

Operating Instructions

Tankvision Professional NXA85

Tankvision LMS NXA86B

Tank Gauging
System Monitor (Client/Server Configurations)





- Make sure the document is stored in a safe place such that it is always available when working on or with the device
- Avoid danger to individuals or the facility: read the "Basic safety instructions" section carefully, as well as all other safety instructions in the document that are specific to working procedures

The manufacturer reserves the right to modify technical data without prior notice. The Endress+Hauser sales organization will supply you with current information and updates to these instructions.

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1 About this document

1.1 Document function

This manual should support during the installation of Tankvision Professional NXA85 and LMS NXA86B.

1.2 Target audience

Beside basic PC operating knowledge no special training is needed to perform the Tank Gauging System operations. Nevertheless it is recommended receiving a training on the system by Endress+Hauser.

1.3 Software versions and certification

 Due to the certification process with weights and measures agencies, the latest software version might only be certified at a later stage. Also some features might be incompatible with the weights and measures regulations and can therefore not be combined.

1.4 Symbols

1.4.1 Safety symbols

DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

WARNING

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

CAUTION

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

1.4.2 Symbols for certain types of information

Tip

Indicates additional information



Reference to documentation



Reference to graphic



Notice or individual step to be observed

 1, 2, 3

Series of steps



Result of a step

1.4.3 Symbols in graphics

1, 2, 3, ...

Item numbers

1., 2., 3.

Series of steps

A, B, C, ...

Views

1.5 Documentation

 For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

The following document types are available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads), depending on the device version:

Document type	Purpose and content of the document
Technical Information (TI)	Planning aid for your device The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.
Brief Operating Instructions (KA)	Guide that takes you quickly to the 1st measured value The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.
Operating Instructions (BA)	Your reference document The Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.
Description of Device Parameters (GP)	Reference for your parameters The document provides a detailed explanation of each individual parameter. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.
Safety instructions (XA)	Depending on the approval, safety instructions for electrical equipment in hazardous areas are also supplied with the device. These are an integral part of the Operating Instructions.  The nameplate indicates which Safety Instructions (XA) apply to the device.
Supplementary device-dependent documentation (SD/FY)	Always comply strictly with the instructions in the relevant supplementary documentation. The supplementary documentation is a constituent part of the device documentation.

1.6 Change history

BA01654G_01.16

- Valid for software version: 18.0.2
- Initial version

BA01654G_02.17

- Valid for software version: 18.0.2
- Changes to the previous version:
Tankvision LMS added

BA01654G_03.17

- Valid for software version: 18.1.1
- Changes to the previous version:
 - Unification of the W&M and the non W&M software packages.

BA01654G_04.18

- Valid for software version: 18.1.1
- Changes to the previous version:
 - Compatibility with Windows 10 and Windows Server 2016
 - Minor changes

BA01654G_05.25

- Valid for software version: 18.1.1
- Changes to the previous version:
 - Minor changes

2 Basic safety instructions

2.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- ▶ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Follow the instructions in this manual.

2.2 Intended use

2.2.1 Intended use of Tankvision Professional NXA85 software

Tankvision Professional is specifically designed for operators of bulk storage facilities, marketing terminals, refineries and pipelines. It is designed to handle all the data acquisition, supervisory control and monitoring required in a single fully integrated solution.

Tankvision Professional integrates all major types of tank measurement instruments into one system.

All measured and calculated tank parameters are accessible to your tank farm and terminal operators as well as to connected host systems.

Multi-user operation is provided by the inbuilt Web Server offering the opportunity to access data at any connected location (local/remote) e.g. for administrative and accounting purposes.

2.2.2 Intended use of Tankvision LMS NXA86B software

Tankvision LMS is a total LNG Tank Storage and Management solution for Peak Shaving, Receiving and Production LNG facilities. The LMS system has been designed to interface to all instruments commonly found on LNG storage tanks, and to collect and present the instrument data through a range of intuitive graphical user interfaces. A typical LNG Tank will have a wide range of measurement instruments to measure Liquid Level, Liquid Density, Liquid and Vapour Temperature, Liquid and Vapour Pressure, Skin Temperature and much more.

Typically each tank would be fitted with an LTD gauge, two further level gauges configured as a Primary and Secondary, and an Alarm Gauge. The LTD gauge is a servo operated unit mounted on the tank roof. The purpose of the LTD gauge is to take accurate profiles of temperature and density throughout the liquid, and whilst not profiling provide continuous liquid level, temperature and density measurement. The Primary and Secondary gauges can be either servo and or radar operated units also mounted on the tank roof. The purpose of these gauges is to provide continuous liquid level measurement, and average liquid temperature measurement. They provide redundancy on the measurement of level and temperature. The average liquid temperature is derived from a

multi point temperature sensor device. The alarm gauge is often a servo or radar based gauge configured to provide volt free contact alarm status to an independent system.

