

Schaeffler GreaseCheck

User manual

SCHAEFFLER

Contents

	Page
About the user manual	
Symbols	2
Availability	2
Legal guidelines	2
Original user manual	2
General safety guidelines	
Usage for the intended purpose	3
Usage not for the intended purpose	3
Selection and qualification of personnel	3
Warning notice	4
Safety regulations.....	6
Scope of delivery	7
Technical description	8
Mounting	10
Electronic evaluation system.....	11
Sensor head	14
Commissioning	16
Operation	16
Troubleshooting and rectification	17
Dismounting	18
Decommissioning and disposal	19
Technical data and accessories	20
Appendix	
EU Declaration of Conformity.....	22
Contact	23

Schaeffler GreaseCheck

About the user manual The purpose of this user manual is to assist the user become acquainted with GreaseCheck and use it for the intended purpose. This user manual describes the installation and use of GreaseCheck and is intended to help in:

- avoiding hazards
- increasing the reliability and service life of the device.

This user manual is part of the device and contains important information.

Symbols The warning and hazard symbols are defined along the lines of ANSI Z535.6–2006.



In case of non-compliance, death or serious injury will occur. <



In case of non-compliance, death or serious injury may occur. <



In case of non-compliance, minor or slight injury will occur. <



In case of non-compliance, damage or malfunctions in the product or the adjacent construction will occur. <

Note There follows additional or more detailed information that must be observed.

Availability This user manual is supplied with each device and can also be ordered retrospectively.

Note If the user manual is absent, incomplete or illegible, the user may lack important information relating to safe use of the device and this may lead to incorrect usage. It must be ensured that this user manual is always complete and legible and that any persons using the device have the user manual available.

Legal guidelines The information in this manual corresponded to the most recent status at the close of editing. The illustrations and descriptions cannot be used as grounds for any claims relating to devices that have already been delivered. Schaeffler Technologies AG & Co. KG accepts no liability for any damage or malfunctions if the device or accessories have been modified or used in an inappropriate manner.

Original user manual This user manual is the original user manual.

General safety guidelines

Usage for the intended purpose GreaseCheck may only be used for measurement of the grease condition and for the monitoring of greases in rolling bearings. GreaseCheck may only be used in an industrial environment.

Usage not for the intended purpose GreaseCheck may not be used in environments with an explosion risk. Usage not for the intended purpose can lead to personal injury or damage to the rolling bearing.

Selection and qualification of personnel GreaseCheck may only be fitted and commissioned by qualified personnel. A person defined as qualified personnel:

- is authorised to use GreaseCheck
- has all the necessary knowledge
- is familiar with the safety guidelines
- has read and understood this manual.

Work on electrical devices Work on electrical devices may only be carried out by an electrically skilled person. An electrically skilled person is in a position, on the basis of his technical training, knowledge and experience as well as his knowledge of the appropriate regulations, to assess the work assigned to him and recognise possible hazards.

Schaeffler GreaseCheck

Warning notice Read this document before commissioning the device. Make sure you are certain that the product is suitable without restrictions for the relevant applications.

GreaseCheck is not classified as a safety component in accordance with the Machinery Directive 2006/42/EC.

The device may only be installed by a trained electrician.

Carry out the installation in accordance with the national and international regulations covering the installation of electro-technical equipment.

Before mounting the device, check for any external damage. If damage or some other defect is found, the device must not be commissioned.

Any interference in or modifications to the device, or the addition or removal of inappropriate components is impermissible, can endanger occupational safety and may render null and void any warranty claim.

Any work on wiring, opening or closing of electrical connections may only be performed while disconnected from the power supply and in a voltage-free state.

The use of GreaseCheck is only permissible within the boundaries of the conditions stated and illustrated in the user manual.

GreaseCheck may only be operated within the limits described in the data sheet. If GreaseCheck is operated outside these limits, the device may be damaged or destroyed.

Do not attempt to repair a damaged GreaseCheck.

