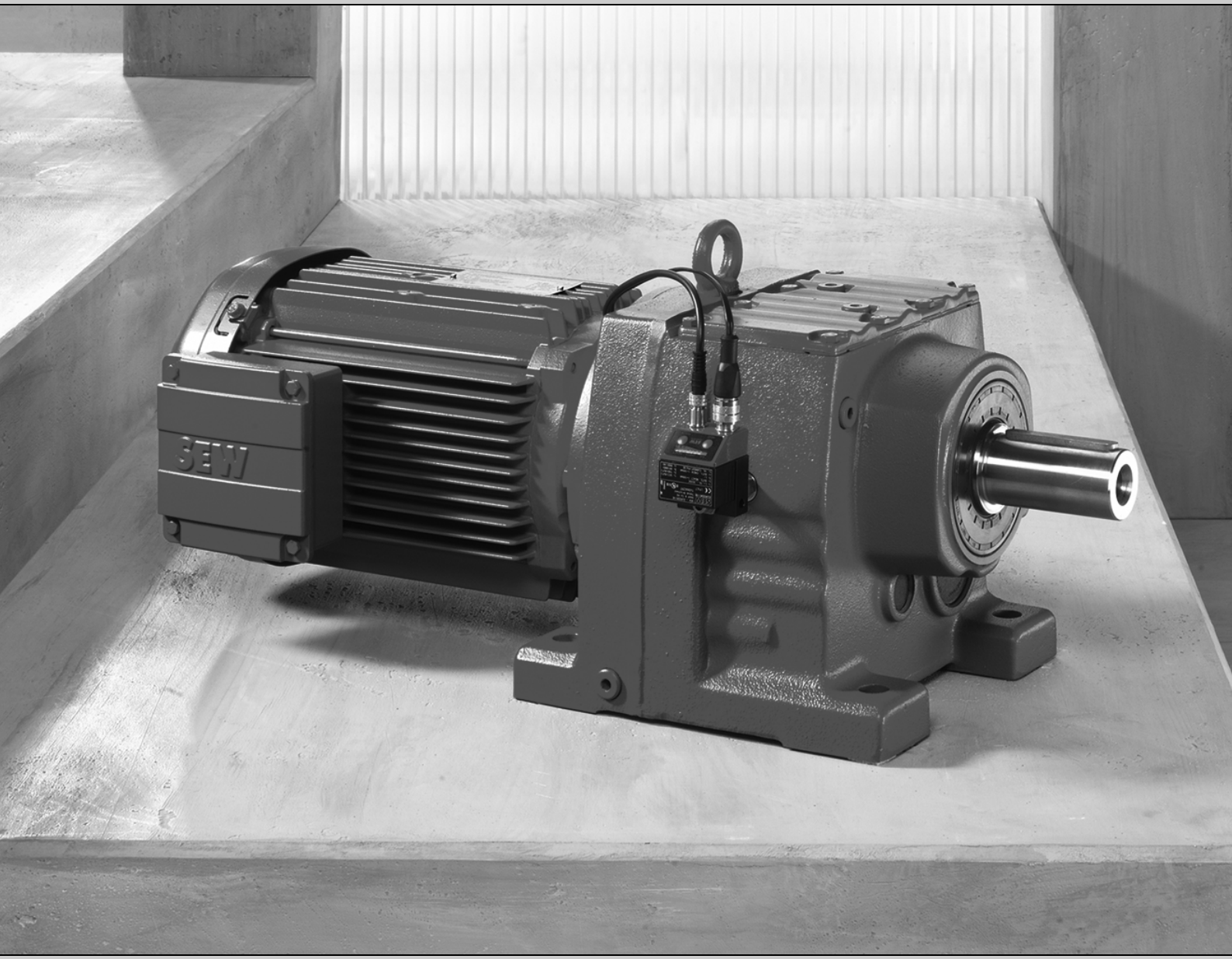
SEW EURODRIVE

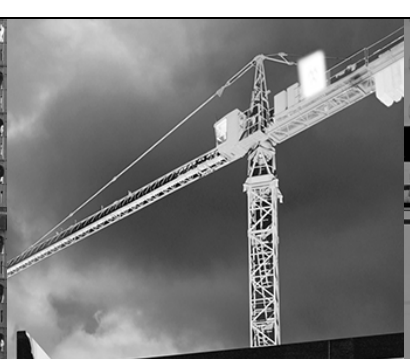
Manual



DUV30A Diagnostic Unit

Edition 03/2010

16710010 / EN

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Contents

1 General Information

1.1 Use of the manual

The manual is part of the product and contains important information on operation and service. The manual is written for all employees who assemble, install, startup, and service the product.

The manual must be accessible and legible. Make sure that staff responsible for the plant and its operation, as well as persons who work independently on the unit, have read the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

The safety notes in this manual are designed as follows:

Pictogram	⚠ SIGNAL WORD
	Type and source of danger. Possible consequence(s) if disregarded. • Measure(s) to prevent the danger.

Pictogram	Signal word	Meaning	Consequences if disregarded
Example:  General danger  Specific danger, e.g. electric shock	**DANGER**	Imminent danger	Severe or fatal injuries
	WARNING	Possible dangerous situation	Severe or fatal injuries
	CAUTION	Possible dangerous situation	Minor injuries
	NOTICE	Possible damage to property	Damage to the drive system or its environment
	**INFORMATION**	Useful information or tip. Simplifies the handling of the drive system.	

1.3 Rights to claim under limited warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the manual. Therefore, read the manual before you start operating the device.

1.4 Exclusion of liability

You must comply with the information contained in the manual to ensure safe operation of the DUV30A diagnostic units and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of this manual. In such cases, any liability for defects is excluded.

1.5 Copyright

2 Safety Notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and observed. Make sure that persons responsible for the plant and its operation, as well as persons who work independently on the unit, have read through the manual carefully and understood it. If you are unclear about any of the information in this documentation, please contact SEW-EURODRIVE.

2.1 Preliminary information

The following safety notes are primarily concerned with the use of DUV30A diagnostic units. If using gear units and gearmotors, please also refer to the safety notes for gear units and motors in the corresponding operating instructions.

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

2.2 General information

⚠ DANGER

During operation, the motors and gearmotors can have live, bare and movable or rotating parts as well as hot surfaces, depending on their enclosure.

Severe or fatal injuries.

- All work related to transportation, storage, setup/mounting, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observation of:
  - The relevant detailed operating instructions
  - The warning and safety signs on the motor/gearmotor
  - All other project planning documents, operating instructions and wiring diagrams related to the drive
  - The specific regulations and requirements for the system
  - The national/regional regulations governing safety and the prevention of accidents
- Never install damaged products
- Immediately report any damage to the shipping company

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to property.

Refer to the documentation for additional information.

2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified staff in the context of this manual are persons familiar with design, mechanical installation, troubleshooting and servicing of the product who possess the following qualifications:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- Knowledge of the manual.

Any electronic work may only be performed by adequately qualified electricians. Qualified electricians in the context of this manual are persons familiar with electrical installation, startup, troubleshooting and servicing of the product who possess the following qualifications:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- Knowledge of the manual.

All work in further areas of transportation, storage, operation and waste disposal may be carried out only by persons who are trained appropriately.

2.4 Designated use

The DUV30A diagnostic units are intended for industrial systems and may only be used in accordance with the information provided in SEW-EURODRIVE's technical documentation and the information given on the nameplate. They fulfill the applicable standards and regulations. Using these products in potentially explosive atmospheres is prohibited, unless specifically designated otherwise.

2.5 Other applicable documentation

The following publications and documents have to be observed as well:

- Operating instructions of the gear unit
- Operating instructions of the motor

2.6 Transport

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.

2.7 Installation/assembly

Observe the notes in chapter "Installation and startup" (page 16).

2.8 Startup/operation

Do not deactivate monitoring and protection equipment even in test mode.

Consult SEW-EURODRIVE if you notice changes in relation to normal operation.

2.9 Inspection/maintenance

Observe the notes in chapter "Service" (page 32).

3 Product Description

3.1 Hardware

The DUV30A diagnostic unit evaluates vibration signals using frequency analysis methods. A micromechanical acceleration sensor is used in the unit. Data can be recorded, processed and evaluated decentrally without any expert knowledge.

3.2 Continuous monitoring

The DUV30A diagnostics unit is suitable for early detection of rolling bearing damage or unbalance. The continuous monitoring function represents a reliable and cost-effective solution compared to intermittent methods.

Observe the physical methods and the respective boundary conditions as described in chapter "Analysis techniques" (page 47).

The DUV30A allows for permanent vibration monitoring of up to 5 different objects or 20 individual frequencies. A rolling bearing or a shaft is defined as an object, for example.

The DUV30A has been designed as a combined sensor that can be used as normal- or slow-speed unit. The only difference is the measuring time in the firmware and the resulting frequency range.

Normal-speed unit:

The normal-speed unit is used for speed values between 120 and 12000 rpm, as well as applications that only briefly (a few seconds) operate at a constant speed. A normal-speed unit has a minimum measuring time of 0.8 s, a frequency resolution of 1.25 s, and can monitor a frequency range of 0 – 5000 Hz.

Hence the normal-speed unit is suitable for drives with higher speed values and applications that only briefly operate at a constant speed (e.g.: Storage and retrieval units).

Low-speed unit:

The low-speed unit is used for speed values between 12 and 3500 rpm and applications that operate at a constant speed over a longer period of time. A low-speed unit has a minimum measuring time of 8 s, a frequency resolution of 0.125 s, and can monitor a frequency range of 0 – 500 Hz.

The low-speed unit is suitable for drives with low speed values and applications that operate at a constant speed (e.g.: conveyor belts).

3.3 Theory of operation

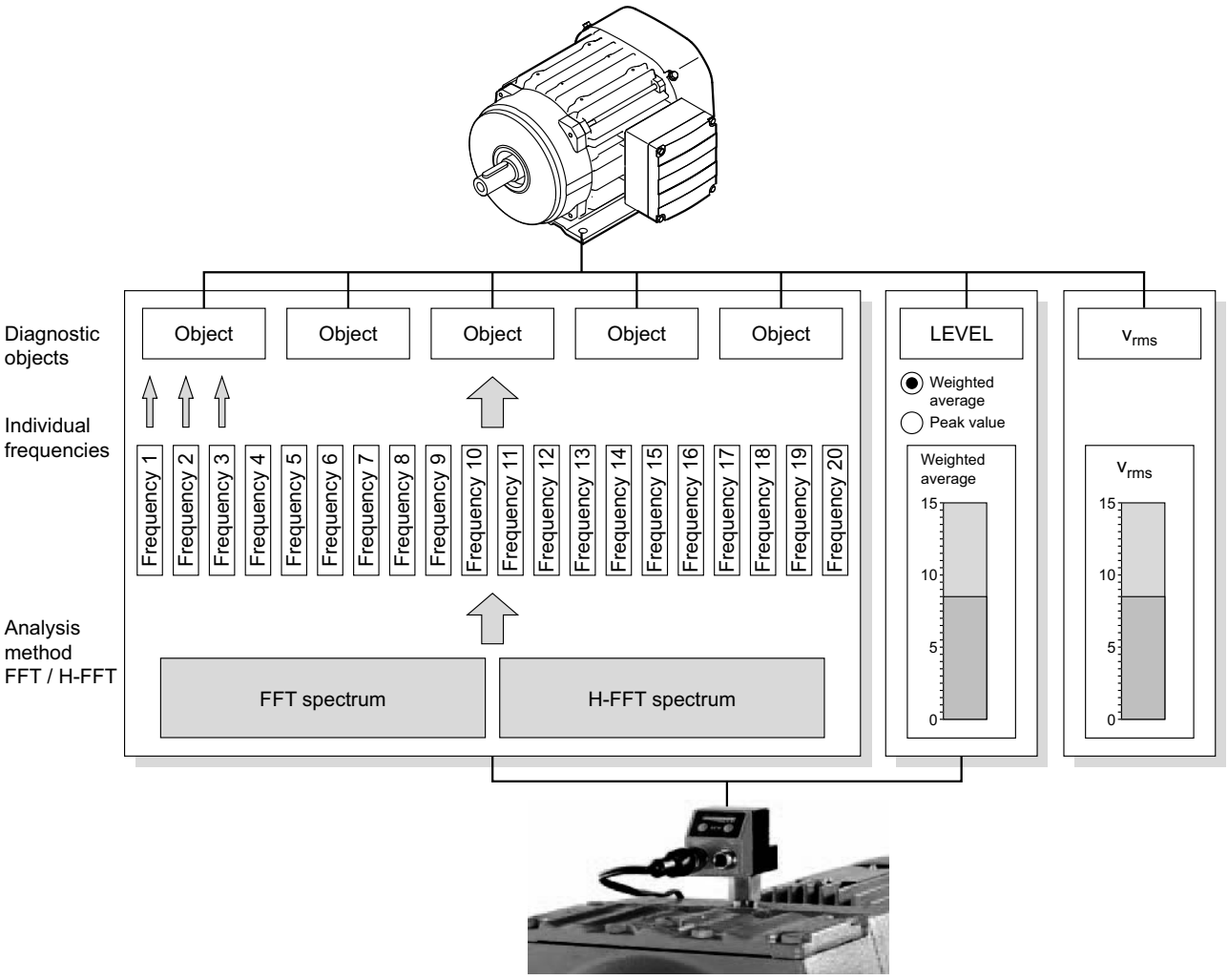
3.3.1 Brief description

The unit measures the structure-borne noise, calculates the frequency spectrum and can then evaluate the condition of the rolling bearings, for example, or the imbalance. The condition can be read out at the unit and is also output via binary signals.

The switching signal can be transmitted via unshielded cables. The unit can also be connected to a bus system.

3.3.2 Detailed description

- The DUV30A diagnostic unit continuously measures the vibration acceleration of a non-rotating machine surface (32 000 values/second) and calculates the amplitudes of damage frequencies (rolling bearing: inner ring, outer ring and rolling element) of up to 5 different diagnostic objects comprising a maximum of 20 individual frequencies. The rolling bearings or diagnostic objects to be monitored are defined using PC software. They are then transferred as parameter sets to the sensor via an RS-232 interface. The condition of the rolling bearing is then evaluated and monitored relative to the teach-in value (reference value).



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- As an option, the diagnostic unit can also calculate the maximum weighted average

or maximum acceleration value. In this case, evaluation and monitoring is performed using absolute limit values without a reference value.

- Indication of early warning or main alarm: The diagnostic object or the level with the highest degree of damage is indicated via the switching outputs.
- The damage progress of the diagnostic objects is also indicated by the LED series on the DUV30A diagnostic unit.
- The DUV30A diagnostic unit can be used with both constant and variable speeds. To ensure correct diagnostics when using variable speeds, the current speed has to be supplied via a 0 – 20 mA current loop or a pulse input (1 – 32 pulses per revolution / 10 kHz) .
- If the roller bearing monitoring function is used with variable speeds, you must ensure that the operating speed related to the set values remains constant for intermittent periods.
- The maximum operating range is:
  - Low-speed units: About 12 min^{-1} to about 3500 min^{-1} shaft speed
  - Normal-speed units: About 120 min^{-1} to about 12 000 min^{-1} shaft speed.
- The sensor is screwed onto the unit near the rolling bearing radial to the rotational axis (see chapter "Installation and startup"). If the sensor is not installed directly next to the bearing seat, you must perform an impulse test to check whether the installation location is suitable for the monitoring mode "Rolling bearing monitoring".

The DUV30A diagnostic unit uses different object limit values for early warning (yellow) and main alarm (red) for all defined spectral diagnostic objects. The limit values of the diagnostic objects are always based on the set teach-in value and describe a signal fan-out. "Green" always corresponds to 100%.

To compensate differences in the trigger threshold for different speeds during variable-speed operation, the diagnostic value (quotient of current teach-in value) is weighted according to the "Weighted signal" curve. Individual weighted curves are defined for each diagnostic object.

The DUV30A diagnostic unit use different wide-band limit values to monitor the vibration level in the time domain. Diese sind im Gegensatz zu den Diagnoseobjekten absolute Werte der Beschleunigung (Einheit „mg“). For variable speed monitoring, the vibration level to be monitored is weighted according to the Weighted signal curve to compensate for differences caused by the trigger threshold.

The vibration velocity v_{rms} is calculated from the vibration acceleration for a freely adjustable frequency window according to DIN ISO 10816 and also displayed as an absolute value in [mm/s]. The function is only available in normal-speed mode.

4 Unit Design

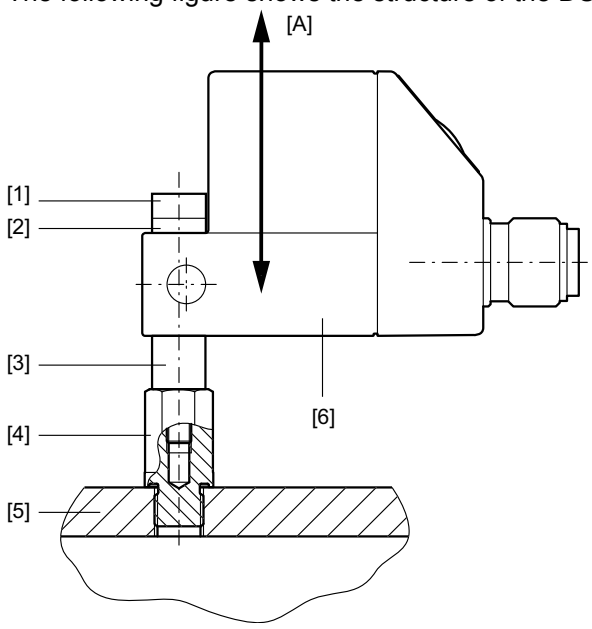
4.1 Scope of delivery

The scope of delivery comprises the following component:

DUV30A diagnostics unit		
Part number	**Meaning**	**Designation**
1 328 969 1	Diagnostic unit (combined unit) Installation material (washer, spacer bushing, M5 bolt)	DUV30A

4.2 Basic unit

The following figure shows the structure of the DUV30A diagnostic unit:



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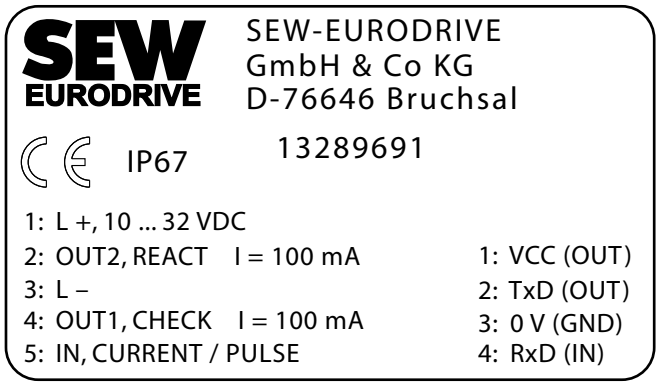
[1] M5 screw
[2] Washer
[3] Spacer bushing
[4] Sensor base
[5] Machine surface
[6] DUV30A diagnostics unit
[A] Measuring axis

4.3 Nameplate/type designation

The following figure shows the nameplate:



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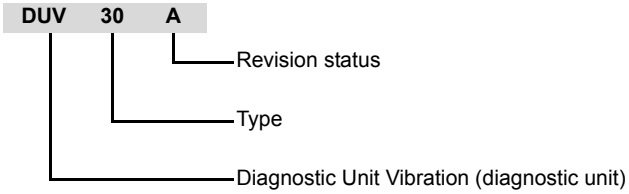
The type designation is explained below:



4.4 Options

Part number	Meaning	Designation
14066300	Configuration software	DUV-S
14066319	Cable for software	DUV-K-RS232-M8
14066327	Power supply unit	DUV-N-24DC
14066335	Impulse tester	DUV-I
14066343	PUR cable[1)] With 1 connector, length 2 m	DUV-K-M12-5pol-2m-PUR
14066351	PUR cable[1)] With 1 connector, length 5 m	DUV-K-M12-5pol-5m-PUR
13266217	PVC cable[2)] With 1 connector, length 5 m	DUV-K-M12-5pol-5m-PVC
13266209	PVC cable[2)] With 1 connector, length 2 m	DUV-K-M12-5pol-2m-PVC

1) PUR cables are ideal for use in environments containing oil.

2) PVC cables are ideal for use in environments containing water and chemicals, e.g. in the food industry.

