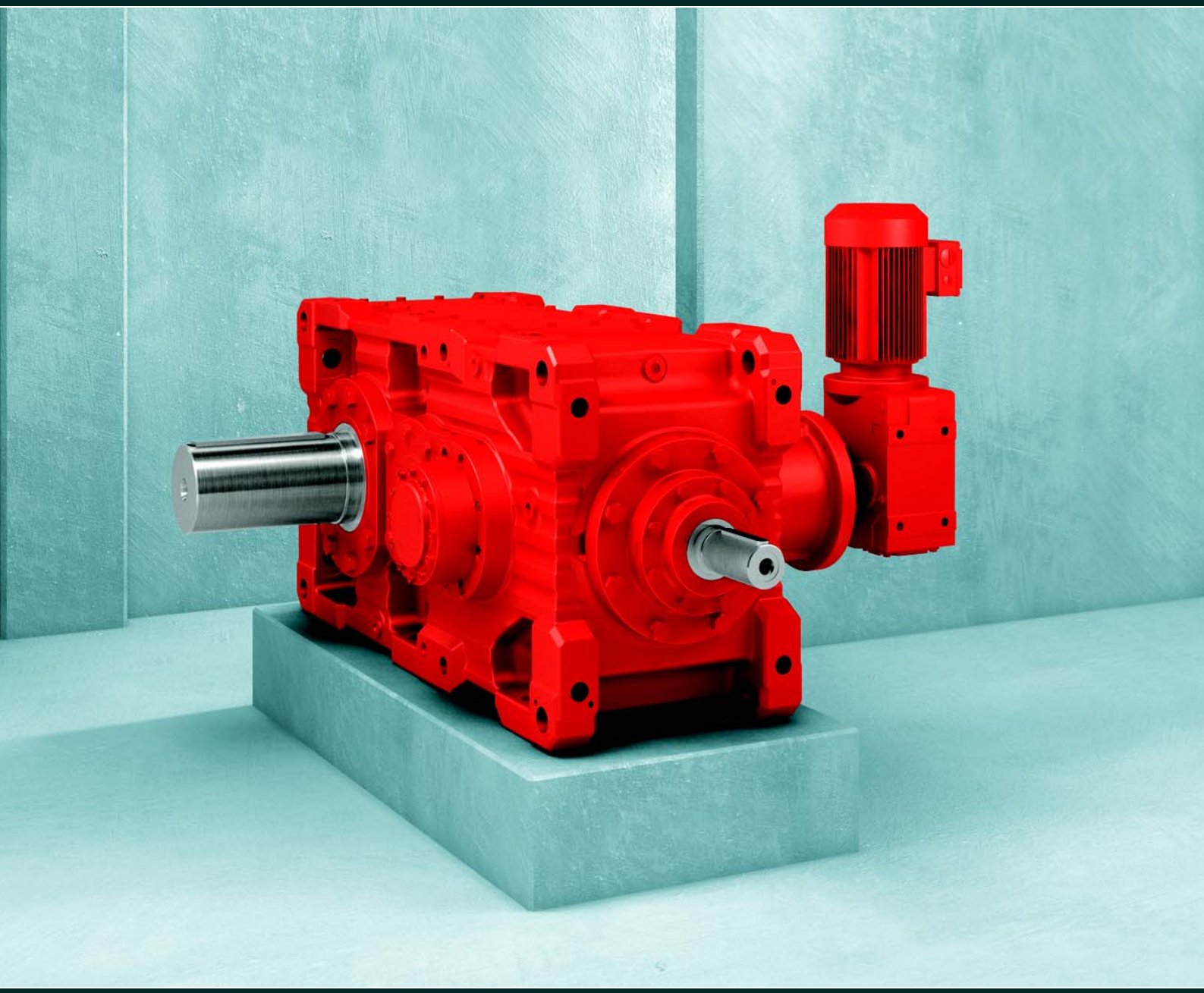
SEW EURODRIVE



Industrial Gear Units: Bevel-Helical Gear Units X.. Series Bucket Elevator Drives

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Catalog















SEW
EURODRIVE

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1 Introduction

1.1 The SEW-EURODRIVE group of companies

Global presence

Driving the world with innovative drive solutions for all branches and for every application. Products and systems from SEW-EURODRIVE are used in a multitude of applications - worldwide. SEW-EURODRIVE products are found in a variety of industries, such as automotive, building materials, food and beverage as well as metal-processing. The decision to use drive technology “made by SEW-EURODRIVE” stands for reliability for both functionality and investment.

Not only are we represented in all important branches of industry today – we are found all over the world: With eleven manufacturing plants and 61 assembly plants in 44 countries and our comprehensive range of services, which we consider an integrative service adequately continuing our commitment to outstanding quality.

Always the right drive

The SEW-EURODRIVE modular concept offers millions of combinations. This wide selection enables you to choose the correct drive for all applications, each based on the required speed and torque range, space available and the ambient conditions. Gear units and gearmotors offering a unique and finely tuned performance range and the best economic prerequisites to face your drive challenges.

The gearmotors are electronically empowered by MOVITRAC® frequency inverters, MOVIDRIVE® inverters and MOVIAXIS® multi-axis servo inverters, a combination that blends perfectly with the existing SEW-EURODRIVE program. As is the case with the mechanical systems, development, production and assembly is carried out completely by SEW-EURODRIVE. In combination with our drive electronics, these drives will provide the utmost in flexibility.

Products of the servo drive system, such as low backlash servo gear units, compact servomotors or MOVIAXIS® multi-axis servo drives provide precision and dynamics. From single-axis or multi-axis applications all the way to synchronized process sequences, servo drive systems by SEW-EURODRIVE offer a flexible and customized implementation of your application.

For economical, decentralized installations, SEW-EURODRIVE offers components from its decentralized drive system, such as MOVIMOT®, the gearmotor with integrated frequency inverter or MOVI-SWITCH®, the gearmotor with integrated switching and protection function. SEW-EURODRIVE has developed hybrid cables to provide cost-effective functional solutions, independent of the philosophy behind or the size of the system. The latest developments from SEW-EURODRIVE: MOVITRANS® - system components for contactless energy transfer, MOVIPRO® - the decentralized drive control and MOVIFIT® - the new decentralized intelligence.

Power, quality and sturdy design combined in one standard product: with SEW-EURODRIVE, high-torque industrial gear units achieve large movements. The modular concept once again provides optimum adaptation of industrial gear units to meet a wide range of the most varying applications.

Your ideal partner

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 in all applications and branches of industry.

1.2 Products and systems from SEW-EURODRIVE

The products and systems from SEW-EURODRIVE are divided into four product groups. These four product groups are:

1. Gearmotors and frequency inverters
2. Servo drive systems
3. Decentralized drive systems
4. Industrial gear units

Products and systems used in several group applications are listed in a separate group "Products and systems covering several product groups." Consult the following tables to locate the products and systems included in the respective product group:

1. Gearmotors and frequency inverters		
Gear units / gearmotors	**Motors**	**Frequency inverters**
• Helical gear units/helical gearmotors • Parallel shaft helical gear units/parallel shaft helical gearmotors • Bevel-helical gear units/bevel-helical gearmotors • Helical-worm gear units/helical-worm gearmotors • Spiroplan® right-angle gearmotors • Drives for overhead trolley systems • Geared torque motors • Multi-speed gearmotors • Variable speed gear units/variable speed gearmotors • Aseptic gearmotors • ATEX compliant gear units/gearmotors • ATEX compliant variable speed gear units/variable speed gearmotors	• Asynchronous AC motors/AC brakemotors • Multi-speed AC motors/AC brakemotors • Energy efficient motors • Explosion-proof AC motors/AC brakemotors • Torque motors • Single-phase motors/single-phase brakemotors • Asynchronous linear motors	• MOVITRAC® frequency inverters • MOVIDRIVE® inverters • Control, technology and communication options for inverters

2. Servo drive systems		
Servo gear units / servo gearmotors	**Servomotors**	**Servo drive inverters / servo inverters**
• Low backlash servo planetary gear units/planetary gearmotors • Low backlash helical-bevel servo gear units / helical-bevel gearmotors • Explosion-proof servo gear units / servo gearmotors	• Asynchronous servomotors / servo brakemotors • Synchronous servomotors / servo brakemotors • Explosion-proof servomotors / servo brakemotors • Synchronous linear motors	• MOVIDRIVE® servo inverters • MOVIAXIS® multi-axis servo inverters • Control, technology and communication options for servo drive inverters and servo inverters

3. Decentralized drive systems		
Decentralized drives	**Communication and installation**	**Contactless energy transfer**
• MOVIMOT® gearmotors with integrated frequency inverter • MOVIMOT® motors/brakemotors with integrated frequency inverter • MOVI-SWITCH® geamotors with integrated switching and protection function • MOVI-SWITCH® motors/brakemotors with integrated switching and protection function • Explosion-proof MOVIMOT® and MOVI-SWITCH® gearmotors	• Fieldbus interfaces • Field distributors for decentralized installation • MOVIFIT® product range – MOVIFIT® MC to control MOVIMOT® drives – MOVIFIT®-SC with integrated electronic motor switch – MOVIFIT®-FC with integrated frequency inverter	• MOVITRANS® system – Stationary components for energy supply – Mobile components for energy absorption – Line cables and installation material

4. Industrial gear units		
Helical and bevel-helical gear units • X series • MC series • ML series	Helical and bevel-helical planetary gear units • P Series (also as planetary gearmotors) • PMC series	Drive packages • Application solutions connected with - Swing base - Gearmotors - Motors - Couplings - Drum and disk brakes - Lubrication systems for conveyor drives, bucket elevators, crushers, agitators, cooling towers, crane systems and much more

Products and systems covering several product groups
• Operator terminals • MOVI-PLC® drive-based control system

In addition to its products and systems, SEW-EURODRIVE offers a comprehensive range of services. These include:

- Technical consulting
- Application software
- Seminars and training
- Extensive technical documentation
- International customer service

Visit our home page:

→ **www.sew-eurodrive.com**

The website offers a great deal of information and services.

2 Product Description and Overview of Types

2.1 Structure of the safety notes

The safety notes in this catalog are structured as follows:

Symbol	Signal word	Meaning	Consequences if disregarded
	**STOP**	Possible damage to property	Damage to the drive system or its environment
	**NOTE**	Useful information or tip. Simplifies handling of the drive system.	

2.2 General information

	**STOP** • The illustrations in the catalog are examples and are not binding. • The specified fill quantities are non-binding guidelines. The marks on the oil dipstick or oil level glass are determinative for the oil level. • Read the operating instructions prior to startup. • The gear units are ready for operation when delivered, but are not filled with oil. • Oil viscosity and grade must comply with those specified on the nameplate. • The weights shown are non-binding average values. • The buyer must provide protection against unintentional contact with moving parts. The applicable safety regulations of the country in which the unit will be used should be followed. The applicable safety regulations of the country in which the unit will be used should be followed.

2.2.1 Nominal power, torques and input speeds

The nominal power and torque values mentioned in the catalog depend on the input speed and are valid for a service factor of F_S = 1.0 and constant load. The overview shows nominal power and torque values for output speeds of 1800 rpm and 1500 rpm. The nominal torque values also apply to an input speed that is 3% lower than the synchronous speed. For input speeds > 1800 rpm, please contact SEW-EURODRIVE.

2.2.2 Mounting position

This catalog describes horizontal gear unit with "M1" mounting position. As an alternative to the usual foot-mounted version, bucket elevator drives are available with torque arm.

2.2.3 Lubrication

The lubrication type "splash lubrication" is used for bucket elevator drives as standard. Pressure or bath lubrication may optionally be used with these gear units.

To provide a visual check on the oil level, an oil level glass is normally used. An oil dipstick may also optionally be used. Instead of the oil drain plug, an oil drain valve may be provided. An oil heater may be necessary when ambient temperatures are low. SEW-EURODRIVE provides the oil heater with a pre-set thermostat that is attached to the gear unit.

2.2.4 Sealing system

Bucket elevator drives are supplied with regreasable radial labyrinth seal (Taconite) as standard.

2.2.5 Thermal rating / cooling

The thermal rating needs to be checked for every gear unit. The relevant values are listed in the selection tables in section 10.

If the thermal rating of the gear unit is insufficient, it can be operated with a fan on the input shaft (depending on the direction of rotation) instead. In this case you will have to make sure that there is enough space left for unimpeded air admission both in axial and radial direction (see section 5.5). Please contact SEW-EURODRIVE for information on other cooling options.

2.2.6 Motor connection

SEW-EURODRIVE can supply the following variants with the gear unit:

- **Motor adapter** with an elastic coupling for attaching IEC (B5) / NEMA ('C' face) motors. The motor adapter may optionally be designed with a fan.
- **Steel frame** as swing base or base plate (including the necessary components, such as couplings, brake, motor and protection guards; see sections 6.3 and 12).

2.2.7 Backstop

Bucket elevator drives come equipped with integrated, oil-lubricated backstop to prevent inadvertent reverse rotation (see section 2.8). Optional with torque limitation for dual and multi drives.

2.2.8 Condition monitoring

A variety of optional equipment is available for condition monitoring:

- PT100 temperature sensor (section 7.1): For measuring the oil bath temperature
- NTB temperature switch (section 7.2): For monitoring the oil temperature of the gear unit

2.2.9 Surface and corrosion protection

If required, all gear units can also be supplied with special surface protection for applications in extremely damp or chemically aggressive environments.

2.2.10 Coating

The gear units are painted with "blue-gray" / machine paint RAL 7031 as per DIN 1843 as standard. Special coatings are available on request. The SEW protection guards included in the delivery are coated in "signal yellow" / RAL 1003.

2.2.11 Noise level

Normally, the gear unit's sound-power levels, according to ISO 8579-1, are below the 50% line given in the standard.

2.3 Drive concepts for bucket elevators

There are two drive concepts for bucket elevators:

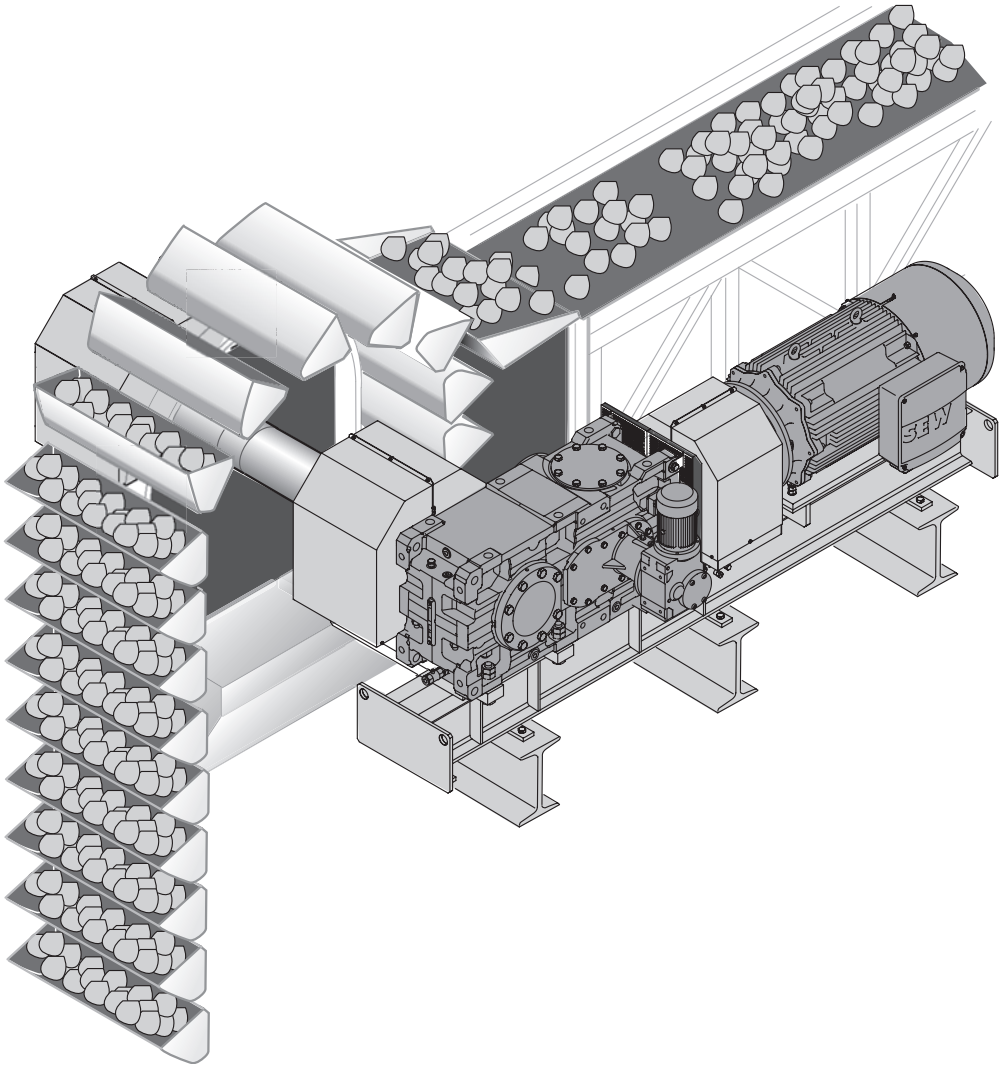
- Single drive
- Dual drive

2.3.1 Single drive

The bucket elevator is driven by a drive that transfers the complete drive power.

The backstop of the main drive is designed in such a way that it is capable of blocking the entire retrodriving torque of the bucket elevator.

"Empty bucket" deisgn means the auxiliary drive can turn the empty bucket elevator during maintenance work. "Full bucket" design means that this is also possible in loaded condition.



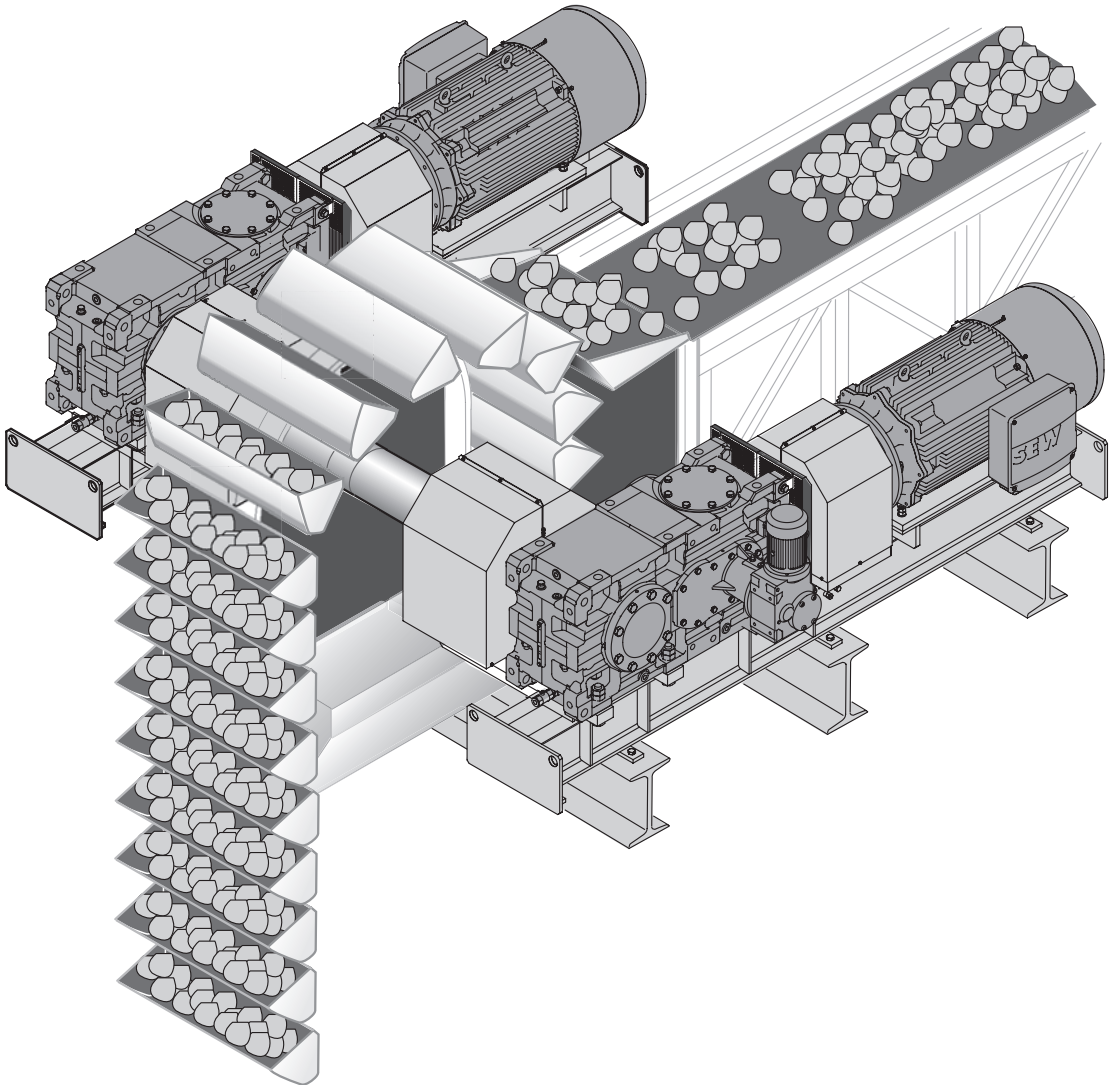
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2.3.2 Dual drive

With dual drives, one drive each is located inversely to the left and right of the bucket elevator head. The required drive power is divided among the two drives.

In order to avoid the retrodriving torque from being distributed unevenly to the backstops of the gear unit, SEW-EURODRIVE recommends using torque limited backstops for dual drives. The retrodriving torque of the bucket elevator is distributed evenly among the two drives due to the torque limitation.

It is usually sufficient to equip only one of the two gear units with an auxiliary drive. The "full buckets" design should be chosen to ensure sufficient power reserves.

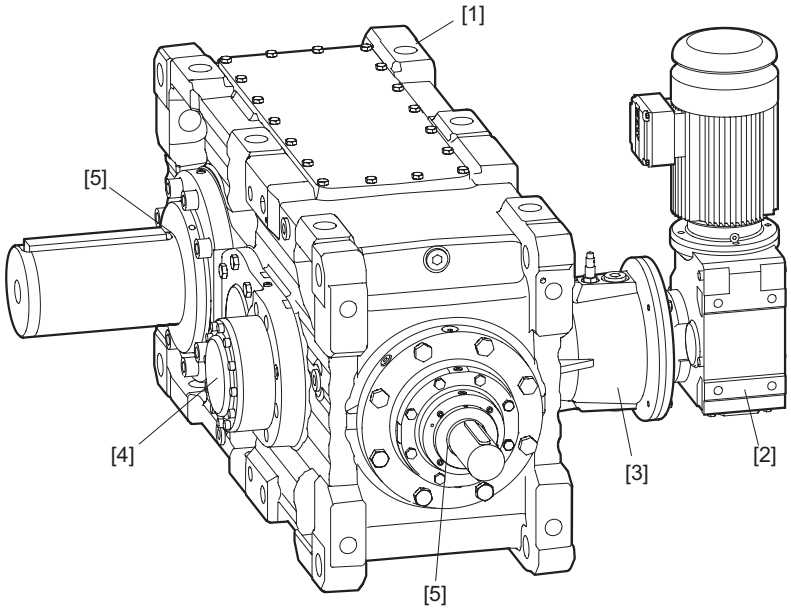


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2.4 Gear unit design

The bucket elevator drive is a standardized application gear unit based on the basic concept of the X gear unit series and covers a gear ratio range of 28..71 (80).

More information on the X series can be found in the catalog "Helical and Bevel-Helical X.. Series Horizontal Gear Units" (publication number: 11681810).



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Unlike the basic design of the X gear unit series, bucket elevator drives come equipped with the following components as standard:

[1] X.K.. bevel-helical gear unit

[2] Auxiliary drive

[3] Auxiliary drive adapter with overrunning clutch and encoder for speed monitoring

[4] Backstop

[5] Radial labyrinth seal (Taconite) on input and output shafts

The following options are also available:

- Speed monitor
- Fan (other cooling options on request)
- Torque-limited backstop
- Oil heater
- Oil drain valve

2.5 Auxiliary drive

The auxiliary drive [2] is available in "empty buckets" design (solely for maintenance purposes) or "full buckets" design. SEW helical worm or bevel-helical gearmotors are used depending on the design. The auxiliary drive is mounted to the bevel-helical gear unit [1] via an auxiliary drive adapter [3]. Refer to the order documents for the exact output torque rates in auxiliary drive operation.

Main drive and auxiliary drive are to be electrically interlocked in such a way that only one of the two motors can be switched on.

The auxiliary drive has its own oil circuit, separated from the oil circuit of the bevel-helical gear unit. The auxiliary drive is delivered filled with oil.

2.6 Overrunning clutch

The overrunning clutch is a part of the auxiliary drive adapter [3] and allows for operation in one direction of rotation via the auxiliary drive [1].

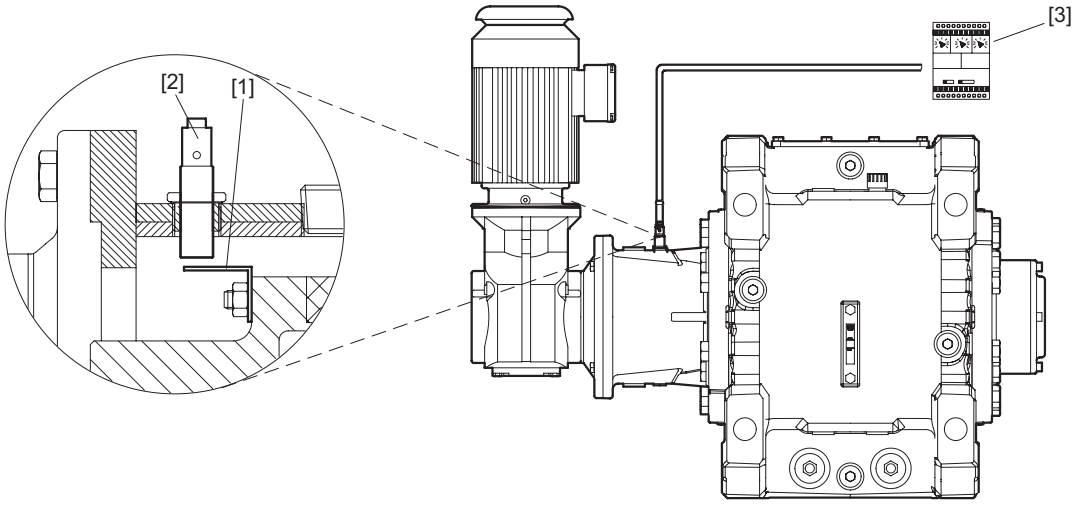
When the main drive is in use, the overrunning clutch is in no load-operation. When the auxiliary drive is used, i.e. in transfer operation, the input shaft of the bevel-helical gear unit [1] is rotating slowly.

The rotary motion of the input shaft of the bevel-helical gear unit [1] must not be obstructed. A brake on the input side of the main drive must be released for auxiliary drive operation.

The overrunning clutch is integrated in the oil circuit of the bevel-helical gear unit. This means maintenance and oil change for the overrunning clutch and the bevel-helical gear unit [3] are carried out at the same time.

2.7 Speed monitoring

STOP	**STOP** For safety reasons, the overrunning clutch must be equipped with speed monitoring. This is because, in case of a malfunction, the overrunning clutch may be damaged due to overspeed.



[1] Trigger cam
[2] Inductive encoder
[3] Speed monitor (optional)

The speed of the overrunning clutch is detected in a contactless manner via trip cam [1] and an inductive conductor [2]. The speed monitor [3] compares the pulses with a defined switching speed.

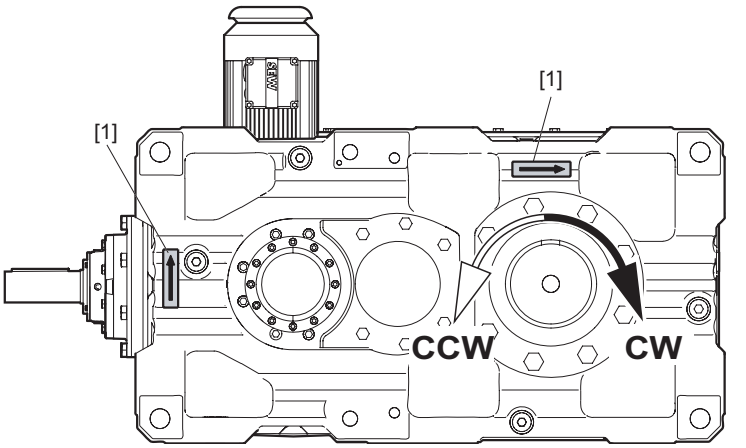
If the switching speed is exceeded (e.g. due to a malfunction of the overrunning clutch), the output relay will switch (optionally NC contact or NO contact). The connection must be made in such a way that the main drive is switched off in this situation. Overspeed at the auxiliary drive will be prevented in this way.

	NOTE The encoder is included in the scope of delivery. The speed monitor, which is not included in the delivery, can be ordered separately (see section 7.4).

2.8 Backstop

The purpose of a backstop is to prevent undesirable reverse rotation. During operation, the backstop permits rotation in only one specified direction of rotation.

The backstop functions by using centrifugal lift-off sprags. Once the lift-off speed is reached, the sprags completely lift off from the contact surface of the outer ring. The backstop is lubricated with gear oil.



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The direction of rotation is determined with a view to the output shaft (LSS).

- CW = Clockwise
- CCW = Counterclockwise

The permitted direction of rotation [1] is indicated on the housing.

Dimensioning

Dimensioning of the backstop is carried out according to the following basic rules:

- Speed of the gear unit input shaft: 0... 1800 rpm
- Maximum permitted torque of the backstop in relation to the output shaft:
  At least 3 times the rated gear unit torque

Contact SEW-EURODRIVE for differing specifications.

STOP	**STOP**
	For determining maintenance intervals, please contact SEW-EURODRIVE if speeds on the input shaft n_1 < 1400 rpm. The backstop may wear off during operation below lift-off speed.

2.9 Technical data at a glance

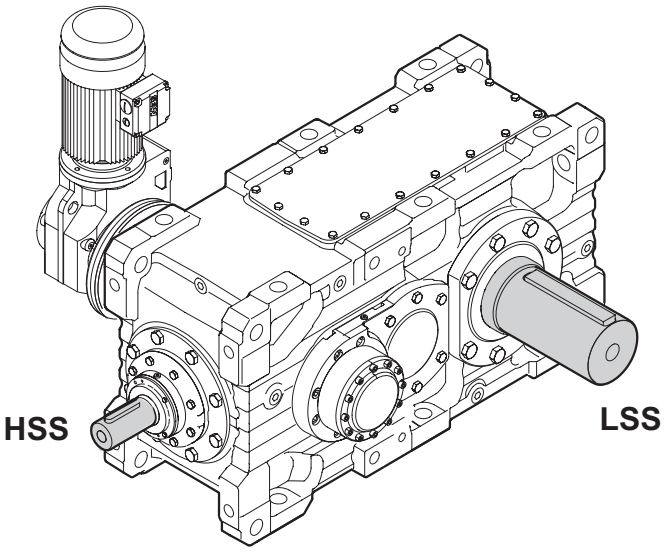
2.9.1 Bevel-helical gear units for bucket elevator drives

Size	Nominal torque [kNm] – class	Nominal gear ratio range
180	58	28...71
190	65	28...80
200	79	28...71
210	90	28...80
220	112	28...71
230	131	28...80
240	156	28...71
250	175	28...80

2.10 Input and output shaft

Two types of shafts are differentiated in the catalog:

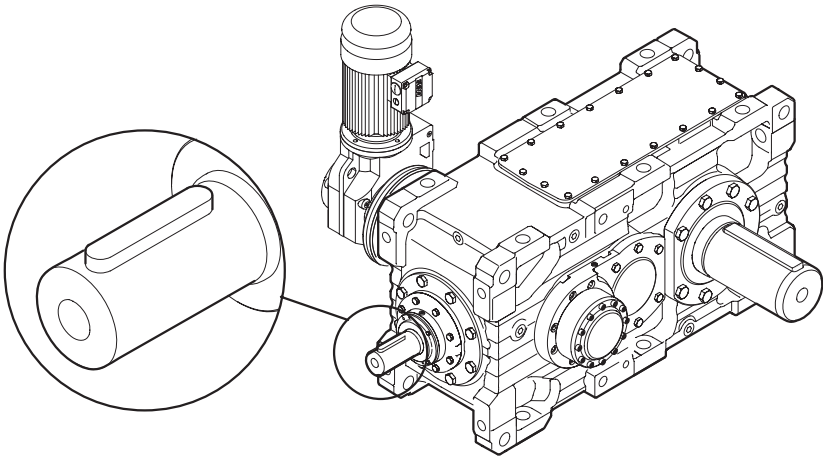
- High-speed shaft (**HSS**), normally an input shaft
- Low-speed shaft (**LSS**), normally an output shaft



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2.10.1 Input shaft

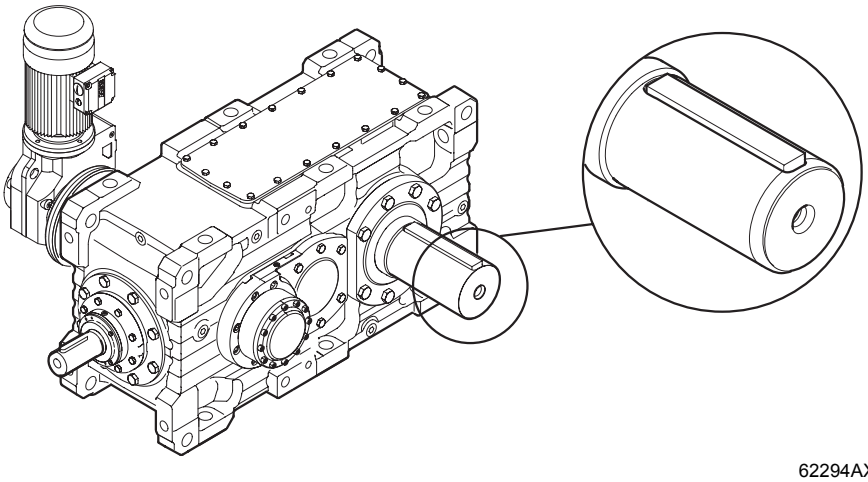
The input shaft is provided with a closed keyway (according to DIN 6885/T1) and center bore (according to DIN 332) The matching key according to DIN 6885/T1 - form A is included in the scope of delivery.



