Australian Government
Department of Industry, Science, Energy and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Supplementary Certificate of Approval

NMI S291A

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Red Jacket Model P75S3-3 Submersible Turbine Pump

submitted by Veeder-Root Company
2709 Route 764
Duncansville PA 16635
USA

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 117 Measuring Systems for Liquids Other than Water, dated June 2011.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 to 4 approved – certificate issued	22/03/02
1	Pattern amended & reviewed – notification of change issued	25/02/08
2	Pattern & variants 1 to 4 reviewed & updated – variants 5 & 6 approved – certificate issued	31/05/13
3	Variant 7 approved – certificate issued	10/09/20

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI (or NSC) S291A' and only by persons authorised by the submittor.

Instruments incorporating a component purporting to comply with this approval shall be marked 'NMI (or NSC) S291A' in addition to the approval number of the instrument, and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

Darryl Hines
Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No S291A

1. Description of Pattern approved on 22/03/02

The Red Jacket STANDARD model P75S3-3 submersible turbine pump with leak detector (Figures 1 to 3) is intended for supplying fuel at a rate of up to 180 L/min to one or more NMI-approved fuel dispensers and to detect leakage of fuel.

The pattern comprises:

- One or more Red Jacket model P75S3-3 100 mm submersible turbine pumps; and
- One or more Red Jacket models FX2V 116-057, FX2DV 116-059, FX1V 116-056-5 or FX1DV 116-058-5 mechanical leak detectors.

1.1 Field of Operation

- The submersible turbine pump is designed to supply liquid to a fuel dispenser at a maximum flow rate of 197 L/min and to detect leakage of fuel.
- The leak detector is designed to sense a pipeline leakage equivalent to 189 mL/min or more, at 69 kPa gauge pressure. When a leak is detected, the leak detector automatically restricts the flow of delivery equivalent to 11 L/min or less at pump pressure of up to 3.5 kPa.
- The submersible turbine pump is for use with fuel dispensers approved for accuracy Class 0.5, metering liquids having a dynamic viscosity in the range 0.5 to 20 mPa.s (at 20ºC).
- For use with fuel dispensers Commission-approved for use with submersible turbine pumps.
- The piping, the size and the number of pumps are installed such that, for all possible operating combinations of deliveries, each measurement transducer is maintained within the approved flow rate range.
- The submersible turbine pump is installed in a manner such that the flowmetering system is at all times maintained at a positive pressure.

A typical installation is shown in Figure 2.

1.2 Markings

Instruments are marked with the following data, together in one location on a data plate or on a metal tag sealed to the top housing of the submersible turbine pump:

Manufacturer’s identification mark or trade mark	Red Jacket, PA, USA
Manufacturer’s designation (model number)	...
Serial number	...
Year of manufacture	...
Pattern approval number	NMI (or NSC) S291A

1.3 Verification Mark and Sealing Provision

There is no requirement for the application of the verification mark to, nor for the sealing of, the pattern or variants. The verification mark is applied to the fuel dispenser to which the pattern or variants approved herein is installed, in accordance with the requirements of the approval documentation for the dispenser.

2. Description of Variant 1 **approved on 22/03/02**

With certain models of Red Jacket mechanical leak detectors, namely:

- Model FX1V;
- Model FX1DV;
- Model FX2V; and
- Model FX2DV.

3. Description of Variant 2 **approved on 22/03/02**

With a Veeder-Root model PLLD electronic line leak detection system.

4. Description of Variant 3 **approved on 22/03/02**

Certain other models and flow rate capacities of Red Jacket submersible turbine pumps, namely:

- Model P150S3-3 100 mm – for deliveries up to 273 L/min;
- Model P300H17-3HB *BigFlo* 150 mm – for deliveries up to 620 L/min; and
- Model P500H17-3K *BigFlo* 150 mm – for deliveries up to 980 L/min.

5. Description of Variant 4 **approved on 22/03/02**

With a Red Jacket model *BigFlo* diaphragm valve leak detector, in addition to the mechanical leak detectors of variant 1 (Figures 4 and 5).

6. Description of Variant 5 **approved on 31/05/13**

Certain other models and flow rate capacities of Red Jacket submersible turbine pumps (Figures 6 to 8), namely:

- Model The Red Jacket P75U3-3RJX 100 mm – for deliveries up to 180 L/min;
- Model The Red Jacket P150U3-3RJX 100 mm – for deliveries up to 273 L/min; and
- Model The Red Jacket P200U3-4RJX 100 mm – for deliveries up to 310 L/min.

7. Description of Variant 6 **approved on 31/05/13**

Certain other models and flow rate capacities of Red Jacket Maxxum submersible turbine pumps (Figure 9), namely:

- Model MXP300J17-3HB Maxxum 150 mm – for deliveries up to 620 L/min; and
- Model MXP500J17-3K Maxxum 150 mm – for deliveries up to 980 L/min.

8. Description of Variant 7 approved on 10/09/20

Certain other models and flow rate capacities of Red Jacket submersible turbine pumps, namely:

- Model P75U17-3RJX 100mm, three phase – for deliveries up to 180 L/min;
- Model P150U17-3RJX 100mm, three phase – for deliveries up to 273 L/min;
- Model P200U17-4RJX 100mm, three phase – for deliveries up to 310 L/min;
- Model AGP75S3-3RJX 100mm, single phase – for deliveries up to 180 L/min;
- Model AGP150S3-3RJX 100mm, single phase – for deliveries up to 273 L/min;
- Model AGP200S3-4RJX 100mm, single phase – for deliveries up to 310 L/min;
- Model AGP75S17-3RJX 100mm, three phase – for deliveries up to 180 L/min;
- Model AGP150S17-3RJX 100mm, three phase – for deliveries up to 273 L/min;
- Model AGP200S17-4RJX 100mm, three phase – for deliveries up to 310 L/min;
- Model AGP75S3-3RAX 100mm, single phase – for deliveries up to 180 L/min;
- Model AGP150S3-3RAX 100mm, single phase – for deliveries up to 273 L/min;
- Model AGP200S3-4RAX 100mm, single phase – for deliveries up to 310 L/min;
- Model AGP75U17-3RAX 100mm, three phase – for deliveries up to 180 L/min;
- Model AGP150U17-3RAX 100mm, three phase – for deliveries up to 273 L/min;
- Model AGP200U17-4RAX 100mm, three phase – for deliveries up to 310 L/min;

TEST PROCEDURE No S291A

Instruments should be tested in accordance with any tests included in the approval documentation for the system in which the pattern is fitted, and accordance with any relevant tests specified in the National Instrument Test Procedures.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

The maximum permissible errors applicable are those specified for the flowmetering system in which the pattern is fitted, as stated in the approval documentation for the system.

