Outline

Links to instructional videos and manuals

1. ABB account registration
2. Organization management
3. Sensor activation – mobile app
4. Sensor commissioning – mobile app
5. Mobile app functionality
6. Web portal
7. Instant asset report; on-demand trend and raw data
8. Data visualization and interpretation
9. ABB Ability™ Digital Powertrain portal
10. ABB Ability™ Smart Sensor subscriptions
LINKS AND MANUALS

PLEASE NOTE INSTRUCTIONAL VIDEOS AND INSTALLATION MANUALS
Links

General information and documentation:

ABB Ability™ Smart Sensor:
https://new.abb.com/motors-generators/service/advanced-services/smart-sensor

For motors:
https://new.abb.com/motors-generators/service/advanced-services/smart-sensor/smart-sensor-for-motors

For pumps:

For mounted bearings:
https://new.abb.com/mechanical-power-transmission/smart-sensor-for-mechanical-products

Cloud Interface API:

Videos

Introduction Smart Sensor:  
https://www.youtube.com/watch?v=AgUVI63mY3g

First time user guide: https://www.youtube.com/watch?v=TE14gDsEM4Q

User / asset / organization management:
https://www.youtube.com/watch?v=TgBZlyX_hLw

Activation and commissioning:
https://youtu.be/rcOWbXf55ec?list=PLFwq1JTSL1fh7Xv2q2YIle83EZi0SLVFH

Data visualization on app:
https://www.youtube.com/watch?v=49wgY6nX5Ls

Data visualization on portal:
https://www.youtube.com/watch?v=IacBttIARko

Gateway installation manuals:
https://youtu.be/4KTmrBtfqEo  
https://youtu.be/BXB6nuUl8-g  
https://youtu.be/P8Bj0-VtqRA
1. ABB account registration

https://www.youtube.com/watch?v=TE14gDsEM4Q
ABB account registration – mobile app

Register new account in ABB system via the mobile app or web portal

1) Install “Smart Sensor Platform” on mobile device (iOS or android)
2) Click “Sign Up” on initial screen
3) Follow steps to create account

- Alternative: web portal (next slide)
ABB account registration – web portal

Register new account in ABB system via mobile app or web portal

1) Open link in web browser: https://smartsensor.abb.com
   *Google Chrome recommended

2) Click “Register now”

3) Follow steps to create account
2. Organization management

https://www.youtube.com/watch?v=TgBZlyX_hLw
ABB Ability™ Smart Sensor virtual organization management

Virtual environment for sensor data access configuration

Users are bundled into “User Groups” consisting of admins and normal users

- User 1
- User 2
- User 3
- User 4
- User 5

User Group 1

User Group 2

User Group 3

Sensors are bundled into “Asset Groups”

- Sensor 1
- Sensor 2
- Sensor 3
- Sensor 4
- Sensor 5
- Sensor 6

Asset Group 1

Asset Group 2

Asset Group 3

Membership

Access

Membership

Virtual entities

Real entities
Example case for OEMs: you decide what your end customers see
ABB Ability™ Smart Sensor app architecture - notes

Organization and user/asset groups: trade-offs

Notes:

1) **Only one “layer”** of user groups and asset groups available, i.e. subgroups are **not** possible.
2) You can have as many “organizations” as you want.
3) An “organization” can represent, for example:
   - **Your whole company:**
     - Advantage: one-stop solution for all your end customers/plants and sensors (full benchmarking).
     - Disadvantage: keeping track of all sensors gets harder as the number of user and asset groups increases.
   - **A specific end-customer:**
     - Advantage: balance between number of organizations and complexity of user and asset group structure.
     - Disadvantage: decreased benchmarking capability, since only one organization can be viewed at a time.
   - **A specific plant/location:**
     - Advantage: complex group/access structures are easier to manage if isolated in one organization.
     - Disadvantage: too many organizations make benchmarking harder and may also be hard to keep track of.
Create or join organization on the mobile app
First use: create or join organization

1) Log in to the app using ABB credentials

2) Click “Create or join organization”
   - Admins of an organization must grant access

3) If the organization does not exist, type desired name and confirm to create a new one
   - This can also appear due to typos when trying to join an existing organization.
   - Organization names are case sensitive!
   - If you create an organization, an asset group called “[Name]Master” is automatically created, where [Name] is the name of the organization.
Switch organization on the app

Moving between organizations: membership is free, but access to motors requires explicit permission

1) Click “Change organization” on main menu (top left sandwich menu of main screen)

2) Enter one of the following:
   • The name of the organization,
   • The e-mail address of a member, or
   • Work without organization → not recommended!

