12000	552	4,31	3,17
13100	605	4,30	2,89

P4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14800	120	24,6	14,6
16100	143	22,5	12,3
14900	160	18,6	11,0
15500	178	17,4	9,85
15500	200	15,4	8,76
15000	221	13,5	7,92
16900	246	13,7	7,10
15100	279	10,8	6,27
17000	311	10,9	5,62
15200	367	8,24	4,77
15400	410	7,49	4,27
17600	457	7,68	3,83
17000	480	7,04	3,64
16100	538	5,96	3,25
18300	600	6,08	2,92

P4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
22600	130	34,6	13,4
21700	144	30,0	12,1
24900	159	31,1	11,0
24700	185	26,5	9,44
24900	197	25,3	8,90
25000	228	21,8	7,67
21900	251	17,4	6,96
25100	278	18,0	6,31
26400	323	16,2	5,41
22100	358	12,3	4,89
26700	397	13,4	4,41
27200	460	11,8	3,80
26000	484	10,7	3,61
27900	565	9,85	3,10
26700	627	8,47	2,79

P4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29300	126	46,3	13,9
29600	147	40,2	11,9
29200	160	36,3	10,9
29800	183	32,3	9,55
29400	200	29,2	8,75
29900	219	27,2	8,01
29900	251	23,8	6,98
29500	274	21,5	6,39
30100	313	19,1	5,59
29700	342	17,3	5,12
30100	407	14,7	4,30
30700	452	13,5	3,87
31000	509	12,1	3,44
31600	564	11,1	3,10
35100	636	11,0	2,75

P4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
44000	129	67,7	13,5
40800	145	56,1	12,1
44800	155	57,3	11,3
44300	180	49,1	9,75
46200	201	45,7	8,70
44500	226	39,3	7,76
44600	247	35,9	7,07
46700	277	33,5	6,31
44800	320	27,8	5,46
46900	351	26,6	4,99
45400	405	22,3	4,32
47200	454	20,7	3,86
48400	483	20,0	3,62
47500	558	16,9	3,13
49400	625	15,7	2,80

P4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
80700	126	128	13,9
81000	141	115	12,4
81900	155	105	11,3
84100	174	96,0	10,0
82400	204	80,5	8,59
84700	229	73,6	7,64
82000	252	64,9	6,95
83000	278	59,6	6,31
85200	312	54,4	5,61
83500	365	45,6	4,80
86700	410	42,1	4,27
84800	453	37,3	3,86
87100	500	34,7	3,50
91000	562	32,2	3,11
83400	627	26,5	2,79

7.2 PH GEAR REDUCER - 1400 rpm

P1H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
7920	2,04	581	686
8300	2,18	570	642
8220	2,55	482	549
8180	2,83	432	495
8320	3,12	399	449
8150	3,60	339	389
8000	4,00	299	350
7580	4,38	259	320
7010	4,92	213	285

P1H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10700	1,95	822	718
11300	2,25	754	622
11200	2,55	654	549
11000	2,76	596	507
10600	3,11	507	450
10500	3,57	440	392
10400	4,00	388	350
10400	4,46	349	314
9300	4,92	283	285

P1H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
15500	1,96	1180	716
17300	2,24	1160	626
17100	2,53	1010	554
16700	2,78	899	504
16400	3,19	772	439
16400	3,56	690	393
15800	3,93	601	356
15100	4,58	492	305
12800	5,09	376	275

P1H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18300	2,04	1340	685
19200	2,25	1280	622
19900	2,50	1190	560
20200	2,82	1070	496
20100	3,27	919	429
20000	3,60	829	389
20100	3,93	765	356
19900	4,36	685	321
18400	4,91	560	285

P1H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24600	1,96	1880	716
24700	2,24	1650	626
24900	2,48	1510	565
25300	2,79	1360	502
25700	3,11	1240	451
26200	3,59	1090	390
25400	3,93	966	356
25200	4,54	829	308
25100	5,08	737	275

P1H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
42900	1,95	3280	716
45600	2,29	2980	613
48400	2,48	2930	565
49600	2,83	2620	494
48800	3,13	2340	448
49200	3,56	2070	393
49100	3,93	1870	356
49300	4,42	1670	317
49400	4,92	1500	284

7.2 PH GEAR REDUCER - 1400 rpm

P2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10300	5,66	278	247
9650	6,53	226	214
9530	7,26	200	193
9000	7,96	173	176
9680	8,57	172	163
10100	9,90	156	141
10100	11,0	140	127
9500	12,1	120	116
9440	15,0	95,8	93,1
9830	16,7	89,8	83,8
9300	18,3	77,6	76,5
9010	20,6	66,9	68,1
8840	22,8	59,3	61,5
9670	25,0	59,2	56,1

P2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
13900	5,52	383	254
13300	6,35	319	220
14100	7,11	302	197
13500	7,84	263	179
14200	9,01	240	155
13900	9,66	220	145
14500	11,1	199	126
13900	12,4	171	113
13200	14,1	143	99,6
14300	15,7	139	89,0
13400	17,6	117	79,8
12900	19,4	102	72,3
13300	23,1	88,1	60,7
12600	25,4	75,8	55,0

P2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16200	5,62	440	249
17600	6,20	432	226
18000	7,23	381	194
20400	8,02	389	175
19900	8,85	343	158
20800	10,1	313	138
20400	11,2	278	125
19200	13,0	225	107
19100	14,5	201	96,4
19400	16,0	184	87,3
18300	18,7	150	74,9
18100	19,7	140	71,2
18800	22,9	125	61,1
16200	25,5	97,2	55,0

P2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24000	5,68	646	247
24000	6,20	592	226
23600	6,87	525	204
25000	8,06	474	174
26600	8,79	462	159
27000	10,4	396	134
27200	11,4	366	123
25800	12,6	313	111
28100	14,7	293	95,4
28300	16,0	270	87,4
26800	17,8	230	78,8
25600	20,0	195	70,0
26800	22,2	185	63,1
23300	25,0	142	56,0

P2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
36300	5,82	952	241
33800	6,37	811	220
34600	7,36	719	190
36700	8,20	683	171
35000	8,98	596	156
37000	10,2	555	138
36400	11,1	500	126
36600	12,9	434	109
37300	14,1	404	99,2
36900	15,5	365	90,6
36100	17,9	309	78,4
35000	20,0	267	70,0
37200	23,1	246	60,6
33300	25,9	196	54,1

P2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
60000	5,70	1610	246
61000	6,29	1480	223
62500	7,07	1350	198
64000	8,02	1220	175
66000	8,84	1140	158
68000	10,1	1030	139
69000	11,1	947	126
70000	12,5	854	112
72000	14,0	785	99,9
73500	15,5	726	90,6
75000	17,4	660	80,6
71900	19,4	567	72,3
75000	22,8	502	61,4
73500	25,4	441	55,0

7.2 PH GEAR REDUCER - 1400 rpm

P3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10500	28,8	57,0	48,6
10300	32,0	50,2	43,7
9830	35,1	43,7	39,9
11000	39,8	43,1	35,1
10300	43,6	36,8	32,1
11400	51,1	34,7	27,4
10800	56,0	30,0	25,0
10400	62,9	25,8	22,3
10900	69,7	24,4	20,1
10300	80,4	20,0	17,4
11300	88,1	19,9	15,9
10100	98,9	15,8	14,2
9720	110	13,7	12,7
10600	121	13,7	11,6

P3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14300	27,8	80,2	50,4
15200	30,6	77,7	45,8
14500	34,2	65,9	40,9
15600	38,6	62,8	36,2
14500	43,3	52,4	32,4
15800	51,5	47,9	27,2
14600	57,7	39,5	24,3
13800	63,1	34,1	22,2
15600	71,2	34,0	19,7
14700	79,8	28,8	17,5
15800	89,0	27,7	15,7
14800	105	22,1	13,4
16400	117	21,9	12,0
14000	129	16,9	10,9

P3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
17900	28,6	97,5	48,9
19700	31,6	97,2	44,3
20500	36,2	88,4	38,7
20800	39,9	81,2	35,1
20000	46,5	67,0	30,1
20600	51,9	61,9	27,0
21700	57,3	59,1	24,4
20700	63,6	50,7	22,0
22200	70,2	49,3	19,9
22600	81,5	43,2	17,2
20900	90,5	36,0	15,5
23000	100,0	35,9	14,0
22500	116	30,1	12,0
21000	129	25,3	10,8

P3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
26000	28,0	145	50,1
28400	30,5	145	45,9
28900	36,2	125	38,7
28500	39,5	113	35,5
28200	43,8	100	32,0
29100	50,9	89,2	27,5
28700	55,6	80,6	25,2
29300	63,6	71,7	22,0
28900	69,4	64,9	20,2
29000	82,8	54,6	16,9
29300	91,8	49,7	15,3
29100	103	43,9	13,5
29400	115	40,0	12,2
28700	129	34,7	10,8

P3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
35800	29,2	191	47,9
39900	32,0	194	43,8
39100	37,0	165	37,9
40800	39,7	161	35,3
40100	45,8	136	30,6
38900	50,3	121	27,8
42300	55,0	120	25,4
41500	63,6	102	22,0
43600	71,3	95,3	19,6
42800	82,3	81,0	17,0
43100	87,6	76,7	16,0
45200	98,2	71,8	14,3
43700	113	60,1	12,3
40400	127	49,6	11,0

P3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
73000	28,3	402	49,4
75000	31,2	375	44,8
77000	35,7	337	39,3
79000	39,3	313	35,6
81000	44,2	286	31,7
83000	49,5	261	28,3
85000	54,6	243	25,6
86000	65,0	206	21,5
88000	71,7	191	19,5
88000	80,6	170	17,4
86000	89,2	150	15,7
90000	98,4	143	14,2
90000	111	127	12,7
85700	123	108	11,4

7.2 PH GEAR REDUCER - 1400 rpm

P4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10300	128	12,8	10,9
11300	142	12,7	9,87
11800	164	11,4	8,55
12400	179	11,0	7,80
11000	201	8,66	6,95
11500	225	8,15	6,23
11700	246	7,53	5,68
11000	277	6,33	5,06
11000	317	5,54	4,42
11300	353	5,09	3,96
12400	387	5,09	3,62
11300	435	4,14	3,22
11500	495	3,72	2,83
12000	552	3,47	2,54
13100	605	3,46	2,31

P4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14900	120	19,8	11,7
16200	143	18,1	9,82
15000	160	14,9	8,77
15600	178	14,0	7,88
15600	200	12,4	7,00
15100	221	10,9	6,34
17000	246	11,0	5,68
15200	279	8,64	5,01
17100	311	8,74	4,49
15200	367	6,62	3,82
15500	410	6,02	3,42
17700	457	6,17	3,06
17100	480	5,66	2,91
16200	538	4,79	2,60
18400	600	4,88	2,33

P4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
22700	130	27,8	10,7
21800	144	24,1	9,71
25000	159	25,0	8,80
24800	185	21,3	7,55
25000	197	20,3	7,12
25100	228	17,5	6,13
22000	251	14,0	5,57
25200	278	14,5	5,04
26500	323	13,0	4,33
22200	358	9,87	3,91
26800	397	10,8	3,53
27300	460	9,45	3,04
26100	484	8,59	2,89
28000	565	7,91	2,48
26800	627	6,81	2,23

P4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29400	126	37,2	11,1
29700	147	32,3	9,54
29400	160	29,2	8,74
29900	183	26,0	7,64
29500	200	23,5	7,00
30000	219	21,8	6,41
30100	251	19,1	5,58
29700	274	17,3	5,12
30200	313	15,4	4,47
29800	342	13,9	4,10
30200	407	11,8	3,44
30800	452	10,9	3,10
31200	509	9,76	2,75
31700	564	8,96	2,48
35300	636	8,84	2,20

P4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
44200	129	54,4	10,8
41000	145	45,1	9,66
44900	155	46,1	9,01
44400	180	39,4	7,80
46400	201	36,7	6,96
44600	226	31,5	6,21
44700	247	28,8	5,66
46900	277	26,9	5,05
45000	320	22,4	4,37
47100	351	21,4	3,99
45500	405	17,9	3,45
47400	454	16,6	3,08
48600	483	16,0	2,90
47700	558	13,6	2,51
49600	625	12,6	2,24

P4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
81000	126	103	11,1
81400	141	92,1	9,95
82300	155	84,5	9,02
84400	174	77,1	8,03
82800	204	64,7	6,87
85000	229	59,1	6,11
82300	252	52,1	5,56
83300	278	47,8	5,04
85600	312	43,7	4,49
83800	365	36,6	3,84
87000	410	33,8	3,42
85200	453	29,9	3,09
87400	500	27,9	2,80
91300	562	25,9	2,49
83700	627	21,3	2,23

7.3 PH GEAR REDUCER - 1140 rpm

P1H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
8080	2,04	482	559
8460	2,18	473	523
8380	2,55	400	447
8340	2,83	359	403
8490	3,12	331	365
8310	3,60	281	317
8160	4,00	248	285
7730	4,38	215	260
7150	4,92	177	232

P1H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10900	1,95	683	585
11600	2,25	626	507
11400	2,55	543	447
11200	2,76	495	413
10800	3,11	421	367
10700	3,57	365	319
10600	4,00	322	285
10600	4,46	290	256
9480	4,92	235	232

P1H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
15800	1,96	982	583
17700	2,24	962	509
17400	2,53	839	451
17000	2,78	747	410
16800	3,19	640	358
16800	3,56	573	320
16100	3,93	499	290
15400	4,58	408	249
13100	5,09	312	224

