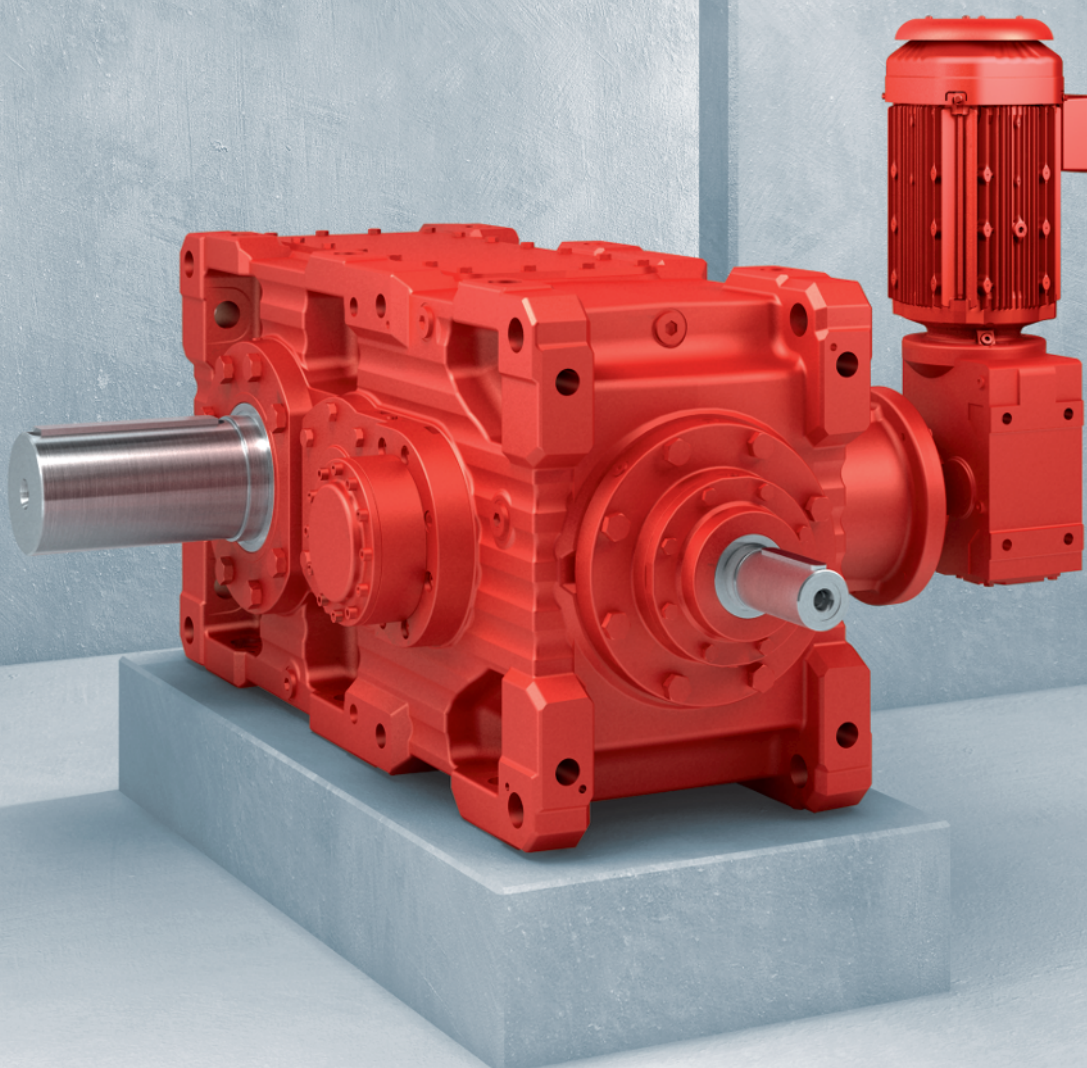




Catalog



Industrial Gear Units

Bucket Elevator Drives – X..e Series

Torque Classes from 7.2 – 285 kNm



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1 Introduction

1.1 What do we stand for?

For a reliable partnership!

Humanity and partnership, solutions and services, responsibility and quality, tradition and innovation: SEW-EURODRIVE, the owner-managed family business, has stood for all this and much more for more than 90 years.

As a market leader in drive and automation technology, we don't just power countless applications in virtually every industry. With over 22000 employees, we are also playing a key role in shaping the future of drive technology. For you. Ensuring you, your systems and machines are always at the cutting edge. Not just now, but in the future as well. We want you to succeed together with us.

1.2 Where can you find us?

We are always nearby!

Our 17 production plants and 92 Drive Technology Centers in 56 countries mean we are at your service on every continent and in every corner of the world, always working with you as an equal partner and ensuring everything runs smoothly.

What makes us truly stand out from other manufacturers? With our broad customer support and service network worldwide, you never have to wait long for spare parts, repairs or professional advice.



56
Countries



17
Production
plants



92
Drive
Technology
Centers



> 22000
employees



Global
service



Countless
industries

1.3 What do we offer?

State-of-the-art drive technology and automation solutions from a single source!

Looking to modernize your processes or to construct a new system? We offer you one of the most extensive ranges of drive technology products, solutions, and services on the market. A single contact person for everything: that sounds good, doesn't it?

						
Gear units	Gearmotors	Motors	Industrial gear units	Decentralized drives/mechatronics	Inverter technology	Servo drives
						
Industrial communication	Control technology	Software	Safety technology	Energy transfer/power supply	Services	

From the very outset, our customers have been able to rely on our high quality, committed advice and support, and fast delivery times. We offer a portfolio of modular solutions that are comprehensive and unique and meet every possible need.

- Perfect combination options and solutions for every application
- Energy efficiency up to IE5
- Quick and easy selection process and project planning
- Comprehensive portfolio – from drives and motors for continuous operation to high-precision servo drives
- Special designs in stainless steel, with explosion protection, or for electrified monorail systems
- Ideal solutions for every application
- Complete automation solutions for your machine or factory and many other areas

Independent of the project scope and the complexity of your requirements: We rise to the challenge, working with you to develop the perfect solution for you – including an all-round service package throughout your entire system life cycle on request.

Predictive maintenance is just one of the service trend topics no. 1. Early diagnosis and end-to-end condition monitoring have been an essential part of our offering for many years. That's because one thing in particular matters to us – the satisfaction and trust of our customers. from planning and the operation phase all the way to modernization. Where necessary, we also take care of drives from other manufacturers.

1.4 What are the goals we want to reach with you?

We want to take you to the top!

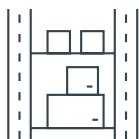
Nothing excites us more than the future of production. We are already using Industry 4.0 principles to transform our manufacturing operations. As far as we are concerned, Industry 4.0 ceased to be a distant vision long ago – it is already a successful reality thanks to our smart factory. As a result, we have become one of the world's pioneers in this field.

Yet we do not just focus on increasing our performance to ever greater levels. We also pass on to you the expertise, experience and technical solutions we have gathered in implementing Industry 4.0 in our production halls. Why not find out more?

No matter how large or small your project may be, no matter how high or complex your requirements may be: We rise to the challenge, working with you to develop the perfect solution for you – including an all-round service package throughout your entire system life cycle on request. Right now, predictive maintenance is one of the top service trends. Early diagnosis and end-to-end condition monitoring have been an essential part of our offering for many years. The only thing that counts is your satisfaction and driving forward your processes – from planning and the operation phase all the way to modernization. Where necessary, we also take care of drives from other manufacturers.

1.5 Why should you choose SEW-EURODRIVE?

Because these ten reasons speak for themselves:



1. You will be more flexible

However much the requirements for your processes and production systems increase, we're there for you every step of the way. With rapid conversions, short delivery times, enhanced capacity and faster format changeovers, we're at your side – from evaluating your needs and implementing an appropriate solution all the way to Life Cycle Services.



2. You will be more satisfied

Our name stands for the best quality. But we do not rest on our laurels. Quite the contrary, in fact. To ensure we meet all standards – both ours and yours – we undergo annual testing, including certification processes. That's because only one thing matters to us – the satisfaction and trust of our customers.



3. You know more

We're happy to share with you the industry and application expertise we have gained over decades and extending far beyond drive technology areas. We work with you to plan and put into practice your tailored solutions in a process where you constantly evolve in tandem with us.



4. You will be more sustainable

We take responsibility for our employees, customers and business partners but also the environment in which we live and work. As a family business, we think in generations and always look beyond today and tomorrow. With us, you too can drive the future.



5. You will be more successful

Like you, we cannot afford to stand still. We provide continuous training for our employees and customers. We constantly expand our horizons and enhance our products, solutions and services, and thus your processes. You can only continue to be successful in the future with optimized workflows.



6. You will be more energy efficient

We go out of our way to find new approaches and make our drives more efficient while always staying well ahead of international regulations. And, if you wish, we work with you to plan your systems and machines so that you can make the best possible use of energy recovery.



7. You will be more innovative

What's the point of innovations if they remain out of your reach? We listen to you, which makes us fully aware of your future challenges, and we respond accordingly. With our approximately 800 researchers, we drive forward innovative technologies and help bring your processes up to date.



8. You will save more money

With us, you can lower your overall operating costs. After all, it isn't just a matter of procurement expenses. Your TCO is significantly determined by the subsequent utilization and service life of your drive technology. We provide you with comprehensive advice on how to reduce your costs through sustainable operations.



9. You will be close to us

Wherever in the world your system is running, our comprehensive service network and experts mean we're always ready to provide advice and practical assistance when you need it. All-in-one, on-site service that knows no bounds and significantly reduces or even eliminates downtimes.



10. You will be faster

Throughout the world, our service staff ensure spare parts get to you fast, and faulty drives – including third-party products – are collected and repaired quickly. Software tools make engineering and startup easier for you. Services covering your entire system life cycle help make you faster and more efficient.

1.6 Documentation

1.6.1 Additional documentation

The following catalogs are available from SEW-EURODRIVE in addition to the following catalogs and brochures. They are also available on the SEW-EURODRIVE website under "Online Support" > "Data and documents":

- Catalog: "X..e Series Helical and Bevel-Helical Gear Units"
- Catalog: "External Oil Supply and Oil Cooling Systems"
- Catalog: "Flange couplings"
- Catalog: "Drive Packages on Steel Support Constructions"
- Catalog: "Hoist Gear Units"
- Brochure: "Technology for Agitators and Aerators"
- Brochure: "Technology for Cranes"
- Brochure: "Drive systems for conveyor systems"

1.7 Product names and trademarks

All product names included in this documentation are trademarks or registered trademarks of the respective titleholders.

1.8 Copyright notice

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1.9 Important information

The following points must be observed.

INFORMATION



- Figures in the catalog are examples. Final dimensions are available from SEW-EURODRIVE on request.
- The specified weights are guide values and may deviate slightly.
- When installing an oil filter in the oil cooling system, make sure there is sufficient height for removing the filter element and the filter housing.

1.10 Decimal separator in numerical values

In this document, a period is used to indicate the decimal separator.

Example: 30.5 kg

2 Product description and overview of types

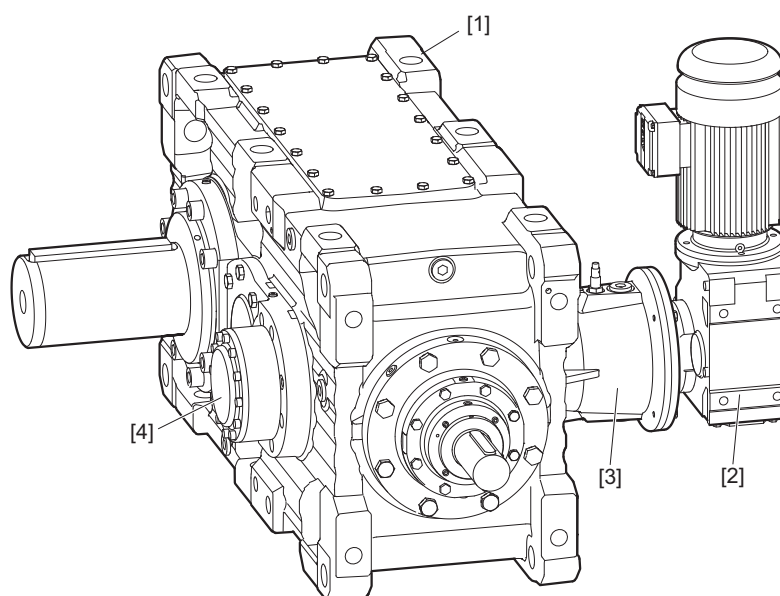
Bucket elevators are conveyor systems that vertically lift large quantities of bulk material. Depending on the volume of the buckets and on the needed conveyor height, high drive powers may be required.

Especially during maintenance, the bucket elevator drive may only be operated at reduced speed. This is the reason why bucket elevator drives are equipped with a directly mounted auxiliary drive. This auxiliary drive provides for the slow movement when the main motor is switched off. The auxiliary drive is available in the types "empty buckets" or "full buckets".

2.1 Gear unit structure

The bucket elevator drive is a standardized application gear unit with a gear ratio range of 20 to 180 that is based on the basic concept of the X..e gear unit series. The auxiliary drive comes from the gear unit series 7.

For more information on the X series, refer to the "Helical and Bevel-Helical X..e Series" catalog.



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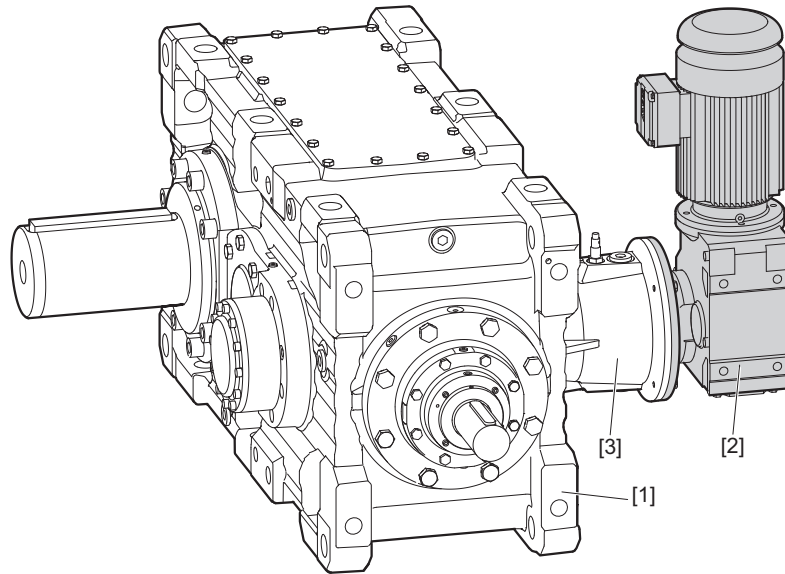
Compared to the basic design of the X..e series gear unit, the following equipment is standard equipment for a bucket elevator drive:

- [1] X.K.. bevel-helical gear unit
- [2] Auxiliary drive
- [3] Auxiliary drive adapter with overrunning clutch and incremental encoder for speed monitoring
- [4] Backstop

In addition, other options are available:

Speed monitor, fan (other cooling option on request), torque-limiting backstop, oil heater, oil drain valve, etc.

2.2 Auxiliary drive/IEC motor standard



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The mounted auxiliary drive [2] can be supplied in the "empty buckets" (exclusively for maintenance purposes) or "full buckets" designs. The auxiliary drive is mounted to the bevel-helical gear unit [1] via an auxiliary drive adapter [3]. For the precise output torques for operation via an auxiliary drive, refer to the order documents.

The auxiliary drive has its own oil circulation that is separated from the oil circulation of the bevel-helical gear unit. The auxiliary drive is delivered with oil fill.

2.2.1 IEC motor standard

The DR.. motor supports all global standards and meets the current IEC motor standard.

As standard, the auxiliary drive is equipped with motors of the DRN.. (IE3) series by SEW-EURODRIVE. For duty types without special requirements on the energy efficiency class, DRS.. (IE1) motors can be used instead. The following table describes both variants.

IE3 motor standard: DRN.. type AC motors

- IE3 (High Efficiency)
- Casting cage of the rotor made of aluminum or copper
- Operating mode: S1/75

DRS motors can be mounted:

IE1 motor standard: DRS.. type AC motors

- IE1 (Standard Efficiency)
- Casting cage of the rotor made of aluminum or copper
- Operating mode: S3/75



INFORMATION

- The typical purpose of use of the auxiliary drive does not correspond to S1 continuous duty, so the motor is designed with duty type S3/75. This means that the cyclic duration factor (cdf) is 7.5 minutes or less over a period of 10 minutes (max. cdf 75%). This means that an IE1 motor can also be used in countries where an IE1 motor in S1 operation is no longer permitted due to efficiency regulations (e.g. the EU).
- For further information about DR motors, refer to the website ([www.sew-eurodrive.de]). If you are unclear about any of the information in this documentation or if you require further information, consult SEW-EURODRIVE.

2.3 Product characteristics

2.3.1 Defined oil flow

A comparison between simulations, test stands and field tests ensures a defined oil flow in all installation and lubrication types. This results in optimum heat dissipation at all relevant points as well as sufficient lubrication for the seal, bearing and gearing.

2.3.2 Individual bearing adjustment and bearing systems

Maximum service life with simultaneous safety is possible by individually adjusting the bearing preload in relation to the exact drive data and influences of the application. For certain sizes, even the entire storage arrangement can be replaced as standard in order to easily adapt to the requirements in the field.

2.3.3 Efficiency

The most accurate calculation thanks to a networked calculation landscape in combination with loss-optimizing options such as a reduced oil level lead to efficient solutions. It can also be used to protect the environment.

2.3.4 Sealing systems

Due to a large variety of sealing systems, safe operation can be performed in all ambient conditions. Certain sealing options are also available in contactless design for optimum operational reliability and protection against external effects.

2.3.5 Finely graduated cooling concepts

Generation X.e can be equipped with various internal and external cooling options to safely transfer power. Of particular note is the finely graduated fan variance within a size that achieves an optimum between thermal and acoustic limits.

2.3.6 Gearing topology

The newly developed procedures for processing allow for creating tribologically optimized gearing surfaces. This enhancement allows for a safe transmission of torques and high overhung loads. In addition, optimized tooth meshing reduces noise emissions.

2.4 Added value in the Generation X..e modular system

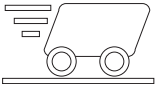
2.4.1 GearOil by SEW-EURODRIVE



GearOil by SEW-EURODRIVE increases the performance of the gear unit with high-quality base oils and the latest additive technologies. The oil reduces friction in rolling and sliding contact, resulting in increased efficiency and wear resistance.

Using GearOil by SEW-EURODRIVE filled at the factory eliminates the need for a first oil change after 500 hours.

2.4.2 Delivery times



The coordinated process chain from order receipt to shipping ensures short delivery times even for customer-specific adjustments.

Replacement parts required during servicing can also be supplied quickly in this way.

2.4.3 Global availability



With 4 production plants and 13 assembly plants across the globe, standardized industrial gear units can be made available worldwide in the shortest possible time. Additional service centers can also provide short-term service of any kind.

2.4.4 Detailed calculation



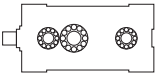
Thanks to the networked calculation landscape, each drive is simulated and calculated with the individually required drive data. Collaboration with research institutes enable us to already use the latest calculation models for series products. The individually tailored product can be created in this way.

2.4.5 Condition monitoring



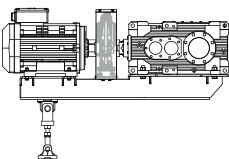
After a detailed preselection, our IOT Suite DriveRadar® monitors the drive for issues such as vibration and temperature, and can in this way detect any damage to bearings, gearing or temperatures in advance and provide a notification.

2.4.6 Bearing concept



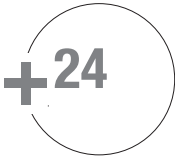
An alternative bearing can be offered as standard for sizes X.260e to X.320e. For this purpose, a reinforced bearing of the intermediate shafts, the output shaft or a combination can be selected individually to adapt to the requirements of the application.

2.4.7 Drive packages



With increasing demand for complete drive systems in the industrial gear unit sector, SEW-EURODRIVE can supply everything from a single source, from the motor cable to the customer's interface. In addition to the motor and gear unit, this also includes system components such as couplings, brakes and sensors, all of which are mounted on a steel frame.

2.5 Extended warranty



If the gear unit starts up after the statutory warranty has expired or if you want to pass on your customer's warranty claim to the supplier, for example, SEW-EURODRIVE offers a new warranty package "+24" for an additional 24 months warranty on the gear unit.

The following 3 packages are available for the gear units.

Packages	Scope	Advantages
+24	24 months of warranty on the gear unit.	The correct installation of the gear unit is checked by a member of the SEW-EURODRIVE Service team.
+24 advanced	Gear unit filled with premium lubricant GearOil by SEW-EURODRIVE, giving you 24 additional months of warranty for your industrial gear unit free of charge.	- First oil change after 500 operating hours no longer necessary. - The correct installation of the gear unit is checked by a member of the SEW-EURODRIVE Service team.
+24 smart	Gear unit filled with premium lubricant GearOil by SEW-EURODRIVE, giving you 24 additional months of warranty for your industrial gear unit free of charge. The gear unit is also equipped with the DriveRadar [®] IoT Suite (system for monitoring the condition of the gear unit).	- No first oil change after 500 operating hours and attractive discounts on the oil fill ex factory and the DriveRadar[®] hardware. - The correct installation of the gear unit is checked and the gear unit condition is continuously monitored by the DriveRadar[®] IoT Suite.

2.6 X..e power range

The nominal power and torque values mentioned in the catalog depend on the input speed and are valid for a service factor of $F_s = 1.0$ at constant load. The overview shows nominal power values and nominal torques for input speeds of 1000 min^{-1} to 1800 min^{-1} . The nominal torques also apply to drive speeds 3% below the synchronous speed. For speeds $> 1800 \text{ min}^{-1}$, contact SEW-EURODRIVE.

The following table provides an overview of the technical data.

Gear unit	Nominal torque class kNm	Nominal gear ratio ranges X3K..	Nominal gear ratio ranges X4K..
X100	7.2	20 – 80	Not available
X110	9	22.4 – 90	
X120	13.6	20 – 71	80 – 140
X130	17	25 – 90	100 – 180
X140	23.4	20 – 71	80 – 140
X150	29.2	25 – 90	100 – 180
X160	38	20 – 71	80 – 140
X170	47.5	25 – 90	100 – 180
X180	61	25 – 71	80 – 140
X190	69	28 – 80	90 – 160
X200	83	25 – 71	80 – 140
X210	96	28 – 80	90 – 160
X220	117	25 – 71	80 – 140
X230	134	28 – 80	90 – 160
X240	165	25 – 71	80 – 140
X250	185	28 – 80	90 – 160
X260	217	25 – 71	80 – 140
X270	252	28 – 80	90 – 160
X280	285	31.5 – 90	100 – 180

2.7 Drive concepts for bucket elevators

There are two different drive concepts for bucket elevators:

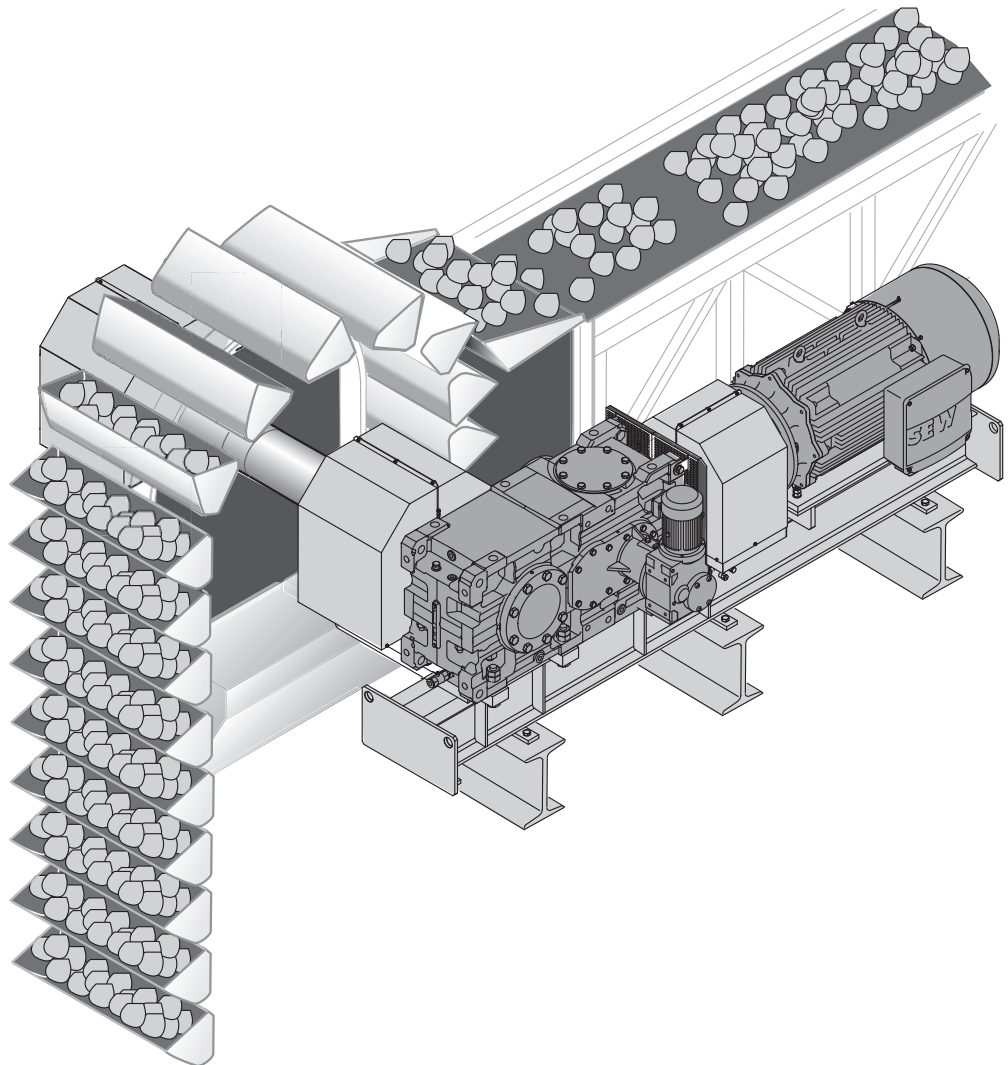
- Single drive
- Dual drive

2.7.1 Single drive

The bucket elevator is driven by a drive that transmits 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.

In the design "empty buckets", the auxiliary drive can turn the empty bucket during maintenance work. In the design "full buckets", this can also be done in loaded condition.



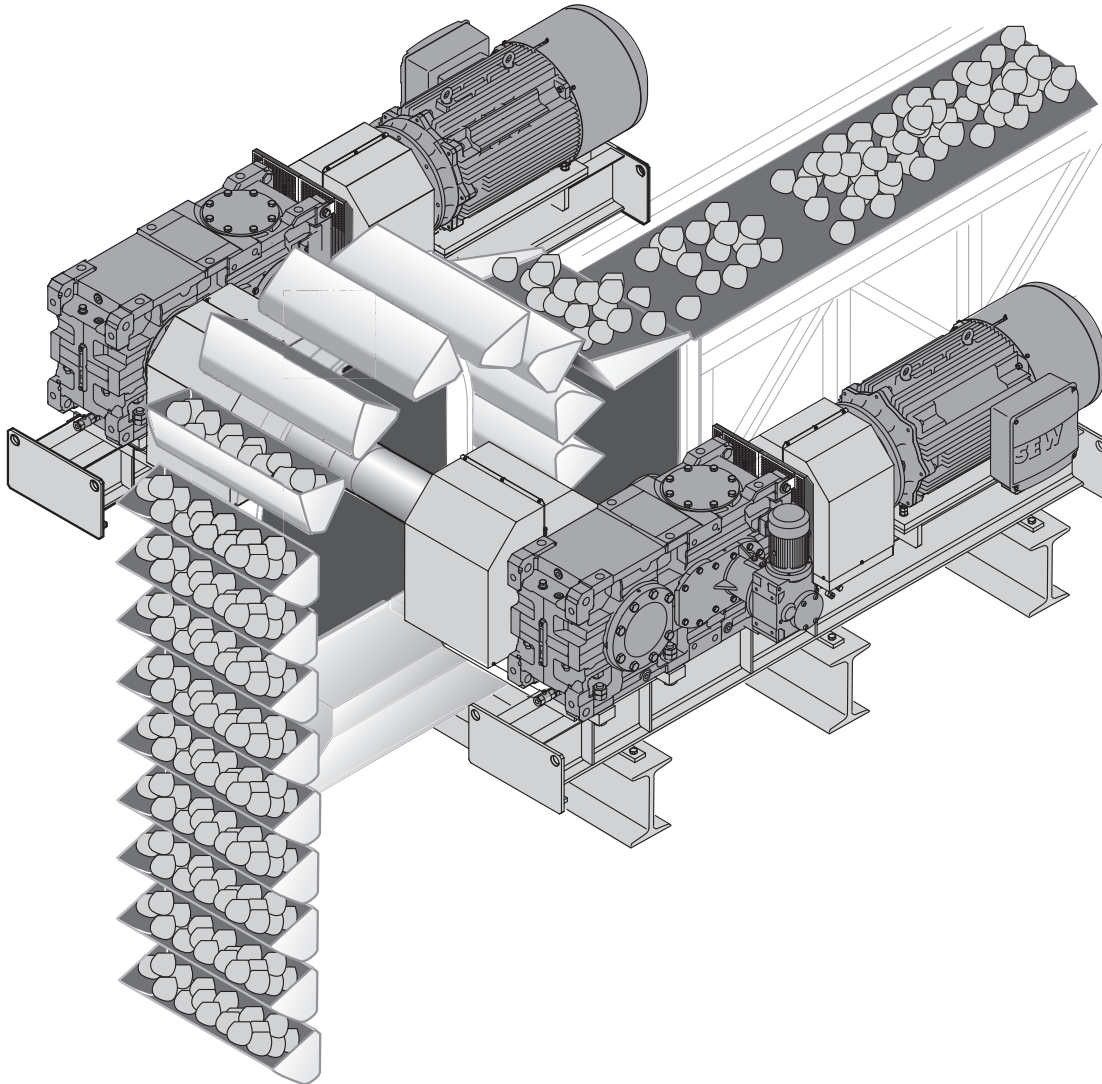
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2.7.2 Dual drive

In dual drives, one drive each is arranged in mirror image to the left and right of the bucket elevator's 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 limiting 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 provide for sufficient power reserves.



2.7.3 Overrunning clutch

The overrunning clutch [1] is installed in the auxiliary drive adapter [2] and allows for operation in one direction of rotation via the auxiliary drive [3].

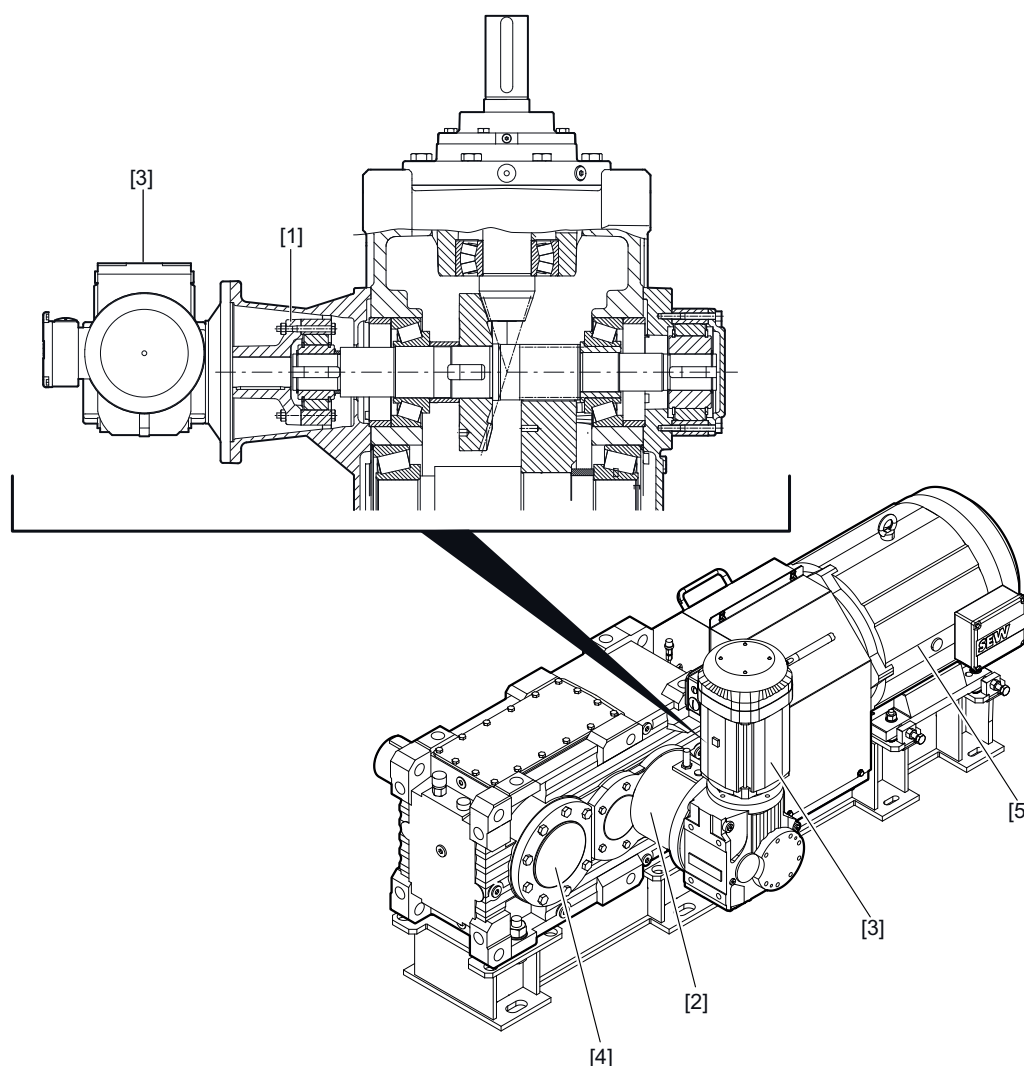
A distinction is made between 2 different operating modes:

- Operation via the main drive: The overrunning clutch [1] uncouples the auxiliary drive [3] and thereby prevents the auxiliary drive [3] from also rotating. The overrunning clutch is freewheeling.
- Operation via the auxiliary drive: The overrunning clutch [1] locks and thereby drives the pinion shaft of the gear unit. In this case, the input shaft of the bevel-helical gear unit [4] is rotating slowly.

Electrically interlock the main drive and auxiliary drive in such a way that only one of the two motors can be switched on at a time.

The rotary motion of the input shaft of the bevel-helical gear unit [4] must not be obstructed. Every brake present in the drive train of a main drive must be released when driving via the auxiliary drive [3].

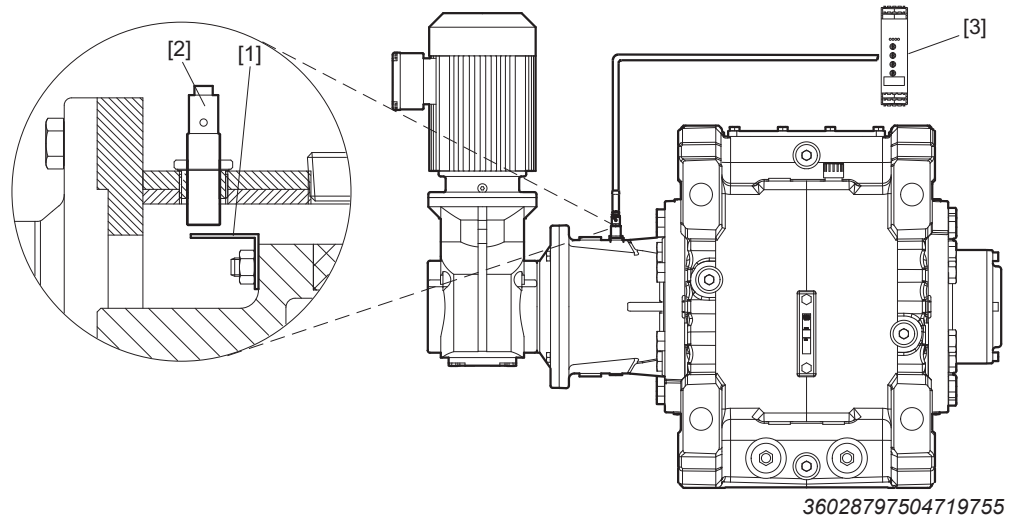
The overrunning clutch [1] is integrated in the oil circuit of the bevel-helical gear unit [4]. Maintenance and oil change are carried out at the same time using this.



2.7.4 Speed monitoring

INFORMATION

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



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

The speed of the overrunning clutch is detected in a contactless manner via trip cam [1] and an inductive incremental encoder [2]. The speed monitor [3] compares the encoder 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 switches (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.

INFORMATION

The incremental encoder is included in the delivery. The speed monitor, which is not included in the delivery, can be ordered separately. For further information, refer to chapter "Speed monitor" (→ 99).

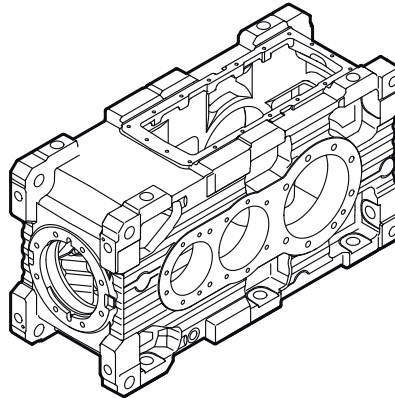
2.8 Housing designs

SEW-EURODRIVE distinguishes between the following housing types:

2.8.1 Horizontal housing /HH

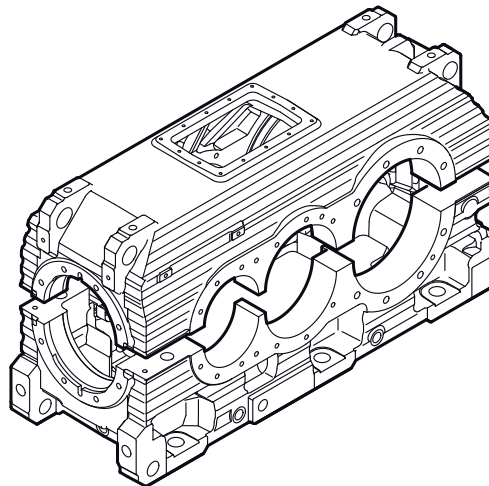
The horizontal housing is designed for mounting position M1. This housing design is non-reversible. For further information, see chapter "Reversible gear units".

The following figure shows an example of a single-piece housing for sizes X100 to 210:



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The following figure shows an example of a two-piece housing for sizes X220 to 320:



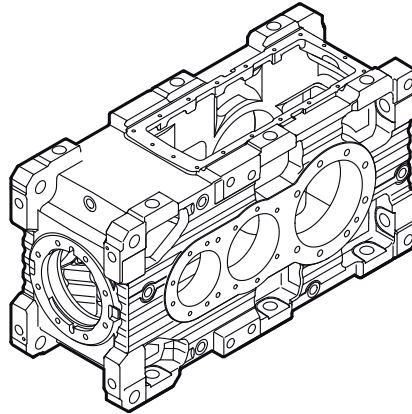
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2.8.2 Universal housing /HU

The universal housing can be installed in any mounting position (M1 to M6). The housings can be reversible if required. For further information, see chapter "Reversible gear units".

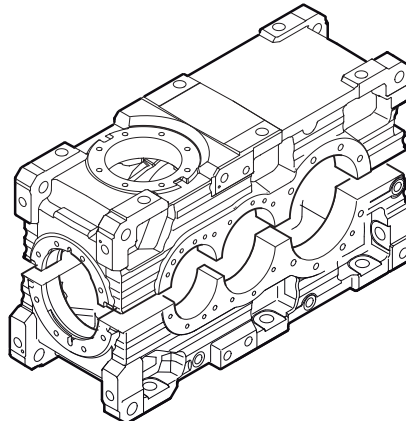
The following figure shows an example of a single-piece housing for sizes X100 to 210:

Two-part housings can also be offered for selected sizes in this range. Contact SEW-EURODRIVE in such cases.



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The following figure shows an example of a two-piece housing for sizes X220 to 320:



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2.9 Assignment of bevel-helical gear units and auxiliary drives

INFORMATION



In the "full buckets" design, the auxiliary drive motors of sizes DRN. 90 to 160 are equipped with a flywheel fan /Z (increased mass inertia). Auxiliary drive motors of sizes DRN. 180 to 225 are not equipped with a flywheel fan.

All motors come equipped with a canopy because the motors are installed vertically as standard.

2.9.1 X3K..

Main drive X3K..	Nominal gear ratio	Auxiliary drives/full buckets 			Auxiliary drives/empty buckets 		
		Gear unit	Motor	i	Gear unit	Motor	i
100	20 – 80	KF57	DRNL90L4/Z/C	35.7	KF37	DRN80M4/C	28.83
110	22.4 – 90	KF57	DRNL90L4/Z/C	35.7	KF37	DRN80M4/C	28.83
120	20 – 71	KF67	DRN100L4/Z/C	35.62	KF47	DRN90S4/C	31.30
130	25 – 90	KF67	DRN100L4/Z/C	35.62	KF47	DRN90S4/C	31.30
140	20 – 71	KF77	DRN112M4/Z/C	38.39	KF57	DRNL90L4/C	35.70
150	25 – 90	KF77	DRN112M4/Z/C	38.39	KF57	DRNL90L4/C	35.70
160	20 – 71	KF87	DRN132S4/Z/C	36.52	KF67	DRN100L4/C	35.62
170	25 – 90	KF87	DRN132S4/Z/C	36.52	KF67	DRN100L4/C	35.62
180	25 – 71	KF97	DRN132L4/Z/C	38.3	KF77	DRN100L4/C	38.39
190	28 – 80	KF97	DRN132L4/Z/C	38.3	KF77	DRN100L4/C	38.39
200	25 – 71	KF97	DRN160M4/C	38.3	KF77	DRN112M4/C	38.39
210	28 – 80	KF97	DRN160M4/C	38.3	KF77	DRN112M4/C	38.39
220	25 – 71	KF107	DRN180M4/C	37.0	KF87	DRN112M4/C	36.52
230	28 – 80	KF107	DRN180M4/C	37.0	KF87	DRN112M4/C	36.52
240	25 – 71	KF127	DRN200L4/C	36.25	KF87	DRN132S4/C	36.52
250	28 – 80	KF127	DRN200L4/C	36.25	KF87	DRN132S4/C	36.52
260	25 – 71	KF127	DRN225S4/C	36.25	KF87	DRN132S4/C	36.52
270	28 – 80	KF127	DRN225S4/C	36.25	KF87	DRN132S4/C	36.52
280	31.5 – 90	KF127	DRN225S4/C	36.25	KF87	DRN132S4/C	36.52

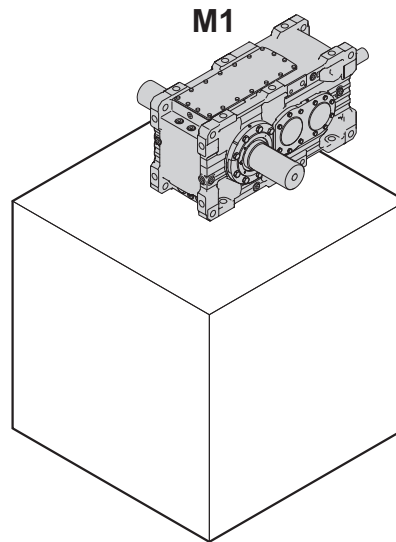
2.9.2 X4K..

Main drive X4K..	Nominal gear ratio	Auxiliary drives/full buckets 			Auxiliary drives/empty buckets 		
		Gear unit	Motor	i	Gear unit	Motor	i
120	80 – 140	KF37	DRN90L4/C	12.14	Not available		
130	100 – 125	KF37	DRN90L4/C	12.14			
	140 – 180		DRN100L4/C	7.96			
140	80 – 90	KF47	DRN100L4/C	13.65			
	100 – 140			12.19			
150	100 – 125	KF47	DRN100L4/C	13.56			
	140 – 180			10.56			
160	80 – 100	KF67	DRN132S4/C	13.22			
	112 – 140			9.66			
170	100 – 125	KF67	DRN132S4/C	13.22			
	140 – 180			9.66			
180	80 – 100	KF77	DRN160M4/C	13.52			
	112 – 140			9.56			
190	90 – 112	KF77	DRN160M4/C	13.52			
	125 – 160			9.56			
200	80 – 125	KF77	DRN160M4/C	13.52			
	140			9.56			
210	90 – 125	KF77	DRN160M4/C	13.52			
	140 – 160			9.56			
220	80 – 100	KF87	DRN180M4/C	12.56			
	112 – 140			8.29			
230	90 – 125	KF87	DRN180M4/C	12.56			
	140 – 160			8.29			
240	80 – 100	KF97	DRN200L4/C	11.99			
	112 – 140			8.71			
250	90 – 112	KF97	DRN200L4/C	11.99			
	125 – 160			8.71			
260	80 – 100	KF97	DRN200L4/C	13.85			
	112 – 140			11.99			
270	90 – 112	KF97	DRN200L4/C	13.85			
	125 – 160			11.99			
280	100 – 125	KF97	DRN200L4/C	13.85			
	140 – 180			10.41			

2.10 Mounting positions

The mounting position defines the spatial position of the gear unit housing and is designated with M1 to M6.

The bucket elevator drive is inserted in mounting position M1.



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2.10.1 Deviating mounting positions

Note that the following deviating mounting positions are permitted for X3K.. gear units in mounting positions M1 and M3. Data is based on a gear unit without pivoted mounting position.

X3K100 – 280	
Mounting position M1 and M3	Mounting position M1 and M3
The diagram shows a side view of the gear unit housing. A horizontal dashed line represents the reference axis. The output shaft is shown with a deviation angle of $+1^\circ$ to 0° relative to this axis.	The diagram shows a front view of the gear unit housing. A horizontal dashed line represents the reference axis. The output shaft is shown with a deviation angle of $\pm 0.5^\circ$ relative to this axis.

2.11 Nameplate

2.11.1 Nameplate 1

The following example shows the structure of the nameplate.

SEW-EURODRIVE

76646 Bruchsal/Germany

Type

X3FS190e/HU/B

Nr.

01.1234567812.0001.06

min.

nom.

max.

i

39.06

PK1

kW

36

180

180

F_s

1.5

MK

Nm

43300

43300

43300

PM

kW

0

n1

rpm

500

1480

1480

T_a

°C

-25...+40

n2

rpm

7.6

37.9

37.9

1743 895 0.13

IM

M1/F1

Made in Germany

Qty. of greasing points

2

Fans

0

Mass kg

1340

Year

2023

Synthetic Oil CLP HC460 90 ltr.

63050423139647755

Type		Type designation
no.		Serial number
P _{K1}	kW	Operating power on the input shaft (HSS)
M _{K2}	Nm	Gear unit output torque
n ₁	rpm	Input speed (HSS)
n ₂	rpm	Output speed (LSS)
min.		Minimum operating point
norm.		Normal operating point
max.		Maximum operating point
i		Exact gear unit ratio
F _s		Service factor
P _M	kW	Nominal motor power
T _a	°C	Deviation from standard temperature range (−20 °C to +40 °C)
Mass	kg	Weight of the gear unit
Greasing points		Number of points that require relubrication
Fan		Number of installed fans
		Oil grade and viscosity class/oil quantity
Year		Year of manufacture
IM		Mounting position and mounting surface

2.11.2 Nameplate 2

The QR code on the product gives you quick access to the digital services from SEW-EURODRIVE.

In addition to being able to enter the QR code with the camera of your mobile device or an appropriate app, you can also use the "Product ID Plus" app from SEW-EURODRIVE. After scanning, you will see the technical data to identify the product directly.

In addition, the search for product-specific spare parts and documentation, as well as fault diagnostics and direct service requests are simple and fast.

The following figure shows an example of a product label:



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2.12 Type designations

2.12.1 Gear units

The following example shows the structure of the type designation:

X3KSB250e /HU /B	
X	Industrial gear unit series
3	Number of gear unit stages • 3 = 3 stages • 4 = 4 stages
K	Gear unit design • K = Bevel-helical gear unit
S	Type of output shaft • S = Solid shaft with key • R = Smooth solid shaft • L = Splined solid shaft • A = Hollow shaft with keyway • H = Hollow shaft with shrink disk • V = Splined hollow shaft • T = Hollow shaft with TorqLOC® hollow shaft mounting system
	Application • B = Bucket elevator gear unit
250	Gear unit sizes • 100 – 280
e	Generation X.e
HU	Housing design • HU = Universal housing • HH = Horizontal housing • HT = Thermal housing
B	Gear unit mounting • /B = Foot • /T = Torque arm • /F = Flange

2.13 Direction of rotation dependencies

2.13.1 X.K..

Standard

Shaft position	03	04	034 ¹⁾	043 ¹⁾
End wheel pos.	4	3	3	4
X3K..				
X4K..				

 = Backstop position

1) Note the restrictions regarding external forces on the LSS

INFORMATION: For more information and a 3D view of the gear unit, refer to chapter "Shaft position, directions of rotation, backstop, auxiliary drive" (→ 32).

INFORMATION



As standard, the auxiliary drive as well as the shrink disk are always located opposite of the output end of the gear unit. The backstop is mounted opposite of the auxiliary drive.

Direction of rotation reversal

Shaft position	03 ¹⁾	04 ¹⁾
End wheel pos.	3	4
X3K..		
X4K..	On request	On request

 = Backstop position

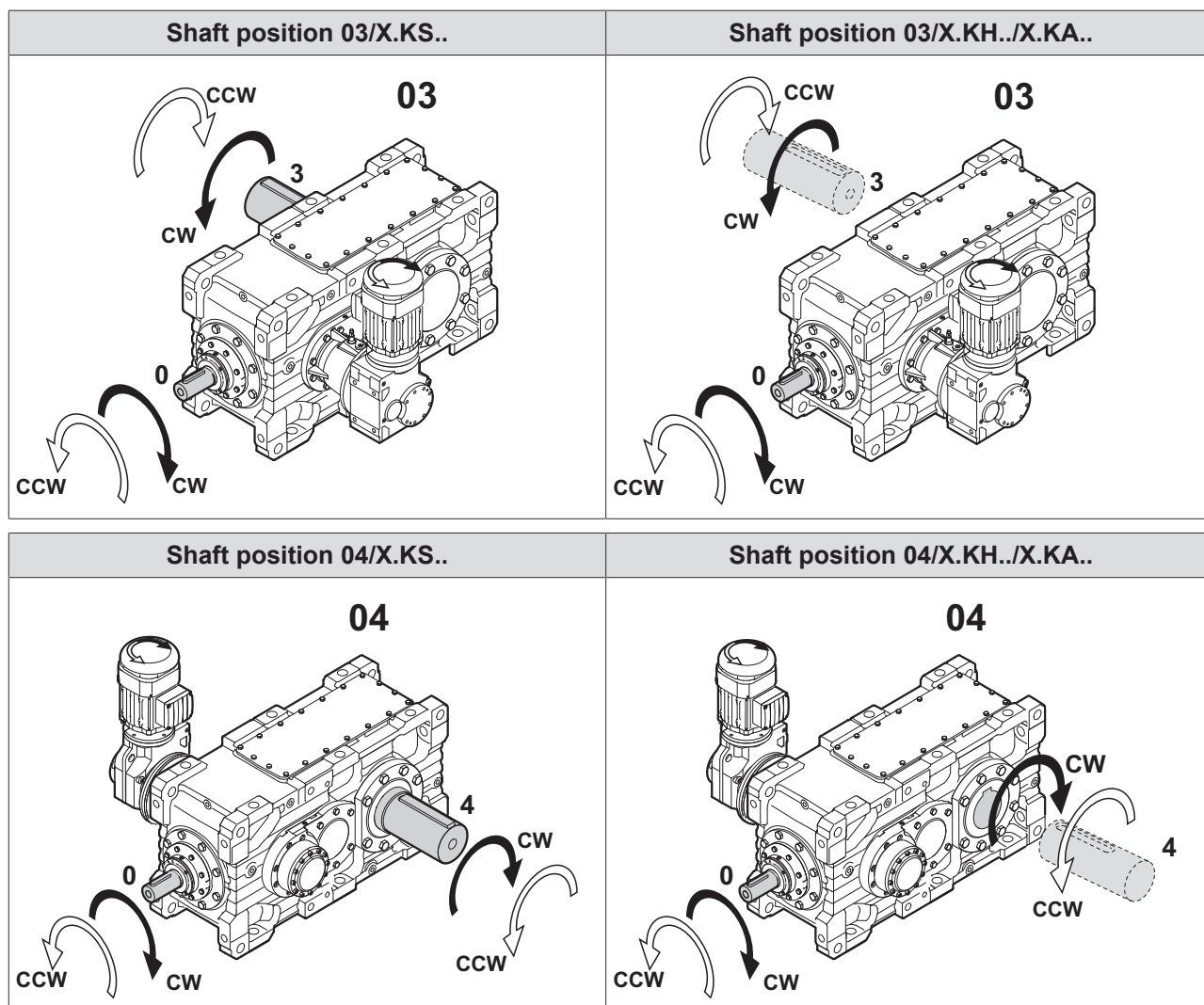
1) Note the restrictions regarding external forces on the LSS

INFORMATION: For more information and a 3D view of the gear unit, refer to chapter "Shaft position, directions of rotation, backstop, auxiliary drive" (→ 32).

2.14 Shaft position, directions of rotation, backstop, auxiliary drive

The following figures show the standard variants of the bucket elevator gear units. The auxiliary drives are mounted in mounting position M4A with motor terminal box position 0°.

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



INFORMATION



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 auxiliary drive, the backstop is installed opposite the output side of the gear unit.

2.15 Position of motor terminal box and cable entry

The position of the motor terminal box has so far been indicated with 0°, 90°, 180° or 270° as viewed onto the fan guard (see figure below). A change in the product standard EN 60034 specifies that the following designations will have to be used for terminal box positions for foot-mounted motors in the future:

- As viewed onto the output shaft = A-side
- Designation as R (right), B (bottom), L (left) and T (top)

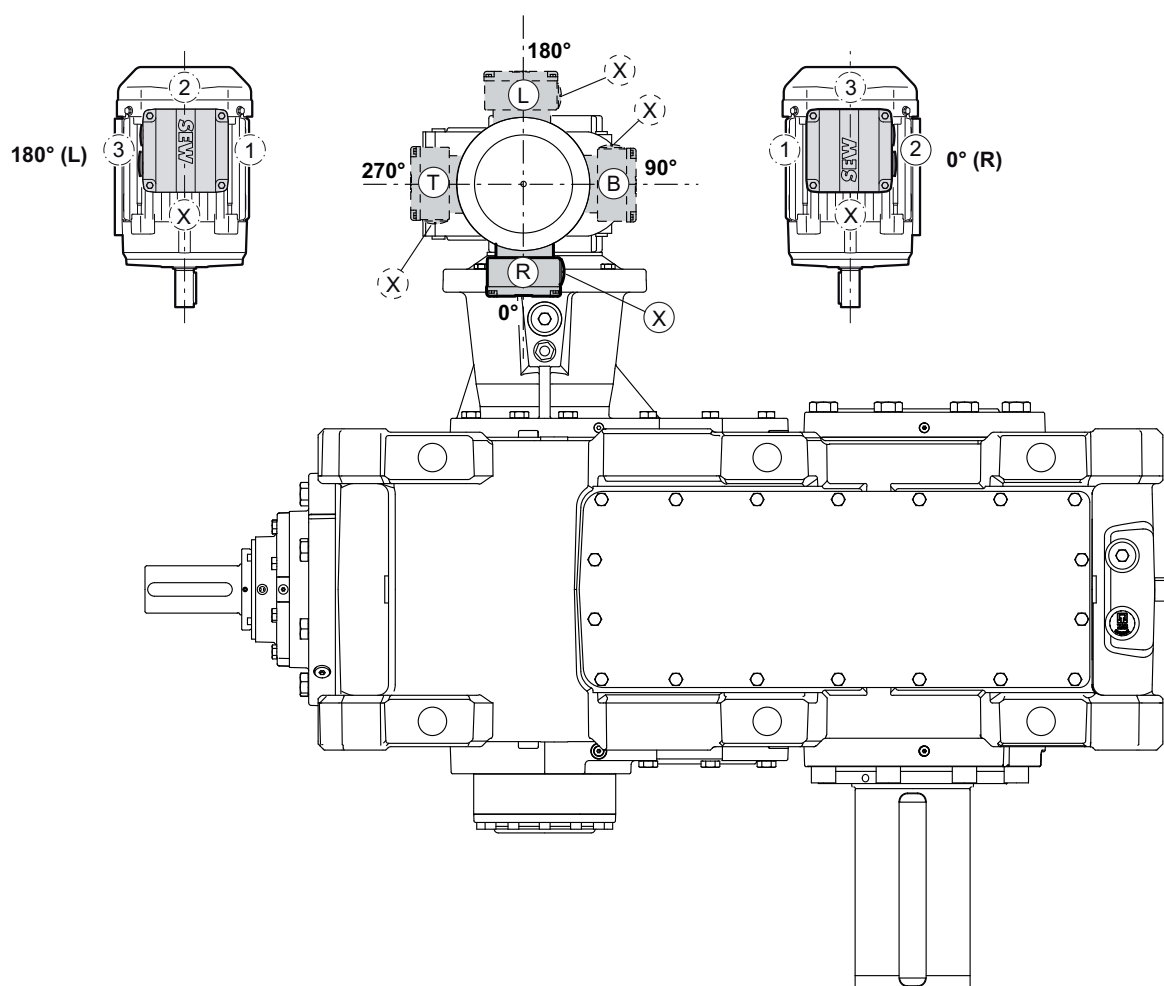
This new designation applies to foot-mounted motors without a gear unit in mounting position B3 (= M1). For gearmotors, the previous designation is maintained. The following figure shows both designations. Where the mounting position of the motor changes, R, B, L and T are rotated accordingly.

The position of the cable entry can be selected as well. Available positions are "X" (= standard position), "1", "2" or "3" (see the following figure)

INFORMATION



Unless other information is given regarding the terminal box, the 0° type (R) with "X" cable entry will be supplied.



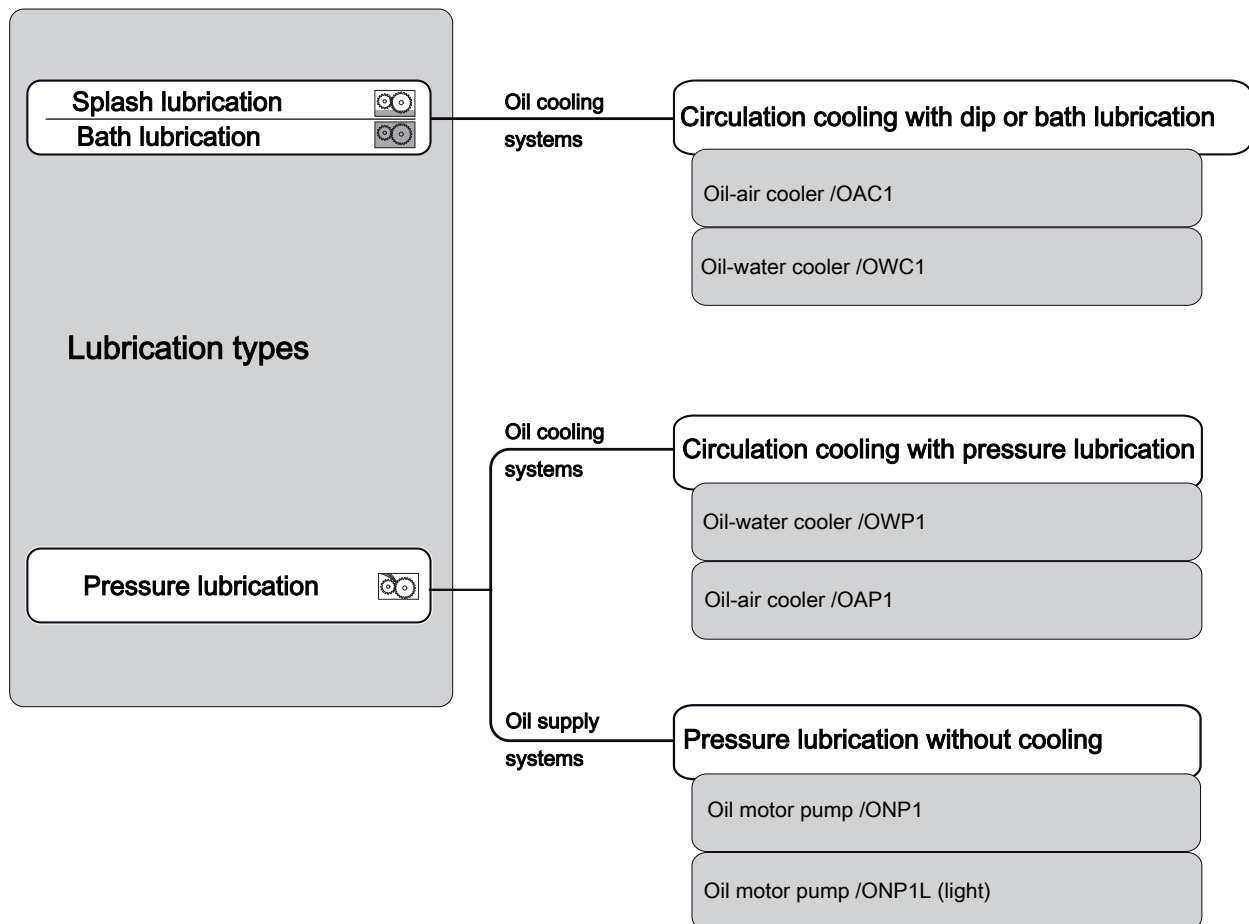
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2.16 Overview of the lubrication and cooling types

Depending on the special application requirements, the following types of lubrication and cooling are available.

2.16.1 Overview: External oil supply and oil cooling systems

The following figure shows an overview of the possible oil supply and oil cooling systems.