3) Click “OK” on pop up.
   • Organization switches automatically on web portal

Notes:
   • Sensor data is not visible until the User is added to a User Group with the correct access rights.
   • The asset group [OrganizationName]Master is created automatically with the organization.
Switch organization on the portal
Moving between organizations: membership is free, but access to motors requires explicit permission

1) Click on the organization in the main menu (top right)

2) Select organization by name from the drop-down list and click “OK”
   - Organization switches automatically on the app
Info about organization and app
Where to find the name of my current organization and other information

1) Click "About" on the main menu
   - Organization shown under user name

2) App, phone, back-end (cloud) API and EULA information displayed.
User management - role types
Access management within one organization in the Smart Sensor portal

Moderator of the "Admin" User Group (equivalent to Organization Admin)
- Can add members to the Admin User Group
- Can create new User Groups for the organization
- Can create new Asset Groups for the organization
- Can connect User Groups and Asset Groups

Admin User Group Member
- Can create new Asset Groups
- Can connect User Groups and Asset Groups

Normal User Group Moderator
- Can add users to that particular User Group

Normal User Group Member
- Can view asset data to which this User Group was granted access (by a member of Admin User Group)
Portal Overview
Starting point for Condition Monitoring, Access & Organization Management

Landing Page of the Smart Sensor portal. From Here you can:

1) Access Condition Monitoring overview, go into Asset Details (see chapter 6.) and Organization Management (following slides).

2) Change your Organization by clicking , see personal account details and Access FAQ, EULA, Privacy Policy and Logout via the symbol.
Organization management
Managing Asset or User Groups in your organization, and more

The different tabs show available organization management functionality.

Organization you're currently logged in to

In some browsers, menus are located in the upper right drop-down button.
Organization management – Asset Groups

Manage assets in the «Asset Groups» page

Under “Asset Groups” tab of the “Organization Management” view,
Click on an Asset Group in the given Organization to view the data from sensors in that Asset Group. E.g. =LB3
Organization management – Asset Groups
Download measurements and transfer assets from one asset group to another

After choosing an Asset Group in your Organization:

1) Click arrow to **download the measurement data of all the assets** in the Asset Group. Data will be sent by email.

2) You can transfer assets to other Asset Groups via the double-arrow icon.

3) By clicking on one of the assets, you are directed to the detailed asset view where you have access to the measurements and Asset/Sensor Information.
Portal Overview
Starting point for Condition Monitoring, Access & Organization Management

Detailed Asset view:
1) Filter selections: from left to right: Organization (ABB), Asset Group (=LB3), Asset (LB3_WK011_AC01)
2) Asset Name and pictures
3) Tabs containing further asset details, health trend, measurements, meta data etc. → Further explanation of the individual tabs and their content in chapter 6
Organization management – Asset Groups

Give access to each Asset Group by defining User Groups

After choosing an Asset Group:

1) Click bottom right button “Add User Group”

2) On the pop-up prompt, choose which User Group you want to give access. Data from all assets in this Asset Group are visible to the members of the User Groups that you, as a moderator, can add to it.
Organization management – User Groups

Manage membership and access in the «User Groups» page

Under “User Groups” tab of the “Organization Management” view,

Click on an User Group in the given organization.
E.g. = ABB Users
Organization management – User Groups
Manage membership and access in the «User Groups» page

In this view, you can see a list of users in that User Group on the left, and a list of Asset Groups on the right.

Users on the left, belonging to this particular User Group, can see data from assets belonging to the Asset Groups on the right.
Organization management – User Groups
Manage membership and access in the «User Groups» page

Press the “Grant access to asset group” button to include more Asset Groups in the access list of a particular User Group.
Add users to User Group
Give other people visibility of your sensors

If you are moderator of a User Group, you can add users to grant them access to sensor data.

1) If a user is not yet a member of your Organization, click “Invite new user”. The user should receive an e-mail with the invitation to join the Organization and User Group.

2) For existing Organization members, click “Add existing user“. Choose user and role from the drop-down lists.

3) You can delete users if you are a moderator by clicking the trash bin.
Add users to User Group
Give other people visibility of your sensors

4) If the user is not in the organization, click “Invite new user”

5) Input e-mail address. New member will receive e-mail instructions to join the organization.

6) To change access from “Member” to “Moderator”, the user must be currently active in the organization.
   • Delete the user from the Group and add the user again, repeating step 2, setting moderator rights from the start.
Give access to new members

E-mail invitation: Please join my group

1) If you already have an ABB account:
   • One link to accept the invitation
   • Only 1 organization access at a time
   • You can always switch organizations

   If you do not have an ABB account:
   • First: set up a user ID in ABB
   • Second: accept the invitation

2) Refresh your app to log into the new organization and see the sensors for which your initial User Group was given access.
Plant management – add new plant

Add a new plant to your organization

Add a new plant to the organization

1) Go to Plant Management, under Organization Management

2) Click “Create plant”

3) Enter details in the pop-up prompt and save.

4) To enter a plant and manage the assets that are located at that plant, click one on the side the list. E.g.: “ABB Lenzburg”.
Plant management – transfer asset to other plants

Transfer sensor from plant to plant to change location on the map

Transfer asset to another plant:

1) Choose sensor from the plant to **transfer**, clicking on the arrows

2) In the pop up, **choose plant** from dropdown list and click “Save”. Your sensor will now be visible on the map at that new location.
Plant location
Location of the plants on a world map

To see the location of your Organization’s plants on a world map, navigate to **Condition Monitoring** view and click on the Map symbol.