P1H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18700	2,04	1110	558
19600	2,25	1060	507
20300	2,50	988	456
20600	2,82	890	404
20500	3,27	763	349
20300	3,60	688	317
20500	3,93	635	290
20300	4,36	569	262
18800	4,91	465	232

P1H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
25100	1,96	1560	583
25200	2,24	1370	509
25400	2,48	1250	460
25800	2,79	1130	409
26200	3,11	1030	367
26800	3,59	908	318
25900	3,93	802	290
25700	4,54	688	251
25600	5,08	612	224

P1H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
43800	1,95	2730	583
46500	2,29	2480	499
49400	2,48	2430	460
50600	2,83	2170	402
49800	3,13	1940	365
50200	3,56	1720	320
50100	3,93	1550	290
50300	4,42	1390	258
50300	4,92	1250	232

7.3 PH GEAR REDUCER - 1140 rpm

P2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10600	5,66	232	201
9890	6,53	188	175
9760	7,26	167	157
9220	7,96	144	143
9920	8,57	144	133
10300	9,90	130	115
10300	11,0	116	104
9730	12,1	100	94,5
9670	15,0	79,9	75,8
10100	16,7	74,9	68,2
9530	18,3	64,7	62,3
9230	20,6	55,8	55,4
9060	22,8	49,5	50,1
9910	25,0	49,4	45,7

P2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14200	5,52	320	207
13600	6,35	266	180
14400	7,11	252	160
13800	7,84	219	145
14500	9,01	200	127
14300	9,66	184	118
14900	11,1	166	103
14200	12,4	142	91,6
13500	14,1	119	81,1
14700	15,7	116	72,5
13800	17,6	97,5	65,0
13200	19,4	85,0	58,9
13600	23,1	73,5	49,5
12900	25,4	63,2	44,8

P2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16600	5,62	367	203
18000	6,20	360	184
18500	7,23	318	158
20900	8,02	325	142
20400	8,85	286	129
21300	10,1	261	113
20900	11,2	232	102
19600	13,0	187	87,5
19600	14,5	168	78,5
19800	16,0	154	71,1
18800	18,7	125	61,0
18500	19,7	117	58,0
19200	22,9	104	49,7
16600	25,5	81,1	44,8

P2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24600	5,68	539	201
24600	6,20	494	184
24200	6,87	438	166
25600	8,06	395	141
27300	8,79	386	130
27700	10,4	330	109
27900	11,4	305	100
26500	12,6	261	90,4
28800	14,7	244	77,7
29000	16,0	225	71,2
27500	17,8	192	64,2
26200	20,0	163	57,0
27500	22,2	154	51,4
23900	25,0	119	45,6

P2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
37200	5,82	795	196
34700	6,37	677	179
35500	7,36	600	155
37600	8,20	570	139
35900	8,98	497	127
37900	10,2	463	112
37300	11,1	417	102
37500	12,9	362	88,7
38300	14,1	337	80,8
37900	15,5	305	73,8
37000	17,9	258	63,9
35900	20,0	223	57,0
38100	23,1	205	49,3
34100	25,9	164	44,1

P2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
61500	5,70	1340	200
62500	6,29	1240	181
64100	7,07	1130	161
65600	8,02	1020	142
67700	8,84	952	129
69700	10,1	859	113
70700	11,1	790	102
71800	12,5	713	91,1
73800	14,0	655	81,4
75300	15,5	606	73,8
76900	17,4	551	65,6
73600	19,4	473	58,9
76900	22,8	419	50,0
75300	25,4	368	44,8

7.3 PH GEAR REDUCER - 1140 rpm

P3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10600	28,8	46,7	39,6
10400	32,0	41,0	35,6
9870	35,1	35,7	32,5
11100	39,8	35,2	28,6
10400	43,6	30,1	26,1
11400	51,1	28,4	22,3
10800	56,0	24,5	20,4
10500	62,9	21,1	18,1
11000	69,7	20,0	16,4
10300	80,4	16,3	14,2
11300	88,1	16,3	12,9
10100	98,9	13,0	11,5
9760	110	11,2	10,3
10700	121	11,2	9,43

P3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14400	27,8	65,6	41,1
15300	30,6	63,6	37,3
14500	34,2	53,9	33,3
15600	38,6	51,3	29,5
14600	43,3	42,8	26,3
15900	51,5	39,2	22,1
14700	57,7	32,4	19,8
13900	63,1	27,9	18,1
15600	71,2	27,8	16,0
14800	79,8	23,6	14,3
15900	89,0	22,7	12,8
14900	105	18,1	10,9
16500	117	17,9	9,75
14000	129	13,8	8,84

P3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18000	28,6	79,8	39,8
19800	31,6	79,5	36,1
20600	36,2	72,3	31,5
20900	39,9	66,5	28,6
20100	46,5	54,9	24,5
20700	51,9	50,7	22,0
21800	57,3	48,3	19,9
20800	63,6	41,5	17,9
22300	70,2	40,3	16,2
22700	81,5	35,4	14,0
21000	90,5	29,5	12,6
23100	100,0	29,4	11,4
22600	116	24,6	9,79
21100	129	20,7	8,81

P3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
26100	28,0	119	40,8
28500	30,5	119	37,4
29100	36,2	102	31,5
28700	39,5	92,3	28,9
28300	43,8	82,2	26,0
29300	50,9	73,0	22,4
28900	55,6	66,0	20,5
29400	63,6	58,7	17,9
29000	69,4	53,1	16,4
29100	82,8	44,7	13,8
29400	91,8	40,7	12,4
29200	103	35,9	11,0
29500	115	32,7	9,95
28900	129	28,4	8,83

P3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
36000	29,2	156	39,0
40100	32,0	159	35,6
39300	37,0	135	30,8
41000	39,7	131	28,7
40300	45,8	112	24,9
39100	50,3	98,8	22,7
42600	55,0	98,2	20,7
41700	63,6	83,3	17,9
43800	71,3	78,0	16,0
43000	82,3	66,3	13,8
43300	87,6	62,8	13,0
45400	98,2	58,7	11,6
43900	113	49,2	10,1
40600	127	40,6	8,97

P3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
73400	28,3	329	40,3
75400	31,2	306	36,5
77400	35,7	276	32,0
79400	39,3	256	29,0
81400	44,2	234	25,8
83400	49,5	214	23,0
85400	54,6	199	20,9
86400	65,0	169	17,5
88400	71,7	157	15,9
88400	80,6	139	14,1
86400	89,2	123	12,8
90500	98,4	117	11,6
90500	111	104	10,3
86100	123	88,7	9,25

7.3 PH GEAR REDUCER - 1140 rpm

P4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10300	128	10,4	8,90
11400	142	10,4	8,04
11800	164	9,35	6,96
12400	179	8,99	6,35
11000	201	7,08	5,66
11600	225	6,67	5,07
11700	246	6,16	4,63
11000	277	5,17	4,12
11100	317	4,53	3,60
11300	353	4,17	3,23
12400	387	4,16	2,95
11300	435	3,39	2,62
11600	495	3,04	2,31
12100	552	2,83	2,07
13200	605	2,83	1,89

P4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14900	120	16,2	9,52
16200	143	14,8	7,99
15000	160	12,2	7,14
15700	178	11,4	6,42
15600	200	10,1	5,70
15100	221	8,88	5,16
17100	246	8,99	4,63
15200	279	7,07	4,08
17200	311	7,15	3,66
15300	367	5,41	3,11
15500	410	4,92	2,78
17800	457	5,04	2,50
17100	480	4,63	2,37
16300	538	3,92	2,12
18500	600	3,99	1,90

P4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
22800	130	22,7	8,75
21900	144	19,7	7,91
25100	159	20,4	7,16
24900	185	17,4	6,15
25200	197	16,6	5,80
25200	228	14,3	4,99
22100	251	11,4	4,54
25300	278	11,8	4,11
26600	323	10,7	3,52
22300	358	8,07	3,19
26900	397	8,80	2,87
27400	460	7,73	2,48
26200	484	7,02	2,35
28200	565	6,47	2,02
26900	627	5,57	1,82

P4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29600	126	30,4	9,04
29900	147	26,4	7,76
29500	160	23,9	7,12
30000	183	21,2	6,22
29600	200	19,2	5,70
30100	219	17,9	5,22
30200	251	15,6	4,55
29800	274	14,1	4,17
30300	313	12,6	3,64
29900	342	11,4	3,34
30300	407	9,66	2,80
30900	452	8,88	2,52
31300	509	7,98	2,24
31900	564	7,32	2,02
35400	636	7,23	1,79

P4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
44300	129	44,5	8,81
41200	145	36,9	7,87
45100	155	37,7	7,33
44600	180	32,3	6,35
46600	201	30,0	5,67
44800	226	25,8	5,05
44900	247	23,6	4,61
47100	277	22,0	4,11
45200	320	18,3	3,56
47300	351	17,5	3,25
45700	405	14,6	2,81
47600	454	13,6	2,51
48900	483	13,1	2,36
47900	558	11,1	2,04
49800	625	10,3	1,82

P4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
81400	126	84,0	9,07
81700	141	75,3	8,10
82600	155	69,1	7,35
84800	174	63,1	6,53
83100	204	52,9	5,59
85400	229	48,3	4,97
82700	252	42,6	4,53
83700	278	39,1	4,11
86000	312	35,7	3,65
84200	365	30,0	3,13
87400	410	27,7	2,78
85600	453	24,5	2,51
87800	500	22,8	2,28
91700	562	21,2	2,03
84100	627	17,4	1,82

7.4 PH GEAR REDUCER - 900 rpm

P1H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
8240	2,04	388	441
8620	2,18	380	413
8540	2,55	322	353
8500	2,83	289	318
8650	3,12	267	288
8470	3,60	226	250
8320	4,00	200	225
7880	4,38	173	205
7290	4,92	142	183

P1H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
11100	1,95	549	462
11800	2,25	504	400
11600	2,55	437	353
11400	2,76	398	326
11000	3,11	339	289
10900	3,57	294	252
10800	4,00	259	225
10800	4,46	234	202
9670	4,92	189	183

P1H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16100	1,96	791	460
18000	2,24	774	402
17800	2,53	676	356
17400	2,78	601	324
17100	3,19	516	282
17100	3,56	461	253
16400	3,93	401	229
15700	4,58	329	196
13300	5,09	251	177

P1H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
19000	2,04	895	440
20000	2,25	853	400
20700	2,50	795	360
21100	2,82	717	319
20900	3,27	614	276
20700	3,60	554	250
20900	3,93	511	229
20700	4,36	458	207
19100	4,91	375	183

P1H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
25600	1,96	1260	460
25700	2,24	1100	402
25900	2,48	1010	363
26300	2,79	907	323
26700	3,11	828	290
27300	3,59	731	251
26400	3,93	645	229
26200	4,54	554	198
26100	5,08	493	177

P1H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
44600	1,95	2190	460
47400	2,29	1990	394
50400	2,48	1960	363
51500	2,83	1750	318
50800	3,13	1560	288
51200	3,56	1380	253
51000	3,93	1250	229
51300	4,42	1120	204
51300	4,92	1000	183

7.4 PH GEAR REDUCER - 900 rpm

P2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10700	5,66	186	159
10000	6,53	151	138
9910	7,26	134	124
9360	7,96	115	113
10100	8,57	115	105
10500	9,90	104	90,9
10500	11,0	93,3	81,8
9880	12,1	80,4	74,6
9810	15,0	64,0	59,8
10200	16,7	60,0	53,9
9670	18,3	51,8	49,2
9370	20,6	44,7	43,8
9190	22,8	39,6	39,5
10100	25,0	39,5	36,1

P2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14400	5,52	256	163
13800	6,35	213	142
14600	7,11	202	127
14000	7,84	176	115
14700	9,01	160	99,9
14500	9,66	147	93,2
15100	11,1	133	81,0
14500	12,4	114	72,3
13700	14,1	95,5	64,1
14900	15,7	92,8	57,2
14000	17,6	78,1	51,3
13400	19,4	68,0	46,5
13800	23,1	58,9	39,0
13100	25,4	50,6	35,4

P2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16800	5,62	294	160
18300	6,20	289	145
18700	7,23	254	125
21200	8,02	260	112
20700	8,85	229	102
21600	10,1	209	88,9
21200	11,2	186	80,5
19900	13,0	150	69,1
19900	14,5	134	62,0
20100	16,0	123	56,1
19100	18,7	100	48,2
18800	19,7	93,9	45,8
19500	22,9	83,6	39,3
16800	25,5	64,9	35,4

P2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
25000	5,68	432	159
25000	6,20	396	145
24600	6,87	351	131
26000	8,06	317	112
27700	8,79	309	102
28100	10,4	265	86,4
28300	11,4	244	79,1
26900	12,6	209	71,4
29300	14,7	196	61,3
29500	16,0	181	56,2
27900	17,8	154	50,7
26600	20,0	131	45,0
27900	22,2	123	40,6
24200	25,0	95,1	36,0

P2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
37700	5,82	637	155
35200	6,37	542	141
36000	7,36	480	122
38200	8,20	457	110
36400	8,98	398	100
38400	10,2	371	88,5
37900	11,1	334	80,9
38000	12,9	290	70,0
38800	14,1	270	63,8
38400	15,5	244	58,2
37600	17,9	206	50,4
36400	20,0	179	45,0
38700	23,1	164	39,0
34600	25,9	131	34,8

