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DIS-51

Installation, Setup & Operation Guide

VEEDER-ROOT™

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Example Illustrations

Illustrations used in this publication may contain components that are customer supplied and not included with the Veeder-Root device. Please check with your Veeder-Root Distributor for recommended installation accessories.

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Introduction

Overview

This manual describes the installation, setup, and operations for the DIS-51 unit sold by Gilbarco Veeder-Root.

The DIS-51 displays ullage as determined by the TLS console up to the tank capacity. Use the display for this purpose only.

Safety Precautions

The following safety symbols are used throughout this manual to alert you to important safety hazards and precautions.

 **EXPLOSIVE** Fuels and their vapors are extremely explosive if ignited.	 **FLAMMABLE** Fuels and their vapors are extremely flammable.
 **ELECTRICITY** High voltage exists in, and is supplied to, the device. A potential shock hazard exists.	 **TURN POWER OFF** Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.
⚠WARNING **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.	***NOTICE*** **NOTICE** is used to address practices not related to physical injury.

⚠ WARNING

The equipment is used in location where lethal voltages and explosive vapors or flammable fuels may be present.

FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.

For this system:

1. **Installers and operators must comply with all applicable safety regulations. This also applies to any local safety any accident prevention regulations which are not stated in this manual. In addition, take necessary precautions during installation, service, and repair to prevent personal injury, property loss and equipment damage.**

   This device must be installed into an electrical system complying with the plant engineering regulations in force and equipped at least wih a 2-pole, 6A, C curve, MCB differential for supply line.
2. **The installation of the DIS-51 including wiring to the TLS console may be only carried out by expert personnel. Refer servicing to trained and qualified personnel only.**
3. **Do not change or modify the display or all any equipment without the prior consent of Veeder-Root.**
4. **Substitution of components may impair intrinsic safety.**
5. **Be sure AC power is "Off" before opening the TLS cover to access communication jumpers. Do not short any voltage across any barrier terminal.**

⚠WARNING **Keep out of reach of children!**

General

The DIS-51 unit allows a tanker driver to connect with the station's ATG to view continuous level measurements for up to 32 tanks, ullage for the tanks, as well as any alarms and warnings.

The DIS-51 display is mounted to the inside window of the station. It is operated by the tanker driver using a push-button switch mounted outside the station in view of the display. Pressing the button activates the display. Pushing the button repeatedly displays tank status for each tank. The display clears when the button has not been pressed for a long period of time.

Product Components

The DIS-51 kit includes:

- 1 DIS-51 unit (cable and cable gland included)
- 1 Power supply
- 1 Junction box
- 1 Push button/switch
- 5 Cable glands PG 13.5 20/25 diameter - 1 for push-button switch, 4 for junction box
- 1 DB9 male connector (used for TLS4 serial port)
- 6 Clamps 4mm^2 for din bar
- 1 Clamp p/fuse 4mm^2 for din bar
- 2 Terminals (connector end stop for multiple series)
- 1 DIN bar

This kit includes the items you may need to connect the DIS-51 and push-button switch to the junction box. The kit does not include the wire/cable that goes from the console to the junction box.

Technical Data

Supply voltage	230 V~ +10% - 15%
Mains frequency	50±2 Hz
Maximum input current	0,2A
IP protection degree	65
Operating temperature	0 to +40°C
Display	2,8“ LCD graphic display with back light
Communication	RS-485 interface, 3-pole connection, galvanically isolated
Connection cable	
Communication	Shielded and twisted cable 3 x 0,25 mm^2 (min.)
Power supply	3 x 1,0 mm^2 (min.)

Gauge Requirements

The DIS-51 can be connected to a Veeder-Root TLS-2, TLS-350, TLS4 or TLS-450/TLS-450PLUS tank monitoring console via a RS-485 serial communications port.

Cable Installation

Cable must be installed to comply with all local and national regulations that may be in force at the time of installation. It is the installer's responsibility to ensure that the installation complies with all relevant and pertinent legislation and codes of practice. Figure 1 shows the wiring connections for DIS-51 system components.

⚠WARNING **Do not run DIS-51 cabling in the same ducts as intrinsically safe TLS probes or sensors.**

