ICM CONTROLS ICM870-9A Soft Starters

ICM CONTROLS ICM870-9A Soft Starters Installation Guide

Contents

ICM CONTROLS ICM870-9A Soft Starters

Specifications

- **Product Name:** ICM870 Soft Start Motor Controller
- **Model:** ICM870-9A/16A
- **Type:** Semi-Conductor Soft-Start Motor Controller, Form 2, Bypassed Controller
- **Features:**
  - Starting current reduction and self-learning algorithm
  - Built-in start capacitor
  - Over-current protection
  - Over/under voltage monitoring
  - Diagnostic indicators
  - Sealed enclosure

Product Usage Instructions

Important Safety Information

- **CAUTION:** The ICM870 must be mounted in an area protected from water or the elements to avoid control failure and electrical hazards.
- **WARNING:** Installation should be done by a certified HVAC technician or licensed electrician following electrical codes.
- **WARNING:** Ensure proper sizing of the generator or inverter to avoid dangerous conditions.

Application
The ICM870 Soft Start Motor Controller is suitable for use on circuits delivering not more than 5,000 rms symmetrical Amperes, 240 V maximum.

Installation Steps

1. Connect the ICM870 RED WIRE to the run capacitor terminal (C/Common/T2).
2. a) Disconnect factory factory-installed compressor run wire from the contactor terminal (T2). b) Splice the ICM870 BROWN WIRE to the compressor run wire previously disconnected.
3. Connect the ICM870 BLUE WIRE to the run capacitor terminal (herm/hermetic/start).

INSTALLATION, OPERATION & APPLICATION GUIDE
For more information on our complete range of American-made products – plus wiring diagrams, troubleshooting tips, and more, visit us at **www.icmcontrols.com**

FEATURES

- Starting current reduction and self-learning algorithm
- Built-in start capacitor
- Over-current protection
- Over/under voltage monitoring
- Diagnostic indicators
- Sealed enclosure

SPECIFICATIONS

Semi-Conductor Soft-Start Motor Controller, Form 2, Bypassed Controller

- **SCCR:** 5kA
- **Ue =** 240 VAC
- **Ui =** 240 VAC
- **Uimp =** 4kv
- FCC 47 CFR Part 15 Subpart B: 2021, Class B
- Pollution degree 3

Input (L1, L2) – 100-240 VAC 50/60Hz

- **Over voltage limits:** 115 VAC nominal = 140 VAC, 240 VAC nominal = 264 VAC
- **Under voltage limits:** 115 VAC nominal = 95 VAC, 240 VAC nominal =195 VAC

Outputs: Compressor

- Solid state/relay
- **Current:** Max. nominal = 9 FLA for ICM870-9A, 16 FLA for ICM870-16A
- **Over-current limits:** ICM870-9A = 11.25A, ICM870-16A = 20A

Environmental

Ambient temperature

- 40°C @ 16 FLA, 8 hour duty
- 50°C @ 16 FLA, Temporary duty –
- F = 30% (3 mins ON and 7 mins OFF); S = 6 (6 cycles per hour)
- **Storage temperature:** -40°F to 149°F (-40°C to 65°C)
- **Humidity:** 0-95% non-condensing
- **Enclosure:** IP65
- **Dimensions:** 7.94” x 4.20” x 2.10”
- **Screw hole center points:** 7.36” x 2.97”

IMPORTANT SAFETY INFORMATION

HIGH VOLTAGE WARNING – Always turn off power at the main service panel before installing.

- **CAUTION**: The ICM870 must be mounted in an area where it will not be exposed to water or the elements. Exposure of the ICM870 soft start to water can cause failure of the control and is a risk for fire or other electrical safety hazards.
  Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical Amperes, 240 V maximum when protected by a circuit breaker having not more than 40 A, 240 volts maximum
- **CAUTION:** Installation of any ICM870 soft start must be done by a certified HVAC technician or licensed electrician. All installations are to be done per local, state, and national electrical codes.
- **WARNING**: Using an undersized generator or invertor with the ICM870 soft start can result in a dangerous condition. Always size your generator or inverter appropriately for your application.