P2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
62400	5,70	1070	158
63400	6,29	991	143
65000	7,07	903	127
66600	8,02	815	112
68600	8,84	762	102
70700	10,1	688	89,2
71800	11,1	633	80,9
72800	12,5	571	71,9
74900	14,0	525	64,2
76400	15,5	486	58,2
78000	17,4	441	51,8
74700	19,4	379	46,5
78000	22,8	336	39,4
76400	25,4	295	35,4

7.4 PH GEAR REDUCER - 900 rpm

P3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10600	28,8	37,0	31,2
10400	32,0	32,5	28,1
9910	35,1	28,3	25,6
11100	39,8	27,9	22,6
10400	43,6	23,9	20,6
11500	51,1	22,5	17,6
10900	56,0	19,4	16,1
10500	62,9	16,7	14,3
11000	69,7	15,8	12,9
10400	80,4	12,9	11,2
11400	88,1	12,9	10,2
10100	98,9	10,3	9,10
9800	110	8,90	8,16
10700	121	8,89	7,44

P3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14400	27,8	52,0	32,4
15400	30,6	50,4	29,5
14600	34,2	42,7	26,3
15700	38,6	40,7	23,3
14700	43,3	34,0	20,8
16000	51,5	31,0	17,5
14800	57,7	25,7	15,6
13900	63,1	22,1	14,3
15700	71,2	22,1	12,6
14900	79,8	18,7	11,3
16000	89,0	18,0	10,1
15000	105	14,3	8,59
16600	117	14,2	7,70
14100	129	11,0	6,98

P3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18100	28,6	63,2	31,4
19900	31,6	63,0	28,5
20700	36,2	57,3	24,9
21000	39,9	52,7	22,5
20200	46,5	43,5	19,3
20800	51,9	40,2	17,4
21900	57,3	38,3	15,7
20900	63,6	32,9	14,1
22400	70,2	32,0	12,8
22800	81,5	28,0	11,0
21100	90,5	23,3	9,94
23200	100,0	23,3	9,00
22700	116	19,5	7,73
21200	129	16,4	6,96

P3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
26200	28,0	94,0	32,2
28600	30,5	94,1	29,5
29200	36,2	80,9	24,9
28800	39,5	73,1	22,8
28500	43,8	65,2	20,6
29400	50,9	57,8	17,7
29000	55,6	52,3	16,2
29500	63,6	46,5	14,1
29100	69,4	42,1	13,0
29200	82,8	35,4	10,9
29500	91,8	32,2	9,81
29400	103	28,5	8,71
29600	115	25,9	7,85
29000	129	22,5	6,97

P3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
36100	29,2	124	30,8
40200	32,0	126	28,1
39500	37,0	107	24,4
41200	39,7	104	22,7
40400	45,8	88,4	19,6
39300	50,3	78,3	17,9
42700	55,0	77,8	16,3
41900	63,6	66,1	14,2
44000	71,3	61,8	12,6
43100	82,3	52,5	10,9
43500	87,6	49,7	10,3
45600	98,2	46,5	9,17
44100	113	39,0	7,93
40700	127	32,1	7,08

P3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
73700	28,3	261	31,8
75700	31,2	243	28,8
77700	35,7	218	25,2
79700	39,3	203	22,9
81700	44,2	185	20,4
83700	49,5	170	18,2
85800	54,6	157	16,5
86800	65,0	134	13,8
88800	71,7	124	12,5
88800	80,6	110	11,2
86800	89,2	97,5	10,1
90800	98,4	92,6	9,15
90800	111	82,3	8,14
86400	123	70,3	7,30

7.4 PH GEAR REDUCER - 900 rpm

P4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10400	128	8,28	7,03
11400	142	8,22	6,34
11800	164	7,41	5,50
12500	179	7,12	5,02
11000	201	5,61	4,47
11600	225	5,28	4,00
11700	246	4,88	3,65
11100	277	4,10	3,25
11100	317	3,59	2,84
11400	353	3,30	2,55
12500	387	3,30	2,33
11400	435	2,68	2,07
11600	495	2,41	1,82
12100	552	2,25	1,63
13200	605	2,24	1,49

P4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
15000	120	12,8	7,51
16300	143	11,7	6,31
15100	160	9,68	5,64
15700	178	9,07	5,07
15700	200	8,04	4,50
15200	221	7,03	4,07
17100	246	7,13	3,65
15300	279	5,60	3,22
17200	311	5,67	2,89
15400	367	4,29	2,45
15600	410	3,90	2,20
17800	457	4,00	1,97
17200	480	3,67	1,87
16300	538	3,11	1,67
18500	600	3,16	1,50

P4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
22900	130	18,0	6,91
22000	144	15,6	6,25
25200	159	16,2	5,66
25000	185	13,8	4,85
25300	197	13,2	4,58
25300	228	11,4	3,94
22200	251	9,04	3,58
25400	278	9,38	3,24
26700	323	8,46	2,78
22300	358	6,40	2,52
27000	397	6,97	2,27
27500	460	6,12	1,96
26300	484	5,57	1,86
28300	565	5,13	1,59
27000	627	4,41	1,44

P4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29700	126	24,1	7,13
30000	147	20,9	6,13
29600	160	18,9	5,62
30100	183	16,8	4,91
29700	200	15,2	4,50
30200	219	14,2	4,12
30300	251	12,4	3,59
29900	274	11,2	3,29
30400	313	9,95	2,87
30000	342	9,00	2,63
30400	407	7,65	2,21
31100	452	7,04	1,99
31400	509	6,33	1,77
32000	564	5,80	1,60
35500	636	5,73	1,42

P4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
44500	129	35,3	6,96
41300	145	29,2	6,21
45300	155	29,9	5,79
44800	180	25,6	5,01
46800	201	23,8	4,47
45000	226	20,4	3,99
45100	247	18,7	3,64
47300	277	17,5	3,25
45300	320	14,5	2,81
47500	351	13,9	2,57
45900	405	11,6	2,22
47800	454	10,8	1,98
49100	483	10,4	1,86
48100	558	8,81	1,61
50000	625	8,19	1,44

P4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
81700	126	66,6	7,16
82000	141	59,7	6,40
83000	155	54,8	5,80
85100	174	50,0	5,16
83500	204	41,9	4,42
85700	229	38,3	3,93
83000	252	33,8	3,58
84000	278	31,0	3,24
86300	312	28,3	2,88
84500	365	23,7	2,47
87700	410	21,9	2,20
85900	453	19,4	1,98
88200	500	18,1	1,80
92100	562	16,8	1,60
84400	627	13,8	1,44

7.5 PH GEAR REDUCER - 700 rpm

P1H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
8320	2,04	305	343
8710	2,18	299	321
8620	2,55	253	275
8580	2,83	227	247
8740	3,12	210	224
8550	3,60	178	194
8400	4,00	157	175
7950	4,38	136	160
7360	4,92	112	142

P1H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
11300	1,95	432	359
11900	2,25	396	311
11700	2,55	343	275
11500	2,76	313	254
11100	3,11	266	225
11000	3,57	231	196
10900	4,00	204	175
10900	4,46	183	157
9760	4,92	148	142

P1H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16200	1,96	621	358
18200	2,24	608	313
17900	2,53	531	277
17500	2,78	472	252
17300	3,19	405	220
17300	3,56	362	196
16600	3,93	315	178
15800	4,58	258	153
13400	5,09	197	138

P1H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
19200	2,04	703	343
20200	2,25	670	311
20900	2,50	625	280
21300	2,82	563	248
21100	3,27	482	214
20900	3,60	435	194
21100	3,93	401	178
20900	4,36	359	161
19300	4,91	294	143

P1H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
25900	1,96	989	358
25900	2,24	867	313
26200	2,48	791	283
26600	2,79	712	251
27000	3,11	650	225
27500	3,59	574	195
26600	3,93	507	178
26400	4,54	435	154
26300	5,08	387	138

P1H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
45000	1,95	1720	358
47900	2,29	1570	306
50900	2,48	1540	283
52000	2,83	1370	247
51200	3,13	1230	224
51600	3,56	1080	196
51500	3,93	981	178
51800	4,42	877	158
51800	4,92	787	142

7.5 PH GEAR REDUCER - 700 rpm

P2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
11000	5,66	149	124
10300	6,53	121	107
10200	7,26	107	96,4
9630	7,96	92,4	87,9
10400	8,57	92,3	81,7
10800	9,90	83,2	70,7
10800	11,0	74,6	63,6
10200	12,1	64,3	58,0
10100	15,0	51,3	46,5
10500	16,7	48,0	41,9
9950	18,3	41,5	38,2
9640	20,6	35,8	34,0
9450	22,8	31,7	30,7
10300	25,0	31,6	28,0

P2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14800	5,52	205	127
14200	6,35	171	110
15000	7,11	161	98,5
14400	7,84	141	89,3
15200	9,01	128	77,7
14900	9,66	118	72,5
15500	11,1	107	63,0
14900	12,4	91,3	56,3
14100	14,1	76,5	49,8
15300	15,7	74,3	44,5
14400	17,6	62,5	39,9
13800	19,4	54,5	36,2
14200	23,1	47,1	30,4
13500	25,4	40,5	27,5

P2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
17300	5,62	236	125
18800	6,20	231	113
19300	7,23	204	96,9
21900	8,02	208	87,3
21300	8,85	184	79,1
22200	10,1	167	69,1
21800	11,2	149	62,6
20500	13,0	120	53,7
20400	14,5	107	48,2
20700	16,0	98,6	43,7
19600	18,7	80,1	37,5
19400	19,7	75,1	35,6
20100	22,9	66,9	30,5
17300	25,5	52,0	27,5

P2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
25700	5,68	345	123
25700	6,20	316	113
25300	6,87	281	102
26800	8,06	253	86,9
28500	8,79	247	79,6
28900	10,4	212	67,2
29100	11,4	196	61,6
27600	12,6	167	55,5
30100	14,7	157	47,7
30300	16,0	144	43,7
28700	17,8	123	39,4
27400	20,0	105	35,0
28700	22,2	98,8	31,6
24900	25,0	76,1	28,0

P2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
38800	5,82	509	120
36200	6,37	434	110
37000	7,36	384	95,2
39300	8,20	366	85,3
37500	8,98	319	78,0
39600	10,2	297	68,9
39000	11,1	267	62,9
39100	12,9	232	54,4
39900	14,1	216	49,6
39500	15,5	195	45,3
38600	17,9	165	39,2
37500	20,0	143	35,0
39800	23,1	131	30,3
35600	25,9	105	27,0

P2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
64200	5,70	860	123
65300	6,29	793	111
66900	7,07	723	99,1
68500	8,02	652	87,3
70600	8,84	610	79,2
72800	10,1	550	69,3
73800	11,1	506	62,9
74900	12,5	457	55,9
77000	14,0	420	50,0
78600	15,5	389	45,3
80300	17,4	353	40,3
76900	19,4	303	36,1
80300	22,8	269	30,7
78600	25,4	236	27,5

7.5 PH GEAR REDUCER - 700 rpm

P3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10700	28,8	28,9	24,3
10400	32,0	25,4	21,9
9970	35,1	22,1	19,9
11200	39,8	21,8	17,6
10400	43,6	18,7	16,0
11500	51,1	17,6	13,7
10900	56,0	15,2	12,5
10600	62,9	13,1	11,1
11100	69,7	12,4	10,1
10400	80,4	10,1	8,71
11400	88,1	10,1	7,95
10200	98,9	8,03	7,08
9860	110	6,97	6,34
10800	121	6,96	5,79

P3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14500	27,8	40,7	25,2
15500	30,6	39,4	22,9
14700	34,2	33,4	20,5
15800	38,6	31,8	18,1
14700	43,3	26,6	16,2
16000	51,5	24,3	13,6
14800	57,7	20,1	12,1
14000	63,1	17,3	11,1
15800	71,2	17,3	9,83
15000	79,8	14,6	8,77
16100	89,0	14,1	7,87
15000	105	11,2	6,68
16700	117	11,1	5,99
14200	129	8,57	5,43

P3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18200	28,6	49,4	24,5
20000	31,6	49,3	22,1
20800	36,2	44,8	19,4
21100	39,9	41,2	17,5
20300	46,5	34,0	15,0
20900	51,9	31,4	13,5
22000	57,3	30,0	12,2
21000	63,6	25,7	11,0
22500	70,2	25,0	9,97
22900	81,5	21,9	8,59
21200	90,5	18,3	7,73
23300	100,0	18,2	7,00
22800	116	15,3	6,01
21300	129	12,8	5,41

P3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
26400	28,0	73,5	25,0
28800	30,5	73,6	22,9
29300	36,2	63,2	19,4
29000	39,5	57,2	17,7
28600	43,8	50,9	16,0
29600	50,9	45,2	13,7
29200	55,6	40,9	12,6
29700	63,6	36,4	11,0
29300	69,4	32,9	10,1
29400	82,8	27,7	8,46
29700	91,8	25,2	7,63
29500	103	22,3	6,77
29800	115	20,3	6,11
29100	129	17,6	5,42

P3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
36300	29,2	96,9	24,0
40500	32,0	98,6	21,9
39700	37,0	83,8	18,9
41400	39,7	81,5	17,7
40600	45,8	69,2	15,3
39500	50,3	61,3	13,9
43000	55,0	60,8	12,7
42100	63,6	51,7	11,0
44200	71,3	48,4	9,82
43400	82,3	41,1	8,50
43700	87,6	38,9	7,99
45800	98,2	36,4	7,13
44300	113	30,5	6,17
41000	127	25,1	5,51

