Installation Guide pureFAMILY

Content

Installation manual and description of the pureFAMILY product platform. Addresses functionality, detailed technical description, and a complete description of how the system is installed.

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Installation Guide – pureFAMILY

Date	Product	Comment
2023-05-05	pureFAMILY	RELEASED (2023-07-14)

> ℹ️ *The pureFAMILY product documentation and pureCLOUD APP is currently only available in English.*

General description of pureFAMILY product platform

General description
pureFAMILY platform is a collection of sensors, gateway and software services delivered from pureSignal of Sweden AB.

The platform consists of:
- Sensors – pureMEMS and purePULSE and
- Gateway – pureGATE (Ethernet, WiFi and 4G gateway).
- Application Software – pureCLOUD (mobile and desktop APP as well as integration to Rest API).

New products and additional sensors will continuously be developed to complement the pureFAMILY. All existing products within pureFAMILY can be remotely updated if needed.

Please contact your distributor or just send an e-mail to info@puresignal.se for more info.

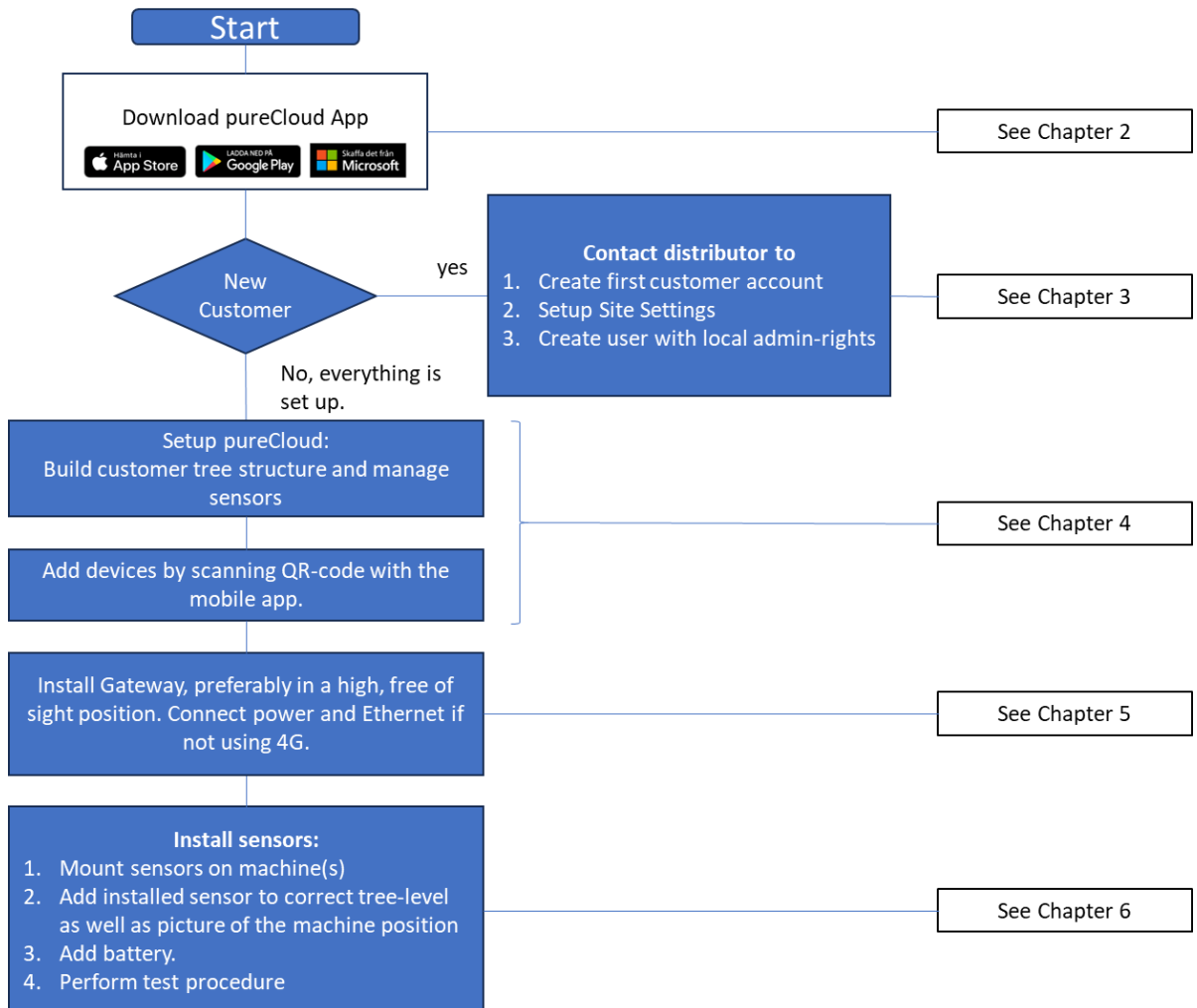Datasheets and other general information are published on the website www.puresignal.se.

