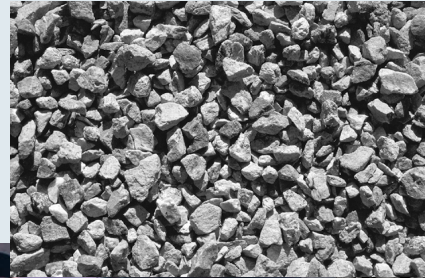


Industrial Gear Units of the ML... Series

Edition 09/2007

Catalogue



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Introduction

The SEW-EURODRIVE Group of Companies

Introduction

SEW-EURODRIVE is a leading company in the global market for electrical drive engineering. Its global presence, extensive product range and broad spectrum of services make SEW-EURODRIVE the ideal partner for the machinery and plant construction industry when it comes to providing drive systems for demanding applications.

SEW-EURODRIVE possesses many years of experience in drive engineering which it puts to good use when developing, producing and selling all its drives with components drawn from mechanical and electrical engineering and electronics.

The company headquarters are in Bruchsal, Germany. Components for SEW-EURODRIVE's modular drive system are manufactured to the highest quality standards in production plants sited in Germany, France, Finland, the USA, Brazil and China. The individual drive systems are assembled with a consistently high quality standard and very short delivery times from stocked components all over the world. SEW-EURODRIVE sales, consulting, customer and spare parts services are available in more than 50 countries around the globe.

The product range

- Gearmotors, gear units and motors
 - Helical gear units/gearmotors
 - Parallel shaft helical gear units/gearmotors
 - Helical-bevel gear units/gearmotors
 - Helical-worm gear units/gearmotors
 - Spiroplan® right-angle gearmotors
 - Planetary gearmotors
 - Industrial gear units
 - Low backlash gear units/gearmotors
 - Brakemotors
 - Drives for trolley drive systems
 - Geared torque motors
 - Pole-changing gearmotors
- Electronically controlled drives
 - MOVITRAC® frequency inverters
 - MOVIDRIVE® drive inverters
 - MOVIDYN® servo controllers
 - Technology and communications options for the inverters
 - Asynchronous AC motors and AC gearmotors
 - DC motors, brakemotors and gearmotors
 - Asynchronous and synchronous linear motors
- Components for decentralized installation
 - MOVIMOT® gearmotors with integrated frequency inverter
 - MOVI-SWITCH® gearmotors with integrated circuit breaker and protective function
 - Field distributors, fieldbus interfaces
- Industrial gear units
 - MC series: helical and bevel-helical gear units (up to 65kNm)
 - M series: helical and bevel-helical gear units (up to 180kNm)
 - ML series: helical and bevel-helical gear units (up to 1200kNm)
 - CN series: helical and bevel-helical gear units (up to 600kNm)
 - P series: planetary gear units (up to 450kNm)
 - Q series: planetary gear units (up to 1400kNm)
- Mechanical variable speed drives
 - VARIBLOC® wide V-belt variable speed gearmotors
 - VARIMOT® friction disk variable speed gearmotors
- Services
 - Technical consulting
 - Application software
 - Seminars and training courses
 - Extensive technical documentation
 - Worldwide customer service

Market Conformity

ML series

Optimised for heavy duty applications

The ML series of industrial gear units is the extension of the successful M series that exceeds even the highest demands on quality, reliability and performance. The optimised product range is made of high-quality materials, which translates into increased safety with drive applications that have been operated with conventional gear units so far or economical advantages for new applications.

“M” stands for modular and “L” stands for large and the series is based on this idea both in terms of design and economy. Customisation to the required characteristics of the drive and the machine design is made easier by simply adding options and mounting parts. The ML series is especially designed Engineered-To-Order applications where the customers' needs are important.

The design features and the wide range of options make the ML series exceptionally user-friendly. Especially important are easy mounting and installation as well as easy maintenance which is also ensured by the horizontal split housing design.

Content of the catalogue

This catalogue describes the helical and bevel-helical gear units of the ML.. series from SEW-EURODRIVE. The catalogue contains technical data, selection tables, dimension sheets and optional accessories. Please refer to the separate catalogues for further information on gear units and AC motors.

Other catalogues

- Gearmotors
- Low Backlash Planetary Gear Units
- MOVIMOT® Gearmotors
- Servo Gearmotors
- Pole-Changing Gearmotors
- Variable Speed Gearmotors
- Drives for Trolley Drive Systems
- Explosion-Proof Drives
- Geared Torque Motors
- Industrial gear units: Bucket Elevator Drives of the MC.. and M.. Series
- Industrial gear units: MC.. Series
- Industrial gear units: M.. Series
- Industrial gear units: Mixer and Agitator Drives of the MC.. Series

General Information

General Information

Nominal power, torques and input speeds	<p>The nominal power and torques mentioned in the catalogue depend on the input speed and are valid for a service factor of $F_S = 1.0$ and a constant, unidirectional load. If the direction of rotation changes once per minute under full load, then only 70% of these values apply.</p> <p>The overview shows nominal powers and torques for input speeds of 1800 rpm, 1500 rpm, 1200 rpm and 1000 rpm. The nominal torque is also valid for input speeds 3% lower than synchronous speeds. For input speeds exceeding 1800 rpm, contact SEW-EURODRIVE.</p>
Thermal rating	<p>The thermal rating needs to be checked for every gear unit. The relevant values are listed in the selection tables in section 3.</p>
Surface and corrosion protection	<p>If required, all gear units can be supplied with a special surface and corrosion protection for applications in extremely humid and/or chemically aggressive environments.</p>
Weights	<p>Note that all weights shown in the catalogue exclude the oil fill for the gear units. You will find the recommended values for oil quantities depending on the gear design and size.</p>
Supply of cooling air	<p>For gear units with cooling fans on the input shaft, it is important that there is enough space in axial and radial direction for a sufficient supply of cooling air.</p>
International markets	<p>SEW-EURODRIVE's gear units conform to ISO and DIN specifications. SEW-EURODRIVE is a member of the AGMA (American Gear Manufacturers' Association), and as such, all its gear units also conform to AGMA specifications.</p>
Steel frame	<p>SEW-EURODRIVE supplies preassembled drive packages on a steel frame (swing base or base frame).</p>
Sealing system	<p>Industrial gear units can be supplied with different seal arrangements for HSS and LSS.</p> <ul style="list-style-type: none">• Lip seal (standard)• Double lip seal with grease nipple• Radial labyrinth seal with grease nipple• Contactless seal
Lubrication	<p>The lubrication types "splash lubrication" or "bath lubrication" are used depending on the gear unit type and design. Pressure lubrication can be used as option for the gear unit. Pressure lubrication is highly recommended when the mechanical power rating P_{K1} is higher than 500 kW.</p>
Modular accessories	<p>Several optional accessories are available for industrial gear units.</p> <ul style="list-style-type: none">• Cooling fan: A cooling fan is used when the thermal rating of the gear unit is insufficient. Radial fan is bi-directional and axial fan is unidirectional.• Shrink disc: A shrink disc is available for all sizes of ML hollow shaft gear units.• Motor adapter with fan: For mounting IEC (B5) or NEMA C-face motors with integrated cooling fan.• Backstop: Gear unit with integrated backstop to prevent undesirable reverse rotation.• Motor bracket: Motor mounting platform for belt driven input.• V-belt drive: Belt driven input. Includes motor bracket, pulleys, V-belt and belt guard.• High speed shaft (HSS) elastic coupling: Preselected HSS couplings are available for mounting to the input motor. Coupling selection depends on motor power and gear unit size.• Low speed shaft (LSS) gear coupling: Preselected LSS gear coupling based on the nominal gear unit torque and output shaft diameter. Couplings are available for vertical and horizontal applications.• HSS and LSS coupling guard: Coupling guard for HSS and LSS. Directly attached to gear unit.• Torque arm: Torque arm for shaft mounted gear units. The torque arm can be mounted to absorb tension or compression.• Pressure lubrication with cooler: A pressure lubrication system with cooler is used when the thermal rating of the basic gear unit is not sufficient. A cooler is used in operating environments where a fan cannot be used or is not sufficient.• Oil drain valve: A ball valve is mounted to the drain plug to allow for easily attaching a drain pipe to the valve when changing the gear unit oil.

General Information

- **Oil heater:**
The oil heating system ensures that the oil is in a suitable viscosity range when starting up the gear unit in cold environments.
- **Sealing systems:**
Optional oil sealing methods are available to protect the gear unit from harsh contaminants in the operating environment.
- **Temperature sensor PT100:**
The PT100 temperature sensor can be used for measuring the oil bath or bearings temperature in the gear unit.
- **SPM adapter (shock pulse adapter):**
Adapters are installed on the gear unit housing for monitoring the vibration at various points on the gear unit.

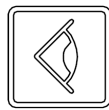
Drive packages

SEW-EURODRIVE can supply ready assembled drive packages consisting of different components, such as gear unit, motor, input and output coupling, brake, etc.

Please consult SEW-EURODRIVE.

General Information

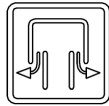
Definition of Icons used in Dimensional Drawings



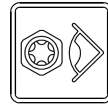
Visual inspection cover



Oil drainage



Breather plug



Oil sight glass

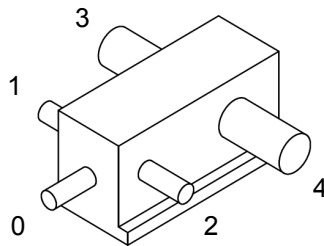


Oil filler



Lifting attachment

Shaft Positions



Gear Unit Type Definition

ML 3 R S F 120

Size: 100 ... 160¹⁾

Gear unit mounting:

F = Foot mounted

T = Torque arm

Low speed shaft type (LSS):

S = Solid shaft

H = Hollow shaft (key or shrink disc connection)

Gear unit type:

P = Helical gear unit (parallel shaft)

R = Bevel-helical gear unit (right angle shaft)

Number of gear stages:

2 = Two stages²⁾

3 = Three stages

4 = Four stages

5 = Five stages³⁾

Industrial gear unit series: ML

1) Please contact SEW-EURODRIVE for sizes 150 & 160

2) For helical gear units only

3) For bevel helical gear units only

Project Planning Procedure

The following flow chart schematically shows the procedure for the project planning of an industrial gear unit.

Drive selection data

- Machine on LSS and ambient conditions
- Load characteristics
- Machine on HSS
- Gear unit requirement:
 - Type and design
 - Service factor
 - Mounting and connection to machine on LSS
 - Loads on LSS and HSS



Gear unit selection*

- Calculate gear ratio: $i = \frac{n_1}{n_2}$
- Calculate input power: $P_{K1} = \frac{M_{K2} \times n_2}{9.550 \times \eta}$
- Specify gear unit size and reduction ratio:
 - For one direction of rotation under load: $P_{N1} \geq P_{K1} \times F_S$
 - For two direction of rotation under load (reversing): $P_{N1} \geq P_{K1} \times F_S \times 1.43$ or $P_{N1,rev} \geq P_{K1} \times F_S$ where $P_{N1,rev} = P_{N1} \times 0.7$
- Calculate permitted peak load: $P_{K1\ zul} = \frac{2 \times P_{N1}}{F_F}$ or $M_{K2\ zul} = \frac{2 \times M_{N2}}{F_F}$
- Check peak load: $P_{K1\ max} \leq P_{K1\ zul}$ or $M_{K2\ max} \leq M_{K2\ zul}$
- Calculate thermal rating: $P_T = P_{TH} \times f_1 \times f_2 \times f_3 \times f_4 \times f_L \times f_T \rightarrow$ page 2.07
- Check thermal rating: $P_{K1} \leq P_T$, otherwise external cooling is required
- Check the occurring external radial and axial shaft loads:
 - Allowed radial force: $F_R = \frac{F_{RN}}{F_S} \times K_Y \rightarrow$ page 3.14
 - For other loads, please consult SEW-EURODRIVE



Select connection to the motor (if required)



Select alternative sealing systems (if required) → page 5.09



Select cooling and pressure lubrication components (if required) → page 5.05



Select monitoring functions and instrumentation (if required) → page 5.09



Check whether all defined requirements are met

* Please refer to **Abbreviations Used** under Appendix in Section 6

General Information

Project Planning for Gear Units

Efficiency of gear units

The efficiency of the gear unit is mainly determined by the gearing and bearing friction. Note that the starting efficiency of a gear unit is always less than its efficiency at operating speed.

The efficiency of ML.. helical and bevel-helical gear units varies depending on the number of gear stages.

Based on nominal power, the efficiency η is roughly:

- ML2P: 0.97
- ML3P / ML3R: 0.955
- ML4P / ML4R: 0.94
- ML5R: 0.93

Service factor F_s

The service factor takes into account the load impacts generated by the driving motor and the driven machine.

Recommended values in respect to

- field of application
 - driven machine
 - operating period / day
- are given in the following table.

These tables are valid for **electric motors** used as driving machine.

For other types of driving machines, the following correction values apply:

- Combustion engines with four or more cylinders: F_s (selection table) + 0.25
- Combustion engines with one or three cylinders: F_s (selection table) + 0.5

Field of application/industry	Driven machine	Service factor operating period / day		
		< 3 h	3-10 h	> 10 h
Agitators and mixers	Agitators for liquids	1.00	1.25	1.50
	Agitators for liquids (variable density)	1.20	1.50	1.65
	Agitators for solids (non-uniform material)	1.40	1.60	1.70
	Agitators for solids (uniform material)	-	1.35	1.40
	Concrete mixers	-	1.50	1.50
Cableways	Material ropeways	-	1.40	1.50
	Aerial tramways	1) ¹⁾	1) ¹⁾	1) ¹⁾
	Surface lifts	1) ¹⁾	1) ¹⁾	1) ¹⁾
	Continuous aerial tramways	1) ¹⁾	1) ¹⁾	1) ¹⁾
	Funicular railway	1) ¹⁾	1) ¹⁾	1) ¹⁾
Conveyors	Bucket elevators	-	1.40	1.50
	Hoists - other	-	1.50	1.80
	Belt conveyors ≤ 100 kW	1.15	1.25	1.40
	Belt conveyors > 100 kW	1.15	1.30	1.50
	Apron feeders	-	1.25	1.50
	Screw feeders	1.15	1.25	1.50
	Shakers, reciprocating	1.55	1.75	2.00
	Escalators	1.55	1.25	1.50
	Passenger lifts	1) ¹⁾	1) ¹⁾	1) ¹⁾
Compressors	Reciprocating	-	1.80	1.90
	Centrifugal compressor	-	1.40	1.50
	Screw-type	-	1.50	1.75
Cranes and hoists	Cranes and hoists	2) ²⁾	2) ²⁾	2) ²⁾
Energy	Frequency converters	-	1.80	2.00
	Water wheels (low speed)	-	-	1.70
	Water turbines	-	-	1) ¹⁾
Fans	Heat exchangers	1.50	1.50	1.50
	Dry cooling towers	-	-	2.00
	Wet cooling towers	2.00	2.00	2.00
	Blowers (axial and radial)	1.50	1.50	1.50
Food industry	Crushers and mills	-	-	1.75
	Beet slicer	-	1.25	1.50
	Drying Drums	-	1.25	1.50

1) Contact SEW-EURODRIVE

2) Contact SEW-EURODRIVE; dimensioning according to FEM1001

General Information

Project Planning for Gear Units

Field of application/industry	Driven machine	Service factor operating period /day		
		< 3 h	3-10 h	> 10 h
Metal mills	Winders	-	1.60	1.75
	Slitters	1.55	1.75	2.00
	Table conveyors, individual drives	1) ¹⁾	1) ¹⁾	1) ¹⁾
	Table conveyors, group drives	1) ¹⁾	1) ¹⁾	1) ¹⁾
	Table conveyors, reversing	1) ¹⁾	1) ¹⁾	1) ¹⁾
	Wire drawing machines	1.35	1.50	1.75
	Flattening machines	1) ¹⁾	1) ¹⁾	1) ¹⁾
Mills and drums	Dryers and coolers	-	1.50	1.60
	Kilns	-	-	2.00
	Ball mills	-	-	2.00
	Coal mills	-	1.50	1.75
Pumps	Centrifugal pumps	1.15	1.35	1.45
	Reciprocating (single-cylinder)	1.35	1.50	1.80
	Reciprocating (multi-cylinder)	1.20	1.40	1.50
	Spiral pumps	-	1.25	1.50
	Rotary (gear type, vane)	-	-	1.25
Lumber industry	Lumber industry	1) ¹⁾	1) ¹⁾	1) ¹⁾
Mining industry	Crushers	1.55	1.75	2.00
	Screens and shakers	1.55	1.75	2.00
	Slewing drives	-	1.55	1.80
	Dredgers	1) ¹⁾	1) ¹⁾	1) ¹⁾
Pulp and paper industry	Debarking Drums and Barkers	1.55	1.80	2.00
	Rolls (pick-up, wire drive, wire suction)	-	1.80	2.00
	Dryer cylinders (anti-friction bearings)	-	1.80	2.00
	Calenders (anti-friction bearings)	-	1.80	2.00
	Filters (pressure vacuum)	-	1.80	2.00
	Beaters and chippers	1.55	1.75	2.00
	Jordan mills	-	1.50	1.75
	Presses (bark, felt, size, suction)	-	-	1.75
	Reels	-	-	1.75
	Pulpers	1) ¹⁾	1) ¹⁾	1) ¹⁾
	Washer filters	-	-	1.50
	Yankee cylinders (dryers)	1) ¹⁾	1) ¹⁾	1) ¹⁾
Rubber and plastic industry	Extruders (plastic)	-	1.40	1.60
	Extruders (rubber)	-	1.50	1.80
	Rubber mills (2 in a row)	1.55	1.75	2.00
	Rubber mills (3 in a row)	-	1.50	1.75
	Warming mills	1.35	1.50	1.75
	Calenders	-	1.65	1.65
	Grinders	1.55	1.75	2.00
	Mixing mills	1) ¹⁾	1) ¹⁾	1) ¹⁾
	Sheeters	1.55	1.75	2.00
	Refiners	1.55	1.75	2.00
	Tubers	1) ¹⁾	1) ¹⁾	1) ¹⁾
Waste water treatment	Impeller areator	-	1.80	2.00
	Thickeners	1.15	1.25	1.50
	Vacuum filters	1.15	1.30	1.50
	Collectors	1.15	1.25	1.50
	Screw pump	-	1.30	1.50
	Brush areators	-	-	2.00

1) Contact SEW-EURODRIVE

General Information

Project Planning for Gear Units

Peak Factor F_F

The peak factor F_F takes into account how often peak loads occur. The permitted peak load depends on the frequency per hour and is calculated according to the following formula:

1. Based on torque

$$M_{K2\ zul} = \frac{2 \times M_{N2}}{F_F}$$

$M_{K2\ zul}$ = permitted peak torque at the gear unit output
 M_{N2} = gear unit nominal torque
 F_F = peak factor according to the following table

2. Based on power

$$P_{K1\ zul} = \frac{2 \times P_{N1}}{F_F}$$

$P_{K1\ zul}$ = permitted peak power at the gear unit input
 P_{N1} = gear unit nominal power
 F_F = peak factor according to the following table

Peak factor F_F	Frequency of peak load per hour					
	1 ... 5	6 ... 20	21 ... 40	41 ... 80	81 ... 160	> 160
	1.00	1.20	1.30	1.50	1.75	2.00

The gear units may only be overloaded for a short period of time. Individual peak loads must not last for more than ten seconds.

Thermal rating P_T

Thermal rating P_T is the actual power rating the gear unit can transmit continuously without exceeding the calculated oil temperature of:

90°C (2 & 3 stage gear units)
 80°C (4 stage gear units)
 70°C (5 stage gear units)

$$P_T = P_{TH} \times f_1 \times f_2 \times f_3 \times f_4 \times f_5 \times f_L \times f_T$$

P_T = actual thermal rating
 P_{TH} = gear unit thermal rating (page 3.08)
 f_1 = altitude factor (table 2.01)
 f_2 = mounting option factor (table 2.02)
 f_3 = installation location factor (table 2.03)
 f_4 = operating cycle factor (table 2.04)
 f_5 = cooling fan factor (table 2.05)
 f_L = lubrication factor (table 2.06)
 f_T = ambient temperature factor (table 2.07)

Table 2.01 Altitude factor

	Altitude (metres above sea level)				
	0	1000	2000	3000	4000
f_1	1.0	0.95	0.91	0.87	0.83

Table 2.02 Mounting option factor

	Mounting type	
	Shaft mounted with torque arm	All other mounting options
f_2	1.07	1.00

Table 2.03 Installation location factor

	Installation location		
	Open area. Air flow $\geq 3.7\text{m/s}$	Large premises, eg workshop. Air flow $\geq 1.4\text{m/s}$	Small confined spaces. Air flow $\geq 0.5\text{m/s}$
f_3	1.0	0.75	0.53

Table 2.04 Operating cycle factor

	Time under load per hour in %				
	100	80	60	40	20
f_4	1.0	1.06	1.16	1.35	1.78

Table 2.05 Cooling fan factor (if required)

	Radial fan	Fan type			
		Axial fan, n_1 [rpm]			
		1000	1200	1500	1800
f_5	1.0	1.3	1.4	1.5	1.5

Table 2.06 Lubrication factor

	Type of lubrication	
	Pressure	Bath or splash
f_L	1.1	1.0

Table 2.07 Ambient temperature factor

	Ambient air temperature [°C]				
	10	20	30	40	50
f_T	1.32	1.18	1.0	0.79	0.60

Note that the above thermal rating calculation is meant as a quick estimate. For detail calculation, please consult SEW-EURODRIVE

Project Planning Example: Steel mill conveyor drive

Technical data and application conditions of conveyor drive gear units

- Foot-mounted bevel helical gear unit with hollow shaft (key connection)
- Output speed $n_2 = 35$ rpm
- Output torque $M_{K2} = 130$ kNm
- Maximum output torque $M_{K2 \max} = 300$ kNm
- Maximum input power $P_{K1 \max} = 1151$ kW
- Operating time: on average 40% per hour, 16 hours per day
- The gear unit is to be started up once per hour (frequency of maximum output torque)
- The gear unit is to be used in a large hall under very dusty and abrasive environment, and an ambient temperature of 40°C
- Installation at sea level.
- Min service factor $F_S = 1.5$

Technical data of AC motors

- Input speed $n_1 = 1500$ rpm
- Motor power $P_m = 700$ kW

Step 1: Calculating the gear ratio

Calculate the gear unit reduction ratio i using the following formula:

$$i = \frac{n_1}{n_2} = \frac{1500 \text{ rpm}}{35 \text{ rpm}} = 42.86$$

i = ratio
 n_1 = input speed
 n_2 = required output speed

This value is used to specify the nominal gear ratio $i_N = 45$

From Section 3, the bevel helical gear unit that has ratio 45 is ML3RHF...

