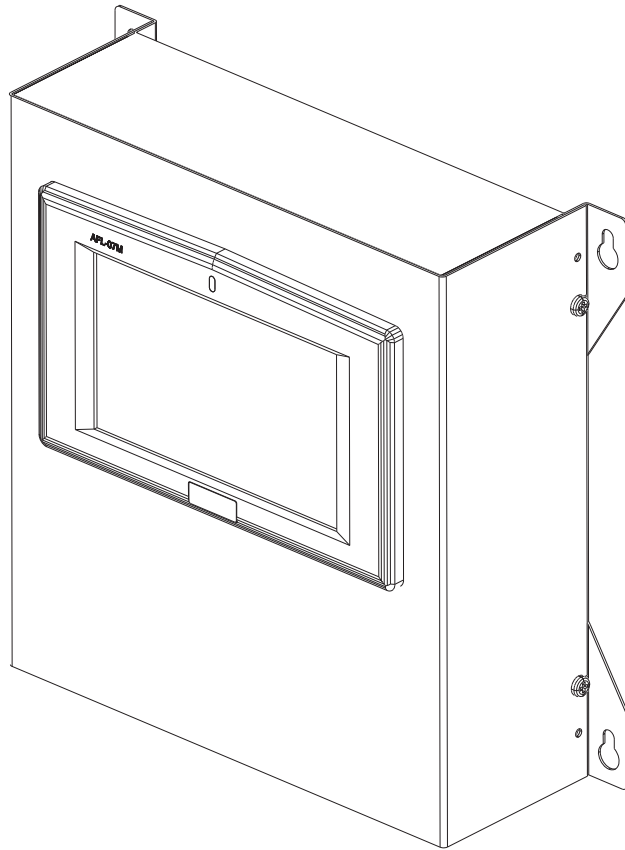


Operating Instructions

Tankvision

Multi Scan NXA83B

Installation and Maintenance manual
Weights and Measures Additions



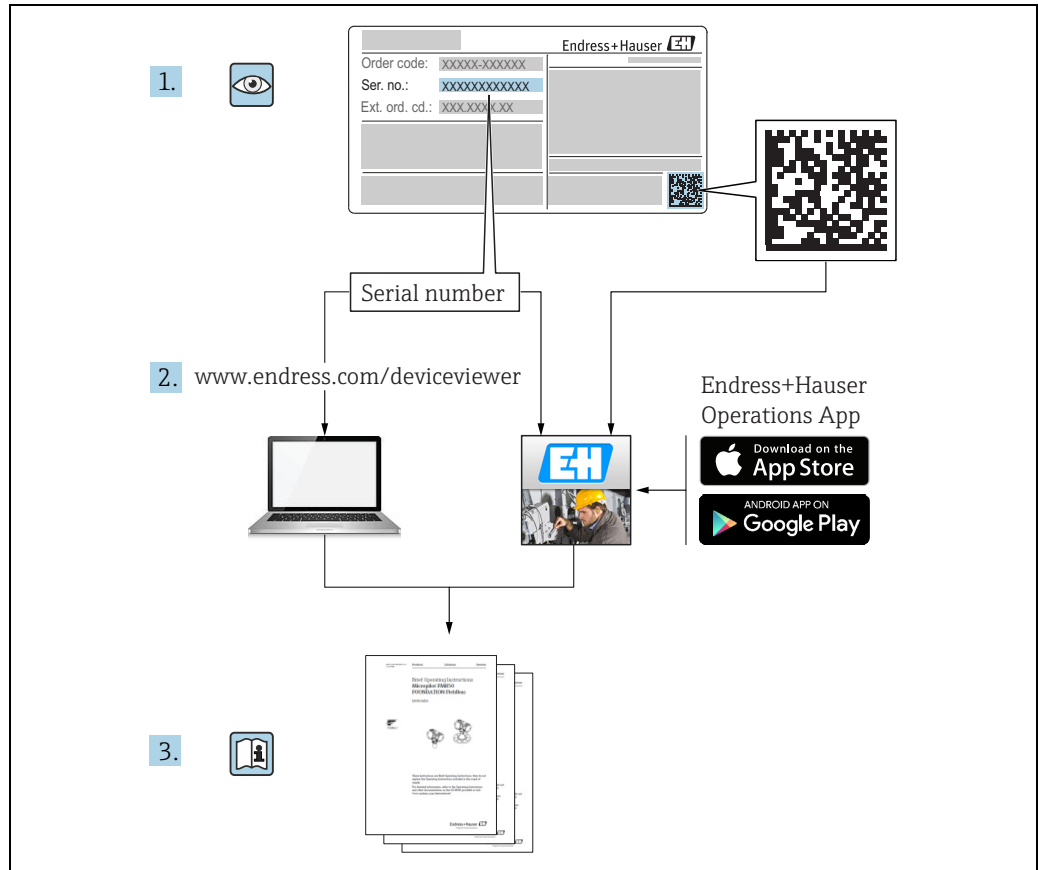


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1 Document information

1.1 Target audience for this manual

This manual is giving detailed information on the system capabilities and architecture. It supports project and sales engineers in designing the system architecture during acquisition and execution phase. Furthermore during operation time of the system all servicing personnel in need of detailed knowledge about the system capabilities.





