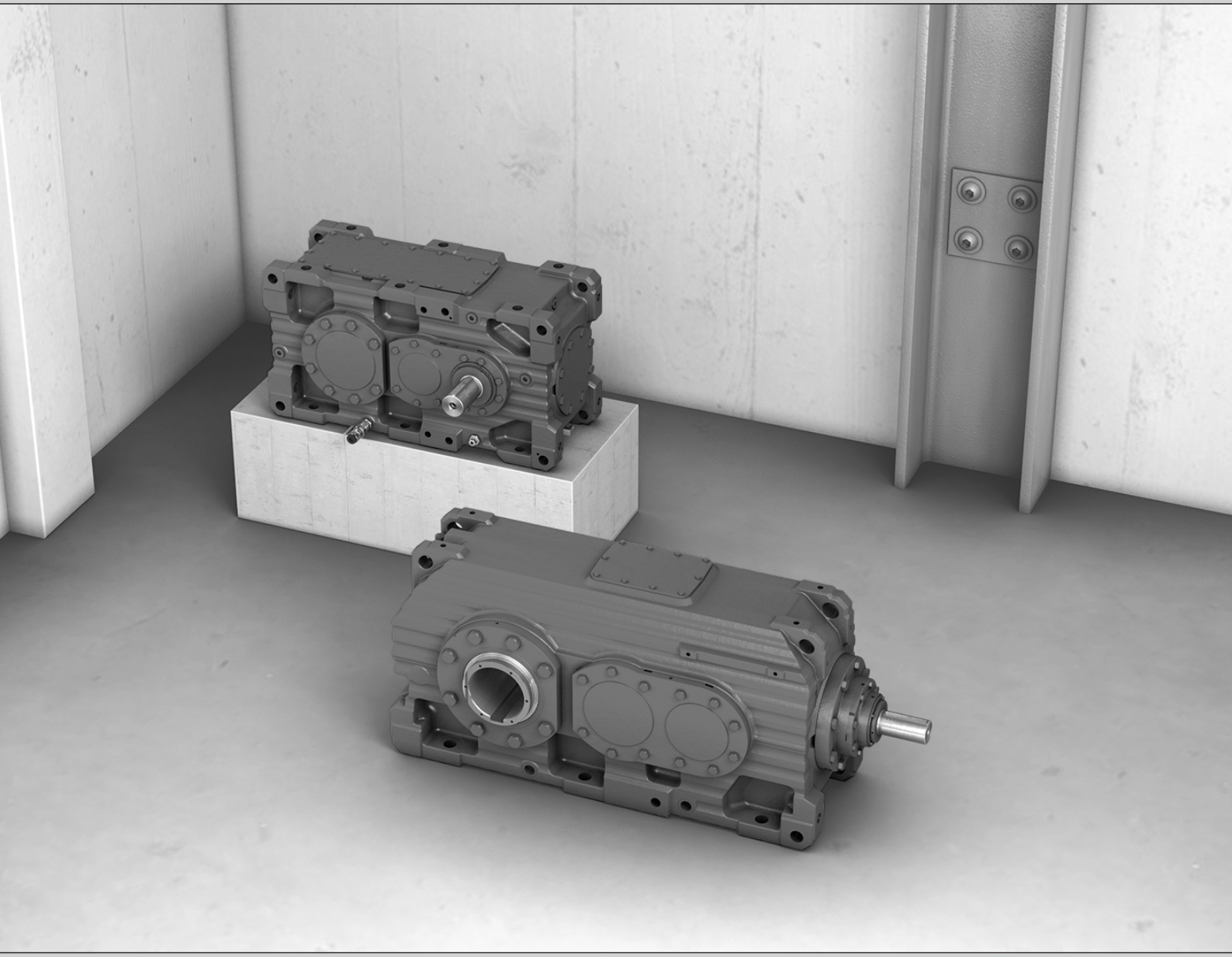
SEW EURODRIVE

# Addendum to the Assembly and Operating Instructions



Industrial Gear Units

## X.. Series Helical and Bevel-Helical Gear Units

Oil-Air Cooler for Splash or Bath Lubrication /OAC

Edition 12/2016

22760652/EN

# Table of contents



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# 1 Important information

## INFORMATION

This addendum describes amendments to the oil-air cooler operating instructions. Observe the additional information specified in this document.

This document does not replace the detailed operating instructions.

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# 2 Oil-air cooler for splash or bath lubrication /OAC

## 2.1 Structure/function

### 2.1.1 Structure

An oil-air cooler can be used if the thermal rating of a naturally cooled gear unit, or the cooling via a fan on the input shaft is not sufficient.

## INFORMATION

- The following information applies to gear units with splash lubrication or bath lubrication.
- Also refer to the operating instructions of the cooling system manufacturer.