1) The location is automatically saved at the moment a sensor is commissioned to a specific plant.
2) Address can also be input manually, but will not influence the location in the map.
Under the tab **Settings** in the Organization Management view

1) The **Gateway Maintenance** mode enables **remote sensor firmware updates**. During the configured update time, measurements are not updated, but remain saved on sensor memory.

2) The **Automatic event dismissal** allows to specify a time period for automatic dismissal of events that were not handled in the defined time period.
Organization management – Trusted Organization

Share Asset Groups with Trusted Organization

Advantages:

- Easy access to multiple Organizations from one portal
- Powertrain capabilities from similar assets of different plants
- Ability to certify third-party support without adding as members of Organization
**Trusted Organization**

Introduction

**Terminology**

- **Admin**: Person that creates Organization. The Admin role is called **Moderator** in the User Group context.
- **Sharing Organization**: Organization deciding which Trusted Organization to trust and share data with.
- **Trusted Organization**: A support group certified by ABB and chosen by the end user to have access to hand-picked Asset Groups.
- **Trusted User**: Member of “Trusted User” user group of Trusted Organization.

**Notes**

- User must be a Moderator from the “Admins” User Group in the Trustee Organization to view the Trusted Organization option and to “trust” their Asset Groups to the Trusted Organization.
- The user only has to be a User Group member in the “Trusted User” User Group within the Trusted Organization to view the Sharing Organization’s data (if the Sharing Organization picked that Trusted Organization to “trust”).
- Trusted User does not need to be a member in the Sharing Organization to see data from that organization, as long as the Sharing Organization Moderator has granted that access to the Trusted Organization.
**Trusted Organization**

Background info

The Sharing Organization «ABB» can specify which asset groups are visible for which Trusted Organization. In this Example «ABB DIGITAL GLOBAL» is a Trusted Organization.

List of Asset Groups in «ABB» that are currently not shared with «ABB DIGITAL GLOBAL». A click on the + symbols makes the asset groups visible to «ABB DIGITAL GLOBAL».

Adding an Organization to “Trusted Organizations” automatically creates a “Trusted User Group”. Users must be added to this user group in order to view assets of organizations with trust relations.

The Trusted Organization feature allows trusted service providers or ABB personnel to view all organizations/customers they have been selected for within the same portal.
1. Create Organization (will appear as normal organization)

2. Follow specific procedure to certify created organization as ‘Trusted’ → please refer to your local Smart Sensor contact or support

3. Once the organization has been trusted, a ‘Trusted User’ user group is automatically created.

4. The Admin of the trusted organization must manually add each user individually to the ‘Trusted User’ user group.

5. Request the sharing organization Admin to trust the created ‘Trusted Organization’. See examples on following slides
Trusted Organization
How to “trust” a Trusted Organization

Organization Admin of the Sharing Organization will select the desired “Trusted Organization” to which they want to grant access. Here ABB DIGITAL GLOBAL.

Please note that not all trusted organizations will be visible. You may have to know the name in advance and type it into the name field to choose it. This applies for ‘non-public’ trusted organizations.

Organization Admin of Sharing Organization will select the Asset Groups that shall be shared with the ‘Trusted Organization’. Click on + to add.
Trusted Organization

How to share asset data with a Trusted Organization

Once Asset Groups have been added they will appear here and the 'Trusted Organization' will have access to them.
Trusted Organization

How to view assets from sharing organizations while on the portal of the Trusted Organization

This is the view from the Trusted Organization ABB DIGITAL GLOBAL. Accessing Assets from its Sharing Organization ABB.

All Asset Groups that the sharing organization chosen to be accessible for the Trusted Organization will appear here.

All of the Sharing Organizations (here ABB) that have selected the Trusted Organization ABB DIGITAL GLOBAL and added their asset groups will appear here.
Trusted Organization
How to stop sharing asset data with a Trusted Organization

If, for some reason, an asset group shall not be shared anymore, it can be removed from the 'Added asset groups', by clicking on the minus sign. This will revoke the trusted organization's access to rights and data is no longer shared (for this asset group).
3. Activation – mobile app

https://youtu.be/rcOWbXf55ec?list=PLFwq1JTSL1fh7Xv2q2YIle83EZi0SLVFH

Back to table of contents
Smart Sensor for hazardous areas
Special Ex-certified Smart Sensor hardware for hazardous environments

1) The same app and portal are used, with practically unchanged user interface.

2) The set-up of the gateway for Ex environments needs a special enclosure.
   → Please contact your local sales unit for details on installations in Ex environments

3) Improved embedded hardware
Activate sensor
How to activate a sensor and make it visible to the app

The activation method differs between the standard and Ex versions.

For the standard Smart Sensor, use the vibration or flipping method.

For the Ex version, use the NFC antenna. Please check your device's documentation for information on the NFC antenna location.

For activation of sensors located in an Ex zone, an Ex certified Smartphone is needed. Alternatively, the sensor must be activated in a safe area, before installation in the Ex zone.

If you have trouble reading the QR code, activate your flash with the icon in the top left corner of the corresponding screen.

Attention: sensor must be in Bluetooth range
Activate the high performance Ex Smart Sensor

How to activate a high performance Ex Smart Sensor

1) Click “Activate Sensor“ (main menu).
2) Read the QR code with the camera
3) Move your NFC antenna close to the indicated area for 5 seconds.

