

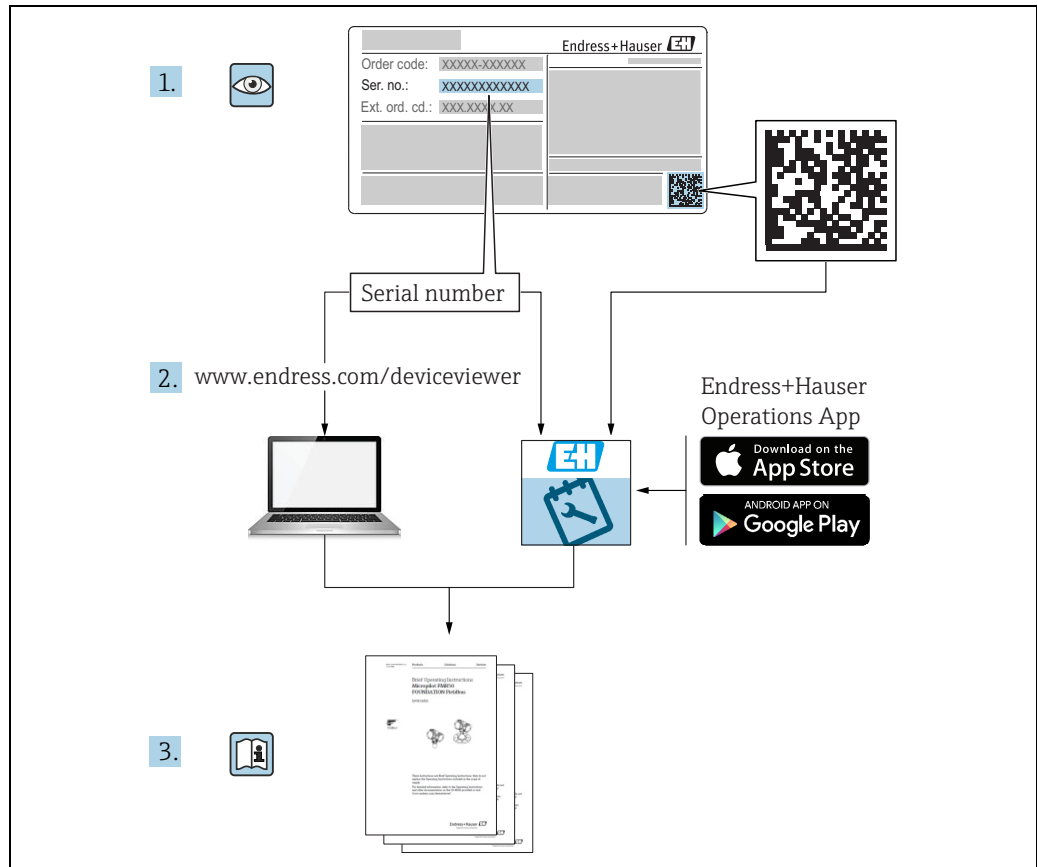
Operating Instructions

Tankvision

Multi Scan NXA83B

Installation manual





A0023555

- 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
BA01290G/01.14	3.0.10	Initial version
BA01290G/02.15	3.0.12	Change of order code structure
BA01290G/03.16	3.1.0 and 4.0.0	Old V1 support and simplified configuration
BA01290G/04.18	3.4.0 and 4.4.0	Changes to V1 Driver and GBT calculations
BA01290G/05.21	5.0.0	Migration to Windows 10 IoT operating system
BA01290G/06.23-00	5.1.0	Introduction of a new Webserver

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1 About this document

1.1 Document function



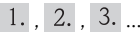

This manual is giving detailed information on the system capabilities and architecture. It supports project and sales engineers in designing the system architecture during acquisition and execution phase. Furthermore during operation time of the system all servicing personnel in need of detailed knowledge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

1.2 Symbols



1.2.1 Safety symbols

Symbol	Meaning
 <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.

1.2.2 Symbols for certain types of information and graphics

Symbol	Meaning
 <small>A0011193</small>	Tip Indicates additional information.
 <small>A0011195</small>	Reference to page Refers to the corresponding page number.
	Series of steps
 <small>A0018373</small>	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

Enraf, Honeywell, Rosemount, Emerson, Saab, L&J, VAREC, GPE are registered trademarks and trademarks of these organizations and companies.
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 Introduction

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.
- Up to 20 serial interfaces can be provided, 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.