Support and service questions can be sent to service@puresignal.se.

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1. Installation - the big picture

Below is an overview of the different installation steps needed to get started with wireless monitoring of your facility.

```
                    Start

        Download pureCloud App              ───────────────  See Chapter 2
    [App Store] [Google Play] [Microsoft]

                                    Contact distributor to
              New          yes     1. Create first customer account
            Customer      ────→    2. Setup Site Settings          ──  See Chapter 3
                                    3. Create user with local admin-rights

         No, everything is
             set up.

          Setup pureCloud:
      Build customer tree structure and manage
                sensors                       ──────────────  See Chapter 4

      Add devices by scanning QR-code with the
                mobile app.

      Install Gateway, preferably in a high, free of
      sight position. Connect power and Ethernet if  ────────  See Chapter 5
                not using 4G.

          Install sensors:
      1. Mount sensors on machine(s)
      2. Add installed sensor to correct tree-level
         as well as picture of the machine position  ────────  See Chapter 6
      3. Add battery.
      4. Perform test procedure
```

2.   Wireless Data Communication

2.1   LoRa radio

The data is transferred from sensors to Gateway with LoRa radio communication. LoRa (Long Range) is the radio signal that carries the data, and LoRaWAN is the communication protocol that controls and defines how that data is communicated across the network.
The main advantages of LoRa radio are that it provides low-power, wide range, and cost-effective connectivity for devices that don't require high data transmission rates and it's a great option when cellular is too expensive or Wi-Fi coverage isn't available.

Some of the best uses are:
Agriculture: With a long range that provides reliability in rural applications for devices that do not have a high data transmission rate, LoRaWAN perfectly supports agricultural use cases.
Assets and logistics: Network-based location and tracking abilities at a low cost and optimized battery life make LoRaWAN suitable for assets and logistics.
Smart metering: LoRaWAN's ability to reach sensors monitoring utilities located underground make this a well-suited connectivity choice for smart metering.
Smart home: The ability to pass through obstruction, such as walls, and ability to support battery powered, low data -consuming applications that can be used in smart homes make this connectivity option appealing.
Healthcare: IoT solutions comprised of LoRa-based hardware can monitor high-risk patients or systems 24/7, ensuring health and medical safety are comprehensively managed.
Industrial: Industrial IoT is transforming operations by digitizing legacy processes and equipment, driving profits, keeping costs lower, and maximizing efficiencies. LoRa-enabled devices and sensors take real-time data to provide key insight into predictive maintenance, machine health, efficiency, reduced downtime, and much more.

pureSignal sensors must use a gateway from pureSignal for fully functionality and be able to manage sensor settings like alarm levels, tree structures etc. However, with some manual customizing the sensors can be able to send data both to pureSignal gateway and other already existing LoRaWAN network if requested but then with limited functionality (one way data transfer) and without possibility to remotely download firmware and update settings. For best performance pureSignal don't recommend using pureSignal sensors with a 3rd party gateway because of the limitations and the lack of ability to update the firmware.

Request to upload data starts from the sensor asking for permission to upload to pureCLOUD via gateway. If permission is granted, uploading continues, otherwise the attempt is stopped, and a new attempt can be made later.

The next step is that the device sends test packets in different radio modes to test reception, and the gateway asks for the mode with optimized signal strength. The three different modes being used are (1) DR7 (also known as FSK), which is the fastest but also has much shorter range; (2) DR6, which is slower but has better range; and (3) DR5, which is the slowest rate but has much better range. In good condition outside (open air or line of sight) the distance can be up to 20km. If no radio mode is good enough, radio transmission is interrupted to save battery until a gateway is available within range.

