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Atwood

SWAT

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Atwood Water Heater Tank and On Demand

1. **Tank Water Heaters**
2. **XT Model Tank**
3. **Sequence of Operations**
4. **Installation**
5. **On Demand**

Presenter: Chantal Hershberger

Customer Service :866-869-3118 or email to service@atwoodmobile.com

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.

If you have questions you can email to training@atwoodmobile.com

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employ certifie
technicians. It h
explain and jus
rates we charge

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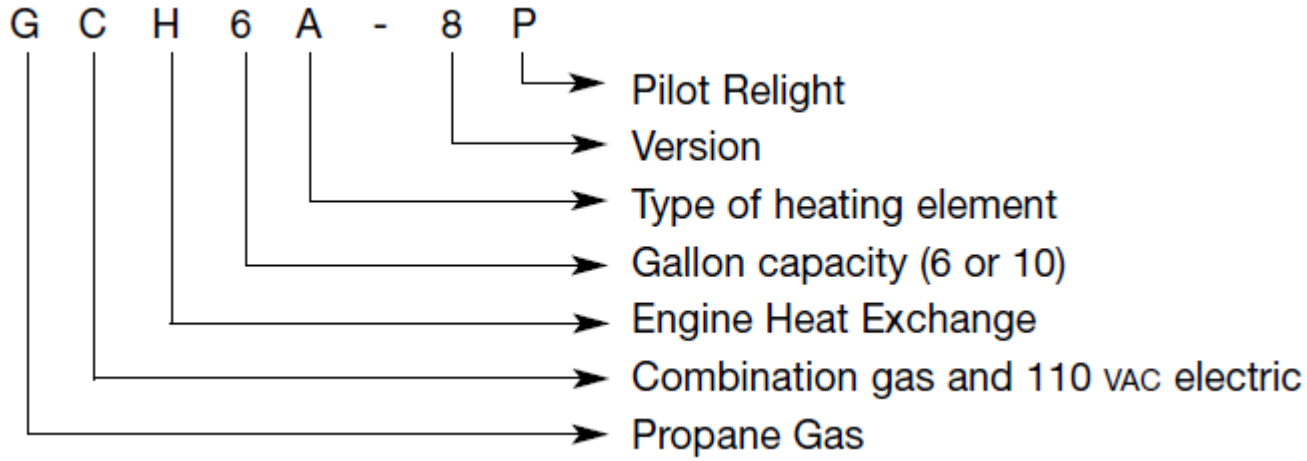
Tank Water Heater Model Number



Type of element A is bolt on AA is screw in

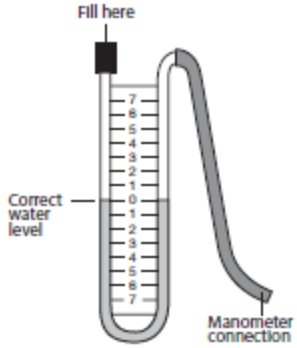
XT-Exothermal Technology at the end of the model number

Recommended Tools and Equipment

U-Tube Manometer - This is the most accurate device for measuring gas pressure. If you use a dial-type manometer, it should be calibrated periodically with this type of manometer.

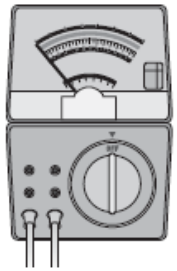
Thermostat Wrench - This tool allows for easier and safer removal of the gas thermostat control. An adjustable version for different size controls is available through most RV distributors or you may fabricate one from angle iron. We do not recommend using a pipe wrench because it may damage the control causing it to go out of calibration.

U-TUBE MANOMETER
with 1/8" pipe nipple



THERMOSTAT WRENCH

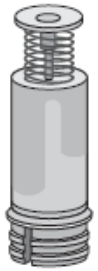
MULTI-METER TO TEST VOLTAGE AND CONTINUITY



Multi-meter - This is the most versatile meter and will test AC voltage and continuity. A continuity test can be used to test for a blown E.C.O. on a gas control.

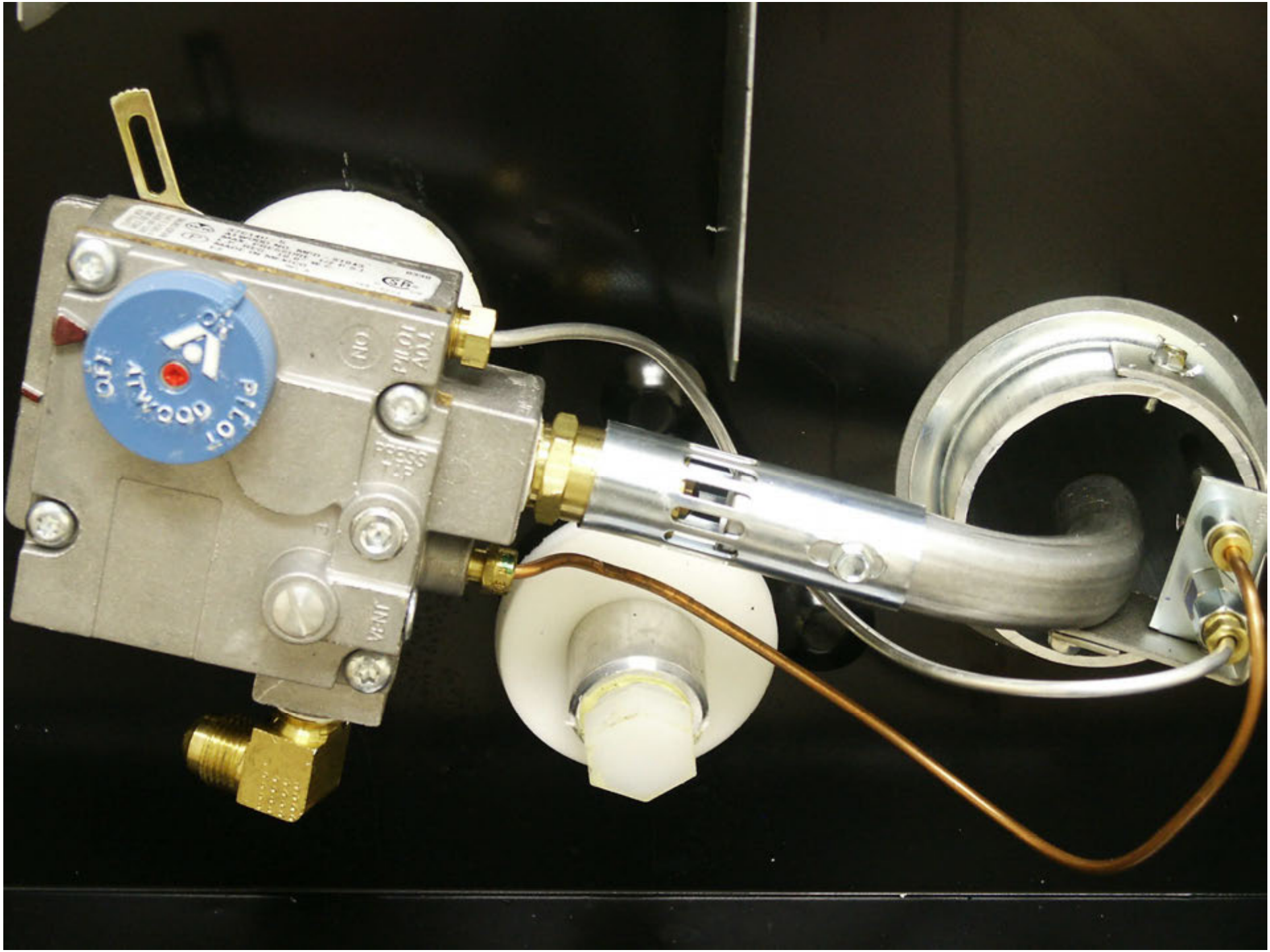
Magnet Assembly Thermocouple Tester - This assembly can be obtained at an electronics or hardware store. This same assembly can also be removed from a Robertshaw control. It will verify if a thermocouple is good. For testing, screw a thermocouple into the tester, heat the thermocouple for 25 seconds and then press the plunger down. If the plunger pops up in less that 25 seconds, the thermocouple is faulty.

MAGNET ASSEMBLY TO TEST THERMOCOUPLE

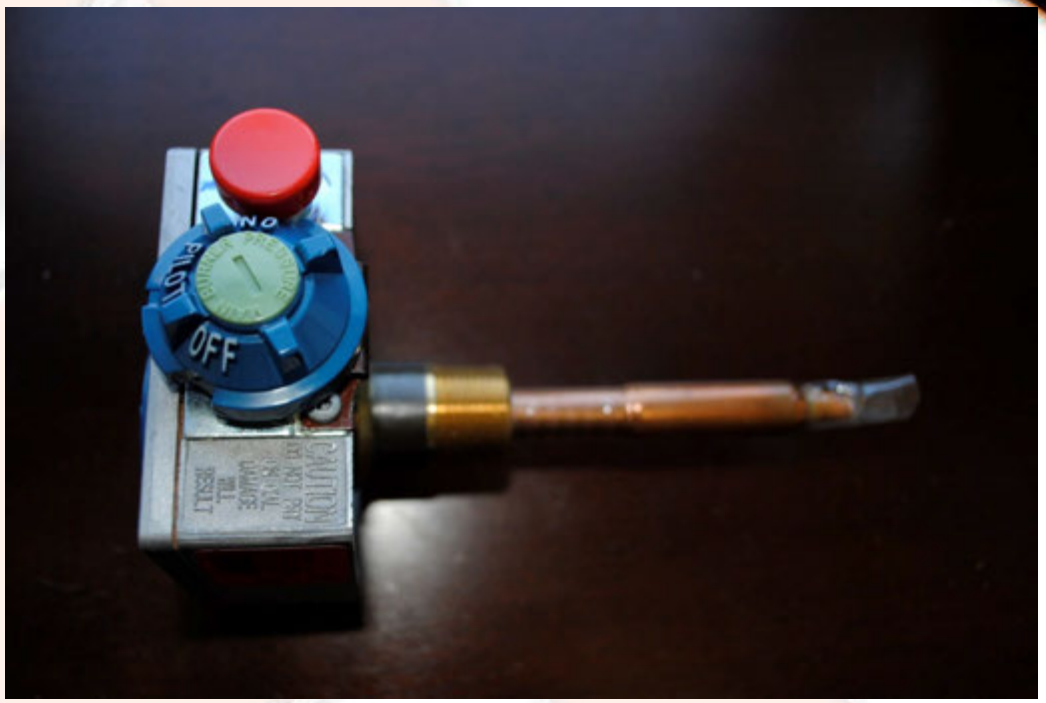


Common Hand Tools - 1/8˝ and 1/4˝ nut drivers, open end wrenches, flat blade and Phillips screw drivers.

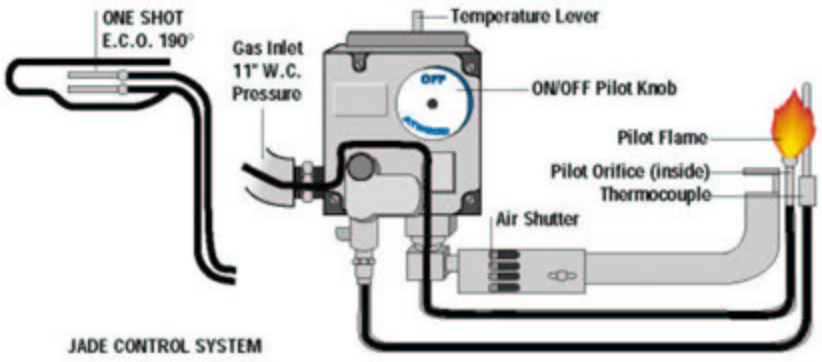
Leak Test Solution - A solution that bubbles when applied to gas fittings or connections showing when a gas leak is present.


PILOT
ON
OFF
IN
OUT

New Pilot Valve 91602



Pilot Sequence of Operation

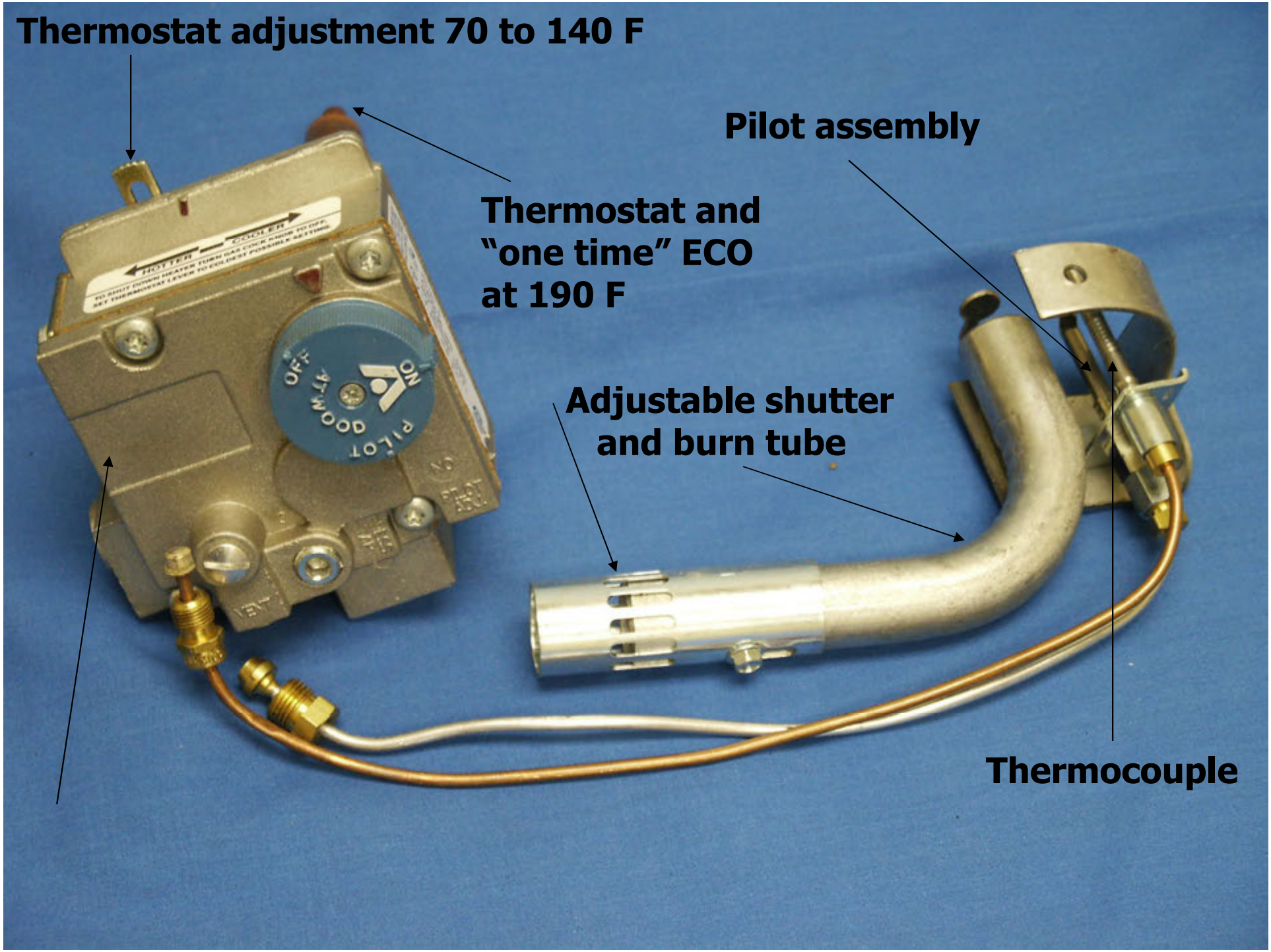


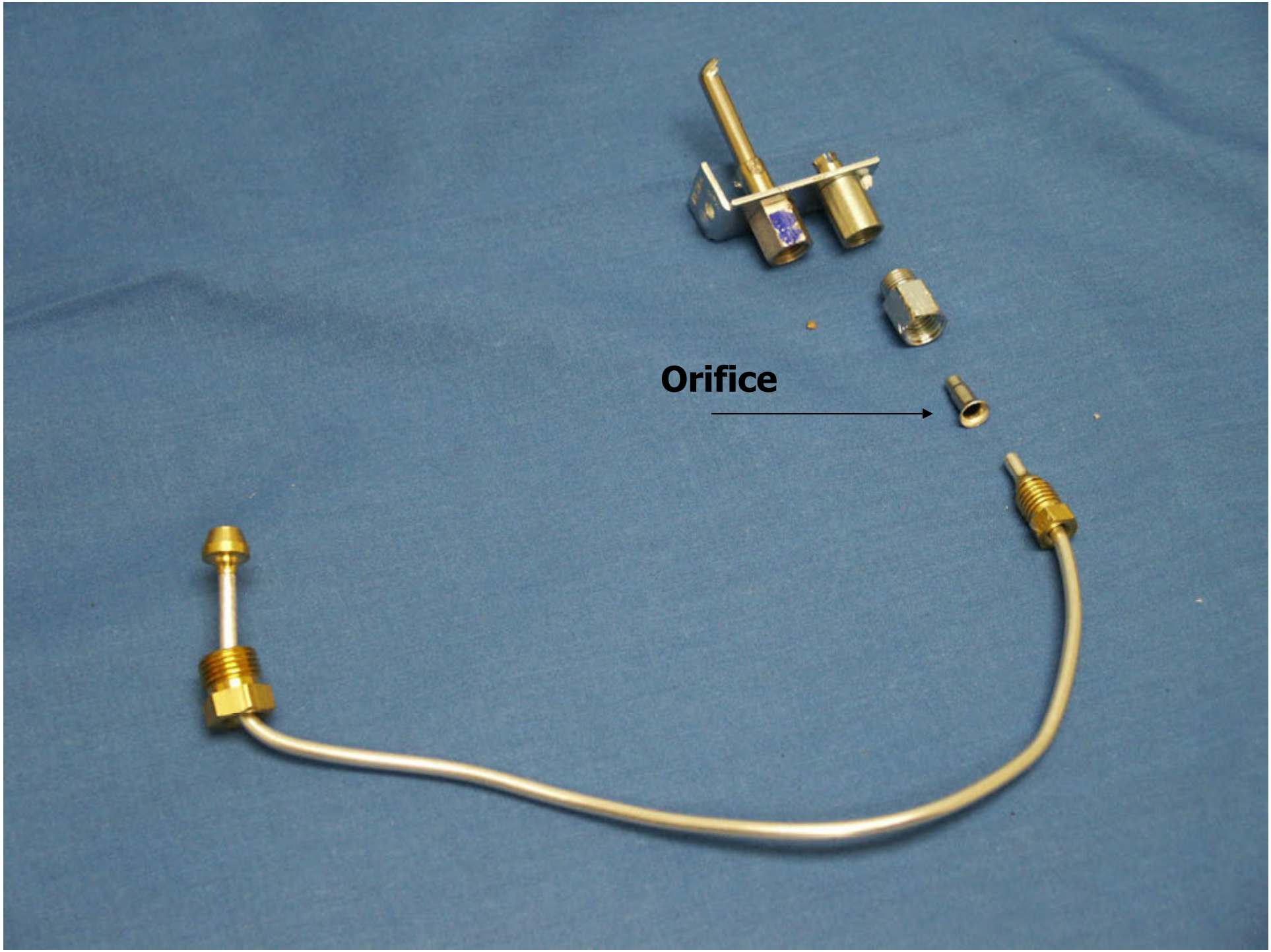
PILOT OPERATION

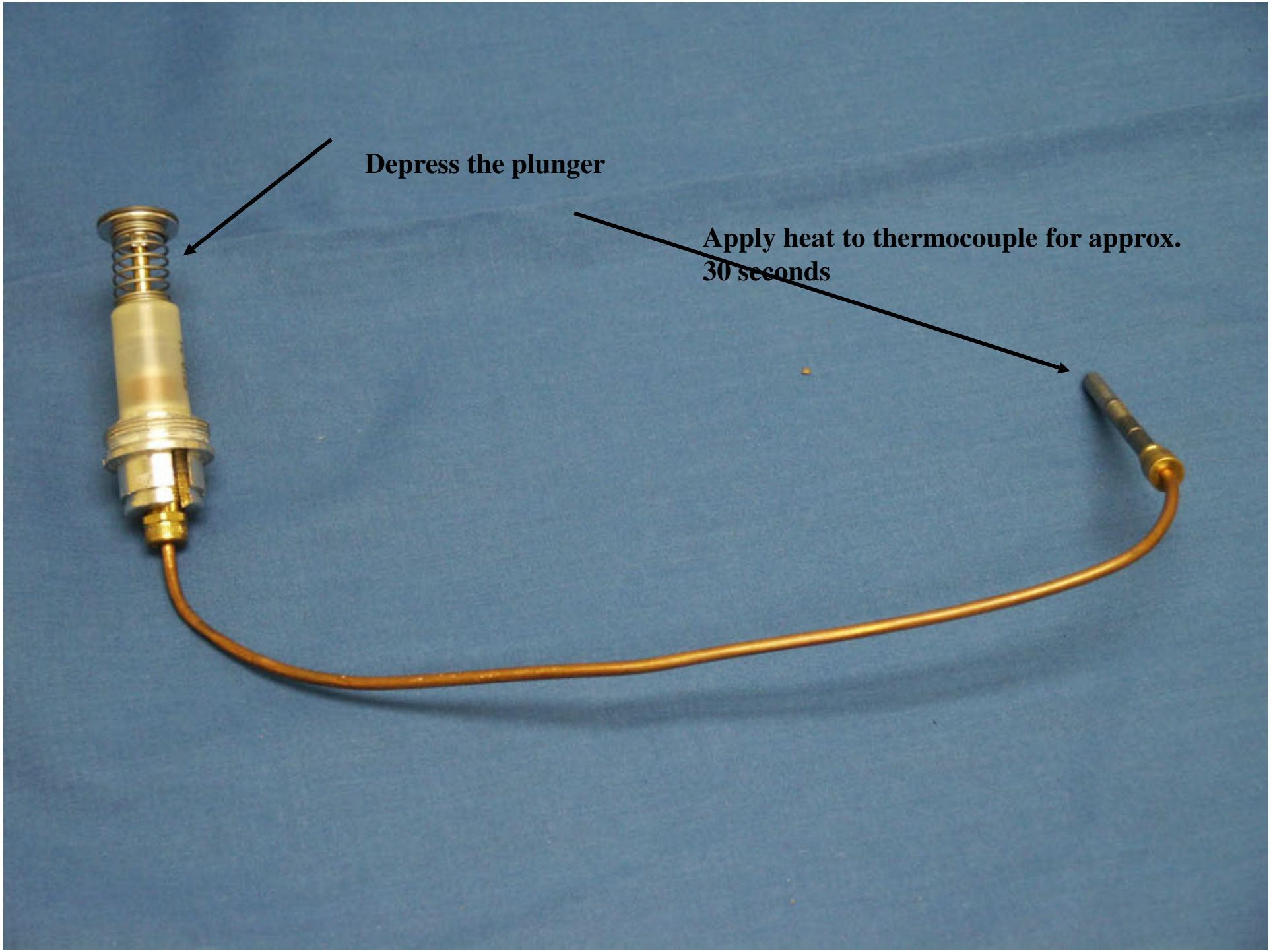
- **Gas Pressure** — 11" W.C. to control is necessary. Set with two gas appliances running.
- **Gas Control** — supplies gas to pilot orifice when control on/off pilot knob is held at pilot position.
- **Pilot Orifice** — meters gas to heat thermocouple. Flame should be high enough to engulf the thermocouple.
- **Thermocouple** — generates millivoltage to the gas control's magnet assembly.
- **Magnet** — when it receives 12 millivolts or more it allows gas to flow freely to pilot without holding pilot knob.
- **E.C.O.** — passes millivolts through the gas control and back to thermocouple. Trips permanently open if water temperature exceeds 190°F.

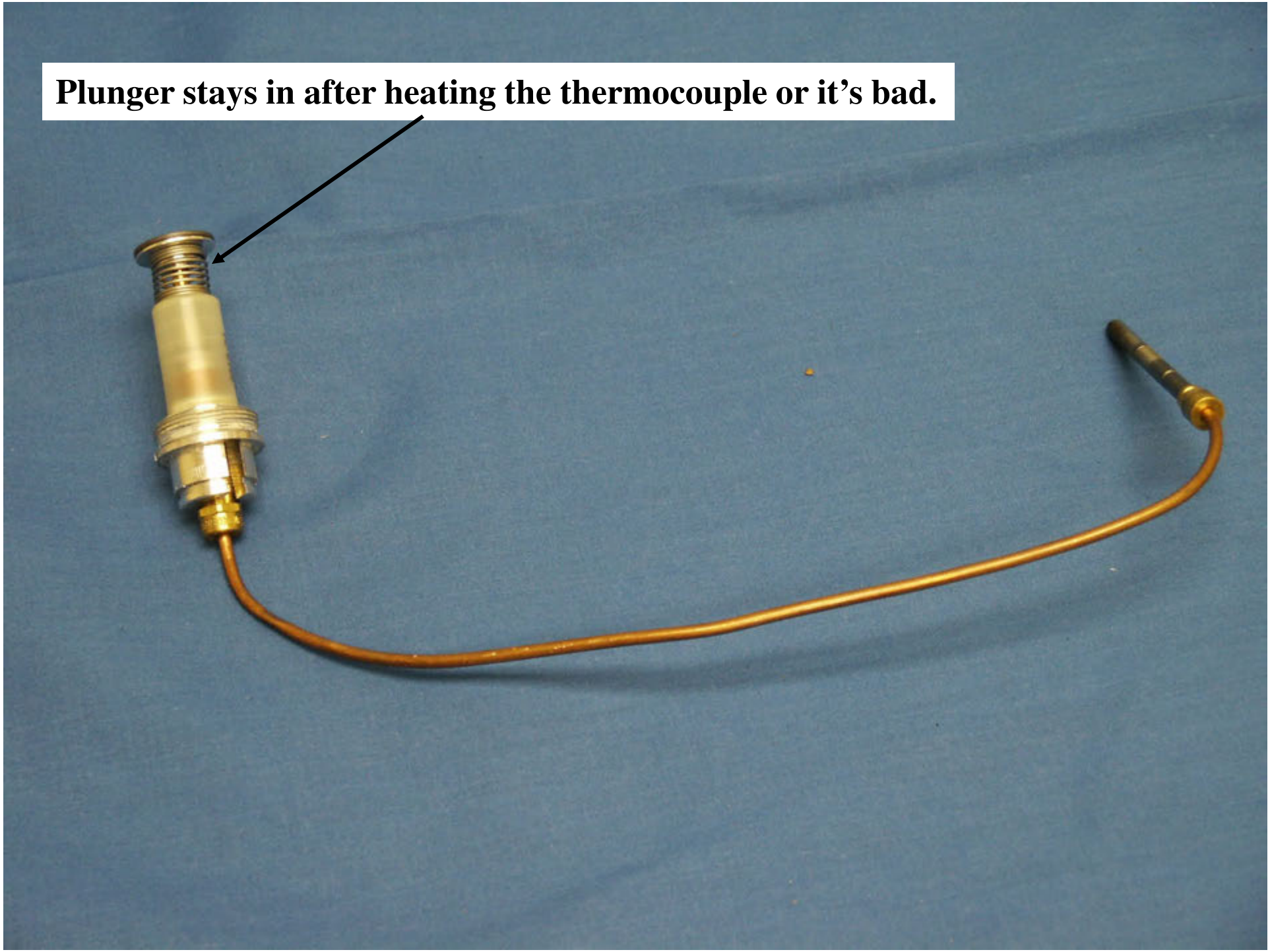
MAIN BURNER OPERATION

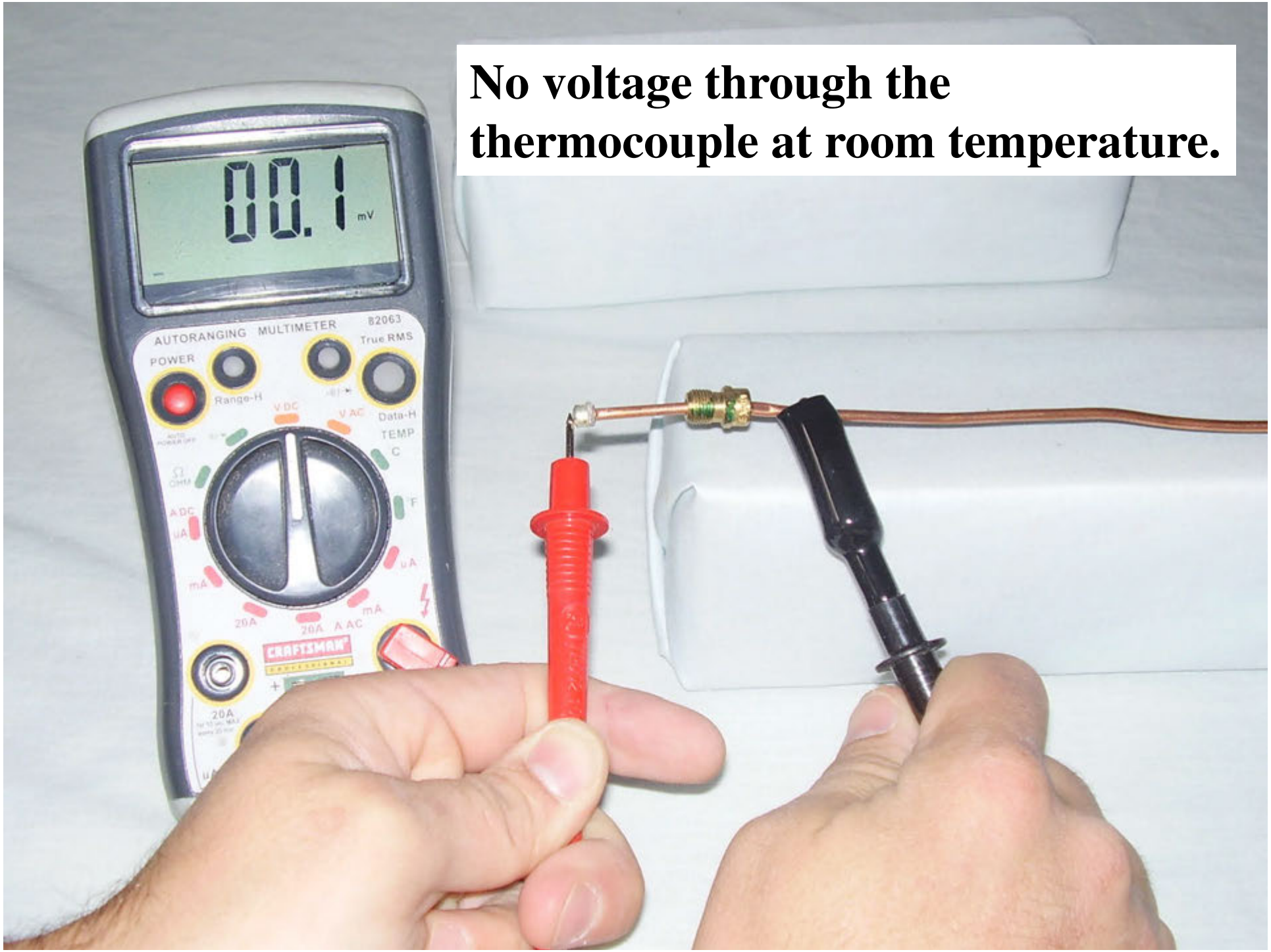
- **Gas Control** — supplies gas to main burner when control knob is set to "ON" position and the temperature lever is set to desired temperature after pilot is lit.
- **Main Burner Orifice** — meters gas through burner tube.
- **Main Burner** — pilot ignites gas when it reaches end of this tube. Flame height adjusted by sliding air shutter. Ideal setting is 1/4 way open (.20'). Flame should be primarily blue with a trace of yellow.
- **Temperature Knob** — setting of knob determines burner cycle and water temperature. Temperature range is 70°F - 140°F.


