Electronic Line Leak Detectors

Application Guide
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Selecting a Line Leak Detector
This guide helps you to properly configure Veeder-Root’s line leak equipment for underground pressurized piping. Note: Following the industry’s best practices, a containment sensor is recommended for sites with Pressurized Line Leak Detection (DPLLD, PLLD) in the event that the submersible pump develops a leak before the check valve and/or functional element. Line leak detectors only check leaks in the primary product line downstream from the pump.

Veeder-Root offers two types of line leak detectors, each uniquely suited to a particular type of application: Digital Pressurized Line Leak Detection (DPLLD) and Pressurized Line Leak Detection (PLLD).

DPLLD and PLLD eliminate the need to break the product line for installation or service. DPLLD and PLLD are the cost-effective choice for most retrofit and new piping installations. Veeder-Root’s electronic line leak detectors have been evaluated by a third party in accordance with EPA evaluation procedures. Please refer to the National Work Group Listings at [www.nwglde.org](http://www.nwglde.org).

### Line Leak Specifications - Supported Pump Models (Footnotes explained at end of table)

<table>
<thead>
<tr>
<th>4-INCH FIXED SPEED MODELS</th>
<th>DPLLD/PLLD</th>
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<td>THE RED JACKET</td>
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<tr>
<td>P75U1RJ1 - RJ3, AGP75S1RJ1 - RJ3 (3/4 HP)</td>
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<td>P150U1RJ1 - RJ3, AGP150S1RJ1 - RJ3 (1-1/2 HP)</td>
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<td>P150U1Y QS1 - QS3, AGP150S1Y QS1 - QS3 (1-1/2 HP)</td>
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<td>P33R1 T1 - T4 (1/3 HP)</td>
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<td>P75S1 T1 - T4 (3/4 HP)</td>
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<td>P150S1 T1, T4 (1-1/2 HP)</td>
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<td>X3P150S1 T1 - T4 (1-1/2 HP)</td>
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<td>X5P150S1 T1 - T4 (1-1/2 HP)</td>
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<td>S85-13 (1/3 HP)</td>
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<td>S85-34 (3/4 HP)</td>
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<td>S85-150 (1-1/2 HP)</td>
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<td>ALL</td>
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# Line Volume Limits

<table>
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<tr>
<th>Console Type</th>
<th>Transducer Type</th>
<th>Piping Type</th>
<th>3.0 GPH Certified Volume (Gal.)</th>
<th>0.2 GPH Certified Volume (Gal.)</th>
<th>0.1 GPH Certified Volume (Gal.)</th>
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<tr>
<td>SERIES 860091-X01 TLS-450PLUS CONSOLES W/SOFTWARE VERSION 7E OR HIGHER</td>
<td>Series 8590-DPLL</td>
<td>Rigid</td>
<td>1178.6</td>
<td>1178.6</td>
<td>165.08</td>
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<td>SERIES 860090-100 TLS-450 CONSOLES</td>
<td>Series 8484-PPLL</td>
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<td>109.84</td>
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<tr>
<td>SERIES 8482 TLS-350, -350PC, -350R, -350RPC, -350PLUS W/ SOFTWARE VERSION X19 OR HIGHER</td>
<td>Series 8484-PPLL</td>
<td>Hybrid (Flex &amp; Rigid)</td>
<td>1178.6</td>
<td>1178.6</td>
<td>267.8</td>
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</table>

1. See Site Preparation and Installation manual for supported settings.
2. Requires TLS-350 Version X19 or later software and CPT Transducer Adapter Kit (Red Jacket P/N 144-326-5).
3. USER DEFINED pipe type must be used for precision (0.2 and 0.1 gph) testing.
4. Requires TLS-350 Version 29C or later software (PLL/D).
5. Requires Model ‘R’ Relief Valve.
Supported Pipe Types and Line Lengths* - For DPLLD and PLLD

*lengths approved are for 3.0, 0.2, & 0.1 gph line leak tests using single pipe types. For mixed line types with DPLLD or PLLD, see footnote 1, 5 & 6 respectively.