The sensor uploads all data, and the gateway may ask for increased transmission strength and/or lower DR if signal strength seems poor. If contact between the sensor and the gateway is lost for too long, the upload will be aborted completely.
When the upload is successful, the data is saved in pureCLOUD and visualised in the application or accessed via an open API. If the upload is interrupted or fails, it will be redone with an adjustable delay (default 5 minutes) and an adjustable number of times (including the first one, default 12).

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An upload with default settings (measuring three axes for 5 seconds) takes approximately 1-2 minutes in DR7, 3 -4 minutes in DR6, and 7-8 minutes in DR5.

> ⓘ *pureSignal sensors are ONLY able to be installed in LoRa radio network in Europe using frequency band 863-870 MHz. Please send request for sensors with frequency ranges for other markets. info@puresignal.se.*

Radio channels

pureSignal primarily uses standard LoRa channels, with some modifications. Relevant legal text is document 2017/1483/EU, specifically bands 47, 48, and 54.

Channel	MHz	DR
0	868,1	0 – 5
1	868,3	0 – 5
2	868.5	0 – 5
3	867.1	0 – 5
4	867,5	0 – 5
5	867,7	0 – 5
6	867,7	0 – 5
7	867,9	0 – 5
8	868,3	6 (250 kHz BW)
9	866,9	7 (FSK)
Fallback	869,525	0

2.2   OpenAPI implementation

pureSignal offers an openAPI implementation from pureCLOUD that includes the possibility to access data via REST API. This will make it possible to create an own customized visualisation system or integration to an already existing system. It's possible to access data like trends, time waveforms and machine pictures. A full API documentation is available for authorized users.

> ⓘ *Please contact pureSignal for API documentation. To be able to make an API connection a special user account must be created. Send e-mail to <u>info@puresignal.se</u>.*

3. Download of pureCLOUD application

pureCLOUD application is available on following platforms:
o   iOS - App Store
o   Windows store
o   Android Apps on Google Play

Search for: pureCLOUD (Until Q3 2023 search for X2 Wireless)

> ⓘ   *There is continuous development in pureCLOUD where cloning of the app has not yet been completed. This will be implemented 2023 Q3. Today the app is called X2 Wireless. Send e-mail to* info@puresignal.se *if any questions.*

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4.   Customers and user accounts

pureSignal recommend that a new customer account and local admin user is created by distributor or pureSignal support. Following additional user accounts and sites can then be added by local admin. Preferred is that at least one customer account is local administrator. This user will be able to change settings, create- and administrate other users. The administration user can also build up the tree structure and create new sites.

Customer information for setting up first pureCLOUD account:
-       *Customer Name* to be visualized.
-       *Customer Sites* to be visualized.
-       Main contact person full *Name*
-       Main contact person *e-mail*
-   Main contact person *phone number*

> ⓘ   *If password is forgotten a new password can be requested on logon site.*

5.   Setup of pureCLOUD

Please use your login credentials to login to pureCLOUD. To follow this instruction, you will need to have **local administration rights** for your account, see chapter 4. Local distributor can create a customer account and a local administrator for new customer. Within a customer domain, multiple sites, sensors, and users can be added.

5.1   Customer local sites and guest sites

There is a difference between sites and guest sites. Sites are your own local sites related to your customer account. And guest sites are sites that you have been invited to someone that have access to that site, perhaps by using an invitation code. In both sites and guest sites your account can have different rights levels. The main levels are: Guest, Tech User and Customer Admin.
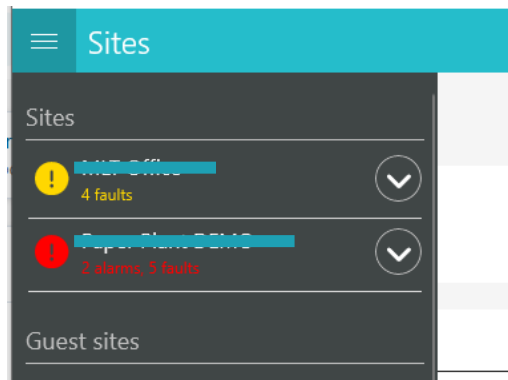
Sites and guest sites

5.2   Customer and user settings

You need to be in main menu to find the settings by using the cogwheel. See picture below and use backward arrow to step backwards in application to main menu.

Customer and user settings

Click on the cog wheel to be able to change user and customer settings.

