

Connecting a SIPLUS CMS1200 SM 1281 to MindSphere

MindSphere, MindConnect Nano, SIPLUS SM 1281

<https://support.industry.siemens.com/cs/ww/en/view/109750010>

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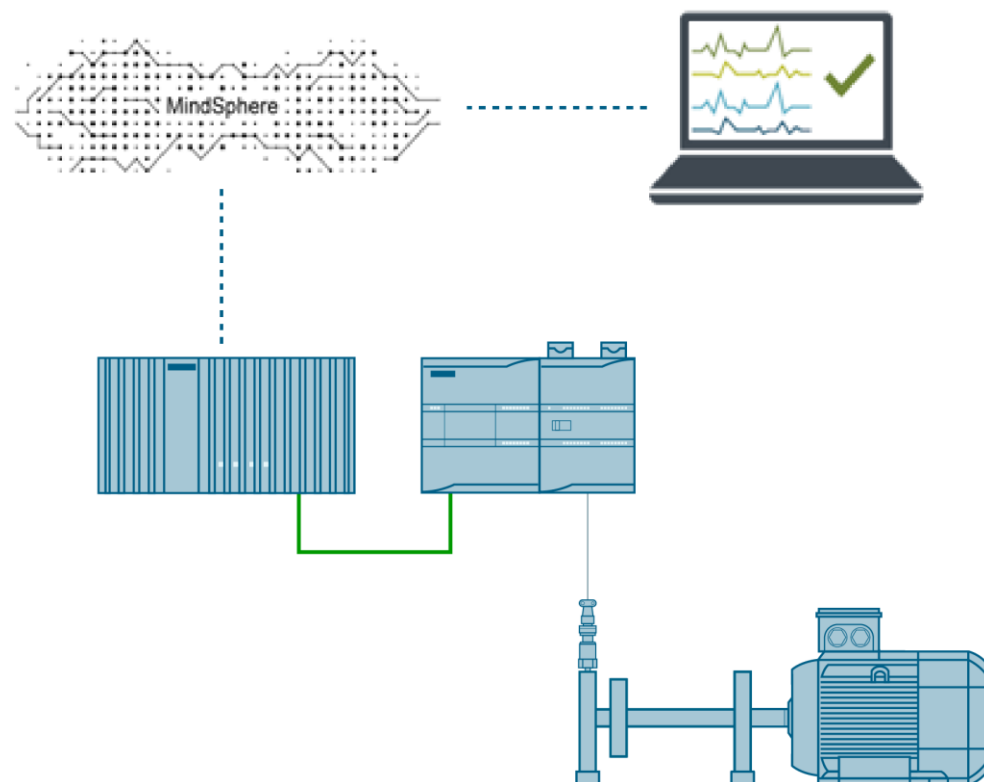
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1 Introduction

1.1 Overview

MindConnect Nano allows you to transfer characteristic values and messages of your SIPLUS CMS1200 SM 1281 to MindSphere and display and analyze them in the respective MindApps.

Figure 1-1



With this setup, it is possible to measure the motor's rotation speed as well as vRMS and aRMS. Via MindConnect Nano, the measured data is transferred to the MindSphere.

From there, you can access the data.

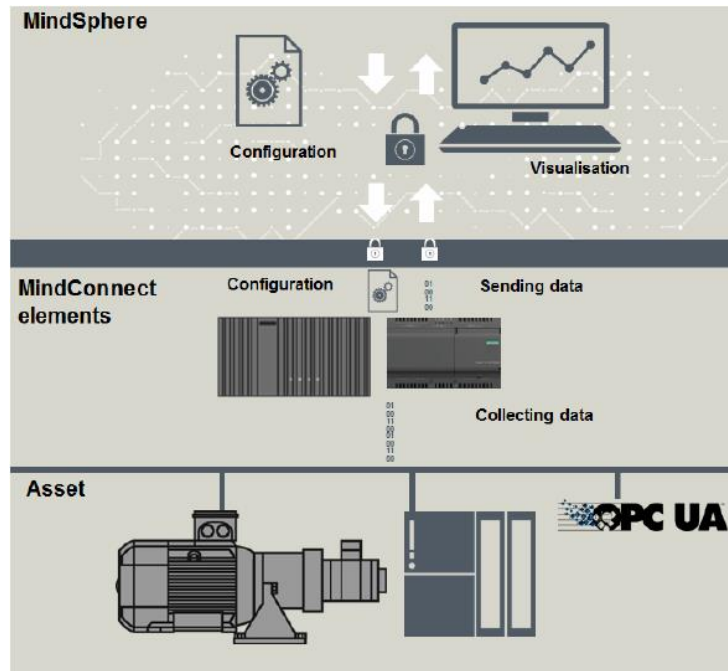
This application example will assist you in connecting MindConnect Nano with your SM 1281. You will learn how to access files from your assets and how to configure them.

1.2 What is MindSphere?

MindSphere provides you with the tools via which you can manage your devices (assets). This requires sensory data, tools for collecting and transmitting data, as well as intelligent software that offers monitoring and support functions.

MindConnect elements provide the hardware for collecting data from assets and transmitting them to MindSphere, which contains the hosting of the web user interfaces.

