

ProGauge MagLink LX 4 and LX Plus Configuration Manual

Part Number: M2051

Revision: 4



MagLink LX 4 and LX Plus

DFS *Worldwide Brands*



IMPORTANT: Before you use this manual, make sure you have the most recent revision. Look at the revision of this document to make sure it agrees with the most current revision found in the FMS Technical Library. Download the latest revision if necessary.



IMPORTANT: If you have an installation in an area that has possible internet connectivity issues, it is recommended to either print or download these manuals to a mobile device (mobile phone, tablet or iPad) before you go to the installation site.



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NOTE: All references to other manuals and instructions in this manual can be found in the FMS Technical Library. Make sure you have the most recent revision.

Related Manuals

Other related manuals necessary to install, configure, maintain or use this product:

[M2050 LX 4 Installation Manual](#)

[M2050-PLUS LX Plus Installation Manual](#)

[M2051 LX 4 and LX Plus Configuration Manual](#)

[M2052 LX 4 and LX Plus User Manual](#)

[M2054-QS LX 4 and LX Plus Quick Start](#)

[FMM2058-PLS LX Plus Wiring Diagram](#)

[FMM2058-PG LX Plus Wiring With ProGauge](#)



ProGauge is a part of Dover Fueling Solutions.

Contact

START ITALIANA S.r.l.
Via Natta 6
20823 Lentate Sul Seveso
MB, Italy
Tel. +39 0362 1581465
Fax +39 0362 1581464

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Table of Contents

Section 1 Preface	7
Section 2 General Warnings	8
Section 3 Introduction	10
3.1 Safety Warnings	12
3.2 Information Panels	12
Section 4 Direct Connection	14
Section 5 Login Procedure	17
Section 6 Admin Account	20
6.1 System Settings	21
6.1.1 Site Info	21
6.1.2 System	22
6.1.3 Protocols	24
6.1.4 Tank Group	25
6.1.5 Shifts	26
6.1.6 Fairbanks	27
6.1.7 SMTP	28
6.1.8 Site Mapping (for Reconciliation/Autocalibration mode only)	29
6.1.8.1 Map Dispensers and Nozzles to Tanks	30
6.1.9 IFSF	30
6.2 Notifications Menu	31
6.2.1 Contacts	31
6.2.2 Notifications	32
6.3 Tank Setup Menu	33
6.3.1 Settings	33
6.3.2 Thresholds	36

6.3.3 Density	38
6.3.4 AEF (Aqueous Ethanol Float) Thresholds	39
6.3.4.1 For ProGauge Probes with AEF	39
6.3.4.2 For OPW 924B Probes with AEF	40
6.3.5 Relays	42
6.3.6 Strappable	43
6.3.7 Leak Test	45
6.3.7.1 Leak Test Setup	46
6.3.7.2 On-demand Test	47
6.3.8 ACR mode	48
6.3.8.1 ACR Configuration Parameters	48
6.3.8.2 Calibration Parameters	48
6.3.9 ACR Results	49
6.3.10 Reconciliation	50
Section 7 Sensor Setup	51
7.1 ProGauge Sensors	51
7.1.1 OPW FMS smart sensors (model LX Plus only).	52
7.2 Relays	53
Section 8 Tank Status	56
Section 9 Sensor Status	60
Section 10 Tank Group Status	61
Section 11 Reports Menu	62
11.1 History	63
11.2 Tank Alarms	63
11.3 Sensor Alarms	64
11.4 Line Alarms	64

11.5 Delivery	65
11.6 Tank Leak Tests	66
11.7 Line Leak Tests	67
11.8 Compliance	68
11.8.1 Sensor Compliance Report	68
11.8.2 Line Compliance Report	68
11.9 Sales	69
11.10 Shifts	70
11.11 Reconciliation	70
11.12 Configuration	73
Section 12 Maintenance	74
12.1 Manuals	74
12.2 Timezone	74
12.3 Network Configuration	75
12.4 Utility	75
12.5 Diagnostic (for LX Plus Only)	77
12.6 Console Settings	77
Section 13 Change Password	79
Section 14 Logout	80
Section 15 Guest Account	81
Section 16 Technical Support	82

Section 1 Preface

Start Italiana S.r.l. has made every effort possible to see that this document is complete, accurate and updated. With every revision of the console, the related information is added to the document. Start Italiana S.r.l. reserves the right to make unannounced improvements and/or changes in the product and/or associated programs. Start Italiana S.r.l. is not liable for damages of any kind, including those resulting in the document, including typographical errors.

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Section 2 General Warnings

Carefully read the instructions in this manual before you do the installation procedures.

Only approved persons are permitted to install this equipment and configure the console.

The manufacturer is not responsible for operations that are not included in this manual.

The manufacturer is not liable in regard to competent bodies for changes to the equipment and software that are not approved.

In case of failure or defect, refer directly to an authorized service provider or manufacturer.

The manufacturer is not liable for injury and/or damage to persons and/or property and/or pets caused by the failure to obey safety instructions.

All approved personnel must know all safety requirements in this manual, the configuration manual and the user manual.

Refer directly to an approved service provider or manufacturer for questions about the operation of the equipment.



IMPORTANT: You must read and obey all safety instructions in this manual before you use this equipment.



WARNING: Incorrect use of this equipment that does not agree with the instructions in this manual can cause a risk to safety.



WARNING: A minimum insulation thickness of 0.25 mm is necessary for all internal wiring of different intrinsically safe circuits.

A grounding conductor must be connected between the I.S. ground terminals of the Intrinsic safety barrier in the console and the power distribution panel. This connection must have a cross-sectional area of at least 4 mm² for the added earth connection.



WARNING: Substitution of components can decrease intrinsic safety.

ADVESTISEMENT: La substitution des composants peut compromettre la sécurité intrinsèque





READ CAREFULLY: The control drawing shown in ILL. 14 shall be provided with all devices.



IMPORTANT: If a replacement power supply cable is necessary, use an applicable, approved ELBZ/7 type power cord. Do not use another type of power cable.

Section 3 Introduction

This manual was prepared in accordance with IEC 82079-1 standards. "Preparation of instructions for use - Structuring, content and presentation - Part 1: General principles and detailed requirements and according to the ATEX Directive 2014/34/EU concerning equipment and protective systems intended for use in potentially explosive atmospheres."

This manual gives all necessary information about the configuration of the MagLink LX 4/LX Plus console.

IMPORTANT: This manual must be used together with the related product manuals:



» M2050-EU MagLink LX 4 /LX Plus Installation Manual

» M2052-EU MagLink LX 4/LX Plus User Manual

You must install the console as shown in the M2050-EU MagLink LX 4 /LX Plus Installation Manual, configure the console as instructed in this manual and use the console in the field as shown in the M2052-EU MagLink LX 4/LX Plus User Manual.

WARNING: This device must not be discarded with household waste. This device is labeled in accordance with European Directive 2012/19/UE concerning used electrical and electronic appliances (waste electrical and electronic equipment – WEEE).



This guideline gives the methods for the return and recycling of used electronic devices as applicable throughout the EU. To return your used device, use the return and collection systems available to you.

The battery used in this device may present a risk of fire or chemical burn if mistreated. Do not disassemble, heat above 50°C or incinerate.



The table that follows lists reference data of the manufacturer:

<i>Data</i>	<i>Description</i>
Name	START ITALIANA S.r.l.
	Via Natta 6
Address	20823 Lentate Sul Seveso, (MB)
	Italy
Telephone	+39 0362 1581465
Fax	+39 0362 1581464
Website	www.startitaliana.com
e-Mail	support@startitaliana.it



INFORMATION: The units of measurement contained in this manual refer to a specified selection by the user. Refer to ["System" on page 22](#) for more information on how to set units of measure.

3.1 Safety Warnings

This manual contains many important Safety Alerts. There can be a risk of injury or damage to property if you do not obey these alerts. The panels below show the types of safety warnings that can be seen and how each is specified.



DANGER: Indicates an immediately hazardous condition that, if not prevented, will result in death or serious injury.



WARNING: Indicates a possibly hazardous condition that, if not prevented, could result in death or serious injury.



CAUTION: Indicates a possibly hazardous situation that, if not prevented, could result in minor or moderate injury.



NOTICE: Indicates important information not related to hazards. A condition that, if not prevented, can result in property damage.



SAFETY INSTRUCTIONS: Indicates instructions and procedures related to safety or gives the location of safety equipment

3.2 Information Panels



NOTE: This panel gives more information about an instruction or procedure.



IMPORTANT: This panel contains special information that is important and must be read and obeyed.



REMINDER: This panel shows information that has been given before in the manual that is important to show again.



TIP: A step or procedure that is recommended to make another step or procedure easier.



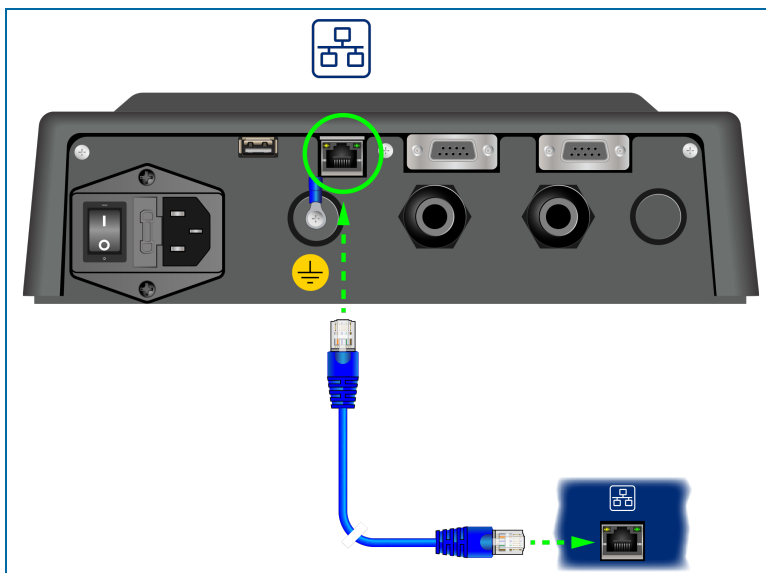
INFORMATION: This panel shows references to more information in other sources.

Section 4 Direct Connection

This section covers how to connect directly to the console using a standard RJ45 cable.

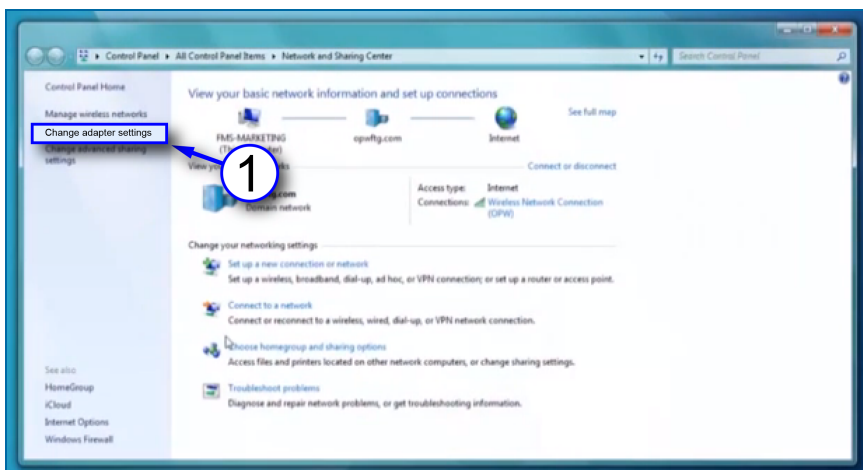


NOTE: If you have a connection problem with a standard RJ45, as an option, try an **RJ45 Crossover cable**.

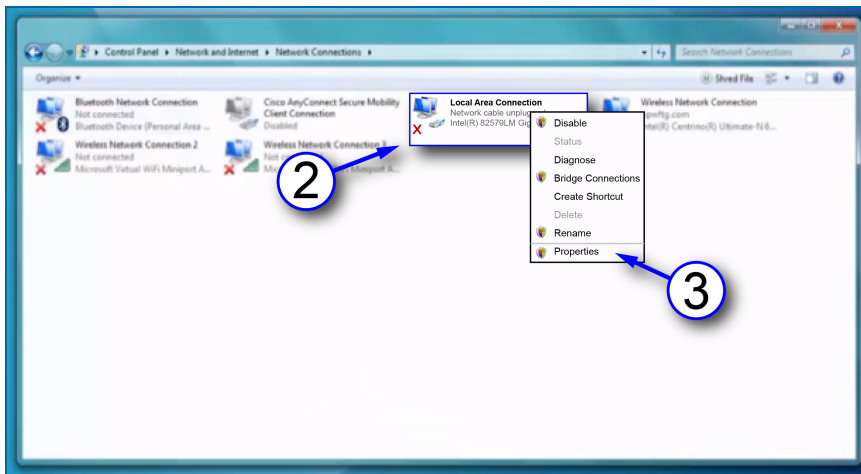


Connect an RJ45 cable from your laptop Ethernet port to the Ethernet port on the bottom panel of the console.

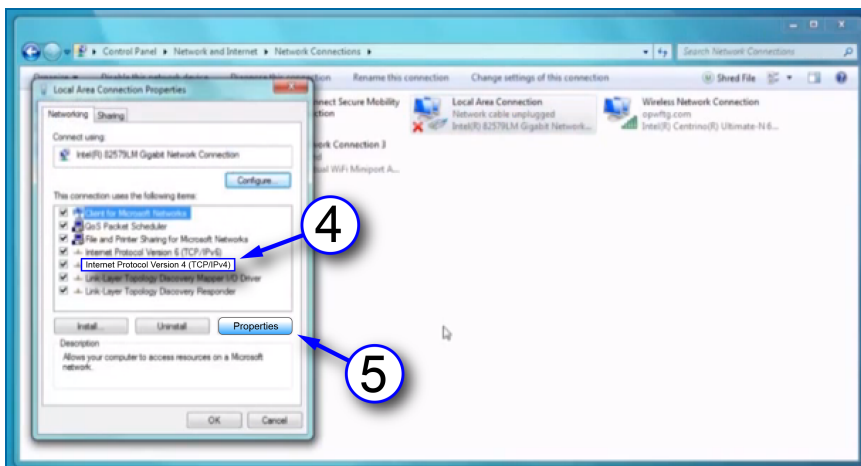
Navigate to Control Panel > All Control Panel Items > Network and Sharing Center on your laptop.



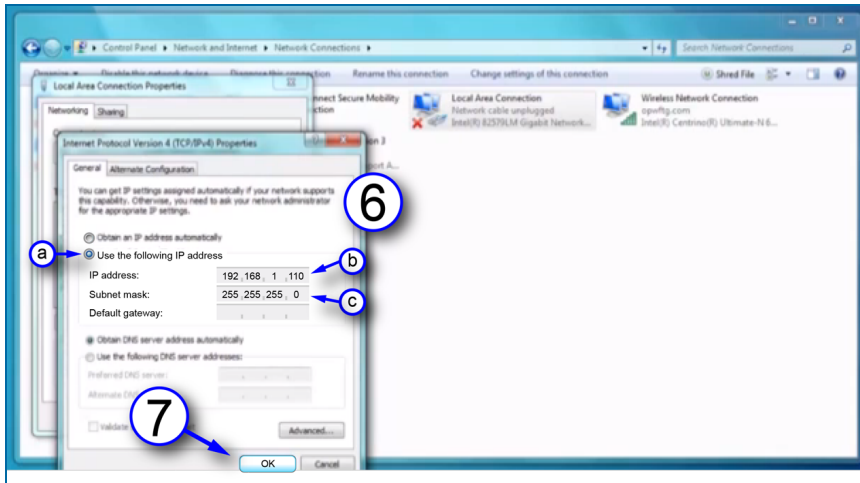
1. Click **Change adapter settings** in the left-side panel.



2. Right-click **Local Area Connections**.
3. Select **Properties** from the menu.



4. Select to highlight **Internet Protocol version 4 (IPv4)** on the list in the pop-up.
5. Click **Properties**.

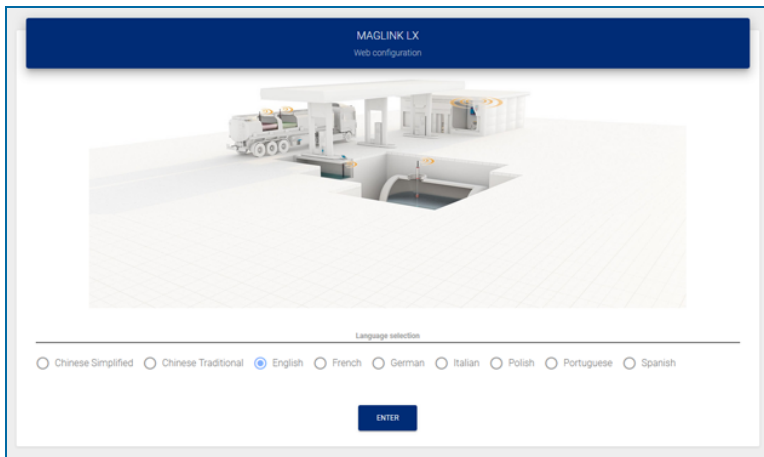


6. Set the **IP address**. The unit comes shipped from the factory with the IP address 10.90.10.92. Your laptop must be set one number higher or one number lower to connect to the console. The connection must be made on port 3000.
 - a. Click the button next to **Use the following IP address**.
 - b. Enter the IP address: **10.90.10.92.3000**.
 - c. Enter the Subnet mask: **255.255.255.0**.
7. Click **OK**.

Your laptop is now set up to communicate directly with your MagLink LX 4 console. Enter the IP address into your browser to connect.

Section 5 Login Procedure

The Home Screen shown below will come into view after you enter the IP Address into your browser.

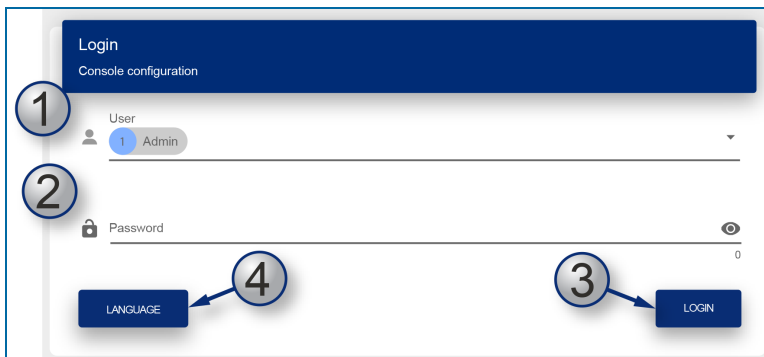


Under **Language selection**, select the radio button adjacent to the language that will be used for the configuration.

The table that follows shows the languages that can be selected:

<i>Console Language Selections</i>		
Chinese Simplified	Chinese Traditional	English
French	German	Italian
Polish	Portuguese	Spanish

Push the **Enter** button. The Login page will come into view.



1. Select a **User** type from the drop-down. There are three (3) types of Users:

- **Guest:** Can only see Tank Status, Sensor Status and Reports (measures, deliveries, leakages, sudden loss). A Guest User cannot make changes to the configuration.
- **Admin:** Has the same rights as Guest and can also make changes to the configuration.

- **SuperAdmin:** This is for internal use only.

2. Enter the **Password**.



NOTE: The initial password for a Guest user and Admin User can be found on the M2054-QS Quick Start instruction that is in the box that came with your console. These passwords are case-sensitive. Only an Admin user can change passwords.



IMPORTANT: The administrator must change the password as soon as possible to prevent access by personnel that are not approved. See ["Change Password" on page 79](#) for information.



TIP: As you type your password only neutral "bullet" characters will show (e.g. •••••). Select the "eye" icon  to show the password characters as you type.

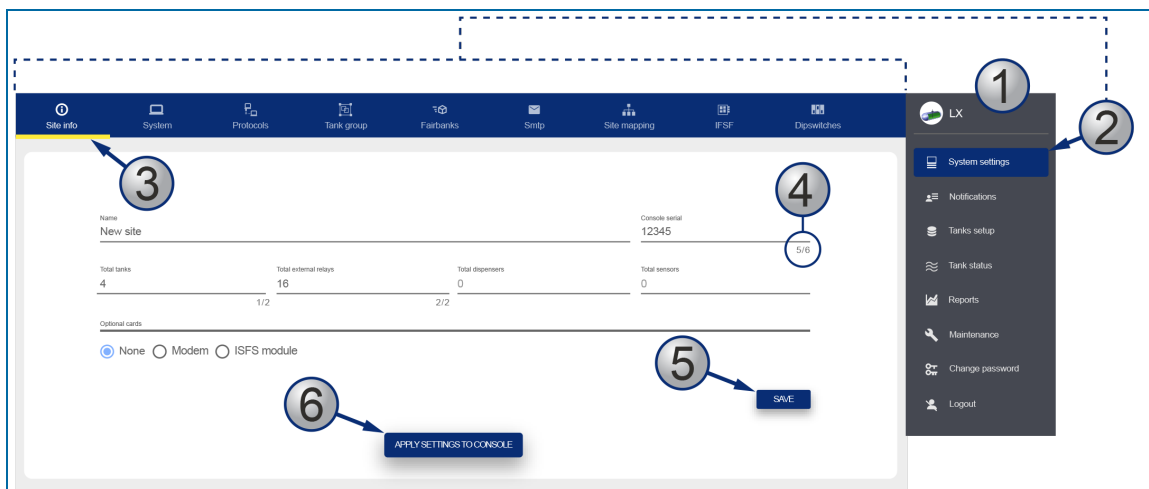
3. Push the LOGIN button to log in to the console with the selected user type.
4. If you did not select the applicable language in the Home screen you can push the LANGUAGE button to go back to the Home screen.