The Multi Scan NXA83B is available as 19 in Rack Mount version. An option is to have a 7 in touch screen built into the front of the device to view and navigate through the different display options.



19 in Rack Mount

NXA83_Rack-Mount

The Multi Scan is available in the following versions:

- 1 to 4 serial ports
- 1 to 12 serial ports
- 1 to 20 serial ports (16 in or outputs and 4 outputs)

The ports can be configured to be either inputs (from the field or host ports) or outputs (to host systems or slave ports). For the version 1 to 20 serial ports, 4 ports are reserved for outputs only.

4.1 Device Support and Compatibility

The Multi Scan NXA83B is designed to interface to the following gauge and transmitter types:

Supplier	Gauge/transmitter type
Endress+Hauser	<ul style="list-style-type: none"> ■ NMR81 and NMR84 Micropilot ■ NRF81 Tankside Monitor ■ NMS80 and NMS81 Proservo ■ NRF590 Tank Side Monitor ■ NMS5 Proservo

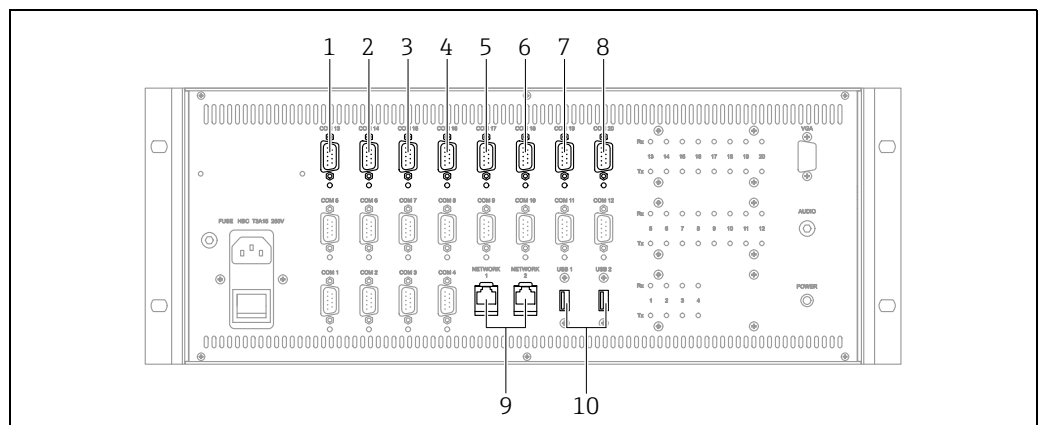
Enraf	<ul style="list-style-type: none"> ■ 811 Servo Gauge ■ 813 Servo Gauge ■ 854 Servo Gauge ■ 872 Radar Gauge ■ 873 Radar Gauge ■ 865 Temperature Selector ■ 911 Flexline Radar Gauge
Whessoe	<ul style="list-style-type: none"> ■ 1311 Transmitter/1071 Outstation ■ 1315 Transmitter/2006 Mechanical float gauge, 1140 Servo gauge ■ ITG 50/60/70 Servo gauges
Saab	<ul style="list-style-type: none"> ■ TRL2 ■ Rex ■ Pro Radar Gauges
Motherwell	<ul style="list-style-type: none"> ■ 2800 Servo Gauge
Varec	<ul style="list-style-type: none"> ■ 1800/1900 Mark/Space Transmitters

Additional protocols and variants upon request.

A range of gauge commands are supported but the availability of these commands depends on the gauge types.

The host and field communication parameters are configurable, however, a number of the above devices operate with fixed parameters.

4.2 Typical Connections



- 1 SAAB TRL2
- 2 Ethernet (OPC)
- 3 ENRAF BPM
- 4 DCS (MODBUS)
- 5 MODBUS Tank Gauges
- 6 ENRAF CIU 858
- 7 WHESOE 550
- 8 VAREC MARK/SPACE
- 9 ETHERNET
- 10 USB