Attachment: NFC and Bluetooth must be activated on your smartphone.

Sensor must be in Bluetooth range

After successful activation, the sensor identifier is visible via Bluetooth and the sensor is ready for commissioning.
Activate the standard Smart Sensor
How to activate a standard sensor and make it visible to the app

Make sure your mobile device’s Bluetooth is activated and that it is connected to the Internet.

1) Click “Activate Sensor” (main menu).

2) Read the QR code with the camera

3) Use one of the following methods:
   a) Method 1: vibration*
   b) Method 2: flipping

*Back plate of sensor has to be in direct contact with the mobile phone.

After activation, sensor is ready for commissioning to an organization.

Attention: sensor must be in Bluetooth range

©ABB
4. Commissioning – mobile app

https://youtu.be/rcOWbXf55ec?list=PLFwq1JTSL1fh7Xv2q2YIle83EZi0SLVFH
Commissioning - add sensor to organization

Adding activated sensors to asset groups via the app

1) Default starting screen: “All Assets“
   • This initial screen shows you all assets in the organization

2) Access “My Groups” view:
   • All authorized asset groups are shown in drop-down
   • Initially, the only group is “My Assets"
     *This group is private, every user has one and no assets should be here, please transfer all assets to another asset group

3) Add a sensor to commission it by clicking +
   or add it from the main menu (next slide)

Attention: sensor must be in Bluetooth range
Commissioning: add sensor

Viewing your sensor on the app

1) Click “Commission new asset” on the main menu
2) Choose sensor according to serial number (SN) by clicking on the + next to it. You find the SN in the sticker of the sensor.

Sensor must be activated first! If the sensor is not found, make sure you are in Bluetooth range and try again.

Attention: sensor must be in Bluetooth range
Commissioning: nameplate configuration

Enter initial settings

1) Configure initial settings
   Asset name, description and serial number
   \(\rightarrow\) Attention: not the sensor serial number
   Optional: add a picture of the asset

2) Enter plant by selecting from dropdown or create a new plant:
   - To create a new plant, tap on the “+”
   - Turn on GPS in your mobile device
   - Tap on “Done” in the upper right corner

Attention: sensor must be in Bluetooth range

Important: accurately configuring your asset’s nameplate on the sensor is necessary for correct operation.

Important: the same process is valid for the Smart Sensor for pumps and mechanical products, only the inputs differ.
Commissioning: fixation and mounting

Mandatory info about the fixation of the motor and sensor mounting

1) Motor Mounting
2) Terminal Box Position
3) Sensor Orientation

Attention: sensor must be in Bluetooth range
Commissioning: nameplate configuration

Mandatory nameplate details, example: motor sensor

1) Motor standard
   For LV motors either NEMA or IEC

2) Nominal motor speed
   rated full load motor speed in rpm

Attention: sensor must be in Bluetooth range
Commissioning: nameplate configuration

Mandatory nameplate details, example: motor sensor

3) Speed Control
   - Either Fixed Speed or variable speed drive

4) Motor voltage
   - Rated motor voltage

5) Motor current
   - Nominal current at the rated voltage

Attention: sensor must be in Bluetooth range
Commissioning: nameplate configuration

**Mandatory** nameplate details, example: motor sensor

Rated nameplate quantities:

6) **Motor nominal power**
   - Power rating on nameplate in kW

7) **Line frequency**
   - Input frequency on nameplate

8) **Power factor**
   - Power factor on nameplate

**Attention:** sensor must be in Bluetooth range
Commissioning: nameplate configuration

Bearing information input

9) Drive-End (DE) Bearing
   • Select if Sealed/Non sealed
   • Choose Manufacturer from drop down ▼
   • Enter bearing number

10) Non Drive-End (NDE) Bearing
    • Same as 9)

Attention: sensor must be in Bluetooth range

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September 3, 2020 | Slide 54
Commissioning: nameplate configuration

Bearing information input

11) Bearing code input

- Bearing code has to be in SKF format
- Input basic designation (no prefixes or suffixes)
  1. Bearing type
  2. Radial width / thrust height
  3. Diameter series
  4. Bore diameter size (d/5)
- E.g. accepted codes: 6303, NU2224

If your bearing code is not accepted, please contact support.smartsensor@abb.com

Attention: sensor must be in Bluetooth range
Commissioning: nameplate configuration

Optional nameplate details, example: motor sensor

Optional inputs (recommended for data labeling and future advanced analytics):

11) Motor load
   - Application being driven by the motor

12) Shaft height
   - According to IEC / NEMA standard

Attention: sensor must be in Bluetooth range
Commissioning: transfer asset
Transferring an asset to specific asset group

1) Upper right corner menu or immediately after commissioning: "Transfer Asset" (You must have admin rights)

2) Define access to the sensor/asset
   a) Tick “Asset Group” to choose one, or
   b) Tick “User” and enter an e-mail address

   In step 2b), granting access to a user would cause only that user to have access to the sensor in their “My Assets” group.

   • Note: It is not possible to transfer assets outside of the current organization. If you need to do this, delete the asset and re-commission it while active in the new desired organization.

