

CALL 1-800-577-8111 FOR SALES AND SUPPORT

WCG

Engineering Operation & Maintenance



- Continuous light and audible alarm indicates leak.
 - Intermittent light and audible alarm indicates a low battery condition.
 - Internal latching relay must be reset after activation.
 - Sensors and diaphragms must be replaced after contact with the pumping medium.
 - Uses one 9V alkaline battery or genuine Wilden power supply.
- 65-8011-99

WIL-GARD II
DIAPHRAGM MONITORING SYSTEM

**Leak
Detector**



WILDEN®

AIR OPERATED DOUBLE DIAPHRAGM PUMPS

THE WIL-GARD™ II DIAPHRAGM MONITORING SYSTEM

Wilden Pump & Engineering Company broadens the scope of applications suitable for the air-operated, double-diaphragm pump by introducing the Wil-Gard™ II Diaphragm Monitoring System. This system detects diaphragm failure at the source: *The Primary Diaphragm*, not at the air chamber or the air exhaust as do other systems. This task is accomplished by utilizing sensors located between the primary and back-up diaphragms within each side of the Wilden pump. The sensors respond instantly to contact with virtually all conductive liquids. These sensors are engineered to withstand the fatigue and punishment issued by a flexing diaphragm without losing their sensitivity. The Wil-Gard™ II control module continuously monitors these sensors for

change in electrical resistance. If a significant change in resistance is detected, the system will activate an audible alarm, a high brightness LED, and a latching relay contact closure while the back-up diaphragm offers containment. The latching relay contacts, provided within the Wil-Gard™ II control module, enable you to activate external components such as isolation valves or air shut-off valves when a leak is detected. The result is product containment, which reduces hazardous emissions, product contamination, and maintenance costs. The Wil-Gard™ II can be powered by a variety of electrical sources to meet your application requirements: 110V AC, 220/240V AC (International), and 9 Volt battery operation are available.

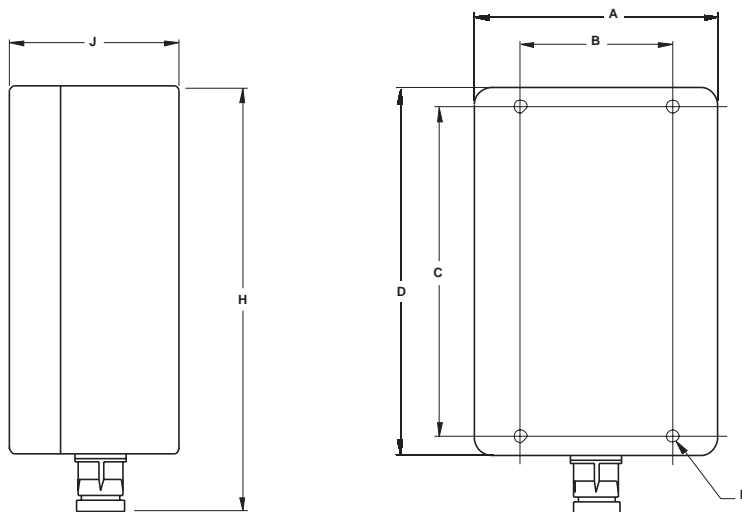
FEATURES

- 110V AC, 220/240V AC (International), or 9 Volt battery with low battery alarm
- Latching relay contacts for external component activation.
- Audible alarm, high brightness LED.
- Factory installed in Wilden pumps.
- Retrofittable to existing Wilden pumps in the field.
- Minimum active components for high reliability.
- Meets NEMA 4X splash resistance: “dust-tight, watertight, corrosion resistant.”

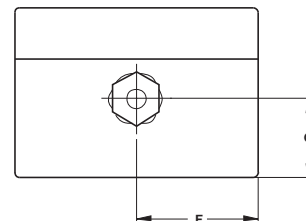
BENEFITS

- 24 Hour pump surveillance.
- Detects conductive liquids
- Offers protection from product contamination (i.e. Relay contact closure activates isolation valves upon alarm initiation).
- Detects leak while back-up diaphragm offers containment.
- Reduces chemical attack on non-wetted pump parts.

