Leak Detection System

819.0661
Rev. D
EN

For detecting leaks in your HI-CLEAN 3A series pump.
Not for use in explosive atmospheres or hazardous locations.

Part No. 819.0517 Leak Detection System

8 bar (0.8 MPa, 120 psi) Maximum Air Input Pressure

Part No. 819.0665 Leak Detector Sensor Replacement Kit

Important Safety Instructions
Read all warnings and instructions in this manual.
Save these instructions.

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Contents

Warnings

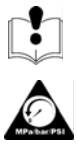
The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

⚠ WARNING

ELECTRIC SHOCK HAZARD

This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.

- Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment.
- Connect only to grounded power source.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.



EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Overview

Usage

The leak detector monitors air operated double diaphragm pumps for diaphragm rupture or other leaks that may contaminate the fluid being pumped. The system is made up of a main control box and two liquid detection sensors. The sensors are screwed into the air side of each diaphragm on the pump. When liquid is sensed by either one of the sensors, an alarm will sound, indicating a diaphragm rupture has occurred. The control box also has the ability to control an external device such as an alarm, light, or an air solenoid via an onboard relay.

During normal operation, the LED indicators on the control box and each sensor will flash once per second, indicating proper operation. If a system fault or a leak is detected, an alarm will sound and the LED on the control box will blink three times per second. See **Troubleshooting** page 10.

NOTE: Always disconnect the power supply from the control box prior to cleaning the pump.

Component Identification and Description

Before you install the system, you should be familiar with the parts discussed in the following paragraphs.

Sensors

The sensors are mounted on the pump to detect liquid on the air side of the diaphragm. See FIG. 1, FIG. 2, and FIG. 3.

The sensors use two methods of detection: optical and conductive.

Sensors	Definition
Conductive	The two metal pins on the sensors. Controls the blue light and its signal is the white wire.
Optical	The plastic dome in the center of the sensor. Controls the yellow light and its signal is the green wire.

Having both conductive and optical sensors allows the sensor to detect as many liquids as possible. When both sensors are in air, both lights (blue and yellow) flash once per second.

When the sensor is immersed in a conductive liquid, the blue LED will stop flashing. When the sensor is immersed in a liquid compatible with the optical sensor the yellow LED will stop flashing.

Control Box

The control box powers and reads the sensors every second. If the sensors detect liquid, the control box will alarm and set its fault relay.

Relay

The relay has two sets of contacts that can be used to indicate an error by turning off a valve, lighting a light, etc. The contacts are located at J4 on the circuit board. See FIG. 5.

There are two separate sets of Common, NO/NC contacts labeled CRS.

- C (Common)
- R is Reset, which is connected to Common during normal operation. (NO)
- S is Set, which is connected to Common when an error is detected. (NC)

For example, if an air valve was held open during normal operation, the power to the valve would enter at C and exit at R. During normal operation C and R are connected and would open if liquid were detected by a sensor. This would stop the pump. Power must be maintained to the control box for the pump to operate. When the control box loses power it will set the relay. Both sets of CRS contacts are floating contacts and are electrically isolated from each other and the electronics on the control board. They do not supply power and should be used as a switch only.

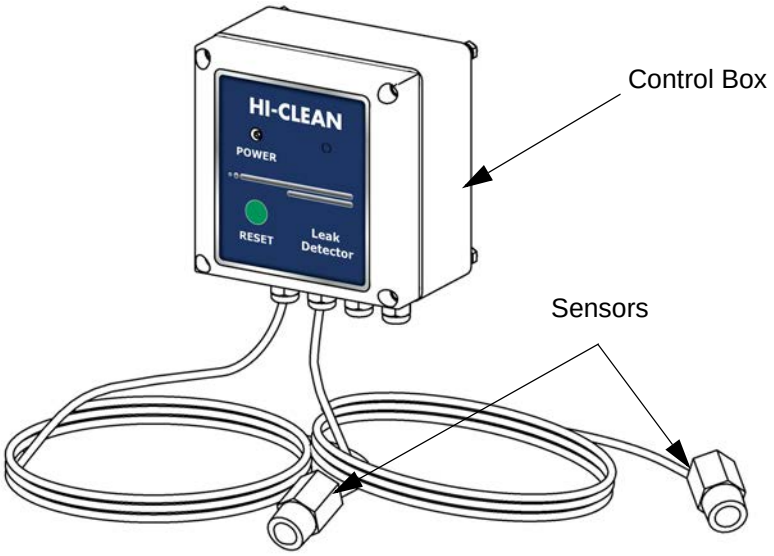


FIG. 1. Leak Detection System

Installation

Install the Sensors

To replace a sensor, order Part No. 819.0665 Leak Detector Sensor Replacement Kit. The kit includes one sensor. To install the kit, first shut off power to the control box. Follow steps 2-7 below, and step 10 on page 7.

