SUCCESS WITH Atwood® TRAINING

SWAT
Welcome to S.W.A.T

Atwood Furnace Part 2
Sequence of operations systems include the following:
1. Fan system
2. Ignition system
3. Burner System

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Customer Service 866-869-3118

www.askforatwood.com
Welcome to Atwood SWAT Training

These classes are to help you troubleshoot our product to reduce time and money to get the customer on the road to their next destination.

These classes are training and not a certification program for RVIA hours.

Welcome to Atwood SWAT Training
Become a Certified RV Service Technician

Join more than 2,200 of your peers in being recognized for your experience and knowledge. What does becoming a Certified RV Service Technician do for you?

- Signifies your individual knowledge of RV technical service
- Exemplifies your advanced capabilities
- Represents your enhanced credibility
- Showcases your commitment to your customers
- Earns money for you and your dealership, which makes you stand apart from non-certified RV technicians

Staying Certified Increases Your Value to Your Dealership and Customers

By retaining your Certification status you are showing your renewed commitment to your customers and reaffirming your elite knowledge of RV technical service.

The Certification Program
Now that we have talked about the different types of furnace and how they work we will not go into the sq of ops that when troubleshooting each of our product the sq of op will be the same for each model.
Sequence of Operation - DC Models (STANDARD ONE-STAGE)

The ON/OFF switch allows power to pass to the circuit breaker and the thermostat.

The thermostat controls the operating circuit to the furnace by reacting to room temperature. When room temperature is below the thermostat set point, the contact closes to allow current to flow to the relay.

The circuit breaker limits amperage draw of motor.

The relay allows current to pass to the motor by closing a switch within the relay. Voltage from the thermostat activates the relay to turn the fan on. This takes 1-25 seconds.

Current flows to the motor to operate the blower. One end of the motor shaft is for the circulating air wheel and the other side is for the combustion air wheel.

Circulating air blows against the sail switch and closes the contacts, completing the circuit. The sail switch is a safety device that insures air flow before ignition.

The limit switch is a safety device that protects the furnace from over heating. The contacts in the limit switch open at a given temperature setting, shutting off power to the electronic ignition system that controls the gas valve.

As power is applied to the circuit board, the system does the following:
1. A timing circuit allows the blower to purge the chamber (15-17 seconds)
2. The board supplies current to the gas valve and causes it to open.
3. As the valve opens, the board sends a high voltage spark to the electrode at the burner. The board detects the presence of a flame. If the flame is not sensed after approximately six seconds, the board will lock out (three try for ignition, one hour lockout and then three retry), shutting off power to the valve.
4. If the system does not ignite and the thermostat remains closed, the blower will remain on until the thermostat is reset manually.

When the thermostat senses the desired room air temperature, the contacts open, removing power from the ignition system and shutting off the gas valve. The blower runs until the relay opens the circuit, shutting off current to the motor.
At the same time providing power to the thermostat and the relay.

When heat is called for, power is sent to the relay and sail switch. This causes the relay to close.

When the relay is closed, power is sent to the motor and it runs.

With switch on, power goes to the circuit breaker.

With the motor running, the sail switch is closed and power goes through the limit switch to the circuit board.

The circuit board opens the gas valve.

And initiates spark.

Note: starting 07/2001 relay is incorporated into circuit board.
Power into switch

Sample switch for clarity

Switch off,
Power into switch

12.10 V
Switch off, no Power out
Power out of switch

Switch on, shows power out.
Power into circuit breaker
Power out of circuit breaker
Relay

Ground

To motor

(+ in from Circuit breaker

(+ in from thermostat
Power from circuit breaker into relay
Thermostat not calling for heat, no voltage to relay
Thermostat calling for heat, voltage at relay.
Relay closes, sending voltage to motor.
Amp draw limits are on label.
Motor with Blower Wheel & Combustion Wheel
Sail switch on inside of motor cover

To limit switch

From relay
Limit switch

Long reach socket used to remove switch.
Limit switch removed
*** QUICK TEST ***
Power at the white wire indicates current through the Sail / Limit switch, back to board.
Previous ignition control boards

Single try with external relay.

Three try with external relay.

Three try with built in relay.
New board with adapter for old connector.

New push pin style connector
Sequence of Operation - DC Models

The on/off switch allows power to pass to the circuit breaker and the thermostat.

The thermostat controls the operating circuit to the furnace by reacting to room temperature. When room temperature is below the thermostat set point, the contact closes to allow current to flow to the relay.