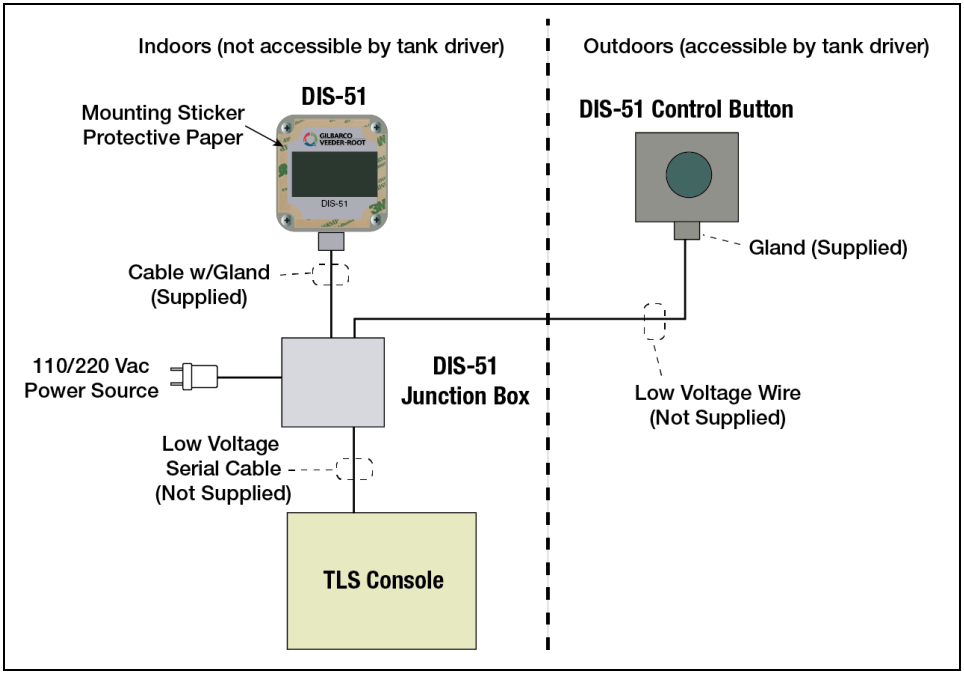


Figure 1. System Block Diagram

Location

The DIS-51 display is designed to be mounted against the inside window of the kiosk and visible to the tanker driver outside the window. After determining the ideal location for mounding the display, ensure the window is clean and dry.

Remove the protective paper from the sticker on the front of the display (Figure 1), press the display firmly against the inside of the window.

Enough space must be left underneath the unit to allow the power lead and the RS-485 cable to be connected, approximately 70 mm.

In case of Automatic Mode installation, the push button can be removed but it is important to complete the DIS-51 configuration before removing the button and attaching the display to the glass of the window.

⚠WARNING **The DIS-51 and installation kit (including junction box and push-button switch) are not intrinsically safe and must not be located in areas what may contain explosive or inflammable concentration of petroleum vapor.**

Once installed avoid getting window cleaning agents, water, etc. onto the DIS-51 display.

Connections

The cable that comes with the DIS-51 is two meters long with 7 pole connections. The signals on this wire are shown in the Table 1 below.

Table 1. DIS-51 Cable Signals

Wire	Signal
White	Voltage supply, GND
Brown	Voltage supply, +5V
Green	RS-485 interface, B (-)
Yellow	RS-485 interface, A (+)
Grey	RS-485 interface, GND
Pink	Button, connection 2
Blue	Button, connection 1

The wire connectors are used to connect the wires to the power supply, push-button switch, and cable coming from the TLS console. These connections are done inside the junction box (see Figure 2).

Wiring Connections

The junction box is equipped with a protection fuse. If necessary, only replace the protection fuse with one having the same characteristics: 1A, glass 5x20mm T.