<table>
<thead>
<tr>
<th>PIPE TYPE</th>
<th>TLS-4XX w/ DPLLD(^3,6) (Length Feet)(^7)</th>
<th>TLS-350 w/ PLLD(^1) (Length Feet)(^7)</th>
<th>BULK MODULUS(^2) (PSI)</th>
<th>VOLUME (Gallons/Foot)</th>
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<tr>
<td>RIGID PIPE</td>
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<td>FIBERGLASS (2 INCH)</td>
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<td>10-500</td>
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<td>10-220</td>
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<td>COPPER (1 INCH, TYPE K)</td>
<td>10-500</td>
<td>10-500</td>
<td>55,000</td>
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<td>FLEXIBLE PIPE - ADVANCED POLYMER TECHNOLOGY</td>
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<td>1.5-INCH (P150SC)</td>
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<td>FLEXIBLE PIPE - AMERON</td>
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<td>DUALOY 3000/FLS III (1.5 INCH)</td>
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<td>20-1100</td>
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<td>20-650</td>
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<td>TLS-350 w/ PLLD¹ (Length Feet)⁷</td>
<td>BULK MODULUS² (PSI)</td>
<td>VOLUME (Gallons/Foot)</td>
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<td><strong>ENVIROFLEX RETRACTABLE PIPE</strong></td>
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<td>PP1500 (1.5 INCH)</td>
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<td>PP1501 (1.5 INCH)</td>
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<td>PP2502 (2.5 INCH)</td>
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<td>10-1100</td>
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<td>10-1100</td>
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</tbody>
</table>

¹Mixed Piping Types with PLLD: Using TLS-350 software Version 23 or later, PLLD is certified for 3 gph-only testing for line volumes up to 212 gallons; and for 0.2/0.1 gph testing for line volumes up to 110 gallons. To determine the line volume for mixed piping types, multiply the line length (in feet) times the 'gallons/foot' value for each pipe type and add the results. For example, site has 150 feet of 2" fiberglass and 50 feet of 3" fiberglass pipe:

\[
\text{Total line volume} = (150 \times 0.204) + (50 \times 0.461) = 30.6 + 23.1 = 53.7 \text{ gallons}
\]

²Bulk Modulus entry is only applicable to TLS-350 consoles w/software Version 23 or later and all TLS-450 Series consoles. Refer to TLS-350 System Setup manual (P/N 576013-623) or TLS-450 Setup Manual (P/N 576013-940) for programming instructions.

³Geoflex piping produced prior to 2001 has a lower bulk modulus than the current product. For this piping (pre-2001) use the values in ( ). For 2001 piping and later, you must set the correct Bulk Modulus in the "User Defined" menu.

⁴Western Fiberglass COFLEX piping produced prior to 2005 has a different bulk modulus than the current product. For piping produced prior to 2005, use the values in ( ).

⁵Line lengths shown represent DPLLD approved lengths for 3 gph and 0.2 gph testing. 3.0 gph and 0.2 gph testing for DPLLD with software version 7E or higher is certified for line volumes up to 1178.6 gallons (not to exceed 3000 feet of line). See footnote 1 for instructions on calculating line volume for mixed piping.

⁶0.1 gph testing is certified for line volumes up to 535.6 gallons (not to exceed 1100 feet of line). See footnote 1 for instructions on calculating line volume for mixed piping.

⁷For line lengths that exceed the maximum allowed entry (for example, 500 feet for 2-inch diameter steel piping), you must select the Piping Type as "User Defined".
Specifications and Compatible Fluids Requirements

The table below lists Veeder-Root Line Leak Detector specifications.

