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Haloguard® IR Refrigerant Monitor Draw Pump Replacement

This bulletin outlines the proper procedure for replacing the draw pump on the **Haloguard® III** or **Haloguard® IR** Controller. The draw pump is located beneath the controller PC board. This procedure is separated into 4 parts: 1) remove the PC board/ Back-plate combination from the **Haloguard® III** or **Haloguard® IR** Controller steel enclosure; 2) separate the PC board and the Back-plate to access the draw pump; 3) pump removal; 4) re-assembly of the PC board/ Back-plate combination into the **Haloguard® III** or **Haloguard® IR** Controller steel enclosure. For part location, refer to *Figure 1a Haloguard® III/ IR Relay Cover Location*. NOTE: For printed circuit board prior to version 4.0 refer to *Figure 1b*. Read the document in its entirety before performing any steps of the procedure.

****CAUTION** Remove all power from Haloguard® before proceeding.**

Part 1: Removing the PC Board/ Back-Plate from the Steel Enclosure

Numbers in parentheses refer to *Figure 1a (1b) Haloguard® III/ IR Relay Cover Location*.

- 1) Open/ remove lid.
- 2) Remove 3 relay/ power safety cover screws (1) and lock washers. Remove the cover. Set aside for replacement later.
- 3) Disconnect all wiring; line cord, alarm relay wiring; Analog Outputs; Remote IR Sensors, Oxygen sensors. **NOTE: mark or tag the wires for replacement later.**
- 4) Disconnect tubing from any INLET PORT and move it to the side. **NOTE: that on units without a scanner the tubing will connect directly to the AIR FILTER.**
- 5) Disconnect **AUDIBLE** (2), **STROBE** (3), **RESET** switch (4), and **MANUAL** switch (5) connectors.
- 6) Loosen the Exhaust port from the steel enclosure. **NOTE:** Loosen the nut only - Do not remove completely.
- 7) Remove the brass restrictor fitting from the Exhaust port to uncover the back-plate mounting screw (6).
- 8) Remove the four 10-32 back-plate mounting screws (6). (On NEMA12 boxes these screws are 6-32 nuts.) **For Version 3 or earlier PC Board:** Note the orientation of the ring-tongue ground wire on the screw in the lower left corner for replacement later.

CAUTION: Remove PC board/ back-plate assembly gently. Resistance may indicate that wires are still connected. Recheck all connectors as excessive force will damage wires or connectors.

- 9) Tilt the PC board/ back-plate and remove from the box.

FIGURE 1a (1b) KEY

- ① Relay Cover Screws
- ② Audible Connector
- ③ Strobe Connector
- ④ Manual Push button Connector
- ⑤ Reset Push button Connector
- ⑥ Back-Plate Mounting Screws (Nuts on NEMA 12 Box)

