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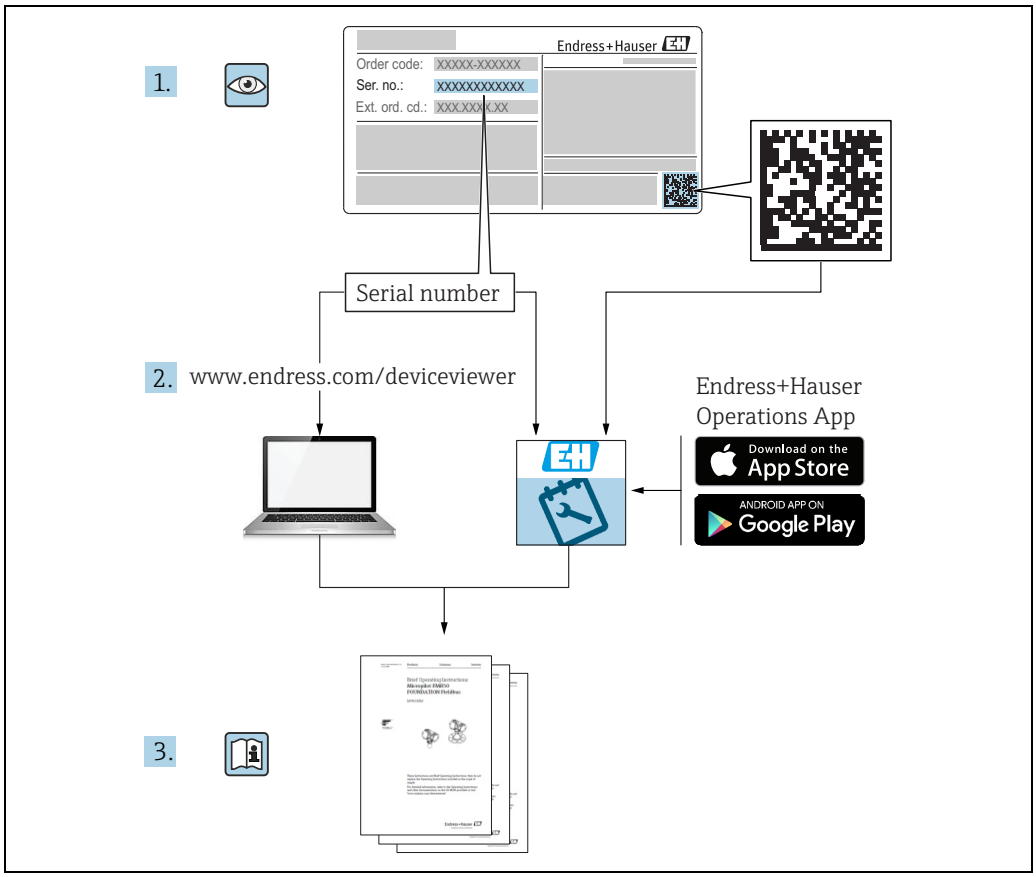
71611393
2023-06-19

Valid as of software version:
5.1.0

Operating Instructions
Tankvision
Multi Scan NXA83B

Installation and Maintenance manual
Weights and Measures Additions

Endress+Hauser
People for Process Automation



- Make sure the document is stored in a safe place such that it is always available when working on or with the device.
- To 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 in line with technological developments without prior notice. Your Endress+Hauser sales center will supply you with current information and updates to this manual.

Version history

Document version	Valid for SW version	Changes to the previous version
BA01287G/01.14	3.0.10	Initial version
BA01287G/02.15	3.0.12	Change of order code structure
BA01287G/03.16	3.1.0 and 4.0.0	Old V1 support and simplified configuration
BA01287G/04.18	3.4.0 and 4.4.0	Changes to V1 Driver and GBT calculations
BA01287G/05.21	5.0.0	Migration to Windows 10 IoT operating system
BA01287G/06.23-00	5.1.0	Introduction of a new Webserver

Table of Contents

1 About this document

1.1 Document function

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 Symbols

1.2.1 Safety symbols

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

1.2.2 Symbols for certain types of information and graphics

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

1.2.3 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)

1.3 Documentation

The following documentation types are available in the Downloads area of the Endress+Hauser website: www.endress.com/downloads

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

- *W@M Device Viewer:* www.endress.com/deviceviewer - Enter the serial number from the nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the matrix code on the nameplate

1.4 Registered trademarks

Microsoft®, Windows® and Internet Explorer®
Registered trademarks of the Microsoft Corporation

Modbus™
Modbus is a registered trademark of Schneider Electric USA, Inc.

