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Technical Information
Tankvision Gauge Link NXA20

Tank Gauging

Inventory Management System with completely integrated software for operation via standard web browser

Application

Tankvision is a dedicated tank inventory system which is operated by a standard web browser and does not require proprietary software or licensing costs.

Tankvision is based on a distributed architecture on a Local Area Network (LAN). Due to its modular structure it can be adjusted to any application. It is ideally suited for small tank farms with only a couple of tanks, but also for large refineries with hundreds of tanks.

Your benefits

- License-free
- Approved for custody transfer applications according to NMI, PTB and others
- Global system engineering and service support
- A robust industrial operating system with embedded software ensures high stability and availability
- Modular design; easily adjustable to any application; can be upgraded as required
- Configuration, commissioning and operation via web browser; no proprietary software required

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People for Process Automation

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Applications

Inventory control

By using Tankvision 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 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.

Choosing the "Interface only" option in Tank Scanner it becomes a fit-for-purpose interface unit to the tank gauges for Tankvision Professional.

With the Gauge Link the Tank Scanner becomes a fit-for-purpose interface unit to the tank gauges with Enraf BPM and Emerson TRL/2 Protocols.

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, LPGs, fuels, biofuels, alcohols

Components

Tankvision consists of the following components:

- **Tankvision Tank Scanner NXA820**
  scans parameters from tank gauges and performs tank calculations (option)
- **Tankvision Data Concentrator NXA821**
  summarizes data from various Tank Scanners NXA820
- **Tankvision Host Link NXA822**
  provides data to host systems (such as PLC or DCS) via Modbus
- **Tankvision Gauge Link NXA20**
  connects the Tank Scanner with tank gauges/sensors with Enraf BPM or Emerson TRL/2 interfaces

Function and system design

System design

Tank management visualization without proprietary software

Tankvision is the first tank management visualization system providing its functionality without the need to have proprietary software installed and maintained on a PC. The main functionality is realized by embedded web pages in the Tankvision components. Tankvision uses an industrial proven operating system and provides high availability. Tankvision is not based on a PC platform and runs independent of connected PCs. This eliminates the need to maintain a specialized PC with a Windows operating system and necessary updates and hot fixes. Tankvision web pages can be accessed from a standard PC with a web browser. Multiple users with different roles can simultaneously log in to each Tankvision component. Additional users can be added as required. There are no multi-user licence fees.

Please check with Endress+Hauser for recommendations on PC, operating system and web browser.

Tank management visualization for tank gauges and sensors with Emerson TRL/2 or Enraf BPM field protocols

Tankvision Tank Scanner is designed to interface with Modbus, Sakura V1 or Whessoe 550 field protocols. This functionality is expanded by the Gauge Link for the Enraf BPM and the Emerson TRL/2 field protocols.

Distributed architecture and scalability

Tankvision is based on a distributed architecture on a Local Area Network (LAN). Coordinated components perform all inventory management tasks. The modular design makes it easy to enlarge the system whenever required and to add further tank areas.

Thus, Tankvision is fully scalable and is ideally suited for applications of any size, from small tank farms to large refineries.

Common hardware platform

The Tankvision components have dedicated tasks in a system, but have a common architecture, based on a 32 Bit processor. The embedded tank management software uses a multi-threaded real time operating system (RTOS), specifically designed for industrial applications. The hardware is designed without wear-out components like hard discs or fans. This guarantees high reliability.

System configuration

Configuration of the Tank Scanner

Each Tankvision component has its own data base and a web server. The components are connected and exchange data with time stamp and status information. Data is optionally encrypted and secured by a CRC checksum.

The Tankvision components are configured with static IP addresses, which are reserved on a DHCP network.

The configuration pages are embedded in the Tankvision components and allow configuration of Tankvision via a connected web browser without configuration software. No Internet access is necessary, as all pages are loaded from the Tankvision system itself.

Configuration of the connected Gauge Link to the Tank Scanner

Bus termination and biasing are controlled by software selectable settings in the Tankvision Gauge Link. By default, these are enabled for point-to-point links or the devices in a multidrop network that are at the outer "ends" of the cable. If the Tankvision Gauge Link is part of a multi-drop network and is not the "end" device on the cable, the termination and biasing may be disabled.

Configuration of the connected tank gauges and sensors to the Gauge Link

The diagnostic/service port generally remains unconnected during normal operation of the Tankvision Gauge Link. The port has a 9 way “D” type socket connector. A suitable cable with mating plug will be required for local connection of a service laptop PC or similar.

A “standard” serial port, a 9 way fully wired plug – socket cable will be required. The cable should be wired pin-to-pin, i.e. 1-1, 2-2, 3-3, … 9-9. Proprietary cables will generally have all pins wired, though only pins 2, 3, 4, 5 and 7 are actually used. Cable length should not exceed 2 m (6.6 ft).

