



RS-485 COMBO CONVERSION REPLACEMENT KIT USA (P/N 476211) AND AUSTRALIA (P/N 462049) FOR MASTERTEMP® AND MAX-E-THERM® POOL AND SPA HEATERS

INSTALLATION INSTRUCTIONS



FAILURE TO FOLLOW ALL INSTRUCTIONS AND WARNINGS CAN RESULT IN SERIOUS BODILY INJURY OR DEATH. THIS PRODUCT SHOULD BE INSTALLED AND SERVICED ONLY BY A QUALIFIED POOL SERVICE PROFESSIONAL. INSTALLERS, POOL OPERATORS AND OWNERS MUST READ THESE WARNINGS AND ALL INSTRUCTIONS IN THE HEATER INSTALLATION AND USER'S GUIDE BEFORE USING THIS PRODUCT. THESE INSTRUCTIONS MUST BE LEFT WITH THE POOL OWNER.

Pentair Water Pool and Spa heater related products are available at:
<https://www.pentair.com/en/products/pool-spa-equipment/pool-heaters.html>
Call (800) 831-7133 for additional free copies of these instructions.

IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS - SAVE THESE INSTRUCTIONS

RS-485 Combo Conversion Instructions for USA and Australian heater models

The following instructions describe how to replace the PCBA, Membrane Pad, Ignition Control Module (ICM) and Wiring Harness in a MasterTemp or Sta-Rite pool and spa heater (USA and Australia models) that doesn't have RS-485 communication capability.

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RS-485 Combo Conversion Replacement (Australia) page 6-8

RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (USA)

When installing this kit, **basic safety precautions** should always be followed. Read and follow all instructions.

Required installation tools:

- Powered socket/nut driver
- 1/4" nut driver bit
- 5/16" socket and nut driver
- 3/8" nut driver

CAUTION!: Before unplugging ICM connector plugs, be sure to match the wire identification on both the existing and replacement wire harnesses.

CAUTION! Before starting: Always disconnect AC power to the heater before proceeding with the wire harness replacement instructions.

To replace the membrane pad PCBA on a MasterTemp® Heater

To open the heater:

1. Remove left side panel from the heater (Fig. 1 and Fig. 2). Remove the four (4) wing nuts holding the top in place.



FIG. 1.
MasterTemp STD Heater



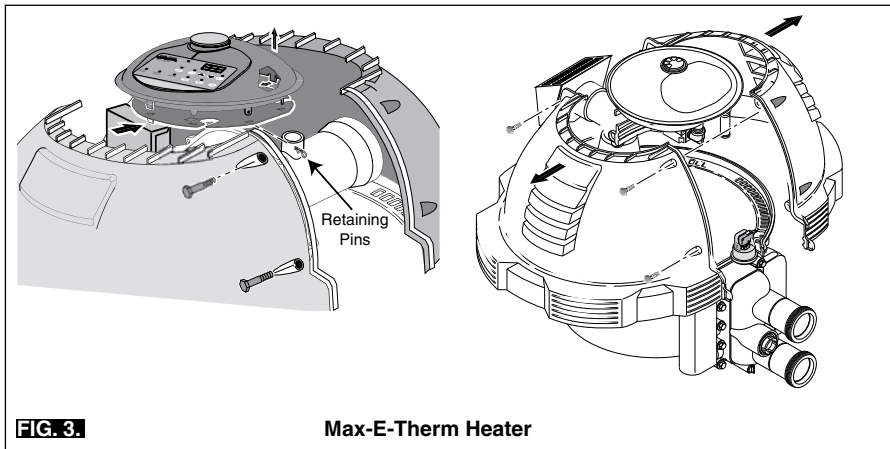
FIG. 2.
MasterTemp 125 Heater

2. Disconnect the wire harness from the back of the PCBA.
3. Disconnect the membrane pad from the PCBA.
4. Remove the four (4) screws holding the PCBA and remove the PCBA.
5. Peel the membrane pad from the top panel by pulling one of the corners. Set the panel aside.
6. Disconnect the wires from the ICM. Remove the two (2) screws that secure the ICM to the junction box.
7. Route the membrane pad connector through the top panel slot in order to connect it to the control board. Peel off the membrane pad backing off the new membrane.
8. Align the membrane pad with the bottom of the recess in the lid and press firmly into place. Smooth the membrane pad with your hand.
9. Place new PCBA into underside of cover and secure with four (4) mounting screws.
10. Reconnect the membrane pad to the PCBA (note the arrow on the membrane connector should be on the bottom)the upper jackets halves from the heater (Fig. 3).
11. Place lid assembly aside and continue with replacing the ICM and Wire Harness.

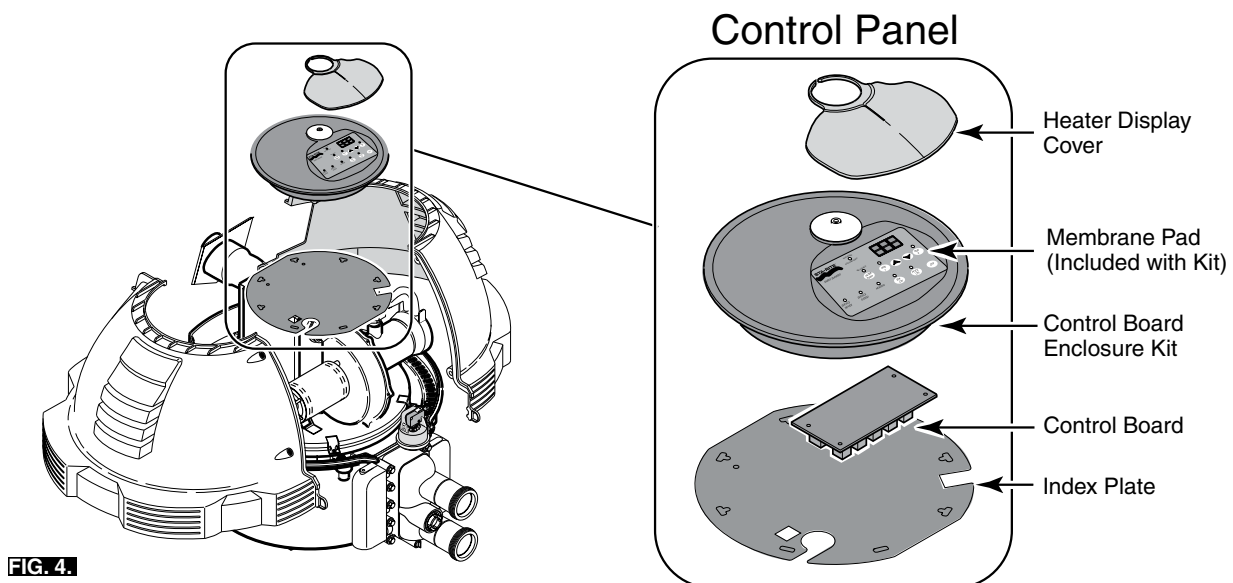
RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (USA)

