



2 Product Description and Overview of Types

2.1 General information

Nominal power, torques and input speeds	<p>The nominal power and torques mentioned in the catalog depend on the input speed and are valid for a service factor of $F_S = 1.0$ and a constant, unidirectional load. If the direction of rotation changes once per minute under full load, then only 70 % of these values apply.</p> <p>The overview shows nominal powers and torques for input speeds of 1800 rpm, 1500 rpm, 1200 rpm and 1000 rpm. The nominal torque is also valid for input speeds 3 % lower than synchronous speeds. For input speeds exceeding 1800 rpm, contact SEW-EURODRIVE.</p>
Thermal rating	The thermal rating needs to be checked for every gear unit. The relevant values are listed in the selection tables.
Noise level	The noise level of all MC gear units is below the permitted values defined in VDI guideline 2159 for gear units.
Coating	The gear units are painted with "blue gray" machine paint RAL 7031 according to DIN 1843. Special coatings are available on request.
Surface and corrosion protection	If required, all gear units can be supplied with a special surface and corrosion protection for applications in extremely humid and/or chemically aggressive environments.
Weights	Note that all weights shown in the catalog exclude the oil fill for the gear units. You will find recommended values for oil quantities depending on mounting position and gear unit design in the dimension drawings. The exact gear unit weight is given in the order-specific dimension drawing.
Low output speeds	<p>Very low output speeds (ratios above 112:1) can be achieved by combining the MC gear unit with a SEW-EURODRIVE gear unit or gearmotor of the R..., F..., K... or S... type.</p> <p>It may be necessary to limit the motor power to match the maximum permitted output torque of the MC unit.</p>
Auxiliary drives	SEW-EURODRIVE can supply MC gear units with an auxiliary drive. This is the standard configuration for 3-stage bevel-helical gear units (MC3R...). Also refer to the separate catalog "Industrial Gear Units: Bucket Elevator Drives of the MC... and M...Series" no. 11214511.
Supply of cooling air	For gear units with cooling fans on the input shaft, it is important that there is enough space in axial and radial direction for a sufficient supply of cooling air. Also refer to the "Cooling fan" section.
International markets	SEW-EURODRIVE is a member of the AGMA (American Gear Manufacturers' Association), and as such, all its gear units conform to AGMA specifications.



Steel frame	SEW-EURODRIVE supplies preassembled drive packages on a steel frame (swing base or base frame → chapter 6.6) for MC industrial gear units with horizontal LSS (MC2PL., MC3PL., MC2RL., MC3RL.).
Sealing system	Industrial gear units can be supplied with different seal arrangements for HSS and LSS (→ chapter 6.4) <ul style="list-style-type: none">• Lip seal (basic solution)• Double lip seal with grease nipple• Radial labyrinth seal with grease nipple
Lubrication	The lubrication types "splash lubrication" or "bath lubrication" are used for the MC series depending on the gear unit design and mounting position (→ chapter 7). Pressure lubrication can be used as option for these gear units.
Motor adapter	The motor adapters are designed for mounting IEC or NEMA motors (→ chapter 6.5).
Modular accessories	Several accessories are available for industrial gear units. See chapters 6 and 7 for a description. <ul style="list-style-type: none">• Mounting flange (→ chapter 6.1): Mounting flange for hollow or solid LSS.• Cooling fan (→ chapter 7.3): A cooling fan is used when the thermal rating of the gear unit is insufficient. The fan is bi-directional and can be installed in the field.• Shrink disc: A shrink disc is available for all sizes of MC hollow shaft gear units.• Motor adapter with fan: For mounting IEC (B5) or NEMA C-face motors with integrated cooling fan.• Backstop (→ chapter 6.3): Gear unit with integrated backstop to prevent undesirable reverse rotation.• Motor bracket (→ chapter 6.7): Motor mounting platform for belt driven input.• V-belt drive (→ chapter 6.7): Belt driven input. Includes motor bracket, pulleys, V-belt and belt guard.• High speed shaft (HSS) elastic coupling: Preselected HSS couplings are available for mounting to the input motor. Coupling selection depends on motor power and gear unit size.