Figure 1-2



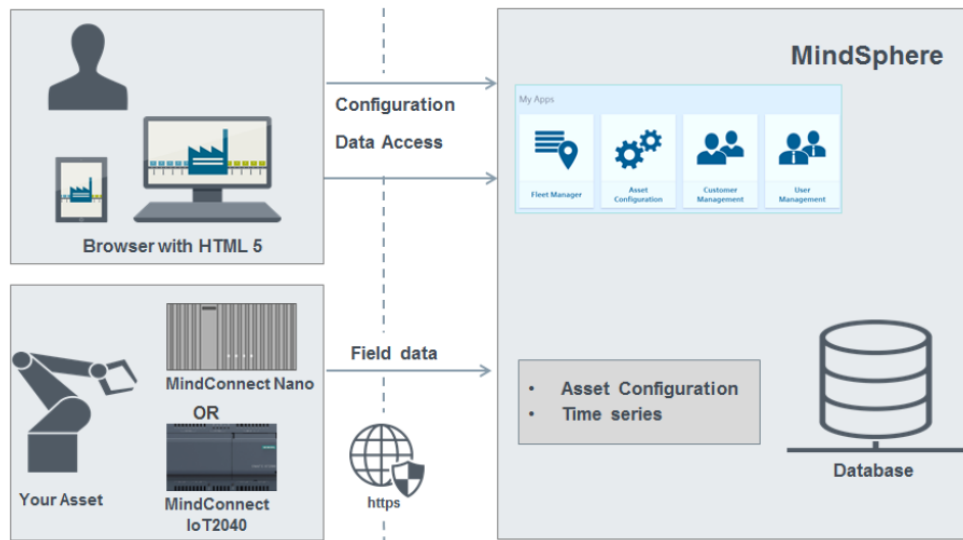
MindSphere and MindConnect Nano allow you to implement the following:

- Creating and managing users and customers
- Creating, managing and changing assets in the MindSphere asset Configuration
- Connecting MindConnect Nano with MindSphere (onboarding)
- Capturing data from data sources (S7, OPC UA) via MindConnect Nano
- Visualizing uploaded data (time series)
- Displaying data points and opening asset requests

1.3 How is the MindSphere Service Provision structured?

This chapter describes the overall structure of the services of MindSphere. MindSphere has the following structure of services and elements:

Figure 1-3



MindConnect Nano

MindConnect Nano is a device that establishes a connection to MindSphere in order to collect data from an asset and transmit them to MindSphere.

Following the initial onboarding to MindSphere, MindConnect Nano receives the required configuration (e.g. network configuration, configuration of the physical asset) from MindSphere. Via Ethernet, MindConnect Nano can be connected to a SIMATIC S7-300 / 400 / 1200 / 1500 SPS, or to an OPC UA server. It supports onboarding of an asset to MindSphere on a one-to-one basis.

Figure 1-1



MindSphere asset configuration

The asset configuration offers the option of carrying out configurations on an asset and MindConnect Nano:

- Defining the data structure and properties of an asset
- Defining the required information of MindConnect Nano to connect it with MindSphere
- asset metadata management, e.g. localization of an asset

MindApp Fleet Manager

The Fleet Manager is used for getting an overview of existing asset values and their basic information, as well as for visualizing asset data. In the Fleet Manager, you can monitor the status of all assets and of the detailed data analysis (variables with aspects, view in different graphs, etc.). It is also possible to save all bookmarks, or to share the configured view.

Fleet Manager displays the configured assets in a list or in an area. Furthermore, aspects and requests of the selected asset can be displayed.

Searching for specific assets and requests can be done by specifying filters, sorting, or free text search.

In three different charts (line, pie and bar charts), the variable's values, which are assigned to the aspects, can be displayed in different time frames (Time Picker).

Fleet Manager allows the definition of rules for an automatic creation of requests and for the creation of manual requests.

1.4 How can I work with MindSphere?

Prerequisites

- Internet connection and a browser (for online user interface) that supports HTML 5 (Firefox 43.0, Google Chrome 47.0, Safari iPad are recommended).
- Internet connection for MindConnect Nano. Provision of standard HTTPS functions for MindConnect Nano (outgoing HTTP connections on port 443)
- Link to online launch-pad with user and password data, as specified by Siemens
- Device (PC, Tablet etc.) with a minimum screen resolution of 1024x768

Visual analysis on assets

- Monitor assets in different views.
- Monitor aspects and threshold values of selected data points in different charts.
- Create manual requests or rules for automatically generated requests to monitor data point values.

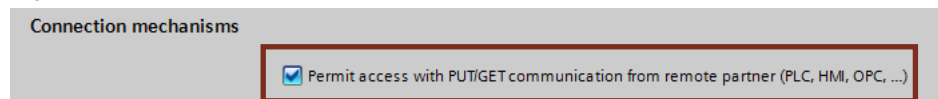
2 Engineering

2.1 Setting up the PLC for the connection to MindSphere

To set up the PLC for the connection to MindSphere, proceed as follows:

1. Open “Devices & networks” in the TIA Portal.
2. Open the properties of your CPU and go to “Protection” in the area navigation.
3. Activate the PUT/GET communication.

Figure 2-1



2.2 Setting up MindConnect Nano for MindSphere

MindConnect Nano is a plug-and-play solution offered by Siemens. It enables you to easily and safely read data from the industrial asset and prepare them for the transfer to MindSphere.

Interfaces of MindConnect Nano

The following figure shows the possible interfaces to integrate the device into existing or planned system environments and networks.

