OPTIME Ecosystem

Predictive Maintenance Made Easy
Condition Monitoring & Smart Lubrication

We pioneer motion

SCHAEFFLER

AVOID UNPLANNED DOWNTIMES THE EASY WAY. CONDITION MONITORING AND SMART LUBRICATION IN ONE SOLUTION.

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Added Value

Avoid Unplanned Downtime

Avoiding unplanned machine downtimes and the costs associated with them, which can run to more than 100,000 euros an hour, is a challenge faced by companies in many different industries. Manual checks and relubrication tie up personnel and conceal risks, especially for hard-to-reach machines in harsh environments.

The OPTIME Ecosystem provides a solution to these problems by offering an easy way to implement predictive maintenance. This makes it a central component of Lifetime Solutions.

Schaeffler Lifetime Solutions
The Lifetime Solutions portfolio has a comprehensive range of products, services, and solutions for industrial maintenance. **It is designed to support maintenance personnel over the entire service life of a machine and can be used in any industry.**

medias.schaeffler.de/en/lifetime-solutions

Added Value

Simplify Maintenance

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FROST & SULLIVAN
2023 BEST PRACTICES AWARD
GLOBAL CONDITION MONITORING EQUIPMENT ENABLING TECHNOLOGY LEADERSHIP AWARD

OPTIME is the world's leading ecosystem for condition monitoring and lubrication. The solution has been successfully used for years in numerous sectors and has won multiple awards. Customers from all industries can begin monitoring and lubricating hundreds, or even thousands, of machines at each plant in just a few days and save money in unplanned downtime equivalent to many multiples of the investment every year. We are constantly adding new functions and features to the solution. In other words,

the OPTIME Ecosystem never sleeps.

What you can expect from the OPTIME Ecosystem

1
Easy installation
Hundreds of sensors or lubricators can be installed and set up on machines in just a few days.

2
Global number one
The OPTIME Ecosystem is the world's leading solution for predictive maintenance and smart lubrication.

3
Easy scalability
The Ecosystem can be scaled at any time. A new plant has been connected every workday since 2023.

4
Value for money
The exceptional price-to-performance ratio makes the solution an easy choice for decision makers.

5
Fast payoff
Investment costs are proven to be recouped within 1–10 months thanks to fewer unplanned machine downtime.

6
Intelligence
AI analyses enable prompt fault detection and rectification.

7
Customer orientation
The OPTIME Ecosystem was developed based on direct user feedback and is constantly being improved.

8
Focus on service
Our team is available at all times to give you the support you need – including training.

9
Safety
Less time spent in hazardous areas results in fewer accidents and enhanced safety.

ACHIEVE TARGETS

Reduce with …

Condition Monitoring unplanned downtime by up to
80%

Smart Lubrication grease consumption by up to
30%

OPTIME Ecosystem energy consumption by up to
3%

Overview of Solution Elements

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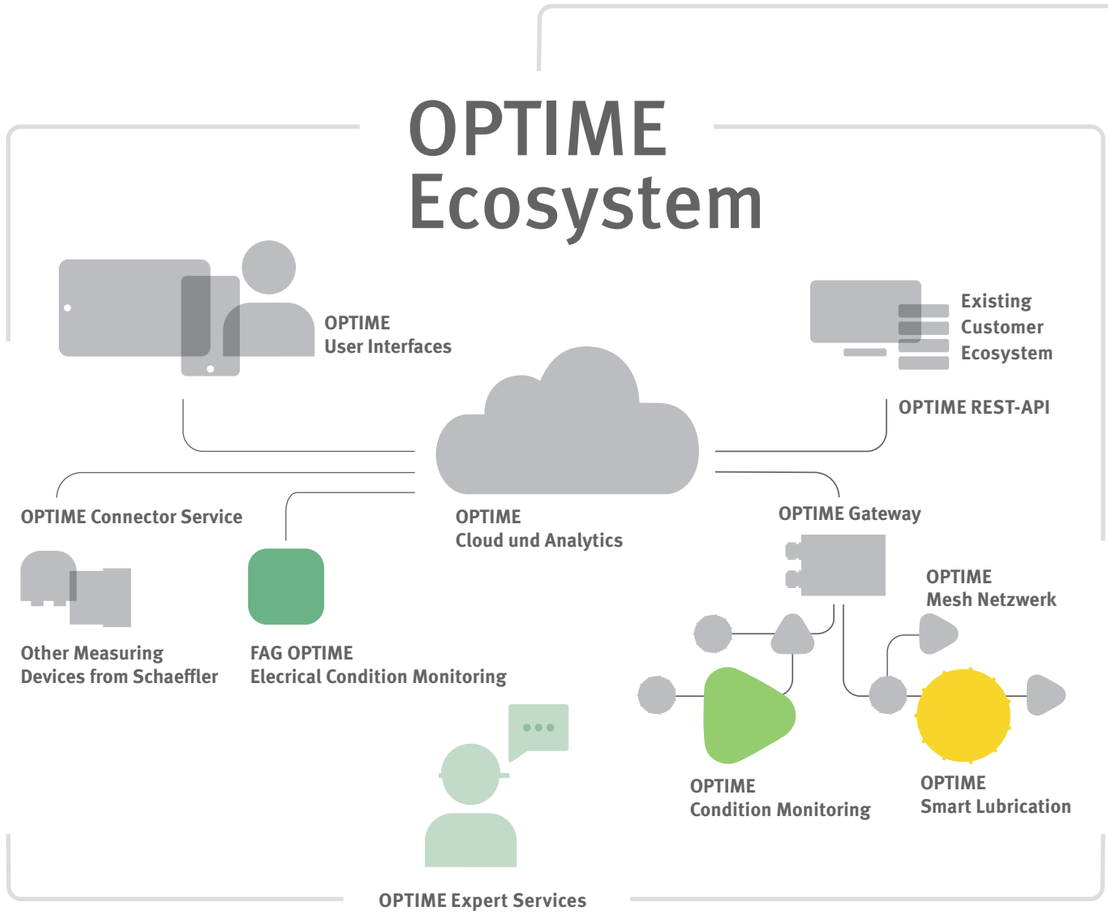
The OPTIME Ecosystem comprises numerous elements and services that work together to reduce unplanned downtime. OPTIME Condition Monitoring and OPTIME Smart Lubrication are components of the intelligent OPTIME Ecosystem.



User Interfaces
With the user interfaces in the mobile OPTIME App, the OPTIME Dashboard (web-based), and the OPTIME Expert-Viewer (optional), users can easily access the information they need – anywhere, at any time.

Cloud & Analytics
With its high computing power and capacity, the OPTIME Cloud & Analytics component captures huge amounts of data and prepares them for easy understanding and processing.