P3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
74100	28,3	204	24,7
76100	31,2	190	22,4
78100	35,7	171	19,6
80100	39,3	159	17,8
82200	44,2	145	15,8
84200	49,5	133	14,1
86200	54,6	123	12,8
87200	65,0	105	10,8
89300	71,7	97,1	9,76
89300	80,6	86,3	8,68
87200	89,2	76,3	7,85
91300	98,4	72,4	7,12
91300	111	64,4	6,33
86900	123	55,0	5,68

7.5 PH GEAR REDUCER - 700 rpm

P4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10800	128	6,70	5,46
11900	142	6,66	4,93
12300	164	6,00	4,28
13000	179	5,77	3,90
11500	201	4,54	3,47
12100	225	4,28	3,11
12200	246	3,95	2,84
11500	277	3,32	2,53
11600	317	2,91	2,21
11900	353	2,67	1,98
13000	387	2,67	1,81
11900	435	2,17	1,61
12100	495	1,95	1,42
12600	552	1,82	1,27
13800	605	1,82	1,16

P4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
15600	120	10,4	5,84
17000	143	9,48	4,91
15700	160	7,84	4,38
16400	178	7,35	3,94
16300	200	6,51	3,50
15800	221	5,70	3,17
17900	246	5,77	2,84
15900	279	4,54	2,51
17900	311	4,59	2,25
16000	367	3,48	1,91
16200	410	3,16	1,71
18600	457	3,24	1,53
17900	480	2,97	1,46
17000	538	2,51	1,30
19300	600	2,56	1,17

P4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
23800	130	14,6	5,37
22900	144	12,6	4,86
26200	159	13,1	4,40
26000	185	11,2	3,78
26300	197	10,7	3,56
26400	228	9,20	3,07
23100	251	7,32	2,78
26500	278	7,60	2,52
27800	323	6,85	2,16
23300	358	5,18	1,96
28100	397	5,64	1,76
28700	460	4,96	1,52
27400	484	4,51	1,44
29400	565	4,15	1,24
28100	627	3,57	1,12

P4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
30900	126	19,5	5,55
31200	147	16,9	4,77
30800	160	15,3	4,37
31400	183	13,6	3,82
31000	200	12,3	3,50
31500	219	11,5	3,20
31600	251	10,0	2,79
31100	274	9,06	2,56
31700	313	8,06	2,24
31300	342	7,29	2,05
31700	407	6,20	1,72
32300	452	5,70	1,55
32700	509	5,12	1,38
33300	564	4,70	1,24
37000	636	4,64	1,10

P4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
46400	129	28,5	5,41
43100	145	23,7	4,83
47200	155	24,2	4,50
46700	180	20,7	3,90
48700	201	19,3	3,48
46900	226	16,6	3,10
47000	247	15,1	2,83
49200	277	14,1	2,53
47200	320	11,7	2,19
49500	351	11,2	2,00
47800	405	9,40	1,73
49800	454	8,73	1,54
51100	483	8,42	1,45
50000	558	7,14	1,25
52000	625	6,63	1,12

P4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
85100	126	53,9	5,57
85400	141	48,4	4,97
86400	155	44,4	4,51
88600	174	40,5	4,01
86900	204	34,0	3,43
89300	229	31,0	3,05
86400	252	27,4	2,78
87500	278	25,1	2,52
89800	312	22,9	2,24
88000	365	19,2	1,92
91400	410	17,8	1,71
89400	453	15,7	1,54
91800	500	14,6	1,40
95900	562	13,6	1,25
87900	627	11,2	1,12

7.6 PH GEAR REDUCER - 500 rpm

P1H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
8470	2,04	222	245
8870	2,18	217	229
8790	2,55	184	196
8750	2,83	165	177
8900	3,12	152	160
8720	3,60	129	139
8560	4,00	114	125
8110	4,38	98,9	114
7500	4,92	81,4	102

P1H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
11500	1,95	314	256
12100	2,25	288	222
11900	2,55	250	196
11800	2,76	228	181
11300	3,11	194	161
11200	3,57	168	140
11100	4,00	148	125
11100	4,46	133	112
9950	4,92	108	102

P1H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16600	1,96	452	256
18500	2,24	443	223
18300	2,53	386	198
17900	2,78	343	180
17600	3,19	295	157
17600	3,56	264	140
16900	3,93	230	127
16100	4,58	188	109
13700	5,09	144	98,2

P1H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
19600	2,04	511	245
20500	2,25	488	222
21300	2,50	455	200
21700	2,82	410	177
21500	3,27	351	153
21300	3,60	317	139
21500	3,93	292	127
21300	4,36	262	115
19700	4,91	214	102

P1H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
26400	1,96	720	256
26400	2,24	631	223
26700	2,48	576	202
27100	2,79	518	179
27500	3,11	473	161
28100	3,59	418	139
27100	3,93	369	127
26900	4,54	317	110
26800	5,08	282	98,4

P1H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
45900	1,95	1250	256
48800	2,29	1140	219
51800	2,48	1120	202
53000	2,83	1000	176
52200	3,13	893	160
52600	3,56	789	140
52500	3,93	714	127
52800	4,42	638	113
52800	4,92	573	102

7.6 PH GEAR REDUCER - 500 rpm

P2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
11300	5,66	109	88,4
10600	6,53	88,6	76,6
10500	7,26	78,7	68,9
9900	7,96	67,8	62,8
10700	8,57	67,8	58,3
11100	9,90	61,1	50,5
11100	11,0	54,8	45,5
10500	12,1	47,3	41,5
10400	15,0	37,6	33,2
10800	16,7	35,3	29,9
10200	18,3	30,5	27,3
9910	20,6	26,3	24,3
9720	22,8	23,3	22,0
10600	25,0	23,2	20,0

P2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
15200	5,52	150	90,6
14600	6,35	125	78,7
15500	7,11	119	70,3
14900	7,84	103	63,8
15600	9,01	94,2	55,5
15300	9,66	86,5	51,8
15900	11,1	78,2	45,0
15300	12,4	67,0	40,2
14500	14,1	56,1	35,6
15700	15,7	54,5	31,8
14800	17,6	45,9	28,5
14200	19,4	40,0	25,8
14600	23,1	34,6	21,7
13900	25,4	29,8	19,7

P2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
17800	5,62	173	89,0
19300	6,20	170	80,6
19800	7,23	149	69,2
22500	8,02	153	62,4
21900	8,85	135	56,5
22800	10,1	123	49,4
22400	11,2	109	44,7
21100	13,0	88,3	38,4
21000	14,5	78,9	34,4
21300	16,0	72,4	31,2
20200	18,7	58,8	26,8
19900	19,7	55,2	25,4
20600	22,9	49,1	21,8
17800	25,5	38,2	19,6

P2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
26400	5,68	254	88,1
26400	6,20	232	80,7
26000	6,87	206	72,8
27500	8,06	186	62,1
29300	8,79	182	56,9
29700	10,4	155	48,0
30000	11,4	144	44,0
28400	12,6	123	39,6
30900	14,7	115	34,1
31200	16,0	106	31,2
29500	17,8	90,5	28,1
28200	20,0	76,8	25,0
29500	22,2	72,6	22,5
25600	25,0	55,9	20,0

P2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
39900	5,82	374	86,0
37200	6,37	319	78,5
38100	7,36	282	68,0
40400	8,20	269	61,0
38500	8,98	234	55,7
40700	10,2	218	49,2
40100	11,1	196	44,9
40200	12,9	171	38,9
41100	14,1	159	35,4
40600	15,5	143	32,4
39700	17,9	121	28,0
38500	20,0	105	25,0
40900	23,1	96,5	21,6
36600	25,9	77,1	19,3

P2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
66000	5,70	631	87,7
67100	6,29	582	79,5
68800	7,07	531	70,8
70400	8,02	479	62,4
72600	8,84	448	56,6
74800	10,1	404	49,5
75900	11,1	372	44,9
77000	12,5	336	40,0
79200	14,0	308	35,7
80900	15,5	285	32,4
82500	17,4	259	28,8
79000	19,4	223	25,8
82500	22,8	197	21,9
80900	25,4	173	19,7

7.6 PH GEAR REDUCER - 500 rpm

P3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10800	28,8	20,8	17,3
10500	32,0	18,3	15,6
10100	35,1	16,0	14,2
11300	39,8	15,7	12,6
10500	43,6	13,5	11,5
11600	51,1	12,7	9,78
11000	56,0	10,9	8,93
10700	62,9	9,43	7,95
11200	69,7	8,92	7,18
10500	80,4	7,30	6,22
11500	88,1	7,28	5,68
10300	98,9	5,79	5,06
9940	110	5,02	4,53
10900	121	5,01	4,13

P3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14600	27,8	29,3	18,0
15600	30,6	28,4	16,4
14800	34,2	24,1	14,6
15900	38,6	22,9	12,9
14900	43,3	19,1	11,6
16200	51,5	17,5	9,71
15000	57,7	14,5	8,67
14100	63,1	12,5	7,92
15900	71,2	12,4	7,02
15100	79,8	10,5	6,27
16200	89,0	10,1	5,62
15200	105	8,06	4,77
16800	117	8,00	4,28
14300	129	6,17	3,88

P3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18300	28,6	35,6	17,5
20200	31,6	35,5	15,8
21000	36,2	32,3	13,8
21300	39,9	29,7	12,5
20500	46,5	24,5	10,7
21100	51,9	22,6	9,64
22200	57,3	21,6	8,73
21200	63,6	18,5	7,86
22700	70,2	18,0	7,12
23100	81,5	15,8	6,13
21400	90,5	13,2	5,52
23500	100,0	13,1	5,00
23000	116	11,0	4,29
21500	129	9,25	3,86

P3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
26600	28,0	53,0	17,9
29100	30,5	53,0	16,4
29600	36,2	45,6	13,8
29200	39,5	41,2	12,7
28900	43,8	36,7	11,4
29800	50,9	32,6	9,82
29400	55,6	29,5	8,99
29900	63,6	26,2	7,86
29500	69,4	23,7	7,20
29700	82,8	20,0	6,04
29900	91,8	18,2	5,45
29800	103	16,1	4,84
30100	115	14,6	4,36
29400	129	12,7	3,87

P3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
36600	29,2	69,8	17,1
40800	32,0	71,1	15,6
40100	37,0	60,4	13,5
41800	39,7	58,7	12,6
41000	45,8	49,8	10,9
39900	50,3	44,1	9,94
43300	55,0	43,8	9,08
42500	63,6	37,2	7,86
44600	71,3	34,8	7,02
43800	82,3	29,6	6,07
44100	87,6	28,0	5,71
46200	98,2	26,2	5,09
44700	113	22,0	4,41
41300	127	18,1	3,94

P3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
74700	28,3	147	17,7
76800	31,2	137	16,0
78800	35,7	123	14,0
80900	39,3	114	12,7
82900	44,2	104	11,3
85000	49,5	95,6	10,1
87000	54,6	88,7	9,16
88000	65,0	75,4	7,69
90100	71,7	69,9	6,97
90100	80,6	62,2	6,20
88000	89,2	55,0	5,61
92100	98,4	52,2	5,08
92100	111	46,4	4,52
87700	123	39,6	4,06

7.6 PH GEAR REDUCER - 500 rpm

P4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
11400	128	5,06	3,90
12500	142	5,03	3,52
13000	164	4,53	3,05
13700	179	4,36	2,79
12200	201	3,43	2,48
12800	225	3,23	2,22
12900	246	2,98	2,03
12200	277	2,51	1,81
12200	317	2,20	1,58
12500	353	2,02	1,42
13700	387	2,02	1,29
12500	435	1,64	1,15
12800	495	1,47	1,01
13300	552	1,37	0,906
14600	605	1,37	0,827

P4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16500	120	7,84	4,17
17900	143	7,16	3,51
16600	160	5,92	3,13
17300	178	5,55	2,82
17300	200	4,91	2,50
16700	221	4,30	2,26
18900	246	4,36	2,03
16800	279	3,43	1,79
19000	311	3,46	1,61
16900	367	2,62	1,36
17200	410	2,39	1,22
19600	457	2,45	1,09
18900	480	2,24	1,04
18000	538	1,90	0,929
20400	600	1,94	0,833

P4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
25200	130	11,0	3,84
24200	144	9,54	3,47
27700	159	9,90	3,14
27500	185	8,43	2,70
27800	197	8,04	2,54
27900	228	6,95	2,19
24400	251	5,53	1,99
28000	278	5,74	1,80
29400	323	5,17	1,55
24600	358	3,91	1,40
29700	397	4,26	1,26
30300	460	3,74	1,09
29000	484	3,40	1,03
31100	565	3,14	0,886
29700	627	2,70	0,797

P4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
32700	126	14,7	3,96
33000	147	12,8	3,41
32600	160	11,6	3,12
33200	183	10,3	2,73
32700	200	9,31	2,50
33300	219	8,66	2,29
33400	251	7,57	1,99
32900	274	6,84	1,83
33500	313	6,09	1,60
33100	342	5,50	1,46
33500	407	4,68	1,23
34200	452	4,30	1,11
34600	509	3,87	0,983
35200	564	3,55	0,886
39100	636	3,50	0,787