Features

- Interfacing Honeywell Enraf BPM or Emerson TRL/2 field protocols
- Asset management with the Honeywell Enraf or Emerson Saab gauge tools

Dependabilty

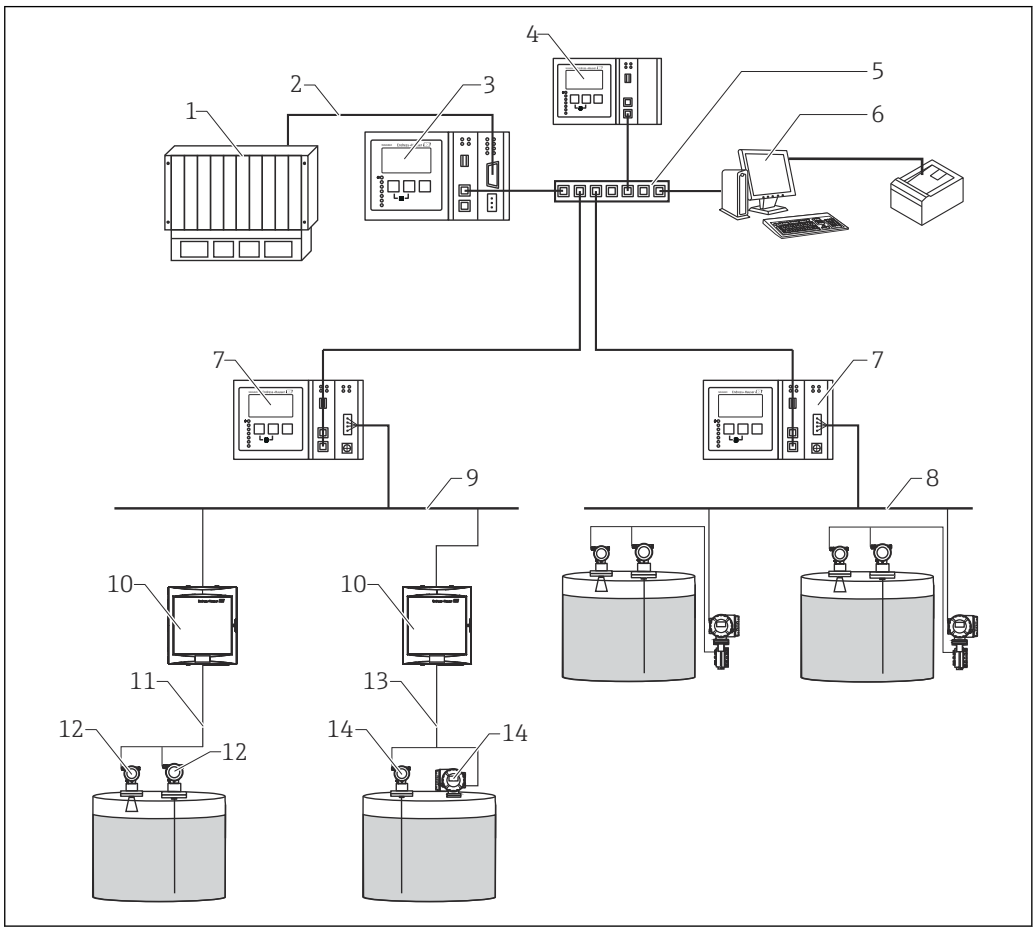
IT security

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.

Typical system configuration

Wiring example for NXA820/821/822/20



1 DCS/PLC (Distributed control system/Programmable logic controlled)
2 Modbus
3 Host Link NXA822
4 Data Concentrator NXA821
5 Switch
6 Operator with Browser/SupplyCare Enterprise (Server)
7 Tank Scanner NXA820
8 Fieldbus protocol
9 Modbus protocol
10 Gauge Link NXA20
11 ENRAF BPM protocol
12 Tank gauges/sensors with Enraf BPM interface
13 Emerson TRL/2 protocol
14 Tank gauges and sensors with Emerson TRL/2 interface

Function of the components

Gauge Link NXA20

The Gauge Link NXA20 connects multiple tank gauges from up to 32 tanks (max. 15 when used in combination with NXA820) via one field-loop. The Gauge Link NXA20 supports different field protocols (Enraf BPM, Emerson TRL/2).

The measured values are transmitted by the Modbus network to the Tank Scanner NXA820 which will provide visualization on HTML pages.

The Gauge Link NXA20 has to be used in combination with the Tank Scanner NXA820 to provide visualization.