Figure 2-2

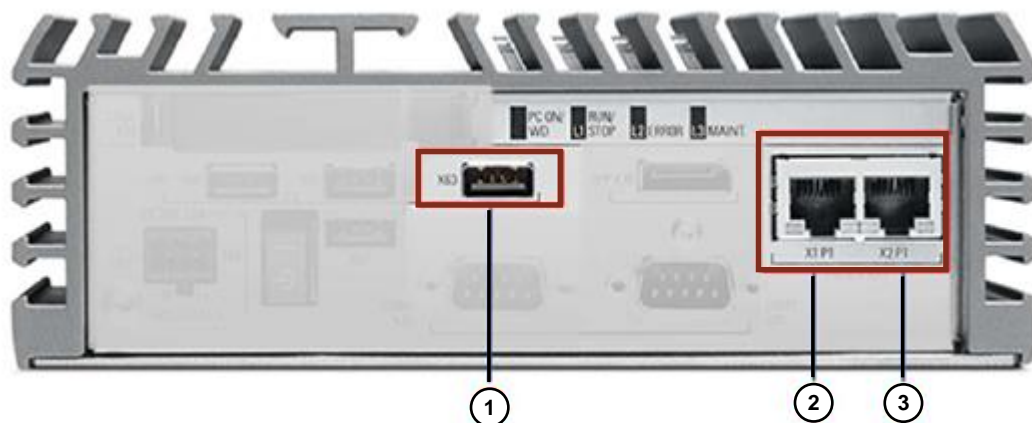





Table 3-4

No.	Interface	Description	Usage	
1.	X63	USB 2.0 Port, high current. Required during onboarding process		Configuration file on the USB stick
2.	PN/IE LAN X1 P1	RJ45 Ethernet connection 1 for 10/100/1000 Mbps Start the onboarding process as follows:		Internet access (to MindSphere)
3.	PN/IE LAN X2 P1	RJ45 Ethernet connection 1 for 10/100/1000 Mbps To complete the onboarding process		Connection to plant network (e.g. S7, OPC UA)

Procedure

Prior to starting the onboarding, connect MindConnect Nano with MindSphere as follows:

1. Plug the Ethernet cable that is connected to the internet into the connector designated with "X1 P1".
2. Plug the Ethernet cable that is connected to your plant network into the connector designated with "X2 P1".
3. Switch on the MindConnect Nano.

2.3 Onboarding MindConnect Nano

This chapter describes the first configuration of an asset and MindConnect Nano to onboard MindConnect Nano to MindSphere.

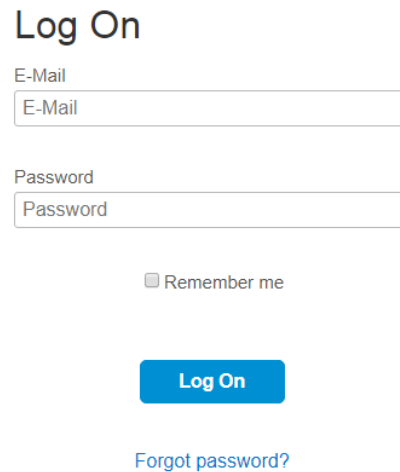
Prerequisites

- The Central Station is connected to the Internet and activated.
- The internet connection cable is properly connected to the Ethernet port for the internet (MindSphere).
- There is an available link to MindSphere UI with login information (user and password data).
- Standard USB device is formatted as FAT or FAT32 single partition.

2.3.1 Logging into the MindSphere

1. Open the link provided by the Siemens AG. The MindSphere destination page for the login appears.
2. Click the “Log on” button.
3. Log into MindSphere with your personal login data and confirm the terms of use after reading them.

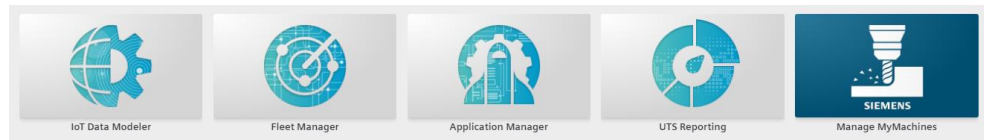
Figure 2-4 **Fehler! Verwenden Sie die Registerkarte 'Start', um dem Text zuzuweisen, der hier angezeigt werden soll.**



The image shows the MindSphere login interface. At the top, the text "Log On" is displayed. Below it are two input fields: "E-Mail" and "Password". Under the "Password" field is a checkbox labeled "Remember me". A blue "Log On" button is positioned below the checkbox. At the bottom, there is a blue link that says "Forgot password?".

You are forwarded to the MindSphere launch pad.

Figure 2-5



2.3.2 Configuring assets

This chapter describes how to configure the data for your asset.

To establish the first connection from MindConnect Nano to MindSphere, create a new asset.

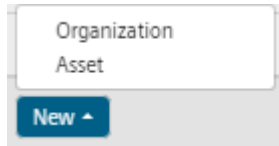
Configuring asset data

To create and configure a new asset, proceed as follows:

1. Open “IoT Data Modeler” from the MindSphere launch pad. The overview page with the asset list and specific information is displayed, if assets have already been configured. If there are no assets, then the asset list is empty and you need to create a first asset.