4.5 Base for mounting

4.5.1 Base for mounting on standard gear units (R, F, K, S)

Part number	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

4.5.2 Base for mounting on industrial gear units

Part number	Meaning
13438336	Mounting base with sealing ring G 3/4
13438344	Mounting base with sealing ring G 1
13438352	Mounting base with sealing ring G1 1/4
13438360	Mounting base with sealing ring G1 1/2

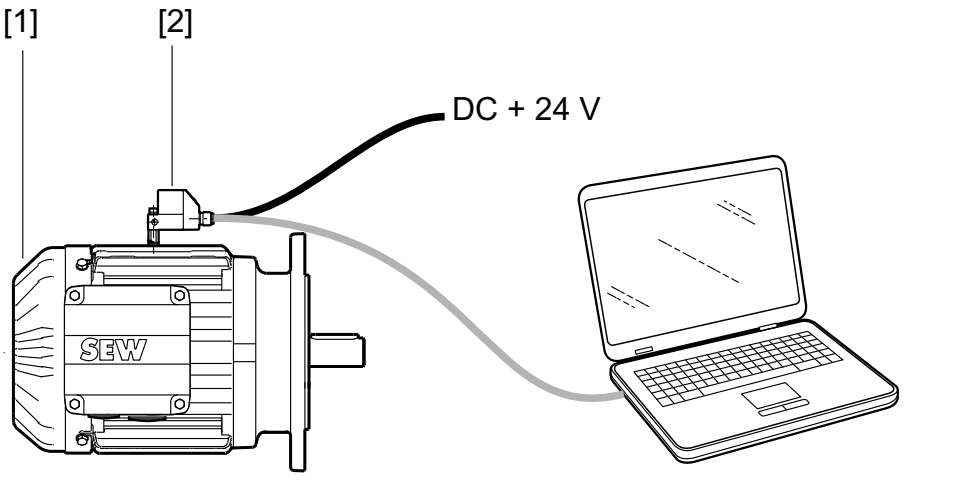
4.5.3 Base for mounting on standard motors

Part number	Meaning
13622617	Mounting base M8
13438425	Mounting base M12
13438441	Mounting base M16
13622625	Mounting base M20

5 Installation, Mounting and Startup

5.1 System overview

The following figure shows an example of a component overview:



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[1] Object to be monitored
[2] DUV30A diagnostics unit

5.2 Required tools/resources

- Set of wrenches/Allen keys
- PC or notebook with RS-232 interface for parameter setting

5.3 Prerequisites

Ensure that the following requirements have been met:

- The ambient temperature is between –30 °C and +70 °C.

  Please contact SEW-EURODRIVE if the ambient temperatures are higher or lower.
- The data on the nameplate of the diagnostic unit match the voltage supply system.
- The diagnostic unit is undamaged (no damage caused by shipping or storage).

5.4 Installing the DUV-S software

5.4.1 DUV-S parameterization software

The optional DUV10A-S parameterization software can be used to monitor up to 5 different objects or 20 individual frequencies.

A parameterization file is generated in the DUV-S software. The file is then transferred to the DUV30A diagnostic unit.

An online help is available for all functions. To call up the help text for each function, press the <F1> key.

5.4.2 System requirements

The DUV-S software requires a PC with:

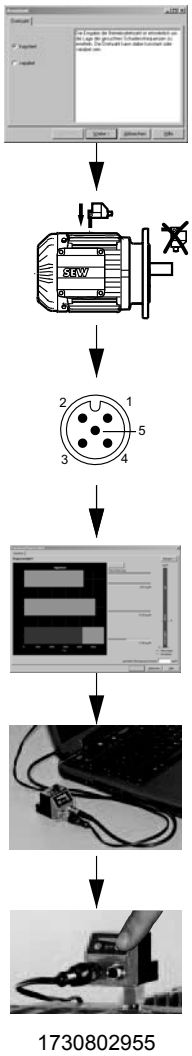
- Pentium II 266 MHz processor or higher (Pentium III recommended)
- At least 128 MB main memory (RAM)
- VGA 800 x 600 or higher
- Microsoft Windows 95 / 98 / NT / 2000 / XP / Vista operating system

5.4.3 Installing the DUV-S software

The parameterization software is supplied on a CD. Insert the CD into your computer, select [Run] from the Start menu and enter the command `D:/DUV-S.exe` (D: stands for the CD ROM drive). Install the parameterization software by clicking on the name and following the instructions.

5.5 Mounting and startup procedure

Proceed as follows to startup the DUV30A diagnostic unit. Each step is described in detail in the following chapters:



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Open or generate the parameter file

Mount the sensor

Electrical connection

Perform the impulse test (optional)

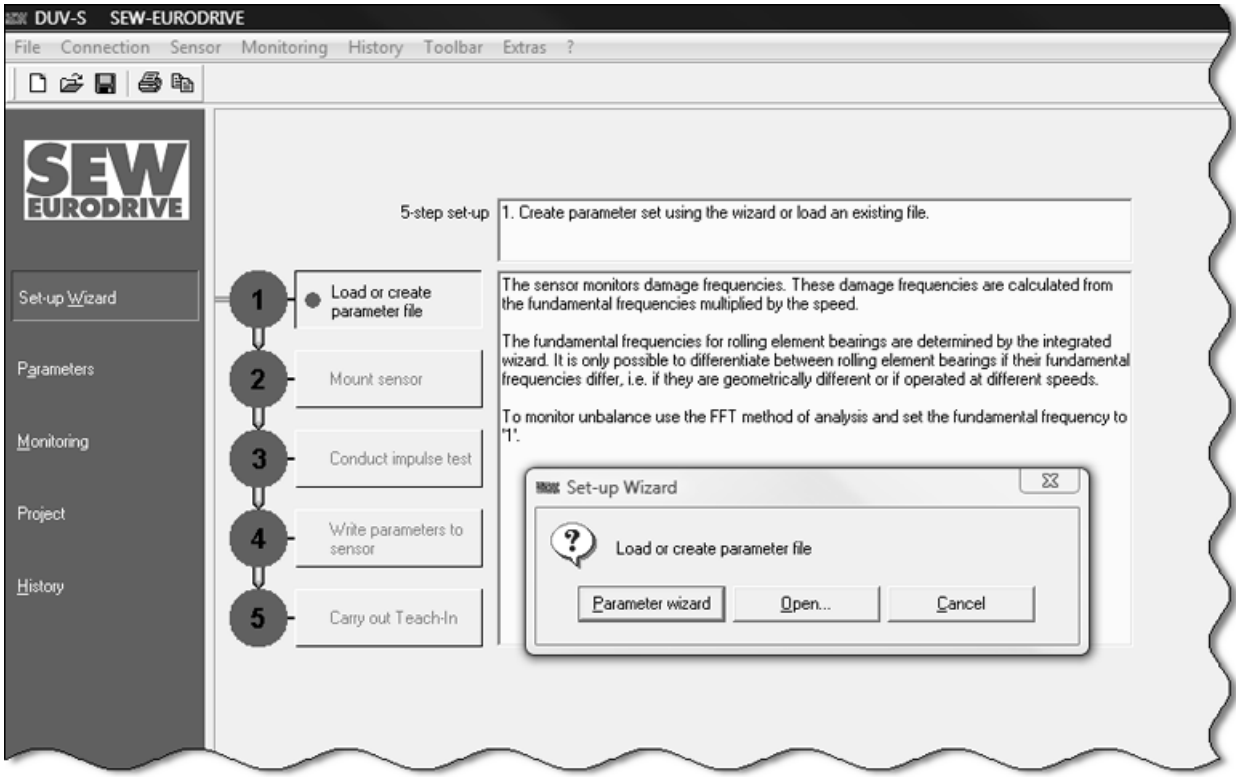
Write parameter file to sensor

Teach-in

For typical normal operation

5.6 Loading or creating a parameter file

Use the software provided to create a suitable parameter set.



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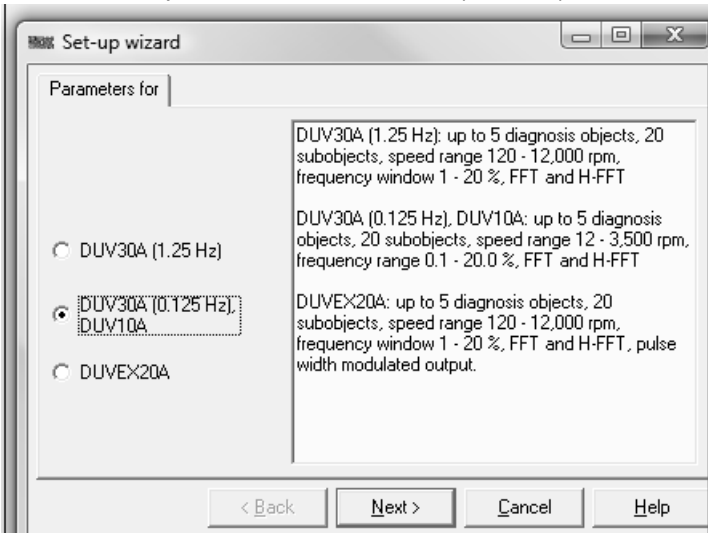
- Select the parameters for DUV30A (1.25 Hz) or DUV30A/DUV10A (0.125 Hz):



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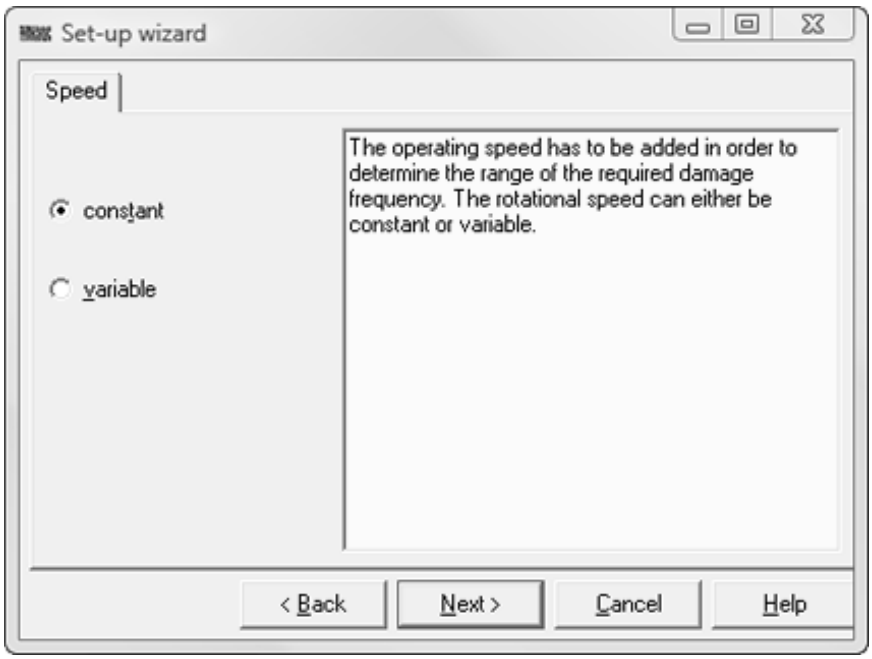
- Select the unit type for monitoring. Note that DUV30A can be operated both as a normal-speed unit (frequency resolution 1.25 Hz) and as a slow-speed unit (frequency resolution 0.125 Hz), whereas DUV10A is a slow-speed unit, see chapter "Continuous monitoring" (page 10).

- Click the button [Load or create parameter file].
- The software now asks you to enter the parameter data using the wizard or load an existing file.
- If you have not created a parameter file yet, call up the wizard. Enter the required data and click [Finished].
- Enter the required speed in the following window:



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5.7 Mounting the sensor

⚠ DANGER

Burns caused by hot surfaces.

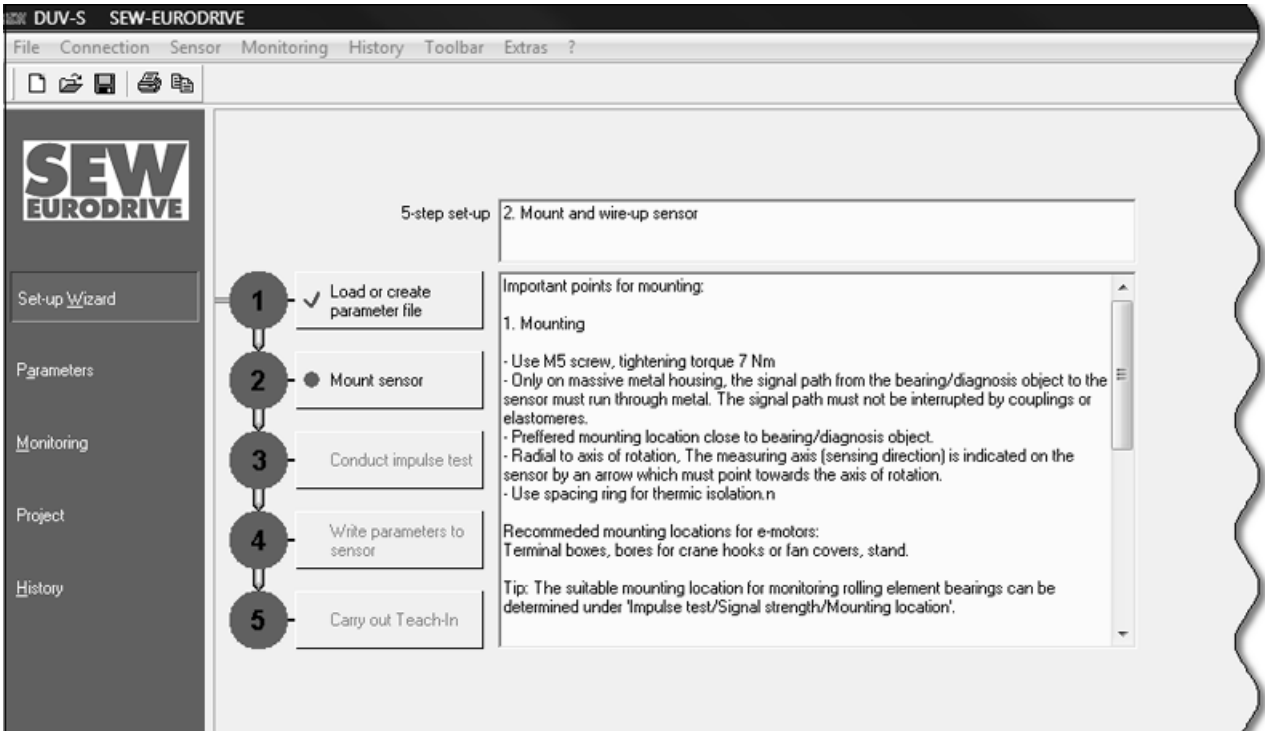
Severe injuries.

- Mount the DUV30A diagnostic unit only after the drive has been switched off and cooled down.

Ensure that the following prerequisites are met during installation:

- The DUV30A diagnostic unit must always be freely accessible.
- The LEDs must always be visible.
- Do not connect the unit at the oil drain plug or breather valves.
- Pay attention to the oil level during installation.

  Bear in mind that if the unit is installed below the oil level, oil may leak out of the gear unit.



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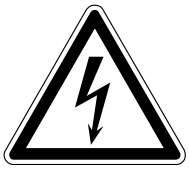
The DUV30A diagnostic unit is installed using a sensor base (page 15), which is screwed either into a screw plug bore of the gear unit or into a crane hook eye of the motor. Observe the following mounting instructions:

- Choose a mounting location that is close to the rolling bearing and preferably radial to the rotary axis.
- Use the washer and bushing provided with the diagnostic unit.

  All "rolling bearing" diagnostic objects defined must have a sufficiently good signal path. A transfer constant of > 5 mg/N is required.
- Tighten the M5 screw using a torque of 7 Nm.
- Once you have mounted the DUV30A diagnostic unit, click on the button [Mount sensor] in the DUV-S software.

	INFORMATION
	• If machines are separated by couplings, SEW-EURODRIVE recommends that you use one diagnostic unit for each machine. • Consider the bolt sizes for mounting the unit on a base. • Install the DUV30A diagnostic unit using the spacer bushing provided to ensure thermal isolation.

5.8 Electrical connection



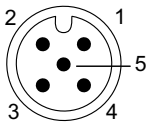
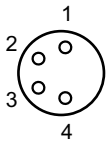
⚠ DANGER

Electric shock due to open connections.

Severe injuries.

- Only qualified electricians may install the unit.
- Observe national and international regulations concerning the installation of electrical systems.
- Protect voltage supply to EN 50178, SELV, PELV.
- For compliance with "limited voltage/current" requirements according to UL 508, para. 32, supply the unit from an electrically isolated source and protect it with an overcurrent device.
- De-energize the system before installation.
- Provide for short-circuit proof outputs.

5.8.1 Wiring diagram

Connector (view onto DUV30A)	Pin	Assignment	Color code
M12 	1	Supply +	Brown
	2 (red function)	Switching output 2/error, 100 mA Programmable NC contact / NO contact	White
	3	Supply –	Blue
	4 (yellow function)	Switching output 1/warning, 100 mA Programmable NC contact / NO contact	Black
	5	Speed (0 ... 20 mA) or pulse input	Gray
M8 	1	Not assigned	
	2	T × D	
	3	GND	
	4	R × D	

For information on evaluating switching outputs, see chapter "Evaluation of switching outputs" (page 26).

5.8.2 Procedure

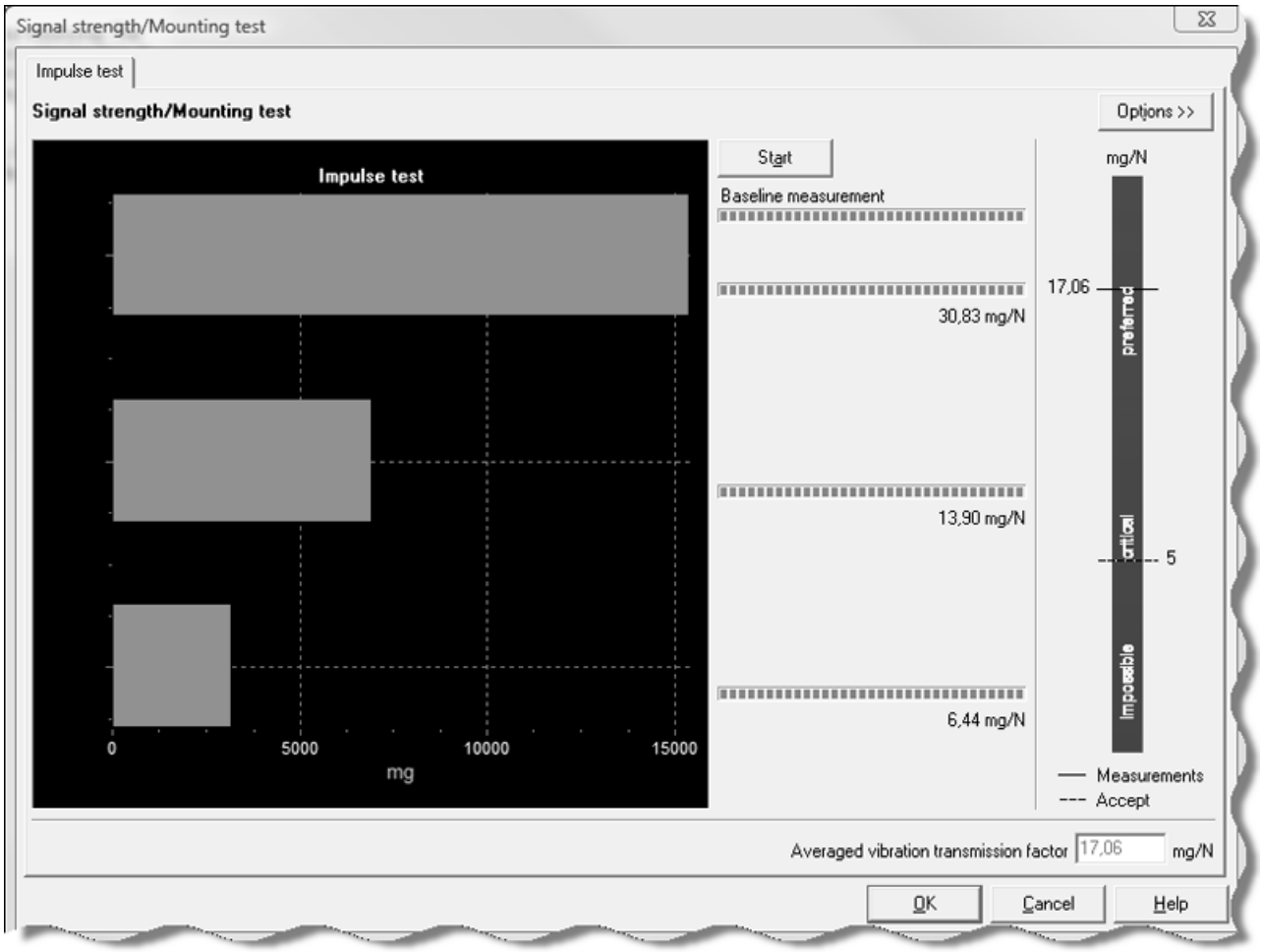
- Connect the voltage supply and switching outputs and, if necessary, set the speed.
- Once you have connected the DUV30A diagnostic unit, click on the button [Mount sensor] in the software.
- You can now establish a connection with the sensor using the menu [Connection] / [Connect].

5.9 Conducting an impulse test (optional)

The mounting location can be tested with the impulse tester. For the test, a defined force is applied as close to the installation position of the respective rolling bearing as possible. The sensor measures the corresponding impulse response. The determined transmission factor is given in acceleration per force (mg/N). This value describes the quality of the signal path. The value of the transmission factor must be greater than 5 mg/N. Reliable monitoring cannot be guaranteed if the value is lower.

5.9.1 Procedure

- Click the [Conduct impulse test] button.
- Click on signal path.
- Start the measurement. The basic level is measured first (noise measurement).
- Then, execute at least one impulse per measurement using the impulse tester as close to the rolling bearing as possible. The software indicates the suitability of the mounting location in a graphic and as a text.



