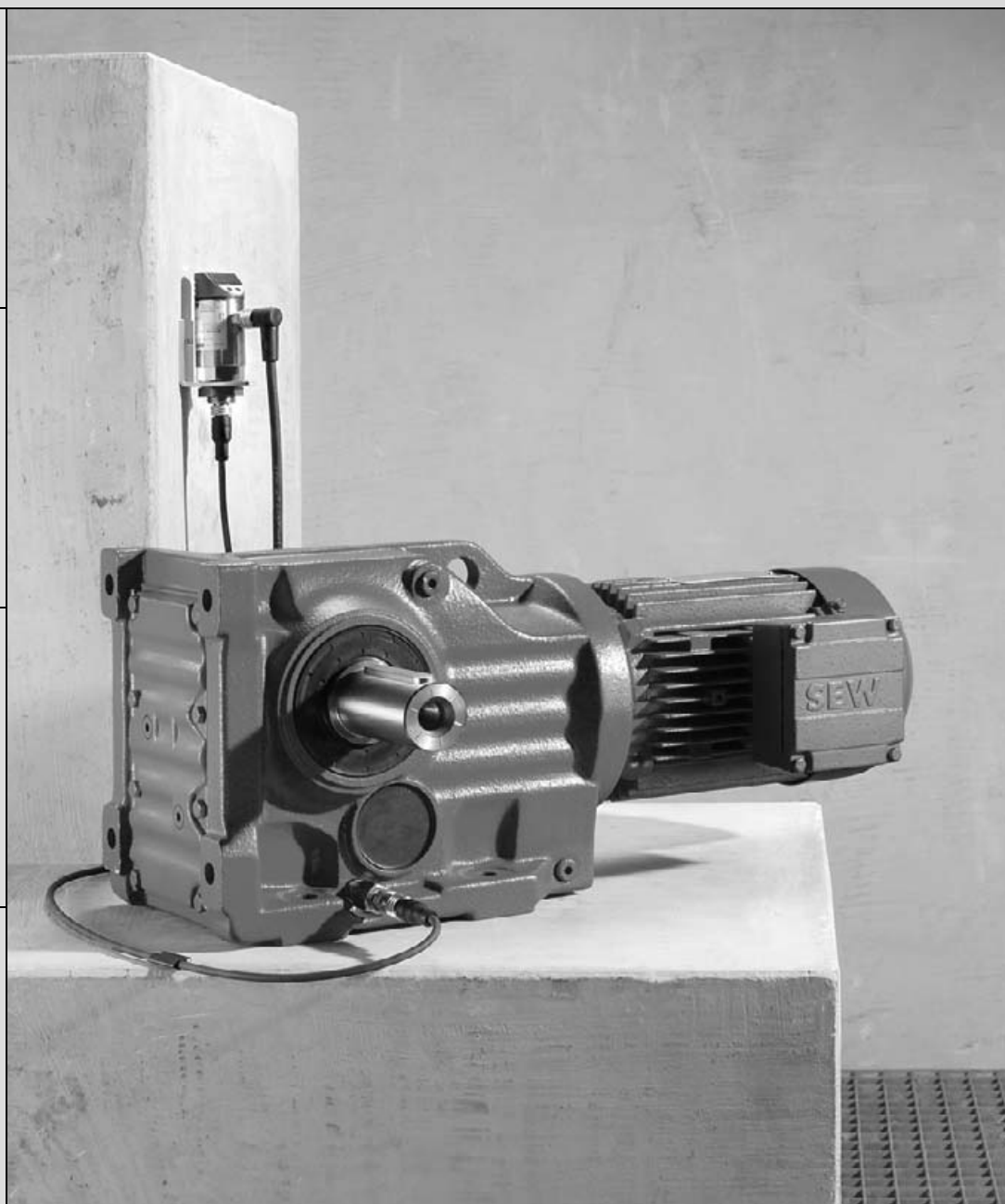
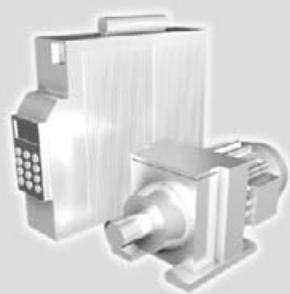




SEW
EURODRIVE



DUO10A Diagnostic Unit

Edition 10/2006

11473428 / EN

Manual





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1 Important Notes

1.1 Explanation of symbols

Always observe the safety and warning information in this documentation.



Electrical hazard

Possible consequences: Severe or fatal injuries.



Hazard

Possible consequences: Severe or fatal injuries.



Hazardous situation

Possible consequences: Slight or minor injuries.



Harmful situation

Possible consequences: Damage to the unit and the environment.



Note

Tips and useful information.



Documentation reference

Indicates a reference to a document, such as operating instructions, catalog or a data sheet.

1.2 Integral part of the product

This manual is an integral part of the DUO10A diagnostic unit and contains important notes on operation and service. It is intended for all persons who perform assembly, installation, startup and service work on the DUO10A diagnostic unit.



1.3 Designated use

The term designated use refers to the procedure specified in the manual.

The DUO10A diagnostic unit is designed for use in industrial and commercial systems. If you intend to use the DUO10A diagnostic unit in applications other than those in industrial and commercial systems, it is essential that you contact SEW-EURODRIVE first.

In compliance with the EC Machinery Directive 98/37/EC, the DUO10A diagnostic unit is a component designed for installation in machinery and systems. In line with the EC Directive, you must not take the unit into operation in the designated fashion until you have established that the end product complies with the Machinery Directive 98/37/EC.

1.4 Qualified personnel

The DUO10A diagnostic unit represents a potential hazard for persons and property. Consequently, assembly, installation, startup and service work may only be performed by trained personnel who are aware of the potential hazards.

Employees must be appropriately qualified for the task in hand and must be familiar with the assembly, installation, startup and operation of the product. The personnel must read the manual, in particular the safety notes section, carefully and ensure that they understand and comply with them.

1.5 Liability for defects

Incorrect handling or any action performed that is not specified in this manual could impair the properties of the product. In this case, you lose any right to claim under limited warranty against SEW-EURODRIVE GmbH & Co KG.

1.6 Product names and trademarks

The brands and product names in this manual are trademarks or registered trademarks of the titleholders.

1.7 Waste disposal



Please follow the current national regulations.

Dispose of the individual materials separately in accordance with the country-specific regulations in force.



2 Safety Notes

2.1 Preliminary information

The following safety notes apply to the DUO10A diagnostic unit.



Please also observe the supplementary safety notes in the individual sections of this manual.



Danger of burns during installation on drives!

Touching the drive when it has not cooled down will result in burns.

Only install the DUO10A diagnostic unit once the drive has cooled down after disconnection.

2.2 General information



Never install damaged products or take them into operation.

Submit a complaint to the shipping company immediately in the event of damage.

Only qualified personnel may carry out the following work:

- Putting into storage
- Installation/assembly
- Connection
- Startup
- Maintenance
- Servicing

The following information and documents must be observed during these processes:

- Relevant operating instructions and wiring diagrams
- Warning and safety signs on the unit
- System-specific regulations and requirements
- National/regional regulations governing safety and the prevention of accidents



Damage to property may result from:

- Improper use
- Incorrect installation or operation
- Unauthorized removal of necessary protection covers or housing

**Safety Notes**Transportation / putting into storage

2.3 Transportation / putting into storage

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately. Do not operate the DUO10A diagnostic unit if it is damaged.

**Possible damage caused by incorrect storage!**

Store the diagnostic unit in a dry, dust-free room if it is not to be installed straight away.

2.4 Installation / startup

See the information in section 5, "Installation and Startup."

2.5 Inspection and maintenance

See the information in section 6, "Operation and Service."

3 Product Description

3.1 Hardware

DUO10A comprises a diagnostic unit and a temperature sensor. The temperature sensor (PT100 or PT1000 resistance sensor) is positioned in the gear unit oil to record the oil's temperature. The diagnostic unit uses the oil temperature values to calculate the remaining service life of the oil.

3.2 Continuous monitoring

The DUO10A diagnostic unit has been developed to enable engineers to plan dates for changing the oil in good time. It records the gear unit temperature continuously and calculates the remaining service life for the selected oil type immediately. For this purpose, the diagnostic unit must be supplied with a 24 V voltage supply. Times when the diagnostic unit is switched off are not included in the forecast.

3.3 Theory of operation

The DUO10A diagnostic unit uses a resistance temperature sensor (PT100 or PT1000) located in the gear unit oil to measure the oil temperature. The unit saves 1 temperature value a minute and determines the values over 15 minutes. It uses the mean value and a stored oil aging curve (oil service life over mean oil temperature) to calculate the remaining service life of the oil. The remaining service life in days is shown in the display of the diagnostic unit. The value shown is a forecast value for the average operating conditions (cyclic duration factor, oil temperature, etc.) since the last oil change. If the operating conditions change after an extended operating period, the display value can fluctuate more widely even after a longer period of time. The current oil temperature can continue to be displayed on the unit.

Users can choose from between 5 oil types when setting the parameters for the unit. In agreement with SEW-EURODRIVE, settings for another customer-specific oil type can be programmed. In addition to the display values, the evaluation unit also has an early warning system in the form of a binary signal, which is triggered when the remaining service life sinks below a preset value. When the oil service life is exceeded, a second binary signal is triggered. Two additional switching signals are used to indicate that the maximum preset oil temperature has been exceeded and to signal whether the complete system is ready for operation. These 4 switching outputs are used to visualize the diagnostic values externally. The status of the switching outputs is also displayed using the LEDs on the diagnostic unit.



4 Delivery Scope and Unit Design

4.1 Scope of delivery

Scope of delivery of the DUO10A diagnostic unit

- 1 manual per order

4.2 Types and options

DUO10A diagnostic unit		
Product no.	Meaning	Designation
13438751	Oil aging analysis unit	DUO10A

4.2.1 Options for the DUO10A diagnostic unit

Product no.	Meaning	Designation
13438778	Cable with 1 connector, PUR, length 5 m	DUO10A-PUR-M12-5m
13438786	Cable with 1 connector, PVC, length 5 m	DUO10A-PVC-M12-5m
13438794	Installation clamp	DUO10A D=34
13438808	Angle bracket	DUO10A
13438816	Temperature sensor PT1000	W4843 PT1000
13438824	Cable, PUR ¹⁾ , length 2 m for W4843 PT1000	W4843 4x0, 34-2m-PUR M12F-M12M
13438832	Cable, PVC ²⁾ , length 2 m for W4843 PT1000	W4843 4x0, 34-2m-PVC M12F-M12M
02894629	Temperature sensor PT100	W4843 PT100
13438840	Cable, PUR ¹⁾ , length 5 m for W4843 PT100	W4843 4x0, 34-5m-PUR M12F-M12M
13438859	Cable, PVC ²⁾ , length 5 m for W4843 PT100	W4843 4x0, 34-5m-PVC M12F-M12M
13439022	Protection cap	DUO10A

1) PUR cables are particularly suited to use in environments containing oil.

