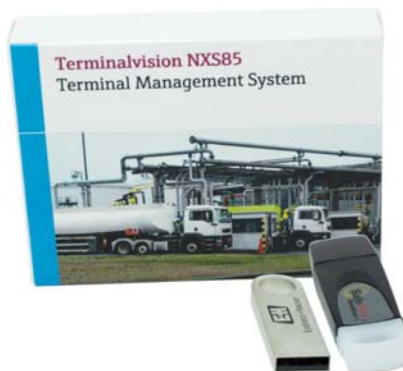


Technical Information

Terminalvision NXS85

Terminal Management



Terminal Management and loading monitoring software

Application

Terminalvision is a terminal management and loading monitoring software package designed to meet the requirements of depots and terminals. Interfacing to most vendor devices used for access control, batch controllers, flow computers, and weighbridges, Terminalvision provides a secure and controlled loading and off-loading procedure. It also enables site control and overview, allowing operators to access details of all gantries (loading bays), loading arms, vehicles, drivers, and product in use on site.

Terminalvision can be provided as a simple standalone station for small depots, or be configured on larger sites as a full Client/Server system where multiple operator stations are required. Printers can be distributed throughout the system, for example placed within the terminal control room for internal reporting, as well as at the exit gate for the automatic printing of BOLs.

Your benefits

- Online monitoring of loading process
- Records all vehicle and personnel interaction on site
- Order entry and management
- Creates records of all loading transactions
- Automatic or on demand BOL, FAN/QAN documents printing
- Compiles a full log of yard activity and history of transactions for easy means of investigation
- Operates under Microsoft Windows and Windows Server
- Interfaces to commonly used batch controllers/flow computers
- Reads in weighing results from connected weighbridge controllers
- Interacts with access control units
- Self service kiosk to automate order entry
- Truck queuing system to enhance the terminal efficiency
- OPC Data Access Server and Modbus connectivity

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Function and system design

Application

Terminalvision is a terminal management and loading monitoring software package designed to meet the requirements of depots and terminals. Interfacing to most vendor devices used for access control, batch controllers, flow computers, and weighbridges, Terminalvision provides a secure and controlled loading and off-loading procedure. It also enables site control and overview, allowing operators to access details of all gantries (loading bays), loading arms, vehicles, drivers, and product in use on site. Terminalvision can be provided as a simple standalone station for small depots, or be configured on larger sites as a full Client/Server system where multiple operator stations are required. Printers can be distributed throughout the system, for example placed within the terminal control room and control rooms for internal reporting, as well as at the exit gate for the automatic printing of BOLs.

Terminalvision also integrates with the Endress+Hauser Loading Metering Skids (LMS) for truck and railcar loading. When considering truck or railcar loading custody transfer certified metering skids are often the best option. Endress+Hauser have the experience of hundreds of truck loading applications around the world based on our world-renowned Promass mass flow meter. In comparison to mechanical PD meters our Promass offers a direct mass output. Due to simultaneous density and temperature output we are able to give a volume output at the same time. The solution is open for the future as the trend clearly will go from volume to mass billing for light hydrocarbons (e.g. as already in place for LPG). Due to much lower pressure loss the Promass could operate with higher flow rates which results in faster loading times or lower pump energy consumption with same flow rate. Endress+Hauser has designed standardized Loading Metering Skids (LMS) for truck and railcar loading applications including batch controller, start/stop valves and grounding system. The solution will come automatically with the European MID approval (no on-site verification required).

The data can be distributed using OPC UA and Modbus TCP.

System Overview

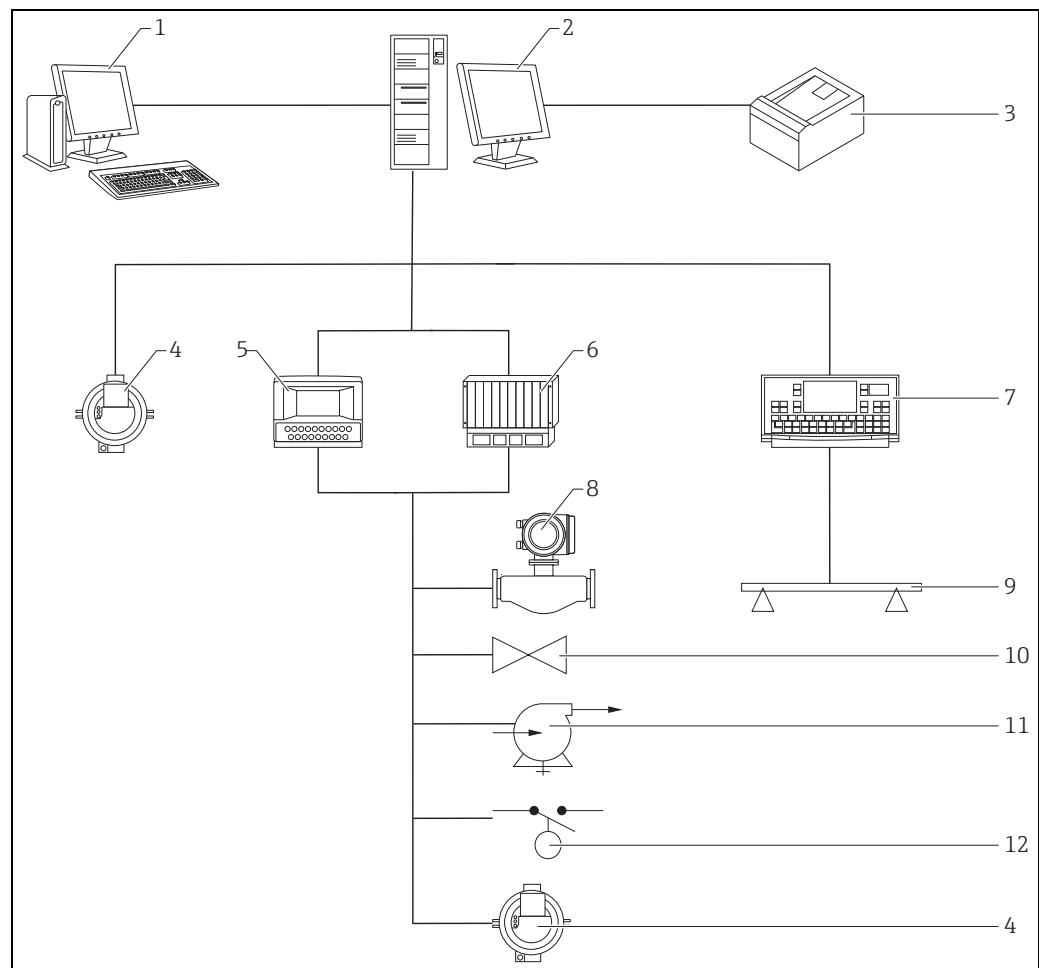
Standalone

The following general architecture represents the common architecture for terminals. It consists of a single standalone operator workstation, consisting of a single PC using Microsoft Windows Operating System and running Terminalvision.