Any repairs necessary must be carried out by Schaeffler Technologies AG & Co. KG.

The factory settings of GreaseCheck may only be changed after consultation with Schaeffler Technologies AG & Co. KG.

Use GreaseCheck only for the monitoring of approved greases.
A list of approved greases can be found at
<https://www.schaeffler.de/content.schaeffler.de/de/produkte-und-loesungen/industrie/produktportfolio/instandhaltungs-produkte/schmierstoffueberwachung/index.jsp>

Dismount GreaseCheck only while disconnected from the power supply and in a voltage-free state.

Do not look into the sensor optics while GreaseCheck is in operation.
Risk of eye damage.

Never bend the sensor cable and the connection cable of the electronic evaluation system.

Do not subject the sensor head to either torsion or tension.

Only use fasteners of a suitable type that do not change the shape of the sensor head.

Schaeffler GreaseCheck

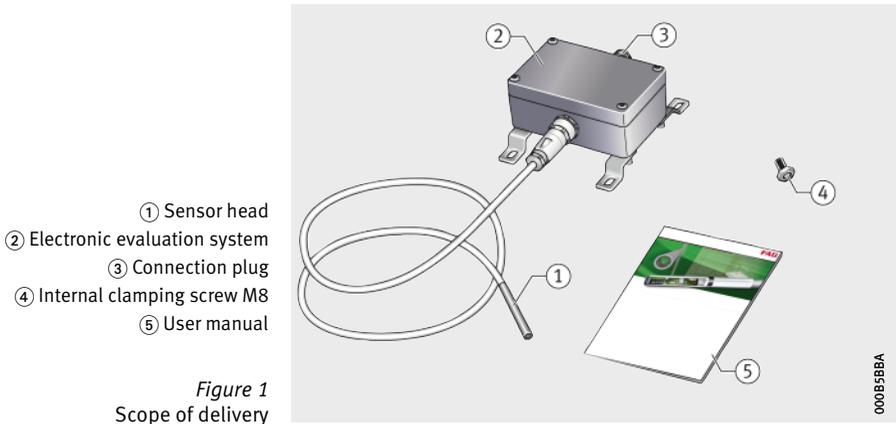
Safety regulations	All important safety specifications are described in the following sections.
Maintenance and repair work	<p>Maintenance and repair work may only be carried out by qualified professionals and in compliance with accident prevention regulations. Personal protective equipment must be used for all work.</p> <p>GreaseCheck must be placed in a voltage-free state before starting maintenance and repair work.</p> <p>If any safety devices must be removed during maintenance or repair, these must be refitted once the work is complete and their function must be checked.</p> <p>When carrying out maintenance and repair work, only suitable tools may be used and these must be used correctly.</p>
Troubleshooting and rectification	Troubleshooting and rectification may only be carried out by qualified professionals and in compliance with accident prevention regulations. Personal protective equipment must be used for all work.
Disposal	<p>Do not dispose of either GreaseCheck or associated components with household waste, since they contain electronic components that must be disposed of in accordance with the applicable regulations.</p> <p>Electronic devices must be disposed of in accordance with the relevant regulations.</p>
Constructional modifications (conversion)	<p>For safety reasons, autonomous modifications (conversion) of GreaseCheck are not permitted.</p> <p>In order to comply with directives on electromagnetic compatibility (EMC), no modifications may be made to the sensor head and controller. Electrical connections to the controller must be carried out strictly in accordance with the measures described hereinafter. In case of doubt, please contact Schaeffler Technologies AG & Co. KG.</p>

Scope of delivery

The scope of delivery comprises:

- 1 electronic evaluation system with connection plug
- 1 sensor head
- 1 internal clamping screw M8
- 2 covers
- 1 user manual.

The scope of delivery is shown in *Figure 1*.



A replacement seal for the housing of the electronic evaluation system is used to maintain the protection class IP67 and is only required if the housing has been opened more than once.

