

Schaeffler OPTIME

What is OPTIME and how does it work?

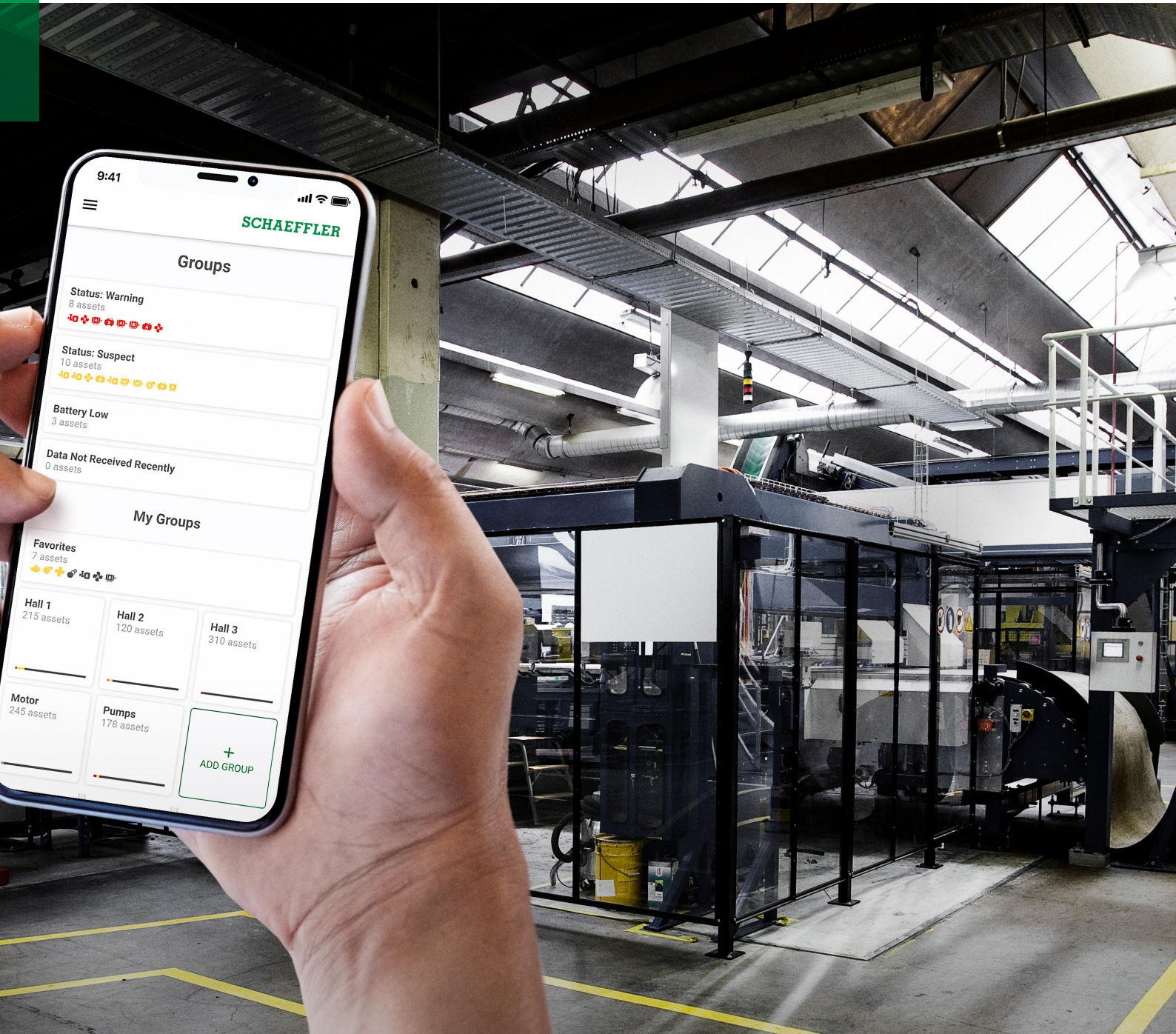


Table of contents

Condition Monitoring Solution

What is OPTIME?	03
Solution components	04
Digital Service	05
Mobile application	06
Web-based dashboard	08
Applications	09
Product Specifications	10

Schaeffler OPTIME

Seamless Monitoring at lowest Cost

What is Schaeffler OPTIME?