The interaction between Terminalvision and an Access Control Unit (ACU) allows to keep control on who is on site by authentication of persons and vehicles entering and/or leaving the terminal. This information is also used to match the persons and vehicles to orders in the system. As alternative or additional strategy to authenticate a ACU can also be mounted directly on the loading bay.

Terminalvision automates and monitors the loading/offloading process in conjunction with batch controllers (BC), flow computers (FC) or PLCs (acting as BC or FC) by providing the necessary information about orders to those units and collecting the measured data for online monitoring and transaction recording (totals).

Weighbridge controllers can be connected to Terminalvision to record the weigh in and weigh out reading done by the weighbridge for the entering or leaving vehicles (e.g. trucks and trailers).



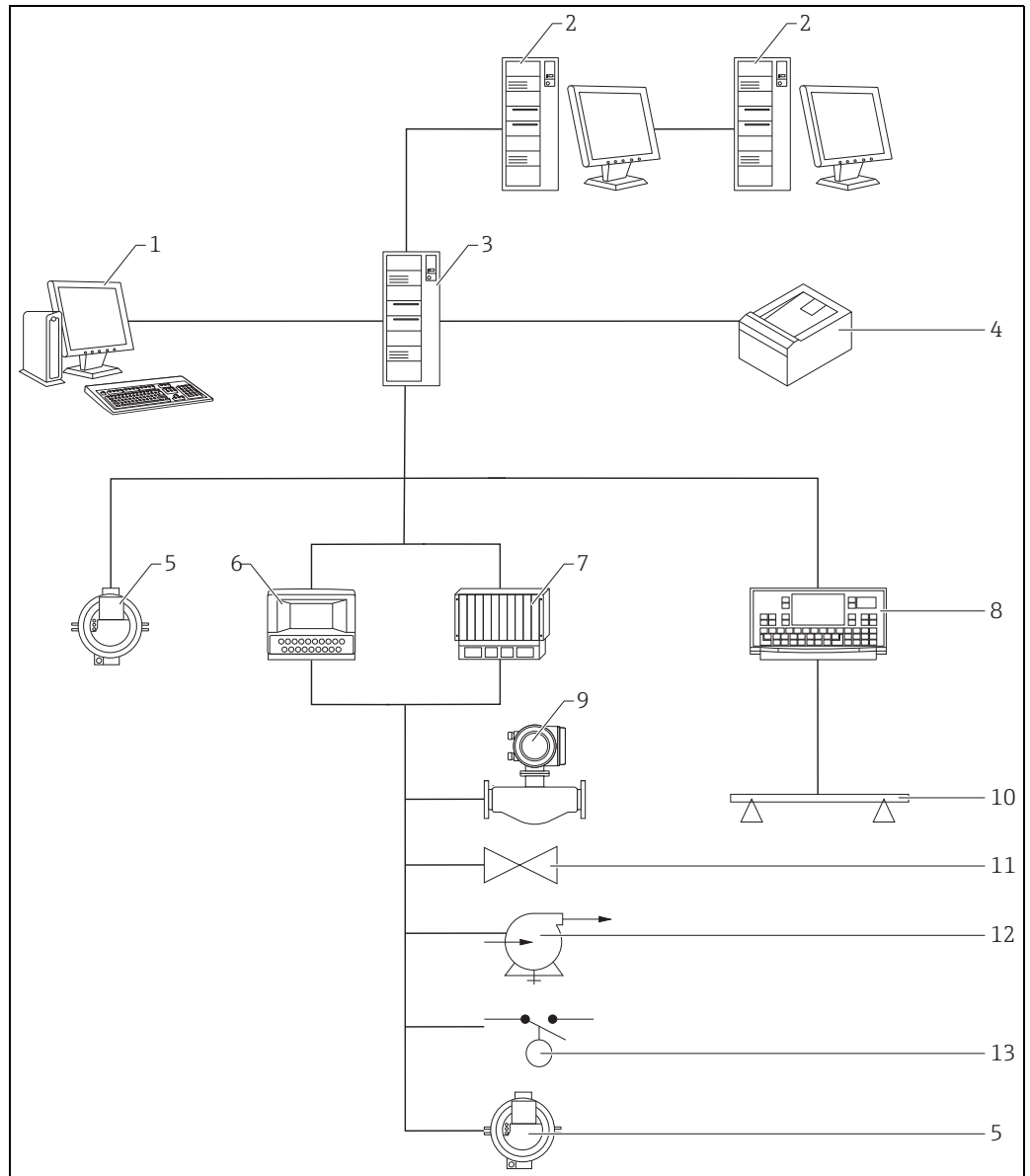
NXS85_Terminalvision_Wiring-example-1

- 1 Tankvision Professional for inventory reconciliation (optional)
- 2 Terminalvision workstation
- 3 BOL printer
- 4 Access control units/Card readers
- 5 Batch controller/Flow computer
- 6 PLCs acting as batch controller/flow computer
- 7 Weighbridge controller (optional)
- 8 Flow meter
- 9 Weighbridge (optional)
- 10 Valves
- 11 Pumps
- 12 Interlocks, e.g. high level switch

Server Client architecture

If multiple operator work stations are required, a client server architecture is normally provided. A central server is used to collect data, and make that available to a number of client operator stations via an Ethernet network. The server version of Terminalvision will run on a Windows Server platform and requires a full SQL Server¹⁾.

The Client Operator Stations are based on a standard PC, running a windows operating system. Each Client Operator station has the full functionality of the Terminalvision software and operates just like the standalone version.



NXS85_Terminalvision_Wiring-example-2

- 1 Tankvision Professional for inventory reconciliation (optional)
- 2 Terminalvision client workstation/Terminalvision self service kiosk/Queuing System station
- 3 Terminalvision server
- 4 BOL printer
- 5 Access control units/Card readers
- 6 Batch controller/Flow computer
- 7 PLCs acting as batch controller/flow computer
- 8 Weighbridge controller (optional)
- 9 Flow meter
- 10 Weighbridge (optional)
- 11 Valves
- 12 Pumps
- 13 Interlocks, e.g. high level switch

1) not part of Terminalvision delivery

Requirements Hardware / PC

Recommended PC Specifications

The amount of clients (server-client system architecture) is limited depending on the PC specifications:

- With an SQL Express installation and a Windows 64/32 bit Version only 2 application clients are supported (included in the delivery package). Note that kiosk and queuing stations shall be considered as application clients.
- With an SQL full installation and a Windows 64 bit Version on a Server System with 16 cores up to 16 application clients are supported (not included in the delivery package). Note that kiosk and queuing stations shall be considered as application clients.

