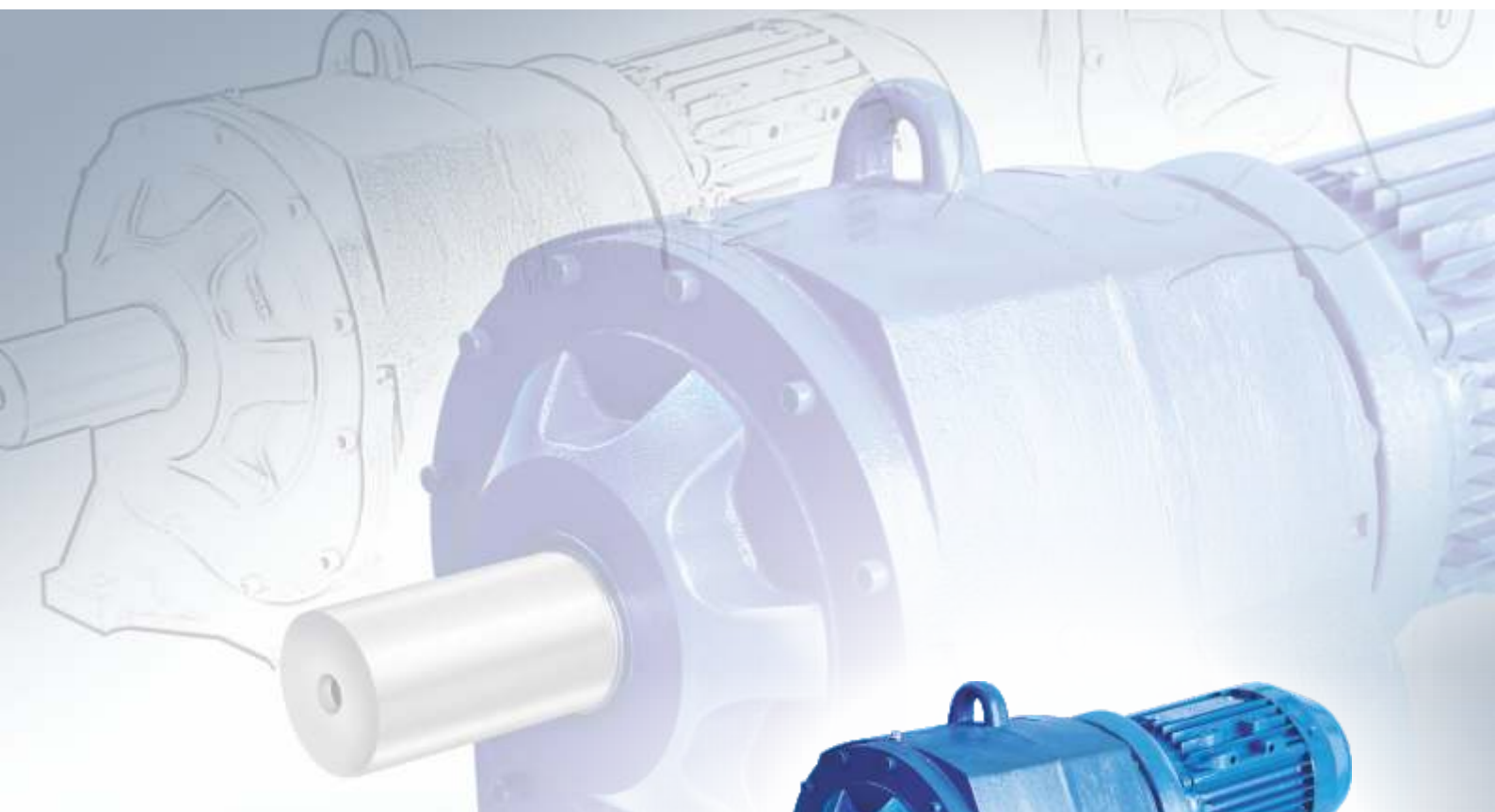




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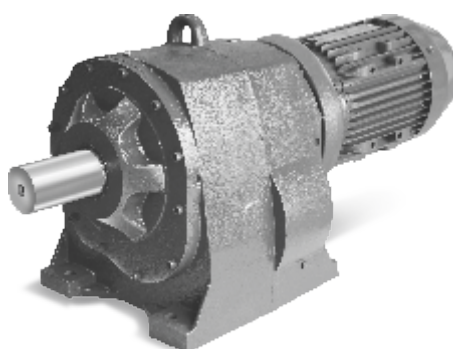
MS series

PREMIUM
STEPHAN

GEARED MOTOR



MS SERIES GEARED MOTORS



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1. The Premium Group

Combined for better performance

Integrated solutions for mechanical drive technology are our strength. We have formed a group of top businesses which in cooperation with one other, offer economical solutions for your drive technology needs, everything from single products to integrated system solutions.

Your basis for success

High-quality products, application expertise and absolute dependability; your decision for the whole Spectrum of the Premium family is a decision for a strong and reliable partner.

The Premium Stephan Company

Premium Stephan, a member of the Premium group, has been developing and manufacturing a wide choice of gear units, geared motors and other products from the field of mechanical drive technology at the Hameln site for decades. Perfected design, computation and manufacturing technologies have contributed to Premium Stephan's outstanding reputation as a partner for individual drive solutions. Customer-oriented customised gear units or backlash-free precision gears for industrial robots are established components in our product assortment, along with the M4, C4 and E4 series. In our production area of 17,000 m², we manufacture according to the most modern, computer-assisted and especially "streamlined" management principles of the third century. Premium Stephan is an associated partner of the Premium group for mechanical drive technology. Along with planning, development and design, we offer our customers not only individual products, but customised solutions through worldwide distribution. Whether assemblies or closed systems, we have the correct solution for your application.

We possess outstanding references in the development, construction and manufacture of individual drive solutions. Through our worldwide distribution, we also offer package solutions for over-sized gear units and drive elements:

- Standard gear units
- Drive-Packages
- Complete solutions
- Customised gear units
- Low-backlash gear units

2. The M4 Product Family

Features	Strong	Advantages
The optimized gearing and shaft geometry compensates deflection under load. Application-hardened, hard-machined gear wheels correspond to high quality requirements.		The Premium Stephan M4 transfers higher torques with a given shaft-center distance for a long, low-maintenance service life.
Gear unit casings, covers, feet, flanges, and motor casings are heavily ribbed and securely connected to each other.		The ruggedly designed casing ensures maximum robustness under high load and failure-free operation.
Carefully dimensioned shaft and roller bearings absorb high external loads. The components are dimensioned to withstand peak loads even under the most adverse operating conditions.		High load-carrying capacities to absorb high external forces at the input and output shaft ensure a long bearing life of the Premium Stephan M4 geared motor.

Features	Silent	Advantages
Optimized gearing geometry and precise abrasive engineering practice create a smooth rolling of the tooth flanks involved in the engagement.		The result is a nearly perfect tooth engagement, even load distribution across the complete face width, minimum vibrations and, therefore, a smooth, low-noise running.
The inside of the casing was reinforced by ribs Similar to the star-shaped output cover.		Perfectly tied-in ribs dampen vibrations and ensure that vibrations are not passed on to the environment as noise.
Using high-precision machining of the motor flange, motor and gear unit were integrated into a harmonic unit.		The pinion mounted directly on the motor shaft engages in the gearing of the gear unit without angle error and does not create any disturbing noise.

Features	Standard	Advantages
Connection dimensions of shafts, feet, and flanges are identical with those of the market standard.		The Premium Stephan M4 series corresponds to the market standard; based on the outstanding performance Specifications, it is predestined to replace existing drives.
The Premium Stephan M4 program features a broad range of designs and numerous standard options. Additional information can be found in the overview of the product program.		The most economical design for the respective application can be selected and is available worldwide.

Features	Smart	Advantages
The Easy Fit System :		
Pre-assembled gear units, motors and wheel sets are stocked in the Premium Stephan assembly centers throughout the world.		Guaranteed High Quality.
Short assembly time and high part interchangeability are granted at each assembly center side due to the unique Easy Fit System.		Over millions of design variants can be quickly assembled through a corresponding combination of pre-assembly components which allows for worldwide availability.
		Short delivery time.

2. The M4 Product Family

The Premium Stephan **M4** preassembly system offers the right components for every application.

The M4 series includes a complete range of coaxial helical geared motors, parallel shaft helical geared motors, and helical bevel geared motors.

The four **S**

Strong,
Silent,
Standard,
Smart

"**Strong**" because of the high rated torques that are above the market standard. They are the most powerful drives on the geared motor market.

"**Silent**" because of the optimized gearing geometry and precision-finished face flanks that allow for an extremely smooth, low-noise running, and

"**Standard**" because of market-oriented dimensions that facilitate the conversion to M4 and allow for a Simple assembly for a worldwide geared motor application.

"**Smart**" The unique EasyFit system allows in minutes to assembly a customize geared motor at dealers place (assembly house).

The modular M4 series was built using a minimum of components, thereby ensuring high reliability and Simple maintenance.

2.1 Use as prescribed

Gear units/geared motors are designed for the purpose of converting rotational Speed and torque. They are intended for use in industrial systems and may only be used as recommended in the Premium Stephan technical documentation and in accordance with the Specifications on the nameplate.

3. Product Description

3.1 Quality through innovation and control

The products manufactured by Premium Stephan meet very high quality requirements. Constant control with strict compliance of initiated quality guidelines meets highest demands. State-of-the-art processing centers, contiguous measuring and test technology, and distinctive quality awareness in all employees are a guarantor for efficient and function-oriented products.

Flexible production flows, supported by the Premium Stephan modular system, guarantee high availability while considering individual demands.

The torsionally-rigid gear unit casings are made of high-quality cast iron and guarantee a vibration-free operation. The robust structure of the M4 geared motors is based on ribbed castings and optimum roller bearings to allow for absorbing even high external loads.

A high efficiency is reached through helical, hardened and precision-machined gear wheels. The motor output becomes effective at the output shaft without nearly any losses.

The gear units are tested in the experimental test field and tested for extreme requirements. With standard motor type of enclosure IP 55 and insulation class F, our electric motors are even safe to operate under extreme operating conditions.

Constant innovation and always looking for better manufacturing processes allow for withstanding the growing requirements of the market.

3.2 General technical data

3.2.1 Motor output and output torque

The motor output and torque values listed in the selection tables refer to normal operating conditions and the standard type of construction or to comparable types of construction of the respective type of gear unit. The decisive factor is that the drive stage does not completely run in the oil bath.

3.2.2 Output Speeds

The output Speeds listed in the selection tables are guide values and can be calculated using the Specified motor Speed n_1 (for rated operation) and the respectively valid exact gear ratio i_{ex} . However, the actual output Speed depends on the effective motor load and the local supply conditions and, therefore, may deviate slightly.

3.2.3 Service Factor

The Service Factor SF listed in the selection tables is calculated using the maximum permissible torque of the gear unit and the output torque permitted by the installed motor output. Service Factors are not standardized and, therefore, may differ dependent upon the manufacturer. For Premium Stephan M4 geared motors, a gear unit with an application factor of $SF = 1$ already offers an enduring dimensioning and, therefore, ensures highest reliability. In case of doubt, we would gladly provide you with more information in a personal consultation.

3.2.4 Weights

The weights Specified are guide values for further dimensioning. Due to the variation in gear ratios and different types of construction (oil quantity), the exact weights may deviate slightly.

3. Product Description

3.3 General construction design and dimensioning

3.3.1 The gear unit

Gear wheels	Carburized and hardened helical and ground or rotary-beveled Spur gears. Bevel gear wheels with helical gearing, lapped bearing surfaces
Castings	GG-20 cast iron as standard
Adaptors	GG-15 cast iron IEC adaptors
Bearings	Sufficiently dimensioned roller bearings so that input and output shaft can absorb Significant external loads
Shafts	Output shafts made of quenched and tempered steel
Lubrication	Splash lubrication with gear unit oil or grease for designs with oil-feed tubing, the lubrication is carried out via integrated pump. Roller bearing at the output shaft end is lubricated for life with grease.
Seals	Radial shaft seals, with dust lip at the output Side
Efficiency	The efficiency of a gear unit is primarily determined by Splash losses, bearing and gearing friction. On an average across all sizes, the efficiency measures approx. 99 % for standard (or Similar) types of construction for each gear stage.

3.3.2 The Motor

Design	Geared motors with integrated motor up to 45 kW (pinion directly on motor shaft). For universal motor assembly (drive end U), a standard IEC motor of B5 may be attached.
Casting	Aluminum alloy as standard up to size 132. A motor housing of cast iron is available as an option. Cast iron is standard starting with Size 160.
Bearing	Deep-groove ball bearing lubricated for life. Starting at Size 200 with equipment for regreasing.
Type of enclosure	IP 55, higher types of enclosure available upon request. Number of poles: Preferably 4-pole motors (1,500 rpm), other number of poles and pole changing motors are possible.
Voltages	up to 3 kW: 230/400 V $\pm$ 10% 50 Hz, 265/460 V $\pm$ 10% 60 Hz from 4 kW to 22 kW: 400/690 V $\pm$ 10% 50 Hz, 460 V delta $\pm$ 10% 60 Hz. Other voltages upon request
Insulation	Insulation class F, utilized to B. Suitable for humidity up to 95%.
Cable entries	On principle, the cable entries of the motors are implemented with the corresponding metric threads. Screwed cable glands are not part of the scope of delivery.
Efficiency class	The standard motors are manufactured according to efficiency class IE 2 . Energy efficient motors to efficiency class IE 3 are available as an option.
Standards	The motors in the range of 0.12 to 22 kW, are according to the standards to CE, CSA and UL. Country Specific executions for USA and Canada are possible on request.

3. Product Description

3.3.3 The brake motor

Design:	Integrated, DC-excited Spring-applied disk brake. Connection via a rectifier installed in the terminal box.
Voltage:	Connection: 230 or 400 VAC corresponding to 102 or 178 V DC at the brake coil.
Type of enclosure:	IP 55 as standard.

3.3.4 Operating conditions

Please consult page 14, chapter 2.5 for hazardous locations according to ATEX.
The geared motors are suited for use at ambient temperatures from -10 °C to +40 °C and installation altitudes up to 1.000 m.a.s.l..
As delivered with oil filling (see above), ambient temperatures from 0 °C to 40 °C are permitted as standard.
In case of deviating ambient temperatures and in aggressive environments (acid vapors or Similar), the manufacturer must be consulted first.

3.3.5 Outputs, torques and Speeds

The outputs and torques listed in the tables refer to a condition at operating temperature with permissible ambient temperatures and standard lubricants. The Specified output Speeds are rounded values and refer to the rated Speed of the motor at delivered rated output.

3.3.6 Installation instructions

The geared motor must be installed free of vibrations. Power transmission elements such as belt pulleys or Similar should be arranged as close to the gear unit housing as possible. The cooling air intake of the motor must not be obstructed by unfavorable installation or contamination. The brake must be accessible for maintenance work.

3.3.7 Reference to applicable standards

The gear unit components, such as shafts, pinions, gear wheels, and bearings are dimensioned according to pertinent EN, ISO or DIN standards.

3.3.8 Delivery instructions

Lubricant:	Sizes 1 and 2: Filled with lubricant for life, ventilation not necessary.
Gear unit oil:	Starting with size 3: Gear units for Germany, Switzerland, and Austria are delivered in filled condition (except for SCA, SCP), otherwise unfilled (internally preserved). Before commissioning, the drain plug must be replaced by the supplied vent plug.
Coating:	RAL 5002 top coat as standard.
Terminal box:	Bores are closed with plastic plugs. Screwed glands are not supplied.
Corrosion protection:	Uncoated parts of the drives (e.g. output shafts) are corrosion-protected.
Lifting Lugs:	Starting with gear unit Size 3 and motor Size 112.

3.4 Notes about the operation in hazardous atmosphere (ATEX)

Attention! You cannot select gearboxes and geared motors for application in hazardous locations (ATEX) from this catalogue. Please advise requirements to your nearest Premium Stephan branch. In the framework of harmonizing European laws, the EC Directive 94/9/EG, generally known as ATEX 100a, has been in force since July 2003. Premium Stephan gear units and geared motors implemented as parallel shaft gear units, helical and bevel gear units in ATEX design meet all the requirements of EC Directive 94/9/EG for device category 2 and 3. The drives can be delivered for use in gaseous as well as dust atmosphere.

3. Product Description

3.4.1 Zonal classification

According to Directive 99/92 EG (ATEX 137), the system operator together with the controlling authority determines which zone must be taken into account. The zone definition is carried out according to different criteria, such as operating condition of the system, the period in which an explosive atmosphere may occur, and whether an air-dust or an air-gas mixture occurs.

Probability of occurrence	Air-gas mixture (G) zone	Air-dust mixture (D) zone
Continuous and long-term	0	20
Occasionally during normal operation	1	21
Rarely, without importance during normal operation	2	22

3.4.2 Device safety classified into categories

Electrical and mechanical equipment are classified into three categories according to the safety requirements. Assigning the devices to the categories is determined by the manufacturer based on a detailed danger analysis. The connection between the zones and the device category is Specified in Directive 94/9/EG.

Premium Stephan gear units meet all requirements of category 2 and 3. The design, dimensioning and classification- on into the corresponding category was performed in close collaboration with TÜV NORD CERT. Devices of category 1 are not supplied by Premium Stephan. Devices of category 2 meet all requirements of category 3 and may also be used here.

Category	Type of defect	Prerequisite/use
1 (no drives from Premium Stephan)	Safety in normal operation and also for rare faults (two errors occurring Simultaneously must be handled)	Devices of this category: • 1 G in zone 0, 1 and 2 for gas • 1 D in zone 20, 21 and 22 for dust
2	Safety in normal operation and in case of an expected fault	Devices of this category: • 2 G in zone 1 and 2 for gas • 2 D in zone 21 and 22 for dust
3	Safety in normal operation	Devices of this category: 3G in zone 2 for Gas 3D in zone 22 for dust

Premium Stephan gear units to Directive 94/9/EG for use in air-gas and air-dust mixture.

Premium Stephan has several decades of experience in the design, manufacture and use of drives in hazardous areas. With the introduction of Directive 94/9/EG, the standard series EN 13463 was issued as the basis for explosion protection for mechanical devices.

Premium Stephan M4 gear units in the designs MI, MP and MK meet all requirements of category 2. Requirements for dust protection and gas protection were taken into account for the approval. For this reason, no distinctions are made with respect to categories 2 and 3. Our gear units of category 2 also meet all requirements of category 3.

3.4.3 Type of protection for gear units

Protection through structural safety

EN 13463-5 (identifier "c")

For this type of explosion protection, the protection is ensured through design and construction measures at the devices as well as the experience of the manufacturer.

3. Product Description

Protection through liquid enclosure

EN 13463-8 (identifier "k")

Potential ignition sources inside the gear unit are rendered ineffective through complete or partial immersion in a protective liquid (gear unit oil) or through constant wetting with a liquid film, the protective liquid can be exclusively intended for preventing a potential ignition source to become effective. In devices such as gear units, it also serves the purpose of lubricating and cooling moving parts.

Premium Stephan gear units for category 2G and 2D

Gear units of category 2G can be used in zone 1 and 2 for gases and gear units of category 2D can be used in zone 21 and 22 for dust. For category 2, Premium Stephan issues a certificate of conformity and certifies the following:

- The compliance of the products with standard EN 13463 with the relevant sections.
- The internal manufacturing control according to Directive 94/9/EG Appendix VIII
- Filing the product documentation with the notified body, TÜV NORD CERT

Premium Stephan gear units for category 3G and 3D

Gear units of category 3 can be used in zone 2 for gases and zone 22 for dust. A separate certification for category 3 is not issued. Since all devices for category 2 also meet the requirements of category 3.

Premium Stephan geared motors conforming to Directive 94/9/EG

The experiences collected over decade-long use in hazardous atmosphere also entered into the dimensioning and design according to the new ATEX directives. The following components were taken into account based on this experience:

- Shrink-fit ring covers according to the standard
- All bolts are secured against automatic loosening and protected against rust
- Stainless steel nameplates
- Proven shaft seals at input and output shaft
- High-quality lubricants
- Oil-level control for all sizes

3.4.4 Type of protection for motors

Motors to Directive 94/9/EG for use with gas

The ATEX motors used by Premium Stephan are manufactured by a well-known German manufacturer. The EN 50014 standard is the basis for the approval. Supplementary standards specify the measures of how an ignition is prevented.

Flameproof enclosure to EN 50018, type of protection "d"

Motors of this type of enclosure can be used for mains operation and inverter operation in zone 1. Motors with flame-proof enclosure can only be combined with the Premium Stephan gear unit in lantern version.

Increased safety to EN 50019, type of protection "e"

The basis of this type of enclosure is avoiding high temperatures at the surface and in the inside during normal operation and in case of a fault, such as a blocked rotor with applied supply voltage. Motors to EN 50019 can be used in zone 1 with mains operation.

Protection through non-sparking equipment to EN 50021, type of protection "n"

The motor design ensures that no gases are ignited during normal operation. A malfunction is not taken into account. Motors to "n" can be used in zone 2 with mains operation.

Motors to Directive 94/9/EG for use with dust

The EN 50281-1 standard serves as the basis for the approval of motors in an explosive dust-gas atmosphere. The decisive factor consists of meeting certain criteria against the intrusion of foreign particles in accordance with EN 60259 IP types of enclosure. Motors of category 3 require at least type of enclosure IP54 and category 2 type of enclosure IP6x.

Dust-proof motors to EN50281-1-1, type of enclosure IP65

Design measures prevent any dust from entering into the inside of the motor. The surface temperature under normal operating conditions does not cause an ignition of dust deposits. A protection in case of faults is ensured through temperature monitoring. These motors correspond to category 2D and can be used in zone 21 and 22 with mains operation.

Dust-protected motors to EN50281-1-1, type of enclosure IP55

In this case, dust cannot enter the motor in dangerous quantities. Only the surface temperature represents an ignition risk and, for this reason, must be protected with temperature sensors. These motors are certified to category 3D and can be used for mains operation in zone 22. For inverter operation, Premium Stephan can perform a corresponding acceptance with the selected inverter.

4. Instructions for Drive Selection

4.1 Service factors / Applications / Operating conditions

4.1.1 Required Service Factor (SF_{min})

Determine the required application factor according to the following formula:

$$SF_{min} = F \times C$$

Whereby the following applies:

F = application factor dependent upon the load characteristic values of the application and the operating time.

The values listed below can be used as guide values for applications that are not listed.

Both criteria - the "Load characteristics related to the application" as well as the "inertia factor M" - must be taken into account. The criterion resulting in the highest F-value is decisive.

Load characteristics of the application	M	F		
		8h/24h	16h/24h	24h/24h
Uniform loads	<0,2	0.8 - 1*	1	1.2
Moderate shock load	<3	1.1	1.25	1.5
Heavy shock load	<10	1.4	1.6	1.7

M = Inertia factor

$$M = \frac{\text{Moment of inertia of driven machine related to motor shaft}}{\text{Mass moments of inertia of the motor (+ brake)}}$$

C = correction factor dependent upon the number of start-ups per hour.

		C		
		8h/24h	16h/24h	24h/24h
	<10	1	1	1
Start-ups / hour	<100	1.1	1.1	1.15
	<500	1.1	1.15	1.25

4.1.2 Selecting the frame Size

A geared motor must be selected for the required motor output (P_m) and the output Speed (n₂) who's Service Factor (SF) is greater than or equal to the required Service Factor (SF_{min}). The selection can also be made based on the available output torque (T_{2m}) of the geared motor.

4. Instructions for Drive Selection

4.1.3 Required application factors for different applications

APPLICATION	Runtime hours/day		
	8h/24h	16h/24h	24h/24h
Construction and building materials machinery			
Mixer	1.25	1.5	1.75
Cement mills	1.5	1.75	2
Mortar guns	0.8 - 1*	1	1.25
Breweries, distilleries			
Mills	0.8 - 1*	1	1.25
Bottling machinery	0.8 - 1*	1	1.25
Elevators			
Bucket elevators	1	1.25	1.5
Load elevators	1	1.25	1.5
Escalators	0.8 - 1*	1	1.25
Filters	1	1.25	1.5
Generators	0.8 - 1*	1	1.25
Wood and plastics processing			
Main drive for saws	1.5	1.75	2
Feed drives for saws	1	1.25	1.5
Crushers	1.5	1.75	2
Machines for gluing, veneering	0.8 - 1*	1	1.25
Drills	0.8 - 1*	1	1.25
Extruders	1.25	1.5	1.75
Machine tools			
Roller straightening, punching device, bending machines	1.25	1.5	1.75
Main and feed drives	1	1.25	1.5
Supply and servo drives	0.8 - 1*	1	1.25
Presses	1.75	2	2
Edging machines	1.5	1.75	2
Plate shears	1.75	2	2
Cranes and hoisting machines			
Hoisting gears, traveling drives	**	**	**
Packaging machines			
Packing machines	1.25	1.5	1.75
Wrapping machines	0.8 - 1*	1	1.25
Compressors			
Centrifugal compressors	1	1.25	1.5
Rotating screw compressors	1	1.25	1.5
Mixers			
Constant density	0.8 - 1*	1	1.25
Variable density	1	1.25	1.5
Iron and steel industry			
Wire-drawing benches	1.25	1.5	1.75
Winding drums	1	1.25	1.5
Roller-table drives	**	**	**

* = 0.8 if operating time < 3h/24h and no external loads occur

** = drives must be dimensioned by the manufacturer

+ = it is recommended consulting the manufacturer for selecting the reverse lock

4. Instructions for Drive Selection

APPLICATION	Runtime hours/day		
	8h/24h	16h/24h	24h/24h
Iron and steel industry Non-reversible rolling mills - multi-operation - single operation	1.25 1.5	1.5 1.75	1.75 2
Mills Ball mills, rod mills Hammer mills, centrifugal mills	1.75 1.5	1.75 1.75	1.75 2
Winding drives Pumps Rotary pumps Circulation, gear, vane pumps Piston pumps: 1 cylinder 2 cylinders or more Screw pumps	1 0.8 - 1* ** 1 1 +	1.25 1 ** 1.25 1.25 +	1.5 1.25 ** 1.5 1.5
Agitators Pure liquid (constant density) Liquid with variable density Liquid mixed with solid bodies	0.8 - 1* 1 1.25	1 1.25 1.5	1.25 1.5 1.75
Conveyor systems Even load Heavy operation, chain, screw conveyor Shaker conveyor	0.8 - 1* 1 1.5	1 1.25 1.75	1.25 1.5 2
Fans Radial Industrial fans Fan drives in cooling towers	0.8 - 1* 1 2	1 1.25 2	1.25 1.5 2
Food-processing industry Crusher Root cutting, kneading machines Meat grinders Filling machines Dough kneading machine Extruders Sugar-cane cutter Toaster	1.75 1.25 1.25 0.8 - 1* 1 1.25 1.75 1.25	2 1.5 1.5 1 1.25 1.5 1.75 1.25	2.25 1.75 1.5 1.5 1.5 1.75 1.75 1.25
Waste water facilities Surface aerator Revolving systems Rakes and channels Screw pumps	1.5 1.75 0.8 - 1* 1	1.5 1.75 1 1.25	1.5 1.75 1.25 1.5
Screens Revolving screens (stones, grit) Screens with water circulation	1 0.8 - 1*	1.25 1	1.5 1.25
Servo drives for systems Service operation Setting-up mode, operation without load Normal operation	0.8 - 1* 1.25	- 1.25 Same as main drive	- 1.25

* = 0.8 if operating time < 3h/24h and no external loads occur

** = drives must be dimensioned by the manufacturer

+ = it is recommended consulting the manufacturer for selecting the reverse lock

4. Instructions for Drive Selection

APPLICATION	Runtime hours/day		
	8h/24h	16h/24h	24h/24h
Agricultural machines			
Mechanical gutter cleaners	0.8 - 1*	1	*
Harvesting machines	0.8 - 1*	1	*
Textile machinery			
Looms	1.25	1.5	1.75
Spinning machines	0.8 - 1*	1	1.25
Laundry machines	1	1.25	1.5
Print and paper technology			
Sheeting cutter	1	1.25	1.5
Winding drives	0.8 - 1*	1	1.25
Bale feeder	1	1.25	1.25

* = 0.8 if operating time < 3h/24h and no external loads occur

** = drives must be dimensioned by the manufacturer

+ = it is recommended consulting the manufacturer for selecting the reverse lock

These Service factors (SF) are empirical values that are based on AGMA and ISO information and experience. They apply to driven machines corresponding to today's state of the art for normal operating conditions and for actuating with electric motors. A consultation is required for Special applications, passenger elevators or Special operating conditions, e.g. high mass acceleration factors.

4.1.4 External loads, axial / radial, conversion, connections

The permissible radial loads listed in the selection tables are guide values and used only for rough orientation purposes. The data refer to action of load in the middle of the respective solid shaft. If no radial load is present, half the value of the radial load specified in the selection tables is permitted as axial load. The resulting maximum value of a radial load for each gear unit size generally occurs at low Speeds and is determined by the material and geometry of the shaft. For all lower values of the frame size, the predetermined bearing life LH10 of the output shaft bearing is limiting. Since variables such as torque, Speed, direction of rotation and load angle of action enter into the calculation and Premium Stephan always assumes the worst-case scenario, significantly higher external loads are permissible in most cases while giving the effective loads. Please contact us and we will gladly recalculate your specific case.

4.1.5 Thermal break even performance

Torque and output stated in the selection charts are mechanical limit values. Depending on mounting position and mounting situation it is possible that the gearbox will overload thermal before reaching the mechanical breakeven performance. Outputs marked (1) are exceeding the thermal break even performance already under normal application conditions.

If the real operation conditions are known, the heat breakeven performance can be recalculated by Premium Stephan. The heat breakeven performance can be increased by using appropriate measures (such as using synthetic lubricants with increased thermal consistency). The following data is necessary for recalculation:

Type or gearbox
 Mounting position
 Input Speed (range)1/min
 Ratio
 Used outputkW
 Duty / power-on time
 Ambient Temperature°C

Installation Site
☐ in a small, closed room
☐ large rooms
☐ outside
 Mounting Situation (Sketch/drawing)

4. Instructions for Drive Selection

Increased Splash losses may occur for mounting positions with high oil level. (MI all V-mountings, MP mounting pos. 2, 5 and 6, MK mounting pos. 2 and 4) or input Speed above 1800 1/min and may lead to excessive heating. Please contact Premium Stephan in these individual cases.

4.2 Notes about the dimensional drawings

The dimensional drawings featured in this catalog are nonbinding. In particular, slightly deviating dimensions may occur for motor dimensions dependent upon the technical requirements. Binding dimensional drawings can be created upon request.

Note : The user is responsible for providing protective covers and professional setup of the complete equipment.

The flanges on the output Side are manufactured according to DIN 42955-N, whereby the tolerances of the center- ring gears correspond to DIN 42948.

Keyways of the output shafts are manufactured according to DIN 6885-T1-"Form A".

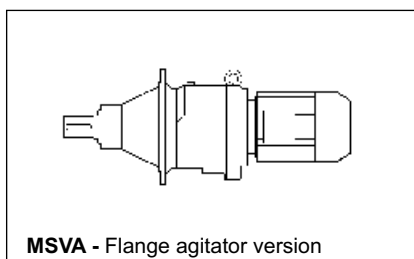
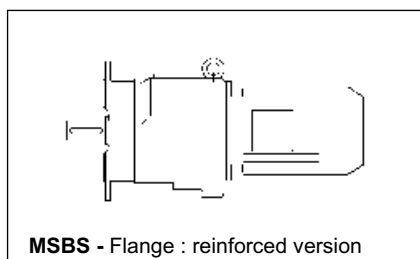
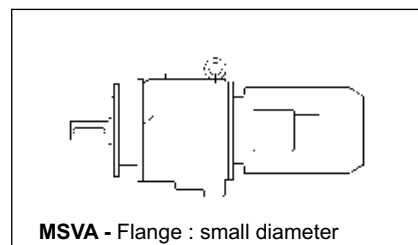
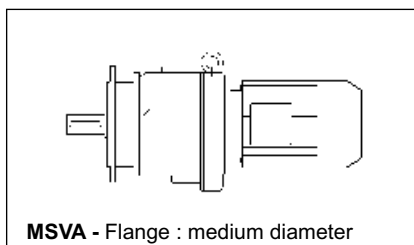
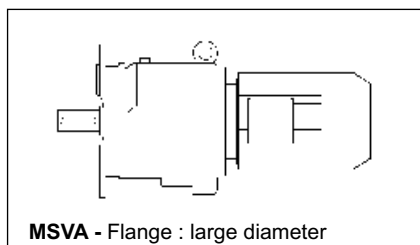
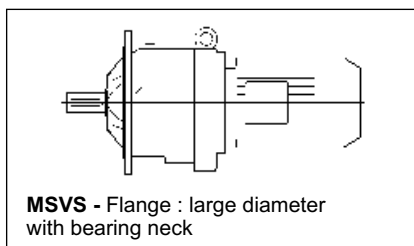
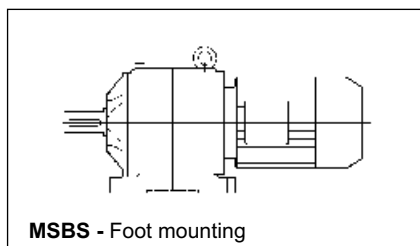
Detailed dimensions of the shafts and recommendations for the designs of the machine shafts can be found in the technical appendix of this catalog.

4.3 Delivery times

Manufacturing and stocking of M4 components are constantly adapted to customer demands. Modern control methods are used in the process. Delivery time for standard design is max. 3 weeks. If necessary we can also achieve 24h delivery service. We can also achieve short delivery times for all remaining geared motors. Please contact us and we will gladly assist you.

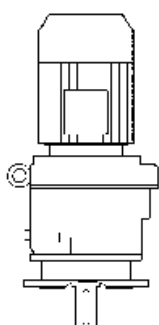
5. MS4 Inline

5.1.1 Version variants for MI4 helical geared motors

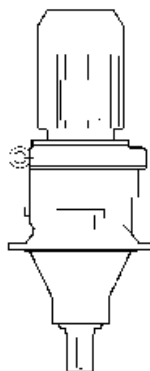


5. MS4 Inline

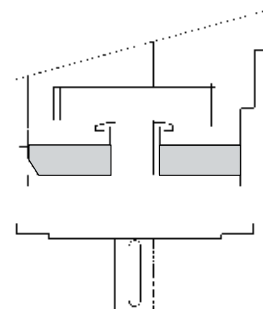
5.1.1 Version variants for MI4 helical geared motors



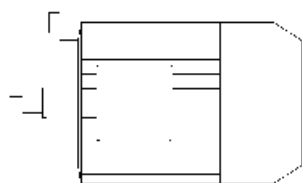
MSVA
Flange : reinforced version
Version with dry well integrated pump



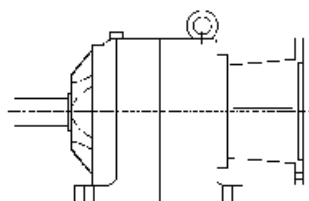
MSVA
Flange : agitator version
Version with tubing and integrated pump



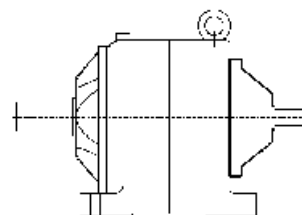
The dry well system



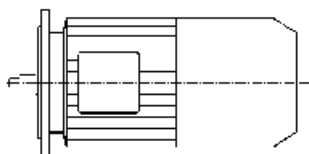
Integral motor



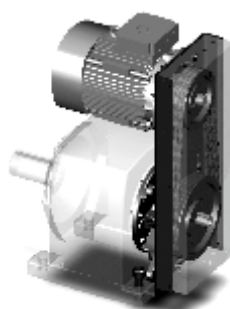
A to L
Adaptor for IEC standard motors



M
Gear unit with free input shaft



Integrated brake motor



N
Motor base version for V-belt drive
motor mounposition IM B5
(schematic drawing)

Overview

	9 Sizes								
	MS -01	MS -02	MS -03	MS -04	MS -05	MS -06	MS -07	MS -08	MS -09
T2m (Nm)	1450	2130	2825	4400	5600	8400	10500	13000	18000
Pm (kW)	0.25 to 90 kW								
i	4.5.....291								

5. MS4 Inline

5.2 Ordering information

Gear units with two and three stages

M	S	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
----------	----------	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----

3	Casing B Foot Version V Flange Version	8-11	Motor Frame Size 0000 - No Motor
4	Number of Stages 2 2-stage 3 3-stage	12	Number of Motor Poles 0 - No Motor T - Two Pole F - Four Pole S - Six Pole E - Eight Pole
5-6	Size 1-2-3-4-5-6-7-8-9	13-17	Total Gear Ratio
7	Adaptor Size A 140 - 11 B 160 - 14 C 200 - 19 D 200 - 24 E 250 - 28 F 300 - 38 G 350 - 42 H 350 - 48 I 400 - 55 J 450 - 60 K 500 - 65 L 550 - 75 M SISO	18	Supply Condition S - Standard A - Additional Accessories e.g. Torque arm, hold back, Special motor etc.

Example

M	S	B	3	0	1	F	1	3	2	S	F	0	4	1	5	5	S
----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------

MS foot version, Three stage, Size 1, Adaptor 300-38 Motor frame size 132S, Four pole motor,
Total gear ratio I = 41.55, Standard Supply Condition.

M	S	V	3	0	1	F	1	3	2	S	F	0	4	1	5	5	S
----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------

MS flange version, Three stage, Size 1, Adaptor 300-38 Motor frame size 132S, Four pole motor,
Total gear ratio I = 41.55, Standard Supply Condition.