1.2 Version history

Document version	Valid for SW version	Changes to the previous version
BA01287/00/EN/01.14	3.0.10	Initial version
BA01287/00/EN/02.15	3.0.12	Change of order code structure
BA01287/00/EN/03.16	3.1.0 and 4.0.0	Old V1 support and simplified configuration
BA01287/00/EN/04.18	3.4.0 and 4.4.0	Changes to V1 Driver and GBT calculations




1.3 Document function

1.3.1 Used symbols



Safety symbols

Symbol	Meaning
 <small>A0011189-EN</small>	DANGER! This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
 <small>A0011190-EN</small>	WARNING! This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
 <small>A0011191-EN</small>	CAUTION! This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
 <small>A0011192-EN</small>	NOTICE! This symbol contains information on procedures and other facts which do not result in personal injury.

Symbols for certain types of information

Symbol	Meaning
 A0011193	Tip Indicates additional information.
 A0011195	Reference to page Refers to the corresponding page number.
1. , 2. , 3. ...	Series of steps
 A0018373	Result of a sequence of actions

Symbols in graphics

Symbol	Meaning
1, 2, 3 ...	Item numbers
1. , 2. , 3. ...	Series of steps
A, B, C ...	Views
 A0011187	Hazardous area Indicates a hazardous area.
 A0011188	Indicates a non-hazardous location Safe area (non-hazardous area)

1.4 Documentation

1.4.1 Operating instructions

Document number	Instrument	Type of Document
BA01288G/00	<ul style="list-style-type: none"> Multi Scan NXA83B 	Operation manual
BA01290G/00		Installation and Maintenance manual
BA01291G/00		Configuration manual
BA01292G/00		DCC Configuration manual
BA01289G/00		OPC Tank Data Server manual
BA01297G/00		Web Client System Operation manual
BA01287G/00		Weights and Measures Additions
BA01296G/00		Redundancy manual

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 beginning work, the specialist staff must have read and understood the instructions in the Operating Instructions and supplementary documentation as well as in the certificates (depending on the application)
- Following instructions and basic conditions

The operating personnel must fulfill the following requirements:

- Being instructed and authorized according to the requirements of the task by the facility's owner operator
- Following the instructions in these Operating Instructions

2.2 IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

Endress+Hauser can be contacted to provide support in performing this task.

2.3 Designated use

2.3.1 Applications

Inventory control

By using Tankvision Multi Scan to monitor the tank level and stored volume of valuable liquids remotely, owners or operators of tank farms or terminals for petroleum products and chemicals (liquids) can visualize the volume of the stored medium in real time. The data can be used to plan the inventory and distribution. The data can also be used to manage tank farm operations like pumping or transferring products. Tankvision has its unique concept using network technology. Without using proprietary software, the users can visualize and manage their valuable liquids stored in the tanks by a web browser. Tankvision Multi Scan is a flexible and cost effective solution due to its scalable architecture. The application coverage goes from small depots with only a few tanks up to refineries.

Inventory Calculations

Tankvision Multi Scan calculates based on measured variables and tank capacity tables:

- Observed/Gross volumes,
- Net volumes and
- Mass

of products like

- Hydrocarbons,
- Liquefied gases,
- Asphalt.

They are corrected according to international standards, including API/ASTM tables 5A, 5B/6, 53A, 53B/54, 23/24, LPG.

This includes temperature corrections at 15 °C, 60 °F and alternative temperatures. Additionally, available pumpable volumes and water volume are calculated.

Remote configuration of measuring equipment

Some on-site operations can be avoided using remote configuration of measuring equipment during commissioning or maintenance (the availability of this feature may depend on the system configuration).

Application areas

- Tank farms in refineries
- Ship loading terminals
- Marketing and distribution terminals
- Pipeline terminals
- Logistic terminals for tanks storing products like crude oils, refined white and black products, chemicals, LPG

2.4 Workplace safety

For work on and with the device:

- Wear the required personal protective equipment according to federal/national regulations.
- Switch off the supply voltage before connecting the device.

2.5 Operational safety

Risk of injury!

- Operate the device in proper technical condition and fail-safe condition only.
- The operator is responsible for interference-free operation of the device.

Conversions to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers

- If, despite this, modifications are required, consult with Endress+Hauser.

Repair

To ensure continued operational safety and reliability,

- Carry out repairs on the device only if they are expressly permitted.
- Observe federal/national regulations pertaining to repair of an electrical device.
- Use original spare parts and accessories from Endress+Hauser only.

2.6 Product safety

The device is designed to meet state-of-the-art safety requirements, has been tested and left the factory in a condition in which it is safe to operate. The device complies with the applicable standards and regulations as listed in the EC declaration of conformity and thus complies with the statutory requirements of the EG directives. Endress+Hauser confirms the successful testing of the device by affixing to it the CE mark.

