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# Service Letter

## Service Letter No. 059

### Combustion Heater - Improved Cycling Switch Installation

#### 1. Planning Information

##### A. Effectivity

- (1) Combustion Heaters listed in Table 1 manufactured by Hartzell Engine Technologies LLC (HET), Janitrol or it's predecessors are affected by this Service Letter.
- (2) All 07D32 series heater cycling switches installed in the aircraft in conjunction with a combustion heater system manufactured by HET, Janitrol, or it's predecessors are affected by this Service Letter.

**WARNING:** DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF THE APPLICABLE AIRCRAFT AND/OR ENGINE MAINTENANCE MANUAL (MM) AND THIS SERVICE LETTER (SL). INFORMATION CONTAINED IN THE MM AND THE SL MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. USE OF OBSOLETE INFORMATION MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE. REFER TO THE APPLICABLE MM INDEX AND THE HET WEBSITE FOR THE MOST RECENT REVISION LEVELS.

##### B. Reason

- (1) All of the mechanical 07D32 Series Cycling Switches are being superseded by improved solid state Cycling Switches, HET P/N 81000 or P/N 81001.
  - a. The improved HET Cycling Switches require minor installation procedures to replace the existing 07D32 Series Cycling Switches.
  - b. The improved HET Cycling Switches, HET P/N 81000 and 81001, are factory set to a mid-range temperature and may require adjustment.
- (2) HET P/N 60009 Unpressurized Heater Cycling Switch Kit may be installed in non-pressurized heaters to replace any existing 07D32 Series Cycling Switches as a product improvement. This Kit contains Cycling Switch, terminal housings, and terminals.
- (3) As a product improvement, HET P/N 60010 Pressurized Heater Cycling Switch Kit may be installed in pressurized heaters to replace any existing 07D32 Series Cycling Switches. This Kit contains Cycling Switch, switch gasket, terminals, and terminal housings.

##### C. Description

- (1) This publication provides Additional Maintenance Information (AMI).
- (2) This Service Letter provides notification that improved solid state Combustion Heater Cycling Switch Kits are available and provides instruction for initial and subsequent installations. Each kit contains an improved Cycling Switch and all the necessary parts for installation. (First time installations require additional parts not included in the kits.)

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#### D. Approval

(1) This technical publication has been approved by Hartzell Engine Technologies LLC.

#### E. References

**WARNING:** DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF A DOCUMENT. INFORMATION CONTAINED IN ANY LISTED DOCUMENT MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. USE OF OBSOLETE INFORMATION MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/ OR SUBSTANTIAL PROPERTY DAMAGE.

- (1) HET P/N 24E25-1 Rev. D or later, B Series Heater Overhaul Manual (for Standard tube).
- (2) HET P/N 94E47 Rev. D or later, B Series Heater Overhaul Manual (for Extended Life tube).
- (3) HET P/N 91M91 Rev. New or later, I Series Heater Overhaul Manual (for Inconel® tube).
- (4) Applicable aircraft maintenance manual or service manual.
- (5) Applicable aircraft AFM or POH.

#### F. Other Publications Affected

- (1) HET P/N 24E25-1, B Series Heater Overhaul Manual (for Standard tube).
- (2) HET P/N 94E47, B Series Heater Overhaul Manual (for Extended Life tube).
- (3) HET P/N 91M91, I Series Heater Overhaul Manual (for Inconel® tube).

## 2. Material Information

- A. As desired for maintenance, one (1) each, Combustion Heater Cycling Switch Kit, HET P/N 60009 (for non-pressurized heaters). Kit contains Cycling Switch, terminal housings, and terminals.
- B. As desired for maintenance, one (1) each, Combustion Heater Cycling Switch Kit, HET P/N 60010 (for pressurized heaters). Kit contains Cycling Switch, switch gasket, terminals, and terminal housings.
- C. One (1) each, Cycling Switch Bracket\*, HET P/N 81017 (any combustion heater).
- D. One (1) each, Gasket\*, HET P/N 88D88-1 (for pressurized heaters only).
- E. Loctite® P/N 30558, High Temperature Gasket Maker, as required. (For pressurized heaters only.) Obtain locally.
- F. Permatex® Gasket Remover or Loctite® Chisel Paint Stripper P/N 79040. Obtain locally.
- . As required, Cable Tie, HET P/N 12D66. (May use T&B, Co. TY-3 or equivalent.)

