

# TLS-HLD

## Setup Manual

# Notice

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## Introduction

System Description.....	1
Serial Interface option.....	1
Related Manuals .....	1
Contractor Certification Requirements .....	1
Restricting System Programming Access .....	2
System Security.....	2
Serial Security .....	2
Front Panel Controls .....	3
Displayed Messages .....	4
Displayed Tank Parameters .....	4
Displayed Alarms.....	4

## Setup

Initial Startup .....	5
Changing a Setup Parameter .....	5
Setup Menus .....	5
Calculating Tank Tilt .....	7

## Printing Out Reports

Setup Requirements .....	9
Tank Status/Inventory Reports .....	9
System Setup Report .....	10
Communication Setup Report .....	10
Tank Setup Report .....	10

## Serial Commands

Serial Security Code .....	11
Serial Command Format .....	11
Function Code 201 .....	12
Function Code 205 .....	13
Function Code 504 .....	14

## Tables

Table 1.	Alarm Index, Cause, and Corrective Action .....	4
Table 2.	Setup Menu .....	5
Table 3.	System Setup Menu .....	6
Table 4.	Tank Setup Menu .....	6
Table 5.	Tank Tilt Calculation Worksheet .....	7
Table 6.	Communications Setup Menu .....	8



# Introduction

This manual contains setup and operation instructions for the Veeder-Root TLS-HLD Console. The Authorized Service Contractor should verify that the console and probes are installed and wired correctly following the procedures outlined in the TLS-HLD Site Prep manual (V-R No. 577013-784), before beginning the setup procedures described herein.

## SYSTEM DESCRIPTION

The TLS-HLD monitors up to six in-tank probes for a wide variety of fluids. The in-tank probes measure product height and temperature, and water height. System status is available to the operator through a front panel display and remotely, via an RS-232 serial interface port

## SERIAL INTERFACE OPTION

The serial interface port provides three user-selectable types of communication:

- **Printer**

If this comm type is selected, the operator can print the Tank Status report, Inventory report, Setup report and Diagnostic report (if enabled). Note, the Diagnostic report is only for system troubleshooting and is not discussed in this manual. See the TLS-HLD Site Prep manual for a description of this report.

- **Modem**

If this comm type is selected, an auto-answer command will be transmitted to the modem during the initialization sequence.

- **Modem or Serial**

If either of these comm types are selected, the user may use a serial language different from the local language (the serial language selections will be languages that map to the standard ASCII character set).

## Related Manuals

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577013-784      TLS-HLD Site Prep manual

## Contractor Certification Requirements

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This manual was written for **Level 3 or Level 4 certified** technicians who have completed system troubleshooting and service training.

In addition, Veeder-Root requires the following minimum training certifications for contractors who install and setup the equipment discussed in this manual:

**Level 1**              Contractors holding valid Level 1 Certification are approved to perform wiring and conduit routing, equipment mounting, probe and sensor installation, tank and line preparation, and line leak detector installation.

**Level 2/3**            Contractors holding valid Level 2/3 Certifications are approved to perform installation checkout, startup, programming and operations training, troubleshooting and servicing for all Veeder-Root Tank Monitoring Systems, including Line Leak Detection and associated accessories.

**Warranty Registrations** may only be submitted by selected Distributors.

## **Restricting System Programming Access**

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To protect against unauthorized access to system operation, two security features can be enabled.

### **SYSTEM SECURITY**

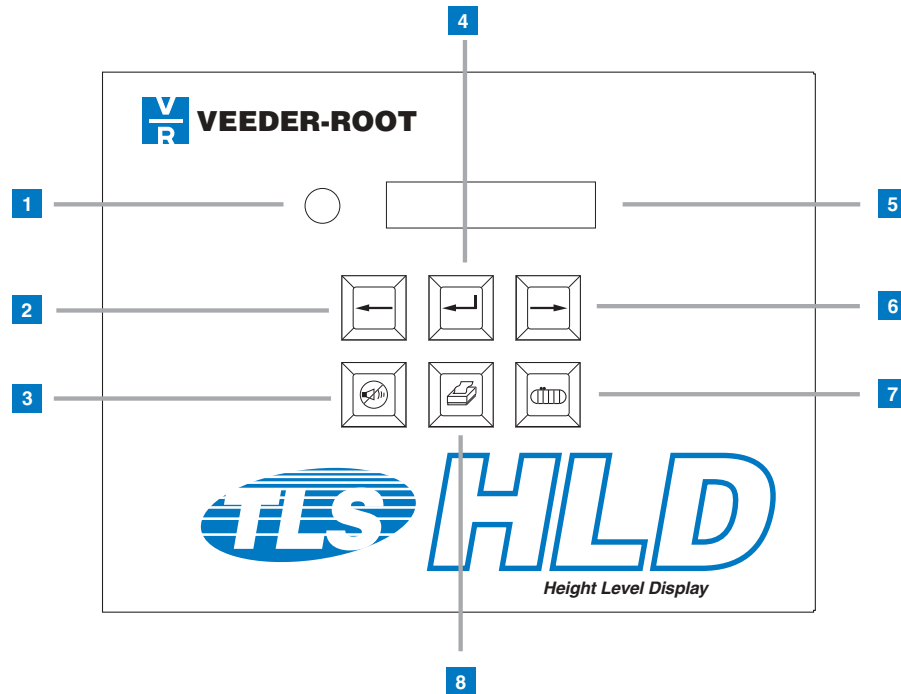
A switch in the console can be set to prevent access to the setup and diagnostic menus after initial programming.

### **SERIAL SECURITY**

A switch in the console can be set that requires the operator to enter a 6-digit security code before the system will respond to a serial command. The default serial security code is 000000. The security code itself can be changed with a serial command. However, the serial security code switch must be reset to the Open position to inhibit the security code requirement.

