



Products: Condition Monitoring



Products: Condition Monitoring

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Belt pulley alignment device Top-Laser SMARTY2 Belt tension measuring device Top-Laser TRUMMY2

LASER-SMARTY2



LASER-EQUILIGN

LASER-TRUMMY2

LASER-SHIM



Shaft alignment device Top-Laser EQUILIGN Shims Top-Laser SHIM



Features

Belt pulley alignment device FAG Top-Laser SMARTY2

These products assist in the alignment of shafts and belt pulleys and the checking of belt tension values.

The FAG Top-Laser SMARTY2 is a line laser for the alignment of belt pulleys and chain sprockets with a diameter of more than 60 mm.

The alignment of belt pulleys and chain sprockets reduces wear and energy losses in tension drives, their bearings and seals. Less heat is generated and the lifetime and reliability of the machines is increased.

The features of the line laser are as follows:

- The parallelism and angular errors of the two pulleys are displayed.
- Alignment can be carried out on both horizontally and vertically mounted belt pulleys.
- Alignment is significantly more rapid and more precise than with conventional methods.
- Alignment can be carried out by one person working alone.
- The measuring device is attached to the pulleys by magnetism.

The laser can be clearly seen on the target marks. Once the machine is adjusted such that the laser beam coincides with the slots in the target marks, it is correctly aligned.

The target marks are available in an optical, *Figure 2*, page 94, and an electronic design, *Figure 1* and *Figure 3*, page 94. In the case of electronic target marks, the adjustment values are displayed in real time on the digital display. Angular errors are shown in degrees, while the parallelism offset is shown in millimetres.



Do not look into the laser beam or point the laser beam into another person's eyes.





Figure 1 Electronic target mark

All the parts are supplied in a lined case, *Figure 2*.

Scope of delivery	1 emitter 2 optical target marks, attached by magnetism 1 battery 1 lined case
Ordering designation	LASER-SMARTY2

Emitter
 Optical target mark
 Battery
 Lined case

Figure 2 Scope of delivery FAG Top-Laser SMARTY2

Replacement part Ordering designation

Accessories

Ordering designation



1 optical target mark, attached by magnetism LASER-SMARTY2.TARGET

1 electronic target mark, attached by magnetism 1 case

LASER-SMARTY2.TARGET-DIGITAL



Electronic target mark
 Case

Figure 3 Scope of delivery FAG Top-Laser TARGET-DIGITAL

Belt tension measuring device FAG Top-Laser TRUMMY2	The robust, handy FAG Top-Laser TRUMMY2 is an optical-electronic manual measuring instrument for belt tension (strand force). The correct belt tension is an essential prequisite for achieving the maximum life of the belt drive. In addition, this gives reduced wear of the drive components, lower energy costs and increased cost-efficiency.
	The FAG Top-Laser TRUMMY2 comprises a cableless measurement probe for direct connection, a measurement probe with cable for difficult to access locations and a manual control device that displays the relevant measurables for belt tension as a frequency in Hz or force in N.
Caution	Do not look into the laser beam or point the laser beam into another person's eyes.
	The simple and reliable user instructions are given in several languages.
	All the parts of the belt tension measuring device are supplied packed in a case, <i>Figure 4</i> .
Scope of delivery	1 manual control device 1 measurement probe for direct connection 1 measurement probe with cable 1 case
Ordering designation	LASER-TRUMMY2



Manual control device
 Measurement probe, direct connection
 Measurement probe, cable connection
 Case

Figure 4 Scope of delivery FAG Top-Laser TRUMMY2

The belt tension measuring device should be calibrated at least every 2 years. The FAG Top-Laser TRUMMY2 should be sent to us for this purpose.

Service Ordering designation Calibration LASER-TRUMMY.CALI-CHECK

Application Before calculating the belt tension, the belt mass and length must be entered. Vibration of the belt is then induced. The device measures the natural frequency by means of clock pulse light and uses this to determine the belt tension, *Figure 5*. This technique is less prone to disruptive influences in comparison with measurement using sound waves.



