

xylem



optimize[®]

Condition monitoring solutions
to optimize your bottom line

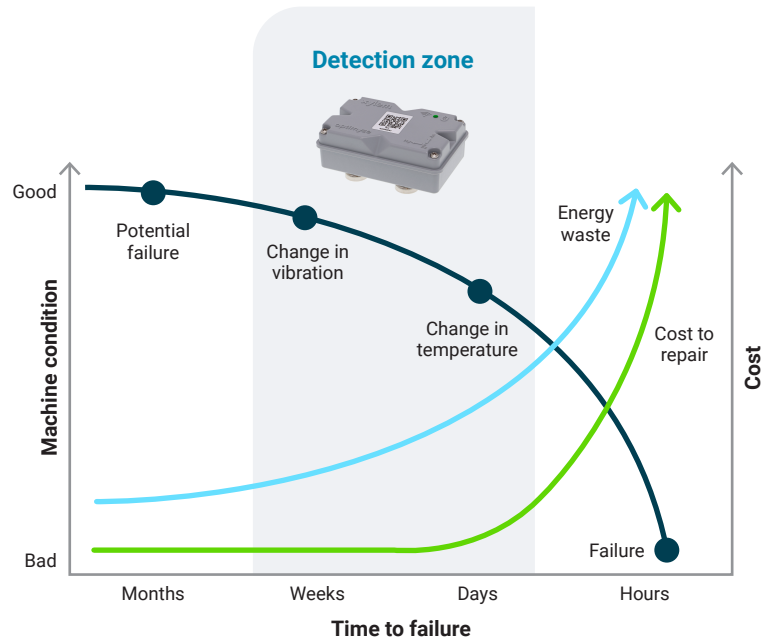


optimize[®] Condition Monitoring Solutions

Introduction to condition monitoring

Corrective maintenance can be up to ten times more expensive than a predictive maintenance strategy. Predictive maintenance involves performing maintenance tasks before catastrophic machine failures occur, based on detected conditions.

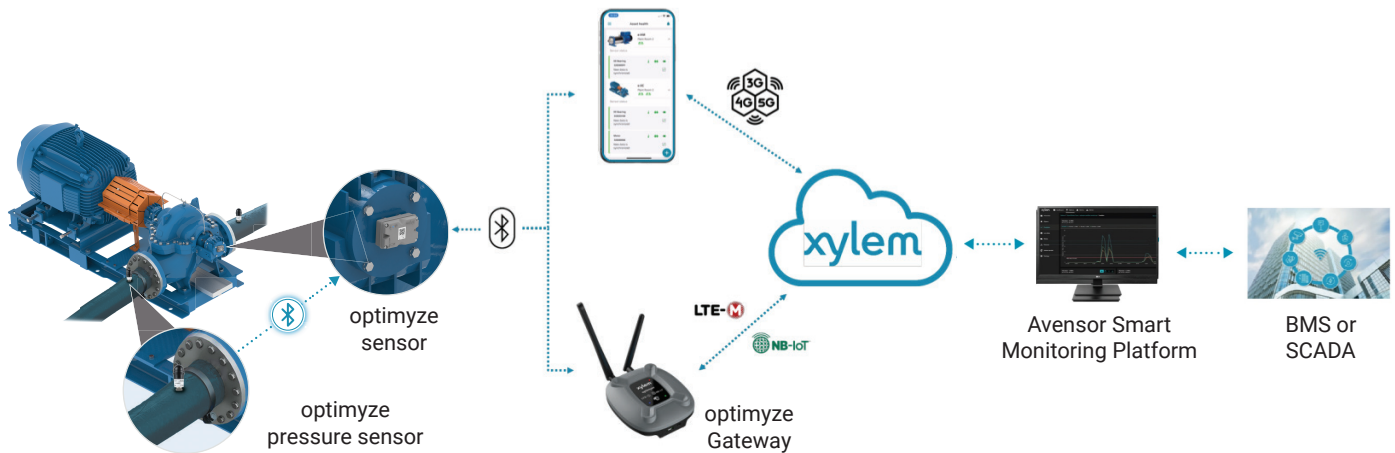
optimize Condition Monitoring Solutions are cost-effective and easily deployable wireless devices that can detect potential machine failures by sensing changes in vibration and temperature. They serve not only as condition monitors but also as comprehensive health guidance and predictive maintenance solutions. The accompanying chart illustrates the high costs of repair and energy waste at failure, while significant savings can be achieved within the detection zone.