Recommended System Requirements

General Requirements

Tank Gauging computers typically receive data using serial communications devices; therefore it is usually simpler to use a computer equipped with serial ports. Where a large number of serial channels need to be terminated at the PC serial communications channels can be conveniently provided via Ethernet to Serial device servers.

Standalone System/Client System

A system in this configuration needs a decent display adaptor and reasonable amounts of RAM and Hard Disk Space. An internal PC speaker is recommended from the point of view of tidiness and of preventing operator interference.

The choice of monitor will largely be affected by the number of loading bays to be displayed and considerations about how the system will be used. A single 24" widescreen monitor is normally sufficient.

Property	Requirement
CPU	Multi-core processor (e.g. Intel Core i7 or equivalent)
Memory	16 GB RAM
Hard Drive	500+ GB
Optical Drive	CD/DVD
USB Ports	Minimum 4
Graphics	DirectX 10 device with WDDM 1.0 or higher driver
Serial Ports	See general requirements – not required for 'Client only' system
Operating System	Windows 10
Audio	Any Windows compatible sound device and speakers
Monitor	1,920 × 1,080 pixel display
Network	Ethernet connection

A simple RAID configuration that mirrors the hard disk to a separate device is a suggested enhancement as it will provide the system with some resilience should the disk fail. Solid state drives offer little in the way of benefit to these systems, as power consumption and faster boot times are of marginal benefit to terminal automation system users.

Server System

Where you have a server computer connected to multiple client stations, the emphasis needs to be on the communications provided by the machine, not on providing a user interface for the operators. Such machines are typically sited in a back room away from the operators so they don't require speakers or large monitors. Rack mounted servers work in these situations, but you need to be careful in selecting them, because 1U and 2U servers are not normally equipped with serial ports and have very limited expansion options.

RAID can improve performance of server computers particularly when used in a RAID 0+1 configuration. RAID 5 offers limited performance gains for SQL Server and tank gauging applications, though does present some extra protection against hard disk failure, though RAID 0 would be the preferred option if disk space is not at a premium.

Property	Requirement
CPU	Multi-core (4, 6, or 8) processor (e.g. Intel E5 Xeon)
Memory	16 GB RAM (32+ GB RAM ¹⁾ if used as a virtual host)
Hard Drive	Dual 500+ GB minimum, RAID recommended
Optical Drive	CD/DVD
USB Ports	Minimum 4
Graphics	Basic VGA output
Serial Ports	See general requirements – not required for 'Client only' system
Operating System	Windows Server 2019
Audio	Not required unless using radio alarm messaging
Monitor	Yes
RAID Adapter	Hardware RAID controller
Network	Dual Ethernet connection

1) depends on the number of virtual machines running on the host

Kiosk Station System

The Kiosk software is developed to be able to be used with a touch screen computer or Touch monitor attached to a computer in order to get the best user experience of the feature. If a touch screen is not used a mouse and keyboard can be used as an alternative.


Property	Requirement
CPU	Touch Screen Computer, with 2 GHz Dual Core processor
Memory	4 GB RAM
Hard Drive	Disk space 80 GB+
USB Ports	Minimum 2
Operating System	Windows 10 Professional
Monitor	Minimum screen resolution: 1280 × 1024, Aspect ratio 4:3
Network	Ethernet connection

Virtualised Terminal Automation Systems

For terminal automation systems being deployed in a virtualised environment (supported virtualised environments include Microsoft Hyper-V and VMWare ESXI), the following specification is recommended for each virtual server deployed on the host machine (based on above server recommended specifications):

Virtual Server System

Property	Requirement
Processor	> 4 Cores
Memory	> 16 GB RAM
Hard Drive	> 150 GB HDD Disk
Optical Drive	CD/DVD
Operating System	Windows Server 2019
Ethernet USB Server	Such as Digi USBAnywhere – to provide a location for the Terminalvision USB Licensing Dongle. Only needed if using Microsoft Hyper-V Virtual Environment.

Property	Requirement
Serial to Ethernet Converter(s)	Such as Moxa NPort series – to provide serial communications to the virtual machine.  If the field interface device selected supports Ethernet connectivity this is not required.

Virtual Client System

It is possible to implement virtual servers and either virtual or physical clients. For a virtualised client system, the following is recommended:

Property	Requirement
Operating System	Windows 10
Memory	16 GB RAM
Hard Drive	50 GB HDD Disk
Processor	4 Cores

If using a virtual environment, a Windows based PC with network access to the remote environment will be required for operator access.

Queuing System

The Queuing system in its entirety can be installed and run on the Terminalvision Server/Client PC, provided that sufficient monitors/displays are attached for displaying the Lounge queue and Operator screens. The standard specification for servers and client PCs described above is therefore sufficient.

Truck Loading/Offloading

The standard process flow of a truck and its driver moving from the entry gate through the site is briefly described. For additional information, check the mentioned documents or contact the local Endress+Hauser representative. The process flow in a short overview looks like this:

1. Arrival on Site
2. Self-Service Kiosk
3. Queuing
4. Pre-loading
5. Loading operation
6. Post-loading
7. Site Exit



The process flow is described in abbreviated form on the following pages. For further information, see the operating instructions for NXS85 on the website www.endress.com/download.

Arrival on Site

Being in control of what is happening on site is of utmost importance for the secure and optimal performance of terminal processes. Terminalvision enables you to formalize and automate your site access control.

If a truck or a driver is not yet registered in Terminalvision, the registration needs to happen upon arrival on site. The configuration of both truck and driver is done by an operator in Terminalvision. After successful configuration two access cards will be handed out. One card for the truck and one card for the driver. The cards are for identification at the entry gate ACU (Access Control Unit) and further card readers within the site. Alternatively, it is possible to create PIN codes and go without access cards.

Drivers database

In the drivers database all persons that have a permission to enter the site (for example, truck drivers), are registered. Beside personal data also permissions like the validity of driver's license etc. can be recorded which can also be used to check if the one wanting to enter the site is still having its permission. It is also possible to assign a PIN or a swipe card to a person which enables in conjunction with Access Control Units (ACU)²⁾ the monitoring of the entry to and exit from the site with minimum manual interaction.

TAS Drivers

TAS Drivers

Fred Smith

Driver Details

Name

Fred Smith

Telephone Number

Touchkey Number

PIN

1111

Card Number

Access Level

1

Lockout Reason

Carrier/Drawer 1

Black Rock Oil

Carrier/Drawer 2

Certi Fuels

Carrier/Drawer 3

Remarks

Licences

Drivers Licence : SMITH45435FM435 60

Hazardous Goods Licence : HGUK 2345 5456 5465

New

Edit

Print

Licences

Download

Exit

Terminalvision_Configuration_EN_030a

2) see below for supported units

Vehicles database

Like the drivers database, all the vehicles with permission to enter the site are stored in the database. The truck-trailer combination is configured as one entry through the user interface of Terminalvision. Also here the stored information is used to provide entry and exit automation together with ACUs (including automatic check for lock out reasons for the vehicle such as expired license).