APPLICATION

The ICM870 is intended for Marine, Recreational Vehicle, and commercial applications. The ICM870 integrates compressor in-rush current over startup time, thus reducing peak current demand on a power supply source (generator or other). The ICM870 will monitor system health including voltage, current, compressor startup, and self-integrity. Upon a fault condition, the ICM870 will halt operation and initiate a 4-minute anti-short cycle routine while providing diagnostic fault information through an LED indicator.

ICM870 COMPARABLE AMPERAGE CROSSES

The ICM870 models cross to the comparable amperage models from the following manufacturers:

- Micro-Air (Easy Start)
- Dometic (Smart Start)
- Carlo Gavazzi (Smooth Starter)
- Network RV (Soft Start)
- Hyper Engineering (Sure Start)

STANDARD AND TEST RESULTS

- UL 60947-4-2
- IEC 60947-4-2: 2020
- CAN ICES-003(B) / NMB-003(B)
- IEC 61000-4-2, Class 3 air, Class 2 contact
- IEC 61000-4-3, Class 3

- IEC 61000-4-4, Class 3
- IEC 61000-4-5, Class 3
- IEC 61000-4-6, Class 3
- IEC 61000-4-8, Class 4
- IEC 61000-4-11, Class 2
- Altitude: 2000 m
- **9A:** AC-58b: 9-180: 420
- **16 A:** AC-58b: 16-180: 420
- IP65

LED INDICATORS

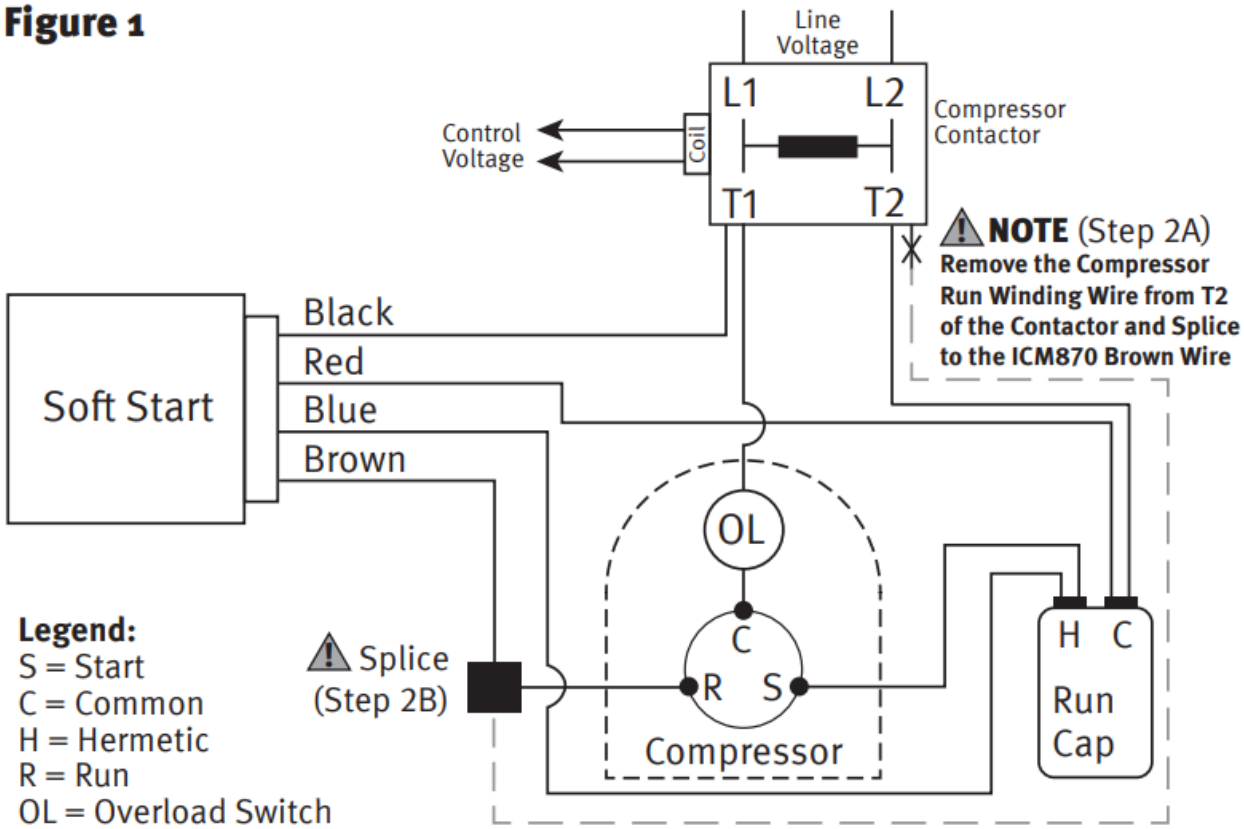
- START = Green
- RUN = Green
- FAULT = Red (flashing)