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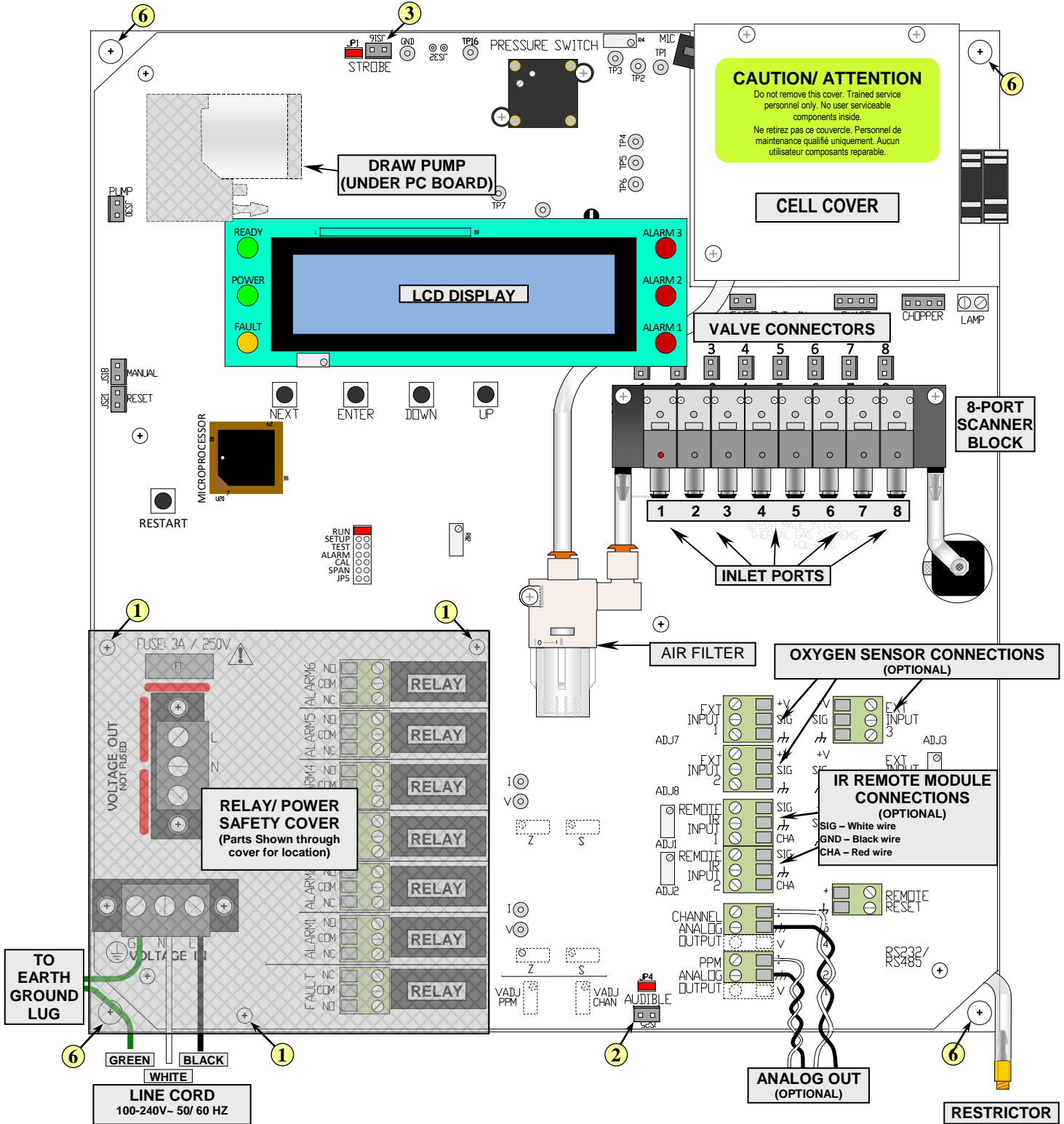


Figure 1a Haloguard® III/ IR Relay Cover Location (Ver 4.0 PC Board)
(Shown with optional 8 Point Scanner)