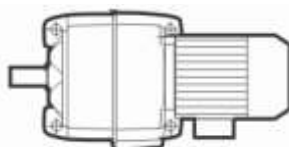
5. MS4 Inline

5.3 Mounting positions

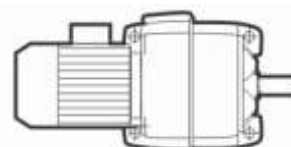
B3



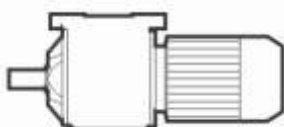
B6



B7



B8



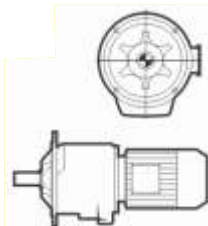
V5



V6



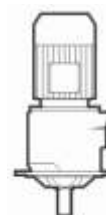
B5



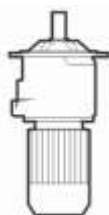
B35



V1



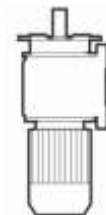
V3



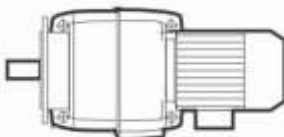
V15



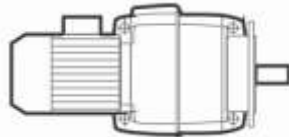
V36



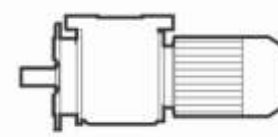
B65



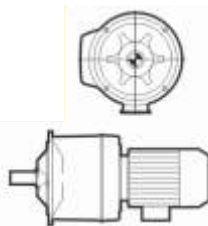
B75



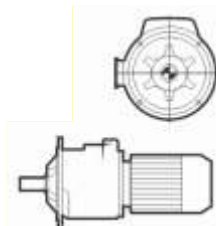
B85



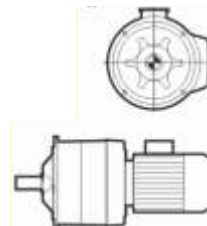
B5 I



B II



B II



5. MS4 Inline

5.4 Auswahltabellen Getriebemotoren MS4 Selection tables for MS4 geared motors Tableaux de sélection pour les motoréducteurs MS4

Beispiel : Auswahltabelle Getriebemotoren
Example : Geared Motor selection table
Exemple de tableau de sélection pour motoréducteurs

Motorleistung Motor output Puissance moteur		Exakte Übersetzung Exact gear ratio Valeur exacte du rapport de démultiplication		Motordrehzahl Motor speed Vitesse moteur		Zulässige Radialkraft für verstärkte Lagerung Permissible radial force for reinforced bearing Force radiale admissible pour paliers support renforcés		Zulässige Radialkraft Permissible radial force Force radiale admissible		Weight	
P	0.12 kW	n ₁	1360 min								
n _{2ex}	T _{2m}	i _{ex}	SF	TYPE			FrN	FrN-G	M		
min-1	Nm						N	N	kg		
5.5	436	255.71	4.90	MSB302B071SF25571S				65802			
5.6	428	250.97	3.38	MSB301B071SF25097S				64925			
6.5	368	215.87	3.97	MSB301B071SF21587S				62319			
Grundauführung MSB • Basic version MSB • Version de base MSB											
Verfügbare Servicefaktor • Available Service Factor SF • Facteur de service diMPonible											
Drehmoment der Abtriebswelle • Torque of output shaft • Couple de l'arbre de sortie											
Genaue Drehzahl der Abtriebswelle • Exact Speed of output shaft & rated load • Vitesse exacte de l'arbre de sortie											

P 0.25 kW n_1 1400 min⁻¹

n2ex min-1	T2m Nm	iex	SF	TYPE	FrN N	FrN-G N	M kg
7.8	308	180.53	4.74	MSB301B071SF18053S		59329	73
7.2	334	195.72	4.36	MSB301B071SF19572S		60667	73
6.5	368	215.87	3.97	MSB301B071SF21587S		62319	73
5.6	428	250.97	3.38	MSB301B071SF25097S		64925	73
5.3	451	264.31	4.74	MSB302B071SF26431S		65802	92

P 0.37 kW n_1 1400 min⁻¹

n2ex min-1	T2m Nm	iex	SF	TYPE	Fr NN	FrN-G N	M kg
11.3	312	123.76	4.67	MSB301B071LF12376S		52735	74
10	353	139.69	4.1	MSB301B071LF13969S		54501	74
8.8	402	159.16	3.63	MSB301B071LF15916S		56451	74
8.33	424	168.01	4.99	MSB302B071LF16801S		57759	93
7.8	456	180.53	3.21	MSB301B071LF18053S		58379	74
7.5	471	186.7	4.52	MSB302B071LF18670S		59406	93
7.2	494	195.72	2.94	MSB301B071LF19572S		59636	74
6.5	545	215.87	2.68	MSB301B071LF21587S		61183	74
6.48	545	215.98	3.92	MSB302B071LF21598S		61728	93
5.7	620	245.81	3.44	MSB302B071LF24581S		63527	93
5.8	611	242.21	4.62	MSB303B071LF24221S		80731	118
5.6	633	250.97	2.29	MSB301B071LF25097S		63604	74
5.4	648	256.94	4.36	MSB303B071LF25694S		82044	118
5.3	667	264.31	3.21	MSB302B071LF26431S		64488	93
4.8	735	291.31	3.84	MSB303B071LF29131S		84887	118

P 0.55 kW n_1 1420 min⁻¹

n2ex min-1	T2m Nm	iex	SF	TYPE	Fr NN	FrN-G N	M kg
16.1	326	88.17	4.48	MSB301C080KF08817S		47322	79
14.3	367	99.26	3.98	MSB301C080KF09926S		48843	79
12.9	409	110.49	3.57	MSB301C080KF11049S		50246	79
11.5	458	123.72	4.66	MSB302C080KF12372S		52208	99
11.5	458	123.76	3.19	MSB301C080KF12376S		51758	79
10.1	421	140.75	4.11	MSB302C080KF14075S		53982	99
10.2	517	139.69	2.8	MSB301C080KF13969S		53398	79
9.3	568	153.47	3.77	MSB302C080KF15347S		55189	99
8.9	589	159.16	2.47	MSB301C080KF15916S		55195	79
8.5	621	168.01	3.41	MSB302C080KF16801S		56465	99
8.2	638	172.49	4.43	MSB303C080KF17249S		72444	124
7.9	668	180.53	2.19	MSB301C080KF18053S		56954	79
7.7	684	184.98	4.12	MSB303C080KF18498S		73816	124
7.6	691	186.7	3.08	MSB302C080KF18670S		57968	99

P 0.55 kW n_1 1420 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
7.3	724	195.72	2.01	MSB301C080KF19572S		58091	79
6.8	770	208.11	3.68	MSB303C080KF20811S		76165	124
6.6	798	215.87	1.83	MSB301C080KF21587S		59479	79
6.6	799	215.98	2.67	MSB302C080KF21598S		60065	99
5.9	896	242.21	3.16	MSB303C080KF24221S		79259	124
5.78	909	245.81	2.35	MSB302C080KF24581S		61669	99
5.7	922	249.23	4.79	MSB304C080KF24923S		77907	161
5.7	928	250.97	1.56	MSB301C080KF25097S		61623	79
5.5	950	256.94	2.98	MSB303C080KF25694S		80482	124
5.4	978	264.31	2.19	MSB302C080KF26431S		62518	99
4.9	1077	291.31	2.62	MSB303C080KF29131S		83116	124

P 0.75 kW n_1 1415 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
20.7	346	68.32	4.22	MSB301C080NF06832S		43559	80
19.3	370	73.16	3.94	MSB301C080NF07316S		44349	80
18.4	389	76.95	3.75	MSB301C080NF07695S		44938	80
16.7	427	84.45	4.98	MSB302C080NF08445S		47902	100
16	446	88.17	3.27	MSB301C080NF08817S		46548	80
14.3	502	99.26	2.91	MSB301C080NF09926S		47972	80
14	513	101.28	4.18	MSB302C080NF10128S		48657	100
13	551	108.85	3.87	MSB302C080NF10885S		49549	100
12.8	559	110.49	2.61	MSB301C080NF11049S		49277	80
11.4	626	123.72	3.41	MSB302C080NF12372S		51149	100
11.4	626	123.76	2.33	MSB301C080NF12376S		50672	80
11.3	632	124.8	4.48	MSB303C080NF12480S		65488	125
10.3	698	137.93	4.05	MSB303C080NF13793S		67247	125
10.1	707	139.69	2.04	MSB301C080NF13969S		52173	80
10	712	140.75	3	MSB302C080NF14075S		52777	100
9.2	777	153.47	2.75	MSB302C080NF15347S		53875	100
9.2	777	153.56	3.67	MSB303C080NF15356S		69166	125
8.9	806	159.16	1.81	MSB301C080NF15916S		53799	80
8.42	850	168.01	2.49	MSB302C080NF17801S		55027	100
8.2	873	172.49	3.24	MSB303C080NF17249S		71279	125
7.8	914	180.53	1.6	MSB301C080NF18053S		55370	80
7.6	936	184.98	3.01	MSB303C080NF18498S		72566	125
7.6	945	186.7	2.25	MSB302C080NF18670S		56370	100
7.5	960	189.74	4.59	MSB304C080NF18974S		71278	162
7.2	991	195.72	1.47	MSB301C080NF19572S		56375	80
6.8	1053	208.11	2.69	MSB303C080NF20811S		74759	125
6.7	1063	210.01	4.13	MSB304C080NF21001S		73138	162
6.6	1093	215.87	1.34	MSB301C080NF21587S		57586	80

P 0.75 kW n_1 1415 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
6.5	1093	215.98	1.95	MSB302C080NF21598S		58216	100
6.2	1159	229.05	3.8	MSB304C080NF22905S		74745	162
5.8	1226	242.21	2.31	MSB303C080NF24221S		77623	125
5.8	1244	245.81	1.72	MSB302C080NF24581S		59604	100
5.7	1261	249.23	3.5	MSB304C080NF24923S		76321	162
5.6	1270	250.97	1.14	MSB301C080NF25097S		59422	80
5.5	1300	256.94	2.17	MSB303C080NF25694S		78747	125
5.4	1338	264.31	1.6	MSB302C080NF26431S		60329	100
4.9	1474	291.31	1.91	MSB303C080NF29131S		81149	125

P 1.1 kW n_1 1410 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
33.9	310	41.55	4.72	MSB301D090SF04155S		37453	83
29.4	357	47.88	4.09	MSB301D090SF04788S		38861	83
26.6	395	52.99	3.69	MSB301D090SF05299S		39887	83
24.8	423	56.82	3.44	MSB301D090SF05682S		40601	83
24	439	58.92	4.77	MSB302D090SF05892S		41349	103
21.8	482	64.71	4.41	MSB302D090SF06471S		42335	103
20.6	509	68.32	2.86	MSB301D090SF06832S		42510	83
19.3	545	73.16	2.68	MSB301D090SF07316S		43226	83
18.6	566	76.03	3.78	MSB302D090SF07603S		44050	103
18.3	573	76.95	2.55	MSB301D090SF07695S		43757	83
16.7	629	84.45	3.38	MSB302D090SF08445S		45179	103
16.5	638	85.59	4.43	MSB303D090SF08559S		58126	128
16	657	88.17	2.22	MSB301D090SF08817S		45195	83
14.2	739	99.26	1.98	MSB301D090SF09926S		46448	83
14.2	742	99.63	3.81	MSB303D090SF09963S		60462	128
13.9	755	101.28	2.84	MSB302D090SF10128S		47141	103
13	755	108.85	2.63	MSB302D090SF10885S		47918	103
12.8	823	110.49	1.77	MSB301D090SF11049S		47581	83
12.5	839	112.64	3.36	MSB303D090SF11264S		62385	128
11.4	922	123.72	2.31	MSB302D090SF12372S		49296	103
11.7	898	120.52	4.9	MSB304D090SF12052S		61938	165
11.4	922	123.76	1.58	MSB301D090SF12376S		48773	83
11.3	930	124.8	3.04	MSB303D090SF12480S		64012	128
11.1	943	126.62	4.67	MSB304D090SF12662S		62712	165
10.3	1018	136.64	4.32	MSB304D090SF13664S		63913	165
10.2	1028	137.93	2.75	MSB303D090SF13793S		65616	128
10.1	1041	139.69	1.39	MSB301D090SF13969S		50029	83
10	1049	140.75	2.04	MSB302D090SF14075S		50669	128
9.2	1143	153.47	1.87	MSB302D090SF15347S		51577	103
9.2	1144	153.56	2.49	MSB303D090SF15356S		67351	128
9.1	1159	155.6	4.85	MSB305D090SF15560S		110764	211

P 1.1 kW n_1 1410 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
8.9	1186	159.16	1.23	MSB301D090SF15916S		51356	83
8.7	1202	161.41	3.65	MSB304D090SF16141S		66566	165
8.4	1252	168.01	1.69	MSB302D090SF16801S		52511	103
8.2	1285	172.49	2.2	MSB303D090SF17249S		69240	128
7.8	1345	180.53	1.09	MSB301D090SF18053S		52599	83
7.6	1377	184.82	4.09	MSB305D090SF18482S		115934	211
7.6	1378	184.98	2.05	MSB303D090SF18498S		70380	128
7.6	1391	186.7	1.53	MSB302D090SF18670S		53574	103
7.4	1414	189.74	3.12	MSB304D090SF18974S		69164	165
7.3	1430	191.96	3.92	MSB305D090SF19196S		117092	211
7.2	1458	195.72	1	MSB301D090SF19572S		53370	83
6.8	1550	208.11	1.82	MSB303D090SF20811S		72299	128
6.7	1565	210.01	2.8	MSB304D090SF21001S		70799	165
6.5	1609	215.98	1.33	MSB302D090SF21598S		54981	103
6.4	1645	220.86	3.42	MSB305D090SF22086S		121436	211
6.2	1706	229.05	2.58	MSB304D090SF22905S		72193	165
5.7	1831	245.81	1.17	MSB302D090SF24581S		55991	103
5.8	1804	242.21	1.57	MSB303D090SF24221S		74760	128
5.7	1857	249.23	2.38	MSB304D090SF24923S		73545	165
5.5	1914	256.94	1.48	MSB303D090SF25694S		75710	128
5.3	1969	264.31	1.09	MSB302D090SF26431S		56498	103
4.8	2170	291.31	1.3	MSB303D090SF29131S		77705	128

P 1.5 kW n_1 1410 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
46.2	310	30.5	4.72	MSB301D090LF03050S		33955	86
44.9	319	31.4	4.44	MSB201D090LF03140S		34210	83
41.4	346	34.04	4.11	MSB201D090LF03404S		34927	83
37.3	384	37.79	3.81	MSB301D090LF03779S		35864	86
33.9	422	41.55	3.46	MSB301D090LF04155S		36725	86
33.3	430	42.35	4.77	MSB302D090LF04235S		37241	106
29.4	486	47.88	3	MSB301D090LF04788S		38022	86
28.6	501	49.33	4.21	MSB302D090LF04933S		38665	106
26.6	538	52.99	2.71	MSB301D090LF05299S		38957	86
24.8	577	56.82	2.53	MSB301D090LF05682S		39604	86
24.4	586	57.68	4.82	MSB303D090LF05768S		51538	131
23.9	599	58.92	3.56	MSB302D090LF05892S		40340	106
22.1	647	63.67	4.37	MSB303D090LF06367S		52874	131
21.8	657	64.71	3.23	MSB302D090LF06471S		41227	106
20.6	694	68.32	2.1	MSB301D090LF06832S		41311	86
19.3	743	73.16	1.96	MSB301D090LF07316S		41943	86
19.1	750	73.82	3.77	MSB303D090LF07382S		54905	131

P 1.5 kW n_1 1410 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
18.6	772	76.03	2.77	MSB302D090LF07203S		42749	83
18.3	782	76.95	1.87	MSB301D090LF07695S		42407	86
16.7	858	84.45	2.48	MSB302D090LF08445S		43733	83
16.5	870	85.59	3.25	MSB303D090LF08559S		56970	131
16	896	88.17	1.63	MSB301D090LF08817S		43648	86
15.4	929	91.5	4.77	MSB304D090LF09150S		56541	168
14.2	1008	99.26	1.45	MSB301D090LF09926S		44707	86
14.2	1012	99.63	2.79	MSB303D090LF09963S		59116	131
13.9	1029	101.28	2.08	MSB302D090LF10128S		45407	106
13.7	1043	102.66	4.24	MSB304D090LF10266S		58149	168
12.95	1106	108.85	1.93	MSB302D090LF10885S		46055	106
12.8	1122	110.49	1.3	MSB301D090LF11049S		45643	86
12.5	1144	112.64	2.47	MSB303D090LF11264S		60864	131
12.2	1171	115.23	4.83	MSB305D090LF11523S		100722	214
11.7	1224	120.52	3.59	MSB304D090LF12052S		60404	168
11.4	1253	123.31	4.34	MSB305D090LF12331S		102531	214
11.4	1257	123.72	1.7	MSB302D090LF12372S		47178	106
11.4	1257	123.76	1.16	MSB301D090LF12376S		46601	86
11.3	1268	124.8	2.23	MSB303D090LF12480S		62326	131
11.1	1286	126.62	3.43	MSB304D090LF12662S		61100	168
10.3	1388	136.64	3.17	MSB304D090LF13664S		62174	168
10.2	1401	137.93	2.02	MSB303D090LF13793S		63753	131
10.1	1419	139.69	1.02	MSB301D090LF13969S		47578	86
10	1430	140.75	1.49	MSB302D090LF14075S		48260	106
9.8	1467	144.45	3.85	MSB305D090LF14445S		106827	214
9.2	1559	153.47	1.37	MSB302D090LF15347S		48950	106
9.2	1560	153.56	1.83	MSB303D090LF15356S		65276	131
9.1	1581	155.6	3.56	MSB305D090LF15560S		108879	214
8.7	1640	161.41	2.68	MSB304D090LF16141S		64512	168
8.4	1707	168.01	1.24	MSB302D090LF16801S		49635	106
8.3	1733	170.57	4.84	MSB306D090LF17057S		97930	280
8.2	1752	172.49	1.61	MSB303D090LF17249S		66910	131
7.6	1878	184.82	3	MSB305D090LF18482S		113695	214
7.6	1879	184.98	1.5	MSB303D090LF18498S		67881	131
7.6	1897	186.7	1.12	MSB302D090LF18670S		50378	106
7.4	1928	189.74	2.28	MSB304D090LF18974S		66749	168
7.4	1937	190.67	4.34	MSB306D090LF19067S		100785	280
7.3	1950	191.96	2.87	MSB305D090LF19196S		114767	214
6.8	2092	205.91	4.01	MSB306D090LF20591S		102779	280
6.8	2114	208.11	1.34	MSB303D090LF20811S		69488	131
6.7	2133	210.01	2.06	MSB304D090LF21001S		68125	168
6.5	2194	215.98	0.97	MSB302D090LF21598S		51284	106
6.4	2233	219.78	4.7	MSB307D090LF21978S		153204	376

P 1.5 kW n_1 1410 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
6.4	2244	220.86	2.51	MSB305D090LF22086S		118760	214
6.4	2249	221.41	3.75	MSB306D090LF22141S		104679	280
6.2	2327	229.05	1.89	MSB304D090LF22905S		69278	168
5.8	2461	242.21	1.15	MSB303D090LF24221S		71488	131
5.7	2532	249.23	1.74	MSB304D090LF24923S		70372	168
5.5	2610	256.94	1.08	MSB303D090LF25694S		72238	131
4.8	2959	291.31	0.95	MSB303D090LF29131S		73770	131

P 2.2 kW n_1 1420 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
73.9	284	19.22	4.93	MSB201E100LF01922S		29454	89
66	318	21.52	4.48	MSB201E100LF02152S		30315	89
58.5	359	24.29	3.97	MSB201E100LF02429S		31245	89
51.6	407	27.51	4.75	MSB202E100LF02751S		32521	106
51.6	407	27.52	4.75	MSB302E100LF02752S		32524	131
51.3	410	27.68	3.38	MSB201E100LF02768S		32259	89
46.6	451	30.5	3.24	MSB301E100LF03050S		33018	93
45.2	465	31.4	3.05	MSB201E100LF03140S		33247	89
45.2	455	30.76	4.26	MSB302E100LF03076S		33409	112
41.7	504	34.04	2.82	MSB201E100LF03404S		33882	89
38.7	542	36.66	3.68	MSB302E100LF03666S		34817	112
37.6	559	37.79	2.61	MSB301E100LF03779S		34704	93
34.2	615	41.55	2.37	MSB301E100LF04155S		35449	93
33.2	632	42.73	4.47	MSB303E100LF04273S		46596	138
33.5	626	42.35	3.27	MSB302E100LF04235S		35973	112
29.7	708	47.88	2.06	MSB301E100LF04788S		36552	93
28.8	729	49.29	3.88	MSB303E100LF04929S		48289	138
28.8	730	49.33	2.89	MSB302E100LF04933S		37188	112
26.8	784	52.99	1.86	MSB301E100LF05299S		37331	93
25	841	56.82	1.73	MSB301E100LF05682S		37860	93
24.6	853	57.68	3.31	MSB303E100LF05768S		50174	138
24.1	872	58.92	2.44	MSB302E100LF05892S		38575	106
22.3	942	63.67	3	MSB303E100LF06367S		51368	138
21.9	957	64.71	2.22	MSB302E100LF06471S		39289	112
21.6	970	65.59	4.53	MSB304E100LF06559S		50528	178
20.8	1011	68.32	1.44	MSB301E100LF06832S		39214	93
20.6	1021	69.03	4.3	MSB304E100LF06903S		51139	178
19.4	1082	73.16	1.35	MSB301E100LF07316S		39697	93
19.2	1092	73.82	2.59	MSB303E100LF07382S		53160	138
18.7	1125	76.03	1.9	MSB302E100LF07603S		40471	112
18.6	1129	76.33	3.9	MSB304E100LF07633S		52342	178
18.5	1138	76.95	1.28	MSB301E100LF07695S		40045	93

P 2.2 kW n_1 1420 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
17.4	1205	81.46	4.66	MSB305E100LF08146S		90059	222
16.8	1249	84.45	1.7	MSB302E100LF08445S		41203	112
16.6	1266	85.59	2.23	MSB303E100LF08559S		54946	138
16.1	1304	88.17	1.12	MSB301E100LF08817S		40941	93
15.5	1354	91.5	3.27	MSB304E100LF09150S		54503	178
15.3	1369	92.53	4.1	MSB305E100LF09253S		93041	222
14.3	1468	99.26	0.99	MSB301E100LF09926S		41660	93
14.3	1474	99.63	1.92	MSB303E100LF09963S		56761	138
14	1498	101.28	1.43	MSB302E100LF10128S		42373	112
13.8	1519	102.66	2.91	MSB304E100LF10266S		55862	178
13.2	1591	107.55	3.54	MSB305E100LF10754S		96620	222
13	1610	108.85	1.32	MSB302E100LF10885S		42795	112
12.6	1666	112.64	1.69	MSB303E100LF11264S		58201	138
12.3	1705	115.23	3.32	MSB305E100LF11523S		98279	222
12	1754	118.54	4.8	MSB306E100LF11854S		87109	290
11.8	1783	120.52	2.47	MSB304E100LF12052S		57719	178
11.5	1830	123.72	1.17	MSB302E100LF12372S		43472	112
11.5	1824	123.31	2.98	MSB305E100LF12331S		99917	222
11.4	1846	124.8	1.53	MSB303E100LF12480S		59376	138
11.2	1873	126.62	2.35	MSB304E100LF12662S		58279	178
10.4	2022	136.64	2.17	MSB304E100LF13664S		59130	178
10.3	2034	137.45	4.13	MSB306E100LF13745S		90408	290
10.3	2041	137.93	1.39	MSB303E100LF13793S		60492	138
10.1	2082	140.75	1.03	MSB302E100LF14075S		44044	112
9.8	2137	144.45	2.64	MSB305E100LF14445S		103765	222
9.8	2155	145.64	3.9	MSB306E100LF14564S		91711	290
9.2	2272	153.56	1.26	MSB303E100LF15356S		61646	138
9.2	2287	154.56	4.59	MSB307E100LF15456S		134607	383
9.1	2302	155.6	2.44	MSB305E100LF15560S		105580	222
9	2339	158.09	3.59	MSB306E100LF15809S		93568	290
8.8	2388	161.41	1.84	MSB304E100LF16141S		60916	178
8.3	2524	170.57	3.33	MSB306E100LF17057S		95298	290
8.2	2552	172.49	1.11	MSB303E100LF17249S		62832	138
8	2619	177.03	4.01	MSB307E100LF17703S		141764	383
7.7	2734	184.82	2.06	MSB305E100LF18482S		109777	222
7.7	2736	184.91	3.85	MSB307E100LF18491S		143244	383
7.7	2737	184.98	1.03	MSB303E100LF18498S		63508	138
7.5	2800	189.27	4.66	MSB308E100LF18927S		159823	474
7.5	2807	189.74	1.57	MSB304E100LF18974S		62522	178
7.4	2821	190.67	2.98	MSB306E100LF19067S		97843	290
7.4	2840	191.96	1.97	MSB305E100LF19196S		110698	222
7	3010	203.43	4.35	MSB308E100LF20343S		162807	474
6.9	3046	205.91	2.76	MSB306E100LF20591S		99602	290

P 2.2 kW n_1 1420 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
6.8	3107	210.01	1.41	MSB304E100LF21001S		63447	178
6.5	3252	219.78	3.23	MSB307E100LF21978S		149577	383
6.4	3268	220.86	1.72	MSB305E100LF22086S		114079	222
6.4	3276	221.41	2.58	MSB306E100LF22141S		101262	290
6.2	3389	229.05	1.3	MSB304E100LF22905S		64175	168
5.7	3687	249.23	1.2	MSB304E100LF24923S		64820	168

P 3.7 kW n_1 1420 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
154.1	229	9.22	4.72	MSB201E112MF00922S		23618	99
143.7	246	9.88	4.52	MSB201E112MF00988S		24042	99
119.5	296	11.88	4	MSB201E112MF01188S		25175	99
106.1	333	13.38	3.72	MSB201E112MF01338S		25916	99
95.1	371	14.93	4.77	MSB202E112MF01493S		26862	116
92.6	382	15.33	3.44	MSB201E112MF01533S		26770	99
88.5	399	16.04	4.64	MSB202E112MF01604S		27324	116
82.3	430	17.26	3.13	MSB201E112MF01726S		27516	99
77.9	454	18.23	4.24	MSB202E112MF01823S		28147	116
73.9	478	19.22	2.93	MSB201E112MF01922S		28189	99
70.6	501	20.12	4.72	MSB203E112MF02012S		37190	141
68.5	516	20.74	3.78	MSB202E112MF02074S		28973	116
66	536	21.52	2.67	MSB201E112MF02152S		28899	99
62.8	563	22.62	3.46	MSB202E112MF02262S		29525	116
63.4	557	22.39	4	MSB203E112MF02239S		38204	141
58.5	604	24.29	2.36	MSB201E112MF02429S		29647	99
57.4	616	24.76	3.12	MSB202E112MF02476S		30097	116
56.5	626	25.15	3.65	MSB203E112MF02515S		39314	141
52.6	671	26.98	3.6	MSB203E112MF02698S		39987	141
51.6	685	27.51	2.83	MSB202E112MF02751S		30755	116
51.6	685	27.52	2.82	MSB302E112MF02752S		30757	122
51.5	686	27.58	4.08	MSB303E112MF02758S		40200	148
51.3	689	27.68	2.01	MSB201E112MF02768S		30439	99
46.8	755	30.35	3.44	MSB203E112MF03035S		41125	141
46.6	759	30.5	1.93	MSB301E112MF03050S		31012	103
46.2	765	30.76	2.53	MSB302E112MF03076S		31435	122
45.7	773	31.06	3.62	MSB303E112MF03106S		41348	148
45.2	781	31.4	1.81	MSB201E112MF03140S		31181	99
42.5	832	33.45	4.8	MSB304E112MF03345S		42786	188
41.7	847	34.04	1.68	MSB201E112MF03404S		31643	99
39.2	902	36.27	3.13	MSB303E112MF03627S		42851	148
38.7	912	36.66	2.19	MSB302E112MF03666S		32463	122
37.6	940	37.79	1.55	MSB301E112MF03779S		32218	103

P 3.7 kW n_1 1420 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
35.6	993	39.9	4.14	MSB304E112MF03990S		42786	188
34.2	1034	41.55	1.41	MSB301E112MF04155S		32715	103
33.2	1063	42.73	2.66	MSB303E112MF04273S		44432	148
33.5	1054	42.35	1.95	MSB302E112MF04235S		33255	122
31.9	1107	44.51	3.76	MSB304E112MF04451S		43826	188
29.7	1191	47.88	1.23	MSB301E112MF04788S		33402	103
29	1218	48.94	4.56	MSB305E112MF04894S		76469	232
28.8	1226	49.29	2.31	MSB303E112MF04929S		45792	148
28.8	1227	49.33	1.72	MSB302E112MF04933S		34021	122
27.1	1305	52.43	3.28	MSB304E112MF05243S		45365	188
26.8	1318	52.99	1.11	MSB301E112MF05299S		33845	103
25.6	1380	55.47	4.06	MSB305E112MF05547S		78874	232
25	1414	56.82	1.03	MSB301E112MF05682S		34121	103
24.6	1435	57.68	1.97	MSB303E112MF05768S		47252	148
24.3	1451	58.33	2.99	MSB304E112MF05833S		46345	188
24.1	1466	58.92	1.45	MSB302E112MF05892S		34793	122
22.3	1584	63.67	1.79	MSB303E112MF06367S		48143	148
21.9	1610	64.71	1.32	MSB302E112MF06471S		35135	122
21.8	1618	65.01	3.46	MSB305E112MF06501S		81953	232
21.6	1632	65.59	2.69	MSB304E112MF06559S		47397	188
20.6	1718	69.03	2.56	MSB304E112MF06903S		47843	188
20.4	1728	69.47	3.25	MSB305E112MF06947S		83247	232
19.2	1837	73.82	1.54	MSB303E112MF07382S		49420	148
18.7	1892	76.03	1.13	MSB302E112MF07603S		35591	122
18.7	1894	76.12	4.45	MSB306E112MF07612S		75095	300
18.6	1899	76.33	2.32	MSB304E112MF07633S		48698	188
17.4	2027	81.46	2.77	MSB305E112MF08146S		86359	232
17.1	2062	82.87	4.08	MSB306E112MF08287S		76643	300
16.8	2101	84.45	1.01	MSB302E112MF08445S		35783	122
16.6	2130	85.59	1.33	MSB303E112MF08559S		50610	148
15.5	2272	91.33	3.7	MSB306E112MF09133S		78422	300
15.5	2277	91.5	1.95	MSB304E112MF09150S		50135	188
15.3	2302	92.53	2.44	MSB305E112MF09253S		88838	232
15.3	2311	92.9	4.56	MSB307E112MF09290S		114979	393
14.3	2479	99.63	1.14	MSB303E112MF09963S		51713	148
13.8	2553	102.61	3.3	MSB306E112MF10261S		80555	300
13.8	2554	102.66	1.73	MSB304E112MF10266S		50961	188
13.3	2648	106.41	3.97	MSB307E112MF10641S		118864	393
13.2	2676	107.55	2.11	MSB305E112MF10755S		91735	232
12.7	2775	111.54	4.72	MSB308E112MF11154S		135044	484
12.6	2803	112.64	1.01	MSB303E112MF11264S		52494	148
12.6	2812	113.01	3.73	MSB307E112MF11301S		123143	393
12.5	2820	113.34	4.58	MSB308E112MF11334S		135583	484

P 3.7 kW n_1 1420 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
12.3	2867	115.23	1.97	MSB305E112MF11523S		93045	232
12	2949	118.54	2.85	MSB306E112MF11854S		83189	300
11.8	2999	120.52	1.47	MSB304E112MF12052S		51966	188
11.5	3068	123.31	1.77	MSB305E112MF12331S		94316	232
11.5	3072	123.46	3.42	MSB307E112MF12346S		125284	393
11.2	3151	126.62	1.4	MSB304E112MF12662S		52235	188
10.4	3400	136.64	1.29	MSB304E112MF13664S		52607	188
10.3	3420	137.45	2.45	MSB306E112MF13745S		85864	300
10.3	3422	137.53	3.09	MSB307E112MF13753S		127902	393
9.8	3594	144.45	1.57	MSB305E112MF14445S		97204	232
9.8	3624	145.64	2.32	MSB306E112MF14564S		86896	300
9.5	3701	148.76	3.52	MSB308E112MF14876S		144887	484
9.3	3795	152.52	4.77	MSB309E112MF15252S		167698	669
9.2	3846	154.56	2.73	MSB307E112MF15456S		129475	393
9.1	3872	155.6	1.45	MSB305E112MF15560S		98513	232
9	3933	158.09	2.13	MSB306E112MF15809S		88341	300
8.8	4016	161.41	1.09	MSB304E112MF16141S		53211	188
8.5	4140	166.38	3.14	MSB308E112MF16638S		148756	484
8.3	4244	170.57	1.98	MSB306E112MF17057S		89658	300
8	4405	177.03	2.39	MSB307E112MF17703S		135489	393
7.7	4599	184.82	1.23	MSB305E112MF18482S		101382	232
7.7	4601	184.91	2.29	MSB307E112MF18491S		136707	393
7.6	4652	186.98	3.89	MSB309E112MF18698S		176532	669
7.5	4709	189.27	2.77	MSB308E112MF18927S		153213	484
7.4	4744	190.67	1.77	MSB306E112MF19067S		91538	300
7.4	4776	191.96	1.17	MSB305E112MF19196S		101978	232
7	5062	203.43	2.59	MSB308E112MF20343S		155703	484
6.9	5123	205.91	1.64	MSB306E112MF20591S		92794	300
6.5	5469	219.78	1.92	MSB307E112MF21978S		141806	393
6.4	5496	220.86	1.02	MSB305E112MF22086S		104046	232
6.4	5509	221.41	1.53	MSB306E112MF22141S		93942	300
6.2	5734	230.43	3.17	MSB309E112MF23043S		185764	669

P 5.5 kW n_1 1440 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
271.5	193	5.3	4.49	MSB201F132SF00530S		19999	136
219.1	240	6.57	3.96	MSB201F132SF00657S		21107	136
199.3	264	7.23	3.75	MSB201F132SF00723S		21604	136
172.9	304	8.33	3.44	MSB201F132SF00833S		22352	136
165.8	316	8.68	4.49	MSB202F132SF00868S		22798	148
156.3	336	9.22	3.22	MSB201F132SF00922S		22891	136
151	348	9.54	4.24	MSB202F132SF00954S		23306	148

P 5.5 kW n_1 1440 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
145.7	360	9.88	3.08	MSB201F132SF00988S		23262	136
128.5	409	11.20	3.87	MSB202F132SF01120S		24179	148
121.2	433	11.88	2.73	MSB201F132SF01188S		24237	136
115.7	454	12.45	3.62	MSB202F132SF01245S		24745	148
115.4	455	12.48	4.74	MSB203F132SF01248S		32089	175
107.6	488	13.38	2.54	MSB201F132SF01338S		24859	136
99.1	530	14.53	4.25	MSB203F132SF01453S		33313	175
96.5	544	14.93	3.25	MSB202F132SF01493S		25712	148
93.9	559	15.33	2.35	MSB201F132SF01533S		25560	136
89.8	585	16.04	3.16	MSB202F132SF01604S		26088	148
87.7	599	16.43	3.91	MSB203F132SF01643S		34311	175
83.4	630	17.26	2.14	MSB201F132SF01726S		26153	136
79.1	664	18.2	3.52	MSB203F132SF01820S		35149	175
79	665	18.23	2.89	MSB202F132SF01823S		26742	148
74.9	701	19.22	2	MSB201F132SF01922S		26673	136
71.6	734	20.12	3.22	MSB203F132SF02012S		35967	175
69.4	757	20.74	2.58	MSB202F132SF02074S		27376	148
66.9	785	21.52	1.82	MSB201F132SF02152S		27200	136
64.3	817	22.39	2.73	MSB203F132SF02239S		36843	175
63.7	825	22.62	2.36	MSB202F132SF02262S		27783	148
63.7	825	22.62	4.85	MSB204F132SF02262S		35271	212
59.3	886	24.29	1.61	MSB201F132SF02429S		27729	136
58.2	903	24.76	2.13	MSB202F132SF02476S		28190	148
58.8	894	24.5	4.45	MSB204F132SF02450S		35892	212
57.2	917	25.15	2.49	MSB203F132SF02515S		37785	175
53.4	984	26.98	2.45	MSB203F132SF02698S		38347	175
52.3	1004	27.51	1.93	MSB202F132SF02751S		28635	148
52.3	1004	27.52	1.93	MSB302F132SF02752S		28637	157
52.2	1006	27.58	2.79	MSB303F132SF02758S		38523	184
52	1010	27.68	1.37	MSB201F132SF02768S		28254	136
50	1050	28.8	3.8	MSB204F132SF02880S		37135	212
49.2	1068	29.28	4.35	MSB205F132SF02928S		65369	257
48.5	1084	29.72	3.67	MSB304F132SF02972S		40500	223
47.4	1107	30.35	2.35	MSB203F132SF03035S		39280	175
47.2	1112	30.5	1.31	MSB301E132SF03050S		28605	140
46.4	1133	31.06	2.47	MSB303F132SF03106S		39460	184
45.9	1145	31.4	1.24	MSB201F132SF03140S		28703	136
45.2	1163	31.88	3.09	MSB204F132SF03188S		37899	212
46.8	1122	30.76	1.73	MSB302F132SF03076S		29066	157
44.1	1190	32.62	4.36	MSB305F132SF03262S		67127	269
43	1220	33.45	3.27	MSB304F132SF03345S		40500	223
42.3	1242	34.04	1.15	MSB201F132SF03404S		28955	136
39.7	1323	36.26	2.14	MSB303F132SF03626S		40647	184
39.3	1337	36.66	1.49	MSB302F132SF03666S		29640	175

P 5.5 kW **n_1 1440 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
38.1	1378	37.79	1.06	MSB301F132SF03779S		29235	140
37.8	1391	38.14	3.84	MSB305F132SF03814S		69692	269
36.1	1455	39.9	2.83	MSB304F132SF03990S		40500	223
35	1502	41.19	3.56	MSB305F132SF04119S		70959	269
34.7	1516	41.55	0.96	MSB301F132SF04155S		29435	140
34	1544	42.35	1.33	MSB302F132SF04235S		29993	157
33.7	1558	42.72	1.81	MSB303F132SF04272S		41835	184
32.4	1623	44.51	2.56	MSB304F132SF04451S		41276	223
31.9	1646	45.12	4.91	MSB306F132SF04512S		64026	339
29.4	1785	48.94	3.11	MSB305F132SF04894S		73801	269
29.2	1798	49.29	1.57	MSB303F132SF04929S		42796	184
29.2	1799	49.33	1.17	MSB302F132SF04933S		30222	157
27.5	1912	52.43	2.24	MSB304F132SF05243S		42361	223
26.8	1959	53.7	4.24	MSB306F132SF05370S		66714	339
26	2023	55.47	2.77	MSB305F132SF05547S		75851	269
25	2104	57.68	1.34	MSB303F132SF05768S		43746	184
24.7	2127	58.33	2.04	MSB304F132SF05833S		43004	223
24.4	2149	58.92	0.99	MSB302F132MF05892S		30255	157
23.5	2231	61.17	3.77	MSB306F132SF06117S		68725	339
22.6	2322	63.67	1.22	MSB303F132SF06367S		44272	184
22.2	2371	65.01	2.36	MSB305F132SF06501S		78410	269
22	2392	65.59	1.84	MSB304F132SF06559S		43640	223
21.3	2464	67.56	4.27	MSB307F132SF06756S		103294	424
21.1	2492	68.32	3.37	MSB306F132SF06832S		70426	339
20.9	2518	69.03	1.75	MSB304F132SF06903S		43889	223
20.7	2534	69.47	2.22	MSB305F132SF06947S		79460	269
19.6	2675	73.35	3.93	MSB307F132SF07335S		106025	424
19.5	2693	73.82	1.05	MSB303F132SF07382S		44932	184
18.9	2776	76.12	3.04	MSB306F132SF07612S		72074	339
18.9	2784	76.33	1.58	MSB304F132SF07633S		44325	223
18.3	2875	78.83	4.53	MSB308F132SF07883S		120253	537
17.7	2971	81.46	1.89	MSB305F132SF08146S		81919	269
17.6	2988	81.91	3.53	MSB307F132SF08191S		108065	424
17.4	3022	82.87	2.78	MSB306F132SF08287S		73355	339
16.3	3216	88.19	4.05	MSB308F132SF08819S		123514	537
15.8	3331	91.33	2.53	MSB306F132SF09133S		74798	339
15.7	3337	91.5	1.33	MSB304F132SF09150S		44894	223
15.6	3375	92.53	1.66	MSB305F132SF09253S		83795	269
15.5	3388	92.9	3.11	MSB307F132SF09290S		111202	424
14.5	3627	99.44	3.6	MSB308F132SF09944S		127019	537
14	3743	102.61	2.25	MSB306F132SF10261S		76484	339
14	3744	102.66	1.18	MSB304F132SF10266S		45080	223
13.6	3864	105.95	4.7	MSB309F132SF10595S		148887	701
13.5	3881	106.41	2.71	MSB307F132SF10641S		114551	424

P 5.5 kW n_1 1440 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
13.4	3923	107.55	1.44	MSB305F132SF10755S		85873	269
12.9	4068	111.54	3.22	MSB308F132SF11154S		130369	537
12.7	4122	113.01	2.55	MSB307F132SF11301S		118160	424
12.7	4134	113.34	3.13	MSB308F132SF11334S		130833	537
12.5	4203	115.23	1.35	MSB305F132SF11523S		86764	269
12.1	4323	118.54	1.95	MSB306F132SF11854S		78486	339
12	4395	120.5	4.11	MSB309F132SF12050S		153668	701
11.7	4498	123.31	1.21	MSB305F132SF12331S		87595	269
11.7	4503	123.46	2.34	MSB307F132SF12346S		119930	424
10.5	4987	136.74	3.64	MSB309F132SF13674S		158409	701
10.5	5013	137.45	1.67	MSB306F132SF13745S		80410	339
10.5	5016	137.53	2.11	MSB307F132SF13753S		122058	424
10	5268	144.45	1.07	MSB305F132SF14445S		89330	269
9.9	5312	145.64	1.58	MSB306F132SF14564S		81117	339
9.7	5426	148.76	2.4	MSB308F132SF14876S		138653	537
9.4	5563	152.52	3.25	MSB309F132SF15252S		162520	701
9.3	5637	154.56	1.86	MSB307F132SF15456S		123316	424
9.3	5675	155.6	0.99	MSB305F132SF15560S		90031	269
9.1	5766	158.09	1.45	MSB306F132SF15809S		82068	339
8.7	6069	166.38	2.15	MSB308F132SF16638S		141784	537
8.4	6221	170.57	1.35	MSB306F132SF17057S		82890	339
8.1	6457	177.03	1.63	MSB307F132SF17703S		127960	424
7.8	6744	184.91	1.56	MSB307F132SF18491S		128864	424
7.7	6820	186.98	2.65	MSB309F132SF18698S		170184	701
7.6	6903	189.27	1.89	MSB308F132SF18927S		145282	537
7.6	6954	190.67	1.21	MSB306F132SF19067S		83972	339
7.1	7420	203.43	1.76	MSB308F132SF20343S		147177	537
7	7510	205.91	1.12	MSB306F132SF20591S		84624	339
6.6	8016	219.78	1.31	MSB307F132SF21978S		132480	424
6.5	8075	221.41	1.05	MSB306F132SF22141S		85157	339
6.2	8405	230.43	2.16	MSB309F132SF23043S		177940	701

P 7.5 kW n_1 1445 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
272.4	263	5.3	3.3	MSB201F132MF00530S		19533	150
267.4	268	5.4	4.52	MSB202F132MF00540S		19812	162
231.5	309	6.24	4.09	MSB202F132MF00624S		20495	162
219.9	326	6.57	2.92	MSB201F132MF00657S		20530	150
200	358	7.23	2.76	MSB201F132SF00723S		20970	150
198.8	360	7.27	3.69	MSB202F132MF00727S		21219	162
173.5	413	8.33	2.53	MSB201F132MF00833S		21622	150
171.8	417	8.41	4.72	MSB203F132MF00841S		28435	189

P 7.5 kW **n_1 1445 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
166.4	430	8.68	3.3	MSB202F132MF00868S		22055	162
156.8	457	9.22	2.37	MSB201F132MF00922S		22082	150
155.6	460	9.29	4.41	MSB203F132MF00929S		29134	189
151.5	473	9.54	3.12	MSB202F132MF00954S		22489	162
146.2	490	9.88	2.27	MSB201F132MF00988S		22395	150
134.2	534	10.77	3.91	MSB203F132MF01077S		30188	189
129	555	11.2	2.85	MSB202F132MF01120S		23220	162
121.6	589	11.88	2.01	MSB201F132MF01188S		23195	150
116.1	617	12.45	2.66	MSB202F132MF01245S		23680	162
115.8	619	12.48	3.49	MSB203F132MF01248S		31246	189
108	663	13.38	1.87	MSB201F132MF01338S		23686	150
99.5	720	14.53	3.13	MSB203F132MF01453S		32331	189
96.8	740	14.93	2.39	MSB202F132MF01493S		24435	162
94.2	760	15.33	1.73	MSB201F132SF01533S		24215	150
90.1	795	16.04	2.33	MSB202F132MF01604S		24715	162
88	814	16.43	2.88	MSB203F132MF01643S		33202	189
83.7	856	17.26	1.57	MSB201G160SF01726S		24639	150
79.4	902	18.2	2.59	MSB203F132MF01820S		33919	189
79.2	904	18.23	2.13	MSB202F132MF01823S		25182	162
79	907	18.29	4.42	MSB204F132MF01829S		32441	226
75.2	952	19.22	1.47	MSB201F132MF01922S		24987	150
71.8	997	20.12	2.37	MSB203F132MF02012S		34608	189
69.7	1028	20.74	1.9	MSB202F132MF02074S		25601	162
69.7	1028	20.74	3.91	MSB204F132MF02074S		33269	226
67.1	1067	21.52	1.34	MSB201F132MF02152S		25312	150
63.9	1121	22.62	1.74	MSB202F132MF02262S		25847	162
64.5	1110	22.39	2.01	MSB203F132MF02239S		35330	189
63.9	1121	22.62	3.57	MSB204F132MF02262S		33827	226
63.1	1134	22.88	4.56	MSB205F132MF02288S		60042	271
59.5	1204	24.29	1.18	MSB201F132MF02429S		25599	150
59	1214	24.5	3.28	MSB204F132MF02450S		34328	226
58.6	1222	24.65	4.15	MSB205F132MF02465S		61113	271
58.3	1227	24.76	1.57	MSB202F132MF02476S		26071	162
57.4	1247	25.15	1.83	MSB203F132MF02515S		36086	189
55.4	1292	26.07	4.04	MSB305F132MF02607S		61920	283
53.6	1337	26.98	1.81	MSB203F132MF02698S		36525	189
52.5	1364	27.51	1.42	MSB202F132MF02751S		26280	162
52.5	1364	27.52	1.42	MSB302F132MF02752S		26281	171
52.4	1367	27.58	2.05	MSB303F132MF02758S		36660	198
52.2	1372	27.68	1.01	MSB201F132MF02768S		25826	150
50.2	1427	28.8	2.8	MSB204F132MF02880S		35297	226
49.4	1451	29.28	3.2	MSB205F132MF02928S		63596	271
48.6	1473	29.72	2.7	MSB304F132MF02972S		37961	237
47.6	1504	30.35	1.73	MSB203F132MF03035S		37230	189