2) PVC cables are particularly suited to use in environments containing water and chemicals, e.g. in the food industry.

4.2.2 Adapter for installing the PT1000 temperature sensor in screw plug bores

**Adapter for
installation in
standard gear
units (R, F, K, S)**

Product no.	Meaning
13439030	Complete adapter M10 x 1 DUO10A
13439049	Complete adapter M12 x 1.5 DUO10A
13439057	Complete adapter M22 x 1.5 DUO10A
13439063	Complete adapter M33 x 2 DUO10A
13439073	Complete adapter M42 x 2 DUO10A



4.2.3 Base for mounting the diagnostic unit on the gear unit using angle brackets

**Adapter for
mounting on
standard gear
units (R, F, K, S)**

Product no.	Meaning
13434411	Mounting base with sealing ring M10 x 1
13438271	Mounting base with sealing ring M12 x 1.5
13438298	Mounting base with sealing ring M22 x 1.5
13438301	Mounting base with sealing ring M33 x 2
13438328	Mounting base with sealing ring M42 x 2

**Base for mount-
ing on industrial
gear units**

Product no.	Meaning
13438336	Mounting base with sealing ring G3/4
13438344	Mounting base with sealing ring G1
13438352	Mounting base with sealing ring G1 1/4
13438360	Mounting base with sealing ring G1 1/2



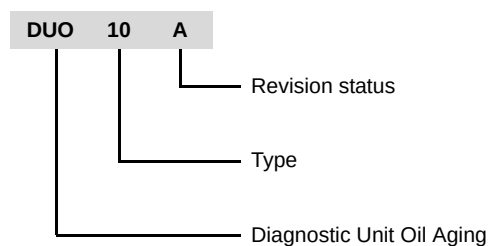
4.3 Nameplate and unit designation

4.3.1 DUO10A diagnostic unit nameplate



Figure 1: Illustration of the DUO10A diagnostic unit

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4.3.2 Nameplate

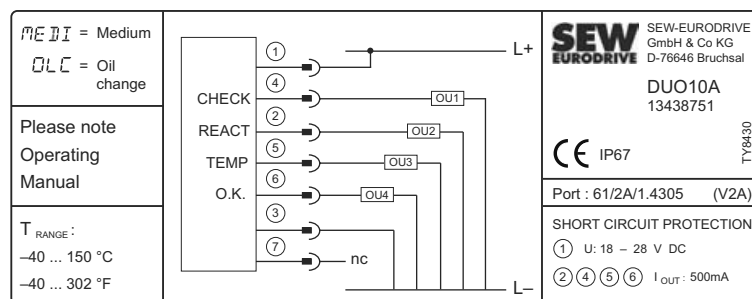
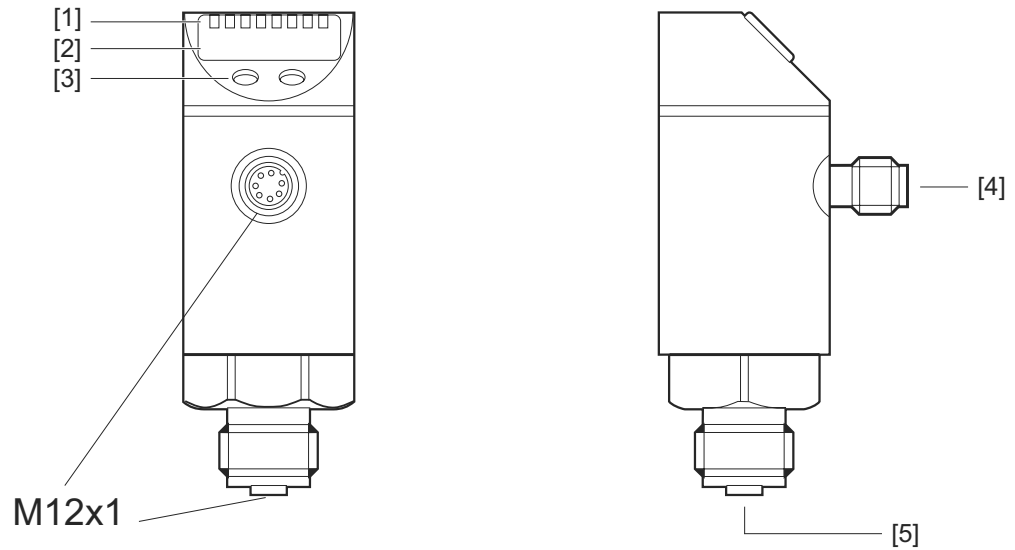


Figure 2: Nameplate

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4.4 Design of the DUO10A diagnostic unit



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Figure 3: Design of the DUO10A diagnostic unit

- [1] LEDs
- [2] 4-digit alphanumeric display
- [3] Configuration keys
- [4] Plug connector for supply cable (24 V and switching outputs)
- [5] Plug connector for temperature sensor



5 Installation and Startup

5.1 Overview of the system

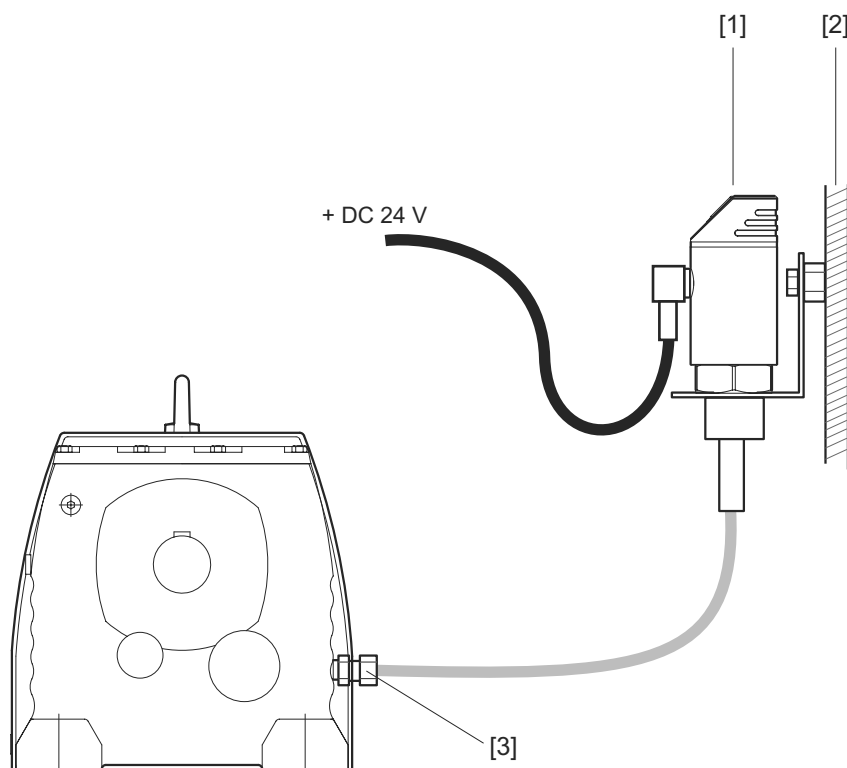


Figure 4: DUO10A system overview

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- [1] Diagnostic unit
- [2] Wall / control cabinet
- [3] Temperature sensor

5.2 Before you begin



The diagnostic unit may only be installed if:

- the data on the nameplate of the diagnostic unit matches the voltage supply system data
- the diagnostic unit is undamaged (no damage caused by shipping or storage)



5.2.1 Prerequisites for installation and startup



Ensure that the following requirements have been met:

- Ambient temperature must be between $-25\text{ }^{\circ}\text{C}$ and $+70\text{ }^{\circ}\text{C}$. Please contact SEW-EURODRIVE if the ambient temperatures are higher or lower.

Under normal operating conditions, the DUO10A diagnostic unit can be mounted on the gear unit using a bracket and base (see sections 4.2.1 and 4.2.3). When the temperature of the gear unit oil and/or the operating conditions is high, do not mount the diagnostic unit directly on the gear unit.



It is best to install the temperature sensor in a gear unit that has not yet been filled with oil. If the gear unit has already been filled with oil, angle the gear unit in such a way that you do not lose any gear unit oil when installing the temperature sensor.

5.2.2 Required tools

- Set of wrenches
- Cleaning equipment in case oil leaks out of the gear unit during the installation of the temperature sensor.



5.3 Installation and startup procedure



Read the safety notes and section 5.2.1 carefully before starting the installation.

5.3.1 Installing temperature sensor PT1000 / PT100



The temperature sensors are screwed into a screw plug bore of the gear unit.

Ensure that the following prerequisites are met during installation:

- Do not change the position of the breather valves.
- Ideally, install the temperature sensor when the gear unit has not been filled with oil.

Installation in standard gear units (R, F, K, S)

You need the following parts:

- Temperature sensor PT1000
- Adapter screw with clamping ring and coupling ring

Procedure

- Screw the coupling ring loosely over the adapter screw up to the stop.
- Insert the temperature sensor into the adapter screw up to the stop.
- Connect both parts by tightening the coupling ring (SW17).
- Remove one of the screw plugs from the gear unit.

The screw-in positions for the different mounting positions of the standard gear units are listed in section 10. For installation on small sizes, such as units smaller than R67, please contact SEW-EURODRIVE.

- Screw the adapter screw into the gear unit. **When installing the screw in positions other than those listed in section 10, make sure that the temperature sensor does not touch any moving parts inside the gear unit.**

Assembly in industrial gear units

You need the following parts:

- Temperature sensor PT100
- Possibly reducing adapter to G1/2 (not included in scope of delivery)

Procedure

- Remove one of the screw plugs from the gear unit.
- Screw the temperature sensor into the gear unit. **Make sure that the temperature sensor does not touch any moving parts inside the gear unit.**



5.3.2 Installing the DUO10A diagnostic unit



Ensure that the following prerequisites are met during installation:

- The DUO10A diagnostic unit must always be freely accessible.
- The LEDs must always be visible.

Installation on a gear unit

You need the following parts:

- Bracket with nut
- Sensor base
- M5 screw (not included in scope of delivery)

Procedure

- Remove a screw plug from the gear unit at the position you want to install the diagnostic unit. Take the oil level in the gear unit into account.
- Screw the sensor base into the screw plug bore.
- Use a tightening torque of 7 Nm to attach the bracket to the sensor base using an M5 screw.
- Feed the diagnostic unit through the opening in the bracket and screw it in place using the nut provided.

