



**Operating instruction manual  
netFIELD App OPC UA IO-Link Adapter**

**Hilscher Gesellschaft für Systemautomation mbH  
[www.hilscher.com](http://www.hilscher.com)**

DOC230804OI01EN | Revision 1 | English | 2024-03 | Released | Public

# Table of contents

<b>1</b>	<b>About this document</b> .....	<b>3</b>
1.1	Description of the contents.....	3
1.2	List of revisions .....	3
1.3	Prerequisites .....	3
1.4	Conventions in this document.....	3
1.5	References to documents .....	4
<b>2</b>	<b>Overview</b> .....	<b>5</b>
2.1	Brief description .....	5
2.2	Licensing and limitations .....	7
2.3	Requirements .....	8
2.4	IO4-compliant MQTT messaging .....	9
2.5	OPC UA and MQTT communication .....	9
2.6	IODD support .....	9
<b>3</b>	<b>Start parameters of the container</b> .....	<b>10</b>
<b>4</b>	<b>Quickstart</b> .....	<b>11</b>
<b>5</b>	<b>App configuration web GUI</b> .....	<b>12</b>
5.1	Login .....	12
5.2	Network .....	13
5.3	Live View .....	16
5.4	Payload .....	18
5.5	IODD Library .....	20
5.6	Settings .....	22
5.6.1	IODD .....	22
5.6.2	MQTT .....	22
5.6.3	License Server .....	26
5.7	Status .....	27
5.8	Container Information.....	28
<b>6</b>	<b>MQTT publishing</b> .....	<b>29</b>
6.1	Overview .....	29
6.2	Data message .....	31
6.3	Health message .....	34
<b>7</b>	<b>Installing CodeMeter and activating container license</b> .....	<b>36</b>
<b>8</b>	<b>Legal notes</b> .....	<b>42</b>
	<b>List of Figures</b> .....	<b>46</b>
	<b>List of Tables</b> .....	<b>47</b>
	<b>Contacts</b> .....	<b>48</b>

# 1 About this document

## 1.1 Description of the contents

This document describes the **netFIELD App OPC UA IO-Link Adapter** from Hilscher.

## 1.2 List of revisions

Index	Date	Author	Revision
1	2024-03-29	NAM	Revision 1 created

Table 1: List of revisions

## 1.3 Prerequisites

You must be familiar with the concepts of software containers. You should understand the requirements of a container towards its container engine (runtime) environment and host operating system (especially in terms of network configuration).

The app is designed to perform best within the Hilscher netFIELD ecosystem. We recommend familiarizing yourself with the netFIELD ecosystem which consists of netFIELD OS, netFIELD Edge devices and the central netFIELD management system <https://netfield.io>.

## 1.4 Conventions in this document

Notes, operation instructions and results of operation steps are marked as follows:

### Notes



---

**Important:**

<important note you must follow to avoid malfunction>

---



---

**Note:**

<general note>

---



---

<note on further information>

---

**Operation instructions**

1. <operational step>

➤ <instruction>

➤ <instruction>

2. <operational step>

➤ <instruction>

➤ <instruction>

**Results**

↻ <intermediate result>

⇒ <final result>

## 1.5 References to documents

This document refers to the following other documents:

[1] Hilscher Gesellschaft für Systemautomation GmbH: [netFIELD Portal operating instruction manual, DOC190701OI05EN, Revision 5](#), English, 2023.

[2] Hilscher Gesellschaft für Systemautomation GmbH: [netFIELD License Server operating instruction manual, DOC230801OI01EN](#), Revision 1, English, 2023

[3] Open Industry 4.0 Alliance: [OEC Development Guideline. 1.1.1](#), English, 2023.

(referenced as: *OI4 Development Guideline*)

[4] IO-Link Community and OPC Foundation: [OPC Unified Architecture for IO-Link Companion Specification](#), Release 1.0, English, 2018

## 2 Overview

### 2.1 Brief description

The platform-independent container app **netFIELD OPC UA IO-Link Adapter** (referenced as: "the app" or "IO-Link Adapter") reads data and information from IO-Link masters and connected devices and converts them into the IoT protocol MQTT as JSON-encoded payload. To support this, the masters must adhere to the services and variables of the *OPC UA IO-Link Companion Specification*.

The app uses Industrial Ethernet for the communication with the IO-Link Master devices:

- PROFINET
- Ethernet/IP
- EtherCAT (requires Ethernet-over-EtherCAT tunnelling)
- TCP/IP

The application container can be deployed under any OCI-compliant container engine such as *Docker* or *Moby*.

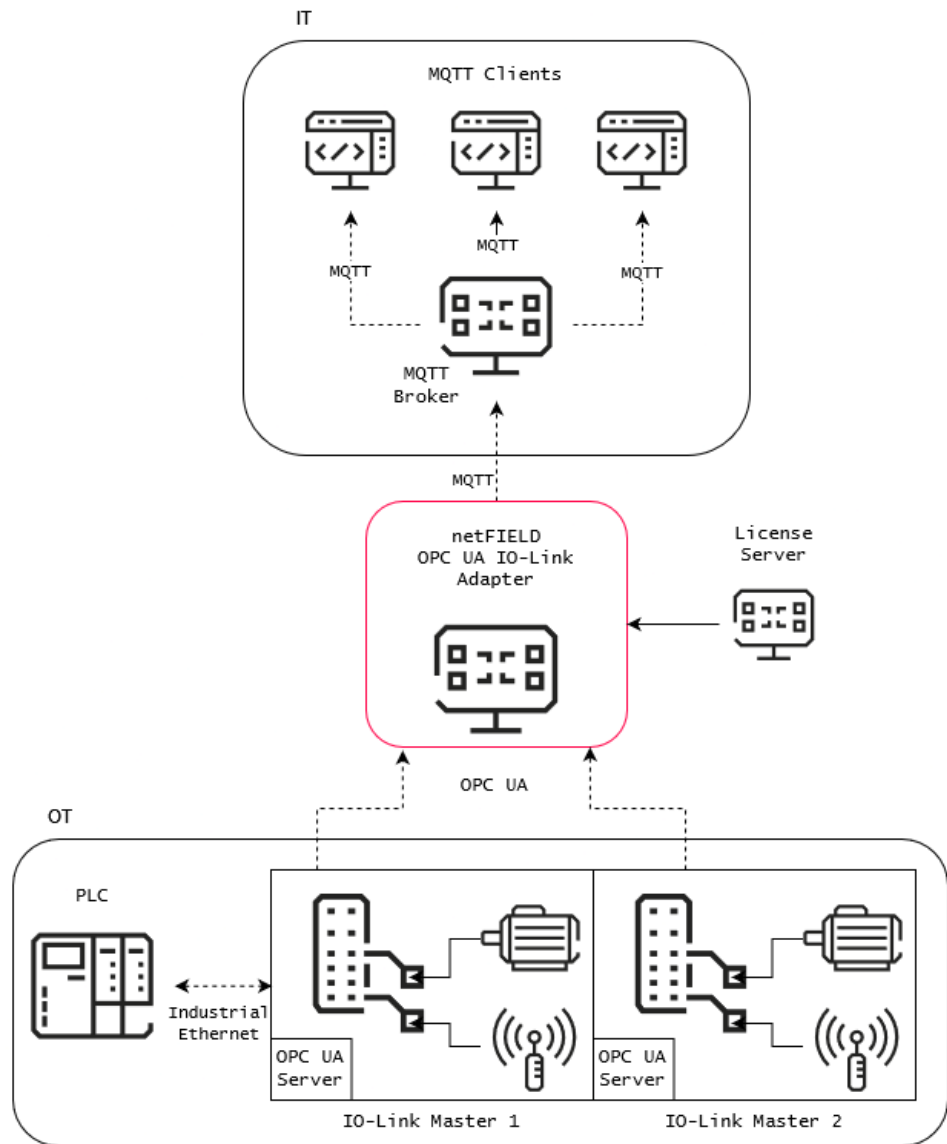


Figure 1: netFIELD OPC UA IO-LINK Adapter data flow

## 2.2 Licensing and limitations

### Demo Mode

Without a license the app:

1. Runs on the Hilscher devices sensorEDGE and sensorEDGE FIELD unrestricted; in conjunction with the devices' embedded IO-Link Master. On these devices, communication to an external IO-Link Master requires a license.
2. Runs on any other device for testing purposes for 30 minutes only and then stops communications while holding the last sampled values.

### Licensed operation

A license is required to use the full functionality of the app.

Hilscher uses the *CodeMeter* licensing technology from *Wibu-Systems*. If you are not already a user of the *CodeMeter* ecosystem, you have two options for running a license server:

- **netFIELD App License Server container**  
You can use the free-of-charge *netFIELD App License Server* container from Hilscher, which can be pulled from <https://hub.docker.com/r/hilscherautomation/netfield-app-license-server>. Please refer to the *netFIELD App License Server operating instructions manual* [▶ page 4] for more information.
- **CodeMeter license server (CodeMeter User Runtime)**  
Alternatively, you can download the *CodeMeter User Runtime* from *Wibu-Systems* under <https://www.wibu.com/us/support/user/downloads-user-software.html> and install it on a local server/machine/PC that can be reached by the *OPC UA IO-Link Adapter* via TCP/IP connection.  
Note that for you as an end-user, the *CodeMeter* technology is free-of-charge, you only have to pay for the *OPC UA IO-Link Adapter* license from Hilscher.  
Example instructions on how to install the license server and activate the license ticket are provided in chapter *Installing CodeMeter and activating container license* [▶ page 36].

For either option you will need to activate a *CodeMeter license ticket* in the respective license server. For purchasing the license ticket, please contact your Hilscher sales representative.

## 2.3 Requirements

### Requirements

- Any container runtime. In the netFIELD ecosystem this can be the *Standard Docker* or the *IoT Edge Docker*.
- Compatible *IO-Link Master* devices (see below)
- TCP/IP connection to the IO-Link Master
- License ticket from Hilscher (not needed in Demo mode)
- License server (not needed in Demo mode)
- (Outside the netFIELD ecosystem):  
Reverse proxy for secure access to the web UI of the app.
- (Temporary) Internet access of the netFIELD or host OS for deploying/  
pulling the container image and downloading missing IODD files.

### Compatible OPC UA server implementation

The *IO-Link Master* device(s) with embedded OPC UA server must adhere to the *IO-Link Base Profile* of the *OPC Unified Architecture for IO-Link Companion Specification* [▶ page 4].



## 2.4 OI4-compliant MQTT messaging

The app conforms to the *Development Guideline for Open Edge Computing version 1.1.x* [▶ page 4] of the [Open Industry 4.0 Alliance](#) (referred to in this document simply as *OI4 Development Guideline*).

It supports secure MQTT with username and password authentication and TLS/SSL encryption. Besides the IO-Link process data (`Data` topic) and health state information (`Health` topic), it also publishes its *Master Asset Model* information (`MAM` topic), license information (`License` topic) and payload structure information (`Metadata` topic) to the local MQTT message bus (see chapter *MQTT publishing* [▶ page 29]).

During container deployment, you can configure the connection to your OI4-compliant MQTT broker via the *Container Create Options* in the netFIELD Portal (see section *Deployment in IoT Edge Docker of netFIELD OS via netFIELD Cloud*) or via the docker-compose *yaml* file provided in the Hilscher knowledge base (see section *Start parameters of the container* [▶ page 10]).

Note that the **Settings > MQTT** page of the app allows you to override the MQTT connection settings made during the container deployment (see section *MQTT* [▶ page 22]); therefore no redeployment is necessary just to adjust the MQTT connection.

## 2.5 OPC UA and MQTT communication

The app uses an integrated OPC UA Client to communicate with the OPC UA server(s) in the IO-Link Master device(s) via TCP port 4840.

The OPC UA server implementation must adhere to the *IO-Link Base Profile of the OPC Unified Architecture for IO-Link Companion Specification* [▶ page 4]. The app supports ISDU requests via *OPC UA Write* and the *OPC UA Call* services.

In multi-master mode, the app supports an unlimited number of OPC UA Server connections at the same time for data retrieval, but only one MQTT broker connection for data publishing.

## 2.6 IODD support

IODD files (IO-Link Device Description) describe features and parameters of IO-Link Devices.