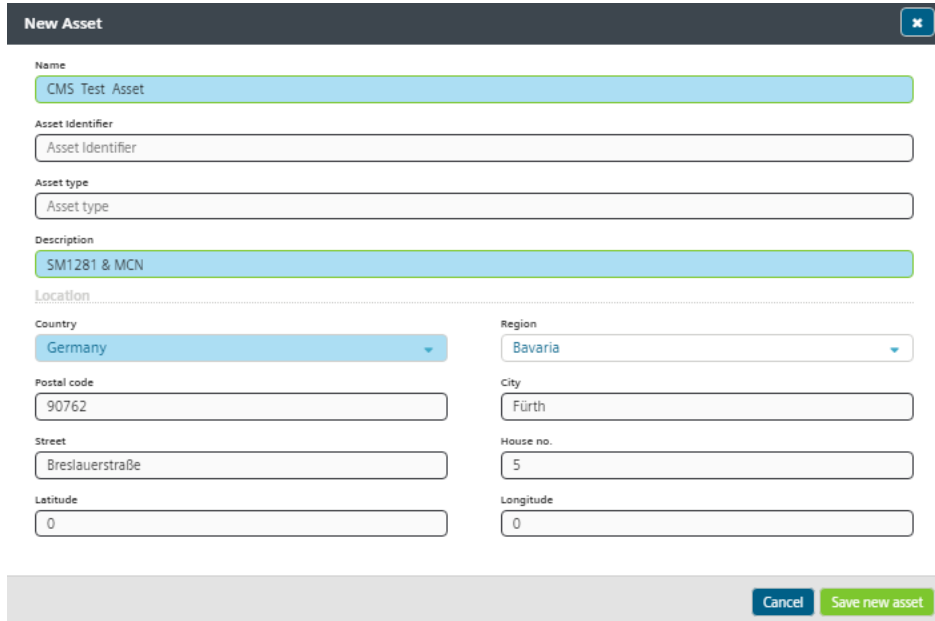
2. Click "New" > "asset".

Figure 2-6



3. Enter the required data and click on "Save new asset".

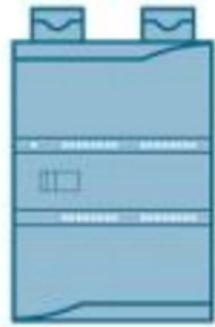
Figure 2-7

A screenshot of a web form titled 'New Asset'. The form contains several input fields: 'Name' (filled with 'CMS Test Asset'), 'Asset Identifier' (filled with 'Asset Identifier'), 'Asset type' (filled with 'Asset type'), and 'Description' (filled with 'SM1281 & MCN'). Below these is a 'Location' section with two columns of fields. The left column includes 'Country' (dropdown with 'Germany'), 'Postal code' (filled with '90762'), 'Street' (filled with 'Breslauerstraße'), and 'Latitude' (filled with '0'). The right column includes 'Region' (dropdown with 'Bavaria'), 'City' (filled with 'Fürth'), 'House no.' (filled with '5'), and 'Longitude' (filled with '0'). At the bottom right of the form are two buttons: 'Cancel' and 'Save new asset'.

4. The "Details" window opens. To make changes, click on "Edit". Additionally, you can add a picture.

Figure 2-8

Details	Agent	Aspects & Datasources
---------	-------	-----------------------

Asset Details	
Name	CMS_Test_Asset
Asset type	Getriebe
Asset Identifier	SM1281
Description	Datenübertragung vom SM1281 über S7-1200 und MC Nano
Image	
Location	
Country	DE
Region	
City	Fürth
Postal code	90762
Street	Breslauer Straße
House no.	5
Longitude	10.965366
Latitude	49.479617

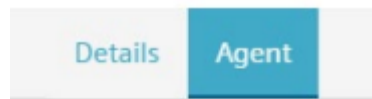
Edit

Configuring MindConnect Nano

In this chapter, you will learn how to configure the MindConnect Nano information and network connections.

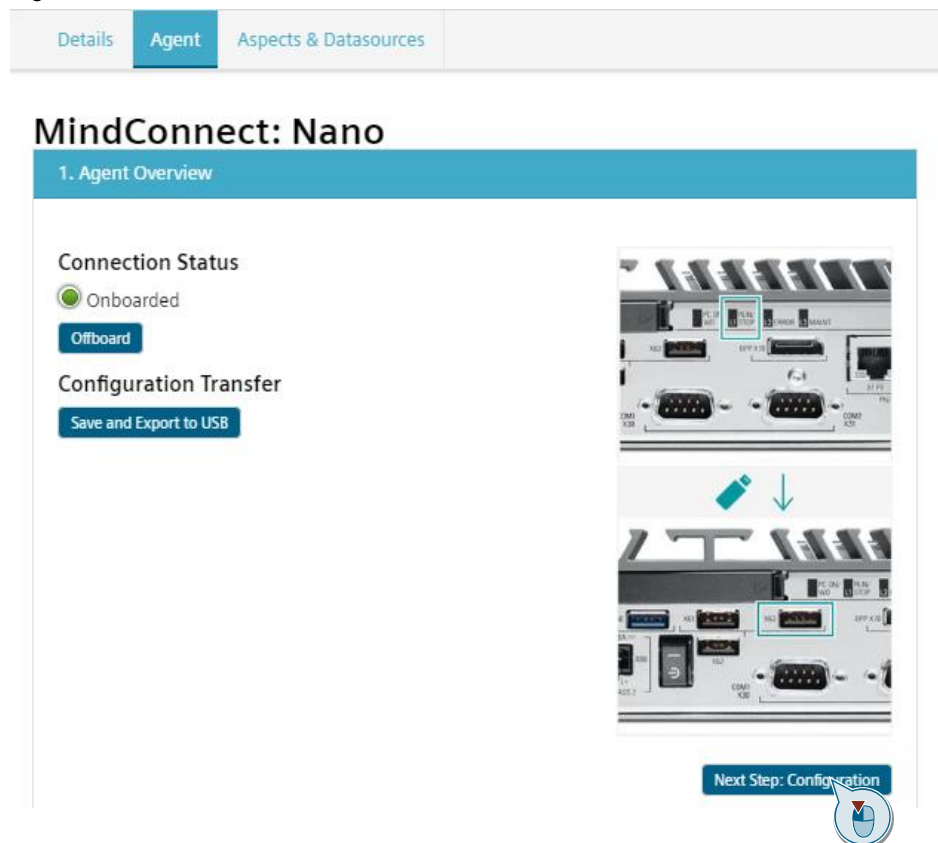
1. Click on “Agent”.
2. Select “MindConnect Nano” and click on “Next”.