Free choice of installation

We offer the following parts:

- Bracket with nut
- Installation clamp for C profile

Procedure

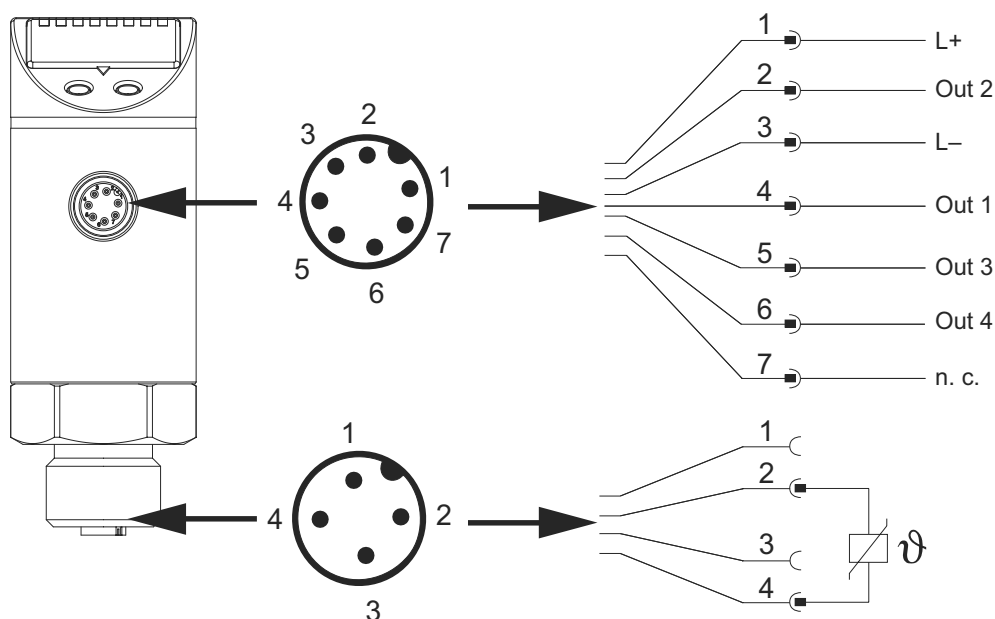
- You can attach the diagnostic unit in a position of your choice using the installation material provided.
- There are a number of different holes for M5 on the bracket which you can use to attach the bracket.
- The Installation clamp for the C profile (slot width 11 mm) is suitable for installing the diagnostic unit in a control cabinet.



5.3.3 Electrical connection



- The unit may only be installed by a qualified electrician.
- Observe the national and international guidelines on setting up electrical systems.
- Voltage supply to EN 50178, SELV, PELV.
- With regards to UL: For operation in a low-voltage circuit with overcurrent protection in accordance with UL873 Tab. 28.1 or $I_{max} = 100/U_b$ (U_b = voltage of the circuit).
- Disconnect the system before connecting the diagnostic unit.
- The outputs are short-circuit proof.
- Make sure the cables are routed safely.
- The diagnostic unit needs a continuous voltage supply of DC 18 ... 28 V.



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Wiring diagram

Connector on DUO10A	Pin	Assignment	Color coding for cables 13438778 and 13438786
	1	L+	Brown
	2	Out 2 (REACT)	White
	3	L-	Blue
	4	Out 1 (CHECK)	Black
	5	Out 3 (TEMP)	Gray
	6	Out 4 (OK)	Pink
	7	Not assigned (n. c.)	Violet



5.3.4 Starting up DUO10A

After connecting the voltage supply and establishing a connection between the diagnostic unit and the temperature sensor, the diagnostic unit displays the value *0 days*.

Configure the diagnostic unit in accordance with sections 7 and 8. After a reset using the unit function OLC, the evaluation unit shows *1095 days* as the initial value of the remaining service life. The value displayed is updated automatically once a day. During the first week, the display value may lower considerably.

If the measured oil temperature fluctuates strongly during operation (intermittent operation, cyclic duration factor $\ll 100\%$), the display value may also fluctuate and show a higher value temporarily.



5.3.5 Increasing the enclosure of the diagnostic unit

A protection cap (part number: 13439022) increases the enclosure of the diagnostic unit from IP67 to IP69K when the unit is installed correctly and a permitted cable is used.

The DUO10A diagnostic unit was tested for IP69K capability in conjunction with the permitted cable in accordance with DIN 40050 part 9. This test simulated high-pressure cleaning in an application. The test object was subjected to a water jet (14 ... 16 l/min, 80 ... 100 bar, 80 °C) for 30 seconds at a time from a number of different angles and at a distance of 10 to 15 cm. This test does not include the permanent effect of high-pressure cleansing and chemicals.

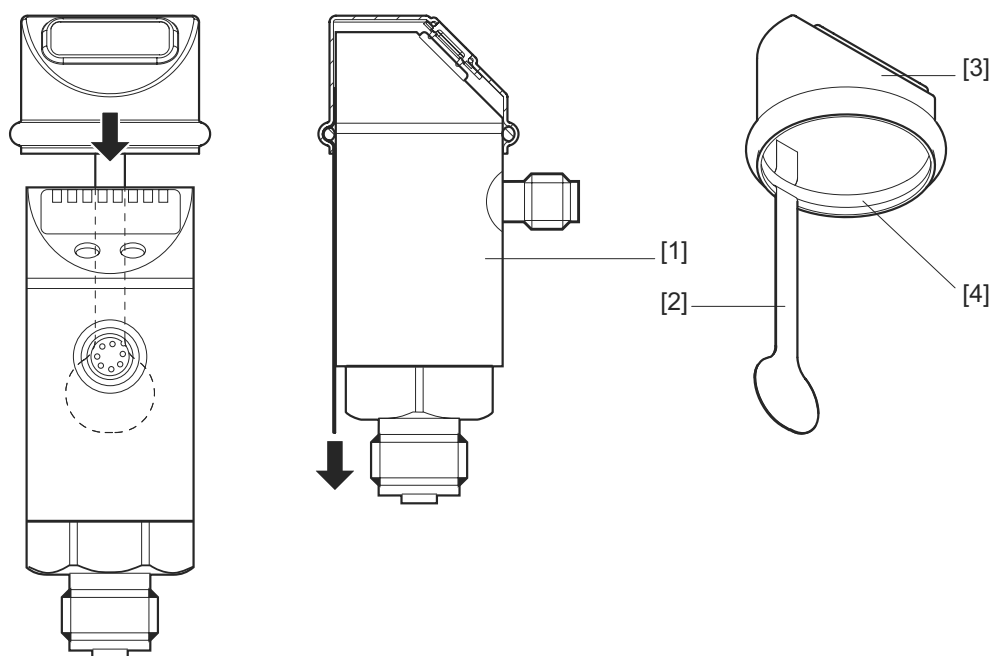


Figure 5: Protection cap

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- [1] Nameplate
- [2] Ventilation tape
- [3] Protection cap
- [4] O-ring



Set the sensor parameters before installing the protection cap. Once the cap is installed, you can no longer access the configuration keys.



Installing the protection cap

- Make sure that the inside of the protection cap and diagnostic unit are clean.
- Grease the O-ring with the lubrication paste provided.
- Push the protection cap onto the head of the diagnostic unit. While doing so, turn it so that the display of the diagnostic unit is visible.



Do not push the protection cap over the nameplate of the diagnostic unit as this impairs the sealing properties. If necessary, move the nameplate.

- Remove the ventilation tape to ensure the seal functions properly.
- Tighten the connector of the cable with a tightening torque of 0.7 ... 0.9 Nm.

***Removal /
reinstallation of
the protection
cap***

- Turn the cap carefully and pull it off.
- Before reinstalling the cap, insert the ventilation tape (between the O-ring and the wall of the protection cap). Use either the original tape or a stable plastic tape with a max. thickness of 0.4 mm.



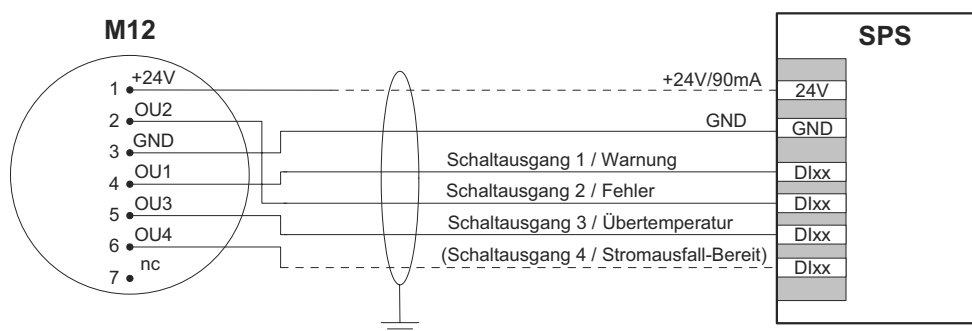
5.4 Evaluating the switching outputs

The switching outputs can be evaluated using:

- A controller
- A frequency inverter
- Decentralized technology

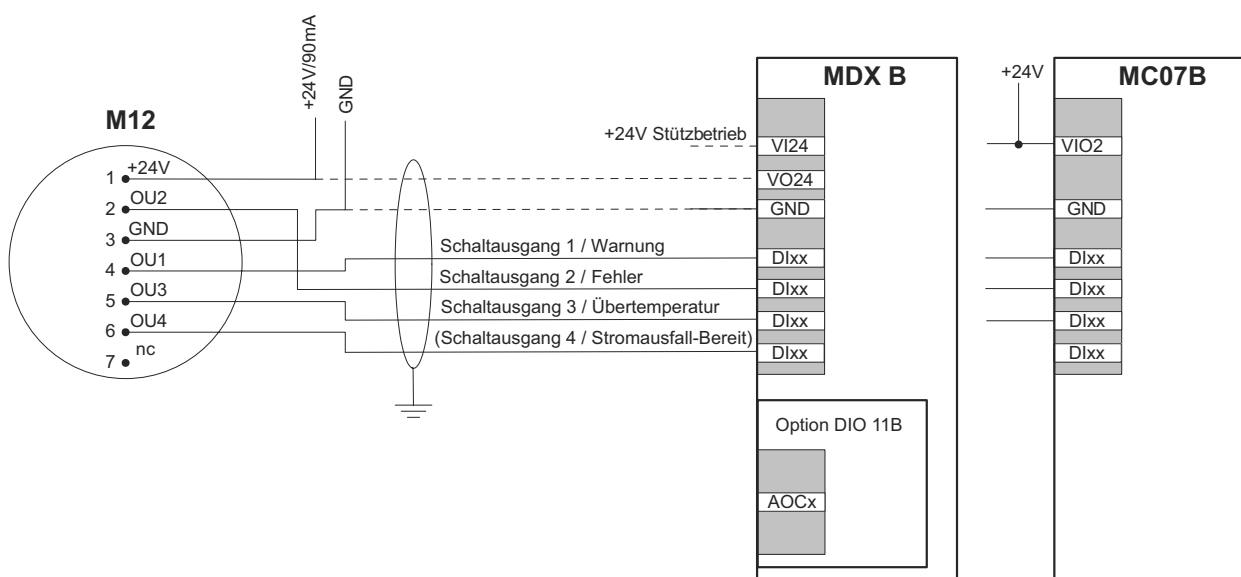
To eliminate system-related interference, only malfunctions lasting longer than 10 seconds ought to lead to a follow-on response.