\* First time installation of the Improved Cycling Switch only.

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#### 3. Accomplishment Instructions

**WARNING 1:** THIS PROCEDURE MUST BE PERFORMED BY COMPETENT AND QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH AIRCRAFT MAINTENANCE THAT IS SPECIFIC TO THE CABIN HEATING SYSTEM. FAILURE TO DO SO MAY RESULT IN ECONOMIC LOSS, EQUIPMENT DAMAGE, AND/OR PHYSICAL INJURY.

**WARNING 2:** DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF THIS SERVICE LETTER AND THE APPLICABLE AIRCRAFT AND/OR HET HEATER MAINTENANCE MANUALS. INFORMATION CONTAINED IN THESE MANUALS OR THIS SERVICE LETTER MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. THE USE OF OBSOLETE INFORMATION MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE.

**CAUTION:** DO NOT DEPEND ON THIS SERVICE LETTER FOR GAINING ACCESS TO THE HEATER INSTALLED IN THE AIRCRAFT. ACCESS REQUIRES THE USE OF THE APPLICABLE MANUFACTURER'S MAINTENANCE MANUALS OR SERVICE INSTRUCTIONS. IN ADDITION, ANY PREFLIGHT OR IN FLIGHT OPERATIONAL CHECKS REQUIRE USE OF THE APPROPRIATE AFM OR POH.

- A. HET does not require that the existing heater Cycling Switch be replaced unless failed or proper operation cannot be achieved. The improved version may be installed as desired at overhaul or other convenient maintenance.
- B. Gain Access
  - (1) Using the applicable aircraft maintenance manual, determine the location of the aircraft combustion heater.
  - (2) Gain access and expose the combustion heater.
  - (3) Locate the heater data tag which typically can be found on the heater jacket on the same side and below the heater electrical terminal strip.
  - (4) Record the heater part number (using an inspection mirror if required).
- C. Cycling Switch Removal, 07D32 Series (Refer to Fig. 1)
  - (1) Some heaters may have the cycling switch located as part of the aircraft heating system installation and not installed on the heater. Refer to the applicable aircraft service or maintenance manual for removal.
  - (2) Disconnect the two electrical leads from the cycling switch terminals.
    - a. Discard the hardware.
    - b. Do not extract wire at this time.
  - (3) Disconnect the electrical lead (201-16) from position 3 of heater electrical terminal strip. Reinstall the hardware. Do not extract wire at this time.
  - (4) Disconnect electrical lead (202-16) at the fuel solenoid valve by separating the single wire nylon Amp connector. The connector is located and secured outside of the fuel solenoid valve box.
    - a. Do not extract wire at this time.
  - (5) Remove the two SEMS screws (P/N 86D35-5) that attach the switch to the mount bracket and retain.