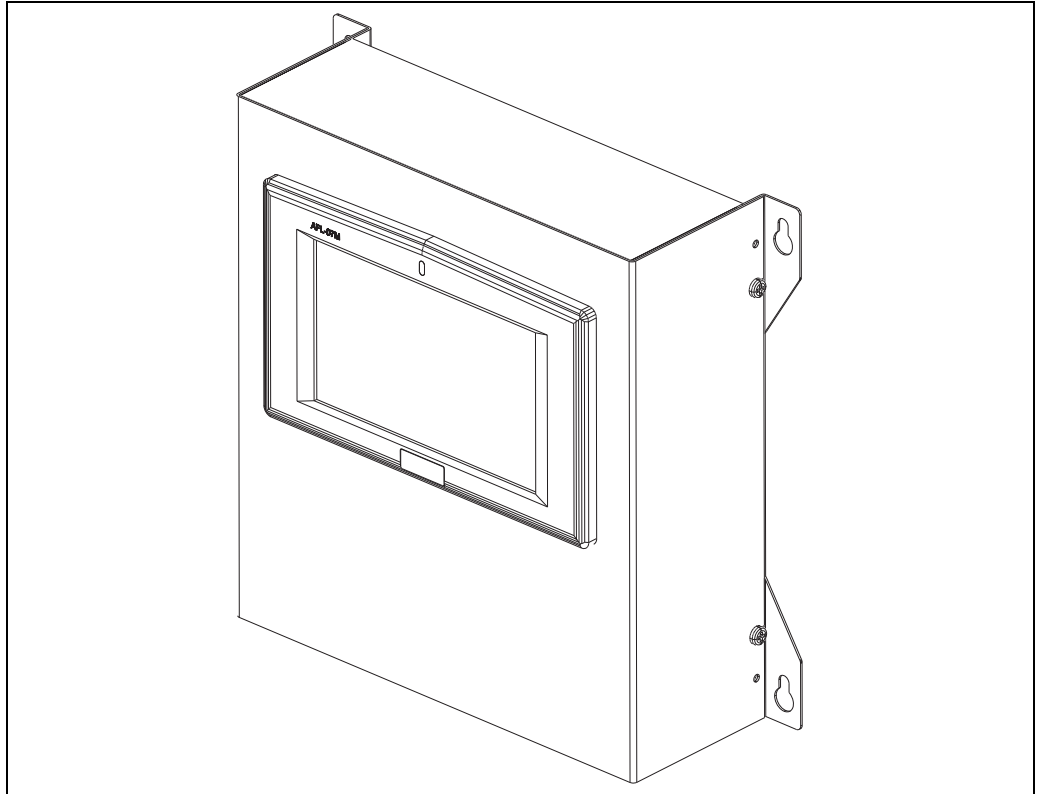
3 Overview

This manual describes the additional features of the Weights and Measures version of the Multi Scan NXA83B, designated as Tankvision Multi Scan NXA83B W&M. The standard features of the Multi Scan NXA83B are described in the Tankvision Multi Scan NXA83B I&M manual.

The Multi Scan NXA83B is a configurable system designed for tank gauging and tank inventory management systems.

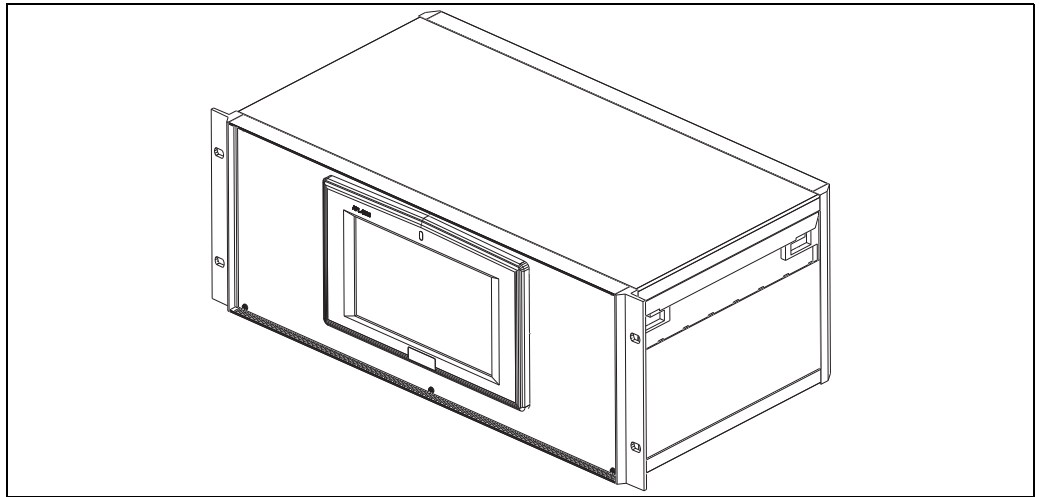
It has been designed to fulfil a number of requirements some of which are listed below:

- Act as a foreign device gateway allowing old legacy equipment and devices with proprietary interfaces to interface with modern devices using OPC and Ethernet Technology
- To provide a complete tank gauging and tank inventory management system for small sites. It can interface directly with a wide variety of tank gauging devices and provide a number of communication links to host devices. The Multi Scan NXA83B polls the field instruments maintaining an in-memory database of live and calculated data whilst also being able to service host computers for data.
- It can provide up to 8 serial interfaces, capable of supporting a range of different electrical interfaces such as RS232, RS485, BPM, Current Loop etc.
- An Ethernet port and two USB ports are also provided.
- There is a 7 in LCD touch screen built into the front of the device, with navigation via the screen.
- The Weights and Measures version of the Multi Scan NXA83B supports extra functionality so that the database and operating system can be physically locked and sealed by W&M personnel. A system that has been sealed cannot have any changes carried out to the operating system, tankgauging firmware, tankgauging database or any access to the flash drive.
- The Weights and Measures version of the Multi Scan NXA83B is only available in the the Wall and Rack Mount format without touch display.
- The Weights and Measures version of the Multi Scan NXA83B does not support a local USB mouse or keyboard, these will be permanently disabled.