1. Mount the leak detector control box in a convenient location. See FIG. 3.
2. Remove plugs from the pump, if plugs are present.
3. See FIG. 2. Remove the sensor caps (A). Screw the sensors (B) into the pump. Use thread sealant, as needed. See FIG. 3.

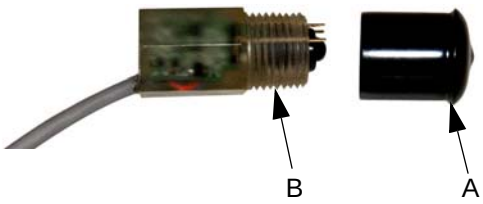


FIG. 2. Sensor and Cap

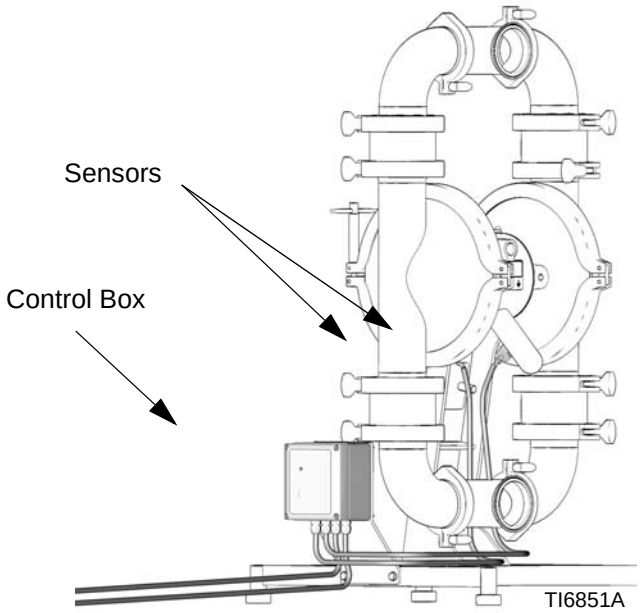


FIG. 3. Typical Installation

If installing Part No. 819.0665 Leak Detector Sensor Replacement Kit, shut off power to the control box before opening the cover.

4. Unscrew four screws (C) and remove the cover (D) from the control box (E). See FIG. 4.

5. Route the sensor wires into the control box through the fittings (F) at the bottom of the box. Tighten the fittings.

6. Attach the lead wires to the sensor terminals as shown in FIG. 4.

7. Plug the sensor terminals to the respective connectors on the circuit board (located on the inside of the cover). See FIG. 5.

