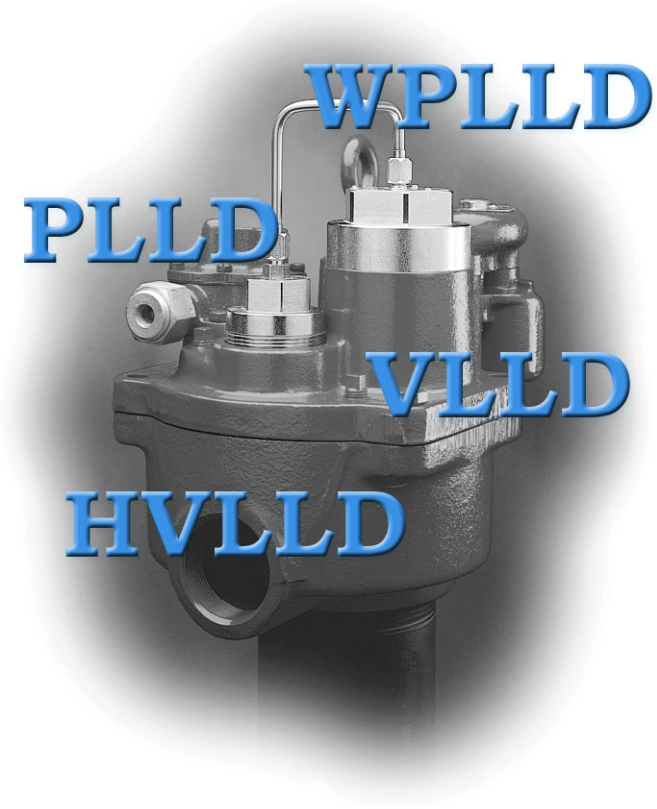
Manual No: **577013-465** ● Revision: **M**

Accu-Flo Meter Service Ltd.

Line Leak Detection Systems

Application Guide



VEEDER-ROOT

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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 systems. **Note: Since PLLD and WPLLD do not perform leak tests on the pump in all applications, appropriate containment/leak detection must be provided when selecting either of these systems. VLLD systems must always be installed in a monitored containment sump.**

Veeder-Root offers four types of line leak systems, each uniquely suited to a particular type of application.

- **PLLD** Pressurized Line Leak Detection
- **WPLLD** Wireless Pressurized Line Leak Detection
- **VLLD** Volumetric Line Leak Detection
- **HVLLD** High-Capacity Volumetric Line Leak Detection

PLLD and WPLLD eliminate the need to break the product line for installation or service. In addition, WPLLD installs without running new wires. PLLD and WPLLD are the cost-effective choice for most retrofit and new piping installations.

Veeder-Root's line leak detection systems have been evaluated by a third party in accordance with EPA evaluation procedures. Please refer to the test reports in Veeder-Root manual numbers 576013-308 and 576013-866 for the results of these evaluations.

Major Features of Each Veeder-Root Line Leak Detector

Feature	PLLD	WPLLD	VLLD	HVLLD
LINE LEAK DETECTION				
3 GPH TESTING	YES	YES	YES	YES
PRECISION TESTING	OPTIONAL	OPTIONAL	YES	YES
POSITIVE SHUTDOWN	YES	YES	YES	YES
3RD PARTY CERTIFIED	YES	YES	YES	YES
INSTALLATION REQUIREMENTS				
REQUIRES TLS CONSOLE	YES	YES	YES	YES
INSTALLS WITHOUT BREAKING PIPING	YES	YES	NO	NO
INSTALLS WITHOUT NEW SUMP	YES	YES	YES	YES[1]
INSTALLS WITHOUT NEW WIRES	NO	YES	NO	NO

[1]Requires 42-inch diameter sump minimum

Ideal Veeder-Root Line Leak Detector for Various Piping Systems

PIPING SYSTEM	IDEAL LINE LEAK DETECTOR
• EXISTING FIBERGLASS OR STEEL PIPING • NO AVAILABLE INTRINSICALLY-SAFE CONDUIT	**WPLLD**
• NEW FIBERGLASS, STEEL, OR FLEXIBLE PIPING • CONDUIT TO PUMP AREA EXISTS, IS EASILY INSTALLED, OR DIRECT BURIAL CABLE CAN BE USED	**PLLD**
• 2-INCH DISCHARGE PUMPS • SUMP AND CONDUIT EXISTS	**VLLD**
• 3-INCH DISCHARGE PUMPS WHEN PRECISION TESTING IS REQUIRED • HIGH THROUGH-PUT • SUMP AND CONDUIT EXISTS	**HVLLD**