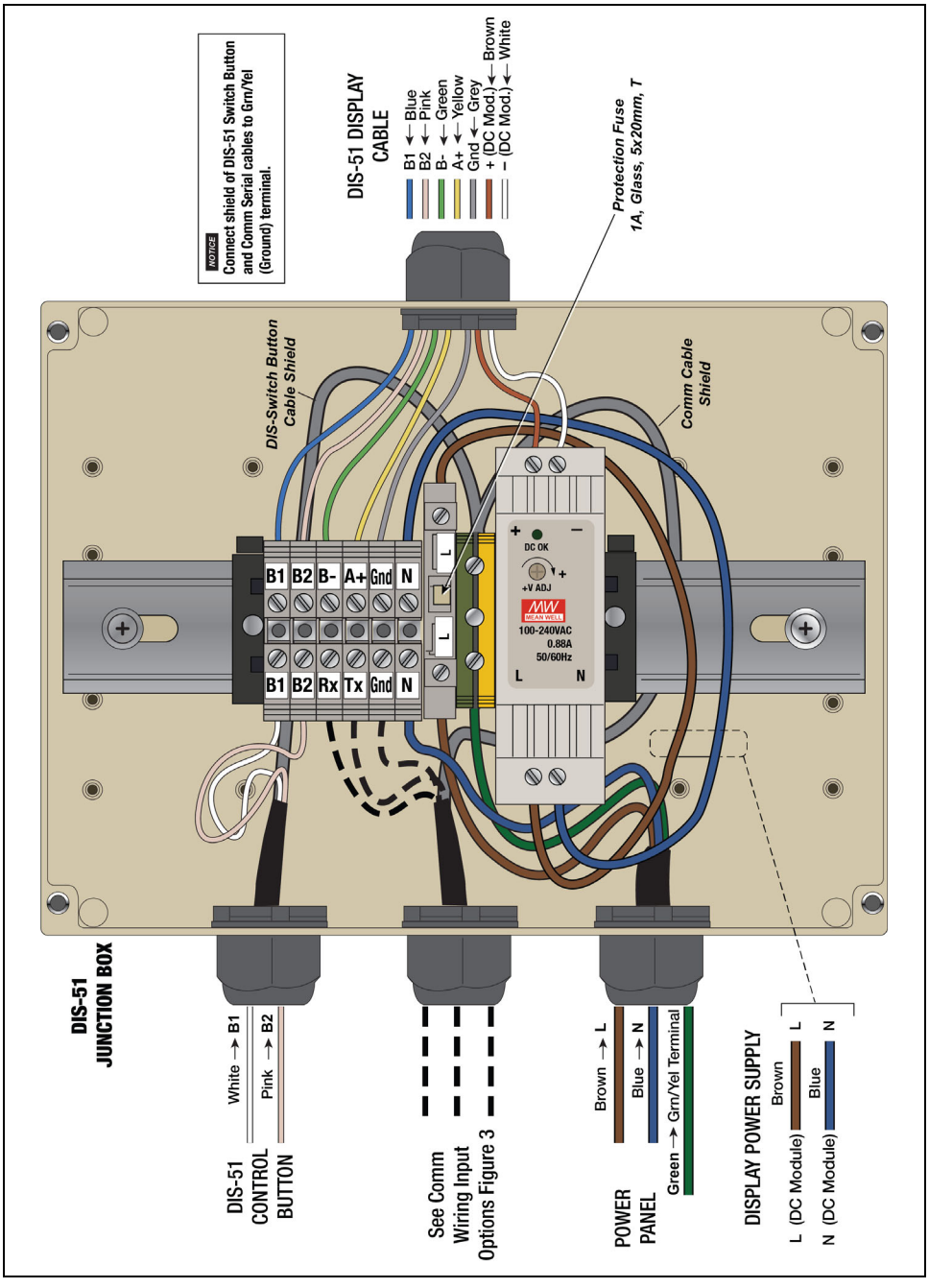


Figure 2. DIS-51 Junction Box Wiring Diagram

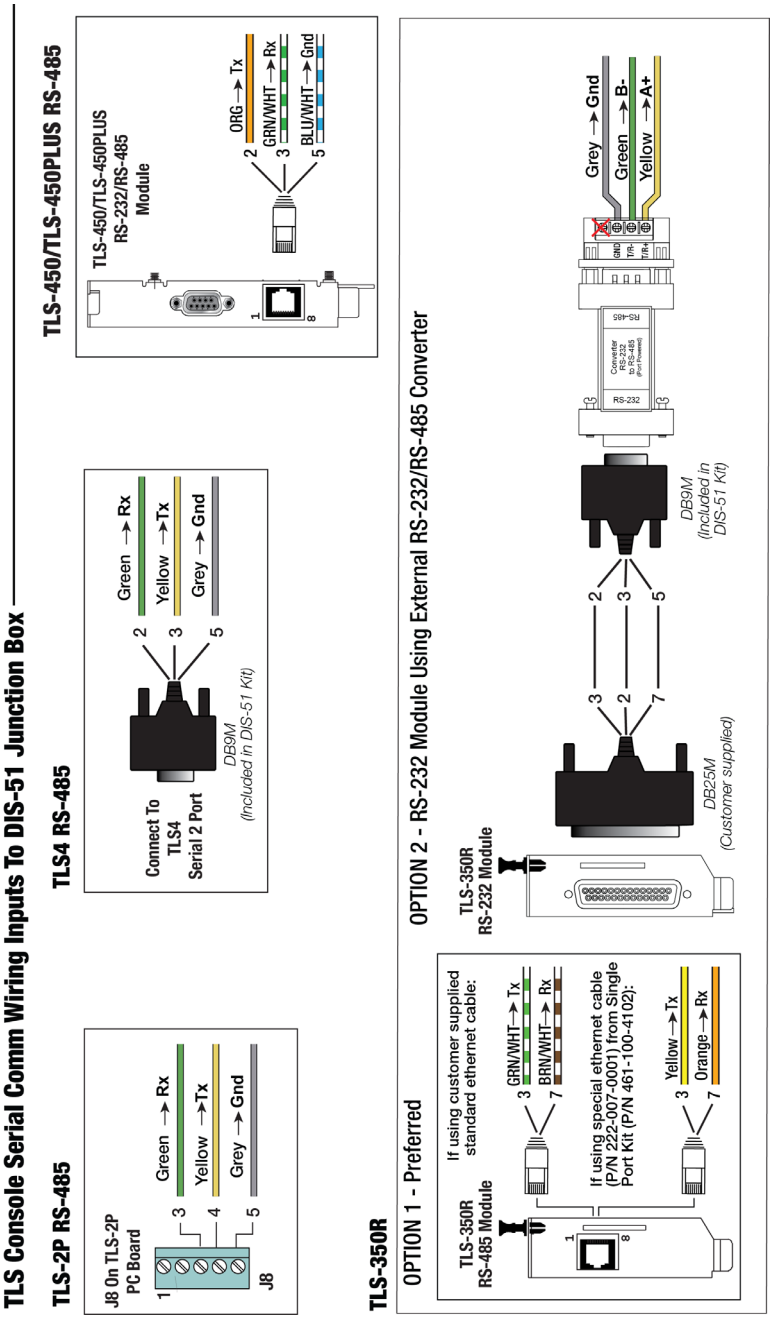


Figure 3. Serial Comm Wiring Input Options

DIS-51 To TLS Console Wiring Connections

This section includes instructions for configuring the jumpers and serial ports and setting up the software for applicable TLS Consoles. Instructions are specific to each console type.