SEW-EURODRIVE uses 2 types of oil-air coolers:

- Oil-air cooler with a combined pump and fan motor
- Oil-air cooler with separate motors for pump and fan

### 2.1.2 General information

The cooling system is delivered as a complete unit on a mounting frame for separate installation but without electrical wiring and piping. As an option, the cooling system can be mounted to the gear unit as a complete unit. In this case, the cooling system is delivered with piping but without wiring.

Depending on the design, the standard delivery of the cooling system includes:

**Design with common pump and fan motor**

The standard delivery of the cooling system includes:

- Pump and fan with directly mounted asynchronous motor
- Oil-air heat exchanger
- Temperature switch /TSK2 with 2 switching points for
  - Controlled start of the pump motor and fan motor at an oil temperature > 60 °C
  - Monitoring of the oil-air cooler, i.e. warning or gear unit shutdown at an oil temperature > 90 °C

**Design with separate motors for fan and pump**

The standard delivery of the cooling system includes:

- Pump with directly mounted asynchronous motor
- Fan with directly mounted asynchronous motor
- Oil-air heat exchanger
- Temperature switch /TSK2 with 2 switching points for
  - Controlled start of the pump motor and fan motor at an oil temperature > 60 °C
  - Monitoring of the oil-air cooler, i.e. warning or gear unit shutdown at an oil temperature > 90 °C

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**Optional accessories**

The cooling system can be equipped with the following components as an option:

- Oil filter with electrical/optical maintenance indicator
  - Single filter
  - Duplex filter
- Flow rate sensor
- Manometer
- Thermometer
- PT100 temperature sensor

### 2.1.3 Function

Observe the following control information for the individual components.

**Pump/fan**

The driving motor of pump and fan is switched on and off depending on the temperature.

When the pump is operated, a pressure control valve integrated in the cooler limits the plant pressure.

## INFORMATION

Do not change the default setting of the valve.

**Temperature switch /TSK2**

The temperature of the plant is monitored via a temperature switch with defined switching points.

- At T > 60 °C → **COOLER ON**
- At T < 50 °C → **COOLER OFF**
- At T > 90 °C → **STOP GEAR UNIT/WARNING**

**PT100 temperature sensor (optional)**

Optionally, a PT100 temperature sensor instead of a temperature switch/TSK2 can be used to control the cooling system. The evaluation of the temperature signal and the controlling of the operator's switching devices is performed by the operator's control.

- At T > 60 °C → **COOLER ON**
- At T < 50 °C → **COOLER OFF**
- At T > 90 °C → **GEAR UNIT STOP / WARNING**

**Filter (optional)**

The filter is monitored visually by a pressure deviation indicator, and electrically by a pressure deviation monitoring device.

When △ p > 2.2 bar → **WARNING** (clean filter)

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### 2.1.4 Interlocking specifications

**Enabling of the gear unit**

The gear unit is enabled if the following condition is met:

- Oil temperature T < 90 °C

**STOP gear unit/warning**

STOP gear unit/warning if the following condition is met:

- Oil temperature T > 90 °C

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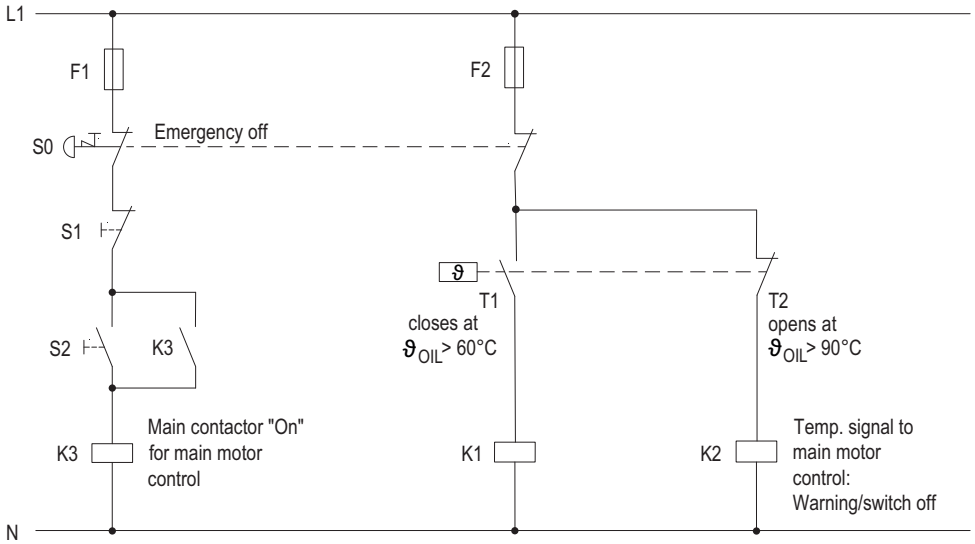
## 2.2 Wiring diagram (schematic illustration)

The wiring diagrams show a possible setup of the control for the cooling system when a TSK2 temperature switch and, optionally, a PT100 temperature sensor are used. Use the wiring diagrams according to the structure of the cooling system.