1. Minimum Flow Rate Test

Note: This test should be carried out on initial verification. Thereafter, it need not be done at every verification but should be done periodically at the discretion of the verifying authority.

The minimum flow rate test is performed by simultaneously running either all hoses on all fuel dispensers connected to a particular submersible turbine pump (where the number of hoses is 6 or less) or by simultaneously running between 2/3 and 3/4 of all such hoses (where the number of hoses is more than 6). For the purpose of this test, where two or more pumps are connected in parallel, they shall be considered as one pump. Check that the lowest flow rate is not less than the minimum flow rate specified in the approval documentation for the dispenser.

2. Flow Interlock Test

For systems where more than one fuel dispenser (or flowmeter #) is connected to the same submersible turbine pump check that while an authorised delivery is in progress, it is not possible to obtain flow through any other unauthorised flowmeter connected to the same pump.

Begin a delivery from one flowmeter. While this delivery is in progress, attempt to make a delivery from a 2nd flowmeter (flowmeter 2) connected to the same pump WITHOUT flowmeter 2 first being authorised (either locally or remotely) and WITHOUT the indicator reset cycle for flowmeter 2 first being initiated; the delivery for flowmeter 2 should not be possible.

(# - in the case of fuel dispensers with more than one flowmeter.)

Note: To maintain a flowmeter in unauthorised mode while attempting the above test, remove the nozzle from its normal hang-up position while holding down the nozzle hang-up latch so that the indicator reset cycle is not activated.

3. Mechanical Leak Detector Test - The Pattern and Variant 3

Operation of the mechanical leak detector fitted to the Pattern or Variant 3 is tested by the following procedure:

Note: This Test should be carried out on initial verification. Thereafter, it need not be done at every verification but should be done periodically at the discretion of the relevant verifying authority.

This test should only be conducted in the presence of an authorised technician. All air must be out (of the system for the leak detection system to work properly. All fittings should be tight.

Further instructions and safety information is provided in the installation/operation manuals for the mechanical leak detection system.

(a) Ensure that the submersible turbine pump is not turned on during this operation by disabling at the STP control box. Relieve line pressure to zero. Connect a test fixture (pressure gauge and test valve) to the test port of the impact valve (‘safety shut-off valve’) of the fuel dispenser.

(b) Start the test by closing the test valve. The line pressure should be zero (0) as indicated on the pressure gauge. At the control box enable the pump; observe that the pressure gauge reads maximum pump pressure and dispense at least 15 L of fuel to remove any air introduced by installing the test fixture. Turn off the pump and observe that the pressure gauge reads the correct relief pressure.

(c) Start the pump by lifting the operating flap, but leaving the nozzle closed. Adjust the test valve for a flow rate of 189 mL in 1 minute at 69 kPa. Leave the test valve set and turn the pump off. Wait until flow ceases from the valve and the test gauge reads zero.

(d) With the test valve adjusted, start the pump by lifting the operating flap, but leaving the nozzle closed. A steady stream of fuel should be observed to flow from the test valve. The pressure on the gauge should not exceed 110 kPa during this step.

Attempt to deliver fuel from the nozzle. A flow rate of less than 12 L/min indicates correct operation of the leak detector.

(e) Leave the pump running; close the nozzle and then the test valve. Pressure on the test gauge should rise to maximum pump pressure after not more than 10 seconds.

(f) Hang up the nozzle. Observe that the pressure gauge reads the correct relief pressure.

(g) Disable the pump at the control box. Relieve line pressure to zero. Remove the test fixture and replace the plug in the test port. Enable the pump, and dispense at least 15 L of fuel from the dispenser to remove any air introduced into the system.

4. Mechanical Leak Detector Test - Variant 1

The mechanical leak detection system fitted to Variant 1 is tested in accordance with the procedures specified in the Red Jacket Petroleum Equipment publication entitled *Test Procedures for Mechanical Leak Detectors (issue 051-272, Rev A 11/96*.

5. Electronic Leak Detector Test - Variant 2

Operation of the electronic leak detection system is tested by the following procedure:

Note: This Test should be carried out on initial verification. Thereafter, it need not be done at every verification but should be done periodically at the discretion of the relevant verifying authority.

This test should only be conducted in the presence of an authorised technician. All air must be out (of the system for the leak detection system to work properly. All fittings should be tight.

Further instructions and safety information is provided in the installation/operation manuals for the electronic leak detection system.

5.1 General

(a) Ensure that the submersible turbine pump is not turned on during this operation by disabling at the STP control box. Connect a test fixture (pressure gauge and test valve) to the test port of the impact valve (‘safety shut-off valve’) of the fuel dispenser.

(b) Connect power to the pump at the control box.

(c) Start the test by closing the test valve. The line pressure should be zero (0) as indicated on the pressure gauge. Start the submersible pump and dispense at least 15 litre of fuel to remove any air introduced by installing the test fixture.

(d) Installation is now ready for the leak tests.

5.2 Standard Leak Test

(a) Close the test valve and reconnect the power to the submersible pump. Make sure that all the nozzles are closed.

Run the pump from the electronic leak detector control panel by pressing ‘TEST’, then the pump number, and then ‘ENTER’. The pump will now run for approximately 5 seconds and then stop. During the running of the pump the pressure on the pressure gauge is approximately 220 kPa; at rest the pressure should be approximately 80 kPa.

(b) Open the test valve so that a fine, steady, unbroken stream of fuel is observed to flow from the test valve. The pressure drop from 80 kPa to 35 kPa should take between 10 seconds and 30 seconds.

Between approximately 300 and 400 ml of fuel should drain from the system. SIGNIFICANTLY LESS OR MORE INDICATES A SYSTEM FAULT.

(c) Leave the test valve open. The submersible pump will automatically start and run briefly (3-5 seconds with the pressure at approximately 220 kPa) and then stop. The pressure will drop immediately to 80 kPa and steadily drop to 35 kPa.