P 7.5 kW n_1 **1445 min⁻¹**

n2ex min-1	T2m Nm	iex	SF	TYPE	Fr NN	FrN-G N	M kg
47	1524	30.76	1.27	MSB302F132MF03076S		26433	171
46.5	1539	31.06	1.82	MSB303F132MF03106S		37363	198
45.8	1562	31.52	4.98	MSB206F132MF03152S		57195	344
45.3	1580	31.88	2.27	MSB204F132MF03188S		35865	226
44.3	1617	32.62	3.21	MSB305F132MF03262S		65151	283
43.2	1658	33.45	2.41	MSB304F132MF03345S		37961	237
39.8	1798	36.27	1.57	MSB303F132MF03627S		38197	198
39.6	1808	36.48	4.32	MSB306F132MF03648S		59172	353
39.4	1817	36.66	1.1	MSB302F132MF03666S		26502	171
37.9	1890	38.14	2.82	MSB305F132MF03814S		67382	283
36.2	1978	39.9	2.08	MSB304F132MF03990S		37961	237
35.1	2041	41.19	2.62	MSB305F132MF04119S		68465	283
34.9	2053	41.42	3.88	MSB306F132MF04142S		60887	353
34.1	2099	42.35	0.98	MSB302F132MF04235S		26369	171
33.8	2118	42.73	1.34	MSB303F132MF04273S		38949	198
32.5	2206	44.51	1.89	MSB304F132MF04451S		38444	237
32.1	2234	45.07	4.68	MSB307F132MF04507S		92730	438
32	2236	45.12	3.61	MSB306F132MF04512S		62037	353
30.1	2380	48.02	4.42	MSB307F132MF04802S		94722	438
29.5	2426	48.94	2.29	MSB305F132MF04894S		70837	283
29.3	2443	49.29	1.16	MSB303F132MF04929S		39466	198
27.6	2599	52.43	1.65	MSB304F132MF05243S		39024	237
26.9	2662	53.7	3.12	MSB306F132MF05370S		64347	353
26.4	2714	54.75	3.88	MSB307F132MF05475S		96361	438
26	2749	55.47	2.04	MSB305F132MF05547S		72491	283
26	2751	55.5	4.75	MSB308F132MF05550S		107629	551
25.1	2859	57.68	0.99	MSB303F132MF05768S		39850	198
24.8	2891	58.33	1.5	MSB304F132MF05833S		39292	237
23.6	3032	61.17	2.78	MSB306F132MF06117S		66028	353
23.6	3034	61.22	4.29	MSB308F132MF06122S		110136	551
22.7	3156	63.67	0.9	MSB303F132MF06367S		39971	198
22.2	3222	65.01	1.74	MSB305F132MF06501S		74472	283
22	3251	65.59	1.35	MSB304F132MF06559S		39465	237
21.5	3324	67.07	3.92	MSB308F132MF06707S		112468	551
21.4	3349	67.56	3.14	MSB307F132MF06756S		100226	438
21.4	3352	67.63	3.88	MSB308F132MF06763S		112680	551
21.2	3386	68.32	2.48	MSB306F132MF06832S		67414	353
20.9	3421	69.03	1.28	MSB304F132MF06903S		39496	237
20.8	3443	69.47	1.63	MSB305F132MF06947S		75253	283
19.7	3635	73.35	2.89	MSB307F132MF07335S		102606	439
19.5	3681	74.28	4.88	MSB309F132MF07428S		133211	715
19	3773	76.12	2.23	MSB306F132MF07612S		68719	353
18.9	3783	76.33	1.16	MSB304F132MF07633S		39467	237
18.3	3907	78.83	3.33	MSB308F132MF07883S		116582	551

P 7.5 kW**n₁ 1445 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
18.1	3955	79.8	4.56	MSB309F132MF07980S		135555	715
17.7	4038	81.46	1.39	MSB305F132MF08146S		76985	283
17.6	4060	81.91	2.6	MSB307F132MF08191S		104358	438
17.4	4107	82.87	2.05	MSB306F132MF08287S		69702	353
16.4	4371	88.19	2.98	MSB308F132MF08819S		119408	551
15.8	4527	91.33	1.86	MSB306F132MF09133S		70771	353
15.8	4535	91.5	0.98	MSB304F132MF09150S		39070	237
15.6	4586	92.53	1.22	MSB305F132MF09253S		78191	283
15.6	4604	92.9	2.29	MSB307F132MF09290S		107006	438
15.4	4644	93.7	3.88	MSB309F132MF09370S		140836	715
14.5	4929	99.44	2.65	MSB308F132MF09944S		122388	551
14.1	5086	102.61	1.66	MSB306F132MF10261S		71960	353
13.6	5251	105.95	3.46	MSB309F132MF10595S		144890	715
13.6	5274	106.41	1.99	MSB307F132MF10641S		109758	438
13.4	5331	107.55	1.06	MSB305F132MF10755S		79359	283
13	5529	111.54	2.37	MSB308F132MF11154S		125175	551
12.8	5601	113.01	1.87	MSB307F132MF11301S		112622	438
12.7	5617	113.34	2.3	MSB308F132MF11334S		125555	551
12.5	5711	115.23	0.99	MSB305F132MF11523S		79785	283
12.2	5875	118.54	1.43	MSB306F132MF11854S		73260	353
12	5972	120.5	3.02	MSB309F132MF12050S		149123	715
11.7	6119	123.46	1.72	MSB307F132MF12346S		113980	438
10.6	6778	136.74	2.68	MSB309F132MF13674S		153251	715
10.5	6813	137.45	1.23	MSB306F132MF13745S		74350	353
10.5	6817	137.53	1.55	MSB307F132MF13753S		115565	438
9.9	7218	145.64	1.16	MSB306F132MF14564S		74696	353
9.7	7373	148.76	1.77	MSB308F132MF14876S		131726	551
9.5	7560	152.52	2.39	MSB309F132MF15252S		156766	715
9.3	7661	154.56	1.37	MSB307F132MF15456S		116473	438
9.1	7835	158.09	1.07	MSB306F132MF15809S		75099	353
8.7	8247	166.38	1.58	MSB308F132MF16638S		134036	551
8.5	8454	170.57	0.99	MSB306F132MF17057S		75370	353
8.2	8774	177.03	1.2	MSB307F132MF17703S		119594	438
7.8	9165	184.91	1.15	MSB307F132MF18491S		120148	438
7.7	9268	186.98	1.95	MSB309F132MF18698S		163130	715
7.6	9381	189.27	1.39	MSB308F132MF18927S		136468	551
7.1	10083	203.43	1.3	MSB308F132MF20343S		137705	551
6.6	10893	219.78	0.96	MSB307F132MF21978S		122118	438
6.3	11421	230.43	1.59	MSB309F132MF23043S		169247	715

P 9.3 kW n_1 1435 min⁻¹

n ₂ ex min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
316.6	281	4.53	4.07	MSB202G160SF00453S		18636	198
270.6	328	5.3	2.65	MSB201G160SF00530S		19115	176
265.6	334	5.4	3.62	MSB202G160SF00540S		19395	198
230.3	386	6.23	4.8	MSB203G160SF00623S		25977	216
230	386	6.24	3.28	MSB202G160SF00624S		20014	198
218.3	407	6.57	2.34	MSB201G160SF00657S		20011	176
199.6	445	7.19	4.2	MSB203G160SF00719S		26900	216
198.6	447	7.23	2.21	MSB201G160SF00723S		20400	176
197.4	450	7.27	2.96	MSB202G160SF00727S		20659	198
172.3	515	8.33	2.03	MSB201G160SF00833S		20965	176
170.6	521	8.41	3.78	MSB203G160SF00841S		27924	216
165.2	537	8.68	2.65	MSB202G160SF00868S		21386	198
155.7	570	9.22	1.9	MSB201G160SF00922S		21355	176
154.5	575	9.29	3.53	MSB203G160SF00929S		28569	216
150.5	590	9.54	2.5	MSB202G160SF00954S		21755	198
145.2	612	9.88	1.82	MSB201G160SF00988S		21615	176
133.3	666	10.77	3.13	MSB203G160SF01077S		29533	216
128.1	693	11.2	2.28	MSB202G160SF01120S		22357	198
120.8	735	11.88	1.61	MSB201G160SF01188S		22257	176
115.3	770	12.45	2.13	MSB202G160SF01245S		22722	198
115	773	12.48	2.79	MSB203G160SF01248S		30487	216
107.2	828	13.38	1.49	MSB201G160SF01338S		22629	176
103.3	859	13.89	4.64	MSB204G160SF01389S		29777	249
98.8	899	14.53	2.51	MSB203G160SF01453S		31448	216
96.1	924	14.93	1.92	MSB202G160SF01493S		23285	198
93.6	949	15.33	1.38	MSB201G160SF01533S		23004	176
92.1	964	15.58	4.18	MSB204G160SF01558S		30465	249
89.5	993	16.04	1.86	MSB202G160SF01604S		23480	198
87.4	1017	16.43	2.3	MSB203G160SF01643S		32203	216
84.2	1054	17.04	4.53	MSB205G160SF01704S		54916	297
83.1	1068	17.26	1.26	MSB201G160SF01726S		23276	176
78.8	1126	18.2	2.07	MSB203G160SF01820S		32813	216
78.7	1128	18.23	1.7	MSB202G160SF01823S		23777	198
78.4	1132	18.29	3.54	MSB204G160SF01829S		31390	249
74.7	1189	19.22	1.18	MSB201G160SF01922S		23470	176
73.5	1209	19.53	4.2	MSB205G160SF01953S		56714	297
71.3	1245	20.12	1.9	MSB203G160SF02012S		33385	216
69.2	1284	20.74	1.52	MSB202G160SF02074S		24003	198
69.2	1284	20.74	3.13	MSB204G160SF02074S		32077	249
66.7	1332	21.52	1.07	MSB201G160SF02152S		23612	176
64.1	1386	22.39	1.61	MSB203G160SF02239S		33969	216
63.5	1400	22.62	1.39	MSB202G160SF02262S		24105	198
63.4	1400	22.62	2.86	MSB204G160SF02262S		32527	249
62.7	1416	22.88	3.65	MSB205G160SF02288S		58795	297

P 9.3 kW**n₁ 1435 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
58.6	1516	24.5	2.63	MSB204G160SF02450S		32921	249
58.2	1526	24.65	3.32	MSB205G160SF02465S		59769	297
58	1532	24.76	1.25	MSB202G160SF02476S		24164	198
57	1557	25.15	1.47	MSB203G160SF02515S		34557	216
55	1613	26.07	3.24	MSB305G160SF02607S		60499	310
55	1616	26.11	4.83	MSB206G160SF02611S		53626	366
53.2	1670	26.98	1.45	MSB203G160SF02698S		34885	216
52.2	1703	27.51	1.14	MSB202G160SF02751S		24161	198
52.1	1703	27.52	1.14	MSB302G160SF02752S		24161	197
52	1707	27.58	1.64	MSB303G160SF02758S		34984	223
49.8	1782	28.8	2.24	MSB204G160SF02880S		33642	249
49	1812	29.28	2.56	MSB205G160SF02928S		62000	297
48.3	1839	29.72	2.16	MSB304G160SF02972S		35675	271
47.3	1878	30.35	1.38	MSB203G160SF03035S		35385	216
46.7	1903	30.76	1.02	MSB302G160SF03076S		24064	197
46.2	1922	31.06	1.45	MSB303G160SF03106S		35475	223
45.5	1951	31.52	3.99	MSB206G160SF03152S		55944	366
45	1973	31.88	1.82	MSB204G160SF03188S		34033	249
44	2019	32.62	2.57	MSB305G160SF03262S		63374	310
42.9	2070	33.45	1.93	MSB304G160SF03345S		35675	271
39.6	2245	36.27	1.26	MSB303G160SF03627S		35992	223
39.3	2257	36.48	3.46	MSB306G160SF03648S		57725	383
37.6	2360	38.14	2.26	MSB305G160SF03814S		65303	310
36	2469	39.9	1.67	MSB304G160SF03990S		35675	271
34.9	2542	41.07	4.07	MSB307G160SF04107S		87612	469
34.8	2549	41.19	2.1	MSB305G160SF04119S		66220	310
34.6	2563	41.42	3.11	MSB306G160SF04142S		59244	383
33.6	2644	42.73	1.07	MSB303G160SF04273S		36351	223
32.2	2754	44.51	1.51	MSB304G160SF04451S		35894	271
31.8	2789	45.07	3.75	MSB307G160SF04507S		90763	469
31.8	2792	45.12	2.89	MSB306G160SF04512S		60247	383
30.7	2894	46.77	4.5	MSB308G160SF04677S		101321	573
29.9	2972	48.02	3.54	MSB307G160SF04802S		92569	469
29.3	3029	48.94	1.83	MSB305G160SF04894S		68169	310
27.4	3245	52.43	1.32	MSB304G160SF05243S		36021	271
26.7	3324	53.7	2.5	MSB306G160SF05370S		62216	383
26.2	3388	54.75	3.11	MSB307G160SF05475S		94043	469
25.9	3433	55.47	1.63	MSB305G160SF05547S		69467	310
25.9	3434	55.5	3.8	MSB308G160SF05550S		105303	573
24.6	3610	58.33	1.2	MSB304G160SF05833S		35950	271
23.5	3786	61.17	2.22	MSB306G160SF06117S		63601	383
23.4	3789	61.22	3.44	MSB308G160SF06122S		107570	573
22.1	4023	65.01	1.39	MSB305G160SF06501S		70929	310
21.9	4059	65.59	1.08	MSB304G160SF06559S		35708	271

P 9.3 kW n_1 1435 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
21.4	4151	67.07	3.14	MSB308G160SF06707S		109657	573
21.2	4181	67.56	2.52	MSB307G160SF06756S		97465	469
21.2	4183	67.59	4.34	MSB309G160SF06759S		127851	742
21.2	4185	67.63	3.11	MSB308G160SF06763S		109846	573
21	4228	68.32	1.99	MSB306G160SF06832S		64703	383
20.8	4272	69.03	1.03	MSB304G160SF06903S		35542	271
20.7	4299	69.47	1.31	MSB305G160SF06947S		71467	310
19.6	4539	73.35	2.31	MSB307G160SF07335S		99528	469
19.3	4597	74.28	3.91	MSB309G160SF07428S		130689	742
8.9	4711	76.12	1.79	MSB306G160SF07612S		65698	383
18.2	4879	78.83	2.67	MSB308G160SF07883S		113279	573
18	4939	79.8	3.65	MSB309G160SF07980S		132846	742
17.6	5042	81.46	1.11	MSB305G160SF08146S		72545	310
17.5	5069	81.91	2.08	MSB307G160SF08191S		101021	469
17.3	5129	82.87	1.64	MSB306G160SF08287S		66414	383
16.3	5458	88.19	2.39	MSB308G160SF08819S		115712	573
15.7	5652	91.33	1.49	MSB306G160SF09133S		67148	383
15.5	5726	92.53	0.98	MSB305G160SF09253S		73148	310
15.4	5749	92.9	1.83	MSB307G160SF09290S		103229	469
15.3	5799	93.7	3.11	MSB309G160SF09370S		137654	742
14.4	6154	99.44	2.12	MSB308G160SF09944S		118221	573
14	6350	102.61	1.33	MSB306G160SF10261S		67888	383
13.5	6557	105.95	2.77	MSB309G160SF10595S		141292	742
13.5	6586	106.41	1.6	MSB307G160SF10641S		105445	469
12.9	6903	111.54	1.9	MSB308G160SF11154S		120500	573
12.7	6994	113.01	1.5	MSB307G160SF11301S		107639	469
12.7	7014	113.34	1.84	MSB308G160SF11334S		120806	573
12.1	7336	118.54	1.15	MSB306G160SF11854S		68557	383
11.9	7457	120.5	2.42	MSB309G160SF12050S		145032	742
11.6	7641	123.46	1.38	MSB307G160SF12346S		108626	469
10.5	8463	136.74	2.14	MSB309G160SF13674S		148608	742
10.4	8506	137.45	0.99	MSB306G160SF13745S		68896	383
10.4	8511	137.53	1.24	MSB307G160SF13753S		109721	469
9.6	9206	148.76	1.41	MSB308G160SF14876S		125492	573
9.4	9439	152.52	1.92	MSB309G160SF15252S		151588	742
9.3	9565	154.56	1.1	MSB307G160SF15456S		110314	469
8.6	10297	166.38	1.26	MSB308G160SF16638S		127063	573
8.1	10956	177.03	0.96	MSB307G160SF17703S		112065	469
7.7	11572	186.98	1.56	MSB309G160SF18698S		156782	742
7.6	11713	189.27	1.11	MSB308G160SF18927S		128536	573
7.1	12590	203.43	1.04	MSB308G160SF20343S		129180	573
6.2	14261	230.43	1.28	MSB309G160SF23043S		161424	742

P 11.0 kW n_1 **1465 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
323.2	325	4.53	3.51	MSB202G160MF00453S		18306	192
323.4	325	4.53	4.99	MSB203G160MF00453S		23702	220
277	379	5.29	4.46	MSB203G160MF00529S		24629	220
276.2	380	5.3	2.28	MSB201G160MF00530S		18719	180
271.2	387	5.4	3.13	MSB202G160MF00540S		19002	192
235.1	447	6.23	4.14	MSB203G160MF00623S		25619	220
234.7	447	6.24	2.83	MSB202G160MF00624S		19560	192
222.9	471	6.57	2.02	MSB201G160MF00657S		19521	180
203.8	515	7.19	3.63	MSB203G160MF00719S		26487	220
202.7	518	7.23	1.91	MSB201G160MF00723S		19861	180
201.5	521	7.27	2.55	MSB202G160MF00727S		20130	192
175.9	597	8.33	1.75	MSB201G160MF00833S		20344	180
174.2	603	8.41	3.26	MSB203G160MF00841S		27441	220
168.7	623	8.68	2.28	MSB202G160MF00868S		20754	192
159	661	9.22	1.64	MSB201G160MF00922S		20668	180
157.8	666	9.29	3.05	MSB203G160MF00929S		28036	220
153.6	684	9.54	2.15	MSB202G160MF00954S		21061	192
148.2	709	9.88	1.57	MSB201G160MF00988S		20878	180
139.8	751	10.48	4.78	MSB204G160MF01048S		27473	253
136.1	772	10.77	2.7	MSB203G160MF01077S		28915	220
133.1	789	11	5.15	MSB205G160MF01100S		48709	301
130.8	803	11.20	1.97	MSB202G160MF01120S		21542	192
126.4	831	11.59	4.56	MSB204G160MF01159S		28038	253
123.3	852	11.88	1.39	MSB201G160MF01188S		21371	180
117.7	892	12.45	1.84	MSB202G160MF01245S		21816	192
117.4	895	12.48	2.41	MSB203G160MF01248S		29771	220
113.5	925	12.91	4.71	MSB205G160MF01291S		50640	301
109.5	960	13.38	1.29	MSB201G160MF01338S		21631	180
105.5	996	13.89	4	MSB204G160MF01389S		29023	253
100.8	1042	14.53	2.16	MSB203G160MF01453S		30614	220
99.9	1051	14.66	4.45	MSB205G160MF01466S		52196	301
98.1	1070	14.93	1.66	MSB202G160MF01493S		22199	192
95.5	1099	15.33	1.19	MSB201G160MF01533S		21861	180
94	1117	15.58	3.61	MSB204G160MF01558S		29620	253
91.3	1150	16.04	1.61	MSB202G160MF01604S		22313	192
89.2	1178	16.43	1.99	MSB203G160MF01643S		31260	220
86	1222	17.04	3.91	MSB205G160MF01704S		54039	301
84.9	1238	17.26	1.09	MSB201G160MF01726S		21989	180
80.5	1305	18.2	1.79	MSB203G160MF01820S		31768	220
80.4	1307	18.23	1.47	MSB202G160MF01823S		22451	192
80.1	1312	18.29	3.05	MSB204G160MF01829S		30398	253
76.2	1378	19.22	1.02	MSB201G160MF01922S		22038	180
75	1401	19.53	3.63	MSB205G160MF01953S		55708	301
72.8	1442	20.12	1.64	MSB203G160MF02012S		32230	220

P 11.0 kW n_1 1465 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
70.6	1487	20.74	1.31	MSB202G160MF02074S		22494	192
70.6	1487	20.74	2.7	MSB204G160MF02074S		30952	253
65.4	1606	22.39	1.39	MSB203G160MF02239S		32683	220
64.8	1622	22.62	1.2	MSB202G160MF02262S		22460	192
64.8	1622	22.62	2.46	MSB204G160MF02262S		31300	253
64	1641	22.88	3.15	MSB205G160MF02288S		57617	301
60.5	1735	24.2	4.49	MSB206G160MF02420S		51781	370
59.8	1757	24.5	2.27	MSB204G160MF02450S		31591	253
59.4	1767	24.65	2.87	MSB205G160MF02465S		58500	301
59.2	1775	24.76	1.08	MSB202G160MF02476S		22362	192
58.2	1804	25.15	1.27	MSB203G160MF02515S		33113	220
56.2	1869	26.07	2.79	MSB305G160MF02607S		59157	314
56.1	1872	26.11	4.17	MSB206G160MF02611S		52648	370
54.3	1934	26.98	1.25	MSB203G160MF02698S		33336	220
53.3	1973	27.51	0.98	MSB202G160MF02751S		22160	192
53.2	1974	27.52	0.98	MSB302G160MF02752S		22159	201
53.1	1977	27.58	1.42	MSB303G160MF02758S		33400	227
51.8	2027	28.26	4.95	MSB207G160MF02826S		80036	457
50.9	2065	28.8	1.93	MSB204G160MF02880S		32079	253
50	2099	29.28	2.21	MSB205G160MF02928S		60493	301
49.3	2131	29.72	1.87	MSB304G160MF02972S		33517	275
48.3	2176	30.35	1.19	MSB203G160MF03035S		33643	220
47.2	2227	31.06	1.26	MSB303G160MF03106S		33691	227
46.5	2260	31.52	3.44	MSB206G160MF03152S		54763	370
46	2286	31.88	1.57	MSB204G160MF03188S		32304	253
45.3	2320	32.35	4.33	MSB307G160MF03235S		81713	473
44.9	2339	32.62	2.22	MSB305G160MF03262S		61694	314
43.8	2398	33.45	1.66	MSB304G160MF03345S		33517	275
40.4	2600	36.27	1.09	MSB303G160MF03627S		33910	227
40.2	2615	36.48	2.99	MSB306G160MF03648S		56358	387
38.4	2735	38.14	1.95	MSB305G160MF03814S		63340	314
36.7	2861	39.9	1.44	MSB304G160MF03990S		33517	275
35.7	2945	41.07	3.51	MSB307G160MF04107S		86023	473
35.6	2953	41.19	1.81	MSB305G160MF04119S		64099	314
35.4	2970	41.42	2.68	MSB306G160MF04142S		57692	387
35.3	2972	41.46	4.37	MSB308G160MF04146S		96873	577
32.9	3191	44.51	1.3	MSB304G160MF04451S		33486	275
32.5	3232	45.07	3.24	MSB307G160MF04507S		88905	473
32.5	3235	45.12	2.5	MSB306G160MF04512S		58556	387
31.3	3353	46.77	3.88	MSB308G160MF04677S		99470	577
30.5	3443	48.02	3.05	MSB307G160MF04802S		90536	473
29.9	3509	48.94	1.58	MSB305G160MF04894S		65649	314
28.1	3738	52.13	4.86	MSB309G160MF05213S		118422	746
27.9	3759	52.43	1.14	MSB304G160MF05243S		33185	275

P 11.0 kW n_1 **1465 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
27.3	3851	53.7	2.15	MSB306G160MF05370S		60203	387
26.8	3926	54.75	2.68	MSB307G160MF05475S		91854	473
26.4	3977	55.47	1.41	MSB305G160MF05547S		66612	314
26.4	3979	55.5	3.28	MSB308G160MF05550S		103107	577
25.7	4094	57.1	4.44	MSB309G160MF05710S		120969	746
25.1	4182	58.33	1.04	MSB304G160MF05833S		32795	275
23.9	4386	61.17	1.92	MSB306G160MF06117S		61309	387
23.9	4389	61.22	2.97	MSB308G160MF06122S		105147	577
22.5	4661	65.01	1.2	MSB305G160MF06501S		67583	314
21.8	4809	67.07	2.71	MSB308G160MF06707S		107002	577
21.7	4844	67.56	2.17	MSB307G160MF06756S		94858	473
21.7	4846	67.59	3.75	MSB309G160MF06759S		125684	746
21.7	4849	67.63	2.68	MSB308G160MF06763S		107169	577
21.4	4899	68.32	1.72	MSB306G160MF06832S		62143	387
21.1	4981	69.47	1.13	MSB305G160MF06947S		67891	314
20	5259	73.35	2	MSB307G160MF07335S		96621	473
19.7	5326	74.28	3.38	MSB309G160MF07428S		128307	746
19.2	5458	76.12	1.54	MSB306G160MF07612S		62846	387
18.6	5652	78.83	2.3	MSB308G160MF07883S		110158	577
18.4	5722	79.8	3.15	MSB309G160MF07980S		130287	746
17.9	5873	81.91	1.79	MSB307G160MF08191S		97870	473
17.7	5942	82.87	1.42	MSB306G160MF08287S		63308	387
16.6	6323	88.19	2.06	MSB308G160MF08819S		112222	577
16	6549	91.33	1.29	MSB306G160MF09133S		63725	387
15.8	6661	92.9	1.58	MSB307G160MF09290S		99661	473
15.6	6718	93.7	2.68	MSB309G160MF09370S		134650	746
14.7	7130	99.44	1.83	MSB308G160MF09944S		114285	577
14.3	7357	102.61	1.15	MSB306G160MF10261S		64043	387
13.8	7597	105.95	2.39	MSB309G160MF10595S		137895	746
13.8	7630	106.41	1.38	MSB307G160MF10641S		101372	473
13.1	7998	111.54	1.64	MSB308G160MF11154S		116086	577
13	8103	113.01	1.29	MSB307G160MF11301S		102932	473
12.9	8126	113.34	1.59	MSB308G160MF11334S		116320	577
12.4	8499	118.54	0.99	MSB306G160MF11854S		64115	387
12.2	8640	120.5	2.09	MSB309G160MF12050S		141168	746
11.9	8852	123.46	1.19	MSB307G160MF12346S		103569	473
10.7	9805	136.74	1.85	MSB309G160MF13674S		144223	746
10.7	9861	137.53	1.07	MSB307G160MF13753S		104202	473
9.8	10666	148.76	1.22	MSB308G160MF14876S		119604	577
9.6	10936	152.52	1.66	MSB309G160MF15252S		146697	746
8.8	11930	166.38	1.09	MSB308G160MF16638S		120478	577
7.8	13407	186.98	1.35	MSB309G160MF18698S		150786	746
6.4	16522	230.43	1.1	MSB309G160MF23043S		154035	746

P 15.0 kW n_1 1460 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
322.1	445	4.53	2.57	MSB202G160LF00453S		17531	208
322.3	444	4.53	3.65	MSB203G160LF00453S		23091	236
276	519	5.29	3.26	MSB203G160LF00529S		23915	236
275.3	520	5.3	1.67	MSB201G160LF00530S		17789	196
270.2	530	5.4	2.28	MSB202G160LF00540S		18078	208
241.1	594	6.06	4.87	MSB204G160LF00606S		24874	269
234.3	611	6.23	3.03	MSB203G160LF00623S		24777	236
234	612	6.24	2.07	MSB202G160LF00624S		18492	208
222.1	645	6.57	1.47	MSB201G160LF00657S		18368	196
216.1	663	6.76	4.56	MSB204G160LF00676S		24874	269
203.1	705	7.19	2.65	MSB203G160LF00719S		25516	236
202	709	7.23	1.39	MSB201G160LF00723S		18593	196
200.8	713	7.27	1.87	MSB202G160LF00727S		18886	208
188.3	761	7.75	4.7	MSB205G160LF00775S		43630	317
183.5	781	7.96	4.2	MSB204G160LF00796S		24874	269
175.3	817	8.33	1.28	MSB201G160LF00833S		18883	196
173.6	825	8.41	2.39	MSB203G160LF00841S		26304	236
166.1	862	8.79	4.33	MSB205G160LF00879S		44966	317
168.1	852	8.68	1.67	MSB202G160LF00868S		19268	208
164.9	869	8.85	3.88	MSB204G160LF00885S		25378	269
158.4	904	9.22	1.2	MSB201G160LF00922S		19051	196
157.2	911	9.29	2.23	MSB203G160LF00929S		26782	236
153.1	936	9.54	1.57	MSB202G160LF00954S		19429	208
147.7	970	9.88	1.15	MSB201G160LF00988S		19144	196
139.3	1028	10.48	3.49	MSB204G160LF01048S		26135	269
135.6	1056	10.77	1.97	MSB203G160LF01077S		27460	236
132.7	1080	11	3.76	MSB205G160LF01100S		47376	317
130.3	1099	11.2	1.44	MSB202G160LF01120S		19624	208
126	1137	11.59	3.33	MSB204G160LF01159S		26559	269
122.9	1166	11.88	1.01	MSB201G160LF01188S		19287	196
117.3	1221	12.45	1.35	MSB202G160LF01245S		19686	208
117	1225	12.48	1.76	MSB203G160LF01248S		28085	236
113.1	1266	12.91	3.44	MSB205G160LF01291S		49077	317
105.1	1363	13.89	2.93	MSB204G160LF01389S		27250	269
100.5	1425	14.53	1.58	MSB203G160LF01453S		28651	236
99.6	1438	14.66	3.25	MSB205G160LF01466S		50421	317
97.8	1464	14.93	1.21	MSB202G160LF01493S		19645	208
93.7	1529	15.58	2.64	MSB204G160LF01558S		27630	269
93	1541	15.71	4.71	MSB206G160LF01571S		45445	386
91	1574	16.04	1.18	MSB202G160LF01604S		19567	208
88.9	1612	16.43	1.45	MSB203G160LF01643S		29041	236
85.7	1672	17.04	2.86	MSB205G160LF01704S		51975	317
80.5	1780	18.14	4.38	MSB206G160LF01814S		46879	386

P 15.0 kW n_1 **1460 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
80.2	1786	18.2	1.31	MSB203G160LF01820S		29309	236
80.1	1789	18.23	1.07	MSB202G160LF01823S		19330	208
79.8	1795	18.29	2.23	MSB204G160LF01829S		28062	269
74.7	1917	19.53	2.65	MSB205G160LF01953S		53342	317
72.6	1973	20.12	1.2	MSB203G160LF02012S		29513	236
70.4	2035	20.74	0.96	MSB202G160LF02074S		18943	208
70.4	2035	20.74	1.97	MSB204G160LF02074S		28304	269
69.4	2064	21.04	3.79	MSB206G160LF02104S		48323	386
66.5	2154	21.96	4.66	MSB207G160LF02196S		73198	473
65.2	2197	22.39	1.01	MSB203G160LF02239S		29658	236
64.5	2219	22.62	1.8	MSB204G160LF02262S		28412	269
63.8	2245	22.88	2.3	MSB205G160LF02288S		54845	317
60.3	2374	24.2	3.28	MSB206G160LF02420S		49648	386
59.6	2404	24.5	1.66	MSB204G160LF02450S		28463	269
59.2	2418	24.65	2.1	MSB205G160LF02465S		55514	317
59.2	2421	24.68	4.12	MSB207G160LF02468S		74054	473
59.1	2424	24.71	4.87	MSB308G160LF02471S		83406	593
56	2558	26.07	2.04	MSB305G160LF02607S		55999	330
55.9	2561	26.11	3.05	MSB206G160LF02611S		50346	386
52.9	2706	27.58	1.04	MSB303G160LF02758S		29675	243
51.7	2773	28.26	3.62	MSB207G160LF02826S		77319	473
50.9	2811	28.66	4.35	MSB308G160LF02866S		86210	593
50.7	2826	28.8	1.41	MSB204G160LF02880S		28403	269
49.9	2873	29.28	1.62	MSB205G160LF02928S		56946	317
49.1	2916	29.72	1.37	MSB304G160LF02972S		28438	291
46.3	3092	31.52	2.51	MSB206G160LF03152S		51984	386
45.8	3127	31.88	1.15	MSB204G160LF03188S		28234	269
45.1	3174	32.35	3.16	MSB307G160LF03235S		78743	489
44.8	3200	32.62	1.62	MSB305G160LF03262S		57743	330
43.6	3282	33.45	1.22	MSB304G160LF03345S		28438	291
42.6	3365	34.29	3.79	MSB308G160LF03429S		89568	593
40	3579	36.48	2.18	MSB306G160LF03648S		53141	403
38.3	3742	38.14	1.43	MSB305G160LF03814S		58720	330
36.6	3914	39.9	1.05	MSB304G160LF03990S		28438	291
36.2	3961	40.38	4.6	MSB309G160LF04038S		108276	762
35.5	4030	41.07	2.57	MSB307G160LF04107S		82283	489
35.4	4041	41.19	1.32	MSB305G160LF04119S		59110	330
35.3	4063	41.42	1.96	MSB306G160LF04142S		54040	403
35.2	4067	41.46	3.2	MSB308G160LF04146S		93012	593
32.4	4422	45.07	2.37	MSB307G160LF04507S		84534	489
32.4	4426	45.11	4.09	MSB309G160LF04511S		110985	762
32.4	4426	45.12	1.83	MSB306G160LF04512S		54578	403
31.2	4588	46.77	2.84	MSB308G160LF04677S		95115	593

P 15.0 kW n_1 1460 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
30.4	4711	48.02	2.23	MSB307G160LF04802S		85753	489
29.8	4802	48.94	1.16	MSB305G160LF04894S		59721	330
28	5115	52.13	3.55	MSB309G160LF05213S		114489	762
27.2	5269	53.7	1.57	MSB306G160LF05370S		55468	403
26.7	5371	54.75	1.96	MSB307G160LF05475S		86703	489
26.3	5442	55.47	1.03	MSB305G160LF05547S		57961	330
26.3	5445	55.5	2.4	MSB308G160LF05550S		97938	593
25.6	5602	57.1	3.24	MSB309G160LF05710S		116660	762
23.9	6001	61.17	1.4	MSB306G160LF06117S		55916	403
23.8	6006	61.22	2.17	MSB308G160LF06122S		99446	593
21.8	6580	67.07	1.98	MSB308G160LF06707S		100756	593
21.6	6629	67.56	1.59	MSB307G160LF06756S		88722	489
21.6	6631	67.59	2.74	MSB309G160LF06759S		120585	762
21.6	6635	67.63	1.96	MSB308G160LF06763S		100871	593
21.4	6703	68.32	1.25	MSB306G160LF06832S		56119	403
19.9	7196	73.35	1.46	MSB307G160LF07335S		89782	489
19.7	7287	74.28	2.47	MSB309G160LF07428S		122703	762
19.2	7468	76.12	1.13	MSB306G160LF07612S		56134	403
18.5	7734	78.83	1.68	MSB308G160LF07883S		102817	593
18.3	7829	79.8	2.3	MSB309G160LF07980S		124266	762
17.8	8036	81.91	1.31	MSB307G160LF08191S		90456	489
17.6	8130	82.87	1.03	MSB306G160LF08287S		56001	403
16.6	8652	88.19	1.51	MSB308G160LF08819S		104009	593
15.7	9114	92.9	1.16	MSB307G160LF09290S		91268	489
15.6	9193	93.7	1.96	MSB309G160LF09370S		127580	762
14.7	9756	99.44	1.34	MSB308G160LF09944S		105025	593
13.8	10395	105.95	1.75	MSB309G160LF10595S		129901	762
13.7	10440	106.41	1.01	MSB307G160LF10641S		91787	489
13.1	10943	111.54	1.2	MSB308G160LF11154S		105698	593
12.9	11119	113.34	1.16	MSB308G160LF11334S		105765	593
12.1	11822	120.5	1.53	MSB309G160LF12050S		132076	762
10.7	13416	136.74	1.35	MSB309G160LF13674S		133906	762
9.6	14964	152.52	1.21	MSB309G160LF15252S		135190	762
7.8	18345	186.98	0.99	MSB309G160LF18698S		136678	762

P 18.5 kW n_1 1455 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
321.2	550	4.53	2.08	MSB202H180MF00453S		16852	265
321.2	550	4.53	2.95	MSB203H180MF00453S		22555	283
286.6	616	5.08	4.33	MSB204H180MF00508S		23985	316
281.6	627	5.17	4.92	MSB205H180MF00517S		38853	364
275.1	642	5.29	2.64	MSB203H180MF00529S		23289	283

P 18.5 kW n_1 1455 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
274.3	644	5.3	1.35	MSB201H180MF00530S		16975	243
269.3	656	5.4	1.85	MSB202H180MF00540S		17268	265
240.3	735	6.06	3.93	MSB204H180MF00606S		23985	316
233.5	757	6.23	2.45	MSB203H180MF00623S		24041	283
233.2	758	6.24	1.67	MSB202H180MF00624S		17557	265
223	792	6.53	4.15	MSB205H180MF00653S		41119	364
221.4	798	6.57	1.19	MSB201H180MF00657S		17359	243
215.4	820	6.76	3.69	MSB204H180MF00676S		23985	316
202.4	873	7.19	2.14	MSB203H180MF00719S		24667	283
201.3	877	7.23	1.13	MSB201H180MF00723S		17484	243
200.1	883	7.27	1.51	MSB202H180MF00727S		17797	265
187.7	941	7.75	3.8	MSB205H180MF00775S		42809	364
182.8	966	7.96	3.4	MSB204H180MF00796S		23985	316
174.7	1011	8.33	1.03	MSB201H180MF00833S		17605	243
173	1021	8.41	1.93	MSB203H180MF00841S		25310	283
168	1054	8.68	1.35	MSB202H180MF00868S		17967	265
165.6	1067	8.79	3.5	MSB205H180MF00879S		44034	364
164.3	1075	8.85	3.14	MSB204H180MF00885S		24389	316
156.7	1127	9.29	1.8	MSB203H180MF00929S		25684	283
152.6	1158	9.54	1.27	MSB202H180MF00954S		18000	265
138.9	1272	10.48	2.82	MSB204H180MF01048S		24965	316
135.1	1307	10.77	1.59	MSB203H180MF01077S		26188	283
132.2	1336	11	3.04	MSB205H180MF01100S		46210	364
129.9	1360	11.20	1.16	MSB202H180MF01120S		17946	265
125.6	1407	11.59	2.69	MSB204H180MF01159S		25264	316
124.9	1415	11.65	4.86	MSB206H180MF01165S		41547	433
116.9	1511	12.45	1.09	MSB202H180MF01245S		17822	265
116.6	1516	12.48	1.42	MSB203H180MF01248S		26609	283
112.7	1567	12.91	2.78	MSB205H180MF01291S		47709	364
104.8	1686	13.89	2.36	MSB204H180MF01389S		25699	316
104.1	1697	13.98	4.21	MSB206H180MF01398S		43199	433
100.1	1764	14.53	1.28	MSB203H180MF01453S		26934	283
97.5	1812	14.93	0.98	MSB202H180MF01493S		17409	265
99.3	1780	14.66	2.63	MSB205H180MF01466S		48867	364
93.4	1892	15.58	2.13	MSB204H180MF01558S		25890	316
92.6	1907	15.71	3.81	MSB206H180MF01571S		44233	433
88.6	1995	16.43	1.17	MSB203G180MF01643S		27099	283
85.6	2063	16.99	4.78	MSB207H180MF01699S		66841	520
85.4	2069	17.04	2.31	MSB205H180MF01704S		50169	364
80.2	2203	18.14	3.54	MSB206H180MF01814S		45479	433
79.9	2210	18.2	1.06	MSB203G180MF01820S		27158	283
79.5	2221	18.29	1.8	MSB204H180MF01829S		26019	316
74.5	2372	19.53	2.14	MSB205H180MF01953S		51271	364