Connection Instructions - DIS-51 to TLS2P

RS-485 Serial Port Configuration On TLS2P

Set jumper J3 onto pins 1 and 2 for 2-wire configuration (see Figure 4).

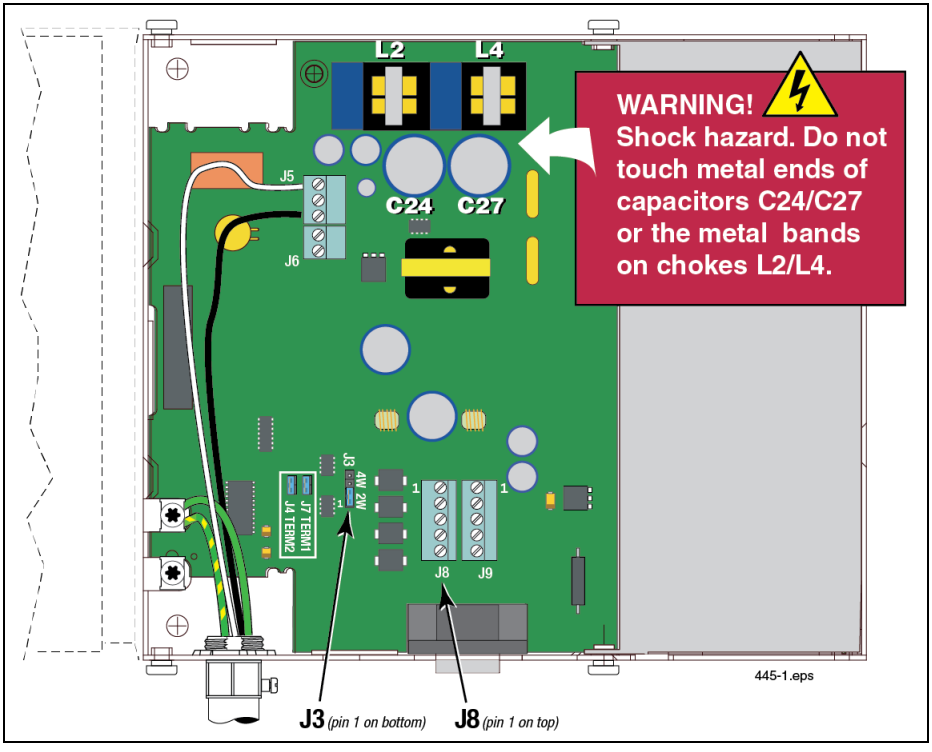


Figure 4. Serial Port Configuration For TLS2P

1. Attach the RS-485 cable from the DIS-51 to TLS2P Serial Port 2 connector (J8) as shown in Figure 3.
2. Only one terminal connector (J8 or J9) can be in use at one time. J9 is for RS-232 only.

TLS2P Software Setup For DIS-51

Go to Menu>System Setup >Comm>Serial Port and select **Serial Port 2**. Then select/enter the following parameters:

- Comm Type - SERIAL
- Handshaking - None
- Baud Rate - 9600
- Parity - NO PARITY
- Data Length - 8
- Stop Bits - 1

Connection Instructions - DIS-51 To TLS-350R

OPTION 1

This is the preferred option and requires a Single Port Kit P/N 461-100-4102 which includes:

- DIS-51 Interface Module for TLS-350R, provides single RS-485 Port, P/N 330799-001 (see Figure 5).

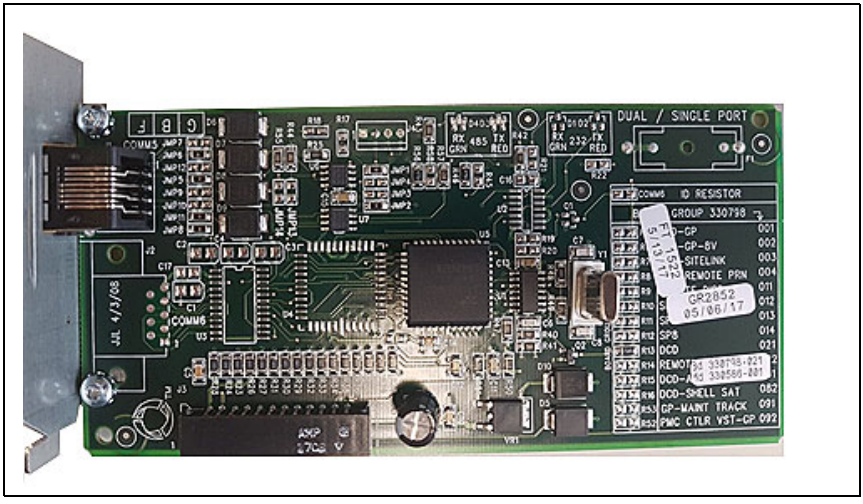


Figure 5. Single Port RS-485 Module For TLS-350R - DCD Configuration

- Flat Cable, P/N 222-007-0001

Wiring Diagram For Option 1

Figure 3 shows the wiring connection between the DIS-51 junction box and a TLS-350R RS-485 Interface Module.