5.4.1 Evaluation using a controller



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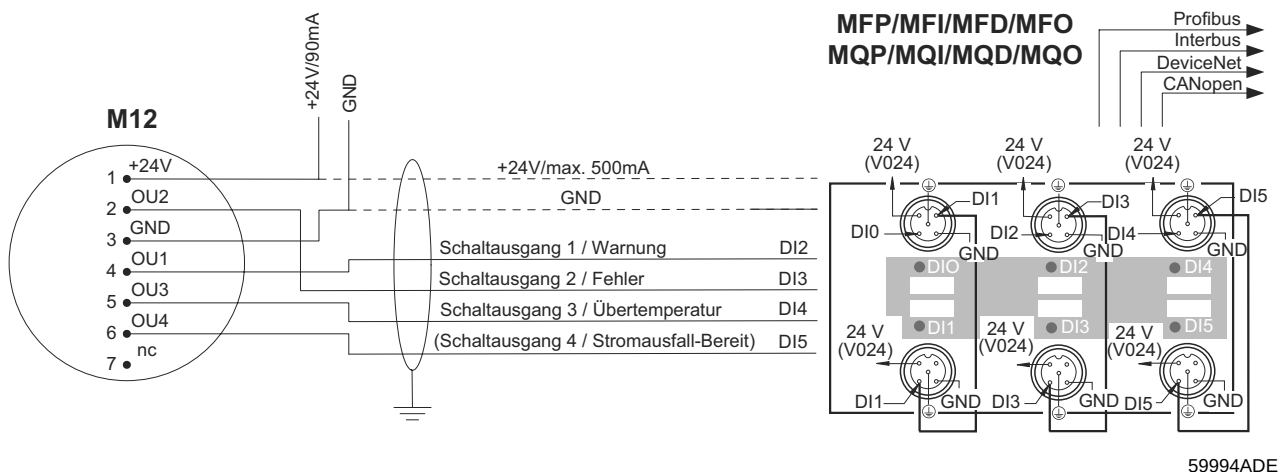
5.4.2 Evaluation using a frequency inverter



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5.4.3 Evaluation using decentralized technology



5.5 Function test

Once installation and startup have been completed, test the function of the switching outputs. On delivery, the switching outputs are assigned as normally-closed contacts as follows:

- OU1 (CHECK):Hno
- OU2 (REACT):Hno
- OU3 (TEMP):Hnc
- OU4 (ok):cannot be adjusted

All 4 LEDs for the status signal of the switching outputs light up, that is, the switching outputs are closed. Change the switching outputs OU1-3 to Hnc or Hno and remove the cable of the temperature sensor. The LEDs on the diagnostic unit should now be off and the switching outputs open.



6 Operation and Service

6.1 Settings

6.1.1 Unit of temperature

You can change the unit of temperature from °C (SI) to °F in the unit functions [Mode/Enter] / [Uni].

6.1.2 Program settings

You can rotate the display by 180° for overhead mounting in [Mode/Enter] / [dis]. Here, you can also switch off the display.

6.2 Operating modes

6.2.1 Run mode

Run mode is the standard working mode.

Once the voltage supply has been switched on, the unit is in run mode. The unit performs its monitoring function and switches the transistor outputs according to the parameters set.

The display shows the oil's remaining service life that is currently forecast. The yellow LEDs indicate the switching status of the outputs, and the green LEDs show the set display unit in days (d).

6.2.2 Display mode

Display mode shows the parameters and the parameter values set.

Switch the unit to display mode by pressing the <Mode/Enter> key briefly. Internally, the system remains in working mode. The set parameter values and the values of the min./max. memory can be read out regardless of this factor:

- Press the <Mode/Enter> key briefly to browse the parameters.
- Press the <Set> key briefly to show the corresponding parameter value for approximately 15 seconds. After another 15 s the unit returns to run mode.

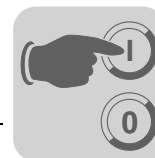
6.2.3 Programming mode: Setting parameter values

To switch the unit to programming mode select a parameter and press the <Set> key for longer than 5 s (the parameter value flashes, then increases in steps). In this case too, the unit remains in working mode. It continues to monitor the device using the current parameters until the change is completed.

Use the <Set> key to change the parameter value, and the <Mode/Enter> key to confirm your selection. The unit returns to run mode if no other key is pressed for 15 seconds.

6.3 Operation

6.3.1 Displaying the remaining service life and the oil temperature



When the unit is operating, you can read off the forecast remaining service life in days from the display. The unit of the display is represented by the 3 green LEDs on the 7 segment display. Press the <Set> key to display the current oil temperature for 15 seconds. The display switches back automatically to the remaining service life.

6.3.2 Error messages

The following error messages can occur during operation:

Error message	Description
OL	Measuring range exceeded
UL	Value below the measuring range
SC1	Flashing: Short circuit in switching output 1
SC2	Flashing: Short circuit in switching output 2
SC3	Flashing: Short circuit in switching output 3
SC4	Flashing: Short circuit in switching output 4
Err	Flashing: No sensor element connected; error or short circuit in the sensor element

The short-circuited outputs are switched off.

When an error or short circuit occurs in the sensor element, the outputs switch ON or OFF depending on the setting in parameter FOUx.

6.4 Maintenance

If used as specified in the catalog, the DUO10A diagnostic unit does not require any maintenance.

6.5 Customer service

Please have the following information to hand if you require the assistance of our customer service:

- Nameplate data (complete)
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause



6.6 *Faults / repairs*

If the DUO10A diagnostic unit does not work properly, please contact the SEW-EURO-DRIVE service team.



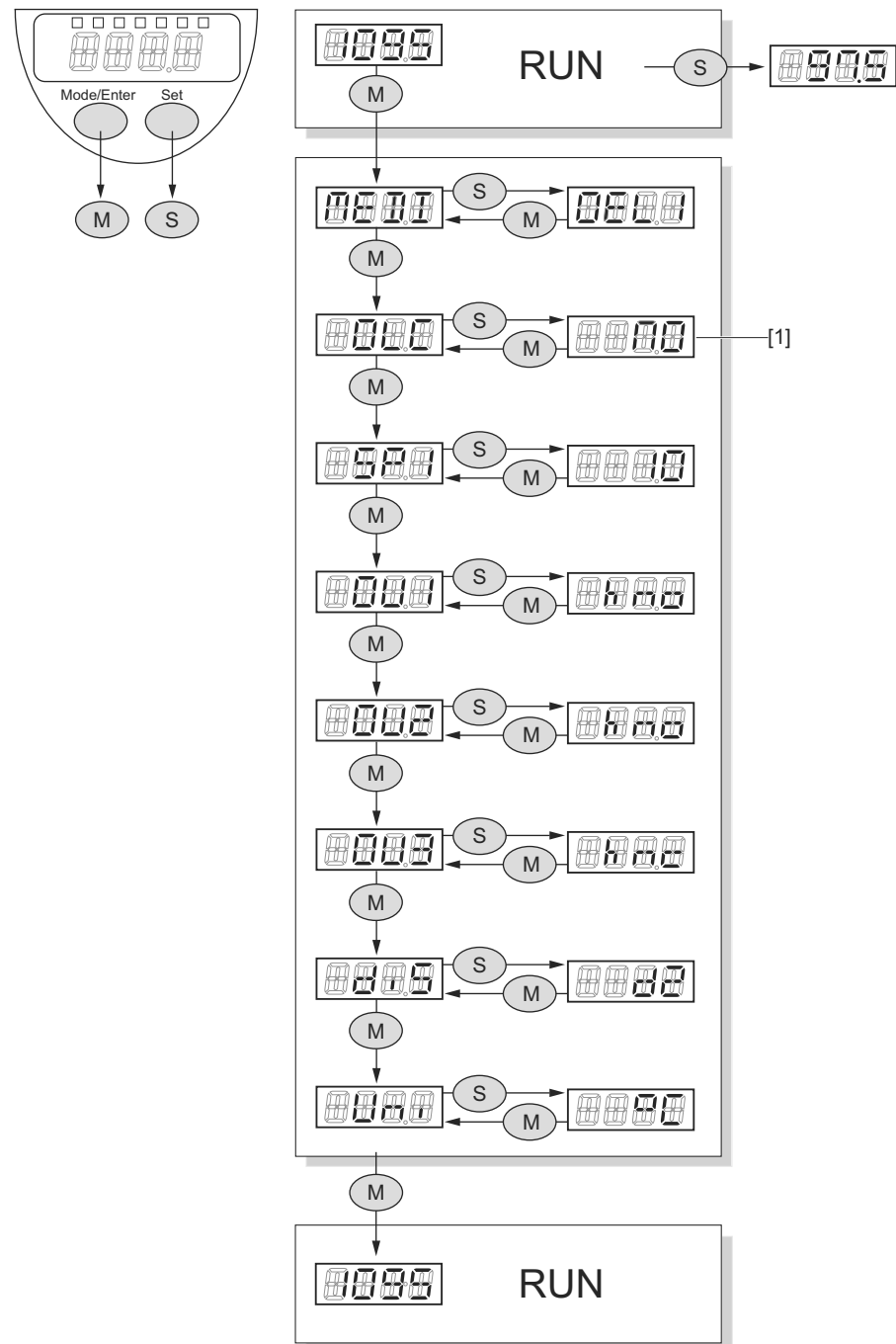
If you have to send in the diagnostic unit to SEW-EURODRIVE, please include the following information:

- Serial number (fi nameplate)
- Unit designation
- Brief application description, incl. drive designation
- Nature of the error
- Accompanying circumstances
- Your own presumptions as to what has happened
- Unusual events preceding the problem



7 Unit Functions

7.1 Overview of the menu



[1] Held down briefly = no
Held down for 5 s = yes

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7.2 Sensor functions and parameters

7.2.1 Main menu

Menu item	Description	Function	Options / Default
MEDI	Characteristics for oils are preset and cannot be changed	See table in section "MEDI".	Options: OIL1 OIL2 OIL3 OIL4 OIL5
OLC	First use or oil changed	Reset remaining service life to OLF1	yes/no
SP1	Setpoint 1 Setpoint 1	Early warning in days	Range: 2 ... 100 Default: 10
OU1	Output configuration Output configuration	- Switching logic - NC contact, NO contact as switching function - Early warning	Default: NC contact hno
OU2	Output configuration Output configuration	- Switching logic - NC contact, NO contact as switching function - Main alarm	Default: NC contact hno
OU3	Output configuration Output configuration	- Switching logic - NC contact, NO contact as switching function - Temperature exceeded for selected oil type	Default: NC contact hnc
dis	Display setting Display setting	Rotate display for overhead installation	Default: d2
Uni	Unit Unit	Setting the temperature unit	°C or °F Default: Both can be selected
EF	Not assigned		

Menu "MEDI" (Medium)

Set the oil type that the gear unit is either filled with or is to be filled with. Only the oil type is important here, not the viscosity or the manufacturer. You can set parameters for the following oil types:

Oil type	Designation	Temperature limit
Mineral oil CLP/Bio oil	OIL1	100 °C
Synthetic oil CLPHC/CLPPAO	OIL2	130 °C
Poly glycol oil CLPPG	OIL3	130 °C
Food grade oil	OIL4	100 °C
Customer-specific ¹⁾	OIL5	Default = OIL1

1) Entered by SEW-EURODRIVE on request.