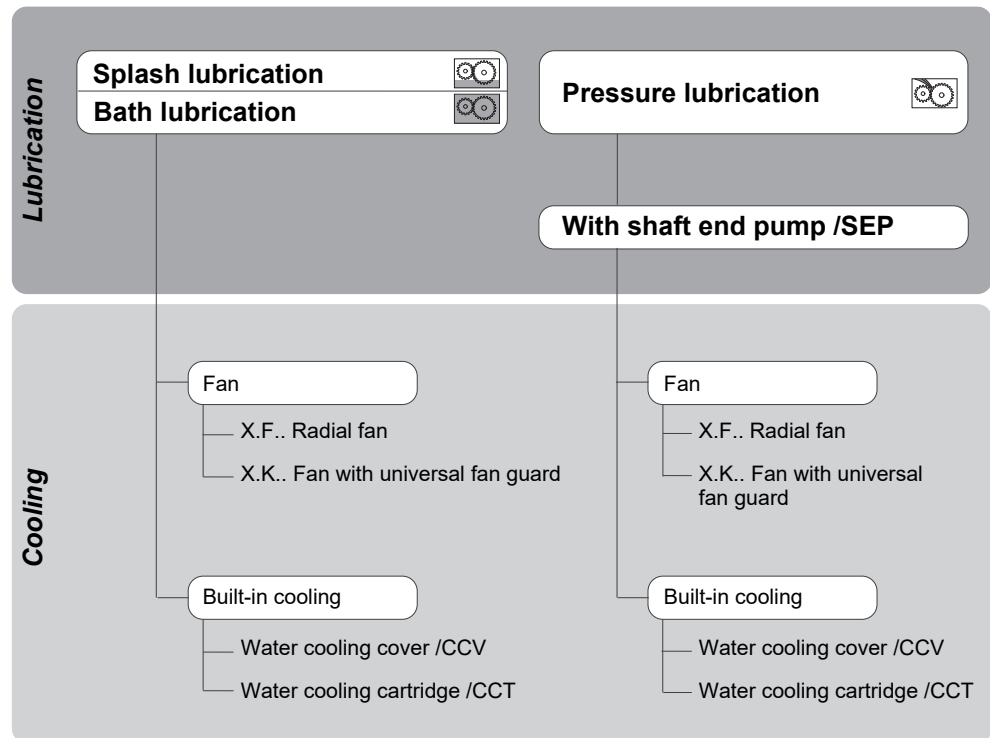


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For information on the structure, function, technical data, etc. of the oil supply and oil cooling systems, refer to the separate "External oil supply and oil cooling systems" catalog.

2.16.2 Overview: Internal oil cooling systems, shaft end pumps and fans

The following combinations of lubrication and cooling types are possible: See section 3 for more information.



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2.17 Lubricant selection

2.17.1 General information on selecting the oil

Unless a special arrangement is made, SEW-EURODRIVE delivers the drives without oil fill. This does not apply to auxiliary drives and primary gear units.

INFORMATION



This means the gear unit must be filled with the correct oil grade and quantity before startup. You find the corresponding information 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).



INFORMATION

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

Observe the operating temperature of the gear unit when specifying the oil change intervals.

2.18 Lubricant table

2.18.1 Permitted lubricants

This chapter describes the permitted lubricants and the permitted temperatures for industrial gear units from SEW-EURODRIVE.

INFORMATION



- 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).
 - Contact SEW-EURODRIVE if you use bio and food grade lubricants or polyglycol oils.
 - Check the compatibility of the used grease and oil.
 - The tables contain the lubricants approved by SEW-EURODRIVE.
 - Oils of the same viscosity class from different manufacturers do not have the same characteristics. In particular, the minimum permitted oil bath temperatures are manufacturer-specific. These temperatures are specified in the lubricant tables.
 - The minimum permitted oil bath temperatures depend on the lubrication type used. These temperatures are specified in the lubricant tables. The values correspond to the maximum viscosity of the individual lubricants.
 - The values specified in the lubricant tables apply as of the time of printing of this document. The data of the lubricants is subject to dynamic change on the part of the lubricant manufacturers. For the latest information about the lubricants, visit: www.sew-eurodrive.de/lubricants
-

Structure of the tables and abbreviations

			SEW EURODRIVE	
[2]			-20 -5 +5	+65
		VG 150 ¹⁾	SEW GearOil Base 150 E1	
			SEW070040013	
[1]			-15 0 +10	+75
		VG 220	SEW GearOil Base 220 E1	
			SEW070040013	
			-10 +5 +15	+85
		VG 320	SEW GearOil Base 320 E1	
			SEW070040013	

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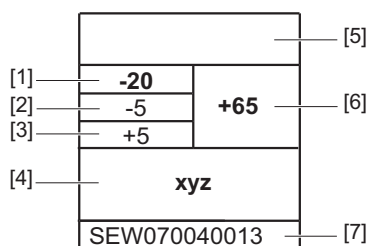
[1] Lubricant type

[2] Viscosity class

Abbreviations

Icons	Designation
CLP	= Mineral oil
CLP HC	= Synthetic polyalphaolefin (PAO)
E	= Ester-based oil
	= Mineral lubricant
	= Synthetic lubricant
	= Lubricant for the food industry (NSF H1 -compliant)
	= Biodegradable oil (lubricant for agriculture, forestry, and water management)
1)	= Lubricants may only be used if service factor $F_s \geq 1.3$

Explanation of the various lubricants



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- [1] Lowest cold start temperature in °C for splash lubrication¹⁾
- [2] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 5000 cSt¹⁾
- [3] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 2000 cSt¹⁾
- [4] Trade name
- [5] Manufacturer
- [6] Highest oil bath temperature in °C²⁾
- [7] Approvals

- 1) In case of lower temperatures, the oil must be heated to the specified minimum temperature, for example, by using an oil heater. For the maximum permitted oil viscosity per pump type, refer to chapter "Explanations on the oil supply system / oil cooling systems and oil viscosity".
- 2) Service life is significantly reduced when exceeded. Observe chapter "Lubricant change intervals".

Explanations on the oil supply system / oil cooling systems and oil viscosity

Adhere to the following oil viscosity: For up-to-date information about the lubricants, visit:

www.sew-eurodrive.de/lubricants

Pressure lubrication	Oil viscosity
Motor pump for pressure lubrication /ONP1	5000 cSt.
Motor pump for pressure lubrication /ONP1L	5000 cSt.
Motor pump incl. air cooler for pressure lubrication /OAP1	5000 cSt.
Shaft end pump /SEP	5000 cSt.
Motor pump incl. water cooler for pressure lubrication /OWP1	5000 cSt.

Lubricant compatibility with oil seal

Approval	Explanation
SEW07004__13:	A lubricant especially recommended with regard to compatibility with the approved oil seals. The lubricant exceeds the state-of-the-art requirements regarding elastomer compatibility.

Permitted application temperature range of the oil seals

In the low temperature range, oil seals can withstand shaft deflections (e.g. through overhung load) only to a limited extent. Especially avoid or limit pulsating or changing radial displacements of the shaft. Contact SEW-EURODRIVE, if required.

Oil seal material class	Permitted oil sump temperature
NBR	-40 °C to +80 °C
FKM	-25 °C to +115 °C
FKM-PSS	-25 °C to +115 °C

Limitations of use of oil seals with the specific lubricant are described in the following table:

Material class			Manufacturer		Material	
S	1	NBR	1	Freudenberg		72 NBR 902
			2	Trelleborg		4NV11
	2	FKM	1	Freudenberg	1	75 FKM 585
					2	75 FKM 170055
			2	Trelleborg	1	VCBVR

Examples:

S11: Only the elastomer 72NBR902 from Freudenberg meets the requirements of the approval in conjunction with the specific lubricant.

S2: Only the elastomer FKM meets the requirements of the approval in conjunction with the specific lubricant.

GearOil by SEW-EURODRIVE – lubricant for gear units

With decades of experience in gear unit development and construction, as well as numerous customer applications, SEW-EURODRIVE has extensive tribological knowledge. On this basis and in accordance with long-term test runs, SEW-EURODRIVE has developed a special formulation for its own premium gear oil: GearOil by SEW-EURODRIVE – the optimum protection for SEW-EURODRIVE gear units.

By using high-quality base materials and additives as well as the appropriate logistics, SEW-EURODRIVE ensures the highest level of quality.

GearOil by SEW-EURODRIVE increases the performance of the gear unit, regardless of whether it is a standard, servo or industrial gear unit. The premium gear oil reduces the friction between gear wheels by creating a very good lubrication film. This increases the service life of lubricant and wear parts, such as sealing rings and bearings. The high scuffing load capacity of the GearOil Base mineral lubricant (scuffing load capacity 14) improves protection from fretting on the gearing. At the same time, GearOil increases the efficiency of the gear unit and protects against corrosion and harmful foaming of the oil. The "self-cleaning" properties of the lubricants prevent deposits as they bind water and dirt particles.

Optionally, you can select GearOil by SEW-EURODRIVE as the initial filling for the gear units and gearmotors. The premium gear oil can be ordered in can or barrel containers for service and maintenance purposes. GearOil by SEW-EURODRIVE can be stored for up to 6 years in unopened containers.

Lubricant tables

This lubricant table is valid when the document is published. Refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]	SEW EURODRIVE	Castrol	FUCHS	Mobil	KLÜBER LUBRICATION	SINOPEC	TOTAL
CLP	VG 150	-20 -5 +65 SEW GearOil Base 150 E1 / US1 / CN1 / BR1	-20 -5 +65 Optigear BM 150	-20 -5 +65 Renolin CLP 150 Plus	-20 -5 +65 Renolin HighGear 150	-20 -5 +65 Klüberoil GEM 1-150 N	-20 -5 +65 AP-SGO 150	
		-15 0 +75 SEW070040013	-15 0 +75 SEW070030013	-15 0 +75 SEW070030013	-15 0 +75 SEW070030013	-15 0 +75 SEW070030013	-15 0 +75 SEW070030013	-15 0 +75 Carter EP 220
	VG 220	-10 +5 +85 SEW GearOil Base 220 E1 / US1 / CN1 / BR1	-10 +5 +85 Optigear BM 220	-10 +5 +85 Renolin CLP 220 Plus	-10 +5 +85 Renolin HighGear 220	-10 +5 +85 Klüberoil GEM 1-220 N	-10 +5 +85 AP-SGO 220	
		-10 +5 +85 SEW070040013	-10 +5 +85 SEW070030013	-10 +5 +85 SEW070030013	-10 +5 +85 SEW070030013	-10 +5 +85 SEW070030013	-10 +5 +85 SEW070030013	-10 +5 +85 Carter EP 320
	VG 320	-5 +10 +90 SEW GearOil Base 320 E1 / US1 / CN1 / BR1	-5 +10 +90 Optigear BM 320	-5 +10 +90 Renolin CLP 320 Plus	-5 +10 +90 Renolin HighGear 320	-5 +10 +90 Klüberoil GEM 1-320 N	-5 +10 +90 AP-SGO 320	
		-5 +10 +90 SEW070040013	-5 +10 +90 SEW070030013	-5 +10 +90 SEW070030013	-5 +10 +90 SEW070030013	-5 +10 +90 SEW070030013	-5 +10 +90 SEW070030013	-5 +10 +90 Carter EP 460
	VG 460	0 +15 +90 SEW GearOil Base 460 E1 / US1 / CN1 / BR1	0 +15 +90 Optigear BM 460	0 +15 +90 Renolin CLP 460 Plus	0 +15 +90 Renolin HighGear 460	0 +15 +90 Klüberoil GEM 1-460 N	0 +15 +90 AP-SGO 460	
		0 +15 +90 SEW070040013	0 +15 +90 SEW070030013	0 +15 +90 SEW070030013	0 +15 +90 SEW070030013	0 +15 +90 SEW070030013	0 +15 +90 SEW070030013	0 +15 +90 Carter EP 680
	VG 680	-25 +15 +90 SEW GearOil Base 680 E1 / US1 / CN1 / BR1	-25 +15 +90 Optigear BM 680	-25 +15 +90 Renolin CLP 680 Plus	-25 +15 +90 Renolin HighGear 680	-25 +15 +90 Klüberoil GEM 1-680 N	-25 +15 +90 AP-SGO 680	
		-25 +15 +90 SEW070040013	-25 +15 +90 SEW070030013	-25 +15 +90 SEW070030013	-25 +15 +90 SEW070030013	-25 +15 +90 SEW070030013	-25 +15 +90 SEW070030013	-25 +15 +90 Carter EP 1000

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This lubricant table is valid when the document is published. Refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]						
CLP HC	VG 32 ¹⁾						
	VG 68 ¹⁾						
	VG 150 ¹⁾	GearOil Synth 150 E1 SEW 070040313	AlphaSyn EP 150 Optigear Synthetic X 150	Renolin Unisyn CLP 150	SHC 629 SHC Gear 150	Klibersynth GEM 4-150 N	Carter SH 150
	VG 220	GearOil Synth 220 E1 SEW 070040313	AlphaSyn EP 220 Optigear Synthetic X 220	Renolin Unisyn CLP 220	SHC 630 SHC Gear 220	Klibersynth GEM 4-220 N	Carter SH 220
	VG 320	GearOil Synth 320 E1 SEW 070040313	AlphaSyn EP 320 Optigear Synthetic X 320	Renolin Unisyn CLP 320	SHC 632 SHC Gear 320	Klibersynth GEM 4-320 N	Carter SH 320
	VG 460	GearOil Synth 460 E1 SEW 070040313	AlphaSyn EP 460 Optigear Synthetic X 460	Renolin Unisyn CLP 460	SHC 634 SHC Gear 460	Klibersynth GEM 4-460 N	Carter SH 460
	VG 680	GearOil Synth 680 E1 SEW 070040313	Optigear Synthetic X 680	Renolin Unisyn CLP 680	SHC 636 SHC Gear 680	Klibersynth GEM 4-680 N	Carter SH 680
	VG 1000				SHC 639 SHC Gear 1000	Klibersynth EG4-1000	

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This lubricant table is valid when the document is published. Refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

[1]	[2]	[3]	SEW EURODRIVE	bremser & leguit	Castrol	FUCHS	KLÜBER LUBRICATION
		VG 68 ¹⁾		-35 -20 -10 +45 Cassida Fluid HF 68	-40 -25 -15 +45 Optileb HY 68	-35 -20 -10 +45 Cassida Fluid HF 68	-35 -20 -10 +45 Klüberoil 4UH1-68 N
	CLP HC ₂ NSF H1	VG 220 ¹⁾	-30 -5 0 +80 SEW GearOil Synth 220 H1 E1 SEW 070040313	-20 -5 +5 +75 Cassida Fluid GL 220	-25 -5 +5 +75 Optileb GT 220 SEW 0700403113	-20 -5 +5 +75 Cassida Fluid GL 220	-25 -5 +5 +75 Klüberoil 4UH1-220 N
		VG 460 ¹⁾	-20 0 +15 +100 SEW GearOil Synth 460 H1 E1 SEW 070040313	-15 +5 +20 +90 Cassida Fluid GL 460	-15 +5 +20 +95 Optileb GT 460 SEW 070040313	-15 +5 +20 +90 Cassida Fluid GL 460	-15 +5 +20 +95 Klüberoil 4UH1-460 N
		VG 680 ¹⁾		-10 +10 +25 +105 Cassida Fluid GL 680		-10 +10 +25 +105 Cassida Fluid GL 680	-10 +10 +25 +105 Klüberoil 4UH1-680 N
		VG 320				-20 0 +10 +8a5 Plantogear 320 S	-20 0 +10 +85 Klüberbio EG2-320
	E	VG 460				-15 +5 +15 +95 Plantogear 460 S	-15 +5 +15 +95 Klüberoil 4UH1-460 N

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- 1) Lubricants may only be used
if the service factor F_s and peak load factor $F_F \geq 1.6$.
The peak output torque M_{K2per} is limited as follows: $F_F \geq 1.6 \rightarrow M_{K2per} \leq 1.25 \times M_{N2}$ (nominal torque) $\rightarrow M_{K2per} \leq 2 \times M_{N2}/F_F = 2/1.6 \times M_{N2}$.
In case of deviations, contact SEW-EURODRIVE.
- 2) NSF-H1 registered oils for the food processing industry cannot be combined with the gear unit option "Extended storage" (a VCI anti-corrosion agent is added).

NOTICE:

Also observe the thermal application limits of the oil seal materials, see chapter "Lubricant compatibility with oil seal" ($\rightarrow$ 41).

2.19 Sealing greases/rolling bearing greases

2.19.1 Bearing greases

The table shows the greases recommended by SEW-EURODRIVE with the "lower operating temperature".

The permitted operating temperature of the lubricant used must be taken into account for the lower and upper operating temperature. For further information, refer to chapter "Lubricant table" (→ 43).

Area of operation	Manufacturer	Greases	Lower temperature limit
Standard	SEW-EURODRIVE	SEW Grease HL 2 E1¹⁾	-40 °C
	Fuchs	Renolit CX TOM 15 OEM	-40 °C
	BP	Energrease LS EP-2	-30 °C
	Castrol	Longtime PD 2	-35 °C
		Spheerol EPL 2	-20 °C
	Klüber	Centoplex EP 2	-25 °C
		Petamo GHY 133 N	-40 °C
	Mobil	Mobilux EP 2	-20 °C
	Shell	Gadus S2 V220 2	-20 °C
	Total	Multis EP 2	-20 °C
	SEW-EURODRIVE	SEW Grease HL 2 H1 E1¹⁾	-40 °C
	Bremer & Leguil	Cassida Grease GTS2	-40 °C
	Fuchs	Plantogel 2¹⁾	-40 °C

1) Use the greases used at the factory if possible.

2.19.2 Premium bearing grease HL 2 E1 Grease by SEW-EURODRIVE

HL 2 E1 Grease by SEW-EURODRIVE consists of optimally matched product components. The calcium sulfonate complex saponified lubricating grease is based on a semi-synthetic base oil. In combination with an optimized additive package, the HL 2 E1 Grease by SEW-EURODRIVE has extraordinary mechanical characteristics. The powerful lubricant provides high thermal and mechanical stability for all friction points (bearings and seals) which are subjected to high levels of stress in the gear unit and the seals in the motor. This minimizes sealing ring wear and reduces the risk of premature roller bearing failure.

The corresponding premium bearing grease HL 2 E1 Grease by SEW-EURODRIVE is available for use in the food processing industry.

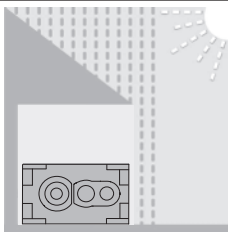
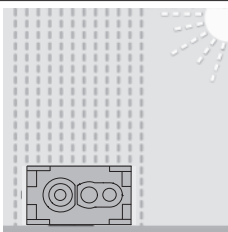
Key advantages:

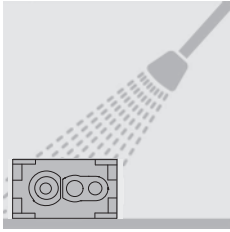
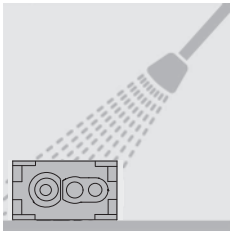
- Good corrosion and wear protection
- Wide service temperature range
- Optimum water resistance
- Resistant to aging
- High thermal and mechanical stability

2.20 Coating and surface protection systems

Used as surface protection under typical ambient conditions, corrosivity category DIN EN ISO 12944-2. The following tables give an overview of coating and surface protection systems.

The gear unit is equipped with the following surface protection.

OS 1 low environmental pollution	
	For environments prone to condensation and atmospheres with low humidity or contamination, such as outdoor applications under roof or with protection, unheated buildings where condensation can build up. According to corrosivity category: C2 (low)
Sample applications	• Systems in saw mills • Agitators and mixers
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	–
OS 2 medium environmental pollution	
	For environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category: C3 (moderate)
Sample applications	• Applications in gravel plants • Cableways
Condensation test ISO 6270	120 h
Salt spray test ISO 7253	240 h

OS 3 high environmental pollution	
	Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt exposure. Based on corrosivity category: C4 (high)
Application examples	• Port cranes • Sewage treatment plants • Mining applications
Condensation test ISO 6270	240 h
Salt spray test ISO 7253	480 h
OS 4 very high environmental pollution	
	Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning also with chemical cleaning agents. Based on corrosivity category: C5 (very high)
Sample applications	• Drives in malting plants • Wet areas in the beverage industry • Conveyor belts in the food industry
Condensation test ISO 6270	360 h
Salt spray test ISO 7253	600 h

INFORMATION



- Standard top coat color RAL 7031, can deviate depending on the order, see order documents.
- Color according to RAL
- Water and hand perspiration repelling rust preventive for external preservation applied to uncoated parts, shaft ends/flanges.
- Sheet metal parts (such as protection covers) are painted in RAL 1003 as standard.
- If you need surface protection systems of a higher quality, contact SEW-EURODRIVE.

2.21 Storage and transport conditions

The gear units can be provided with the following protection and packaging types depending on the storage and transport conditions.

2.21.1 Internal conservation

Standard corrosion protection

After the test run, the test oil 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 corrosion protection

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

2.21.2 Exterior corrosion protection

The following measures are taken for exterior corrosion protection:

- Corrosion protection is applied to bare, non-painted functional surfaces of shafts, flanges, mounting and foot surfaces on the gear unit. Remove it only using an appropriate solvent which is not harmful to the oil seal.
- 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.

INFORMATION



If the gear unit is stored longer than 6 months, regularly check the protective coating of unpainted areas as well as the paint coating. Areas with protective coating and/or paint that has been removed may have to be repainted.

2.21.3 Packaging

Standard packaging

The gear unit is delivered on a pallet, securely attached and without cover.

Use: Transportation by land

Long-term packaging

The gear unit is delivered in a wooden box that is also appropriate for sea transport.

Application: Sea transport and/or for extended storage

2.21.4 Storage conditions

INFORMATION



- The gear unit must be stored in a shock-free manner during the storage period until startup to prevent damage to the rolling bearing races.
- The gear units are delivered without oil; different protection systems are required depending on the storage period and storage conditions as shown in the table below.

Corrosion protection + packaging	Storage location	Storage duration
Standard corrosion protection + standard packaging	Under a roof and enclosed at constant temperature and atmospheric humidity (5 °C < θ < 60 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors and no shocks.	Max. 6 months with intact surface protection.
Long-term corrosion protection + standard packaging	Under a roof and enclosed at constant temperature and atmospheric humidity (5 °C < θ < 60 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors and no shocks.	Max. 3 years with regular inspection and checking for intactness.
Long-term corrosion protection + long-term packaging	Under a roof, protected against rain and free from shocks.	Max. 3 years with regular inspection and checking for intactness.

INFORMATION



If stored in tropical zones, provide for sufficient protection against insect damage. Contact SEW-EURODRIVE in the case of differing requirements.

2.22 Ambient conditions

The gear units are suited for operation at ambient temperatures from -40°C to +40°C, though the standard design might have to be modified depending on the ambient temperature.

When operated in areas with low ambient temperatures, high levels of humidity, aggressive or explosive atmospheres, please consult SEW-EURODRIVE.

Sealing, lubrication, ventilation, surface protection, and other properties of the gear unit can then be adjusted to the specific ambient conditions.

2.23 Potentially explosive atmospheres (ATEX)

X..e series industrial gear units are available for operation in potentially explosive atmospheres.

The explosion-protected designs comply with the requirements of Directive 2014/34/EU for equipment group I, category M2 and equipment group II, categories 2 and 3.

For the project planning of the gear units, contact SEW-EURODRIVE.

2.24 Gear unit characteristics

2.24.1 Gearing and shafts

The gearing with edge corrections is made of high-quality, tempered, and ground case hardening steels. The output shafts are made of tough quenched and tempered steel.

2.24.2 Shaft bearings

Self-aligning, cylindrical, and tapered roller bearings from well-known manufacturers are used.

2.24.3 Thermal rating

The thermal rating needs to be checked for every gear unit. The relevant values are listed in the "Selection tables".

The values specified in the selection tables serve as a guide, the number of real influencing factors cannot be mapped. For an exact calculation, contact SEW-EURODRIVE.

2.24.4 Noise level

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

2.25 Type of lubrication**2.25.1 Splash lubrication**

Standard lubrication type for horizontal mounting positions (M1 or M3). Gearing and bearing parts that are not immersed in the oil bath are lubricated by splashing oil.

Reduced oil level

The reduced oil level allows for operating the gear unit with a smaller oil quantity. The machine elements that are not submerged in the oil are sufficiently supplied with oil by an internal oil distribution system. This significantly reduces the power loss depending on the gear ratio.

The reduced oil level is not available for gear units of the size X4K..

2.25.2 Bath lubrication

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

2.25.3 Pressure lubrication

The gear unit is equipped with a motor pump. The oil level is low and possibly even reduced in comparison with the splash lubrication. The gearings and bearing positions that are not submerged in the oil bath are supplied with oil via lubrication lines.

2.26 Thermal rating/cooling

The thermal rating needs to be checked for every gear unit. The relevant values are listed in chapter "Selection tables" (→ 117).

If the thermal rating of the gear unit is insufficient, it can be operated either with a fan on the input shaft (depending on the direction of rotation) or with an oil-air cooler. 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. Please contact SEW-EURODRIVE for information on other cooling options.

2.27 Recycling, reprocessing, reuse

SEW-EURODRIVE GmbH & Co KG strives to use as few new natural resources as possible in the production of its products. An important aspect of this is the circular economy with the recycling of materials as well as the inspection and/or reprocessing of returned components and their reuse in new products. SEW-EURODRIVE GmbH & Co KG only uses these processes if the resulting materials and components are of the same quality as new parts.

3 Options and accessories

3.1 Optional input shaft ends X2K.., X3K.. and X4K..

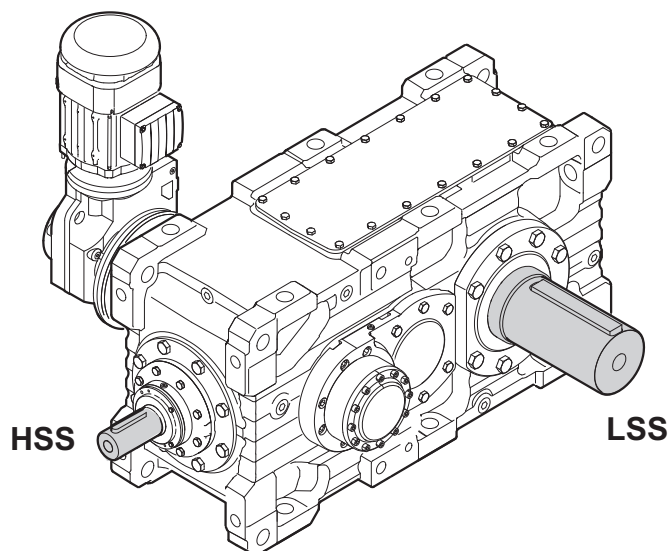
If the standard input shaft is too short because axial fans, brakes and a hydraulic coupling are used, the extended input shaft can be selected as an option.

For more information, refer to the chapter "Dimension sheet": "Optional input shaft ends X2K.. and X3K..".

3.2 Input and output shaft

There are two types of shafts:

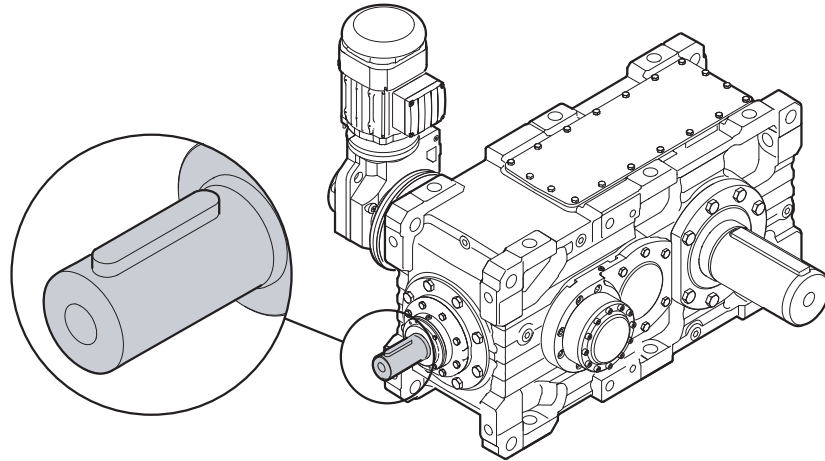
- High-speed shaft (**HSS**)
- Low-speed shaft (**LSS**)



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3.2.1 Input shaft

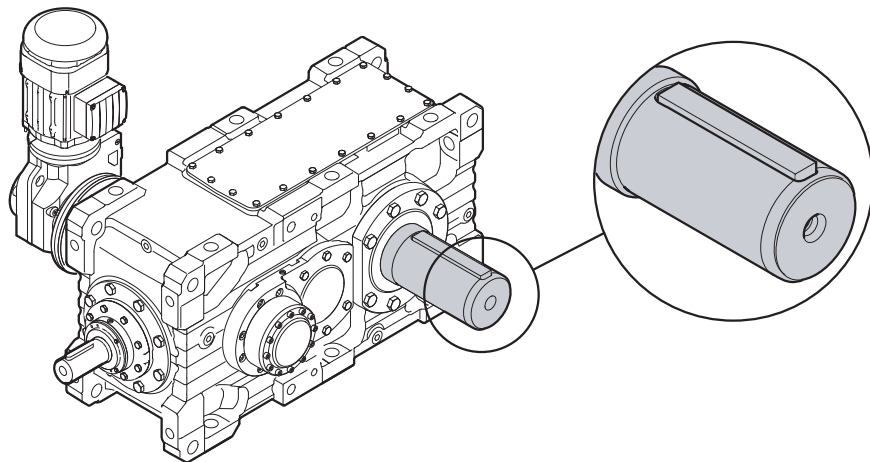
The input shaft is provided with a closed keyway according to DIN 6885/T1 and a centering bore according to DIN 332. The matching key according to DIN 6885/T1 - form A is included in the scope of delivery.



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3.2.2 Output shaft as a solid shaft with key /..S

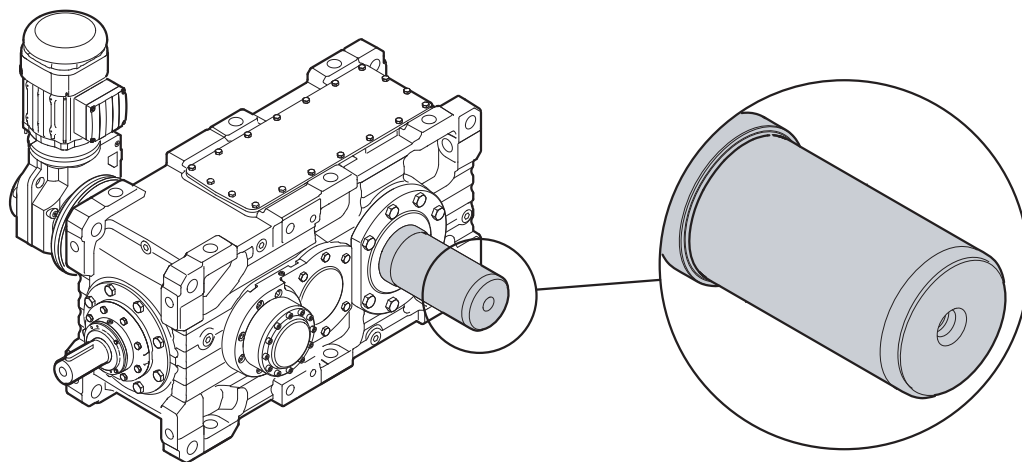
The output shaft is provided with a closed keyway according to DIN 6885/T1 and a centering bore (according to DIN 332). The delivery includes a key according to DIN 6885/T1 – form B. The shaft has an insertion area with a reduced diameter to simplify the mounting of output elements, such as a coupling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



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3.2.3 Smooth output shaft /..R

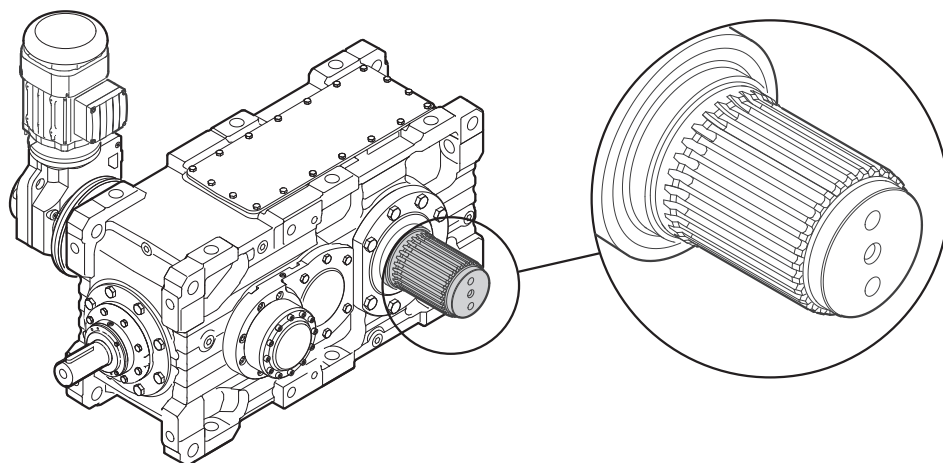
The gear units are available with a smooth output shaft to install non-positive output elements, such as flange couplings with a cylindrical interference fit. The shaft's face has a centering bore according to DIN 332. The insertion area with reduced diameter facilitates the mounting of output elements.



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3.2.4 Output shaft as a splined solid shaft/..L

The output shaft is a splined shaft according to DIN 5480. There is a centering in front of and behind the splined shaft to improve the guide of the output element. Two threads are available on the front end of the shaft for mounting an end plate.



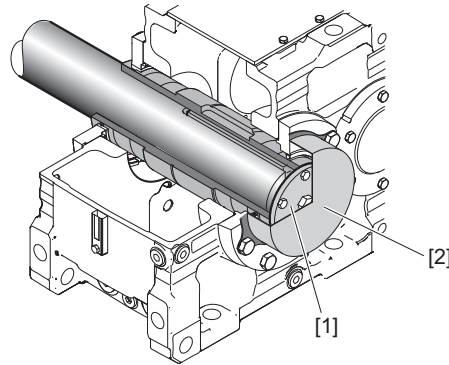
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3.2.5 Output shaft as a hollow shaft with keyway /..A

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

Included in the delivery:

- Protection cover [2]
- Retaining screws [1] or
- 2 retaining rings



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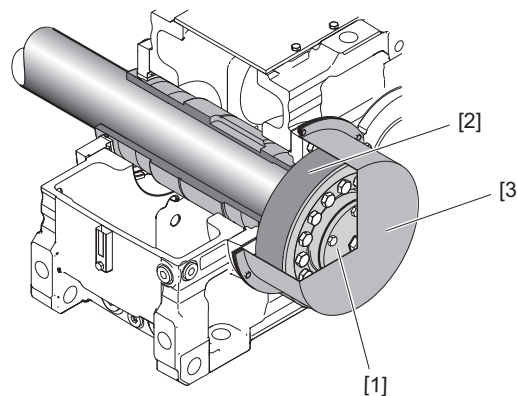
The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

3.2.6 Output shaft as a hollow shaft with shrink disk /..H

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

Included in the delivery:

- Shrink disk [2] and protection cover [3]
- Endplate with retaining screws [1] or
- 2 retaining rings



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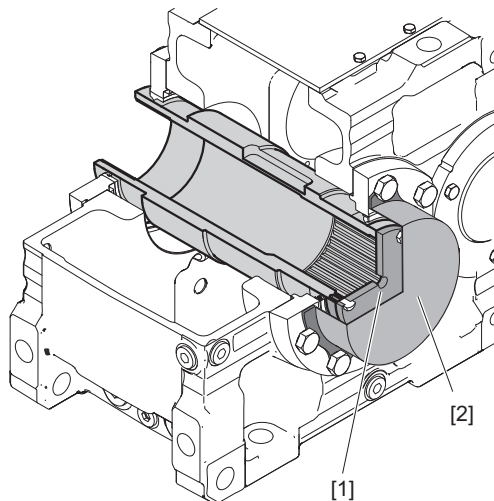
The protection cover is dust-tight. The standard sealing system is therefore normally used on the side of the safety cover.

3.2.7 Output shaft as a splined hollow shaft /..V

The output shaft is splined according to DIN 5480.

Included in the delivery:

- Protection cover [2]
- Endplate with screws [1] or
- 2 retaining rings



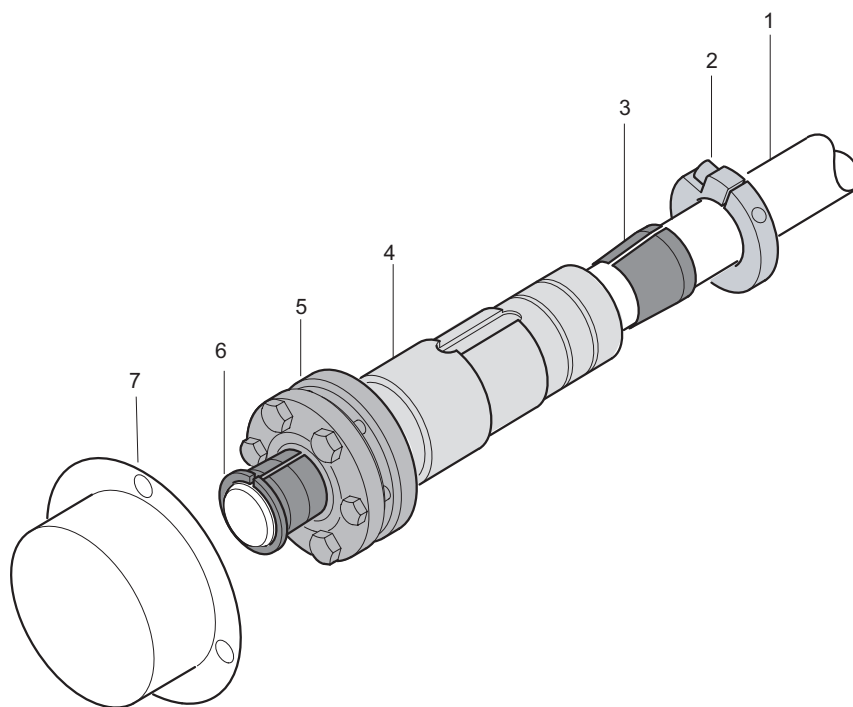
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3.2.8 TorqLOC® mounting system for gear units with hollow shaft

TorqLOC® description

The TorqLOC® hollow shaft mounting system is used for achieving a non-positive connection between the customer shaft and the hollow shaft in the gear unit. This makes the TorqLOC® hollow shaft mounting system an alternative to the previous hollow shaft with shrink disk, hollow shaft with key, and splined hollow shaft.

The TorqLOC® hollow shaft mounting system consists of the following components:



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- [1] Customer shaft
- [2] Clamping ring
- [3] Conical bronze bushing
- [4] Hollow shaft in gear unit
- [5] Shrink disk
- [6] Conical steel bushing
- [7] Fixed safety cover

Advantages of TorqLOC®

The TorqLOC® hollow shaft mounting system is characterized by the following advantages:

- Cost saving as the customer shaft can be made from drawn material up to quality h11.
- Cost saving because different customer shaft diameters can be realized with one hollow shaft diameter and different bushings.
- Simple installation as there is no need to accommodate any shaft connections.
- Simple removal even after many hours of operation as the formation of contact corrosion has been reduced and the conical connections can easily be released.

3.2.9 Gear unit mounting for hollow shaft gear units

NOTICE

Due to the rigid connection between the machine shaft and the hollow shaft of the gear unit, constraining forces can be imposed on the output shaft bearing. This damages the output shaft bearing and promotes the formation of friction corrosion in the connection between the machine shaft and the hollow shaft of the gear unit.

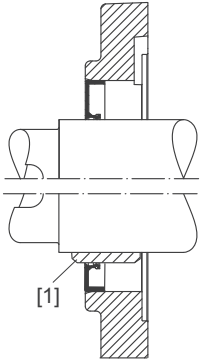
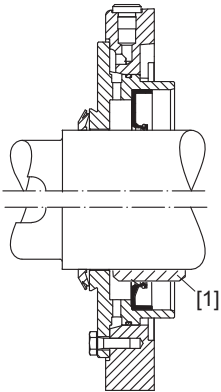
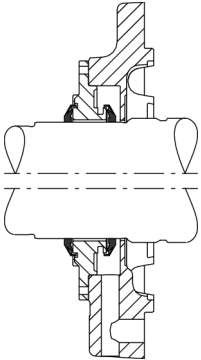
Possible damage to property.

- For machine shafts without their own bearing or with only one bearing point, the gear unit is designed with foot or flange mounting and used as a bearing point. Make sure that the bearing is very well aligned coaxially to the existing bearing point.
- If the machine shaft has at least two bearing points, the gear unit should be connected merely to the machine shaft and supported with a torque arm. To prevent overdetermination of the bearing, gear units with foot or flange mounting must be avoided.

3.3 Sealing system

3.3.1 Input shaft

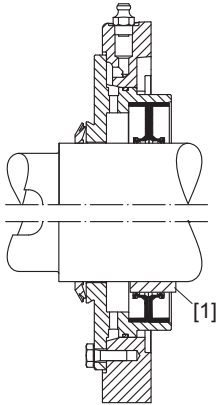
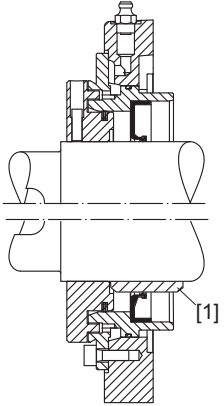
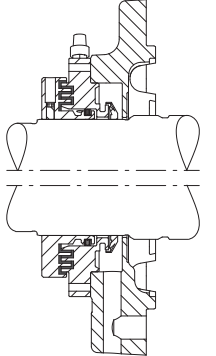
Non-regreasable seal

Designation	Property	Environment	Figure
Standard	Single oil seal with dust protection lip	Normal environment	
Designation	Property	Environment	Figure
Dust-protected	Single oil seal with dust protection cover	Medium dust load with abrasive particles	
Non-contact with dust protection*	Non-contact seal with dust protection and standstill sealing	Low dust load with abrasive particles	

[1] Optional with oil seal sleeve

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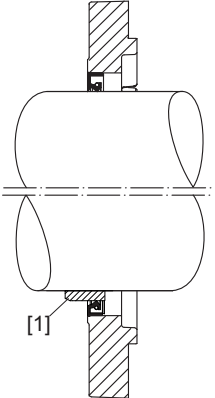
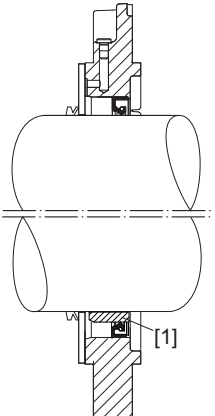
Regreasable seal

Designation	Property	Environment	Figure
Dust-protected regreasable	Double oil seal with dust protection cover	High dust load with abrasive particles	
Radial labyrinth seal (Taconite), regreasable	Single oil seal with radial labyrinth seal	Very high dust load with abrasive particles	
Non-contact with regreasable radial labyrinth seal	Contactless seal with radial labyrinth and standstill sealing	Medium to very high dust load with abrasive particles	

[1] Optional with oil seal sleeve

3.3.2 Output shaft

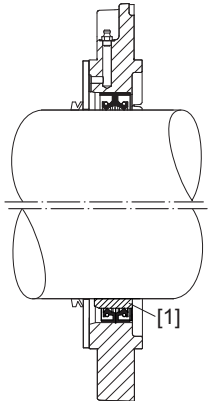
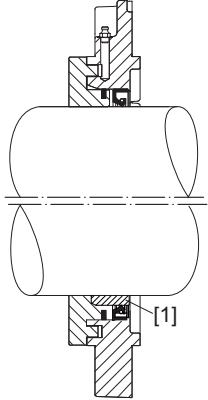
Non-regreasable seal

Designation	Property	Environment	Figure
Standard	Single oil seal with dust protection lip	Normal environment	
Dust-protected	Single oil seal with dust protection cover	Medium dust load with abrasive particles	

[1] Optional with oil seal sleeve

27796361/EN – 04/2024

Regreasable seal

Designation	Property	Environment	Figure
Dust-protected regreasable	Double oil seal with dust protection cover	High dust load with abrasive particles	
Radial labyrinth seal (Taconite), regreasable	Single oil seal with radial labyrinth seal	Very high dust load with abrasive particles	

[1] Optional with oil seal sleeve

3.3.3 Position of lubrication points

INFORMATION



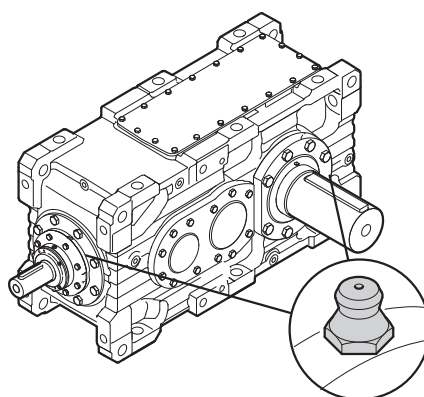
For further information on the lubrication points, refer to the dimension sheet.

Universal housing /HU, horizontal housing /HH, thermal housing /HT

Grease nipple on gear unit cover

Regreasable sealing systems are usually equipped with taper greasing nipples according to DIN 71412 A R1/8. Relubrication must be carried out at regular intervals. The lubrication points are near the input and/or output shaft.

Example



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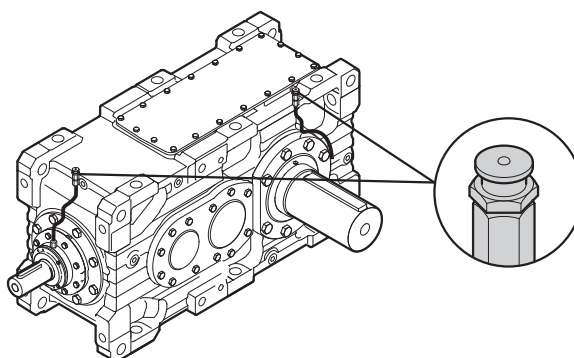
Grease nipple on the top side of the gear unit

When installed in a restricted space, the lubrication points can be relocated to the top side of the gear unit. Flat greasing nipples according to DIN 3404 A G1/8 are used. Relubrication must be carried out at regular intervals.

Note the following points:

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

Example



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3.4 Backstop /BS

INFORMATION



For information on the exact position, direction of rotation dependencies, and dimensions of the backstop, see chapter "Backstop X.F.. /BS [mm]".

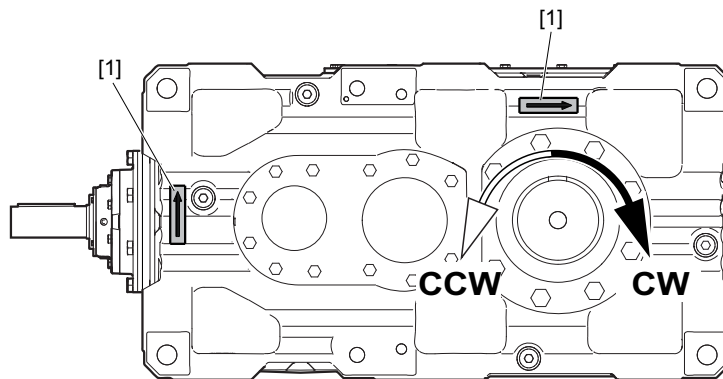
3.4.1 Use

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

3.4.2 Description

The backstop operates with 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.

3.4.3 Direction of rotation



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Backstops are installed at SEW-EURODRIVE plants according to the order. This means that the direction of rotation for the output shaft must be specified. The customer must check whether the connected electric motor rotates in the correct direction of rotation. If not, the electric motor may damage the backstop.

The direction of rotation is determined as viewed onto the output shaft (LSS):

- CW = clockwise rotation
- CCW = counterclockwise rotation

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

3.4.4 Dimensioning

The backstop design complies with the following basic rules:

- Speed of the gear unit input shaft: 0 – 1800 min⁻¹
- Maximum permitted torque of the backstop in relation to the output shaft: At least 2.8 times the nominal gear unit torque.

In case of deviating requirements, contact SEW-EURODRIVE.



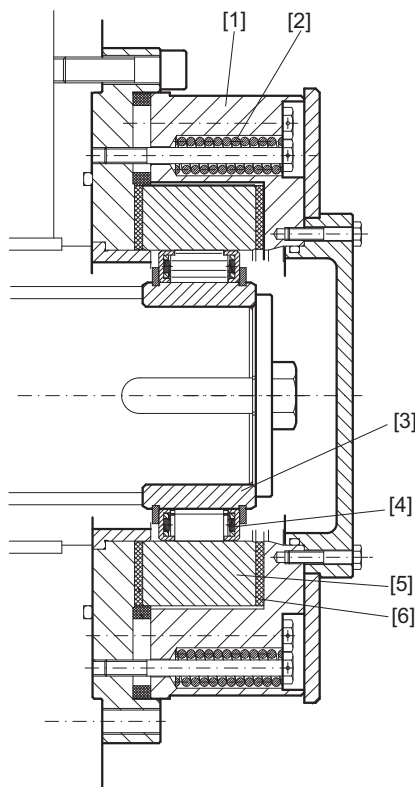
INFORMATION

For information on torque-limited backstops, e.g. for dual drives, please contact SEW-EURODRIVE.

3.5 Torque limiting backstop /BSL

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.



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

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

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

INFORMATION



The slip torque is set at the factory. Changing the slip torque is not permitted.

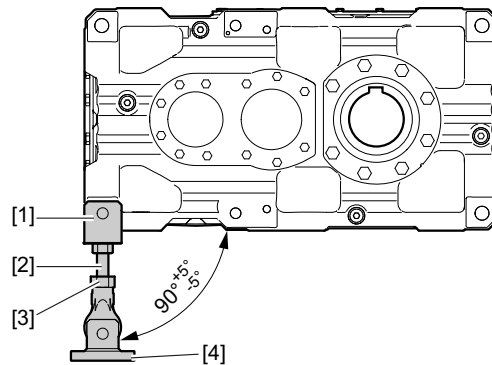
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3.6 Torque arm /T

A torque arm is available as option for shaft-mounted gear units to support the reaction torque. 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 yoke with bolt [1], a threaded bolt [2], a maintenance-free joint head [3], and a yoke plate with bolt [4]. The design with the joint head allows for compensating assembly tolerances and operational displacements. Constraining forces on the output shaft are avoided in this way.



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- [1] Yoke head with bolt
- [2] Stud bolt with nuts
- [3] Joint head
- [4] Yoke plate with bolt

3.7 Drive packages on a steel construction

For gear units in a horizontal mounting position, complete preassembled drive packages on a steel frame (swing base or base frame) are available from SEW-EURODRIVE.

The dimensions of the swing base and the base frame are determined by SEW-EURODRIVE specifically for each order.

For further information, refer to the "Drive packages on steel substructures" catalog.

3.7.1 Swing base /SB

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

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

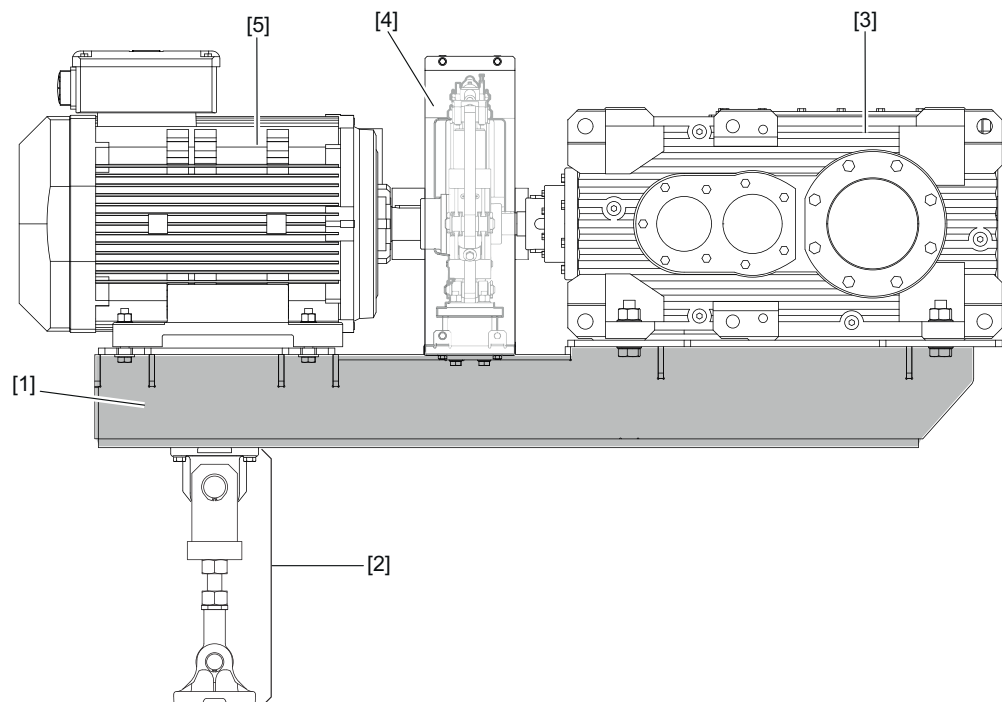
The steel frame [1] is supported by a torque arm [2].

INFORMATION



The system frame must be sufficiently dimensioned to absorb the torque.

The following figure shows an example of a gear unit with swing base.



- [1] Swing base
[2] torque arm (optional)
[3] Bevel-helical gear unit

- [4] Coupling with protection cover
[5] Motor

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3.7.2 Base frame /BF

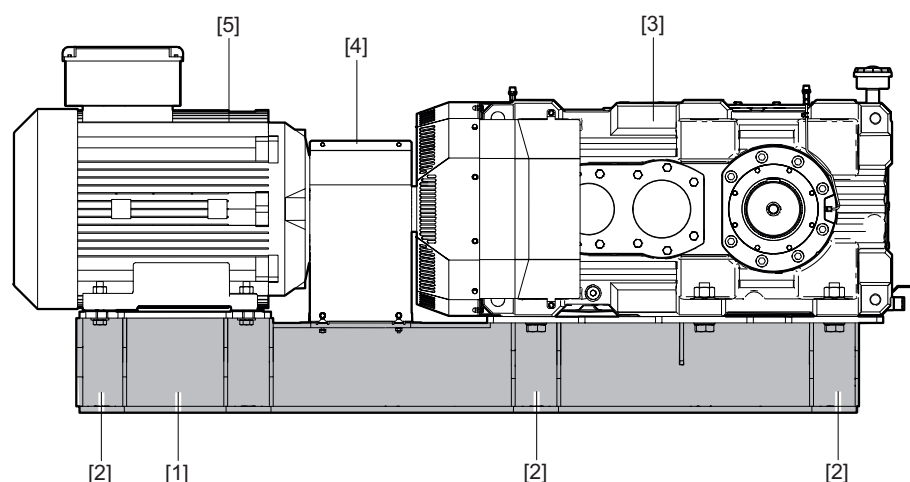
A base frame is a steel frame [1] that accommodates the gear unit, coupling and motor (and brake, if required), including a protection device, such as a cover. The steel frame is supported by several foot mountings [2]. Such a frame is usually used for solid shaft gear units with elastic coupling on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

INFORMATION



It is important that the support structure of the foot mounting is adequately dimensioned and rigid.

The following figure shows an example of a gear unit with base frame and coupling.



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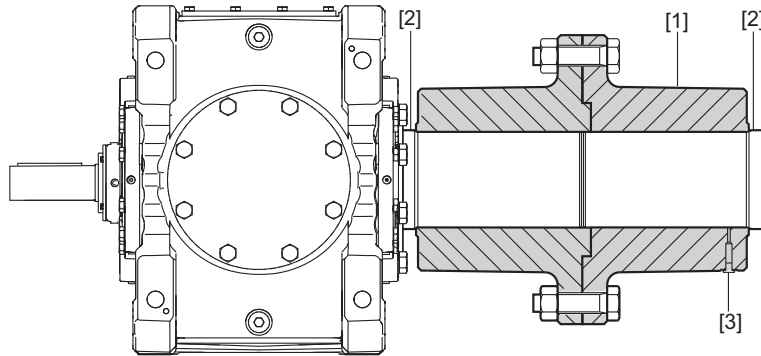
- [1] Base frame
- [2] Foot mounting
- [3] Bevel-helical gear unit
- [4] Coupling with protection cover
- [5] Motor

3.8 Flange coupling with cylindrical interference fit /FC-S

Flange coupling [1] is a rigid coupling for connecting 2 shafts [2].

It is suitable for operation in both directions of rotation, but cannot compensate any shaft misalignments. Torque between the shaft and the coupling is transmitted via a cylindrical shrink fit. Both coupling halves are mounted together at their flanges. The couplings are equipped with several disassembly bores [3] for removing the interference fit hydraulically.

The dimensions and dimensioning of the machine shaft are available upon request from SEW-EURODRIVE.



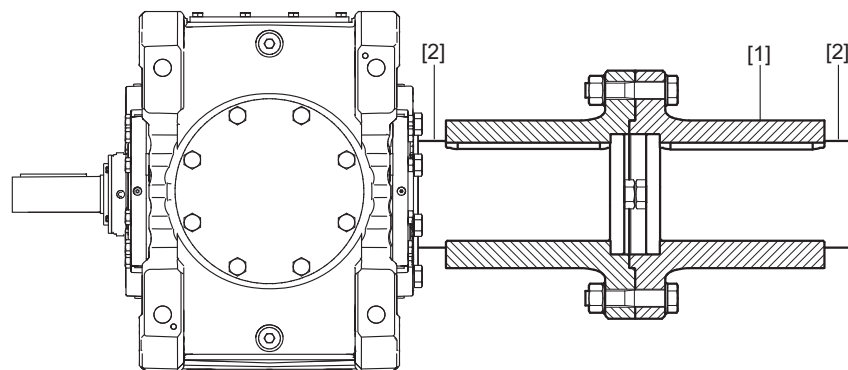
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3.9 Flange coupling with keyway /FC-K

Flange coupling [1] is a rigid coupling for connecting 2 shafts [2].

It is suitable for operation in both directions of rotation, but cannot compensate any shaft misalignments. Torque between the shaft and the coupling is transmitted via a keyed connection. Both coupling halves are mounted together at their flanges.

The dimensions and dimensioning of the machine shaft are available upon request from SEW-EURODRIVE.



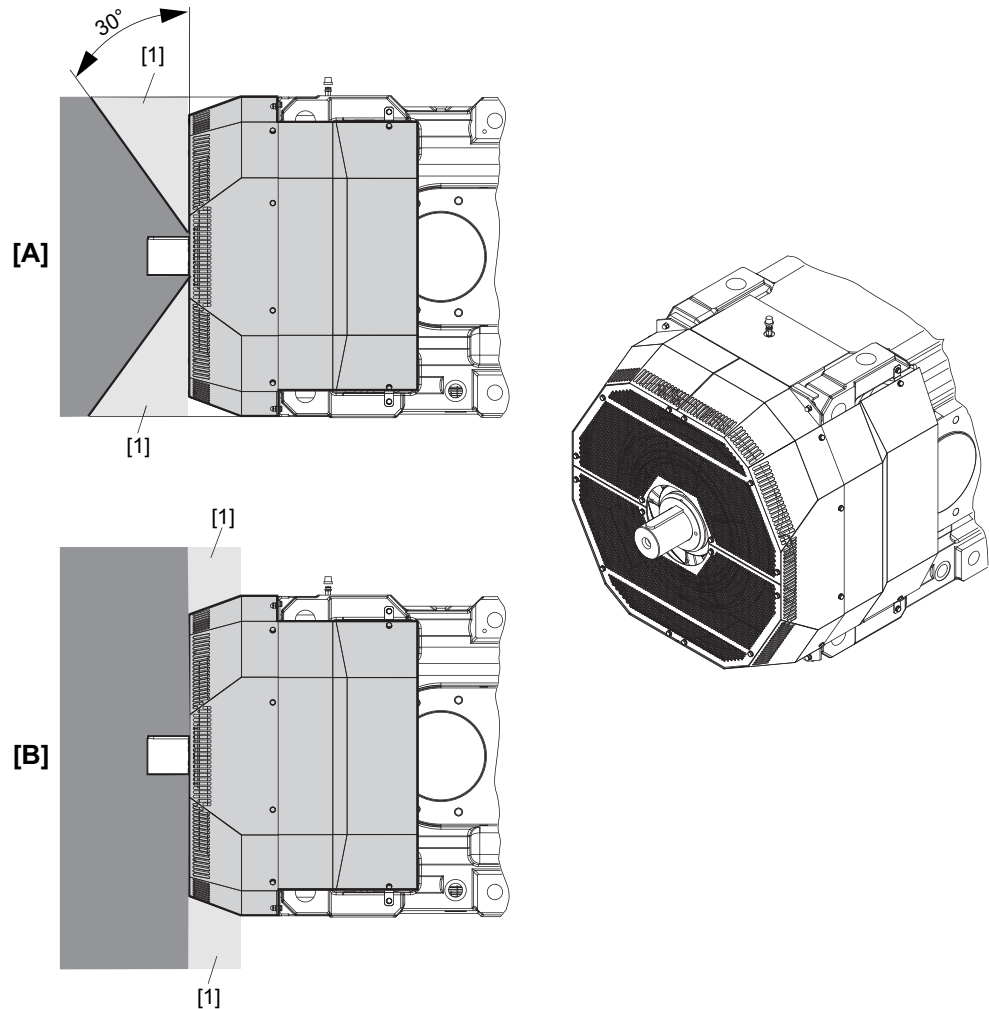
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3.10 Fan /FAN

Fans with optimized noise and flow engineering geometry are used. A fan may be retrofitted to raise the thermal rating or when the ambient conditions change after gear unit startup. The direction of rotation of the gear unit does not influence the operation of the fan.

SEW-EURODRIVE offers the following fan variants:

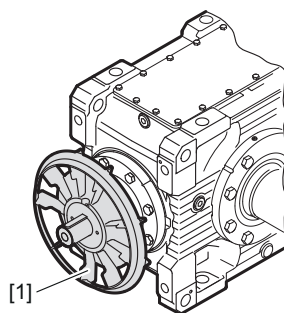
3.10.1 X.K..



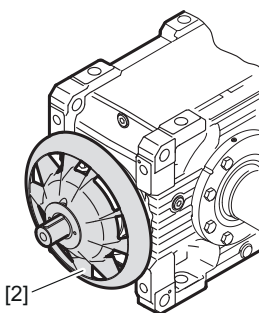
- [A] Radial fan and axial fan
- [B] Diagonal fan
- [1] Air intake clearance

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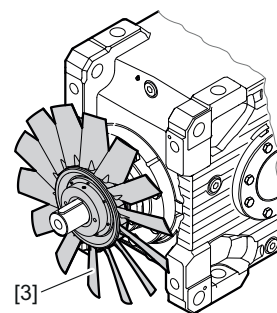
X.K.. fan designs



[1] Radial fan



[2] Diagonal fan



[3] Axial fan

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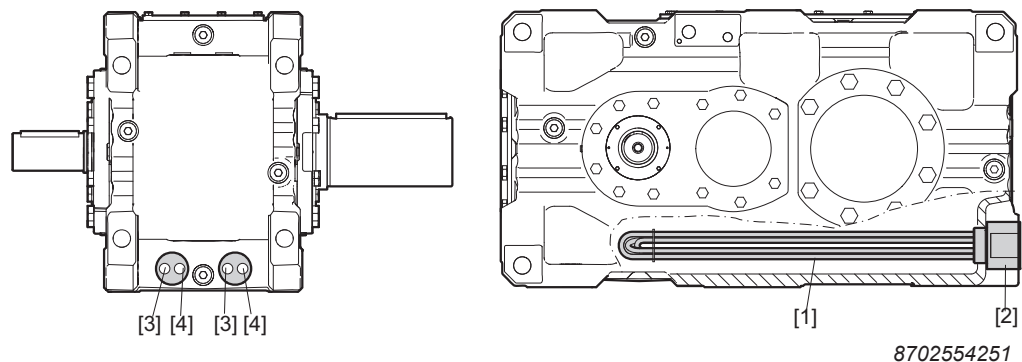
3.11 Built-in cooling, water cooling cartridge /CCT

The water cooling cartridge is mounted in the oil sump of the gear unit and is supplied with cooling water through a water connection that is provided by the user. It is available for sizes X100 to 320. For the connection dimensions, refer to chapter "Water cooling cover, water cooling cartridge and oil heater [mm]".