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2.10.2 Output shaft as a solid shaft with key

The output shaft is provided with a closed keyway (according to DIN 6885/T1) and center bore (according to DIN 332) The scope of delivery includes a key according to DIN 6885/T1 - form B. In order to simplify the mounting of output elements, such as a coupling hub, the shaft has an insertion area with a reduced diameter.



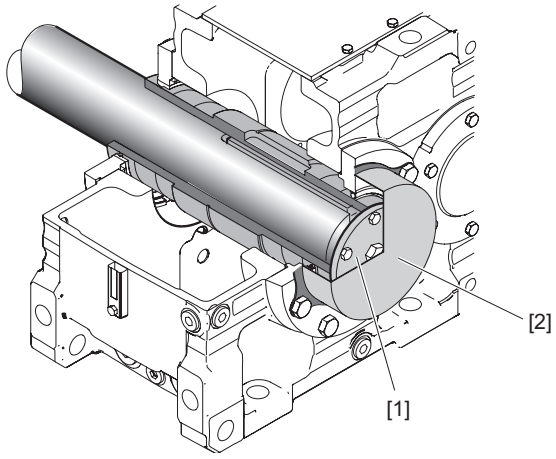
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2.10.3 Output shaft as a hollow shaft with keyway

The hollow shaft is equipped with a keyway according to DIN 6885/T1.

Included in the scope of delivery:

End plate with bolts [1], protection guard [2]



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The protection guard is dust-proof. The standard sealing system is, therefore, normally used on the protection guard side.

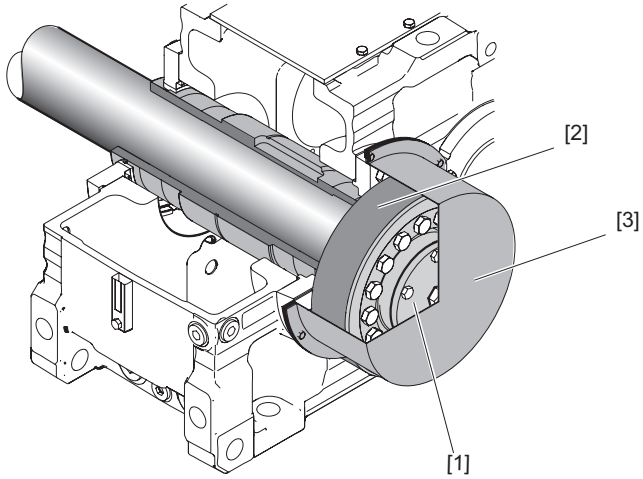
For detailed specifications on the geometry of the machine shaft, refer to section 11.

2.10.4 Output shaft as hollow shaft with shrink disk

The shrink disk is positioned on the side opposite to the machine shaft.

Included in the scope of delivery:

End plate with retaining screws [1], shrink disk [2], protection guard [3]



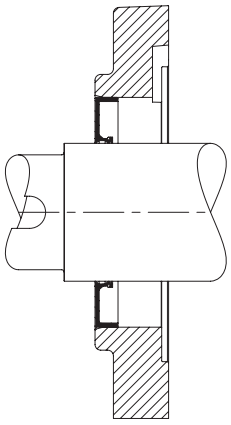
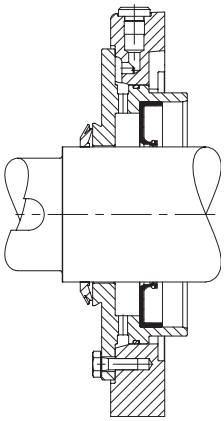
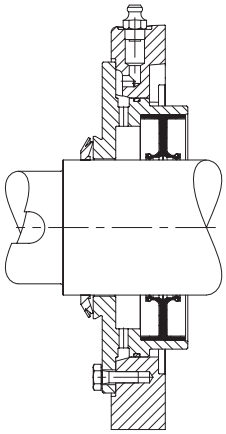
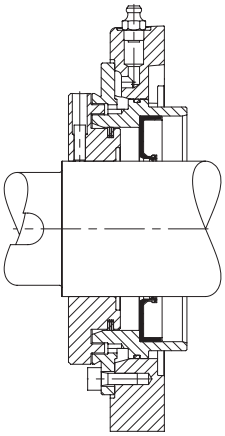
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The protection guard is dust-proof. The standard sealing system is, therefore, normally used on the protection guard side.

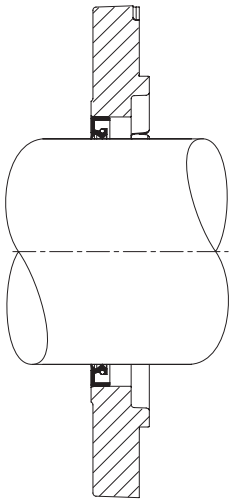
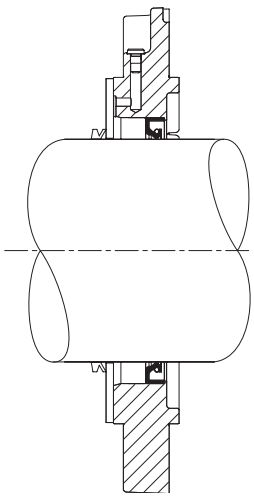
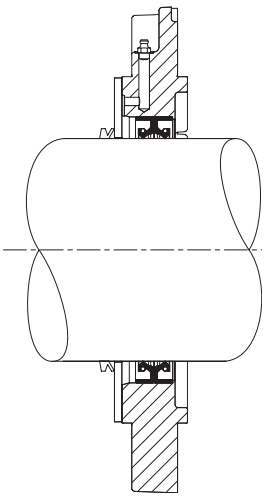
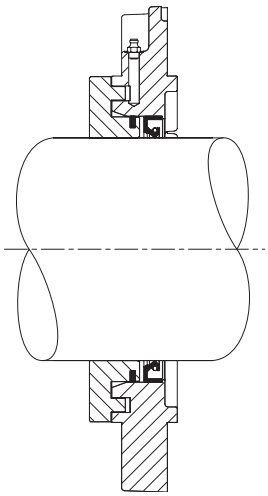
For detailed specifications on the geometry of the machine shaft, refer to section 11.

2.11 Sealing systems

2.11.1 Input shaft

Standard	Protection against dust	Protection against dust Regreaseable	Radial labyrinth seal (Taconite) Regreaseable
Single lip seal with dust protection lip	Single lip seal with dust protection cover	Double lip seal with dust protection cover	Single lip seal with radial labyrinth seal
• Normal environment	• **Medium** dust load with abrasive particles	• **High** dust load with abrasive particles	• **Very high** dust load with abrasive particles
 60591AXX	 61497AXX	 60593AXX	 60594AXX

2.11.2 Output shaft

Standard	Protection against dust	Protection against dust Regreaseable	Radial labyrinth seal (Taconite) Regreaseable
Single lip seal with dust protection lip	Single lip seal with dust protection cover	Double lip seal with dust protection cover	Single lip seal with radial labyrinth seal
• Normal environment	• **Medium** dust load with abrasive particles	• **High** dust load with abrasive particles	• **Very high** dust load with abrasive particles
 60620AXX	 60623AXX	 60621AXX	 60622AXX

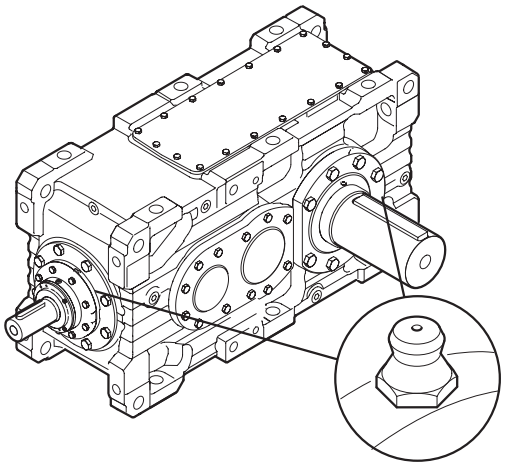
	NOTE
	Please note that the gear unit shaft is rotating during regreasing.

2.11.3 Position of the lubrication points

Grease nipple on gear unit cover (standard)

Taper greasing nipples according to DIN 71412 A R1/8 are normally used on the gear unit cover in regreasable sealing systems. Regreasing should be carried out at regular intervals. The lubrication points are located near the input and output shafts.

Example



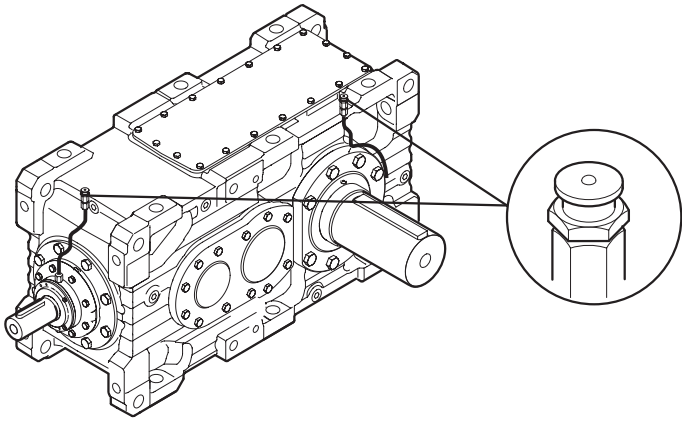
Grease nipple on the top side of the gear unit (option)

When installed in a restricted space, the lubrication points can be relocated to the top side of the gear unit. In this case, flat grease nipples according to DIN 3404 A G1/8 are used. Regreasing should be carried out at regular intervals.

Note the following points:

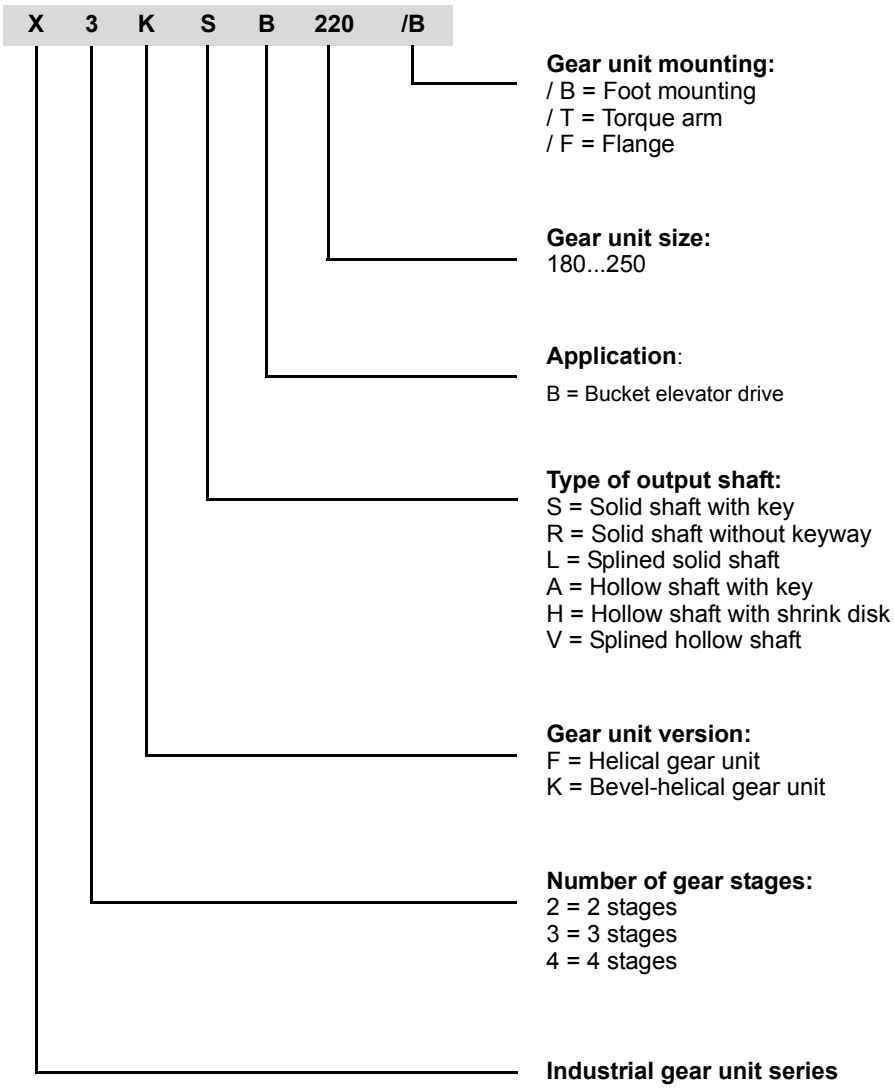
- This option is normally used on drives with fans and/or motor adapters
- The option applies to both drive and output shaft(s)

Example



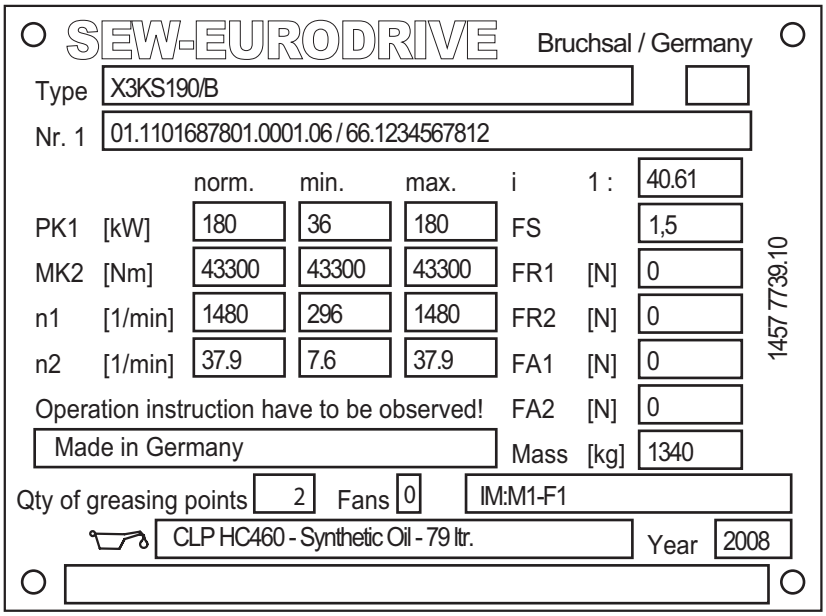
2.12 Unit designation

2.12.1 Example



2.13 Nameplate

2.13.1 Example



60614AXX

Type		Unit designation
Nr. 1		Serial number
P_{K1}	[kW]	Power produced on the input shaft (HSS)
M_{K2}	[Nm]	Gear unit output torque
n_1	[1/min]	Input speed (HSS)
n_2	[1/min]	Output speed (LSS)
norm.		Standard operating point
min.		Operating point at minimum speed
max		Operating point at maximum speed
i		Exact gear unit reduction ratio
F_S		Service factor
F_{R1}	[N]	Actual overhung load acting on the input shaft
F_{R2}	[N]	Actual overhung load acting on the output shaft
F_{A1}	[N]	Actual axial load acting on the input shaft
F_{A2}	[N]	Actual axial load acting on the output shaft
Mass	[kg]	Weight of the gear unit
Qty of greasing points		Number of points for regreasing
Fans		Number of installed fans
		Oil grade and viscosity class/oil quantity
Year		Year of construction
IM		Mounting position and mounting surface

2.14 Coating and surface protection systems

SEW version	OS 1 Low environmental impact	OS 2 Medium environmental impact	OS 3 High environmental impact
Use as surface protection with typical ambient conditions Corrosion categories DIN EN ISO 12944-2	Unheated buildings where condensation can build up. Atmospheres with low contamination levels, mostly rural areas.	Production spaces with high humidity levels and low air contamination. City and industrial atmospheres, medium contamination with sulphur dioxide (NPP, dairies)	Chemical processing plants, swimming pools, boat houses above sea water. Industrial areas and coastal areas with moderate salt load.
	C2 (low)	C3 (moderate)	C4 (high)
Condensation test ISO 6270	120 h	120 h	240 h
Salt spray test ISO 7253	–	240 h	480 h
NDFT on concrete base[1)]	150 µm (0.0106 in)	210 µm (0.0106 in)	270 µm (0.0106 in)
Color top coat[2)]	RAL 7031	RAL 7031	RAL 7031
Color according to RAL	Yes	Yes	Yes
Uncoated parts: shaft end/flange	Coat with hand perspiration and water repellent anticorrosion agent for external preservation		

1) NDFT (nominal dry film thickness) = standard layer thickness; minimum layer thickness = 80% NDFT; maximum layer thickness = 3x NDFT (DIN EN ISO 12944-5)

2) Standard color

2.15 Storage and transport conditions

2.15.1 Interior corrosion protection

Standard protection

After the test run, the test oil fill is drained out of the gear unit. The remaining oil film protects the gear unit against corrosion for a limited period of time.

Long-term protection

After the test run, the test oil fill is drained out of the gear unit and the interior space is filled will a vapor phase inhibitor. The breather filter is replaced by a screw plug and enclosed with the gear unit.

2.15.2 Exterior corrosion protection

- Bare, uncoated parts are coated with an anti-rust agent. Remove it only using an appropriate solvent which is not harmful to the oil seal.
- Sealing surfaces on radial oil seals are protected by an appropriate anti-corrosion agent.
- When the gear unit is filled with vapor phase inhibitor, the breather filter is replaced by a screw plug and enclosed with the gear unit. The enclosed breather filter must be installed on the gear unit again before startup.
- Small spare parts and loose pieces, such as bolts, nuts, etc., are packed in corrosion protection plastic bags (VCI corrosion protection bags).
- Threaded holes and blind holes are covered by plastic plugs.

STOP	**STOP**
	• If the bucket elevator drive is stored longer than six months, you must check the protective coating of unpainted areas as well as the paint coating regularly. Areas with protective coating and/or paint that has been removed may have to be repainted. • The output shaft must be rotated at least one full rotation so that the position of the roller elements in the bearings of the input and output shafts changes. This procedure must be repeated every six months until startup.

2.15.3 Packaging

Standard packaging

The bucket elevator drive is delivered on a pallet without cover.

Application: Land transport

Long-term packaging

The bucket elevator drive is delivered on a pallet. The bucket elevator drive is wrapped in a film and equipped with appropriate corrosion protection material in the film packaging.

Application: Land transport and for long-term storage

Seaworthy packaging

The bucket elevator drive is packaged in a seaworthy wooden box and is delivered on a pallet that is appropriate for sea transport. The gear unit is wrapped in a film and equipped with appropriate corrosion protection material in the film packaging.

Application: Sea transport and for long-term storage

2.15.4 Storage conditions

	**STOP** During storage up to startup, the bucket elevator drive must be stored in a shock-free manner in order to prevent damage to the anti-friction bearing races.

	**NOTE** The gear units are delivered without an oil fill; different protection systems are required depending on storage period and storage conditions.

Climate zone	Packaging and corrosion protection	Storage location	Storage duration
Temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)	Long-term packaging + Long-term corrosion protectio:	Under roof, protected against rain and snow, no shock loads.	Up to three years with regular checks of the packaging and moisture indicator (rel. humidity < 50 %).
	Standard packaging + Standard corrosion protection	Under roof, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ< 60 °C, < 50 % relative humidity). Protected against sudden temperature fluctuations and for controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks.	One year or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.
Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	Long-term packaging + Long-term corrosion protectio: Protected against insect damage and mildew by chemical treatment.	Under roof, protected against rain and shocks.	Up to three years with regular checks of the packaging and moisture indicator (rel. humidity < 50 %).
	Standard packaging + Standard corrosion protection	Under roof, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ< 50°C, < 50 % relative humidity). Protected against sudden temperature fluctuations and for controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks. Protected against insect damage.	One year or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.

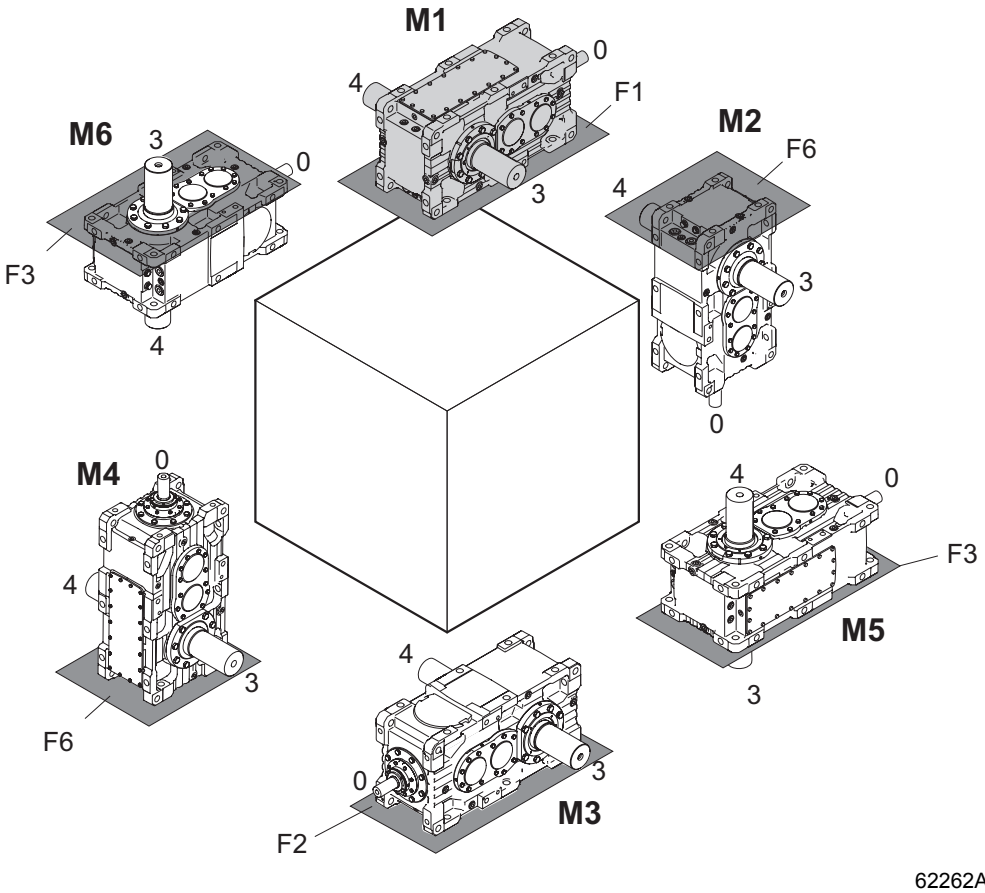
3 Mounting Position, Mounting Surfaces and Shaft Position

3.1 Mounting position and standard mounting surfaces

A certain standard mounting surface is assigned to each mounting position:

STOP	**STOP**
	• The mounting position and/or mounting surface may not differ from the order. • A ± 1° deviation is permitted.

	NOTE
	• The gear units marked in gray are standard versions. • For variants other than the standard assignment, there might be restrictions regarding the accessories, and delivery times may be longer. • Other mounting surfaces are possible in combination with a certain mounting position. Refer to the order-specific dimension drawing.



62262AXX

3.2 *Pivoted mounting positions*

Pivoted mounting positions are mounting positions that differ from the standard mounting positions.

The designation of the pivoted mounting positions is structured as follows:

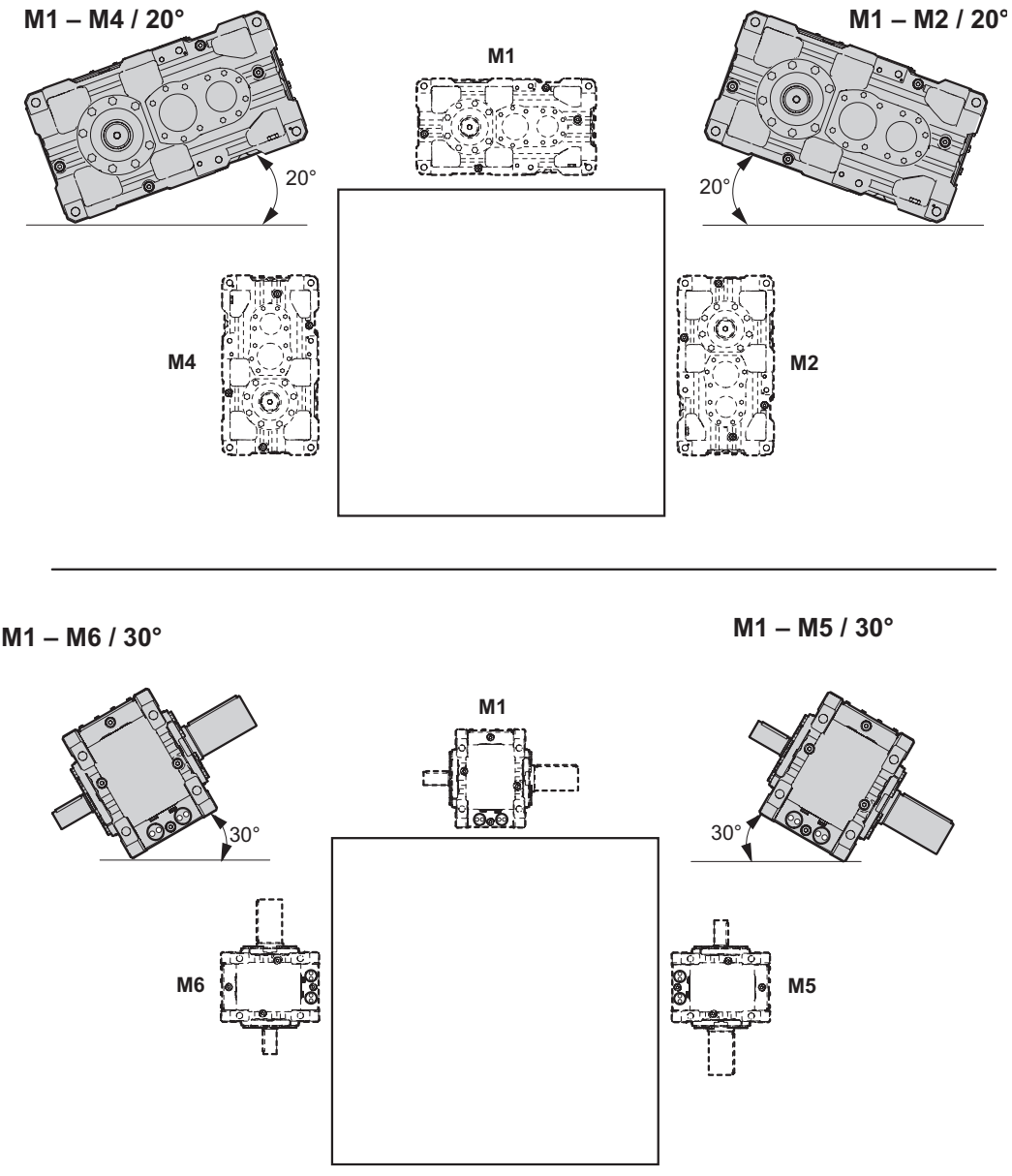
M1 – M4 / 20°
[1] [2] [3]

[1] Original mounting position

[2] Targeted mounting position

[3] Pivoting angle

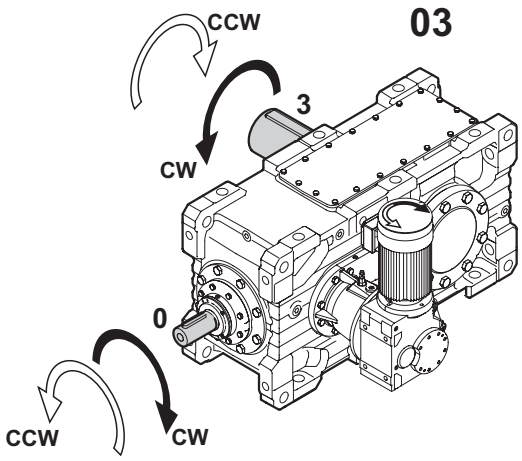
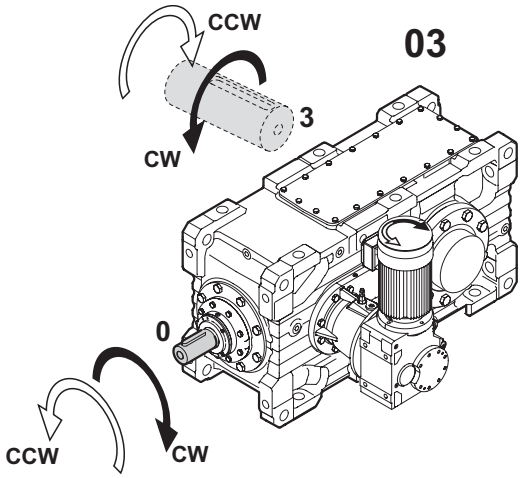
The following figure shows 4 examples:

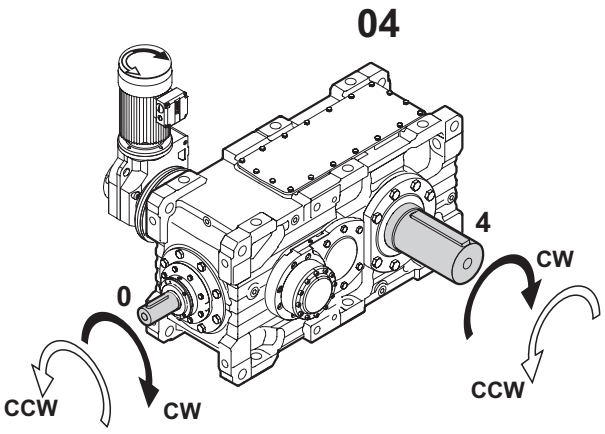
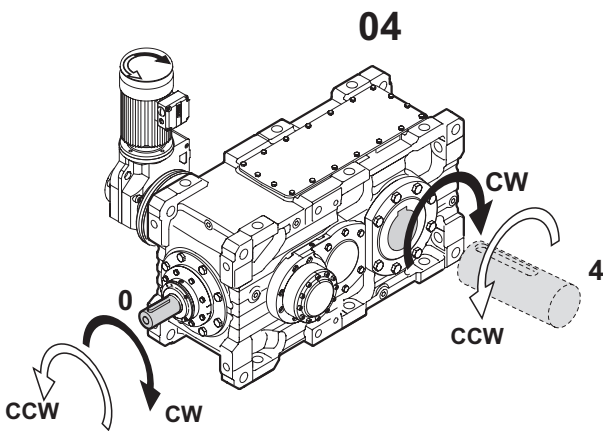


	NOTE
	For pivoted mounting positions, there might be restrictions regarding the accessories, and delivery times may be longer.

3.3 Shaft position, direction of rotation, backstop, auxiliary drive

The shaft positions (03 and 04) and corresponding directions of rotation shown in the following diagrams apply to solid shaft and hollow shaft version output shafts (LSS).

Shaft position 03 / X.KS..	Shaft position 03 / X.KH.. / X.KA..
 62295AXX	 62296AXX

Shaft position 04 / X.KS..	Shaft position 04 / X.KH.. / X.KA..
 62854AXX	 62855AXX

	NOTE
	The auxiliary drive and the shrink disk (X.KH.. version) are always located opposite the output side of the gear unit. The backstop is installed opposite the auxiliary drive. For bucket elevator drives without auxilliary drive, the backstop is installed opposite the output side of the gear unit.