Figure 2-9



3. Click on “Next Step: Configuration”.

Figure 2-11



4. Enter the identifier of the MindConnect Nano. It can be found on the MindConnect Nano.

Figure 2-12

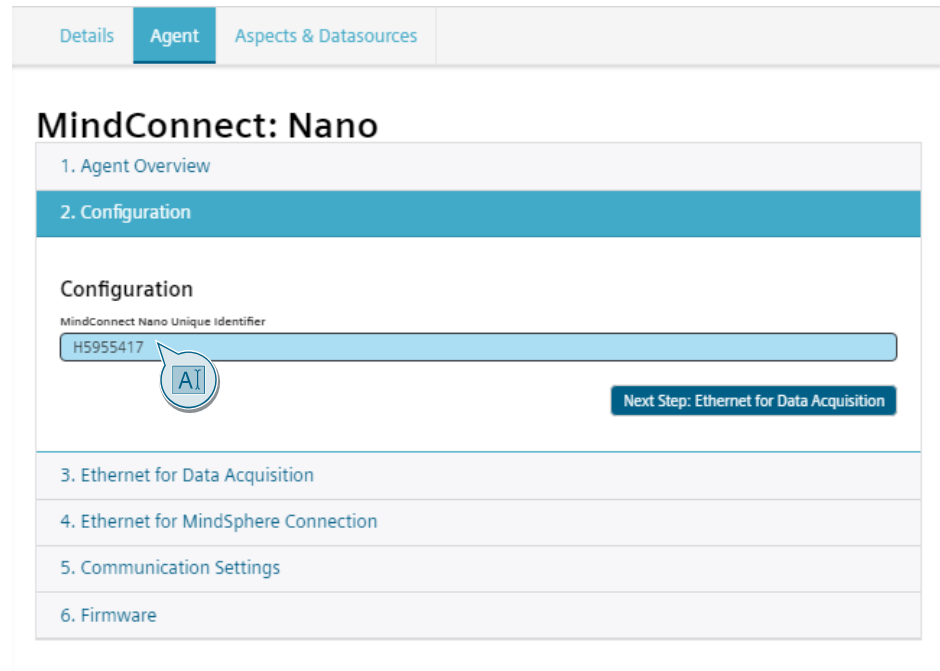


Figure 2-13



5. Click on "Next Step: Ethernet for Data Acquisition".

6. Activate the check box “Local DHCP network” to use DHCP, or enter a static IP address and subnet mask and click on “Next Step: Ethernet for MindSphere Connection”.

Figure 2-10

MindConnect: Nano

1. Agent Overview
2. Configuration
3. Ethernet for Data Acquisition

Ethernet Interface for Data Acquisition Connection

Enter network connection Information

☐ DHCP local network

IP Address
192.168.0.27

Netmask
255.255.255.0

Next Step: Ethernet for MindSphere Connection

4. Ethernet for MindSphere Connection
5. Communication Settings
6. Firmware

Note

The network configuration of the MindConnect Nano requires information on the Ethernet interfaces for data acquisition (Ethernet with X2P1) and MindSphere (Ethernet with X1P1). If your company uses a proxy server, it also needs to be configured in order to connect MindConnect Nano with MindSphere. Contact your IT administrator to get more information on your local network settings.

Note

Make sure that the entered IP address is not already being used in your network.

7. Activate the check box “DHCP” to use DHCP, or enter a static IP address, a subnet mask and the gateway (DNS server is optional) and click on “Next Step: Communication Settings”.

Figure 2-15

MindConnect: Nano

1. Agent Overview
2. Configuration
3. Ethernet for Data Acquisition
- 4. Ethernet for MindSphere Connection**

Ethernet Interface for MindSphere Connection

Enter network connection information

☐ DHCP

IP Address
10.11.11.85

Netmask
255.255.255.0


Gateway
10.11.11.255

DNS 1
192.168.117.0

DNS 2
DNS 2

Next Step: Communication Settings

5. Communication Settings
6. Firmware



8. To configure a proxy, activate the check box "Proxy". Enter the IP address of the proxy and the port. You may also enter the user name and the password, however, these are not mandatory. Then click on "Next Step: Firmware".

Figure 2-16

MindConnect: Nano

1. Agent Overview

2. Configuration

3. Ethernet for Data Acquisition

4. Ethernet for MindSphere Connection

5. Communication Settings

Proxy
Enter Proxy Information

☒ Proxy exists

Proxy Address: 52.20.183.146

Proxy Port: 3128

User: User Name

Password: *****

Upload Cycle: 15 s

Proxy Server

Next Step: Firmware

Supported proxy authentication types are:

- Basic (user name and password)
- Digest (user name and password)
- Anonymous (no user name and password is left blank)

Proxy supports https/https, not SOCKS

If you do not wish to configure a proxy, click on "Next Step: Firmware".