The app ships with IODDs for many widely used IO-Link Devices. In addition to this the app automatically identifies missing IODD files and downloads them from the *IODDfinder* Internet database (if this function is enabled on the **Settings > IODD** page of the app). Missing IODD files can also be uploaded to the app manually (see chapter *IODD Library* [▶ page 20]).

The app contains an integrated IODD interpreter which automatically maps the information contained in the IODD files to the parameters and values read from the connected IO-Link Devices via OPC UA Server, which the app can then convert into MQTT topics.

### 3 Start parameters of the container

Start-up parameters, compose files and instructions on how to deploy the container on other container runtimes are provided in the Hilscher Knowledge base:

- Go to the [netFIELD App OPC UA IO-Link Adapter](#) page.
- On the *netFIELD App OPC UA IO-Link Adapter* page, click on the link under **Current release**.
- On the current release page, you will find the start-up parameters and links to the compose files for the different uses cases under the **Release Notes**.
- Please use the compose files as a reference to adapt to your respective runtime environment.

## 4 Quickstart

This list shows an overview of the steps to complete to deploy the netFIELD App OPC UA IO-Link Adapter container.

1. Activate license  
Section *Licensing and limitations* [▶ page 7]
2. Deploy container
  - **Within netFIELD ecosystem**  
Section *Deployment in IoT Edge Docker of netFIELD OS via netFIELD Cloud*
  - **Other OCI runtime**  
Section *Start parameters of the container* [▶ page 10]
3. Login to web GUI
  - **Within netFIELD ecosystem**  
Chapter *Login* [▶ page 12]
  - **Other OCI runtime**  
Hilscher Knowledge Base: [How do I expose Web UI's of netFIELD App containers in a secure way when running on hosts that are not supporting netFIELD OS \(e.g.using nginx\)?](#)
4. Configure license server endpoint  
Section *License Server* [▶ page 26]
5. Configure OPC UA server connections  
Section *Network* [▶ page 13]
6. Update IODDs  
Sections *Live View* [▶ page 16], *Payload* [▶ page 18] and *IODD Library* [▶ page 20]
7. **Optional:** Reconfigure MQTT connection  
Section *MQTT* [▶ page 22]
8. **Optional:** Configure MQTT Publishing interval and monitor current sensor data on the **Payload** page.  
Section *Payload* [▶ page 18]
9. Connect to MQTT broker with a third party MQTT client or application (e.g. *MQTT Explorer*) to consume the sensor data.

## 5 App configuration web GUI



### Note:

Depending on the type of device the app is running on, some menu items might differ from what is described in the following sections.

### 5.1 Login

The netFIELD OPC UA IO-Link Adapter container provides a configuration web GUI that can be accessed via port 80 of the container. Note that you have to make sure that this port can be accessed from the outside via web browser. We recommend you to use a reverse proxy or API gateway with HTTPS and authentication support for this. For testing purposes, you can temporarily expose the port, e.g. via Docker port expose.



### Note:

If the container is deployed on a host with the netFIELD Operating System (netFIELD OS), the configuration web GUI is automatically plugged-into the **Local Device Manager** of the netFIELD OS, where it can be accessed via the **netFIELD OPC UA IO-Link Adapter** entry in the navigation panel (side bar) of the Local Device Manager.

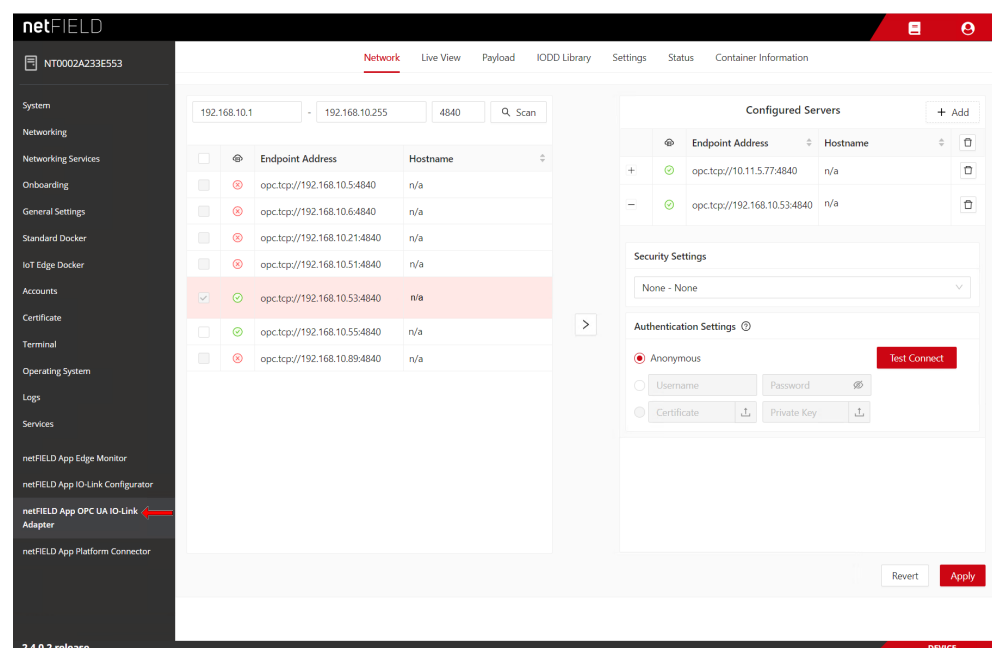


Figure 2: Web UI plugin in Local Device Manager (within netFIELD ecosystem)



### Note:

Note that it might take a few minutes after deployment before the **netFIELD App OPC UA IO-Link Adapter** entry becomes visible in the navigation panel. You may also have to reload the web page in your browser by pressing **F5** on your keyboard.

## 5.2 Network

On the **Network** page, you can scan (via ICMP ping) connected local networks for IO-Link Master devices containing an OPC UA server and configure your connections to these servers in order to retrieve their IO-Link data.

**Note:**

This page is not available in demo mode.

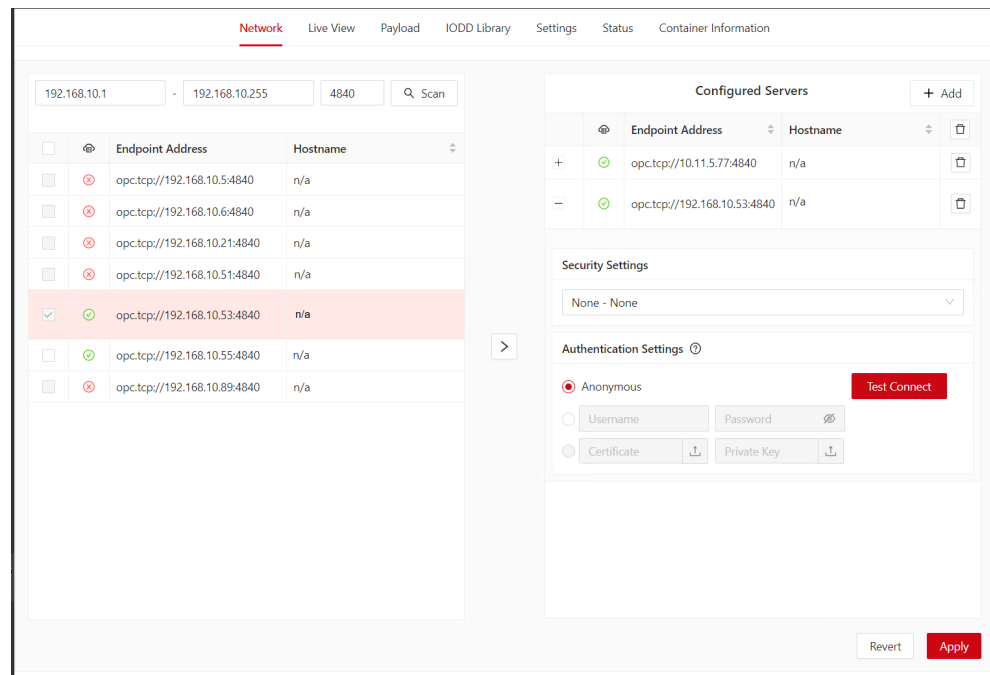


Figure 3: Network page

**Note:**

If you know the IP address(es) of the IO-Link Master device(s) whose data you want to retrieve, you can skip the scan process and directly add the corresponding OPC UA servers to the **Configured Servers** list on the right side by clicking the **+ Add** button.

## Network scan

The **Scan** area on the left side of the screen allows you to search for IO-Link Master devices (or rather their embedded OPC UA servers) via ICMP ping. The app automatically uses all available Ethernet interfaces that it can access via its host OS for scanning all connected local networks.

Note that each search run is limited to a maximum of 255 IP addresses and network masks are not supported.

Element	Description	
Range (max. 255 IP addresses per run)	<input type="text" value="192.168.10.1"/>	Enter the start address of the IP address range that you want to scan
	<input type="text" value="192.168.10.255"/>	Enter the end address of the IP address range that you want to scan
	<input type="text" value="4840"/>	Enter the port number that you expect the OPC UA server to listen on. In most cases, this will be the preset port 4840.
	<input type="button" value="🔍 Scan"/>	Click here to start scanning
Results	<input type="checkbox"/>	Click a box in the first column to select a found IO-Link Master device with OPC UA server. Only devices with accessible OPC UA server (green checkmark) can be selected.
		Found device/host is not an IO-Link Master with accessible OPC UA server
		Found device/host is an IO-Link Master with accessible OPC UA server
	Endpoint Address	Shows the URL of the found device/host
	Hostname	Shows the hostname of the found device/host. You can sort the list alphabetically by clicking into the column header.
<input type="button" value="➤"/>	Click this button to add selected IO-Link Master devices/hosts to the <b>Configured Servers</b> list on the right side of the screen.	

Table 2: Elements in scan area

## Configured Servers

In the **Configured Servers** area on the right side, you can configure your OPC UA Server connections.

Element	Description	
<b>+ Add</b>	If you know the IP address of the IO-Link Master device/host whose data you want to retrieve, you can click here to add the OPC UA Server manually by entering its IP address and port number. Thus, you can skip the scan process and directly add the corresponding OPC UA server to the <b>Configured Servers</b> list.	
		No OPC UA Server available at added IP address/host
		OPC UA Server is available at added IP address/host
Endpoint Address	Shows the URL of the added device/host/server. You can sort the list in ascending or descending order by clicking into the column header.	
Hostname	Shows the name of the added device/host/server. You can sort the list alphabetically by clicking into the column header.	
	Removes the entry from the list. If you click the icon in the header of the list, all items are removed.	





Element	Description
+	Display the security and authentication settings for the current entry:
Security Settings	<p><b>Note:</b> The OPC UA server in a Hilscher IO-Link Master currently does not support any security mode/policies, therefore <code>None - None</code> is preset here when connecting to it and no other entries are shown.</p> <p>In the drop-down list, select the security mode &amp; policy combination that you want to use for your server connection. Only modes/policies that are supported by the OPC UA server will be offered for selection.</p> <p>The first value denotes the security policy (i.e. encryption algorithm), e.g. <code>Basic256Sha256</code>, the second value denotes the security mode, e.g. <code>SignAndEncrypt</code>.</p>
Authentication Settings	<p>Select the authentication mode and specify the required parameters where necessary. You can test the settings by clicking the <b>Test Connect</b> button. The test result is indicated by a red x or a green checkmark:</p> <p> Test connection failed</p> <p> Test connection successful</p>
Anonymous	<p>Select this option if you want to connect anonymously (i.e. without credentials). This allows a read-only connection to the OPC UA server in a Hilscher IO-Link Master.</p> <p>If the OPC UA server does not accept anonymous connections, this option is disabled.</p>
Username / Password	<p>Enter the login credentials for the OPC UA server. This allows read and write access to the OPC UA server in a Hilscher IO-Link Master.</p> <p>Note that the default credentials for Hilscher IO-Link Masters are:</p> <p><b>username:</b> root <b>password:</b> password</p>
Certificate / Private Key	<p>If you want to authenticate via X.509 certificate and private key file, click  buttons to upload the corresponding files.</p> <p>If the OPC UA server does not accept authentication via security certificate, this option is disabled.</p>
-	Collapses the configuration fields for the current entry.
Revert	Restores the previously saved server configurations.
Apply	Saves your configuration and establishes the server connections accordingly.