Schaeffler OPTIME is an easily scalable Condition Monitoring solution, developed for various purposes in industry, recommended for a range of rotating machines with a speed of 100-5000 rpm.

During the development of the system, special attention was paid to the very simple commissioning, problem-free expansion and versatile use of the solution. The effort for the user was kept as low as possible for each individual process step.

These features make Schaeffler OPTIME particularly suitable for condition-based-monitoring of a large number of machines.



Benefits of Schaeffler OPTIME

- Cost-efficient monitoring.
- Monitoring hundreds of rotating machines for just a few cents per day – up to 50 percent cheaper than manual monitoring with handheld measurement devices.
- Quick to install.
- Installing the sensors and setting up the app takes just a few minutes – no previous knowledge is necessary.
- Use expert knowledge.
- Digital Service provides professional diagnoses based on expert algorithms and machine learning, available 24/7 via app – so you always make the right decision.
- For beginners and advanced users.
- Easy handling, offers decisive information and extensive extensions suitable for different users and needs.

Schaeffler OPTIME

Solution Components



1. Sensors

The battery-operated sensors can be mounted quickly and easily on the machines and record vibration and temperature data of the monitored unit. The wireless mesh network enables automatic data exchange between all connected units.

2. Gateway

The gateway receives the data sent by the sensors and transmits it to the cloud.

3. Digital Service

In the cloud, continuous, automatic analyses are carried out and early warnings are sent out in case of beginning and imminent failures. The results are based on algorithms derived from Schaeffler rolling bearing knowledge and condition monitoring expertise as well as machine learning.

All results are available in an easy-to-use smartphone app and a web-based dashboard. The functions are tailored to the needs of the users and their individual work processes.



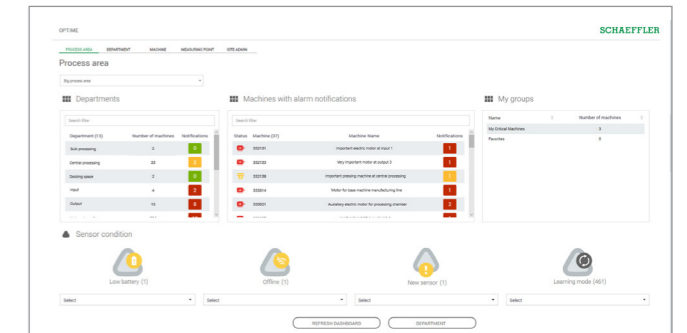
Activate and integrate the sensor using the Schaeffler OPTIME App.

Schaeffler OPTIME

Digital Service

OPTIME Digital Service is a cloud-based solution and can be used via mobile App and web applications for desktop browsers, e.g. in control rooms or at the workplace.

OPTIME Digital Service, made available to the customer after subscription to the service and purchase of the OPTIME Solution hardware components, by creating a dedicated customer area within the Schaeffler Cloud. The OPTIME installation is managed via the mobile application or the OPTIME Dashboard. The digital service consists of mandatory and optional service components.



Dashboard

Obligatory service components

Digital Service Tenant with monthly fee

The Digital Service Tenant consists of:

- Provision and access to your own customer area in the Schaeffler Cloud
- User access and management
- Commissioning and activation of sensors and gateways via the mobile App
- Hardware allocation, including the creation of plants and machines, and corresponding groups
- Access to mobile and web applications for desktop browsers
- Gateway SIM data costs are included in the monthly fee

Digital Service Analytics with monthly fee

- Vibration-based automated condition assessment of monitored machines, using algorithm-based automated diagnostics
- Display of alarms and failure causes
- Fees are only charged for active sensors. A sensor is active as soon as the Schaeffler Cloud receives measurement data from the sensor.