Mesh Network
Connection of all OPTIME Ecosystem devices* via the gateways – the automated, self-healing OPTIME Mesh Network configures itself, requires little energy, and offers a very large coverage area.

* except OPTIME E-CM (has got independent LTE connection due to installation in el. cabinet)

REST-API
The OPTIME REST API makes it easy to connect the OPTIME Ecosystem to other existing systems and get the most out of the data collected. Existing customer ecosystems may include maintenance and asset management systems, databases, and other elements.

Connector Service
With the OPTIME Connector Service, you can easily connect SmartCheck, ProLink CMS, and other devices to the OPTIME Ecosystem.

Expert Services
Expert Services complement the OPTIME Ecosystem with key services such as integrated in-app access to vibration experts, training, and support offerings to help you get the most out of your OPTIME Ecosystem.

Condition Monitoring
With wireless vibration sensors, you can monitor your machines, even in hazardous areas, from wherever you are.

- OPTIME 3
- OPTIME 5
- OPTIME 5 Ex

Smart Lubrication
Simplify lubrication

- With the world's first intelligent lubricator, the OPTIME C1.
- With FAG OPTIME C4 for multiple lubrication points.
- OPTIME C1 Adapter, used in conjunction with the OPTIME C1, turns existing, gas-powered lubricators into smart devices.

Gateway
The OPTIME Gateway collects data from OPTIME vibration sensors and lubricators. It is a standalone device that makes secure cloud connectivity easy without requiring integration into your IT/OT networks and can also be used in hazardous areas up to Zone 2/21.

Electrical Condition Monitoring
With current and voltage measurement electrical failures on AC motors can be detected independent by machine ambient conditions FAG OPTIME E-CM.

Overview of Solution Elements

OPTIME App

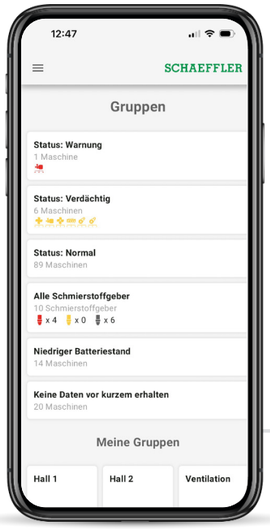
The app shows key information from the OPTIME Dashboard, such as the machine status and alarms, in an optimal way for mobile use. With the app, you can access information even when you are situated at the machine. In addition, you can add information from the machine.
You can easily organize the sensors and lubricators on all your machines with the help of group or machine management. Find out how the mobile app works below.

The Schaeffler OPTIME App can be downloaded from the Apple App Store or Google Play.

Schaeffler OPTIME

Group management

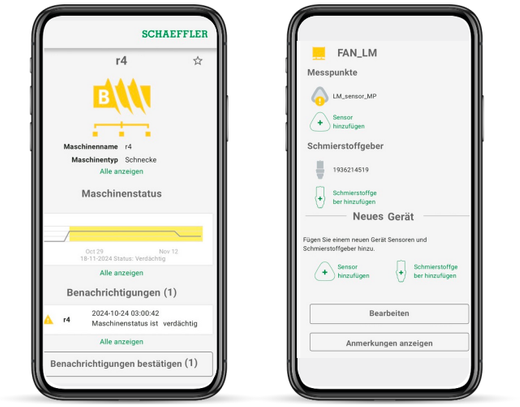
- Machine health status
  - *Severe: Machine exhibits advanced damage. These machines should be inspected and, if necessary, repaired.*
  - *Warning: Inspect the machine and schedule repairs for the next regular maintenance date.*
  - *Suspect: No immediate response is required.*
- All lubricators: In this group, the statuses of all lubricant sensors are displayed. In addition to the filling level and the remaining time until the cartridge needs to be changed, problematic operational statuses with respect to lubrication are displayed.
- Battery status: Sensors or lubricators with low battery levels are shown here.
- Reception status: Sensors or lubricators that are offline and have not transmitted any data in the last 24 hours are shown here.



My groups

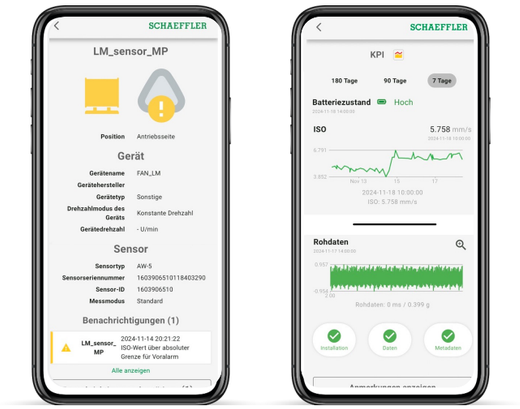
Below the alarm-based groups are the individual user-defined groups, which can be created very easily.
Examples

- Local conditions (location, building)
- Production-relevant structures (segments, product lines, production units)
- Machine types (motors, fans, pumps)



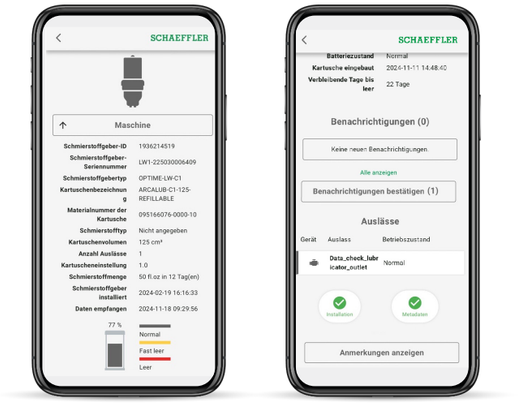
Machine management

- Track machine status
- Acknowledge alarm notifications
- Edit machines
- View and add notes to machine log
- Navigate to subordinate sensors or lubricators
- Add new sensors or lubricators
- Request expert analyses



Sensor management OPTIME Condition Monitoring

- Acknowledge alarm notifications
- View KPIs
- View raw data
- Edit sensors
- Request new KPIs and raw data
- View and add notes to machine log



Smart Lubricators

- View and acknowledge alarm notifications
- View status information
- View cartridge information
- Edit lubricator and outlet names
- Change dispensing settings
- Change lubricant cartridge
- Reactivate lubricator
- Deactivate lubricator
- Show notes

