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ONE-NUT™ PUMPS

A UNIBLOC® BRAND

The simplest ideas are often the best

Flotronic 'One - Nut' pumps

Installation Operation and Maintenance Manual

Diaphragm Leak Detection System

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PLEASE KEEP FOR FUTURE REFERENCE

Contents

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WARNINGS

The following warnings are for the setup, usage, grounding, maintenance and repair of the Leak Detection System.

WARNING

Electric Shock Hazard

Improper grounding, setup or usage of this equipment can cause electric shock.

- Remove power before connecting or disconnecting cables and accessories to the unit.
- Electrical installation must be carried out by a qualified electrician and comply with all local codes and regulations.
- Unit must be grounded to ensure user safety.

Equipment Misuse

Misuse can cause serious injury or death.

- Do not exceed the maximum pressure or temperature rating of the lowest rated system component. Read all technical documentation related to the equipment and ensure compliance.
- Only pump products that are compatible with the pump wetted parts.
- Do not modify the equipment.
- Check the device and installation daily and replace any worn or damaged parts immediately using genuine Flotronic Pumps spares.
- Cables should be routed to avoid damage.

Personal Protective Equipment

Appropriate personal protective equipment must be worn when operating, servicing or working in the equipment area.

CAUTION

To prevent the risk of electric shock, do not remove cover. No user-serviceable parts inside. Refer servicing to qualified service personnel.

NOTE:

This unit MUST be earthed/grounded.

OVERVIEW

System Description

The leak detection system monitors Flotronic Double Diaphragm pumps for diaphragm failure that could cause contamination of the product being pumped and/or the air control systems internal to the pump and/or the immediate area surrounding the pump.

The system comprises of two sensors and a main control unit. The two sensors are connected to the air side of the pump and constantly monitor the air chambers for the presence of foreign material that would indicate a diaphragm failure. Upon sensing a diaphragm failure the main unit stops the pump by activating a solenoid valve, (customer supplied), in the pump air supply line. The fault is also indicated on the main control unit by the flashing of a red LED.

Main Components

It is recommended that you should familiarise yourself with the system before installation and operation. This will help ensure optimum system performance.

Sensors

The sensors are mounted on the pump, one per air chamber, to detect the presence of foreign material other than air on the driving side of the diaphragms.

The sensors are of a capacitive type and detect changes in a self generated capacitive field. This means that they do not rely on a conductive or transparent pumped media and can function correctly with most substances that may be pumped.

Another benefit of this sensor type is the ability to sense through a barrier, in this case a protective PTFE housing that stops the sensor from directly contacting the pumped media. To this end the system can be used to detect most aggressive substances that are compatible with PTFE

Main Control Unit

The main control unit powers the sensors and continuously monitors their output state, ensuring a fast response to any possible diaphragm failure. If the main control unit detects a failure from either sensor the red LED on the front panel will flash. Simultaneously the solenoid output is de-activated and the connected solenoid valve, (customer supplied), stops the air flow to the pump thus stopping the pump.

The main unit latches in the alarm condition until the failure has cleared and the unit is reset by pressing the front panel mounted Reset button. If the failure mode is still present, i.e. pumped media still contaminating the sensors, the unit will not be able to be reset until the failure has been rectified.

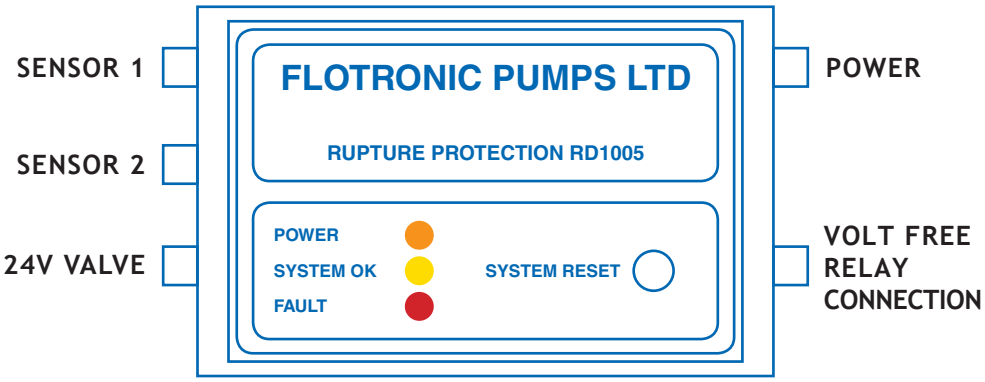
If there is a power failure to the main unit, the default pump operation mode is off and the pump will be stopped. Upon power supply being restored the unit will stay in the pump off condition until the Reset button is pressed.

The main control unit will alarm and set to fail condition if the sensors are not connected or if the sensors fail to operate within their normal parameters.

NOTE:

To fully comply with the 3A standard there must be a solenoid valve connected to the main control unit to enable the pump to be stopped once a failure mode is detected. The solenoid valve needs to be fitted to the air pipe supplying the pump. See Technical Data section for solenoid specifications.