<table>
<thead>
<tr>
<th>SPECIFICATION</th>
<th>TLS-4XX w/ DPLLD</th>
<th>TLS-350 w/ PLLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATING TEMP:</td>
<td>-25 TO + 130°F</td>
<td>-25 TO + 130°F</td>
</tr>
<tr>
<td>COMPATIBLE FUELS:</td>
<td>UNLEADED GASOLINE, LEADED GASOLINE, 5% METHANOL / 95% UNLEADED, 0 - 100% ETHANOL, 10% ETHANOL / 90% UNLEADED, 15% MTBE / 85% UNLEADED, DIESEL, BIODIESEL (UP TO B100)</td>
<td>UNLEADED GASOLINE, LEADED GASOLINE, 5% METHANOL / 95% UNLEADED, 0 - 100% ETHANOL, 10% ETHANOL / 90% UNLEADED, 15% MTBE / 85% UNLEADED, DIESEL, BIODIESEL (UP TO B100)</td>
</tr>
<tr>
<td>LINE FLOW RATE:</td>
<td>120 GPM MAX. W/SWIFTCHECK VALVE</td>
<td>120 GPM MAX. W/SWIFTCHECK VALVE</td>
</tr>
<tr>
<td>OPERATING RANGE:</td>
<td>0 - 70 PSI</td>
<td>0 - 70 PSI</td>
</tr>
<tr>
<td>PROOF PRESSURE:</td>
<td>200 PSI</td>
<td>200 PSI</td>
</tr>
<tr>
<td>MAX. VERTICAL PIPELINE HEIGHT ABOVE TRANSDUCER</td>
<td>11 FEET</td>
<td>11 FEET</td>
</tr>
<tr>
<td>MINIMUM PUMP OUTPUT PRESSURE</td>
<td>23 psi</td>
<td>23 psi</td>
</tr>
</tbody>
</table>

1 Biodiesel compliant with ASTM D7467 (up to B20) or ASTM D6751.
2 Consult pump manufacturer for compatibility ratings on fuel blends greater than B20.
3 Applications that exceed these max. vertical pipeline heights will require further consultation. Please contact Veeder-Root at 800-323-1799 and request a Veeder-Root/Red Jacket Application Engineer.
4 Pump output pressure should be a minimum of 4 psi above the check valve’s relief pressure.

Veeder-Root recommends that system software for the console be upgraded to the latest version when installing any new hardware. For TLS-350 Consoles, when installing latest software, PLLD must be specified and customer must upgrade to ECPU2 if not already installed. See Accessories/Upgrades section of price book or your local Veeder-Root authorized distributor for details.
Check Valve Requirements

DPLLD and PLLD require certain check valves or Pressurstat assemblies to be installed on the pump. Use of non-compatible check valves can result in loss of leak detection performance.