Belt
 TRUMMY2, cableless measurement probe

Figure 5 Measurement

Shaft alignment device FAG Top-Laser EQUILIGN

The FAG Top-Laser EQUILIGN, *Figure 6*, is an alignment system for coupled and decoupled shafts in motors, pumps, ventilators and gearboxes with rolling bearings.

The advantages of the system are:

- simple mounting
- error-free handling even by untrained personnel using step-by-step display on the manual control device
- automatic tolerance checking.
 - A symbol indicates when the shafts are correctly aligned
- more precise alignment than with conventional methods
- rapid, simple measurement by means of Active Clock measurement mode
- robust control device.
 Watertight and insensitive to contamination in accordance with IP 65
- user interface in 20 languages
- easy generation of reports
- real time display of displacement in all axes.





Figure 6 Shaft alignment device FAG Top-Laser EQUILIGN

Caution A



All the parts of the shaft alignment device are supplied packed in a case, *Figure 7*.

Scope of delivery 1 manual control device

- 1 emitter and receiver including cable 2 m long
 - 1 reflector
 - 5 batteries
- 1 Allen key
- 1 cable for connecting USB memory stick to device
- 1 cable for connecting device to PC via USB port
- 2 brackets
- 2 chains, 300 mm long
- 4 posts, 115 mm long
- 1 tape measure
- 1 case

Ordering designation

Manual control device Emitter/receiver Reflector Batteries, LR6 (AA) DC 1,5 V, 5 pieces Allen key, 4 mm Cable for USB memory stick Cable for PC Bracket Chain, 300 mm long Post, 115 mm long Tape measure Case

Figure 7 Scope of delivery FAG Top-Laser EQUILIGN



Replacement parts	Designation	Description	Scope of delivery Quantity
	LASER-EQUILIGN-DEVICE	Manual control device	1
	LASER-EQUILIGN.TRANS	Emitter/receiver with cable	1
	LASER-EQUILIGN.REFLECT	Reflector	1
	LASER-EQUILIGN.USB-CABLE	Cable for USB memory stick, 2 m long	1
	LASER-EQUILIGN.PC-CABLE	Cable for PC, 2 m long	1
	LASER.BRACKET	Bracket	2
	LASER.CHAIN300-SET	Chain, 300 mm long	2
	LASER.POST115-SET	Post, 115 mm long	4
	LASER.TAPE	Tape measure, 1 m long	1
	LASER-EQUILIGN.CASE	Case	1

Comprehensive range
of accessoriesA comprehensive range of accessories is available in order to
expand the possible applications of the base device FAG Top-Laser
EQUILIGN.

The accessories can be ordered as a set in a handy, robust case or as individual parts.

Accessories, individual parts

Designation	Description	Scope of delivery Quantity
LASER.CHAIN600-SET	Chain, 600 mm long	2
LASER.CHAIN1500-SET	Chain, 1 500 mm long	2
LASER.POST150-SET	Post, 150 mm long	4
LASER.POST200-SET	Post, 200 mm long	4
LASER.POST250-SET	Post, 250 mm long	4
LASER.POST300-SET	Post, 300 mm long	4
LASER.BRACKET-MAGNET	Magnetic holder including 2 posts, 150 mm long	1



Accessories, set

Designation	Description	Scope of delivery Quantity
LASER.ACCESS-SET	Chain, 600 mm long	2
	Chain, 1500 mm long	2
	Post, 150 mm long	4
	Post, 200 mm long	4
	Post, 250 mm long	4
	Post, 300 mm long	4
	Magnetic holder including 2 posts, 150 mm long	2
	Case	1



Chains, 600 mm
 Chains, 1500 mm
 Posts, 150 mm
 Posts, 200 mm
 Posts, 250 mm
 Posts, 300 mm
 Magnetic holder
 (a) Case

Figure 8 Accessories, set

It Before alignment is carried out, any soft foot must be eliminated. FAG Top-LaserEQUILIGN clearly indicates the soft foot. Each individual screw foot connection is loosened and the device is monitored to see if it displays any changes between the foot screwed firmly into place and the loosened foot. The soft foot can then be eliminated using shims. This eliminates any tendency towards vibration and bearing damage as a result of housing deformation. During measurement, at least three positions are approached at different angles. These must be measured at an angle of at least 90°. The intelligent control system prevents incorrect usage here. The actual condition of the subassembly is then displayed, *Figure 9*.



