Technical Information

Tankvision Multi Scan NXA83B

Inventory Management System
with completely integrated software

Valid from SW version 3.4.0 and 4.4.0

Application

Tankvision is a dedicated tank inventory system. It is ideally suited for tank farms with various protocols used for communicating with the installed field devices and/or redundancy needs.

Tankvision Multi Scan performs the following tasks:
- scanning of parameters from tank gauges
- provides data to Tankvision Professional NXA85
- provides data to host systems (such as PLC or DCS) via Modbus and/or OPC

Your benefits

- Approved for custody transfer applications according to PTB
- Global system engineering and service support
- A robust industrial operating system with embedded software ensures high stability and availability.
- Legacy protocol management; allowing gradual upgrades
- No hard disc or fans - no wear out
- Predefined or customized operator screens via the optional touch display for typical operation of a tank farm.
- Built in web server for basic tank farm operations
- Connects to Tankvision Professional for additional functionality

Endress+Hauser

People for Process Automation

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Applications

Inventory control

By using Tankvision Multi Scan to scan the parameters of tank gauges together with Tankvision Professional 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..

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

Function and system design

System design

Tankvision Multi Scan is designed to act as gateway for legacy tank instrumentation into recent Tank Inventory software (e.g. Tankvision Professional) or control systems (DCS or PLC). Where required also the redundant collection and distribution of tank parameters is managed by Tankvision Multi Scan.

System configuration

Tankvision Multi Scan is configured without any special software only by standard Microsoft Windows tools (Remote desktop). Network access to the Multi Scan is password protected.

Configuration of connected tank gauges/sensors
Different vendor's tools can be used to configure gauges by tunneling through the Multi Scan.

Features

- Provides data Providing visualization software (e.g. Tankvision Professional) with the scanned parameters of tank gauges.
- Remote access
  Any PC with the specified requirements in the Intranet can be connected to Tankvision.
- Redundancy
  Hot standby with automatic switchover, various switching rules.

Features with limited functions

- Representation of tank data
  Tank data can be represented graphically or in tables.
- Definition and management of products
  Product characteristics can be defined.
- Alarms
  Limit alarms (high-high, high, low, low-low and other programmable alarms) can be defined for measured certain tank parameters.
- Reports
  Reports can be sent to a printer (network printer or directly connected via USB) at scheduled time intervals or on demand.
- Volume calculation and correction
  Calculation tables according to API, ASTM and IP are integrated.
- Graphical User Interface (GUI)
 Tankvision uses an intuitive and optimized user interface.

Security

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.

Typical system architecture

NXA83_Typical_system_configuration
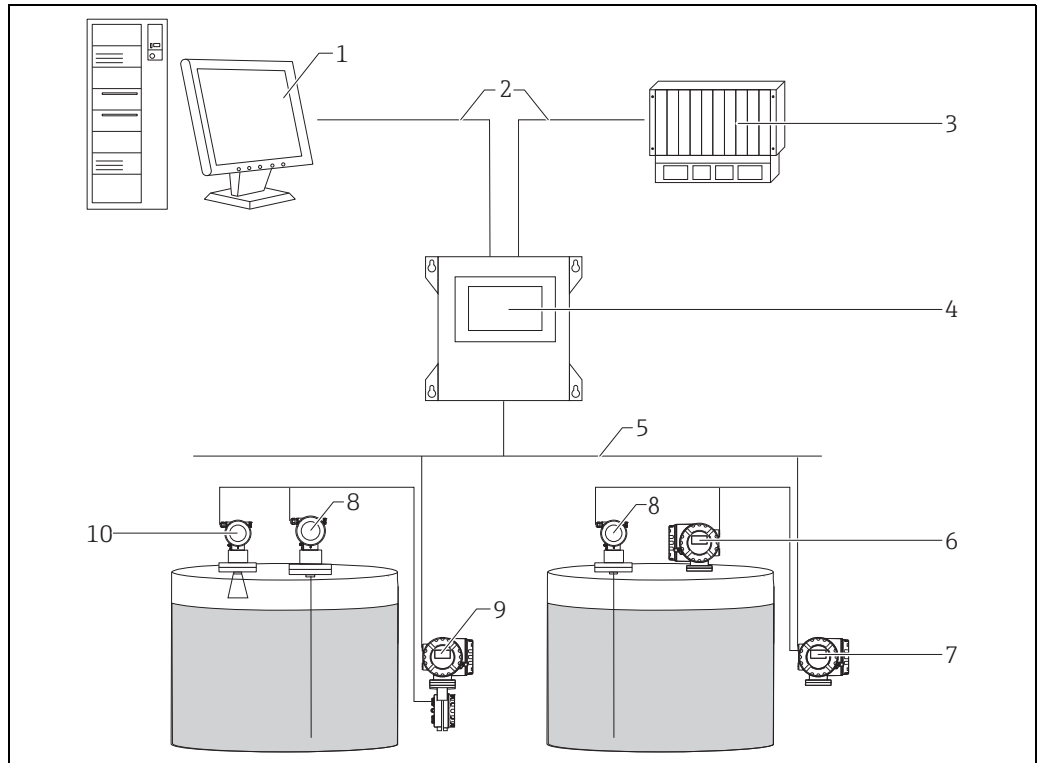
1	*Tankvision Professional NXA85 Workstation*
2	*Ethernet/Serial*
3	*DCS/PLC (Distributed control system/Programmable logic controlled)*
4	*Tankvision Multi Scan NXA83B*
5	*Fieldbus protocol (Modbus, Sakura V1, Whessoe WM550)*
6	*Proservo*
7	*Promonitor*
8	*Prothermo*
9	*Tank Side Monitor*
10	*Micropilot*