Changes made in the "MEDI" menu only take effect when you perform a reset using the menu item "OLC". The reset must take place within an hour, otherwise the diagnostic unit will continue to use the values set previously.



Menu "OLC" (Oil Change)	After changing the oil or using the oil for the first time, set the diagnostic unit back to the maximum service life. To do so, activate the option "Yes" and confirm your selection by pressing the <Mode/Enter> key.
Menu "SP1" (Setpoint1)	Enter how many days before the forecast oil change the signal of switching output OU1 = CHECK should be set.
Menu OU1 (Output1 = CHECK)	Switching output 1 is the early warning, which supplies a switching signal SP1 days before the forecast oil change. Configure the switching logic here. • NC contact: hno • NO contact: hnc
Menu OU2 (Output = REACT)	Switching output 2 is the main alarm that switches automatically as soon as the forecast remaining service life reaches the value 0 days. Configure the switching logic here. • NC contact: hno • NO contact: hnc
Menu OU3 (Output = TEMP)	Switching output 3 indicates when the oil temperature exceeds the specified temperature limits (see table in the section "MEDI"). The set limit values indicate that the permitted operating temperature has been exceeded quite considerably. Configure the switching logic here. • NC contact: hnc • NO contact: hno
Menu "dis" (Display)	When installing the unit overhead or in other mounting positions, you can rotate the display by 180° or switch it off completely. • Default: d2 • Display rotated: rd2 • Display off: OFF
Menu "Uni" (Unit)	You can switch the unit of temperature between °C and °F.
Menu "EF" (Extended functions)	Not assigned.



7.3 LED code

These illustrations are based on the factory setting.

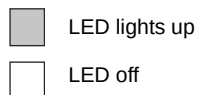
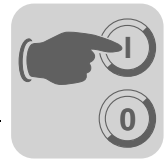


Illustration	Meaning
	- Voltage applied. - RUN mode - All switching outputs configured as NC contacts and OK.
	Current temperature in °C.
	- RUN mode - Maximum oil temperature exceeded.
	- Early warning has triggered. - The oil will have to be changed soon.
	- Main alarm has triggered. - Oil must be changed now.
	Error message: Break in the cable or error in the diagnostic unit.
	Error message: Error in temperature sensor.



8 Programming

1		Press the <Mode/Enter> key until the parameter you require is displayed on the screen.
2		Press and hold down the <Set> key. The current parameter value is displayed for 5 s, then it is increased. You can increase the value in steps by pressing the key once or hold it down to increase the value continuously. To lower the value, let the value run to the maximum value. It then starts from the minimum value again.
3		Press the <Mode/Enter> key briefly to confirm the parameter value you have set.
4	Change additional parameters: Start the procedure again with step 1.	End programming: Wait for 15 s or press the <Mode/Enter> key until the current measuring value is displayed again.



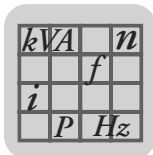
While you are making the settings, if you do not press a key for a period of 15 s, the unit returns to run mode and any changes you have made do not take effect.

Changes made in the "MEDI" menu item only takes effect after an oil reset OLC is performed.

8.1 Locking / unlocking

The unit can be locked electronically to prevent a user from making incorrect entries unintentionally. In run mode, hold down both programming keys for 10 s. The locked is locked or unlocked as soon as the display goes out.

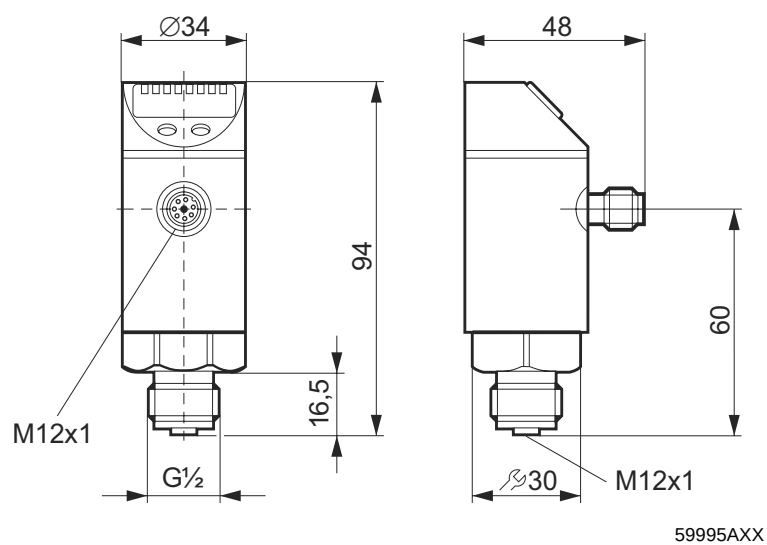
When the unit is locked, "Loc" appears in the display if you try to change parameter values.

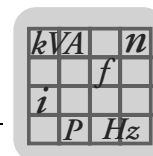


9 Technical Data

9.1 DUO10A diagnostic unit

9.1.1 Dimension drawing for the DUO10A diagnostic unit



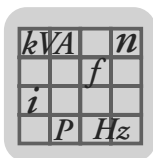


9.1.2 Technical data for the DUO10A diagnostic unit

Technical data	Value
Electrical version	DC PNP
Output function	3 x programmable NC/NO contacts 1 x NC contact (diagnostic output)
Operating voltage	DC 18 ... 28 V ¹⁾
Current carrying capacity for each output	< 500 mA ²⁾
Short circuit protection	Clocked
Reverse polarity protection	Yes
Overload protected	Yes
Watchdog integrated	Yes
Voltage drop	< 2 V
Current consumption	< 90 mA (when display is active)
Setting range OU1/OU2 Switching point, SP in steps of	0 ... 100 d 1 d
Accuracy OU1/OU2 OU3 Display	- 1 % - 0.2 °C / - 0.36 °F - 1 %
Resolution OU1/OU2 OU3 Display	- 1 % - 0.2 °C / - 0.5 °F 1 d
Thermal effect (per 10 K)	0.1 %
Readiness delay	1.5 s
Response time of switching output	200 ms
Measuring temperature	-40 ... +150 °C
Ambient temperature	-25 ... +70 °C
Storage temperature	-40 ... +85 °C
Enclosure, protection class	IP67, III
Insulation resistance	> 100 MΩ / DC 500 V
Shock resistance	50 g (DIN / IEC 68-2-27, 11 ms)
Vibration resistance	20 g (DIN / IEC 68-2-6, 10 ... 2000 Hz)
EMC	EN 61000-4-2 ESD: 4 kV CD / 8 kV AD EN 61000-4-3 HF emitted: 10 V/m EN 61000-4-4 burst: 2 kV EN 61000-4-6 HF conducted: 10 V
Housing materials	V2A (1.4301); V2A (1.4305); EPDM/X (Santoprene); PC (Macrolon); PBT (Pocan); FPM (Viton)
Function indicator Switching status Function	4 x yellow LEDs 4-digit alphanumeric display
Connection	M12 plug-in connection; gold-plated con- tacts
Connection diagram	See the section "Electrical connection" on page 18.

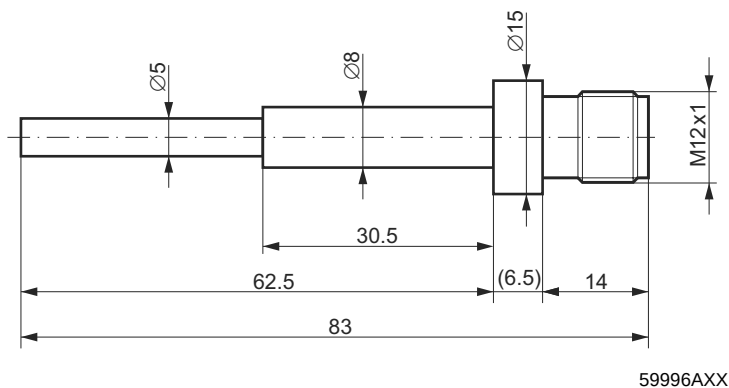
1) According to EN 50178, SELV, PELV

2) Maximum value for each output. Total current carrying capacity of the unit: max. 1 A. Two outputs can be connected in parallel for a total current carrying capacity of 1 A.



9.2 Temperature sensor PT1000

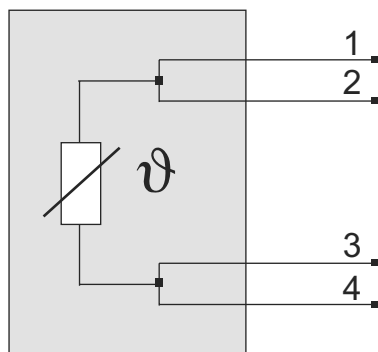
9.2.1 Dimension sheet for temperature sensor PT1000



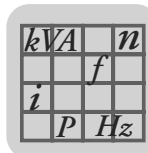
9.2.2 Technical data of the temperature sensor PT1000

Technical data	Value
Rod length	62.5 mm
Measuring range	−40 ... 130 °C
Permitted oil temperature	−40 ... 130 °C
Accuracy	− (PT1000 + 0.2 K)
Measuring element	1 x PT1000 to DIN EN 60751, class B, 4-conductor connection
Response dynamics T05/T09 (s)	3 / 8 to DIN EN 60751
Ambient temperature	−25 ... 80 °C
Enclosure, protection class	IP67, III
Housing materials	V4A (1.4404)
Materials in contact with the medium	V4A (1.4404)
Connection	M12 plug-in connection; gold-plated contacts

9.2.3 Connection diagram of the temperature sensor PT1000



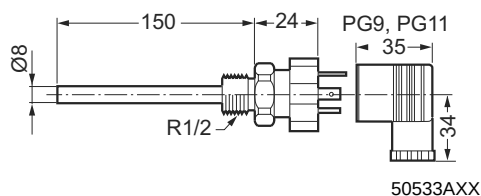
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9.3 Temperature sensor PT100

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

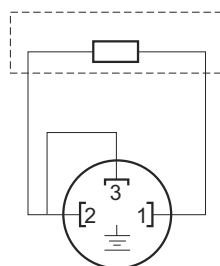
9.3.1 Dimension sheet for the temperature sensor PT100



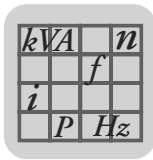
9.3.2 Technical data for the temperature sensor PT100

- Sensor tolerance $\pm (0.3 + 0.005 \times t)$, (corresponds to DIN IEC 751, class B), t = oil temperature
- Plug connector DIN 43650 PG9 (IP65)
- The tightening torque for the retaining screw in the back of the plug connector for electrical connection is 25 Nm.