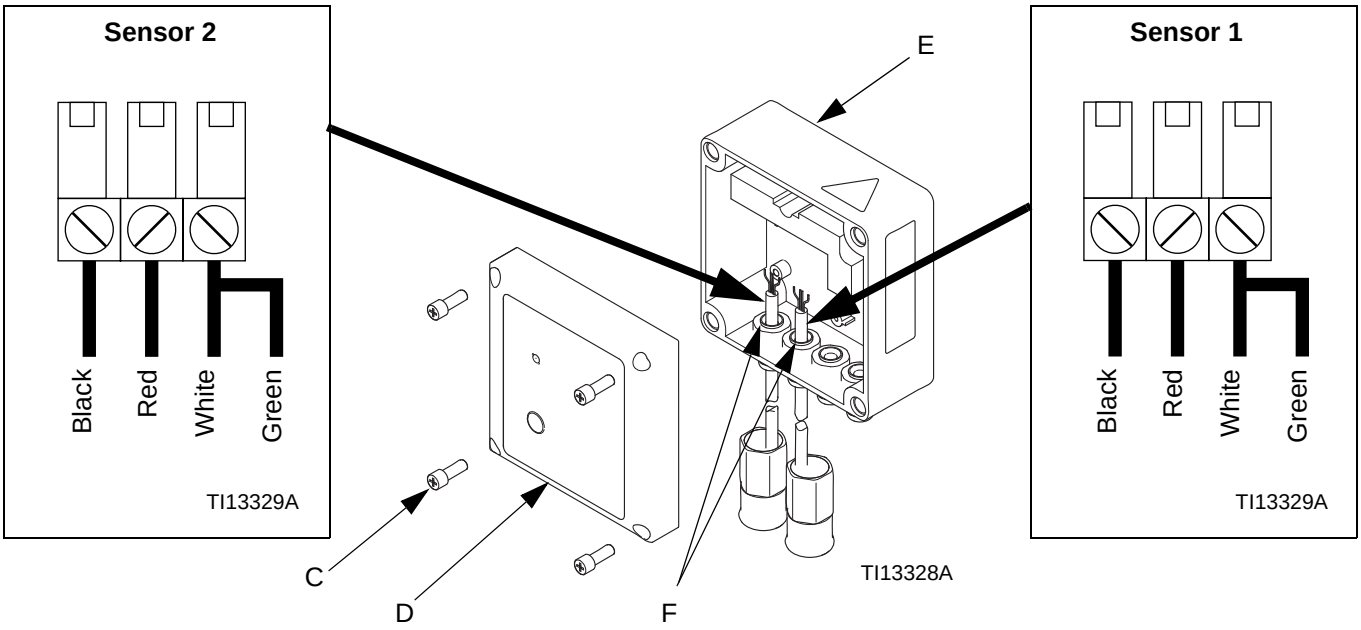


FIG. 4. Sensor Wire Connections in Control Box

Connect Power

Connect the leak detector to a 24 VDC power source OR a 110 VAC or 230 VAC power source. Do not connect to both.

8. The control box can be powered by 230 VAC, 110 VAC, or 24 VDC.

   AC power is connected to J6 on the circuit board. The ground connection is the pin between the pins N and 110. See FIG. 5.

   a. To operate on 230 VAC, connect between pins marked N and 220.

   b. To operate from 110 VAC, connect between pins marked N and 110.

   c. To operate from 24 VDC, connect to J1. J1 is marked for positive and negative polarity. Disconnect any power to the AC connector J6 if the system is to be powered by 24 VDC. See FIG. 5.

9. Connect an external ACPRH, air valve, etc. to the internal relay (CRS), if desired, using J4. See FIG. 5.

   - C (Common)
   - R is Reset, which is connected to Common during normal operation. (NO)
   - S is Set, which is connected to Common when an error is detected. (NC)

10. Reinstall the cover (D) using the four screws (C).

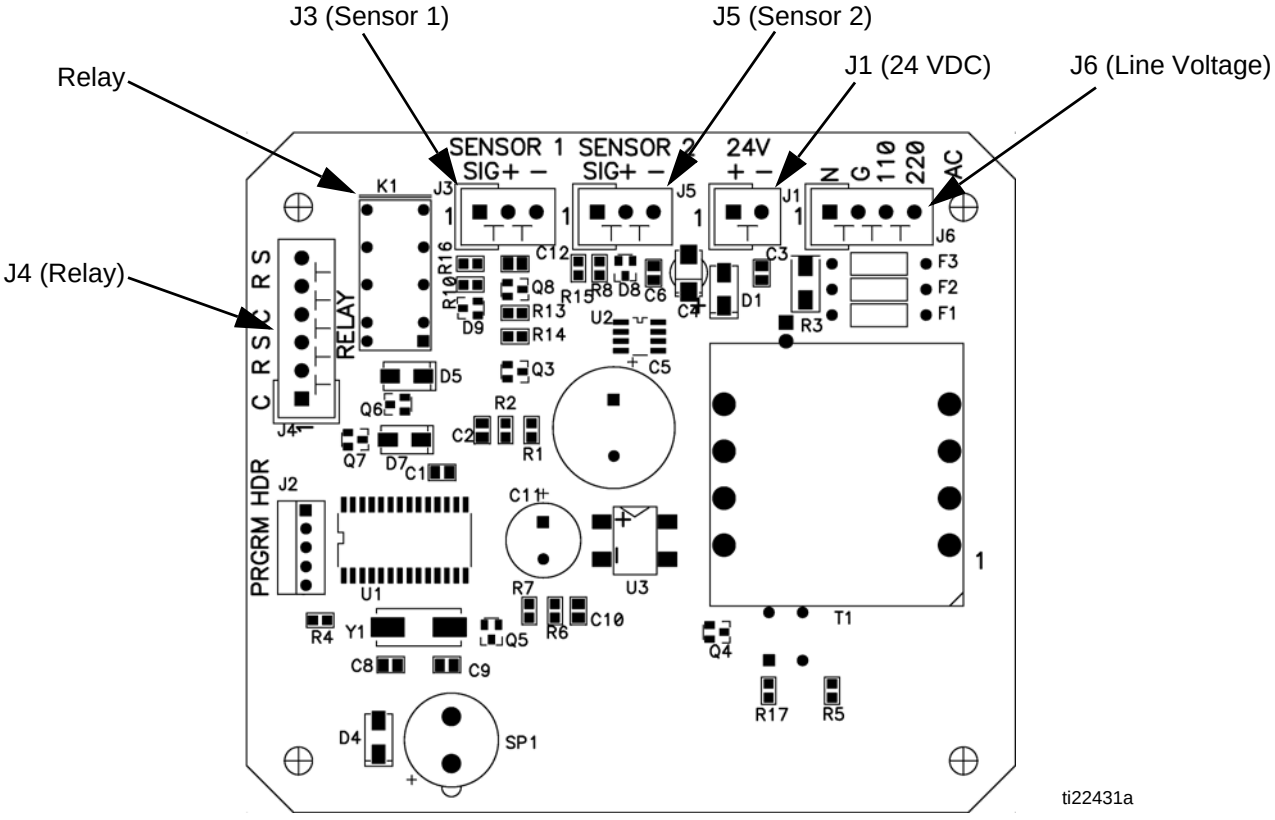
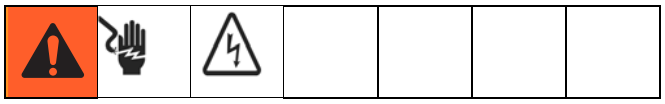


FIG. 5. Circuit Board Terminal Connections

Grounding



1. Follow the instructions in your pump manual to ground the diaphragm pump system and check its electrical grounding continuity.

2. When the Leak Detector is powered by 230 VAC or 110 VAC, ground the Leak Detector by connecting the ground wire to terminal G on terminal J6. See FIG. 5.

Operation

Leak Detector Operation

During normal operation, the LED on the leak detector control box and the sensors will flash once per second.

If an error or a diaphragm rupture occurs, the LED and sensors will flash three times per second and the alarm will sound. The relay will trip and change state. To stop the alarm, press the reset button or remove power for 30 seconds. See FIG. 6.

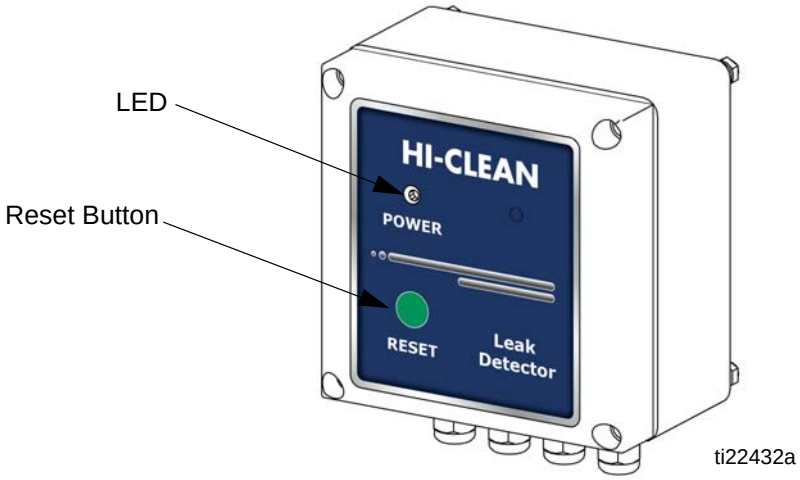


FIG. 6. LED and Reset Button

Maintenance

Clean Sensors

Clean the sensors whenever the pump is disassembled for cleaning or inspection.