Pump category	Standard	Pump type	Vibration velocity (mm/s) and LED color		
			LED	Power rating 00kW	Power rating >200kW
1	ISO10816-7	Category 1 – critical	Green	≤ 4.0	≤ 5.0
			Yellow	4.0 - 6.6	5.0 - 7.6
			Red	> 6.6	> 7.6
2	ISO10816-7	Category 2 – general	Green	≤ 5.1	≤ 6.1
			Yellow	5.1 - 8.5	6.1 - 9.5
3	ANSI/HI9.6.4	End suction, vertical inline, split case, and horizontal multistage	Green	≤ 4.9	≤ 6.2
			Red	> 4.9	> 6.2
4	ANSI/HI9.6.4	Vertical turbine and vertical multistage	Green	≤ 4.3	≤ 5.6
			Red	> 4.3	> 5.6

optimize sets a baseline for your machine using either ISO or ANSI/Hi vibration standards and historical data trends. Once the normal condition is established, optimize then gives health guidance and predictive maintenance advice. The natural steady state properties of your machine vary based on the machine type, so a few additional parameters are inputted when setting up optimize. Above is a chart displaying the vibration velocity (mm/s) thresholds based on the vibration standard and additional parameters (power rating, and pump type). The resultant asset health is based on a traffic light warning system; the green LED color would be considered in the “normal” or acceptable range and so on.

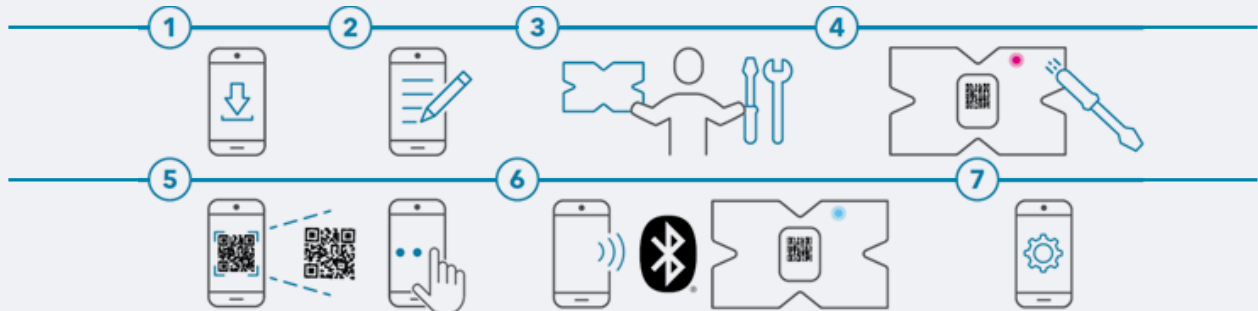
optimize system architecture



Getting started with the standard optimize sensor

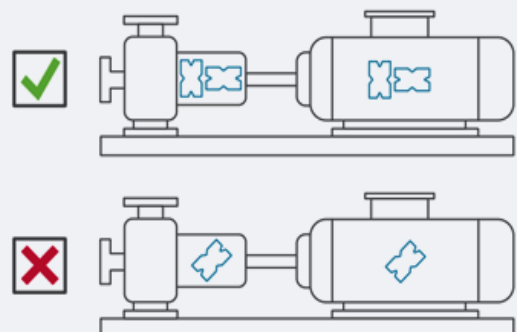
optimize sensors use Bluetooth® wireless technology to communicate vibration and temperature data to a smart device, then automatically share with other local users through a cloud. This enables condition-based maintenance strategies for pumps, motors, and other key assets. Early identification of potential failures reduces the cost of repair.

Follow the quick start guide to download the mobile app, and pair your smart device to the **optimize** sensor (see part numbers below) in the mobile app via Bluetooth.