P 18.5 kW n_1 1455 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
73.8	2393	19.71	4.21	MSB207H180MF01971S		69001	520
70.2	2518	20.74	1.59	MSB204H180MF02074S		25987	316
69.2	2554	21.04	3.06	MSB206H180MF02104S		46700	433
66.3	2666	21.96	3.77	MSB207H180MF02196S		71352	520
64.3	2746	22.62	1.46	MSB204H180MF02262S		25885	316
63.6	2778	22.88	1.86	MSB205H180MF02288S		52420	364
60.1	2938	24.2	2.65	MSB206H180MF02420S		47781	433
59.4	2975	24.5	1.34	MSB204H180MF02450S		25727	316
59	2993	24.65	1.69	MSB205H180MF02465S		52902	364
59	2996	24.68	3.33	MSB207H180MF02468S		72110	520
58.9	3000	24.71	3.93	MSB308H180MF02471S		81393	640
55.8	3165	26.07	1.65	MSB305H180MF02607S		53236	377
55.7	3170	26.11	2.46	MSB206H180MF02611S		48331	433
51.5	3432	28.26	2.92	MSB207H180MF02826S		74942	520
50.8	3479	28.66	3.51	MSB308H180MF02866S		83875	640
50.5	3497	28.8	1.14	MSB204H180MF02880S		25185	316
49.7	3555	29.28	1.31	MSB205H180MF02928S		53843	364
49	3608	29.72	1.1	MSB304H180MF02972S		23993	338
47.6	3711	30.57	4.4	MSB209H180MF03057S		99444	782
46.2	3827	31.52	2.03	MSB206H180MF03152S		49553	433
45.6	3870	31.88	0.93	MSB204H180MF03188S		24673	316
45	3928	32.35	2.56	MSB307H180MF03235S		76143	536
44.6	3961	32.62	1.31	MSB305H180MF03262S		54286	377
43.5	4061	33.45	0.98	MSB304H180MF03345S		23993	338
42.4	4164	34.29	3.06	MSB308H180MF03429S		86773	640
41.2	4286	35.3	4.23	MSB309H180MF03530S		102655	809
39.9	4429	36.48	1.76	MSB306H180MF03648S		50327	450
38.2	4631	38.14	1.15	MSB305H180MF03814S		54203	377
36	4902	40.38	3.71	MSB309H180MF04038S		105610	809
35.4	4987	41.07	2.08	MSB307H180MF04107S		79012	536
35.3	5001	41.19	1.07	MSB305H180MF04119S		52945	377
35.1	5029	41.42	1.58	MSB306H180MF04142S		50845	450
35.1	5034	41.46	2.58	MSB308H180MF04146S		89634	640
32.3	5472	45.07	1.91	MSB307H180MF04507S		80708	536
32.3	5477	45.11	3.3	MSB309H180MF04511S		108007	809
32.2	5478	45.12	1.47	MSB306H180MF04512S		51097	450
31.1	5678	46.77	2.29	MSB308H180MF04677S		91304	640
30.3	5831	48.02	1.8	MSB307H180MF04802S		81567	536
27.9	6330	52.13	2.87	MSB309H180MF05213S		111047	809
27.1	6521	53.7	1.27	MSB306H180MF05370S		51325	450
26.6	6647	54.75	1.58	MSB307H180MF05475S		82196	536
26.2	6738	55.5	1.94	MSB308H180MF05550S		93416	640
25.5	6933	57.1	2.62	MSB309H180MF05710S		112891	809

P 18.5 kW n_1 1455 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
23.8	7427	61.17	1.13	MSB306H180MF06117S		51196	450
23.8	7433	61.22	1.75	MSB308H180MF06122S		94457	640
21.7	8143	67.07	1.6	MSB308H180MF06707S		95291	640
21.5	8203	67.56	1.28	MSB307H180MF06756S		83354	536
21.5	8207	67.59	2.21	MSB309H180MF06759S		116122	809
21.5	8211	67.63	1.58	MSB308H180MF06763S		95360	640
21.3	8295	68.32	1.01	MSB306H180MF06832S		50848	450
19.8	8906	73.35	1.18	MSB307H180MF07335S		83798	536
19.6	9019	74.28	1.99	MSB309H180MF07428S		117800	809
18.5	9572	78.83	1.36	MSB308H180MF07883S		96393	640
18.2	9689	79.8	1.86	MSB309H180MF07980S		118998	809
17.8	9945	81.91	1.06	MSB307H180MF08191S		83969	536
16.5	10707	88.19	1.22	MSB308H180MF08819S		96823	640
15.5	11377	93.7	1.58	MSB309H180MF09370S		121395	809
14.6	12073	99.44	1.08	MSB308H180MF09944S		96922	640
13.7	12864	105.95	1.41	MSB309H180MF10595S		122906	809
12.1	14630	120.5	1.23	MSB309H180MF12050S		124121	809
10.6	16603	136.74	1.09	MSB309H180MF13674S		124878	809
9.5	18519	152.52	0.98	MSB309H180MF15252S		125120	809

P 22.0 kW n_1 1460 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
322.3	652	4.53	1.75	MSB202H180LF00453S		16173	293
322.3	652	4.53	2.49	MSB203H180LF00453S		22020	311
287.6	731	5.08	3.65	MSB204H180LF00508S		23096	344
282.5	744	5.17	4.15	MSB205H180LF00517S		38305	392
276	761	5.29	2.22	MSB203H180LF00529S		22664	311
275.3	763	5.3	1.14	MSB201H180LF00530S		16161	271
270.2	777	5.4	1.56	MSB202H180LF00540S		16459	293
241.1	871	6.06	3.32	MSB204H180LF00606S		23096	344
234.3	897	6.23	2.06	MSB203H180LF00623S		23304	311
234	898	6.24	1.41	MSB202H180LF00624S		16623	293
223.8	939	6.53	3.5	MSB205H180LF00653S		40427	392
222.1	946	6.57	1	MSB201H180LF00657S		16351	271
216.1	972	6.76	3.11	MSB204H180LF00676S		23096	344
203.1	1034	7.19	1.81	MSB203H180LF00719S		23817	311
200.8	1046	7.27	1.27	MSB202H180LF00727S		16708	293
188.3	1116	7.75	3.2	MSB205H180LF00775S		41987	392
183.5	1145	7.96	2.87	MSB204H180LF00796S		23096	344
177.6	1183	8.22	5.01	MSB206H180LF00822S		37712	461
173.6	1210	8.41	1.63	MSB203H180LF00841S		24316	311

P 22.0 kW n_1 1460 min⁻¹

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
168.1	1249	8.68	1.14	MSB202H180LF00868S		16667	293
166.1	1264	8.79	2.95	MSB205H180LF00879S		43103	392
164.9	1274	8.85	2.65	MSB204H180LF00885S		23400	344
153.1	1372	9.54	1.07	MSB202H180LF00954S		16572	293
157.2	1336	9.29	1.52	MSB203H180LF00929S		24586	311
155.9	1347	9.36	4.61	MSB206H180LF00936S		38819	461
139.3	1508	10.48	2.38	MSB204H180LF01048S		23794	344
135.6	1549	10.77	1.35	MSB203H180LF01077S		24915	311
132.7	1583	11	2.57	MSB205H180LF01100S		45044	392
130.3	1612	11.2	0.98	MSB202H180LF01120S		16268	293
126	1667	11.59	2.27	MSB204H180LF01159S		23970	344
125.3	1676	11.65	4.1	MSB206H180LF01165S		40648	461
117	1796	12.48	1.2	MSB203H180LF01248S		25134	311
113.1	1857	12.91	2.35	MSB205H180LF01291S		46342	392
111.6	1882	13.08	4.78	MSB207H180LF01308S		61935	548
105.1	1998	13.89	2	MSB204H180LF01389S		24148	344
104.4	2012	13.98	3.55	MSB206H180LF01398S		42120	461
100.5	2091	14.53	1.08	MSB203H180LF01453S		25216	392
99.6	2109	14.66	2.22	MSB205H180LF01466S		47314	392
98.4	2134	14.83	4.4	MSB207H180LF01483S		63652	548
93.7	2242	15.58	1.8	MSB204H180LF01558S		24149	344
93	2260	15.71	3.21	MSB206H180LF01571S		43022	461
88.9	2364	16.43	0.99	MSB203G180LF01643S		25157	311
85.9	2445	16.99	4.03	MSB207H180LF01699S		65479	548
85.7	2452	17.04	1.95	MSB205H180LF01704S		48363	392
82.9	2534	17.61	4.84	MSB208H180LF01761S		73886	638
80.5	2611	18.14	2.99	MSB206H180LF01814S		44079	461
79.8	2632	18.29	1.52	MSB204H180LF01829S		23975	344
74.7	2811	19.53	1.81	MSB205H180LF01953S		49201	392
74.1	2836	19.71	3.55	MSB207H180LF01971S		67427	548
72.7	2888	20.07	4.33	MSB208H180LF02007S		75921	638
70.4	2984	20.74	1.35	MSB204H180LF02074S		23670	344
69.4	3027	21.04	2.58	MSB206H180LF02104S		45077	461
66.6	3153	21.91	4.98	MSB209H180LF02191S		90550	810
66.5	3160	21.96	3.18	MSB207H180LF02196S		69507	548
64.5	3255	22.62	1.23	MSB204H180LF02262S		23359	344
63.8	3293	22.88	1.57	MSB205H180LF02288S		49994	392
60.3	3482	24.2	2.24	MSB206H180LF02420S		45914	461
59.6	3525	24.5	1.13	MSB204H180LF02450S		22990	344
59.2	3547	24.65	1.43	MSB205H180LF02465S		50289	392
59.2	3551	24.68	2.81	MSB207H180LF02468S		70165	548
59.1	3556	24.71	3.32	MSB308H180LF02471S		79379	668
58.7	3578	24.86	4.38	MSB209H180LF02486S		93178	810

P 22.0 kW n_1 **1460 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
56	3751	26.07	1.39	MSB305H180LF02607S		50474	405
55.9	3757	26.11	2.08	MSB206H180LF02611S		46317	461
52.1	4030	28.01	4.52	MSB309H180LF02801S		95638	837
51.7	4067	28.26	2.47	MSB207H180LF02826S		72564	548
50.9	4123	28.66	2.96	MSB308H180LF02866S		81540	668
49.9	4213	29.28	1.1	MSB205H180LF02928S		50552	392
47.8	4398	30.57	3.71	MSB209H180LF03057S		97426	810
46.3	4535	31.52	1.71	MSB206H180LF03152S		47121	461
45.1	4655	32.35	2.16	MSB307H180LF03235S		73544	564
44.8	4694	32.62	1.11	MSB305H180LF03262S		48917	405
42.6	4935	34.29	2.58	MSB308H180LF03429S		83979	668
41.4	5080	35.3	3.57	MSB309H180LF03530S		100325	837
40	5249	36.48	1.49	MSB306H180LF03648S		47513	478
36.2	5810	40.38	3.13	MSB309H180LF04038S		102945	837
35.5	5910	41.07	1.75	MSB307H180LF04107S		75740	564
35.3	5959	41.42	1.34	MSB306H180LF04142S		47650	478
35.2	5965	41.46	2.18	MSB308H180LF04146S		86256	668
32.4	6486	45.07	1.61	MSB307H180LF04507S		76883	478
32.4	6491	45.11	2.79	MSB309H180LF04511S		105029	837
32.4	6492	45.12	1.24	MSB306H180LF04512S		47617	478
31.2	6729	46.77	1.94	MSB308H180LF04677S		87494	668
30.4	6910	48.02	1.52	MSB307H180LF04802S		77382	564
28	7502	52.13	2.42	MSB309H180LF05213S		107605	837
27.2	7728	53.7	1.07	MSB306H180LF05370S		47181	478
26.7	7878	54.75	1.34	MSB307H180LF05475S		77688	564
26.3	7985	55.5	1.64	MSB308H180LF05550S		88894	668
25.6	8217	57.1	2.21	MSB309H180LF05710S		109121	837
23.8	8809	61.22	1.48	MSB308H180LF06122S		89468	668
21.8	9651	67.07	1.35	MSB308H180LF06707S		89826	668
21.6	9722	67.56	1.08	MSB307H180LF06756S		77985	564
21.6	9726	67.59	1.87	MSB309H180LF06759S		111660	837
21.6	9731	67.63	1.34	MSB308H180LF06763S		89849	668
19.9	10554	73.35	1	MSB307H180LF07335S		77814	564
19.7	10688	74.28	1.68	MSB309H180LF07428S		112896	837
18.5	11344	78.83	1.15	MSB308H180LF07883S		89969	668
18.3	11482	79.8	1.57	MSB309H180LF07980S		113730	837
16.6	12689	88.19	1.03	MSB308H180LF08819S		89637	668
15.6	13483	93.7	1.34	MSB309H180LF09370S		115209	837
13.8	15246	105.95	1.19	MSB309H180LF10595S		115911	837
12.1	17339	120.5	1.04	MSB309H180LF12050S		116166	837

P 30.0 kW n_1 **1465 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
323.4	886	4.53	1.29	MSB202I200LF00453S		14621	382
323.4	886	4.53	1.83	MSB203I200LF00453S		20796	397
288.5	993	5.08	2.69	MSB204I200LF00508S		21064	446
283.5	1010	5.17	3.05	MSB205I200LF00517S		37054	487
277	1034	5.29	1.64	MSB203I200LF00529S		21235	397
271.2	1056	5.4	1.15	MSB202I200LF00540S		14610	382
262.4	1092	5.58	4.49	MSB206I200LF00558S		33438	549
241.9	1184	6.06	2.44	MSB204I200LF00606S		21064	446
235.1	1218	6.23	1.52	MSB203I200LF00623S		21621	397
234.8	1220	6.24	1.04	MSB202I200LF00624S		14487	382
224.5	1276	6.53	2.57	MSB205I200LF00653S		38846	487
216.9	1321	6.76	2.29	MSB204I200LF00676S		21064	446
212.1	1350	6.91	4.21	MSB206I200LF00691S		35008	549
203.8	1406	7.19	1.33	MSB203I200LF00719S		21875	397
191.1	1499	7.67	4.92	MSB207I200LF00767S		53179	635
188.9	1516	7.75	2.36	MSB205I200LF00775S		40109	487
184.1	1556	7.96	2.11	MSB204I200LF00796S		21064	446
178.2	1607	8.22	3.69	MSB206I200LF00822S		36263	549
174.2	1645	8.41	1.2	MSB203I200LF00841S		22043	397
167.6	1709	8.74	4.54	MSB207I200LF00874S		55181	635
166.7	1718	8.79	2.17	MSB205I200LF00879S		40974	487
165.5	1731	8.85	1.95	MSB204I200LF00885S		21139	446
157.8	1816	9.29	1.12	MSB203I200LF00929S		22078	397
156.5	1831	9.36	3.39	MSB206I200LF00936S		37168	549
139.8	2049	10.48	1.75	MSB204I200LF01048S		21119	446
136.1	2105	10.77	0.99	MSB203I200LF01077S		22006	397
135.8	2109	10.79	3.97	MSB207I200LF01079S		57293	635
133.1	2152	11	1.89	MSB205I200LF01100S		42378	487
126.4	2266	11.59	1.67	MSB204I200LF01159S		21012	446
125.7	2278	11.65	3.02	MSB206I200LF01165S		38594	549
113.5	2524	12.91	1.73	MSB205I200LF01291S		43215	487
112	2557	13.08	3.52	MSB207I200LF01308S		59526	635
105.5	2716	13.89	1.47	MSB204I200LF01389S		20601	446
104.9	2732	13.97	4.65	MSB208I200LF01397S		67552	737
104.8	2734	13.98	2.61	MSB206I200LF01398S		39655	549
99.9	2866	14.66	1.63	MSB205I200LF01466S		43763	487
98.8	2900	14.83	3.24	MSB207I200LF01483S		60926	635
94	3047	15.58	1.32	MSB204I200LF01558S		20170	446
93.8	3054	15.62	4.07	MSB208I200LF01562S		69007	737
93.3	3071	15.71	2.36	MSB206I200LF01571S		40252	549
86.2	3322	16.99	2.97	MSB207I200LF01699S		62366	635
86	3332	17.04	1.43	MSB205I200LF01704S		44236	487
83.2	3443	17.61	3.56	MSB208I200LF01761S		70521	737

P 30.0 kW n_1 **1465 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
80.7	3548	18.14	2.2	MSB206I200LF01814S		40880	549
80.1	3577	18.29	1.12	MSB204I200LF01829S		19304	446
76	3767	19.26	4.55	MSB209I200LF01926S		84969	922
75	3820	19.53	1.33	MSB205I200LF01953S		43791	487
74.3	3855	19.71	2.61	MSB207I200LF01971S		63830	635
73	3925	20.07	3.19	MSB208I200LF02007S		72086	737
70.6	4056	20.74	0.99	MSB204I200LF02074S		18374	446
69.6	4114	21.04	1.9	MSB206I200LF02104S		41367	549
66.9	4284	21.91	3.66	MSB209I200LF02191S		87244	922
66.7	4294	21.96	2.34	MSB207I200LF02196S		65288	635
64	4475	22.88	1.16	MSB205I200LF02288S		41376	487
62.4	4593	23.49	3.97	MSB309I200LF02349S		88455	938
60.5	4732	24.2	1.64	MSB206I200LF02420S		41647	549
59.4	4820	24.65	1.05	MSB205I200LF02465S		39940	487
59.4	4826	24.68	2.07	MSB207I200LF02468S		65720	635
59.3	4832	24.71	2.44	MSB308I200LF02471S		74776	760
58.9	4862	24.86	3.22	MSB209I200LF02486S		89426	922
56.2	5098	26.07	1.02	MSB305I200LF02607S		38720	491
56.1	5105	26.11	1.53	MSB206I200LF02611S		41713	549
52.3	5477	28.01	3.32	MSB309I200LF02801S		91412	938
51.8	5527	28.26	1.81	MSB207I200LF02826S		67130	635
51.1	5604	28.66	2.18	MSB308I200LF02866S		76203	760
47.9	5977	30.57	2.73	MSB209I200LF03057S		92814	922
46.5	6163	31.52	1.26	MSB206I200LF03152S		41563	549
45.3	6326	32.35	1.59	MSB307I200LF03235S		67602	656
42.7	6706	34.29	1.9	MSB308I200LF03429S		77591	760
41.5	6903	35.3	2.63	MSB309I200LF03530S		94997	938
40.2	7133	36.48	1.1	MSB306I200LF03648S		41080	564
36.3	7895	40.38	2.31	MSB309I200LF04038S		96852	938
35.7	8032	41.07	1.29	MSB307I200LF04107S		68261	656
35.4	8099	41.42	0.98	MSB306I200LF04142S		40346	564
35.3	8107	41.46	1.6	MSB308I200LF04146S		78534	760
32.5	8814	45.07	1.19	MSB307I200LF04507S		68140	656
32.5	8821	45.11	2.05	MSB309I200LF04511S		98222	938
31.3	9145	46.77	1.42	MSB308I200LF04677S		78783	760
30.5	9391	48.02	1.12	MSB307I200LF04802S		67814	656
28.1	10195	52.13	1.78	MSB309I200LF05213S		99738	938
26.8	10706	54.75	0.98	MSB307I200LF05475S		67387	656
26.4	10852	55.5	1.2	MSB308I200LF05550S		78557	760
25.7	11166	57.1	1.63	MSB309I200LF05710S		100504	938
23.9	11971	61.22	1.09	MSB308I200LF06122S		78066	760
21.8	13115	67.07	0.99	MSB308I200LF06707S		77334	760
21.7	13217	67.59	1.37	MSB309I200LF06759S		101461	938

P 30.0 kW n_1 1465 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
21.7	13225	67.63	0.98	MSB308I200LF06763S		77252	760
19.7	14525	74.28	1.24	MSB309I200LF07428S		101688	938
18.4	15604	79.8	1.16	MSB309I200LF07980S		101688	938
15.6	18323	93.7	0.98	MSB309I200LF09370S		101070	938

P 37.0 kW n_1 1470 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
324.6	1089	4.53	1.05	MSB202J225LF00453S		13263	440
324.6	1089	4.53	1.49	MSB203J225SF00453S		19725	455
289.5	1220	5.08	2.19	MSB204J225SF00508S		19286	504
284.5	1242	5.17	2.48	MSB205J225SF00517S		35958	545
284.6	1242	5.17	5.02	MSB207J225SF00517S		47639	693
277.9	1271	5.29	1.33	MSB203J225SF00529S		19985	455
263.3	1342	5.58	3.65	MSB206J225SF00558S		32576	607
242.7	1456	6.06	1.99	MSB204J225SF00606S		19286	504
235.9	1498	6.23	1.24	MSB203J225SF00623S		20148	455
225.3	1568	6.53	2.09	MSB205J225SF00653S		37463	545
224.2	1576	6.56	4.39	MSB207J225SF00656S		50207	693
217.6	1624	6.76	1.86	MSB204J225SF00676S		19286	545
212.9	1660	6.91	3.42	MSB206J225SF00691S		33942	607
204.5	1728	7.19	1.08	MSB203J225SF00719S		20176	455
191.7	1843	7.67	4	MSB207J225SF00767S		51936	693
189.6	1864	7.75	1.92	MSB205J225SF00775S		38465	545
184.7	1913	7.96	1.72	MSB204J225SF00796S		19286	504
178.8	1976	8.22	3	MSB206J225SF00822S		34994	607
168.2	2101	8.74	3.69	MSB207J225SF00874S		53717	693
167.3	2112	8.79	1.77	MSB205J225SF00879S		39111	545
166	2128	8.85	1.58	MSB204J225SF00885S		19161	504
157	2250	9.36	2.76	MSB206J225SF00936S		35723	607
149.6	2362	9.83	5.02	MSB208J225SF00983S		61109	795
140.3	2518	10.48	1.43	MSB204J225SF01048S		18778	504
136.3	2593	10.79	3.23	MSB207J225SF01079S		55549	693
133.6	2645	11	1.54	MSB205J225SF01100S		40045	545
126.9	2785	11.59	1.36	MSB204J225SF01159S		18423	504
126.2	2800	11.65	2.46	MSB206J225SF01165S		36796	607
122.7	2879	11.98	4.39	MSB208J225MF01198S		63476	795
113.9	3102	12.91	1.4	MSB205J225SF01291S		40480	545
112.4	3143	13.08	2.86	MSB207J225SF01308S		57418	693
105.8	3338	13.89	1.19	MSB204J225SF01389S		17499	504
105.2	3358	13.97	3.78	MSB208J225SF01397S		65216	795
105.2	3360	13.98	2.12	MSB206J225SF01398S		37498	607

P 37.0 kW n_1 **1470 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
101.3	3487	14.51	4.69	MSB209J225SF01451S		77928	980
100.3	3523	14.66	1.33	MSB205J225SF01466S		39880	545
99.1	3565	14.83	2.63	MSB207J225SF01483S		58541	693
94.3	3745	15.58	1.08	MSB204J225SF01558S		16689	504
94.1	3753	15.62	3.31	MSB208J225SF01562S		66396	795
93.6	3775	15.71	1.92	MSB206J225SF01571S		37828	607
86.5	4084	16.99	2.41	MSB207J225SF01699S		59642	693
86.3	4095	17.04	1.17	MSB205J225SF01704S		37743	545
86.3	4095	17.04	4.36	MSB209J225SF01704S		80510	980
83.5	4232	17.61	2.9	MSB208J225SF01761S		67577	795
81	4361	18.14	1.79	MSB206J225SF01814S		38080	607
76.3	4630	19.26	3.7	MSB209J225SF01926S		82425	980
75.3	4695	19.53	1.08	MSB205J225SF01953S		35157	545
74.6	4738	19.71	2.12	MSB207J225SF01971S		60683	693
73.2	4824	20.07	2.59	MSB208J225SF02007S		68730	795
69.9	5057	21.04	1.55	MSB206J225SF02104S		38120	607
67.1	5266	21.91	2.98	MSB209J225SF02191S		84352	980
66.9	5278	21.96	1.9	MSB207J225SF02196S		61596	693
62.6	5646	23.49	3.23	MSB309J225SF02349S		85353	996
60.8	5816	24.2	1.34	MSB206J225SF02420S		37913	607
59.6	5931	24.68	1.68	MSB207J225SF02468S		61831	693
59.5	5939	24.71	1.99	MSB308J225SF02471S		70749	818
59.1	5976	24.86	2.62	MSB209J225SF02486S		86144	980
56.3	6275	26.11	1.24	MSB206J225SF02611S		37684	607
52.5	6732	28.01	2.7	MSB309J225SF02801S		87714	996
52	6794	28.26	1.48	MSB207J225SF02826S		62375	693
51.3	6888	28.66	1.77	MSB308J225SF02866S		71533	818
48.1	7347	30.57	2.22	MSB209J225SF03057S		88778	980
46.6	7575	31.52	1.03	MSB206J225SF03152S		36700	607
45.4	7776	32.35	1.29	MSB307J225SF03235S		62403	714
42.9	8243	34.29	1.55	MSB308J225SF03429S		72002	818
41.6	8485	35.3	2.14	MSB309J225SF03530S		90336	996
36.4	9704	40.38	1.88	MSB309J225SF04038S		91521	996
35.8	9872	41.07	1.05	MSB307J225SF04107S		61718	714
35.5	9964	41.46	1.31	MSB308J225SF04146S		71778	818
32.6	10842	45.11	1.67	MSB309J225SF04511S		92266	996
31.4	11240	46.77	1.16	MSB308J225SF04677S		71161	818
28.2	12531	52.13	1.45	MSB309J225SF05213S		92854	996
26.5	13339	55.5	0.98	MSB308J225SF05550S		69513	818
25.7	13725	57.1	1.32	MSB309J225SF05710S		92965	996
21.7	16246	67.59	1.12	MSB309J225SF06759S		92537	996
19.8	17853	74.28	1.01	MSB309J225SF07428S		91880	996

P 45.0 kW n_1 1470 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
324.6	1324	4.53	1.23	MSB203J225MF00453S		18502	489
289.5	1484	5.08	1.8	MSB204J225MF00508S		17254	538
284.5	1511	5.17	2.04	MSB205J225MF00517S		34706	579
284.6	1510	5.17	4.13	MSB207J225MF00517S		46674	727
277.9	1546	5.29	1.09	MSB203J225MF00529S		18556	489
263.3	1632	5.58	3	MSB206J225MF00558S		31592	641
242.7	1770	6.06	1.63	MSB204J225MF00606S		17254	538
235.9	1821	6.23	1.02	MSB203J225MF00623S		18465	489
225.3	1907	6.53	1.72	MSB205J225MF00653S		35883	579
224.2	1917	6.56	3.61	MSB207J225MF00656S		48993	727
217.6	1975	6.76	1.53	MSB204J225MF00676S		17254	538
212.9	2019	6.91	2.81	MSB206J225MF00691S		32725	641
200.2	2146	7.34	5.1	MSB208J225MF00734S		56056	829
191.7	2241	7.67	3.29	MSB207J225MF00767S		50516	727
189.6	2267	7.75	1.58	MSB205J225MF00775S		36587	579
184.7	2326	7.96	1.41	MSB204J225MF00796S		17254	538
178.8	2403	8.22	2.47	MSB206J225MF00822S		33545	641
177.5	2421	8.28	4.7	MSB208J225MF00828S		57400	829
168.2	2555	8.74	3.04	MSB207J225MF00874S		52044	727
167.3	2569	8.79	1.45	MSB205J225MF00879S		36982	579
166	2588	8.85	1.3	MSB204J225MF00885S		16901	538
157	2737	9.36	2.27	MSB206J225MF00936S		34072	641
149.6	2873	9.83	4.13	MSB208J225MF00983S		59231	829
141.6	3035	10.38	4.97	MSB209J225MF01038S		70830	1014
140.3	3063	10.48	1.17	MSB204J225MF01048S		16103	538
136.3	3153	10.79	2.65	MSB207J225MF01079S		53556	727
133.6	3217	11	1.26	MSB205J225MF01100S		36748	579
126.9	3387	11.59	1.12	MSB204J225MF01159S		15465	538
126.2	3406	11.65	2.02	MSB206J225MF01165S		34741	641
122.7	3501	11.98	3.61	MSB208J225MF01198S		61187	829
119.6	3592	12.29	4.51	MSB209J225MF01229S		73344	1014
113.9	3772	12.91	1.15	MSB205J225MF01291S		34678	579
112.4	3823	13.08	2.35	MSB207J225MF01308S		55008	727
105.8	4060	13.89	0.98	MSB204J225MF01389S		13953	538
105.2	4084	13.97	3.11	MSB208J225MF01397S		62546	829
105.2	4086	13.98	1.75	MSB206J225MF01398S		35033	641
101.3	4241	14.51	3.86	MSB209J225MF01451S		75738	1014
100.3	4285	14.66	1.09	MSB205J225MF01466S		32476	579
99.1	4336	14.83	2.17	MSB207J225MF01483S		55815	727
94.1	4565	15.62	2.72	MSB208J225MF01562S		63412	829
93.6	4591	15.71	1.58	MSB206J225MF01571S		35059	641
86.5	4967	16.99	1.98	MSB207J225MF01699S		56529	727
86.3	4980	17.04	3.58	MSB209J225MF01704S		77939	1014

P 45.0 kW n_1 1470 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
83.5	5147	17.61	2.38	MSB208J225MF01761S		64212	829
81	5304	18.14	1.47	MSB206J225MF01814S		34881	641
76.3	5631	19.26	3.04	MSB209J225MF01926S		79518	1014
74.6	5762	19.71	1.75	MSB207J225MF01971S		57086	727
73.2	5867	20.07	2.13	MSB208J225MF02007S		64895	829
69.9	6150	21.04	1.27	MSB206J225MF02104S		34410	641
67.1	6404	21.91	2.45	MSB209J225MF02191S		81046	209
66.9	6419	21.96	1.57	MSB207J225MF02196S		57377	727
62.6	6867	23.49	2.65	MSB309J225MF02349S		81809	1030
60.8	7073	24.2	1.1	MSB206J225MF02420S		33646	641
59.6	7214	24.68	1.38	MSB207J225MF02468S		57386	727
59.5	7224	24.71	1.63	MSB308J225MF02471S		66146	852
59.1	7268	24.86	2.16	MSB209J225MF02486S		82392	1014
56.3	7632	26.11	1.02	MSB206J225MF02611S		33080	641
52.5	8187	28.01	2.22	MSB309J225MF02801S		83488	1030
52	8262	28.26	1.21	MSB207J225MF02826S		56941	727
51.3	8377	28.66	1.46	MSB308J225MF02866S		66195	852
48.1	8935	30.57	1.83	MSB209J225MF03057S		84166	1014
45.4	9457	32.35	1.06	MSB307J225MF03235S		56462	748
42.9	10025	34.29	1.27	MSB308J225MF03429S		65615	852
41.6	10320	35.3	1.76	MSB309J225MF03530S		85009	1030
36.4	11803	40.38	1.54	MSB309J225MF04038S		85429	1030
35.5	12119	41.46	1.07	MSB308J225MF04146S		64056	852
32.6	13187	45.11	1.37	MSB309J225MF04511S		85459	1030
28.2	15240	52.13	1.19	MSB309J225MF05213S		84987	1030
25.7	16692	57.1	1.09	MSB309J225MF05710S		84348	1030

P 55.0 kW n_1 1475 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
290.5	1808	5.08	1.48	MSB204K250MF00508S		14714	682
285.4	1840	5.17	1.68	MSB205K250MF00517S		33142	713
285.6	1839	5.17	3.39	MSB207K250MF00517S		45468	860
264.2	1988	5.58	2.47	MSB206K250MF00558S		30361	776
243.6	2156	6.06	1.34	MSB204K250MF00606S		14714	682
242.9	2162	6.07	4.79	MSB208K250MF00607S		52432	958
226.1	2323	6.53	1.41	MSB205K250MF00653S		33907	713
224.9	2335	6.56	2.96	MSB207K250MF00656S		47475	860
218.3	2405	6.76	1.26	MSB204K250MF00676S		14714	682
213.6	2459	6.91	2.31	MSB206K250MF00691S		31202	776
200.9	2614	7.34	4.19	MSB208K250MF00734S		54303	958
192.4	2730	7.67	2.7	MSB207K250MF00767S		48742	860
190.2	2761	7.75	1.29	MSB205K250MF00775S		34239	713

P 55.0 kW n_1 1475 min⁻¹

n _{2ex} min-1	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
185.4	2834	7.96	1.16	MSB204K250MF00796S		14714	682
179.4	2927	8.22	2.03	MSB206K250MF00822S		31733	776
178.1	2949	8.28	3.86	MSB208K250MF00828S		55421	958
168.7	3113	8.74	2.49	MSB207K250MF00874S		49953	860
167.8	3129	8.79	1.19	MSB205K250MF00879S		33060	713
166.6	3152	8.85	1.07	MSB204K250MF00885S		14075	682
157.5	3334	9.36	1.86	MSB206K250MF00936S		32008	776
150.1	3499	9.83	3.39	MSB208K250MF00983S		56884	958
142.1	3697	10.38	4.08	MSB209K250MF01038S		68871	1135
136.7	3841	10.79	2.18	MSB207K250MF01079S		51065	860
134	3918	11	1.04	MSB205K250MF01100S		29800	713
126.6	4149	11.65	1.66	MSB206K250MF01165S		32173	776
123.2	4264	11.98	2.96	MSB208K250MF01198S		58327	958
120	4376	12.29	3.71	MSB209K250MF01229S		71026	1035
112.8	4657	13.08	1.93	MSB207K250MF01308S		51997	860
105.6	4974	13.97	2.55	MSB208K250MF01397S		59209	958
105.5	4978	13.98	1.43	MSB206K250MF01398S		31951	776
101.7	5166	14.51	3.17	MSB209K250MF01451S		73002	1135
99.4	5281	14.83	1.78	MSB207K250MF01483S		52407	860
94.5	5561	15.62	2.23	MSB208K250MF01562S		59682	958
93.9	5593	15.71	1.3	MSB206K250MF01571S		31597	776
86.8	6050	16.99	1.63	MSB207K250MF01699S		52637	860
86.6	6066	17.04	2.94	MSB209K250MF01704S		74725	1135
83.8	6270	17.61	1.96	MSB208K250MF01761S		60006	958
81.3	6460	18.14	1.21	MSB206K250MF01814S		30881	776
76.6	6859	19.26	2.5	MSB209K250MF01926S		75885	1135
74.8	7019	19.71	1.43	MSB207K250MF01971S		52590	860
73.5	7146	20.07	1.75	MSB208K250MF02007S		60101	958
70.1	7491	21.04	1.04	MSB206K250MF02104S		29773	776
67.3	7801	21.91	2.01	MSB209K250MF02191S		76913	1135
67.2	7819	21.96	1.28	MSB207K250MF02196S		52104	860
62.8	8364	23.49	2.18	MSB309K250MF02349S		77378	1155
59.8	8787	24.68	1.14	MSB207K250MF02468S		51830	860
59.7	8799	24.71	1.34	MSB308K250MF02471S		60393	975
59.3	8853	24.86	1.77	MSB209K250MF02486S		77702	1135
52.7	9973	28.01	1.83	MSB309K250MF02801S		78205	1155
52.2	10064	28.26	1	MSB207K250MF02826S		50148	860
51.5	10204	28.66	1.2	MSB308K250MF02866S		59523	975
48.3	10884	30.57	1.5	MSB209K250MF03057S		78401	1135
43	12211	34.29	1.04	MSB308K250MF03429S		57630	975
41.8	12571	35.3	1.44	MSB309K250MF03530S		78350	1155
36.5	14377	40.38	1.27	MSB309K250MF04038S		77813	1155
32.7	16062	45.11	1.13	MSB309K250MF04511S		76950	1155

P 75.0 kW n_1 **1480 min⁻¹**

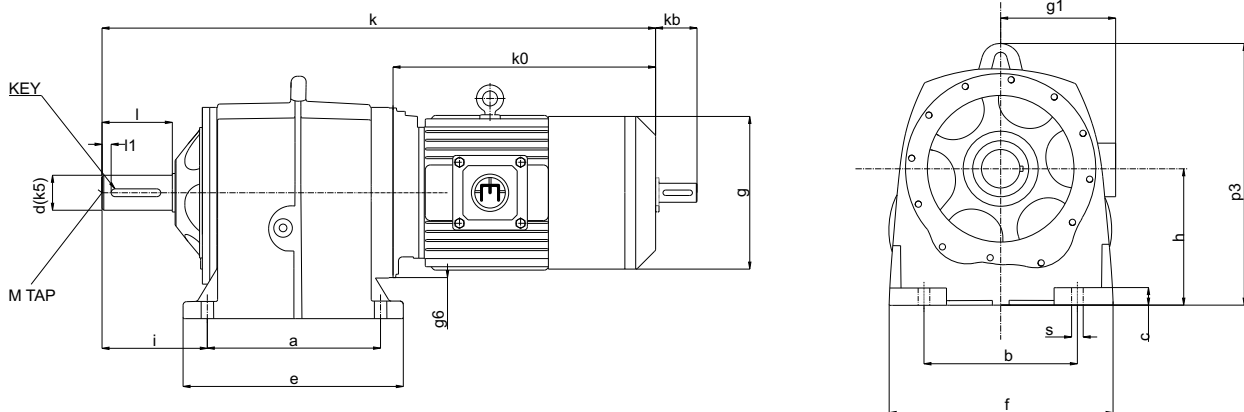
n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
291.7	2456	5.07	3.93	MSB208L280SF00507S		48150	1136
291.5	2457	5.08	1.09	MSB204L280SF00508S		9635	860
286.4	2501	5.17	1.23	MSB205L280SF00517S		29745	891
286.5	2500	5.17	2.49	MSB207L280SF00517S		43056	1038
265.1	2702	5.58	1.81	MSB206L280SF00558S		27900	954
44.4	2931	6.06	0.99	MSB204L280SF00606S		9635	860
243.7	2939	6.07	3.52	MSB208L280SF00607S		49530	1136
6.8	3158	6.53	1.04	MSB205L280SF00653S		27245	891
225.7	3173	6.56	2.18	MSB207L280SF00656S		44439	1038
214.3	3342	6.91	1.7	MSB206L280SF00691S		28158	954
201.6	3553	7.34	3.08	MSB208L280SF00734S		50795	1136
93	3710	7.67	1.99	MSB207L280SF00767S		45192	1038
180	3978	8.22	1.49	MSB206L280SF00822S		28109	954
178.7	4007	8.28	2.84	MSB208L280SF00828S		51465	1136
169.3	4230	8.74	1.83	MSB207L280SF00874S		45770	1038
158.1	4531	9.36	1.37	MSB206L280SF00936S		27880	954
150.6	4756	9.83	2.49	MSB208L280SF00983S		52189	1136
142.6	5024	10.38	3	MSB209L280SF01038S		64955	1313
137.2	5220	10.79	1.6	MSB207L280SF01079S		46083	1038
127	5638	11.65	1.22	MSB206L280SF01165S		27037	954
123.6	5795	11.98	2.18	MSB208L280SF01198S		52605	1136
120.4	5947	12.29	2.73	MSB209L280SF01229S		66390	1313
113.2	6329	13.08	1.42	MSB207L280SF01308S		45973	1038
105.9	6760	13.97	1.88	MSB208L280SF01397S		52535	1136
105.9	6765	13.98	1.06	MSB206L280SF01398S		25788	954
102	7021	14.51	2.33	MSB209L280SF01451S		67528	1313
99.8	7177	14.83	1.31	MSB207L280SF01483S		45592	1038
94.8	7557	15.62	1.64	MSB208L280SF01562S		52221	1136
87.1	8222	16.99	1.2	MSB207L280SF01699S		44855	1038
86.9	8244	17.04	2.17	MSB209L280SF01704S		68299	1313
84	8521	17.61	1.44	MSB208L280SF01761S		51594	1136
76.8	9322	19.26	1.84	MSB209L280SF01926S		68617	1313
75.1	9539	19.71	1.06	MSB207L280SF01971S		43598	1038
73.7	9712	20.07	1.29	MSB208L280SF02007S		50512	1136
7.6	10602	21.91	1.48	MSB209L280SF02191S		68648	1313
63	11367	23.49	1.6	MSB309L280SF02349S		68516	1333
59.9	11958	24.71	0.99	MSB308L280SF02471S		48887	1136
59.5	12031	24.86	1.3	MSB209L280SF02486S		68323	1313
52.8	13553	28.01	1.34	MSB309L280SF02801S		67639	1333
48.4	14791	30.57	1.1	MSB209L280SF03057S		66870	1313
41.9	17084	35.3	1.06	MSB309L280SF03530S		65032	1333

P 90.0 kW n_1 **1480 min⁻¹**

n _{2ex} min ⁻¹	T _{2m} Nm	i _{ex}	SF	TYPE	Fr NN	FrN-G N	M kg
291.7	2947	5.07	3.28	MSB208L280MF00507S		46332	1196
286.4	3001	5.17	1.03	MSB205L280MF00517S		24850	951
286.5	3000	5.17	2.08	MSB207L280MF00517S		41246	1098
265.1	3242	5.58	1.51	MSB206L280MF00558S		26053	1014
243.7	3526	6.07	2.93	MSB208L280MF00607S		47355	1196
225.7	3808	6.56	1.82	MSB207L280MF00656S		42161	1098
214.3	4010	6.91	1.42	MSB206L280MF00691S		25875	1014
201.6	4263	7.34	2.57	MSB208L280MF00734S		48165	1196
193	4452	7.67	1.66	MSB207L280MF00767S		42530	1098
180	4773	8.22	1.24	MSB206L280MF00822S		25391	1014
178.7	4809	8.28	2.36	MSB208L280MF00828S		48498	1196
169.3	5076	8.74	1.53	MSB207L280MF00874S		42634	1098
158.1	5437	9.36	1.14	MSB206L280MF00936S		24784	1014
150.6	5707	9.83	2.08	MSB208L280MF00983S		48668	1196
142.6	6029	10.38	2.5	MSB209L280MF01038S		62017	1373
137.2	6264	10.79	1.34	MSB207L280MF01079S		42347	1098
127	6766	11.65	1.02	MSB206L280MF01165S		23184	1014
123.6	6954	11.98	1.82	MSB208L280MF01198S		48314	1196
120.4	7136	12.29	2.27	MSB209L280MF01229S		62913	1373
113.2	7594	13.08	1.19	MSB207L280MF01308S		41456	1098
105.9	8112	13.97	1.56	MSB208L280MF01397S		47529	1196
102	8425	14.51	1.94	MSB209L280MF01451S		63423	1373
99.8	8613	14.83	1.09	MSB207L280MF01483S		40481	1098
94.8	9068	15.62	1.37	MSB208L280MF01562S		46626	1196
87.1	9866	16.99	1	MSB207L280MF01699S		39018	1098
86.9	9893	17.04	1.8	MSB209L280MF01704S		63479	1373
84	10225	17.61	1.2	MSB208L280MF01761S		45285	1196
76.8	11187	19.26	1.53	MSB209L280MF01926S		63167	1373
73.7	11655	20.07	1.07	MSB208L280MF02007S		43321	1196
67.6	12722	21.91	1.23	MSB209L280MF02191S		62450	1373
63	13641	23.49	1.34	MSB309L280MF02349S		61870	1393
59.5	14438	24.86	1.08	MSB209L280MF02486S		61289	1373
52.8	16264	28.01	1.12	MSB309L280MF02801S		59715	1393