Step 2: Calculating the operating power

The input power P_{K1} of the drive is calculated as follows using the output torque M_{K2} or output power P_{K2} as well as output speed n_2 and efficiency η :

$$P_{K1} = \frac{M_{K2} \times n_2}{9.550 \times \eta} = \frac{130 \text{ kNm} \times 35 \text{ rpm}}{9.550 \times 0.955} = 498.9 \text{ kW}$$

P_{K1} = input power [kW]
 M_{K2} = output torque [kNm]
 η = efficiency

(where $\eta = 0.955$ for three-stage gear units)

Step 3: Specifying gear unit size and gear unit reduction ratio

The required nominal power of the gear unit P_{N1} is calculated using input power P_{K1} and service factor $F_S = 1.5$ using the following formula:

$$P_{N1} \geq P_{K1} \times F_S$$

$$P_{K1} \times F_S = 498.9 \text{ kW} \times 1.5 = 748.35 \text{ kW}$$

This value is used to select the gear unit size ML3RHF120 from the selection tables in page 3.02.

The selection of the gear unit provides the following technical data:

- Nominal power $P_{N1} = 916$ kW
- Exact gear ratio $i_{ex} = 44.62$
- Nominal gear unit torque $M_{N2} = \frac{P_{N1} \times 9.550 \times \eta}{n_2} = \frac{916 \text{ kW} \times 9.550 \times 0.955}{1500 / 44.62} = 248.5 \text{ kNm}$
- Thermal rating $P_{TH} = 365$ kW

General Information

Project Planning Example: Steel mill conveyor drive

Step 4: Calculating the permitted peak load

The permitted peak power $P_{K1\ ZUL}$ is calculated using nominal power P_{N1} and peak factor F_F :

$$P_{K1\ ZUL} = \frac{2 \times P_{N1}}{F_F} = \frac{2 \times 916\text{ kW}}{1.0} = 1832\text{ kW}$$

$P_{K1\ ZUL}$ = permitted peak power on gear unit input [kW]
 P_{N1} = nominal power [kW]
 F_F = peak factor

The permitted peak torque $M_{K2\ ZUL}$ is calculated using nominal torque M_{N2} and peak factor F_F :

$$M_{K2\ ZUL} = \frac{2 \times M_{N2}}{F_F} = \frac{2 \times 248.5\text{ kNm}}{1.0} = 497\text{ kNm}$$

$M_{K2\ ZUL}$ = permitted peak torque on gear unit output [kNm]
 M_{N2} = nominal gear unit torque [kNm]
 F_F = peak factor

Step 5: Checking the peak load

The maximum operating power $P_{K1\ max}$ must not exceed the permitted peak power $P_{K1\ ZUL}$!

$$P_{K1\ max} \leq P_{K1\ ZUL}$$

$$1151\text{ kW} \leq 1832\text{ kW}$$

or

The maximum output torque $M_{K2\ max}$ must not exceed the permitted peak torque $M_{K2\ ZUL}$!

$$M_{K2\ max} \leq M_{K2\ ZUL}$$

$$300\text{ kNm} \leq 497\text{ kNm}$$

Step 6: Calculating the thermal rating

$$P_T = P_{TH} \times f_1 \times f_2 \times f_3 \times f_4 \times f_L \times f_T = 365\text{ kW} \times 1.0 \times 1.0 \times 0.75 \times 1.35 \times 1.0 \times 0.79 = 292\text{ kW}$$

P_T = actual thermal rating
 P_{TH} = gear unit thermal rating
 f_1 = altitude factor
 f_2 = mounting option factor
 f_3 = installation location factor
 f_4 = operating cycle factor
 f_L = lubrication factor
 f_T = ambient temperature factor

Higher thermal ratings are possible when using synthetic lubricants and special seals. Please contact SEW-EURODRIVE in such cases.

Step 7: Checking the thermal rating

The input power P_{K1} must not exceed the thermal rating P_T ($P_{K1} \leq P_T$).
Additional cooling is required if $P_{K1} > P_T$

$$498.9\text{ kW} > 292\text{ kW}$$

→ Thermal rating not sufficient at 40°C

with one radial fan:

$$P_T = P_{TH} \times f_1 \times f_2 \times f_3 \times f_4 \times f_5 \times f_L \times f_T = 679\text{ kW} \times 1.0 \times 1.0 \times 0.75 \times 1.35 \times 1.0 \times 1.0 \times 0.79 = 543.1\text{ kW}$$

$$498.9\text{ kW} < 543.1\text{ kW}$$

→ Thermal rating is sufficient with one radial fan

Conclusion

- Gear unit type: ML3RHF120
- Exact ratio: 44.62
- Final output speed: 33.62 rpm
- Final $F_s = P_{N1}/P_{K1} = 916/498.9 = 1.84$
- with one radial cooling fan
- with radial labyrinth seal with grease nipple (for dusty environment with highly abrasive particles, please refer to page 5.09)

Nominal Mechanical Power Ratings

Helical Gear Units

Size ML2P..	n ₁ [rpm]	Nominal Mechanical Power Ratings P _{N1} [kW]										
		Nominal Ratio i _N										
		5.6	6.3	7.1	8	9	10	11.2	12.5	14	16	18
100	1800	4019	3758	3496	3232	2968	2703	2703	2437	2327	1995	1764
	1500	3538	3308	3077	2845	2612	2379	2379	2145	1953	1662	1479
	1200	3026	2829	2632	2433	2151	2035	2035	1805	1577	1330	1183
	1000	2663	2490	2316	2142	1806	1791	1748	1515	1324	1108	986
110	1800	6027	5625	5223	4821	4061	3671	3244	3011	2733	2414	2034
	1500	5337	4981	4625	4160	3417	3082	2723	2528	2294	2026	1708
	1200	4587	4162	3760	3366	2763	2488	2198	2041	1852	1636	1379
	1000	3852	3494	3157	2828	2321	2088	1846	1713	1555	1374	1152
120	1800	-	-	-	-	-	-	-	-	-	-	-
	1500	6586	6147	5489	5049	4610	4401	4078	3305	2892	2751	2515
	1200	5676	5298	4730	4351	3760	3552	3291	2670	2335	2221	2030
	1000	5026	4691	4188	3853	3158	2982	2763	2242	1960	1865	1705
130	1800	-	-	-	-	-	-	-	-	-	-	-
	1500	9023	8422	7820	7218	6617	5813	4664	4601	4041	3960	3347
	1200	7776	7257	6739	6221	5702	4701	3770	3719	3265	3197	2702
	1000	6886	6427	5968	5445	4802	3949	3165	3123	2742	2685	2269
140	1800	-	-	-	-	-	-	-	-	-	-	-
	1500	-	-	-	-	-	-	-	-	-	-	-
	1200	9657	9034	8100	7476	6853	6230	5781	5064	4673	4492	4039
	1000	8552	8000	7173	6621	6069	5374	4856	4252	3923	3770	3390

Size ML3P..	n ₁ [rpm]	Nominal Mechanical Power Ratings P _{N1} [kW]												
		Nominal Ratio i _N												
		20	22.5	25	28	31.5	35.5	40	45	50	56	63	71	80
100	1800	1457	1365	1275	1117	854	854	785	683	609	472	467	407	388
	1500	1283	1201	1097	930	752	740	654	574	507	415	389	346	327
	1200	1036	971	876	743	643	592	523	464	406	352	311	280	265
	1000	871	809	730	619	542	493	436	390	338	295	260	236	223
110	1800	2140	1947	1495	1442	1330	1232	1096	970	766	723	674	595	532
	1500	1797	1635	1316	1269	1171	1084	912	806	674	637	562	500	448
	1200	1452	1321	1125	1085	977	871	728	644	577	531	450	405	362
	1000	1219	1110	956	922	814	726	605	536	481	443	375	341	305
120	1800	2723	2578	2406	2226	1661	1543	1462	1360	1197	924	855	751	675
	1500	2397	2269	2069	1852	1462	1358	1218	1132	997	813	719	632	568
	1200	1965	1821	1654	1480	1237	1154	974	905	797	696	582	511	460
	1000	1638	1517	1377	1233	1028	962	811	754	665	612	489	430	387
130	1800	3874	3630	3246	2446	2404	2241	2034	1830	1621	1396	1246	1102	976
	1500	3410	3140	2701	2153	2115	1939	1696	1524	1350	1163	1038	927	820
	1200	2759	2508	2158	1841	1713	1550	1356	1218	1080	930	830	750	664
	1000	2296	2088	1797	1616	1426	1291	1129	1015	900	775	692	631	559
140	1800	-	-	-	-	-	-	-	-	-	-	-	-	-
	1500	4610	4141	3869	3639	3255	2521	2425	2218	1956	1671	1478	1300	1206
	1200	3944	3516	3174	2915	2600	2157	1992	1773	1563	1336	1182	1040	976
	1000	3470	2927	2642	2427	2165	1894	1659	1477	1302	1113	986	867	821

Power ratings: The ratings are nominal, Service Factor F_S = 1.0

Lubrication: Pressure lubrication is highly recommended when the mechanical power rating P_{K1} is higher than 500 kW

Cooling: Additional cooling is required, when the running power rating P_{K1} is higher than the thermal rating P_T

Check the maximum allowed rotational speed on page 3.06 & 3.07

Check the thermal ratings on page 3.08 & 3.09

Technical Data

Nominal Mechanical Power Ratings

Helical Gear Units

Size ML4P..	n ₁ [rpm]	Nominal Mechanical Power Ratings P _{N1} [kW]													
		Nominal Ratio i _N													
		71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	1800	483	369	331	310	283	261	233	210	186	166	146	130	121	96
	1500	407	325	291	272	249	222	201	177	156	139	123	109	102	81
	1200	329	278	249	233	209	186	168	143	126	113	99	88	82	65
	1000	277	238	219	201	175	160	142	120	106	95	83	74	69	55
110	1800	547	509	469	435	402	381	322	308	264	237	213	200	173	153
	1500	481	448	413	381	341	325	270	259	228	202	179	168	145	128
	1200	412	383	345	311	285	272	218	209	186	163	145	136	117	104
	1000	359	329	298	261	245	232	183	176	156	137	121	114	98	87
120	1800	858	770	695	580	556	514	473	396	360	337	305	270	254	223
	1500	755	678	583	510	489	453	398	333	311	291	259	227	214	188
	1200	646	555	471	436	406	380	321	269	260	236	209	183	173	152
	1000	544	467	395	364	338	319	269	226	224	198	176	154	145	127
130	1800	1163	905	840	780	764	685	612	558	502	454	427	383	352	295
	1500	969	797	739	686	650	583	530	482	434	392	369	330	302	248
	1200	775	681	631	587	544	488	443	403	363	328	306	269	244	200
	1000	646	584	525	496	470	422	383	348	312	277	257	226	205	169
140	1800	1659	1510	1355	1120	1035	943	850	770	697	633	570	542	478	423
	1500	1403	1270	1140	986	911	830	734	666	603	547	486	458	402	356
	1200	1135	1027	927	843	773	681	615	558	504	445	393	370	325	287
	1000	955	876	786	718	644	572	532	482	436	374	330	311	273	242

Bevel Helical Gear Units

Size ML3R..	n ₁ [rpm]	Nominal Mechanical Power Ratings P _{N1} [kW]														
		Nominal Ratio i _N														
		14	16	18	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71
100	1800	1822	1664	1470	1415	1274	1159	1086	845	780	663	592	495	451	383	331
	1500	1604	1465	1294	1197	1070	974	913	721	650	558	498	412	376	322	279
	1200	1372	1196	1107	967	865	787	738	582	520	452	402	330	301	260	227
	1000	1200	1010	931	813	727	662	620	488	433	377	338	275	250	219	191
110	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1500	2337	2052	1760	1676	1509	1373	1164	1018	758	667	703	549	496	391	372
	1200	1961	1670	1505	1353	1217	1109	936	814	607	534	562	439	397	318	298
	1000	1646	1408	1287	1136	1020	932	780	679	505	445	468	366	331	268	248
120	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1500	3081	2687	2290	2259	1860	1758	1534	1350	1200	1053	916	867	743	631	544
	1200	2552	2199	1959	1823	1591	1480	1312	1080	974	843	741	701	594	510	440
	1000	2162	1858	1724	1531	1355	1243	1111	900	820	702	618	589	495	429	370
130	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1500	3714	3439	3141	3141	2801	2399	2386	1740	1712	1371	1371	1247	1082	957	823
	1200	3114	2825	2641	2641	2396	1984	1906	1499	1366	1182	1162	1059	865	777	662
	1000	2641	2390	2201	2201	2002	1662	1587	1301	1136	1014	968	882	721	654	551
140	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1200	3949	3833	3390	3246	3160	2680	2646	2054	1926	1657	1515	1345	1200	1057	918
	1000	3377	3250	2862	2723	2654	2247	2222	1817	1616	1381	1263	1130	1009	881	765

Power ratings: The ratings are nominal. Service Factor F_S = 1.0

Lubrication: Pressure lubrication is highly recommended when the mechanical power rating P_{N1} is higher than 500 kW

Cooling: Additional cooling is required, when the running power rating P_{N1} is higher than the thermal rating P_T

Check the maximum allowed rotational speed on page 3.06 & 3.07

Check the thermal ratings on page 3.10 & 3.11

Nominal Mechanical Power Ratings

Bevel Helical Gear Units

Size ML4R..	n ₁ [rpm]	Nominal Mechanical Power Ratings P _{N1} [kW]													
		Nominal Ratio i _N													
		63	71	80	90	100	112	125	140	160	180	200	225	250	280
100	1800	464	451	403	367	310	276	243	231	203	188	167	140	139	114
	1500	409	379	339	309	273	243	214	194	176	162	144	117	117	96
	1200	347	307	275	250	221	199	175	157	147	134	117	96	95	78
	1000	292	258	232	214	185	167	147	132	124	113	97	80	80	65
110	1800	582	582	537	509	417	359	333	294	274	252	230	209	188	133
	1500	512	502	451	428	367	316	281	252	237	218	198	180	160	113
	1200	438	402	365	346	300	270	235	211	198	182	165	147	129	92
	1000	385	335	309	291	259	238	203	182	171	157	137	123	108	77
120	1800	922	873	697	673	575	535	472	443	357	338	303	273	224	226
	1500	777	734	614	565	506	450	400	379	309	292	262	235	189	190
	1200	628	594	525	455	433	372	335	317	259	244	215	197	154	154
	1000	529	500	446	382	378	322	289	274	223	209	179	170	130	130
130	1800	1350	1000	1000	900	822	724	678	612	546	502	455	391	353	333
	1500	1125	880	880	792	692	609	575	528	472	434	393	338	305	285
	1200	900	753	725	662	566	509	481	442	395	357	314	282	255	230
	1000	750	656	616	558	490	440	416	382	333	300	262	244	219	194
140	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1500	1530	1327	1251	1035	990	872	821	754	651	597	537	492	399	341
	1200	1237	1074	1012	885	807	726	688	632	543	490	434	412	323	276
	1000	1041	903	852	772	698	628	595	546	456	412	364	356	271	232

Size ML5R..	n ₁ [rpm]	Nominal Mechanical Power Ratings P _{N1} [kW]													
		Nominal Ratio i _N													
		280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250
100	1800	119	119	106	94	83	80	72	66	61	51	45	39	36	31
	1500	105	99	88	78	69	68	60	56	51	42	37	32	30	26
	1200	86	79	71	63	55	54	48	45	41	34	30	26	24	21
	1000	72	66	59	52	46	45	40	37	34	28	25	21	20	17
110	1800	175	168	142	130	126	108	101	88	73	64	60	52	46	41
	1500	152	145	125	108	106	90	84	74	61	53	50	43	39	34
	1200	124	121	102	87	85	72	67	59	49	42	40	35	31	27
	1000	104	101	85	73	71	60	56	49	41	35	33	29	26	22
120	1800	252	234	210	179	165	142	132	117	119	97	87	76	67	63
	1500	210	195	175	150	141	119	111	98	99	81	73	63	56	52
	1200	168	156	141	120	113	96	89	79	79	65	59	50	44	42
	1000	140	130	117	100	94	80	75	66	66	55	49	42	37	35
130	1800	333	308	277	262	205	213	184	161	142	126	115	112	95	85
	1500	283	257	232	223	176	178	154	134	120	105	96	94	79	71
	1200	226	205	187	178	146	142	123	107	97	84	76	75	63	57
	1000	189	171	156	149	126	118	103	89	81	70	64	62	52	48
140	1800	489	449	406	371	335	299	281	232	213	186	160	150	127	125
	1500	422	387	351	319	282	250	234	194	178	155	133	125	106	104
	1200	353	322	286	255	226	200	187	155	142	124	106	100	84	83
	1000	300	269	238	212	188	167	156	129	119	104	88	83	70	69

Power ratings: The ratings are nominal, Service Factor F_S = 1.0

Lubrication: Pressure lubrication is highly recommended when the mechanical power rating P_{K1} is higher than 500 kW

Cooling: Additional cooling is required, when the running power rating P_{K1} is higher than the thermal rating P_T

Check the maximum allowed rotational speed on page 3.06 & 3.07

Check the thermal ratings on page 3.12 & 3.13

Technical Data

Exact Ratios

Helical Gear Units

Size ML2P..	Exact Ratios i_{ex}										
	Nominal Ratio i_N										
	5.6	6.3	7.1	8	9	10	11.2	12.5	14	16	18
100	5.7000	6.3214	7.0385	7.8750	8.8636	10.050	10.755	12.307	13.719	15.634	17.517
110	5.6933	6.3179	7.0385	7.8792	8.8727	10.023	11.413	12.342	13.650	15.556	17.938
120	5.4133	6.0071	7.0760	7.9435	8.9762	10.159	11.000	12.593	13.684	15.748	17.833
130	5.7000	6.3214	7.0385	7.8750	8.8636	10.050	11.500	12.352	13.268	15.232	18.039
140	5.5161	6.1034	7.1538	8.0000	9.0000	10.200	10.895	12.747	13.456	15.490	17.778

Size ML3P..	Exact Ratios i_{ex}												
	Nominal Ratio i_N												
	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71	80
100	19.795	21.843	24.205	28.518	32.335	34.604	39.171	44.238	50.524	54.271	63.114	71.703	76.070
110	20.099	21.865	25.553	26.988	30.614	34.313	39.280	44.361	49.959	54.104	61.444	69.222	77.875
120	20.364	22.185	24.634	27.510	31.335	35.327	40.525	43.572	49.394	53.675	62.024	71.054	79.617
130	20.301	22.312	25.909	28.807	32.663	36.089	41.295	44.354	50.025	57.960	62.428	69.197	78.699
140	19.452	22.821	25.269	27.750	31.091	35.236	38.499	43.646	49.494	56.017	63.323	71.988	76.962

Size ML4P..	Exact Ratios i_{ex}													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	69.028	76.486	90.116	99.192	111.80	126.65	143.03	162.88	174.45	196.64	224.16	255.07	273.49	311.67
110	71.746	79.855	90.351	101.26	114.87	121.65	144.62	154.54	177.13	203.53	230.65	246.47	277.67	311.30
120	68.350	80.189	88.646	100.56	108.12	121.18	136.81	156.61	180.01	195.62	221.90	254.37	271.14	310.62
130	70.338	78.136	87.289	102.40	116.11	124.71	140.66	158.22	181.04	205.37	221.51	253.92	281.45	322.59
140	71.944	79.920	89.542	100.61	112.72	127.50	139.31	157.32	178.73	202.04	230.32	245.55	281.44	319.95

Bevel Helical Gear Units

Size ML3R..	Exact Ratios i_{ex}														
	Nominal Ratio i_N														
	14	16	18	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71
100	13.561	15.155	17.328	19.861	22.344	24.655	26.407	30.180	34.325	38.226	43.775	49.021	54.565	61.929	70.429
110	13.578	15.174	17.499	20.032	21.916	24.655	28.000	32.000	35.556	39.596	43.996	50.654	56.382	64.121	67.996
120	13.640	15.500	17.875	20.463	22.028	24.099	27.111	31.497	33.889	39.371	44.620	50.432	54.074	62.460	72.193
130	13.493	15.292	17.612	20.153	21.959	25.476	27.439	29.934	34.368	39.349	44.092	48.359	55.686	60.749	69.844
140	13.600	15.520	17.738	19.477	22.407	25.207	26.993	30.368	34.261	38.666	45.915	48.462	54.692	62.308	71.250

Size ML4R..	Exact Ratios i_{ex}													
	Nominal Ratio i_N													
	63	71	80	90	100	112	125	140	160	180	200	225	250	280
100	62.587	71.272	80.181	88.475	101.05	112.71	128.61	138.14	158.45	175.43	202.07	231.04	245.11	269.70
110	62.431	71.470	80.489	88.721	99.918	111.45	126.57	144.42	156.40	173.16	195.08	219.47	250.93	276.10
120	65.007	68.987	78.396	90.295	96.488	110.41	125.98	134.96	160.85	172.82	197.98	226.67	259.17	271.63
130	61.683	69.393	79.405	87.619	100.05	114.34	122.82	136.78	157.25	175.04	196.13	223.67	254.37	273.69
140	62.561	72.645	77.268	87.292	98.987	113.13	121.14	134.91	162.75	181.15	205.94	218.06	247.99	272.86

Size ML5R..	Exact Ratios i_{ex}													
	Nominal Ratio i_N													
	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250
100	282.30	316.62	356.48	401.85	453.70	483.60	546.77	624.92	687.41	783.09	894.22	1022.0	1094.8	1260.7
110	290.35	308.23	367.11	413.83	439.31	487.14	554.80	633.04	709.01	811.66	865.48	989.12	1119.7	1239.4
120	283.48	318.14	351.57	395.84	449.83	497.18	566.59	632.35	678.80	777.86	880.78	1015.7	1148.2	1230.8
130	275.81	314.72	355.39	402.99	461.62	505.78	566.03	651.78	709.61	818.21	900.28	961.89	1099.6	1265.7
140	278.08	309.57	350.28	392.55	446.07	502.84	537.58	647.80	705.61	808.11	900.14	962.17	1135.0	1206.9

Nominal Output Torque

Helical Gear Units

Size ML2P..	Nominal Output Torque M_{N2} [kNm]										
	Nominal Ratio i_N										
	5.6	6.3	7.1	8	9	10	11.2	12.5	14	16	18
100	141	146	151	156	148	167	174	173	168	160	160
110	203	204	206	206	191	194	195	196	197	198	191
120	252	261	275	284	263	281	282	262	248	272	282
130	364	376	389	397	394	368	337	357	337	379	379
140	437	452	475	491	506	508	490	502	489	541	558

Size ML3P..	Nominal Output Torque M_{N2} [kNm]												
	Nominal Ratio i_N												
	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71	80
100	157	161	161	161	159	155	155	157	156	146	149	154	154
110	220	221	223	227	227	227	217	216	219	218	210	215	216
120	304	307	309	309	294	310	300	300	299	299	277	279	281
130	425	425	424	424	425	425	425	410	410	409	394	398	401
140	615	609	608	614	613	608	582	588	588	568	569	569	576

Size ML4P..	Nominal Output Torque M_{N2} [kNm]													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	171	163	177	179	176	182	183	176	167	168	168	170	170	154
110	231	236	241	238	253	253	238	244	248	251	252	253	246	244
120	333	336	314	329	328	347	331	318	363	348	350	353	354	356
130	408	410	412	456	490	472	484	495	508	511	512	516	519	490
140	616	628	631	648	652	655	665	681	700	679	687	686	690	695