Table 3: Elements in Configured Servers area

## 5.3 Live View

The **Live View** page provides a graphical overview of your IO-Link Master devices and the sensors/actors connected to their ports, along with some basic information. If the app is connected to more than one IO-Link Master device, you can select the displayed IO-Link Master by using the drop-down list in the middle or by using the side arrows  to scroll through the images.

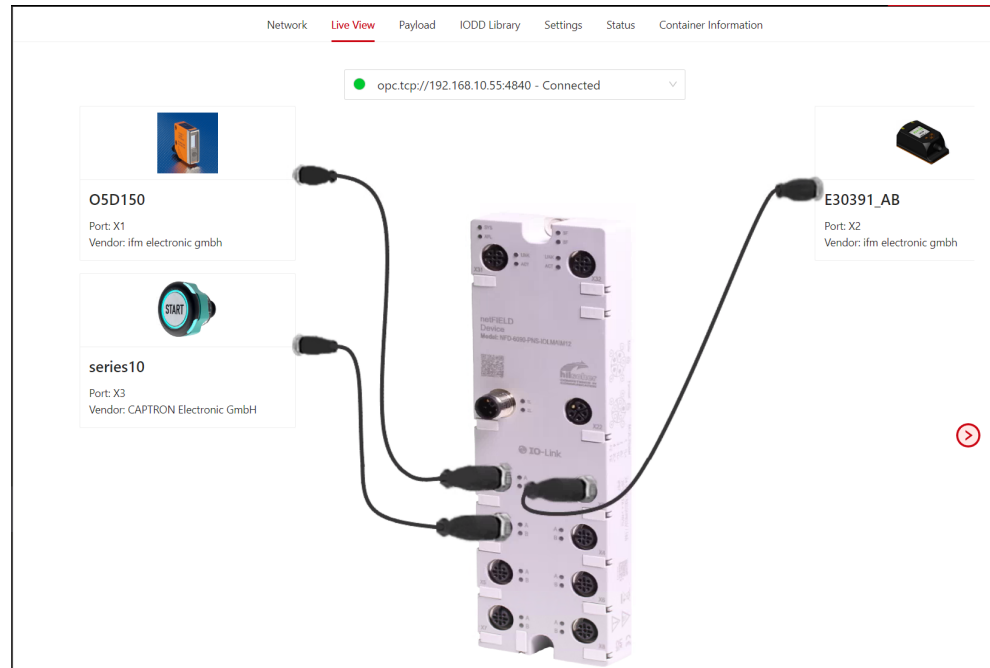


Figure 4: Live View page



### Note:

The app requires the IODD file of a sensor/actor to properly retrieve and publish its process data. If the IODD file is missing, you can either upload it manually to the IODD Library (see section *IODD Library* [▶ page 20]) or allow the integrated IODD finder of the app to automatically download it from the Internet.

For this, you have to enable an Internet connection for the host OS of the app and also enable the **Automatic download from IODDfinder** option under **Settings > IODD**.



## Device removal indication

IO-Link devices that have been disconnected from the IO-Link Master are marked with a red X and will still be visible in the *Live View*, indicating the port to which they were originally connected.

In the example below, the sensor *WTB2SC-2P3244A00* was originally connected at port X6 but is now connected at port X8.

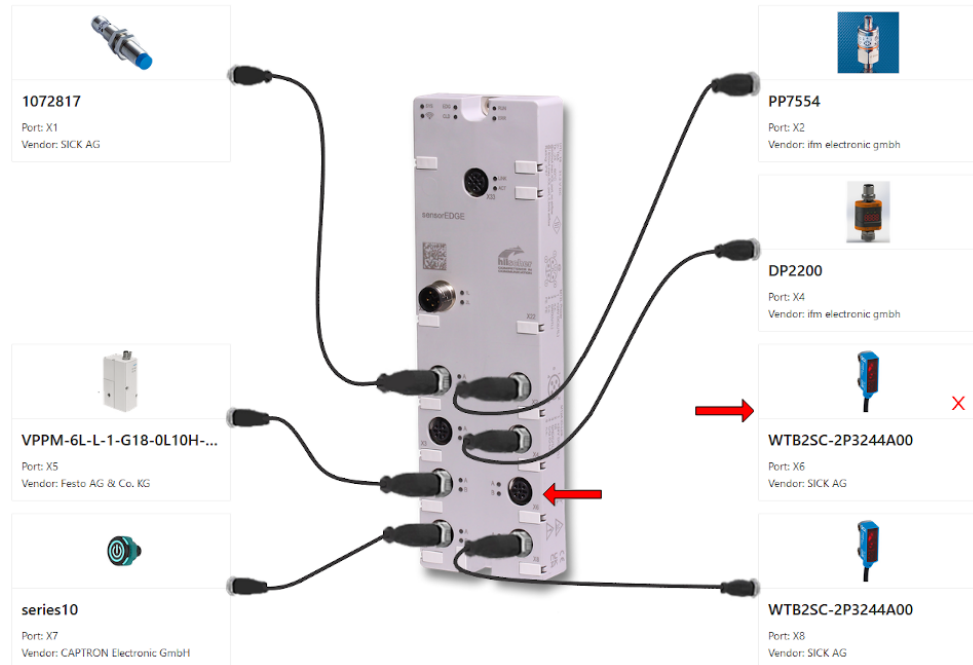


Figure 5: Pulled sensor indication

If a new device is connected at the corresponding port (in this example port X6), the “device removal indication” for the *WTB2SC-2P3244A00* sensor will disappear. If no new device is connected to that port, the indication will remain until the app is restarted.

## 5.4 Payload

On the **Payload** page, you can monitor the current process data values from the sensors/actors and configure their publishing interval on the MQTT bus.

Name	Status / Value	Publishing
+   opc.tcp://10.11.5.77:4840	Connected	1 second
+   opc.tcp://192.168.10.53:4840	Connected	1 second
-   opc.tcp://192.168.10.55:4840	Connected	Various
-   Port X1 - OSD150 <ifm.com/OSD150/OSD150/nd>	Online	1 second
-   Observation		1 second
Distance	3 cm	
Switch state [OUT1]	Active	
+   Process Data Input		1 second
+   Port X2 - E30391_AB <ifm.com/E30391_AB/E30391_AB/000129163805>	Online	10 seconds
Port X3 - series10	Missing IODD	-

Figure 6: Payload page

The IO-Link Master devices with their connected sensors/actors and their observation/process data are listed in an expandable “tree” hierarchy. The first level of the hierarchy displays the OPC UA Servers of the IO-Link Masters with their IP addresses. On the second level are the ports with their connected sensors/actors, followed by the process data nodes of the sensors/actors. The elements in the hierarchy can be expanded or collapsed by clicking the and buttons on the left side of an element.

The drop-down fields in the **Publishing** column allow you to configure the interval in which the corresponding data nodes shall be published onto the MQTT broker, or disable their publication altogether.


















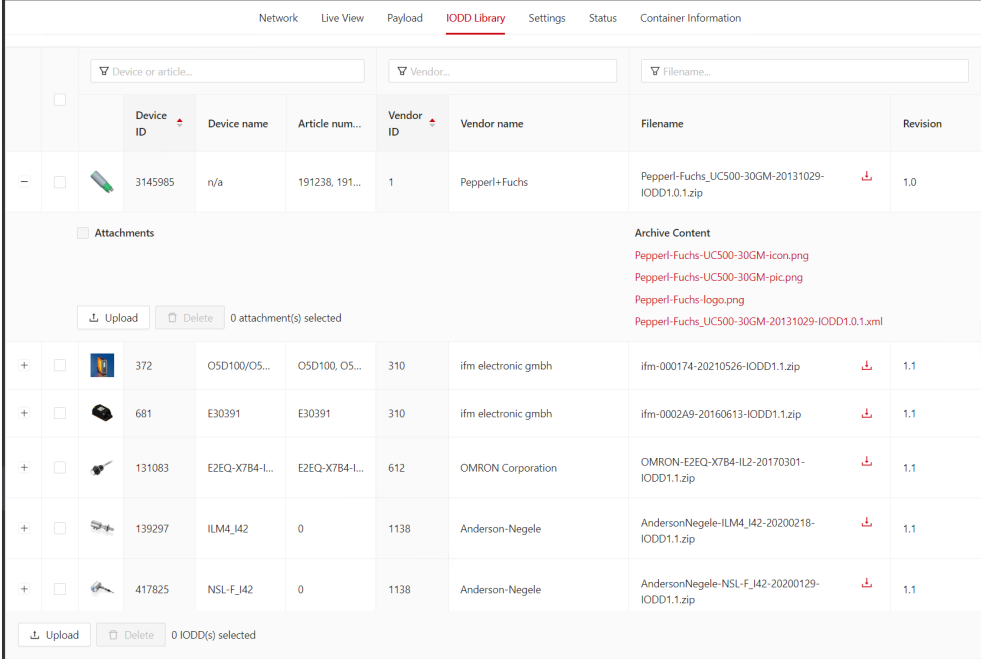
Element	Description	
Filter options	The filter elements in the header allow you to filter the list for certain parameters:	
	 Search name...	Enter a string that shall be used for filtering the list for a <b>Name</b> entry.
	 Search status/value...	Enter a string that shall be used for filtering the list for a <b>Status / Value</b> entry.
	 Filter publishing...	Select a publishing parameter/interval that shall be used for filtering the list.
Name	The <b>+</b> and <b>-</b> buttons on the left side of an element allow you to expand and collapse elements and to navigate to individual data nodes in the hierarchy.	
	 opc.tcp://[IP address]:[port]	URL of the OPC UA server within the IO-Link Master device.
	 Port X1 - [device name]	Shows the sensor/actor device that is connected to a port (e.g. X1) of the IO-Link Master
	 Observation	Observation data as defined in the IODD of the sensor/actor device
	 Process Data Input	Process data input as defined in the IODD of the sensor/actor device
Status / Value	Shows state or current value of the corresponding element.	
	 opc.tcp://[IP address]:[port]	Connected - App is successfully connected to the server
		Connection failed – Failure due to an error while connecting. After 60 seconds, a new attempt for “Connecting” is performed.
		Not connected - Initial state when a new server configuration is added or the app is started. Automatically changes to "Connecting" after a short time.
		Connecting – App is in the process of connecting to the server
		Disconnecting – Server is disconnecting, e.g. because the server or its host device is shutting down
		Cancelling connect - Disconnect is tried while in "Connecting" state. This could happen if a server configuration is changed very fast a couple of times. For example, the user applies a configuration with wrong parameters and while attempting to establish a connection, the user applies new settings.
		Not responding – No response from the server for a period of time. This state lasts only a short time, because an immediate disconnect/connect is attempted.
 Port X1 [device name]	Missing IODD – IODD file of the connected sensor/actor is missing	
	Online – Sensor/actor is online	
 Observation	Individual states and values according to the specific sensor/actor.	
 Process Data Input	Individual states and values according to the specific sensor/actor.	
Publishing	The drop-down field allows you to configure the publication intervals of the data nodes.	
	 50 milliseconds	Select here a fixed time interval. Default is 1 second.
	...	
	 1 day	
	 On Change	Data node is published on value change
	 On Request	Data node is published only if requested via <code>Get</code> method
	<input type="radio"/> Off	Do not publish data node. <b>Note:</b> Data node cannot be requested via <code>Get</code> method either
<input type="text" value="Custom interval ms"/> 	Enter here a custom interval between 1 and 1000 milliseconds, then click the checkmark button to save the new interval.	

Table 4: Elements on Payload page

## 5.5 IODD Library

The **IODD Library** page allows you to manage IO-Link Device Description files (IODD). IODD files contain descriptions of features and parameters of IO-Link Devices. The app requires these descriptions to read the parameters and process data values from the connected IO-Link Devices. The app ships with IODDs for many widely used IO-Link Devices built-in. If the app recognizes that the IODD file of a connected sensor/actor is missing (and the **Automatic download from IODDfinder** option on the **IODD** page under **Settings** is enabled), the app automatically tries to locate and download the missing IODD file from the Internet. The host OS of the app must have internet access for this function.

You can also upload missing IODD files to the app manually from your local PC by clicking the  **Upload** button in the footer. You can upload a single IODD.xml file or the whole official IODD ZIP package (containing e.g. also PNG images and logos) released by the device's vendor, as available e.g. on the <https://ioddfinder.io-link.com/> page.