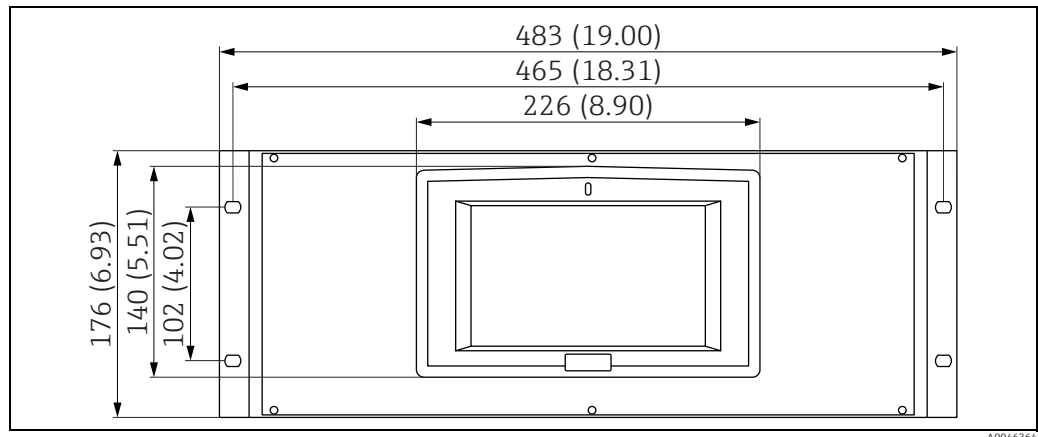
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5 Installation

5.1 Mechanical Installation

The Multi Scan NXA83B is available in two different enclosures - 19 in Rack Mount. All versions of the Multi Scan NXA83B are intended for installation within a building and should not be mounted in hazardous areas. The Rack mount version is housed in an aluminium 4U 19 in case, which has 4 front fixing holes suitable for M6 bolts. All power and signal connectors are located on the rear panel of the enclosure.

5.1.1 Dimensions

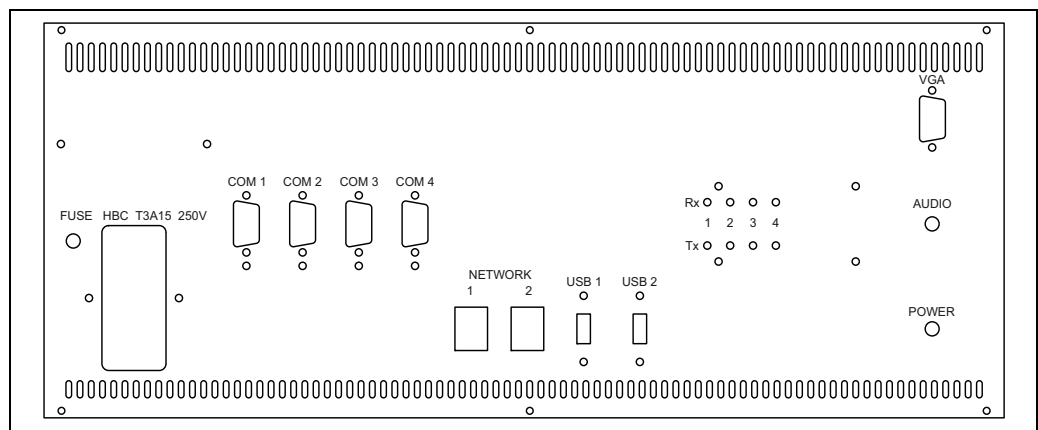


Measuring unit mm (in)

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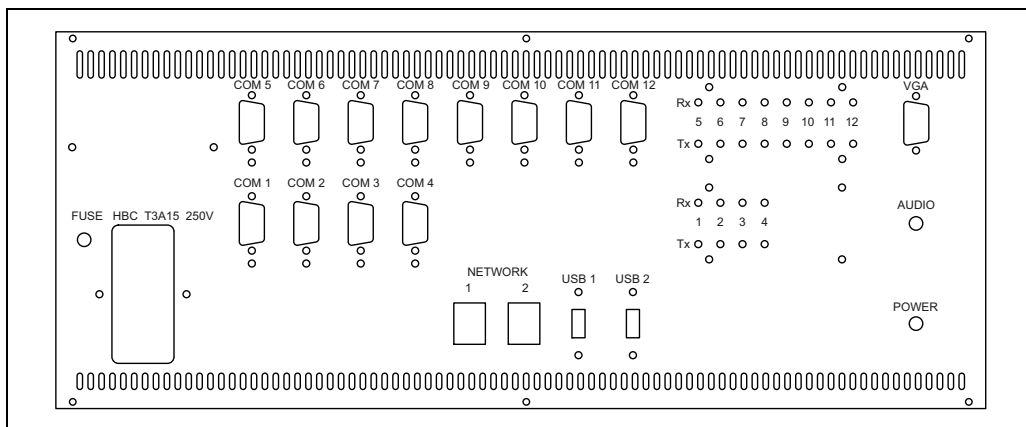
Depth of enclosure: 315 mm (12.4 in)