DIMENSIONAL DRAWING WILDEN WIL-GARD™ II



DIMENSIONS — WIL-GARD™ II		
ITEM	STANDARD (inch)	METRIC (mm)
A	3 9/64	79.8
B	1 31/32	50.0
C	4 17/64	108.3
D	4 3/4	120.3
E	Ø.166	4.2
F	1 37/64	40.1
G	1 1/64	25.8
H	5 15/32	139.3
J	2 3/16	55.6

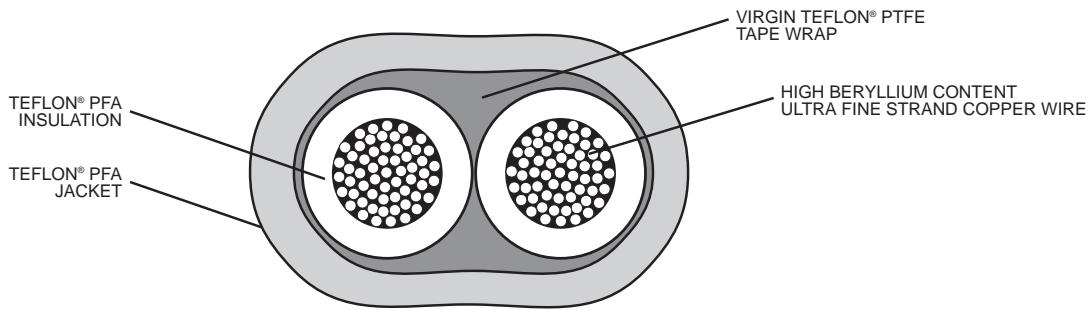


SENSOR CABLE SPECIFICATIONS

The sensor cables utilize high Beryllium content ultra fine strand copper wire to remain sensitive even when subjected to millions of pump strokes in a dynamic environment. Teflon® PTFE and Teflon® PFA is used as the binder and jacket for chemical resistance.

Conductivity Threshold: 4.54 micro-Siemens
 Length of sensor cables: 36" (0,91m)
 Length of extension cords: 35' (10,67m) and 100' (30,48m)
 (See page 3)
 Connectors: Sealed. Housed in composite material — Ultem®

CROSS SECTION OF SENSOR CABLE



INSTALLATION OF SENSOR CABLE

Care should be used during the installation process to protect the sensor from being exposed to fluid, or from fluid being trapped between the diaphragms.

1. The location of the sensor wire ends shall be between the outer Teflon® diaphragms and the inner back-up diaphragms on both sides of unit being assembled.
2. The sensor wire end should be 1/3 of the way between the outer edge and the center hole of the diaphragm. **(Note:** See chart [below right] for precise measurement.)
3. Sensor wire ends shall be inserted to the 6:00 position and channeled out of the unit to the 3:00 position on the air valve side.

To ensure proper sealing and operation, torque outer pistons to proper specification. The wires should be routed straight down and along the outside of the liquid chamber under the clamp band. Refer to illustration (*Figure 1*). Refer to pump operation and maintenance manual for usage of Gore-tex expanded gasket material to seal between Teflon® primary diaphragm and liquid chamber.