An LMS system can operate in a simple standalone configuration or as a fully redundant system where security and integrity are of paramount importance. The LMS system has a flexible and scalable architecture allowing it to be tailored to a number of different applications easily.

2.3 IT security

The manufacturer warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

3 Incoming acceptance and product identification

3.1 Incoming acceptance

On receipt of the delivery:

1. Check the packaging for damage.
 - ↳ Report all damage immediately to the manufacturer.
Do not install damaged components.
2. Check the scope of delivery using the delivery note.
3. Compare the data on the nameplate with the order specifications on the delivery note.
4. Check the technical documentation and all other necessary documents, e.g. certificates, to ensure they are complete.



If one of the conditions is not satisfied, contact the manufacturer.

3.2 Product identification

The following options are available for identification of the software:

- Nameplate specifications
- Order code with breakdown of the software features on the delivery note
- Enter serial numbers from nameplates in *Device Viewer*
(www.endress.com/deviceviewer): All information about the software is displayed.

For an overview of the technical documentation provided, enter the serial number from the nameplate in the *Device Viewer* (www.endress.com/deviceviewer).

3.2.1 Nameplate

The information that is required by law and is relevant to the product is shown on the nameplate, e.g.:

- Manufacturer identification
- Product name
- Order code
- Extended order code
- Serial number
- Barcode

3.2.2 Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany
Place of manufacture: See nameplate.

3.2.3 Order code and product version



To find out the version of your software, enter the order code indicated on the nameplate in the search screen at the following address:
www.products.endress.com/order-ident

4 Introduction

4.1 About System Monitor

The Tank Gauging System Monitor (System Monitor) monitors any servers associated with the client to ensure that they are online. If a server becomes unresponsive the System Monitor is able to alert the user.

NOTICE

When switching to a single-server configuration the databases on the servers will cease to be synchronised.

This may lead to data loss!

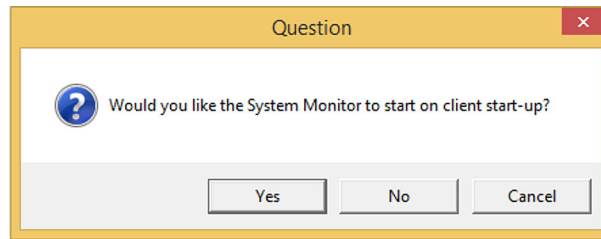
- Only use the Break Redundancy feature of the System Monitor if you are certain that this is what you want to do.

The System Monitor can be used to break the redundancy of a system, that is, to remove an unresponsive (offline) server from the Tank Gauging System. It is also capable of restoring the redundancy at a later time.

For more information, see chapter "Breaking the Redundancy".

5 Setup

To set up the System Monitor simply run it once. The user is presented with a dialogue box as shown below.

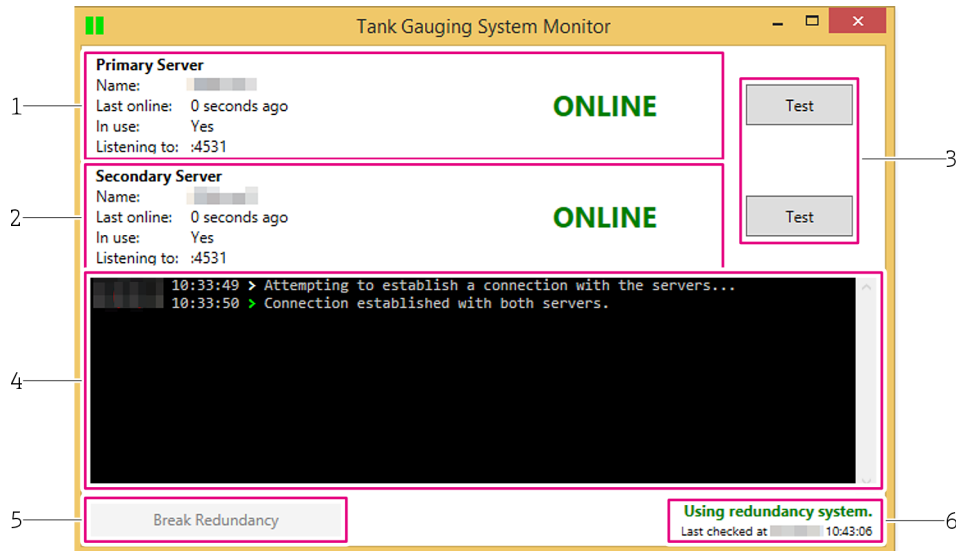


Click **Yes** to allow the System Monitor to automatically start up when the client starts. Alternatively, click **No** if you want to start the System Monitor manually. Clicking **Cancel** will not set the System Monitor to start up automatically, but it will ask you again the next time the System Monitor is manually started.