The table that follows shows the types of data that can be seen by the two User types:

<i>Data Type</i>	<i>Guest</i>	<i>Admin</i>
Inventory	X	X
Historical Data Table	X	X
Alarm status	X	X
Delivery/Leakage	X	X
Login	X	X
Logout	X	X
Association of alarm to relays (per tank)		X
Managing internal and external sensors		X
Automatic print features		X
Managing strapping tables		X
Configuring email address book		X
Configuration of all dispensers		X
TCP/IP address configuration, DNS		X

<i>Data Type</i>	<i>Guest</i>	<i>Admin</i>
Utility operations (Backup/restore, Clean historical data: Historical readings, alarms, reconciliation, shift reports, Touch screen calibration of the console; Restarting the console, Restarting the operating system of the console)		X
Reconciliation (if enabled)		X
Shift report with scheduling		X
Sensors current status	X	X
Autocalibration Analysis		X
Tanks, sensors, Line leak setup		X

Section 6 Admin Account



1. When an Admin User is logged in, the screen will show a *Main Menu* on the right side of the display.
2. When a **menu item** is selected, its related *tabs* will come into view along the top of the display (the selected menu item will be highlighted by a blue background).
3. When a **Tab** is selected in the *Tabs Bar* it is highlighted by a yellow line.
4. When an entry in a tab has a *character limit* it is shown as "number of characters entered / character limit" to the right of its entry line.
5. Each tab has a **SAVE** button that is used to save that tab's configuration data after it is entered.



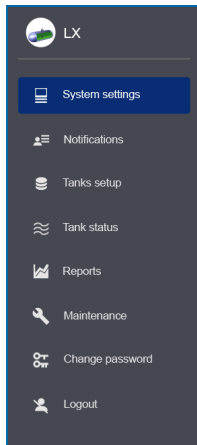
IMPORTANT: Make sure you save the configuration data that you entered before you continue to another tab.

6. When all applicable tabs have been configured you can click the **APPLY SETTINGS TO CONSOLE** button to save all of the configuration data to the console.



TIP: It is recommended to start from the Site Info tab and complete all applicable fields. Then, continue to the next tab to the right and complete all applicable fields. Continue this procedure until you have completed all tabs.

6.1 System Settings



6.1.1 Site Info

The 'Site info' configuration page in the LX system. The top navigation bar includes links for Site info, System, Protocols, Tank groups, Shifts, Fairbanks, SMTP, Site mapping, and IFSF. The right sidebar shows the 'System settings' menu. The main content area has a 'Site info' header. Below it are fields for 'Name' (MagLink LX), 'Console serial' (00001), and three 'Address' fields (Address 1, Address 2, Address 3). There are also dropdown menus for 'Total tanks' (3 Tanks), 'Total external relays' (0 Relays), and 'Total OM4 relays' (0 OM4 relays). A 'DETECT DEVICES' button is at the bottom left, and a 'SAVE' button is at the bottom right.

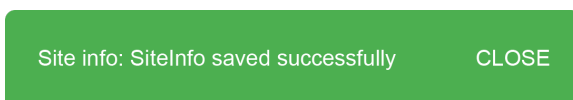
Enter the applicable information into the fields and make the correct selections as shown in the table that follows:

Field	Description
Name	The name of your site or station.*
Console serial	Enter your console's serial number. This field is read-only. Only a superuser can change it.
Total Tanks	This field shows the number of probes connected to the console. Enter 1-32*
Total external relays	This field shows the number of external output relays connected to the console. Enter 1-32*
Total dispensers	This <i>read-only</i> field shows the number of pumps configured for reconciliation/autocalibration.
Total sensors	This field shows the number of environmental sensors configured in the console.

Field	Description
Detect Button	For model LX Plus only. This will start an auto-detect for 924B probes, DMP 1-wire probes and Smart Sensors with the iSIM module. Devices found during auto-detection will show in the drop-down list.
Total OM4 Relays	For model LX Plus only. If OM4 module(s) are connected to the console, select the total number of relays. Each OM4 module has four (4) relays. Example: If only one OM4 is connected, select 4. If two OM4 modules are connected, select 8.

*Fields marked with an asterisk are mandatory.

Click **Save**. A confirmation message will come into view.



Select **CLOSE**.

6.1.2 System

The screenshot displays the 'System' settings interface for the LX 4.17.9 console. The top navigation bar includes links for Site info, System, Protocols, Tank groups, Shifts, Fairbanks, SMTP, Site mapping, and iPSF. The 'System' section is active, showing various configuration options. The 'Console language' is set to English. 'Date formats' includes options for yyyy-MM-dd, dd-MM-yyyy (selected), and MM-dd-yyyy. 'TC volume' has radio buttons for 15 °C (selected) and 20 °C. 'Level' has radio buttons for mm (selected), cm, and inches. 'Volume' has radio buttons for litres (selected) and gallons. 'Temperature' has radio buttons for °C (selected) and °F. 'Alarm settings' is set to 10. 'Alarm buzzer' has a slider and radio buttons for Mute, Short (selected), Long, and Continuous. A 'Save' button is located below the alarm buzzer settings. The 'Dipswitch settings' section is a table with columns for Position, Status, Name, and Description. The table lists three dipswitches, all with a status of OFF. At the bottom of the page, there is a button labeled 'APPLY SETTINGS TO CONSOLE'.

Position	Status	Name	Description
1	OFF	Inverted relays	OFF: Normal, OK: Inverted
2	OFF	Internal inputs	OFF: Disabled, OK: Enabled
8	OFF	WBM	OFF: Inactive, OK: WBM approved



NOTE: All fields have selections (but not Alarm settings/Tolerance & Leak threshold) with default values. Changes to level and/or volume unit and number of decimals can automatically change with the selection.

Field	Description
Console language	Select the language for the graphical user interface .
Date formats	Date format used in the console
TC vol (°C)	Select the temperature used for the temperature compensated volume calculations
Level	Measurement units of the product and water height
Volume	Measurement units of the product and water volume
Alarm Settings	<p>The alarm hysteresis text box is used ONLY in when there is NO alarm. This is used when there is turbulence in the tank. This is important for relay management. In the examples below, Hysteresis is the value interval between the yellow and red lines. Recommended setting: 10 mm</p> <div> <p>STARTING FROM NO ALARM STATUS</p> <p>Relay 1 is linked to H₂O Alarm</p> <ul style="list-style-type: none"> • $H_2O \leq H_2O \text{ Alarm Threshold} - \text{Hysteresis Value}$ → Alarm OFF ○ • $H_2O \leq H_2O \text{ Alarm Threshold}$ → Alarm OFF ○ • $H_2O > H_2O \text{ Alarm Threshold}$ → Alarm ON ● </div> <div> <p>STARTING FROM ALARM STATUS</p> <p>Relay 1 is linked to H₂O Alarm</p> <ul style="list-style-type: none"> • $H_2O > H_2O \text{ Alarm Threshold}$ → Alarm ON ● • $H_2O > H_2O \text{ Alarm Threshold} - \text{Hysteresis Value}$ AND $H_2O < H_2O \text{ Alarm Threshold}$ → Alarm ON ● • $H_2O < H_2O \text{ Alarm Threshold} - \text{Hysteresis Value}$ → Alarm OFF ○ </div>
Temperature	Measurement units of the temperature of the product.
Alarm Buzzer	<p>Continuous: The buzzer will operate continuously and will stop when the alarm is cleared or acknowledged.</p> <p>Long: The buzzer will operate for 3 minutes. It will stop automatically.</p> <p>Short: The buzzer will operate for 30 seconds. It will stop automatically.</p> <p>Mute: The buzzer will not operate.</p>

The Dip-switch Settings field shows the function of the dip-switches.



NOTE: The STATUS field is for future use and can be ignored at this time.



NOTE: Position 2 is only be shown in the LX4 and is not shown in the LX Plus (LX Plus does not support internal inputs).

Click **Save** when you complete the *System* tab configuration.

The system will also show the status of the Dip-switches 1 & 2.

6.1.3 Protocols

This section specifies the protocol to use to communicate with a POS (point of sale) system or a FCC (forecourt controller system).

Field	Description
Connection	<p>Select the type of connection:</p> <ul style="list-style-type: none"> » None: If no device communicates with the console. » Serial: If a serial RS232 connection is made between the POS/FCC and the console. » TCP/IP: If a TCP-IP connection is made between the POS/FCC and the console.
Sales	<p>Click YES if the POS/FCC will transmit the dispenser sales transactions to the console. The Gilbarco BCD protocol is supported for this function. Note, that only one connection at a time can support the sales transactions.</p>

Field	Description
Protocol	<p>Select one of the three:</p> <ul style="list-style-type: none"> » Gilbarco: To permit the GVR TLS350 protocol commands. If the "i" button that comes into view is selected when a Gilbarco POS connection has been mapped, the supported VeederRoot commands will be shown. » DOMS OPC: To permit the DOMS OPC protocol commands. » PV4: To permit the OPW PV4 protocol commands. » Probe Emulation: Emulation of the "M" command of the Progaug probe (the console responds to the M command). This protocol can be used by forecourt controllers that support the Progaug probe M command and need to get information on the product height, water height and product temperature only.
Port	<ul style="list-style-type: none"> » If serial communication was selected above, select which serial port will be used (COM1 or COM2). » If TCP-IP communication was selected above, configure the TCP-IP port that to be used.
Baud rate / Parity / Data bits / Stop bits	These fields are in operation if serial communication has been selected. Configure the settings for the serial ports.
Printer Connection	<p>Select:</p> <ul style="list-style-type: none"> » None: If no printer is connected » USB: If a printer is connected through the USB port. » COM1/COM2: If a printer is connected to the serial port (baud rate for the printer should be set to 9600 bps). Note that this is necessary for the fields to become available if the serial ports have not been configured for POS/FCC communication.
Gilbarco Invalid Field Character	Select the symbol ("?" or "0") to use in the VeederRoot protocol commands for invalid fields. The default is "?".

Click **Save** and **Apply settings to console** when you complete the *Protocols* tab configuration.

6.1.4 Tank Group




NOTE: The number of tanks are configured in the Site Info tab. Tank parameters are configured in Tanks setup from the Main Menu.

This tab is used to make Siphon (Manifold) groups.



IMPORTANT: Tanks in a Siphon (Manifold) group must contain the same product.

There are two (2) panels to configure in the "Tank Group" screen.

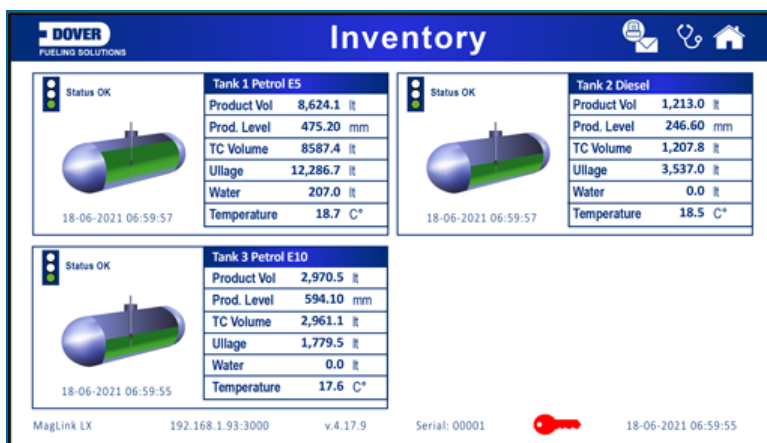
- In the top panel:
 - Enter a **Name** for the Tank Group.
 - Select a **Product Family** from the drop-down for this Tank Group. The tanks that contain the selected product family will automatically come into view under *Available Tanks*.
 - Click the **Save New** button.
- In the bottom panel:
 - Add the applicable tanks to the Tank Group
 - Click the **Save**  icon on the right side of the panel.
 - Click **Apply settings to console** to complete the procedure.

To delete a group, click the **Delete**  icon on the right side of the panel.

6.1.5 Shifts

The "Shifts" screen is used to configure shift reports. A shift report shows the tank contents at the beginning and end of the shift. The shift report is made in another menu.

Configure the **Closing Time** for up to four shifts (use the drop-down lists).



When the site is Closed, a red key icon will show at the bottom of the Graphical User Interface (see the illustration above).

When complete, click the **Save Shift Schedule** button. Click **Apply Settings to Console** to complete the procedure.

Open/Close site: This will be applicable to future releases. This functionality has not been implemented at this time. This will be used to enter specified site open and close times. After the site close time, the tank can be monitored for a theft (sudden loss) event. This is applicable to tanks in Standard mode only.

6.1.6 Fairbanks

The screenshot shows the 'Fairbanks' configuration page in the MagLink LX interface. It includes fields for configuring the connection to a Fairbanks server.

Field	Value
Server	Required
User	Required
Port	21
Upload interval (ms)	15
Transfer mode	Active

Buttons for 'Save' and 'APPLY SETTINGS TO CONSOLE' are visible at the bottom. A sidebar on the right contains navigation links for System settings, Notifications, Tanks setup, Sensors Setup, Line Leak Setup, Tank status, Sensor Status, Line Leak Status, Tank group status, Reports, Maintenance, Change password, Translate, and Logout.

The console can send information to a Fairbanks server through FTP if applicable. This information includes:

- Inventory stock levels
- Deliveries
- Alarms

- Pump transactions (if connected to a POS/FCC that uses the Gilbarco BCD protocol).

Field	Description
Server	The IP address of the server that will receive the files (given by the server administrator).
Folder	The folder in the server where the files are to be sent, provided by the server administrator (optional, can be left blank)
User	User name provided by the server administrator
Password	Password provided by the server administrator
ID	Console identifier. If set to 0, the FTP transfer gets disabled.
Port	FTP port, provided by the server administrator
Interval	How often the console will attempt to establish connection to the server in order to send the files
Transfer mode	Active or Passive, info provided by the server administrator.
Enable SFTP	For SFTP connections

Click **Save** when you complete the *Fairbanks* tab configuration.

6.1.7 SMTP

The console can send email notifications related to tank information, tank events and console events.

Configure the SMTP connection parameters in this page. Notifications and email recipients are configured under ["Notifications Menu" on page 31](#).

Field	Description
Server	The email server that handles the email functionality
Sender	Email of the sender
User	Username provided by the mail Server
Password	Password provided by the mail Server
Port	SMTP port, provided by the mail Server
Enable SSL	Activate it for SSL connections.

Use the TEST button to send a test email to a specified recipient.



REMINDER: The recipient must first be configured under ["Contacts" on page 31](#).

Click **Save** when you complete the *SMTP* tab configuration.

6.1.8 Site Mapping (for Reconciliation/Autocalibration mode only)

A POS/FCC that uses the Gilbarco BCD Dispenser Interface Protocol must be used to communicate pump sales. Configure the tank-to-nozzle mapping on this tab.

Field	Description
Dispenser (POS system settings)	<p>This field identifies the index of the first pump (refer to the Gilbarco BCD Dispenser Interface Protocol).</p> <p>Select Index 0 if the first pump in the POS/FCC is identified as Pump 0.</p> <p>Select Index 1 if the first pump in the POS/FCC is identified as Pump 1.</p> <p>The word "Pump" refers to the Fueling Position as shown in the Gilbarco BCD Dispenser Interface Protocol.</p>
Nozzle (POS system settings)	<p>This field identifies the index of the first nozzle of the pump (refer to the Gilbarco BCD Dispenser Interface Protocol).</p> <p>Select Index 0 if the first nozzle in the POS/FCC is identified as Nozzle 0.</p> <p>Select Index 1 if the first nozzle in the POS/FCC is identified as Nozzle 1.</p> <p>The word "Nozzle" refers to the Meter Identifier as shown in the Gilbarco BCD Dispenser Interface Protocol.</p>
Total dispensers	Identifies the total number of pumps (Fueling Positions) that are connected to the tanks monitored by the console
Max nozzles	Identifies the maximum number of nozzles for each pump.

Click **Save** when you complete the top section of the *Site mapping* tab configuration.

6.1.8.1 Map Dispensers and Nozzles to Tanks

Dispenser	Nozzle	Offset	Tank	Enabled
1	1	-1.23	1 2 3 4	<input checked="" type="checkbox"/>

1. Select a **Dispenser**.
2. Map each **Nozzle** to a Tank.
3. The offset is the "meter drift" value of the dispenser (the meter drift is set during a pump calibration).
4. Use the slider button to Enable the Nozzle to Tank mapping.



IMPORTANT: Nozzle-to-tank mapping must be done correctly or the console will communicate incorrect sales data for the tanks and the autocalibration / reconciliation function will not operate correctly.



NOTE: When manifolded tanks are in use, the first tank in the Manifold Group should be mapped to the related nozzles. The reconciliation reports and the delivery reports for the full manifold Group will be shown under the 1st tank.

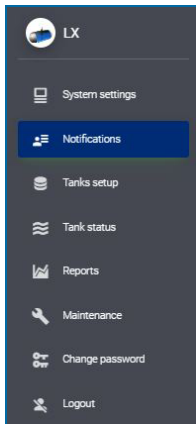
Autocalibration cannot be performed in a tank that is part of a Manifold Group.

Click the **Save Mapping** button at the bottom of the panel to save the configuration.

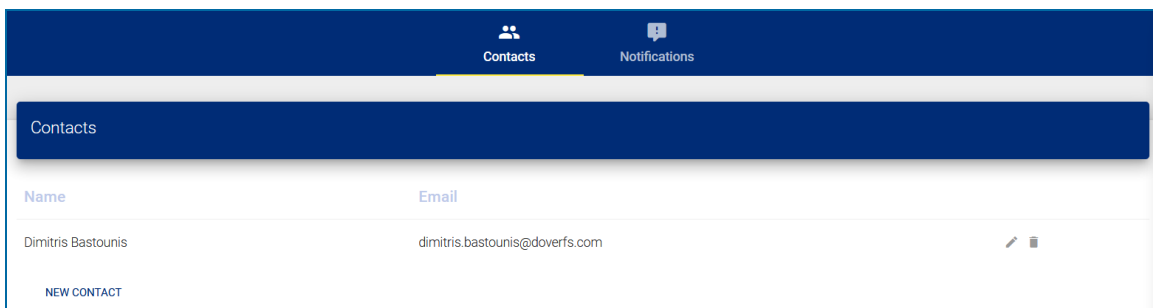
6.1.9 IFSF

This is not in use at this time. Ignore this section. For IFSF connections, the external IFSF module must be used.



6.2 Notifications Menu



6.2.1 Contacts



When the contacts tab is selected, all contacts that have been entered can be seen.

Click the **Edit** icon  to change information for a contact. Click the Delete icon  to remove a contact.

Click **NEW CONTACT** to configure notification information for a new contact name. The New Contact window will come into view.

A screenshot of the 'New contact' form. The title 'New contact' is at the top. Below it are two input fields: 'Name' with the value 'Dimitris Bastounis' and 'Email' with the value 'dimitris.bastounis@doverfs.com'. Below the email field is a character count '18 / 30'. At the bottom right are two buttons: 'CANCEL' and 'SAVE'.

Complete the fields:

- Name
- Email: To receive notifications by email

Click **Save** when you complete the *New Contact* configuration.

