ITEM INFORMATION COVER SHEET

ITEM # | MODEL # | MANUFACTURER | ITEM DESCRIPTION | ELECTRICAL | SUPPLY | MECHANICAL: WASTE
--- | --- | --- | --- | --- | --- | ---
GSMP117 | 350 | Vedeer Root | Fuel tank monitoring system | FSC | VND | EC
 to provide power. CC to provide data.

PARTS LIST:
1. 312020-952
2. 332812-001
3. 332813-001
4. 333545-001
5. 790091-001
6. 790095-001
7. 794380-303
8. 794380-323
9. 846390-110
10. 846391-110
11. 846391-410
12. 846400-011
13. 846400-014
14. 859080-001
15. 860091-301
16. 886100-010

Additional Information:
Installation Instructions
Gilbarco® EMC™ Series

Underground fuel storage systems for environmental management.

web-enabled dispensers | POS systems | retail management solutions | global site service

Marconi Commerce Systems
Why Marconi?

Marconi is one of the world’s largest manufacturers of fueling and site management equipment. Our fuel dispensers, POS devices, and environmental management products are specifically designed to operate together as a “Totally Integrated Site Management System.” By choosing Marconi, you will discover the benefits of a single source supplier for all your equipment, service and support needs.

EMC™ with BIR

Environmental Management Console with Business Inventory Reconciliation has all the features of an EMC and more. It is a modular-designed system for comprehensive monitoring of fuel storage tanks and piping. The system effectively tracks wetstock inventories with customer-specific modules, probes and sensors.

The EMC with BIR utilizes advancements in hardware* and software to support an electronic interface with any of the following Gilbarco devices: G-SITE® POS**, Transac® System 1000™, TCRG®/G2 or Transac 12 Series Pump Controllers.

BIR automatically and continuously accumulates fuel data such as: metered sales, deliveries and tank inventories to produce consistent, accurate and timely wetstock reconciliation reports. The automatic and electronic accumulation of fuel data removes error sources normally associated with manual reconciliation. Reconciliation reports are available at the push of a button. The system retains BIR reconciliation data for a period of 60 days. The EMC with BIR provides the following wetstock management features:

• Automatic tank to meter mapping. BIR maps each fuel meter to the specific supply tank.
• Automatic tank calibration. BIR creates an accurate tank calibration chart.
• Adjusted Fuel Delivery Report. BIR provides an adjusted fuel delivery report.
• Automatic collection of wetstock data eliminates errors associated with manual reconciliation.
• Automatic reconciliation reports. BIR provides accurate and timely reconciliation reports.

EMC™ Enhanced

EMC Enhanced (12 tanks maximum) is a modular designed console that meets EPA requirements. These consoles provide environmental monitoring capabilities to satisfy strict compliance regulations for tanks and lines.

Optional hardware and software capabilities for EMC modular units include:

• Fax/Modem
• RS 232
• Input/Output Relays
• Overfill Alarm
• Remote Display (BIR and Enhanced units only)
• Pressurized Line Leak Detection
External Sensor System (ESS) achieves regulatory compliance at minimal cost.

PC-Controlled EMC™ Series

The models described at left are also available in lower cost PC-controlled versions with the same precise monitoring capabilities. The EMC-PC with BIR, EMC-PC Enhanced and EMC Basic-PC utilize your existing on-site computer for system programming and monitoring. Eliminating the printer, keyboard and display from the EMC eliminates cost and duplication of equipment.

External Sensor System

External Sensor System (ESS) achieves regulatory compliance at minimal cost. If you are satisfied with your current inventory measuring and reporting system, the ESS can provide continual monitoring through the use of various sensors. Sensor support features include:

- Dry Interstitial Tank Sensors
- Sump/Pan Sensors
- Groundwater/Vapor Well Sensors
- Supports up to 16 Sensors

Above-Ground Tank System

Above-Ground Tank System (ATS) is specifically designed for above-ground tank applications. The ATS provides inventory management with one or two magnetostrictive probes and leak detection with up to six sensors. Built-in tank charts include most popular sizes from 250 to 30,000 gallons and accommodates custom rectangular and cylindrical above-ground tanks.