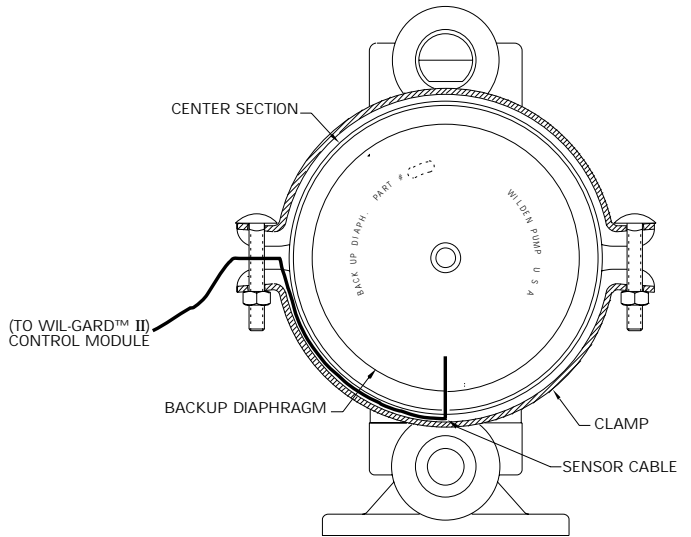


Figure 1

SIDE VIEW OF PUMP

CHART	
Unit Size	Inches
M1	1"
M2	1 1/4"
M4	1 1/2"
M8	2"
M15	2 1/3"
M20	2 1/3"

INSTALLATION

The Wil-Gard™ II is designed for use with Wilden Teflon®-fitted models. The system cannot be used with rubber or thermoplastic primary diaphragms. This unit can be purchased as a factory installed option in the Wilden pump or as an accessory to be installed in existing pumps. The NEMA 4X enclosure is constructed of Polycarbonate with stainless steel screws, nylon cable grip, and polycarbonate label.

The Wil-Gard™ II can be powered by a variety of electrical sources to meet your application requirements: 110V AC, 220/240V AC (International), and 9 Volt battery operation are available. The unit can also be powered by 24V DC by supplying 24V DC to the terminal connector and utilizing a 9V DC battery. (**NOTE:** Battery must be installed.)

If the control module is powered by a 9-VOLT, ALKALINE BATTERY, life expectancy of the battery is approximately 12 months. A low battery alarm is incorporated into this system which alerts the user of a low battery condition. For further information please refer to page 3 (*Figure 8*).

The control module is splash resistant, but should be mounted in a dry, safe, accessible location. The circuit board has a conformal coating (mill spec. I46058C Type UR) to protect it from inadvertent contact with moisture. Upon completion of installation, verify the integrity of all connections. Cable grip, lid, and all wiring connections should be secure to assure proper operation.

The Wil-Gard™ II has been designed to meet UL standard 913 for intrinsically safe electrical devices for

Class I, Division I Categories C and D. The control module **must** be mounted in a “safe area.” The sensors, however, may safely be located in the Class I, Division I, Categories C and D areas.

The Wil-Gard™ II system alone is designed to detect diaphragm failure. However, with the addition of a few electric components, it is simple to use the detection features of the module to actively intervene when diaphragm failure occurs. In most applications, the internal relay (2 amp, 250 volts max.) is used to direct power to a solenoid valve installed on the pump air inlet, which suspends pump operation when failure occurs. In some situations, it is appropriate to isolate the inlet and discharge piping from the pump to prevent product contamination or product containment.