The amount of heat that can be dissipated depends on the intake temperature and the flow rate of the cooling medium that flows through the unit. For the permitted thermal rating, refer to chapter "Selection tables".

3.11.1 Structure

The following figure shows an example of a gear unit with water cooling cartridge.



- | | |
|----------------------|------------|
| [1] Cooling pipes | [3] Supply |
| [2] Connection piece | [4] Return |

The water cooling cartridge consists of 3 main parts:

- Cooling pipes (CuNi alloy)
- Tube plate (brass)
- Connection piece (brass; gray cast iron; steel)

2 bores are available to connect to the cooling circuit:

- Pipe thread G1/4" for sizes X100 – 170
- Pipe thread G1/2" for sizes X180 – 280

The piping is not included in the scope of delivery.

The gear unit with water cooling cartridge is delivered completely assembled.

The water cooling cartridges can be retrofitted to a certain extent. Contact SEW-EURODRIVE.

INFORMATION



- For gear unit sizes 140, 160, 180, 200, 220, 240, 260, the water cooling cartridge option comprises two cartridges as standard; for sizes 100, 110, 120, 130, 150, 170, 190, 210, 230, 250, 270, 280, it comprises one cartridge.
- The possible use as well as the maximum number of water cooling cartridges depends, among others, on gear unit size, mounting position, end gear position, lubrication type. Depending on the mounting position and mounting surface, there may be limitations of the possible combinations of accessory options. Contact SEW-EURODRIVE.

3.11.2 Notes on connection and operation

To achieve the thermal rating specified in the selection tables "", different cooling water flow rates are necessary depending on gear unit size, mounting position, and lubrication type. By way of example, the following table lists the approximate values for the volume flow required for the mounting position M5 (water inflow temperature 15 °C).

INFORMATION

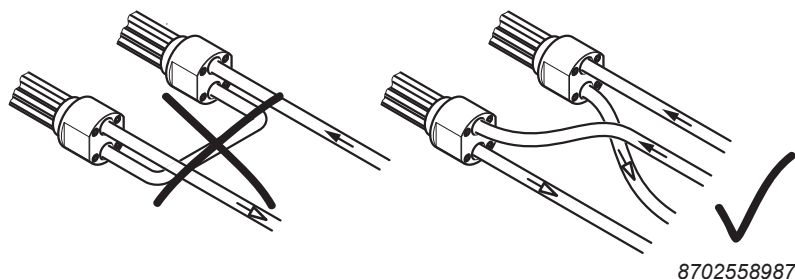


Contact SEW-EURODRIVE when using another cooling water flow rate, another cooling water temperature, special cooling media (the cooling capacity of the water cooling cartridge changes), aggressive cooling media, such as brackish water or salt water.

Size	Cooling water flow rate in l/min per cooling cartridge	Max. cooling water flow rate l/min
X140 – 150	8	15
X160 – 170	10	
X180 – 190	13	
X200 – 210	15	28
X220 – 230	19	
X240 – 250	21	
X260 – 270	16	25
X280	18	

The cooling circuit must be connected in parallel for gear units with 2 water cooling cartridges.

The table lists the cooling water volume flow for one water cooling cartridge. Twice the cooling water flow rate is required when using 2 water cooling cartridges.



3.11.3 Requirements on the water quality



INFORMATION

Contact SEW-EURODRIVE if fully desalinated or demineralized water is used as cooling medium.

The following requirements on the water quality are recommendations. In exceptional cases, certain concentrations of substances of content might cause unforeseen reactions.

The quality of the water as well as its substances are important factors for assessing the cooling water available for water cooling cartridges. The water quality is determined by the water hardness and the pH value of the water.

Water hardness

Water hardness is defined by the amount of hardeners (carbonates and bicarbonates) in the water. Particularly at higher temperatures, the hardeners accumulate to the surface of the water cooling cartridge and lead to a reduction in performance. In case of very hard water, these deposits must be taken into account when designing the water cooling cartridge.

The following table shows the classification of German degrees of hardness to water quality °dH:

Degree of hardness ¹⁾	Water quality
0 – 5 °dH	Very soft water
5 – 10 °dH	Soft water
10 – 20 °dH	Medium hard water
20 – 30 °dH	Hard water
> 30 °dH	Very hard water

1) 10 mg/l of hardener corresponds to 1 °dH

pH value

The water cooling cartridge partially consists of a copper and nickel alloy, to which the following applies:

- Corrosion issues when **pH value is < 6**
- The following applies to alkaline water:
→ Corrosion problems when **water hardness is < 6°dH**.

Lower values can lead to corrosion due to free carbon dioxide.

The following table describes the classification of the water quality based on the pH value:

pH value	Water quality
4.5	Strongly acidic
4.5 – 6.0	Acidic
6.0 – 6.8	Slightly acidic
7.0	Neutral
7.2 – 7.7	Slightly alkaline
7.7 – 8.2	Alkaline
8.2	Strongly alkaline

Cooling water assessment based on water substances

The following table provides an overview of the resistance of copper-nickel pipes to water content in non-drinking water.

Evaluation criterion	Approximate concentration mg/l	Evaluation CuNi10Fe1Mn
pH value	< 6	0
	6 to 9	+
	> 9	0
Chloride	to 1000	+
	> 1000	+ (< 25000 mg/l)
Sulfate	Up to 70	+
	70 to 300	+
	> 300	+ (< 25000 mg/l)
Nitrate	Up to 100	+
	> 100	0
Free (aggressive) carbon dioxide	Up to 20	+
	20 to 50	0
	> 50	–
Oxygen	Up to 2	+
	> 2	+
Ammonium	Up to 2	+
	2 to 20	+
	> 20	–
Iron (dissolved)	Up to 10	0
	> 10	–
Manganese (dissolved)	Up to 1	0
	> 1	–
Free chlorine	Up to 5	Permanently < 0.5 mg/l
	> 5	Intermittently < 3.0 mg/l
Sulfide		0
Ammonia		+ (< 15 mg/l)

+ = Usually good resistance

0 = Corrosion problems can occur, particularly if multiple factors are valued at 0

– = Use is not recommended

Types of cooling water/characteristics

As standard, water cooling cartridges are made of copper nickel pipes. Observe the following special features.

Industrial water

Industrial water is usually untreated water (not drinking water), which is often strongly contaminated. A water analysis is required to assess the use.

For industrial water, water cooling cartridges made of copper, brass and steel have a good resistance. Contact SEW-EURODRIVE.

Stream water and river water

Stream and river water is usually untreated water (not drinking water), which is often strongly contaminated. A water analysis is required to assess the use.

For stream and river water, water cooling cartridges made of stainless steel and titanium have a good resistance. Contact SEW-EURODRIVE.

Cast iron parts must be protected against corrosion by a suitable coating.

3.12 Oil heater /OH

An oil heater is required to ensure lubrication during a cold gear unit startup when the ambient temperature is low.

INFORMATION



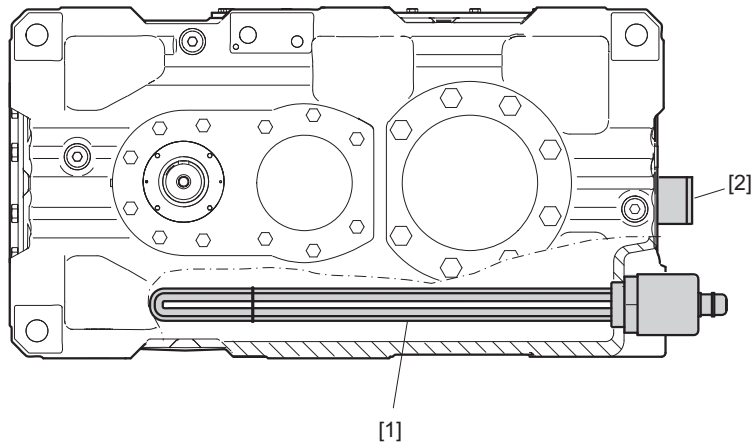
Note the oil viscosity outside of the gear unit (e.g. in the oil pipes) when performing a cold gear unit startup.

The heater is screwed into the gear unit housing at the factory and is controlled by a thermostat. The set trip temperature on the thermostat under the oil is set at the factory depending on the lubricant used.

3.12.1 Structure

The oil heater consists of 2 basic parts:

1. Heating element in the oil sump (oil heater) with terminal box
2. Thermostat with integrated temperature sensor



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[1] Oil heater

[2] Thermostat with integrated temperature sensor

INFORMATION



- It is essential that the heating elements are fully immersed in the oil sump to prevent any damage.
- The position of the thermostat varies depending on the design and mounting position of the gear unit.
- The possible use as well as the maximum number of heating elements depends among others on the size, mounting position, end gear position, and lubrication type. Not all combinations of accessory options might be possible depending on the mounting position and mounting surface. Contact SEW-EURODRIVE.
- **1 heating element** is used with the following sizes as standard: 110, 130, 150, 170, 190, 210, 230, 250, 270, 280. **2 heating elements** are used with the following sizes as standard: 100, 120, 140, 160, 180, 200, 220, 240, 260.
- To keep the gear unit startup temperature, the thermostat can be energized continuously. The heating process can take several hours.
- For dimensions of the heating elements, refer to chapter "Water cooling cartridge / CCT and oil heater /OH in [mm]" (→ 198).

3.12.2 Information on the function of the oil heater

- The trip point of the oil heater thermostat is factory-set to a temperature of about 5 K above the respective "initial temperature for gear unit startup", see chapter "Limit temperature for gear unit startup" (→ 82).

At this temperature, the thermostat disables the oil heater, see chapter "Limit temperature for gear unit startup" (→ 82). The gear unit may not be started up until then. The thermostat activates the oil heater again once the temperature is about 5 K below the switching point.

- In order to prevent the oil from burning, the heating elements of the heater have a maximum surface load. This is why the heating process for cold gear unit oil can take between one and several hours. The exact duration of the heating process before the start varies depending on the gear unit size, design, mounting position, oil quantity, and ambient temperature.
- Thermostat and oil heater are installed in the gear unit and are ready for operation. Prior to startup, wire them properly and connect them to the current supply.
- Contact SEW-EURODRIVE if a differing oil viscosity class is used or if ambient temperatures fall below the specified limit temperature.

3.12.3 Connection power

The table shows the power of the installable heating elements.

Size	P _{inst}		P _{inst}	
	1 heating element		2 heating elements	
	kW	K/h	kW	K/h
X100	1 × 0.4	6	2 × 0.4	11
X110	1 × 0.6	6	-	-
X120	1 × 0.7	6	2 × 0.7	11
X130	1 × 0.7	5	-	-
X140	1 × 0.8	5	2 × 0.8	10
X150	1 × 0.9	5	-	-
X160	1 × 1.1	4	2 × 1.1	8
X170	1 × 1.1	4	-	-
X180	1 × 1.6	5	2 × 1.6	10
X190	1 × 1.6	5	-	-
X200	1 × 1.8	4	2 × 1.8	8
X210	1 × 1.8	4	-	-
X220	1 × 2.2	4	2 × 2.2	8
X230	1 × 2.2	4	-	-
X240	1 × 2.2	3	2 × 2.2	6
X250	1 × 2.6	3	-	-
X260	1 × 3.8	4	2 × 3.8	8
X270	1 × 3.8	4	-	-
X280	1 × 4.2	4	-	-

K/h = Heating capacity in Kelvin/hour

P_{inst} = Power of the installed heater

3.12.4 Limit temperature for gear unit startup

The minimum permitted ambient temperature/oil temperature for gear unit startup depends on the viscosity of the oil used and the lubrication type of the gear unit.

Before startup, the oil may have to be heated to the specified "starting temperature" by an oil heater. Observe the lubricant table in chapter "Permitted lubricants" (→ 38).

3.13 Breather /BPG

The breather serves to prevent non-permitted pressure generated by heating or cooling during operation.

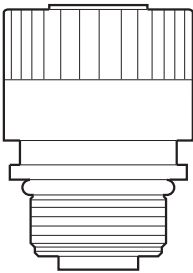
INFORMATION



Refer to the dimension sheet and the order documents for further information on the breather.

The following breathers can be used.

3.13.1 Standard

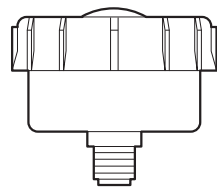


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Structure

Features	
Housing material	Polyamide
Filter inserts	Polyester filter, not exchangeable
Filter size	2 µm
Threads	3/4" or 1"

3.13.2 Breather with filter insert /PI



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The breather has the following characteristics:

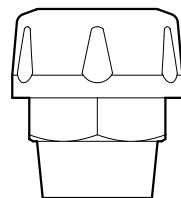
- Corrosion-resistant
- Robust filter housing
- High dirt-absorbing capacity

Structure

The breather has a corrosion-proof housing with an air intake opening at the top. The cover with protection lip keeps splashing water off.

Features	
Housing material	Polyamide
Filter inserts	Wire mesh, galvanized
Filter size	10 µm
Threads	3/4" or 1"

3.13.3 Breather made of steel

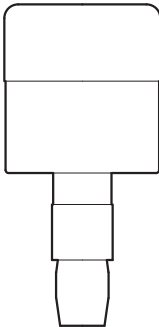


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Structure

Characteristics	
Housing material	Steel
Filter inserts	Wire mesh
Threads	3/4" or 1"

3.13.4 Desiccant breather filter /DC



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The breather has the following characteristics:

- Absorbs water moisture and humidity
- Reduces oil mist

Structure

Features	
Housing material	Polycarbonate
Filter inserts	• Polyester filter: Removes air particles > 3 µm • Silica gel: Absorbs water and humidity. Saturation is indicated by the color changing from blue to pink. • Foam pad: Absorbs oil mist
Thread	3/8" or 1"

3.14 Accessories

The following section describes the accessories for the several lubrication types.

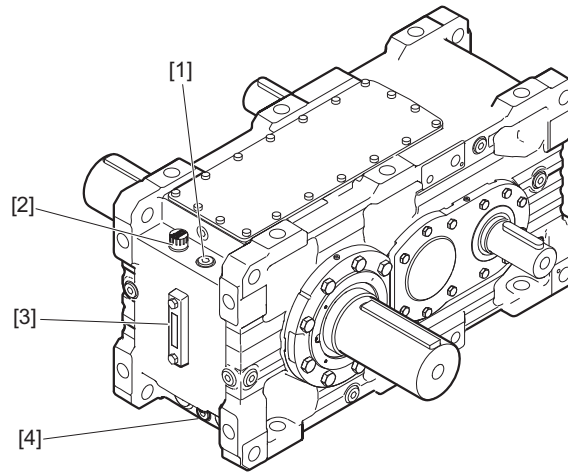
INFORMATION



The position of the accessories may vary depending on gear unit design and gear unit size. For dimensions of oil dipstick, oil drain valve, and oil level glass, refer to chapter "Oil drain valve ODV / oil level glass OLG / oil dipstick OD [mm]".

3.14.1 General accessories

The following figure shows the general accessories.



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- | | |
|-----------------------------|---------------------|
| [1] Oil dipstick (optional) | [3] Oil level glass |
| [2] Gear unit venting | [4] Oil drain |

Visual oil level check

The following types are available as standard for gear units in **M1** mounting position with splash lubrication:

- Oil dipstick for gear unit sizes X100 to 170
- Oil level glass for sizes X180 to 280

For other mounting positions and lubrication types, the gear unit is equipped with an oil dipstick as standard.

Gear unit venting

The purpose of gear unit venting is to prevent that non-permitted pressure occurs from heating during operation. The gear units are equipped with a high-quality breather filter as standard.

Oil drain

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

4 Condition monitoring

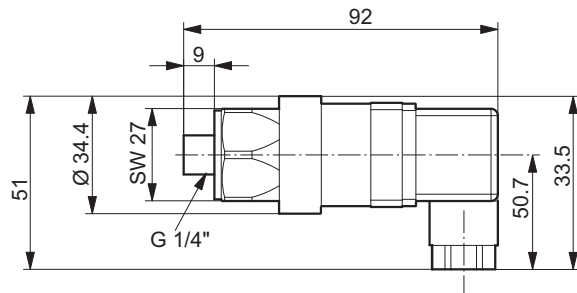
4.1 Pressure switch /PS

All gear units with pressure lubrication are equipped with a pressure switch for function monitoring.

The pressure switch is to be connected and integrated into the system in such a way that the gear unit can only be operated when the oil pump is building up pressure. A short-term compensation (max 20 s) during startup is permitted.

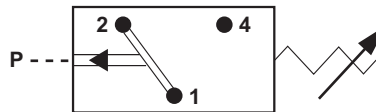
The electrical connection as well as evaluation of the switching signal are to be implemented by the customer.

4.1.1 Dimensions



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4.1.2 Electrical connection



722003723

- [1] [2] NC contact
[1] [4] NO contact

4.1.3 Technical data

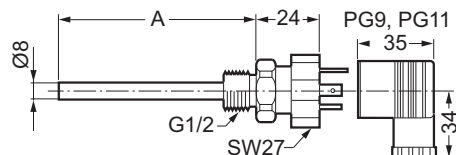
- Switching pressure: 0.5 ± 0.2 bar
- Maximum switching capacity: 4 A – AC 250 V; 4 A – DC 24 V
- Plug connector: DIN EN 175301-803
- The tightening torque for the retaining screw on the back of the plug connector for electrical connection is 0.25 Nm.

4.2 Temperature sensor /PT100

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

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

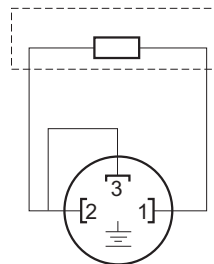
4.2.1 Dimensions



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A in mm
50
150

4.2.2 Electrical connection



9007199613899531

[1] [2] Resistor element connection

4.2.3 Technical data

- Design with thermowell and changeable measuring insert
- Sensor tolerance $K \pm (0.3 + 0.005 \times T)$, (corresponds to DIN IEC 751 class B)
T = Oil temperature in °C
- Plug connector: DIN EN 175301-803 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

4.3 Temperature switch /NTB

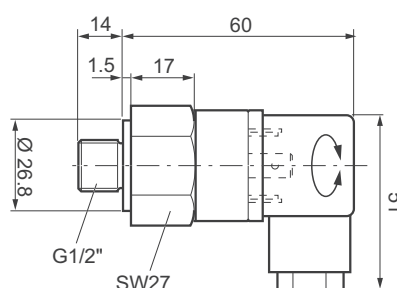
A temperature switch with preset switching temperatures of 70, 80, 90, or 100 °C is available for monitoring the gear unit's oil temperature.

For various functions, the temperature switch is also used as a limit value switch, e.g. for:

- tripping a pre-alarm
- tripping a main alarm for switch-off of the main motor

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

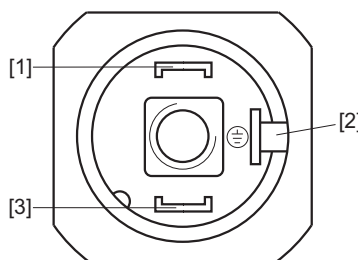
4.3.1 Dimensions



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4.3.2 Electrical connection

To guarantee a long service life and trouble-free functioning, we recommend that you use a relay in the power circuit instead of a direct connection through the temperature switch.



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- [1] [3] NC contact
[2] Grounding terminal 6.3 × 0.8

4.3.3 Technical data

- Trip temperature: 70 °C, 80 °C, 90 °C, 100 °C ± 5 °C
- Contact capacity: 10 A – AC 240 V
- Plug connector: DIN EN 175301-803 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

4.4 Temperature switch /TSK

The TSK temperature switch is used with oil supply systems for circulation cooling. It is provided with 2 fixed trip points (60 °C and 90 °C) for controlling and monitoring the system.

The temperature switch is integrated in the circuit of the oil supply system as follows:

- The cooling system is activated when the oil temperature reaches 60 °C.
- Warning signal or disconnection of the gear unit when the oil temperature exceeds 90 °C (usually a sign of malfunction in the oil supply system)

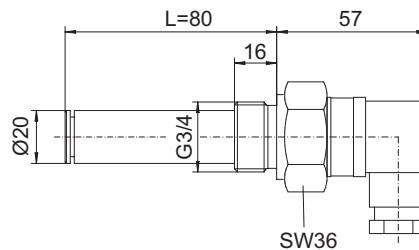
The temperature switch is located in the gear unit's oil sump. The exact position depends on the gear unit version and position of the shaft.

INFORMATION



With sizes X100 – 210, the temperature switch is only possible in combination with the universal housing.

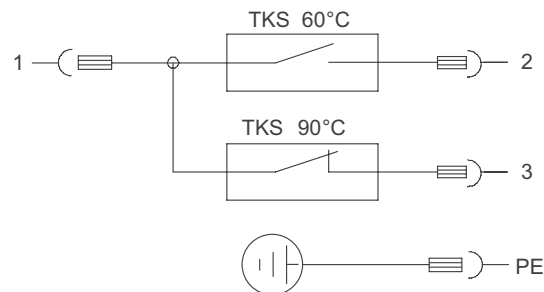
4.4.1 Dimensions



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4.4.2 Electrical connection

To guarantee a long service life and trouble-free functioning, we recommend that you use a relay in the power circuit instead of a direct connection through the temperature switch.



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[1][2] Switch 60 °C NO contact
[1][3] Switch 90 °C NC contact
PE Grounding terminal

4.4.3 Technical data

- Switching temperatures: 60 °C and 90 °C
- Contact capacity: 2 A – AC 240 V
- Plug connector: DIN EN 175301-803 PG11 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 0.25 Nm.

4.5 Diagnostic unit DUO10A (oil ageing)

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

The diagnostic unit consists of a PT100 temperature sensor and an evaluation unit. The PT100 temperature sensor installed in the gear unit measures the oil temperature present in the gear unit. The diagnostic unit uses the oil temperature values to calculate the predicted remaining service life of the oil. This calculated value is continuously displayed on the evaluation unit display. If required, the display can display the current gear unit oil temperature.

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

Oil grades:

Oil type	Designation	Limit temperature
Mineral oil CLP/ Bio oil	OIL1	100 °C
Synthetic oil CLPHC/CLPPAO	OIL2	130 °C
Polyglycol oil CLPPG	OIL3	130 °C
Food grade oil	OIL4	100 °C
Customer-specific	OIL5	Default setting = OIL1

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

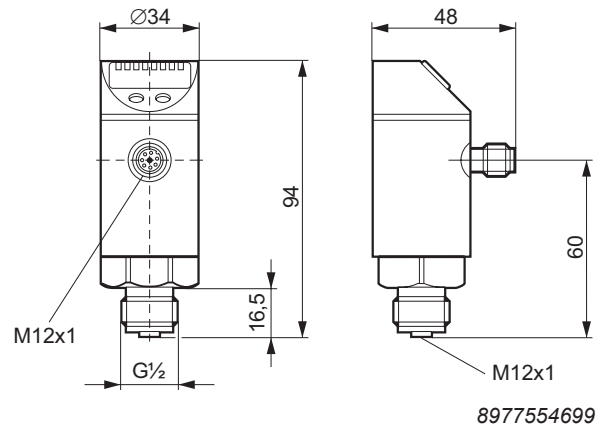
- Early warning:
Is set to a few days before expiration of the remaining service life. The number of days can be set directly on the evaluation unit.
- Main alarm:
Is set when the estimated remaining service life reaches zero.
- Limit temperature:
Shows when the permitted oil temperature has been exceeded.
- Ready for operation:
Displays errors in the wiring and recognizable faults in the evaluation unit.

INFORMATION

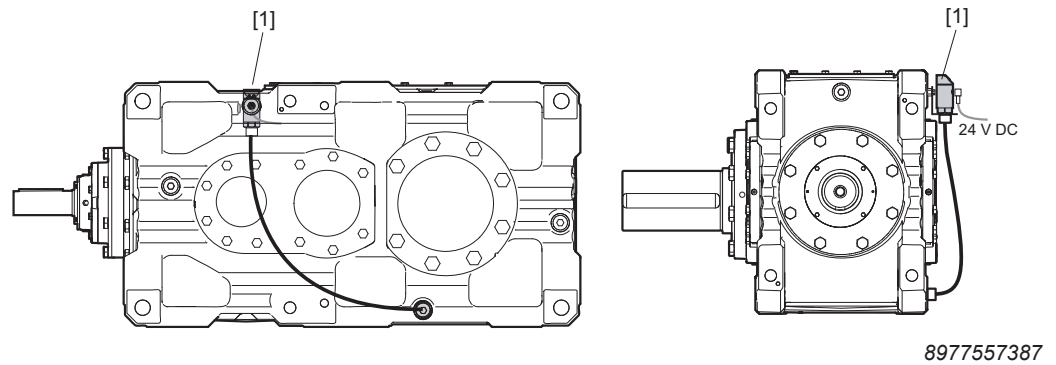


For further information on the evaluation unit and accessories, refer to the "DUO10A Diagnostic Unit" manual, part no. 11473428.

4.5.1 Dimensions



4.5.2 Mounting examples

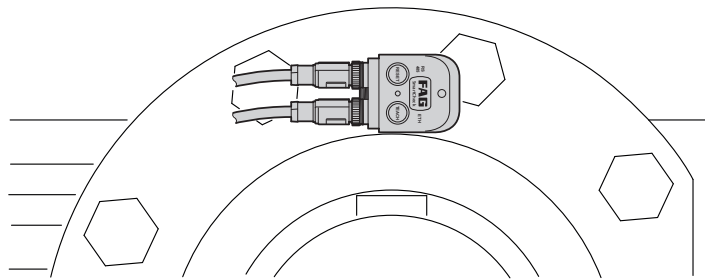


[1] DUO10A diagnostic unit

4.6 DUV40A (Diagnostic Unit Vibration)

The DUV40A vibration monitoring system is used for early detection of damage to gear units and gearmotors (e.g. bearing damage or imbalance). Permanent frequency-selective monitoring of the gearmotor is used for this purpose. Apart from the vibration analysis, additional measured values of up to 3 signal encoders can be detected, recorded and analyzed. The additional signals can be used as reference values for signal analysis e.g. to trigger time or event-controlled measuring tasks. After the analysis and depending on user-defined alarm limits, the system can switch outputs and display the state using LEDs.

DUV40A is configured using the SmartWeb software. If you use several Vibration SmartCheck systems, you can control them centrally from one PC using the SmartUtility Light software.



INFORMATION



For more information about DUV40A, refer to the "Diagnostic Unit Vibration" manual, part number: 31559018/EN.

4.6.1 Scope of delivery

- Vibration SmartCheck unit with integrated SmartWeb software
- Vibration SmartCheck and SmartWeb documentation on CD-ROM
- SmartUtility Light software with user documentation on CD-ROM

4.6.2 Technical data

DUV40A (Diagnostic Unit Vibration)	
Housing	Glass fiber reinforced plastic
Mounting	Hexagon socket head screw M6 × 45 Contact surface on the machine: 25 mm Ø
Current consumption	< 200 mA at 24 V
Ambient temperature	-20 to +70 °C
Internal operating temperature	-20 to +85 °C
Voltage supply	DC 11 – 32 V or Power over Ethernet (PoE) based on 802.3af Mode A
Size	44 mm × 57 mm × 55 mm
Weight	Approx. 210 g
Degree of protection	IP 67
Operating system	Embedded Linux
Software	SmartWeb (Mozilla Firefox ESR 38 (recommended), Internet Explorer 11, Internet Explorer 9 is not recommended for performance reasons) Vibration SmartUtility Light or optionally Vibration SmartUtility Languages: German, English, Chinese, Spanish, and French

Internal sensor technology	
Vibration	Acceleration sensor (piezoelectric sensor) Frequency range 0.8 Hz to 10 kHz Measuring range ±50 g
Temperature	Measuring range -20 to +70 °C

Measurement	
Measurement functions	Acceleration Speed and distance by integration System temperature Process parameters (e.g. speed, load, pressure)
Diagnostic procedure	Time signal, envelope, spectrum and trend analysis, rotational speed and frequency tracking

Characteristic values (time and frequency range)	
Defined characteristic values	DIN/ISO 10816
Calculated characteristic values	RMS, frequency-selective RMS, constant component, peak, peak-to-peak, crest factor, Wellhausen count, carpet level, condition guard Other user-defined characteristic values are possible.

Signal processing	
Frequency resolution	1600, 3200, 6400 or 12800 lines

4 Condition monitoring

DUV40A (Diagnostic Unit Vibration)

Signal processing	
Measurement resolution	24 bit (A/D converter)
Frequency range	0.8 Hz – 10 kHz
Low passes	50 Hz – 10 kHz (50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 5 kHz, 10 kHz)
High passes (only envelope)	750 Hz, 1 kHz, 2 kHz (other filters on request)
Memory	
Program and data	64 MB RAM, 128 MB Flash
Inputs and outputs	
Inputs	2 analog inputs (0 – 10 V / 0 – 24 V / 0 – 20 mA / 4 – 20 mA), frequency range 0 – 500 Hz, 12 Bit 1 digital input (0 – 30 V, 0.1 Hz – 1 kHz)
Outputs	1 analog output (0 – 10 V / -20 mA / 4 – 20 mA), 12 bit 1 switching output (open collector, max. 1 A, 28 V)
Interfaces	
Control elements	2 capacitive pushbuttons (learning mode, alarm reset, restart, factory settings)
Display elements	1 LED to display status and alarm 1 LED to acknowledge the pushbuttons 2 LEDs to display communication
Communication	Ethernet 100 Mb/s OPC UA (server) available with additional license
Electrical connections	3 polarity reversal-protected M12 plug connectors for supply, inputs/outputs and Ethernet

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4.6.3 Part numbers

	Description	Part number
Sensor	DUV40A (Diagnostic Unit Vibration)	19175892
Cable	Voltage supply cable 8-pin for SmartCheck 5 m; M12(B) <-> open end	19179596
Cable	Ethernet cable for SmartCheck 5 m; M12 <-> RJ45	19179618
Cable	I/O cable 8-pin for SmartCheck 5 m; M12(St) <-> open end	19179626
Cable	Power/Ethernet/I-O signals in 10 m and 20 m	

	Description	Part number
Base for mounting on standard gear units (R, F, K, and S gear units)	Mounting base with sealing ring M10 × 1	20593422
	Mounting base with sealing ring M12 × 1.5	20593430
	Mounting base with sealing ring M22 × 1.5	20593449
	Mounting base with sealing ring M33 × 2	20593457
	Mounting base with sealing ring M42 × 2	20593465

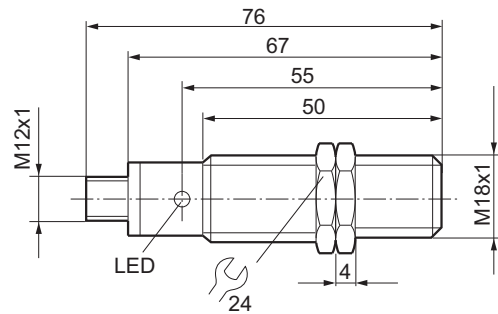
	Description	Part number
Base for mounting on industrial gear units	Mounting base with sealing ring G3/4"	20593384
	Mounting base with sealing ring G1"	20593392
	Mounting base with sealing ring G1 1/4"	20593406
	Mounting base with sealing ring G1 1/2"	20593414

	Description	Part number
Base for mounting on standard motors	Mounting base M5	21014175
	Mounting base M6	21014167
	Mounting base M8	20593503
	Mounting base M10	21014248
	Mounting base M12	20593473
	Mounting base M16	20593481
	Mounting base M20	20593511

4.7 Inductive incremental encoder

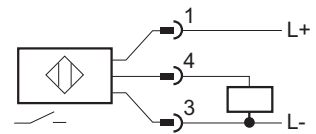
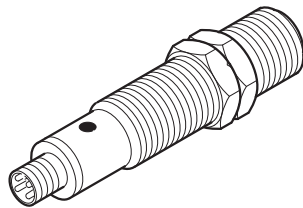
The speed of the overrunning clutch is monitored using an inductive encoder.

4.7.1 Dimensions



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4.7.2 Electrical connection



4.7.3 Technical data

- Electrical design DC PNP (N.O. contact)
- Operating voltage DC 10 – 36 V
- Maximum current carrying capacity 250 mA
- Working distance 0 – 4 mm
- Degree of protection IP67
- Connection via three-core cable with a cable cross section of 1.5 mm² and a maximum cable length of 500 m.

INFORMATION

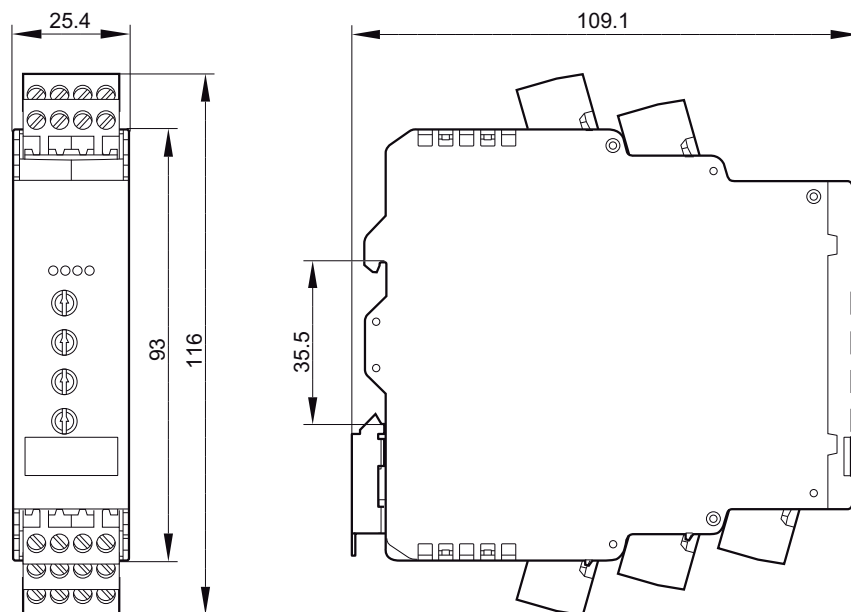


The connecting cable and the M12 plug connector are not included in the delivery.

Make sure that the signal line is installed separately (not in multi-core cables), and shield them if necessary.

4.8 Speed monitor

4.8.1 Dimensions



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4.8.2 Technical data

Speed monitor: Manufacturer ifm type D200	
Nominal voltage AC	110 – 240 V
Nominal frequency	50 – 60 Hz
Voltage tolerance	-20%/+10%
Power consumption	6 W
Nominal voltage DC (alternative)	27 V (typ. 24)
Voltage tolerance	-20%/+10%
Power consumption	4 W
Auxiliary power for sensors	18.5 – 30 V DC SELV, ≤ 100 mA
Sensor type (pulse input)	PNP (type 2 according to IEC 61131-2)
Input frequency	≤ 5000 Hz

INFORMATION



For more information on the speed monitor, refer to the manufacturer's documentation delivered with the speed monitor and to the manufacturer's web page www.ifm.com.

5 Project planning for drives

5.1 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 latest documentation from SEW-EURODRIVE. The documentation can also be downloaded in PDF format from the SEW homepage (<http://www.sew-eurodrive.de>).

5.1.1 Drive Engineering – Practical Implementation

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

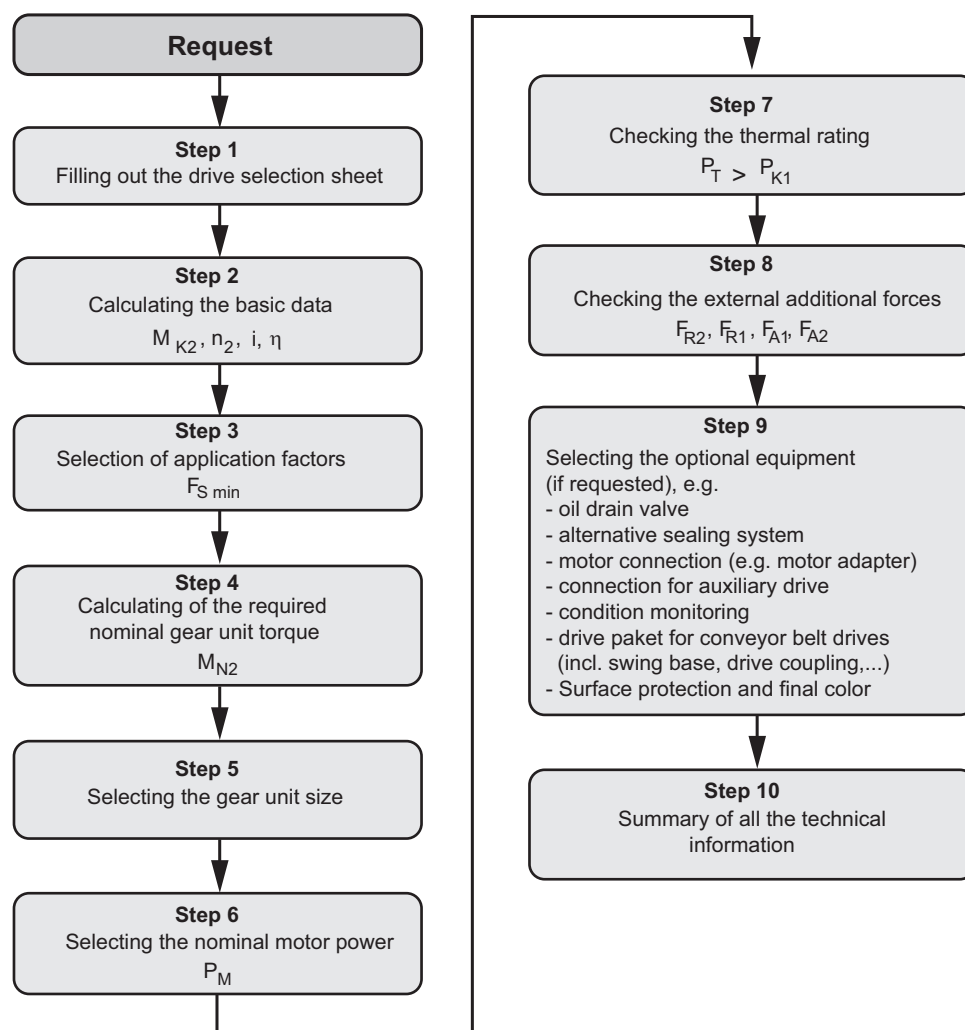
5.1.2 Explanation of the designations

The table below describes the designations.

Designation	Explanation	
α	Application angle of the radial load	°
f_1	Altitude factor (= correction factor for calculation of the thermal rating of the gear unit)	—
F_A	Axial load	kN
F_R	Overhung load	N
F_{R1}	Overhung load on HSS (Distance from the shaft shoulder must be given)	kN
F_{R2}	Overhung load on LSS (Distance from the shaft shoulder must be given)	kN
F_S	Service factor = $M_{N2}/M_{K2} = P_{N1}/P_{K1}$	—
$F_{S \min}$	Application-specific service factor	—
f_z	Transmission element factor	—
η	Efficiency	—
H	Installation altitude above sea level	m
HSS	High-speed gear shaft (usually input shaft)	—
f_1	Altitude factor	—
f_t	Thermal factor	—
f_{rev}	Reversing factor	—
i	Gear ratio	—
i_{ex}	Exact gear unit ratio	—
i_N	Nominal gear unit ratio	—
LSS	Low-speed gear shaft (usually output shaft)	—
$L_{h \min}$	Required bearing service life	h
M_{K1}	Input torque (= Operating torque on HSS)	kNm
$M_{K1 \max}$	Peak input torque (= peak operating torque at HSS)	kNm
M_{K2}	Output torque (= Operating torque on LSS)	kNm
$M_{K2 \max}$	Peak output torque (= peak operating torque at LSS)	kNm
$M_{K2 \text{ per}}$	Permitted peak output torque	kNm
M_M	Nominal motor torque	kNm
M_{N2}	Nominal gear unit torque	kNm
n_1	Input speed (HSS)	min ⁻¹
n_2	Output speed (LSS)	min ⁻¹
n_M	Motor speed	min ⁻¹
P_{K1}	Operating power on HSS	kW

5.2 Project planning procedure

The following flow diagram illustrates the procedure for the project planning of X.. series industrial gear units.



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5.2.1 Step 1: Drive selection data

1. Machine on LSS (normally a driven machine)

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

1.1 Area 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 sun protection ($v_a \geq 3$ m/s)

1.6 Ambient conditions [X]

- ☐ Normal
☐ Dusty
☐ Damp
☐ Corrosive
☐ Dry

2. Load characteristics

2.1 Required speed n_2 [1/min] [...]

normal	min.	max.

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

normal	min.	max.

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

normal	min.	max.

2.4 Frequency of load peaks ($M_{K2 \text{ max.}}$ or $P_{K1 \text{ max.}}$)

 per hour

2.5 Number of startups per hour [...]

 Startups

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

- ☐ CW rotation
☐ CCW rotation
☐ Both directions of rotation
☐ Reversible

2.7 Operating time/day [X]

- ☐ < 3 hours
☐ 3 – 10 hours
☐ > 10 hours

2.8 Backstop required [X]

- ☐ No
☐ Yes

2.9 Exact load cycle attached [X]

- ☐ No
☐ Yes

3. Machine on HSS (normally a drive machine)

3.1 Type: [X]

- ☐ AC motor ☐ AC motor/inverter ☐ DC motor
☐ Hydraulic motor ☐ Servomotor
☐ Combustion engine with 1 – 3 cylinders
☐ Combustion engine with ≥ 4 cylinders

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

normal	min.	max.

3.3 Motor speed n_M [1/min] [...]

normal	min.	max.

3.4 Nominal motor torque M_M [kNm] [...]

normal	min.	max.

3.5 Input speed n_1 [1/min] [...]

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. Gear unit requirements

4.1 Gear unit type [X]

- ☐ Helical gear unit X.F.. ☐ Bevel-helical gear unit X.K..

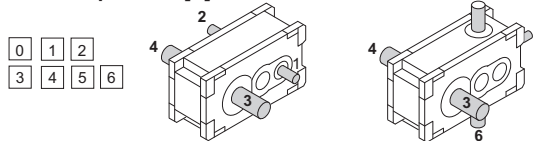
4.2 Mounting position [X]

- ☐ M1 – M6

4.3 Mounting surface [X]

- ☐ F1 – F6

4.4 Shaft position [X]



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

based on

- ☐ Nominal motor power P_M / motor torque M_M
- ☐ Operating power on LSS P_{K2}
Operating torque on LSS M_{K2}

4.6 Required bearing service life $L_{h \min}$ [...] Hours**4.7 Housing fixation [X]**

- ☐ Foot-mounted
- ☐ Flange-mounted
- ☐ Torque arm

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

- ☐ Elastic coupling (claw coupling or pin coupling)
- ☐ Flexible coupling
- ☐ Rigid flange coupling
- ☐ Drum coupling
- ☐ Chain sprocket
- ☐ Pinion

- ☐ Hollow shaft – torque arm
- ☐ Hollow shaft – foot mounting
- ☐ Hollow shaft – flange mounting
- ☐ Other

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

LSS version (if solid shaft)

- ☐ Solid shaft with keyway
- ☐ Solid shaft without keyway
- ☐ Splined solid shaft DIN 5480

Other

LSS version (if hollow shaft)

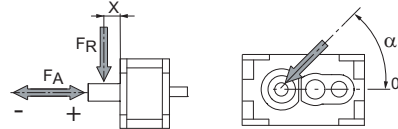
- ☐ Hollow shaft with keyway
- ☐ Hollow shaft for shrink disc connection, includes shrink disc
- ☐ Splined hollow shaft DIN 5480

Other **4.10 HSS connection to motor [X]**

- ☐ Customer installation (base frame)
- ☐ Motor adapter with elastic coupling
- ☐ Swing base/base frame
- ☐ Motor bracket with V-belt drive
- ☐ Motor scoop
- ☐ Other, see diagram

4.11 Machine shaft bearings

- ☐ 2 bearings, gear unit transfers only torque
- ☐ 1 bearing opposite gear unit, the gear unit acts as a bearing point
- ☐ 1 bearing directly at the gear unit, the gear unit acts as a bearing point

4.12 Forces acting on the output shaft LSS [X] [...]Axial force F_A [kN]

Shaft 3	Shaft 4

Radial force F_R [kN]

Shaft 3	Shaft 4

Distance from shaft shoulder X [mm]

Shaft 3	Shaft 4

Application angle of the radial force α [°]

Shaft 3	Shaft 4

or variable ☐☐**4.13 Forces acting on drive shaft HSS [X] [...]**Axial force F_A [kN]

0	1	2	3	4	5	6

Radial force F_R [kN]

0	1	2	3	4	5	6

Distance from shaft shoulder X [mm]

0	1	2	3	4	5	6

Application angle of the radial force α [°]

0	1	2	3	4	5	6

or variable ☐☐☐☐☐☐☐**4.14 Electrical supply [X] [...]**AC
3-phase 1-phase

DC

Mains supply V_{Line} ☐☐☐

V

Hz

AC
3-phase 1-phase

DC

Auxiliary voltage V_{Aux} ☐☐☐

V

Hz

Degree of protection IP Explosion protection required ☐ Yes ☐ No**4.15 Permitted cooling (if required) [X]**

Permitted Not permitted

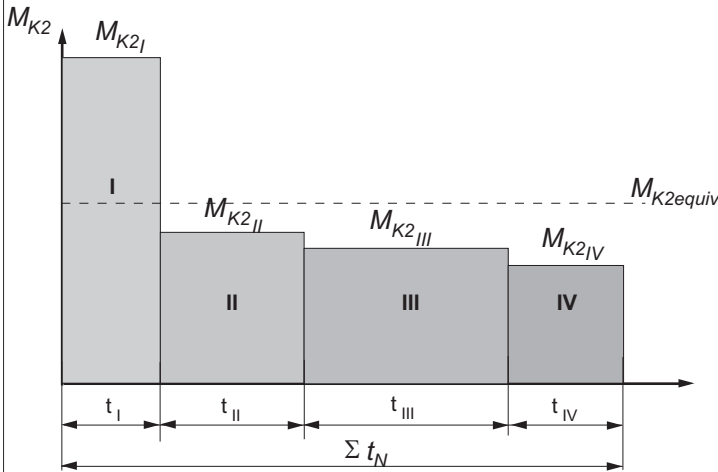
Fan ☐☐Cooling cover / cartridge ☐☐External oil-air cooler ☐☐External oil-water cooler ☐☐Cooling water available ☐ Yes ☐ No

Cooling water temperature

 °C

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5.2.2 Step 2: Calculation of basic data – M_{K2} , n_2 , i , η

Constant torque	$M_{K2} = \frac{P_{K1} \times 9550 \times \eta}{n_2} \text{ Nm}$ Note: If P_{K1} is unknown $\rightarrow P_{K1} = P_M$ M_{K2} = Operating torque on LSS in Nm P_{K1} = Operating power on HSS in kW n_2 = Output speed (LSS) in min^{-1} P_M = Nominal motor power in kW η = Efficiency
Equivalent torque with load spectrum and constant speed n_2 for bearing service life calculation	$M_{K2\text{equiv}} = \sqrt[10]{(M_{K2I})^{\frac{10}{3}} \times \frac{t_I}{\sum t_N} + (M_{K2II})^{\frac{10}{3}} \times \frac{t_{II}}{\sum t_N} + \dots (M_{K2n})^{\frac{10}{3}} \times \frac{t_n}{\sum t_N}}$ The following figure shows a load example:  M_{K2} = Operating torque on LSS in Nm t_N = Time share of the load I, II,...n = load cases Gearing, shaft and key safety factors must be checked with the greatest torque of the load collective. If single load situations exceed the nominal torque of the gear unit, contact SEW-EURODRIVE.
Gear ratio	$i = \frac{n_1}{n_2}$ n_1 = Input speed (HSS) min^{-1} n_2 = Output speed (LSS) in min^{-1}
The following efficiency levels apply to gear units – η	$\eta = f(i; \text{gear unit type})$ The efficiency of the gear units is mainly determined by the gearing and bearing friction as well as by churning losses. For the calculation, the following guide values apply for splash and pressure lubrication: - X2F.. = 0.976 - X3F.. = 0.964 - X4F.. = 0.953 - X2K.. = 0.978 - X3K.. = 0.970 - X4K.. = 0.957

5.2.3 Step 3: Selection of application factors

Application-specific service factor – $F_{S\ min}$ and peak loads

The application-specific service factor takes into account all continuously occurring dynamic torques that are applied to the gear unit from outside beyond rated operation based on the application factor according to DIN 3990/ISO 6336.

These torques depend, among others, on the characteristics of the driving and driven machine, the amount and distribution of the mass moments of inertia, the spring stiffness in the input and output trains (shafts and couplings, etc.), protective measures such as safety couplings, etc., as well as the operating conditions, and apply to gear units with uniform power requirements.

Furthermore, an additional check for peak loads is required only if this condition does not apply. This is necessary, for example, for intermittent duty, operation with extreme, repeated shock loads, etc.

In general, the gear units can be loaded with up to twice the nominal gear unit torque for a limited number of load changes.

In this specific case, we recommend contacting SEW-EURODRIVE.

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

Recommended values in relation to

- Area of application
- Type of driven machine
- Operating hours/day

are listed in the table below.

INFORMATION



These tables apply only to gear units driven by electric motors. For other types of driving motors, the following correction values apply:

- Combustion engines with 4 or more cylinders:
 - $F_{S\ min}$ (selection table) + 0.25
- Combustion engines with 1 to 3 cylinders:
 - $F_{S\ min}$ (selection table) + 0.5

INFORMATION



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

Area of application	Type of application (driven machine)	Application-specific service factor $F_{S\ min}$ Operating hours/day
		> 10 h
Conveyor systems	Bucket elevators	1.50
	Belt conveyor ≤ 100 kW	1.40
	Belt conveyor > 100 kW	1.50
	Apron feeders	1.50
	Feeding screw	1.50
	Shakers, screens	2.00
	Escalators	1.50
	Passenger elevators	¹⁾

5.2.4 Step 4: Calculating the required nominal torque – M_{N2}

Constant load direction – constant torque:

$$M_{N2} \geq M_{K2} \times F_{Smin}$$

M_{N2} = Nominal gear unit torque in kNm
 M_{K2} = Operating torque at LSS in kNm
 F_{Smin} = Application-specific service factor

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

The selection of the gear unit size is based on the nominal gear unit torque M_{N2} according to the speed/power overview tables in chapter "Selection tables".

If the input speed $n_1 < 1000 \text{ min}^{-1}$, the value for 1000 min^{-1} can be used for M_{N2} .

For input speeds $n_1 > 1800 \text{ min}^{-1}$, contact SEW-EURODRIVE.

The following table shows an excerpt from the selection tables as an example.

															P _{TH} 20°C			
															 RAD  AXIAL  AXIAL/HT			
i _N	i _{ox}	n ₂	M _{N2}	P _{N1}	n ₃	M _{K3}	Aux. Drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. Drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
20	19.09	52	7.2	41	3.6	1.88	KF37	DRN80M4 0.75 kW S1 IN=1.75 A (400V)	28.83	3.0	4.60	KF57	DRN90L4/Z 1.5 kW S1 IN=3.45 A (400V)	35.70	58	93	105	-
22.4	21.09	47	7.2	37	3.3	2.08				2.7	5.09				51	82	91	-
25	24.55	41	7.2	32	3.6	1.88				3.0	4.60				53	85	94	-
28	27.12	37	7.2	29	3.3	2.08				2.7	5.09				47	75	83	-
31.5	30.35	33	7.2	26	2.9	2.33				2.4	5.69				48	77	85	-
35.5	34.35	29	7.2	23	3.3	2.08				2.7	5.09				42	67	74	-
40	38.45	26	7.2	20	2.9	2.33				2.4	5.69				43	68	76	-
45	42.96	23	7.2	18	2.6	2.60				2.2	6.36				39	61	67	-
50	48.08	21	7.2	16	2.4	2.92				1.9	7.12				39	63	69	-
56	52.49	19	7.2	15	2.6	2.60				2.2	6.36				35	56	62	-
63	58.74	17	7.2	13	2.4	2.92				1.9	7.12				36	57	63	-
71	67.2	15	7.2	12	2.6	2.60				2.2	6.36				31	49	55	-
80	75.21	13	7.2	10	2.4	2.92				1.9	7.12				32	51	56	-

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5.2.6 Step 6: Selecting the nominal motor power – P_M

$$P_M \geq P_{K1} = \frac{P_{K2}}{\eta}$$

P_M = Nominal motor power in kW
 P_{K1} = Operating power at HSS in kW
 P_{K2} = Operating power at LSS in kW
 η = Efficiency

5.2.7 Step 7: Checking 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 specific oil temperature.

The thermal rating P_T depends on the following factors:

- Ambient temperature
- Air circulation and sunlight exposure at the installation site
- Installation altitude
- Heat conduction to the base at the installation site
- Gear unit type, size and gear ratio
- External cooling type of the gear unit
- Lubrication type of the gear unit
- Lubricant type
- Cyclic duration factor

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

- Ambient temperature 20 °C
- Installation in a large hall (air velocity ≥ 1.4 m/s)
- Self-cooling or fan cooling.
- Base as steel support structure
- Installation altitude < 1000 m above sea level

INFORMATION



- For other ambient temperatures and lubrication types, you can calculate the thermal rating P_T using the temperature factor f_T and the lubrication factor f_L . The resulting calculation results are approximate values. Contact SEW-EURODRIVE to determine the exact values.
- Sufficient protection from direct sunlight is absolutely necessary when installed outdoors. If the gear unit cannot be protected against direct sunlight, then the thermal calculation must be performed taking account of the actual sunlight in kW/m².

$$P_T = P_{TH} \times f_1 \times f_t$$

P_T = Thermal rating of the gear unit in kW

P_{TH} = Nominal thermal rating of the gear unit in kW. The values in the "Selection tables" depend on the type of cooling, mounting position, and lubrication type.

f_1 = Altitude factor

f_t = temperature factor

Altitude factor f_1

The following table lists the altitude factor f_1 .

Altitude factor	Altitude H in m above sea level				
	up to 999	1000 – 2000	2000 – 3000	3000 – 4000	4000 – 5000
f_1	1.00	0.95	0.91	0.87	0.83

Temperature factor f_t

The following table shows the temperature factor f_t .

Ambient temperature °C	10	15	20	25	30	35	40	45	50
SEW GearOil Base 320	0.92	0.86	0.80	0.73	0.67	0.60	0.54	0.47	0.41
SEW GearOil Synth 320	1.15	1.07	1.00	0.93	0.85	0.78	0.70	0.63	0.55

Selecting the cooling system

If the thermal rating P_T of a gear unit is not sufficient with cooling by fan, water cooling cover, or water cooling cartridge, you can use a cooling system with circulation cooling; see chapter "Cooling".

The proper size of the cooling system can be determined by approximation by means of the power loss P_V of the gear unit.

$$P_V = P_{K1} \times (1 - \eta)$$

P_V = Power loss in kW

P_{K1} = Operating power at HSS in kW

η = Efficiency see chapter "Step 2: Calculation of basic data – MK2, n2, i, η " (→ 105) (applies only to splash or pressure lubrication)

The power loss P_V of the gear unit must be smaller than the cooling capacity of the cooling system.

$$P_V < \text{cooling capacity of cooling system [kW]}$$

The selection of an appropriate cooling system also depends on the following factors:

- Actual power loss to be cooled
- Present cooling water temperature and volume flow
- Ambient temperature
- Ratio of oil quantity in the gear unit to oil volume flow of cooling system > 2

INFORMATION



Contact SEW-EURODRIVE for selecting the appropriate cooling system based on the ambient conditions of your system.

5.2.8 Step 8: Checking the external additional forces – F_R :

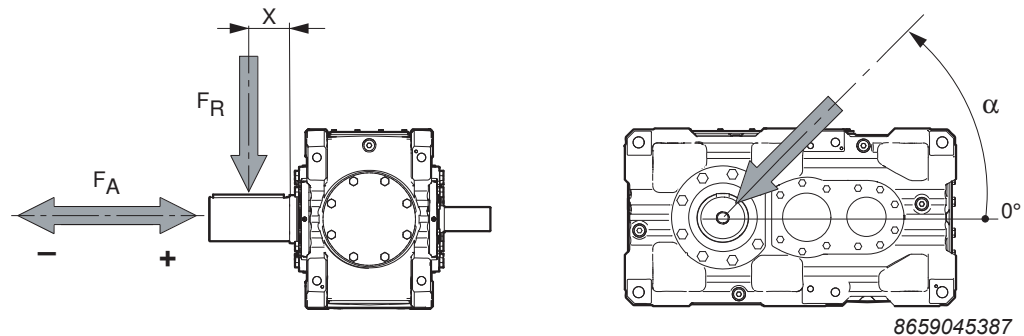
Dependencies

The permitted additional forces 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 overhung load (rotating or at a specific application angle)
- Application point of the overhung load in relation to the shaft shoulder
- Relation of axial load and overhung load

Definition of the force application

The coordinate system of the force is fixed. The angle 0° divides the housing in the longitudinal plane from right to left.



INFORMATION



The definition of the force application is always based on the output shaft end.

Determining the overhung load

When determining the resulting overhung load, the type of transmission element mounted on the shaft end must be considered. The following transmission element factors f_z must be considered for various transmission elements.

Drive component	Factor of the drive component f_z	Comments
Gear wheels	1.15	< 17 teeth
Sprockets	1.40	< 13 teeth
Sprockets	1.25	< 20 teeth
Narrow V-belt pulleys	1.75	Influence of pre-tensioning
Flat V-belt pulleys	2.50	Influence of pre-tensioning
Toothed belt pulleys	1.50	Influence of pre-tensioning

The overhung load acting on the gear shaft is calculated as follows:

$$F_R = \frac{M_{K2} \times 2000}{d_0} \times f_z$$

F_R = Overhung load in N

M_{K2} = Output torque in Nm

d_0 = Mean diameter of the installed transmission element in mm

f_z = Transmission element factor

Maximum permitted overhung load $F_{Rmax\ per}$

The following table shows the permitted overhung load that applies under the following conditions:

- The specified loads only refer to the gear unit housing. Other machine elements, such as shaft, bearing or screw fittings, are not included in the table below.
- Overhung load acts on standard solid shafts (LSS).
- The application point of the overhung load is on the center of the shaft end.
- No external axial force F_A acts on the output shaft.
- The gear unit service factor is 1.3 or greater.
- The application angle of the overhung load is favorable.
- For mounting flanges with external overhung loads, contact SEW-EURODRIVE.
- Applies only to foot-mounted gear units in mounting position M1 and mounting surface F1.
- Quasi-static overhung load ($N_{max} = 1000$) with constant direction and value.
- Cyclic overhung load can be sustained ($N \geq 1000\ 000$) for a repeated load.
- In case of deviating operating conditions, contact SEW-EURODRIVE.

Size	$F_{Rmax\ per}$ kN	
	Static	Cyclic
X100	104	61
X110	104	61
X120	131	77
X130	131	77
X140	157	92
X150	157	92
X160	302	152
X170	302	152
X180	397	194
X190	397	194
X200	445	218
X210	445	218
X220	632	328
X230	632	328
X240	758	370
X250	758	370
X260	880	408
X270	880	408
X280	880	408

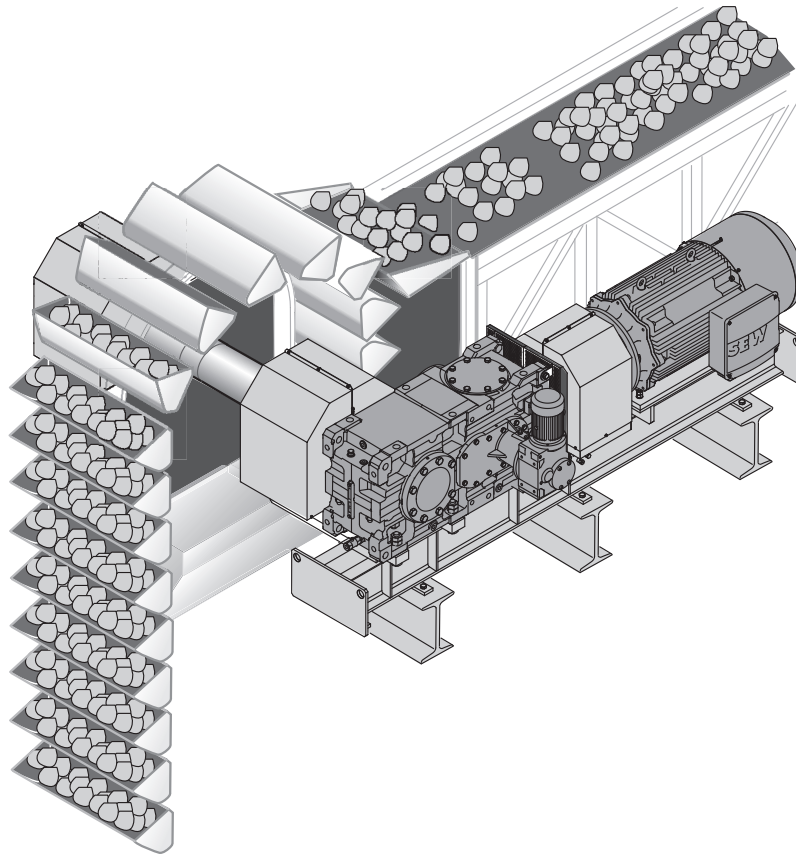
General information

Contact SEW-EURODRIVE in case of the following:

- Permitted axial loads on the output shaft (**LSS**).
- With permitted overhung and axial loads on the input shaft (**HSS**).

5.3 Project planning example: Bucket elevator drive

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



8963445643

5.3.1 Technical data and application conditions

- Bevel-helical gear unit, foot-mounted (mounting position M1), hollow shaft with key
- Output speed $n_2 = 35 \text{ min}^{-1}$
- Input speed motor $n_1 = 1470 \text{ min}^{-1}$
- Operating power on the output shaft LSS $P_{K2} = 135 \text{ kW}$
- Peak operating torque on the output shaft LSS $M_{K2 \text{ max}} = 55 \text{ kNm}$
- Operating time: 16 hours per day
- The gear unit is started up once per hour (frequency of maximum output speed)
- Estimated service life of 15 years
- The gear unit is to be operated outdoors under very dusty conditions and an ambient temperature range of $0^\circ\text{C} - 40^\circ\text{C}$.
- Installation altitude $H = 1200 \text{ m}$
- Customer requirements: Service factor ≥ 1.4

Step 1: Filling out the drive selection sheet

See chapter "Drive selection data" (→ 103)

Step 2: Calculating the basic data

Constant operating torque M_{K2} :

$$M_{K2} = \frac{P_{K1} \times 9550 \times \eta}{n_2} = \frac{135 \text{ kW} \times 9550}{35 \text{ min}^{-1}} = 36.8 \text{ kNm}$$

M_{K2} = Operating torque at LSS in kNm

P_{K1} = Output power in kW

n_2 = Output speed of the LSS in min^{-1}

Calculate the gear unit ratio using the following formula:

$$i = \frac{n_1}{n_2} = \frac{1470}{35} = 42$$

i = Gear ratio

n_1 = Input speed (HSS) in min^{-1}

n_2 = Output speed (LSS) in min^{-1}

This value is used to determine the nominal gear ratio after having specified the gear unit size.