## Front Panel Controls

The components on the front panel are shown below. In addition to the front panel red LED flashing when an alarm is activated, an audible beeper inside the console is also switched On.



### Legend for numbered boxes

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1 Bi-color LED - Green (Continuously On) = Normal; Red (Flashing) = Alarm.</li> <li>2 Back key - press to scroll back to the previous display in the current menu. If the display is the first in a submenu, you scroll to the display that was used to enter the submenu.</li> <li>3 Silent key - press to deactivate the audible alarm annunciator (internal beeper), if enabled, and acknowledge alarm. If another alarm occurs after the beeper is silenced, the beeper will restart. The beeper can be tested by an extended press of this key.</li> <li>4 Enter key - press to scroll to the first display in the submenu of the current item. If the current item does not have a submenu there is no response.</li> <li>5 LCD Display - This Liquid Crystal Display contains 2 lines. When the system is in the top level menu, the top line of the display contains system status and/or</li> </ol> | <p>alarm information and the bottom line contains tank inventory information. When the system is in one of the three setup submenus, the top line displays the name of the setup menu and the bottom line displays the current setup parameter.</p> <ol style="list-style-type: none"> <li>6 Select key - press to scroll from one display to the next in the current menu. If the display shown is the last in a submenu, the Select key scrolls the display up to the display at the top of the submenu.</li> <li>7 Tank key - press to scroll to the next tank number.</li> <li>8 Print key - press to print the report associated with the displayed menu item. If the report includes tank information, the report will contain data for all configured tanks.</li> </ol> |
|---|--|

## Displayed Messages

### DISPLAYED TANK PARAMETERS

The following parameters for a tank can be viewed by pressing the Select key.

- Product Height,
- Product Temperature (requires probes that have temperature measurement capability),
- Water Height (requires probes that have water floats).

The operator presses the Tank key to move from one tank to another.

If a parameter is not available for any tank in the system, that display will not appear. When viewing a display that is available in one of the tanks, but is not available for the current tank, a “NO DATA” message will be displayed for that parameter.

### DISPLAYED ALARMS

When an alarm occurs, the console’s internal beeper will activate (if enabled), the front panel LED will flash red, and the top line of the display will change from ALL FUNCTIONS NORMAL to show the alarm message. In the case of multiple alarms, the main display screen will automatically scroll through the active alarms. You can press the Silent key to switch off the internal beeper (if enabled) and acknowledge the alarm, but the front panel red LED will continue to flash until the condition that caused the alarm is corrected.

When an alarm condition returns to the normal state, the alarm will be removed from the list of alarms. If no alarms are active, the red LED will return to the Normal state (continuous green), the beeper (if enabled) will be switched off, and the top line of the display status line will again read ALL FUNCTIONS NORMAL.

Table 1 lists each of the displayed alarms, a possible cause, and a suggested corrective action.

**Table 1.- Alarm Index, Cause, and Corrective Action**

Alarm	Cause	Action
PROBE OUT	If the console is not reliably communicating with the probe, the Probe Out alarm will activate.	Call for service following the procedures established for your site.
INVALID HEIGHT	(Only probes that use two floats) - If the water float and the product float are too close together to provide reliable height data, the Invalid Height alarm will activate	Call for delivery.
LOW TEMPERATURE	(Only probes with temperature option) - If the Probe is reporting a temperature lower than -4° F (-19.8° C), the Low Temperature alarm will activate.	Probe returns to normal operation after probe temperature rises above -4°F (-19.8°C).
NO TANKS CONFIGURED	This message displays in the top line of the display until at least one tank has been auto-configured or configured in the Tank Setup menu. The front panel red LED will be flashing, but the console’s internal beeper will not be switched on.	Configure at least one tank in Tank Setup.



# Setup

## Initial Startup

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To access the Setup Mode functions, the security switch must be enabled (if you can not access the setup menus, you must reset the security switch - see TLS-HLD Site Prep manual). With the security switch enabled, all probes connected, and power turned On to the console, the display will read “All Functions Normal”.

## Changing a Setup Parameter

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If the menu is on a Setup display that can be changed, pressing the Enter key will start a cursor blinking under the first letter or number of the selection. Subsequent presses of the Select key will scroll through the available choices. When the desired choice is displayed, press the Enter key to accept the choice and the cursor will stop blinking. If at any time during the choice selection the Back key is pressed, the changes will be discarded, the original choice will be displayed and the cursor will stop blinking. Press the Select key to move down the setup menu.

In the case of numeric entries each power of 10 will be selectable. The first press of the Enter key will place the cursor on the highest power of 10. Press the Select key to scroll through the numbers 0 through 9. When the desired number is visible, press the Enter key to place the cursor on the next highest power of 10. When the Enter key is pressed for the entry's lowest power of 10, the value is accepted and the cursor will be removed.

## Setup Menus

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Perform the setup procedure listed in the steps in the Table 2 - Table 6 below.

**Table 2.- Setup Menu**

Menu	Display Sequence	Notes and/or Instructions
Setup Press → key until display at right appears	Setup Press ↵	Setup Menu. There are three setup submenus in Setup: System, Tank, and Communication. Press ↵ key to enter Setup menu.
	System Setup Press ↵	Press ↵ key to enter System Setup (see Table 3). Press → key to move to Tank Setup function.
	Tank Setup Press ↵	Press ↵ key to enter Tank Setup (see Table 4). Press → key to move to Communications Setup function.
	Communications Setup Press ↵	Press ↵ key to enter Communications Setup (see Table 6). Press → key to return to System Setup Menu. Press ← key to return to Setup Menu.