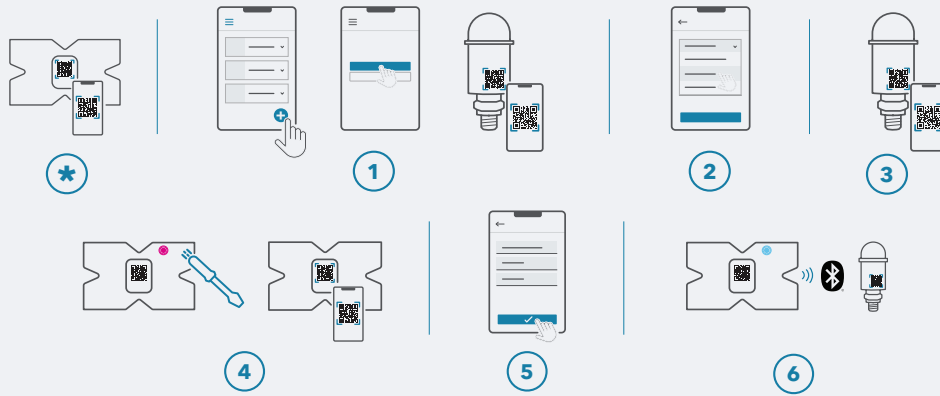
All users who want to view data from the optimize sensor(s) must follow steps 1-7 to pair their own smart device to the sensor(s) in the mobile app via Bluetooth. Install **optimize** sensor near the asset bearings. To ensure orientation of sensor is correct, see figure.

In addition to the standard optimize sensor, two premium (optional) accessories are available, providing additional parameter to monitor and enhancing overall condition monitoring and optimization through remote monitoring capabilities.



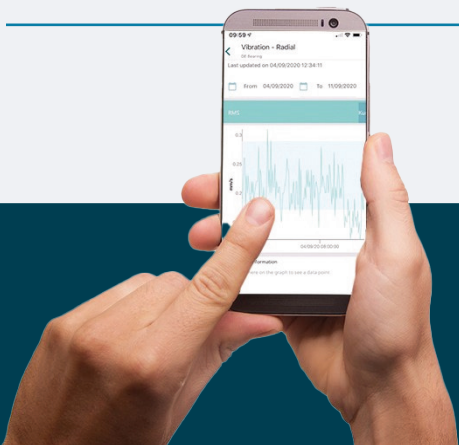
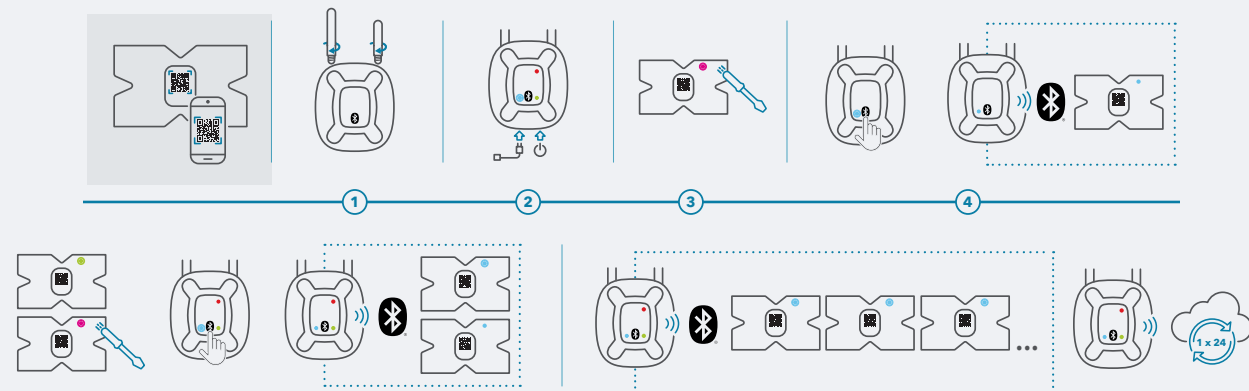
Optional optimize pressure sensor

The optimize Pressure Sensor is an optional accessory that can be added to the system for monitoring differential pressure or individual pressure points. (Pairing xylem's optimize pressure sensors to a condition monitor sensor is only one additional step in the setup process. Follow the quick start guide for the pressure sensor after configuring the optimize sensor in the mobile app.)



Connecting optimize Gateway

The optimize Gateway provides remote connectivity for optimize condition monitoring sensors. Once set up and paired, the Gateway will automatically connect to the sensors every 24 hours to collect asset health data. The data will then be securely sent to the xylem cloud over low-power LTE-M or NB-IoT, allowing users to access the latest information about their assets without physically being within Bluetooth range. Follow the quick start guide to pair optimize gateway with optimize device.