### 2.2.1 Control circuit with control via temperature switch /TSK2

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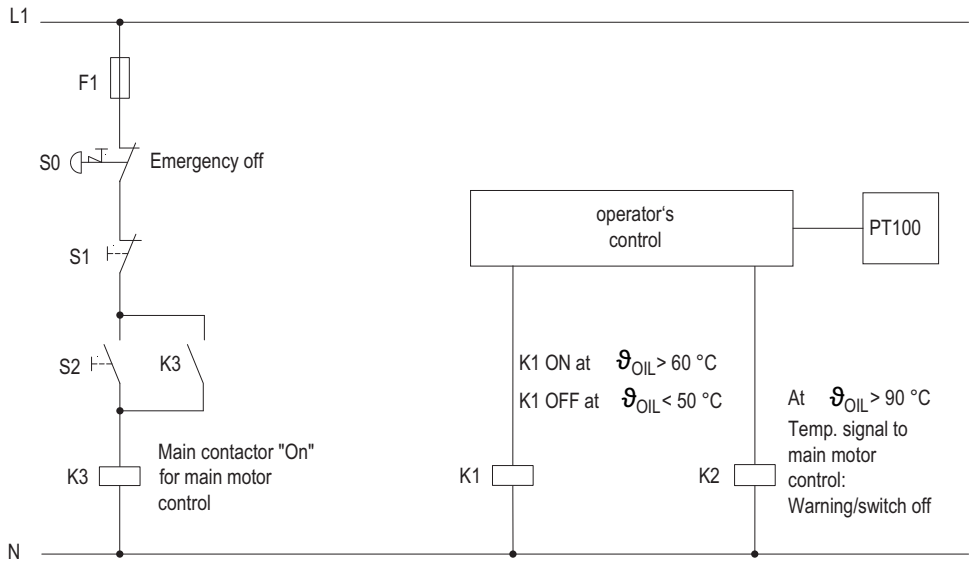
### 2.2.2 Control circuit with control via PT100 temperature sensor

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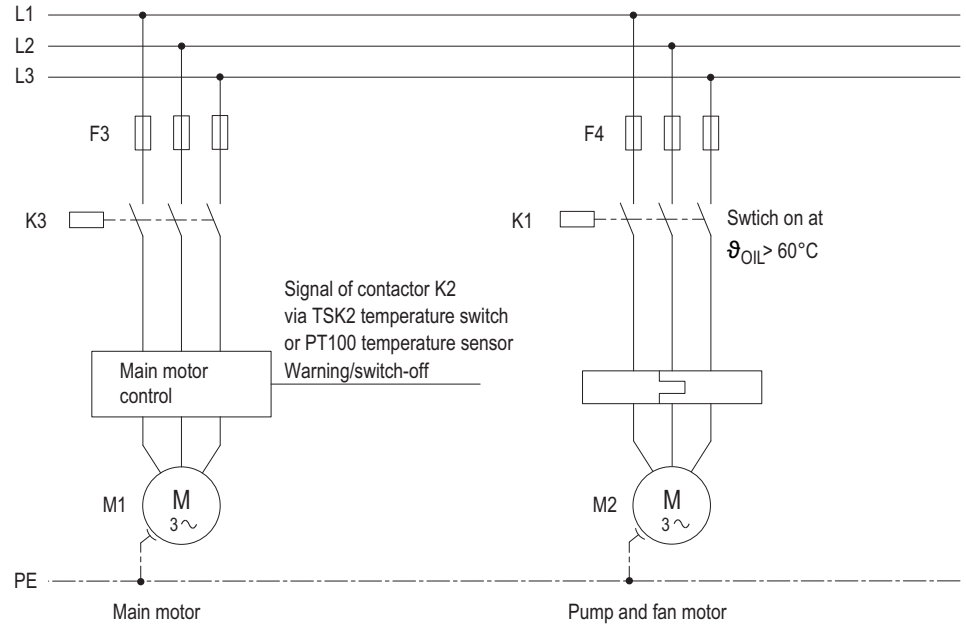
### 2.2.3 Main circuit with combined pump and fan motor