<table>
<thead>
<tr>
<th>Supported Pumps</th>
<th>Check/Relief Valve Type</th>
<th>3.0 GPH Only Testing (Req’d. Kit)</th>
<th>3.0, 0.2, 0.1 GPH Testing (Req’d. Kit)</th>
<th>Additional Req’d. Parts for Manifolded Lines (Single Tank w/ 2 STPs, or 2 or More Tanks w/ STP in Each)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Red Jacket</td>
<td>None Required</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>Check Valve for Each Slave Pump P/N 410153-002 (See illustration in Note 1 below)</td>
</tr>
<tr>
<td>Quantum (All Models)</td>
<td>Red Jacket SpikeCheck Valve (Factory Installed)</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>Red Jacket Quantum SpikeCheck Valve, Non-PSI Relief Valve, Required for Each Slave Pump, P/N 388-081-5 (Field Installed Only)</td>
</tr>
<tr>
<td></td>
<td>Red Jacket SpikeCheck Valve (Field Only Installed) P/N 388-080-5</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>Non-Vented SwiftCheck Valve for Each Slave Pump, P/N 330020-416</td>
</tr>
<tr>
<td></td>
<td>Red Jacket Pressurstat Assembly,</td>
<td>Not supported</td>
<td>Not supported</td>
<td></td>
</tr>
<tr>
<td>Standard (All Models)</td>
<td>SwiftCheck</td>
<td>848480-003 (TLS-350) 859080-002 (TLS-4XX)</td>
<td>848480-003 (TLS-350) 859080-002 (TLS-4XX)</td>
<td>Non-Vented SwiftCheck Valve for Each Slave Pump, P/N 330020-416</td>
</tr>
<tr>
<td></td>
<td>Red Jacket Functional Element Assembly</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>Not supported</td>
<td></td>
</tr>
<tr>
<td>Maxxum</td>
<td>None Required</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>See Note 4 below.</td>
</tr>
<tr>
<td>Big-Flo</td>
<td>Pressurstat Kit P/N 144-314-5</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>Not supported</td>
<td></td>
</tr>
<tr>
<td>FE Petro</td>
<td>FE Petro Model R P/N 40098932 and Replacement O-ring for the Valve Housing (See Note 4 below)</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>848480-001 (TLS-350) 859080-001 (TLS-4XX)</td>
<td>Non-Vented SwiftCheck Valve for Each Slave Pump, P/N 330020-416 ---- OR ---- FE Petro 65 psi Relief Check Valve (FE P/N 402459931) (See Note 5 below)</td>
</tr>
<tr>
<td>Tokheim &amp; Bennett</td>
<td>SwiftCheck</td>
<td>848480-003 (TLS-350) 859080-002 (TLS-4XX)</td>
<td>848480-003 (TLS-350) 859080-002 (TLS-4XX)</td>
<td>Non-Vented SwiftCheck Valve for Each Slave Pump, P/N 330020-416</td>
</tr>
</tbody>
</table>

NOTES:

1. The Veeder-Root High Pressure Check Valve (P/N 410153-002) is shown below:

   ![High pressure relief valve with 'H' stamped on underside of poppet valve]

2. For Red Jacket Quantum pumps, the SpikeCheck is the preferred check valve type.
3. 0.2/0.1 gph testing is supported for the Maxxum pump, but you must select 'User Defined' as the pipe type during DPLLD or PLLD setup.
4. If maximum pump pressure is NOT a minimum of 5 psi below the pressurstat relief setting, then a check valve must be installed in the discharge line of the slave pump (see "Manifolded Line Applications" on page 9).
5. Veeder-Root does not warrant the performance of FE Petro's Model 'R' check valve or 65 psi relief check valve.
TLS-4XX Series Consoles - DPLLD Leak Detection Hardware/Test Requirements

TLS-450/TLS450PLUS Console DPLLD Hardware Requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>ITEM</th>
<th>PART NO.</th>
<th>Qty. Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DPLLD Pressure Sensor Without SwiftCheck Valve</td>
<td>859080-001</td>
<td>1 of either type per line</td>
</tr>
<tr>
<td></td>
<td>DPLLD Pressure Sensor With Swift-Check Valve</td>
<td>859080-002</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>USM Module - up to 16 monitored lines per module, 4 modules per console max.</td>
<td>332812-001</td>
<td>Depends on number of lines monitored</td>
</tr>
<tr>
<td>3</td>
<td>UIOM Module - up to 5 monitored lines per module, 4 modules per console max.</td>
<td>332813-001</td>
<td>Depends on number of lines monitored</td>
</tr>
<tr>
<td>4</td>
<td>DPLLD Leak Test Option Selection - (required for 0.2/0.1 gph testing only)</td>
<td>See Leak Test Options table below</td>
<td>Select1 type</td>
</tr>
</tbody>
</table>

Leak Test Options

<table>
<thead>
<tr>
<th>TESTING OPTION</th>
<th>0.2 GPH TESTS</th>
<th>0.1 GPH TESTS</th>
<th>TLS-450 P/N</th>
<th>TLS-450PLUS P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULTIMATE TESTING</td>
<td>D, M, R</td>
<td>D, A, R</td>
<td>332972-007</td>
<td>332972-007</td>
</tr>
<tr>
<td>RISK MANAGEMENT</td>
<td>D, M, R</td>
<td>D, A</td>
<td>332972-008</td>
<td>332972-008</td>
</tr>
<tr>
<td>BASE COMPLIANCE</td>
<td>None</td>
<td>D, A</td>
<td>332972-009</td>
<td>332972-009</td>
</tr>
<tr>
<td>3 GPH</td>
<td>332972-999</td>
<td>INCLUDED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where:

D (ON-DEMAND) - Testing can be initiated manually through the TLS Console.