Step 3: Selection of application factors

Application-specific service factor (Belt conveyor $P > 100 \text{ kW}$, $t > 10 \text{ h/day}$)	$F_{S \min} = 1.5$
---	--------------------

Step 4: Calculating of the required nominal gear unit torque

Required nominal gear unit torque M_{N2} :

$$M_{N2} \geq M_{K2} \times F_{Smin} = 36.8 \text{ kNm} \times 1.5 = 55.2 \text{ kNm}$$

M_{N2} = Nominal gear unit torque in kNm

M_{K2} = Operating torque at LSS in kNm

F_{Smin} = Application-specific service factor

Step 5: Selecting the gear unit size

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

- Nominal gear unit torque $M_{N2} = 60.7 \text{ kNm}$

See chapter "Selection tables".

- Gear unit type **X3KA180e/HH/B**
- Nominal gear ratio $i_N = 45$, see exact gear ratio $i_{ex} = 43.6$
- Auxiliary drive **KF97DRN132S4/Z**
- $n_3 = 2.2 \text{ min}^{-1}$, $M_{K3} = 37.7 \text{ kNm}$

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 in kW

P_{K2} = Operating power at LSS in kW

P_{K1} = Operating power at HSS in kW

η = Efficiency from chapter "Step 2: Calculation of basic data – MK2, n_2 , i , η " (→ 105)

Select a motor of the next larger power class: $P_M = 160 \text{ kW}$

Step 7: Checking the peak load conditions

A peak load analysis deviating from the procedure defined in chapter 5.2 cannot be performed via the catalog selection. Contact SEW-EURODRIVE in such cases.

Step 8: Checking the thermal rating

$$P_T \geq P_{TH} \times f_1 \times f_T = 155kW \times 0.95 \times 0.7 = 103kW$$

P_T = Thermal rating in kW

P_{TH} = Nominal thermal rating in kW

f_1 = Altitude factor = 0.95; See chapter "Altitude factor" (→ 110)

f_T = Temperature factor = 0.7; see chapter "Temperature factor" (ambient temperature with splash lubrication without additional cooling).

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

$$141.4 \text{ kW} > 103 \text{ kW}$$

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

$$P_T \geq P_{TH} \times f_1 \times f_T = 395kW \times 0.95 \times 0.7 = 263kW$$

$$141.4kW < 263kW$$

With one fan:

→ Thermal rating sufficient at 40 °C with a fan

Step 9: Checking the external additional forces

There are no external additional forces.

Step 10: Selecting the optional equipment

- Dusty environment → Taconite seals on the input and output shafts.

Step 11: Summary of all the technical information

- Gear unit type X3KA180e/HH/B
- Gear ratio $i_{ex} = 43.6$
- Nominal gear unit torque $M_{N2} = 60.7 \text{ kNm}$
- Motor $P_M = 160 \text{ kW}$
- Taconite seals on the input and output shafts
- Fan on the input shaft

6 Selection tables

6.1 Information on the selection tables

The thermal rating P_{TH} depends on several influencing factors. Contact SEW-EURODRIVE for your specific application.

															$P_{TH} \text{ } 20^{\circ}C$			
																		
i_N	i_{ex}	n_2	M_{N2}	P_{N1}	n_3	M_{K3}	Aux. Drive	Motor	i_{aux}	n_3	M_{K3}	Aux. Drive	Motor	i_{aux}	P_{TH}	P_{TH}	P_{TH}	P_{TH}
		min^{-1}	kNm	kW	min^{-1}	kNm				min^{-1}	kNm				kW	kW	kW	kW
20	19.09	52	7.2	41	3.6	1.88	KF37	DRN80M4 0.75 kW S1 IN=1.75 A (400V)	28.83	3.0	4.60	KF57	DRN90L4/Z 1.5 kW S1 IN=3.45 A (400V)	35.70	58	93	105	-
22.4	21.09	47	7.2	37	3.3	2.08				2.7	5.09				51	82	91	-
25	24.55	41	7.2	32	3.6	1.88				3.0	4.60				53	85	94	-
28	27.12	37	7.2	29	3.3	2.08				2.7	5.09				47	75	83	-
31.5	30.35	33	7.2	26	2.9	2.33				2.4	5.69				48	77	85	-
35.5	34.35	29	7.2	23	3.3	2.08				2.7	5.09				42	67	74	-
40	38.45	26	7.2	20	2.9	2.33				2.4	5.69				43	68	76	-
45	42.96	23	7.2	18	2.6	2.60				2.2	6.36				39	61	67	-
50	48.08	21	7.2	16	2.4	2.92				1.9	7.12				39	63	69	-
56	52.49	19	7.2	15	2.6	2.60				2.2	6.36				35	56	62	-
63	58.74	17	7.2	13	2.4	2.92				1.9	7.12				36	57	63	-
71	67.2	15	7.2	12	2.6	2.60				2.2	6.36				31	49	55	-
80	75.21	13	7.2	10	2.4	2.92				1.9	7.12				32	51	56	-
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]

Key:

$P_{TH} 20^{\circ}C$ = thermal rating at $20^{\circ}C$

- [1] Nominal gear ratio
- [2] Exact gear unit ratio
- [3] Output speed (LSS)
- [4] Nominal gear unit torque
- [5] Nominal gear unit power
- [6] Output speed during operation via the auxiliary drive (empty buckets)
- [7] Output torque during operation via the auxiliary drive (empty buckets)
- [8] Auxiliary drive (empty buckets): Size
- [9] Auxiliary drive motor (empty buckets): Size
- [10] Auxiliary drive (empty buckets): Gear ratio
- [11] Output speed during operation via the auxiliary drive (full buckets)
- [12] Output torque during operation via the auxiliary drive (full buckets)
- [13] Auxiliary drive (full buckets): Size
- [14] Auxiliary drive motor (full buckets): Size
- [15] Auxiliary drive (full buckets): Gear ratio
- [16] Thermal rating: Without fan
- [17] Thermal rating: With radial fan
- [18] Thermal rating: With axial fan
- [19] Thermal rating: With thermal housing and axial fan

Symbols:



Empty buckets



Full buckets



Radial fan



Axial fan



Axial fan with thermal gear unit housing

6.2 Selection tables

6.2.1 X.100 with 7.2 kNm

1000 min⁻¹

							Empty buckets				Full buckets				P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
20	19.09	52	7.2	41	3.6	1.88	KF37	DRN80M4 0.75 kW S1 IN=1.75 A (400V)	28.83	3.0	4.60	KF57	DRN90L4/Z 1.5 kW S1 IN=3.45 A (400V)	35.70	58	93	105	-
22.4	21.09	47	7.2	37	3.3	2.08				2.7	5.09				51	82	91	-
25	24.55	41	7.2	32	3.6	1.88				3.0	4.60				53	85	94	-
28	27.12	37	7.2	29	3.3	2.08				2.7	5.09				47	75	83	-
31.5	30.35	33	7.2	26	2.9	2.33				2.4	5.69				48	77	85	-
35.5	34.35	29	7.2	23	3.3	2.08				2.7	5.09				42	67	74	-
40	38.45	26	7.2	20	2.9	2.33				2.4	5.69				43	68	76	-
45	42.96	23	7.2	18	2.6	2.60				2.2	6.36				39	61	67	-
50	48.08	21	7.2	16	2.4	2.92				1.9	7.12				39	63	69	-
56	52.49	19	7.2	15	2.6	2.60				2.2	6.36				35	56	62	-
63	58.74	17	7.2	13	2.4	2.92				1.9	7.12				36	57	63	-
71	67.2	15	7.2	12	2.6	2.60				2.2	6.36				31	49	55	-
80	75.21	13	7.2	10	2.4	2.92				1.9	7.12				32	51	56	-

1200 min⁻¹

							Empty buckets				Full buckets				P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
20	19.09	63	7.2	49	4.4	1.55	KF37	DRN80M4 0.75 kW S1 IN=1.56 A (460V)	28.83	3.6	3.81	KF57	DRN90L4/Z 1.5 kW S1 IN=3.00 A (460V)	35.70	58	105	120	-
22.4	21.09	57	7.2	44	4.0	1.71				3.3	4.21				52	93	105	-
25	24.55	49	7.2	38	4.4	1.55				3.6	3.81				54	97	110	-
28	27.12	44	7.2	35	4.0	1.71				3.3	4.21				48	86	95	-
31.5	30.35	40	7.2	31	3.6	1.91				2.9	4.71				50	88	97	-
35.5	34.35	35	7.2	27	4.0	1.71				3.3	4.21				43	76	84	-
40	38.45	31	7.2	24	3.6	1.91				2.9	4.71				44	78	86	-
45	42.96	28	7.2	22	3.2	2.14				2.6	5.26				40	70	77	-
50	48.08	25	7.2	19	2.9	2.40				2.3	5.89				41	72	79	-
56	52.49	23	7.2	18	3.2	2.14				2.6	5.26				37	64	71	-
63	58.74	20	7.2	16	2.9	2.40				2.3	5.89				38	66	72	-
71	67.2	18	7.2	14	3.2	2.14				2.6	5.26				32	57	62	-
80	75.21	16	7.2	13	2.9	2.40				2.3	5.89				33	58	64	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
20	19.09	79	7.2	61	3.6	1.88	KF37	DRN80M4 0.75 kW S1 IN=1.75 A (400V)	28.83	3.0	4.60	KF57	DRN90L4/Z 1.5 kW S1 IN=3.45 A (400V)	35.70	57	120	135	-
22.4	21.09	71	7.2	56	3.3	2.08				2.7	5.09				50	105	120	-
25	24.55	61	7.2	48	3.6	1.88				3.0	4.60				55	110	125	-
28	27.12	55	7.2	43	3.3	2.08				2.7	5.09				49	99	110	-
31.5	30.35	49	7.2	39	2.9	2.33				2.4	5.69				50	100	115	-
35.5	34.35	44	7.2	34	3.3	2.08				2.7	5.09				44	88	98	-
40	38.45	39	7.2	30	2.9	2.33				2.4	5.69				45	90	100	-
45	42.96	35	7.2	27	2.6	2.60				2.2	6.36				41	81	90	-
50	48.08	31	7.2	24	2.4	2.92				1.9	7.12				42	83	92	-
56	52.49	29	7.2	23	2.6	2.60				2.2	6.36				38	74	82	-
63	58.74	26	7.2	20	2.4	2.92				1.9	7.12				39	76	84	-
71	67.2	22	7.2	18	2.6	2.60				2.2	6.36				34	66	73	-
80	75.21	20	7.2	16	2.4	2.92				1.9	7.12				34	67	74	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
20	19.09	94	7.2	74	4.4	1.55	KF37	DRN80M4 0.75 kW S1 IN=1.56 A (460V)	28.83	3.6	3.81	KF57	DRN90L4/Z 1.5 kW S1 IN=3.00 A (460V)	35.70	52	135	150	-
22.4	21.09	85	7.2	67	4.0	1.71				3.3	4.21				46	120	130	-
25	24.55	73	7.2	57	4.4	1.55				3.6	3.81				54	125	140	-
28	27.12	66	7.2	52	4.0	1.71				3.3	4.21				48	110	120	-
31.5	30.35	59	7.2	46	3.6	1.91				2.9	4.71				49	115	125	-
35.5	34.35	52	7.2	41	4.0	1.71				3.3	4.21				45	99	110	-
40	38.45	47	7.2	37	3.6	1.91				2.9	4.71				46	100	110	-
45	42.96	42	7.2	33	3.2	2.14				2.6	5.26				41	91	100	-
50	48.08	37	7.2	29	2.9	2.40				2.3	5.89				42	93	105	-
56	52.49	34	7.2	27	3.2	2.14				2.6	5.26				39	84	93	-
63	58.74	31	7.2	24	2.9	2.40				2.3	5.89				39	85	95	-
71	67.2	27	7.2	21	3.2	2.14				2.6	5.26				34	74	81	-
80	75.21	24	7.2	19	2.9	2.40				2.3	5.89				35	75	83	-

6.2.2 X.110 with 9.0 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
22.4	21.97	46	8.9	44	3.2	2.17	KF37	DRN80M4 0.75 kW S1 IN=1.75 A (400V)	28.83	2.6	5.30	KF57	DRN90L4/Z 1.5 kW S1 IN=3.45 A (400V)	35.70	62	100	110	-
25	24.26	41	9	40	2.9	2.40				2.3	5.85				55	89	98	-
28	28.26	35	8.92	34	3.2	2.17				2.6	5.30				57	91	100	-
31.5	31.21	32	9	31	2.9	2.40				2.3	5.85				51	81	90	-
35.5	34.94	29	8.94	28	2.6	2.68				2.1	6.56				52	82	91	-
40	39.53	25	9	25	2.9	2.40				2.3	5.85				45	72	79	-
45	44.26	23	8.94	22	2.6	2.68				2.1	6.56				46	73	80	-
50	49.44	20	9	20	2.3	3.00				1.9	7.32				41	66	73	-
56	55.35	18	8.98	18	2.0	3.36				1.7	8.20				42	67	74	-
63	60.4	17	9	16	2.3	3.00				1.9	7.32				38	60	67	-
71	67.62	15	8.99	15	2.0	3.36				1.7	8.20				39	61	67	-
80	77.33	13	9	13	2.3	3.00				1.9	7.32				34	53	59	-
90	86.58	12	8.99	11	2.0	3.36				1.7	8.20				34	54	59	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
22.4	21.97	55	8.9	53	3.8	1.78	KF37	DRN80M4 0.75 kW S1 IN=1.75 A (400V)	28.83	3.1	4.38	KF57	DRN90L4/Z 1.5 kW S1 IN=3.00 A (460V)	35.70	62	115	125	-
25	24.26	49	9	48	3.5	1.97				2.8	4.84				56	100	110	-
28	28.26	42	8.92	41	3.8	1.78				3.1	4.38				58	105	115	-
31.5	31.21	38	9	38	3.5	1.97				2.8	4.84				52	93	100	-
35.5	34.94	34	8.94	33	3.1	2.21				2.5	5.42				53	94	105	-
40	39.53	30	9	30	3.5	1.97				2.8	4.84				47	82	91	-
45	44.26	27	8.94	26	3.1	2.21				2.5	5.42				47	83	92	-
50	49.44	24	9	24	2.8	2.46				2.3	6.05				43	75	83	-
56	55.35	22	8.98	21	2.5	2.76				2.0	6.78				43	76	84	-
63	60.4	20	9	20	2.8	2.46				2.3	6.05				39	69	76	-
71	67.62	18	8.99	17	2.5	2.76				2.0	6.78				40	70	77	-
80	77.33	16	9	15	2.8	2.46				2.3	6.05				35	61	67	-
90	86.58	14	8.99	14	2.5	2.76				2.0	6.78				35	61	68	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
22.4	21.97	68	8.9	66	3.2	2.17	KF37	DRN80M4 0.75 kW S1 IN=1.75 A (400V)	28.83	2.6	5.30	KF57	DRN90L4/Z 1.5 kW S1 IN=3.00 A (460V)	35.70	62	130	145	-
25	24.26	62	9	60	2.9	2.40				2.3	5.85				55	115	130	-
28	28.26	53	8.92	51	3.2	2.17				2.6	5.30				59	120	135	-
31.5	31.21	48	9	47	2.9	2.40				2.3	5.85				53	105	120	-
35.5	34.94	43	8.94	42	2.6	2.68				2.1	6.56				54	110	120	-
40	39.53	38	9	37	2.9	2.40				2.3	5.85				48	95	105	-
45	44.26	34	8.94	33	2.6	2.68				2.1	6.56				49	96	105	-
50	49.44	30	9	30	2.3	3.00				1.9	7.32				44	87	97	-
56	55.35	27	8.98	26	2.0	3.36				1.7	8.20				45	88	98	-
63	60.4	25	9	24	2.3	3.00				1.9	7.32				41	80	89	-
71	67.62	22	8.99	22	2.0	3.36				1.7	8.20				41	81	90	-
80	77.33	19	9	19	2.3	3.00				1.9	7.32				36	71	78	-
90	86.58	17	8.99	17	2.0	3.36				1.7	8.20				36	71	79	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
22.4	21.97	82	8.9	79	3.8	1.78	KF37	DRN80M4 0.75 kW S1 IN=1.75 A (400V)	28.83	3.1	4.38	KF57	DRN90L4/Z 1.5 kW S1 IN=3.00 A (460V)	35.70	57	140	160	-
25	24.26	74	9	72	3.5	1.97				2.8	4.84				51	130	145	-
28	28.26	64	8.92	62	3.8	1.78				3.1	4.38				58	135	150	-
31.5	31.21	58	9	56	3.5	1.97				2.8	4.84				53	120	130	-
35.5	34.94	52	8.94	50	3.1	2.21				2.5	5.42				54	120	135	-
40	39.53	46	9	44	3.5	1.97				2.8	4.84				48	105	120	-
45	44.26	41	8.94	39	3.1	2.21				2.5	5.42				49	110	120	-
50	49.44	36	9	36	2.8	2.46				2.3	6.05				45	98	110	-
56	55.35	33	8.98	32	2.5	2.76				2.0	6.78				45	99	110	-
63	60.4	30	9	29	2.8	2.46				2.3	6.05				42	90	100	-
71	67.62	27	8.99	26	2.5	2.76				2.0	6.78				42	91	100	-
80	77.33	23	9	23	2.8	2.46				2.3	6.05				37	79	88	-
90	86.58	21	8.99	20	2.5	2.76				2.0	6.78				37	80	89	-

6.2.3 X.120 with 13.6 kNm

1000 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
													 RAD  AXIAL  AXIAL/HT					
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
20	20.02	50	13.6	74	3.2	3.12	KF47	DRN90S4 1.1 kW S1 IN=2.60 A (400V)	31.30	2.8	7.08	KF67	DRN100L4/Z 2.2 kW S1 IN=4.80 A (400V)	35.62	77	130	145	-
22.4	22.79	44	13	62	2.8	3.55				2.5	8.06				78	135	150	-
25	25.75	39	13.6	57	3.2	3.12				2.8	7.08				72	120	130	-
28	29.32	34	13.1	48	2.8	3.55				2.5	8.06				73	120	135	-
31.5	30.96	32	13.6	48	2.7	3.75				2.4	8.52				64	105	120	-
35.5	35.25	28	13.1	40	2.4	4.27				2.1	9.70				65	110	120	-
40	40.01	25	12.7	34	2.7	3.75				2.4	8.52				58	95	105	-
45	45.55	22	13.1	31	2.4	4.27				2.1	9.70				58	97	105	-
50	47.92	21	13	30	2.7	3.75				2.4	8.52				53	87	96	-
56	54.55	18	13.1	26	2.4	4.27				2.1	9.70				53	88	98	-
63	61.35	16	12.5	22	2.7	3.75				2.4	8.52				48	78	87	-
71	69.84	14	13.1	21	2.4	4.27				2.1	9.70				48	80	88	-
80	82.12	12	11.3	15	-	-	-	-	-	2.6	5.42	KF37	DRN90L4 1.5 kW S1 IN=3.45 A (400V)	12.14	46	-	-	-
90	93.49	11	12.6	15	-	-				2.3	6.17				46	-	-	-
100	104.18	9.6	12.9	14	-	-				2.1	6.87				44	-	-	-
112	118.6	8.4	12.6	12	-	-				1.8	7.82				44	-	-	-
125	125.27	8	13.6	12	-	-				1.7	8.26				40	-	-	-
140	142.6	7	12.6	10	-	-				1.5	9.40				40	-	-	-

1200 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
20	20.02	60	13.6	88	3.9	2.57	KF47	DRN90S4 1.1 kW S1 IN=2.60 A (400V)	31.30	3.4	5.85	KF67	DRN100L4/Z 2.2 kW S1 IN=4.80 A (400V)	35.62	73	145	165	-
22.4	22.79	53	13	74	3.4	2.93				3.0	6.67				76	150	165	-
25	25.75	47	13.6	69	3.9	2.57				3.4	5.85				72	135	150	-
28	29.32	41	13.1	58	3.4	2.93				3.0	6.67				73	140	155	-
31.5	30.96	39	13.6	57	3.3	3.10				2.9	7.04				64	120	135	-
35.5	35.25	34	13.1	48	2.9	3.52				2.5	8.01				65	125	135	-
40	40.01	30	12.7	41	3.3	3.10				2.9	7.04				59	110	120	-
45	45.55	26	13.1	37	2.9	3.52				2.5	8.01				60	110	120	-
50	47.92	25	13	36	3.3	3.10				2.9	7.04				54	99	110	-
56	54.55	22	13.1	32	2.9	3.52				2.5	8.01				55	100	110	-
63	61.35	20	12.5	27	3.3	3.10				2.9	7.04				49	89	99	-
71	69.84	17	13.1	25	2.9	3.52				2.5	8.01				50	91	100	-
80	82.12	15	11.3	18	-	-	-	-	-	3.1	4.51	KF37	DRN90L4 1.5 kW S1 IN=3.45 A (400V)	12.14	47	-	-	-
90	93.49	13	12.6	18	-	-				2.8	5.14				48	-	-	-
100	104.18	12	12.9	16	-	-				2.5	5.73				45	-	-	-
112	118.6	10	12.6	14	-	-				2.2	6.52				46	-	-	-
125	125.27	9.6	13.6	14	-	-				2.1	6.88				41	-	-	-
140	142.6	8.4	12.6	12	-	-				1.8	7.84				42	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
20	20.02	75	13.6	110	3.2	3.12	KF47	DRN90S4 1.1 kW S1 IN=2.60 A (400V)	31.30	2.8	7.08	KF67	DRN100L4/Z 2.2 kW S1 IN=4.80 A (400V)	35.62	65	170	185	-
22.4	22.79	66	13	93	2.8	3.55				2.5	8.06				67	170	190	-
25	25.75	58	13.6	86	3.2	3.12				2.8	7.08				68	155	175	-
28	29.32	51	13.1	73	2.8	3.55				2.5	8.06				70	160	175	-
31.5	30.96	48	13.6	71	2.7	3.75				2.4	8.52				61	140	155	-
35.5	35.25	43	13.1	60	2.4	4.27				2.1	9.70				63	140	155	-
40	40.01	37	12.7	52	2.7	3.75				2.4	8.52				59	125	140	-
45	45.55	33	13.1	47	2.4	4.27				2.1	9.70				60	125	140	-
50	47.92	31	13	45	2.7	3.75				2.4	8.52				55	115	125	-
56	54.55	27	13.1	39	2.4	4.27				2.1	9.70				56	115	130	-
63	61.35	24	12.5	33	2.7	3.75	-	-	-	2.4	8.52	KF37	DRN90L4 1.5 kW S1 IN=3.45 A (400V)	12.14	50	105	115	-
71	69.84	21	13.1	31	2.4	4.27				2.1	9.70				51	105	115	-
80	82.12	18	11.3	23	-	-				2.6	5.42				49	-	-	-
90	93.49	16	12.6	22	-	-				2.3	6.17				50	-	-	-
100	104.18	14	12.9	20	-	-				2.1	6.87				47	-	-	-
112	118.6	13	12.6	17	-	-				1.8	7.82				48	-	-	-
125	125.27	12	13.6	18	-	-				1.7	8.26				43	-	-	-
140	142.6	11	12.6	15	-	-				1.5	9.40				43	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
20	20.02	90	13.6	135	3.9	2.57	KF47	DRN90S4 1.1 kW S1 IN=2.60 A (400V)	31.30	3.4	5.85	KF67	DRN100L4/Z 2.2 kW S1 IN=4.15 A (460V)	35.62	52	180	205	-
22.4	22.79	79	13	110	3.4	2.93				3.0	6.67				55	185	205	-
25	25.75	70	13.6	105	3.9	2.57				3.4	5.85				61	170	190	-
28	29.32	61	13.1	87	3.4	2.93				3.0	6.67				63	175	195	-
31.5	30.96	58	13.6	86	3.3	3.10				2.9	7.04				55	155	170	-
35.5	35.25	51	13.1	73	2.9	3.52				2.5	8.01				57	155	175	-
40	40.01	45	12.7	62	3.3	3.10				2.9	7.04				57	140	155	-
45	45.55	40	13.1	56	2.9	3.52				2.5	8.01				58	140	155	-
50	47.92	38	13	53	3.3	3.10				2.9	7.04				54	125	140	-
56	54.55	33	13.1	47	2.9	3.52				2.5	8.01				55	130	145	-
63	61.35	29	12.5	40	3.3	3.10	-	-	-	2.9	7.04	KF37	DRN90L4 1.5 kW S1 IN=3.45 A (400V)	12.14	50	115	130	-
71	69.84	26	13.1	37	2.9	3.52				2.5	8.01				51	120	130	-
80	82.12	22	11.3	27	-	-				3.1	4.51				51	-	-	-
90	93.49	19	12.6	27	-	-				2.8	5.14				51	-	-	-
100	104.18	17	12.9	24	-	-				2.5	5.73				48	-	-	-
112	118.6	15	12.6	21	-	-				2.2	6.52				49	-	-	-
125	125.27	14	13.6	21	-	-				2.1	6.88				44	-	-	-
140	142.6	13	12.6	17	-	-				1.8	7.84				45	-	-	-

6.2.4 X.130 with 17.0 kNm

1000 min⁻¹

							Empty buckets							Full buckets							P _{TH} 20°C			
																								
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW						
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm													
25	25.03	40	17	74	2.6	3.90	KF47	DRN90S4 1.1 kW S1 IN=2.60 A (400V)	31.30	2.3	8.85	KF67	DRN100L4/Z 2.2 kW S1 IN=4.80 A (400V)	35.62	84	145	160	-						
28	28.43	35	15.8	60	2.3	4.43				2.0	10.0				84	140	160	-						
31.5	32.19	31	17	57	2.6	3.90				2.3	8.85				78	130	145	-						
35.5	36.56	27	15.9	47	2.3	4.43				2.0	10.0				78	130	145	-						
40	38.71	26	17	48	2.1	4.69				1.9	10.6				70	115	130	-						
45	43.96	23	15.9	39	1.9	5.33				1.7	12.0				70	115	130	-						
50	50.02	20	15.9	34	2.1	4.69				1.9	10.6				63	105	115	-						
56	56.81	18	15.9	30	1.9	5.33				1.7	12.0				63	105	115	-						
63	59.9	17	16.3	30	2.1	4.69				1.9	10.6				57	94	105	-						
71	68.03	15	16	26	1.9	5.33				1.7	12.0				57	94	105	-						
80	76.69	13	15.7	22	2.1	4.69				1.9	10.6				52	85	94	-						
90	87.09	11	15.9	20	1.9	5.33				1.7	12.0				52	85	94	-						
100	102.65	9.7	14.2	15	-	-	-	-	-	2.1	6.77	KF37	DRN90L4/Z 1.5 kW S1 IN=3.45 A (400V)	12.14	50	-	-	-						
112	116.58	8.6	15.7	15	-	-				1.8	7.69				49	-	-	-						
125	130.23	7.7	16.1	14	-	-				1.7	8.59				47	-	-	-						
140	147.9	6.8	15.7	12	-	-				2.2	9.51		DRN100LS4/Z 2.2 kW S1 IN=4.75 A (400V)	7.96	47	-	-	-						
160	156.58	6.4	16.5	12	-	-				2.1	10.1				43	-	-	-						
180	177.83	5.6	15.7	10	-	-				1.8	11.4				43	-	-	-						

1200 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.03	48	17	88	3.1	3.22	KF47	DRN90S4 1.1 kW S1 IN=2.30 A (460V)	31.30	2.8	7.32	KF67	DRN100L4/Z 2.2 kW S1 IN=4.15 A (460V)	35.62	83	160	180	-
28	28.43	42	15.8	72	2.8	3.66				2.4	8.31				82	160	180	-
31.5	32.19	37	17	69	3.1	3.22				2.8	7.32				79	150	165	-
35.5	36.56	33	15.9	57	2.8	3.66				2.4	8.31				79	145	165	-
40	38.71	31	17	57	2.6	3.87				2.3	8.80				71	130	145	-
45	43.96	27	15.9	47	2.3	4.40				2.0	10.0				71	130	145	-
50	50.02	24	15.9	41	2.6	3.87				2.3	8.80				64	120	130	-
56	56.81	21	15.9	36	2.3	4.40				2.0	10.0				64	120	130	-
63	59.9	20	16.3	36	2.6	3.87				2.3	8.80				59	110	120	-
71	68.03	18	16	31	2.3	4.40				2.0	10.0				59	105	120	-
80	76.69	16	15.7	27	2.6	3.87				2.3	8.80				54	97	110	-
90	87.09	14	15.9	24	2.3	4.40				2.0	10.0				53	97	105	-
100	102.65	12	14.2	18	-	-	-	-	-	2.5	5.64	KF37	DRN90L4/Z 1.5 kW S1 IN=3.00 A (460V)	12.14	52	-	-	-
112	116.58	10	15.7	18	-	-				2.2	6.41				51	-	-	-
125	130.23	9.2	16.1	16	-	-				2.0	7.16				49	-	-	-
140	147.9	8.1	15.7	14	-	-				2.6	7.92		DRN100LS4/Z 2.2 kW S1 IN=4.15 A (460V)	7.96	49	-	-	-
160	156.58	7.7	16.5	14	-	-				2.5	8.39				45	-	-	-
180	177.83	6.7	15.7	12	-	-				2.2	9.52				45	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.03	60	17	110	2.6	3.90	KF47	DRN90S4 1.1 kW S1 IN=2.60 A (400V)	31.30	2.3	8.85	KF67	DRN100L4/Z 2.2 kW S1 IN=4.80 A (400V)	35.62	74	185	205	-
28	28.43	53	15.8	90	2.3	4.43				2.0	10.0				75	180	205	-
31.5	32.19	47	17	86	2.6	3.90				2.3	8.85				77	170	190	-
35.5	36.56	41	15.9	71	2.3	4.43				2.0	10.0				77	170	190	-
40	38.71	39	17	71	2.1	4.69				1.9	10.6				69	150	170	-
45	43.96	34	15.9	59	1.9	5.33				1.7	12.0				69	150	170	-
50	50.02	30	15.9	52	2.1	4.69				1.9	10.6				65	135	150	-
56	56.81	26	15.9	46	1.9	5.33				1.7	12.0				65	135	150	-
63	59.9	25	16.3	45	2.1	4.69				1.9	10.6				60	125	140	-
71	68.03	22	16	39	1.9	5.33				1.7	12.0				60	125	135	-
80	76.69	20	15.7	34	2.1	4.69	-	-	-	1.9	10.6	KF37	DRN90L4/Z 1.5 kW S1 IN=3.45 A (400V)	12.14	55	115	125	-
90	87.09	17	15.9	30	1.9	5.33				1.7	12.0				55	110	125	-
100	102.65	15	14.2	23	-	-				2.1	6.77				54	-	-	-
112	116.58	13	15.7	22	-	-				1.8	7.69				54	-	-	-
125	130.23	12	16.1	20	-	-				1.7	8.59				51	-	-	-
140	147.9	10	15.7	17	-	-				2.2	9.51		DRN100LS4/Z 2.2 kW S1 IN=4.75 A (400V)	7.96	51	-	-	-
160	156.58	9.6	16.5	17	-	-				2.1	10.1				47	-	-	-
180	177.83	8.4	15.7	15	-	-				1.8	11.4				47	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.03	72	17	135	3.1	3.22	KF47	DRN90S4 1.1 kW S1 IN=2.30 A (460V)	31.30	2.8	7.32	KF67	DRN100L4/Z 2.2 kW S1 IN=4.15 A (460V)	35.62	62	200	225	-
28	28.43	63	15.8	110	2.8	3.66				2.4	8.31				64	200	225	-
31.5	32.19	56	17	105	3.1	3.22				2.8	7.32				70	190	210	-
35.5	36.56	49	15.9	85	2.8	3.66				2.4	8.31				71	185	210	-
40	38.71	46	17	86	2.6	3.87				2.3	8.80				63	170	185	-
45	43.96	41	15.9	71	2.3	4.40				2.0	10.0				64	165	185	-
50	50.02	36	15.9	62	2.6	3.87				2.3	8.80				64	150	170	-
56	56.81	32	15.9	55	2.3	4.40				2.0	10.0				64	150	170	-
63	59.9	30	16.3	54	2.6	3.87				2.3	8.80				60	140	155	-
71	68.03	26	16	46	2.3	4.40				2.0	10.0				60	140	155	-
80	76.69	23	15.7	40	2.6	3.87	-	-	-	2.3	8.80	KF37	DRN90L4/Z 1.5 kW S1 IN=3.00 A (460V)	12.14	55	125	140	-
90	87.09	21	15.9	36	2.3	4.40				2.0	10.0				55	125	140	-
100	102.65	18	14.2	27	-	-				2.5	5.64				55	-	-	-
112	116.58	15	15.7	27	-	-				2.2	6.41				55	-	-	-
125	130.23	14	16.1	24	-	-				2.0	7.16				53	-	-	-
140	147.9	12	15.7	21	-	-				2.6	7.92		DRN100LS4/Z 2.2 kW S1 IN=4.15 A (460V)	7.96	53	-	-	-
160	156.58	11	16.5	21	-	-				2.5	8.39				48	-	-	-
180	177.83	10	15.7	17	-	-				2.2	9.52				48	-	-	-

6.2.5 X.140 with 23.4 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
20	21.13	47	23.4	120	3.5	3.96	KF57	DRN90L4 1.5 kW S1 IN=3.00 A (460V)	35.70	3.2	11.3	KF77	DRN112M4/Z 4.0 kW S1 IN=7.20 A (460V)	38.39	110	195	215	-
22.4	22.6	44	23.4	110	3.2	4.24				3.0	12.1				110	195	220	-
25	26.42	38	23.4	96	2.8	4.96				2.6	14.1				105	180	200	-
28	28.25	35	23.4	90	2.6	5.30				2.4	15.1				105	185	205	-
31.5	33.46	30	23.4	76	2.8	4.96				2.6	14.1				95	165	185	-
35.5	35.78	28	23.4	71	2.6	5.30				2.4	15.1				96	165	185	-
40	40.78	25	23.4	62	2.3	6.04				2.1	17.3				87	150	165	-
45	43.61	23	23.4	58	2.1	6.46				2.0	18.5				88	150	170	-
50	49.82	20	23.4	51	2.3	6.04				2.1	17.3				81	140	155	-
56	53.28	19	23.4	48	2.1	6.46				2.0	18.5				82	140	155	-
63	63.79	16	23.4	40	2.3	6.04				2.1	17.3				73	125	140	-
71	68.21	15	23.4	38	2.1	6.46				2.0	18.5				74	125	140	-
80	83.36	12	23.4	31	-	-	-	-	-	2.3	12.3	KF47	DRN100L4/Z 3.0 kW S1 IN=5.80 A (460V)	13.65	67	-	-	-
90	89.14	11	23.4	29	-	-				2.2	13.2				68	-	-	-
100	104.2	9.6	23.4	25	-	-				2.0	13.7				63	-	-	-
112	111.42	9	23.4	23	-	-				1.9	14.6				64	-	-	-
125	127	7.9	23.4	20	-	-				1.7	16.7				58	-	-	-
140	135.81	7.4	23.4	19	-	-				1.6	17.8				59	-	-	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
20	21.13	57	23.4	145	4.2	3.28	KF57	DRN90L4 1.5 kW S1 IN=3.00 A (460V)	35.70	3.9	9.39	KF77	DRN112M4/Z 4.0 kW S1 IN=7.20 A (460V)	38.39	110	220	245	-
22.4	22.6	53	23.4	135	3.9	3.50				3.6	10.0				110	225	245	-
25	26.42	45	23.4	115	3.4	4.10				3.1	11.7				100	205	230	-
28	28.25	42	23.4	110	3.1	4.38				2.9	12.5				105	210	230	-
31.5	33.46	36	23.4	91	3.4	4.10				3.1	11.7				97	190	210	-
35.5	35.78	34	23.4	85	3.1	4.38				2.9	12.5				98	190	210	-
40	40.78	29	23.4	75	2.8	4.99				2.6	14.3				89	170	190	-
45	43.61	28	23.4	70	2.6	5.34				2.4	15.3				90	175	190	-
50	49.82	24	23.4	62	2.8	4.99				2.6	14.3				83	160	175	-
56	53.28	23	23.4	58	2.6	5.34				2.4	15.3				84	160	180	-
63	63.79	19	23.4	48	2.8	4.99				2.6	14.3				75	145	160	-
71	68.21	18	23.4	45	2.6	5.34				2.4	15.3				75	145	160	-
80	83.36	14	23.4	37	-	-	-	-	-	2.8	10.3	KF47	DRN100L4/Z 3.0 kW S1 IN=5.80 A (460V)	13.65	70	-	-	-
90	89.14	13	23.4	35	-	-				2.6	11.0				70	-	-	-
100	104.2	12	23.4	30	-	-				2.5	11.4				66	-	-	-
112	111.42	11	23.4	28	-	-				2.3	12.2				66	-	-	-
125	127	9.4	23.4	24	-	-				2.0	13.9				61	-	-	-
140	135.81	8.8	23.4	23	-	-				1.9	14.9				61	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
20	21.13	71	23.4	180	3.5	3.96	KF57	DRN90L4 1.5 kW S1 IN=3.45 A (400V)	35.70	3.2	11.3	KF77	DRN112M4/Z 4.0 kW S1 IN=8.10 A (400V)	38.39	97	255	280	-
22.4	22.6	66	23.4	170	3.2	4.24				3.0	12.1				99	255	285	-
25	26.42	57	23.4	145	2.8	4.96				2.6	14.1				92	235	265	-
28	28.25	53	23.4	135	2.6	5.30				2.4	15.1				94	240	265	-
31.5	33.46	45	23.4	115	2.8	4.96				2.6	14.1				96	215	240	-
35.5	35.78	42	23.4	105	2.6	5.30				2.4	15.1				97	220	240	-
40	40.78	37	23.4	93	2.3	6.04				2.1	17.3				89	200	220	-
45	43.61	34	23.4	87	2.1	6.46				2.0	18.5				90	200	220	-
50	49.82	30	23.4	77	2.3	6.04				2.1	17.3				84	185	205	-
56	53.28	28	23.4	72	2.1	6.46				2.0	18.5				84	185	205	-
63	63.79	24	23.4	60	2.3	6.04	-	-	-	2.1	17.3	KF47	DRN100L4/Z 3.0 kW S1 IN=6.40 A (400V)	13.65	76	165	185	-
71	68.21	22	23.4	56	2.1	6.46				2.0	18.5				77	165	185	-
80	83.36	18	23.4	46	-	-				2.3	12.3				73	-	-	-
90	89.14	17	23.4	43	-	-				2.2	13.2				73	-	-	-
100	104.2	14	23.4	37	-	-				2.0	13.7				69	-	-	-
112	111.42	13	23.4	35	-	-				1.9	14.6				69	-	-	-
125	127	12	23.4	30	-	-				1.7	16.7				63	-	-	-
140	135.81	11	23.4	28	-	-				1.6	17.8				64	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
20	21.13	85	23.4	215	4.2	3.28	KF57	DRN90L4 1.5 kW S1 IN=3.00 A (460V)	35.70	3.9	9.39	KF77	DRN112M4/Z 4.0 kW S1 IN=7.20 A (460V)	38.39	79	275	310	-
22.4	22.6	80	23.4	200	3.9	3.50				3.6	10.0				82	280	315	-
25	26.42	68	23.4	175	3.4	4.10				3.1	11.7				77	260	290	-
28	28.25	64	23.4	160	3.1	4.38				2.9	12.5				79	265	295	-
31.5	33.46	54	23.4	135	3.4	4.10				3.1	11.7				91	240	265	-
35.5	35.78	50	23.4	130	3.1	4.38				2.9	12.5				93	240	270	-
40	40.78	44	23.4	110	2.8	4.99				2.6	14.3				84	220	245	-
45	43.61	41	23.4	105	2.6	5.34				2.4	15.3				85	220	245	-
50	49.82	36	23.4	93	2.8	4.99				2.6	14.3				83	205	225	-
56	53.28	34	23.4	87	2.6	5.34				2.4	15.3				84	205	230	-
63	63.79	28	23.4	72	2.8	4.99	-	-	-	2.6	14.3	KF47	DRN100L4/Z 3.0 kW S1 IN=5.80 A (460V)	13.65	76	185	205	-
71	68.21	26	23.4	68	2.6	5.34				2.4	15.3				77	185	205	-
80	83.36	22	23.4	55	-	-				2.8	10.3				75	-	-	-
90	89.14	20	23.4	52	-	-				2.6	11.0				76	-	-	-
100	104.2	17	23.4	44	-	-				2.5	11.4				71	-	-	-
112	111.42	16	23.4	41	-	-				2.3	12.2				71	-	-	-
125	127	14	23.4	36	-	-				2.0	13.9				65	-	-	-
140	135.81	13	23.4	34	-	-				1.9	14.9				66	-	-	-

6.2.6 X.150 with 29.2 kNm

1000 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	26.25	38	29.2	120	2.8	4.92	KF57	DRN90L4 1.5 kW S1 IN=3.45 A (400V)	35.70	2.6	14.1	KF77	DRN112M4/Z 4.0 kW S1 IN=8.10 A (400V)	38.39	120	215	240	-
28	28.1	36	29.2	115	2.6	5.27				2.4	15.1				120	210	235	-
31.5	32.81	30	29.2	96	2.2	6.16				2.1	17.6				115	200	220	-
35.5	35.13	28	29.2	90	2.1	6.59				1.9	18.8				115	200	220	-
40	41.56	24	29.2	76	2.2	6.16				2.1	17.6				105	180	200	-
45	44.5	22	29.2	71	2.1	6.59				1.9	18.8				105	180	200	-
50	50.65	20	29.2	62	1.8	7.50				1.7	21.4				96	165	185	-
56	54.23	18	29.2	58	1.7	8.03				1.6	23.0				95	165	180	-
63	61.88	16	29.2	52	1.8	7.50				1.7	21.4				89	155	170	-
71	66.26	15	29.2	48	1.7	8.03				1.6	23.0				88	150	170	-
80	79.22	13	29.2	40	1.8	7.50	1.7	21.4	80	135	150	-						
90	84.83	12	29.2	38	1.7	8.03	1.6	23.0	79	135	150	-						
100	103.52	9.7	29.2	31	-	-	-	-	-	1.9	15.3	KF47	DRN100L4/Z 3.0 kW S1 IN=6.40 A (400V)	13.65	73	-	-	-
112	110.85	9	29.2	29	-	-				1.7	16.4				73	-	-	-
125	129.41	7.7	29.2	25	-	-				1.5	19.2				69	-	-	-
140	138.56	7.2	29.2	23	-	-				1.8	15.9				69	-	-	-
160	157.72	6.3	29.2	20	-	-				1.6	18.1				64	-	-	-
180	168.89	5.9	29.2	19	-	-				1.5	19.4				63	-	-	-

1200 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	26.25	46	29.2	145	3.4	4.07	KF57	DRN90L4 1.5 kW S1 IN=3.00 A (460V)	35.70	3.1	11.6	KF77	DRN112M4/Z 4.0 kW S1 IN=7.20 A (460V)	38.39	120	245	270	-
28	28.1	43	29.2	135	3.2	4.36				2.9	12.4				120	240	265	-
31.5	32.81	37	29.2	115	2.7	5.09				2.5	14.5				115	230	250	-
35.5	35.13	34	29.2	110	2.5	5.45				2.3	15.6				115	225	250	-
40	41.56	29	29.2	91	2.7	5.09				2.5	14.5				105	205	230	-
45	44.5	27	29.2	85	2.5	5.45				2.3	15.6				105	205	225	-
50	50.65	24	29.2	75	2.2	6.20				2.1	17.7				98	190	210	-
56	54.23	22	29.2	70	2.1	6.64				1.9	19.0				97	185	205	-
63	61.88	19	29.2	62	2.2	6.20				2.1	17.7				91	175	195	-
71	66.26	18	29.2	58	2.1	6.64				1.9	19.0				90	175	190	-
80	79.22	15	29.2	48	2.2	6.20	2.1	17.7	82	155	175	-						
90	84.83	14	29.2	45	2.1	6.64	1.9	19.0	81	155	170	-						
100	103.52	12	29.2	37	-	-	-	-	-	2.2	12.8	KF47	DRN100L4/Z 3.0 kW S1 IN=5.80 A (460V)	13.65	76	-	-	-
112	110.85	11	29.2	35	-	-				2.1	13.7				76	-	-	-
125	129.41	9.3	29.2	30	-	-				1.8	16.0				72	-	-	-
140	138.56	8.7	29.2	28	-	-				2.1	13.2				71	-	-	-
160	157.72	7.6	29.2	24	-	-				1.9	15.1				67	-	-	-
180	168.89	7.1	29.2	23	-	-				1.8	16.1				66	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	26.25	57	29.2	180	2.8	4.92	KF57	DRN90L4 1.5 kW S1 IN=3.45 A (400V)	35.70	2.6	14.1	KF77	DRN112M4/Z 4.0 kW S1 IN=8.10 A (400V)	38.39	110	280	310	-
28	28.1	53	29.2	170	2.6	5.27				2.4	15.1				110	275	305	-
31.5	32.81	46	29.2	145	2.2	6.16				2.1	17.6				105	260	290	-
35.5	35.13	43	29.2	135	2.1	6.59				1.9	18.8				105	260	285	-
40	41.56	36	29.2	115	2.2	6.16				2.1	17.6				105	240	265	-
45	44.5	34	29.2	105	2.1	6.59				1.9	18.8				105	235	260	-
50	50.65	30	29.2	94	1.8	7.50				1.7	21.4				99	220	240	-
56	54.23	28	29.2	88	1.7	8.03				1.6	23.0				98	215	240	-
63	61.88	24	29.2	77	1.8	7.50				1.7	21.4				93	200	225	-
71	66.26	23	29.2	72	1.7	8.03				1.6	23.0				92	200	220	-
80	79.22	19	29.2	61	1.8	7.50	-	-	-	1.7	21.4	KF47	DRN100L4/Z 3.4 kW S1 IN=6.40 A (400V)	13.65	84	180	200	-
90	84.83	18	29.2	57	1.7	8.03				1.6	23.0				83	180	200	-
100	103.52	14	29.2	46	-	-				1.9	15.3				80	-	-	-
112	110.85	14	29.2	43	-	-				1.7	16.4				79	-	-	-
125	129.41	12	29.2	37	-	-				1.5	19.2				75	-	-	-
140	138.56	11	29.2	35	-	-				1.8	15.9				75	-	-	-
160	157.72	9.5	29.2	30	-	-				1.6	18.1				70	-	-	-
180	168.89	8.9	29.2	28	-	-				1.5	19.4				69	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	26.25	69	29.2	215	3.4	4.07	KF57	DRN90L4 1.5 kW S1 IN=3.00 A (460V)	35.70	3.1	11.6	KF77	DRN112M4/Z 4.0 kW S1 IN=7.20 A (460V)	38.39	95	305	340	-
28	28.1	64	29.2	205	3.2	4.36				2.9	12.4				95	305	340	-
31.5	32.81	55	29.2	175	2.7	5.09				2.5	14.5				91	290	320	-
35.5	35.13	51	29.2	160	2.5	5.45				2.3	15.6				91	285	320	-
40	41.56	43	29.2	135	2.7	5.09				2.5	14.5				105	265	295	-
45	44.5	40	29.2	130	2.5	5.45				2.3	15.6				105	260	290	-
50	50.65	36	29.2	110	2.2	6.20				2.1	17.7				96	240	270	-
56	54.23	33	29.2	105	2.1	6.64				1.9	19.0				95	240	265	-
63	61.88	29	29.2	93	2.2	6.20				2.1	17.7				92	225	250	-
71	66.26	27	29.2	87	2.1	6.64				1.9	19.0				91	220	245	-
80	79.22	23	29.2	73	2.2	6.20	-	-	-	2.1	17.7	KF47	DRN100L4/Z 3.0 kW S1 IN=5.80 A (460V)	13.65	84	200	225	-
90	84.83	21	29.2	68	2.1	6.64				1.9	19.0				83	200	220	-
100	103.52	17	29.2	56	-	-				2.2	12.8				82	-	-	-
112	110.85	16	29.2	52	-	-				2.1	13.7				82	-	-	-
125	129.41	14	29.2	45	-	-				1.8	16.0				78	-	-	-
140	138.56	13	29.2	42	-	-				2.1	13.2				77	-	-	-
160	157.72	11	29.2	37	-	-				1.9	15.1				72	-	-	-
180	168.89	11	29.2	34	-	-				1.8	16.1				71	-	-	-

6.2.7 X.160 with 38.0 kNm

1000 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
20	20.23	49	38	205	3.6	5.56	KF67	DRN100L4 2.2 kW S1 IN=4.80 A (400V)	35.62	3.5	14.2	KF87	DRN132S4/Z 5.5 kW S1 IN=10.5 A (400V)	36.52	180	330	365	-
22.4	22.8	44	38	180	3.2	6.27				3.1	16.0				180	325	360	-
25	24.77	40	38	165	3.0	6.81				2.9	17.4				170	310	345	-
28	27.91	36	38	150	2.6	7.68				2.6	19.6				165	305	340	-
31.5	30.94	32	38	135	3.0	6.81				2.9	17.4				160	285	315	-
35.5	34.87	29	38	120	2.6	7.68				2.6	19.6				160	280	315	-
40	39.12	26	38	105	2.3	8.61				2.3	22.0				130	235	260	-
45	44.08	23	38	93	2.1	9.71				2.0	24.8				130	235	260	-
50	48.46	21	38	86	2.3	8.61				2.3	22.0				120	210	235	-
56	54.62	18	38	76	2.1	9.71				2.0	24.8				120	210	235	-
63	62.05	16	38	67	2.3	8.61	-	-	-	2.3	22.0	KF67	DRN132S4/Z 5.5 kW S1 IN=10.5 A (400V)	13.22	105	190	210	-
71	69.92	14	38	59	2.1	9.71				2.0	24.8				105	190	210	-
80	81.9	12	38	51	-	-				2.4	21.7				110	-	-	-
90	92.3	11	38	45	-	-				2.2	24.5				110	-	-	-
100	100.25	10	38	42	-	-				2.0	26.6				105	-	-	-
112	112.98	8.9	38	37	-	-				2.4	21.8				105	-	-	-
125	126.75	7.9	38	33	-	-				2.1	24.4				89	-	-	-
140	142.85	7	38	29	-	-				1.9	27.5				88	-	-	-

1200 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
20	20.23	59	38	245	4.4	4.60	KF67	DRN100L4 2.2 kW S1 IN=4.15 A (460V)	35.62	4.3	11.7	KF87	DRN132S4/Z 5.5 kW S1 IN=9.50 A (460V)	36.52	175	375	415	-
22.4	22.8	53	38	215	3.9	5.18				3.8	13.2				175	370	410	-
25	24.77	48	38	200	3.6	5.63				3.5	14.4				165	350	390	-
28	27.91	43	38	175	3.2	6.34				3.1	16.2				160	345	385	-
31.5	30.94	39	38	160	3.6	5.63				3.5	14.4				160	325	360	-
35.5	34.87	34	38	140	3.2	6.34				3.1	16.2				160	320	355	-
40	39.12	31	38	125	2.8	7.12				2.8	18.2				130	265	295	-
45	44.08	27	38	110	2.5	8.02				2.5	20.5				130	265	295	-
50	48.46	25	38	105	2.8	7.12				2.8	18.2				120	240	265	-
56	54.62	22	38	91	2.5	8.02				2.5	20.5				120	240	265	-
63	62.05	19	38	80	2.8	7.12	-	-	-	2.8	18.2	KF67	DRN132S4/Z 5.5 kW S1 IN=9.50 A (460V)	13.22	110	215	240	-
71	69.92	17	38	71	2.5	8.02				2.5	20.5				110	215	240	-
80	81.9	15	38	61	-	-				2.9	18.1				115	-	-	-
90	92.3	13	38	54	-	-				2.6	20.4				115	-	-	-
100	100.25	12	38	50	-	-				2.4	22.2				110	-	-	-
112	112.98	11	38	44	-	-				2.9	18.2				110	-	-	-
125	126.75	9.5	38	39	-	-				2.6	20.4				92	-	-	-
140	142.85	8.4	38	35	-	-				2.3	23.0				91	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
20	20.23	74	38	305	3.6	5.56	KF67	DRN100L4 2.2 kW S1 IN=4.80 A (400V)	35.62	3.5	14.2	KF87	DRN132S4/Z 5.5 kW S1 IN=10.5 A (400V)	36.52	150	425	475	-
22.4	22.8	66	38	270	3.2	6.27				3.1	16.0				150	420	470	-
25	24.77	61	38	250	3.0	6.81				2.9	17.4				140	400	445	-
28	27.91	54	38	220	2.6	7.68				2.6	19.6				145	395	440	-
31.5	30.94	48	38	200	3.0	6.81				2.9	17.4				150	375	415	-
35.5	34.87	43	38	175	2.6	7.68				2.6	19.6				150	370	410	-
40	39.12	38	38	160	2.3	8.61				2.3	22.0				120	310	340	-
45	44.08	34	38	140	2.1	9.71				2.0	24.8				120	305	340	-
50	48.46	31	38	130	2.3	8.61				2.3	22.0				120	280	310	-
56	54.62	27	38	115	2.1	9.71				2.0	24.8				120	275	305	-
63	62.05	24	38	100	2.3	8.61	-	-	-	2.3	22.0	KF67	DRN132S4/Z 5.5 kW S1 IN=10.5 A (400V)	13.22	110	250	280	-
71	69.92	21	38	89	2.1	9.71				2.0	24.8				110	250	275	-
80	81.9	18	38	76	-	-				2.4	21.7				120	-	-	-
90	92.3	16	38	68	-	-				2.2	24.5				120	-	-	-
100	100.25	15	38	62	-	-				2.0	26.6				110	-	-	-
112	112.98	13	38	55	-	-				2.4	21.8				110	-	-	-
125	126.75	12	38	49	-	-				2.1	24.4				94	-	-	-
140	142.85	11	38	44	-	-				1.9	27.5				93	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
n ₁ = 1800 min ⁻¹ (50Hz)																		
20	20.23	89	38	365	4.4	4.60	KF67	DRN100L4 2.2 kW S1 IN=4.15 A (460V)	35.62	4.3	11.7	KF87	DRN132S4/Z 5.5 kW S1 IN=9.50 A (460V)	36.52	115	465	520	-
22.4	22.8	79	38	325	3.9	5.18				3.8	13.2				120	460	510	-
25	24.77	73	38	300	3.6	5.63				3.5	14.4				115	440	490	-
28	27.91	64	38	265	3.2	6.34				3.1	16.2				115	435	485	-
31.5	30.94	58	38	240	3.6	5.63				3.5	14.4				130	410	460	-
35.5	34.87	52	38	215	3.2	6.34				3.1	16.2				130	405	455	-
40	39.12	46	38	190	2.8	7.12				2.8	18.2				105	340	380	-
45	44.08	41	38	170	2.5	8.02				2.5	20.5				110	340	375	-
50	48.46	37	38	155	2.8	7.12				2.8	18.2				110	310	345	-
56	54.62	33	38	135	2.5	8.02				2.5	20.5				110	305	340	-
63	62.05	29	38	120	2.8	7.12	-	-	-	2.8	18.2	KF67	DRN132S4/Z 5.5 kW S1 IN=9.50 A (460V)	13.22	105	280	310	-
71	69.92	26	38	105	2.5	8.02				2.5	20.5				105	275	305	-
80	81.9	22	38	92	-	-				2.9	18.1				120	-	-	-
90	92.3	20	38	81	-	-				2.6	20.4				115	-	-	-
100	100.25	18	38	75	-	-				2.4	22.2				110	-	-	-
112	112.98	16	38	66	-	-				2.9	18.2				110	-	-	-
125	126.75	14	38	59	-	-				2.6	20.4				93	-	-	-
140	142.85	13	38	53	-	-				2.3	23.0				92	-	-	-

6.2.8 X.170 with 47.5 kNm

1000 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.15	40	47.3	205	2.9	6.92	KF67	DRN100L4 2.2 kW S1 IN=4.80 A (400V)	35.62	2.9	17.6	KF87	DRN132S4/Z 5.5 kW S1 IN=10.5 A (400V)	36.52	190	345	385	-
28	28.26	35	47.5	180	2.6	7.77				2.5	19.8				185	340	375	-
31.5	30.78	32	47	165	2.4	8.47				2.3	21.6				180	325	360	-
35.5	34.6	29	47.5	150	2.1	9.52				2.1	24.3				175	320	355	-
40	38.45	26	46.9	130	2.4	8.47				2.3	21.6				165	300	330	-
45	43.22	23	47.5	120	2.1	9.52				2.1	24.3				165	295	325	-
50	48.62	21	46.9	105	1.9	10.7				1.8	27.3				140	245	275	-
56	54.64	18	47.5	94	1.7	12.0				1.6	30.7				135	245	270	-
63	60.23	17	46.6	85	1.9	10.7				1.8	27.3				125	220	245	-
71	67.69	15	47.5	77	1.7	12.0				1.6	30.7				125	220	245	-
80	77.11	13	46.4	66	1.9	10.7	1.8	27.3	115	200	220	-						
90	86.67	12	47.5	60	1.7	12.0	1.6	30.7	110	195	215	-						
100	101.79	9.8	45.6	49	-	-	-	-	-	2.0	27.0	KF67	DRN132S4/Z 5.5 kW S1 IN=10.5 A (400V)	13.22	120	-	-	-
112	114.4	8.7	47.3	45	-	-				1.7	30.4				115	-	-	-
125	124.6	8	46	40	-	-				1.6	33.1				110	-	-	-
140	140.03	7.1	47.5	37	-	-				1.9	27.0				110	-	-	-
160	157.54	6.3	45.4	32	-	-				1.7	30.4				93	-	-	-
180	177.05	5.6	47.2	29	-	-				1.5	34.1				92	-	-	-

1200 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.15	48	47.3	245	3.5	5.72	KF67	DRN100L4 2.2 kW S1 IN=4.15 A (460V)	35.62	3.4	14.6	KF87	DRN132S4/Z 5.5 kW S1 IN=9.50 A (460V)	36.52	185	390	435	-
28	28.26	42	47.5	220	3.1	6.42				3.1	16.4				185	385	425	-
31.5	30.78	39	47	200	2.9	7.00				2.8	17.9				175	370	410	-
35.5	34.6	35	47.5	180	2.6	7.87				2.5	20.1				170	360	400	-
40	38.45	31	46.9	160	2.9	7.00				2.8	17.9				170	340	375	-
45	43.22	28	47.5	145	2.6	7.87				2.5	20.1				165	335	370	-
50	48.62	25	46.9	125	2.3	8.85				2.2	22.6				140	280	310	-
56	54.64	22	47.5	115	2.0	9.95				2.0	25.4				135	275	305	-
63	60.23	20	46.6	100	2.3	8.85				2.2	22.6				130	255	280	-
71	67.69	18	47.5	92	2.0	9.95				2.0	25.4				125	250	275	-
80	77.11	16	46.4	79	2.3	8.85	-	-	-	2.2	22.6	KF67	DRN132S4/Z 5.5 kW S1 IN=9.50 A (460V)	13.22	115	225	250	-
90	86.67	14	47.5	72	2.0	9.95				2.0	25.4				115	225	250	-
100	101.79	12	45.6	59	-	-				2.3	22.5				120	-	-	-
112	114.4	10	47.3	54	-	-				2.1	25.3				120	-	-	-
125	124.6	9.6	46	49	-	-				1.9	27.6				115	-	-	-
140	140.03	8.6	47.5	45	-	-				2.3	22.5				115	-	-	-
160	157.54	7.6	45.4	38	-	-				2.1	25.3				96	-	-	-
180	177.05	6.8	47.2	35	-	-				1.8	28.5				95	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.15	60	47.3	305	2.9	6.92	KF67	DRN100L4 2.2 kW S1 IN=4.80 A (400V)	35.62	2.9	17.6	KF87	DRN132S4/Z 5.5 kW S1 IN=10.5 A (400V)	36.52	165	445	500	-
28	28.26	53	47.5	275	2.6	7.77				2.5	19.8				165	440	490	-
31.5	30.78	49	47	250	2.4	8.47				2.3	21.6				155	420	470	-
35.5	34.6	43	47.5	225	2.1	9.52				2.1	24.3				155	415	460	-
40	38.45	39	46.9	200	2.4	8.47				2.3	21.6				160	390	435	-
45	43.22	35	47.5	180	2.1	9.52				2.1	24.3				160	385	425	-
50	48.62	31	46.9	155	1.9	10.7				1.8	27.3				130	325	360	-
56	54.64	27	47.5	140	1.7	12.0				1.6	30.7				130	320	355	-
63	60.23	25	46.6	125	1.9	10.7				1.8	27.3				125	290	325	-
71	67.69	22	47.5	115	1.7	12.0				1.6	30.7				125	290	320	-
80	77.11	19	46.4	99	1.9	10.7	-	-	-	1.8	27.3	KF67	DRN132S4/Z 5.5 kW S1 IN=10.5 A (400V)	13.22	115	265	290	-
90	86.67	17	47.5	90	1.7	12.0				1.6	30.7				115	260	290	-
100	101.79	15	45.6	74	-	-				2.0	27.0				125	-	-	-
112	114.4	13	47.3	68	-	-				1.7	30.4				125	-	-	-
125	124.6	12	46	61	-	-				1.6	33.1				120	-	-	-
140	140.03	11	47.5	56	-	-				1.9	27.0				115	-	-	-
160	157.54	9.5	45.4	47	-	-				1.7	30.4				99	-	-	-
180	177.05	8.5	47.2	44	-	-				1.5	34.1				98	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.15	72	47.3	365	3.5	5.72	KF67	DRN100L4 2.2 kW S1 IN=4.15 A (460V)	35.62	3.4	14.6	KF87	DRN132S4/Z 5.5 kW S1 IN=9.50 A (460V)	36.52	130	490	550	-
28	28.26	64	47.5	330	3.1	6.42				3.1	16.4				130	480	540	-
31.5	30.78	58	47	300	2.9	7.00				2.8	17.9				125	465	520	-
35.5	34.6	52	47.5	270	2.6	7.87				2.5	20.1				125	455	510	-
40	38.45	47	46.9	240	2.9	7.00				2.8	17.9				140	435	480	-
45	43.22	42	47.5	215	2.6	7.87				2.5	20.1				140	425	475	-
50	48.62	37	46.9	190	2.3	8.85				2.2	22.6				115	360	400	-
56	54.64	33	47.5	170	2.0	9.95				2.0	25.4				115	355	395	-
63	60.23	30	46.6	150	2.3	8.85				2.2	22.6				115	325	360	-
71	67.69	27	47.5	140	2.0	9.95				2.0	25.4				115	320	355	-
80	77.11	23	46.4	120	2.3	8.85	-	-	-	2.2	22.6	KF67	DRN132S4/Z 5.5 kW S1 IN=9.50 A (460V)	13.22	115	290	325	-
90	86.67	21	47.5	110	2.0	9.95				2.0	25.4				110	290	320	-
100	101.79	18	45.6	88	-	-				2.3	22.5				125	-	-	-
112	114.4	16	47.3	82	-	-				2.1	25.3				125	-	-	-
125	124.6	14	46	73	-	-				1.9	27.6				115	-	-	-
140	140.03	13	47.5	67	-	-				2.3	22.5				115	-	-	-
160	157.54	11	45.4	57	-	-				2.1	25.3				98	-	-	-
180	177.05	10	47.2	53	-	-				1.8	28.5				97	-	-	-