Java®
Registered trademark of Sun Microsystems, Inc.

Mozilla® Firefox®
Registered trademark of the Mozilla Foundation

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All other marks are property of their respective owners.

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 personnel must fulfill the following requirements for its tasks:
- 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 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 or 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 pump able 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

2.3 Workplace safety

For work on and with the device:
- Wear the required personal protective equipment according to federal or national regulations.

Before connecting or disconnecting the device:
- Switch off the supply voltage.

2.4 Operational safety

Risk of injury!
- Operate the device only if it is in proper technical condition, free from errors and faults.
- The operator is responsible for interference-free operation of the device.

Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers!
- If modifications are nevertheless required, consult with the manufacturer.

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 the repair of an electrical device.
- Use only original spare parts and accessories.

2.5 Product safety

This measuring device is designed in accordance with good engineering practice 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. It meets general safety standards and legal requirements. It also complies with the EC directives listed in the device-specific EC Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.
Furthermore, the device meets the legal requirements of the applicable UK regulations (Statutory Instruments). These are listed in the UKCA Declaration of Conformity along with the designated standards.
By selecting the order option for UKCA marking, Endress+Hauser confirms a successful evaluation and testing of the device by affixing the UKCA mark.

Contact address Endress+Hauser UK:
- Endress+Hauser Ltd.
  Floats Road
  Manchester M23 9NF
  United Kingdom
  www.uk.endress.com

2.6 IT security

Our 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 Identification

3.1 Product identification

The following options are available for identification of the device:

- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- *W@M Device Viewer:* www.endress.com/deviceviewer - Enter the serial number from the nameplate

The following documentation types are available in the Downloads area of the Endress+Hauser website: www.endress.com/downloads

3.2 Nameplate

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

Manufacturer identification
Device name
Order code
Extended order code
Serial number
Degree of protection
Barcode
CE mark
Admissible ambient temperature
Supply voltage

3.3 Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany

Place of manufacture: See nameplate.

3.4 Order code and device version

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

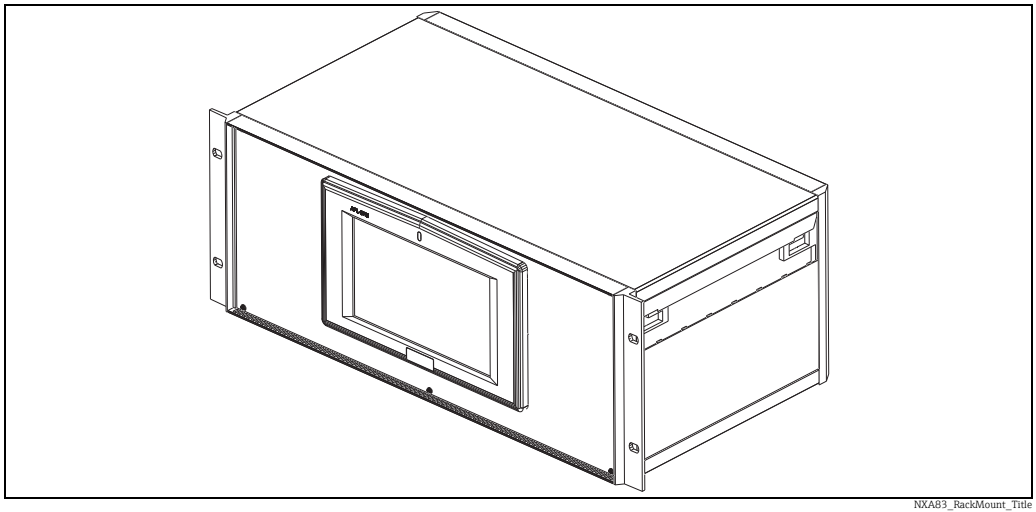
4 Overview

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, tank-gauging firmware, tank-gauging database or any access to the flash drive.
- The Weights and Measures version of the Multi Scan NXA83B is only available in the 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_RackMount_Title