The screenshot displays the IODD Library page with the following table of IODD files:

Device ID	Device name	Article num...	Vendor ID	Vendor name	Filename	Revision
3145985	n/a	191238, 191...	1	Pepperl+Fuchs	Pepperl-Fuchs_UC500-30GM-20131029-IODD1.0.1.zip	1.0
372	OSD100/OS...	OSD100, OS...	310	ifm electronic gmbh	ifm-000174-20210526-IODD1.1.zip	1.1
681	E30391	E30391	310	ifm electronic gmbh	ifm-0002A9-20160613-IODD1.1.zip	1.1
131083	E2EQ-X7B4-I...	E2EQ-X7B4-I...	612	OMRON Corporation	OMRON-E2EQ-X7B4-IL2-20170301-IODD1.1.zip	1.1
139297	ILM4_I42	0	1138	Anderson-Negele	AndersonNegele-ILM4_I42-20200218-IODD1.1.zip	1.1
417825	NSL-F_I42	0	1138	Anderson-Negele	AndersonNegele-NSL-F_I42-20200129-IODD1.1.zip	1.1

Below the table, the attachments for the selected IODD file are listed:

- Pepperl-Fuchs-UC500-30GM-icon.png
- Pepperl-Fuchs-UC500-30GM-pic.png
- Pepperl-Fuchs-logo.png
- Pepperl-Fuchs\_UC500-30GM-20131029-IODD1.0.1.xml

Figure 7: IODD Library page









Element	Description
Filter options	The filter elements in the header allow you to filter the list for certain parameters:
 Device or article...	Enter a string that shall be used for filtering the list for a device ID, device name or article number
 Vendor...	Enter a string that shall be used for filtering the list for a vendor ID or vendor name
 Filename...	Enter a string that shall be used for filtering the list for a file name
	Expand / collapse list entries to show attached files ( <b>Attachments</b> ) respectively files contained in the zip archive ( <b>Archive Content</b> )
<input type="checkbox"/> 	Allows you to select an IODD archive of a sensor/actor device for deletion
	Thumbnail picture of sensor/actor device
Device ID	Device and vendor IDs according to the IODD
Article number	
Vendor ID	
Vendor name	
Filename	Name of the IODD zip respectively xml file
Revision	IO Device Profile revision
 Upload	Opens a dialog for uploading IODDs via browser
 Delete	Deletes a selected IODD xml or zip archive. If the IODD is currently used by the app, a warning will be issued.

Table 5: Elements on IODD Library page

## 5.6 Settings

### 5.6.1 IODD

On the **IODD** page, you can enable/disable the automatic IODD downloading function of the app. If enabled, the app will automatically try to download missing IODD files for connected sensors/actors. Note that this requires an Internet connection for the app. Note also that as an alternative, you can always manually upload missing IODD files on the *IODD Library* [▶ page 20] page from your local PC via web browser.

### 5.6.2 MQTT

On the **MQTT** page, you can configure the connection of your app to your MQTT broker. If you intend to use a TLS-encrypted connection, you can also upload the required key and certificates here. These files will be stored in a container-specific location, assuring their persistence. Note that the app by default uses the MQTT settings defined during the deployment in *Container Create Options* (if deployed via netFIELD Portal) or the compose file/deployment manifest (if deployed on other container runtimes). If the broker configured via these settings is not available, you can enter override settings here without re-deploying the container.



---

**Note:**

Note if the app is deployed on netFIELD OS:

If the *Container Create Options* or the compose file do not contain valid MQTT settings, the app automatically uses the **Default MQTT Client** settings of the netFIELD OS as a fallback.

The default MQTT client is defined in the **Local Device Manager** under **General Settings > Default MQTT Client**.

---

- If you want to change the current MQTT settings for your app, select the **Override current settings** option and enter your custom MQTT settings in the configuration fields that are now enabled:

The screenshot shows the 'MQTT' settings page. At the top, there are navigation tabs: Network, Live View, Payload, IODD Library, **Settings**, Status, and Container Information. Below these, there are sub-tabs: IODD, **MQTT**, and License Server. The main content area includes:

- A toggle switch for 'Override current settings' which is turned on.
- A checked checkbox for 'Encrypted communication (TLS/SSL)'.
- Two 'Broker URIs' entries, each with a dropdown menu set to 'ssl', a text input field, and a port number field set to '8883'.
- A 'Username' text input field.
- A 'Password' text input field with a visibility icon.
- 'Keep alive interval' set to '60' seconds.
- 'Connect timeout' set to '300' seconds.
- 'Client key file' and 'Client certificate file' fields with upload icons.
- A checked checkbox for 'Verify server certificate'.
- 'Server CA certificate file' field with an upload icon.
- An 'Apply' button.
- At the bottom right, 'License status' is shown with a green dot and 'MQTT connection status' is shown with a red dot.

Figure 8: MQTT Client Settings

Element	Description
Override current settings	Select this option if you want to customize your MQTT settings. If no valid presets can be found, this slide control is automatically set to <b>Override</b> .
Encrypted communication (TLS/SSL)	Select this option if you want to use TLS/SSL encryption for creating a secure connection to the MQTT broker. The entries in the dropdown-list for the protocol are context-sensitive and change accordingly. You can upload the corresponding key and certificate files in the fields further down below.





Element	Description
Broker URIs	<p>Define here the server URI(s) of the MQTT broker(s) in the format &lt;protocol&gt;://&lt;host&gt;:&lt;port&gt;; e.g. tcp://192.168.10.11:1883</p> <p><b>Note:</b> You can specify more than one server for redundancy. When multiple server URIs are specified, the client will first try to connect to the first server in the list, if this fails to the second, and so on. If a server connection has been successfully established, only this connection will be used. The client will not open multiple connections to multiple servers simultaneously.</p> <p>The MQTT client supports the following protocols:</p> <ul style="list-style-type: none"> <li>• TCP <ul style="list-style-type: none"> <li>– MQTT (translates to TCP)</li> <li>– TCP</li> <li>– WS (WebSocket)</li> </ul> </li> <li>• Encrypted <ul style="list-style-type: none"> <li>– MQTTS</li> <li>– SSL</li> <li>– WSS (secure WebSocket over HTTPS)</li> </ul> </li> </ul>
	<div style="display: flex; justify-content: space-between;"> <div style="width: 10%; text-align: center;"><b>+</b></div> <div>After having entered the URI, click this button to add a new broker URI</div> </div>
	<div style="display: flex; justify-content: space-between;"> <div style="width: 10%; text-align: center;"></div> <div>Click this button to delete an existing server URI</div> </div>
Username	Enter here the user name for authentication at the MQTT broker (if required by the MQTT broker). Note that the netFIELD App MQTT Broker deployed from the netFIELD Portal does not require login authentication.
Password	Enter here the password for authentication at the MQTT broker (if required by the MQTT broker). Note that the netFIELD App MQTT Broker deployed from the netFIELD Portal does not require login authentication.
Keep alive interval	Defines the maximum length of time in seconds that the broker and the app may not communicate with each other.
Connect timeout	Defines the maximum length of time in seconds that is allowed for completing the connection process.
Client key file	If you are using TLS/SSL: Click the  button to upload the private key (in PEM format) that the integrated MQTT client of the app shall use.
Client certificate file	If you are using TLS/SSL: Click the  button to upload the certificate (in PEM format) that the integrated MQTT client of the app shall use.
Verify server certificate	If you are using TLS/SSL: Select this option if the app shall verify the certificate of the MQTT broker against the Server CA certificate file. Note that if this option is disabled, the app will also accept invalid certificates from the MQTT broker (not recommended).
Server CA certificate file	If you are using TLS/SSL: Click the  button to upload the file containing the certificates (in PEM format) of the trusted Certificate Authorities for the server certificate.
Apply	Click this button to save and apply your new MQTT Settings
License status	Indicates whether the app is connected to a license server and is running with a valid license. Green dot: OK Red dot: Failure
MQTT connection status	Indicates whether the app is connected to an MQTT broker:  <div style="display: flex; align-items: center;"> <span style="color: green; font-size: 1em; margin-right: 5px;">●</span> Successfully connected </div> <div style="display: flex; align-items: center;"> <span style="color: red; font-size: 1em; margin-right: 5px;">●</span> Failure </div>

Table 6: MQTT Settings



- Click **Apply** button.
- The app automatically restarts with the new MQTT settings.
- Wait for a few seconds, then check the **MQTT connection status** indicator in the footer if the new settings were successfully applied, resulting in an MQTT broker connection.  
You can also check this on the **Status** page.

### 5.6.3 License Server

On the **License Server** page, you can specify the IP address or host name (“endpoint”) of your CodeMeter license server, so that the app can verify the required license for multi-master-mode. The preset broadcast address 255.255.255.255 allows the app to connect automatically to a license server running in the same local container network.

If the required license and/or license server is not available via broadcast in the same local container network, you can add its reachable endpoint address here.

Note that the CodeMeter standard port 22350 is implicit and does not need to be entered here.

**Note:**

You can specify more than one server endpoint here if multiple local license servers are available, e.g. as backup servers.

The app will try to retrieve a valid license from the first server endpoint in the list. If the first server is not available or if there is no valid license on that server, the app will automatically try the other endpoints.

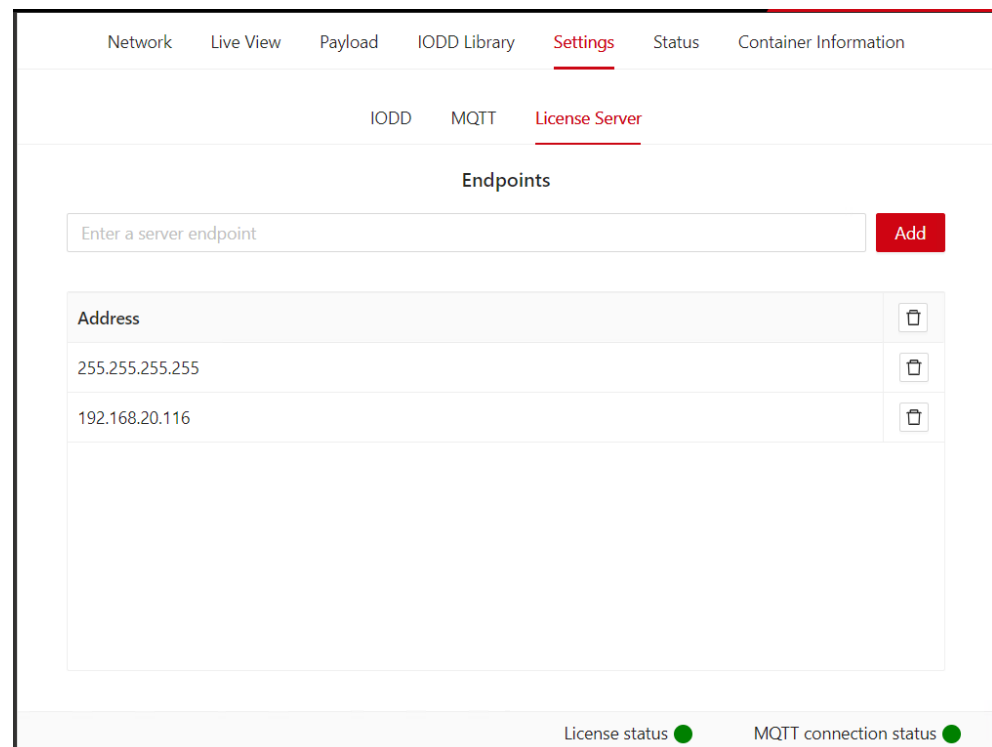


Figure 9: License Server Endpoints

- To specify a license server, enter the IP address or the hostname of the machine on which your license server is running, then click **Add** button.
- The new endpoint is automatically saved.  
If the app has so far been without a license, it now automatically tries to connect to the new server to retrieve it.

**Note:**

Note that the **Settings successfully updated** message does not indicate a successful license server connection. To check whether the app did succeed in connecting to the server and retrieving its license, check the **License status** indicator in the footer or open the **Status** [▶ page 27] page and check the **License status** there under **Container status**.

## 5.7 Status

The **Status** page shows information about workload caused by the app (i.e. its container), its license state and the state of its connection to the MQTT broker.