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- (6) On non-pressurized heaters:
    - a. Lift the cycling switch from the mount bracket or at the jacket opening and discard the cycling switch.
  - (7) On pressurized heaters:
    - a. Remove the HET P/N 35D88 hold down plate and retain.
    - b. Using a non-metallic flat tool, lightly pry up the cycling switch while applying gasket remover and remove the cycling switch from the mount bracket. Refer to the Material Information section of this Service Letter.
    - c. Discard the cycling switch.
    - d. Remove and discard the HET P/N 35D89 gasket.
- D. Cycling Switch Mount Bracket Replacement (First time only:)
- (1) If the 07D32 Series Cycling Switch is being replaced with an improved Cycling Switch for the first time, it will also be necessary to replace the existing cycling switch mount bracket. Any subsequent replacement will not require mount bracket replacement.
  - (2) Remove and retain the six (6) SEMS screws (P/N 86D35-1) that attach the mount bracket to the jacket.
  - (3) On non-pressurized heaters:
    - a. Remove and discard the P/N 88D87-1 cycling switch mount bracket.
    - b. Clean the surface of the heater jacket at the cycling switch mount bracket using isopropyl alcohol.
    - c. Install an HET P/N 81017 Cycling Switch Mount Bracket using the six (6) retained SEMS screws (P/N 86D35-1). No gasket or sealant is required.
  - (4) On pressurized heaters, the cycling switch mount bracket is mounted on the heater jacket with a gasket and screws. All are sealed with adhesive type sealants. (Refer to Fig. 3.)
    - a. Using a non-metallic flat tool, lightly pry up the P/N 88D87-1 cycling switch mount bracket while applying gasket remover. Refer to the Material Information section of this Service Letter.
    - b. Remove and discard the P/N 88D87-1 cycling switch mount bracket and the HET P/N 88D88-1 gasket.
    - c. Thoroughly clean any remaining gasket and sealant from the heater jacket using a stiff, non-metallic bristle brush and shop cloths soaked in gasket remover. Refer to the Material Information section of this Service Letter.
    - d. Using a non-metallic putty knife or spatula, evenly apply Loctite® 30558 High Temperature Gasket Maker onto the cycling switch mount bracket surface and to both surfaces of the new switch gasket (P/N 88D87-1) (not included in 60010 Kit).
    - e. Install the HET P/N 81017 Cycling Switch Mount Bracket using six (6) retained SEMS screws (P/N 86D35-1) with gasket maker applied to the first 2-3 threads and under the heads of the screws.
    - f. Assemble parts immediately while the gasket maker is still wet.
    - g. Torque the screws to 12-15 in-lbs.

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#### E. Improved Cycling Switch Installation

**NOTE:** The Cycling Switch is a solid state device sensitive to damage by electro-static discharge (ESD). Do not remove the Cycling Switch from its protective package until just before installation.

1. Immediately before removing the Cycling Switch from its protective package, eliminate any ESD on your body by touching a known earth ground.
- (1) The fit and function of the 07D32 Series and the P/N 81000 or P/N 81001 Cycling Switches are the same; however, the improved Cycling Switch has three wires while the 07D32 series has only two. Instructions are provided for installation of the new wiring configuration.
  - (2) There are two unique kits: one for non-pressurized heaters; and one for pressurized heaters shown in Table 1.
    - a. These kits contain ring terminals, pin and socket terminals, pin and socket housings, and the Improved Cycling Switch.
    - b. Except for sealant application, use of gasket, and hold down plate, the instructions for use of either kit will be the same.
    - c. Wire length must be obtained from Table 1, Cycling Switch Installation Instruction.
  - (3) Preparation of the Improved Cycling Switch must occur prior to installation.
    - a. Select the desired heater part number from Table 1. This table includes B Series standard or extended life (EL) combustion tube heaters and I-Series Inconel® (IS) combustion tube heaters which may share common base part numbers.
    - b. Cut the red, white, and black wires to the appropriate length shown in Table 1 for the selected heater part number in Table 1. If the selected heater part number does not appear, refer to the "Other Heater" instructions.
    - c. Strip back the RED and BLACK wire ends to 0.203 to 0.235 inch (5.16 to 5.97 mm).
    - d. Strip back the WHITE wire end to 0.172 to 0.202 inch (4.47 to 5.13 mm).
    - e. Slide heat shrink wire marking down to within 1 or 2 inches of the terminal for each wire.
    - f. Using a P/N 47386 AMP crimper (or equivalent), crimp new P/N 57A88 Ring Terminals onto the RED (201-16) and BLACK (205-16) wires.
      1. Follow tool manufacturers crimping instructions to make sure of a quality crimp.
    - g. Using a P/N 91504-1 AMP crimper (or equivalent), crimp a new P/N 75D79 Socket Terminal onto the WHITE (202-16) wire.
      1. Follow tool manufacturers crimping instructions to make sure of a quality crimp.
  - (4) Install the prepared improved cycling switch by placing it in the cycling switch bracket in the heater jacket (non-pressurized only).
    - a. Secure with two SEMS screws (P/N 86D35-5) retained from step 3.C(5).
    - b. Torque the screws to 12-15 in-lbs.
  - (5) Installation of the prepared improved cycling switch in a pressurized heater requires that a gasket and sealant be used with the new switch.
    - a. Using a non-metallic putty knife or spatula, evenly apply Loctite® 30558 High Temperature Gasket Maker onto the cycling switch mount bracket surface and both surfaces of a new P/N 35D89 switch gasket (included in 60010 Kit).