5.1.2 Backplane assembly variant 4 channels

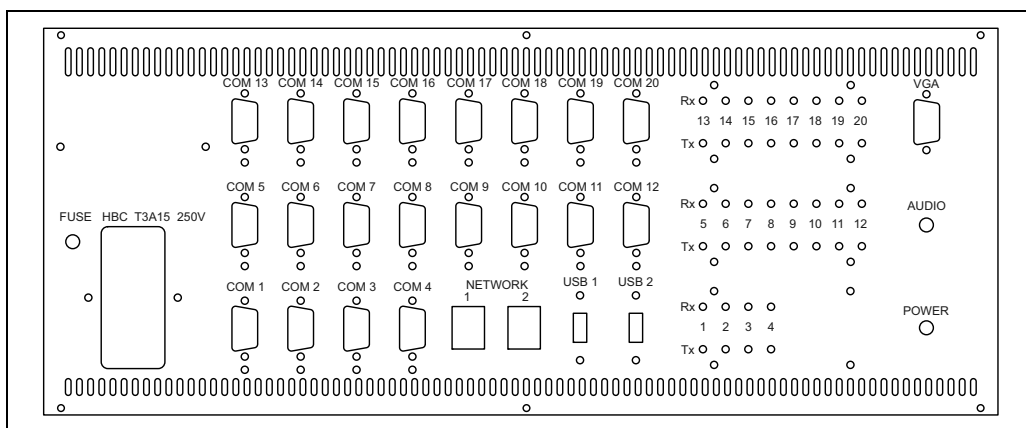


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5.1.3 Backplane assembly variant 12 channels



5.1.4 Backplane assembly variant 20 channels



5.2 Electrical Installation

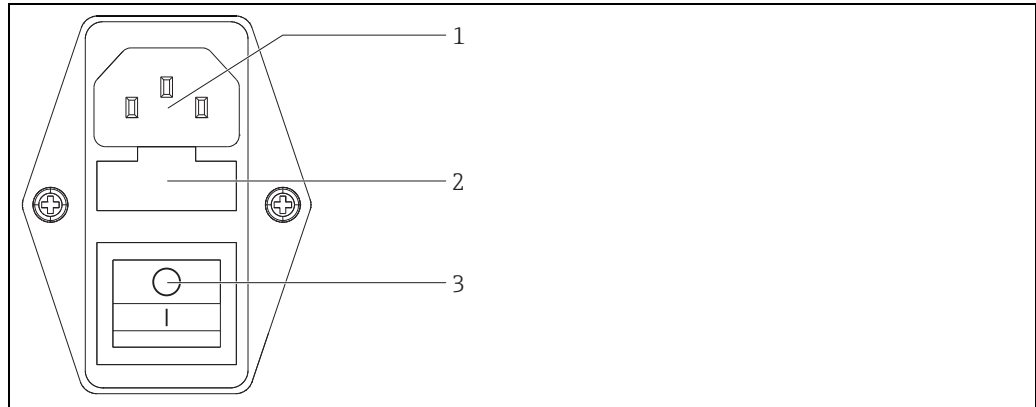
The Multi Scan NXA83B requires connection to a mains power supply with the following characteristics:

Voltage	Frequency	Current	Power
100 to 240 V _{AC}	47 to 63 Hz	max. 0.8 A	40 W

The Multi Scan NXA83B contains a 20 × 5 mm (0.79 × 0.2 in) cartridge fuse protecting the mains input. The fuse is rated at 3.15 A, time delay (antisurge or slow blow). The fuse must be suitable for use at 240 V_{ac}.

The mains should be supplied with a standard IEC lead (kettle plug) and plugged into the socket shown below. A mains switch is provided to turn power on/off to the Multi Scan NXA83B. The socket, switch and fuse are found on the rear panel.

There is a GREEN power indication LED which will be permanently illuminated whilst power is applied to the Multi Scan NXA83B. The LED mounted on the same panel as the main power connector.



- 1 IEC Socket
- 2 Fuse
- 3 Mains Switch

NXA83_Mains-Switch

5.3 Network and USB connections

The Multi Scan NXA83B has one Ethernet network connector and two USB connectors mounted on rear panel of the unit. For graphics → 12.

The Ethernet connector accepts RJ45 network cables and has the standard PC pin assignment. To connect directly to another PC requires a cross-over network cable, whilst to connect to a hub, switch or similar requires a standard cable.

The network port is required to configure the Multi Scan NXA83B, using the Tankvision Multi Scan Configurator software, via a remote desktop session. It may also be used to connect to host systems using the Modbus TCP and datacon protocols.