Display of actual condition
 Foot screw connection
 Direction of vertical displacement
 Direction of horizontal displacement

Figure 9 Alignment



Once the foot screw connections have been loosened, the vertical misalignment is first eliminated by means of shims. FAG Top-Laser EQUILIGN shows the displacement in real time. This means that the user can monitor on the display how the measurement results change as soon as the subassembly is moved. Horizontal adjustment is then carried out until the symbol with the thumb pointing upwards is displayed. Once the foot screw connections are tightened, the shafts are aligned.

Shims FAG Top-Laser SHIM

Shims FAG Top-Laser SHIM are used to eliminate vertical misalignment or soft feet.

These shims are made from corrosion-resistant high grade steel and are available in seven thicknesses (0,05 mm, 0,1 mm, 0,2 mm, 0,5 mm, 0,7 mm, 1 mm, 2 mm) and in four sizes (dimension c =15 mm, 23 mm, 32 mm, 44 mm), *Figure 10* and table, page 103.



Available chime						
Available shifts	Designation	Mass	Dimensio	ns in mm		
		m	а	b	с	Thickness
		g				
	LASER.SHIM15×0,05	11	55	50	15	0,05
	LASER.SHIM15×0,10	22	55	50	15	0,1
	LASER.SHIM15×0,20	44	55	50	15	0,2
	LASER.SHIM15×0,50	110	55	50	15	0,5
	LASER.SHIM15×0,70	155	55	50	15	0,7
	LASER.SHIM15×1,00	220	55	50	15	1
	LASER.SHIM15×2,00	440	55	50	15	2
	LASER.SHIM23×0,05	21	75	70	23	0,05
	LASER.SHIM23×0,10	42	75	70	23	0,1
	LASER.SHIM23×0,20	84	75	70	23	0,2
	LASER.SHIM23×0,50	210	75	70	23	0,5
	LASER.SHIM23×0,70	295	75	70	23	0,7
	LASER.SHIM23×1,00	420	75	70	23	1
	LASER.SHIM23×2,00	840	75	70	23	2
	LASER.SHIM32×0,05	29	90	80	32	0,05
	LASER.SHIM32×0,10	58	90	80	32	0,1
	LASER.SHIM32×0,20	115	90	80	32	0,2
	LASER.SHIM32×0,50	290	90	80	32	0,5
	LASER.SHIM32×0,70	410	90	80	32	0,7
	LASER.SHIM32×1,00	580	90	80	32	1
	LASER.SHIM32×2,00	1160	90	80	32	2
	LASER.SHIM44×0,05	53	125	105	44	0,05
	LASER.SHIM44×0,10	106	125	105	44	0,1
	LASER.SHIM44×0,20	212	125	105	44	0,2
	LASER.SHIM44×0,50	530	125	105	44	0,5
	LASER.SHIM44×0,70	742	125	105	44	0,7
	LASER.SHIM44×1,00	1 0 5 0	125	105	44	1
	LASER.SHIM44×2,00	2 100	125	105	44	2

Further information

TPI 182, FAG Alignment Tools – Top-Laser: SMARTY2 · TRUMMY2 · EQUILIGN · SHIM

Enquiries:

industrial-services@schaeffler.com, +49 2407 9149-66.