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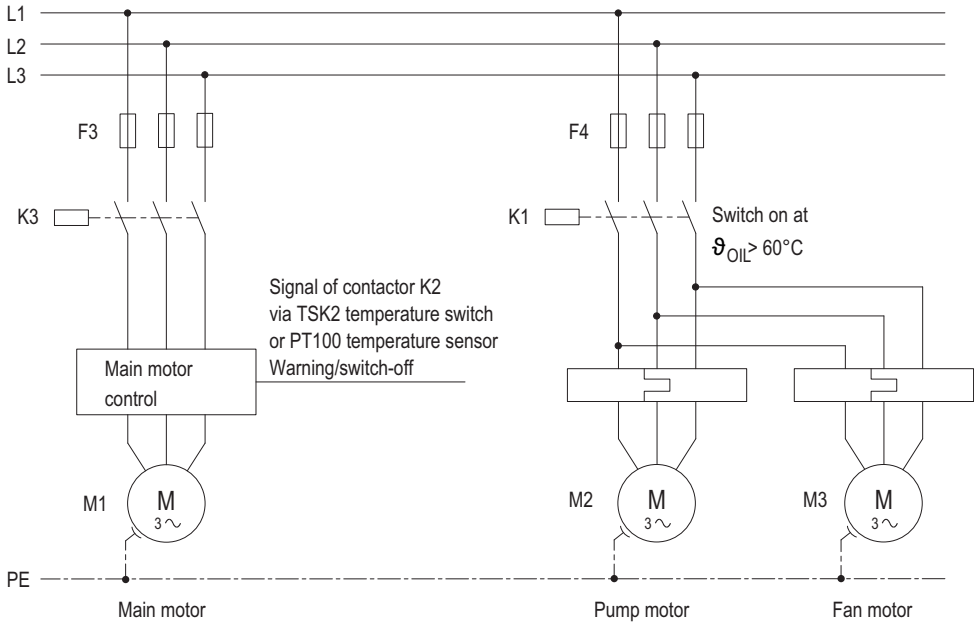
### 2.2.4 Main circuit with separate motors for pump and fan

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## 2.3 Installation/assembly

### INFORMATION

First adhere to the operating instructions of the oil supply system manufacturer.

#### 2.3.1 Installation and connection information

The cooling system and the gear unit have to be set up separately as standard. As an option, the cooling system can be mounted to the gear unit as a complete unit. In this case, the cooling system is delivered with piping but without wiring.

Provide for a low-vibration installation location max. 1 meter from the gear unit. Install the cooling system at the same level as the gear unit or lower. If this is not possible, contact SEW-EURODRIVE.

Install the cooling system in such a way that input and output air can flow unobstructedly. Provide for sufficient ventilation and protection against dirt.

### INFORMATION

For the dimensions of the cooling system and detailed technical data, refer to the operating instructions of the cooling system manufacturer.

#### 2.3.2 Mechanical connection

Connect the cooling system to the gear unit according to the identifying markings and observing local regulations.

In this respect, observe the following basic conditions:

- Do not reduce the specified cable cross section.
- It is important that you choose the correct wall thickness and material when selecting pipes, hoses and screw fittings. Preferably use screw fittings with non-metallic gaskets.

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### 2.3.3 Electrical connection

Observe country-specific regulations during the electrical connection.

With the standard design, connect the following components:

- Fan motor
- Pump motor
- Temperature switch/temperature sensor

Observe the following information.

- Make sure that the pump and the fan rotate in the correct direction.
- Observe the motor data sheet.
- If a temperature switch/TSK2 is used, it must be integrated in the circuit in a way that:
  - The pump and fan are switched on at the first switching point (at 60 °C oil temperature).
  - Either a warning signal is activated or the main drive is switched off at the second switching point (at 90 °C oil temperature).
- If a temperature sensor/PT100 is used, it must be integrated in the circuit in a way that
  - The pump and fan are switched on at 60 °C oil temperature.
  - The pump motor and the fan motor are switched off if the oil temperature falls below 50 °C.
  - Either a warning signal is issued or the main drive is switched off when the oil temperature reaches 90 °C.

When using options:

- Connect the electrical maintenance indicator of the oil filter to the customer-provided control.
- Connect the flow rate sensor to the customer-provided control.

### 2.3.4 Limit temperature for start-up of the oil supply system

To ensure a correct function of the oil supply system the gear unit oil must have at least the minimum oil viscosity. The viscosity depends on the used oil, and on the oil temperature in the oil pipes/hoses and in the oil pump. Observe chapter "Permitted lubricants" (→ 🗎 16).

When the oil supply system is used at low ambient temperatures, it may be required to adjust the oil supply system. Contact SEW-EURODRIVE, if required.

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## 2.4 Notes on checking the oil level

Using an oil supply system might influence the oil level. The fill quantities specified on the nameplate are guide values and refer only to the gear unit. The mark on the oil dipstick, oil level glass or oil sight glass is the decisive indicator of the correct oil quantity.