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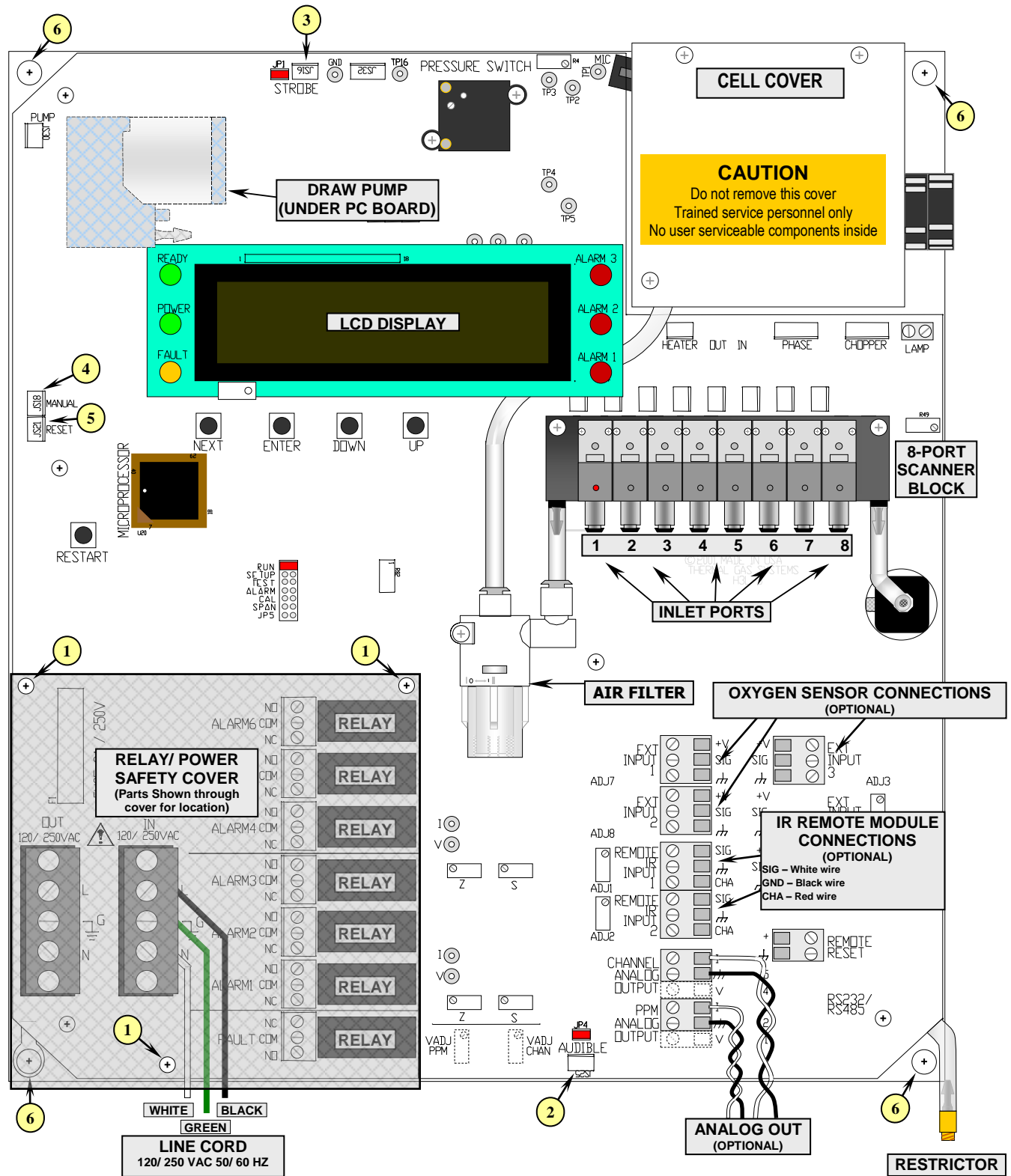


Figure 1b Haloguard® III/ IR Relay Cover Location (Ver 3 PC Board)
(Shown with optional Scanner)

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Part 2: Separating the PC Board from the Back-Plate

It is not necessary to completely separate the PC Board from the back plate just to access and remove the pump. The following steps should sufficiently separate the two surfaces for this purpose while minimizing the chance of potential damage to components such as the microphone. If complete separation is required refer to the *H3 PC Board Replacement* document.

Numbers in parentheses refer to *Figure 2a (2b) Haloguard® III/ IR PC Board Screw Location*.

- 1) Remove the 3 – 3/8 inch (1) Cell Cover mounting screws. **NOTE: location of lock washers and flat washer.** Remove the Cell Cover (2).
- 2) Disconnect the **LAMP** (3).
- 3) Disconnect **CHOPPER** (4), **PHASE** (5), **PUMP** (6), **HEATER** (7) and **MICROPHONE** (8) connectors. **CAUTION: microphone wires are fragile. USE EXTREME CARE WHEN REMOVING.**
- 4) Remove the 2 – 1 inch (9) Pressure switch mounting screws.
- 5) Remove the 1½ inch Air Filter mounting screw (10) and 1/16 inch nylon spacer (under filter).
- 6) **For Scanner Units:** Remove the 2 - 13/16 inch (11) Scanner mounting screws. **NOTE: removing these screws will free the pressure switch, air filter, and scanner block to move. It is not necessary to completely remove these items in order to replace the pump.** Remove the 2 - ¼ inch, male-female standoffs (12) that the scanner block was secured to.
- 7) For non-scanner units remove the 2 – ¼ inch (11) PC Board mounting screws. For all units remove the 6 – ¼ inch (13) PC Board mounting screws. **NOTE: On scanner units one screw is located under the Scanner Block location. CAUTION: On Version 3 or before pc boards - Be sure the lock washers are omitted where indicated.**
- 8) Slightly lift the pc board and disconnect the 3 wire power connector (14) from the back of the pc board. **On Version 3 or before pc boards:** Disconnect black, white and green wires connecting the PC board to the back-plate (14) by moving the PC board slightly to the right and unscrewing the wires from the white terminal block on the back-plate.
- 9) Disconnect the 3-wire connector (black, green and red wires) from the Regulator IC (integrated circuit) mounted on the back-plate (15). **NOTE: On Version 3 or before pc boards wire colors are (black, white and red).**