Overview of Solution Elements

User Interfaces

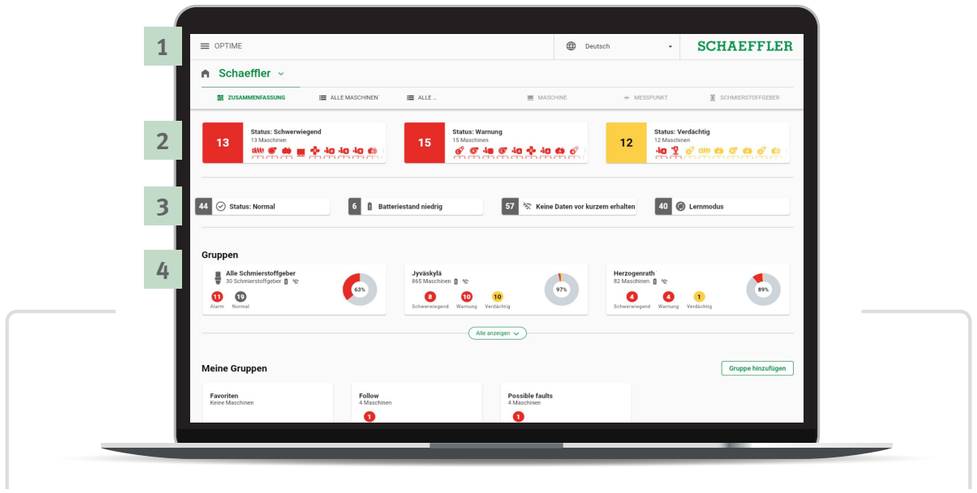
With the user interfaces in the intuitive mobile OPTIME App, the OPTIME Dashboard, and the OPTIME ExpertViewer, users can easily access needed information at any time, regardless of their location or function.

What the OPTIME dashboard offers

- Start screen showing complete overview of plant at a glance
- Intuitive control functions for easy and fast navigation
- Search function for easy finding of all machines and assets
- Uniform user interface and user experience across all devices (including tablets)
- Special user and asset management for administrators

Browser

- Google Chrome
- Microsoft Edge
- Mozilla Firefox
- Safari
- Microsoft Internet Explorer



Find important functions quickly

1. **Access to OPTIME management functions and to user instructions and manuals**
2. **Quick view showing all warnings and alarms coming from the user's device at a glance**
3. **These special groups deliver the operational statuses and data for the sensors and lubricators, e.g., sensors and lubricators that have low battery levels, have not recently received data, or are in learning mode.**
4. **Automatically created user plant structure for easy visualization of status of each department or individual area and fast localization of problems.**

Functions for administrators only

- User management
  - *Add, edit, and delete users and profiles*
  - *Send notifications to users*
- Asset management
  - *Add, move, and delete gateways, sensors, and lubricators*

Overview of Solution Elements

Cloud & Analytics, Mesh Network, Cybersecurity

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Apart from the user interfaces, there are two main technical components of the OPTIME Ecosystem Digital Services: Cloud & Analytics and the Mesh Network.

Cloud & Analytics

The OPTIME Cloud & Analytics platform helps companies manage large amounts of data and gain valuable insights from them. The high computing power of the platform makes fast processing of data streams collected from various sources possible.
A central aspect of OPTIME Cloud & Analytics is its ability to prepare data. State-of-the-art algorithms filter, clean, and structure the raw data, thereby providing the basis for reliable analyses.
The platform uses advanced analytical tools to identify patterns and trends in the data. The platform uses advanced analytical tools to identify patterns and trends in the data, supplemented by specific evaluation logic based on decades of experience of condition monitoring experts. OPTIME Cloud & Analytics visualizes the data. Thanks to clear dashboards and interactive reports, users can gain an understanding of complex data without requiring any in-depth knowledge of vibration analysis.

Mesh Network

OPTIME communication is based on the licensed Wirepas mesh (WM) technology. It is a decentralized wireless communication protocol for IoT devices. Due to the unique decentralized operation, the device nodes contain the entire network intelligence. The devices themselves make all decisions locally and cooperatively, e.g., about the choice of adjacent node, the transmission power, and the frequency channel. This makes reliable, scalable, and user-friendly connectivity for devices possible with no interference with neighboring networks. Each node is a redistribution point in the mesh network, resulting in greater network coverage and seamless communication with no dead zones, even in hard-to-reach spots.

Cybersecurity

- **Schaeffler's Commitment to Robust Cybersecurity:** At Schaeffler, we are committed to maintaining the highest standards of cybersecurity across all our operations, ensuring ongoing protection and data integrity for our customers.
- **Best Practice Standards:** We adhere to internationally recognized standards such as IEC 62443 and OWASP ASVS, systematically implementing these frameworks to assure comprehensive security throughout our services.
- **Secure Data Management:** Our security architecture includes dedicated secure areas with both physical and logical measures that are continuously assessed to safeguard data during transmission and storage.
- **Advanced Encryption Techniques:** Data protection is ensured through AES-256 encryption along with robust key management practices, maintaining data confidentiality via secure protocols such as SSH, HTTPS, and MQTT/TLS.
- **Device Security Management:** Utilizing IEEE 802.1AR IDevID standards (OPTIME Gateway Generation 2), we establish a solid foundation for device integrity and lifecycle management. This ensures the integrity of OPTIME IoT Edge Devices from production through their entire lifecycle.
- **Innovative Cryptographic Advancements:** We are carefully evaluating our cryptographic strategies amidst technological progress, focusing on emerging threats. This includes regularly reviewing RSA practices and exploring advancements in quantum-resistant cryptographic technologies.
- **ISO 27001 Certification:** Our OPTIME platform and services are operated according to ISO 27001 certification, strengthening our commitment to comprehensive information security management.
- **Schaeffler's proactive and adaptive approach** reflects our dedication to providing a secure, reliable environment for our customers, ensuring both present and future protection needs are met.

Digital Services Mandatory

The OPTIME Digital Service forms the basis for the OPTIME Ecosystem. This cloud-based solution can be used via mobile apps and web apps for desktop browsers in such places as control rooms or at workstations. After the customer has subscribed to the Digital Service, a separate area in the Schaeffler Cloud is created specifically for the customer and the customer is granted access to the Digital Service. Management of the OPTIME installation is done via the mobile app or the OPTIME Dashboard. OPTIME Digital Service comprises basic as well as optional service components.

Digital Base Fee

- Access to OPTIME Dashboard and App
- Unlimited number of users
- Training Campus
- Provision of and access to customer-specific area in the Schaeffler Cloud
- User access and management
- Commissioning and activation of sensors and gateways via the mobile app
- Note: Schaeffler requires the name and an email address of at least one main user from the customer's organization in order to create the subscriber.
- After the order has been successfully processed, the customer sets up the subscription and is invoiced for it at the beginning of the following month.
- The customer is informed by email of the successful setup.
- Any minimum contract periods agreed on start on the 1st of the month of the first invoice.

Digital Service Analytics

- Vibration or electrical signal based condition assessment of monitored machines using algorithm-based automated diagnostics
- Display of alarms and root causes of failures
- Fees are only charged for active sensors. A sensor is active as soon as the Schaeffler Cloud receives measurement data from the sensor.
- If Schaeffler shipped a gateway with a SIM card, the data transfer costs are included in the monthly fees.*
- Note: Schaeffler only needs the monitored machine type and elecrical motor nameplate data for the automated analysis and alarms. Other optional metadata (criticality, machine ISO class, and more) can be included to yield better results.