To replace the membrane pad and PCBA on a Sta-Rite Max-E-Therm

1. Unbolt the four bolts and separate the jackets halves. Pull hair pin clips. (Fig. 3).
2. Press the plastic clips on the control panel assembly.
3. Lift control panel assembly off of support plate.
4. Disconnect the connectors from the control panel assembly.



5. Disconnect the wire harness from the back of the PCBA.
6. Disconnect the membrane pad from the PCBA.
7. Remove the four (4) screws holding the PCBA and remove the PCBA
8. Peel the membrane pad from the top panel by pulling one of the corners.
9. Route the membrane pad connector through the top panel slot in order to connect it to the control board. Peel off the membrane backing
10. Align the membrane pad with the bottom of the recess in the lid and press firmly into place. Smooth the membrane pad with your hand.
11. Place new PCBA into underside of cover and secure with four (4) mounting screws.
12. Reconnect the membrane pad to the PCBA (note the arrow on the membrane connector should be on the bottom)the upper jackets halves from the heater (Fig. 3).
13. Route the membrane pad connector through the top panel slot to connect to the control board. Peel of the membrane backing. Align the membrane pad properly onto the area of the top panel.
14. Set the lid assembly aside and continue replacing the ICM and wire harness replacing it with the new Control Board with RS-485 communication. Note: The PCBA is not serviceable.



RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (USA)

To replace the Ignition Control Module:

1. Disconnect all connector plugs and wires from the legacy ICM. Remove the screws from the legacy ICM. Remove ICM from the heater. (Fig. 5).
2. Install the new ICM into the heater Control Box compartment. Secure the unit with the two (2) screws.

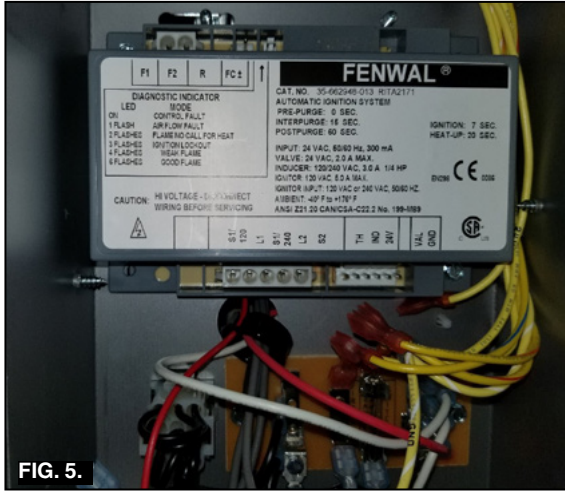


FIG. 5.

3. Bring the Flat 5-pin plug, 2-pin plug and multi-pin connector into the control box. Install the bushing in the hole. Also, bring the Flame current cable into the control box. (Fig. 7).



FIG. 7.

4. Route the Red and Green wires into the Control Box through the bottom hole. Plug the Fireman's jumper into the terminal board. Install bushing. Be sure the bushings are install when routing the wires into the Junction box. (Fig. 8). *Note: The plugs are shown in the control box and the Fireman's jumper installed.*

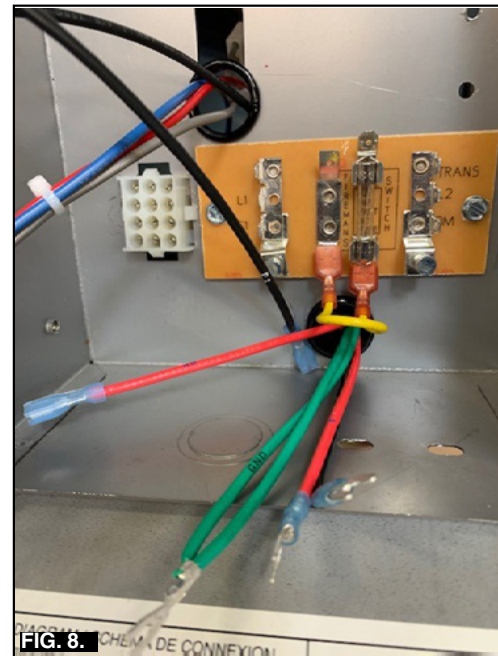


FIG. 8.