NXA83_WallMount_Title

Wall Mount

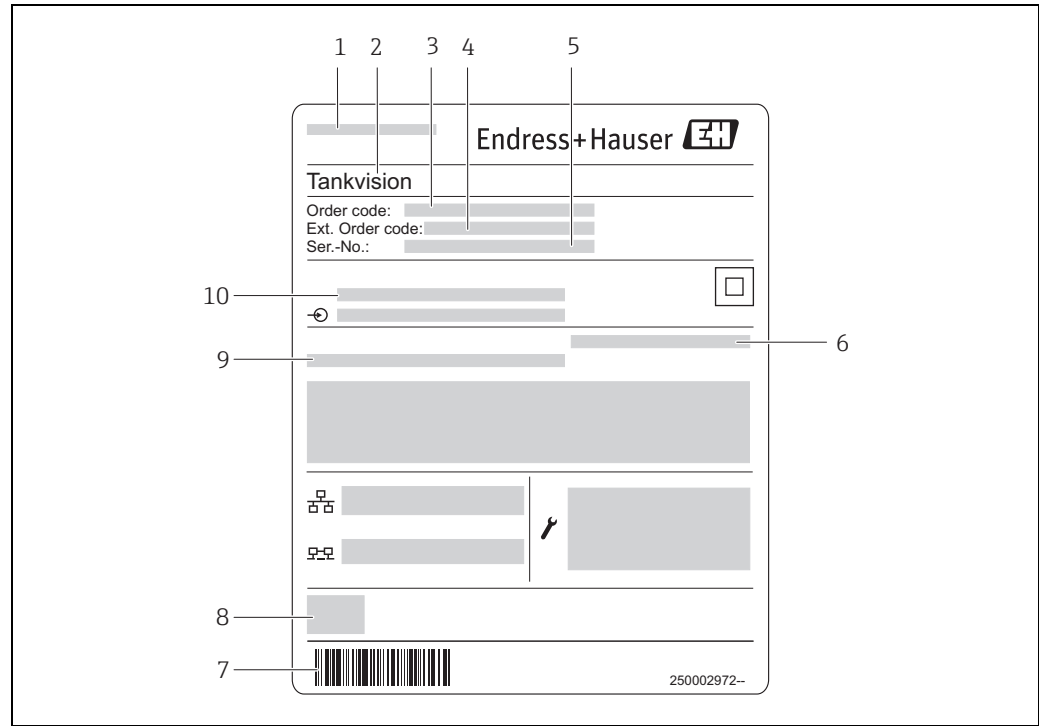


NXA83_RackMount_Title

19 in Rack Mount

4 W&M Functionality

4.1 Name Plate



- 1 Address of manufacturer
 2 Device name
 3 Order code
 4 Extended order code (Ext. ord. cd.)
 5 Serial number (Ser. no.)
 6 Degree of protection
 7 Barcode
 8 CE mark
 9 Admissible ambient temperature
 10 Supply voltage

On the Wall Mount version of the Multi Scan NXA83B, the name plate is attached on the right hand side of the cover.

On the Rack Mount version of the Multi Scan NXA83B, the name plate is attached on the left side of the front.

The name plate is attached with seals to the Multi Scan NXA83B.

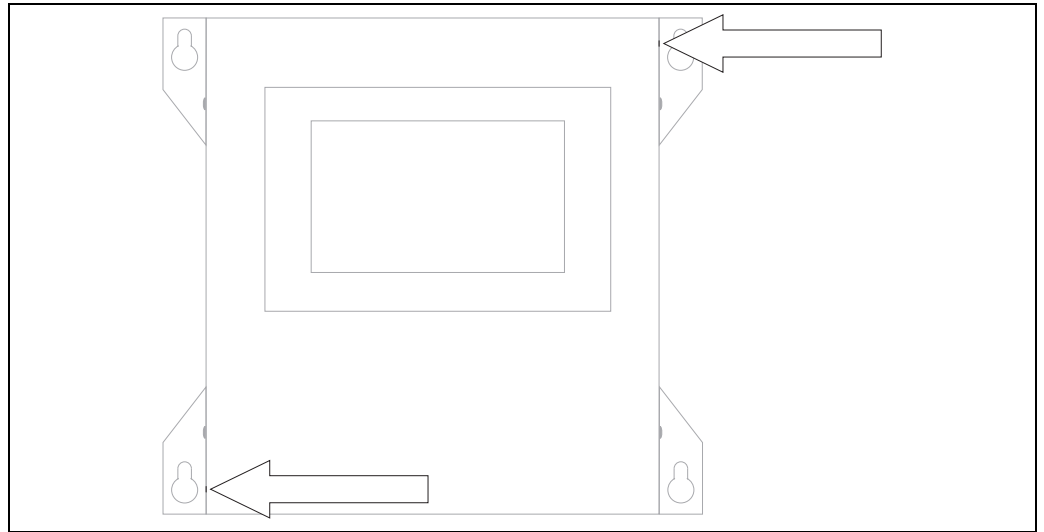
4.2 Unlocking the system

The system must be unlocked before any modifications to the database/firmware can be carried out, e.g. during commissioning.

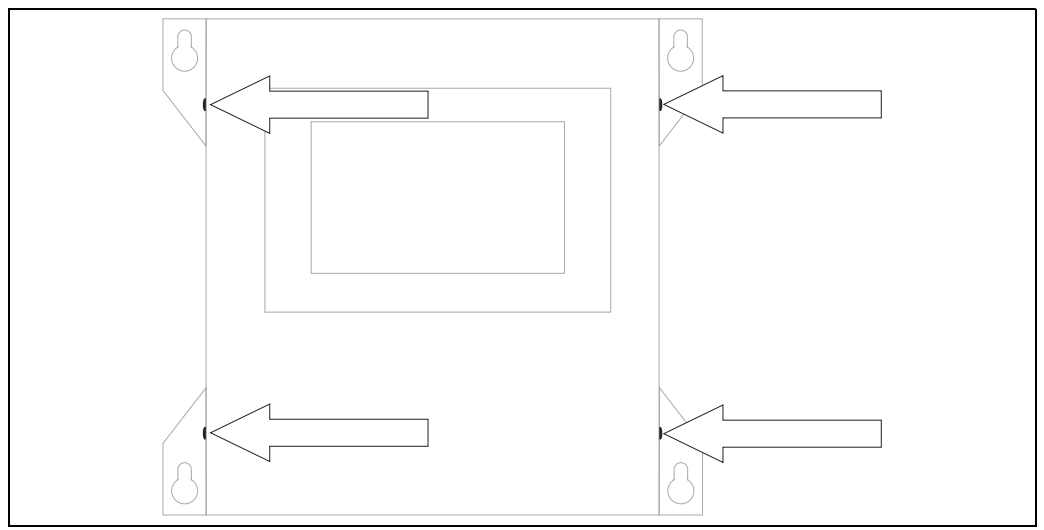
There is a physical lock device inserted into the LX2 motherboard. This must be removed to unlock the system. To gain access to the lock device, the front panel must be removed, including the lead seals.