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

4-INCH FIXED SPEED MODELS			PLLD	WPLLD[1]	VLLD	HVLLD[2]
RED JACKET	THE RED JACKET	P75U1RJ1 - RJ3, AGP75S1RJ1 - RJ3 (3/4 HP)	YES	YES	NO	NO
		P150U1RJ1 - RJ3, AGP150S1RJ1 - RJ3 (1-1/2 HP)	YES	YES	NO	NO
		X3P150U1RJ1 - RJ3, X3AGP150S1RJ1 - RJ3 (1-1/2 HP)	YES	YES	NO	NO
		P200U1-3RJ1 - RJ3, AGP200S1RJ1 - RJ3 (2 HP)	YES	YES	NO	NO
	QUANTUM	P33U1 QS1 - QS3, AGP33S1 QS1 - QS3 (1/3 HP)	YES	YES	YES	YES
		P75U1Y QS1 - QS3, AGP75S1Y QS1 - QS3 (3/4 HP)	YES	YES	YES	YES
		P150U1Y QS1 - QS3, AGP150S1Y QS1 - QS3 (1-1/2 HP)	YES	YES	YES	YES
		X3P150U1Y QS1 - QS3, X3AGP150S1Y QS1 - QS3 (1-1/2 HP)	YES	YES	YES	YES
		X5P150U1Y QS1 - QS3, X5AGP150S1Y QS1 - QS3 (1-1/2 HP)	NO	NO	YES	YES
		P200U1-3Y QS1 - QS3, AGP200S1-3Y QS1 - QS3 (2 HP)	YES	YES	YES	YES
	STANDARD	P33R1 T1 - T4 (1/3 HP)	YES	YES	YES	YES
		P75S1 T1 - T4 (3/4 HP)	YES	YES	YES	YES
		P150S1 T1 - T4 (1-1/2 HP)	YES	YES	YES	YES
		X3P150S1 T1 - T4 (1-1/2 HP)	YES	YES	YES	YES
		X5P150S1 T1 - T4 (1-1/2 HP)	NO	NO	YES	YES
FE PETRO		STP33, STPAG33 (1/3 HP)	YES	YES	YES	YES
		STP75, STPAG75 (3/4 HP)	YES	YES	YES	YES
		STP150, STPAG150, STPAGH150 (1-1/2 HP)	YES	YES	YES	YES
		STP200, STPAG200, STPMR200, STPR200 (2 HP)	YES	YES	NO	NO
		STPH200, STPAGH200, STPHMR200, STPHR200 (2 HP)	YES	YES	NO	NO
TOKHEIM		585-13 (1/3 HP)	YES	NO	YES	YES
		585-34 (3/4 HP)	YES	NO	YES	YES
		585-150 (1-1/2 HP)	YES	NO	YES	YES
BENNETT		ALL	YES	NO	YES	YES
4-INCH VARIABLE SPEED MODELS						
RED JACKET[3]		STD and AG CPT (2 HP)[4]	YES	NO	YES	YES
		QUANTUM P200U202Y QS1 - QS3 CPT (2 HP)	YES	NO	YES	YES
		QUANTUM AGP200T202Y QS1 - QS3 CPT (2 HP)	YES	NO	YES	YES
		THE RED JACKET P200U20-2RJ1 - RJ3 (2 HP)	YES	NO	YES	YES
		THE RED JACKET AGP200T20-2RJ1 - RJ3 (2 HP)	YES	NO	YES	YES
FE PETRO[3]		IST (2 HP)	YES	NO	YES	YES
		STP VS2, STPAG VS2 (2 HP)	YES	NO	NO	NO
		STPRVS4, ISTVS4 AG	YES	NO	NO	NO
		STPMRVS4, ISTMVS4 AG	YES	NO	NO	NO
6-INCH HIGH CAPACITY MODELS						
RED JACKET - BIG-FLO		MAXXUM MXP300 (3 HP)	YES[5]	NO	NO	YES
		MAXXUM MXP500 (5 HP)	YES[5]	NO	NO	YES
		P100H1 - 1MB (1 HP)	YES[5]	NO	NO	YES
		P150H1 - 1HB (1-1/2 HP)	NO	NO	NO	NO
		P200H1 - 2MB (2 HP)	YES[5]	NO	NO	YES
		P200H3 - 2MB (2 HP)	YES[5]	NO	NO	YES
		P300H3 - 2HB (3 HP)	YES[5]	NO	NO	YES
		P500H3 - 2K (5 HP)	YES[5]	NO	NO	YES
FE PETRO		STP3, STPAG3 (3 HP)	NO	NO	NO	YES
		STP5, STPAG5 (5 HP)	NO	NO	NO	YES
		STP5H (5HP)	NO	NO	NO	NO
APPLICATIONS						
SIPHON/MANIFOLDED TANKS			YES	YES	YES	YES
MANIFOLDED LINES			YES	YES	YES	YES
ELECTRONIC BLENDERS			YES	YES	YES	YES
MECHANICAL BLENDERS			NO	NO	YES	YES

[1]Not applicable with FE Smart Controller. [2]Requires customer to provide line strainer. [3]See Site Preparation and Installation manual for supported settings.
[4]Requires Version X19 or later software and CPT Transducer Adaptor Kit (Red Jacket P/N 144-326-5). [5]3.0 gph only testing.