P4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
49000	129	21,6	3,87
45500	145	17,9	3,45
49900	155	18,3	3,22
49300	180	15,6	2,78
51500	201	14,6	2,49
49600	226	12,5	2,22
49700	247	11,4	2,02
52000	277	10,7	1,80
49900	320	8,87	1,56
52300	351	8,48	1,43
50500	405	7,10	1,23
52600	454	6,60	1,10
54000	483	6,36	1,03
52900	558	5,39	0,895
55000	625	5,01	0,799

P4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
89900	126	40,7	3,98
90300	141	36,5	3,55
91300	155	33,5	3,22
93700	174	30,6	2,87
91900	204	25,6	2,45
94400	229	23,4	2,18
91300	252	20,7	1,99
92500	278	19,0	1,80
95000	312	17,3	1,60
93000	365	14,5	1,37
96600	410	13,4	1,22
94500	453	11,9	1,10
97100	500	11,0	1,000
101000	562	10,3	0,889
92900	627	8,44	0,798

8.1 BH GEAR REDUCER - 1750 rpm

B2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
5940	5,27	217	332
6930	6,16	217	284
7710	6,85	217	255
8470	7,53	217	232
9780	8,70	217	201
9680	9,67	193	181
7930	11,3	135	155
8820	12,6	135	139
9470	13,8	133	127
8520	15,5	106	113
7570	17,3	84,5	101
7200	19,6	70,9	89,3
7880	21,5	70,8	81,5
8770	24,1	70,1	72,6

B2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
8600	5,44	305	322
9750	6,16	305	284
10600	6,68	305	262
11900	7,50	305	233
12700	8,63	285	203
12700	9,67	252	181
11900	10,8	213	162
12100	12,6	185	139
12000	14,0	165	125
11600	15,5	145	113
9640	17,3	108	101
9890	19,9	96,0	88,1
10900	21,9	96,0	79,8
10100	24,5	79,4	71,4

B2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
11600	5,41	412	324
13300	6,11	419	287
14700	6,71	422	261
16000	7,70	400	227
17100	8,61	382	203
16700	9,51	338	184
15500	11,1	270	158
15100	12,4	235	142
15700	14,4	211	121
15200	16,0	183	109
14200	17,7	155	98,8
14200	20,4	134	85,7
15000	22,7	127	77,2
14800	25,1	114	69,7

B2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
17800	5,44	632	322
20000	6,04	638	290
22800	6,82	645	256
24200	7,89	592	222
23600	8,70	524	201
23000	9,49	467	184
21800	11,3	371	155
23600	12,3	369	142
22200	13,7	313	128
22000	15,4	274	113
19600	17,5	216	100
21100	19,4	209	90,2
21600	21,9	190	80,0
18800	24,3	149	72,0

B2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
21900	5,41	781	324
24800	5,98	798	292
25700	6,74	736	260
26200	7,50	673	233
26700	8,67	593	202
27200	9,49	552	184
27600	11,0	486	160
28100	12,3	439	142
28600	14,3	387	123
29500	16,0	357	110
28600	17,6	314	99,5
25500	19,3	256	90,9
28400	22,2	247	78,7
30500	24,9	236	70,3

B2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
45100	5,52	1570	317
47000	5,98	1520	292
50000	6,85	1410	256
51500	7,55	1310	232
60800	8,61	1360	203
58500	9,49	1190	184
53900	10,7	974	164
53900	12,3	842	142
53900	13,9	749	126
53400	15,5	665	113
55900	17,4	618	100
51500	19,7	504	88,9
55900	21,9	491	79,8
58800	24,7	459	70,8

8.1 BH GEAR REDUCER - 1750 rpm

B3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
9380	29,1	62,8	60,1
9350	32,7	55,7	53,5
10200	36,3	54,7	48,2
10800	40,4	52,2	43,3
10200	44,3	44,8	39,5
9880	49,7	38,8	35,2
10300	57,6	34,9	30,4
10200	64,6	30,9	27,1
9820	71,6	26,8	24,5
10800	78,4	26,7	22,3
9820	88,1	21,7	19,9
9520	98,4	18,9	17,8
9700	113	16,8	15,5
11300	122	18,0	14,3

B3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
13300	27,2	95,5	64,3
14100	30,1	91,5	58,2
13700	33,5	79,5	52,2
14200	38,0	72,8	46,0
14100	42,4	64,8	41,3
14300	49,4	56,3	35,4
14600	55,2	51,5	31,7
14400	65,0	43,1	26,9
15100	72,4	40,6	24,2
13500	79,9	33,0	21,9
11600	90,4	25,0	19,4
13000	101	25,0	17,3
14400	113	24,9	15,5
13700	125	21,4	14,0

B3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
17600	27,7	124	63,2
18100	31,5	112	55,6
18100	35,0	101	50,0
18700	40,9	88,9	42,7
18900	45,2	81,6	38,8
19000	50,5	73,2	34,6
19400	55,4	68,3	31,6
19800	63,8	60,3	27,4
20100	72,0	54,3	24,3
20100	80,0	49,1	21,9
20700	91,6	44,1	19,1
20800	102	39,9	17,2
21300	112	36,9	15,6
19600	125	30,6	14,0

B3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
27800	27,5	197	63,7
26500	30,5	169	57,4
27900	35,7	152	49,0
28000	38,7	141	45,2
27600	42,9	125	40,8
28100	50,3	109	34,8
28400	55,8	99,1	31,3
28200	62,9	87,6	27,8
28500	69,7	79,7	25,1
28400	78,5	70,4	22,3
28600	87,0	64,1	20,1
28500	98,0	56,7	17,9
28800	109	51,6	16,1
28000	122	44,5	14,3

B3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
38400	26,9	278	65,1
37600	31,1	236	56,3
39400	35,0	220	50,0
38700	40,4	187	43,3
37700	45,3	162	38,7
40900	48,6	164	36,0
40100	56,1	139	31,2
42100	62,9	130	27,8
41300	72,6	111	24,1
37400	81,3	89,6	21,5
42100	87,5	93,9	20,0
44200	98,0	87,9	17,9
42700	113	73,6	15,5
39400	127	60,5	13,8

B3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
68600	26,9	497	65,1
70600	30,2	455	57,9
71500	35,0	399	50,0
78400	39,3	389	44,5
78400	44,0	347	39,7
78400	48,6	315	36,0
78400	54,6	280	32,1
78400	63,8	240	27,4
78400	71,7	213	24,4
78400	79,9	191	21,9
78400	90,2	169	19,4
78400	99,5	154	17,6
78400	112	137	15,7
78400	125	123	14,0

8.1 BH GEAR REDUCER - 1750 rpm

B4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
12400	123	20,0	14,2
11800	135	17,4	12,9
13000	161	16,1	10,9
12600	176	14,2	9,94
10600	197	10,7	8,88
10800	227	9,48	7,70
12000	253	9,43	6,93
12700	277	9,14	6,32
11100	317	6,96	5,53
11200	347	6,43	5,05
12300	380	6,42	4,60
12500	432	5,78	4,05
10800	487	4,40	3,60
11900	541	4,39	3,24
13000	593	4,38	2,95

B4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16100	128	25,0	13,7
14900	143	20,7	12,2
16800	160	20,9	10,9
14900	181	16,4	9,65
16900	202	16,6	8,65
16900	221	15,2	7,91
15100	251	12,0	6,98
17000	280	12,1	6,26
16300	315	10,3	5,55
16400	349	9,35	5,01
15300	391	7,79	4,48
17500	436	7,98	4,01
14900	481	6,16	3,64
18200	573	6,33	3,06
15600	632	4,92	2,77

B4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24500	125	38,9	13,9
23800	146	32,4	12,0
24100	161	29,8	10,9
24800	179	27,6	9,80
24800	208	23,8	8,41
25200	230	21,8	7,62
25000	256	19,4	6,83
25800	282	18,3	6,22
25100	314	15,9	5,57
26300	366	14,3	4,78
25100	407	12,3	4,30
22500	444	10,1	3,94
25900	490	10,5	3,57
27800	571	9,71	3,07
26600	634	8,35	2,76

B4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29500	123	47,8	14,2
29100	134	43,2	13,0
29700	160	36,9	10,9
29800	183	32,3	9,55
29400	200	29,2	8,75
29600	222	26,6	7,89
29500	250	23,5	7,01
29800	277	21,4	6,32
30000	312	19,2	5,61
29900	360	16,5	4,86
30000	405	14,8	4,32
30700	450	13,6	3,89
31000	506	12,2	3,46
31600	562	11,2	3,12
35100	633	11,0	2,77

B4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
40500	125	64,8	14,0
44100	144	61,0	12,2
39200	154	50,8	11,4
43600	183	47,4	9,55
40700	198	40,8	8,82
44400	224	39,5	7,81
40900	259	31,5	6,76
41000	275	29,6	6,35
44700	309	28,9	5,67
41200	356	23,0	4,91
41700	403	20,6	4,34
42200	452	18,6	3,87
46300	481	19,2	3,64
44800	556	16,1	3,15
44300	623	14,2	2,81

B4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
79700	130	122	13,4
79700	147	108	11,9
79700	170	93,6	10,3
79700	181	87,7	9,67
79700	203	78,0	8,60
79700	225	70,4	7,76
79700	253	62,6	6,91
79700	280	56,6	6,24
79700	309	51,3	5,66
79700	348	45,7	5,04
79700	395	40,2	4,43
79700	440	36,0	3,97
79700	482	32,9	3,63
79700	542	29,3	3,23
79700	604	26,3	2,90

8.2 BH GEAR REDUCER - 1400 rpm

B2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
6070	5,27	178	266
7080	6,16	177	227
7870	6,85	177	204
8650	7,53	177	186
9980	8,70	177	161
9880	9,67	158	145
8100	11,3	111	124
9000	12,6	110	111
9670	13,8	108	102
8700	15,5	86,8	90,5
7730	17,3	69,0	81,0
7350	19,6	57,9	71,4
8050	21,5	57,8	65,2
8950	24,1	57,3	58,0

B2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
8780	5,44	249	257
9950	6,16	249	227
10800	6,68	249	210
12100	7,50	249	187
13000	8,63	232	162
12900	9,67	206	145
12200	10,8	174	130
12300	12,6	151	111
12300	14,0	135	99,8
11900	15,5	118	90,5
9840	17,3	87,8	81,0
10100	19,9	78,4	70,5
11200	21,9	78,5	63,8
10300	24,5	64,9	57,1

B2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
11800	5,41	337	259
13600	6,11	342	229
15000	6,71	344	209
16300	7,70	327	182
17400	8,61	312	163
17000	9,51	276	147
15800	11,1	220	126
15400	12,4	192	113
16100	14,4	172	97,2
15500	16,0	149	87,5
14500	17,7	126	79,1
14500	20,4	109	68,6
15300	22,7	104	61,7
15100	25,1	92,9	55,8

B2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18200	5,44	516	257
20400	6,04	521	232
23300	6,82	526	205
24700	7,89	483	177
24100	8,70	428	161
23500	9,49	381	147
22200	11,3	303	124
24100	12,3	301	113
22700	13,7	256	102
22400	15,4	224	90,7
20000	17,5	176	80,0
21500	19,4	171	72,1
22000	21,9	155	64,0
19100	24,3	122	57,6

B2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
23000	5,41	656	259
26000	5,98	670	234
27000	6,74	618	208
27500	7,50	565	187
28000	8,67	498	161
28500	9,49	463	148
29000	11,0	408	128
29500	12,3	369	113
30000	14,3	325	98,2
31000	16,0	299	87,6
30000	17,6	263	79,6
26800	19,3	215	72,7
29900	22,2	207	63,0
32000	24,9	198	56,2

B2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
46000	5,52	1290	253
48000	5,98	1240	234
51000	6,85	1150	204
52500	7,55	1070	185
62000	8,61	1110	163
59700	9,49	970	147
55000	10,7	795	131
55000	12,3	687	113
55000	13,9	611	101
54500	15,5	543	90,5
57000	17,4	505	80,3
52500	19,7	412	71,2
57000	21,9	401	63,8
60000	24,7	375	56,7

8.2 BH GEAR REDUCER - 1400 rpm

B3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
9580	29,1	51,3	48,0
9550	32,7	45,5	42,8
10400	36,3	44,6	38,5
11000	40,4	42,6	34,7
10400	44,3	36,6	31,6
10100	49,7	31,7	28,2
10500	57,6	28,5	24,3
10500	64,6	25,2	21,7
10000	71,6	21,9	19,6
11000	78,4	21,8	17,8
10000	88,1	17,8	15,9
9720	98,4	15,4	14,2
9900	113	13,7	12,4
11500	122	14,7	11,4

B3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
13600	27,2	78,0	51,5
14400	30,1	74,7	46,6
14000	33,5	64,9	41,7
14500	38,0	59,4	36,8
14400	42,4	52,9	33,0
14600	49,4	46,0	28,3
14900	55,2	42,0	25,4
14700	65,0	35,2	21,6
15400	72,4	33,2	19,3
13800	79,9	27,0	17,5
11800	90,4	20,4	15,5
13300	101	20,4	13,8
14700	113	20,3	12,4
14000	125	17,5	11,2

B3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18000	27,7	101	50,6
18500	31,5	91,5	44,5
18500	35,0	82,5	40,0
19100	40,9	72,6	34,2
19300	45,2	66,6	31,0
19400	50,5	59,8	27,7
19800	55,4	55,8	25,3
20200	63,8	49,3	21,9
20500	72,0	44,3	19,4
20600	80,0	40,1	17,5
21100	91,6	36,0	15,3
21200	102	32,5	13,8
21700	112	30,1	12,5
20000	125	25,0	11,2