The circuit breaker limits amperage draw of motor.

The relay allows current to pass to the motor by closing a switch within the relay. A heater coil within the relay actuates a bimetal disc which closes the relay circuit. This takes 17-20 seconds.

Current flows to the motor to operate the blower. One end of the motor shaft is for the circulating air wheel and the other side is for the combustion air wheel.

Circulating air blows against the sail switch and closes the contacts, completing the circuit. The sail switch is a safety device that insures air flow before ignition.

The limit switch is a safety device that protects the furnace from over heating. The contacts in the limit switch open at a given temperature setting, shutting off power to the electronic ignition system that controls the gas valve.

As power is applied to the circuit board, the system does the following:
1. A timing circuit allows the blower to purge the chamber (15-17 seconds)
2. The board supplies current to the gas valve and causes it to open. A manual electrical switch is provided and must be in the “ON” position for current to reach the valve.
3. As the valve opens, the board sends a high voltage spark to the electrode at the burner. The board detects the presence of a flame. If the flame is not sensed after approximately six seconds, the board will lock out (three try for ignition, one hour lockout and then three retry), shutting off power to the valve.
4. If the system does not ignite and the thermostat remains closed, the blower will remain on until the thermostat is reset manually.

When the thermostat senses the desired room air temperature, the contacts open, removing power from the ignition system and shutting off the gas valve. The blower runs until the heater in the relay cools and opens the circuit, shutting off current to the motor.

### WARNING
FURNACE PRODUCES HIGH TEMPERATURE
- Locate furnace out of traffic and away from furniture and draperies.
- Do not touch or put combustibles near appliance. Hot surface temperature may occur.
- Supervise young children in the same room as the furnace.
- Do not place clothing or flammable materials on or near the furnace.
Board

Power from CB

Power to motor

Ground

Power from T-stat

Power to gas valve

Power from Sail / Limit switch

High tension to electrode

Power from CB

Power to motor
Power from circuit breaker to board.
Thermostat off, no power at blue wire into board.
Also no power from board to motor.
Thermostat calling for heat, power shows on blue wire into board.
Then, power is sent to the motor.
*** QUICK TEST ***
With the thermostat calling for heat. You should have power at the blue wire.
Amp-draw test
Checking to see if power is sent to the gas valve.
Checking resistance of a coil, each should be between 30 – 50 OHMs.
Burner head, electrode & valve assembly removal.
Loosen wing nut and slide exhaust tube out.
Disconnect the lead to the gas valve.

Disconnect the lead to the electrode.
Remove the 4 screws that hold the valve assembly in.
Slide burner assembly out
Electrode
Gas valve
Burner head
Combustion wheel cover.
Orifice
Local sense electrode.

Remote sense electrode.

Should have 1/8” gap.
Burnt through burner head

Caused by improper combustion, low gas pressure or improper burn due to blockage.
“Fault” light
Fault codes

<table>
<thead>
<tr>
<th>Number of Flashes</th>
<th>Diagnostic Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 w/ 3 sec pause</td>
<td>Air Flow Limit Fault</td>
</tr>
<tr>
<td>2 w/ 3 sec pause</td>
<td>Flame Sense Fault</td>
</tr>
<tr>
<td>3 w/ 3 sec pause</td>
<td>Ignition Lockout Fault</td>
</tr>
<tr>
<td>Steady on, no flashing</td>
<td>Internal Control Failure</td>
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</tbody>
</table>
Blower wheel and motor removal
The blower and combustion wheels are held on several different ways.

- Spring type compression clamp.
- An allen screw that locks against the armature.
- Or a strap / screw clamp.
Remove compression ring or allen screw from inside of blower wheel.
Slide blower wheel to the left and then out.

Note: Any of the blower wheels (plastic or metal) may be quite difficult to slide off of the motor armature.
Remove compression ring or allen screw from combustion wheel and slide wheel off the armature.
Loosen motor clamp.

Hold motor locator tab up and slide motor out.
QUESTIONS ????
QUESTIONS ????
Over the years of running a mobile RV repair service, having a dedicated place to access service manuals for all the different appliances and components found on RVs was something that I always had a desire to create.

I hope this resource makes your RV repairs easier, as it has mine, but please be careful and follow proper safety practices when attempting to repair your own RV.

If in doubt, please consult with a professional RV technician!

All service manuals provided on www.myrvworks.com are believed to be released for distribution and/or in the public domain.