Tankvision Multi Scan in Switch By System redundancy mode
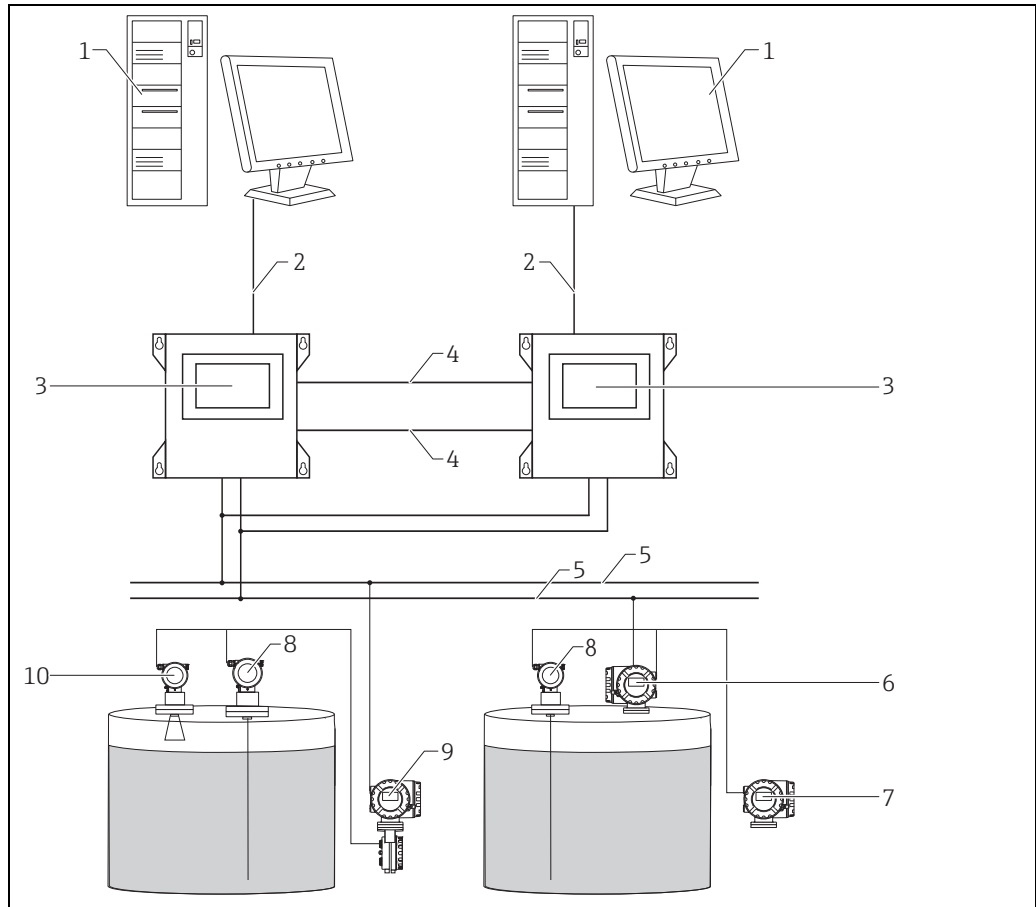
NXA83_System-configuration_Switch-by-system