Supported Pipe Types and Line Lengths* - TLS-350 Series Consoles

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

RIGID PIPES	PLLD[1] (Feet)	WPLLD[2] (Feet)	VLLD (Feet)	HVLLD (Feet)	BULK MODULUS[3] (PSI)	VOLUME (Gallons/Foot)
FIBERGLASS (2-INCH)	10-500	10-500	10-775	10-775	25,000	0.204
FIBERGLASS (3-INCH)	10-220	10-220	10-350	10-350	35,000	0.461
STEEL (2-INCH)	30-500	30-500	10-875	10-875	50,000	0.190
COPPER (1-INCH, TYPE K)	10-500	No	No	No	55,000	0.041
FLEXIBLE PIPE - ADVANCED POLYMER TECHNOLOGY						
1.5-INCH (P150SC)	20-1100	No	No	No	8800	0.092
1.75-INCH (P175SC)	20-850	No	No	No	7400	0.125
2.0-INCH (P200SC)	20-650	No	No	No	5600	0.163
2.5-INCH (P250SC)	20-430	No	No	No	4400	0.255
FLEXIBLE PIPE - AMERON						
DUALOY 3000/FLS III (1.5 INCH)	20-1100	No	10-500	10-500	5400	0.092
DUALOY 3000/FLS III (2.0 INCH)	20-650	No	10-500	10-500	7600	0.163
FLEXIBLE PIPE - ENVIRON						
GEOFLEX II or D (1.5-INCH)	30-1100	10-500	10-500	10-500	5700	0.092
GEOFLEX D (2-INCH)	30-650	No	10-225	10-225	4500	0.163
GEOFLEX D (3-INCH)	30-300	No	No	No	4100	0.367
FLEXIBLE PIPE - FURON						
OPW PISCES - SINGLE WALL						
SP15 (1.5 INCH)	30-1100	No	10-500	10-500	9000	0.092
SP20 (2 INCH)	30-650	No	10-225	10-225	7000	0.163
OPW PISCES - DOUBLE WALL						
CP15 (1.5 INCH)	10-1100	No	10-500	10-500	17,500	0.092
CP15DW (1.5 INCH)	30-1100	No	10-500	10-500	5400	0.092
CP20 (2 INCH)	30-650	No	10-225	10-225	7600	0.163
WESTERN FIBERGLASS - DOUBLE WALL						
COFLEX (1.5 INCH)	10-1100	No	10-500	10-500	5400	0.092
COFLEX (2 INCH)	30-650	No	10-225	10-225	7600	0.163
FLEXIBLE PIPE - NUPI						
SMARTFLEX (1.5 INCH)	20-1100	No	No	No	8600	0.092
FLEXIBLE PIPE - PETROTECHNIK						
PETROTECHNIK UPP EXTRA (63 mm)	20-650	No	No	No	11,500	0.163
FLEXIBLE PIPE - TOTAL CONTAINMENT						
ENVIROFLEX RETRACTABLE PIPE						
PP1500 (1.5-INCH)	10-1100	10-500	10-500	10-500	2400	0.092
PP1501 (1.5-INCH)	10-1100	10-500	10-500	10-500	3500	0.092
PP1502 (1.5-INCH)	10-1100	No	10-775	10-775	7300	0.092
PP1503 (1.5-INCH)	10-1100	No	10-225	10-225	2500	0.092
PP2500 AND PP2501 (2.5-INCH)	No	No	10-775	10-775	---	---
PP2502 (2.5-INCH)	10-430	No	10-225	10-225	8700	0.255
PP2503 (2.5-INCH)	10-430	No	10-225	10-225	3100	0.255
OMNIFLEX COAXIAL PIPE						
CP1501 (1.5-INCH)	10-1100	10-500	10-500	10-500	13,000	0.092
CP1503 (1.5-INCH)	10-1100	No	10-500	10-500	4500	0.092
CP2503 (2.5-INCH)	20-430	No	No	No	3900	0.255

[1]Mixed Piping Types with PLLD: Using 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:

Total line volume = [150 x 0.204] + [50 x 0.461]
= 30.6 + 23.1
= 53.7 gallons

[2]The 0.2 and 0.1 gph line leak tests cannot be run on flex piping with WPLLD.

[3]Bulk Modulus entry is only applicable to consoles with software Version 23 or later. Refer to the TLS System Setup manual (V-R P/N 576013-623) for programming instructions.

Specifications and Compatible Fluids Requirements

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

VLLD/HVLLD		PLLD/WPLLD	
OPERATING TEMP:	-25 TO +130°F	**OPERATING TEMP:**	-25 TO +130°F
COMPATIBLE FUELS:	UNLEADED GASOLINE LEADED GASOLINE 5% METHANOL / 95% UNLEADED 10% ETHANOL / 90% UNLEADED 15% MTBE / 85% UNLEADED DIESEL KEROSENE JET FUEL AVIATION GASOLINE	**COMPATIBLE FUELS:**	UNLEADED GASOLINE LEADED GASOLINE 5% METHANOL / 95% UNLEADED 10% ETHANOL / 90% UNLEADED 15% MTBE / 85% UNLEADED DIESEL KEROSENE JET FUEL AVIATION GASOLINE
LINE FLOW RATE:	70 GPM (VLLD) 220 GPM (HVLLD)	**LINE FLOW RATE:**	120 GPM MAX. W/SWIFTCHECK VALVE
FLOW RESTRICTION:	2.2 PSI @ 40 GPM (VLLD) 3 PSI @ 160 GPM (HVLLD)	**OPERATING RANGE:**	0 - 70 PSI
HOUSING DESIGN:	EXPLOSION PROOF	**PROOF PRESSURE:**	200 PSI
CHECK VALVE WEIGHT:	3 LBS. (VLLD) 10 LBS. (HVLLD)		
CONTROLLER WEIGHT:	18 LBS.		
DIMENSIONS:	VALVE: 3.5” L (VLLD) VALVE: 7” L (HVLLD)		
CONTROLLER:	8” L X 5.5” W X 6.5” H		

Console Software Requirements

All Veeder-Root Line Leak Detection Systems require a TLS-350 Series Console with installed system software versions shown in the table below.