To unlock a Multi Scan NXA83B:

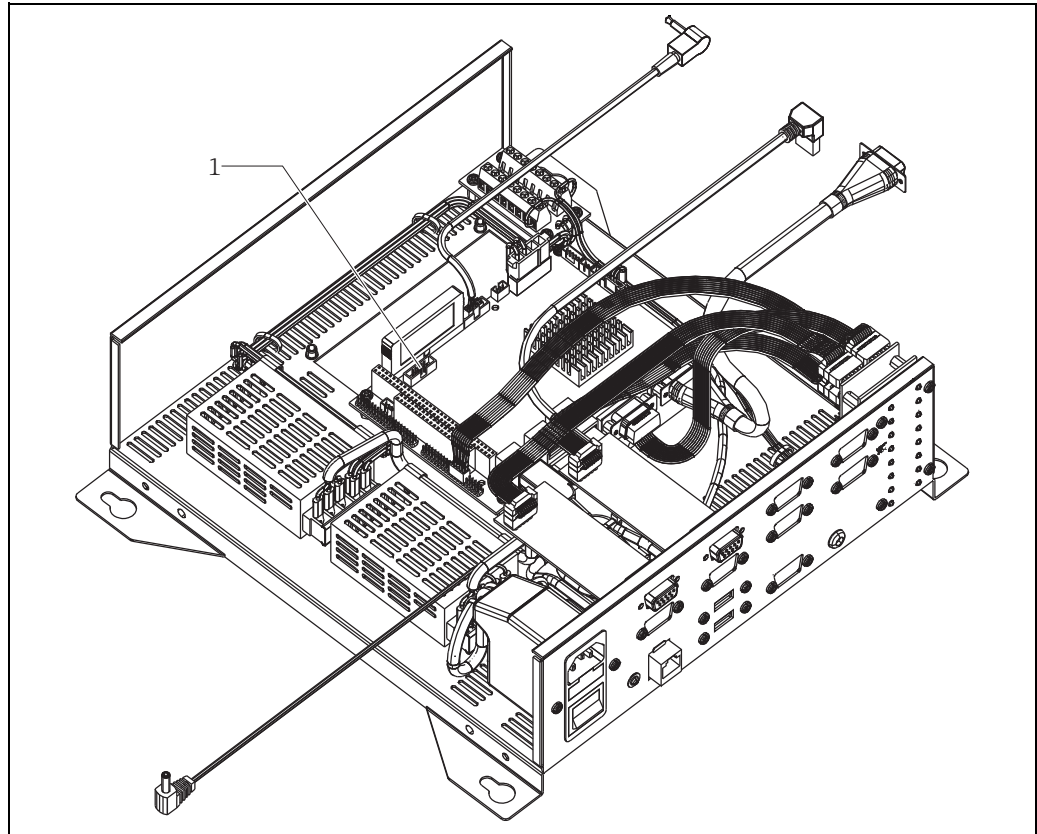
1. Break the seals on the top right and bottom left of the cover. These seals will consist of lockwire through a hole in the cover and chassis (see diagram of hole location in Locking section).



2. Loosen the four screws indicated below and remove the cover.



3. Remove the lock device (a 10 way IDC connector) plugged into connector CN14 on the LX2 mother board.



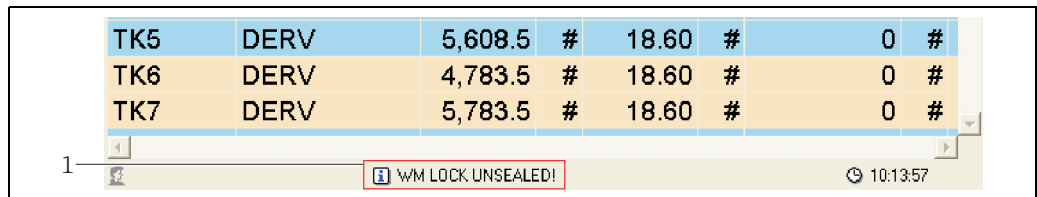
NXA83_Wall-Mount_CN14

1 W&M Lock, CN14

4. Reboot the system.

The system will remain locked for approximately 1 minute following the reboot. After this time all of the standard configuration activities may be carried out, such as downloading a modified database from a configurator PC. However the USB ports will not recognize a mouse or keyboard even if unlocked.

The tankgauging display on the NXA83B will show a message at the bottom of the screen, to indicate the lock has been removed and the system is no longer W&M approved.