Bevel Helical Gear Units

Size ML3R..	Nominal Output Torque M_{N2} [kNm]														
	Nominal Ratio i_N														
	14	16	18	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71
100	148	139	147	147	148	148	149	134	135	131	135	123	124	124	123
110	203	194	205	207	203	209	199	198	164	160	188	169	170	157	154
120	268	262	281	285	272	273	274	258	253	252	251	271	244	239	238
130	325	333	353	404	401	386	397	355	356	363	389	389	366	362	351
140	418	460	463	483	542	516	547	503	505	487	528	499	503	500	497

Size ML4R..	Nominal Output Torque M_{N2} [kNm]													
	Nominal Ratio i_N													
	63	71	80	90	100	112	125	140	160	180	200	225	250	280
100	164	165	167	170	168	169	170	164	177	178	177	167	177	159
110	216	215	223	232	233	238	230	236	240	245	241	243	245	192
120	308	309	314	309	327	319	327	332	323	324	318	346	302	318
130	415	408	439	439	440	452	459	469	470	472	462	490	501	476
140	584	589	591	605	621	638	647	662	667	670	673	697	605	569

Size ML5R..	Nominal Output Torque M_{N2} [kNm]													
	Nominal Ratio i_N													
	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250
100	180	186	187	187	187	195	195	210	210	199	199	199	199	198
110	268	277	278	269	278	263	278	279	261	258	258	258	259	251
120	353	367	367	354	378	354	379	379	401	387	388	382	382	382
130	463	479	495	533	518	534	520	519	514	508	511	536	515	541
140	742	739	742	742	747	747	747	746	746	747	710	712	713	749

* Calculated with $n_1=1000$ rpm
 Sizes 150 & 160 up to 1200 kNm are available. Please consult SEW-EURODRIVE

Technical Data

Allowed Rotational Speed (Splash / Bath Lubrication)

Helical Gear Units

Size ML2P..	Allowed Rotational Speed n_{1max} [rpm]										
	Nominal Ratio i_N										
	5.6	6.3	7.1	8	9	10	11.2	12.5	14	16	18
100	1300	1400	1500	1700	1800	1800	1800	1800	1800	1800	1800
110	1200	1300	1400	1500	1600	1600	1600	1600	1600	1600	1600
120	1000	1100	1250	1400	1400	1400	1400	1400	1400	1400	1400
130	900	1000	1100	1200	1200	1200	1200	1200	1200	1200	1200
140	800	850	950	1050	1050	1050	1050	1050	1050	1050	1050

Size ML3P..	Allowed Rotational Speed n_{1max} [rpm]												
	Nominal Ratio i_N												
	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71	80
100	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
110	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
120	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
130	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
140	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200

Size ML4P..	Allowed Rotational Speed n_{1max} [rpm]													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
110	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
120	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
130	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
140	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600

Bevel Helical Gear Units

Size ML3R..	Allowed Rotational Speed n_{1max} [rpm]														
	Nominal Ratio i_N														
	14	16	18	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71
100	1100	1250	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
110	1000	1100	1300	1300	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
120	900	1000	1150	1150	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
130	800	900	1000	1000	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100
140	700	800	900	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

Size ML4R..	Allowed Rotational Speed n_{1max} [rpm]													
	Nominal Ratio i_N													
	63	71	80	90	100	112	125	140	160	180	200	225	250	280
100	1900	1900	1900	2050	2050	2050	2050	2050	2050	2050	2050	2050	2050	2050
110	1700	1700	1700	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
120	1500	1500	1500	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
130	1250	1350	1350	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
140	1100	1200	1200	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350

Size ML5R..	Allowed Rotational Speed n_{1max} [rpm]													
	Nominal Ratio i_N													
	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250
100	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750
110	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650	2650
120	2340	2340	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430
130	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
140	2050	2050	2050	2050	2050	2050	2050	2050	2050	2050	2050	2050	2050	2050

Allowed rotational speeds are valid for continuous running conditions with standard single lip seal option
Higher allowed rotational speeds for other seal options are available according to the running conditions, please consult SEW-EURODRIVE

Allowed Rotational Speed (Pressure Lubrication)

Helical Gear Units

Size ML2P..	Allowed Rotational Speed n_{1max} [rpm]													
	Nominal Ratio i_N													
	5.6	6.3	7.1	8	9	10	11.2	12.5	14	16	18			
100	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
110	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
120	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
130	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
140	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250

Size ML3P..	Allowed Rotational Speed n_{1max} [rpm]												
	Nominal Ratio i_N												
	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71	80
100	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
110	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
120	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
130	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
140	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500

Size ML4P..	Allowed Rotational Speed n_{1max} [rpm]													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
110	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
120	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
130	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
140	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000

Bevel Helical Gear Units

Size ML3R..	Allowed Rotational Speed n_{1max} [rpm]														
	Nominal Ratio i_N														
	14	16	18	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71
100	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
110	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
120	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420
130	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350
140	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200

Size ML4R..	Allowed Rotational Speed n_{1max} [rpm]													
	Nominal Ratio i_N													
	63	71	80	90	100	112	125	140	160	180	200	225	250	280
100	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
110	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
120	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
130	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
140	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600

Size ML5R..	Allowed Rotational Speed n_{1max} [rpm]														
	Nominal Ratio i_N														
	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250	
100	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	
110	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	
120	2680	2680	2680	2680	2680	2680	2680	2680	2680	2680	2680	2680	2680	2680	
130	2450	2450	2450	2450	2450	2450	2450	2450	2450	2450	2450	2450	2450	2450	
140	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	

Allowed rotational speeds are valid for continuous running conditions with standard single lip seal option
Higher allowed rotational speeds for other seal options are available according to the running conditions, please consult SEW-EURODRIVE

Technical Data

Thermal Rating*

ML2P... / Ambient Air Temperature 30°C

Size ML2P..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1000 rpm										
		Nominal Ratio i _N										
		5.6	6.3	7.1	8	9	10	11.2	12.5	14	16	18
100	-	335	342	348	355	361	366	371	376	381	387	392
	1	471	478	484	491	497	502	507	512	517	523	528
	2	642	649	655	662	668	673	678	683	688	694	699
110	-	428	436	445	453	461	467	474	480	487	494	500
	1	601	610	619	627	634	641	648	654	661	668	674
	2	819	828	836	845	852	859	866	872	878	886	892
120	-	537	548	559	569	579	587	596	604	612	621	628
	1	756	767	777	787	797	805	814	822	830	839	847
	2	1030	1041	1051	1062	1071	1080	1088	1096	1104	1113	1121
130	-	628	641	653	665	676	686	696	706	715	725	734
140	-	800	816	832	847	861	874	886	898	910	924	935

Size ML2P..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1200 rpm										
		Nominal Ratio i _N										
		5.6	6.3	7.1	8	9	10	11.2	12.5	14	16	18
100	-	324	331	338	345	351	357	363	368	373	379	384
	1	509	516	523	530	536	542	548	553	558	564	569
	2	692	700	707	713	720	726	731	737	742	748	753
110	-	413	423	432	440	449	456	463	470	476	484	491
	1	649	659	668	676	685	692	699	706	712	720	727
	2	884	893	902	911	919	926	933	940	947	955	961
120	-	520	531	543	553	564	573	582	590	599	608	616
	1	816	828	839	850	860	869	878	887	895	905	913
	2	1111	1123	1134	1145	1155	1164	1173	1182	1190	1200	1208
130	-	607	621	634	647	659	669	680	690	700	711	720
140	-	773	790	807	824	839	852	866	878	891	905	917

Size ML2P..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1500 rpm										
		Nominal Ratio i _N										
		5.6	6.3	7.1	8	9	10	11.2	12.5	14	16	18
100	-	309	317	325	332	339	345	351	357	363	369	374
	1	560	568	576	583	590	596	602	608	614	620	625
	2	762	769	777	784	791	797	803	809	815	821	827
110	-	395	405	415	424	433	440	448	456	463	471	478
	1	715	725	735	744	753	761	769	776	783	792	798
	2	972	982	992	1002	1011	1018	1026	1033	1041	1049	1056
120	-	469	509	521	533	544	553	563	573	582	592	601
	1	899	911	923	935	946	956	966	975	984	995	1004
	2	1222	1235	1247	1259	1270	1279	1289	1298	1308	1318	1327
130	-	580	595	609	623	636	647	658	669	680	692	702
140	-	-	-	-	-	-	-	-	-	-	-	-

Size ML2P..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1800 rpm										
		Nominal Ratio i _N										
		5.6	6.3	7.1	8	9	10	11.2	12.5	14	16	18
100	-	296	305	313	321	328	334	341	347	353	360	366
	1	607	615	624	631	639	645	652	658	664	671	677
	2	824	833	841	849	856	862	869	875	881	888	894
110	-	378	389	400	410	419	427	435	443	451	460	467
	1	775	786	796	806	816	824	832	840	848	856	864
	2	1053	1063	1074	1084	1093	1101	1110	1118	1125	1134	1142
120	-	-	-	-	-	-	-	-	-	-	-	-
130	-	-	-	-	-	-	-	-	-	-	-	-
140	-	-	-	-	-	-	-	-	-	-	-	-

* Thermal rating values (with fan) are based on radial fan option
For thermal rating with axial fan, please refer to page 2.07, table 2.05

Thermal Rating*

ML3P... / Ambient Air Temperature 30°C

Size ML3P..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1000 rpm												
		Nominal Ratio i _N												
		20	22.5	25	28	31.5	35.5	40	45	50	56	63	71	80
100	-	261	265	269	272	276	280	283	287	289	292	295	298	301
	1	359	364	367	371	375	378	382	385	388	391	394	397	400
	2	483	488	491	495	499	502	506	509	512	515	518	521	524
110	-	322	327	332	336	341	345	350	354	357	361	365	368	372
	1	444	449	454	458	463	467	472	476	479	483	487	490	494
	2	597	602	606	611	616	620	625	629	632	636	640	643	646
120	-	412	419	424	430	436	442	447	453	457	462	467	471	475
	1	568	574	580	586	592	598	603	609	613	618	622	627	631
	2	763	770	776	782	788	793	799	804	809	813	818	823	827
130	-	491	499	505	512	520	526	533	539	544	550	556	561	566
140	-	608	618	627	635	644	653	661	669	675	682	689	696	702

Size ML3P..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1200 rpm												
		Nominal Ratio i _N												
		20	22.5	25	28	31.5	35.5	40	45	50	56	63	71	80
100	-	254	258	262	266	270	274	278	281	284	288	291	294	297
	1	388	392	396	400	404	408	412	415	419	422	425	428	431
	2	521	526	530	534	538	542	545	549	552	555	558	561	564
110	-	313	319	324	329	334	339	343	347	351	355	359	363	366
	1	479	485	489	494	499	504	509	513	517	521	525	528	532
	2	644	649	654	659	664	669	673	678	681	685	689	693	697
120	-	401	408	414	421	427	433	439	445	449	454	459	464	469
	1	613	620	626	632	639	645	651	656	661	666	671	676	680
	2	823	830	837	843	849	855	861	867	872	877	882	886	891
130	-	477	486	493	501	508	516	523	529	535	541	547	553	558
140	-	592	603	612	621	630	639	648	656	663	671	678	685	692

Size ML3P..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1500 rpm												
		Nominal Ratio i _N												
		20	22.5	25	28	31.5	35.5	40	45	50	56	63	71	80
100	-	245	250	254	258	262	267	271	275	278	281	285	288	291
	1	427	432	436	440	445	449	453	457	460	463	467	470	473
	2	573	578	582	586	591	595	599	603	606	609	613	616	619
110	-	302	308	313	319	324	329	334	339	343	347	351	356	359
	1	527	533	538	544	549	554	559	564	568	572	576	580	584
	2	707	713	719	724	729	735	739	744	748	752	757	761	765
120	-	387	394	401	408	415	421	428	434	439	444	450	455	460
	1	674	682	689	695	702	709	715	721	726	732	737	742	747
	2	905	913	919	926	933	940	946	952	957	962	968	973	978
130	-	460	470	477	486	494	502	509	516	523	529	535	542	548
140	-	571	582	592	602	612	622	632	641	648	656	664	672	679

Size ML3P..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1800 rpm												
		Nominal Ratio i _N												
		20	22.5	25	28	31.5	35.5	40	45	50	56	63	71	80
100	-	237	242	246	251	256	260	264	269	272	276	279	283	286
	1	462	467	472	476	481	486	490	494	494	501	505	508	512
	2	620	625	630	634	639	643	648	652	655	659	662	666	669
110	-	292	299	304	310	316	321	327	332	336	340	345	349	353
	1	571	577	583	588	594	600	605	610	614	619	623	628	632
	2	765	772	777	783	789	794	800	805	809	813	818	822	826
120	-	374	382	389	397	404	411	418	424	430	436	441	447	452
	1	730	738	745	753	760	767	774	780	786	792	797	803	808
	2	979	987	994	1002	1009	1016	1023	1030	1035	1041	1047	1052	1057
130	-	446	455	464	472	484	489	498	505	512	519	525	532	538
140	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Thermal rating values (with fan) are based on radial fan option
For thermal rating with axial fan, please refer to page 2.07, table 2.05

Technical Data

Thermal Rating

ML4P... / Ambient Air Temperature 30°C

Size ML4P..	Thermal Rating P_{TH} [kW] / $n_1 = 1000$ rpm													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	174	176	178	180	181	183	184	186	188	189	191	192	193	194
110	214	217	219	221	224	226	228	230	232	233	235	237	238	240
120	274	278	281	283	286	289	291	294	297	299	301	303	305	307
130	327	331	334	337	341	344	347	350	353	356	358	361	363	365
140	405	410	415	419	423	426	430	434	438	441	444	447	450	453

Size ML4P..	Thermal Rating P_{TH} [kW] / $n_1 = 1200$ rpm													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	170	173	175	176	178	180	182	184	185	187	188	189	191	192
110	210	213	216	218	220	222	224	227	229	231	232	234	236	237
120	269	273	276	279	282	284	287	290	293	295	297	299	302	304
130	321	325	329	332	335	339	342	346	349	351	354	356	359	362
140	398	403	408	412	416	420	424	429	432	436	439	442	445	448

Size ML4P..	Thermal Rating P_{TH} [kW] / $n_1 = 1500$ rpm													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	166	168	171	173	175	176	178	180	182	184	185	187	188	190
110	205	208	211	213	216	218	220	223	225	227	229	231	232	234
120	262	266	270	273	276	279	282	285	288	290	293	295	297	300
130	312	317	321	325	328	332	335	339	343	346	349	351	354	357
140	387	393	398	403	407	412	416	421	425	429	432	436	439	442

Size ML4P..	Thermal Rating P_{TH} [kW] / $n_1 = 1800$ rpm													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	162	165	167	169	171	173	175	177	179	181	183	184	186	187
110	200	203	206	209	212	214	216	219	221	223	226	227	229	231
120	256	260	264	267	271	274	277	280	283	286	289	291	294	296
130	305	310	314	318	322	326	330	334	337	341	344	347	350	352
140	379	384	390	395	400	404	409	414	419	422	426	430	433	437

ML4P...X / Ambient Air Temperature 30°C

Size ML4P..X	Thermal Rating P_{TH} [kW] / $n_1 = 1000$ rpm													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	184	187	189	190	192	194	196	198	199	201	202	203	205	206
110	237	240	243	245	247	250	252	254	256	258	260	262	263	265
120	296	300	303	306	309	312	315	318	320	323	325	327	329	331
130	353	357	361	365	368	372	375	379	382	384	387	390	392	395
140	442	447	452	456	461	465	469	474	478	481	484	488	491	494

Size ML4P..X	Thermal Rating P_{TH} [kW] / $n_1 = 1200$ rpm													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	181	183	185	187	189	191	193	195	197	198	200	201	203	204
110	233	236	239	241	244	246	248	251	253	255	257	259	261	262
120	291	295	298	301	304	307	310	313	316	319	321	323	326	328
130	346	351	355	359	363	366	370	373	377	380	383	385	388	391
140	434	439	444	449	454	458	462	467	471	475	479	482	486	489

Size ML4P..X	Thermal Rating P_{TH} [kW] / $n_1 = 1500$ rpm													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	176	179	181	183	185	187	189	191	193	195	197	198	200	201
110	227	230	233	236	238	241	244	246	249	251	253	255	257	259
120	283	287	291	295	298	301	304	308	311	313	316	319	321	324
130	338	342	347	351	355	359	363	367	370	373	377	380	383	386
140	422	428	434	439	444	449	454	459	463	467	471	475	479	482

Size ML4P..X	Thermal Rating P_{TH} [kW] / $n_1 = 1800$ rpm													
	Nominal Ratio i_N													
	71	80	90	100	112	125	140	160	180	200	225	250	280	315
100	172	175	177	180	182	184	186	188	190	192	194	196	197	199
110	222	225	228	231	234	237	239	242	245	247	250	252	254	256
120	277	281	285	289	292	296	299	303	306	309	312	314	317	320
130	330	335	340	344	348	352	356	361	365	368	372	375	378	381
140	413	419	425	430	436	441	446	452	456	461	465	469	473	477

Thermal Rating*

ML3R... / Ambient Air Temperature 30°C

Size ML3R..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1000 rpm														
		Nominal Ratio i _N														
		14	16	18	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71
100	-	189	196	203	208	215	219	225	230	235	240	245	249	253	257	261
	1	300	308	314	320	326	331	336	341	347	352	356	360	364	369	373
110	-	242	252	260	267	275	282	288	295	302	308	314	319	325	330	335
	1	385	395	403	410	418	424	431	438	445	451	457	462	467	473	478
120	-	303	315	326	334	344	352	361	369	377	385	393	399	406	413	419
	1	481	493	504	513	522	531	539	547	556	564	571	578	585	591	598
130	-	354	368	380	390	402	411	421	431	441	450	459	466	475	482	490
140	-	450	468	484	497	511	524	536	549	561	573	584	594	604	614	623

Size ML3R..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1200 rpm														
		Nominal Ratio i _N														
		14	16	18	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71
100	-	178	186	193	199	205	210	216	222	227	233	238	242	246	251	255
	1	325	333	340	346	352	357	363	369	374	380	385	389	393	398	402
110	-	228	238	247	255	263	270	277	284	292	298	305	310	316	322	327
	1	416	427	436	443	451	458	466	473	480	487	493	499	504	510	515
120	-	285	298	309	319	329	338	347	356	365	373	381	388	395	402	409
	1	521	534	545	554	565	573	582	591	600	609	617	624	631	638	645
130	-	333	348	361	372	384	395	405	416	426	436	445	453	462	470	478
140	-	424	443	460	474	489	502	516	529	542	555	567	577	587	598	608

Size ML3R..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1500 rpm														
		Nominal Ratio i _N														
		14	16	18	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71
100	-	163	172	180	186	193	199	205	211	217	222	228	232	237	242	247
	1	358	367	375	381	388	394	400	406	412	418	423	428	432	437	442
110	-	209	221	230	238	247	255	263	270	278	285	292	298	304	310	316
	1	460	471	481	489	498	505	513	521	528	536	543	549	555	561	567
120	-	262	276	288	298	309	319	328	338	348	357	365	373	381	388	396
	1	575	589	601	611	622	632	642	651	661	670	679	686	694	701	709
130	-	306	322	336	348	361	372	384	395	406	417	427	436	445	454	463
140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Size ML3R..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1800 rpm														
		Nominal Ratio i _N														
		14	16	18	20	22.5	25	28	31.5	35.5	40	45	50	56	63	71
100	-	150	160	168	175	182	188	195	201	208	214	219	224	229	234	240
	1	389	399	407	413	421	427	434	440	447	452	458	463	468	473	478
110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
120	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Thermal rating values (with fan) are based on radial fan option
 For thermal rating with axial fan, please refer to page 2.07, table 2.05

Technical Data

Thermal Rating*

ML4R... / Ambient Air Temperature 30°C

Size ML4R..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1000 rpm													
		Nominal Ratio i _N													
		63	71	80	90	100	112	125	140	160	180	200	225	250	280
100	-	157	160	163	166	169	172	174	177	179	182	184	186	188	190
	1	231	235	238	241	243	246	248	251	254	256	258	260	262	264
110	-	194	198	202	205	209	212	215	218	222	224	227	230	232	234
	1	285	289	293	297	300	304	307	310	313	316	319	321	323	326
120	-	248	253	258	263	267	271	275	279	283	287	290	294	297	300
	1	365	370	375	380	384	388	392	396	401	404	408	411	414	417
130	-	295	301	307	313	318	323	328	332	337	342	346	350	353	357
140	-	366	374	381	388	394	400	406	412	418	424	429	434	438	443

Size ML4R..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1200 rpm													
		Nominal Ratio i _N													
		63	71	80	90	100	112	125	140	160	180	200	225	250	280
100	-	152	155	158	162	165	167	170	173	176	178	180	183	185	187
	1	250	253	257	260	263	265	268	271	274	276	278	281	283	285
110	-	187	192	196	200	203	206	210	213	217	220	223	225	228	230
	1	308	313	317	321	324	328	331	334	338	341	344	346	349	351
120	-	239	245	250	255	260	264	268	273	277	281	285	288	291	295
	1	394	400	405	410	415	419	423	427	432	436	440	443	446	450
130	-	285	292	298	304	309	315	320	325	330	335	339	343	347	351
140	-	354	362	370	377	384	390	396	403	409	415	420	426	430	435

Size ML4R..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1500 rpm													
		Nominal Ratio i _N													
		63	71	80	90	100	112	125	140	160	180	200	225	250	280
100	-	145	148	152	156	159	162	165	167	171	173	176	178	180	182
	1	275	279	283	286	289	292	295	298	301	304	306	308	311	313
110	-	178	183	188	192	196	200	203	206	210	214	217	220	222	225
	1	339	344	349	353	356	360	364	367	371	375	378	381	383	386
120	-	228	234	240	246	250	255	260	264	269	274	277	281	285	288
	1	434	440	446	451	456	461	466	470	475	479	483	487	490	494
130	-	272	279	286	293	298	304	309	315	321	326	330	335	339	343
140	-	337	346	355	363	370	377	384	390	398	404	409	413	420	426

Size ML4R..	Number of fan/s	Thermal Rating P _{TH} [kW] / n ₁ = 1800 rpm													
		Nominal Ratio i _N													
		63	71	80	90	100	112	125	140	160	180	200	225	250	280
100	-	138	143	146	150	153	157	160	163	166	169	172	174	176	179
	1	298	302	306	310	313	316	319	322	326	328	331	334	336	338
110	-	171	176	181	185	189	193	197	201	205	209	212	215	218	221
	1	368	373	378	382	386	390	394	398	402	405	408	412	415	417
120	-	219	225	231	237	242	247	252	257	262	267	271	275	279	282
	1	471	477	483	489	494	499	504	509	514	519	523	527	530	534
130	-	261	268	275	282	288	295	300	306	312	318	322	327	332	336
140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Thermal rating values (with fan) are based on radial fan option
For thermal rating with axial fan, please refer to page 2.07, table 2.05