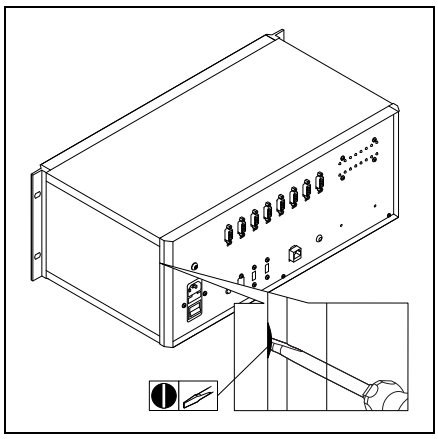
19 in Rack Mount

5 W&M Functionality

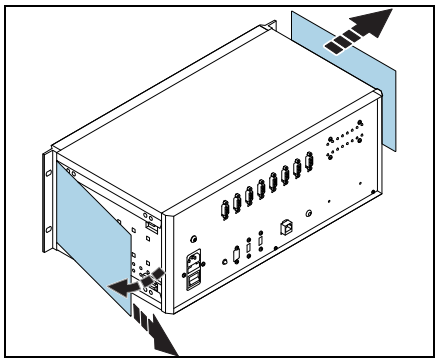
5.1 Unlocking the system

The system must be unlocked before any modifications to the database or firmware can be carried out, e.g. during commissioning.
There is a physical lock device inserted into the motherboard. It must be removed to unlock the system. To gain access to the lock device, the covers must be removed.

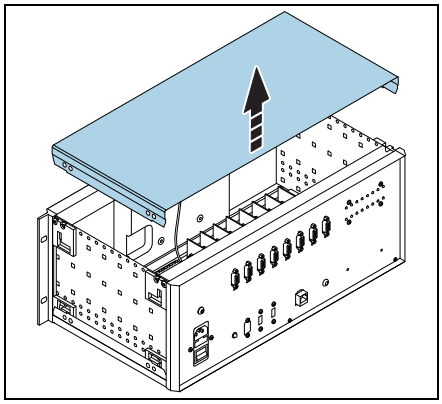
Removing the covers of Multi Scan NXA83B



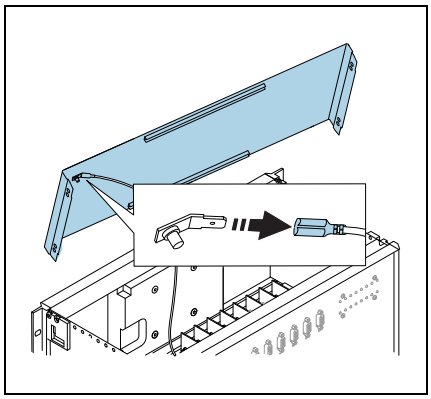
1. Insert the flat screwdriver between side-cover and a chassis.