NOTE: Always disconnect the power supply from the control box prior to cleaning the pump.

Test to ensure proper operation

1. Verify non-fault condition. With power to the control box, verify that:
    - the LED indicator on the control box flashes once per second.
    - both the yellow and blue LED indicators on each sensor flash once per second.
2. Verify operation of the Optical sensor. Submerge each sensor separately in a non-transparent fluid such as milk. Verify that:
    - the alarm sounds.
    - the yellow LED on this sensor stops flashing.
    - the LED on the control box blinks three times per second.
    - the relay is set and performs the intended operation (i.e. shuts down the pump).
3. Verify operation of the Conductive sensor. Submerge each sensor separately in a conductive fluid such as water. Verify that:
    - the alarm sounds.
    - the blue LED on this sensor stops flashing.
    - the LED on the control box blinks three times per second.
    - the relay is set and performs the intended operation (i.e. shuts down the pump).
4. Verify loss-of-power condition: Disconnect the power supply from the control box. Verify that:
    - the relay is set and performs the intended operation (i.e. shuts down the pump)

Troubleshooting

Problem	Cause	Solution
Light flashes 3/sec and alarm sounds 1/sec.	Sensor has detected liquid.	Determine which sensor has detected the liquid. Inspect the diaphragm on the side on which liquid has been detected. Replace diaphragm as necessary. To assure proper sensor operation, clean and dry the sensor head and the air side of the diaphragm pump.
Light flashes 3/sec and alarm sounds 3/sec.	One of the sensors is unplugged or has failed.	Remove the cover from the leak detector control box. Inspect the sensor connection for proper contacts and connections. If the problem persists, replace the sensor(s) as required.
Light flashes 3/sec and alarm sounds 8/sec.	The reset button is stuck in the down position.	Remove any obstruction possibly depressing the reset button. If no obstruction exists, remove the cover and inspect the reset button for anything holding it in the down position.
Relay is set and light flashes 3/sec until reserve power is gone.	Loss of power to the leak detection system.	Once main power is restored, the alarm will clear and the system will resume normal operation. If the control box relay is wired to the air supply to the pump, the control box must be powered for the pump to work.

Technical Data

Input voltage range	12-28 VDC 100-130 VAC, 50/60 Hz 190-260 VAC, 50/60 Hz
Maximum power consumption	3 W
Relay contact rating, 230 VAC	60 W, 62.5 VA
Maximum sensor pressure	14 bar (1.4 MPa, 200 psi)
Operating temperature range	-18 to 40°C (0 to 104°F)
Maximum sensor line length	0.6 m (2 ft)

Type of liquids that can be detected: water, oil, or any liquid compatible with polysulphone.

Customer Services/Guarantee

CUSTOMER SERVICES

If you require spare parts, please contact your local distributor, providing the following details:

- Pump Model
- Type
- Serial Number, and
- Date of First Order.

GUARANTEE

All VERDER pumps are warranted to the original user against defects in workmanship or materials under normal use (rental use excluded) for two years after purchase date. This warranty does not cover failure of parts or components due to normal wear, damage or failure which in the judgement of VERDER arises from misuse.

Parts determined by VERDER to be defective in material or workmanship will be repaired or replaced.

LIMITATION OF LIABILITY

To the extent allowable under applicable law, VERDER’s liability for consequential damages is expressly disclaimed. VERDER’s liability in all events is limited and shall not exceed the purchase price.

WARRANTY DISCLAIMER

VERDER has made an effort to illustrate and describe the products in the enclosed brochure accurately; however, such illustrations and descriptions are for the sole purpose of identification and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the products will necessarily conform to the illustration or descriptions.

PRODUCT SUITABILITY

Many regions, states and localities have codes and regulations governing the sale, construction, installation and/or use of products for certain purposes, which may vary from those in neighboring areas. While VERDER attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchasing and using a product, please review the product application as well as the national and local codes and regulations, and be sure that product, installation, and use complies with them.

Original instructions. This manual contains English.
Revision D, July 2017

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