Observe the chapter "Checking the oil level" in the operating instructions for the gear unit.

### 2.4.1 Additionally required gear unit oil

The following table shows the lubricant fill quantity for the oil supply system which has to be filled into the gear unit additionally.

The information is based on the standard cross section of the pipes for a suction pipe length of 1.5 m and a pressure pipe length of 2.5 m.

| Size | Additional oil quantity in the gear unit in l |
|---|---|
| OAC 005 | 4.5 |
| OAC 010 | 4.5 |
| OAC 020 | 5.0 |
| OAC 025 | 5.5 |
| OAC 030 | 5.5 |
| OAC 040 | 8.0 |
| OAC 050 | 10.0 |
| OAC 060 | 14.0 |

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## 2.5 Startup

### 2.5.1 Notes

**NOTICE**

Improper startup may result in damages to the gear unit or oil supply system.

Possible damage to property.

- Observe the following information.

- Before startup, check the functionality of the monitoring devices. (Depending on the types of pressure switch, flow monitor, temperature switch/temperature sensor, maintenance indicator etc.)
- Before taking the gear unit into operation for the first time and after each oil change, run the oil pump at least 10 minutes to ensure that all oil chambers are filled with oil. Switch off the oil pump and control the oil level after a short period of time. Correct the oil level if necessary.
- An oil heater is mandatory when operating the oil supply system at low ambient temperatures. For further information, refer to chapter "Limit temperature for start-up of the oil supply system" (→ 🗎 11).

### 2.5.2 Venting the pump

**⚠ WARNING**

Danger due to leaking and squirting gear unit oil.

Serious injury.

- You must wear safety goggles.
- Be very careful when you vent the pump.

If the pump does not supply oil immediately when the oil supply system starts, do the following:

- Fill the pump with oil.
- Vent the pump on the pressure side during start, if possible at the highest point.

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## 2.6 Inspection/maintenance

### INFORMATION

First adhere to the operating instructions of the oil supply system manufacturer.

### 2.6.1 Inspection and maintenance intervals

Adhere to the following inspection and maintenance intervals.

| Time interval | What is to be done? |
|---|---|
| • **Depending on the operating conditions, at least every 12 months** | • Check the condition of the oil-air cooler, if necessary, clean the cooler matrix<br>• Check the condition of the oil filter, replace the filter element if necessary |
| • **Varying (depending on external factors)** | • Check all hose pipes for tightness. |

### 2.6.2 Checking hose pipes

### NOTICE

Hoses and hose pipes are subject to natural aging even if they are properly stored and used. This is why the period of use is limited.

- The period of use of hose pipes should not exceed 6 years from the date of manufacture printed on them.
- The operator of the plant is responsible for making sure that hose pipes are replaced at adequate intervals even if they do not show any signs of safety-related defects.
- Have hose pipes checked by a specialist at least once a year to ensure operational safety.

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## 2.7 Malfunctions

| Fault | Possible cause | Measure |
|---|---|---|
| No oil pump suction | • Air in the pipes | • Fill the suction line and oil pump with oil<br>• Vent pressure pipe on startup |
| | • Not enough oil in the gear unit | • Check oil level in gear unit |
| | • Wrong oil grade in the gear unit | • Check oil grade (in particular when temperatures are low) |
| | • Motor not running | • Check electrical connections |
| | • Wrong direction of rotation of the motor | • Change the direction of rotation |
| Delivery rate of oil pump not sufficient | • Oil circulation clogged | • Open valves and plugs |
| | • Wrong oil grade | • Check oil grade (in particular when temperatures are low) |
| | • Wrong motor speed | • Check pump motor speed |
| | • Negative pressure at pump suction side too high | • Increase cross section of suction line<br>• Decrease suction lift |
| Oil pump very loud | • Negative pressure at pump suction side too high | • Increase cross section of suction line<br>• Decrease suction lift<br>• Avoid distortion of the suction line<br>• Avoid reductions in the suction pipes |
| Oil pump delivers froth | • Not enough oil in the gear unit | • Check oil level in gear unit |
| | • Suction line leaking | • Check screw fittings for leaks |
| Cooling capacity is not reached | • Air temperature higher than dimensioned | • Use larger cooler |
| Insufficient air flow | • Lamella blocked | • Clean cooler matrix |
| | • Obstacles in the vicinity | • Adhere to minimum clearance |

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## 2.8 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 greases and oils used.
- 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 are subject to dynamic change on the part of the lubricant manufacturers. For the latest information about the lubricants, visit: www.sew-eurodrive.de/lubricants