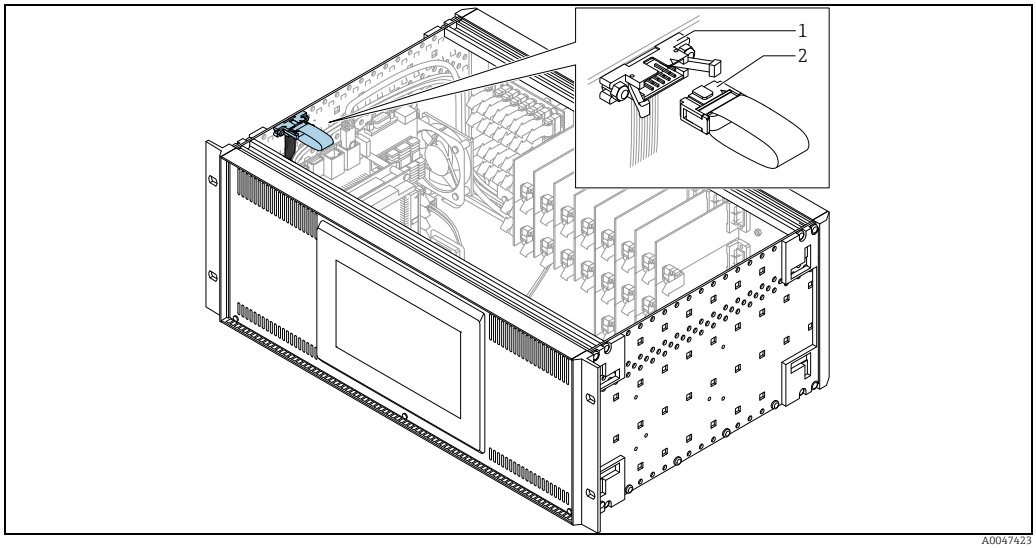
2. Remove the side-covers.



3. Move up the top-cover.

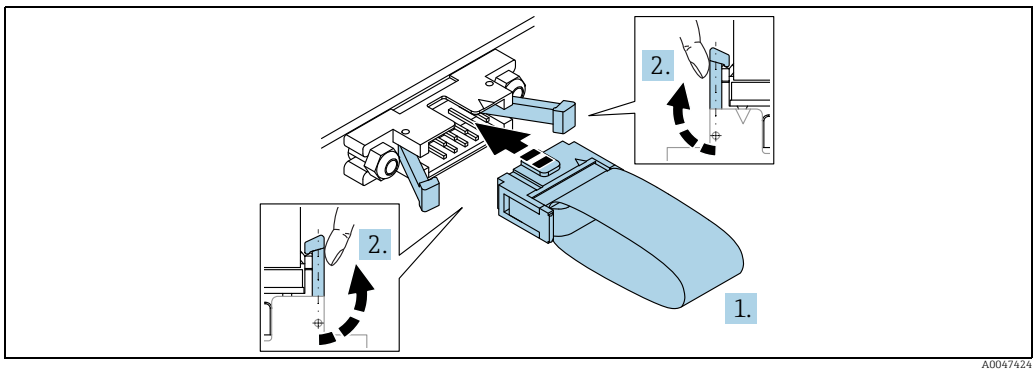


4. Disconnect the grounding cable from the top-cover.



Locking device location

1 Locking device socket
2 Locking device



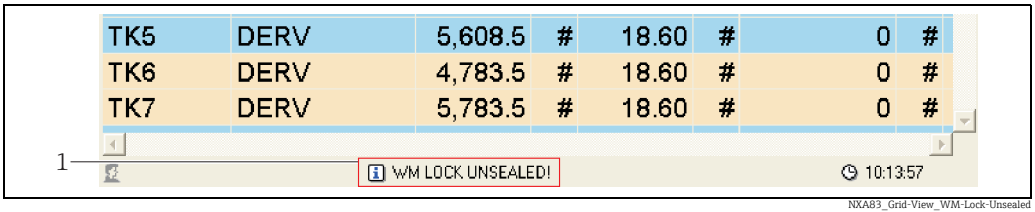
Removing the locking device

Removing the locking device:

1. Open the side locks.
2. Pull out the locking device from the socket.

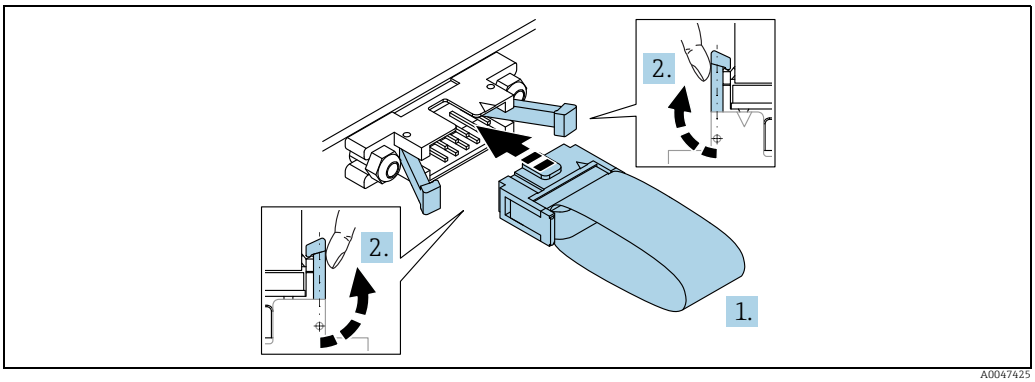
The system will remain locked for approximately 1 minute following the reboot. After this time all of the standard configuration activities may be carried out, such as downloading a modified database from a configurator PC. However the USB ports will not recognize a mouse or keyboard even if unlocked.

The tank-gauging 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.



1 Indicator: W&M Lock unsealed

5.2 Locking the system



Inserting the locking device

To lock the system:

1. Insert the locking device into the socket.
2. Close the side locks.

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 tank-gauging 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 tank-gauging firmware and the tank-gauging database.

5.3 W&M display features

5.3.1 Data Status tags

The status of all data fields shown in the tank-gauging 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:

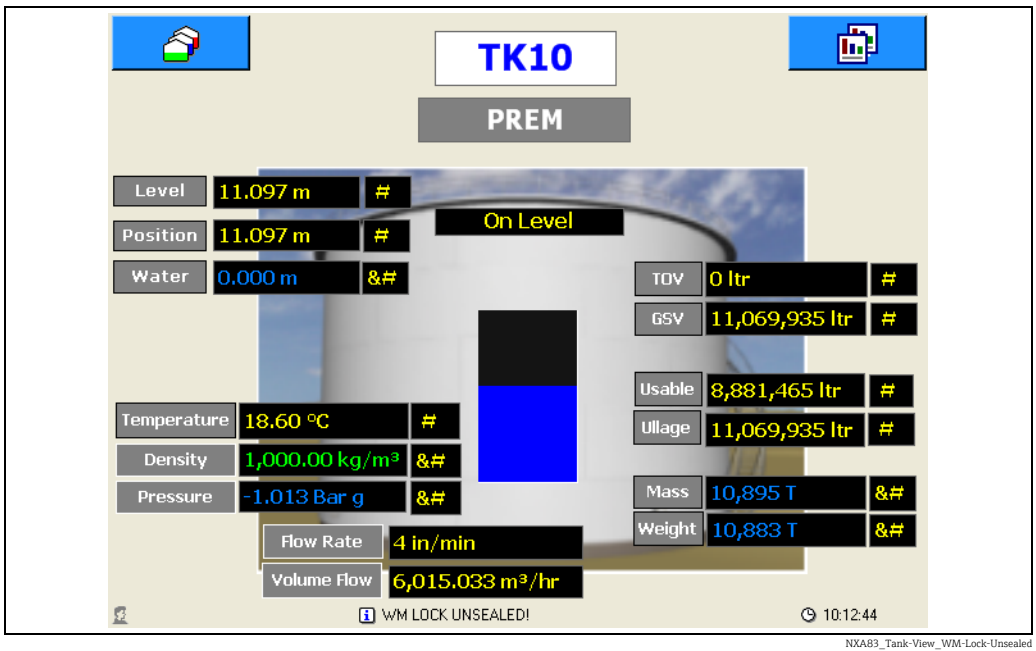
Character	Description
DN	= Diagnostic Number: Indicates data failure and is followed by a two digit number indicating the error code. This will replace the value displayed.
&	Data is Manual input
S	Data is stored, i.e. Level when servo gauge is not following level etc.
#	Data is not calibrated (not W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

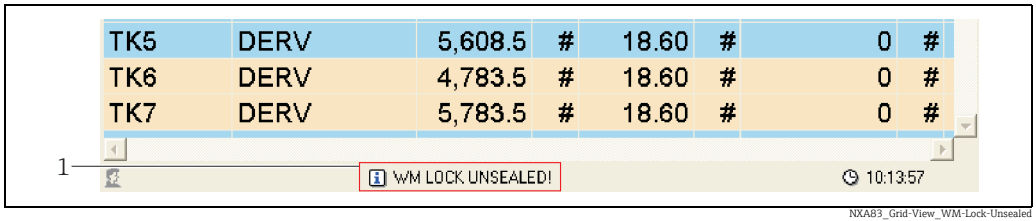
The diagram below is an example of a Single Tank display configured to show the W&M status fields.



