

# Easy Start

364 (3 ton) Soft Starter  
368 (6 ton) Soft Starter

Installation Manual

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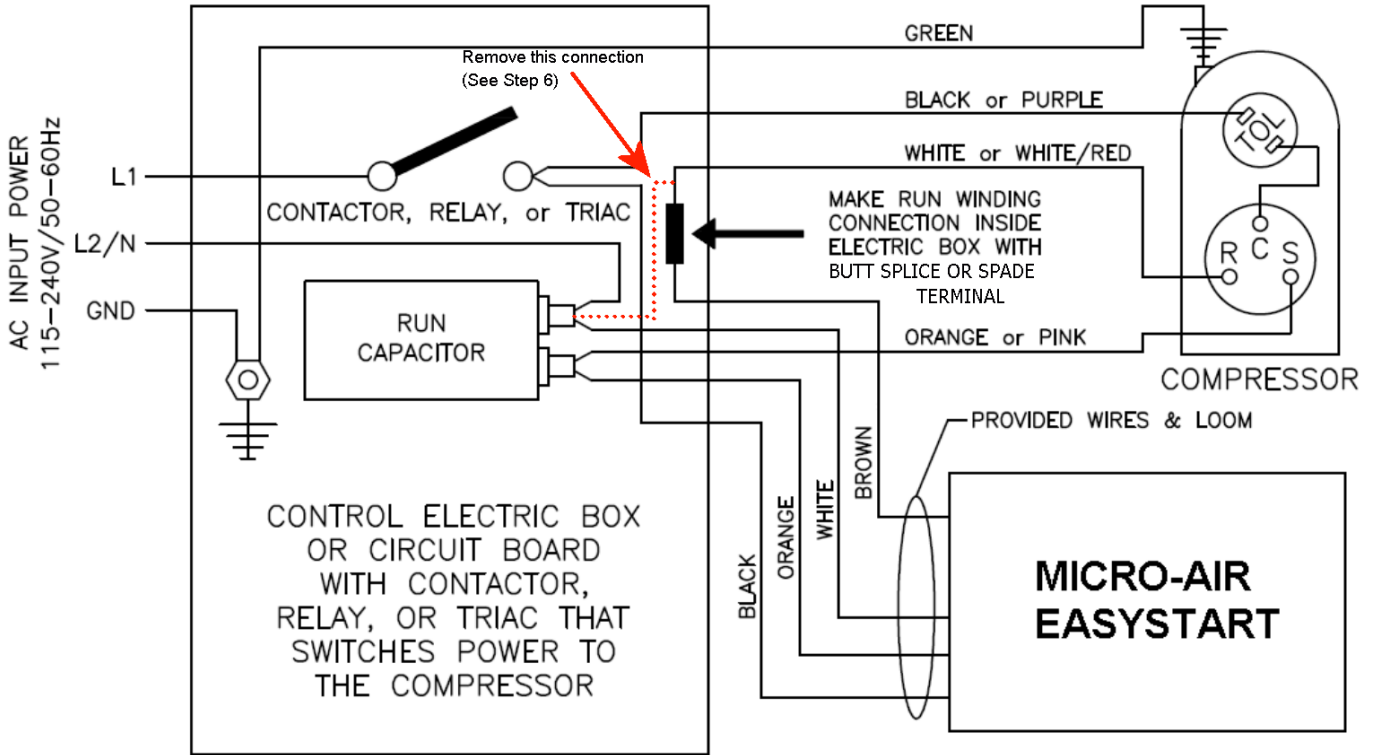
## Retrofit Instructions