B3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
28300	27,5	161	50,9
27000	30,5	138	45,9
28500	35,7	124	39,2
28500	38,7	115	36,2
28100	42,9	102	32,6
28700	50,3	88,9	27,8
29000	55,8	80,9	25,1
28800	62,9	71,5	22,3
29100	69,7	65,1	20,1
28900	78,5	57,5	17,8
29200	87,0	52,4	16,1
29100	98,0	46,3	14,3
29400	109	42,1	12,9
28500	122	36,3	11,4

B3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
39200	26,9	227	52,0
38400	31,1	193	45,1
40200	35,0	179	40,0
39500	40,4	152	34,6
38500	45,3	133	30,9
41700	48,6	134	28,8
40900	56,1	114	25,0
42900	62,9	106	22,3
42100	72,6	90,4	19,3
38200	81,3	73,2	17,2
43000	87,5	76,7	16,0
45100	98,0	71,7	14,3
43600	113	60,1	12,4
40200	127	49,4	11,0

B3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
70000	26,9	406	52,0
72000	30,2	371	46,3
73000	35,0	325	40,0
80000	39,3	317	35,6
80000	44,0	283	31,8
80000	48,6	257	28,8
80000	54,6	229	25,6
80000	63,8	196	21,9
80000	71,7	174	19,5
80000	79,9	156	17,5
80000	90,2	138	15,5
80000	99,5	125	14,1
80000	112	112	12,5
80000	125	100	11,2

8.2 BH GEAR REDUCER - 1400 rpm

B4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
12500	123	16,1	11,3
11900	135	14,0	10,3
13100	161	13,0	8,72
12600	176	11,4	7,95
10600	197	8,61	7,11
10900	227	7,62	6,16
12000	253	7,58	5,54
12800	277	7,35	5,06
11100	317	5,59	4,42
11300	347	5,17	4,04
12300	380	5,16	3,68
12600	432	4,65	3,24
10800	487	3,54	2,88
12000	541	3,53	2,59
13100	593	3,52	2,36

B4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16100	128	20,1	10,9
14900	143	16,6	9,76
16900	160	16,8	8,75
15000	181	13,2	7,72
16900	202	13,3	6,92
17000	221	12,2	6,33
15100	251	9,61	5,58
17100	280	9,71	5,01
16400	315	8,27	4,44
16500	349	7,51	4,01
15400	391	6,26	3,58
17600	436	6,42	3,21
15000	481	4,95	2,91
18300	573	5,09	2,44
15700	632	3,95	2,21

B4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24600	125	31,3	11,2
23900	146	26,1	9,58
24200	161	23,9	8,68
24900	179	22,2	7,84
24900	208	19,1	6,73
25300	230	17,5	6,10
25100	256	15,6	5,46
25900	282	14,7	4,97
25200	314	12,8	4,46
26400	366	11,5	3,82
25200	407	9,86	3,44
22600	444	8,12	3,16
26000	490	8,47	2,86
27900	571	7,80	2,45
26700	634	6,71	2,21

B4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29600	123	38,4	11,4
29300	134	34,7	10,4
29800	160	29,7	8,75
29900	183	26,0	7,64
29500	200	23,5	7,00
29800	222	21,4	6,31
29600	250	18,9	5,61
29900	277	17,2	5,05
30200	312	15,4	4,49
30000	360	13,3	3,89
30200	405	11,9	3,45
30800	450	10,9	3,11
31100	506	9,80	2,76
31700	562	8,99	2,49
35200	633	8,87	2,21

B4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
40700	125	52,0	11,2
44300	144	49,0	9,72
39300	154	40,8	9,11
43800	183	38,1	7,64
40800	198	32,8	7,06
44600	224	31,7	6,25
41100	259	25,3	5,41
41100	275	23,8	5,08
44900	309	23,2	4,54
41400	356	18,5	3,93
41900	403	16,5	3,47
42400	452	14,9	3,10
46500	481	15,4	2,91
45000	556	12,9	2,52
44500	623	11,4	2,25

B4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
80000	130	97,8	10,7
80000	147	87,0	9,55
80000	170	75,2	8,26
80000	181	70,4	7,74
80000	203	62,7	6,88
80000	225	56,6	6,21
80000	253	50,3	5,52
80000	280	45,5	4,99
80000	309	41,2	4,53
80000	348	36,7	4,03
80000	395	32,3	3,54
80000	440	28,9	3,18
80000	482	26,4	2,90
80000	542	23,5	2,58
80000	604	21,1	2,32

8.3 BH GEAR REDUCER - 1140 rpm

B2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
6110	5,27	146	216
7130	6,16	145	185
7930	6,85	145	166
8710	7,53	145	151
10100	8,70	145	131
9950	9,67	129	118
8160	11,3	90,7	101
9070	12,6	90,7	90,7
9740	13,8	88,8	82,7
8760	15,5	71,2	73,7
7790	17,3	56,6	65,9
7400	19,6	47,4	58,2
8110	21,5	47,4	53,1
9020	24,1	47,0	47,3

B2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
8850	5,44	205	210
10000	6,16	204	185
10900	6,68	204	171
12200	7,50	204	152
13100	8,63	191	132
13000	9,67	169	118
12300	10,8	143	106
12400	12,6	124	90,7
12300	14,0	111	81,3
11900	15,5	97,0	73,7
9910	17,3	72,0	65,9
10200	19,9	64,4	57,4
11200	21,9	64,3	52,0
10400	24,5	53,2	46,5

B2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
11900	5,41	276	211
13700	6,11	281	187
15100	6,71	282	170
16400	7,70	268	148
17500	8,61	256	132
17200	9,51	227	120
15900	11,1	181	103
15500	12,4	158	92,2
16200	14,4	141	79,1
15600	16,0	123	71,3
14600	17,7	104	64,4
14600	20,4	89,8	55,8
15400	22,7	85,4	50,3
15200	25,1	76,3	45,4

B2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18300	5,44	423	210
20600	6,04	428	189
23500	6,82	432	167
24900	7,89	397	144
24300	8,70	351	131
23600	9,49	313	120
22400	11,3	248	101
24300	12,3	247	92,3
22900	13,7	210	83,2
22600	15,4	184	73,9
20200	17,5	145	65,1
21700	19,4	140	58,7
22200	21,9	127	52,1
19300	24,3	99,7	46,9

B2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
23600	5,41	547	211
26600	5,98	559	191
27600	6,74	515	169
28200	7,50	472	152
28700	8,67	415	131
29200	9,49	386	120
29700	11,0	340	104
30200	12,3	307	92,3
30700	14,3	271	79,9
31700	16,0	250	71,4
30700	17,6	220	64,8
27400	19,3	179	59,2
30600	22,2	173	51,3
32800	24,9	165	45,8

B2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
46400	5,52	1050	206
48400	5,98	1020	191
51400	6,85	943	166
52900	7,55	881	151
62500	8,61	912	132
60200	9,49	796	120
55400	10,7	653	107
55400	12,3	564	92,3
55400	13,9	502	82,1
54900	15,5	446	73,7
57500	17,4	414	65,4
52900	19,7	338	57,9
57500	21,9	329	52,0
60500	24,7	308	46,1

8.3 BH GEAR REDUCER - 1140 rpm

B3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
9670	29,1	42,1	39,1
9640	32,7	37,4	34,8
10500	36,3	36,7	31,4
11100	40,4	35,0	28,2
10500	44,3	30,1	25,8
10200	49,7	26,0	22,9
10600	57,6	23,4	19,8
10600	64,6	20,7	17,6
10100	71,6	18,0	15,9
11100	78,4	17,9	14,5
10100	88,1	14,6	12,9
9810	98,4	12,7	11,6
9990	113	11,3	10,1
11600	122	12,1	9,32

B3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
13700	27,2	64,1	41,9
14600	30,1	61,4	37,9
14100	33,5	53,3	34,0
14600	38,0	48,9	30,0
14500	42,4	43,5	26,9
14700	49,4	37,8	23,1
15000	55,2	34,6	20,7
14800	65,0	29,0	17,6
15600	72,4	27,3	15,7
14000	79,9	22,2	14,3
12000	90,4	16,8	12,6
13400	101	16,8	11,3
14800	113	16,7	10,1
14100	125	14,4	9,15

B3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18200	27,7	83,3	41,2
18600	31,5	75,2	36,2
18700	35,0	67,8	32,6
19300	40,9	59,7	27,8
19500	45,2	54,8	25,2
19600	50,5	49,1	22,6
20000	55,4	45,8	20,6
20400	63,8	40,5	17,9
20700	72,0	36,5	15,8
20800	80,0	33,0	14,3
21300	91,6	29,6	12,5
21400	102	26,8	11,2
21900	112	24,8	10,2
20200	125	20,6	9,14

B3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
28600	27,5	132	41,5
27300	30,5	114	37,4
28800	35,7	102	31,9
28800	38,7	94,5	29,5
28400	42,9	84,1	26,6
29000	50,3	73,1	22,6
29200	55,8	66,5	20,4
29100	62,9	58,8	18,1
29400	69,7	53,5	16,4
29200	78,5	47,3	14,5
29500	87,0	43,1	13,1
29400	98,0	38,0	11,6
29600	109	34,6	10,5
28800	122	29,9	9,31

B3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
39500	26,9	187	42,4
38800	31,1	159	36,7
40600	35,0	147	32,6
39900	40,4	125	28,2
38900	45,3	109	25,2
42100	48,6	110	23,5
41300	56,1	93,5	20,3
43300	62,9	87,5	18,1
42500	72,6	74,4	15,7
38500	81,3	60,2	14,0
43400	87,5	63,1	13,0
45500	98,0	59,0	11,6
44000	113	49,4	10,1
40600	127	40,6	8,99

B3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
70700	26,9	334	42,4
72700	30,2	305	37,7
73700	35,0	268	32,6
80800	39,3	261	29,0
80800	44,0	233	25,9
80800	48,6	211	23,5
80800	54,6	188	20,9
80800	63,8	161	17,9
80800	71,7	143	15,9
80800	79,9	128	14,3
80800	90,2	114	12,6
80800	99,5	103	11,5
80800	112	91,8	10,2
80800	125	82,3	9,15

8.3 BH GEAR REDUCER - 1140 rpm

B4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
12500	123	13,1	9,23
11900	135	11,4	8,42
13100	161	10,6	7,10
12700	176	9,35	6,48
10700	197	7,03	5,79
10900	227	6,23	5,02
12100	253	6,20	4,51
12800	277	6,01	4,12
11200	317	4,57	3,60
11300	347	4,23	3,29
12400	380	4,22	3,00
12600	432	3,80	2,64
10900	487	2,89	2,34
12000	541	2,89	2,11
13200	593	2,88	1,92

B4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16200	128	16,4	8,90
15000	143	13,6	7,95
16900	160	13,7	7,13
15100	181	10,8	6,29
17000	202	10,9	5,64
17000	221	9,99	5,15
15200	251	7,85	4,55
17100	280	7,94	4,08
16400	315	6,77	3,62
16500	349	6,14	3,27
15400	391	5,12	2,92
17600	436	5,25	2,61
15000	481	4,05	2,37
18400	573	4,16	1,99
15700	632	3,23	1,80

B4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24700	125	25,6	9,09
24000	146	21,3	7,80
24300	161	19,6	7,07
25000	179	18,1	6,38
25000	208	15,6	5,48
25400	230	14,4	4,97
25200	256	12,7	4,45
26000	282	12,0	4,05
25300	314	10,4	3,63
26500	366	9,41	3,11
25300	407	8,06	2,80
22700	444	6,64	2,57
26100	490	6,92	2,33
28100	571	6,38	2,00
26800	634	5,49	1,80

B4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29800	123	31,4	9,26
29400	134	28,4	8,49
29900	160	24,3	7,12
30000	183	21,2	6,22
29600	200	19,2	5,70
29900	222	17,5	5,14
29700	250	15,4	4,57
30000	277	14,1	4,12
30300	312	12,6	3,66
30200	360	10,9	3,16
30300	405	9,69	2,81
30900	450	8,92	2,53
31300	506	8,02	2,25
31800	562	7,35	2,03
35400	633	7,25	1,80

B4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
40900	125	42,6	9,15
44500	144	40,1	7,92
39500	154	33,3	7,42
44000	183	31,1	6,22
41000	198	26,8	5,75
44800	224	25,9	5,09
41200	259	20,7	4,41
41300	275	19,5	4,14
45100	309	19,0	3,69
41500	356	15,1	3,20
42100	403	13,5	2,83
42600	452	12,2	2,52
46700	481	12,6	2,37
45200	556	10,6	2,05
44700	623	9,32	1,83

B4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
80400	130	80,0	8,74
80400	147	71,1	7,78
80400	170	61,5	6,72
80400	181	57,6	6,30
80400	203	51,2	5,60
80400	225	46,3	5,06
80400	253	41,1	4,50
80400	280	37,2	4,07
80400	309	33,7	3,69
80400	348	30,0	3,28
80400	395	26,4	2,89
80400	440	23,7	2,59
80400	482	21,6	2,37
80400	542	19,2	2,10
80400	604	17,3	1,89

8.4 BH GEAR REDUCER - 900 rpm

B2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
6140	5,27	116	171
7170	6,16	115	146
7970	6,85	115	131
8760	7,53	115	120
10100	8,70	115	103
10000	9,67	103	93,1
8200	11,3	71,9	79,6
9110	12,6	71,9	71,6
9790	13,8	70,5	65,3
8810	15,5	56,5	58,2
7830	17,3	44,9	52,1
7440	19,6	37,7	45,9
8150	21,5	37,6	41,9
9060	24,1	37,3	37,3