LINE LEAK DETECTION TYPE	SYSTEM SOFTWARE
PLLD	VERSION 7 OR HIGHER
WPLLD	VERSION 12 OR HIGHER
VLLD	VERSION 6 OR HIGHER
HVLLD	VERSION 6 OR HIGHER

Veeder-Root recommends that system software for the console be upgraded to the latest version when installing any new hardware. When installing Version 19 software and subsequent releases, PLLD or WPLLD must be specified or customer must upgrade to ECPU if not already installed. See Accessories/Upgrades section of price book or your local Veeder-Root authorized distributor for details.

PLLD and WPLLD Check Valves

PLLD and WPLLD 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.

	Pump Type	3.0 GPH ONLY TESTING HARDWARE AND KIT REQUIREMENTS			3.0, 0.2, & 0.1 GPH TESTING HARDWARE AND KIT REQUIREMENTS			ADDITIONAL PARTS REQUIRED FOR MANI-FOLDED LINES	
		PLLD Kit Required	WPLLD Kit Required	Check/Relief Valve Required Kits	PLLD Kit Required	WPLLD Kit Required	Check/Relief Valve Required Kits	Single Tank w/ 2 STPs	2 or More Tanks w/ STP in Each
RED JACKET	The Red Jacket	848480-001	849490-006	None Required	848480-001	849490-006	None Required	Interlock Relay & Check Valve for Slave Pump P/N 410153-002	Check Valve for each Slave Pump P/N 410153-002
	Quantum (All models)		849490-005 (except CPT)	Red Jacket SpikeCheck valve (factory installed)		849490-005 (except CPT)	Red Jacket SpikeCheck valve (factory installed)	Non-Vented SwiftCheck Valve for Slave Pump Kit P/N 330020-416 & Interlock Relay	Non-Vented SwiftCheck Valve for each Slave pump Kit P/N 330020-416
				Red Jacket Pressurstat Assy.					
		848480-003		SwiftCheck (in PLLD kit)	848480-003		SwiftCheck (in PLLD kit)		
	Standard (All models)	848480-003	849490-002 (except CPT)	SwiftCheck (in W/PLLD kits)	848480-003	849490-002 (except CPT)	SwiftCheck (in W/PLLD kits)		
		848480-001	849490-003 (except CPT)	Red Jacket Pressurstat Assy.					
	Maxxum Big-Flo			None Required				Interlock Relay	None Required
	FE Petro	848480-001	849490-001	FE Petro Model R P/N 400988932 and replacement O-ring for the valve housing	848480-001	849490-001	FE Petro Model R P/N 400988932, and replacement O-ring for the valve housing	Non-Vented SwiftCheck Valve for Slave Pump Kit P/N 330020-416 OR FE Petro 65 psi Relief Check Valve (FE P/N 402459931) And Interlock Relay	Non-Vented SwiftCheck Valve for each Slave pump Kit P/N 330020-416 OR FE Petro 65 psi Relief Check Valve (FE P/N 402459931)
	Tokheim & Bennett	848480-003		SwiftCheck (in PLLD kit)	848480-003		SwiftCheck (in PLLD kit)	Non-Vented SwiftCheck Valve for Slave Pump Kit P/N 330020-416 And Interlock Relay	Non-Vented SwiftCheck Valve for each Slave pump Kit P/N 330020-416

Not Supported

Notes:

Veeder-Root does not warrant the performance of FE Petro's Model 'R' check valve or 65 psi relief check valve.

Hardware Required to Configure PLLD Systems in New TLS-350 Series Systems

Pressurized Line Leak Detector (PLLD)

Order one per line.

MODEL NO.	ITEM
848480-003	PRESSURIZED LINE LEAK DETECTOR WITH SWIFTCHECK VALVE
848480-001	PRESSURIZED LINE LEAK DETECTOR WITHOUT SWIFTCHECK VALVE

PLLD Modules

Pressurized Line Leak Detection Modules

One Pressurized Line Leak Detector Interface Module for up to six line leak detectors, and one Pressurized Line Leak Controller Module for up to three line leak detectors must be ordered separately.

MODEL NO.	ITEM
330843-001	SIX INPUT PRESSURIZED LINE LEAK INTERFACE MODULE (MAXIMUM 1 PER CONSOLE)
330374-001	THREE OUTPUT PRESSURIZED LINE LEAK CONTROLLER MODULE (MAXIMUM 2 PER CONSOLE)

Pressurized Line Leak Detection Precision Testing Software Module

Precision line leak detection capability (0.2 gph / 0.1 gph) requires one SEM (Software Enhancement Module) per system that must be ordered separately from the table below. Not required for 3.0 gph only line leak detection capability.

TESTING OPTION	TLS-350/TLS-350PLUS/ TLS-350R WITHOUT BIR (SEM P/N)	TLS-350R WITH BIR (SEM P/N)
ULTIMATE TESTING	330160-010	330160-110
RISK MANAGEMENT	330160-060	330160-160
BASE COMPLIANCE	330160-050	330160-150
3.0 GPH	INCLUDED*	INCLUDED*

*A SEM is not required for 3 GPH only testing.