Optional service components

Digital Service REST API usage, with monthly fee, consisting of:

- Access to REST API to retrieve data from the Schaeffler cloud into the customer system

Schaeffler OPTIME

Mobile Application

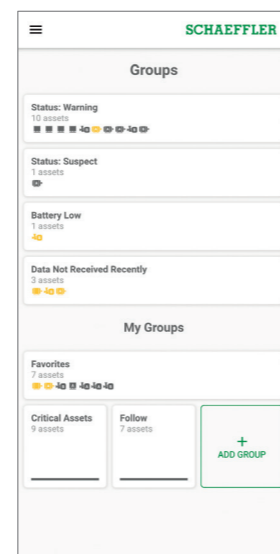
The OPTIME app can be downloaded from the App Store and Google Play. The app shows the real machine status according to criticality, thus allowing optimal planning of maintenance activities. You can organize your machine park individually and easily with the help of the group-, machine- and sensor management.



Group management

Alarm-based groups are preset in the group management initial screen:

- Alarm status
 - Severe: Plants show advanced damage. These installations should be inspected and repaired if necessary.
 - Warning: Inspect plant and schedule repair work for the next regular maintenance interval.
 - Suspect: Observe; no immediate reaction required.
- Battery status: Sensors with critical battery condition.
- Reception status: Sensors which are offline and have not transmitted any data in the last 24 hours.



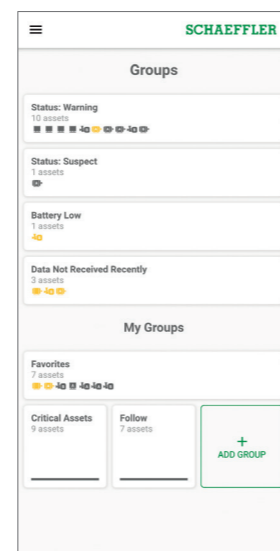
Group management

Subgroups

Below the alarm-based groups are the user-defined groups that can be created individually.

Examples

- Local conditions (location, buildings)
- Structures relevant to production (segments, product lines, production units)
- Machine types (motors, fans, pumps)



Subgroups (Favorites)

Schaeffler OPTIME

Mobile Application

Group view

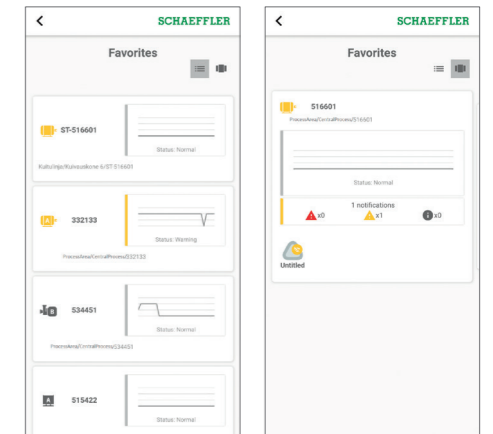
Within a group all assigned machines can be found. There is the list view and the tile view.

List view

The color-coded alarm status of the machine, the status diagram with alarm level and possible open alarm notifications are displayed.

Tile view

In addition to the list view, an extended overview of alarm notifications and the status of the machine's sensors are displayed.

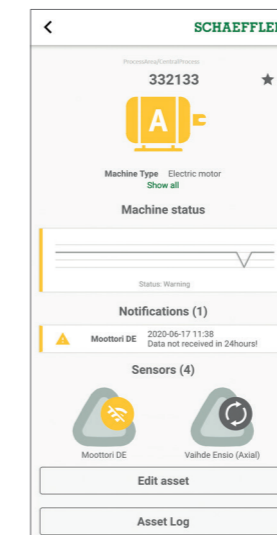


List view

Tile view

Machine management

If you select a machine within the group, you can access the machine management. The machine management shows a machine and related information such as the status, active alarm notifications and the sensors connected to the machine.