Software Setup For Serial Port RS-485 On TLS-350R - Option 1

- Comm Type - 2 (RS-485)
- Baud Rate - 9600
- Parity - None
- Stop Bits - 1
- Data Length - 8
- RS-232 Security Code - Disabled

OPTION 2

This option uses a TLS-350R RS-232 Comm Module (P/N 329362-002) and an external RS232/RS485 Converter (P/N 500194).

NOTICE **The external converter must be installed outside of the DIS-51 junction box to maintain its certifications.**

Wiring Diagram For Option 2

Figure 3 shows the wiring connection between the DIS-51 junction box and the TLS-350R RS-232 Interface Module.

Software Setup For Serial Port RS-232 On TLS-350R - Option 2

- Comm Type - 2 (RS-232)
- Baud Rate - 9600
- Parity - None
- Stop Bits - 1
- Data Length - 8
- RS-232 Security Code - Disabled

Connection Instructions - DIS-51 to TLS4

RS-485 Serial Port Configuration On TLS4

1. Put all three jumpers for the Serial Port 2 (J38) into position P2-RS-485 as shown in Figure 6.

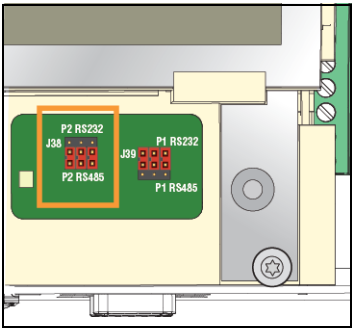


Figure 6. Serial Port 2 J38 Jumpers Set To RS-485 Positions

a. Turn off power to the TLS4 Console.

b. To reach the jumpers, remove the housing lid. The jumpers are located near the lower right side of the display.

c. Close to the jumpers there are the two LEDs D15 (Rx, green) and D16 (Tx, red) that indicate the status of the Rx and Tx lines of port 2.

d. When the communication between the DIS-51 Display and the TLS-4 is established, both LEDs should light up periodically.

Wiring Diagram

Figure 3 shows the wiring connections between the DIS-51 junction box and the TLS4 Serial 2 Port.

Software Setup For TLS4 Serial 2 Port

Go to Menu>Setup > Communication > Serial Port and select **Serial Port 2**.

Enter the following parameters:

- Label - e.g. DIS-51 Display
- Usage - RS-485
- Baud Rate - 9600
- Data Bit - 8
- Parity - No Parity

- Stop Bit - 1
- Use Handshaking - No Handshaking
- Security Code - Serial Command Security can be used but this requires that this feature is also enabled in the DIS-51 Display and that the Security Code is set to the same characters in both devices. Use Configuration menu to enable and change the Security Code settings in the DIS-51. See “Entering and Changing the Security Code in DIS-51” on page 21.
- RS232 End of Message - Disabled
- EXT Character Display - 0x03
- ETX Character Computer - 0x03

Connection Instructions - DIS-51 to TLS-450 Series

The RS-232/RS-485 Comm module (P/N 330020-618 for DIS-51 communication is shown in Figure 7.

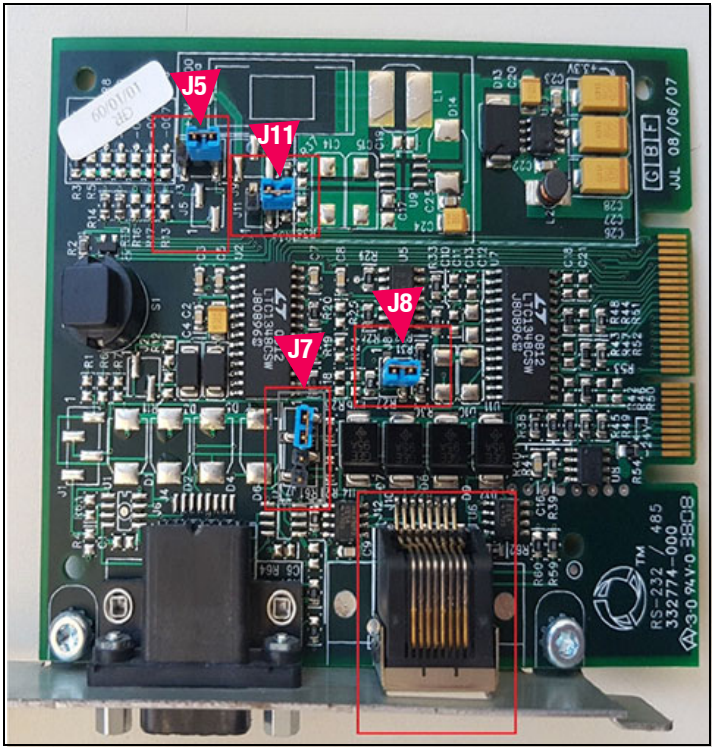


Figure 7. RS-232/RS-485 Comm Module For TLS-450/TLS-450PLUS

RS-485 Serial Port Configuration On TLS-450/TLS-450PLUS

1. The jumpers should be set as shown in Figure 7 above:
   a. J7 (determines if serial interface is RS-232 or RS-485) should be set on pins 1 and 2. Notice the 1 on the right side of the J7 box. That is pin 1.
   b. J8 should connect both pins.
2. The other jumpers should be set as shown.