5. MS4

MSB2 S



4.5 DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	l	d	KEY	l1	M TAP
MS 01	180	260	215	315	140	290	25	17.5	346	100	50	14x9x80	10	M16x36
MS 02	195	295	240	343	156	320	27	18	374	110	55	16x10x100	5	M20x42
MS 03	225	310	250	370.5	160	360	30	22	427	120	60	18x11x110	5	M20x42

MOTOR DETAILS

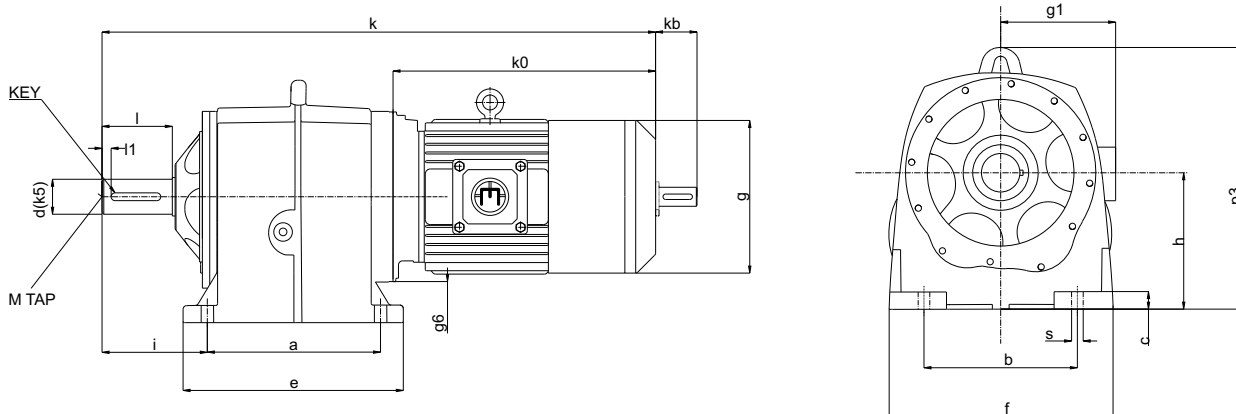
FRAME SIZE		71	80	90S	90L	100L	112M	132S	132M	160M
	Ko	231	227	252	277	306	328	369	407	475
	Kb	44	57	72	72	82	83	103	103	156
	g	140	157	174	174	195	220	260	260	316
	g1	124	134	140	140	162	170	206	206	226
	g6	160	200	200	200	250	250	300	300	350
Model										
MS 01	k	-	-	680.4	705.4	767.9	789.9	831.9	869.9	961.3
MS 02	k	-	-	-	-	782.5	804.5	878	916	1010.5
MS 03	k	-	-	-	-	803	825	894	932	1036.5

FRAME SIZE		160L	180M	180L	200L	225S	225M	250M	280S/M
	Ko	519	569	607	662	677	702	774	870
	Kb	136	120	121	125	149	149	151	150
	g	316	354	354	394	450	450	489	544
	g1	226	265	265	312	337	337	415	445
	g6	350	350	350	400	450	450	550	550
Model									
MS 01	k	1005.3	1055.3	1093.3	-	-	-	-	-
MS 02	k	1054.5	1104.5	1142.5	1187.1	1229	1254	-	-
MS 03	k	1080.5	1130.5	1168.5	1221	1261.1	1286.1	1361.9	-

Please refer page 115 for weight data

5. MS4

MSB2 S



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	l	d	KEY	l1	M TAP
MS 04	250	360	290	409	185	395	33	26	471	140	70	20x12x125	7.5	M20x42
MS 05	268	390	330	456	223.5	428.5	36	26	505	170	80	22x14x160	5	M20x42
MS 06	315	410	340	513	220	473	40	33	576	170	90	25x14x160	5	M24x50
MS 07	330	490	370	562	265.5	529	45	33	629	210	100	28x16x180	15	M24x50
MS 08	355	500	380	614	260	579	50	39	689	210	110	28x16x180	15	M24x50
MS 09	425	580	500	657	270	645	55	39	798	210	120	32x18x200	5	M24x50

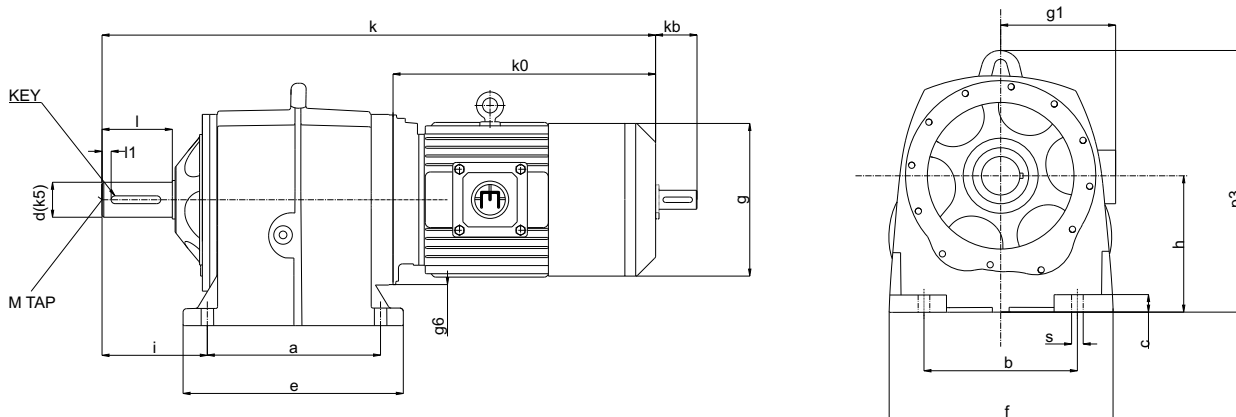
MOTOR DETAILS

FRAME SIZE		100L	112M	132S	132M	160M	160L	180M	180L	200L	225S	225M	250M	280S/M
	Ko	306	328	369	407	475	519	569	607	662	677	702	774	870
	Kb	82	83	103	103	156	136	120	121	125	149	149	151	150
	g	195	220	260	260	316	316	354	354	394	450	450	489	544
	g1	162	170	206	206	226	226	265	265	312	337	337	415	445
	g6	250	250	300	300	350	350	350	350	400	450	450	550	550
Model														
MS 04	k	880.8	902.8	939.8	977.8	1074.8	1118.8	1168.8	1206.8	1268.8	1304.2	1329.2	1442.9	1538.9
MS 05	k	-	-	996.8	1034.8	1136.8	1180.8	1230.8	1268.8	1323	1367.8	1392.8	1467.2	1563.2
MS 06	k	-	-	1053	1091	1156.4	1200.4	1250.4	1288.4	1332	1400.4	1425.4	1483.2	1579.2
MS 07	k	-	-	-	-	1264.7	1308.7	1358.7	1396.7	1451.7	1482.5	1507.5	1594.7	1690.7
MS 08	k	-	-	-	-	-	-	1377.4	1415.4	1488.4	1531.4	1556.4	1664.4	1760.4
MS 09	k	-	-	-	-	-	-	1421.3	1442	1497	1512	1537	1609	1705

Please refer page 115 for weight data

5. MS4

MSB3 S



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	l	d	KEY	l1	M TAP
MS 01	180	260	215	315	140	290	25	17.5	346	100	50	14x9x80	10	M16x36
MS 02	195	295	240	343	156	320	27	18	374	110	55	16x10x100	5	M20x42
MS 03	225	310	250	370.5	160	360	30	22	427	120	60	18x11x110	5	M20x42
MS 04	250	360	290	409	185	395	33	26	471	140	70	20x12x125	7.5	M20x42

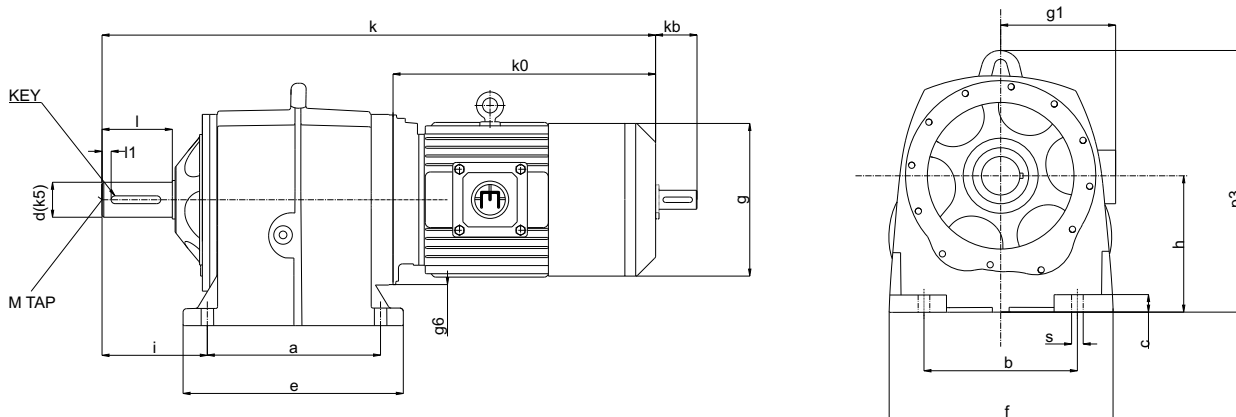
MOTOR DETAILS

FRAME SIZE	71	80	90S	90L	100L	112M	132S	132M	160M	160L	180M	180L
Ko	231	227	252	277	306	328	369	407	475	519	569	607
Kb	44	57	72	72	82	83	103	103	156	136	120	121
g	140	157	174	174	195	220	260	260	316	316	354	354
g1	124	134	140	140	162	170	206	206	226	226	265	265
g6	160	200	200	200	250	250	300	300	350	350	350	350
Model												
MS 01	K	657.1	663.6	688.6	713.6	762.4	784.4	856.3	894.3	-	-	-
MS 02	K	696.4	707.7	732.7	757.7	798	820	887	925	1027.9	1071.9	-
MS 03	K	740	736	761	786	830.3	852.3	915.9	953.9	1053.9	1097.9	-
MS 04	K	-	782.8	807.8	832.8	877.3	899.3	949.5	987.5	1092	1136	1186

Please refer page 115 for weight data

5. MS4

MSB3 S



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	l	d	KEY	l1	M TAP
MS 05	268	390	330	456	223.5	428.5	36	26	505	170	80	22x14x160	5	M20x42
MS 06	315	410	340	513	220	473	40	33	576	170	90	25x14x160	5	M24x50
MS 07	330	490	370	562	265.5	529	45	33	629	210	100	28x16x180	15	M24x50

MOTOR DETAILS

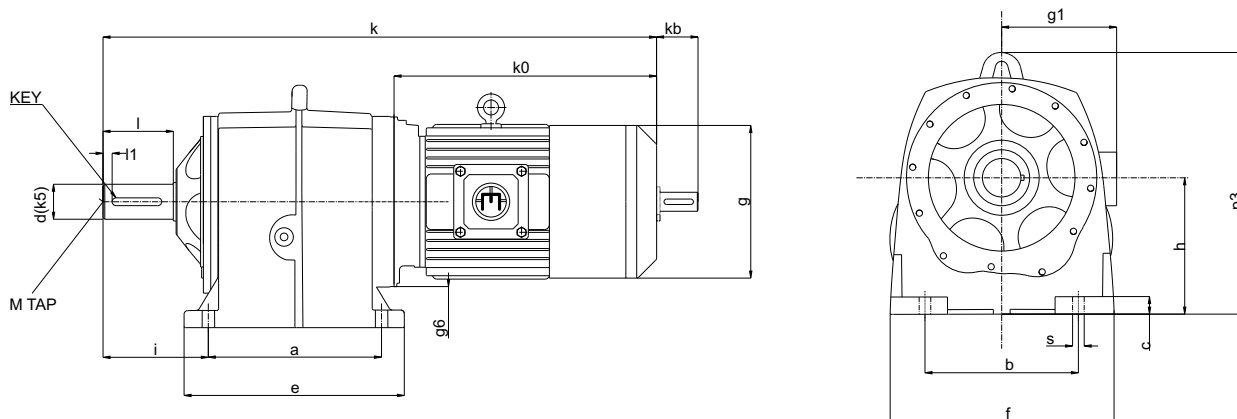
FRAME SIZE		90S	90L	100L	112M	132S	132M
	Ko	252	277	306	328	369	407
	Kb	72	72	82	83	103	103
	g	174	174	195	220	260	260
	g1	140	140	162	170	206	206
	g6	200	200	250	250	300	300
Model							
MS 05		K	873.8	898.8	935.8	957.8	1037.8
MS 06		K	899.4	924.4	953.4	975.4	1053
MS 07		K	1019.7	1044.7	1073.7	1095.7	1156.2

FRAME SIZE		160M	160L	180M	180L	200L	225S	225M
	Ko	475	519	569	607	662	677	702
	Kb	156	136	120	121	125	149	149
	g	316	316	354	354	394	450	450
	g1	226	226	265	265	312	337	337
	g6	350	350	350	350	400	450	450
Model								
MS 05		K	1173.8	1217.8	1267.8	1305.8	1363.3	
MS 06		K	1196	1240	1290	1328	1380	
MS 07		K	1303.8	1347.8	1397.8	1435.8	1492.8	1539.816

Please refer page 115 for weight data

5. MS4

MSB3 S



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	l	d	KEY	l1	MTAP
MS 08	355	500	380	614	260	579	50	39	689	210	110	28x16x180	15	M24x50
MS 09	425	580	500	657	270	645	55	39	798	210	120	32x18x200	5	M24x50

MOTOR DETAILS

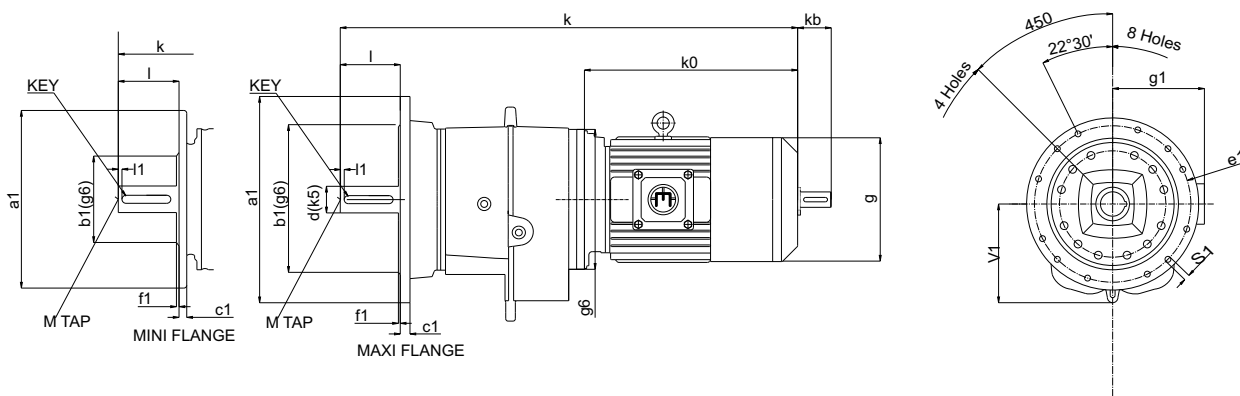
FRAME SIZE		100L	112M	132S	132M	160M	160L	180M
	Ko	306	328	369	407	475	519	569
	Kb	82	83	103	103	156	136	120
	g	195	220	260	260	316	316	354
	g1	162	170	206	206	226	226	265
	g6	250	250	300	300	350	350	350
Model								
MS 08	K	1109.4	1131.4	1184.4	1222.4	1331.9	1375.9	1425.9
MS 09	K	1159	1181	1217.3	1255.3	1371.3	1415.3	1465.3

FRAME SIZE		180L	200L	225S	225M	250M	280S	280M
	Ko	607	662	677	702	774	870	870
	Kb	121	125	149	149	151	150	150
	g	354	394	450	450	489	544	544
	g1	265	312	337	337	415	445	445
	g6	350	400	450	450	550	550	550
Model								
MS 08	K	1463.9	1523.9	1570.87	1595.87	1664.37	1760.37	1760.37
MS 09	K	1503.3	1554.2	1618.804	1643.804	1701.654	1797.654	1797.654

Please refer page 115 for weight data

5. MS4

MSV2 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	l	KEY	l1	M TAP
MS 01	Mini Flange	300	230	19.5	265	4	13.5	4	195	50	100	14x9x80	10	M16x36
	Maxi Flange	350	250	21	300	5	17.5							
MS 02	Mini Flange	300	230	19.5	265	4	17.5	4	218	55	110	16x10x100	5	M20x42
	Maxi Flange	400	300	21	350	5	17.5							
MS 03	Mini Flange	350	250	23.5	300	5	17.5	4	238	60	120	18x11x110	5	M20x42
	Maxi Flange	450	350	25.5	400	5	17.5	8						

MOTOR DETAILS

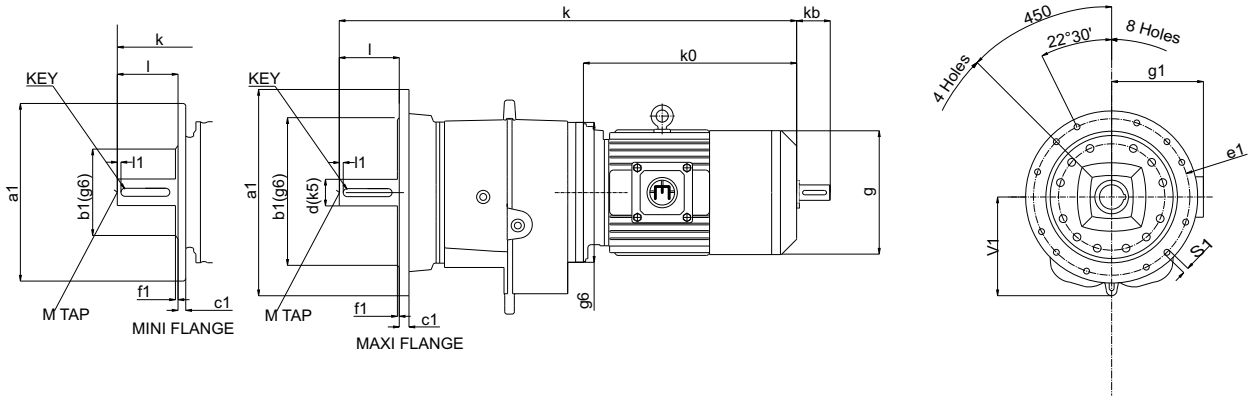
FRAME SIZE		90S	90L	100L	112M	132S	132M	160M
Ko		252	277	306	328	369	407	475
Kb		72	72	82	83	103	103	156
g		174	174	195	220	260	260	316
g1		140	140	162	170	206	206	226
g6		200	200	250	250	300	300	350
Model								
MS 01	K	680.4	705.4	767.856	789.856	831.856	869.856	961.25
MS 02	K			782.509	804.509	878.009	916.009	1010.509
MS 03	K			802.966	824.966	893.966	931.966	1036.466

FRAME SIZE		160L	180M	180L	200L	225S	225M	250M
Ko		519	569	607	662	677	702	774
Kb		136	120	121	125	149	149	151
g		316	354	354	394	450	450	489
g1		226	265	265	312	337	337	415
g6		350	350	350	400	450	450	550
Model								
MS 01	K	1005.25	1055.25	1093.25				
MS 02	K	1054.509	1104.509	1142.509	1187.122	1229.002	1254.002	
MS 03	K	1080.466	1130.466	1168.466	1221.039	1261.126	1286.126	1361.923

Please refer page 115 for weight data

5. MS4

MSV2 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	I	KEY	I1	MTAP
MS 04	Mini Flange	350	250	20	300	5	17.5	4	265	70	140	20x12x125	7.5	M20x42
	Maxi Flange	450	350	23.5	400			8						
MS 05	Mini Flange	400	300	20	350	5	17.5	4	288	80	170	22x14x160	5	M20x42
	Maxi Flange	550	450	23.5	500		17.5	8						
MS 06	Mini Flange	450	350	28	400	5	17.5	8	326	90	170	25x14x160	5	M24x50
	Maxi Flange	550	450	28	500		17.5	8						

MOTOR DETAILS

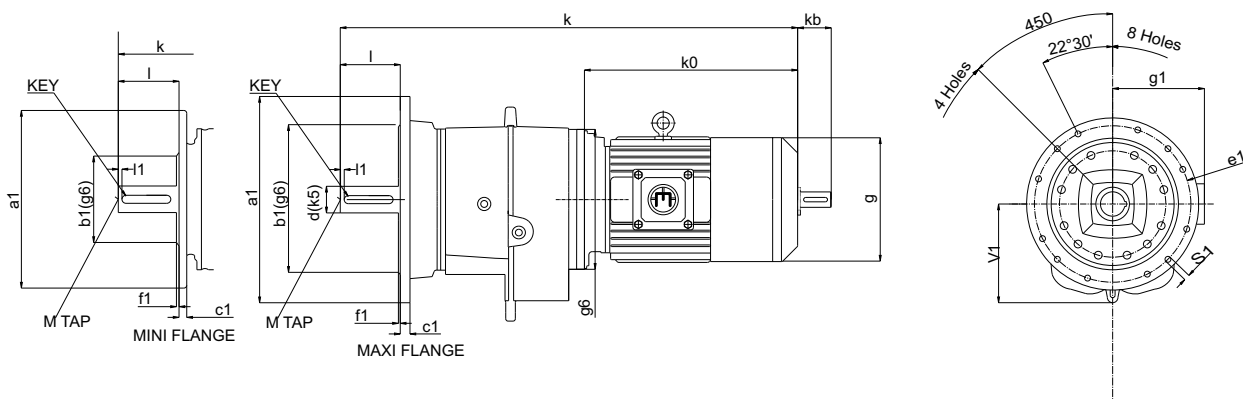
FRAME SIZE		90S	90L	100L	112M	132S	132M	160M	160L
Ko		252	277	306	328	369	407	475	519
Kb		72	72	82	83	103	103	156	136
g		174	174	195	220	260	260	316	316
g1		140	140	162	170	206	206	226	226
g6		200	200	250	250	300	300	350	350
Model									
MS 04	K			880.766	902.766	939.774	977.774	1074.774	1118.774
MS 05	K					996.758	1034.758	1136.758	1180.758
MS 06	K					1053	1091	1156.415	1200.415

FRAME SIZE		180M	180L	200L	225S	225M	250M	280S/M
Ko		569	607	662	677	702	774	870
Kb		120	121	125	149	149	151	150
g		354	354	394	450	450	489	544
g1		265	265	312	337	337	415	445
g6		350	350	400	450	450	550	550
Model								
MS 04	K	1168.774	1206.774	1268.774	1304.185	1329.185	1442.888	1538.888
MS 05	K	1230.758	1268.758	1323.002	1367.758	1392.758	1467.173	1563.173
MS 06	K	1250.415	1288.415	1331.993	1400.415	1425.415	1483.203	1579.203

Please refer page 115 for weight data

5. MS4

MSV2 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	l	KEY	l1	MTAP
MS 07	Mini Flange	450	350	28	400	5	17.5	8	370	100	210	28x16x180	15	M24x50
	Maxi Flange	550	450	28	500	5	17.5							
MS 08	Mini Flange	450	350	31	400	5	17.5	8	409	110	210	28x16x180	15	M24x50
	Maxi Flange	550	450	31	500	5								
MS 09	Mini Flange	550	450	32	500	5	17.5	8	450	120	210	32x18x200	5	M24x50
	Maxi Flange	660	550	32	600	6	22							

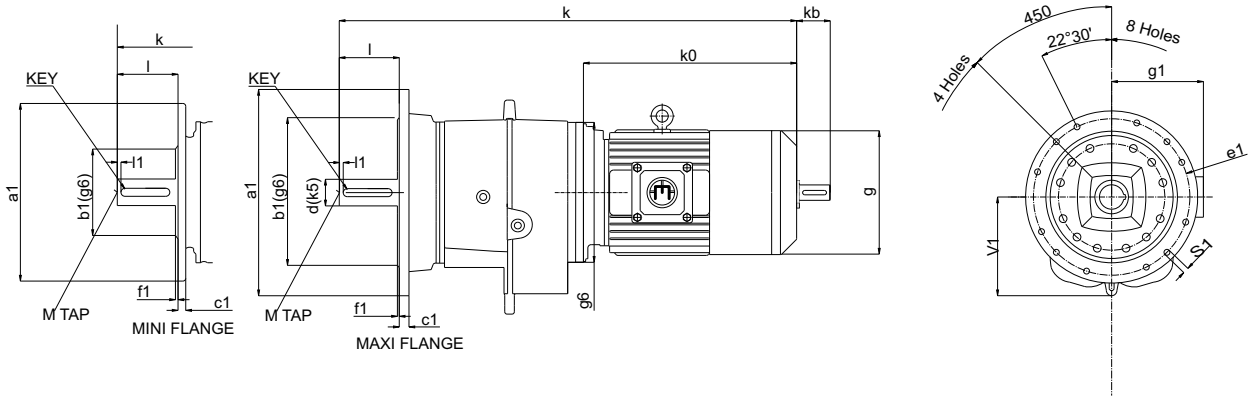
MOTOR DETAILS

FRAME SIZE		160M	160L	180M	180L	200L	225S	225M	250M	280S/M
Ko		475	519	569	607	662	677	702	774	870
Kb		156	136	120	121	125	149	149	151	150
g		316	316	354	354	394	450	450	489	544
g1		226	226	265	265	312	337	337	415	445
g6		350	350	350	350	400	450	450	550	550
Model										
MS 07	K	1264.702	1308.702	1358.702	1396.702	1451.702	1482.458	1507.458	1594.702	1690.702
MS 08	K			1377.35	1415.35	1488.35	1531.35	1556.35	1664.37	1760.37
MS 09	K			1421.295	1442.004	1497.004	1512.004	1537.004	1609.004	1705.004

Please refer page 115 for weight data

5. MS4

MSV3 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	I	KEY	I1	MTAP
MS 01	Mini Flange	300	230	19.5	265	4	13.5	4	195	50	100	14x9x80	10	M16x36
	Maxi Flange	350	250	21	300	5	17.5							
MS 02	Mini Flange	300	230	19.5	265	4	17.5	4	218	55	110	16x10x100	5	M20x42
	Maxi Flange	400	300	21	350	5	17.5							
MS 03	Mini Flange	350	250	23.5	300	5	17.5	4	238	60	120	18x11x110	5	M20x42
	Maxi Flange	450	350	23.5	400	5	17.5	8						

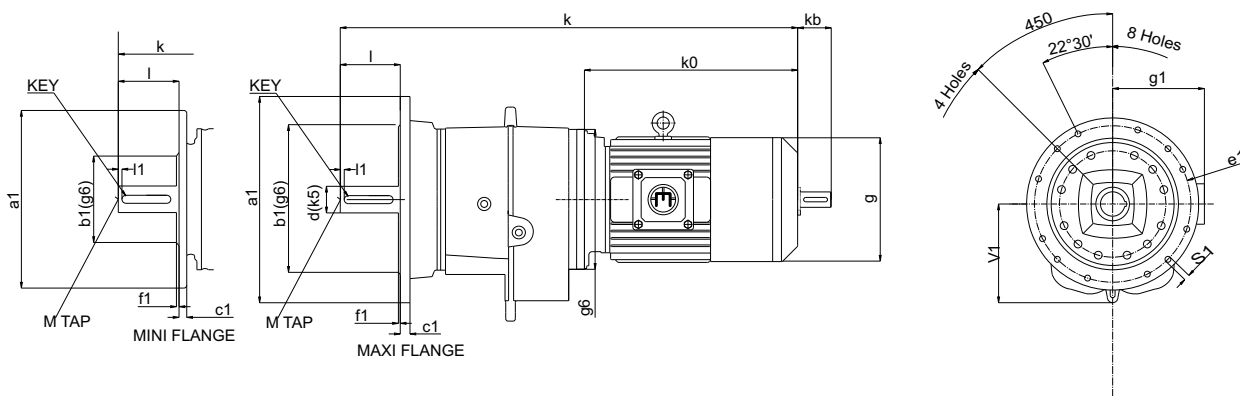
MOTOR DETAILS

FRAME SIZE		71	80	90S	90L	100L	112M	132S	132M	160M	160L
Ko		231	227	252	277	306	328	369	407	475	519
Kb		44	57	72	72	82	83	103	103	156	136
g		140	157	174	174	195	220	260	260	316	316
g1		124	134	140	140	162	170	206	206	226	226
g6		160	200	200	200	250	250	300	300	350	350
Model											
MS 01	K	657.132	663.606	688.606	713.606	762.406	784.406	856.25	894.25		
MS 02	K	696.415	707.742	732.742	757.742	797.953	819.953	886.992	924.992	1027.903	1071.903
MS 03	K		735.966	760.966	785.966	830.294	852.294	915.912	953.912	1053.903	1097.903

Please refer page 115 for weight data

5. MS4

MSV3 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	I	KEY	I1	MTAP
MS 04	Mini Flange	350	250	20	300	5	17.5	4	265	70	140	20x12x125	7.5	M20x42
	Maxi Flange	450	350	23.5	400			8						
MS 05	Mini Flange	400	300	20	350	5	17.5	4	288	80	170	22x14x160	5	M20x42
	Maxi Flange	550	450	23.5	500		17.5	8						
MS 06	Mini Flange	450	350	28	400	5	17.5	8	326	90	170	25x14x160	5	M24x50
	Maxi Flange	550	450	28	500		17.5	8						

MOTOR DETAILS

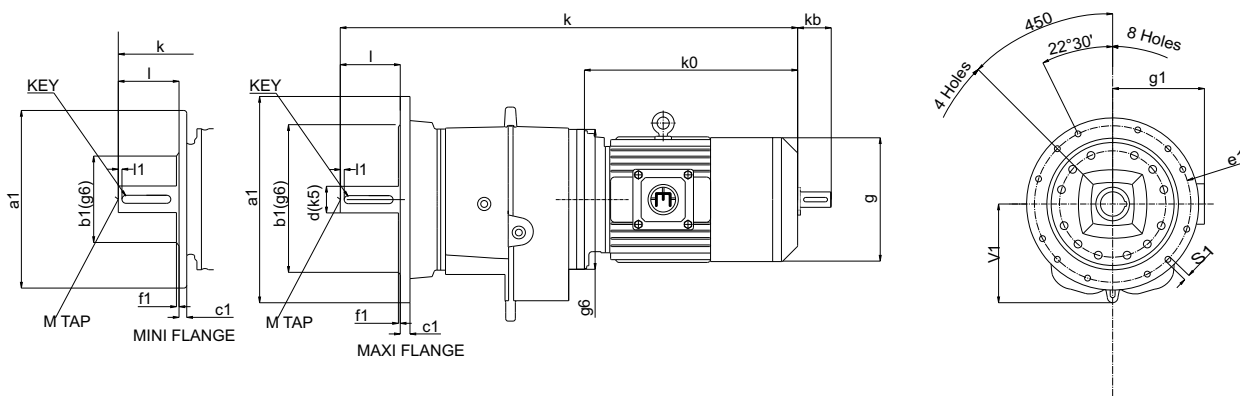
FRAME SIZE		80	90S	90L	100L	112M	132S
Ko		227	252	277	306	328	369
Kb		57	72	72	82	83	103
g		157	174	174	195	220	260
g1		134	140	140	162	170	206
g6		200	200	200	250	250	300
Model							
MS 04	K	782.774	807.774	832.774	877.274	899.274	949.536
MS 05	K		873.758	898.758	935.758	957.758	1037.824
MS 06	K		899.415	924.415	953.415	975.415	1053

FRAME SIZE		132M	160M	160L	180M	180L	200L
Ko		407	475	519	569	607	662
Kb		103	156	136	120	121	125
g		260	316	316	354	354	394
g1		206	226	226	265	265	312
g6		300	350	350	350	350	400
Model							
MS 04	K	987.536	1092.01	1136.01	1186.01	1224.01	
MS 05	K	1075.824	1173.823	1217.823	1267.823	1305.823	1363.323
MS 06	K	1091	1196	1240	1290	1328	1380.003

Please refer page 115 for weight data

5. MS4

MSV3 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	I	KEY	I1	MTAP
MS 07	Mini Flange	450	350	28	400	5	17.5	8	370	100	210	28x16x180	15	M24x50
	Maxi Flange	550	450	28	500	5	17.5							
MS 08	Mini Flange	450	350	31	400	5	17.5	8	409	110	210	28x16x180	15	M24x50
	Maxi Flange	550	450	31	500	5	17.5							
MS 09	Mini Flange	550	450	32	500	5	17.5	8	450	120	210	32x18x200	5	M24x50
	Maxi Flange	660	550	32	600	6	22							

MOTOR DETAILS

FRAME SIZE		90S	90L	100L	112M	132S	132M	160M	160L
Ko		252	277	306	328	369	407	475	519
Kb		72	72	82	83	103	103	156	136
g		174	174	195	220	260	260	316	316
g1		140	140	162	170	206	206	226	226
g6		200	200	250	250	300	300	350	350
Model									
MS 07	K	1019.702	1044.702	1073.702	1095.702	1156.202	1194.202	1303.816	1347.816
MS 08	K			1109.35	1131.35	1184.35	1222.35	1331.87	1375.87
MS 09	K			1159.004	1181.004	1217.295	1255.295	1371.304	1415.304

FRAME SIZE		180M	180L	200L	225S	225M	250M	280S	280M
Ko		569	607	662	677	702	774	870	870
Kb		120	121	125	149	149	151	150	150
g		354	354	394	450	450	489	544	544
g1		265	265	312	337	337	415	445	445
g6		350	350	400	450	450	550	550	550
Model									
MS 07	K	1397.816	1435.816	1492.816	1539.816	1564.816			
MS 08	K	1425.87	1463.87	1523.87	1570.87	1595.87	1664.37	1760.37	1760.37
MS 09	K	1465.304	1503.304	1554.154	1618.804	1643.804	1701.654	1797.654	1797.654

Please refer page 115 for weight data

5. MS4

5.6 Auswahl Getriebe MS4 Selection of gear unit MS4 Sélection d'un réducteur MS4

Beispiel: Auswahltabellen Getriebe
Example: Gear unit selection table
Exemple de tableau de sélection pour réducteurs

Getriebeart und -größe
Gear unit type and size
Type et taille du réducteur

Synchrondrehzahl des Motors
Synchronous speed of motor
Vitesse synchrone du moteur réducteur

MS..01		TYPE MS.01.....0... MS.01M00000...										1450 Nm			
Type	...	n _{syn} =	1500 min ⁻¹				1000 1/min				750 1/min				
		i _{ex}	n ₂ min ⁻¹	P kW	T ₂ Nm	F _r N	n ₂ min ⁻¹	P kW	T ₂ Nm	F _r N	n ₂ min ⁻¹	P kW	T ₂ Nm	F _r N	
MS201...		5.30	282.81	25.73	869	15033	188.54	17.15	869	15533	141.41	12.87	869	16033	
		6.57	228.22	22.70	950	15908	152.15	15.14	950	16408	114.11	11.35	950	16908	
		7.23	207.56	21.46	987	16318	138.37	14.31	987	16818	103.78	10.73	987	17318	
		8.33	180.15	19.69	1044	16959	120.10	13.12	1044	17459	90.07	9.84	1044	17959	

Max. Nenndrehmoment
Max. rated torque
Couple nominal maxi.

Zulässige Radialkraft
Permissible radial force
Force radiale admissible

Drehmoment an der Abtriebswelle
Torque at output shaft
Couple au niveau de l'arbre de sortie

Mechanische Nennleistung des Getriebes
Mechanical rated power of gear unit
Puissance nominale mécanique du réducteur

Auswahldrehzahl der Abtriebswelle
Selection speed of output shaft
Vitesse de l'arbre de sortie

Exakte Übersetzung
Exact gear ratio
Valeur exacte du rapport de démultiplication

5. MS4

MS-01 TYPE MS.01.....0... MS.01M00000... 1450 Nm													
Type	nsyn =	1500 min-1				1000 min-1				750 min-1			
	ies	n2	P	T2	Fr-G	n2	P	T2	Fr-G	n2	P	T2	Fr-G
		min-1	kW	Nm	N	min-1	kW	Nm	N	min-1	kW	Nm	N
MS.201M00000...	5.3	282.81	25.73	869	15033	188.54	17.15	869	15533	141.41	12.87	869	16033
	6.57	228.22	22.7	950	15908	152.15	15.14	950	16408	114.11	11.35	950	16908
	7.23	207.56	21.46	987	16318	138.37	14.31	987	16818	103.78	10.73	987	17318
	8.33	180.15	19.69	1044	16959	120.1	13.12	1044	17459	90.07	9.84	1044	17959
	9.22	162.77	18.44	1082	17460	108.51	12.29	1082	17960	81.38	9.22	1082	18460
	9.88	151.79	17.66	1111	17799	101.19	11.77	1111	18299	75.89	8.83	1111	18799
	11.88	126.24	15.63	1182	18787	84.16	10.42	1182	19287	63.12	7.81	1182	19787
	13.38	112.09	14.53	1238	19400	74.73	9.69	1238	19900	56.04	7.27	1238	20400
	15.33	97.82	13.44	1312	20083	65.21	8.96	1312	20583	48.91	6.72	1312	21083
	17.26	86.89	12.24	1345	20921	57.93	8.16	1345	21421	43.45	6.12	1345	21921
	19.22	78.06	11.46	1402	21538	52.04	7.64	1402	22038	39.03	5.73	1402	22538
	21.52	69.69	10.42	1427	22452	46.46	6.94	1427	22952	34.84	5.21	1427	23452
	24.29	61.74	9.22	1426	23660	41.16	6.15	1426	24160	30.87	4.61	1426	24660
	27.68	54.19	7.86	1386	25265	36.13	5.24	1386	25765	27.1	3.93	1386	26265
	31.4	47.78	7.08	1416	26413	31.85	4.72	1416	26913	23.89	3.54	1416	27413
	34.04	44.07	6.56	1422	27261	29.38	4.38	1422	27761	22.03	3.28	1422	28261
MS.301M00000...	30.5	49.18	7.47	1450	25470	32.79	4.98	1450	25970	24.59	3.73	1450	26470
	37.79	39.69	6.03	1450	27856	26.46	4.02	1450	28356	19.85	3.01	1450	28856
	41.55	36.1	5.48	1450	28971	24.07	3.65	1450	29471	18.05	2.74	1450	29971
	47.88	31.33	4.76	1450	30676	20.89	3.17	1450	31176	15.66	2.38	1450	31676
	52.99	28.31	4.3	1450	31950	18.87	2.87	1450	32450	14.15	2.15	1450	32950
	56.82	26.4	4.01	1450	32849	17.6	2.67	1450	33349	13.2	2	1450	33849
	68.32	21.95	3.33	1450	35328	14.64	2.22	1450	35828	10.98	1.67	1450	36328
	73.16	20.5	3.11	1450	36277	13.67	2.08	1450	36777	10.25	1.56	1450	37277
	76.95	19.49	2.96	1450	37318	13	1.97	1450	37818	9.75	1.48	1450	38318
	88.17	17.01	2.58	1450	38972	11.34	1.72	1450	39472	8.51	1.29	1450	39972
	99.26	15.11	2.29	1450	40768	10.07	1.53	1450	41268	7.56	1.15	1450	41768
	110.49	13.58	2.06	1450	42429	9.05	1.37	1450	42929	6.79	1.03	1450	43429
	123.76	12.12	1.84	1450	44256	8.08	1.23	1450	44756	6.06	0.92	1450	45256
	139.69	10.74	1.63	1450	46649	7.16	1.09	1450	47149	5.37	0.82	1450	47649
	159.16	9.42	1.43	1450	48762	6.28	0.95	1450	49262	4.71	0.72	1450	49762
	180.53	8.31	1.26	1450	50911	5.54	0.84	1450	51411	4.15	0.63	1450	51911
	195.72	7.66	1.16	1450	52355	5.11	0.78	1450	52855	3.83	0.58	1450	53355
	215.87	6.95	1.06	1450	54245	4.63	0.7	1450	54745	3.47	0.53	1450	55245
	250.97	5.98	0.91	1450	56732	3.98	0.61	1450	57232	2.99	0.45	1450	57732

Please refer page 115 for weight data

5. MS4

MS-02 TYPE MS.02.....0... MS.02M00000... 2130 Nm													
Type	nsyn =	1500 min-1				1000 min-1				750 min-1			
	ies	n2	P	T2	Fr-G	n2	P	T2	Fr-G	n2	P	T2	Fr-G
		min-1	kW	Nm	N	min-1	kW	Nm	N	min-1	kW	Nm	N
MS.202M00000...	4.53	330.93	39.58	1142	12569	220.62	26.39	1142	13069	165.47	19.79	1142	13569
	5.4	277.65	35.21	1211	13231	185.1	23.47	1211	13731	138.82	17.6	1211	14231
	6.24	240.37	31.87	1266	13826	160.25	21.25	1266	14326	120.19	15.94	1266	14826
	7.27	206.34	28.75	1331	14466	137.56	19.17	1331	14966	103.17	14.37	1331	15466
	8.68	172.74	25.73	1422	15164	115.16	17.15	1422	15664	86.37	12.86	1422	16164
	9.54	157.29	24.27	1474	15542	104.86	16.18	1474	16042	78.64	12.14	1474	16542
	11.2	133.88	22.19	1583	16103	89.25	14.79	1583	16603	66.94	11.09	1583	17103
	12.45	120.53	20.73	1642	16576	80.35	13.82	1642	17076	60.26	10.36	1642	17576
	14.93	100.5	18.65	1772	17292	67	12.43	1772	17792	50.25	9.32	1772	18292
	16.04	93.51	18.13	1851	17420	62.34	12.08	1851	17920	46.76	9.06	1851	18420
	18.23	82.27	16.56	1923	18128	54.85	11.04	1923	18628	41.14	8.28	1923	19128
	20.74	72.32	14.79	1953	19154	48.21	9.86	1953	19654	36.16	7.4	1953	20154
	22.62	66.32	13.54	1950	20024	44.22	9.03	1950	20524	33.16	6.77	1950	21024
	24.76	60.58	12.19	1921	21121	40.39	8.12	1921	21621	30.29	6.09	1921	22121
	27.51	54.52	11.04	1934	22131	36.34	7.36	1934	22631	27.26	5.52	1934	23131
MS.302M00000...	27.52	54.5	11.04	1935	22071	36.33	7.36	1935	22571	27.25	5.52	1935	23071
	30.76	48.77	9.9	1938	23301	32.51	6.6	1938	23801	24.38	4.95	1938	24301
	36.66	40.92	8.54	1994	24904	27.28	5.69	1994	25404	20.46	4.27	1994	25904
	42.35	35.42	7.6	2050	26231	23.62	5.07	2050	26731	17.71	3.8	2050	27231
	49.33	30.41	6.72	2110	27716	20.27	4.48	2110	28216	15.2	3.36	2110	28716
	58.92	25.46	5.68	2130	29780	16.97	3.79	2130	30280	12.73	2.84	2130	30780
	64.71	23.18	5.17	2130	31173	15.45	3.45	2130	31673	11.59	2.59	2130	32173
	76.03	19.73	4.4	2130	33302	13.15	2.93	2130	33802	9.86	2.2	2130	34302
	84.45	17.76	3.96	2130	34921	11.84	2.64	2130	35421	8.88	1.98	2130	35921
	101.28	14.81	3.3	2130	37582	9.87	2.2	2130	38082	7.41	1.65	2130	38582
	108.85	13.78	3.07	2130	38802	9.19	2.05	2130	39302	6.89	1.54	2130	39802
	123.72	12.12	2.7	2130	40855	8.08	1.8	2130	41355	6.06	1.35	2130	41855
	140.75	10.66	2.38	2130	43001	7.1	1.58	2130	43501	5.33	1.19	2130	44001
	153.47	9.77	2.18	2130	44509	6.52	1.45	2130	45009	4.89	1.09	2130	45509
	168.01	8.93	1.99	2130	46259	5.95	1.33	2130	46759	4.46	1	2130	47259
	186.7	8.03	1.79	2130	48120	5.36	1.19	2130	48620	4.02	0.9	2130	49120
	215.98	6.95	1.55	2130	50784	4.63	1.03	2130	51284	3.47	0.77	2130	51784
	245.81	6.1	1.36	2130	53219	4.07	0.91	2130	53719	3.05	0.68	2130	54219
	264.31	5.68	1.27	2130	54466	3.78	0.84	2130	54966	2.84	0.63	2130	55466

