EasyStart 364 (ASY-364-X20-IP) Installation Instructions for the Coleman™ / Airxcel™ Air Conditioners

using Installation Kit KIT-364-RT2

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Introduction

Coleman™ or Airxcel™ Air conditioners are used throughout the RV industry for many years. EasyStart is a great companion to achieve low current starts on these units.

The information contained in this manual can be used to install EasyStart on most Coleman™ brand air conditioning units. Similar models are grouped together as the installation is very comparable for these units.

Safety first

Follow standard electrical safety guidelines for your locality when working with your air conditioner. If you are uncomfortable working on your air conditioner, please seek professional help from RV dealers, electricians or HVAC service installers to complete the installation of this product.

An air conditioner is a high voltage AC device that can cause an electric shock. The voltage inside can cause severe injury or death if improperly handled. Always be sure power is removed from the entire RV or boat before working on the air conditioner.

Many air conditioners are installed on the top of RV's where there is a significant risk of falling. Be sure to mitigate that risk where ever possible and use safety equipment and assistance where required.

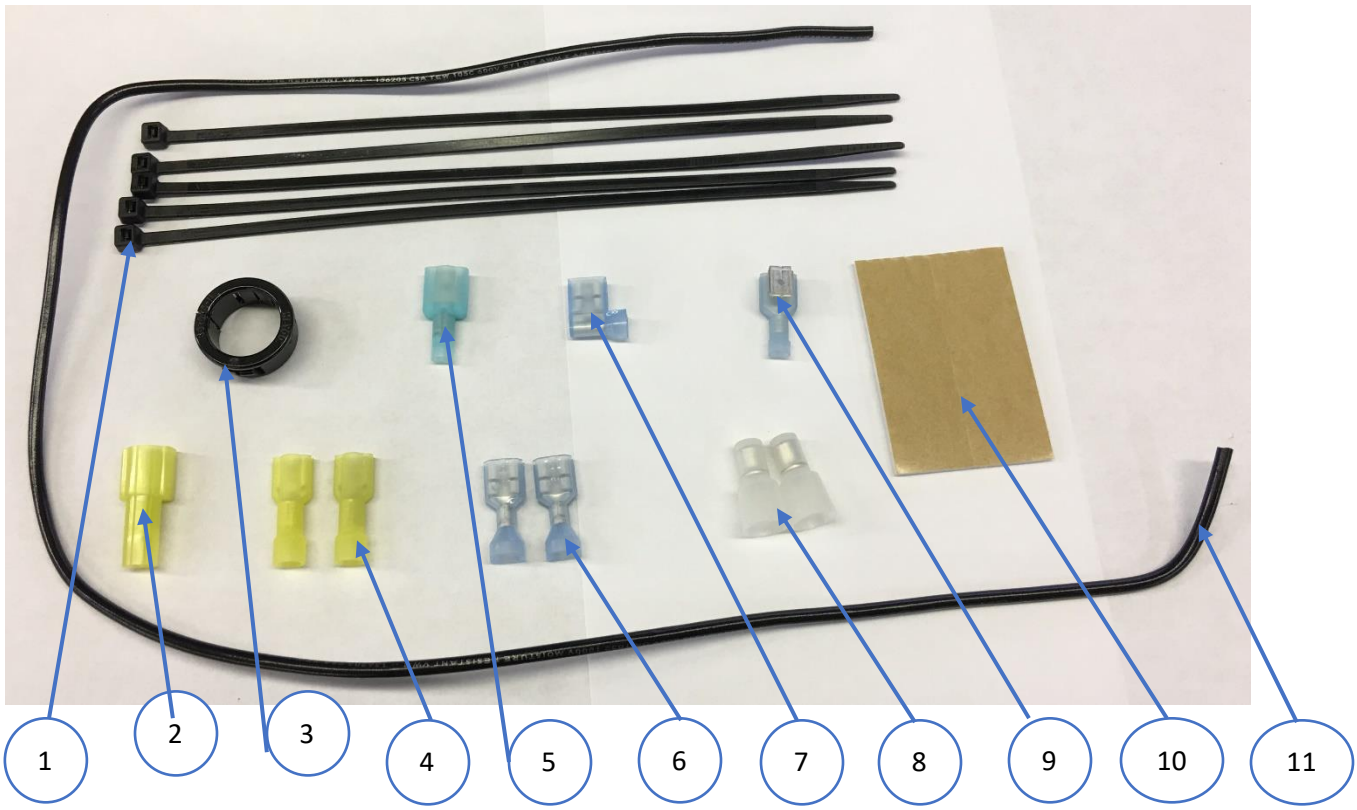
Making a good crimp

Good crimps are essential for a long-lasting, reliable installation. There are many informative guides, videos and tool recommendations on the internet. Please consult this excellent reference if you are unfamiliar with crimping connectors or need to purchase a tool.

Moderately tug on the crimp joint after making your crimp to be sure the joint was properly made. If the wire pulls out, the joint was not done correctly and must be redone. It is better to test every joint during the install than to find out on a hot day that the crimp failed!

Installation kit for Coleman Mach (KIT-364-RT2)

Note some of the items in this kit are meant for use in other A/C systems as well, and will therefore not be used in this described installation



1. (5) Zip ties
2. (1) Male yellow quick disconnect
3. (1) Snap bushing (Used in Dometic Penguin II only)
4. (2) Female yellow quick disconnect
5. (1) Male blue quick connect
6. (2) Female blue quick connect
7. (1) Female angled quick connect
8. (2) End splice connector
9. (1) Piggyback connector
10. (1) Double sided foam tape
11. (1) Two feet (61cm) 14AWG wire.

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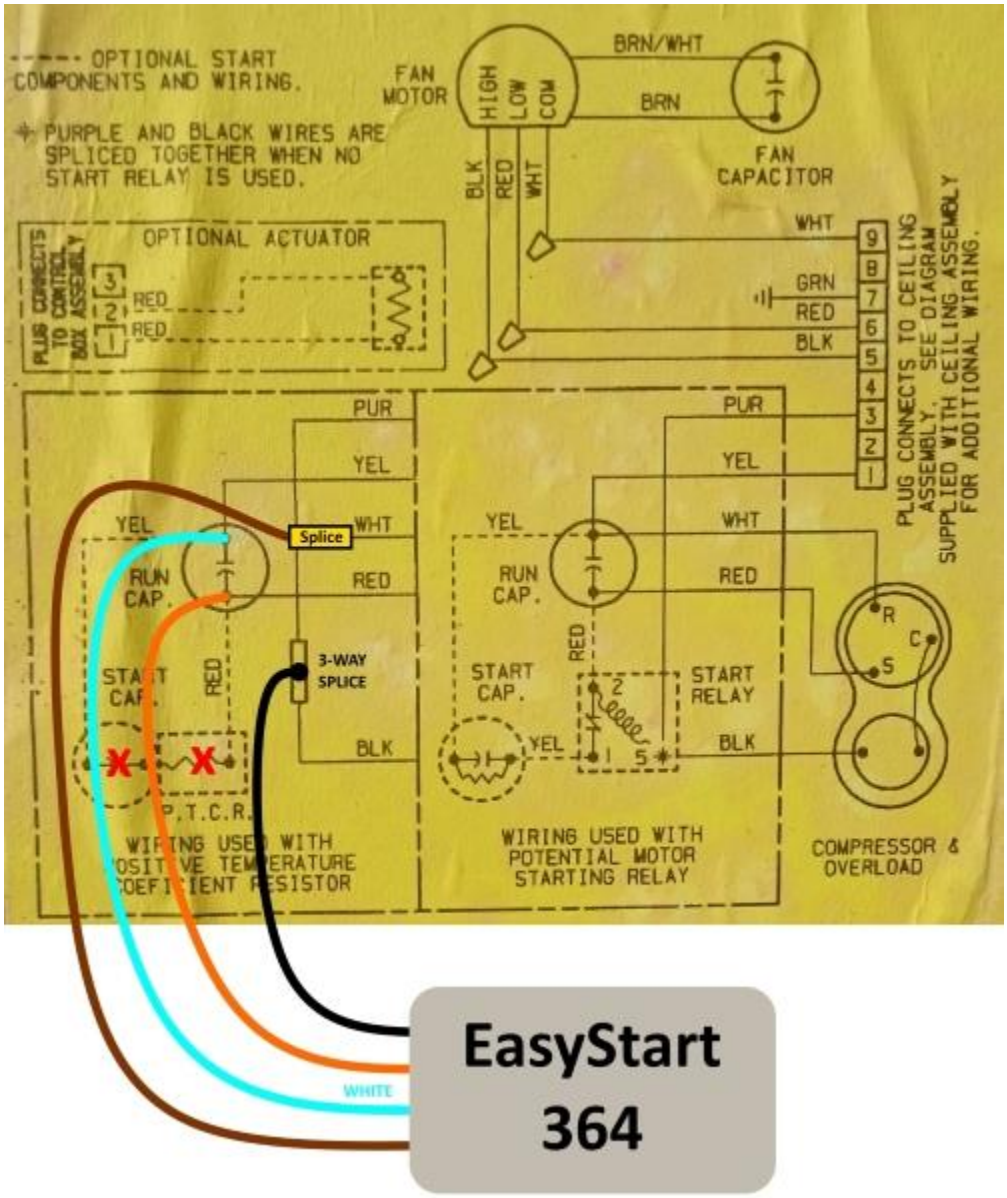
Mach 1, 3, 3+, 10, 15 high profile models

Wiring diagram



A Coleman AC may be factory configured four different ways as shown in the factory diagram above. The dash outlined block on the left where EasyStart is connected shows a PTCR and start capacitor. The right dashed block shows a start relay configuration. The dashed components inside each block show that those components may not be installed in either configuration. There may be 2 or 3 capacitors inside of the electric box.

EasyStart installs the same way regardless of the configuration used in your air conditioner. Follow the instructions in this manual to correctly install EasyStart.