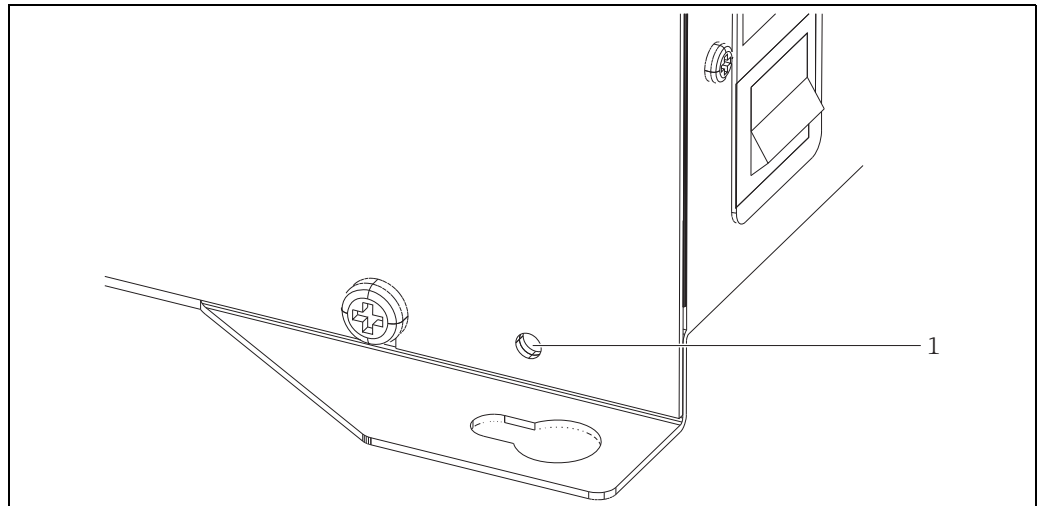
NXA83_Grid-View_WM-Lock-Unsealed

1 Indicator: W&M Lock unsealed

4.3 Locking the system

The procedure for locking the system is the reverse of unlocking:

1. Remove the cover.
2. Insert the Lock device into connector CN14 on the LX2 mother board.
3. Replace the cover and tighten the four screws.
4. Insert the lockwires in the top right and bottom left of the cover and seal. The wires should be inserted through the cover and the base plate, thereby making it impossible to remove the cover without breaking the seal.



1 W&M Lockwire Hole

NXA83_WallMount_Removing-Cover_Lockwire-Holes

When the system is locked the following will apply:

- USB ports will not recognize a mouse or keyboard
- USB ports will not recognize any flash sticks
- The internal flash drive cannot be accessed via the network
- Remote control of the Multi Scan NXA83B is disabled
- The Tankgauging display screens cannot be closed, therefore no access is available to the Windows operating system

This will prohibit any changes to the Windows operating system, the tankgauging firmware and the tankgauging database.

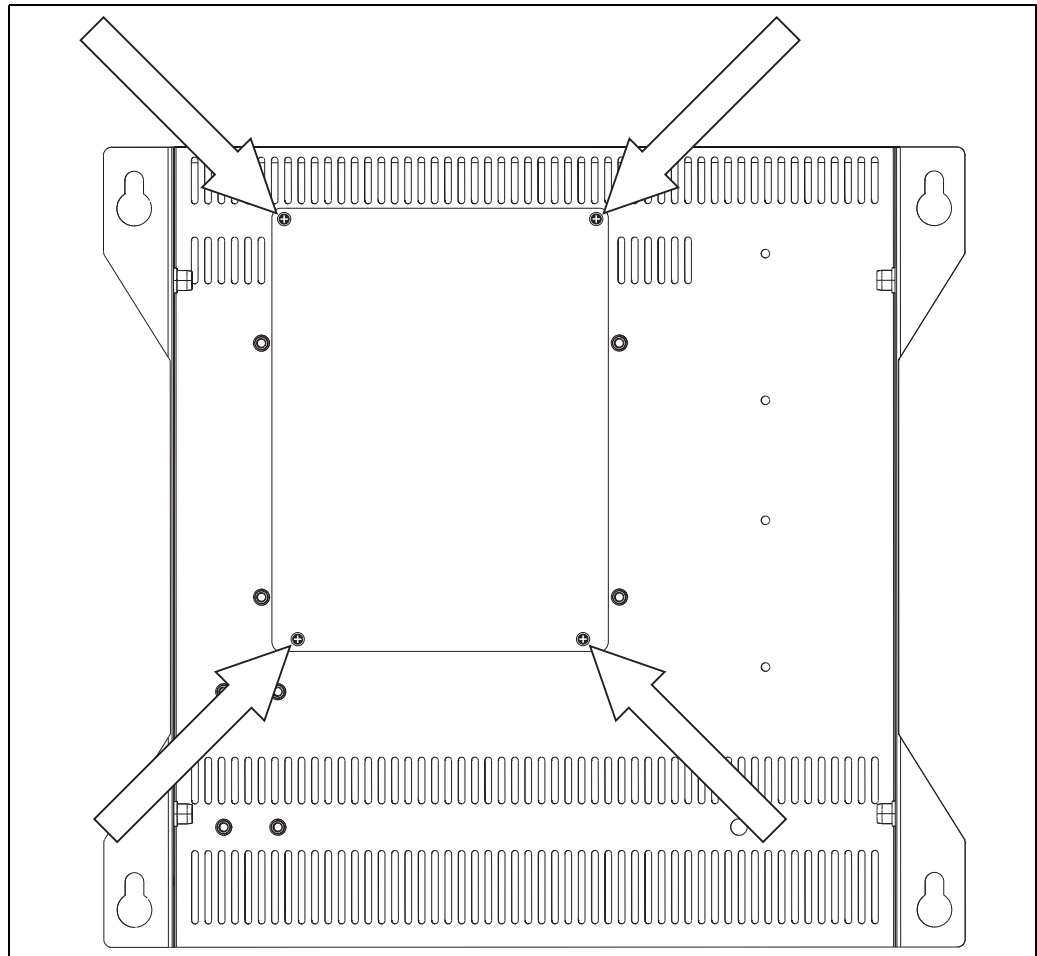
4.4 Rear access panel

There is a removable panel on the underside of the Multi Scan NXA83B, which is used to gain access to the underside of the LX2 motherboard so that the internal flash memory drive may be replaced.