EMC™ Basics

EMC Basics are “fixed feature” models that incorporate many fuel monitoring functions for EPA compliance. These lower cost, non-expandable consoles support the following features and equipment, depending upon the model chosen:

- In-Tank Inventory/Leak Detection
- Overfill Alarm
- Built-in RS 232 Interface
- Input/Output Relays
- Interstitial Tank Sensors
- Sump/Pan Sensors
- Available in 4 tank/8 sensor or 8 tank/0 sensor models
- Basic 1, 2, 3 and 4 Tank Systems available with probe(s) and probe install kit(s).
- Continuous Statistical Leak Detection (3 and 4 tank systems only)
- Internal Site/Fax Modem

Above-Ground Tank System

Above-Ground Tank System (ATS) is specifically designed for above-ground tank applications. The ATS provides inventory management with one or two magnetostrictive probes and leak detection with up to six sensors. Built-in tank charts include most popular sizes from 250 to 30,000 gallons and accommodates custom rectangular and cylindrical above-ground tanks.
Benefits

Buy Only What You Need. The modular design of EMC™ with BIR and EMC Enhanced allows the customer to choose features required today with the ability to change or expand in the future.

Be In Touch Without Being There. The optional Fax/Modem module for the EMC with BIR and EMC Enhanced allows up to sixteen customized fuel reports to be faxed to eight different locations. The customer specifies which reports go to any particular location.

Identify Problems Early. Your EMC with BIR or EMC Enhanced can be assembled with modules to activate alarms or lights when a leak or programmable alarm condition occurs. In addition to sensor and probe alarms, other store fixtures such as entrance warnings or air conditioning power failures can be monitored through the EMC for on-site alarms or remote fax notification. Early identification can minimize damage and save money.

Easy To Use. There are no complicated programming sequences with the EMC consoles. Simple prompts in English or a customer-specified language assist the operator. Product names, report headings and alarm condition descriptions with up to 20 characters can be easily programmed. Measurements can be set in U.S., Imperial or Metric units.

Simplify Leak Detection. Sometimes it takes a sophisticated system to make things simple. Your EMC console can be built to receive input from a variety of leak detection devices, so it’s all tied together into one comprehensive system. Depending on the console and modules chosen, your system can monitor a variety of probes, sensors and other peripheral devices.

Options

Continuous Statistical Leak Detection. Continuous Statistical Leak Detection (CSLD) software provides 0.2 GPH in-tank leak detection with no tank shutdown. CSLD is ideal for 24 hour locations or installations with tanks that exceed 15,000 gallons. CSLD is third party certified for UST up to 30,000 gallons. Some throughput restrictions may apply.

Effective Fuel Inventory Management. Fuel Manager software for the EMC modular series tracks fuel usage to help plan efficient deliveries and avoid lost sales due to fuel out conditions. Printed reports summarize average sales for each day and forecast how long existing fuel inventories should last. Fuel Manager can use the fax/modem module to automatically send fuel order requests.

Pressurized Line Leak Detection. Marconi offers line leak detection equipment for the EMC modular series to meet your new installation or retrofit requirements. Line leak detection is available for 0.1 GPH, 0.2 GPH, or 3.0 GPH line tightness testing.

Overfill Alert. The EMC can activate the optional overfill alarm with horn and flashing light to alert a delivery driver of a possible tank overfill condition.

Approvals: UL Listed. CSA Approved.
TLS-450PLUS Console

Site Prep and Installation Manual

VEEDER-ROOT
Introduction

This manual assumes that you are installing the console in a new site (before pavement is put down and with no wiring runs in place). Among the topics covered are:

• Site layout considerations.
• Installing the console.
• Probe installation procedures.
• Sensor installation procedures.
• Installing wiring conduit between the console and the probes and sensors.
• Probe and sensor field junction box wiring diagrams.
• Device-to-console wiring connection examples.
• Connecting ac power to console and initial startup procedure

Contractor Certification Requirements

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

Installer Certification (Level 1): Contractors holding valid Installer Certification are approved to perform wiring and conduit routing; equipment mounting; probe, sensor and carbon canister vapor polisher installation; wireless equipment installation; tank and line preparation; and line leak detector installation.

Technician Certification (Level 2/3): Contractors holding valid Technician Certifications are approved to perform installation checkout, startup, programming and operations training, system tests, troubleshooting and servicing for all Veeder-Root Series Tank Monitoring Systems, including Line Leak Detection. In addition, Contractors with the following sub-certification designations are approved to perform installation checkout, startup, programming, system tests, troubleshooting, service techniques and operations training on the designated system.
  • Wireless 2
  • Tall Tank

Warranty Registrations may only be submitted by selected Distributors.
Related Documents

**DOCUMENTS REQUIRED TO INSTALL EQUIPMENT**

This equipment must be installed according to the applicable installation document:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>ATEX Descriptive System</th>
<th>IECEx Descriptive System</th>
<th>UL/cUL Control Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLS-450PLUS</td>
<td>331940-006</td>
<td>331940-106</td>
<td>331940-008</td>
</tr>
<tr>
<td>Intrinsically Safe Apparatus for Wireless Applications</td>
<td>331940-005</td>
<td>331940-105</td>
<td>331940-012</td>
</tr>
</tbody>
</table>

**Safety Precautions**

The following safety symbols may be 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 ELECTICAL POWER OFF**
  - Live power to a device creates a potential shock hazard. Turn off electrical power to the device and associated accessories when servicing the unit.