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Mounting locations

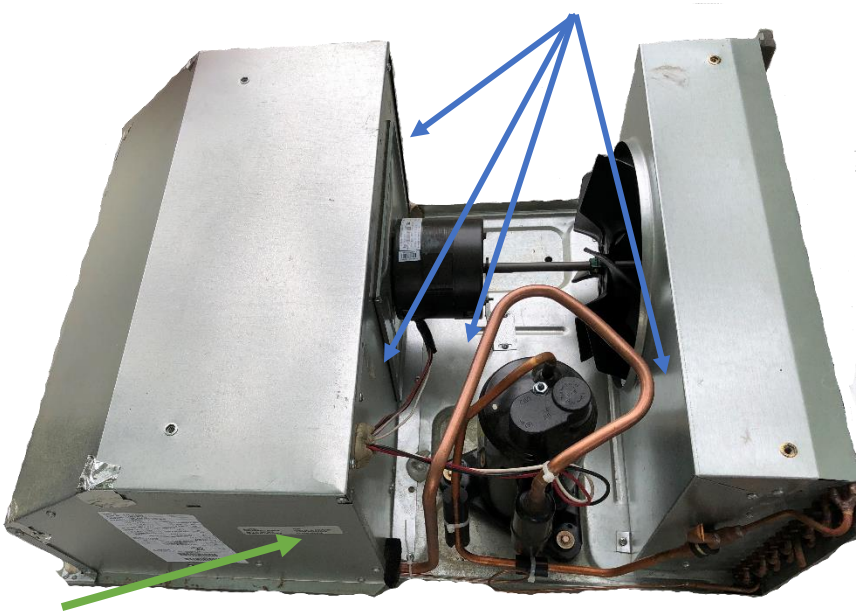

Figure 1

The blue arrows in Figure 1 above show possible mounting locations. This can vary depending on how the tubing is run in this part of the air conditioner. Use the double-sided tape included in the optional installation kit to secure EasyStart to the Air Conditioner. The wire exit should be pointing down or the box should be mounted parallel to the bottom of the cabinet.

Clean and dry the selected mounting area. Use double sided foam tape to secure the enclosure to the air conditioner in one of the identified areas.

The green arrow in Figure 1 shows the location or the door for the electric box. Remove the screws to gain access to the inside of the box.

Routing the wire

The electrical box wire entry is sealed with a putty as shown in Figure 2. Pull back the putty and push through the EasyStart wiring harness. Replace the putty by pressing it around all the wires. Leave the black sleeve around the wires intact where they enter the electrical box. Neatly secure the wires using wire ties.

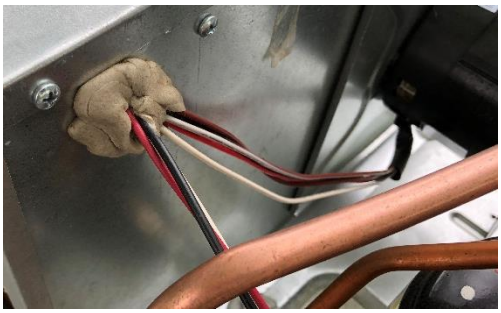

Figure 2

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Identifying the wires

The blue arrow to the left points to the top of the compressor. Three wires exit this cap colored BLACK, WHITE, and RED shown entering the electric box by the green arrow.

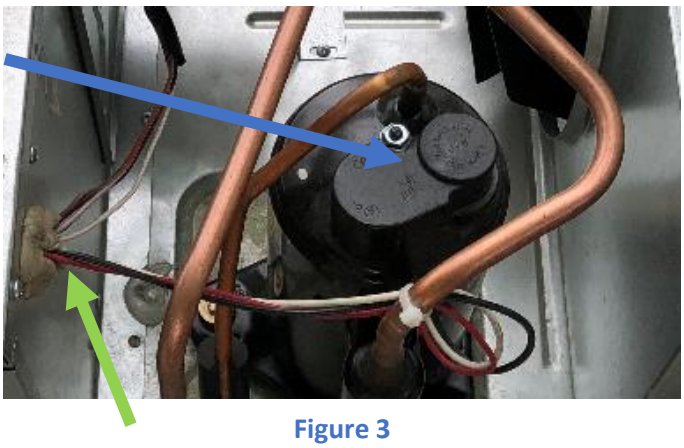

Figure 3

Making the connections

Use only end splice or jacketed spade connectors for connecting one wire to another. Wire nuts can come off in this high vibration environment and automotive connectors are not rated for line voltage.

Brown wire

Follow the white wire from the compressor into the electric box to the top of the run capacitor as indicated by the green arrow in figure 4. Disconnect the white wire and cut off the connector on the end. Strip about ½ inch (1.27cm) of insulation from the white wire and from the BROWN wire from EasyStart. Twist both wires together and crimp them with and end splice connector as shown in figure 5.

Figure 5

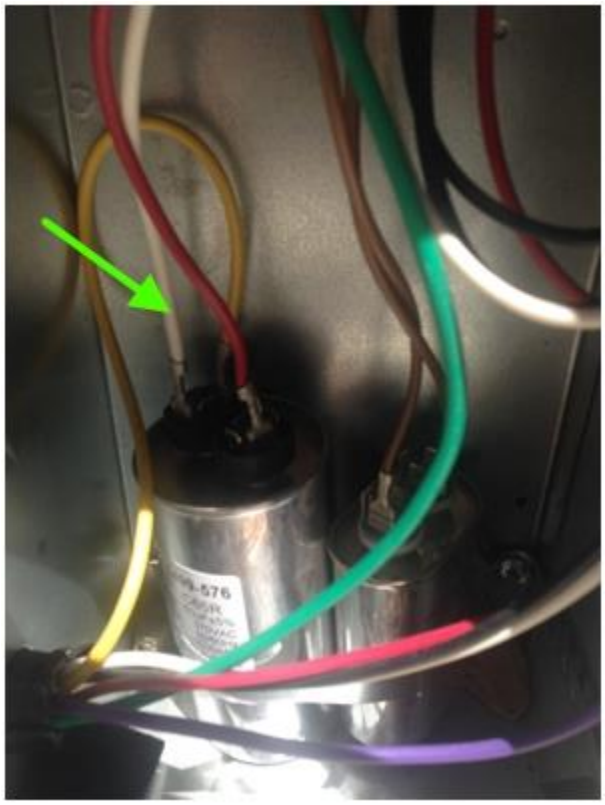

Figure 4

Note: *Some installations will have multiple wires on the terminal group along with the white and yellow wires shown in figure 4. Be sure to follow the white wire from the compressor completely back to the capacitor to be sure you have the correct wire.*

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White wire

Place a yellow female quick-connect terminal on the WHITE wire from EasyStart and crimp tightly. Connect the WHITE wire from EasyStart to the run capacitor on the same terminal group as the yellow wire indicated by the yellow arrow in figure 6.

Figure 6

Orange wire

Place a blue female quick-connect terminal on the ORANGE wire from EasyStart and crimp it tightly. Connect the ORANGE wire to the red wire terminal group on run capacitor shown by the orange arrow in figure 7. Be sure the crimped plastic ends completely cover the bare wire. It is not necessary or recommended to rely on electrical tape on the connections as shown in figure 7.

Figure 7

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Black wire

Follow the black wire from the compressor into the electrical box to where is connects to the purple wire pointed to by the orange arrow in figure 8. There is an end splice connector located at the junction of these two wires. Cut off this end splice connector. Strip about ½ inch (1.27cm) of insulation from both the black and purple wires. Strip ½ inch (1.27cm) from the BLACK wire from EasyStart and twist the three wires together. Securely crimp the three wires together using a new end splice as shown in figure 9.

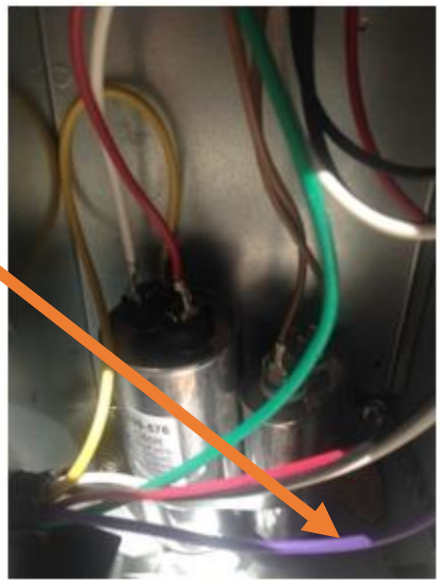

Figure 8

Figure 9

NOTE: *Some air conditioners have a freeze switch similar to figure 9A. The black wire from the compressor goes to this switch and only an orange and a brown wire go back into the electric box. The purple power wire will connect with the brown wire that comes from the switch in these systems. Make your connection either at the junction of the brown and purple wire or anywhere convenient in the brown wire from the switch.*

Figure 9A

NOTE: *Some air conditioners have a small freeze sensor board inside the electric box so the purple power wire and the black wire from the compressor do not join as shown above. Splice the EasyStart BLACK wire to the black wire from the compressor in these systems.*

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Removing existing start components

Figure 10

Some systems may use a start cap (orange arrow in figure 10) and PTCR (green arrow in figure 10). Previous owners may have also installed a hard start kit that replaces these components. These components form a circuit that connect from the yellow wire side of the run capacitor to the red wire side of the run capacitor.

Figure 7 shows a single red wire connecting to the run capacitor. If your system has only this single red wire then there are no start components in your system so skip the rest of this section.

If there is another wire connected to the red wire group on the run capacitor (other than the orange wire from EasyStart), remove the wire and disconnect it from the component it connects to. If the end of the wire is directly connected to the PTCR (such as a different style PTCR than shown in figure 10), disconnect the PTCR wire on the other side of the PTCR from the start capacitor as well.

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Mach 8 low profile models.

Model identification and wiring diagrams

Two slightly different models of low-profile air conditioner were produced. They are identified here as style 1 and style 2. Diagrams are normally installed on the electric box inside cover.

Style 1

Figure 11 shows the early model low profile unit. The picture is shown with the fan removed for easier access. Capacitors are mounted inside the metal box in the center of the AC unit. The EasyStart wiring connections will all be made inside this box.

Figure12 shows the wiring diagram shipped with this model.