**Table 3.- System Setup Menu**

Menu	Display Sequence	Display Notes and/or Instructions
System Setup	System Setup Press ↵	Press ↵ key to enter System Setup.
	System Setup Lang: Chinese	To accept Chinese, press → key. To change language press ↵ key, then press → key until desired language displays. Choices are English, French, Spanish, Portuguese, or Chinese. Press ↵ key to accept choice.
	System Setup Units: Metric	To accept Metric units, press → key. To change units press ↵ key, then press → key until desired units display. Choices are Metric or U.S..
	System Setup Audible Alarm: Disabled	To accept Disabled, press → key. To change audible annunciator press ↵ key, then press → key until desired option displays. Choices are Disabled or Enabled. Press ↵ key to accept change. System Setup is complete.
	System Setup Press ↵	Press → key to move to Tank Setup, or press ← key to return to Setup menu. Pressing the Print key prints out a copy of the System Setup report if a printer is setup and connected.

**Table 4.- Tank Setup Menu**

Menu	Display Sequence	Display Notes and/or Instructions
Tank Setup	Tank Setup Press ↵	Press ↵ key to enter Tank Setup.
	T1: Configured Yes	Set this entry to Yes for each tank that has a probe installed. Choices are Yes or No.
	T1: Tilt +0000.0 mm	Tank Tilt allows you to adjust for a difference between fuel height at the probe location and fuel height at the center of the tank caused by a tilt in the tank. You must enter a minus (-) if the Tank Tilt is a negative value. A Tank Tilt value is not required if the probe is located in the center of the tank. If the probe is installed in the center of the tank, the value is 000.00 U.S.; 0000.0 Metric. Enter the calculated tank tilt for the selected tank from column G of the worksheet in Table 5 below. Range: -3657 to +3657 mm (-144.0 to +144.0). Tank setup is complete.

## Calculating Tank Tilt

Use the worksheet in Table 5 to record measurements and perform Tank Tilt calculations for up to six tanks.

1. Stick the tank at the fill riser opening at least three times. Enter the average reading in column A of the worksheet.
2. Stick the tank at the probe riser at least three times. Enter the average reading in column B of the worksheet.
3. Subtract the fuel height at the probe riser from the height at the fill riser ( $A - B = C$ ). Enter the result in column C of the worksheet.
4. Measure the distance between the probe and fill risers. Enter the measurement in column D of the worksheet.
5. Divide the value in column C by that in column D to determine the pitch. Enter the quotient in column E of the worksheet.
6. Measure the distance from the probe riser to the center of the tank. Enter the distance in column F of the worksheet.
7. Multiply column E by column F to determine Tank Tilt. Enter the product in column G of the worksheet.
8. Enter the tank tilt (column G) from the worksheet for the selected tank.

**Table 5.- Tank Tilt Calculation Worksheet**

Tank	A Fuel Height @ Fill Riser	B Fuel Height @ Probe Riser	C (A-B=C)	D Distance Fill to Probe Risers	E Pitch (C+D = E)	F Distance Probe Riser to Center of Tank	G Tank Tilt (E x F)
1							
2							
3							
4							
5							
6							

**Table 6.- Communications Setup Menu**

Menu	Display Sequence	Display Notes and/or Instructions
Communication Setup	Communications Setup Press ↵	The Communication Setup procedure allows you to select whether system status and tank reports are sent to a remote printer or transmitted via modem or direct connection to a computer. Press ↵ key to enter Communications Setup.
	Communications Setup Type: Serial	Use this display to select communication options of Printer, Modem, or Serial. Note: if you select modem, an auto-answer command will be sent to the modem when the setup menu is exited.
	Communications Setup Baud Rate: 9600	Choose the baud rate that matches the external device connected to the console. Choices are 300, 600, 1200, 2400, 4800, or 9600.
	Communications Setup Parity: None	Choose the parity that matches the external device connected to the console. Choices are None, Odd, or Even.
	Communications Setup Data Length: 8	Choose the data length that matches the external device connected to the console. Choices are 8 or 7 (must be set to 8 if Comm Type is set to Printing).
	Communications Setup Stop Bit: 1	Choose the number of stop bits that matches the external device connected to the console. Choices are 1 or 2.
	Communications Setup Handshake: XOn/XOff	Choose the way in which data flows across the interface. Choices are None or XOn/XOff (software controls the handshake).
	Communications Setup Page Eject: No	This entry applies only when Comm Type is set to Printer. Page eject sends a page feed command at the conclusion of the report or when a report exceeds the length of the current page (a page length is 25 lines in Chinese and 50 lines in other languages). Choices are Yes or No.
	Communications Setup Answer On: 1	Select the number of rings to occur before the console will answer an incoming communication. This entry applies to modems only. Options are 0 to 9.
	Communications Setup Lang: English	Select the language for modem or serial communications only. Options are English, French, Spanish, and Portuguese. Communication setup is complete.

## Printing Out Reports

You can print the reports described in this section on any printer that has a 9-pin dot matrix print head, a serial interface, and is capable of emulating Epson print commands. The report formats will fit on either letter size or A4 size paper.

Press the Print key to print a report. However, what report you print depends on what is visible in the LCD display:

### Setup Requirements

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The TLS-HLD Console must have the following Communications Setup selections enabled:

- Baud rate set to 9600 (recommended) - However, if you experience problems printing at 9600 baud, lower the baud rate to 2400,
- Parity set to None (recommended),
- Data length set to 8 (required),
- Stop bit set to 1 (recommended), and
- Handshake set to XON/XOFF (may be required at the higher baud rates).

Note: for printing to occur, the console and printer communication settings must match.