6.2.9 X.180 with 61.0 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.55	39	61	260	2.7	10.3	KF77	DRN100L4 3.0 kW S1 IN=6.60 A (400V)	38.39	2.7	31.3	KF97	DRN132L4/Z 9.2 kW S1 IN=11.1 A (400V)	38.30	190	360	400	450
28	28.61	35	60.8	230	2.4	11.5				2.4	35.1				195	370	410	460
31.5	32.36	31	61	205	2.7	10.3				2.7	31.3				180	330	365	410
35.5	36.24	28	60.8	180	2.4	11.5				2.4	35.1				185	335	375	420
40	38.93	26	61	170	2.2	12.4				2.2	37.7				160	295	330	370
45	43.6	23	60.7	150	2.0	13.9				2.0	42.2				165	305	335	380
50	47.57	21	61	140	2.2	12.4				2.2	37.7				150	275	300	340
56	53.27	19	60.7	125	2.0	13.9				2.0	42.2				155	280	310	350
63	60.9	16	60.8	110	2.2	12.4				2.2	37.7				135	240	265	300
71	68.2	15	60.6	97	2.0	13.9				2.0	42.2				135	245	270	305
80	79.89	13	61	84	-	-	-	-	-	2.4	42.9	KF77	DRN160M4/Z 11.0 kW S1 IN=22.0 A (400V)	13.52	135	-	-	-
90	89.46	11	61	75	-	-				2.2	48.0				135	-	-	-
100	103.42	9.7	61	65	-	-				1.9	55.5				125	-	-	-
112	115.81	8.6	60.6	57	-	-				2.4	44.0				130	-	-	-
125	124.41	8	60.7	54	-	-				2.2	47.3				115	-	-	-
140	139.32	7.2	60.2	47	-	-				2.0	53.0				120	-	-	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.55	47	61	310	3.2	11.3	KF77	DRN100L4 3.0 kW S1 IN=7.20 A (460V)	38.39	3.2	25.9	KF97	DRN132L4/Z 9.2 kW S1 IN=16.8 A (460V)	38.30	185	405	450	510
28	28.61	42	60.8	275	2.9	12.7				2.9	29.0				190	415	460	520
31.5	32.36	37	61	245	3.2	11.3				3.2	25.9				175	375	415	470
35.5	36.24	33	60.8	220	2.9	12.7				2.9	29.0				180	380	420	475
40	38.93	31	61	205	2.7	13.6				2.7	31.2				160	335	375	420
45	43.6	28	60.7	180	2.4	15.3				2.4	35.0				165	345	380	430
50	47.57	25	61	170	2.7	13.6				2.7	31.2				150	310	345	390
56	53.27	23	60.7	150	2.4	15.3				2.4	35.0				155	315	350	395
63	60.9	20	60.8	130	2.7	13.6				2.7	31.2				135	270	300	340
71	68.2	18	60.6	115	2.4	15.3				2.4	35.0				135	275	305	345
80	79.89	15	61	100	-	-	-	-	-	2.9	35.7	KF77	DRN160M4/Z 11.0 kW S1 IN=19.1 A (460V)	13.52	140	-	-	-
90	89.46	13	61	90	-	-				2.6	40.0				140	-	-	-
100	103.42	12	61	78	-	-				2.3	46.2				130	-	-	-
112	115.81	10	60.6	69	-	-				2.9	36.7				135	-	-	-
125	124.41	9.6	60.7	64	-	-				2.7	39.4				120	-	-	-
140	139.32	8.6	60.2	57	-	-				2.4	44.1				120	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.55	59	61	390	2.7	10.3	KF77	DRN100L4 3.0 kW S1 IN=6.60 A (400V)	38.39	2.7	31.3	KF97	DRN132L4/Z 9.2 kW S1 IN=11.1 A (400V)	38.30	170	465	520	590
28	28.61	52	60.8	345	2.4	11.5				2.4	35.1				175	475	530	600
31.5	32.36	46	61	305	2.7	10.3				2.7	31.3				165	425	475	540
35.5	36.24	41	60.8	275	2.4	11.5				2.4	35.1				170	435	485	550
40	38.93	39	61	255	2.2	12.4				2.2	37.7				150	385	430	485
45	43.6	34	60.7	225	2.0	13.9				2.0	42.2				155	395	440	495
50	47.57	32	61	210	2.2	12.4				2.2	37.7				145	355	395	450
56	53.27	28	60.7	185	2.0	13.9				2.0	42.2				150	365	405	460
63	60.9	25	60.8	165	2.2	12.4				2.2	37.7				130	310	345	390
71	68.2	22	60.6	145	2.0	13.9				2.0	42.2				135	320	355	400
80	79.89	19	61	125	-	-	-	-	-	2.4	42.9	KF77	DRN160M4/Z 11.0 kW S1 IN=22.0 A (400V)	13.52	140	-	-	-
90	89.46	17	61	110	-	-				2.2	48.0				140	-	-	-
100	103.42	15	61	97	-	-				1.9	55.5				130	-	-	-
112	115.81	13	60.6	86	-	-				2.4	44.0				135	-	-	-
125	124.41	12	60.7	80	-	-				2.2	47.3				120	-	-	-
140	139.32	11	60.2	71	-	-				2.0	53.0				125	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.55	70	61	465	3.2	11.3	KF77	DRN100L4 3.0 kW S1 IN=7.20 A (460V)	38.39	3.2	25.9	KF97	DRN132L4/Z 9.2 kW S1 IN=16.8 A (460V)	38.30	145	510	570	650
28	28.61	63	60.8	415	2.9	12.7				2.9	29.0				155	520	580	660
31.5	32.36	56	61	370	3.2	11.3				3.2	25.9				145	470	520	600
35.5	36.24	50	60.8	325	2.9	12.7				2.9	29.0				155	480	530	610
40	38.93	46	61	305	2.7	13.6				2.7	31.2				135	425	475	540
45	43.6	41	60.7	270	2.4	15.3				2.4	35.0				140	435	485	550
50	47.57	38	61	255	2.7	13.6				2.7	31.2				135	395	440	500
56	53.27	34	60.7	225	2.4	15.3				2.4	35.0				140	400	450	510
63	60.9	30	60.8	195	2.7	13.6				2.7	31.2				125	345	385	435
71	68.2	26	60.6	175	2.4	15.3				2.4	35.0				130	350	390	445
80	79.89	23	61	150	-	-	-	-	-	2.9	35.7	KF77	DRN160M4/Z 11.0 kW S1 IN=19.1 A (460V)	13.52	135	-	-	-
90	89.46	20	61	135	-	-				2.6	40.0				140	-	-	-
100	103.42	17	61	115	-	-				2.3	46.2				130	-	-	-
112	115.81	16	60.6	105	-	-				2.9	36.7				135	-	-	-
125	124.41	14	60.7	96	-	-				2.7	39.4				120	-	-	-
140	139.32	13	60.2	85	-	-				2.4	44.1				120	-	-	-

6.2.10 X.190 with 69.0 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	28.53	35	68.3	260	2.4	11.5	KF77	DRN100L4 3.0 kW S1 IN=6.60 A (400V)	38.39	2.4	35.0	KF97	DRN132L4/Z 9.2 kW S1 IN=11.1 A (400V)	38.30	205	385	425	470
31.5	32.06	31	67.3	230	2.1	12.9				2.1	39.3				210	385	430	475
35.5	36.14	28	68.2	205	2.4	11.5				2.4	35.0				190	350	385	430
40	40.61	25	67.3	180	2.1	12.9				2.1	39.3				195	355	390	430
45	43.48	23	69	170	2.0	13.9				2.0	42.1				175	315	350	385
50	48.85	20	67.2	150	1.8	15.6				1.8	47.3				175	320	350	390
56	53.11	19	69	140	2.0	13.9				2.0	42.1				160	290	320	355
63	59.68	17	67.2	125	1.8	15.6				1.8	47.3				160	290	325	360
71	68	15	67.9	110	2.0	13.9				2.0	42.1				140	250	280	310
80	76.41	13	67.2	96	1.8	15.6				1.8	47.3				140	255	280	310
90	89.21	11	69	85	-	-	-	-	-	2.2	47.9	KF77	DRN160M4/Z 11.0 kW S1 IN=22.0 A (400V)	13.52	140	-	-	-
100	100.24	10	67.8	74	-	-				2.0	53.8				145	-	-	-
112	115.48	8.7	68.4	65	-	-				1.7	62.0				135	-	-	-
125	129.76	7.7	67.7	57	-	-				2.1	49.3				135	-	-	-
140	138.93	7.2	69	54	-	-				2.0	52.8				120	-	-	-
160	156.11	6.4	67.6	47	-	-				1.8	59.3				125	-	-	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	28.53	42	68.3	310	2.9	12.6	KF77	DRN100L4 3.0 kW S1 IN=7.20 A (460V)	38.39	2.9	29.0	KF97	DRN132L4/Z 9.2 kW S1 IN=16.8 A (460V)	38.30	200	430	480	530
31.5	32.06	37	67.3	275	2.6	14.2				2.6	32.6				205	435	485	540
35.5	36.14	33	68.2	245	2.9	12.6				2.9	29.0				190	395	440	485
40	40.61	30	67.3	215	2.6	14.2				2.6	32.6				190	400	445	490
45	43.48	28	69	205	2.4	15.2				2.4	34.9				170	355	395	440
50	48.85	25	67.2	180	2.1	17.1				2.1	39.2				175	360	400	445
56	53.11	23	69	170	2.4	15.2				2.4	34.9				160	330	365	405
63	59.68	20	67.2	150	2.1	17.1				2.1	39.2				165	330	370	410
71	68	18	67.9	130	2.4	15.2				2.4	34.9				140	285	315	350
80	76.41	16	67.2	115	2.1	17.1				2.1	39.2				145	290	320	355
90	89.21	13	69	100	-	-	-	-	-	2.6	39.9	KF77	DRN160M4/Z 11.0 kW S1 IN=19.1 A (460V)	13.52	145	-	-	-
100	100.24	12	67.8	89	-	-				2.3	44.8				145	-	-	-
112	115.48	10	68.4	78	-	-				2.0	51.6				140	-	-	-
125	129.76	9.2	67.7	69	-	-				2.6	41.1				140	-	-	-
140	138.93	8.6	69	65	-	-				2.4	44.0				125	-	-	-
160	156.11	7.7	67.6	57	-	-				2.1	49.4				125	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	28.53	53	68.3	390	2.4	11.5	KF77	DRN100L4 3.0 kW S1 IN=6.60 A (400V)	38.39	2.4	35.0	KF97	DRN132L4/Z 9.2 kW S1 IN=11.1 A (400V)	38.30	185	495	550	610
31.5	32.06	47	67.3	340	2.1	12.9				2.1	39.3				190	500	560	620
35.5	36.14	42	68.2	305	2.4	11.5				2.4	35.0				175	450	500	560
40	40.61	37	67.3	270	2.1	12.9				2.1	39.3				180	455	510	560
45	43.48	34	69	260	2.0	13.9				2.0	42.1				160	410	455	510
50	48.85	31	67.2	225	1.8	15.6				1.8	47.3				165	415	460	510
56	53.11	28	69	215	2.0	13.9				2.0	42.1				155	375	420	465
63	59.68	25	67.2	185	1.8	15.6				1.8	47.3				160	380	425	470
71	68	22	67.9	165	2.0	13.9				2.0	42.1				140	330	365	405
80	76.41	20	67.2	145	1.8	15.6				1.8	47.3				145	335	370	410
90	89.21	17	69	125	-	-	-	-	-	2.2	47.9	KF77	DRN160M4/Z 11.0 kW S1 IN=22.0 A (400V)	13.52	145	-	-	-
100	100.24	15	67.8	110	-	-				2.0	53.8				150	-	-	-
112	115.48	13	68.4	97	-	-				1.7	62.0				140	-	-	-
125	129.76	12	67.7	86	-	-				2.1	49.3				140	-	-	-
140	138.93	11	69	82	-	-				2.0	52.8				125	-	-	-
160	156.11	9.6	67.6	71	-	-				1.8	59.3				130	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	28.53	63	68.3	465	2.9	12.6	KF77	DRN100L4 3.0 kW S1 IN=7.20 A (460V)	38.39	2.9	29.0	KF97	DRN132L4/Z 9.2 kW S1 IN=16.8 A (460V)	38.30	160	540	600	680
31.5	32.06	56	67.3	410	2.6	14.2				2.6	32.6				165	550	610	680
35.5	36.14	50	68.2	370	2.9	12.6				2.9	29.0				160	500	560	620
40	40.61	44	67.3	325	2.6	14.2				2.6	32.6				165	500	560	630
45	43.48	41	69	310	2.4	15.2				2.4	34.9				145	450	500	560
50	48.85	37	67.2	270	2.1	17.1				2.1	39.2				150	455	510	570
56	53.11	34	69	255	2.4	15.2				2.4	34.9				145	415	465	520
63	59.68	30	67.2	220	2.1	17.1				2.1	39.2				145	420	470	520
71	68	26	67.9	195	2.4	15.2				2.4	34.9				135	365	405	450
80	76.41	24	67.2	175	2.1	17.1				2.1	39.2				135	370	410	455
90	89.21	20	69	155	-	-	-	-	-	2.6	39.9	KF77	DRN160M4/Z 11.0 kW S1 IN=19.1 A (460V)	13.52	145	-	-	-
100	100.24	18	67.8	135	-	-				2.3	44.8				145	-	-	-
112	115.48	16	68.4	115	-	-				2.0	51.6				140	-	-	-
125	129.76	14	67.7	105	-	-				2.6	41.1				140	-	-	-
140	138.93	13	69	98	-	-				2.4	44.0				125	-	-	-
160	156.11	12	67.6	85	-	-				2.1	49.4				125	-	-	-

6.2.11 X.200 with 83.0 kNm

1000 min⁻¹

						Empty buckets					Full buckets					P _{TH} 20°C			
																			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW	
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm								
25	25.72	39	83	350	2.7	13.5	KF77	DRN112M4 4.0 kW S1 IN=8.10 A (400V)	38.39	2.7	36.9	KF97	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	38.30	230	450	495	560	
28	29.17	34	83	310	2.4	15.3				2.4	41.9				230	440	485	550	
31.5	31.97	31	83	280	2.7	13.5				2.7	36.9				215	400	445	500	
35.5	36.26	28	83	250	2.4	15.3				2.4	41.9				210	395	435	490	
40	39.61	25	83	225	2.2	16.8				2.2	45.8				210	390	430	480	
45	44.92	22	83	200	1.9	19.0				1.9	51.9				210	380	420	470	
50	48.39	21	83	190	2.2	16.8				2.2	45.8				200	365	405	450	
56	54.88	18	83	165	1.9	19.0				1.9	51.9				195	355	395	445	
63	61.95	16	83	145	2.2	16.8				2.2	45.8				185	330	365	410	
71	70.26	14	83	130	1.9	19.0				1.9	51.9				180	325	360	400	
80	79.69	13	83	115	-	-	-	-	-	2.5	42.8	KF77	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	13.52	175	-	-	-	
90	90.37	11	83	100	-	-				2.2	48.5				170	-	-	-	
100	99.7	10	83	91	-	-				2.0	53.5				160	-	-	-	
112	113.07	8.8	83	80	-	-				1.7	60.7				155	-	-	-	
125	123.51	8.1	83	74	-	-				1.6	66.3				155	-	-	-	
140	140.07	7.1	83	65	-	-				2.0	53.2				9.56	150	-	-	-

1200 min⁻¹

Empty buckets										Full buckets					P _{TH} 20°C			
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.72	47	83	420	3.3	11.2	KF77	DRN112M4 4.0 kW S1 IN=7.20 A (460V)	38.39	3.3	30.6	KF97	DRN160M4 11.0 kW S1 IN=19.1 A (460V)	38.30	220	510	560	630
28	29.17	41	83	370	2.9	12.7				2.9	34.7				220	495	550	620
31.5	31.97	38	83	340	3.3	11.2				3.3	30.6				210	455	500	570
35.5	36.26	33	83	300	2.9	12.7				2.9	34.7				205	445	495	560
40	39.61	30	83	275	2.6	13.9				2.7	38.0				210	440	485	550
45	44.92	27	83	240	2.3	15.7				2.3	43.0				205	430	475	540
50	48.39	25	83	225	2.6	13.9				2.7	38.0				200	415	460	510
56	54.88	22	83	200	2.3	15.7				2.3	43.0				200	405	450	500
63	61.95	19	83	175	2.6	13.9				2.7	38.0				185	375	415	465
71	70.26	17	83	155	2.3	15.7				2.3	43.0				180	370	410	455
80	79.69	15	83	135	-	-	-	-	-	2.9	35.6	KF77	DRN160M4 11.0 kW S1 IN=19.1 A (460V)	13.52	175	-	-	-
90	90.37	13	83	120	-	-				2.6	40.4				175	-	-	-
100	99.7	12	83	110	-	-				2.4	44.6				165	-	-	-
112	113.07	11	83	97	-	-				2.1	50.6				160	-	-	-
125	123.51	9.7	83	88	-	-				1.9	55.2				160	-	-	-
140	140.07	8.6	83	78	-	-				2.4	44.4				9.56	155	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.72	58	83	520	2.7	13.5	KF77	DRN112M4 4.0 kW S1 IN=8.10 A (400V)	38.39	2.7	36.9	KF97	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	38.30	195	570	640	720
28	29.17	51	83	465	2.4	15.3				2.4	41.9				190	560	630	710
31.5	31.97	47	83	420	2.7	13.5				2.7	36.9				195	520	580	650
35.5	36.26	41	83	370	2.4	15.3				2.4	41.9				195	510	570	640
40	39.61	38	83	340	2.2	16.8				2.2	45.8				195	500	560	630
45	44.92	33	83	300	1.9	19.0				1.9	51.9				190	490	550	620
50	48.39	31	83	280	2.2	16.8				2.2	45.8				195	475	530	590
56	54.88	27	83	250	1.9	19.0				1.9	51.9				190	465	520	580
63	61.95	24	83	220	2.2	16.8				2.2	45.8				180	430	480	540
71	70.26	21	83	195	1.9	19.0				1.9	51.9				180	420	470	530
80	79.69	19	83	170	-	-	-	-	-	2.5	42.8	KF77	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	13.52	180	-	-	-
90	90.37	17	83	150	-	-				2.2	48.5				175	-	-	-
100	99.7	15	83	135	-	-				2.0	53.5				165	-	-	-
112	113.07	13	83	120	-	-				1.7	60.7				160	-	-	-
125	123.51	12	83	110	-	-				1.6	66.3				160	-	-	-
140	140.07	11	83	97	-	-				2.0	53.2				155	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.72	70	83	630	3.3	11.2	KF77	DRN112M4 4.0 kW S1 IN=7.20 A (460V)	38.39	3.3	30.6	KF97	DRN160M4 11.0 kW S1 IN=19.1 A (460V)	38.30	155	620	700	800
28	29.17	62	83	560	2.9	12.7				2.9	34.7				155	610	680	780
31.5	31.97	56	83	510	3.3	11.2				3.3	30.6				170	570	630	720
35.5	36.26	50	83	445	2.9	12.7				2.9	34.7				170	560	620	710
40	39.61	45	83	410	2.6	13.9				2.7	38.0				175	550	620	700
45	44.92	40	83	360	2.3	15.7				2.3	43.0				170	540	600	680
50	48.39	37	83	340	2.6	13.9				2.7	38.0				175	520	580	660
56	54.88	33	83	300	2.3	15.7				2.3	43.0				175	510	570	640
63	61.95	29	83	265	2.6	13.9				2.7	38.0				170	475	530	600
71	70.26	26	83	235	2.3	15.7				2.3	43.0				165	465	520	590
80	79.69	23	83	205	-	-	-	-	-	2.9	35.6	KF77	DRN160M4 11.0 kW S1 IN=19.1 A (460V)	13.52	175	-	-	-
90	90.37	20	83	180	-	-				2.6	40.4				170	-	-	-
100	99.7	18	83	165	-	-				2.4	44.6				160	-	-	-
112	113.07	16	83	145	-	-				2.1	50.6				160	-	-	-
125	123.51	15	83	135	-	-				1.9	55.2				160	-	-	-
140	140.07	13	83	115	-	-				2.4	44.4				155	-	-	-

6.2.12 X.210 with 96.0 kNm

1000 min⁻¹

							Empty buckets			Full buckets			P _{TH} 20°C					
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	29.13	34	96	355	2.4	15.3	KF77	DRN112M4 4.0 kW S1 IN=8.10 A (400V)	38.39	2.4	41.8	KF97	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	38.30	240	455	510	560
31.5	32.97	30	96	315	2.1	17.3				2.1	47.4				235	445	495	550
35.5	36.2	28	96	285	2.4	15.3				2.4	41.8				220	410	455	500
40	40.99	24	96	255	2.1	17.3				2.1	47.4				215	400	445	490
45	44.85	22	96	230	1.9	19.0				1.9	51.8				215	395	440	485
50	50.78	20	96	205	1.7	21.5				1.7	58.7				210	385	430	470
56	54.79	18	96	190	1.9	19.0				1.9	51.8				205	370	410	455
63	62.03	16	96	170	1.7	21.5				1.7	58.7				200	365	400	445
71	70.15	14	94	145	1.9	19.0				1.9	51.8				185	335	375	410
80	79.42	13	96	130	1.7	21.5				1.7	58.7				180	330	365	400
90	90.23	11	95.3	115	-	-	-	-	-	2.2	48.4	KF77	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	13.52	180	-	-	-
100	102.16	9.8	96	105	-	-				1.9	54.8				175	-	-	-
112	112.9	8.9	95.5	93	-	-				1.7	60.6				165	-	-	-
125	127.82	7.8	96	82	-	-				1.5	68.6				160	-	-	-
140	139.86	7.2	95.1	75	-	-				2.0	53.2				160	-	-	-
160	158.34	6.3	96	66	-	-				1.7	60.2				155	-	-	-

1200 min⁻¹

							Empty buckets			Full buckets					P _{TH} 20°C			
																		
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	29.13	41	96	430	2.9	12.7	KF77	DRN112M4 4.0 kW S1 IN=7.20 A (460V)	38.39	2.9	34.7	KF97	DRN160M4 11.0 kW S1 IN=19.1 A (460V)	38.30	225	520	570	630
31.5	32.97	36	96	380	2.5	14.3				2.6	39.3				225	500	560	620
35.5	36.2	33	96	345	2.9	12.7				2.9	34.7				215	465	520	570
40	40.99	29	96	305	2.5	14.3				2.6	39.3				210	455	500	560
45	44.85	27	96	280	2.3	15.7				2.3	43.0				215	450	495	550
50	50.78	24	96	245	2.1	17.8				2.1	48.7				210	435	485	540
56	54.79	22	96	230	2.3	15.7				2.3	43.0				205	420	470	520
63	62.03	19	96	205	2.1	17.8				2.1	48.7				200	410	455	500
71	70.15	17	94	175	2.3	15.7				2.3	43.0				190	385	425	470
80	79.42	15	96	160	2.1	17.8				2.1	48.7				185	375	415	455
90	90.23	13	95.3	140	-	-	-	-	-	2.6	40.3	KF77	DRN160M4 11.0 kW S1 IN=19.1 A (460V)	13.52	180	-	-	-
100	102.16	12	96	125	-	-				2.3	45.7				180	-	-	-
112	112.9	11	95.5	110	-	-				2.1	50.5				165	-	-	-
125	127.82	9.4	96	99	-	-				1.8	57.1				165	-	-	-
140	139.86	8.6	95.1	89	-	-				2.4	44.3				160	-	-	-
160	158.34	7.6	96	80	-	-				2.1	50.1				160	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	29.13	51	96	540	2.4	15.3	KF77	DRN112M4 4.0 kW S1 IN=8.10 A (400V)	38.39	2.4	41.8	KF97	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	38.30	200	590	650	730
31.5	32.97	45	96	475	2.1	17.3				2.1	47.4				200	570	640	710
35.5	36.2	41	96	430	2.4	15.3				2.4	41.8				200	530	590	650
40	40.99	37	96	380	2.1	17.3				2.1	47.4				200	520	580	640
45	44.85	33	96	350	1.9	19.0				1.9	51.8				200	510	570	630
50	50.78	30	96	305	1.7	21.5				1.7	58.7				195	500	560	620
56	54.79	27	96	290	1.9	19.0				1.9	51.8				200	485	540	590
63	62.03	24	96	255	1.7	21.5				1.7	58.7				195	475	530	580
71	70.15	21	94	220	1.9	19.0				1.9	51.8				185	440	490	540
80	79.42	19	96	200	1.7	21.5				1.7	58.7				180	430	480	530
90	90.23	17	95.3	175	-	-	-	-	-	2.2	48.4	KF77	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	13.52	180	-	-	-
100	102.16	15	96	155	-	-				1.9	54.8				180	-	-	-
112	112.9	13	95.5	140	-	-				1.7	60.6				170	-	-	-
125	127.82	12	96	125	-	-				1.5	68.6				165	-	-	-
140	139.86	11	95.1	110	-	-				2.0	53.2				165	-	-	-
160	158.34	9.5	96	100	-	-				1.7	60.2				160	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	29.13	62	96	640	2.9	12.7	KF77	DRN112M4 4.0 kW S1 IN=7.20 A (460V)	38.39	2.9	34.7	KF97	DRN160M4 11.0 kW S1 IN=19.1 A (460V)	38.30	165	640	720	800
31.5	32.97	55	96	570	2.5	14.3				2.6	39.3				165	620	700	780
35.5	36.2	50	96	520	2.9	12.7				2.9	34.7				175	580	650	720
40	40.99	44	96	455	2.5	14.3				2.6	39.3				175	570	640	710
45	44.85	40	96	420	2.3	15.7				2.3	43.0				180	560	630	700
50	50.78	35	96	370	2.1	17.8				2.1	48.7				175	550	610	680
56	54.79	33	96	345	2.3	15.7				2.3	43.0				185	530	600	660
63	62.03	29	96	305	2.1	17.8				2.1	48.7				180	520	580	640
71	70.15	26	94	265	2.3	15.7				2.3	43.0				175	485	540	600
80	79.42	23	96	240	2.1	17.8				2.1	48.7				170	475	530	590
90	90.23	20	95.3	210	-	-	-	-	-	2.6	40.3	KF77	DRN160M4 11.0 kW S1 IN=19.1 A (460V)	13.52	180	-	-	-
100	102.16	18	96	185	-	-				2.3	45.7				175	-	-	-
112	112.9	16	95.5	165	-	-				2.1	50.5				165	-	-	-
125	127.82	14	96	150	-	-				1.8	57.1				160	-	-	-
140	139.86	13	95.1	135	-	-				2.4	44.3				160	-	-	-
160	158.34	11	96	120	-	-				2.1	50.1				160	-	-	-

6.2.13 X.220 with 117 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																RAD	AXIAL	AXIAL /HT
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	29.13	34	96	355	2.4	15.3	KF77	DRN112M4 4.0 kW S1 IN=8.10 A (400V)	38.39	2.4	41.8	KF97	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	38.30	240	455	510	560
31.5	32.97	30	96	315	2.1	17.3				2.1	47.4				235	445	495	550
35.5	36.2	28	96	285	2.4	15.3				2.4	41.8				220	410	455	500
40	40.99	24	96	255	2.1	17.3				2.1	47.4				215	400	445	490
45	44.85	22	96	230	1.9	19.0				1.9	51.8				215	395	440	485
50	50.78	20	96	205	1.7	21.5				1.7	58.7				210	385	430	470
56	54.79	18	96	190	1.9	19.0				1.9	51.8				205	370	410	455
63	62.03	16	96	170	1.7	21.5				1.7	58.7				200	365	400	445
71	70.15	14	94	145	1.9	19.0				1.9	51.8				185	335	375	410
80	79.42	13	96	130	1.7	21.5				1.7	58.7				180	330	365	400
90	90.23	11	95.3	115	-	-	-	-	-	2.2	48.4	KF77	DRN160M4 11.0 kW S1 IN=22.0 A (400V)	13.52	180	-	-	-
100	102.16	9.8	96	105	-	-				1.9	54.8				175	-	-	-
112	112.9	8.9	95.5	93	-	-				1.7	60.6				165	-	-	-
125	127.82	7.8	96	82	-	-				1.5	68.6				160	-	-	-
140	139.86	7.2	95.1	75	-	-				2.0	53.2				160	-	-	-
160	158.34	6.3	96	66	-	-				1.7	60.2				155	-	-	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																RAD	AXIAL	AXIAL /HT
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.28	47	115.8	600	3.4	10.6	KF87	DRN112M4 4.0 kW S1 IN=7.20 A (460V)	36.52	3.4	49.7	KF107	DRN180M4 18.5 kW S1 IN=30.0 A (460V)	37.00	305	680	760	850
28	27.9	43	114.3	530	3.1	11.8				3.1	54.9				300	660	740	830
31.5	32.02	37	115.8	470	3.4	10.6				3.4	49.7				290	610	680	760
35.5	35.34	34	113.6	420	3.1	11.8				3.1	54.9				285	600	660	740
40	39.55	30	117	385	2.8	13.2				2.8	61.4				270	570	630	700
45	43.65	27	113.6	340	2.5	14.5				2.5	67.8				265	550	610	690
50	48.32	25	117	320	2.8	13.2				2.8	61.4				255	520	570	640
56	53.33	23	113.1	280	2.5	14.5				2.5	67.8				250	500	560	630
63	61.86	19	117	250	2.8	13.2				2.8	61.4				225	460	510	570
71	68.27	18	112.8	215	2.5	14.5				2.5	67.8				220	450	495	560
80	81.61	15	114.8	185	-	-	-	-	-	3.1	57.0	KF87	DRN180M4 18.5 kW S1 IN=30.0 A (460V)	12.56	240	-	-	-
90	90.07	13	111.8	165	-	-				2.8	62.9				235	-	-	-
100	99.97	12	115.8	150	-	-				2.5	69.8				220	-	-	-
112	110.34	11	111.5	135	-	-				3.5	50.9				215	-	-	-
125	123.47	9.7	116.2	125	-	-				3.1	56.9				205	-	-	-
140	136.27	8.8	111.6	110	-	-				2.8	62.8				200	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.28	59	115.8	740	2.8	12.9	KF87	DRN112M4 4.0 kW S1 IN=8.10 A (400V)	36.52	2.8	59.9	KF107	DRN180M4 18.5 kW S1 IN=34.5 A (400V)	37.00	270	770	860	970
28	27.9	54	114.3	670	2.6	14.2				2.6	66.1				265	750	840	950
31.5	32.02	47	115.8	590	2.8	12.9				2.8	59.9				275	700	780	880
35.5	35.34	42	113.6	520	2.6	14.2				2.6	66.1				270	680	760	860
40	39.55	38	117	480	2.3	15.9				2.3	74.0				255	640	710	810
45	43.65	34	113.6	425	2.1	17.6				2.1	81.7				250	630	700	790
50	48.32	31	117	395	2.3	15.9				2.3	74.0				240	590	660	740
56	53.33	28	113.1	350	2.1	17.6				2.1	81.7				235	580	640	720
63	61.86	24	117	310	2.3	15.9				2.3	74.0				220	520	580	650
71	68.27	22	112.8	270	2.1	17.6				2.1	81.7				215	510	570	640
80	81.61	18	114.8	230	-	-	-	-	-	2.6	68.4	KF87	DRN180M4 18.5 kW S1 IN=34.5 A (400V)	12.56	245	-	-	-
90	90.07	17	111.8	205	-	-				2.3	75.5				240	-	-	-
100	99.97	15	115.8	190	-	-				2.1	83.8				225	-	-	-
112	110.34	14	111.5	165	-	-				2.9	61.0				220	-	-	-
125	123.47	12	116.2	155	-	-				2.6	68.3				210	-	-	-
140	136.27	11	111.6	135	-	-				2.3	75.4				205	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.28	71	115.8	890	3.4	10.6	KF87	DRN112M4 4.0 kW S1 IN=7.20 A (460V)	36.52	3.4	49.7	KF107	DRN180M4 18.5 kW S1 IN=30.0 A (460V)	37.00	215	840	940	1050
28	27.9	65	114.3	800	3.1	11.8				3.1	54.9				215	820	920	1050
31.5	32.02	56	115.8	710	3.4	10.6				3.4	49.7				240	770	860	970
35.5	35.34	51	113.6	630	3.1	11.8				3.1	54.9				235	750	840	940
40	39.55	46	117	580	2.8	13.2				2.8	61.4				225	710	790	890
45	43.65	41	113.6	510	2.5	14.5				2.5	67.8				225	690	770	870
50	48.32	37	117	475	2.8	13.2				2.8	61.4				220	650	730	820
56	53.33	34	113.1	420	2.5	14.5				2.5	67.8				215	640	710	800
63	61.86	29	117	375	2.8	13.2				2.8	61.4				200	580	640	730
71	68.27	26	112.8	325	2.5	14.5				2.5	67.8				200	570	630	710
80	81.61	22	114.8	280	-	-	-	-	-	3.1	57.0	KF87	DRN180M4 18.5 kW S1 IN=30.0 A (460V)	12.56	240	-	-	-
90	90.07	20	111.8	245	-	-				2.8	62.9				240	-	-	-
100	99.97	18	115.8	230	-	-				2.5	69.8				225	-	-	-
112	110.34	16	111.5	200	-	-				3.5	50.9				220	-	-	-
125	123.47	15	116.2	185	-	-				3.1	56.9				210	-	-	-
140	136.27	13	111.6	160	-	-				2.8	62.8				205	-	-	-

6.2.14 X.230 with 134 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	28,63	35	129,9	490	2.5	14.6	KF87	DRN112M4 4.0 kW S1 IN=8.10 A (400V)	36.52	2.5	67.9	KF107	DRN180M4 18.5 kW S1 IN=34.5 A (400V)	37.00	325	620	680	750
31,5	31,43	32	132,7	460	2.3	16.0				2.3	74.5				320	600	670	740
35,5	36,26	28	129,9	390	2.5	14.6				2.5	67.9				300	550	610	670
40	39,82	25	131,9	360	2.3	16.0				2.3	74.5				295	540	600	660
45	44,78	22	132,2	320	2.0	18.0				2.0	83.8				280	510	560	620
50	49,17	20	131,9	290	1.8	19.8				1.8	92.1				275	500	550	610
56	54,71	18	132,2	265	2.0	18.0				2.0	83.8				260	465	510	560
63	60,08	17	131,3	240	1.8	19.8				1.8	92.1				255	455	500	550
71	70,05	14	132,2	205	2.0	18.0				2.0	83.8				230	410	455	500
80	76,91	13	130,8	185	1.8	19.8				1.8	92.1				225	405	445	490
90	92,41	11	128,9	155	-	-	-	-	-	2.3	77.5	KF87	DRN180M4 18.5 kW S1 IN=34.5 A (400V)	12.56	240	-	-	-
100	101,47	9,9	129,6	140	-	-				2.1	85.1				235	-	-	-
112	113,21	8,8	129,9	125	-	-				1.9	94.9				220	-	-	-
125	124,31	8	129	115	-	-				1.7	104				215	-	-	-
140	139,81	7,2	132,2	105	-	-				2.3	77.3				205	-	-	-
160	153,52	6,5	129,3	92	-	-				2.1	84.9				200	-	-	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	28,63	42	129,9	590	3.0	12.1	KF87	DRN112M4 4.0 kW S1 IN=7.20 A (460V)	36.52	3.0	56.3	KF107	DRN180M4 18.5 kW S1 IN=30.0 A (460V)	37.00	310	690	770	850
31,5	31,43	38	132,7	550	2.8	13.2				2.7	61.8				305	680	750	830
35,5	36,26	33	129,9	465	3.0	12.1				3.0	56.3				300	620	690	760
40	39,82	30	131,9	430	2.8	13.2				2.7	61.8				295	610	680	750
45	44,78	27	132,2	385	2.5	14.9				2.4	69.6				275	580	640	700
50	49,17	24	131,9	350	2.2	16.4				2.2	76.4				270	560	620	690
56	54,71	22	132,2	315	2.5	14.9				2.4	69.6				260	530	580	640
63	60,08	20	131,3	285	2.2	16.4				2.2	76.4				255	520	570	630
71	70,05	17	132,2	250	2.5	14.9				2.4	69.6				230	465	520	570
80	76,91	16	130,8	225	2.2	16.4				2.2	76.4				230	460	510	560
90	92,41	13	128,9	185	-	-	-	-	-	2.7	64.6	KF87	DRN180M4 18.5 kW S1 IN=30.0 A (460V)	12.56	245	-	-	-
100	101,47	12	129,6	170	-	-				2.5	70.9				240	-	-	-
112	113,21	11	129,9	150	-	-				2.2	79.1				225	-	-	-
125	124,31	9,7	129	135	-	-				2.0	86.8				220	-	-	-
140	139,81	8,6	132,2	125	-	-				2.7	64.5				210	-	-	-
160	153,52	7,8	129,3	110	-	-				2.5	70.8				205	-	-	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	28,63	52	129,9	740	2.5	14.6	KF87	DRN112M4 4.0 kW S1 IN=8.10 A (400V)	36.52	2.5	67.9	KF107	DRN180M4 18.5 kW S1 IN=34.5 A (400V)	37.00	280	790	880	970
31,5	31,43	48	132,7	690	2.3	16.0				2.3	74.5				275	770	860	950
35,5	36,26	41	129,9	580	2.5	14.6				2.5	67.9				280	710	790	880
40	39,82	38	131,9	540	2.3	16.0				2.3	74.5				275	700	780	860
45	44,78	33	132,2	480	2.0	18.0				2.0	83.8				260	650	730	810
50	49,17	31	131,9	435	1.8	19.8				1.8	92.1				255	650	720	790
56	54,71	27	132,2	395	2.0	18.0				2.0	83.8				245	600	670	740
63	60,08	25	131,3	360	1.8	19.8				1.8	92.1				245	590	660	730
71	70,05	21	132,2	310	2.0	18.0				2.0	83.8				225	530	590	650
80	76,91	20	130,8	280	1.8	19.8				1.8	92.1				220	530	580	640
90	92,41	16	128,9	230	-	-	-	-	-	2.3	77.5	KF87	DRN180M4 18.5 kW S1 IN=34.5 A (400V)	12.56	250	-	-	-
100	101,47	15	129,6	210	-	-				2.1	85.1				245	-	-	-
112	113,21	13	129,9	190	-	-				1.9	94.9				230	-	-	-
125	124,31	12	129	170	-	-				1.7	104				225	-	-	-
140	139,81	11	132,2	155	-	-				2.3	77.3				215	-	-	-
160	153,52	9,8	129,3	140	-	-				2.1	84.9				210	-	-	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	28,63	63	129,9	890	3.0	12.1	KF87	DRN112M4 4.0 kW S1 IN=7.20 A (460V)	36.52	3.0	56.3	KF107	DRN180M4 18.5 kW S1 IN=30.0 A (460V)	37.00	225	860	960	1050
31,5	31,43	57	132,7	820	2.8	13.2				2.7	61.8				225	840	940	1050
35,5	36,26	50	129,9	700	3.0	12.1				3.0	56.3				250	780	870	970
40	39,82	45	131,9	650	2.8	13.2				2.7	61.8				245	770	860	950
45	44,78	40	132,2	580	2.5	14.9				2.4	69.6				235	720	800	890
50	49,17	37	131,9	520	2.2	16.4				2.2	76.4				230	710	790	880
56	54,71	33	132,2	475	2.5	14.9				2.4	69.6				225	660	740	820
63	60,08	30	131,3	430	2.2	16.4				2.2	76.4				225	650	730	800
71	70,05	26	132,2	370	2.5	14.9				2.4	69.6				210	590	660	730
80	76,91	23	130,8	335	2.2	16.4				2.2	76.4				205	580	650	710
90	92,41	19	128,9	275	-	-	-	-	-	2.7	64.6	KF87	DRN180M4 18.5 kW S1 IN=30.0 A (460V)	12.56	245	-	-	-
100	101,47	18	129,6	250	-	-				2.5	70.9				245	-	-	-
112	113,21	16	129,9	225	-	-				2.2	79.1				230	-	-	-
125	124,31	14	129	205	-	-				2.0	86.8				225	-	-	-
140	139,81	13	132,2	185	-	-				2.7	64.5				210	-	-	-
160	153,52	12	129,3	165	-	-				2.5	70.8				210	-	-	-

6.2.15 X.240 with 165 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																RAD	AXIAL	AXIAL /HT
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.64	39	165	700	2.8	18.0	KF87	DRN132S4 5.5 kW S1 IN=10.5 A (400V)	36.52	2.8	96.5	KF127	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	36.25	335	690	770	820
28	29.51	34	162.7	600	2.4	20.7				2.5	111				325	660	730	780
31.5	32.47	31	165	550	2.8	18.0				2.8	96.5				320	630	700	740
35.5	37.38	27	161.7	470	2.4	20.7				2.5	111				310	600	670	720
40	39.96	25	165	450	2.3	22.1				2.3	118				310	600	670	720
45	46	22	160.7	380	2.0	25.5				2.0	136				300	580	640	680
50	48.83	20	164.6	370	2.3	22.1				2.3	118				290	560	620	660
56	56.2	18	160	310	2.0	25.5				2.0	136				280	530	590	630
63	62.51	16	163.6	285	2.3	22.1				2.3	118				265	495	550	590
71	71.95	14	159.3	240	2.0	25.5				2.0	136				255	475	530	560
80	82.39	12	164	220	-	-	-	-	-	2.7	107	KF97	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	11.99	270	450	495	-
90	94.83	11	157.4	180	-	-				2.3	123				260	435	480	-
100	103.71	9.6	163	170	-	-				2.1	135				250	410	450	-
112	119.37	8.4	157.7	145	-	-				2.6	112				240	395	435	-
125	127.64	7.8	162	140	-	-				2.4	120				240	395	435	-
140	146.91	6.8	158	120	-	-				2.1	138				230	380	420	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																RAD	AXIAL	AXIAL /HT
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	25.64	47	165	840	3.4	14.9	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	3.4	80.1	KF127	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	36.25	305	770	860	920
28	29.51	41	162.7	720	2.9	17.1				3.0	92.2				295	730	820	880
31.5	32.47	37	165	660	3.4	14.9				3.4	80.1				300	710	790	840
35.5	37.38	32	161.7	560	2.9	17.1				3.0	92.2				290	680	750	810
40	39.96	30	165	540	2.7	18.3				2.8	98.5				295	680	750	800
45	46	26	160.7	455	2.4	21.1				2.4	113				280	650	720	770
50	48.83	25	164.6	445	2.7	18.3				2.8	98.5				280	630	690	740
56	56.2	21	160	375	2.4	21.1				2.4	113				270	600	670	710
63	62.51	19	163.6	345	2.7	18.3				2.8	98.5				255	560	620	660
71	71.95	17	159.3	290	2.4	21.1				2.4	113				245	540	600	640
80	82.39	15	164	260	-	-	-	-	-	3.2	89.0	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	11.99	275	510	560	-
90	94.83	13	157.4	220	-	-				2.8	103				265	490	540	-
100	103.71	12	163	205	-	-				2.6	112				250	465	510	-
112	119.37	10	157.7	175	-	-				3.1	93.4				240	445	495	-
125	127.64	9.4	162	165	-	-				2.9	99.9				245	450	495	-
140	146.91	8.2	158	140	-	-				2.5	115				235	430	475	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.64	59	165	1050	2.8	18.0	KF87	DRN132S4 5.5 kW S1 IN=10.5 A (400V)	36.52	2.8	96.5	KF127	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	36.25	235	850	960	1050
28	29.51	51	162.7	900	2.4	20.7				2.5	111				235	820	920	1000
31.5	32.47	46	165	830	2.8	18.0				2.8	96.5				255	800	890	960
35.5	37.38	40	161.7	700	2.4	20.7				2.5	111				250	770	850	920
40	39.96	38	165	670	2.3	22.1				2.3	118				250	760	850	920
45	46	33	160.7	570	2.0	25.5				2.0	136				245	730	820	880
50	48.83	31	164.6	550	2.3	22.1				2.3	118				245	710	790	850
56	56.2	27	160	465	2.0	25.5				2.0	136				235	680	760	810
63	62.51	24	163.6	430	2.3	22.1	-	-	-	2.3	118	KF97	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	11.99	230	640	710	760
71	71.95	21	159.3	365	2.0	25.5				2.0	136				225	610	680	730
80	82.39	18	164	325	-	-				2.7	107				270	580	650	-
90	94.83	16	157.4	275	-	-				2.3	123				260	560	620	-
100	103.71	14	163	260	-	-				2.1	135				250	530	590	-
112	119.37	13	157.7	215	-	-				2.6	112				235	510	570	-
125	127.64	12	162	210	-	-				2.4	120				240	510	570	-
140	146.91	10	158	175	-	-				2.1	138				230	495	550	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
25	25.64	70	165	1250	3.4	14.9	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	3.4	80.1	KF127	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	36.25	155	910	1050	1150
28	29.51	61	162.7	1100	2.9	17.1				3.0	92.2				155	870	1000	1100
31.5	32.47	55	165	990	3.4	14.9				3.4	80.1				195	860	970	1050
35.5	37.38	48	161.7	840	2.9	17.1				3.0	92.2				190	830	930	1000
40	39.96	45	165	810	2.7	18.3				2.8	98.5				195	830	930	1000
45	46	39	160.7	680	2.4	21.1				2.4	113				190	790	890	960
50	48.83	37	164.6	660	2.7	18.3				2.8	98.5				195	770	860	930
56	56.2	32	160	560	2.4	21.1				2.4	113				195	740	830	890
63	62.51	29	163.6	520	2.7	18.3	-	-	-	2.8	98.5	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	11.99	190	700	780	830
71	71.95	25	159.3	435	2.4	21.1				2.4	113				185	670	750	800
80	82.39	22	164	395	-	-				3.2	89.0				250	640	710	-
90	94.83	19	157.4	330	-	-				2.8	103				245	620	690	-
100	103.71	17	163	310	-	-				2.6	112				230	590	650	-
112	119.37	15	157.7	260	-	-				3.1	93.4				225	560	630	-
125	127.64	14	162	250	-	-				2.9	99.9				225	570	630	-
140	146.91	12	158	210	-	-				2.5	115				220	540	600	-

6.2.16 X.250 with 185 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	27.55	36	185	730	2.6	19.3	KF87	DRN132S4 5.5 kW S1 IN=10.5 A (400V)	36.52	2.7	103	KF127	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	36.25	335	690	770	810
31.5	31.64	32	182.1	620	2.3	22.2				2.3	119				320	660	730	780
35.5	34.89	29	185	570	2.6	19.3				2.7	103				320	630	700	740
40	40.08	25	181	490	2.3	22.2				2.3	119				310	600	670	710
45	42.95	23	185	465	2.1	23.8				2.2	127				310	600	670	710
50	49.33	20	181	400	1.8	27.3				1.9	146				295	570	640	680
56	52.47	19	185	385	2.1	23.8				2.2	127				290	550	610	650
63	60.27	17	179.9	325	1.8	27.3				1.9	146				280	530	590	620
71	67.18	15	182.9	300	2.1	23.8				2.2	127				265	495	550	580
80	77.17	13	179.2	255	1.8	27.3				1.9	146				255	475	530	560
90	88.53	11	181.4	225	-	-	-	-	-	2.5	115	KF97	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	11.99	270	450	495	-
100	101.7	9.8	176.5	190	-	-				2.2	132				260	435	480	-
112	111.45	9	181.8	180	-	-				2.0	145				250	410	450	-
125	128.02	7.8	176.5	150	-	-				2.4	120				240	390	435	-
140	137.16	7.3	181.8	145	-	-				2.2	129				240	395	435	-
160	157.56	6.3	176.9	125	-	-				1.9	148				230	380	415	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
n ₁ = 1200 min ⁻¹ (50Hz)																		
28	27.55	44	185	870	3.1	16.0	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	3.2	86.0	KF127	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	36.25	300	760	860	910
31.5	31.64	38	182.1	750	2.7	18.4				2.8	98.8				295	730	820	870
35.5	34.89	34	185	690	3.1	16.0				3.2	86.0				300	710	780	830
40	40.08	30	181	590	2.7	18.4				2.8	98.8				290	680	750	800
45	42.95	28	185	560	2.6	19.7				2.6	105				290	670	750	800
50	49.33	24	181	475	2.2	22.6				2.3	121				280	650	720	760
56	52.47	23	185	465	2.6	19.7				2.6	105				275	620	690	730
63	60.27	20	179.9	390	2.2	22.6				2.3	121				265	600	660	700
71	67.18	18	182.9	360	2.6	19.7				2.6	105				255	560	620	660
80	77.17	16	179.2	305	2.2	22.6				2.3	121				245	540	600	630
90	88.53	14	181.4	270	-	-	-	-	-	3.0	95.7	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	11.99	275	510	560	-
100	101.7	12	176.5	230	-	-				2.6	110				265	490	540	-
112	111.45	11	181.8	215	-	-				2.4	120				250	465	510	-
125	128.02	9.4	176.5	180	-	-				2.9	100				240	445	490	-
140	137.16	8.7	181.8	175	-	-				2.7	107				245	445	495	-
160	157.56	7.6	176.9	150	-	-				2.3	123				235	430	475	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	27.55	54	185	1100	2.6	19.3	KF87	DRN132S4 5.5 kW S1 IN=10.5 A (400V)	36.52	2.7	103	KF127	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	36.25	235	850	960	1050
31.5	31.64	47	182.1	940	2.3	22.2				2.3	119				230	810	920	980
35.5	34.89	43	185	860	2.6	19.3				2.7	103				255	800	890	950
40	40.08	37	181	730	2.3	22.2				2.3	119				250	760	850	910
45	42.95	35	185	700	2.1	23.8				2.2	127				250	760	850	910
50	49.33	30	181	600	1.8	27.3				1.9	146				245	730	820	870
56	52.47	29	185	580	2.1	23.8				2.2	127				245	710	790	840
63	60.27	25	179.9	490	1.8	27.3				1.9	146				235	680	760	800
71	67.18	22	182.9	445	2.1	23.8				2.2	127				230	640	710	750
80	77.17	19	179.2	380	1.8	27.3				1.9	146				225	610	680	720
90	88.53	17	181.4	335	-	-	-	-	-	2.5	115	KF97	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	11.99	265	580	650	-
100	101.7	15	176.5	285	-	-				2.2	132				260	560	620	-
112	111.45	13	181.8	270	-	-				2.0	145				245	530	590	-
125	128.02	12	176.5	225	-	-				2.4	120				240	510	570	-
140	137.16	11	181.8	220	-	-				2.2	129				240	510	570	-
160	157.56	9.5	176.9	185	-	-				1.9	148				230	490	550	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	27.55	65	185	1300	3.1	16.0	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	3.2	86.0	KF127	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	36.25	155	900	1050	1100
31.5	31.64	57	182.1	1100	2.7	18.4				2.8	98.8				155	870	990	1050
35.5	34.89	52	185	1050	3.1	16.0				3.2	86.0				195	860	970	1050
40	40.08	45	181	880	2.7	18.4				2.8	98.8				190	830	930	990
45	42.95	42	185	840	2.6	19.7				2.6	105				195	830	930	990
50	49.33	36	181	720	2.2	22.6				2.3	121				190	790	890	950
56	52.47	34	185	690	2.6	19.7				2.6	105				195	770	860	920
63	60.27	30	179.9	590	2.2	22.6				2.3	121				195	740	830	880
71	67.18	27	182.9	540	2.6	19.7				2.6	105				195	700	780	830
80	77.17	23	179.2	455	2.2	22.6				2.3	121				185	670	750	790
90	88.53	20	181.4	405	-	-	-	-	-	3.0	95.7	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	11.99	250	640	710	-
100	101.7	18	176.5	345	-	-				2.6	110				245	620	680	-
112	111.45	16	181.8	320	-	-				2.4	120				230	590	650	-
125	128.02	14	176.5	270	-	-				2.9	100				225	560	630	-
140	137.16	13	181.8	260	-	-				2.7	107				225	560	630	-
160	157.56	11	176.9	220	-	-				2.3	123				220	540	600	-

6.2.17 X.260 with 217 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	27.55	36	185	730	2.6	19.3	KF87	DRN132S4 5.5 kW S1 IN=10.5 A (400V)	36.52	2.7	103	KF127	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	36.25	335	690	770	810
31.5	31.64	32	182.1	620	2.3	22.2				2.3	119				320	660	730	780
35.5	34.89	29	185	570	2.6	19.3				2.7	103				320	630	700	740
40	40.08	25	181	490	2.3	22.2				2.3	119				310	600	670	710
45	42.95	23	185	465	2.1	23.8				2.2	127				310	600	670	710
50	49.33	20	181	400	1.8	27.3				1.9	146				295	570	640	680
56	52.47	19	185	385	2.1	23.8				2.2	127				290	550	610	650
63	60.27	17	179.9	325	1.8	27.3				1.9	146				280	530	590	620
71	67.18	15	182.9	300	2.1	23.8				2.2	127				265	495	550	580
80	77.17	13	179.2	255	1.8	27.3				1.9	146				255	475	530	560
90	88.53	11	181.4	225	-	-	-	-	-	2.5	115	KF97	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	11.99	270	450	495	-
100	101.7	9.8	176.5	190	-	-				2.2	132				260	435	480	-
112	111.45	9	181.8	180	-	-				2.0	145				250	410	450	-
125	128.02	7.8	176.5	150	-	-				2.4	120				240	390	435	-
140	137.16	7.3	181.8	145	-	-				2.2	129				240	395	435	-
160	157.56	6.3	176.9	125	-	-				1.9	148				230	380	415	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	26.09	46	217	1100	3.3	15.9	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	3.4	105	KF127	DRN225S4 37.0 kW S1 IN=58.0 A (460V)	36.25	310	890	1000	1100
28	29.51	41	217	960	2.9	17.1				3.0	113				305	860	970	1050
31.5	30.68	39	217	920	2.8	17.8				2.9	118				315	870	980	1100
35.5	34.7	35	217	810	2.5	20.2				2.5	133				305	840	940	1050
40	38.86	31	217	730	2.8	17.8				2.9	118				340	820	920	1000
45	43.96	27	216.5	640	2.5	20.2				2.5	133				330	790	890	970
50	47.48	25	217	600	2.8	17.8				2.9	118				325	760	850	930
56	53.7	22	215.1	530	2.5	20.2				2.5	133				315	730	810	890
63	60.78	20	217	470	2.8	17.8				2.9	118				305	680	760	830
71	68.75	17	214.3	410	2.5	20.2				2.5	133				295	660	730	800
80	84.73	14	217	335	-	-	-	-	-	2.8	104	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	13.85	310	560	620	-
90	95.84	13	211.6	290	-	-				2.4	117				300	540	600	-
100	104.76	11	217	275	-	-				2.2	128				280	500	560	-
112	118.5	10	211.6	235	-	-				2.3	126				275	485	540	-
125	123.21	9.7	217	230	-	-				2.2	131				275	490	540	-
140	139.37	8.6	212.1	200	-	-				1.9	148				265	475	530	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	26.09	57	217	1350	2.7	19.1	KF87	DRN132S4 5.5 kW S1 IN=10.5 A (400V)	36.52	2.8	102	KF127	DRN225S4 37.0 kW S1 IN=67.0 A (400V)	36.25	195	980	1100	1250
28	29.51	51	217	1200	2.4	20.7				2.5	136				190	940	1100	1200
31.5	30.68	49	217	1150	2.3	21.5				2.4	142				200	960	1100	1200
35.5	34.7	43	217	1000	2.1	24.3				2.1	160				195	930	1050	1150
40	38.86	39	217	910	2.3	21.5				2.4	142				265	920	1050	1150
45	43.96	34	216.5	800	2.1	24.3				2.1	160				260	880	990	1100
50	47.48	32	217	750	2.3	21.5				2.4	142				270	850	960	1050
56	53.7	28	215.1	660	2.1	24.3				2.1	160				260	820	920	1000
63	60.78	25	217	590	2.3	21.5				2.4	142				265	770	860	950
71	68.75	22	214.3	510	2.1	24.3				2.1	160				260	740	830	910
80	84.73	18	217	420	-	-	-	-	-	2.3	125	KF97	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	13.85	295	630	700	-
90	95.84	16	211.6	365	-	-				2.0	141				285	610	680	-
100	104.76	14	217	340	-	-				1.9	154				265	570	640	-
112	118.5	13	211.6	295	-	-				1.9	151				260	550	620	-
125	123.21	12	217	290	-	-				1.8	157				265	560	620	-
140	139.37	11	212.1	250	-	-				1.6	177				255	540	600	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
25	26.09	69	217	1600	3.3	15.9	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	3.4	105	KF127	DRN225S4 37.0 kW S1 IN=58.0 A (460V)	36.25	53	1050	1200	1350
28	29.51	61	217	1450	2.9	17.1				3.0	113				56	1000	1150	1300
31.5	30.68	59	217	1400	2.8	17.8				2.9	118				73	1000	1150	1300
35.5	34.7	52	217	1200	2.5	20.2				2.5	133				72	980	1150	1250
40	38.86	46	217	1100	2.8	17.8				2.9	118				160	990	1100	1250
45	43.96	41	216.5	960	2.5	20.2				2.5	133				150	950	1050	1200
50	47.48	38	217	900	2.8	17.8				2.9	118				180	920	1050	1150
56	53.7	34	215.1	790	2.5	20.2				2.5	133				180	890	1000	1100
63	60.78	30	217	700	2.8	17.8				2.9	118				200	840	940	1050
71	68.75	26	214.3	610	2.5	20.2				2.5	133				200	810	910	1000
80	84.73	21	217	510	-	-	-	-	-	2.8	104	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	13.85	265	690	770	-
90	95.84	19	211.6	435	-	-				2.4	117				260	670	750	-
100	104.76	17	217	410	-	-				2.2	128				240	630	700	-
112	118.5	15	211.6	350	-	-				2.3	126				235	610	680	-
125	123.21	15	217	350	-	-				2.2	131				240	610	690	-
140	139.37	13	212.1	300	-	-				1.9	148				235	590	660	-

6.2.18 X.270 with 252 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																RAD	AXIAL	AXIAL /HT
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	28.65	35	251.8	950	2.5	20.1	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	2.6	132	KF127	DRN225S4 37.0 kW S1 IN=67.0 A (400V)	36.25	390	820	930	1000
31.5	32.07	31	251.8	850	2.2	22.5				2.3	148				385	810	910	990
35.5	33.7	30	252	810	2.1	23.6				2.2	156				385	810	900	980
40	37.72	27	250.4	720	1.9	26.5				1.9	174				380	790	880	960
45	42.68	23	252	640	2.1	23.6				2.2	156				380	740	830	890
50	47.78	21	249.3	570	1.9	26.5				1.9	174				375	730	810	880
56	52.14	19	252	530	2.1	23.6				2.2	156				355	680	760	820
63	58.37	17	248.3	465	1.9	26.5				1.9	174				350	670	750	800
71	66.76	15	252	415	2.1	23.6				2.2	156				325	610	680	730
80	74.73	13	246.8	360	1.9	26.5				1.9	174				320	600	670	720
90	93.07	11	239.2	280	-	-	-	-	-	2.1	137	KF97	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	13.85	315	495	550	-
100	104.18	9.6	246.3	260	-	-				1.9	153				310	490	540	-
112	115.07	8.7	251.8	240	-	-				1.7	169				285	450	495	-
125	128.81	7.8	244.7	210	-	-				1.7	164				280	440	490	-
140	135.33	7.4	250.3	205	-	-				1.7	172				280	440	485	-
160	151.49	6.6	244.2	175	-	-				1.5	193				275	430	480	-

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
																RAD	AXIAL	AXIAL /HT
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
28	28.65	42	251.8	1150	3.0	16.6	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	3.1	110	KF127	DRN225S4 37.0 kW S1 IN=58.0 A (460V)	36.25	335	910	1050	1150
31.5	32.07	37	251.8	1000	2.7	18.6				2.7	123				330	900	1000	1100
35.5	33.7	36	252	970	2.6	19.6				2.6	129				335	890	1000	1100
40	37.72	32	250.4	860	2.3	21.9				2.3	145				335	880	990	1050
45	42.68	28	252	770	2.6	19.6				2.6	129				350	830	930	1000
50	47.78	25	249.3	680	2.3	21.9				2.3	145				345	820	910	990
56	52.14	23	252	630	2.6	19.6				2.6	129				330	770	860	930
63	58.37	21	248.3	560	2.3	21.9				2.3	145				330	750	840	910
71	66.76	18	252	495	2.6	19.6				2.6	129				310	690	770	830
80	74.73	16	246.8	435	2.3	21.9				2.3	145				305	680	750	810
90	93.07	13	239.2	340	-	-	-	-	-	2.5	114	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	13.85	315	560	620	-
100	104.18	12	246.3	310	-	-				2.3	128				310	550	610	-
112	115.07	10	251.8	290	-	-				2.0	141				285	510	560	-
125	128.81	9.3	244.7	250	-	-				2.1	137				280	500	550	-
140	135.33	8.9	250.3	245	-	-				2.0	144				280	495	550	-
160	151.49	7.9	244.2	210	-	-				1.8	161				275	490	540	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	28.65	52	251.8	1450	2.5	20.1	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	2.6	132	KF127	DRN225S4 37.0 kW S1 IN=58.0 A (460V)	36.25	220	1000	1150	1250
31.5	32.07	47	251.8	1300	2.2	22.5				2.3	148				225	990	1150	1250
35.5	33.7	45	252	1200	2.1	23.6				2.2	156				230	990	1150	1250
40	37.72	40	250.4	1100	1.9	26.5				1.9	174				235	970	1100	1200
45	42.68	35	252	960	2.1	23.6				2.2	156				280	930	1050	1150
50	47.78	31	249.3	850	1.9	26.5				1.9	174				280	920	1050	1100
56	52.14	29	252	790	2.1	23.6				2.2	156				280	860	970	1050
63	58.37	26	248.3	700	1.9	26.5				1.9	174				280	850	950	1050
71	66.76	22	252	620	2.1	23.6				2.2	156				270	780	870	950
80	74.73	20	246.8	540	1.9	26.5				1.9	174				270	770	860	930
90	93.07	16	239.2	425	-	-	-	-	-	2.1	137	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	13.85	300	640	710	-
100	104.18	14	246.3	390	-	-				1.9	153				295	630	700	-
112	115.07	13	251.8	360	-	-				1.7	169				270	580	640	-
125	128.81	12	244.7	310	-	-				1.7	164				270	570	630	-
140	135.33	11	250.3	305	-	-				1.7	172				265	570	630	-
160	151.49	9.9	244.2	265	-	-				1.5	193				265	560	620	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
28	28.65	63	251.8	1700	3.0	16.6	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	3.1	110	KF127	DRN225S4 37.0 kW S1 IN=58.0 A (460V)	36.25	99	1050	1200	1350
31.5	32.07	56	251.8	1550	2.7	18.6				2.7	123				99	1050	1200	1350
35.5	33.7	53	252	1450	2.6	19.6				2.6	129				110	1050	1200	1350
40	37.72	48	250.4	1300	2.3	21.9				2.3	145				115	1050	1200	1300
45	42.68	42	252	1150	2.6	19.6				2.6	129				180	1000	1150	1250
50	47.78	38	249.3	1000	2.3	21.9				2.3	145				180	990	1100	1200
56	52.14	35	252	950	2.6	19.6				2.6	129				195	940	1050	1150
63	58.37	31	248.3	840	2.3	21.9				2.3	145				200	920	1050	1150
71	66.76	27	252	740	2.6	19.6				2.6	129				210	850	950	1050
80	74.73	24	246.8	650	2.3	21.9				2.3	145				210	830	940	1000
90	93.07	19	239.2	510	-	-	-	-	-	2.5	114	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	13.85	270	700	780	-
100	104.18	17	246.3	465	-	-				2.3	128				265	690	770	-
112	115.07	16	251.8	430	-	-				2.0	141				245	630	710	-
125	128.81	14	244.7	375	-	-				2.1	137				245	630	700	-
140	135.33	13	250.3	365	-	-				2.0	144				245	620	690	-
160	151.49	12	244.2	320	-	-				1.8	161				245	610	680	-

6.2.19 X.280 with 285.0 kNm

1000 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
31.5	32.07	31	280.2	950	2.2	22.5	KF87	DRN132S4 5.5 kW S1 IN=10.50 A (400V)	36.52	2.3	148	KF127	DRN225S4 37.0 kW S1 IN=67.00 A (400V)	36.25	475	970	1100	31.5
35.5	35.92	28	285	860	2.0	25.2				2.0	166				470	940	1050	35.5
40	37.72	27	283.1	810	1.9	26.5				1.9	174				470	940	1050	40
45	42.25	24	285	730	1.7	29.6				1.7	195				465	920	1000	45
50	47.78	21	283.1	640	1.9	26.5				1.9	174				455	860	950	50
56	53.51	19	284	580	1.7	29.6				1.7	195				445	840	930	56
63	58.37	17	283.1	530	1.9	26.5				1.9	174				425	790	880	63
71	65.38	15	282.8	475	1.7	29.6				1.7	195				415	770	850	71
80	74.73	13	283.1	415	1.9	26.5				1.9	174				385	710	780	80
90	83.7	12	281.1	370	1.7	29.6				1.7	195				375	690	760	90
100	104.18	9.6	267.8	280	-	-	-	-	-	1.9	153	KF97	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	13.85	365	570	630	100
112	116.68	8.6	277.5	260	-	-				1.7	172				360	560	620	112
125	128.81	7.8	280.2	240	-	-				1.5	189				330	520	570	125
140	144.27	6.9	277.6	210	-	-				1.8	159			10.41	325	510	560	140
160	151.49	6.6	283.1	205	-	-				1.7	167				325	510	560	160
180	169.67	5.9	278.2	180	-	-				1.5	187				320	495	550	180

1200 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH}	P _{TH}	P _{TH}	P _{TH}
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm				kW	kW	kW	kW
31.5	32.07	37	280.2	1150	2.7	18.6	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	2.7	123	KF127	DRN225S4 37.0 kW S1 IN=58.0 A (460V)	36.25	430	1100	1200	1300
35.5	35.92	33	285	1050	2.4	20.9				2.5	138				425	1050	1200	1250
40	37.72	32	283.1	980	2.3	21.9				2.3	145				430	1050	1200	1250
45	42.25	28	285	880	2.1	24.5				2.1	162				420	1000	1150	1250
50	47.78	25	283.1	770	2.3	21.9				2.3	145				430	970	1100	1150
56	53.51	22	284	690	2.1	24.5				2.1	162				425	940	1050	1150
63	58.37	21	283.1	640	2.3	21.9				2.3	145				405	890	990	1050
71	65.38	18	282.8	570	2.1	24.5				2.1	162				400	870	970	1050
80	74.73	16	283.1	495	2.3	21.9				2.3	145				375	800	880	950
90	83.7	14	281.1	440	2.1	24.5				2.1	162				365	780	860	930
100	104.18	12	267.8	340	-	-	-	-	-	2.3	128	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	13.85	370	650	720	-
112	116.68	10	277.5	315	-	-				2.0	143				365	640	710	-
125	128.81	9.3	280.2	285	-	-				1.8	158				335	590	650	-
140	144.27	8.3	277.6	255	-	-				2.2	133			11.99	330	580	640	-
160	151.49	7.9	283.1	245	-	-				2.0	139				330	570	640	-
180	169.67	7.1	278.2	215	-	-				1.8	156				325	560	620	-

1500 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
31.5	32.07	47	280.2	1400	2.2	22.5	KF87	DRN132S4 5.5 kW S1 IN=10.50 A (400V)	36.52	2.3	148	KF127	DRN225S4 37.0 kW S1 IN=67.00 A (400V)	36.25	330	1200	1350	1450
35.5	35.92	42	285	1300	2.0	25.2				2.0	166				325	1150	1300	1450
40	37.72	40	283.1	1200	1.9	26.5				1.9	174				335	1200	1350	1450
45	42.25	36	285	1100	1.7	29.6				1.7	195				335	1150	1300	1400
50	47.78	31	283.1	960	1.9	26.5				1.9	174				370	1100	1200	1300
56	53.51	28	284	860	1.7	29.6				1.7	195				365	1050	1200	1300
63	58.37	26	283.1	800	1.9	26.5				1.9	174				360	1000	1150	1200
71	65.38	23	282.8	710	1.7	29.6				1.7	195				355	990	1100	1200
80	74.73	20	283.1	620	1.9	26.5				1.9	174				340	910	1000	1100
90	83.7	18	281.1	550	1.7	29.6				1.7	195				335	890	990	1050
100	104.18	14	267.8	425	-	-	-	-	-	1.9	153	KF97	DRN200L4 30.0 kW S1 IN=57.0 A (400V)	13.85	365	740	830	-
112	116.68	13	277.5	390	-	-				1.7	172				360	730	810	-
125	128.81	12	280.2	360	-	-				1.5	189				335	670	750	-
140	144.27	10	277.6	315	-	-				1.8	159				330	660	730	-
160	151.49	9.9	283.1	305	-	-				1.7	167				330	660	730	-
180	169.67	8.8	278.2	270	-	-				1.5	187				320	650	720	-

1800 min⁻¹

					Empty buckets					Full buckets					P _{TH} 20°C			
i _N	i _{ex}	n ₂	M _{n2}	P _{N1}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	n ₃	M _{K3}	Aux. drive	Motor	i _{aux}	P _{TH} kW	P _{TH} kW	P _{TH} kW	P _{TH} kW
		min ⁻¹	kNm	kW	min ⁻¹	kNm				min ⁻¹	kNm							
31.5	32.07	56	280.2	1700	2.7	18.6	KF87	DRN132S4 5.5 kW S1 IN=9.50 A (460V)	36.52	2.7	123	KF127	DRN225S4 37.0 kW S1 IN=58.00 A (460V)	36.25	205	1300	1450	1600
35.5	35.92	50	285	1550	2.4	20.9				2.5	138				200	1250	1450	1550
40	37.72	48	283.1	1450	2.3	21.9				2.3	145				210	1250	1450	1550
45	42.25	43	285	1300	2.1	24.5				2.1	162				210	1250	1400	1500
50	47.78	38	283.1	1150	2.3	21.9				2.3	145				280	1200	1350	1450
56	53.51	34	284	1050	2.1	24.5				2.1	162				275	1150	1300	1400
63	58.37	31	283.1	960	2.3	21.9				2.3	145				290	1100	1250	1350
71	65.38	28	282.8	850	2.1	24.5				2.1	162				285	1100	1200	1300
80	74.73	24	283.1	750	2.3	21.9				2.3	145				290	990	1100	1200
90	83.7	22	281.1	660	2.1	24.5				2.1	162				285	970	1100	1150
100	104.18	17	267.8	510	-	-	-	-	-	2.3	128	KF97	DRN200L4 30.0 kW S1 IN=50.0 A (460V)	13.85	345	820	910	-
112	116.68	15	277.5	470	-	-				2.0	143				340	800	890	-
125	128.81	14	280.2	430	-	-				1.8	158				315	750	830	-
140	144.27	12	277.6	380	-	-				2.2	133				310	730	810	-
160	151.49	12	283.1	370	-	-				2.0	139				310	730	810	-
180	169.67	11	278.2	325	-	-				1.8	156				305	710	790	-

7 Design and operating notes

7.1 General information

Not included in the delivery:

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

7.2 Auxiliary drive

All motors come equipped with a canopy because the motors are installed vertically as standard.