Attention: sensor must be in Bluetooth range

©ABB
September 3, 2020 | Slide 57 | All the shown screenshots are from the iOS app.
Configuration and commissioning

Summary

Create account

- Become part of the Smart Sensor user base and enable predictive maintenance for your assets.

Create your organization

- Create organization via app.
- Create User and Asset Groups via the Portal.
- Connect User/Asset Groups.
- Invite users to an Organization.
- Add users to User Groups.

Activate your sensor

- Activate the Sensor using the mobile app.

Recommendations:
1. Do not commission sensor before previous steps.
2. Gather nameplate information beforehand to commission your sensors from the comfort of your office.

You now have access to the Smart Sensor Platform app and to the Digital Powertrain and Smart Sensor portals.

You are ready to activate and commission your sensors.

Configure and deploy!

- Find sensor with mobile app.
- Add sensor to the desired Asset Group.
- Enter nameplate data for the monitored asset.
- Transfer to an Asset Group.
- Mount sensor on the asset.

You can now add sensors to Asset Groups.

Load measurements with the app or wait for the gateway, and view trend data online!
5. Smart Sensor app general functionalities

Download app to tablet or cellphone with iOS or Android
1) Landing page. Clicking on the top left icon leads you to the main menu (≡).

2) The active organization is visible below your name. You can commission, activate and update Sensors, request support and change your organization.

3) Clicking on an asset shows the detailed view for that particular asset.

4) Swiping left or right on the information card shows you additional information such as events and health status.
1) Click on the information icon on the top left for an explanation of the pictograms.

2) Click the menu button to access further functionalities.

3) Several functionalities available:
   a) **Load measurements**
   b) **Retrieve raw data** (must be requested to support team)
   c) **Update firmware** (only visible if firmware is not newest)
   d) Further functions on next slides.
Functionality menu of the asset

Asset views and Asset management
Update firmware
How to keep your sensor up-to-date

1) If your commissioned sensor needs a firmware update, you will see the “microchip” pictogram under the asset name.

2) Open the asset menu at the top right corner and click “Update firmware”.
   - Follow the instructions on the screen
   - Average update time approx. 15 minutes.

3) To update the firmware before commissioning, activate the sensor then use the main menu functionality.

Attention: sensor must be in Bluetooth range

©ABB
September 3, 2020 | Slide 63
All the shown screenshots are from the iOS app.
Measurement interval
Adjust the measurement interval

Sampling interval: 1 h by default.
Max. Interval: 12 h
Min. Interval: 15 min
Memory: 720 measurements
Estimated battery life: 5 years.

Shortening the interval decreases the battery life and the length of internal history proportionately.

E.g. 1h interval:
• 720 / 24h = 30 days in memory

E.g. 30min interval:
• Battery life est. 2.5 years
• 15 days data in memory

Attention: sensor must be in Bluetooth range
Load measurement
Smart Sensor Platform mobile app

Load measurements from the asset detail view:

1) Tap “load measurement” from the asset menu to load from sensor’s memory.

2) From the “operational parameters” asset card, click on gauge button to trigger a new measurement on-demand.

Measurements are loaded to the cloud (app and portal)
The measurement is triggered immediately, outside of the fixed schedule.

Attention: sensor must be in Bluetooth range
Load measurement offline (weak or no mobile internet)

Move towards better mobile connectivity

1. Load data (from sensor to mobile device via Bluetooth).
2. Move to better coverage area, turn flight mode off.
3. Swipe down on the app to sync with the cloud.

With weak or no internet connection:
- Log in to Smart Sensor app and to your organization
- Put phone in flight mode (except Bluetooth)

You should see “Add measurements <Asset Name>” in the sync prompt.

Attention: sensor must be in Bluetooth range
Synchronize motor and pump sensor

You can now enhance the pump sensor's precision by synchronizing it with a motor sensor via the mobile app.

1) Navigate to **PUMP SENSOR** asset view.
2) Choose **Synchronize speed** from the “Calibration” submenu.
3) Pick a **MOTOR SENSOR** from the list of sensors in range.
4) Check the relation between sensors on the **ASSET CARD**

**Attention:** sensor must be in Bluetooth range
Add maintenance event
Add maintenance event in the app

To add new maintenance event, click on an asset in the app.
1) In the event log of the asset, click + to add new maintenance event
2) Write a description
3) Choose type of maintenance from the dropdown list and Save

*This feature is currently only possible from the app.
Other functionalities – regreasing event

Configure a regreasing event

To configure regreasing:

1) Click the menu button in the top right corner of the asset detail view
2) Under "Calibration" in the asset menu, click "Configure regreasing" button.
3) Read the info box and click next
4) Set the last greasing event
Other functionalities – regreasing event

To finish configuring regreasing:

5) Set the rated temperature

6) Set the relubrication interval

Example of regreasing instructions on ABB motor nameplate:
When exchanging the sensor for an asset and replacing it with a new sensor, follow the steps:

1) **Activate** new sensor in Bluetooth range
2) Select asset and click on “Replace Sensor”
3) Click “PROCEED”
4) Select new sensor from the list
5) Commissioning happens automatically

From now on, historical data as well as nameplate details and picture are carried over to continue with the new sensor’s data.
Set rotation direction
Configuring sensor to detect direction of rotation

1) Use your sensor to calibrate the direction of rotation by tapping „set rotation direction“
2) Read the instructions on the screen
3) Visual observation of the rotation speed.
   – Click on „Switch Direction“ until the arrows in the visualization indicate the direction of rotation that you observed on the shaft.
**Take responsibility**
Assigning responsibility for an asset to user

1) By tapping "take responsibility" with the app the sensor will be assigned to the user.