### Tank Status/Inventory Reports

---

Pressing Print key when TX: HEIGHT, TX: TEMP, or TX: WATER messages are displaying will print out the following reports:

#### Inventory Report

TANK	HEIGHT	WATER	TEMP
1	48.9	0.0	37.3
2	58.9	0.0	38.0

Notes:

1. If none of the connected probes have temperature measurement capability, the TEMP columns will not print. However, if any probes in the system have temperature measurement capability, the TEMP columns will print for those probes, but not for the others.
2. If none of the connected probes have water measurement capability, the WATER column will not print. However, if any probes in the system have water measurement capability, the WATER column will print for those probes, but not for the others.

#### Tank Status Report

No active alarm status printout:

ALL FUNCTIONS NORMAL

Active alarm status printout (any active alarms from the list below will print out preceded by the tank number, e.g., T1: Probe Out):

Tx: PROBE OUT  
 Tx: INVALID HEIGHT  
 Tx: LOW TEMPERATURE

## System Setup Report

---

Pressing Print key when SYSTEM SETUP or COMMUNICATION SETUP message is displaying will print out the following report:

```

SYSTEM SETUP

LANG           : CHINESE
UNITS          : METRIC
    
```

## Communication Setup Report

---

Pressing Print key when COMMUNICATION SETUP message is displaying will print out the following report:

```

SERIAL SETUP

TYPE           : SERIAL
BAUD RATE      : 9600
PARITY         : NONE
DATA LENGTH    : 8
STOP BIT       : 1
HANDSHAKE      : XON/XOFF
PAGE EJECT     : NO
ANSWER ON      : 1
LANG           : ENGLISH
    
```

## Tank Setup Report

---

Pressing Print key when TANK SETUP message is displaying will print out the following report:

```

TANK SETUP

TANK           : 1           2           3
CONFIGURED     : YES        NO        YES
TILT           : +hhh.h    +hhh.h    +hhh.h
    
```

## Serial Commands

You can send commands from a controlling computer, a display terminal (CRT), or a printing terminal to the TLS-HLD Console to download reports and perform other tasks.

This section assumes that the necessary equipment and connections are in place to enter serial commands.

The TLS-HLD Site Prep manual covers the connection of the console to a remote serial device and as well as a complete description of the console's serial commands.

Three of the available serial commands are discussed in this manual:

- Function Code 201 - In-Tank Inventory Report
- Function Code 205 - In-Tank Status Report, and
- Function Code 504 - Set System Security Code.

### Serial Security Code

---

If the Serial Security code switch is enabled every serial command must include a 6-digit security code before the TLS-HLD Console will respond to the command.

The default Serial Security code is 000000. It can be changed with Function Code 504.

### Serial Command Format

---

The TLS-HLD Console responds to a serial command message string with the following configuration:

SOH	Security Code	Command Type	Function Code	ID
-----	---------------	--------------	---------------	----

where: SOH = Control-A character (ASCII 01),

Security code (required if Serial Security switch is enabled) = 000000 (default) or XXXXXX (user selectable from ASCII characters 20 Hex to 7E Hex)

Command type = I for Inquire or S for Set

Function code = 201, 205, or 504

ID = Identifier of device for which you are requesting data, e.g., 04 = Tank 4

If the system receives a command message string containing a Function Code that it does not recognize, it will respond with <SOH>9999<ETX>.

where: 9999 = Indicates that the system doesn't understand the command,

ETX = Control-C character (ASCII 03).

## Function Code 201

This serial command instructs the TLS-HLD Console to send an In-Tank Inventory Report for any tank or all tanks:

<SOH>sssssI201TT (if Security Switch Enabled), or

<SOH>I201TT (if Security Switch Disabled)

Where: <SOH>= Control-A character (ASCII 01)

sssss= 6-digit serial security code

I= Inquire command

201= Function Code 201

TT= Tank identifier (00 for all tanks or 01 - 06 for single tank)

**Example serial command (send Tank 1 inventory, Security Switch disabled):**

<SOH>I20101

**TLS-HLD response:**

<SOH>

I201TT

TANK	HEIGHT	WATER	TEMP
------	--------	-------	------

1	48.9	0.0	18.39
---	------	-----	-------

<ETX>



## Function Code 205

This serial command instructs the TLS-HLD Console to send an In-Tank Status Report for any tank or all tanks:

<SOH>**ssssssI205TT** (if Security Switch Enabled), or

<SOH>**I205TT** (if Security Switch Disabled)

Where: <SOH> = Control-A character (ASCII 01)

ssssss = 6-digit serial security code

I = Inquire command

205 = Function Code 205

TT = Tank identifier (00 for all tanks or 01 - 06 for single tank)

**Example serial command (send In-Tank Status report for all tanks, Security Switch enabled, Security code 134428):**

<SOH>134428I20500

**TLS-HLD response:**

<SOH>

I205TT

TANK	STATUS
1	ALL FUNCTIONS NORMAL
2	ALL FUNCTIONS NORMAL
3	ALL FUNCTIONS NORMAL

<ETX>

**Additional STATUS Messages are:**

INVALID HEIGHT

PROBE OUT

LOW TEMPERATURE

NO TANKS CONFIGURED

## Function Code 504

---

This serial command enters a new TLS-HLD Console Serial Security code:

**<SOH>S50400ssssssaaaaaa** (if Security Switch Enabled), or

**<SOH>S50400aaaaaa** (if Security Switch Disabled)

Where:        <SOH> = Control-A character (ASCII 01),  
              S = Set command,  
              504 = Function Code 504,  
              00 = System Identifier,  
              ssssss = old 6-digit numeric security code (default or user-selected),  
              aaaaaa = new 6-digit numeric security code.