At this point it should be possible to lift the PC Board 2 or 3 inches to access the pump underneath.

Part 3: Pump Removal

Cut wire tie from pump clip. Remove and discard. Note: This wire tie is used to secure the pump during shipping and not required for normal operation.

- 1) Gently remove inlet and exhaust tubes from the Draw Pump. Note: Before removing, use a permanent marker or a piece of tape to mark the inlet and exhaust tubes for replacement.
- 2) Unsnap Draw Pump from clip.
- 3) Install new pump.
- 4) Install a new wire tie if desired. **CAUTION: do not nick the red and black wires on the Draw Pump.**
- 5) Reattach the inlet and exhaust tubes.

If replacing a BLUE Hargraves brand pump with a BLACK KNF brand pump be sure to install the C015A capacitor module. Refer to Appendix A for this procedure.

CAUTION: Failure to install the C015A module could cause the ANALOG OUTPUT to malfunction.

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FIGURE 2a (2b) KEY

- 1** 3/8" Cell Cover Screws
- 2** Cell Cover
- 3** Lamp Wires
- 4** Chopper Connector
- 5** Phase Connector
- 6** Pump Connector
- 7** Heater Connector
- 8** Microphone Connector
- 9** 1" Pressure Switch Mounting Screws
- 10** 1½" Air Filter Mounting Screw
- 11** 13/16" Scanner Block Mounting Screws
- 12** ¼" Male-female Standoffs
- 13** ¼" PC Board Mounting Screws (approximately 6-10)
- 14** AC Connector/ Wires connecting PC board to back-plate
- 15** 3-wire connector to Regulator IC (mounted on back-plate)
- 16** Temperature Sensor (mounted to the test cell)
- 17** Heater Driver IC (mounted on the back side of PC Board)