2) It will be shown in the Smart Sensor portal "Asset Properties" tab under the "Asset Details" area who the responsible user is. This makes the user reachable to members of the organization with access to that asset’s data.
Main Menu – Services and Support functions

Smart Sensor Platform mobile app: main menu

From the main menu, you can:

1) **Services** that allow you to:
   - Commission new assets
   - Activate Sensors
   - Update Sensor Firmware (after activation, before commissioning)
   - See plant locations on a map
   - Refresh configuration (sync app with the back-end)

2) **Support functions**:
   - **Settings**: Define measurement units, language etc.
   - **About**: App information
   - **FAQ**: Frequently Asked Questions (link to the web page)
   - **Feedback**: Report an issue directly to the Support Team. In order to get the best possible support, attach the application reports.
   - **Tutorial**: Asset activation instructions

Application logs contain important information for our Support Team to be able to debug issues quickly and thoroughly.
6. Smart Sensor web portal

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Dashboard – overall condition index
Overall condition «donut»: calculated from separate Condition Indexes over a period of time

The overall condition represented by the donut is calculated over a period of time, out several KPIs.

The first line graph shows events you have received for the fleet per unit of time (see next slide for explanation on events).

The second graph shows the history of health status of each asset in your fleet (see next few slides for differentiation of health status and condition index).

The line graphs do not correspond to the donuts; this page will be redesigned.

* Unknown assets indicate outdated firmware or no measurements loaded in the past days.
Dashboard – Number of Events & Health Trend

The three types of events

Number of Events
The green line shows the development of the daily total number of alarms and alerts combined. The blue line shows the number of acknowledged alarms and alerts.

Health Trend
Shows daily total of green (healthy) yellow (weak) and red (critical) assets. 

Note: the health trend indicator shows the status based on the last measurement. The condition indexes (donuts) are based on the last 7 days.
Dashboard – Events

The three types of events

- **Alarms**: Triggered automatically when trespassing thresholds. Alarms and alerts can be acknowledged and closed.
- **Alerts**
- **Maintenance**: Entered manually in the app.
Dashboard – Condition Indexes

Indicators calculated over long periods of time from several KPIs

→ "Condition Indexes" are an aggregation of several KPIs over several days.

Assets can be filtered by type of condition index, status or asset type.

The condition indexes are defined as below:

- **Environmental stress**: Vibration and temperatures while machine is stopped.
- **Operational stress**: Vibration and temperatures while machine is running.
- **Total stress**: aggregates operational and environmental stress.
- **Reliability**: Bearing condition, other KPIs
- **Overall health**: aggregates total stress and reliability indexes

**NOTE: CONDITION INDEXES ARE NOT MEANT TO MATCH THE STATUS OF INDIVIDUAL KPIs!**
Health Indicator vs. Condition Index

Differences between health indicators and condition indexes

Health Status Indicator under Asset Details are based on the last measurement

Condition Indexes are calculated over time and aggregate several KPIs
Asset Details view – Event Log

Events on the portal

The Event Log is a list of events:

- **Alarms**
- **Alerts**
- **Maintenance**

Within the selected time frame you can see the history of events. By clicking on the dropdown, a list events of that type is shown.

You can see the recommended action, close the event and, by clicking on an event, add comments.

Maintenance events can be added manually in the mobile app (see slide “Add maintenance event” in the previous section).
Asset Details view – Event Log

Closing an event

When closing an alarm or alert, provide a closing reason and a comment.
Asset Details view – Operational parameters

View the data trends of your assets

The Operational Parameters tab in the Asset Details view visualizes trend data. You can add and remove KPIs by clicking on the + and – symbols respectively.

• Click  for further information on parameters.
• Click  to adjust alarm and alert levels for the health parameters.
• Click  to receive an e-mail with an export of the measurements.
Asset Details view – Operational parameters
Adjusting Alarm and Alert levels

Click ‹› next to the Health KPI to adjust the alarm and alert levels.

**Vibration** limits are set in [mm/s RMS] and **Skin temperature** levels in [°C].

KPIs without this option are scaled proportionally to signal energy values and therefore have no physical unit.

A suggestion is calculated by the portal based on previous measurements and other aspects.

You can also turn on/off notifications from this screen.

For more information on the recommended alarm and alert levels, click ‌‌
Manually determine alert/alarm thresholds

In order to determine optimal thresholds:

1. Using the mobile app (see previous section), manually trigger measurement from an asset under smooth operating conditions.
2. Note the [mm/s RMS] vibration and the [°C] temperature values.
3. Ensure thresholds are above those values.
   a) If necessary, perform step 1 again under operating conditions recognized as a desired «alert» or «alarm» state.
   b) Note those values and use them to set the specific thresholds.
Asset Details view - Asset and Sensor Properties

Information about your machine and the sensor monitoring it

Asset information is visible under "Asset Properties".