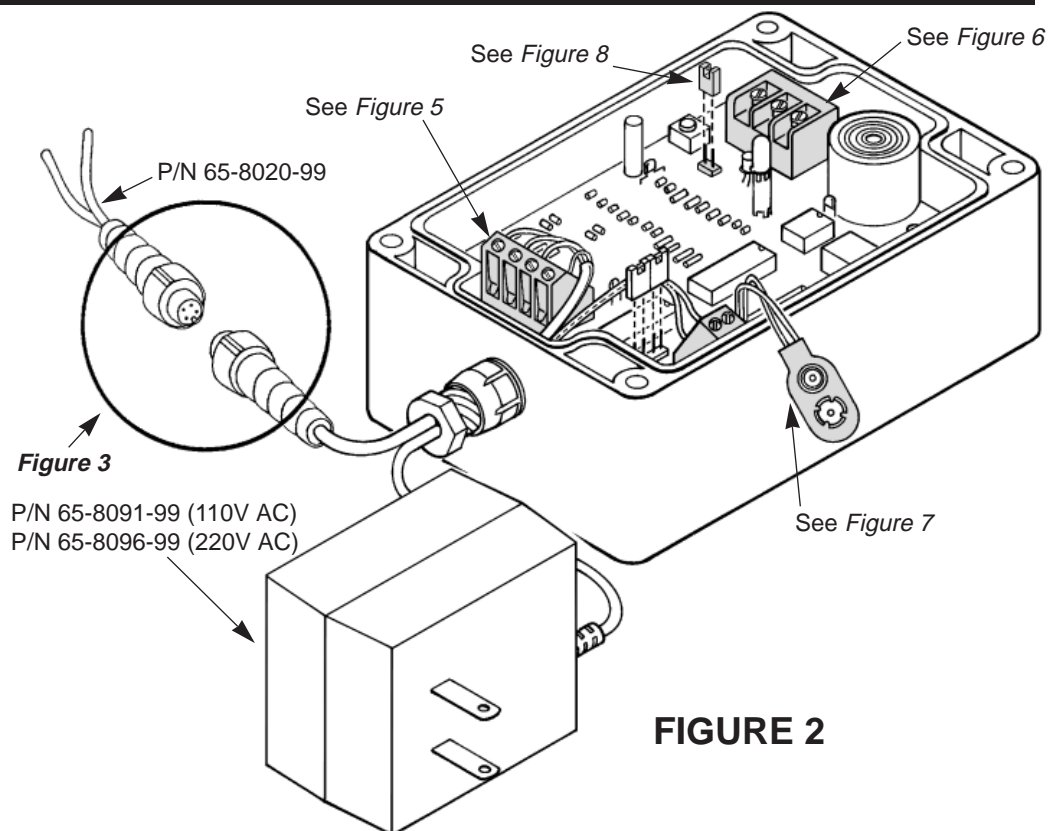
The sensors should be protected from fluids prior to and during installation. If the sensor comes into contact with a fluid prior to installation it may not perform as designed. Please refer to page 1 for the installation of the diaphragm and sensor cable.

CAUTION: Do not expose sensor to fluids before sensor is installed in pump.

Sensors cannot be reused. Back-up diaphragms and sensor cables must be replaced when primary diaphragm failure occurs.

CAUTION: When powered by a 9 Volt Alkaline battery in cold weather (below 40° F), battery life is considerably shortened.

Figure 2 is an illustration of the control module circuit board highlighting important features which need to be taken into consideration prior to installation. Please refer to *Figures 4–8* on the opposite page for discussion on sensor cable installation, installation of external components to internal relay, supplying power to module, and low battery jumper positions. Please read the operating manual in its entirety prior to the installation of the Wil-Gard™ II.



INSTALLATION OF SENSOR RECEPTACLE AND EXTENSION CORDS

Once the sensor cables have been installed within the pump as discussed on page 1, they must be connected to the control module via the sensor receptacle which is factory installed. (See Fig. 3.) The sensor cables are connected to the sensor receptacle by simply inserting the in-line plug into the receptacle, aligning the key notch, and turning the connector clockwise one-half turn until a click is heard. If the sensor cables extending from the pump are not long enough to reach the control module, the user can lengthen the wiring with 35' (10,67m) and 100' (30,48m) extension cords available from Wilden. These extension cords utilize the same connectors as the sensor cable and receptacle for compatibility and ease of use (see Fig. 4). In lieu of the Wilden extension cords, the user may supply his own wire (AWG 24) up to 2500 feet (762m). It is critical that the wires are kept separate and Wilden sensor cable is installed in the pump. It is important that all wiring connections are waterproof and secure. It may be necessary to run all wiring through conduit. The cable grip located on the bottom of the control module should be tightened so that the penetration is resistant to liquid intrusion. It is possible that the 6" sensor receptacle (P/N 65-8050-99) may need to be replaced. It is vital that the sensor wire pairs are kept separate and installed as per Figure 5.