B2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
8890	5,44	162	166
10100	6,16	162	146
10900	6,68	162	135
12300	7,50	162	120
13200	8,63	151	104
13100	9,67	134	93,1
12300	10,8	113	83,5
12500	12,6	98,2	71,6
12400	14,0	87,7	64,2
12000	15,5	76,9	58,2
9960	17,3	57,1	52,1
10200	19,9	51,1	45,3
11300	21,9	51,1	41,0
10400	24,5	42,2	36,7

B2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
12000	5,41	219	166
13700	6,11	223	147
15200	6,71	224	134
16500	7,70	213	117
17600	8,61	203	105
17300	9,51	180	94,7
16000	11,1	143	81,3
15600	12,4	125	72,8
16300	14,4	112	62,5
15700	16,0	97,3	56,3
14700	17,7	82,2	50,8
14700	20,4	71,2	44,1
15500	22,7	67,8	39,7
15300	25,1	60,5	35,8

B2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18400	5,44	336	166
20700	6,04	339	149
23600	6,82	343	132
25100	7,89	315	114
24400	8,70	279	103
23800	9,49	248	94,8
22500	11,3	197	79,5
24400	12,3	196	72,9
23000	13,7	166	65,7
22700	15,4	146	58,3
20300	17,5	115	51,4
21800	19,4	111	46,4
22300	21,9	101	41,2
19400	24,3	79,1	37,0

B2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24000	5,41	440	166
27100	5,98	450	150
28200	6,74	415	134
28700	7,50	380	120
29200	8,67	334	104
29800	9,49	311	94,8
30300	11,0	274	82,1
30800	12,3	247	72,9
31300	14,3	218	63,1
32400	16,0	201	56,3
31300	17,6	177	51,2
28000	19,3	144	46,8
31200	22,2	139	40,5
33400	24,9	133	36,1

B2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
46600	5,52	837	163
48600	5,98	806	150
51700	6,85	748	131
53200	7,55	699	119
62800	8,61	724	105
60500	9,49	632	94,8
55700	10,7	518	84,3
55700	12,3	448	72,9
55700	13,9	398	64,8
55200	15,5	354	58,2
57700	17,4	329	51,6
53200	19,7	268	45,7
57700	21,9	261	41,0
60800	24,7	244	36,4

8.4 BH GEAR REDUCER - 900 rpm

B3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
9810	29,1	33,8	30,9
9780	32,7	30,0	27,5
10700	36,3	29,4	24,8
11300	40,4	28,1	22,3
10600	44,3	24,1	20,3
10300	49,7	20,9	18,1
10800	57,6	18,7	15,6
10700	64,6	16,6	13,9
10300	71,6	14,4	12,6
11300	78,4	14,4	11,5
10300	88,1	11,7	10,2
9960	98,4	10,1	9,15
10100	113	9,03	8,00
11800	122	9,66	7,36

B3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14000	27,2	51,4	33,1
14800	30,1	49,2	29,9
14300	33,5	42,7	26,8
14900	38,0	39,2	23,7
14700	42,4	34,8	21,2
14900	49,4	30,3	18,2
15200	55,2	27,7	16,3
15000	65,0	23,2	13,9
15800	72,4	21,9	12,4
14200	79,9	17,8	11,3
12100	90,4	13,4	9,95
13600	101	13,4	8,89
15100	113	13,4	7,97
14300	125	11,5	7,22

B3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18400	27,7	66,7	32,5
18900	31,5	60,3	28,6
19000	35,0	54,4	25,7
19500	40,9	47,8	22,0
19800	45,2	43,9	19,9
19800	50,5	39,4	17,8
20300	55,4	36,7	16,3
20700	63,8	32,5	14,1
21000	72,0	29,2	12,5
21100	80,0	26,4	11,3
21700	91,6	23,7	9,83
21800	102	21,4	8,85
22200	112	19,9	8,01
20500	125	16,5	7,22

B3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29000	27,5	106	32,7
27700	30,5	91,1	29,5
29200	35,7	81,9	25,2
29200	38,7	75,7	23,3
28800	42,9	67,4	21,0
29400	50,3	58,6	17,9
29700	55,8	53,3	16,1
29500	62,9	47,1	14,3
29800	69,7	42,9	12,9
29700	78,5	37,9	11,5
30000	87,0	34,5	10,3
29800	98,0	30,5	9,18
30100	109	27,7	8,28
29200	122	23,9	7,35

B3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
40100	26,9	150	33,5
39400	31,1	127	29,0
41200	35,0	118	25,7
40500	40,4	100	22,3
39400	45,3	87,4	19,9
42700	48,6	88,2	18,5
41900	56,1	74,9	16,0
44000	62,9	70,1	14,3
43200	72,6	59,6	12,4
39100	81,3	48,2	11,1
44100	87,5	50,5	10,3
46200	98,0	47,3	9,18
44700	113	39,6	7,95
41200	127	32,6	7,10

B3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
71800	26,9	267	33,5
73800	30,2	245	29,8
74800	35,0	214	25,7
82000	39,3	209	22,9
82000	44,0	187	20,4
82000	48,6	169	18,5
82000	54,6	151	16,5
82000	63,8	129	14,1
82000	71,7	115	12,5
82000	79,9	103	11,3
82000	90,2	91,2	9,98
82000	99,5	82,7	9,05
82000	112	73,5	8,05
82000	125	66,0	7,22

8.4 BH GEAR REDUCER - 900 rpm

B4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
12600	123	10,4	7,29
12000	135	9,07	6,65
13200	161	8,41	5,60
12800	176	7,42	5,11
10700	197	5,58	4,57
11000	227	4,94	3,96
12100	253	4,91	3,56
12900	277	4,77	3,25
11200	317	3,62	2,84
11400	347	3,35	2,60
12400	380	3,35	2,37
12700	432	3,01	2,09
10900	487	2,29	1,85
12100	541	2,29	1,66
13200	593	2,28	1,52

B4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16300	128	13,0	7,03
15100	143	10,8	6,28
17000	160	10,9	5,63
15100	181	8,55	4,96
17100	202	8,65	4,45
17100	221	7,93	4,07
15300	251	6,23	3,59
17200	280	6,30	3,22
16500	315	5,36	2,85
16600	349	4,87	2,58
15500	391	4,06	2,30
17700	436	4,16	2,06
15100	481	3,21	1,87
18400	573	3,30	1,57
15800	632	2,56	1,42

B4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24800	125	20,3	7,17
24100	146	16,9	6,16
24400	161	15,5	5,58
25100	179	14,4	5,04
25200	208	12,4	4,32
25500	230	11,4	3,92
25300	256	10,1	3,51
26200	282	9,51	3,20
25400	314	8,27	2,86
26700	366	7,46	2,46
25400	407	6,39	2,21
22800	444	5,27	2,03
26300	490	5,49	1,84
28200	571	5,06	1,58
26900	634	4,35	1,42

B4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29900	123	24,9	7,31
29500	134	22,5	6,70
30100	160	19,2	5,62
30100	183	16,8	4,91
29700	200	15,2	4,50
30000	222	13,9	4,06
29900	250	12,2	3,60
30100	277	11,1	3,25
30400	312	10,0	2,89
30300	360	8,62	2,50
30400	405	7,69	2,22
31100	450	7,07	2,00
31400	506	6,36	1,78
32000	562	5,83	1,60
35500	633	5,75	1,42

B4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
41100	125	33,7	7,22
44700	144	31,8	6,25
39700	154	26,4	5,86
44200	183	24,7	4,91
41200	198	21,3	4,54
45000	224	20,6	4,02
41400	259	16,4	3,48
41500	275	15,4	3,27
45300	309	15,0	2,92
41700	356	12,0	2,52
42200	403	10,7	2,23
42700	452	9,69	1,99
46900	481	9,99	1,87
45400	556	8,37	1,62
44900	623	7,39	1,45

B4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
80700	130	63,4	6,90
80700	147	56,4	6,14
80700	170	48,8	5,31
80700	181	45,7	4,97
80700	203	40,6	4,42
80700	225	36,7	3,99
80700	253	32,6	3,55
80700	280	29,5	3,21
80700	309	26,7	2,91
80700	348	23,8	2,59
80700	395	20,9	2,28
80700	440	18,8	2,04
80700	482	17,2	1,87
80700	542	15,3	1,66
80700	604	13,7	1,49

8.5 BH GEAR REDUCER - 700 rpm

B2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
6190	5,27	90,6	133
7220	6,16	90,4	114
8030	6,85	90,4	102
8830	7,53	90,5	93,0
10200	8,70	90,3	80,5
10100	9,67	80,4	72,4
8270	11,3	56,4	61,9
9180	12,6	56,3	55,7
9870	13,8	55,3	50,8
8880	15,5	44,3	45,2
7890	17,3	35,2	40,5
7500	19,6	29,5	35,7
8210	21,5	29,5	32,6
9130	24,1	29,2	29,0

B2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
8960	5,44	127	129
10200	6,16	127	114
11000	6,68	127	105
12400	7,50	127	93,3
13300	8,63	119	81,1
13200	9,67	105	72,4
12400	10,8	88,9	64,9
12600	12,6	77,0	55,7
12500	14,0	68,8	49,9
12100	15,5	60,3	45,2
10000	17,3	44,8	40,5
10300	19,9	40,0	35,2
11400	21,9	40,0	31,9
10500	24,5	33,1	28,6

B2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
12000	5,41	172	129
13800	6,11	175	115
15300	6,71	176	104
16600	7,70	167	90,9
17800	8,61	159	81,3
17400	9,51	141	73,6
16100	11,1	112	63,2
15700	12,4	98,1	56,6
16400	14,4	87,8	48,6
15800	16,0	76,2	43,8
14800	17,7	64,4	39,5
14800	20,4	55,8	34,3
15600	22,7	53,1	30,9
15400	25,1	47,4	27,9

B2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18600	5,44	263	129
20800	6,04	266	116
23800	6,82	269	103
25200	7,89	247	88,7
24600	8,70	218	80,5
23900	9,49	195	73,7
22700	11,3	155	61,9
24600	12,3	154	56,7
23200	13,7	130	51,1
22900	15,4	114	45,4
20400	17,5	90,0	40,0
22000	19,4	87,3	36,1
22500	21,9	79,2	32,0
19500	24,3	62,0	28,8

B2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
24700	5,41	353	129
28000	5,98	360	117
29000	6,74	332	104
29600	7,50	304	93,3
30100	8,67	268	80,7
30600	9,49	249	73,8
31200	11,0	219	63,8
31700	12,3	198	56,7
32300	14,3	174	49,1
33300	16,0	161	43,8
32300	17,6	142	39,8
28800	19,3	115	36,4
32100	22,2	111	31,5
34400	24,9	107	28,1

B2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
47000	5,52	656	127
49000	5,98	632	117
52100	6,85	587	102
53600	7,55	548	92,7
63300	8,61	567	81,3
61000	9,49	495	73,7
56200	10,7	406	65,6
56200	12,3	351	56,7
56200	13,9	312	50,4
55600	15,5	277	45,2
58200	17,4	258	40,2
53600	19,7	210	35,6
58200	21,9	205	31,9
61300	24,7	191	28,3

8.5 BH GEAR REDUCER - 700 rpm

B3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
9910	29,1	26,5	24,0
9880	32,7	23,5	21,4
10800	36,3	23,1	19,3
11400	40,4	22,0	17,3
10800	44,3	18,9	15,8
10400	49,7	16,4	14,1
10900	57,6	14,7	12,2
10800	64,6	13,0	10,8
10400	71,6	11,3	9,78
11400	78,4	11,3	8,92
10400	88,1	9,19	7,95
10100	98,4	7,97	7,11
10200	113	7,09	6,22
11900	122	7,59	5,72

B3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14100	27,2	40,3	25,7
14900	30,1	38,7	23,3
14400	33,5	33,6	20,9
15000	38,0	30,7	18,4
14900	42,4	27,4	16,5
15100	49,4	23,8	14,2
15400	55,2	21,8	12,7
15200	65,0	18,2	10,8
15900	72,4	17,2	9,66
14300	79,9	13,9	8,76
12300	90,4	10,6	7,74
13700	101	10,6	6,91
15200	113	10,5	6,20
14400	125	9,03	5,62

B3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18600	27,7	52,4	25,3
19100	31,5	47,3	22,2
19100	35,0	42,7	20,0
19700	40,9	37,6	17,1
20000	45,2	34,5	15,5
20000	50,5	30,9	13,9
20500	55,4	28,8	12,6
20900	63,8	25,5	11,0
21200	72,0	22,9	9,72
21300	80,0	20,7	8,75
21900	91,6	18,6	7,65
22000	102	16,8	6,88
22500	112	15,6	6,23
20700	125	13,0	5,61

B3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29300	27,5	83,2	25,5
28000	30,5	71,5	23,0
29500	35,7	64,3	19,6
29500	38,7	59,5	18,1
29100	42,9	52,9	16,3
29700	50,3	46,0	13,9
30000	55,8	41,9	12,5
29800	62,9	37,0	11,1
30100	69,7	33,7	10,0
30000	78,5	29,8	8,92
30200	87,0	27,1	8,04
30100	98,0	23,9	7,14
30400	109	21,8	6,44
29500	122	18,8	5,72