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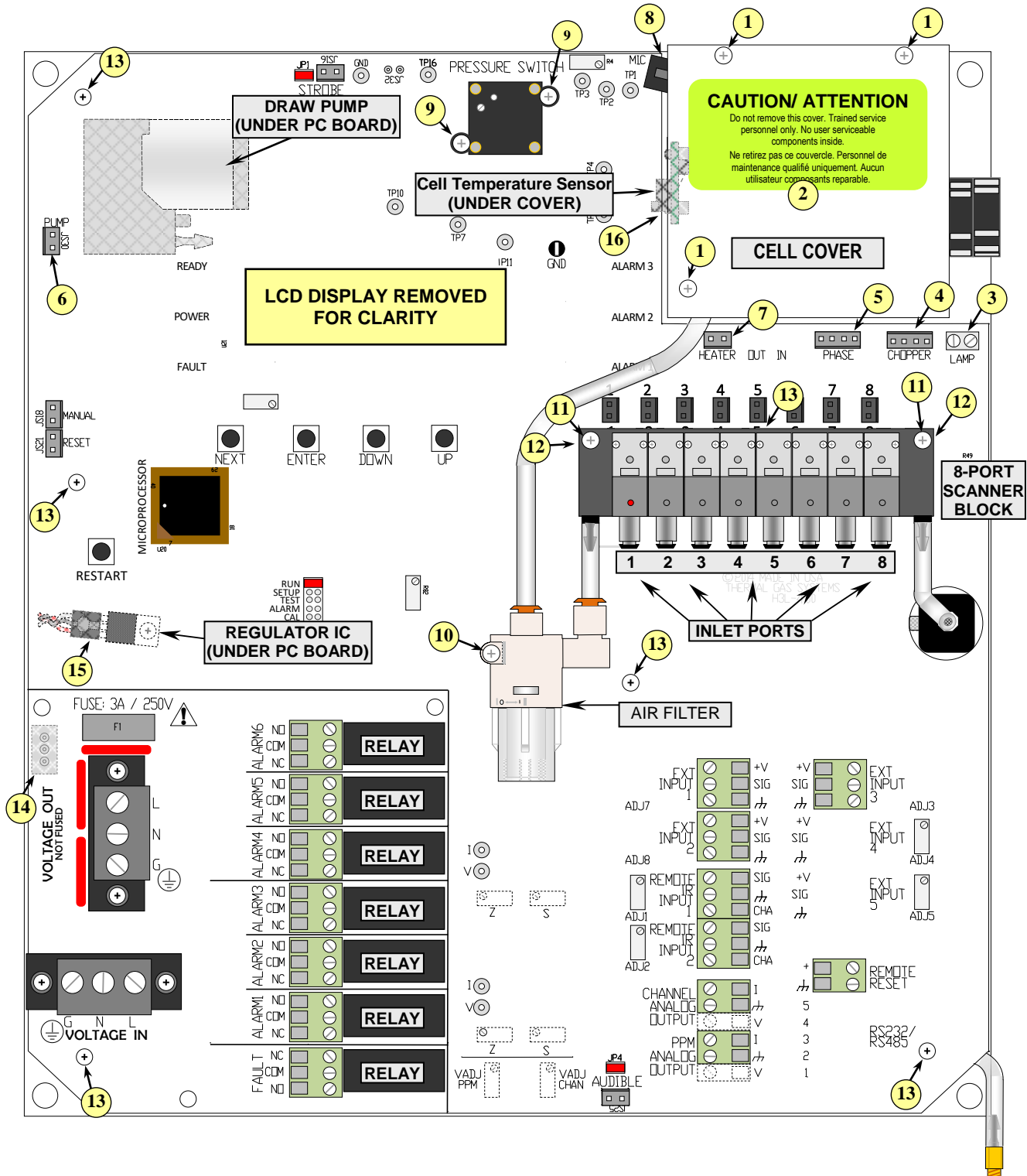


Figure 2a Haloguard® III/ IR PC Board Screw Location (Ver 4.0 PC Board)
(Shown with optional 8 Point Scanner)