- Low speed shaft (LSS) gear coupling:
Preselected LSS gear coupling based on the nominal gear unit torque and output shaft diameter. Couplings are available for vertical and horizontal applications.
- HSS and LSS coupling guard (→ chapter 6.8):
Coupling guard for HSS and LSS. Directly attached to the gear unit.
- Torque arm (→ chapter 6.2):
Torque arm for shaft mounted gear units. The torque arm can be mounted to absorb tension or compression.
- Shaft end pump (→ chapter 7.5):
(Only available for gear unit sizes 04 – 09) The shaft end pump is the preferred solution when pressure lubrication is required. All piping is external to the gear unit.
- Pressure lubrication with cooler (→ chapter 7.6, 7.8, 7.9):
A pressure lubrication system with cooler is used when the thermal rating of the basic gear unit is not sufficient. A cooler is used in operating environments where a fan cannot be used or is not sufficient.
- Oil drain valve:
A ball valve is mounted to the drain plug to allow for easily attaching a drain pipe to the valve when changing the gear unit oil.
- Oil heater (→ chapter 7.11):
(Only available for gear unit sizes 04 – 09) The oil heating system ensures that the oil is in sufficient liquid condition when starting up the gear unit in cold environments.
- Sealing systems (→ chapter 6.4):
Optional oil sealing methods are available to protect the gear unit from harsh contaminants in the operating environment.
- Temperature sensor PT100 (→ chapter 7.14):
The PT100 temperature sensor can be used for measuring the oil bath temperature in the gear unit.
- SPM adapter (shock pulse adapter) (→ chapter 7.15):
Adapters are installed on the gear unit housing for monitoring the vibration at various points on the gear unit.



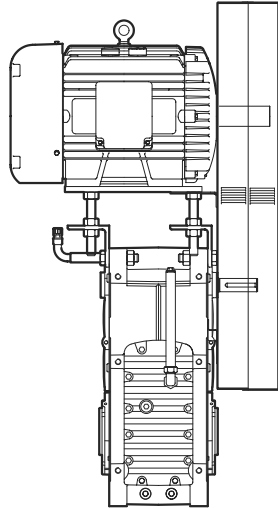
Drive packages

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

Please consult SEW-EURODRIVE.

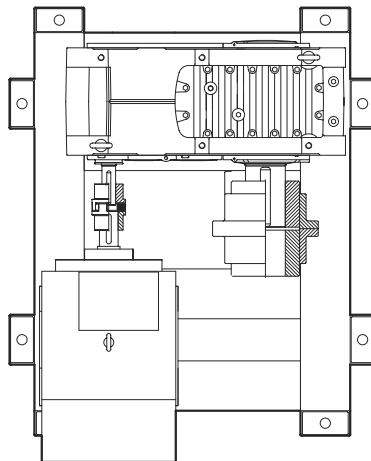
Examples

Complete **V-belt drive packages** including motor bracket, AC motor, belts, sheaves, and guard.



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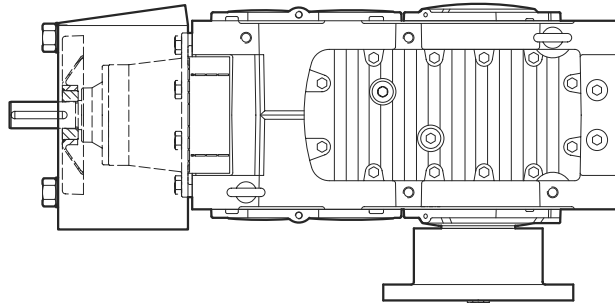
Base plates and couplings