Figure 11: Early Mach 8 (style 1) with capacitors inside electric box

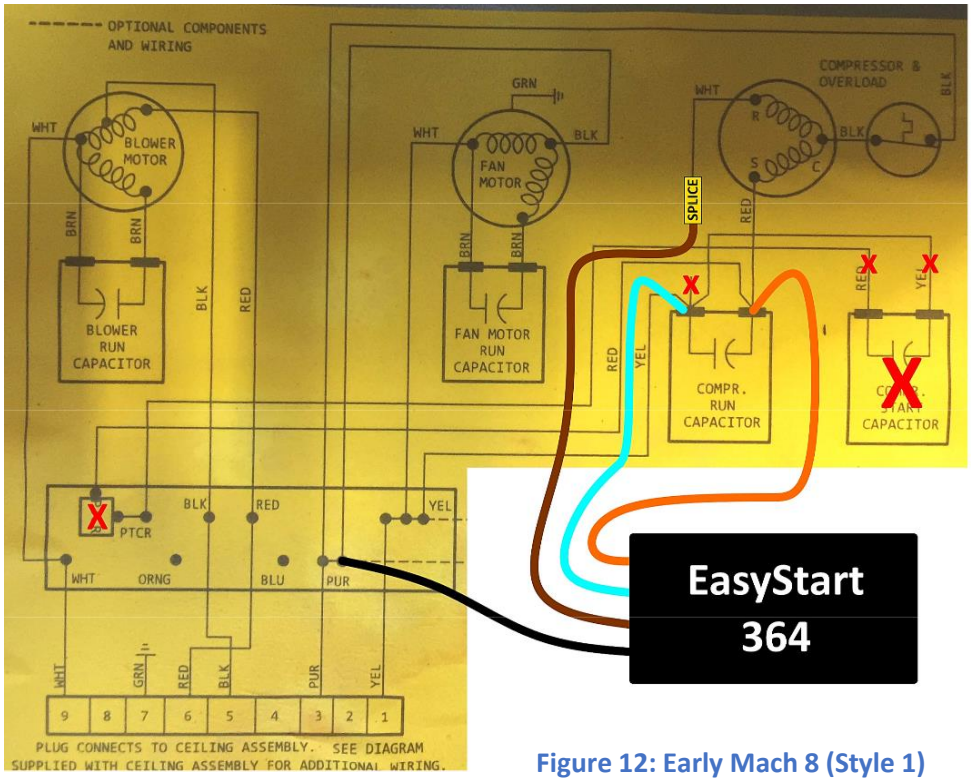

Figure 12: Early Mach 8 (Style 1)

- Remove wires with red X's (Compressor start capacitor can be left in place after disconnection)
- Verify that the compressor red wire connects to the silver run capacitor.
- Remove any other red wires from this connection and remove the wires. Connect the orange wire to the run capacitor next to the compressor red wire.

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Style 2

Figure 13 shows a later low-profile unit. The capacitors are mounted outside the box as indicated by the blue arrow in the figure. Wiring connections to EasyStart will all be made inside the electric box in the center of the unit just under the fan.

Figure 14 shows the wiring diagram shipped with this unit and modified to show EasyStart.

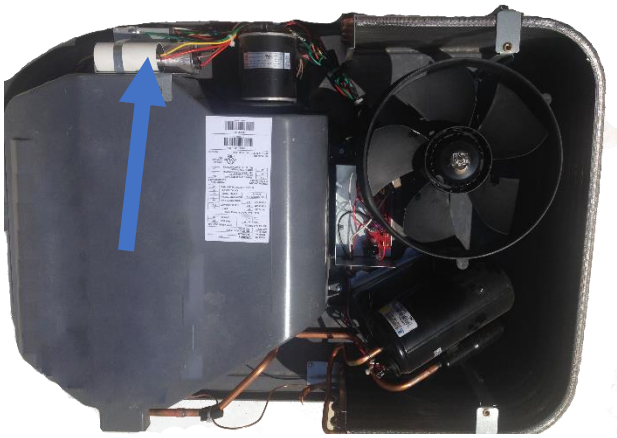

Figure 13 Later Mach 8 (Style 2) with capacitors outside of the electric box

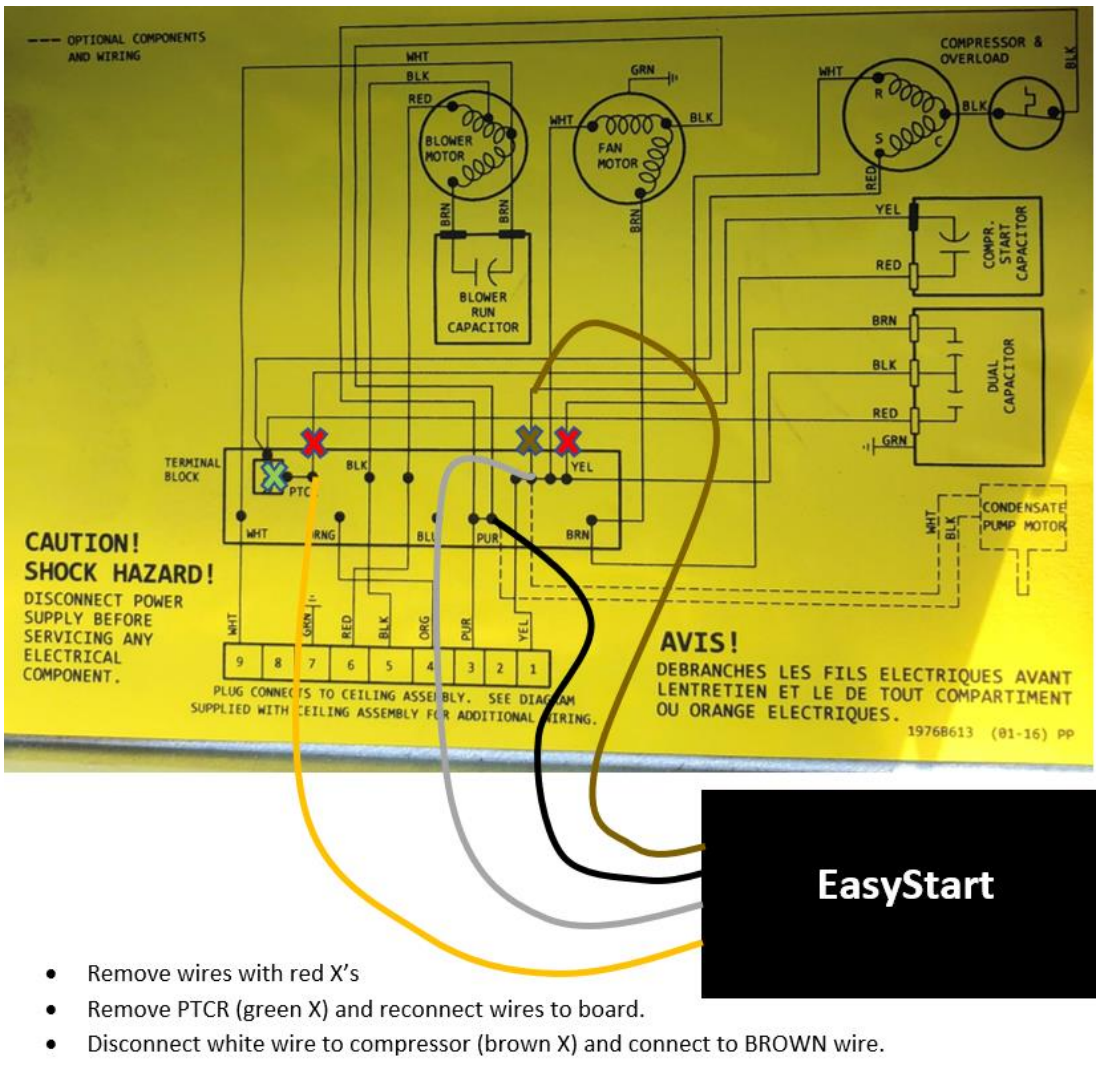

Figure 14: Later Mach 8 style (Style 2)

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Mounting location

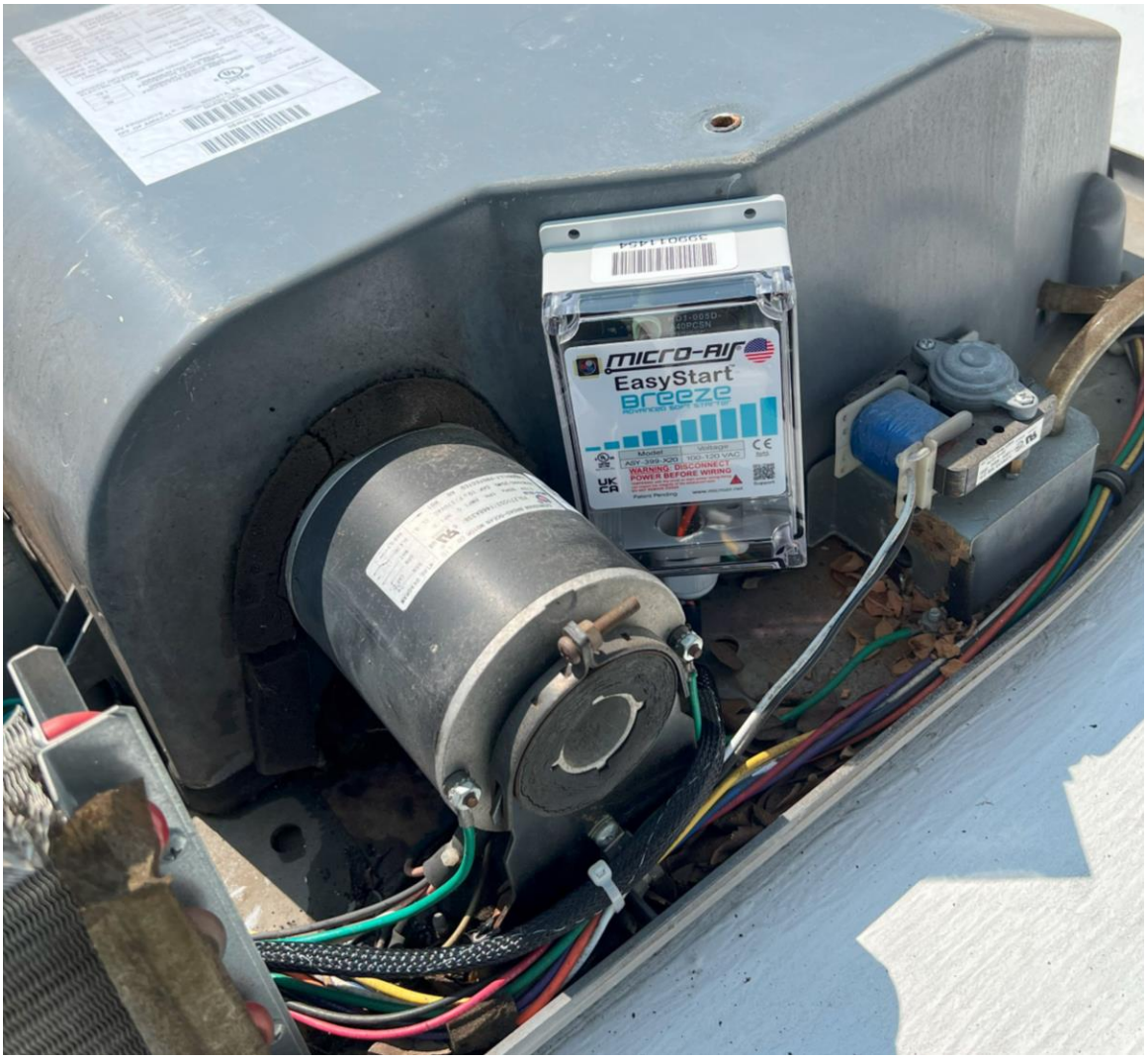

Figure 20

Figure 20 shows the recommended EasyStart mounting location. Clean and dry the surface of the mounting area. Use double sided foam tape provided in the installation kit to secure the enclosure to the cleaned air conditioner surface. Make sure to have at least ½" of clearance to the black fan motor. Route the wires along the fan motor with the other wires and secure with a provided zip tie.