7.3 Dimensioning the machine shaft for hollow shaft gear units

7.3.1 Output shaft as a hollow shaft with keyed connection /..A

The material and the keyed connection of the machine shaft (for design X..A) should be dimensioned by the customer according to the loads (e.g. impacts) that will occur.

Depending on the gear unit size, the material of the shaft must have the following minimum yield point for transferring the nominal torque:

- 320 N/mm² for sizes X..A100 – X..A280

The material of the key must be selected according to the loads that will occur.

The minimum key length given in the dimension sheets must be observed. If a longer key is used, it should be aligned symmetrically to the hollow shaft.

With a continuous machine shaft or axial forces, SEW-EURODRIVE recommends that the machine shaft is designed with a contact shoulder. To prevent the retaining screw of the machine shaft from loosening upon a reversing load direction, it should be secured with a suitable threadlocker. If necessary, two eccentric retaining screws may be used.

INFORMATION



For detailed information on machine shaft design, refer to the dimension sheets in chapter "Hollow shaft with key X...A".

7.3.2 Output shaft as a hollow shaft with shrink disk /..H

The material of the machine shaft should be dimensioned by the customer according to the loads that will occur (e.g. impact).

The shaft material must have the following minimum yield point for transferring the nominal torque.

- 360 N/mm² for sizes X..100 to X..280

7.3.3 Output shaft as a splined hollow shaft /..V

The material of the machine shaft should be dimensioned by the customer according to the loads that will occur (e.g. impact).

The shaft material must have the following minimum yield point for transferring the nominal torque.

- 320 N/mm² for sizes X..100 to X..280

7.4 Dimensioning the customer hub of solid shaft gear units

The material of the customer hub should be dimensioned according to the loads that will occur.

7.5 Dimensioning the machine shaft with flange coupling

The material of the machine shaft as well as the keyed connection (of versions with key) 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. Choose the dimensions of the machine shaft according to the smooth solid shaft X..R.

INFORMATION



Detailed information regarding the design of the machine shaft can be provided by SEW-EURODRIVE upon request.

8 Important notes

8.1 Dimension sheet information

INFORMATION



- Dimension sheets and gear unit models can be found on <https://www.drivegate.biz>
- Unless specified otherwise, all dimensions are given in **mm**. NEMA motor adapters are an exception to this rule: Their dimensions are given in **inches**.

8.1.1 General information

Scope of delivery



= Standard parts supplied by SEW-EURODRIVE.



= Standard parts not supplied by SEW-EURODRIVE.

Mounting positions

The dimension sheets show horizontal gear units (mounting position M1)

For other mounting positions, or inclined or changing mounting positions (see chapter "Fixed and variable pivoted mounting positions") as can occur with drives in booms, information and dimension sheets are available from SEW-EURODRIVE.

Weight

The specified weight data are guide values. The information on the nameplate is binding.

INFORMATION



The weight data in the selection tables do not include the oil fill.

Options: Shaft types

Chapter "Dimension sheets: options" shows the options in connection with gear unit X.S.. with a solid shaft. Unless indicated otherwise, all options are also possible for gear units with other shaft types.

8.1.2 Tolerances

Shaft ends

Diameter tolerance in accordance with DIN 748:

Ø = Smooth output shaft /..R → ISO v6

Ø = Output shaft as a solid shaft with key /..S → ISO m6

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

Ø	> 16 to 21 mm	→ M6
Ø	> 21 to 24 mm	→ M8
Ø	> 24 to 30 mm	→ M10
Ø	> 30 to 38 mm	→ M12
Ø	> 38...50 mm	→ M16
Ø	> 50 to 85 mm ¹⁾	→ M20
Ø	> 85...130 mm ¹⁾	→ M24
Ø	> 130...225 mm ¹⁾	→ M30
Ø	> 225...320 mm ¹⁾	→ M36
Ø	> 320 mm ¹⁾	→ M42

1) Dimensions not according to DIN 332; the thread depth including the counterbore is at least twice that of the nominal thread diameter

Keys according to DIN 6885 (domed type)

Hollow shafts

Diameter tolerance:

Ø → ISO H7 for hollow shafts for shrink disk

Ø → ISO H8 for hollow shafts with keyway

Mounting flange

Centering shoulder tolerance: ISO f7

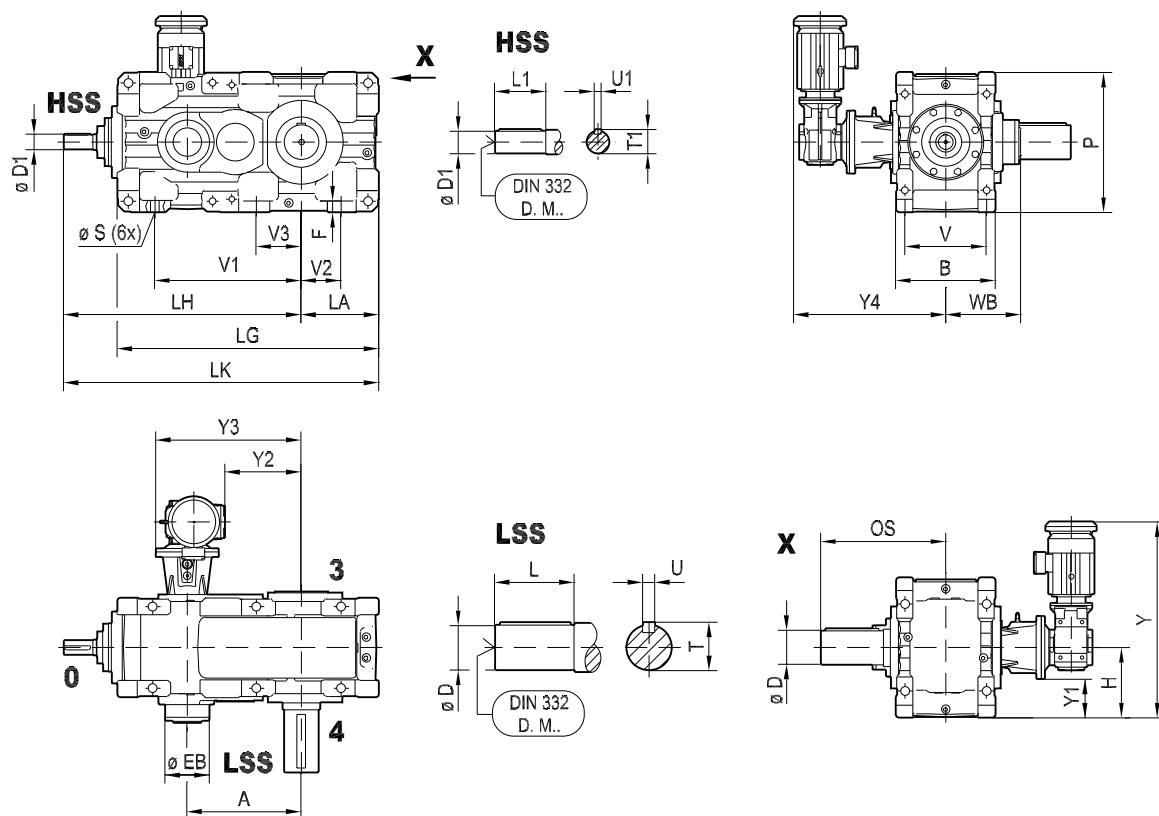
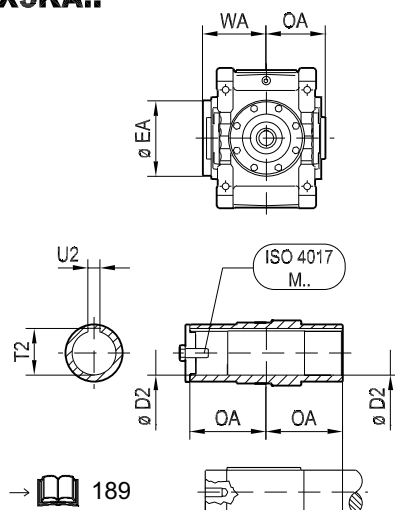
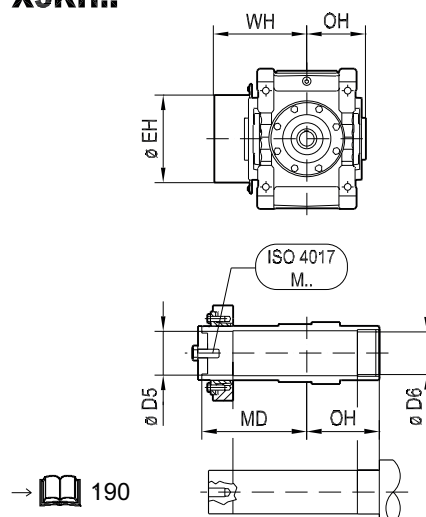
9 Dimension sheets: Gear unit

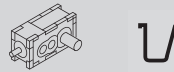
9.1 X3K..

9.1.1 X3K100 – 210 Empty buckets

X3KS..

48 024 02 07

**X3KA..****X3KH..**



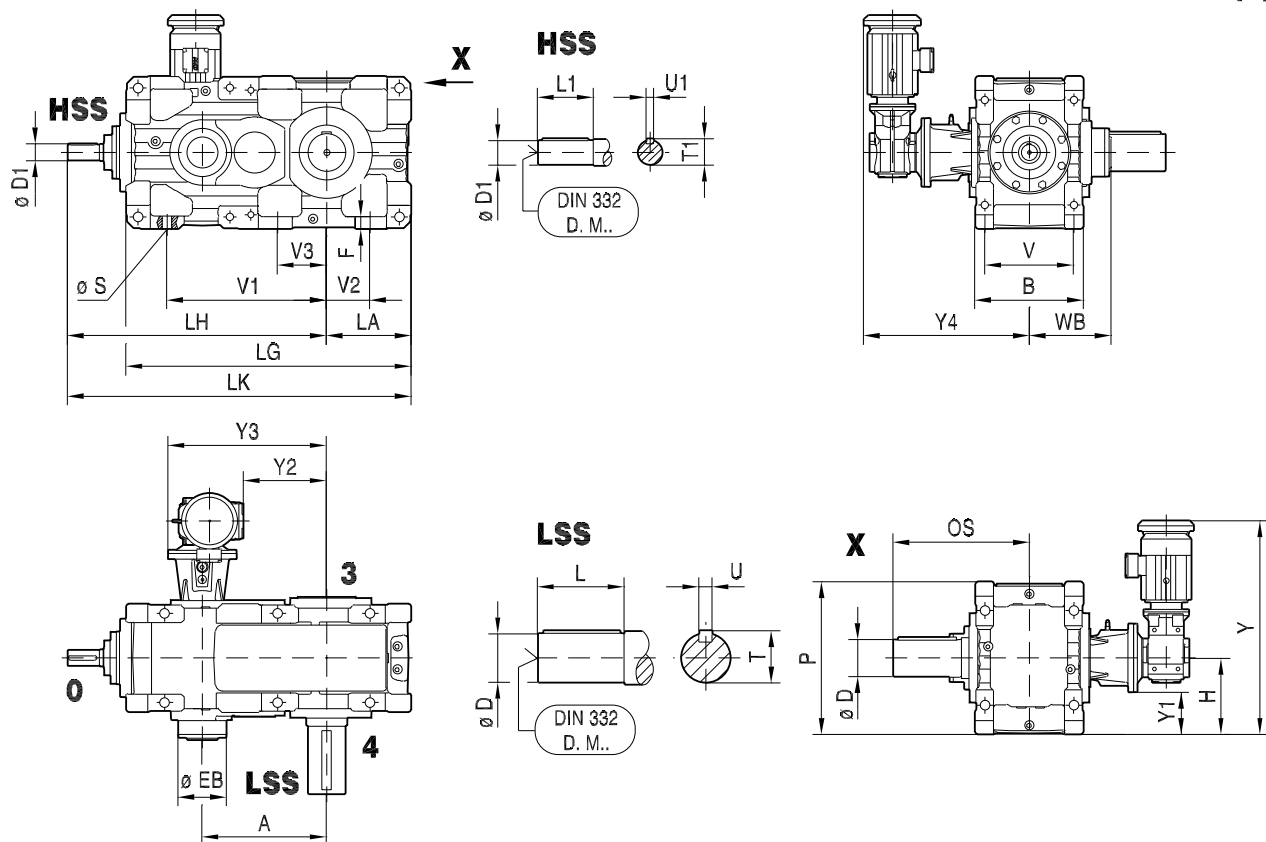
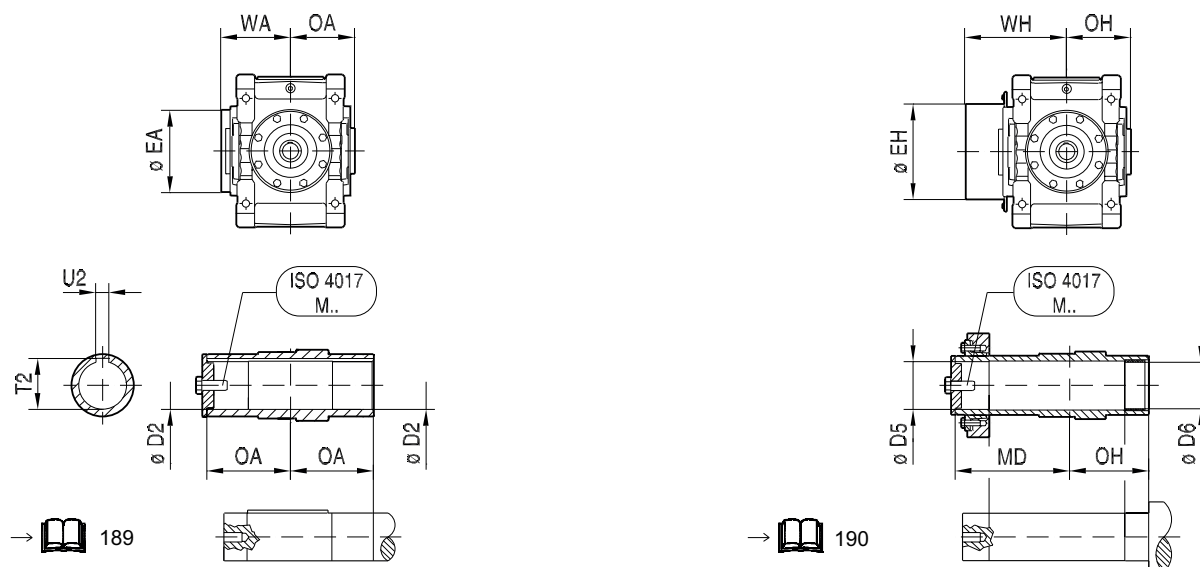
X3K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	W B		Y	Y1	Y2	Y3	Y4
X100	278	260	133	29	190 _{-0.5}	190 _{-0.5}	658	632	822	380	24 (4x)	210	370	90	-	213	KF37DRN80M4	643	109	178	359	439
X110	298	260	133	29	190 _{-0.5}	215 _{-0.5}	703	652	867	380	24 (4x)	210	390	115	-	213	KF37DRN80M4	643	109	198	379	439
X120	327	300	153	33	225 _{-0.5}	215 _{-0.5}	767	745	960	450	28 (4x)	245	440	105	-	235	KF47DRN90S4	703	125	215	427	483
X130	363	300	153	33	225 _{-0.5}	250 _{-0.5}	838	781	1031	450	28 (4x)	245	475	140	-	235	KF47DRN90S4	703	125	251	463	483
X140	388	360	175	42	265 _{-0.5}	250 _{-0.5}	903	879	1129	530	35 (4x)	290	510	110	-	284	KF57DRN90L4	782	140	256	513	541
X150	430	360	175	42	265 _{-0.5}	295 _{-0.5}	990	921	1216	530	35 (4x)	290	555	155	-	284	KF57DRN90L4	782	140	298	555	541
X160	474	425	190	50	315 _{-0.5}	355 _{-0.5}	1144	1036	1391	630	42 (4x)	345	620	185	-	320	KF67DRN100L4	884	190	334	599	618
X170	525	425	190	50	315 _{-0.5}	355 _{-0.5}	1195	1087	1442	630	42 (4x)	345	670	185	-	320	KF67DRN100L4	884	190	385	650	618
X180	544	475	210	55	335 _{-0.5}	370 _{-0.5}	1249	1135	1505	670	42 (6x)	390	710	190	215	360	KF77DRN100L4	920	185	364	694	701
X190	576	475	210	55	335 _{-0.5}	370 _{-0.5}	1281	1167	1537	670	42 (6x)	390	740	190	215	360	KF77DRN100L4	920	185	396	726	701
X200	614	515	210	60	375 _{-0.5}	420 _{-0.5}	1409	1286	1706	750	48 (6x)	420	780	205	230	381	KF77DRN112M4	991	225	434	764	729
X210	650	515	210	60	375 _{-0.5}	420 _{-0.5}	1445	1322	1742	750	48 (6x)	420	815	205	230	381	KF77DRN112M4	991	225	470	800	729

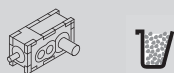
			HSS	Ø D1	L1	T1	U1	DIN 332 D. M..	LSS	Ø D	L	OS	T	U	DIN 332 D. M..	kg
X100	14	1.5	X100	32 _{k6}	80	35	10 _{h9}	M12	X100	80 _{m6}	170	343	85	22 _{h9}	M20	263
X110	15	1.5	X110	32 _{k6}	80	35	10 _{h9}	M12	X110	90 _{m6}	170	346	95	25 _{h9}	M24	283
X120	21	2.2	X120	38 _{k6}	100	41	10 _{h9}	M12	X120	100 _{m6}	210	401	106	28 _{h9}	M24	400
X130	22	2.2	X130	38 _{k6}	100	41	10 _{h9}	M12	X130	110 _{m6}	210	404	116	28 _{h9}	M24	450
X140	34	3.15	X140	50 _{k6}	110	53.5	14 _{h9}	M16	X140	120 _{m6}	210	432	127	32 _{h9}	M24	650
X150	35	3.15	X150	50 _{k6}	110	53.5	14 _{h9}	M16	X150	130 _{m6}	250	475	137	32 _{h9}	M24	690
X160	61	3.7	X160	60 _{m6}	140	64	18 _{h9}	M20	X160	140 _{m6}	250	506	148	36 _{h9}	M30	1047
X170	61	3.7	X170	60 _{m6}	140	64	18 _{h9}	M20	X170	160 _{m6}	300	556	169	40 _{h9}	M30	1192
X180	76	5.9	X180	70 _{m6}	140	74.5	20 _{h9}	M20	X180	170 _{m6}	300	592	179	40 _{h9}	M30	1504
X190	76	5.9	X190	70 _{m6}	140	74.5	20 _{h9}	M20	X190	170 _{m6}	300	592	179	40 _{h9}	M30	1614
X200	102	5.9	X200	80 _{m6}	170	85	22 _{h9}	M20	X200	180 _{m6}	300	612	190	45 _{h9}	M30	2126
X210	102	5.9	X210	80 _{m6}	170	85	22 _{h9}	M20	X210	190 _{m6}	350	662	200	45 _{h9}	M30	2226

X3KA..								
LSS	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg
								
X100	75 ^{H8}	158	173	80.4	22 ^{JS9}	207	M20x60-8.8	253
X110	85 ^{H8}	170	176	90.4	22 ^{JS9}	209	M24x70-8.8	273
X120	95 ^{H8}	202	190.5	100.4	25 ^{JS9}	223	M24x70-8.8	380
X130	105 ^{H8}	222	194	111.4	28 ^{JS9}	225	M24x70-8.8	425
X140	115 ^{H8}	222	222	122.4	32 ^{JS9}	253	M24x70-8.8	615
X150	125 ^{H8}	250	224.5	132.4	32 ^{JS9}	255	M24x70-8.8	640
X160	135 ^{H8}	270	256	143.4	36 ^{JS9}	319	M30x90-8.8	977
X170	150 ^{H8}	270	256	158.4	36 ^{JS9}	319	M30x90-8.8	1112
X180	165 ^{H8}	278	292	174.4	40 ^{JS9}	356	M30x90-8.8	1404
X190	165 ^{H8}	278	292	174.4	40 ^{JS9}	356	M30x90-8.8	1514
X200	180 ^{H8}	332	319.5	190.4	45 ^{JS9}	383	M30x90-8.8	2041
X210	190 ^{H8}	332	319.5	200.4	45 ^{JS9}	383	M30x90-8.8	2111

X3KH..								
LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
								
X100	80 ^{H7}	81 ^{H9}	220	261	173	294	M24x70-8.8	263
X110	90 ^{H7}	91 ^{H9}	225	265	176	298	M24x70-8.8	283
X120	100 ^{H7}	101 ^{H9}	272	286.5	190.5	319	M24x70-8.8	390
X130	110 ^{H7}	111 ^{H9}	292	297	194	328	M24x70-8.8	440
X140	120 ^{H7}	121 ^{H9}	304	329	222	356	M24x70-8.8	640
X150	130 ^{H7}	131 ^{H9}	322	337.5	224.5	368	M24x70-8.8	670
X160	140 ^{H7}	141 ^{H9}	368	375	256	427	M30x90-8.8	1007
X170	150 ^{H7}	151 ^{H9}	368	364	256	427	M30x90-8.8	1167
X180	165 ^{H7}	166 ^{H9}	382	400	292	463	M30x60-8.8	1454
X190	165 ^{H7}	166 ^{H9}	382	400	292	463	M30x60-8.8	1564
X200	180 ^{H7}	181 ^{H9}	446	450.5	319.5	517	M30x60-8.8	2111
X210	190 ^{H7}	191 ^{H9}	446	453.5	319.5	517	M30x60-8.8	2196

9.1.2 X3K100 – 210 Full buckets

X3KS..48 024 01 07
1(2)**X3KA..****X3KH..**

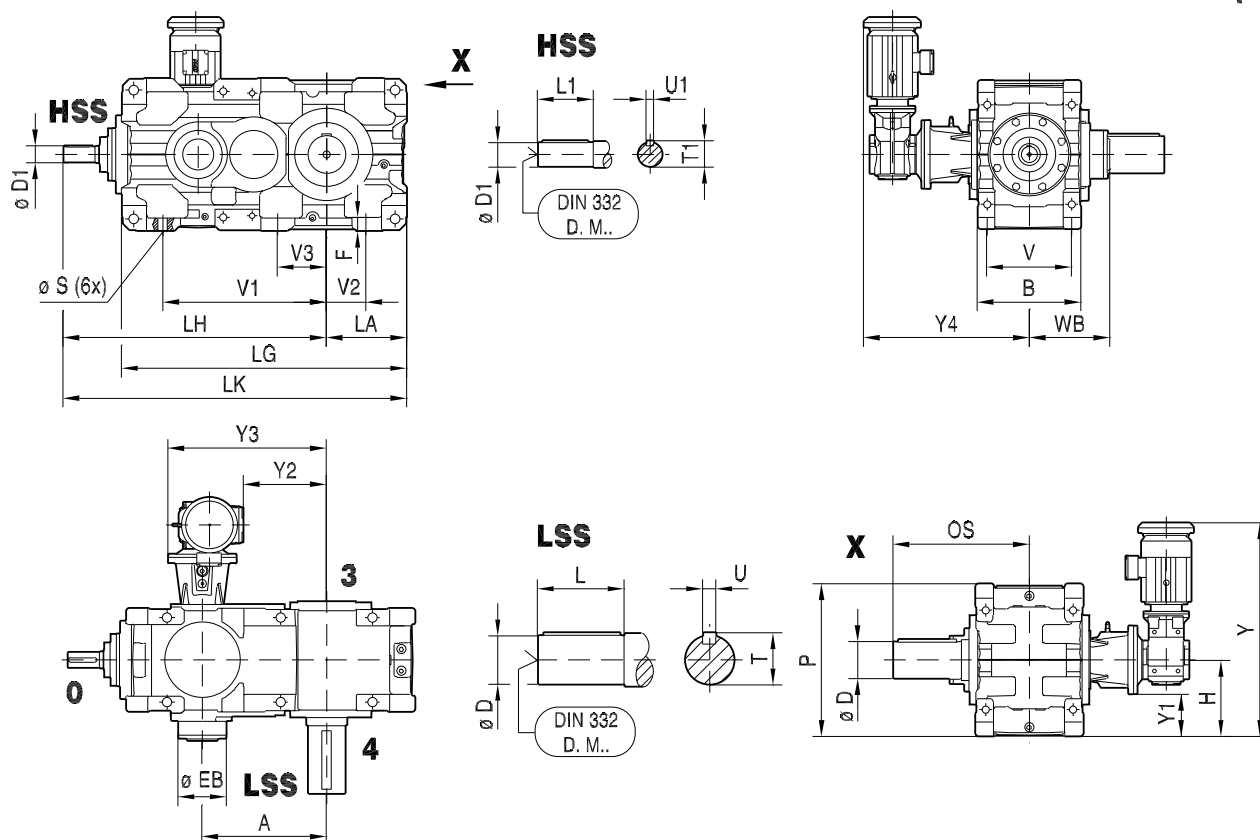
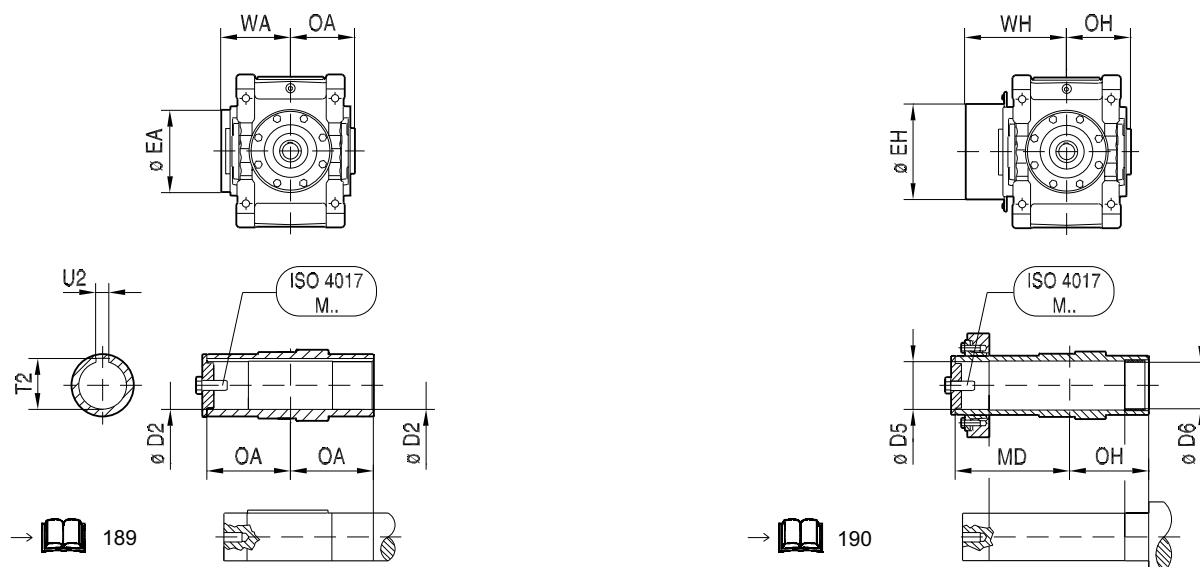


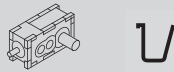
X3K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	W B		Y	Y1	Y2	Y3	Y4
X100	278	260	133	29	190 _{0.5}	190 _{0.5}	658	632	822	380	24 (4x)	210	370	90	-	213	KF57DRN90L4	707	65	146	403	494
X110	298	260	133	29	190 _{0.5}	215 _{0.5}	703	652	867	380	24 (4x)	210	390	115	-	213	KF57DRN90L4	707	65	166	423	494
X120	327	300	153	33	225 _{0.5}	215 _{0.5}	767	745	960	450	28 (4x)	245	440	105	-	235	KF67DRN100L4	794	100	187	452	435
X130	363	300	153	33	225 _{0.5}	250 _{0.5}	838	781	1031	450	28 (4x)	245	475	140	-	235	KF67DRN100L4	794	100	223	488	435
X140	388	360	175	42	265 _{0.5}	250 _{0.5}	903	879	1129	530	35 (4x)	290	510	110	-	284	KF77DRN112M4	881	115	208	538	633
X150	430	360	175	42	265 _{0.5}	295 _{0.5}	990	921	1216	530	35 (4x)	290	555	155	-	284	KF77DRN112M4	881	115	250	580	633
X160	474	425	190	50	315 _{0.5}	355 _{0.5}	1144	1036	1391	630	42 (4x)	345	620	185	-	320	KF87DRN132S4	1031	140	262	649	735
X170	525	425	190	50	315 _{0.5}	355 _{0.5}	1195	1087	1442	630	42 (4x)	345	670	185	-	320	KF87DRN132S4	1031	140	313	700	735
X180	544	475	210	55	335 _{0.5}	370 _{0.5}	1249	1135	1505	670	42 (6x)	390	710	190	215	360	KF97DRN132L4	1117	110	279	769	860
X190	576	475	210	55	335 _{0.5}	370 _{0.5}	1281	1167	1537	670	42 (6x)	390	740	190	215	360	KF97DRN132L4	1117	110	311	801	860
X200	614	515	210	60	375 _{0.5}	420 _{0.5}	1409	1286	1706	750	48 (6x)	420	780	205	230	381	KF97DRN160M4	1224	150	349	839	879
X210	650	515	210	60	375 _{0.5}	420 _{0.5}	1445	1322	1742	750	48 (6x)	420	815	205	230	381	KF97DRN160M4	1124	150	385	875	879

			HSS	Ø D1	L1	T1	U1	DIN 332 D. M..	LSS	Ø D	L	OS	T	U	DIN 332 D. M..	kg
X100	14	3.15	X100	32 _{k6}	80	35	10 _{h9}	M12	X100	80 _{m6}	170	343	85	22 _{h9}	M20	285
X110	15	3.15	X110	32 _{k6}	80	35	10 _{h9}	M12	X110	90 _{m6}	170	346	95	25 _{h9}	M24	305
X120	22	5.9	X120	38 _{k6}	100	41	10 _{h9}	M12	X120	100 _{m6}	210	401	106	28 _{h9}	M24	422
X130	23	5.9	X130	38 _{k6}	100	41	10 _{h9}	M12	X130	110 _{m6}	210	404	116	28 _{h9}	M24	472
X140	35	5.9	X140	50 _{k6}	110	53.5	14 _{h9}	M16	X140	120 _{m6}	210	432	127	32 _{h9}	M24	706
X150	36	5.9	X150	50 _{k6}	110	53.5	14 _{h9}	M16	X150	130 _{m6}	250	475	137	32 _{h9}	M24	746
X160	63	11.9	X160	60 _{m6}	140	64	18 _{h9}	M20	X160	140 _{m6}	250	506	148	36 _{h9}	M30	1141
X170	63	11.9	X170	60 _{m6}	140	64	18 _{h9}	M20	X170	160 _{m6}	300	556	169	40 _{h9}	M30	1286
X180	79	21.5	X180	70 _{m6}	140	74.5	20 _{h9}	M20	X180	170 _{m6}	300	592	179	40 _{h9}	M30	1651
X190	79	21.5	X190	70 _{m6}	140	74.5	20 _{h9}	M20	X190	170 _{m6}	300	592	179	40 _{h9}	M30	1761
X200	105	21.5	X200	80 _{m6}	170	85	22 _{h9}	M20	X200	180 _{m6}	300	612	190	45 _{h9}	M30	2307
X210	105	21.5	X210	80 _{m6}	170	85	22 _{h9}	M20	X210	190 _{m6}	350	662	200	45 _{h9}	M30	2407

X3KA..									X3KH..								
 LSS	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg	 LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
X100	75 ^{H8}	158	173	80.4	22 ^{JS9}	207	M20x60-8.8	275	X100	80 ^{H7}	81 ^{H9}	220	261	173	294	M24x70-8.8	285
X110	85 ^{H8}	170	176	90.4	22 ^{JS9}	209	M24x70-8.8	295	X110	90 ^{H7}	91 ^{H9}	225	265	176	298	M24x70-8.8	305
X120	95 ^{H8}	202	190.5	100.4	25 ^{JS9}	223	M24x70-8.8	402	X120	100 ^{H7}	101 ^{H9}	272	286.5	190.5	319	M24x70-8.8	412
X130	105 ^{H8}	222	194	111.4	28 ^{JS9}	225	M24x70-8.8	447	X130	110 ^{H7}	111 ^{H9}	292	297	194	328	M24x70-8.8	462
X140	115 ^{H8}	222	222	122.4	32 ^{JS9}	253	M24x70-8.8	671	X140	120 ^{H7}	121 ^{H9}	304	329	222	356	M24x70-8.8	696
X150	125 ^{H8}	250	224.5	132.4	32 ^{JS9}	255	M24x70-8.8	696	X150	130 ^{H7}	131 ^{H9}	322	337.5	224.5	368	M24x70-8.8	726
X160	135 ^{H8}	270	256	143.4	36 ^{JS9}	319	M30x90-8.8	1071	X160	140 ^{H7}	141 ^{H9}	368	375	256	427	M30x90-8.8	1101
X170	150 ^{H8}	270	256	158.4	36 ^{JS9}	319	M30x90-8.8	1206	X170	150 ^{H7}	151 ^{H9}	368	364	256	427	M30x90-8.8	1261
X180	165 ^{H8}	278	292	174.4	40 ^{JS9}	356	M30x90-8.8	1551	X180	165 ^{H7}	166 ^{H9}	382	400	292	463	M30x60-8.8	1601
X190	165 ^{H8}	278	292	174.4	40 ^{JS9}	356	M30x90-8.8	1661	X190	165 ^{H7}	166 ^{H9}	382	400	292	463	M30x60-8.8	1711
X200	180 ^{H8}	332	319.5	190.4	45 ^{JS9}	383	M30x90-8.8	2222	X200	180 ^{H7}	181 ^{H9}	446	450.5	319.5	517	M30x60-8.8	2292
X210	190 ^{H8}	332	319.5	200.4	45 ^{JS9}	383	M30x90-8.8	2292	X210	190 ^{H7}	191 ^{H9}	446	453.5	319.5	517	M30x60-8.8	2377

9.1.3 X3K220 – 250 Empty buckets

X3KS..48 045 01 07
1(2)**X3KA..****X3KH..**

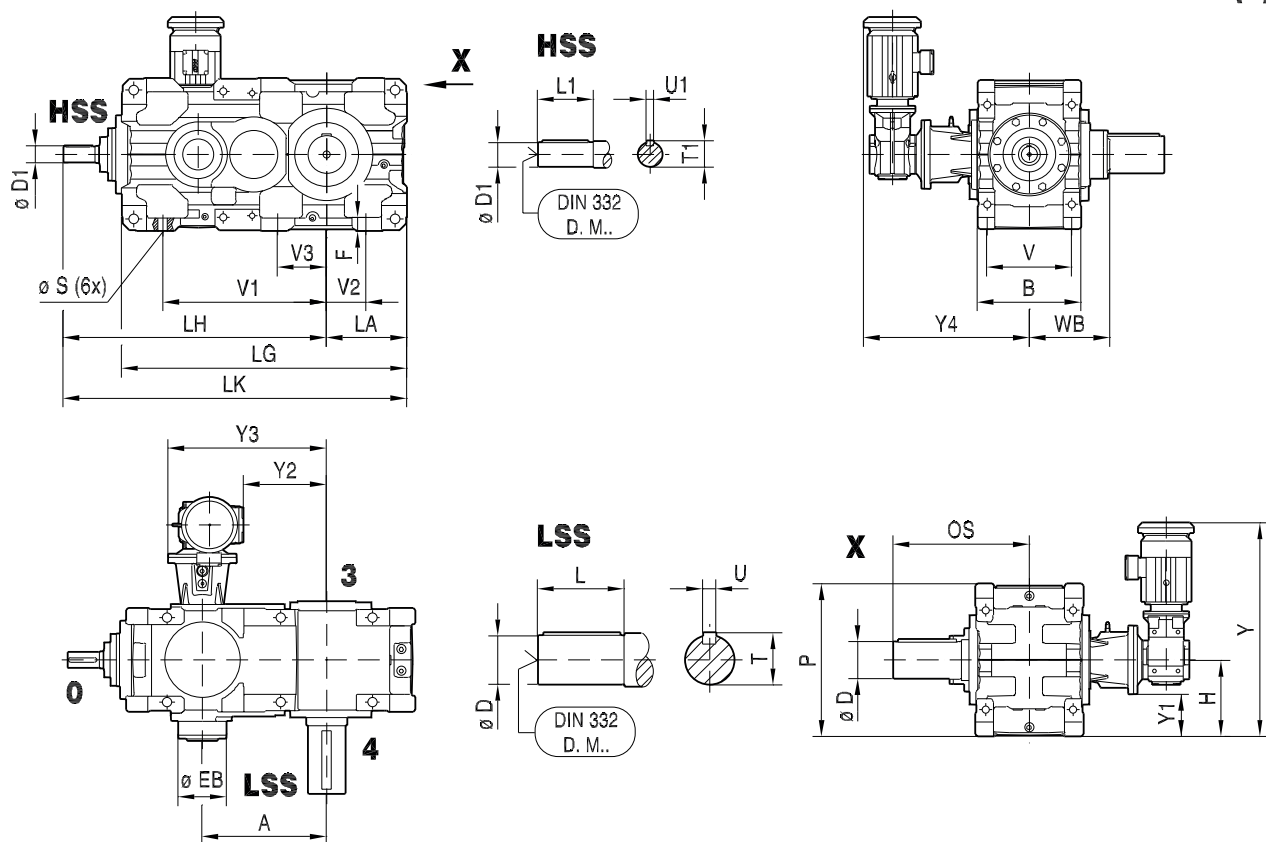
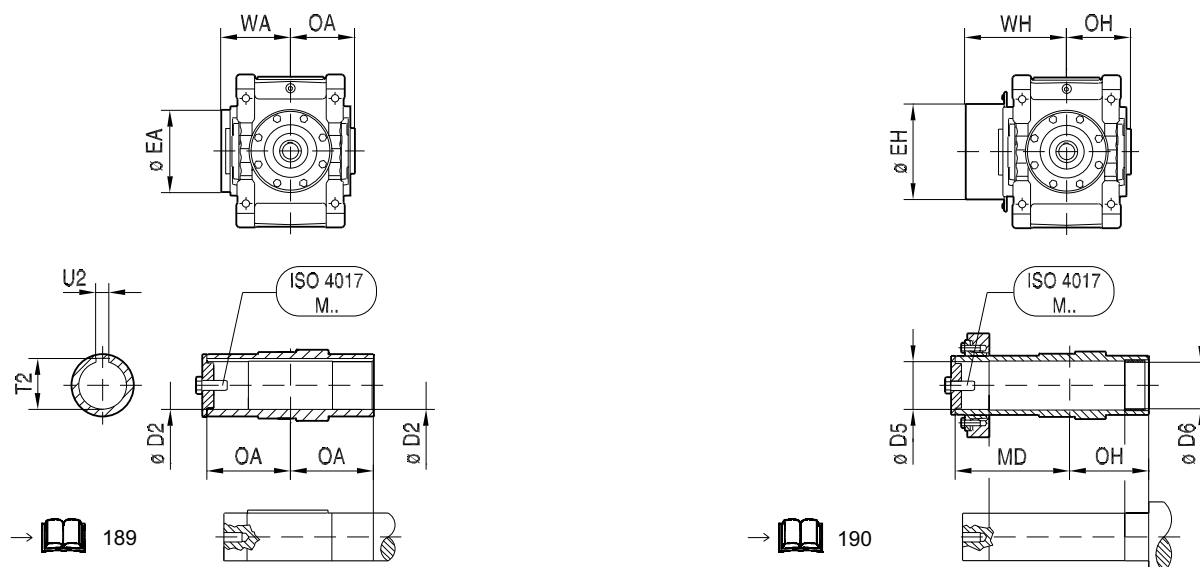


X3K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X220	694	540	245	62	425 _{0.5}	465 _{0.5}	1584	1430	1895	850	48	440	910	250	280	426	KF87DRN112M4	1091	250	482	689	828
X230	734	540	245	62	425 _{0.5}	465 _{0.5}	1624	1470	1935	850	48	440	950	250	280	426	KF87DRN112M4	1091	250	522	909	828
X240	776	625	290	68	450 _{0.5}	495 _{0.5}	1721	1597	2092	900	56	510	990	250	305	472	KF87DRN132S4	1166	275	564	951	873
X250	799	625	290	68	450 _{0.5}	495 _{0.5}	1744	1620	2115	900	56	510	1010	250	305	472	KF87DRN132S4	1166	275	587	974	873

		M1	M4		HSS	Ø D1	L1	T1	U1	DIN 332 D. M..		LSS	Ø D	L	OS	T	U	DIN 332 D. M..	kg
X220		131	11.9	X220		85 _{m6}	170	90	22 _{h9}	M20	X220		210 _{m6}	350	703	221	50 _{h9}	M30	3036
X230		131	11.9	X230		85 _{m6}	170	90	22 _{h9}	M20	X230		230 _{m6}	410	763	241	50 _{h9}	M36	3206
X240		171	11.9	X240		100 _{m6}	210	106	28 _{h9}	M24	X240		230 _{m6}	410	811	241	50 _{h9}	M36	4066
X250		171	11.9	X250		100 _{m6}	210	106	28 _{h9}	M24	X250		240 _{m6}	410	811	252	56 _{h9}	M36	4196

X3KA..									X3KH..								
 LSS	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg	 LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
X220	210 ^{H8}	360	352.5	221.4	50 ^{JS9}	417	M30x90-8.8	2856	X220	210 ^{H7}	211 ^{H9}	484	497.5	352.5	562	M30x90-8.8	2961
X230	210 ^{H8}	360	352.5	221.4	50 ^{JS9}	417	M30x90-8.8	2986	X230	210 ^{H7}	211 ^{H9}	484	497.5	352.5	562	M30x90-8.8	3096
X240	230 ^{H8}	420	400.5	241.4	50 ^{JS9}	469	M36x110-8.8	3781	X240	230 ^{H7}	231 ^{H9}	558	571.5	400.5	654	M36x110-8.8	3946
X250	240 ^{H8}	420	400.5	252.4	56 ^{JS9}	469	M36x110-8.8	3891	X250	240 ^{H7}	241 ^{H9}	558	571.5	400.5	654	M36x110-8.8	4051

9.1.4 X3K220 – 250 Full buckets

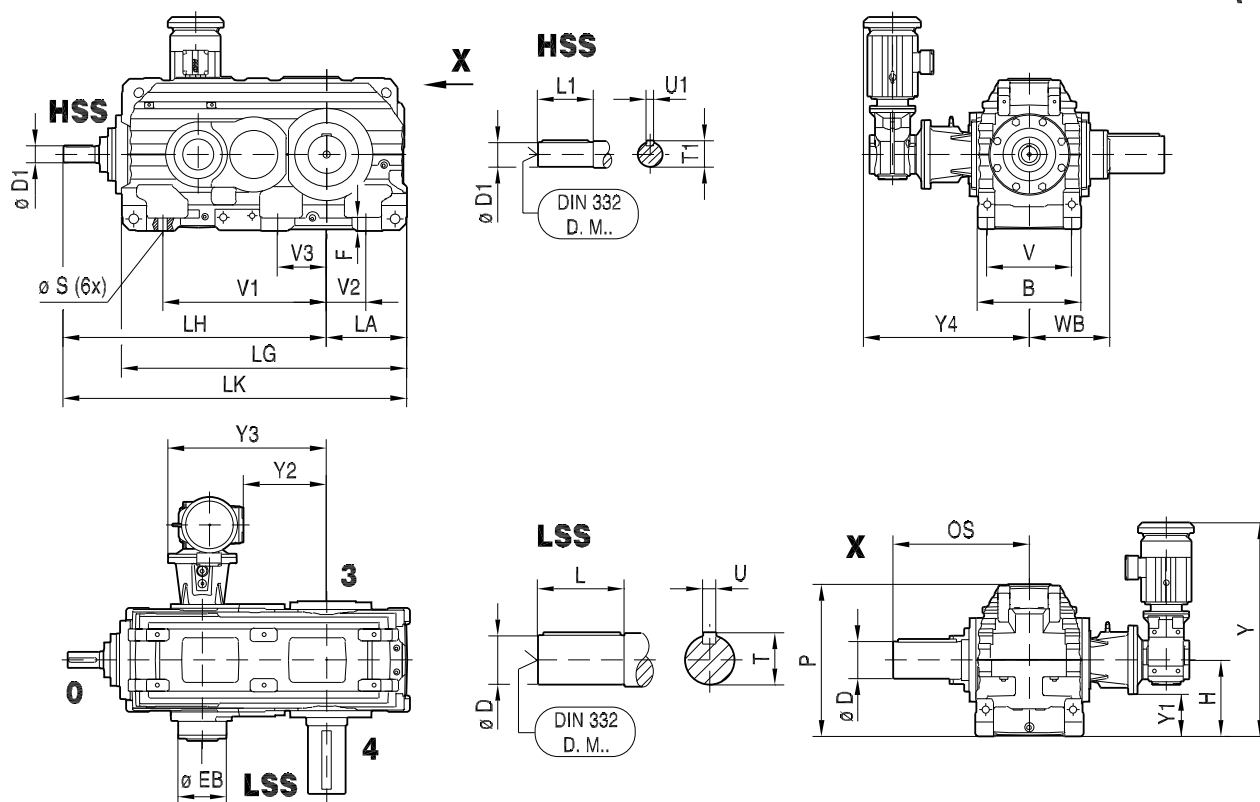
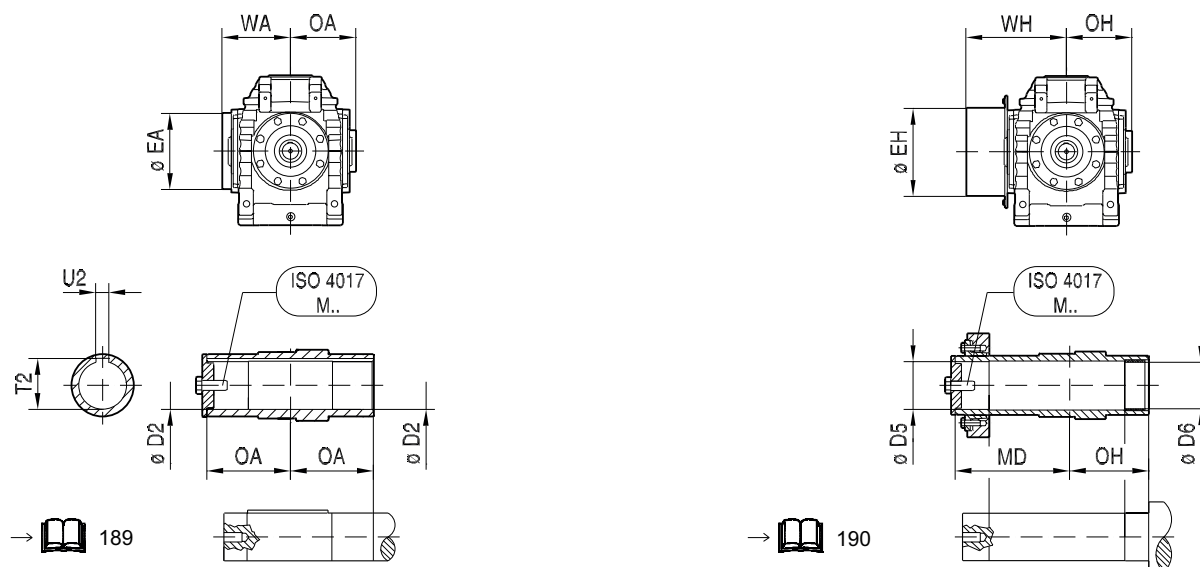
X3KS..48 045 01 07
1(2)**X3KA..****X3KH..**

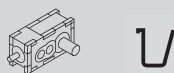
																								
X3K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4		
X220	694	540	245	62	425 _{-0,5}	465 _{-0,5}	1584	1430	1895	850	48	440	910	250	280	426	KF107DRN180M4	1355	200	379	919	987		
X230	734	540	245	62	425 _{-0,5}	465 _{-0,5}	1624	1470	1935	850	48	440	950	250	280	426	KF107DRN180M4	1355	200	419	959	987		
X240	776	625	290	68	450 _{-0,5}	495 _{-0,5}	1721	1597	2092	900	56	510	990	250	305	472	KF127DRN200L4	1524	175	401	1051	1158		
X250	799	625	290	68	450 _{-0,5}	495 _{-0,5}	1744	1620	2115	900	56	510	1010	250	305	472	KF127DRN200L4	1524	175	424	1074	1158		

			HSS	Ø D1	L1	T1	U1	DIN 332 D. M..	LSS	Ø D	L	OS	T	U	DIN 332 D. M..	kg
	M1	M4														
X220	137	35.1	X220	85 _{m6}	170	90	22 _{h9}	M20	X220	210 _{m6}	350	703	221	50 _{h9}	M30	3317
X230	137	35.1	X230	85 _{m6}	170	90	22 _{h9}	M20	X230	230 _{m6}	410	763	241	50 _{h9}	M36	3487
X240	179	55	X240	100 _{m6}	210	106	28 _{h9}	M24	X240	230 _{m6}	410	811	241	50 _{h9}	M36	4623
X250	179	55	X250	100 _{m6}	210	106	28 _{h9}	M24	X250	240 _{m6}	410	811	252	56 _{h9}	M36	4753

X3KA..									X3KH..								
LSS	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg	LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
																	
X220	210 ^{H8}	360	352.5	221.4	50 ^{JS9}	417	M30x90-8.8	3137	X220	210 ^{H7}	211 ^{H9}	484	497.5	352.5	562	M30x90-8.8	3242
X230	210 ^{H8}	360	352.5	221.4	50 ^{JS9}	417	M30x90-8.8	3267	X230	210 ^{H7}	211 ^{H9}	484	497.5	352.5	562	M30x90-8.8	3377
X240	230 ^{H8}	420	400.5	241.4	50 ^{JS9}	469	M36x110-8.8	4338	X240	230 ^{H7}	231 ^{H9}	558	571.5	400.5	654	M36x110-8.8	4503
X250	240 ^{H8}	420	400.5	252.4	56 ^{JS9}	469	M36x110-8.8	4448	X250	240 ^{H7}	241 ^{H9}	558	571.5	400.5	654	M36x110-8.8	4608

9.1.5 X3K260 – 280 Empty buckets

X3KS../HH48 024 01 09
1(2)**X3KA../HH****X3KH../HH**

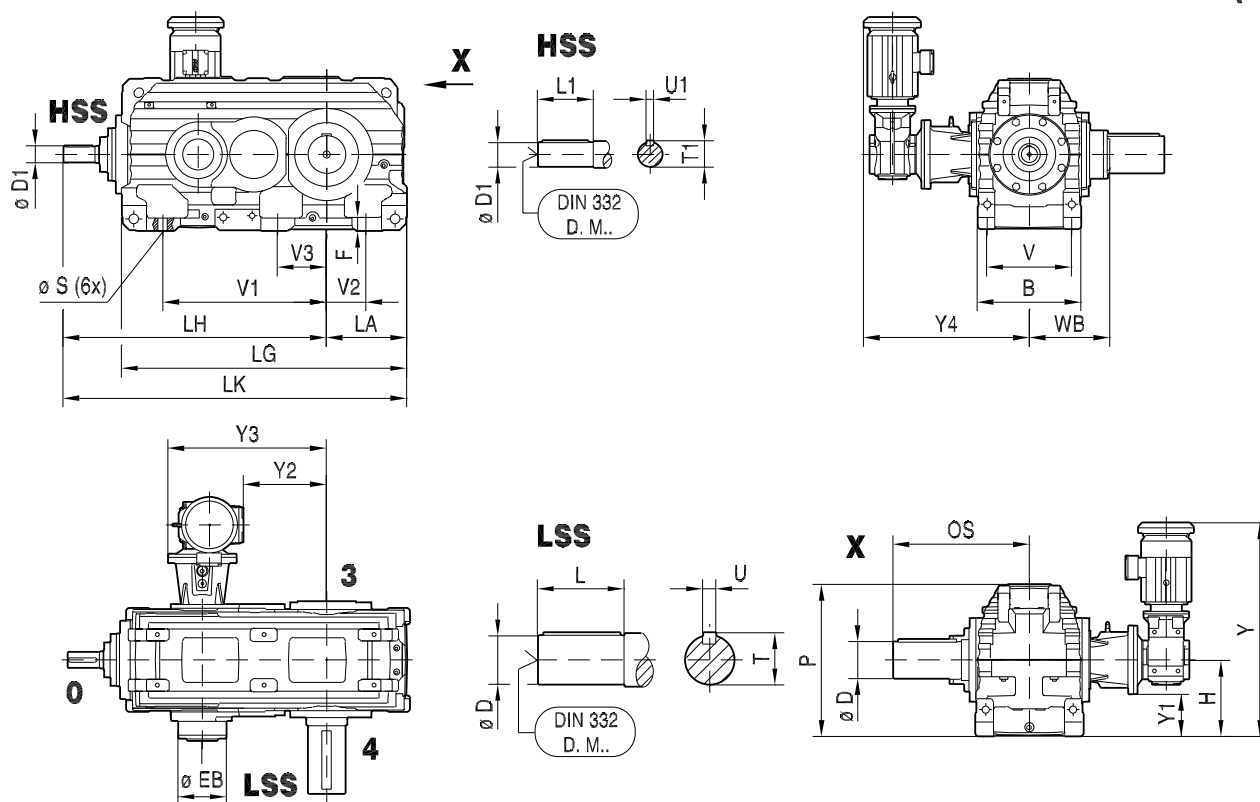
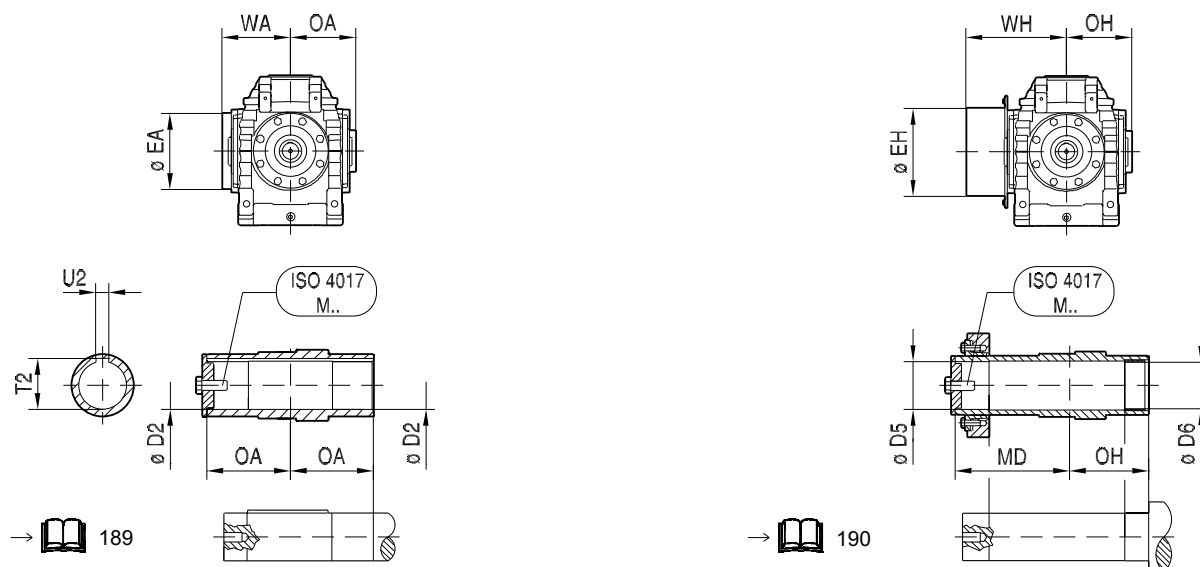


X3K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	W B		Y	Y1	Y2	Y3	Y4
X260	855	705	288	73	500 _{-0.5}	545 _{-0.5}	1900	1767	2312	1000	56	590	1110	300	350	553	KF87DRN132S4	1216	325	643	1030	951
X270	890	705	288	73	500 _{-0.5}	545 _{-0.5}	1935	1802	2347	1000	56	590	1110	300	350	553	KF87DRN132S4	1216	325	678	1065	951
X280	942	705	288	73	555 _{-0.5}	610 _{-0.5}	2052	1854	2464	1110	56	590	1190	360	380	553	KF87DRN132S4	1271	380	730	1117	951

 [I]			HSS 	Ø D1	L1	T1	U1	DIN 332 D. M..	LSS 	Ø D	L	OS	T	U	DIN 332 D. M..	kg
X260	257	11.9	X260	110 _{m6}	210	116	28 _{h9}	M24	X260	250 _{m6}	410	847	262	56 _{h9}	M36	4706
X270	257	11.9	X270	110 _{m6}	210	116	28 _{h9}	M24	X270	270 _{m6}	470	920	282	63 _{h9}	M36	5206
X280	327	11.9	X280	110 _{m6}	210	116	28 _{h9}	M24	X280	290 _{m6}	470	920	302	63 _{h9}	M30	5656

X3KA..									X3KH..								
LSS 	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg	LSS 	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
X260	240 ^{H8}	420	437	252.4	56 ^{JS9}	509	M36x110-8.8	4256	X260	250 ^{H7}	255 ^{H9}	558	608	437	694	M36x110-8.8	4406
X270	275 ^{H8}	460	450	287.4	63 ^{JS9}	523	M36x110-8.8	4706	X270	280 ^{H7}	285 ^{H9}	602	630	450	706	M36x110-8.8	4956
X280	275 ^{H8}	460	450	287.4	63 ^{JS9}	523	M36x110-8.8	5056	X280	280 ^{H7}	285 ^{H9}	602	630	450	706	M36x110-8.8	4756

9.1.6 X3K260 – 280 Full buckets

X3KS../HH48 024 01 09
1(2)**X3KA../HH****X3KH../HH**

																						
X3K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X260	855	705	288	73	500 _{0.5}	545 _{0.5}	1900	1767	2312	1000	56	590	1110	300	350	553	KF127DRN225S4	1548	225	480	1130	1235
X270	890	705	288	73	500 _{0.5}	545 _{0.5}	1935	1802	2347	1000	56	590	1110	300	350	553	KF127DRN225S4	1548	225	515	1165	1235
X280	942	705	288	73	555 _{0.5}	610 _{0.5}	2052	1854	2464	1110	56	590	1190	360	380	553	KF127DRN225S4	1603	280	567	1217	1235

			HSS	Ø D1	L1	T1	U1	DIN 332 D. M..	LSS	Ø D	L	OS	T	U	DIN 332 D. M..	kg
X260	267	55	X260	110 _{m6}	210	116	28 _{h9}	M24	X260	250 _{m6}	410	847	262	56 _{h9}	M36	5293
X270	267	55	X270	110 _{m6}	210	116	28 _{h9}	M24	X270	270 _{m6}	470	920	282	63 _{h9}	M36	5793
X280	337	55	X280	110 _{m6}	210	116	28 _{h9}	M24	X280	290 _{m6}	470	920	302	63 _{h9}	M30	6243

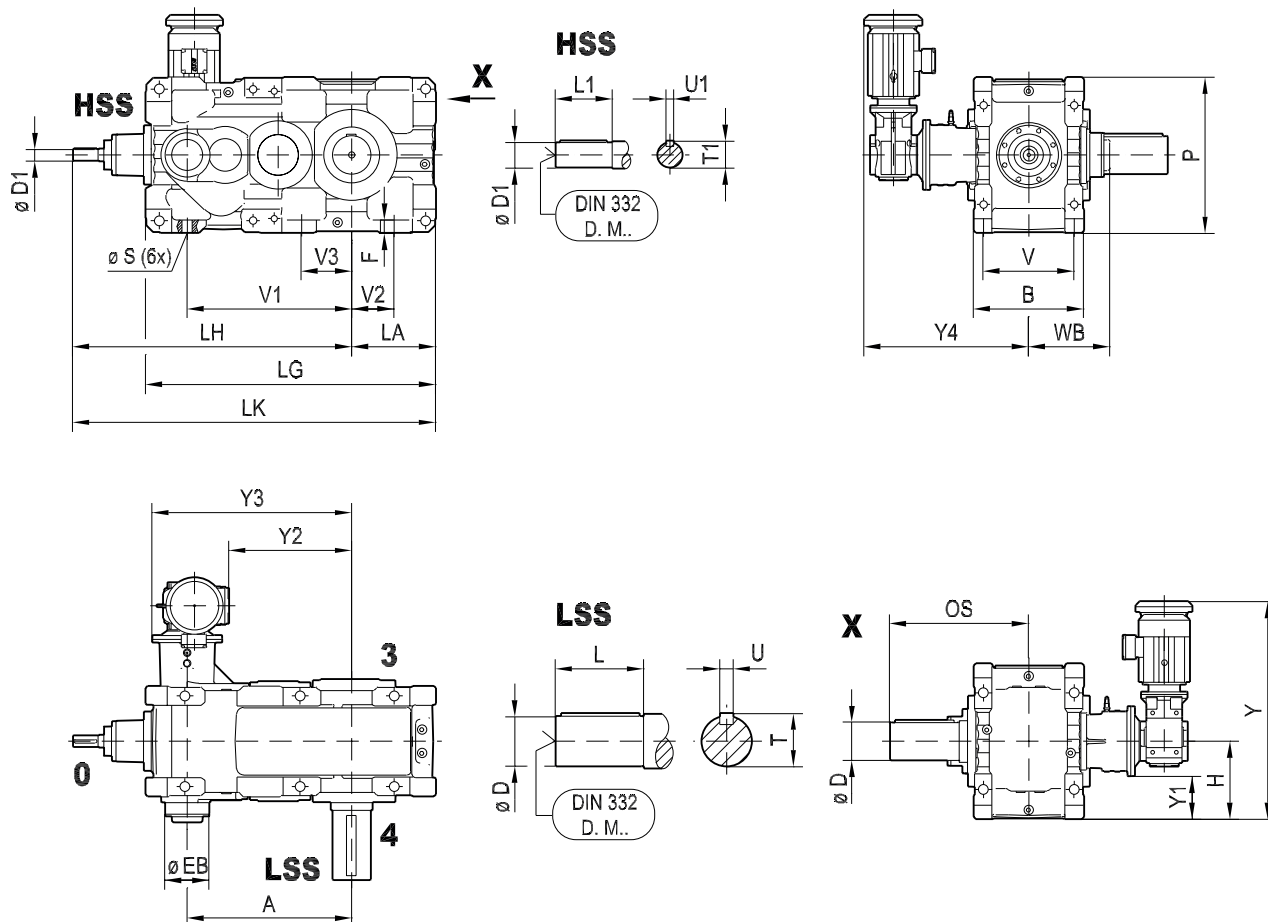
X3KA..									X3KH..								
LSS	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg	LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
																	
X260	240 ^{H8}	420	437	252.4	56 ^{JS9}	509	M36x110-8.8	4843	X260	250 ^{H7}	255 ^{H9}	558	608	437	694	M36x110-8.8	4993
X270	275 ^{H8}	460	450	287.4	63 ^{JS9}	523	M36x110-8.8	5293	X270	280 ^{H7}	285 ^{H9}	602	630	450	706	M36x110-8.8	5543
X280	275 ^{H8}	460	450	287.4	63 ^{JS9}	523	M36x110-8.8	5643	X280	280 ^{H7}	285 ^{H9}	602	630	450	706	M36x110-8.8	5943

9.2 X4K..

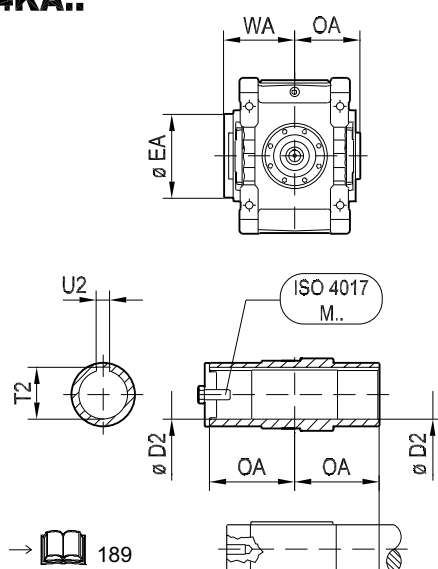
9.2.1 X4K120 – 210 Full buckets

X4KS..