4 Project Planning for Drives

4.1 Additional documentation

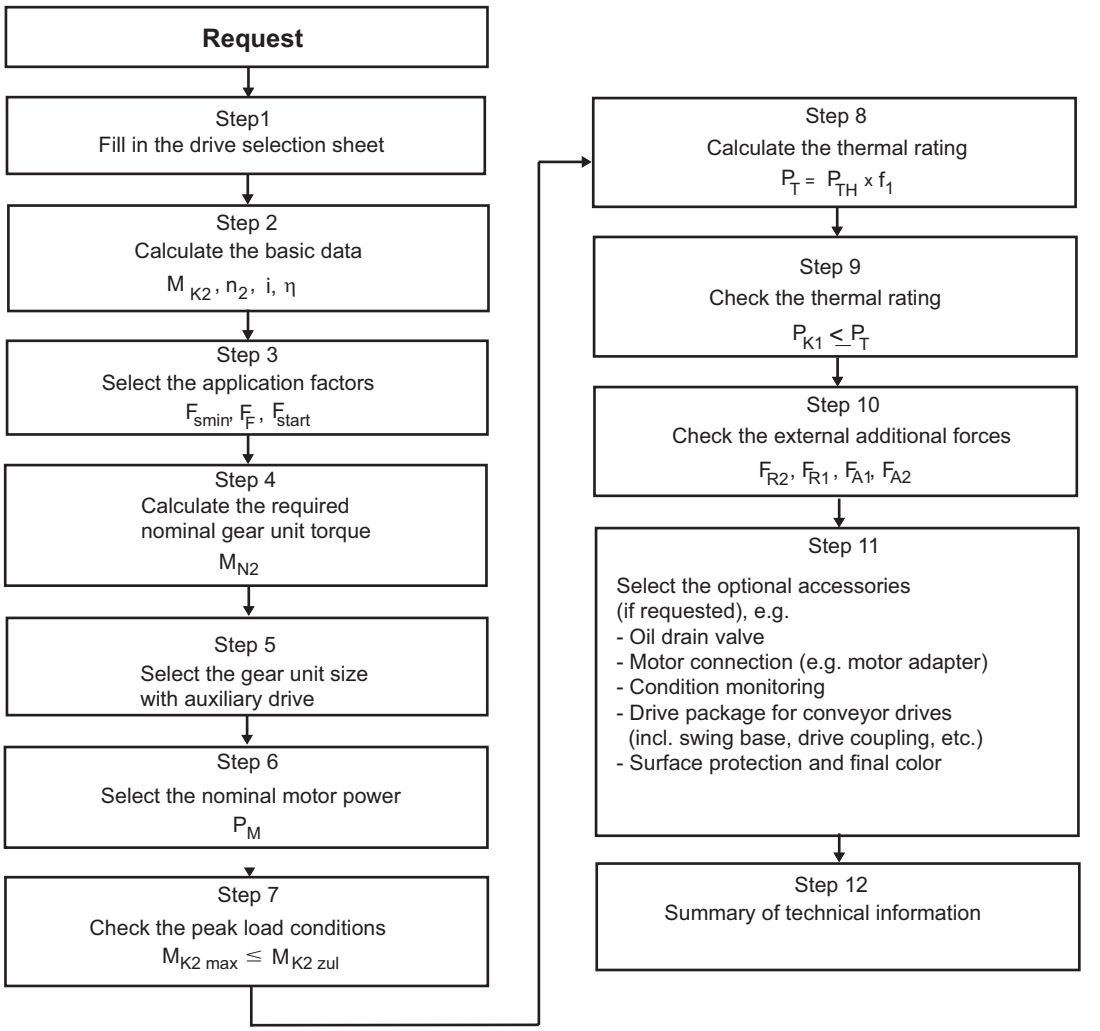
In addition to the information in this catalog, SEW-EURODRIVE offers extensive documentation covering the entire topic of electrical drive engineering. This is primarily documentation from the "Drive Engineering " Practical Implementation" series. You can order the current documentation from SEW-EURODRIVE. The documentation can also be downloaded in PDF format from the SEW homepage (http://www.sew-eurodrive.com).

Drive Engineering Practical Implementation

The publication "Drive Engineering – Practical Implementation – Drive Selection with SEW-EURODRIVE Gearmotors" features extensive information on characteristics, differentiating features and application areas of SEW drives. A comprehensive collection and assignment of the most important formulae for drive calculation as well as detailed examples for the most frequently used applications make this documentation an important tool for project planning and an essential addition to SEW-EURODRIVE product catalogs.

4.2 Project planning procedure

The following flow diagram illustrates the project planning procedure for a bucket elevator drive.



62970AEN

4.2.1 Step 1: Drive selection data

1.0 Machine on LSS (normally a driven machine)

Legend: [...] = Values to be filled in
[X] = Mark your selection with ☒

1.1 Field of application/industry [...]

1.2 Application [...]

1.3 Ambient temperature [°C] [...]

normal | min. | max.

1.4 Installation altitude [m] [...]

1.5 Gear unit installation [X]

- ☐ Small space ($v_a \geq 0.5$ m/s)
- ☐ Large spaces and halls ($v_a \geq 1.4$ m/s)
- ☐ Outdoors with protection against the sun ($v_a \geq 3$ m/s)

1.6 Ambient conditions [X]

- ☐ normal
- ☐ dusty
- ☐ damp
- ☐ corrosive
- ☐ dry

2.0 Load characteristics

2.2 Drive concept

- ☐ Single drive
- ☐ Dual drive

For dual drive, enter the following data for one drive only!

2.2 Required speed n_2 [rpm] [...]

normal | min. | max.

2.3 Operating power on HSS P_{K1} [kW] [...]

normal | min. | max.

2.4 Operating torque on LSS M_{K2} [kNm] [...]

normal | min. | max.

2.5 Frequency of peak loads ($M_{K2\ max.}$ or $P_{K1\ max.}$)

per hour

2.6 Number of startup per hour [...]

start-ups

2.7 Direction of rotation under load (LSS) [X]

- ☐ Clockwise (CW)
- ☐ Counterclockwise (CCW)

2.8 Operating time/day [X]

- ☐ ≤ 3 hours
- ☐ 3 ... 10 hours
- ☐ > 10 hours

2.9 Backstop [X]

- ☐ Standard backstop
- ☐ Torque-limiting backstop (recommended for dual drive)

2.10 Auxiliary drive [X]

- ☐ "Empty" buckets
- ☐ "Full" buckets
- ☐ Auxiliary drive on both drives (optional for dual drives)
- ☐ Speed monitoring required for encoder
- ☐ Output torque on LSS via auxiliary drive M_{K3}

3.0 Machine on HSS (normally a drive machine)

3.1 Type: [X]

- ☐ AC motor
- ☐ AC motor/inverter
- ☐ DC motor
- ☐ Hydraulic motor
- ☐ Servomotor

3.2 Motor power P_M [kW] [...]

normal | min. | max.

3.3 Motor speed n_M [kW] [...]

normal | min. | max.

3.4 Motord torque M_M [kNm] [...]

normal | min. | max.

3.5 Input speed n_1 [rpm] [...]

normal | min. | max.

3.6 If electric motor: [X] [...]

- ☐ IEC
- ☐ NEMA

Motor size (IEC or NEMA code):

3.7 Motor mounting position [X] [...]

- ☐ B3
- ☐ B5
- ☐ V1
- ☐ Other:

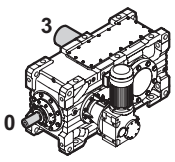
4.0 Gear unit requirements

4.1 Mounting position if other than M1

4.2 Shaft position [X]

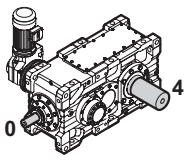
For dual drive, enter only shaft position of drive with auxiliary drive

☐ 03



For dual drive,
second gear unit shaft position 04

☐ 04



For dual drive,
second gear unit shaft position 03

4.6 Required service factor $F_{S\ min.}$ [X] [...]

based on

☐ Motor power P_M/motor torque M_M

☐ Operating power P_{K1}/ operating torque M_{K1}

4.7 Required bearing service life $L_{h\ min}$ [...]

hours

4.8 Gear unit fixation / torque arm [X]

☐ Foot-mounted

☐ Torque arm

4.9 LSS connection to customer machine shaft [X] [...]

☐ Elastic coupling (claw or pin coupling)

☐ Flexible coupling

☐ Rigid flange coupling

☐ Drum coupling

☐ Chain sprocket

☐ Pinion

☐ Hollow shaft - torque arm

☐ Hollow shaft - foot-mounted

☐ Other

4.10 LSS gear unit version [X] [...]

LSS version (if solid shaft)

☐ Solid shaft with keyay

☐ Solid shaft without keyway

☐ Splined solid shaft DIN 5480

☐ Other

LSS version (if hollow shaft)

☐ Hollow shaft with keyway

☐ Hollow shaft for shrink disk connection, incl. shrink disk

☐ Splined hollow shaft DIN 5480

☐ Other

4.11 HSS connection to motor [X]

☐ Customer installation (base frame)

☐ Motor adapter with elastic coupling

☐ Swing base/base frame

☐ Motor scoop with V-belt drive

☐ Motor scoop

☐ Other, see diagram

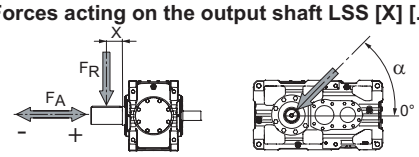
4.12 Machine shaft bearings

☐ 2 bearings, gear unit transfers only torque

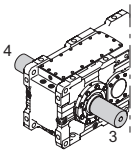
☐ 1 bearing opposite gear unit; gear unit acts as a bearing point

☐ 1 bearing directly on the gear unit; gear unit acts as a bearing point

4.13 Forces acting on the output shaft LSS [X] [...]

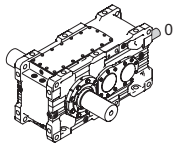


	Shaft 3	Shaft 4
Axial force F_A [kN]		
Radial force F_R [kN]		
Distance from shaft shoulder X [mm]		
Application angle of the radial force α [°]		
or variable	☐	☐



4.14 Forces acting on the input shaft HSS [X] [...]

	Shaft 0
Axial force F_A [kN]	
Radial force F_R [kN]	
Distance from shaft shoulder X [mm]	
Application angle of the radial force α [°]	
or variable	☐



4.15 Electrical supply [X] [...]

	AC 3-phase	AC 1-phase	DC		
Mains supply V_{mains}	☐	☐	☐	V	HZ
Auxiliary voltage V_{aux}	☐	☐	☐	V	HZ

Degree of protection: IP

Expl. protection required: ☐ Yes ☐ No

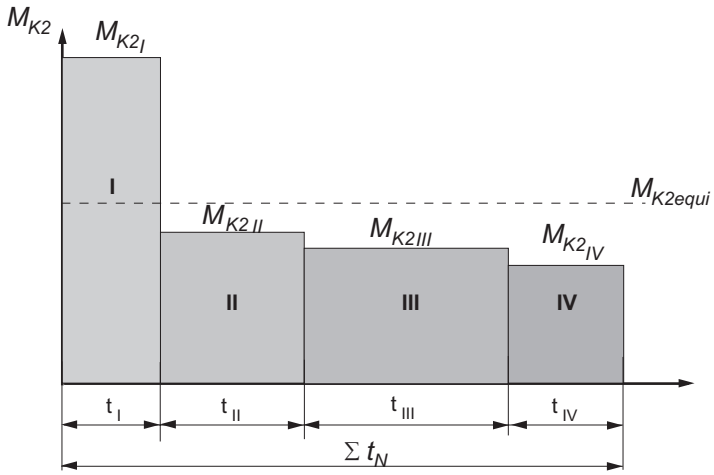
4.16 Permitted cooling (if required) [X]

	Permitted	Not permitted
Fan	☐	☐
Cooling cover/cartridge	☐	☐
External oil-air cooler	☐	☐
External oil-water cooler	☐	☐

Cooling water available: ☐ Yes ☐ No

Cooling water temperature: °C

4.2.2 Step 2: Calculating the basic data – M_{K2}, n_2, i, η

Constant torque	$M_{K2} = \frac{P_{K1} \times 9550 \times \eta}{n_2}$ [Nm] Comment: If P_{K1} is not known -> $P_{K1} = P_M$ M_{K2} = Operating torque on LSS [Nm] P_{K1} = Operating power on HSS [kW] n_2 = Output speed (LSS) 1/min P_M = Nominal motor power [kW]
Equivalent torque with load spectrum and constant speed n_2	$M_{K2equiv} = \sqrt[6.6]{(M_{K2_I})^{6.6} \times \frac{t_I}{\Sigma t_N} + (M_{K2_{II}})^{6.6} \times \frac{t_{II}}{\Sigma t_N} + ... (M_{K2_n})^{6.6} \times \frac{t_n}{\Sigma t_N}}$ The following figure shows a load example:  M_{K2} = Operating torque on LSS [Nm] $\frac{t_I}{\Sigma t_N}$ .... $\frac{t_I}{\Sigma t_N}$ = Proportion of time of the load I, II,...n = Types of load
Reduction ratio	$i = \frac{n_1}{n_2}$ n_1 = Input speed (HSS) 1/min n_2 = Output speed (LSS) 1/min
Efficiency – η	η = f (i; Gear unit type) The efficiency of the gear unit is mainly determined by the gearing and bearing friction as well by churning losses. The following guide values apply to the calculation: X2F...: 0.975 X3F...: 0.96 X4F...: 0.94 X3K..: 0.955 X4K..: 0.935

4.2.3 Step 3: Selecting the application factors

Application-specific service factor	$F_{S\ min}$	
Peak load factor	F_F	see next page
Startup factor	F_{start}	see next page

$F_{S\ min}$ - Application-specific service factor

The application-specific service factor F_{Smin} takes account of the typical load behavior with regard to the driven machine.

Recommended values with reference to

- Field of application
- Type of driven machine
- Operating period / day

are given in the following table.



STOP

In the event of deviations from the typical load behavior, please consult SEW-EURODRIVE.

Field of application	Type of application (Driven machine)	Application-specific service factor $F_{S\ min}$ Operating period / day		
		< 3 h	3-10 h	> 10 h
Conveyors	Bucket elevators	-	1.40	1.50
	Vertical conveyors - 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, screens	1.55	1.75	2.00
	Escalators	1.25	1.25	1.50
	Passenger elevators	1)	1)	1)

1) Contact SEW-EURODRIVE

Peak load factor F_F

The peak load factor F_F takes account of the overload capability of gearing and rotating parts.

Peak load factor F_F					
Frequency of peak load per hour					
1...5	**6...20**	**21...40**	**41...80**	**81...160**	**> 160**
1	1.2	1.3	1.5	1.75	2.0

Startup factor - F_{start}

The startup factor F_{start} takes account of the overload caused by startup.

Startup mode	Startup factor - F_{start}
Direct	3.0
Soft startup	1.8
Frequency inverter	1.5...2.0[1)]
Delta / star	1.3
Hydraulic coupling without delay chamber	2.0
Hydraulic coupling with delay chamber	1.6

1) Dependent on setting

4.2.4 Step 4: Calculating the required nominal gear unit torque M_{N2}

Constant direction of load – constant torque:

$M_{N2} \geq M_{K2} \times F_{S\ min}$ [N

M_{N2} = Nominal gear unit torque [kNm]
M_{K2} = Operating torque on the LSS [kNm]
$F_{S\ min}$ = Application-specific service factor

4.2.5 Step 5: Selecting the gear unit size – M_{N2}

The selection of the gear unit size is based on the gear unit rated torque M_{N2} according to the speed/power overview tables in section 10 and is divided into two ranges:

- Input speed n_1 = 1500 1/min
- Input speed n_1 = 1800 1/min

The selection table guide on the foldout page of the catalog can be used to quickly locate the speed/power overview table and to make a preliminary selection of the gear unit size.

If the input speed n_1 < 1500 1/min, then the value for 1500 1/min can be used for M_{N2}.

For input speeds n_1 > 1800 1/min, please contact SEW-EURODRIVE.

X.K180..,n_1 = 1500 1/min **58.0 kNm**

					KF77DV100L4 i = 38.39 P_m = 3 kW I_N = 6.3 A (400V 50Hz)		KF97DV132ML4/Z i = 38.30 P_m = 9.2 kW I_N = 18.1 A (400V 50Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C
28	**28.61**	52	58.0	333	2.3	12.0	2.4	35.8		163	115	334	247
31.5	**32.36**	46	58.0	295	2.6	10.7	2.6	32.0		145	105	292	218
35.5	**36.24**	41	58.0	263	2.3	12.0	2.4	35.8		151	108	302	225
40	**38.93**	39	58.0	245	2.1	12.9	2.2	38.5		133	96	266	198
45	**43.6**	34	58.0	219	1.9	14.5	2.0	43.1	**X3K..**	137	99	274	204
50	**47.57**	32	58.0	201	2.1	12.9	2.2	38.5		123	89	244	182
56	**53.27**	28	58.0	179	1.9	14.5	2.0	43.1		124	90	245	183
63	**60.9**	25	58.0	157	2.1	12.9	2.2	38.5		105	77	206	155
71	**68.2**	22	58.0	140	1.9	14.5	2.0	43.1		107	78	211	158

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4.2.6 Step 6: Selecting the nominal motor power P_M

$$P_M \geq P_{K1} = \frac{P_{k2}}{\eta} \quad [kW]$$

P_M = Nominal motor power [kW]
P_{K1} = Operating power on the HSS [kW]
P_{K2} = Operating power on the LSS [kW]

→ Select the nominal motor power

4.2.7 Step 7: Checking the peak load conditions – $M_{K2\ zul}$; M_{K2max}

Permitted peak output torque $M_{K2\ zul}$:

Constant load direction

$$M_{K2\ zul} = \frac{2 \times M_{N2}}{F_F} \quad [kNm]$$

$M_{K2\ zul}$ = Permitted peak output torque [kNm]
M_{N2} = Nominal gear unit torque [kNm]
F_F = Peak load factor

Calculate the peak output torque $M_{K2\ max}$:

$$M_{K2\ max} = \frac{P_M \times 9.95}{n_2 \times \eta} \times F^*_{start} \quad [kNm]$$

$M_{K2\ max}$ = Peak output torque [kNm]
P_M = Nominal motor power [kW]
F_{start} = Startup factor
n_2 = Output speed (LSS) [1/min]
η = Efficiency

* If F_{start} is not specified, take account of the start factors according to page 35.

Check the gear unit selection:

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

4.2.8 Step 8: Calculating the thermal rating P_T

The thermal rating P_T of a gear unit is the power that a gear unit can transmit continuously without exceeding a certain oil temperature. The thermal rating depends on the following factors:

- Ambient temperature
- Air circulation and sunlight exposure at the installation site
- Installation altitude
- Heat conduction to the foundation at the installation site
- Type of gear unit, size and gear ratio
- Type of gear unit external cooling
- Type of gear unit lubrication
- Type of lubrication
- Operating hours

For the following ambient conditions, the thermal rating can be directly read from the selection tables:

- Ambient temperature 20°C or 40°C (The thermal rating can be interpolated for ambient temperatures of 30°C).
- Installation in a large hall
- Natural cooling or cooling with
  - Fan
  - Integrated cooler (water cooling cover or water cooling cartridge)
  - Combination of fan with integrated cooler
  - Circulation cooling with oil-water cooler
- Foundation as steel support structure
- Installation altitude ≤ 1,000 m above sea level
- Horizontal mounting position (M1)
- Splash lubrication

STOP	**STOP**
	It is of fundamental importance that sufficient protection from direct sunlight be provided when installed outdoors.

i	**NOTE**
	Please contact SEW-EURODRIVE in case of other ambient conditions.

$$P_T = P_{TH} \times f_1 \text{ [kW]}$$

P_{TH} = Nominal thermal rating of the gear unit [kW]. The values in the selection tables in section 10 depend on the ambient temperature and cooling method.

f_1 = Altitude factor

Altitude factor f_1

	Altitude H [m above sea level]				
	Up to 1000	**1000 - 2000**	**2000 - 3000**	**3000 - 4000**	**4000 - 5000**
f_1	1.00	0.95	0.91	0.87	0.83

	NOTE
	Contact SEW-EURODRIVE in case of deviating conditions.

4.2.9 Step 9: Checking the thermal rating:

The gear unit's thermal rating must be at least as large as the operating power on the input shaft [HSS]

$P_T \geq P_{K1}$

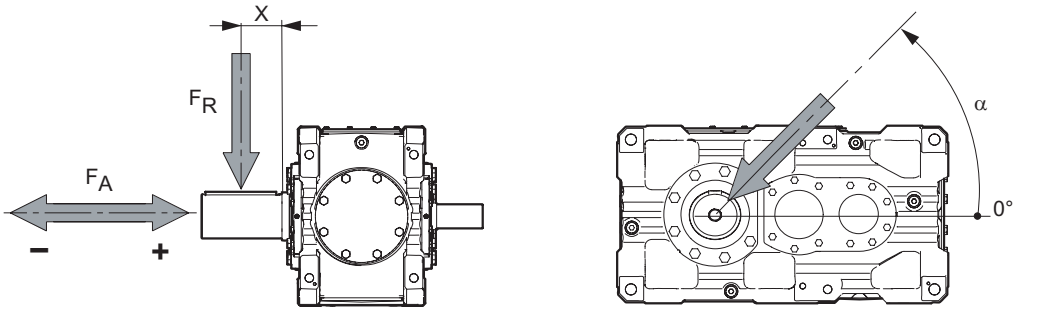
4.2.10 Step 10: Checking the external additional forces:

Dependencies

The permitted forces on the shaft depend on the following factors:

- Service factor
- Required bearing service life
- Direction of the axial force (from or towards gear unit)
- Application angle of the radial force (rotating or at a specific position)
- Application angle of the radial force in relation to the shaft shoulder
- Relation of axial to radial force and vice versa.

Definition of force application



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	NOTE
	The force application is always defined as viewed onto the output shaft end.

Determining overhung force

An important factor for determining the resulting overhung force is the type of transmission element mounted to the shaft end. The following transmission element factors f_Z have to be considered for various transmission elements.

Transmission element	Transmission element factor f_Z	Comments
Gears	1.15	< 17 teeth
Chain sprockets	1.40	< 13 teeth
Chain sprockets	1.25	< 20 teeth
Narrow V-belt pulleys	1.75	Influence of the tensile force
Flat belt pulleys	2.50	Influence of the tensile force
Toothed belt pulleys	1.50	Influence of the tensile force

The overhung load exerted on the motor or gear shaft is calculated as follows:

$$F_R = \frac{M_d \text{ x } 2000}{d_0} \text{ x } f_z \quad [kN]$$

F_R = Overhung load [N]

M_d = Torque [Nm]

d_0 = Mean diameter of the installed transmission element [mm]

f_Z = Transmission element factor

Permitted overhung forces output shaft (LSS)

The following table shows two values for the permitted overhung force on standard solid shafts that apply under the following conditions:

- The application point of the overhung force is on the midpoint of the shaft end
- No external axial force F_A acts on the output shaft.
- The gear unit service factor is 1.3 or higher
- The application angle of the overhung load is applied at the most unfavorable point

For the force F_{Ra}

- The shaft speed is less than or equal to the given value

For the force $F_{Ra\ max}$

- Applies only to foot-mounted gear units in mounting position M1
- Max. possible peak value under more advantageous service conditions

	F_{Ra} [kN] X3KS..	**$F_{Ra\ max}$ [kN] X..S.**
Speed n_2	**≤ 70 1/min**	**-**
Shaft position	**03, 04**	**all shaft positions**
Size		
180	93.9	170.0
190	91.2	170.0
200	105.0	190.0
210	98.9	190.0
220	128.8	230.0
230	116.64	230.0
240	184.4	280.0
250	173.0	280.0

NOTE

Contact SEW-EURODRIVE in case of deviating conditions.

Permitted axial forces output shaft (LSS)

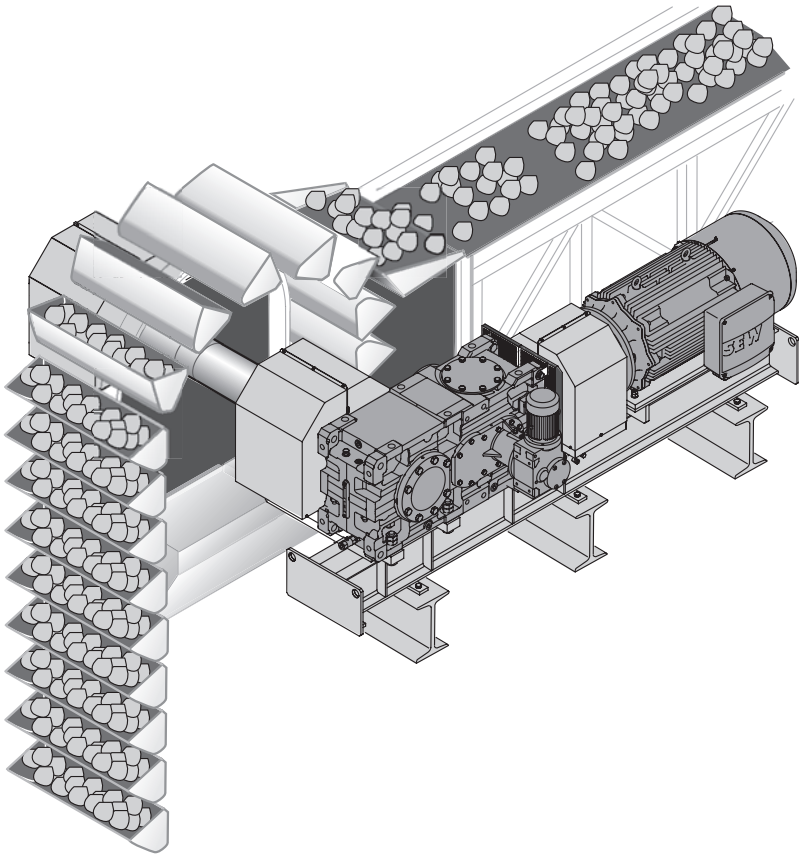
Please contact SEW-EURODRIVE.

Permitted overhung and axial forces input shaft (HSS)

Please contact SEW-EURODRIVE.

4.3 Example for project planning: Bucket elevator drive

The following project planning example shows the planning of a bucket elevator drive.



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Technical data and requirements on the application

Main gear unit

- Bevel-helical gear unit, foot-mounted, solid shaft with key
- Output speed n_2 = 30 1/min
- Input speed motor n_1 = 1470 1/min
- Operating power on the output shaft LSS P_{K2} = 135 kW
- Peak operating torque on the output shaft LSS $M_{K2\ max}$ = 55 kNm
- Operating period: 24 hours a day
- The gear unit is started up five times per hour (frequency of maximum output torque).
- The gear unit is to be operated in a large hall under very dusty conditions and an ambient temperature range of 0°C…40°C.
- Installation altitude H = 1200 m
- Oil drain valve

Auxiliary drive

- "Full buckets" design
- Output speed when operated with auxiliary drive $n_3 \approx 3$ 1/min
- Output torque when operated with auxiliary drive $M_{K3} \approx 30$ kNm

Step 1: Filling out the drive selection sheet

Step 2: Calculating the basic data

Constant operating torque M_{K2}:

$$M_{K2} = \frac{P_{K2} \times 9550}{n_2} = \frac{135\ \text{kW} \times 9550}{30\ 1/\text{min}} = 43.0\ \text{kNm}$$

M_{K2} = Operating torque on the LSS [kNm]
P_{K2} = Output power [kW]
n_2 = Output speed LSS [1/min]

Calculate the gear unit reduction ratio using the following formula:

$$i = \frac{n_1}{n_2} = \frac{1470}{30} = 49$$

i = Gear ratio
n_1 = Input speed (HSS) [1/min]
n_2 = Output speed (LSS) [1/min]

This value is used to specify the nominal gear ratio $i_n = 50$

Step 3: Selecting the application factors

Application-specific service factor (bucket elevator, t > 10 h/day)	$F_{S\ min} = 1.5$
Peak load factor (1...5 peak loads per hour)	$F_F = 1.0$
Startup factor (frequency inverter)	$F_{start} = 1.6$

Step 4: Calculating the required nominal gear unit torque

The required nominal gear unit torque M_{N2}:

$$M_{N2} \geq M_{K2} \times F_{S\ min} = 43\ \text{kNm} \times 1.5 = 64.5\ \text{kNm}$$

M_{N2} = Nominal gear unit torque [kNm]
M_{K2} = Operating torque on the LSS [kNm]
$F_{S\ min}$ = Application-specific service factor

Step 5: Selecting the gear unit size

Select a gear unit of the next larger torque class using the foldout page at the end of this catalog.

- Nominal gear unit torque M_{N2} = 65 kNm

See selection table in section 10

- Gear unit type **X3KSB190/B**
- Nominal gear ratio i_N = 50 → exact gear ratio i_{ex} = 48.85
- Auxiliary drive **KF97DV132ML4/Z**
- n_3 = 1.7 1/min, M_{K3} = 48.3 kNm

Step 6: Selecting the nominal motor power

Required motor power:

$$P_M \geq P_{K1} = \frac{P_{k2}}{\eta} = \frac{135\ \text{kW}}{0.955} = 141.4\ \text{kW}$$

P_M = Nominal motor power [kW]
P_{K2} = Operating power on the LSS [kW]
P_{K1} = Operating power on the HSS [kW]
η = Efficiency from section 4.2.2

Select a motor of the next larger power class: P_M = 160 kW

Step 7: Checking the peak load conditions

Permitted peak torque $M_{K2\ zul}$:

$$M_{K2\ zul} = \frac{2 \times M_{N2}}{F_F} = \frac{2 \times 65\ \text{kNm}}{1} = 130\ \text{kNm}$$

$M_{K2\ zul}$ = Permitted peak output torque [kNm]
M_{N2} = Nominal gear unit torque [kNm]
F_F = Peak load factor

Calculate the peak output torque $M_{K2\ max}$ based on the motor power

$$M_{K2\ max} = \frac{P_M \times 9.55 \times \eta \times F_{start}}{n_2} = \frac{160\ \text{kW} \times 9.55 \times 0.955 \times 1.6}{30\ 1/\text{min}} = 77.8\ \text{kNm}$$

The peak output torque $M_{K2\ max}$ must not exceed the permitted peak output torque $M_{K2\ zul}$.

$M_{K2\ max} \leq M_{K2\ zul}$
77.8 kNm ≤ 130 kNm

→ This means you may use the selected gear unit size.

Step 8: Calculating the thermal rating

$P_T = P_{TH} \times f_1$ = 103 kW x 0.95 = 98 kW

$f_1 = 0.95 \rightarrow H = 1200$ m

P_T = Thermal rating [kW]
P_{TH} = Nominal thermal rating [kW]
f_1 = Altitude factor

Step 9: Checking the thermal rating and selecting the gear unit cooling

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

141.4 kW > 98 kW

→ Thermal rating at 40°C is not sufficient without additional cooling

With one fan:

$P_T = P_{TH} \times f_1$ = 213 kW x 0.95 = 202.4 kW

141.4 kW < 202.4 kW

→ Thermal rating at 40°C with one fan sufficient

Step 10: Checking the external additional forces

There are no external additional forces

Step 11: Selecting the optional equipment

- Oil drain valve

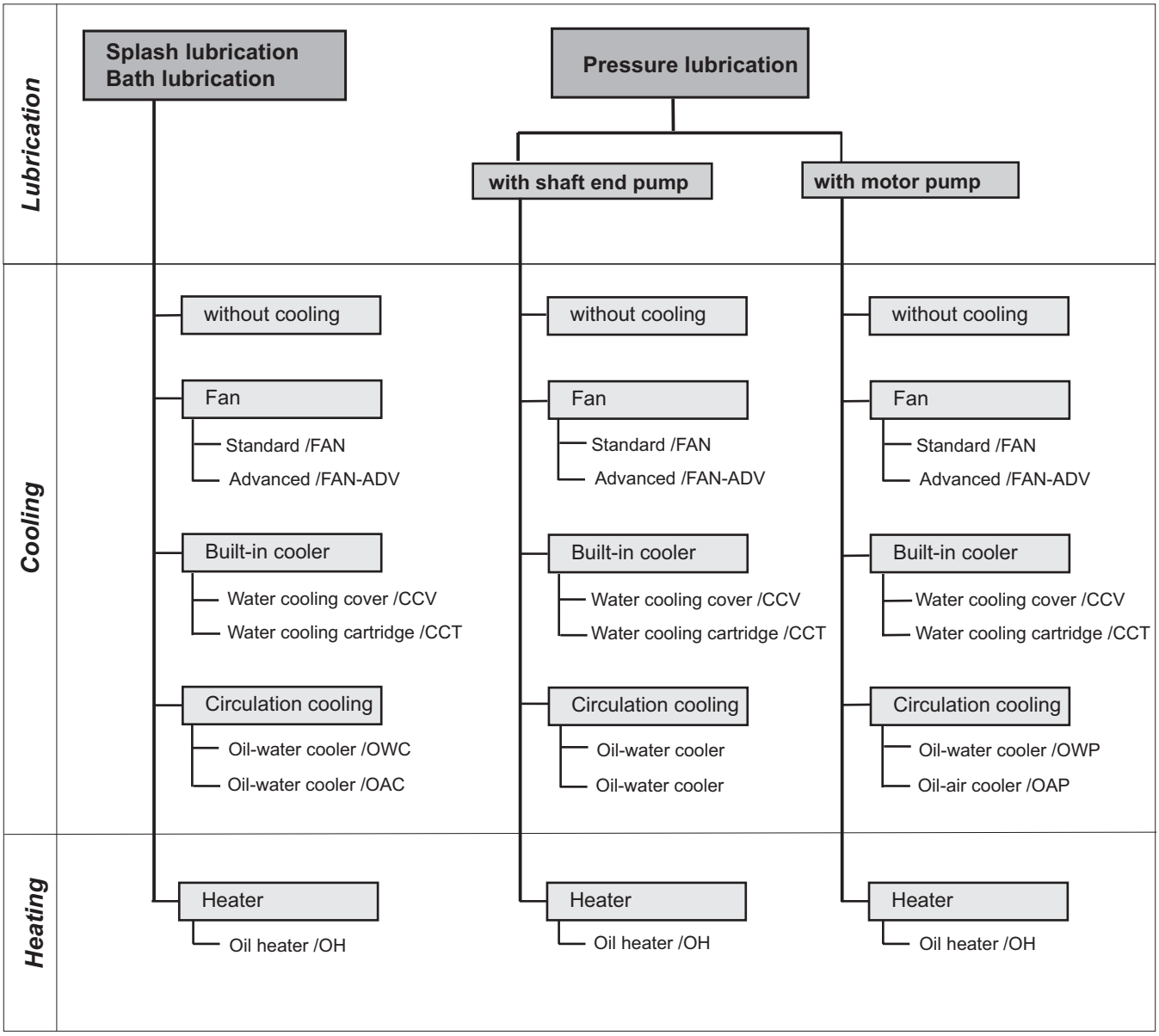
Step 12: Summary of all the technical information

- Gear unit type: X3KSB190/B
- Gear ratio i_{ex} = 48.85
- Nominal gear unit torque M_{N2} = 65 kNm
- Motor: P_M = 160 kW
- Oil drain valve
- Fan fan on input shaft
- Auxiliary drive KF97DV132ML4/Z
  n_3 = 1.7 1/min, M_{K3} = 48.3 kNm

5 Lubrication, Cooling, and Heating

5.1 Overview of lubrication and cooling types

The following combinations of lubrication and cooling types are possible.