**Example serial command - replace the existing serial security code 134428 with new code of 168828, Serial Security switch enabled:**

**<SOH>S50400134428168828**

**TLS-HLD response:**

**<SOH>**

**I50400**

**168828**

**<ETX>**



# 目录

<b>引言</b> .....	<b>3</b>
系统说明.....	3
串行接口选项.....	3
相关手册.....	3
承包商认证要求.....	4
限制系统编程访问.....	4
系统安全措施.....	4
串行安全措施.....	4
前面板控制.....	5
显示的信息.....	6
显示的油罐参数.....	6
显示的警报.....	6
<b>设置</b> .....	<b>8</b>
初始启动.....	8
改变设置参数.....	8
设置菜单.....	8
计算油罐倾斜度.....	10
<b>打印出报告</b> .....	<b>12</b>
设置要求.....	12
油罐状态/库存报告.....	12
系统设置报告.....	13
通讯设置报告.....	13
油罐设置报告.....	13
<b>串行命令</b> .....	<b>14</b>
串行安全代码.....	14
功能代码 201.....	15
功能代码 205.....	16
功能代码 504.....	17

## 表格

表 1. 警报索引、原因和校正措施.....	7
表 2. 设置菜单.....	8
表 3. 系统设置菜单.....	9
表 4. 油罐设置菜单.....	9
表 5. 油罐倾斜度计算工作表.....	10
表 6. 通讯设置菜单.....	11

## 引言

本手册包括维德路特 TLS-HLD 控制台的设置与操作说明。在进行本手册所介绍的设置程序前，授权的维修服务承包商应当确认控制台和探棒已经按照 TLS-HLD 现场准备手册（V-R No.577013-784）中概述的程序正确地安装和布线。

## 系统说明

TLS-HLD 可以监视多达 6 个用于探测各种液体的罐内探棒。罐内探棒可以测量油品高度和温度以及水位高度。操作人员可以通过前面板显示器以及 RS-232 串行接口端口远程访问系统状态。

## 串行接口选项

串行接口端口提供 3 种用户可选的通讯方式：

- 打印机

如果选择了这种通讯类型，操作人员可以打印油罐状态报告、库存报告、设置报告和诊断报告（如果启用的话）。注意，诊断报告只用于查找系统的故障，本手册不予讨论。有关这个报告的说明，请参见 TLS-HLD 现场准备手册。

- 调制解调器

如果选择了这种通讯类型，在初始化序列过程中，一个自动应答命令将传递到调制解调器上。

- 调制解调器或串行接口

如果选择了这 2 种通讯类型中的一种，用户可使用不同于本地语言的串行语言（串行语言的选择应是能变换至标准 ASCII 字符集的语言）。

## 相关手册

577013-784 TLS-HLD 现场准备手册

## 承包商认证要求

本手册专为已经完成系统故障查找和维修培训的 3 级或 4 级技术人员编写。

另外，对安装和设置本手册所讨论设备的承包商，维德路特公司要求达到以下的最低培训认证要求。

1 级 允许持有有效认证 1 级的承包商进行布线和管线道的路径选择，设备安装，探棒和传感器安装，油罐和管线准备以及管线测漏器的安装。

2/3 级 允许持有有效认证 2 级或 3 级的承包商进行安装检验，启动，编程和操作培训，对所有的维德路特油罐监测系统进行故障查找和维修，包括管线测漏装置和相关的附件。

可能只需要一些选定的经销商提交保修登记。

## 限制系统编程访问

要在系统操作中防止未经授权的访问，可使用 2 种安全措施。

## 系统安全措施

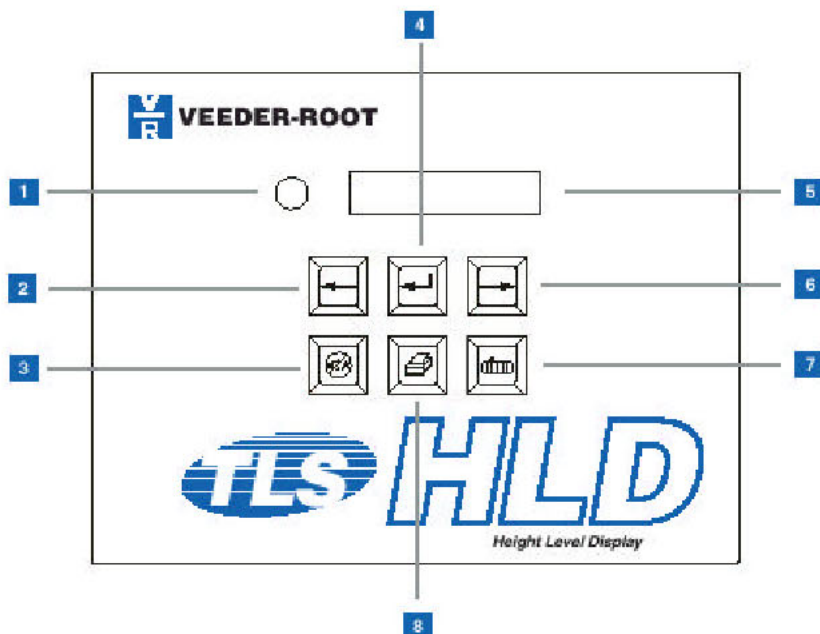
在初始编程后 在控制台中可设置一个开关来防止对设置和诊断菜单进行访问

## 串行安全措施

在系统对一个串行命令进行应答前，在控制台中可设置一个开关，要求操作人员输入一个 6 位数字的安全代码。默认串行安全代码是 000000。安全代码本身可用一个串行命令更改。但要停止要求输入安全代码，串行安全代码开关必须重新设定至断开的位置。