Thermal Rating

ML5R... / Ambient Air Temperature 30°C

Size ML5R..	Thermal Rating P_{TH} [kW] / $n_1 = 1000$ rpm													
	Nominal Ratio i_N													
	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250
100	110	112	114	115	116	118	119	120	121	122	123	124	125	126
110	136	138	140	142	144	145	147	148	150	151	153	154	155	156
120	175	177	179	182	184	186	188	190	192	193	195	197	198	199
130	208	211	214	216	219	221	224	226	228	230	232	234	236	238
140	258	262	265	268	272	274	277	280	283	286	288	290	293	295

Size ML5R..	Thermal Rating P_{TH} [kW] / $n_1 = 1200$ rpm													
	Nominal Ratio i_N													
	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250
100	108	110	111	113	114	116	117	118	119	121	122	123	124	125
110	133	135	137	139	141	143	144	146	147	149	150	152	153	154
120	171	173	176	178	181	183	185	187	189	191	192	194	196	197
130	203	206	209	212	215	217	220	222	225	227	229	231	233	235
140	252	256	260	263	267	270	273	276	279	282	284	287	289	291

Size ML5R..	Thermal Rating P_{TH} [kW] / $n_1 = 1500$ rpm													
	Nominal Ratio i_N													
	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250
100	105	106	108	110	111	113	114	116	117	118	120	121	122	123
110	129	131	134	136	138	139	141	143	144	146	148	149	150	152
120	165	168	171	174	176	178	180	183	185	187	189	191	192	194
130	197	200	204	207	210	212	215	218	220	223	225	227	228	231
140	242	246	250	254	258	261	264	267	270	273	276	279	281	284

Size ML5R..	Thermal Rating P_{TH} [kW] / $n_1 = 1800$ rpm													
	Nominal Ratio i_N													
	280	315	355	400	450	500	560	630	710	800	900	1000	1120	1250
100	102	104	105	107	109	110	112	113	115	116	118	119	120	121
110	126	128	130	132	135	136	138	140	142	144	145	147	148	149
120	161	164	167	169	172	174	177	179	182	184	186	188	190	191
130	191	195	198	202	205	208	211	213	216	219	221	223	226	228
140	237	242	246	250	254	258	261	265	268	271	274	277	280	282

Technical Data

Allowed Radial Forces

1. Determining the allowed radial force F_R

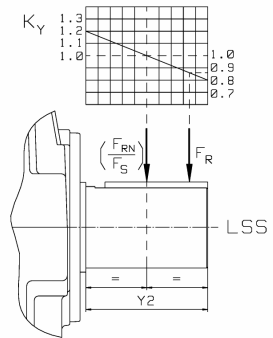
$$F_R = \frac{F_{RN}}{F_S} \times K_Y$$

F_R = the allowed actual radial force
 F_{RN} = the allowed nominal radial force in the middle of the shaft end
 F_S = service factor
 K_Y = the effect of the radial force location

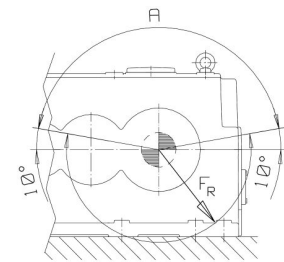
Allowed nominal radial forces F_{RN} [kN] in the middle of the LSS end
(when axial force $F_A = 0$)

Size	LSS speed [rpm]		
	≤ 13	≤ 22	≤ 50
100	240	190	150
110	370	330	300
120	430	380	350
130	400	350	325
140	500	440	405
150	Please consult SEW-EURODRIVE		
160			

Ensure that the gear unit is rigidly mounted in order not to be moved by the external forces
 When the radial force F_R is upwards (segment marked with A), please consult SEW-EURODRIVE
 F_{RN} is the allowed radial force to the most unfavourable direction on the shaft end
 Gear units are dimensioned to take radial forces on HSS and LSS end. No axial forces are permitted
 For axial loading on the HSS and LSS end, please consult SEW-EURODRIVE
 For through going shaft and exact loading, please consult SEW-EURODRIVE
 V-belt pulley pitch diameter must be greater than 6 times the shaft end diameter



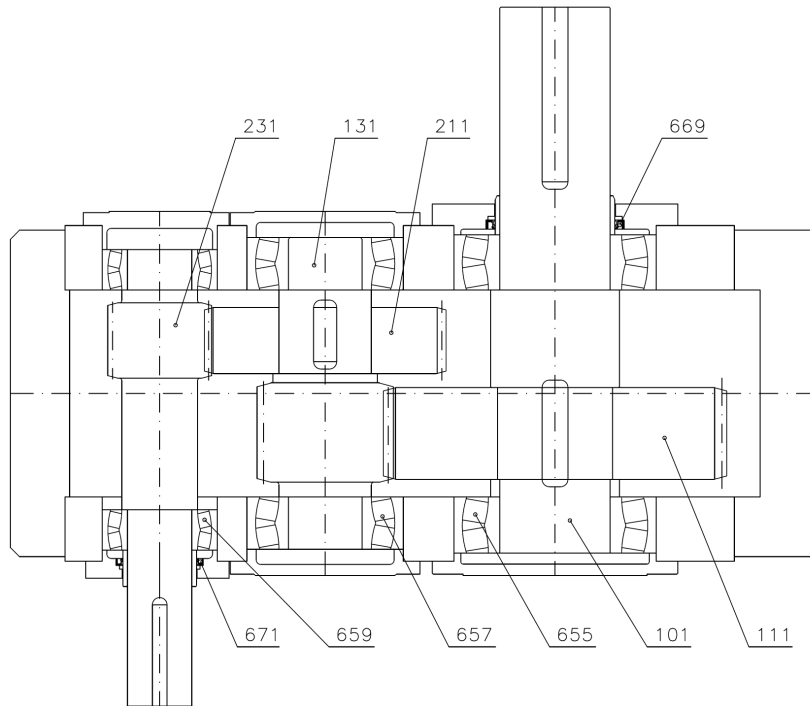
The effect of the radial force location



Allowed radial force direction

Position Numbers for Main Components

ML2P..



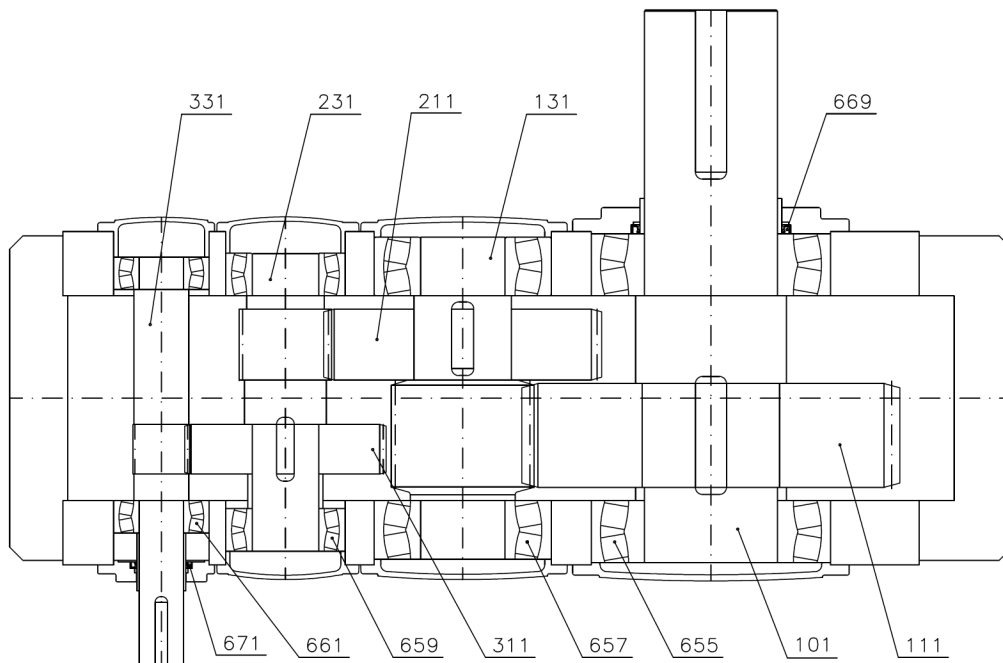
Main Components

Pos No.	Quantity	Description	
101	1	Output Shaft (LSS)	
111	1	Wheel	2 nd Stage
131	1	Pinion	2 nd Stage
211	1	Wheel	1 st Stage
231	1	Pinion Shaft (HSS)	1 st Stage
655	2	Bearing	
657	2	Bearing	
659	2	Bearing	
669	-	Oil Seal	
671	-	Oil Seal	

Technical Data

Position Numbers for Main Components

ML3P..

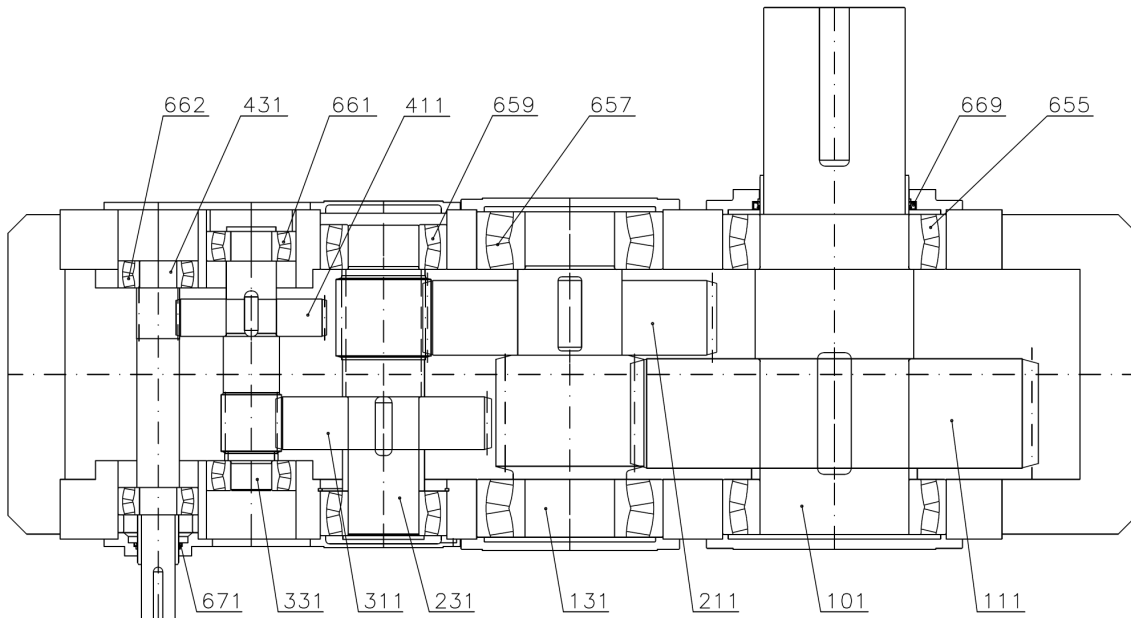


Main Components

Pos No.	Quantity	Description	
101	1	Output Shaft (LSS)	
111	1	Wheel	3rd Stage
131	1	Pinion	
211	1	Wheel	2nd Stage
231	1	Pinion	
311	1	Wheel	1st Stage
331	1	Pinion Shaft (HSS)	
655	2	Bearing	
657	2	Bearing	
659	2	Bearing	
661	2	Bearing	
669	-	Oil Seal	
671	-	Oil Seal	

Position Numbers for Main Components

ML4P..



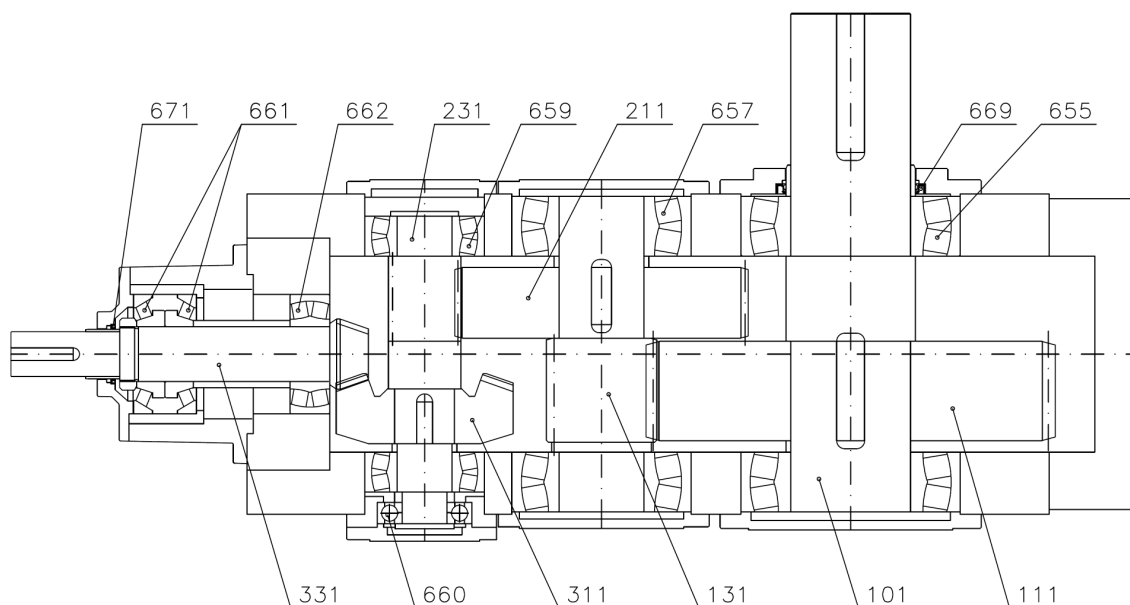
Main Components

Pos No.	Quantity	Description	
101	1	Output Shaft (LSS)	
111	1	Wheel	4th Stage
131	1	Pinion	
211	1	Wheel	3rd Stage
231	1	Pinion	
311	1	Wheel	2nd Stage
331	1	Pinion	
411	1	Wheel	1st Stage
431	1	Pinion Shaft (HSS)	
655	2	Bearing	
657	2	Bearing	
659	2	Bearing	
661	2	Bearing	
662	2	Bearing	
669	-	Oil Seal	
671	-	Oil Seal	

Technical Data

Position Numbers for Main Components

ML3R..

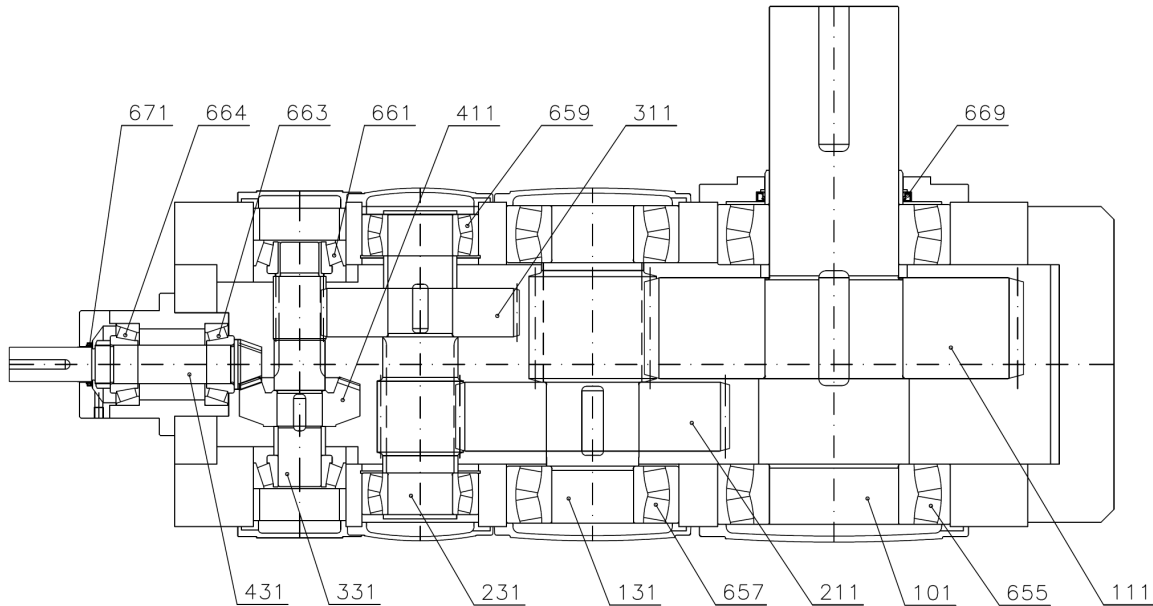


Main Components

Pos No.	Quantity	Description	
101	1	Output Shaft (LSS)	
111	1	Wheel	3rd Stage
131	1	Pinion	
211	1	Wheel	2nd Stage
231	1	Pinion	
311	1	Bevel Wheel	1st Stage
331	1	Bevel Pinion Shaft (HSS)	
655	2	Bearing	
657	2	Bearing	
659	2	Bearing	
660	1	Bearing	
661	2	Bearing	
662	1	Bearing	
669	-	Oil Seal	
671	-	Oil Seal	

Position Numbers for Main Components

ML4R..100-110



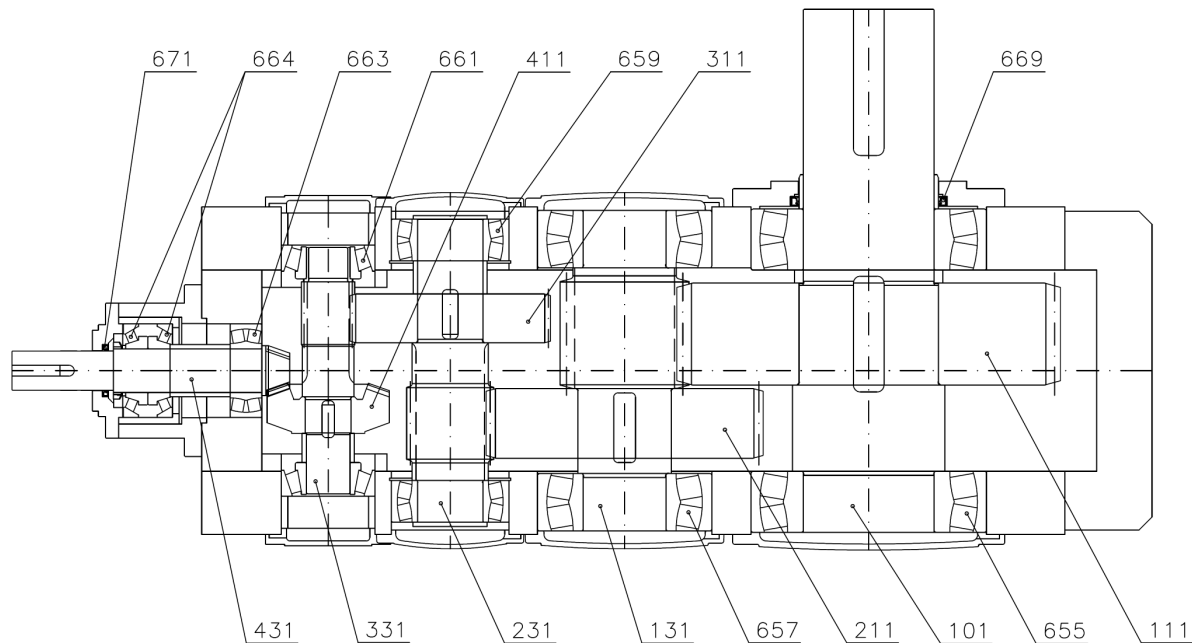
Main Components

Pos No.	Quantity	Description	
101	1	Output Shaft (LSS)	
111	1	Wheel	4th Stage
131	1	Pinion	
211	1	Wheel	3rd Stage
231	1	Pinion	
311	1	Wheel	2nd Stage
331	1	Pinion	
411	1	Bevel Wheel	1st Stage
431	1	Bevel Pinion Shaft (HSS)	
655	2	Bearing	
657	2	Bearing	
659	2	Bearing	
661	2	Bearing	
663	1	Bearing	
664	1	Bearing	
669	-	Oil Seal	
671	-	Oil Seal	

Technical Data

Position Numbers for Main Components

ML4R..120-140

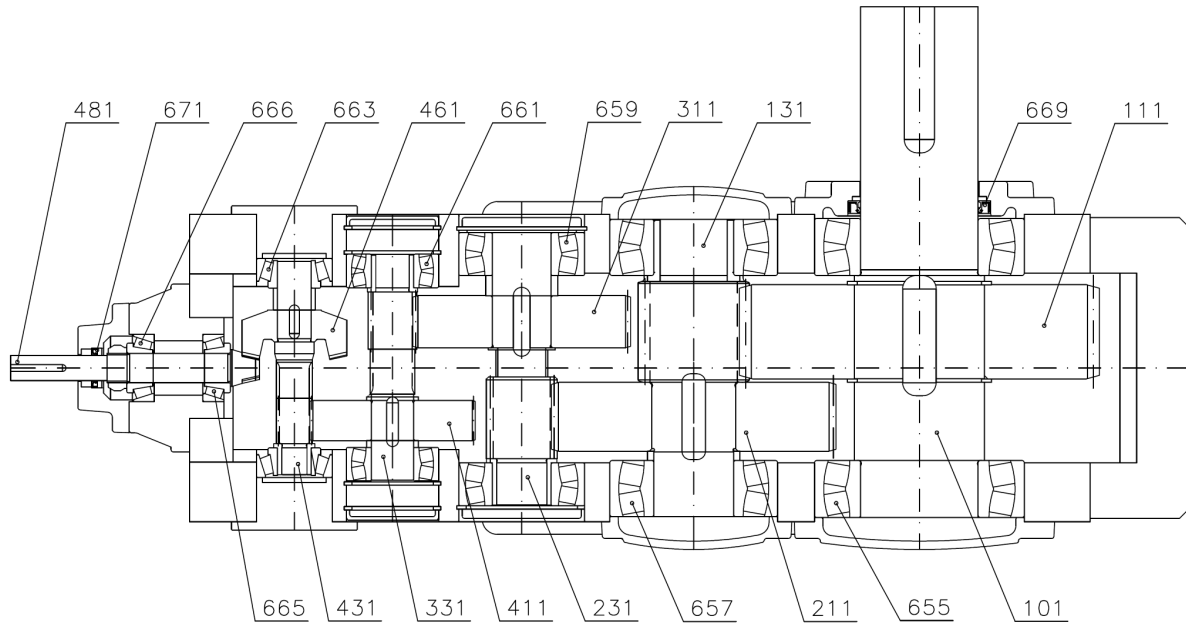


Main Components

Pos No.	Quantity	Description	
101	1	Output Shaft (LSS)	
111	1	Wheel	4th Stage
131	1	Pinion	
211	1	Wheel	3rd Stage
231	1	Pinion	
311	1	Wheel	2nd Stage
331	1	Pinion	
411	1	Bevel Wheel	1st Stage
431	1	Bevel Pinion Shaft (HSS)	
655	2	Bearing	
657	2	Bearing	
659	2	Bearing	
661	2	Bearing	
663	1	Bearing	
664	1	Bearing	
669	-	Oil Seal	
671	-	Oil Seal	

Position Numbers for Main Components

ML5R..