1   Tankvision Professional NXA85 Workstation
2   Ethernet
3   Tankvision Multi Scan NXA83B
4   Control link RS232
5   Fieldbus protocol
6   Proservo
7   Promonitor
8   Prothermo
9   Tank Side Monitor
10 Micropilot

Inputs and Outputs

Power supply

Supply voltage	Frequency	Power consumption	Current consumption
100 to 240 V_{AC}	50 to 60 Hz	40 VA	max. 0.8 A

The Multi Scan contains a 20 x 5 mm cartridge fuse protecting the mains input. The fuse is rated at 3.15 A, time delay (antisurge/slow blow). The fuse is suitable for use at 240 V_{ac}.

Interfaces

The Multi Scan is available in two versions:
- 1 to 8 serial ports
- 1 to 20 serial ports

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

Multi Scan support the following electrical interfaces:
- RS232
- RS485
- Bi-Phase Mark
- Current Loop

In addition an Ethernet port with up to 5 connections and two USB ports are also provided.

Multi Scan has an LED module, one pair for each of the serial ports, to indicate communication activity. One LED indicates transmission and the other one indicates the receipt of data.

Non isolated (bus ground = Multi Scan chassis ground):
- RS-232

Optocoupler isolated:
- RS-485
- Current Loop (GPE/Whessoe)
- L&J
- Varec

Transformer isolated:
- Enraf BPM
- "SAAB"/Rosemount TRL/2

Supported Input protocols (from the field)
- Modbus RS485/RS232, max. 15 gauges
- Modbus Ethernet
- Sakura V1, max. 10 gauges
- Whessoe WM550, max. 15 gauges
- Protocol compatible to Enraf GPU (Bi-Phase Mark), max. 8 gauges
- Protocol compatible to Saab TRL/2, max. 8 gauges
- Protocol compatible to VAREC Mark/Space, max. 15 gauges
- Protocol compatible to Scientific Instruments (RS485), max. 15 gauges
- Protocol compatible to Tokyo Keiso (FW9000), max. 15 gauges

Additional protocols and variants upon request.

Device support

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

Endress+Hauser:
- Micropilot S + Tank Side Monitor, Micropilot NMR81, Micropilop NMR84, Tank Side Monitor NRF590, Tank Side Monitor NRF81, Proservo NMS8, Proservo NMS80, Proservo NMS81

Enraf:
- 811 Servo Gauge
- 813 Mechanical Gauge Transmitter
- 854 Servo Gauge
- 872 Radar Gauge
- 873 Radar Gauge
- 865 Temperature Selector

Whessoe:
- 1311 Transmitter/1071 Outstation

- 1315 Transmitter/2006 Mechanical float gauge, 1140 Servo gauge
- ITG 50/60/70 Servo gauges

Emerson:
- TRL2, Rex, Raptor, Pro Radar Gauges

Varec:
- 1800/1900 Mark/Space Transmitters

Other devices supported 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.

Supported output/ communication (to host system)	- Native driver to connect to Tankvision Professional (Ethernet, RS485, RS232) - Modbus (RS485, RS232, Ethernet) - OPC DA Server to connect to Clients using version 1.0, 2.0, 3.0 (Ethernet) Additional protocols and variants upon request.

Environment

Mounting location	Indoor
Ambient temperature	0 to +40 ℃ (+32 to +104 ℉)
Storage temperature	0 to +70 ℃ (+32 to +158 ℉)
Relative humidity	max. 90 % at +25 ℃ (+77 ℉) (non-condensing)
Electromagnetic compatibility (EMC)	EMC according to the requirements of the EN 61326-series and the NAMUR-recommendation EMC (NE21). Details can be found in the Declaration of Conformity.