Precision Testing Frequencies

On-Demand (D)

Testing can be initiated manually through the TLS Console or by programming a date and time into memory.

Auto (A)

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.

Monthly (M)

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.

Repetitive (R)

Tests will run repetitively according to pre-programmed time intervals.

Refer to the matrix below to determine which precision testing option best meets your needs:

TESTING OPTION	0.2 GPH TESTS	0.1 GPH TESTS
ULTIMATE TESTING	D, M, R	D, A, R
RISK MANAGEMENT	D, M, R	D, A
BASE COMPLIANCE	None	D, A

PLLD Accessories and Spare Parts for Existing TLS-350 Series Systems

The following PLLD accessories and spare parts are available:

MODEL NO.	ITEM
331014-001	SWIFTCHECK VALVE (INSTALLS IN THE PUMP'S MECHANICAL LEAK DETECTOR PORT)
847490-109	SIX INPUT PLLD INTERFACE MODULE (THROUGH-HOLE MOUNT) - REPLACEMENT ONLY
847490-110	SIX INPUT PLLD INTERFACE MODULE (SURFACE MOUNT)
331689-001	NON-VENTED SWIFTCHECK

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.

Hardware Required for WPLLD Systems in New TLS-350 Series Systems

Wireless Pressurized Line Leak Detector (WPLLD)

Order one per line.

MODEL NO.	ITEM
849490-001	WPLLD KIT - FOR FE PETRO PUMPS[1]
849490-002	WPLLD KIT WITH SWIFTCHECK VALVE - FOR RED JACKET PUMPS (EXCLUDING QUANTUM)[2]
849490-003	WPLLD KIT - 3 GPH ON RED JACKET PUMPS (EXCLUDING QUANTUM)[3]
849490-004	WPLLD KIT W/O SWIFTCHECK VALVE FOR RED JACKET PUMPS (EXCLUDING QUANTUM)
849490-005	WPLLD KIT - FOR RED JACKET QUANTUM PUMPS[4]
849490-006	WPLLD KIT - FOR THE RED JACKET PUMP

[1]Contains Line Leak Sensor, and installation kit for FE Petro pumps. Requires FE Petro Model R Check Valve, P/N 400988932.

[2]Contains Line Leak Sensor, SwiftCheck valve, and installation kit for Red Jacket pumps.

[3]Supports 3 GPH testing only. Contains Line Leak Sensor, and installation kit for Red Jacket pumps. Requires Red Jacket's Pressurstat Assembly models 323-001-5 or 323-002-5. Does not support precision (0.2 GPH or 0.1 GPH) line testing.

[4]Contains Line Leak Sensor and installation kit for Red Jacket Quantum pumps. Requires purchase of SpikeCheck valve, P/N 388-080-5, from Red Jacket.

Wireless Pressurized Line Leak Detection Modules

One or more of each module required. One WPLLD AC Interface Module (P/N 330874-001) and one Communications Module (P/N 330883-001) per console must be ordered. Additionally, one WPLLD controller module (P/N 330841-001) for up to 3 lines required (maximum 4 modules per console).

MODEL NO.	ITEM
330874-001	WPLLD AC INTERFACE MODULE (MAXIMUM 1 PER CONSOLE)
330883-001	COMMUNICATIONS MODULE (MAXIMUM 1 PER CONSOLE)
330841-001	WPLLD CONTROLLER MODULE (MAXIMUM 4 PER CONSOLE)

Wireless Pressurized Line Leak Detection Precision Testing Software (Optional)

Precision line leak detection capability requires one SEM (Software Enhancement Module) per system from the table below. Not required for 3.0 gph only line leak detection capability.

TESTING OPTION	TLS-350 / TLS-350 PLUS / TLS-350R WITHOUT BIR (SEM P/N)	TLS-350R WITH BIR (SEM P/N)
ULTIMATE TESTING	330160-010	330160-110
RISK MANAGEMENT	330160-060	330160-160
BASE COMPLIANCE	330160-050	330160-150
3.0 GPH	INCLUDED*	INCLUDED*

*Software enhancement module not required for 3 GPH testing.

Precision Testing Frequencies

On-Demand (D)

Testing can be initiated manually through the TLS Console or by programming a date and time into memory.

Auto (A)

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.

Monthly (M)

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.

Repetitive (R)

Tests will run repetitively according to pre-programmed time intervals.

Refer to the matrix below to determine which precision testing option best meets your needs:

TESTING OPTION	0.2 GPH TESTS	0.1 GPH TESTS
ULTIMATE TESTING	D, M, R	D, A, R
RISK MANAGEMENT	D, M, R	D, A
BASE COMPLIANCE	NONE	D, A

WPLLD Accessories & Spare Parts for Existing TLS-350 Series Systems

The following WPLLD accessories and spare parts are available:

MODEL NO.	ITEM
330020-290	WIRELESS REPLACEMENT TRANSDUCER FOR RED JACKET PUMPS
330020-291	WIRELESS REPLACEMENT TRANSDUCER FOR FE PETRO PUMPS
330773-001	SWIFTCHECK VALVE FOR WPLLD
330841-001	WPLLD CONTROLLER MODULE
330874-001	WPLLD AC INTERFACE MODULE
330883-001	WPLLD COMMUNICATIONS MODULE
331689-001	NON-VENTED SWIFTCHECK

Configuring VLLD Systems

A complete VLLD system for the TLS-350/350R Console requires:

Volumetric Line Leak Detector Kits

Order one or the other per line depending on system installed.