Wiring Diagram

Figure 3 shows the wiring connections between the DIS-51 junction box and the TLS-450/TLS-450PLUS RS-485 Port.

Software Setup For TLS-450/TLS-450 PLUS Serial 2 Port

Go to Menu>Setup > Communication > Serial Port and select **Serial Port 2**.

Enter the following parameters:

- Label - e.g. DIS-51 Display
- Usage - RS-485
- Baud Rate - 9600
- Data Bit - 8
- Parity - No Parity
- Stop Bit - 1
- Use Handshaking - No Handshaking
- Security Code - Serial Command Security can be used but this requires that this feature is also enabled in the DIS-51 Display and that the Security Code is set to the same characters in both devices. Use Configuration menu to enable and change the Security Code settings in the DIS-51. See “Entering and Changing the Security Code in DIS-51” on page 21.
- RS232 End of Message - Disabled
- EXT Character Display - 0x03
- ETX Character Computer - 0x03

DIS-51 Configuration Screens

The user enters the Configuration Main Menu after pressing on the push-button switch for more than10 seconds.

Once in the Configuration Main Menu, the following actions can be triggered by pressing the push-button switch as discussed below:

Pressing the push-button switch for less than 2 seconds (short press):

- The cursor (<) moves to the next line item in the menu.
- If the cursor is on the bottom line of the display and another menu item exists, that menu item will be displayed in the bottom line.
- If the cursor is on the last available menu item, it jumps back to the top item in the menu.

Pressing the push-button switch for more than 2 seconds (long press):

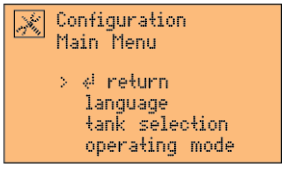
- If the cursor IS on the top line item of a menu, it returns to the next higher menu or leaves the Configuration Main Menu.
- If the cursor is NOT on the top line of a menu, the selected menu is opened, or the configuration is selected/changed.

After exiting the Configuration Main Menu, all changes are automatically stored and saved even after turning off the system.

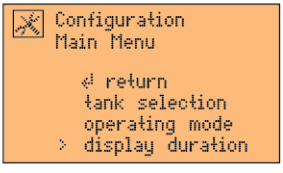
NOTICE **Do not interrupt the power supply while in the Configuration Menu or any changes will not be saved.**

Main Menu

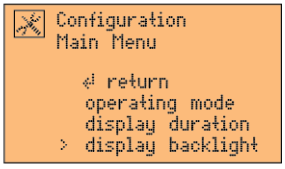
Configuration Main Menu:



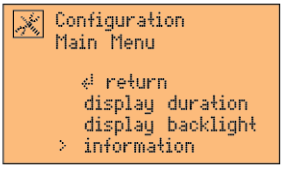
Configuration Main Menu (scrolled down one line):



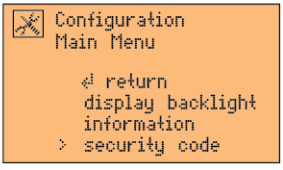
Configuration Main Menu (scrolled down two lines):



Configuration Main Menu (scrolled down three lines):



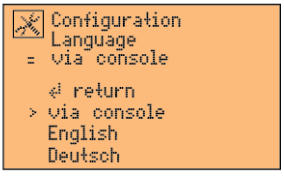
Configuration Main Menu (scrolled down four lines):



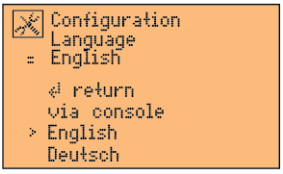
Sub-Menu Language Selection

Available languages: via console ,English, Deutsch, Français, Español, Português, Italiano and русский.