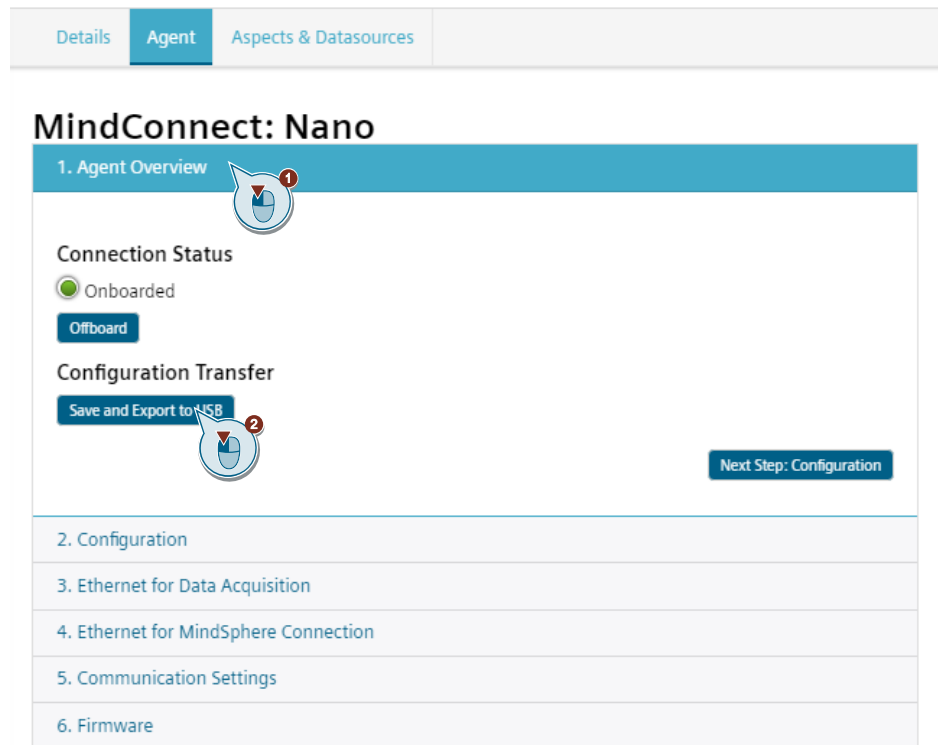
9. To finish the configuration, click on "Save".

2.3.3 Transferring the configuration to MindConnect Nano

To transfer the configuration to the MindConnect Nano, proceed as follows:

1. Return to “1. Agent Overview” and click on “Save and Export to USB”.

Figure 2-17



2. Save the file on a USB stick.

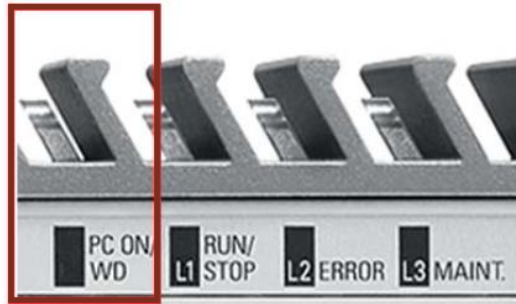
Note

The USB stick needs to be formatted with FAT or FAT32 and may only contain a single partition. The configuration file on the USB stick is only valid for seven days.

3. Switch on the MindConnect Nano.

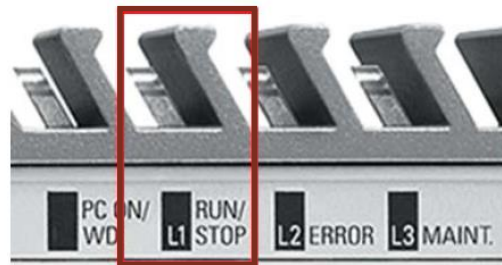
4. Wait until the “PC ON / WD” power LED flashes GREEN.

Figure 2-18



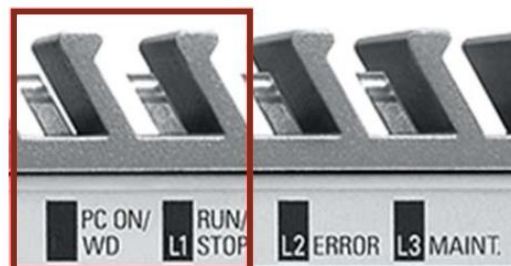
5. Plug the USB stick with the configured asset data into the USB port (X63) of the MindConnect Nano.
 - a. MindConnect Nano recognizes the USB configuration and the “RUN / STOP / L1” LED flashes ORANGE during the configuration. The onboard status in the asset configuration flashes orange for a brief moment.
 - b. MindConnect Nano receives the configuration from the USB stick and deletes it. Initially, the “RUN / STOP / L1” LED flashes GREEN before turns solid GREEN. Figure 2-11

Figure 2-12







6. Remove the USB stick.
7. Check the status in the asset configuration.
8. Check, if the “PC ON/WD” and “RUN /STOP /L1” LEDs flash solid green.

Figure 2-13



9. Check, if the user interface displays the “Onboarded” status and the “Online” status (internet connection between MindConnect Nano and MindSphere).

Figure 2-19

Details Agent Aspects & Datasources				
Agents Overview				
Onboarded	Online	Name	Type	
		H5955417	NanoBox	
				

Note

If you make changes to the network connection of the already “onboarded” MindConnect Nano, these changes need to be transferred to the MindConnect Nano via a USB stick again.

The first connection between MindConnect Nano and MindSphere has been established.

As soon as MindConnect Nano is onboard, the connection to your asset is permanently established and your asset for the data acquisition can be configured. Every additional configuration (apart from the network configuration) of the connected asset will be automatically synchronized with your onboard MindConnect Nano.