To replace the wire harness:

- **LEGACY WIRE HARNESS (USA) (P/N 42001-0104):** Disconnect all connector plugs and wires from all heater components. Remove the wire harness from the heater.
- **Install wire harness (USA) (P/N 476221):BEFORE YOU START, LAY OUT THE WIRING HARNESS.**

1. Cut one tie to release two jumpers.
2. Route the 12-pin plug in the control box from the back. The plug is shown from outside the Control Box. (Fig. 6.) *Note: Narrow key hole in the upper right corner of the plug.*

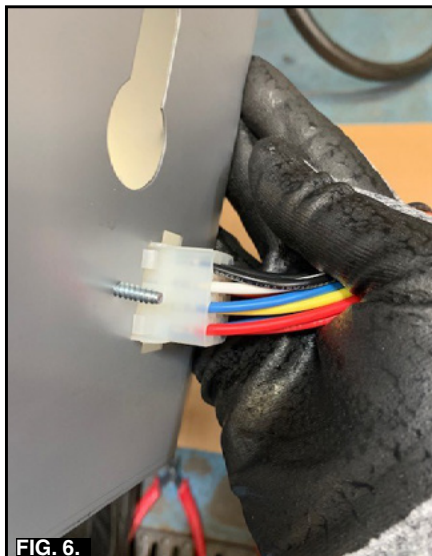
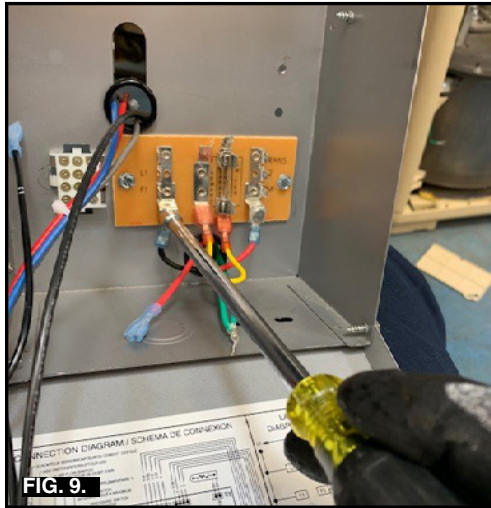


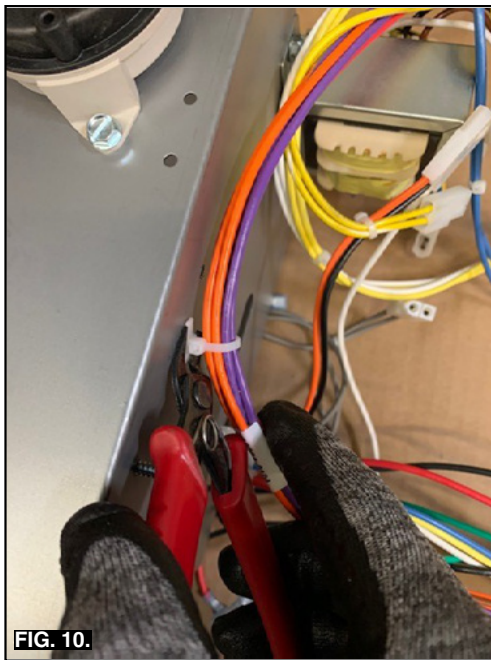
FIG. 6.

RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (USA)

5. Connect BLACK and RED wires to terminal board connections. Match wire identification with terminal marking. (Fig. 9).



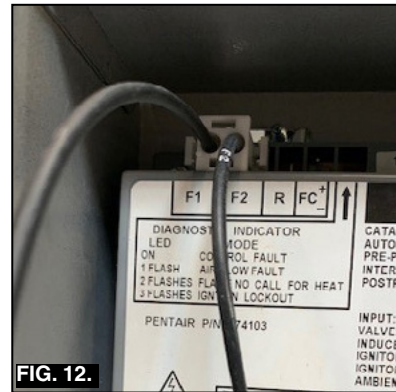
6. From outside the Control Box, push the clip through its hole in the back of the box. (Fig. 10).



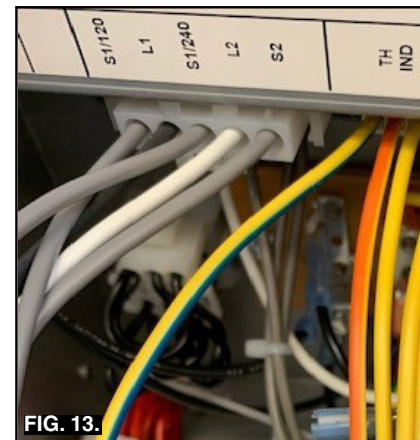
7. Install the bushing in the top of the control box. Use (Fig. 11)



8. Connect the 2-pin connector to F1 / F2 at the upper right side of the ICM. (Fig. 12)



9. Connect 5-pin connector to lower right side of the ICM and connect multi-pin connector next to 5-pin connector. (Fig. 13).



10. Mount the bundle of wires on the blower. Plug in the blower motor. (Fig. 14).



RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (USA)

11. Connect the Stack Flu sensor. (Fig. 15)

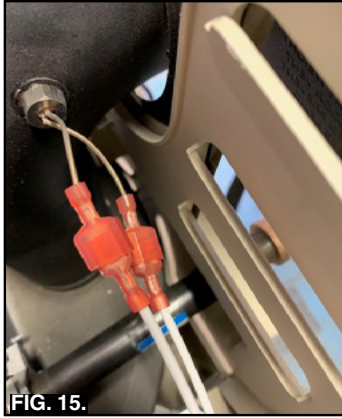


FIG. 15.

12. Connect the Gas Valve. (Fig. 16)

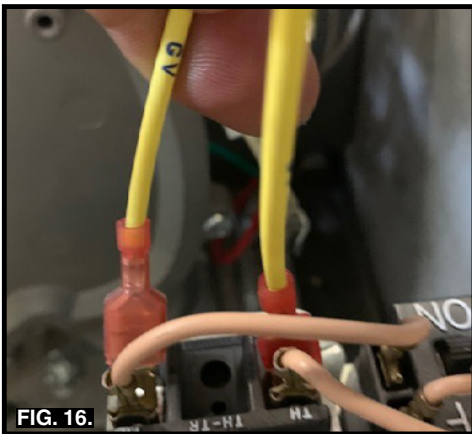


FIG. 16.