Digital Lubrication Management

- Display of status information for the OPTIME Smart Lubricator devices (e.g., filling level, battery status, or number of days before cartridge change is required)
- Generation and display of alarms (critical lubricant level, exceeded temperature limits, excessively high backpressure)
- Identification of root causes of faults
- Support in selection of lubricant and relubrication parameters
- Remote change of lubrication settings
- Fees are only charged for active devices. A device is active as soon as Schaeffler OPTIME Cloud receives data from the device.
- If Schaeffler shipped a gateway with a SIM card, the data transfer costs are included in the monthly fees.*

** Your Schaeffler contact will be happy to answer any questions you may have regarding prices.*

Digitale and Expert Services Optional

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OPTIME ExpertViewer

The digital service OPTIME ExpertViewer offers an extensive collection of analysis tools for manual depth analysis and root cause analysis. Vibration data and data from lubricators can be evaluated with them. The service can be used with all OPTIME-compatible data, including Schaeffler SmartCheck and Schaeffler ProLink CMS. The ExpertViewer is optimized for the high-performance analysis of large amounts of vibration data. Handling is easy. Users log in with the user data for OPTIME.
Good to know: The number of users on the customer side for the ExpertViewer digital service is not limited. Monthly fees are charged for this service. The OPTIME ExpertViewer is provided as a download and requires an active Digital Service subscription.

Digital Service REST API

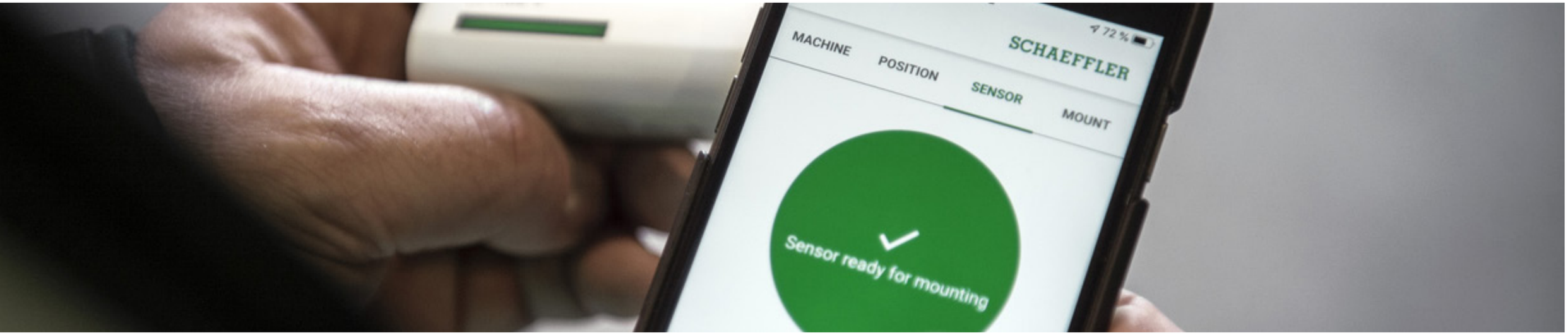
With this service, OPTIME data can be made accessible via a software interface. You receive access to raw vibrations and raw KPI values (for each sensor) as well as machine status, pending/active alarms, and alarm history (for each machine). You can also view information such as when the cartridge needs to be changed as well as the filling level, status, and any alarms/warnings for each of the lubricators. AC motor health status on rotor and stator is as available as power consumption information of the electric motor. Data access rates are limited by the API proxy. The rate limits protect the OPTIME Condition Monitoring system from deliberate or accidental misuse via the API. Schaeffler requires at least one lead developer from the customer's organization as a contact person, who receives access to the Schaeffler API Developer Portal. The designated lead developer is provided with access and introductory information. Monthly fees are charged for this service. The service is accessed through the Schaeffler Developer Portal. This guarantees the state-of-the-art security and protection of the system.

Connector Service

With the OPTIME Connector Service, you can easily connect SmartCheck, ProLink CMS, and other devices to the OPTIME Ecosystem. As a result, these Condition Monitoring systems are also able to use the intelligence and advantages of the OPTIME Ecosystem.
The Connector Service ensures that devices with different communication protocols and data formats can communicate with each other. The Connector enables real-time processing of data through standardized APIs.
In a few words, the OPTIME Ecosystem as a central platform enables the monitoring and management of all connected devices and data streams, which greatly facilitates maintenance and support.
The interface is provided. Monthly fees are charged based on usage.

Single Sign-On Activation

OPTIME Single-Sign-On (SSO) Activation is available as an add-on service for the OPTIME solution.
SSO authentication makes a smoother user experience. OPTIME users authenticate only once with their company login data and without any other OPTIME-specific login data. With just one set of login data to access multiple applications, users no longer need to remember multiple passwords. In addition, the risk of password theft is reduced. The default method for SSO authentication in OPTIME is to use Open ID Connect (OIDC) protocols and configure a specific AD group for administrators, operators, and viewers for each organization.
SSO activation enables the central management of OPTIME users in a central identity provider solution by the customer's IT department. This means you can rely on the company's preferred password checks and even multifactor authentication if this is required by company policy.
If you are interested in this service, please get in touch with your Schaeffler contact, who will connect you to a Schaeffler specialist to discuss details.



If your schedule is full, you're under time pressure, or you need more maintenance personnel, you can be sure of one thing:

WE ARE THERE RIGHT FROM THE START – THE FIRST MONTH …

… and we mean personally there, despite our love of automation.
Our journey together can begin; our common aim is to avoid unplanned downtimes. In the first month, we plan the OPTIME rollout all the way to installation. The doors to the OPTIME Ecosystem, the Training Campus, and the technical product support from our experts open for you.

FOR 6 MONTHS, WE ARE YOUR BODYGUARD …

… and are there to offer you advice during and after the installation of your OPTIME system. During this six-month phase, we regularly invite you to participate in a team call, for example, to discuss the statuses of your assets and to provide clarification, for example, on how to interpret the measurement results.

AFTER 7 MONTHS, YOU DECIDE …

… how you want to continue using the Expert Service. We offer three different options for this. Our goal is to give you as much support as you need. And don't worry you can switch to another service package at any time if you need additional services.

INSTALLATION PHASE

Services

- Project planning
- Subscription setup
- Account creation
- Access to Schaeffler Online Training Campus
- Practical installation support
- OPTIME device mounting service (optional)

ACCOMPANIMENT PHASE

Services

- Regular data analysis by experts
- System checking and maintenance
- Consultations with Schaeffler experts
- Alarm management and fine-tuning
- Added value documentation
- Access to condition monitoring experts

SCALE-UP-PHASE

After 7 months, you can continue on your own or continue to rely on our experts. You can use our Expert Service as follows.