2.4 Configuring the data acquisition

This part of the manual demonstrates how to enable data acquisition by configuring the data from the field in MindSphere after an asset has been activated. This requires a complete configuration of the machine data (data points).

Note

For an asset, you can define a maximum of 110 data points for MindConnect Nano, at a sample rate of one second (max. 80.000 values/hour).

Prerequisites

- PC with internet connection
- Activated MindConnect Nano
- Valid login data (user and password data) for MindSphere

Procedure

To configure the aspects, proceed as follows:

1. In the MindSphere Launchpad, click on “IoT Data modeler”.
2. Select your asset.
3. Go to “Aspects & Datasources”.
4. Click on “New > Add Datasource”.
5. Assign a name to the data source and select “S7” as protocol.

6. Add the appropriate data points.

Figure 2-20

Aspects & Datasources

Datasource:

Data Source Name: Data Source Protocol:

Data Point Configuration (3): Add Datapoint

Configuration	Address	Data Type		
actualSpeed	DB6.DB184	REAL		
vRMS	DB6.DB198	REAL		
aRMS	DB6.DB204	REAL		

Configuration:

IP Address of S7:

Note Please note the corresponding data block for the addressing of the data points. The “Offsets” need to be added up.

Note Further information on the addressing of the data blocks can be found in the documentation on STEP 7 Engineering and TIA Portal.

7. Specify the address of the controller.
8. Click on “Save Config”.

With every saved modification, the number of your MindSphere units change. A dialog window informs you on the updated status of the MindSphere units.

MindConnect Nano receives the configuration from MindSphere via an established internet connection. MindConnect Nano launches the data acquisition. You can go to Fleet Manager to view the time series of a configured asset. In most cases, an update of the browser tabs is required.

2.5 Carrying out a visual analysis on assets

This chapter describes how to query the status of your fleet and how to analyze the data of your assets in detail.

Prerequisites

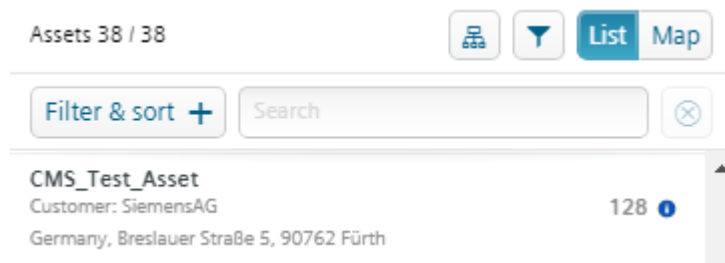
- MindConnect Nano is connected to the Internet and activated.
- Aspects and data points are configured.

2.5.1 Monitoring assets in the MindApp Fleet Manager

This chapter describes how the data of a selected asset are monitored in the Fleet Manager. The configured assets are already displayed in the list on the left side of the Fleet Manager window.

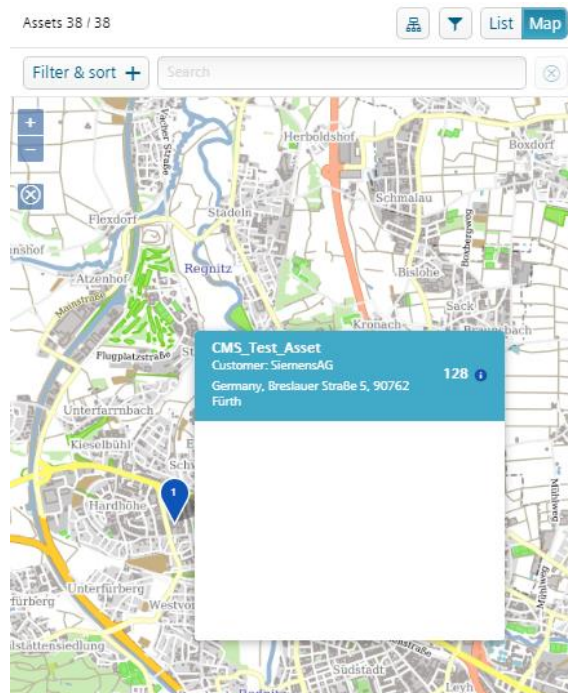
1. Go to the Fleet Manager in the MindSphere launch pad. The overview page with the plant list appears. The list shows the alphabetically sorted assets that have been configured in the plant configuration. The assets contain the following information:
 - asset name
 - Customer
 - Customer address
 - Number of non-closed requests (sorted by priority level)

Figure 2-21



Alternatively, you can also switch between list and map view.

Figure 2-22

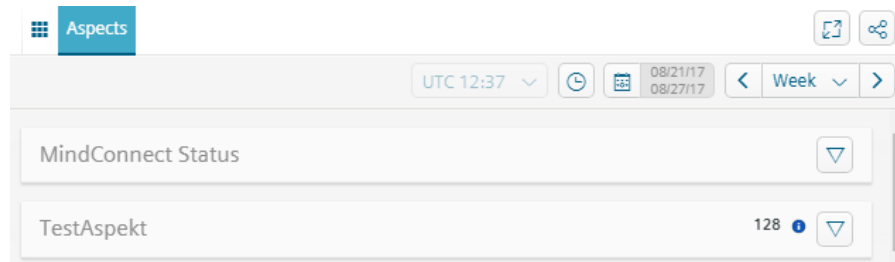


Note

You can see your asset in the map view only if you have specified your coordinates.

2. Select the desired asset from the list.
3. Click on the “Aspects” tile.
4. Select the appropriate aspect.

Figure 2-23



In the aspect view, you can monitor the time series of variables by configuring the different chart views and by determining the time frame (time selection: day, week, month).