6.2.2 Notifications

Event	Email	Print	Contacts
Tank alarm	<input type="checkbox"/>	<input type="checkbox"/>	Contact list
Delivery	<input type="checkbox"/>	<input type="checkbox"/>	Contact list
Leakage	<input type="checkbox"/>	<input type="checkbox"/>	Contact list
Current inventory			Contact list
Shift	<input type="checkbox"/>	<input type="checkbox"/>	Contact list
Sudden loss	<input type="checkbox"/>	<input type="checkbox"/>	Contact list
Sensor alarm	<input type="checkbox"/>	<input type="checkbox"/>	Contact list
Line alarm	<input type="checkbox"/>	<input type="checkbox"/>	Contact list
Line leak	<input type="checkbox"/>	<input type="checkbox"/>	Contact list
Line Compliance			Contact list
Sensor Compliance			Contact list

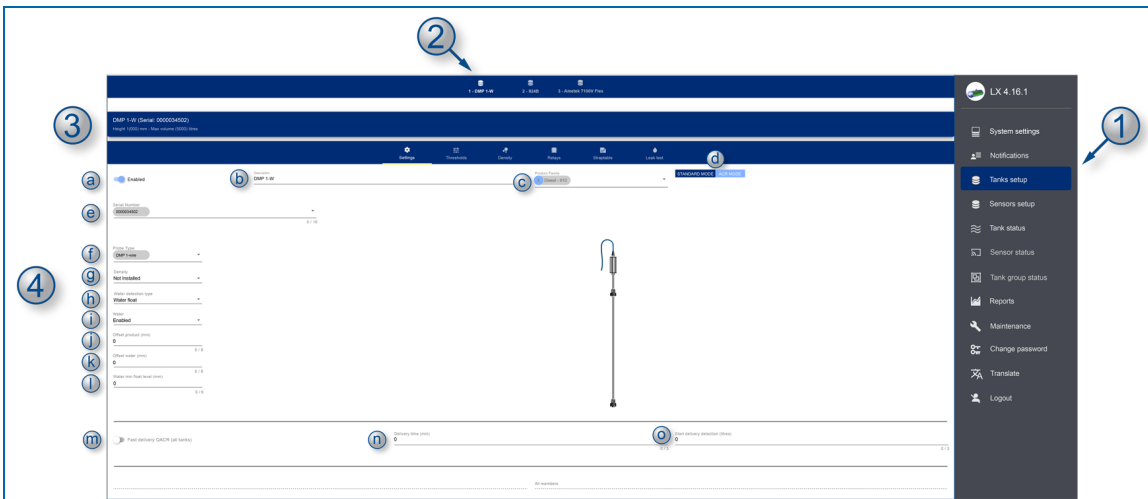
Set up the contact name(s) and notification type for each of the Notification Events.

Field	Alarm Description
Tank alarm	High-high product, High product, Low product, Low-low product, Water
Delivery	End of delivery report
Leakage	Leakage detected
Current Inventory	A current inventory report can be started from the Graphical User Interface (GUI) to be printed or to be emailed. For the report to be emailed, select the recipients here.
Line Alarm	Alarms related to the operation of the PLLD: plld sensor no link, no STP link (no link with LIM), plld sensor open (no reading), plld sensor short (wrong polarity), STP controller (STP contactor fusedamaged), Line leak, No leak test, No annual leak test, Pressure low.
Line Leak	An alarm related to a PLLD test that failed.
Line Compliance	A report with PLLD test history that can be started to be emailed from the GUI. Select the email recipients here.

Field	Alarm Description
Sensor Compliance	A report with sensor history that can be started to be emailed from the GUI. Select the email recipients here.
Shift	Shift report
Sudden loss	Sudden loss report. NOTE: This requires the site to be closed.
Sensor	Sensor alarm

Click **Save** when you complete the *Notifications* tab configuration.

6.3 Tank Setup Menu



1. Select **Tank setup** from the Main Menu. The number of Tanks configured in ["Site Info" on page 21](#) will show in the Tabs bar.
2. Select a Tank to configure.
3. An information bar below the tabs bar will show the **Height** and **Max Volume** of the selected tank. This is read-only data from the last line of the tank strapping table (["Straptable" on page 43](#)).

6.3.1 Settings



NOTE: If the tank does not do autocalibration / reconciliation, then select the Standard mode button and configure as below.

4. The bar below the information bar shows the configuration parameter selections. **Settings** is the first selection.
 - a. Move the **Enabled** slider button to ON to let the application query the installed probe during the read cycle. A probe query does not occur if this button is OFF.
 - b. **Description:** Enter a description of the tank.
 - c. Select the **product type** from the *Product family* drop-down.

- d. Select a button for **Standard** or **ACR** Mode (to turn on the ACR function).
- e. **Serial Number:** 924B and DMP 1-Wire probes that are connected through the ISB (LX Plus models only) are automatically recognized once they have been detected.
 - If the console is an LX Plus model, the probes that were connected to the ISB and detected in the System Settings/Info menu will show here.
 - If the console is an LX4 model, the probe serial number must be entered manually.



NOTE: When a serial number is entered manually, a “QUERY” button will come into view. When the “QUERY” button is selected, the console will try to communicate with the probe to get information on the probe type (e.g 924B, DMP-IS 1-Wire, DMP-IS RS485, XMT-SI-485 etc) and the number of floats that are detected on the probe.

- f. **Probe type:** If the console can successfully communicate with the probe to get its configuration, this field will populate automatically.
 - DMP-485: DMP-IS probe connected through RS485.



NOTE: With this selection the console thinks that the probe has 5 temperature sensors and the applicable tank leak detection settings are automatically detected.

DMP 1-WIRE: DMP-IS probe with 1-wire protocol connected on the ISB.



NOTE: With this selection the console thinks that the probe has 5 temperature sensors and the applicable tank leak detection settings are automatically detected.

- DMP FLEX: DMP flexible probe connected via RS485.
- DMP FLEX 1-wire: DMP flexible probe with 1-wire protocol connected on the ISB.
- XMT-SI-485: XMT-SI-485 probe connected through RS485.
- XMT-SI-RF: XMT-SI wireless probe connected through an RS485 RF Receiver.
- XMT-EXd: XMT explosion proof probe connected through RS485.
- OPW 924B: OPW 924B with 5 temperature sensors.
- OPW 924A: Previous generation OPW 924A probe with 5 temperature sensors.
- VSmart analog: For OPW 7100V flexible probes that connect through the Vsmart module.

- Radar LR120: For Siemens Radar transmitter LR120 (see Appendix in this manual for the setup).
- g. **Density:** Select *Densimeter* if a density measurement float is installed on the probe (applicable to DMP probes only).

NOTE: For DMP 1-wire probes (LX Plus models only):



For console software versions earlier than 4.17.9 in combination with DMP probes with firmware version older than v08, the probe needs to be configured firstly via RS485 (with the dedicated DMP Probe Config Manager) in order to use the densimeter.

For console software version 4.17.9 and later in combination with DMP firmware version v08 and later, there is no need for the above requirement and the console can push the configuration to the probe.



NOTE: For DMP RS485 probes: The density configuration for DMP 485 probes can be pushed to the probe by the console.

- h. Select the **Water detection type** from the drop-down:
- **Not installed:** Water float is not installed on the probe
 - **Water float:** Water float is installed on the probe
 - **AEF:** Aqueous Ethanol Float installed in the place of the standard water float.
- i. Select the status of **Water** detection from the drop-down:
- **Enabled:** The water float is present and measurements will be available and taken into processes (this setting will send the “two floats” information to DMP Probe)
 - **Ignored:** The water float is installed but no measurements are processed, Water values are shown as “0”.
 - **Ignored during delivery:** The water float is present and measurements will be available and taken into processes. However, when the delivery is detected, the last measurements will be locked and shown to not cause false alarms during delivery. Once the delivery has completed, the water measurements will be unlocked.
- j. **Offset product:** This value is used to calibrate the position of the product float. Possible value range: ± 5000 mm (197 in).
- k. **Offset water:** This value is used to calibrate the water float. Possible value range: ± 5000 mm (197 in).
- l. **Water Min Float Level:** This is the threshold to set the water volume at zero and show the water level.

- If “Water level from probe + water offset” > Water Min Float level, the Water volume *and* Water level will be shown.
 - If “Water level from probe + water offset” < Water Min Float level, the Water volume will not be shown but the Water level will be shown.
- m. Move the **Fast delivery QACR** slider button to the right (to the enabled position) to let the application use the QACR algorithm for the delivery detection. Set the delivery time (in minutes). The QACR algorithm is the delivery algorithm that is usually used when the tank is in ACR mode. For some situations where a tank is in Standard mode and the site would like to have the delivery report as quickly as possible, the QACR algorithm can be used.
 - n. Enter the **Delivery time** in minutes: Set the delivery time to tell the console how much time to wait from the moment the delivery detection has ended before the final delivery report is printed. This delivery time is used to permit time for the turbulence within the tank to settle and to have a stable level.
 - o. Enter the amount (in liters) to **Start delivery detection**: Set the Delivery start threshold to tell the console when to know when a delivery has started (for example if set at 300 liters, this means that as soon as there is a 300 liter volume increase, then this is a delivery start point).

Click **Save** when you complete the *Settings* configuration.

6.3.2 Thresholds

Alarm	Level (mm)	Volume (litres)	%
Safe working capacity	1188	4750	95
High High	0	0	0
High	0	0	0
Low	0	0	0
Low Low	0	0	0
HH Water	0	0	0
Water	0	0	0
Sudden Loss	0	0	0

1. Select **Thresholds** from the configurations parameters. Use one of two methods to adjust each of the parameter values:
 - a. Move the slider until you get the correct values.

- i. The slider for **Safe working capacity** adjusts by **%**. The Level and Volume values will adjust automatically.
 - ii. The slider for all other parameters adjusts by **Level**. The Volume and % values will adjust automatically.
 - b. Click the **Edit** icon (✎) for one of the values. Enter the correct value in the pop-up. Click **OK** to save the value. The other values for that parameter will adjust automatically.
2. Click **Save** when you complete the *Thresholds* configuration.



NOTE: From the top Threshold down, each of the Threshold value sets (Level, Volume and %) must be lower than the one above it. For example, the Low Threshold must have lower values than the High Threshold. If the values are not set correctly, the SAVE button will not be on.

6.3.3 Density

DMP 1-W (Serial 0000034502)
Height (1000) mm - Max volume (5000) litres

Settings Thresholds **Density** Relays Strappable Leak test ACR mode ACR results Reconciliation

Fuel type and density value

Product family: Diesel - B10 Product density TC (API - kg/m³): 845 Tolerance of gravity (%): 50

Current density values

Density (TC density) (API - kg/m³): 836.8 (845) Temperature (°C): 26.6

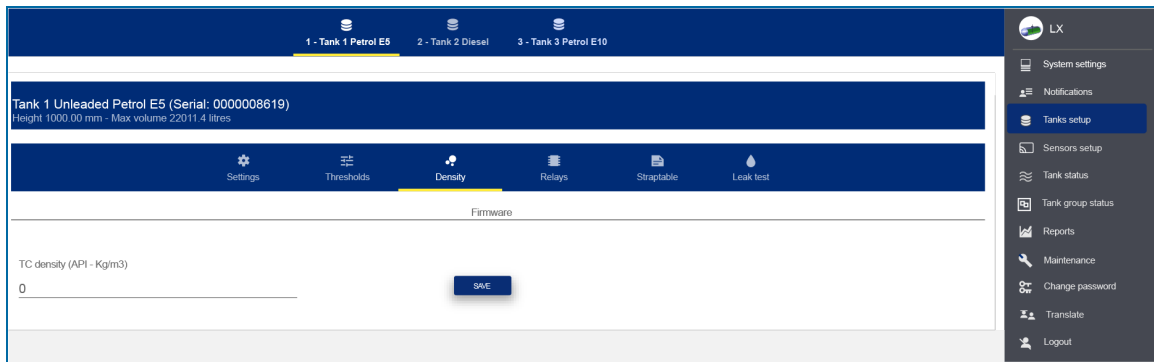
Coefficient settings

Coefficient A: -209.958 Coefficient B: 2442.793

Density (hydrometer): 847.04 TCDensity (hydrometer): 851.13

Configure a probe with an installed density float in this screen. The parameters that show in the illustration above are only available when the **DMP Density** Probe type is selected in ["Tank Setup Menu" on page 33](#) > ["Settings" on page 33](#).

1. Select **Density** from the configurations parameters. The **Product family** and the **Product density TC** are shown.
2. Enter the **Tolerance**. Accepted values are between 1-100. This is used to set the accepted tolerance of measured density. Whenever the measurement is outside of this tolerance, the system will use the default Product density TC value for all calculations. The default value is 20%.
3. **Current Density Values**: The density values as read by the sensor.
 - **Density**: This is the density value at ambient temperature
 - **TC density**: This is the density value compensated at reference temperature.
 - **Temperature**: This is the current temperature of the product
4. The **Coefficients settings** are values that are given with the density sensor.
 - a. Enter the Coefficient A (negative) and Coefficient B (positive) values in the fields.
 - b. Click **Save** after you enter the values.
5. **Density (hydrometer) / TC Density (hydrometer)**: If the density of the product can be measured with a 3rd party instrument such as a hydrometer, then the density value as measured by the instrument can be used to calibrate the density sensor. Use either of the two values to calibrate the density sensor (the system will automatically change the B value to adapt to the manually entered hydrometer density).



For all other probes types, enter the product density at the reference temperature. Values are permitted in API format or in Kg/m3 format.

6.3.4 AEF (Aqueous Ethanol Float) Thresholds

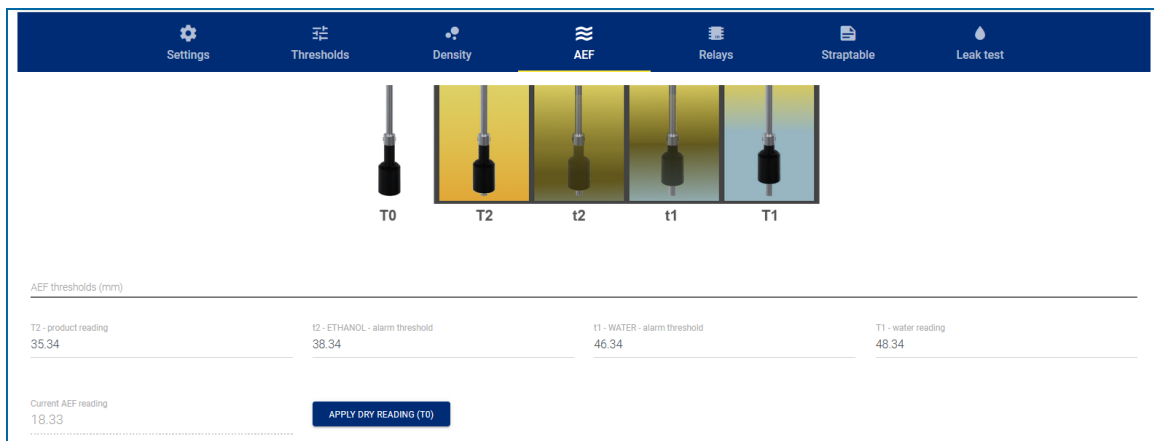
When an AEF is selected in the Water detection type, the AEF thresholds screen will show as a separate tab.



NOTE: The water height will not be shown if the Delivery status is “In progress”. During a delivery, the AEF reading is discarded and alarms will not occur to avoid incorrect measurements.

6.3.4.1 For Progauging Probes with AEF

The AEF in a Progauging probe measures very precise water levels at the bottom of the tank. The setup screen is shown in the image below:



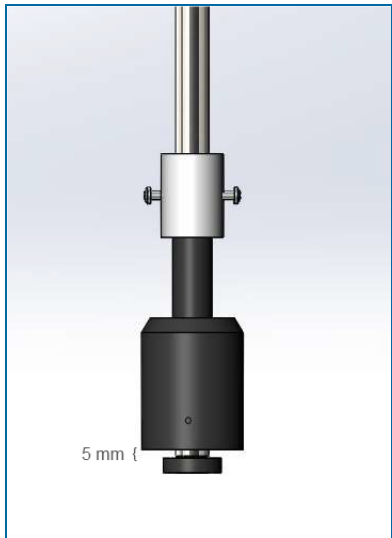
Four (4) thresholds will show that will must be calculated. The current AEF reading value is used by the console to automatically make these calculations.

- T2: AEF position in normal product
- t2: AEF position when lift begins in ethanol (phase separation has started)

- t1: AEF position when lift begins in water (water starts to collect)
- T1: AEF position in water (water has collected)

Do the steps that follow to let the console calculate the thresholds:

1. Install the AEF on the probe and put the probe in a vertical position. Attach the AEF so that the moving element hangs down at approximately 5 mm above the black retaining ring at the bottom of the probe (see the illustration below).



2. With the AEF in this position, push the **Apply Dry Reading (T0)** button. This will automatically calculate all thresholds.

The alarms will be set as follows:

- When the water level measured by the AEF is between the t2 and t1 threshold, an ETHANOL alarm is caused.
- When the water level measured by the AEF is greater than the t1 threshold, then a WATER alarm is caused.

6.3.4.2 For OPW 924B Probes with AEF

The OPW-FMS AEF on a 924B probe measures the density at the bottom of the tank. The setup screen is shown in the image below:

Tank 4 (Serial: 0000015082)
Height (2000) mm - Max volume (5000) litres

Settings Thresholds Density **AEF** Relays Strappable Leak test

T2 t2 t1 T1

AEF thresholds (API - kg/m3)

T2 - product density 830	t2 - ETHANOL - alarm threshold 870	t1 - WATER - alarm threshold 930	T1 - water density 999.06
-----------------------------	---------------------------------------	-------------------------------------	------------------------------

Current AEF reading / TC density
850.854309

1 Coefficient settings

Coefficient A -209.958	Coefficient B 2442.793
---------------------------	---------------------------

Density (hydrometer)
847.04

TC Density (hydrometer)
851.13

3 **SAVE**

LX 4.16.1

- System settings
- Notifications
- Tanks setup**
- Sensors setup
- Tank status
- Sensor status
- Tank group status
- Reports
- Maintenance
- Change password
- Translate
- Logout

1. The coefficients A, B must be configured. These coefficients are engraved on the float body and can also be found on a label that is included in the packaging of the AEF. Enter the **A & B Coefficients** into the fields.
2. Two alarm thresholds are used:
 - t2 Ethanol alarm threshold and t1 Water alarm threshold.
 - The system recommends default values for these thresholds however, the user can overwrite them.
3. Click **Save** when you complete the configuration.

6.3.5 Relays

The screenshot above shows the menu for an LX Plus that has eight (8) external relays and four (4) OM4 relays configured at the System Settings/Site Info menu.



NOTE: The same menu in a LX4 console would show only the four (4) Internal Relays as it does not support the external OM4.

The relays of the console can be configured in this screen.



NOTE: The External Relays and OM4 relays (LX Plus models only) that show must first be set up in ["Site Info" on page 21](#).

The available alarms/actions that can be linked to a relay:

- | | | | |
|-------------------|-----------|----------------|---------------|
| » Disabled | » Low | » High/High | » Water |
| » No Link | » Low/Low | » Ethanol | » High |
| » Probe Error | » Leak | » No Leak Test | » Sudden Loss |
| » High/High Water | | | |

Click **Save** when you complete the *Relays* configuration.

6.3.6 Straptable

DMP 1-W (Serial: 0000034502)
Height (1000) mm - Max volume (5000) litres

Settings Thresholds Density Relays **Straptable** Leak test

2 COPY FROM TANK

1 Import options

a Level: ☒ mm ☐ cm ☐ inches

b Volume: ☒ litres ☐ gallons

c Field separator: ☐ Comma ☒ Semicolon ☐ Tab ☐ Space

File: Select strap table to upload
Tank chart generator

Tank chart generator

Index	Level (mm)	Volume (litres)	Diff (litres)
1	0	0	0
2	10	8.46	8.46
3	20	23.86	15.4
4	30	43.71	19.85
5	40	67.09	23.38
6	50	93.47	26.38
7	60	122.48	29.01

System settings
Notifications
Tanks setup
Sensors Setup
Line Leak Setup
Tank status
Sensor Status
Line Leak Status
Tank group status
Reports
Maintenance
Change password
Translate
Logout

The Strapping table shows the related mm / litre value of the Tank Volume.

You can enter a Strapping table in one of the methods that follow:

1. You can import a table from a csv or txt file. You must configure the import parameters:
 - a. Level units
 - b. Volume units
 - c. The Field separator



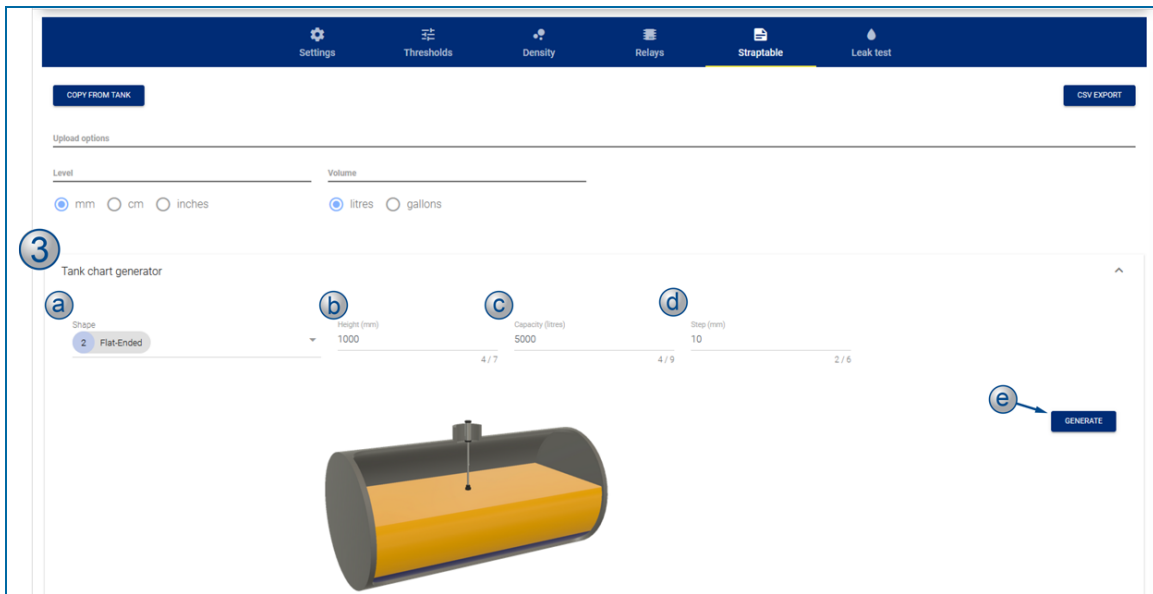
IMPORTANT: The Field separator for a tank table/strapping chart from a 3D Laser **MUST** be set as a semicolon (;).