1. Read and understand these instructions completely before proceeding.
2. Improper wiring can result in damage to EasyStart or connected components including but not limited to wiring, compressors, and capacitors. ***Micro Air Corp is not responsible for damages to any of the aforementioned equipment caused by improper wiring.***
3. Turn off the breaker for the compressor's electrical system.
4. Consult the manufacture's installation manual and wiring diagram for the identification of the following:
  - a. Start capacitor (typically in a plastic can), start relay, or compressor start device. Note that these devices may NOT be installed on some systems.
  - b. Run capacitor (typically in a metal can). Most have 2, multi-point terminal connections (or clusters). Some have 3 terminal connections.
  - c. Control board switched-L1 output or main contactor compressor L1 output connecting to the compressor common terminal (C) wire. Note some systems utilize a contactor to switch power to the compressor, other use a power relay integrated into the main control board.
5. If the system utilizes a start capacitor with a start relay, or a start assist device, disconnect all the wiring connected to the start capacitor or the start assist and remove them from the electric box. Be aware that some connections to the compressor (e.g. compressor common L1 and compressor Run L2) may have junction connections at terminals of the start relay. Therefore, it is best to NOT remove the start relay unless you are able to trace out these wiring junctions and splice them. Disconnecting and removing only the start capacitor from a system with a start cap and start relay will effectively disable the start relay, thus eliminating the need for it being removed.
6. Locate the compressor run capacitor. Locate the wire connected from the run capacitor to the compressor run winding terminal (R), and disconnect it from the run capacitor. Connect (splice) the brown wire from EasyStart to the disconnected wire.
7. Connect the white wire from EasyStart to the same terminal of the run capacitor from which you disconnected the (white) run winding (R) wire in step 6 above.
8. Connect the orange wire from EasyStart to the terminal on the run capacitor that connects to the compressor start winding terminal (S). If the run capacitor is a dual, compressor/fan type, make sure to choose the correct capacitor terminal, typically labeled "COMP", "C", Herm, or "H".
9. Connect the black wire from EasyStart to the switched-L1 connection emanating from the main control board or main contactor that typically has a black or purple wire that connects to the compressor common (C) terminal wire.
10. Wiring is now complete. Remove any remaining unused or disconnected wires and close all open electrical boxes and panels.
11. Securely mount the EasyStart using the four holes provided on the mounting flange, locating it close to the original system electric box (limited by wire harness length).
12. Turn on the system circuit breaker using shore power. Start a heating or cooling cycle with the thermostat.
13. EasyStart will now learn the characteristics of the compressor for the next five starts. This operation will be done during normal operation and does not require any intervention or special actions. Once the learning process is completed, the EasyStart can be operated on either shore or generator power. During the learning starts, be sure to allow enough off time between starts for pressures to equalize. Equalization occurs in most systems within five minutes so we advise waiting at least five minutes between starts.

### **IMPORTANT INSTALLATION NOTE FOR CRUISAIR® MARINE CUSTOMERS ONLY:**

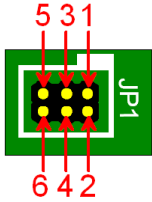
When installing EasyStart into 230V SMX control applications that use the triac to switch power to the compressor, it is necessary to replace the triac with a relay. If the triac is not replaced, the pump relay triggers may suffer damage and ultimately fail. Please note that this is not required for 115V SMX applications and the triac is still safe to use. See the Microair Webstore or contact Microair for details on the appropriate relay.

**Example EasyStart Installation Wiring Diagram:**

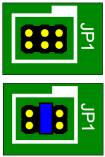


## Jumper Usage:

A six pin diagnostic header is located inside the EasyStart box. Most installations will not need to access this header.



**Jumpers may be placed on JP1 for certain special functions. Place jumpers only as shown below.**



**Normal:** Most operation should be done without a jumper installed on JP1 or with the jumper installed across pins 3 and 4 as shown.



**Default:** A compressor may be operated with a factory defined start characteristic. This may not be the optimal start for the connected compressor and is generally used for factory diagnostics. No optimization is done with this setting.



**Relearn:** If a compressor, start capacitor, or run capacitor is replaced, place a jumper on pins 4 and 6 as shown. Cycle power on then off again and replace the jumper in the “Normal” position. Follow step 13 of the retrofit instructions to complete the relearn process.



**Disable:** This setting disables the microprocessor on the board so no operation can occur.

## Anti-Short Cycle Timer:

EasyStart models incorporate a timer that prevents immediate restarts. This feature was added to prevent overheating of the start capacitor and reduce faults due to un-equalized pressures in the system. Restart will take up to 5 minutes if power is removed then reapplied.

Later models include a wire jumper JP2 (see picture on right) that can be cut to eliminate this feature. System controls must be sufficient to prevent short cycling if this jumper is cut.

**Warning: Starts must be limited to 1 start every 5 minutes with pressures equalized if JP2 is cut.**



## EasyStart Troubleshooting:

### Wiring Evaluation:

- All start components from the original installation are removed including PTC's and start capacitors.
- The Brown wire from EasyStart connects directly to the compressor run winding.
- The Black wire from EasyStart is spliced to the thermostat relay feeding the compressor overload protector on the compressor common terminal.
- The Orange wire from EasyStart is connected to the compressor run capacitor on the same side as the compressor start winding.
- The White wire from EasyStart is connected to the AC-L2 or AC-N side of the compressor run capacitor.