6 Window Overview

6.1 General

The window can be displayed by clicking on the tray icon.



- 1 Primary server information
- 2 Secondary server information
- 3 Test buttons
- 4 Log
- 5 Break Redundancy/Restore Redundancy button
- 6 General information

The main window and its controls:

- Primary server information: see chapter "Server and Information Overview"
- Secondary server information: This contains the same information as (1), but for the secondary server. See chapter "Server and Information Overview"
- Test buttons: Clicking these manually checks whether the server is online and reports the approximate latency between the servers and the client. See chapter "Test Buttons Overview"
- Log: This box displays any messages produced by the System Monitor while it has been running. Different coloured arrows show different levels of information. See chapter "Log Overview"
- Break Redundancy/Restore Redundancy button: This button causes the system to break/restore the redundancy and becomes clickable only when necessary. See chapter "Updating the Configuration"
- General information: Includes a message stating whether the system is using a redundancy or single-server configuration, as well as the time of the last communication attempt to the servers

Minimising or closing the window will hide it to the tray. To exit the System Monitor, instead right click on the tray icon and select **Exit**. For more information about the tray icon, see chapter "Tray Icon".

6.2 Server and Information Overview

Primary Server	
Name:	
Last online:	0 seconds ago
In use:	Yes
Listening to:	:4531
ONLINE	
Secondary Server	
Name:	
Last online:	0 seconds ago
In use:	Yes
Listening to:	:4531
ONLINE	

 1 The primary and secondary servers are both online in a redundant configuration

The server information section of the System Monitor displays the following information about each server:

- **Name** - The name of the server
- **Last online** - The amount of time since the last successful communication with the server. This displays **0 seconds ago** if the server is online, and **Unknown** if the System Monitor has not been able to communicate with the server since it started, or since a recent configuration change
- **In use** - Whether the server is part of the system or just being monitored. For example, after switching to a single-server configuration, one server will no longer be in use. The System Monitor will still check to see if it is online so that it can inform the user when it is possible to switch back to a redundancy configuration
- **Listening to** - The port the server hosts the Events Service on, the port used to check if the server is online
- **Status** - Displays **ONLINE** if the server can be reached by the System Monitor, otherwise displays **OFFLINE**

Primary Server	
Name:	
Last online:	0 seconds ago
In use:	Yes
Listening to:	:4531
ONLINE	
Secondary Server	
Name:	
Last online:	Unknown
In use:	No
Listening to:	:4531
OFFLINE	

 2 A user has switched the configuration to a single-server configuration after the secondary server went offline

Primary Server	
Name:	
Last online:	0 seconds ago
In use:	Yes
Listening to:	:4531
ONLINE	
Secondary Server	
Name:	
Last online:	0 seconds ago
In use:	No
Listening to:	:4531
ONLINE	

 3 The secondary server has come back online, but the system is still using a single-server configuration

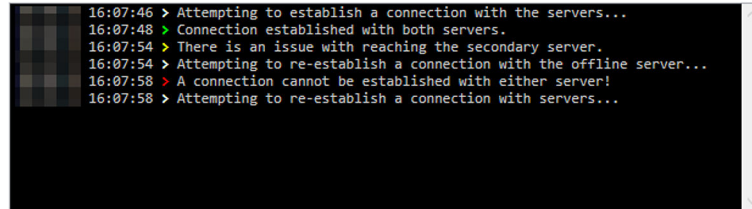
6.3 Test Buttons Overview

```
08:56:36 > Attempting to establish a connection with the servers...
08:56:37 > Connection established with both servers.
09:12:37 > Connection established with in ~0ms.
09:12:38 > Connection established with in ~1ms.
```

 4 The log showing successful connections to the servers

The test buttons attempt to create a connection with the servers and, if successful, display a success message along with an approximate latency to the log. If it is unable to establish a connection (after 1 second) it displays an error message in the log. For more information about the log, see the following chapter.

6.4 Log Overview



5 The System Monitor's log with some sample messages

The log section of the System Monitor displays messages created by the System Monitor when an event occurs. Each message is prefixed with the time and date as well as a coloured arrow indicating the severity of the messages.