Schaeffler GreaseCheck

- Technical description** The condition of the grease is determined by means of an optical reflection method.
- For this purpose, the sensor head is immersed in the grease.
- Monitoring of the grease is carried out on the basis of characteristic changes for automatic condition assessment.
- A cable provides communication between the sensor head and the electronic evaluation system.
- The measurement depth of the sensor head extends only a few millimetres into the grease. There must be grease directly in front of the sensor head for measurement. Air inclusions can lead to incorrect measurements.
- The optimum measurement point will vary from one application to another. The sensor must not record grease in direct rolling contact. The grease conditions present in areas adjacent to the raceway will allow comparable measurement results.
- GreaseCheck gives the following output data:
- water content
 - the change in water content of the measured grease relative to fresh grease or respectively to a defined upper limit
 - grease deterioration
 - the change in turbidity and ageing of the measured grease relative to fresh grease or respectively to a defined upper limit
 - temperature
 - output of the current temperature of the grease.

Measurement of the grease condition begins approx. 5 seconds after GreaseCheck is connected to the power supply.

Both the deterioration of the grease and the water content are determined and outputted via the analogue channel as follows:

- grease deterioration:
 - 11 mA to 4 mA
from fresh grease to 100% grease deterioration
(as a function of the qualification value)
- water content:
 - 13 mA to 20 mA
from 0% water content to 100% water content
(as a function of the qualification value).

The analogue output toggles in rhythm between 1 second and 300 seconds between the two measurement ranges (the toggle time can be defined).

A limit value can be set in order to activate a switching output. As soon as the grease condition reaches the set switch threshold in relation to grease deterioration or water content respectively, the DC-24-V output is set to “high” (power supply). The switch thresholds can be adjusted accordingly in the EEPROM file.

Schaeffler GreaseCheck

Mounting Before mounting the device, check for any external damage. If damage or some other defect is found, the device must not be commissioned. In case of doubt, please contact Schaeffler Technologies AG & Co. KG.

Note Only suitable tools may be used, such as tools with voltage insulation. Use the tool correctly.

- Mounting procedure In mounting, the following operations must be carried out:
- identification of the measurement position of the sensor head and the mounting position of the electronic evaluation system
 - if GreaseCheck is the only user of the CAN bus:
 - tighten the four screws in the housing cover of the electronic evaluation system (tightening torque 1,5 Nm)
 - if GreaseCheck is not the only user of the CAN bus:
 - deactivate the 120 ohm resistor by changing the jumper on the circuit board of the evaluation unit, *Figure 2*. Then close the electronic evaluation system as described above.
 - mounting of the electronic evaluation system and laying of the connection cable
 - mounting of the sensor head at the measurement position and laying of the sensor connection cable
 - connection of the sensor connection cable to the electronic evaluation system
 - connection of the connection cable for the electronic evaluation system to the infrastructure according to the plan, *Figure 4*, page 13
 - commission the GreaseCheck.