INSTALLATION



System Connection

The main unit is fitted with sockets for the connection of the two sensors and solenoid valve and a 150mm hard wired lead fitted with a socket and plug for mains power connection.

The sensors are supplied pre-wired for immediate use.

The solenoid valve and mains power connection plugs are user connectable using screw terminals internal to the plugs. (Plugs supplied with main unit).

Power Connection

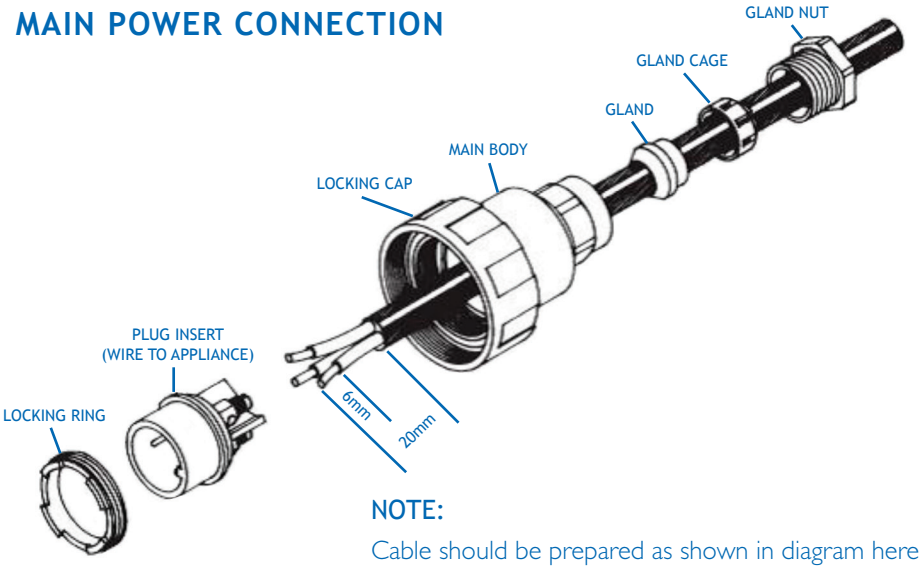
Be sure that the power supply voltage of the area where this unit will be used meets the voltage requirements, 96 – 264Vac @ 50/60Hz, of the main control unit.

Please observe the wiring code below, if in any doubt please consult a qualified electrician.

NOTE:

This unit MUST be earthed/grounded by connecting a suitable earth connection to the plug terminal marked as Earth on the connection diagram below.

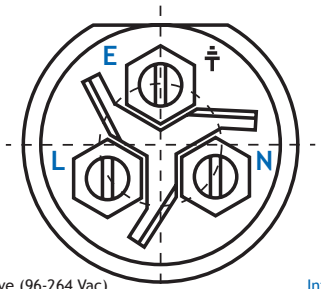
MAIN POWER CONNECTION



NOTE:

Cable should be prepared as shown in diagram here.

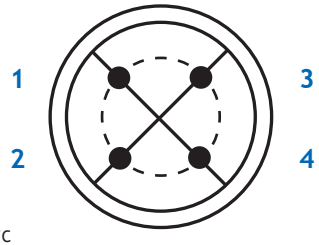
Main Power Connection



L = Live (96-264 Vac)
N = Neutral (96-264 Vac)
E = Earth

Internal screw terminals are lettered

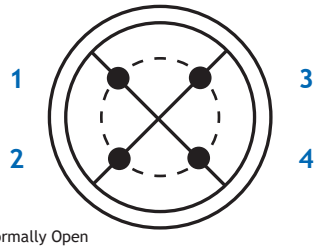
Solenoid Valve Connection

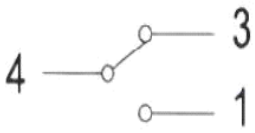


1 = N/C
2 = +24 Vdc (positive)
3 = N/C
4 = -24 Vdc (negative)

Internal screw terminals are numbered

Volt Free Relay Connection
Max 1A @ 30V





1 = Normally Open
2 = No Connection
3 = Normally Closed
4 = Common

Internal screw terminals are numbered

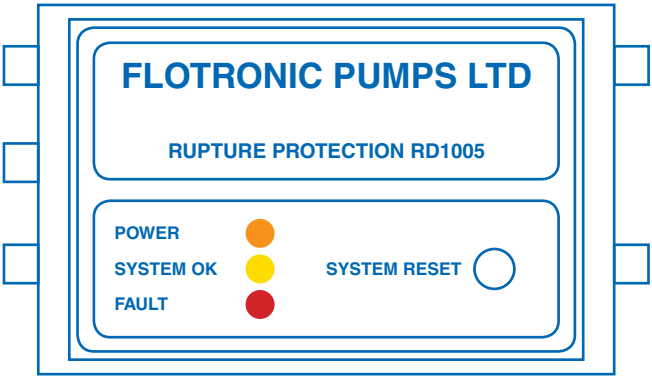
Leak Detector Operation

During normal operation only the 'Power' LED on the main control box will be lit continuously.