Account: (see picture below)
User settings: Click on user settings to change your own account settings like language, phone number or password.
Alarm settings: This is a global change of alarm notifications.

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Sites:
Current site: Edit actual selected site information like name, address, and GPS location. It's also possible to add and remove sensor and create tree structure for this site. See section 5.3 – 5.5 for more info.

Sites: Add new sites to your own customer account or modify guest sites depending on your own account permissions.
Join site: Join other sites. Your account can have following permission levels in other sites: Alarms only, simple info, detailed info and full control.
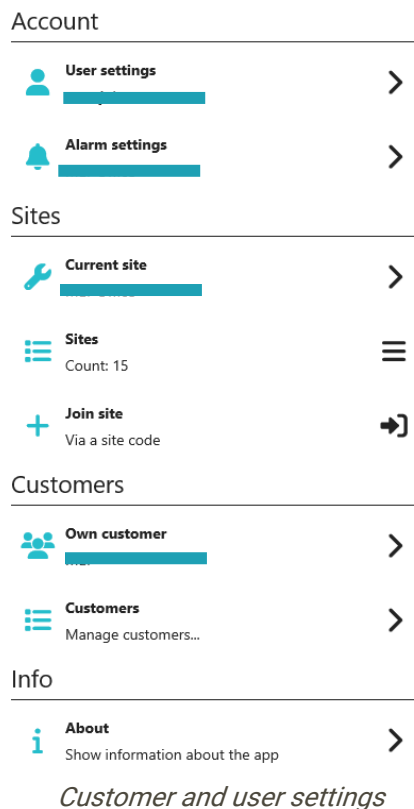
Customers:
Own customers: Create and edit customer and sites for your account. And add or edit user accounts.
Customers: Edit other customers that your account has access to. Similar like "Own customers" above.
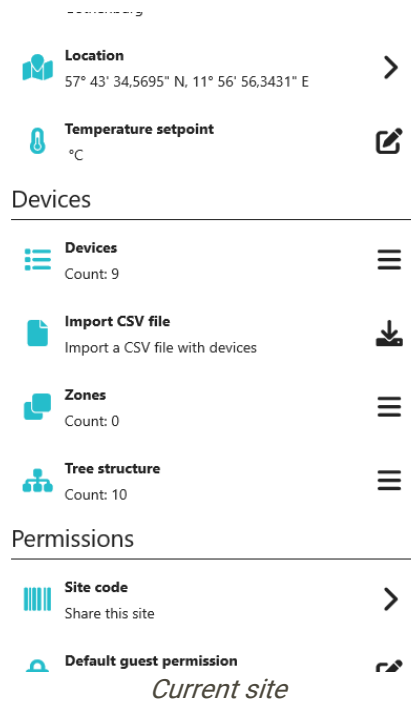
Info:
About: See actual version of application.

Account

User settings   >

Alarm settings   >

Sites

Current site   >

Sites
Count: 15   ≡

Join site
Via a site code   →]

Customers

Own customer   >

Customers
Manage customers...   >

Info

About
Show information about the app   >

Customer and user settings

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5.3 Customer tree structure

Go to settings (see section 5.2) and select "Current site" to edit tree structure for actual selected customer. It's also possible to modify other customers if you select "Customers" instead of "Current Site".

Find Tree structure and click somewhere on the line. This will open another view to be able to build up the tree. As the highest level you will see the site name. From this level you will be able to create new nodes preferably with a picture or a map. A node can be both a tree level or a machine name. Click on the level and select "Add New Node". Each new level can have areas beside or below.

Current site

After a level is created it can be edited with a click on same line.

To be able to delete a level make sure that all sensors are removed from this level.
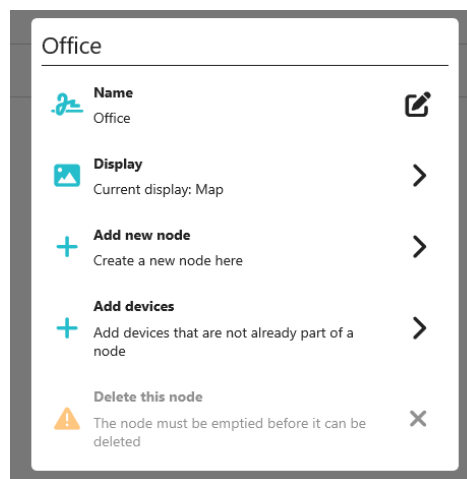
Build a tree structure.