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5.2 Terms

5.2.1 Types of lubrication

A basic concept for the type of lubrication has been specified for each SEW-EURODRIVE gear unit. Fundamentally, a combination of types is possible.

Splash lubrication

The oil level is low; gearing and bearing parts that are not immersed in the oil bath are lubricated by splashing oil. Standard lubrication type for horizontal mounting positions (M1 or M3).

Bath lubrication

The gear unit is (almost) completely filled with oil; all gearing and bearing positions are either completely or partly submerged in the oil bath.

- Standard lubrication type with oil expansion tank for:
  - Swiveling mounting positions with horizontal gear units beyond a certain inclination angle (depending on type of gear unit, version and size)
  - Vertical gear units (mounting position M5)
  - Upright mounting position (M4) with X.K gear units
- Standard lubrication type with oil expansion tank for:
  - Upright mounting position (M4) with X.F gear units

Pressure lubrication

With pressure lubrication, the oil level is low. Gearing and bearing parts that are not immersed in the oil sump are lubricated by oil using a shaft end pump or motor pump through lubrication lines.

Pressure lubrication is used when:

- Splash lubrication is not possible (see the relevant mounting positions and variants under "Bath lubrication")
- Instead of bath lubrication, when that is not desired and/or is not thermally advantageous (see the relevant mounting positions and variants)
- Drywell sealing system is desired (only vertical LSS downwards)
- High input speeds are present and the speed limit for other types of lubrication is exceeded (dependent on the gear unit size, version, and number of stages)

5.2.2 Types of cooling

The following types of cooling are differentiated for the gear units:

Natural cooling The gear unit is cooled by natural convection.

Fan cooling A fan is installed on the gear unit input shaft; its airflow improves the transmission of heat from the gear unit surface to the environment.

Integrated cooler This refers to cooling systems installed directly in the gear unit housing or mounted very close to it, e.g. a water cooling cover or a water cooling cartridge.

Circulation cooling The gear unit oil is pumped out of the gear unit to an external heat exchanger by a pump (motor pump or shaft end pump). This normally involves oil supply systems with oil-water or oil-air heat exchangers.

5.2.3 Oil heater

An oil heater pre-heats the gear unit oil using heating elements in the gear unit oil bath. Oil heating may be required to ensure lubrication at startup when the ambient temperature is low.

5.3 Selection of lubricants

	**STOP**
	The oil viscosity and type (mineral/synthetic) that are to be used are determined by SEW-EURODRIVE specifically for each order. This information is noted in the order confirmation and on the gear unit's nameplate. Any deviation from these conditions requires consultation with SEW-EURODRIVE.

5.3.1 General information on selecting oil

Unless a special arrangement is made, SEW-EURODRIVE delivers the drives without oil fill. An exception are auxiliary drives and primary gear units.

	**STOP**
	That means that the gear unit must be filled with the correct oil grade and quantity before startup. The corresponding information can be found on the nameplate of the gear unit.

The following tables provide an overview of mineral and synthetic oils.

Mineral oil

Standards

Lubrication oils are divided into ISO VG viscosity classes according to ISO 3448 and DIN 51519.

ISO class	ISO 6743-6 Designation	DIN 51517-3 Designation	AGMA 9005-D94 Designation
150	ISO-L-CKC 150	DIN 51517-CLP 150	AGMA 4 EP
220	ISO-L-CKC 220	DIN 51517-CLP 220	AGMA 5 EP
320	ISO-L-CKC 320	DIN 51517-CLP 320	AGMA 6 EP
460	ISO-L-CKC 460	DIN 51517-CLP 460	AGMA 7 EP
680	ISO-L-CKC 680	DIN 51517-CLP 680	AGMA 8 EP

Synthetic oil

Standards

Lubrication oils are divided into ISO VG viscosity classes according to ISO 3448 and DIN 51519.

ISO class	ISO 6743-6 Designation	DIN 51519 Designation	AGMA 9005-D94 Designation
150	ISO-L-CKT 150	CLP HC 150	AGMA 4 EP
220	ISO-L-CKT 220	CLP HC 220	AGMA 5 EP
320	ISO-L-CKT 320	CLP HC 320	AGMA 6 EP
460	ISO-L-CKT 460	CLP HC 460	AGMA 7 EP
680	ISO-L-CKT 680	CLP HC 680	AGMA 8 EP

In addition to having the required viscosity, the oil must fulfill the following criteria:

- CLP oils according to DIN 51517-3
- Micro-pitting test according to FVA, FV no. 54/ I-IV, GFT class high, damage force level >10

If synthetic oil is used, SEW-EURODRIVE recommends polyalphaolefin-based oil (CLP HC).

NOTE

Note the maximum operating temperature of the gear unit.

If required, a cooling system must be used or the oil change interval must be shortened (see "Lubricant Change Intervals" in the "Helical and Bevel-Helical X.. Series Horizontal Gear Units" operating instructions.

5.3.2 Approved lubricants

Notes on the lubricant table

The lubricant table on the following page shows the permitted lubricants for SEW-EURODRIVE gear units. Please refer to the following legend for the lubricant table.

	**STOP**
	The standard for viscosity and oil grade is the type of oil that is specified by SEW-EURODRIVE in the order (see order confirmation and nameplate).

	**NOTE**
	Consult SEW-EURODRIVE if you use bio- and food grade lubricants or polyglycol oils.

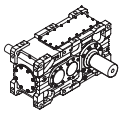
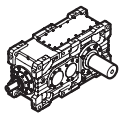
Legend to the lubricant table

Abbreviations used, meaning of shading, and notes:

CLP = Mineral oil
CLP HC = Synthetic polyalphaolefin

	= Synthetic lubricant
	= Mineral lubricant

Lubricant table

				X.F.. 			X.K.. 				
DIN (ISO)	ISO VG class	Mobil®	Shell	KLÜBER LUBRICATION	ARAL	bp	TEXACO	FUCHS	Q8	Castrol	TOTAL
CLP	VG 150			KLÜBER GEM 1-150N	Degol BG 150 Plus	BP Energol GR-XF 150	Meropa 150	Renolin CLP150Plus	Goya NT 150	Alpha SP 150 Alphamax 150 Optigear BM 150 Tribol 1100/150	
CLP HC	VG 150	Mobilgear SHC XMP150		Klüber GEM4-150N	Degol PAS 150	BP Enersyn EP-XF 150	Pinnacle WM 150	Renolin Unisyn CLP 150	ELGreco 150	Optigear Synthetic X 150 Tribol 1510/150 Tribol 1710/150	Carter SH 150
CLP	VG 220	Mobilgear XMP220	Shell Omala F220	KLÜBER GEM 1-220N	Degol BG 220 Plus	BP Energol GR-XF 220	Meropa 220	Renolin CLP 220 Plus	Goya NT 220	Alpha SP 220 Alphamax 220 Optigear BM 220 Tribol 1100/220	Carter EP 220
CLP HC	VG 220	Mobilgear SHC XMP220	Shell Omala Oil HD 220	Klüber GEM4-220N	Degol PAS 220	BP Enersyn EP-XF 220	Pinnacle WM 220	Renolin Unisyn CLP 220	ELGreco 220	Optigear Synthetic A 220 Optigear Synthetic X 220 Tribol 1510/220 Tribol 1710/220	Carter SH 220
CLP	VG 320	Mobilgear XMP320	Shell Omala F 320	KLÜBER GEM 1-320N	Degol BG 320 Plus	BP Energol GR-XF 320	Meropa 320	Renolin CLP 320 Plus	Goya NT 320	Alpha SP 320 Alphamax 320 Optigear BM 320 Tribol 1100/320	Carter EP 320
CLP HC	VG 320	Mobilgear SHC XMP320 Mobil SHC 632	Shell Omala Oil HD 320	Klüber GEM4-320N	Degol PAS 320	BP Enersyn EP-XF 320	Pinnacle EP 320	Renolin Unisyn CLP 320	ELGreco 320	Optigear Synthetic A 320 Optigear Synthetic X 320 Tribol 1510/ 320 Tribol 1710/ 320	Carter SH 320
CLP	VG 460	Mobilgear XMP460	Shell Omala F460	KLÜBER GEM 1-460N	Degol BG 460 Plus	BP Energol GR-XF 460	Meropa 460	Renolin CLP 460 Plus	Goya NT 460	Alphamax 460 Optigear BM 460 Tribol 1100/460	Carter EP 460
CLP HC	VG 460	Mobilgear SHC XMP460 Mobil SHC 634	Shell Omala Oil HD 460	Klüber GEM4-460N	Degol PAS 460	BP Enersyn EP -XF 460	Pinnacle WM 460	Renolin Unisyn CLP 460	ELGreco 460	Optigear Synthetic X 460 Tribol 1510/ 460 Tribol 1710/ 460	Carter SH 460
CLP	VG 680	Mobilgear XMP680		KLÜBER GEM 1-680N	Degol BG 680 Plus	BP Energol GR-XF 680	Meropa 680	Renolin CLP 680 Plus	Goya NT 680	Alpha SP 680 Optigear BM 680 Tribol 1100 / 680	Carter EP 680

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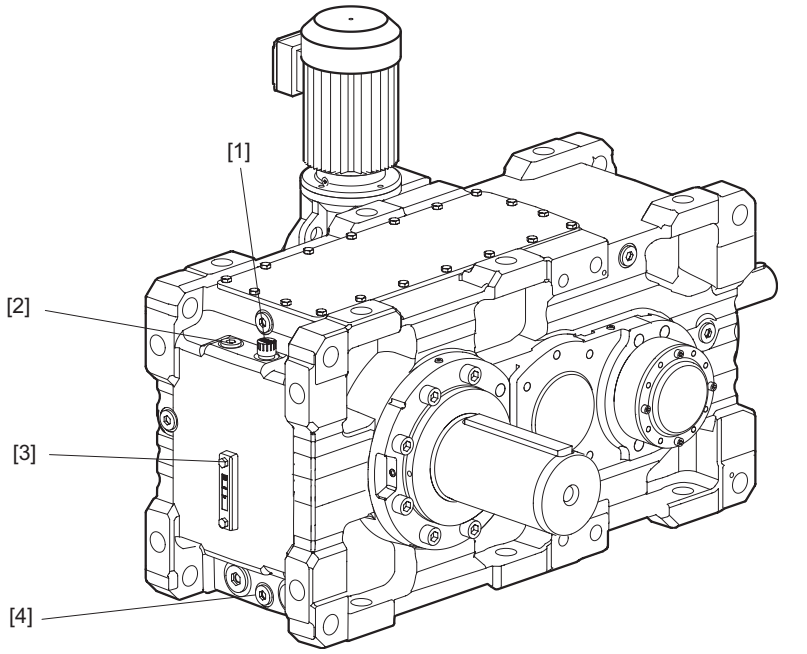
5.3.3 Sealing grease

The following overview shows the greases recommended by SEW-EURODRIVE.

Supplier	Oil
Aral	Aralub HLP2
BP	Energrease LS-EPS
Castrol	Spheerol EPL2
Chevron	Dura-Lith EP2
Elf	Epexa EP2
Exxon	Beacon EP2
Gulf	Gulf crown Grease 2
Klüber	Centoplex EP2
Kuwait	Q8 Rembrandt EP2
Mobil	Mobilux EP2
Molub	Alloy BRB-572
Optimol	Olista Longtime 2
Shell	Alvania EP2
Texaco	Multifak EP2
Total	Multis EP2
Tribol	Tribol 3030-2

5.4 Accessories

	NOTE
	The position of accessories may vary depending on gear unit type and size. For more details, refer to section 10.3.



[1] Breather
[2] Oil dipstick (optional)
[3] Oil level glass
[4] Oil drain

Visual oil level check

In the M1 mounting position, the gear unit is equipped with an oil level glass as standard. A dipstick can be used as option.

Breather

When a gear unit is vented, non-permitted pressures, which arise from heating during operation, are avoided. The gear units are normally equipped with a high-quality breather filter with a filter mesh of 2 μm.

Oil drainage

The gear unit is normally equipped with an oil drain plug. An oil drain valve may be provided as option. This allows for a drain line to be easily attached when changing the gear unit oil.

5.5 Cooling

If the thermal rating of the gear unit is insufficient, it can be operated with a fan on the input shaft (depending on the direction of rotation) instead. For gear units with fans on the input shaft, make sure that there is enough space in the axial and radial directions to allow for sufficient supply of cooling air.

Please contact SEW-EURODRIVE for information on other cooling options.

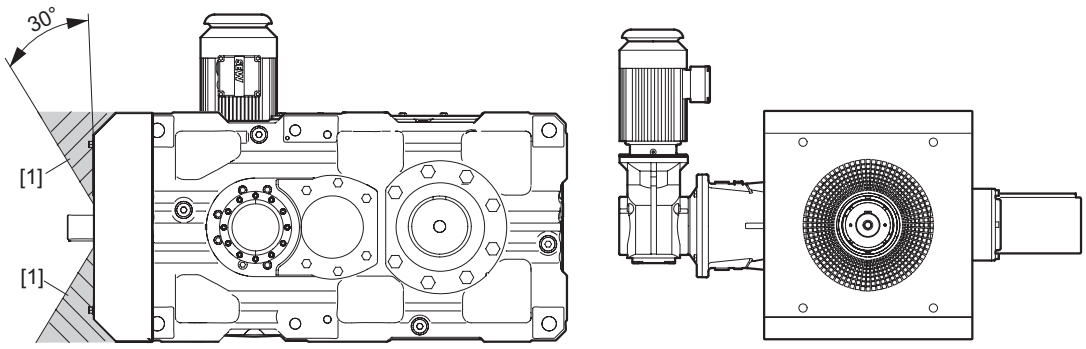
5.5.1 Fan

Fans with optimized noise and flow engineering geometry are used.

To raise the thermal rating or when the ambient conditions change after gear unit start-up, a fan may be retrofitted.

	NOTE
	Information about the fan regarding dimensions, position and clear air intake [1] is provided in section 10.3.

X.K.. fan (standard)

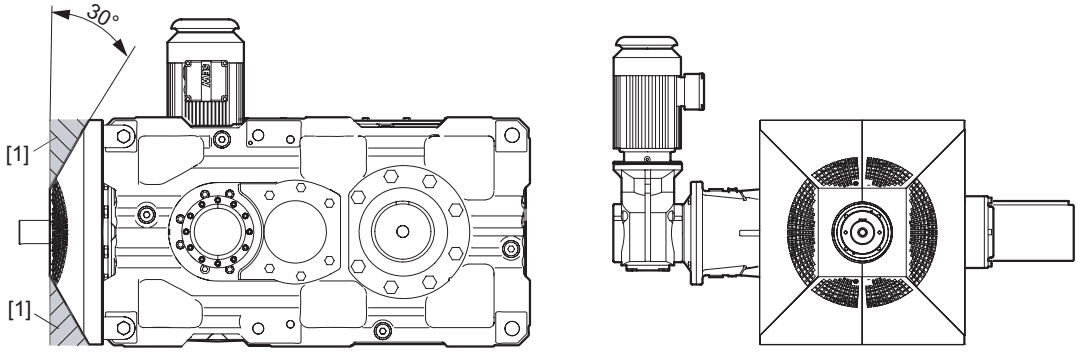


[1] Air intake that should be kept clear

X.K.. fan advanced (option)

When the X3K Advance fan is used, the connection element, such as hydraulic centrifugal coupling, can be mounted flush on the fan guard.

The air intake that must be kept clear is integrated into the fan guard.



[1] Air intake that should be kept clear

	NOTE
	The type X.K.. Advanced fan cannot be used together with a torque arm because the fan guard is mounted to the attachment point of the torque arm.

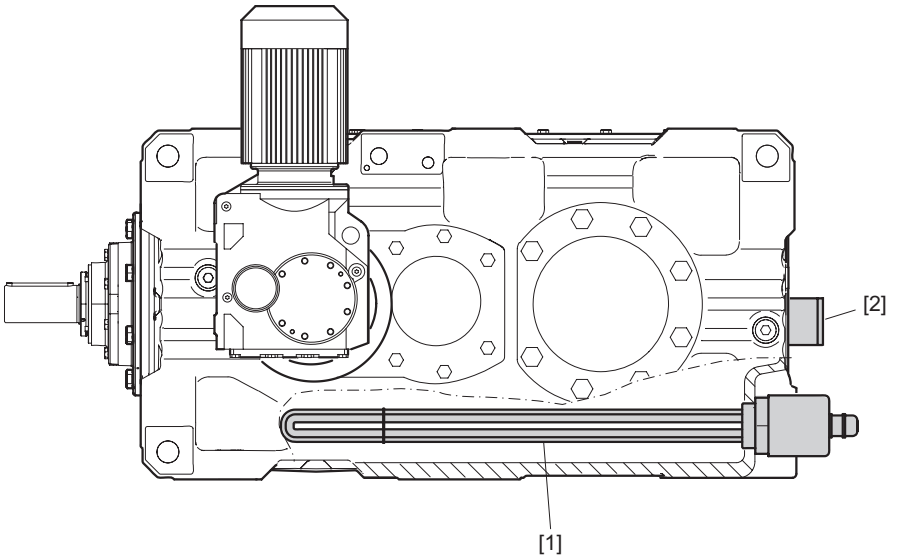
5.6 Oil heater

An oil heater is required to ensure lubrication at cold startup.

5.6.1 Structure

The oil heater consists of two basic parts:

1. Resistor element in the oil sump ("Oil heater") with terminal box
2. Temperature sensor with thermostat



[1] Oil heater

[2] Temperature sensor with thermostat

STOP	**STOP**
	In order to prevent damage, it is essential that the heating elements are fully immersed in the oil sump.

	NOTE
	The position of the thermostat and the temperature sensor varies with design and mounting position of the gear unit.

5.6.2 Connection power

The table below shows the power of the heaters that may be installed.

Size	P_{inst} 1 heating element		P_{inst} 2 heating elements	
	[kW]	[K/h]	[kW]	[K/h]
180	1 x 1.6	4.2	2 x 1.6	14
190	1 x 1.6	4.1	-	-
200	1 x 1.9	4.0	2 x 1.9	13
210	1 x 1.9	3.9	-	-
220	1 x 2.25	3.7	2 x 2.25	12
230	1 x 2.25	3.7	-	-
240	1 x 2.25	3.1	2 x 2.25	9
250	1 x 2.6	3.6	-	-

K/h = Heating power [kelvins/hour]

P_{inst} = Power of the installed heater

5.6.3 Notes on the oil heater

- The thermostat of the oil heater is factory set to a temperature of ca. 5 K above the respective limit temperature. When this temperature is reached, the thermostat deactivates the oil heater. Only then may the gear unit be taken into operation. The thermostat activates the oil heater again once the temperatures lies ca.5 K below the limit temperature.
- The thermostat and oil heater are installed on the gear unit and ready for operation, but they must be properly connected to the external power supply before startup.
- Contact SEW-EURODRIVE if a differing oil viscosity class is used or if ambient temperatures fall below the specified limit temperature.

5.6.4 Limit temperature for gear unit startup

The minimum permissible ambient temperature for gear unit startup depends on the viscosity of the oil that is used and of the lubrication type of the gear unit.

STOP	**STOP** Prior to startup, the oil must be heated to the temperature specified under "without heater" (see below table) using the oil heater.

The following tables show the limit temperatures (minimum ambient temperatures) for gear unit startup without and with oil heater.

Mineral oil

Lubrication type	Type	ISO VG320	ISO VG220	ISO VG150
Splash lubrication, bath lubrication	**without heater** (minimum permitted ambient/oil bath temperature)	–12 °C	–16 °C	–21 °C
	with heater (1 heating element) (minimum permitted ambient temperature) Sizes 180 - 250	–30 °C	–34 °C	–39 °C
	with heater (2 heating elements) (minimum permitted ambient temperature) Only sizes 180, 200, 220, 240	–40 °C	–40 °C	–40 °C
Pressure lubrication and shaft end pump	**without heater** (minimum permitted ambient/oil batch temperature)	+6 °C	+1 °C	–4 °C
	with heater (1 heating element) (minimum permitted ambient temperature) Sizes 180 - 250	–12 °C	–17 °C	–22 °C
	with heater (2 heating elements) (minimum permitted ambient temperature) Sizes 180, 200, 220, 240	–30 °C	–34 °C	–39 °C
Pressure lubrication and motor pump	**without heater** (minimum permitted ambient/oil bath temperature)	+15 °C	+10 °C	+5 °C
	with heater (1 heating element) (minimum permitted ambient temperature) Sizes 180 - 250	–3 °C	–8 °C	–13 °C
	with heater (2 heating elements) (minimum permitted ambient temperature) Sizes 180, 200, 220, 240	–20 °C	–25 °C	–30 °C

Synthetic oil

Lubrication type	Type	ISO VG320	ISO VG220	ISO VG150
Splash lubrication, bath lubrication	**without heater** (minimum permitted ambient/oil bath temperature)	–25 °C	–29 °C	–33 °C
	with heater (1 heating element) (minimum permitted ambient temperature) Sizes 180 - 250	–40 °C	–40 °C	–40 °C
	with heater (2 heating elements) (minimum permitted ambient temperature) Only sizes 180, 200, 220, 240	–-40 °C	–40 °C	–40 °C
Pressure lubrication and shaft end pump	**without heater** (minimum permitted ambient/oil bath temperature)	–-4 °C	–8 °C	–14 °C
	with heater (1 heating element) (minimum permitted ambient temperature) Sizes 180 - 250	–22 °C	–26 °C	–32 °C
	with heater (2 heating elements) (minimum permitted ambient temperature) Only sizes 180, 200, 220, 240	–39 °C	–40 °C	–40 °C
Pressure lubrication and motor pump	**without heater** (minimum permitted ambient/oil bath temperature)	+8 °C	+3 °C	–3 °C
	with heater (1 heating element) (minimum permitted ambient temperature) Sizes 180 - 250	–10 °C	–15 °C	–21 °C
	with heater (2 heating elements) (minimum permitted ambient temperature) Only sizes 180, 200, 220, 240	–27 °C	–32 °C	–38 °C



STOP

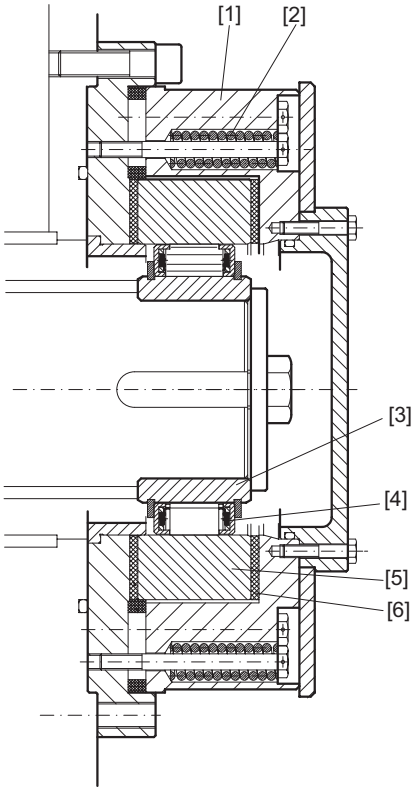
The temperatures specified refer to the average values of the permitted lubricants based on the lubricant table (see page 51). In borderline cases, the permitted temperature of the lubricant that is actually being used must be verified. When planning the motor, observe the increased starting torque at low temperatures. It may be necessary to contact SEW-EURODRIVE.

6 Options and Accessories

6.1 Torque-limited backstop

Torque-limiting backstops are used in dual drives where both drives are equipped with a backstop.

The torque limitation prevents the restoring torque from being unevenly distributed to the individual backstops. Dynamic torque peaks are also reduced during the blocking phase.



62171AXX

[1]	Housing	[4]	Freewheel cage
[2]	Compression springs	[5]	Outer ring
[3]	Inner ring	[6]	Friction lining

As with a backstop without torque control, the locking torque is transmitted to the outer ring via sprags.

However, for a torque-controlled backstop, the outer ring [5] is not securely bolted on the gear unit housing. It is held between two friction linings [6]. The friction linings are loaded via a housing [1] with screws and compression springs [2].

STOP	**STOP**
	The slip torque is factory-set. Changing the slip torque is not permitted.

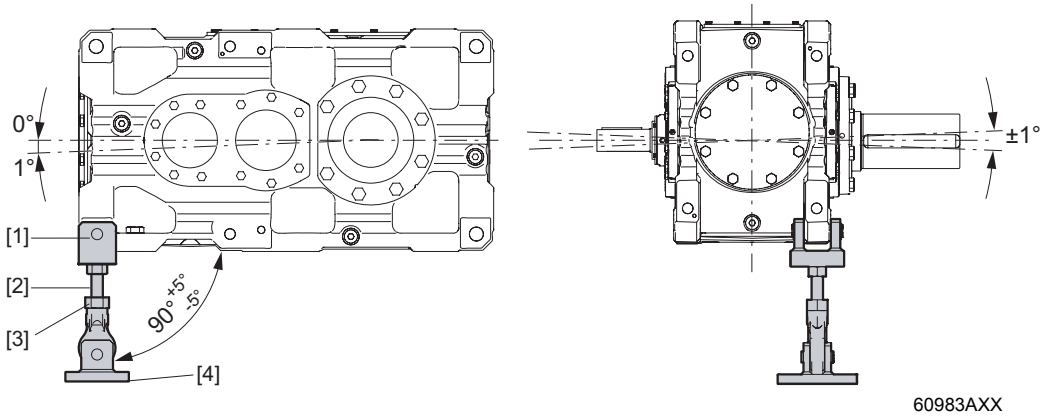
6.2 Torque arm

A torque arm is available to support the reaction moment of hollow shaft gear units in the shaft-mounted version.

The torque arm can bear tensile stress as well as thrust loads.

The length of the torque arm can be adjusted within a certain range.

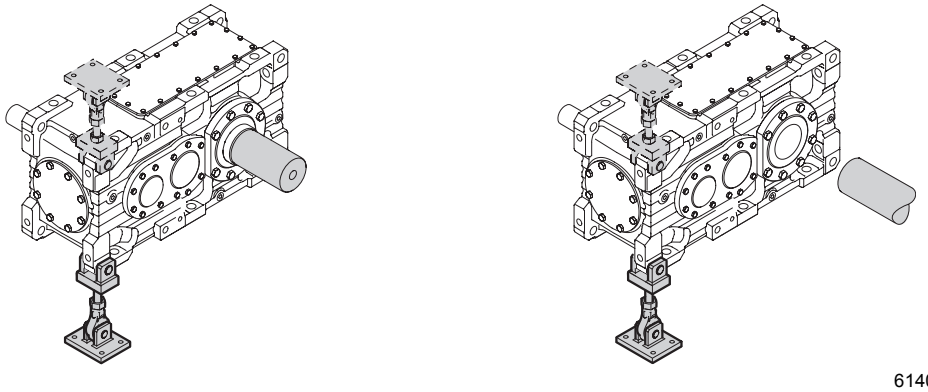
The torque arm consists of a joint head with bolt [1], threaded bolt [2], maintenance-free joint head, and fork plate with bolt [4]. The design using the joint head allows for the compensation of assembly tolerances and operational displacements. Constraining forces on the output shaft are thus avoided.



[1] Joint head with bolt
[2] Threaded bolt with nut
[3] Joint head
[4] Fork plate with bolt

STOP	**STOP**
	Do not deform the torque arm during installation. Deformation leads to constraining forces on the output shaft, which may negatively influence the service life of the output shaft bearings.

To keep the bending moment on the machine shaft as low as possible, the torque arm must always be mounted on the same side as the machine that is driven. The torque arm can be mounted on the top or bottom of the gear unit.



	NOTE
	The X.K.. Advanced fan cannot be used together with a torque arm because the fan guard is mounted to the attachment point of the torque arm.

6.3 Drive package on steel frame

For bucket elevator drives, complete preassembled drive packages on a steel frame (swing base or base frame) are available from SEW-EURODRIVE.

6.3.1 Swing base

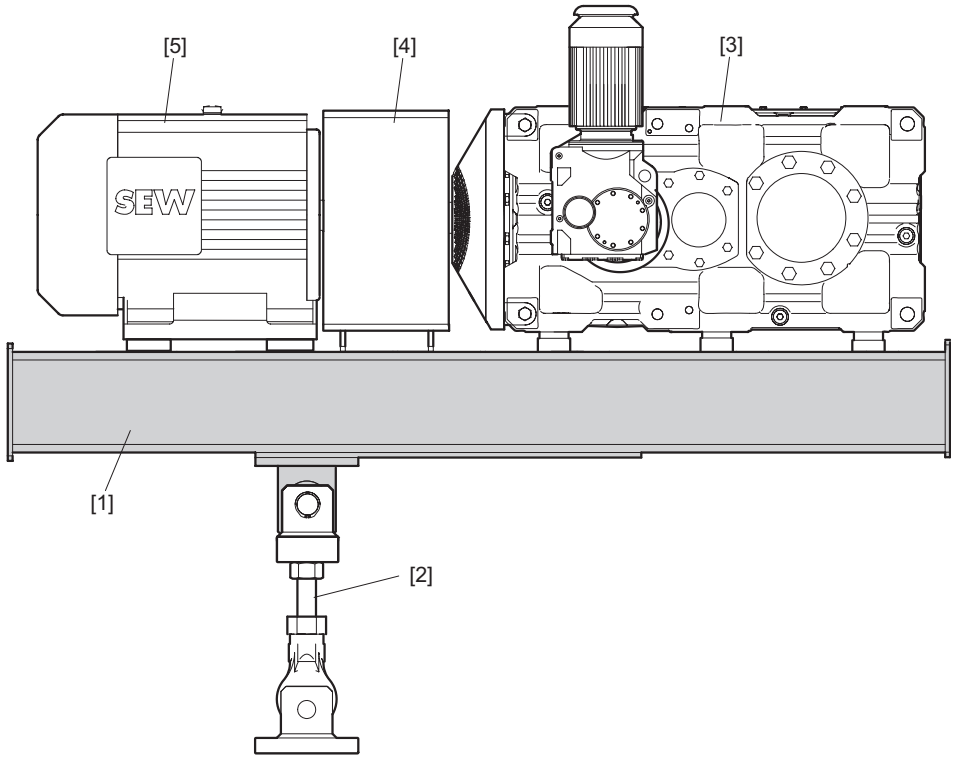
A swing base is a steel frame [1] that accommodates the gear unit, (hydro) coupling and motor (and brake, if required), including protection devices, such as a guard, etc. A swing base is normally used for:

- Hollow shaft gear units or
- Solid shaft gear units with flange coupling on the output shaft

The steel frame [1] is supported by a torque arm [2].

STOP	**STOP** It is essential that: • The system frame is sufficiently dimensioned to absorb the torque • The swing base is not strained during installation (hazard of damage to gear unit and coupling)

Example: Swing base with coupling



62194AXX

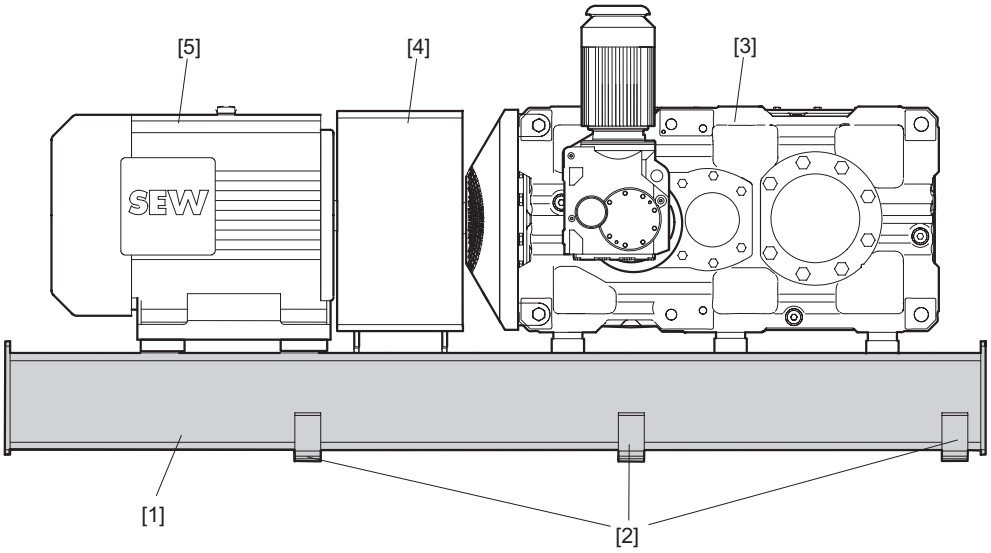
[1] Swing base
[2] Torque arm (optional)
[3] Bevel-helical gear unit with auxiliary drive
[4] Coupling with protection cover
[5] Main drive motor

6.3.2 Base plate

A base plate is a steel frame [1] that accommodates the gear unit, (hydro) coupling and motor (and brake, if required), including protection devices, such as guards, etc. The steel frame is supported by several foot mountings [2]. Such a frame is usually used for solid shaft gear units with elastic coupling on the output shaft.

STOP	**STOP**
	It is essential that: • The support structure of the foot mounting is adequately dimensioned and rigid. • The base plate is not deformed during installation (hazard of damage to gear unit and coupling).

Example: Base plate with coupling



62195AXX

[1] Base plate

[2] Foot mounting

[3] Bevel-helical gear unit with auxiliary drive

[4] Coupling with protection cover

[5] Main drive motor

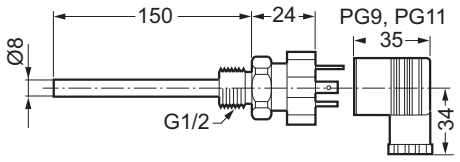
7 Condition Monitoring

7.1 PT100 temperature sensor

The PT100 temperature sensor can be used to measure the temperature of the oil in the gear unit.