Thermostat adjustment 70 to 140 F
Pilot assembly
Thermostat and
"one time" ECO
at 190 F
Adjustable shutter
and burn tube
Thermocouple
OFF
PILOT
ON

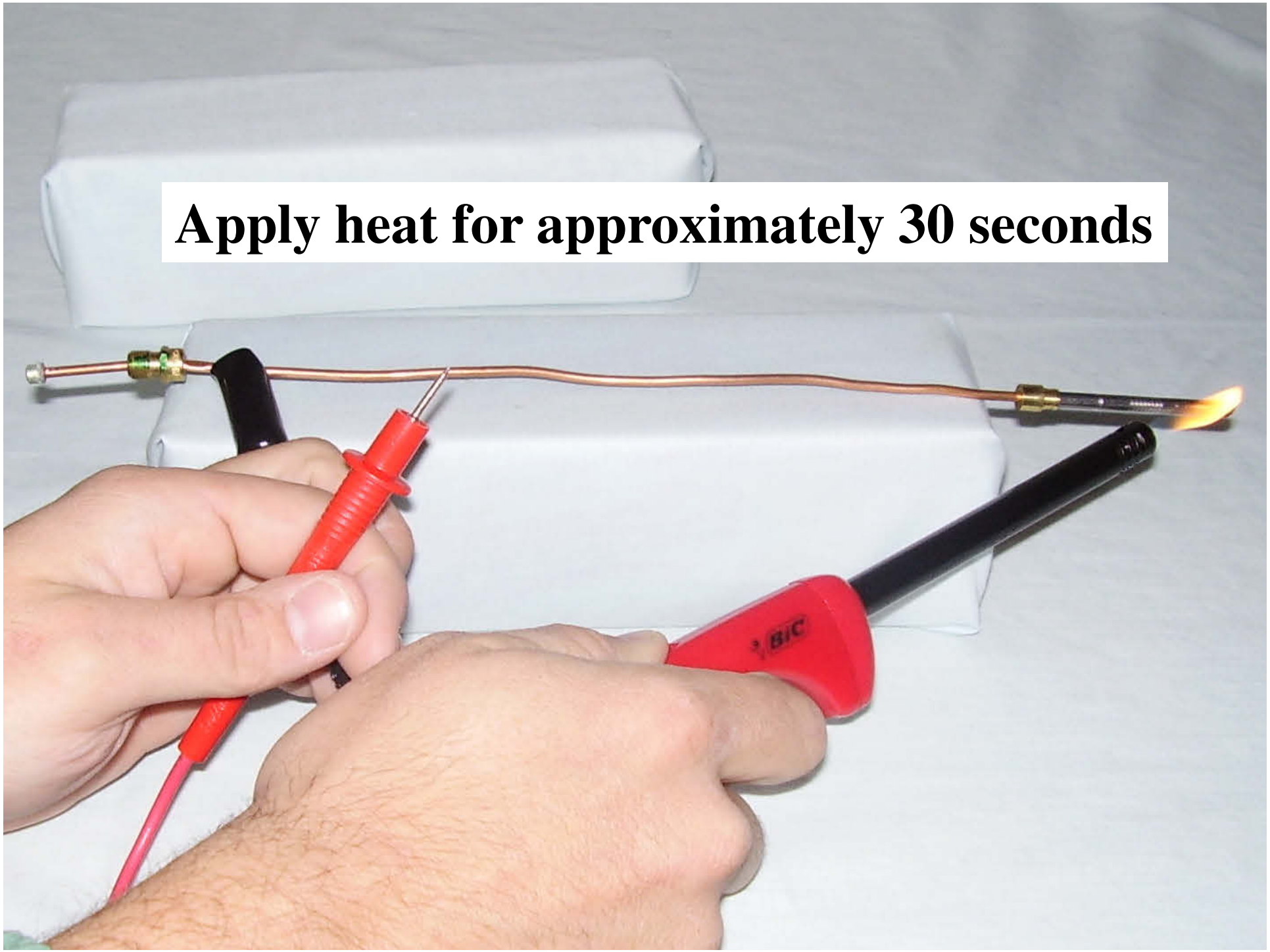

Orifice

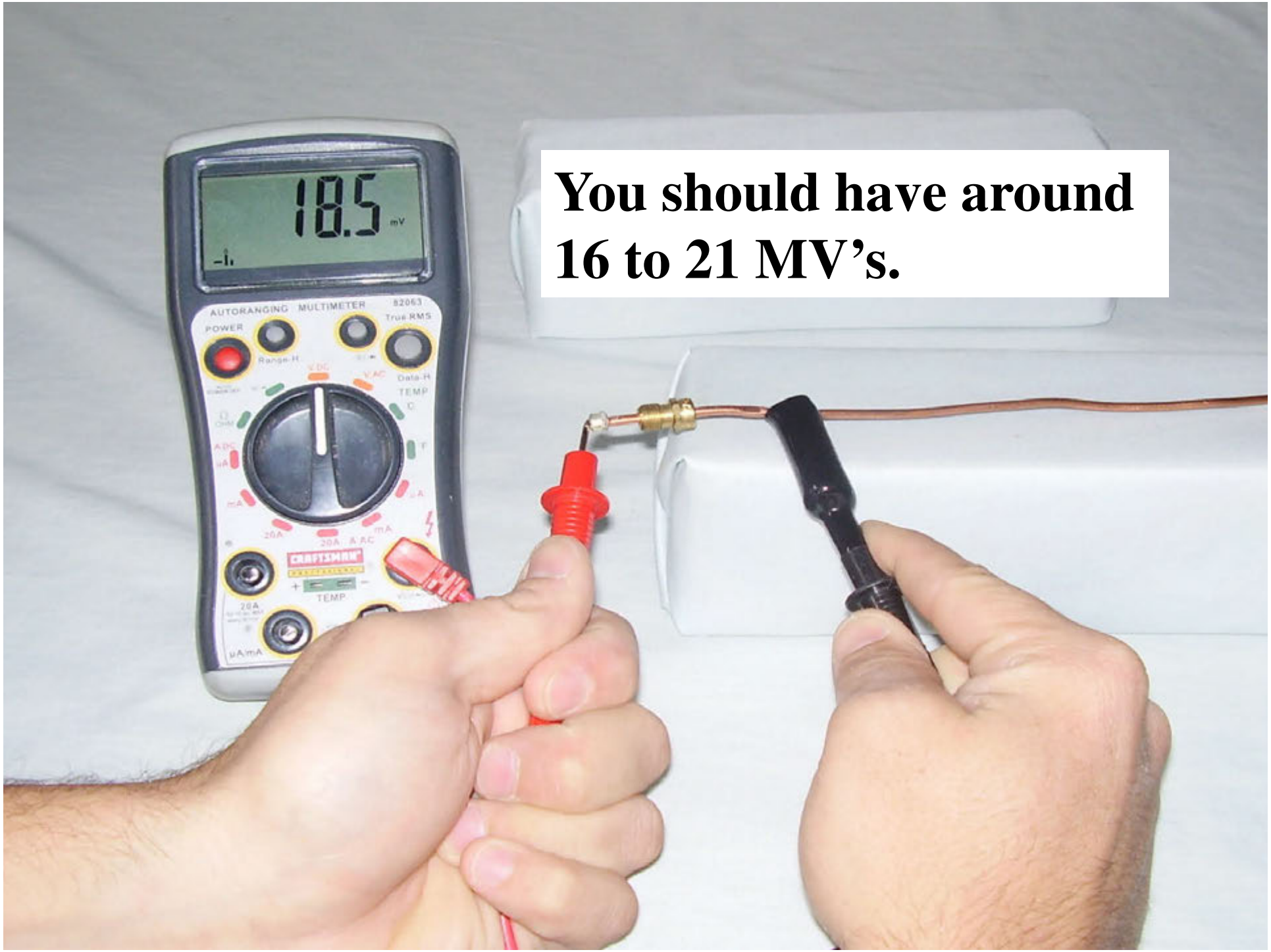

Depress the plunger
Apply heat to thermocouple for approx. 30 seconds

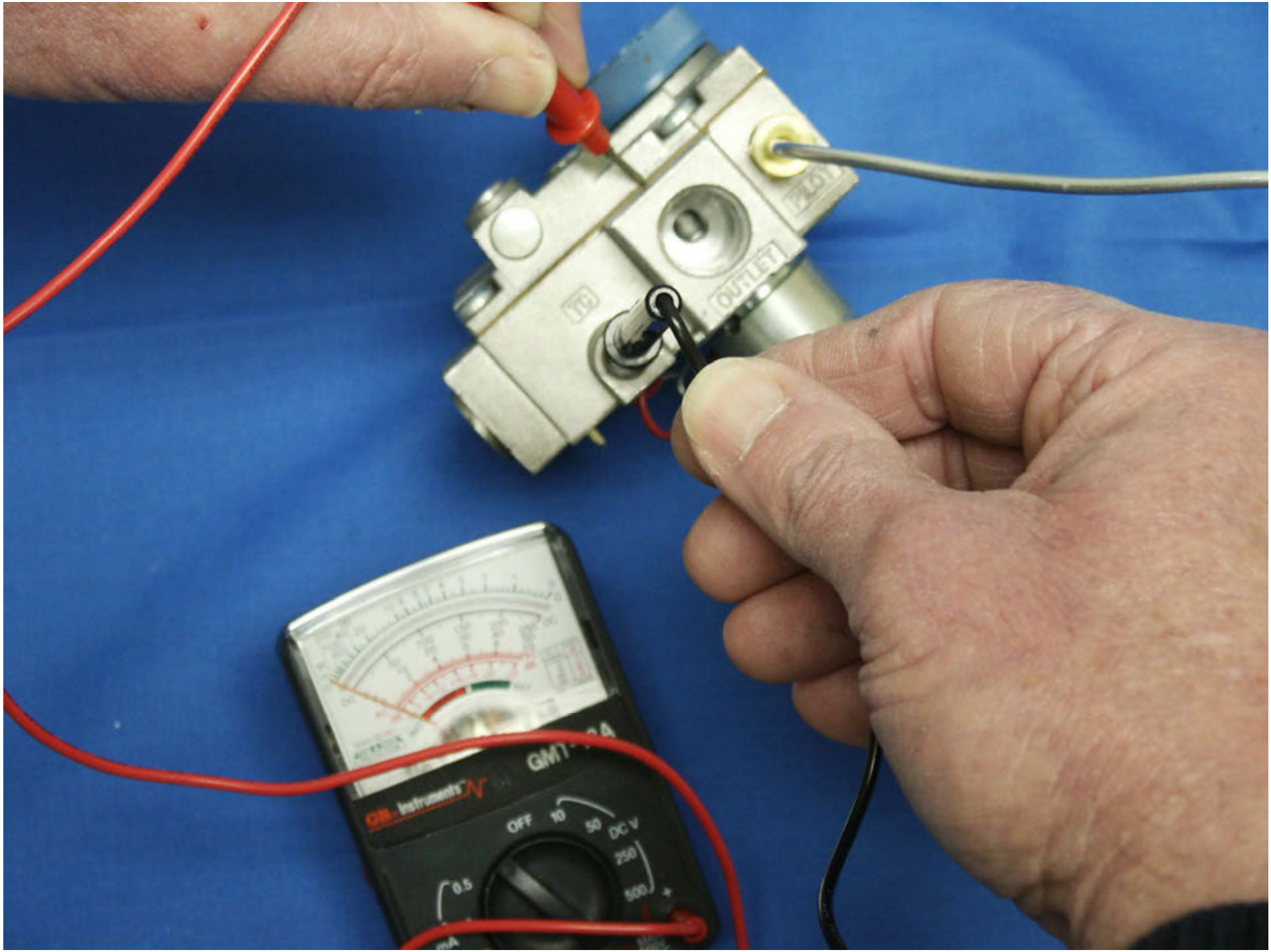

Plunger stays in after heating the thermocouple or it’s bad.

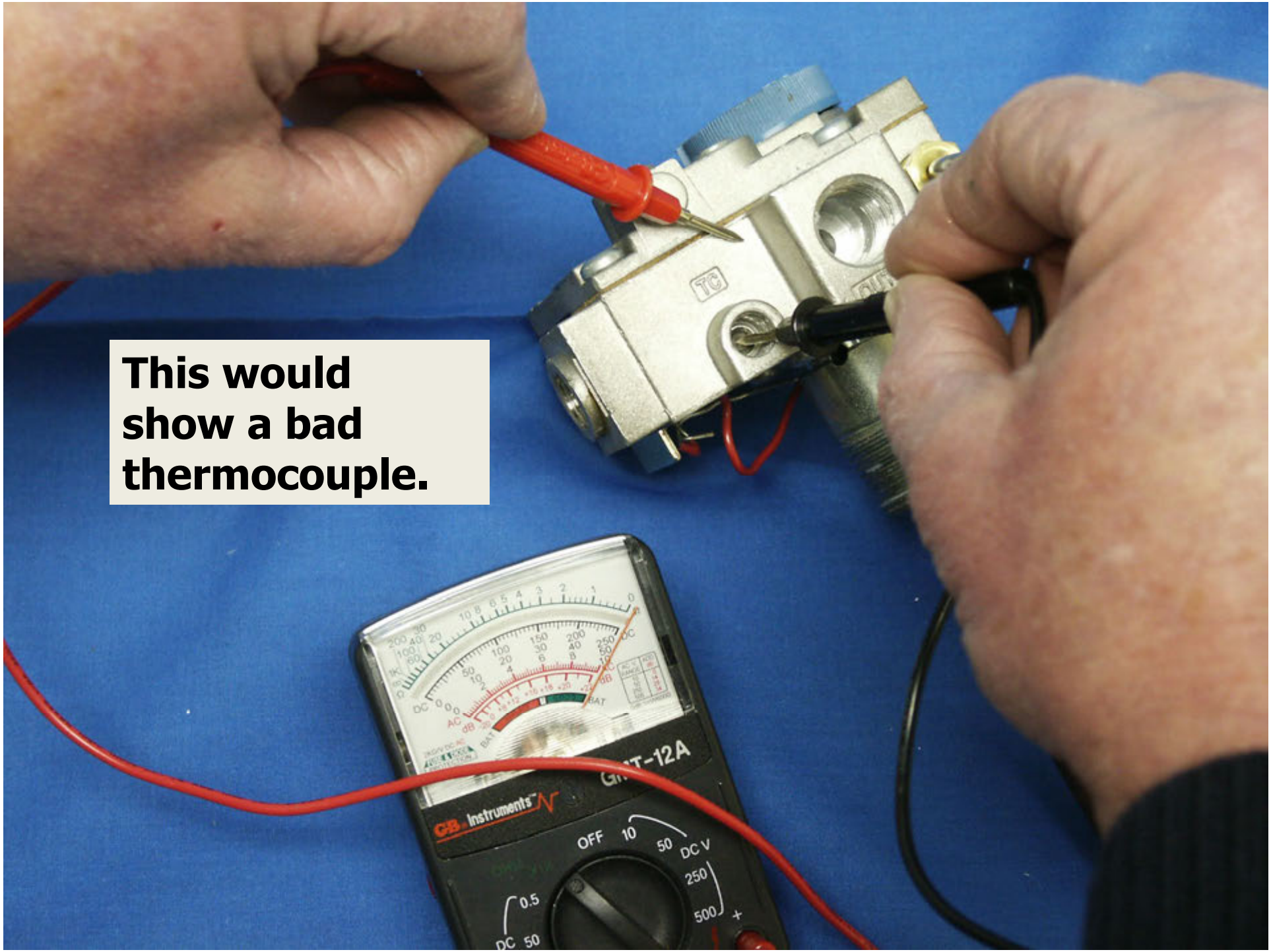


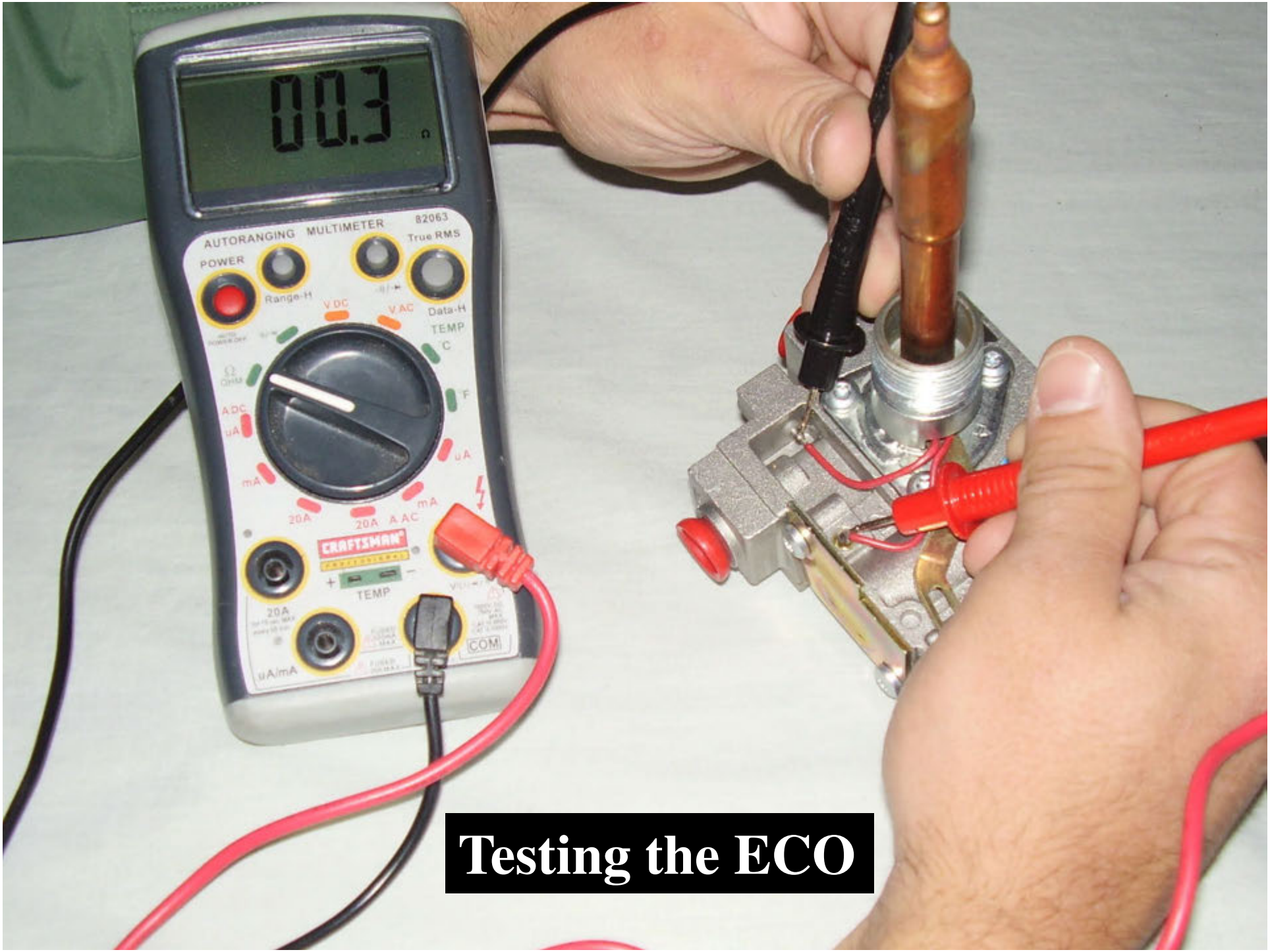
No voltage through the thermocouple at room temperature.

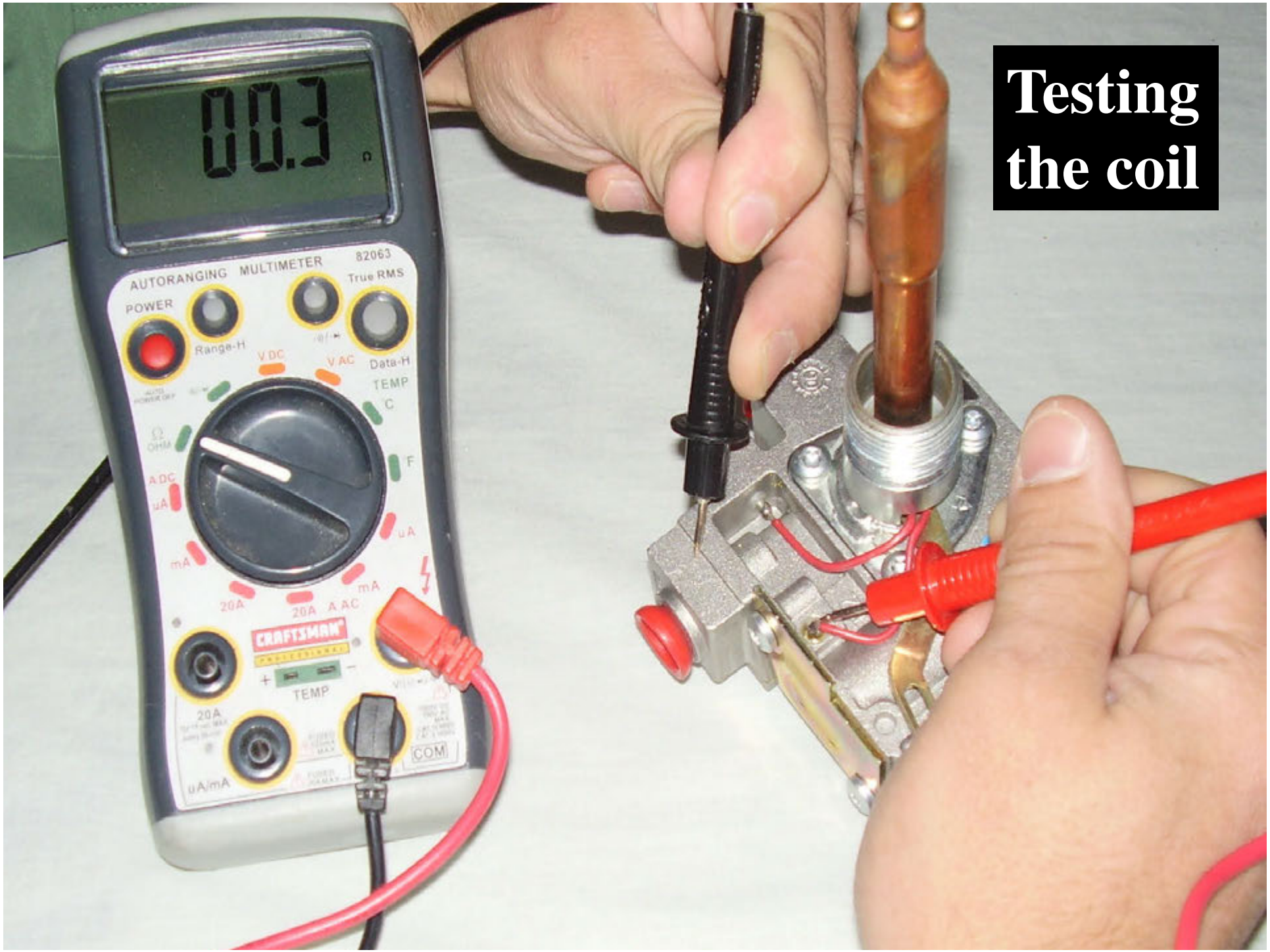

Apply heat for approximately 30 seconds
BIC


18.5
mV
AUTORANGING MULTIMETER
82063
True RMS
POWER
Range-H
Data-H
TEMP
CRAFTSMAN
TEMP
You should have around
16 to 21 MV's.

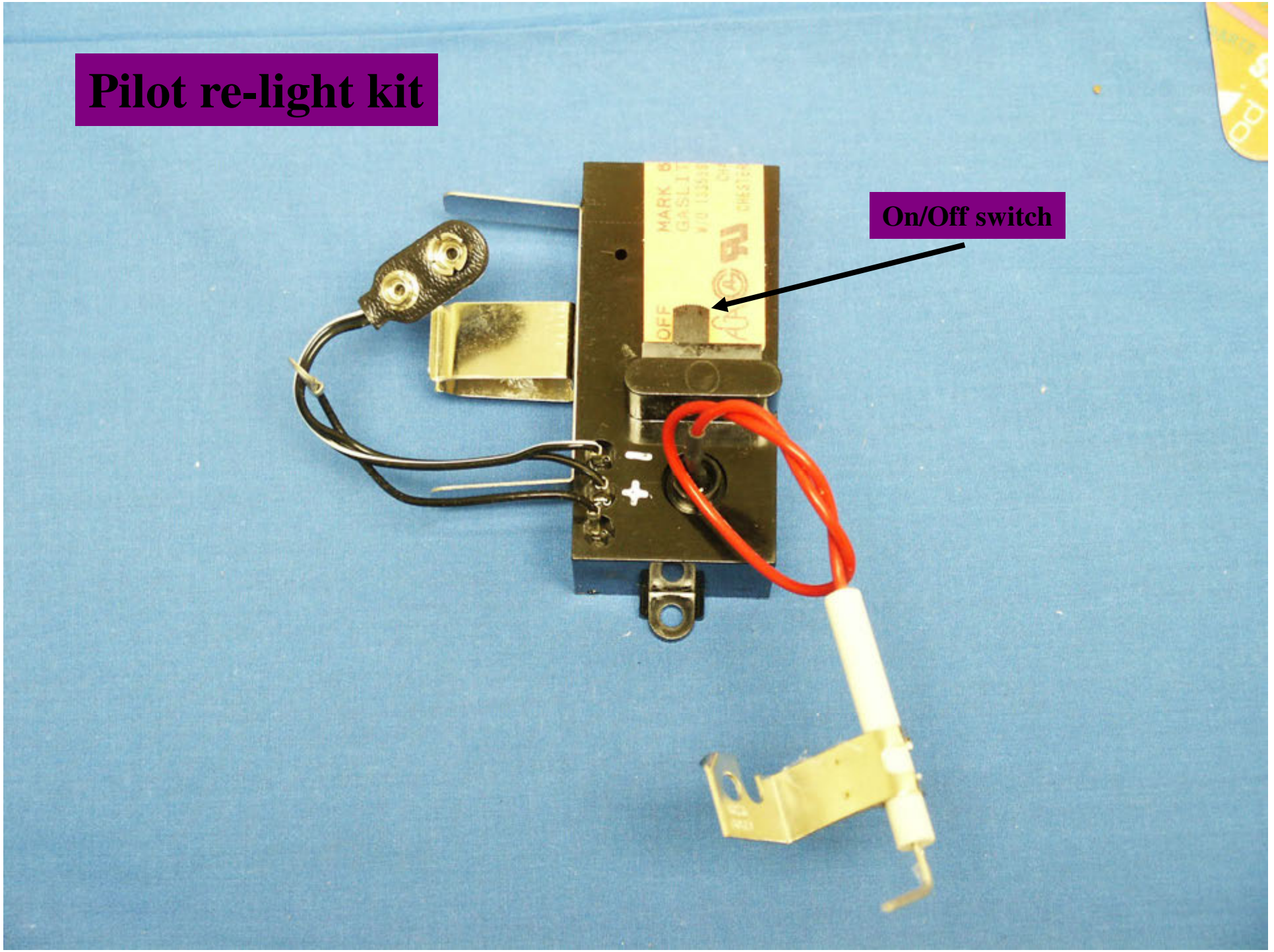

PILOT
OUTLET
GB Instruments
OFF
10
50
DC V
250
500
0.5


This would show a bad thermocouple.
TC
CB Instruments
OFF
10
50
DC V
250
500
0.5
DC 50

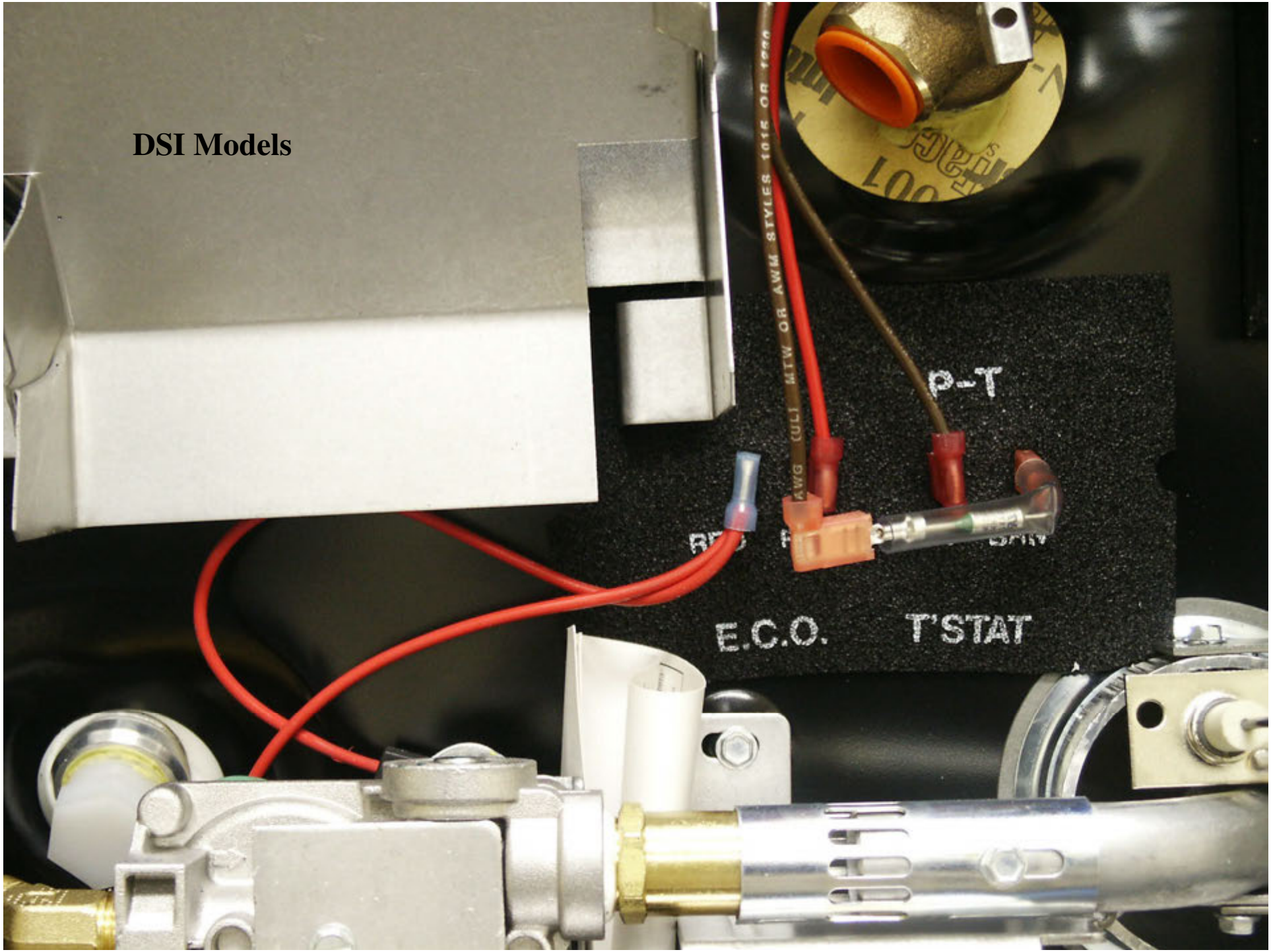

00.3
AUTORANGING MULTIMETER
82063
True RMS
POWER
Range-H
Data-H
V DC
V AC
TEMP
C
F
A DC
uA
mA
20A
A AC
CRAFTSMAN
TEMP
20A
COM
uA/mA
Testing the ECO


Testing
the coil
00.3
AUTORANGING MULTIMETER
82063
True RMS
POWER
Range-H
Data-H
V DC
V AC
TEMP
C
F
OHM
A DC
uA
mA
20A
A AC
CRAFTSMAN
TEMP
COM
uA/mA

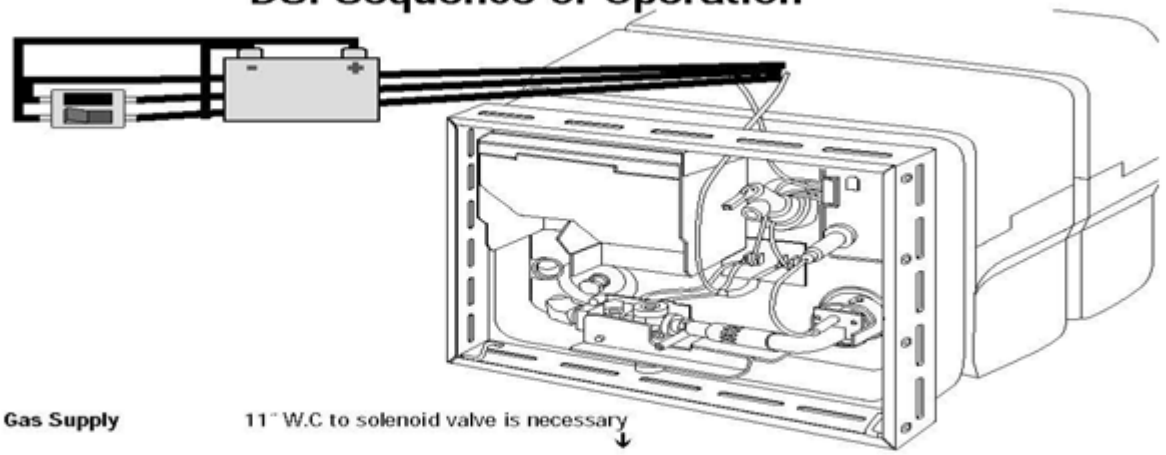
Pilot re-light kit



DSI Models



DSI Sequence of Operation



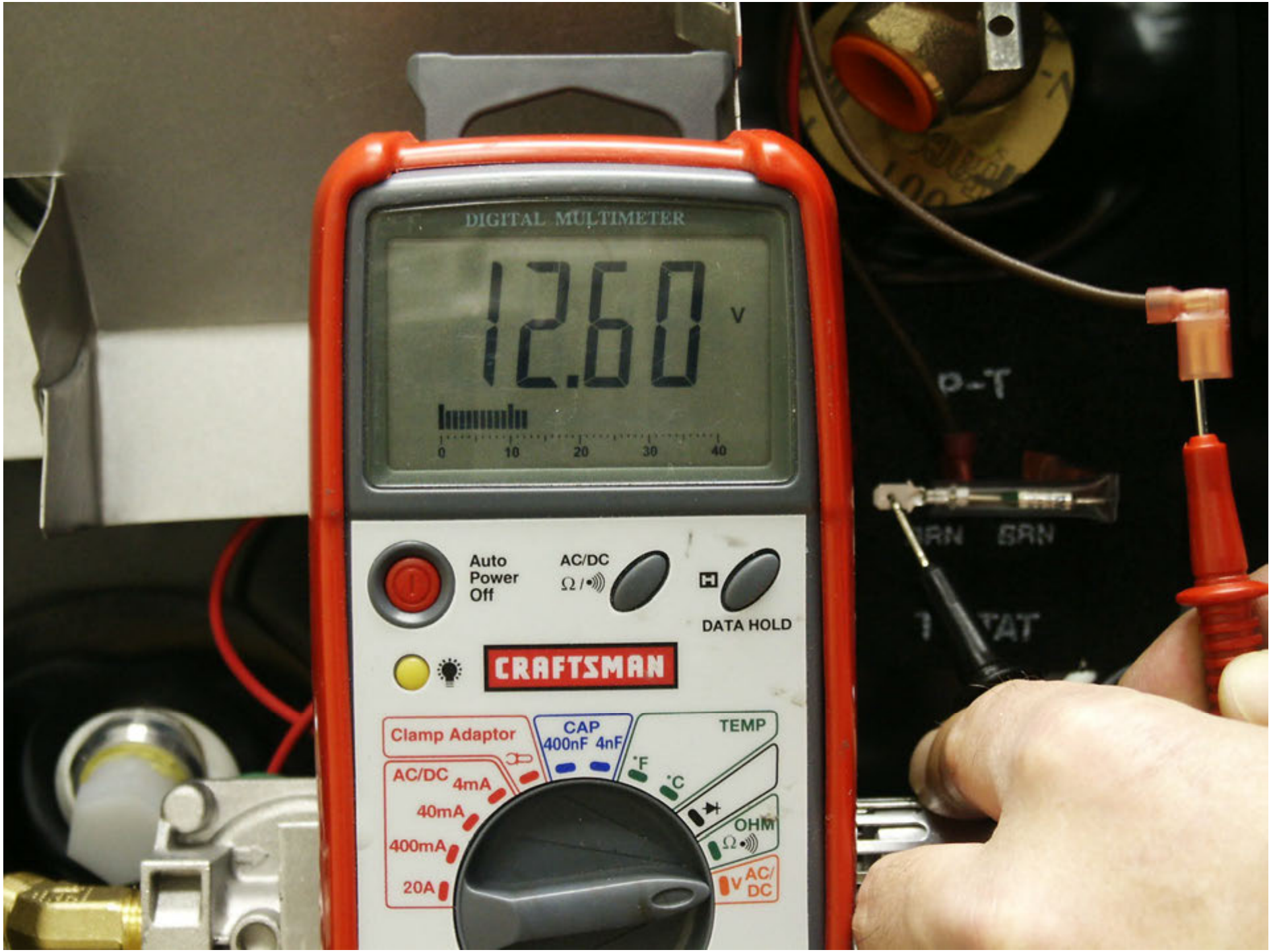
- **Gas Supply** — 11˝ W.C to solenoid valve is necessary
- **12VDC Battery or filtered side of Convertor** — Voltage source to water heater
- **ON/OFF Switch** — It supplies 12VDC to water heater
- **Thermal Cut-Off** — A one shot heat sensing fuse that's normally closed and sends power to the thermostat. When tripped by excessive heat (190°F), (i.e. blocked burner or flue tube) it cuts power to the circuit board and shuts down ignition.
- **Thermostat** — A normally closed non-adjustable temperature switch that sends current to the circuit board. It opens when the water temperature reaches approximately 140°F.
- **Circuit Board** — The next step is the direct spark ignition system. For a period of 6-8 seconds the circuit board will send voltage to both the gas solenoid valve and the electrodes. If ignition does not occur, the board goes into a lock-out condition and the non-ignition light illuminated at the ON/OFF switch.