9.3.3 Electrical connection of the temperature sensor PT100



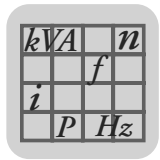
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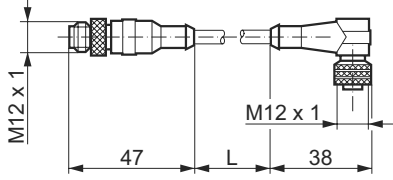
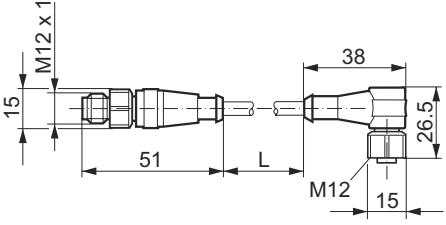
9.4 Cable for DUO10A

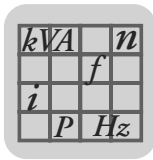
9.4.1 Connection cable for DUO10A

	PUR connection cable for DUO10A	PVC connection cable for DUO10A
Part number	13438778	13438786
Dimension drawing		
Technical data		
Operating voltage	AC 250 V / DC 300 V	
Current carrying capacity	4 A	
Design	Angled	
Ambient temperature	-25 ... 80 °C	-25 ... 100 °C
Enclosure	IP68	IP68 / IP69 K
Grip material	PUR	PVC
Coupling ring material	Brass; nickel plated	V4A (1.4404)
Tightening torque for the coupling ring	0.7 ... 0.9 Nm	
Cable length	5 m	
Diameter	6.2 mm	5.3 mm
Shielding	Shielded (shield not applied)	
Connection	8 x 0.25 mm² - Halogen-free	8 x 0.34 mm² (42 x ~ 0.1 mm)
Sheath color	Black	Orange

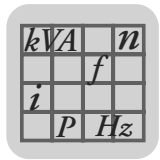


9.4.2 Connection cable from DUO10A to temperature sensor PT1000

	PUR connection cable for PT1000	PVC connection cable for PT1000
Part number	13438824	13438832
Dimension drawing		
Technical data		
Operating voltage	AC 250 V / DC 300 V	
Current carrying capacity	4 A	
Design	Straight / angled	
Ambient temperature	-25 ... 85 °C	-25 ... 100 °C
Enclosure	IP68	IP68 / IP69 K
Grip material	PUR	PVC; PA 6.6
Coupling ring material	Brass; nickel plated	V4A (1.4404)
Tightening torque for the coupling ring	0.7 ... 0.9 Nm	
Cable length	2 m	
Diameter	4.7 mm	5.3 mm
Shielding	Shielded (shield not applied)	
Connection	4 x 0.34 mm² (42 x ~ 0.1 mm) - Halogen-free	4 x 0.34 mm² (42 x ~ 0.1 mm)
Sheath color	Black	Orange

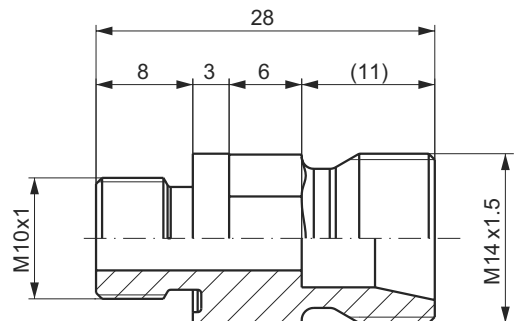

9.4.3 Connection cable from DUO10A to temperature sensor PT100

	PUR connection cable for PT100	PVC connection cable for PT100
Part number	13438840	13438859
Dimension drawing		
Technical data		
Operating voltage	AC 24 V / DC 24 V	
Current carrying capacity	4 A	
Design	Straight / angled	
Overvoltage protection VDR	Integrated	
Ambient temperature	-25 ... 85 °C	
Enclosure	IP67	
Grip material	M12: PUR Valve connector PP	PVC
Coupling ring material	Brass; nickel plated	V4A (1.4404)
Tightening torque for the coupling ring	0.7 ... 0.9 Nm	
Cable length	5 m	
Diameter	5 mm	
Shielding	Shielded (shield not applied)	
Contacts	M12 connector, contacts: gold-plated Valve connector, contacts: Brass, nickel plated	
Connection	3 x 0.5 mm² (42 x ~ 0.1 mm) - Halogen-free	3 x 0.5 mm² (42 x ~ 0.1 mm)
Sheath color	Black	Orange
Accessories	Screw, label	



9.5 Adapter for installing the PT1000 temperature sensor (stainless steel)

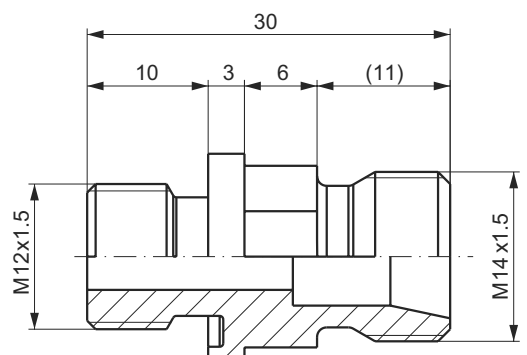
9.5.1 Dimension drawing of adapter M10 x 1



1343 837 9

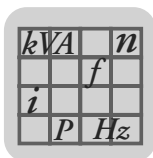
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9.5.2 Dimension drawing of adapter M12 x 1.5



1343 847 6

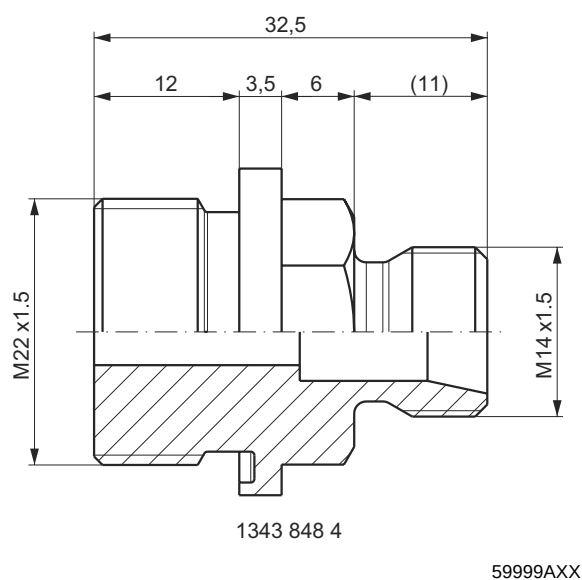
59998AXX



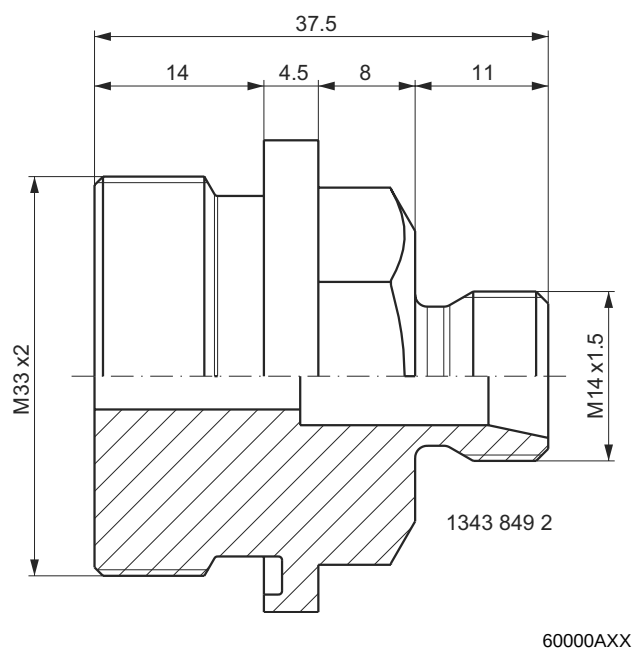
Technical Data

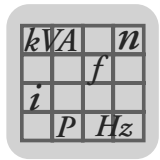
Adapter for installing the PT1000 temperature sensor (stainless steel)