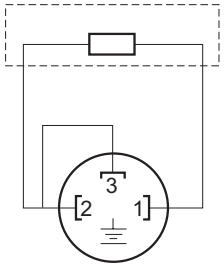
The temperature sensor is located in the gear unit's oil sump. The exact position depends on the gear unit version and position of the shaft.

7.1.1 Dimensions



50533AXX

7.1.2 Electrical connection



50534AXX

[1] / [2] Resistor element connection

7.1.3 Technical data

- Sensor tolerance [K] ± (0.3 + 0.005 x T), (corresponds to DIN IEC 751 class B),
  T = Oil temperature [°C]
- Plug connector DIN 43650 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection = 0.25 Nm.

7.2 NTB temperature switch

A temperature switch with fixed switching temperatures of 70, 80, 90 or 100 °C is used for monitoring the gear unit oil temperature.

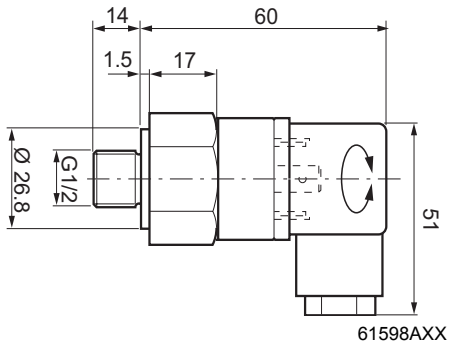
The temperature switch is normally used for the following functions:

- Early warning at 70 °C or 80 °C
- Stopping the main drive motor of the gear unit at 90 °C or 100 °C

To guarantee a long service life and functioning under all conditions, using a relay in the power circuit instead of a direct connection through the temperature switch is recommended.

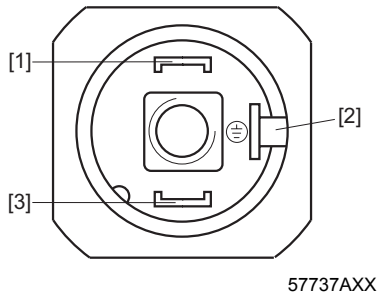
The temperature switch is located in the gear unit's oil sump. The exact position depends on the gear unit version and position of the shaft.

7.2.1 Dimensions



[1] Cable clamp

7.2.2 Electrical connection



[1]/[3] NC contact (without vacuum)

[2] Grounding terminal 6.3 x 0.8

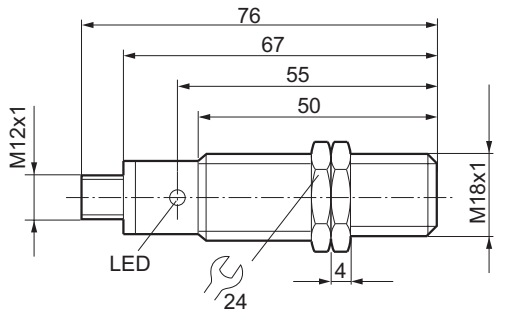
7.2.3 Technical data

- Switching precision ± 5 °K
- Maximum switching power 1A - 240 V_{AC}
- Plug connector DIN 43650 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for the electrical connection is 0.25 Nm.

7.3 Inductive encoder

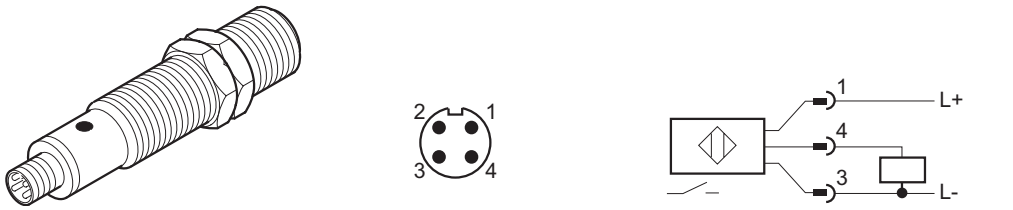
The speed of the overrunning clutch is monitored using an inductive encoder.

7.3.1 Dimensions



63042AXX

7.3.2 Electrical connection



63043AXX

7.3.3 Technical data

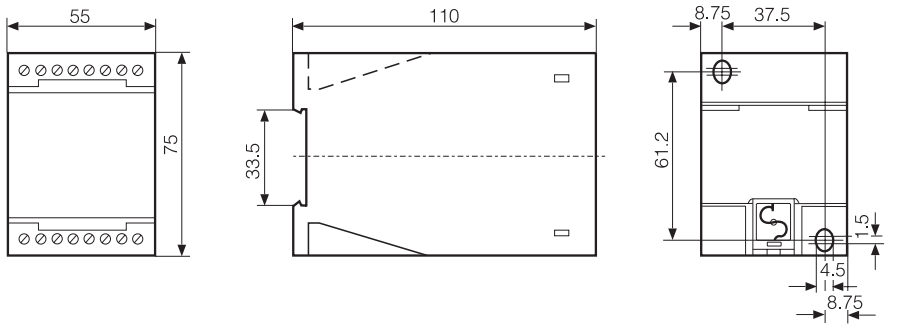
- Electrical design DC PNP (normally open contact)
- Operating voltage DC 10 - 36 V
- Maximum current carrying capacity 250 mA
- Working sensing range 0 - 4 mm
- Degree of protection IP67
- Connection via three-core cable with a cable cross section of 1.5 mm^2 and a maximum cable length of 500 m

	NOTE
	The connecting lead and the M12 plug connector are not included in the scope of delivery Make sure that the signal line is installed separately (not in multi-core cables): Shield them, if necessary.

7.4 Speed monitor

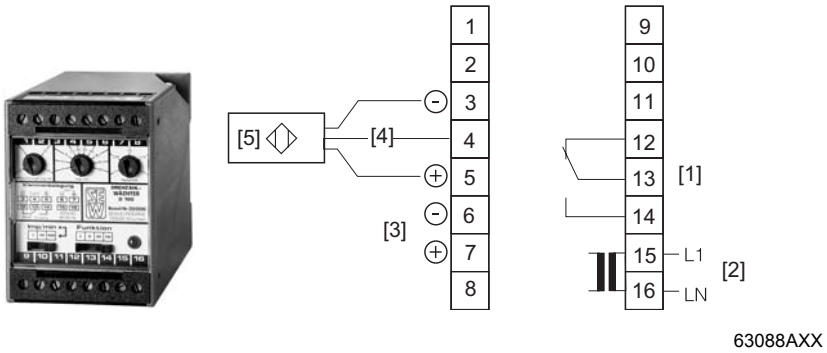
A speed monitor is available for evaluating the signals of the inductive encoder.

7.4.1 Dimensions



52250AXX

7.4.2 Electrical connection



63088AXX

[1] Relay output
[2] Supply voltage AC 230 V (47...63 Hz)
[3] DC 24 V supply voltage
[4] Signal
[5] Encoder

7.4.3 Technical data

- Operating voltage AC 230 V (50 ... 60 Hz) ±10 % / DC 24 V ±10 %
- Maximum switching power AC 8 A - 250 V
- Auxiliary power for sensors DC 24 V (max. 30 mA)
- Maximum input frequency 250 Hz
- Degree of protection of housing IP40 / terminals IP20

7.5 Diagnostic unit DUO10A (oil aging)

The DUO10A diagnostic unit was developed for advance planning of oil changes.

The diagnostic unit consists of a PT100 temperature sensor and an evaluation unit. The temperature sensor installed in the gear unit measures the current gear unit oil temperature. The diagnostic unit calculates the estimated remaining service life for the gear unit oil from the measured oil temperature. This calculated value is continuously shown on the evaluation unit's display; when needed, the display can be changed to the current gear unit oil temperature.

The oil types used by SEW are recorded in the evaluation unit, wherein a type of oil approved by SEW-EURODRIVE can be customized.

Oil types:

Oil grade	Designation	Limit temperature
Mineral oil CLP/ Bio oil	OEL1	100 °C
Synthetic oil CLPHC/CLPPAO	OEL2	130 °C
Polyglycol CLPPG	OEL3	130 °C
Food grade oil	OEL4	100 °C
Customer-specific	OIL5	default = OIL1

Four switching outputs (NC/NO) with the following functions are available to connect the evaluation unit:

- Early warning:

  Is set a few days before the expiration of the remaining service life, the number of days may be set directly on the evaluation unit.

- Main alarm:

  Is set when the estimated remaining service life reaches zero.

- Limit temperature:

  Shows when the permitted oil temperature has been exceeded.

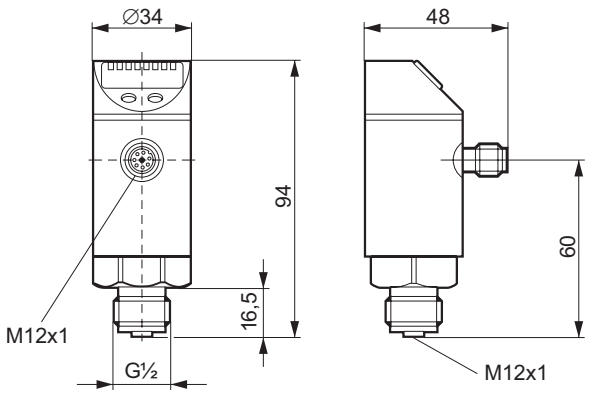
- 'Ready for operation':

  Displays errors in the wiring and recognizable faults in the evaluation unit.

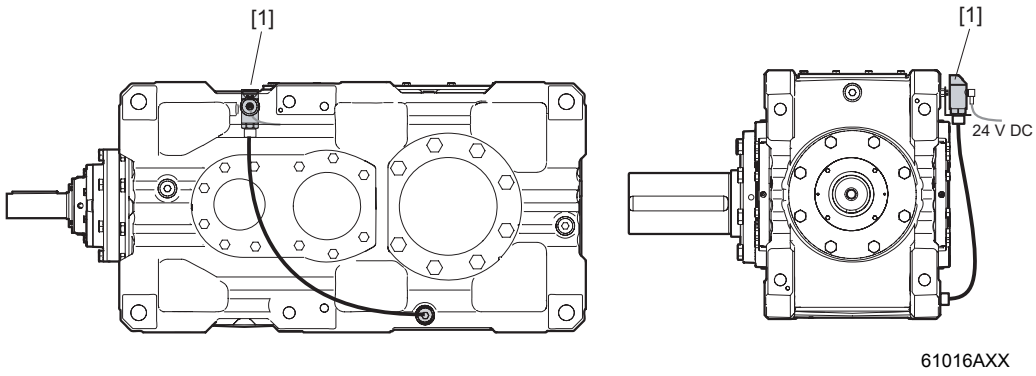
NOTE

For more information about the evaluation unit and accessories, refer to the "DUO10A Diagnostic Unit" manual, publication no. 11473428.

7.5.1 Dimensions



7.5.2 Mounting example



[1] DUO10A diagnostic unit

7.6 DUV10A diagnostic unit (vibrations diagnostics)

The DUV10A diagnostic unit provides a vibration analysis value, in which it uses frequency analysis methods to evaluate vibration signals from the gear unit.

A micromechanical acceleration pickup, built into the diagnostic unit, is used as the sensor. The unit allows up to 5 different objects (bearings, etc.) or individual 20 frequencies (imbalance, gear meshing frequencies, etc.) to be monitored. Further, a frequency-dependent level monitor, for monitoring impacts or vibrations, can also be activated. The diagnostics objects to be monitored are defined using external software and are transferred to the diagnostics monitor via an RS-232 interface.

The damage progress is indicated by an LED series on the DUV10A diagnostic unit. Two switching outputs for connecting the diagnostic unit are available.

- Early warning:

  The early warning signals that the early warning threshold of one of the objects (bearings, etc.) has been exceeded, thus warning of the beginning of a damaging process.
- Main alarm:

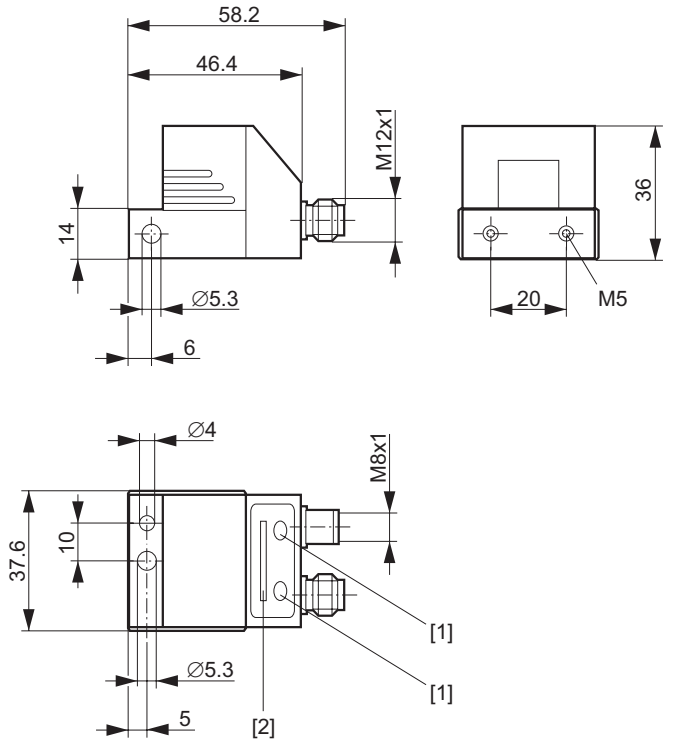
  The main alarm signals that the main alarm threshold of one of the objects (bearings, etc.) has been exceeded, thus warning of upcoming damage.

After startup of the drive to be monitored and the diagnostic unit, a comparison measurement ('teach-in') is carried out and stored in the diagnostic unit. During operating, the current measurements and the teach-in values are compared, and a trend analysis is carried out. Changes to this relationship (measured value: teach-in value) indicate the early phase of possible damages.

The maximum operating range is a shaft speed of 12 to 3500 rpm, with a minimum measuring time of 8 seconds per object. The diagnostic unit can be operated with both constant and variable speeds, whereby the actual measurement can only occur during constant speed.

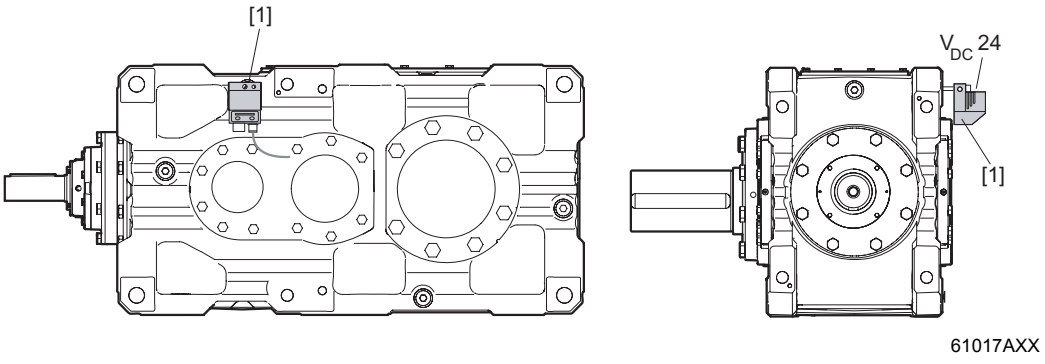
	NOTE
	For more information about the evaluation unit and accessories, refer to the "DUV10A Diagnostic Unit" manual, publication no. 11425016.

7.6.1 Dimensions



58351AXX

7.6.2 Mounting example



61017AXX

[1] DUV10A diagnostic unit

8 Design and Operating Notes

8.1 General information

Not included in the scope of delivery:

- Set of wrenches
- Torque wrench
- Mounting device
- Compensation elements (shims, spacing rings), if necessary
- Fasteners for input and output elements
- Lubricant (e.g. NOCO® fluid from SEW-EURODRIVE) → except for hollow shaft gear units
- For hollow shaft gear units → aids for assembly/disassembly on the machine shaft
- Securing components for the gear unit base

8.2 Gear unit mounting

The following table shows the thread sizes and the tightening torques of the individual gear unit sizes.

Size	Bolt/nut	Tightening torque bolt/nut Strength classes 8.8 [Nm]
180	M36	2500
190		
200	M42	4000
210		
220		
230		
240	M48	6000
250		

8.3 Dimensioning the machine shaft for hollow shaft gear units

The material of the machine shaft as well as the keyed connection (on version X..A) should be dimensioned by the customer according to the loads that will occur. The shaft material should have a yield point of at least 320 N/mm² (46,400 lb/in²).

Hollow shaft with key

The key length should be, at minimum, that shown in the dimension sheets. If a longer key is used, it should be aligned symmetrically to the hollow shaft.

With a through-going machine shaft or axial forces, SEW-EURODRIVE recommends that the machine shaft be designed with a contact shoulder. Contact SEW-EURODRIVE if the load reverses directions.

	NOTE
	For detailed specifications on the geometry of the machine shaft, refer to section 11.

9 Important Notes

	NOTE
	Unless specified otherwise, all dimensions are given in mm.

9.1 Information about dimension sheets

9.1.1 General information

Scope of delivery

= Standard parts supplied by SEW-EURODRIVE.

= Standard parts not supplied by SEW-EURODRIVE.

Oil volumes / weight

The specified fill quantities are guide values. The information on the nameplate is binding.

	NOTE
	The weights shown in the selection tables do not include an oil fill.

Options

The option dimension sheets show the options in connection with gear unit X.S.. with a solid shaft. Unless otherwise indicated, all options are also possible for gear units with hollow shafts (X.A../X.H..).

9.1.2 Tolerances

Shaft ends

Diameter tolerance in accordance with DIN 748:

- ∅ ≤ 50 mm → ISO k6
- ∅ > 50 mm → ISO m6

Center bores according to DIN 332, part 2 (Type D..):

- ∅ > 16...21 mm → M6
- ∅ > 21...24 mm → M8
- ∅ > 24...30 mm → M10
- ∅ > 30...38 mm → M12
- ∅ > 38...50 mm → M16
- ∅ > 50...85 mm → M20
- ∅ > 85...130 mm → M24
- ∅ > 130...225 mm[5)] → M30
- ∅ > 225...320 mm[5)] → M36
- ∅ > 320...500 mm[5)] → M42

[5)] Dimensions not according to DIN 332; the thread depth including the counterbore is at least twice that of the rated thread diameter

Keys according to DIN 6885 (domed type)

Hollow shafts Diameter tolerance:

- ∅ → ISO H7 for hollow shafts with shrink disks
- ∅ → ISO H8 for hollow shafts with keyway

Mounting flange Centering shoulder tolerance: ISO f7

9.1.3 Abbreviations for optional accessories

The table contains the symbols used in the following illustrations and their meaning.

Abbreviation	Meaning
/BS	Backstop
/BSL	Torque-limited backstop
/F	Mounting flange
/FAN	Fan
/FAN-ADV	Fan version Advanced
/HSST	Through-going drive shaft = shaft position 12 or 21
/LSST	Through-going output shaft = shaft position 34 or 43
/T	Torque arm
/OAC	Circulation cooling oil-air cooler with motor pump
/OD	Oil dipstick
/ODV	Oil drain valve
/OH	Oil heater
/OWC	Circulation cooling oil-water cooler with motor pump

9.1.4 Symbols

The table contains the symbols used in the following illustrations and explains their meaning.

Symbol	Meaning
	Oil filling plug
	Oil drain
	Oil level glass
	Oil dipstick
	Breather plug
	Inspection opening
	Air outlet screw
	Oil inflow
	Oil return
	Water inflow
	Water return
	Flat grease nipple
	Taper grease nipple

9.2 Notes about selection tables

Detailed selection table example

[1]

X.K250..,n_1 = 1500 1/min					KF87DV132S4 i = 36.52 P_m = 5.5 kW I_N = 11 A (400V 50Hz)		KF127DV200L4 i = 36.25 P_m = 30 kW I_N = 55 A (400V 50Hz)			P_{TH} [kW]				175 kNm
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28[1]	**27.55**	54	175	1045	2.5	19.8	2.6	104		263	*)	601	430	
31.5[1]	**31.64**	47	175	910	2.2	22.7	2.3	119		252	*)	576	412	
35.5	**34.89**	43	175	825	2.5	19.8	2.6	104		247	*)	533	388	
40	**40.08**	37	175	718	2.2	22.7	2.3	119		243	*)	524	382	
45	**42.95**	35	175	670	2.1	24.3	2.1	128		244	*)	522	381	
50	**49.33**	30	175	583	1.8	28.0	1.9	147	**X3K..**	240	164	513	374	90 92
56	**52.47**	29	175	549	2.1	24.3	2.1	128		230	159	481	353	
63	**60.27**	25	175	478	1.8	28.0	1.9	147		221	153	462	340	
71	**67.18**	22	175	428	2.1	24.3	2.1	128		209	147	432	319	
80	**77.17**	19	175	373	1.8	28.0	1.9	147		202	142	416	307	
[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]

[1] Type and technical data of auxiliary drive

[2] Nominal gear ratio

[3] Exact gear unit reduction ratio

[4] Output speed (LSS)

[5] Nominal torque of the gear unit

[6] Nominal gear unit power

[7] Output speed when operated with auxiliary drive (empty buckets)

[8] Output torque when operated with auxiliary drive (empty buckets)

[9] Output speed when operated with auxiliary drive (full buckets)

[10] Output torque when operated with auxiliary drive (full buckets)

[11] Symbol for gear unit type

Thermal rating:

[12] Without additional cooling at 20 °C ambient temperature

[13] Without additional cooling at 40 °C ambient temperature

[14] Wtih fan at 20 °C ambient temperature

[15] With fan at 40 °C ambient temperature

[16] Main dimension sheet page number

Empty buckets

Full buckets

1) = Pressure lubrication required; contact SEW-EURODRIVE

* = Contact SEW-EURODRIVE

\- = No catalog version; contact SEW-EURODRIVE

10 Bevel-Helical Gear Units

10.1 Selection tables n_1 = 1500 1/min

X.K180..,n_1 = 1500 1/min **58.0 kNm**

					KF77DV100L4 i = 38.39 P_m = 3 kW I_N = 6.3 A (400V 50Hz)		KF97DV132ML4/Z i = 38.30 P_m = 9.2 kW I_N = 18.1 A (400V 50Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**28.61**	52	58.0	333	2.3	12.0	2.4	35.8		163	115	334	247	
31.5	**32.36**	46	58.0	295	2.6	10.7	2.6	32.0		145	105	292	218	
35.5	**36.24**	41	58.0	263	2.3	12.0	2.4	35.8		151	108	302	225	
40	**38.93**	39	58.0	245	2.1	12.9	2.2	38.5		133	96	266	198	
45	**43.60**	34	58.0	219	1.9	14.5	2.0	43.1	**X3K..**	137	99	274	204	84 86
50	**47.57**	32	58.0	201	2.1	12.9	2.2	38.5		123	89	244	182	
56	**53.27**	28	58.0	179	1.9	14.5	2.0	43.1		124	90	245	183	
63	**60.90**	25	58.0	157	2.1	12.9	2.2	38.5		105	77	206	155	
71	**68.20**	22	58.0	140	1.9	14.5	2.0	43.1		107	78	211	158	

X.K190..,n_1 = 1500 1/min **65.0 kNm**

					KF77DV100L4 i = 38.39 P_m = 3 kW I_N = 6.3 A (400V 50Hz)		KF97DV132ML4/Z i = 38.30 P_m = 9.2 kW I_N = 18.1 A (400V 50Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**28.53**	53	65.0	375	2.3	12.0	2.4	35.7		170	120	346	257	
31.5	**32.06**	47	65.0	333	2.0	13.5	2.1	40.1		167	118	341	252	
35.5	**36.14**	42	65.0	296	2.3	12.0	2.4	35.7		152	110	305	228	
40	**40.61**	37	65.0	263	2.0	13.5	2.1	40.1		154	111	308	230	
45	**43.48**	34	65.0	246	1.9	14.4	2.0	43.0		139	100	277	207	84
50	**48.85**	31	65.0	219	1.7	16.2	1.7	48.3	**X3K..**	143	103	286	213	86
56	**53.11**	28	65.0	201	1.9	14.4	2.0	43.0		128	93	254	190	
63	**59.68**	25	65.0	179	1.7	16.2	1.7	48.3		129	94	255	191	
71	**68.00**	22	65.0	157	1.9	14.4	2.0	43.0		109	80	214	161	
80	**76.41**	20	65.0	140	1.7	16.2	1.7	48.3		112	82	219	165	

X.K200..,n_1 = 1500 1/min — 79.0 kNm

					KF77DV112M4 i = 38.39 P_m = 4 kW I_N = 8.7 A (400V 50Hz)		KF97DV160M4 i = 38.30 P_m = 11 kW I_N = 22.5 A (400V 50Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**29.17**	51	79.0	445	2.3	15.8	2.4	42.9		182	126	382	281	
31.5	**31.97**	47	79.0	406	2.6	13.9	2.7	37.8		171	122	349	259	
35.5	**36.26**	41	79.0	358	2.3	15.8	2.4	42.9		169	120	343	255	
40	**39.61**	38	79.0	328	2.1	17.3	2.2	46.8		172	122	348	259	
45	**44.92**	33	79.0	289	1.9	19.6	1.9	53.1	**X3K..**	169	120	342	254	84 86
50	**48.39**	31	79.0	269	2.1	17.3	2.2	46.8		161	115	324	241	
56	**54.88**	27	79.0	237	1.9	19.6	1.9	53.1		158	113	318	237	
63	**61.95**	24	79.0	210	2.1	17.3	2.2	46.8		144	104	288	215	
71	**70.26**	21	79.0	185	1.9	19.6	1.9	53.1		142	102	283	211	

X.K210..,n_1 = 1500 1/min — 90.0 kNm

					KF77DV112M4 i = 38.39 P_m = 4 kW I_N = 8.7 A (400V 50Hz)		KF97DV160M4 i = 38.30 P_m = 11 kW I_N = 22.5 A (400V 50Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**29.13**	51	90.0	508	2.3	15.8	2.4	42.8		195	136	407	300	
31.5	**32.97**	45	90.0	449	2.0	17.9	2.1	48.4		192	134	400	295	
35.5	**36.20**	41	90.0	409	2.3	15.8	2.4	42.8		175	125	356	264	
40	**40.99**	37	90.0	361	2.0	17.9	2.1	48.4		172	123	350	260	
45	**44.85**	33	90.0	330	1.9	19.6	1.9	53.0		171	122	347	258	84
50	**50.78**	30	90.0	291	1.7	22.2	1.7	60.0	**X3K..**	169	120	341	254	86
56	**54.79**	27	90.0	270	1.9	19.6	1.9	53.0		165	118	330	246	
63	**62.03**	24	90.0	239	1.7	22.2	1.7	60.0		162	116	324	242	
71	**70.15**	21	90.0	211	1.9	19.6	1.9	53.0		147	106	294	220	
80	**79.42**	19	90.0	186	1.7	22.2	1.7	60.0		145	105	289	216	

X.K220..,n_1 = 1500 1/min — 112 kNm

i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	KF87DV112M4 i = 36.52 P_m = 4 kW I_N = 8.7 A (400V 50Hz) n_3 [1/min]	M_{K3} [kNm]	KF107DV180M4 i = 37.00 P_m = 18.5 kW I_N = 37 A (400V 50Hz) n_3 [1/min]	M_{K3} [kNm]		P_{TH} [kW] 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**27.90**	54	112	660	2.5	14.7	2.5	66.7		249	169	536	391	
31.5	**32.02**	47	112	575	2.8	13.3	2.8	60.5		230	162	474	350	
35.5	**35.34**	42	112	521	2.5	14.7	2.5	66.7		227	160	468	346	
40	**39.55**	38	112	466	2.2	16.4	2.3	74.7		220	155	451	334	
45	**43.65**	34	112	422	2.0	18.1	2.1	82.4	**X3K..**	217	153	445	329	90 92
50	**48.32**	31	112	381	2.2	16.4	2.3	74.7		200	143	404	300	
56	**53.33**	28	112	345	2.0	18.1	2.1	82.4		197	141	398	296	
63	**61.86**	24	112	298	2.2	16.4	2.3	74.7		178	129	355	265	
71	**68.27**	22	112	270	2.0	18.1	2.1	82.4		172	125	344	257	

X.K230..,n_1 = 1500 1/min — 131 kNm

i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	KF87DV112M4 i = 36.52 P_m = 4 kW I_N = 8.7 A (400V 50Hz) n_3 [1/min]	M_{K3} [kNm]	KF107DV180M4 i = 37.00 P_m = 18.5 kW I_N = 37 A (400V 50Hz) n_3 [1/min]	M_{K3} [kNm]		P_{TH} [kW] 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**28.63**	52	131	753	2.4	15.0	2.5	68.5		259	*)	556	405	
31.5	**31.43**	48	131	686	2.2	16.5	2.3	75.2		256	174	549	401	
35.5	**36.26**	41	131	594	2.4	15.0	2.5	68.5		236	166	485	359	
40	**39.82**	38	131	541	2.2	16.5	2.3	75.2		233	165	479	354	
45	**44.78**	33	131	481	2.0	18.6	2.0	84.6		226	160	461	342	90
50	**49.17**	31	131	438	1.8	20.4	1.8	92.9	**X3K..**	223	158	456	337	92
56	**54.71**	27	131	394	2.0	18.6	2.0	84.6		205	147	413	307	
63	**60.08**	25	131	359	1.8	20.4	1.8	92.9		202	145	408	304	
71	**70.05**	21	131	308	2.0	18.6	2.0	84.6		179	129	356	266	
80	**76.91**	20	131	280	1.8	20.4	1.8	92.9		177	128	352	263	

X.K240..,n_1 = 1500 1/min — 156 kNm

					KF87DV132S4 i = 36.52 P_m = 5.5 kW I_N = 11 A (400V 50Hz)		KF127DV200L4 i = 36.25 P_m = 30 kW I_N = 55 A (400V 50Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**29.51**	51	156	869	2.4	21.2	2.5	111		254	*)	581	415	
31.5	**32.47**	46	156	790	2.7	18.4	2.8	97.1		249	*)	537	391	
35.5	**37.38**	40	156	686	2.4	21.2	2.5	111		239	*)	515	375	
40	**39.96**	38	156	642	2.2	22.7	2.3	119		246	167	526	384	
45	**46.00**	33	156	558	1.9	26.1	2.0	137	**X3K..**	230	156	493	359	90 92
50	**48.83**	31	156	525	2.2	22.7	2.3	119		231	160	484	356	
56	**56.20**	27	156	457	1.9	26.1	2.0	137		222	154	465	342	
63	**62.51**	24	156	410	2.2	22.7	2.3	119		210	147	434	320	
71	**71.95**	21	156	357	1.9	26.1	2.0	137		202	142	417	308	

X.K250..,n_1 = 1500 1/min — 175 kNm

					KF87DV132S4 i = 36.52 P_m = 5.5 kW I_N = 11 A (400V 50Hz)		KF127DV200L4 i = 36.25 P_m = 30 kW I_N = 55 A (400V 50Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**27.55**	54	175	1045	2.5	19.8	2.6	104		263	*)	601	430	
31.5	**31.64**	47	175	910	2.2	22.7	2.3	119		252	*)	576	412	
35.5	**34.89**	43	175	825	2.5	19.8	2.6	104		247	*)	533	388	
40	**40.08**	37	175	718	2.2	22.7	2.3	119		243	*)	524	382	
45	**42.95**	35	175	670	2.1	24.3	2.1	128		244	*)	522	381	90
50	**49.33**	30	175	583	1.8	28.0	1.9	147	**X3K..**	240	164	513	374	92
56	**52.47**	29	175	549	2.1	24.3	2.1	128		230	159	481	353	
63	**60.27**	25	175	478	1.8	28.0	1.9	147		221	153	462	340	
71	**67.18**	22	175	428	2.1	24.3	2.1	128		209	147	432	319	
80	**77.17**	19	175	373	1.8	28.0	1.9	147		202	142	416	307	

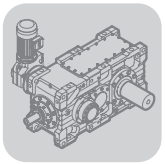
10.2 Selection tables n_1 = 1800 1/min

X.K180..,n_1 = 1800 1/min — 58.0 kNm

					KF77DV100L4 i = 38.39 P_m = 3kW I_N = 6.8 A(460V 60Hz)		KF97DV132ML4/Z i = 38.30 P_m = 9.2 kW I_N = 16.4 A(460V 60Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**28.61**	63	58.0	400	2.7	10.0	2.8	29.6		158	108	377	277	
31.5	**32.36**	56	58.0	354	3.1	8.97	3.2	26.5		144	100	331	245	
35.5	**36.24**	50	58.0	316	2.7	10.0	2.8	29.6		149	104	343	254	
40	**38.93**	46	58.0	294	2.5	10.7	2.6	31.8		132	92	301	223	
45	**43.60**	41	58.0	263	2.3	12.0	2.4	35.7	**X3K..**	136	95	311	230	84 86
50	**47.57**	38	58.0	241	2.5	10.7	2.6	31.8		123	87	277	206	
56	**53.27**	34	58.0	215	2.3	12.0	2.4	35.7		124	88	279	207	
63	**60.90**	30	58.0	188	2.5	10.7	2.6	31.8		106	76	235	176	
71	**68.20**	26	58.0	168	2.3	12.0	2.4	35.7		108	77	240	180	