A (AUTO) - Tests will run repetitively until a passing test is achieved. Once a passing test is achieved, testing will stop and recommence six months from the date of the last passing test.

M (MONTHLY) - Tests will run repetitively until a passing test is achieved. Once a passing test is achieved, testing will stop and recommence the first calendar day of the next month.

R (REPETITIVE) - Tests will run repetitively according to pre-programmed time intervals.

DPLLD Accessories and Spare Parts

The following DPLLD accessories and spare parts are available:

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>331014-001</td>
<td>SWIFTCHECK VALVE (INSTALLS IN THE PUMP'S MECHANICAL LEAK DETECTOR PORT)</td>
</tr>
<tr>
<td>330020-619</td>
<td>UNIVERSAL PROBE/SENSOR INTERFACE MODULE</td>
</tr>
<tr>
<td>330020-620</td>
<td>UNIVERSAL INPUT/OUTPUT INTERFACE MODULE</td>
</tr>
<tr>
<td>330020-416</td>
<td>NON-VENTED SWIFTCHECK</td>
</tr>
<tr>
<td>410153-002</td>
<td>KIT-CHECK VALVE-HIGH</td>
</tr>
<tr>
<td>410557-001</td>
<td>KIT-CHECK/RELIEF VALVE</td>
</tr>
<tr>
<td>410557-002</td>
<td>KIT-CHECK/RELIEF VALVE-NON RELIEF</td>
</tr>
</tbody>
</table>
TLS-350 Consoles - PLLD Leak Detection Hardware/Test Requirements


<table>
<thead>
<tr>
<th>Item</th>
<th>ITEM</th>
<th>PART NO.</th>
<th>Qty. Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PLLD Pressure Sensor With Swift-Check Valve</td>
<td>848480-003</td>
<td>1 of either type per line</td>
</tr>
<tr>
<td></td>
<td>PLLD Pressure Sensor Without Swift-Check Valve</td>
<td>848480-001</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PLLD Interface Module - TLS-350/TL-350 Plus/TLS-350R Consoles - monitors up to 6 lines, 1 module per console max.</td>
<td>330843-001</td>
<td>Depends on number of lines monitored</td>
</tr>
<tr>
<td></td>
<td>“J” PLLD Interface Module - TLS-350J Console - monitors up to 4 lines, 1 module per console max.</td>
<td>330843-002</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PLLD Controller Module - All Console Models - monitors up to 3 lines, 2 modules per console max.</td>
<td>330374-001</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>PLLD Leak Test Option Selection - (required for 0.2/0.1 gph testing only)</td>
<td>See Leak Test SEM Modules table below</td>
<td>Select 1 SEM Module</td>
</tr>
</tbody>
</table>

Precision line leak detection capability (0.2 gph / 0.1 gph) requires one SEM (Software Enhancement Module) for the console. A SEM module is not required for 3.0 gph-only line leak detection capability.

Leak Test SEM Modules

<table>
<thead>
<tr>
<th>LEAK TEST OPTION</th>
<th>0.2 GPH TESTS</th>
<th>0.1 GPH TESTS</th>
<th>TLS-350/TLS-350J/TL-350PLUS/TLS-350R WITHOUT BIR (SEM P/N)</th>
<th>TLS-350R WITH BIR (SEM P/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULTIMATE TESTING</td>
<td>D, M, R</td>
<td>D, A, R</td>
<td>330160-010</td>
<td>330160-110</td>
</tr>
<tr>
<td>RISK MANAGEMENT</td>
<td>D, M, R</td>
<td>D, A</td>
<td>330160-060</td>
<td>330160-160</td>
</tr>
<tr>
<td>BASE COMPLIANCE</td>
<td>None</td>
<td>D, A</td>
<td>330160-050</td>
<td>330160-150</td>
</tr>
<tr>
<td>3.0 GPH</td>
<td>None</td>
<td></td>
<td>INCLUDED</td>
<td>INCLUDED</td>
</tr>
</tbody>
</table>