TAS Vehicle

Vehicle Details

Registration Number: NAS6 RGY

Vehicle Type: Trailer

Security

Touchkey Number:

PIN: 1111

Card Number:

Access Level: 1

Locked Out: ☐

Reason:

Carrier/Drawer

Carrier/Drawer 1: Certi Fuels

Carrier/Drawer 2:

Carrier/Drawer 3:

Licences

Compartments

Compartment	Capacity (m³)	Capacity (kg)
1	4.000	
2	4.000	
3	4.000	
4	6.000	

Add Remove

Delete OK Cancel

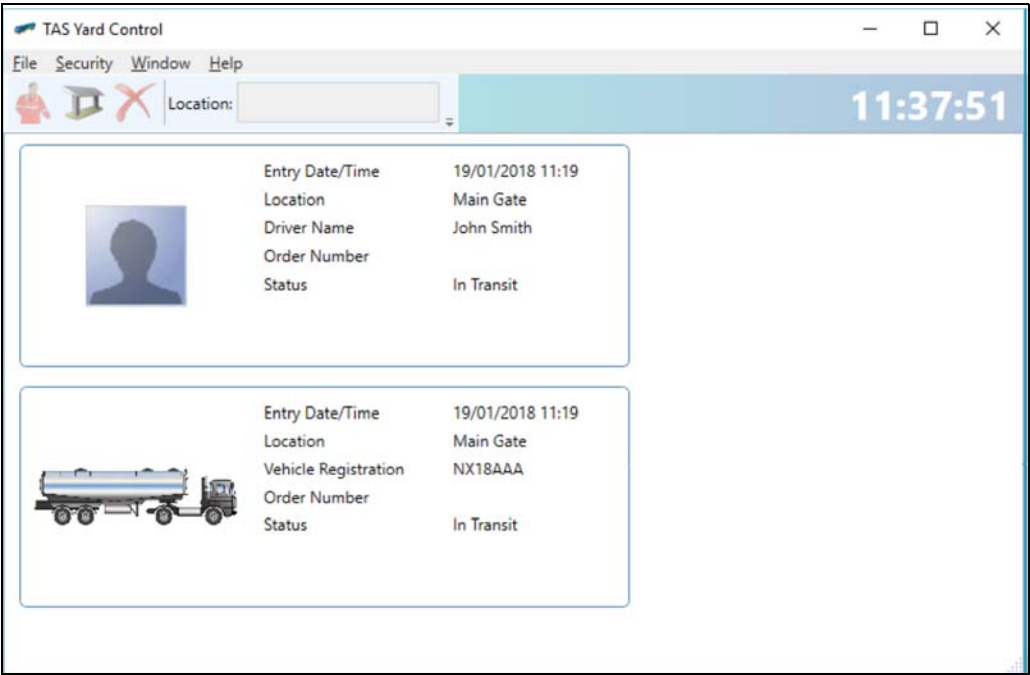
Terminalvision_Configuration_EN_032

Site Access

When a truck arrives on site and the driver has an access card both for himself and the truck, he can proceed to the entry gate where both cards need to be swiped at the card reader. Terminalvision checks if the required licenses are still valid and if no lockout reason is existing the gate opens and the driver can enter the site to park his vehicle in the parking lot until it is his turn to go to the loading bay.

Yard Control

The yard control gives a comprehensive overview about currently registered persons and vehicles. All registering actions at ACUs independent of them being a person or a vehicle are tracked in a transaction log enabling investigations if needed.



Terminalvision_Operation_EN_004

Order Management

Terminalvision offers a facility to enter and plan orders. Several different types of orders are currently supported from open orders to exactly defined compartment orders which include specifications of vehicle and driver to take or deliver the product to/from the terminal.

The initiation of a load /unload of a vehicle can be bound to a presence of an order and the according loading transactions are associated to the order.

All orders and transactions are stored and offer the possibility to be evaluated at a later stage.

The screenshot displays the 'TAS Order' window, which is divided into several sections for managing orders. The 'Order' section on the left contains fields for Order Type (set to 'Compartment Order'), Order Number, Order Date (10/07/2018), Quantity Type (Default), Direction (Load), Supplier (Sun Energy), Date Dependent (unchecked), Date From (10/07/2018), Date To (10/07/2018), Authorised (unchecked), Comments, Seal Number, and Seal Count (1). Below this is the 'Customer' section with fields for Customer (Sun Energy), Reference Number (SE2357), and Destination (RS Fuels). The 'Logistics' section at the bottom includes Carrier (Sun Energy), Driver (Fred Smith), and Vehicle (NA34 TEY). On the right, the 'Products' section features a table with the following data:

Compartment	Capacity (m³)	Supplier Product	Authorised (m³)
1	2.000	BIODIESEL	2.000
2	2.000	BIODIESEL	2.000
3	2.000	DERV	2.000

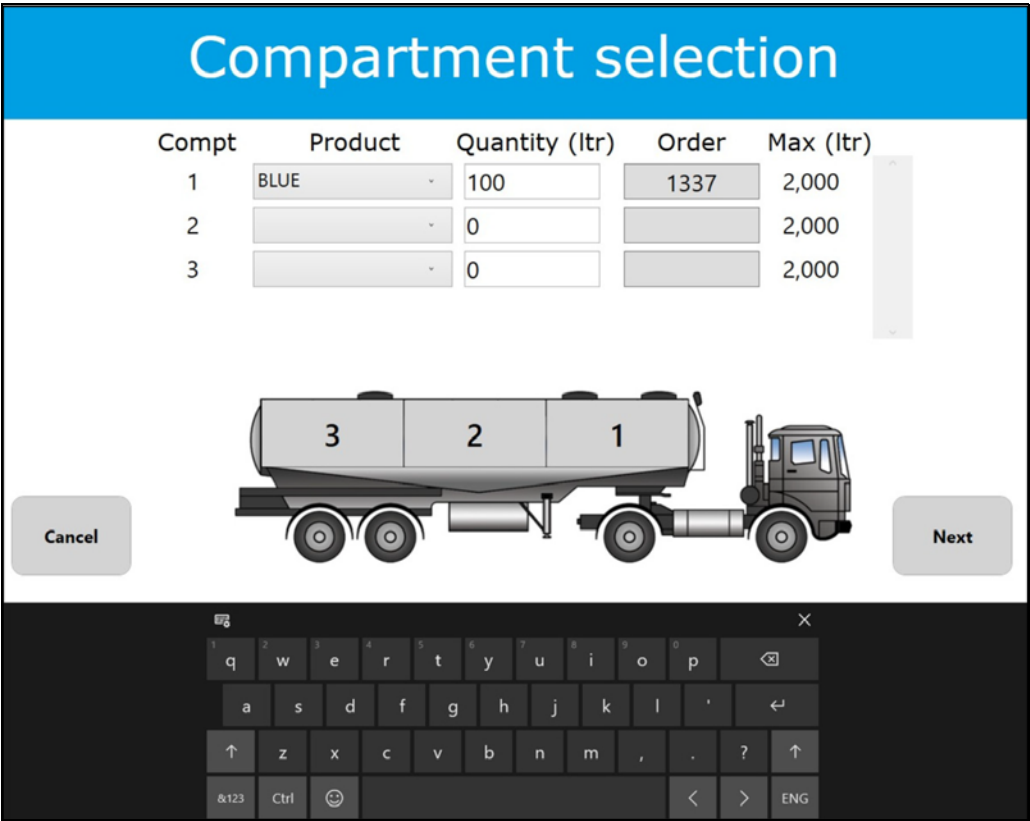
At the bottom right of the window are 'OK' and 'Cancel' buttons.