MODEL NO.	ITEM
847590-001	VOLUMETRIC LINE LEAK DETECTOR KIT (INCLUDES PUMP PORT STRAINER) - FOR VLLD SYSTEM
847590-101	HIGH CAPACITY VOLUMETRIC LINE LEAK DETECTOR KIT - FOR HVLLD SYSTEM*

*A strainer of 60-mesh or finer is required. For 2-inch discharge pumps with leak detector port, the V-R pump port strainer, P/N 329861-001, can be used. When the pump port strainer cannot be used, an in-line strainer such as the Morrison P/N 286-U is required.

VLLD Module

MODEL NO.	ITEM
329398-001	ONE INPUT LINE LEAK INTERFACE (ONE REQUIRED PER LINE LEAK DETECTOR. MAXIMUM 8 PER CONSOLE)

Pump Port Strainer

MODEL NO.	ITEM
329861-001	PUMP PORT STRAINER

Thermistor

Using a thermistor can shorten the line test for lines less than 500 feet.

MODEL NO.	ITEM
576010-856	THERMISTOR (ONE PER CONSOLE FOR LINE LEAK DETECTION)

VLLD Accessories

The following VLLD accessories are available:

VLLD Installation Cable

VLLD cables shown in the table below contain bundled wires which eases cable installation.

Model No.	Item
330221-001	250 FT. 8-CONDUCTOR LINE LEAK DETECTOR INSTALLATION CABLE
330221-002	500 FT. 8-CONDUCTOR LINE LEAK DETECTOR INSTALLATION CABLE
330221-101	250 FT. 11-CONDUCTOR LINE LEAK DETECTOR INSTALLATION CABLE
330221-102	500 FT. 11-CONDUCTOR LINE LEAK DETECTOR INSTALLATION CABLE

VLLD Troubleshooting Kit

The kit in the table below is recommended for each service technician repairing VLLD systems.

Model No.	Item
330020-035	VOLUMETRIC LINE LEAK DETECTOR TROUBLESHOOTING KIT (INCLUDES: PRESSURE GAUGE, FLARE CAPS, SPARE CHECK VALVE FILTERS, FILTER REMOVAL TOOL, AND TROUBLESHOOTING GUIDE)

Special Installations

Manifolded Line Applications

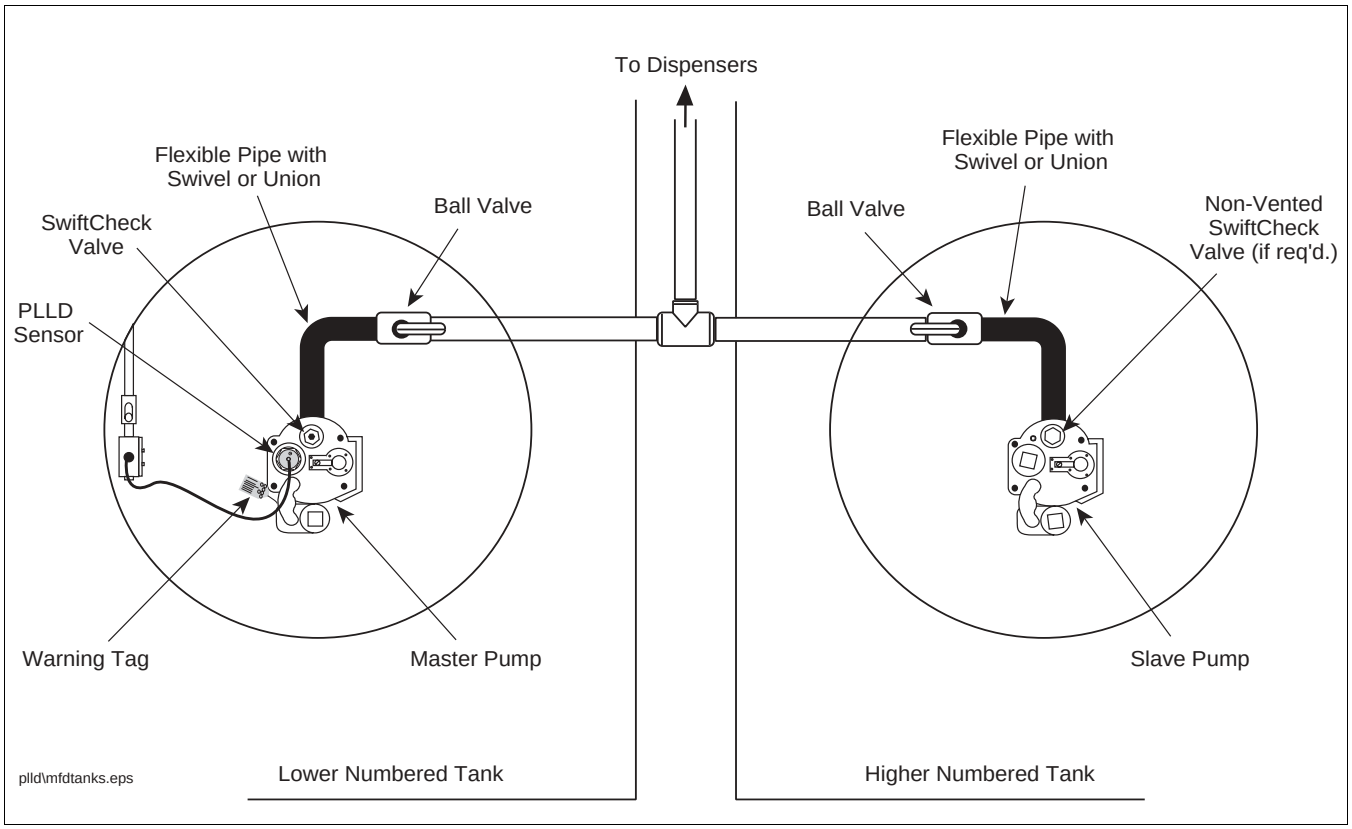
PLLD, WPLLD, and VLLD leak detection systems can handle product lines supplied by multiple tanks and pumps, to a maximum of 8 tanks and pumps per product line.