9.5.3 Dimension drawing of adapter M22 x 1.5

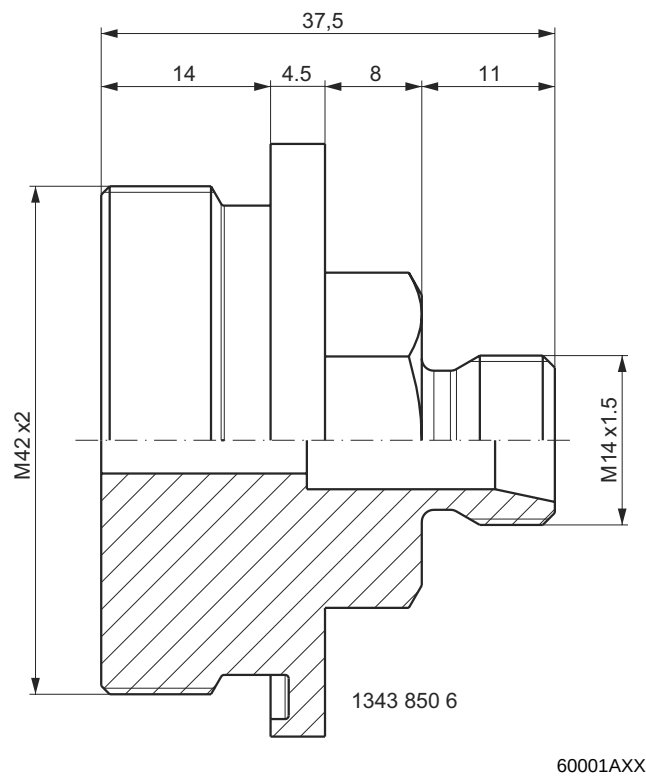


9.5.4 Dimension drawing of adapter M33 x 2





9.5.5 Dimension drawing of adapter M42 x 2

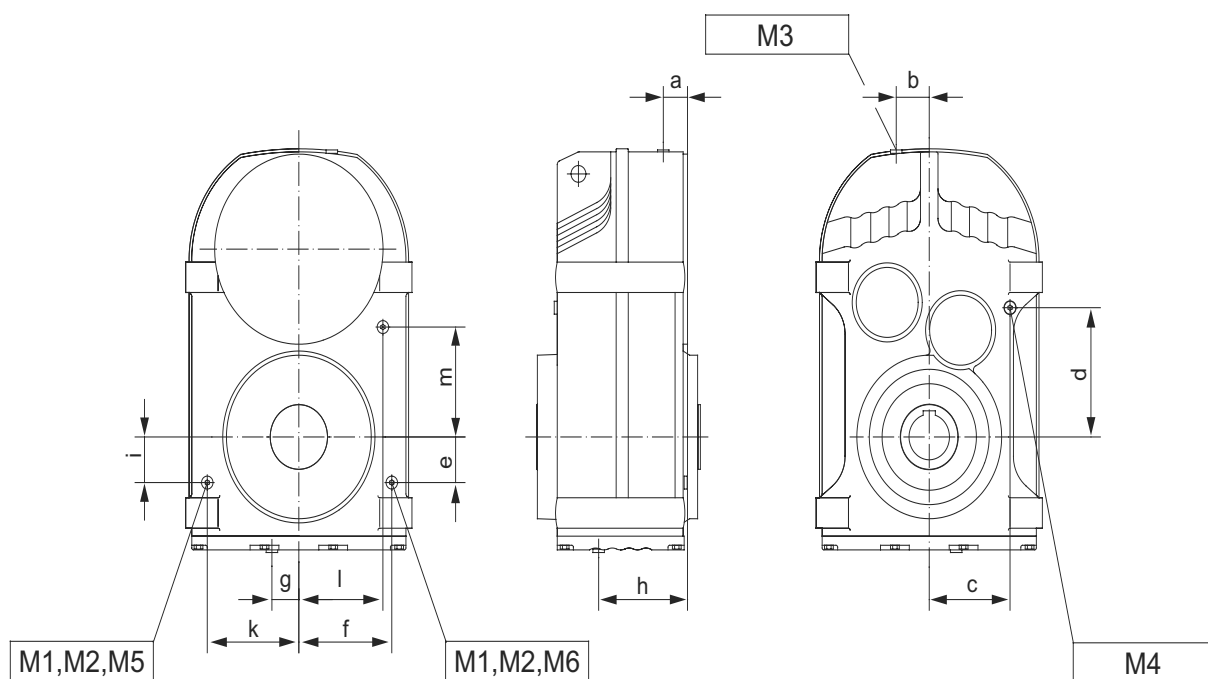




10 Appendix

10.1 Dimension sheets for installing the temperature sensor in the drive

10.1.1 Positions of the installation locations on the gear units F, FA 57 ... FA 157

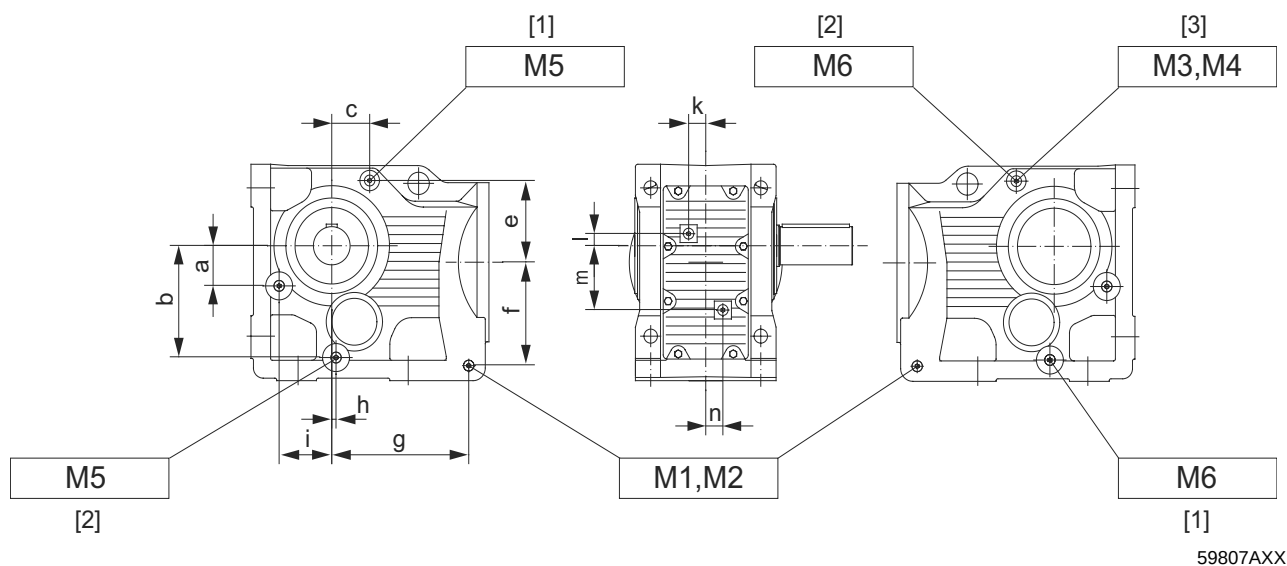


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Type	a	b	c	d	e	f	g	h	i	k	l	m	Screw plug bore
F / FF / FA / FAF 57	25	25	70	93	30	78.5	29	95	30	78.5	78.5	80	M10 x 1
F / FF / FA / FAF 67	26	30	78	106	32	83	40	100	32	83	83	90	M10 x 1
F / FF / FA / FAF 77	30	40	92.5	136	30	100	43.5	122	35	110	110	106.5	M12 x 1.5
F / FF / FA / FAF 87	36	45	120	170	60	115	40	130.5	60	136	139	148	M12 x 1.5
F / FF / FA / FAF 97	45	45	135	175	65	150	63	155	70	160	165	170	M22 x 1.5
F / FF / FA / FAF 107	45	60	155	215	60	165	55	165	55	188	188	195	M22 x 1.5
F / FF / FA / FAF 127	50	70	190	235	60	195	75	202	60	210	210	230	M33 x 2
F / FF / FA / FAF 157	60	110	215	290	75	265	65	257	75	265	265	250	M42 x 2



10.1.2 Positions of the installation locations on the gear units K, KA 37 ... K 157



- [1] Output, B end
- [2] Output, A end
- [3] Opposite output

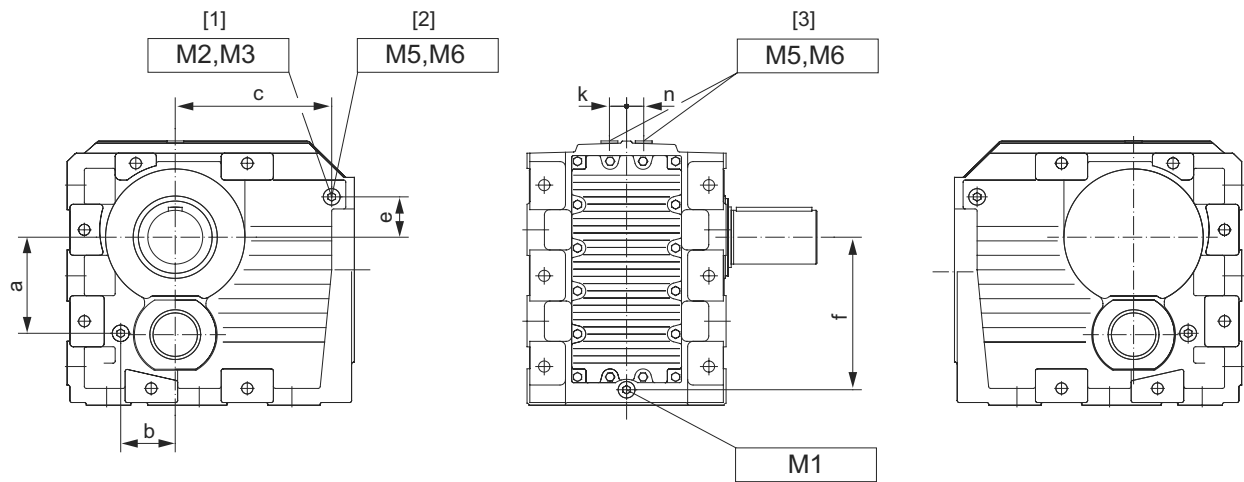
Reverse direction of rotation: Check position.

Hollow shaft gear unit: Check positions.

Type	a	b	c	e	f	g	h	i	k	l	m	n	Screw plug bore
K / KF / KA / KAF 37	35	80	48	46	84	117	5	37	15	-46	46	15	M10 x 1
K / KF / KA / KAF 47	42	—	42	55	95	139	—	42	18.5	-47	47	18.5	M10 x 1
K / KF / KA / KAF 57	38	111	49	65	115	145	5	51	23.5	-21	56	15	M10 x 1
K / KF / KA / KAF 67	41	117	56	66	122	152	4	62	22	-20	69	22	M10 x 1
K / KF / KA / KAF 77	50	156	50	84	158	171	2	74	23.5	9	86	23.5	M12 x 1.5
K / KF / KA / KAF 87	63	178.5	62	102.5	188	224	7	90	28	17	103	28	M12 x 1.5
K / KF / KA / KAF 97	116	225	85	116	235	238	5	114	45	12	123	45	M22 x 1.5
K / KF / KA / KAF 107	123	268	85	153	285	290	10	146	44.5	38	157	44.5	M22 x 1.5
K / KF / KA / KAF 127	144	319	105	172	332	335	-15	164	61	40	178	61	M33 x 2
K / KF / KA / KAF 157	207	380	123	192	400	368	-7	200	50	44	214	50	M42 x 2



10.1.3 Positions of the installation locations on the gear units K, KH 167 and KH 187



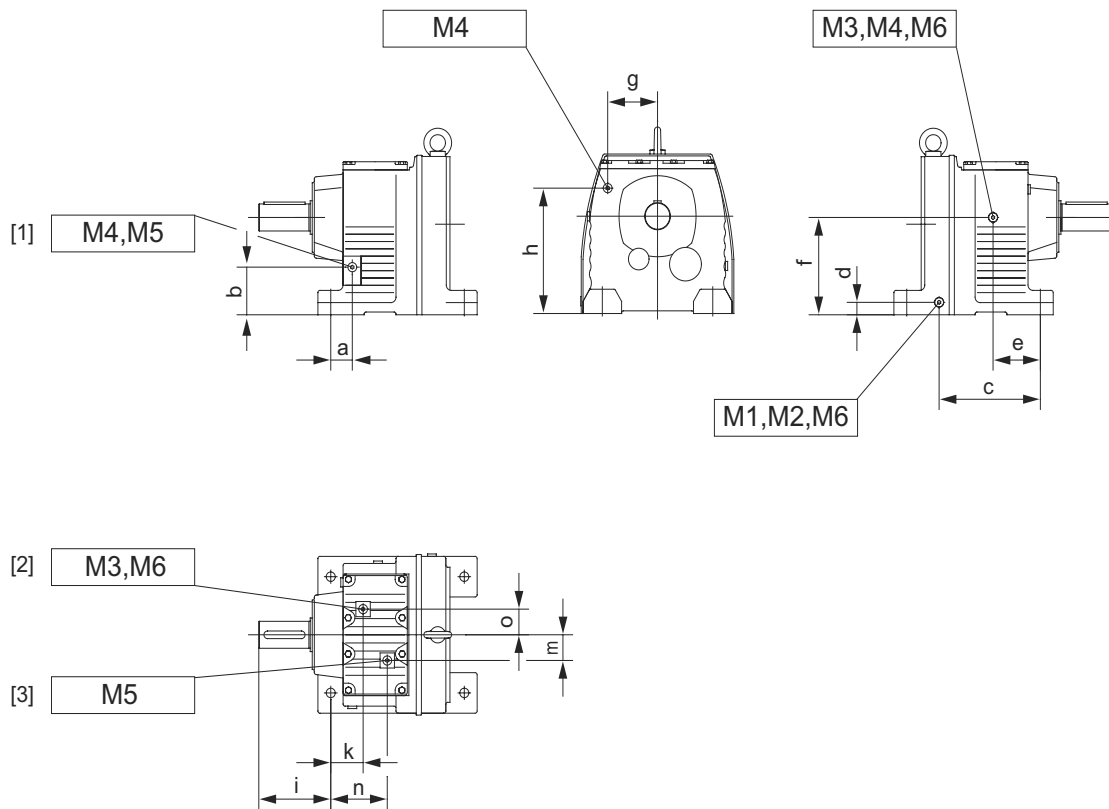
59808AXX

- [1] Both ends
 [2] Bottom
 [3] Opposite output (output end with reversal of direction of rotation)