The sensors can be added at this point "Add devices". More information will follow in next section.

5.4   Manage sensor

To add one or multiple new sensors into a customer you will need to use the mobile app iOS or Android App by scanning the sensor(s) QR-code. Later, it will be possible to manged them in mobile app or in PC client after the sensors have been added.

Start your mobile device and go to settings and select the actual site where the sensors should be added. Continue to "Devices" and "Scan QR code". The QR code can be found on all pureSignal products.

It is possible to add sensors one by one or select multi-scan to scan many sensors at the same time. For each sensor that is added, a green box will appear along with a low beep next to the scan box. If the box doesn't turn green, it is because the sensor cannot be added of some reason. This may be because of the sensor has already been added to this customer. Locate the sensor by searching for it and manually move it to the site where it should belong. It's recommended to name the sensors at the same time as they are added.

All new added sensors will initially be in the highest level of actual site. It's possible to scan the QR-code with your standard mobile camera to find the QR-code again and name the sensor in pureCLOUD application if you have forgot to name it.

Continue from section 5.3 and select "Add devices". Add device means that the sensor will be moved to the desired location in the tree. Other pureSignal products like a Gateway can also be moved in the tree structure.

5.5   Sensor settings

Go to main view in the application. Click on the text "Sensor List" to enter the customer tree. If the customer has more than one levels, find the level where the sensor is located. Open the sensor settings by clicking somewhere on the sensor name. In this view you will see a trend in the top of the screen and last measured data from this sensor. In the top right corner, there is an icon with three horizontal lines. Click on this icon. In this menu it's possible to name the sensor and edit all other unique sensor settings. Below is an explanation for each setting.

Default value inside brackets like [-10°].

Cloud settings:

Name:	Name of the sensor
Placement:	Placement
Floor:	Floor
Type of space:	-
Machine type:	A list of common machine types
Outdoor sensor:	Indoor or outdoor sensor
Exclude from analyses:	Future function.
Exclude from reports:	Future function.
Apartment number:	Not actual
Timeout:	Set desired timeout until sensor. This means that the sensor will not alarm because the sensor is not connected.

Sensor settings:

Polling interval:	Polling interval for trend measurement.
Lower alarm limit temperature:	[-10°] Lower alarm limit for temperature alarm
Upper alarm limit temperature:	[60°] Upper alarm limit for temperature alarm

Upload attempt interval: [5 min] Time between every attempt to upload data to gateway.
Upload attempts: [12] Number of attempts to upload data to gateway.
Synchronized measurement: [Disabled] This will enable sensor in same level in the tree to synchronize all sensors to measure at same time. See more info in separate section.
Blocked measurement time: [120 min] This is a function inside synchronized measurement.
Time signal length: [5000ms] The length of the measured raw time waveform.
Time signal upload interval: [0 hour] The time between raw time signal measurement.
Filter for velocity trend values: [10 Hz] High pass filter for velocity trend. Select between 2 Hz and 10Hz.
Filter for acceleration trend values: [10 Hz] High pass filter for acceleration trend. Select between 10 Hz and 500 Hz.
Time signal axis: [XYZ] Select axes to be measured for raw time waveform. This will save battery lifetime. (This will not influence trend measurement)
Resampling frequency: [12800Hz] Resampling frequency of raw time waveform.
Trend value settling time: [1000ms] Settling time before start of measurement.
Trend value measuring time: [1000ms] Measuring time for trend measurement.

Technical information:
See more information in section LoRa Network and next section.

Latest SF: SF7 is the best signal strength see more info chapter 2.
Measurement blocked: Number of measurements that has been blocked.
Resends: Number of resend measurements.
Upload pending: Time waveform upload pending.

5.6   Synchronized measurement

Sensors in same tree level can act together as a group of sensors. This requires that the sensors have enabled synchronized measurement, see previous section on how to enable this. By default, the sensors have this disabled.

Following functions will be possible for synchronized sensors:
-       Trend and time waveforms will be measured at same time.
-       A triggered alarm on one sensor in a group sensors can trigger time waveform measurement for all sensors in same group next specified time.
-       RPM data will be attached to all measured time waveform inside group.

5.7   Sensor status

An explaining text will be available in different positions in the application. This will describe the status of the sensor based on the measurement result.