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Note

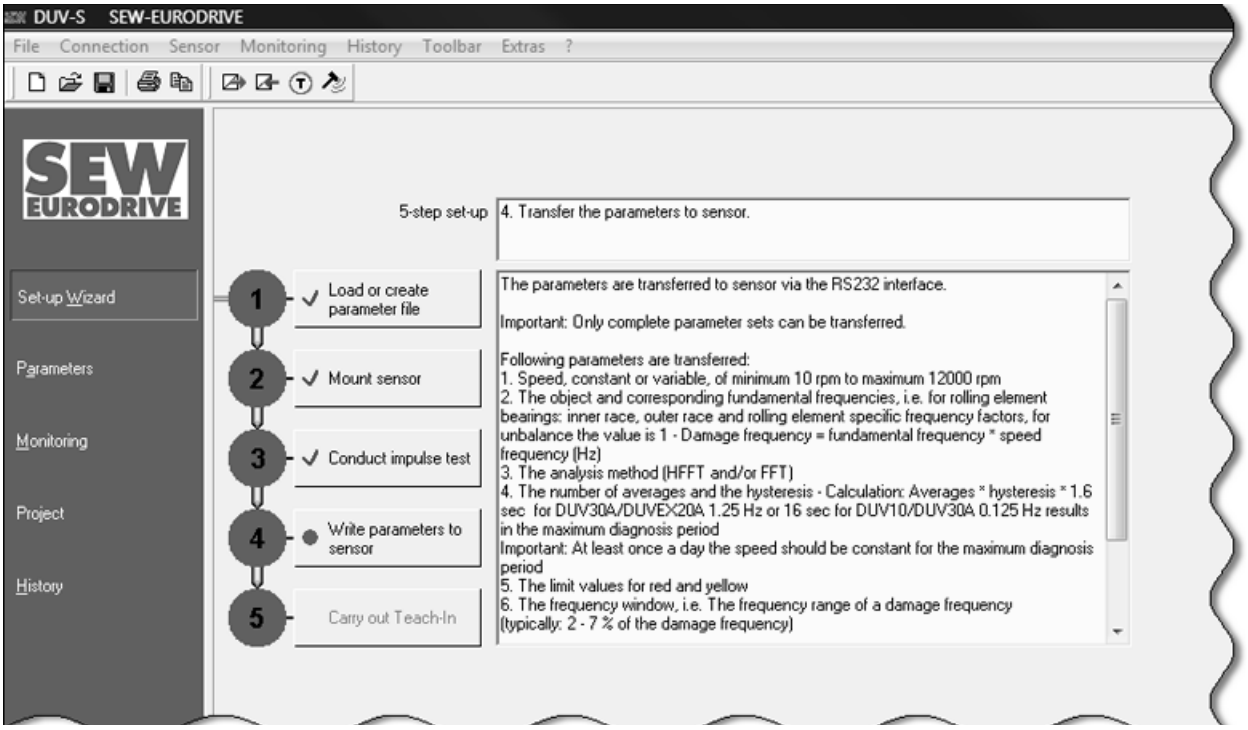
The impulse test can usually be carried out during operation.

If the error message "The difference between the noise level and impulse test is too small" is displayed, repeat the measurement when the machine is at a standstill.

If the message "Mounting location not suitable" is displayed, change the mounting location and repeat the impulse test.

5.10 Writing the parameter file to the sensor

The following screenshot shows the step "Writing parameters to the sensor":



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- To send the parameters to the sensor via RS-232 interface, click on the [Write parameters to the sensor] button.

	INFORMATION
	Only complete parameter sets can be transferred. A complete parameter set must at least include the speed, a frequency factor, an object, and the teach-in value.

The following parameters are transferred to the sensor:

- Speed, constant or variable, from at least 120 min^{-1} to max. 12 000 min^{-1} for normal-speed units and at least 12 min^{-1} to max. 3500 min^{-1} for slow-speed units.
- The diagnostic objects and their frequency factors
- The analysis method (HFFT and/or FFT)
- The number of averages and the response delay (hysteresis)

  Calculation for slow-speed units: Averages x response delay x 8 seconds = maximum diagnostic time

  Calculation for normal-speed units: Averages x response delay x 0.8 seconds = maximum diagnostic time

	INFORMATION
	The speed must be constant for the maximum diagnostic time at least once a day.

- The threshold values for red and yellow LEDs
- The frequency window; that is, the frequency range of a damage frequency (typical value: 2 to 7% of the damage frequency)
- The threshold values for the level monitor
- The basic values of the teach-in run
- Header data and project description

5.11 Teach-in

	INFORMATION
	The teach-in function is an automatic self-learning process performed by the sensor under **typical operating conditions** triggered by pressing the teach-in button on the unit or using the software.

The teach-in speed must be within the range previously defined for the operating speed and should ideally be close to the upper operating speed.

The teach-in function (Menu [Sensor] / [Teach-In]) is used to measure the reference values of the running machine and store them in the sensor. Diagnostic analyses are based on the teach-in value. This is why you must ensure that the teach-in process is performed correctly under typical operating conditions.

To ensure that the preset limit values can be used for the monitoring type "rolling bearings", you must make sure that the bearing to be monitored is not already damaged.

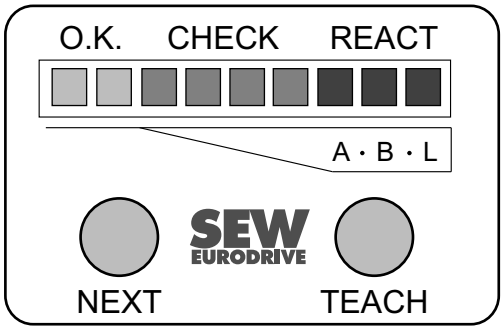
If the sensor is operated at different speeds, the teach-in run is conducted at a typical speed with similar operating conditions, preferably using a mid-range speed. The set number of averages is also in effect in the teach-in run.

The reference data are then recorded (FFT envelope and FFT spectrum). The file should be archived. The data can be used as a reference for diagnostics performed at a later date.

After the teach-in run, the data are read out from the sensor for backup.

5.11.1 Teach-in process

After you have connected the DUV30A diagnostic unit all the LEDs light up (delivery status).



1675163659

Teach-in directly on the DUV30A

- Press the <TEACH> button for 5 seconds. The parameterized DUV30A diagnostic unit adjusts itself to the operating conditions automatically. The yellow LEDs 2, 3 and 4 flash.

Teach-in using the software

- During teach-in using a PC/notebook, LED 1 is lit and LED 2 flashes. A message is then displayed on the screen and the unit switches to monitoring mode. In monitoring mode, LEDs 1 and 2 are lit up green continuously.
- The unit is now in monitoring mode and shows the damage progress via the LEDs.

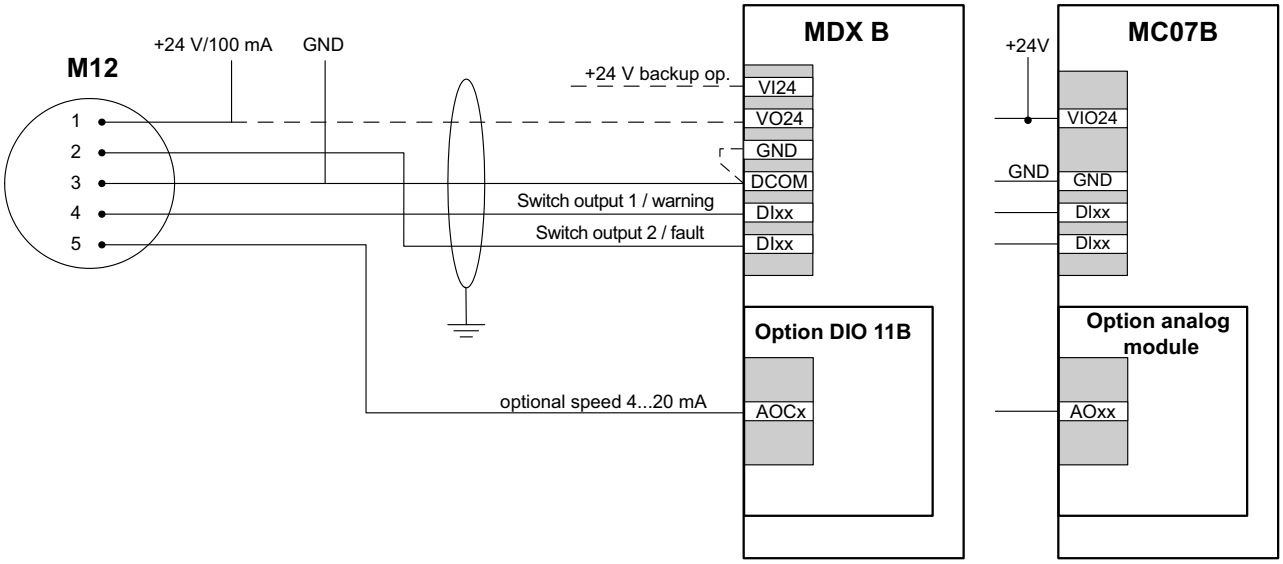
5.12 Evaluation of the switching outputs

The sensor can be evaluated by the following units:

- Frequency inverters
- Decentralized technology

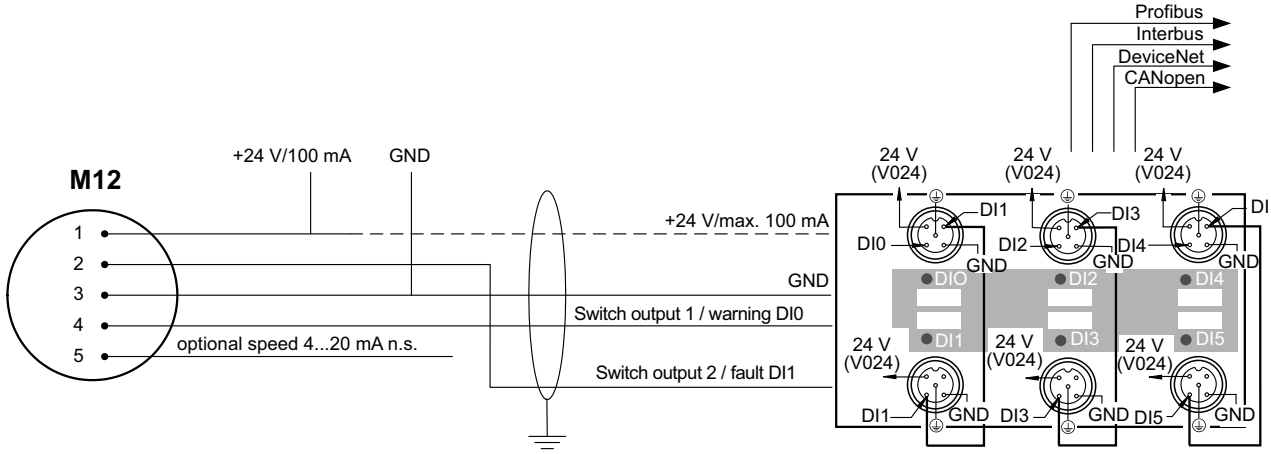
  (The binary signals are connected to the modules MFP/MFI/MFD/MFO or MQP/MQI/MQD/MQO and information is transmitted in the 4th PD word via PROFIBUS, INTERBUS, DeviceNet or CANopen. The binary signals can also be connected to other fieldbus modules).
- Controller
- Evaluation via online/tele service using Complete Drive Management (CDM) database

5.12.1 Evaluation using a frequency inverter



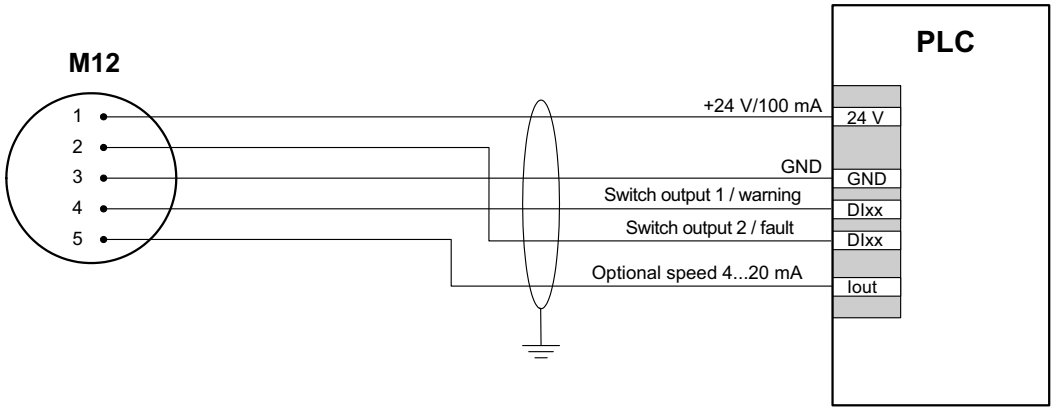
1675264395

5.12.2 Evaluation using decentralized technology



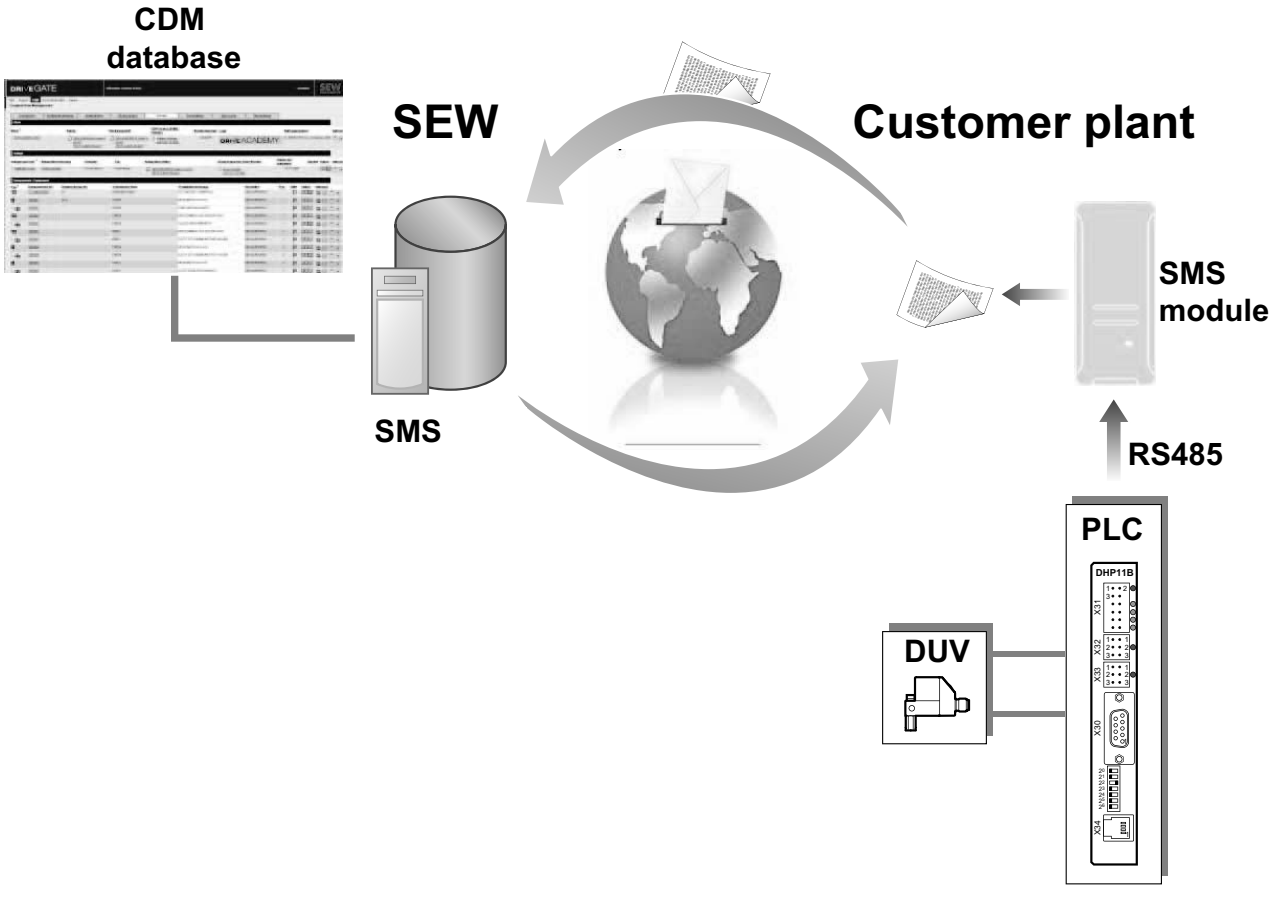
1675717643

5.12.3 Evaluation using a controller



1675723019

5.12.4 Evaluation via online/tele service using Complete Drive Management (CDM) database



1761078283

6 Operation

6.1 Settings

6.1.1 Country settings

Choose [Extras] / [Settings] to change the parameter input units from metric (comma, mm) to US (period, inch).

The language is selected under [File] / [Language].

6.1.2 Finding a COM port

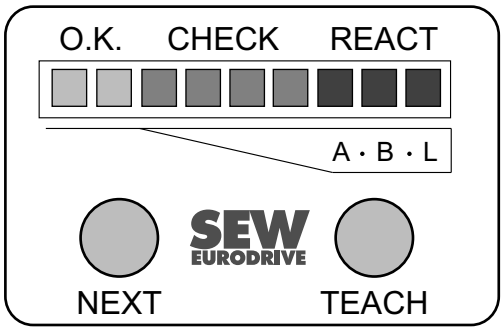
Choose [Extras] / [Scan COM ports] to update the list of COM ports available ([Connection] / [Settings]). In this way, any virtual serial ports (e.g. from USB converters) connected after the program was started are now added to the list.

6.1.3 Program settings

Select your preferred settings for units of length (millimeter or inch) and decimal separators (comma or period). The individual frequency windows for the subobjects shown in the spectral display (monitor) can be displayed.

6.2 Display damage progress

	INFORMATION
	Make sure that the DUV30A diagnostic unit has been configured correctly for your application using the DUV-S software, see chapters "Parameters" (page 35) and "Application" (page 36). If no parameter sets are available, all the LEDs light up (delivery status).

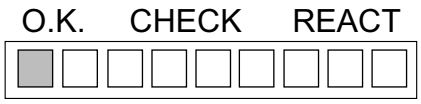
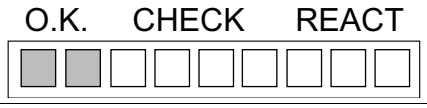
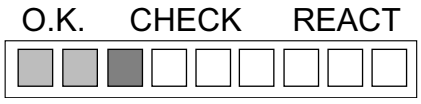
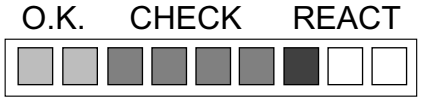


1675163659

After completing the teach-in process, the unit is in monitoring mode and indicates the damage progress via LEDs. The following display options can be selected:

- Display on the unit
- Display in the DUV-S software

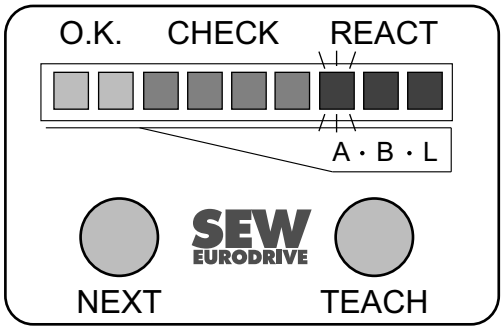
6.2.1 Display on the unit

Fig.	Description	Meaning
	• LED 1 green "O.K." is lit up	• Voltage supply is OK
	• LEDs 1 and 2 green "O.K." are lit up	• The diagnostic unit is ready for operation and without error
	• LEDs 1 and 2 green "O.K." are lit up • LED 3 yellow "CHECK" is lit up	• Damage has been detected (at an early stage) • The first switching output is activated (early warning). • The drive will break down in a few weeks. • Press the <NEXT> button to display the diagnosis of the early damage. (see chapter "Displaying the damaged object" (page 30). • You can track the damage progress using the yellow "CHECK" LEDs.
	• LEDs 1 and 2 green "O.K." are lit up • LEDs 3 ... 6 yellow "CHECK" are lit up • LED 7 red "REACT" is lit up continuously	• The second switching output is activated (main alarm). • Total failure is imminent. • The damage must be repaired immediately!

Displaying the damaged object

When the first yellow LED lights up, you can display where the damage has occurred. Proceed as follows:

- Press the <NEXT> button to display the diagnosis of the early damage.
- The flashing red "REACT" LED indicates which object is damaged.