### 2.8.1 Explanation of the structure of the tables and abbreviations

| Icons | Designation |
|---|---|
| CLP | = Mineral oil |
| CLP HC | = Synthetic polyalphaolefin (PAO) |
| E | = Oil based on esters |
|  | = 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 $F_s \geq 1.3$ |
| RWDR | = Radial oil seal |

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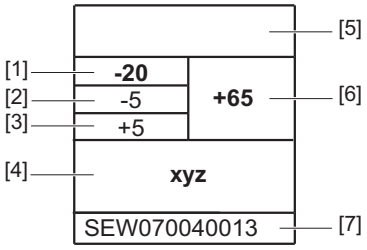
### 2.8.2 Explanation of the various lubricants

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[1] Lowest cold start temperature in °C for splash lubrication*
[2] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 5000 cSt*
[3] Lowest cold start temperature in °C for drives with pumps up to a max. oil viscosity of 2000 cSt*
[4] Trade name
[5] Manufacturer
[6] Highest oil bath temperature in °C. MUST NOT BE EXCEEDED.
[7] Approvals

*In case of low temperatures, the oil must be heated to the specified minimum temperature, for example by using an oil heater. The maximally permitted oil viscosity per pump type is specified in the following chapter.

### 2.8.3 Explanation of the oil supply systems and the oil viscosity

In standard design, the motor pump of the cooling system is dimensioned for an oil viscosity of **2000 cSt.**

Optionally, a motor pump with an increased suction capacity can be used. This motor pump is dimensioned for an oil viscosity of **5000 cSt.** Contact SEW-EURODRIVE, if required.

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### 2.8.4 Lubricant tables

The lubricant table is valid when this document is printed. Please refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

| DIN (ISO) API | ISO,SAE NLGI | Castrol | FUCHS | Mobil® | KLÜBER LUBRICATION | Shell | TEXACO | TOTAL |
|---|---|---|---|---|---|---|---|---|
| CLP | VG 150 [1] | -20 -5 +5 +65 | -20 -5 +5 +65 | -20 -5 +5 +65 | -20 -5 +5 +65 | | -20 -5 +5 +65 | |
| | | Optigear BM 150 | Renolin CLP 150 Plus | Mobilgear 600 XP 150 | Klüberoil GEM 1-150 N | | Meropa 150 | |
| | | | Alpha SP 150 | | | | | |
| | S0 | -15 0 +10 +75 | -15 0 +10 +75 | -15 0 +10 +75 | -15 0 +10 +75 | -15 0 +10 +75 | -15 0 +10 +75 | -15 0 +10 +75 |
| | VG 220 | Optigear BM 220 | Renolin CLP 220 Plus | Mobilgear 600 XP 220 | Klüberoil GEM 1-220 N | Shell Omala Oil F 220 | Meropa 220 | Carter EP 220 |
| | | | Alpha SP 220 | | | | | |
| | S0 | -10 +5 +15 +85 | -10 +5 +15 +80 | SEW07003013 -10 +5 +15 +80 | -10 +5 +15 +80 | -10 +5 +15 +80 | -10 +5 +15 +80 | -10 +5 +15 +80 |
| | VG 320 | Optigear BM 320 | Renolin CLP 320 Plus | Mobilgear 600 XP 320 | Klüberoil GEM 1-320 N | Shell Omala Oil F 320 | Meropa 320 | Carter EP 320 |
| | | | Alpha SP 320 | | | | | |
| | S0 | -5 +10 +20 +90 | -5 +10 +20 +90 | SEW07003013 -5 +10 +20 +90 | -5 +10 +20 +90 | -5 +10 +20 +90 | -5 +10 +20 +90 | -5 +10 +20 +90 |
| | VG 460 | Optigear BM 460 | Renolin CLP 460 Plus | Mobilgear 600 XP 460 | Klüberoil GEM 1-460 N | Shell Omala Oil F 460 | Meropa 460 | Carter EP 460 |
| | | | Alpha SP 460 | | | | | |
| | S0 | 0 +15 +25 +90 | 0 +15 +25 +90 | SEW07003013 0 +15 +25 +90 | 0 +15 +25 +90 | | 0 +15 +25 +90 | 0 +15 +25 +90 |
| | VG 680 | Optigear BM 680 | Renolin CLP 680 Plus | Mobilgear 600 XP 680 | Klüberoil GEM 1-680 N | | Meropa 680 | Carter EP 680 |
| | | | Alpha SP 680 | | | | | |
| | S0 | +5 +20 +30 +90 | | SEW07003013 | | | | |
| | VG 1000 | Optigear BM 1000 | | | | | | |
| | S0 | | | | | | | |

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The lubricant table is valid when this document is printed. Please refer to www.sew-eurodrive.de/lubricants for the latest version of the table.