Network port	Pin	Signal name
<p style="text-align: center;">1 8</p> <p style="text-align: center; font-size: small;">NXA83_Network-Port_Pin-Assignment</p>	1	TX+
	2	TX-
	3	RX+
	4	No Connect
	5	No Connect
	6	RX-
	7	No Connect
	8	No Connect

The two USB connectors allow a range of peripheral devices to be connected to the Multi Scan NXA83B, such as flash memory 'sticks', printers and modems. They are compliant with the USB 2.0 specification.

5.4 Serial Ports

The Multi Scan NXA83B has eight serial ports available for connection to gauges or host computers. These are:

- COM 1 – COM 8

W&M systems will use COM 8 to connect to the touchscreen.

The serial ports will use the RS232 hardware specification by default. However a range of plug in cards is available to support other hardware interfaces.

Supported boards include:

- Old and New V1
- RS485/RS422 Modbus
- Whessoe Current Loop
- Enraf Bi Phase Mark
- Varec Mark/Space
- SAAB TRL
- L&J Tankway

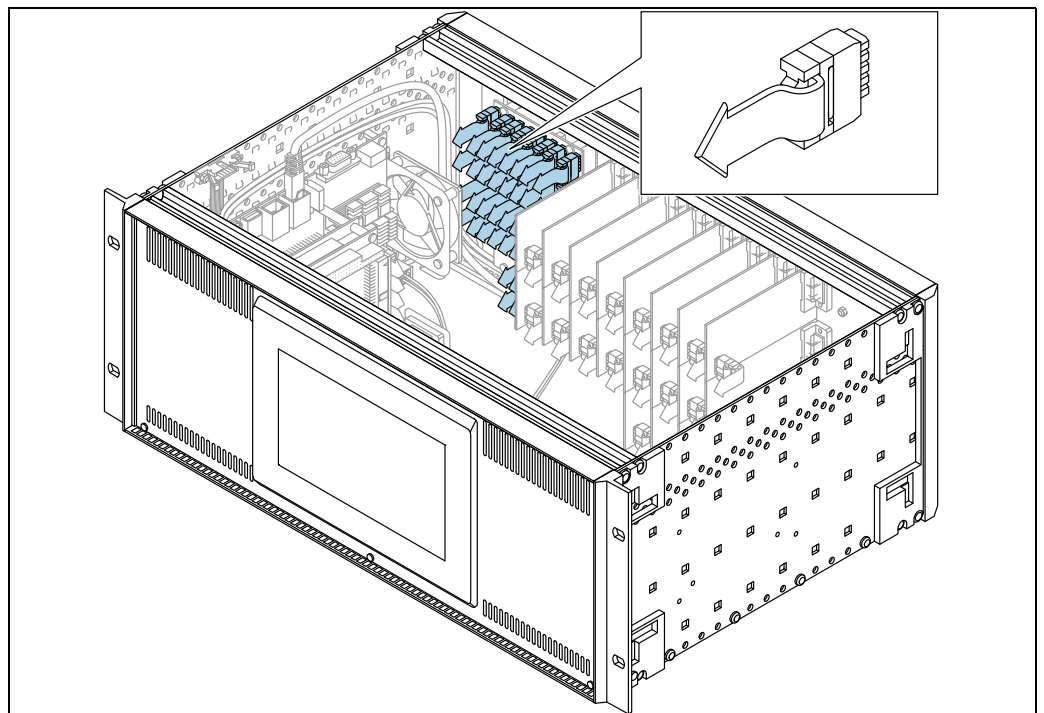
Usually the interfaces will be specified at time of purchase, and the Multi Scan NXA83B will be supplied with all required boards installed.

All serial ports are located on the rear panel of the unit. Only ports that have been purchased (and licensed) will have connectors, all other ports will be fitted with blanking plates.

5.5 LED Module

The Multi Scan NXA83B has an LED module which consists of a bank of eight pairs of LEDs, one pair for each of the serial ports, to indicate communication activity. One LED is transmit and the other one is receive.

Each pair of LEDs has a serial connector from the RS232 port on the mother board, and another going to the interface board.