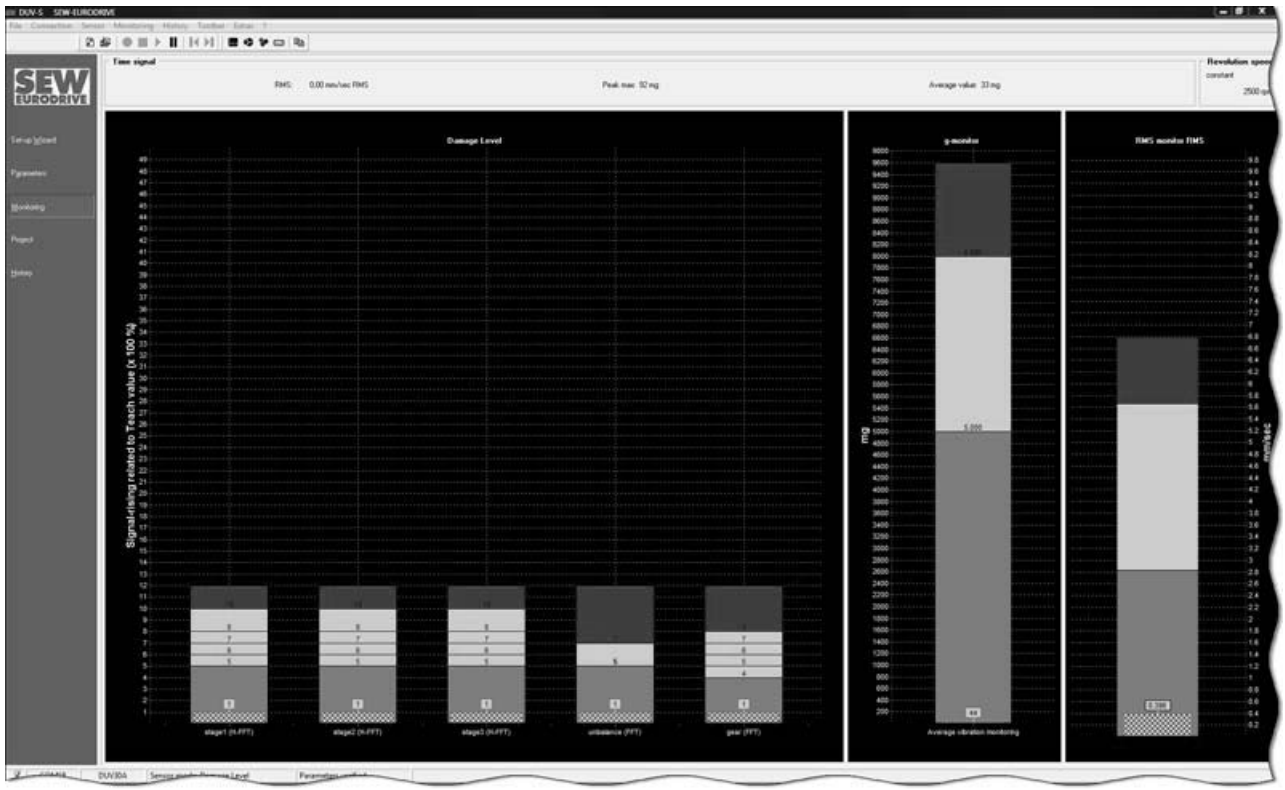
1676340619

LED red A	Object 1 or 4
LED red B	Object 2 or 5
LED red L	Object 3 or level monitoring device or V r.m.s. monitor

- Diagnose the damage using the DUV-S software.

6.2.2 Display in the DUV-S software

The following figure shows the damage progress in the DUV-S software if the V_{rms} monitor is active:



2609195403

7 Service

7.1 Maintenance

If used as specified in the manual, the DUV30A diagnostic unit does not require any maintenance.

7.2 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

7.3 Fault/repair

If the DUV30A diagnostic unit does not work properly, please contact the SEW-EURODRIVE service team.

	INFORMATION
	If you have to send in the diagnostic unit to SEW-EURODRIVE, please include the following information: • Serial number (see nameplate) • Type designation • Brief application description, incl. drive designation • Nature of the fault • Accompanying circumstances • Your own presumptions as to what has happened • Unusual events preceding the problem

7.4 Disposal

Dispose the DUV30A diagnostic unit in accordance with the material structure and the regulations in force.

8 Unit Functions

8.1 Sensor functions

8.1.1 Testing switching outputs

The function of the switching outputs 1 and 2 can be tested by setting them manually. To do so, choose [Sensor] / [Test switching output 1] or [Test switching output 2].

8.1.2 Teach values

The teach values are set in the sensor for each object and can be read out and changed manually using the function [Sensor] / [Teach values].

If you set the teach values manually, you do not have to perform the teach-in process later. The DUV30A diagnostic unit is ready for operation immediately.

The process of setting teach values manually can be used to reuse a known reference value for, for example, machines of the same type.

An absolute limit value can also be obtained by multiplying the teach value by the threshold level.

Example:

Nominal threshold level for early warning diagnostic object 1: 800 mg

Nominal threshold level for main alarm diagnostic object 1: 1600 mg

Set reference value: 80 mg

Results in a limit value setting for:

Early warning: 10 (corresponds to 800 mg = 80 mg x 10)

Main alarm: 20 (corresponds to 1600 mg = 80 mg x 20)

8.1.3 Read

You can read out the parameter set from the sensor via the menu [File] / [Read from sensor].

8.1.4 Teach-in

The teach-in function ([Sensor] / [Teach-in] menu) is used to measure the reference values of the running machine and store them in the sensor. Diagnostic analyses are based on the teach-in value. Therefore, you must ensure that the teach-in process is performed correctly under typical operating conditions.

To ensure that the preset limit values can be used for the monitoring type "Rolling bearings," you must make sure that the bearing to be monitored is not already damaged.

If the sensor is operated at different speeds, the teach-in run is conducted at a typical speed with similar operating conditions, preferably using a mid-range speed.

The set number of averages is also in effect in the teach-in run.

8.1.5 Write

You can write the parameter set ([File] / [Write to sensor] menu) to the sensor.

8.1.6 Reset

The data of the sensor can be reset. To delete all the data, including the teach-in data, choose [Sensor] / [Reset parameters].

8.1.7 Lock the teach button

There are two ways to lock the teach button:

- On the sensor via the menu [Sensor] / [Lock teach button].
- Manually by pressing both buttons for at least 5 seconds.

You can unlock the diagnostic unit again using the two described methods.

8.1.8 Sensor settings

To change the sensor settings, choose [Extras] / [Settings...].

- You can set up either write protection or both read and write protection for the sensor by using the password function.
- To activate and configure the history memory, choose [Sensor] / [Sensor settings]. To do so, select the [Activate history] check box and enter a value between 1 second and 12 hours in the [Interval] field. Click [Accept] to start the history memory.

	INFORMATION
	Important: These settings are only activated when the parameter data is written to the sensor!

8.1.9 Display sensor information

You can read out the serial number, firmware version, and hardware version via the menu [?] / [Info].

8.2 Parameters

8.2.1 Set diagnostic objects

The "Set diagnostic objects" input screen in the wizard gives you an overview of all the diagnostic objects currently defined. You can create additional diagnostic objects as long as the maximum number of diagnostic objects or all subobjects is not exceeded.

Maximum number of diagnostic objects	Maximum number of subobjects
5	20

If you do not want to create any more diagnostic objects, the wizard moves on to the settings for the level monitor and the project data.

If an object is selected from the list, the wizard can be activated again for this object.

8.2.2 Header data

Header data is used to archive the application. Alphanumerical entries for the following data are stored in the sensor:

- Manufacturer
- Place
- Address
- Installation site
- Machine

8.2.3 Project description

The project description is used to archive notes relating to the project.

	INFORMATION
	The data is stored in the parameter file, not in the sensor.

8.2.4 Print parameters

Choose the menu item [Print] in the wizard to print out a list of the set parameters.

8.2.5 Save parameters

Use the buttons [Save to hard drive[and [Write to sensor] to save the parameters as a file and/or to transfer them to the sensor.

	INFORMATION
	The history data must be saved separately in CSV or XML format.

8.3 Application

8.3.1 Parameters

Parameter sets can be created for different types of sensors. The possible input values vary according to the sensor type and are, therefore, taken into account in the input fields.

8.3.2 Speed behavior

Operating speed data is important for defining speed-related damage frequencies. The DUV30A diagnostic unit can be used with both constant and variable speeds. To ensure correct diagnostics when using variable speeds, the current speed has to be supplied via a 0 – 20 mA current loop or an HTL incremental encoder (1 – 32 pulses).

If the setpoint speed is used as information for asynchronous motors, it is important to enter the nominal speed under nominal load. Deviations caused by slip can be compensated by the frequency window. If the slip exceeds 5 %, the actual speed should be taken directly from the shaft, e.g. using a proximity switch.

Entry:

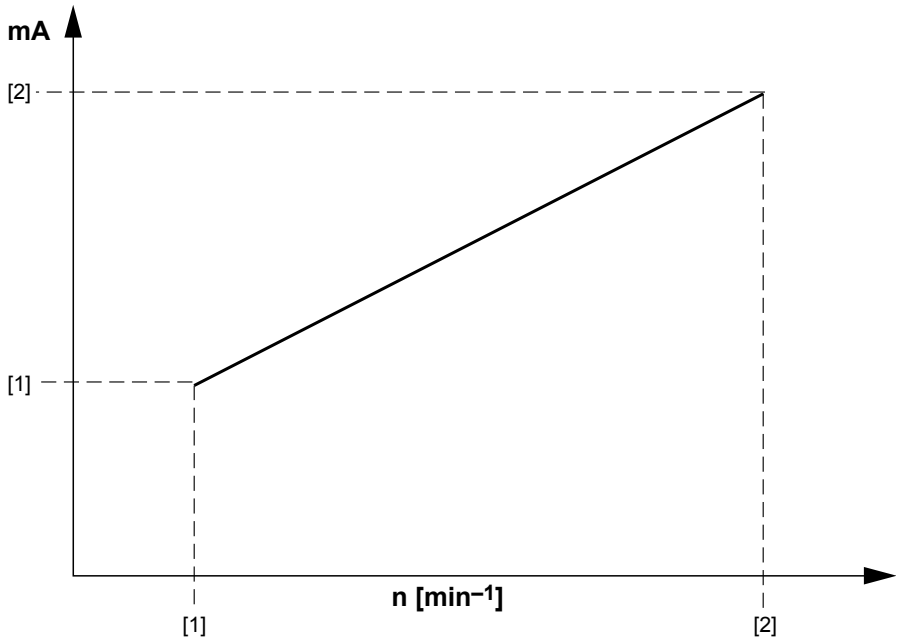
- Constant operating speed
- Variable operating speed

8.3.3 Speed input

With variable-speed applications, the DUV30A diagnostic unit must be provided with the operating speed. A 0 – 20mA current loop or a pulse signal (for example, from a proximity switch) can be used to provide information about the speed. The maximum adjustment of the current loop is 20 mA. The HTL pulse signal (1 to 32 pulses) may not exceed a maximum switching frequency of 10 kHz. The minimum pulse band is 3 µs.

8.3.4 Speed calibration

The sensor has to be provided with the operating speed to monitor applications with variable speed. If the speed is supplied via a 0 – 20 mA current loop, the speed input signal is calibrated using user-defined lower and upper speeds:



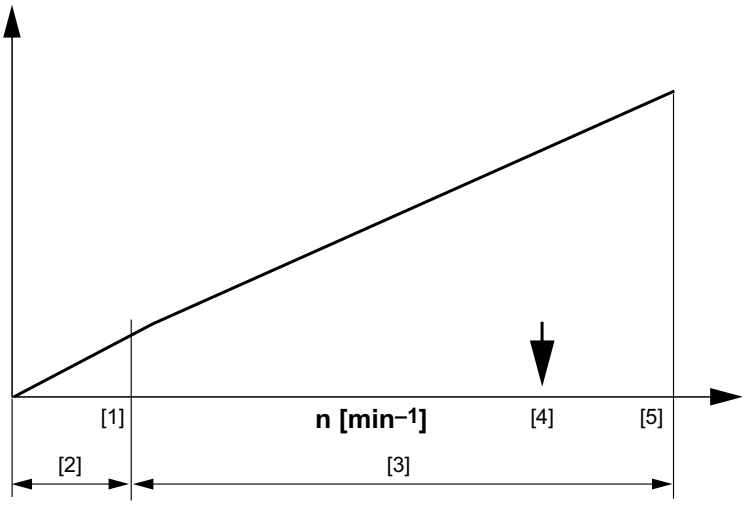
1204873099

[1] Lower speed
[2] Upper speed

	INFORMATION
	The speed at 20 mA, calculated using the given data, must not drop below 12 min^{-1} and not exceed 3500 min^{-1}. In normal-speed units, the calculated speed at 20 mA must not drop below 120 min^{-1} and not exceed 12000 min^{-1}.

8.3.5 Operating range

The sensor must receive information on the operating speed range to monitor applications with variable speed. This is done by specifying the lower and upper operating speed:



1204877963

[1] Lower operating speed
[2] No monitoring possible
[3] Monitoring
[4] Teach-In speed
[5] Upper operating speed

	Low-speed unit	Normal-speed unit
Minimum number of revolutions per min	12	120
Maximum number of revolutions per min	3500	12000

INFORMATION

If the sensor is configured for variable-speed operation, the sensor only performs the measurements when the current speed is higher than the minimum operating speed and lower than the maximum operating speed. Measurements cannot be performed if the speed input is not connected.

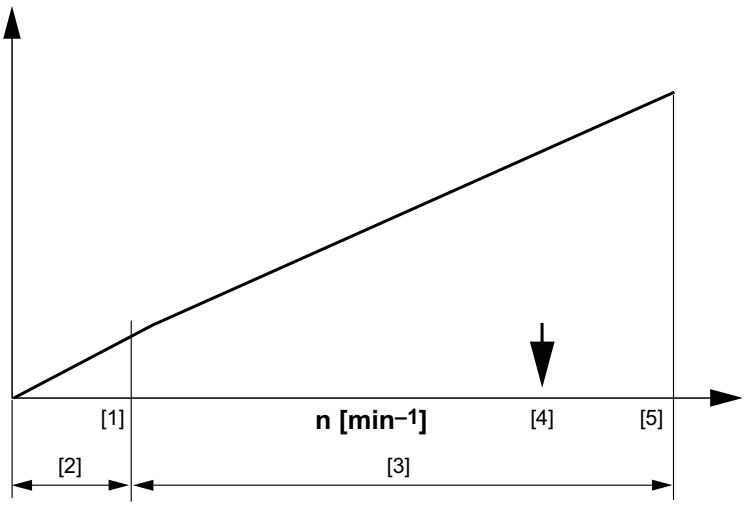
8.3.6 Constant speed

You can only define one machine speed. If the diagnostic objects (e.g. rolling bearing) are based on different speeds (gear unit), you must also define the transmission ratio for each diagnostic object.

For machines using mains operation, the operating speed is assumed to be constant. If the setpoint speed is used as information for asynchronous motors, it is important to enter the nominal speed under nominal load. As with asynchronous machines, variations caused by slip can be compensated by the frequency window. If the variations in the actual operating speed exceed 5%, SEW-EURODRIVE recommends to measure the speed.

8.3.7 Teach-in speed

If the machine to be monitored is operated at variable speeds, you must define which speed is to be used for the teach-in run, in order to take the weighting of the reference value into account. The teach-in speed must be within the range previously defined for the operating speed and should ideally be close to the upper operating speed.



1204877963

[1] Lower operating speed
[2] No monitoring possible
[3] Monitoring
[4] Teach-In speed
[5] Upper operating speed

8.3.8 Averaging of diagnostic objects

Number of individual measurements required to calculate a spectral diagnostic analysis.

Low-speed units:

A measurement takes 8 seconds and corresponds to the frequency resolution of 0.125 Hz in the spectrum as long as all the specified frequencies are in one frequency range (0...50; 50...150; 150...250, etc.). Ensure operation at a constant speed for the resulting total measurement time.

Possible values: 1 (=none); 2; 4; 8; 16; 32

Recommended setting: 2

Averages can be set for the level monitor regardless of these settings.

Normal-speed units:

A measurement takes 0.8 seconds and corresponds to the frequency resolution of 1.25 Hz in the spectrum as long as all the specified frequencies are in one frequency range (0...500; 500...1500; 1500...2500, etc.). Ensure operation at a constant speed for the resulting total measurement time.

Possible values: 1 (=none); 2; 4; 8; 16; 32

Recommended setting: 2

Averages can be set for the level monitor and the V rms monitor regardless of these settings.

8.3.9 Frequency window

The frequency window specifies the relative search width in the frequency spectrum for each damage frequency. The frequency window is positioned above and below the monitored frequency. The frequency window is used to compensate for inaccuracies in the description of the frequency location (tolerance corridor).

Normal-speed units:

The input values are relative in percent.

Minimum value range	1 %
Maximum value range	20 %

Example: Normal-speed unit with 1.25 Hz frequency resolution

Frequency window = 5%; damage frequency = 311.5 Hz corresponds to spectral line 249

Search range = Spectral lines 237 to 286 correspond to 296.25 Hz to 357.5 Hz

INFORMATION

Definition of spectral line:

The calculated frequency spectrum comprises discrete frequency lines, the so called spectral lines. The standard frequency resolution of the DUV30A diagnostic unit is 0.125 Hz for slow-speed units and 1.25 Hz for normal-speed units in the spectrum. This means that the distance between the spectral lines is 0.125 Hz or 1.25 Hz.

Low-speed units:

The input values are relative in percent.

Minimum value range	0.1 %
Maximum value range	20 %

The frequency window setting applies to all set objects, as the maximum frequency window of the individual diagnostic objects comes into effect.

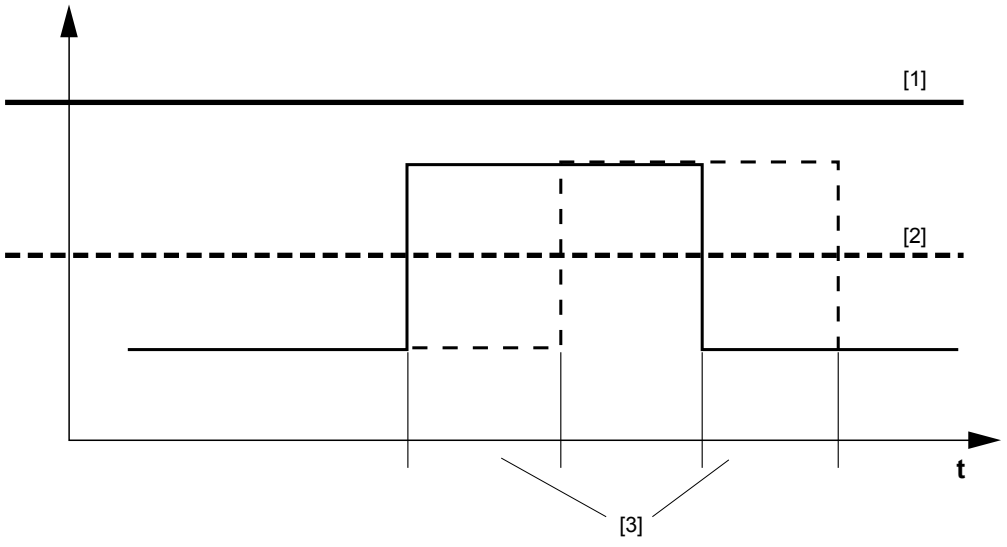
8.4 Diagnostic objects

8.4.1 Response delay for diagnostic object

To avoid false alarms, the sensor is set to a response delay (hysteresis) of 5 as standard. This means that an increase in the diagnostic value is only displayed after a sustainability check confirms 5 subsequent increases. In this way, the sustainability of the displayed diagnostic analysis is guaranteed.

The response delay can be set from 1 (no delay) to 10. The total response time then results from the number of averages multiplied by the defined response delay.

If the DUV30A diagnostic unit is in diagnostics mode, it will only show a change when the measured value exceeds the teach-in value by 100%. The set response delay has the same effect on all defined diagnostic objects. A response delay for the level monitor can be set independently of this.



1204868235

[1] Switching output: RED
[2] Switching output: YELLOW
[3] Response delay of the diagnostic objects

8.4.2 Output stage

The switching signals (output stage) of the DUV30A diagnostic unit can be set as both normally closed and normally open contacts. We recommend that you use the setting "Normally closed" (cable break detection).

	INFORMATION
	If you want to evaluate the switching signals of the DUV30A diagnostic unit in a MOVIDRIVE® MDX60B/61B frequency inverter, you must set the switching signals to "Normally closed contacts".

8.4.3 Vibration velocity v_{rms}

In addition to the 5 objects, the vibration velocity v_{rms} can be monitored in normal-speed mode. For this purpose, the vibration velocity is calculated in line with DIN ISO 10816 (evaluation of machine vibration by measurements on non-rotating parts) from the raw acceleration signal in the freely adjustable frequency range between 1.25 and 1000 Hz (standard 10 to 1000 Hz). This allows the DUV30A diagnostic unit to monitor limit values with the unit [mm/s] from DIN ISO 10816.

8.4.4 Level monitor

In addition to the frequency selective (i.e. narrow-band) rolling bearings and/or diagnostic object measurement, the level monitor enables vibration condition monitoring in the time domain. This so-called broadband measurement provides general information on the entire system by evaluating the raw acceleration signal with regards to maximum acceleration or mean acceleration.

8.4.5 Monitoring type

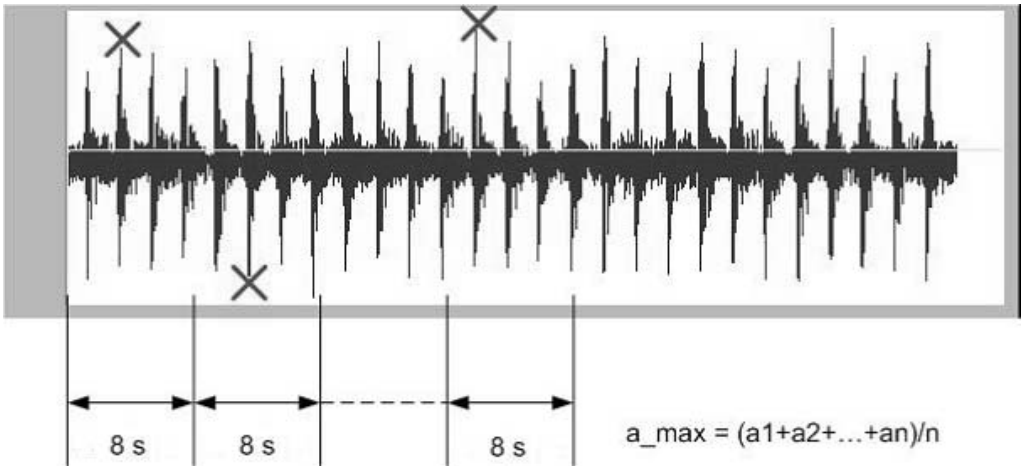
The monitoring mode determines whether the level monitor should monitor the maximum peak (peak monitoring) or the weighted average (vibration monitoring) of the acceleration signal. In contrast to the diagnostic objects, the subsequent monitoring function uses absolute values.