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 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.

A relay on a Four-Relay module or I/O Combination module 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 PLLD is shown below:



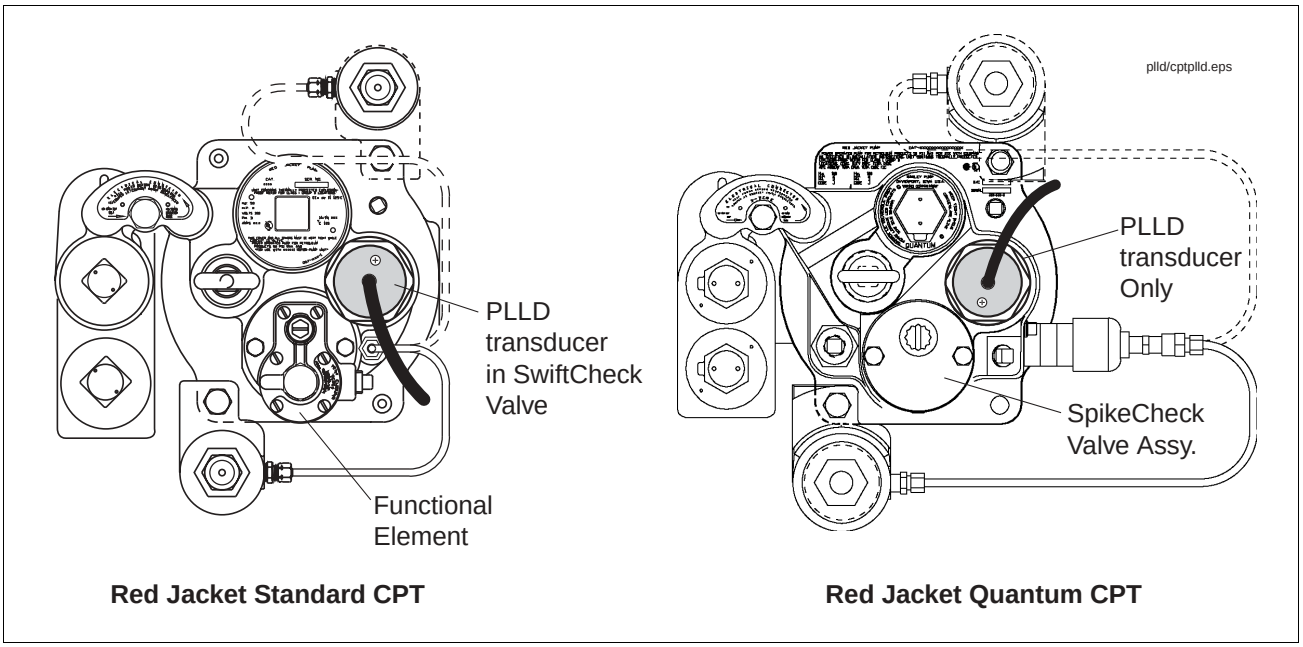
Transducer Installation - Red Jacket CPT and Quantum CPT Pumps

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.

   IMPORTANT! Seal any pipe threads using a UL-classified, nontoxic pipe sealant suitable for the fuel involved. The figure below illustrates two PLLD transducer installations in Red Jacket CPT pumps - consult “PLLD and WPLLD Check Valves” on page 5, to determine what check valve you will need to install to perform your intended level of testing.
2. Verify that the console has Version x19 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.