### Trouble Lights:

Three diagnostic lights are provided inside the EasyStart box on the printed circuit board. These lights are labeled in white silkscreened letters next to the light. When a fault is detected, EasyStart will illuminate one or more lights to indicate which fault occurred. All faults except over current will reset after 3 minutes. Over current is reset by removing power from EasyStart and reapplying power. Users will not normally need to view these lights. The chart below defines the lights that are turned on for each fault.

	D21	D22	D23
Power Interruption		ON	ON
Stall	ON		ON
Over Current		ON	
Overload/Klixon Open	ON		
Start winding not detected-EasyStart is miswired	ON	ON	ON

### Fuses:

Protection fuses are installed in the start circuit to prevent damage due to miswiring or start capacitor failure. If this fuse fails in normal operation, there is most likely a problem with the start capacitor which should be replaced along with the fuse.

#### 364 (3 ton)

1. Revision H and earlier boards: These boards incorporate a non-replaceable fuse in the start circuit. These units must be returned to Microair for repair.
2. Revision I and above boards: These boards incorporate a replaceable 15A 250V rated, slow blow, 5mm x 20mm glass fuse.

#### 368 (6 ton)

1. Revision E and earlier boards: These boards incorporate a non-replaceable fuse in the start circuit. These units must be returned to Microair for repair.
2. Revision F and above boards: These boards incorporate a replaceable 30A 250VAC rated 3AB, 3AG, ¼" x 1 ¼" (6.35mm x 31.75mm) slow blow ceramic fuse.

## FAQ:

### **What is re-learning?**

The re-learning process simply clears the EasyStart memory and returns it to as shipped condition. EasyStart should be re-learned whenever a compressor is changed or if pressures were not allowed to equalize during the learning process.

To re-learn EasyStart, remove power and open the EasyStart box. Locate the 6 pin header shown in the jumper usage section of this manual and place the shorting jumper over pins 4 and 6 as shown. Start a cycle with your thermostat with the compressor powered from AC mains and allow EasyStart to start the compressor. Remove power once the compressor starts and replace the jumper to the stored position over pins 3 and 4. Replace the cover on EasyStart and complete at least 4 additional starts. Be sure to allow time for pressures to equalize between starts, usually 3 to 5 minutes.

**Be sure to remove the jumper from pins 4 and 6 and replace it to pins 3 and 4 immediately after the FIRST start and after power is removed.**

### **I connected everything and it just won't start. What do I do now?**

First, do the wiring evaluation in this section. Wiring should be exactly as shown in the sample diagram with no left over start components. If there are any questions about wiring your unit, you can send a wiring diagram for your compressor to [help@microair.net](mailto:help@microair.net) along with your question.

Be sure you are only using regular AC line power and not a generator or inverter for the first five starts. The first starts on EasyStart are usually higher than the final start and can overload marginal supplies and prevent EasyStart from learning the best start for your compressor.

Check for any trouble lights. If any are illuminated, identify the reason EasyStart is not starting your compressor. Most times trouble lights point to a problem with the wiring.

### **What does a “Stalled” indication from EasyStart mean?**

Stalled means EasyStart is not seeing the condition where it can declare that the compressor is running and connect the compressor directly. The first thing to do is the wiring evaluation above.

Stalled can also be caused by an improperly sized or bad start capacitor. 3T systems with 220 volt 12K BTU and smaller compressors may require smaller value start capacitors. Contact Microair prior to purchase to determine requirements for these systems.

### **What does “Power Interruption” mean?**

Power was lost for several AC cycles of power and EasyStart shut down. Compressors will stall after only a few lost cycles creating a huge load when power is restored. EasyStart prevents this excessive load by preventing operation for 3 minutes. EasyStart will restart the compressor following this delay.

We have found that some power conditioning equipment uses relays to switch taps on a transformer may switch too slowly to properly run a compressor.

### **What does “Start winding not detected-EasyStart is miswired” mean?**

One of the following:

- The orange wire is not connected to the start winding.
- The Compressor Start winding is open.
- Line L2 is connected to the compressor start winding.

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