- **WARNING**
  - Heed the adjacent instructions to avoid damage to equipment, property, environment or personal injury.

- **WEAR EYE PROTECTION**
  - Wear eye protection when working with pressurized fuel lines or epoxy sealant to avoid possible eye injury.

- **GLOVES**
  - Wear gloves to protect hands from irritation or injury.

- **INJURY**
  - Careless or improper handling of materials can result in bodily injury.

- **READ ALL RELATED MANUALS**
  - Knowledge of all related procedures before you begin work is important. Read and understand all manuals thoroughly. If you do not understand a procedure, ask someone who does.
National Electrical Code Compliance

The following information is for general reference and is not intended to replace recommended National Electric Code (NEC) procedures. It is important for the installer to understand that electrical equipment and wiring located in Class I, Division 1 and 2 installations shall comply with the latest appropriate Articles found in the National Electric Code (NFPA 70) and the Code for Motor Fuel Dispensing Facilities and Repair Garages, (NFPA 30A).

PROBE- AND SENSOR-TO-CONSOLE WIRING

Wire Type

To ensure the best operating systems available, Veeder-Root **REQUIRES** the use of shielded cable for all probes and sensors regardless of conduit material or application. In these installations, shielded cable must be rated less than 100 picofarad per foot and be manufactured with a material suitable for the environment, such as Carol™ C2534 or Belden™ 88760, 8760, 8770 or similar.

Note: Throughout this manual, when mentioning any cable or wire being used for probe and sensor to console wiring, it will be referring to shielded cable.

Wire Length

Improper system operation could result in undetected potential environmental and health hazards if the probe- or sensor-to-console wire runs exceed 1000 feet. Wire runs must be less than 1000 feet to meet intrinsic safety requirements.

Splices

Veeder-Root recommends that no splices be made in the wire run between a sensor or probe junction box and the console. Each splice degrades signal strength and could result in poor system performance.

Wire Gauges - Color coded

- Shielded cable must be used in all installations. Probe- and Sensor-to-console wires should be #14-#18 AWG stranded copper wire and installed as a Class 2 circuit. As an alternate method when approved by the local authority having jurisdiction, 22 AWG wire such as Belden 88761 may be suitable in installations with the following provisions:
  - Wire run is less than 750 feet
  - Capacitance does not exceed 100 pF/foot
  - Inductance does not exceed 0.2 μH/foot

POWER WIRING

Wires carrying 120 or 240 Vac from the power panel to the console should be #14 AWG (or larger) copper wire for line, neutral and chassis ground (3); and #12 AWG copper wire for barrier ground.

SENSOR AND PROBE JUNCTION BOXES

Weatherproof electrical junction boxes with a gasketed cover are required on the end of each probe and sensor conduit run at the manhole or monitoring well location. Gasketing or sealing compound must be used at each entry to the junction box to ensure a waterproof junction. The interior volume of each junction box must be a minimum of 16 cubic inches.

Veeder-Root recommends the following junction boxes or equivalent:

- Appleton Electric Co. - JBDX junction box, JBK-B cover, and JB-GK-V gasket.
- Crouse-Hinds Co. - GRFX-139 junction box, GRF-10 cover, and GASK-643 gasket.
Permissible Console Input/Output Connections

Figures 1 - 3 illustrate the console’s plug-in module locations and the maximum number allowed in each of the two bays of the console: Comm Bay and Module Bay. Input/output cables to the console’s Comm modules attach to connectors on each module’s end plate, and are accessible through an opening in the base of the console.

The Comm Bay is divided into 5 communication slots numbered from 1 to 5 going from left to right (see Figure 1). Only slots 1-3 are available for user-selectable Comm modules (Figure 2). Slots 4 and 5 are fixed and can not be changed (see Figure 3).

Important, to avoid attaching a Comm cable to a non-configurable (NC) port, identify the configurable (C) ports of any Comm module being installed by referring to Table 1. Also verify the Comm cable port connections to Comm modules in slots 4 and 5. Record all Comm port connections for use at setup.

Figure 1. TLS-450PLUS Console - Plug-in Module Compartments
Console Installation

Locating the Console

Select a mounting location on the inside of any building. The console must be protected from severe vibration, extremes in temperature and humidity, rain, and other conditions that could harm computerized electronic equipment. The console’s operating temperature range is 32 to 104°F (0 to 40°C), and its storage temperature range is -40 to +162°F (-40 to +74°C).