13. Connect the Air Flow Switch. (Fig. 17).



FIG. 17.

14. Connect the Blower assembly. (Fig. 18).

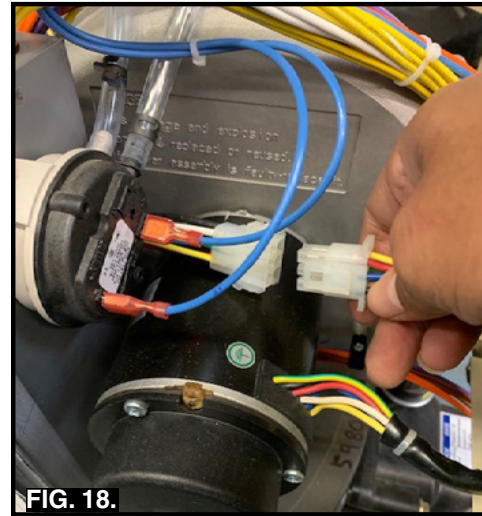


FIG. 18.

15. Plug in the Transformer. (Fig. 19).

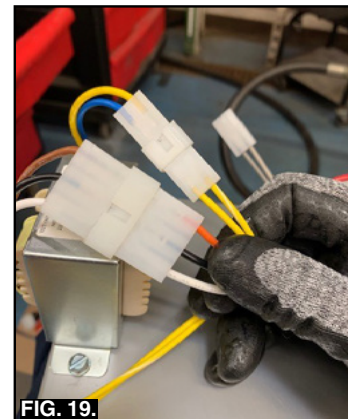


FIG. 19.

16. Route wires (HL, AGS, WP, etc) to the manifold. (Fig. 20).

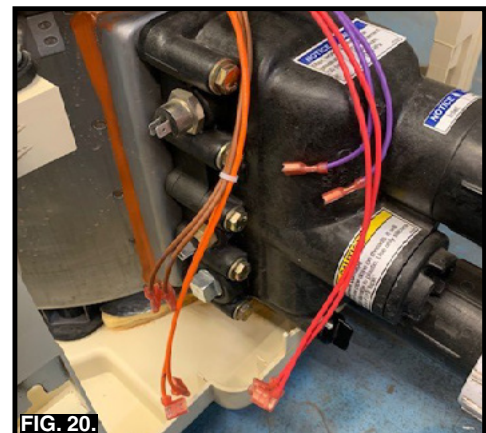


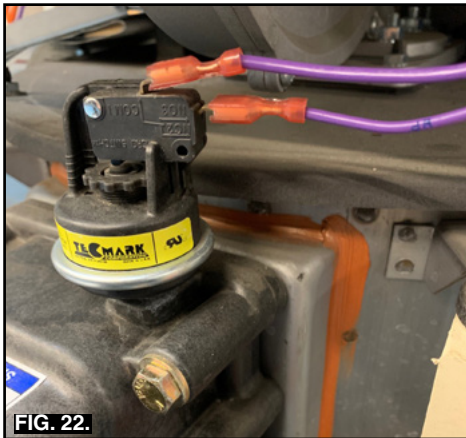
FIG. 20.

RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (USA)

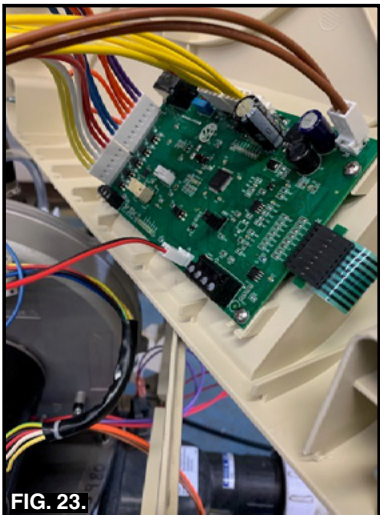
17. Connect the Thermistor sensor and High Limit Switch.
Note: The Thermistor sensor is located at the top of the manifold. The High Limit switch is located at the bottom of the manifold. (Fig. 21).



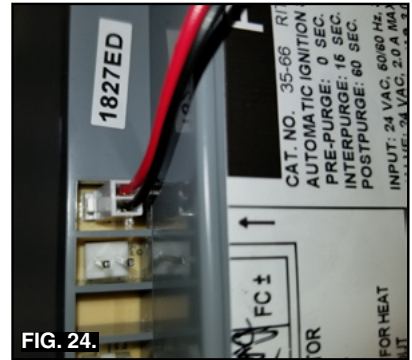
18. Connect the Water Pressure Switch and AGS switch. The AGS is located on the right side. (Fig. 22).



19. Plug the harness into the back of the circuit board. (Fig. 23).



20. Connect one end of the flame cable (Red/Black wires) to Control Board and the other end to the upper left side of the ICM. (Fig 24)



21. Reassemble the heater control panel assembly. Be sure that the control panel can be adjusted without having to lean over the exhaust vent.
22. Replace hair pin clips. See Fig. 2, 3) page 3.
23. Replace jacket halves and bolts and tighten.

RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (AUSTRALIA)

When installing this kit, **basic safety precautions** should always be followed. Read and follow all instructions.

Required installation tools:

- Powered socket/nut driver
- 1/4" nut driver bit
- 5/16" socket and nut driver
- 3/8" nut driver

CAUTION! Before unplugging ICM connector plugs, be sure to match the wire identification on both the existing and replacement wire harnesses.

CAUTION! Before starting: Always disconnect AC power to the heater before proceeding with the wire harness replacement instructions.

To replace the membrane pad PCBA on a MasterTemp® Heater

1. **MasterTemp Heater:** Remove left side panel from the heater (Fig. 1 and Fig. 2).