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Identifying the wires (Style 1 and Style 2)

The blue arrow to the left points to the top of the compressor in Figure 21. Three wires exit this cap colored BLACK, WHITE, and RED. These wires enter the electric box as shown by the green arrow in Figure 16. The connections these wires make inside the electric box will be used to connect EasyStart in the next installation steps.

Figure 21 : Compressor (both styles)

Routing the wire

Route the wires into one of the wire entries on the side of the electric box. There is usually enough room where the compressor wires enter the box to add the EasyStart wires. You may need to cut off the pre-crimped connectors on the wire to route the wire through the grommet on the side of the box. Re-crimp new connectors on those wires if this is required for your installation. Secure any excess wire using the wire ties supplies in the installation kit.

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Making the connections

Use only end splice or jacketed spade connectors for connecting one wire to another. Wire nuts can come off in this high vibration environment and automotive connectors are not rated for line voltage.

Style 2

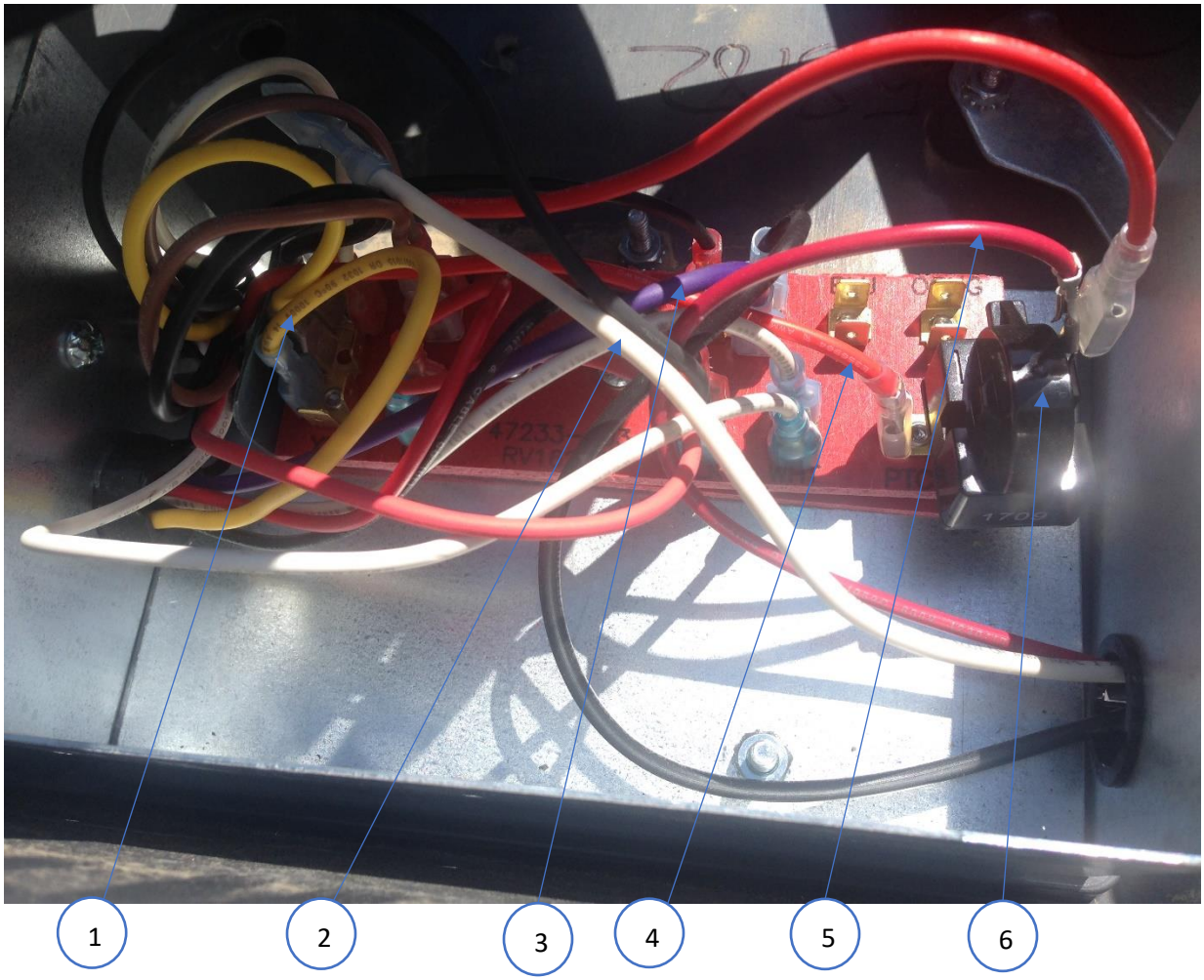

Figure 22: Style 2 electric box

Brown wire

Follow the white wire from the compressor into the electric box. Continue to follow the wire to the connector block and unplug the wire from the connector block (see arrow 2 in Figure 22). Install the yellow male quick connect on the BROWN wire from EasyStart and crimp the connector. Connect the unplugged white wire into the BROWN wire from EasyStart.

White Wire

Place a yellow female quick-connect terminal on the WHITE wire from EasyStart and crimp the connector. Connect the WHITE wire from EasyStart to the empty terminal created when the white wire from the compressor was disconnected (see BROWN wire step).

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Disconnect the start capacitor

If your unit has a start capacitor is must be disconnected. Not all units have start capacitors so first determine if your unit has one. Follow the red wire from the compressor into the electric box (arrow 5 in Figure 22). If this wire leads to a PTCR you have a start capacitor that must be removed. If you do not have a start capacitor, you can continue to the next step placing the orange wire.

First locate the start capacitor. There are typically two capacitors in this design, a metal case "run capacitor" and a plastic cased "start capacitor". The plastic cased capacitor with a red and a yellow wire connected to it is the start capacitor. Follow the red and yellow wires into the electric box. Disconnect both wires from their connections and secure the ends out of the way with a wire tie. This is pointed to by arrows 1 and 4 on Figure 22 however the wires must be traced back from the capacitor to be sure the correct wires are disconnected.

Disconnect the two remaining red wires from the compressor from the PTCR and remove the PTCR. Reconnect the red wires to the PTCR terminals on the connection block.

Orange wire

Install a piggyback quick connect on the ORANGE wire from EasyStart. Disconnect the red wire from the compressor. Plug the ORANGE wire from EasyStart into the empty terminal created by removing the red wire from the compressor. Plug the red wire from the compressor into the orange wire's piggy back connector end.

Black wire

Install a female blue quick connect on the BLACK wire from EasyStart. Connect it to an empty terminal in the same group as the purple wire. (see Figure 22 arrow 3). The group consists of multiple connectors and although not visible in the picture, there is an extra unused terminal.

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Style 1

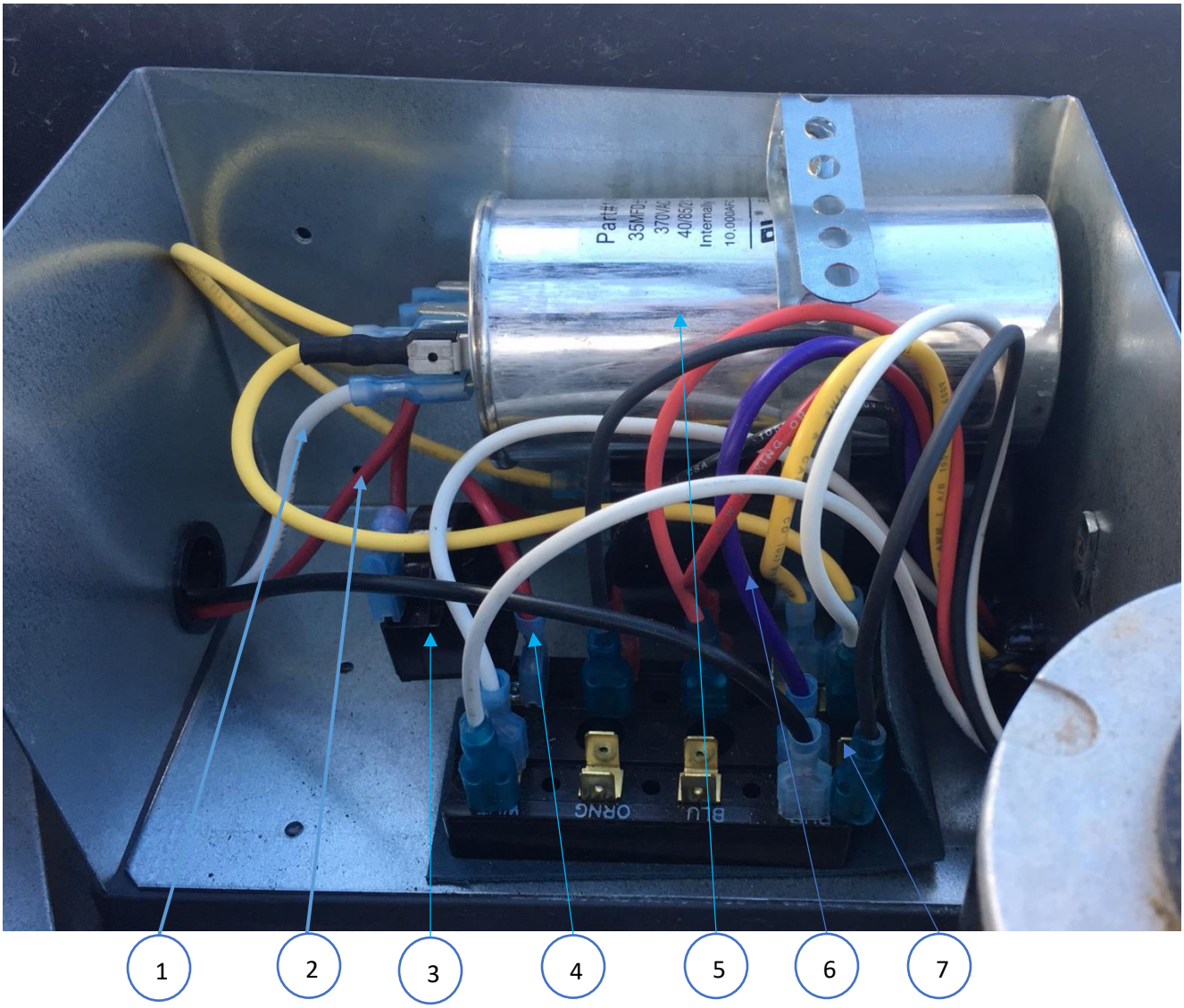

Figure 23: Style 1 electric box

Brown wire

Follow the white wire from the compressor into the electric box. Continue to follow the wire to the run capacitor (arrow 1 in Figure 23) and unplug the wire from the capacitor. Install the yellow male quick connect on the BROWN wire from EasyStart and crimp the connector. Connect the unplugged white wire into the BROWN wire from EasyStart.