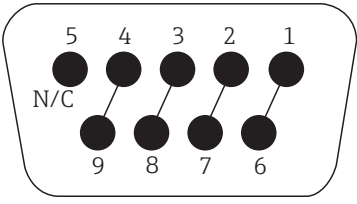


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5.6 Interface Connection Details

5.6.1 Internal Relay Board Connection

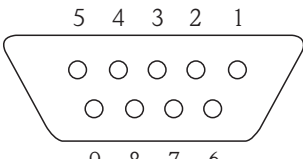
Connector Type: 9 Way D-Type socket

Interface connection	Pins	Relay contacts
 <p style="text-align: center; font-size: small;">NXA83_Interface-Connection_Internal-Relay-Board</p>	1 – 6	Relay 1 contacts
	2 – 7	Relay 2 contacts
	3 – 8	Relay 3 contacts
	4 – 9	Relay 4 contacts

Each contact pair may be configured to be N/O or N/C.

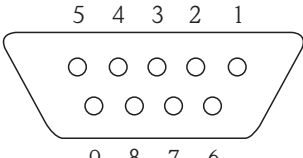
5.6.2 RS232 Connection

Connector Type: 9 Way D-Type plug

Interface connection	Pins	RS232
 <p style="text-align: center; font-size: small;">NXA83_Interface-Connection_Varec-Mark</p>	2	RXD
	3	TXD
	5	GROUND
	7	RTS
	8	CTS

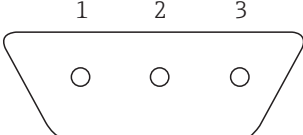
5.6.3 RS485/RS422 Connection

Connector Type: 9 Way D-Type (MALE) plug

Interface connection	Pins	RS485 2 WIRE	RS485/RS422 4 WIRE
 <p style="text-align: center; font-size: small;">NXA83_Interface-Connection_Varec-Mark</p>	1	-	T-
	2	-	T+
	3	TD+	R+
	4	TD-	R-
	5	GROUND	GROUND

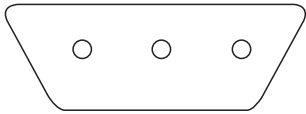
5.6.4 Enraf BPM Connection

Connector Type: Phoenix Connector, Screw Terminal

Interface connection	Pins	ENRAF BPM
 <p style="text-align: center; font-size: small;">NXA83_Interface-Connection_Enraf-BPM</p>	1	TL1
	2	SCREEN
	3	TL2

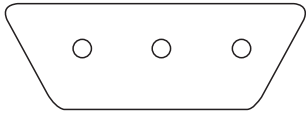
5.6.5 Saab TRL2 Connection

Connector Type: Phoenix Connector, Screw Terminal

Interface connection	Pins	SAAB TRL2
 <small>NXA83_Interface-Connection_Enraf-BPM</small>	1	FB1
	2	SCREEN
	3	FB2

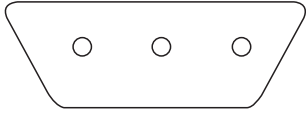
5.6.6 Whessoe Current Loop Connection

Connector Type: Phoenix Connector, Screw Terminal

Interface connection	Pins	WHESOE 20 mA
 <small>NXA83_Interface-Connection_Enraf-BPM</small>	1	LOOP +
	2	SCREEN
	3	LOOP -

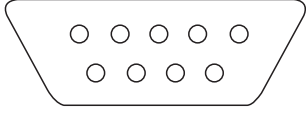
5.6.7 HART Connection

Connector Type: Phoenix Connector, Screw Terminal

Interface connection	Pins	HART
 <small>NXA83_Interface-Connection_Enraf-BPM</small>	1	LOOP -
	2	SCREEN
	3	LOOP +

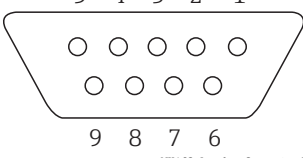
5.6.8 L&J Tankway Connection

Connector Type: 9 Way D-Type socket

Interface connection	Pins	Function
 <small>NXA83_Interface-Connection_Varec-Mark</small>	1/6	POWER
	2/7	COMPUTER
	3/8	ENCODER
	5/9	GROUND

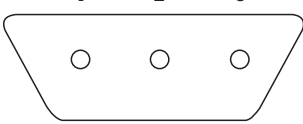
5.6.9 Varec Mark / Space Connection

Connector Type: 9 Way D-Type socket

Interface connection	Pins	Function
	1/6	+48 V SUPPLY
	2/7	MARK
	3/8	SPACE
	5/9	0 V SUPPLY
	4	SPARE

5.6.10 V1 Connection

Connector Type: Phoenix Connector, Screw Terminal

Interface connection	Pins	HART
	1	FIELDBUS 0 V
	2	SCREEN
	3	FIELDBUS +24 V

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