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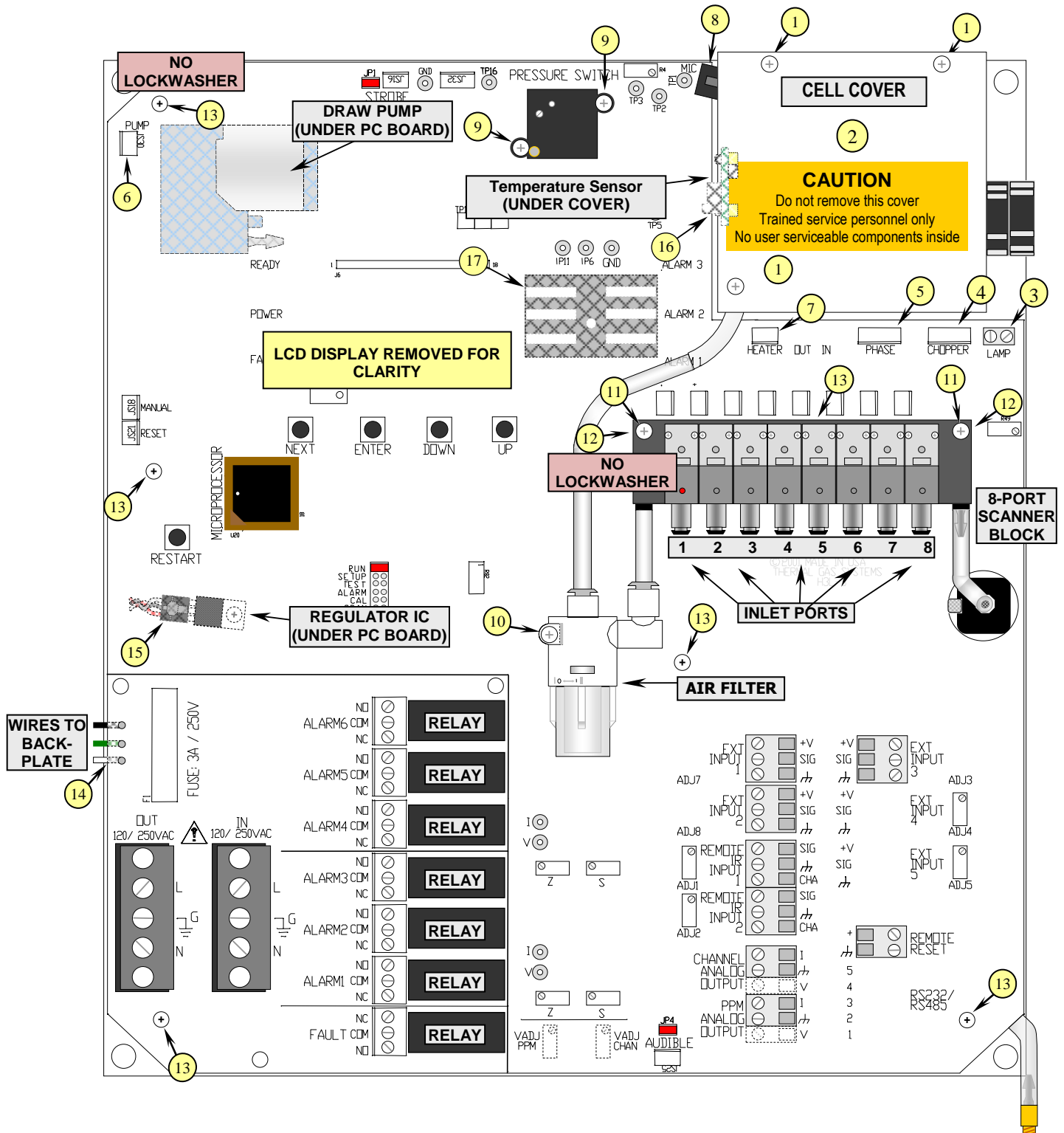


Figure 2b Haloguard® III/ IR PC Board Screw Location(Ver 3 PC Board)
(Shown with optional Scanner)

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Part 4: Re-assembly of the Controller

Reassembly is the reverse of removal.

Numbers in parentheses refer to *Figure 2a (2b) Haloguard® III/ IR PC Board Screw Location*.

- 1) Reconnect the 3-wire connector (black, green and red wires) to the Regulator IC (integrated circuit) mounted on the back-plate (15). **NOTE: On Version 3 or before pc boards wire colors are (black, white and red). If replacing a BLUE pump with a BLACK pump the 3 pin connector will attach to the C015A capacitor module.**
- 2) On the back side of the PC board, check the Heater Control ICs. If they are in sockets, insure that they are fully and properly seated.
- 3) Reconnect the 3 wire power connector (14) from the back of the pc board. **On Version 3 or before pc boards:** reconnect the black, white and green wires from the PC board to the white terminal block on the back-plate (14).
- 4) Align the PC board with the 2 inch, hex standoffs on the back-plate and replace the 6 – ¼ inch (13) PC Board mounting screws and lock washers. **CAUTION: On Version 3 or before pc boards - Be sure the lock washers are omitted where indicated.** For non-scanner units replace the 2 – ¼ inch (11) PC Board mounting screws and lock washers.
- 5) **For Scanner Units:** Reinstall the 2 - ¼ inch, male-female standoffs (12) for the scanner block. Secure the scanner block using the 13/16 inch mounting screws (12).
- 6) Replace the 1/16 inch nylon spacer under filter and secure the Air Filter using the 1½ inch mounting screw (10).
- 7) Secure the Pressure switch with the 2- 1 inch (9) mounting screws.
- 8) Reconnect **CHOPPER** (4), **PHASE** (5), **PUMP** (6), **HEATER** (7) and **MICROPHONE** (8) connectors. **CAUTION: microphone wires are fragile. USE EXTREME CARE.**
- 9) Reconnect the **LAMP** (3).
- 10) Replace the Cell Cover (2). Secure with the 3 – 3/8 inch (1) Cell Cover mounting screws lock washers and flat washer.

Numbers in parentheses refer to *Figure 1a (1b) Haloguard® III/ IR Relay Cover Location*.