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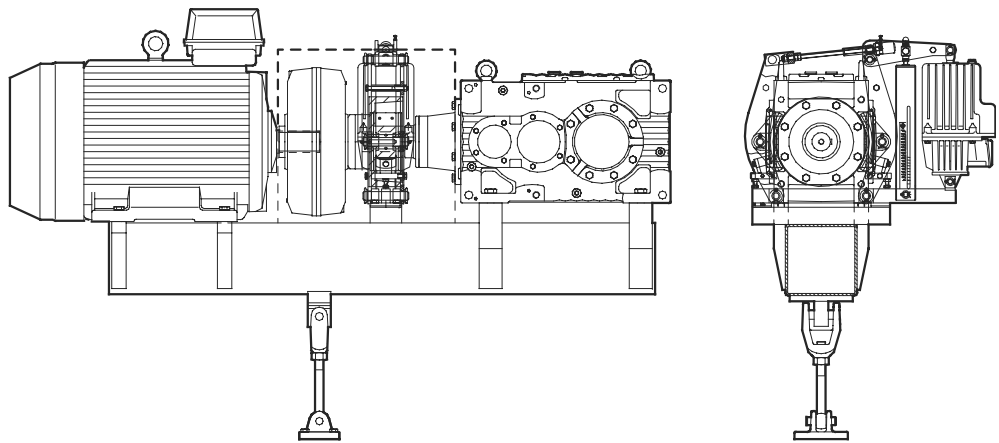


Rigid flange coupling hubs as alternative to shaft mounted gear units.



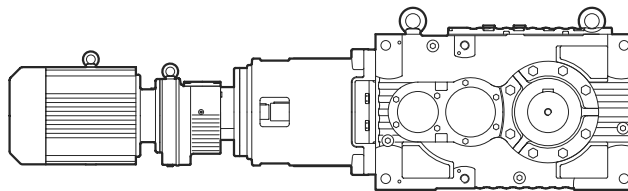
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Complete drive packages including **swing base, fluid coupling, brake, and torque arm.**



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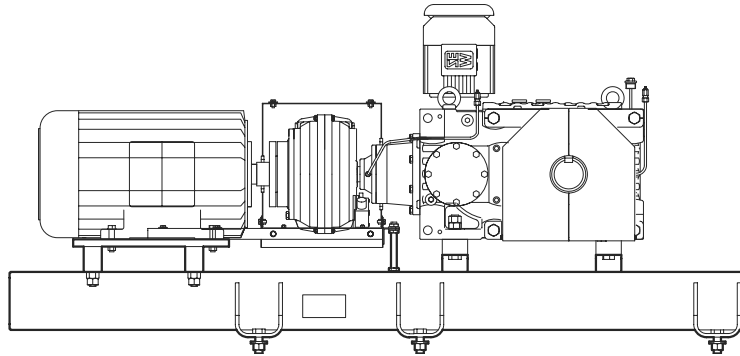
An **SEW gearmotor** mounted to the input end of the MC.. gear unit allows for a wide range of ratios and shaft configurations.



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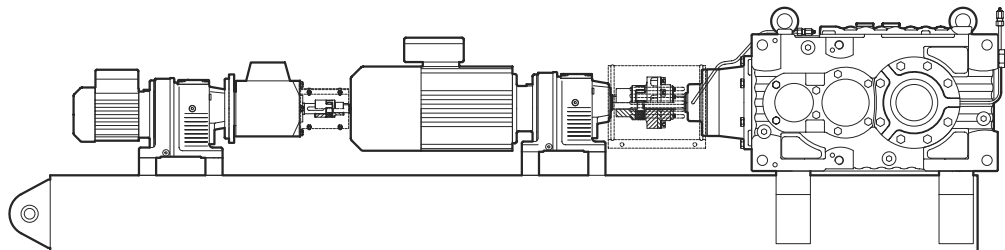


Complete **bucket elevator drive packages** including base frame or swing base, fluid coupling, LSS elastic claw coupling, auxiliary drive for full or empty buckets, backstop, overrunning clutch, fluid coupling and LSS coupling protection cover according to UVV safety regulations.



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Complete **portal scraper reclaimer travel drive** for wide speed ranges of over 1:3000 including swing base with integrated torque arm with rubber bushing, main drive for high speed, auxiliary drive for low speed connected via a brake-clutch element and corresponding protection covers.



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As alternative, SEW-EURODRIVE can also provide a proven solution for this application using a single main drive gear unit and motor in conjunction with a MOVIDRIVE® frequency inverter with integrated IPOS^{plus}® positioning and sequence control.