Mechanical construction

|	
Wall mounted version	The wall mount version is housed in a stainless steel enclosure, suitable for wall mounting via 4 fixing holes designed to accept M6 bolts. All connectors for power and signals are located on the bottom face of the enclosure. The unit should always be mounted with this face at the bottom.
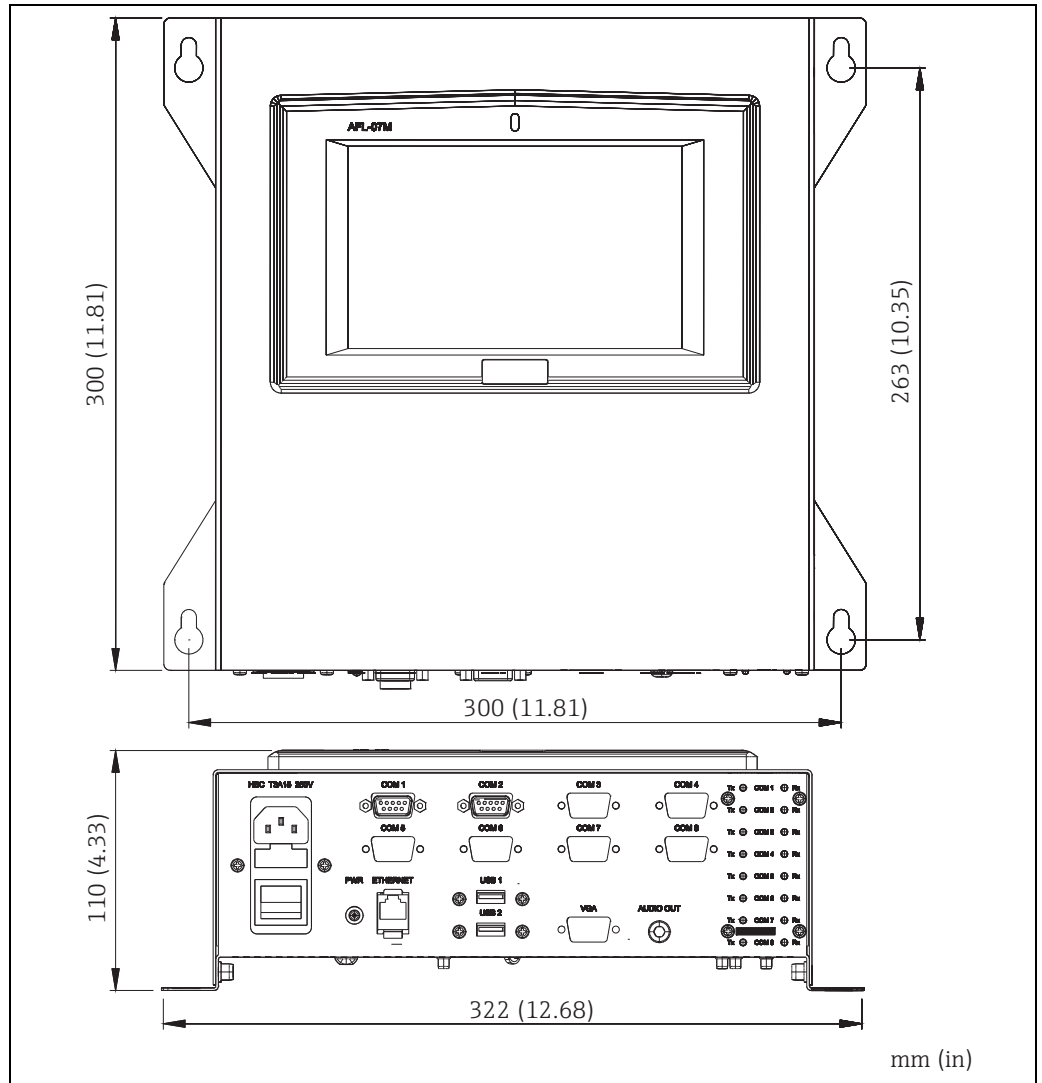
NXA83_WallMount_Measurements

mm (in)