Select a file from the attachment list.

2. You can copy a strapping table from a different tank. Click the **Copy from tank** button and select an available strapping table from the list that comes into view.

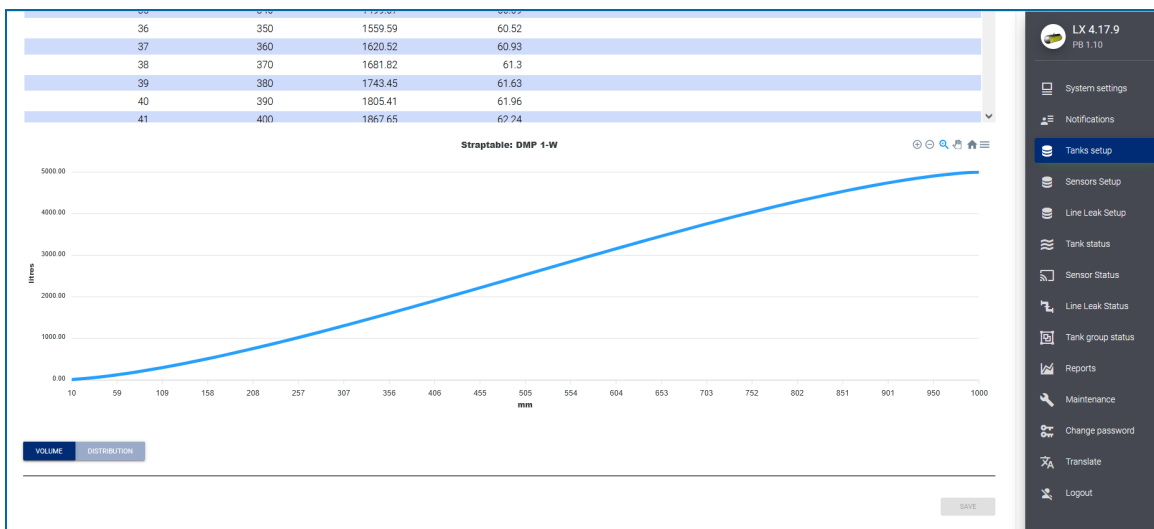
When a strapping table upload is complete, the strapping points (Index) can be seen in the table at the bottom of the screen. Use the scroll bar to see more points

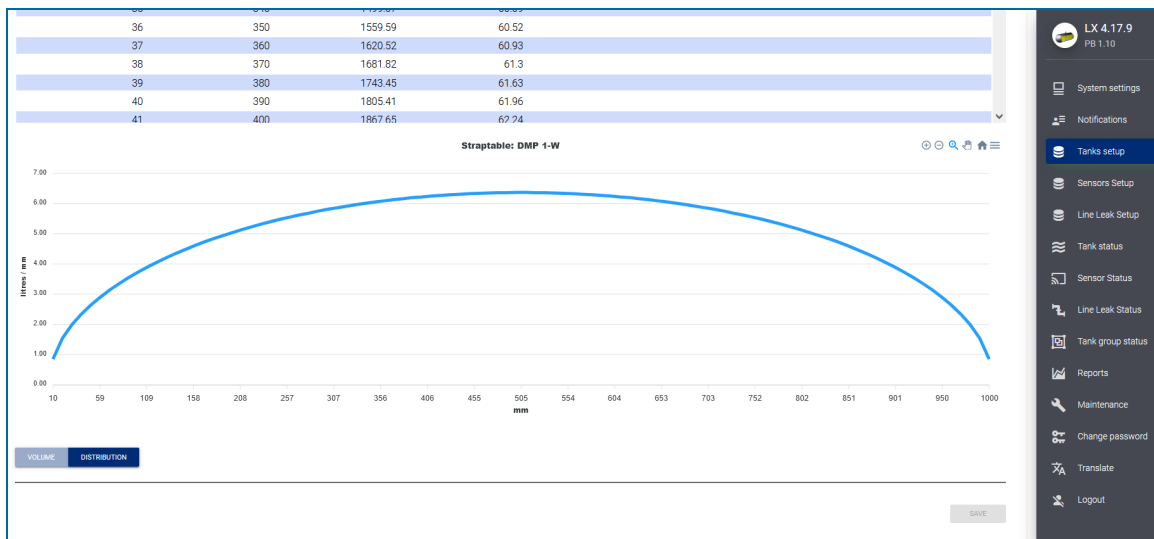
A selected strapping table can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.



3. You can use the *tank generator* function of the console.
 - a. Select the tank shape from the drop-down list (Vertical, Flat ended, Cylindrical, Dished-Ellipsoidal).
 - b. Enter the tank **Height** (in mm).
 - c. Enter the tank **Capacity** (in litres).
 - d. Enter the number of **Steps** for the chart to be divided into.
 - e. Select the **Generate** button.

The bottom of the screen shows the volume to height graph and the volume distribution (liters per unit of height). See the screenshots below:





6.3.7 Leak Test

The console can run a leak test in 3 ways:

- Automatic test: In this mode, the user can program the test frequency and the console will automatically try to run a test at the specified frequency.
- Scheduled test: The user can program the test to start at a specified date and time.
- On demand: The user can select to start the test now.

On a web browser, the user can configure the automatic and scheduled leak test. The On-demand test can be started through the web browser Tank Status menu or through the Graphical User Interface.

The console will start the test if the applicable parameters are correct (i.e a stable level in the tank and 8 hrs after the last fuel delivery). Activity in the tank such as a pump sale or a fuel delivery will automatically abort the test.

The algorithm compares the temperature compensated volume between the start and end of the test period.

External factors can affect the test results (such as ground vibration, extreme winds that cause too much evaporation, probe failure or a sticky float, incorrect tank charts).

6.3.7.1 Leak Test Setup

On the Tanks Setup tab, click on the applicable tank. Configure the parameters as shown:

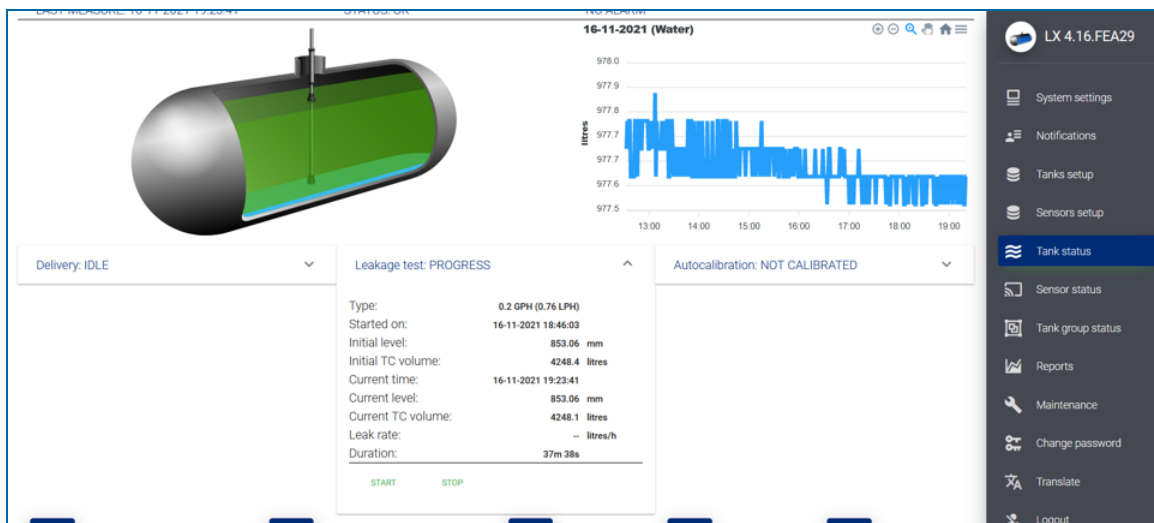
1. Select the **Leak Test** tab.
2. Put the slider button into **Enabled** status.
3. Select the **frequency** of the test (Daily, Weekly, Monthly, Yearly).
4. **Leak test warning period in days**: This warning is in use when the user has selected the weekly, monthly or yearly frequency for an automatic test. If the console has not completed a leak test within x number of days in the frequency period, this warning will show to warn the user.

EXAMPLE: If Weekly auto test frequency is selected and the Warning period = 6 days. If after 6 days from the start of the week the console has not completed a leak test, a warning will show to notify the user.

5. **Duration (mins)**: This is how long the test will run. The minimum is 30 mins. It is recommended to set this parameter to 120 mins.
6. **Minimum fill (%)**: This is the minimum fill in the tank for a leak test to start. If the fill in the tank is less than this threshold, the leak test will not start. It is recommended to set this parameter to 50%.
7. **Leak test threshold (liters per hour)**: The minimum is 1 gallon per hour (3.785 liters per hour) for XMT-SI probes and for DMP-IS probes with 1 temperature sensor. For DMP probes with 5 temperature sensors and for OPW 924B probes the threshold can be 0.2 gph or 0.1 gph.
8. Push **Save** to save this configuration

For a Scheduled Test, select a date from the date picker, then configure the parameters as above.

6.3.7.2 On-demand Test



From the tank status tab, click on the **Leakage test** drop-down menu. Use the Start/Stop buttons to start or to stop a test.

6.3.8 ACR mode

The menu in the image below will show when the tank is in ACR Mode.

ACR CONFIGURATION			
Unstable delivery time (min)	Start delivery detection (litres)	Ending delivery detection (litres/min)	
0	0	0	0
0 / 6		0 / 6	
Vapor Recovery System	Evaporation factor (%)		
0 No Vapor Recovery System	0		
		0 / 6	
CALIBRATION PARAMETERS			
Calibration segments			
Number of segments (25-45)	Low segment	High segment	
0	0	0	
Accepted values: 25 - 45	Accepted values: 1 - 0	Accepted values: 1 - 0	
0 / 2		0 / 2	
Calibration cycles			
Max	Required		
0	0		
Accepted values: 1 - 100	Accepted values: 1 - 0		
0 / 3		0 / 3	

6.3.8.1 ACR Configuration Parameters

- **Unstable delivery timer:** Enter the time necessary to let the product settle at the end of delivery.
Turbulence can occur during and after a delivery. This can cause incorrect indications. Enter a time from 0 (disable) to 59 minutes. After this time a probe can be monitored as usual.
The recommended value is five (5) minutes.
- **Start delivery detection:** This shows the minimum quantity of product increase necessary to start delivery detection. The recommended value is 100 liters.
- **End delivery detection:** This is the quantity (in gallons/liters) for each minute to show the end of delivery. The recommended value is 20 liters (5.25 gallons).
- **Vapor Recovery system:**
- **Evaporation factor (%):** This is used only when ACR tank mode is selected to calculate evaporation loss as a percentage of unit volume. For diesel products enter "0," for unleaded products enter "0.17."

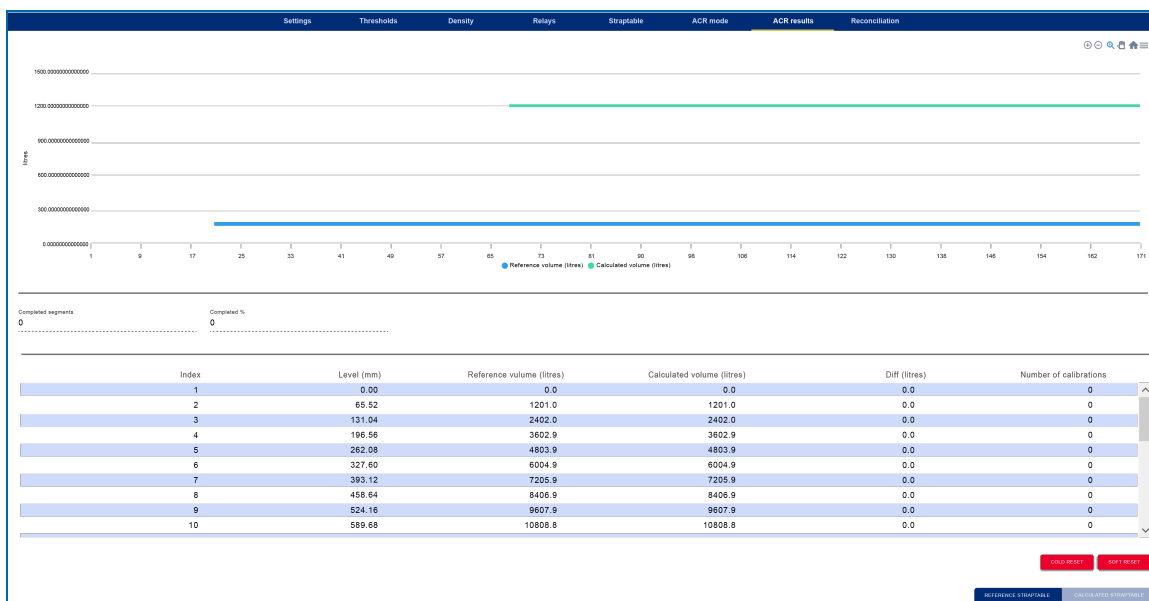
6.3.8.2 Calibration Parameters

- **Number of segments:** The tank is divided into a specified number of segments for Autocalibration. The permitted range is 25-45 segments. The higher number of segments selected, the more precision in the Autocalibration. This would also increase the time to complete Autocalibration.
- **Low segment:** This shows the lowest segment of the calibration range.
- **High segment:** This shows the top segment of the calibration range.

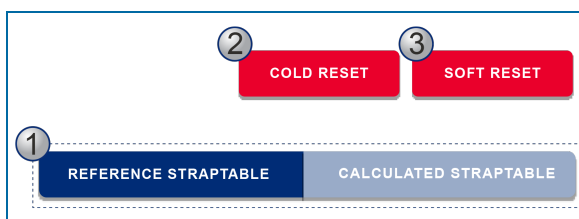
- **Calibration cycles max:** This is the maximum calibration cycles value parameter. This sets the number of auto calibration cycles in which the segments will not be changed if the auto calibration process is not complete. the minimum value is 5 and the maximum is 10.
- **Calibration cycles required:** This value specifies the Autocalibration status percentage (%).

When each segment of the specified auto calibration volume range is at this value, Autocalibration is complete. Because there can be segments in an Autocalibration cycle that are not changed, some segments can be changed more than the required value.

6.3.9 ACR Results



The graphic shows the reference chart (entered by the user) and the autocalibration chart.



1. The **Reference straptable** and **Calculated straptable** buttons control which of the two straptables to use for the current volume conversions. When autocalibration is complete, the user must select one of the two buttons to use the "Reference" table or to use the "Autocalibration" table.
2. The **Cold reset** button will delete all data (autocalibration table and number of calibrations) and the procedure will start again.
3. The **Soft reset** button will delete the number of calibrations but will keep the autocalibration table. This lets the user improve the autocalibration if the autocalibrated data is not sufficient.

6.3.10 Reconciliation

1 - Tank 1

2 - Tank 2

3 - Tank 3

Tank 1 (Serial: 39583)

Height 1000.00 mm - Max volume 50000.0 litres

Settings

Thresholds

Density

Relays

Straptable

ACR mode

Reconciliation

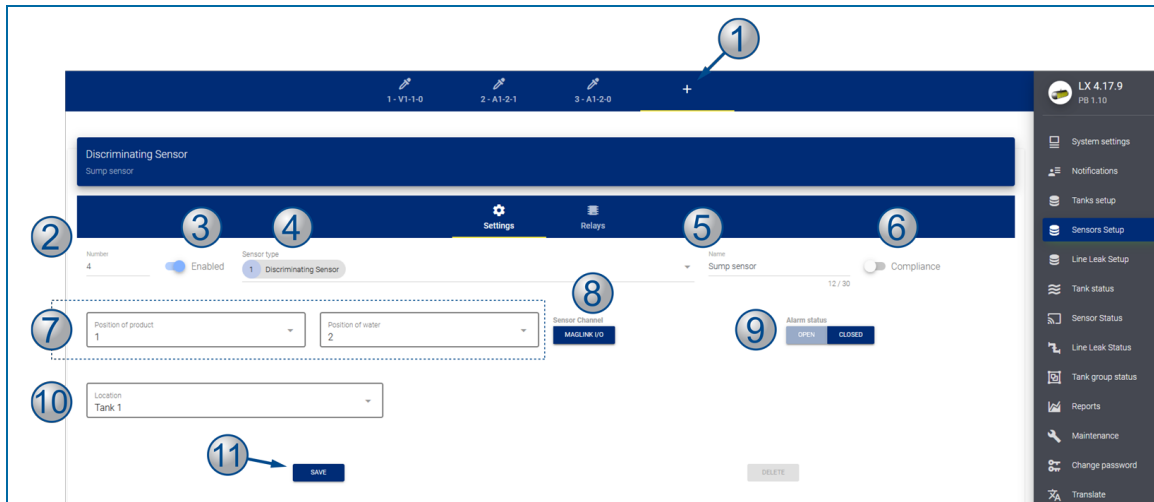
Test vend (liters)	Unexpected sales (liters)	Average time (min)	
12	15	23	
	2 / 6	2 / 6	2 / 6
Loss warning (liters)	Loss alarm (liters)	Unaccounted variance (%)	
50	80	10	
	2 / 6	2 / 6	2 / 6

SAVE

- **Test vend:** This is the quantity of product used in the calibration of hose meters. In meter calibration, there is a product quantity removed from the tank without a related sale. if *Unaccounted variance* is greater than Test vend threshold, then it is reported as “Test vend” and it is not thought of as a “Loss”.
- **Unexpected sales (liters):** An alarm will be caused when the tank is in a quiet mode (there are no sales) and product loss is sensed.
- **Average time:** This specifies the time for the loss warning or loss alarm.
- **Loss warning (liters):** A difference more than this threshold will cause a Loss Warning
- **Loss alarm (liters):** A difference more than this threshold will cause a Loss Alarm.
- **Unaccounted variance (%):** If a difference in the daily reconciliation is more than this threshold, it will cause an alarm.

Section 7 Sensor Setup

7.1 ProGauge Sensors



To add a ProGauge sensor:

1. Tap the “+” sign to add a new sensor.
2. Enter a Sensor Id **number** (e.g. 1, 2, 3 etc.).
3. When the **Enabled** button is on (**blue**), the sensor is enabled in the system. To disable a sensor, tap this button again so it is "grayed-out." The sensor's configuration will stay but alarm conditions cannot be caused.
4. Select a **Sensor Type** from the drop-down:
 - **On/off**: ProGauge sensor with one float only.
 - **Discriminating**: ProGauge sensor with two floats. One float that can sense product and one float to sense water.
 - **2 Ch Wireless sensor**: ProGauge wireless RF sensor with two floats (product, water).
 - **1 Ch Wireless sensor**: ProGauge wireless RF sensor with one float (product).
 - Other selections refer to OPW-FMS Smart Sensors (for the LX Plus model only).
5. Enter a **Name** for the sensor (up to 30 characters).
6. **Compliance**: Put the button in the ON (blue) position if you want the sensor to be part of the Compliance reporting. The sensor compliance feature is a way to see the report for specified sensors for 3 periods: Today, Last 24 Hours and Last 12 Months (or selected date).
7. **Position of Product / Position of Water**: This field is enabled only when a ProGauge discriminating sensor has been selected. The user must give a slot number on the CN10 connector or on the input card of the MagLink I/O
8. **Sensor Channel**: This is applicable only when a ProGauge On/off or Discriminating sensor has been selected. Select where the sensor is to be connected. Internal refers to the internal CN10 connector (only EXd sensors can connect to the CN10). For Intrinsically Safe sensors, select the MagLink I/O.

9. **Alarm status:** Select the method that will cause an alarm:

- **Open:** For normally open sensors, the alarm is caused when the sensor contact closes.
- **Closed:** For normally closed sensors, the alarm is caused when the sensor contact opens.



NOTE: The ProGauge on/off and discriminating operate as normally closed sensors.

10. Select the **Location** (Tank number) of the sensor.

11. Click **Save** to save the Settings configuration.

7.1.1 OPW FMS smart sensors (model LX Plus only).

OPW-FMS Smart Sensors are automatically detected and will come into view next to the “+” sign in the header. The sensor type and serial number will show automatically on the relevant fields (fields 3,5).

To configure the sensor:

1. Make sure the applicable sensor is selected in the header. Enter a number for the sensor to identify the sensor in the configuration.
2. Push the **Enable** button. If the sensor is not enabled (and the button is "grayed-out") the system cannot read the sensor status (but the sensor configuration can continue to be saved).
3. The **Sensor Type** will automatically show when the sensor is detected.
4. Enter a **name** for the sensor
5. The **Serial Number** will automatically show when the sensor is detected.
6. Select a **Location** from the drop-down. This is used for information only.