Features	Vibration diagnosis is the most reliable method for identifying the start of machine damage at an early stage. Unbalance and misalignment defects can be detected accurately, as well as rolling bearing damage and gear tooth defects.
	FAG vibration measuring devices help in planning maintenance work, increasing bearing life and reducing costs. As a result, plant availability is increased and the risk of unplanned downtime is reduced.
Monitoring devices – offline and online	In the field of offline monitoring devices (regular monitoring), Schaeffler offers the FAG Detector III.
	The online monitoring systems (continuous measurement) include FAG SmartCheck, FAG DTECT X1 _s , FAG WiPro _s and FAG ProCheck.
	In order to achieve optimum networking to plant control facilities or monitoring centres, all online systems have versatile communication options as standard.
Worldwide service	On all devices relating to condition monitoring, Schaeffler offers a worldwide service – from the customer hotline to customer- specific service contracts.
Vibration measuring device FAG Detector III	FAG Detector III is a handy, easy to use vibration measuring device. Preinstalled standard configurations in accordance with DIN ISO 10816 make this a Plug-and-Play solution and allow authoritative information on the machinery condition, entirely without time-consuming training or system configuration.
	This allows, for example, rapid inspection of ventilators, pumps, electric motors, compressors or vacuum pumps. All the user must do is start the measurement process by pressing a few buttons and wait until it is completed. The device evaluates the measurement results and presents the results, with self-explanatory symbols.

on the device display, *Figure 1*.



Value OK
 Prealarm
 Main alarm

Figure 1 Symbols in the device display

Schaeffler Technologies

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	The system also has the following features: non-contact temperature measurement speed detection route function report generator.
Analysis software	For more detailed analysis, the PC software Trendline is available free of charge and includes comprehensive functions. These include the Viewer, which gives the user a wide range of tools for data evaluation. The integrated rolling bearing database, con- taining approximately 20 000 bearings from various manufacturers, facilitates easier and more efficient analysis of the measured data. Since the damage frequencies can be incorporated in the measure- ment results, simple damage analysis is possible.
Automatic detection of measurement points	The automatic detection of measurement points through the use of RFID technology gives error-free and precise identification of the measurement points on a measurement route. FAG Detector III identifies the measurement points by means of RFID tags on the machinery. With the proven FAG Detector III, mobile vibration and temperature monitoring is thus quicker, simpler and more reliable. The functionality of automatic measurement point detection is not available worldwide.
Further information	Enquiries: industrial-services@schaeffler.com, +49 2407 9149-66.
Balancing function	A further special feature of FAG Detector III is the balancing function. For this purpose, the optionally available Balancing Kit is required. This makes it possible to not only detect but also eliminate unbalances.
	The results of the balancing process are also transferred to the Trendline software for evaluation.

Ordering examples	The vibration measuring device FAG Detector III is available in two variants, with the balancing function available for ordering in a upgraded version.
Scope of delivery Base device	 base device with rechargeable battery accelerometer, attached by magnetism, and sensor cable infrared temperature sensor charger with worldwide compatibility PC data cable (serial and USB) user manual protective bag with holder for temperature sensor Trendline PC software free of charge case
Ordering designation	DETECT3-KIT
Scope of delivery Device with automatic measurement point detection	As DETECT3-KIT 1 RFID reader (integrated) 5 RFID tags for identifying the measurement point
Ordering designation	DETECT3-KIT-RFID
Scope of delivery Upgrade level with balancing function	 accelerometer, attached by magnetism, and sensor cable trigger sensor, optical trigger sensor, induction reflective mark for trigger sensor cable for trigger sensor, 10 m magnetic holder for trigger sensor extension for magnetic holder balance dongle for activation of balancing function case
Ordering designation	DETECT3.BALANCE-KIT
Accessories	Sensor extension cables with a length of 5 m or 15 m are available by agreement. The charging dock, mounting pads and additional RFID tags are available by agreement.
Further information	 TPI WL 80-64, FAG Detector III – The Solution for Monitoring and Balancing or www.FAG-DetectorIII.de Enquiries: industrial-services@schaeffler.com, +49 2407 9149-66.