FIG. 1.
MasterTemp STD Heater



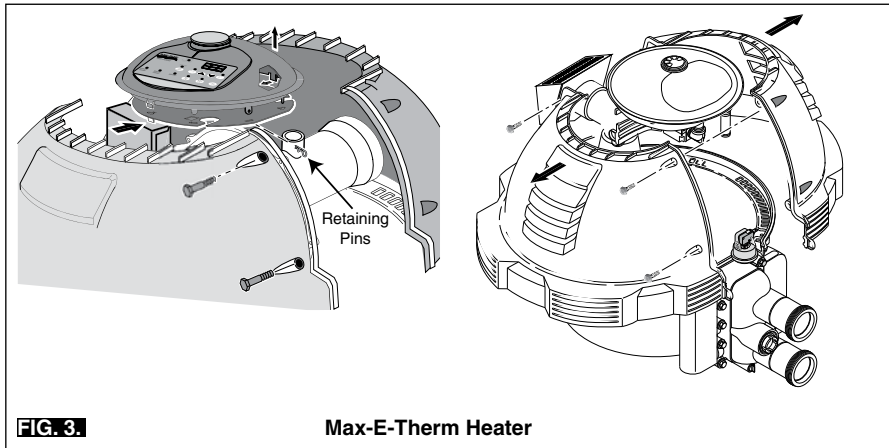
FIG. 2.
MasterTemp 125 Heater

2. Disconnect the wire harness from the back of the PCBA.
3. Disconnect the membrane pad from the PCBA.
4. Remove the four (4) screws holding the PCBA and remove the PCBA.
5. Peel the membrane pad from the top panel by pulling one of the corners. Set the panel aside.
6. Disconnect the wires from the ICM. Remove the two (2) screws that secure the ICM to the junction box.
7. Route the membrane pad connector through the top panel slot in order to connect it to the control board. Peel off the membrane pad backing
8. Align the membrane pad with the bottom of the recess in the lid and press firmly into place. Smooth the membrane pad with your hand.
9. Place new PCBA into underside of cover and secure with four (4) mounting screws.
10. Reconnect the membrane pad to the PCBA (note the arrow on the membrane connector should be on the bottom)the upper jackets halves from the heater (Fig. 3).
11. Place lid assembly aside and continue with replacing the ICM and Wire Harness.

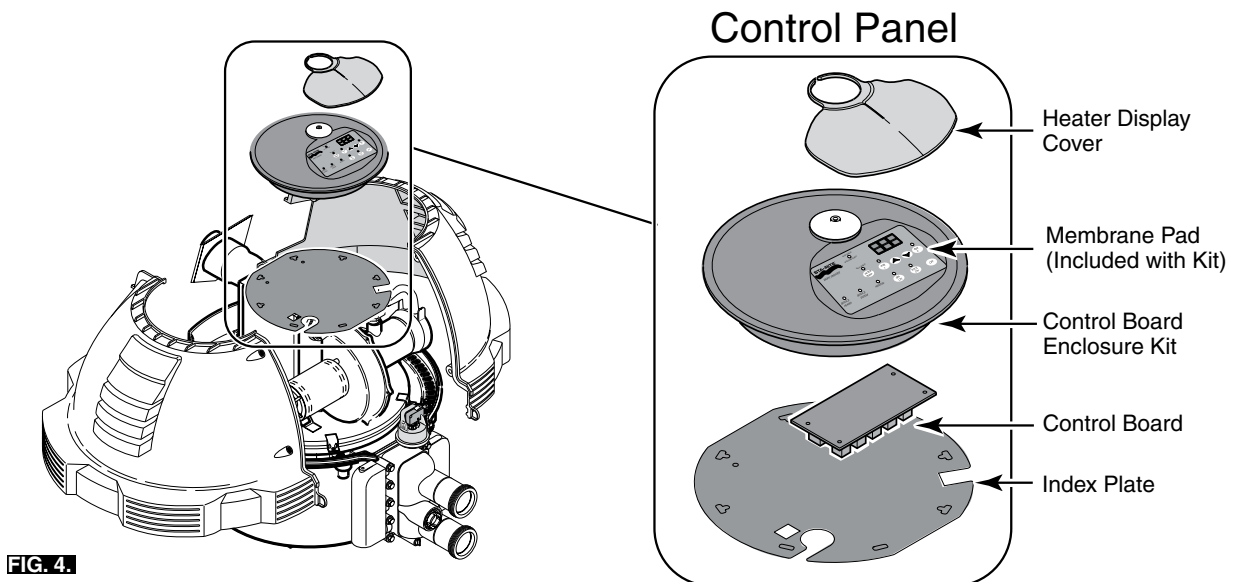
RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (AUSTRALIA)

To replace the membrane pad and PCBA on a Sta-Rite Max-E-Therm

1. Unbolt the four bolts and separate the jackets halves. Pull hair pin clips. (Fig. 3).
2. Press the plastic clips on the control panel assembly.
3. Lift control panel assembly off of support plate.
4. Disconnect the connectors from the control panel assembly.



5. Disconnect the wire harness from the back of the PCBA.
6. Disconnect the membrane pad from the PCBA.
7. Remove the four (4) screws holding the PCBA and remove the PCBA
8. Peel the membrane pad from the top panel by pulling one of the corners.
9. Route the membrane pad connector through the top panel slot in order to connect it to the control board. Peel off the membrane backing
10. Align the membrane pad with the bottom of the recess in the lid and press firmly into place. Smooth the membrane pad with your hand.
11. Place new PCBA into underside of cover and secure with four (4) mounting screws.
12. Reconnect the membrane pad to the PCBA (note the arrow on the membrane connector should be on the bottom)the upper jackets halves from the heater (Fig. 3).
13. Route the membrane pad connector through the top panel slot to connect to the control board. Peel of the membrane backing. Align the membrane pad properly onto the area of the top panel.
14. Set the lid assembly aside and continue replacing the ICM and wire harness replacing it with the new Control Board with RS-485 communication. Note: The PCBA is not serviceable.



RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (AUSTRALIA)

To replace the wire harness on a MasterTemp® or Max-E-Therm® Heater:

To replace the Ignition Control Module:

1. Disconnect all connector plugs and wires from the legacy ICM. Remove the screws from the legacy ICM. Remove ICM from the heater. (Fig 5.)
2. Install the ICM onto the heater junction box compartment. Secure the unit with the two (2) screws.
3. Reconnect the membrane pad to the PCBA. Note the arrow on the membrane connector should be on the bottom.

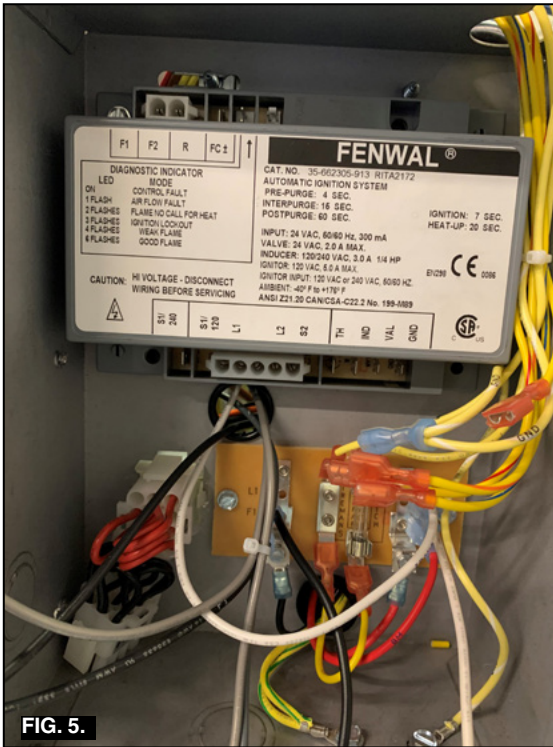


FIG. 5.

To replace the wire harness:

- **LEGACY WIRE HARNESS (USA) (P/N 474163):** Disconnect all connector plugs and wires from all heater components. Remove the wire harness from the heater.
 - **Install wire harness (USA) (P/N 476222):** BEFORE YOU START, LAY OUT THE WIRING HARNESS.
1. Cut one tie to release two jumpers.

2. Place the 12-pin plug in the control box from the back. The plug is shown from the inside the control box. Note: narrow key in upper right corner of plug. (Fig. 6.)

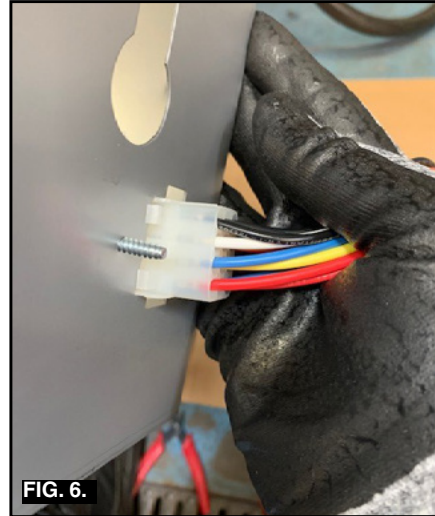


FIG. 6.

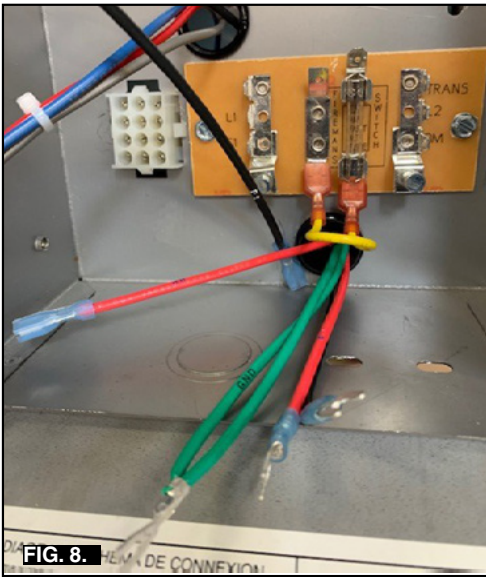
3. Bring the Flat 5-pin plug, 2-pin plug into the control box. Install the bushing. If heater has new Control Board bring flame current cable as well. (Fig. 7.)



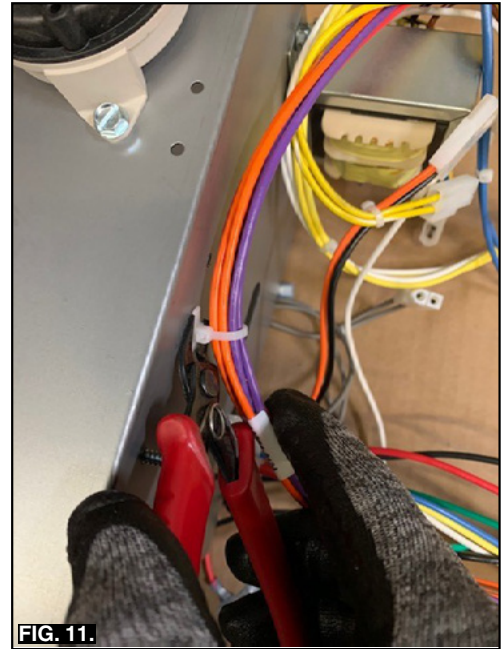
FIG. 7.

RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (AUSTRALIA)

4. Route the Red and Green wires into the Control Box through the bottom hole. Plug the Fireman's jumper into the terminal board. Install bushing. Be sure the bushings are install when routing the wires into the Junction box. (Fig. 8). *Note: The plugs are shown in the control box and the Fireman's jumper installed.*



7. From outside the Control Box, push the clip through its hole in the back of the box. (Fig. 11).



5. Install the bushing in the top of the control box. (Fig. 9)



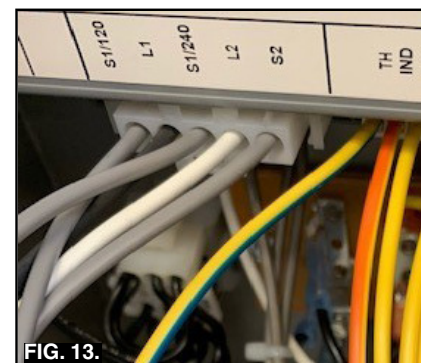
8. Connect the 2-pin connector to F1 / F2 at the upper right side of the ICM. (Fig. 12)



6. Connect wires to terminal board connections. Match wire identification with terminal marking. (Fig. 10)



9. Connect 5-pin connector to lower left side of the ICM. (Fig. 13).



RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (AUSTRALIA)

10. Connect S1/240, located on the left side of the 5-pin connector. (Fig. 14).

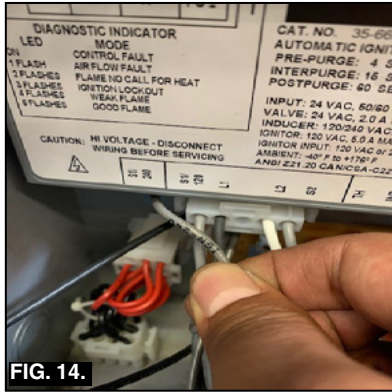


FIG. 14.

14. Connect the Orange/Yellow wire to IND ¼" tab at ICM. (Fig. 18)

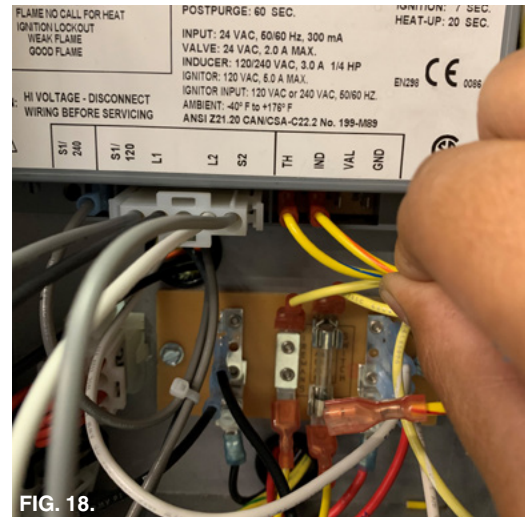


FIG. 18.

11. Plug in the transformer. (Fig. 15).

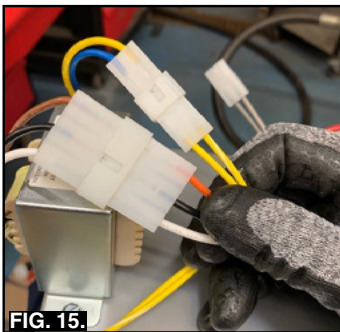


FIG. 15.

15. Connect the Red/yellow wire to VAL ¼" tab at the ICM, (Fig. 19)

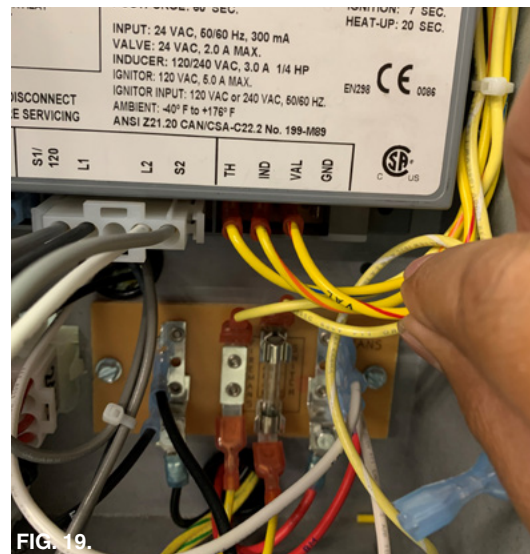


FIG. 19.

12. Connect the Air Flow sensor. (Fig. 16).



FIG. 16.

16. Connect the White/Yellow wire to GND ¼" tab at the ICM. (Fig. 20)

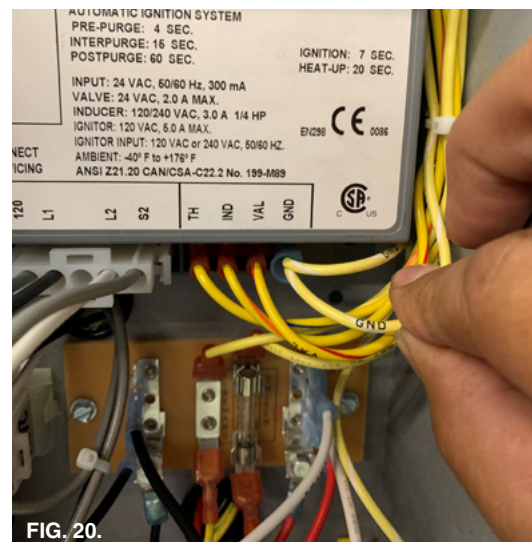


FIG. 20.

13. Connect the Blue/Yellow wire to TH ¼" tab at ICM. (Fig. 17)

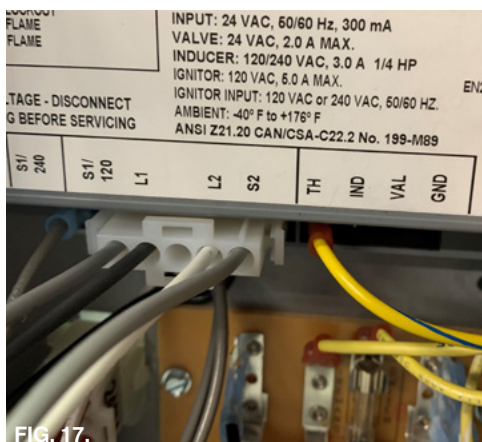


FIG. 17.

RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (AUSTRALIA)

17. Connect the 24 VAC plug at the upper right side as shown in Fig. 21.

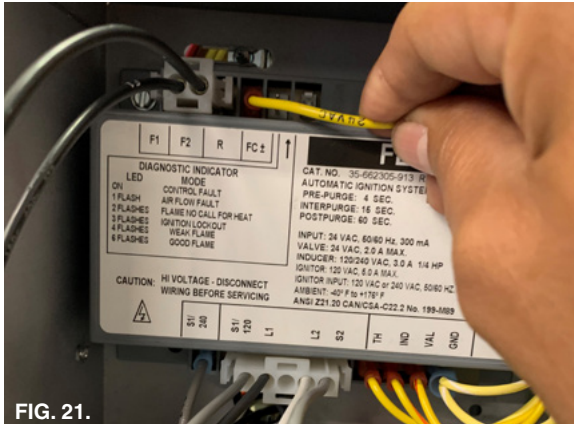


FIG. 21.

18. Connect the Blower assembly.(Fig. 22).

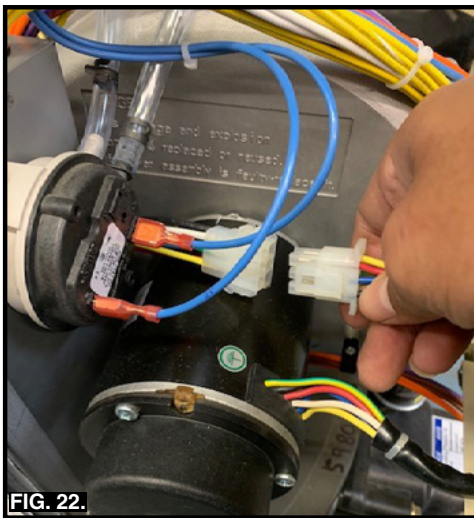


FIG. 22.

19. Route wires (HL, AGS, WP, etc) to the manifold. (Fig. 23).

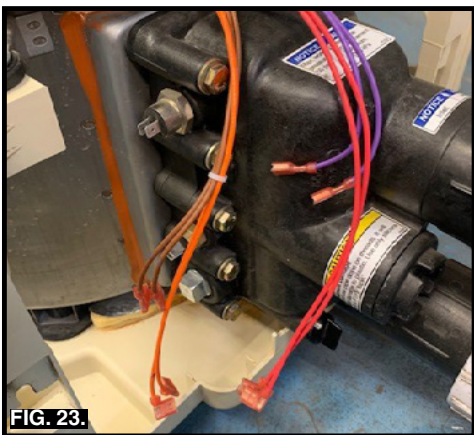


FIG. 23.

20. Connect the Thermistor sensor and High Limit Switch. *Note: The Thermistor sensor is located at the top of the manifold. The High Limit switch is located at the bottom of the manifold. (Fig. 24).*



FIG. 24.

21. Connect the Flu Sensor. (Fig. 25).



FIG. 25.

22. Connect the Gas Valve. (Fig. 26).

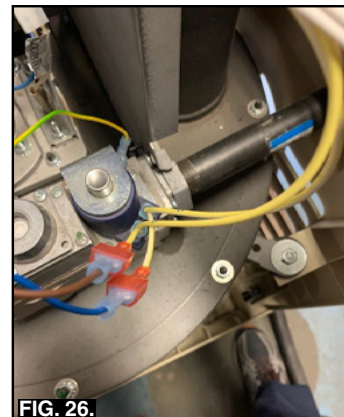
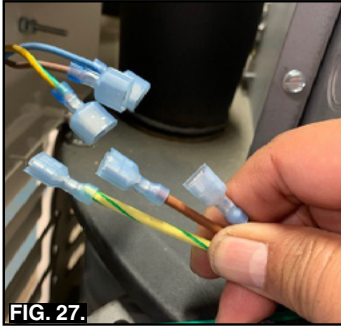


FIG. 26.

RS-485 COMBO CONVERSION REPLACEMENT INSTRUCTIONS (AUSTRALIA)

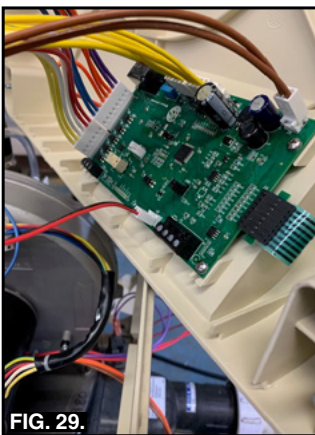
23. Connect the cables that supply power to the heater. (Fig. 27).



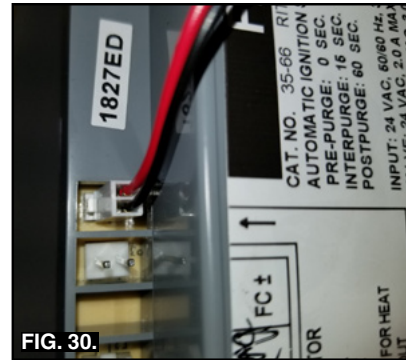
24. Connect the Water Pressure Switch and AGS switch. The AGS is located on the right side. (Fig. 28).



25. Plug the harness into the back of the circuit board. (Fig. 29).



26. Connect one end of the flame cable (Red/Black wires) to Control Board and the other end to the upper left side of the ICM. (Fig 30).



27. Reassemble the heater control panel assembly. Be sure that the control panel can be adjusted without having to lean over the exhaust vent.
28. Replace hair pin clips. See Fig. 2, 3) page 3.
29. Replace jacket halves and bolts and tighten.



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