- 11) Tilt the PC board/ back-plate and insert into the box. **CAUTION: do not trap wires or Exhaust Tube under-back plate during installation.**
- 12) **For Version 3 or earlier PC Board:** Replace the ring-tongue ground wire on the screw in the lower left corner. Note its orientation.
- 13) Replace the four 10-32 back-plate mounting screws (6). (6-32 nuts on NEMA12 boxes)
- 14) Reattach the brass restrictor fitting to the Exhaust port in the steel enclosure.
- 15) Tighten the Exhaust port to the case. **NOTE: Tighten the inside nut only so exhaust tubing is not twisted.**
- 16) Reconnect **AUDIBLE** (2), **STROBE** (3), **RESET** switch (4), and **MANUAL** switch (5) connectors.
- 17) Reconnect tubing from any INLET PORT. **NOTE: for non-scanner units connect to the AIR FILTER.**
- 18) Replace all wiring; line cord, alarm relay wiring; Analog Outputs; Remote IR Sensors, Oxygen sensors. Refer to **Haloguard® III or Haloguard® IR Instruction Manual** for additional installation information.
- 19) Replace relay/ power safety cover and 3 screws (1) and lock washers.
- 20) Close lid.
- 21) Return **Haloguard® III or Haloguard® IR** to service.

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APPENDIX A

Haloguard® III/ IR Refrigerant Monitor Black Pump C015A Capacitor Assembly Installation ERRATA

This bulletin provides brief information outlining the correct location and attachment of the 1000uF capacitor assembly (TGS part number C015A). This assembly installation is required as part of the upgrade from a BLUE Hargraves pump to a BLACK KNF pump in the **Haloguard® III** or **Haloguard® IR** series of refrigerant leak detection systems. This erratum is a supplement to the pump replacement procedure outlined in the “*H3 Pump Replacement*” document. For information on removing the PC board/ back-plate assembly and changing the pump itself refer to that document. This bulletin applies to all **Haloguard® III** or **Haloguard® IR** instruments displaying other than the SGS Listing Mark as certified by SGS North America. Generally, these instruments predate April 2015.

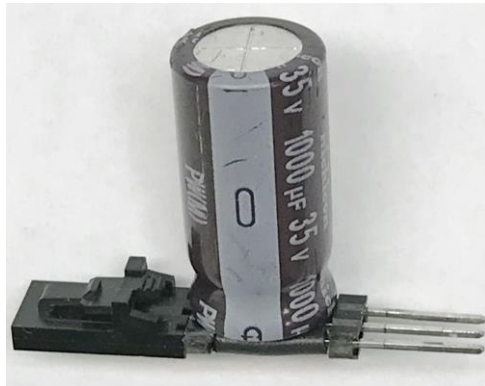


Figure 1 - Black Pump Capacitor Assembly (C015A)

Proper installation of this assembly will improve the stability of the ANALOG Output signals. Without this assembly installed, the current in the CHANNEL Analog Output may drop to 4mA when the pump starts. This may briefly display as a “REM SN DISCONT” (Remote Sensor Discontinuity) to an external Remote Display device or Building Automation System, then return to normal as the current recovers.

****** CAUTION *****

Before proceeding unplug the Haloguard® unit from any AC outlet.

Before proceeding refer to the “H3 Pump Replacement” document

Failure to follow these procedures could result in shock hazard.

Refer to the “H3 Pump Replacement” document for Steps 1, 2, and 3 below.

- 1) Remove the PC Board/ back-plate assembly from the **Haloguard®** steel enclosure.
- 2) Separate the PC Board from the back-plate.
- 3) Remove the blue Hargraves pump. Replace with black KNF pump.