2.2 Basic gear unit versions

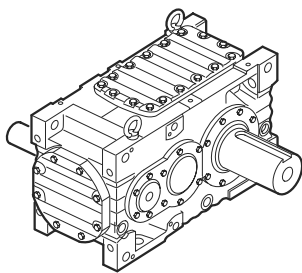
MC.. units are available as

- parallel shaft helical gear units (MC.P..) and
- right-angle bevel-helical gear units (MC.R..)

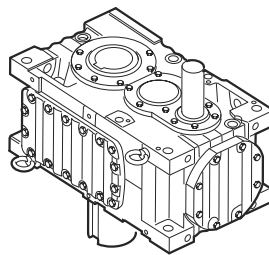
in 3 gear unit designs

- Horizontal LSS (MC..L...) with "horizontally" oriented housing and horizontal LSS
- Vertical LSS (MC..V...) with "vertical" output shaft
- Upright mounted (MC..E...) with "upright" housing

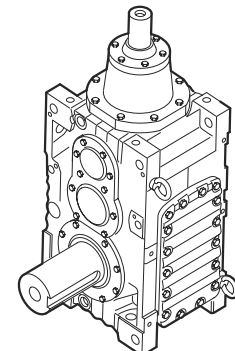
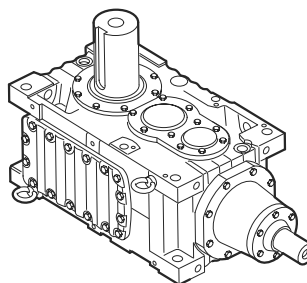
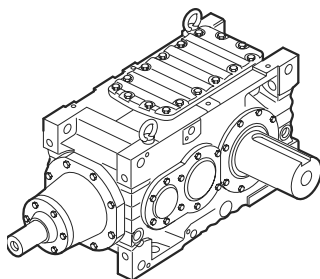
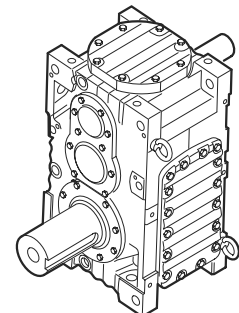
Horizontal LSS (L)



Vertical LSS (V)



Upright design (E)



with the following mounting options:

- Foot mounted (MC...F)
- Flange mounted (no designation)
- Shaft mounted with torque arm (MC...T)

Basic output shaft (LSS) variants

- Solid shaft with keyway (MC...S)
- Hollow shaft with keyway (MC...H)
- Hollow shaft for shrink disc connection (MC...H)