Where:

- **D** (ON-DEMAND) - Testing can be initiated manually through the TLS Console.
- **A** (AUTO) - Tests will run repetitively until a passing test is achieved. Once a passing test is achieved, testing will stop and recommence six months from the date of the last passing test.
- **M** (MONTHLY) - Tests will run repetitively until a passing test is achieved. Once a passing test is achieved, testing will stop and recommence the first calendar day of the next month.
- **R** (REPETITIVE) - Tests will run repetitively according to pre-programmed time intervals.

PLLD Accessories and Spare Parts

The following PLLD accessories and spare parts are available:

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>331014-001</td>
<td>SWIFTCHECK VALVE (INSTALLS IN THE PUMP’S MECHANICAL LEAK DETECTOR PORT)</td>
</tr>
<tr>
<td>847490-109</td>
<td>SIX INPUT PLLD INTERFACE MODULE (THROUGH-HOLE MOUNT) - REPLACEMENT ONLY</td>
</tr>
<tr>
<td>847490-110</td>
<td>SIX INPUT PLLD INTERFACE MODULE (SURFACE MOUNT)</td>
</tr>
<tr>
<td>330020-416</td>
<td>NON-VENTED SWIFTCHECK</td>
</tr>
<tr>
<td>410153-002</td>
<td>KIT-CHECK VALVE-HIGH</td>
</tr>
<tr>
<td>410557-001</td>
<td>KIT-CHECK/RELIEF VALVE</td>
</tr>
<tr>
<td>410557-002</td>
<td>KIT-CHECK/RELIEF VALVE- NON RELIEF</td>
</tr>
</tbody>
</table>

**Note:**
The through-hole mount, six input PLLD Interface Module (P/N 847490-109) is for repair/replacement in existing consoles only. Spare 847490-109 modules are shipped with complete installation and programming instructions and not pre-installed in consoles. Customers that require replacement of PLLD Interface Modules should replace like for like, i.e. through-hole mount PLLD Interface Modules for through-hole mount PLLD Interface Modules. Surface mount PLLD Interface Modules are NOT interchangeable with through-hole mount PLLD Interface Modules.
Special Installations

Manifolded Line Applications

DPLL and PLLD leak detection systems can handle product lines supplied by multiple tanks and pumps, to a maximum of 8 tanks and pumps per product line.

Standard line leak sensing and check valve equipment should be installed at the primary pump.

To perform 0.2 and 0.1 gph tests, a non-vented SwiftCheck valve (P/N 330020-416), or new Red Jacket 65 psi relief valve (P/N 410153-002), or SpikeCheck Valve Non-PSI Relief Valve for Standard Pump (P/N 410557-002), or FE Petro 65 psi Relief Check Valve (FE P/N 402459931) should be installed on each of the other pumps supporting the manifolded product line. The Non-Vented SwiftCheck Valve is rated to a maximum 70 gpm.

NOTICE For 5 HP Maxxum pumps in diesel, an additional in-line check valve with no pressure relief should be installed on the ‘Slave’ pump to prevent backflow.

A relay on a Four-Relay module or I/O Combination module (TLS-350 Series) or I/O Module (TLS-450 Series) must be available to control each secondary pump. The standard line leak modules will provide pump control output for the primary pump and the “Pump In” signal for the set.

A typical manifolded line installation for DPLL and PLLD is shown below:

Transducer Installation - Red Jacket CPT and Quantum CPT Pumps

This installation procedure is to be used with Red Jacket CPT and Quantum CPT Pumps.