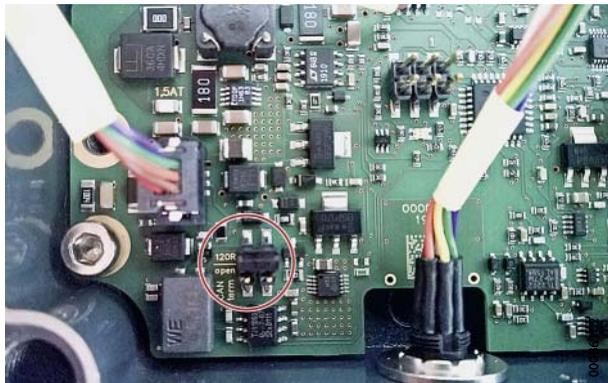


Figure 2
120 ohm resistor on circuit board

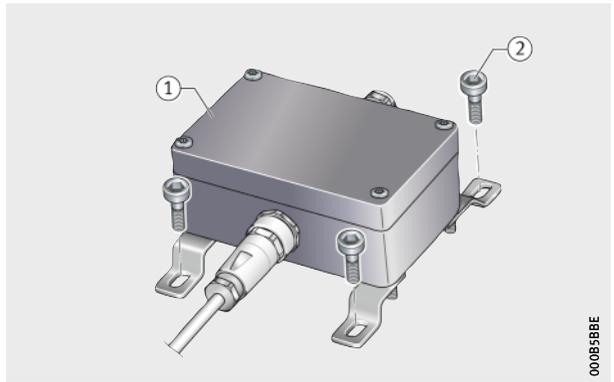
Electronic evaluation system

The electronic evaluation system is mounted as follows:

- ▶ Mount the housing of the electronic evaluation system on the four mounting brackets (\varnothing 4 mm) using four screws (tightening torque 1 Nm to 2 Nm), *Figure 3*. Select the mounting material in accordance with the surface underneath.
- ▶ Lay the connection cable of the electronic evaluation system to the controller in such a way that it is firmly laid and cannot flap. Observe the minimum bending radius of the connection cable.
- ▶ Connect the supplied plug M12 in accordance with the connection plan to a 6 strand shielded twisted-pair cable with a cross-section of 0,5 mm² and connect the plug to the electronic evaluation system, *Figure 4*, page 13. With a cable length of more than 20 m, signal disruptions may occur in individual cases.
- ▷ The electronic evaluation system is mounted and connected to the controller.

- ① Electronic evaluation system
- ② Mounting screws (not included in scope of delivery)

Figure 3
Mounting of
electronic evaluation system



Schaeffler GreaseCheck

- Guidelines on electrical connections** Any work on wiring, opening or closing of electrical connections may only be performed while disconnected from the power supply and in a voltage-free state.
- During mounting, ensure that the cables are not subjected to any mechanical tensile load. If necessary, take measures to relieve the tensile load.
- Observe the minimum permissible bending radii of the cables. These are stated in the manufacturer's data sheets. For cables included in the standard accessories for Schaeffler Technologies AG & Co. KG, the minimum recommended bending radius is 59 mm.
- Mount the cables such that they are firmly laid and cannot flap.
- Do not lay signal cables parallel with lines carrying high currents.
- Shielding application
- The shielding must always be applied over an extensive area to the EMC shielding plates on the switch cabinet side and fully over the connection plug of the electronic evaluation system.
 - Do not trim the shielding after the application point but continue it as far as the connection terminals.
- CAN bus
- If a CAN bus is not used, the CAN bus must be applied to unwired terminals with zero potential.
- Switching output
- If a switching output is not used, the switching output must be applied to an unwired terminal with zero potential.

Analogue output ■ If an analogue output is not used, the analogue output must be applied to an unwired terminal with zero potential.

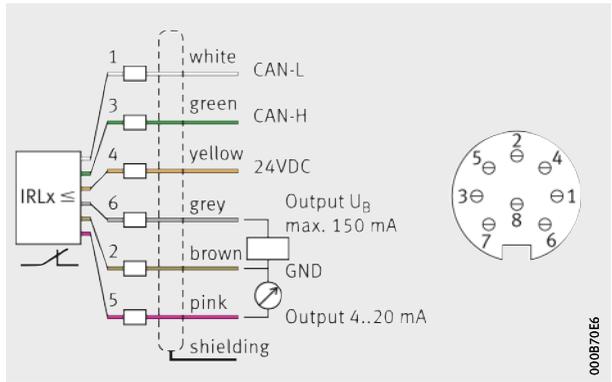


Figure 4
Connection and pin assignment



The controller is supplied factory fitted with a 120 ohm resistor for CAN bus communication. This can be deactivated by means of a jumper. The controller box must be opened and the jumper moved to the corresponding position.

Schaeffler GreaseCheck

Sensor head For mounting of the sensor head, select a position that is optimum for monitoring of the grease condition. Ensure that a grease layer of sufficient thickness is present for measurement by the sensor head. The grease layer thickness should be at least 5 mm. If the grease layer is thinner than the minimum value, the measurement signal may be affected by influences such as rolling elements passing by or reflecting surfaces.