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- b. Immediately assemble parts while the gasket maker is still wet.
- c. Install the retained HET P/N 35D88 hold down plate. (Refer to Fig. 3.)
- d. Apply gasket maker to the first 2-3 threads and under the heads of the two SEMS screws (P/N 86D35-5) retained from step 3.C(5).
- e. Secure the screws and torque to 12-15 in-lbs.
- f. Allow three (3) to five (5) hours for gasket maker to cure before testing or using equipment.

**NOTE:** Prior to connecting the white cycling switch wire, check the solenoid valve coil for resistance. It must read 10 ohms or more. If less, replace the solenoid valve.

- (6) Locate the new lead 202-16 (white) attached to the improved cycling switch and route it along the existing harness to the fuel solenoid valve box. (Refer to Fig. 2.)
  - a. Extract the pin from the nylon connector attached to the fuel solenoid valve wire and cut the lead close to the terminal end.
  - b. Discard pin and housing.
  - c. Strip back the fuel solenoid valve wire end 0.172 to 0.202 inch (4.47 to 5.13 mm).
  - d. Using a P/N 91504-1 AMP crimper, crimp P/N 75D78 Pin Terminal onto the fuel solenoid lead.
    1. Follow tool manufacturers crimping instructions to make sure of a quality crimp.
  - e. Put the new P/N 80D48-1 Pin Housing onto the 202-16 fuel solenoid valve wire pin and put the new P/N 80D49-1 Socket Housing onto the 202-16 cycling switch lead socket.
  - f. Connect the nylon connectors.
- (7) Locate the new lead 201-16 (red) attached to the improved cycling switch and route it along the existing harness to the electrical terminal strip.
  - a. Remove position 3 screw, install new lead. Reinstall position 3 screw.
  - b. Torque the screw to 11-13 in-lbs.
- (8) Locate the new lead 205-16 (black) attached to the improved cycling switch and route along the existing harness to the electrical terminal strip.
  - a. Remove position 5 screw, install new lead. Reinstall position 5 screw.
  - b. Torque the screw to 11-13 in-lbs.
- (9) Cut the existing cable ties securing leads (201-16) and (202-16).
- (10) Extract and discard the original wires.
  - a. When routing the new wiring cut existing cable ties and replace at the same location with new cable ties (not included in kit).
  - b. Use P/N 12D66 or equivalent cable ties.
- (11) The P/N 81000 and P/N 81001 Cycling Switches delivered in the HET Kits are factory adjusted for a mid-range temperature. Adjustment of this set point may be required if the proper temperature can not be obtained (refer to section 3.F of this service letter).

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#### F. Improved Cycling Switch Test and Adjustment (Refer to Fig. 4.)

**WARNING:** MAKE SURE THAT THE HEATER AIR INLET IS CLEAR AND THE EXHAUST HAS BEEN ROUTED TO OUTSIDE AIR WITHOUT LEAKS BEFORE STARTING AND RUNNING THE HEATER (WITH AIRCRAFT OUTSIDE IS PREFERRED). HAZARDOUS FUMES FROM THE HEATER EXHAUST OR AN UNCONTAINED FIRE MAY CAUSE INJURY OR DEATH.