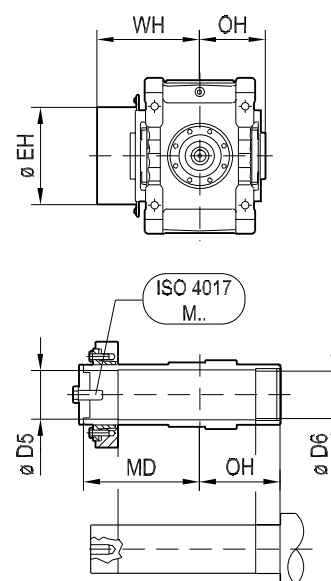
48 008 01 23



X4KA..



X4KH..



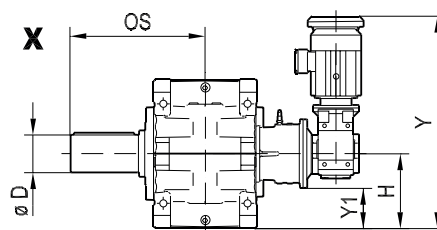
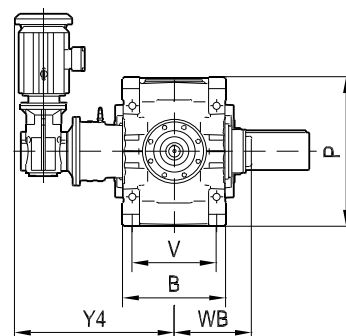
																						
X4K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X120	327	300	153	33	225 _{0,5}	215 _{0,5}	767	710	925	450	28 (4x)	245	440	105	-	191	KF37DRN90L4	679	145	327	508	463.5
X130	363	300	153	33	225 _{0,5}	250 _{0,5}	838	746	996	450	28 (4x)	245	475	140	-	194	KF37DRN90L4 KF37DRN100LS4	679	145	363	544	463.5
X140	388	360	175	42	265 _{0,5}	250 _{0,5}	903	856	1106	530	35 (4x)	290	510	110	-	222	KF47DRN100L4	786	165	356	553	472.5
X150	430	360	175	42	265 _{0,5}	295 _{0,5}	990	898	1193	530	35 (4x)	290	555	155	-	225	KF47DRN100L4	786	165	390	602	556.5
X160	474	425	190	50	315 _{0,5}	355 _{0,5}	1144	1029	1384	630	42 (4x)	345	620	185	-	256	KF67DRN132S4	934	190	432	644	556.5
X170	525	425	190	50	315 _{0,5}	355 _{0,5}	1195	1080	1435	630	42 (4x)	345	670	185	-	256	KF67DRN132S4	934	190	471	736	604.5
X180	544	475	210	55	335 _{0,5}	370 _{0,5}	1249	1198	1568	670	42 (6x)	390	710	190	215	292	KF77DRN160M4	1076	185	522	787	604.5
X190	576	475	210	55	335 _{0,5}	370 _{0,5}	1281	1230	1600	670	42 (6x)	390	740	190	215	292	KF77DRN160M4	1076	185	518.7	857	739
X200	614	515	210	60	375 _{0,5}	420 _{0,5}	1409	1285	1705	750	48 (6x)	420	780	205	230	312	KF97DRN160M4	1116	225	550.7	889	739
X210	650	515	210	60	375 _{0,5}	420 _{0,5}	1445	1321	1741	750	48 (6x)	420	815	205	230	312	KF97DRN160M4	1116	225	605.7	944	756.5

			HSS	Ø D1	L1	T1	U1	DIN 332 D. M..	LSS	Ø D	L	OS	T	U	DIN 332 D. M..	kg
X120	25	1.5	X120	28 _{k6}	60	31	8 _{h9}	M10	X120	100 _{m6}	210	401	106	28 _{h9}	M24	390
X130	23	1.5	X130	28 _{k6}	60	31	8 _{h9}	M10	X130	110 _{m6}	210	404	116	28 _{h9}	M24	434
X140	36	2.2	X140	32 _{k6}	80	35	10 _{h9}	M12	X140	120 _{m6}	210	432	127	32 _{h9}	M24	634
X150	39	2.2	X150	32 _{k6}	80	35	10 _{h9}	M12	X150	130 _{m6}	250	475	137	32 _{h9}	M24	704
X160	67	3.7	X160	38 _{k6}	100	41	10 _{h9}	M12	X160	140 _{m6}	250	506	148	36 _{h9}	M30	1076
X170	67	3.7	X170	38 _{k6}	100	41	10 _{h9}	M12	X170	160 _{m6}	300	556	169	40 _{h9}	M30	1236
X180	81	5.9	X180	50 _{k6}	110	53.5	14 _{h9}	M16	X180	170 _{m6}	300	592	179	40 _{h9}	M30	1622
X190	84	5.9	X190	50 _{k6}	110	53.5	14 _{h9}	M16	X190	170 _{m6}	300	592	179	40 _{h9}	M30	1632
X200	107	5.9	X200	50 _{k6}	110	53.5	14 _{h9}	M16	X200	180 _{m6}	300	612	190	45 _{h9}	M30	2063
X210	109	5.9	X210	50 _{k6}	110	53.5	14 _{h9}	M16	X210	190 _{m6}	350	662	200	45 _{h9}	M30	2113

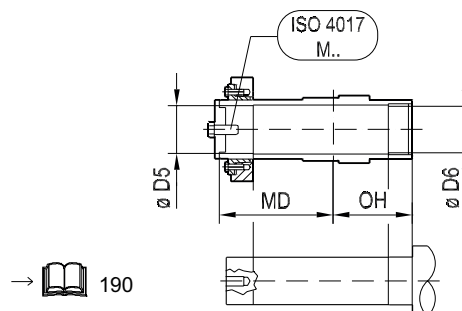
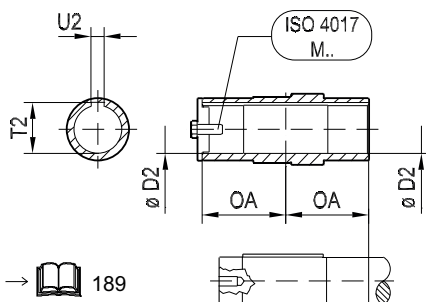
X4KA..									X4KH..								
LSS	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg	LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
X120	95 ^{H8}	202	190.5	100.4	25 ^{JS9}	223	M24x70-8.8	370	X120	100 ^{H7}	101 ^{H9}	272	286.5	190.5	319	M24x70-8.8	380
X130	105 ^{H8}	222	194	111.4	28 ^{JS9}	225	M24x70-8.8	409	X130	110 ^{H7}	111 ^{H9}	292	297	194	328	M24x70-8.8	424
X140	115 ^{H8}	222	222	122.4	32 ^{JS9}	253	M24x70-8.8	599	X140	120 ^{H7}	121 ^{H9}	304	329	222	356	M24x70-8.8	624
X150	125 ^{H8}	250	224.5	132.4	32 ^{JS9}	255	M24x70-8.8	654	X150	130 ^{H7}	131 ^{H9}	322	337.5	224.5	368	M24x70-8.8	684
X160	135 ^{H8}	270	256	143.4	36 ^{JS9}	319	M30x90-8.8	1006	X160	140 ^{H7}	141 ^{H9}	368	375	256	427	M30x90-8.8	1036
X170	150 ^{H8}	270	256	158.4	36 ^{JS9}	319	M30x90-8.8	1156	X170	150 ^{H7}	151 ^{H9}	368	364	256	427	M30x90-8.8	1211
X180	165 ^{H8}	278	292	174.4	40 ^{JS9}	356	M30x90-8.8	1522	X180	165 ^{H7}	166 ^{H9}	382	400	292	463	M30x60-8.8	1572
X190	165 ^{H8}	278	292	174.4	40 ^{JS9}	356	M30x90-8.8	1532	X190	165 ^{H7}	166 ^{H9}	382	400	292	463	M30x60-8.8	1582
X200	180 ^{H8}	332	319.5	190.4	45 ^{JS9}	383	M30x90-8.8	1978	X200	180 ^{H7}	181 ^{H9}	446	450.5	319.5	517	M30x60-8.8	2048
X210	190 ^{H8}	332	319.5	200.4	45 ^{JS9}	383	M30x90-8.8	1988	X210	190 ^{H7}	191 ^{H9}	446	453.5	319.5	517	M30x60-8.8	2038

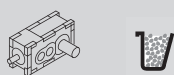
X4KS../HU

48 009 01 23^L



Technical drawing of a ball valve in the closed position. The drawing shows a cross-section of the valve body with a central ball. Dimensions are indicated: WA (Width of the valve body), OA (Overall width), and ØEA (Outer diameter of the valve body).





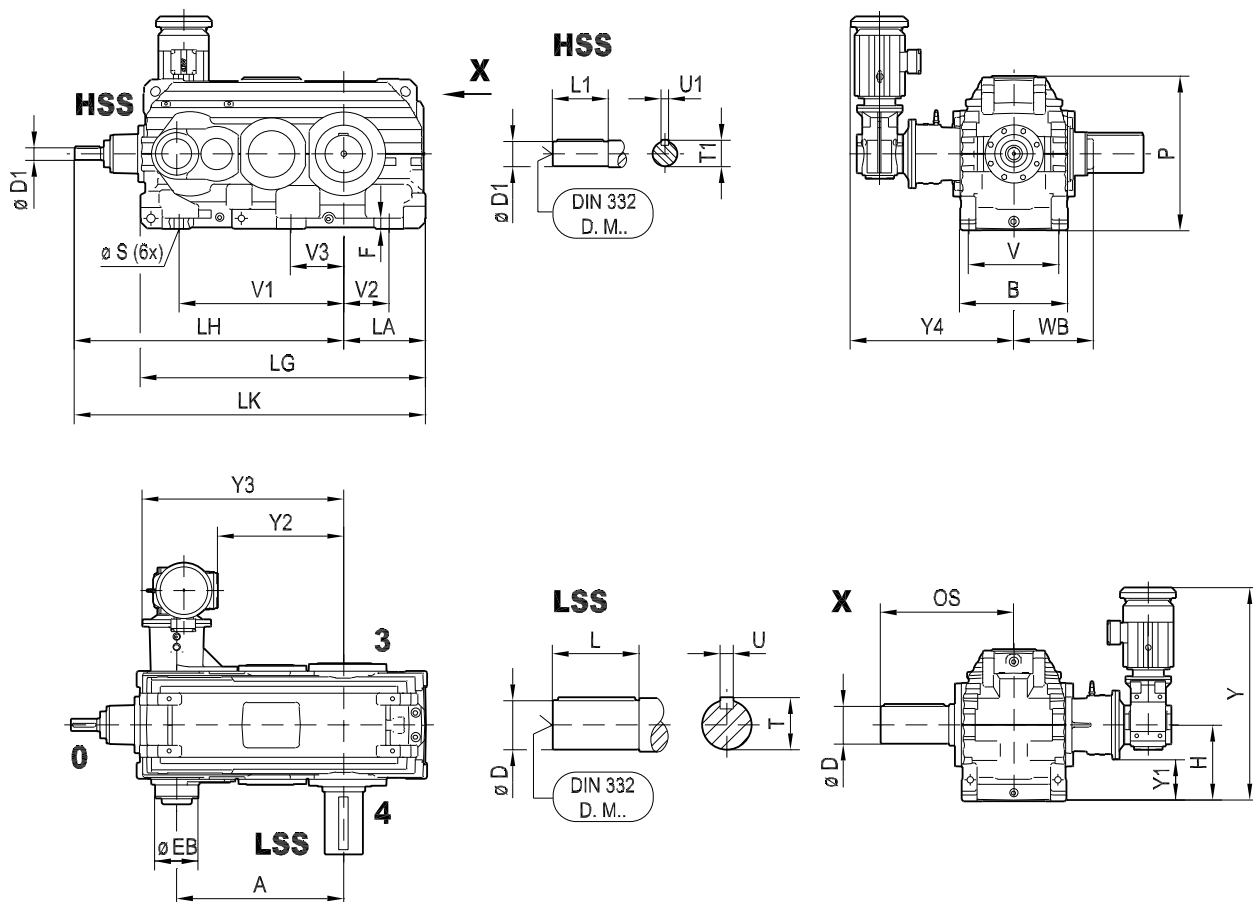
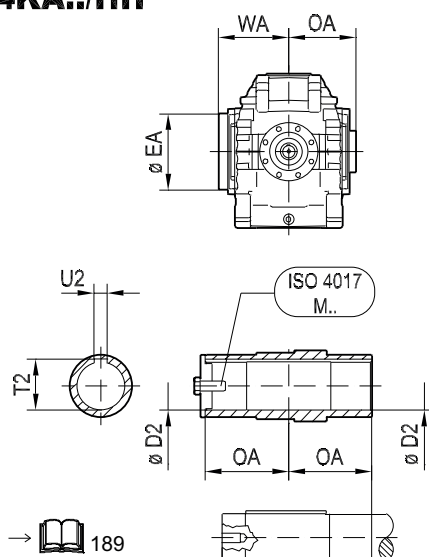
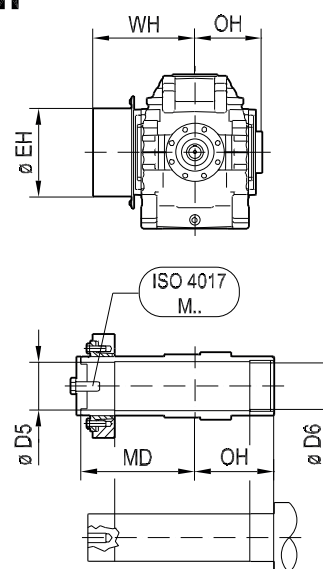
X4K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X220	894	540	210	62	425 _{0.5}	465 _{0.5}	1584	1456	1921	854	48	440	910	250	280	331	KF87DRN180M4	1239	250	682	1069	829.5
X230	934	540	210	62	425 _{0.5}	465 _{0.5}	1624	1496	1963	854	48	440	950	250	280	331	KF87DRN180M4	1239	250	722	1109	829.5
X240	1004	625	210	68	450 _{0.5}	495 _{0.5}	1721	1595	2090	900	56	510	990	250	305	377	KF97DRN200L4	1389	225	739	1229	973.5
X250	1027	625	210	68	450 _{0.5}	495 _{0.5}	1744	1618	2113	900	56	510	1010	250	305	377	KF97DRN200L4	1389	225	762	1252	973.5

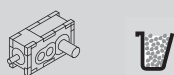
		M1	M4		HSS	Ø D1	L1	T1	U1	DIN 332 D. M..		LSS	Ø D	L	OS	T	U	DIN 332 D. M..	kg
					X220	60 _{m6}	140	64	18 _{h9}	M20		X220	210 _{m6}	350	703	221	50 _{h9}	M30	2750
					X230	60 _{m6}	140	64	18 _{h9}	M20		X230	230 _{m6}	410	763	241	50 _{h9}	M36	2980
					X240	70 _{m6}	140	74.5	20 _{h9}	M20		X240	230 _{m6}	410	811	241	50 _{h9}	M36	3948
					X250	70 _{m6}	140	74.5	20 _{h9}	M20		X250	240 _{m6}	410	811	252	56 _{h9}	M36	4168

X4KA..									X4KH..								
																	
LSS	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg	LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
X220	210 ^{H8}	360	352.5	221.4	50 ^{JS9}	417	M30x90-8.8	2570	X220	210 ^{H7}	211 ^{H9}	484	497.5	352.5	562	M30x90-8.8	2675
X230	210 ^{H8}	360	352.5	221.4	50 ^{JS9}	417	M30x90-8.8	2760	X230	210 ^{H7}	211 ^{H9}	484	497.5	352.5	562	M30x90-8.8	2870
X240	230 ^{H8}	420	400.5	241.4	50 ^{JS9}	469	M36x110-8.8	3663	X240	230 ^{H7}	231 ^{H9}	558	571.5	400.5	654	M36x110-8.8	3828
X250	240 ^{H8}	420	400.5	252.4	56 ^{JS9}	469	M36x110-8.8	3863	X250	240 ^{H7}	241 ^{H9}	558	571.5	400.5	654	M36x110-8.8	4023

X4KS../HH

48 010 01 23

**X4KA../HH****X4KH../HH**



X4K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X220	894	540	210	62	425 _{0.5}	465 _{0.5}	1584	1456	1921	850	48	440	910	250	280	331	KF87DRN180M4	1239	250	682	1069	829.5
X230	934	540	210	62	425 _{0.5}	465 _{0.5}	1624	1496	1963	850	48	440	950	250	280	331	KF87DRN180M4	1239	250	722	1109	829.5
X240	1004	625	210	68	450 _{0.5}	495 _{0.5}	1721	1595	2090	900	56	510	990	250	305	377	KF97DRN200L4	1389	225	739	1229	973.5
X250	1027	625	210	68	450 _{0.5}	495 _{0.5}	1744	1618	2113	900	56	510	1010	250	305	377	KF97DRN200L4	1389	225	762	1252	973.5

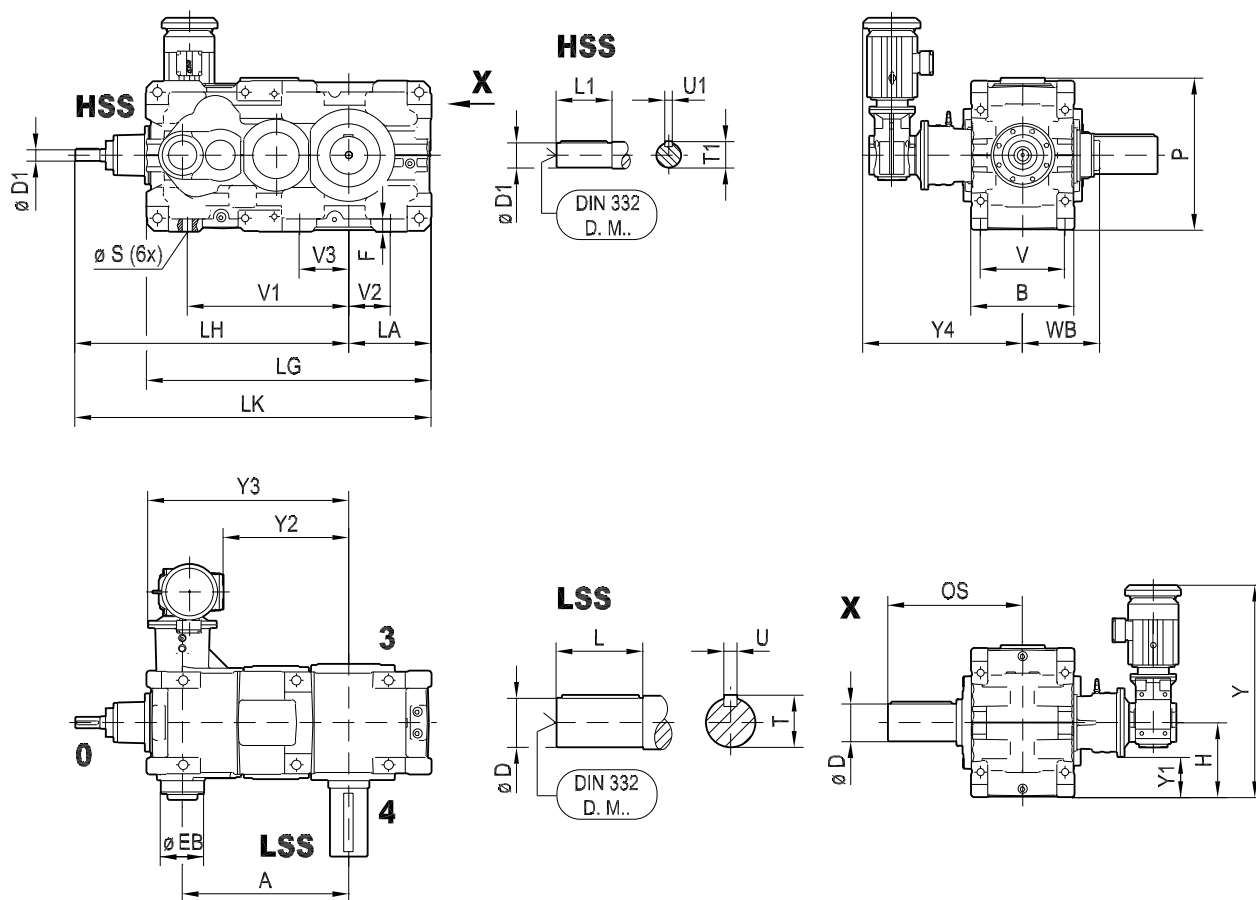
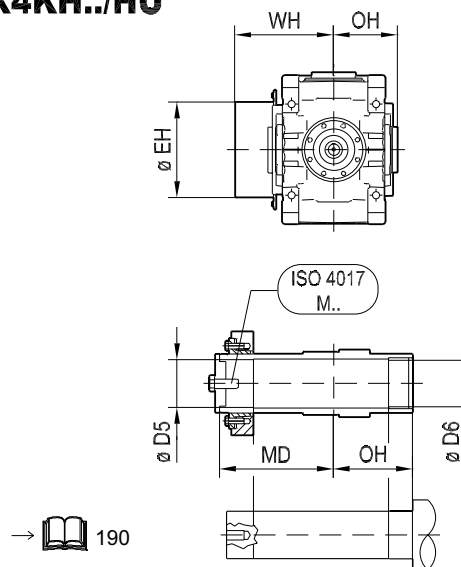
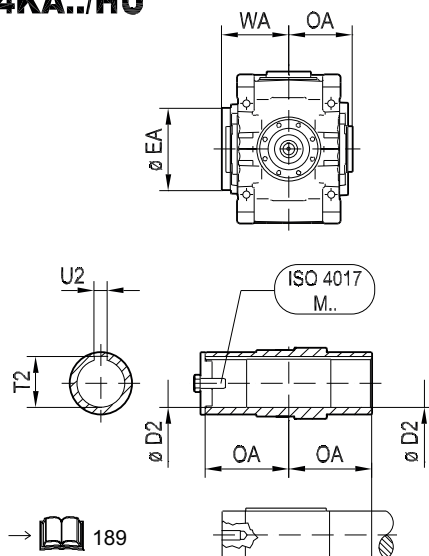
		M1	M4		HSS	Ø D1	L1	T1	U1	DIN 332 D. M..		LSS	Ø D	L	OS	T	U	DIN 332 D. M..	kg
					X220	60 _{m6}	140	64	18 _{h9}	M20		X220	210 _{m6}	350	703	221	50 _{h9}	M30	3010
					X230	60 _{m6}	140	64	18 _{h9}	M20		X230	230 _{m6}	410	763	241	50 _{h9}	M36	3250
					X240	70 _{m6}	140	74.5	20 _{h9}	M20		X240	230 _{m6}	410	811	241	50 _{h9}	M36	4298
					X250	70 _{m6}	140	74.5	20 _{h9}	M20		X250	240 _{m6}	410	811	252	56 _{h9}	M36	4528

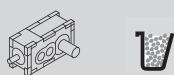
X4KA..									X4KH..								
																	
LSS	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg	LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
X220	210 ^{H8}	360	352.5	221.4	50 ^{JS9}	417	M30x90-8.8	2830	X220	210 ^{H7}	211 ^{H9}	484	497.5	352.5	562	M30x90-8.8	2935
X230	210 ^{H8}	360	352.5	221.4	50 ^{JS9}	417	M30x90-8.8	3030	X230	210 ^{H7}	211 ^{H9}	484	497.5	352.5	562	M30x90-8.8	3140
X240	230 ^{H8}	420	400.5	241.4	50 ^{JS9}	469	M36x110-8.8	4013	X240	230 ^{H7}	231 ^{H9}	558	571.5	400.5	654	M36x110-8.8	4178
X250	240 ^{H8}	420	400.5	252.4	56 ^{JS9}	469	M36x110-8.8	4223	X250	240 ^{H7}	241 ^{H9}	558	571.5	400.5	654	M36x110-8.8	4383

9.2.3 X4K250 – 280 Full buckets

X4KS../HU

48 011 01 23

**X4KA../HU****X4KH../HU**



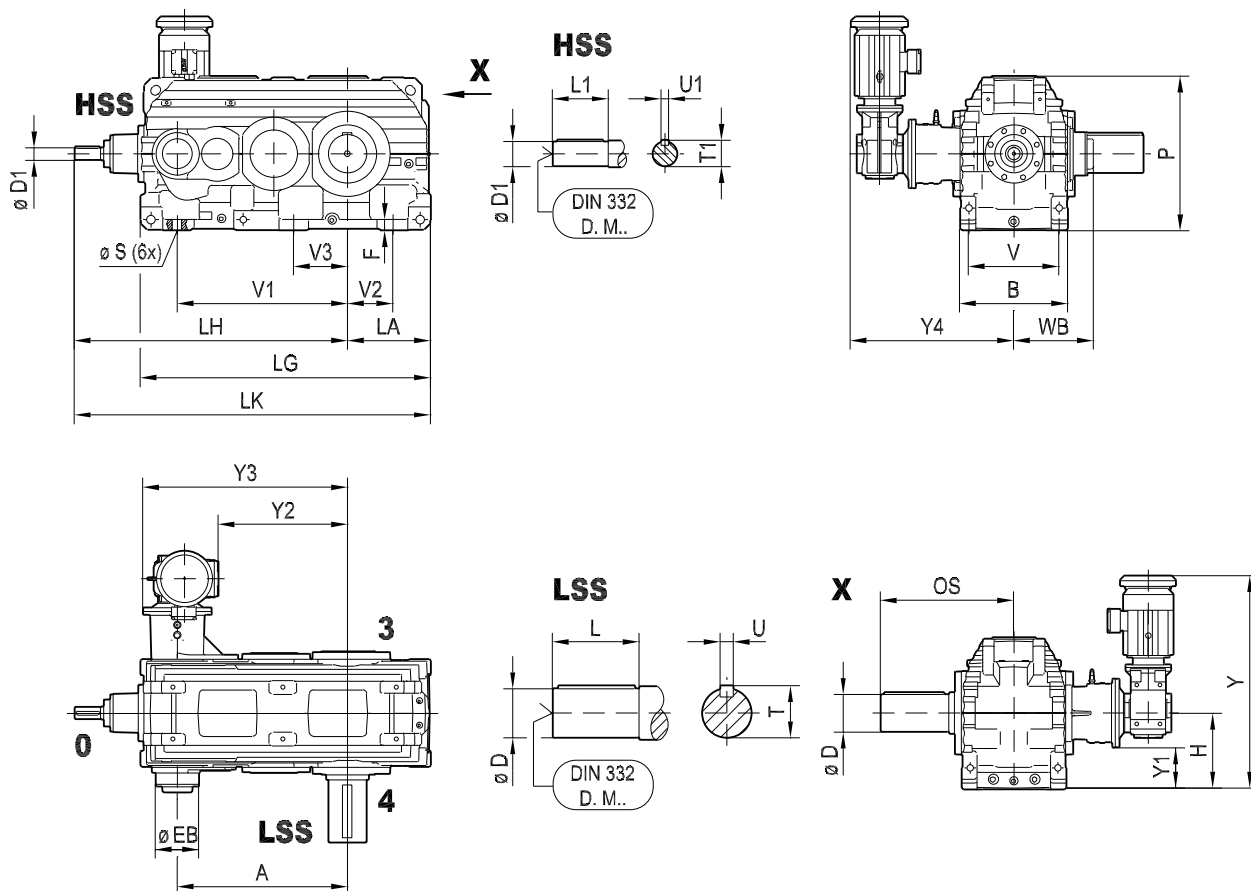
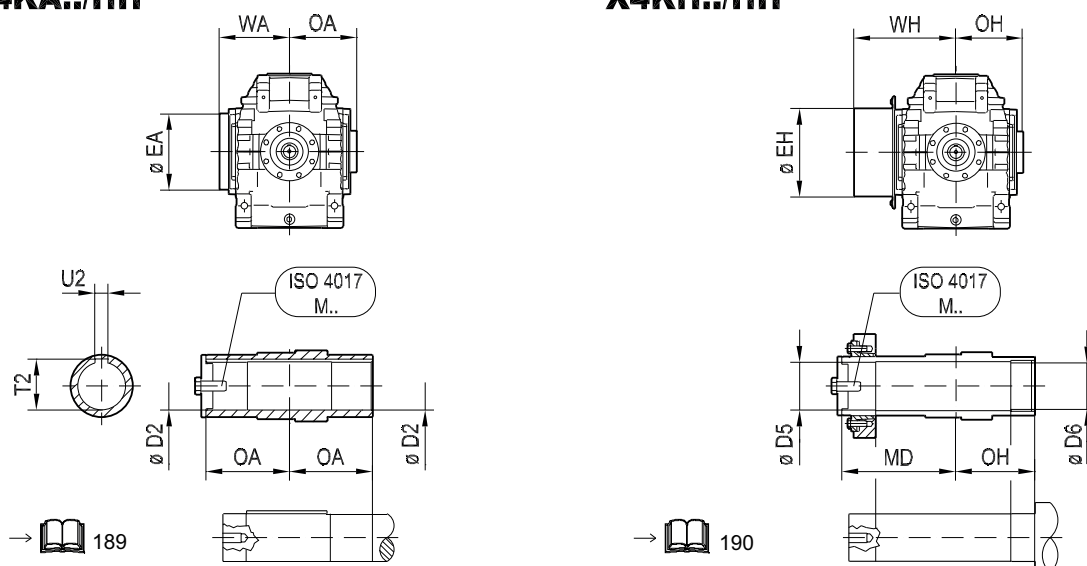
X4K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X260	111	705	210	63	500 _{0.5}	545 _{0.5}	1900	1785	2330	1017	56	590	1100	300	350	437	KF97DRN200L4	1439	275	848	1338	1015
X270	1148	705	210	63	500 _{0.5}	545 _{0.5}	1935	1820	2365	1017	56	590	1100	300	350	450	KF97DRN200L4	1439	275	883	1373	1015
X280	1200	705	210	73	555 _{0.5}	610 _{0.5}	2052	1872	2482	1127	56	590	1190	360	380	450	KF97DRN200L4	1494	330	935	1425	1015

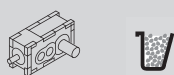
 [I]			HSS 	Ø D1	L1	T1	U1	DIN 332 D. M..	LSS 	Ø D	L	OS	T	U	DIN 332 D. M..	kg
X260	275	21.5	X260	80 _{m6}	170	85	22 _{h9}	M20	X260	250 _{m6}	410	847	262	56 _{h9}	M36	4808
X270	275	21.5	X270	80 _{m6}	170	85	22 _{h9}	M20	X270	270 _{m6}	470	920	282	63 _{h9}	M36	5308
X280	335	21.5	X280	80 _{m6}	170	85	22 _{h9}	M20	X280	290 _{m6}	470	920	302	63 _{h9}	M36	5808

X4KA.. 									X4KH.. 								
LSS	Ø D2	Ø EA	OA	T2	U2	WA	ISO 4017 M..	kg	LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
X260	240 ^{H8}	420	437	252.4	56 ^{JS9}	509	M36x110-8.8	4358	X260	250 ^{H7}	255 ^{H9}	558	608	437	694	M36x110-8.8	4238
X270	275 ^{H8}	460	450	287.4	63 ^{JS9}	523	M36x110-8.8	4808	X270	280 ^{H7}	285 ^{H9}	602	630	450	706	M36x110-8.8	5058
X280	275 ^{H8}	460	450	287.4	63 ^{JS9}	523	M36x110-8.8	5258	X280	280 ^{H7}	285 ^{H9}	602	630	450	706	M36x110-8.8	5508

X4KS../HH

48 012 01 23

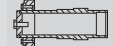
**X4KA../HH****X4KH../HH**



X4K..	A	B	Ø EB	F	H	LA	LG	LH	LK	P	Ø S	V	V1	V2	V3	WB		Y	Y1	Y2	Y3	Y4
X260	111	705	210	63	500 _{0.5}	545 _{0.5}	1900	1785	2330	1017	56	590	1100	300	350	437	KF97DRN200L4	1439	275	848	1338	1015
X270	1148	705	210	63	500 _{0.5}	545 _{0.5}	1935	1820	2365	1017	56	590	1100	300	350	450	KF97DRN200L4	1439	275	883	1373	1015
X280	1200	705	210	73	555 _{0.5}	610 _{0.5}	2052	1872	2482	1127	56	590	1190	360	380	450	KF97DRN200L4	1494	330	935	1425	1015

 [I]			HSS 	Ø D1	L1	T1	U1	DIN 332 D. M..	LSS 	Ø D	L	OS	T	U	DIN 332 D. M..	kg
X260	275	21.5	X260	80 _{m6}	170	85	22 _{h9}	M20	X260	250 _{m6}	410	847	262	56 _{h9}	M36	5158
X270	275	21.5	X270	80 _{m6}	170	85	22 _{h9}	M20	X270	270 _{m6}	470	920	282	63 _{h9}	M36	5658
X280	335	21.5	X280	80 _{m6}	170	85	22 _{h9}	M20	X280	290 _{m6}	470	920	302	63 _{h9}	M36	6208

X4KA.. 								
LSS	Ø D2	Ø EA	Ø A	T2	U2	WA	ISO 4017 M..	kg
X260	240 ^{H8}	420	437	252.4	56 ^{JS9}	509	M36x110-8.8	4708
X270	275 ^{H8}	460	450	287.4	63 ^{JS9}	523	M36x110-8.8	5158
X280	275 ^{H8}	460	450	287.4	63 ^{JS9}	523	M36x110-8.8	5658

X4KH.. 								
LSS	Ø D5	Ø D6	Ø EH	MD	OH	WH	ISO 4017 M..	kg
X260	250 ^{H7}	255 ^{H9}	558	608	437	694	M36x110-8.8	4588
X270	280 ^{H7}	285 ^{H9}	602	630	450	706	M36x110-8.8	5408
X280	280 ^{H7}	285 ^{H9}	602	630	450	706	M36x110-8.8	5908

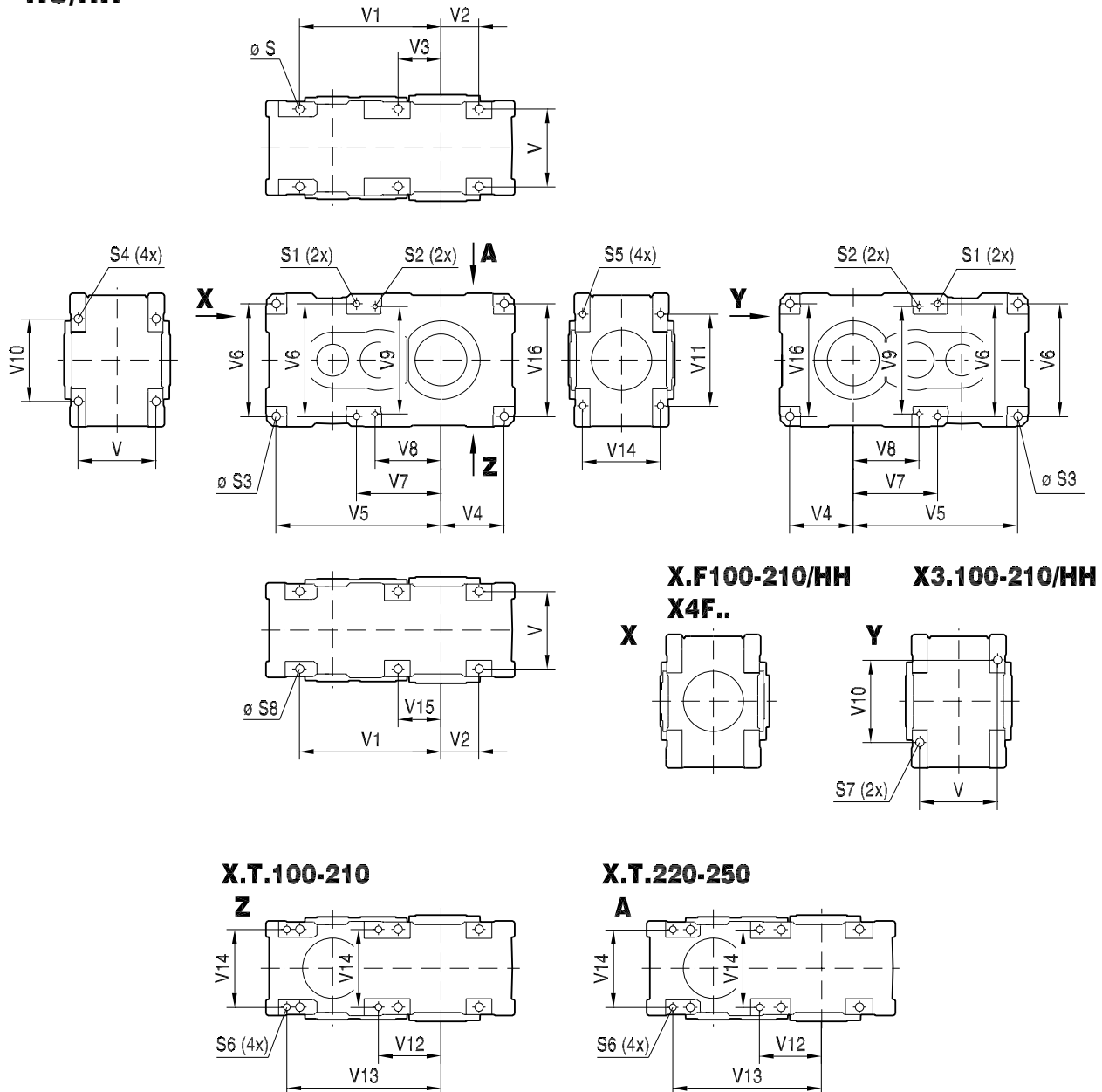
10 Dimension sheets: Options

10.1 Housing bores

10.1.1 Universal and horizontal housing X100 – 280 HU/HH

HU/HH

48 037 01 13



Universal housing X100 – 280 /HU

	Ø S	S1 (2x)	S2 (2x)	Ø S3	S4 (4x)	S5 (4x)	S7 (2x)	Ø S8	V	V1	V2	V3	V4	V5
X100	24 (4x)	M20	-	24 (4x)	ø 24	M20	-	24 (4x)	210	370	90	-	160	441
X110	24 (4x)	M20	-	24 (4x)	ø 24	M20	-	24 (4x)	210	390	115	-	185	461
X120	28(4x)	M24	-	28 (4x)	ø 28	M24	-	28(4x)	245	440	105	-	184	521
X130	28 (4x)	M24	-	28 (4x)	ø 28	M24	-	28 (4x)	245	475	140	-	219	557
X140	35 (4x)	M30	-	35 (4x)	ø 35	M30	-	35 (4x)	290	510	110	-	210	613
X150	35 (4x)	M30	M20	35 (4x)	ø 35	M30	-	35 (4x)	290	555	155	-	255	655
X160	42 (4x)	M36	M24	42 (4x)	ø 42	M36	-	42 (4x)	340	620	185	-	303	737
X170	42 (4x)	M36	M24	42 (4x)	ø 42	M36	-	42 (4x)	340	670	185	-	303	788
X180	42 (6x)	M36	M30	42 (4x)	ø 42	M36	-	42 (6x)	390	710	190	215	318	827
X190	42 (6x)	M36	M30	42 (4x)	ø 42	M36	-	42 (6x)	390	740	190	215	318	859
X200	48 (6x)	M42	M30	48 (4x)	ø 48	M42	-	48 (6x)	420	780	205	230	360	930
X210	48 (6x)	M42	M30	48 (4x)	ø 48	M42	-	48 (6x)	420	815	205	230	360	966
X220	48 (6x)	M42	M36	48 (4x)	M42x63	M42	-	48 (6x)	440	910	250	280	403	1057
X230	48 (6x)	M42	M36	48 (4x)	M42x63	M42	-	48 (6x)	440	950	250	280	403	1097
X240	56 (6x)	M48	M36	56(4x)	M48x72	M48	-	56 (6x)	510	990	250	305	425	1155
X250	56 (6x)	M48	M36	56 (4x)	M48x72	M48	-	56 (6x)	510	1010	250	305	425	1178
X260	56 (6x)	M48	M48	56 (4x)	M48x72	M48	-	56 (6x)	590	1110	300	350	475	1285
X270	56 (6x)	M48	M48	56 (4x)	M48x72	M48	-	56 (6x)	590	1110	300	350	475	1320
X280	56 (6x)	M48	-	56 (4x)	M48x72	M48	-	56 (6x)	590	1190	360	380	540	1372

	V6	V7	V8	V9	V10	V11	V14	V15	V16
X100	315	197	-	-	250	250	210	-	315
X110	315	217	-	-	250	250	210	-	315
X120	380	233	-	-	300	310	245	-	380
X130	380	269	-	-	300	310	245	-	380
X140	445	277	-	-	335	350	290	-	445
X150	445	319	250	430	335	350	290	-	445
X160	525	348	265	500	400	415	345	-	525
X170	525	399	265	500	400	415	345	-	525
X180	565	424	333	546	415	460	390	215	565
X190	565	456	333	546	415	460	390	215	565
X200	630	478	350	610	455	510	420	230	630
X210	630	514	350	610	455	510	420	230	630
X220	725	531	415	680	610	600	440	280	725
X230	725	571	415	680	610	600	440	280	725
X240	760	625	450	740	600	600	510	305	760
X250	760	648	450	740	600	600	510	305	760
X260	860	683	500	860	710	710	590	350	860
X270	860	718	500	860	710	710	590	350	860
X280	970	569	-	970	710	710	590	380	970

Horizontal housing X100 – 210 /HH

	Ø S	S1 (2x) ¹⁾	S1 (2x) ²⁾	S2 (2x)	Ø S3	S4 (4x)	S5 (4x)	Ø S7 (2x)	Ø S8	V	V1	V2	V3
X100	24 (4x)	M20	-	-	24 (2x)	-	M20	24	24 (4x)	210	370	90	-
X110	24 (4x)	M20	-	-	24 (2x)	-	M20	24	24 (4x)	210	390	115	-
X120	28 (4x)	M24	-	-	28 (2x)	-	M24	28	28 (4x)	245	440	105	-
X130	28 (4x)	M24	-	-	28 (2x)	-	M24	28	28 (4x)	245	475	140	-
X140	35 (4x)	M30	-	-	35 (2x)	-	M30	35	35 (4x)	290	510	110	-
X150	35 (4x)	M30	-	-	35 (2x)	-	M30	35	35 (4x)	290	555	155	-
X160	42 (4x)	M36	-	-	42 (2x)	-	M36	42	42 (4x)	340	620	185	-
X170	42 (4x)	M36	-	-	42 (2x)	-	M36	42	42 (4x)	340	670	185	-
X180	42 (6x)	M36	-	-	42 (2x)	-	M36	42	42 (4x)	390	710	190	215
X190	42 (6x)	M36	-	-	42 (2x)	-	M36	42	42 (4x)	390	740	190	215
X200	48 (6x)	M42	-	-	48 (2x)	-	M42	48	48 (4x)	420	780	205	230
X210	4 8(6x)	M42	-	-	48 (2x)	-	M42	48	48 (4x)	420	815	205	230

1) X3F

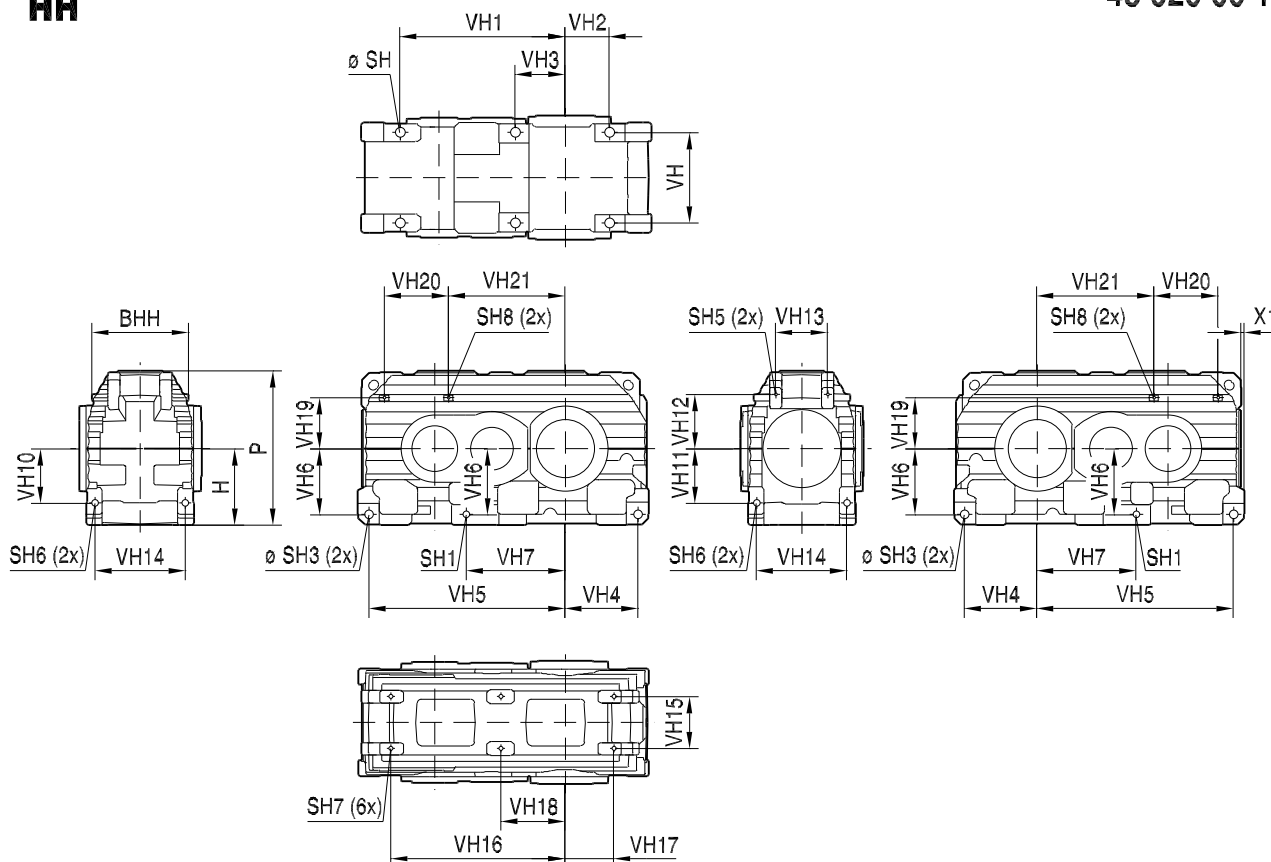
2) X3K

	V4	V5	V6	V7	V8	V9	V10	V11 ¹⁾	V11 ²⁾	V14	V15
X100	-	441	315	197	-	-	250	-	250	210	-
X110	-	461	315	217	-	-	250	-	250	210	-
X120	-	521	380	233	-	-	300	-	310	245	-
X130	-	557	380	269	-	-	300	-	310	245	-
X140	-	613	445	277	-	-	335	-	350	290	-
X150	-	655	445	319	-	-	335	-	350	290	-
X160	-	737	525	348	-	-	400	-	415	345	-
X170	-	788	525	399	-	-	400	-	415	345	-
X180	-	827	565	424	-	-	415	-	460	390	-
X190	-	859	565	456	-	-	415	-	460	390	-
X200	-	930	630	478	-	-	455	-	510	420	-
X210	-	966	630	514	-	-	455	-	510	420	-

1) X3F

2) X3K

Horizontal housing X220 – 280 /HH

HH**48 020 00 18**

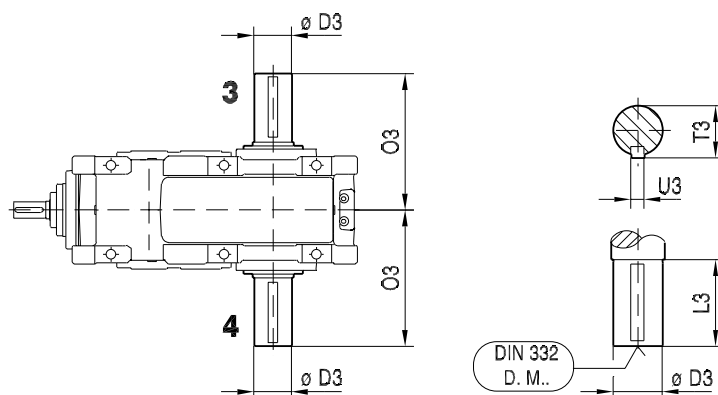
	VH	VH1	VH2	VH3	VH4	VH5	VH6	VH7	VH10	VH11	VH12	VH13	VH14	VH15	VH16	VH17	VH18
X220	440	910	250	440	-	1057	362.5	531	305	300	274	245	440	-	980	300	245
X230	440	950	250	440	-	1097	362.5	571	305	300	274	245	440	-	1080	300	-
X240	510	990	250	510	-	1155	380	625	300	300	280	314	510	-	1097	320	-
X250	510	1010	250	510	-	1178	380	648	300	300	280	314	510	-	1120	320	-
X260	590	1110	300	350	475	1285	430	683	355	355	355	340	590	422	1142	318	340
X270	590	1110	300	350	475	1320	430	718	355	355	355	340	590	457	1177	283	340
X280	590	1190	360	380	540	1372	485	569	355	355	355	340	590	435	1235	365	340

	VH19	VH20	VH21	Ø SH (6x)	SH1	Ø SH3	SH5 (2x)	SH6 (2x)	SH7	SH8 (2x)	BHH
X220	269	316	636	48	M42	48 (1x)	M16	M42	M24 (4x)	M16	488
X230	269	316	676	48	M42	48 (1x)	M16	M42	M24 (4x)	M16	488
X240	277	350	715	56	M48	56 (1x)	M16	M48	M30 (4x)	M16	568
X250	277	350	738	56	M48	56 (1x)	M16	M48	M30 (4x)	M16	568
X260	334	420	764	56	M48	56 (2x)	M20	M48	M30 (6x)	M20	632
X270	334	420	799	56	M48	56 (2x)	M20	M48	M30 (6x)	M20	632
X280	377	420	851	56	M48	56 (2x)	M20	M48	M30 (6x)	M20	632

10.2 Output shaft /LSST in mm

LSST

48 022 00 18

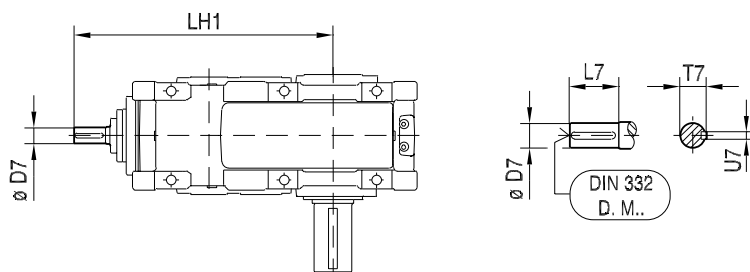


	Ø D3	L3	O3	T3	U3	DIN 332 D.M..
X100	80 _{m6}	170	343	85	22 _{h9}	M20
X110	90 _{m6}	170	346	95	25 _{h9}	M24
X120	100 _{m6}	210	401	106	28 _{h9}	M24
X130	110 _{m6}	210	404	116	28 _{h9}	M24
X140	120 _{m6}	210	432	127	32 _{h9}	M24
X150	130 _{m6}	250	475	137	32 _{h9}	M24
X160	140 _{m6}	250	506	148	36 _{h9}	M30
X170	160 _{m6}	300	556	169	40 _{h9}	M30
X180	170 _{m6}	300	592	179	40 _{h9}	M30
X190	170 _{m6}	300	592	179	40 _{h9}	M30
X200	180 _{m6}	300	612	190	45 _{h9}	M30
X210	190 _{m6}	350	662	200	45 _{h9}	M30
X220	210 _{m6}	350	703	221	50 _{h9}	M30
X230	230 _{m6}	410	763	241	50 _{h9}	M36
X240	230 _{m6}	410	811	241	50 _{h9}	M36
X250	240 _{m6}	410	811	252	56 _{h9}	M36
X260	250 _{m6}	410	847	262	56 _{h9}	M36
X270	270 _{m6}	470	920	282	63 _{h9}	M36
X280	290 _{m6}	470	920	302	63 _{h9}	M36

10.3 Optional input shaft ends /HSS in mm

HSS

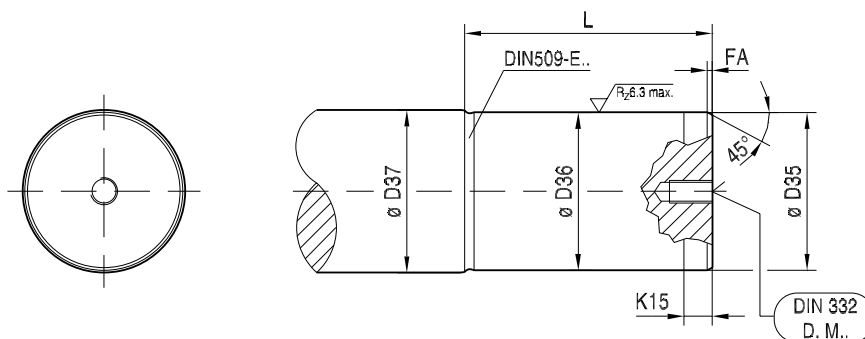
48 018 00 18



X3K..	Ø D7	L7	LH1	T7	U7	DIN 332 D.M..
X100	32 _{k6}	100	652	35	10 _{h9}	M12
X110	32 _{k6}	100	672	35	10 _{h9}	M12
X120	38 _{m6}	130	775	41	10 _{h9}	M12
X130	38 _{m6}	130	811	41	10 _{h9}	M12
X140	50 _{k6}	140	909	53.5	14 _{h9}	M16
X150	50 _{k6}	140	951	53.5	14 _{h9}	M16
X160	60 _{m6}	180	1076	64	18 _{h9}	M20
X170	60 _{m6}	180	1127	64	18 _{h9}	M20
X180	70 _{m6}	200	1195	74.5	20 _{h9}	M20
X190	70 _{m6}	200	1227	74.5	20 _{h9}	M20
X200	80 _{m6}	200	1316	85	22 _{h9}	M20
X210	80 _{m6}	200	1352	85	22 _{h9}	M20
X220	85 _{m6}	210	1470	90	22 _{h9}	M20
X230	85 _{m6}	210	1510	90	22 _{h9}	M20
X240	100 _{m6}	250	1637	106	28 _{h9}	M24
X250	100 _{m6}	250	1660	106	28 _{h9}	M24
X260	110 _{m6}	300	1857	116	28 _{h9}	M24
X270	110 _{m6}	300	1892	116	28 _{h9}	M24
X280	110 _{m6}	300	1944	116	28 _{h9}	M24