Click **Save** to save the Settings configuration.

7.2 Relays

Use this screen to start a relay when a sensor is in an alarm condition.

Select between the internal relays or the external relays on the MagLink I/O or the OM4 relays (for LX Plus only). The external relays must first be configured in the System Settings > Site Info menu).

Select the sensor alarm that will start the relay:

The table below shows the warnings/alarms that will be caused by the different FMS smart sensors:

<i>Sensor part number</i>	<i>Description</i>	<i>Warning/Alarm message generated on console</i>
30-0232-DH-10	Discriminating Dispenser sump sensor	No link Open Short
30-0232-DH-20	Discriminating STP sump sensor	High (when sensor detects hydrocarbons) Liquid warning (when bottom float lifts in liquid) High liquid (when top float lifts in liquid)
30-0236-LW	Discriminating interstitial sensor (optical)	No link Water (when sensor detects water) High liquid (when sensor detects any liquid other than water)
30-0234-HW-06/15/20	Hydrocarbon liquid sensor with water indicator (6, 15, 24 ft lengths)	No link Open Short Water (when sensor detects water) High liquid (when sensor detects hydrocarbons)

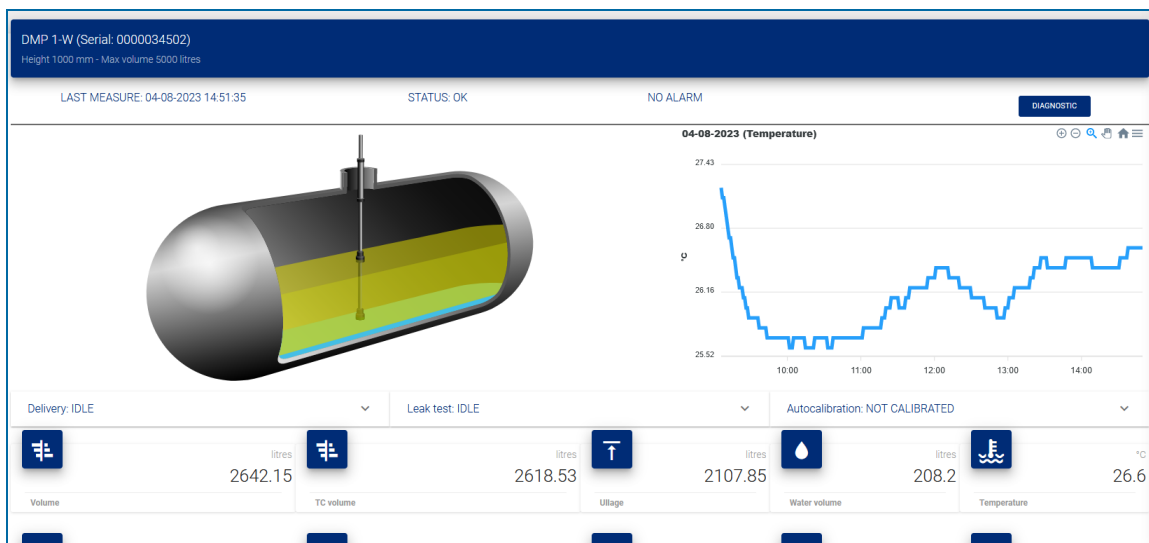
<i>Sensor part number</i>	<i>Description</i>	<i>Warning/Alarm message generated on console</i>
30-0234-HW-01	Interstitial hydrocarbon liquid with water indicator	No link Open Short Water (when sensor detects water) High liquid (when sensor detects hydrocarbons)
30-0231-S	Interstitial sensor-float switch-(small plastic)	No link
30-0231-L	Sump sensor-float switch-(large plastic)	High
30-0230-S	Liquid only float sensor (brass)	
30-0232-D-10	Dual float non-discriminating dispenser sump sensor	No link Open Short
30-0232-D-20	Dual float non-discriminating STP sump sensor	Liquid warning (when bottom float lifts in liquid) High liquid (when top float lifts in liquid)
30-0232-D-10B	Dual float brine sensor for containment sump	No link Open Short
30-0232-D-20B	Dual float brine sensor for fiberglass tanks	Low liquid (when bottom float falls below normal position) High liquid (when top float lifts above normal position)
30-0235-V	Hydrocarbon vapor sensor	No link Open Short Vapor (when sensor detects hydrocarbon vapor)

The table below shows the warnings/alarms that will be caused by the different Progaug sensors:

<i>Sensor part number</i>	<i>Description</i>	<i>Warning/Alarm message generated on console</i>
10-SL1-L110-C	On/Off sensor	No link
10-SL1-L110-GJE		High
10-SL2-L200-GCD	Discriminating sensor	No link
10-SL2-L200-GJKE		High (when top float lifts) Water (when bottom float lifts)

<i>Sensor part number</i>	<i>Description</i>	<i>Warning/Alarm message generated on console</i>
3-XRF600GAB-D1R0-DSC	Wireless (2 floats)	No link
		High (when top float lifts)
		Water (when bottom float lifts)
3-XRF600GAB-D1R0-DSC	Wireless (1 float)	No link
		High

Section 8 Tank Status

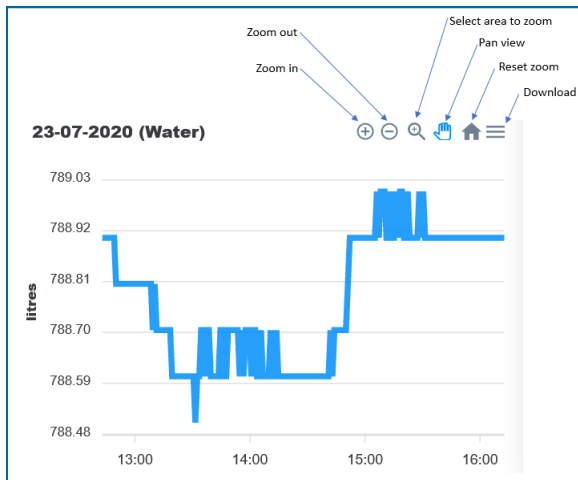


A colored icon next to each tank icon in the top bar shows the status of the tanks:

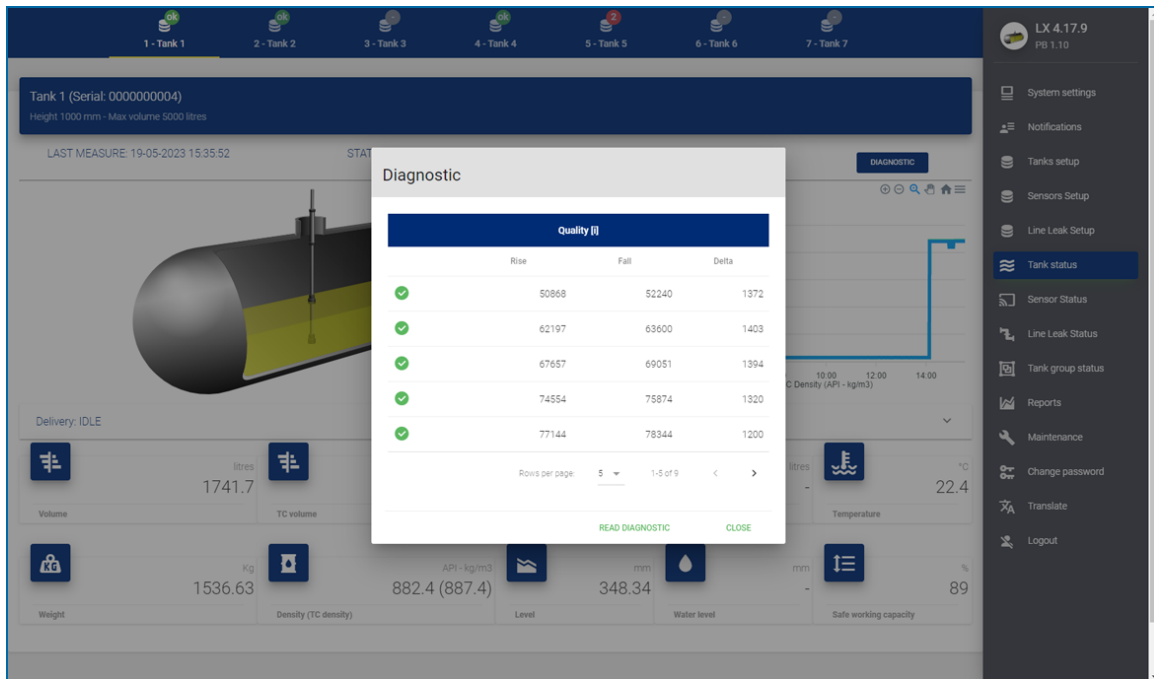
- Yellow: Alarms are active and they have been acknowledged.
- Red: Alarms are active but they have not been acknowledged.
- Green: There are no alarms for this tank.
- Grey: The tank is disabled.

The graph on the right side of the screen will scroll automatically to show the information that follows:

- Product / water height
- Product volume / Product volume TC
- Water volume
- Density / TC density
- Temperature



Select the Diagnostic button to open the Diagnostic panel to show information on the quality of the probe signal (to be assessed by the Progaugage factory personnel).

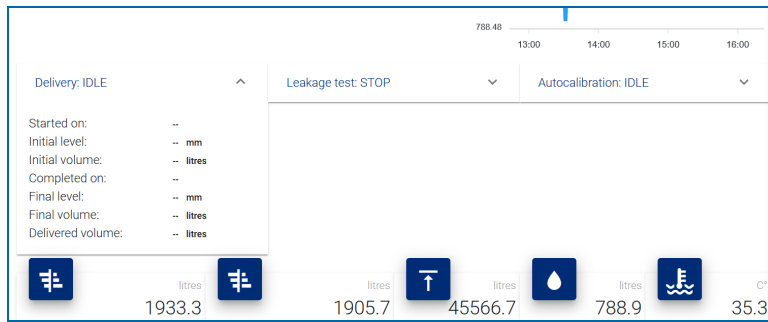


The green check-mark in the left column shows that the signal strength is sufficient.

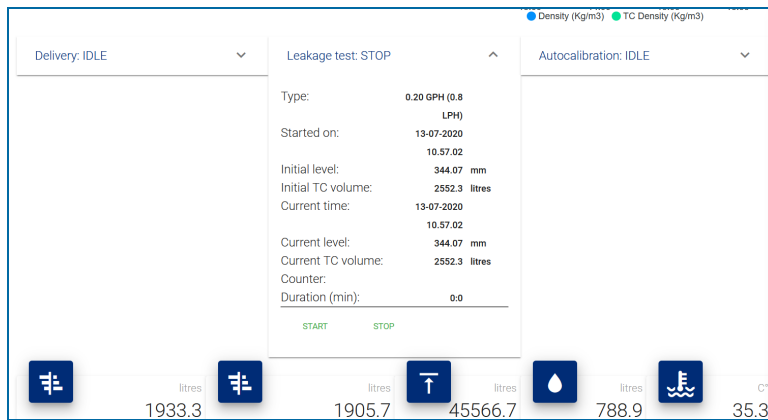
A yellow check-mark shows a medium signal while a red check-mark would show a low quality probe signal.

The bottom of the screen shows information on the Deliveries, Leak Tests and Autocalibration.

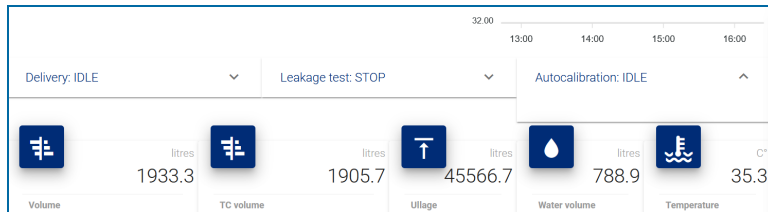
- **Delivery:** Click on the Delivery drop-down menu to show information on the last delivery recorded.



- **Leakage test:** Click on the Leakage drop-down menu to show information on the status of the leakage function. The user can manually start and stop a leak test from this menu.

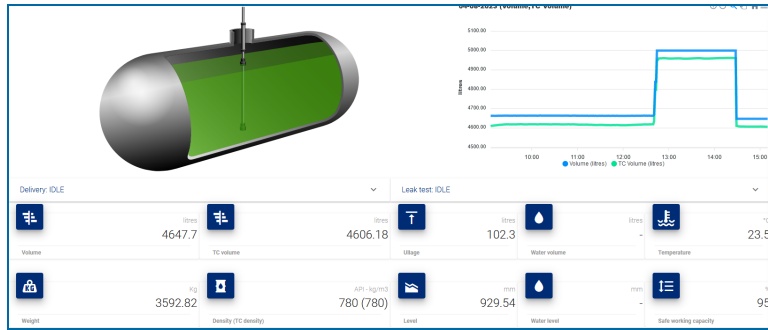


- **Autocalibration:** This is only available when the tank is in ACR mode. Click the Autocalibration drop-down menu to show information on the status of the autocalibration function.

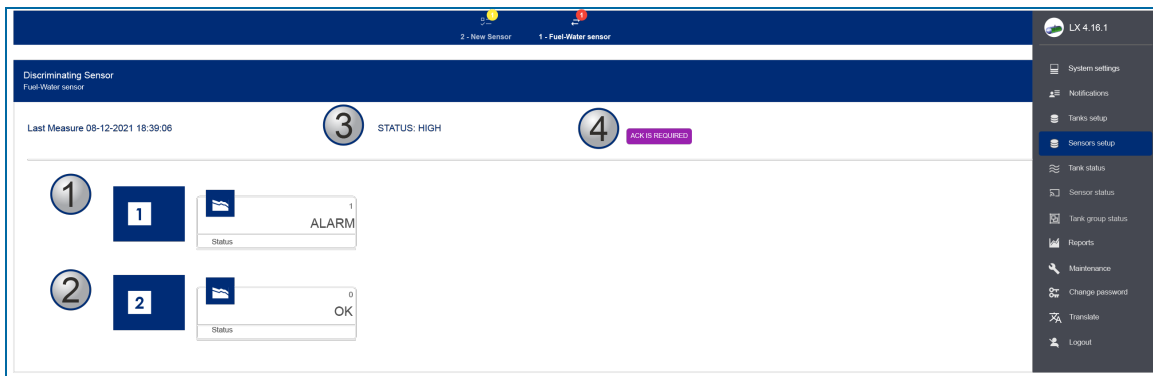


Tank inventory is shown at the bottom of the page.

TC volume refers to the temperature compensated volume. This is calculated through the API tables.



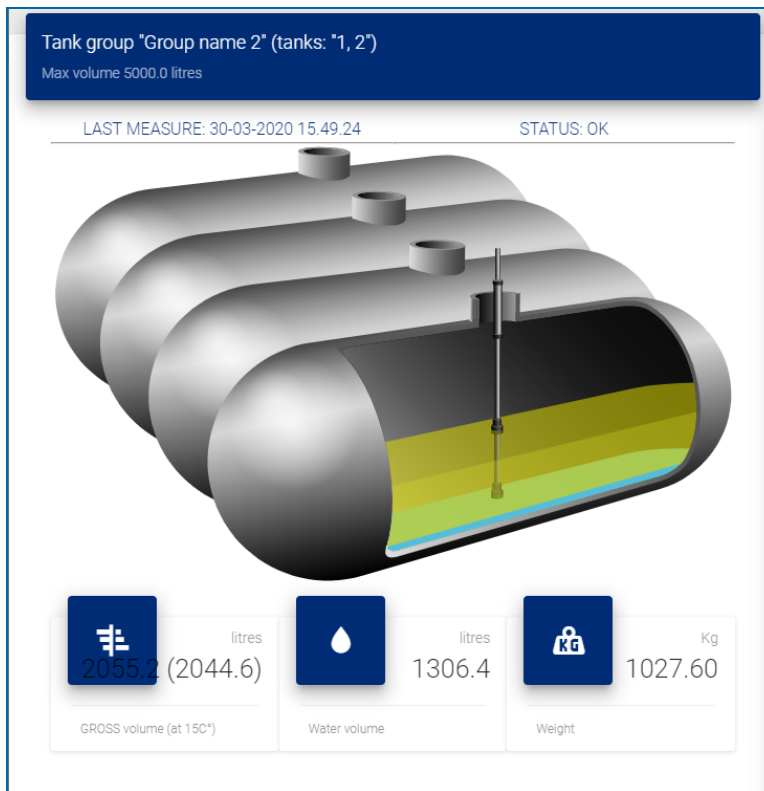
Section 9 Sensor Status



The Sensor Status screen is shown in the image above. The icons in the example refer to a ProGauge Discriminating Sensor with two floats.

1. Icon 1 shows the status of the **Product** float.
2. Icon 2 shows the status of the **Water** float.
3. The full sensor status is shown at the top of the panel.
4. Push the ACK IS REQUIRED button to acknowledge the alarm. This will also stop the alarm buzzer.

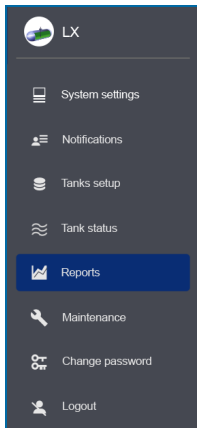
Section 10 Tank Group Status



A summary of the tank group is shown on this screen:

- Gross volume (at 15°C)
- Water volume
- Mass (in Kg)

Section 11 Reports Menu



Reports can be made for 11 types of information:

- Tank inventory History
- Tank Alarms
- Sensor Alarms
- Line Alarms (LX Plus models only)
- Product Deliveries
- Tank Leak Tests
- Line Leak Tests (LX Plus models only)
- Compliance
- Pump Sales
- Shifts
- Reconciliation

11.1 History

Time	Tank	Level (mm)	Water (mm)	Temp (°C)	Volume (litres)	TC volume (litres)	Water vol (litres)	Density (API - kg/m3)	Status
04-08-2023 15:16	2	929.61	0	23.6	4648.03	4606.45	0	780	LEAK
04-08-2023 15:15	2	929.57	0	23.6	4647.87	4606.28	0	780	LEAK
04-08-2023 15:14	2	929.6	0	23.6	4648	4606.42	0	780	LEAK
04-08-2023 15:13	2	929.57	0	23.6	4647.85	4606.31	0	780	LEAK
04-08-2023 15:12	2	929.54	0	23.5	4647.72	4606.24	0	780	LEAK
04-08-2023 15:11	2	929.6	0	23.5	4648	4606.55	0	780	LEAK

To set up a History Report:

- Select a **Tank Number** from the drop-down.
- Use the date-selector to select a **From Date** for your report.
- Select to see the data in a **Table** or **Graph**.
- The History Report can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.

11.2 Tank Alarms

Time	Tank	Alarm	Status	Volume (litres)	Level (mm)	Water vol (litres)	Water Level (mm)
04-08-2023 15:05:25	1	DATA ERROR	ALARM	0	0	0	0

1. Select a **Tank Number** from the drop-down. Alternatively, use the slider button to select **All tanks**.
2. Use the date selector to select a **From Date** and **To Date** for your report.
3. Click the **Load** button to show the data.

11.3 Sensor Alarms

Time	Type	Location	Number	Name	Alarm	Status
03-08-2023 09:11:42	6ft (183 cm) HC Liquid Sensor with water indicator	Tank 1	1	V1-1-0	OK	OK
02-08-2023 16:53:28	6ft (183 cm) HC Liquid Sensor with water indicator	Tank 1	1	V1-1-0	NO LINK	ALARM
31-07-2023 15:39:22	6ft (183 cm) HC Liquid Sensor with water indicator	Tank 1	1	V1-1-0	OK	OK
31-07-2023 15:38:04	6ft (183 cm) HC Liquid Sensor with water indicator	Tank 1	1	V1-1-0	NO LINK	ALARM
31-07-2023 15:29:16	6ft (183 cm) HC Liquid Sensor with water indicator	Tank 1	1	V1-1-0	OK	OK

1. Select a **Sensor** from the drop-down. Alternatively, use the slider button to select **All sensors**.
2. Use the date-selector to select a **From Date** and **To Date** for your report.
3. Click the **Load** button to show the data.

11.4 Line Alarms

This report shows all alarms related to line leak. It will also show the results of leak tests with the test type, the running pressure in psi, the reference pressure of the test in psi and the leak rate (in gph on lts/hr).

Time	Line	Alarm	Status	Test type (lts/hr)	Running pressure (psi)	Ref. pressure (psi)	Rate (lts/hr)
04-08-2023 12:42:20	1	NO LINK	ALARM	0	0	0	0
04-08-2023 12:42:17	1	NO LINK,NO STP LINK	ALARM	0	0	0	0
04-08-2023 09:23:33	1	NO LINK	ALARM	0	0	0	0
04-08-2023 09:02:47	1	NO LINK,NO STP LINK	ALARM	0	0	0	0
03-08-2023 15:03:24	1	NO LINK	ALARM	0	0	0	0

1. Select a **Line** from the drop-down. Alternatively, use the slider button to select **All Lines**.
2. Use the date-selector to select a **From Date** and **To Date** for your report.
3. Click the **Load** button to show the data.