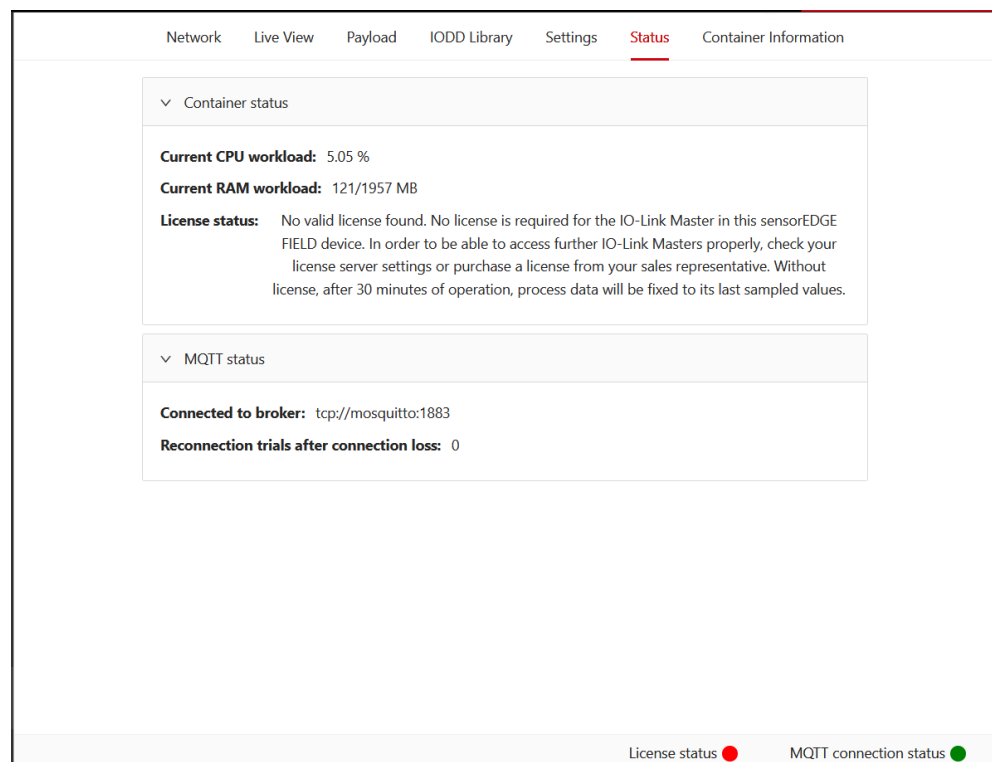


Figure 10: Status page

## 5.8 Container Information

The **Container Information** page displays formal information about the application container like versions, used components, disclaimers etc.

Container Information		
Name	netFIELD App OPC UA IO-Link Adapter	
Version	1.2.4-build.140	
ApiVersion	1	
Description	netFIELD App OPC UA IO-Link Adapter	
Vendor	Hilscher Gesellschaft fuer Systemautomation mbH	
Licenses	HILSCHER netFIELD Source Code/Software LICENSE AGREEMENT <a href="https://netfield.io/licenses/Hilscher_netFIELD_Source_Code_Software_License.pdf">https://netfield.io/licenses/Hilscher_netFIELD_Source_Code_Software_License.pdf</a>	
Disclaimer	See <a href="https://netfield.io/termsAndConditions">https://netfield.io/termsAndConditions</a>	

Used Components		
Name	Version	License
@ant-design/icons	4.7.0	MIT
@reduxjs/toolkit	1.8.0	MIT
antd	4.21.7	MIT
cors	2.8.5	MIT
express	4.18.2	MIT

Figure 11: Container Information Page

## 6 MQTT publishing

### 6.1 Overview

#### Namespace elements and MQTT topics/resources provided by the app

The app uses/supports the following MQTT topic namespace elements defined in the *Oi4 Development Guideline* v1.1.x:

```
Oi4/<ServiceType>/<AppId>/<Method>/<Resource>/<Source>/<Filter>
```

e.g.:

Oi4 <ServiceType> <AppId> (also Oi4Identifier)  
↓ ↓ ↓  
Oi4/OTConnector/hilscher.com/netFIELD,20App,20OPC,20UA,20IO-Link,20Adapter/1917.011/netfield-app-opc-ua-io-link-adapter/Get/Data/ifm.com/O5D150/O5D150/observation  
↑ ↑ ↑ ↑  
<Source> <Filter> <Method> <Resource>

Element	Values/parameters	Description
Oi4	Oi4	Fixed value indicating that the MQTT message follows the OI4 Development Guideline.
ServiceType	OTConnector	Fixed value indicating the type of service that the app provides.
AppId	hilscher.com/ netFIELD,20App, 20OPC,20UA,20IO- Link,20Adapter/ 1917.011/netfield-app- opc-ua-io-link-adapter	Fixed value uniquely identifying the app as source of the MQTT message. Is also identical with the Oi4Identifier of the app.
Method	Pub	Used to publish a resource like Data or Health
	Get	Used for a dedicated request of a resource

Element	Values/parameters	Description
Resource	Data	Actual payload topic containing process/observation data from the sensors/actors. Is published: <ul style="list-style-type: none"> <li>• By default every minute or according to configuration on <b>Payload</b> page</li> <li>• On <code>Get/Data</code> request</li> </ul> For more information, see section <i>Data message</i> [▶ page 31].
	Health	Health information regarding the app and connected sensor/actors. Is published: <ul style="list-style-type: none"> <li>• On initialization of the app</li> <li>• When a health value of the app or of a connected sensor/actor changes</li> <li>• Every minute (“heartbeat”)</li> <li>• On <code>Get/Health</code> request</li> </ul> For more information, see section <i>Health message</i> [▶ page 34].
	MAM	<i>Master Asset Model</i> topic as required by the <i>OI4 Development Guideline</i> . Contains information about the app (= “asset”), like manufacturer, model, version etc. Is published: <ul style="list-style-type: none"> <li>• On initialization of the app</li> <li>• On <code>Get/MAM</code> request</li> </ul>
	License	License information regarding the app as required by the <i>OI4 Development Guideline</i> Is published: <ul style="list-style-type: none"> <li>• On <code>Get/License</code> request</li> </ul>
	Metadata	Describes the structure of the payload data provided by the <code>Data</code> resource. Is published: <ul style="list-style-type: none"> <li>• On initialization of the app</li> <li>• On <code>Get/Metadata</code> request</li> </ul>
Source	<code>ifm.com/O5D150/O5D150</code> (example)	Identifies the sensor/actor providing the payload data. The value is derived from the IODD of the sensor/actor.
Filter	<code>observation</code>	Data points derived from the IODD of the sensor/actor that can be used as filter criteria
	<code>processDataInput</code>	

Table 7: *OI4 elements used by the app*

Note that the two most important topics, `Data` and the `Health`, are published automatically by the app. Besides this, all resources/topics can be retrieved via the MQTT broker by publishing the corresponding `Get` request from your third party MQTT client; e.g. for retrieving the license topic:

```
Oi4/OTConnector/hilscher.com/netFIELD,20App,20OPC,20UA,20IO-Link,20Adapter/1917.011/netfield-app-opc-ua-io-link-adapter/Get/License
```

The following sections provide more detailed descriptions of the `Data` and the `Health` topics published by the app. The `MAM`, `License` and `Metadata` resources are not described here in detail, for more information, please refer to the *OI4 Development Guideline*.

## 6.2 Data message

The netFIELD App OPC UA IO-Link Adapter “bundles” the current data values from all connected OPC UA servers and devices (i.e. “data nodes”) in one message array in JSON format and publishes it to the MQTT broker under the topic:

```
Oi4/OTConnector/hilscher.com/netFIELD,20App,20OPC,20UA,20IO-Link,20Adapter/1917.011/netfield-app-opc-ua-io-link-adapter/Pub/Data
```

The updating rate of the topic is determined by the **Publishing** intervals of the data nodes (default: 1s), which can be configured for each data node individually on the **Payload** page of the app.

Note that if you configure different intervals for your data nodes, the shortest interval will determine how often the app sends an update to the topic. Data nodes configured with a longer interval will be included in the current message array only when “it’s their turn”.

For example, if your payload consists of two data nodes, *node A* with an interval of one second and *node B* with an interval of ten seconds, the MQTT message (containing data from *node A*) will be sent every second, whereby every 10<sup>th</sup> message will also include data from node B in its array.

The JSON data message depicted below contains four data nodes/`DataSetWriterIds` provided by two sensors. Each sensor provides an `observation` and a `processDataInput` filter, which are two different data nodes/`DataSetWriterIds`.

```

{
  (1) "MessageId": "16902025680-OTConnector/hilscher.com/netFIELD,20App,20OPC,20UA,
      20IO-Link,20Adapter/1917.011/netfield-app-opc-ua-io-link-adapter"
  "MessageType": "ua-data"
  (2) "PublisherId": "OTConnector/hilscher.com/netFIELD,20App,20OPC,20UA,20IO-Link,20Adapter/
      1917.011/netfield-app-opc-ua-io-link-adapter"
  (3) "Messages":[
    {
      (4) "DataSetWriterId": 3
      (5) "SequenceNumber": 123
      (6) "Timestamp": "2023-09-05T10:06:49.409Z"
      (7) "Filter": "observation"
      (8) "Source": "ifm.com/O5D150/O5D150/"
      (9) "Payload":{
          "Distance": "57 cm"
          "Switch state [OUT1]": "Inactive"
        }
    }
    {
      "DataSetWriterId": 2
      "SequenceNumber": 123
      "Timestamp": "2023-09-05T10:06:49.409Z"
      "Filter": "processDataInput"
      "Source": "ifm.com/O5D150/O5D150/"
      "Payload":{
        "Distance": 57
        "Switch state [OUT1]": false
      }
    }
    {
      "DataSetWriterId": 6
      "SequenceNumber": 145
      "Timestamp": "2023-09-05T10:06:59.420Z"
      "Filter": "observation"
      "Source": "pepperl-fuchs.com/UC500-30GM-IUEP-IO-V15/UC500-30GM-IUEP-IO-
        V15/40000027077821"
      "Payload":{
        "Distance": "391 mm"
        "Echo Amplitude": "49.809 %"
        "Switching Signals": "Signal: 1 inactive / 2 inactive"
      }
    }
    {
      "DataSetWriterId": 7
      "SequenceNumber": 145
      "Timestamp": "2023-09-05T10:06:59.420Z"
      "Filter": "processDataInput"
      "Source": "pepperl-fuchs.com/UC500-30GM-IUEP-IO-V15/UC500-30GM-IUEP-IO-
        V15/40000027077821"
      "Payload":{
        "Distance (14 bit)": 391
        "Switching Signal 1": false
      }
    }
  ]
}

```



```

        "Switching Signal 2":false
    }
}
]
}

```

No.	Element	Description
(1)	MessageId	ID consisting of current UNIX timestamp in milliseconds and Publisher ID
(2)	PublisherId	ID consisting of Service Type (OTConnector) and OI4 Identifier of the app (hilscher.com/netFIELD...)
(3)	Messages	Start of the message array. The number of messages in the array depend on the number of data nodes (= DataSetWriterIds) and on the publishing interval defined for the nodes (data nodes with longer publishing intervals or “on-change” setting will not be included in every publication cycle)
(4)	DataSetWriterId	ID of the data node providing the payload value(s)
(5)	SequenceNumber	Message counter for the data node. Last known count will be resumed when the data node is temporarily offline and then online again. Will be reset to 0 when the app is restarted
(6)	Timestamp	Indicates date and time of the acquisition of the data node values
(7)	Filter	Additional information relating to the DataSetWriterId
(8)	Source	Name or ID of the sensor/actor providing the payload value(s) (as derived from the IODD)
(9)	Payload	Payload section containing the actual sensor/actor value(s) (as derived from the IODD)

Table 8: Important elements in Data message

## 6.3 Health message

The netFIELD App OPC UA IO-Link Adapter “bundles” information about its own health and the currently connected sensors/actors (i.e. “data nodes”) in one message array in JSON format and publishes it to the MQTT broker under the topic:

```
Oi4/OTConnector/hilscher.com/netFIELD,20App,20OPC,20UA,20IO-Link,20Adapter/1917.011/netfield-app-opc-ua-io-link-adapter/Pub/Health
```

The app publishes the health topic on the following occasions and intervals:

- Initialization of the app
- When a health value of the app or of a connected sensor/actor changes
- Every minute (as a kind of heartbeat)
- On `Get/Health` request

Note that this publication behavior cannot be changed by the user.