1. Install the Red Jacket CPT Transducer Adapter Kit (Red Jacket part number 144-326-5) following the instructions with the kit. Thread the PLLD transducer in the mechanical LLD port of the pump.

   NOTICE Seal any pipe threads using a UL-classified, nontoxic pipe sealant suitable for the fuel involved.

   The figure below illustrates two DPLL and PLLD transducer installations in Red Jacket CPT pumps - consult “Check Valve Requirements” on page 6, to determine what check valve you will need to install to perform your intended level of testing.

2. Verify that the TLS-350 Series Console has Version x19 or later (TLS-450 Series Console has Version 1 or later) software.

3. Verify that the CPT Controller has Version 1.02 or later software installed.
4. Locate red switch bank labeled S1 on the CPT’s Controller CPU board, and verify that dip switch 2 is set to the Closed position (to enable the PLLD precision line leak function), and dip switch 8 is set to the Open position (to disable the CPT’s line leak function).

5. Verify that the Rotary Pressure Dial, also on the CPT’s Controller CPU board, is set to either the 2 (24 psi), 3 (27 psi), 4 (30 psi), 5 (33 psi), or 6 (36 psi) position.

---

**Transducer Installation - Red Jacket Big-Flo Pumps, Red Jacket Maxxum Pumps and FE Petro High Capacity Pumps**

**BIG-FLO PUMPS**

1. You will need to install a reducing tee (customer supplied) in either of the 3-inch discharge ports of the pump with the 2-inch opening facing up. If you have the room, it may be easier to install this tee between the Pressurstat kit and the unused port instead of in the discharge line (as shown in the figure below). Alternatively, the DPLL or PLLD transducer can be installed in the leak detector port of a Big-Flo leak detector if it is already present in the line (as shown in the figure below).

2. Install the Red Jacket Big-Flo Pressurstat Kit (Red Jacket part number 144-314-5) following the instructions with the kit.

3. Thread the DPLL or PLLD transducer into the 2-inch opening of the tee.

**NOTICE** Seal any pipe threads using a UL-classified, nontoxic pipe sealant suitable for the fuel involved.

4. Verify that the TLS-350 Series Console has Version x19 or later (TLS-450 Series Console has Version 1 or later) software.

---

**OPTIONAL INSTALLATION EXAMPLE**

- 3/4" NPT Union, 3/4"NPT nipples, reducing nipple (customer supplied)
- DPLL or PLLD transducer
- 3' discharge line (to dispensers)
- Red Jacket Big-Flo Pressurstat kit - P/N 144-314-5 (customer supplied)
- 2"x 2"x 3" reducing tee and 3' NPT nipple (customer supplied)
- Junction box (customer supplied)
- Seal-off, epoxy seal per NFPA spec (customer supplied)
- conduit to console (customer supplied)
- DPLL or PLLD transducer in 2" port of Big-Flo Leak Detector (customer supplied)
- 3" 3’90 degree elbow (customer supplied)
- 3’ discharge line (to dispensers)
MAXXUM PUMPS

1. Thread the DPLL or PLLD transducer into the 2-inch opening of the transducer port.

   NOTICE  Seal any pipe threads using a UL-classified, nontoxic pipe sealant suitable for the fuel involved.

2. If any in-line check valves or a Big-Flo Diaphragm Valve are installed in the line, they must be removed.

3. Verify that the TLS 350 Series Console has Version x19 or later software (TLS-450 Series Consoles Version 1 or later software).

FE PETRO HIGH CAPACITY PUMPS

1. Install a reducing tee (customer supplied) in either of the 3-inch discharge ports of the pump with the 2-inch port facing up.

   NOTICE  Seal any pipe threads using a UL-classified, nontoxic pipe sealant suitable for the fuel involved.

2. Thread the D/PLL transducer into the 2-inch port on the tee fitting.

3. Install a model "R" relief valve into the pump if one is not already present.