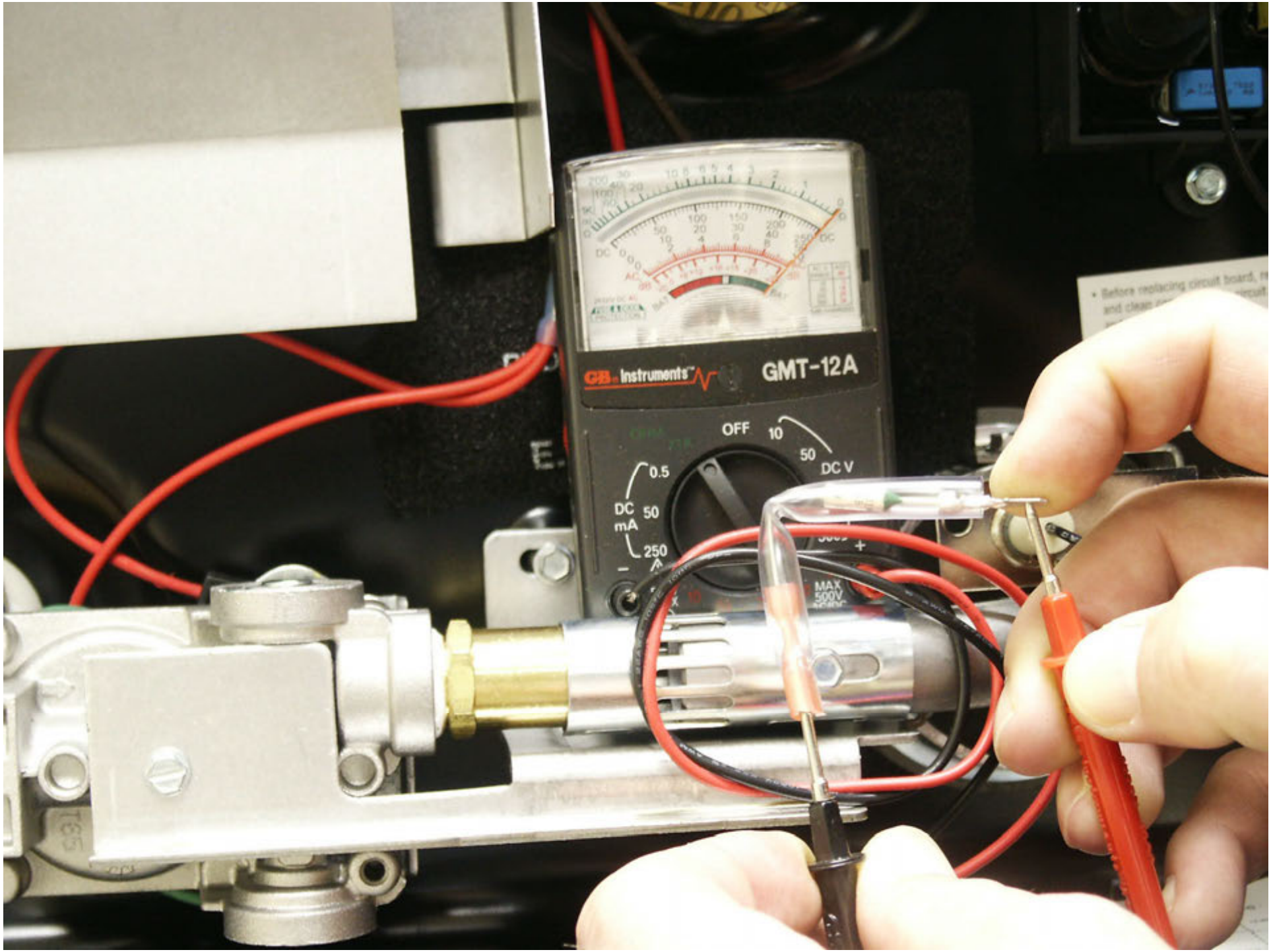
· E.C.O.
A normally closed safety temperature switch that sends voltage to solenoid valve. The switch opens if the water temperature exceeds 180°F.

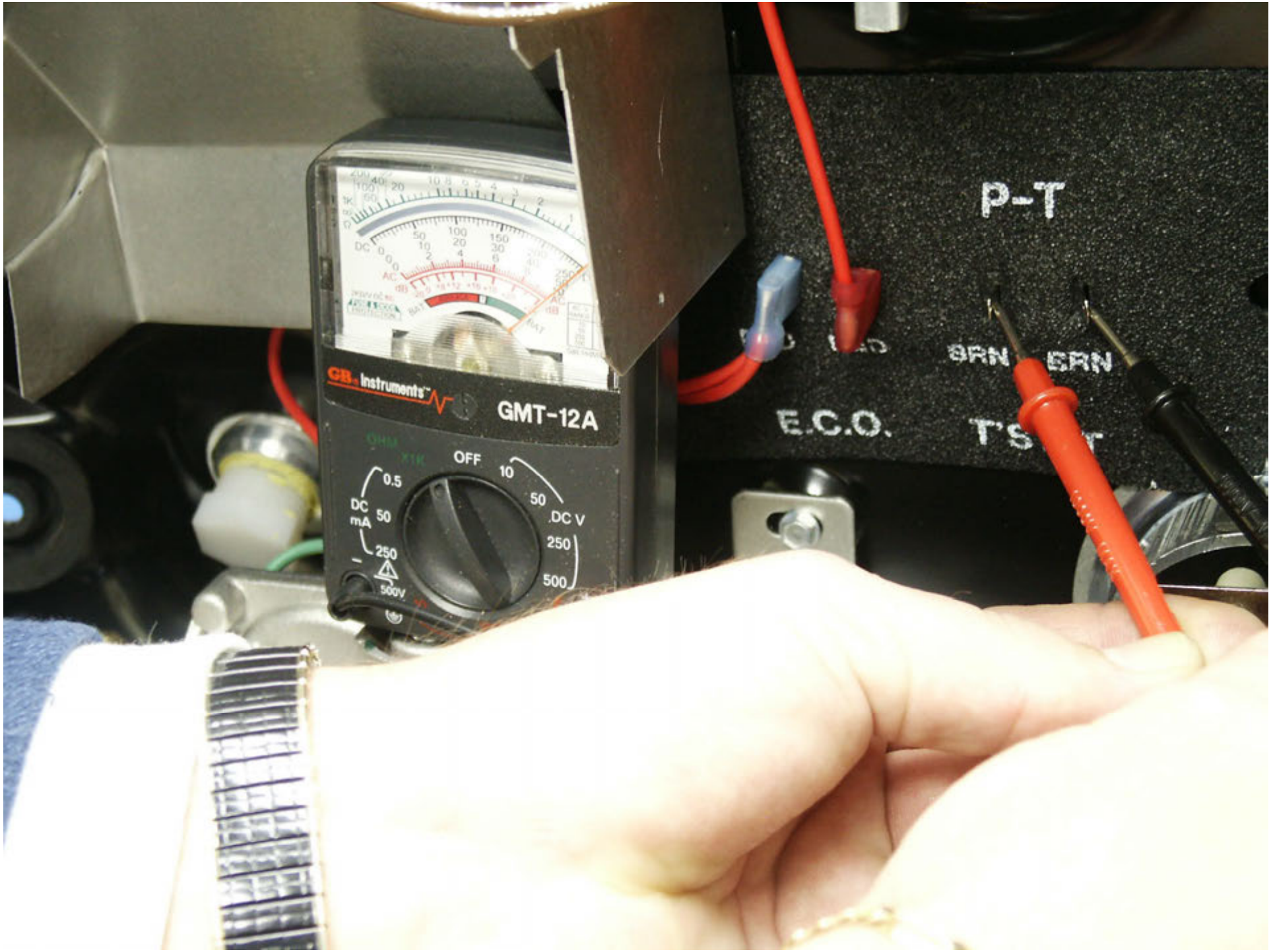
· Gas Valve
The dual solenoid valve that opens and sends gas to electrodes when a minimum of 10.5 VDC is applied to it.

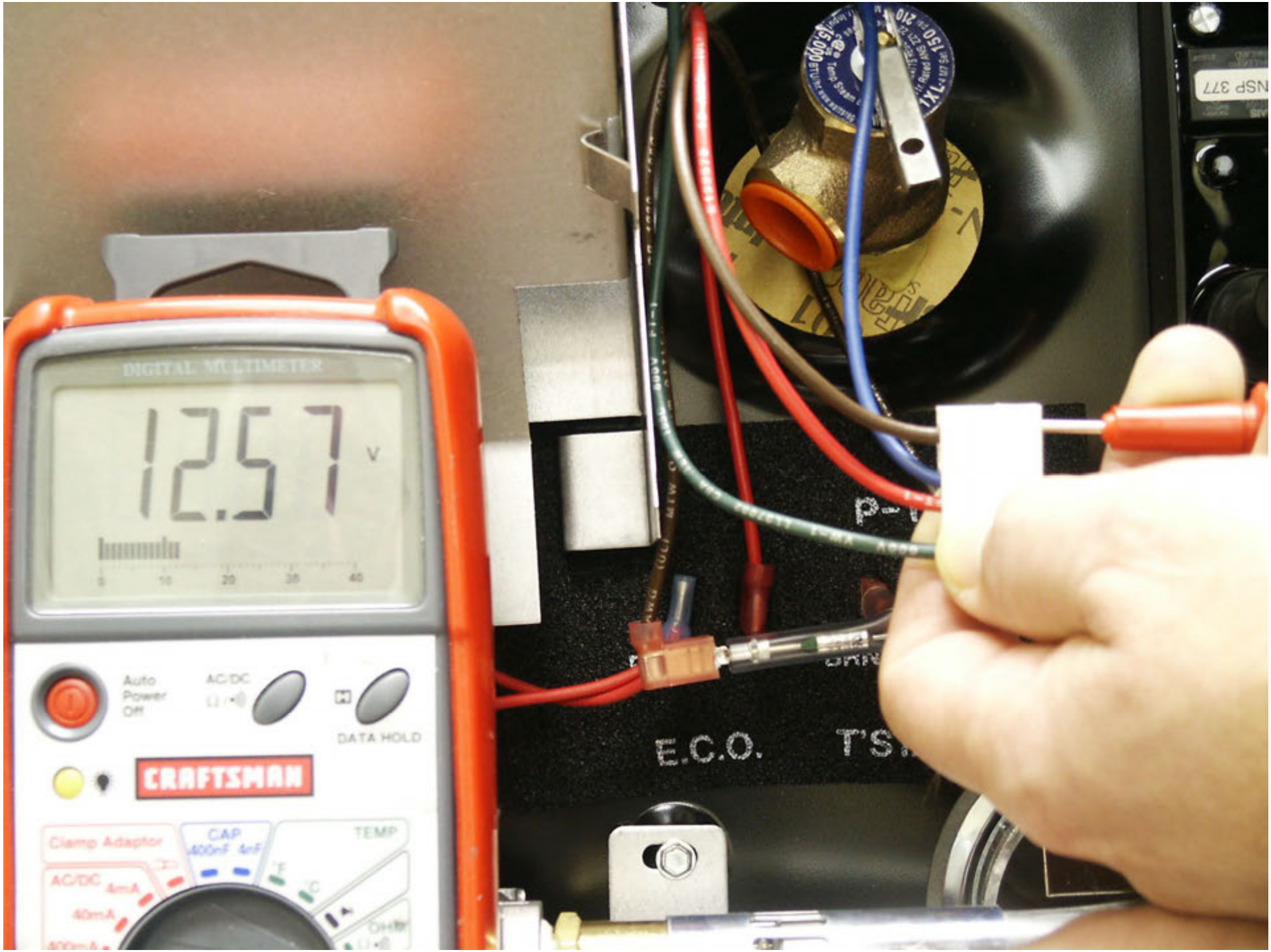
· Electrodes
Creates a spark to ignite gas. If the electrodes do not sense a flame in 6-8 seconds, a signal is sent to the board to shut the gas valve down and the system goes into safety lock-out.

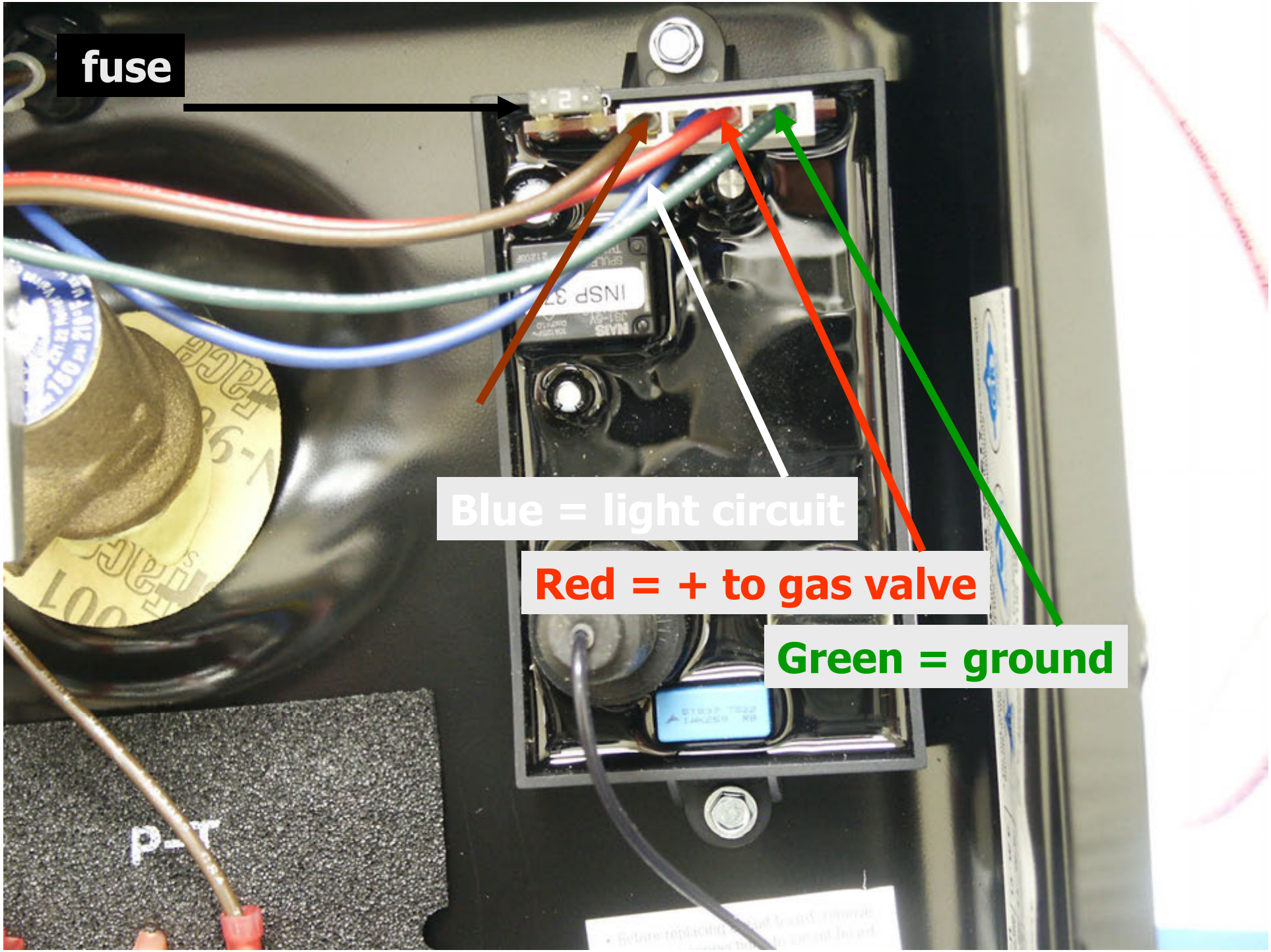
NOTE: If this situation exists, the ON/OFF switch must be turned off and back on again.

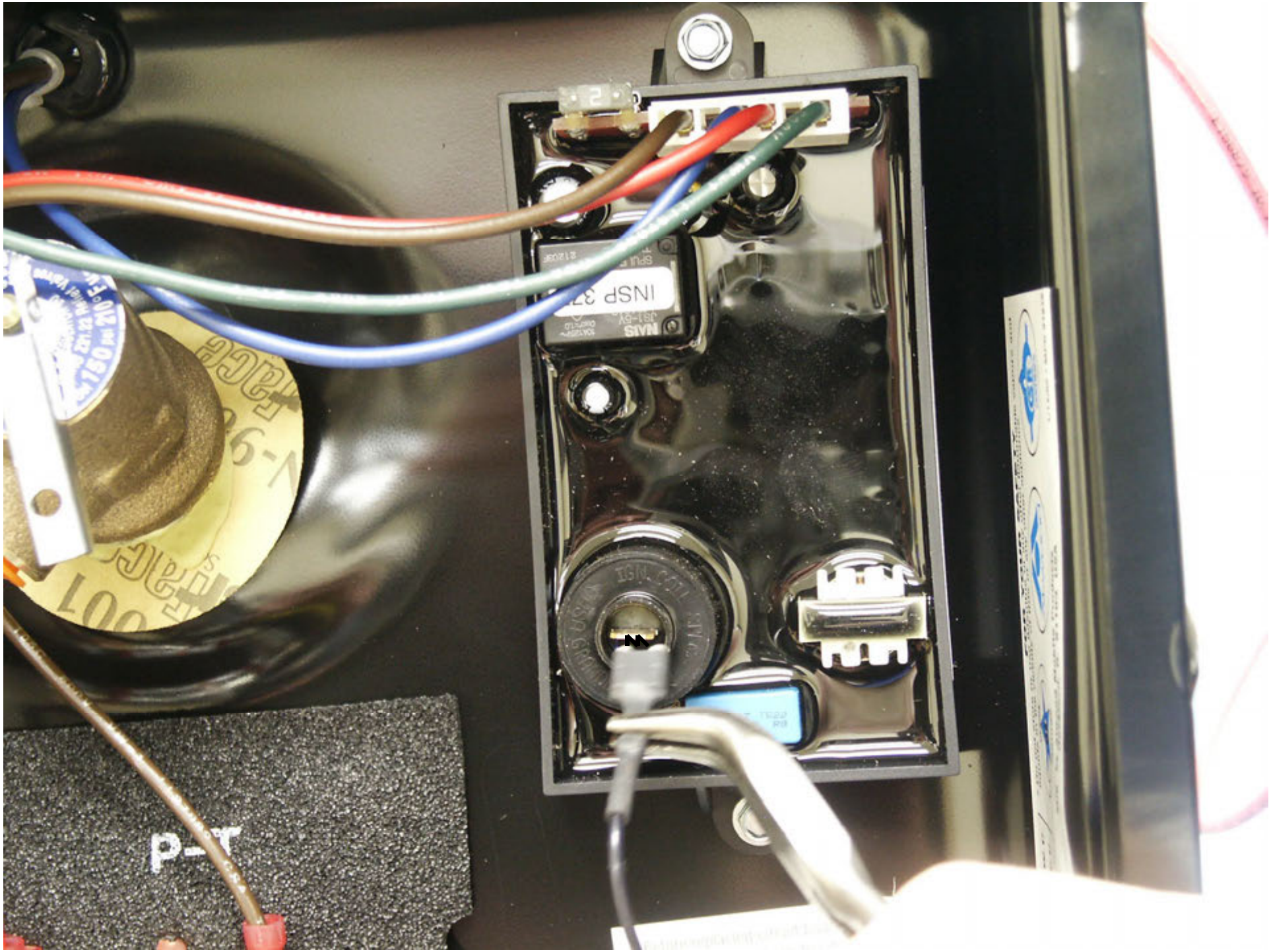

DIGITAL MULTIMETER
12.60
V
0
10
20
30
40
Auto
Power
Off
AC/DC
Ω /
DATA HOLD
CRAFTSMAN
Clamp Adaptor
CAP
400nF 4nF
TEMP
°F
°C
AC/DC
4mA
40mA
400mA
20A
OHM
Ω
V AC/
DC


GB Instruments
GMT-12A
OFF
10
50
DC V
0.5
DC
mA
50
250
MAX
500V


P-T
BRN
BRN
E.C.O.
GMT-12A
OFF
0.5
10
50
DC mA
DC V
250
500
500V

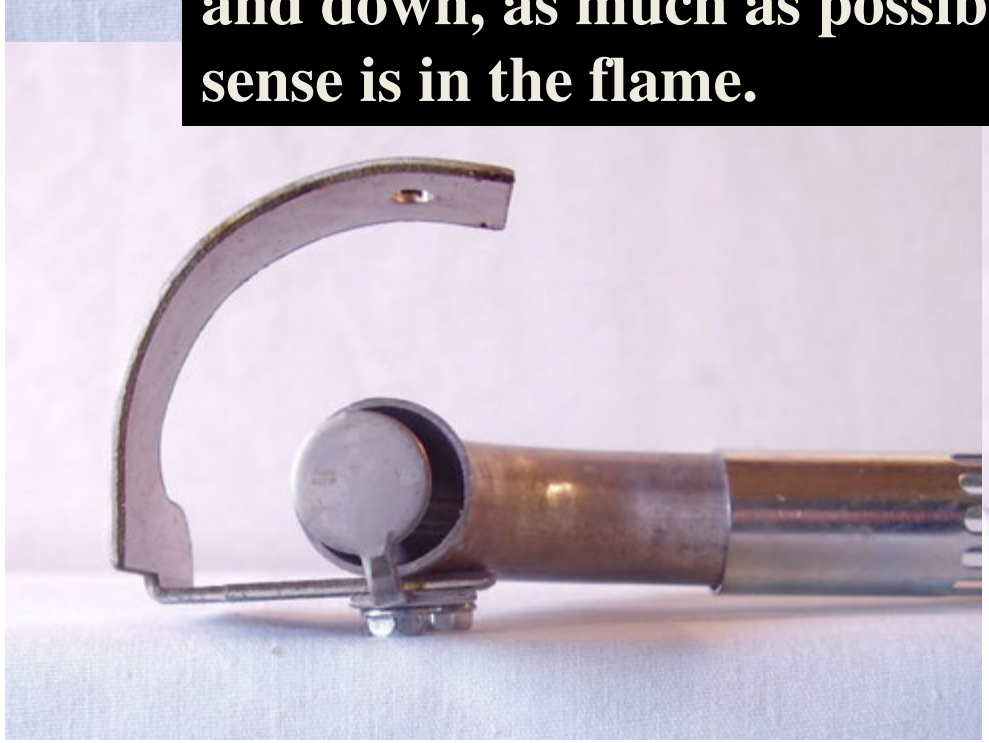

DIGITAL MULTIMETER
12.57 V
CRAFTSMAN
Auto Power Off
AC/DC
DATA HOLD
Clamp Adaptor
CAP
TEMP
E.C.O.