Two alarm thresholds and a speed-dependent signal weighting can be set.

The response delay and number of averages are set independent of the settings of the diagnostic objects.

Peak monitoring

The following figure shows an example of a peak monitoring recording in slow-speed mode with a minimum measuring time of 8 s. For normal-speed units, the minimum measuring time is 0.8 s.

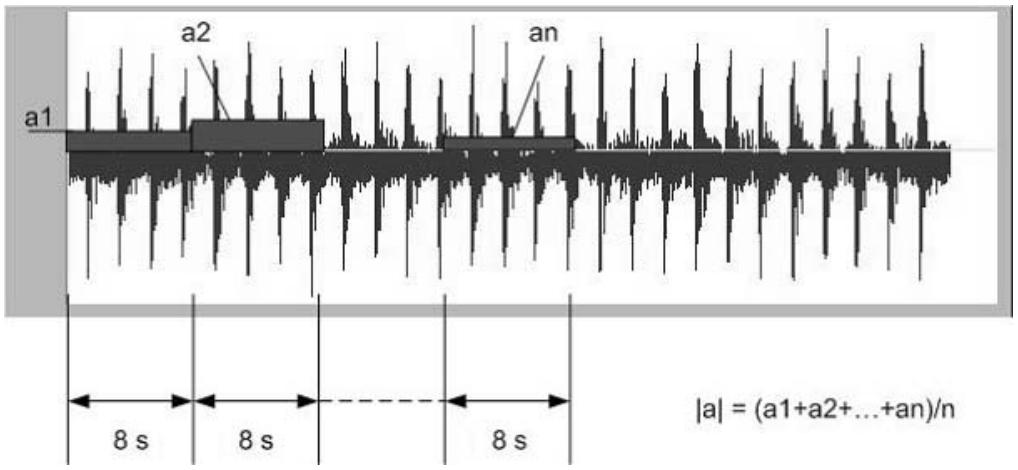


1204768523

X Trigger time (highest peak within the measuring time)

Vibration monitoring

The following figure shows an example of a vibration monitoring recording in slow-speed mode with a minimum measuring time of 8 s. For normal-speed units, the minimum measuring time is 0.8 s.



1204770955

a Trigger interval

8.4.6 Constant switch points

The DUV30A diagnostic unit uses its own threshold values for monitoring the vibration acceleration (level) and the vibration velocity in the time domain. In contrast to the diagnostic objects, these values for acceleration (unit [mg]) or speed (unit [mm/s]) are absolute.

For variable speed monitoring, the vibration level to be monitored is weighted according to the "Weighted signal" curve to compensate for differences caused by the trigger threshold.

You can define two threshold levels (red and yellow), which are also used to switch the outputs.

- Alarm indication with yellow LED:

  First yellow LED lights up and switching output 1 is activated

- Alarm indication with red LED:

  First yellow LED lights up and 3rd red LED (L) lights up and switching output 2 is activated

Minimum: 200 mg; 0 mm/s

Maximum: 25000 mg; 50 mm/s

Units:

1 mg = 0.001 g

1 g = 9.81 m/s^2 (gravitational acceleration)

8.4.7 Variable switch points

Variable limit values can be set via the operating speed range for variable speed operation. The curve for the early warning alarm is dragged using the left mouse button and the distance between yellow and red is specified as a percentage value. Only values that result in threshold levels < 25000 mg or < 50 mm/s are accepted. The exact values are displayed for the defined teach-in speed.

8.4.8 Average level

The average level is the number of individual measurements required to calculate a diagnostic value.

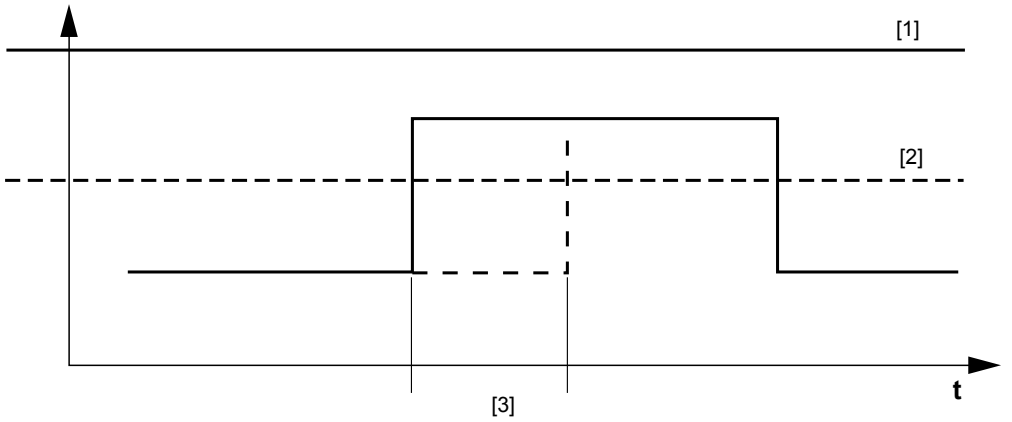
The averaging of the vibration level (time domain) or the vibration velocity is set independent of the average for determining the diagnostic values (frequency range).

The measuring interval is 8 seconds for slow-speed units and 0.8 s for normal-speed units for determining the weighted average, the maximum peak, and the vibration velocity.

8.4.9 Response delay level

A response delay can be set separately for the level monitor independent of the settings for the spectral diagnostic objects. To avoid false alarms, the sensor is set to a response delay (hysteresis) of 5 as standard. This means that the level value is only displayed after a sustainability check confirms 5 subsequent increases. This ensures the relevance of the displayed values.

The response delay can be set from 1 (no delay) to 10. The total response time then results from the number of averages multiplied by the defined response delay:



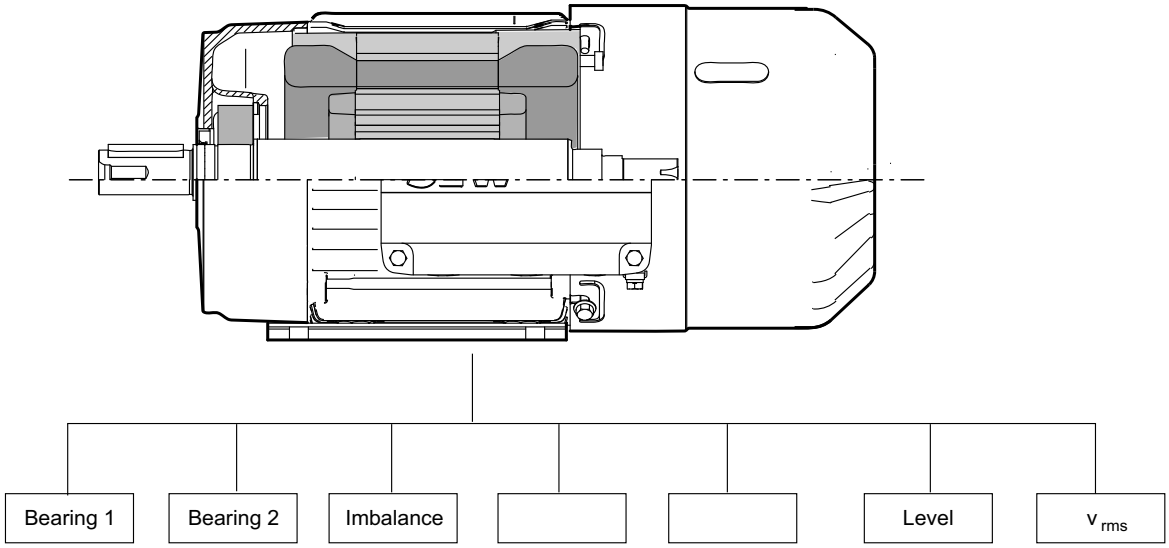
1204870667

[1] Switching output: RED
[2] Switching output: YELLOW
[3] Response delay level monitor

8.4.10 Diagnostic objects

The machine diagnostics carried out by the DUV30A diagnostic unit is automatically built-up by defining a machine model via so-called diagnostic objects. The software can monitor up to 5 different diagnostic objects at the same time. A diagnostic object is a group of characteristic damage frequencies that are defined using so-called frequency factors. Multiplying the speed frequency by the frequency factor results in the actual damage frequency. Therefore, applications operated at constant speed have a constant damage frequency.

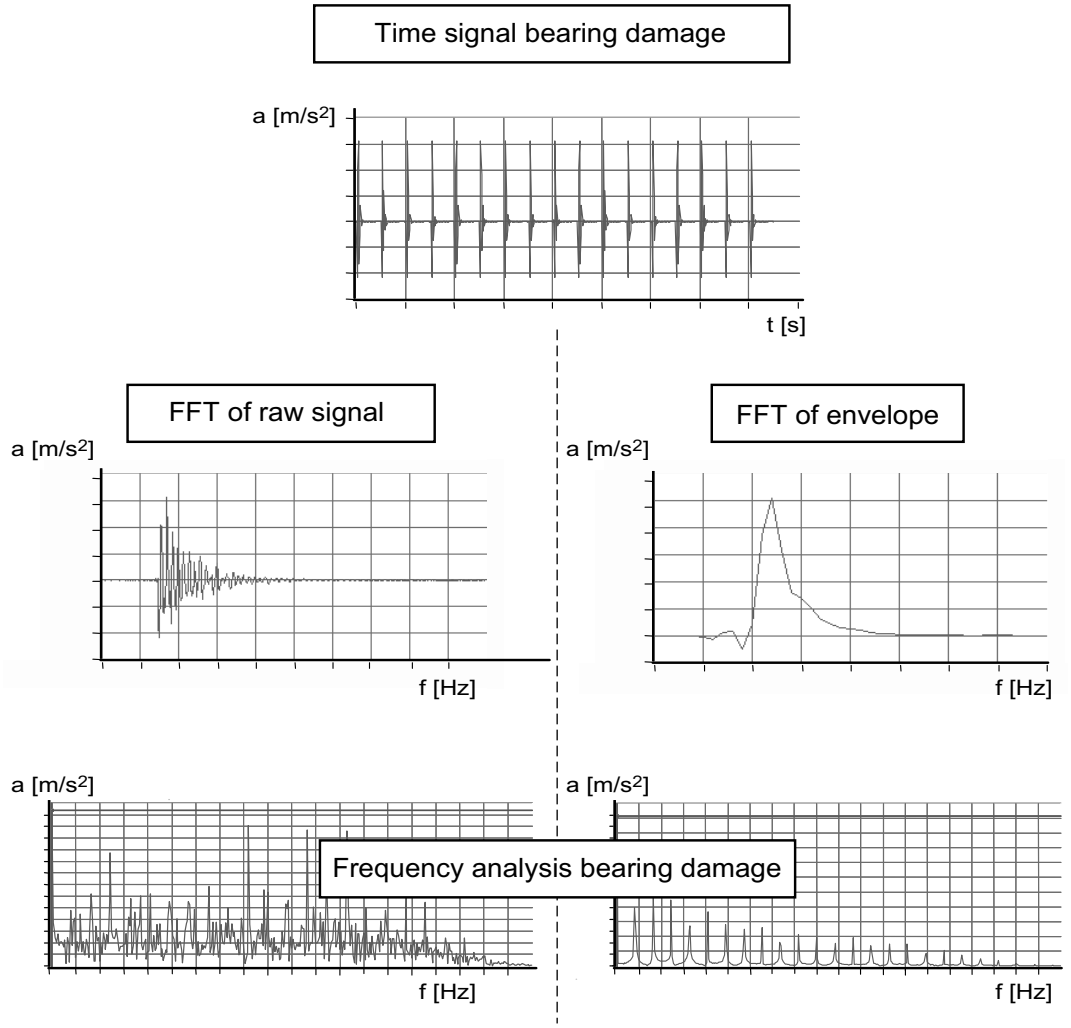
The diagnostic object is assigned an analysis method depending on the damage type. For example, tooth meshing frequencies and unbalances are monitored with the FFT method and rolling bearing damage with the H-FFT method.



1681322123

8.4.11 Analysis method

The signal analysis is used to generate informative properties from the raw acceleration data. The software for the DUV30A diagnostic unit uses methods of fast frequency analysis (Fast Fourier Transformation = FFT). The analysis method differentiates between the calculation of the linear spectrum from the raw acceleration data (FFT) and from the envelope curve of the acceleration data (H-FFT). The selected analysis method can be assigned to a specific diagnostic object. In this way, for example, unbalance and rolling bearing damage can be monitored in one sensor.



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	INFORMATION
	Predominantly, vibration monitoring allows you to detect damages that cause vibrations at a distinct frequency, e.g. pitting damages. Damages caused by foreign particles, bearing currents, blocked bearings or the like. Further, the diagnostics can be affected by overlapping frequencies or extreme, interfering vibrations as known from agitators or mixers. Needle roller bearings and hybrid bearings such as in planetary gear units are not suitable for vibration monitoring.

Frequency resolution of the linear spectrum

Sensor	Frequency range	Frequency resolution
Normal-speed unit	1,25 – 5000 Hz	1.25 Hz
Low-speed unit	0,125 – 500 Hz	0.125 Hz

FFT:

Evaluation of harmonic signals, for example, unbalance, cavitation, resonance, alignment errors, tooth meshing.

H-FFT:

Evaluation of high-frequency, peak-shaped signals such as roller bearing damage

8.4.12 Diagnostic type

If you select the diagnostic type "Rolling bearing" or "Unbalance", default values are set automatically for diagnosing rolling bearings or detecting unbalance. This option simplifies the parameter setting process.

If you select "Other", it is possible to set parameters for any machine damage if it is characterized by assigned symptomatic frequencies/orders.

8.4.13 Rolling bearing

The parameter setting "Rolling bearing" determines the rolling bearing condition from the amplitudes of the ball pass frequencies:

- Inner ring
- Outer ring
- Rolling element

You can use the rolling bearing database or enter your own bearing data.

8.4.14 Imbalance

The parameter setting "Unbalance" determines the machine condition using the amplitudes of the rotational frequency.

8.4.15 Other

The damage type "Other" can be used to set any machine damage by specifying the damage frequencies (orders) for each diagnostic object.

8.4.16 Gear ratio

Gear ratio measuring speed / object speed

The ratio indicates the differences in speed between the motor shaft and the shaft that the monitored rolling bearing (or object) supports, if:

- the specified speed refers to the motor shaft and
- the shafts are connected by a gear unit

For the quotient, this means:

- (measurement/object) < 1: speed increase relating to the drive
- (measurement/object) > 1: speed decrease relating to the drive

	INFORMATION
	The input values of the object speed and the measuring speed must each be < 50.

8.4.17 Designation

Enter an alphanumeric designation for the diagnostic object to be monitored.

8.4.18 Damage frequencies

Enter the damage frequencies (subobjects) that are to be assigned to a particular type of machine damage (object).

A maximum of 20 individual frequencies can be defined using the DUV30A diagnostic unit. These frequencies can be assigned to a maximum of 5 diagnostic objects.

The characteristic data for the object is calculated using the total of the individual amplitudes of the given frequencies.

The frequencies are described using the so-called order analysis. Hereby, the required frequency is the current rotational frequency multiplied by an order.

The order denotes the multiple of the rotational frequency. The damage frequency is calculated as follows:

Damage frequency = order x rotational frequency

Example: Order = 6.23, rotational frequency = 50 Hz: Damage frequency = 373.8 Hz

The order always relates to the corresponding frequency of the defined error object. If the speeds between the objects differ, the corresponding gear ratios have to be taken into account.

8.4.19 Frequency window

The frequency window specifies the relative search width in the frequency spectrum for each damage frequency. The frequency window is positioned above and below the monitored frequency. The frequency window is used to compensate for inaccuracies in the description of the frequency location (tolerance corridor).

The input values are relative in percent.

Frequency window	Low-speed unit	Normal-speed unit
Minimum frequency window	0.1 %	1 %
Maximum frequency window	20 %	20 %

The frequency window setting applies to all set objects, as the maximum frequency window of the individual diagnostic objects comes into effect.

Example: Normal-speed unit

Frequency window = 5%; damage frequency = 311.5 Hz corresponds to spectral line 249

Frequency window = Spectral lines 237 to 261 correspond to 296.25 Hz to 326.25 Hz

8.4.20 Threshold values for diagnostic objects

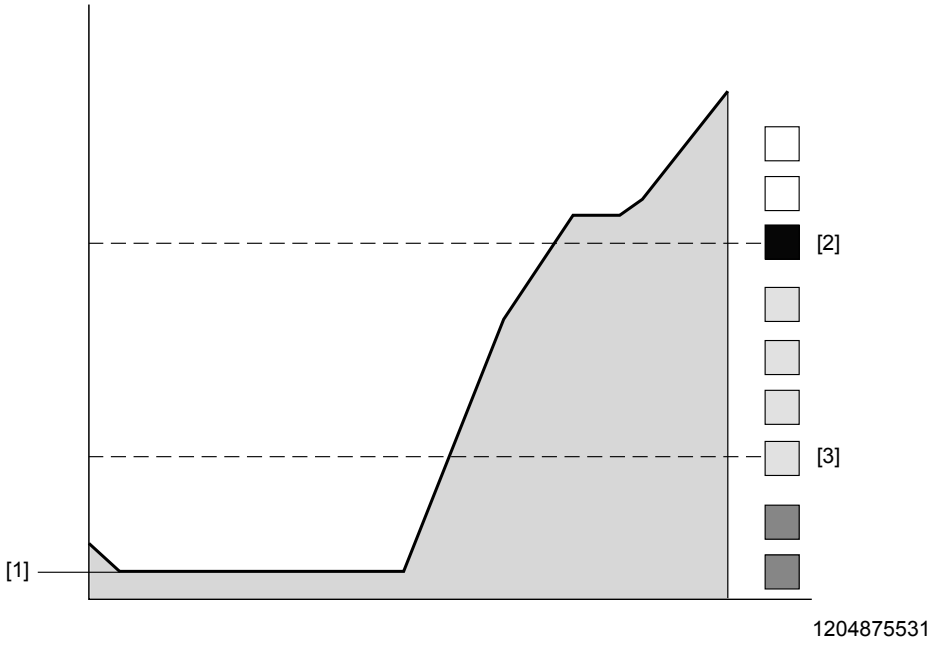
The software for the diagnostic unit uses different threshold values for early warning (yellow) and main alarm (red) for all defined spectral diagnostic objects. The threshold values of the diagnostic objects are always based on the set teach-in value and describe a signal fan-out. "Green" always corresponds to 100%.

Value range for early warning: 2; 3; 4;...; 20 (in whole numbers) corresponds to: 200%; 300%; etc.

Value range for main alarm: 3; 4; 5; .....; 99 (in whole numbers). If the set threshold values are larger by 4, integer intermediate values are achieved for the yellow LED chain.

To compensate differences caused by the threshold level for different speeds during variable-speed operation, the diagnostic value is weighted according to the "Weighted signal" curve. Individual weighted curves are defined for each diagnostic object.

If the diagnostic type "Rolling bearing" is selected, the limit values and weighted curves are set automatically:



[1] Teach-in = 100%
[2] Main alarm
[3] Early warning

8.4.21 Transmission characteristics

The transmission factor is a measure for the mechanical transmission of peak pulse sequences relating to rolling bearing damage.

The transmission factor can be measured using a mechanical impulse test (ping test) when the sensor is connected. The sensor must be mounted correctly in the designated location and the impulse must be provided as close to the bearing to be monitored as possible.

The impulse test is an option. Its result has no direct influence on the startup procedure.

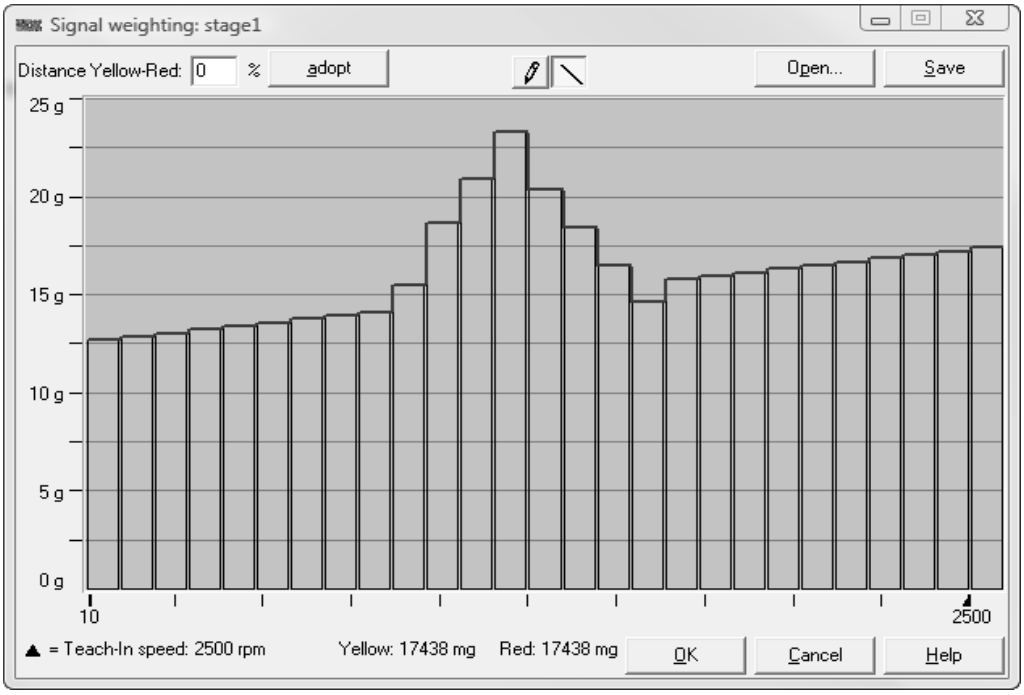
8.4.22 Signal weighting

For variable speed monitoring, it is possible to correct the variables based on the speed. The values displayed indicate how the variables of constant damage change with speed. The change is taken into account during the evaluation and calculation in the sensor.