Other variants, such as

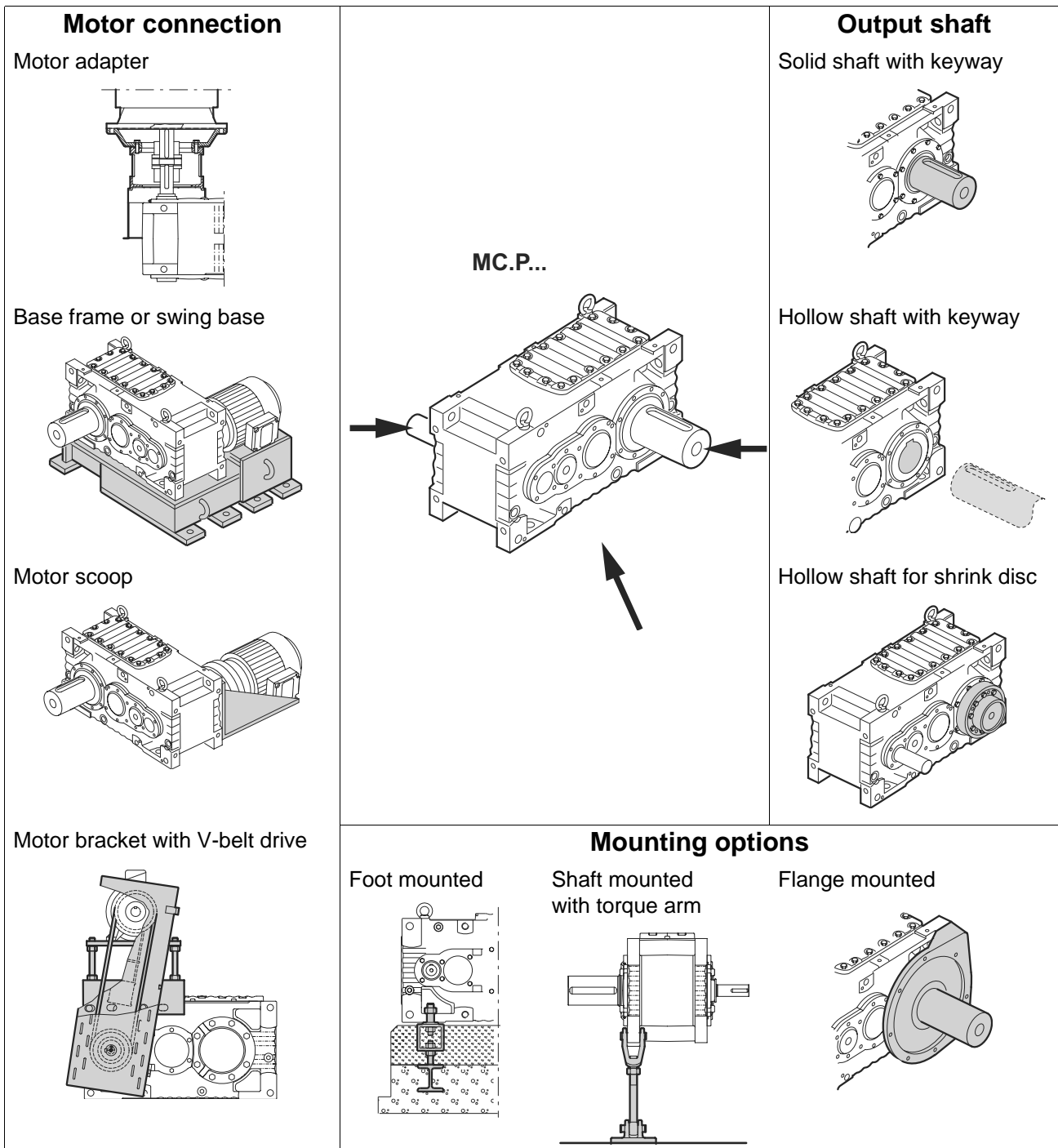
- hollow shaft with spline according DIN 5480
- shortened solid shaft without keyway for shrink fitted flange coupling hub
- through going shaft

are available on request.

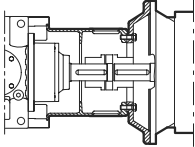
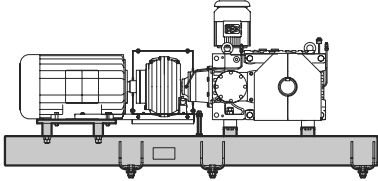
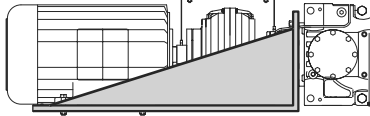
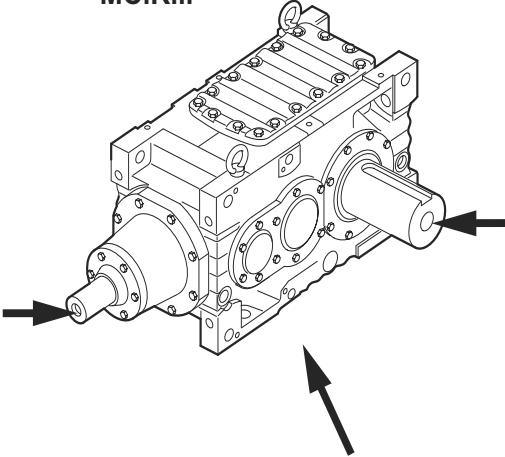
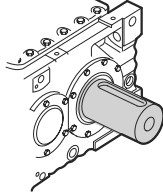
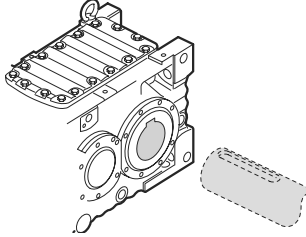
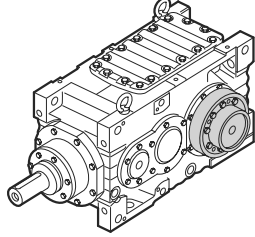
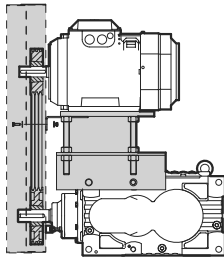
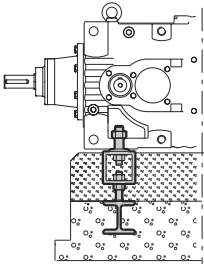
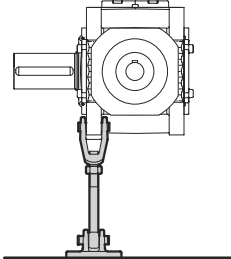
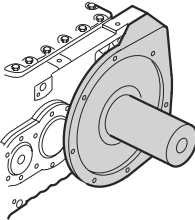