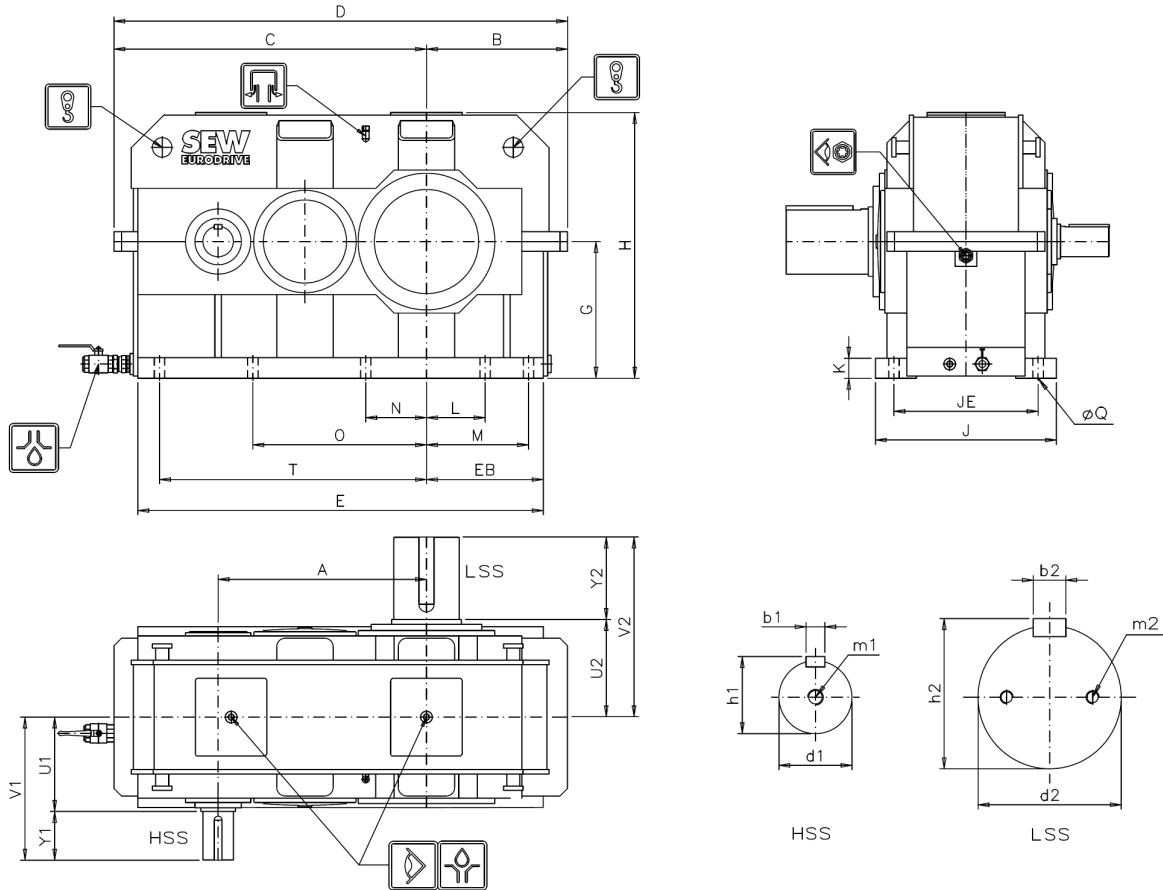


Main Components

Pos No.	Quantity	Description	
101	1	Output Shaft (LSS)	
111	1	Wheel	5th Stage
131	1	Pinion	
211	1	Wheel	4th Stage
231	1	Pinion	
311	1	Wheel	3rd Stage
331	1	Pinion	
411	1	Wheel	2nd Stage
431	1	Pinion	
461	1	Bevel Wheel	1st Stage
481	1	Bevel Pinion Shaft (HSS)	
655	2	Bearing	
657	2	Bearing	
659	2	Bearing	
661	2	Bearing	
663	2	Bearing	
665	1	Bearing	
666	1	Bearing	
669	-	Oil Seal	
671	-	Oil Seal	

Gear Unit Dimensions

ML2P..100-140



Shaft ends: ISO/R775-1969

Size	Housing Dimensions [mm]									Foot Mounting [mm]							
	A	B	C	D	E	EB	G	H	J	JE	K	L	M	N	O	T	Q
100	765	505	1155	1660	1460	405	500	975	652	526	72	185	335	225	660	950	42
110	855	565	1280	1845	1650	466	560	1090	710	590	82	240	400	260	750	1100	48
120	960	650	1440	2090	1868	538	630	1225	834	664	92	270	470	280	800	1230	54
130	1080	715	1615	2330	2090	595	710	1370	888	718	102	280	500	330	950	1400	54
140	1210	812	1820	2632	2352	672	800	1525	940	770	112	300	580	380	1050	1580	54

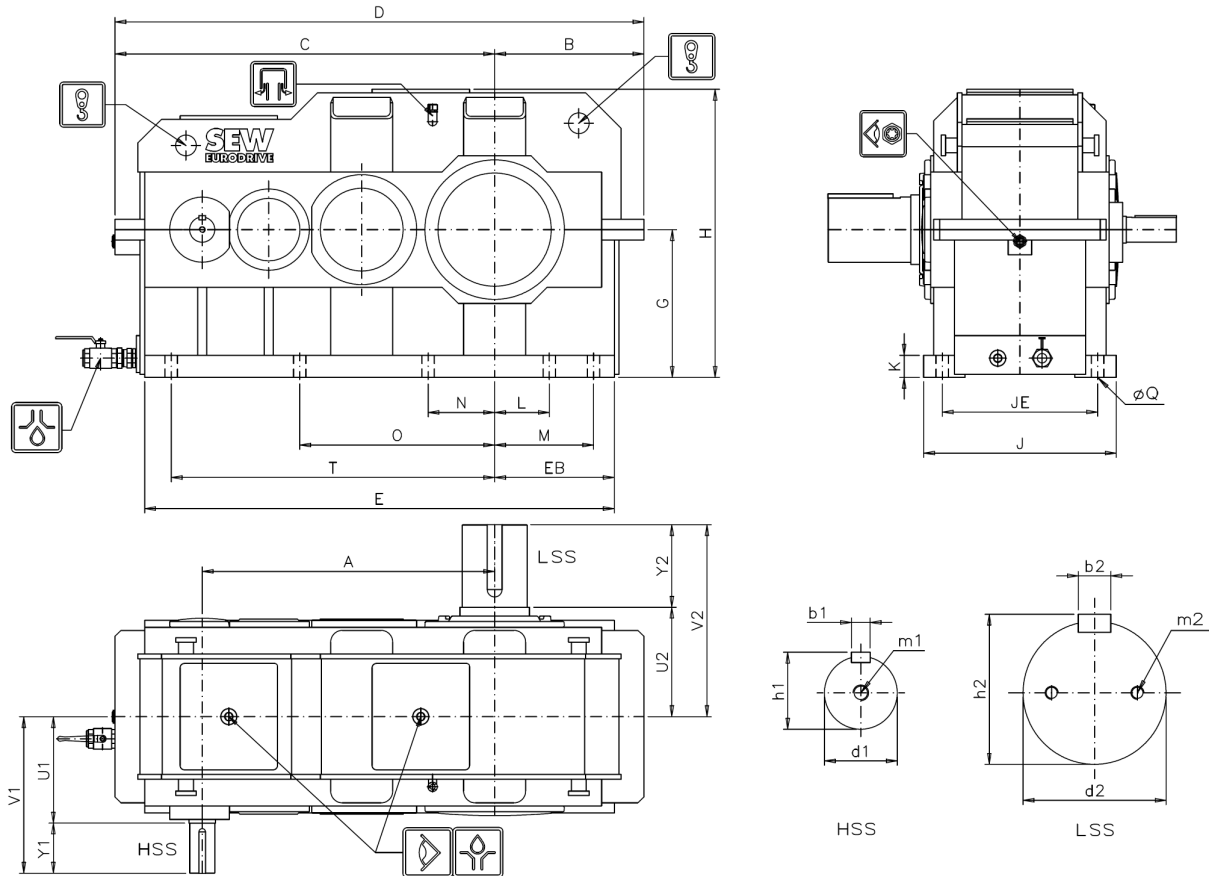
Size	i_N	HSS Dimensions [mm]							LSS Dimensions [mm]						Weight [kg]	Oil Quantity [l]		
		U1	Y1	V1	d1	b1	h1	m1	U2	Y2	V2	d2	b2	h2		m2*	Bath	Pressure
100	5.6 .. 11.2	350	190	540	120m6	32h9	127	M24	370	280	650	220m6	50h9	231	M20	3100	190	114
	12.5 .. 18		190	540	100m6	28h9	106	M24										
110	5.6 .. 11.2	420	225	645	130m6	32h9	137	M24	420	330	750	260m6	56h9	272	M24	4100	265	155
	12.5 .. 18		190	610	110m6	28h9	116	M24										
120	5.6 .. 12.5	435	225	660	140m6	36h9	148	M30	450	380	830	300m6	70h9	314	M24	5500	355	190
	14 .. 18		190	625	120m6	32h9	127	M24										
130	5.6 .. 12.5	465	270	735	160m6	40h9	169	M30	485	450	935	340m6	80h9	355	M30	7900	510	290
	14 .. 18		225	690	140m6	36h9	148	M30										
140	5.6 .. 12.5	495	270	765	170m6	40h9	179	M30	535	450	985	380m6	80h9	395	M30	10400	735	430
	14 .. 18		225	720	150m6	36h9	158	M30										

+ 2x180°, distance 0.6xd2

Weight and oil quantity shown are the average values

Gear Unit Dimensions

ML3P..100-140



Shaft ends: ISO/R775-1969

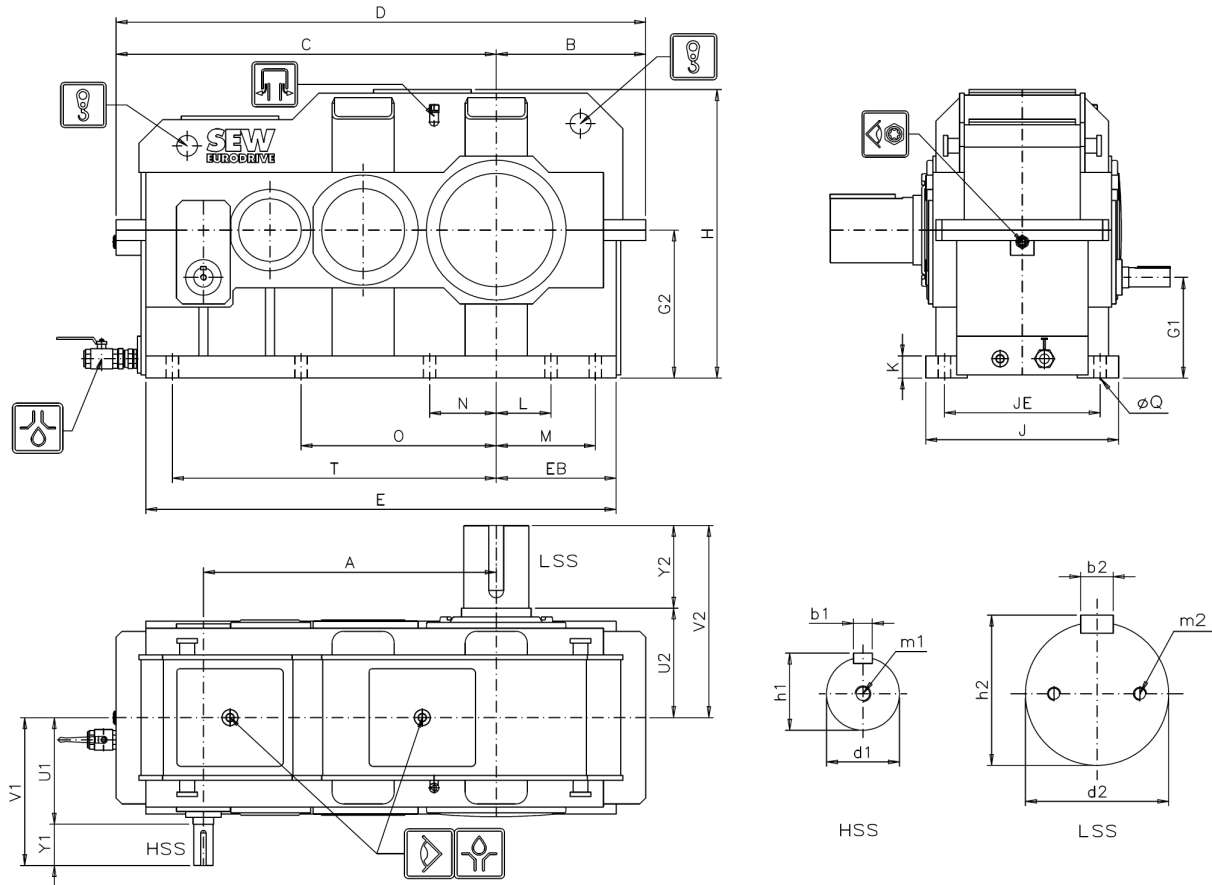
Size	Housing Dimensions [mm]								Foot Mounting [mm]								
	A*	B	C	D	E	EB	G	H	J	JE	K	L	M	N	O	T	Q
100	990	505	1285	1790	1590	405	500	975	652	526	72	185	335	225	660	1095	42
110	1105	565	1383	1948	1750	466	560	1090	710	590	82	240	400	260	750	1212	48
120	1240	650	1582	2232	2000	538	630	1225	834	664	92	270	470	280	800	1370	54
130	1395	715	1750	2465	2225	595	710	1370	888	718	102	280	500	330	950	1535	54
140	1565	812	1968	2780	2500	672	800	1525	940	770	112	300	580	380	1050	1728	54

Size	i_N	HSS Dimensions [mm]							LSS Dimensions [mm]						Weight [kg]	Oil Quantity [l]		
		U1	Y1	V1	d1	b1	h1	m1	U2	Y2	V2	d2	b2	h2		m2*	Bath	Pressure
100	20 .. 40	150	510	85m6	22h9	90	M20	370	280	650	220m6	50h9	231	M20	3300	200	120	
	45 .. 56	360	125	485	75m6	20h9	79.5											M20
	63 .. 80	125	485	65m6	18h9	69	M20											
110	20 .. 40	150	550	95m6	25h9	100	M24	420	330	750	260m6	56h9	272	M24	4400	280	165	
	45 .. 50	400	150	550	85m6	22h9	90											M20
	56 .. 80	125	525	75m6	20h9	79.5	M20											
120	20 .. 40	190	625	100m6	28h9	106	M24	450	380	830	300m6	70h9	314	M24	6100	385	230	
	50 .. 63	435	150	585	90m6	25h9	95											M24
	71 .. 80	150	585	80m6	22h9	85	M20											
130	20 .. 40	190	650	110m6	28h9	116	M24	485	450	935	340m6	80h9	355	M30	8300	550	325	
	50 .. 63	460	190	650	100m6	28h9	106											M24
	71 .. 80	150	610	90m6	25h9	95	M24											
140	20 .. 40	190	700	120m6	32h9	127	M24	535	450	985	380m6	80h9	395	M30	10900	770	480	
	50 .. 63	510	190	700	110m6	28h9	116											M24
	71 .. 80	190	700	100m6	28h9	106	M24											

* Please refer to Optional Accessories section for the maximum total centre distance available
+ 2x180°, distance 0.6xd2
Weight and oil quantity shown are the average values

Gear Unit Dimensions

ML4P..100-140



Shaft ends: ISO/R775-1969

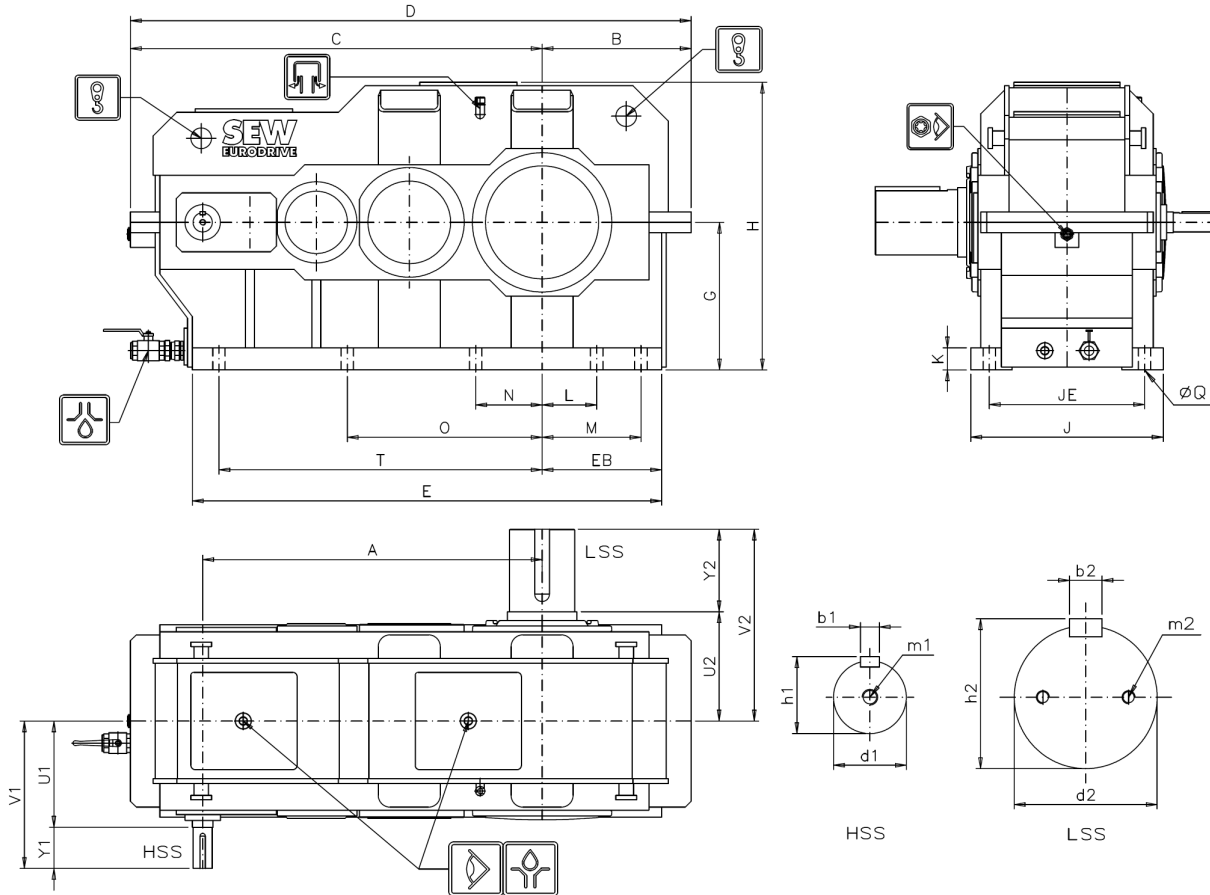
Size	Housing Dimensions [mm]									Foot Mounting [mm]								
	A	B	C	D	E	EB	G1	G2	H	J	JE	K	L	M	N	O	T	Q
100	990	505	1285	1790	1590	405	340	500	975	652	526	72	185	335	225	660	1095	42
110	1105	565	1383	1948	1750	466	380	560	1090	710	590	82	240	400	260	750	1212	48
120	1240	650	1582	2232	2000	538	430	630	1225	834	664	92	270	470	280	800	1370	54
130	1395	715	1750	2465	2225	595	485	710	1370	888	718	102	280	500	330	950	1535	54
140	1565	812	1968	2780	2500	672	550	800	1525	940	770	112	300	580	380	1050	1728	54

Size	i _N	HSS Dimensions [mm]							LSS Dimensions [mm]						Weight [kg]	Oil Quantity [l]		
		U1	Y1	V1	d1	b1	h1	m1	U2	Y2	V2	d2	b2	h2		m2*	Bath	Pressure
100	71 .. 112	125	485	65m6	18h9	69	M20	370	280	650	220m6	50h9	231	M20	3500	200	120	
	125 .. 180	360	125	485	60m6	18h9	64											M20
	200 .. 315	95	455	50k6	14h9	53.5	M16											
110	71 .. 112	125	525	75m6	20h9	79.5	M20	420	330	750	260m6	56h9	272	M24	4600	280	165	
	125 .. 180	400	125	525	70m6	20h9	74.5											M20
	200 .. 315	95	495	55m6	16h9	59	M20											
120	71 .. 112	150	585	80m6	22h9	85	M20	450	380	830	300m6	70h9	314	M24	6250	400	235	
	125 .. 200	435	125	560	75m6	20h9	79.5											M20
	225 .. 315	125	560	60m6	18h9	64	M20											
130	71 .. 140	150	610	90m6	25h9	95	M24	485	450	935	340m6	80h9	355	M30	8600	545	315	
	160 .. 180	460	150	610	80m6	22h9	85											M20
	200 .. 315	125	585	70m6	20h9	74.5	M20											
140	71 .. 140	190	700	100m6	28h9	106	M24	535	450	985	380m6	80h9	395	M30	11150	775	460	
	160 .. 200	510	150	660	90m6	25h9	95											M24
	225 .. 315	125	635	75m6	20h9	79.5	M20											