If a fault develops, i.e. from diaphragm or sensor failure, the 'Fault' LED will flash and the pump will stop.

To reset the system after a failure has occurred, and the cause has been rectified, press the 'Reset' button.

If there is an interruption to the power supply to the main control unit the pump will stop, to restart the pump press the 'Reset' button.



Maintenance

NOTE:

Always disconnect the power supply from the control box before any maintenance or cleaning operation is carried out.

Clean Sensors

In the event of a diaphragm failure the sensor housing will need to be cleaned to remove all traces of product that may stop the system from resetting and thus the pump from re-starting.

1. Unplug the sensors from the main control box.
2. Remove air domes from pump. (See pump IOM for details)
3. Clean the sensor port on the inside of the air dome to remove all traces of product.
4. Dry the sensor port. Any cleaning solution left in the chamber may be detected as a failure upon system re-start.
5. Rebuild pump replacing failed components.

If the contamination is difficult to remove from the port it is possible to unscrew the PTFE sensor housing from the air dome to gain better access. If this is required ensure that upon re-assembly the metal sealing ring is positioned over the external thread of the PTFE housing to provide a seal between the air dome and the PTFE sensor housing.

NOTE:

Ensure that the cleaning solution used is compatible with the items being cleaned.

Care should be taken not to apply harsh cleaning chemicals to the exposed sensor section on the outside of the pump.

Main Control Unit

The main control unit requires no maintenance, should a fault be suspected please notify Flotronic Pumps Ltd who can advise the best course of action. It may be necessary to return the item to Flotronic Pumps Ltd for investigation.

Test System Function

The system should be checked for proper function every 3 months or earlier if a problem is suspected.

Sensor Check

1. Disconnect the power supply to the main control unit.
2. Switch off the air supply to the pump.
3. Unplug the sensors from the main control unit.
4. Unscrew the PTFE sensor housings from the air domes complete with sensors.
5. Reconnect the sensors to the main control unit.
6. Reconnect the power supply to the main control unit.
7. Ensure the flat front face of the PTFE sensor housings are clear of any obstructions that could be sensed.
8. Reset the main control unit by pressing the Reset button.
9. The fail LED on the main unit should turn off with the power light remaining on.
10. Place your hand close to the flat front face of one of the PTFE sensor housings. The main control unit should register a fault and the LED fault light should illuminate.
11. Repeat steps 7 to 9 for the other sensor.

NOTE:

If the main control unit fails to register a fault condition during the above tests, or it constantly registers a fault condition please refer to the 'Troubleshooting' section at the back of this manual or contact Flotronic Pumps Ltd for advice.

Pump Shut Down Check

Once it is confirmed that the sensors are functioning correctly the pump should be reassembled to perform the 'pump shut down check'.

To perform this check:

1. Connect the power supply to the main control unit.
2. Turn on the air supply to the pump.
3. The pump should not start and the red LED indicator on the main control unit should be flashing.
4. Press the Reset button on the main control unit, the pump should start to operate and the fault LED should go off.
5. Disconnect the power supply to the main control unit, the pump should stop.

If the system passed the above test then the correct function of the sensors, main control unit and solenoid valve have been confirmed.

TROUBLESHOOTING

Problem	Probable Cause	Solution
Power LED not illuminated and system does not function	Power failure	Check power supply lead for damage. Confirm unit is receiving power.
	Main Control Unit fault	Contact Flotronic Pumps Ltd for advice.
Fault LED flashing	Diaphragm failure	Strip pump and check for diaphragm failure or the presence of liquid in the air chamber.
	Sensor Fault	Check sensor cable for damage. Plug sensors into main control unit. Perform sensor check on page 9 to confirm sensor function.
	Main Control Unit fault	Perform full system check to establish definite fault with unit and not legitimate liquid sensing. Contact Flotronic Pumps Ltd for advice.
Pump does not stop when fault LED is flashing	Solenoid valve fault	Check solenoid cable for damage. Check solenoid valve is not faulty. Check solenoid valve complies with the requirements stated in the Technical section of this manual.
	Main control Unit fault	Contact Flotronic Pumps Ltd for advice.
Pump does not run	Power failure	Restore power to the main control unit and press the Reset button.
	Air supply failure Pump failure	Check air supply to the pump Strip and assess the pump in accordance with the pump IOM.

TECHNICAL DATA

Main Control Unit

Input Voltage Range	96-264Vac, 50/60Hz
Main Control Unit Operating Temp. Range	0 - 40°c
Main Control Unit IP Rating	IP65
Maximum Power Consumption	30 Watts

Sensors

Maximum Sensor Pressure	7.2 Barg (105psi)
Sensor Temp. Range	-25°c – 85°c
Sensor IP Rating	IP67
Sensor lead length	0.5 Metres

Solenoid Valve

Solenoid Valve Type	Normally Closed
Solenoid Valve Voltage	24Vdc
Solenoid Valve Maximum Power Rating	16 Watts
Solenoid Valve IP Rating	Depending on customer requirements, minimum recommended IP65.

NOTE:

Solenoid valve should be rated for continuous energisation.

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