Please refer page 115 for weight data

5. MS4

MS-03 TYPE MS.03.....0... MS.03M00000... 2825 Nm													
Type	nsyn =	1500 min-1				1000 min-1				750 min-1			
	ies	n2	P	T2	Fr-G	n2	P	T2	Fr-G	n2	P	T2	Fr-G
		min-1	kW	Nm	N	min-1	kW	Nm	N	min-1	kW	Nm	N
MS.203M00000...	4.5293	331.18	56.25	1622	16624.9	220.78	37.5	1622	17125	165.59	28.13	1622	17625
	5.289	283.6	50.26	1692	17475.2	189.07	33.51	1692	17975	141.8	25.13	1692	18475
	6.23	240.74	46.67	1851	18006.6	160.49	31.11	1851	18507	120.37	23.33	1851	19007
	7.19	208.68	40.83	1869	19141.4	139.12	27.22	1869	19641	104.34	20.42	1869	20141
	8.41	178.32	36.77	1969	20037.4	118.88	24.51	1969	20537	89.16	18.39	1969	21037
	9.29	161.54	34.32	2029	20652.5	107.69	22.88	2029	21152	80.77	17.16	2029	21652
	10.77	139.32	30.42	2085	21797.3	92.88	20.28	2085	22297	69.66	15.21	2085	22797
	12.48	120.17	27.14	2156	22926.2	80.11	18.09	2156	23426	60.08	13.57	2156	23926
	14.53	103.24	24.38	2255	24029.4	68.83	16.25	2255	24529	51.62	12.19	2255	25029
	16.43	91.31	22.4	2342	24934.7	60.88	14.93	2342	25435	45.66	11.2	2342	25935
	18.2	82.42	20.16	2335	26135.5	54.95	13.44	2335	26636	41.21	10.08	2335	27136
	20.12	74.57	18.44	2361	27178.9	49.71	12.29	2361	27679	37.29	9.22	2361	28179
	22.39	66.98	15.63	2228	29157.8	44.65	10.42	2228	29658	33.49	7.81	2228	30158
	25.15	59.63	14.27	2285	30318.8	39.75	9.51	2285	30819	29.82	7.14	2285	31319
	26.98	55.6	14.06	2415	30558.1	37.07	9.37	2415	31058	27.8	7.03	2415	31558
	30.35	49.42	13.44	2596	31195.1	32.95	8.96	2596	31695	24.71	6.72	2596	32195
MS.303M00000...	27.579	54.39	15.96	2802	28569.1	36.26	10.64	2802	29069	27.19	7.98	2802	29569
	31.06	48.3	14.14	2795	30097.1	32.2	9.42	2795	30597	24.15	7.07	2795	31097
	36.27	41.36	12.24	2825	32123.7	27.57	8.16	2825	32624	20.68	6.12	2825	33124
	42.73	35.11	10.39	2825	34509.4	23.41	6.92	2825	35009	17.55	5.19	2825	35509
	49.29	30.43	9	2825	36719.1	20.29	6	2825	37219	15.22	4.5	2825	37719
	57.68	26.01	7.69	2825	39193.9	17.34	5.13	2825	39694	13	3.85	2825	40194
	63.67	23.56	6.97	2825	40868.8	15.71	4.65	2825	41369	11.78	3.48	2825	41869
	73.82	20.32	6.01	2825	43384.7	13.55	4.01	2825	43885	10.16	3.01	2825	44385
	85.59	17.52	5.18	2825	46063.1	11.68	3.46	2825	46563	8.76	2.59	2825	47063
	99.63	15.06	4.45	2825	48925.4	10.04	2.97	2825	49425	7.53	2.23	2825	49925
	112.64	13.32	3.94	2825	51309.6	8.88	2.63	2825	51810	6.66	1.97	2825	52310
	124.8	12.02	3.56	2825	53396.9	8.01	2.37	2825	53897	6.01	1.78	2825	54397
	137.93	10.88	3.22	2825	55473.6	7.25	2.14	2825	55974	5.44	1.61	2825	56474
	153.56	9.77	2.89	2825	57671.3	6.51	1.93	2825	58171	4.88	1.44	2825	58671
	172.49	8.7	2.57	2825	60118.3	5.8	1.72	2825	60618	4.35	1.29	2825	61118
	184.98	8.11	2.4	2825	61695.7	5.41	1.6	2825	62196	4.05	1.2	2825	62696
	208.11	7.21	2.13	2825	64489.8	4.81	1.42	2825	64990	3.6	1.07	2825	65490
	242.21	6.19	1.83	2825	68206.5	4.13	1.22	2825	68707	3.1	0.92	2825	69207
	256.94	5.84	1.73	2825	69655.8	3.89	1.15	2825	70156	2.92	0.86	2825	70656
	291.31	5.15	1.52	2825	72974.6	3.43	1.02	2825	73475	2.57	0.76	2825	73975

Please refer page 115 for weight data

5. MS4

MS-04 TYPE MS.04.....0... MS.04M00000... 4400 Nm													
Type	nsyn =	1500 min-1				1000 min-1				750 min-1			
	ies	n2	P	T2	Fr-G	n2	P	T2	Fr-G	n2	P	T2	Fr-G
		min-1	kW	Nm	N	min-1	kW	Nm	N	min-1	kW	Nm	N
MS.204M00000...	5.08	295.43	82.6	2670	8996	196.96	55.07	2670	9496	147.72	41.3	2670	9996
	6.06	247.68	75	2892	13200	165.12	50	2892	13700	123.84	37.5	2892	14200
	6.76	222.04	70.31	3024	15791	148.03	46.88	3024	16291	111.02	35.16	3024	16791
	7.96	188.49	64.79	3282	18843	125.66	43.19	3282	19343	94.25	32.4	3282	19843
	8.85	169.43	59.79	3370	19682	112.95	39.86	3370	20182	84.72	29.9	3370	20682
	10.48	143.16	53.85	3592	20209	95.44	35.9	3592	20709	71.58	26.93	3592	21209
	11.59	129.47	51.36	3788	19909	86.31	34.24	3788	20409	64.73	25.68	3788	20909
	13.89	108.01	45.1	3988	21176	72.01	30.07	3988	21676	54	22.55	3988	22176
	15.58	96.26	40.63	4030	23006	64.17	27.08	4030	23506	48.13	20.31	4030	24006
	18.29	82	34.38	4003	26625	54.67	22.92	4003	27125	41	17.19	4003	27625
	20.74	72.32	30.42	4016	29202	48.21	20.28	4016	29702	36.16	15.21	4016	30202
	22.62	66.31	27.76	3998	31344	44.21	18.51	3998	31844	33.16	13.88	3998	32344
	24.5	61.23	25.52	3981	33359	40.82	17.01	3981	33859	30.61	12.76	3981	34359
	28.8	52.08	21.77	3991	36021	34.72	14.51	3991	36521	26.04	10.88	3991	37021
	31.88	47.06	17.71	3594	37776	31.37	11.81	3594	38276	23.53	8.85	3594	38776
MS.304M00000...	29.72	50.47	21.04	3981	30650	33.65	14.03	3981	31150	25.24	10.52	3981	31650
	33.45	44.84	18.75	3993	37002	29.9	12.5	3993	37502	22.42	9.38	3993	38002
	39.9	37.59	16.2	4115	41152	25.06	10.8	4115	41652	18.8	8.1	4115	42152
	44.51	33.7	14.69	4162	42972	22.47	9.79	4162	43472	16.85	7.34	4162	43972
	52.43	28.61	12.81	4276	45616	19.07	8.54	4276	46116	14.31	6.41	4276	46616
	58.33	25.72	11.67	4332	47515	17.14	7.78	4332	48015	12.86	5.83	4332	48515
	65.59	22.87	10.52	4393	49688	15.25	7.01	4393	50188	11.43	5.26	4393	50688
	69.03	21.73	10	4394	50782	14.49	6.67	4394	51282	10.87	5	4394	51782
	76.33	19.65	9.05	4400	52954	13.1	6.04	4400	53454	9.83	4.53	4400	53954
	91.5	16.39	7.55	4400	56999	10.93	5.04	4400	57499	8.2	3.78	4400	57999
	102.66	14.61	6.73	4400	59786	9.74	4.49	4400	60286	7.31	3.37	4400	60786
	120.52	12.45	5.73	4400	63946	8.3	3.82	4400	64446	6.22	2.87	4400	64946
	126.62	11.85	5.46	4400	65162	7.9	3.64	4400	65662	5.92	2.73	4400	66162
	136.64	10.98	5.06	4400	67234	7.32	3.37	4400	67734	5.49	2.53	4400	68234
	161.41	9.29	4.28	4400	71815	6.2	2.85	4400	72315	4.65	2.14	4400	72815
	189.74	7.91	3.64	4400	76383	5.27	2.43	4400	76883	3.95	1.82	4400	77383
	210.01	7.14	3.29	4400	79495	4.76	2.19	4400	79995	3.57	1.65	4400	80495
	229.05	6.55	3.02	4400	82074	4.37	2.01	4400	82574	3.27	1.51	4400	83074
	249.23	6.02	2.77	4400	84697	4.01	1.85	4400	85197	3.01	1.39	4400	85697

Please refer page 115 for weight data

5. MS4

MS-05 TYPE MS.05.....0... MS.05M00000... 5600 Nm													
Type	nsyn =	1500 min-1				1000 min-1				750 min-1			
	ies	n2	P	T2	Fr-G	n2	P	T2	Fr-G	n2	P	T2	Fr-G
		min-1	kW	Nm	N	min-1	kW	Nm	N	min-1	kW	Nm	N
MS.204M00000...	5.17	290.28	93.75	3084	23850	193.52	62.5	3084	24350	145.14	46.88	3084	24850
	6.53	229.89	79.06	3284	25875	153.26	52.71	3284	26375	114.94	39.53	3284	26875
	7.75	193.46	72.4	3574	26209	128.97	48.27	3574	26709	96.73	36.2	3574	27209
	8.79	170.69	66.67	3730	27066	113.8	44.45	3730	27566	85.35	33.33	3730	28066
	11	136.31	58.02	4065	28313	90.87	38.68	4065	28813	68.15	29.01	4065	29313
	12.91	116.23	53.02	4356	28870	77.49	35.35	4356	29370	58.12	26.51	4356	29870
	14.66	102.34	50.1	4675	28607	68.22	33.4	4675	29107	51.17	25.05	4675	29607
	17.04	88.04	44.06	4779	31041	58.69	29.38	4779	31541	44.02	22.03	4779	32041
	19.53	76.79	40.83	5078	31443	51.19	27.22	5078	31943	38.39	20.42	5078	32443
	22.88	65.55	35.52	5175	34452	43.7	23.68	5175	34952	32.78	17.76	5175	35452
	24.65	60.85	32.29	5068	37384	40.57	21.53	5068	37884	30.43	16.15	5068	38384
MS.305M00000...	29.279	51.23	24.9	4641	46039	34.15	16.6	4641	46539	25.62	12.45	4641	47039
	26.07	57.54	31.46	5221	37391	38.36	20.97	5221	37891	28.77	15.73	5221	38391
	32.62	45.98	25	5192	43797	30.66	16.67	5192	44297	22.99	12.5	5192	44797
	38.14	39.33	21.98	5336	46941	26.22	14.65	5336	47441	19.67	10.99	5336	47941
	41.19	36.42	20.42	5354	49084	24.28	13.61	5354	49584	18.21	10.21	5354	50084
	48.94	30.65	17.81	5550	52581	20.43	11.87	5550	53081	15.32	8.91	5550	53581
	55.47	27.04	15.86	5600	56085	18.03	10.57	5600	56585	13.52	7.93	5600	57085
	65.01	23.07	13.53	5600	61525	15.38	9.02	5600	62025	11.54	6.77	5600	62525
	69.47	21.59	12.66	5600	63704	14.4	8.44	5600	64204	10.8	6.33	5600	64704
	81.46	18.41	10.8	5600	68831	12.28	7.2	5600	69331	9.21	5.4	5600	69831
	92.53	16.21	9.51	5600	72568	10.81	6.34	5600	73068	8.11	4.75	5600	73568
	107.55	13.95	8.18	5600	77057	9.3	5.45	5600	77557	6.97	4.09	5600	78057
	115.23	13.02	7.63	5600	79134	8.68	5.09	5600	79634	6.51	3.82	5600	80134
	123.31	12.16	6.93	5438	82301	8.11	4.62	5438	82801	6.08	3.46	5438	83301
	144.45	10.38	6.09	5600	86580	6.92	4.06	5600	87080	5.19	3.04	5600	87580
	155.6	9.64	5.65	5600	89267	6.43	3.77	5600	89767	4.82	2.83	5600	90267
	184.82	8.12	4.76	5600	95345	5.41	3.17	5600	95845	4.06	2.38	5600	96345
	191.96	7.81	4.58	5600	96909	5.21	3.05	5600	97409	3.91	2.29	5600	97909
	220.86	6.79	3.98	5600	102043	4.53	2.66	5600	102543	3.4	1.99	5600	103043

Please refer page 115 for weight data

5. MS4

MS-06 TYPE MS.06.....0... MS.06M000000... 8400 Nm													
Type	nsyn =	1500 min-1				1000 min-1				750 min-1			
	ies	n2	P	T2	Fr-G	n2	P	T2	Fr-G	n2	P	T2	Fr-G
		min-1	kW	Nm	N	min-1	kW	Nm	N	min-1	kW	Nm	N
MS.206M000000...	5.58	268.66	137.91	4902	19835	179.11	91.94	4902	20335	134.33	68.96	4902	20835
	6.91	217.21	129.17	5679	22013	144.81	86.11	5679	22513	108.61	64.58	5679	23013
	8.22	182.48	113.33	5931	20984	121.65	75.55	5931	21484	91.24	56.67	5931	21984
	9.36	160.21	104.17	6209	21720	106.81	69.44	6209	22220	80.1	52.08	6209	22720
	11.65	128.75	92.71	6876	22441	85.83	61.8	6876	22941	64.37	46.35	6876	23441
	13.98	107.3	80.21	7138	24172	71.53	53.47	7138	24672	53.65	40.1	7138	25172
	15.71	95.5	72.6	7259	25507	63.67	48.4	7259	26007	47.75	36.3	7259	26507
	18.14	82.67	67.5	7797	25962	55.12	45	7797	26462	41.34	33.75	7797	26962
	21.04	71.3	58.34	7814	28309	47.53	38.89	7814	28809	35.65	29.17	7814	29309
	24.2	61.99	50.52	7782	30779	41.33	33.68	7782	31279	31	25.26	7782	31779
	26.11	57.45	46.99	7810	32023	38.3	31.32	7810	32523	28.73	23.49	7810	33023
MS.306M000000...	31.52	47.59	38.75	7775	35561	31.73	25.83	7775	36061	23.8	19.37	7775	36561
	36.48	41.12	33.65	7813	38231	27.41	22.43	7813	38731	20.56	16.82	7813	39231
	41.42	36.22	30.21	7965	40259	24.15	20.14	7965	40759	18.11	15.1	7965	41259
	45.12	33.25	28.13	8078	41644	22.16	18.75	8078	42144	16.62	14.06	8078	42644
	53.7	27.93	24.27	8298	44642	18.62	16.18	8298	45142	13.97	12.14	8298	45642
	61.17	24.52	21.57	8400	47162	16.35	14.38	8400	47662	12.26	10.79	8400	48162
	68.32	21.96	19.31	8400	49773	14.64	12.88	8400	50273	10.98	9.66	8400	50773
	76.12	19.71	17.33	8400	52282	13.14	11.56	8400	52782	9.85	8.67	8400	53282
	82.87	18.1	15.92	8400	54453	12.07	10.61	8400	54953	9.05	7.96	8400	55453
	91.33	16.42	14.45	8400	56887	10.95	9.63	8400	57387	8.21	7.22	8400	57887
	102.61	14.62	12.86	8400	59876	9.75	8.57	8400	60376	7.31	6.43	8400	60876
	118.54	12.65	11.13	8400	63899	8.44	7.42	8400	64399	6.33	5.57	8400	64899
	137.45	10.91	9.6	8400	68169	7.28	6.4	8400	68669	5.46	4.8	8400	69169
	145.64	10.3	9.06	8400	69844	6.87	6.04	8400	70344	5.15	4.53	8400	70844
	158.09	9.49	8.35	8400	72356	6.33	5.56	8400	72856	4.74	4.17	8400	73356
	170.57	8.79	7.74	8400	74670	5.86	5.16	8400	75170	4.4	3.87	8400	75670
	190.67	7.87	6.92	8400	78139	5.24	4.61	8400	78639	3.93	3.46	8400	79139
	205.91	7.28	6.41	8400	80673	4.86	4.27	8400	81173	3.64	3.2	8400	81673
	221.41	6.77	5.96	8400	82937	4.52	3.97	8400	83437	3.39	2.98	8400	83937

Please refer page 115 for weight data

5. MS4

MS-07 TYPE MS.07.....0... MS.07M00000... 10500 Nm													
Type	nsyn =	1500 min-1				1000 min-1				750 min-1			
	ies	n2	P	T2	Fr-G	n2	P	T2	Fr-G	n2	P	T2	Fr-G
		min-1	kW	Nm	N	min-1	kW	Nm	N	min-1	kW	Nm	N
MS.207M00000...	5.17	290.4	189.63	6236	28005	193.6	126.42	6236	28505	145.2	94.82	6236	29005
	6.56	228.74	165.62	6914	30459	152.49	110.42	6914	30959	114.37	82.81	6914	31459
	7.67	195.63	151.04	7373	31520	130.42	100.7	7373	32020	97.82	75.52	7373	32520
	8.74	171.6	139.38	7756	32851	114.4	92.92	7756	33351	85.8	69.69	7756	33851
	10.79	139.05	121.87	8370	34248	92.7	81.25	8370	34748	69.53	60.94	8370	35248
	13.08	114.7	108.13	9002	35998	76.46	72.08	9002	36498	57.35	54.06	9002	36998
	14.83	101.13	99.48	9393	37198	67.42	66.32	9393	37698	50.57	49.74	9393	38198
	16.99	88.29	91.15	9859	38679	58.86	60.76	9859	39179	44.14	45.57	9859	39679
	19.71	76.1	80.2	10065	42148	50.73	53.47	10065	42648	38.05	40.1	10065	43148
	21.96	68.31	71.87	10047	45830	45.54	47.91	10047	46330	34.16	35.94	10047	46830
	24.68	60.78	63.54	9983	47496	40.52	42.36	9983	47996	30.39	31.77	9983	48496
	28.26	53.07	55.73	10028	52408	35.38	37.15	10028	52908	26.53	27.87	10028	53408
MS.307M00000...	32.35	46.37	48.76	10043	55016	30.91	32.51	10043	55516	23.18	24.38	10043	56016
	41.07	36.52	39.58	10350	60624	24.35	26.39	10350	61124	18.26	19.79	10350	61624
	45.07	33.28	36.46	10461	64408	22.19	24.31	10461	64908	16.64	18.23	10461	65408
	48.02	31.24	34.34	10500	66695	20.82	22.9	10500	67195	15.62	17.17	10500	67695
	54.75	27.4	30.13	10500	68833	18.27	20.08	10500	69333	13.7	15.06	10500	69833
	67.56	22.2	24.41	10500	74531	14.8	16.27	10500	75031	11.1	12.21	10500	75531
	73.35	20.45	22.49	10500	78182	13.63	14.99	10500	78682	10.23	11.24	10500	79182
	81.91	18.31	20.14	10500	81115	12.21	13.42	10500	81615	9.16	10.07	10500	82115
	92.9	16.15	17.75	10500	85652	10.76	11.84	10500	86152	8.07	8.88	10500	86652
	106.41	14.1	15.5	10500	90547	9.4	10.33	10500	91047	7.05	7.75	10500	91547
	113.01	13.27	14.59	10500	96118	8.85	9.73	10500	96618	6.64	7.3	10500	97118
	123.46	12.15	13.36	10500	99000	8.1	8.91	10500	99500	6.07	6.68	10500	100000
	137.53	10.91	11.99	10500	102715	7.27	8	10500	103215	5.45	6	10500	103715
	154.56	9.7	10.67	10500	105038	6.47	7.11	10500	105538	4.85	5.34	10500	106038
	177.03	8.47	9.32	10500	113784	5.65	6.21	10500	114284	4.24	4.66	10500	114784
	184.91	8.11	8.92	10500	115662	5.41	5.95	10500	116162	4.06	4.46	10500	116662
	219.78	6.83	7.5	10500	123708	4.55	5	10500	124208	3.41	3.75	10500	124708

Please refer page 115 for weight data

5. MS4

MS-08 TYPE MS.08.....0... MS.08M00000... 13000 Nm													
Type	nsyn =	1500 min-1				1000 min-1				750 min-1			
	ies	n2	P	T2	Fr-G	n2	P	T2	Fr-G	n2	P	T2	Fr-G
		min-1	kW	Nm	N	min-1	kW	Nm	N	min-1	kW	Nm	N
MS.208M00000...	5.07	295.6	298.96	9658	20453	197.07	199.31	9658	20953	147.8	149.48	9658	21453
	6.07	247	267.71	10350	21129	164.67	178.48	10350	21629	123.5	133.86	10350	22129
	7.34	204.33	234.38	10954	22492	136.22	156.26	10954	22992	102.16	117.19	10954	23492
	8.28	181.13	215.63	11368	23354	120.75	143.75	11368	23854	90.57	107.81	11368	24354
	9.83	152.64	189.59	11861	25071	101.76	126.39	11861	25571	76.32	94.79	11861	26071
	11.98	125.25	165.62	12627	26575	83.5	110.41	12627	27075	62.63	82.81	12627	27575
	13.97	107.37	142.71	12692	29845	71.58	95.14	12692	30345	53.69	71.35	12692	30845
	15.62	96.05	125	12427	33436	64.04	83.33	12427	33936	48.03	62.5	12427	34436
	17.61	85.19	109.38	12261	36975	56.79	72.92	12261	37475	42.59	54.69	12261	37975
	20.07	74.74	97.92	12511	39404	49.83	65.28	12511	39904	37.37	48.96	12511	40404
	24.71	60.7	75	11798	48613	40.47	50	11798	49113	30.35	37.5	11798	49613
MS.308M00000...	28.66	52.35	66.98	12219	51319	34.9	44.65	12219	51819	26.17	33.49	12219	52319
	34.29	43.74	58.34	12736	54832	29.16	38.89	12736	55332	21.87	29.17	12736	55832
	41.46	36.18	49.26	13000	59836	24.12	32.84	13000	60336	18.09	24.63	13000	60836
	46.77	32.08	43.67	13000	63717	21.38	29.11	13000	64217	16.04	21.83	13000	64717
	55.5	27.03	36.8	13000	69451	18.02	24.53	13000	69951	13.51	18.4	13000	70451
	61.22	24.5	33.36	13000	73073	16.33	22.24	13000	73573	12.25	16.68	13000	74073
	67.07	22.37	30.45	13000	76427	14.91	20.3	13000	76927	11.18	15.22	13000	77427
	67.63	22.18	30.19	13000	76827	14.79	20.13	13000	77327	11.09	15.1	13000	77827
	78.83	19.03	25.9	13000	82646	12.69	17.27	13000	83146	9.51	12.95	13000	83646
	88.19	17.01	23.16	13000	87021	11.34	15.44	13000	87521	8.5	11.58	13000	88021
	99.44	15.08	20.54	13000	91912	10.06	13.69	13000	92412	7.54	10.27	13000	92912
	111.54	13.45	18.31	13000	96686	8.97	12.2	13000	97186	6.72	9.15	13000	97686
	113.34	13.23	18.02	13000	97960	8.82	12.01	13000	98460	6.62	9.01	13000	98960
	148.76	10.08	13.73	13000	109984	6.72	9.15	13000	110484	5.04	6.86	13000	110984
	166.38	9.02	12.27	13000	115378	6.01	8.18	13000	115878	4.51	6.14	13000	116378
	189.27	7.93	10.79	13000	121689	5.28	7.19	13000	122189	3.96	5.39	13000	122689
	203.43	7.37	10.04	13000	125285	4.92	6.69	13000	125785	3.69	5.02	13000	126285

Please refer page 115 for weight data

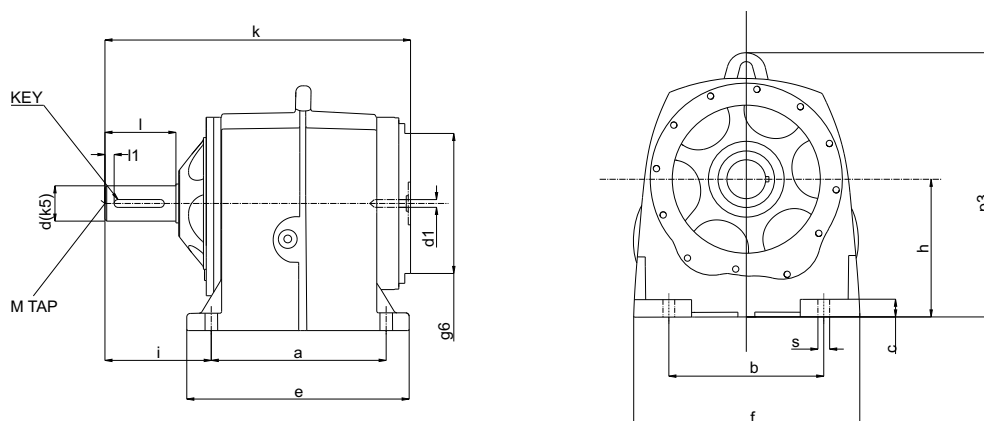
5. MS4

	TYPE MS.09.....0... MS.09M00000... 18000 Nm												
Type	nsyn =	1500 min-1				1000 min-1				750 min-1			
	iex	n2	P	T2	Fr-G	n2	P	T2	Fr-G	n2	P	T2	Fr-G
		min-1	kW	Nm	N	min-1	kW	Nm	N	min-1	kW	Nm	N
MS.209M00000...	10.38	144.48	228.13	15078	34255	96.32	152.08	15078	34755	72.24	114.06	15078	35255
	12.29	122.06	207.29	16217	35147	81.37	138.19	16217	35647	61.03	103.64	16217	36147
	14.51	103.39	177.09	16357	39030	68.92	118.06	16357	39530	51.69	88.54	16357	40030
	17.04	88.05	164.58	17850	39128	58.7	109.72	17850	39628	44.02	82.29	17850	40128
	19.26	77.87	139.81	17146	44316	51.91	93.21	17146	44816	38.93	69.9	17146	45316
	21.91	68.47	112.5	15691	52511	45.64	75	15691	53011	34.23	56.25	15691	53511
	24.86	60.33	98.96	15663	56444	40.22	65.97	15663	56944	30.17	49.48	15663	57444
	30.57	49.08	83.86	16317	61199	32.72	55.9	16317	61699	24.54	41.93	16317	62199
	23.49	63.86	120.37	18000	47407	42.57	80.25	18000	47907	31.93	60.18	18000	48407
	28.01	53.56	100.95	18000	52988	35.7	67.3	18000	53488	26.78	50.48	18000	53988
	35.3	42.49	80.09	18000	60867	28.33	53.39	18000	61367	21.24	40.05	18000	61867
MS.309M00000...	40.38	37.15	70.03	18000	65413	24.77	46.69	18000	65913	18.58	35.01	18000	66413
	45.11	33.25	62.68	18000	69770	22.17	41.79	18000	70270	16.63	31.34	18000	70770
	52.13	28.77	54.23	18000	75112	19.18	36.16	18000	75612	14.39	27.12	18000	76112
	57.1	26.27	49.52	18000	78617	17.51	33.01	18000	79117	13.13	24.76	18000	79617
	67.59	22.19	41.83	18000	85575	14.8	27.89	18000	86075	11.1	20.92	18000	86575
	74.28	20.19	38.07	18000	90081	13.46	25.38	18000	90581	10.1	19.03	18000	91081
	79.8	18.8	35.43	18000	93017	12.53	23.62	18000	93517	9.4	17.72	18000	94017
	93.7	16.01	30.18	18000	100337	10.67	20.12	18000	100837	8	15.09	18000	101337
	105.95	14.16	26.69	18000	105418	9.44	17.79	18000	105918	7.08	13.34	18000	106418
	120.5	12.45	23.46	18000	112303	8.3	15.64	18000	112803	6.22	11.73	18000	113303
	136.74	10.97	20.68	18000	118509	7.31	13.78	18000	119009	5.48	10.34	18000	119509
	152.52	9.83	18.54	18000	124347	6.56	12.36	18000	124847	4.92	9.27	18000	125347
	186.98	8.02	15.12	18000	146875	5.35	10.08	18000	147375	4.01	7.56	18000	147875
	230.43	6.51	12.27	18000	147623	4.34	8.18	18000	148123	3.25	6.14	18000	148623

Please refer page 115 for weight data

5. MS4

MSB2 S



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	l	d	KEY	l1	MTAP
MS 01	180	260	215	315	140	290	25	17.5	346	100	50	14x9x80	10	M16x36
MS 02	195	295	240	343	156	320	27	18	374	110	55	16x10x100	5	M16x36
MS 03	225	310	250	370.5	160	360	30	22	427	120	60	18x11x110	5	M20x42
MS 04	250	360	290	409	185	395	33	26	471	140	70	20x12x125	7.5	M20x42

MOTOR DETAILS

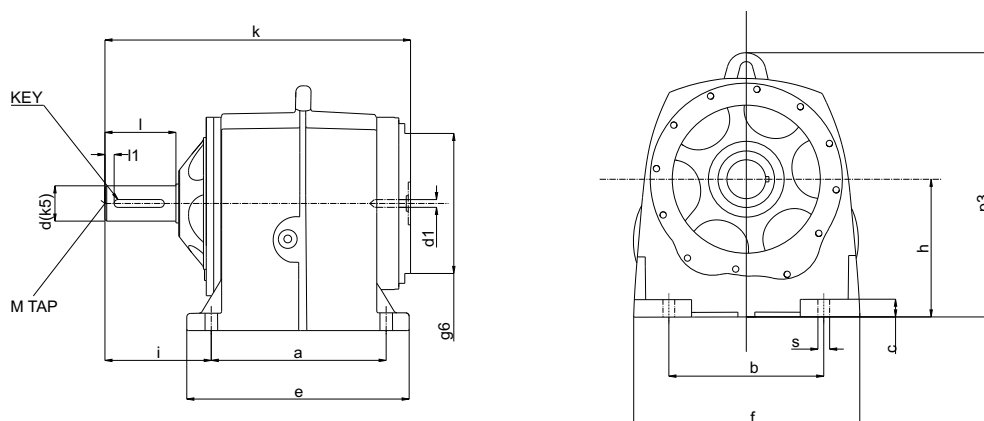
FRAME SIZE		90S	90L	100L	112M	132S	132M	160M	160L
g6		200	200	250	250	300	300	350	350
d1		24	24	28	28	38	38	42	42
Model									
MS 01	k	428.4	428.4	461.9	461.9	462.9	462.9	486.3	486.3
MS 02	k			476.5	476.5	509	509	535.5	535.5
MS 03	k			497	497	525	525	561.5	561.5
MS 04	k			574.8	574.8	570.8	570.8	599.8	599.8

FRAME SIZE		180M	180L	200L	225S	225M	250M	280S/M
g6		350	350	400	450	450	550	550
d1		48	48	55	60	60	65	75
Model								
MS 01	k	486.3	486.3					
MS 02	k	535.5	535.5	525.1	552	552		
MS 03	k	561.5	561.5	559	584.1	584.1	587.9	
MS 04	k	599.8	599.8	606.8	627.2	627.2	668.9	668.9

Please refer page 115 for weight data

5. MS4

MSB2 S



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	l	d	KEY	l1	MTAP
MS 05	268	390	330	456	223.5	428.5	36	26	505	170	80	22x14x160	5	M20x42
MS 06	315	410	340	513	220.2	473	40	33	576	170	90	24x14x160	5	M24x50
MS 07	330	490	370	562	265.5	529	45	33	629	210	100	28x16x180	15	M24x50
MS 08	355	500	380	614	260	579	50	39	689	210	110	28x16x180	15	M24x25
MS 09	425	580	500	657	270	645	55	39	798	210	120	32x18x200	5	M24x25

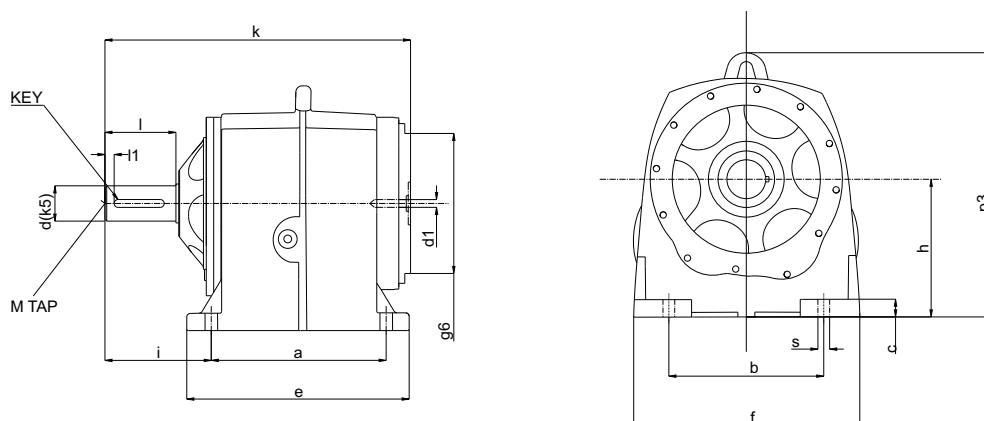
MOTOR DETAILS

FRAME SIZE		132S	132M	160M	160L	180M	180L	200L	225S	225M	250M	280S/M
g6		300	300	350	350	350	350	400	450	450	550	550
d1		38	38	42	42	48	48	55	60	60	65	75
Model												
MS 05	k	627.8	627.8	661.8	661.8	661.8	661.8	661	690.8	690.8	693.2	693.2
MS 06	k	684	684	681.4	681.4	681.4	681.4	670	723.4	723.4	709.2	709.2
MS 07	k			789.7	789.7	789.7	789.7	789.7	805.5	805.5	820.7	820.7
MS 08	k					808.4	808.4	826.4	854.4	854.4	890.4	890.4
MS 09	k					852.3	852.3	891.3	891.3	891.3	935	927.7

Please refer page 115 for weight data

5. MS4

MSB3 S



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	l	d	KEY	l1	MTAP
MS 01	180	260	215	315	140	290	25	17.5	346	100	50	14x9x80	10	M16x36
MS 02	195	295	240	343	156.6	320	27	18	374	110	55	16x10x100	5	M16x36
MS 03	225	310	250	370.5	160	360	30	22	427	120	60	18x11x110	5	M20x42
MS 04	250	360	290	409	185	395	33	26	471	140	70	20x12x125	7.5	M20x42

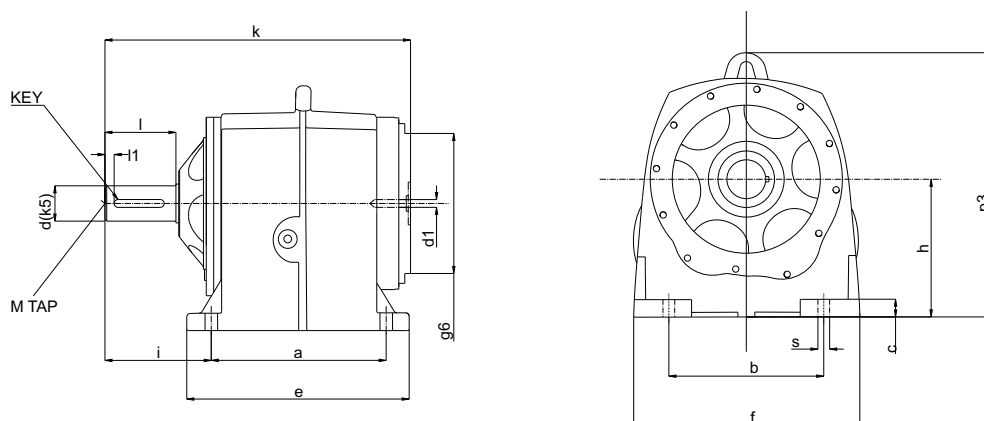
MOTOR DETAILS

FRAME SIZE		71	80	90S	90L	100L	112M	132S	132M	160M	160L	180M	180L
g6		160	200	200	200	250	250	300	300	350	350	350	350
d1		14	19	24	24	28	28	38	38	42	42	48	48
Model													
MS 01	K	426.1	436.6	436.6	436.6	456.4	456.4	487.2	487.2				
MS 02	K	465.4	480.7	480.7	480.7	491.9	491.9	517.9	517.9	552.9	552.9		
MS 03	K		508.9	508.9	508.9	524.2	524.2	546.9	546.9	578.9	578.9		
MS 04	K		555.7	555.7	555.7	571.2	571.2	580.5	580.5	617.1	617.1	617.1	617.1

Please refer page 115 for weight data

5. MS4

MSB3 S



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	l	d	KEY	l1	MTAP
MS 05	268	390	330	456	223.5	428.5	36	26	505	170	80	22x14x160	5	M20x42
MS 06	315	410	340	513	220	473	40	33	576	170	90	25x14x160	5	M24x50
MS 07	330	490	370	562	265.5	529	45	33	629	210	100	28x16x180	15	M24x50
MS 08	355	500	380	614	260	579	50	39	689	210	110	28x16x180	15	M24x50
MS 09	425	580	500	657	270	645	55	39	798	210	120	32x18x200	5	M24x50

MOTOR DETAILS

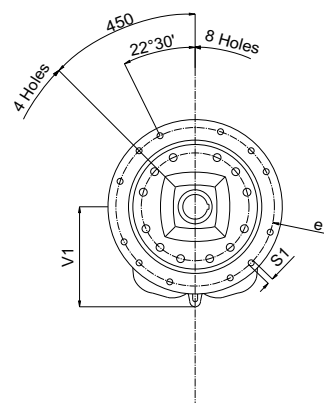
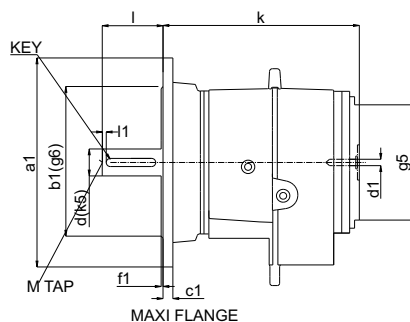
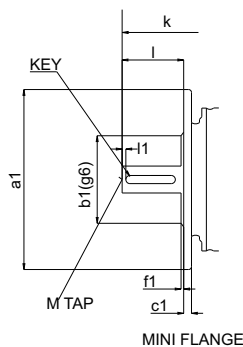
FRAME SIZE		90S	90L	100L	112M	132S	132M	160M	160L
g6		200	200	250	250	300	300	350	350
d1		24	24	28	28	38	38	42	42
Model									
MS 05	K	621.7	621.7	629.7	629.7	668.8	668.8	698.8	698.8
MS 06	K	647.4	647.4	647.4	647.4	684	684	721	721
MS 07	K	767.7	767.7	767.7	767.7	787.2	787.2	828.8	828.8
MS 08	K			803.3	803.3	815.3	815.3	856.8	856.8
MS 09	K			853.1	853.1	848.2	848.2	896.3	896.3

FRAME SIZE		180M	180L	200L	225S	225M	250M	280S/M
g6		350	350	400	450	450	550	550
d1		48	48	55	60	60	65	75
Model								
MS 05	K	698.8	698.8	701.3				
MS 06	K	721	721	718				
MS 07	K	828.8	828.8	830.8	862.8	862.8		
MS 08	K	856.8	856.8	861.8	893.8	893.8	890.3	890.3
MS 09	K	896.3	896.3	892.1	941.8	941.8	927.6	927.6

Please refer page 115 for weight data

5. MS4

MSV2 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	I	KEY	I1	MTAP
MS 01	Mini Flange	300	300	19.5	265	5	13.5	4	195	50	100	14x9x80	10	M16x36
	Maxi Flange	350	250	21	300	5	17.5							
MS 02	Mini Flange	300	230	19.5	265	5	17.5	4	218	55	110	16x10x100	5	M16x36
	Maxi Flange	400	300	21	350	5	17.5							
MS 03	Mini Flange	350	250	23.5	300	5	17.5	4	238	60	120	18x11x110	5	M20x42
	Maxi Flange	450	350	25.5	400	6	17.5	8						