White Wire

Place a yellow female quick-connect terminal on the WHITE wire from EasyStart and crimp the connector. Connect the WHITE wire from EasyStart to the empty terminal on the run capacitor created when the white wire from the compressor was disconnected (see BROWN wire step).

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Disconnect the start capacitor

If your unit has a start capacitor is must be disconnected. Not all units have start capacitors so first determine if your unit has one. Follow the red wire from the compressor into the electric box (arrow 2 in Figure 23). If this wire leads to a PTCR (pointed to by arrow 3 in Figure 23) you have a start capacitor that must be removed. If you do not have a start capacitor, you can continue to the next step placing the orange wire.

First locate the start capacitor. There may be up to 3 capacitors in this design. The metal case capacitor (pointed to in Figure 23 arrow 5) is the "run capacitor". If the unit has a start capacitor, it will have a red and a yellow wire connected to it. If the unit has a fan capacitor, it has two brown wires connected to it. Disconnect both red and yellow wires from the start capacitor. Follow the wires to the other end of the wire. Disconnect and remove the wires.

Disconnect any remaining red wires from the compressor from the PTCR and remove the PTCR. Reconnect the wires to the PTCR terminals on the connection block.

Orange wire

Install a female blue quick connect on the ORANGE wire from EasyStart. Verify that the red wire from the compressor connects to the silver run capacitor as shown in figure 24. If not, disconnect the compressor red wire and reconnect it to the group opposite the yellow wires as shown by the red arrow. Disconnect and remove any other red wires on this group of terminals. Connect the ORANGE EasyStart wire into one of the open terminals as shown by the orange arrow in figure 24.

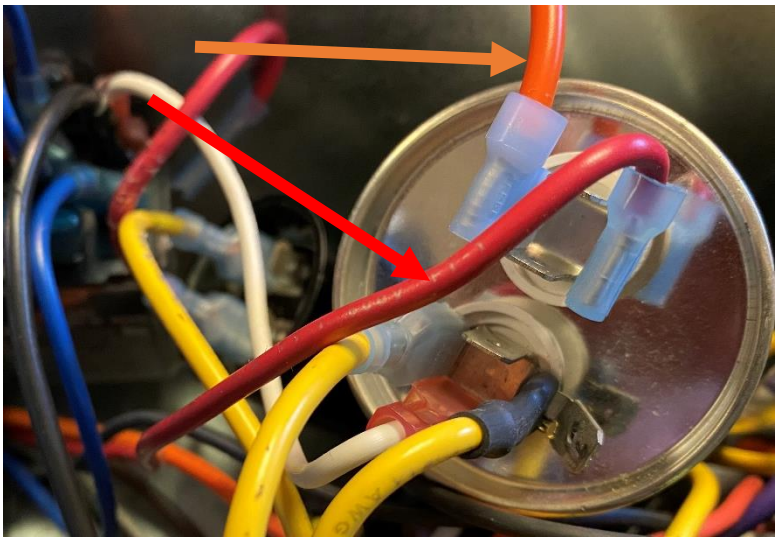

Figure 24

Black wire

Install a female blue quick connect on the BLACK wire from EasyStart. Connect it to an empty terminal in the same group as the purple wire. (see Figure 23 arrow 6). Figure 23 arrow 7 points to a barely visible extra terminal on the connection block where the black wire can be connected.

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Other Models

There are a few other models of Coleman air conditioners we should mention. The process of wiring them is comparable to the Mach 1 and similar units. Use these diagrams along with the component identification shown in the Mach 1 section to identify and connect EasyStart. Wiring colors are the same with all models we have come across so far. The wires from the compressor are:

- Black to the compressor overload and compressor “C” common winding
    - For ALL systems wiring EasyStart BLACK to this wire is the goal
- White to the compressor “R” run winding.
- Red to the compressor “S” start winding.

Mounting location varies for these models however it is always possible to find an appropriate location. Mount the unit with the wiring exit on the box pointing down or mount the box parallel to the ground. Never mount the box with the wires pointing up.

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Polar Cub #1

Outdoor Temp Board Only

This instruction is for units without start components. If the run capacitor has more than one red wire on the run capacitor as shown below, please use figure 33.

The red X by the run capacitor indicates the white wire is disconnected from the white/yellow wire terminal group and reconnected to the BROWN wire from EasyStart using a splice joint. The white wire (shown in blue for contrast) is connected where the compressor white wire was removed.

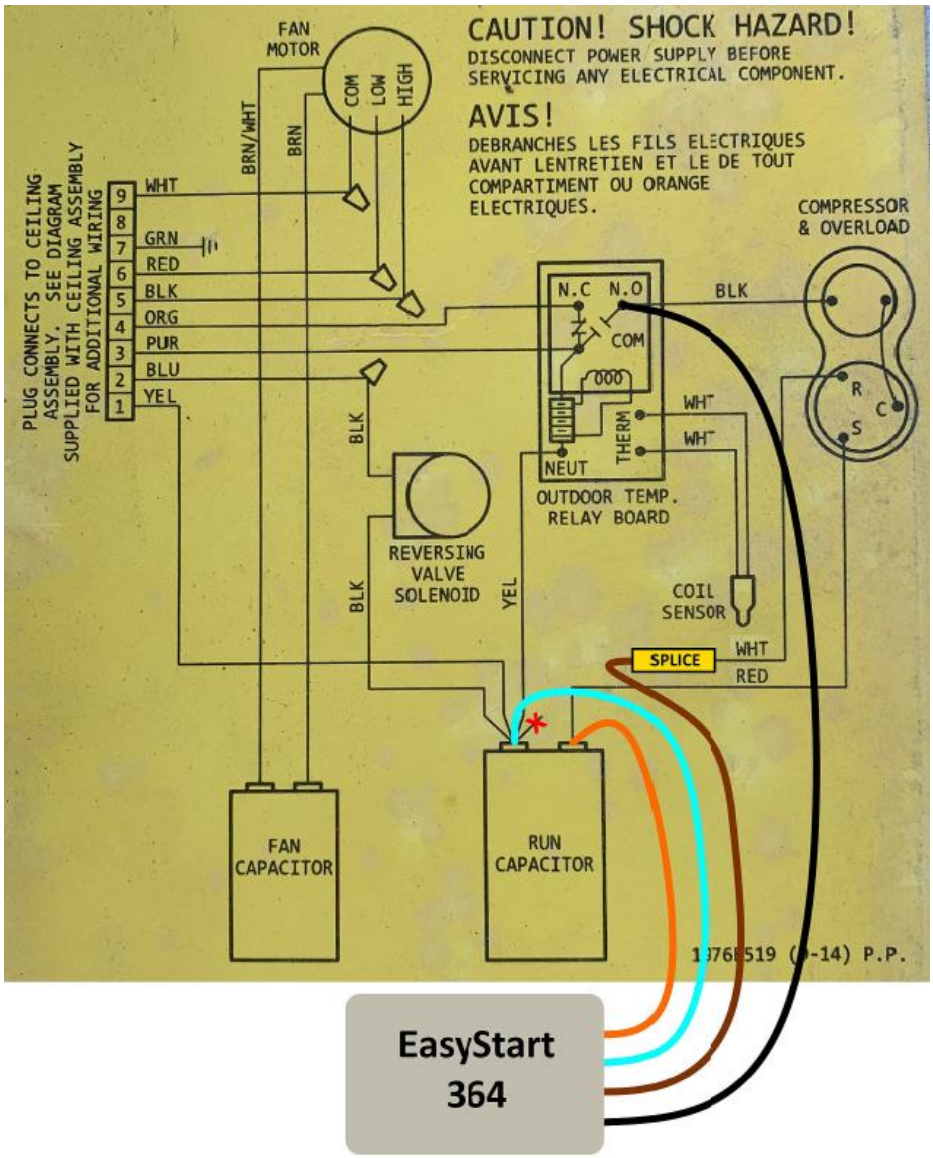

Figure 30

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Figure 31 shows the outdoor temperature relay board. The black wire on the relay shown by the orange arrow is the wire of interest on the N.O. connection in the schematic of Figure 30, to which the EasyStart BLACK wire will connect. First, disconnect the black wire from the relay. If the connector on the existing black wire is unjacketed, cut it off and crimp on tightly a blue female connector as it is in Figure 31.

Next, with 14-AWG wire (included in the kit), cut two 4-5-inch wires and strip each end. Crimp a blue female connector on one wire and a blue male on the other wire. Create a 3-wire pigtail on the end of the EasyStart BLACK wire with the two new wires using an end splice as shown in Figure 32. Plug the male pigtail into the disconnected compressor black wire and the female pigtail into the N.O. relay terminal.