Sensor-related information is found in the "Sensor Properties" tab next to Asset Properties.
Asset Details view - Notifications

Turn on different kinds of notifications for selected assets

Configure the notification mode for each asset under “Asset Details”.

Attention: this applies only for the user currently logged in the portal.

Click the “info” button for more details about each notification type.

Note:

- **Parameter alert / alarm notifications** are triggered for all individual KPI threshold violations: short-term, detailed monitoring.

- **Condition change notifications** happen when a Condition Index status changes: longer term, overview monitoring.
7. Instant Asset Report; On Demand Raw and Trend Data

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On Demand Load Measurement

Request a trend measurement manually

1) Navigate to **Asset Details** on the main menu bar on top.
2) Select asset group.
3) Choose sensor.
4) Click **Load measurement**.
5) Read the notification. It can take up to 30 min until the requested load measurement is visible on the portal.
6) Click **Request**.
On Demand Raw Data Collection

Request a raw data measurement from a specific sensor

1) Navigate to Asset Details.
2) Select asset group.
3) Choose sensor.
4) Click Raw data collection.
5) Read the notification.

Raw data measurements affect the battery life. Click Request.

Note: This feature is only available for moderators of the organization’s Admin user group.
Asset Details view – Vibration FFT

Get a vibration FFT plot for your assets

After successful raw data collection, you will be notified via e-mail.

The automatic / instant asset reports based on your raw data collections are visible in the Reports tab of the Asset Details view.
Asset Details view – Vibration FFT

Get a vibration FFT plot for your assets

In the Vibration FFT tab of the Asset Details view, the velocity vibration spectrum is visible for your latest raw dataset that has been successfully triggered and transferred to the cloud.
7. Visualization and interpretation of data

App: https://www.youtube.com/watch?v=49wgY6nX5Ls
Portal: https://www.youtube.com/watch?v=lacBttlARko

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Data visualization on the mobile app

Viewing data on the mobile app

1) “Event Logs” card: individual, momentary limit violations.
   • Switch panels by swiping the screen left and right.

2) “Health Parameters” card: KPIs influencing condition indexes.

3) This is the overall condition index / indicator.
   ➔ Aggregates health parameters (KPIs) over the last 7 days.
   ➔ This is why it does not follow a single health KPI’s status.
Data visualization on the mobile app

Viewing data on the mobile app

The **Condition Index** indicator at the bottom right corner of the asset thumbnail aggregates all KPIs over a 7-day period.

- **Green** when everything is fine
- **Yellow** when some KPIs have been occasionally above their thresholds in the 7-day period.
- **Red** when alarm limits have lately been violated more often than recommended and equipment condition is deteriorating.

**Other panels include:**

- Latest operational parameters
- Asset nameplate data
Trend data monitoring on the mobile app

Viewing data on the mobile app

1) On the “Operational Parameters” screen, click the trend button on the lower right corner

2) Choose the time period and up to two KPIs to superimpose on the graph view
Trend data monitoring on the portal

Portal view “Asset Detail”: “Operational Parameters”

This view shows individual KPIs over time for each asset in turn.

You can choose to be notified on any individual, momentary violation.

For a more conservative view, use the condition indexes on the landing page of the portal.

The evolution of data trends over time may indicate a deterioration in the equipment condition.
Trend data monitoring on the portal

Portal view “Asset Detail”

For a closer look at an asset’s health symptoms, go to «Asset Details» view.

For maintenance decisions, refer to the Condition Index “donuts” on the portal landing page.

These measurements are more important as a trend that is becoming worse over time than as individual statements!

This is why the Condition Indexes exist: to prevent excessive notifications on every threshold violation.
8. Digital Powertrain portal

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Users own the sensors that they commission themselves. For other sensors, access rights must be manually granted to a user before data can be accessed.
What is a Digital Powertrain?

An intelligent powertrain equipped with sensors and cloud connectivity. It can include motors, pumps, drives, bearings, couplings and gearboxes, and other applications like fans and compressors.

It is a combination of 2 existing web interfaces:

- **Smart Sensor** portal for motors, pumps and mounted bearings;
- **RCM** portal for drives.

You can build a digital powertrain out of multiple monitored assets in the Powertrain portal.
Why Digital Powertrain?

So that customers can monitor their entire process / powertrain or benchmark performance accross similarly rated assets, e.g. motors rated for the same power or speed.

Our digital powertrain combines connectivity and data analytics with our expertise to make your operations efficient, predictable and safe.
Creating a powertrain step by step

Preparation steps

0
The Powertrain Portal puts together the following assets:

- From the Drives portal:
  - Drives
- From the Smart Sensor Portal:
  - Motors
  - Pumps
  - Mounted bearings
  - …

Access to the monitored assets on both portals is a pre-requisite.