- Expert Service on request
- Regular data analysis by experts

TRAININGS

You get free access to the OPTIME Condition Monitoring and OPTIME Smart Lubrication basic training courses.
› more

Hardware Components

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OPTIME Condition Monitoring

OPTIME Condition Monitoring is an easy-to-scale condition monitoring solution within the OPTIME Ecosystem. It was developed to serve a variety of purposes in industry and is recommended for series of rotating machines with speeds of 120*–5000 rpm. It minimizes user efforts for each individual process step.
This makes OPTIME Condition Monitoring particularly suitable for condition-based monitoring of large numbers of machines, even in hazardous areas.

OPTIME 3, 5 and 5 Ex Sensors

The battery-operated sensors can be quickly and easily mounted on the machines and record vibration and temperature data for the monitored unit.

1 OPTIME 3: Recommended for machine speeds of 120 rpm* to 3000 rpm
2 OPTIME 5: Recommended for machine speeds of up to 5000 rpm
3 OPTIME 5 Ex: Extends range of use cases to include hazardous areas

Applications & Modes

Typical machine combinations › more
Modes: Standard, Dynamic, High Dynamic › more

FAG OPTIME Electrical Condition Monitoring

OPTIME electrical condition monitoring adds several AC motor condition related data to the OPTIME Ecosystem. Ambient condition indipendent installation in the electrical motor cabinet enlarges the monitorable machine parc. So applications with high/low temperature, submersal pumps and other difficult to reach applications can be monitored.

FAG OPTIME E-CM

The two channel CAT III 300 V specified measurement device is suitable to measure two motors independently from each other. Measurement ranges are for current 1 to 400 A and for voltage up to 500 V (phase to phase) or 300 V (phase to neutral). The split core current transformers/Rogowski coils easen the installation effort for the qualified local electrician.

4 FAG OPTIME E-CM: Recommended for low/mid voltage AC motors, recommended for machine speeds › 100 rpm, 30 seconds of constant speed and on duty time ›20%

OPTIME Smart Lubrication

The OPTIME C1 and FAG OPTIME C4 Smart Lubricator are designed to simplify lubrication, minimize rounds, and supply hundreds of lubrication points. It is an easy-to-use and economical solution for automatic single-pointand multi-point lubrication. OPTIME C1 and FAG OPTIME C4 expand Smart Lubrication to the OPTIME Ecosystem. This allows users to identify relationships between machine condition and lubrication in one comprehensive solution.

OPTIME C1, CONCEPT1 and Adapter

5 OPTIME C1 can be screwed directly onto a lubrication point or connected to a lubrication line.
6 A cartridge CONCEPT1 serves as a lubricant reservoir. The possible term setting can be from 1 month to 12 months.
7 The cartridge adapter allows certain lubrication devices from other manufacturers to use the intelligent lubrication of the OPTIME C1. › more
8 The FAG OPTIME C4, with its powerful pump system, can supply up to 4 lubrication points, even over long distances.

9 OPTIME Gateway

OPTIME Gateway and OPTIME Gateway Ex are standalone devices that enable secure cloud connectivity.
They process data from OPTIME vibration sensors and lubricators.

* Application-specific

OPTIME Condition Monitoring Applications

The OPTIME vibration solution offers different modes (Standard, Dynamic, Highly Dynamic) to allow adaptation to the duty cycle of the machine. See the following page for more information.
For OPTIME 3 sensors, machine speeds of 120 rpm* to 3000 rpm are recommended, and for OPTIME 5 sensors, machine speeds of up to 5000 rpm are recommended; in addition, the sensor variant OPTIME 5 Ex makes it possible to extend this use case to cover hazardous areas. When choosing a suitable combination of machines and sensor, it is important to consider a few factors (see table).
FAG OPTIME E-CM monitors machines by the electrical motor signals and can be used in several applications with motor speed ›100rpm, 30 sec. on constant speed and ›20% on duty to detect electrical and mechanical issues (see table).

Typical combinations of machines and sensors

Application	Characteristic	Sensor		Mounting location
Electric motor	‹ 0,5 m	OPTIME 3	1	• Bearing position on the drive side of the motor • Central on the engine • In the middle at the foot of the motor
Electric motor	› 0,5 m	OPTIME 3	2	• Drive side and non-drive side of the motor • Foot from drive side and non-drive side of the motor
Fan	overhang	OPTIME 3	1	• Plummer block housing
Fan	between the bearing	OPTIME 3	2	• Plummer block housing
Fan	directly coupled	OPTIME 3	1	• Drive side of the motor
Compressor	–	OPTIME 5	2	• Bearing location
Pillow block	–	OPTIME 3	1	• Bearing location
Pump	–	OPTIME 5	2	• Bearing location
Gear motor	‹ 0,5 m	OPTIME 5	1	• Bearing location
Gear motor	› 0,5 m	OPTIME 3	1	• Motor
Gear motor	› 0,5 m	OPTIME 5	1	• Gearbox
Extruder	–	OPTIME 3	2	• Bearing location
Calander	–	OPTIME 3	2	• Bearing location
Belt drive	–	OPTIME 3	2	• Bearing location
Saw	–	OPTIME 5	1	• Bearing position of the saw blade
Shaft	–	OPTIME 3	1	• Bearing housing
Gearbox	–	OPTIME 5	2	• Input and output

Typical machines for FAG OPTIME E-CM

Application	Characteristic	Sensor		Mounting location
Electric motor	AC	OPTIME E-CM**	1	• Inside electrical motor cabinet, current transformers on power line cables, insulation CAT III 300 V • VFD and DOL applications
Fan	overhang	OPTIME E-CM**	1	• Inside electrical motor cabinet
Fan	between the bearing	OPTIME E-CM**	1	• Inside electrical motor cabinet
Fan	directly coupled	OPTIME E-CM**	1	• Inside electrical motor cabinet
Compressor	–	OPTIME E-CM**	1	• Inside electrical motor cabinet
Pump	–	OPTIME E-CM**	1	• Inside electrical motor cabinet
Belt drive	–	OPTIME E-CM**	1	• Inside electrical motor cabinet

* Application-specific; ** FAG OPTIME E-CM is alternative option for machines running in difficult ambient conditions (high temperature, under water, difficult or dangerous to reach). OPTIME E-CM = FAG OPTIME E-CM