B3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
40500	26,9	117	26,0
39800	31,1	99,7	22,5
41600	35,0	92,8	20,0
40900	40,4	78,8	17,3
39800	45,3	68,6	15,5
43200	48,6	69,3	14,4
42300	56,1	58,8	12,5
44400	62,9	55,1	11,1
43600	72,6	46,8	9,64
39500	81,3	37,9	8,61
44500	87,5	39,7	8,00
46700	98,0	37,1	7,14
45100	113	31,1	6,18
41600	127	25,6	5,52

B3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
72500	26,9	210	26,0
74500	30,2	192	23,1
75600	35,0	168	20,0
82800	39,3	164	17,8
82800	44,0	147	15,9
82800	48,6	133	14,4
82800	54,6	118	12,8
82800	63,8	101	11,0
82800	71,7	90,0	9,76
82800	79,9	80,8	8,76
82800	90,2	71,6	7,76
82800	99,5	64,9	7,04
82800	112	57,7	6,26
82800	125	51,8	5,62

8.5 BH GEAR REDUCER - 700 rpm

B4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
13100	123	8,44	5,67
12500	135	7,35	5,17
13700	161	6,81	4,36
13300	176	6,01	3,98
11200	197	4,52	3,55
11400	227	4,00	3,08
12600	253	3,98	2,77
13400	277	3,86	2,53
11700	317	2,93	2,21
11800	347	2,71	2,02
12900	380	2,71	1,84
13200	432	2,44	1,62
11400	487	1,86	1,44
12600	541	1,85	1,29
13800	593	1,85	1,18

B4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
16900	128	10,5	5,47
15700	143	8,71	4,88
17700	160	8,81	4,38
15800	181	6,93	3,86
17800	202	7,00	3,46
17800	221	6,41	3,16
15900	251	5,04	2,79
17900	280	5,10	2,50
17200	315	4,34	2,22
17300	349	3,94	2,01
16100	391	3,28	1,79
18400	436	3,37	1,61
15700	481	2,60	1,45
19200	573	2,67	1,22
16500	632	2,07	1,11

B4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
25800	125	16,4	5,58
25100	146	13,7	4,79
25400	161	12,6	4,34
26100	179	11,6	3,92
26200	208	10,0	3,36
26500	230	9,21	3,05
26300	256	8,18	2,73
27200	282	7,70	2,49
26400	314	6,70	2,23
27800	366	6,04	1,91
26400	407	5,17	1,72
23700	444	4,26	1,58
27300	490	4,44	1,43
29300	571	4,09	1,23
28000	634	3,52	1,10

B4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
31100	123	20,1	5,69
30700	134	18,2	5,21
31300	160	15,6	4,37
31400	183	13,6	3,82
31000	200	12,3	3,50
31200	222	11,2	3,16
31100	250	9,92	2,80
31400	277	9,02	2,53
31700	312	8,10	2,25
31500	360	6,97	1,94
31700	405	6,22	1,73
32300	450	5,72	1,56
32700	506	5,14	1,38
33300	562	4,72	1,25
37000	633	4,66	1,11

B4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
42700	125	27,3	5,62
46500	144	25,7	4,86
41300	154	21,4	4,55
46000	183	20,0	3,82
42900	198	17,2	3,53
46800	224	16,7	3,13
43100	259	13,3	2,71
43200	275	12,5	2,54
47100	309	12,2	2,27
43400	356	9,70	1,96
44000	403	8,68	1,74
44500	452	7,84	1,55
48800	481	8,09	1,46
47300	556	6,77	1,26
46700	623	5,98	1,12

B4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
84000	130	51,3	5,37
84000	147	45,7	4,78
84000	170	39,5	4,13
84000	181	37,0	3,87
84000	203	32,9	3,44
84000	225	29,7	3,11
84000	253	26,4	2,76
84000	280	23,9	2,50
84000	309	21,6	2,26
84000	348	19,3	2,01
84000	395	16,9	1,77
84000	440	15,2	1,59
84000	482	13,9	1,45
84000	542	12,4	1,29
84000	604	11,1	1,16

8.6 BH GEAR REDUCER - 500 rpm

B2H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
6260	5,27	65,5	94,9
7300	6,16	65,3	81,2
8120	6,85	65,3	73,0
8920	7,53	65,3	66,4
10300	8,70	65,2	57,5
10200	9,67	58,1	51,7
8350	11,3	40,7	44,2
9280	12,6	40,7	39,8
9970	13,8	39,9	36,3
8970	15,5	32,0	32,3
7970	17,3	25,4	28,9
7580	19,6	21,3	25,5
8300	21,5	21,3	23,3
9230	24,1	21,1	20,7

B2H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
9060	5,44	91,8	92,0
10300	6,16	91,8	81,1
11100	6,68	91,7	74,8
12500	7,50	91,7	66,7
13400	8,63	85,6	57,9
13300	9,67	75,9	51,7
12600	10,8	64,1	46,4
12700	12,6	55,6	39,8
12600	14,0	49,7	35,7
12200	15,5	43,5	32,3
10200	17,3	32,4	28,9
10400	19,9	28,9	25,2
11500	21,9	28,9	22,8
10600	24,5	23,9	20,4

B2H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
12200	5,41	124	92,4
14000	6,11	126	81,9
15500	6,71	127	74,5
16800	7,70	120	64,9
18000	8,61	115	58,1
17600	9,51	102	52,6
16300	11,1	81,1	45,1
15900	12,4	70,8	40,4
16600	14,4	63,4	34,7
16000	16,0	55,0	31,3
15000	17,7	46,5	28,2
14900	20,4	40,3	24,5
15800	22,7	38,3	22,0
15600	25,1	34,2	19,9

B2H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18800	5,44	190	92,0
21100	6,04	192	82,8
24000	6,82	194	73,3
25500	7,89	178	63,3
24900	8,70	158	57,5
24200	9,49	140	52,7
22900	11,3	112	44,2
24900	12,3	111	40,5
23400	13,7	94,2	36,5
23100	15,4	82,6	32,4
20600	17,5	65,0	28,6
22200	19,4	63,0	25,8
22700	21,9	57,2	22,9
19800	24,3	44,8	20,6

B2H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
25000	5,41	254	92,4
28200	5,98	260	83,6
29300	6,74	240	74,2
29900	7,50	219	66,6
30400	8,67	193	57,7
31000	9,49	180	52,7
31500	11,0	158	45,6
32000	12,3	143	40,5
32600	14,3	126	35,1
33700	16,0	116	31,3
32600	17,6	102	28,4
29100	19,3	83,3	26,0
32400	22,2	80,3	22,5
34800	24,9	76,9	20,1

B2H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
47500	5,52	474	90,5
49500	5,98	456	83,6
52600	6,85	424	73,0
54200	7,55	395	66,2
64000	8,61	410	58,1
61600	9,49	358	52,7
56800	10,7	293	46,8
56800	12,3	253	40,5
56800	13,9	225	36,0
56200	15,5	200	32,3
58800	17,4	186	28,7
54200	19,7	152	25,4
58800	21,9	148	22,8
61900	24,7	138	20,2

8.6 BH GEAR REDUCER - 500 rpm

B3H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
10100	29,1	19,2	17,2
10000	32,7	17,1	15,3
10900	36,3	16,7	13,8
11600	40,4	16,0	12,4
10900	44,3	13,7	11,3
10600	49,7	11,9	10,1
11000	57,6	10,7	8,69
11000	64,6	9,46	7,74
10500	71,6	8,20	6,99
11500	78,4	8,18	6,37
10500	88,1	6,66	5,68
10200	98,4	5,77	5,08
10400	113	5,14	4,44
12100	122	5,50	4,09

B3H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
14300	27,2	29,3	18,4
15100	30,1	28,0	16,6
14700	33,5	24,3	14,9
15200	38,0	22,3	13,2
15100	42,4	19,8	11,8
15300	49,4	17,2	10,1
15600	55,2	15,8	9,07
15400	65,0	13,2	7,70
16200	72,4	12,4	6,90
14500	79,9	10,1	6,25
12400	90,4	7,66	5,53
13900	101	7,65	4,94
15400	113	7,61	4,43
14700	125	6,55	4,01

B3H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
18900	27,7	38,0	18,1
19400	31,5	34,3	15,9
19400	35,0	30,9	14,3
20000	40,9	27,2	12,2
20300	45,2	25,0	11,1
20300	50,5	22,4	9,89
20800	55,4	20,9	9,03
21200	63,8	18,5	7,83
21500	72,0	16,6	6,94
21600	80,0	15,0	6,25
22200	91,6	13,5	5,46
22300	102	12,2	4,92
22800	112	11,3	4,45
21000	125	9,39	4,01

B3H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
29700	27,5	60,3	18,2
28400	30,5	51,8	16,4
29900	35,7	46,6	14,0
30000	38,7	43,1	12,9
29500	42,9	38,3	11,6
30100	50,3	33,3	9,93
30400	55,8	30,3	8,96
30300	62,9	26,8	7,95
30600	69,7	24,4	7,17
30400	78,5	21,6	6,37
30700	87,0	19,6	5,74
30500	98,0	17,3	5,10
30800	109	15,8	4,60
30000	122	13,6	4,08

B3H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
41100	26,9	85,1	18,6
40300	31,1	72,3	16,1
42200	35,0	67,3	14,3
41400	40,4	57,1	12,4
40400	45,3	49,7	11,0
43800	48,6	50,2	10,3
42900	56,1	42,6	8,91
45100	62,9	39,9	7,95
44200	72,6	33,9	6,89
40100	81,3	27,4	6,15
45200	87,5	28,8	5,72
47300	98,0	26,9	5,10
45800	113	22,5	4,42
42200	127	18,5	3,94

B3H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
73500	26,9	152	18,6
75600	30,2	139	16,5
76700	35,0	122	14,3
84000	39,3	119	12,7
84000	44,0	106	11,4
84000	48,6	96,3	10,3
84000	54,6	85,7	9,16
84000	63,8	73,3	7,84
84000	71,7	65,2	6,97
84000	79,9	58,5	6,25
84000	90,2	51,9	5,54
84000	99,5	47,0	5,03
84000	112	41,8	4,47
84000	125	37,5	4,01

8.6 BH GEAR REDUCER - 500 rpm

B4H 180

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
13600	123	6,26	4,05
13000	135	5,45	3,69
14200	161	5,05	3,11
13800	176	4,45	2,84
11600	197	3,35	2,54
11800	227	2,96	2,20
13100	253	2,95	1,98
13900	277	2,86	1,81
12100	317	2,17	1,58
12300	347	2,01	1,44
13400	380	2,01	1,32
13700	432	1,81	1,16
11800	487	1,38	1,03
13100	541	1,37	0,925
14300	593	1,37	0,844

B4H 200

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
17600	128	7,81	3,90
16300	143	6,46	3,49
18400	160	6,53	3,13
16400	181	5,14	2,76
18500	202	5,19	2,47
18500	221	4,76	2,26
16500	251	3,74	1,99
18600	280	3,78	1,79
17800	315	3,22	1,59
17900	349	2,92	1,43
16700	391	2,44	1,28
19100	436	2,50	1,15
16300	481	1,93	1,04
19900	573	1,98	0,873
17100	632	1,54	0,791

B4H 225

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
26800	125	12,2	3,98
26100	146	10,1	3,42
26400	161	9,31	3,10
27100	179	8,64	2,80
27200	208	7,43	2,40
27600	230	6,83	2,18
27300	256	6,07	1,95
28300	282	5,71	1,78
27400	314	4,97	1,59
28800	366	4,48	1,37
27400	407	3,84	1,23
24600	444	3,16	1,13
28400	490	3,30	1,02
30500	571	3,04	0,876
29100	634	2,61	0,789

B4H 250

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
32300	123	14,9	4,06
31900	134	13,5	3,72
32500	160	11,5	3,12
32600	183	10,1	2,73
32100	200	9,14	2,50
32400	222	8,32	2,25
32300	250	7,35	2,00
32600	277	6,69	1,81
32900	312	6,00	1,60
32700	360	5,17	1,39
32900	405	4,61	1,23
33600	450	4,25	1,11
33900	506	3,81	0,987
34500	562	3,50	0,890
38400	633	3,45	0,790

B4H 280

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
44400	125	20,3	4,01
48300	144	19,1	3,47
42900	154	15,9	3,25
47800	183	14,8	2,73
44500	198	12,8	2,52
48600	224	12,3	2,23
44700	259	9,84	1,93
44800	275	9,26	1,82
48900	309	9,03	1,62
45100	356	7,20	1,40
45600	403	6,44	1,24
46200	452	5,82	1,11
50700	481	6,00	1,04
49100	556	5,02	0,900
48500	623	4,44	0,803

B4H 355

Mn_2 [Nm]	i	Pn_1 [kW]	n2 [rpm]
87200	130	38,1	3,84
87200	147	33,9	3,41
87200	170	29,3	2,95
87200	181	27,4	2,76
87200	203	24,4	2,46
87200	225	22,0	2,22
87200	253	19,6	1,97
87200	280	17,7	1,78
87200	309	16,1	1,62
87200	348	14,3	1,44
87200	395	12,6	1,27
87200	440	11,3	1,14
87200	482	10,3	1,04
87200	542	9,16	0,923
87200	604	8,22	0,828

9.1 SALES CONDITIONS

All supplies effected by MOTOVARIO are governed exclusively by the general terms of sale that you can find on our website:

http://www.motovario.com/eng/corporate/sales-conditions

NOTES

PBH / IEC / STD / EN / REV.0 / 2018