6.4.1 Timestamp Format

The timestamp takes the format *Day/Month/Year Hour:Minutes:Seconds*.

6.4.2 Message Severity

The arrow icon (>) indicates the severity of the message and can take one of the 4 following colours:

- Indicates general information
- Indicates a successful action has occurred
- Indicates a non-critical issue or warning
- Indicates a critical issue has occurred

6.4.3 Examples of logged messages

The following list contains examples of messages that may be logged. The list is neither comprehensive nor applicable to all system configurations.

Message	Severity
–PROGRAM STARTED–	Info
–PROGRAM EXITED–	Info
Attempting to establish a connection with the servers	Info
Unable to write to the log file	Warn
System monitor is shutting down	Warn
Connection established with server in time ms	Success
Couldn't establish connection to server. Gave up after time ms	Fail
No changes detected in the last hour	Info
Connection established with both servers	Info
There is an issue with reaching the primary server	Warn
Attempting to re-establish a connection with the offline server	Info
There is an issue with reaching the secondary server	Warn
Attempting to re-establish a connection with the offline server	Info

Message	Severity
There is an issue with reaching the server	Fail
Attempting to re-establish a connection with servers	Info
The system configuration file will be backed up	Info
The server will be removed from the system	Warn
Switched configuration to single server solution	Info
Unable to switch configuration to single server solution	Fail
The system will switch servers	Warn
Switching server from server to server	Info
Primary server switched in configuration	Success
Unable to switch servers	Fail
The system configuration file will be restored	Info
Switched configuration to redundancy solution	Success
Unable to switch configuration to redundancy solution	Fail
The current user will be logged off	Info
Error attempting to log user off	Fail
Service pack will be downloaded	Info
Service pack downloaded to path	Success
Error downloading service pack	Fail

6.4.4 Saved Files

The log is saved into a daily file usually located at *C:\ProgramData\Tank Farm Automation\Client\SystemMonitor\logs*. These files are saved as plain text and can be viewed at any time. The timestamp in the log takes the format *YearMonthDay HourMinutesSeconds:Milliseconds*.

7 System Status

The following is a table of icons displaying the various possible statuses of the system.

Status Icon	Meaning
	The system is using a redundancy configuration and both servers are online.
	The system is using a redundancy configuration and the secondary server is offline.
	The system is using a redundancy configuration and the primary server is offline.
	The system is using a redundancy configuration and both servers are offline.
	The system is using a single-server configuration and the primary server is online.
	The system is using a single-server configuration and the primary server is offline.

The relevant icon is used as the tooltip of the System Monitor. If the icon contains a green bar then the system is operational. If no green bar is displayed then the client cannot communicate with either server and the system can be considered offline. This can be considered a serious error.

7.1 Balloon Tool Tips

Balloon tool tips appear above the tray icon every time the system status changes. This can be disabled by right clicking the tray icon and selecting **Disable Balloon Tips**. They can be re-enabled by again right clicking the tray icon and selecting **Enable Balloon Tips**.

7.2 Update Period

The primary and secondary servers are checked once every second by the System Monitor to ensure they are online. If the server does not respond within 1 000 ms (1 second) then it is deemed to be offline by the System Monitor and will appear as such in the tray icon and main window.

7.3 User Intervention

If user intervention is recommended, the main window will appear on screen (after 10 seconds). The delay is to ensure that the main window does not appear if, for example, a connection to the servers is momentarily lost and then gained just a few seconds later. For more information on updating the configuration, see chapter "Updating the Configuration".

User intervention is recommended when:

■ **Using a Redundancy Configuration**

Both servers are offline. No action can be taken using the System Monitor, but a serious error has occurred and should be taken in to account.

■ **Using a Single-Server Configuration**

- Both servers are offline. The System Monitor will recommend switching to a redundancy configuration as an attempt to communicate with either server as soon as one becomes available. A serious error has occurred.
- The primary server is offline but the secondary server is online. The client is unable to communicate with the servers as the only server it is pointed at is offline. The System Monitor will recommend switching the configuration to use the secondary, online server.
- Both servers are online. As both servers are online, it is recommended to switch back to a redundancy configuration as this is generally seen as the safer of the 2 options.

8 Updating the Configuration

If it is possible to update the configuration, the **Break Redundancy/Restore Redundancy** button will be available to click (see chapter "General"). If the user has the correct permissions, the System Monitor will then attempt to modify the configuration of the system.