Active status - list of examples that can be present:
-       Everything is normal: All sensors work as they should and no alarm from last measurement is active.
-       Communication error: (number of sensors) The sensor has been activated but it is currently not sending any data.
-       Temperature alarm: (number of sensors) Temperature alarm
-       RMS Velocity warning: (number of sensors) RMS Velocity Warning from last measurement compared to set alarm limits.
-       RMS Velocity alarm: (number of sensors) RMS Velocity Alarm from last measurement compared to set alarm limits.
-       RMS Acceleration warning: (number of sensors) RMS Acceleration Warning from last measurement compared to set alarm limits.

- RMS Acceleration alarm: (number of sensors) RMS Acceleration Alarm from last measurement compared to set alarm limits.

Technical information based on the signal transmission can be found in section sensor settings.

5.8   View sensor data

pureCLOUD is not aimed to be an expert software for visualization and measurement data. It's possible to view trends and alarm levels in a simple view but for a better visualization it's possible to view same trends and calculated fft based on raw data signal in pureCLOUD+. Please contact your distributor to get access to pureCLOUD+.

View sensor data:
Go to one of your sensors or to the main view of the application. In the sensor view you will find an icon like picture below. (Same icon you will find in the upper right corner in the main view.) Click on the icon and a list of different trends will be present from actual sensor. Click on one of the names for a trend. A simple graph will be presented of selected trend.

Trend icon

It's also possible to view statistics from this sensor or manual download raw data time waveform to PC.

Click on the three horizontal lines in the upper right corner. This will show filter settings and other options of the graph. All added trends in the view will be present in a list and can be removed or temporary hidden.

Graph settings

6.   Setup of pureGate

A gateway from pureSignal is required to be able to setup pureFAMILY sensors. The gateway package includes gateway, LoRa-antenna and USB-C power adapter for the most common power sockets.

It's important to have a good location of the gateway both for the local LoRa radio network and eventually for 4G connection to GPRS. LoRa network is a long-range network and data can be transferred up to 5 km in open air. The best position for the gateway is high up in the building for best performance of both communications.

The Gateway can be ordered in an industrialized case version (IP68) if required from your distributer. If the sensors are mounted behind sheet metal and concrete, the gateway must be located closer to the sensors. An external LoRa antenna can also be ordered from your distributor if required.

Configuration and monitoring of the number of sensors communicating through which gateway can be seen in PureCLOUD.

It's recommended to have more than one gateway if the number of sensors is more than 25. This is to guarantee high availability of the sensor data. The sensors will automatically transfer data through the best available gateway. There is no upper limit to the number of sensors a gateway can handle, but depending on the signal strength and how much data that is sent, more gateways will be required as the number of sensors increases. The recommendation is to expand to three gateways when the number of sensors exceeds 100. Next recommended limit for four gateways is around 300 sensors.

6.1   Setup the pureGATE

1.   If DHCP local LAN-network will be used there is no need of any changes of gateway settings. Just plug-in gateway to power and LAN cable and the gateway will be ready to use.
2.   If the gateway is ordered with a preconfigured SIM-card from pureSignal the gateway can just be connected to power and ready to use.
3.   If the gateway should be connected to a local WiFi network continue in this section.
4.   If user would like to setup the gateway with their own SIM-card continue in this section.

Continue from point 3 & 4:
Following text will explain how to:
1.   Change to static IP address,
2.   Connect to local WiFi network.
3.   Setup of SIM-card.

Do following steps for all changes of gateway:
-    Download latest IP Scanner software from http://www.foab.se/sip/
-    Run IP-scanner *"as administrator"*.
-    Connect gateway via LAN cable direct to PC. (Observe crossed LAN cable may be used depending on your hardware)
-    Local IP: Select the network adapter in drop down list that your gateway is connected to. (Your local network do not need a specific IP settings.)
-    Click "*Scan for units*"
-    A list of found gateways will be presented.
-    Compare MAC-ID on the backside of gateway case to select correct device.
-    Double-click to open the gateway settings.

-        IP Address: DHCP is preconfigured but can be changed to static. Preferred is to leave the settings as they are.

Static IP Address:
-        Use DHCP: Change to *"No"* if static IP should be used.
-        Click on *"Send new settings".* If all settings are ready leave this section.