+ 2x180°, distance 0.6xd2
Weight and oil quantity shown are the average values

Gear Unit Dimensions

ML4P..100-140X



Shaft ends: ISO/R775-1969

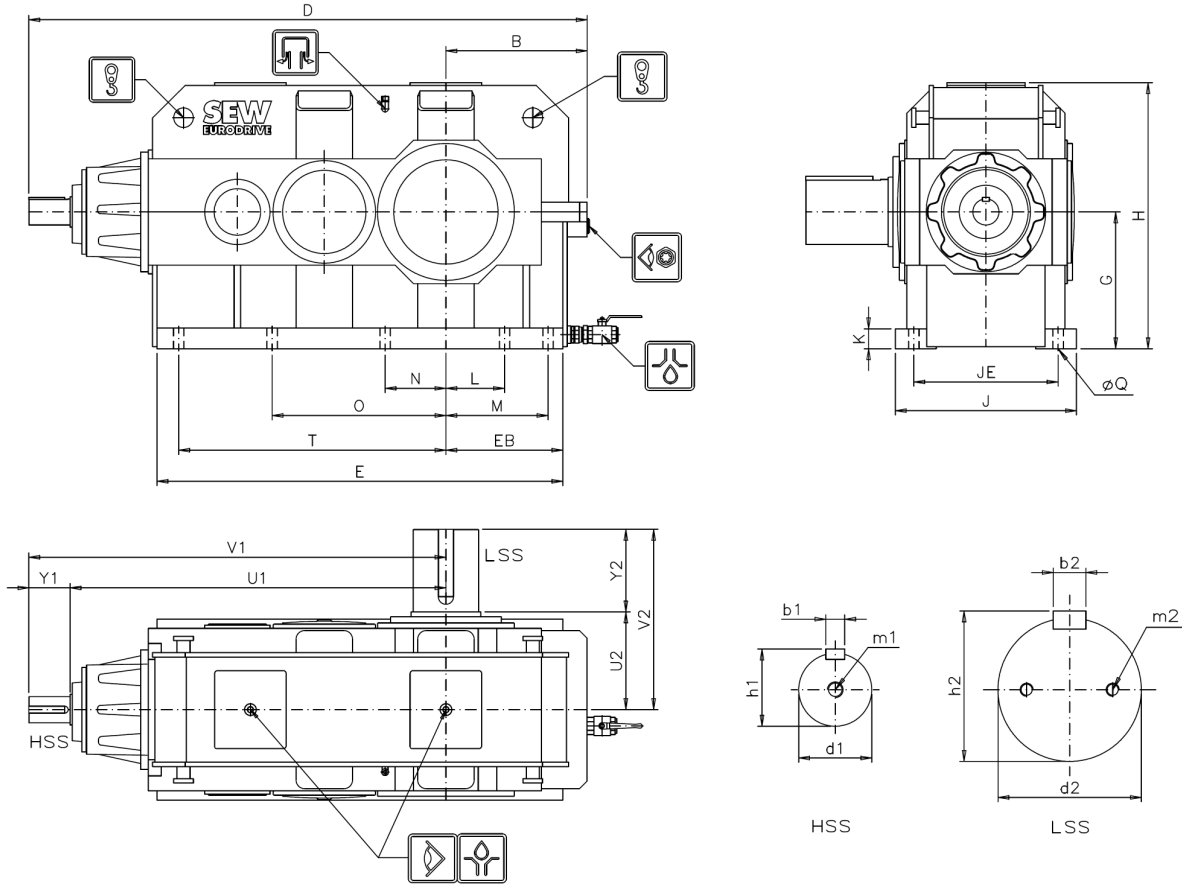
Size	Housing Dimensions [mm]									Foot Mounting [mm]							
	A*	B	C	D	E	EB	G	H	J	JE	K	L	M	N	O	T	Q
100	1150	505	1395	1900	1590	405	500	975	652	526	72	185	335	225	660	1095	42
110	1285	565	1563	2128	1750	466	560	1090	710	590	82	240	400	260	750	1212	48
120	1440	650	1760	2410	2000	538	630	1225	834	664	92	270	470	280	800	1370	54
130	1620	715	1985	2700	2225	595	710	1370	888	718	102	280	500	330	950	1535	54
140	1815	812	2218	3030	2500	672	800	1525	940	770	112	300	580	380	1050	1728	54

Size	i _N	HSS Dimensions [mm]							LSS Dimensions [mm]						Weight [kg]	Oil Quantity [l]		
		U1	Y1	V1	d1	b1	h1	m1	U2	Y2	V2	d2	b2	h2		m2*	Bath	Pressure
100	71 .. 112	125	485	65m6	18h9	69	M20	370	280	650	220m6	50h9	231	M20	3600	225	130	
	125 .. 180	360	125	485	60m6	18h9	64											M20
	200 .. 315	95	455	50k6	14h9	53.5	M16											
110	71 .. 112	125	525	75m6	20h9	79.5	M20	420	330	750	260m6	56h9	272	M24	4700	320	185	
	125 .. 180	400	125	525	70m6	20h9	74.5											M20
	200 .. 315	95	495	55m6	16h9	59	M20											
120	71 .. 112	150	585	80m6	22h9	85	M20	450	380	830	300m6	70h9	314	M24	6350	450	260	
	125 .. 200	435	125	560	75m6	20h9	79.5											M20
	225 .. 315	125	560	60m6	18h9	64	M20											
130	71 .. 140	150	610	90m6	25h9	95	M24	485	450	935	340m6	80h9	355	M30	8800	620	355	
	160 .. 180	460	150	610	80m6	22h9	85											M20
	200 .. 315	125	585	70m6	20h9	74.5	M20											
140	71 .. 140	190	700	100m6	28h9	106	M24	535	450	985	380m6	80h9	395	M30	11350	880	520	
	160 .. 200	510	150	660	90m6	25h9	95											M24
	225 .. 315	125	635	75m6	20h9	79.5	M20											

* Please refer to Optional Accessories section for the maximum total centre distance available
+ 2x180°, distance 0.6xd2
Weight and oil quantity shown are the average values

Gear Unit Dimensions

ML3R..100-140



Shaft ends: ISO/R775-1969

Size	i _N	Housing Dimensions [mm]							Foot Mounting [mm]							
		B	D	E	EB	G	H	J	JE	K	L	M	N	O	T	Q
100	14 .. 63	505	2075	1460	405	500	975	652	526	72	185	335	225	660	950	42
	71		2035													
110	14 .. 56	565	2305	1650	466	560	1090	710	590	82	240	400	260	750	1100	48
	63 .. 71		2265													
120	14 .. 56	650	2600	1868	538	630	1225	834	664	92	270	470	280	800	1230	54
	63 .. 71		2600													
130	14 .. 56	715	2845	2090	595	710	1370	888	718	102	280	500	330	950	1400	54
	63 .. 71		2810													
140	14 .. 63	812	3137	2352	672	800	1525	940	770	112	300	580	380	1050	1580	54
	71		3102													

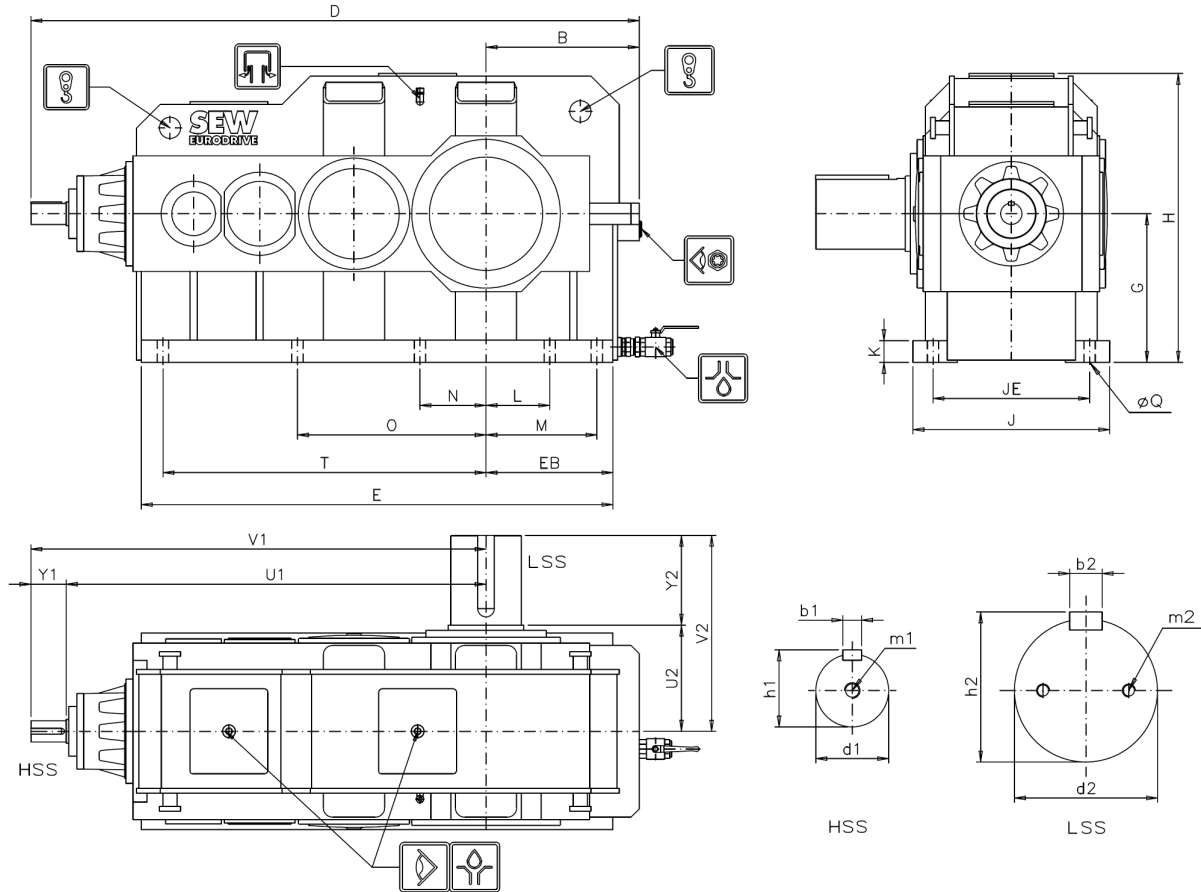
Size	i _N	HSS Dimensions [mm]							LSS Dimensions [mm]					Weight [kg]	Oil Quantity [l]			
		U1	Y1	V1	d1	b1	h1	m1	U2	Y2	V2	d2	b2		h2	m2*	Bath	Pressure
100	14 .. 63	1380	190	1570	100m6	28h9	106	M24	370	280	650	220m6	50h9	231	M20	3300	165	95
	71		150	1530	85m6	22h9	90	M20										
110	14 .. 56	1550	190	1740	110m6	28h9	116	M24	420	330	750	260m6	56h9	272	M24	4400	235	150
	63 .. 71		150	1700	90m6	25h9	95	M24										
120	14 .. 56	1760	190	1950	120m6	32h9	127	M24	450	380	830	300m6	70h9	314	M24	6000	325	180
	63 .. 71		190	1950	100m6	28h9	106	M24										
130	14 .. 56	1905	225	2130	130m6	32h9	137	M24	485	450	935	340m6	80h9	355	M30	8300	485	285
	63 .. 71		190	2095	110m6	28h9	116	M24										
140	14 .. 63	2100	225	2325	140m6	36h9	148	M30	535	450	985	380m6	80h9	395	M30	11000	660	420
	71		190	2290	120m6	32h9	127	M24										

+ 2x180°, distance 0.6xd2

Weight and oil quantity shown are the average values

Gear Unit Dimensions

ML4R..100-140



Shaft ends: ISO/R775-1969

Size	i _N	Housing Dimensions [mm]							Foot Mounting [mm]							
		B	D	E	EB	G	H	J	JE	K	L	M	N	O	T	Q
100	63 .. 280	505	2079	1590	405	500	975	652	526	72	185	335	225	660	1095	42
	63 .. 225	565	2315	1800	466	560	1090	710	590	82	240	400	260	750	1212	48
250 .. 280	2290															
120	63 .. 225	650	2615	2000	538	630	1225	834	664	92	270	470	280	800	1370	54
	250 .. 280		2590													
130	63 .. 225	715	2915	2255	595	710	1370	888	718	102	280	500	330	950	1535	54
	250 .. 280		2875													
140	63 .. 225	812	3262	2562	672	800	1525	940	770	112	300	580	380	1050	1728	54
	250 .. 280		3222													

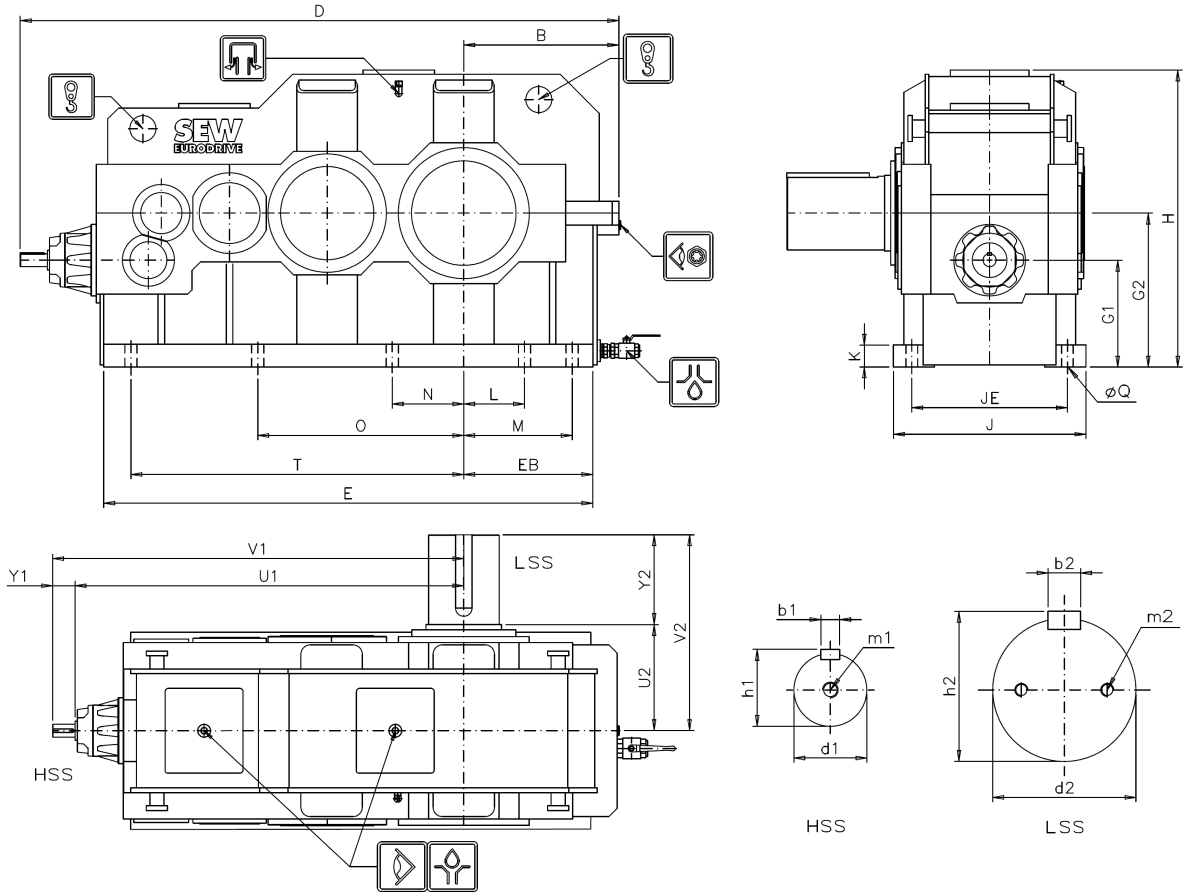
Size	i _N	HSS Dimensions [mm]						LSS Dimensions [mm]						Weight [kg]	Oil Quantity [l]			
		U1	Y1	V1	d1	b1	h1	m1	U2	Y2	V2	d2	b2		h2	m2 ⁺	Bath	Pressure
100	63 .. 200	1449	125	1574	75m6	20h9	79.5	M20	370	280	650	220m6	50h9	231	M20	3400	195	115
	225 .. 280		125	1574	65m6	18h9	69	M20										
110	63 .. 225	1600	150	1750	85m6	22h9	90	M20	420	330	750	260m6	56h9	272	M24	4560	270	160
	250 .. 280		125	1725	70m6	20h9	74.5	M20										
120	63 .. 225	1815	150	1965	90m6	25h9	95	M24	450	380	830	300m6	70h9	314	M24	6300	380	230
	250 .. 280		125	1940	75m6	20h9	74.5	M20										
130	63 .. 225	2010	190	2200	100m6	28h9	106	M24	485	450	935	340m6	80h9	355	M30	8600	520	305
	250 .. 280		150	2160	85m6	22h9	85	M20										
140	63 .. 225	2260	190	2450	110m6	28h9	116	M24	535	450	985	380m6	80h9	395	M30	11200	745	455
	250 .. 280		150	2410	90m6	25h9	95	M24										

+ 2x180°, distance 0.6xd2

Weight and oil quantity shown are the average values

Gear Unit Dimensions

ML5R..100-140



Shaft ends: ISO/R775-1969

Size	i _n	Housing Dimensions [mm]								Foot Mounting [mm]							
		B	D	E	EB	G1	G2	H	J	JE	K	L	M	N	O	T	Q
100	280 .. 900	505	1984	1590	405	349	500	975	652	526	72	185	335	225	660	1095	42
	1000 .. 1250		1959														
110	280 .. 1250	565	2219	1788	466	386	560	1090	710	590	82	240	400	260	750	1212	48
	280 .. 1250	650	2451	2008	538	439	630	1225	834	664	92	270	470	280	800	1370	54
120	280 .. 1250	715	2760.5	2255.5	595	493	710	1370	888	718	102	280	500	330	950	1535	54
140	280 .. 1250	812	3060.5	2525	672	565	800	1525	940	770	112	300	580	380	1050	1728	54

Size	i _n	HSS Dimensions [mm]							LSS Dimensions [mm]							Weight [kg]		Oil Quantity [l]	
		U1	Y1	V1	d1	b1	h1	m1	U2	Y2	V2	d2	b2	h2	m2 ⁺	[kg]	Bath	Pressure	
100	280 .. 900	1384	95	1479	45k6	14h9	48.5	M16	370	280	650	220m6	50h9	231	M20	3570	210	115	
	1000 .. 1250		70	1454	35k6	10h9	38	M12											
110	280 .. 900	1559	95	1654	50k6	14h9	53.5	M16	420	330	750	260m6	56h9	272	M24	4720	300	160	
	1000 .. 1250		95	1654	40k6	12h9	43	M16											
120	280 .. 1000	1706	95	1801	55m6	16h9	59	M20	450	380	830	300m6	70h9	314	M24	6420	420	225	
	1120 .. 1250		95	1801	45k6	14h9	48.5	M16											
130	280 .. 1250	1920.5	125	2045.5	65m6	18h9	69	M20	485	450	935	340m6	80h9	355	M30	8750	570	310	
140	280 .. 1250	2123.5	125	2248.5	70m6	20h9	74.5	M20	535	450	985	380m6	80h9	395	M30	11360	795	455	

+ 2x180°, distance 0.6xd2

Weight and oil quantity shown are the average values

Optional Accessories

- i Hollow Shaft**
 - Shrink Disk 5.02
 - Key Connection 5.02

- ii Cooling**
 - Radial Fan Dimensions 5.03
 - Axial Fan Dimensions 5.04

- iii Lubrication**
 - Lubrication Unit 5.05

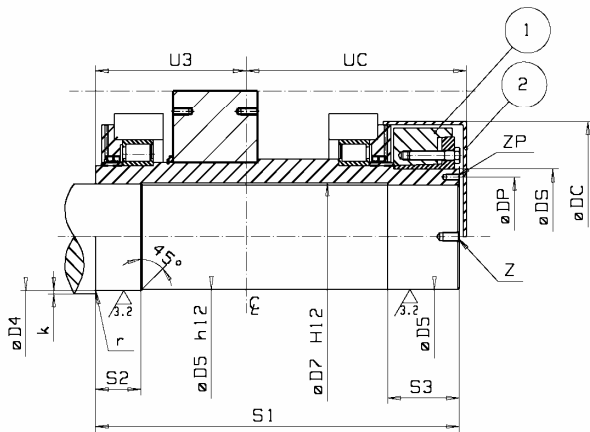
- iv Optional Seal Arrangements**
 - Optional Seal Arrangements 5.09

- v Coupled Equipment**
 - Sensors 5.09
 - Back Stop 5.10

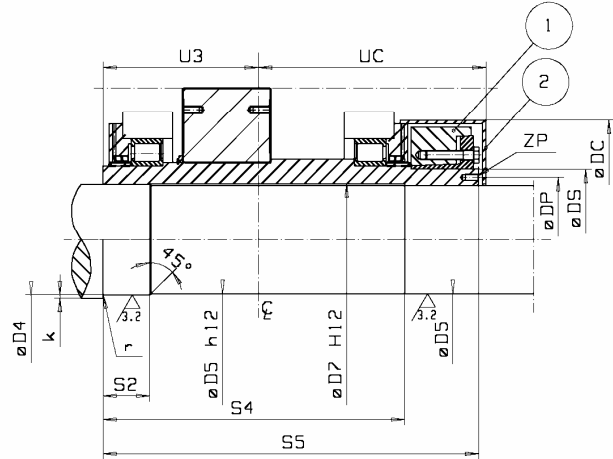
- vi Modifications**
 - Extended Total Centre Distance 5.11

Optional Accessories

Hollow Shaft - Shrink Disk Connection



Item 1: Shrink Disk
Item 2: Cover



Item 1: Shrink Disk
Item 2: Cover

Hollow Output Shaft with Shrink Disk

Hollow Output Shaft with Shrink Disk (Through going shaft)

Size	Dimensions [mm]																			
	Shrink Disk			Shaft end of driven machine											Hollow Shaft		Cover			
	Size standard	ØDS	Ma* [Nm]	ØD4		ØD5		ØD7	S1	S2	S3	S4	S5	k min	r max	U3	ØDP	ZP 6x60°	ØDC	UC
100	300/d=300	300	840	230	250js7/H8	229	249g6/H7	251	872	125	140	732	872	8	6	362	275	M12x24	513	540
110	360/d=360	360	840	240	300js7/H8	239	299g6/H7	301	975	150	167	808	975	8	6	400	330	M16x30	620	610
120	390/d=390	390	1250	270	310js7/H8	269	309g6/H7	311	1044	160	175	869	1044	8	6	435	350	M16x30	680	644
130	420/d=420	420	1250	280	330js7/H8	279	329g6/H7	331	1123	165	196	927	1123	8	6	465	375	M20x40	700	693
140																				

Please consult SEW-EURODRIVE

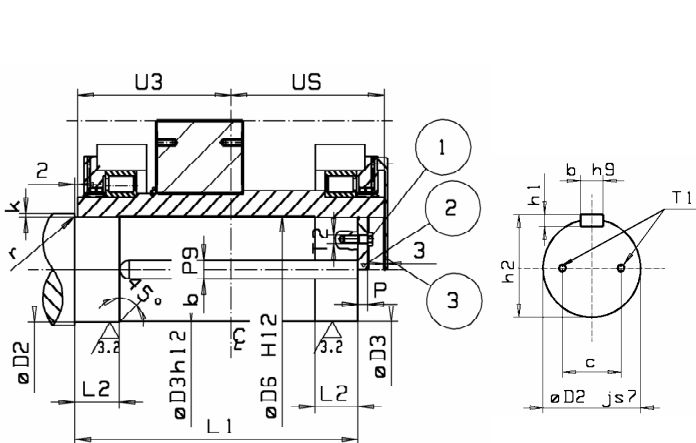
* Tightening torque of shrink disk screws

Z) Threaded holes according to customers standard. Recommended for assembly

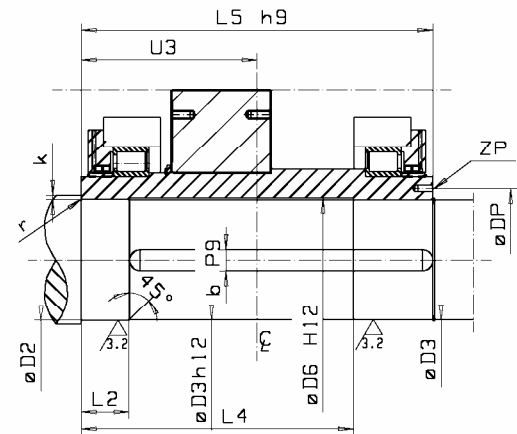
ZP) For disassembly tools

If not specified, the shrink disk shall be on the opposite side of the driven machine. For other configuration, please consult SEW-EURODRIVE

Hollow Shaft - Key Connection



Item 1: Screws are not included in normal delivery
Item 2: End Plate
Item 3: Cover



Hollow Output Shaft with Key Connection (Through going shaft)