X.K190..,n_1 = 1800 1/min — 65.0 kNm

					KF77DV100L4 i = 38.39 P_m = 3 kW I_N = 6.8 A(460V 60Hz)		KF97DV132ML4/Z i = 38.30 P_m = 9.2 kW I_N = 16.4 A(460V 60Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**28.53**	63	65.0	450	2.7	10.0	2.8	29.5		165	113	391	287	
31.5	**32.06**	56	65.0	400	2.4	11.2	2.5	33.2		162	111	385	282	
35.5	**36.14**	50	65.0	355	2.7	10.0	2.8	29.5		151	105	346	256	
40	**40.61**	44	65.0	316	2.4	11.2	2.5	33.2		152	106	349	259	
45	**43.48**	41	65.0	295	2.3	12.0	2.4	35.6		138	97	314	233	84
50	**48.85**	37	65.0	263	2.0	13.5	2.1	40.0	**X3K..**	142	100	324	241	86
56	**53.11**	34	65.0	242	2.3	12.0	2.4	35.6		128	91	289	215	
63	**59.68**	30	65.0	215	2.0	13.5	2.1	40.0		129	92	290	216	
71	**68.00**	26	65.0	189	2.3	12.0	2.4	35.6		110	79	244	183	
80	**76.41**	24	65.0	168	2.0	13.5	2.1	40.0		112	81	250	187	



X.K200..,n_1 = 1800 1/min — 79.0 kNm

					KF77DV112M4 i = 38.39 P_m = 4 kW I_N = 7 A(460V 60Hz)		KF97DV160M4 i = 38.30 P_m = 11 kW I_N = 20 A(460V 60Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**29.17**	62	78.5	531	2.8	13.0	2.8	35.5		174	*)	429	312	
31.5	**31.97**	56	79.0	488	3.2	11.4	3.2	31.3		168	*)	395	290	
35.5	**36.26**	50	79.0	430	2.8	13.0	2.8	35.5		165	113	388	286	
40	**39.61**	45	79.0	394	2.6	14.2	2.6	38.7		168	116	394	290	84
45	**44.92**	40	79.0	347	2.3	16.1	2.3	43.9	**X3K..**	166	114	387	286	86
50	**48.39**	37	79.0	322	2.6	14.2	2.6	38.7		159	110	367	272	
56	**54.88**	33	79.0	284	2.3	16.1	2.3	43.9		156	109	361	267	
63	**61.95**	29	79.0	252	2.6	14.2	2.6	38.7		144	101	327	243	
71	**70.26**	26	79.0	222	2.3	16.1	2.3	43.9		141	99	322	239	

X.K210..,n_1 = 1800 1/min — 90.0 kNm

					KF77DV112M4 i = 38.39 P_m = 4 kW I_N = 7 A(460V 60Hz)		KF97DV160M4 i = 38.30 P_m = 11 kW I_N = 20 A(460V 60Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**29.13**	62	87.4	592	2.8	12.9	2.8	35.4		187	*)	458	334	
31.5	**32.97**	55	88.6	530	2.5	14.7	2.5	40.1		184	*)	450	328	
35.5	**36.20**	50	90.0	491	2.8	12.9	2.8	35.4		172	*)	403	297	
40	**40.99**	44	90.0	433	2.5	14.7	2.5	40.1		169	116	396	292	
45	**44.85**	40	90.0	396	2.3	16.1	2.3	43.9		169	116	393	290	84
50	**50.78**	35	90.0	350	2.0	18.2	2.0	49.7	**X3K..**	166	115	386	285	86
56	**54.79**	33	90.0	324	2.3	16.1	2.3	43.9		163	113	375	277	
63	**62.03**	29	90.0	286	2.0	18.2	2.0	49.7		160	111	368	273	
71	**70.15**	26	90.0	253	2.3	16.1	2.3	43.9		147	103	334	248	
80	**79.42**	23	90.0	224	2.0	18.2	2.0	49.7		144	101	328	244	

X.K220..,n_1 = 1800 1/min — 112 kNm

					KF87DV112M4 i = 36.52 P_m = 4 kW I_N = 7 A(460V 60Hz)		KF107DV180M4 i = 37.00 P_m = 18.5 kW I_N = 31.5 A(460V 60Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**27.90**	65	112	792	3.0	12.0	3.1	55.5		231	*)	598	430	
31.5	**32.02**	56	112	690	3.4	10.9	3.4	50.3		223	*)	534	391	
35.5	**35.34**	51	112	625	3.0	12.0	3.1	55.5		220	*)	527	386	
40	**39.55**	46	112	559	2.7	13.5	2.7	62.2		214	145	509	373	
45	**43.65**	41	112	506	2.5	14.9	2.5	68.6	**X3K..**	211	143	502	368	90 92
50	**48.32**	37	112	457	2.7	13.5	2.7	62.2		197	136	457	337	
56	**53.33**	34	112	414	2.5	14.9	2.5	68.6		194	135	451	333	
63	**61.86**	29	112	357	2.7	13.5	2.7	62.2		177	125	403	299	
71	**68.27**	26	112	324	2.5	14.9	2.5	68.6		172	121	390	290	

X.K230..,n_1 = 1800 1/min — 131 kNm

					KF87DV112M4 i = 36.52 P_m = 4 kW I_N = 7 A(460V 60Hz)		KF107DV180M4 i = 37.00 P_m = 18.5 kW I_N = 31.5 A(460V 60Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28	**28.63**	63	126	872	3.0	12.3	3.0	57.0		241	*)	621	446	
31.5	**31.43**	57	129	810	2.7	13.5	2.7	62.6		239	*)	614	442	
35.5	**36.26**	50	129	702	3.0	12.3	3.0	57.0		229	*)	547	401	
40	**39.82**	45	131	649	2.7	13.5	2.7	62.6		226	*)	540	396	
45	**44.78**	40	131	577	2.4	15.2	2.4	70.4		220	150	521	382	90
50	**49.17**	37	131	526	2.2	16.7	2.2	77.3	**X3K..**	217	148	514	378	92
56	**54.71**	33	131	473	2.4	15.2	2.4	70.4		202	140	468	346	
63	**60.08**	30	131	430	2.2	16.7	2.2	77.3		200	139	462	341	
71	**70.05**	26	131	369	2.4	15.2	2.4	70.4		178	126	405	300	
80	**76.91**	23	131	336	2.2	16.7	2.2	77.3		176	124	400	297	

X.K240..,n_1 = 1800 1/min — 156 kNm

					KF87DV132S4 i = 36.52 P_m = 5.5 kW I_N = 9.4 A(460V 60Hz)		KF127DV200L4 i = 36.25 P_m=30 kW I_N = 47.5 A(460V 60Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28[1]	**29.51**	61	156	1043	2.9	17.6	2.9	93.4		*)	*)	641	448	
31.5	**32.47**	55	156	948	3.3	15.3	3.4	81.1		*)	*)	600	430	
35.5	**37.38**	48	156	824	2.9	17.6	2.9	93.4		222	*)	576	413	
40	**39.96**	45	156	770	2.7	18.8	2.8	99.8		230	*)	588	424	
45	**46.00**	39	156	669	2.3	21.7	2.4	114	**X3K..**	215	*)	551	396	90 92
50	**48.83**	37	156	631	2.7	18.8	2.8	99.8		220	*)	544	395	
56	**56.20**	32	156	548	2.3	21.7	2.4	114		212	139	522	380	
63	**62.51**	29	156	493	2.7	18.8	2.8	99.8		203	137	489	358	
71	**71.95**	25	156	428	2.3	21.7	2.4	114		196	132	471	344	

X.K250..,n_1 = 1800 1/min — 175 kNm

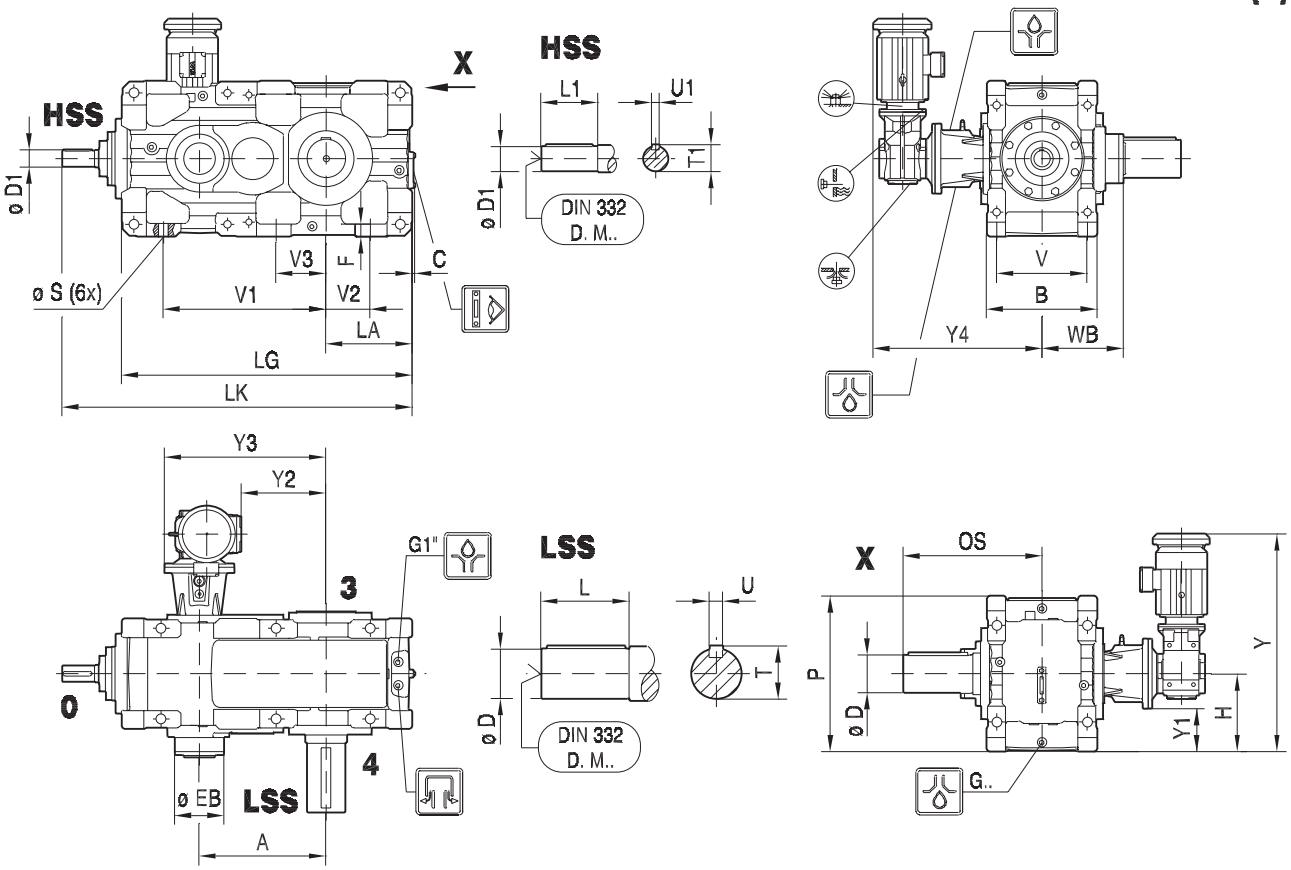
					KF87DV132S4 i = 36.52 P_m = 5.5 kW I_N = 9.4 A(460V 60Hz)		KF127DV200L4 i = 36.25 P_m = 30 kW I_N = 47.5 A(460V 60Hz)			P_{TH} [kW]				
i_N	i_{ex}	n_2 [1/min]	M_{N2} [kNm]	P_{N1} [kW]	n_3 [1/min]	M_{K3} [kNm]	n_3 [1/min]	M_{K3} [kNm]		P_{TH} 20°C	P_{TH} 40°C	P_{TH} 20°C	P_{TH} 40°C	
28[1]	**27.55**	65	174	1247	3.1	16.4	3.2	87.2		*)	*)	663	464	
31.5[1]	**31.64**	57	175	1092	2.7	18.9	2.7	100		*)	*)	635	445	
35.5	**34.89**	52	175	990	3.1	16.4	3.2	87.2		*)	*)	596	428	
40	**40.08**	45	175	862	2.7	18.9	2.7	100		226	*)	585	421	
45	**42.95**	42	175	804	2.5	20.2	2.6	107		229	*)	584	421	90
50	**49.33**	36	175	700	2.2	23.3	2.2	123	**X3K..**	225	*)	574	414	92
56	**52.47**	34	175	658	2.5	20.2	2.6	107		219	*)	541	393	
63	**60.27**	30	175	573	2.2	23.3	2.2	123		211	*)	520	378	
71	**67.18**	27	175	514	2.5	20.2	2.6	107		203	137	487	357	
80	**77.17**	23	175	448	2.2	23.3	2.2	123		196	132	469	343	

10.3 Dimension Sheets

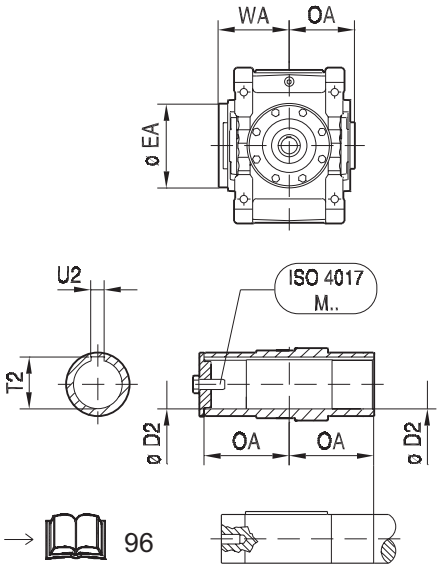
10.3.1 Main dimension sheet X3K180 - 210 / empty buckets

X3KS..

48 024 00 07
1(2)

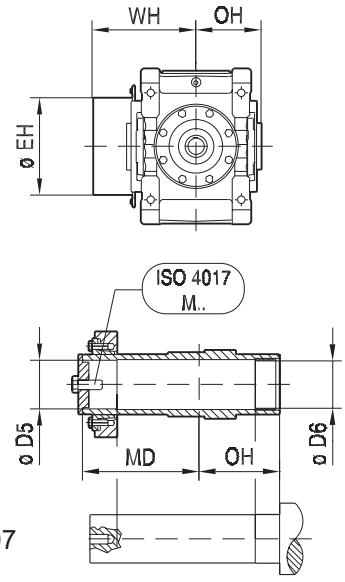


X3KA..

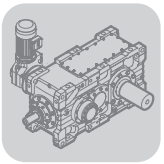


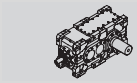
→ 96

X3KH..



→ 97





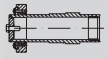
X3K..	A	B	ø EB	C	F	G..	H	LA	LG	LK	P	S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X3K.180	544	475	210	13	55	G1"	$335_{-0.5}$	370	1249	1505	670	42	390	710	190	215	360	KF77DV100L4	912	185	364	724	704
X3K.190	576	475	210	13	55	G1"	$335_{-0.5}$	370	1281	1537	670	42	390	740	190	215	360	KF77DV100L4	912	185	396	756	704
X3K.200	614	515	245	13	60	G1"	$375_{-0.5}$	420	1409	1706	750	48	420	780	205	230	394	KF77DV112M4	958	225	434	794	734
X3K.210	650	515	245	13	60	G1"	$375_{-0.5}$	420	1445	1742	750	48	420	815	205	230	428	KF77DV112M4	958	225	470	830	734

Oil [l]		
X3K.180	78	10
X3K.190	79	10
X3K.200	109	11
X3K.210	109	11

HSS	∅ D1	L1	T1	U1	DIN 332 D. M..
X3K.180	70_{m6}	140	74.5	20_{h9}	M20
X3K.190	70_{m6}	140	74.5	20_{h9}	M20
X3K.200	80_{m6}	170	85	22_{h9}	M20
X3K.210	80_{m6}	170	85	22_{h9}	M20

LSS	∅ D	L	OS	T	U	DIN 332 D. M..	kg
X3KS180	170_{m6}	300	592	179	40_{h9}	M30	1385
X3KS190	170_{m6}	300	592	179	40_{h9}	M30	1575
X3KS200	180_{m6}	300	612	190	45_{h9}	M30	2130
X3KS210	190_{m6}	350	662	200	45_{h9}	M30	2140

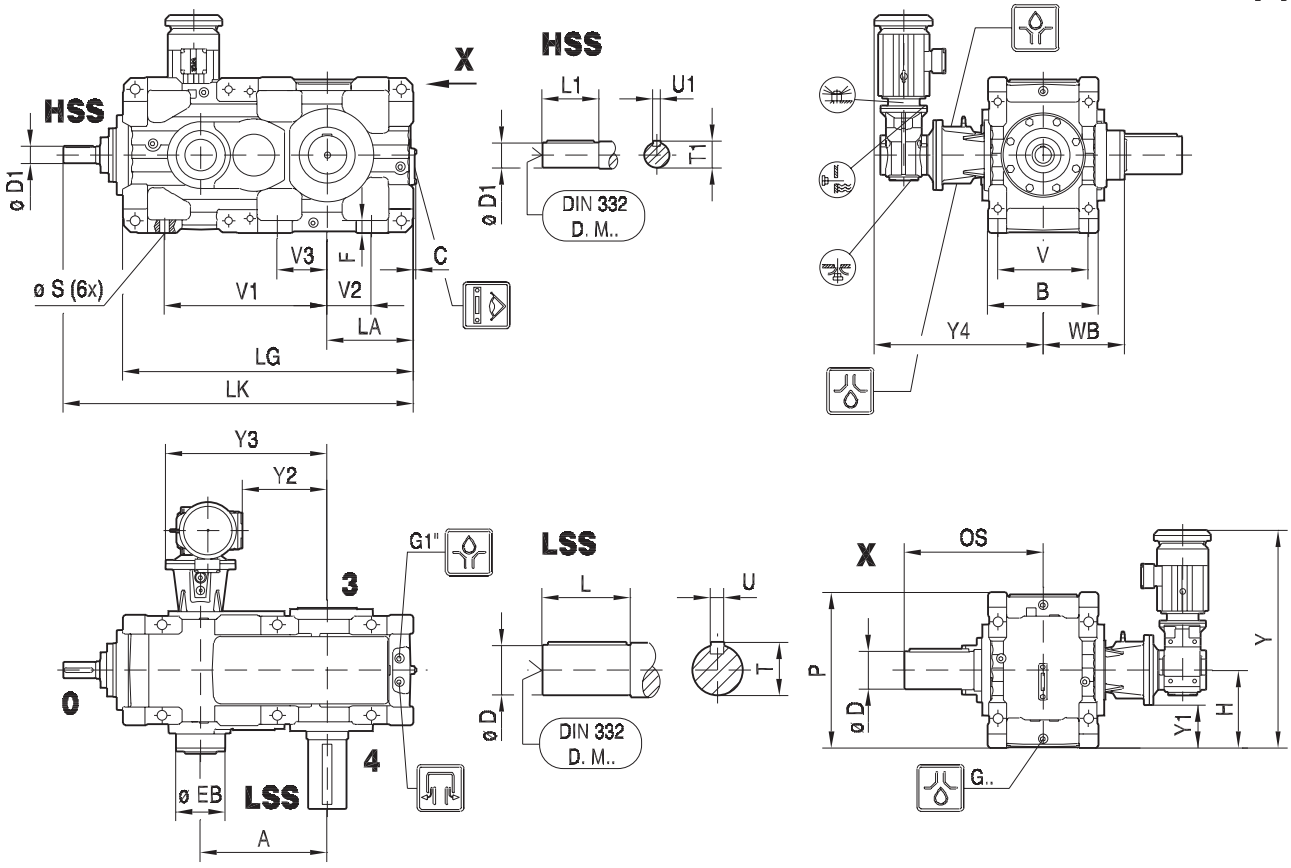
X3KA..								
LSS 	∅ D2	∅ EA	OA	T2	U2	WA	ISO 4017 M..	kg
X3KA180	165^{H8}	263	292	174.4	40^{JS9}	340	M30x60-8.8	1120
X3KA190	165^{H8}	263	292	174.4	40^{JS9}	340	M30x60-8.8	1310
X3KA200	180^{H8}	313	320	190.4	45^{JS9}	372	M30x60-8.8	1850
X3KA210	190^{H8}	313	320	200.4	45^{JS9}	372	M30x60-8.8	1830

X3KH..								
LSS 	∅ D5	∅ D6	∅ EH	MD	OH	WH	ISO 4017 M..	kg
X3KH180	165^{H7}	166^{H9}	379	400	292	447	M30x60-8.8	1140
X3KH190	165^{H7}	166^{H9}	379	400	292	447	M30x60-8.8	1330
X3KH200	180^{H7}	181^{H9}	439	450	320	501	M30x60-8.8	1880
X3KH210	190^{H7}	191^{H9}	439	453	320	501	M30x60-8.8	1860

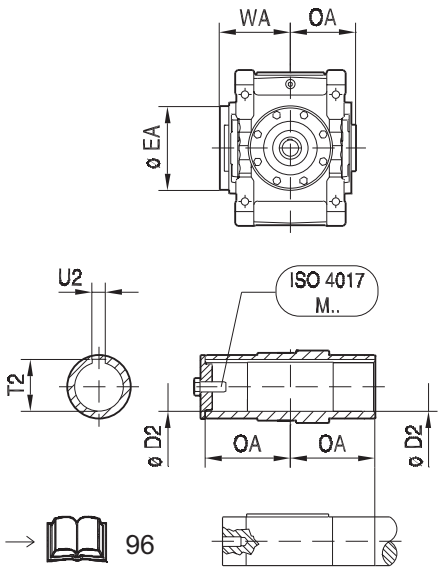
10.3.2 Main dimension sheet X3K180 - 210 / full buckets

48 024 00 07
1(2)

X3KS..

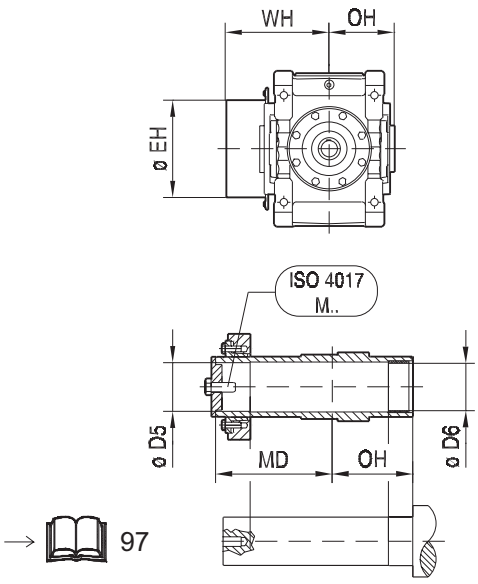


X3KA..



→ 96

X3KH..



→ 97



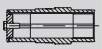
X3K..	A	B	ø EB	C	F	G..	H	LA	LG	LK	P	S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X3K.180	544	475	210	13	55	G1"	$335_{-0.5}$	370	1249	1505	670	42	390	710	190	215	360	KF97DV132ML4	1111	110	279	809	861
X3K.190	576	475	210	13	55	G1"	$335_{-0.5}$	370	1281	1537	670	42	390	740	190	215	360	KF97DV132ML4	1111	110	311	841	861
X3K.200	614	515	245	13	60	G1"	$375_{-0.5}$	420	1409	1706	750	48	420	780	205	230	394	KF97DV160M4	1151	150	349	879	880
X3K.210	650	515	245	13	60	G1"	$375_{-0.5}$	420	1445	1742	750	48	420	815	205	230	428	KF97DV160M4	1151	150	385	915	880

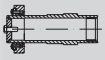
 [l]		
X3K.180	80	27.5
X3K.190	81	27.5
X3K.200	113	30.5
X3K.210	113	30.5

HSS 	∅ D1	L1	T1	U1	DIN 332 D. M..
X3K.180	70_{m6}	140	74.5	20_{h9}	M20
X3K.190	70_{m6}	140	74.5	20_{h9}	M20
X3K.200	80_{m6}	170	85	22_{h9}	M20
X3K.210	80_{m6}	170	85	22_{h9}	M20

LSS 	∅ D	L	OS	T	U	DIN 332 D. M..	
X3KS180	170_{m6}	300	592	179	40_{h9}	M30	1565
X3KS190	170_{m6}	300	592	179	40_{h9}	M30	1755
X3KS200	180_{m6}	300	612	190	45_{h9}	M30	2320
X3KS210	190_{m6}	350	662	200	45_{h9}	M30	2330

10

X3KA..								
LSS 	∅ D2	∅ EA	OA	T2	U2	WA	ISO 4017 M..	
X3KA180	165^{H8}	263	292	174.4	40^{JS9}	340	M30x60-8.8	1120
X3KA190	165^{H8}	263	292	174.4	40^{JS9}	340	M30x60-8.8	1310
X3KA200	180^{H8}	313	320	190.4	45^{JS9}	372	M30x60-8.8	1850
X3KA210	190^{H8}	313	320	200.4	45^{JS9}	372	M30x60-8.8	1830

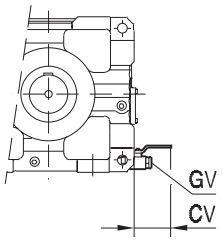
X3KH..								
LSS 	∅ D5	∅ D6	∅ EH	MD	OH	WH	ISO 4017 M..	
X3KH180	165^{H7}	166^{H9}	379	400	292	447	M30x60-8.8	1140
X3KH190	165^{H7}	166^{H9}	379	400	292	447	M30x60-8.8	1330
X3KH200	180^{H7}	181^{H9}	439	450	320	501	M30x60-8.8	1880
X3KH210	190^{H7}	191^{H9}	439	453	320	501	M30x60-8.8	1860

10.3.3 Options X3K180 - 210

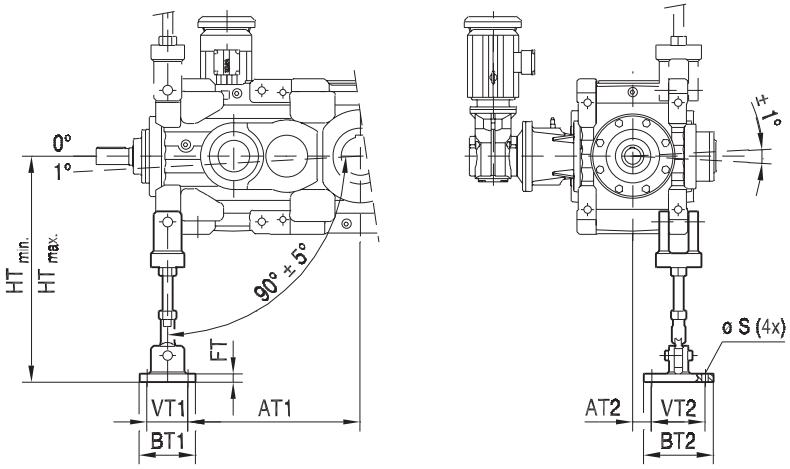
X3K..

48 046 00 07
2(2)

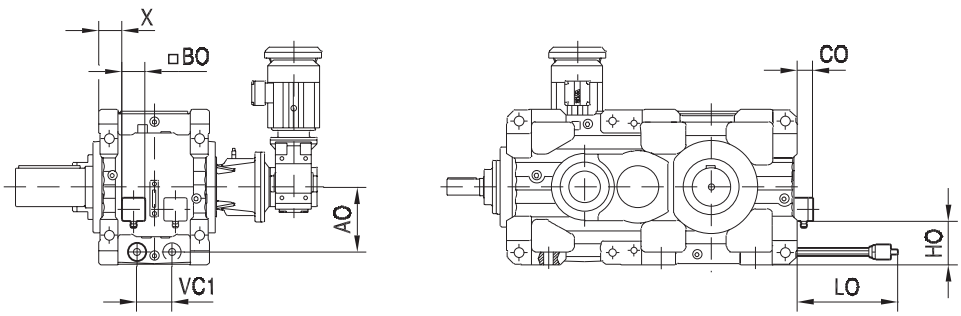
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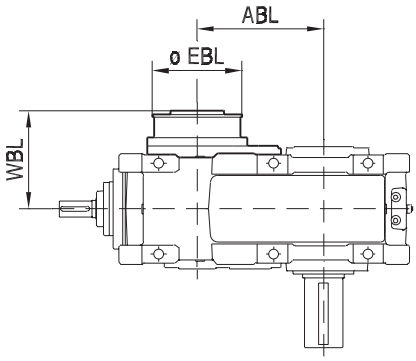
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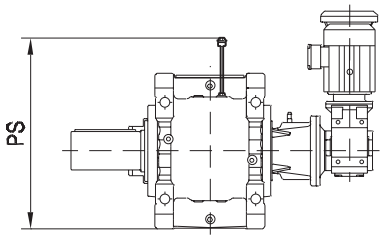
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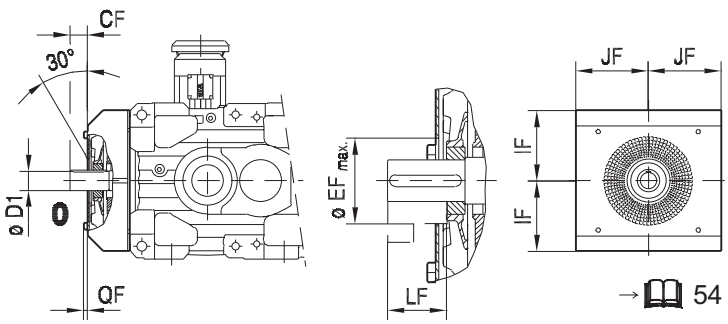
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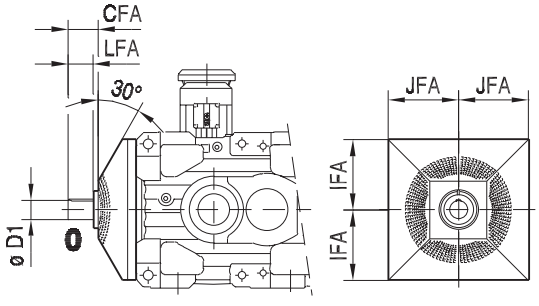


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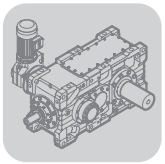


→ 54

/FAN- ADV



→ 54



/ODV		
X3K..	**GV**	**CV**
X3K.180	G1"	92
X3K.190	G1"	92
X3K.200	G1"	75
X3K.210	G1"	75

/T										
X3K..	**AT1**	**AT2**	**BT1**	**BT2**	**FT**	**$HT_{min.}$**	**$HT_{max.}$**	**VT1**	**VT2**	**∅ S (4x)**
X3K.180	762	102	200	250	30	745	795	130	188	22
X3K.190	794	102	200	250	30	745	795	130	188	22
X3K.200	865	118	200	250	30	795	845	130	188	22
X3K.210	901	118	200	250	30	795	845	130	188	22

/OH							
X3K..	**AO**	**□ BO**	**CO**	**HO**	**LO**	**VC1**	**X**
X3K.180	280	100	82	120	1220	150	90
X3K.190	280	100	82	120	1220	150	90
X3K.200	320	100	82	130	1420	150	110
X3K.210	320	100	82	130	1420	150	110

/BSL			
X3K..	**ABL**	**∅ EBL**	**WBL**
X3K.180	544	386	427
X3K.190	576	386	427
X3K.200	614	462	466
X3K.210	650	462	466

/OD	
X3K..	**PS**
X3K.180	880
X3K.190	880
X3K.200	980
X3K.210	980

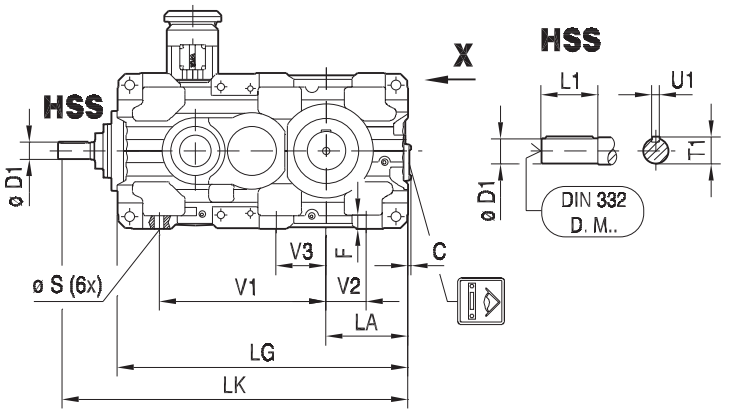
/FAN							
X3K..	**CF**	**∅ D1**	**$∅ EF_{max.}$**	**IF**	**JF**	**LF**	**QF**
X3K.180	70	70_{m6}	190	330	303	90	14
X3K.190	70	70_{m6}	190	330	303	90	14
X3K.200	95	80_{m6}	215	370	338	115	16
X3K.210	95	80_{m6}	215	370	338	115	16

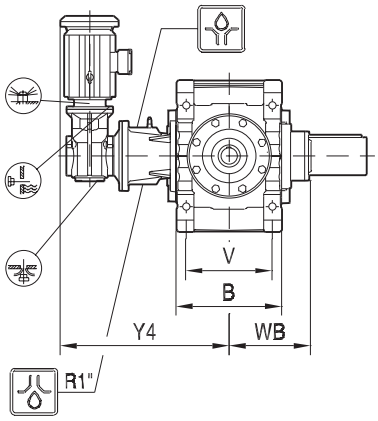
/FAN-ADV				
CFA	**∅ D1**	**IFA**	**JFA**	**LFA**
90	70_{m6}	330	304	84
90	70_{m6}	330	304	84
115	80_{m6}	370	327	109
115	80_{m6}	370	327	109

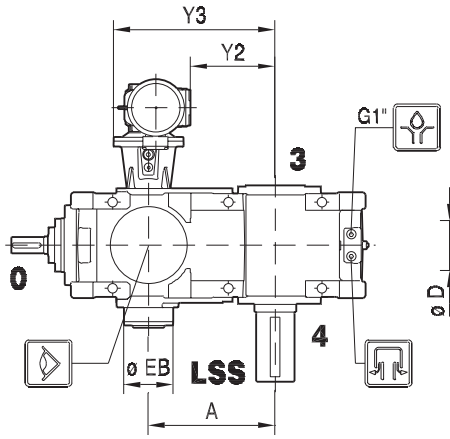
10.3.4 Main dimension sheet X3K220 - 250 / empty buckets

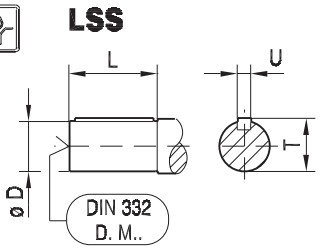
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1(2)

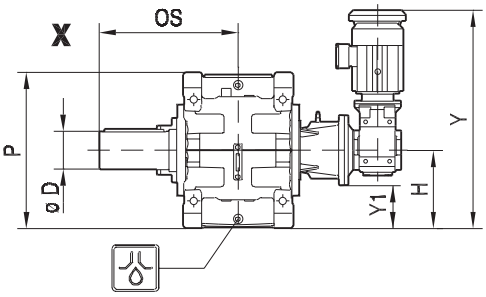
X3KS..