The teach value and the measured value are weighted using the signal weighting table. The teach value is weighted using the specified teach-in speed, and the measured value is adjusted using the measured speed. This is why you must keep to the teach-in speed during the teach-in run.

You can either use predefined curves or create and load your own. If you use the diagnostic type "Rolling bearing damage" when setting parameters, preconfigured settings are loaded. These can be changed as required.

Also indicated is the extent to which the teach-in value is adjusted in the signal-weighted diagram shown in the "Subobjects" and "Objects" modes. The following figure shows the signal weighting:



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The following formula applies:

$$\text{Damage level (or limit value)} = \frac{\text{measured value in mg / weighted signal at measured speed}}{\text{teach-in value in mg / weighted signal at teach-in speed}}$$

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Determining the damage level (300 mg at 5000 rpm, teach-in 65 mg), taking the signal weighting into account:

$$X = \frac{300\ \text{mg} / 97\ \%}{65\ \text{mg} / 86\ \%}$$

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The required teach value can also be determined in order to exceed the yellow limit value (4) for given values (300 mg at 5000 rpm):

$$4 = \frac{300\ \text{mg} / 97\ \%}{X\ \text{mg} / 86\ \%}$$

1204792843

Solved according to X (teach-in value)

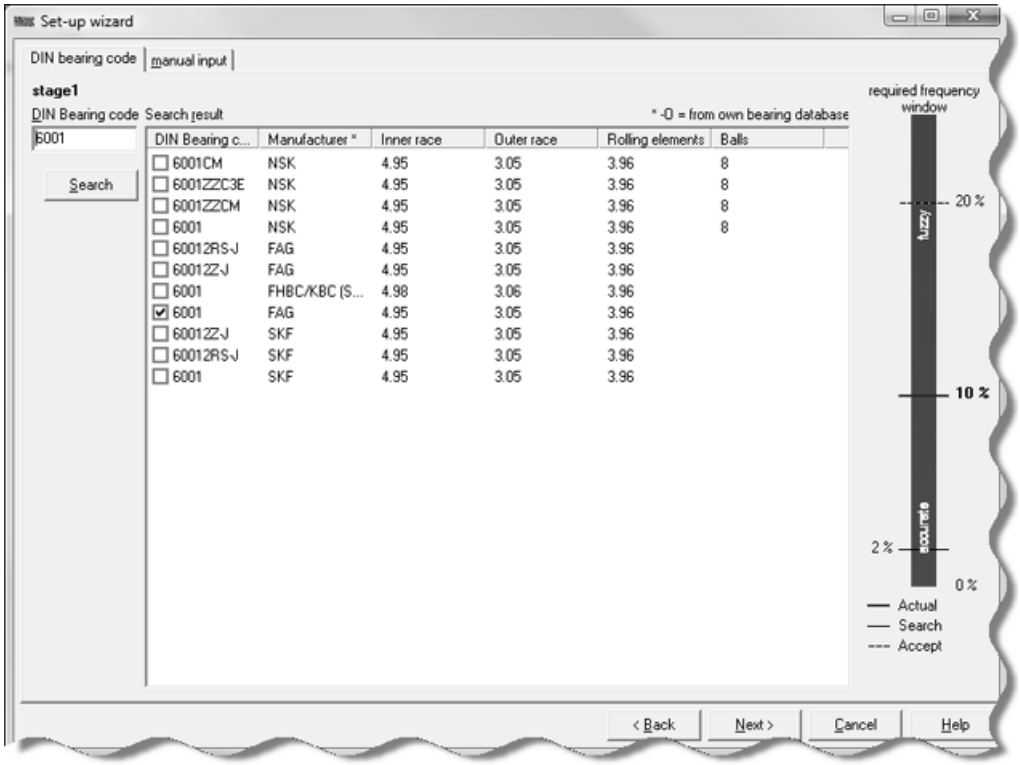
X = 66.5 mg

8.4.23 Conflict check

The purpose of the conflict check is to ensure that the set monitoring parameters are complete and plausible.

8.5 Rolling bearing database

The most common rolling bearings from a range of manufacturers are stored in the bearing database. They can be defined by entering a brief description of the bearing. The bearings listed in the user-defined bearing database can be included in the search and displayed ([Extras] / [Settings] / [Rolling bearing database] / [Search]). An "E" is added to the bearing designation (see column "DIN", e.g. "6000E"). The following figure shows a rolling bearing database:



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Short description = DIN

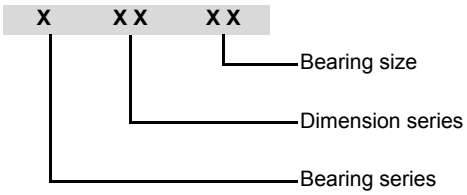
Each standard rolling bearing has a short description according to DIN 623 with which it can be uniquely assigned to a specific bearing group. Furthermore, geometric data can also be identified from this designation.

The ball pass orders are also described.

Suffixes and prefixes do not usually have any influence on the ball pass orders. Only the suffix "E" usually indicates a reduced number of rolling elements and is therefore relevant to the ball pass orders.

There are only marginal differences in grooved ball bearings between the different manufacturers. For all other bearing types, the difference between the bearing manufacturers is relevant and must be taken into account for parameterization. Bearing designations with more than 5 digits are special designs. In this case, you should consult the manufacturers' databases.

8.5.1 Bearing designation



Bearing series designation	
1	Self-aligning ball bearing
2	Spherical roller bearing and axial spherical roller bearing
3	Taper roller bearings
4	Double-row deep-groove ball bearing
5	Axial deep-groove ball bearing
6	Single-row grooved ball bearing
7	Single-row angular contact ball bearing
N	Cylindrical roller bearing

The bearing size multiplied by 5 defines the inner diameter of the bearing.

Example:

Bearing 6(0)212:

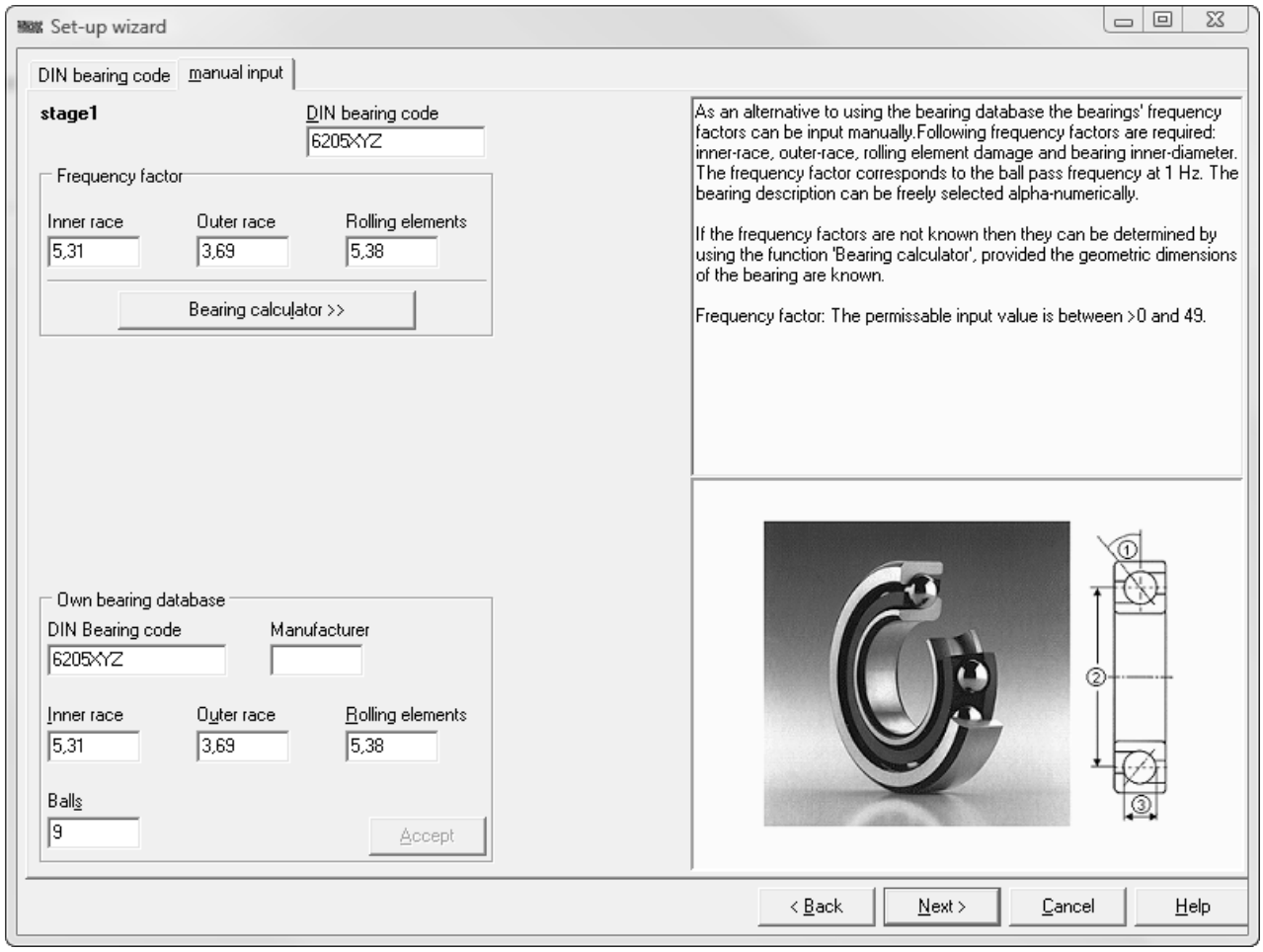
Inner diameters = 12 x 5 = 60 mm

8.5.2 Creating rolling bearings

As an alternative to using the rolling bearing database, the ball pass frequencies can be input manually by entering the orders (= multiplier for rotational frequency) for the inner ring, outer ring and rolling bearing in the input screen.

If you know the bearing geometry, you can use the bearing calculator to calculate the frequency factors.

The following figure shows the window for defining your own bearing:



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The bearing data can be stored in the user-defined rolling bearing database. The bearings of the user-defined database are also displayed when you search the general rolling bearing database. An "E" is added to the manufacturer designation (see tab "DIN bearing code" > "Manufacturer" column, e.g. "SKFE").

8.5.3 Database settings

The path for the "user-defined database" can be entered again in order to reintegrate previously stored bearing databases or to include new bearing databases. Choose the source for the bearing database under [Extras] / [Settings] / [Rolling bearing database]. You can restrict your search to optimize the search speed and to avoid double search results.

The default setting is "CD database and user-defined rolling bearing database". This setting is recommended by SEW-EURODRIVE. If the bearings to be monitored are not stored here, you can create them.

8.5.4 Impulse test

The impulse test measures the signal transmission from the object to be measured to the installation location of the sensor. This test determines the suitability of the installation location ([Signal path] / [Mounting test]). Furthermore, limit value parameters can be set automatically ([Signal path] / [Diagnostic object]).

The impulse test is triggered using the start button. Before an impulse is triggered, the background noise of the machines is measured.

Next, an impulse is provided at the relevant bearing seat using the impulse tester (part number 14066335), and three impulse responses are measured at the designated installation location.

The results of the impulse test are only valid if there is sufficient distance between the background noises and the test results, and the value deviations do not exceed 40%.

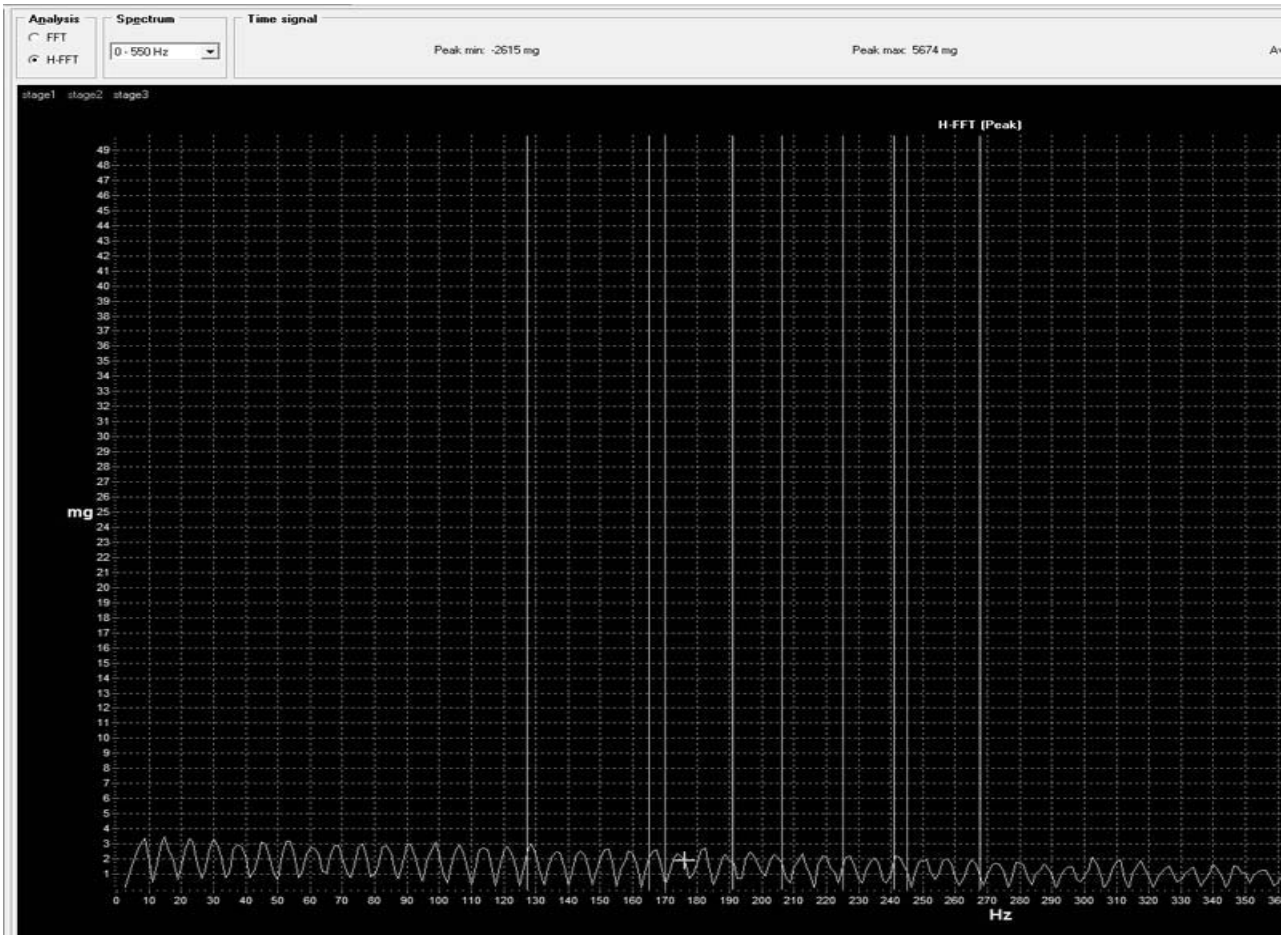
If the background noises are too strong, we recommend repeating the measurements when the machine is not in operation.

A minimum result of 5 mg/N is required to ensure reliable monitoring of rolling bearings.

8.6 Monitoring

8.6.1 Spectral display

Considers the linear spectra, the raw time signal and the envelope-modulated time signal. The amplitudes are given in "mg-peak". The total frequency range is divided into 7 different areas. Open the "Spectrum" selection menu to display an area, here: "0-500 Hz":



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Furthermore, maximum and minimum acceleration, as well as the weighted average of the acceleration per time interval are displayed. In normal-speed mode, a spectrum is calculated every 0.8 seconds. This corresponds to a spectral resolution of 1.25 Hz. In slow-speed mode, a spectrum is calculated every 8 seconds. This corresponds to a spectral resolution of 0.125 Hz. Windowing takes place via a Hanning window.

The cursors (lines) refer to the damage frequencies configured in the sensor. If you want to alter these values, the settings in the sensor must be changed. In the program settings you can choose whether the frequency window for the corresponding damage frequency should be displayed.

Use the right mouse button to choose from acceleration (mg), velocity (mm/s) or displacement (µm). In the same way, amplitude values can be displayed as peak (basic setting, calculation basis in the sensor) or RMS. To zoom into the diagram, draw a rectangle by keeping the left mouse button pressed and moving the mouse from top left to bottom right. To zoom out, use the context menu (right mouse button).

The averages (1, 2, 4, 8, 16, 32) can also be simulated using the context menu.

Furthermore, maximum and minimum acceleration, as well as the weighted average of the acceleration per time interval are displayed.

	INFORMATION
	In the spectral mode, the function to monitor diagnostic objects is deactivated, which means switching outputs cannot be switched. Do not interrupt the cable connection between the sensor and PC in spectral mode, as otherwise the sensor would remain in the spectral mode and monitoring would not be possible.

8.6.2 Subobjects

In the subobject mode, the damage-relevant frequency groups are displayed with the amplitudes and found frequencies per object. The spectral evaluation can be performed using either the raw signal or the envelope-demodulated time signal. The settings in the sensor are valid. If you want to change the analysis method, you must adjust the sensor parameters accordingly. In slow-speed mode, new values are calculated every 8 seconds, in normal-speed mode every 0.8 seconds.

The diagram represents an order analysis. Furthermore, maximum and minimum acceleration, as well as the weighted average of the acceleration per time interval are displayed.

You can use the right mouse button to choose from acceleration (mg), velocity (mm/s) or displacement (µm). It is also possible to include or exclude the signal weighting of the subobjects.

The averages (1, 2, 4, 8, 16, 32) can also be simulated via the context menu.

8.6.3 Object mode

The weighted and average characteristic values are displayed for each object in the object mode. The reference values from the teach-in are shown in the form of "blue bars" if a teach-in run has already been performed.

The evaluation can be performed using either the raw signal or the envelope-demodulated time signal. The settings in the sensor are valid. If you want to change the analysis method, you must adjust the sensor parameters accordingly. As soon as new values have been calculated (according to the number of set averages), a new value is displayed (see chapter "Averaging of diagnostic objects" (page 40)).

The object values can be displayed with or without weighting (make the selection using the right mouse button).

8.6.4 Diagnostic value

The weighted and average characteristic values are displayed for each object in the condition mode or diagnostic value mode. The teach-in values are the reference values, see illustration (page 31).

The evaluation can be performed using either the raw signal or the envelope-demodulated time signal. The settings in the sensor are valid. If you want to change the analysis method, you must adjust the sensor parameters accordingly. As soon as new values have been calculated (according to the number of set averages), a new value is displayed (see chapter "Averaging of diagnostic objects" (page 40)).

The limit values shown correspond with the set limit values in the sensor and correlate with the LED display on the sensor.

If different averages have been set for the level monitor and diagnosis objects, the data from the level and diagnosis objects according to the number of averages, which are set for the diagnostic objects, are displayed anew. The set parameters are valid for monitoring.

8.6.5 Recording data

According to the diagnostic depth (spectrum-subobjects-objects-diagnostic value), the corresponding data can be stored continually (data streaming) and then displayed again. This means that the DUV30A diagnostic unit can also be used as a measuring device.

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To record or play a measurement, first open the file. The file has to be created before you can record any data. The data can then be recorded or visualized using the functions data recording or play.

8.7 Universal assignment

If no data is available for the bearings when you set the parameters for the DUV30A diagnostic unit in normal-speed mode, you can configure a universal assignment in addition to the level/peak monitor and the v_{rms} monitor, which monitors a specified frequency field using the broadband frequency.

The 20 individual frequencies of the subobjects are assigned center frequencies of a selected logarithmic frequency series and a frequency window of 10%. The frequency series can be structured as follows:

Number	Center frequency (Hz)	Order
1	5.02	0.20
2	6.14	0.25
3	7.50	0.30
4	9.17	0.37
5	11.20	0.45
6	13.69	0.55
7	16.73	0.67
8	20.45	0.82
9	25,00	1,00
10	30.55	1.22
11	37.34	1.49
12	45.64	1.83
13	55.78	2.23
14	68.18	2.73
15	83.33	3.33
16	101.85	4.07
17	124.48	4.98
18	152.14	6.09
19	185.95	7.44
20	227.27	9.09

The example is recommended for a slow-speed unit with a speed of 25 Hz (= 1500 rpm). This means monitoring in the frequency field between 4.5 Hz and 250 Hz. Selecting a frequency window of 10% corresponds to setting a classification with approximately 4 bands per octave.