Inputs and Outputs

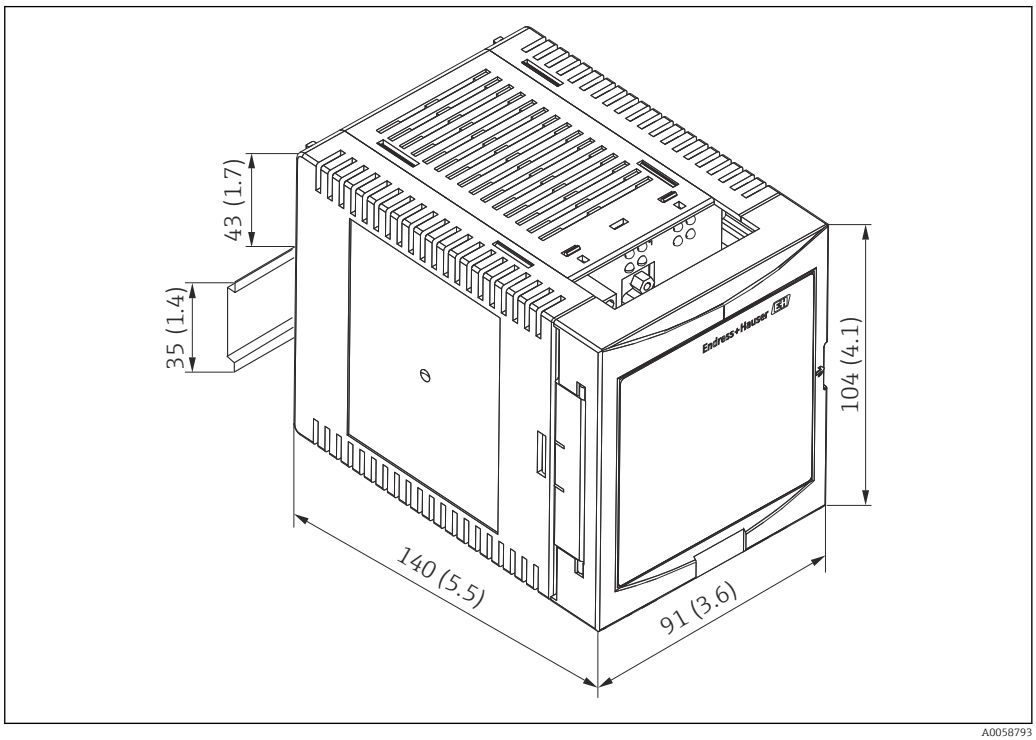
Power supply	Supply voltage: 90 to 250 V_{AC} (50/60 Hz) Power consumption: max. 23 VA Current consumption: max. 100 mA at 230 V_{AC} Fuse: T 400 mA HBC 250 V AC, 20 × 5 mm (0.79 × 0.2 in)
Galvanic isolation	The following terminals are galvanically isolated from each other: Fieldbus interface (Enraf BPM or Emerson TRL/2 interface)
Diagnostic/Service port connector	RS232 connector
Fieldbus protocols	The Gauge Link NXA20 is available with the following field protocols: ▪ Enraf BPM, max. 32 gauges (max. 15 when used in combination with NXA820) ▪ Emerson TRL/2, max. 32 gauges (max. 15 when used in combination with NXA820)

Environment

Mounting location	Cabinet or protective housing
Ambient temperature	−40 to +60 °C (−40 to +140 °F)
Storage temperature	−40 to +85 °C (−40 to +185 °F)
Relative humidity	max. 90 % at +25 °C (+77 °F), non-condensing
Ingress protection	IP20
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.
Installation	Tankvision Gauge Link NXA20 is designed to be installed in a cabinet, using a standard 35 mm DIN (top-hat) rail conforming to EN 50022 (BS 5584) (IEC 60715).

Mechanical construction

Dimensions



Unit of measurement mm (in)

Materials

Housing

Polycarbonate

Colour: light grey

Front cover

Polyamide PA6

Colour: grey

Installation considerations

It is recommended to take the information contained in the Operating Instructions into consideration when designing the system architecture (see "Documentation").

System requirements of user PC

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

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 above 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 normally 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.

The NXA20 provides two grounding points for the shield, close to the fieldbus interface connector:
- The “)” terminal, which should already be connected directly to ground
- The “S” terminal (13), which provides capacitive connection to the “)” terminal

NOTICE

EMC requirements!
The legal EMC requirements are fulfilled only when
▶ the cable shield is grounded on both sides.

Human interface

Operating concept

Tankvision is operated by a standard web browser (e.g. Microsoft Edge). The Tankvision components contain predefined operating pages. If required, they can be adjusted by the user.

Languages

The operating pages are available in the following languages:
English

Check with Endress+Hauser for the latest information on available languages.

Certificates and approvals

Current certificates and approvals for the product are available at www.endress.com on the relevant product page:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Downloads**.

Ordering information

Detailed ordering information is available from your nearest sales organization www.addresses.endress.com or in the Product Configurator at www.endress.com:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Configuration**.

Product Configurator - the tool for individual product configuration
- Up-to-the-minute configuration data
- Depending on the device: direct input of information specific to the measuring point, such as the 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

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.

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