OPTIME Condition Monitoring Operating Modes

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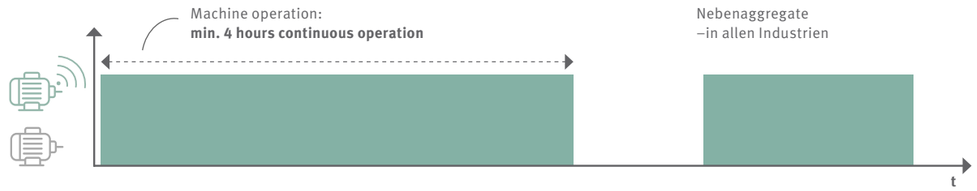
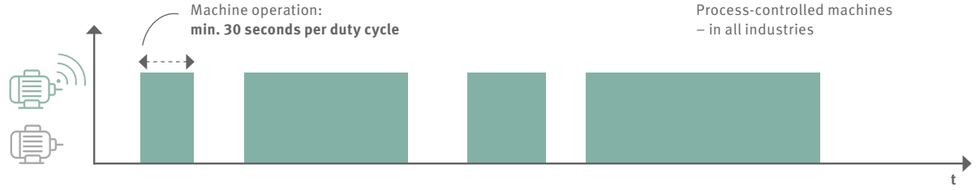
To ensure reliable machine monitoring for all types of machines, OPTIME Condition Monitoring offers three different mode settings. The best battery life is achieved in Standard mode. In Dynamic and High Dynamic modes, the OPTIME sensor learns to detect when the machine is in operation and performs measurements only in this state.

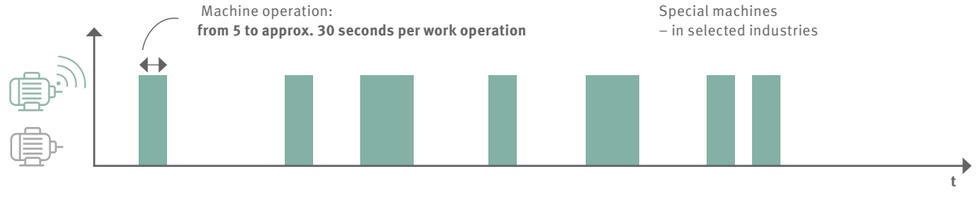
Standard Mode (STM)
Sensors measure at fixed time intervals.
Suitable for machines that run continuously for at least 4 hours.



Dynamic Mode (DM)
Dynamic measurements for machines that operate only occasionally but run continuously for more than 30 seconds.



High Dynamic Mode (HDM)
Dynamic measurements for machines that are operated only occasionally and are active for at least 5 seconds to about 30 seconds.



Use Case – HDM
A customer uses HD mode for container cranes and was able to detect developing bearing damage at an early stage. Unplanned downtime and expensive consequential damage were prevented.

›Scan or click on link to find out more

Product Specifications

OPTIME Condition Monitoring

OPTIME CM sensors	OPTIME-3	OPTIME-5	OPTIME 5 Ex
Vibration bandwidth	2 Hz – 3 kHz	2 Hz – 5 kHz	
Amplitude range	±2/±4/±8/±16 g	±2/±4/±8/±16 g	
Temperature trend measurement	–40°C to +85°C	–40°C to +85°C	
Calculated KPIs	$RMS_{Low,}$ $Kurtosis_{Low,}$ $ISO_{VELOCITY,}$ $RMS_{High,}$ $Kurtosis_{High,}$ DeMod, Temperature	$RMS_{Low,}$ $Kurtosis_{Low,}$ $ISO_{VELOCITY,}$ $RMS_{High,}$ $Kurtosis_{High,}$ DeMod, Temperature	
Measurement cycle	KPIs: 6x per day Time waveform: every 24 h	KPIs: 6x per day Time waveform: every 24 h	
Typical target applications	Motors, generators, fans, pillow block bearings, up to 3.000 rpm	Pumps, geared motors and small gearboxes, compressors, HVACs etc., up to 5.000 rpm	
Sensor commissioning	NFC (Near Field Communication)	NFC (Near Field Communication)	
Communication	Wirepas Mesh (2.4GHz ISM Band)	Wirepas Mesh (2.4GHz ISM Band)	
Sensor transmission range (line of sight)	up to 100 m	up to 100 m	
Power supply	Non-replaceable Li-$SOCl_2$ battery	Non-replaceable Li-$SOCl_2$ battery	
Typical battery life	up to 5 years (depending on configuration)	up to 5 years (depending on configuration)	
Operating temperature range	-40° to +85°C	-40° to +85°C	
Recommended storage temperature (for optimum battery life)	0° to 30°C	0° to 30°C	
Ingress protection	IP 69K	IP 69K	
Materials	Mounting base: steel AISI 316, housing: Polycarbonate	Mounting base: steel AISI 316, housing: Polycarbonate	
Mounting	Single Bolt Mounting (M6) (Adapters available)	Single Bolt Mounting (M6) (Adapters available)	
Dimensions	Please see drawings		
Certifications	CE, ANATEL, ANRT, COC, CRC, FCC, IC, ICASA, IFETEL, IMDA, KC, MIC, MOC, NBTC, NCC, NTC, RCM, SDPPI, SIRIM, SRRC, SUBTEL, TDRA, UKCA, WPC		
Hazardous areas		ATEX/IECEx Zone 1/21 For details please see sensor markings. CCC, CSA, ECAS Ex, INMETRO, KCs, MASC, PESO	

Product Specifications

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OPTIME Electrical Condition Monitoring

	Characteristic	Value
Dimensions	Dimensions	104 x 90 x 58 mm (W x H x D)
	Mounting	DIN rail, 35 mm, 6 modules. Must be installed in a mechanically and electrically flameproof enclosure
Operating conditions	Environment	Only for indoor use, IP 20
	Operating temperature	-5 to +60°C
	Humidity	Relative humidity: 5% to 90% Non-condensing
	Pollution degree	2
	Operating altitude	Up to 2000 m
Voltage supply	Main power supply	AC 50 or 60 Hz, 100–480 V (N-Ph or Ph-Ph, effective value) Overvoltage category CAT III 600 V
	Connection	2-pole terminal block 1.5–2.5 mm2 wires (16-12 AWG) Stripping length: 7 mm Tightening torque: 0.5 Nm
	Consumption	Max. 10 W
Voltage signal inputs	No. of connections	2
	Connection	4-pole terminal block 1.5–2.5 mm2 wires (16-12 AWG) Stripping length: 7 mm Tightening torque: 0.5 Nm
	Voltage range	N-Ph: 58–300 V RMS Ph-Ph: 100–500 V RMS Max. 300 V referenced to ground
	Frequency range	10–200 Hz (in the event of higher frequencies please consult us)
	Measuring category	CAT III
	Overvoltage category	CAT III 300 V
Current signal inputs (use only with Schaeffler sensors)	No. of connections	2
	Connection	RJ45
	Nominal voltage	333 mV (differential, RMS)
	Maximum voltage	426 mV (differential, RMS)
	Sensors	Set with 3 current transformers or Rogowski coils