The mounting surface should be strong enough to support the console's weight which could be approximately 35 pounds with a full complement of modules. You should also consider wall space for routing the power wiring conduits and probe and sensor wiring conduits that must be connected to the console.

Mounting the Console

Install the console fastening devices to the mounting surface using the hole pattern shown in Figure 5. Up to 1/4” diameter screws may be used.

Mount the console to the mounting surface using the four mounting flanges on the back of the unit. Install metal conduit between the console and the power panel. Figure 5 shows the two designated knockouts through which power wiring can safely enter the console.
Console Installation

Mounting the Console

Figure 5. TLS-450PLUS Console Dimensions And Designated Conduit Knockouts
Wiring Conduit Safety Issues

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Symbols]</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
</tr>
<tr>
<td><strong>FAILURES TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.</strong></td>
</tr>
<tr>
<td>Probes and sensors operate in areas where flammable liquids and explosive vapors may be present.</td>
</tr>
<tr>
<td>Improper installation may result in fire or explosion causing serious injury or death.</td>
</tr>
<tr>
<td><strong>Practice the following:</strong></td>
</tr>
<tr>
<td>1. Read thoroughly and follow the instructions shipped with each probe and sensor.</td>
</tr>
<tr>
<td>2. Probe and sensor wiring conduit must not contain any other wires.</td>
</tr>
<tr>
<td>3. Probe and sensor wiring and conduits must enter the console only through their designated areas.</td>
</tr>
<tr>
<td>4. Power and communication wires and conduit must not enter the intrinsically safe area of the console.</td>
</tr>
</tbody>
</table>

Wiring between the console and the probes and sensors is of limited electrical power so that there is insufficient energy to ignite fuel. In the console, the low power, probe and sensor wiring is considered intrinsically safe because it is physically isolated from all high power wiring. To maintain the integrity of this safety feature, you must install probe and sensor wiring in separate conduits from all other wiring. In addition, probe and sensor conduits can only enter the console through the designated intrinsically safe area knockouts.

**NOTE:** Wiring from separate probes and sensors may be run in the same conduit or trough provided they are powered by the same console. Improper system operation will result if probe and sensor wiring to separate consoles share the same conduit. Do not run probe and sensor wiring to separate consoles in the same conduit. Do not run probe and sensor wiring with other equipment’s intrinsically safe wiring in the same conduit. Improper system operation could also occur if the conduit locking nuts attaching conduit to the console are not tightened sufficiently to score the console’s paint film and make good metal-to-metal contact. For proper grounding use grounding/bonding set screw conduit locknuts to achieve a good conduit-to-console metal bond.
Connecting Power to the Console

When the TLS-450PLUS console is used with a TLS RF Wireless 2 System (W2), the TLS-450PLUS must be on a separate circuit breaker from the TLS RF console(s).

After all connections have been made to the console, connect the wires carrying ac power to the console at the breaker panel - Check the Input Power Rating on the label affixed to the underside of the console to verify input power requirements.

**WARNING**

This console contains high voltages which can be lethal. It is also connected to low power devices that must be kept intrinsically safe.

1. Do not connect the console AC power supply wires at the breaker until all devices are installed.
2. Attach conduit from the power panel to the console's Power Area knockouts only.

Connecting power wires to a live circuit can cause electrical shock that may result in serious injury or death.

Routing conduit for power wires into the intrinsically safe compartment can result in fire or explosion resulting in serious injury or death.

3. Pull three #14 AWG or larger color-coded wires for AC line (hot), AC neutral and chassis ground between the power panel and the console.

4. Pull one wire, with a minimum 90°C rating, for barrier ground - For UL/cUL installations use a # 12 AWG wire, and for ATEX/IECEEx installations use a 4 mm² wire.

5. Connect the input 120 or 240 Vac power wires as shown in Figure 44.
Connecting Power to the Console

Connecting Wiring to Console Modules

Figure 44. Wiring AC Power To The TLS-450PLUS Console

POWER WIRING NOTES:

- Barrier ground wire requirements:
  - For UL/cUL approved systems, use a 12 AWG barrier ground wire
  - For ATEX/IECEx approved systems, use a 4 sq. mm barrier ground wire
- Use an ohmmeter to check the electrical resistance between the console’s metal case and the power panel’s earthing ground wire connection at the ‘known good ground’. It should read less than 1 ohm.
- Connect the power supply wires in the power panel to a separate dedicated circuit.
- Electrical rating of power input - 120 or 240 Vac, 50/60 Hz, 2 A maximum.
- See Figure 1 for locations of power conduit knockouts into the console. Power wiring must enter the console through designated knockouts.