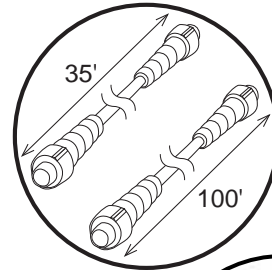


Figure 4

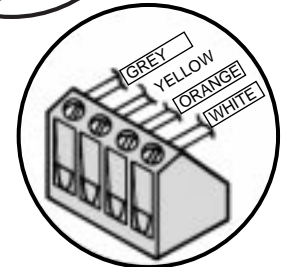


Figure 5

INSTALLATION OF EXTERNAL COMPONENTS TO INTERNAL RELAY

There is a single-pole, double-throw (SPDT) relay on the control module circuit board. External wiring is connected to this relay through the screw terminals on the edge of the circuit board (See Fig. 6). This relay connects the common (COM) pole to the normally open (N.O.) pole when an alarm is triggered. The relay is provided so that external components can be controlled by the module, handling a maximum of 2 Amps at 250 Volts. Therefore, to attach more than one component or a large inductive load, it may be necessary to use the internal relay to drive an external multi-pole relay which can handle more components and/or higher amperage (See Fig. 9). There is also a normally closed contact (N.C.) which can be used to operate a component (such as an air inlet shut-off solenoid valve) which should be powered during normal operation and de-energized when an alarm occurs. Note: This is a latching relay which must be re-set when tripped. To re-set relay, simply depress the button located to the left of the relay.

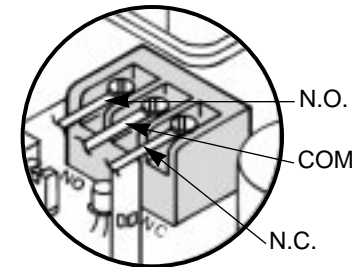


Figure 6

SUPPLYING POWER TO CONTROL MODULE

The Wil-Gard™ II can be powered by a variety of electrical sources to meet your application requirements. The control module utilizes a 9 Volt battery terminal connector as a battery power supply interface. Either a 110V AC to 9V DC transformer or a 220/240V AC to 9V DC (International) transformer is supplied with the Wil-Gard™ II. These transformers are connected to the control module via the two conductor terminal at the bottom right of the module. The white-striped wire connects to the top (+) terminal and the solid black wire to the bottom (-) terminal allowing for alternating currents to be used to power the unit. The unit can also be powered by 24V DC by supplying 24V DC to the terminal connector and utilizing a 9V DC battery. (**NOTE:** Battery must be installed.) If your application requires battery operation, disconnect the transformer wires from the same connector (see Fig. 7), feed them through the cable grip of the enclosure and remove. Install a 9 Volt Alkaline Battery. When the 9 Volt battery is utilized to power the unit, the low battery alarm alerts the operator that the battery is nearing a low voltage and should be replaced. The LED and audible alarm activate intermittently whenever a low battery condition is detected. The relay discussed above can also respond when this low battery condition occurs. There is a small jumper (J3) connector on the circuit board whose setting determines the relay response. If the pins are "jumped" (connected together) via the small plastic clip, the relay will be actuated (and latch) in the event of a low battery alarm; otherwise it will not.