**NOTE:** For troubleshooting purposes, it must be noted that the new solid state Cycling Switch is normally closed but will measure as an open when unpowered.

- (1) To test the function of the Improved Cycling Switch, put a thermometer or a temperature probe capable of reading temperatures up to 500° F in the ventilation duct approximately 18 to 24 inches from the heater outlet and in the approximate center of the duct.
- (2) Connect a 16 gage (minimum) jumper wire across the terminals of the duct switch, if applicable, to make it inoperative.
- (3) Start the heater and observe the action of the cycling switch while the heater is running.
- (4) The cycling switch should cycle to control the outlet air temperature below 250° F. This is a function of ambient air temperature and air flow conditions.
- (5) Observe heater cycling switch operation by monitoring the temperature fluctuation indicated by thermometer. Normal operating range is 190° F to 230° F.
- (6) If the switch cycles outside of this range (high or low), it can be adjusted to the normal range of 190° F to 230° F. Do not to exceed 250° F.
- (7) To adjust temperature range, turn the adjusting screw counterclockwise to decrease temperature and clockwise to increase temperature. (Refer to Figure 4.)
  - a. If adjustment fails to restore the proper temperature range, replace the cycling switch.

**NOTE:** If optional testing of an overheat switch is desired after an improved cycling switch is installed per SL-059, the lack of terminals on the cycling switch has changed the test procedure.

1. To accomplish an optional overheat switch test, the cycling switch must be bypassed by connecting a jumper between heater terminal strip position 3 and the pin connector attached to the fuel solenoid wire (202-16).
  - i. Care must be taken to avoid inadvertently grounding the white (202-16) cycling switch wire while performing this test. If this wire is grounded, the cycling switch may be damaged.
2. Refer to the applicable maintenance manual and revision as shown in 1.E(1),(2),& (3) above.
3. All instructions provided in section 10, "Testing" of the applicable maintenance manual will apply, with the exception of the cycling switch bypass as noted above.

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- (8) When the correct temperature range has been achieved, shut down the heater and allow it to cool.
- (9) Remove the duct switch jumper and thermometer or temperature probe.
  - a. If optional overheat test has been performed, remove cycling switch jumper. Reconnect pin connector at fuel solenoid.

#### G. Return Heater to Service

- (1) After the improved cycling switch has been correctly installed, the aircraft combustion heater will be ready to "return to service".
- (2) Perform a functional ground test in accordance with the aircraft maintenance manual.
  - a. Check security of installation and for possible hot air leakage.
  - b. Correct any anomaly.
- (3) Using the latest revision of the applicable aircraft manufacturer's maintenance manuals, install any portion of the aircraft that was removed to gain access.
- (4) Perform a operational test in accordance with the aircraft maintenance manual and/or AFM or POH and make sure that the heater operates properly.

#### H. Maintenance Record

- (1) Upon successful completion of the Accomplishment Instructions contained in this Service Letter, make an appropriate log book entry noting installation of the applicable cycling switch kit in accordance with this Service Letter.

#### 4. Contact Information

- A. Contact HET Product Support for all communications regarding the technical content of this Service Letter.

- (1) Phone +1.334.386.5400 (Option 2)
- (2) Fax +1.334.386.5450
- (3) E-mail at techsupport@HartzellEngineTech.com
- (4) Address

Hartzell Engine Technologies LLC  
2900 Selma Highway  
Montgomery, AL 36108  
USA



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Table 1 - Cycling Switch Instruction