Users within Bluetooth range can connect to the sensor and retrieve stored data or take a live data sample.

optimize solutions to meet your needs



optimize Sensors



optimize Mobile App



Avensor Smart Monitoring Platform*



optimize Gateway*

Condition monitoring

- Periodic vibration, temperature, and pressure measurement
- RMS, Kurtosis and FFT (Fast Fourier Transform)
- Instant health guidance using ISO or ANSI/HS vibration standards
- Graphical trending
- Maintenance reminders and logs
- Report generation and asset documentation



Asset lifecycle management

- Overview of assets across stations and sites
- Visibility of other key assets and controllers
- Analytics and data export capability
- Alarm and user management
- Connection to SCADA or BMS via OPC UA connector or machine to machine API



Remote monitoring

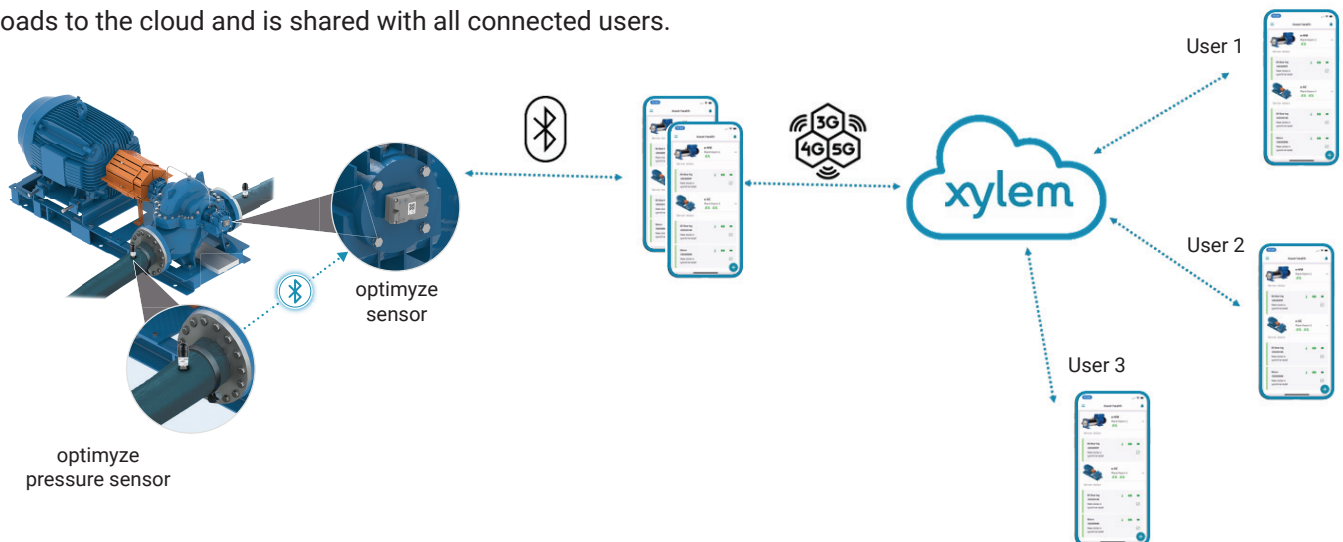
- 24/7 access to asset health information
- One-button pairing and setup
- Cellular LPWAN Connectivity providing effective coverage inside buildings and basements



*Annual subscription required (1st year included)