The following basic variants are possible for motor connection:

- Motor adapter with elastic coupling
- Motor scoop
- Motor bracket with V-belt drive
- For horizontal mounting position: steel construction (base frame or swing base)



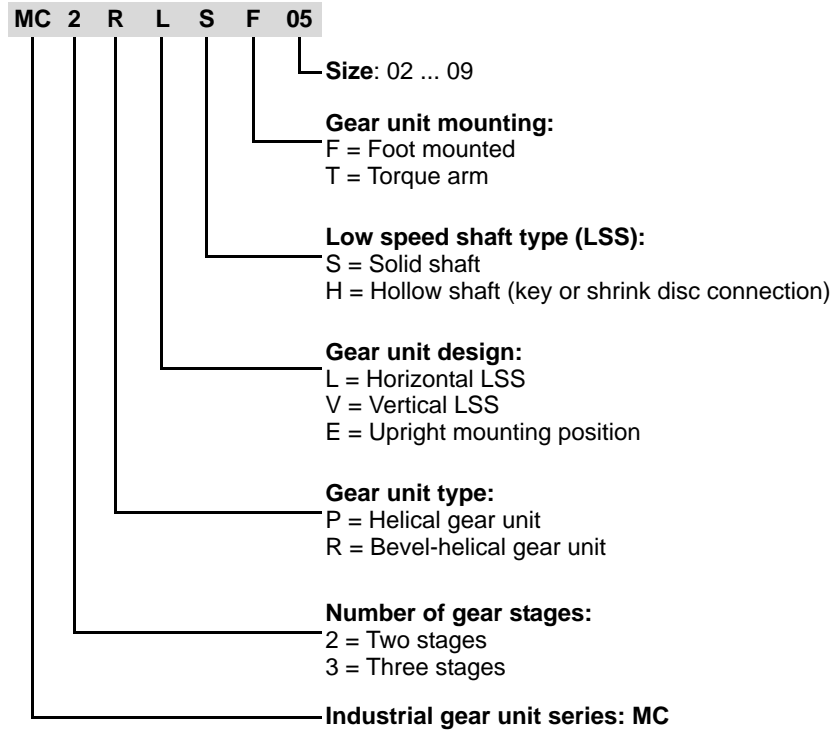


<p>Motor connection</p> <p>Motor adapter</p>  <p>Base frame or swing base</p>  <p>Motor scoop</p> 	<p>MC.R...</p> 	<p>Output shaft</p> <p>Solid shaft with keyway</p>  <p>Hollow shaft with keyway</p>  <p>Hollow shaft for shrink disc</p> 
<p>Motor bracket with V-belt drive</p> 	<p>Mounting options</p> <p>Foot mounted</p>  <p>Shaft mounted with torque arm</p>  <p>Flange mounted</p> 	