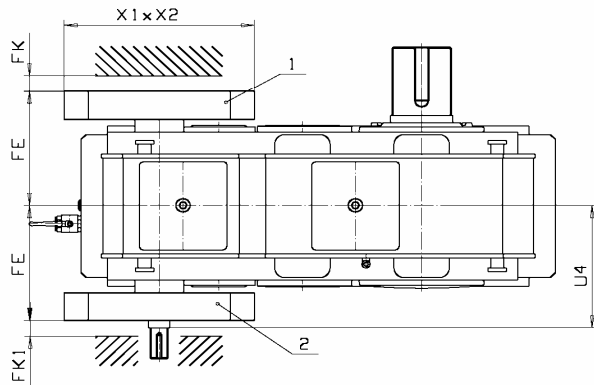
Hollow Output Shaft with Key Connection

Size	Dimensions [mm]																						
	ØD2		ØD3	ØD6	L1	L2	L4	L5	P	T1	c	T2	U3	US	ZP 6x60°	ØDP	Screw		b	h1	h2	k* min	r max
	min	standard															Size	Pcs					
100	230	240 js7/H8	239 js7/H8	241	657	120	535	724	30	M24x45	144	M30	362	362	M12x24	270	M24x70	2	56	32	252	8	6
110	240	280 js7/H8	279 js7/H8	281	732	140	590	800	32	M24x70	168	M30	400	400	M16x30	320	M24x100	2	63	32	292	8	6
120	280	300 js7/H8	299 js7/H8	301	801	145	654	870	32	M24x70	180	M30	435	435	M16x30	350	M24x100	2	70	36	314	8	6
130	300	320 js7/H8	319 js7/H8	321	852	150	700	930	36	M30x80	192	M36	465	465	M20x40	380	M30x110	2	70	36	334	8	6
140	340	370 js7/H8	369 js7/H8	371	938	180	756	1012	36	M30x80	220	M36	506	506	M20x40	425	M30x110	2	80	40	385	10	8

* Shoulder required only for Through Going Shaft

Cooling - Radial Fan Dimensions

Helical Gear Units

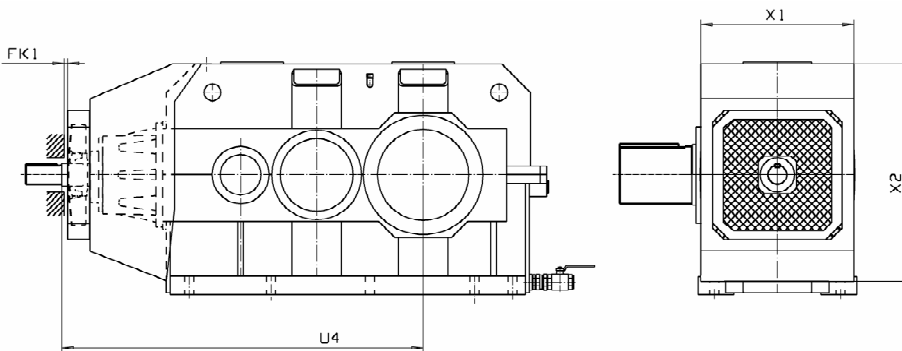


Size ML2P..	Dimensions [mm]						
	Fan*	U4	X1	X2	FE	FK _{min}	FK1 _{min}
100	Ø400	490	550	550	460	65	20
110	Ø530	560	680	680	520	65	20
120	Ø530	575	680	680	540	65	20

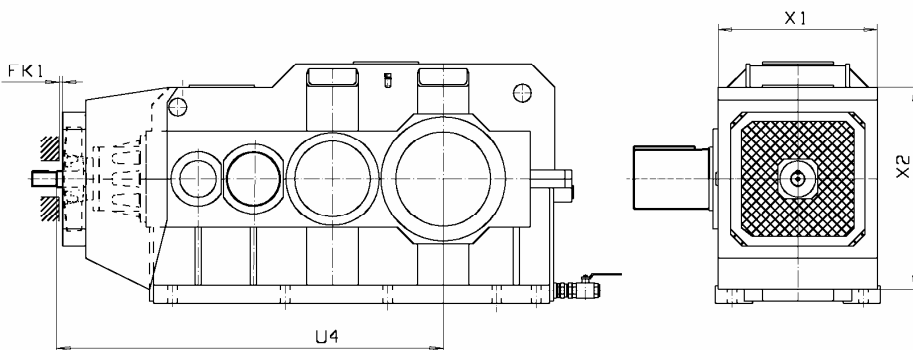
Size ML3P..	Dimensions [mm]						
	Fan*	U4	X1	X2	FE	FK _{min}	FK1 _{min}
100	Ø400	500	550	550	470	65	20
110	Ø530	540	680	680	510	65	20
120	Ø530	575	680	680	545	65	20

1. Fan on the HSS at the opposite side of the motor
2. Fan on the HSS

Bevel Helical Gear Units



Size ML3R..	Dimensions [mm]				
	Fan*	U4	X1	X2	FK1 _{min}
100	Ø400	1520	718	890	20
110	Ø530	1690	758	1000	20
120	Ø530	1900	805	1140	20



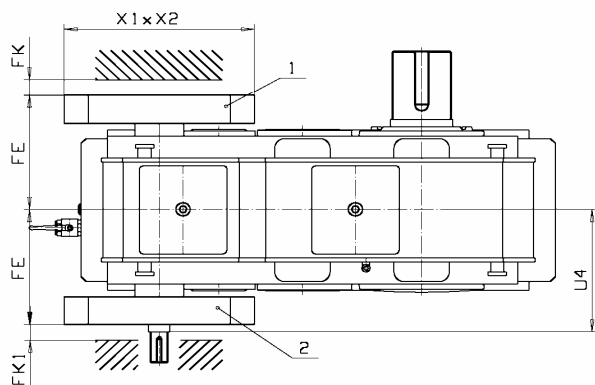
Size ML4R..	Dimensions [mm]				
	Fan*	U4	X1	X2	FK1 _{min}
100	Ø400	1585	718	800	20
110	Ø530	1735	758	900	20
120	Ø530	1955	805	1020	20

* Outer diameter of the fan

Optional Accessories

Cooling - Axial Fan Dimensions

Helical Gear Units

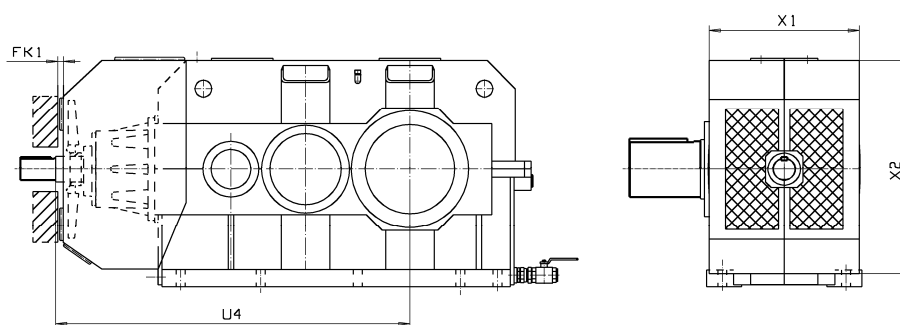


Size ML2P..	Dimensions [mm]						
	Fan*	U4	X1	X2	FE	FK _{min}	FK1 _{min}
100	Ø672	490	718	718	460	65	30
110	Ø742	560	788	788	520	65	30
120	Ø742	575	788	788	540	65	30

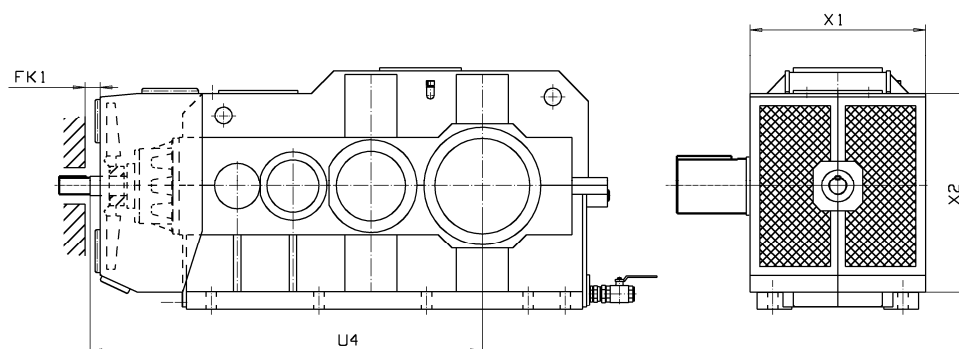
Size ML3P..	Dimensions [mm]						
	Fan*	U4	X1	X2	FE	FK _{min}	FK1 _{min}
100	Ø672	500	718	718	470	65	30
110	Ø742	540	788	788	510	65	30
120	Ø742	575	788	788	545	65	30

1. Fan on the HSS at the opposite side of the motor
2. Fan on the HSS

Bevel Helical Gear Units



Size ML3R..	Dimensions [mm]				
	Fan*	U4	X1	X2	FK1 _{min}
100	Ø672	1520	718	890	30
110	Ø742	1690	788	1000	30
120	Ø742	1900	805	1140	30



Size ML4R..	Dimensions [mm]				
	Fan*	U4	X1	X2	FK1 _{min}
100	Ø672	1585	718	800	30
110	Ø742	1735	788	900	30
120	Ø742	1955	805	1000	30

* Outer diameter of the fan

Lubrication Unit

1. Selecting oil flow and cooling rating

Power loss to be cooled

$$P_L = \left(P_{K1} - \frac{P_T}{2} \right) (1 - \eta)$$

Required oil flow for cooling the gear unit:

$$Q_R = 2.3 \times P_L$$

Required oil pump output

$$Q_P \geq \max(Q_R, Q_L)$$

P_L = power loss to be cooled [kW]

P_{K1} = gear unit running load [kW]

P_T = gear unit thermal rating (→ section 3) [kW]

η = efficiency (→ section 2)

Q_R = oil flow required for cooling the gear unit [dm³/min]

Q_L = oil flow required for lubrication of the gear unit [dm³/min] (→ table 5.01)

Q_P = oil pump output [dm³/min]

1.1 Selecting the size of Oil Cooler

Required cooling rating

$$P_C \geq F_L \times P_L$$

P_C = cooling rating [kW]

F_L = safety factor for cooling capacity, clean cooling media $F_L = 1.1$
dirty cooling media $F_L = 1.2$

1.2 Water flow required for Water / Oil Coolers

For Plate Cooler, type P

$$Q_W \leq 2 \times P_L$$

For Pipe Cooler, type B, BS or R

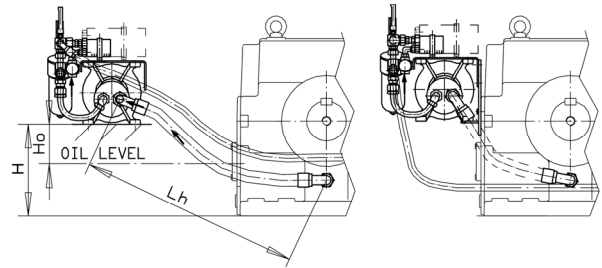
$$Q_W = F_W \times P_L$$

Q_W = water flow [dm³/min]

F_W = safety factor for flow capacity, clean water $F_W = 1.5$
dirty water $F_W = 3$

Table 5.01: Oil flow required for lubrication of gear unit

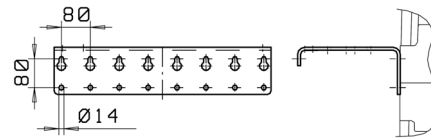
Size	Oil flow for lubrication Q_L [dm ³ /min]			
	ML2P..	ML3P/3R..	ML4P/4R..	ML5R..
100	18.5	22.1	25.7	27.9
110	20.5	24.5	28.5	31
120	23	27.4	31.9	34.7
130	25.8	30.9	35.9	39.1
140	29.1	34.8	40.5	44



F = Floor mounted

W = Wall mounted

Picture 5.01: Lubrication unit mounting position



Picture 5.02: Mounting plate for wall mounting

Selection Example

Data: ML4PSF120, $n_N = 100$, $n_1 = 1500$ rpm, $P_{K1} = 400$ kW, $P_T = 273$ kW, Fresh water cooling media, Ambient temperature = 30°C, Plate cooler

1) Power loss to be cooled

$$P_L = \left(400 - \frac{273}{2} \right) (1 - 0.94) = 15.8 \text{ kW}$$

2) Required oil flow for cooling the gear unit:

$$Q_R = 2.3 \times 15.8 = 36.3 \text{ dm}^3/\text{min}$$

3) Required oil flow for lubrication of the gear unit:

$$Q_L = 31.9 \text{ dm}^3/\text{min} \quad (\rightarrow \text{table 5.01})$$

4) Required oil pump output

$$Q_P \geq \max(36.3, 31.9) \text{ dm}^3/\text{min} \quad (\rightarrow \text{table 5.02, } Q_P = 44 \text{ dm}^3/\text{min} \geq Q_R, \text{ OK})$$

5) Required cooling rating

$$P_C \geq 1.1 \times 15.8 \geq 17.4 \text{ kW} \quad (\rightarrow \text{table 5.02, choose } P_C = 19 \text{ kW and } T_W = 25..40^\circ\text{C})$$

6) Calculate water flow required

$$Q_W \leq 2 \times 15.8 = 31.6 \text{ dm}^3/\text{min}$$

Hence, Lubrication Unit selected is **MHP29 / P2560 / FF25V / IW**

Note that the above simplified selection method is meant as a guide for quick selection of the Lubrication Unit. For detail calculation and selection, please consult SEW-EURODRIVE.

Optional Accessories

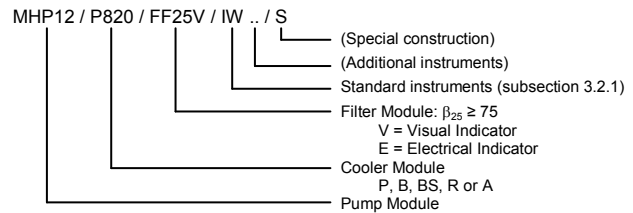
Lubrication Unit

2. Specifying the Lubrication Unit Modules

See selection tables 5.02, 5.03 and 5.04 for the list of Lubrication Unit Modules

Below is the list of information to be given in an order:

- type of the unit (e.g. MHP12 / P820 / FF25V / IW)
- motor main voltage and frequency
- instrument voltage (and frequency)
- ambient temperature range
- water temperature range (for water coolers)
- mounting position and location of the unit (→ picture 5.01)
- installation height H and hose length L_h must be advised to SEW-EURODRIVE when the lubrication unit is installed separate from the gear unit (→ picture 5.01).



It is recommended to place the Lubrication Unit at the low speed shaft end of the gear unit (→ picture 5.01, mounting position W).

The maximum length of the standard suction hose is 1000 mm. The maximum length of the pressure hose is 1500 mm. If hoses of greater length are required, the hose size must be increased and it is recommended to use steel piping between the Gear Unit and the Lubrication Unit (refer to SEW-EURODRIVE for more information).

Order example: MHP12 / P820 / FF25V / IW, at LSS end of the gear unit.

3. Technical data of components

Protection class for all electrical components is at minimum IP54. All electrical instruments can be connected according to NC (Normally closed) principle.

3.1 Component modules

- (1) Pump, type MHP/KF, Gear Wheel Pump + Motor, nominal pressure 1 MPa (10 bar/145 psi).
- (2) Fibre-glass Filter, type FF, standard degree of filtration 25 μm abs; $\beta_{25} = 75$ (ISO 4572).
 - (A1) Standard visual Filter Contamination Indicator, code V.
 - (A2) Optional Electrical Contamination Indicator (24 VDC or 230 VAC), code E.
- (3) Cooler type P, Plate Cooler, material AISI 316/Cu, not for seawater (table 5.02).
 - Optional:
 - type BS, Pipe Cooler, material Cu/Ni, for seawater (→ table 5.03)
 - type B, Pipe Cooler, material Cu/Ni, not for seawater (→ table 5.03)
 - type R, Pipe Cooler, material AISI 316, not for seawater (→ table 5.03)
 - type A, Air/oil Cooler (→ table 5.04)

3.2 Instrument module

3.2.1 Standard instruments

Use code IW for Lubrication Unit with Water Cooler and code IA for Lubrication Unit with Air Cooler.

- (4) Cooling Power Regulator
 - for Water Coolers, Thermostatic Water Valve, minimum water pressure required is 200 kPa (2 bar/29 psi).
 - for Air Coolers, Thermostatic Switch (controls the cooling fan of the Air Cooler).
- (5) Thermometer, scale 0 .. 100°C (+32 .. +212°F).
- (6) Pressure gauge, scale 0 .. 10 bar (0 .. 145 psi).
- (7) Pressure relief valve. Factory pre-adjusted.
- (8) Pressure switch (24 VDC or 230 VAC),

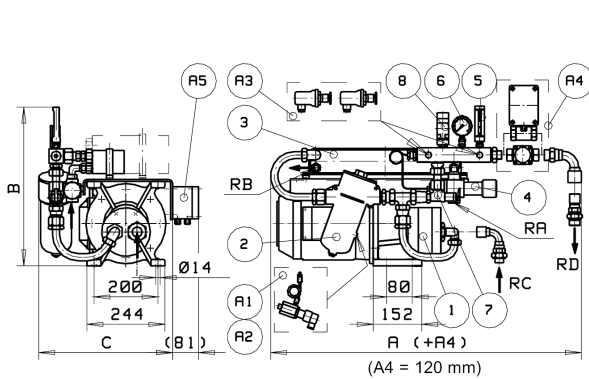
3.2.2 Additional Instruments

- (A3) Temperature Monitors (2 pcs; 70°C and 80°C, 24 VDC or 230 VAC). Additional code 2T.
- (A4) Flow Indicator; visual (FV), electrical (FE).
- (A5) Connection Box (CB).

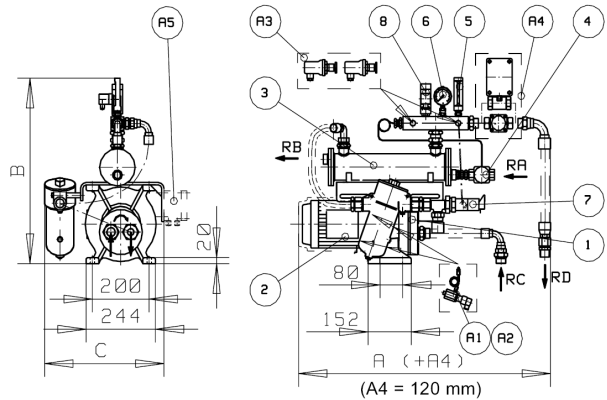
For special instruments please consult SEW-EURODRIVE.

Lubrication Unit

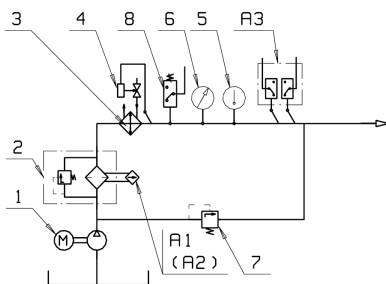
Technical data for Pressure Lubrication Unit with Water / Oil Cooler module



Type MHP/KF with Plate Cooler type P (table 5.01)



Type MHP with Pipe Cooler type B, BS and R (table 5.02)



Flow diagram for Water / Oil Cooler

Standard equipment

1. Pump
2. Filter
3. Cooler
4. Cooling Power Regulator
5. Thermometer
6. Pressure Gauge
7. Pressure Relief Valve
- A1. Visual Filter Contamination Indicator

Optional accessories

8. Pressure switch
- A2. Electrical Filter Contamination Indicator
- A3. Temperature Monitors
- A4. Flow Indicator
- A5. Connection Box

Table 5.02 Lubrication Unit with Plate Cooler, type P. Not for sea water

Cooling Rating P _c [kW]	Pump Output Q _p [dm ³ /min]	Water Temperature range T _w [°C]	Water Supply Q _w [dm ³ /min]	Pump Module	Cooler Module P	Motor Rating 1500rpm		Weight [kg]	Dimensions [mm]			Water Connections female	
						IEC	[kW]		A	B	C	RA	RB
0.75	2.5	5..25	..1	MH-2	P8-10	19FF165	0.75	29	630	500	423	R3/8	R1/2
		25..40	1..2	MH-2	P8-10			29					
2.5	7.5	5..25	3..7	MH-5	P8-20	19FF165	0.75	30	630	500	423	R3/8	R1/2
		25..40	2..11	MH-5	P8-20			30					
3.4	11	5..25	4..10	MHP-7	P8-20	19FF165	0.75	30	630	500	423	R3/8	R1/2
		25..40	2..10	MHP-7	P8-30			32					
5.3	18	5..25	8..16	MHP-12	P8-30	24FF165	1.1	42	630	500	423	R3/8	R1/2
		25..40	6..9	MHP-12	P8-40			43					
8.5	18	5..25	4..16	MHP-12	P15-40	24FF165	1.1	45	790	500	423	R3/8	R1/2
		25..40	4..16	MHP-12	P15-50			47					
10.5	28	5..25	6..12	MHP-18	P15-40	24FF165	1.5	48	787	540	423	R3/4	R1
		25..40	5..24	MHP-18	P15-50			49					
15	28	5..25	5..24	MHP-18	P25-40	24FF165	1.5	55	889	540	423	R3/4	R1
		25..40	7..24	MHP-18	P25-60			62					
19	44	5..25	6..22	MHP-29	P25-40	28FF215	3	68	889	600	452	R3/4	R1
		25..40	9..38	MHP-29	P25-60			75					
24	44	5..25	9..38	MHP-29	P25-60	28FF215	3	68	889	600	452	R3/4	R1
		25..40	10..38	MHP-29	P25-100			88					
25	65	5..25	8..16	MHP-47	P25-60	28FF215	4	71	889	600	452	R3/4	R1
		25..40	12..57	MHP-47	P25-60			71					
29	65	5..25	10..23	MHP-47	P25-70	28FF215	4	72	889	600	452	R3/4	R1
		25..40	12..57	MHP-47	P25-110			93					
43	100	5..25	16..32	MKF3/80	P25-80	38FF265	7.5	*	889	580	500	R3/4	R1
		25..40	28..87	MKF3/80	P25-80			*					
48	100	5..25	16..28	MKF3/80	P25-80	38FF265	7.5	*	889	580	500	R3/4	R1
		25..40	20..87	MKF3/80	P25-100			*					
59	135	5..25	22..43	MKF3/100	P25-80	42FF300	11	*	889	580	500	R3/4	R1
		25..40	38..117	MKF3/100	P25-100			*					
66	152	5..25	24..48	MKF3/112	P25-100	42FF300	11	*	889	580	500	R3/4	R1
		25..40	32..133	MKF3/112	P25-110			*					
72	165	5..25	19..52	MKF4/125	P27-100	42FF300	11	*	889	580	500	R1	R1 1/4
		25..40	30..144	MKF4/125	P25-110			*				R3/4	R1
87	200	5..25	25..63	MKF4/150	P45-60	42FF300	15	*	889	580	624	R1	R1 1/4
		25..40	32..174	MKF4/150	P45-80			*					