Online monitoring system FAG SmartCheck	 FAG SmartCheck is a compact, innovative, modular online measuring system for continuous monitoring of machinery and process parameters on a decentralised basis. It can be used on assemblies where such monitoring was previously too cost-intensive. FAG SmartCheck is suitable, for example, for early detection of rolling bearing damage, unbalances and misalignments on: electric and geared motors vacuum and fluid pumps ventilators and fans gearboxes and compressors spindles and machine tools separators and decanters.
Plug-and-Play system	FAG SmartCheck is ready for immediate use. When supplied, it already has a set of key data that facilitate general, reliable machinery monitoring. In addition, predefined configuration templates are available for monitoring of items such as fans, pumps and bearings. These can easily be matched to individual requirements. Due to the integrated bearing database of FAG and INA standard bearings, data configur- ation and later analysis are simpler. The system has an independent teaching mode that identifies the alarm thresholds.
Parameters monitored	In addition to the standard parameters of vibration and temperature, it is possible to record other classic operating parameters such as pressure or flow rate. All parameters can be correlated with each other and included in the alarm configuration. The data are recorded and analysed centrally by the system. The current machine condition can be displayed directly on the device or transferred to any control facility as required. It is only necessary to integrate FAG SmartCheck in the existing network structure.
Mitsubishi control system	General communication with controllers can be carried out through connection of the analogue and digital interfaces with the controller. The communication protocol SLMP has been implemented specially for Mitsubishi controllers of the L and Q series. This allows direct transfer of the measurables status and gives information, for example, on rolling bearing damage, unbalance, misalignments or temperature fluctuations that can be notified in plain text to the operator by means of the controller.

Access via the Internet	FAG SmartCheck has an intuitive user concept designed as a Web interface. It is therefore possible to access the system via the Internet using any standard Internet browser. The Web interface can be used to configure the system and view current data.
Remote monitoring	The data can be transferred to other locations by remote access and analysed there by the operator or external service providers such as the Schaeffler vibration experts. This is particularly important for customers who still have little experience of data analysis or wish to outsource this function.
Further information	 TPI 214, FAG SmartCheck or www.FAG-SmartCheck.de Enquiries: industrial-services@schaeffler.com, +49 2407 9149-66.



Online monitoring system FAG SmartQB

FAG SmartQB is an easy way to get started in Condition Monitoring. It monitors the vibrations in electric motors, pumps and fans. Commissioning can be carried out by an employee who does not have specific knowledge in the field of vibration diagnosis. The 7" display shows user-friendly plain text messages, *Figure 2*.

The features of FAG SmartQB are:

- suitable for machinery with fixed and variable speeds from 100 min⁻¹ to 15 000 min⁻¹
- preconfigured for up to six sensors
- touch panel with plain text messages
- minimal installation work using 1 cable technique (Power over Ethernet)
- live display of current values
- trend pattern of damage development
- user interface in 16 languages
- RJ45 Ethernet interface for service technicians.



Figure 2 Online monitoring system FAG SmartQB The scope of delivery comprises three parts, *Figure 3*.

Scope of delivery

housing with sensor unit FAG SmartQB with 7" touch panel
 FAG SmartQB sensor 1
 Ethernet cable, 10 m long
 SMART-QB

Ordering designation



Housing
 Sensor
 Ethernet cable

Figure 3 Scope of delivery Online monitoring system FAG SmartQB

Replacement parts

Designation	Description	Scope of delivery Quantity
SMART-QB.SENSOR-1	Sensor 1	1
SMART-CHECK.CABLE-ETH-P-M12-RJ45-10M	Ethernet cable, 10 m long	1



Installation and commissioning	In addition, installation and commissioning are exceptionally simple. Any industrial electrician can install the system and, without prior knowledge of vibration technology, can carry out commissioning within five minutes. The touch display gives personnel all relevant information, from mounting through recommended actions in the case of errors. At first startup, the customer selects one of 16 languages and, where necessary, replaces the preset contact details for technical support from Schaeffler with his own information.
	After selection of the machine (electric motor, pump or fan) to which the FAG SmartQB Sensor is attached and the category "variable speed machine" or "constant speed machine" and input of the individual machine name, the FAG SmartQB automatically selects the best measurement configuration and the system is immediately ready for teach-in mode. This runs automatically.
	A maximum of six sensors can be connected to one FAG SmartQB. Each sensor can monitor a different machine. New sensors can also be added using the menu just as easily as in first installation. After commissioning, the FAG SmartQB shows relevant information
	Examples include: alarm status vibration values defect frequency maximum values mean values trend patterns.
Defect causes	 The Condition Monitoring system can detect a total of five defect causes and output these on the display: bearing damage unbalance friction/cavitation increases in temperature significant changes in the vibration patterns. Due to the automated allocation of defects, the maintenance personnel no longer require knowledge of vibration technology. Maintenance measures and any ordering of replacement parts as necessary can be immediately initiated through defect allocation.