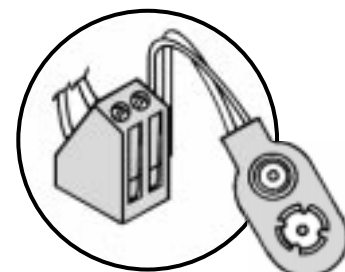


Figure 7

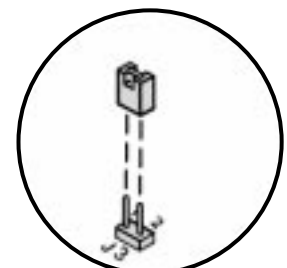
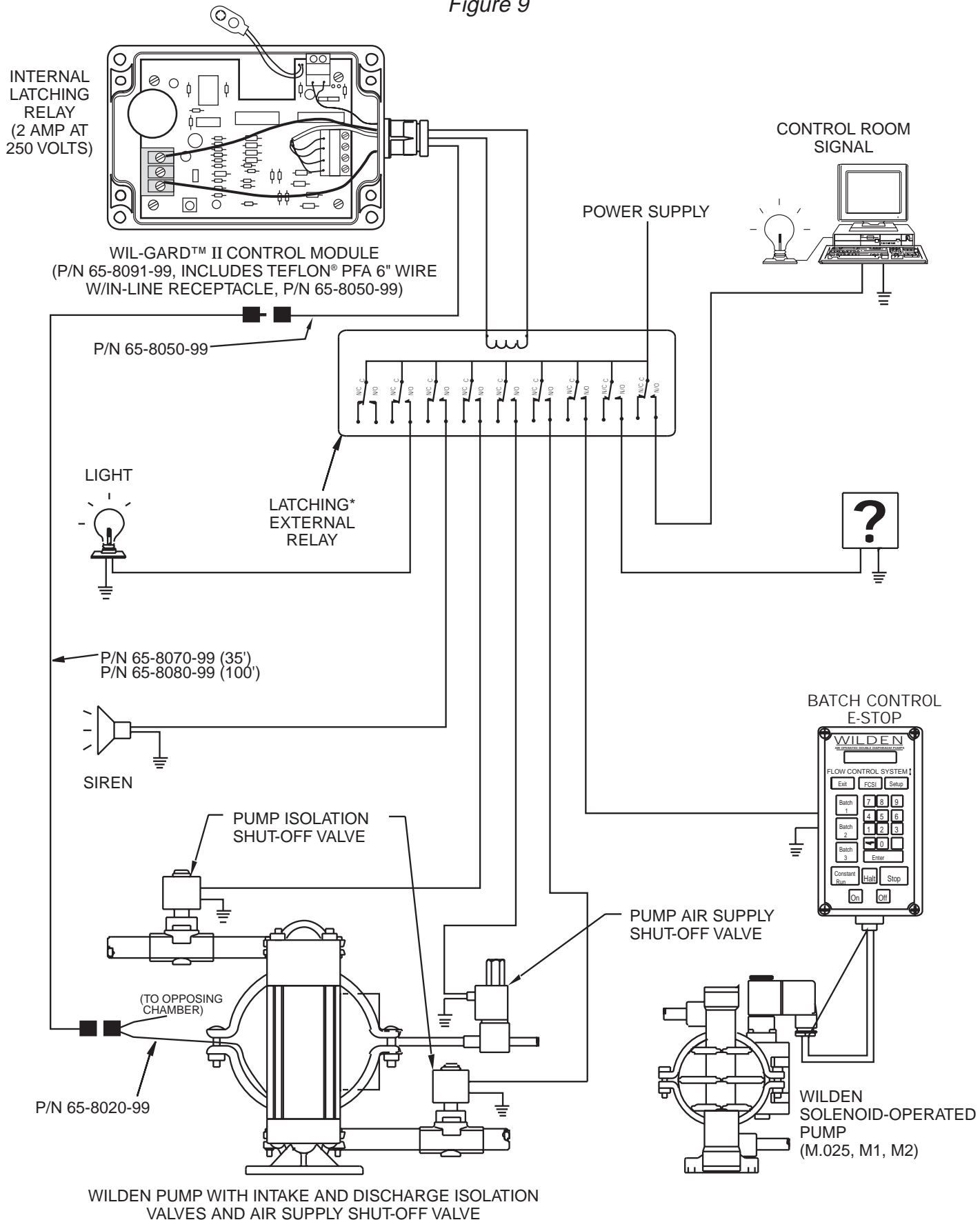


Figure 8

NOTE: USE ONLY A 9 VOLT ALKALINE BATTERY. One can verify that the battery is dead by momentarily pushing the "Relay Reset" push button in the top left corner of the circuit board. The LED will flash for an instant and the audible alarm will "chirp."

ALARM INITIATION ⇒ RELAY CLOSURE ⇒ COMPONENT ACTIVATION

Figure 9



TROUBLESHOOTING

Audible alarm, LED and relay do not activate upon diaphragm failure.

- Check battery life if used. (Refer to page 3.)
- Verify that battery clip is securely and properly connected to the battery or that the transformer is properly connected to the module and plugged into a “live” outlet.
- 6" wire receptacle (P/N 65-8050-99) is not connected correctly to the control module terminal block (refer to page 3, Fig. 4)
- Sensor wires (P/N 65-8020-99), 6" receptacle (P/N 65-8050-99), and/or the extension cords are crushed or broken.
- Verify the integrity of the 4 pin connector.
- Verify the sensor wire placement within the pump.
- Check the sensor for contamination; sensors cannot be reused.

