

## Franklin Fueling Systems

### FMP-LS500 RS-485 and 4-20mA ELLD sensors with EVO Series consoles (for Rigid, Flexible or Hybrid Combination of Rigid and Flexible Pipelines)

#### AUTOMATIC ELECTRONIC LINE LEAK DETECTOR

- Certification** Leak rate of 3.0 gph at 10 psi\* with PD = 100% and PFA = 0%.  
 Leak rate of 0.2 gph at operating pressure with PD = 100% and PFA = 0%.  
 Leak rate of 0.1 gph at 1.5 times operating pressure\* with PD = 100% and PFA = 0%.  
 \*Since leak rate varies as a function of pressure, this leak rate and pressure were certified using an equivalent leak rate and pressure, in accordance with an acceptable protocol.
- Leak Threshold** 1.5 gph for leak rate of 3.0 gph.  
 0.1 gph for leak rate of 0.2 gph.  
 0.05 gph for leak rate of 0.1 gph.  
 A pipeline system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.
- Applicability** Gasoline, diesel, aviation fuels, fuel oil #4, waste oil, kerosene, biodiesel B6-B20 meeting ASTM D7467, biodiesel B100 meeting ASTM D6751.
- Specification** On pressurized rigid, flexible, or combination rigid and flexible pipelines, system can perform 3.0 gph, 0.2 gph, and 0.1 gph tests.  
 Tests are conducted at operating pressure.
- Pipeline Capacity** Maximum line capacity for **Hourly** testing using bulk modulus limits:

Example Pipeline	Evaluated Volume (gallons)	Evaluated Bulk Modulus (PSI)	Example Bulk Modulus (PSI)	Multiplier to Convert Evaluated Volume to Equivalent Example Pipeline Volume (multiplier)	Pressure Drop per ML on Evaluated Line (PSI)	Line Volume Equivalent to Evaluated Line Volume Based on Bulk Modulus (gallons)	Maximum Pipeline Volume Allowed for Specific Bulk Modulus (gallons)
Evaluated Pipeline	601.01	19288	-	1.000	0.0085	-	1202.02
1	-	-	5000	0.259	-	155.80	311.60
2 (APT pipeline)	-	-	5025.24	0.261	-	156.59	313.17
3	-	-	7500	0.389	-	233.70	467.40
4 (UPP pipeline)	-	-	10000	0.518	-	311.60	623.20
5	-	-	12500	0.648	-	389.50	778.99
6	-	-	15000	0.778	-	467.40	934.79
7	-	-	17500	0.907	-	545.30	1090.59
8	-	-	20000	1.000	-	601.01	1202.02*
9	-	-	25000	1.000	-	601.01	1202.02*
10	-	-	30000	1.000	-	601.01	1202.02*
11	-	-	35000	1.000	-	601.01	1202.02*
12	-	-	40000	1.000	-	601.01	1202.02*
13	-	-	50000	1.000	-	601.01	1202.02*
14	-	-	60000	1.000	-	601.01	1202.02*
15	-	-	70000	1.000	-	601.01	1202.02*
16	-	-	80000	1.000	-	601.01	1202.02*

Maximum line capacity for **Monthly and Annual** testing using bulk modulus limits:

Example Pipeline	Evaluated Volume (gallons)	Evaluated Bulk Modulus (PSI)	Example Bulk Modulus (PSI)	Multiplier to Convert Evaluated Volume to Equivalent Example Pipeline Volume (multiplier)	Pressure Drop per ML on Evaluated Line (PSI)	Line Volume Equivalent to Evaluated Line Volume Based on Bulk Modulus (gallons)	Maximum Pipeline Volume Allowed for Specific Bulk Modulus (gallons)
Evaluated Pipeline	279.51	34601	-	1.000	0.0237	-	559.02
1	-	-	5000	0.145	-	40.39	80.78
2 (APT pipeline)	-	-	5025.24	0.145	-	40.59	81.19
3	-	-	7500	0.217	-	60.59	121.17
4 (UPP pipeline)	-	-	10000	0.289	-	80.78	161.56
5	-	-	12500	0.361	-	100.98	201.95
6	-	-	15000	0.434	-	121.17	242.34
7	-	-	17500	0.506	-	141.37	282.73
8	-	-	20000	0.578	-	161.56	323.12
9	-	-	25000	0.723	-	201.95	403.90
10	-	-	30000	0.867	-	242.34	484.69
11	-	-	35000	1.000	-	279.51	559.02*
12	-	-	40000	1.000	-	279.51	559.02*
13	-	-	50000	1.000	-	279.51	559.02*
14	-	-	60000	1.000	-	279.51	559.02*
15	-	-	70000	1.000	-	279.51	559.02*
16	-	-	80000	1.000	-	279.51	559.02*

**Waiting Time**

None between delivery and testing.  
 None between dispensing and testing for leak rate of 3.0 gph.  
 Depending on temperature stability, 1½ to 10 hours between dispensing and testing for leak rates of 0.2 gph and 0.1 gph.

**Test Period**

Response time is 12 to 19 minutes for leak rate of 3.0 gph.  
 Minimum of 75 minutes for leak rate of 0.2 gph.  
 Minimum of 605 minutes for leak rate of 0.1 gph.  
 Test data are acquired and recorded by a microprocessor.

**System Features**

Permanent installation on pipeline.  
 Automatic testing of pipeline every 45 minutes for leak rate of 3.0 gph.  
 Automatic testing of pipeline when pump has been idle for 2 hours for leak rate of 0.2 gph.  
 Automatic testing of pipeline when pump has been idle for 3½ hours for leak rate of 0.1 gph.  
 Pump shutdown, indicator light and alarm activation if leak is declared for 3.0 gph and 0.2 gph tests.

**Calibration**

System must be checked annually and, if necessary, calibrated in accordance with manufacturer's instructions.

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 Dates of Evaluations: 09/23/2024