NXA83_Tank-View_WM-Lock-Unsealed

5.3.2 Lock Status display

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



NXA83_Grid-View_WM-Lock-Unsealed

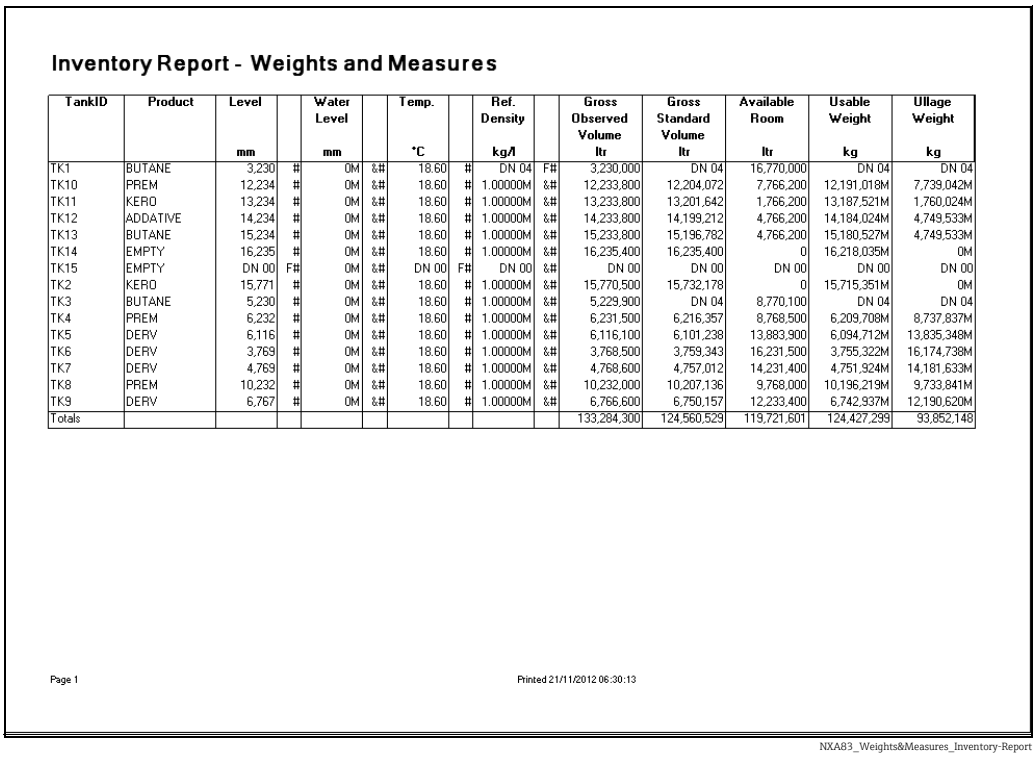
1 Indicator: W&M Lock unsealed

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"**.

5.4 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 (→ 14).