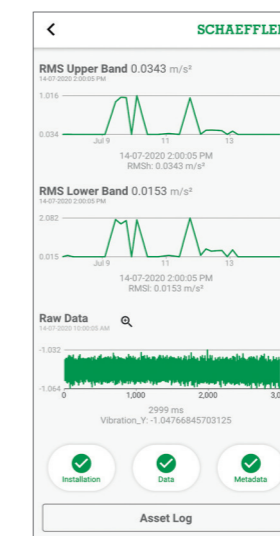
Machine management

Functions

- Tracking the machine status
- Acknowledge alarm notifications
- Machining of machines
- Edit and view machine log
- Navigation to the subordinate sensors
- Add a new sensor

Sensor management

The selection of a sensor leads to the sensor management. The sensor management shows active alarm notifications, KPIs and raw data related to the sensor.



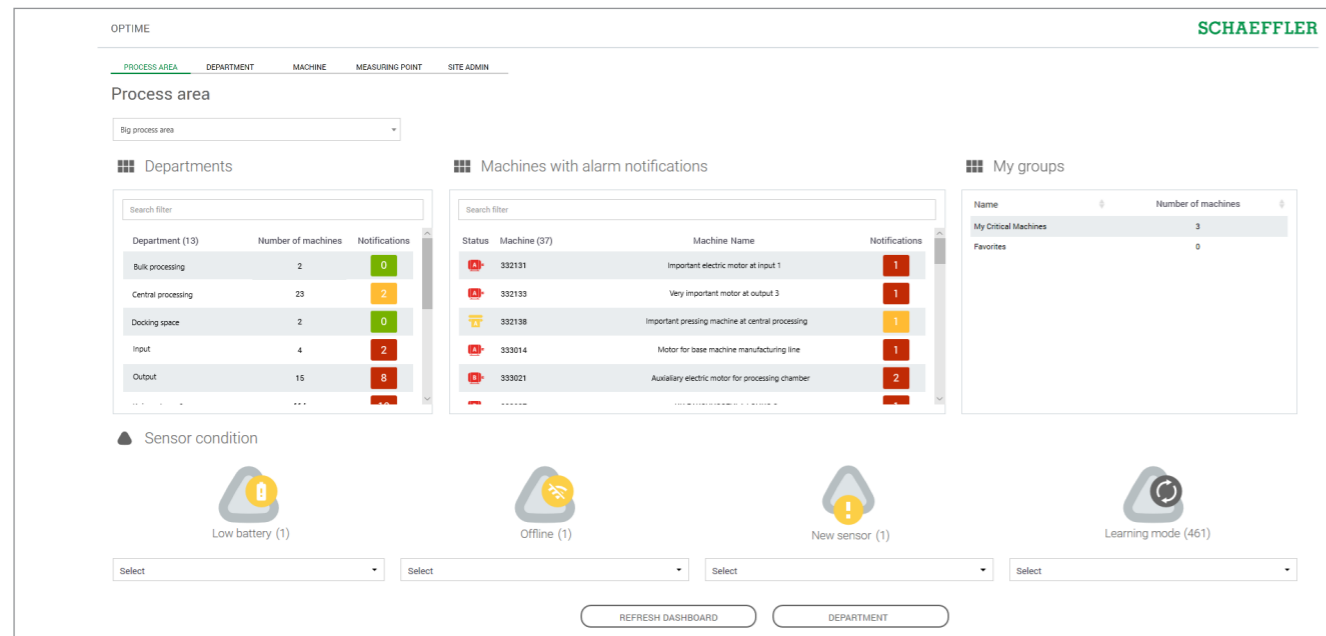
Sensor management

Functions

- Acknowledge alarm notifications
- View KPIs
- View raw data
- Edit sensor
- Request new KPIs and raw data
- Edit machine log

Schaeffler OPTIME

Web-based Dashboard



The OPTIME dashboard is the central user interface for use in control rooms where KPIs and alarm notifications for plant condition monitoring can be controlled.