Product Specifications

OPTIME Electrical Condition Monitoring

	Characteristic	Value
	Measured variable	*Frequency, Ip, VpN, Upp, Pp, Ptot, Sp, Stot, Qp, Qtot and PF (vector), voltage imbalance (as per IEC 61557-12)
Ethernet connectivity (reserved for future use)	No. of connections	2
	Connection	RJ45
	Interface	10/100 base-T (IEEE 802.3)
	Cabling	Auto MDI/MDIX
RS485 connectivity (reserved for future use)	No. of connections	1
	Connection	3-pole terminal block, 0.14–1.5 mm2 Wire cable (25–16 AWG) Stripping length: 7 mm Tightening torque: 0.25 Nm
	Signal level	0 to 5 V (A-B) and -7 to 12 V (GND-A/B)
	Common mode voltage isolation	Max. 1.5 kV
	Speed	9.6 – 115.2 kbps
	Protocols supported	Modbus RTU
Wireless connectivity	Antenna	External 50 ohm
	Connection	SMA
	Protocol	LTE Category 1
	Frequency bands	LTE-FDD: B1/2/3/4/5/7/8/12/13/14/18/19/20/25/26/28
WiFi connectivity	Antenna	Internal
	Protocol	IEEE 802.11 a/b/g/n
	Frequency	2.4 GHz
	Mode	Access point
	Security	WPA2 authentication, AES encryption

***Description of measured variables**

Ip	Current per phase [A]
VpN	Voltage phase-neutral conductor [V]
Upp	Voltage phase-phase [V]
Pp	Power per phase [W]
Ptot	Power total [W]
Sp	Apparent power per phase [VA]
Stot	Apparent power total [VA]
Qp	Reactive power per phase
Qtot	Reactive power total
PF	Power factor [0–100%] (Ptot/Stot) voltage imbalance

Product Specifications

OPTIME Smart Lubrication I OPTIME C1

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Description		Value
Function		
Drive system		Electro-mechanical
Operating pressure		‹10 bar
Metering volume per lubrication interval		0,5 cm³
Metering volume per day (dependent on size and setting of CONCEPT1)		0,17 up to 8,3 cm³
Commissioning		NFC
Lubricator		
Dispensing time (steplessly adjustable		1 up to 12 months
Lubricant volume		60, 125, 250* cm³
Lubricant	Grease	‹ NLGI 2
	Oil	› 68 mm2/s
Communication		
Wirepas Mesh (ISM band)		2,4 GHz
Range with line of sight		100 m
Electrical characteristics		
Power supply (battery pack)		6 V
		2,3 Ah
Other characteristics		
Mounting position		As required
Threaded connector		G¼
Housing material		PET
Mass		0,25 kg
Packing unit		10 pieces
Ambient conditions		
Protection class		IP68
Operating temperature		–10 up to +55 °C
Storage (protect from direct sunlight, store in a dry place)	Temperature (recommended)	+20 ± 5 °C
	Humidity	‹65 %
Certifications		
Link		–

* with suitable cartridges from other manufacturers

Overview of key functions:

- Status and level information available via OPTIME App or Desktop Dashboard
- Automatic alarm notification for incidents
- Easy installation and maintenance
- Possibility of setting each lubricator individually
- Optimized maintenance and routing
- Operating pressure of up to 10 bar
- Quick and easy replacement of lubricant cartridge
- Multilingual user navigation

Product Specifications

OPTIME Smart Lubrication I FAG OPTIME C4

Characteristic		Value
Dimensions (WxHxD)		144 mm x 297 mm x 144 mm
Drive system		electromechanical
Mass (without cartridge)		≈ 2.4 kg
Installation position		vertical, max. vertical tilt 5°
Housing material		PA
Protection class		IP66 [1]
Lubricant delivery		Piston pump
Metering volume per outlet for each delivery stroke		0.12 cm³ +0.012/–0.012 cm³
Number of lubrication points		≤ 4
Number of outlets		4
Outlet type		Push-in fitting 6 mm with clamping tongs for PA pipe or metal pipes with appropriate claw groove geometry
Lubricant volume	Grease	400 cm³ / 750 cm³
	Oil tank	850 cm³
Lubricants	Grease	Grease up to NLGI 2 [2]
	Oil	68 cSt ... 1500 cSt
Max. permissible operating pressure		70 bar
Operating temperature		–20 °C ... +70 °C
Communication Wirepas Mesh	Frequency band	2.4 GHz
	max. range with line of sight	60 m
Communication NFC	Frequency band	13.56 MHz
Maximum output		+8 dBm
Operating voltage (Class 2; NEC/NFPA 70)		DC 24 V (±1,2 V)
Current consumption		I_{max} ≤ 500 mA at DC 24 V
Weitergehende technische Details finden Sie in der Bedienungsanleitung im medias-Online-Shop		

[1] Outdoor use not tested as part of UL certification.
[2] Arcanol greases up to NLGI 3 (taking into account the maximum lubricant line length). Other greases up to NLGI 2 (with experimental determination of the maximum lubricant line length).
No solid particles, except PTFE, when using third party greases, the suitability of the pump system within the limit temperatures occurring is to be checked by customer.

All lubricant-dependent values determined using Arcanol MULTITOP at +20 °C.

Product Specifications

OPTIME Ecosystem

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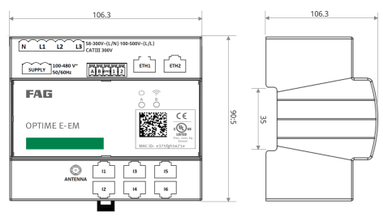
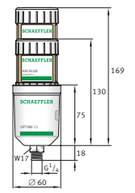
Gateway	OPTIME Gateway (Ex)	OPTIME Gateway 2 (Ex)
Sensor communication	Wirepas Mesh (2.4 GHz ISM Band), maximum number of sensors: 50	Wirepas Mesh (2.4 GHz ISM Band), maximum number of sensors: 50
Sensor communication Schaeffler IoT Hub	2G, LTE CAT M1 LTE-Stick: GSM, UMTS, LTE (default) Wi-Fi 2.4GHz, Ethernet RJ45	LTE, UMTS, GSM (integrated) Wi-Fi 2.4GHz, Ethernet RJ45
SIM card format	Micro-SIM (3FF) depending on LTE stick	Micro-SIM 3FF
Ingress protection	IP 66/67 (standard) IP 66, Nema 4X (Ex)	IP 66, Nema 4X (standard and Ex)
Protection class		⧈
Operating temperature	-20°C to 50°C (standard) -20°C to 55°C (Ex)	-20°C to 70°C (standard) -20°C to 55°C (Ex)
Storage temperature	-40°C to 85°C Humidity 20 ... 90 °C	-40°C to 70°C Humidity 20 ... 90 °C
Power supply	Voltage range 85-264VAC, 47-440Hz, Power consumption 30VA max.	Voltage range 100 ... 240 VAC (±10 %), 50/60 Hz Alternative voltage range 12 VDC (±10%) Power consumption 20 VA
Certifications	CE (EU Directive 2014/53/EU), ANATEL, ANRT, COC, CRC, FCC, IC, ICASA, IFETEL, IMDA, KC, MIC, MOC, NBTC, NCC, NTC, RCM, SDPPI, SIRIM, SRRC, SUBTEL, TDRA, WPC	CE (EU Directive 2014/53/EU), FCC conform, further certifications will follow
Certifications(Ex)	ATEX/IECEx Zone 2/21 Further details are available on the device label CCC, QPS, ECAS Ex, INMETRO, KCs, MASC, PESO	ATEX/IECEx Zone 2/21 Further details are available on the device label CCC, QPS, ECAS Ex, INMETRO, KCs, MASC, PESO