### Note:

The health resource is derived from `IDeviceHealthType` described in the [DeviceHealth Interface](#) section of the [OPC UA Online Reference](#), but was extended by an additional property called `healthScore`.

The JSON health message depicted below contains the health information of the app itself and of two connected sensors.

```
{
  (1) "MessageId": "16902025700-OTConnector/hilscher.com/netFIELD,20App,20OPC,20UA,20IO-Link,20Adapter/1917.011/netfield-app-opc-ua-io-link-adapter"
  "MessageType": "ua-data"
  (2) "PublisherId": "OTConnector/hilscher.com/netFIELD,20App,20OPC,20UA,20IO-Link,20Adapter/1917.011/netfield-app-opc-ua-io-link-adapter"
  (3) "DataSetClassId": "d8e7b6df-42ba-448a-975a-199f59e8ffeb"
  (4) "Messages":[
    {
      (5) "DataSetWriterId": 4
      (6) "Timestamp": "2023-09-05T12:20:44.444Z"
      (7) "Source": "hilscher.com/netFIELD,20App,20OPC,20UA,20IO-Link,20Adapter/1917.011/netfield-app-opc-ua-io-link-adapter"
      (8) "Payload":{
        (9) "Health": "NORMAL_0"
        (10) "HealthScore": 100
      }
    }
    {
      "DataSetWriterId": 5
      "Timestamp": "2023-09-05T12:20:44.444Z"
      "Source": "ifm.com/O5D150/O5D150/"
      "Payload":{
        "Health": "NORMAL_0"
        "HealthScore": 100
      }
    }
  ]
}
```

```

    }
  {
    "DataSetWriterId": 11
    "Timestamp": "2023-09-05T12:20:44.444Z"
    "Source": "pepperl-fuchs.com/UC500-30GM-IUEP-IO-V15/UC500-30GM-IUEP-IO-
      V15/40000027077821"
    "Payload":{
      "Health": "NORMAL_0"
      "HealthScore": 100
    }
  }
}
]
}

```

No.	Element	Description										
(1)	MessageId	ID consisting of current UNIX timestamp in milliseconds and Publisher ID										
(2)	PublisherId	ID consisting of Service Type ( <code>OTConnector</code> ) and OI4 Identifier of the app ( <code>hilscher.com/netFIELD...</code> )										
(3)	DataSetClassId	Predefined GUID for the health resource (as defined by the OI4 Alliance)										
(4)	Messages	Start of the message array. The number of messages in the array depend on the number of data nodes (= <code>DataSetWriter</code> )										
(5)	DataSetWriterId	ID of the data node ( <code>DataSetWriter</code> ) providing the health information										
(6)	Timestamp	Indicates date and time of the acquisition of the data node values										
(7)	Source	App respectively sensor/actor providing its health information										
(8)	Payload	Payload section containing the actual health information of the app/sensor/actor										
(9)	Health	<p><code>DeviceHealthEnumeration</code> indicating the health status of the asset (see also <a href="#">DeviceHealth Interface</a> section of the <i>OPC UA Online Reference</i>).</p> <table border="1"> <tbody> <tr> <td>NORMAL_0</td> <td>Normal operation</td> </tr> <tr> <td>FAILURE_1</td> <td>Failure (high severity): Signal invalid due to malfunction in the device, sensor or actuator.</td> </tr> <tr> <td>CHECK_FUNCTION_2</td> <td>Function check (low severity): Signal temporarily invalid (e.g. frozen) due to on-going work on the device.</td> </tr> <tr> <td>OFF_SPEC_3</td> <td>Out of Specification (medium severity): Permissible ambient or process conditions exceeded or the measuring uncertainty of sensors or deviations from the set value in actuators is probably greater than expected.</td> </tr> <tr> <td>MAINTENANCE_REQUIRED_4</td> <td>Maintenance required (low severity): Although the signals are valid, the remaining life is nearly exhausted or a function will soon be restricted due to operational conditions.</td> </tr> </tbody> </table>	NORMAL_0	Normal operation	FAILURE_1	Failure (high severity): Signal invalid due to malfunction in the device, sensor or actuator.	CHECK_FUNCTION_2	Function check (low severity): Signal temporarily invalid (e.g. frozen) due to on-going work on the device.	OFF_SPEC_3	Out of Specification (medium severity): Permissible ambient or process conditions exceeded or the measuring uncertainty of sensors or deviations from the set value in actuators is probably greater than expected.	MAINTENANCE_REQUIRED_4	Maintenance required (low severity): Although the signals are valid, the remaining life is nearly exhausted or a function will soon be restricted due to operational conditions.
NORMAL_0	Normal operation											
FAILURE_1	Failure (high severity): Signal invalid due to malfunction in the device, sensor or actuator.											
CHECK_FUNCTION_2	Function check (low severity): Signal temporarily invalid (e.g. frozen) due to on-going work on the device.											
OFF_SPEC_3	Out of Specification (medium severity): Permissible ambient or process conditions exceeded or the measuring uncertainty of sensors or deviations from the set value in actuators is probably greater than expected.											
MAINTENANCE_REQUIRED_4	Maintenance required (low severity): Although the signals are valid, the remaining life is nearly exhausted or a function will soon be restricted due to operational conditions.											
(10)	HealthScore	<p>Optional meter to indicate the current health level as a result of sub-optimal process and/or environmental conditions in the range from 0 to 100 %.</p> <p><b>Note:</b> There are no rules how <code>Health</code> and <code>HealthScore</code> are related to each other. Depending on an asset, its implementation, used technology, protocol or use case it was made for, a <code>HealthScore</code> of 30 % can coexist with a <code>Health</code> of <code>NORMAL_0</code>, e.g. when a yearly service has to be done in short term.</p>										

Table 9: Important elements in Health message

## 7 Installing CodeMeter and activating container license

For users who are not using the *netFIELD App License Server* and are not familiar with the *CodeMeter* licensing technology from Wibu, this section describes how to setup a CodeMeter server in your local network and activate your netFIELD App container license key.

The **CodeMeter User Runtime for Windows** is used as an example of a CodeMeter server here.

### 1. Download license server from Wibu-Systems.

- Go to the **CodeMeter User Software** page  
<https://www.wibu.com/us/support/user/downloads-user-software.html>
- Under **CodeMeter User Download**, download the **CodeMeter User Runtime** according to the operating system of the server/machine/PC on which you want to install your license server, e.g. **CodeMeter User Runtime for Windows**:

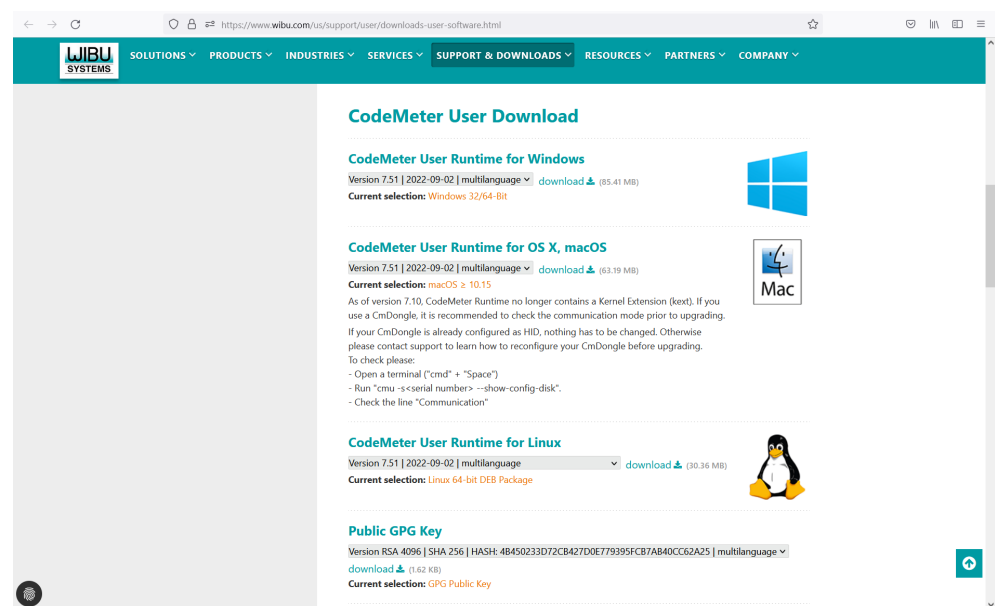


Figure 12: CodeMeter runtime download

### 2. Install the CodeMeter runtime on your server/machine/PC.

- Install the license server via the downloaded **CodeMeterRuntime.exe** installer.

- In the **Custom Setup** dialog of the setup wizard, make sure that the **Network Server** option is enabled:

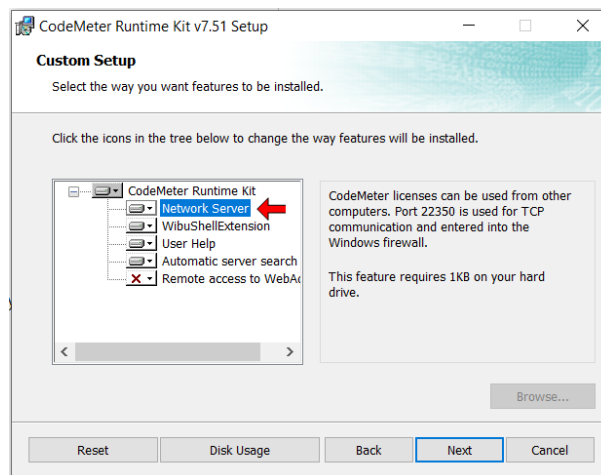


Figure 13: Enable network server option

- After installation, you will find the *CodeMeter Control Center* in the Windows taskbar:

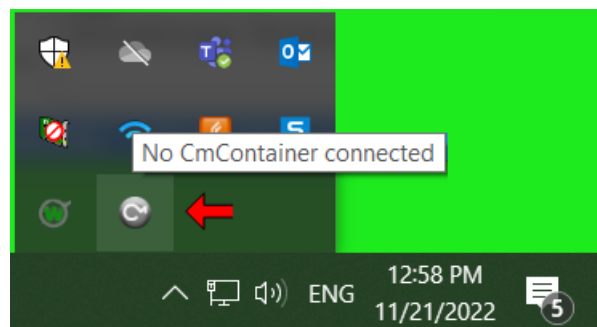


Figure 14: Installed CodeMeter server in taskbar

3. Obtain netFIELD App container license.
  - Contact your local Hilscher sales representative ([www.hilscher.com/company/offices](http://www.hilscher.com/company/offices)) to obtain a license ticket for your netFIELD App container.
  - After purchasing the license, you will receive a license ticket in the form of an URL.
4. Activate license ticket.
  - Open the link using a web browser on the server/machine/PC where the previously installed license server is running.