8.1 Permissions

To modify the configuration, the following must be true:

- The user has Windows administrative access
- The user has the Security Manager's *System Settings/Redundancy/Reconfigure* permission
- An audit event can successfully be created

8.2 Breaking the Redundancy

 Just because you can break the redundancy does not mean you should. The system will work normally in a redundancy configuration even if one server cannot be reached. You should only use this option if you wish to remove a server from the system.

The redundancy can be broken when the system is currently using a redundancy configuration and one of the servers goes offline. Breaking the redundancy will cause the offline server to be completely ignored by the client, instead leaving the client to communicate with the online server in a single-server configuration.

Breaking the redundancy causes the online server to become the primary server. The secondary server will now be greyed out to indicate that it is not in use (see chapter "Server and Information Overview"). A server cannot be removed from the system unless it is already offline and the alternative server is online.

NOTICE

When switching to a single-server configuration the databases on the servers will cease to be synchronised.

This may lead to data loss!

- ▶ Only use the Break Redundancy feature of the System Monitor if you are certain that this is what you want to do.

8.3 Restoring the Redundancy

The redundancy can be restored if the system is currently using a single-server configuration and:

- Both monitored servers are online. This will cause the client to communicate with both servers again and the system will be deemed to be using a fully operational redundancy system
- Both monitored servers are offline. Although neither server can be reached, it is possible to switch to a redundancy system so that as soon as one server becomes available the client will be able to communicate with it

Restoring the redundancy causes each server to take its initial status (i.e. the server that was originally the primary server will become the primary server if it was not already) and neither server will be greyed out, indicating that both are in use (see chapter "Server and Information Overview"). Only the server originally in the redundancy system can be re-added to the system. The System Monitor cannot be used to add new servers to the system.

8.4 Switching Servers

If the system is currently using a single-server configuration and in the rare case that the primary server is offline while the secondary server is now online, it is possible to switch servers so that the client can communicate with the online server.

If the user selects the option to Switch Servers the System Monitor will:

- 1. Restore the redundancy
- 2. Immediately and automatically break the redundancy to switch to the working server

Switching servers causes the online server to become the primary server. The secondary server will still be greyed out to indicate that it is not in use (see chapter "Server and Information Overview").

9 Tray Icon

The tray icon appears in the tray of the client and displays the current status of the system. For available statuses and their definitions, see chapter "System Status".

9.1 Clicking the Tray Icon

Clicking the tray icon once will display the main window of the System Monitor.

9.2 Right Clicking the Tray Icon

Right clicking the tray icon will bring up the tray icon's context menu.

9.3 Context Menu

The context menu contains the following:

- **Enable/Disable Tooltips** - Enables or disables the tray icon's balloon tool tips respectively. For more information about tooltips, see chapter "Balloon Tool Tips"
- **Restart Client** - Presents a warning box asking the user if they wish to restart the client. Proceeds to restart the client if the user selects yes
- **Exit** - Closes the System Monitor

10 Troubleshooting

Error message in the log: "Unable to write to the log file..."

Possible cause	Solution
The System Monitor was unable to create a log file or the log file is in read-only mode.	Ensure that all files in the System Monitor's logs folder (usually located at <i>C:\ProgramData\tank farm automation\client\SystemMonitor\logs</i>) can be written to.

Error message in the log: "Unable to switch configuration to ..."

Possible cause	Solution
The user does not have the required permissions to switch configurations.	To switch configurations, users must be a Windows administrator and have the <i>System Settings/Redundancy/Reconfigure</i> permission set by the Security Manager. 1. See chapter "Updating the Configuration".

Error message in the log: "Unable to switch configuration to ..."

Possible cause	Solution
The System Monitor was unable to create a backup of the application.config file.	The configuration file will not be modified if a backup cannot be created first. 1. Ensure the backup folder exists (usually found at <i>C:\ProgramData\tank farm automation\client\configuration\backup</i>) and that the application.config file found in this folder (if it exists) is not in use by any other application (such as a text editor).

Error message in the log: "Unable to switch configuration to ..."

Possible cause	Solution
An audit event could not be created.	Switching configurations will fail if an audit event cannot be created first.

Error message window: "Unable to modify system configuration."

Possible cause	Solution
See previous error messages: "Unable to switch configuration to ...".	See previous error messages: "Unable to switch configuration to ...".

 Error message window: "Unable to create/delete shortcut" during setup

Possible cause	Solution
The user does not have Windows administrator privileges.	Ensure the user has Windows administrator privileges when attempting to set the System Monitor to automatically start-up. 1. Delete the System Monitor shortcut (if it exists) found in the start-up folder (usually located at <i>C:\ProgramData\Microsoft\Windows\Start Menu\Programs\StartUp</i>) and try again.



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