Heater P/N (std, EL, IS)	Original Cycling Switch	Red Wire	White Wire	Black Wire	Cycling Switch Kit P/N
62D95-1B 45D70-2 37D77-1 20D35-1 22D25-1 96C62-1 99C80-2	A07D32	Cut 9 inches from cycling switch housing.	Cut 19 inches from cycling switch housing.	Cut 10 inches from cycling switch housing.	60009
C34D51 D34D51 E34D51	B07D32	Cut 9 inches from cycling switch housing.	Cut 19 inches from cycling switch housing.	Cut 10 inches from cycling switch housing.	60010
C39D59 D39D59	A07D32	Cut 9 inches from cycling switch housing.	Cut 21 inches from cycling switch housing.	Cut 10 inches from cycling switch housing.	60009
42D79-1	A07D32	Cut 9 inches from cycling switch housing.	Cut 23 inches from cycling switch housing.	Cut 10 inches from cycling switch housing.	60009
23E62-2 65D79-3 91E18-1	A07D32	Cut 9 inches from cycling switch housing.	Cut 24 inches from cycling switch housing.	Cut 10 inches from cycling switch housing.	60009
B37D88	A07D32	Cut 13 inches from cycling switch housing.	Cut 24 inches from cycling switch housing.	Cut 12 inches from cycling switch housing.	60009
90D38-1 90D38-2 91E88-1 91E88-4	A07D32	Cut 13 inches from cycling switch housing.	Cut 26 inches from cycling switch housing.	Cut 14 inches from cycling switch housing.	60009
39D90-1	A07D32	Cut 19 inches from cycling switch housing.	Cut 21 inches from cycling switch housing.	Cut 18 inches from cycling switch housing.	60009
07E02-1	B07D32	Cut 24 inches from cycling switch housing.	Cut 23 inches from cycling switch housing.	Cut 23 inches from cycling switch housing.	60010
82D20-1	B07D32	Cut 9 inches from cycling switch housing.	Cut 17 inches from cycling switch housing.	Cut 8 inches from cycling switch housing.	60010
Other Heater Part Numbers (with 07D32 series)	Refer to switch removed	Measure wire from cycling switch to heater electrical terminal. Cut to same length.	Measure wire from cycling switch to fuel solenoid AMP connector. Cut to same length.	Cut wire using same length as measured for red wire plus one inch.	60009 60010
All Heater Instruction	Refer to switch removed	Strip wire end .203 to .235 inch & crimp HET P/N 57A88 Ring Terminal. Use AMP 47386 or equiv. crimping tool. Slide heat shrink down to 1 to 2 inches from terminal.	Strip wire end .172 to .202 inch & crimp HET P/N 75D79 AMP socket terminal. Use an Amp 91504-1 or equiv. crimping tool. Install the AMP socket housing HET P/N 80D49-1. Slide heat shrink down to 1 to 2 inches from terminal.	Strip wire end .203 to .235 inch & crimp HET P/N 57A88 Ring Terminal. Use AMP 47386 or equiv. crimping tool. Slide heat shrink down to 1 to 2 inches from terminal.	60009 60010