➤ The link leads you to a Wibu-Systems **Available Licenses** web page:

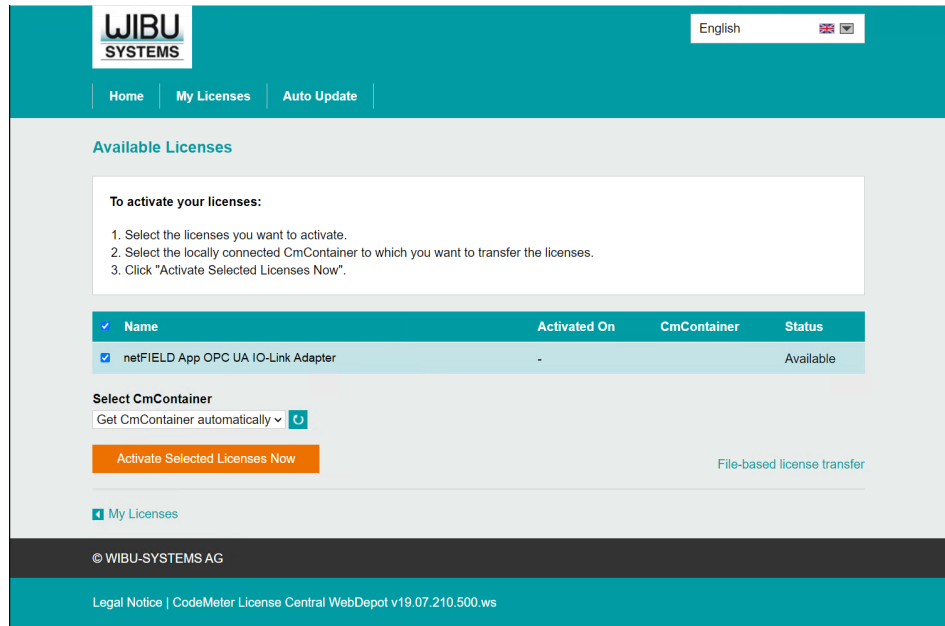


Figure 15: Activate license web page

- Make sure that your netFIELD App container (in this example the **netFIELD App OPC UA IO-Link Adapter** is selected (check-marked), then click **Activate Selected Licenses Now** button.
  - The License key is now automatically downloaded, imported and activated in your local CodeMeter license server.
5. Check activation of license (optional).
- To check your license, open the *CodeMeter Control Center* in the Windows taskbar:

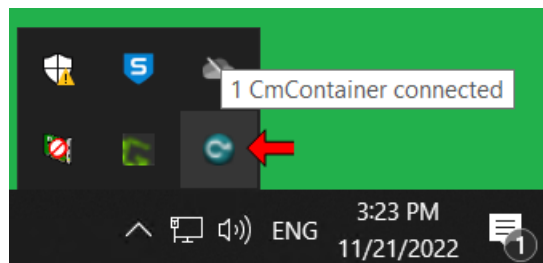


Figure 16: Open CodeMeter Control Center

- In the *CodeMeter Control Center*, you can also open the **WebAdmin** web interface for more details.

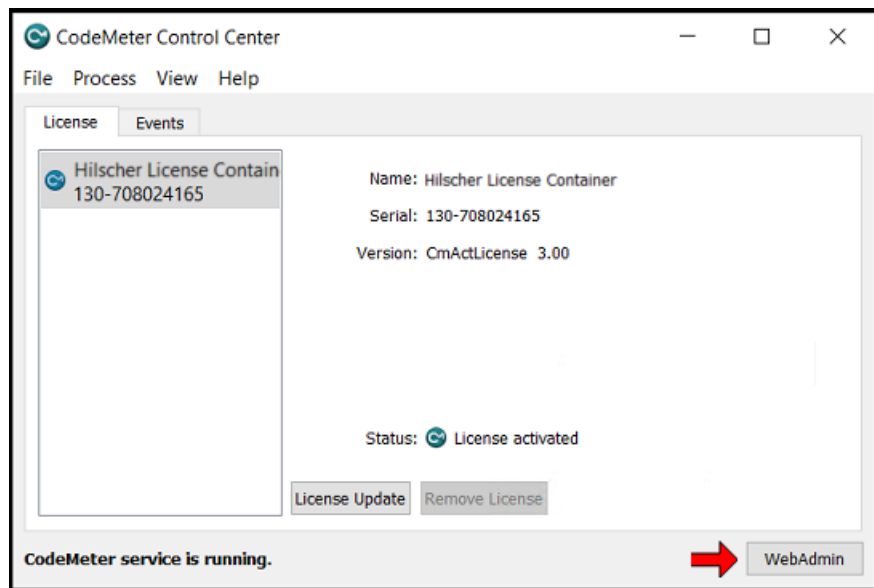


Figure 17: CodeMeter Control Center

- In the **WebAdmin** web interface, open **Container** tab > **Hilscher License Container** > **Licenses** to display information on the license:

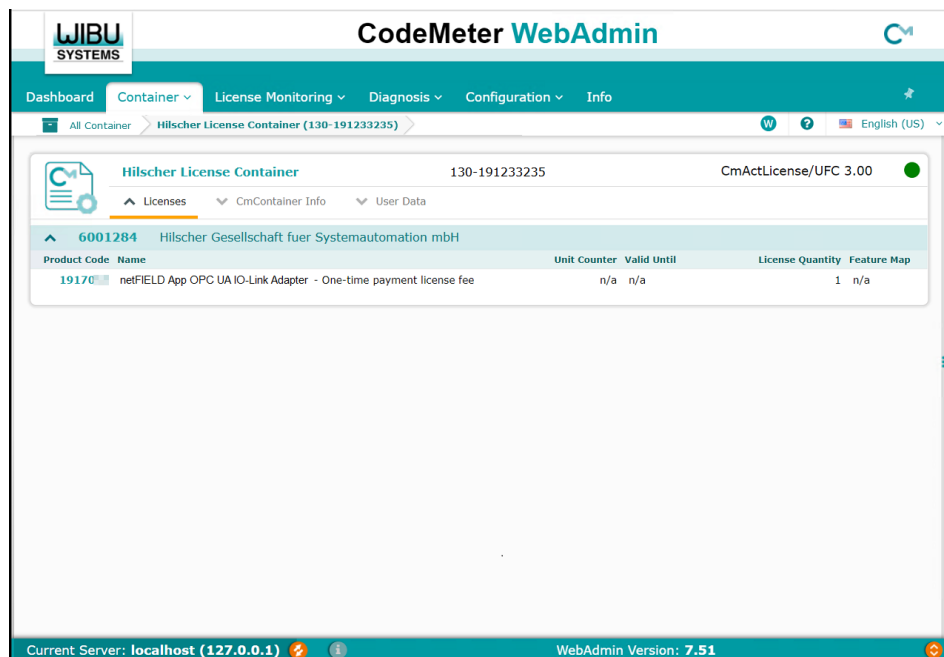


Figure 18: Licenses in WebAdmin

- Click on the **Product Code** to open the **Product Item Details** page, where you can find further details, like e.g. the **Maintenance Period**.

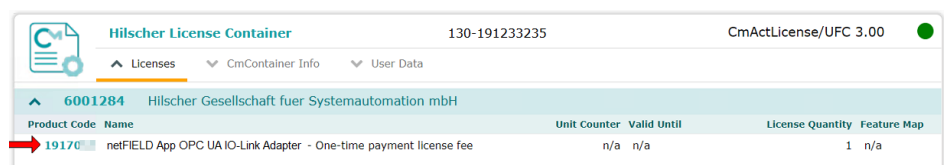


Figure 19: Click on Product Code

- The **Maintenance Period** on the **Product Item Details** page tells you for how long you can receive free updates for the app:

Product Item Options	Size (Bytes)	Dependencies	Value
Text	56		netFIELD App OPC UA IO-Link Adapter - One-time payment
License Quantity	4	data, serial, counter	1
Maintenance Period	8	data, serial, counter	Start: 2000-01-01 01:00:00 End: 2023-10-17 13:25:43
Extended Protected Data #136	16	data, serial, counter	0x6c 0x63 0x64 0x63 0x00 0x01 0x51 0x0b 0x00 0x00 0x00 0x00 0x00 0x00 0x01 0x00

Figure 20: Product Item Details

6. Configure the CodeMeter license server endpoint in the netFIELD App container.

- To configure the CodeMeter license server endpoint in your container, open the **License Server** page of the container’s configuration web UI:

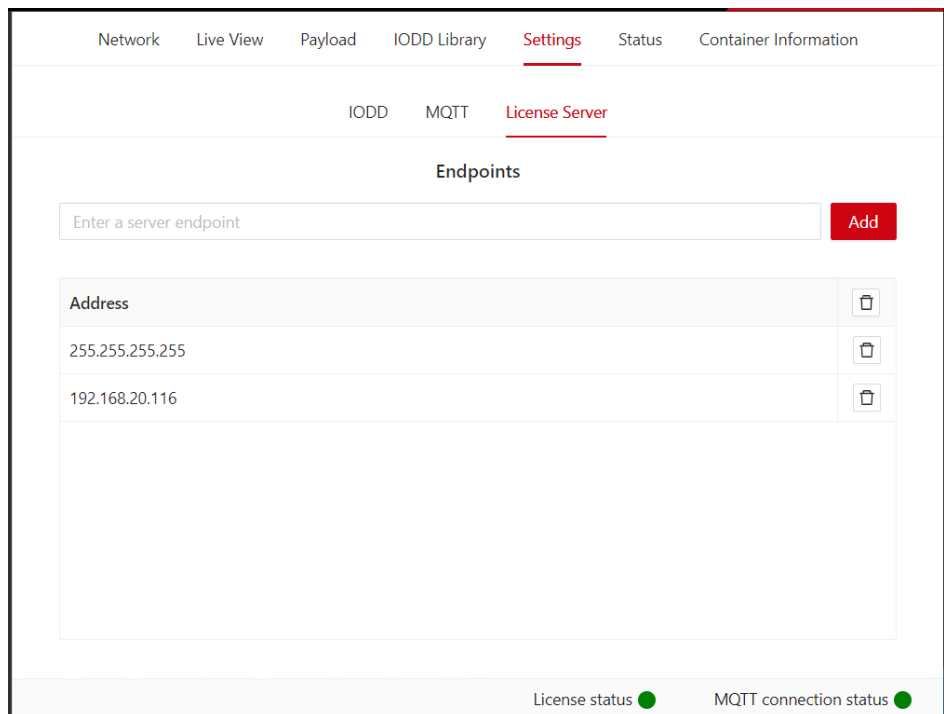


Figure 21: License Server screen

- On the **License Server** page, enter the host name or the IP address of the server/machine/PC where the license server is running.



**Note:**

Note that the required host name and IP address are displayed on the **Dashboard** tab of the CodeMeter **WebAdmin** web interface for reference:



- After clicking the **Add** button on the **License Server** page, your netFIELD App container immediately tries to connect to the server and retrieve its license.
7. Check the license state on the **Status** page.
- You can check the license state under **Container status** on the **Status** page:

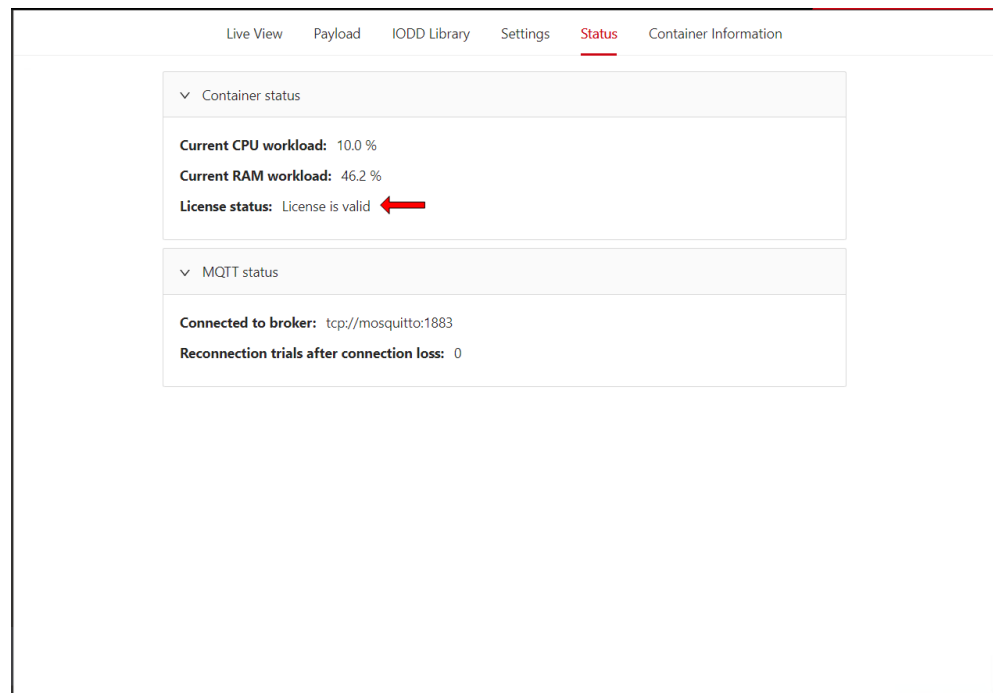


Figure 22: Check license status

## 8 Legal notes

### Terms and conditions

Please read the terms and conditions under <https://www.netfield.io/termsOfUse>.