MOTOR DETAILS

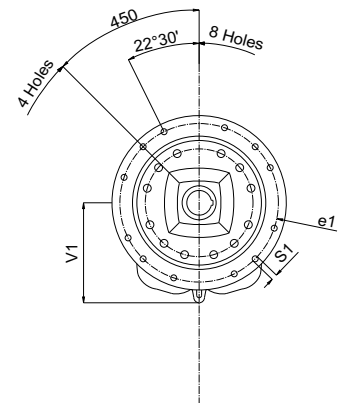
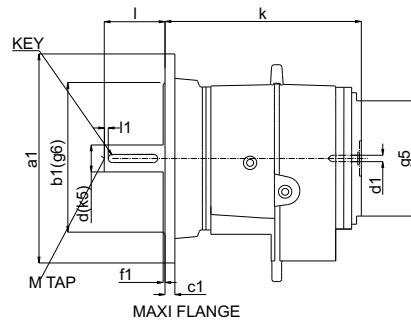
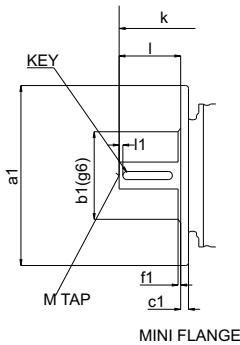
FRAME SIZE		90S	90L	100L	112M	132S	132M
g5		200	200	250	250	300	300
d1		24	24	28	28	38	38
Model							
MS 01	k	428.4	428.4	461.9	461.9	462.9	462.9
MS 02	k			476.5	476.5	509	509

FRAME SIZE		160M	160L	180M	180L	200L	225S	225M	250M
g5		350	350	350	350	400	450	450	550
d1		42	42	48	48	55	60	60	65
Model									
MS 01	k	486.3	486.3	486.3	486.3				
MS 02	k	535.5	535.5	535.5	535.5	525.1	552	552	
MS 03	k	561.5	561.5	561.5	561.5	559	584.1	584.1	587.9

Please refer page 115 for weight data

5. MS4

MSV2 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	l	KEY	l1	MTAP
MS 04	Mini Flange	350	250	20	300	5	17.5	4	265	70	140	20x12x25	7.5	M20x42
	Maxi Flange	450	350	23.5	400			8						
MS 05	Mini Flange	400	300	20	350	5	17.5	4	288	80	170	22x14x160	5	M20x42
	Maxi Flange	550	450	23.5	500			8						
MS 06	Mini Flange	450	350	28	400	5	17.5	8	326	90	170	25x14x160	5	M24x50
	Maxi Flange	550	450	28	500			8						

MOTOR DETAILS

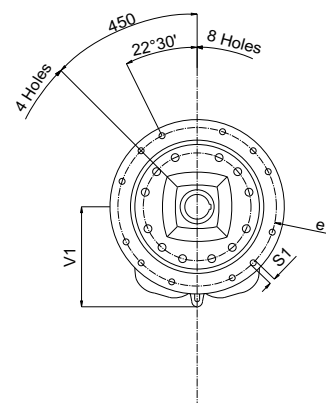
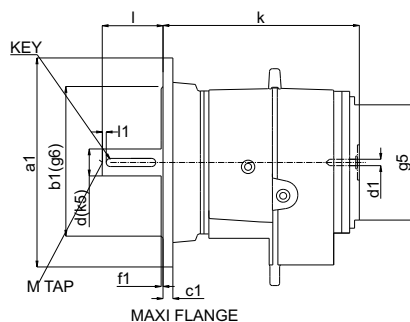
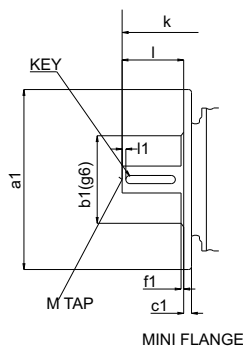
FRAME SIZE		100L	112M	132S	132M	160M	160L	180M	180L
g5		250	250	300	300	350	350	350	350
d1		28	28	38	38	42	42	48	48
Model									
MS 04	k	574.8	574.8	570.8	570.8	599.8	599.8	599.8	599.8
MS 05	k			627.8	627.8	661.8	661.8	661.8	661.8
MS 06	k			684	684	681.4	681.4	681.4	681.4

FRAME SIZE		200L	225S	225M	250M	280S	280M
g5		400	450	450	550	550	550
d1		55	60	60	65	75	75
Model							
MS 04	k	606.8	627.2	627.2	668.9	668.9	
MS 05	k	661	690.8	690.8	693.2	693.2	693.2
MS 06	k	670	723.4	723.4	709.2	709.2	709.2

Please refer page 115 for weight data

5. MS4

MSV3 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	I	KEY	I1	MTAP
MS 07	Mini Flange	450	350	28	400	5	17.5	8	370	100	210	28x16x180	15	M24x50
	Maxi Flange	650	450	28	300	5	17.5							
MS 08	Mini Flange	450	350	31	400	5	17.5	8	409	110	210	28x16x180	15	M24x50
	Maxi Flange	660	450	31	500	5	17.5							
MS 09	Mini Flange	550	450	32	500	5	17.5	8	450	120	210	32x18x200	5	M24x50
	Maxi Flange	660	550	32	600	6	22							

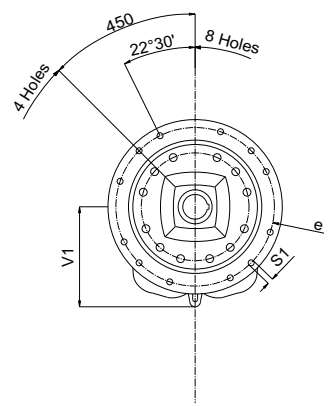
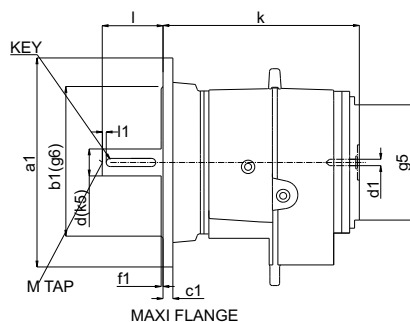
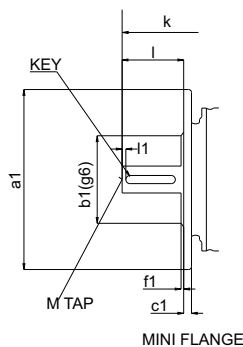
MOTOR DETAILS

FRAME SIZE		160M	160L	180M	180L	200L	225S	225M	250M	280S	280M
g5		350	350	350	350	400	450	450	550	550	550
d1		42	42	48	48	55	60	60	65	75	75
Model											
MS 07	k	789.7	789.7	789.7	789.7	789.7	805.5	805.5	820.7	820.7	820.7
MS 08	k			808.4	808.4	826.4	854.4	854.4	890.4	890.4	890.4
MS 09	k			852.3	852.3	891.3	891.3	891.3	935	927.7	927.7

Please refer page 115 for weight data

5. MS4

MSV3 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	l	KEY	I1	MTAP
MS 01	Mini Flange	300	230	19.5	265	4	13.5	4	195	50	100	14x9x80	10	M16x36
	Maxi Flange	350	250	21	300	5	17.5							
MS 02	Mini Flange	300	230	19.5	265	4	17.5	4	218	55	110	16x10x100	5	M16x36
	Maxi Flange	400	300	21	350	5	17.5							
MS 03	Mini Flange	350	250	23.5	300	5	17.5	4	238	60	120	18x11x110	5	M20x42
	Maxi Flange	450	350	26.5	400	5	17.5	8						

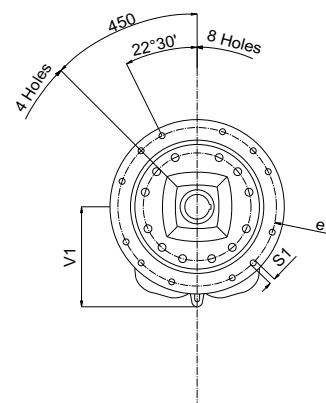
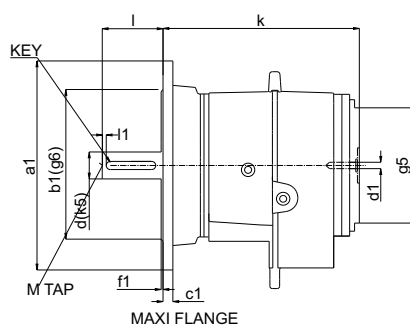
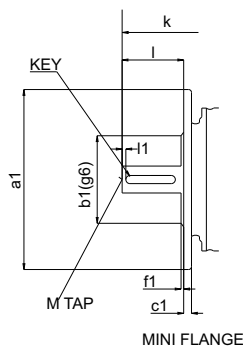
MOTOR DETAILS

FRAME SIZE		71	80	90S	90L	100L	112M	132S	132M	160M	160L
g5		160	200	200	200	250	250	300	300	350	350
d1		14	19	24	24	28	28	38	38	42	42
Model											
MS 01	K	426.1	436.6	436.6	436.6	456.4	456.4	487.3	487.3		
MS 02	K	465.4	480.7	480.7	480.7	492	492	518	518	552.9	552.9
MS 03	K		509	509	509	524.3	524.3	546.9	546.9	578.9	578.9

Please refer page 115 for weight data

5. MS4

MSV3 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	I	KEY	I1	MTAP
MS 04	Mini Flange	350	250	17	300	5	17	4	265	60	140	20x12x125	7.5	M20x42
	Maxi Flange	450	350	20	400			8						
MS 05	Mini Flange	400	300	18	350	5	18	4	288	70	140	22x14x160	5	M20x42
	Maxi Flange	550	450	22	500		17	8						
MS 06	Mini Flange	450	350	20	400	5	18	8	326	80	170	25x14x160	5	M24x50
	Maxi Flange	550	450	25	500		17	8						

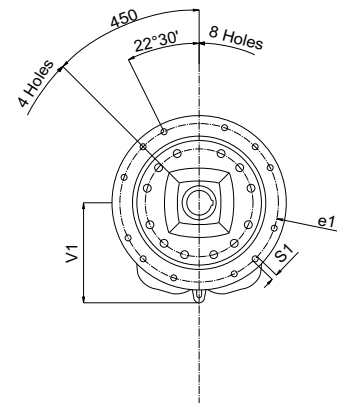
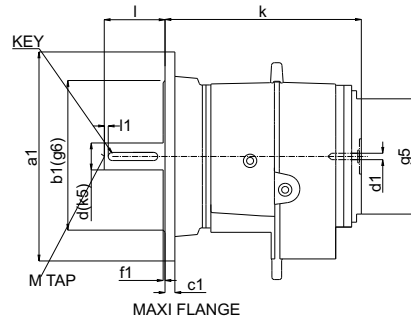
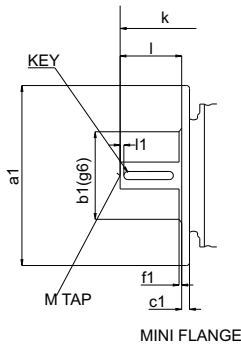
MOTOR DETAILS

FRAME SIZE		80	90S	90L	100L	112M	132S	132M	160M	160L	180M	180L	200L
g5		200	200	200	250	250	300	300	350	350	350	350	400
d1		19	24	24	28	28	38	38	42	42	48	48	55
Model													
MS 04	K	555.8	555.8	555.8	571.3	571.3	580.5	580.5	617	617	617	617	
MS 05	K		621.8	621.8	629.8	629.8	668.8	668.8	698.8	698.8	698.8	698.8	701.3
MS 06	K		647.4	647.4	647.4	647.4	684	684	721	721	721	721	718

Please refer page 115 for weight data

5. MS4

MSV3 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	d(k5)	l	KEY	l1	MTAP
MS 07	Mini Flange	450	350	28	400	5	17.5	8	370	100	210	28x16x180	15	M24x25
	Maxi Flange	550	450	28	500	5	17.5							
MS 08	Mini Flange	450	350	31	400	5	17.5	8	409	110	210	28x16x180	15	M24x25
	Maxi Flange	550	450	31	500	5	17.5							
MS 09	Mini Flange	550	450	32	500	5	17.5	8	450	120	210	32x18x200	5	M24x25
	Maxi Flange	650	550	32	600	6	22							

MOTOR DETAILS

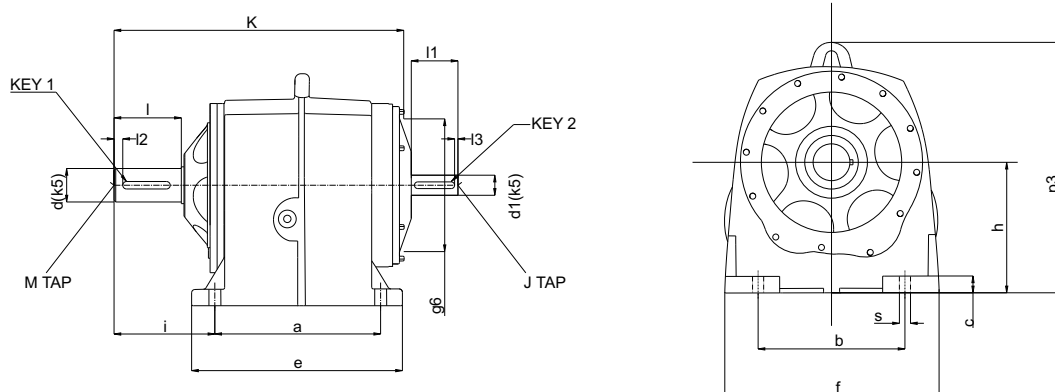
FRAME SIZE		90S	90L	100L	112M	132S	132M	160M	160L
g5		200	200	250	250	300	300	350	350
d1		24	24	28	28	38	38	42	42
Model									
MS 07	K	767.7	767.7	767.7	767.7	787.2	787.2	828.8	828.8
MS 08	K			803.4	803.4	815.4	815.4	856.9	856.9
MS 09	K			853	853	848.3	848.3	896.3	896.3

FRAME SIZE		180M	180L	200L	225S	225M	250M	280S	280M
g5		350	350	400	450	450	550	550	550
d1		48	48	55	60	60	65	75	75
Model									
MS 07	K	828.8	828.8	830.8	862.8	862.8			
MS 08	K	856.9	856.9	861.9	893.9	893.9	890.4	890.4	890.4
MS 09	K	896.3	896.3	892.2	941.8	941.8	927.7	927.7	927.7

Please refer page 115 for weight data

5. MS4

MSB2/3 S



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL	h	a	b	e	i	f	c	s	p3	K
MS 01	180	260	215	315	140	290	25	17.5	346	521
MS 02	195	295	240	343	156	320	25	18	374	566
MS 03	225	310	250	370.5	160	360	29	22	427	598
MS 04	250	360	290	409	185	395	33	26	471	684
MS 05	268	390	330	456	223.5	428.5	36	26	505	756
MS 06	315	410	340	513	220	473	40	33	576	790
MS 07	330	490	370	562	260	529	45	33	629	947
MS 08	355	500	380	614	260	579	50	39	689	976
MS 09	425	580	500	657	270	645	55	39	798	1026

Output Shaft

MODEL	I	d(K5)	I2	KEY 1	M TAP
MS 01	100	50	10	14x9x80	M16X36
MS 02	110	55	5	16x10x100	M16X36
MS 03	120	60	5	18x11x110	M20X42
MS 04	140	70	7.5	20x12x125	M20X42
MS 05	170	80	5	22x14x160	M20X42
MS 06	170	90	5	25x14x160	M24X50
MS 07	210	100	15	28x16x180	M24X50
MS 08	210	110	15	28x16x180	M24X50
MS 09	210	120	5	32x18x200	M24X50

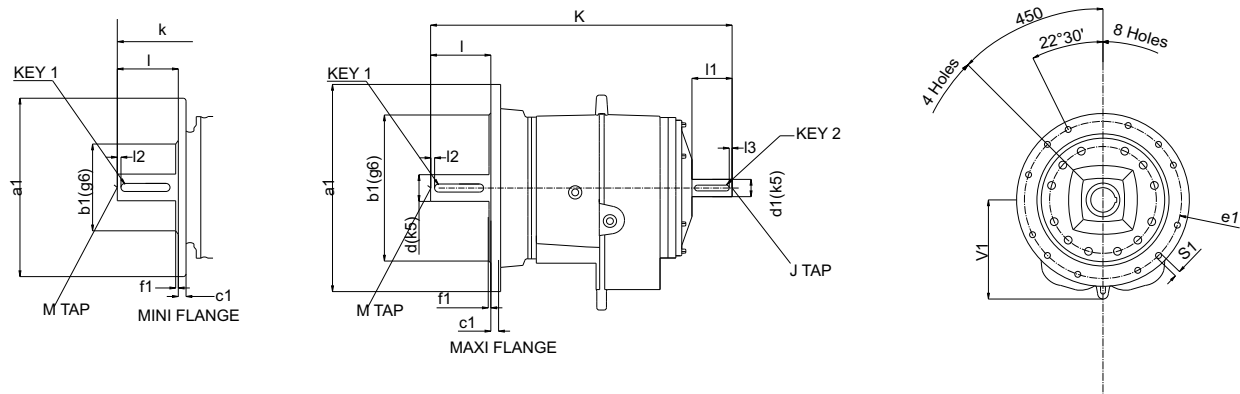
Input Shaft

MODEL	I1	d1	I3	KEY 2	M TAP
MS 01	80	28	5	10X8X70	M10X22
MS 02	80	32	5	10X8X70	M10X22
MS 03	80	38	5	12X8X70	M12X26
MS 04	110	42	5	12x8x100	M12X26
MS 05	110	50	5	16X10X100	M16X36
MS 06	110	55	5	16X10X100	M16X36
MS 07	110	55	5	16X10X100	M16X36
MS 08	140	60	10	18X11X120	M20X42
MS 09	140	65	10	18X11X120	M20X42

Please refer page 115 for weight data

5. MS4

MSV2/3 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	K
MS 01	Mini Flange	300	230	19.5	265	4	13.5	4	195	521
	Maxi Flange	350	250	21	300	5	17.5			
MS 02	Mini Flange	300	230	19.5	265	4	17.5	4	218	566
	Maxi Flange	400	300	21	350	5	17.5			
MS 03	Mini Flange	350	250	23.5	300	5	17.5	4	238	598
	Maxi Flange	450	350	25.5	400	5	17.5	8		
MS 04	Mini Flange	350	250	20	300	5	17.5	4	265	684
	Maxi Flange	450	350	23.5	400			8		

Output Shaft

MODEL	I	d(K5)	I2	KEY 1	M TAP
MS 01	100	50	10	14x9x80	M16X36
MS 02	110	55	5	16x10x100	M16X36
MS 03	120	60	5	18x11x110	M20X42
MS 04	140	70	7.5	20x12x125	M20X42

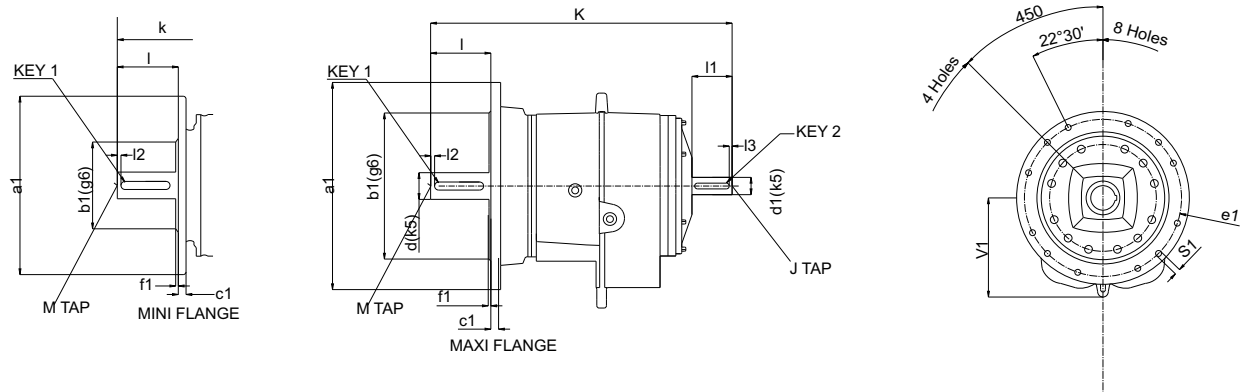
Input Shaft

MODEL	I1	d1(K5)	I3	KEY 2	M TAP
MS 01	80	28	5	10X8X70	M10X22
MS 02	80	32	5	10X8X70	M10X22
MS 03	80	38	5	12X8X70	M12X26
MS 04	110	42	5	12x8x100	M12X26

Please refer page 115 for weight data

5. MS4

MSV2/3 A



DIMENSIONAL DRAWINGS OF GEARED MOTORS

MODEL		a1	b1(g6)	c1	e1	f1	s1	No of Holes	V1	K
MS 05	Mini Flange	400	300	20	350	5	17.5	4	288	756
	Maxi Flange	550	450	23.5	500		17.5	8		
MS 06	Mini Flange	450	350	20	400	5	17.5	8	326	790
	Maxi Flange	550	450	23.5	500		17.5	8		
MS 07	Mini Flange	450	350	28	400	5	20	8	370	947
	Maxi Flange	550	450	28	500	5	22			
MS 08	Mini Flange	450	350	31	400	5	22	8	409	976
	Maxi Flange	550	450	31	500	5				
MS 09	Mini Flange	550	450	32	500	5	22	8	450	1026
	Maxi Flange	660	550	32	740	6				

Output Shaft

MODEL	I	d (K5)	I2	KEY 1	M TAP
MS 05	170	80	5	22x14x160	M20X42
MS 06	170	90	5	25x14x160	M24X50
MS 07	210	100	15	28x16x180	M24X50
MS 08	210	110	15	28x16x180	M24X50
MS 09	210	120	5	32x18x200	M24X50

Input Shaft

MODEL	I1	d1(K5)	I3	KEY 2	M TAP
MS 05	110	50	5	16X10X100	M16X36
MS 06	110	55	5	16X10X100	M16X36
MS 07	110	55	5	16X10X100	M16X36
MS 08	140	60	10	18X11X120	M20X42
MS 09	140	65	10	18X11X120	M20X42

Please refer page 115 for weight data

6. Technical Appendix

6. Technical Appendix

6.1 Technical Appendix, General

6.1.1 Symbols used

Formula sign	Description
C	Correction factor
$\cos \varphi$	Power factor
d	Speed of runner
F	Application factor
F_2	Factor dependent upon stray mass moment of inertia
F_b	Factor dependent upon output and operating time
F_m	Factor dependent upon load torque
F_{rN}	Permissible rated external load
F_{rN-G}	Permissible rated external load for reinforced bearing
F_p	Calculated radial load
f_r	Factor for the radial load
Fr	Calculated radial load (N)
F_x	Axial load
F_x	N Rated axial load
F_z	Dependent upon additional mass moment of inertia
i	Gear ratio
I_A	Starting current
i_{ex}	Exact gear ratio
i_N	Rated gear ratio
I_n	Rated current
J1	Inertia of brake hub and brake disk
J2	Inertia of the motor without brake
J3	Inertia of the motor with brake
JE	Inertia of the motor
J_{zus}	Inertia of the additional mass
M	Mass acceleration factor
m	Mass
M_b	Calculated bending moment
M_{bn}	Rated bending moment
η	Efficiency
n_1	Rated speed of the motor
n_2	Selection of the output speed
n_{2ex}	Exact speed of output shaft (full load)
L_p	Mean sound pressure level at 1 m, without load
n_{max}	Max. permissible speed
n_{syn}	Synchronous speed of the motor
P	Mechanical rated output of the gear unit
P_a	Output power
P_m	Motor output
P_N	Rated switching capacity (motor brake)

6. Technical Appendix

6. Technical Appendix

6.1 Technical Appendix, General

6.1.1 Symbols used

Formula sign	Description
P_{zo}	Drive power
r	Pitch circle radius of power transmission element
SF	Available service factor
SF_{min}	Required service factor
Sr	Speed range for motors with inverter
t_b	Brake time
t_1	Operating time of the single-disc safety brake
t_2	Braking time of the single-disc safety brake
T_2	Torque at the output shaft
t_3	Braking time of single-disc safety brakes switching at the AC side
T_A	Starting torque of the motor
T_a	Output torque (load torque)
T_B	Braking torque of the motor
T_K	Breakdown torque of the motor
T_n	Rated torque
T_s	Pull-up torque of the motor
W_{max}	Energy capability per braking
Z	Max. permissible operating frequency of brake motors
Z_B	No. of brakings per hour
Z_{o1}	No-load operating frequency per hour without brake
Z_{o2}	No-load operating frequency per hour with brake

6. Technical Appendix

6.2 Project planning checklist

Data

1. Load									
Motor output	P_m	=	kW						
Motor speed			min^{-1}						
Output power	P_a	=	kW						
Output torque	T_a	=	Nm						
Operating time in hours/day	<table border="1"> <tr> <td>$\leq 8h$</td> <td>$\leq 16h$</td> <td>$\leq 24h$</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	$\leq 8h$	$\leq 16h$	$\leq 24h$					
$\leq 8h$	$\leq 16h$	$\leq 24h$							
Torque peaks T_a	T_a	=	Nm						
Frequency			/h						
Duration			S						
Operating frequency			c/h						
Inertia of driven machine			kgm^2						
Acceleration time			s						
Reversing operation									
Backstop required									
2. Speed									
Constant speed									
Variable speed									
Direction of rotation: CW = clockwise									
CCW = counter clockwise									
3. Connection of motor/gear unit									
Geared motor (integrated assembly)									
Gear unit for IEC motors									
Free drive shaft									
Coupling									
V-belt drive:									
Diameter of belt pulley :									
Motor	$\varnothing$		mm						
Gear unit	$\varnothing$		mm						
Belt profile									
Number of belts									
Other: please specify									
4. Connection of gear unit/driven machine									
Coupling									
Sprocket, diameter	$\varnothing$		mm						
Pinion, diameter	$\varnothing$		mm						
Other : please specify									

6. Technical Appendix

6.2 Project planning checklist

Data

5. External load on output shaft

Radial load

Distance between point of action
and shaft shoulder

F_r = N
 L_r = mm

Direction of load (see below)

Q_r = °

Axial load

Pointing to the gear unit

F_x = + N

Pointing away from the gear unit

F_x = - N

6. External load on drive shaft

Radial load

Distance between point of action
and shaft shoulder

F_{rHSS} = N
 L_{rHSS} = mm

Direction of load

Q_{rHSS} = ° Axial load

Axial load

Pointing to the gear unit

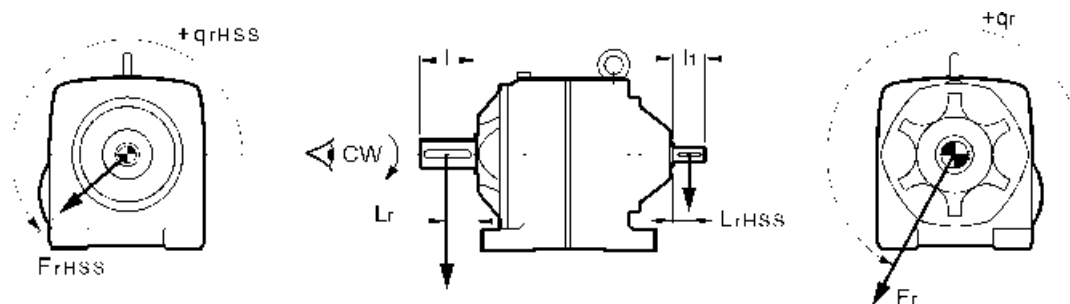
F_x = + NP

Pointing away from the gear unit

F_x = - N

Definitions :

MI4



6. Technical Appendix

6.2 Project planning checklist

Data

7. Brake

Braking torque TB

$$T_R = \quad \text{Nm}$$

Braking time

$$T_b = S$$

8. Mounting parameters

Mounting position

Ambient temperature (°C)

min/max = / °C

Exposure to solar radiation

Max. noise emission

dB(A)

Measuring distance

M

Environmental conditions

Air humidity in %

%

Dust

Aggressive atmosphere, please specify

Electrical details

Voltage and frequency

Operating mode

S

%

/

Type of enclosure

IP

Insulation class

Drive: Type

Order No.:

Sketch :

6. Technical Appendix

6.2.1 Coating Systems

The standard available coatings for the different types of applications from Premium Stephan are summarized in the following tables. Before the dip primer coating, all castings undergo grit blasting for surface preparation (SA 2 ½). If no special coating is defined, the delivery features system 1 in RAL 5002. For high-quality coatings (4...6), the final color tone can be defined by the customer. If no color tone is specified, the final coating is done in RAL 5002 (blue).

Deviating versions are possible in addition to the listed coatings (e.g. through customer regulations). However, they must be checked by Premium Stephan for feasibility in each case before placing an order. It is possible that it may result in significant deviations with respect to extra prices and delivery time. Please contact us.

Table : 1

System no.:	0		1		2		3	
Paint coat								
1	Dip primer coating Color : Red- brown	20 µm	Dip primer coating Color : Red- brown	20 µm	Dip primer coating Color : Red- brown	20 µm	Dip primer coating Color : Red- brown	20 µm
2			1C top coat Color: RAL 5002 Acrylic/PVC	40 µm	1C top coat Color: RAL 7035 Acrylic/PVC	40 µm	1C top coat Color: RAL 7035 Acrylic/PVC	40 µm
3							1C top coat Color: RAL 5002 Acrylic/PVC	40 µm
4								
5								
6								
Total coating thickness		20 µm		60 µm		60 µm		100 µm
Additional paint coats							1	
Drying time less than			1 day		1 day		1 day	
Corrosion protection	++		+++		++		++++	
Temperature resistance								
Continuous load up to	100 °C		100 °C		100 °C		100 °C	
Short-term load up to	160 °C		160 °C		160 °C		160 °C	
Chemical resistance	-		+		-		++	
Mechanical resistance	-		+		-		++	
UV resistance	-		+		-		++	
Application	Only S4 - gear heads for assembly center		Standard coating for S4 indoor installation		Pre-coating for final coating at customer		High-quality coating for S4 indoor installation	
Extra price	No		No		No		Yes	

6. Technical Appendix

6.2.1 Coating Systems

Table : 2

System no.:	4		5		6	
Paint coat						
1	Dip primer coat Color: Red-brown	20 µm	Dip primer coat Color: Red-brown	20 µm	Dip primer coat Color: Red-brown	20 µm
2	2C paint base Color: RAL 7035 Polyurethane (Derocryl)	40 µm	2C paint base Color: RAL 7035 Epoxy	40 µm	2C paint base Color: RAL 7035 Epoxy	40 µm
3	2C top coat Color: NKW Polyurethane (Derocryl)		2C paint base Color RAL 7035 Epoxy	40 µm	2C paint base Color RAL 7035 Epoxy	40 µm
4			2C top coat Color: NKW Epoxy	40 µm	2C top coat Color: NKW Epoxy	40 µm
5			2C top coat Color: NKW Epoxy	40 µm	2C top coat Color: NKW Epoxy	40 µm
6					2C top coat Color: NKW Polyurethane (Derocryl)	30 µm
Total coating thickness		100 µm		180 µm		210 µm
Additional paint coats	1		3		4	
Drying time less than	2 days		3 days		4 days	
Corrosion protection	+++++		+++++		+++++	
Temperature resistance						
Continuous load up to	100 °C		100 °C		100 °C	
Short-term load up to	160 °C		160 °C		160 °C	
Chemical resistance	+++		++++		+++++	
Mechanical resistance	+++		++++		+++++	
UV resistance	++++		++++		++++	
Application	Standard coating for S4 outdoor installation		High-quality coating for S4 indoor and outdoor installation at average environmental loads		High-quality coating for S4 indoor and outdoor installation in extreme applications	
Extra price	Yes		Yes		Yes	

Key					
-	Insufficient		NKW	Per customer request	
+	Available				
++	Sufficient				
+++	Satisfactory				
++++	Good				
	Excellent				

6. Technical Appendix

6.2.2 *Type of enclosure*

The motors correspond to type of enclosure IP55 to IEC 34 - 5 as standard, i.e. they are protected against harmful penetration of dust and water.

The first code number IP5* identifies the protection against harmful dust accumulations inside the motor. The second code IP*5 identifies the protection against the penetration of jet water from all directions. Higher types of enclosure can be supplied upon request.

6.2.3 *Insulation class*

Proven insulation materials according to class F are used for all motors (limiting temperature 155 °C). However, the actual heating corresponds only to insulation class B (limiting temperature 130 °C). Exception: size 132MG-4G (9 kW).

This ensures high reliability and long service life. It is also possible to operate the motors under special conditions, such as an unfavorable electrical supply, an ambient temperature of 55 °C, or a permanently increased load of up to 110 % of the rated output.

6.2.4 *Protection against tropical influences*

All motors are designed in type of enclosure IP55 to IEC 34 - 5. They are suitable for use under dusty and humid environmental influences and, to a limited extent, in tropical environments.

If the environmental conditions promote the formation of mildew, algae or condensate, an additional tropical insulation should be provided.

If motors are exposed to humid or condensate-forming conditions for an extended period of time, an electrical space heater (option) is recommended to avoid moisture condensate inside the motor windings. A control device must ensure that the space heater is switched off during operation and switched on during standstill. The standard supply voltage is 230 V ± 10 %.

6.2.5 *Protection of motors against non-permissible loads*

Selecting the correct protective device largely determines the operational reliability and service life of the motor. Suitable overcurrent release devices (motor protecting switches) are placed in the supply line for direct protection against overload and blocking.

Motors with an output starting at 4 kW are equipped with thermistors (PTC thermistors) as standard. Motors with lower outputs can be supplied with thermistors or thermostats (thermal contacts) upon request (option). Standard motors can be retrofitted with thermostats.

Thermistors (PTC thermistors) are temperature-dependent resistors to IEC 34-11 and DIN 44081 / 44082. Technical data: see below.

Thermostats (thermo switches, thermal contacts) are temperature-dependent bimetal switches. The response temperature is 150 °C and cannot be adjusted. Technical data: see below.

Selecting the correct motor protection is dependent upon the application:

- Possible causes of a thermal overload in each specific application
- Value of product being manufactured
- Costs arising from loss of production
- Possible dangers due to a motor fault

6. Technical Appendix

6.2.6 Type of enclosure

Motor fault	Motor protecting switch		Built into the motor windings	
	Thermal	Magnetic	Thermostats	Thermistors
Continuous overload	G	G	G	G
High operating frequency, unsuitable operating mode	A	A	A	G
Continuous undervoltage or overvoltage or incorrect supply frequency	A	A	G	G
High ambient temperature at motor installation site	P	P	G	G
Insufficient ventilation, blockage of air flow	P	P	G	G
Failure of a supply phase	P	P	A	G
Blockage of rotor	G	G	A	G

Key	
G	Good
A	Acceptable
P	Poor or no protection
Thermistor	Response temperature 160 °C, design to IEC34-11 and DIN 44081 / 44082
Thermostat	Response temperature 150 °C, max. 250 VAC, 1.6 A, cos η 0.6

6.2.7 Safe switching of high inductances

- a) Switching of multi-pole motor windings.
Switching a multi-pole motor winding in conjunction with unfavorable conductor routing may lead to voltage peaks that can damage or destroy the winding insulation. It is recommended to equip the supply lines with varistors.
- b) Switching of brake coils.
Varistors must be used to avoid damaging switching over voltages when switching brake coils on the DC side. The brake rectifiers and brake controllers used by Premium-Stephan feature varistors as standard. On principle, special braking contactors or contacts of category AC3 according to IEC 158 must be used for switching of brake coils.

6. Technical Appendix

6.2.8 50-Hz motors on a 60-Hz supply system

Motors dimensioned for 50 Hz can also be operated on 60-Hz supply networks without any problems. In this case, the rated speed increases by 20%. At the same time, current and power factor remain unchanged. The additional information can be found in the table.

Motor winding 50 Hz	Connection to 60 Hz	Power P	Torque T
400 V $\pm$ 10 %	380/400 V $\pm$ 5 % 50 Hz	0.90 x P(50 Hz)	0.75 x T(50 Hz)
400 V $\pm$ 10 %	400 V -10 % / + 25 %	1.00 x P(50 Hz)	0.83 x T(50 Hz)
400 V $\pm$ 10 %	440 V -10 % / +15 %	1.10 x P(50 Hz)	0.92 x T(50 Hz)
400 V $\pm$ 10 %	460 V $\pm$ 10 %	1.15 x P(50 Hz)	0.96 x T(50 Hz)
400 V $\pm$ 10 %	480 V - 10 % + 5%	1.20 x P(50 Hz)	1.00 x T(50 Hz)
500 V $\pm$ 10 %	500 V -10 % / + 25 %	1.00 x P(50 Hz)	0.83 x T(50 Hz)
500 V $\pm$ 10 %	575 V $\pm$ 10 %	1.15 x P(50 Hz)	0.96 x T(50 Hz)

6.2.9 Operation with inverter

The operation of three-phase AC induction motors with frequency inverter (variable voltage and frequency) causes stray losses in the motor. For this reason, it is generally required to reduce the rated torque of the motors so that the permissible winding temperature is not exceeded. An additional reduction of the output is required due to reduced motor speed and, therefore, reduced self-cooling. The output reduction is dependent upon the torque demand of the driven machine and the speed setting range.

For vertical versions with tubing (SCA, SFA, SCP), the output speed ranges according to chapter 7.4.7 must be taken into account. In case of doubt, a consultation with our plant is required.

High speeds

Standard motors can generally also be operated above their rated speed. If standard motors must be operated with frequencies above 60 Hz, please consult our plant.

Power tables

Rated powers of 4-pole motors from the Premium Stephan series are listed for various applications. Data for other pole numbers are available upon request.

The powers apply to correctly installed frequency inverters with characteristics of column A or B.

	A	B
Complete harmonic distortion	< 2.5%	< 6%
Maximum peak voltage	1600 V	1400 V
Max. voltage rise du / dt	1.0 kV / s	5.6 kV / s
Max. carrier switching frequency	5 kHz	5 kHz
Max. motor to inverter cable length	30 m	60 M

6. Technical Appendix

6.2.10 Standard version

Our motors and geared motors correspond to the relevant standards. The most important ones are:

	IEC (CEI)	DIN	VDE
Rated output	IEC 34 - 1, IEC 85	DIN EN 60034 - 1	VDE 0530 - 1
Dimensions	IEC 72	DIN 42673 / 42677	
Mounting position	IEC 34 - 7	DIN EN 60034 - 7	VDE 0530 - 7
Cylindrical shaft ends	IEC 72	DIN 748 - 3	
Terminal designations	IEC 34 - 8	DIN VDE 0530 - 8	VDE 0530 - 8
Enclosure types (IP code)	IEC 34 - 5	DIN VDE 0530 - 5	VDE 0530 - 5
Cooling types (IC code)	IEC 34 - 6	DIN EN 60034 - 6	VDE 0530 - 6
Noise limits	IEC 34 - 9	DIN EN 60034 - 9	VDE 0530 - 9
Supply voltage	IEC 38	DIN IEC 38	

6.2.11 Explosion-protected motors

	IEC (CEI)	DIN
General	IEC 79 - 0	DIN EN 50014
Increased safety (EEx e)	IEC 79 - 7	DIN EN 50019
Flame-proof enclosure (EEx d)	IEC 34 - 1	DIN EN 50018
Non sparking (EEx n)		DIN EN 50021
Electrical equipment for use in areas with combustible dust		DIN EN 50281

6.2.12 Thermal standards

Three-phase AC squirrel-cage motors from Premium-Stephan correspond to the thermal regulations of the relevant national and international standards for permissible over temperature.