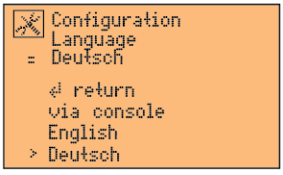
Configuration, sub-menu Language, via console selected:



Configuration, sub-menu Language, English selected:

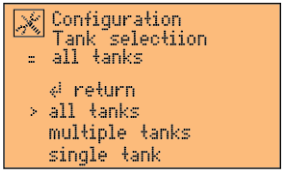


Configuration, sub-menu Language, Deutsch selected:

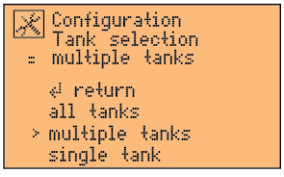


Sub-Menu Tank Selection

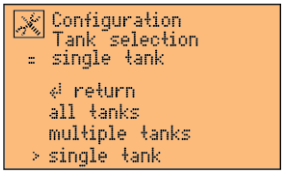
Configuration, sub-menu Tank selection, all tanks selected:



Configuration, sub-menu Tank selection, multiple tanks selected:

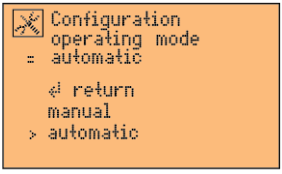


Configuration, sub-menu Tank selection, single tank selected:

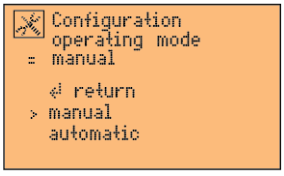


Sub-Menu Operating Mode

Configuration, sub-menu operating mode, automatic mode selected:



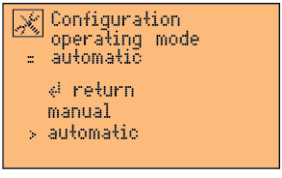
Configuration, sub-menu operating mode, manual mode selected:



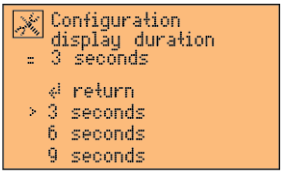
Sub-Menu Display Duration

The contents of the sub-menu display duration depend on the selected operating mode. In operating mode **automatic**, a display duration of 3, 6 or 9 seconds can be selected (this is the time that the display stays on one tank before automatically switching over to the next tank). In operating mode **manual**, the selection is 1, 2, 5 or 10 minutes (this is the time that the display stays on after the user has pushed the button for the last time).

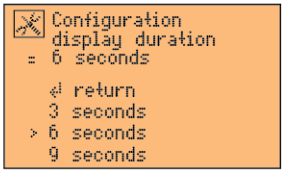
When Automatic mode is selected:



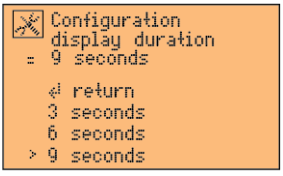
Configuration, sub-menu display duration, 3 seconds selected:



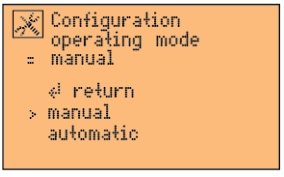
Configuration, sub-menu display duration, 6 seconds selected:



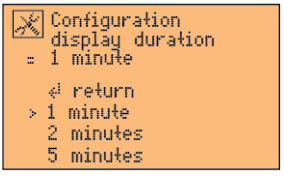
Configuration, sub-menu display duration, 9 seconds selected:



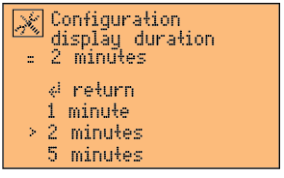
When Manual mode is selected:



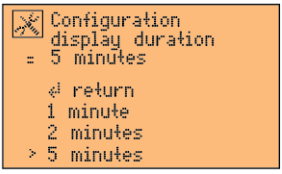
Configuration, sub-menu display duration, 1 minute selected:



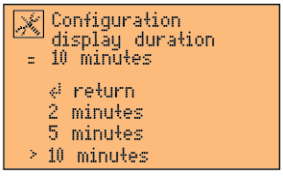
Configuration, sub-menu display duration, 2 minutes selected:



Configuration, sub-menu display duration, 5 minutes selected:

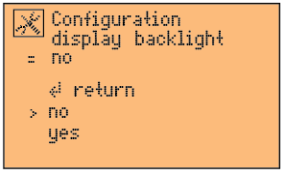


Configuration, sub-menu display duration, 10 minutes selected:

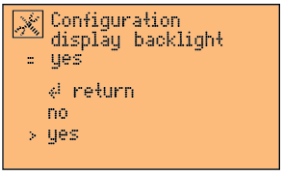


Sub-Menu Display Backlight

Configuration, sub-menu display backlight, no selected:

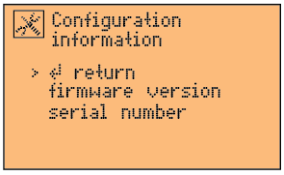


Configuration, sub-menu display backlight, yes selected:

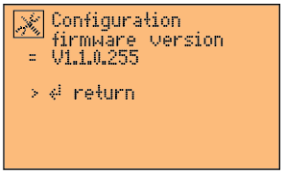


Sub-Menu Information

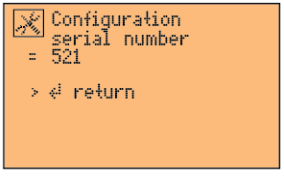
Configuration, sub-menu information:



Configuration, sub-menu information -> firmware version:



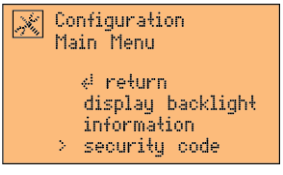
Configuration, sub-menu information -> serial number:



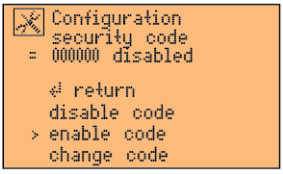
Entering and Changing the Security Code in DIS-51

If you enable Serial Command Security in the console you must also enable it in the DIS-51, and the security code must be set to the same code in both the console and the DIS-51.