### Copyright

© Hilscher Gesellschaft für Systemautomation mbH

All rights reserved.

The images, photographs and texts in the accompanying materials (in the form of a user's manual, operator's manual, Statement of Work document and all other document types, support texts, documentation, etc.) are protected by German and international copyright and by international trade and protective provisions. Without the prior written consent, you do not have permission to duplicate them either in full or in part using technical or mechanical methods (print, photocopy or any other method), to edit them using electronic systems or to transfer them. You are not permitted to make changes to copyright notices, markings, trademarks or ownership declarations. Illustrations are provided without taking the patent situation into account. Any company names and product designations provided in this document may be brands or trademarks by the corresponding owner and may be protected under trademark, brand or patent law. Any form of further use shall require the express consent from the relevant owner of the rights.

### Important notes

Utmost care was/is given in the preparation of the documentation at hand consisting of a user's manual, operating manual and any other document type and accompanying texts. However, errors cannot be ruled out. Therefore, we cannot assume any guarantee or legal responsibility for erroneous information or liability of any kind. You are hereby made aware that descriptions found in the user's manual, the accompanying texts and the documentation neither represent a guarantee nor any indication on proper use as stipulated in the agreement or a promised attribute. It cannot be ruled out that the user's manual, the accompanying texts and the documentation do not completely match the described attributes, standards or any other data for the delivered product. A warranty or guarantee with respect to the correctness or accuracy of the information is not assumed.

We reserve the right to modify our products and the specifications for such as well as the corresponding documentation in the form of a user's manual, operating manual and/or any other document types and accompanying texts at any time and without notice without being required to notify of said modification. Changes shall be taken into account in future manuals and do not represent an obligation of any kind, in particular there shall be no right to have delivered documents revised. The manual delivered with the product shall apply.

Under no circumstances shall Hilscher Gesellschaft für Systemautomation mbH be liable for direct, indirect, ancillary or subsequent damage, or for any loss of income, which may arise after use of the information contained herein.

### Liability disclaimer

The hardware and/or software was created and tested by Hilscher Gesellschaft für Systemautomation mbH with utmost care and is made available as is. No warranty can be assumed for the performance or flawlessness of the hardware and/or software under all application conditions and scenarios and the work results achieved by the user when using the hardware and/or software. Liability for any damage that may have occurred as a result of using the hardware and/or software or the corresponding documents shall be limited to an event involving willful intent or a grossly negligent violation of a fundamental contractual obligation. However, the right to assert damages due to a violation of a fundamental contractual obligation shall be limited to contract-typical foreseeable damage.

It is hereby expressly agreed upon in particular that any use or utilization of the hardware and/or software in connection with

- Flight control systems in aviation and aerospace;
- Nuclear fission processes in nuclear power plants;
- Medical devices used for life support and
- Vehicle control systems used in passenger transport

shall be excluded. Use of the hardware and/or software in any of the following areas is strictly prohibited:

- For military purposes or in weaponry;
- For designing, engineering, maintaining or operating nuclear systems;
- In flight safety systems, aviation and flight telecommunications systems;
- In life-support systems;
- In systems in which any malfunction in the hardware and/or software may result in physical injuries or fatalities.

You are hereby made aware that the hardware and/or software was not created for use in hazardous environments, which require fail-safe control mechanisms. Use of the hardware and/or software in this kind of environment shall be at your own risk; any liability for damage or loss due to impermissible use shall be excluded.

## Warranty

Hilscher Gesellschaft für Systemautomation mbH hereby guarantees that the software shall run without errors in accordance with the requirements listed in the specifications and that there were no defects on the date of acceptance. The warranty period shall be 12 months commencing as of the date of acceptance or purchase (with express declaration or implied, by customer's conclusive behavior, e.g. putting into operation permanently).

The warranty obligation for equipment (hardware) we produce is 36 months, calculated as of the date of delivery ex works. The aforementioned provisions shall not apply if longer warranty periods are mandatory by law pursuant to Section 438 (1.2) BGB, Section 479 (1) BGB and Section 634a (1) BGB [Bürgerliches Gesetzbuch; German Civil Code] If, despite of all due care taken, the delivered product should have a defect, which already existed at the time of the transfer of risk, it shall be at our discretion to either repair the product or to deliver a replacement product, subject to timely notification of defect.

The warranty obligation shall not apply if the notification of defect is not asserted promptly, if the purchaser or third party has tampered with the products, if the defect is the result of natural wear, was caused by unfavorable operating conditions or is due to violations against our operating regulations or against rules of good electrical engineering practice, or if our request to return the defective object is not promptly complied with.

## Costs of support, maintenance, customization and product care

Please be advised that any subsequent improvement shall only be free of charge if a defect is found. Any form of technical support, maintenance and customization is not a warranty service, but instead shall be charged extra.

## Additional guarantees

Although the hardware and software was developed and tested in-depth with greatest care, Hilscher Gesellschaft für Systemautomation mbH shall not assume any guarantee for the suitability thereof for any purpose that was not confirmed in writing. No guarantee can be granted whereby the hardware and software satisfies your requirements, or the use of the hardware and/or software is uninterrupted or the hardware and/or software is fault-free.

It cannot be guaranteed that patents and/or ownership privileges have not been infringed upon or violated or that the products are free from third-party influence. No additional guarantees or promises shall be made as to whether the product is market current, free from deficiency in title, or can be integrated or is usable for specific purposes, unless such guarantees or promises are required under existing law and cannot be restricted.

## **Confidentiality**

The customer hereby expressly acknowledges that this document contains trade secrets, information protected by copyright and other patent and ownership privileges as well as any related rights of Hilscher Gesellschaft für Systemautomation mbH. The customer agrees to treat as confidential all of the information made available to customer by Hilscher Gesellschaft für Systemautomation mbH and rights, which were disclosed by Hilscher Gesellschaft für Systemautomation mbH and that were made accessible as well as the terms and conditions of this agreement itself.

The parties hereby agree to one another that the information that each party receives from the other party respectively is and shall remain the intellectual property of said other party, unless provided for otherwise in a contractual agreement.

The customer must not allow any third party to become knowledgeable of this expertise and shall only provide knowledge thereof to authorized users as appropriate and necessary. Companies associated with the customer shall not be deemed third parties. The customer must obligate authorized users to confidentiality. The customer should only use the confidential information in connection with the performances specified in this agreement.

The customer must not use this confidential information to his own advantage or for his own purposes or rather to the advantage or for the purpose of a third party, nor must it be used for commercial purposes and this confidential information must only be used to the extent provided for in this agreement or otherwise to the extent as expressly authorized by the disclosing party in written form. The customer has the right, subject to the obligation to confidentiality, to disclose the terms and conditions of this agreement directly to his legal and financial consultants as would be required for the customer's normal business operation.

## **Export provisions**

The delivered product (including technical data) is subject to the legal export and/or import laws as well as any associated regulations of various countries, especially such laws applicable in Germany and in the United States. The products / hardware / software must not be exported into such countries for which export is prohibited under US American export control laws and its supplementary provisions. You hereby agree to strictly follow the regulations and to yourself be responsible for observing them. You are hereby made aware that you may be required to obtain governmental approval to export, reexport or import the product.

## List of Figures

Figure 1:	netFIELD OPC UA IO-LINK Adapter data flow.....	6
Figure 2:	Web UI plugin in Local Device Manager (within netFIELD ecosystem) .....	12
Figure 3:	Network page .....	13
Figure 4:	Live View page .....	16
Figure 5:	Pulled sensor indication.....	17
Figure 6:	Payload page.....	18
Figure 7:	IODD Library page.....	20
Figure 8:	MQTT Client Settings .....	23
Figure 9:	License Server Endpoints.....	26
Figure 10:	Status page .....	27
Figure 11:	Container Information Page.....	28
Figure 12:	CodeMeter runtime download .....	36
Figure 13:	Enable network server option .....	37
Figure 14:	Installed CodeMeter server in taskbar .....	37
Figure 15:	Activate license web page .....	38
Figure 16:	Open CodeMeter Control Center.....	38
Figure 17:	CodeMeter Control Center .....	39
Figure 18:	Licenses in WebAdmin .....	39
Figure 19:	Click on Product Code .....	39
Figure 20:	Product Item Details .....	40
Figure 21:	License Server screen .....	40
Figure 22:	Check license status.....	41

## List of Tables

Table 1:	List of revisions .....	3
Table 2:	Elements in scan area .....	14
Table 3:	Elements in Configured Servers area .....	14
Table 4:	Elements on Payload page .....	19
Table 5:	Elements on IODD Library page .....	21
Table 6:	MQTT Settings.....	23
Table 7:	OI4 elements used by the app .....	29
Table 8:	Important elements in Data message .....	33
Table 9:	Important elements in Health message .....	35

# Contacts

## HEADQUARTER

### Germany

Hilscher Gesellschaft für  
Systemautomation mbH  
Rheinstraße 15  
65795 Hattersheim  
Phone: +49 (0) 6190 9907-0  
Fax: +49 (0) 6190 9907-50  
E-mail: [info@hilscher.com](mailto:info@hilscher.com)

### Support

Phone: +49 (0) 6190 9907-990  
E-mail: [hotline@hilscher.com](mailto:hotline@hilscher.com)

## SUBSIDIARIES

### China

Hilscher Systemautomation (Shanghai) Co. Ltd.  
200010 Shanghai  
Phone: +86 (0) 21-6355-5161  
E-mail: [info@hilscher.cn](mailto:info@hilscher.cn)

### Support

Phone: +86 (0) 21-6355-5161  
E-mail: [cn.support@hilscher.com](mailto:cn.support@hilscher.com)

### France

Hilscher France S.a.r.l.  
69800 Saint Priest  
Phone: +33 (0) 4 72 37 98 40  
E-mail: [info@hilscher.fr](mailto:info@hilscher.fr)

### Support

Phone: +33 (0) 4 72 37 98 40  
E-mail: [fr.support@hilscher.com](mailto:fr.support@hilscher.com)

### India

Hilscher India Pvt. Ltd.  
Pune, Delhi, Mumbai, Bangalore  
Phone: +91 8888 750 777  
E-mail: [info@hilscher.in](mailto:info@hilscher.in)

### Support

Phone: +91 020-24243777  
E-mail: [info@hilscher.in](mailto:info@hilscher.in)

### Italy

Hilscher Italia S.r.l.  
20090 Vimodrone (MI)  
Phone: +39 02 25007068  
E-mail: [info@hilscher.it](mailto:info@hilscher.it)

### Support

Phone: +39 02 25007068  
E-mail: [it.support@hilscher.com](mailto:it.support@hilscher.com)

### Japan

Hilscher Japan KK  
Tokyo, 160-0022  
Phone: +81 (0) 3-5362-0521  
E-mail: [info@hilscher.jp](mailto:info@hilscher.jp)

### Support

Phone: +81 (0) 3-5362-0521  
E-mail: [jp.support@hilscher.com](mailto:jp.support@hilscher.com)

### Republic of Korea

Hilscher Korea Inc.  
13494, Seongnam, Gyeonggi  
Phone: +82 (0) 31-739-8361  
E-mail: [info@hilscher.kr](mailto:info@hilscher.kr)

### Support

Phone: +82 (0) 31-739-8363  
E-mail: [kr.support@hilscher.com](mailto:kr.support@hilscher.com)

### Austria

Hilscher Austria GmbH  
4020 Linz  
Phone: +43 732 931 675-0  
E-mail: [sales.at@hilscher.com](mailto:sales.at@hilscher.com)

### Support

Phone: +43 732 931 675-0  
E-mail: [at.support@hilscher.com](mailto:at.support@hilscher.com)

### Switzerland

Hilscher Swiss GmbH  
4500 Solothurn  
Phone: +41 (0) 32 623 6633  
E-mail: [info@hilscher.ch](mailto:info@hilscher.ch)

### Support

Phone: +41 (0) 32 623 6633  
E-mail: [support.swiss@hilscher.com](mailto:support.swiss@hilscher.com)

### USA

Hilscher North America, Inc.  
Lisle, IL 60532  
Phone: +1 630-505-5301  
E-mail: [info@hilscher.us](mailto:info@hilscher.us)

### Support

Phone: +1 630-505-5301  
E-mail: [us.support@hilscher.com](mailto:us.support@hilscher.com)