## 前面板控制

前面板上的部件显示如下。当一个警报被激活时，除了前面板上红色发光二极管闪光外，也接通了控制台内的一个声音呼叫器。



### 编号框图例

1. 双色发光二极管 – 绿色(持续发亮)=正常；红色(闪光)=警报。
2. 倒行键 – 按此键可以滚动回到当前菜单前面的显示。如果这一显示是子菜单中的第一个显示，则会滚动到用来进入子菜单的显示。
3. 无声键 – 按此键关闭声音警报信号器（内部声音呼叫器，如果已启用的话）以及确认警报器。在信号器关闭后，如果发生另一警报，则信号器重新激活。可以通过延长按此键测试信号器。
4. 输入键 – 按此键在当前项目的子菜单中滚动到第一个显示。如果当前的项目没有子菜单，则没有反应。
5. LCD 显示器 – 这个液晶显示器包括 2 行。当系统处于顶层菜单中时，显示器的顶行显示系统状态和/或警报信息，底行显示油罐库存信息。当系统处于 3 个设置子菜单中的其中之一时，顶行显示设置菜单的名称，而底行显示当前的设置参数。
6. 选择键 – 按此键将会在当前的菜单中从一个显示内容滚动到下一个显示内容。如果显示的内容是子菜单中的最后一个，则选择键将滚动到子菜单的最上端显示。
7. 油罐键 – 按此键滚动到下一个油罐编号。
8. 打印键 – 按此键打印与当前显示的菜单项目有关的报告。如果报告包括油罐信息，则该报告将包括所有已配置油罐的数据。



## 显示的信息

### 显示的油罐参数

可以通过按选择键浏览下列油罐参数：

- 油品高度
- 油品温度（要求具有温度测量能力的探棒）
- 水位高度（要求具有水浮子的探棒）

按下油罐键，操作人员可以从一个油罐转移到另一个油罐。

如果系统中的任何一个油罐都没有某一个参数，则不会出现该参数。如果正在浏览其中某一个油罐具有的、而当前油罐没有的某项显示时，对于该项参数会显示一个“无数据”的信息。

### 显示的警报

当警报发生时，控制台内部声音呼叫器将激活（如果启用的话），前面板发光二极管将闪红光。显示器的顶行将从显示所有功能正常转变为显示警报信息。当有多个警报时，主显示屏幕将自动地滚动显示激活的警报。您可以按无声键关闭内部声音呼叫器（如果启用的话），以确认警报。但是前面板上的红色发光二极管将继续闪光，直到警报条件得以解除。

当一种警报条件恢复正常状态时，这一警报将从警报清单中去除。如果没有激活的警报，红色的发光二极管将返回到正常状态（绿灯持续亮）声音呼叫器（如果启用的话）将关闭而且显示器状态行的顶行将显示一切功能正常

表 1 列示了每种显示警报、可能的原因和建议采取的校正措施。

表 1. 警报索引、原因和校正措施

警报	原因	校正措施
探棒失效	如果控制台不能和探棒进行可靠的通讯，将激活探棒失效警报。	按照您的加油站建立的程序请求维修服务。
无效高度	(只适用于使用 2 个浮子的探棒) - 如果水浮子和油浮子靠得太近而不能提供可靠的高度数据，将激活无效高度警报。	要求进油。
低温	(只适用于有温度可选功能的探棒) - 如果探棒报告的温度低于 4 F (-19.8°C)，将激活低温警报。	当探棒温度上升到 4 F (-19.8°C) 后，探棒恢复正常操作。
未配置油罐	在至少有一个油罐已经自动配置或在油罐设置菜单中进行了配置之前，这条信息将一直显示在显示器的顶行。前面板红色的发光二极管将闪光，但是控制台的内部声音呼叫器不会打开。	在油罐设置中至少配置一个油罐。

# 设置

## 初始启动

如果要访问设置模式功能，必须打开安全开关（如果您不能访问设置菜单，您必须重新设置安全开关 – 见 TLS-HLD 现场准备手册）。在开启安全开关、连接所有的探棒、接通控制台的电源后，显示器将显示“所有功能正常”。

## 改变设置参数

如果菜单处于一个可以改变的设置显示中，按输入键，则会在选择的第一个字母或编号下开始有光标闪烁。继续按选择键，将翻阅可用的选择。当显示想要的选择时，按输入键选择该项目，则光标将停止闪烁。如果在选择过程中的任何时候按倒行键，则将放弃更改，并显示原来的选择，而且光标将停止闪烁。按选择键可以在设置菜单中下移。

在输入数字时，10 的每次方都是可选择的。第一次按输入键，光标将置于 10 的最高次方上。按选择键翻阅 0 至 9 的数字。当看到所要的数字时，按输入键，然后光标将置于 10 的下一个最高次方上。当按输入键输入 10 的最低次方后，数值被接受，而且光标将消失。

## 设置菜单

按照下面表 2 到表 6 所列示的步骤，执行设置程序。

表 2. 设置菜单

菜单	显示次序	注释和/或用法说明
设置 按→键直到右边的显示出现	设置	设置菜单。在设置菜单中有 3 个设置子菜单：系统子菜单，油罐子菜单和通讯子菜单。按←键进入设置菜单。
	系统设置	按←键进入系统设置（见表 3）。
	按←键	按→键移到油罐设置功能。
	油罐设置	按←键进入油罐设置（见表 4）。
	按←键	按→键移到通讯设置功能。
	通讯设置	按←键进入通讯设置（见表 6）。
按←键	按→键返回到系统设置菜单。按←键返回到设置菜单。	