Note If acceptable mounting is not possible using only the internal clamping screw M8, a suitable adapter must be used. Schaeffler Technologies AG & Co. KG can provide assistance in design of the mounting adapter.

The sensor head should be mounted as follows, *Figure 5*, page 15:

NOTICE

Damage to the rolling bearing. Damage to the rolling bearing as a result of metal swarf in ongoing operation. Ensure that metal swarf or drilling residues do not remain in the bearing, bearing housing or grease. <

- ▶ At a suitable position, drill a hole with a diameter of 6,8 mm.
- ▶ Tap a thread M8 in the hole.
- ▶ Screw the internal clamping screw M8 into the thread.
- ▶ Slide the sensor head into the internal clamping screw until it is sufficiently immersed in the grease.

NOTICE

Damage to the rolling bearing. Damage to or impairment of the function of the rolling bearing due to excessive insertion of the sensor. Do not slide the sensor head too far into the fitting position. <

- ▶ Tighten the internal clamping screw using an open-end wrench with an across flats distance of 13 mm and a tightening torque of 4 Nm.
- ▶ Pull the sensor head carefully in order to check that it is securely seated.
- ▶ Prevent any escape of grease at the mounting position by means of appropriate measures.
- ▷ The sensor head is fitted in the rolling bearing at the measurement position.

- ① Tapping of thread M8
- ② Screwing in the internal clamping screw
- ③ Inserting the sensor head
- ④ Tightening the internal clamping screw to 4 Nm

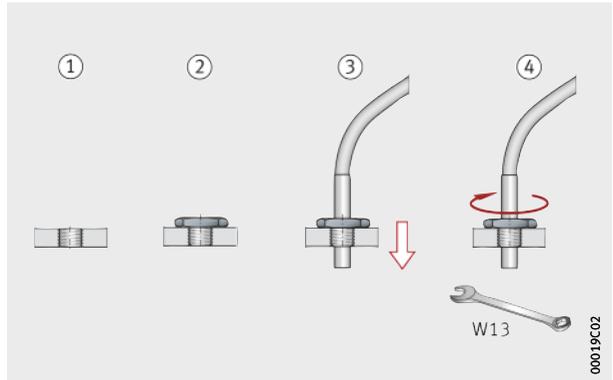


Figure 5
Mounting of sensor head

Connecting the sensor head to the electronic evaluation system

The sensor head should be attached to the electronic evaluation system as follows:

- ▶ Lay the connection cable of the sensor in such a way that it is firmly laid and cannot flap. Observe the minimum bending radius of the cable.
- ▶ Connect the connection cable of the sensor to the appropriate connection on the electronic evaluation system.

⚠ CAUTION

Hazardous radiation. Risk of damage to eyes due to radiation in the infrared range. Do not look into the sensor optics while the sensor head and electronic evaluation system are connected to the power supply. ◀

- ▷ The sensor head and electronic evaluation system are connected.

Schaeffler GreaseCheck

Commissioning At the time of delivery, GreaseCheck is in its packaging and is preset to the factory setting for the appropriate lubricant. The electronic evaluation system and the sensor head are matched to each other. There is no need to set GreaseCheck itself. It is only necessary to find a position in which GreaseCheck can detect the current grease condition.

Settings may only be made on GreaseCheck after consultation with the manufacturer.

The basic settings are as follows:

- grease:
 - LOAD400
- switch threshold:
 - 90% of the relevant parameter.

A different configuration of GreaseCheck can be carried out by the technical departments of Schaeffler Technologies AG & Co. KG.