11.5 Delivery

The screenshot shows the 'Deliveries' report interface. At the top is a navigation bar with icons for History, Alarms, Sensor alarms, Line alarms, Deliveries (active), Tank leak tests, Line leak tests, Compliance, Sales, and Shifts. Below the navigation bar is the 'Deliveries' section header. A dashed box highlights the filter area, which includes a 'Tank' dropdown menu (callout 1), an 'All Lines' toggle, and date selectors for 'From (dd-MM-yyyy)' and 'To (dd-MM-yyyy)' (callout 2). To the right of the date selectors are 'LOAD' (callout 3) and 'CSV EXPORT' (callout 4) buttons. Below the filter area, it says 'Items: 1'. A table displays the delivery data for Tank 1.

Tank	Start/End time	Duration	Volume (litres)	Delivered (litres)	Water vol (litres)	Water diff (litres)	Temp (°C)	Diff (°C)
1	03-08-2023 11:47:25 03-08-2023 11:47:25	6m 24s	389.76 2589.1	2169.17	0 30.17	30.17	25.9 25.3	-0.6

1. Select a **Tank Number** from the drop-down.
2. Use the date-selector to select a **From Date** and **To Date** for your report.
3. Click the **Load** button to show the data.
4. The Delivery Report can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.

11.6 Tank Leak Tests

The screenshot shows the 'Tank leak tests' interface. Callout 1 points to the 'Tank' dropdown menu. Callout 2 points to the date range selector (From: 01-08-2023, To: 08-08-2023). Callout 3 points to the 'LOAD' button. Callout 4 points to the 'CSV EXPORT' button.

Tank	Start/End time	Duration	Flowrate (litres/h)	TC volume (litres)	Loss (litres)	Water (litres)	Diff (litres)	Temp (°C)	Diff (°C)	Method	
1	04-08-2023 12:44:04 04-08-2023 14:44:04	2h 0m 0s	0.665	2619.9 2618.52	-1.38	0	0	26 26.6	0.6	custom	TEST PASSED
2	03-08-2023 12:30:02 03-08-2023 12:30:02	2h 0m 0s	-0.534	4616.16 4617.16	1.29	0	0	23.4 23.3	-0.1	0.2 gph	LEAK INDICATED
1	03-08-2023 11:53:03 03-08-2023 11:56:03	3m 0s	23762.592	3840.14 2565.67	-1274.47	0	0	25.3 26	0.7	custom	DELIVERY DURING TEST

1. Select a **Tank Number** from the drop-down.
2. Use the date-selector to select a **From Date** and **To Date** for your report.
3. Click the **Load** button to show the data.
4. The Tank Leak Test Report can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.

The screenshot shows the 'Leakages' report interface. It displays a table of leak test results for Tank 1, filtered for the date range 29-09-2020 to 30-09-2020.

Tank	Start/End time	Duration	Flowrate (litres/h)	TC volume (litres)	Loss (litres)	Water vol (litres)	Diff (litres)	Temp (C°)	Diff (C°)	Method	Res
1	29-09-2020 12:56:03 29-09-2020 12:59:57	3m 54s	0.0	5707.6 5707.6	0.0	0.0	0.0	29.3 29.3	0.0	0.20 GPH (0.8 LPH)	ABORT (STOPP)
1	28-09-2020 11:20:03 28-09-2020 13:20:03	2h 0m 0s	-6.4	5720.5 5710.5	-10.0	0.0	0.0	26.7 28.1	1.4	0.20 GPH (0.8 LPH)	LE INDICAT

This report will show the results of leak tests that have been done in the tanks.

The report will show:

- The start and end time of the test
- The Leak threshold
- The volume difference between the start-end (at ambient temperature and temperature compensated)
- The result of the test and if the test was aborted.

11.7 Line Leak Tests

The screenshot shows the 'LLD Leak tests' interface. At the top is a navigation bar with icons for History, Alarms, Sensor alarms, Line alarms, Deliveries, Tank leak tests, Line leak tests (active), Compliance, Sales, and Shifts. Below the navigation bar is a header section with a 'Line' dropdown menu (callout 1), a date range selector (callout 2) with 'From (dd-MM-yyyy)' and 'To (dd-MM-yyyy)' fields, a 'LOAD' button (callout 3), and a 'CSV EXPORT' button (callout 4). The main content area displays a table of leak test results.

LLD	Start/End time	Duration	Type (litres/h)	Leak Rate (litres/h)	Ref. Pressure (psi)	Run. Pressure (psi)	Result
1	07-08-2023 17:31:07 07-08-2023 17:32:49	1m 42s	11.356	0	10	0	ABORTED (STOPPED)
1	07-08-2023 17:26:49 07-08-2023 17:29:27	2m 38s	11.356	0	10	49.59	ABORTED (STOPPED)
1	04-08-2023 15:49:19 04-08-2023 15:50:20	1m 1s	11.356	0	10	0	ABORTED (STOPPED)
1	04-08-2023 15:39:45 04-08-2023 15:41:27	1m 42s	11.356	0	10	0	ABORTED (STOPPED)

1. Select an **LLD number** from the drop-down.
2. Use the date-selector to select a **From Date** and **To Date** for your report.
3. Click the **Load** button to show the data.
4. The LLD leak test report can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.

This report will show the results of line leak tests that have been completed. The report will show:

- The start and end time of the test
- The Leak threshold (type)
- The leak rate calculated in liters/hr
- The reference pressure for the leak threshold
- The Running pressure (the running pressure is the pressure in the pipeline which is recorded once the STP has stopped to pressurize).
- The LLD leak test result.

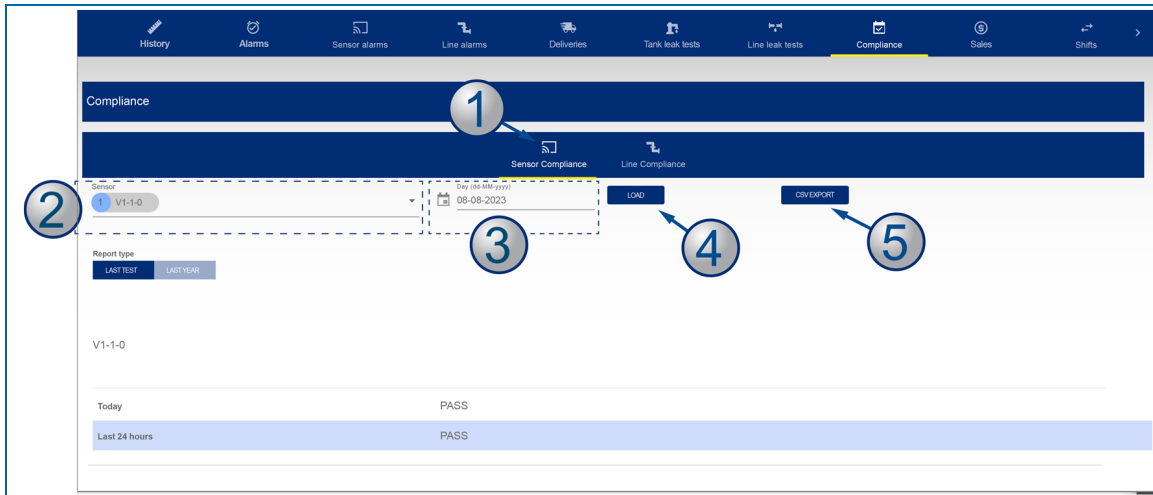
11.8 Compliance

The Compliance report has two (2) sub-reports:

- A sensor compliance report
- A LLD compliance report

Both reports show data related to the sensor statuses and the LLD leak tests.

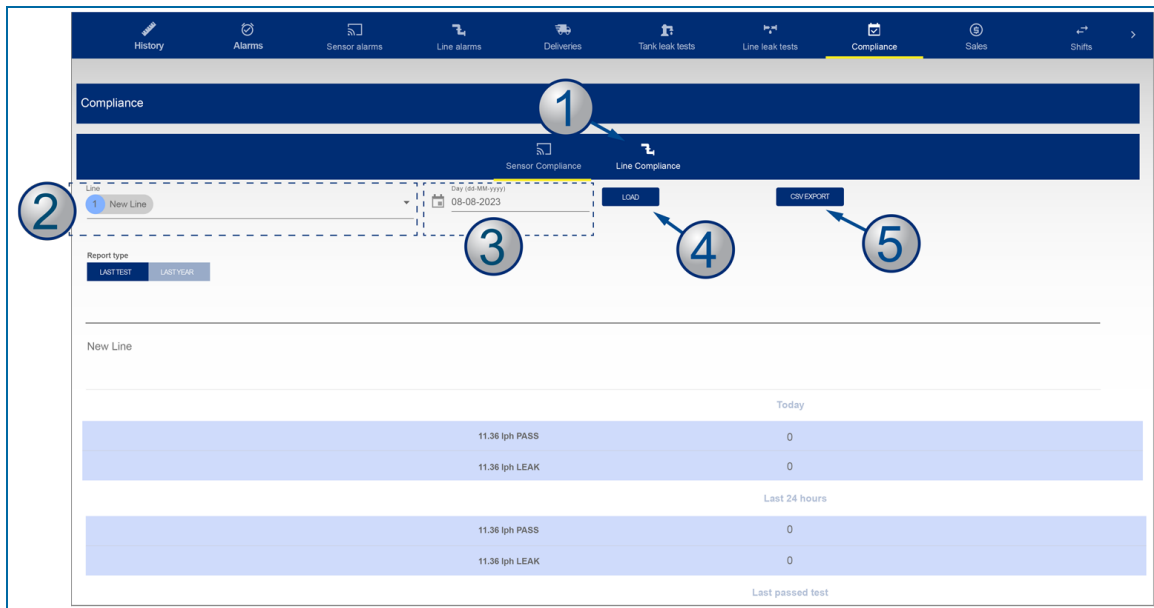
11.8.1 Sensor Compliance Report



1. Select **Sensor Compliance** from the *Compliance* menu bar.
2. Select a **Sensor Number** from the drop-down.
3. Use the date-selector to select a **Date**.
4. Click the **Load** button to show the data.
5. The Report can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.

11.8.2 Line Compliance Report

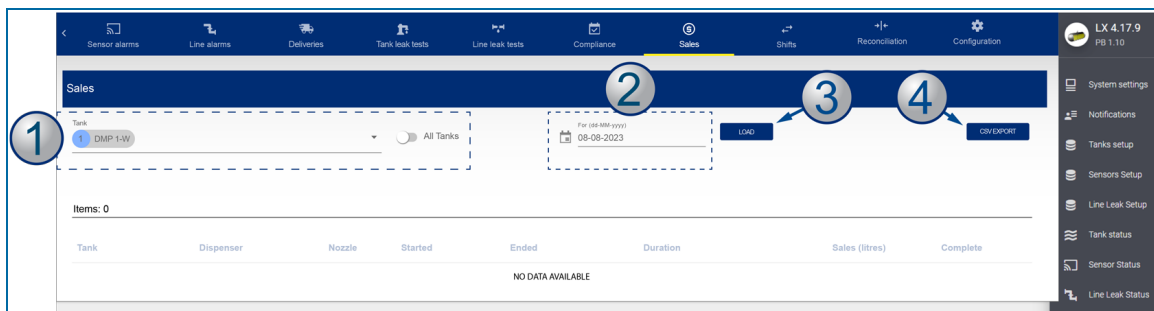
This report shows a summary of LLD tests done for each line line "today" and in the last 24 hours and identifies the last test passed.



1. Select **Line Compliance** from the *Compliance* menu bar.
2. Select a **Line Number** from the drop-down.
3. Use the date-selector to select a **Date**.
4. Click the **Load** button to show the data.
5. The Report can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.

11.9 Sales

This report will show the pump sales that are sent by the forecourt controller.



NOTE: Pump Sales Reports related to tanks can only be made when the reconciliation function is in operation and there is communication with a forecourt controller.

1. Select a **Tank Number** from the drop-down or use the slider button to select **All tanks**.

2. Use the date-selector to select a **Date** for your report.
3. Click the **Load** button to show the data.
4. The Sales Report can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.

11.10 Shifts

This report will show the shifts related to specified tanks.

1. Select a **Tank Number** from the drop-down or use the slider button to select **All tanks**.
2. Use the date selector to select a **From Date** and **To Date** for your report.
3. Push the **Load** button to show the data.
4. The Shift Report can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.

11.11 Reconciliation

Loss rate (litres/hour)	Date time	Volume (litres)	Level (mm)	Temp (°C)	Sales (litres)	Temp. var. (litres)	Evap. var. (litres)	Water var. (litres)
-1.03	04-08-2023 14:00:02	2642.33	522.37	26.5	0	1.02	0	-0.06
5.61	04-08-2023 13:00:00	2642.4	522.38	26	0	-0.63	0	-3.58
0	04-08-2023 12:13:39	2642.28	522.36	26.3	0	0	0	0

There are three types of reconciliation reports available:

- Hourly
 - Daily
 - Petroleum (periodic)
1. Select a **Tank Number** from the drop-down.
 2. Use the date selector to select a **From Date** and **To Date** for your report.
 3. Select a **report type** (Hourly, Daily, Petroleum).

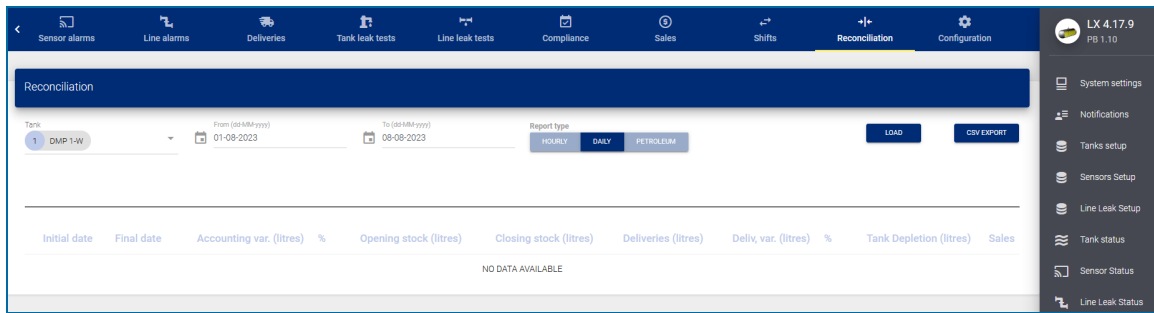
4. Push the **Load** button to show the data.
5. These reports can be exported to a csv format that can be saved in a spreadsheet or text editor. Click the **CSV Export** button to continue.

Below are descriptions of the contents of each report:

HOURLY REPORT

This report will show (see the image above):

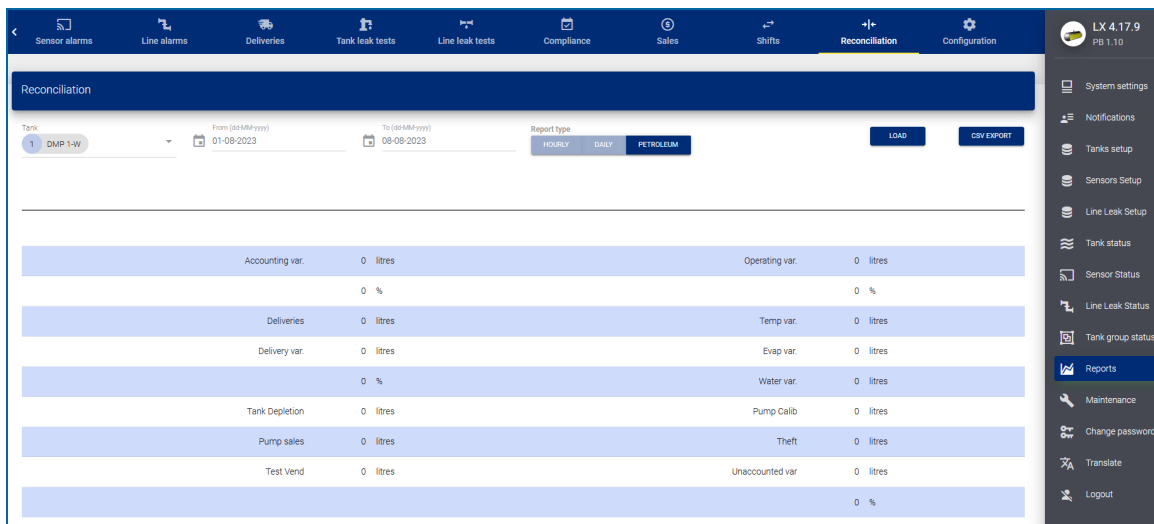
- The Loss rate in liters / hour up to that hour (cumulative figure).
- The volume, the level and the temperature at the end of the hour.
- The cumulative dispenser sales (field Sales) up to that hour.
- The difference in liters because of the temperature difference between the current hour and the hour before.
- The difference in liters because of the evaporation between the current hour and the hour before (only if an evaporation factor has been programmed in the ACR settings in the Tank Setup).
- The difference because of the water change in liters between the current hour and the hour before.



DAILY REPORT

This report will show (see the image above):

- The opening and closing stock for the day.
- The delivered volume for the day.
- The delivery variance for the day.
- The tank depletion for the day.
- The pump sales for the day.



PETROLEUM REPORT

For a given period, this report will show (see the image above):

- **Accounting var** (variance): This is the sum of Operating variance and Delivery variance, shown in liters and as a % of tank sales
- **Deliveries**: The quantity of liters delivered.
- **Delivery var** (variance): This is the Delivery variance. This is calculated as the difference between ATG measured delivery and invoiced delivery (invoice detail entered manually during delivery report). The result is shown in liters and as a % of tank sales.
- **Tank depletion**: The quantity of liters physically kept in the tank.

- **Pump sales:** The quantity of liters that were sold by the tank (as recorded by the dispensers).
- **Test vend:** The quantity of fuel that was pumped out of the tank during a pump calibration check.
- **Operating var** (variance): This is the difference between Tank Depletion and Pump Sales, In liters and as a % of tank sales.
- **Temp var** (variance): This is a temperature difference for the given time period.
- **Evap var** (Evaporation variance): This is an evaporation difference for the given time period.
- **Water var** (variance): This is a difference because of a change in the water volume for the given time period.
- **Pump calib** (calibration): This is a difference because of the dispenser meter drift (this is only applicable if a meter offset has been programmed in the Site Mapping).
- **Theft:** This is a difference that was recorded as a theft (it will be necessary for the Unexpected Sales threshold to be programmed in the Reconciliation settings in the Tank Setup).
- **Unaccounted var** (variance): This is calculated as:
 - $\text{Unaccounted variance} = \text{Operating variance} - \text{Temp variance} - \text{Evap variance} - \text{Water variance} - \text{Pump calibration} - \text{Theft}.$
 - This is calculated in liters and as a percent of sales.

11.12 Configuration

The screenshot shows the Configuration menu with the following sections:

- Configuration** (Header)
- Print** button
- Site info**
 - Console serial: 00001
 - Name: MagLink LX
 - Address 1
 - Address 2
 - Address 3
 - Total external relays: 0
 - Total OM4 relays: 0
- Settings**
 - General**
 - Console language: English
 - Date formats: dd-MM-yyyy
 - Level: [mm]
 - Volume: [litres]
 - TC volume: 15 [°C]
 - Temperature: [°C]
 - Leak: [pph]
 - Weight: [kg]
 - Alarm settings: 10
 - Alarm buzzer: Mute
 - Relays**
 - Server: 21
 - Port: Disabled
 - Transfer mode: Passive
 - Folder
 - User
 - Id: 1
 - Upload interval (min): 15
 - Network configuration**
 - Type: Static IP
 - TCP-IP: 192.168.1.93
 - Port: 3900
 - Mask: 255.255.255.0
 - Gateway: 192.168.1.1
 - DNS 1: 8.8.8.8
 - DNS 2: 8.8.4.4
- Dipswitch settings**

Position	Status	Name	Description
1	OFF	Inverted relays	OFF: Normal, OK: Inverted
8	OFF	WBM	OFF: Inactive, OK: W&M approved

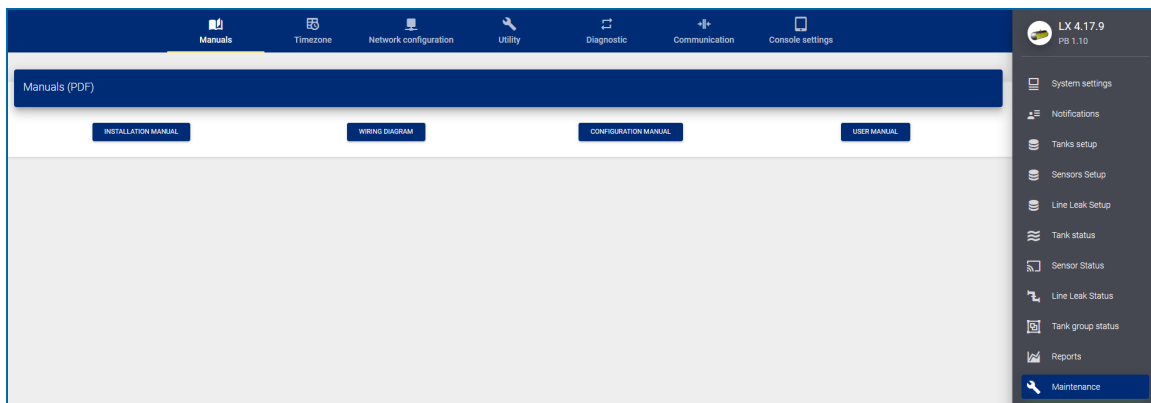
A summary of the configuration is given in this menu. Click the **PRINT** button to print the configuration report to a printer connected to the PC.