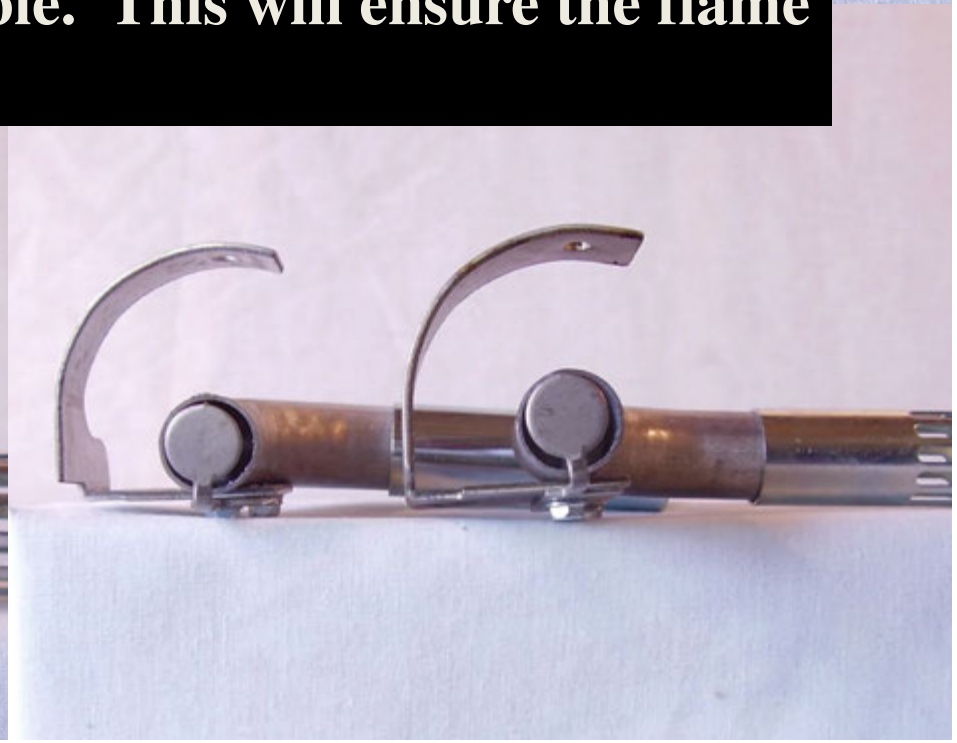

fuse
Blue = light circuit
Red = + to gas valve
Green = ground

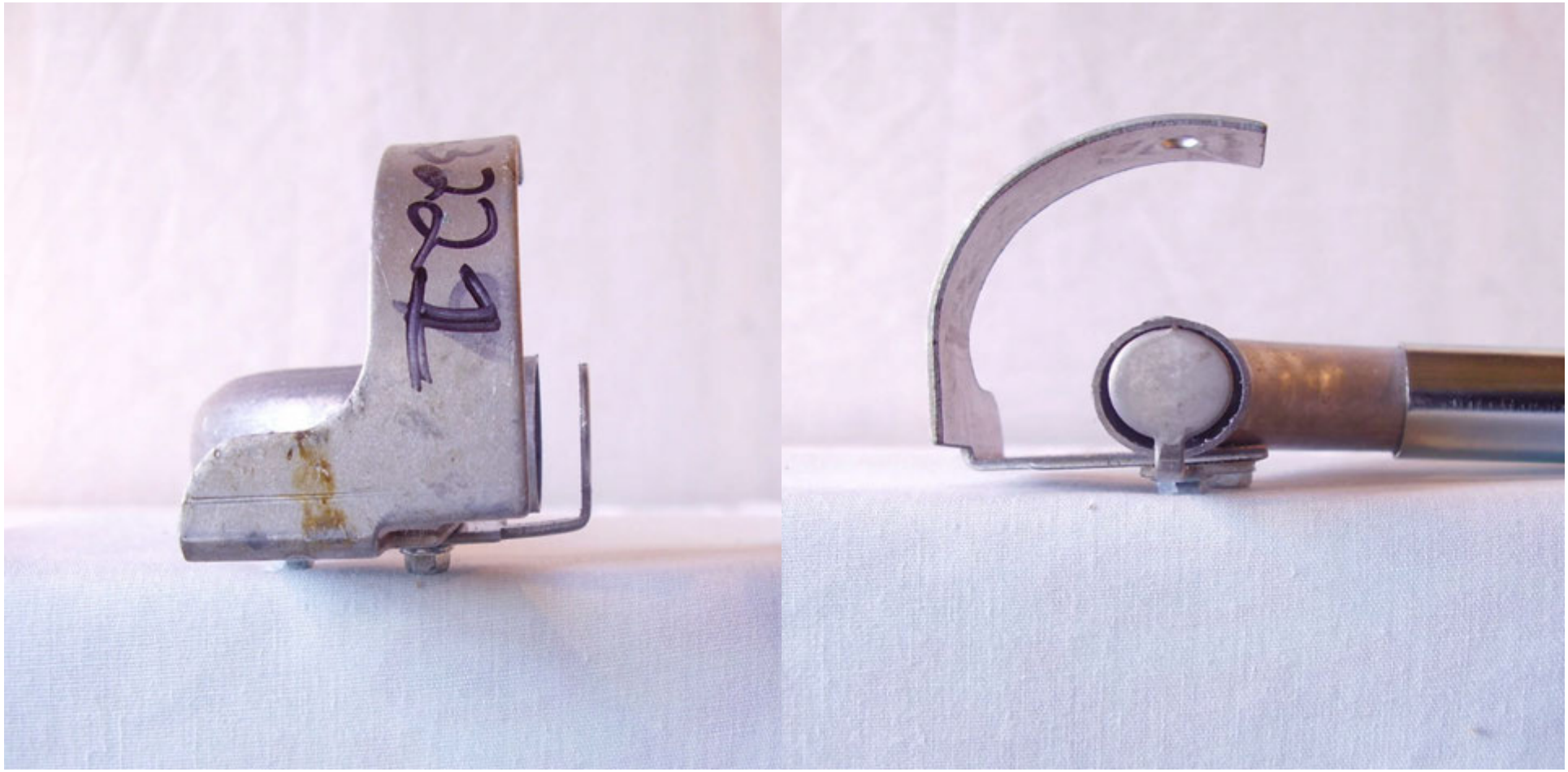


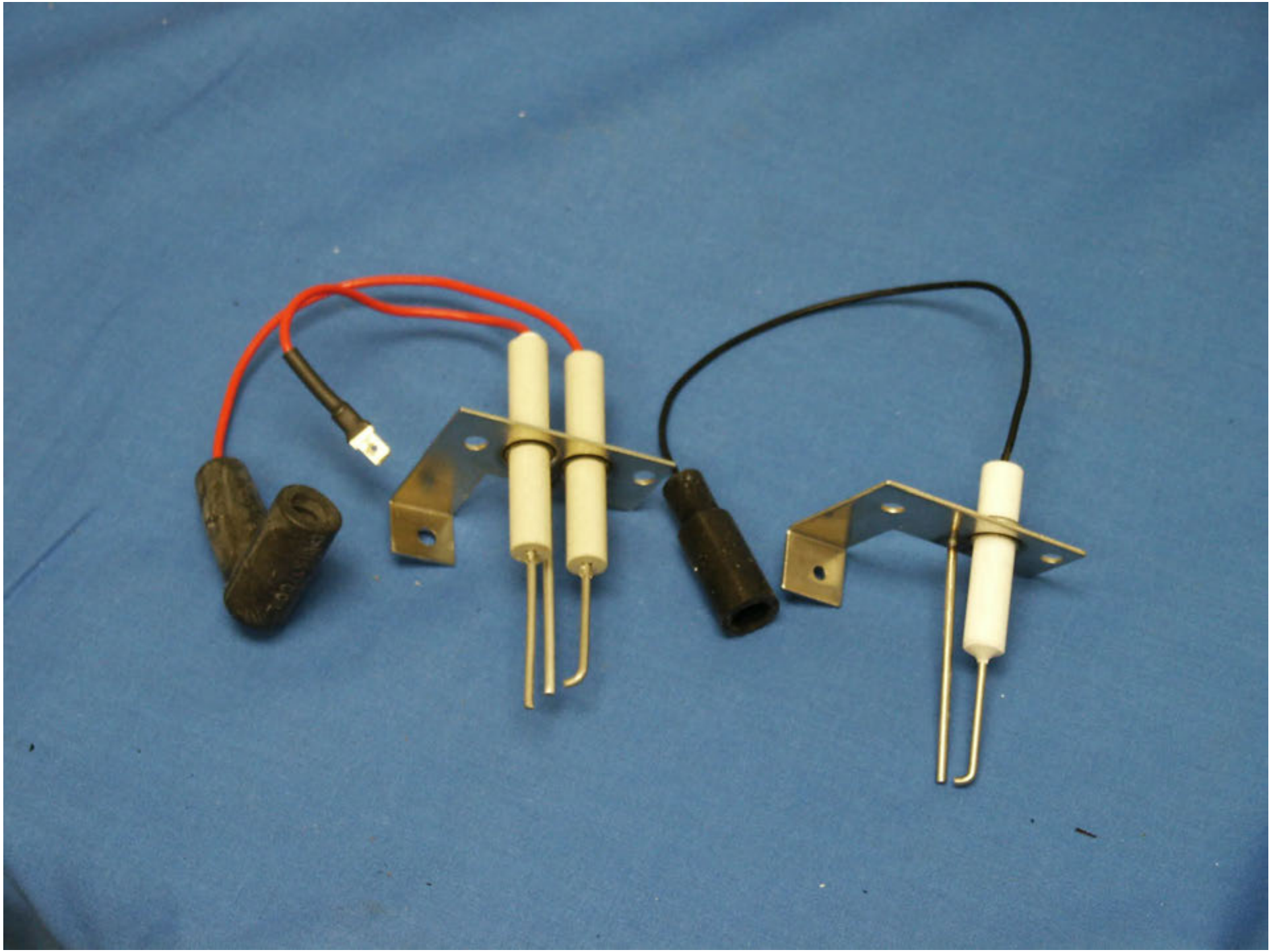

HEAT START
BRN
RED
BLK
• Before replacing circuit board, remove and clean connections to circuit board and ignition sense probe.
• Check for a short in the valve or light wiring that may have blown a track on the board.
• See Manual - MPD 93755 or 93756.
10/15/02 MPD 93809
AUTOMATIC STORAGE WATER HEATER
GH6A-8E
Capacity U.S. Gal.
6.0
Input BTU/HR Débit BTU/h
8,800
Recovery GAL/HR
9.40
Max Inlet Gas PRESSURE
Min inlet Gas PRESSURE for input adj
MANIFOLD PRESSURE
10"
Maximum working pressure 150 PSI
Pressure 300 PSI. For use with LP gas only.
Suitable for water (potable) heating only
DESIGN COMPLIES WITH
721.10.1 CSA 4.1-
FOR DIRECT VENT INSTALLATION
RECREATIONAL VEHICLE

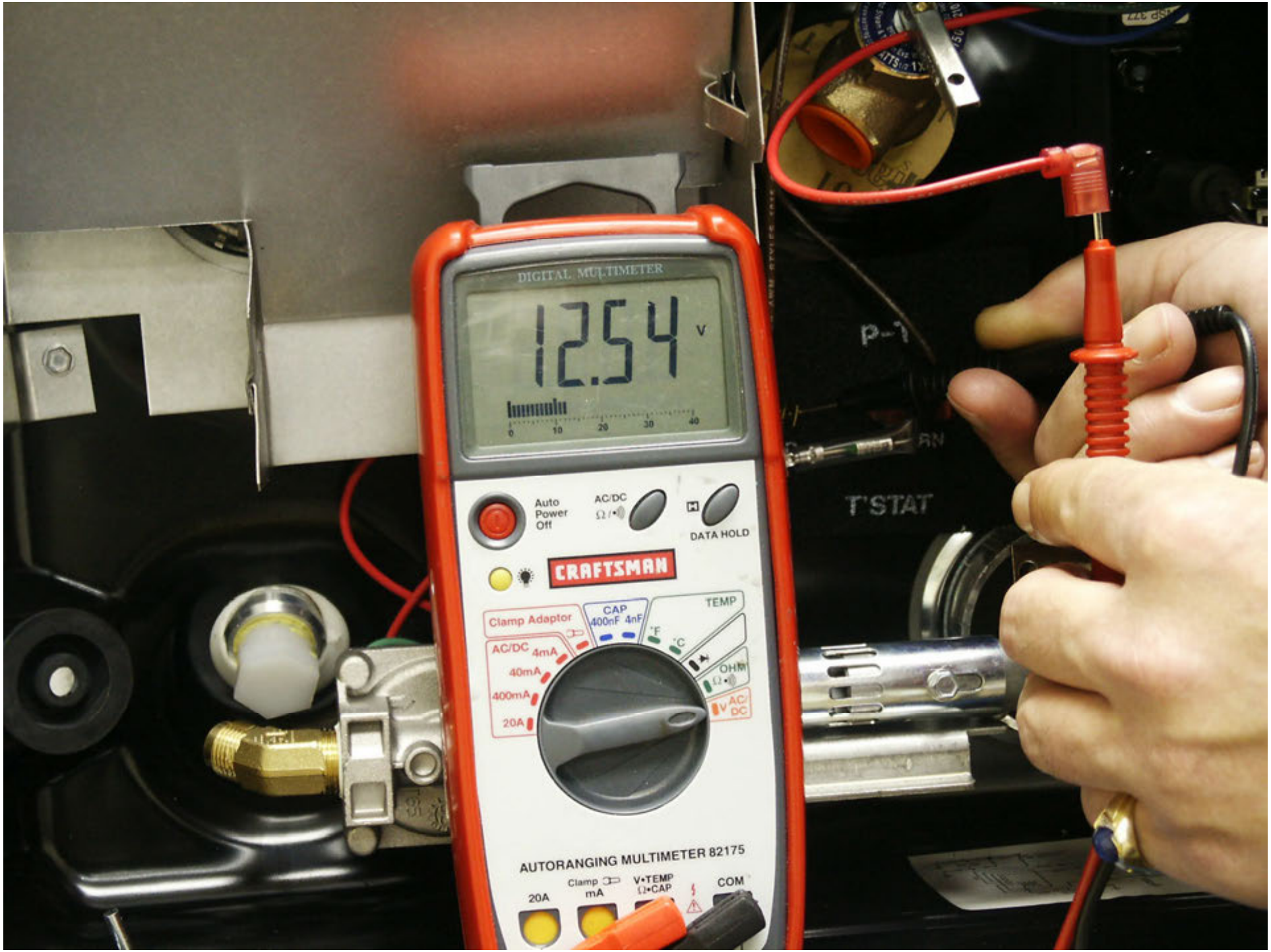
You want the flame spreader centered and straight up and down, as much as possible. This will ensure the flame sense is in the flame.

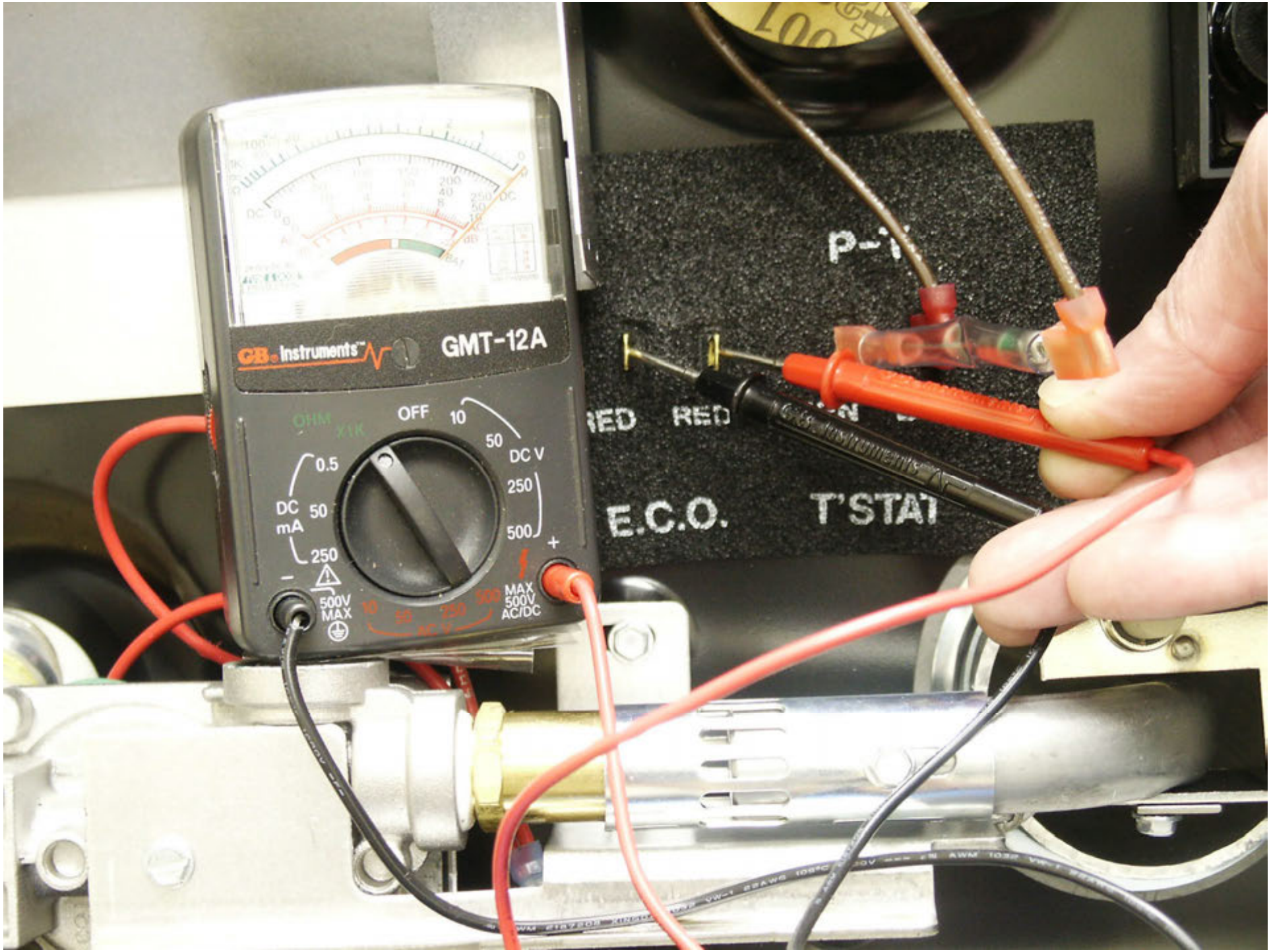


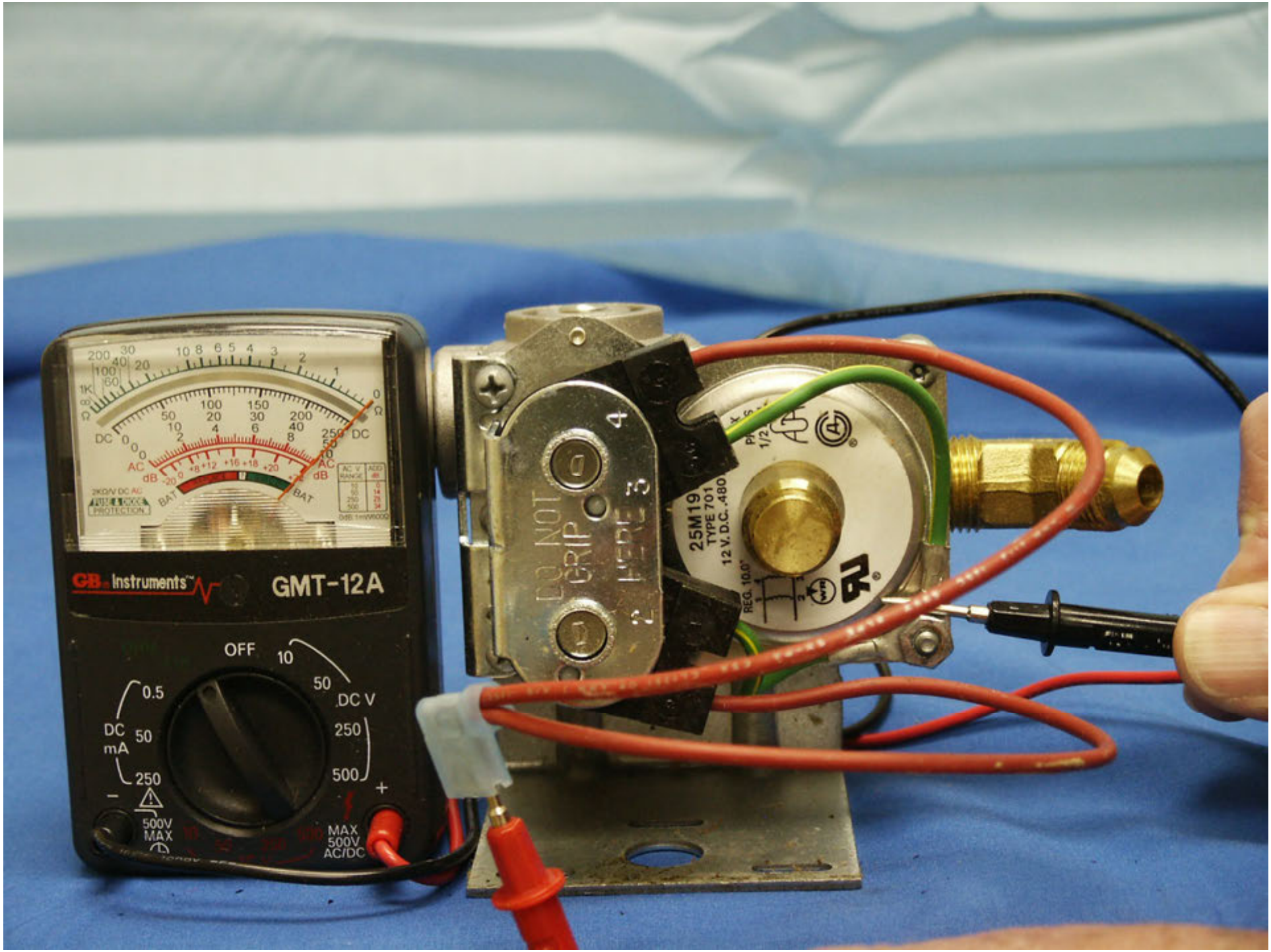


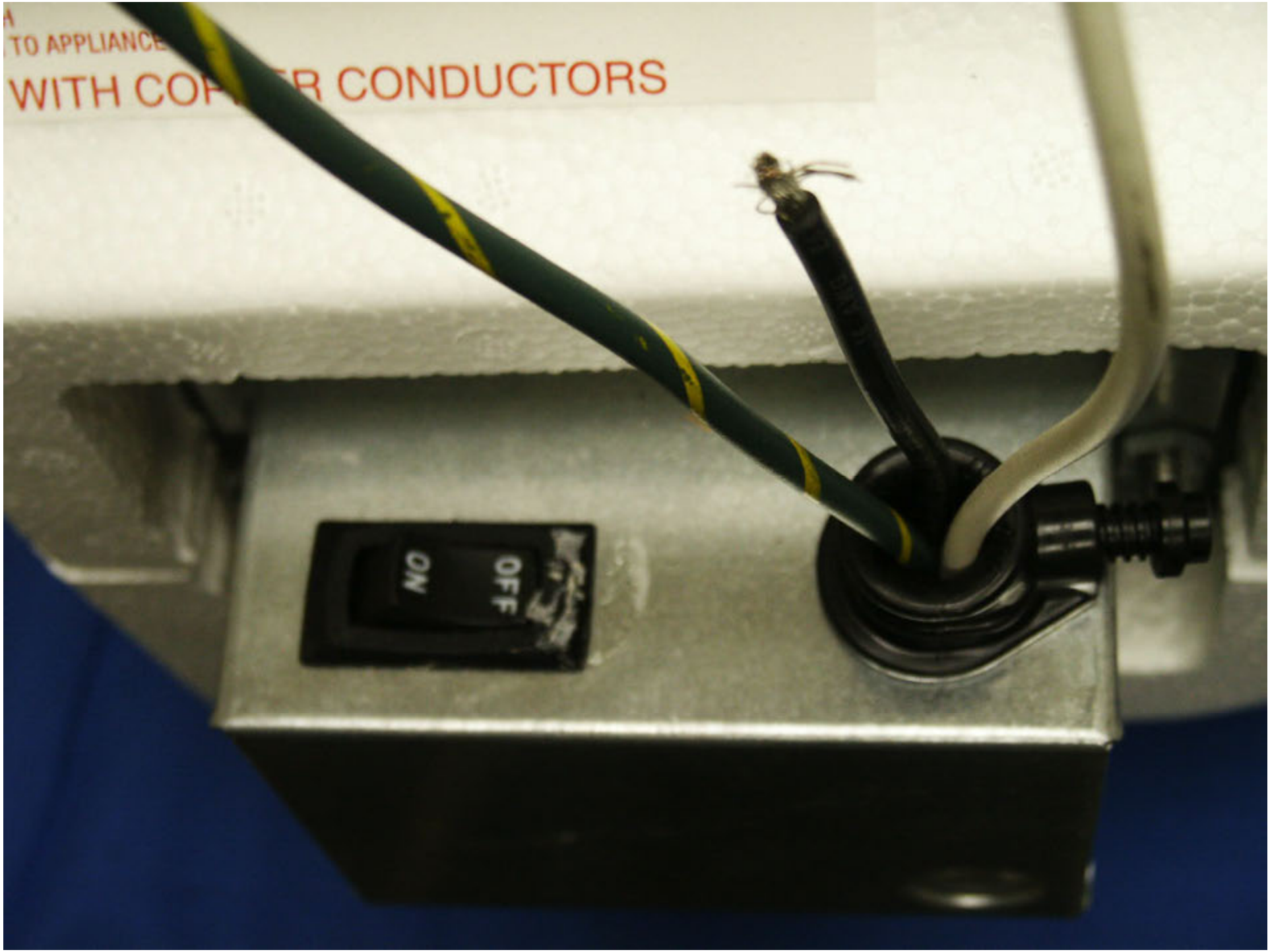


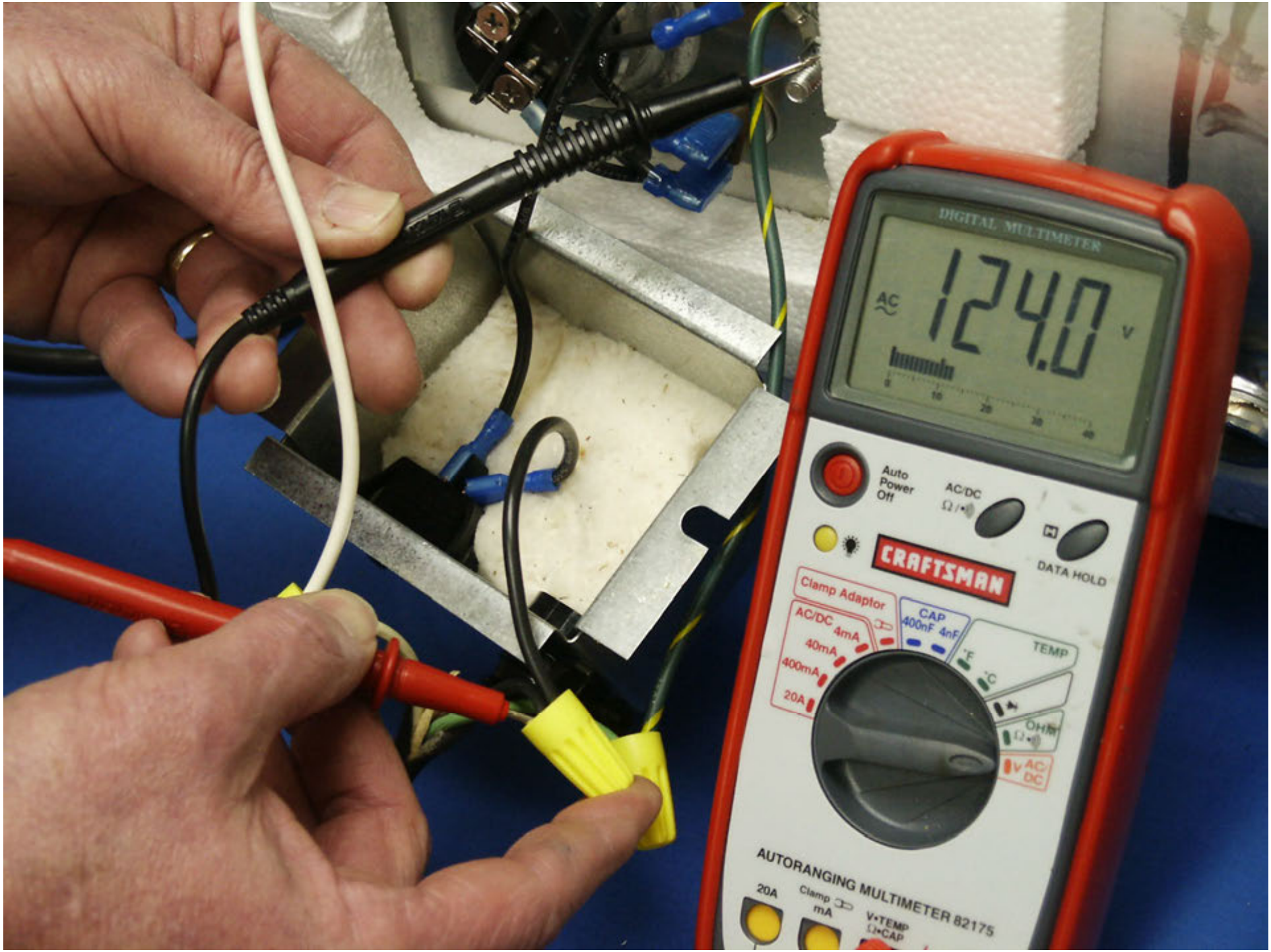


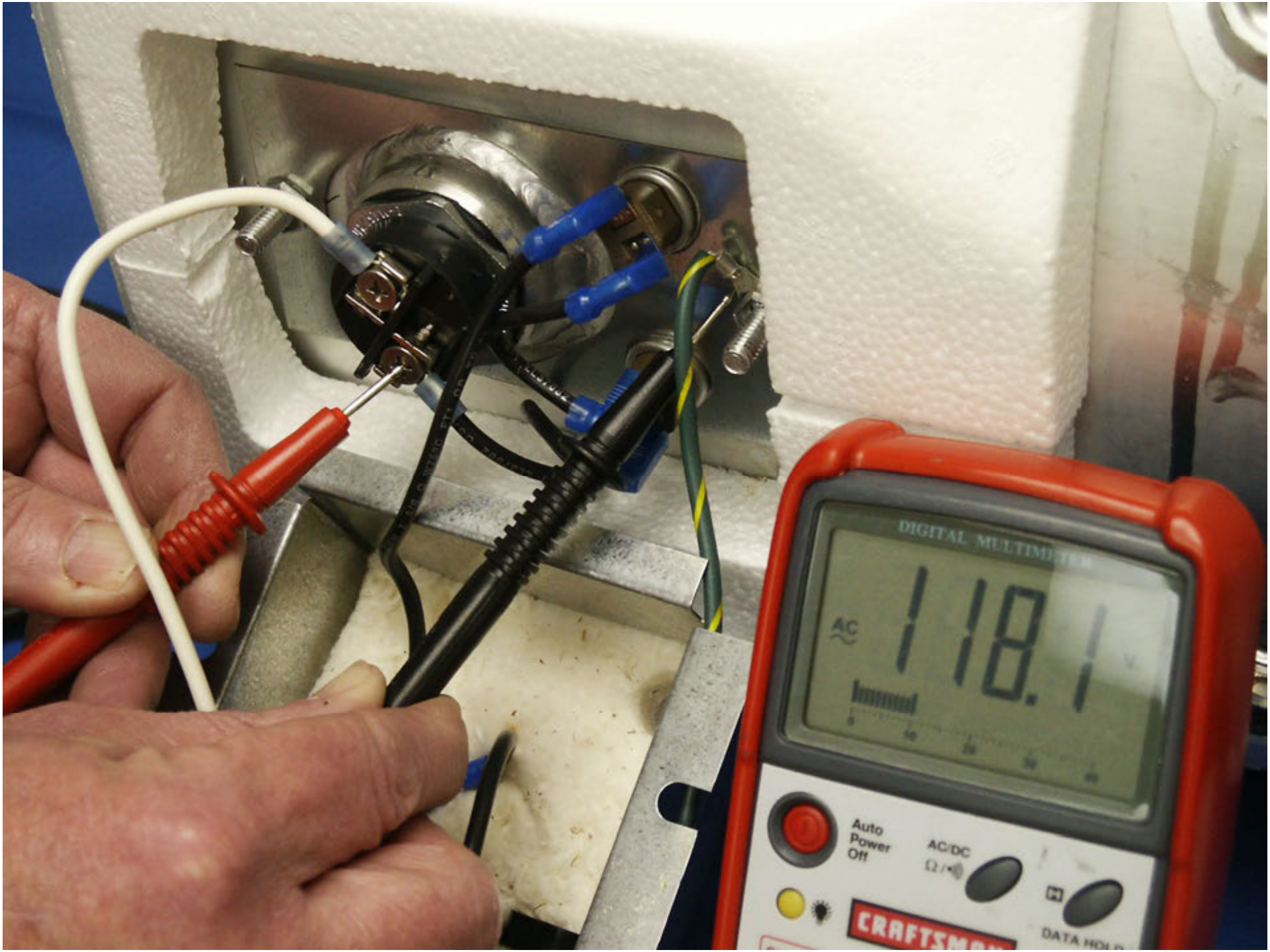

DIGITAL MULTIMETER
12.54
V
Auto
Power
Off
AC/DC
DATA HOLD
CRAFTSMAN
Clamp Adaptor
CAP
400nF 4nF
TEMP
°F
°C
AC/DC 4mA
40mA
400mA
20A
OHM
V AC/DC
AUTORANGING MULTIMETER 82175
20A
Clamp
mA
V•TEMP
Ω•CAP
COM
T'STAT

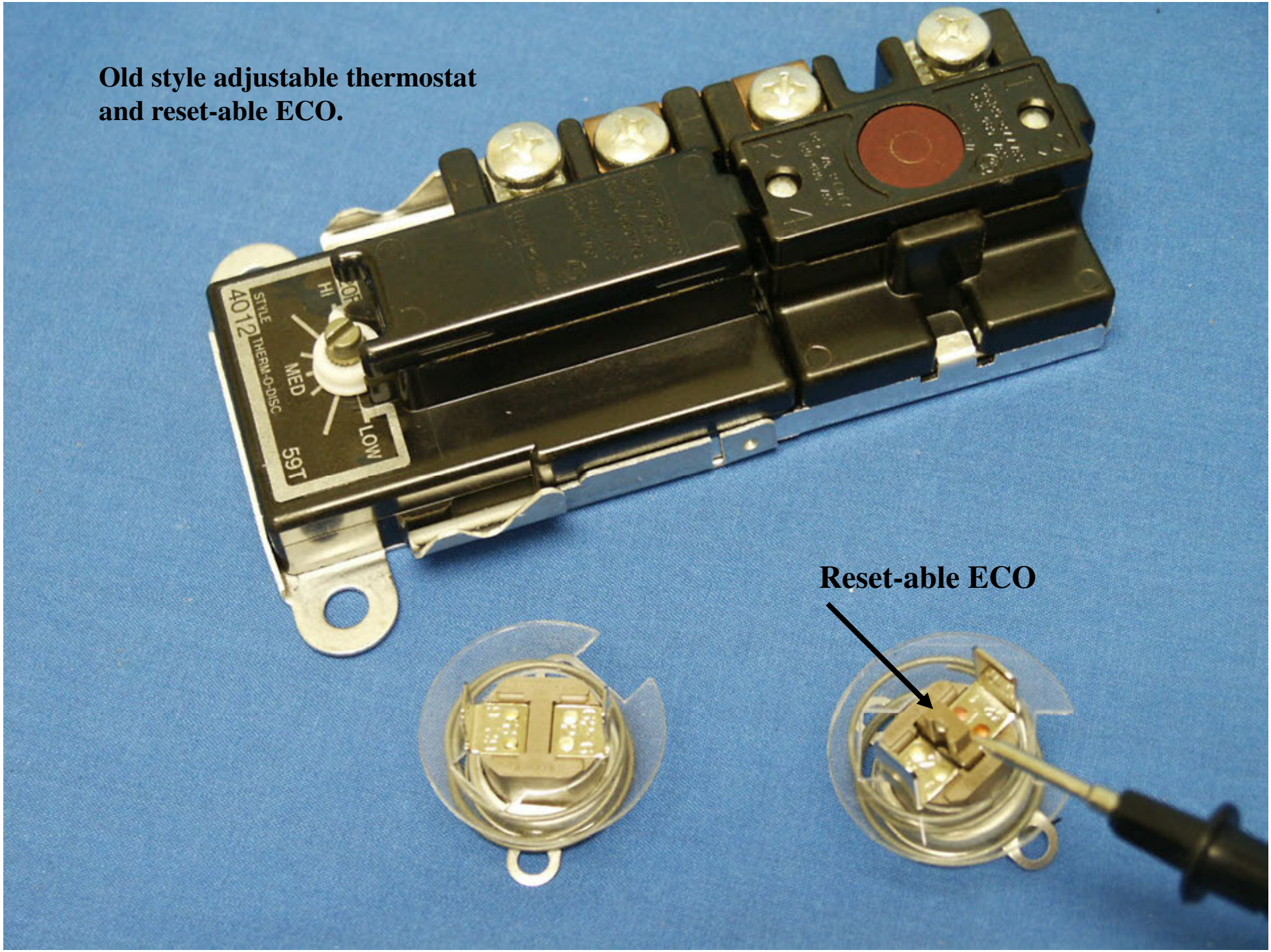

GB Instruments
GMT-12A
OHM
X1K
OFF
10
50
DC V
0.5
DC
mA
50
250
250
500
+
500V
MAX
10
50
250
500
AC V
MAX
500V
AC/DC
E.C.O.
T'STAT