2.3 Unit designation for gear units

Sample unit designation



Example: Nameplate of the MC.. series industrial gear unit, SEW-EURODRIVE

SEW-EURODRIVE		Bruchsal/Germany	
Typ	MC3RLHF07		
Nr. 1	01.3115835301.0001.02	Nr. 2	T34567
Pe kW	55	MN2 kNm	35.6
Fs	1.6	kg	780
i 1:	61.883 : 1	Year	2004
n r/min	1480/23.9		
Lubricant	CLP 220 Miner..Oil/ca. 33 liter4		
Number of greasing points:	4	Made by SEW	

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Typ	= Unit designation
Nr. 1	= Serial number 1
Nr. 2	= Serial number 2
Pe [kW]	= Absorbed power on the input shaft
Fs	= Service factor
n [r/min]	= Input/output speed
kg [kg]	= Weight
i	= Exact gear unit reduction ratio
Lubricant	= Oil grade and viscosity class / oil volume
M _{N2} [kNm]	= Nominal gear unit torque
Year	= Year of manufacture
Number of greasing points	= Number of points that require regreasing



2.4 Corrosion and surface protection

Introduction

The corrosion and surface protection of gear units comprises the following three basic features:

1. Painting system
 - Standard painting system K7 E160/2
 - High-resistant painting system K7 E260/3 as option

2. Gear unit corrosion protection with
 - interior protection and
 - exterior protection

3. Gear unit packing
 - Standard packing (palette)
 - Wooden box
 - Seaworthy packing

Standard painting system K7 E 160/2

Painting is performed according to TEKNOS EPOXY SYSTEM K7, which is based on the high-solid epoxy paint TEKNOPLAST HS 150.

Two layer system K7 E 160/2	Thickness
• Epoxy primer	60 µm
• Teknoplast HS 150	100 µm
TOTAL	160 µm

Color shade: RAL 7031, blue gray

Guards and shields

Powder coating, epoxy-based coat paint (EP) is used for guards and shields.

Layer thickness 65 µm

Color shade: TM 1310 PK, warning in yellow color

High-resistant painting system K7 E 260/3

Painting is performed according to TEKNOS EPOXY SYSTEM K7, which is based on the high-solid epoxy paint TEKNOPLAST HS 150.

Three-layer system, E 260/3	thickness
• Epoxy primer	60 µm
• Teknoplast HS 150	2x100 µm
TOTAL	260 µm

Optional color shade

Other color shades are possible on request.



Usage of painting system

Environmental pollution	None	Low	Medium	High	Very high
Typical environmental conditions		Unheated buildings where condensation might occur Atmospheres with low pollution, mostly rural areas	Production rooms with high level of moisture and low air pollution City and industrial atmospheres, moderate pollution with sulphur dioxide, coastal areas with low salt load	Industrial areas and costal areas with moderate salt load Chemical plants	Buildings or areas with almost permanent condensation and high pollution Industrial areas with very high levels of moisture and aggressive atmospheres
Mounting	Indoors	Indoors	Indoors or outdoors	Indoors or outdoors	Indoors or outdoors
Relative humidity	< 90 %	up to 95 %	up to 100 %	up to 100 %	up to 100 %
Recommended painting system	Standard painting system K7 E160/2	Standard painting system K7 E160/2	Standard painting system K7 E160/2	High resistant painting system K7 E260/3	Contact SEW-EURODRIVE

Storage and transport conditions

Industrial gear units of the MC... series are delivered without oil fill. Different protection systems are required depending on storage period and ambient conditions:

Storage period: up to ... months	Storage conditions Gear unit corrosion protection				Transport conditions Gear unit packing	
	OUTDOORS, roofed	INDOORS, heated (0...+20°C)	Storage area close to sea OUT- DOORS, roofed	Storage area close to sea INDOORS	Land transport	Sea transport
6	Standard protection	Standard protection	Contact SEW-EURODRIVE	Long-term protection	Standard packing	Seaworthy packing
12	Contact SEW-EURODRIVE	Standard protection	Contact SEW-EURODRIVE	Long-term protection	Standard packing	Seaworthy packing
24	Long-term protection	Contact SEW-EURODRIVE	Contact SEW-EURODRIVE	Long-term protection	Standard packing	Seaworthy packing
36	Contact SEW-EURODRIVE	Long-term protection	Contact SEW-EURODRIVE	Long-term protection	Standard packing	Seaworthy packing