Market sectors FAG SmartQB is typically used in the following sectors:

- cement
- paper
- steel
- water management
- machinery and equipment building

repair shops for electric motors, pumps and fans.

FAG SmartQB is optimised for use in these sectors and is supplied already configured. Due to the automated defect allocation, maintenance measures and any ordering of replacement parts as necessary can be immediately initiated.

Comprehensive range of accessories

An extensive range of accessories is available to expand the possible applications of the monitoring system FAG SmartQB, see table and *Figure 4*. The accessories can be ordered as individual items.

Accessories, individual parts

Designation	Description	Scope of delivery Quantity
SMART-QB.SENSOR-2	Sensor 2	1
SMART-QB.SENSOR-3	Sensor 3	1
SMART-QB.SENSOR-4	Sensor 4	1
SMART-QB.SENSOR-5	Sensor 5	1
SMART-QB.SENSOR-6	Sensor 6	1
SMART-CHECK.CABLE-ETH-P-M12-RJ45-20M	Ethernet cable, 20 m long	1
SMART-CHECK.CABLE-ETH-P-M12-RJ45-30M	Ethernet cable, 30 m long	1
SMART-QB.LAMP	Lamp incl. cable 2×10 m long	1



Sensor 2
 Sensor 3
 Sensor 4
 Sensor 5
 Sensor 6
 Ethernet cable
 Cable for lamp

 Lamp

Figure 4 Accessories for FAG SmartQB

Online monitoring system FAG DTECT X1 _s	FAG DTECT $X1_s$ is a versatile online system for the monitoring of rotating components and elements in the machinery and plant industry. Typical applications can be found, for example, in the steel, raw materials, paper and marine industries.
	The system gives early, reliable detection of possible damage and thus helps to prevent unplanned and expensive downtime. The risk of possible production shutdowns is reduced. As a result, the capacity utilisation of machinery and plant is increased.
Versatile system	The system can be tailored to customer-specific requirements by means of the software.
	The base device has 8 measurement channels. All conventional acceleration, speed and travel sensors can be attached.
	Due to its compact size and robust housing (protection class IP 67), it is suitable for a wide range of monitoring applications. It has standardised connectors allowing easy installation on machinery and plant.
Remote monitoring	Defects and damage can be detected on machinery without the need for a diagnosis expert on site. The data can be transferred to other locations by remote access and analysed there, for example by Schaeffler vibration experts.
Further information	 TPI 170, FAG DTECT X1_s Enquiries: industrial-services@schaeffler.com, +49 2407 9149-66.

Online monitoring system FAG WiPro _s	FAG WiPro _s allows online monitoring of wind farms – onshore and offshore. The system gives early and reliable detection of possible machine damage. This helps to prevent unplanned downtime and expensive secondary damage. Due to its small size, it can easily be accommodated in small spaces such as the nacelle of a wind turbine.
Versatile system	FAG WiPro _s is equipped with a signal processor and evaluates all measurement signals internally. Due to the intelligent linking of expert knowledge with information from the turbine, it is possible to keep the transferred data volume very small. This is particularly important where a large number of turbines must be continuously monitored over a long period.
Remote monitoring	The automatic messaging function by means of TCP/IP, wifi modem (optional), landline modem or DSL router allows efficient worldwide monitoring. The data can be transferred to other locations by remote access and analysed there, for example by Schaeffler vibration experts.
Further information	 WL 80 373, Flyer FAG WiPros Enquiries: industrial-services@schaeffler.com, +49 2407 9149-66.