Type	a	b	c	e	f	k	n	Screw plug bore
K / KH 167	286	159	456	120	454	50	50	M42 x 2
K / KH 187	345	180	527.5	135	550	65	65	M42 x 2



10.1.4 Positions of the installation locations on the gear units R 67 ... R 167



59809AXX

[1] Except for R77, R107

[2] Except for R77

[3] Only R87, R167

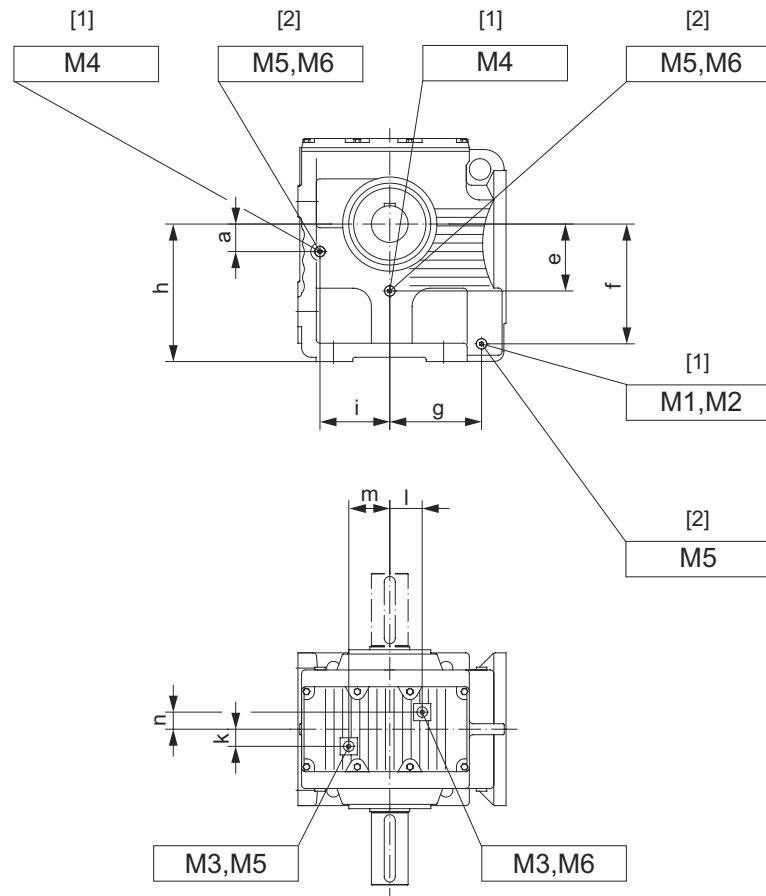
Type	a	b	c	d	e	f	g	h	i	k	m	n	o	p	Screw plug bore
R 67	39	70	150	18.5	80	130	72	165	100	45.5	—	—	0	—	M10 x 1
R 77	37	66	156	19	72.5	140	81	182	115	52.5	37.5	96.5	11.5	—	M12 x 1.5
R 87	42	88	197	23	92	182	97	232	140	63	47.5	110	47.5	—	M12 x 1.5
R 97	65	130	240	30	115	225	115	294	160	76.5	60	132.5	60	—	M22 x 1.5
R 107	70	133	265	32	128	250	130	330	185	91	65	141	40	—	M22 x 1.5
R 137	84	155	321	38	157	315	150	422	220	105	54	176	72	—	M22 x 1.5
R 147	97	175	383	46	179	355	185	470	260	125	70	205	75	—	M33 x 2
R 167	125	206	462	53	210	425	205	560	270	150	90	240	90	—	M42 x 2



Appendix

Dimension sheets for installing the temperature sensor in the drive

10.1.5 Positions of the installation locations on the gear units S 77 ... S 97



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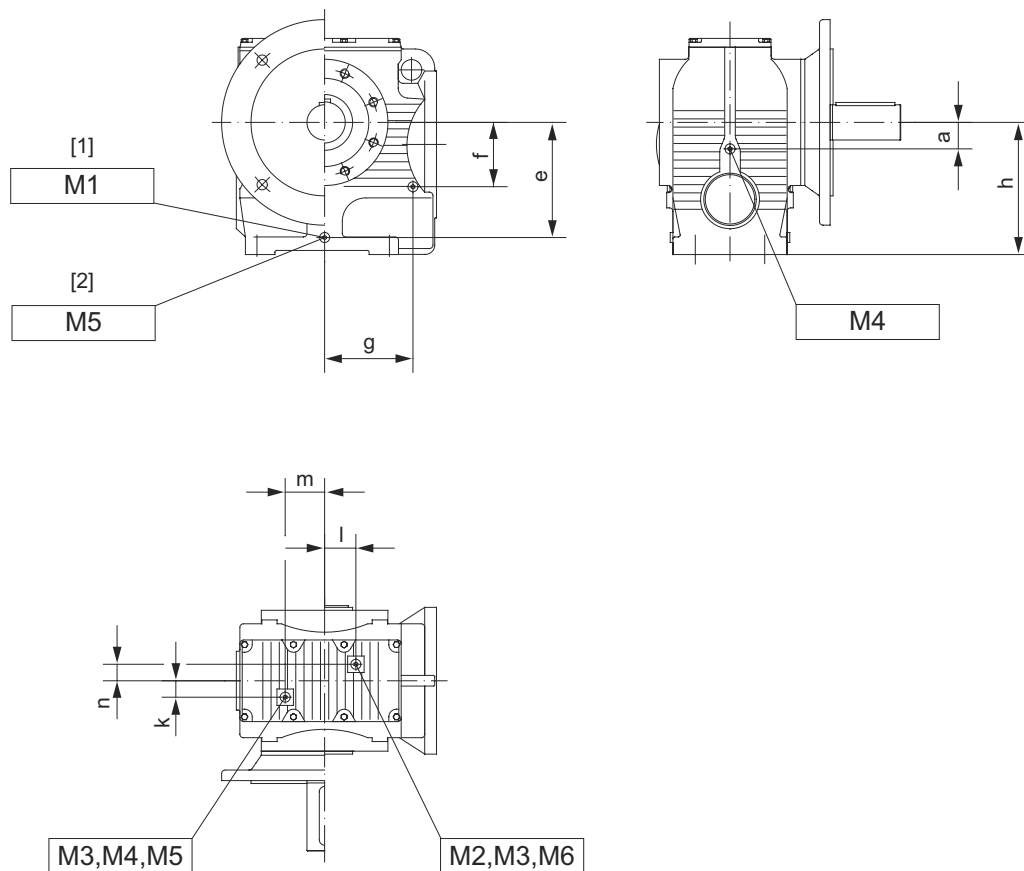
[1] Both ends

[2] Bottom

Type	a	e	f	g	h	i	k	l	m	n	Screw plug bore
S 77	40	90	158	127	180	90	23.5	42	53	23.5	M12 x 1.5
S 87	45	109.5	196	150	225	114	28	53	67	28	M12 x 1.5
S97	66	136	245	198	280	140	45	67	68	45	M12 x 1.5



10.1.6 Positions of the installation locations on the gear units SA, SF 67 ... SF 97



59812AXX

[1] Both ends

[2] Bottom

Type	a	e	f	g	h	i	k	l	m	n	Screw plug bore
SF / SA 67	30	120	74	105	140	–	22	4	45	22	M10 x 1
SF / SA 77	40	158	90	127	180	–	23.5	42	53	23.5	M12 x 1.5
SF / SA 87	45	196	109.5	150	225	–	28	53	67	28	M12 x 1.5
SF / SA 97	66	245	136	198	280	–	45	67	68	45	M22 x 1.5



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Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
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	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au
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Belgium			
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Korea			
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Mexico			
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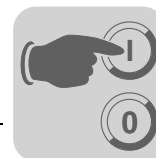
Address List

South Africa			
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	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za
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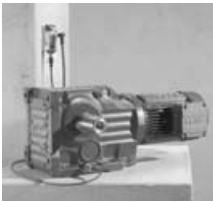
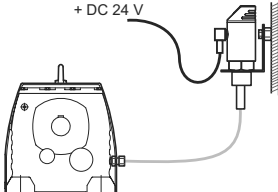
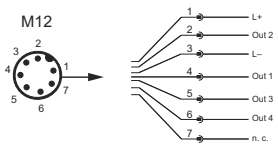
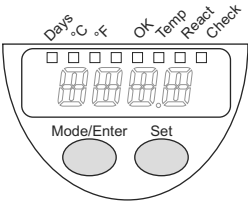


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	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
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12 Quick Startup

Step	Illustration	Procedure	Please note:
1		Installation - Specify application - Which oil type is used in the gear unit? - How long has the oil been in the gear unit?	You can later make all settings directly at the diagnostic unit.
2		Mechanical connection - Mount the temperature sensor in a screw plug bore of the gear unit. - Either mount the diagnostic unit directly to the gear unit or in a suitable place, e.g. in the control cabinet.	- Ideally, the temperature sensor is mounted near the input shaft, since this is where often the highest oil temperatures occur. - Furthermore, the temperature sensor has to be located below the oil level. Oil can leak out when installing the unit, if the gear unit has already been filled with oil. - When installing the temperature sensor, make sure that it does not touch any moving parts inside the gear unit. - Make sure that the screw plug bores are sealed. - The diagnostic unit ought to be accessible during operation.
3		Electrical connection Connect the voltage supply and the switch outputs. Connect the temperature sensor to the diagnostic unit.	- The electrical connection may only be established by a qualified electrician. - Disconnect the system before connecting the diagnostic unit. - The connection cables have to be shielded. - Make sure that the shielding is connected correctly. - The outputs of the diagnostic unit are short-circuit proof.
4		Parameter setting - Set the gear oil type, early warning in days and the switching parameters. - When all parameters of the diagnostic unit are set, activate the diagnostic unit via the OLC (= oil change) function.	- See also the flow chart on page 27. - Changes only take effect after the OLC parameter has been set. - Please note that in this case, the diagnostic unit starts the calculation again from the beginning. - If the oil has been in the gear unit for a while, the SEW service can adjust the remaining service life accordingly.
5		Operating status (RUN mode) - During operation, the display shows the remaining service life in days. - Press the <Set> key to display the current oil temperature. - The unit of the display is represented by the 3 green LEDs on the display. - The 4 yellow LEDs show the status of the switching outputs.	If the yellow LED "ok" is not lit, a fault has occurred.

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