表 3. 系统设置菜单

菜单	显示次序	显示注释和/或用法说明
系统设置	系统设置 按←键	按←键进入系统设置
	系统设置 语言: 汉语	如果接受汉语, 按→键。要改变语言种类, 按←键, 然后按→键直到想要的语言显示出来。选项是英语、法语、西班牙语、葡萄牙语或汉语。按←键接受选择。
	系统设置 单位: 公制	如果接受公制单位, 按→键。要改变单位, 按←键, 然后按→键直到想要的单位显示出来。选项是公制或美制。
	系统设置 声音警报: 禁用	如果接受禁用选择, 按→键。要改变声音信号器, 按←键, 然后按→键直到想要的选项显示出来。选项是禁用或启用。按←键接受选择 系统设置结束
	系统设置 按←键	按 键转移到油罐设置 或按 键返回到设置菜单 如果打印机已经设置并连接 则可以按打印键打印输出系统设置报告的拷贝

表 4. 油罐设置菜单

菜单	显示次序	显示注释和/或用法说明
油罐设置	油罐设置 按←键	按←键进入油罐设置。
	T1: 已配置 是	对每个安装了探棒的油罐, 将这个输入设置为是。选项为是或否。
	T1: 倾斜度 +0000.0mm	油罐倾斜度允许您为因油罐倾斜度而引起的探棒位置的油品高度和油罐中心处的油品高度之间的差别进行调整。如果油罐倾斜度为负值, 您必须输入一个负号; 如果探棒位于油罐的中心处, 则不需要油罐倾斜度值。如果探棒装在油罐中心, 数值为 000.00 (美制), 0000.0 (公制)。为每个选定的油罐输入由下面表 5 中的工作表 G 列计算确定的油罐倾斜度。范围: -3657 到+3657mm(-144.0 到+144.0)。 油罐设置结束。

## 计算油罐倾斜度

使用表 5 中的工作表可以为多达 6 个油罐记录测量结果并执行油罐倾斜度计算

1. 用量油杆测量在填充立管开口处的油罐油品高度至少 3 次。在工作表的 A 列中记录平均读数。
2. 用量油杆测量在探棒立管处的油罐油品高度至少 3 次。在工作表的 B 列中记录平均读数。
3. 用探棒立管处的油品高度减去填充立管处的油品高度 ( $A-B=C$ )，将结果记录到工作表的 C 列中。
4. 测量探棒和填充立管间的距离，将结果记录在工作表的 D 列中。
5. 用 C 列的值除以 D 列的值以确定倾角，将系数记录在工作表的 E 列中。
6. 测量从探棒立管到油罐中心的距离，将距离记录在工作表的 F 列中。
7. E 列乘以 F 列，计算出油罐倾斜度，将乘积记录在工作表的 G 列中。
8. 输入选定油罐的油罐倾斜度 (工作表的 G 列)。

表 5. 油罐倾斜度计算工作表

油罐	A 油品高度 在填充立 管处	B 油品高度 在探棒立 管处	C <b>(A-B=C)</b>	D 填充立管 到探棒立 管的距离	E 倾角 <b>(C÷D=E)</b>	F 从探棒立管 到油罐中心 的距离	G 油罐倾斜 度 <b>(E×F)</b>
1							
2							
3							
4							
5							
6							

表 6. 通讯设置菜单

菜单	显示次序	显示注释和/或用法说明
通讯设置	通讯设置 按←键	通讯设置程序允许您选择将系统状态和油罐报告发送至远程打印机，还是通过调制解调器或直接连接传送到计算机上。 按←键进入系统设置。
	通讯设置 类型：串行	使用这一显示可以选择打印机、调制解调器或串行接口 3 种通讯选项。注意：如果您选择调制解调器后，当退出设置菜单时，将会有有一个自动应答命令送至调制解调器。
	通讯设置 波特率：9600 通讯设置 奇偶校验位：无	选择与连接到控制器的外部设备相匹配的波特率。选项是 300，600，1200，2400，4800 或 9600 选择与连接到控制器的外部设备相匹配的奇偶校验位。选项是无，奇数或偶数。
	通讯设置 数据长度：8	选择与连接到控制器的外部设备相匹配的数据长度。选项是 8 或 7（如果通讯类型设定为打印，则必须设为 8）
	通讯设置 停止位：1	选择与连接到控制器的外部设备相匹配的停止位数，选项是 1 或 2。
	通讯设置 信号交换：XOn/XOff	选择数据流过接口的方式。选项是无或 XOn/XOff（由软件控制信号交换）
	通讯设置 换页：否	只有当通讯类型设定为打印机时，这一项才适用。在报告结束时或报告超过当前页的长度（中文纸长是 25 行，其他语言纸长是 50 行）时，换页程序发出进纸命令。选项为是或否。
	通讯设置 应答：1	选择控制台在应答输入通讯前发生的响铃次数。这一项只适用于调制解调器。选项是 0 到 9。
	通讯设置 语言：英语	只选择用于调制解调器或串行通讯的语言。选项是英语、法语、西班牙语或葡萄牙语。 通讯设置结束。

## 打印出报告

您可以在任何一台具有 9 针点阵打印头、串行接口并能模仿 EPSON 打印命令的打印机上打印本节说明的报告。报告的格式符合信纸或 A4 纸的尺寸。

按打印键打印一份报告。但是，您可以打印的报告类型取决于液晶显示器上可见的选择。

## 设置要求

TLS-HLD 控制台必须已经具有下列生效的通讯设置选择：

- 波特率设定为 9600（推荐） - 可是，如果设定在 9600 波特打印有问题，降低波特率至 2400，
- 奇偶校验位设定为无（推荐），
- 数据长度设定为 8（要求），
- 停止位设定为 1，及
- 信号交换设定为 XON/XOFF（在更高的波特率时可能要求此设定值）。