Rack mounted version   The rack mount version is housed in an aluminum 4U 19 in case, which has 4 front fixing holes suitable for M6 bolts.
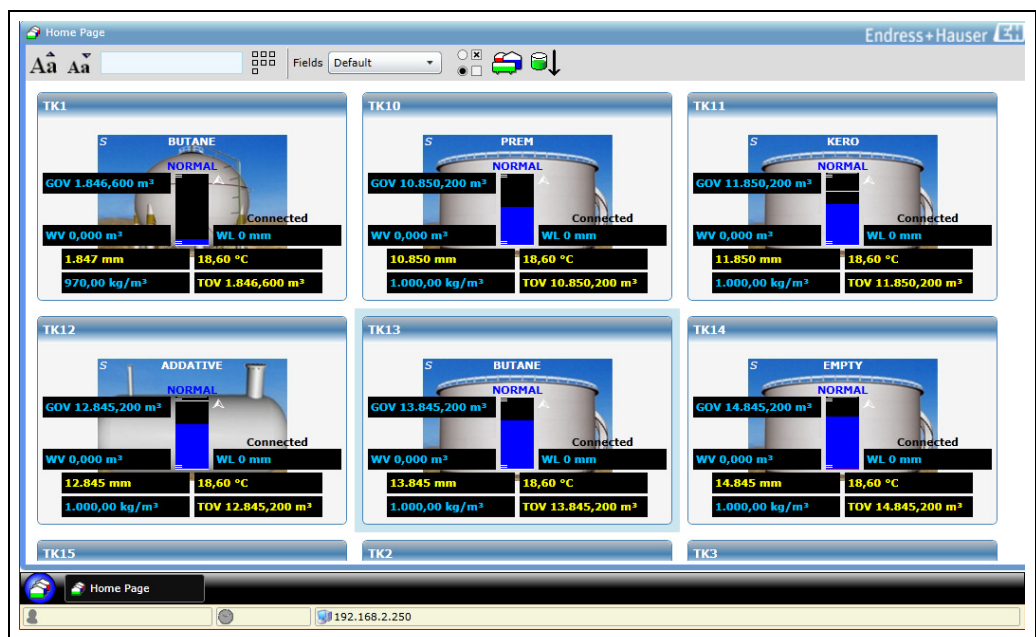All power and signal connectors are located on the rear panel of the enclosure.
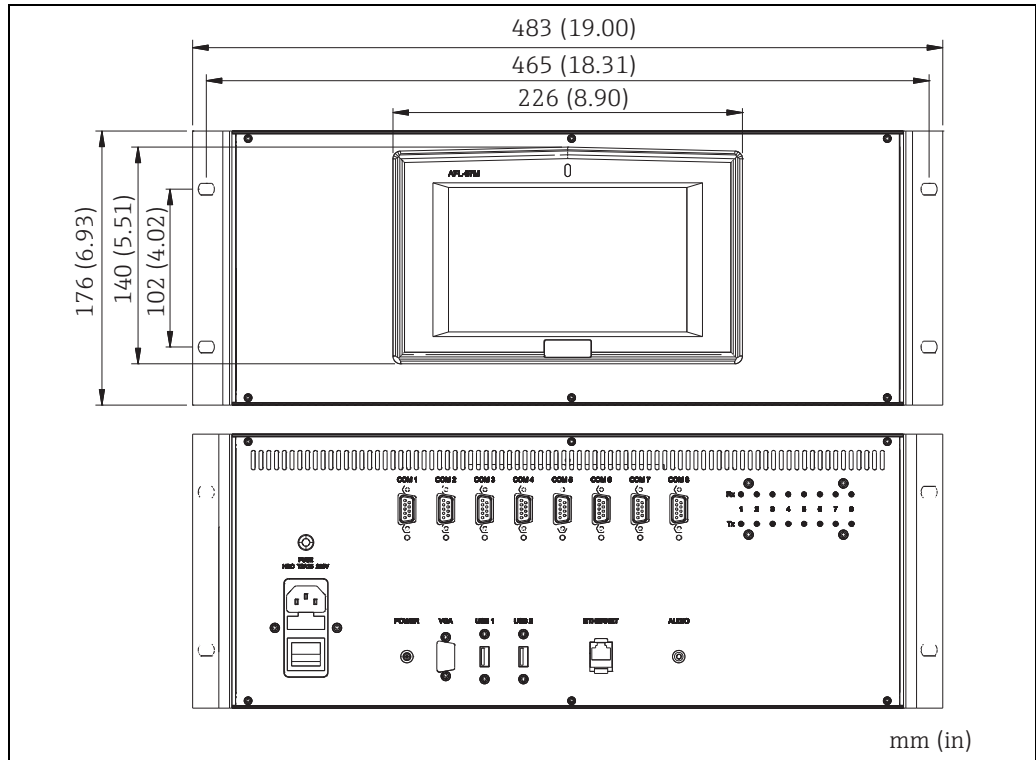
NXA83_RackMount_Measurements