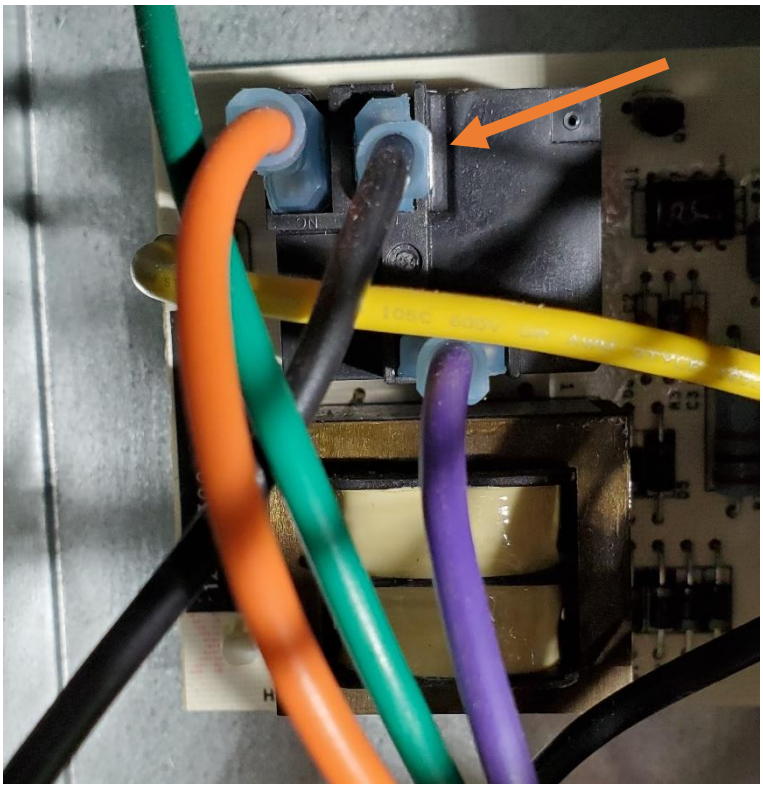

Figure 31

Figure 32

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Pressure Switch Relay – with or without components on Pin 7

These models have a pressure switch relay that the compressor black wire connects to. A typical schematic is shown in Figure 33.

Red X indicates wires and components that are to be removed. Not all systems have these components. If the run capacitor has only a single red wire on the terminal group opposite the white/yellow wire group then there are no start components. If there is a second red wire or small black plastic piece with red wires (Figure 10, green arrow), remove the wire at both ends.

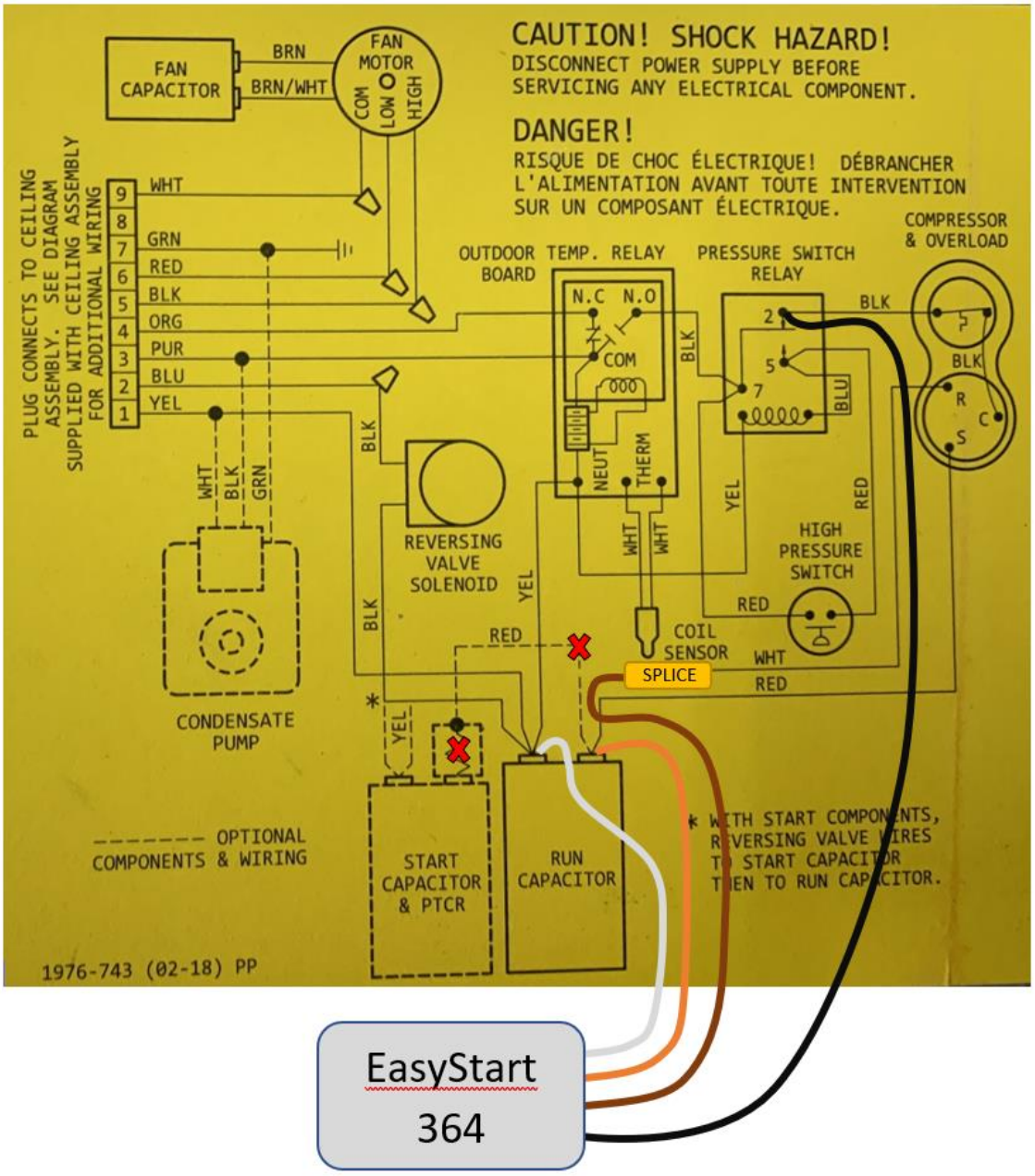

Figure 33

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Figure 34 shows the pressure switch relay by the green arrow and a different angle in Figure 35. The black wire on the relay shown by the orange arrow in Figures 34 and 35 is the wire of interest on the Pin 2 connection in the schematic of Figure 33, to which the EasyStart BLACK wire will connect. First, disconnect the black wire from the relay. If the connector on the existing black wire is unjacketed, cut it off and crimp on tightly a blue female connector as it is in Figure 34.

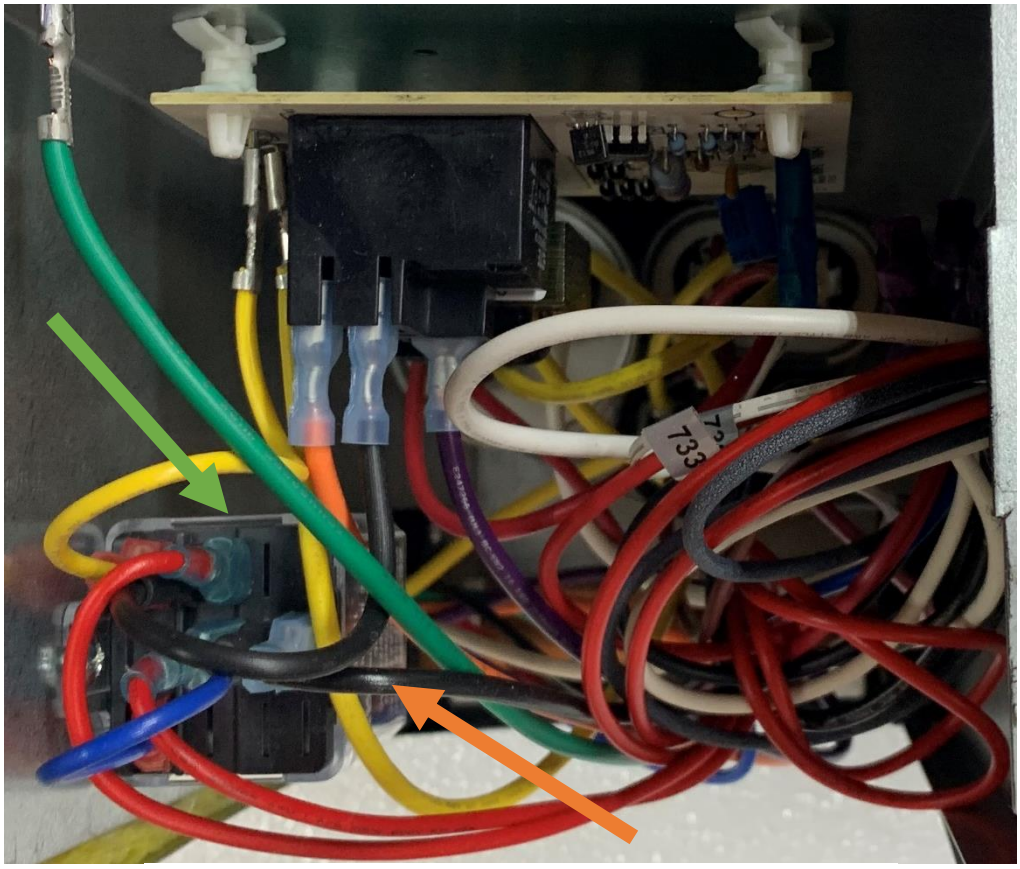

Figure 34

Next, with 14-AWG wire (included in the kit), cut two 4 to 5-inch wires and strip each end. Crimp a blue female connector on one wire and a blue male on the other wire. Create a 3-wire pigtail on the end of the EasyStart BLACK wire with the two new wires using an end splice as shown in Figure 36. Plug the male pigtail into the disconnected compressor black wire and the female pigtail into the Pin 2 relay terminal.