A current list of greases that can be measured using GreaseCheck can be found at

<https://www.schaeffler.de/content.schaeffler.de/de/produkte-und-loesungen/industrie/produktportfolio/instandhaltungs-produkte/schmierstoffueberwachung/index.jsp>

Operation When the controller is connected to the power supply, the LED will show red for approx. 5 seconds. In this bootloader mode, external access is possible in order to change configurations. The sensor then changes autonomously to measurement mode (the status LED will show continuously green). As soon as data communication is carried out via the bus, the status LED changes to flashing green. The sensor generates new measurement values at an interval of approx. 5 seconds, the current value is stored in the memory and can be called up via the bus interface.



In order to ensure error-free measurement results, the grease grade must not be changed during operation. During operation, no setting work or checking is required.

Troubleshooting and rectification

This section covers errors that may occur and the associated remedial measures.

Error messages

Error message	Cause of error	Remedy
Grease signal does not change	The sensor head is not in contact with the grease	Immerse the sensor head in the grease to a greater depth
	The sensor is too far from the changed grease	
	Deposits on the sapphire disc	Clean the sapphire disc using a microfibre cloth
No signal	The sensor head is not inserted	Insert the sensor head in the rolling bearing
	The sensor head is defective	Replace the sensor head
Cable breakage (analogue signal < 4 mA)	GreaseCheck is being operated outside the intended range	Replace the signal cable
Power supply is present but CAN communication with the sensor is not possible	Terminal resistance is set incorrectly	Set the 120 ohm terminal resistance for the CAN bus, see Mounting of evaluation unit
LED on controller shows continuously red	The firmware is caught in bootloader mode	Disconnect the power to the sensor and restart

Schaeffler GreaseCheck

- Dismounting** GreaseCheck should be dismounted as follows:
- ▶ Ensure that the controller to which the electronic evaluation system is connected is in a voltage-free state.
 - ▶ Disconnect the connection cable for the power supply from the electronic evaluation system.
 - ▶ Disconnect the sensor cable from the electronic evaluation system.
 - ▶ Loosen the internal clamping screw using an open-end wrench SW13.
 - ▶ Avoid applying torsion forces to the sensor head. This can lead to destruction of the sensor head.
 - ▶ Pull the sensor head carefully and without rotation out of the internal clamping screw and close off the hole.
 - ▷ The grease sensor is dismounted.

Decommissioning and disposal

In order to prevent environmental contamination, disposal of GreaseCheck must be carried out in accordance with the directives of the relevant country of use.

Do not dispose of either GreaseCheck or associated components with household waste, since they contain electronic components that must be disposed of in accordance with the applicable regulations.

Components of GreaseCheck that are defective and cannot be repaired must be disposed of by environmentally acceptable methods.

All materials used (plastics, metals, electronic subassemblies) must be fed separately to recycling facilities.

Any used GreaseCheck and grease-soaked materials must be disposed of by environmentally acceptable methods.

Electronic devices must be disposed of in accordance with the relevant regulations.

If problems occur in relation to disposal in accordance with legislation and environmentally acceptable methods, the Grease-Check can be returned to Schaeffler Technologies AG & Co. KG.

By carrying out correct disposal, you are making a valuable contribution to protecting the environment.

Schaeffler GreaseCheck

Technical data and accessories

This chapter contains the technical data, accessories and replacement parts for GreaseCheck.

Technical data GreaseCheck

Description		Value	Unit
Measurement factor	Water content	0 to +100	%
	Grease deterioration	0 to +100	%
	Temperature	-20 to +100	°C
Analogue output	Water content	+13 to +20	mA
	Deterioration	+11 to +4	mA
Switching output of power supply (DC 24 V) ¹⁾		+3 to +150	mA
Working range of sensor		+5 to +80	°C
Storage temperature range		-20 to +90	°C
Power supply DC		24 ± 20%	V
CAN bus connection		-	-
Protection class IP		67	-
Mass	Electronic evaluation system	310	g
	Sensor head	40	g
Power consumption	typical	43	mA
	max.	250	mA
Cable length of sensor head		800	mm
Diameter of sensor head		5	mm

¹⁾ The switching output must be subjected to a load such that it carries a minimum of 3 mA and a maximum 150 mA.