| DIN (ISO) API | ISO,SAE NLGI | Castrol | | | FUCHS | | | Mobil® | | | KLÜBER LUBRICATION | | | Shell | | | TEXACO | | | TOTAL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLP HC | VG 32 [1] | | | | | | | -40 -30 -25 | SHC 624 | +30 | | | | | | | | | | | | |
| | | | | | | | | S0 | | | | | | | | | | | | | | |
| | VG 68 [1] | | | | -35 -20 -10 | Renolin Unisyn CLP 68 | +50 | -40 -25 -15 | SHC 626 | +50 | -35 -20 -10 | Klübersynth GEM 4-68 N | +50 | -40 -20 -10 | Omala S4 GX 68 | +50 | | | | | | |
| | | | | | S0 | | | S0 | | | S0 | | | S0 | | | | | | | | |
| | VG 150 [1] | -25 -10 0 | Alphasyn EP 150 | +70 | -30 -10 +0 | Renolin Unisyn CLP 150 | +70 | -30 -10 -10 | SHC 629 | +75 | -25 -10 0 | Klübersynth GEM 4-150 N | 70 | -30 -10 0 | Omala S4 GX 150 | +75 | -25 -10 0 | Pinnacle EP 150 | +70 | -35 -15 -5 | Carter SH 150 | +75 |
| | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | |
| | VG 220 | -25 -5 +5 | Alphasyn EP 220 | +80 | -25 -5 +5 | Renolin Unisyn CLP 220 | +80 | -20 0 +10 | HighGear Synth 220 | +75 | -25 -5 0 | SHC 630 | +85 | -25 -10 +5 | Klübersynth GEM 4-220 N | +85 | -25 -5 +5 | Omala S4 GX 220 | +85 | -25 -5 +5 | Pinnacle EP 220 | +80 | -25 -5 +5 | Carter SH 220 | +80 |
| | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | |
| | VG 320 | -20 0 +10 | Alphasyn EP 320 | +90 | -20 0 +10 | Renolin Unisyn CLP 320 | +90 | -15 0 +15 | HighGear Synth 320 | +85 | -20 -5 +10 | SHC 632 | +95 | -20 0 +15 | Klübersynth GEM 4-320 N | +95 | -20 0 +10 | Omala S4 GX 320 | +95 | -20 0 +10 | Pinnacle EP 320 | +90 | -20 0 +10 | Carter SH 320 | +90 |
| | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | |
| | VG 460 | -15 +5 +15 | Alphasyn EP 460 | +100 | -15 +5 +15 | Renolin Unisyn CLP 460 | +100 | -10 +5 +20 | HighGear Synth 460 | +95 | -15 +5 +15 | SHC 634 | +105 | -20 0 +15 | Klübersynth GEM 4-460 N | +110 | -15 +5 +20 | Omala S4 GX 460 | +105 | -15 +5 +15 | Pinnacle EP 460 | +100 | -15 +5 +15 | Carter SH 460 | +100 |
| | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | |
| | VG 680 | -10 +10 +25 | Optigear Synthetic X 460 | +110 | -10 +10 +25 | Renolin Unisyn CLP 460 | +110 | -5 +10 +25 | HighGear Synth 460 | +110 | -10 +10 +25 | SHC 636 | +110 | -15 +10 +25 | Klübersynth GEM 4-460 N | +110 | -10 +10 +25 | Omala S4 GX 460 | +110 | -10 +10 +25 | Pinnacle EP 460 | +110 | -10 +10 +25 | Carter SH 460 | +110 |
| | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | |
| | | -10 +10 +25 | Optigear Synthetic X 680 | +110 | -10 +10 +25 | Renolin Unisyn CLP 680 | +110 | -5 +10 +25 | HighGear Synth 680 | +110 | -10 +10 +25 | SHC 636 | +110 | -15 +10 +25 | Klübersynth GEM 4-680 N | +110 | -10 +10 +25 | Omala S4 GX 680 | +110 | -10 +10 +25 | Pinnacle EP 460 | +110 | -10 +10 +25 | Carter SH 680 | +110 |
| | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | | S0 | | |
| | VG 1000 | | | | | | | -10 +15 +30 | SHC 639 | +110 | -10 +15 +30 | SHC Gear 1000 | +110 | 0 +20 +30 | Klübersynth EG4-1000 | +110 | | | | | | |
| | | | | | | | | S0 | | | S0 | | | S0 | | | | | | | | |