Log in to the portal:

0) Navigate on your browser to: https://powertrain.abb.com

1) Log in with existing ABB account
Creating a powertrain step by step

Preliminary steps

2) When entering the dashboard, click on the gearwheel on the top right

3) Click on “+ Add new Powertrain” to go to the Powertrain configurator

- You can choose from a list of countries or plants.
- Plants are defined when you commission your sensor with the mobile app.
Configuring a powertrain step by step

Three main steps

The 3 steps to configure a new digital powertrain:

- Location
- Components
- Naming

Step 1) Location
Choose a site from the dropdown list and click on Next
Configuring a powertrain step by step

Three main steps

Step 2) Components

- Select **component type** from the dropdown list
- Add specific assets from the list of **available components** by clicking on the +
- Repeat process for more assets
- Click on **Next**
Configuring a powertrain step by step

Three main steps

Step 3) Naming
Enter a name for the powertrain and click on save
Visualization of powertrain data
A few clicks to creating a graph

0) Click on the home icon on the top left to go to the Dashboard

1) Click on «Condition Indexes» to see the condition of each powertrain. Then click on the graph of the powertrain.

* The hierarchy shows the details of the condition of the powertrains and their assets
Visualization of powertrain data: trends

Visualize time-series data

1) "Trend" is selected by default.

2) On the «Cross Asset KPI Visualization" page, **add** the desired KPIs for **each asset in your digital powertrain** from the dropdown lists by clicking **+**

3) Adjust the **timeframe on the top right**.

4) Click on the KPIs below the graph to **hide/show** them

5) **Save** as template if desired
Visualization of powertrain data: scatterplots

Visualize relationships between KPIs

1) Choose graph type "Scatterplot" from the drop-down menu
2) Choose the asset from the list of available assets
3) Selected the combinations of KPIs to visualize as scatterplot.
4) To remove the data click the «x» next to the name
Visualization of powertrain data: scatterplots

Visualize relationships between KPIs

1) Choose graph type "Histogram" from the drop-down menu
2) Choose the asset from the list of available assets
3) Selected the KPI to visualize as histogram.
4) To remove the data click the «x» next to the name
How to buy a new subscription voucher – as an end user or partner

The subscription vouchers can be purchased directly with your local ABB sales unit

1. **Contact your ABB sales unit or partner**
   They should be able to provide you with a list of subscription plans with different validity periods and prices.

2. **Choose your subscription**
   Talk to your local ABB sales unit about your needs if you need help deciding which subscription duration is best for your accounting needs.

3. **Purchase your subscription**
   After selecting your desired subscription, agree on purchasing terms with your local ABB sales contact.

4. **Activate subscription**
   You will receive a voucher with a code for the purchased subscription. To activate it, just scan the code from the voucher with the ABB Ability™ Smart Sensor Platform app.

5. **Start monitoring your motors and pumps**
   You can access the ABB Ability™ Digital Powertrain condition monitoring solution for motors and pumps via the ABB Ability™ Smart Sensor web portal (https://smartsensor.abb.com) or the ABB Ability™ Smart Sensor Platform app.
How to buy a new subscription via ABB Ability™ Marketplace – as end user

The subscription plans can be purchased in the ABB Ability Marketplace™

1. Access ABB Ability Marketplace™ and register
   Fill in the required information to log in (e.g. contact/business info). Please note that account validation can last up to 7 working days. Purchase is possible after your account is validated.

2. Choose your condition monitoring subscription plan
   Use the solution cluster menu to find the desired application under ‘Condition Monitoring’ and choose a subscription plan.

3. Purchase confirmation
   Once you have chosen subscription model, billing period, payment type (credit card or SEPA direct-debit) and accepted the Terms and Conditions, you will receive purchase confirmation.

4. Activate subscription
   You will receive a voucher with a code for the purchased subscription plan. To activate it, just scan the code from the voucher with the ABB Ability™ Smart Sensor Platform app. Please note that the voucher(s) can only be downloaded by registered users in the ABB Ability™ Smart Sensor web portal.

5. Start monitoring your motors and pumps
   You can access the ABB Ability™ Digital Powertrain condition monitoring solution for motors and pumps via the ABB Ability™ Smart Sensor web portal (https://smartsensor.abb.com) or the ABB Ability™ Smart Sensor Platform app.
How to buy a new subscription via ABB Ability™ Marketplace – as a partner

The subscription plans can be purchased in the ABB Ability Marketplace™

1. **Register as partner**

   Afterwards, you will receive an invitation from Marketplace to register. You will need to fill in the required information (e.g. contact and business information).

   Please note that account validation can last up to 7 working days.

   Purchase is possible after your account is validated.

2. **Complete training process**

3. **Choose your condition monitoring subscription plan**
   Use the solution cluster menu to find the desired application under ‘Condition Monitoring’ and choose a subscription plan.

4. **Purchase confirmation**
   After selecting your desired subscription model and payment type, you will receive the purchase confirmation and the Condition Monitoring voucher.

5. **Sell your digital services**

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For more information, please visit [marketplace.ability.abb](https://marketplace.ability.abb): The online store for ABB’s digital solutions and expertise
**ABB Ability Marketplace™ is available in most OECD countries**

Please contact your local sales unit if Marketplace is not available in your country

List of countries where the ABB Ability Marketplace™ is available:

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