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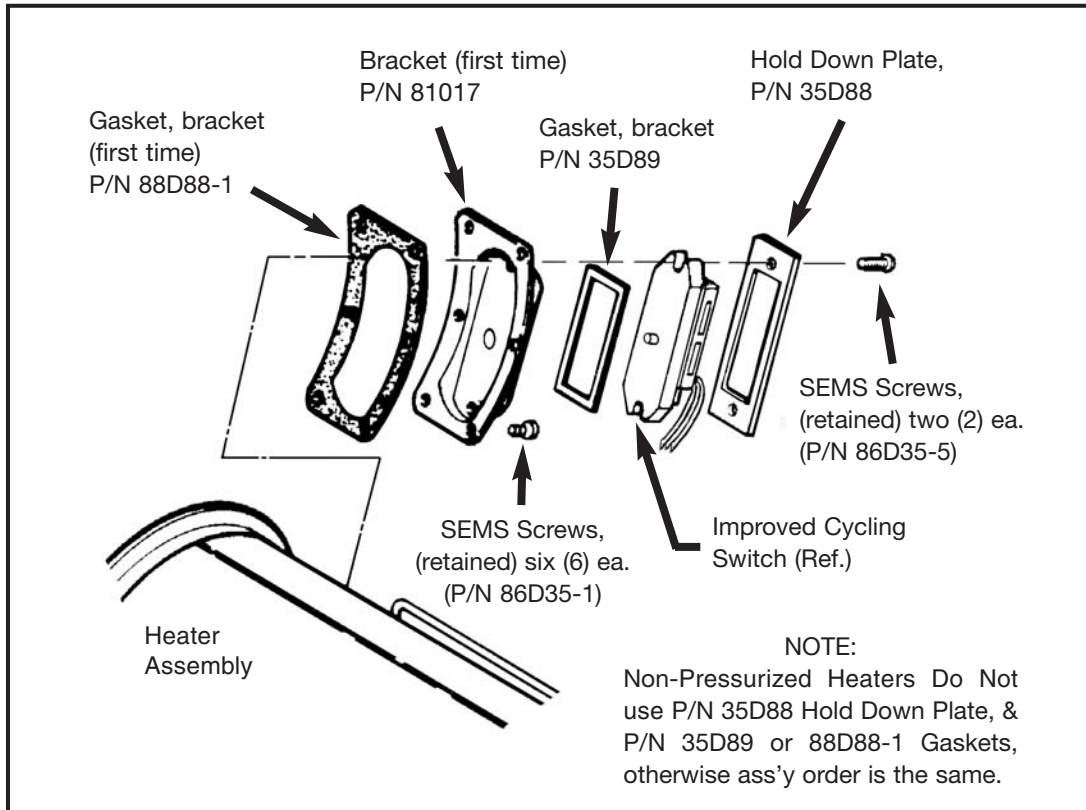


Figure 3 - Cycling Switch Parts Stack (Pressurized Heater)

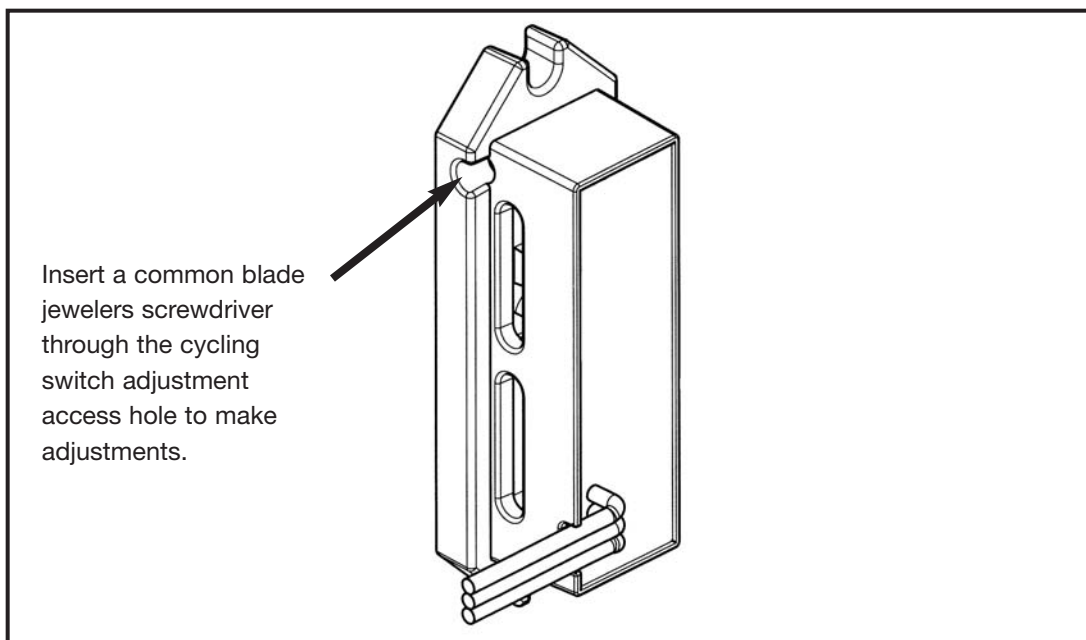


Figure 4 - P/N 81000 & 81001 Cycling Switch Adjustment Access

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