Local WiFi Network
-        WiFi Enabled: Change to *"Yes"* if local WiFi network will be used.
-        Click on *"Send new settings".* Close "Unit Info" window.
-        Wait until device is ready to open and confirm that the new settings are present.
-        WiFi SSID: Select your local network and type the password.
-        Click on *"Send new settings".* If all settings are ready leave this section.

Use of GPRS:
-        Use GPRS: Change "Use GPRS" to Yes
-        APN: Type APN name and eventually login credentials.
-        Click "Send New Settings".
-        The gateway will try to connect to APN and status will be present below. This can take up to 5 minutes and eventually a restart will be needed.
-        By default, all gateway prevents of sending high data volume when SIM-card is active. This limitation will stop the raw signal to be sent if this is active.
-        Got to tab: GWP and "Allow upload via Modem": *"Yes or No"*
-        Click on *"Send new settings".*

In view GWP status of all connection can be seen.

ⓘ   *If SIM-card is used the gateway will have to be allowed to send raw data signal via 4G/GPRS. If modem is preconfigured from your distributer this will already be done but can be deactivated if desired.*

7. Installation of pureFAMILY sensors

7.1 Hardware installation

The pureMEMS sensors are screwed either directly into the machine or into an adapter which is then screwed or glued into the machine. To get the best transmission of the signal between the machine and the accelerometer, the sensor should be screwed on. The delivery always includes screws, in Europe M6x35 stainless steel. If requested also 1/4" 28 UNF x 1 1/2" as an option.

Mount flat surface:
Find a surface on the machine that is flat enough for a sensor to be mounted. The surface required for sufficient signal transmission should be about 10 mm in diameter. If the surface is larger, this is positive for the signal quality and worse if it is smaller diameter.

Using the supplied screw with the M6 thread, drill a pilot hole with a 5 mm drill bit with a minimum depth of 8 mm. Thread the hole with a threaded pin M6. Clean the threads.

Screw on the sensor and note the directions of the axes and position to be entered later in pureCLOUD.

Mount with M8 90º countersink:
Mount the sensor with M8 90º countersink for best signal transmission. Machines sometimes already have pre-drilled holes of this type and countersink. From your distributor you can order an adapter in the accessory list that suites between the supplied M6 screw and a hole of type M8 countersink. You will find an accessory list in the end of this installation guide.

Instruction of how to drill a M8 90º countersink hole:
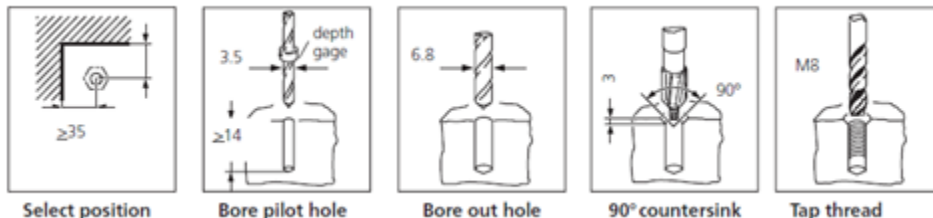
Extension adapters:
Extension adapters are also available in lengths 50mm and 100mm. Using an extension adapter may sometimes be the only way to mount a sensor in certain positions. Take into consideration that an extension adapter can negatively affect the vibration results values. E.g. trends can show higher levels compare to real values from machine depending on conditions. In pureCLOUD you can manually turn off the X, Y and Z direction if desired to avoid misleading data.

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7.2   Install the battery/ replace the battery

Battery type is 17330 and can be bought from your distributer or from a local dealer.

Unscrew the tube from the sensor head. Carefully remove the old battery from the battery holder. Mount the new battery as shown in the picture. Verify the condition of the sealing before remount of the tube. Use hand power to screw the tube all the way in.
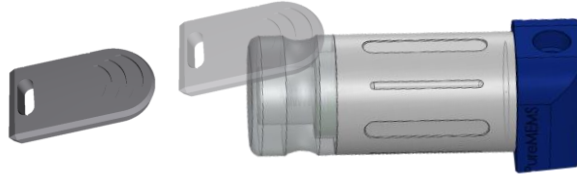

Battery orientation

When the battery is attached, the sensor will connect to pureCLOUD and perform a control. A trend measurement will be performed, and result will appear in pureCLOUD after 1-2 minutes.

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8. Test measurement to verify installation

A magnet is required to trigger a manual measurement of the sensor.