An audible alarm will sound and 'PUMP ALARM PUMP NR...' will appear on the display of the electronic leak detector control panel. The electronic leak detector will shut down the respective pump.

(d) Pump operation after alarm is affected by programming - attempts to deliver fuel from the nozzle will either be temporarily or permanently inhibited until the system is reset to normal operation. The pressure on the gauge should still be 0 kPa. The pump is switched off and should only be re-started by an authorised technician.

5.3 Catastrophic Leak Test

(a) Close the test valve and reconnect the power to the submersible pump. Make sure that all the nozzles are closed.

Run the pump from the electronic leak detector control panel by pressing 'TEST', then the pump number, and then 'ENTER'. The pump will now run for approximately 5 seconds and then stop. During the run of the pump the pressure on the pressure gauge is approximately 220 kPa; at rest the pressure should be approximately 80 kPa.

(b) Open the test valve quickly so that the pressure drop from 80 kPa to 35 kPa takes less than 8 seconds.

Between approximately 300 and 400 ml of fuel should drain from the system. SIGNIFICANTLY LESS OR MORE INDICATES A SYSTEM FAULT.

(c) An audible alarm will sound and 'PUMP ALARM PUMP NR...' will appear on the display of the electronic leak detector control panel. The electronic leak detector will shut down the respective pump.

(d) Pump operation after alarm is affected by programming - attempts to deliver fuel from the nozzle will either be temporarily or permanently inhibited until the system is reset to normal operation. The pressure on the gauge should still be 0 kPa. The pump is switched off and should only be restarted by an authorised technician.

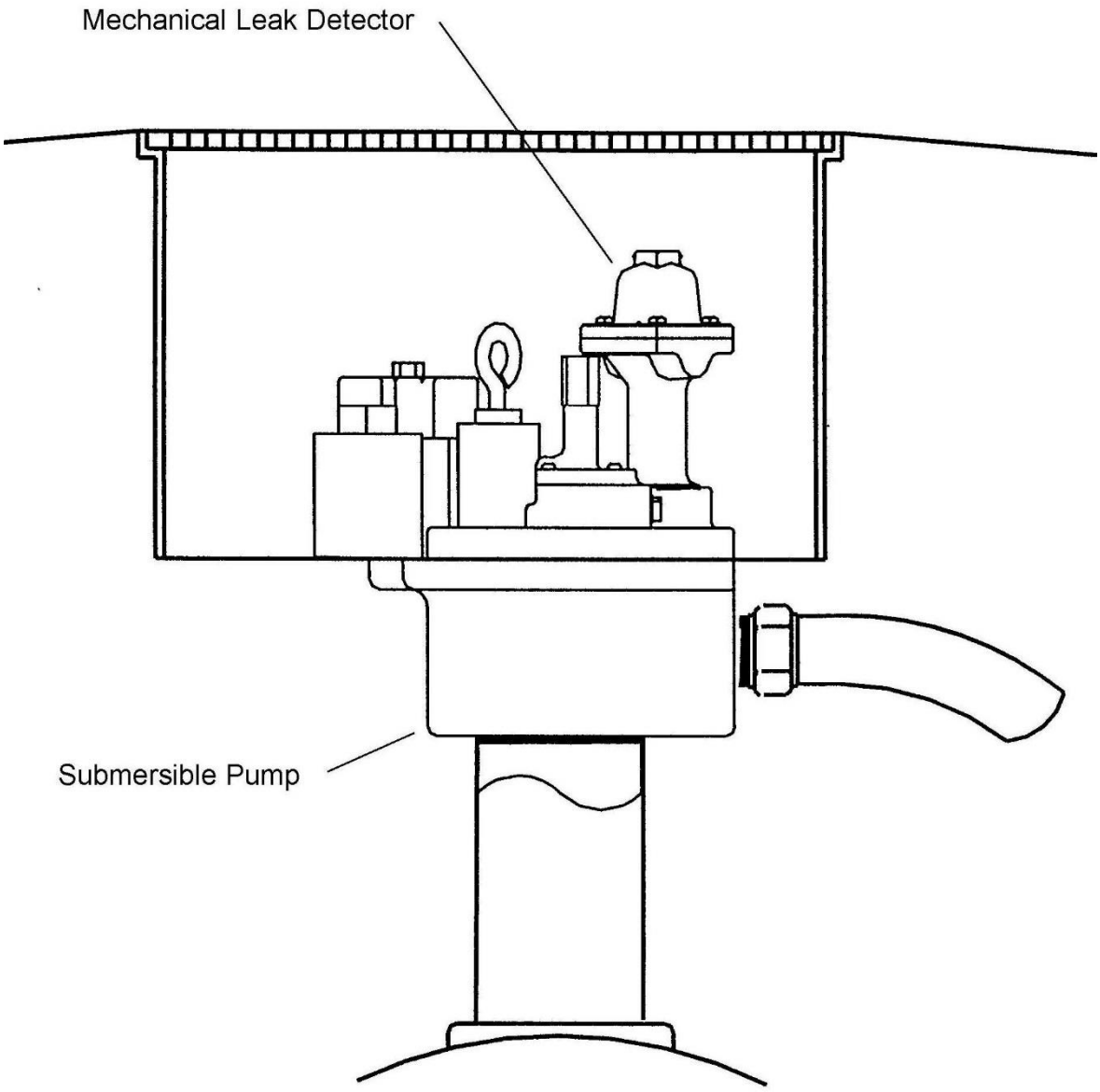
5.4 Further Tests

Repeat tests 5.2 and 5.3 for other submersible turbine pumps.

5.5 At Completion of Electronic Leak Detector Testing

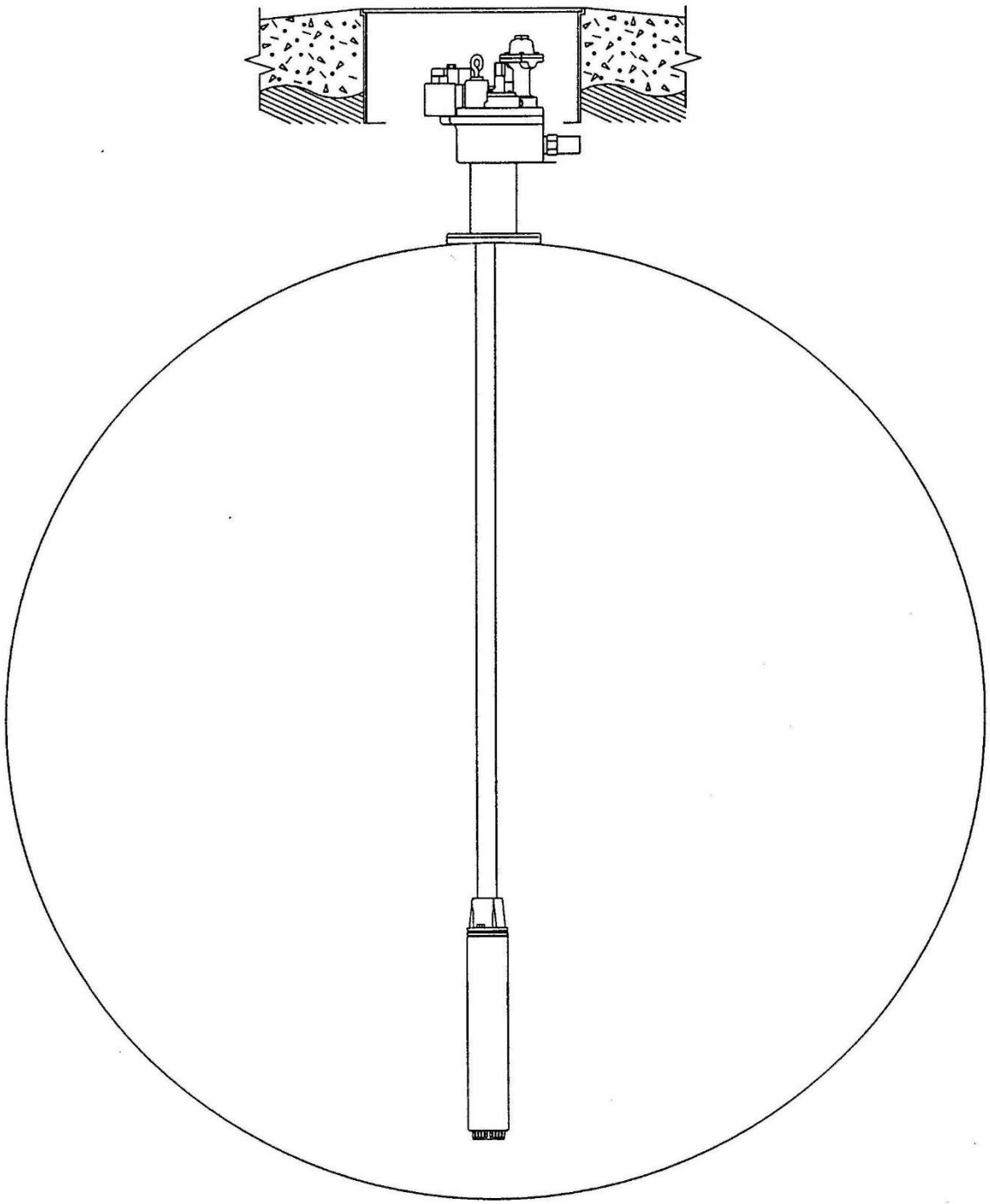
Disable the pump at the control box. Remove the test fixture and replace the plug in the test port. Enable the pump, and dispense at least 15 L of fuel from the dispenser to remove any air introduced into the system.

FIGURE S291A – 1



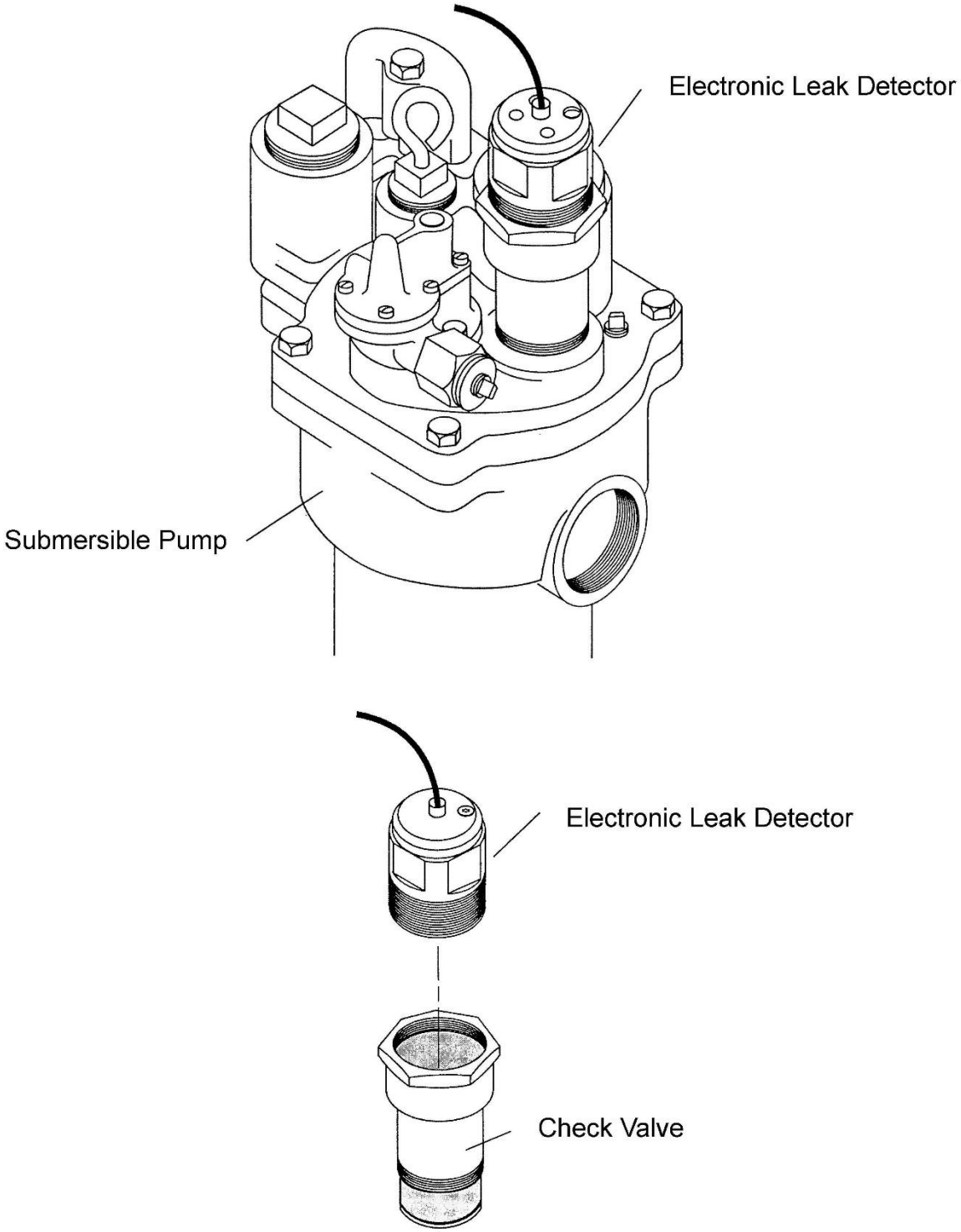
Red Jacket Model P75S3-3 Submersible Turbine Pump

FIGURE S291A – 2



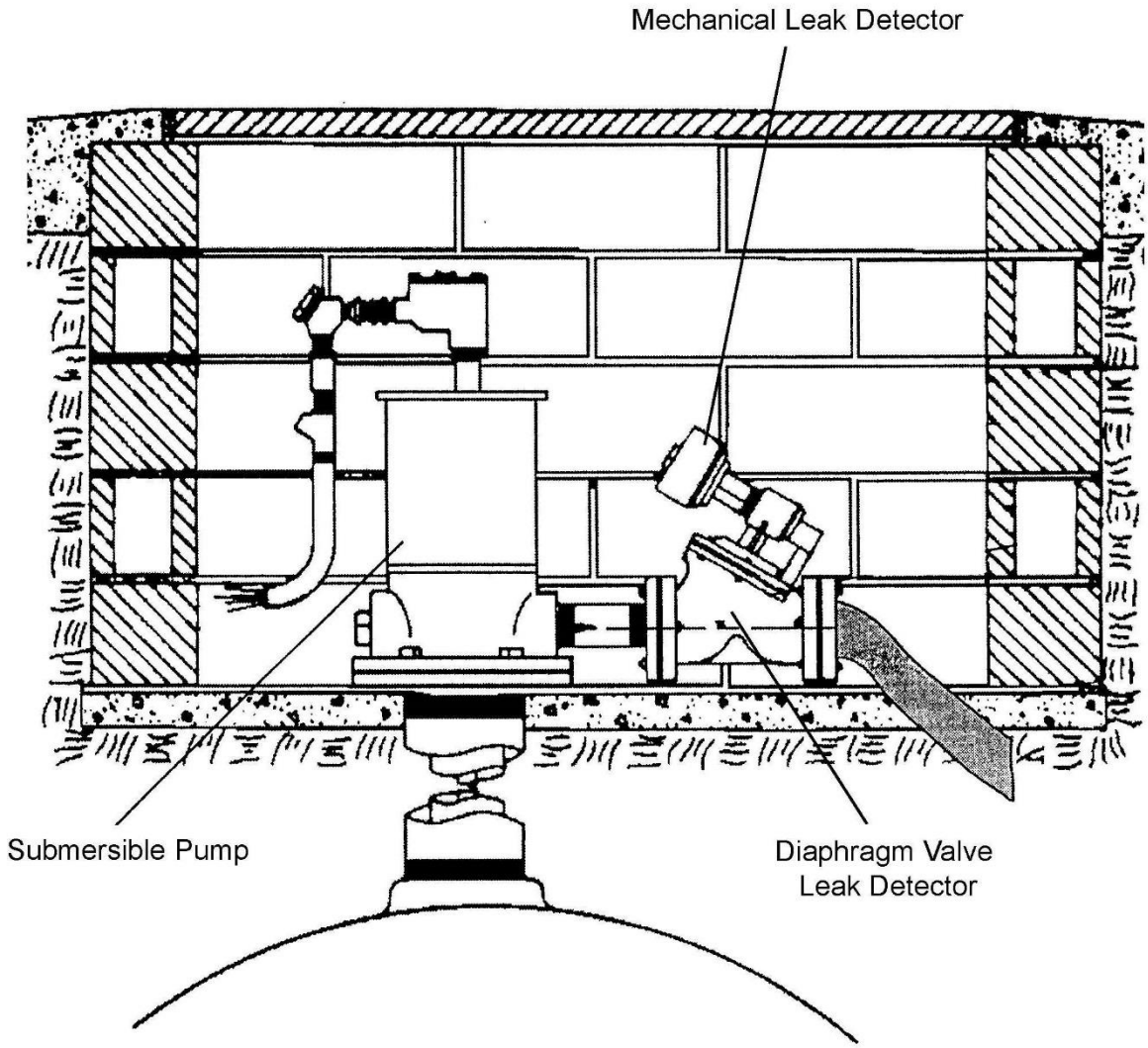
Typical Submersible Pump System - The Pattern and Variant 1

FIGURE S291A – 3



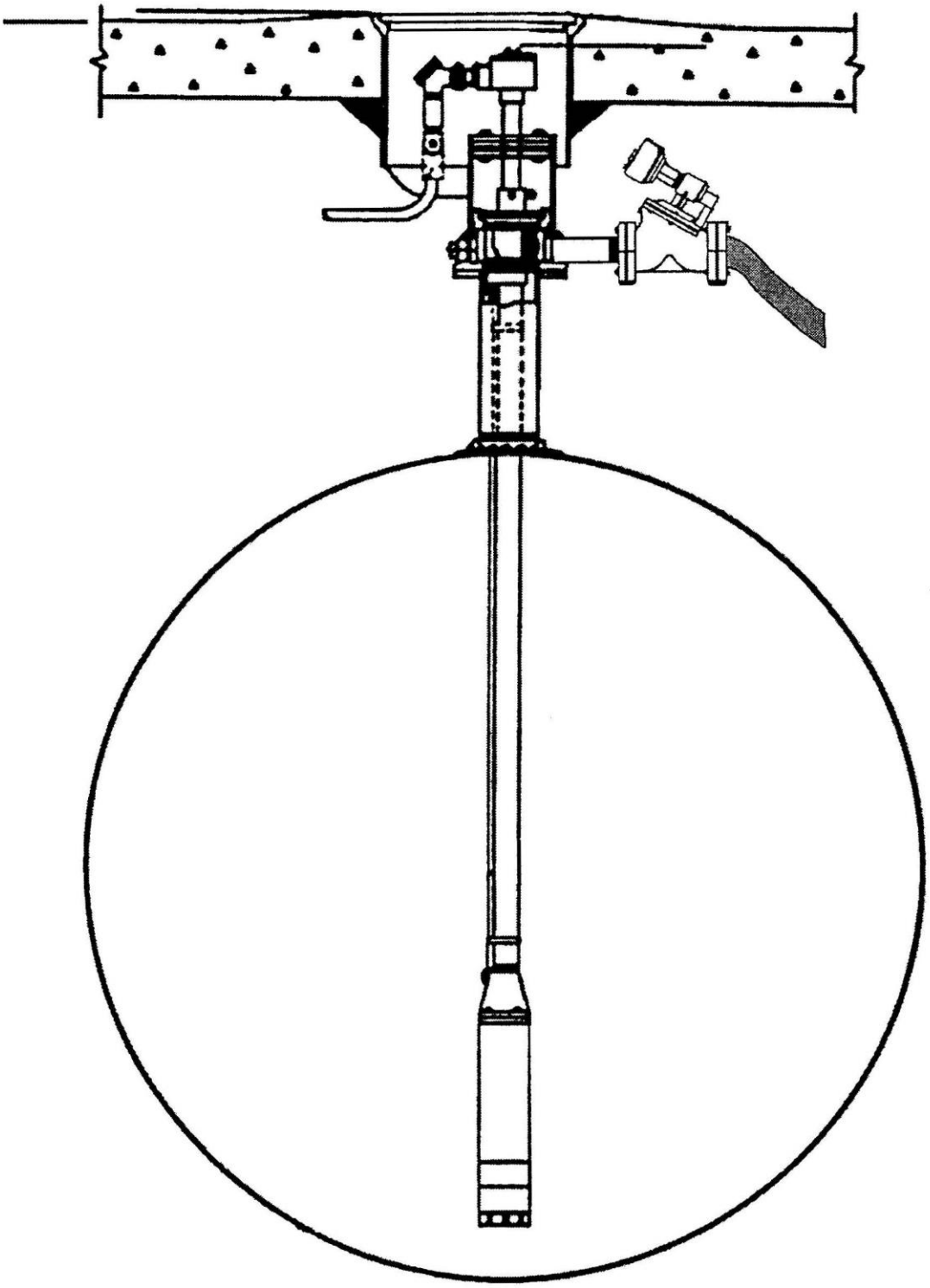
Typical Red Jacket Submersible Pump With Veeder-Root
Electronic Leak Detector – Variant 2

FIGURE S291A – 4



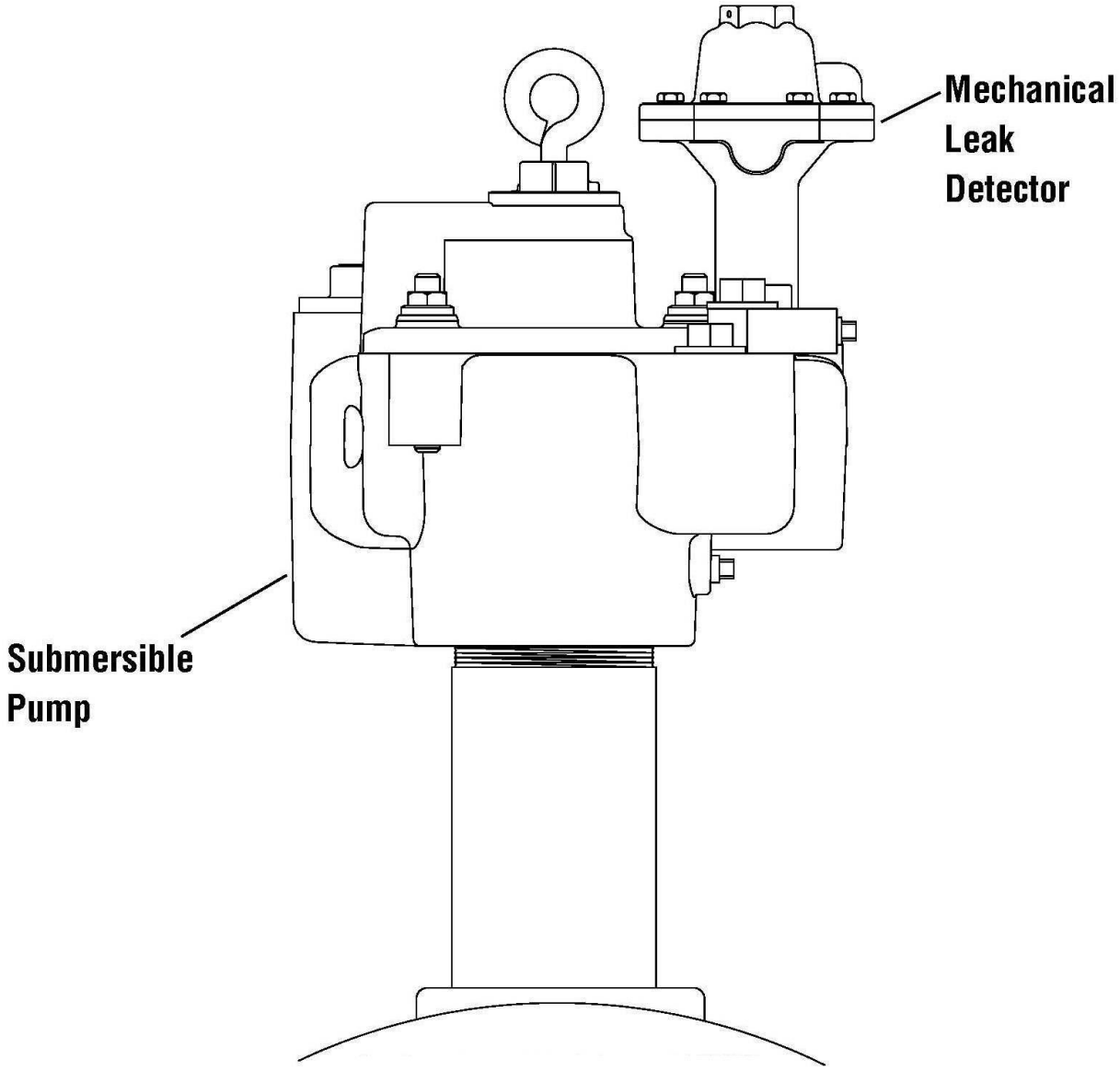
Typical Red Jacket Submersible Pump With Mechanical and Diaphragm Valve Leak Detectors – Variant 4

FIGURE S291A – 5



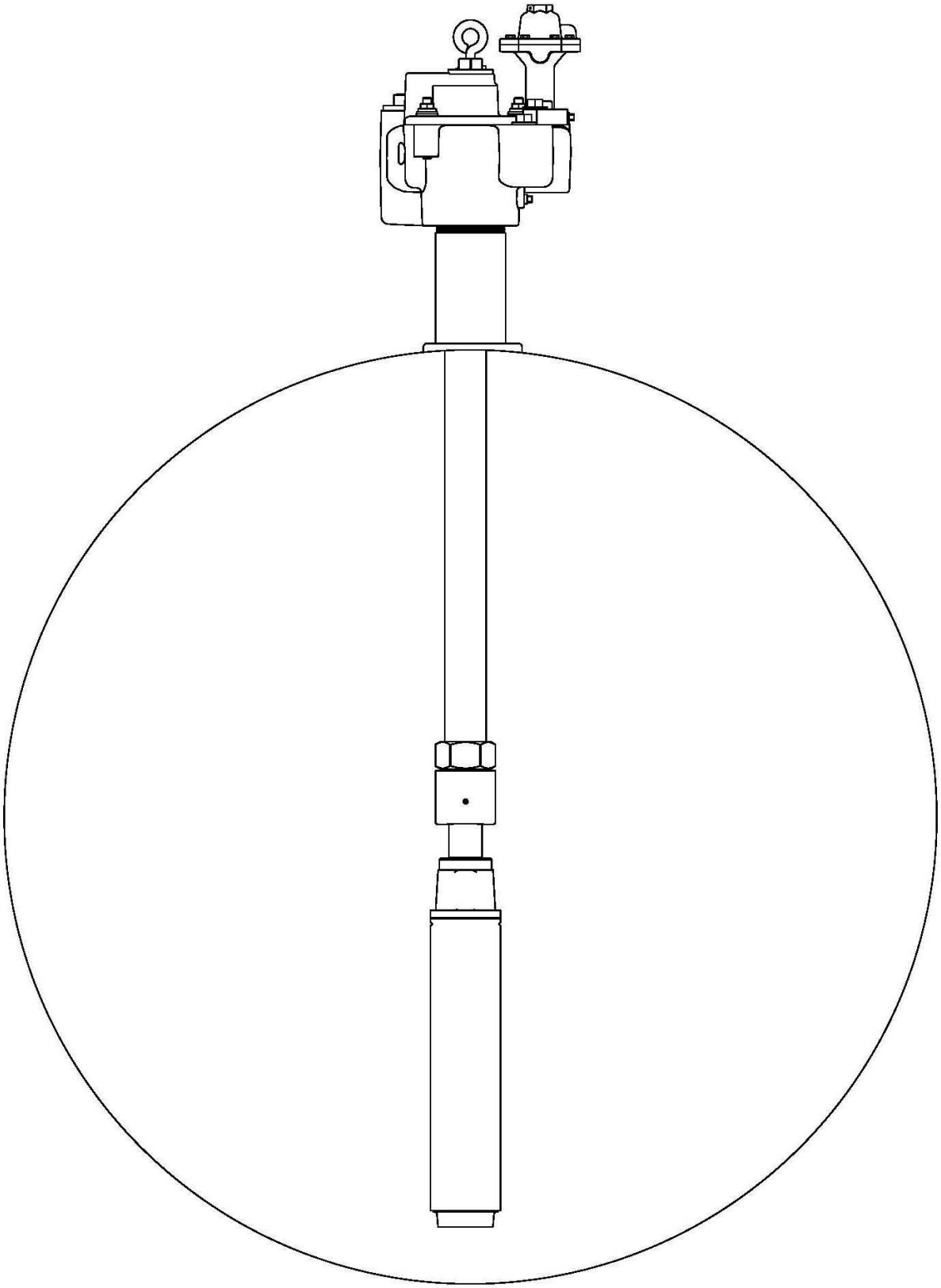
Typical Submersible Pump System With Mechanical and Diaphragm Valve Leak Detectors – Variant 4

FIGURE S291A – 6



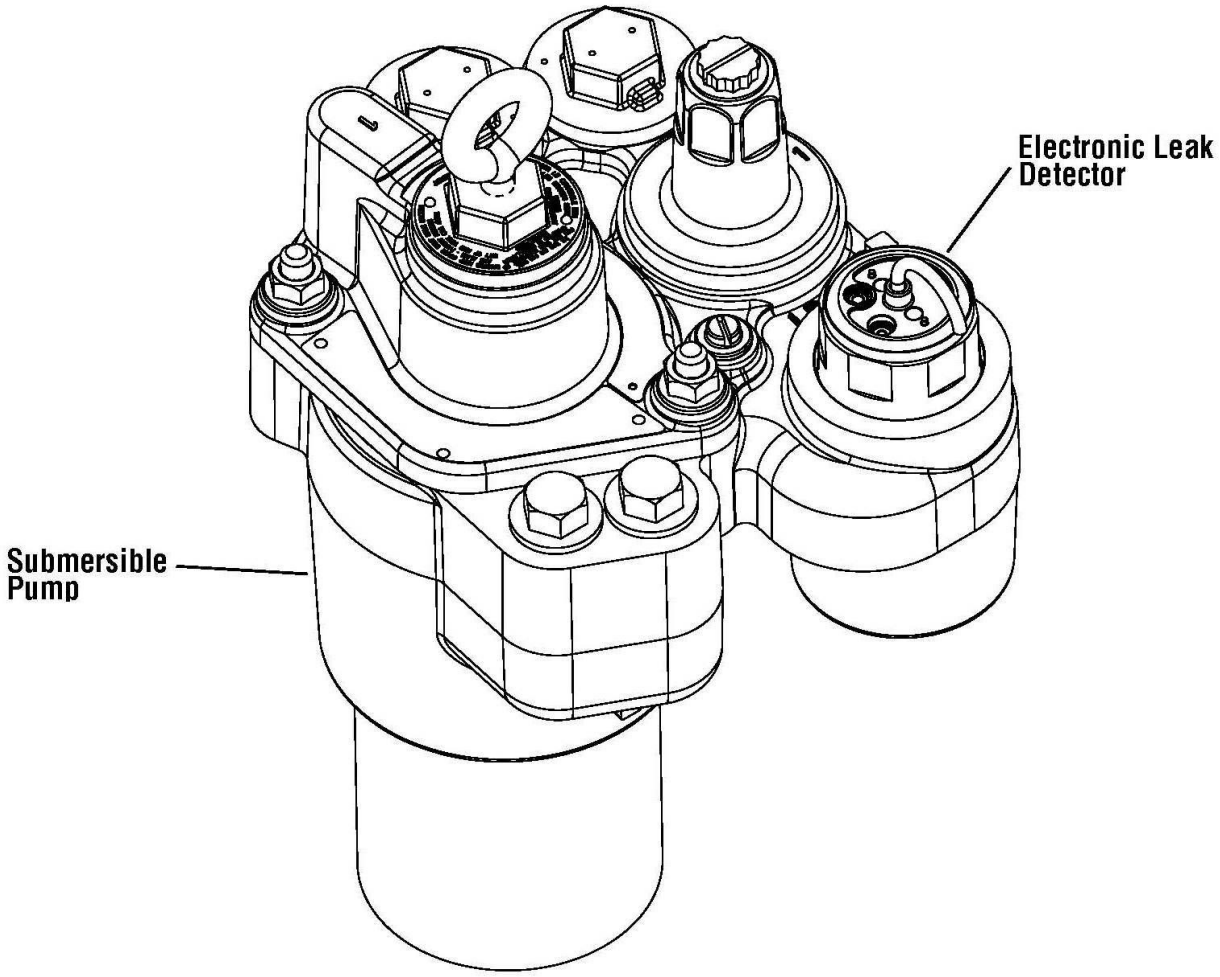
Model The Red Jacket P75U3-3RJX, P150U3-3RJX or P200U3-4RJX
Submersible Pump with Mechanical and Leak Detectors – Variant 5

FIGURE S291A – 7



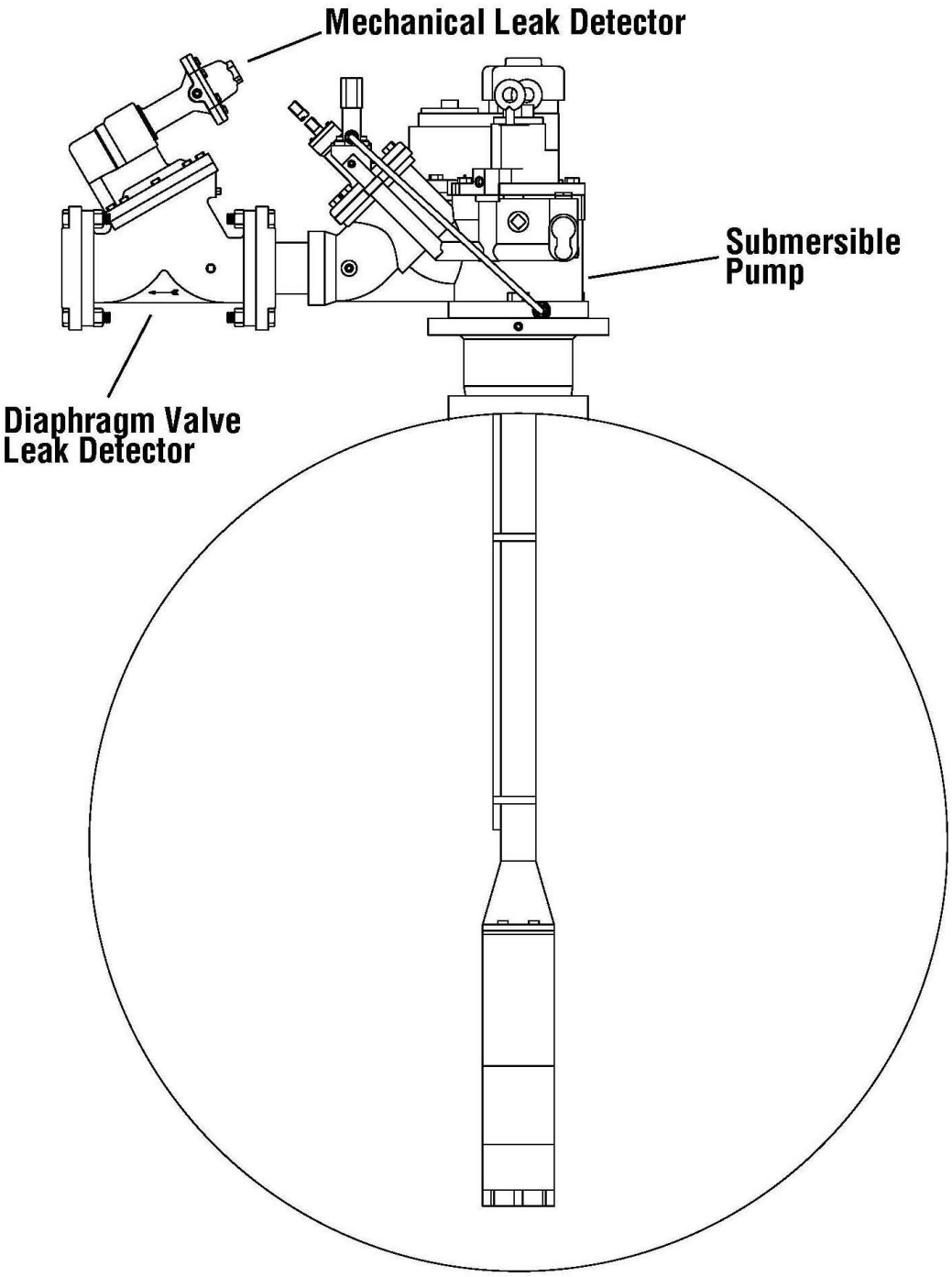
Typical Model The Red Jacket Submersible Pump System – Variant 5

FIGURE S291A – 8



Typical Model The Red Jacket Submersible Pump with Veeder-Root Electronic Leak Detector – Variants 2 and 5

FIGURE S291A – 9



Typical MAXXUM Submersible Pump System with Mechanical and Diaphragm Valve Leak Detectors – Variant 6

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