The following basic settings are required:

Speed	Constant or variable
Basic ratio	1/1
Diagnostic object type	Other
Analysis method	H-FFT
Subobjects	Frequency factors (orders) from the table above
Required frequency window	10 %
Threshold values	• Yellow: 6 • Red: 10

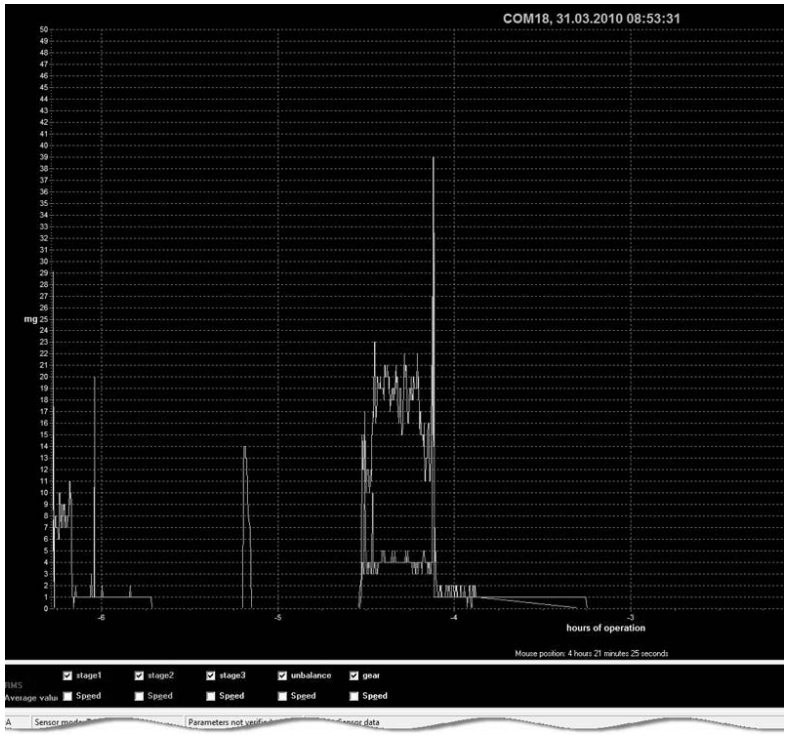
Once you have entered the frequency factor and a short designation, create the subobject by selecting [Add]. After 4 subobjects, another object must be created. The DUV30A diagnostic unit now indicates when the vibration amplitude in one of the created frequency bands has increased by the set threshold values.

8.8 History

The history memory is a circular buffer (= when the buffer is full, the oldest entry is deleted to make room for a new entry) that can hold up to 2500 entries.

To activate and configure the history memory, choose [Sensor] / [Sensor settings]. To do so, select the [Activate history] check box and enter a value between 1 second and 12 hours in the [Interval] field. Click [Accept] to start the history memory.

After a preset period has elapsed, the sensor continues to store the highest object value measured per diagnostic object, together with the corresponding speed (with variable-speed operation), in internal memory modules. The list of history data can be read from the sensor via the menu [History] / [Read from sensor/history] or . The following figure shows the history memory:



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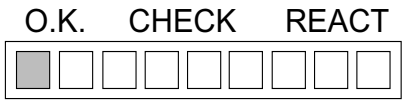
The display can be extended to show several values. To do so, select the corresponding check box in the lower section of the screen. The corresponding speeds taken at different points can also be shown (dotted line, right scaling axis).

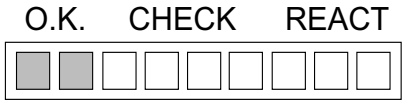
The history also lists the read-out time and can be saved as CSV file or XML file via [History] / [Save/history] or . The history data can be re-loaded from the file via [History] / [Open.../history] or .

8.9 LED code

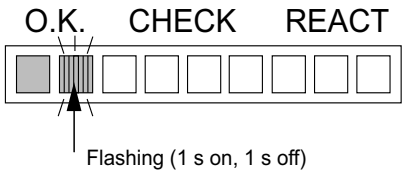
Voltage applied



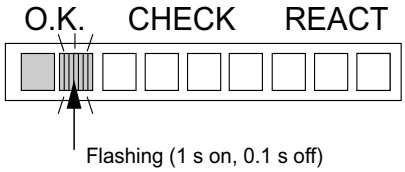
Sensor ready for operation



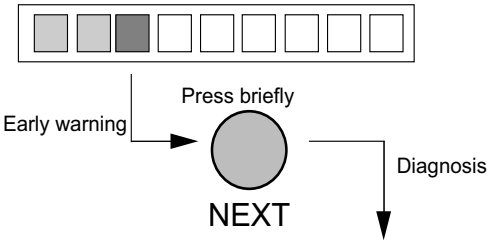
Teach-in



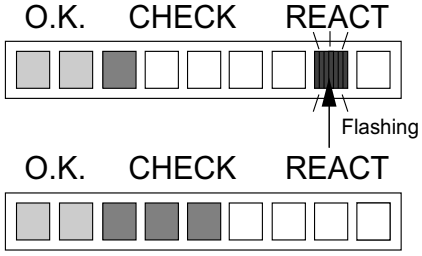
FFT transmitted (to PC)



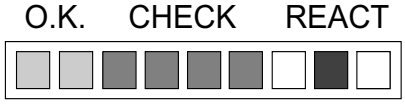
Object has exceeded yellow threshold value



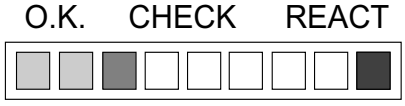
Damage progress



Object has exceeded red threshold value



Level has exceeded vibration velocity v_{rms} and red threshold value



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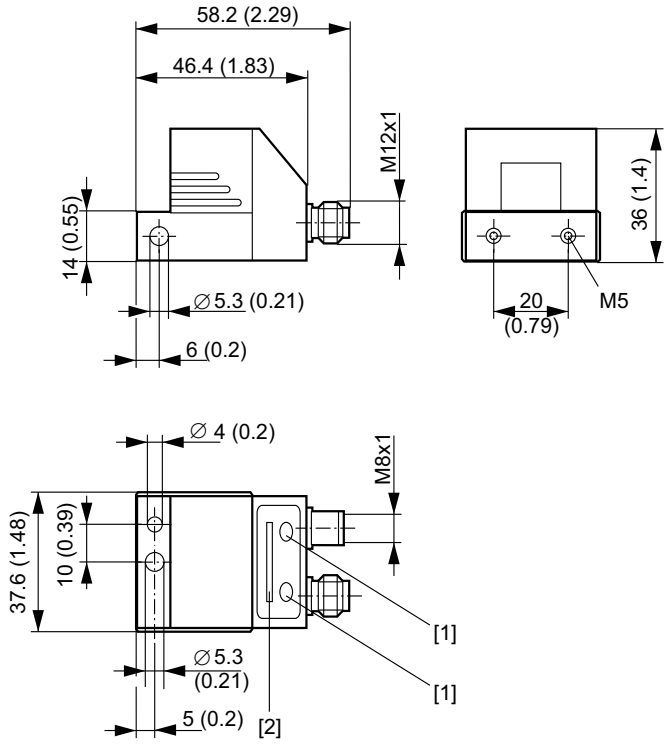
9 Technical Data

9.1 General technical data

Technical data	Value
Measuring range	±20 g
Frequency range	Low-speed unit: 0.125 to 500 Hz
	Normal-speed unit: 1.25 to 5000 Hz
Spectral resolution	Low-speed unit: 0.125 Hz
	Normal-speed unit: 1.25 Hz
Diagnostic methods	FFT, envelope-FFT, trend analysis
Minimum measuring period	Low-speed unit: 8.0 s
	Normal-speed unit: 0.8 s
Speed range	Low-speed unit: 12 to 3500 rpm
	Normal-speed unit: 120 to 12000 rpm
Switch outputs	1: Early warning 2: Main alarm
Operating voltage	10 to 32 V
Current consumption at DC 24 V	100 mA
Protection class	III
EMC	IEC 1000-4-2/3/4/6
Overload capacity	100 g
Temperature range	-30 to +70 °C [-22 to 158 °F]
Degree of protection	IP67
Housing materials	• Zinc die casting • Coating based on epoxy finish • Polyester membrane keypad
Electrical connection for supply and switching output	M12 plug connector
Electrical connection for RS-323 communication	M8 plug connector
Certificates and standards	CE

9.2 Dimension drawing

The dimension drawing shows the mechanical dimensions of the DUV30A diagnostic unit in mm (in):



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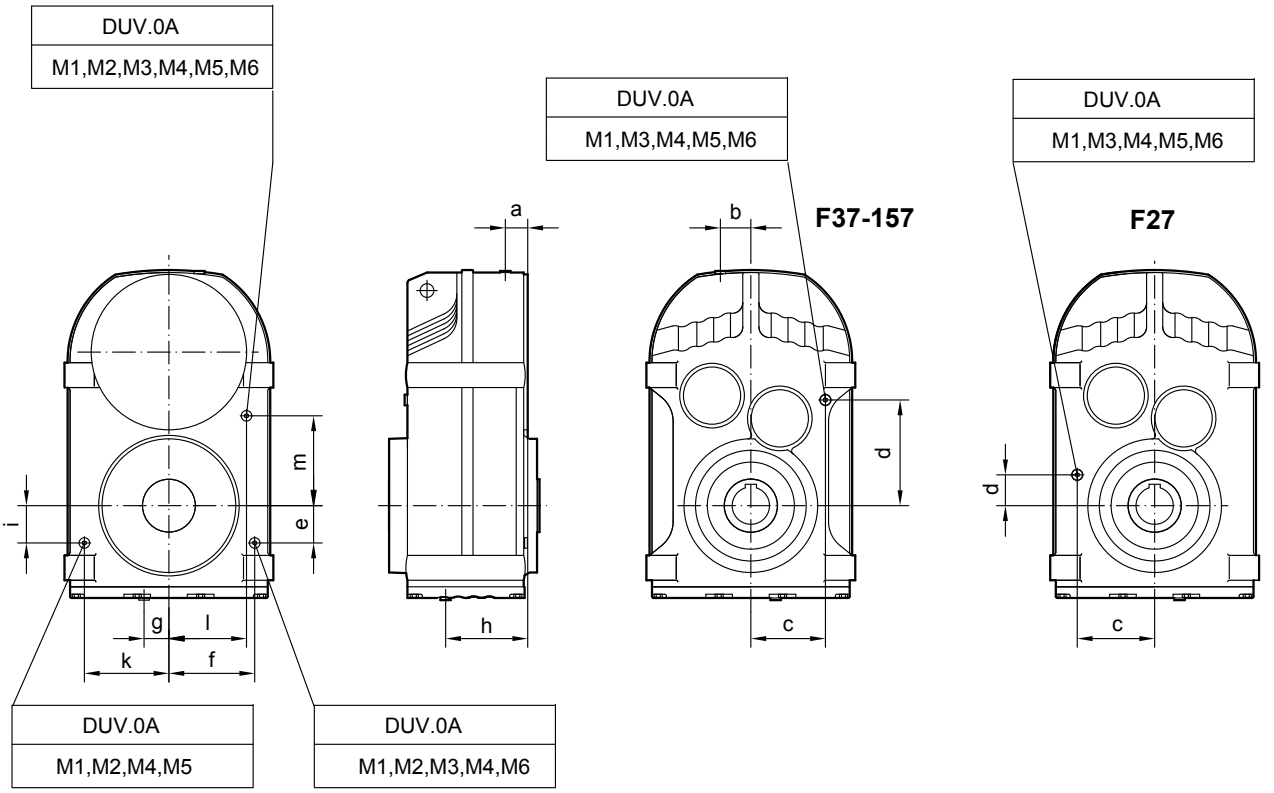
[1] Programming keys
[2] LEDs

10 Appendix

10.1 Dimension sheets for mounting locations on the drive

This chapter contains dimension sheets for installation on R, F, K and S gear units and on DV and DR motors. Dimension sheets for installation on IGX gear units are available from SEW-EURODRIVE on request.

10.1.1 Mounting locations on the gear units F, FA 27 – FA 157



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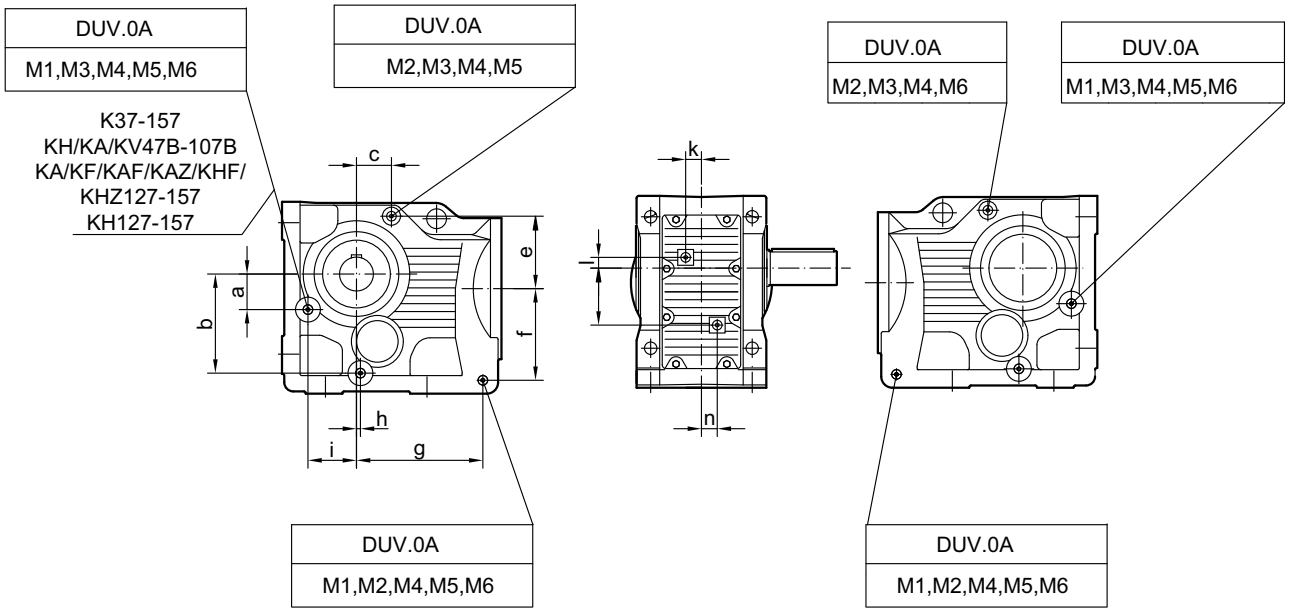
Type	a	b	c	d	e	f	g	h	i	k	l	m	Mounting bore
F / FF / FA / FAF 27	-	-	57	25	-	-	-	-	-	-		-	M10 x 1
F / FF / FA / FAF 37	20	20	60	61	6	66	25	63	6	66	66	61	M10 x 1
F / FF / FA / FAF 47	22	20	61	43	20	70	39.5	74	20	70	70	70	M10 x 1
F / FF / FA / FAF 57	25	25	70	93	30	78.5	29	95	30	78.5	78.5	80	M10 x 1
F / 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

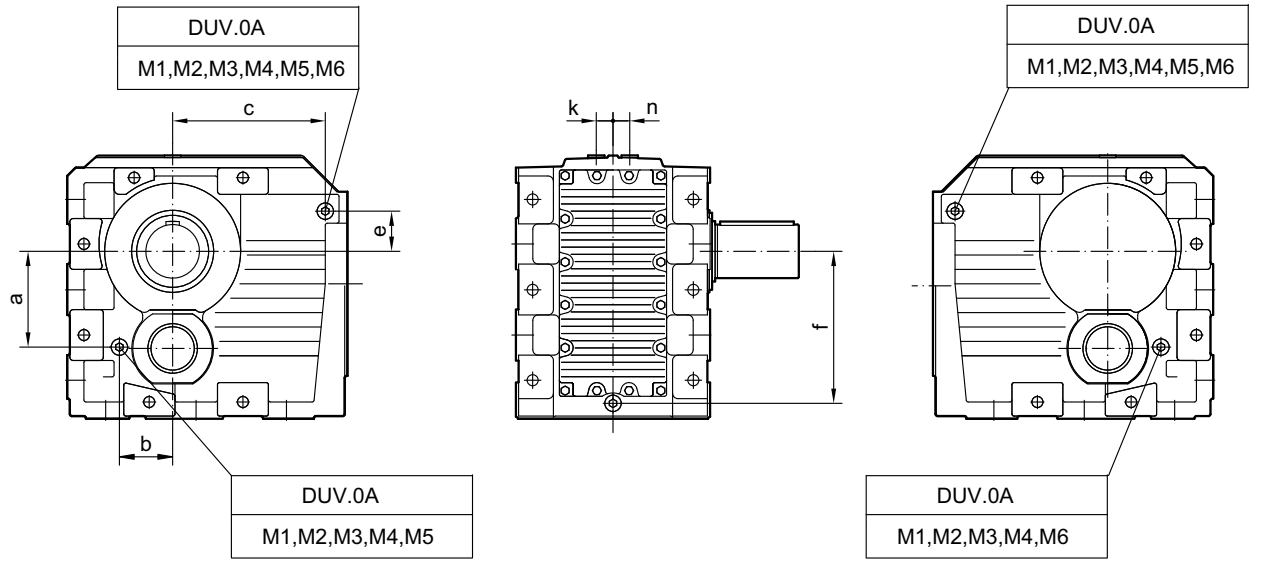
10.1.2 Mounting locations on the gear units K, KA 37 – K 157



1204863371

Type	a	b	c	e	f	g	h	i	k	l	m	n	Mounting 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	23.5	17	103	23.5	M12 x 1.5
K / KF / KA / KAF 97	116	225	85	116	235	238	5	114	47	12	123	47	M22 x 1.5
K / KF / KA / KAF 107	123	268	85	153	285	290	10	146	46.5	38	157	46.5	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

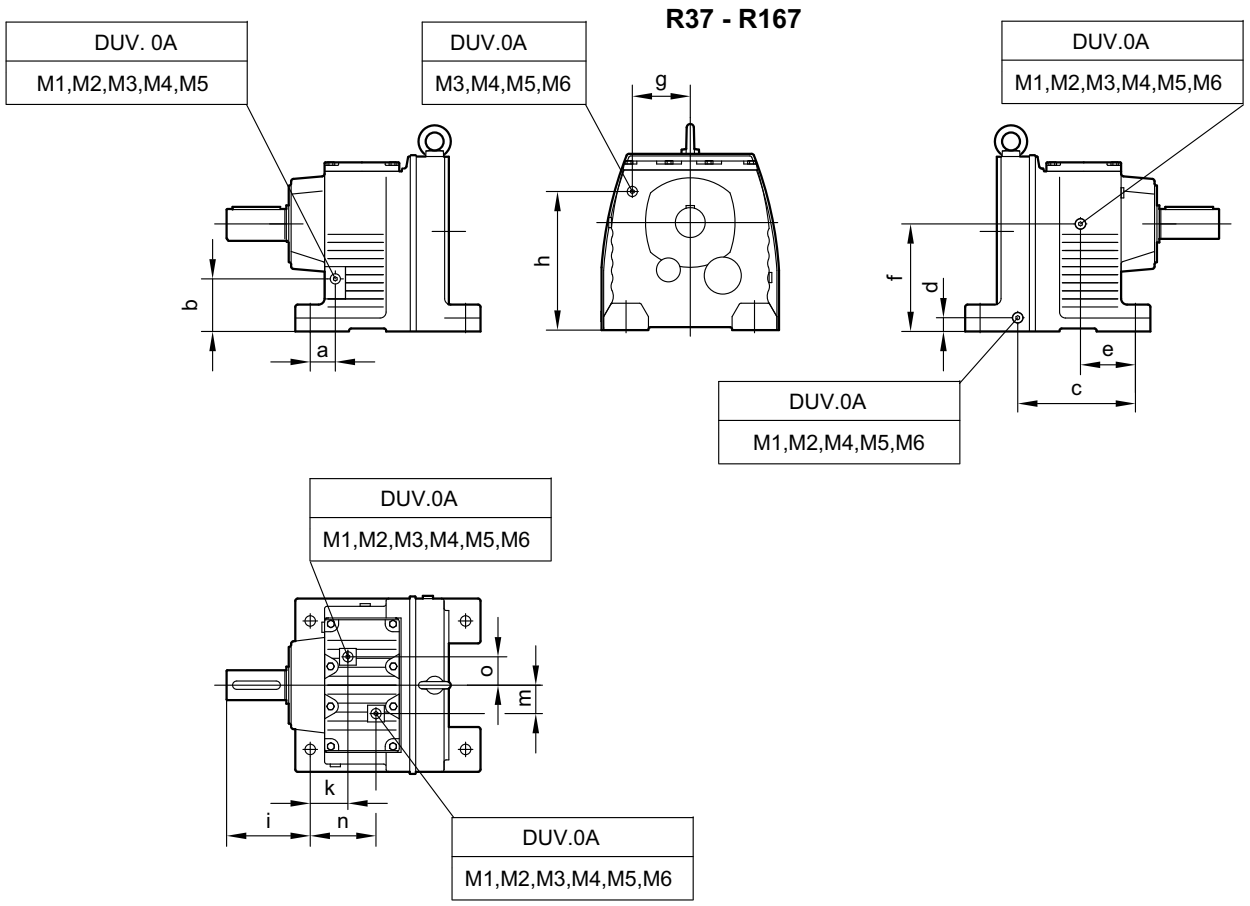
10.1.3 Mounting locations on the gear units K, KH 167 and KH 187



1204858507

Type	a	b	c	e	f	k	n	Mounting 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