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- 4) On the back-plate, locate the capacitor assembly insertion location - as shown in Figure 2. This is the point where the 3-conductor cable attaches to the 7812 voltage regulator that is mounted to the back-plate. *Note: this 3-wire cable may be colored WHITE, BLACK, RED (as shown in Figure 2) or GREEN, BLACK, RED depending on the age of the Haloguard® unit.*

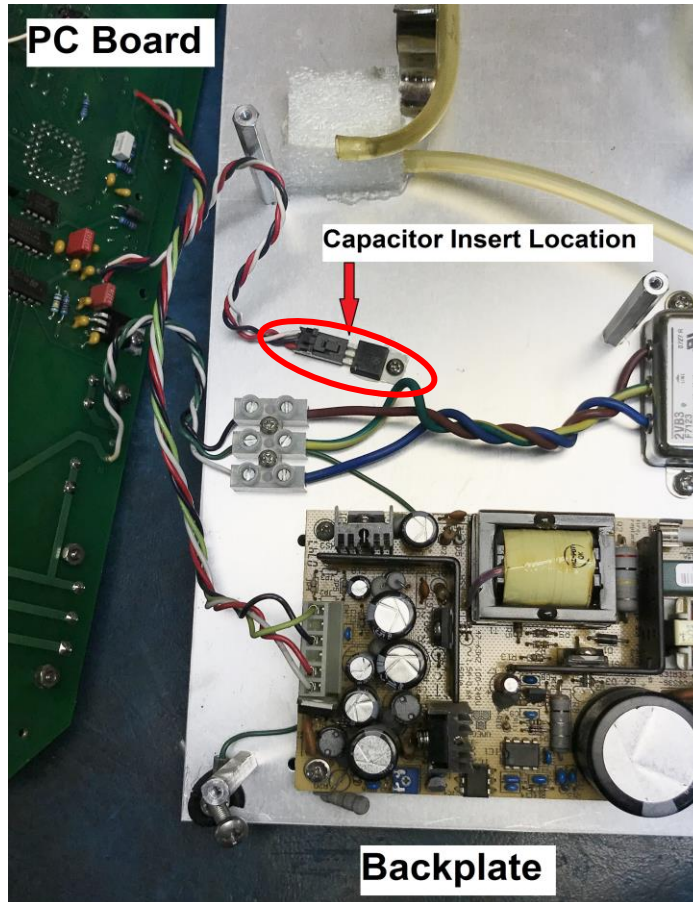


Figure 2 - Haloguard® III Backplate showing Pump

- 5) Unplug the black 3 pin connector from the 7812 regulator.

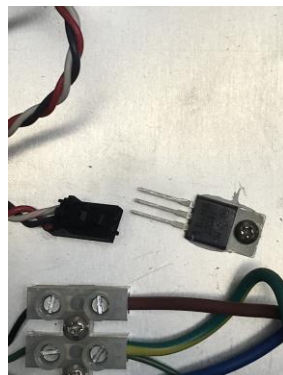


Figure 3 – Three Pin Connector Unplugged

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- 6) Insert the capacitor assembly (C015A) onto the 7812 voltage regulator. **Caution: be sure all 3 pins of the voltage regulator are firmly and correctly inserted into the connector and do not slide under the connector.**



Figure 4 – Capacitor Assembly (C015A) to 7812

- 7) Insert the 3-pin Connector onto the capacitor assembly (C015A). **Caution: be sure all 3 pins of the connector are firmly and correctly inserted onto the capacitor assembly and do not slide under it.**



Figure 5 – Three Pin Connector to Capacitor Assembly (C015A)

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- 8) If the Capacitor Assembly overhangs the base plate edge it may be necessary to loosen the screw on the 7812 voltage regulator and rotate the assembly slightly. **Note that there is additional room in the steel enclosure that may accommodate the assembly without this necessity.**

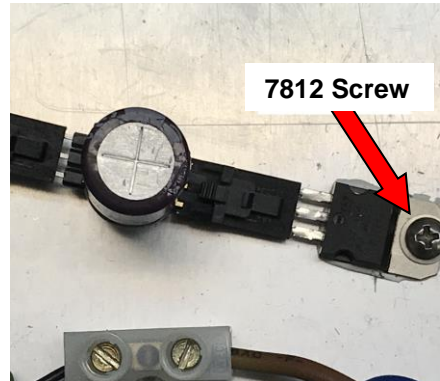


Figure 6 – 7812 Screw Location

Refer to the “H3 Pump Replacement” document for Steps 9, and 10 below.

- 9) Reassembly is the reverse of removal. Re-attach the PC Board to the back-plate.
10) Replace the PC Board/ back-plate assembly into the **Haloguard®** steel enclosure.