Wil-Gard™ II functioned correctly upon diaphragm failure, not noticed by personnel.

- Install external alarm system to internal relay.
- Install solenoid valve to provide active intervention upon diaphragm failure.
- Utilize latching, external relay to insure intervention.

Unit is alarming, but diaphragm has not failed.

- Verify the torque specification of the outer piston.
- Verify the torque specification of the clamp bands.
- Verify that new Goretex on liquid chambers was utilized upon installation.

Relay does not activate upon low battery alarm initiation.

- Check low battery jumper position as per page 3, Fig. 8.

CONDUCTIVE LIQUIDS — AN OVERVIEW

Liquids that conduct an electrical charge are said to be conductive. Conductive liquids may contain a percentage of water and are usually inorganic. For example, acids and caustics are typically conductive, whereas solvents and hydrocarbons in 100% concentration are typically non-conductive.

The introduction of a conductive liquid such as ordinary water will introduce conductivity to non-conductive liquids. For any given non-conductive liquid, it is not possible to predict the volume of conductive media which must be added to result in a conductive liquid. Therefore, a conductivity test must be performed to verify that the Wil-Gard™ II will detect

the process fluid upon diaphragm failure. The test for conductivity can be performed in two ways:

- 1) Contact your authorized Wilden distributor for an on-site review. In this event, the actual sensor cable of the Wil-Gard™ II is dipped into the process fluid in question, to determine whether the conductivity of the process fluid is sufficient for detection.
- 2) A conductivity meter can be utilized to measure the conductivity of the process fluid. The Wil-Gard™ II will detect any fluid that has a conductivity of more than 4.54 micro-Siemens.

MODEL NUMBER, OPTIONAL AND REPLACEMENT PARTS

WIL-GARD™ II MODEL NUMBER: 65-8101-99

System includes:

Wil-Gard™ II Control Module w/6" Receptacle	65-8001-99
Wil-Gard™ II Conductive Sensor Cables	65-8020-99
110V AC to 9V DC Transformer	65-8091-99

WIL-GARD™ II (INTERNATIONAL) MODEL NUMBER: 65-8111-99

System includes:

Wil-Gard™ II Control Module w/6" Receptacle	65-8011-99
Wil-Gard™ II Conductive Sensor Cables	65-8020-99
220V AC to 9V DC Transformer	65-8096-99

Replacement Parts

Wil-Gard™ II Control Module w/6" Receptacle	65-8001-99 (110V)
Wil-Gard™ II Control Module w/6" Receptacle	65-8011-99 (220V)
Teflon® PFA 6" Wire w/In-Line Receptacle	65-8050-99
Wil-Gard™ II Conductive Sensor Cables	65-8020-99
110V AC to 9V DC Transformer	65-8091-99
220V AC to 9V DC Transformer (International)	65-8096-99