Use the three (3) relay slider buttons (“Print Tanks Relays,” “Print Sensors Relays,” “Print LLDs Relays”) to include relay configurations for the different modules.

Section 12 Maintenance

The Maintenance Menu has tabs to get access to technical manuals, wiring diagrams configure the console's Time zone (and Time and date), Network Configuration, Utility functions and Console settings.

12.1 Manuals

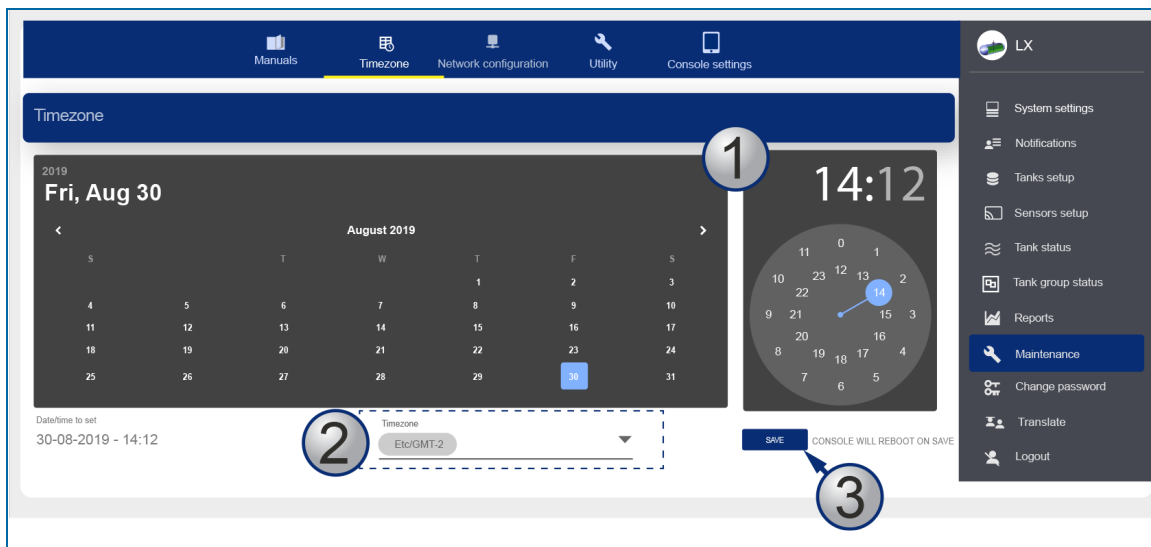


Click the **Manuals** icon in the *Maintenance* menu to get access to the Installation (M2050 for LX 4 and M2050-PLUS for LX Plus), Configuration (M2051 for both, LX 4 and LX Plus) and User (M2052 for both, LX 4 and LX Plus) manuals and Wiring diagrams (for LX Plus) for your console.



IMPORTANT: There are separate manuals for Installation. M2050 is for the installation of the LX 4 console and M2050-PLUS is for installation of the LX Plus console.

12.2 Timezone



1. Use the calendar and clock tools to select the date and time.
2. Select the applicable **time zone** from the drop-down.
3. Click **Save**. The console application will restart.

12.3 Network Configuration

1. Enter the **network parameters** into the applicable fields
2. Click **Save** when you have completed all applicable fields.

12.4 Utility

Utility functions can be done in this screen.

1. **Update Console:** Use this function to do a software update. You must get the update zip file through DFS.
 - Click the **Select zip file** button to select the update file.
 - Click the **Update** button to install the update.
2. **Database backup:** In this part of the screen you can;
 - Make a database backup and store it on the SD card. Click the **Create new backup** button. A new, date-stamped backup file is stored on the SD card.
 - Download the backup to your computer. Select the applicable file from the drop down menu. Click the **Download backup to PC** button. The console will automatically reboot.



NOTE: The download procedure downloads two (2) files:

- » data_yyyy-mm-dd_hh-mm-ss.zip. This is the database backup that contains the configuration and events.
- » temp_data_yyyy-mm-dd_hh-mm-ss.zip. This is the configuration backup only.

- Restore the backup that is stored on the SD card: Select the applicable file from the drop-down menu. Click the **Restore selected backup** button.
 - Delete the backup that is stored on the SD card: Select the applicable file from the drop-down menu. Click the **Delete selected backup** button.
3. **Upload backup:** Use this part of the screen to upload the database backup file **data_yyyy-mm-dd_hh-mm-ss.zip** and the configuration backup **temp_data_yyyy-mm-dd_hh-mm-ss.zip**.
 - Select the applicable **database backup** file.
 - Select the applicable **configuration backup** file.
 - Click the **Restore backup** button to install these backup files.
 4. **Log files:** To download log files to your computer:
 - Select the applicable **log file** from the drop-down menu.



NOTE: The log file that contains information on probes/sensor/communications functions can be found in the iTouch.log. This is the most common log file that DFS tech support will ask for when troubleshooting a problem.

- Click the **Download Log File** button.
5. **Console reset:**
 - Click the **Reboot** button to restart the console.
 - Click the **Cold Reset** button to put the console back in original factory default settings. This procedure will remove the database.

- Click the **Clear Cache** button to clear the cache memory of the console. This is useful if the console responds to functions too slowly or when the alarms status does not update correctly.

12.5 Diagnostic (for LX Plus Only)

Device diagnostic			
Tank/Probe			
Name	Serial number	Firmware version	Model
1 - DMP 1-W	000034502	10.00	
2 - 924B	1404252005	8.01	
3 - Armetek 7100V Flex	4220000107		
4 - RS485 PROBE	0000011842	0.30	VRIC_RF_0.3
Sensors			
Name	Serial number	Firmware version	Model
1 - V1-1-0	11929	10.08	30-0234HW-06 HC LIQUID/WATER 6FT
2 - A1-2-1	3850	10.08	30-0232-04-10 FLOAT DUAL HC LIQ 10
3 - A1-2-0	5639	10.08	30-0234HW-01 HC LIQUID/WATER 1FT
Other devices			
Name	Number	Firmware version	
PB board	1	1.10	
LIM	1	2.02	

This menu shows a summary of the devices that have been detected on the ISB (LX Plus models only) and devices that have been configured.



NOTE: In the Other Devices panel (for LX Plus models only) these devices will show when they are detected:

PC board (auxiliary board where the ISB connects)
LIM (Line Interface Module)
VSmart Module

12.6 Console Settings

Timezone	Network configuration	Utility	Console settings
<div>Console settings</div> <div> <div>Numeric password</div> <div> <div>Session timeout (min)</div> <div>30</div> </div> <div>6 / 9</div> <div>2</div> </div> <div>SAVE</div>			

In this section, the numeric password to get access to the Maintenance section on the Graphical User Interface of the console can be changed.

The timeout session gives the time that the user can be logged in to the Maintenance section before the system automatically logs the user out.

Section 13 Change Password

The screenshot shows a 'Password change' form with a dark blue header. Below the header, there are four input fields and a 'SAVE' button. The fields are labeled 'User', 'Current', 'New', and 'Confirm'. The 'User' field has a dropdown menu with '1 Admin' selected. The 'Current', 'New', and 'Confirm' fields have password strength indicators (an eye icon and a '0'). A '5' in a circle with an arrow points to the 'SAVE' button.

1. Select the applicable **User** from the drop-down.

2. Enter the **Current password** for the selected user.

3. Enter the **New password**.

4. Enter the **new password** again in the *Confirm* field.

5. Click **Save** when you have completed all fields.

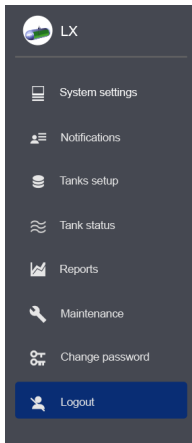


NOTE: Only an Admin user can change passwords.



TIP: As you type your password only neutral "bullet" characters will show (e.g. •••••). Select the "eye" icon  to show the password characters as you type.

Section 14 Logout

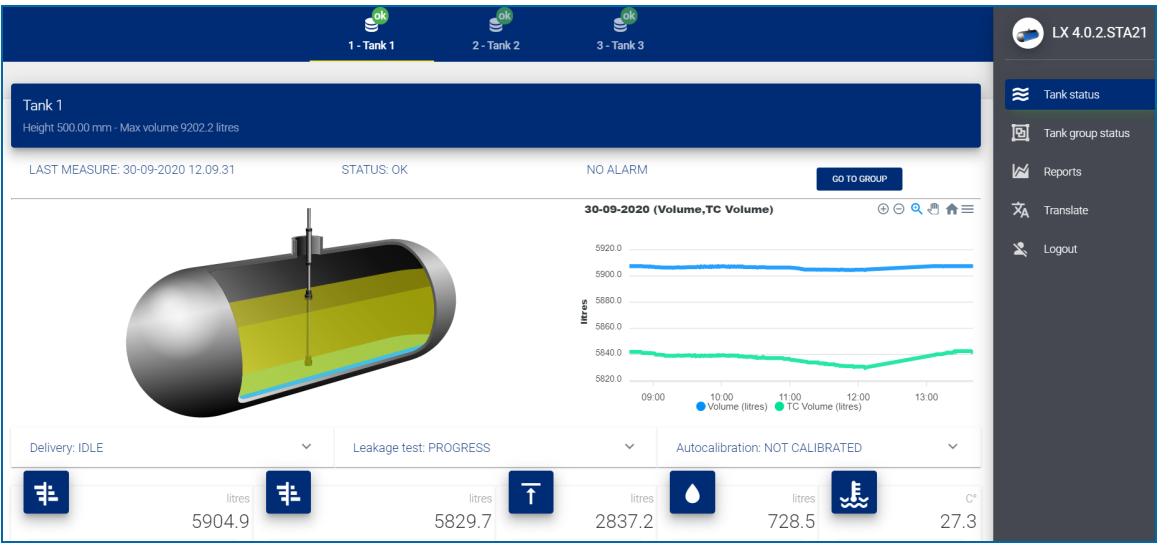


Select **Logout** from the *Main Menu*. The Login screen will come into view.

A login interface with a white background and a blue header bar. The header bar contains the text 'Login' and 'Console configuration'. Below the header, there are two input fields: 'User' and 'Password'. The 'User' field has a dropdown menu with '1 Admin' selected. The 'Password' field has a toggle icon (an eye) to its right. At the bottom of the form, there are two buttons: 'LANGUAGE' on the left and 'LOGOUT' on the right.

Click the **Logout** button to log out of the console.

Section 15 Guest Account



A Guest account only gives access to the Tank Status page and a view of data from Reports.

Section 16 Technical Support

When you ask for technical support from DFS, it is recommended that you give direct access to the console over the internet through ports 3000 and 22. As an alternative, the console can be connected to a site computer and technical support can get access through a third-party program (such as TeamViewer). If technical support cannot get access to the console in one of these two methods, the user must supply technical support with the log files and the database backup of the console.

Refer to ["Utility" on page 75](#) for information on log files and the database backup in the console.

Appendix - Maglink LX PLUS Pressurized Line Leak Detection (PLLD)

Line Leak Setup

The Line Leak Setup menu is used to:

- Configure the PLLD-DAS (or older model I/O module) and the LIM (Line Interface Module).
- Configure the pipeline characteristics (length, size, Beta factor).
- Schedule leak tests (run a test now/later, run automatic testing).

1. Click on the “+” icon in the top menu bar to add a new PLLD configuration. Each PLLD sensor must have its own configuration.

A. Settings

2. **Number:** Enter a **number** to identify the PLLD sensor configuration.
3. **Enabled:** When the “Enabled” button is in its ON position, the PLLD configuration is active. The system will try to start tests on the applicable pipeline.



NOTE: If the “Enabled” button is OFF, then the system will not try to run tests on the applicable pipeline. Pressure readings will not be received and the pipe stiffness calibration procedure will not be able to start.

4. **Name:** Enter a **name** to identify the line.
5. **Tank:** Select the **tank number** from the drop-down that has the STP with the PLLD sensor installed.

MAGLINK I/O (PLLD-DAS in new software versions)

6. **Sensor span:** The default value is 87 psi. *Do not change this value.*
7. **Address:** Select address **1** for the first PLLD-DAS module, address **2** for the second PLLD-DAS module, and so on.

NOTE: There can be more than one PLLD-DAS module connected to the LX Plus console. Each PLLD-DAS module must have its address set by the dip switches on its motherboard.



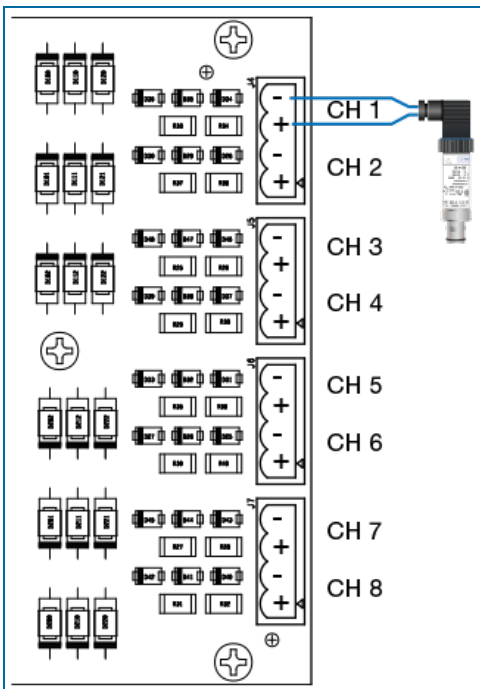
Only one Maglink I/O module can be connected to the LX Plus console.

For more information on how to set the PLLD-DAS address Dip Switches, refer to the ID Addresses/Dip Switches sub-section of the PLLD-DAS section of the [M2050-PLUS MagLink LX Plus Installation Manual](#).

8. **Position:** Enter the **Position** (connector slot) where the PLLD sensor is connected to the PLLD board.
 - The PLLD board has 8 connector slots.

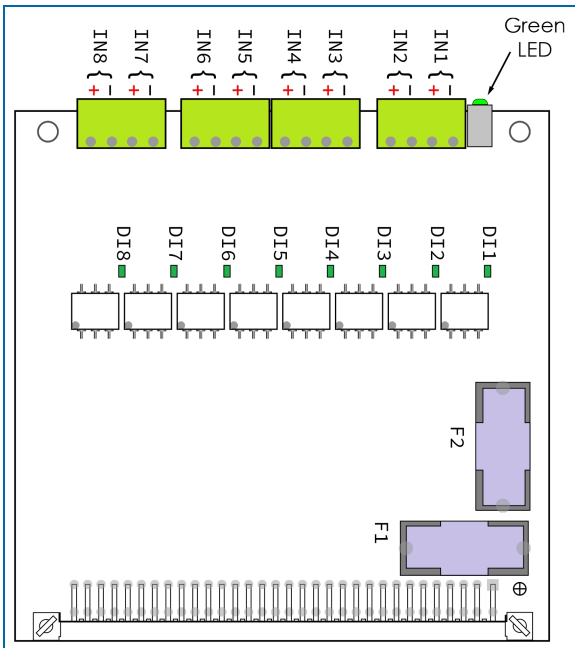


NOTE: For PLLD-DAS: Position 1 is at the top (CH1). See the illustration below.





NOTE: For MagLink I/O: Slot No1 is next to the Green LED. Slot No8 is on the opposite side of the Green LED. See schematic below.

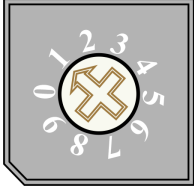


The PLLD board must be installed on the top slot of the I/O, see the image below.



LIM (Line Interface Module)

9. **Device:** Select the LIM address identification number from the drop-down (select 1 through 4). Each LIM module must have its own LIM address. Use the rotary switch on the LIM board to configure the LIM address.



INFORMATION: Refer to the [M00-20-8321-LIM LIM Procedure Guide](#) for information on configuration of the LIM device..

10. **Channel:** Select the LIM Channel from the drop-down (1 through 4) where the applicable STP is connected

Pipeline

1. **Line length:** Enter the total length of the pipeline (from the STP to the last dispenser. Include the length of all branches that are installed between the STP and dispensers)
2. **Pipeline:** A series of specific pipelines is included in this field. The user can select a pipeline and the system will automatically populate the volume/length parameter in the next field.



NOTE: If your pipeline is not listed here, you can select the closest pipeline and manually enter the volume/length parameter in the next field (it will override the automatically selected volume/length).

3. **Volume/length:** You can keep the default value (automatically given when a Pipeline is selected above) or, manually enter a specified value.



NOTE: If you enter a value manually, make sure you use the correct units of measure.

4. **Minimum Test Pressure:** This is the minimum pressure in the pipeline during the leak test. Usually the pipeline pressure is more than 20 psi. It is recommended to keep the default value.
5. **Minimum Dispensing Pressure:** This is the minimum pressure in the pipeline during normal dispensing.
6. **Beta:** Pipe stiffness in psi and pipe material can have an effect on pressure calculations. Refer to the "Pipe Data" tables at the end of this Appendix. These values are theoretical.
7. **Calibrated Beta:** This is the pipe stiffness in psi that has been calculated by the console's algorithm during the process "Beta calibration" (internal process that can calculate the pipe stiffness through a controlled leak in the system). The system uses the Calibrated Beta value for the leak rate calculations once it has been calculated and shown on the field here. If there is no Calibrated Beta value, the system will use the theoretical Beta for the leak rate calculations.
8. **RESET button:** If you click the RESET button, the Calibrated Beta value is erased and the system will use the theoretical Beta for the leak rate calculations.
9. To open the "Calibrate" panel, select the arrow on the right side of the collapsed panel.

Calibrate

The system can calculate pipe stiffness in the "Calibrate" panel. The user must start a controlled leak in the system for the calibration to occur.

10. **Leak generator (gph):** Enter the type of the leak generator. The most common leak generators can start a 3 gallon per hour (gph) leak at 10 psi.
11. **Number of calibration cycles (3-12):** During each calibration cycle the system will pressurize the STP. It will then stop the STP and record the pressure in the line. It is recommended to complete the maximum number of cycles (12) for the best calibration results.
12. **Start calibration immediately:** If this slider button is enabled (pushed to the right and shown in blue), the system will then start the calibration sequence as when the START button is clicked.

If the slider button is disabled, when the START button is clicked: the system waits for the dispenser nozzle to be picked up momentarily, then be put back into the cradle. This will cause the system to start the calibration once the nozzle is back into the cradle. This method is used to start the calibration

process from the forecourt (the technician lifts the nozzle for 2 seconds and puts the nozzle back in the cradle. The calibration will then start).

13. **Calibration status:** This is an information window that shows the current status of the process.
14. **START button:** This starts the calibration sequence (this can be immediately or through the nozzle signal . Refer to “Start calibration immediately” in the previous step.).
15. **STOP button:** This will stop the calibration sequence.

Click the **SAVE** button to save the current pipeline setup.



NOTE: If the DELETE button is selected, it will erase the PLLD configuration.

Leak Test

Automatic LLD leak test – click the Save button to save the settings

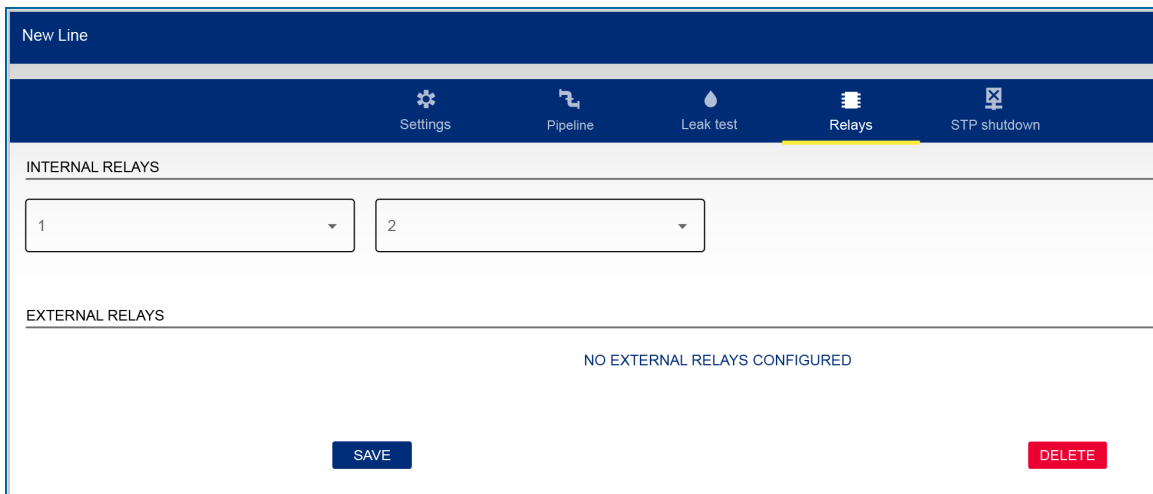
1. **Enabled:** When this button is “Enabled,” the system will run a leak test automatically that uses specified frequencies.