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| DIN (ISO) API | ISO,SAE NLGI | bremer & leguil | Castrol | FUCHS | KLÜBER LUBRICATION |
|---|---|---|---|---|---|
| CLP HC NSF H1 | VG 68 [1] | Cassida Fluid HF 68 S0 -35 -20 -10 +45 | Optileb HY 68 S0 -40 -25 -15 +45 | | Klüberoil 4UH1-68 N S0 -35 -20 -10 +45 |
| | | Cassida Fluid HF 68 S0 -20 -5 +5 +75 | Optileb HY 68 S0 -25 -5 +5 +75 | | Klüberoil 4UH1-68 N S0 -25 -5 +5 +75 |
| | VG 220 [1] | Cassida Fluid GL 220 S0 -15 +5 +20 +90 | Optileb GT 220 S0 -15 +5 +20 +95 | | Klüberoil 4UH1-220 N S0 -15 +5 +15 +95 |
| | VG 460 [1] | Cassida Fluid GL 460 S0 -15 +5 +20 +90 | Optileb GT 460 S0 -15 +5 +20 +95 | | Klüberoil 4UH1-460 N S0 -15 +5 +15 +95 |
| E | VG 460 | | | Plantogear 460 S S0 -15 +5 +15 +95 | Klüberbio CA2-460 S0 -15 +5 +15 +95 |

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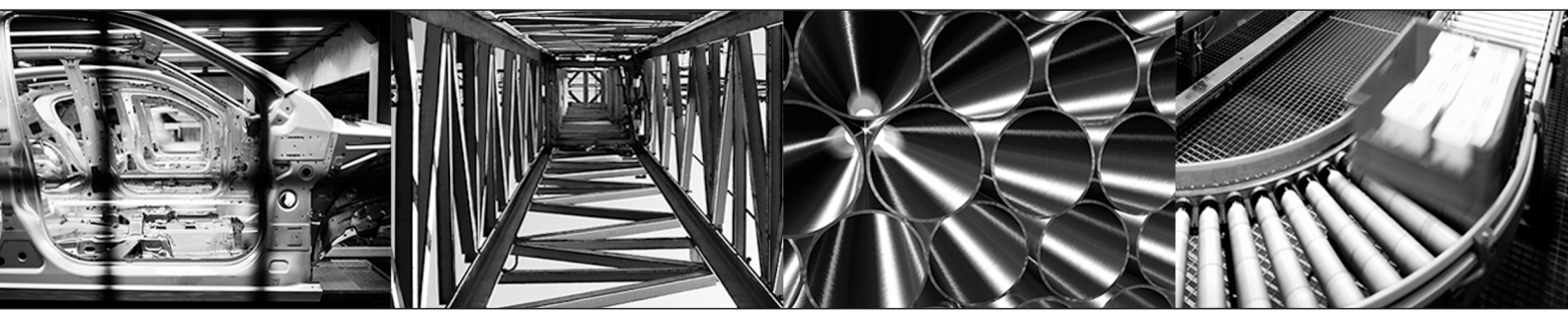

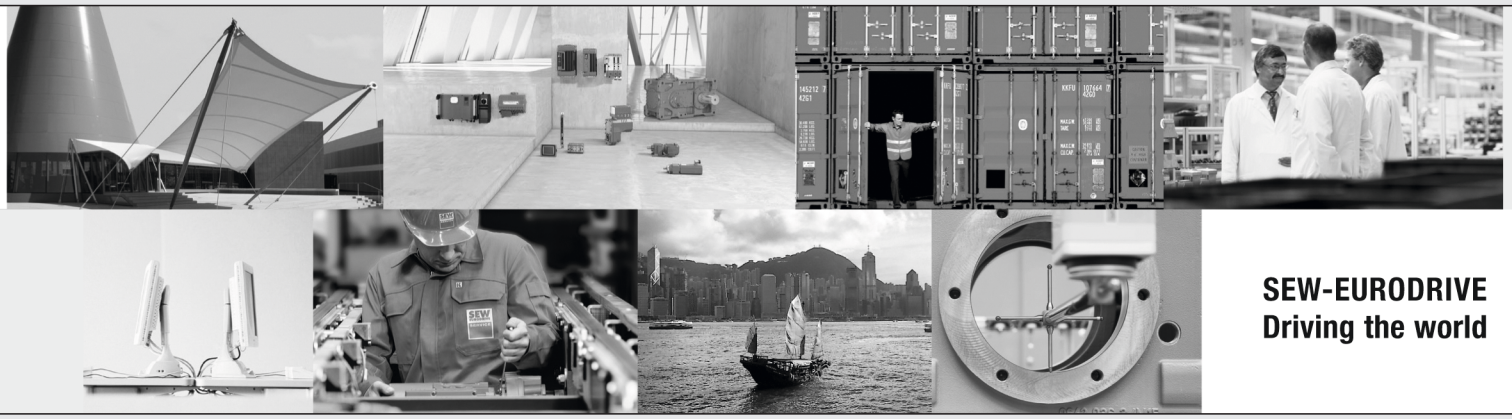

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