10.4 Solid shaft, smooth design /R in mm

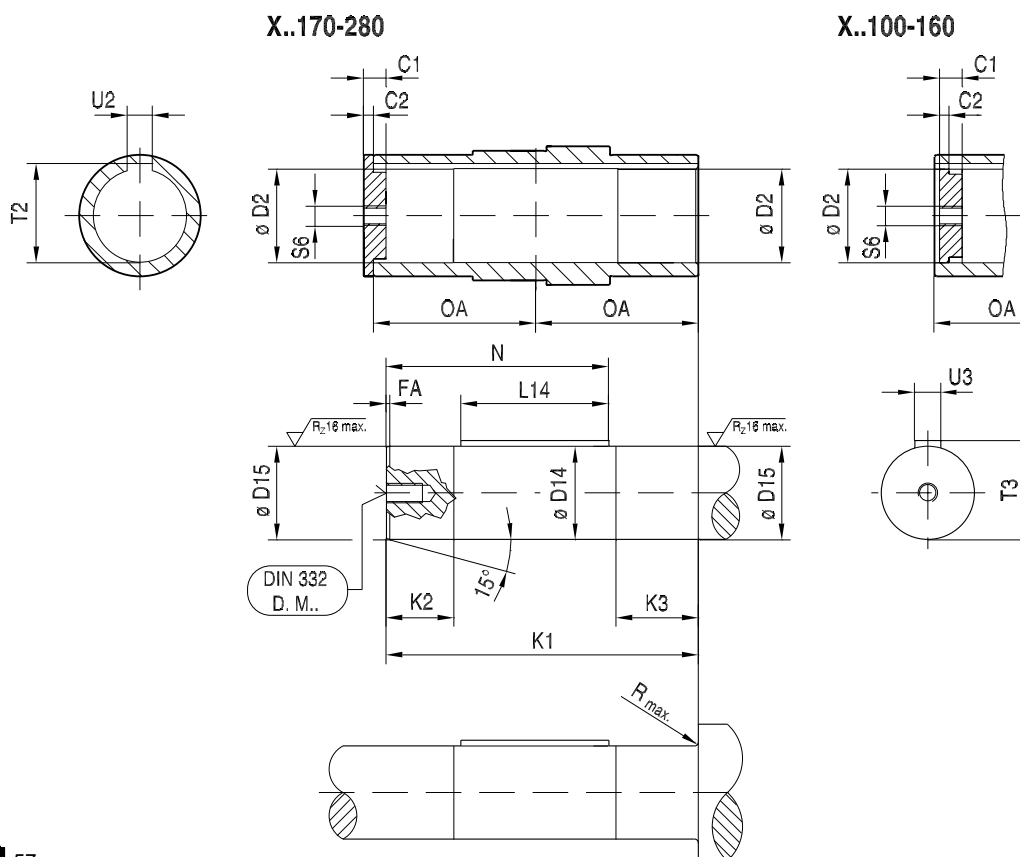
48 003 00 12

→  56

	Ø D35	Ø D36	Ø D37	FA	K15	L	DIN 332 D.M..	DIN 509
X100	85 _{H9}	85 _{V6}	90	2	9	131	M20	E2.5x0.4
X110	85 _{H9}	85 _{V6}	100	2	9	131	M20	E2.5x0.4
X120	115 _{H9}	115 _{V6}	120	2	9	165	M24	E2.5x0.4
X130	115 _{H9}	115 _{V6}	130	2	9	165	M24	E2.5x0.4
X140	135 _{H9}	135 _{V6}	140	3	11	202	M30	E2.5x0.4
X150	135 _{H9}	135 _{V6}	160	3	11	202	M30	E2.5x0.4
X160	165 _{H9}	165 _{V6}	170	3	11	222	M30	E2.5x0.4
X170	165 _{H9}	165 _{V6}	170	3	11	222	M30	E2.5x0.4
X180	175 _{H9}	175 _{V6}	180	3	14	253	M30	E2.5x0.4
X190	175 _{H9}	175 _{V6}	180	3	14	253	M30	E2.5x0.4
X200	195 _{H9}	195 _{V6}	200	3	14	283	M30	E2.5x0.4
X210	195 _{H9}	195 _{V6}	200	3	14	283	M30	E2.5x0.4
X220	235 _{H9}	235 _{V6}	240	3	14	298	M36	E2.5x0.4
X230	235 _{H9}	235 _{V6}	240	3	14	298	M36	E2.5x0.4
X240	275 _{H9}	275 _{V6}	280	4	14	318	M36	E2.5x0.4
X250	275 _{H9}	275 _{V6}	280	4	14	318	M36	E2.5x0.4
X260	275 _{H9}	275 _{V6}	280	4	14	318	M36	E2.5x0.4
X270	295 _{H9}	295 _{V6}	300	4	19	343	M36	E2.5x0.4
X280	295 _{H9}	295 _{V6}	300	4	19	343	M36	E2.5x0.4

10.5 Hollow shaft with key /A in mm

48 004 00 12

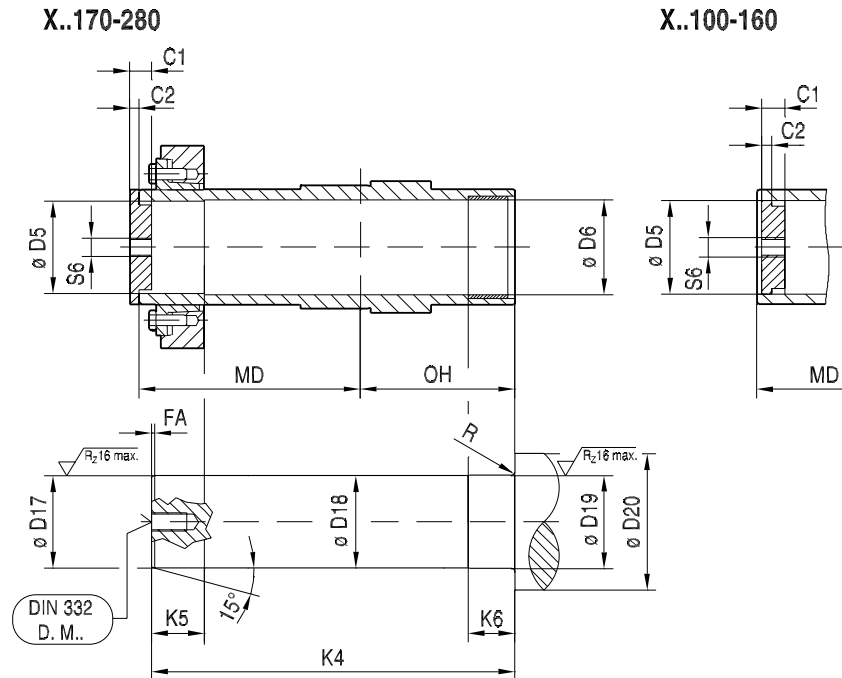


→ 57

	C1	C2	ø D2	ø D14	ø D15	FA	K1	K2	K3	L14	N	OA	R _{max.}	S6	T2	T3	U2	U3	DIN 332 D.M..
X100	25	12	75 ^{H8}	75 _{h11}	75 _{js7}	2	312	47.5	81	120	220	173	1.6	M24	79.9	79.5	20 ^{JS9}	20 _{h9}	M20
X110	30	14	85 ^{H8}	85 _{h11}	85 _{js7}	2	312.5	45	84	100	210	176	1.6	M30	90.4	90	22 ^{JS9}	22 _{h9}	M20
X120	30	14	95 ^{H8}	95 _{h11}	95 _{js7}	2	342	53	92	140	244.5	190.5	1.6	M30	100.4	100	25 ^{JS9}	25 _{h9}	M24
X130	30	14	105 ^{H8}	105 _{h11}	105 _{js7}	2	347	68	109	160	258	194	1.6	M30	111.4	111	28 ^{JS9}	28 _{h9}	M24
X140	30	14	115 ^{H8}	115 _{h11}	115 _{js7}	2	403	61	102	200	306	222	1.6	M30	122.4	122	32 ^{JS9}	32 _{h9}	M24
X150	30	14	125 ^{H8}	125 _{h11}	125 _{js7}	3	408	76	117	200	308.5	224.5	1.6	M30	132.4	132	32 ^{JS9}	32 _{h9}	M24
X160	36	16	135 ^{H8}	135 _{h11}	135 _{js7}	3	465	80	127	250	361	256	1.6	M36	143.4	143	36 ^{JS9}	36 _{h9}	M30
X170	36	17	150 ^{H8}	150 _{h11}	150 _{js7}	3	493	96	115	280	377	256	1.6	M36	158.4	158	36 ^{JS9}	36 _{h9}	M30
X180	36	17	165 ^{H8}	165 _{h11}	165 _{js7}	3	565	109	128	300	423	292	2	M36	174.4	174	40 ^{JS9}	40 _{h9}	M30
X190	36	17	165 ^{H8}	165 _{h11}	165 _{js7}	3	565	109	128	300	423	292	2	M36	174.4	174	40 ^{JS9}	40 _{h9}	M30
X200	36	17	180 ^{H8}	180 _{h11}	180 _{js7}	3	620	130	149	320	460.5	319.5	2	M36	190.4	190	45 ^{JS9}	45 _{h9}	M30
X210	36	17	190 ^{H8}	190 _{h11}	190 _{js7}	3	620	130	149	320	460.5	319.5	2	M36	200.4	200	45 ^{JS9}	45 _{h9}	M30
X220	36	17	210 ^{H8}	210 _{h11}	210 _{js7}	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50 ^{JS9}	50 _{h9}	M30
X230	36	17	210 ^{H8}	210 _{h11}	210 _{js7}	3	686	133	152	370	518.5	352.5	2.5	M36	221.4	221	50 ^{JS9}	50 _{h9}	M30
X240	45	22	230 ^{H8}	230 _{h11}	230 _{js7}	3	778	147	170	370	562.5	400.5	2.5	M42	241.4	241	50 ^{JS9}	50 _{h9}	M36
X250	45	22	240 ^{H8}	240 _{h11}	240 _{js7}	3	778	147	170	370	562.5	400.5	2.5	M42	252.4	252	56 ^{JS9}	56 _{h9}	M36
X260	45	22	240 ^{H8}	240 _{h11}	240 _{js7}	3	851	143	166	450	639	437	2.5	M42	252.4	252	56 ^{JS9}	56 _{h9}	M36
X270	45	22	275 ^{H8}	275 _{h11}	275 _{js7}	4	877	158	181	450	652	450	5	M42	287.4	287	63 ^{JS9}	63 _{h9}	M36
X280	45	22	275 ^{H8}	275 _{h11}	275 _{js7}	4	877	158	181	500	677	450	5	M42	287.4	287	63 ^{JS9}	63 _{h9}	M36

10.6 Hollow shaft with shrink disk /H in mm

48 005 00 12



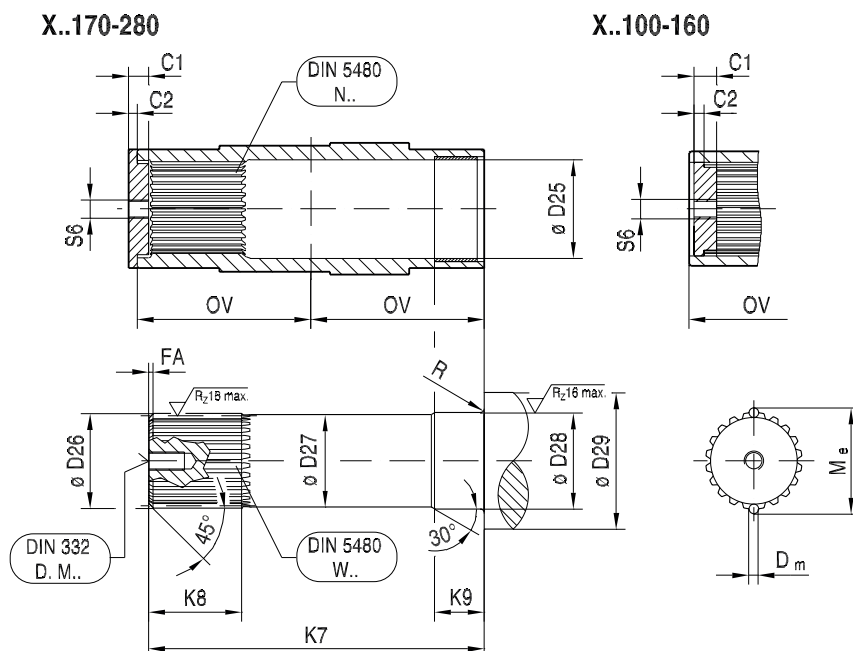
→ 57

	C1	C2	Ø D5	Ø D6	Ø D17	Ø D18	Ø D19	Ø D20	FA	K4	K5	K6	MD	OH	R	S6	DIN 332 D.M..
X100	30	14	80 ^{H7}	81 ^{H9}	80 _{h6}	80 _{h11}	81 _{m6}	95	2	394.5 ₋₁	46	42 ₋₁	261	173	3	M30	M24
X110	30	14	90 ^{H7}	91 ^{H9}	90 _{h6}	90 _{h11}	91 _{m6}	105	2	400.5 ₋₁	46	42 ₋₁	265	176	3	M30	M24
X120	30	14	100 ^{H7}	101 ^{H9}	100 _{h6}	100 _{h11}	101 _{m6}	115	2	437 ₋₁	51	52 ₋₁	286.5	190.5	3	M30	M24
X130	30	14	110 ^{H7}	111 ^{H9}	110 _{h6}	110 _{h11}	111 _{m6}	125	2	449 ₋₁	55	52 ₋₁	297	194	3	M30	M24
X140	30	14	120 ^{H7}	121 ^{H9}	120 _{h6}	120 _{h11}	121 _{m6}	135	2	509 ₋₁	59	62 ₋₁	329	222	3	M30	M24
X150	30	14	130 ^{H7}	131 ^{H9}	130 _{h6}	130 _{h11}	131 _{m6}	145	3	520 ₋₁	66	62 ₋₁	337.5	224.5	3	M30	M24
X160	36	16	140 ^{H7}	141 ^{H9}	140 _{h6}	140 _{h11}	141 _{m6}	155	3	583 ₋₁	66	73 ₋₁	375	256	4	M36	M30
X170	36	17	150 ^{H7}	151 ^{H9}	150 _{h6}	150 _{h11}	151 _{m6}	165	3	600 ₋₁	83	73 ₋₁	364	256	4	M36	M30
X180	36	17	165 ^{H7}	166 ^{H9}	165 _{g6}	165 _{h11}	166 _{m6}	180	3	672 ₋₁	83	83 ₋₁	400	292	4	M36	M30
X190	36	17	165 ^{H7}	166 ^{H9}	165 _{g6}	165 _{h11}	166 _{m6}	180	3	672 ₋₁	83	83 ₋₁	400	292	4	M36	M30
X200	36	17	180 ^{H7}	181 ^{H9}	180 _{g6}	180 _{h11}	181 _{m6}	195	3	750 ₋₁	101	83 ₋₁	450.5	319.5	4	M36	M30
X210	36	17	190 ^{H7}	191 ^{H9}	190 _{g6}	190 _{h11}	191 _{m6}	205	3	753 ₋₁	106	83 ₋₁	453.5	319.5	4	M36	M30
X220	36	17	210 ^{H7}	211 ^{H9}	210 _{g6}	210 _{h11}	211 _{m6}	230	3	830 ₋₁	118	108 ₋₁	497.5	352.5	5	M36	M30
X230	36	17	210 ^{H7}	211 ^{H9}	210 _{g6}	210 _{h11}	211 _{m6}	230	3	830 ₋₁	118	108 ₋₁	497.5	352.5	5	M36	M30
X240	45	22	230 ^{H7}	231 ^{H9}	230 _{g6}	230 _{h11}	231 _{m6}	250	3	948 ₋₁	140	108 ₋₁	571.5	400.5	5	M42	M36
X250	45	22	240 ^{H7}	241 ^{H9}	240 _{g6}	240 _{h11}	241 _{m6}	260	3	948 ₋₁	140	108 ₋₁	571.5	400.5	5	M42	M36
X260	45	22	250 ^{H7}	255 ^{H9}	250 _{g6}	250 _{h11}	255 _{m6}	280	4	1021 ₋₁	140	108 ₋₁	608	437	5	M42	M36
X270	45	22	280 ^{H7}	285 ^{H9}	280 _{g6}	280 _{h11}	285 _{m6}	310	4	1056 ₋₁	146	143 ₋₁	630	450	5	M42	M36
X280	45	22	280 ^{H7}	285 ^{H9}	280 _{g6}	280 _{h11}	285 _{m6}	310	4	1056 ₋₁	146	143 ₋₁	630	450	5	M42	M36

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10.7 Splined hollow shaft /V in mm

48 006 00 12



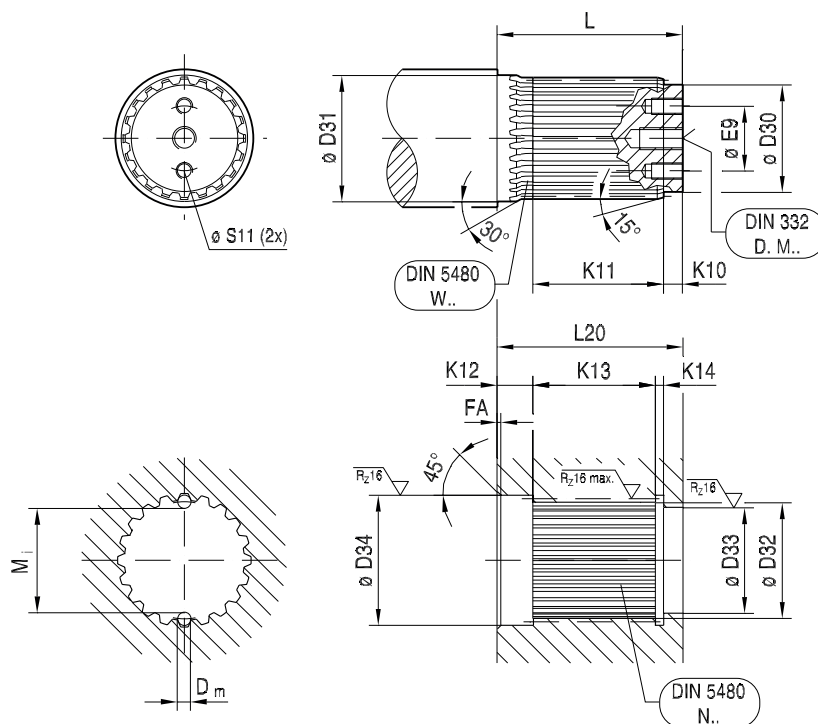
	Ø D25	Ø D26	Ø D27	Ø D28	Ø D29	FA	K7	K8	K9
X100	81 ^{H9}	74.4 _{h10}	73	81 _{m6}	95	3	306 ₋₁	81	42 ₋₁
X110	91 ^{H9}	84.4 _{h10}	83	91 _{m6}	105	3	311.5 ₋₁	81	42 ₋₁
X120	101 ^{H9}	94.4 _{h10}	93	101 _{m6}	115	3	341 ₋₁	91	52 ₋₁
X130	111 ^{H9}	109.4 _{h10}	108	111 _{m6}	125	3	346 ₋₁	86	52 ₋₁
X140	121 ^{H9}	119.4 _{h10}	118	121 _{m6}	135	3	402 ₋₁	101	62 ₋₁
X150	131 ^{H9}	129.4 _{h10}	128	131 _{m6}	145	3	407 ₋₁	101	62 ₋₁
X160	141 ^{H9}	139.4 _{h10}	138	141 _{m6}	155	3	464 ₋₁	111	73 ₋₁
X170	151 ^{H9}	149.4 _{h10}	148	151 _{m6}	165	3	492 ₋₁	121	73 ₋₁
X180	166 ^{H9}	159 _{h10}	158	166 _{m6}	180	5	564 ₋₁	166	83 ₋₁
X190	166 ^{H9}	159 _{h10}	158	166 _{m6}	180	5	564 ₋₁	166	83 ₋₁
X200	191 ^{H9}	179 _{h10}	178	191 _{m6}	205	5	619 ₋₁	176	83 ₋₁
X210	191 ^{H9}	179 _{h10}	178	191 _{m6}	205	5	619 ₋₁	176	83 ₋₁
X220	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	5	685 ₋₁	201	108 ₋₁
X2KV220	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	5	755 ₋₁	201	108 ₋₁
X230	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	5	685 ₋₁	201	108 ₋₁
X2KV230	211 ^{H9}	199 _{h10}	198	211 _{m6}	230	5	755 ₋₁	201	108 ₋₁
X240	231 ^{H9}	219 _{h10}	218	231 _{m6}	250	5	777 ₋₁	216	108 ₋₁
X2KV240	231 ^{H9}	219 _{h10}	218	231 _{m6}	250	5	852 ₋₁	216	108 ₋₁
X250	241 ^{H9}	219 _{h10}	218	241 _{m6}	260	5	777 ₋₁	216	108 ₋₁
X2KV250	241 ^{H9}	219 _{h10}	218	241 _{m6}	260	5	852 ₋₁	216	108 ₋₁
X260	255 ^{H9}	239 _{h10}	238	255 _{m6}	275	5	850 ₋₁	216	108 ₋₁
X270	285 ^{H9}	258.4 _{h10}	258	285 _{m6}	305	8	876 ₋₁	248	143 ₋₁
X280	285 ^{H9}	258.4 _{h10}	258	285 _{m6}	305	8	876 ₋₁	248	143 ₋₁

	Dm	M e	OV	R	C1	C2	S6	DIN 332 D.M..	DIN 5480
X100	6	81.326 ^{-0.069} _{-0.125}	173	3	30	14	M30	M24	W 75x3x30x24x8f N 75x3x30x24x9H
X110	6	91.092 ^{-0.068} _{-0.123}	176	3	30	14	M30	M24	W 85x3x30x27x8f N 85x3x30x27x9H
X120	6	101.141 ^{-0.068} _{-0.122}	190.5	3	30	14	M30	M24	W 95x3x30x30x8f N 95x3x30x30x9H
X130	6	116.076 ^{-0.078} _{-0.139}	194	3	30	14	M30	M24	W 110x3x30x35x8f N 110x3x30x35x9H

	Dm	M e	OV	R	C1	C2	S6	DIN 332 D.M..	DIN 5480
X140	6	126.095 ^{-0.078} _{-0.138}	222	3	30	14	M30	M24	W 120x3x30x38x8f N 120x3x30x38x9H
X150	6	136.329 ^{-0.081} _{-0.144}	224.5	3	30	14	M30	M24	W 130x3x30x42x8f N 130x3x30x42x9H
X160	6	146.167 ^{-0.080} _{-0.143}	256	4	36	16	M36	M30	W 140x3x30x45x8f N 140x3x30x45x9H
X170	6	156.172 ^{-0.079} _{-0.141}	256	4	36	17	M36	M30	W 150x3x30x48x8f N 150x3x30x48x9H
X180	10	170.009 ^{-0.086} _{-0.152}	292	4	36	17	M36	M30	W 160x5x30x30x8f N 160x5x30x30x9H
X190	10	170.009 ^{-0.086} _{-0.152}	292	4	36	17	M36	M30	W 160x5x30x30x8f N 160x5x30x30x9H
X200	10	190.090 ^{-0.087} _{-0.155}	319.5	4	36	17	M36	M30	W 180x5x30x34x8f N 180x5x30x34x9H
X210	10	190.090 ^{-0.087} _{-0.155}	319.5	4	36	17	M36	M30	W 180x5x30x34x8f N 180x5x30x34x9H
X220	10	210.158 ^{-0.088} _{-0.157}	352.5	5	36	17	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X2KV220	10	210.158 ^{-0.088} _{-0.157}	387.5	5	36	17	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X230	10	210.158 ^{-0.088} _{-0.157}	352.5	5	36	17	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X2KV230	10	210.158 ^{-0.088} _{-0.157}	387.5	5	36	17	M36	M30	W 200x5x30x38x8f N 200x5x30x38x9H
X240	10	230.215 ^{-0.102} _{-0.179}	400.5	5	45	22	M42	M36	W 220x5x30x42x8f N 220x5x30x42x9H
X2KV240	10	230.215 ^{-0.102} _{-0.179}	438	5	45	22	M42	M36	W 220x5x30x42x8f N 220x5x30x42x9H
X250	10	230.215 ^{-0.102} _{-0.179}	400.5	5	45	22	M42	M36	W 220x5x30x42x8f N 220x5x30x42x9H
X2KV250	10	230.215 ^{-0.102} _{-0.179}	438	5	45	22	M42	M36	W 220x5x30x42x8f N 220x5x30x42x9H
X260	10	250.264 ^{-0.102} _{-0.180}	437	5	45	22	M42	M36	W 240x5x30x46x8f N 240x5x30x46x9H
X270	16	276.230 ^{-0.101} _{-0.177}	450	5	45	22	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H
X280	16	276.230 ^{-0.101} _{-0.177}	450	5	45	22	M42	M36	W 260x8x30x31x8f N 260x8x30x31x9H

10.8 Splined solid shaft / L in mm

48 084 05 07



→ 56

	Ø D30	Ø D31	Ø D32	Ø D33	Ø D34	Ø E9	FA	K10	K11	K12	K13	K14
X100	60 _{k6}	80 _{k6}	69 ^{H10}	60 ^{H7}	80 ^{H7}	-	2	12	71	28	65	10
X110	70 _{k6}	90 _{k6}	79 ^{H10}	70 ^{H7}	90 ^{H7}	-	2	12	71	28	65	10
X120	85 _{k6}	105 _{k6}	94 ^{H10}	85 ^{H7}	105 ^{H7}	-	2	15	76	31	70	10
X130	95 _{k6}	115 _{k6}	104 ^{H10}	95 ^{H7}	115 ^{H7}	-	2	15	81	31	75	10
X140	100 _{k6}	125 _{k6}	110 ^{H10}	100 ^{H7}	125 ^{H7}	-	2	20	103	38	95	12
X150	110 _{k6}	135 _{k6}	120 ^{H10}	110 ^{H7}	135 ^{H7}	-	2	20	108	38	100	12
X160	120 _{k6}	145 _{k6}	130 ^{H10}	120 ^{H7}	145 ^{H7}	-	2	25	118	43	110	12
X170	130 _{k6}	155 _{k6}	140 ^{H10}	130 ^{H7}	155 ^{H7}	-	2	25	128	43	120	12
X180	140 _{k6}	165 _{k6}	150 ^{H10}	140 ^{H7}	165 ^{H7}	80	3	25	163	48	155	12
X190	140 _{k6}	165 _{k6}	150 ^{H10}	140 ^{H7}	165 ^{H7}	80	3	25	163	48	155	12
X200	155 _{k6}	185 _{k6}	170 ^{H10}	155 ^{H7}	185 ^{H7}	95	3	25	173	48	165	12
X210	155 _{k6}	185 _{k6}	170 ^{H10}	155 ^{H7}	185 ^{H7}	95	3	25	173	48	165	12
X220	195 _{k6}	225 _{k6}	210 ^{H10}	195 ^{H7}	225 ^{H7}	125	3	30	163	53	155	12
X230	195 _{k6}	225 _{k6}	210 ^{H10}	195 ^{H7}	225 ^{H7}	125	3	30	163	53	155	12
X240	225 _{k6}	255 _{k6}	240 ^{H10}	225 ^{H7}	255 ^{H7}	140	3	35	168	58	160	12
X250	225 _{k6}	255 _{k6}	240 ^{H10}	225 ^{H7}	255 ^{H7}	140	3	35	168	58	160	12
X260	230 _{k6}	265 _{k6}	244 ^{H10}	230 ^{H7}	265 ^{H7}	160	3	35	193	64	183	12
X270	250 _{k6}	285 _{k6}	264 ^{H10}	250 ^{H7}	285 ^{H7}	160	3	35	203	64	193	12
X280	250 _{k6}	285 _{k6}	264 ^{H10}	250 ^{H7}	285 ^{H7}	160	3	35	203	64	193	12

	L	L20	Dm	M i	Ø S11 (2x)	DIN 332 D.M..	DIN 5480
X100	110	111 ⁺¹	5.25	63.932 ^{0.160} _{0.060}	-	M20	W 75x3x30x24x8m N 75x3x30x24x9H
X110	110	111 ⁺¹	5.25	73.922 ^{0.148} _{0.056}	-	M20	W 85x3x30x27x8m N 85x3x30x27x9H
X120	121	122 ⁺¹	5.25	89.066 ^{0.146} _{0.055}	-	M20	W 100x3x30x32x8m N 100x3x30x32x9H
X130	126	127 ⁺¹	5.25	99.001 ^{0.158} _{0.060}	-	M24	W 110x3x30x35x8m N 110x3x30x35x9H
X140	160	161 ⁺¹	9	101.103 ^{0.173} _{0.064}	-	M24	W 120x5x30x22x8m N 120x5x30x22x9H
X150	165	166 ⁺¹	9	111.103 ^{0.173} _{0.064}	-	M24	W 130x5x30x24x8m N 130x5x30x24x9H
X160	185	186 ⁺¹	9	121.003 ^{0.173} _{0.064}	-	M24	W 140x5x30x26x8m N 140x5x30x26x9H

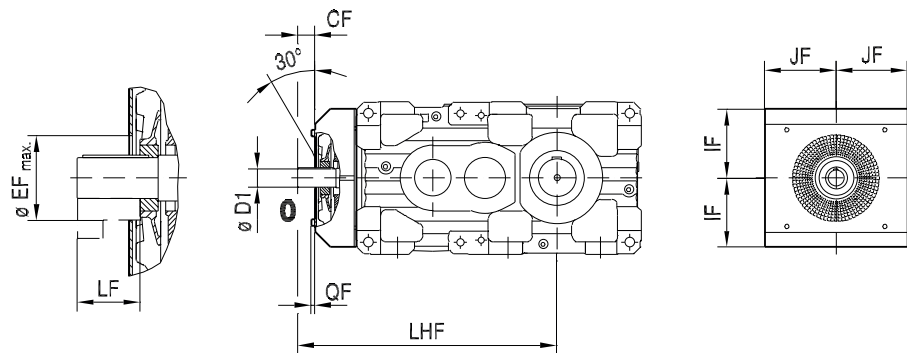
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	L	L20	Dm	M i	Ø S11 (2x)	DIN 332 D.M..	DIN 5480
X170	195	196 ⁺¹	9	131.103 ^{0.173 0.064}	-	M24	W 150x5x30x28x8m N 150x5x30x28x9H
X180	230	231 ⁺¹	9	141.103 ^{0.173 0.064}	M24x30	M30	W 160x5x30x30x8m N 160x5x30x30x9H
X190	230	231 ⁺¹	9	141.103 ^{0.173 0.064}	M24x30	M30	W 160x5x30x30x8m N 160x5x30x30x9H
X200	240	241 ⁺¹	9	161.103 ^{0.173 0.064}	M24x30	M30	W 180x5x30x34x8m N 180x5x30x34x9H
X210	240	241 ⁺¹	9	161.103 ^{0.173 0.064}	M24x30	M30	W 180x5x30x34x8m N 180x5x30x34x9H
X220	240	241 ⁺¹	9	201.103 ^{0.194 0.071}	M24x30	M30	W 220x5x30x42x8m N 220x5x30x42x9H
X230	240	241 ⁺¹	9	201.103 ^{0.194 0.071}	M24x30	M30	W 220x5x30x42x8m N 220x5x30x42x9H
X240	255	256 ⁺¹	9	231.103 ^{0.194 0.071}	M30x36	M36	W 250x5x30x48x8m N 250x5x30x48x9H
X250	255	256 ⁺¹	9	231.103 ^{0.194 0.071}	M30x36	M36	W 250x5x30x48x8m N 250x5x30x48x9H
X260	283	284 ⁺¹	14	230.592 ^{0.202 0.074}	M30x36	M36	W 260x8x30x31x8m N 260x8x30x31x9H
X270	293	294 ⁺¹	14	250.650 ^{0.213 0.078}	M30x36	M36	W 280x8x30x34x8m N 280x8x30x34x9H
X280	293	294 ⁺¹	14	250.650 ^{0.213 0.078}	M30x36	M36	W 280x8x30x34x8m N 280x8x30x34x9H

10.9 Fan X..K /FAN in mm

X..K /FAN

48 007 00 12

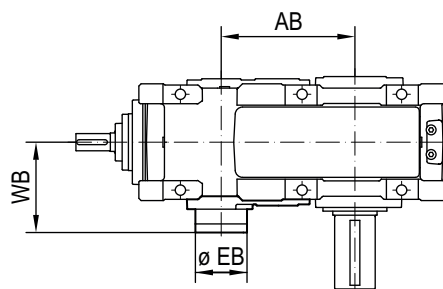


→ 73

/FAN									
X3K..	CF	Ø D1	Ø EF _{max.}	IF	JF	LF	LHF	QF	i
X100	31	32 _{k6}	105	185	165	50	632	11	–
X110	31	32 _{k6}	105	185	165	50	652	11	–
X120	46	38 _{k6}	135	220	200	65	745	11	–
X130	46	38 _{k6}	135	220	200	65	781	11	–
X140	51	50 _{k6}	155	260	230	70	879	11	–
X150	51	50 _{k6}	155	260	230	70	921	11	–
X160	76	60 _{m6}	170	310	270	95	1036	11	–
X170	76	60 _{m6}	170	310	270	95	1087	11	–
X180	71	70 _{m6}	190	330	303	90	1135	11	–
X190	71	70 _{m6}	190	330	303	90	1167	11	–
X200	96	80 _{m6}	215	370	338	115	1286	11	–
X210	96	80 _{m6}	215	370	338	115	1322	11	–
X220	96	85 _{m6}	245	420	350	115	1430	16	–
X230	96	85 _{m6}	245	420	350	115	1470	16	–
X240	131	100 _{m6}	245	445	398	150	1597	14	–
X250	131	100 _{m6}	245	445	398	150	1620	14	–
X260	124	110 _{m6}	245	495	438	145	1767	14	–
X270	124	110 _{m6}	245	495	438	145	1802	14	–
X280	124	110 _{m6}	245	495	438	145	1854	14	–

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10.10 Backstop X.K../BS in mm

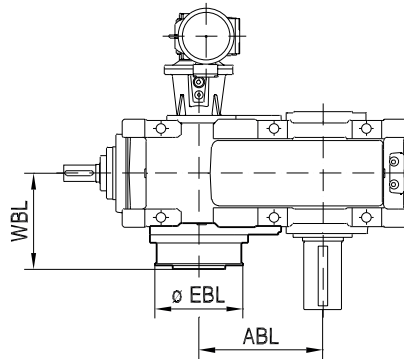
X.K../BS**48 013 01 12****Fig. A**
extern

X3K..	i_{tot}	Fig	AB	Ø EB	WB
X100	28 – 71	A	278	133	213
X110	31.5 – 90	A	298	133	213
X120	28 – 71	A	327	153	235
X130	31.5 – 90	A	363	153	235
X140	28 – 71	A	388	175	284
X150	31.5 – 90	A	430	175	284
X160	28 – 71	A	474	190	320
X170	31.5 – 90	A	525	190	320
X180	28 – 71	A	544	210	360
X190	28 – 80	A	576	210	360
X200	28 – 71	A	614	210	381
X210	28 – 80	A	650	210	381
X220	28 – 71	A	694	245	426
X230	28 – 80	A	734	245	426
X240	28 – 35.5	A	776	290	472
	40 – 71	A	776	245	470
X250	28 – 80	A	799	290	472
X260	28 – 71	A	855	288	553
X270	28 – 80	A	890	288	553
X280	31.5 – 90	A	942	288	553

10.11 Torque limiting backstop X.K../BSL in mm

BSL

48 004 01 11



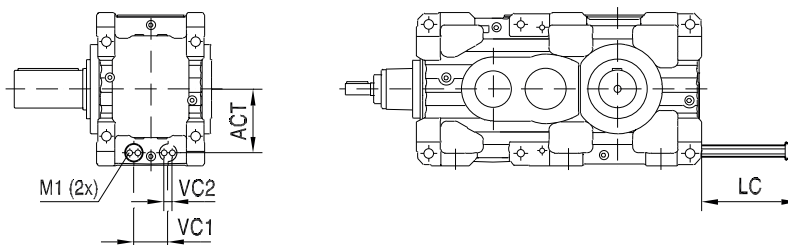
→ 68

X3K..	i_{tot}	ABL	Ø EBL	WBL
X120	28 – 71	327	280	317
X130	31.5 – 90	363	280	317
X140	28 – 71	388	311	352
X150	31.5 – 90	430	311	352
X160	28 – 71	474	345	391
X170	31.5 – 90	525	345	391
X180	28 – 71	544	386	427
X190	28 – 80	576	386	427
X200	28 – 71	614	462	466
X210	28 – 80	650	462	466
X220	28 – 71	694	462	493
X230	28 – 80	734	462	493
X240	28 – 71	776	516	563
X250	28 – 80	799	516	563
X260	28 – 71	855	630	600
X270	28 – 80	890	630	600
X280	31.5 – 90	942	630	600

10.12 Water cooling cartridge /CCT and oil heater /OH in [mm]

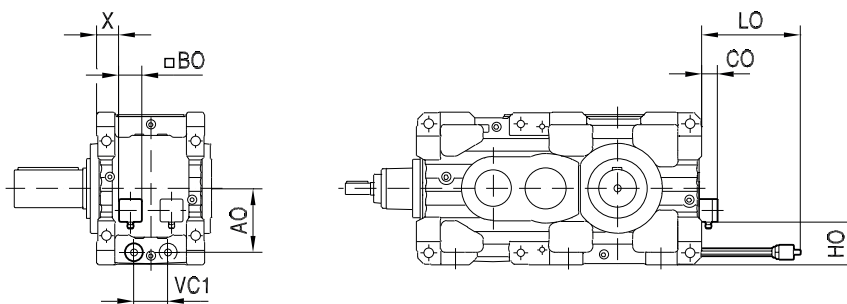
CCT

48 021 00 18



→ 75

OH



→ 80

10.12.1 Water cooling cartridge /CCT

	ACT	LC	M1 (2x)	VC2	VC1	VC
X140	209	695	G1/4"	24	100	2
X150	209	825	G1/4"	24	100	1
X160	250	945	G1/4"	24	115	2
X170	250	945	G1/4"	24	115	1
X180	280	950	G1/2"	34	150	2
X190	280	1000	G1/2"	34	150	1
X200	320	1100	G1/2"	34	150	2
X210	320	1150	G1/2"	34	150	1
X220	362	1350	G1/2"	34	180	2
X230	362	1350	G1/2"	34	180	1
X240	385	1400	G1/2"	34	200	2
X250	385	1450	G1/2"	34	200	1
X260	430	1600	G1/2"	35	280	2
X270	430	1600	G1/2"	35	280	1
X280	485	1750	G1/2"	35	280	1

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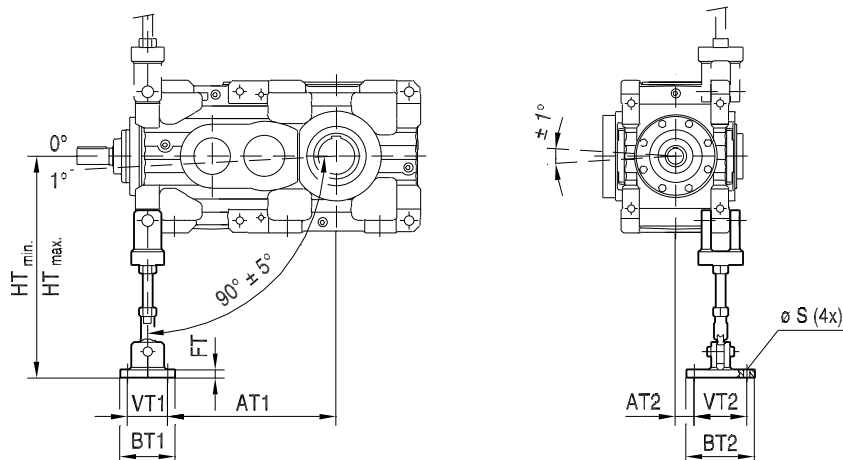
10.12.2 Oil heater /OH in mm

	AO	BO	CO	HO	LO	LO	VC1	X	max. 
X100	151	100	91	82	490	490	75	13	2
X110	151	100	91	82	580	580	75	13	1
X120	175	100	112	75	680	680	90	35	2
X130	175	100	112	75	680	680	90	35	1
X140	209	100	85	80	780	780	100	75	2
X150	209	100	85	85	890	890	100	75	1
X160	250	100	85	115	1010	1010	115	90	2
X170	250	100	85	115	1010	1010	115	90	1
X180	280	100	82	120	960	960	150	90	2
X190	280	100	82	120	960	960	150	90	1
X200	320	100	82	130	1110	1110	150	110	2
X210	320	100	82	130	1110	1110	150	110	1
X220	362	100	82	140	1310	1310	180	110	2
X230	362	100	82	140	1310	1310	180	110	1
X240	380	100	82	150	1310	1310	200	130	2
X250	380	100	82	150	1510	1510	200	130	1
X260	430	100	77	170	1660	1660	280	122.5	2
X270	430	100	77	170	1660	1660	280	122.5	1
X280	485	100	77	170	1810	1810	280	122.5	1

10.13 Torque arm /T in mm

T

48 011 01 12



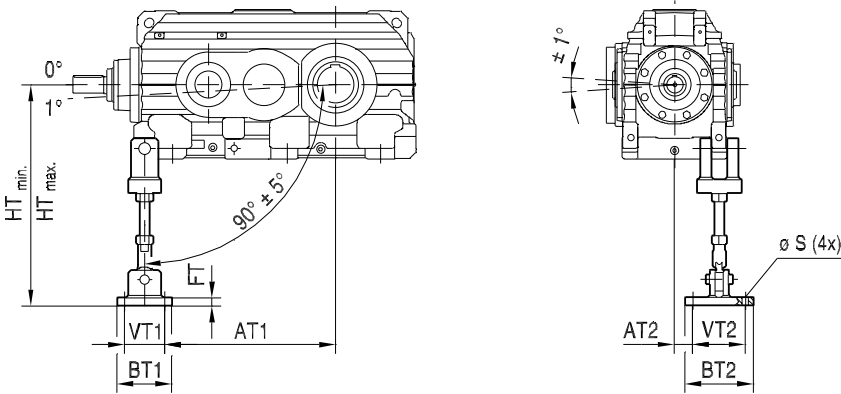
→ 69

	AT1	AT2	BT1	BT2	FT	HT _{min.}	HT _{max.}	Ø S (4x)	VT1	VT2
X100	406	46.5	120	160	25	435	475	13.5	70	120
X110	426	46.5	120	160	25	435	475	13.5	70	120
X120	486	63.5	120	160	25	509	549	13.5	70	120
X130	522	63.5	120	160	25	509	549	13.5	70	120
X140	578	86.5	120	160	25	547	587	13.5	70	120
X150	620	86.5	120	160	25	547	587	13.5	70	120
X160	672	78	180	240	30	725	775	22	130	188
X170	723	78	180	240	30	725	775	22	130	188
X180	762	103	180	240	30	745	795	22	130	188
X190	794	103	180	240	30	745	795	22	130	188
X200	865	118	200	250	30	795	845	22	130	188
X210	901	118	200	250	30	795	845	22	130	188
X220	992	126	200	250	30	840	890	22	130	188
X230	1032	126	200	250	30	840	890	22	130	188
X240	1045	150	300	300	30	920	970	26	220	220
X250	1068	150	300	300	30	920	970	26	220	220
X260	1175	190	300	300	30	970	1020	26	220	220
X270	1210	190	300	300	30	970	1020	26	220	220
X280	1262	190	300	300	30	1025	1075	26	220	220

10.14 Torque arm /T-HH in mm

T-HH

48 012 01 12



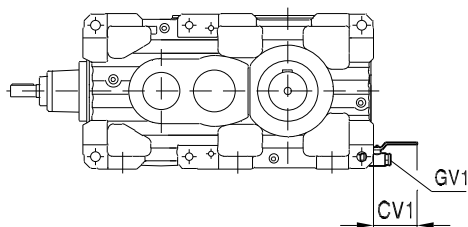
→ 69

	AT1	AT2	BT1	BT2	FT	HT _{min.}	HT _{max.}	Ø S (4x)	VT1	VT2
X220	992	126	200	250	30	840	890	22	130	188
X230	1032	126	200	250	30	840	890	22	130	188
X240	1045	150	300	300	30	920	970	26	220	220
X250	1068	150	300	300	30	920	970	26	220	220
X260	1175	190	300	300	30	970	1020	26	220	220
X270	1210	190	300	300	30	970	1020	26	220	220
X280	1262	190	300	300	30	1025	1075	26	220	220

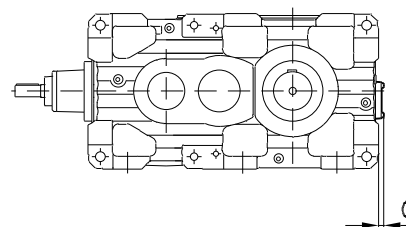
10.15 Oil dipstick /OD, oil level glass /OLG, oil drain valve /ODV, and breather /BPG in mm

48 035 01 13

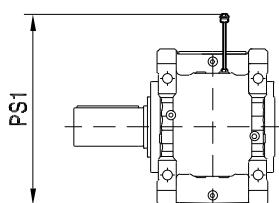
ODV



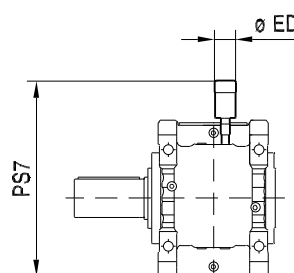
OLG



OD



BPG



10.15.1 Oil drain valve /ODV

	CV1	GV1
X100	89	G1/2"
X110	89	G1/2"
X120	83	G1/2"
X130	83	G1/2"
X140	66	G1/2"
X150	66	G1/2"
X160	91	G1"
X170	91	G1"
X180	92	G1"
X190	92	G1"
X200	75	G1"
X210	75	G1"
X220	107	G1 1/4"
X230	107	G1 1/4"
X240	86	G1 1/4"
X250	86	G1 1/4"
X260	85	G1 1/4"
X270	85	G1 1/4"
X280	85	G1 1/4"

10.15.2 Oil level glass /OLG

	C
X100	-
X110	-
X120	-
X130	-
X140	-
X150	-
X160	-
X170	-
X180	17 ⁺²
X190	17 ⁺²
X200	17 ⁺²
X210	17 ⁺²
X220	16 ⁺²
X230	16 ⁺²
X240	16 ⁺²
X250	16 ⁺²
X260	13 ⁺²
X270	13 ⁺²
X280	13 ⁺²

10.15.3 Oil dipstick /OD

	OD					
	M1	M5		M4		
	PS1	PS5	PS6	PS4	PSK	COD
X100	520	620	420	790	1060	-
X110	520	620	420	830	1100	-
X120	620	660	480	880	1270	54
X130	620	660	480	950	1240	54
X140	710	750	560	1040	1370	41
X150	710	750	560	1120	1450	41
X160	830	810	660	1300	1620	49
X170	830	810	660	1350	1670	49
X180	890	970	750	1470	1830	51
X190	890	970	750	1500	1865	51
X200	980	1010	800	1640	1985	48
X210	980	1010	800	1680	2020	48
X220	1120	1100	1000	1940	2220	90
X230	1120	1100	1000	1980	2260	90
X240	1150	1170	1150	2110	2380	92
X250	1150	1170	1150	2130	2400	92
X260	1300	-	1180	2270	-	89
X270	1300	-	1180	2300	-	89
X280	1470	-	1180	2420	-	89

10.15.4 Breather /BPG

	BPG	ø ED	PS7	Gear unit housing
X100 – 110	DC HG-8	104	633 ⁺⁵	HU/HH
	DC2	102	542 ⁺⁵	HU/HH
	DC3	102	593 ⁺⁵	HU/HH
	DC4	102	644 ⁺⁵	HU/HH
	PI	118	480 ⁺⁵	HU/HH
	Stainless steel	62	453 ⁺⁵	HU/HH
X120 – 130	DC HG-8	104	693 ⁺⁵	HU/HH
	DC2	102	602 ⁺⁵	HU/HH
	DC3	102	653 ⁺⁵	HU/HH
	DC4	102	704 ⁺⁵	HU/HH
	PI	118	540 ⁺⁵	HU/HH
	Stainless steel	62	513 ⁺⁵	HU/HH
X140 – 150	DC HG-8	104	758 ⁺⁵	HU/HH
	DC2	102	667 ⁺⁵	HU/HH
	DC3	102	718 ⁺⁵	HU/HH
	DC4	102	769 ⁺⁵	HU/HH
	PI	118	605 ⁺⁵	HU/HH
	Stainless steel	62	578 ⁺⁵	HU/HH
X160 – 170	DC HG-8	104	882 ⁺⁵	HU/HH
	DC2	102	791 ⁺⁵	HU/HH
	DC3	102	842 ⁺⁵	HU/HH
	DC4	102	893 ⁺⁵	HU/HH
	PI	118	729 ⁺⁵	HU/HH
	Stainless steel	71	689 ⁺⁵	HU/HH
X180 – 190	DC HG-8	104	922 ⁺⁵	HU/HH
	DC2	102	831 ⁺⁵	HU/HH
	DC3	102	882 ⁺⁵	HU/HH
	DC4	102	933 ⁺⁵	HU/HH
	PI	118	769 ⁺⁵	HU/HH
	Stainless steel	71	729 ⁺⁵	HU/HH
X200 – 210	DC HG-8	104	987 ⁺⁵	HU/HH
	DC2	102	896 ⁺⁵	HU/HH
	DC3	102	947 ⁺⁵	HU/HH
	DC4	102	998 ⁺⁵	HU/HH
	PI	118	834 ⁺⁵	HU/HH
	Stainless steel	71	662 ⁺⁵	HU/HH
X220 – 230	DC HG-8	104	1072 ⁺⁵	HU/HH
	DC2	102	981 ⁺⁵	HU/HH
	DC3	102	1032 ⁺⁵	HU/HH
	DC4	102	1083 ⁺⁵	HU/HH
	PI	118	919 ⁺⁵	HU/HH
	Stainless steel	71	747 ⁺⁵	HU/HH
X240 – 250	DC HG-8	104	1066 ⁺⁵	HU/HH
	DC2	102	975 ⁺⁵	HU/HH
	DC3	102	1024 ⁺⁵	HU/HH
	DC4	102	1077 ⁺⁵	HU/HH
	PI	118	911 ⁺⁵	HU/HH
	Stainless steel	71	779 ⁺⁵	HU/HH

	BPG	ø ED	PS7	Gear unit housing
X260 - 270	DC HG-8	104	1204 ⁺⁵	HH
	DC HG-8	104	1166 ⁺⁵	HU
	DC2	102	1113 ⁺⁵	HH
	DC2	102	1075 ⁺⁵	HU
	DC3	102	1164 ⁺⁵	HH
	DC3	102	1124 ⁺⁵	HU
	DC4	102	1215 ⁺⁵	HH
	DC4	102	1177 ⁺⁵	HU
	PI	118	1051 ⁺⁵	HH
	PI	118	1011 ⁺⁵	HU
	Stainless steel	71	879 ⁺⁵	HU/HH
X280	DC HG-8	104	1314 ⁺⁵	HH
	DC HG-8	104	1276 ⁺⁵	HU
	DC2	102	1223 ⁺⁵	HH
	DC2	102	1185 ⁺⁵	HU
	DC3	102	1274 ⁺⁵	HH
	DC3	102	1234 ⁺⁵	HU
	DC4	102	1325 ⁺⁵	HH
	DC4	102	1287 ⁺⁵	HU
	PI	118	1161 ⁺⁵	HH
	PI	118	1211 ⁺⁵	HU
	Stainless steel	71	989 ⁺⁵	HU/HH

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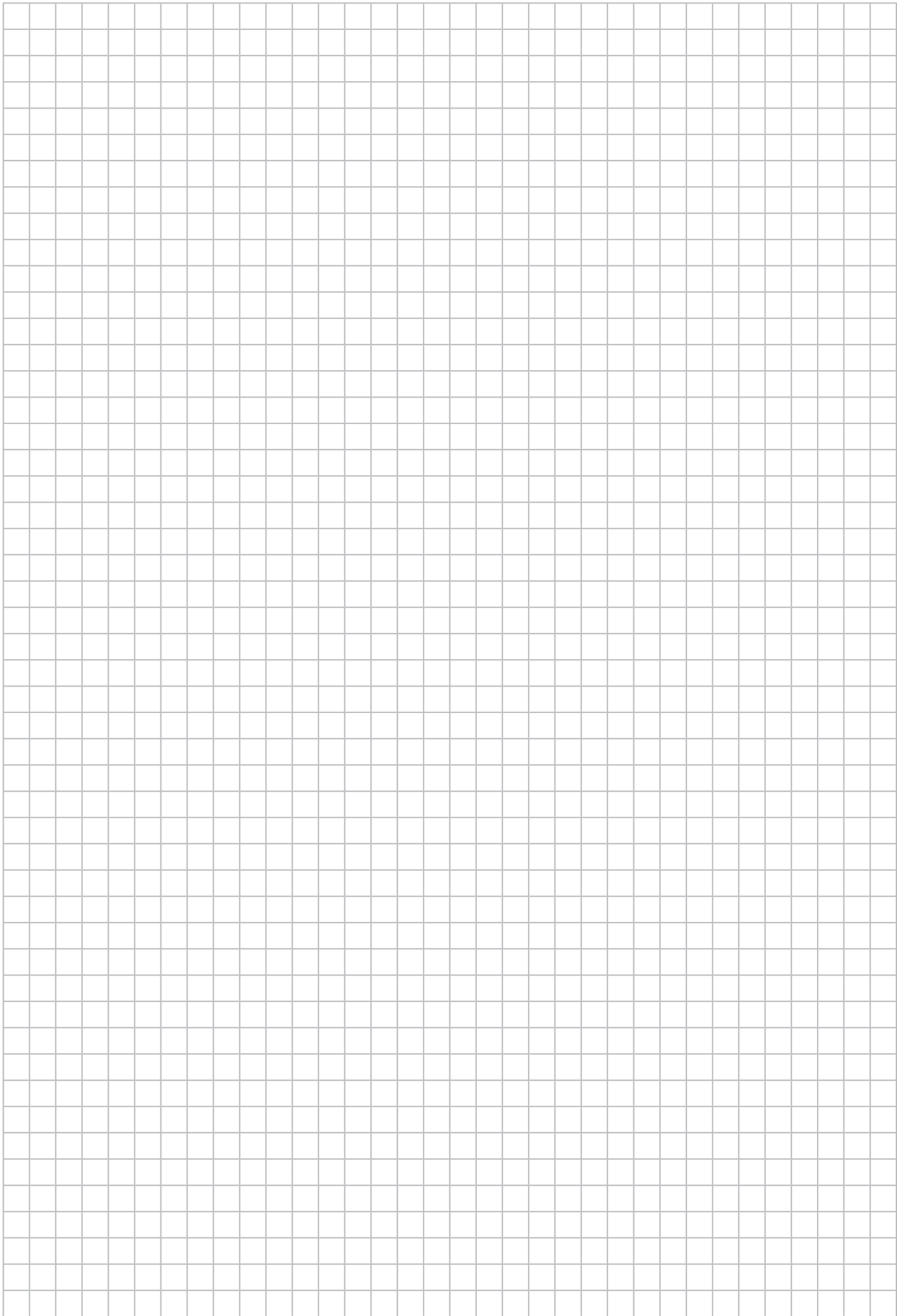
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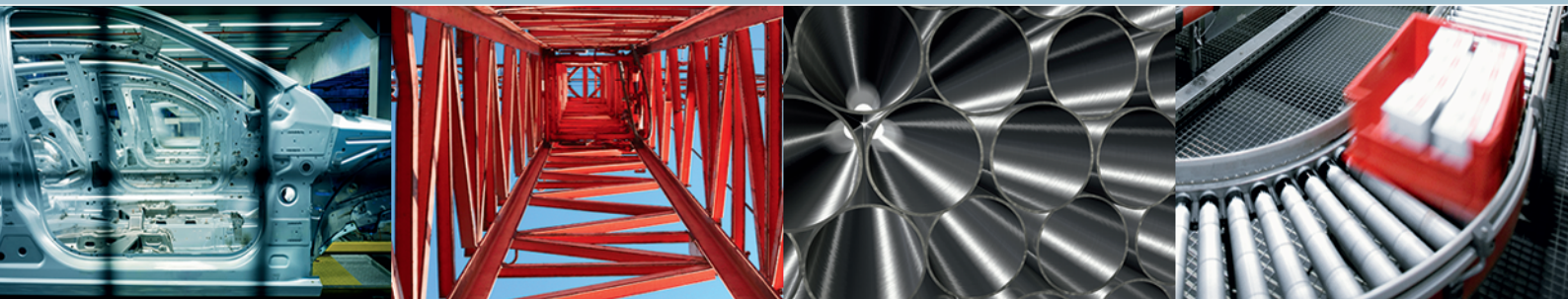
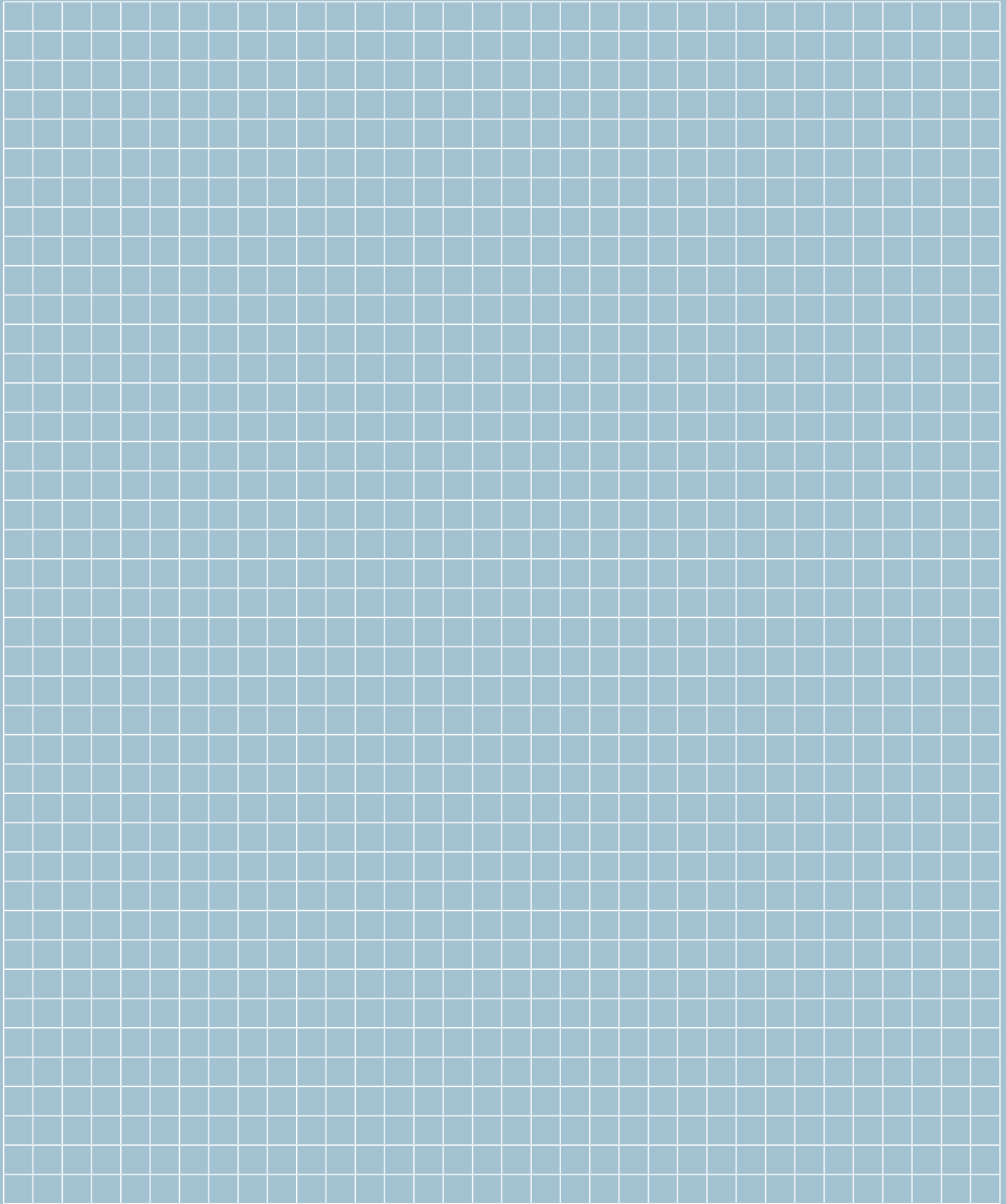
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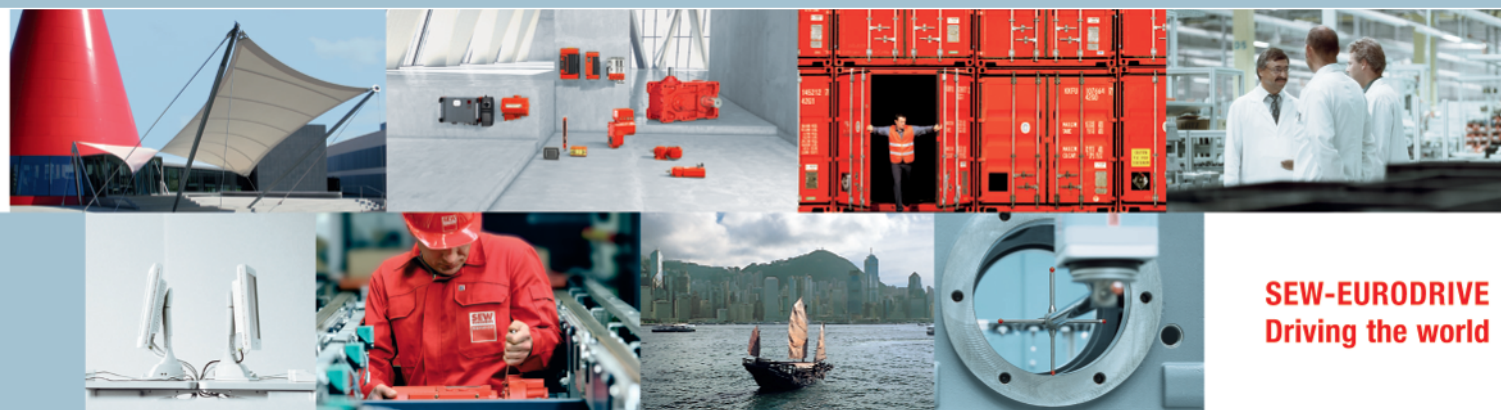
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