Dimensions of all Condition Monitoring OPTIME sensors (3, 5, 5 Ex)

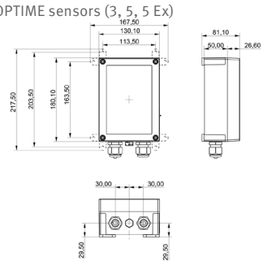


Dimensions of FAG OPTIME E-CM

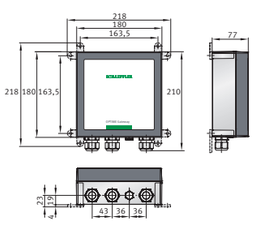


Dimensions of OPTIME C1

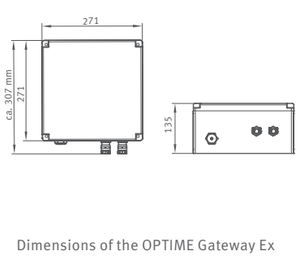
Dimensions of FAG OPTIME C4



Dimensions of the OPTIME Gateway



Dimensions of the OPTIME Gateway 2



Dimensions of the OPTIME Gateway Ex and OPTIME Gateway 2 Ex

Customer Testimonials

“I never thought the installation of 100 sensors would be so easy and fast.

I had planned three days for the installation, but the work was already done in 14 hours.

OPTIME was so easy to set up that I sent the Schaeffler employees home sooner than expected!”

Carmelo Hernandez
Maintenance Manager
Heidelberg Materials (formerly Lehigh Hanson)

“OPTIME C1 lets us know early enough if the points are not lubricated or the lubrication point is empty.

When I open the app and see that everything is running smoothly, it gives me peace of mind.”

Peter Hannappel
Maintenance Manager
Westerwälder Elektro Osmose

“OPTIME helped us avoid unplanned downtimes and saved us more than US$920,000.

I love the ease of installation, ease of use, and the really cool OPTIME Dashboard. It’s great that you always have everything in view.”

Ryan Miernicki
Reliability Engineer
Acme Corrugated Box

FURTHER INFORMATION

Technical details on OPTIME Condition Monitoring
› Scan QR code
› Click on link

Technical details on OPTIME C1
› Scan QR code
› Click on link

Technical details on FAG OPTIME C4
› Scan QR-Code
› Click on link

More Information on the Expert Service
› E-Mai us

OPTIME Ecosystem in Action

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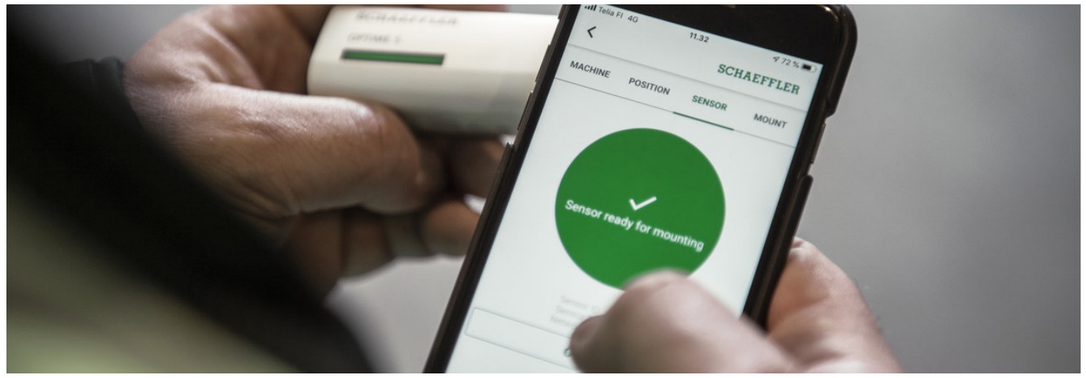

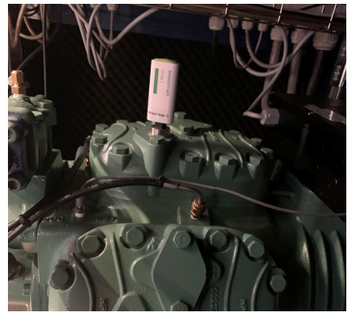

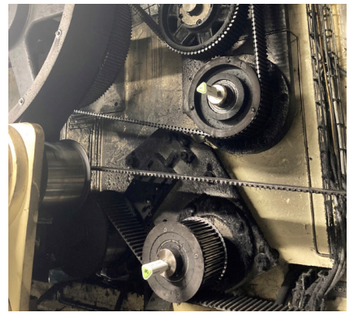

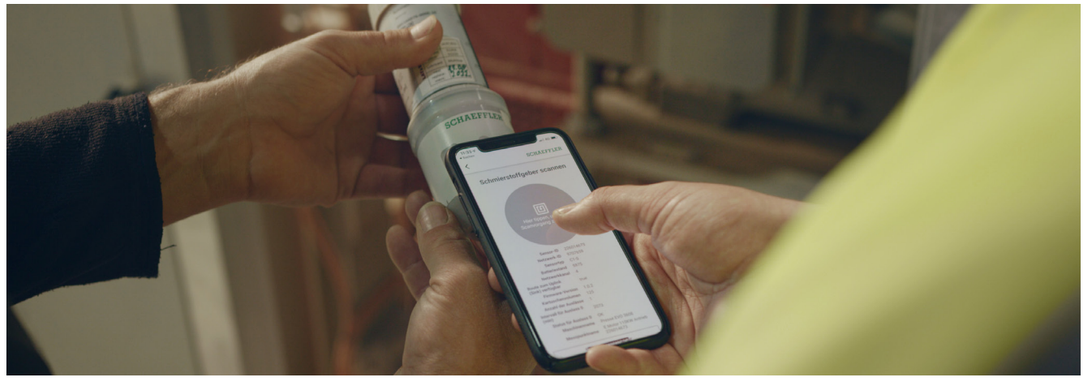

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