Functions

- Track machine status
- Active monitoring of machines and their KPIs
- Display of alarm notifications based on learned KPI limits as an indication of possible machine defects
- Confirmation of alarm notifications
- Display and generation of log entries for machines
- Display of KPI data and raw sensor data

Functions exclusively for administrators

- User administration
 - Add, edit and delete users and profiles
 - Send notifications to users
- Management of the installations
 - Add, move and delete gateways and sensors

Browser

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

Schaeffler OPTIME

Applications



The OPTIME system is suitable for machines that are operated continuously or partially continuously. Furthermore, the machine should normally run in a stable operating condition (speed and power) for a period of about one hour. With OPTIME-AW3 sensors, machine speeds from 50 rpm to 3000 rpm can be monitored, with OPTIME-AW5 sensors up to 5000 rpm. When selecting the suitable combination of machine and sensor, some factors must be considered, see table.

Typical combinations of machines and sensors

Application	Characteristic	Sensor	Number	Mounting location
Electric motor	< 0,5 m	OPTIME 3	1	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Plummer block housing
Fan	between the bearing	OPTIME 3	2	<ul style="list-style-type: none"> • Plummer block housing
Fan	directly coupled	OPTIME 3	1	<ul style="list-style-type: none"> • Drive side of the motor
Compressor	–	OPTIME 5	2	<ul style="list-style-type: none"> • Bearing location
Pillow block	–	OPTIME 3	1	<ul style="list-style-type: none"> • Bearing location
Pump	–	OPTIME 5	2	<ul style="list-style-type: none"> • Bearing location
Gear motor	< 0,5 m	OPTIME 5	1	<ul style="list-style-type: none"> • Bearing location
Gear motor	> 0,5 m	OPTIME 3	1	<ul style="list-style-type: none"> • Motor
Gear motor	> 0,5 m	OPTIME 5	1	<ul style="list-style-type: none"> • Gearbox
Extruder	–	OPTIME 3	2	<ul style="list-style-type: none"> • Bearing location
Calander	–	OPTIME 3	2	<ul style="list-style-type: none"> • Bearing location
Belt drive	–	OPTIME 3	2	<ul style="list-style-type: none"> • Bearing location
Saw	–	OPTIME 5	1	<ul style="list-style-type: none"> • Bearing position of the saw blade
Shaft	–	OPTIME 3	1	<ul style="list-style-type: none"> • Bearing housing
Gearbox	–	OPTIME 5	2	<ul style="list-style-type: none"> • Input and output

Schaeffler OPTIME

Product Specification

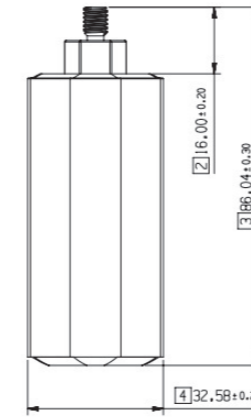
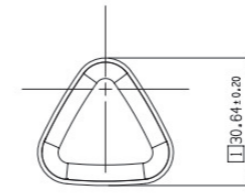
OPTIME sensors	OPTIME-3 	OPTIME-5 
Vibration bandwidth	10 Hz – 3 kHz	10 Hz – 5 kHz
Amplitude range	±2/±4/±8/±16 g	±2/±4/±8/±16 g
Temperature trend measurement	-40°C to +85°C	-40°C to +85°C
Calculated KPIs	RMS _{Low} , Kurtosis _{Low} , ISO _{VELOCITY} , RMS _{High} , Kurtosis _{High} , DeMod, Temperature	RMS _{Low} , Kurtosis _{Low} , ISO _{VELOCITY} , RMS _{High} , Kurtosis _{High} , DeMod, Temperature
Measurement cycle	KPIs: every 4 h Time waveform: every 24 h	KPIs: every 4 h 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: thermoplastics	Mounting base: steel AISI 316, housing: thermoplastics
Mounting	Single Bolt Mounting (M6) (Adapters available)	Single Bolt Mounting (M6) (Adapters available)
Dimensions	Please see drawings	
Certifications	Europe: CE (Radio Equipment Directive 2014/53/EU) for further countries please see manual)	
Hazardous Area Classification	Zone 1 (in planning)	Zone 1 (in planning)