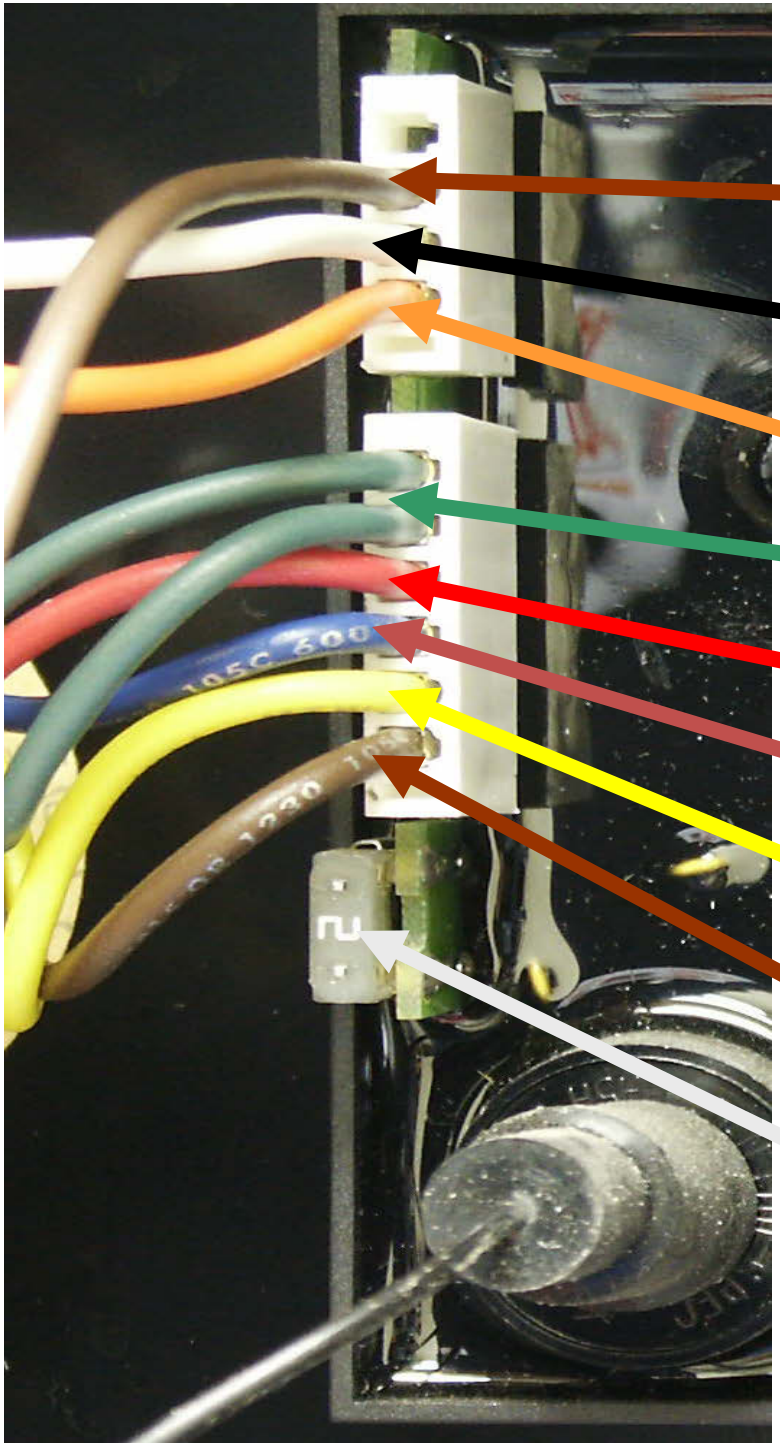

GB Instruments
GMT-12A
OFF
10
50
.DC V
250
500
0.5
DC
mA
50
250
500V
MAX
MAX
500V
AC/DC
DO NOT
GRIP
HERE
25M19
TYPE 701
12 V.D.C. 480


TO APPLIANCE
WITH COP R CONDUCTORS
ON
OFF


DIGITAL MULTIMETER
AC
124.0
V
Auto Power Off
AC/DC
DATA HOLD
CRAFTSMAN
Clamp Adaptor
AC/DC 4mA
40mA
400mA
20A
CAP
400nF 4nF
TEMP
°F
°C
OHM
V AC/DC
AUTORANGING MULTIMETER 82175
20A
Clamp mA
V•TEMP
Ω•CAP


DIGITAL MULTIMETER
AC
118.1
Auto
Power
Off
AC/DC
CRAFTSMAN
DATA HOLD


Old style adjustable thermostat
and reset-able ECO.
HI
MED
LOW
4012
59T
Reset-able ECO



Gas/Electric module board

Power to Thermal cut-off/thermostat

Power in from electric switch

Power in from gas switch

Both green are ground

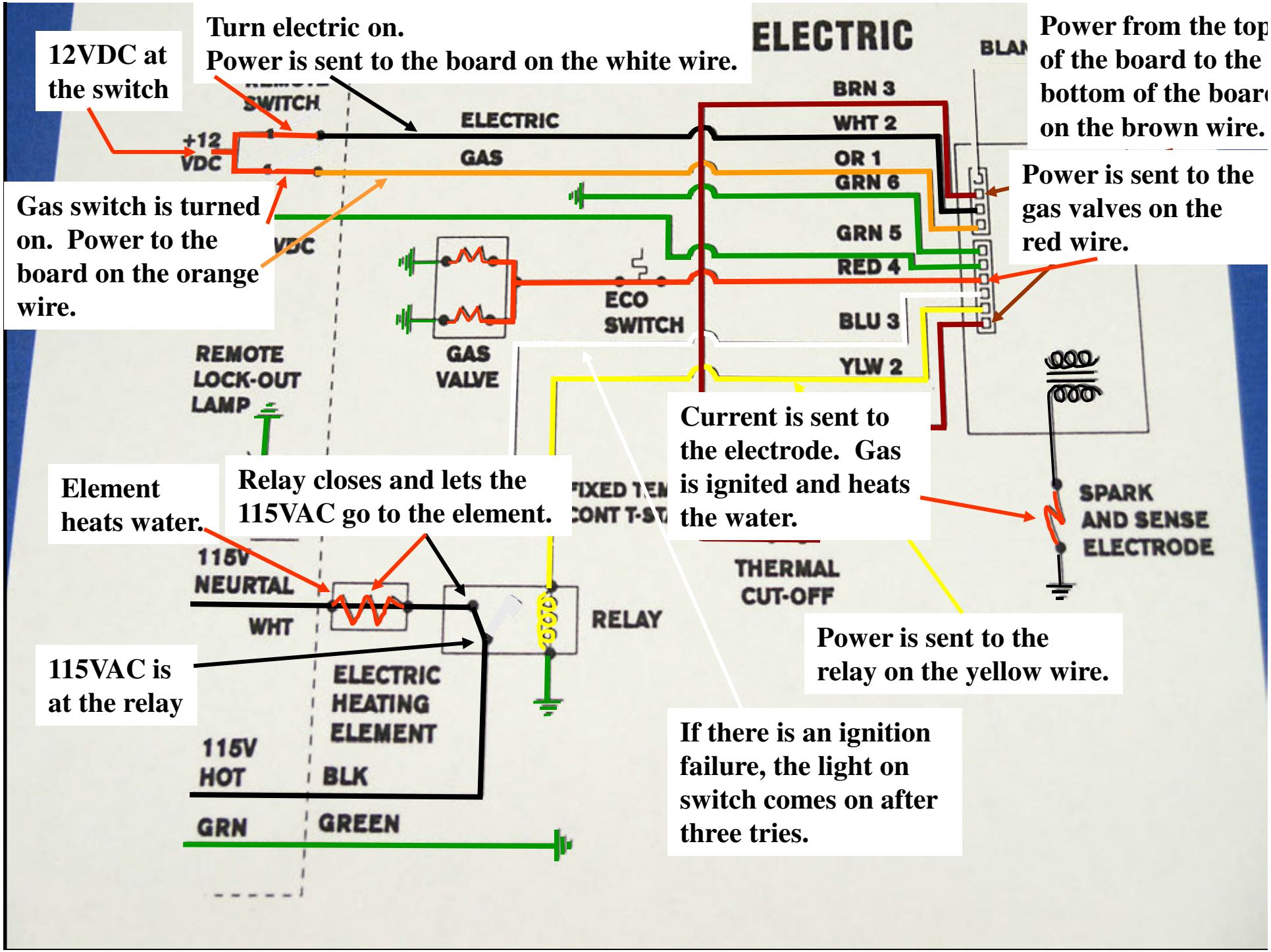
Power to gas valve

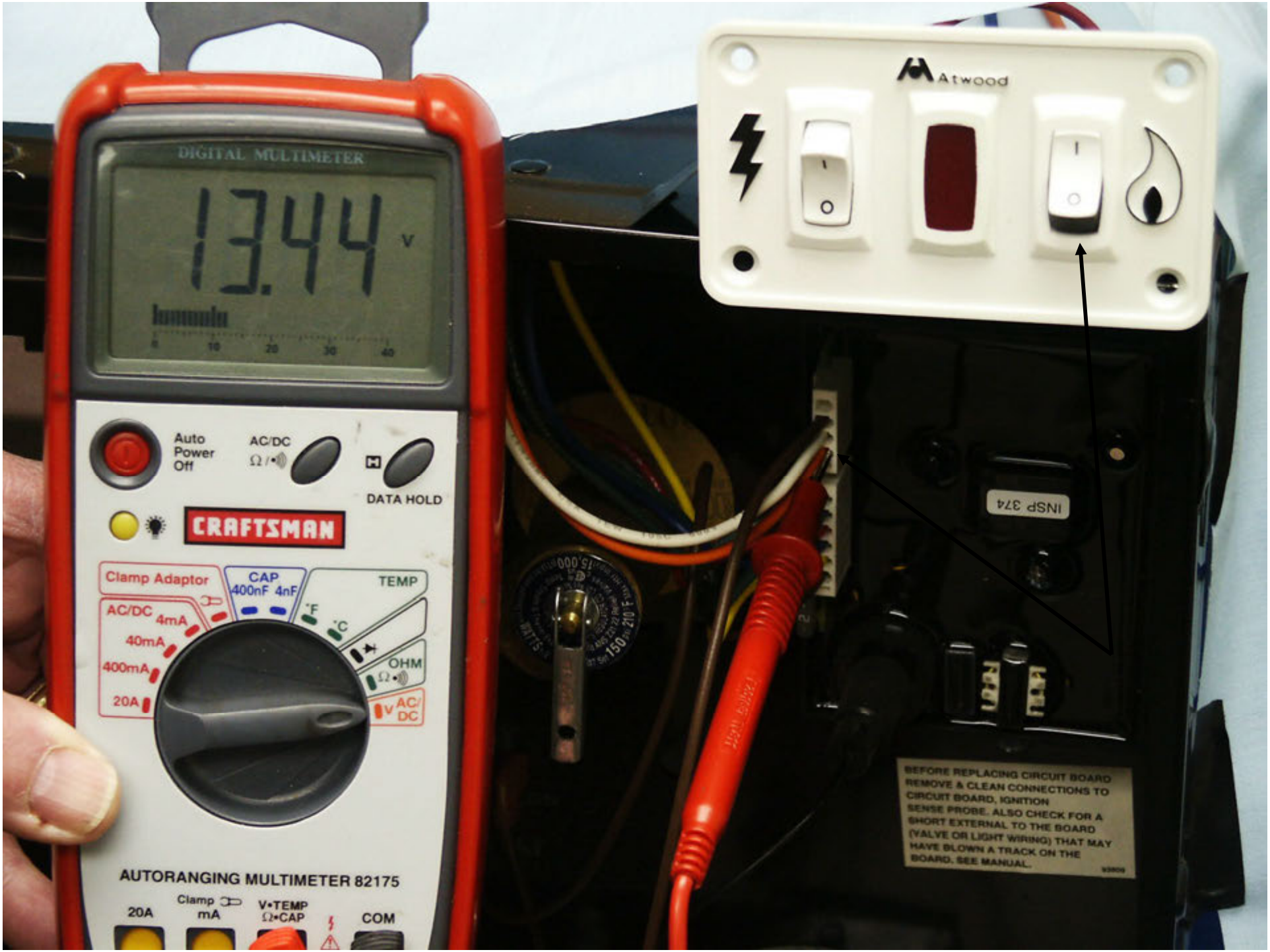
Light circuit

Power to AC circuit on the back

Power from top through thermostat

Fuse


12VDC at the switch
Turn electric on.
Power is sent to the board on the white wire.
ELECTRIC
Power from the top of the board to the bottom of the board on the brown wire.
SWITCH
+12 VDC
ELECTRIC
GAS
BRN 3
WHT 2
OR 1
GRN 6
GRN 5
RED 4
BLU 3
YLW 2
Gas switch is turned on. Power to the board on the orange wire.
Power is sent to the gas valves on the red wire.
ECO SWITCH
GAS VALVE
REMOTE LOCK-OUT LAMP
Current is sent to the electrode. Gas is ignited and heats the water.
SPARK AND SENSE ELECTRODE
Element heats water.
Relay closes and lets the 115VAC go to the element.
115V NEURTAL
WHT
RELAY
THERMAL CUT-OFF
Power is sent to the relay on the yellow wire.
115VAC is at the relay
ELECTRIC HEATING ELEMENT
115V HOT
BLK
GRN
GREEN
If there is an ignition failure, the light on switch comes on after three tries.


DIGITAL MULTIMETER
13.44
V
Auto Power Off
AC/DC
DATA HOLD
CRAFTSMAN
Clamp Adaptor
CAP 400nF 4nF
TEMP
°F
°C
AC/DC 4mA
40mA
400mA
20A
OHM
V AC/DC
AUTORANGING MULTIMETER 82175
20A
Clamp mA
V•TEMP Ω•CAP
COM
Atwood
INSP 374
BEFORE REPLACING CIRCUIT BOARD REMOVE & CLEAN CONNECTIONS TO CIRCUIT BOARD, IGNITION SENSE PROBE. ALSO CHECK FOR A SHORT EXTERNAL TO THE BOARD (VALVE OR LIGHT WIRING) THAT MAY HAVE BLOWN A TRACK ON THE BOARD. SEE MANUAL.


DIGITAL MULTIMETER
Auto Power Off
AC/DC
DATA HOLD
CRAFTSMAN
Clamp Adaptor
CAP 400nF 4nF
TEMP
°F
°C
AC/DC
4mA
40mA
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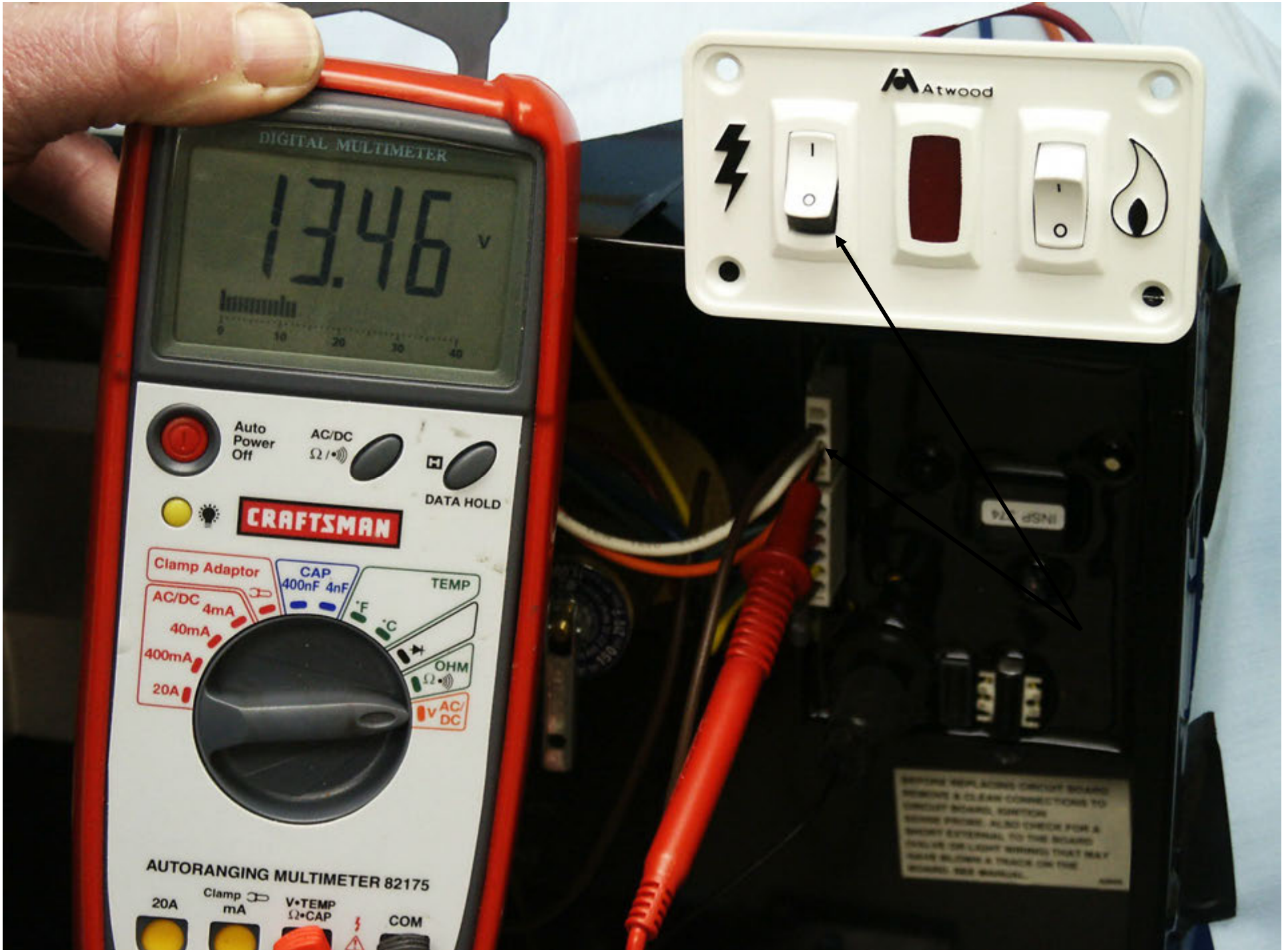
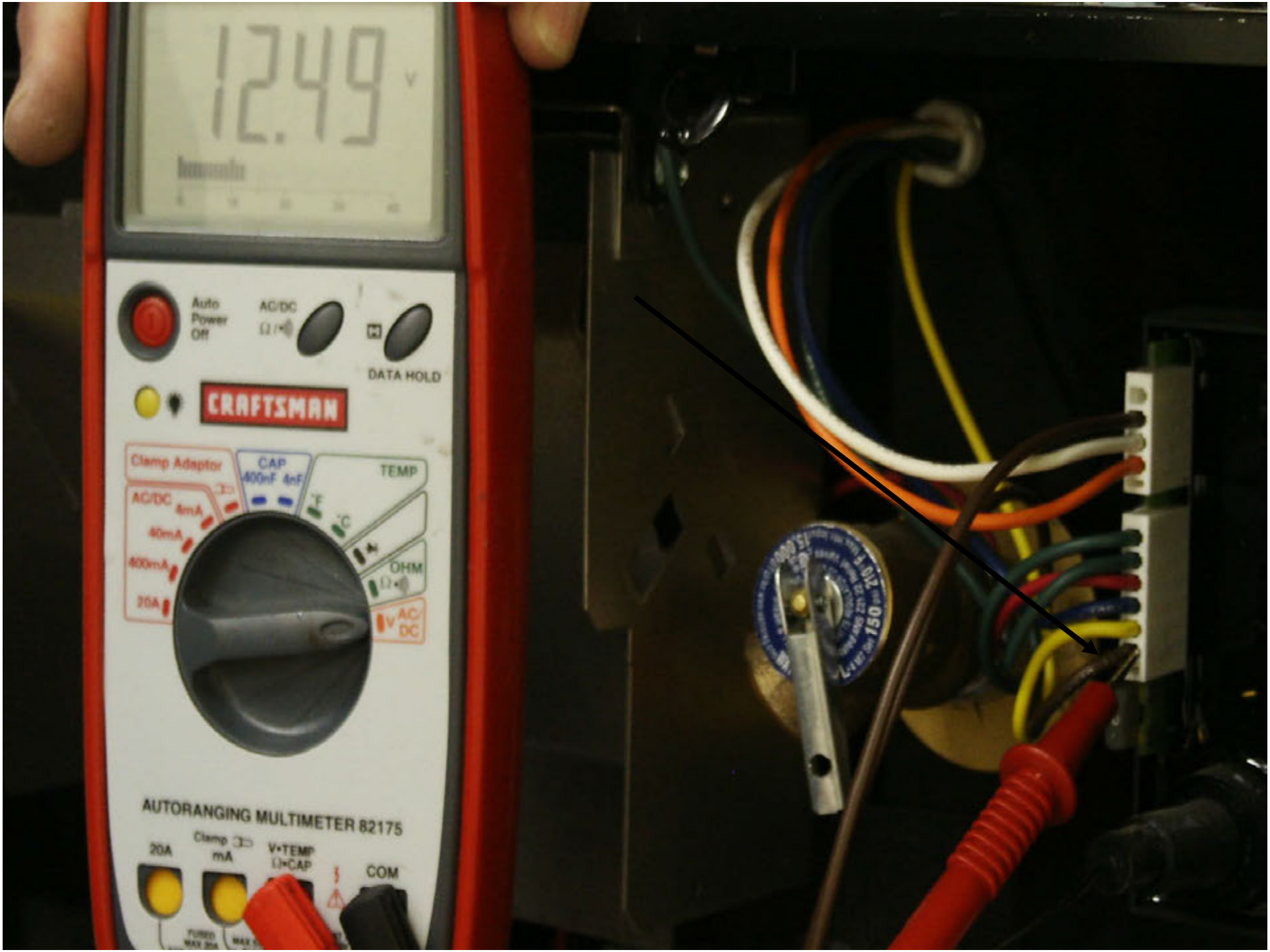
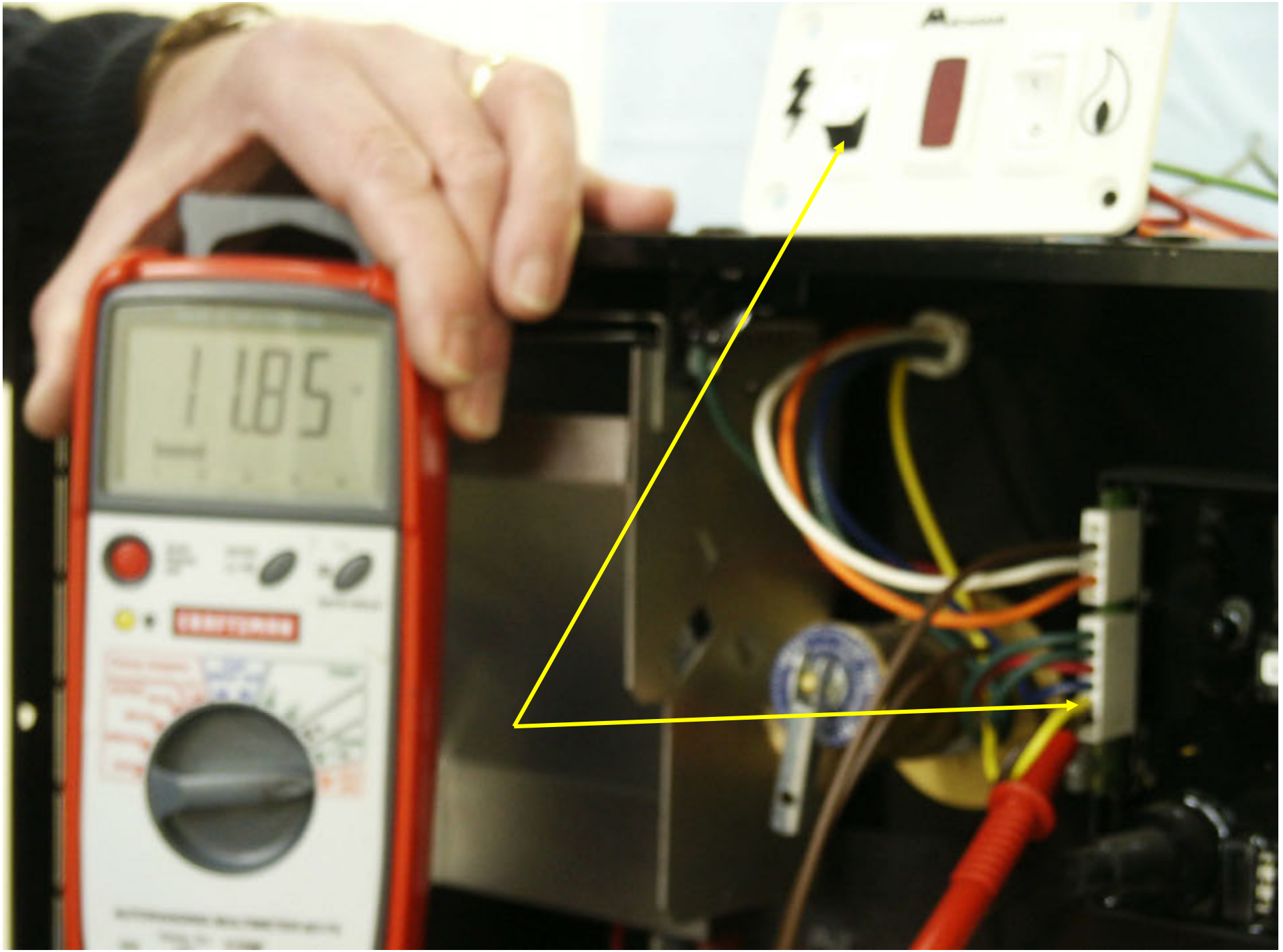
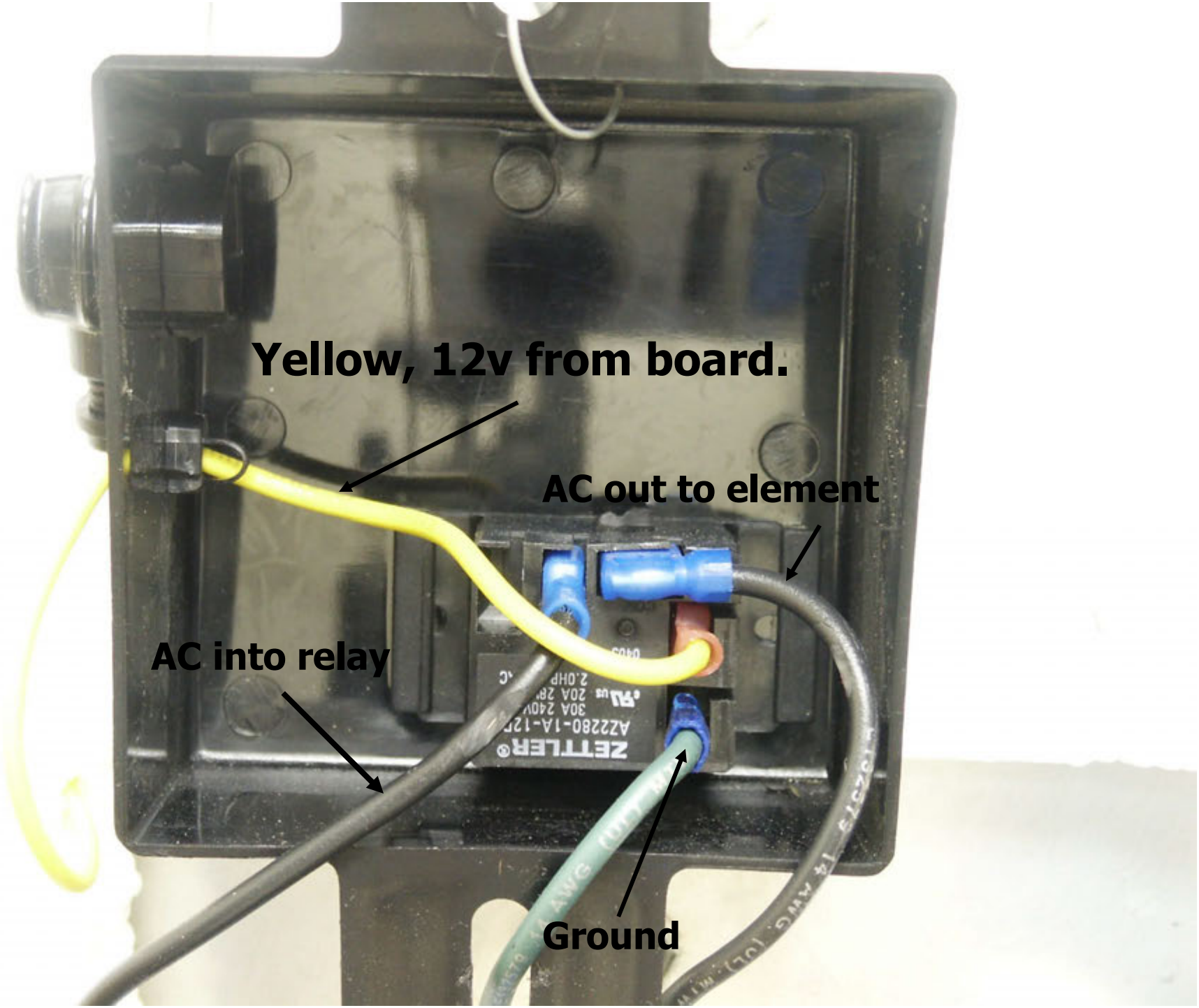
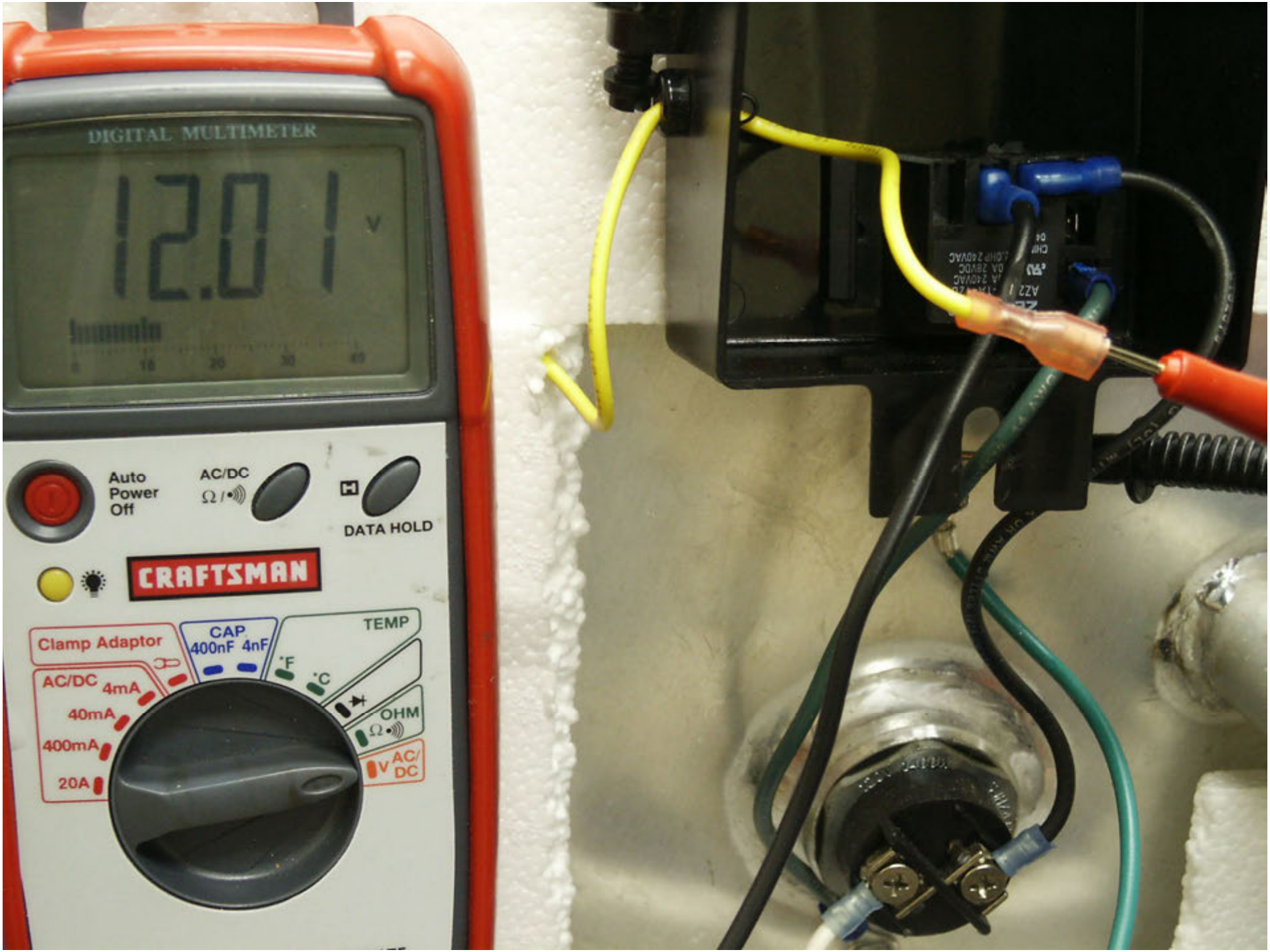