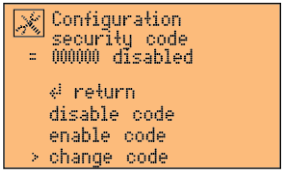
1. Long press the push-button switch until you enter Configuration Main menu. Short press the push-button switch until you are at the “security code” option,” then long press to select it.



2. Short press the push-button switch until you are at "**enable code**," then long press to select it.

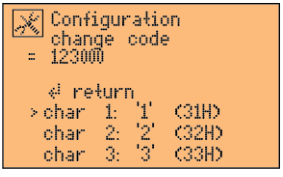


3. Short press the push-button switch until you are at "**change code**," then long press to select it.

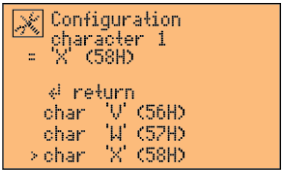


NOTICE **Note the code is the third line on the screen. You can enter a maximum of 6 characters and this code must match the code on your console.**

4. Short press the push-button switch until you are the first character that needs to change, then long press to enter into the list of available replacement characters.

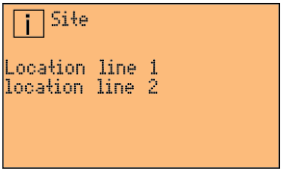


5. Scroll down and short press the **char** for the first character.



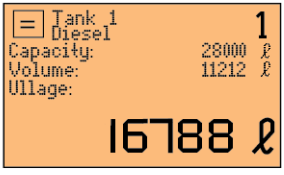
6. Short press the push-button switch until you are at "**return**," then long press to select it.
7. Repeat steps 4, 5 and 6 for each of the other characters you want to change.
8. After inserting the entire code, press on "**return**" until you exit the Configuration menu.

The truck driver pushes the push button/switch to activate the display. The Site screen displays. It shows where the DIS-51 display is located. The site screen displays after start-up and each time that the display is activated by the external switch.

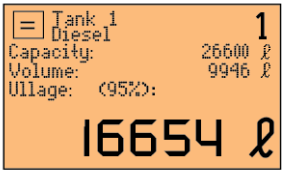


If the operation mode is ‘manual’, pushing the push button/switch again displays the tank data screen for the first tank. The tank data screens show the current data available. If the operation mode is ‘automatic’, the DIS-51 display automatically advances through the tank screens.

Without user ullage:



With user ullage (set to 95%):



If the operation mode is ‘manual’, the driver continues to push the push button/switch to scroll through the available tanks.

Display Icons

The following icons at the top left of the display are used to indicate the various states of the DIS-51.

	Normal	No change in level (volume). The level for the displayed tank is not currently changing. This indicates not dispensing and no delivery.
	Dispensing	Dispensing is currently taking place out of the displayed tank. The level (volume) decreases.
	Delivery	A delivery into the displayed tank is currently taking place. The level (volume) increases.
	Information	The DIS-51 display is showing information data (e.g. site information).
	Alarm and Error	There is an error preventing the normal display of data for a single tank or for all tanks.
	Configuration	The DIS-51 is in configuration mode.

Error screens

The error screens are not tank specific and are shown if there is a general problem.

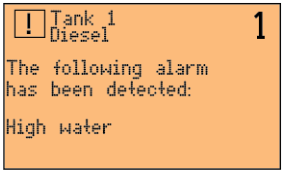
No communication with the console:

No tanks configured (not a tank at all):

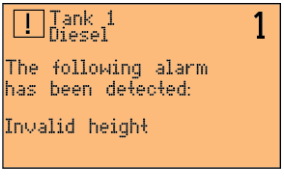
Alarm screens

The alarm screens are tank specific and are shown alternating with the tank data of the selected tank.

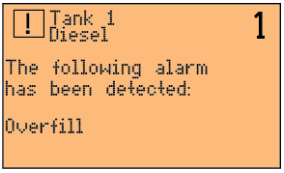
Water high alarm (code 03):



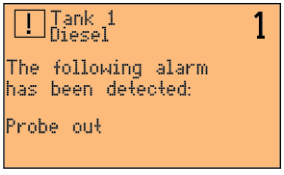
Invalid height alarm (code 08):



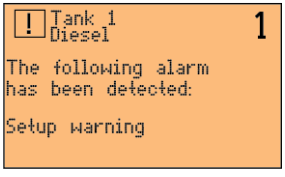
Overfill alarm (code 04), or maximum product alarm (code 12):



Probe out alarm (code 09):



Setup warning (code 01):



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