OPTIME Gateway

Sensor communication	Wirepas Mesh (2.4GHz ISM Band)
Communication to Schaeffler IoT Hub	2G, LTE CAT M1 (default) Wi-Fi 2.4GHz, Ethernet RJ45
SIM card format	Micro-SIM (3FF)
Ingress Protection	IP 66/67
Temperature range	-20°C to 50°C (operation), -40°C to 85°C (storage)
Power supply	Voltage Range 85-264VAC, 47-440Hz, Power Consumption 30VA max.
Dimensions	Please see drawings
Certifications	Europe: CE (Radio Equipment Directive 2014/53/EU), for further countries please see manual

Schaeffler OPTIME

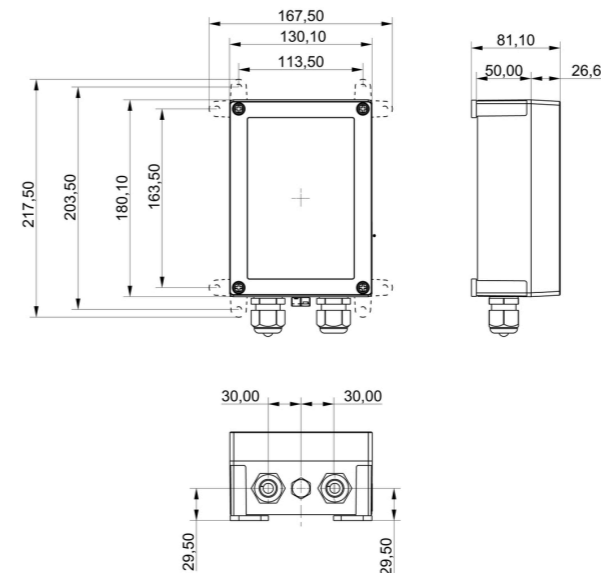
Product Specification



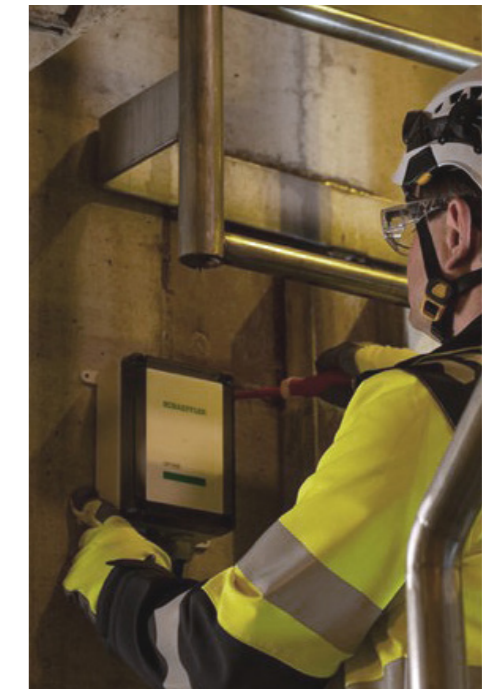
Dimensions of OPTIME Sensor



Installing OPTIME



Dimensions OPTIME Gateway



OPTIME in action

Schaeffler Technologies AG & Co. KG

Georg-Schäfer-Straße 30
97421 Schweinfurt
Germany

www.schaeffler.de/optime

optime@schaeffler.com

Phone +49 2407 9149-66

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: 2020, September

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