DIGITAL MULTIMETER
13.46
V
Auto Power Off
AC/DC
DATA HOLD
CRAFTSMAN
Clamp Adaptor
CAP 400nF 4nF
TEMP
°F
°C
AC/DC 4mA
40mA
400mA
20A
OHM
V AC/DC
AUTORANGING MULTIMETER 82175
20A
Clamp mA
V•TEMP Ω•CAP
COM
Atwood


12.49
V
Auto
Power
Off
AC/DC
DATA HOLD
CRAFTSMAN
Clamp Adaptor
CAP
400nF 4nF
TEMP
AC/DC
4mA
40mA
400mA
20A
OHM
V AC/
DC
AUTORANGING MULTIMETER 82175
20A
Clamp
mA
V•TEMP
Ω•CAP
COM


1185


Yellow, 12v from board.
AC out to element
AC into relay
Ground


DIGITAL MULTIMETER
12.01
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Auto
Power
Off
AC/DC
Ω / •))
DATA HOLD
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Clamp Adaptor
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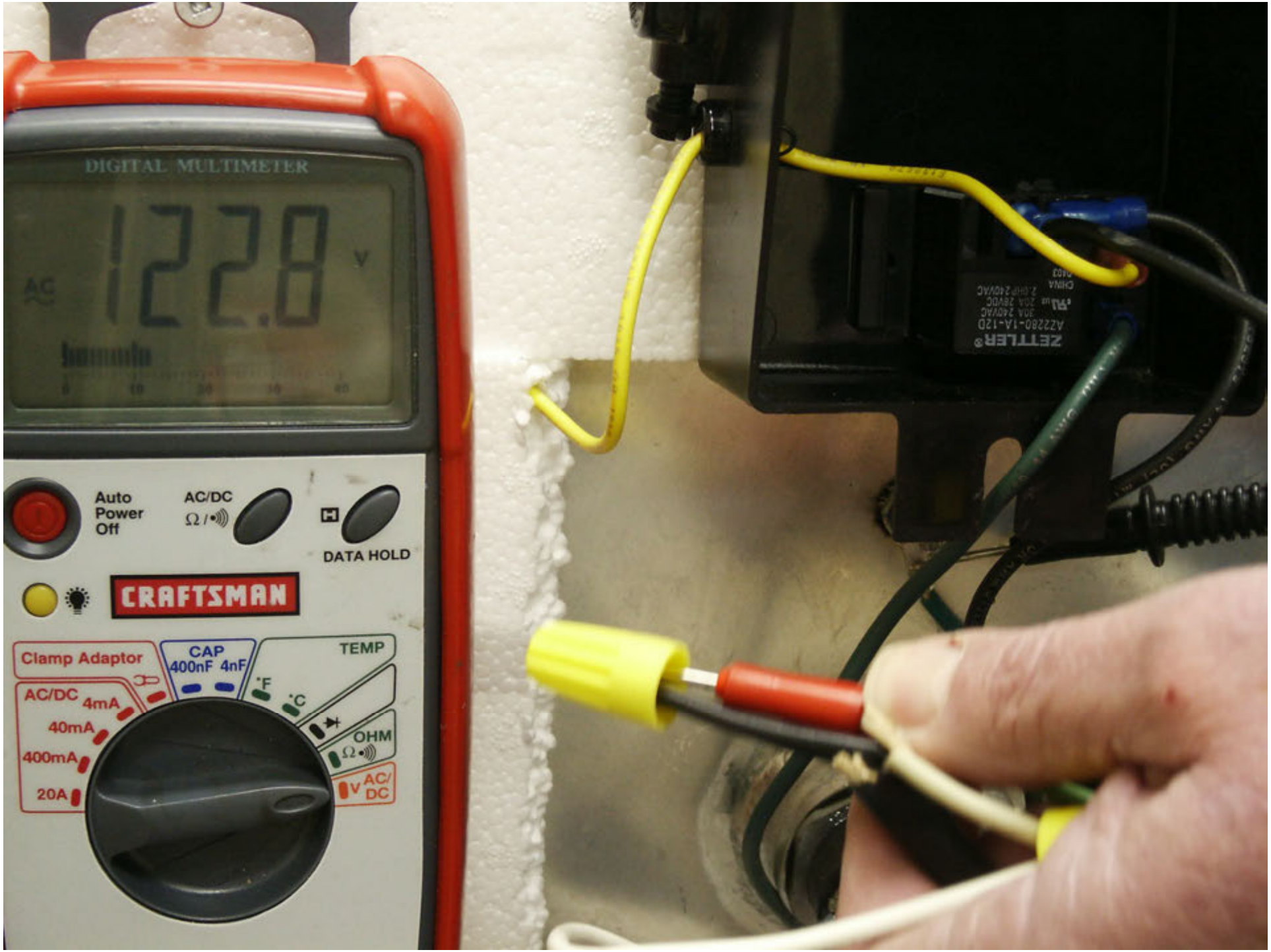
V AC/
DC


DIGITAL MULTIMETER
122.8
V
AC
Auto
Power
Off
AC/DC
Ω /•))
DATA HOLD
CRAFTSMAN
Clamp Adaptor
CAP
400nF 4nF
TEMP
°F
°C
AC/DC 4mA
40mA
400mA
20A
OHM
Ω •))
V AC/
DC
ZETTLER
AZ2280-1A-12D


DIGITAL MULTIMETER
10.1
Ω
0
10
20
30
40
Auto Power Off
AC/DC
Ω /•))
DATA HOLD
CRAFTSMAN
TEMP
°F
°C
CAP
400nF 4nF
Clamp Adaptor
AC/DC 4mA
40mA
400mA
20A
OHM
Ω •))
V AC/DC
MULTIMETER 82175
V•TEMP
Ω•CAP
COM

Aftermarket Heating Elements

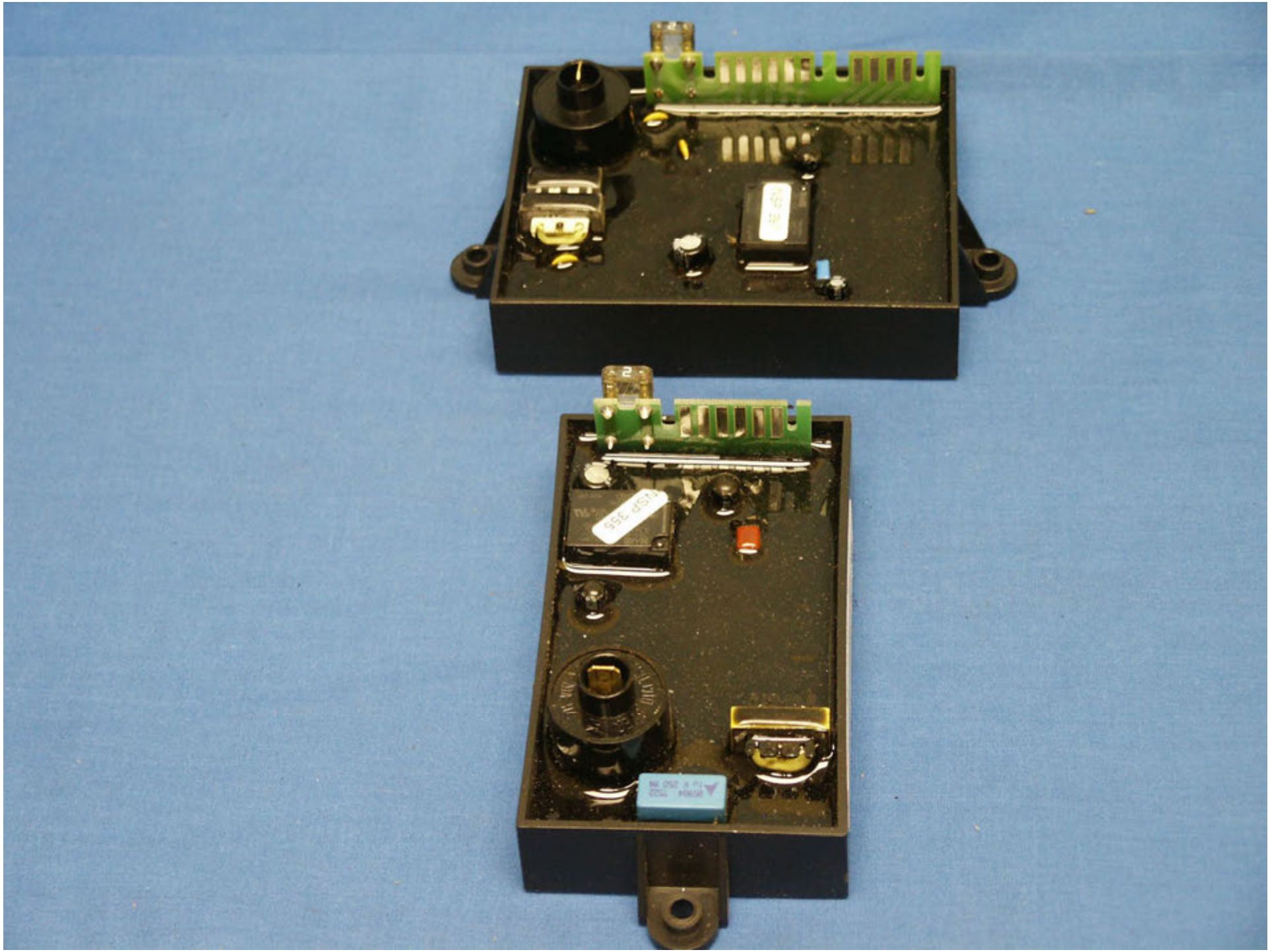
WARNING
EXPLOSION / BURN INJURY

- Aftermarket heating elements can lack critical safety controls.
- Use of these devices can lead to an out of control heating of water tank and a catastrophic wet side explosion.

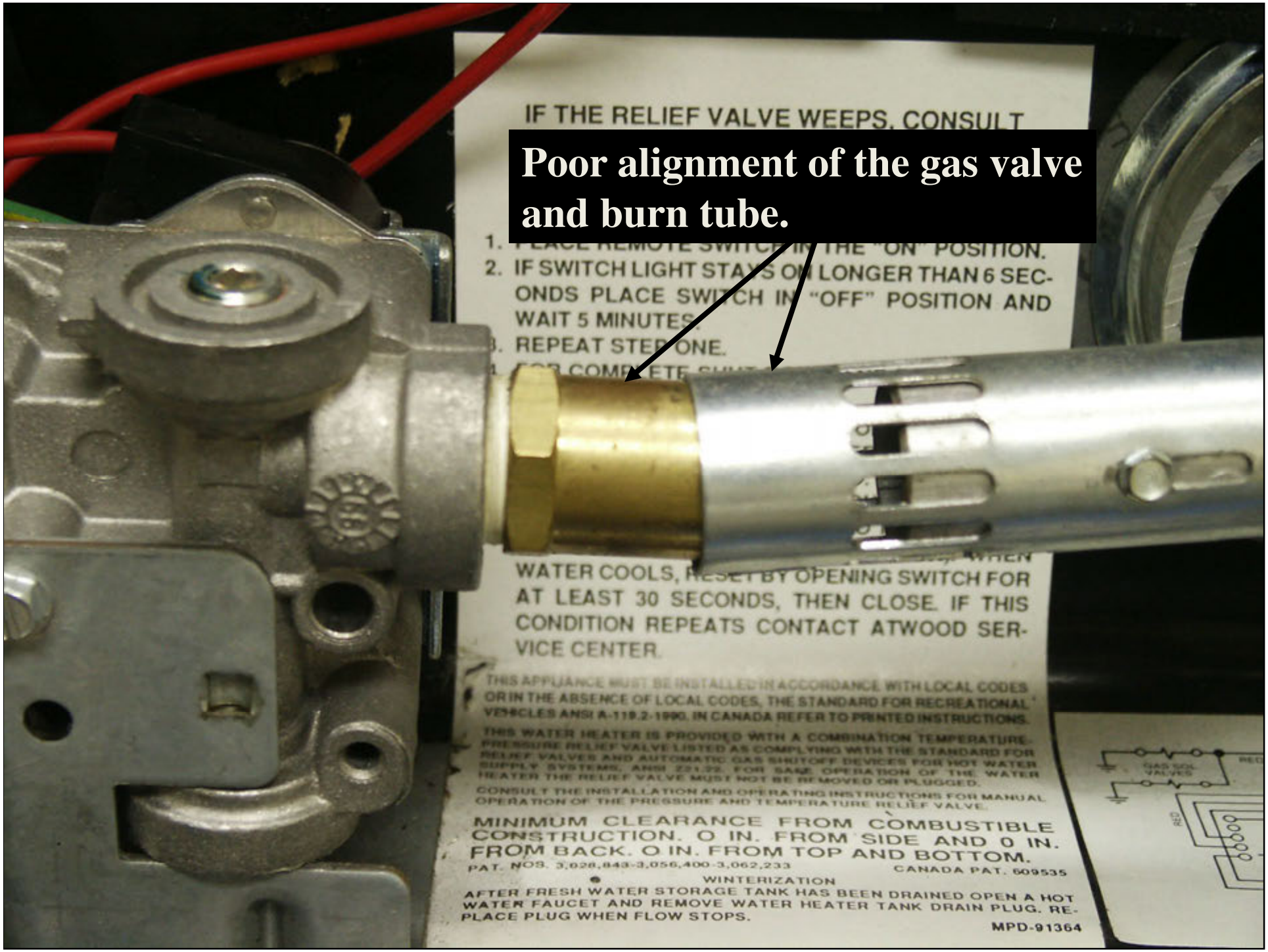
YOU DO NOT NEED AN AFTERMARKET HEATING ELEMENT ON AN ATWOOD WATER HEATER. THE USE OF AFTERMARKET HEATING ELEMENT DEVICES MAY ALSO RESULT IN DAMAGE TO COMPONENTS OR WATER HEATER. Atwood's written warranty states - "failure or damage resulting from any alteration to our water heater is the owner's responsibility". **ANY ALTERATION, SUCH AS THE ADDITION OF AN AFTERMARKET HEATING ELEMENT DEVICE, WILL VOID THE WARRANTY.**

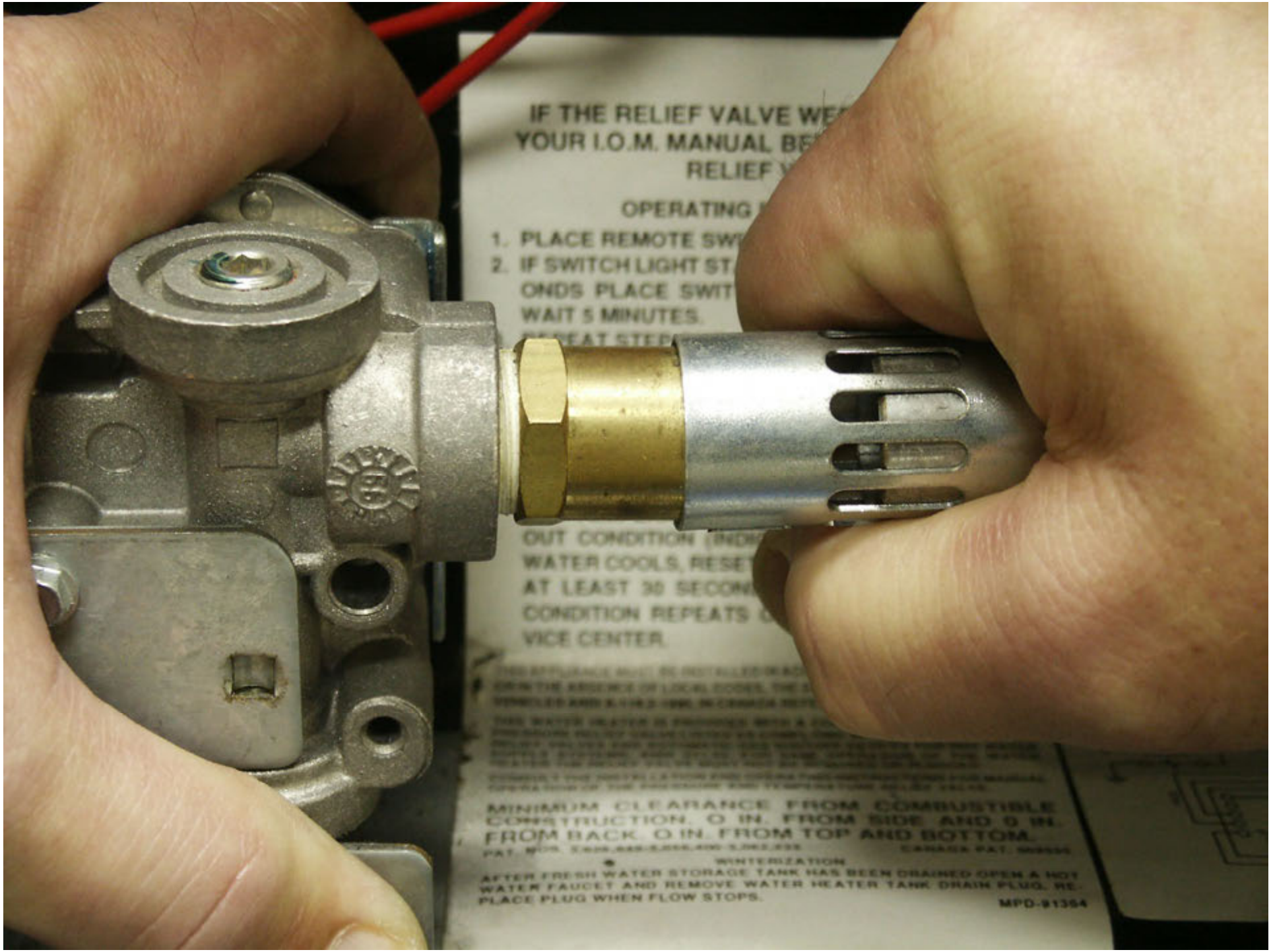
- Temperatures produced by these heating elements can exceed the 190˚F. Limiting of the ECO on pilot model gas control valves. This gas control valve contains a one-shot ECO. When this ECO blows, the control is completely non-functional and must be replaced.
  THIS IS A NON-WARRANTABLE SITUATION.

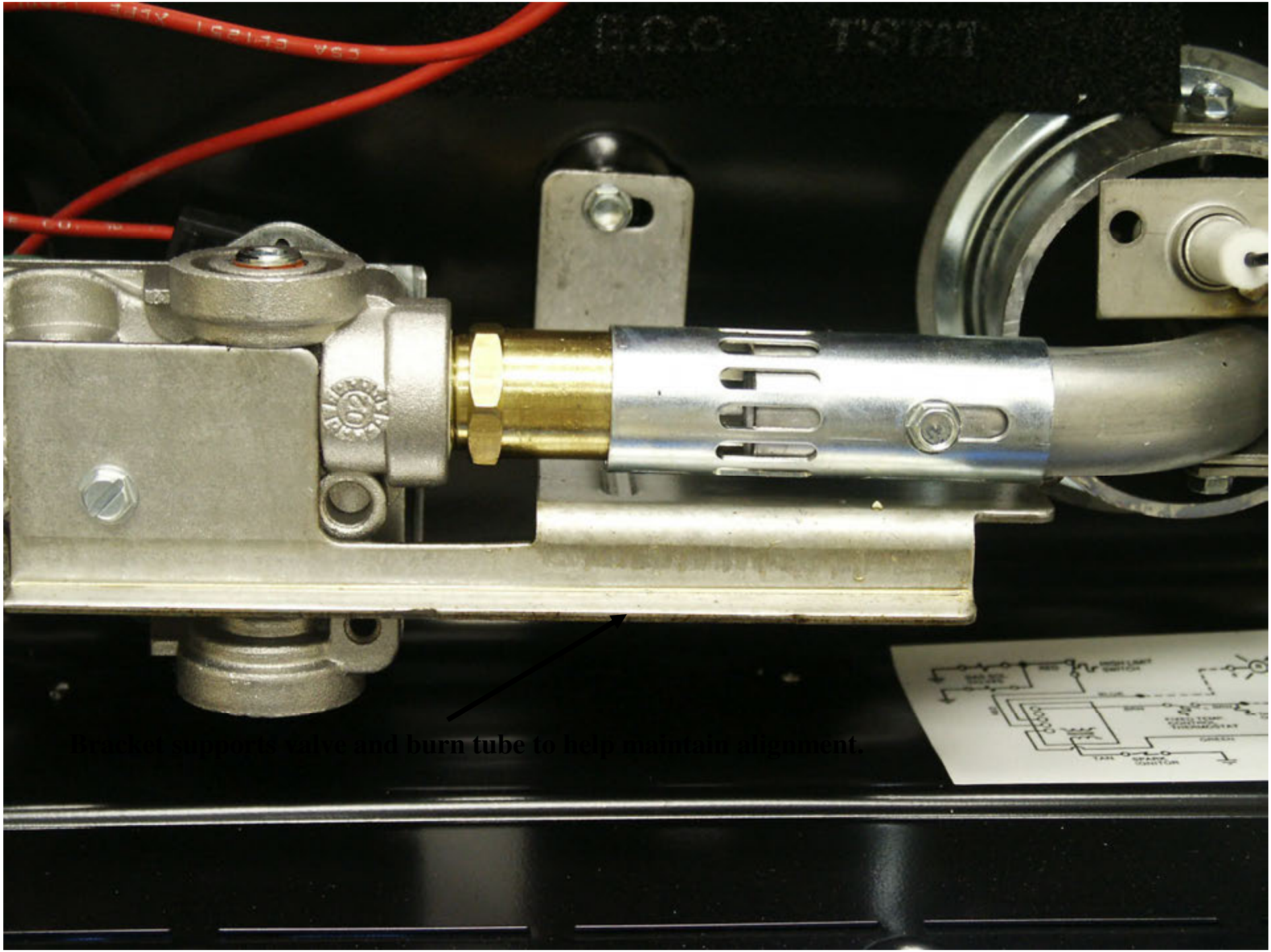

FENWAL INC ASHLAND MASS
CAT NO 05-152436-053
AUTO IGNITION SYSTEM
ANS Z21.20 a 1979
INPUT 12 VDC 100MA
VALVE 12 VDC 1A MAX
IGNITION TIME
POWER
M.V.
VALVE
SENSE
GROUND
1537-02



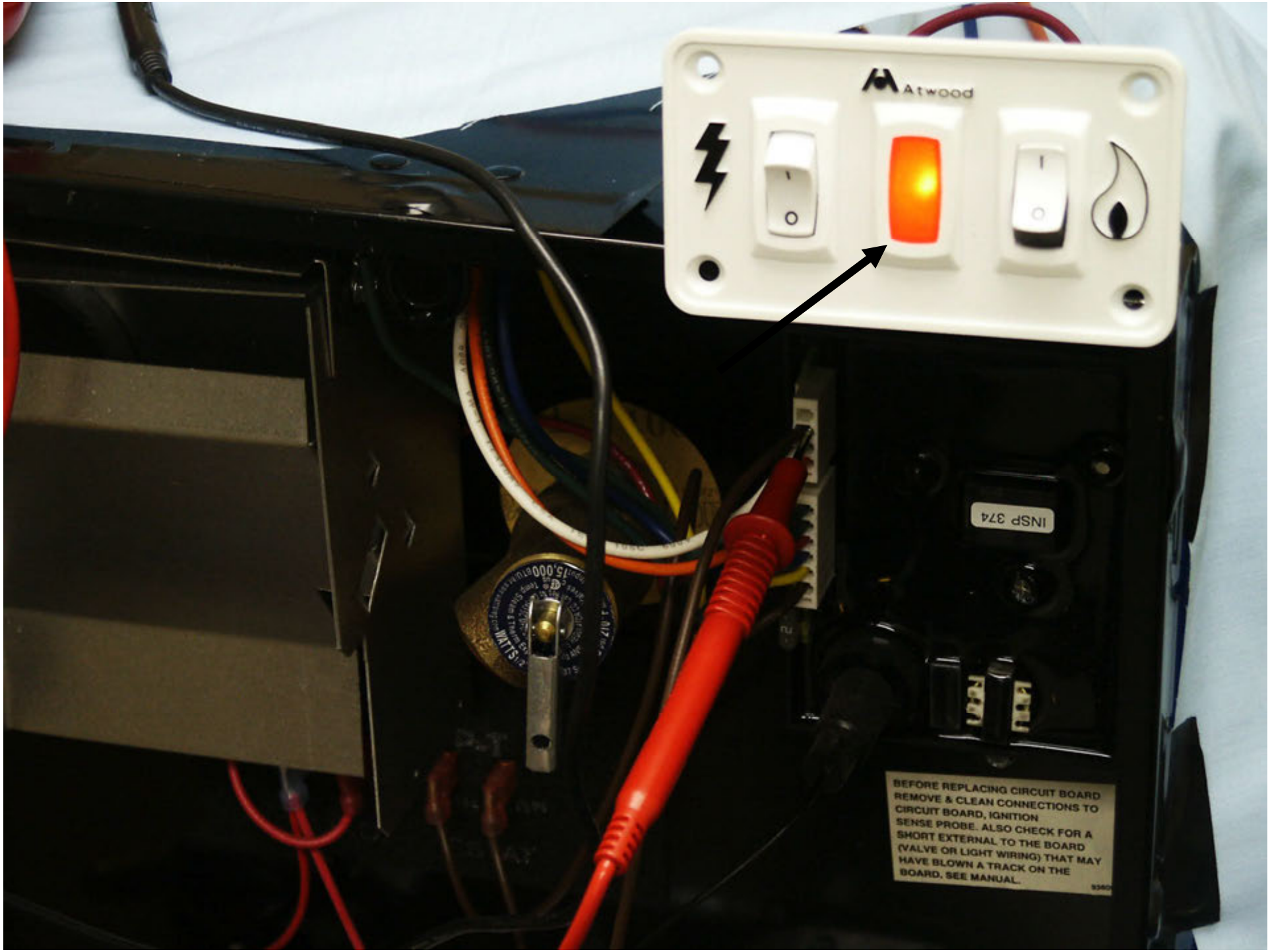

CT-3021-1
1533-51 REV F


Poor alignment of the gas valve and burn tube.
IF THE RELIEF VALVE WEEPS, CONSULT
2. IF SWITCH LIGHT STAYS ON LONGER THAN 6 SEC-
ONDS PLACE SWITCH IN "OFF" POSITION AND
WAIT 5 MINUTES.
REPEAT STEP ONE.
WATER COOLS, RESET BY OPENING SWITCH FOR
AT LEAST 30 SECONDS, THEN CLOSE. IF THIS
CONDITION REPEATS CONTACT ATWOOD SER-
VICE CENTER.
THIS APPLIANCE MUST BE INSTALLED IN ACCORDANCE WITH LOCAL CODES
OR IN THE ABSENCE OF LOCAL CODES, THE STANDARD FOR RECREATIONAL
VEHICLES ANSI A-119.2-1990. IN CANADA REFER TO PRINTED INSTRUCTIONS.
THIS WATER HEATER IS PROVIDED WITH A COMBINATION TEMPERATURE-
PRESSURE RELIEF VALVE LISTED AS COMPLYING WITH THE STANDARD FOR
RELIEF VALVES AND AUTOMATIC GAS SHUTOFF DEVICES FOR HOT WATER
SUPPLY SYSTEMS, ANSI Z21.22. FOR SAFE OPERATION OF THE WATER
HEATER THE RELIEF VALVE MUST NOT BE REMOVED OR PLUGGED.
CONSULT THE INSTALLATION AND OPERATING INSTRUCTIONS FOR MANUAL
OPERATION OF THE PRESSURE AND TEMPERATURE RELIEF VALVE.
MINIMUM CLEARANCE FROM COMBUSTIBLE
CONSTRUCTION. O IN. FROM SIDE AND 0 IN.
FROM BACK. O IN. FROM TOP AND BOTTOM.
PAT. NOS. 3,028,843-3,056,400-3,062,233
CANADA PAT. 609535
WINTERIZATION
AFTER FRESH WATER STORAGE TANK HAS BEEN DRAINED OPEN A HOT
WATER FAUCET AND REMOVE WATER HEATER TANK DRAIN PLUG. RE-
PLACE PLUG WHEN FLOW STOPS.
MPD-91364


IF THE RELIEF VALVE WE
YOUR I.O.M. MANUAL BE
RELIEF
OPERATING
1. PLACE REMOTE SWI
2. IF SWITCH LIGHT ST
ONDS PLACE SWIT
WAIT 5 MINUTES.
OUT CONDITION (INDI
WATER COOLS, RESE
AT LEAST 30 SECON
CONDITION REPEATS
VICE CENTER.
MINIMUM CLEARANCE FROM COMBUSTIBLE CONSTRUCTION. 0 IN. FROM SIDE AND 0 IN. FROM BACK. 0 IN. FROM TOP AND BOTTOM.
WINTERIZATION
AFTER FRESH WATER STORAGE TANK HAS BEEN DRAINED OPEN A HOT WATER FAUCET AND REMOVE WATER HEATER TANK DRAIN PLUG. REPLACE PLUG WHEN FLOW STOPS.
MPD-91354

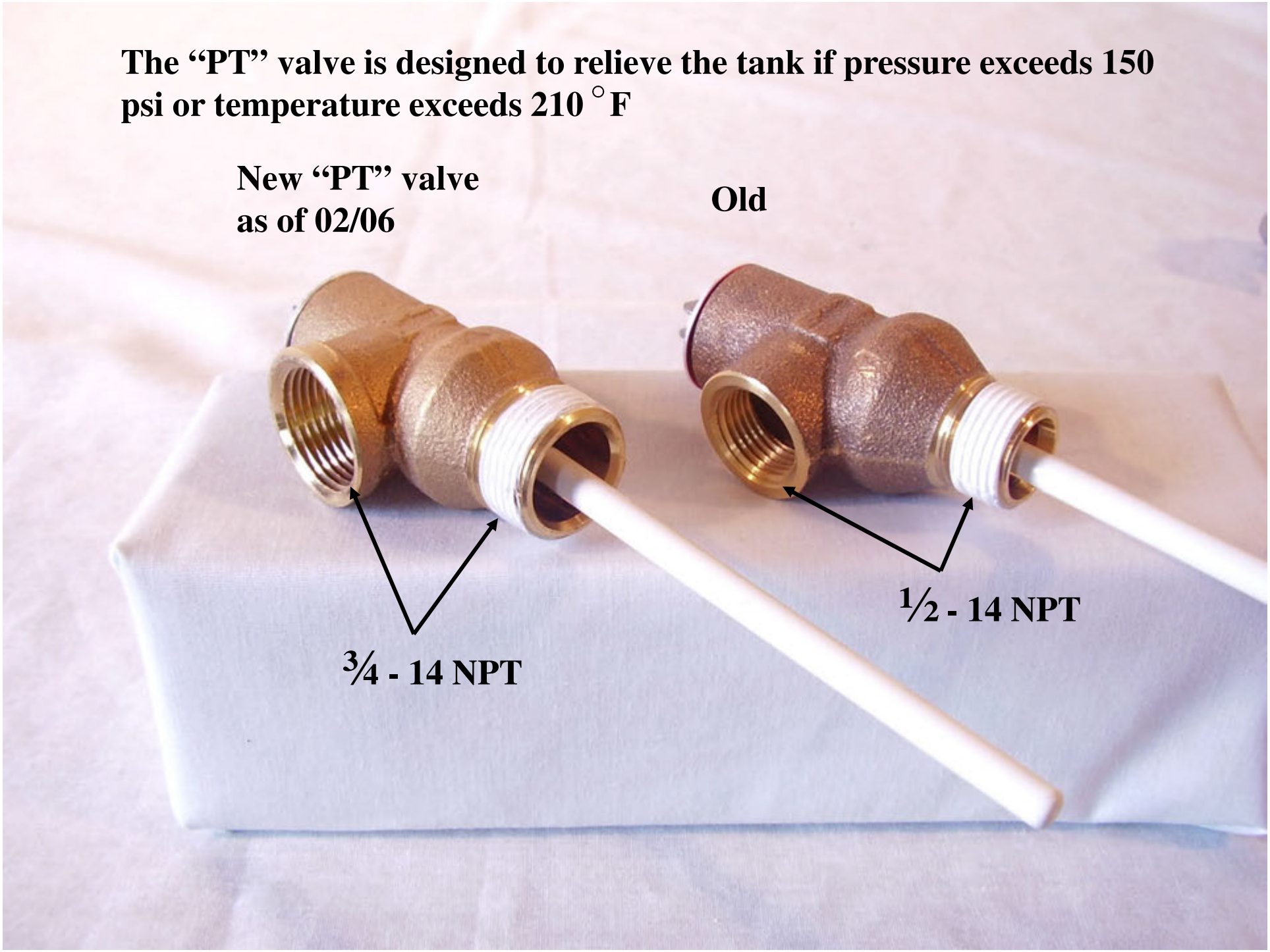


Bracket supports valve and burn tube to help maintain alignment.