Standard	Permissible ambient temperature	Permissible overtemperature in K (measured using the resistance method) Insulation class	
	°C	B	F
DIN, VDE, IEC	40	80	105
British Standards (BS)	40	80	105
Canadian Standards (CSA)	40	80	105
USA (NEMA)	40	80	105
American Bureau of Shipping (ABS)	50	75	95
Bureau Veritas (BV)	50	70	90
Det Norske Veritas	45	70	90
Germanischer Lloyd (GL)	45	75	95
Lloyds Register (LR)	45	70	90

6. Technical Appendix

6.2.13 Tolerances

The following tolerances apply to the performance specifications of electrical machines to DIN EN 60034:

- Efficiency η : - 0.15 (1 - 0) for rated outputs ≥ 50 kW
 - 0.10 (1 - 0) for rated outputs > 50 kW
- Power factor $\cos \phi$: - (1 - $\cos \phi$) / 6
- Slip: $\pm 20\%$ for rated outputs > 1 kW
 $\pm 30\%$ for rated outputs ≤ 1 kW
- Starting current: + 20%
- Starting torque: - 15% ... + 25%
- Mass moment of inertia: $\pm 10\%$
- Sound pressure level: + 3 dB(A)

6.2.14 Calculation of maximum permissible operating frequency of motors: Z

The maximum permissible operating frequency of a brake motor is dependent upon:

- the size of the accelerated mass moments of inertia
- the relative operating time
- the relative load, i.e. the ratio of actual output power and
- rated output of the motor
- load torque during acceleration

The no-load operating frequency listed in the tables can be converted to the actual application using the following formula:

$$Z = Z_0 \times F_z \times F_b \times F_m$$

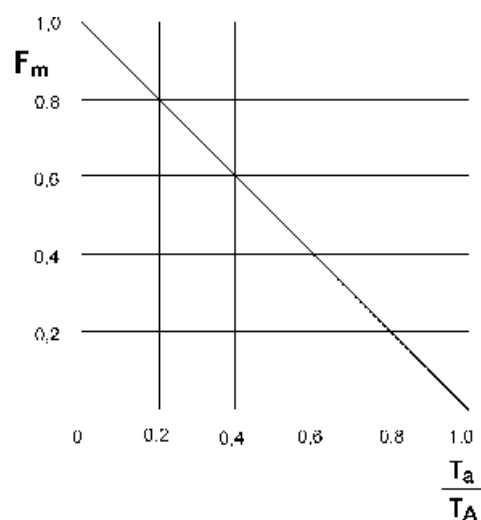
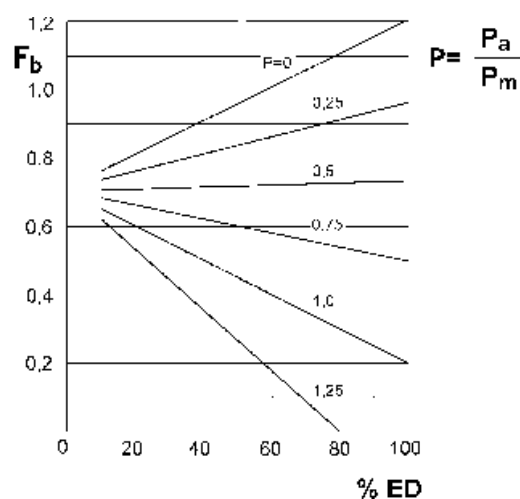
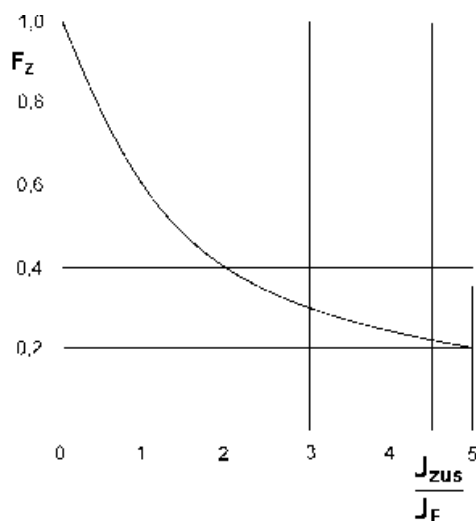
F_z	Dependent upon additional mass moment of inertia
F_b	dependent upon output and operating time
F_m	dependent upon load torque
Z_0	no-load operating frequency at 60% operating time
J_E	mass moment of inertia of the motor
J_{zus}	mass moment of inertia of driven machine referenced to the motor shaft
T_a	load torque
T_A	acceleration torque (motor)
E_D	operating time

$$\text{whereby } P = P_a / P_m$$

P_a : power demand after completed acceleration
 P_m : rated motor output

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Diagrams



6.2.15 Spring-applied single-disk safety brake for direct current and dry run

In the electromagnetic single-disk brake, the braking force is applied through springs and the brake is electrically released. In case of a power failure, the brake is applied. This allows it to meet the predetermined safety requirements. The brakes can be supplied with a manual release upon request.

The brakes are manufactured and tested according to VDE 0580 and correspond to CENELEC Memorandum no. 3, part 3, par. 2.3 of the EC safety directives.

Standard voltages:

102 VDC / 230 VAC for motor output up to 3 kW
178 VDC / 400 VAC for motor output starting at 4 kW

Other voltages can be supplied and must be specified when ordering.

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Technical data:

The response times apply to normal operating temperatures and rated voltage with adjusted gap. The values listed are subject to the regular tolerances.

t1 (operating time) is the time from switching on the voltage to the drop-off of the brake torque to 10% of the rated torque TB.

t2 or t3 (breake time) is the time from switching off the voltage to an increase of the brake torque to 90% of its rated value. t2 applies to switching on the DC side, t3 to switching on the AC side.

The brakes correspond to enclosure type IP55 and, therefore are protected against damaging dust accumulations and jet water.

PR is the permissible braking energy in Joule per second. The permissible braking energy per braking WRmax is dependent upon the operating frequency. The listed values apply to a motor speed of 1500 min-1.

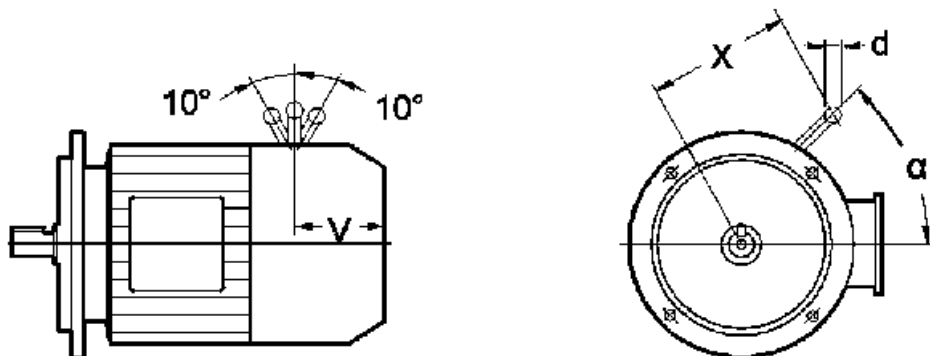
The dynamic braking torque TB applies to dry run, run in brake and normal operating conditions. The braking torque decreases with increasing motor speed.

If the friction areas contain oil or grease, the braking torque is reduced down to 50%. If the brake is not run in, the braking torque may be 20% less than the rated torque.

6.2.16 Brake kit

Standard motors of size 63 to 180 can be converted to brake motors. Brake kits are available for this purpose. The brake hub is installed on the motor shaft to ensure an operationally reliable design. Only the plastic fan blade is driven by a screw-in shaft.

Position of the manual release lever



Motor Size	Brake Size	TB Nm	°	X mm	d mm	V mm
63	08	4	0	85	25	75
71	08	4	0	85	25	75
80	10	10	0	98	25	91
90	13	20	0	117	25	93
100	15	40	30	128	32	97
112	15	40	30	128	32	115
132	20	80	30	166	40	122
160	23	150	30	210	40	161
180	26	240	30	230	40	183
200 / 225	458-25	400	0	500	24	
250 / 280	Upon request					

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6.2.17 Brake data

Motor Size	Brake Size	T _B Nm	n _{max.} min ⁻¹	P _R j/s	W _{Rmax} J	W _{RN} J	P _{ZO} W	t ₁ ms	t ₂ ms	t ₃ ms	J ₁ kg*cm*	m kg
63	08	5	10000	80	3 x 10 ³	5 x 10 ⁷	22	35	30	70	0,15	0,8
71	08	5	10000	80	3 x 10 ³	5 x 10 ⁷	22	35	30	70	0,15	0,8
80	10	10	5400	100	6 x 10 ³	12 x 10 ⁷	28	45	45	95	0,45	1,4
90	13	20	5400	130	12 x 10 ³	20 x 10 ⁷	34	60	60	140	1,72	2,5
100	15	40	4000	160	25 x 10 ³	35 x 10 ⁷	42	80	75	175	4,5	4,0
112	15	40	4000	160	25 x 10 ³	35 x 10 ⁷	42	80	75	175	4,5	4,0
132	20	100	3500	250	50 x 10 ³	125 x 10 ⁷	100	160	120	280	12,2	10
160	23	150	3000	300	75 x 10 ³	200 x 10 ⁷	150	200	150	350	28,5	12,6
180	26	250	3000	350	105 x 10 ³	340 x 10 ⁷	250	220	180	500	66,5	19,5
200	458-25	400	3000	520	125 x 10 ³		110	110	375	950	200	29
225	458-25	400	3000	520	125 x 10 ³		110	110	375	950	200	29
250	Upon request											
280	Upon request											

T _B	Rated torque
n _{max.}	Max. speed
P _R	Max. friction power
W _{Rmax}	Max. friction energy per operation
W _{RN}	Friction energy until re-adjustment
P _{zo}	Coil power
t ₁	Operating time
t ₂	Break time (switching on DC side)
t ₃	Break time (switching on AC side)
J ₁	Moment of inertia of the brake
m	Weight

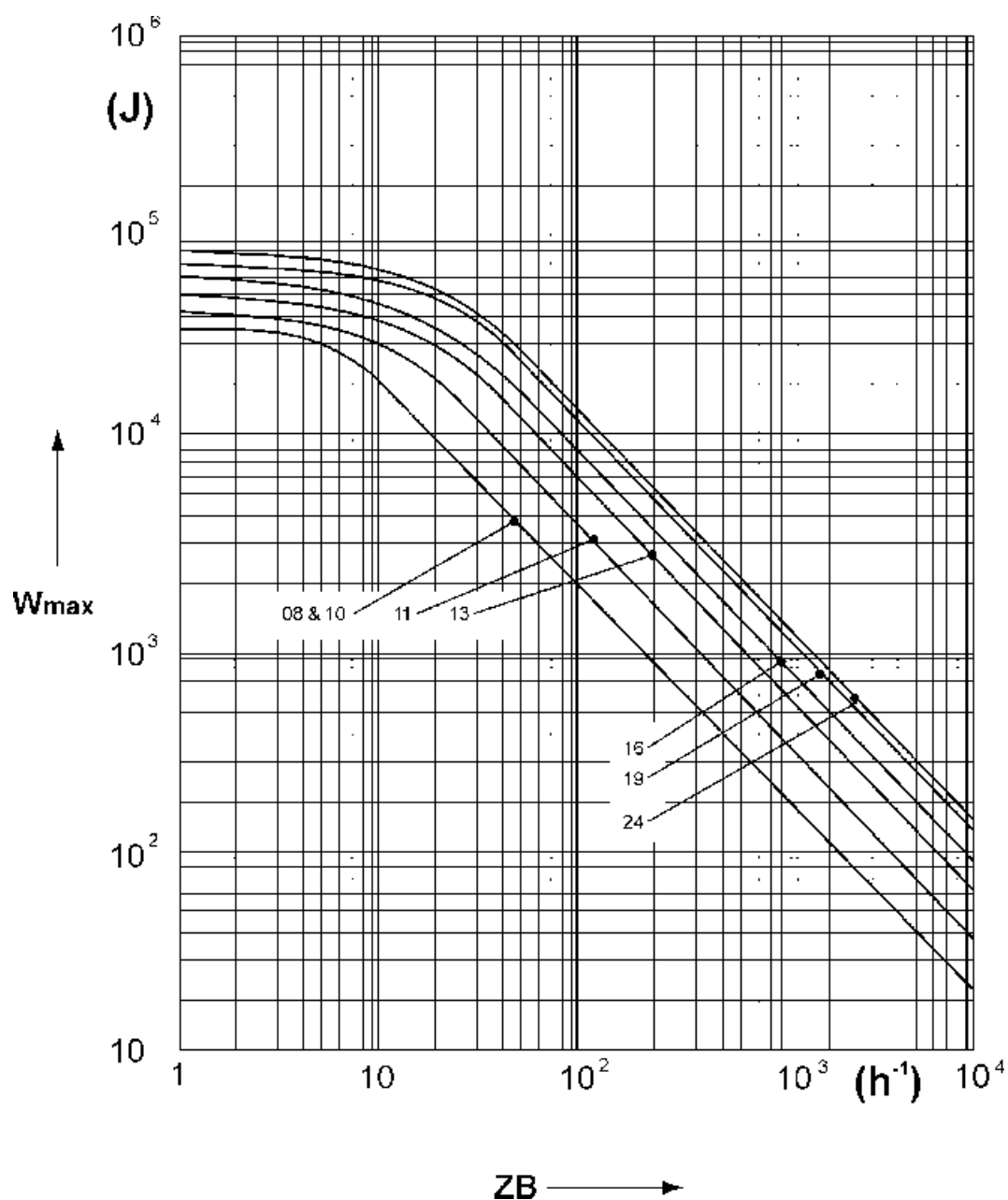
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6.2.18 Power capability per braking

In general, the permissible operating frequency of a brake motor is limited by the heating of the motor. The brake output should be determined for each braking W for control purposes.

$$W = 0.0055 \times n^2 \times (J_{\text{zus}} + JE)$$

The permissible value WR_{max} can be found in the diagram.



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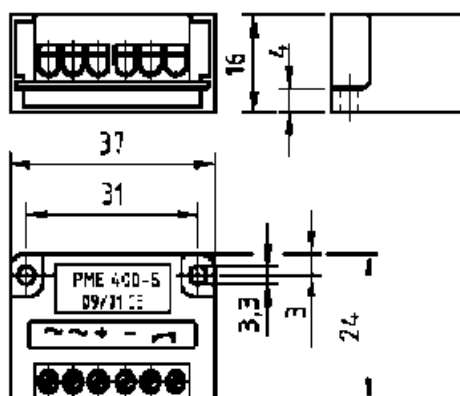
6.2.19 Brake rectifier

The brake rectifiers being used generate the necessary direct voltage (DC) for operating the brake from the AC supply voltage (AC).

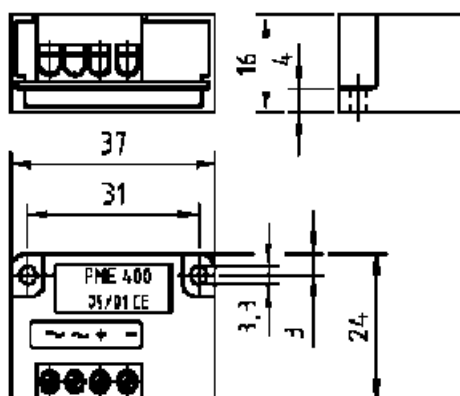
Dependent upon the voltage applied, one-way or bridge rectifiers are used.

The brakes are usually switched on the AC side. However, the brakes can also be switched on the DC side for short brake application times. For this purpose, the built-in switching bridge must be removed.

Rectifier for switching at the DC side
or at the AC side

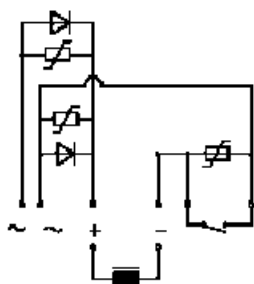


Rectifier for switching at the AC side



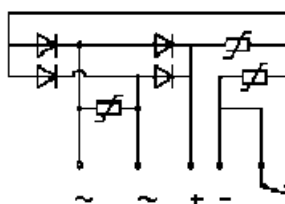
Half wave rectifier

Switching at the DC side
PME 400-S



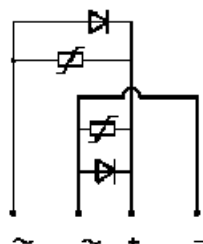
Full wave rectifier

Switching at the DC side
PMB 400 - S



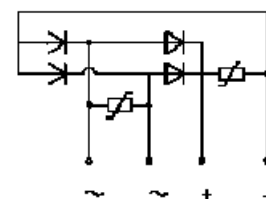
Half wave rectifier

Switching at the AC side
PME 400



Full wave rectifier

Switching at the AC side
PMB 400



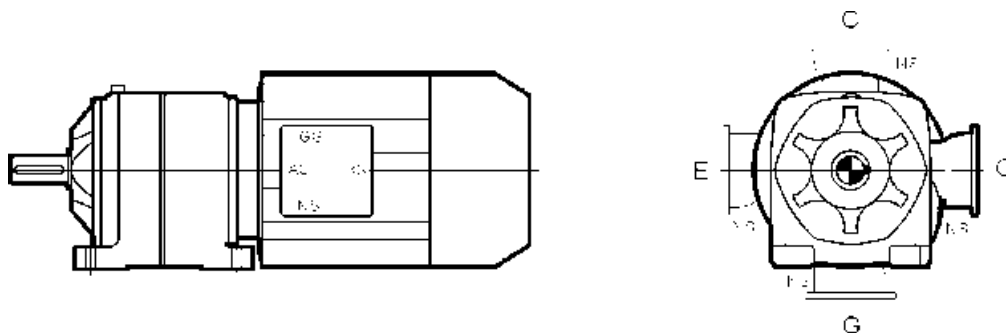
If speed control or synchronous control is required, the motors can be equipped with tachometer generators or pulse generators.

Notes

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6.2.21 Terminal box position

MS4

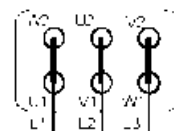
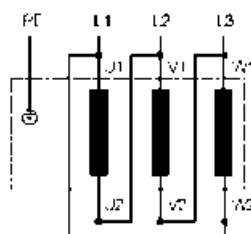


The terminal box position is independent of the mounting position. The normal position is "O". The cable entry is arranged in position "NS" as standard.

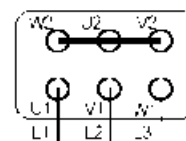
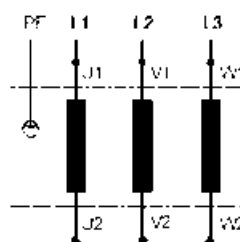
6.2.22 Connection diagrams

Motor connection diagrams

Delta connection
low voltage



Star connection
high voltage



Connection designations of add-on devices

	IEC standard	UK standard
PTC thermistor	10 - 11	TP1 - TP2
Thermal contacts (NC contact)	20 - 21	TB1 - TB2
Thermal contacts (NO contact)	30 - 31	
Magnetic brake	60 - 61	BR1 - BR2
Space heater	70 - 71	H1 - H2
Three-phase AC external fan	U - V - W	
Single-phase external fan	U1 - U2	

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6.2.23 2nd shaft end

The motors can be supplied with a second shaft end upon request. Please contact us.

6.2.24 Plug connectors (Harting)

The motors can be supplied with plug connectors upon request. Please contact us.

6.2.25 Cast iron fan

The motors can be supplied with cast iron fan upon request. Please contact us.

6.2.26 Cable entries

Size	Cable entry
63 to 90	1 x M20X1.5
100	1 x M20X1.5
112 to 132	1 x M25X1.5
160 to 180	2 x M32X1.5

Cable entries are closed during transport.
Screwed cable glands are not part of the scope of delivery!

6.3 Technical Appendix, Mechanical

6.3.1 Backstops in the input lantern

Backstops are used to limit the direction of rotation to a freely selectable direction of rotation. In the opposite direction, backstops act as a blocker. Backstops are frequently used for conveyor drives that are operated in a tilt position or for fan drives. In both cases, there is only one free direction of rotation, whereby a spinning of the drive is desired for the opposite direction.

In certain applications, backstops can be an alternative to an electromagnetic brake on the motor.

The backstops are placed at the drive shaft (U/L-lantern) between the regular bearing and are mounted dependent upon the desired free direction of rotation according to the order. The free direction of rotation must be specified at ordering.

If speed-disengaging backstops are used, this safety component needs to be checked only every 6 000 operating hours or no later than every 3 years. The system operator must take all the necessary safety precautions to avoid failure of the backstop that may result in personal injuries and/or damages to the drive unit and/or the application.

It is necessary to replace the backstop under the following conditions:

- In the event of observing unusually high wear of the gear unit.
- When the oil in the gear unit is contaminated.
- In the event of unusually high load.

This may have had an adverse effect on the condition of the clamping elements and bearing races in the integrated backstop.

CAUTION!

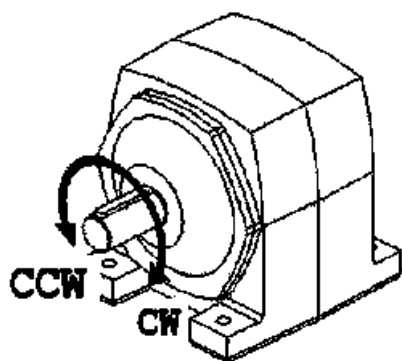
Only authorized, qualified personnel is permitted to replace the backstop or change the direction of rotation of the backstop while complying with the operating instructions for the respective backstop.

Never loosen or release any part of the backstop facility while the drive is under load: This could affect the reversal action of the drive and load; the drive unit must be in a no-load condition and secured against inadvertent movements.

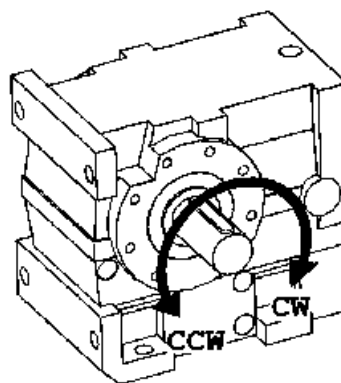
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6.3.2 Indication of output rotating direction when using backstops

For the order of a gearbox with backstop you have to indicate the required direction of rotation, viewed at output shaft on output side of gearbox. For drives with left and right output shaft the direction of rotation is given viewed at side L. To avoid damage to the gearbox or the unit, the direction of rotation needs to be checked before operating.



CW = rotation right, CCW = rotation left



CW = rotation right, CCW = rotation left

6.3.3 Motor base versions

Our motor base version is a special variant to connect or drive a gear unit with a motor by means of belt drive. This provides the following advantages:

- Compact version - an advantage, for example, if structural conditions do not allow for an integral mounting of the motor.
- After installing the drive in the machine or system, the total gear ratio can be adjusted using a simple change in the belt drive gear ratio.

6.3.4 Gear unit with free drive shaft

All gear units of the S4 family can also be designed with free drive shaft. In this case, there is a standard for the shaft dimensions of the drive shaft dependent upon the gear unit type (MS4) and the gear unit size. This standard is also shown in the dimensioned drawings of the gear units. In addition to these standard dimensions, alternate dimensions are possible or even required, based on applied external loads. The following table provides an overview of the options in the design of the drive shafts. Lines with a light-gray background contain the values for our standard dimensions.

For permissible loads at the drive shaft please contact Premium-Stephan.

6. Technical Appendix

6.3.5 Noise level

This chapter discusses the noise levels (sound pressure levels) of the S4 gear unit series of size 1 to 9. design index 6 and 7. Motor noises are not taken into account.

Table 1 listed below shows sound pressure level L_p that can be expected with high probability for standardized conditions. Slight deviations are possible due to manufacturing tolerances.

To obtain values from other conditions, correcting factors must be added according to Tables 2-4.

$$L_p = L_p' + K_1 + K_2 + K_3$$

If the noise level must be guaranteed, 3 dBA must be added at the top tolerance limit. See also the attached examples.

The listed values refer only to the gear units and are intended for an initial orientation. Lower values are partially possible for the noise level. Please contact us.

Sound pressure under standardized conditions:

Table 1 shows values and tolerances for sound pressure L_p in dBA at a distance of 1 meter from the gear unit (Input speed $n_1 = 1500$ 1/min gear ratio $i = 11.2$). The reference power is dependent upon the service factor SF.

Table 1:

Gear Unit Size	Consumed power in kW Half the catalog power data, ½ in kW							
	1kW	2kW	5kW	10kW	20kW	50kW	75kW	100kW
1...4	58 +/- 1	62 +/- 1	66 +/- 1.5	69.5 +/- 1.5	73 +/- 2			
5...7	57 +/- 1	61 +/- 1	65 +/- 1.5	68.5 +/- 1.5	72 +/- 2	77 +/- 2	79 +/- 3	
8...9	56 +/- 1	60 +/- 1	64 +/- 1.5	68.5 +/- 1.5	71 +/- 2	76 +/- 2	78 +/- 3	80 +/- 3

Correcting factor for non-standard conditions:

Table 2 : Correcting factor K_1 in dBA for distance from gear unit,

Gear Unit Size	Distance from gear unit (m)					
	1 m	3 m	5 m	10 m	30 m	50 m
1...4	0	-6	-10	-16	-26	-30
5...7	0	-5	-9	-15	-25	-29
8...9	0	-4	-8	-14	-24	-28

Table 3 : Correcting factor K_2 in dBA for input speed n_1

Gear Unit Size	Input speed n_1 (1/min)						
	500 RPM	750 RPM	1000 RPM	1500 RPM	1800 RPM	2400RPM	3000 RPM
1...9	-7	-5	-3	0	+1.5	+5	+8

Table 4 : Correcting factor K_3 in dBA for gear ratio

Gear Unit Size	Gear unit ratio i	
	4.5... 10	>= 11.2
1...9	+2	0

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Examples

Example 1

MSB304F132MF02500S, consumed power $P_a = 7.5$ kW
 Expected sound pressure level at 1 meter?
 Service factor $SF=1.2$ ' use consumed power according to Table 1 (interpolate and round the values)
 $L_p' = (67.8 \pm 1.5)$ dBA
 Distance = 1 m, $n_1 = 1500$ 1/min $i = 11.2$ ' $K_1 = K_2 = K_3 = 0$
 $L_p = L_p'$
 Guaranteed value = $(67.8 + 1.5 + 3)$ dBA = **72.3 dBA**

Example 2

MSB205G160MF05600S, consumed power $P_a = 11$ kW
 Expected sound pressure level at 1 meter?
 Service factor $SF = 3.45$ ' Use half the catalog power data (see Gear unit selection tables)
 $P/2 = (39/2)$ kW = 19.5 kW $\rightarrow L_p' = (72 \pm 2)$ dBA
 Distance = 1 m, $n_1 = 1500$ 1/min, $i < 11.2$ ' $K_1 = K_2 = 0$, $K_3 = 2$ dBA
 $L_p = (L_p' + 2)$ dBA = (74 ± 2) dBA
 Guaranteed value = $(74 + 2 + 3)$ dBA = **79 dB**

6.3.6 Mass moments of inertia GD^2 (kgm²)

The listed values each refer to the drive shaft of the gear unit.

MS4

2/3-stage gear units GD^2 (kgm²)

	MS-01		MS-02		MS-03		MS-04		MS-05	
	Ratio	GD^2	Ratio	GD^2	Ratio	GD^2	Ratio	GD^2	Ratio	GD^2
TRIPLE REDUCTION	250.97	0.00064	255.71	0.00088	291.31	0.0016	249.23	0.0031	220.86	0.0049
	215.87	0.00080	241.25	0.00098	256.94	0.0019	229.05	0.0036	191.96	0.0061
	195.72	0.00094	216.28	0.00118	242.21	0.0021	210.01	0.0041	184.82	0.0065
	180.53	0.00106	186.30	0.00150	208.11	0.0026	189.74	0.0048	155.60	0.0084
	159.16	0.00129	170.02	0.00176	184.98	0.0032	161.41	0.0062	144.45	0.0094
	139.69	0.00156	150.78	0.00200	172.49	0.0035	136.64	0.0079	123.31	0.0118
	123.76	0.00187	126.75	0.00276	153.56	0.0041	126.62	0.0087	115.23	0.0127
	110.49	0.00221	116.48	0.00331	137.93	0.0048	120.52	0.0095	107.55	0.0144
	99.26	0.00257	103.44	0.00366	124.80	0.0056	102.66	0.0120	92.53	0.0177
	88.17	0.00303	92.48	0.00403	112.64	0.0064	91.50	0.0141	81.46	0.0211
	76.95	0.00364	83.15	0.00470	99.63	0.0076	76.33	0.0180	69.47	0.0260
	73.16	0.00390	72.17	0.00541	85.59	0.0093	69.03	0.0206	65.01	0.0275
	68.32	0.00427	65.21	0.00668	73.82	0.0113	65.59	0.0215	55.47	0.0347
	56.82	0.00543	59.92	0.00755	63.67	0.0136	58.33	0.0256	48.94	0.0406
	52.99	0.00594	47.58	0.00947	57.68	0.0154	52.43	0.0293	41.19	0.0502
	47.88	0.00676	42.78	0.01148	49.29	0.0186	44.51	0.0360	38.14	0.0532
	41.55	0.00808	37.13	0.01375	42.73	0.0222	39.90	0.0412	32.62	0.0667
	37.79	0.00911	33.25	0.01714	36.27	0.0272	33.45	0.0513	26.07	0.0843
	30.50	0.01194	27.58	0.01969	31.06	0.0326	29.72	0.0578		
					27.58	0.0375				

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	MS-01		MS-02		MS-03		MS-04		MS-05	
	Ratio	GD ²	Ratio	GD ²	Ratio	GD ²	Ratio	GD ²	Ratio	GD ²
DOUBLE REDUCTION	34.04	0.00100	27.19	0.00172	30.35	0.0029	31.88	0.0044	29.28	0.0072
	31.40	0.00113	25.03	0.00202	26.98	0.0035	28.80	0.0052	24.65	0.0094
	27.68	0.00137	22.37	0.00231	25.15	0.0039	24.50	0.0067	22.88	0.0105
	24.29	0.00168	20.14	0.00265	22.39	0.0047	22.62		19.53	0.0134
	21.52	0.00202	18.24	0.00322	20.12	0.0055	20.74	0.0087	17.04	0.0164
	19.22	0.00239	16.17	0.00389	18.20	0.0064	18.29	0.0106	14.66	0.0205
	17.26	0.00279	14.62	0.00433	16.43	0.0074	15.58	0.0134	12.91	0.0246
	15.33	0.00331	12.39	0.00564	14.53	0.0089	13.89	0.0159	11.00	0.0309
	13.38	0.00401	10.83	0.00655	12.48	0.0110	11.59	0.0208	8.79	0.0424
	11.88	0.00474	9.29	0.00822	10.77	0.0136	10.48	0.0240	7.75	0.0505
	9.88	0.00611	8.39	0.00938	9.29	0.0167	8.85	0.0305	6.53	0.0642
	9.22	0.00672	7.12	0.01201	8.41	0.0191	7.96	0.0355	5.17	0.0890
	8.33	0.00771	6.21	0.01487	7.19	0.0238	6.76	0.0447		
	7.23	0.00935	5.20	0.01820	6.23	0.0291	6.06	0.0523		
	6.57	0.01065	4.50	0.02334	5.29	0.0368	5.08	0.0673		
	5.30	0.01430			4.53	0.0456				

	MS-06		MS-07		MS-08		MS-09	
	Ratio	GD ²	Ratio	GD ²	Ratio	GD ²	Ratio	GD ²
TRIPLE REDUCTION	221.41	0.0141	219.78	0.0183	203.43	0.0179	230.43	0.0461
	205.91	0.0173	184.91	0.0224	189.27	0.0219	186.98	0.0565
	190.67	0.0185	177.03	0.0241	166.38	0.0235	152.52	0.0607
	170.57	0.0240	154.56	0.0311	148.76	0.0304	136.74	0.0784
	158.09	0.0267	137.53	0.0347	113.34	0.0339	120.50	0.0874
	145.64	0.0337	123.46	0.0437	111.54	0.0428	105.95	0.1102
	137.45	0.0363	113.01	0.0472	99.44	0.0461	93.70	0.1716
	118.54	0.0410	106.41	0.0532	88.19	0.0520	79.80	0.1935
	102.61	0.0457	92.90	0.0629	78.83	0.0641	74.28	0.2386
	91.33	0.0499	81.91	0.0748	67.63	0.0835	67.59	0.2837
	82.87	0.0617	73.35	0.0925	67.07	0.1032	57.10	0.3507
	76.12	0.0652	67.56	0.0977	61.22	0.1090	52.13	0.3705
	68.32	0.0823	54.75	0.1234	55.50	0.1376	45.11	0.4677
	61.17	0.0963	48.02	0.1444	46.77	0.1610	40.38	0.5474
	53.70	0.1190	45.07	0.1785	41.46	0.1990	35.30	0.6766
	45.12	0.1260	41.07	0.1889	34.29	0.2107	28.01	0.7162
	41.42	0.1412	32.35	0.2325	28.66	0.2452	23.49	0.9896
	36.48	0.1555			24.71	0.3099		
DOUBLE REDUCTION	31.52	0.0171	28.26	0.0257	20.07	0.0462	30.57	0.0823
	26.11	0.0223	24.68	0.0336	17.61	0.0603	24.86	0.1074
	24.20	0.0250	21.96	0.0376	15.62	0.0675	21.91	0.1204
	21.04	0.0318	19.71	0.0478	13.97	0.0859	19.26	0.1531
	18.14	0.0391	16.99	0.0587	11.98	0.0978	17.04	0.1881
	15.71	0.0487	14.83	0.0662	9.83	0.1221	14.51	0.2348
	13.98	0.0570	13.08	0.0796	8.28	0.1469	12.29	0.2825
	11.65	0.0716	10.79	0.1000	7.34	0.1844	10.38	0.3744
	9.36	0.0982	8.74	0.1372	6.07	0.2529		
	8.22	0.1169	7.67	0.1633	5.07	0.3252		
	6.91	0.1485	6.56	0.2075				
	5.58	0.2001	5.17	0.2885				

6. Technical Appendix

6.3.7 Weight Details Of Geared Motor And Gear Head

ADAPTOR		160-14		200-19		200-24		250-28		300-38		350-42		350-48		400-55	450-60		550-65		550-75		SISO
MOTOR FRAME		71		80		90		100/112		132		160		180		200	225		250	280			
MOTOR POWER(kW)		0.25	0.37	0.55	0.75	1.1	1.5	2.2	3.7	5.5	7.5	9.3	11	15	18.5	22	30	37	45	55	75	90	
MOTOR WEIGHT(kg)		6	7	10	11	14	17	22	32	60	74	93	97	113	160	188	270	328	362	475	653	713	
GEAR HEAD	STAGE																						
MS-01	3	67	67	69	69	69	69	71	71	80													68
	2					66	66	67	67	76	76	83	83	83	83								66
MS-01	3	73	74	79	80	83	86	93	103	140													
	2						83	89	99	136	150	176	180	196	243	271							
MS-02	3	86	86	89	89	89	89	90	90	97	97	104	104										87
	2							84	84	88	88	105	105	105	105	105	112	112					82
MS-02	3	92	93	99	100	103	106	112	122	157	171	197	201										
	2							106	116	148	162	198	202	218	265	293	382	440					
MS-03	3		111	114	114	114	114	116	116	124	124	130	130	130									118
	2								109	115	115	123	123	123	123	127	127	127					112
MS-03	3		118	124	125	128	131	138	148	184	198	223	227	243	160	188	270						
	2								141	175	189	216	220	236	283	311	397	455	489				
MS-04	3			151	151	151	151	156	156	163	163	178	178	178	178								159
	2									152	152	156	156	156	156	156	176	176	176	207	207		149
MS-04	3			161	162	165	168	178	188	223	237	271	275	291	338								
	2									212	226	249	253	269	316	344	446	504	538	682	860		
MS-05	3					197	197	200	200	209	209	217	217	217	217	217	221						211
	2									197	197	204	204	204	204	204	217	217	217	238	238	238	200
MS-05	3					211	214	222	232	269	283	310	314	330	377	405	491						
	2									257	271	297	301	317	364	392	487	545	579	713	891	951	
MS-06	3						263	268	268	279	279	290	290	290	290	290	294						285
	2										270	273	273	273	273	273	279	279	279	301	301	301	272
MS-06	3						280	290	300	339	353	383	387	403	450	478	564						
	2										344	366	370	386	433	461	549	607	641	776	954	1014	
MS-07	3						359	361	361	364	364	376	376	376	376	376	386	386	386				387
	2												360	360	360	360	365	365	365	385	385	385	370
MS-07	3						376	383	393	424	438	469	473	489	536	564	656	714	748				
	2												457	473	520	548	635	693	727	860	1038	1098	
MS-08	3							452	452	477	477	480	480	480	480	480	490	490	490	500	500		478
	2														450	450	467	467	467	483	483	483	458
MS-08	3							474	484	537	551	573	577	593	640	668	760	818	852	975	1153		
	2														610	638	737	795	829	958	1136	1196	
MS-09	3								637	641	641	649	649	649	649	649	668	668	668	680	680	680	655
	2															622	622	652	652	652	660	660	638
MS-09	3								669	701	715	742	746	762	809	837	938	996	1030	1155	1333	1393	
	2															782	810	922	980	1014	1135	1313	1373
	WEIGHT OF GEARED MOTOR (kg) = GEAR HEAD WEIGHT + MOTOR WEIGHT																						
	WEIGHT OF GEAR HEAD (kg)																						

6. Technical Appendix

6.3.8 External loads at the output shaft

Calculation

Occurring radial load

The radial load exerted through a power transmission element is derived from the following formula:

$$F_r = \frac{9550 \times P_a \times f_r}{n_2 \times r} \quad \text{or} \quad F_r = \frac{T_a \times f_r}{r}$$

whereby

Fr	=	calculated radial load (N)
Pa	=	effective output (kW)
Ta	=	output torque (Nm)
n2	=	output speed (min-1)
r	=	pitch circle radius of power transmission element (m)
fr	=	factor for the radial load
	=	1 for a sprocket (single string)
	=	1.25 for a gear wheel or sprocket (double string)
	=	1.5 for a V-belt pulley
	=	2.5 for a flat belt pulley

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Point of action of the radial load

The distance of the point of action to the shaft shoulder must be as small as possible.

The following tables provide the permissible rated external loads (F_{rN}) at four different points of action. For other points of action, the values can be determined through interpolation.

Check:

Check whether

$$F_{rN} = F_r \times SF_{min}$$

whereby

SF_{min} = required Service Factor

F_{rN} = permissible rated external load

**Permissible rated external loads F_{rN}^* (N) at the output shaft for multi-stage gear units (entire S4 family).
Point of action A_r**

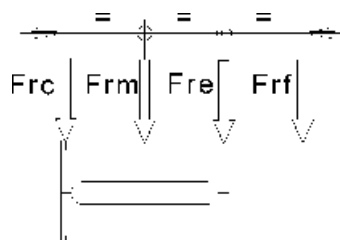
n_2	A_r	Size								
min^{-1}		MS-01	MS-02	MS-03	MS-04	MS-05	MS-06	MS-07	MS-08	MS-09
20	A_{rc}	1.29	1.29	1.29	1.31	1.37	1.33	1.35	1.33	1.30
	A_{rm}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	A_{re}	0.72	0.82	0.82	0.70	0.60	0.80	0.79	0.80	0.81
	A_{rf}	0.53	0.69	0.69	0.51	0.43	0.67	0.66	0.67	0.68
45	A_{rc}	1.29	1.29	1.29	1.35	1.46	1.33	1.35	1.33	1.30
	A_{rm}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	A_{re}	0.68	0.82	0.82	0.62	0.60	0.80	0.79	0.80	0.81
	A_{rf}	0.50	0.69	0.69	0.45	0.43	0.67	0.66	0.67	0.68
60	A_{rc}	1.29	1.29	1.29	1.31	1.54	1.33	1.35	1.33	1.30
	A_{rm}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	A_{re}	0.66	0.82	0.82	0.62	0.60	0.80	0.79	0.80	0.81
	A_{rf}	0.48	0.69	0.69	0.45	0.43	0.67	0.66	0.67	0.68
75	A_{rc}	1.29	1.29	1.29	1.38	1.63	1.33	1.35	1.33	1.30
	A_{rm}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	A_{re}	0.64	0.82	0.82	0.62	0.60	0.80	0.79	0.80	0.81
	A_{rf}	0.47	0.69	0.69	0.45	0.43	0.65	0.66	0.67	0.68
95	A_{rc}	1.31	1.29	1.29	1.50	1.61	1.33	1.35	1.33	1.30
	A_{rm}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	A_{re}	0.64	0.82	0.82	0.62	0.60	0.80	0.79	0.80	0.81
	A_{rf}	0.47	0.69	0.69	0.45	0.43	0.66	0.65	0.67	0.68
150	A_{rc}	1.29	1.29	1.29	1.51	1.57	1.33	1.35	1.33	1.30
	A_{rm}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	A_{re}	0.65	0.82	0.82	0.62	0.60	0.80	0.79	0.80	0.81
	A_{rf}	0.48	0.69	0.69	0.45	0.43	0.66	0.65	0.66	0.68
240	A_{rc}	1.29	1.29	1.29	2.45	1.51	1.33	1.35	1.33	-
	A_{rm}	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
	A_{re}	0.67	0.82	0.82	0.62	0.60	0.80	0.79	0.80	-
	A_{rf}	0.49	0.69	0.69	0.45	0.43	0.67	0.66	0.67	-

$$F_{rc} = F_{rN} \times A_{rc}$$

$$F_{rm} = F_{rN} \times A_{rm}$$

$$F_{re} = F_{rN} \times A_{re}$$

$$F_{rf} = F_{rN} \times A_{rf}$$



6. Technical Appendix

6.3.9 Installation, General Conditions

The drive units must be installed or attached free of vibration or mounted on a flat, rigid and solid frame or foundation in order to avoid vibrations.

CAUTION!

The drive units must be aligned with utmost care! Stress and strain in the housing must be avoided.

To align the gear unit, place it on 3 of the 4 mounting points and use shims to match the fourth point to an accuracy of less than 0.2 mm.

After the gear unit has been aligned correctly and after the shims have been fitted, the gear unit must be firmly screwed down to the foundation. Screw class 8.8 in accordance with DIN 267. Screw size: see dimensional drawings. The screws must be tightened to the torque requirements as specified by the manufacturer. Trouble-free lubrication and ventilation are ensured only when the gear unit is mounted in the correct position.

It is necessary to correct the amount of lubricant and the position of the breather screw if the mounting position of the gear unit is changed.

Before start-up, check the position-dependent oil level by loosening the oil level plug of the drive unit.

CAUTION!

Sizes 1 and 2 are lubricated for life. In this case, the surface temperature and the noise level emitted by the gear unit must be constantly monitored during the procedure.

Intermediate inserts or pads made of plastic must be used if there is a risk of electrochemical corrosion between the gear unit and system. Gear unit casings must be grounded.

The cooling air intake of the motor must not be obstructed.

6.3.10 Mounting power transmission elements

Observe the operating instructions provided with the power transmission elements. Use elastic couplings for direct power transmission from gear unit to driven machine, while slip couplings are required in case of a blocking risk. Only use rigid couplings in connection with unsupported or overhanging shafts (e.g. with agitators or aerators).

Due to the radial loads that occur, power transmission elements such as flat belts or V-belts, gearwheels and sprockets, cranks, eccentric cams etc. are to be arranged as close to the gear unit housing as possible. Consequently, the bearings and drive shaft are then subject to the lowest load. Refer to the technical sales documentation for the maximum permissible load values.

The protective coating on the end of the shaft must be removed by suitable means prior to mounting the transmission elements. The same procedure applies for transmitting the drive power to the gear unit in connection with a free drive shaft. Great care must be taken while fitting power transmission elements onto the ground output shaft of the gear unit, and can be carried out using the threaded hole provided for this purpose on the end face of the shaft. Preferably, the power transmission element should be heated to a temperature of approx. 100 °C. The hole is to be dimensioned in accordance with ISO H7. All parts must be thoroughly deburred, cleaned and the fit locations lightly greased. Avoid all knocks and impact to the end of the shaft.

6.3.11 Mounting coupling on output shaft

Observe the operating instructions from the coupling manufacturer. Accurate alignment and regular inspection are necessary.

The maximum permissible shaft extensions of the coupling used must be maintained and checked.

The specified distance between the coupling halves should be maintained.

Only adjust the radial offset after the angle offset and the distance between the shaft ends have been checked. Recheck the angle offset after correcting the radial offset.



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