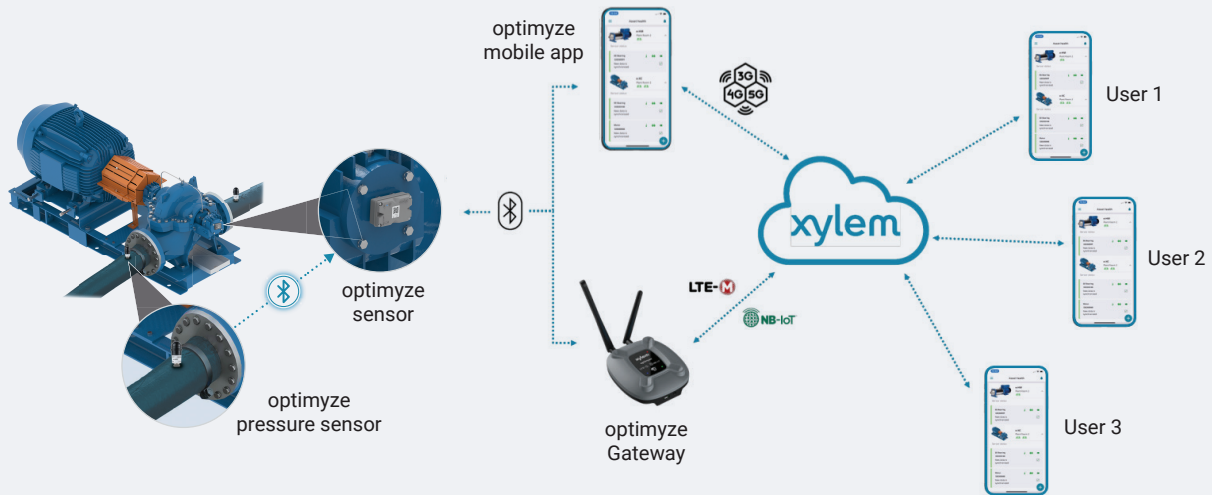
What happens after install?

New data is collected at a customizable frequency set during sensor registration in the mobile app. It is stored in the sensor until the user reconnects via Bluetooth. If cloud sync is enabled, the data uploads to the cloud and is shared with all connected users.



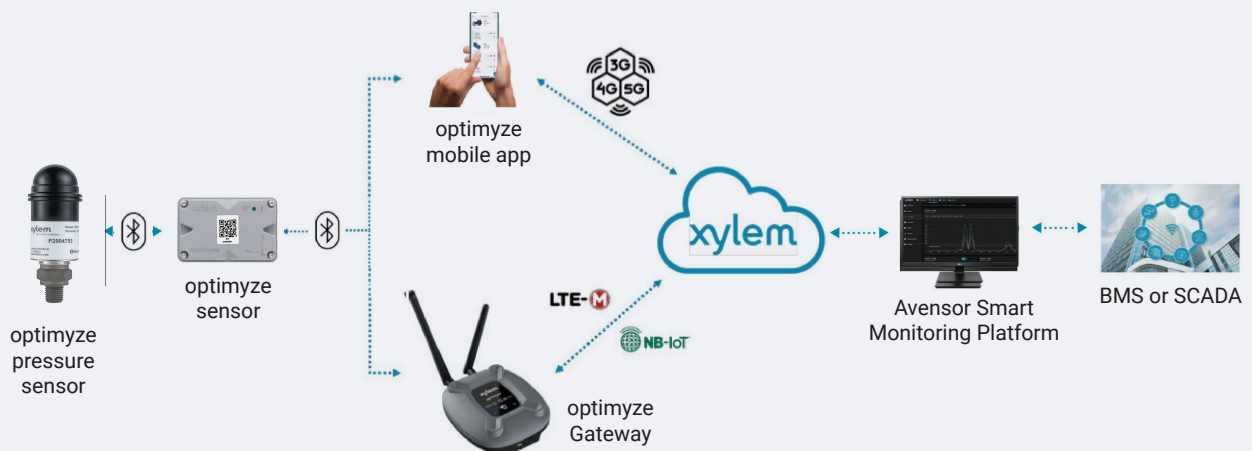
Adding a Gateway device

With the separate purchase of a Gateway, users can access data from anywhere stored on the cloud without retrieving data with their mobile device. The Gateway pulls new data from the optimize sensors via Bluetooth connection, then pushes the data to the cloud using a cellular network.



Adding Avensor

Avensor, Xylem's IoT platform is a mobile or web-based application that retrieves data from the cloud and offers smart monitoring solutions for users with access anytime, anywhere. Avensor amplifies the benefits of the optimize mobile app but also collecting historical data to analyze trends and generate alerts preventing failure and equipment downtime. The Avensor application programming interface (API) gives BMS or SCADA systems access to Avensor data. Please contact your organization's Avensor administrator or your Xylem Sales contact person to set up an account on Avensor. The web platform can be accessed via <https://cloud.xylem.com/avensor>.



Follow these steps to add an optimize sensor to an existing station:

1. Go to "Stations".
2. Select the station.
3. Go to "Devices".
4. Click the button "Add device".
5. For Device type, select optimize from drop-down menu.
6. Enter a name to identify the device and sensor serial number from the QR code.
7. Click "Add device".