Online monitoring system FAG ProCheck	FAG ProCheck is a versatile online monitoring system. It can be used to prevent unplanned downtime and for quality control. The system offers a high level of functionality and is available in a range of variants – from an 8 channel to a 16 channel system.
Parameters monitored	FAG ProCheck continuously records data on vibration, temperature and other process parameters and subsequently carries out their evaluation. As a result, incipient damage and its causes can be detected at a very early stage and the appropriate countermeasures can be introduced in good time. This gives a considerable reduction in operating costs. In addition, FAG ProCheck offers the possibility of correlating a large number of analogue and digital input and output signals to the vibration data. These channels also allow simple communication with higher level systems such as process control systems.
Versatile system	Due to its extremely robust and compact design, this system is ideally suited for use in almost all industrial segments. The system can be used in steelworks, paper machinery, cement plants or in the oil and gas industry.
Remote monitoring	Defects and damage can be detected on machinery without the need for a diagnosis expert on site. The data can be transferred to other locations by remote access and analysed there, for example by Schaeffler vibration experts.
Explosion-protected variant	An explosion-protected version of FAG ProCheck is available by agreement. In this version, a specially pressure-encapsulated housing prevents the system coming into contact with an explosive atmosphere. This is because wherever flammable gases, vapours, fluids or dust occur, the presence of oxygen and an ignition source can rapidly cause an explosion.
Further information	 TPI WL 80-69, FAG ProCheck State of the Art Machine Monitoring for Maximum Availability Enquiries: industrial-services@schaeffler.com, +49 2407 9149-66.
Customer-specific solutions	The display, which is individually tailored to the customer's require- ments, gives a user interface that allows a rapid overview of the condition of the plant. Depending on the complexity of the plant, this display can be arranged on several levels.
Other monitoring systems	Other monitoring systems for the requirements of specific sectors are available by agreement.



Product overview Monitoring of lubricants



Particle sensor Wear Debris Check



Monitoring of lubricants

Features

The operating life of the lubricant is the decisive value for the bearing life. Depending on the application, either a grease or particle sensor can be used for monitoring. The lubricant can be topped up or replaced in good time before damage occurs.

Grease sensor FAG GreaseCheck The grease sensor has a diameter of 5 mm and is inserted in a hole in the housing as close as possible to the rolling bearing. The sensor is positioned in the lubricant. This grease sensor optically measures the water content, the extent of grease deterioration and the grease temperature directly in the bearing arrangement. This information is transferred by cable to the evaluation unit, *Figure 1*. The evaluation unit generates an analogue signal and a digital system that gives the user rapid and simple information on the condition of the grease.



Grease sensor
 Electronic evaluation system

Figure 1 Grease sensor and electronic evaluation system

> In the past, bearings were regreased as a function of time. The grease quantities and lubrication intervals were calculated numerically. If the grease sensor is used, regreasing can be carried out as a function of condition.

mm

Advantages	The grease sensor facilitates:
	Iubrication appropriate to needs
	lower lubricant costs
	prevention of unplanned downtime
	lower maintenance costs
	lower equipment costs.
Further information	TPI 234, Condition Monitoring of Greases in Rolling Bearings
	Enquiries: industrial-services@schaeffler.com, +49 2407 9149-66.

Monitoring of lubricants

Particle sensor FAG Wear Debris Check

Particle sensors of this type can be used to determine wear at an early stage in heavily loaded industrial gearboxes on the basis of particles in the oil. The debris particles that can indicate a failure can be detected in the oil several months in advance. Through monitoring of particles in the lubricant, damage is detected at an early stage. This helps to prevent secondary damage and downtime periods. The particle sensor is installed in an ancillary flow of the recirculating lubrication system in the gearbox ahead of the filter or in a separate circuit.

Typical applications for the FAG Wear Debris Check can be found, for example, in gearboxes in raw material extraction plant, planetary gearboxes in wind turbines or in ship propulsion systems.

The features of the particle sensor are as follows:

- monitoring of the number of particles in the oil
- differentiation of the particles into ferrous and non-ferrous metals
- classification of the particles according to size
- possible integration in an online monitoring system for linking of oil particle and vibration data.

Where oil and vibration monitoring facilities are combined, damage in gearboxes with recirculating oil lubrication can be detected at an early stage and the source can be determined. In this way, it is possible to prevent production shutdowns or secondary damage.

Further information

- WL 80 366, Flyer FAG Wear Debris Check
- Enquiries:
 - industrial-services@schaeffler.com, +49 2407 9149-66.