Atwood
INSP 374
BEFORE REPLACING CIRCUIT BOARD REMOVE & CLEAN CONNECTIONS TO CIRCUIT BOARD, IGNITION SENSE PROBE. ALSO CHECK FOR A SHORT EXTERNAL TO THE BOARD (VALVE OR LIGHT WIRING) THAT MAY HAVE BLOWN A TRACK ON THE BOARD. SEE MANUAL.


THE FINEST REPLACEMENTS IN THESE PARTS
Atwood
DANGER
MPD 91326
ADJUST CONTROL KIT
Atwood
6 92931 93105 0

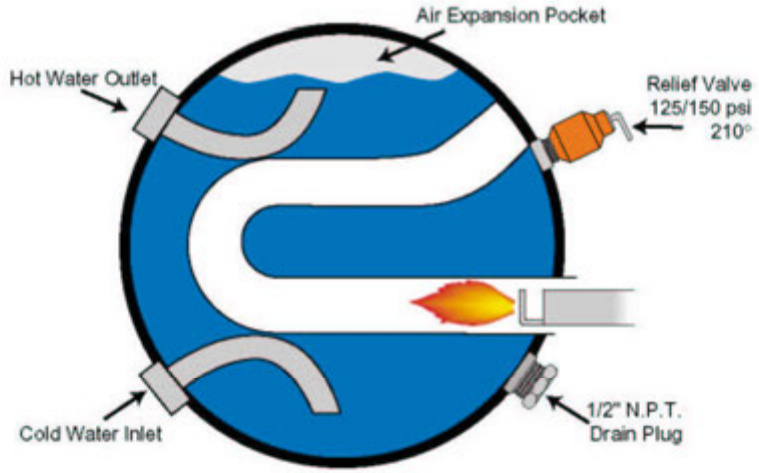
The "PT" valve is designed to relieve the tank if pressure exceeds 150 psi or temperature exceeds 210 °F



PRESSURE-TEMPERATURE RELIEF VALVE

Weeping or dripping of a pressure-temperature relief valve while the water heater is running DOES NOT mean it is defective. This is normal expansion of water as it is heated in the closed water system of a recreation vehicle. The Atwood water heater tank is designed with an internal air gap at the top of the tank to reduce the possibility of weeping and dripping. In time, the expanding water will absorb this air. To replace the air follow these steps:

Step 1: Turn off water heater
Step 2: Turn off incoming water supply
Step 3: Open the closest hot water faucet in the coach
Step 4: Pull handle of pressure-temperature relief valve straight out and allow water to flow until it stops.
Step 5: Allow pressure-temperature relief valve to snap shut, turn on water supply and close faucet.



WATER HEATER TANK CORROSION

Pinhole leaks from galvanic corrosion may cause the water heater tank to fail.

Microscopic particles of metals (like iron and copper) suspended in water, set up a reaction inside the water heater that is not unlike the principle on which an automotive battery operates. The aluminum tank is the anode and the metals in the water serve as the cathode. Consequently, the aluminum gradually sacrifices itself and aluminum particles are carried away with the water flow.

A white scaly material (aluminum oxide) often is formed around the points where the heaviest action is taking place and heat accelerates the process. Severity of the problem varies considerably in different locales depending on the metal and mineral content of the water. White deposits inside the water heater tank are usually from water impurities that have settled out.

Periodic flushing of the water heater tank under pressure is recommended to slow down this process. For flushing instructions see your owners manual or contact Atwood for a copy of our recommended procedure.

ATWOOD CLAD TANK

The Atwood water heater tank is constructed of a core of high strength aluminum. The interior of the tank consists of a 15% thickness of type 7072 aluminum (pure aluminum and zinc) that is fused to the core during the rolling process. This material protects the tank from the affects of heavy metals and salts found in waters throughout the country. It is anodic to these heavy metals and acts much like an anode in a steel glass lined tank except it will last much longer. There is also no need to replace an anode on a yearly basis.

Flushing the tank on a regular basis has been found to be helpful in insuring the best performance of your water hater and adding to the useful life of the tank. For flushing instructions see your owners manual or contact Atwood for a copy of our recommended procedures.

GENERAL INSTALLATION

Below is the most common type of installation for the water heater. However, there are other approved methods such as baggage compartment (refer to MPD 90093) and flush mounting installations (refer to MPD 93948). Consult your Field Auditor, Account Manager, or the Atwood Service Department if you have additional questions.

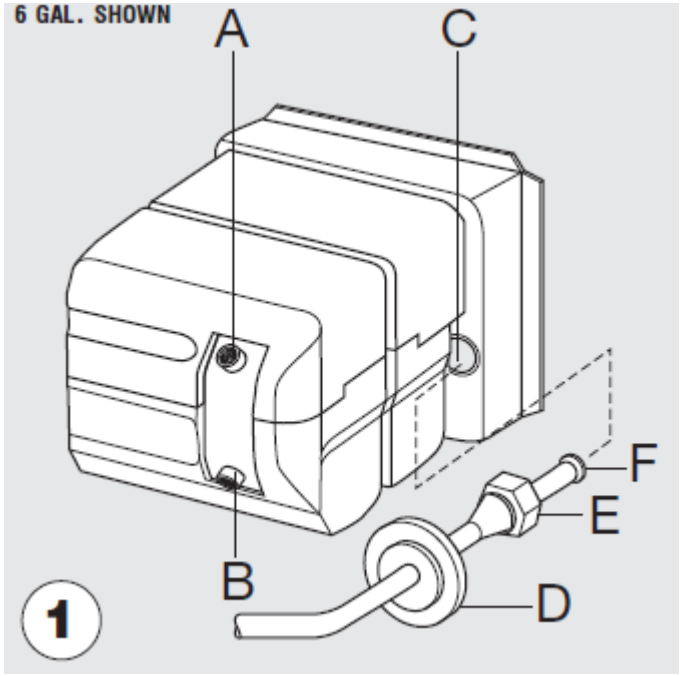
1. Locate water heater on floor of coach before erecting side walls. The water heater tank must be permanently supported at the same level as the bottom of sidewall cutout (by the floor or a raised floor).
2. To install water heater on carpeting, you must install appliance on a metal or wood panel that extends at least three inches beyond the full width and depth of appliance.
3. If water heater is installed where leakage of connections or tank will damage adjacent area, install a drain pan which can be drained to out side of coach, under water heater.
4. Connect both 1/2″ NPT water lines - hot water outlet female (FIG 1-A) and cold water inlet female (FIG 1-B) and 3/8″ flared LP gas lines (FIG 1-C).
   a. Allow flexibility in water and gas lines so you can pull unit forward through wall one inch past skin (FIG 2.
   b. Seal gas line entrance opening by sliding grommet (FIG 1-D) onto 3/8″ tubing (FIG 1-F) before flaring tubing (FIG 1-F). Pull gas line and grommet through opening in housing (FIG 1-C). Connect flare fitting (FIG 1-E) and press grommet into opening. If gas line tubing is already flared, cut grommet on one side. Place split grommet over gas line and press it into opening.
   c. Always use pipe lubricant on threads when connecting hot and cold water couplings. A suitable plastic fitting is recommended.

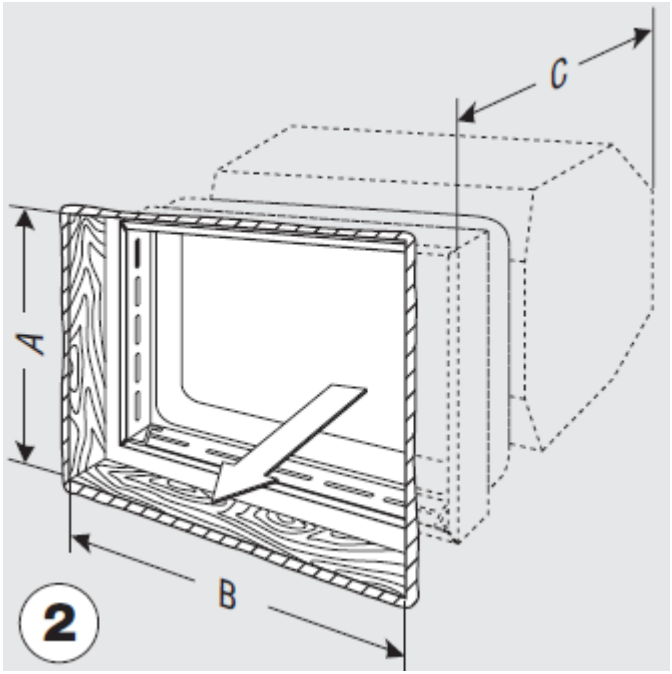
⚠ CAUTION

PRODUCT DAMAGE

- Do not lift, pull or push main burner tube (FIG 9-C).

5. Erect side walls and cut opening. See chart and FIG 2-A & B. Frame with 2x2 lumber (or equivalent).





CUTOUT

CAPACITY	CUT OUT DIMENSION		DEPTH
Gallon	A	B	C
4 - 6	12-5/8″	16-1/4″	17-5/8″
10	15-3/4″	16-1/4″	20-5/8″

MINIMUM CLEARANCE FROM COMBUSTIBLE CONSTRUCTION

Sides:	0″	Top:	0″
Back:	0″	Bottom:	0″

6. Bend all flanges 90° along scored lines (FIG 3).
7. To prevent water leaks caulk thoroughly around opening, including bend slots (FIG 3-A). Butyl Tape (1″x1/8″) may be substituted for caulking material.
8. Push unit against caulking, secure 4-corner brackets FIG 4-A to coach with No.8 - 3/4″ round head screws (not furnished) or equivalent. Complete the installation by inserting the same type of #8 screws in the holes provided around the flange of the water heater housing. **Check all gaskets, they must adhere to the pan creating an air tight seal.**
9. Attach access door (FIG 5).
   a. Snap hinge pin (FIG 5-A) into clip (FIG 5-B).
   b. Slide cover (FIG 5-C) onto hinge pin.
   c. Slide hinge pin into cover, snapping into clip at same time (FIG 5-D).

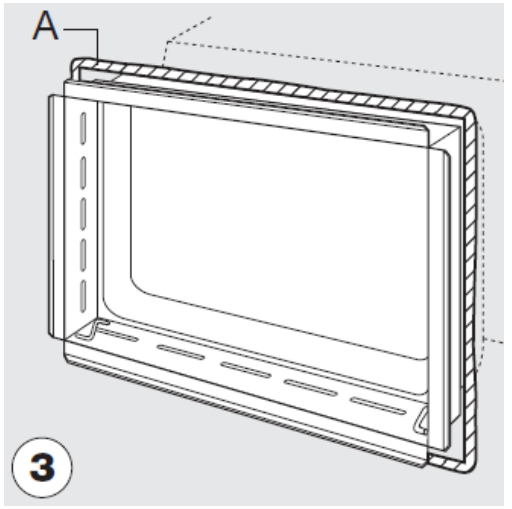
NOTE: To remove hinge pin, support access cover and apply force to corner of hinge pin as shown FIG 5-E.

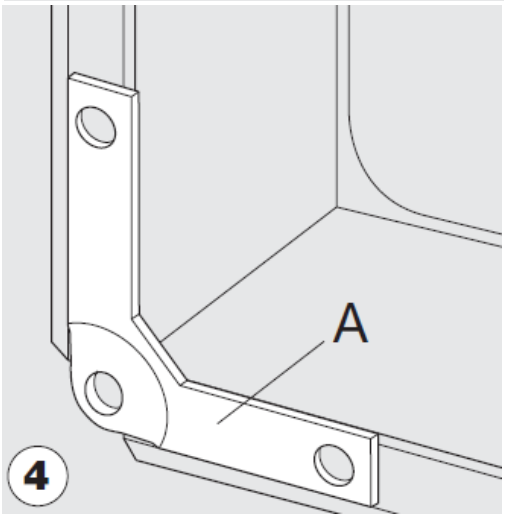
10. Disconnect unit and its individual shut-off valve from gas supply line during any pressure testing of system in excess of 1/2 PSIG (3.4 kPa, 14″ water column [W.C.]). DO NOT set inlet pressure higher than maximum indicated on rating plate of gas valve (13″ W.C.). Isolate unit from gas supply line by closing its individual manual shutoff valve during any pressure testing ≤ 1/2 psig.

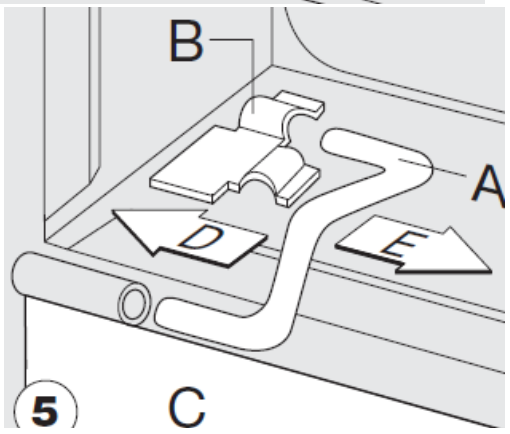
⚠ WARNING
FIRE AND/OR EXPLOSION

- DO NOT use matches, candles or other sources of ignition when checking for gas leaks.

11. Turn on gas and check water heater and all connections for gas leaks with leak detecting solution.
12. Fill water heater tank, check all connections for water leaks (FIG 1-A & B).



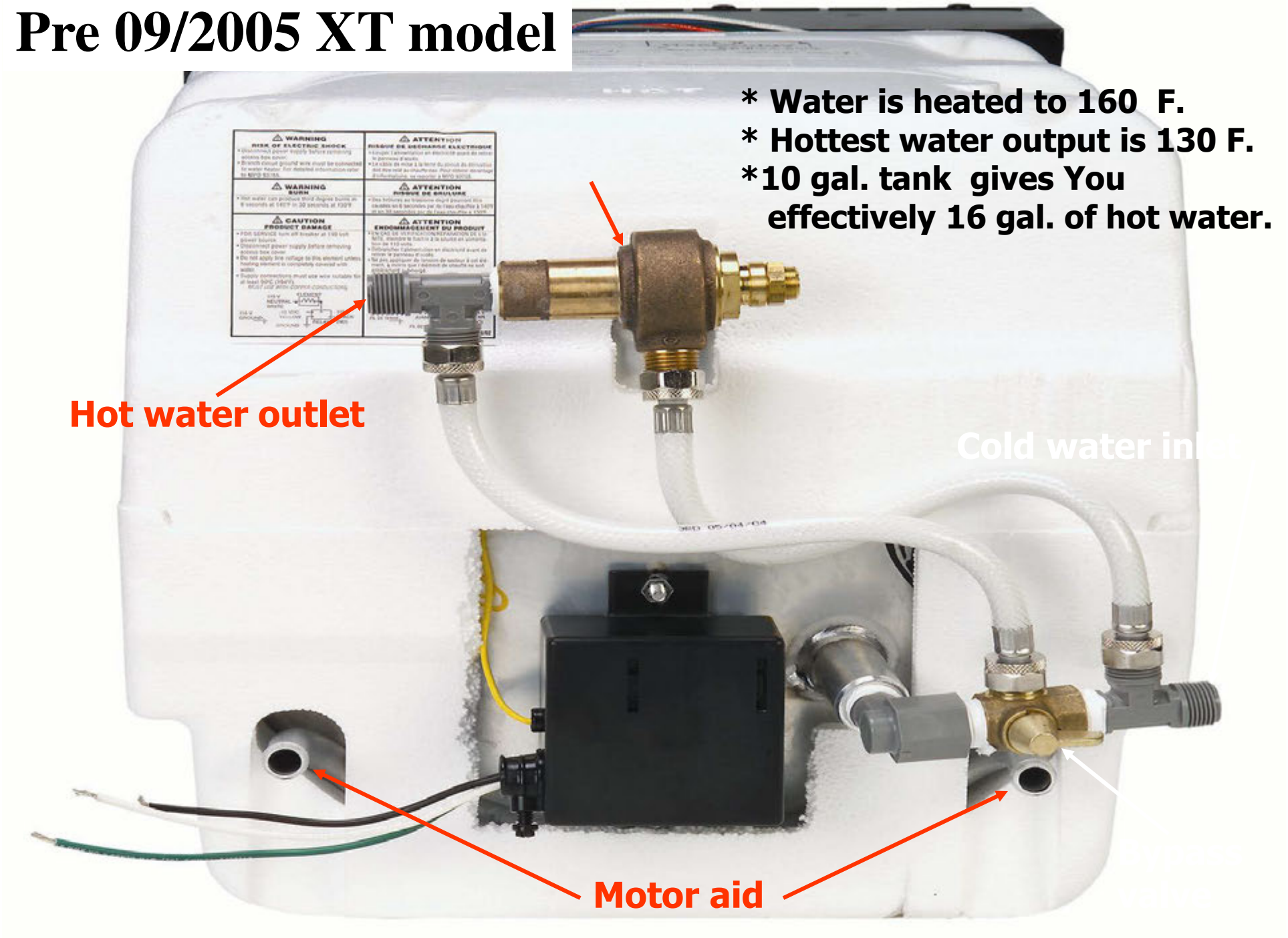


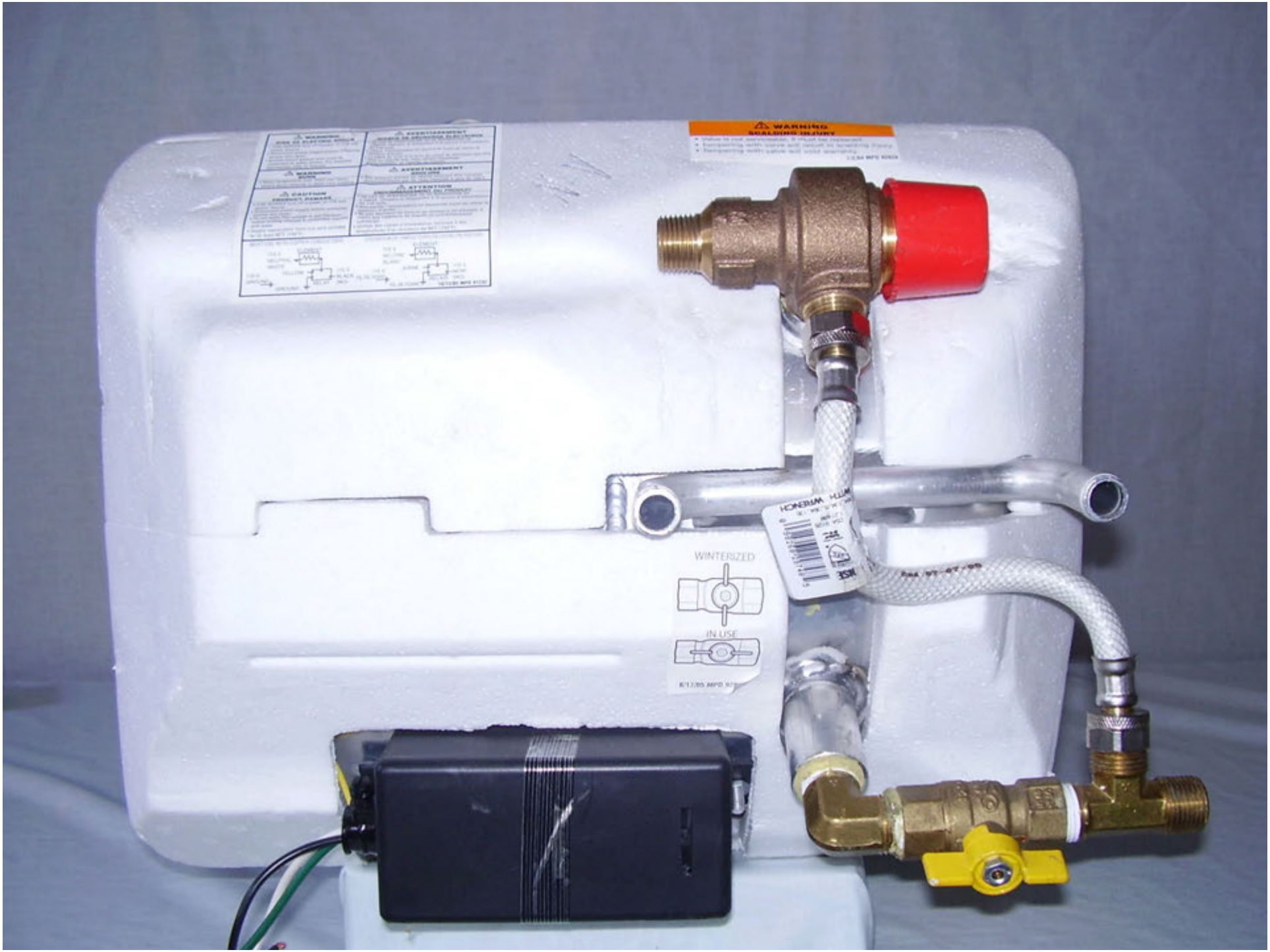


Atwood XT®

Advanced Water Heater System Featuring Exothermal Technology

Pre 09/2005 XT model




WARNING
SCALDING INJURY
WINTERIZED
IN USE


WARNING
RISK OF ELECTRIC SHOCK
ATTENTION
RISQUE DE DECHARGE ELECTRIQUE
WARNING
BURN
ATTENTION
RISQUE DE BRULURE
CAUTION
PRODUCT DAMAGE
ATTENTION
ENDOMMAGEMENT DU PRODUIT
WARNING
SCALDING INJURY

Thermostat and ECO for XT Unit

Questions????

On Demand Water Heater

On Demand Water Heater

The new ODWH requires that the door be changed.
There are 2 sizes of replacement door
Small for 6 gallon applications
Large for 10 gallon or larger. The door is not included for this reason.

Model Number for On Demand Water Heaters

Explanation of Model Number:

OD_____ On Demand

50_____ Input in 1000's Btu

01_____ Generation

CW____ Cold Weather Kit

Sequence of Operations

Gas Supply

11”wc to 13”wc

12VDC

(battery or filtered side of convertor) Water Heater voltage source

On/Off switch

supplies 12VDC to heater

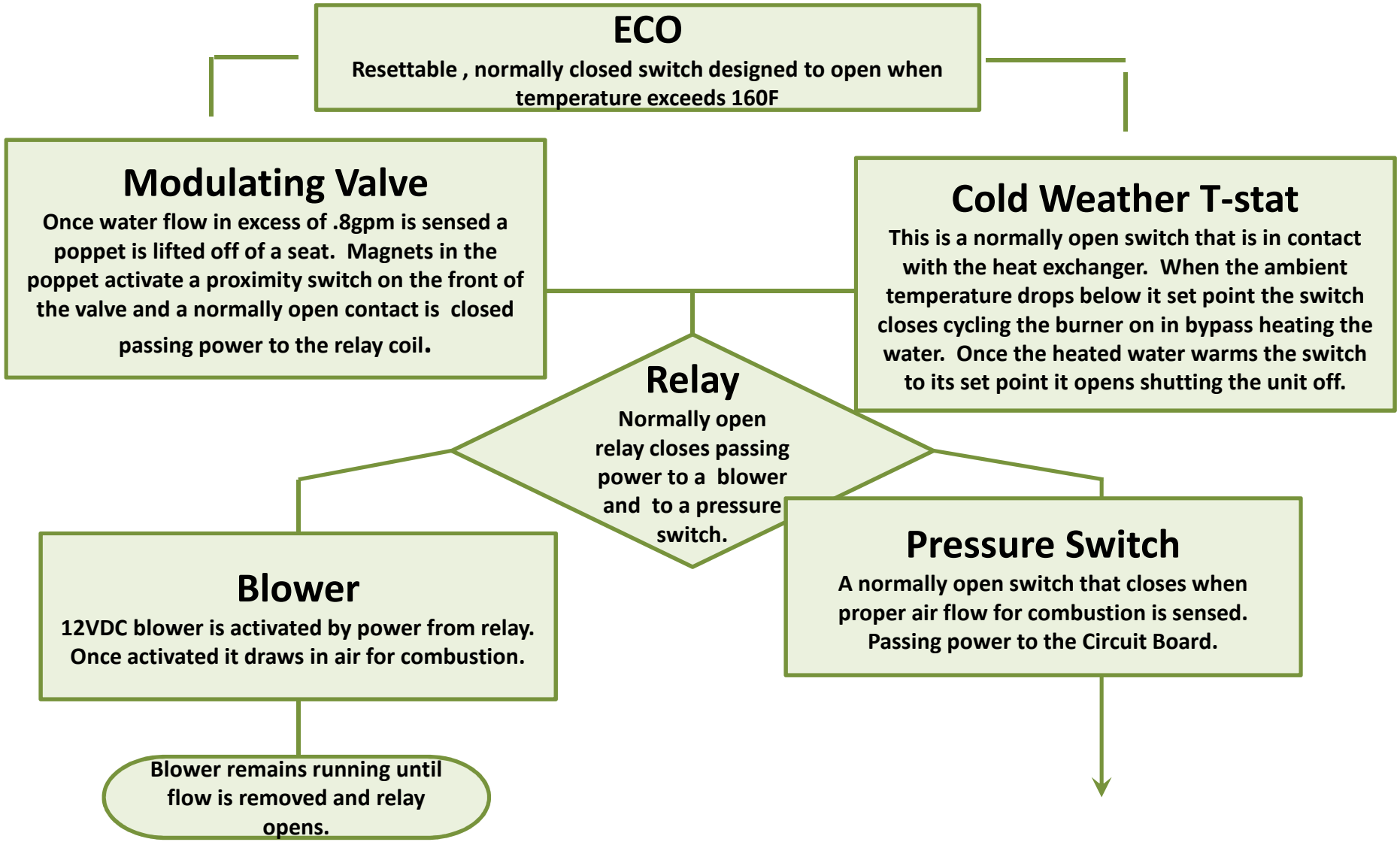
3A fuse

protects heater from excessive current

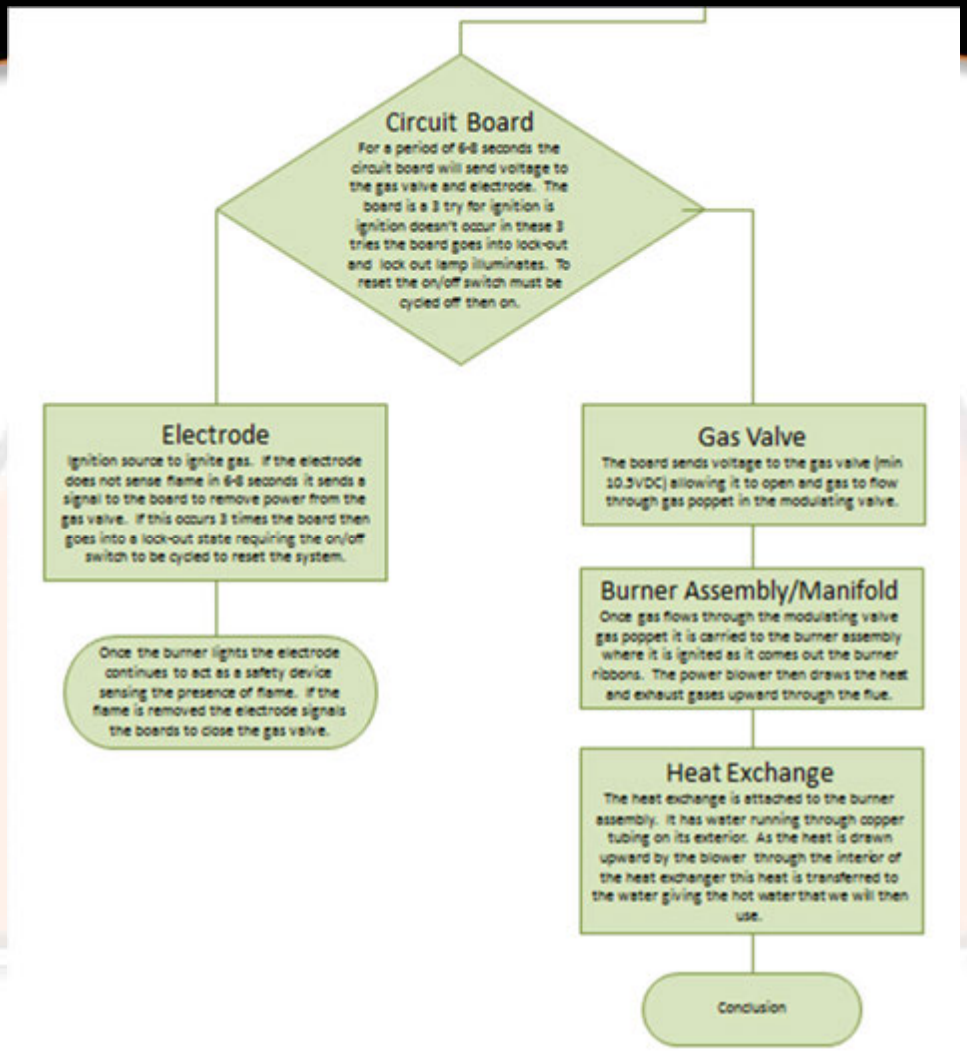
ECO

Resettable , normally closed switch designed to open when temperature exceeds 160F

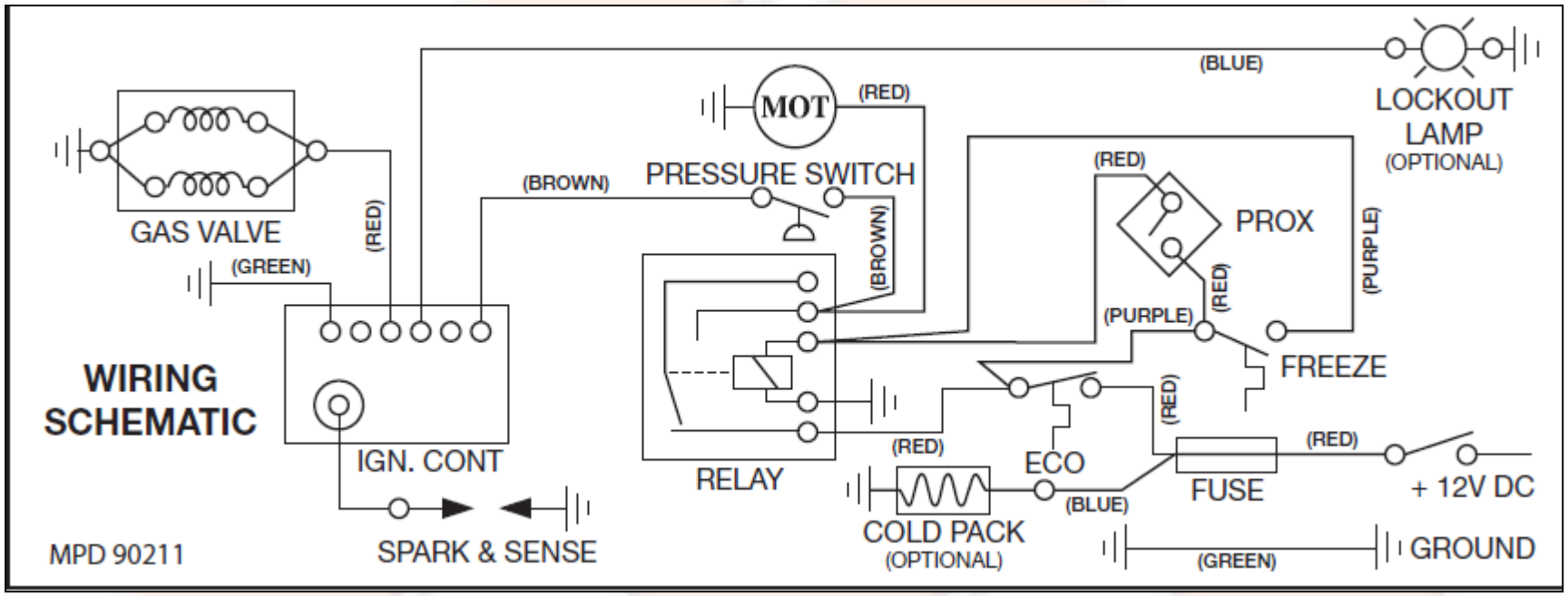
Sequence of operation



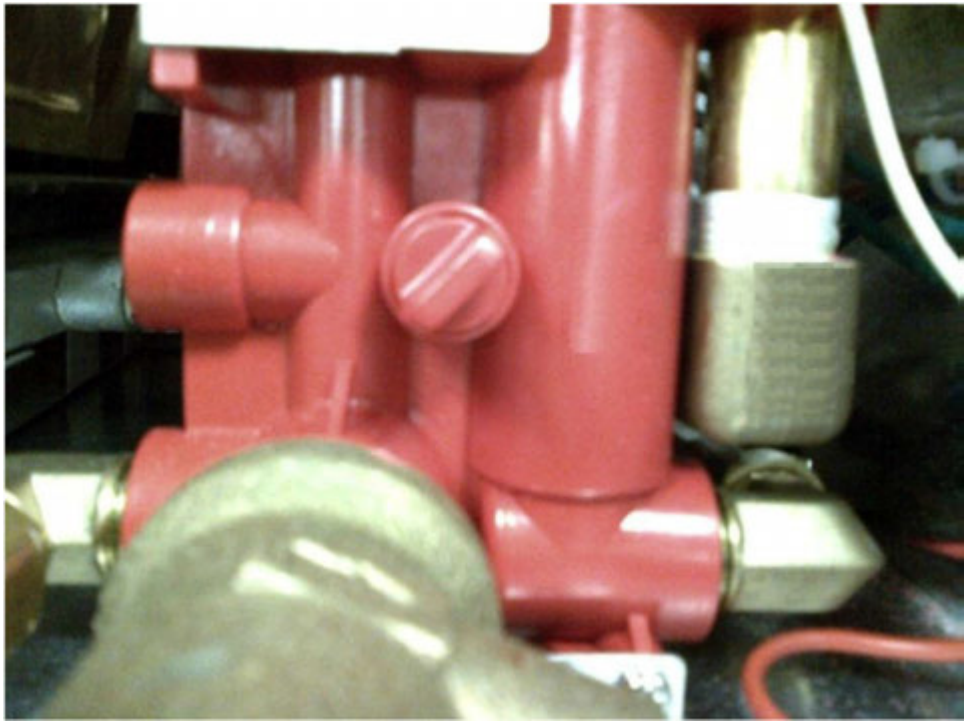
Sequence of Operations



Wiring Diagram



Modulating Valve Adjustment on the On Demand Water Heater



Modulating Valve Adjustment:
The modulating water valve will have a factory preset setting which is designed and tested for an approximate 60^0F (33^0C) rise in temperature for a hot water flow rate ranging from 1.00 GPM to 1.50 GPM as measured at the water outlet (ie. faucet or shower head). The consumer is encouraged to set the modulating valve to provide hot water in the 110^0F-115^0F (43^0C - 46^0C) range.