This is not an operation that should normally be required, therefore this panel should be locked at the time of commissioning. It does not need to be unlocked to carry out any database modifications etc.

The rear panel will be fixed with four screws capable of being lockwired.

To lock the panel, insert a lockwire through the four screws and apply a seal to the lockwire.



NXA83_WallMount_Rear-Access-Cover

If access is required to the rear of the LX2 motherboard remove the seal and remove the panel, but once finished the seal should be re-applied.

4.5 W&M display features

4.5.1 Data Status tags

The status of all data fields shown in the tankgauging screens will be indicated by a set of characters displayed after the value (or replacing the value in the case of data failure). These will include:

Character	Description
DN	= Diagnostic Number: Indicates data failure and is followed by a two digit number indicating the error code. This will replace the value displayed.
&	Data is Manual input
S	Data is stored, i.e. Level when servo gauge is not following level etc.
#	Data is not calibrated (not W & M approved)

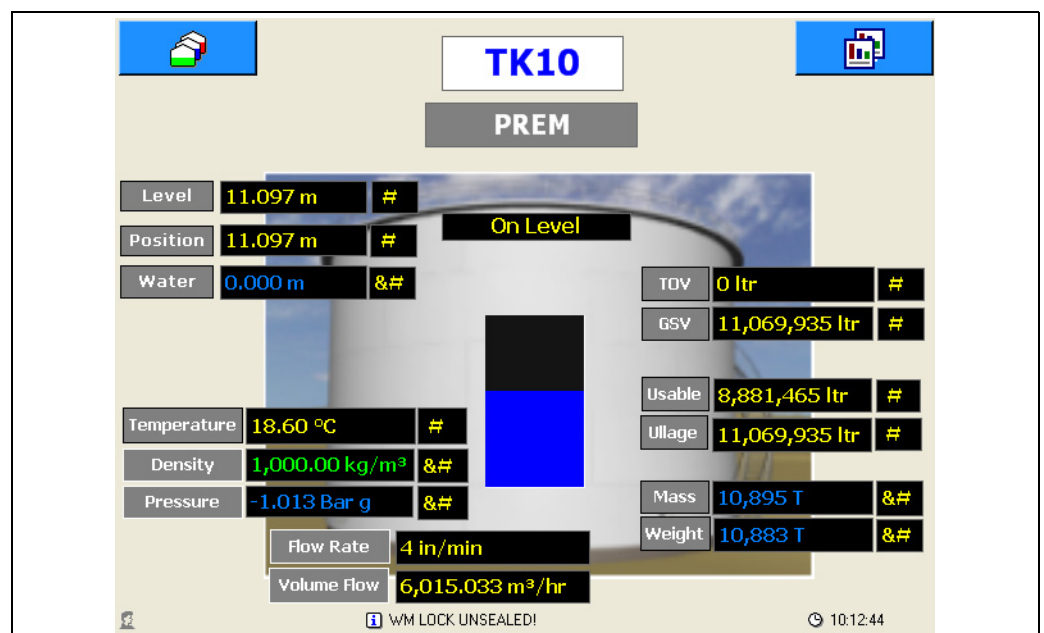
All values calculated from primary inputs (such as volumes, mass etc.) will inherit any status values from the primary data used in the calculation.

Calibrate means that the tank has been accepted by W&M authorities for custody transfer. The calibration status is configured using the Multi Scan NXA83B configurator tools which are described in a later section.

The following parameters can be set to be Calibrated:

- Product Level
- Product Temperature
- Density
- Water Level
- Vapour Pressure
- Vapour Temperature

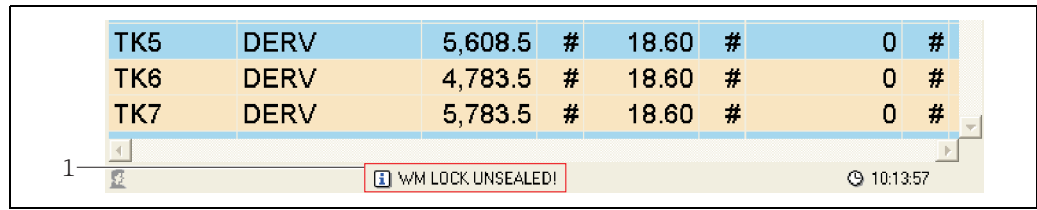
The diagram below is an example of a Single Tank display configured to show the W&M status fields.



NXA83_Tank-View_WM-Lock-Unsealed

4.5.2 Lock Status display

If the system is unlocked a message will be displayed on the status bar at the bottom of the screen.



1 Indicator: W&M Lock unsealed

The system should not be considered W&M approved if this message is displayed. When W&M locked the status message will read "WM APPROVED".

4.6 Printing

A printer may be connected as normal to the USB ports or via the network.

The same set of status tags will be printed against each data item as shown on the 7 in display (→ 15).