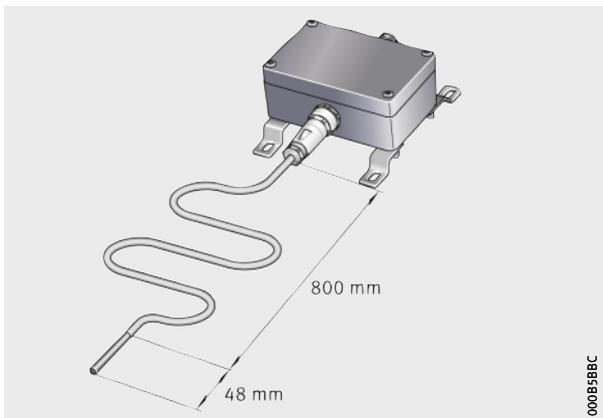


Figure 6
Dimension drawing

System package

Article number	Description
081747098-0000-10	GREASE-CHECK Sensor head with connection cable and electronic evaluation system, connection socket, covers and user manual

Schaeffler GreaseCheck

Appendix

EC Declaration of Conformity

The EC Declaration of Conformity contains the relevant guidelines, harmonised standards and documents. Compliance with these standards is confirmed by the CE symbol on the device name plate.

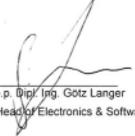
SCHAEFFLER	
en	
EC Declaration of Conformity	
in accordance with EC – Machinery Directive 2011/65/EU and EMC Directive 2014/30/EU	
<p>We hereby declare that the product described below is in conformity with the applicable health and safety requirements of the EC Directive in terms of its design and type and in the execution we have brought into circulation. This declaration shall cease to be valid if any modification is made to the product without our agreement.</p>	
Product description:	Grease Sensor
Product name:	FAG GreaseCheck
Applicable harmonised standards:	
Directive 2014/30/EU	OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the approximation of the laws of the Member States relating to electromagnetic compatibility
Directive 2011/65/EU	OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of use certain hazardous substances in electrical and electronic equipment
DIN EN 61326-1;	Electrical equipment for measurement, control and laboratory use – EMC requirements - Part 1. General requirements (IEC 61326-1:2013); German version EN 61326-1:2013
Constraint	Nothing
Signatures:	
 Dipl. Ing. Armin Kempkes Vice President Condition Monitoring Industry 4.0	 p.p. Dipl. Ing. Götz Langer Head of Electronics & Software
Date: Herzogenrath, 19.06.2018	
<small>This declaration certifies conformity with the stated directives but does not represent a guarantee of characteristics. The safety guidelines in the user manual must be observed.</small>	
<small>FAG Industrial Services GmbH • Kaiserstrasse 100 • D-52134 Herzogenrath • Tel.: +49 2407 9149-99</small>	
000B651F	

Figure 7
EC Declaration of Conformity

Contact For any questions relating to special application cases, please contact Schaeffler Application Engineering or the Schaeffler Technologies Center.

Schaeffler Technologies AG & Co. KG
Postfach 1260

97419 Schweinfurt (Germany)

Georg-Schäfer-Straße 30

97421 Schweinfurt

Phone +49 2407 9149-99

Fax +49 2407 9149-59

E-mail support.is@schaeffler.com

Internet www.schaeffler.com/services



Schaeffler Technologies AG & Co. KG

Georg-Schäfer-Straße 30
97421 Schweinfurt
Germany

Internet www.schaeffler.de/en
E-mail info.de@schaeffler.com

In Germany:

Phone 0180 5003872
Fax 0180 5003873

From other countries:

Phone +49 9721 91-0
Fax +49 9721 91-3435

Every care has been taken to ensure the correctness of the information contained in this publication but no liability can be accepted for any errors or omissions.

We reserve the right to make technical changes.

© Schaeffler Technologies AG & Co. KG
Issued: 2018, August

This publication or parts thereof may not be reproduced without our permission.

BA 35 GB-D