Terminalvision_Operation_EN_002

Self- Service Kiosk

The Self Service Kiosk module is a software intended to be installed in PCs with touch screens and utilized by drivers to create or select available orders for the loading process in the loading bay. For better understanding, the self-service kiosk supports the selection of different languages before starting the interaction with the HMI.

At the self-service kiosk, the driver needs to perform an authentication of himself and his vehicle with PIN, or even fingerprint plus access card. After successful authentication, the kiosk allows to select an available pre-order or open order to be adapted to the trucks properties or to enter a completely new compartment order.



Terminalvision_Operation_EN_n001.png

After successful order entry/selection the kiosk automatically prints the QAN (Queue Advisory Note). Before proceeding to the loading area, it is required to get the order authorized by an operator.

Queue Advisory Note (QAN)

The Queue Advisory Note is a printout that usually is automatically printed at the self-service kiosk after successful order configuration. This special report only is available if the queuing system has been ordered and installed. It indicates the queuing details as well as giving a short overview on the order such as order number, supplier, driver, vehicle, products and amount per compartment.

Queue Advisory Note		
Queue No	A010	
Order	5789642	
Supplier	Shell	
Driver	Max	
Trailer	F-KL 579	
Compartment	Product	Amount
1	Shell V-Power	2000 l
2	Shell Super 95	3000 l
3	Shell Super 95	3000 l
4	Shell Super 95 E10	3000 l
5	Shell Super 95 E10	3000 l

Terminalvision_Operation_EN_n002.png

Seal Handling

To make sure seal numbers match the seals attached on site, it is required to mention those on the BOL. Terminalvision offers the possibility to enter seal numbers handed out to the driver in advance in the self-service kiosk. Seal numbers are entered as contiguous seals by defining the initial seal number and the seal count. In case of spoiling a seal, any additional seal numbers can be entered by the operator in a free text field in the order configuration screen.

Queuing

The optional truck queuing system helps the user to optimize the throughput of trucks in terminals where Terminalvision is installed. As such it automatically routes trucks to the correct loading bay considering vehicle types and product availability at the loading bay. For further control the queuing system shows the expected arrival time of the truck at the first loading bay they are planned to visit. To speed up high priority loadings, it is possible to change the priority in the Terminalvision operator screens. All the queuing information can be displayed on monitors in waiting rooms in multi languages. Here the drivers can check the status of their queue position earlier printed out at the self-service kiosk on the QAN.

Go To Bay		Wait In Lounge						
		1)			5)			
		2)			6)			
		3)			7)			
		4)			8)			
Bay Status	1)		2)		3)		4)	

Terminalvision_Operation_EN_n003.png


Pre-Loading

Before proceeding to the loading bay, a pre-loading checkpoint can be included to prepare the vehicle for the loading process such as draining remaining product from the compartments. After successful completion and scanning the access card at the ACU, an automatic print-out of a Fill Advisory Note (FAN) can be triggered.

Fill Advisory Note (FAN)

The Fill Advisory Note (FAN) is a more detailed version of the Queue Advisory Note (QAN) that also only is available when using the queuing system. This report can be printed automatically or on demand and shall give an overview on the loading details of the order to be loaded in the loading bay.

Terminalvision
Queue Advisory Note

Endress+Hauser 
 People for Process Automation

Fill Advisory No: 1

Queue	
Driver Name	1 Alice
Vehicle Registration	Truck 01
Date:	14/02/2020 16:48:04

Orders

Order Number	Customer Reference
3	Comp

Compartments

Compartment	Product	Quantity (m³)
1	Derv	5.000
2	Bio	5.000

Products

Product	Quantity (m³)
Bio	5.000
Derv	5.000

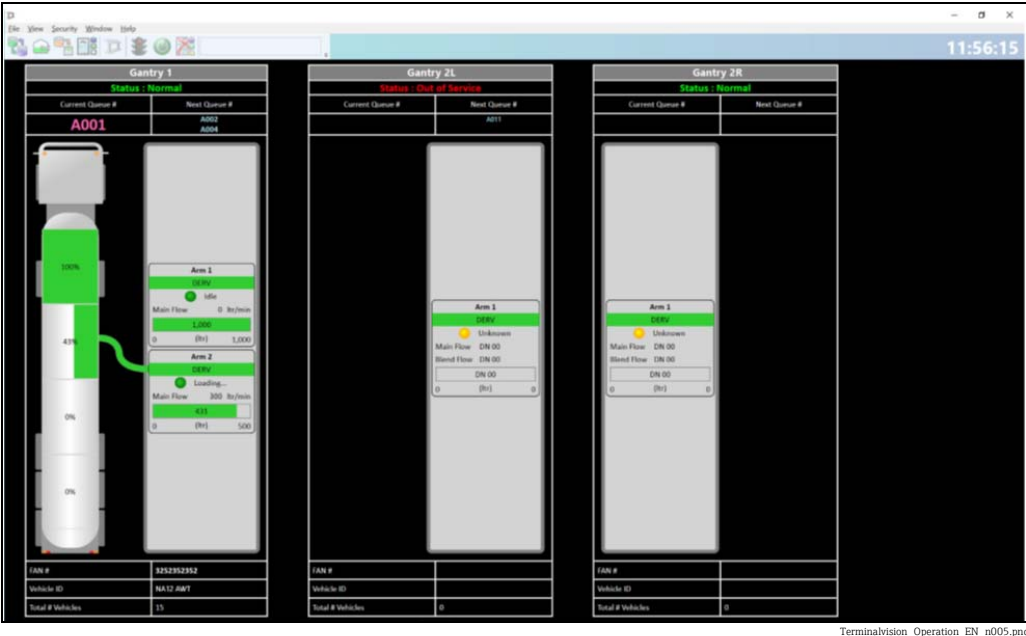
Terminalvision_Operation_EN_n004.png

Loading Operation

The loading process is enabled by Terminalvision. It matches orders, vehicles and persons and downloads them afterwards to the connected batch controller or flow computer. Those units are in charge of controlling the load process within the loading bay itself by checking for interlocks (like high level alarms or correctly fitted grounding), giving signals to pumps and valves, and receiving the flow measurement from the flow meter. Additionally, Terminalvision offers the possibility to monitor the loading process remotely, for example from the control room.

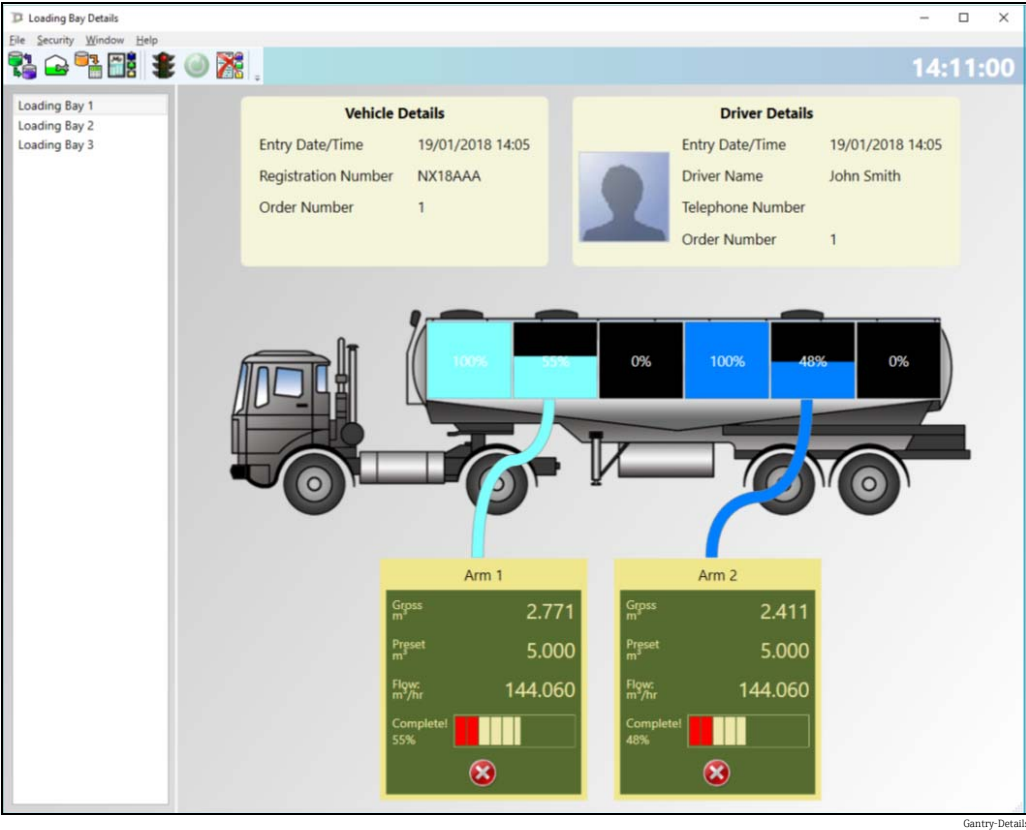
Yard Overview

The Yard Overview gives a summary view on all loading bays including the main parameters. In urgent cases a loading process can be terminated from this screen.



Gantry Details

The Gantry Detail view gives additional information on the actions taking places in the selected loading bay. The display is based on the configuration of the vehicle currently present in the bay. In urgent cases a loading process can be terminated from this screen.³⁾



3) Currently a maximum number of 50 gantries (loading bays) are supported, more upon request.

Post-Loading

After completing the loading operation, the truck moves on to another checkpoint where scanning the access card at an ACU will trigger the printing of the BOL. Based on the BOL the actual loading operation can be confirmed by signing the BOL.

Bill of Lading (BOL)

The Bill of Lading (BOL) is reporting the overall results of the loading process and is therefore the last step before the vehicle and its driver exits the terminal. The BOL commonly states information about the load like the product(s) loaded with quantities, order numbers, and contacts. If ordered, the BOL can be designed in different ways to fit to commonly used office printers as well as ticket printers. The print-out of the BOL can be automatic after completion of the loading or on demand for example when intending to leave the site.

Terminalvision Bill of Lading				Transaction						
Emergency Tel: +4911223344				Date:	14 Dec 2016					
				Site:	Duck Oil					
Stock Holder		Drawer		Destination						
Duck Oil Hauptstrasse 1 Maulburg 79689 +497621121212		Schwarzwald Oil Wurststrasse 78 Lörrach 79539 +497622202020		Schwarzwald Oil Station Steinen Eisenbahnstrasse 32 79582 Steinen Germany						
Gantry	Gantry 1	Start Time:	11:12:08	Meter Trans Id:	10					
Order No	2	Stop Time:	11:17:57	Meter UID:	0					
Compartment Details and Returns										
Compartment	Product Code	Product Name	Obs. Vol. (m³)	Std. Vol. (m³)	Return Vol. (m³)	Accum. Obs. Vol. (m³)	Ref. Dens. (kg/m³)	Temp. (°C)	Status Code	
2	JETA1	Jet Fuel A1	0.495	0.500	0.000	9.535	765.8	5.6	0	
3	UGAS	Unleaded Gasoline	1.486	1.500	0.000	9.041	765.8	6.8	0	
Product Totals										
Product Code	Product Name	Observed Volume (m³)	Standard Volume (m³)	Density (kg/m³)	Temperature (°C)	VCF				
JETA1	Jet Fuel A1	0.495	0.500							
UGAS	Unleaded Gasoline	1.486	1.500							
ADR Hazardous Goods										
ADR Description						Total Quantity (m³)				
UN 1203 MOTOR SPIRIT, 3, PG II						1.980				
Order Comments:										

Terminalvision_Operation_EN_029

Transactions

A full historical log of all transactions is maintained by the system. All active (not committed) transactions and those that completed in the last three hours can be viewed from the TAS Transactions menu option. Current transactions older than 30 days will be cleared from the TAS Transactions screen but can still be viewed from the TAS Transaction History screen.

TAS Transactions				
Start Time	Stop Time	Gantry	Reference Number	
+ 14/02/2020 14:27	14/02/2020 14:29	Bay 01		
+ 19/02/2020 08:20	19/02/2020 08:50	Bay 01	OPEN #1	
+ 13/02/2020 22:05	19/02/2020 09:01	Bay 01	OPEN #1	
+ 21/02/2020 08:50	21/02/2020 10:05	Bay 01	Comp	
+ 20/02/2020 22:25	20/02/2020 22:38	Bay 01		
+ 24/02/2020 05:52	24/02/2020 05:54	Bay 01		
+ 24/02/2020 05:55	24/02/2020 05:58	Bay 01	Comp	
+ 24/02/2020 22:33	24/02/2020 22:34	Bay 01		
+ 24/02/2020 22:31	24/02/2020 22:33	Bay 01		
+ 24/02/2020 21:21	25/02/2020 22:01	Bay 01		
+ 24/02/2020 21:19	26/02/2020 16:49	Bay 01		

Terminalvision_Operation_EN_n006.png

The TAS Transactions screen offers multiple options such as reprinting the Bill of Lading (BOL) or manually creating and editing existing transactions, if configured accordingly. Manually editing transactions allows to manually create new transactions, add or remove manual batches to existing transactions, edit batch additives or merge transactions.

Site Exit

After completing the post-loading checks, the truck can proceed to the exit gate, where the access card will be scanned to update the driver and vehicle status in the yard overview and to open the exit gate. If configured and the required infrastructure is available, either an SMS or email can be sent to the customer to inform him that the truck has left the site.

Railcar Loading / Offloading

In this section a possible workflow for a railcar loading operation is described. For additional information, check the mentioned documents or contact the local Endress+Hauser representative.

The Railcar Loading / Offloading in a short overview looks like this:

1. Arrival on Site
2. Vehicle and order creation
3. Loading operation
4. Print Bill of Lading (BOL)



The Railcar Loading / Offloading is described in abbreviated form on the following pages. For further information, see the operating instructions for NXS85 on the website www.endress.com/download.

Arrival on Site

For railcar loadings it is assumed that the trains arriving on site usually have not been there before. In addition, the loading operation should not be executed by the driver, but by a site operator who is on site when the train arrives. Therefore, access control with access cards to be scanned at an Access Control Unit (ACU) is not required. Instead, trains enter the loading area directly and wait for the start of the loading operation there.

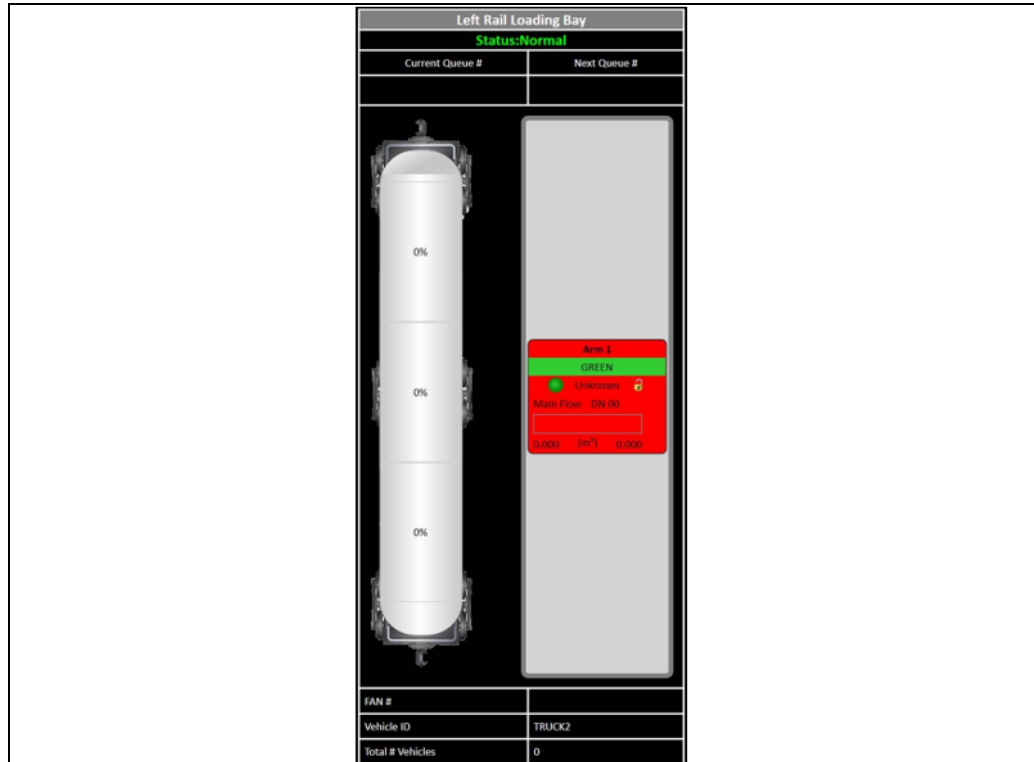
Vehicle and order creation

Before starting a loading operation, it is required to create the vehicles and orders in Terminalvision. In the vehicles database a new vehicle is created for each railcar. For authenticating of the railcar at the batch controller in the loading bay a PIN is entered.

Pre-Orders can be used to represent the ordered amounts for the complete train. This order type allows the specification of a list of products with specific quantities which can be taken at any time. The order is completed when the specified product quantities have been taken.

Loading Operation

The loading operation is started by authenticating the operator executing the loading operation with his access card, the railcar to be loaded with its PIN, selecting the available pre-order and specifying the product and amount to be loaded via the batch controller. The batch controller is in charge of controlling the load process within the loading bay itself by checking for interlocks (like high level alarms or correctly fitted grounding), giving signals to pumps and valves, and receiving the flow measurement from the flow meter. Additionally, Terminalvision offers the possibility to monitor the loading process remotely, for example from the control room.



Terminalvision_Operation_EN_n007.png

Print Bill of Lading (BOL)

When all loadings are finished the corresponding BOLs (one BOL for each railcar) can be printed at a Terminalvision client station and the train leaves the site.

Bulk Movements

The planning and monitoring of bulk movements happens in a tank gauging system such as Tankvision Professional where the tank level is visualized with the input from tank gauging devices or alternatively can be done by manual dipping. For reconciliation reasons it is required to provide the movement information in Terminalvision as well. Independent of the monitoring method, ship and pipeline receipts or disposals are manually entered in Terminalvision as bulk movements.

ERP Integration

To minimize the effort of double data entry in Terminalvision and the local ERP system, it is possible to synchronize data between both systems by using the IMS Middleware SXS70. Following use cases are available:

- Copying order data from the Business System to Terminalvision
- Copying transactions from Terminalvision to the Business System
- Copying driver and truck data from Terminalvision to the Business System



For more information on ERP integration, check the Technical Information IMS Middleware SXS70 and other related documents on the website www.endress.com/download.

Alternative Workflows

Alternative workflows can be implemented. E.g. when loading based on weight instead of using batch controllers. For more information on adapting this sample process to your needs, contact the local Endress+Hauser representative.

Reporting

Reports

Terminalvision can produce a comprehensive set of reports. For customizing the available reports to your company needs contact your local Endress+Hauser representative.
Report details are covered in the document BA01584G Operation.

Report Name	Description	On Demand	Automatic print	Automatic e-mail	Application package needed
Daily Stocks	Shows book stock holding for each product per customer and per tank	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Observed Daily Stocks	Shows observed book stock holding, and summarizes activities for each product per customer and per tank	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Standard Daily Stocks	Shows standard book stock holding, and summarizes activities for each product per customer and per tank	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Mass Balance	Shows mass book stock holding, and summarizes activities for each product per customer and per tank	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Daily Closedown	Compares current closing book stock in each tank to the physical stock in the tank	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
WeighbridgeTicket	Print out from weighbridge screen, showing gross and tare weights	X			Weighbridge, value recording (EI)
Reconciliation	Movements and adjustments broken down by product and type of movement recorded over a time period sorted by date	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Stock Sales	Outgoing movements broken down by product recorded over a time period	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Bill of Lading	Print out of transaction details following loading/receipt through batch controller	X	X	X	
TAS Yard History	Hard copy of the TAS Yard History data	X			
TAS Transaction	List of transactions that have occurred in a given date period	X			
TAS Order	Hard copy of TAS order details	X			
Monthly Customer Stocks	Monthly report showing customer stock movements and adjustment in selected month	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Daily Customer Stock E-mail	Daily statement showing site stock status	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Customer Stock Movements	Monthly report showing customer stock movements and adjustment in selected month	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Monthly Mass Balance	Monthly report showing customer and tank stock movements focusing on mass quantities	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾

Report Name	Description	On Demand	Automatic print	Automatic e-mail	Application package needed
Monthly Stocks	Monthly report showing customer stock movements in observed, standard and mass quantities	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Observed Monthly Stocks	Monthly report showing customer and tank stock movements focusing on observed volumes.	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Standard Monthly Stocks	Monthly report showing customer and tank stock movements focusing on standard volumes.	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Receipt Certificate	Print out of one movement's details in full	X			
Receipt Certificate, Brief	Print out of one movement's details in a brief format	X			
TAS Driver List	Print out of drivers and their details	X			
Meter Totals	Report showing batch controller internal counters as recorded during TAS transactions	X			
TransportLoss_MonthToDate	Differences between advised and actual figures as entered in movements (day-by-day in month)	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
TransportLoss_YearToDate	Differences between advised and actual figures as entered in movements (month-by-month in year)	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
OperationLoss_MonthToDate	Differences between book and physical stocks (day-by-day in a month)	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
OperationLoss_YearToDate	Differences between book and physical stocks (month-by-month in a year)	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
TAS Vehicles	Print out of vehicles and their details	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
Fill Advisory Note	Prints out fill details	X			Loading arms with queuing system ²⁾
Queue Advisory Note	Prints out queue details	X	X		Loading arms with queuing system ²⁾
SitePerformance	Self-congratulatory report to show how many trucks and volumes loaded (day-by-day for month)	X			Inventory Reconciliation with Tankvision Professional NXA85 ¹⁾
ProductPerformance	Report showing how much of each grade each customer has loaded and what additives have been used	X			
LoadingActivity	Lists transactions grouped by date	X			

1) Product Configurator "Application Package" ordering feature, option "EM"

2) Product Configurator "Connected Unit" ordering feature, option "B"

User Management

User Management

The system has a very flexible security system that includes from providing full access with no passwords to stringent controls on every relevant feature.

Users and their privileges are entered through the user configuration module. This is essentially a group of features for each user. For each user you can determine their access rights on a feature by feature basis. Access rights can be **No Access**, **Read Only**, **Edit** or **Full Access** as an Administrator.

Supported devices

Batch controllers/flow computers

Batch controller ¹⁾	Maximum number of blend components	Loading arms per device	Number of additives supported per device	Card reader supported	Ability to act as ACU	Supports seal number input at bay
Accuload 3	2	6	0	X	X	-
Avery Hardoll	0	1	0	-	-	-
Contrec 1010	0	4	0	X ²⁾	X	-
Contrec 1010 CB	2	1	0	X ²⁾	X	-
Danload 6000	2	1	0	-	X	-
Danload 8000	2	1	11	-	X	-
Danload 8000 Multiarm	0	4	11	-	X	-
Microload	0	1	0	X	X	-
PLC Driver	0	1	0	-	X	X
Vega II	0	1	6	X	X	-
Vega T	0	1	6	X	X	-
Vega II blending	2	1	6	X	X	-
VEGA III	2	6	16	X	X	-

1) Further supported batch controllers or flow computers consult Endress+Hauser

2) Contrec supports TAG device, not the usual proximity card

Access Control Units (ACU)

- MercuryHMI Mercury 2+
- ISOIL IMPIANTI RF-ID/B master version (Bay access control in conjunction with batch controller ISOIL IMPIANTI VEGA II and T)
- ISOIL IMPIANTI RF-ID/A slave version (standalone site access control at entry/exit)
- Further supported access control units consult Endress+Hauser

Weighbridge controllers⁴⁾

- WeightronBilanciali D410
- WeightronBilanciali D800
- A&D AD-4329
- Further supported weighbridge controllers consult Endress+Hauser

Max. supported devices

Currently 400 devices (Batch Controllers, Flow Computers, PLCs, Access Control Units and Weighbridge Controllers) in total are supported.⁵⁾

Application packages

Weighbridges

The weighbridges application packages enables the take in of the results from the weighing process from the connected weighbridge controller (see above for supported controllers). The results are further processed, recorded, and if required integrated onto reports as for example the Bill of Lading (BOL).

4) Requires Application Packages Weighbridge

5) The actual maximum number of devices might be lower as for example a maximum of 50 gantries (loading bays) each with max. 10 loading arms are currently supported. In this case the number of devices would be distinguished by the number of loading arms controlled by the selected batch controllers.

Reconciliation with Tankvision Professional NXA85

Terminalvision offers Stock Management functionalities building on the transaction processing system for loading operations. It is providing additional tools and features for controlling and monitoring the following:

- Receipts into Storage
- Opening, Closing Stocks over daily, monthly periods
- Reconciliation of transactions to Physical Stock
- Co-mingled storage
- Accounting Adjustments to cater for losses/gains
- Stock accounts for Customers

The optional reconciliation package provides the ability to import Tank and Product data, Tank Capacity Tables, and Physical Stock into Terminalvision NXS85 from Endress+Hauser Tankvision Professional NXA85.

In the context of Stock Management this enables the user to base the reconciliation on measured physical stock data from the tank gauging system rather than the manually entered storage data of the terminal management software.

Scope of delivery

Scope of delivery

Scope of delivery (initial order) of Terminalvision:

- Terminalvision Software on USB stick
- USB Dongle

Ordering information

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

Downloads

For an overview of the technical documentation provided, visit the Downloads area of the Endress+Hauser website (www.endress.com/downloads).

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