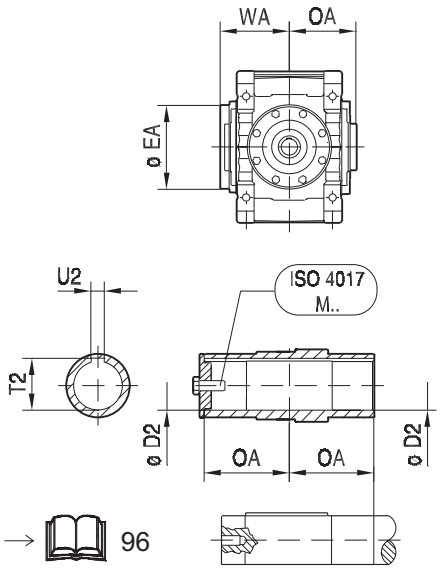






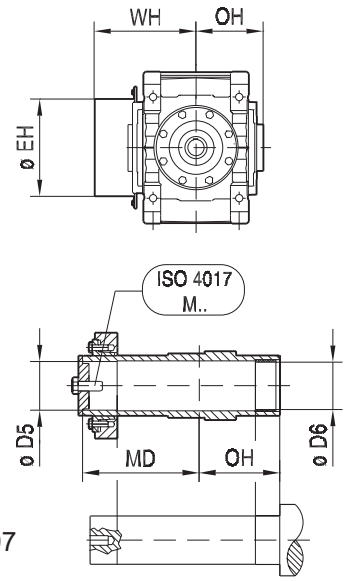


X3KA..

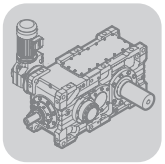


→ 96

X3KH..



→ 97





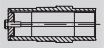
X3K	A	B	ø EB	C	F	G..	H	LA	LG	LK	P	S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X3K.220	694	540	290	14	62	G1 1/4"	$425_{-0.5}$	465	1584	1895	850	48	440	910	250	280	428	KF87DV112M4	1058	250	482	906	831
X3K.230	734	540	290	14	62	G1 1/4"	$425_{-0.5}$	465	1624	1935	850	48	440	950	250	280	428	KF87DV112M4	1058	250	522	946	831
X3K.240	776	625	290	14	68	G1 1/4"	$450_{-0.5}$	495	1721	2092	900	56	510	990	250	305	472	KF87DV132S4	1128	275	564	988	876
X3K.250	799	625	290	14	68	G1 1/4"	$450_{-0.5}$	495	1744	2115	900	56	510	1010	250	305	472	KF87DV132S4	1128	275	587	1011	876

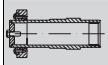
		
X3K.220	151	20
X3K.230	151	20
X3K.240	186	20
X3K.250	186	20

HSS 	∅ D1	L1	T1	U1	DIN 332 D. M..
X3K.220	85_{m6}	170	90	22_{h9}	M20
X3K.230	85_{m6}	170	90	22_{h9}	M20
X3K.240	100_{m6}	210	106	28_{h9}	M24
X3K.250	100_{m6}	210	106	28_{h9}	M24

LSS 	∅ D	L	OS	T	U	DIN 332 D. M..
X3KS220	210_{m6}	350	703	221	50_{h9}	M30
X3KS230	230_{m6}	410	763	241	50_{h9}	M36
X3KS240	230_{m6}	410	811	241	50_{h9}	M36
X3KS250	240_{m6}	410	811	252	56_{h9}	M36

10

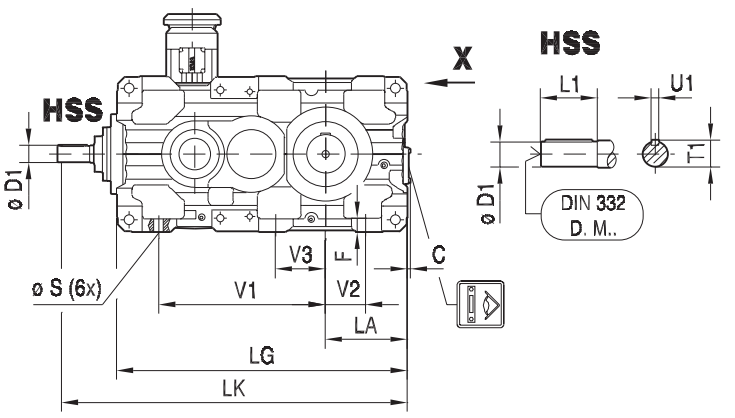
X3KA..								
LSS 	∅ D2	∅ EA	OA	T2	U2	WA	ISO 4017 M..	
X3KA220	210^{H8}	334	353	221.4	50^{JS9}	398	M30x60-8.8	2330
X3KA230	210^{H8}	334	353	221.4	50^{JS9}	398	M30x60-8.8	2470
X3KA240	230^{H8}	404	401	241.4	50^{JS9}	458	M36x70-8.8	3200
X3KA250	240^{H8}	404	401	252.4	56^{JS9}	458	M36x70-8.8	3280

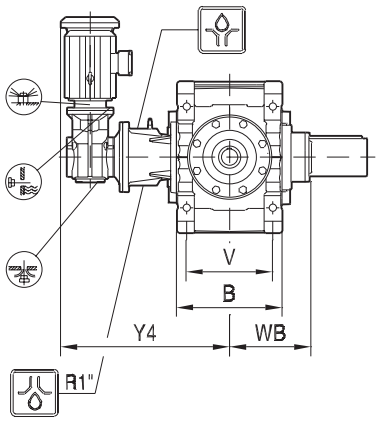
X3KH..								
LSS 	∅ D5	∅ D6	∅ EH	MD	OH	WH	ISO 4017 M..	
X3KH220	210^{H7}	211^{H9}	482	498	353	548	M30x60-8.8	2410
X3KH230	210^{H7}	211^{H9}	482	498	353	548	M30x60-8.8	2550
X3KH240	230^{H7}	231^{H9}	542	572	401	619	M36x70-8.8	3280
X3KH250	240^{H7}	241^{H9}	542	572	401	619	M36x70-8.8	3350

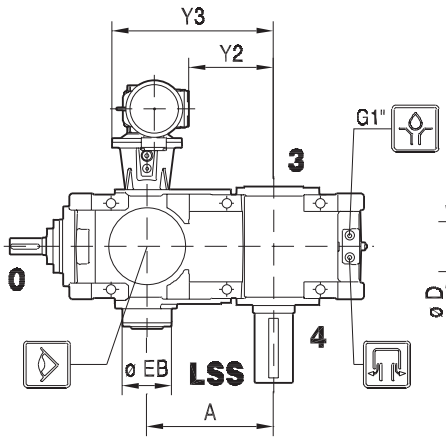
10.3.5 Main dimension sheet X3K220 - 250 / full buckets

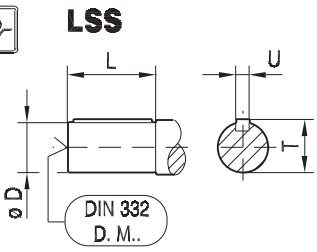
48 045 00 07
1(2)

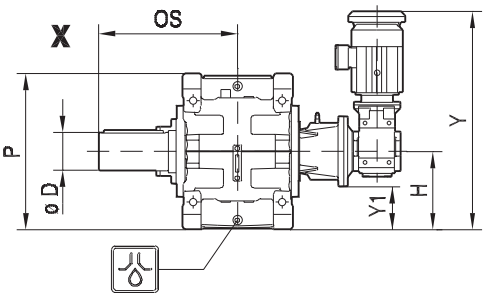
X3KS..



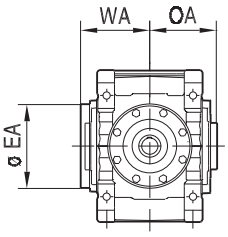


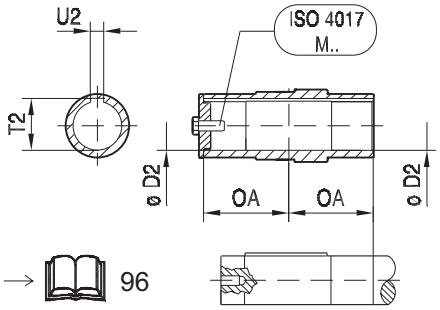






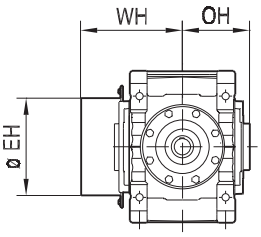
X3KA..

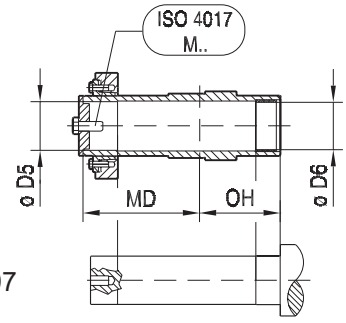




→ 96

X3KH..





→ 97

X3K	A	B	ø EB	C	F	G..	H	LA	LG	LK	P	S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X3K.220	694	540	290	14	62	G1 1/4"	$425_{-0.5}$	465	1584	1895	850	48	440	910	250	280	428	KF107 DV180M4	1381	200	379	1009	983
X3K.230	734	540	290	14	62	G1 1/4"	$425_{-0.5}$	465	1624	1935	850	48	440	950	250	280	428	KF107 DV180M4	1381	200	419	1049	983
X3K.240	776	625	290	14	68	G1 1/4"	$450_{-0.5}$	495	1721	2092	900	56	510	990	250	305	472	KF127 DV200L4	1495	175	401	1151	1140
X3K.250	799	625	290	14	68	G1 1/4"	$450_{-0.5}$	495	1744	2115	900	56	510	1010	250	305	472	KF127 DV200L4	1495	175	424	1174	1140

Oil [l]			HSS	∅ D1	L1	T1	U1	DIN 332 D. M..	LSS	∅ D	L	OS	T	U	DIN 332 D. M..	kg
X3K.220	156	48	**X3K.220**	85_{m6}	170	90	22_{h9}	M20	**X3KS180**	210_{m6}	350	703	221	50_{h9}	M30	3155
X3K.230	156	48	**X3K.230**	85_{m6}	170	90	22_{h9}	M20	**X3KS190**	230_{m6}	410	763	241	50_{h9}	M36	3285
X3K.240	192	71	**X3K.240**	100_{m6}	210	106	28_{h9}	M24	**X3KS200**	230_{m6}	410	811	241	50_{h9}	M36	4425
X3K.250	192	71	**X3K.250**	100_{m6}	210	106	28_{h9}	M24	**X3KS210**	240_{m6}	410	811	252	56_{h9}	M36	4525

10

X3KA..								
LSS	∅ D2	∅ EA	OA	T2	U2	WA	ISO 4017 M..	kg
X3KA220	210^{H8}	334	353	221.4	50^{JS9}	398	M30x60-8.8	2330
X3KA230	210^{H8}	334	353	221.4	50^{JS9}	398	M30x60-8.8	2470
X3KA240	230^{H8}	404	401	241.4	50^{JS9}	458	M36x70-8.8	3200
X3KA250	240^{H8}	404	401	252.4	56^{JS9}	458	M36x70-8.8	3280

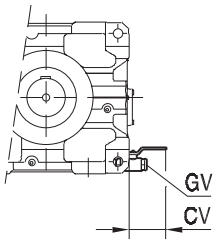
X3KH..								
LSS	∅ D5	∅ D6	∅ EH	MD	OH	WH	ISO 4017 M..	kg
X3KH220	210^{H7}	211^{H9}	482	498	353	548	M30x60-8.8	2410
X3KH230	210^{H7}	211^{H9}	482	498	353	548	M30x60-8.8	2550
X3KH240	230^{H7}	231^{H9}	542	572	401	619	M36x70-8.8	3280
X3KH250	240^{H7}	241^{H9}	542	572	401	619	M36x70-8.8	3350

10.3.6 Options X3K220 - 250

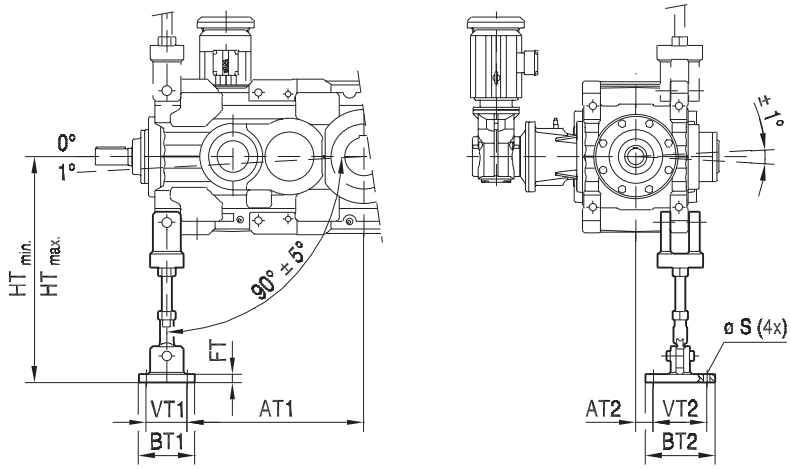
X3K..

48 047 00 07
2(2)

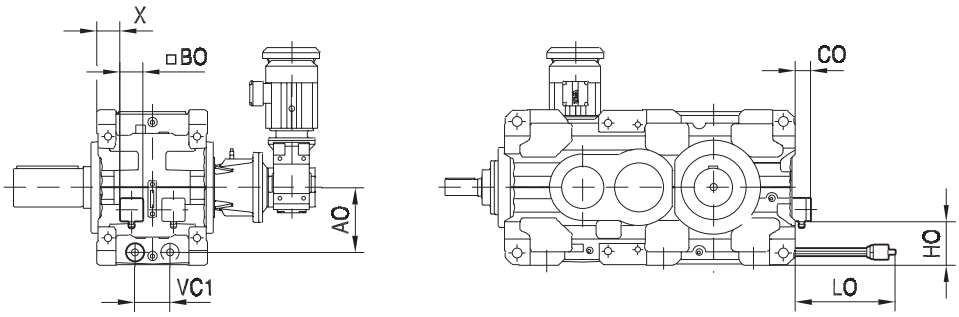
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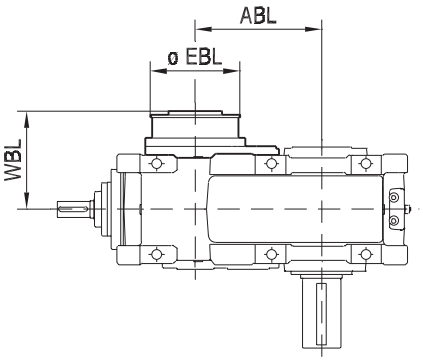
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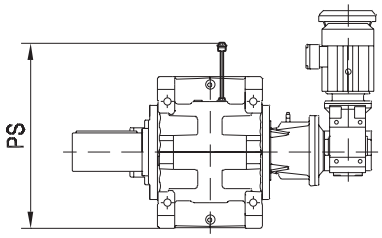
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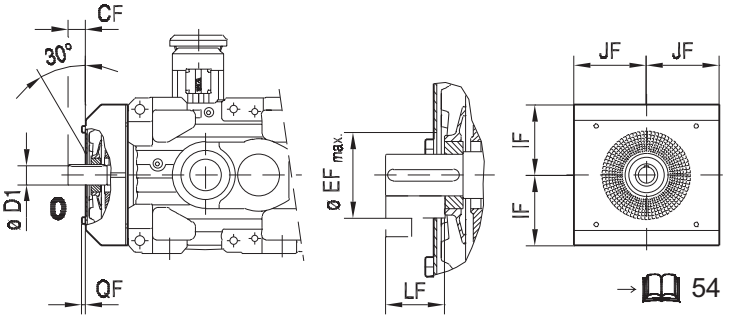
/BSL



/OD

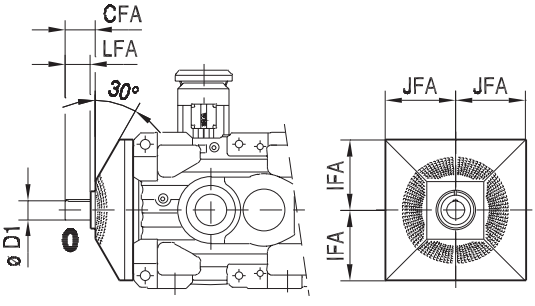


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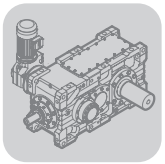


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/FAN- ADV



→ 📖 54



/ODV		
X3K..	**GV**	**CV**
X3K.220	G1 1/4"	107
X3K.230	G1 1/4"	107
X3K.240	G1 1/4"	86
X3K.250	G1 1/4"	86

/T										
X3K..	**AT1**	**AT2**	**BT1**	**BT2**	**FT**	**$HT_{min.}$**	**$HT_{max.}$**	**VT1**	**VT2**	**∅ S (4x)**
X3K.220	992	126	200	250	30	840	890	130	188	22
X3K.230	1032	126	200	250	30	840	890	130	188	22
X3K.240	1045	150	300	300	30	920	970	220	220	26
X3K.250	1068	150	300	300	30	920	970	220	220	26

/OH							
X3K..	**AO**	**□ BO**	**CO**	**HO**	**LO**	**VC1**	**X**
X3K.220	362	100	82	140	1665	180	110
X3K.230	362	100	82	140	1665	180	110
X3K.240	380	100	82	150	1695	200	130
X3K.250	380	100	82	150	1895	200	130

/BSL			
X3K..	**ABL**	**∅ EBL**	**WBL**
X3K.220	694	462	493
X3K.230	734	462	493
X3K.240	776	516	563
X3K.250	799	516	563

/OD	
X3K..	**PS**
X3K.220	1120
X3K.230	1120
X3K.240	1150
X3K.250	1150

/FAN							
X3K..	**CF**	**∅ D1**	**∅ $EF_{max.}$**	**IF**	**JF**	**LF**	**QF**
X3K.180	95	85_{m6}	245	420	350	115	21
X3K.190	95	85_{m6}	245	420	350	115	21
X3K.200	130	100_{m6}	245	445	398	150	16
X3K.210	130	100_{m6}	245	445	398	150	16

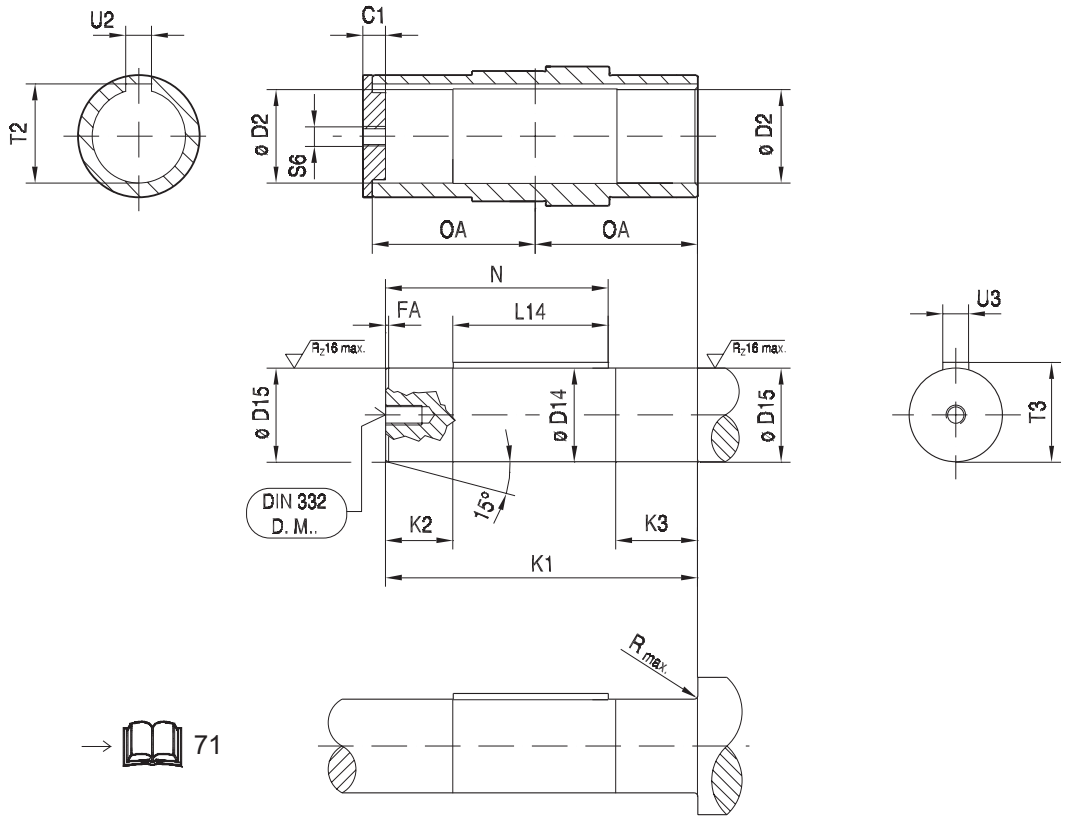
/FAN-ADV				
CFA	**∅ D1**	**IFA**	**JFA**	**LFA**
115	85_{m6}	420	345	109
115	85_{m6}	420	345	109
145	100_{m6}	444	392	140
145	100_{m6}	444	392	140

11 Additional Dimension Sheets

11.1 Hollow shaft with key X..A

X..A180 - 250

48 039 01 07



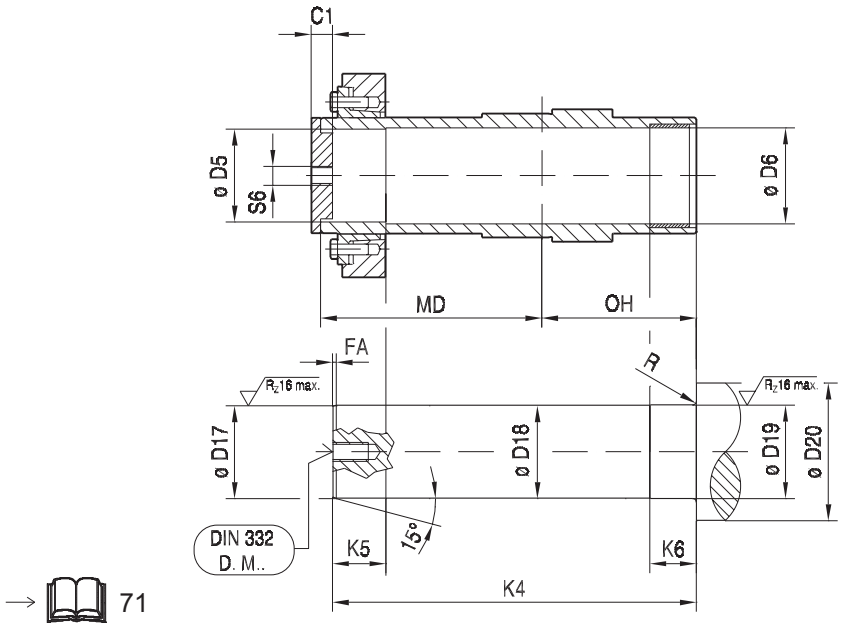
→ 71

	C1	∅ D2	∅ D14	∅ D15	FA	K1	K2	K3	L14	N	OA	$R_{max.}$	S6	T2	T3	U2	U3	DIN 332 D.M..
X3KA180	36	165^{H8}	165_{h11}	165_{js7}	3	565	109	128	300	423	292	2	M36	174.4	174	40^{JS9}	40_{h9}	M30
X3KA190	36	165^{H8}	165_{h11}	165_{js7}	3	565	109	128	300	423	292	2	M36	174.4	174	40^{JS9}	40_{h9}	M30
X3KA200	36	180^{H8}	180_{h11}	180_{js7}	3	620	130	149	320	461	320	2	M36	190.4	190	45^{JS9}	45_{h9}	M30
X3KA210	36	190^{H8}	190_{h11}	190_{js7}	3	620	130	149	320	461	320	2	M36	200.4	200	45^{JS9}	45_{h9}	M30
X3KA220	36	210^{H8}	210_{h11}	210_{js7}	3	686	133	152	370	519	353	2.5	M36	221.4	221	50^{JS9}	50_{h9}	M30
X3KA230	36	210^{H8}	210_{h11}	210_{js7}	3	686	133	152	370	519	353	2.5	M36	221.4	221	50^{JS9}	50_{h9}	M30
X3KA240	45	230^{H8}	230_{h11}	230_{js7}	3	778	147	170	370	563	401	2.5	M42	241.4	241	50^{JS9}	50_{h9}	M36
X3KA250	45	240^{H8}	240_{h11}	240_{js7}	3	778	147	170	370	563	401	2.5	M42	252.4	252	56^{JS9}	56_{h9}	M36

11.2 Hollow shaft with shrink disk X..H

X..H180 - 250

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→ 71

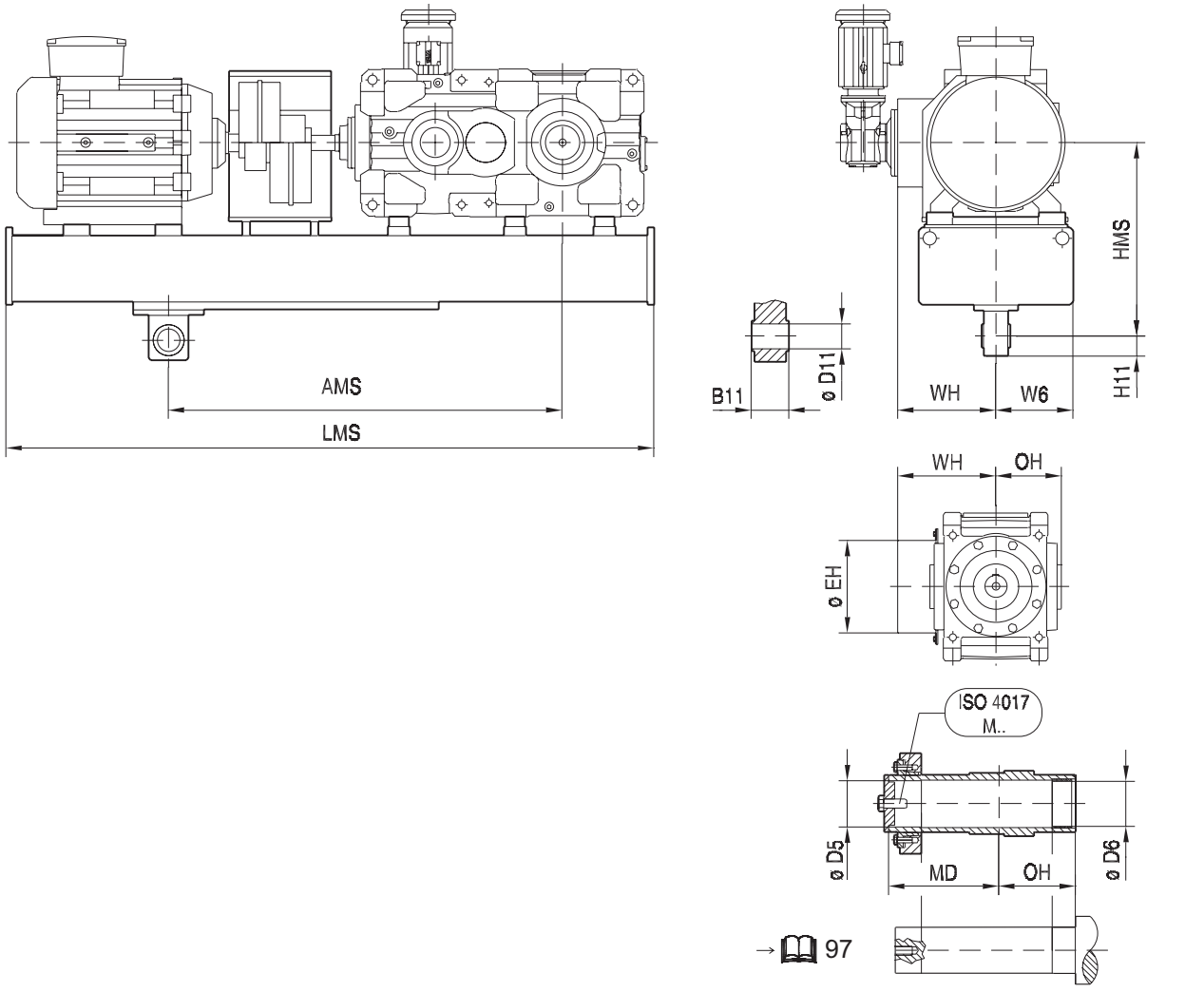
	C1	ø D5	ø D6	ø D17	ø D18	ø D19	ø D20	FA	K4	K5	K6	MD	OH	R	S6	DIN 332 D.M..
X3KH180	36	165^{H7}	166^{H9}	165_{g6}	165_{h11}	166_{m6}	180	3	672_{-1}	83	83_{-1}	400	292	4	M36	M30
X3KH190	36	165^{H7}	166^{H9}	165_{g6}	165_{h11}	166_{m6}	180	3	672_{-1}	83	83_{-1}	400	292	4	M36	M30
X3KH200	36	180^{H7}	181^{H9}	180_{g6}	180_{h11}	181_{m6}	195	3	750_{-1}	101	83_{-1}	451	320	4	M36	M30
X3KH210	36	190^{H7}	191^{H9}	190_{g6}	190_{h11}	191_{m6}	205	3	753_{-1}	106	83_{-1}	454	320	4	M36	M30
X3KH220	36	210^{H7}	211^{H9}	210_{g6}	210_{h11}	211_{m6}	230	3	830_{-1}	118	108_{-1}	498	353	5	M36	M30
X3KH230	36	210^{H7}	211^{H9}	210_{g6}	210_{h11}	211_{m6}	230	3	830_{-1}	118	108_{-1}	498	353	5	M36	M30
X3KH240	45	230^{H7}	231^{H9}	230_{g6}	230_{h11}	231_{m6}	250	3	948_{-1}	140	108_{-1}	572	401	5	M42	M36
X3KH250	45	240^{H7}	241^{H9}	240_{g6}	240_{h11}	241_{m6}	260	3	948_{-1}	140	108_{-1}	572	401	5	M42	M36

12 Drive Packages on Steel Frame

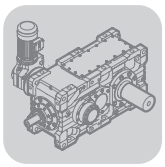
12.1 X3K.. Motor swing with hydraulic centrifugal coupling

X3KH..