Depth of enclosure: 260 mm (10.24 in)

Embedded human interface with limited functions

Web Server

The Web Client can be provided on any Windows station with a network connection to the device. The installation of Microsoft Silverlight is necessary to operate the web client screens. The webserver access is limited to 2 concurrent users.

NXA83_Web-Server_Homepage

Home Page

Single Tank Overview

Alarm Event Viewer

Grid View

LCD display (optional)   The Multi Scan is available with a 7 in Widescreen LCD screen built into the front of the device, with navigation via a touch screen.

Single Tank View

Grid View

Remote desktop   The Remote desktop is used for configuration purpose only.
It is offering a standard Windows XP operating user interface.

Installation considerations

ℹ️ It is recommended to take the information contained in the Operating Instructions into consideration when designing the system architecture (→ 🖹 14).

System requirements of user PC

Check the latest information on hardware and software requirements.
Please contact your local Endress+Hauser Sales Center.

Network requirements

Network switches **must** always be used to interconnect Tankvision components (Network hubs must **never** be used).
Only use screened cables (Category 5 or higher).

> **NOTICE**
> **EMC requirements**
> The legal EMC requirements are fulfilled **only** when
> ▸ a screened LAN cable is used and
> ▸ the cable screen is properly terminated to screened RJ45 connectors.

> **NOTICE**
> **Harsh environments**
> Most commercial and IT infrastructure networking switches (and components) are not designed to be used within harsh environments (e.g. temperatures below +5 ℃, dusty or with high levels of EMC or electrical noise).
> ▸ It is therefore recommended that **only** networking components specifically designed for industrial control purposes be used within the control room (or control cabinet) environment as part of the Tankvision system.

Shielding and Grounding

When planning the shielding and grounding for a fieldbus system, there are three important points to consider:

- Electromagnetic compatibility (EMC)
- Explosion protection
- Safety of the personnel

To ensure the optimum electromagnetic compatibility of systems, it is important that the system components and all cables, which connect the components, are shielded and that no portion of the system is unshielded. Ideally, the cable shields are connected to the normal metal housings of the connected field devices. Since these are generally connected to the protective earth, the shield of the bus cable is grounded many times. Keep the stripped and twisted lengths of cable shield to the terminals as short as possible.
This approach, which provides the best electromagnetic compatibility and personnel safety, can be used without restriction in systems with good potential equalization.
In the case of systems without potential equalization, a power supply frequency (50/60 Hz) equalizing current can flow between two grounding points which, in unfavourable cases, e.g. when it exceeds the permissible shield current, may destroy the cable.
To suppress the low frequency equalizing currents on systems without potential equalization, it is therefore recommended to connect the cable shield directly to the building ground (or protective earth) at one end only and to use capacitive coupling to connect all other grounding points.

> **NOTICE**
> **EMC requirements**
> The legal EMC requirements are fulfilled **only** when
> ▸ the cable shield is grounded on both sides!

Certificates and approvals

CE mark

The measuring system meets the legal requirements of the EC-guidelines.
Endress+Hauser confirms the instrument passing the required tests by attaching the CE-mark.

Ordering information

Detailed ordering information is available from the following sources:
- In the Product Configurator on the Endress+Hauser website: www.endress.com → Select country → Instruments → Select device → Product page function: Configure this product

- From your Endress+Hauser Sales Center: www.endress.com/worldwide

  Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Documentation

Operating Instructions

BA01288G

Operation manual

BA01290G

Installation and Maintenance manual

BA01291G

Configuration manual

BA01292G

DCC Communications Configuration

BA01289G

OPC Tank Data Server

BA01287G

Weights and Measures Additions

BA01297G

Web Client System Operation

BA01296G

Redundancy manual

Registered trademarks

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