The consumer can then add cold water to achieve the desired hot water temperature. Care must be taken to prevent higher temperatures which may result in scalding. The factory setting will satisfy most applications, however the modulating water valve has been designed with flexibility in mind to handle a wide range of diverse situations. For hotter temperatures the modulating valve can be adjusted counter-clockwise toward the MAX position; for cooler hot water temperatures, the modulating valve can be adjusted clockwise toward the MIN position. One should use caution not to force the valve adjustment beyond the MAX and MIN points.

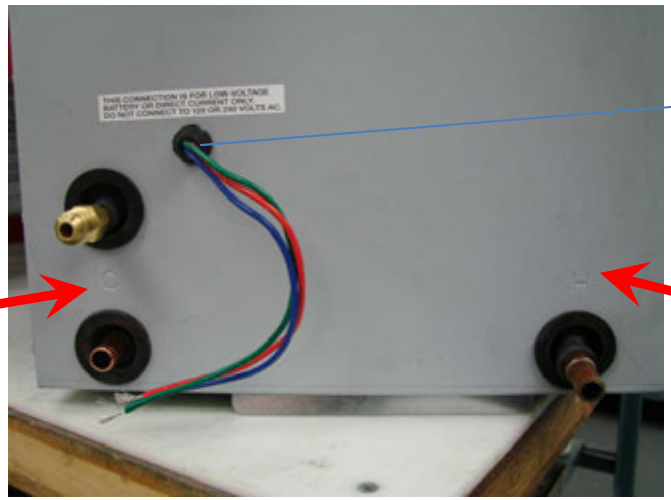
Heater doesn’t fire & blower doesn’t turn on

Step 1.

Make sure the unit is receiving power.

Step 2.

Check that the unit has been installed correctly with the flow of water coming into the pipe marked with a “C” for cold and exiting the unit on the side marked with a “H” for hot. The heater is operated with water flow and if the flow is in the wrong direction the unit will not function properly. Also verify that the unit is getting the proper amount of water flow a flow between .5 and .8 gpm is required to cycle the unit on.



These 3 wires will hook to the Wall switch (not provided)

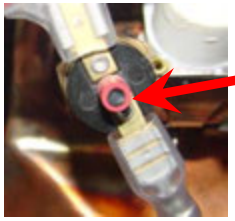
“C” for cold water outlet

“H” for hot water outlet

Heater doesn’t fire & blower doesn’t turn on
(continued)

Step 2.

Check that the ECO has not been tripped.



Press button to reset if it doesn’t reset continue to run the water the try again after a minute or so. This will cool the heat exchange tube and allow for reset.

Step 3.

Verify fuse has not been tripped.

Wire inside fuse should be unbroken. If wire is broken replace.

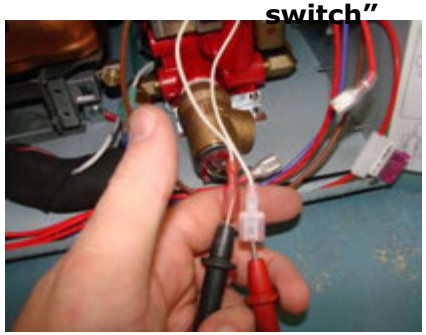
Heater doesn’t fire & blower doesn’t turn on (continued)

Step 4.

Make sure the reed switch is functioning properly by using a multimeter to check for continuity while using a magnet to close the reed switch.

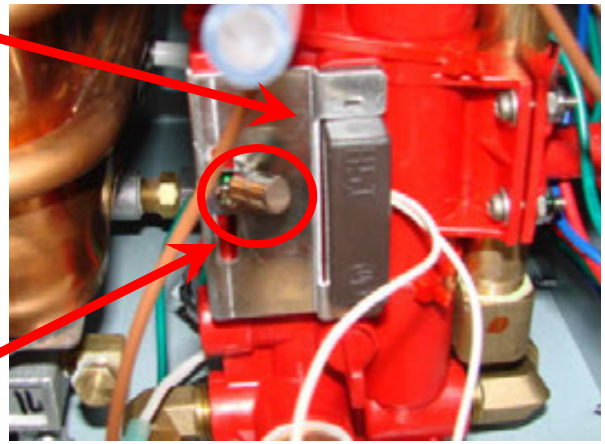
Reed switch

“proximity switch”



Multimeter leads are placed on separate reed switch leads to test for continuity.

Magnet



Place a magnet in close proximity to the reed switch then use the multimeter to ensure the switch closed. If no continuity is found then the reed switch isn’t functioning properly

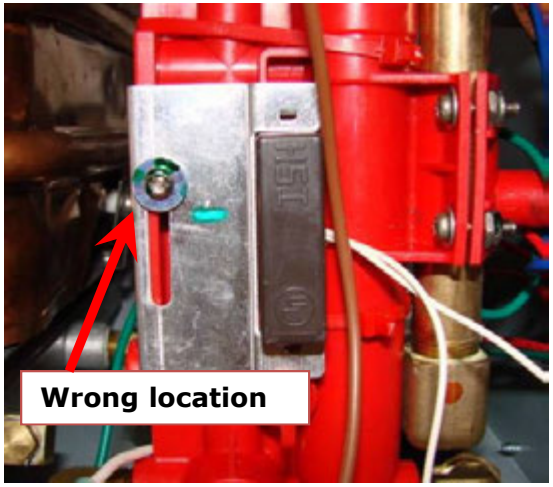
Multimeter

Set multimeter to this setting to check for continuity.

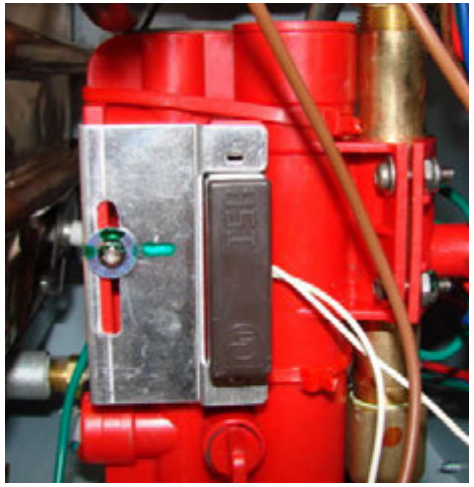
Heater doesn't fire & blower doesn't turn on
(continued)

Step 5.

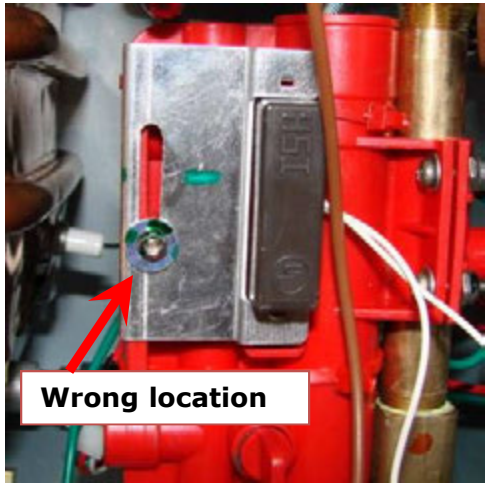
Verify that the reed switch is in the proper location. Not only can the switch be bad, but if it is located too high on the valve or too low it can prevent the switch from interacting with the magnetic field of the water poppet and cause the unit not to operate.



This example is too low notice the screw is located at the top of the slot. This location could cause problems with operation.



Proper setting for operation. Notice the screw is approximately 2/3 of the way up the slot.

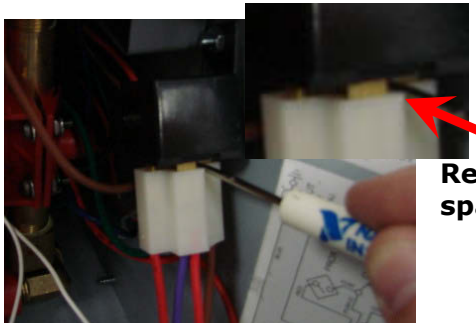


This example is too high notice the screw is located at the bottom of the slot. This location could cause the unit problems with operation.

Heater doesn't fire & blower doesn't turn on (continued)

Step 6.

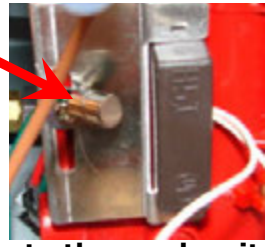
Verify that the relay if functioning properly. To do this activate the reed switch with a magnet then use a multimeter to check for voltage as described below.



Relay spades

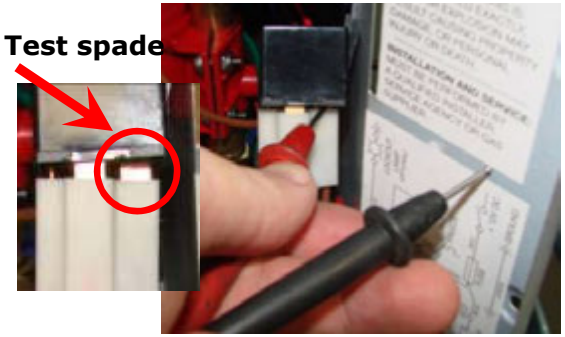
With the unit off use a small screw driver to gently expose the spades of the relay.

Magnet



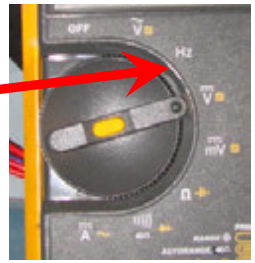
Then activate the reed switch by placing a magnet close to the switch. This should power the relay. You should hear an audible click if power is provided if not the relay isn't functioning.

Test spade



Finally test the relay using a multimeter. The red lead should be placed on the spade closest to the right wall of the unit as pictured. While the black lead can be placed against the metal casing. If the relay is working properly the meter should read near 12 volts.

Be sure meter is set as pictured for measuring DC voltage.



Multimeter

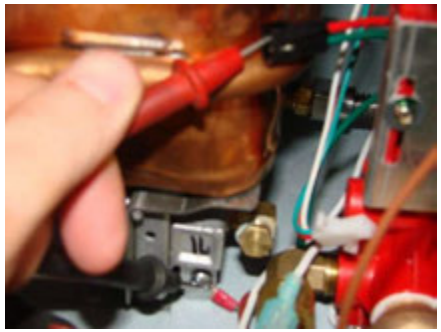
Heater doesn’t fire & blower doesn’t turn on (continued)

Step 7.

Verify that blower motor is operational. If the blower isn’t operational then the unit will not function.

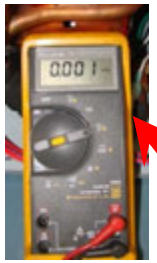
Find the wire harness connection for the blower and verify it is plugged in properly.

If the motor still doesn’t function unplug the motor and verify that the pins on the black terminal properly aligned with the holes on the white terminal



If the motor is still not working verify with a multimeter that it is receiving 12 volts. Do this by using a magnet in proximity of the reed switch to activate the unit. Then place the red lead of the meter on the pin of the black terminal that is attached to the red wire. While placing the black lead of the meter to the metal case. The multimeter should read 12 volts if it does and the motor still isn’t functioning when plugged back in the motor is faulty.

Be sure meter is set as pictured for measuring DC voltage.



Multimeter

Heater doesn’t fire & blower does turn on

Step 1.

Check to see if you smell gas from the exhaust if you do follow steps 2 through 3 . If not then follow steps 4 through 10.

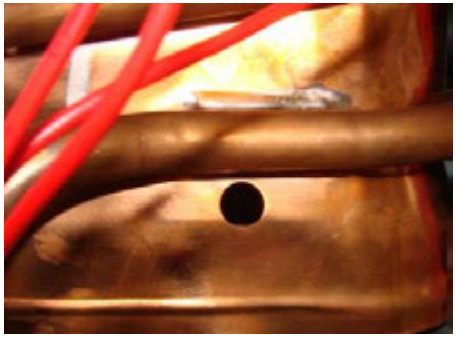
Step 2.

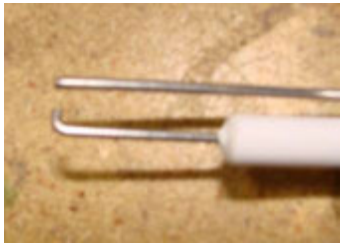
Verify that the electrode is plugged into the circuit board.

Heater doesn't fire & blower does turn on (continued)

Step 3.

Verify that the electrode is providing a strong spark. To do this make sure the gap on the electrode is properly set. Also check that the electrode is not arcing to the gas manifold in a way that would prevent ignition.

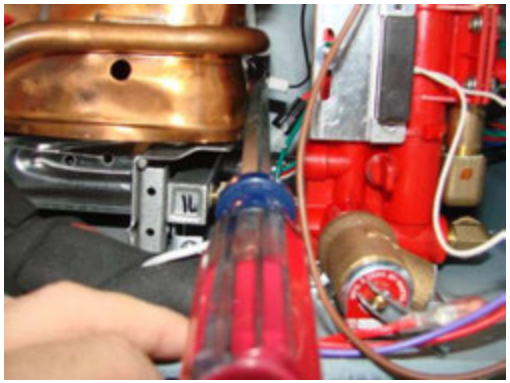




Properly gapped electrode

improperly gapped electrode

By looking through the opening in the heat exchanger pictured above. You should be able to see the spark of the electrode. The electrode should have a gap as large as the one pictured to the right. If it is closed down like the picture to the far right then the gap should be reset.



Sometimes the electrode may be arcing to the manifold preventing ignition. If this appears to be the case a screwdriver can be used to gentle reposition the electrode away from the manifold.

Heater doesn’t fire & blower does turn on (continued)

Step 4.

Since you do not smell gas from the exhaust we the problem is gas is most likely not reaching the manifold. Verify that your gas supply is turned on and the unit is receiving propane.

Gas supply is on

Gas supply is off

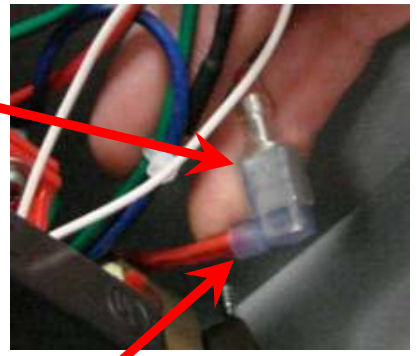
Heater doesn’t fire & blower does turn on (continued)

Step 5.

If your gas supply was on but still no gas is coming from the manifold visually check that the gas valve is correctly plugged into the wiring harness. Also while you are at this connection make sure the valve is receiving power from the ignition module. Do this by unplugging the connection and using a multimeter to verify that power is coming from the ignition module. If it is not receiving power move to step 6-10. If it is receiving power and not opening you have a faulty valve. Replace it then verify this fixed the unit.

To check for voltage while the unit is attempting to light place your red probe on the male spade of the gas valve connection. At the same time place the black probe against the case. If you are reading 12 V then the valve is receiving the proper power.

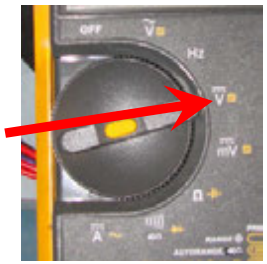
Wire harness connector



Gas valve connector

The gas valve connector is the female terminal of this connection. Be sure it is plugged in correctly.

Be sure meter is set as pictured for measuring DC voltage.



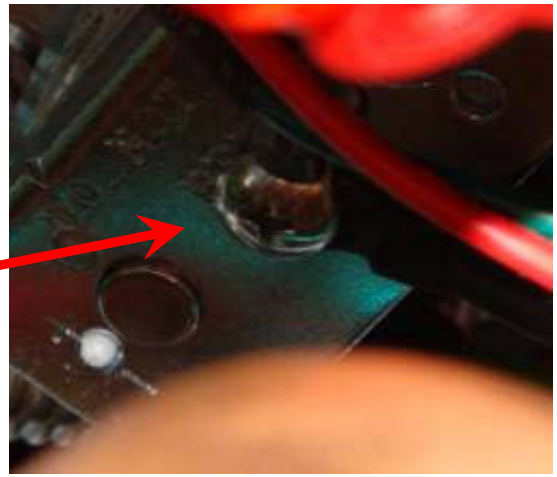
Multimeter

Heater doesn’t fire & blower does turn on (continued)

Step 6.

After checking the gas valve connection if you are still not receiving gas to the manifold check that the wire harness is properly grounded.

Connection to ground.

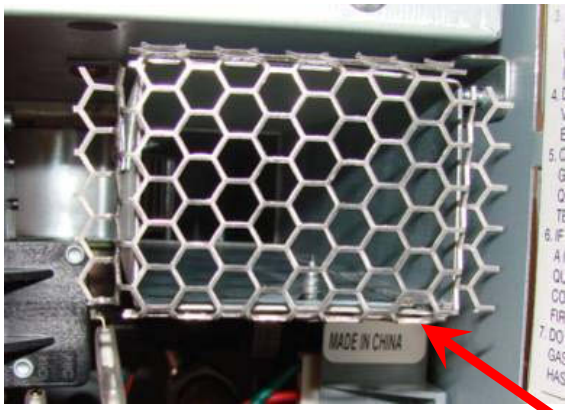


This unit has two ground connections one is below the manifold as seen in the picture to the left. The other is a ground to the valve it’s self seen in the picture on the right. Check that these connections are present and not loose.

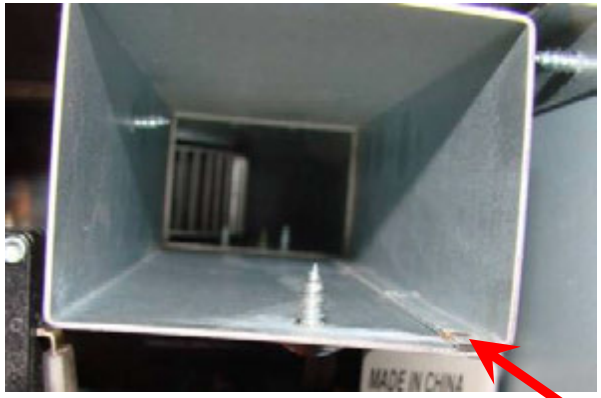
Heater doesn’t fire & blower does turn on (continued)

Step 7.

Verify that the flue is not blocked in any way. The unit is designed to not operate if the flue becomes blocked. The fan will still run, but if something is lodged in the flue this could prevent the heater from firing. So shut the unit off to prevent an accident then remove the screen and check the flue.



Remove the grate from the flue to allow an unobstructed look inside the flue.



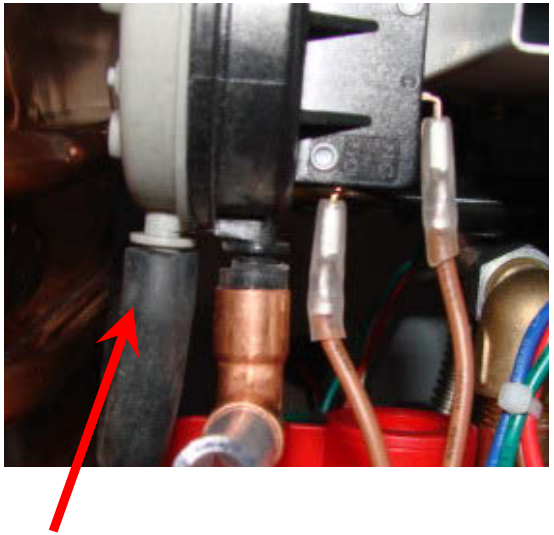
grate

Unobstructed flue.

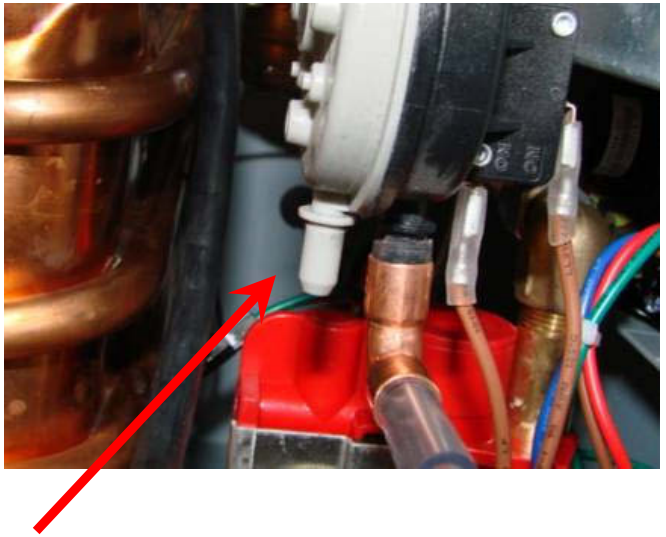
Heater doesn’t fire & blower does turn on (continued)

Step 8.

Verify the pressure switch is attached to the blower assembly. If the hose that attaches the pressure switch to the blower assembly comes free it can prevent the unit from firing. Also if the hose develops a leak due to a puncture or weathering that causes it to crack it can prevent the heater from firing. This could also have condensation in it that could freeze so squeeze that hose to see if it is possibly frozen.



This is the tube that connects the pressure switch to the blower housing. Even if this hose is securely in place still take time to look for wear or possible leaks.



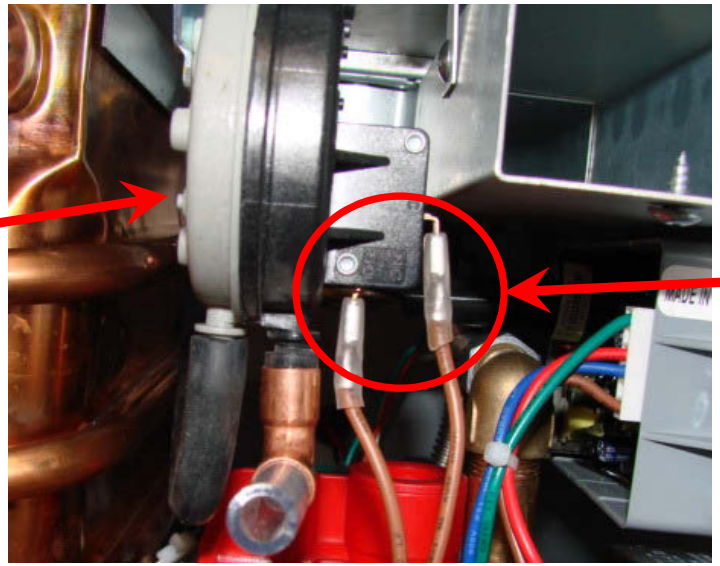
If the hose is not connected here or at the blower housing then the heater cannot close the switch and will not ignite.

Heater doesn't fire & blower does turn on (continued)

Step 9.

Next make sure that the pressure switched is wired into the circuit. The switch should have two brown wires attached one from the ignition module and one from the relay. Verify these are present and properly installed.

Pressure switch



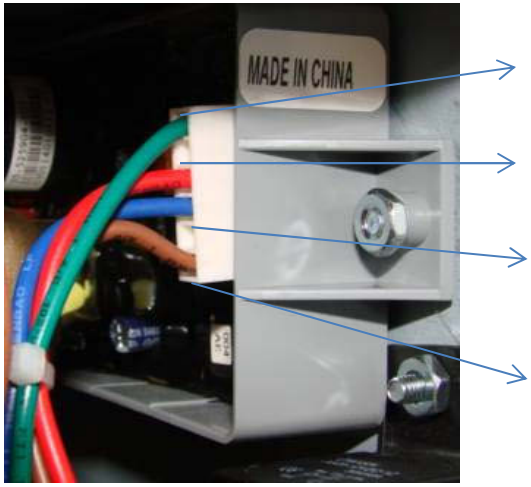
Terminal from the ignition module and relay.

This switch is a normally open contact that closes when a vacuum is created by the operation of the blower motor. This causes the switch to close allowing power to pass to the ignition module and operate the gas valve. If these terminals are not installed attached to the switch the motor would still operate, but the gas valve would not.

Heater doesn’t fire & blower does turn on (continued)

Step 10.

If the unit is not receiving power then we need to check the connection to the ignition module. Unplug the wire harness from the module and verify that none of the pins are damaged or bent. Then reattach the harness making sure that each pin goes in the appropriate slot and the connection is firmly in place. Then recheck the voltage at the terminal. If there is still no voltage replace the ignition module and check again.



ground

Power to valve

Light circuit

12 volt + in
From switch

Unit turns on immediately after being powered.

Step 1.

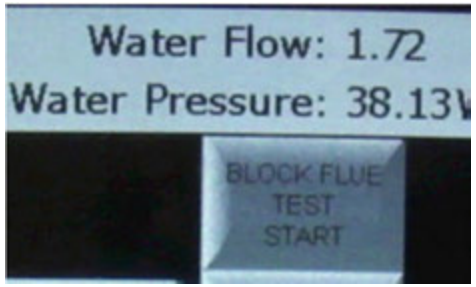
If the unit turns on immediately after being powered the first step is to unplug the wire pictured below. If after disconnecting this connection the unit shuts off you know that you have a faulty cold weather t-stat. If it doesn't shut off after disconnecting this continue through the troubleshooting steps.

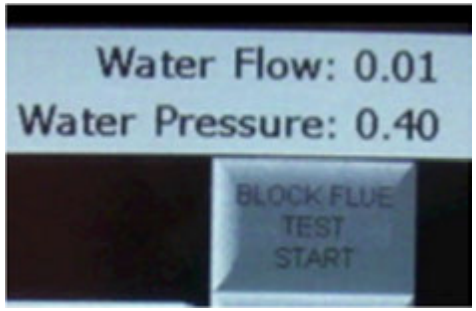
Terminal for the cold weather t-stat circuit.

Unit turns on immediately after being powered. (continued)

Step 2.

Since you eliminated the cold weather t-stat as the problem be sure to verify that you do not have water flowing through the unit.



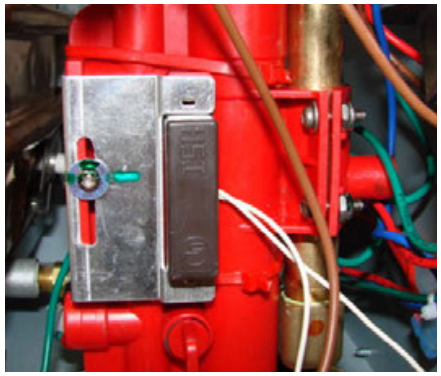


Check the water flow on the tester as pictured above make sure that water flow is below .8 gpm. If it is not shut the valve and make sure the heater turns off if it does not move forward in the trouble shooting guide.

Unit turns on immediately after being powered.
(continued)

Step 3.

If no water is flowing through the unit then you need to check your reed switch. The reed switch may have moved from its original position and be sitting lower on the valve causing the switch's contacts to close try loosing the screw on the switch and adjusting it up to a point where the unit shuts off. To do this mark the original location before moving the switch. Then loosen the set screw and slide the bracket towards the top of the valve. If moving the switch upward doesn't eventually shut off the unit then the location of the switch is not the problem. So return the switch to its original location.



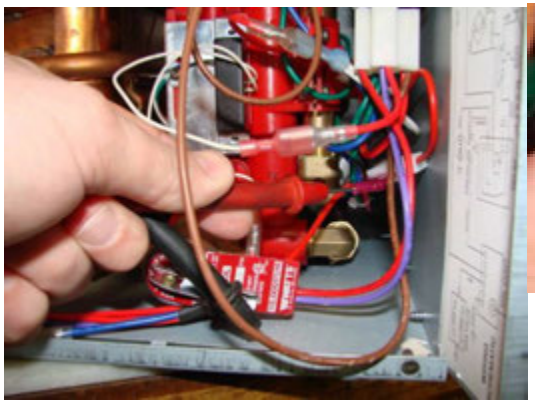
Step 4.

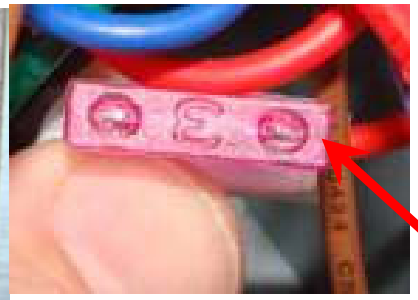
If steps 1-3 do not prevent the heater from operating without flow then the mod valve may be faulty. Change the mod valve and verify that this solves the problem

Unit is blowing the 3 amp fuse repeatedly

Step 1.

Verify that the voltage being provided to the heater is 12 VDC. Do this by using a multimeter to verify the heater is receiving the proper voltage.





Place probe tip against exposed portion of the fuse

To verify proper voltage set a multimeter to read DC voltage. Then place the red probe tip on the exposed metal at the top of the fuse and the black lead on the heater's case. The multimeter should read within two volts of 12 VDC. Make sure that when you meter the voltage on the fuse you are checking a good fuse and not one that has been blown.

Be sure meter is set as pictured for measuring DC voltage.

Multimeter

Unit is blowing the 3 amp fuse repeatedly

Step 2.

If the input voltage is correct and you are still blowing fuses then you may have a short in the wiring. Inspect the wiring harness for any breaks or cuts in the insulation. Also make sure that the heater was wired correctly.

Some factors relating to output performance are:

1. City or Park Water Service incoming pressures.
2. Incoming water temperatures

3. Obstructions or restrictions in the water system including water bypass valves in vehicles. The bypass valve in your water system should be OFF during normal use.

4. Use of flow restrictors in faucets and/or shower heads. Eliminate restrictors for best performance.

5. Propane gas system pressure should be 11”w.c. while in operation. Be sure that LP tanks have plenty of gas and are properly regulated. This should be verified by an authorized Atwood service technician.

6. The gas flow may be too low due to improper gas line diameter (under 3/8 inch outside diameter). The gas line may be excessively long (over 20-30 feet) or the on/off solenoid at the tank (if you have one) may have an orifice that is too small (under 3/16th of an inch).

Water Flow:

one of the basic components to the function of the On Demand Water Heater is the flow of the water. To verify the flow you need a gallon jug and a stop watch to time how long it takes to fill a gallon and calculate the gallons per minute (gpm). This can vary within the coach so it may be required at more than one faucet.

The heaters output performance will be best when operating between 1.0 – 1.50 gpm

The faster the water is flowing around the heat exchange the less time it has to heat and the lower the output temperature will be. The slower it travels around the heat exchange the more time it has to heat and the hotter it will be at the tap. Therefore some adjustment to water temperature can be made by adjusting the flow rate (gpm) with the use of the water valves at the faucet.

Gas pressure:

Proper gas pressure is also critical to the output performance. The operating gas pressure must be set at 11” WC with at least half of the appliances running.

The Manifold pressure can be checked by putting a manometer on the brass fitting at the Manifold when the water flow is all the way on in the coach with two hot water faucets opened up. If the water flow is between the 1.0-1.50 GPM you will see a manifold pressure of 9” WC.

Manifold pressure test point

Questions???

This manual has been provided courtesy of My RV Works, Inc.

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You can find more RV service manuals here:

www.myrvworks.com/manuals

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!

DARREN KOEPP - OWNER, MY RV WORKS, INC.

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