Standard protection / interior

- Gear units undergo a test run with protection oil. The protection oil is drained by SEW-EURODRIVE before dispatch. The remaining layer of protection oil on the inner parts serves as basic protection.

Standard protection / exterior

- Oil seals and seal surfaces are protected by suitable grease.
- Unpainted surfaces (including spare parts) are covered with a protective coating. Before other equipment is mounted to such surfaces, the protective coating must be removed using a solvent.
- Small spare parts and loose pieces, such as screws, nuts, etc., are supplied in corrosion protected plastic bags (VCI corrosion protection bag).
- Threaded holes and blind holes are covered by plastic plugs.
- The breather plug (position → chapter "Mounting Positions") is already installed.

Standard protection / packing

Standard packing is used: The gear unit is delivered on a pallet without cover



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- If the gear unit is stored longer than 6 months, it is recommended to regularly check the protective coating of unpainted areas as well as the paint coat. Areas with removed protection coating or paint have to be repainted, if necessary.
- The LSS must be rotated at least one turn in such a way that the position of the roller elements in the bearings of LSS and HSS changes. This procedure has to be repeated every 6 months until startup.

Long-term protection / interior

The following procedure is applied in addition to the "standard protection":

- A VPI solvent is sprayed through the oil filling hole
- The breather plug is replaced with a screw plug (before startup, the screw plug must be replaced again by the breather plug, which is attached to the gear unit separately)
- **Never open the gear unit near open flames, sparks and hot objects because solvent vapors might be ignited.**
- **Take preventive measures to protect people from solvent vapors. It is absolutely crucial that open flames are avoided when the solvent is applied and when the solvent evaporates.**



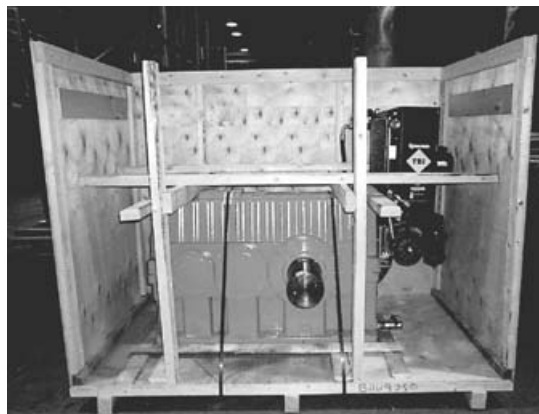


Long-term protection / exterior

- Oil seals and seal surfaces are protected through suitable grease
- Unpainted surfaces (including spare parts) are covered with a protective coating. Before other equipment is mounted to such surfaces, the protective coating must be removed using a solvent.
- Small spare parts and loose pieces, such as screws, nuts, etc., are supplied in corrosion protected plastic bags (VCI corrosion protection bag).
- Threaded holes and blind holes are covered by plastic plugs
- The breather plug (Position → chapter "Mounting Positions") is already installed.

Long-term protection / packing

- Seaworthy packing is used: The gear unit is packed in a seaworthy plywood box with a wooden frame



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- If the gear unit is stored for longer than 6 months, it is recommended to regularly check the protective coating of unpainted areas as well as the paint coat. Areas with removed protection coating or paint have to be repainted, if necessary.
- The LSS must be rotated at least one turn in such a way that the position of the roller elements in the bearings of LSS and HSS changes. This procedure must be repeated every 6 months until startup.
- The interior long-term protection with the VPI solvent has to be repeated every 24 / 36 months (according to the table "Storage and transport conditions") until startup.

Alternative packing

Optionally, the gear unit can be supplied in a wooden box with standard gear unit protection.