* Please consult SEW-EURODRIVE

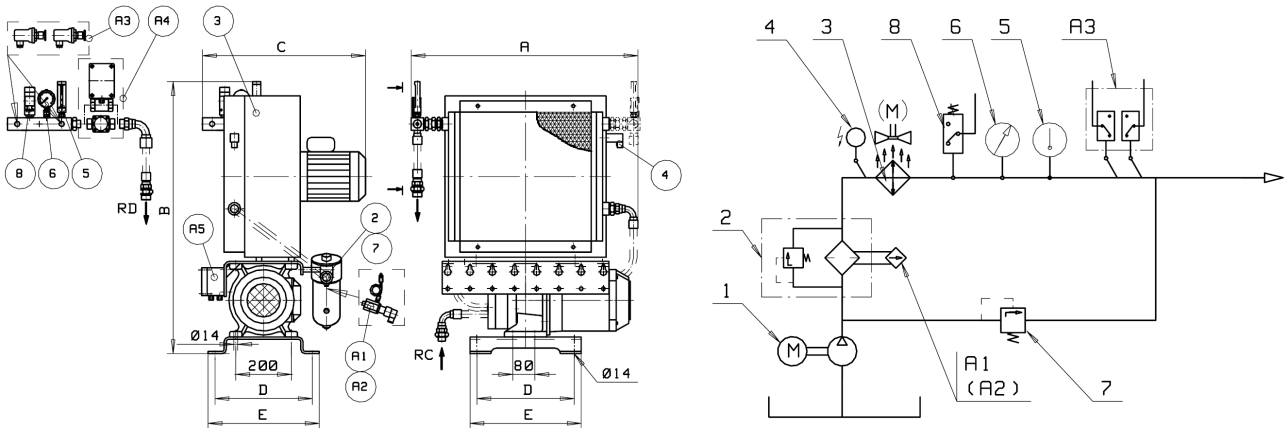
Optional Accessories

Lubrication Unit

Table 5.03 Lubrication Unit with Pipe Cooler, types B, BS and R (for sea water, choose type BS)

Cooling Rating P _c [kW]	Pump Output Q _p [dm ³ /min]	Water Supply Q _w [dm ³ /min]	Pump Module	Cooler Module B, BS, R	Motor Rating 1500 rpm		Weight [kg]	Dimensions [mm]			Water Connections female	
					IEC	[kW]		A	B	C	RA	RB
0.75	2.5	1.2	MHI2	2	19FF165	0.75	50	700	645	390	R1/2	R3/4
2.5	7.5	4.8	MHI5	2	19FF165	0.75	50	700	645	390	R1/2	R3/4
3.4	11	5..10	MHP7	2	19FF165	0.75	52	730	635	390	R1/2	R3/4
5.3	18	8..16	MHP12	2	24FF165	1.1	56	740	635	390	R1	R3/4
8.5	18	13..26	MHP12	3	24FF165	1.1	61	750	695	390	R1	R1 1/4
10.5	28	16..32	MHP18	3	24FF165	1.5	64	760	695	390	R1	R1 1/4
15	28	23..45	MHP18	4	24FF165	1.5	67	840	695	390	R1	R1 1/4
19	44	29..57	MHP29	4	28FF215	3	84	860	755	430	R1	R1 1/4
24	44	32..63	MHP29	5	28FF215	3	87	1010	755	430	R1	R1 1/4
25	65	38..75	MHP47	4	28FF215	4	93	860	755	430	R1	R1 1/4
29	65	44..87	MHP47	5	28FF215	4	96	1010	755	430	R1	R1 1/4

Technical data for Pressure Lubrication Unit with Air / Oil Cooler module



Type MHP/KF with Air / Oil Cooler type A (table 5.03)

Flow diagram for Air / Oil Cooler

Table 5.04 Lubrication Unit with Air / Oil Cooler, type A

Cooling Rating P _c [kW]	Pump Output Q _p [dm ³ /min]	Pump Module	Cooler Module	Motor Rating 1500 rpm [kW]	Fan Motor		Noise level (1m) [dB(A)]	Weight [kg]	Dimensions [mm]				
					rpm	power [kW]			A	B	C	D	E
0.75	2.5	MHI2	A042	0.75	3000	0.25	70	40	500	730	530	*	*
2.5	7.5	MHI5	A042	0.75	3000	0.25	70	40	500	730	530	*	*
3.4	11	MHP7	A042	0.75	3000	0.25	70	40	500	730	530	*	*
5.3	18	MHP12	A074	1.1	1500	0.25	64	60	600	800	540	*	*
8.5	18	MHP12	A114	1.1	1500	0.25	71	60	670	870	570	350	400
10.5	28	MHP18	A164	1.5	1500	0.37	74	70	730	930	590	350	400
15	28	MHP18	A234	1.5	1500	0.75	79	80	850	1020	660	350	400
19	44	MHP29	A336	3	1000	0.55	72	100	960	1090	680	350	400
24	44	MHP29	A334	3	1500	2.2	84	110	960	1090	750	350	400
25	65	MHP47	A334	4	1500	2.2	84	110	960	1090	750	350	400
29	65	MHP47	A444	4	1500	2.2	84	130	960	1130	770	350	400
43	100	MKF3/80	A566	7.5	1000	1.5	81	140	1140	^	795	^	^
48	100	MKF3/80	A564	7.5	1500	2.2	84	140	1140	^	795	^	^
59	135	MKF3/100	A564	11	1500	2.2	84	145	1140	^	795	^	^
66	152	MKF3/112	A766	11	1000	2.2	86	210	1290	^	810	^	^
72	165	MKF4/125	A786	11	1000	2.2	87	220	1290	^	830	^	^
87	200	MKF4/150	A1128	15	750	2.2	85	230	1290	^	915	^	^

* Separate foot not included

^ Please consult SEW-EURODRIVE

Maximum air temperature, T_{air,max} = 35°C

SEW-EURODRIVE reserves the right to optimise the Cooling Unit for each application

Optional Seal Arrangements

Seal arrangement alternatives on high speed shaft (HSS) and low speed shaft (LSS)¹⁾

SLS	DLS	RLS
<p>Lip seal (Standard)</p> <p>Single lip seal with dust protection cover</p> <ul style="list-style-type: none"> Clean environment 	<p>Double lip seal with grease nipple</p> <p>Double lip seal with regreaseable dust protection cover</p> <ul style="list-style-type: none"> Dusty environment with abrasive particles 	<p>Radial labyrinth seal with grease nipple</p> <p>Single lip seal with radial grease labyrinth (Taconite seals)</p> <ul style="list-style-type: none"> Dusty environment with highly abrasive particles

Lip seal material

NBR

- when the running temperature of the oil is less than 80°C

VITON²⁾

- when hot media is flowing through the low speed shaft warming up the seal surfaces

- when outside source radiates heat on the seal warming it up

- always on HSS

1) Seal arrangement selection does not affect the outer shaft end dimensions

2) VITON is less sensitive to become hard than NBR in high temperatures

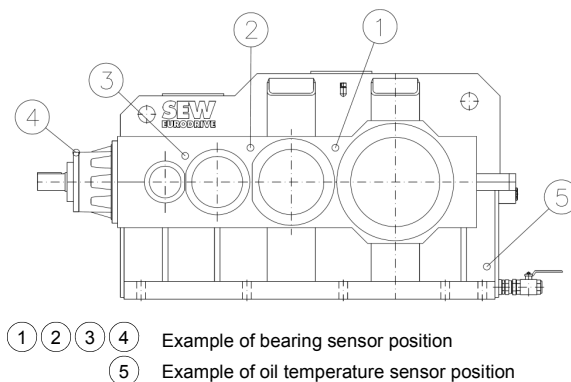
Coupled Equipment - Sensors

Shock Impulse Sensor

SIS1	SIS2	SIS3								
Nipple STD-2 UNC5/16 and cover STE-01	Nipple 32000 and cover 81025	Shock pulse transducer 40000 and TNC cable connector 13008								
	<table border="1"> <thead> <tr> <th>g</th> <th>L [mm]</th> </tr> </thead> <tbody> <tr> <td>M8 (UNC 5/16")</td> <td>24, 113, 202, 291</td> </tr> </tbody> </table>	g	L [mm]	M8 (UNC 5/16")	24, 113, 202, 291	<table border="1"> <thead> <tr> <th>g</th> <th>L [mm]</th> </tr> </thead> <tbody> <tr> <td>M8 (UNC 5/16")</td> <td>17, 106, 195, 284</td> </tr> </tbody> </table>	g	L [mm]	M8 (UNC 5/16")	17, 106, 195, 284
g	L [mm]									
M8 (UNC 5/16")	24, 113, 202, 291									
g	L [mm]									
M8 (UNC 5/16")	17, 106, 195, 284									

Temperature Sensor

TSO	TSB
Oil temperature sensor (PT100)	Bearing temperature sensor (PT100)



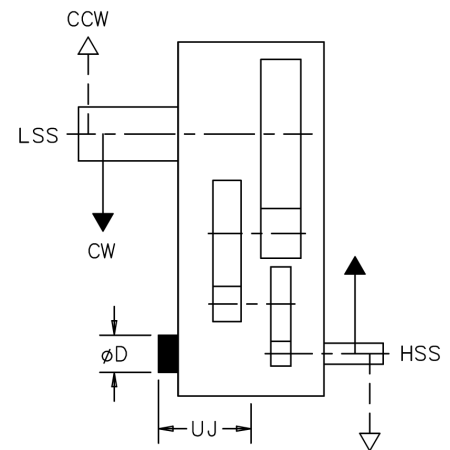
Optional Accessories

Coupled Equipment - Back Stop

Standard backstop arrangement dependent on shaft position and rotation direction

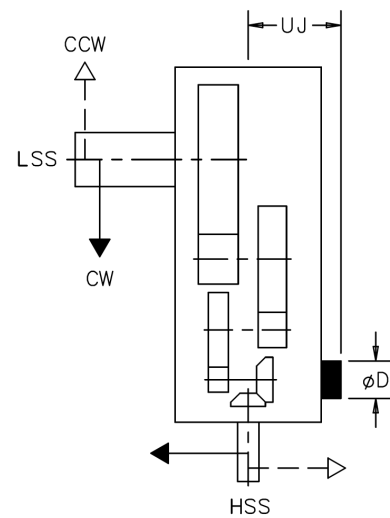
Helical Gear Units

Type	Shaft Position			
	14	13	24	23
ML2P..				
ML3P..				
ML4P..				



Bevel Helical Gear Units

Type	Shaft Position			
	03A	03B	04A	04B
ML3R..				
ML4R..				
ML5R..				



Rotation direction of shaft is determined when viewed from shaft end

Coupled Equipment - Back Stop

Size ML2P..	i _N	Backstop	ØD [mm]	UJ [mm]
100	5.6 .. 7.1	FXM200-63SX	310	488
	8 .. 18	FXM170-63SX	290	484
110	5.6 .. 7.1	FXM240-63UX	400	549
	8 .. 18	FXM200-63SX	310	526
120	5.6 .. 12.5	FXM240-96UX	420	636
	14 .. 18	FXM240-63UX	400	581
130	5.6 .. 18	FXM240-96UX	420	666
	5.6 .. 6.3	FXM290-96UX	460	682
140	7.1 .. 18	FXM290-70UX	460	652

Size ML3P..	i _N	Backstop	ØD [mm]	UJ [mm]
100	20 .. 50	FXM140-50SX	245	461
	56 .. 80	FXM100-40SX	190	436
110	20 .. 31.5	FXM140-50SX	245	499
	35.5 .. 80	FXM120-50SX	210	484
120	20 .. 31.5	FXM170-63SX	290	554
	35.5 .. 80	FXM140-50SX	245	531
130	20 .. 45	FXM170-63SX	290	584
	50 .. 80	FXM140-50SX	245	561
140	20 .. 31.5	FXM200-63SX	310	629
	35.5 .. 80	FXM170-63SX	290	625

Size ML4P..	i _N	Backstop	ØD [mm]	UJ [mm]
100	71 .. 180	FXM100-40SX	190	436
	200 .. 315	FXM86-25DX	150	414
110	71 .. 80	FXM120-50SX	210	484
	90 .. 315	FXM100-40SX	190	474
120	71 .. 125	FXM120-50SX	210	516
	140 .. 315	FXM100-40SX	190	506
130	71 .. 180	FXM120-50SX	210	546
	200 .. 315	FXM100-40SX	190	536
140	71 .. 90	FXM140-50SX	245	602
	100 .. 315	FXM120-50SX	210	587

Backstop with Torque Limiter (for multi-drive application)

Size ML3P..	i _N	Backstop	ØD [mm]	UJ [mm]
100	20 .. 40	FXRV140-50SX	430	510
	45 .. 80	FXRV100-50SX	350	504
110	20 .. 31.5	FXRV170-63SX	500	571
	35.5 .. 80	FXRV140-50SX	430	549
120	20 .. 40	FXRV170-63SX	500	603
	45 .. 80	FXRV140-50SX	430	581
130	20 .. 40	FXRV200-63SX	555	638
	45 .. 80	FXRV170-63SX	500	638
140	20 .. 40	FXRV240-63UX	710	700
	45 .. 80	FXRV200-63SX	555	671

Size ML3R..	i _N	Backstop	ØD [mm]	UJ [mm]
100	14 .. 40	FXM170-63SX	290	484
	45 .. 71	FXM140-50SX	245	461
110	14 .. 71	FXM170-63SX	290	522
	14 .. 35.5	FXM200-63SX	310	558
120	40 .. 71	FXM170-63SX	290	554
	14 .. 35.5	FXM240-63UX	400	611
130	40 .. 71	FXM200-63SX	310	588
	14 .. 40	FXM240-96UX	420	707
140	45 .. 71	FXM240-63UX	400	652

Size ML4R..	i _N	Backstop	ØD [mm]	UJ [mm]
100	63 .. 280	FXM120-50SX	210	446
110	63 .. 280	FXM120-50SX	210	485
120	63 .. 280	FXM140-50SX	245	531
130	63 .. 280	FXM170-63SX	290	584
140	63 .. 280	FXM170-63SX	290	625

Size ML5R..	i _N	Backstop	ØD [mm]	UJ [mm]
100	280 .. 1250	AA50	150	440
110	280 .. 1250	AA55	160	484
120	280 .. 1250	AA60	170	528
130	280 .. 560	AA70	190	574
	630 .. 1250	AA60	170	557
140	280 .. 1250	AA70	190	615

Backstops are dimensioned to brake output torque up to gear unit nominal output torque M_{N2}.
For other backstops and configurations, please consult SEW-EURODRIVE

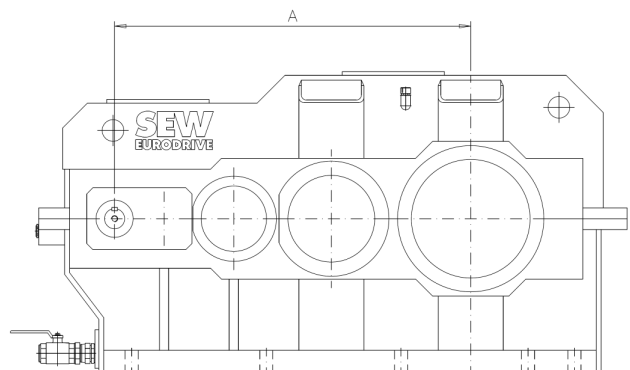
Size ML3R..	i _N	Backstop	ØD [mm]	UJ [mm]
100	14 .. 45	FXRV170-63SX	500	533
	50 .. 71	FXRV140-50SX	430	511
110	14 .. 40	FXRV200-63SX	555	571
	45 .. 71	FXRV170-63SX	500	571
120	14 .. 35.5	FXRV240-63UX	710	632
	40 .. 71	FXRV200-63SX	555	603
130	14 .. 71	FXRV240-63UX	710	665
	14 .. 45	FXRV260-63UX	750	721
140	50 .. 71	FXRV240-63UX	710	711

Modifications - Extended Total Centre Distance

Size ML3P..	Total Centre Distance [mm]	
	Standard	Non-standard (Max)
100	990	1205
110	1105	1350
120	1240	1510
130	1395	1690
140	1565	1900

Size ML4P..X	Total Centre Distance [mm]	
	Standard	Non-standard (Max)
100	1150	1520
110	1285	1705
120	1440	1910
130	1620	2140
140	1815	2400

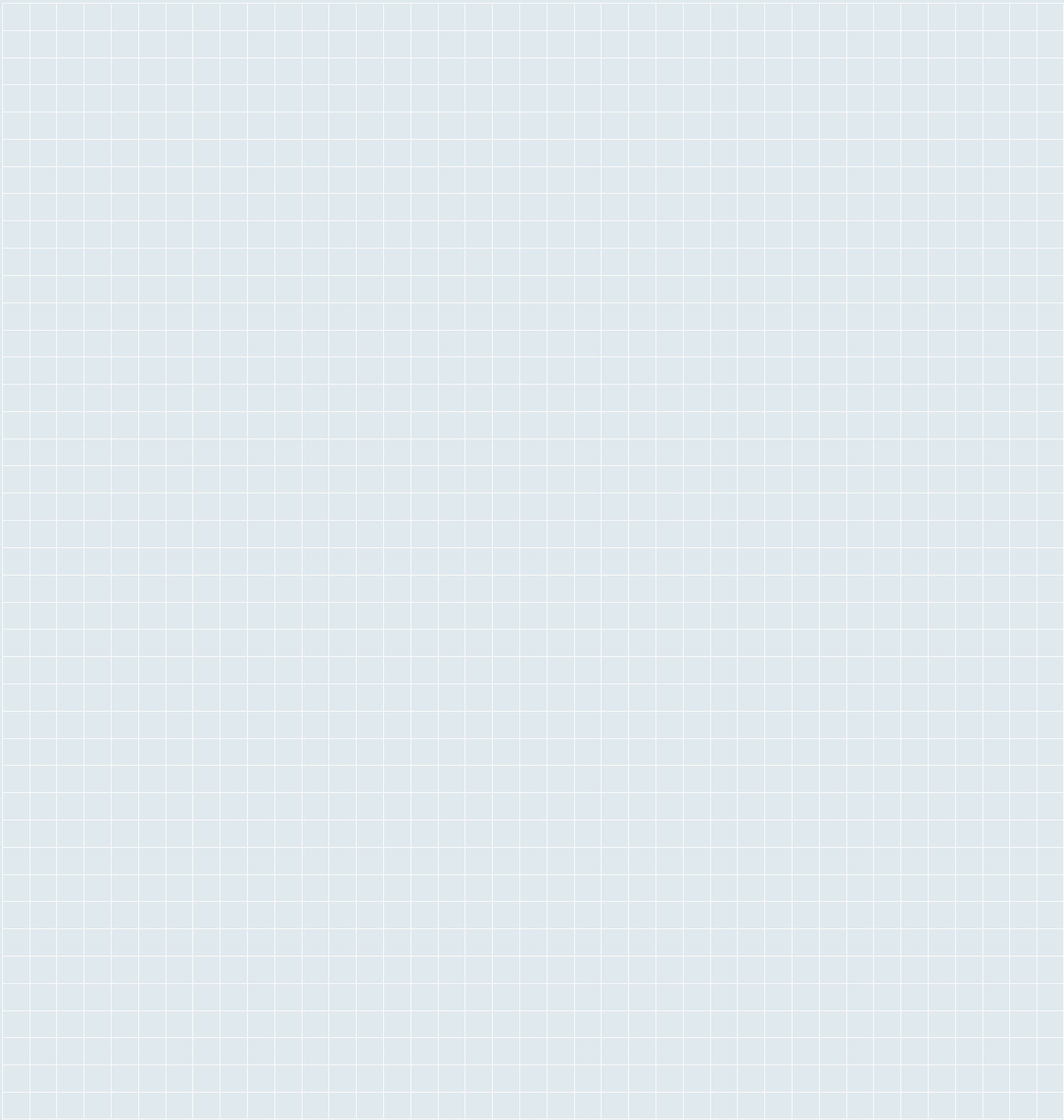
For non-standard total centre distance, please consult SEW-EURODRIVE



Appendix

Abbreviations Used

f_1	Altitude factor (= Correction factor for calculating the thermal rating of the gear unit)	-
f_2	Mounting option factor (= Correction factor for calculating the thermal rating of the gear unit)	-
f_3	Installation location factor (= Correction factor for calculating the thermal rating of the gear unit)	-
f_4	Operating cycle factor (= Correction factor for calculating the thermal rating of the gear unit)	-
f_5	Cooling fan factor (= Correction factor for calculating the thermal rating of the gear unit)	-
f_L	Lubrication factor (= Correction factor for calculating the thermal rating of the gear unit)	-
f_T	Ambient temperature factor (= Correction factor for calculating the thermal rating of the gear unit)	-
F_A	Axial force	kN
F_F	Peak factor	-
F_L	Safety factor for cooling capacity	-
F_R	Allowed actual radial force	kN
F_{RN}	Allowed nominal radial force	kN
F_S	Gear unit service factor = $M_{N2}/M_{K2} = P_{N1}/P_{K1}$	-
F_W	Safety factor for flow capacity	-
η	Efficiency	-
HSS	High speed shaft of the gear unit	-
i_{ex}	Exact gear unit reduction ratio	-
i_N	Nominal gear unit reduction ratio	-
K_Y	Radial force location factor	-
LSS	Low speed shaft of the gear unit	-
M_{K2}	Output torque (= operating torque on LSS)	kNm
$M_{K2\ MAX}$	Peak output torque	kNm
$M_{K2\ ZUL}$	Permitted peak torque on the gear unit output	kNm
M_{N2}	Nominal gear unit torque	kNm
n_1	Input speed (HSS)	rpm
n_2	Output speed (LSS)	rpm
P_C	Cooling rating	kW
P_{K1}	Input power (= operating power on HSS)	kW
$P_{K1\ MAX}$	Peak input power on HSS	kW
$P_{K1\ ZUL}$	Permitted peak power on the gear unit input	kW
P_{K2}	Output power (= operating power on gear unit output)	kW
P_L	Power loss to be cooled	kW
P_M	Nominal motor power	kW
P_{N1}	Nominal gear unit power	kW
$P_{N1,\ rev}$	Nominal gear unit power with reversing load = $P_{N1} \times 0.7$	kW
P_T	Thermal rating of the gear unit at existing ambient conditions	kW
P_{TH}	Nominal thermal rating of the gear unit at defined ambient conditions	kW
Q_L	Oil flow required for lubrication of the gear unit	dm ³ /min
Q_P	Oil pump output	dm ³ /min
Q_R	Oil flow required for cooling the gear unit	dm ³ /min
Q_W	Water flow rate	dm ³ /min



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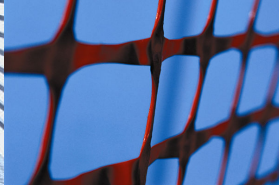
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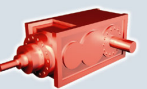
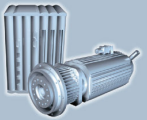
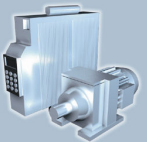


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