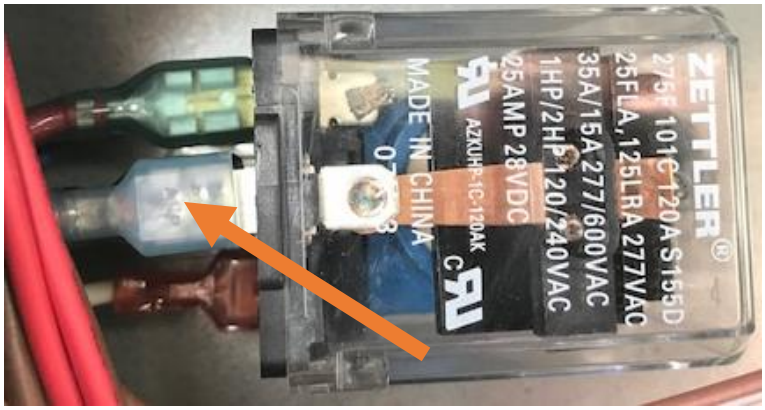

Figure 35

Figure 36

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Polar Cub #2

This version is an alternate wiring supplied with some models. The red X's in the PTCR, start capacitor, YEL, and RED wires are all components that must be removed if they are installed. Not all systems have these components. If the run capacitor has only a single red wire on the HERM terminal or a single red wire on the terminal group opposite the white/yellow wire group then there is no start components its red X's can be ignored.

The red X by the run capacitor indicates the white wire is disconnected from the yellow wire terminal and reconnected to the BROWN wire from EasyStart.

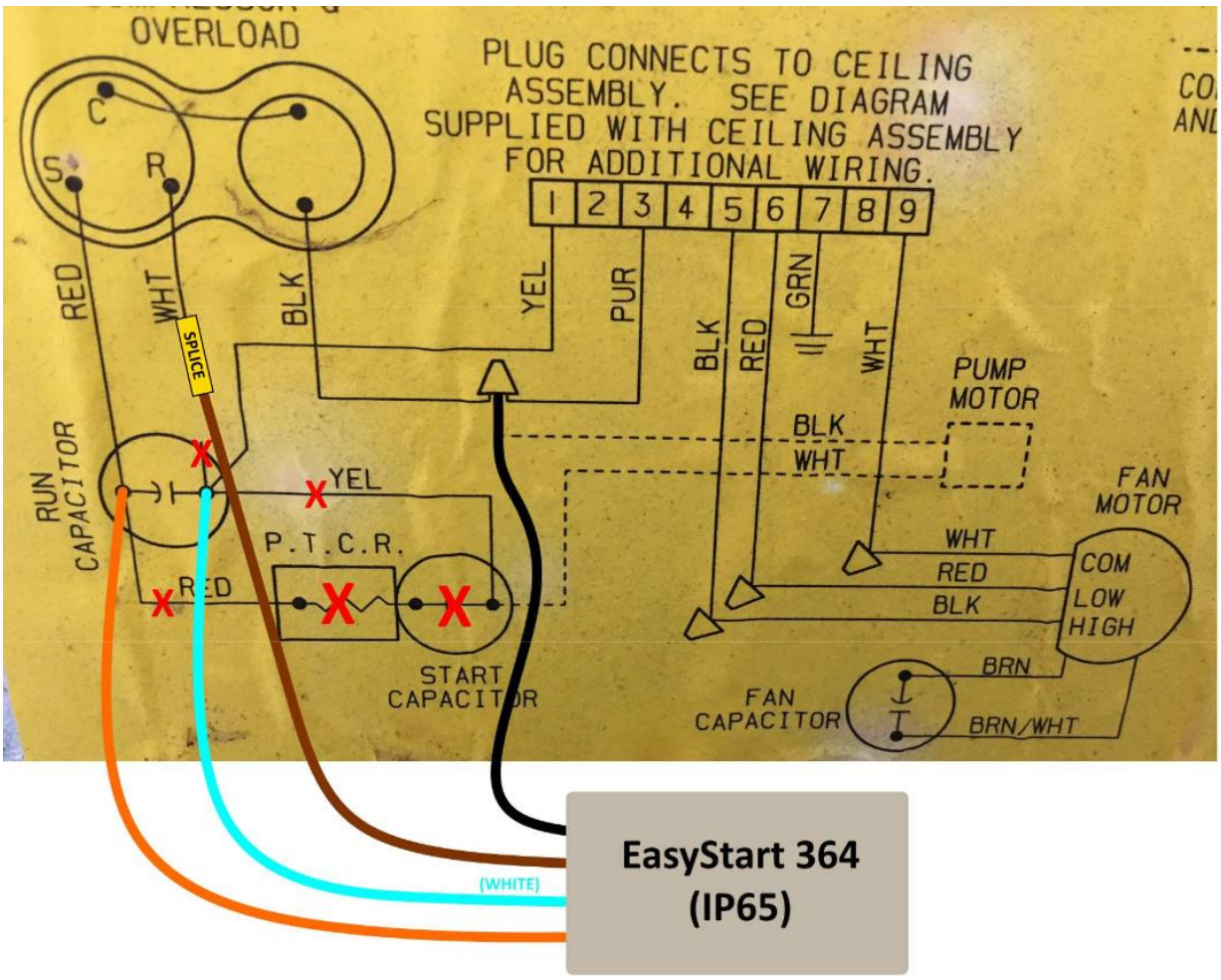

Figure 36

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TSR Mach 3

The TSR Mach 3 is an older model that is still similar to other models here. The diagram is included because it is drawn visibly different from the other models. The wiring is however the same.

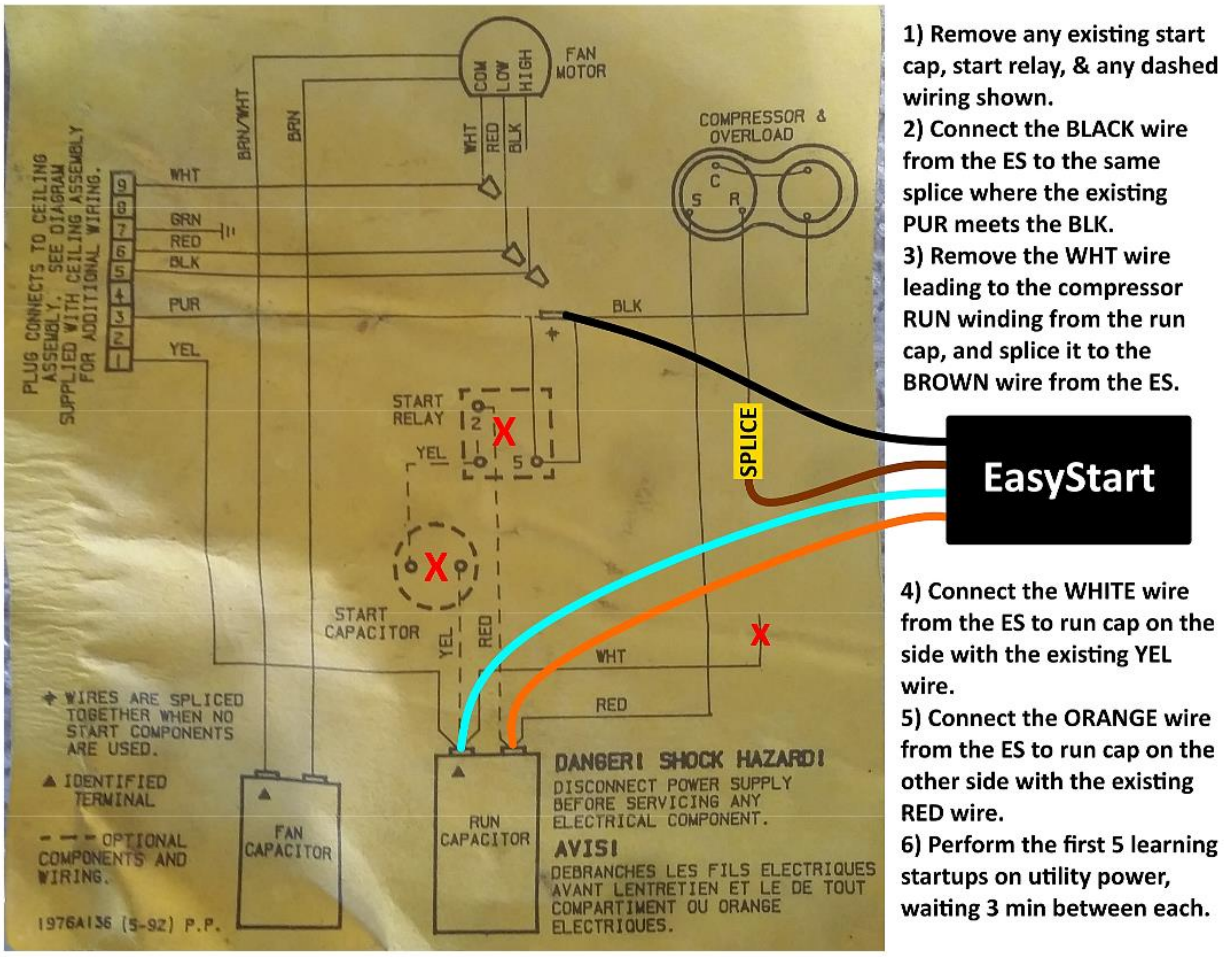

Figure 37

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High efficiency two ton

This unit is actually two compressors in one box therefore two EasyStart units are required. The box is typically “basement” or under coach mounted. As with other models, start components are removed by removing the red and yellow wires from the run capacitor that go to the PTCR and start capacitor.