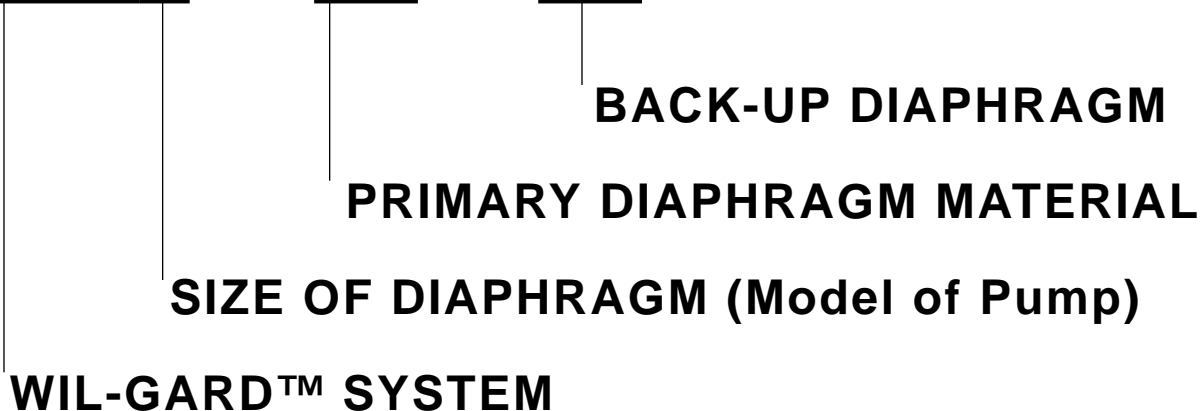
Optional Parts

35' PE Extension w/In-Line Receptacle & Plug	65-8070-99
100' PE Extension w/In-Line Receptacle & Plug	65-8080-99

9 Volt Alkaline Battery sold separately.

MODEL NUMBER LEGEND:

DMSX - XX - XX



SYSTEM MODEL NUMBERS

DMS1-TF-NE	M1 WIL-GARD™ SYSTEM, NEOPRENE BACK-UP
DMS1-TF-BN	M2 WIL-GARD™ SYSTEM, HI TEMP. BUNA-N BACK-UP
DMS2-TF-NE	M2 WIL-GARD™ SYSTEM, NEOPRENE BACK-UP

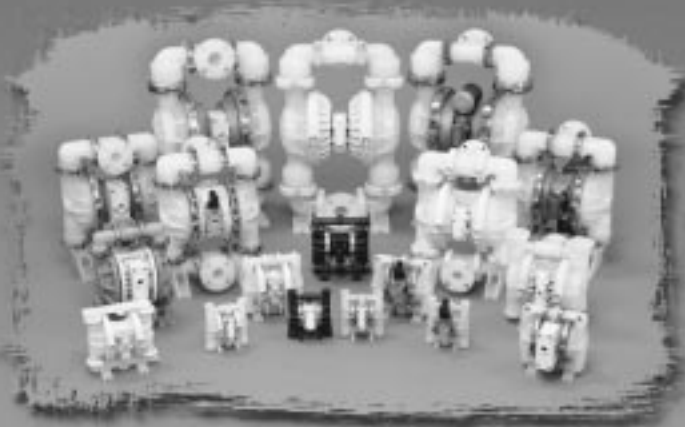
REPLACEMENT PARTS

WIL-GARD™ CONTROL MODULE	65-8000-99
M1 TEFLON® DIAPHRAGM	TF93
M2 TEFLON® DIAPHRAGM	TF83
QTY. (2) M1 BACK-UP NEOPRENE DIAPHRAGMS WITH SENSORS*	01-1010-51-100
QTY. (2) M1 BACK-UP HI TEMP. BUNA N DIAPHRAGMS WITH SENSORS*	01-1010-52-100
QTY. (2) M2 BACK-UP NEOPRENE DIAPHRAGMS WITH SENSORS*	02-1010-51-100

* Part numbers 01-1010-51-100, 01-1010-52-100 and 02-1010-51-100, include a pair of back-up diaphragms with sensors and Teflon® wire attached. A single back-up diaphragm with sensor is not available. Sensor or wires are not sold independently.

ENGINEERED REVOLUTION

“Revolutionizing the way you solve your toughest pumping problems”



Plastic

- Polypropylene
- Carbon-Filled Acetal
- PVDF
- Teflon® PTFE
- Teflon® PFA



Metal

- Aluminum
- 316 S.S.
- Cast Iron
- Hastelloy



SANIFLO™ SANITARY PUMP TECHNOLOGY

FDA USDA 3A



HYTEC BELLOWS TECHNOLOGY

ULTRAPURE TEFLON PROCESS PUMPS

- Teflon® PFA
- Teflon® PTFE



Accessories

- SPCI
- Wil-Gard
- FCSI
- Equalizers
- Drum Pump Kits
- APV



WILDEN® AIR OPERATED DOUBLE DIAPHRAGM PUMPS

22069 Van Buren St., Grand Terrace, CA 92313-5607
Telephone (909) 422-1730 • Fax (909) 783-3440
www.wildenpump.com

A **DOVER** RESOURCES COMPANY

Your local authorized distributor:

