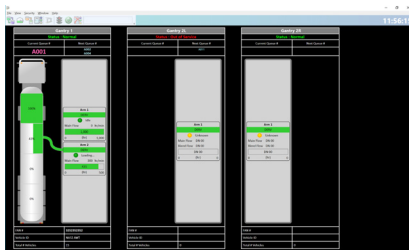


Technical Information

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

Table of contents

Function and system design	3
Application	3
System Overview	4
Requirements Hardware / PC	6
Recommended PC Specifications	6
Recommended System Requirements	6
Functions and operator interface	9
Site access	9
Order Management	11
Loading process	11
Yard Overview	11
Gantry Details	12
Bill of Lading (BOL)	12
Reporting	13
Reports	13
User Management	13
User Management	13
Supported devices	13
Batch controllers/flow computers	13
Access Control Units (ACU)	13
Weighbridge controllers	13
Max. supported devices	13
Application packages	13
Weighbridges	13
Reconciliation with Tankvision Professional NXA85	14
Queuing System	14
Self Service Kiosk	14
Scope of delivery	14
Scope of delivery	14
Ordering information	14
Ordering information	14
Documentation	15
Operating Instructions	15
Registered trademarks	15
Trademarks	15

Function and system design

Application

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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).

System Overview

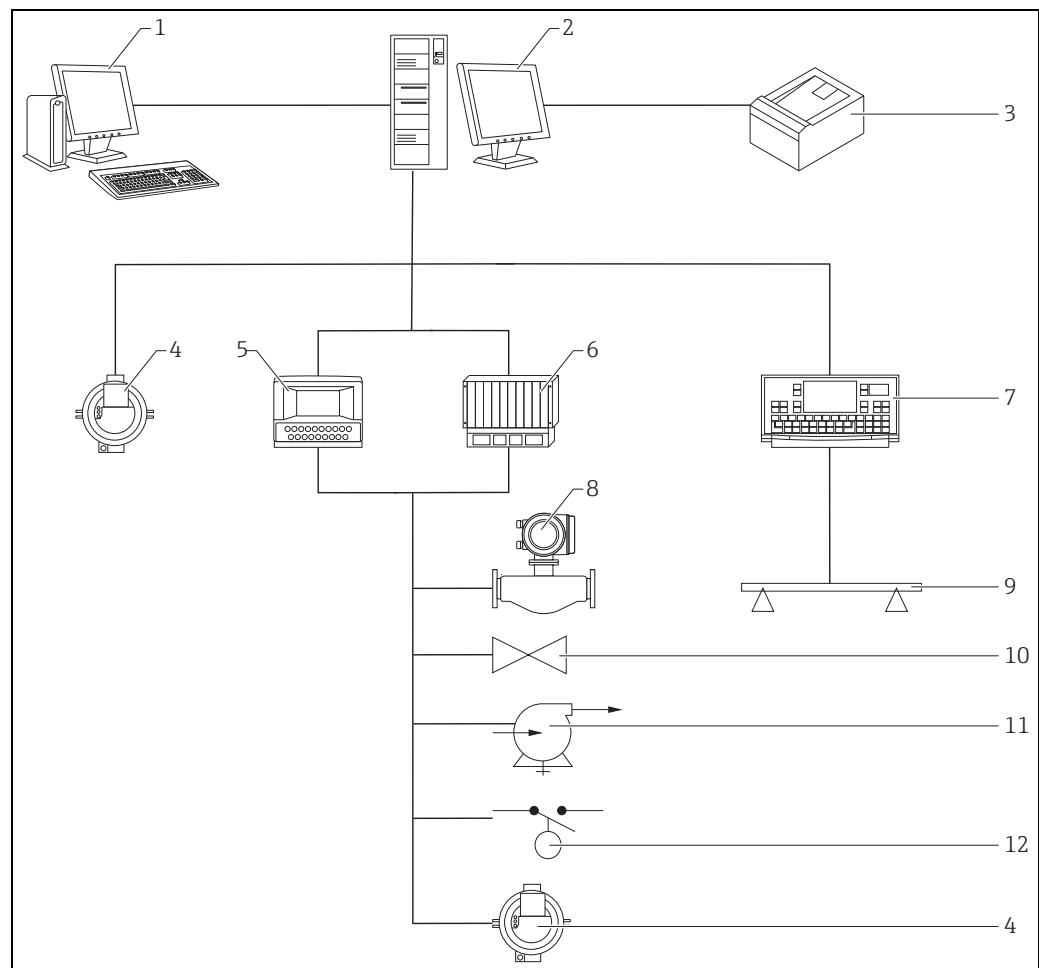
Standalone

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).



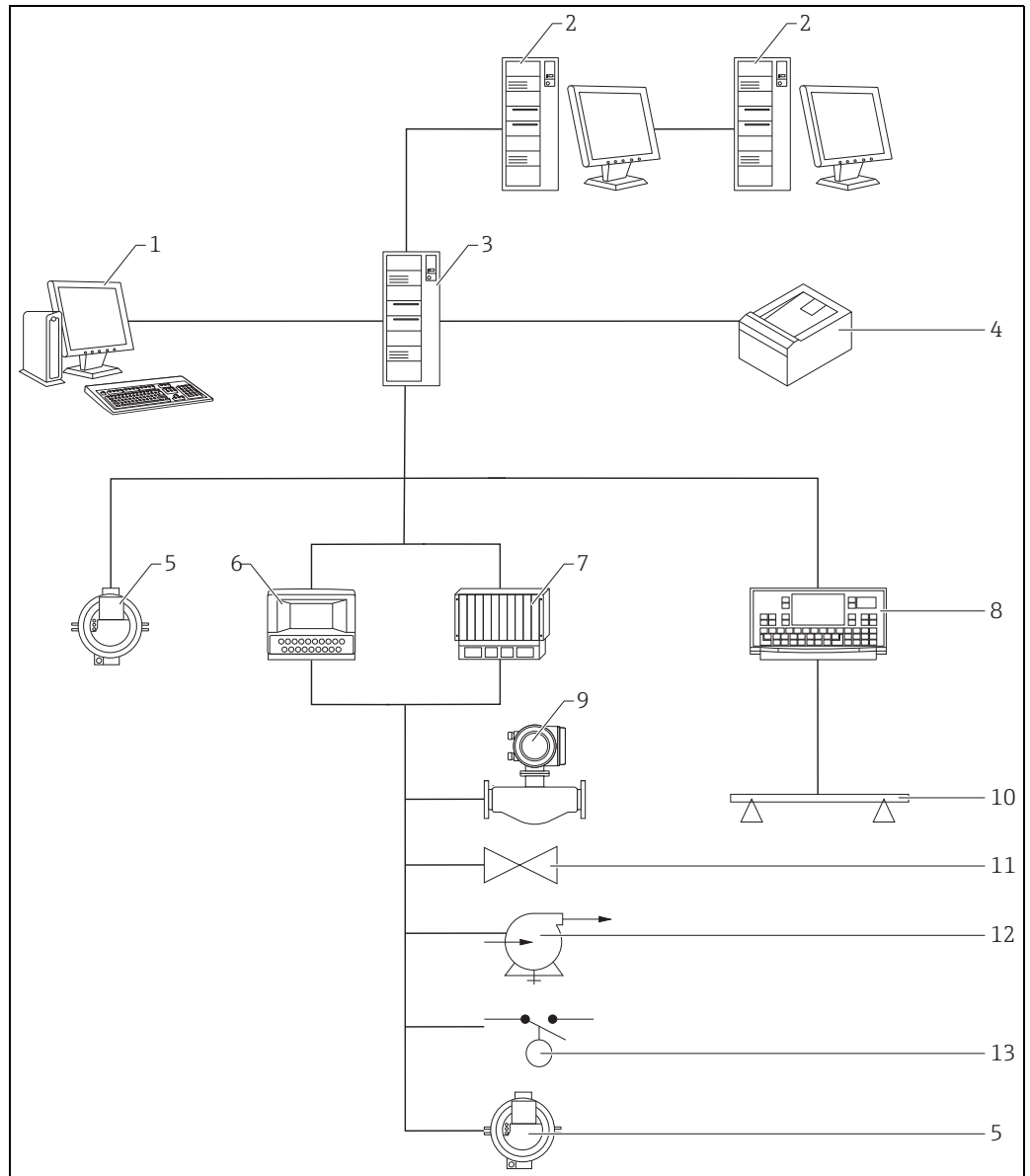
NXS85_Terminalvision_Wiring-example-1

- 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). Please 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). Please note that kiosk and queuing stations shall be considered as application clients.

Recommended System Requirements

General Requirements

Support for 64 bit Windows operating systems only is provided from version 18.1.0 onwards. Both 32 and 64 bit Windows operating systems were supported by 18.0.2, but prior to 18.0.2 only 32 bit Windows operating systems were supported. 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	64 bit Windows 7 Professional / 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 2016
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 2016
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 7 SP1, 64 bit / 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.

Functions and operator interface

In this section the main functions of Terminalvision are briefly described. For additional function scope you are requiring for your project please contact your Endress+Hauser representative.

Site access

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.

Drivers database

In the persons (drivers) database all persons that have a permission to enter the site whether they are members of staff, or personnel of site customers or suppliers (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 Driver

TAS Driver

Driver Details

Name

Fred Smith

Telephone Number

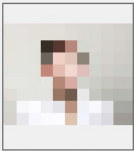
Remarks

Inducted

☒

Induction Date

05/12/2011



Change Picture

Remove Picture

Security

Touchkey Number

PIN

1111

Card Number

Access Level

1

Locked Out

☐

Reason

Report to Office

Carriers

Carrier 1

Oil Storage

Carrier 2

Vesco

Carrier 3

Licenses

Drivers License

☐

License Number

Expiry Date

05/12/2011

Dangerous Goods

☐

License Number

Expiry Date

05/12/2011

AIP License

☐

License Number

Expiry Date

05/12/2011

Delete

OK

Cancel

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: TX-11234

Vehicle Type: Trailer

Security

Touchkey Number:

PIN: 7777

Card Number:

Access Level: 1

Locked Out: ☐

Reason: Report to Office

Carriers

Carrier 1:

Carrier 2:

Carrier 3:

Licenses

Dangerous Goods: ☐

License Number:

Expiry Date: 05/12/2011

AIP License: ☐

License Number:

Expiry Date: 05/12/2011

Compartments

Compartment	Capacity (m³)	Capacity (kg)
1	1,000.000	
2	1,000.000	

Add Remove

Delete OK Cancel

Terminalvision_Configuration_EN_032

Yard Control

The yard overview 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.

TAS Yard Control

Entry Date/Time: 25/03/2010 11:36

Gate: ENTRYGATE

Driver Name: Fred Smith

Order Number: Unknown

Status: In Transit

Gantry: N/A

Telephone Number:

Entry Date/Time: 25/03/2010 11:36

Gate: ENTRYGATE

Vehicle Registration: vb45 0aa

Order Number: Unknown

Status: In Transit

Gantry: N/A

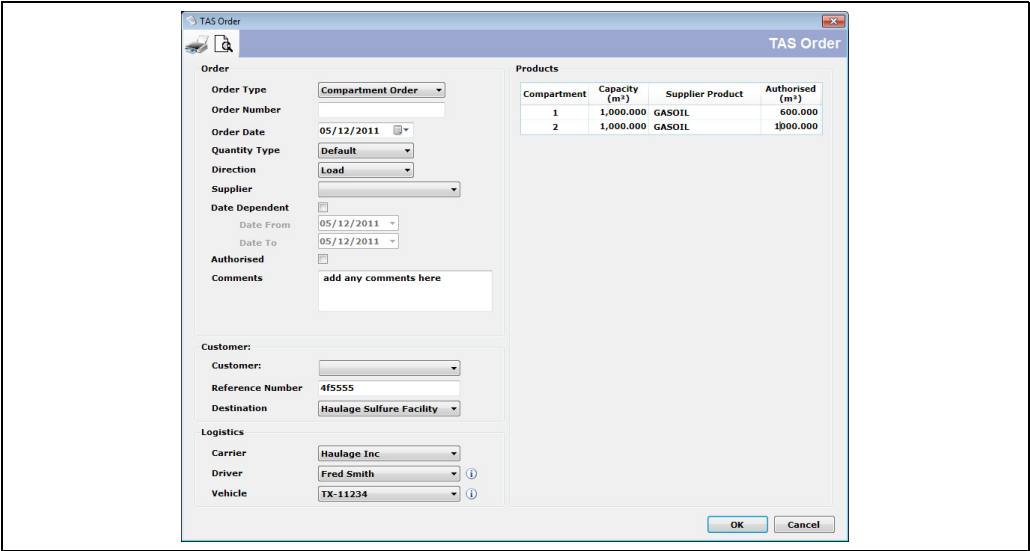
Terminalvision_Operation_EN_004

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.



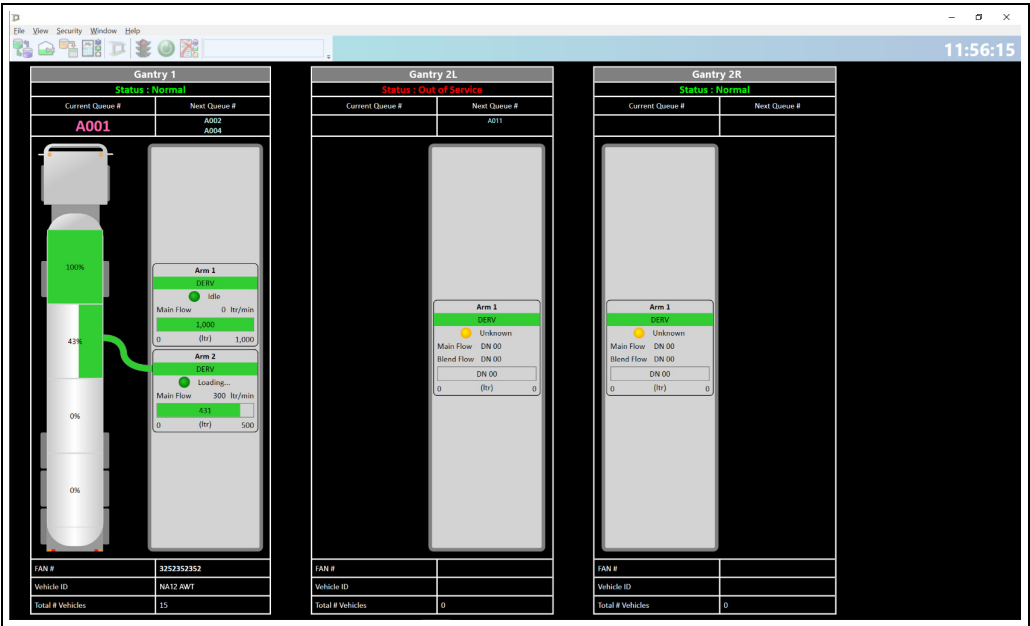
Terminalvision_Operation_EN_002

Loading process

The loading process is enabled by Terminalvision. It matches of 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 online monitor the loading process.

Yard Overview

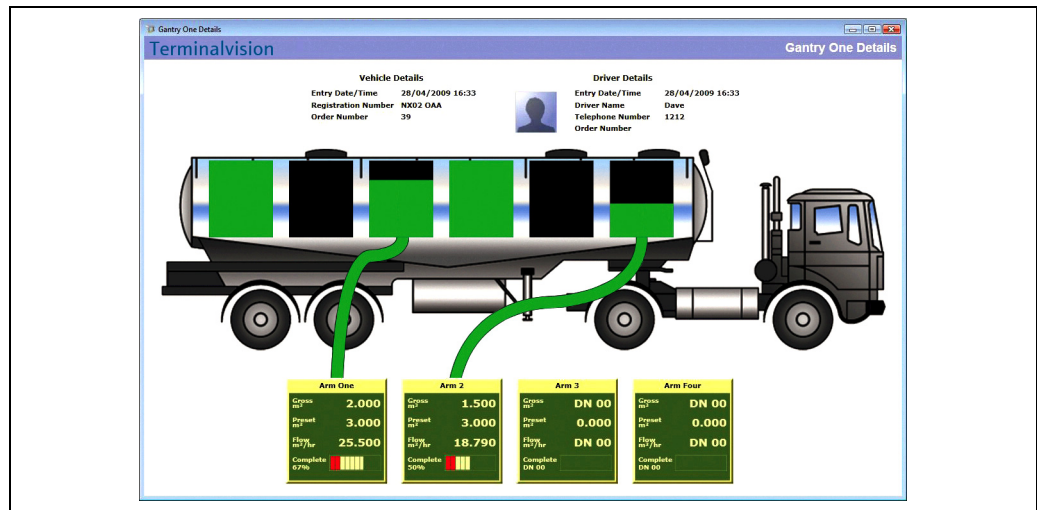
The Yard Overview gives a summary view on all loading bays including the main parameters. In urgent cases a loading process can be terminated from this screen.