Avensor adds the device to the station and relevant data from the sensor should be available soon.

Features & part numbers



Features available with Avensor

Station and device management

The user can manage information about the stations and devices:

- View connectivity status for connected devices
- Change station or device names
- Enter location
- Enable or disable alarm monitoring

Data management and analytics

- Shows live data & stores it
- Displays trend graphs for analysis of data
- Option to download data for further analysis outside the application

Alarm management

Avensor shows alarm notifications from connected devices

- There are individual alarms for each device and station in the system
- All alarms have a default priority level for each device. It is possible to change the priority level of each alarm in the system.
- Create a call list to notify users when there is an alarm.
- There are several options to acknowledge an alarm (web, mobile, SMS)
- All alarms are recorded in the alarm log

More about the **optimize** app

- Easy access to documents such as operating manuals, parts lists, and technical brochures for Xylem-specific equipment
- Dashboard – view a list or map of all assets and their status
- Within each asset:
 - View list of parameters
 - Temperature
 - Vibration (three axis)
 - Battery
 - Plotted charts for each parameter
 - Vibration trends
 - FFT
 - Kurtosis
 - Force read button to gather real time data
 - Customizable reports for each asset
 - Create reminders for each asset
 - Ex. Check pump seal every quarter
 - Create maintenance logs for each asset
 - Ex. Pump seal checked, no action needed

Part name	Part #
optimize sensor	P2007024
optimize optional power supply	P2007066
optimize battery replacement kit	P2007030
optimize optional flat plat mounting kit	P2007031
optimize Gateway	P2007065
optimize optional round magnet mounting kit	P2007015
optimize Gateway power supply	P2007067
optimize pressure sensor 0-100 psi	P2004731
optimize pressure sensor 0-250 psi	P2004753
optimize pressure sensor 0-500 psi	P2004754
optimize pressure sensor battery	P2004732

Frequently asked questions

What type of data is collected by the optimize sensor?

- Vibration (three axis)
- RMS, Kurtosis & FFT (Fast Fourier Transform)
- Temperature

Does the Gateway connect to existing SCADA systems? No, with the use of the Avensor platform and the Gateway, connection to existing SCADA systems is simple.

How does the cellular network work for the Gateway? There is an annual fee to maintain the service. The first year is free with the purchase of the Gateway then Xylem will charge the customer the following year. There is no third party involved.

Can the sensor be submerged? No, the sensor is rated NEMA 4 and IP56.

What is the optimize sensor sampling frequency? The default sample is 1 sample per 30 minutes but can be adjustable.

What is the battery life? Typically 3-5 years depending on the sampling frequency chosen. For example, a sampling frequency of every 1 sec will drain the battery faster than a sampling frequency of 24 hrs. The battery is replaceable. There is an optional power supply.

What is the range for Gateway and sensor(s)? It is recommended to use up to 6 sensors per gateway within 100 feet (30 m). You can use multiple Gateways in the same facility.

What is the range limit for the pressure sensors? optimize sensor must be within 100 feet (30 m) of pressure sensor to pair and operate.

Can I opt out of syncing my data to the cloud? Yes, you can opt out to sync data to the cloud via the "Settings" on the app. Please turn the "Sync" off to prevent cloud backup.

Are there other mounting options? Yes, the magnets can be mounted on a flat or curved surface (minimum diameter must be 7 in [180 mm]). There is also a fixed mounting bracket available to purchase.

Can a sensor be moved to a different piece of equipment? Yes, data can be erased off the sensor or you can choose to keep all stored data on the sensor and just put it on a different piece of equipment.

When pairing sensors to a Gateway, can I connect all the sensors at once? Yes, however the pairing mode times out after a few seconds so you may miss the window to connect all sensors if trying to connect many. It may be easier to connect one sensor at a time.

How do I update the software on the optimize sensor? Through the app, the sensor will need to be in pairing mode to complete an update.

What if I can't connect to the sensor to download data for an extended period of time? It's recommended to use the Gateway for unlimited access to cloud storage however; new data can be stored in the **optimize** sensor for about one year at the standard sampling rate. The oldest data would be erased to make room for new data.

Xylem Product Cybersecurity

Xylem values your system security and the availability of your critical services. For more information on Xylem cybersecurity practices or to contact the cybersecurity team please visit xylem.com/security.



Learn more about
optimize® solutions

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