Inventory Report - Weights and Measures

TankID	Product	Level	Water Level	Temp.	Ref. Density	Gross Observed Volume	Gross Standard Volume	Available Room	Usable Weight	Ullage Weight				
		mm	mm	°C	kg/l	ltr	ltr	ltr	kg	kg				
TK1	BUTANE	3,230	#	OM	#	18.60	#	DN 04	F#	3,230.000	DN 04	16,770.000	DN 04	DN 04
TK10	PREM	12,234	#	OM	#	18.60	#	1.00000M	#	12,233.800	12,204.072	7,766.200	12,191.019M	7,739.042M
TK11	KERO	13,234	#	OM	#	18.60	#	1.00000M	#	13,233.800	13,201.642	1,766.200	13,187.521M	1,760.024M
TK12	ADDATIVE	14,234	#	OM	#	18.60	#	1.00000M	#	14,233.800	14,199.212	4,766.200	14,184.024M	4,749.533M
TK13	BUTANE	15,234	#	OM	#	18.60	#	1.00000M	#	15,233.800	15,196.782	4,766.200	15,180.527M	4,749.533M
TK14	EMPTY	16,235	#	OM	#	18.60	#	1.00000M	#	16,235.400	16,235.400	0	16,218.035M	OM
TK15	EMPTY	DN 00	F#	OM	#	DN 00	F#	DN 00	#	DN 00	DN 00	DN 00	DN 00	DN 00
TK2	KERO	15,771	#	OM	#	18.60	#	1.00000M	#	15,770.500	15,732.178	0	15,715.351M	OM
TK3	BUTANE	5,230	#	OM	#	18.60	#	1.00000M	#	5,229.900	DN 04	8,770.100	DN 04	DN 04
TK4	PREM	6,232	#	OM	#	18.60	#	1.00000M	#	6,231.500	6,216.357	8,768.500	6,209.708M	8,737.837M
TK5	DERV	6,116	#	OM	#	18.60	#	1.00000M	#	6,116.100	6,101.238	13,883.900	6,094.712M	13,835.348M
TK6	DERV	3,769	#	OM	#	18.60	#	1.00000M	#	3,768.500	3,759.343	16,231.500	3,755.322M	16,174.738M
TK7	DERV	4,769	#	OM	#	18.60	#	1.00000M	#	4,768.600	4,757.012	14,231.400	4,751.924M	14,181.633M
TK8	PREM	10,232	#	OM	#	18.60	#	1.00000M	#	10,232.000	10,207.136	9,768.000	10,196.219M	9,733.841M
TK9	DERV	6,767	#	OM	#	18.60	#	1.00000M	#	6,766.600	6,750.157	12,233.400	6,742.937M	12,190.620M
Totals										133,284.300	124,560.529	119,721.601	124,427.299	93,852.148

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NXA83_Weights&Measures_Inventory-Report

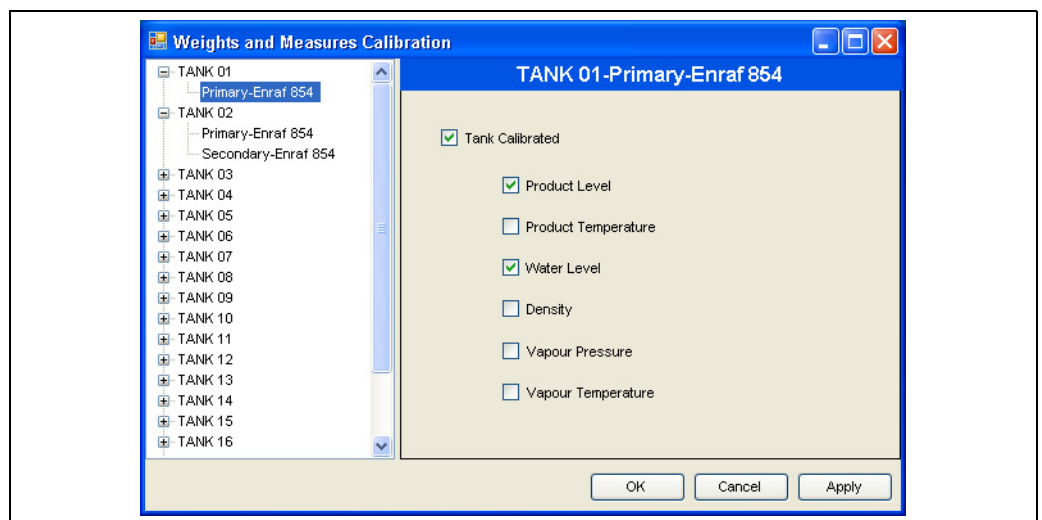
4.7 W&M Calibration

Weights and Measures (W&M) approved Multi Scan NXA83B are required to display the approval status of all parameters displayed on screen. Data for tanks that are not approved will be displayed with a '#' symbol.

The **W&M Calibration** screens allows tanks to be marked as approved and also to mark the individual parameters on those tanks. These parameters comprise:

- Product Level
- Product Temperature
- Water Level
- Density
- Vapour Pressure
- Vapour Temperature

The W&M Calibration screens are available as part of the Multi Scan NXA83B Configurator, via the menu option **Configuration** → **W&M Calibrate**.



NXA83_Weights&Measures-Calibration

In order to adjust the calibration status of a gauge, it must first be selected. Choose the tank containing the Gauge from the list on the left of the screen. Expand the tank and choose the gauge from those available. The individual calibration status boxes will be grayed out and marked as not calibrated (unticked) until the **Tank Calibrated** field is ticked. Once the **Tank Calibrated** field is ticked the individual parameters may be ticked to show their calibration status.

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