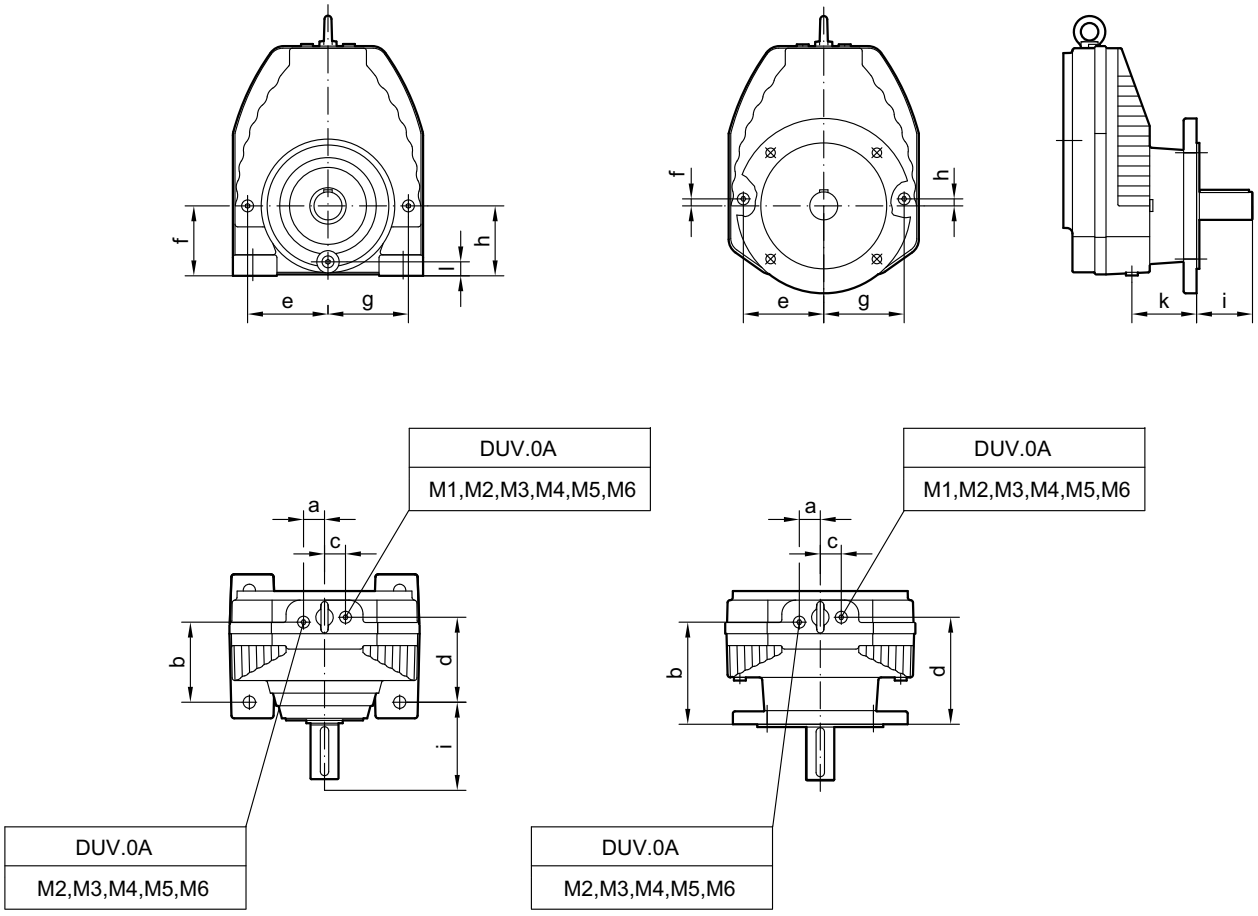
10.1.4 Mounting locations on the gear units R 07 – R 167



1204856075

Type	a	b	c	d	e	f	g	h	i	k	m	n	o	p	Mounting bore
R 07	-	-	-	-	-	-	-	-	48	-	-	87.5	-	-16.6	M10 x 1
R 17	-	-	-	-	-	-	40	101	58	-	-	111	-	19	M10 x 1
R 27	-	-	-	-	-	-	40	116	75	-	-	-	-	-	M10 x 1
R 37	27	44	102	14	48	90	54	111	75	48	30	48	16	-	M10 x 1
R 47	30	65	117	15	55.5	115	58	142	90	37	23.5	67	-23.5	-	M10 x 1
R 57	31.5	63	128	18	57.5	115	66	144.5	100	44	27	81	-27	-	M10 x 1
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

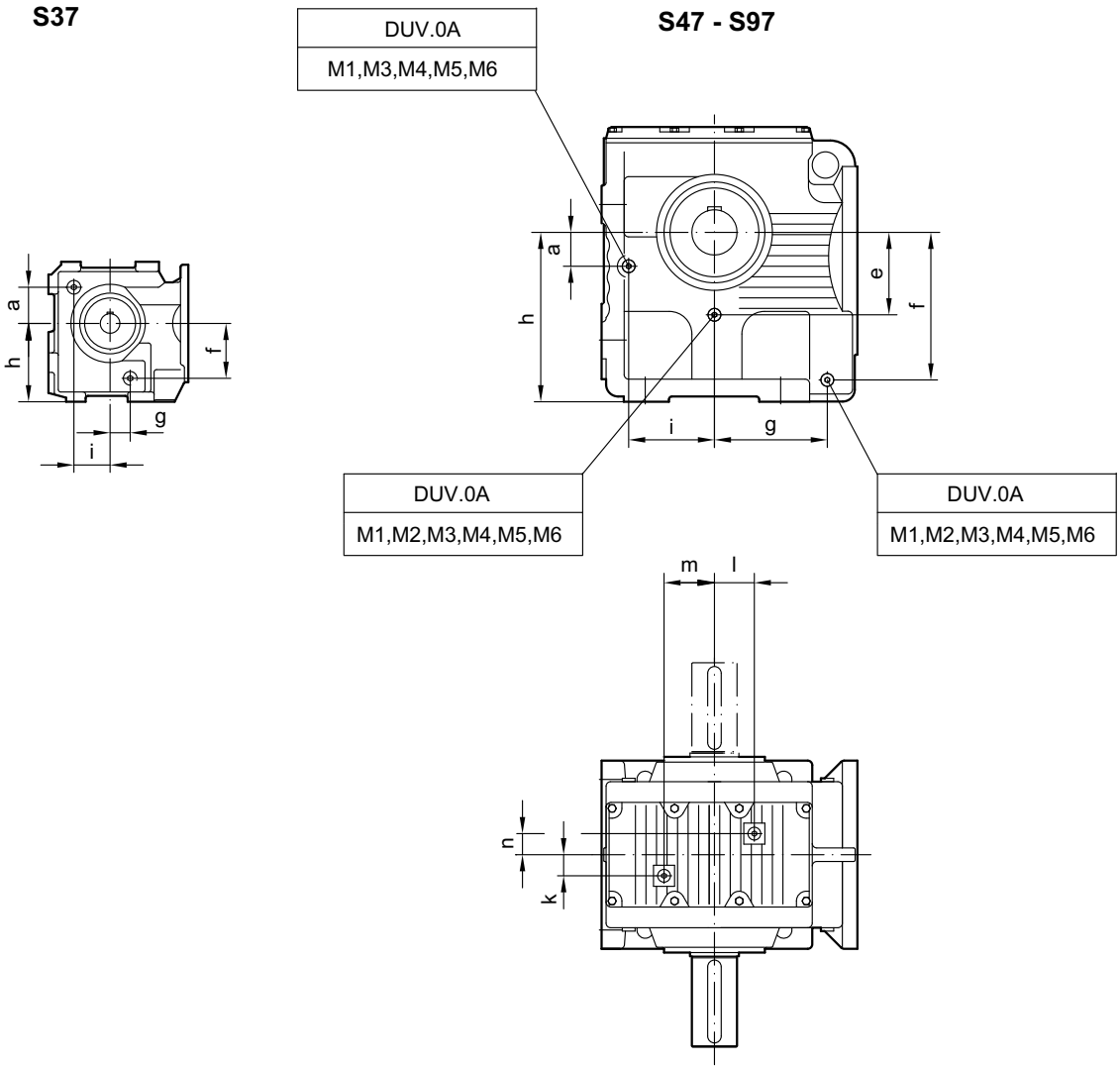
10.1.5 Mounting locations on the gear units RX 57 – RX 107



1208483339

Type	a	b	c	d	e	f	g	h	i	k	l	Mounting bore
RX 57	12.5	83	12.5	88	65	63.5	65	63.5	56	-	17	M10 x 1
RXF 57	12.5	99	12.5	104	65	0.5	65	0.5	40	61.5	-	M10 x 1
RX 67	15	90	15	96.5	72	80.5	72	80.5	75	-	24	M10 x 1
RXF 67	15	115	15	121.5	72	0.5	72	0.5	50	70	-	M10 x 1
RX 77	30	99	30	107.5	89	92	89	92	85	-	21	M12 x 1.5
RXF 77	30	124	30	132.5	89	2	89	2	60	74	-	M12 x 1.5
RX 87	30	114.5	30	121.5	115	100.5	115	100.5	110	-	20	M12 x 1.5
RXF 87	30	144.5	30	151.5	115	0.5	115	0.5	80	91	-	M12 x 1.5
RX 97	40	120	40	138	138	114	138	114	140	-	26	M22 x 1.5
RXF 97	40	160	40	178	138	2	138	2	100	103	-	M22 x 1.5
RX 107	40	144	40	166	157	138	157	138	152	-	33	M22 x 1.5
RXF 107	40	176	40	198	157	-2	157	-2	120	112	-	M22 x 1.5

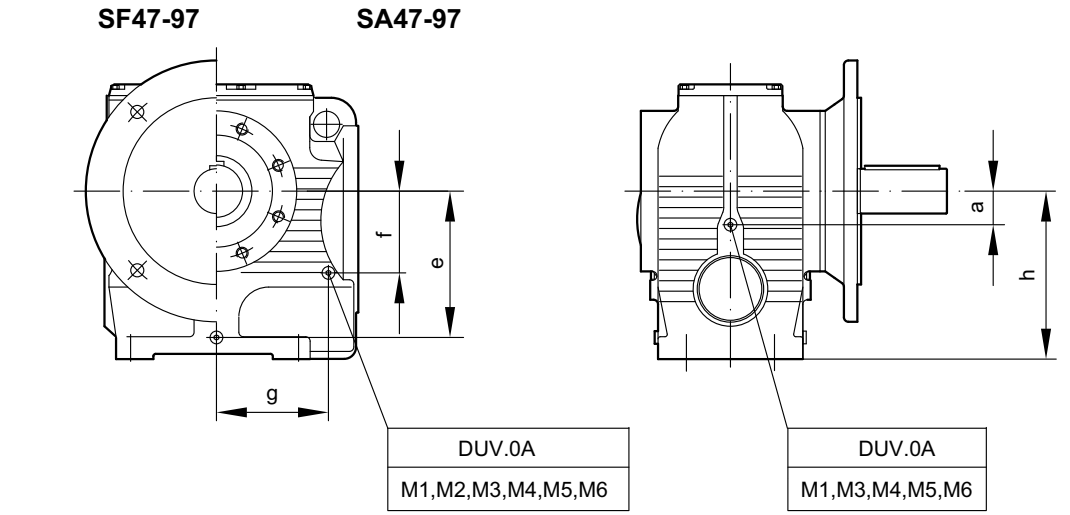
10.1.6 Mounting locations on the gear units S 37 – S 97

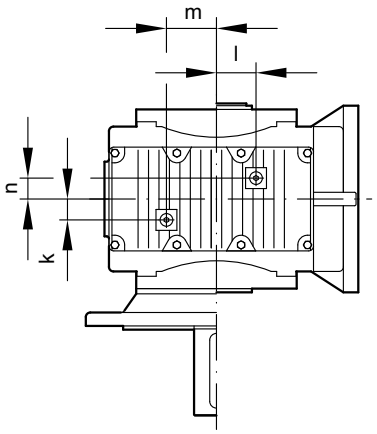


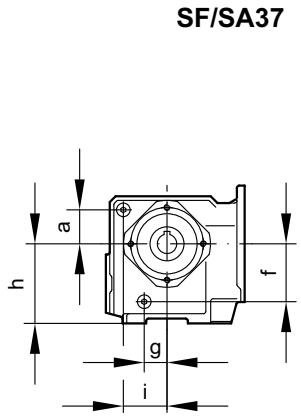
1204853643

Type	a	e	f	g	h	i	k	l	m	n	Mounting bore
S 37	37	-	58	16.5	80	37	-	-	-	-	M10 x 1
S 47	16	48	83	75	100	53	15	-	26	15	M10 x 1
S 57	23	60	96	85	112	57	18.5	-	25	18.5	M10 x 1
S 67	30	74	120	105	140	84	22	4	45	22	M10 x 1
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

10.1.7 Mounting locations on the gear units SA, SF 37 – SF 97





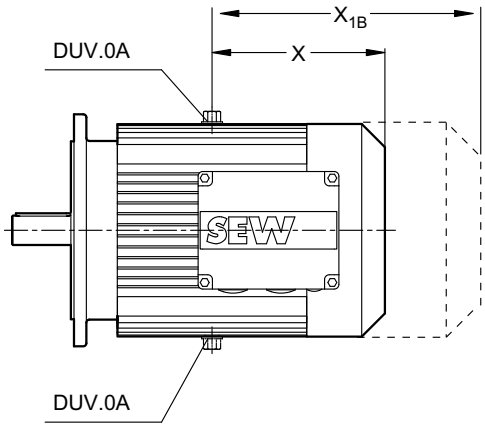


1204851211

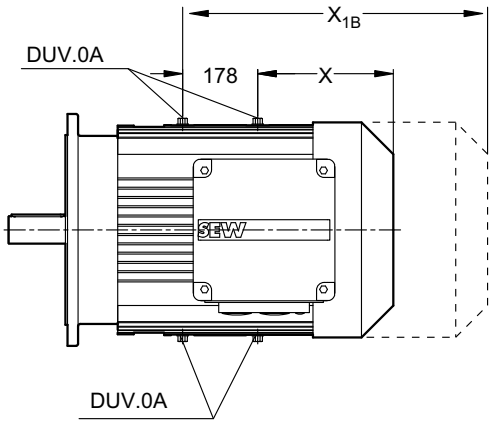
Type	a	e	f	g	h	i	k	l	m	n	Mounting bore
SF / SA 37	-	-	60	21.5	82	45	-	-	-	-	M10 x 1
SF / SA 47	16	83	48	75	100	-	15	-	26	15	M10 x 1
SF / SA 57	23	96	60	85	112	-	18.5	-	25	18.5	M10 x 1
SF / SA 67	30	120	74	105	140	-	22	4	45	22	M10 x 1
SF / SA 77	40	158	90	127	180	-	23.5	42	53	23.5	M12 x 1.5
SF / SA 87	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

10.1.8 Mounting locations on AC motors DV112M – DV280

DV112M – DV225



DV250 – DV280



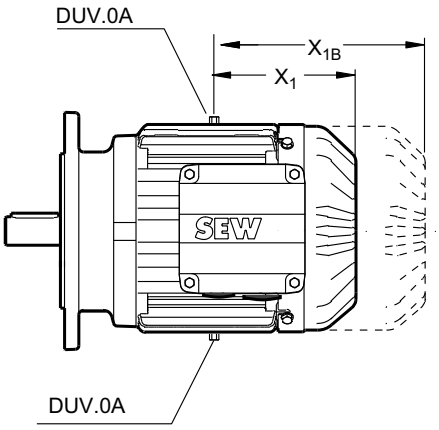
1735282699

Type	X	X_{1B}	Mounting bore
DV112M – DV132S	209	289	M8 x 1.25
DV132M	223	335	M12 x 1,75
DV132ML + DV160M	254	366	M12 x 1,75
DV160L	278	434	M12 x 1,75
DV180	314	470	M12 x 1,75
DV200	342	498	M16 x 2
DV225	384	540	M16 x 2
DV250 + DV280	490	506	M20 x 2.5

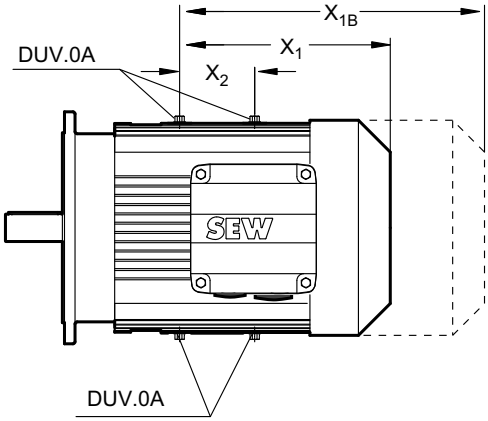
The DT56 – DV100 motors have no fixture for mounting the DUV diagnostic unit. In this case, choose a mounting location on the associated gear unit.

10.1.9 Mounting locations on AC motors DR100 – DR315

DR100 – DR225



DR315



1735255179

Type	X_1	X_{1B}	X_2	Mounting bore
DR100L, LC	145,5	239	–	M8 x 1.25
DR112M	144	256	–	M8 x 1.75
DR132S	228	340	–	M8 x 1.75
DR132M, MC	259	371	–	M8 x 1.75
DR160S, M, MC	251,5	388,5	–	M12 x 1.75
DR180S, M, L, LC	279	468	–	M12 x 1.75
DR200L/225S, M, MC	352	557	–	M16 x 2
DR315K/S	634	885	300	M20 x 2.5
DR315M/L	764	1015	400	M20 x 2.5

The DR71 – DR90 motors have no fixture for mounting the DUV diagnostic unit. In this case, choose a mounting location on the associated gear unit.

10.2 Request form for project planning for DUV vibration sensor

Please fill in this form and send it to your local SEW office:

Customer, company: .....
Customer no.: ....
Contact person: .....
Phone/Fax: .....
Email: .....
Street: .....
Zip code, city, country: .....
Place, date: .....

Request form for DUV30A diagnostic unit with request for:

☐	Quotation
☐	Return call
☐	Startup in SC (without teach-in)
☐	Startup at the customer location (date: .....)

Project data		
Speed to be monitored n_{IST}	☐	$12 < n_{IST} < 3500$ 1/min
	☐	$120 < n_{IST} < 12000$ 1/min
	☐	Feasibility is yet to be checked.
Constant speed (± 5%):		..... rpm
Variable speed		..... rpm to ..... rpm
		time interval with constant speed ..... s at ..... rpm
Variable speed	☐	Actual speed input 0 to 20 mA
	☐	Pulse input 1 – 32 pulse/revolution HTL (± 24 V)
Objects to be monitored (per DUV max. 5 objects + level + vibration velocity v_{rms} (according to DIN ISO 10816-1) – each bearing and each gearing counts as one object).		
Gear unit monitoring	☐	Input
	☐	Output
	☐	Intermediate stage(s)
Motor monitoring	☐	Motor bearing A
	☐	Motor bearing B
	☐	Rotor imbalance
	☐	Technical support required
External gearing (if applicable):		Number of teeth:.....
External bearings (if applicable)		Manufacturer/type: .....
Level monitor (if applicable)	☐	Vibration monitor
	☐	Peak monitor
	☐	Vibration velocity v_{rms} acc. to DIN ISO 10816-1

Drive data		
Motor type and manufacturer:		.....
No. of order confirmation:		.....
With frequency inverter/option:		.....

Startup		
Standard		CE logo
		ATEX zone
Degree of protection IP		.....
DC 24 V voltage supply		Yes, on site by the customer
		No, during startup by SEW
Actual speed signal (0 to 20 mA)		Yes, on site by the customer
		MDX with option: DIO
		MC07B with option: FIO
Connection of the DUV signals		Only locally
		On site by the customer
		Consulting required
Condition of the drive		New, to be mounted yet
		New, already delivered
		Component is in operation
		Used, but will be overhauled by the following Service Center: .....
Startup support:		Is required
		Not required

Additional data	
Installation location (motor/ gear unit)	.....
No. of spare parts list (if applicable)	.....
Mounting location on the drive	.....
Gear ratio per stage	.....
Number of rolling elements	.....
Speed 1	..... rpm
Speed 2	..... rpm
Nominal bearing service life L10h	..... h

11 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service Competence Center	**Central**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 sew-algeria@reducom-dz.com http://www.reducom-dz.com

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

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at

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

Belgium			
Assembly **Sales** **Service**	**Brussels**	**SEW Caron-Vector** Avenue Eiffel 5 BE-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	**Industrial Gears**	**SEW Caron-Vector** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
	Antwerp	**SEW Caron-Vector** Glasstraat, 19 BE-2170 Merksem	Tel. +32 3 64 19 333 Fax +32 3 64 19 336 http://www.sew-eurodrive.be service-antwerpen@sew-eurodrive.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

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

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

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

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

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.com.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
	Additional addresses for service in China provided on request!		

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

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

Czech Republic			
Sales	**Prague**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

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

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

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

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 Normanton, West-Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

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

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

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

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 c.v.shivkumar@seweurodriveindia.com

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

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

Italy			
Assembly **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Société industrielle & commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1115 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Kazakhstan			
Sales	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" 050061, Республика Казахстан г.Алматы, пр.Райымбека, 348	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@info.com.lb
	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

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

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

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

Morocco			
Sales	**Casablanca**	Afit Route D'El Jadida KM 14 RP8 Province de Nouaceur Commune Rurale de Bouskoura MA 20300 Casablanca	Tel. +212 522633700 Fax +212 522621588 fatima.haquiq@premium.net http://www.groupe-premium.com

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

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

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

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

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 45 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	24 Hour Service		Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

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

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

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

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

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

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

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

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

South Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 4419164 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

USA			
Production **Assembly** **Sales** **Service** **Corporate Offices**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com

USA			
Assembly **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

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

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