Inventory Report - Weights and Measures

TankID	Product	Level mm		Water Level mm		Temp. °C		Ref. Density kg/l		Gross Observed Volume ltr	Gross Standard Volume ltr	Available Room ltr	Usable Weight kg	Ullage Weight kg
TK1	BUTANE	3,230	#	0M	&#	18.60	#	DN 04	F#	3,230,000	DN 04	16,770,000	DN 04	DN 04
TK10	PREM	12,234	#	0M	&#	18.60	#	1.00000M	&#	12,233,800	12,204,072	7,766,200	12,191,018M	7,739,042M
TK11	KERO	13,234	#	0M	&#	18.60	#	1.00000M	&#	13,233,800	13,201,642	1,766,200	13,187,521M	1,760,024M
TK12	ADDATIVE	14,234	#	0M	&#	18.60	#	1.00000M	&#	14,233,800	14,199,212	4,766,200	14,184,024M	4,749,533M
TK13	BUTANE	15,234	#	0M	&#	18.60	#	1.00000M	&#	15,233,800	15,196,782	4,766,200	15,180,527M	4,749,533M
TK14	EMPTY	16,235	#	0M	&#	18.60	#	1.00000M	&#	16,235,400	16,235,400	0	16,218,035M	0M
TK15	EMPTY	DN 00	F#	0M	&#	DN 00	F#	DN 00	&#	DN 00	DN 00	DN 00	DN 00	DN 00
TK2	KERO	15,771	#	0M	&#	18.60	#	1.00000M	&#	15,770,500	15,732,178	0	15,715,351M	0M
TK3	BUTANE	5,230	#	0M	&#	18.60	#	1.00000M	&#	5,229,900	DN 04	8,770,100	DN 04	DN 04
TK4	PREM	6,232	#	0M	&#	18.60	#	1.00000M	&#	6,231,500	6,216,357	8,768,500	6,209,708M	8,737,837M
TK5	DERV	6,116	#	0M	&#	18.60	#	1.00000M	&#	6,116,100	6,101,238	13,883,900	6,094,712M	13,835,348M
TK6	DERV	3,769	#	0M	&#	18.60	#	1.00000M	&#	3,768,500	3,759,343	16,231,500	3,755,322M	16,174,738M
TK7	DERV	4,769	#	0M	&#	18.60	#	1.00000M	&#	4,768,600	4,757,012	14,231,400	4,751,924M	14,181,633M
TK8	PREM	10,232	#	0M	&#	18.60	#	1.00000M	&#	10,232,000	10,207,136	9,768,000	10,196,219M	9,733,841M
TK9	DERV	6,767	#	0M	&#	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

Page 1

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NXA83_Weights&Measures_Inventory-Report

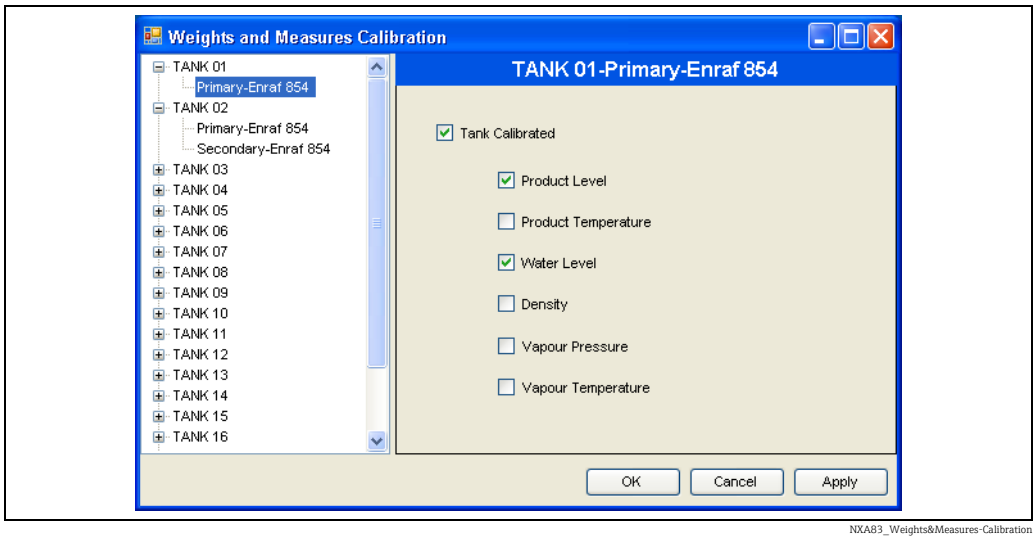
5.5 W&M Calibration

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
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.

Index

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