Yard Overview

Gantry Details

The Gantry Detail view gives additional information on the actions taking place 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⁾



Gantry-Details

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.⁴⁾ 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.

Transaction		189							
Bill of Lading		Date	02 Jan 2010						
Emergency Tel:		Site	Site 1						
Stock Holder	Drawer	Destination							
Oil Storage Ltd	Oil Storage Ltd	www							
Gantry	Gantry 1	Start Time:	13:27:53						
Order No	1002	Stop Time:	13:34:14						
Compartment Details and Returns									
Compartment	Product Code	Product Name	Obs. Vol. (ltr)	Std. Vol. (ltr)	Return Vol. (ltr)	Accum. Obs. Vol. (ltr)	Ref. Dens. (kg/l)	Temp. (°C)	Status Code
1	GASOIL	GASOIL	1015	1015	0	162093	0.0000	-100.0	7
2	GASOIL	GASOIL	1081	1081	0	163174	0.0000	-100.0	7
3	GASOIL	GASOIL	2013	2013	0	165187	0.0000	-100.0	7
4	GASOIL	GASOIL	2011	2011	0	167197	0.0000	-100.0	7
Product Totals									
Product Code	Product Name	Observed Volume (ltr)	Standard Volume (ltr)						
GASOIL	GASOIL	6120	6120						
ADR Hazardous Goods									
ADR Description			Total Quantity (t)						
Order Comments:									
Driver Signature:				Driver: Terry					
				Vehicle Reg: NV515PPP					
Printed: 02/01/2010 13:36:33				Page 1 of 1					

Terminalvision_Operation_EN_029

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

4) The content of the report can be amended to the needs of the site. Please contact your local Endress+Hauser representative.

Reporting

Reports

Beside the Bill of Lading (BOL) Terminalvision can produce a comprehensive set of reports, for example order reports, transaction reports, and summary reports on a flow meter, customer, time based (daily, monthly) etc. For branding the available reports to your company needs or adding your own reports to the set of already available ones contact your local Endress+Hauser representative.

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

- ISOIL IMPIANTI VEGA II
- ISOIL IMPIANTI VEGA T
- FMC Accuload III
- FMC Microload
- Contrec 1010
- DANLOAD 8000
- Further supported batch controllers or flow computers please consult Endress+Hauser

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 please consult Endress+Hauser

Weighbridge controllers⁵⁾

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

Max. supported devices

Currently 400 devices (Batch Controllers, Flow Computers, PLCs, Access Control Units and Weighbridge Controllers) in total are supported.⁶⁾

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).

5) Requires Application Packages Weighbridge

6) 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.

Queuing System

The queuing system of vehicles functionally relates to a module consisting of a truck queuing facility to augment the Terminalvision functionality.

The truck queuing system helps the user to plan truck loading with a view to optimising the throughput of trucks in terminals where Terminalvision is installed. It takes into consideration the number and order to go through check points and stations, order creation, loading bay availability as well as priorities.

All the queuing information can be displayed in monitors on waiting rooms in dual languages.

The Queuing module is made to interact with Terminalvision and the Self Service Kiosk stations.

Self Service Kiosk

The Self Service Kiosk module is a software intended to be installed in PCs with touch screens that can help automate the ordering process.

This system that is intended to be utilised by drivers, allows them to create/select orders, once they have passed the authentication process. Drivers will be able to alter/specify all applicable order details prior to proceeding to the loading bay through a user friendly interface designed specifically for touchscreens (but can also be used with mouse and keyboard if it is so desired).

Scope of delivery

Scope of delivery

Scope of delivery (initial order) of Terminalvision:

- Terminalvision Software DVD
- License CD
- USB Dongle
- Installation Manual

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

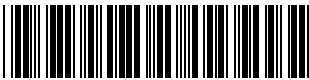
- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability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

Documentation

Operating Instructions	BA01580G
	Installation
	BA01582G
	Configuration
	BA01583G
	Weighbridge Configuration
	BA01584G
	Operation
	BA01897G
	Queuing Installation and Operation
	BA01898G
	Self-Service Kiosk

Registered trademarks

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