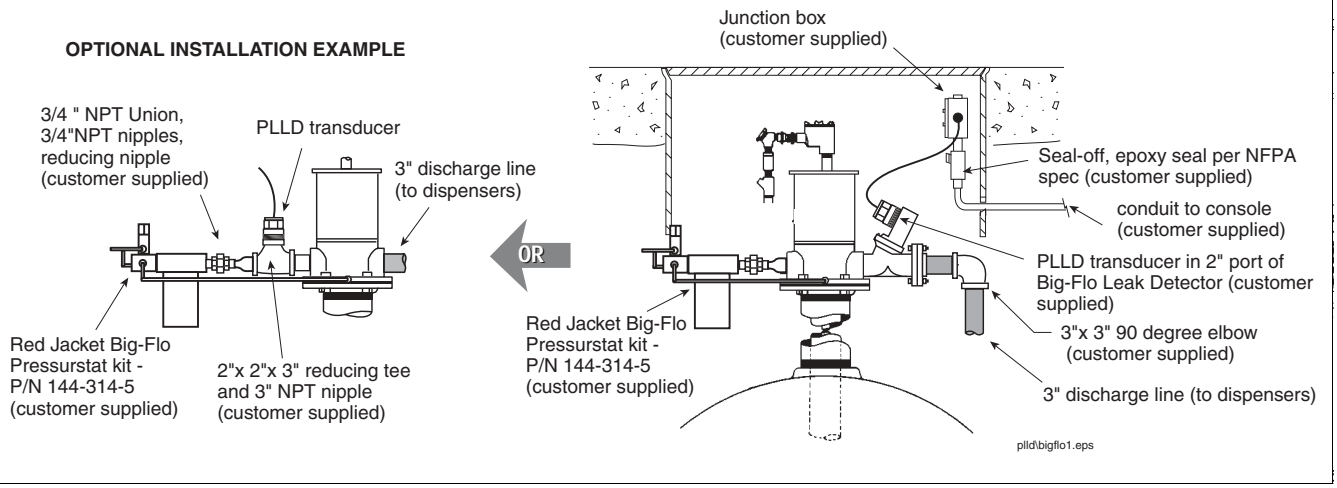


Transducer Installation - Red Jacket Big-Flo and Maxxum Pumps

BIG-FLO PUMPS

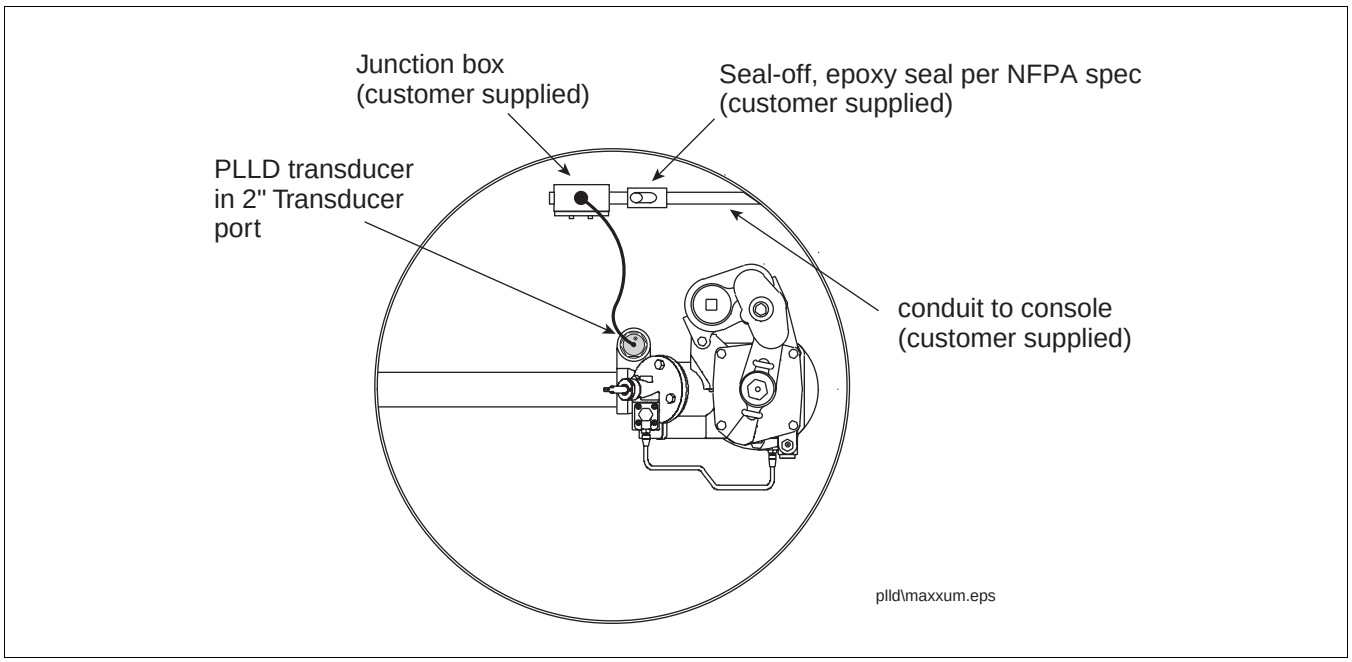
1. You will need to install a reducing tee (customer supplied) in either of the 3-inch discharge ports of the pump with the 2-inch opening facing up. If you have the room, it may be easier to install this tee between the Pressurstat kit and the unused port instead of in the discharge line (as shown in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

   IMPORTANT! Seal any pipe threads using a UL-classified, nontoxic pipe sealant suitable for the fuel involved.
4. Verify that the console has Version x19 or later software.



MAXXUM PUMPS

1. Thread the PLLD transducer into the 2-inch opening of the transducer port.
   IMPORTANT! Seal any pipe threads using a UL-classified, non-toxic pipe sealant suitable for the fuel involved.
2. Verify that the console has Version x19 or later software.



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