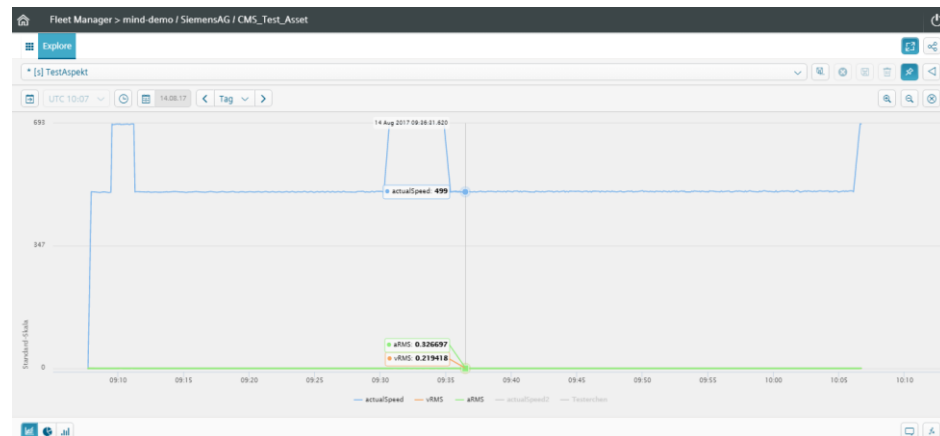
There are the following types of charts:

- Line chart
- Pie chart
- Bar chart

The line chart displays incoming values as data points that are connected with lines. These data points are the values and are displayed according to the time period set in the time frame.

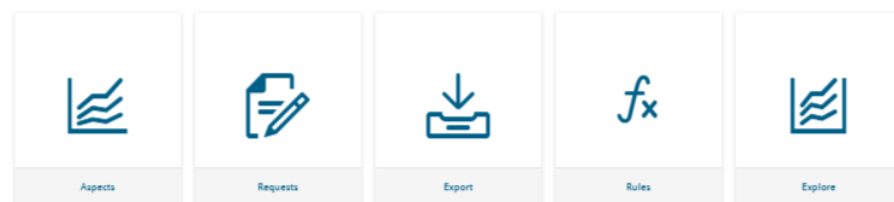
Pie and bar charts display the last available values of the configured time frame, or values from the time frame during which a request has been selected.

Figure 2-24



A more detailed view of the graphs can be found under “Explore”.

Figure 2-25



2.5.2 Creating requests

In this chapter, you will learn how to configure requests.

There are two options to configure a request in Fleet Manager:

- Create a rule for automatically generated requests: Rules are used to determine, whether a system is running or not.
- Manually creating a request to provide information on a specific machine status, for example, or to request maintenance work.

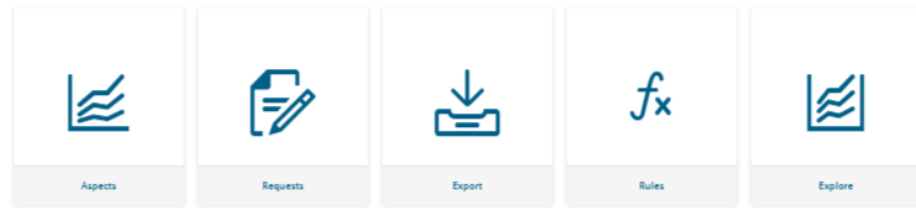
For each asset, you can create, edit or delete several rules.

You can also delete several rules at once, if needed. One rule can monitor exactly one variable.

Creating rules for automatically generated requests

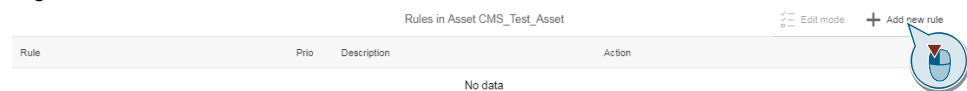
1. Click on the “Rules” tile in the Fleet Manager.

Figure 2-26



2. Then click on “Add new rule”

Figure 2-27



3. The web interface guides you through the process of creating automatically generated requests. Set the respective request according to your individual needs.

Creating manual requests

To create a manual request, proceed as follows:


1. In the Fleet Manager, click on the “Rules” tile.
2. Select the corresponding aspect and click on the speech bubble button.

Figure 2-28



3. Fill in the marked fields and then click on "Create".

Figure 2-29

 Create manual request



Description*

Test


Action*

Test


Severity*

 Urgent 

Timestamp*

Aug 24, 2017, 12:43 PM 

Measuring Point*

aRMS 

Create

Close

3 Appendix

3.1 Service and support

Industry Online Support

Do you have any questions or need support?

Siemens Industry Online Support offers access to our entire service and support know-how as well as to our services.

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- Plant Data Services
- Spare Parts Services
- Repair Services
- On Site and Maintenance Services
- Retrofit and Modernization Services
- Service Programs and Agreements

Detailed information on our service offer is available in the Service Catalog:

<https://support.industry.siemens.com/cs/sc>

Industry Online Support app

Thanks to the "Siemens Industry Online Support" app, you will get optimum support even when you are on the move. The app is available for Apple iOS, Android and Windows Phone.

<https://support.industry.siemens.com/cs/ww/en/sc/2067>

3.2 Links and literature

Table 3-1

No.	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to the entry page of the application example https://support.industry.siemens.com/cs/ww/en/view/109750010

3.3 Change documentation

Table 3-3

Version	Date	Modifications
V1.0	09/2017	First version