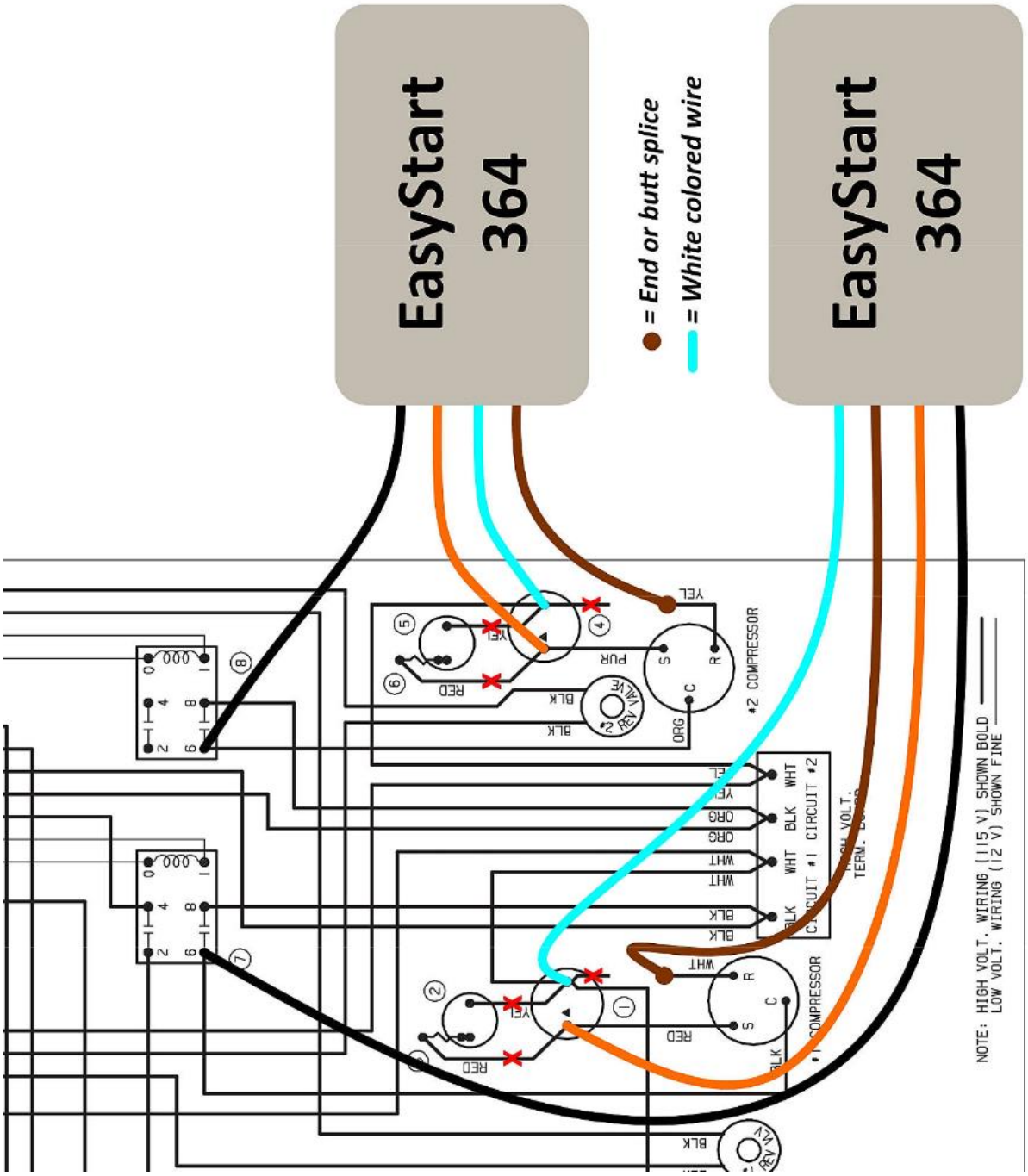

Figure 38

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Units with Freeze Switch on Compressor

Figure 39 shows EasyStart wiring where a freeze switch in a heat pump model is directly connected to the compressor.

Red X indicates wires and components that are to be removed. Not all systems have these components. If the run capacitor has only a single red wire on the terminal group opposite the white/yellow wire group then there are no start components. If there is a second red wire or small black plastic piece with red wires (Figure 10, green arrow), remove the wire at both ends.

The red X by the run capacitor indicates the white wire is disconnected from the yellow wire terminal and reconnected to the BROWN wire from EasyStart.

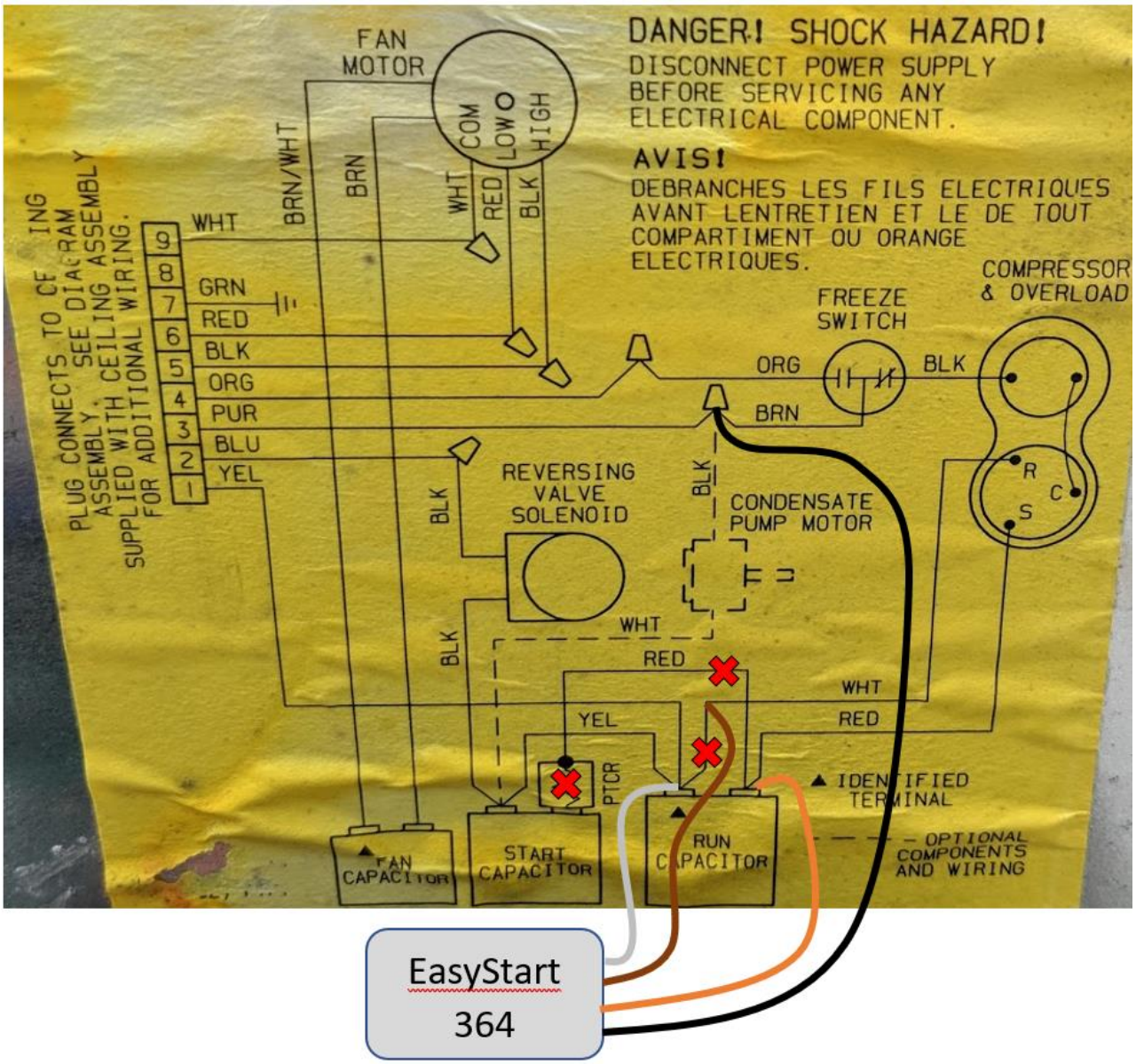

Figure 39

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Learn process

This process was created for users who want to use the system on a limited power source right away. If you are going to be using utility power for a while, you can just let EasyStart cycle normally to learn the compressor.

EasyStart "Learns" the start characteristic for your compressor over the first five starts. We recommend that these starts are done on a 20 amp or greater utility power source with all other loads in the RV turned off.

Utility power Is preferred however installations that do not have access to utility power can do the learn process on a generator. Generators must have a continuous rated output capable of supporting the air conditioner. Any low RPM economy or ECO mode must be switched off so the compressor can start with the maximum capacity of the generator.

The best power source for learning is one that you have reliably run the air conditioner from before installing EasyStart.

1. Breaker on the air conditioning unit.
2. Set the thermostat to start the air conditioner compressor. Heat mode may be used if you are using a heat pump model.
3. The compressor will start up shortly after the fan starts. Let the compressor run for 30 seconds.
4. Set the thermostat to turn off the compressor.
5. Set the thermostat to start the compressor again.
6. EasyStart will wait 3 minutes from the time the compressor stopped in step 4 to restart the compressor.
7. The compressor will start up shortly after the fan starts. Let the compressor run for 30 seconds.
8. Set the thermostat to turn off the compressor.
9. Repeat steps 5 to 8 three more times to complete the learn process.

Once the learn process is complete, EasyStart does not learn again. EasyStart can now be used on generators, inverters or utility power to provide low-current starts every time.

Note*: Learning can be done during regular operation. It is not necessary to start and stop the air conditioner if you are going to run it on AC mains power for a while before using an inverter or generator. Normal compressor cycling will complete this process as well.*

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Troubleshooting FAQ

How do I know I installed it correctly?

EasyStart has a few characteristics that can help you determine that. First, the compressor should start more quietly than it did before. Lights will dim much less and if you have a volt or current meter you should see a measurable difference.

Second, if you turn off the compressor at the thermostat when it is running then turn it on right away, EasyStart will prevent the compressor from starting for five minutes. If the compressor starts sooner, you have a wiring problem.

Nothing works, not even the fan.

EasyStart does not affect the fan at all. If the fan does not run then most likely you connected the wrong white wire to the brown wire. Check it again and make sure the wire connected to the brown wire is the white wire that comes from the compressor.

The fan runs but it won't start on utility power.

1. Go through these directions again and verify every connection.
2. Be sure you turned on all the power you turned off. Some thermostats need DC to operate as well as AC.
3. Check the thermostat set point. If you have a digital thermostat the ambient temperature must be above the set point for the air conditioning to work. If it's a slide thermostat, it must be set for full cool.
4. Is it too cold for the compressor to start? We often get calls where a slide thermostat will not work under 70°F (21.2°C) ambient. Try heat mode if you have a heat pump and it is too cold or warm the RV with the heater first.
5. Check your line voltage when the compressor tries to start and make sure it is not dropping below 108 VAC. Some RV's have surge suppressors that cut off on low voltage.

I did everything in the last FAQs and it still will not start. What next?

Go to the Micro-Air.net website and download "Advanced EasyStart Troubleshooting". Follow the steps given to determine the possible problems.

My air conditioner runs great on commercial electric power but will not start on my generator.

Be sure all the loads are turned off in your RV. A 15K BTU air conditioner will use about 1800-1900 watts to run leaving no additional capacity for any other loads on a 2000-watt generator. Be sure you check generator reviews before you chose a generator. Not all generators can run an air conditioner.

My air conditioner shuts off early on generator. What can be wrong?

Aside from the suggestions in the last questions, you should also test your generator output and verify the RV load. We offer a generator test kit on Microair.net. The associated manual is available from the test kit purchase page and has the complete test and additional things to look for.

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