注意：若要打印，控制台和打印机通讯设置必须匹配。

## 油罐状态/库存报告

当显示 TX:HEIGHT, TX:TEMP 或 TX:WATER 信息时，按打印键将打印出下面的报告：

### 库存报告

油罐	高度	水位	温度
1	48.9	0.0	37.3
2	58.9	0.0	38

### 注意：

如果连接的探棒都不具有温度测量能力，将不会打印温度这一列。但是，如果系统中任一探棒具有温度测量能力，则会打印该探棒的温度列，但不会打印其他探棒的温度列。

如果连接的探棒都不具有水位测量能力，将不会打印水位这一列。但是，如果系统中任一探棒具有水位测量能力，则会打印该探棒的水位列，但不会打印其他探棒的水位列。

### 油罐状态报告

不存在激活的警报状态时打印：

所有功能正常

存在激活的警报状态时打印（下面列出的任何激活警报，在打印时前面都会打印油罐编号，

例如, T1: 探棒失效):

Tx: 探棒失效

Tx: 无效高度

Tx: 低温

## 系统设置报告

当显示系统设置或通讯设置信息时, 按打印键将打印出下面的报告:

系统设置

语言: 汉语

单位: 公制

## 通讯设置报告

当显示通讯设置信息时, 按打印键将打印出下面的报告:

串行设置

类型 : 串行

波特率 : 9600

奇偶校验位: 无

数据长度 : 8

停止位 : 1

信息交换 : XON/XOFF

换页: : 否

应答 : 1

语言 : 英语

## 油罐设置报告

当显示油罐设置信息时, 按打印键将打印出下面的报告:

油罐设置

油罐 : 1 2 3

已配置 : 是 否 是

倾斜度 : +hhh.h +hhh.h +hhh.h



## 串行命令

您可以从控制终端、显示终端（CRT）或打印终端向 TLS-HLD 发送命令，以下载报告及执行其他任务。

本节假定必要的设备和连接已经各就各位，可以输入串行命令。

TLS-HLD 现场准备手册涵盖了控制台到远程串行设备的连接 以及控制台串行命令的完整说明。

本手册讨论了 3 种可用的串行命令：

- 功能代码 201 – 罐内库存报告
- 功能代码 205 – 罐内状态报告，以及
- 功能代码 504 – 设置系统安全代码

## 串行安全代码

如果串行安全代码开关已经开启，则在 TLS-HLD 控制台应答命令前，每个串行代码必须包括一个 6 位数的安全代码。

默认的串行安全代码是 000000。它可由功能代码 504 改变。

串行命令格式

TLS-HLD 控制台用下列配置对串行命令消息字符串做出应答：

**SOH** **安全代码** **命令类型** **功能代码** **ID**

其中：SOH = 控制-A 字符（ASCII 码 01）

安全代码（如果串行开关开启，要求此代码）= 000000（默认）或 XXXXXX（从 ASCII 字符 20Hex 到 7EHex 可供用户选择）

命令类型 = I 用于查询，或 S 用于设定

功能代码 = 201，205 或 504

ID = 您查询的数据所在设备的标识符，例如，04 = 油罐 4

如果系统接收到的命令信息字符串包括它不能识别的功能代码，系统会以 <SOH>9999<ETX>应答。

其中：9999 = 说明系统不能理解命令

ETX = 控制-C 字符（ASCII 码 03）

## 功能代码 201

这个串行命令指示 TLS-HLD 控制台发送任一油罐或所有油罐的罐内库存报告

<SOH>sssssI201TT (如果安全开关开启), 或

<SOH> I201TT (如果安全开关关闭)

其中: <SOH> =控制-A 字符 (ASCII 码 01)

sssss = 6 位数的串行安全代码

I = 查询命令

201 = 功能代码 201

TT = 油罐标识符 (00 代表所有油罐, 01-06 代表单个油罐)

串行命令举例 (发送油罐 1 的库存报告, 安全开关关闭):

<SOH> I20101

TLS-HLD 应答:

<SOH>

I201TT

油罐	高度	水位	温度
1	48.9	0.0	18.39

<ETX>

## 功能代码 205

这个串行命令指示 TLS-HLD 控制台发送任一油罐或所有油罐的罐内状态报告。

<SOH>sssssI205TT (如果安全开关开启), 或

<SOH> I205TT (如果安全开关关闭)

其中: <SOH> =控制-A 字符 (ASCII 代码 01)

sssss = 6 位数的串行安全代码

I = 查询命令

205 = 功能代码 205

TT = 油罐标识符 (00 代表所有油罐, 01-06 代表单个油罐)

串行命令举例 (发送所有的罐内状态报告, 安全开关开启, 安全代码 134428):

<SOH> 134428I20500

TLS-HLD 应答:

<SOH>

I205TT

油罐	状态
1	所有功能正常
2	所有功能正常
3	所有功能正常

<ETX>

其它的状态信息是:

无效高度

探棒失效

低温

无配置的油罐

## 功能代码 504

这个串行命令用于输入新的 TLS-HL 控制台串行安全代码。

<SOH>S50400sssssaaaaaa (如果安全开关开启), 或

<SOH> S50400aaaaaa (如果安全开关关闭)

其中: <SOH> =控制-A 字符 (ASCII 代码 01)

S = 设定命令

504= 功能代码 504

00 = 油罐标识符

sssss = 原来的 6 位数字串行安全代码 (默认的或用户选择的)

aaaaaa = 新的 6 位数字串行安全代码

串行命令举例 – 用新的串行安全代码 168828 代替原有的串行安全代码 134428, 安全开关开启):

<SOH> S50400434428168828

TLS-HLD 应答:

<SOH>

I50400

168828

<ETX>



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