2. **3 gph (11.36 lph)**: The automatic 3 gph (11.36 lph) test will run continuously every hour. The test will start after the last dispensing transaction if the last test was done more than 1 hour before.
3. **0.2 gph (0.76 lph)**: Select the applicable frequency. Select a monthly warning in days if applicable (if a leak test has not been done within "x" days, then a warning will be caused).
4. **0.1 gph (0.38 lph)**: Select the applicable frequency. Select a yearly warning in days if applicable (if a leak test has not been conducted within "x" days, then a warning will be caused).

Scheduled Leak Test

5. **Leak Test Rate**: Select the leak test rate. Then select if the test will start now now (click the **NOW** button or later at a scheduled date and time by (select the **SCHEDULE** button).
6. **Apply** button: Click **Apply** to apply the settings.
7. **Delete**: The Delete button will delete the scheduled leak test configuration.
8. Click **SAVE** to save the setup. Click **DELETE** to erase it.

Relays



New Line

Settings Pipeline Leak test **Relays** STP shutdown

INTERNAL RELAYS

1 2

EXTERNAL RELAYS

NO EXTERNAL RELAYS CONFIGURED

SAVE DELETE

In the Relays tab, the user can program a relay to be started when an LLD condition occurs. Configure the internal, external (an I/O module is necessary for an external relay) or OM4 relays.

The available conditions that can cause a relay to start include:

SENSORS NO LINK (there is no communication between console and PLLD-DAS or Maglink I/O PLLD module)

NO STP LINK (there is no communication between console and LIM)

SENSOR OPEN (there is no reading from PLLD sensor)

SENSOR SHORT (the PLLD sensor wires shorted)

STP CONTROLLER (the STP contactor fused or stuck)

LINE LEAK (a leak test failed)

NO LEAK TEST (no leak test has been done as the WARNINGS setup in the Leak Test tab)

NO ANNUAL LEAK TEST (no annual leak test has been done as the WARNINGS setup in the Leak Test tab)

PRESSURE LOW (the STP dispensing pressure is less than the Minimum Dispensing Pressure configured at the Pipeline tab)

STP Shutdown

New Line

Settings Pipeline Leak test Relays **STP shutdown**

Line leak shutdown reasons

- 11.36 lph leak detected (always blocks STP)
- 0.76 lph leak detected
- 0.38 lph leak detected

Other shutdown reasons

Device	Reason	Delay [hrs:mm]
Tank 1 - Tank 1 Diesel	HH WATER	10:00

ADD STP SHUTDOWN REASON

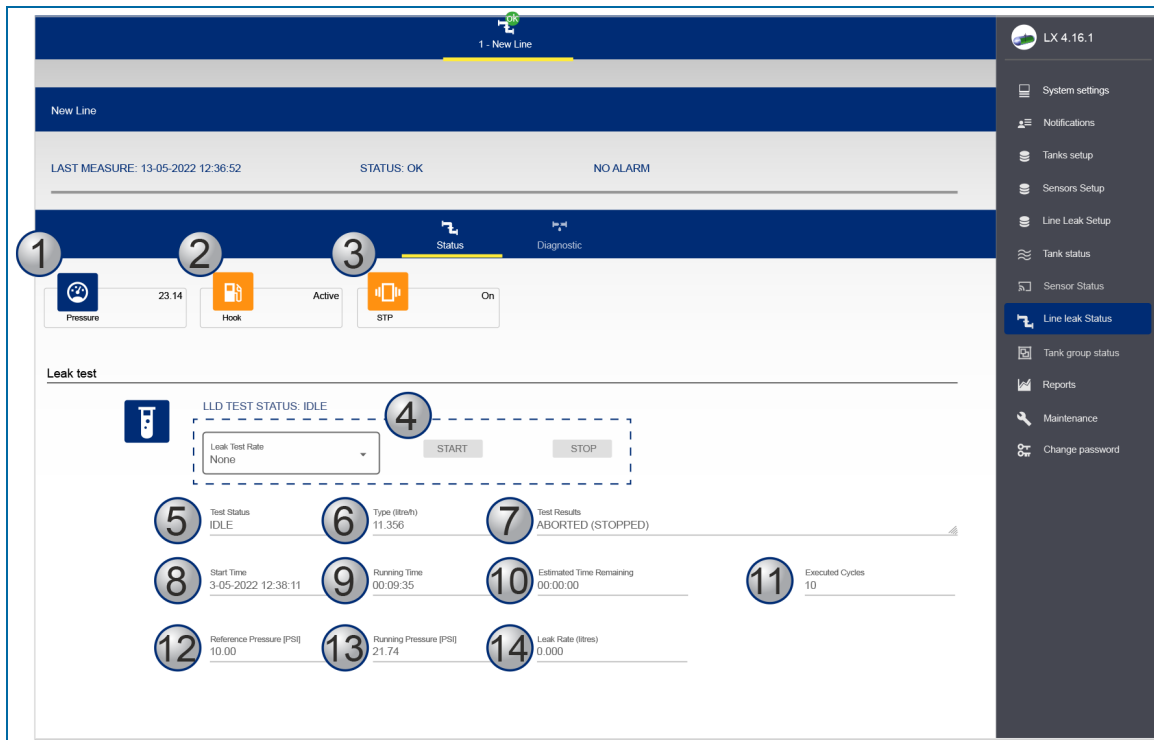
SAVE DELETE

In the STP Shutdown tab the user can configure the conditions under which the STP will automatically shutdown.

1. A 3 gph (11.36 lph) line leak fail will always shut down the STP.
2. Where applicable, select the STP to be shutdown during a 0.2 gph (0.76 lph) fail and/or a 0.1 gph (0.38 lph) fail.
3. The STP can also be configured to shutdown by other causes, (for example, high water detected by the probe in the tank or by an environmental sensor activating).
 - a. To configure an event that will cause an STP shutdown, select **ADD STP SHUTDOWN REASON**.
 - b. Select the applicable event.
 - c. The *Delay* is a timer that starts a countdown from the point in time the event was caused. The STP will shutdown once the timer ends.

In the example shown in the image above, an HH Water alarm event on Tank 1 has been caused that will shutdown the STP after 10 continuous hours that the alarm is active.

Line Leak Status



1. **Pressure** icon: This shows the current pressure in the pipeline.
2. **Hook** icon: This changes to show to “Active” when the hook signal is in operation.
3. **STP** icon: This changes to show that the STP is “On” when the STP is operational.
4. **Leak Test Rate**: Select a **Leak Test Rate** from the drop-down. Click the **Start** button to start an On Demand test. Click the **Stop** button to stop a test that has been started.
5. **Test Status Idle**: This shows *Idle* if a test is not in progress.
6. **Type**: This shows the type of leak test.
7. **Test Results**: Shows the result of the test. Possible results are: PASSED, FAILED, ABORTED (STOPPED) and IN PROGRESS.
8. **Start Time**: This shows the time when the test started.
9. **Running Time**: This shows the total time of the test since it started.
10. **Estimated Remaining Time**: Approximate time until the test is complete.
11. **Executed Cycles**: The system will start and stop the STP a number of times during the test to get pressure readings. Each start and stop sequence is considered to be a cycle. This field shows how many cycles have been completed so far.
12. **Reference Pressure**: This is the reference pressure at which the test will run. A 3 gph test is referenced at 10 psi.
13. **Running Pressure**: This is the pressure in the pipeline once the STP has stopped fueling.

14. **Leak Rate:** The calculated leak rate in liters/gallons per hour.

Graphical User Interface

Refer to the PLLD section of [M2052 LX 4 and LX Plus User Manual](#).

Pipe Data Tables

The data for some industry known pipes is shown below.

<i>RIGID PIPE TYPES</i>	<i>BETA</i>	<i>Gals/inch</i>	<i>Liters/cm</i>	<i>Liters/mm</i>
FIBERGLASS (2 INCH)	25000	0,017	0,0253	0,0025
FIBERGLASS (3 INCH)	25000	0,038	0,0566	0,0057
STEEL (2 INCH)	50000	0,016	0,0238	0,0024
COPPER (1 INCH, TYPE K)	55000	0,003	0,0045	0,0004

<i>ADVANCED POLYMER TECHNOLOGY FLEXIBLE PIPE TYPES</i>	<i>BETA</i>	<i>Gals/inch</i>	<i>Liters/cm</i>	<i>Liters/mm</i>
1.5-INCH (P150SC)	8800	0,008	0,0119	0,0012
1.75-INCH (P175SC)	7400	0,01	0,0149	0,0015
2.0-INCH (P200SC)	5600	0,014	0,0209	0,0021
2.5-INCH (P250SC)	4400	0,021	0,0313	0,0031
1.5-INCH (XP-150-SC)	5042	0,008	0,0119	0,0012
2.0-INCH (XP-200-SC)	5420	0,014	0,0209	0,0021

<i>AMERON FLEXIBLE PIPE TYPES</i>	<i>BETA</i>	<i>Gals/inch</i>	<i>Liters/cm</i>	<i>Liters/mm</i>
DUALOY 3000/FLS III	5400	0,008	0,0119	0,0012
DUALOY 3000/FLS III	7600	0,014	0,0209	0,0021

<i>BRUGG FLEXIBLE PIPE TYPES</i>	<i>BETA</i>	<i>Gals/inch</i>	<i>Liters/cm</i>	<i>Liters/mm</i>
FLEXWELL HL-40 (1.5 INCH)	33000	0,008	0,0119	0,0012

ENVIRON FLEXIBLE PIPE TYPES	BETA	Gals/inch	Liters/cm	Liters/mm
GEOFLEX D (1.5 INCH)	14500	0,008	0,0119	0,0012
GEOFLEX D (2 INCH)	11000	0,014	0,0209	0,0021
GEOFLEX D (3 INCH)	4100	0,031	0,0462	0,0046
GEOFLEX PLUS D (1.5 INCH)	16500	0,008	0,0119	0,0012

FURON FLEXIBLE PIPE TYPES	BETA	Gals/inch	Liters/cm	Liters/mm
SP15 (1.5 INCH)	9000	0,008	0,0119	0,0012
SP20 (2 INCH)	7000	0,014	0,0209	0,0021
CP15 (1.5 INCH)	11650	0,008	0,0119	0,0012
CP15DW (1.5 INCH)	5400	0,008	0,0119	0,0012
CP20 (2 INCH)	7600	0,014	0,0209	0,0021
COFLEX (1.5 INCH)	14500	0,008	0,0119	0,0012
COFLEX (2 INCH)	11000	0,014	0,0209	0,0021

NUPI FLEXIBLE PIPE TYPES	BETA	Gals/inch	Liters/cm	Liters/mm
SMARTFLEX (1.5 INCH)	8600	0,008	0,0119	0,0012
SMARTFLEX (2.0 INCH)	15000	0,014	0,0209	0,0021

PETROTECHNIK FLEXIBLE PIPE TYPES	BETA	Gals/inch	Liters/cm	Liters/mm
UPP EXTRA (63 mm)	1500	0,014	0,0209	0,0021

<i>TOTAL CONTAINMENT FLEXIBLE PIPE TYPES</i>	<i>BETA</i>	<i>Gals/inch</i>	<i>Liters/cm</i>	<i>Liters/mm</i>
PP1500 (1.5 INCH)	2400	0,008	0,0119	0,0012
PP1501 (1.5 INCH)	3500	0,008	0,0119	0,0012
PP1502 (1.5 INCH)	7300	0,008	0,0119	0,0012
PP1503 (1.5 INCH)	2500	0,008	0,0119	0,0012
PP2500 AND PP2501				
PP2502 (2.5 INCH)	8700	0,021	0,0313	0,0031
PP2503 (2.5 INCH)	3100	0,021	0,0313	0,0031
CP1501 (1.5 INCH)	13000	0,008	0,0119	0,0012
CP1503 (1.5 INCH)	4500	0,008	0,0119	0,0012
CP2503 (2.5 INCH)	3900	0,021	0,0313	0,0031

<i>FLEXWORKS FLEXIBLE PIPE TYPES</i>	<i>BETA</i>	<i>Gals/inch</i>	<i>Liters/cm</i>	<i>Liters/mm</i>
C15 (1.5 INCH)	14500	0,008	0,0119	0,0012
C20 (2.0 INCH)	11000	0,014	0,0209	0,0021
C30 (3.0 INCH)	4100	0,031	0,0462	0,0046

WIRING DIAGRAM

Refer to [FMM2058-PLS LX Plus Wiring Diagram](#).

Site Configuration Chart

Use the chart below to record information that will be necessary for the programming of the PLLD in the LX PLUS.

Tank No	Product	STP No	STP manifolded	Pipe inner Diameter (in/cm/mm)	Pipe Type	Beta	Pipe length (in/cm/mm)	Pipe volume (gals/in, lts/cm, lts/mm)	PLLD DAS / I/O channel	LIM1 CHANNEL	LIM2 CHANNEL

NOTES:

- At **STP manifolded**, record if a specified STP is manifolded with another STP. Enter the manifolded STP in the box. If there is no manifold, enter N/A.
- At **Pipe volume**, use this formula: If cm is used as the unit of measure, then $\text{Pipe volume liters/cm} = 3.14 * \text{Diameter (cm)} * \text{Diameter (cm)} \div 4000$. If inches is used as the unit of measure, then $\text{Pipe Volume Gallons/inch} = 3.14 * \text{Diameter (in)} * \text{Diameter (in)} * 0.00108$.

Appendix How to Configure a Siemens LR120 Radar

Before you connect the Siemens LR120 Radar to a Maglink LX console, the SIEMENS mobile IQ app must be used to configure the device.

- After you connect the Radar device to a power source (8-30 V DC), a Bluetooth PIN is required to connect to the device.
- When a connection has been made, go to Setup > Detailed setup > Communication > Address, and change the address (the default is 246). This address will show as a Serial Number in the Maglink LX.

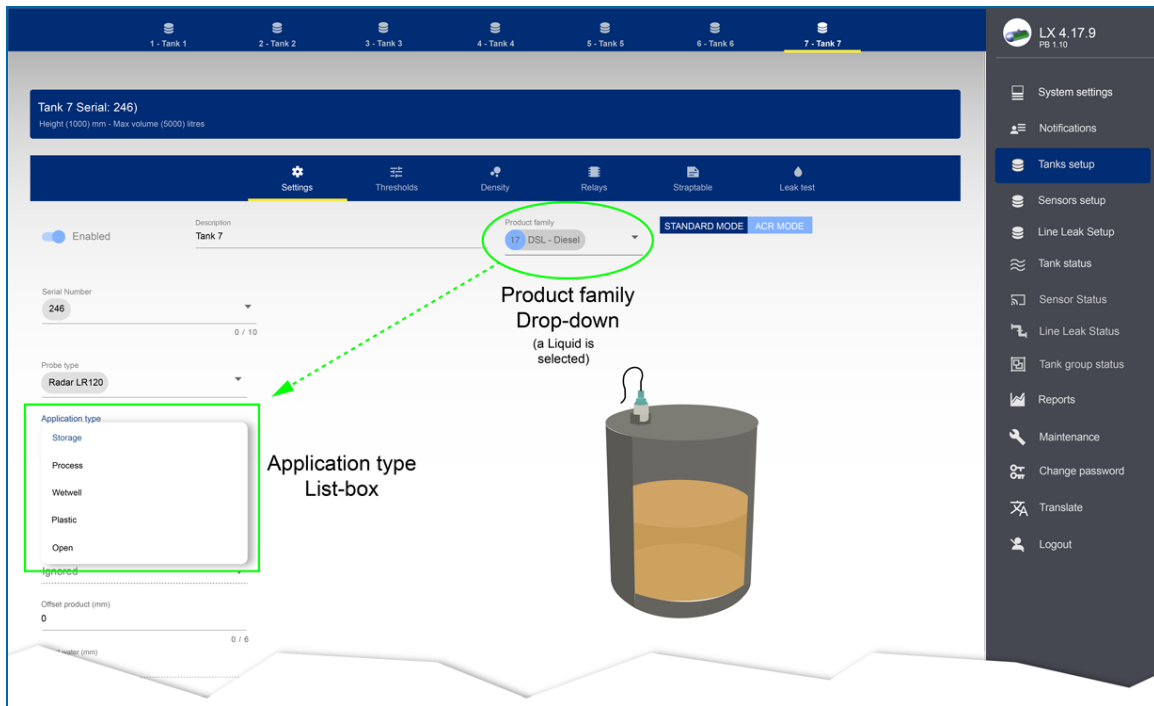


IMPORTANT: Separate addresses must be set up for each site. Two or more Radar devices cannot have the same address.

- After address configuration, the Radar device can be connected to the Maglink LX console.
- On Web UI > Tanks setup > Settings Serial Number, the Radar device address must be entered. After "QUERY PROBE" the system should automatically adjust the probe type to "Radar LR120."

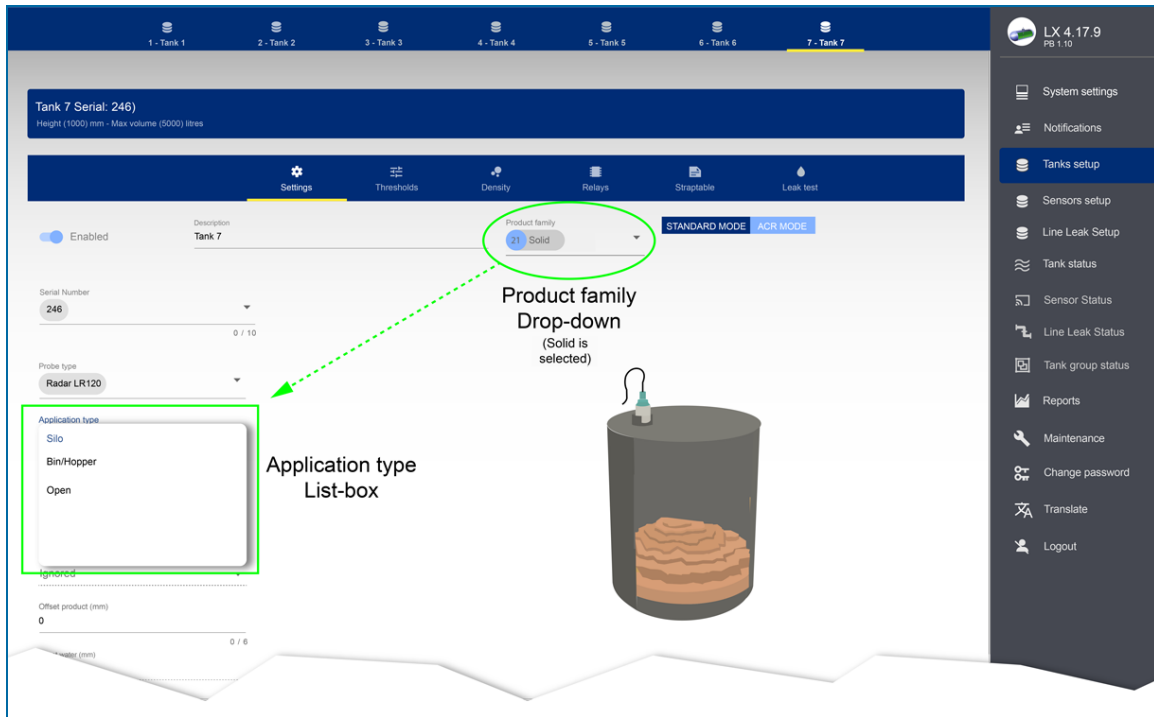
(Continued on next page)

- When a liquid is selected in the "Product Family" drop-down, the "Application type" list-box will show the values below (see the screen image below):
 - Storage
 - Process
 - Wetwell
 - Plastic
 - Open



(Continued on next page)

- When "Solid" is selected in the "Product family" drop-down, the "Application type" list-box will show the values below (see the screen image below):
 - Silo
 - Bin/Hopper
 - Open



Revisions-M2051

Revision #	ECO	Effective	Software Version	Key Changes
0	1784	8/19/20		Initial Release
1	1836	12/3/2020		Added Autocalibration and Reconciliation. Updated screens and procedures
2	1944	10/8/2021		New Start Italiana address, update ip address set up, available languages, new system screen, removed DIP-Switch section, Density and ACR Results update, new Tech Support procedure.
3	1998	3/14/2022		General Updates, screen updates, AEF Thresholds, Sensor relays.
4	DB	9/11/2023		General Updates, screen updates, add languages, new AEF w/PG and OPW, PLLD, PLLD-DAS, Siemens LR120 Radar setup.



NOTE: It is possible that older software versions might not support all features

ProGauge