Test procedure
Hold the magnet against the end of the tube on the pureMEMS sensor. When the magnet is present within sensing range, the diode will light up solid blue. The magnet must be held for at least 5 seconds to trigger trend measurement and time waveform simultaneously. If the magnet is held for less than 5 seconds, the manual measurement is limited to trend measurement.

> ℹ️ *Numbers of triggered time signal per day can vary depending on sensor settings. This is a limitation for permitted transmission radio time in the LoRa network. Trend measurement will always be possible to trigger manual.*
>
> *Time waveform (as default) will be measured in Z direction for 5 seconds with a sampling rate of 25,6kHz.*
>
> *The default setting for trend measurement is set to:*
> - *X direction: RMS velocity 10-1000Hz*
> - *Y direction: RMS velocity 10-1000Hz*
> - *Z direction: RMS velocity 10-1000Hz, RMS acceleration 500-5000Hz and 0-Peak acceleration 500-5000Hz.*
> - *Temperature*

Evaluation of LED
If the magnet is held for at least 5 seconds, the diode will flash blue 3 times to indicate that sensor has received the time waveform command. If the magnet is held for less than 5 seconds, the diode will turn off and limit the measurement to trend measurement.

If the diode flashes red, it indicates that the maximum number of triggered time waveform signal has been reached based on the radio rules that exist on the maximum transmission time per day in the LoRa network.

The diode will light white during the time that the time signal is transferred to the gateway. The transmitting time to send the data is different depending on the sensor settings. The diode will turn to start flashing white if the sensor either lost contact with the gateway or if sending data from the sensor has been pending.

If the sensor has configured alarm levels, the diode will flash according to:
Green = Ok
Yellow = Warning
Red = Alarm

If no alarm levels are configured in the sensor, the diode will flash green regardless of the vibration level.

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> ⓘ *Configuration of sensor properties like alarm levels and facility machine tree structure is done by using pureCLOUD application. See separate chapter.*

All LED indications

The LED on the device is an RGB LED and different colours and patterns are used to indicate actual status.

Blue	Solid	The sensor has detected a magnet that is held close to tube.
Blue	Three flashes	A new measurement of time signal will be made.
Purple	Solid	Measurement in progress.
White	Solid	Upload attempts are in progress.
White	Three flashes	Upload successful.
White	Slowly flashing	Waiting for re-upload attempt.
Green	Flash 10 sec	Trend values were below set limits.
Yellow	Flash 10 sec	Trend values were above warning, but below alarm limits.
Red	Flash 10 sec	Trend values were above alarm limits.
Red	Three flashes	Measurement is blocked.
Red	Six flashes	Upload failed.
Red	Short flash	Sensor failure. Flashing about every 4 seconds.

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9. List of accessories

List of accessories suitable for pureSignal products.

ART NR	TITLE	DESCRIPTION
PS1028	Manual Trigger Magnet	Plastic cover
PS1011	Battery SAFT LS17330	High-performance battery
PS1040	Loctite 454	Glue for flat studs
PS1031	Outdoor Antenna Long Range LoRaWAN	600mm long
PS1038	Screw M6 A4 M6x35	Standard screw for pureMEMS. Stainless Steel
PS1019	Screw M6 A4 M6x40	Stainless Steel. Extra long
PS1022	M6 -> M8x1,25. 90° Male conical studs	Standard stud for pureMEMS. Suitable with M6x35mm screw. (M8x1,25 90° Male conical)
PS1027	M6 -> Flat Glue studs	Standard stud for pureMEMS. Suitable with M6x35mm screw. (M6 Flat studs)
PS1035	Extension 50mm. Conical M8x1,25 90°	Standard extension for pureMEMS. Suitable with M6x35mm screw. (M8x1,25 90° Male conical) Total extension length 50mm.
PS1036	Extension 100mm. Conical M8x1,25 90°	Standard extension for pureMEMS. Suitable with M6x35mm screw. (M8x1,25 90° Male conical) Total extension length 100mm.
PS3010	Switch Read Sensor M8 1,5m	RPM trigger sensor with integrated cable 1,5 with open end. Threads sensor head M8. Spare part for purePULSE.
PS3014	M8 Straight Connector	Mini 4-pin Connector. Spare part for purePULSE and suitable together with PS3010.
Coming...	Flat magnet for temporary use	Flat magnet Suitable with M6x35mm screw. Diameter 25mm. Height 15 mm