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X3KH..	Motor	AMS	B11	ø D5	ø D6	ø D11	ø EH	H11	HMS	LMS	MD	OH	W6	WH	ISO 4017 M..
X3KH180	250M	1600	120	165^{H7}	166	100^{H9}	379	90	875	2600	400	292	370	447	M30x60-8.8
	280S	1600	120	165^{H7}	166	100^{H9}	379	90	875	2800	400	292	370	447	M30x60-8.8
	280M	1600	120	165^{H7}	166	100^{H9}	379	90	875	2800	400	292	370	447	M30x60-8.8
	315S	1600	120	165^{H7}	166	100^{H9}	379	90	875	2950	400	292	370	447	M30x60-8.8
	315M	1600	120	165^{H7}	166	100^{H9}	379	90	875	2950	400	292	370	447	M30x60-8.8
	315L	1600	120	165^{H7}	166	100^{H9}	379	90	875	3000	400	292	370	447	M30x60-8.8
	315ML	1600	120	165^{H7}	166	100^{H9}	379	90	875	3050	400	292	370	447	M30x60-8.8
	315	1600	120	165^{H7}	166	100^{H9}	379	90	875	3150	400	292	370	447	M30x60-8.8
	355S	1600	120	165^{H7}	166	100^{H9}	379	90	875	3300	400	292	370	447	M30x60-8.8
X3KH190	250M	1600	120	165^{H7}	166	100^{H9}	379	90	875	2650	400	292	370	447	M30x60-8.8
	280S	1600	120	165^{H7}	166	100^{H9}	379	90	875	2850	400	292	370	447	M30x60-8.8
	280M	1600	120	165^{H7}	166	100^{H9}	379	90	875	2850	400	292	370	447	M30x60-8.8
	315S	1600	120	165^{H7}	166	100^{H9}	379	90	875	3000	400	292	370	447	M30x60-8.8
	315M	1600	120	165^{H7}	166	100^{H9}	379	90	875	3000	400	292	370	447	M30x60-8.8



X3KH..	Motor	AMS	B11	ø D5	ø D6	ø D11	ø EH	H11	HMS	LMS	MD	OH	W6	WH	ISO 4017 M..
X3KH190	315L	1600	120	165^{H7}	166	100^{H9}	379	90	875	3050	400	292	370	447	M30x60-8.8
	315ML	1600	120	165^{H7}	166	100^{H9}	379	90	875	3100	400	292	370	447	M30x60-8.8
X3KH200	250M	1800	120	180^{H7}	181	100^{H9}	439	90	1000	2800	451	320	370	501	M30x60-8.8
	280S	1800	120	180^{H7}	181	100^{H9}	439	90	1000	2950	451	320	370	501	M30x60-8.8
	280M	1800	120	180^{H7}	181	100^{H9}	439	90	1000	2950	451	320	370	501	M30x60-8.8
	315S	1800	120	180^{H7}	181	100^{H9}	439	90	1000	3150	451	320	370	501	M30x60-8.8
	315M	1800	120	180^{H7}	181	100^{H9}	439	90	1000	3150	451	320	370	501	M30x60-8.8
	315L	1800	120	180^{H7}	181	100^{H9}	439	90	1000	3150	451	320	370	501	M30x60-8.8
	315ML	1800	120	180^{H7}	181	100^{H9}	439	90	1000	3200	451	320	370	501	M30x60-8.8
	315	1800	120	180^{H7}	181	100^{H9}	439	90	1000	3350	451	320	370	501	M30x60-8.8
	355S	1800	120	180^{H7}	181	100^{H9}	439	90	1000	3450	451	320	370	501	M30x60-8.8
X3KH210	280S	1800	120	190^{H7}	191	100^{H9}	439	90	1000	3000	454	320	370	501	M30x60-8.8
	280M	1800	120	190^{H7}	191	100^{H9}	439	90	1000	3000	454	320	370	501	M30x60-8.8
	315S	1800	120	190^{H7}	191	100^{H9}	439	90	1000	3150	454	320	370	501	M30x60-8.8
	315M	1800	120	190^{H7}	191	100^{H9}	439	90	1000	3150	454	320	370	501	M30x60-8.8
	315L	1800	120	190^{H7}	191	100^{H9}	439	90	1000	3200	454	320	370	501	M30x60-8.8
	315ML	1800	120	190^{H7}	191	100^{H9}	439	90	1000	3250	454	320	370	501	M30x60-8.8
	315	1800	120	190^{H7}	191	100^{H9}	439	90	1000	3400	454	320	370	501	M30x60-8.8
	355S	1800	120	190^{H7}	191	100^{H9}	439	90	1000	3500	454	320	370	501	M30x60-8.8
X3KH220	280S	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3150	498	353	370	548	M30x60-8.8
	280M	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3150	498	353	370	548	M30x60-8.8
	315S	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3300	498	353	370	548	M30x60-8.8
	315M	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3300	498	353	370	548	M30x60-8.8
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	315ML	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3350	498	353	370	548	M30x60-8.8
	315	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3550	498	353	370	548	M30x60-8.8
	355S	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3650	498	353	370	548	M30x60-8.8
X3KH230	280S	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3200	498	353	370	548	M30x60-8.8
	280M	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3200	498	353	370	548	M30x60-8.8
	315S	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3350	498	353	370	548	M30x60-8.8
	315M	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3350	498	353	370	548	M30x60-8.8
	315L	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3350	498	353	370	548	M30x60-8.8
	315ML	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3400	498	353	370	548	M30x60-8.8
	315	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3550	498	353	370	548	M30x60-8.8
	355S	1900	120	210^{H7}	211	100^{H9}	482	90	1050	3650	498	353	370	548	M30x60-8.8
X3KH240	315S	2000	230	230^{H7}	231	124^{H9}	542	110	1140	3550	572	401	370	619	M36x70-8.8
	315M	2000	230	230^{H7}	231	124^{H9}	542	110	1140	3550	572	401	370	619	M36x70-8.8
	315L	2000	230	230^{H7}	231	124^{H9}	542	110	1140	3550	572	401	370	619	M36x70-8.8
	315ML	2000	230	230^{H7}	231	124^{H9}	542	110	1140	3600	572	401	370	619	M36x70-8.8
	315	2000	230	230^{H7}	231	124^{H9}	542	110	1140	3700	572	401	370	619	M36x70-8.8
	355S	2000	230	230^{H7}	231	124^{H9}	542	110	1140	3800	572	401	370	619	M36x70-8.8
X3KH250	315S	2000	230	240^{H7}	241	124^{H9}	542	110	1140	3550	572	401	370	619	M36x70-8.8
	315M	2000	230	240^{H7}	241	124^{H9}	542	110	1140	3550	572	401	370	619	M36x70-8.8
	315L	2000	230	240^{H7}	241	124^{H9}	542	110	1140	3550	572	401	370	619	M36x70-8.8
	315ML	2000	230	240^{H7}	241	124^{H9}	542	110	1140	3600	572	401	370	619	M36x70-8.8
	315	2000	230	240^{H7}	241	124^{H9}	542	110	1140	3750	572	401	370	619	M36x70-8.8
	355S	2000	230	240^{H7}	241	124^{H9}	542	110	1140	3850	572	401	370	619	M36x70-8.8

13 Abbreviation Key and Index

13.1 Abbreviation key

α	Application angle of the radial load	°
f_1	Altitude factor (= correction factor for calculating the thermal rating of the gear unit)	-
F_A	Axial force	kN
F_F	Peak load factor	-
F_R	Radial load	kN
F_{R1}	Existing radial load on HSS (distance from shaft shoulder has to be specified)	kN
F_{R2}	Existing radial load on LSS (distance from shaft shoulder has to be specified)	kN
F_{Ra}	Permitted radial load in the middle of LSS	kN
F_{Re}	Permitted radial load in the middle of HSS	kN
F_S	Service factor= $M_{N2} / M_{K2} = P_{N1} / P_{K1}$	-
F_{start}	Start factor	-
$F_{S\ min}$	Application-specific service factor	-
f_z	Transmission element factor	-
η	Efficiency	-
H	Installation altitude above sea level	m
HSS	High speed shaft of the gear unit (normally the input shaft)	-
i	Reduction ratio	-
i_{ex}	Exact gear unit reduction ratio	-
i_N	Nominal gear unit reduction ratio	-
$L_{h\ min}$	Required bearing service life	h
LSS	Low speed shaft of the gear unit (normally the output shaft)	-
M_{K1}	Input torque (= operating torque on HSS)	kNm
$M_{K1\ max}$	Peak input torque (= peak operating torque on LSS)	kNm
M_{K2}	Output torque (= operating torque on LSS)	kNm
$M_{K2\ max}$	Peak output torque (= peak operating torque on LSS)	kNm
$M_{K2\ zul}$	Permitted peak output torque	kNm
M_M	Nominal motor torque	kNm
M_{N2}	Nominal gear unit torque	kNm
n_1	Input speed (HSS)	1/min
n_2	Output speed (LSS)	1/min
n_M	Motor speed	1/min
P_{K1}	Operating power on HSS	kW
$P_{K1\ max}$	Peak operating power on HSS	kW
$P_{K1\ zul}$	Permitted peak operating power on HSS	kW
P_{K2}	Operating power on LSS	kW
P_M	Nominal motor power	kW
P_{N1}	Nominal gear unit power (based on HSS)	kW
P_T	Thermal rating of the gear unit at existing ambient conditions	kW
P_{TH}	Thermal rating of the gear unit at defined ambient conditions	kW

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Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-EUROCOME Zone Industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Technical Offices	**Alsace Franche-Comté**	SEW-USOCOME 1, rue Auguste Gasser F-68360 Soultz	Tel. +33 3 89 74 51 62 Fax +33 3 89 76 58 71
	Alsace Nord	SEW-USOCOME 15, rue Mambourg F-68240 Sigolsheim	Tel. +33 3 89 78 45 11 Fax +33 3 89 78 45 12
	Aquitaine	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan B.P.182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09

France			
	Ardennes Lorraine	SEW-USOCOME 7, rue de Prény F-54000 Nancy	Tel. +33 3 83 96 28 04 Fax +33 3 83 96 28 07
	Bourgogne	SEW-USOCOME 10, rue de la Poste F-71350 Saint Loup Géanges	Tel. +33 3 85 49 92 18 Fax +33 3 85 49 92 19
	Bretagne Ouest	SEW-USOCOME 4, rue des Châtaigniers F-44830 Brains	Tel. +33 2 51 70 54 04 Fax +33 2 51 70 54 05
	Centre Auvergne	SEW-USOCOME 27, avenue du Colombier F-19150 Laguenne	Tel. +33 5 55 20 12 10 Fax +33 5 55 20 12 11
	Centre Pays de Loire	SEW-USOCOME 9, rue des Erables F-37540 Saint Cyr sur Loire	Tel. +33 2 47 41 33 23 Fax +33 2 47 41 34 03
	Champagne	SEW-USOCOME Impasse des Ouises F-10120 Saint André les Vergers	Tel. +33 3 25 79 63 24 Fax +33 3 25 79 63 25
	Lyon Nord-Est	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 03 Fax +33 4 72 15 37 15
	Lyon Ouest	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 04 Fax +33 4 72 15 37 15
	Lyon Sud-Est	SEW-USOCOME Montée de la Garenne F-26750 Génissieux	Tel. +33 4 75 05 65 95 Fax +33 4 75 05 65 96
	Nord	SEW-USOCOME 348, rue Léon Garet F-62520 Le Touquet	Tel. +33 3 21 90 21 40 Fax +33 3 21 90 21 44
	Normandie	SEW-USOCOME 5 rue de la Limare F-14250 Brouay	Tel. +33 2 31 37 92 86 Fax +33 2 31 74 68 15
	Paris Est	SEW-USOCOME Résidence Le Bois de Grâce 2, allée des Souches Vertes F-77420 Champs sur Marne	Tel. +33 1 64 68 40 50 Fax +33 1 64 68 45 00
	Paris Ouest	SEW-USOCOME 42 avenue Jean Jaurès F-78580 Maule	Tel. +33 1 30 90 89 86 Fax +33 1 30 90 93 15
	Paris Picardie	SEW-USOCOME 25 bis, rue Kléber F-92300 Levallois Perret	Tel. +33 1 41 05 92 74 Fax +33 1 41 05 92 75
	Paris Sud	SEW-USOCOME 6. chemin des Bergers Lieu-dit Marchais F-91410 Roinville sous Dourdan	Tel. +33 1 60 81 10 56 Fax +33 1 60 81 10 57
	Provence	SEW-USOCOME Résidence Les Hespérides Bât. B2 67, boulevard des Alpes F-13012 Marseille	Tel. +33 4 91 18 00 11 Fax +33 4 91 18 00 12
	Pyrénées	SEW-USOCOME 179, route de Grazac F-31190 Caujac	Tel. +33 5 61 08 15 85 Fax +33 5 61 08 16 44



France			
	Sud-Atlantique	SEW-USOCOME 12, rue des Pinsons F-44120 Vertou	Tel. +33 2 40 80 32 23 Fax +33 2 40 80 32 13

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84 reducom_sew@yahoo.fr

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
	Perth	SEW-EURODRIVE PTY. LTD. 105 Robinson Avenue Belmont, W.A. 6104	Tel. +61 8 9478-2688 Fax +61 8 9277-7572 enquires@sew-eurodrive.com.au
	Brisbane	SEW-EURODRIVE PTY.LTD. 1 /34 Collinsvale St Rocklea, Queensland, 4106	Tel. +61 7 3272-7900 Fax +61 7 3272-7901 enquires@sew-eurodrive.com.au
Technical Offices	**Adelaide**	SEW-EURODRIVE PTY. LTD. Unit 1/601 Anzac Highway Glenelg, S.A. 5045	Tel. +61 8 8294-8277 Fax +61 8 8294-2893 enquires@sew-eurodrive.com.au
	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at
Technical Offices	**Linz**	SEW-EURODRIVE Ges.m.b.H. Reuchlinstr. 6/3 A-4020 Linz	Tel. +43 732 655 109-0 Fax +43 732 655 109-20 tb-linz@sew-eurodrive.at
	Graz	SEW-EURODRIVE Ges.m.b.H. Grabenstraße 231 A-8045 Graz	Tel. +43 316 685 756-0 Fax +43 316 685 755 tb-graz@sew-eurodrive.at
	Dornbirn	SEW-EURODRIVE Ges.m.b.H. Lustenauerstraße 27/1 A-6850 Dornbirn	Tel. +43 5572 3725 99-0 Fax +43 5572 3725 99-20 tb-dornbirn@sew-eurodrive.at

Bangladesh			
Sales	**Dhaka**	Jainex Industrial and Engineering Ltd B 12 Apon Nibash East Nasirabad Bangladesh	Tel. +880 1713103502 Fax +880 31 613041 jainexbd@onlinectg.net

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brüssel**	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.be
Service Competence Center	**Industrial Gears**	SEW Caron-Vector S.A. Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
Technical Office	**Vlaanderen**	SEW Caron-Vector S.A. Verlorenbroodstraat, 122, bus 6 B-9820 Merelbeke	Tel. +32 92 1686 25 Fax +32 92 2741 55

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 – Rodovia Presidente Dutra Km 208 Guarulhos – 07251-250 - SP SAT – SEW ATENDE – 0800 7700496	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca marketing@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 marketing@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl



China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
Technical Offices	**Brno**	SEW-EURODRIVE CZ S.R.O. Křenová 52 CZ -60200 Brno	Tel. +420 543256151 + 543256163 Fax +420 543256845
	Hradec Králové	SEW-EURODRIVE CZ S.R.O. Čechova 498 CZ-50202 Hradec Králové	Tel. +420 495510141 Fax +420 495521313
	Plzeň	SEW-EURODRIVE CZ S.R.O. Areal KRPA a.s. Zahradni 173/2 CZ-32600 Plzeň	Tel. +420 378775300 Fax +420 377970710
	Klatovy	SEW-EURODRIVE CZ S.R.O. Technická kancelář Klatovy Domažlická 800 CZ-33901 Klatovy	Tel. +420 376310729 Fax +420 376310725

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Technical Offices	**Helsinki**	SEW-EURODRIVE OY Luutnantintie 5 FIN-00410 Helsinki	Tel. +358 201 589-300 Fax + 358 9 5666-311 sew@sew.fi
	Vaasa	SEW-EURODRIVE OY Hietasaarenkatu 18 FIN-65100 Vaasa	Tel. +358 201 589-300 Fax +358 6 3127-470 sew@sew.fi
	Rovaniemi	SEW-EURODRIVE OY Valtakatu 4 A FIN-96100 Rovaniemi	Tel. +358 201 589-300 Fax +358 201 589-239 sew@sew.fi
Production **Assembly** **Service**	**Karkkila**	SEW Industrial Gears OY Valurinkatu 6 FIN-03600 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
Technical Offices	**London**	SEW-EURODRIVE Ltd. 764 Finchely Road, Temple Fortune GB-London N.W.11 7TH	Tel. +44 20 8458-8949 Fax +44 20 8458-7417
	Midlands	SEW-EURODRIVE Ltd. 5 Sugar Brook court, Aston Road, Bromsgrove, Worcs B60 3EX	Tel. +44 1527 877-319 Fax +44 1527 575-245
	Scotland	SEW-EURODRIVE Ltd. Scottish Office No 37 Enterprise House Springkerse Business Park GB-Stirling FK7 7UF Scotland	Tel. +44 17 8647-8730 Fax +44 17 8645-0223

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Greece			
Technical Office	**Thessaloniki**	Christ. Boznos & Son S.A. Maiandrou 21 562 24 Evosmos, Thessaloniki	Tel. +30 2 310 7054-00 Fax +30 2 310 7055-15 info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

Iceland			
Sales	**Reykjavik**	Vélaverk ehf. Bolholti 8, 3h. IS - 105 Reykjavik	Tel. +354 568 3536 Fax +354 568 3537 velaverk@velaverk.is

India			
Assembly **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com
Technical Offices	**Bangalore**	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bangalore - 560052 - Karnataka	Tel. +91 80 22266565 Fax +91 80 22266569 salesbang@seweurodriveindia.com ganesh@seweurodriveindia.com
	Kolkata	SEW EURODRIVE India Private Limited 2nd floor, Room No. 35 Chowringhee Court 55, Chowringhee Road Kolkata - 700 071 - West Bengal	Tel. +91 33 22827457 Fax +91 33 22894204 saleskal@seweurodriveindia.com a.j.biswas@seweurodriveindia.com
	Chandigarh	SEW EURODRIVE India Private Limited Sujit Kumar Mishra H.No.5464/3 Modern Housing Complex Manimajra Chandigarh -160101	Tel. +91 9878469579 Fax +91 1722738664 saleschand@seweurodriveindia.com
	Chennai	SEW-EURODRIVE India Private Limited 2nd Floor, Josmans Complex, No. 5, McNichols Road, Chetpet Chennai - 600031 - Tamil Nadu	Tel. +91 44 42849813 Fax +91 44 42849816 saleschen@seweurodriveindia.com c.v.shivkumar@seweurodriveindia.com
	Coimbatore	SEW-EURODRIVE India Private Limited Office No 60 Arpee Centre (Opp Annapoorna Hotel) 420 N, NSR Road, Saibaba Colony Coimbatore 641 0111 - Tamil Nadu	Tel. +91 422 2455420 Fax +91 422 2443988 salescmb@seweurodriveindia.com p.selvakumar@seweurodriveindia.com
	Madgaon	SEW-EURODRIVE India Private Limited Flat No.-G1, Shivas-Laxmi Prasad Co-Operative Housing Society, Padmanarayan Estate, Near Jivottaam Math, Gagole Madgao, Goa - 403 602	samrat.chakravorty@seweurodriveindia.com

India			
	Hyderabad	SEW-EURODRIVE India Private Limited 408, 4th Floor, Meridian Place Green Park Road Amerpeet Hyderabad - 500016 - Andhra Pradesh	Tel. +91 40 23414698 Fax +91 40 23413884 saleshyd@seweurodriveindia.com ma.choudary@seweurodriveindia.com
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza, J.B. Nagar, Andheri Kurla Road, Andheri (E) Mumbai - 400059 - Maharashtra	Tel. +91 22 28348440 Fax +91 22 28217858 salesmumbai@seweurodriveindia.com p.s.ray@seweurodriveindia.com
	New Delhi	SEW-EURODRIVE India Private Limited 418-419, Suneja Tower-1 District Centre, Janak Puri New Delhi 110 058	Tel. +91 11 25544111 Fax +91 11 25544113 salesdelhi@seweurodriveindia.com vikram.juneja@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Office No. 2 & 7, First Floor, Triveni Apartment Model Colony, Gokhale Road Pune 411016 - Maharashtra	Tel. +91 20 25671751 Fax +91 20 25661668 salespune@seweurodriveindia.com praveen.hosur@seweurodriveindia.com
	Raipur	SEW-EURODRIVE India Private Limited Flat No-0-102, First Floor Satyam Appt., Golchha Park Nr Mining Office, Ring Road-1 Raipur 492 001 - Chhattisgarh	Tel. +91 9893290624 sutanu.sarkar@seweurodriveindia.com

Indonesia			
Technical Office	**Jakarta**	SEW-EURODRIVE Pte Ltd. Jakarta Liaison Office, Menara Graha Kencana Jl. Perjuangan No. 88, LT 3 B, Kebun Jeruk, Jakarta 11530, Indonesia	Tel. +62 21 5359066 Fax +62 21 5363686 Service Hotline: +65 61000 739 sew@cbn.net.id

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Technical Offices	**Bologna**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via della Grafica, 47 I-40064 Ozzano dell'Emilia (Bo)	Tel. +39 051 65-23-801 Fax +39 051 796-595
	Caserta	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Carlo III Km. 23,300 I-81020 S. Nicola la Strada (Caserta)	Tel. +39 0823 219011 Fax +39 0823 421414
	Firenze	RIMA Via Einstein, 14 I-50013 Campi Bisenzio (Firenze)	Tel. +39 055 898 58-21 Fax +39 055 898 58-30



Italy			
	Pescara	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Europa,132 I-65010 Villa Raspa di Spoltore (PE)	Tel. +39 085 41-59-427 Fax +39 085 41-59-643
	Torino	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Filiale Torino c.so Unione Sovietica 612/15 - int. C I-11035 Torino	Tel. +39 011 3473780 Fax +39 011 3473783
	Verona	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via P. Sgulmero, 27/A I-37132 Verona	Tel. +39 045 89-239-11 Fax +39 045 97-6079

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Technical Offices	**Fukuoka**	SEW-EURODRIVE JAPAN CO., LTD. C-go, 5th-floor, Yakuin-Hiruzu-Bldg. 1-5-11, Yakuin, Chuo-ku Fukuoka, 810-0022	Tel. +81 92 713-6955 Fax +81 92 713-6860 sewkyushu@jasmine.ocn.ne.jp
	Osaka	SEW-EURODRIVE JAPAN CO., LTD. B-Space EIRAI Bldg., 3rd Floor 1-6-9 Kyoumachibori, Nishi-ku, Osaka, 550-0003	Tel. +81 6 6444--8330 Fax +81 6 6444--8338 sewosaka@crocus.ocn.ne.jp
	Tokyo	SEW-EURODRIVE JAPAN CO., LTD. Izumi-Bldg. 5 F 3-2-15 Misaki-cho Chiyoda-ku, Tokyo 101-0061	Tel. +81 3 3239-0469 Fax +81 3 3239-0943 sewtokyo@basil.ocn.ne.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr
Technical Offices	**Daegu**	SEW-EURODRIVE KOREA Co., Ltd. No.1108 Sungan officetel 87-36, Duryu 2-dong, Dalseo-ku Daegu 704-712	Tel. +82 53 650-7111 Fax +82 53 650-7112
	DaeJeon	SEW-EURODRIVE KOREA Co., Ltd. No. 1502, Hongin officetel 536-9, Bongmyung-dong, Yusung-ku Daejeon 305-301	Tel. +82 42 828-6461 Fax +82 42 828-6463
	Kwangju	SEW-EURODRIVE KOREA Co., Ltd. 4fl., Dae-Myeong B/D 96-16 Unam-dong, Buk-ku Kwangju 500-170	Tel. +82 62 511-9172 Fax +82 62 511-9174

Korea			
	Seoul	SEW-EURODRIVE KOREA Co., Ltd. No.504 Sunkyung officetel 106-4 Kuro 6-dong, Kuro-ku Seoul 152-054	Tel. +82 2 862-8051 Fax +82 2 862-8199

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Technical Offices	**Kota Kinabalu**	SEW-EURODRIVE Sdn Bhd (Kota Kinabalu Branch) Lot No. 2,1st Floor, Inanam Baru Phase III, Miles 5.1 /2, Jalan Tuaran, Inanam 89350 Kota Kinabalu Sabah, Malaysia	Tel. +60 88 424792 Fax +60 88 424807
	Kuala Lumpur	SEW-EURODRIVE Sdn. Bhd. No. 2, Jalan Anggerik Mokara 31/46 Kota Kemuning Seksyen 31 40460 Shah Alam Selangor Darul Ehsan	Tel. +60 3 5229633 Fax +60 3 5229622 sewpjy@po.jaring.my
	Kuching	SEW-EURODRIVE Sdn. Bhd. Lot 268, Section 9 KTLD Lorong 9, Jalan Satok 93400 Kuching, Sarawak East Malaysia	Tel. +60 82 232380 Fax +60 82 242380
	Penang	SEW-EURODRIVE Sdn. Bhd. No. 38, Jalan Bawal Kimsar Garden 13700 Prai, Penang	Tel. +60 4 3999349 Fax +60 4 3999348 seweurodrive@po.jaring.my



Mexico			
Assembly **Sales** **Service**	**Queretaro**	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Queretaro C.P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 ali.alami@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Technical Office	**Palmerston North**	SEW-EURODRIVE NEW ZEALAND LTD. C/-Grant Shearman, RD 5, Aronui Road Palmerston North	Tel. +64 6 355-2165 Fax +64 6 355-2316 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Philippines			
Technical Office	**Manila**	SEW-EURODRIVE Pte Ltd Manila Liaison Office Suite 110, Ground Floor Comfoods Building Senator Gil Puyat Avenue 1200 Makati City	Tel. +63 2 894275254 Fax +63 2 8942744 sewmla@i-next.net

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
		24 Hour Service	Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

Poland			
Technical Office	**Tychy**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Nad Jeziorem 87 PL-43-100 Tychy	Tel. +48 32 2175026 + 32 2175027 Fax +48 32 2277910
	Bydgoszcz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Fordońska 246 PL-85-959 Bydgoszcz	Tel. +48 52 3606590 Fax +48 52 3606591
	Poznań	SEW-EURODRIVE Polska Sp.z.o.o. ul. Romana Maya 1, pokój 202 PL-61-371 Poznań	Tel. +48 61 8741640 Fax +48 61 8741641
	Szczecinek	SEW-EURODRIVE Polska Sp.z.o.o. ul. Mickiewicza 2 pok. 36 PL-78-400 Szczecinek	Tel. +48 94 3728820 Fax +48 94 3728821

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Technical Offices	**Lisboa**	SEW-EURODRIVE, LDA. Tertir Edifício Lisboa Gabinete 119 P-2615 Alverca do Ribatejo	Tel. +351 21 958-0198 Fax +351 21 958-0245 esc.lisboa@sew-eurodrive.pt
	Porto	SEW-EURODRIVE, LDA. Av. 25 de Abril, 68 4440-502 Valongo	Tel. +351 229 350 383 Fax +351 229 350 384 MobilTel. +351 9 32559110 esc.porto@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucureşti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Technical Office	**Yekaterinburg**	ZAO SEW-EURODRIVE Kominterna Str. 16 Office 614 RUS-620078 Ekaterinburg	Tel. +7 343 310 3977 Fax +7 343 310 3978 eso@sew-eurodrive.ru
	Irkutsk	ZAO SEW-EURODRIVE 5-Armii Str., 31 RUS-664011 Irkutsk	Tel. +7 3952 25 5880 Fax +7 3952 25 5881 iso@sew-eurodrive.ru
	Moskau	ZAO SEW-EURODRIVE RUS-107023 Moskau	Tel. +7 495 9337090 Fax +7 495 9337094 mso@sew-eurodrive.ru
	Novosibirsk	ZAO SEW-EURODRIVE pr. K Marksa, d.30 RUS-630087 Novosibirsk	Tel. +7 383 3350200 Fax +7 383 3462544 nso@sew-eurodrive.ru
	Togliatti	ZAO SEW-EURODRIVE Sportivnaya Str. 4B, office 2 Samarskaya obl. RUS-445057 Togliatti	Tel. +7 8482 710529 Fax +7 8482 810590



Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.co.yu

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-83554 Bratislava	Tel. +421 2 49595201 Fax +421 2 49595200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-97411 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za dross@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

South Africa			
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
Technical Offices	**Port Elizabeth**	SEW-EURODRIVE PTY LTD. 5 b Linsay Road Neave Township 6000 Port Elizabeth	Tel. +27 41 453-0303 Fax +27 41 453-0305 dswanepoel@sew.co.za
	Richards Bay	SEW-EURODRIVE PTY LTD. 25 Eagle Industrial Park Alton Richards Bay P.O. Box 458 Richards Bay 3900	Tel. +27 35 797-3805 Fax +27 35 797-3819 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Technical Offices	**Barcelona**	Delegación Barcelona Avenida Francesc Maciá 40-44 Oficina 3.1 E-08206 Sabadell (Barcelona)	Tel. +34 93 7162200 Fax +34 93 7233007
	Lugo	Delegación Noroeste Apartado, 1003 E-27080 Lugo	Tel. +34 639 403348 Fax +34 982 202934
	Madrid	Delegación Madrid Gran Via. 48-2° A-D E-28220 Majadahonda (Madrid)	Tel. +34 91 6342250 Fax +34 91 6340899
	Seville	MEB Pólogono Calonge, C/A Nave 2 - C E-41.077 Sevilla	Tel. +34 954 356 361 Fax +34 954 356 274 mebsa.sevilla@mebsa.com
	Valencia	MEB Músico Andreu i Piqueres, 4 E-46.900 Torrente (Valencia)	Tel. +34 961 565 493 Fax +34 961 566 688 mebsa.valencia@mebsa.com

Sri Lanka			
Sales	**Colombo**	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se
Technical Offices	**Göteborg**	SEW-EURODRIVE AB Gustaf Werners gata 8 S-42131 Västra Frölunda	Tel. +46 31 70968-80 Fax +46 31 70968-93
	Malmö	SEW-EURODRIVE AB Borrgatan 5 S-21124 Malmö	Tel. +46 40 68064-80 Fax +46 40 68064-93
	Stockholm	SEW-EURODRIVE AB Björkholmsvägen 10 S-14125 Huddinge	Tel. +46 8 44986-80 Fax +46 8 44986-93

Sweden			
	Skellefteå	SEW-EURODRIVE AB Trädgårdsgatan 8 S-93131 Skellefteå	Tel. +46 910 7153-80 Fax +46 910 7153-93

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Technical Offices	**Rhaetian Switzerland**	André Gerber Es Perreyres CH-1436 Chamblon	Tel. +41 24 445 3850 Fax +41 24 445 4887
	Bern / Solothurn	Rudolf Bühler Muntersweg 5 CH-2540 Grenchen	Tel. +41 32 652 2339 Fax +41 32 652 2331
	Central Switzerland and Ticino	Beat Lütolf Baumacher 11 CH-6244 Nebikon	Tel. +41 62 756 4780 Fax +41 62 756 4786
	Zürich	René Rothenbühler Nörgelbach 7 CH-8493 Saland	Tel. +41 52 386 3150 Fax +41 52 386 3213
	Bodensee and East Switzerland	Markus Künzle Eichweg 4 CH-9403 Goldach	Tel. +41 71 845 2808 Fax +41 71 845 2809

Taiwan (R.O.C.)			
Sales	**Nan Tou**	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878
	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Hwa South Road, Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Technical Offices	**Bangkok**	SEW-EURODRIVE (Thailand) Ltd. 6th floor, TPS Building 1023, Phattanakarn Road Suanluang Bangkok,10250	Tel. +66 2 7178149 Fax +66 2 7178152 sewthailand@sew-eurodrive.com
	Hadyai	SEW-EURODRIVE (Thailand) Ltd. Hadyai Country Home Condominium 59/101 Soi.17/1 Rachas-Utid Road. Hadyai, Songkhla 90110	Tel. +66 74 359441 Fax +66 74 359442 sewthailand@sew-eurodrive.com
	Khonkaen	SEW-EURODRIVE (Thailand) Ltd. 4th Floor, Kaow-U-HA MOTOR Bldg, 359/2, Mitraphab Road. Muang District Khonkaen 40000	Tel. +66 43 225745 Fax +66 43 324871 sew-thailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 5, Rue El Houdaibiah 1000 Tunis	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419164, 3838014, 3738015 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Technical Offices	**Adana**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Kizilay Caddesi 8 Sokak No 6 Daðtekin Is Merkezi Kat 4 Daire 2 TR-01170 SEYHAN / ADANA	Tel. +90 322 359 94 15 Fax +90 322 359 94 16
	Ankara	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Özcelik Is Merkezi, 14. Sok, No. 4/42 TR-06370 Ostim/Ankara	Tel. +90 312 3853390 / +90 312 3544715 / +90 312 3546109 Fax +90 312 3853258
	Bursa	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Besevler Küçük Sanayi Parkoop Parçacilar Sitesi 48. Sokak No. 47 TR Nilüfer/Bursa	Tel. +90 224 443 4556 Fax +90 224 443 4558
	Izmir	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. 1203/11 Sok. No. 4/613 Hasan Atli Is Merkezi TR-35110 Yenisehir-Izmir	Tel. +90 232 4696264 Fax +90 232 4336105

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
Sales	**Kiev**	SEW-EURODRIVE GmbH S. Oleynika str. 21 02068 Kiev	Tel. +380 44 503 95 77 Fax +380 44 503 95 78 kso@sew-eurodrive.ua
	Donetsk	SEW-EURODRIVE GmbH 25th anniversary of RKKA av. 1-B, of. 805 Donetsk 83000	Tel. +380 62 38 80 545 Fax +380 62 38 80 533 dso@sew-eurodrive.ua

Uruguay			
Sales	**Montevideo**	SEW-EURODRIVE Uruguay, S. A. German Barbato 1526 CP 11200 Montevideo	Tel. +598 2 90181-89 Fax +598 2 90181-88 sewuy@sew-eurodrive.com.uy

USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com



USA			
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net



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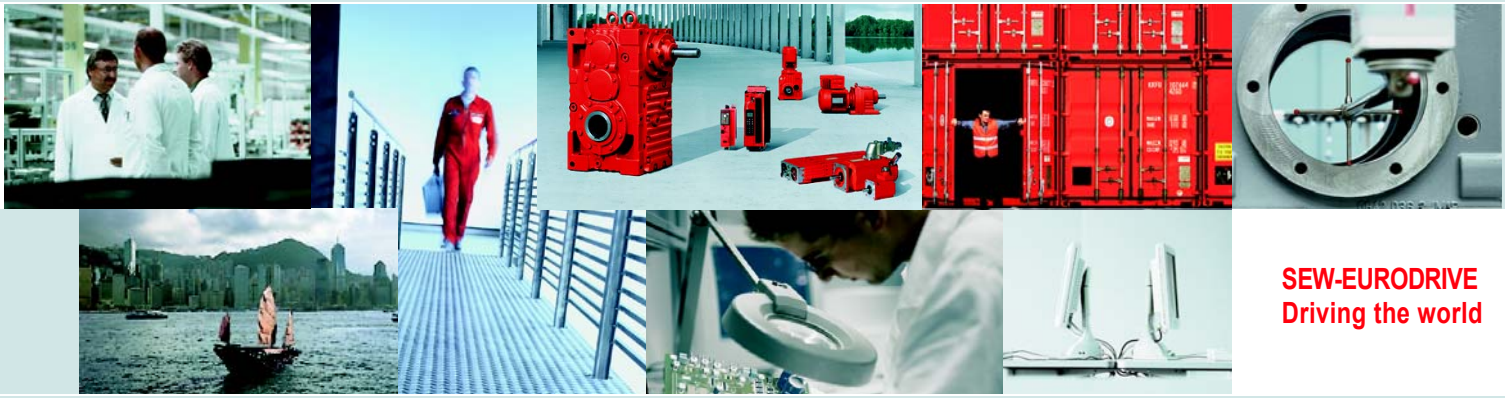
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