FLASH CODES

Size	BTU	RLA	ICM870 Model
3 Ton *	36,000	16	16A
4 Ton	48,000	22	32A
5 Ton	60,000	26	32A
6 Ton	72,000	32	32A

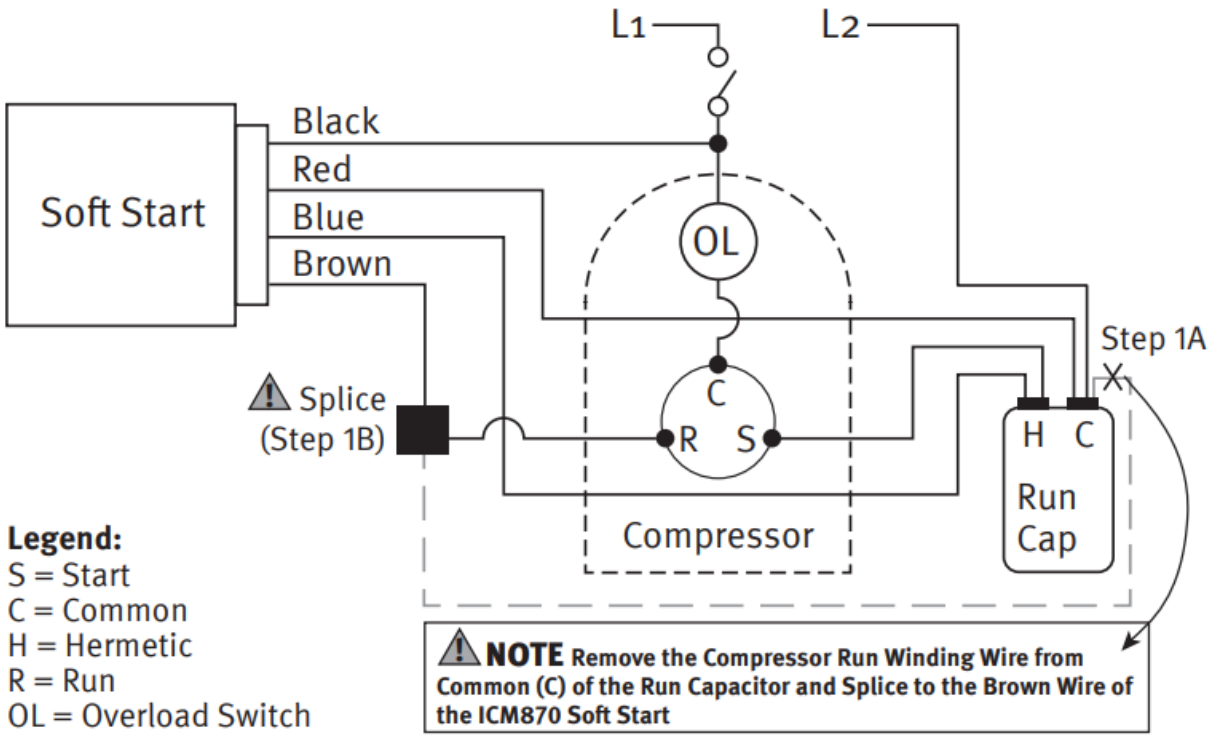
WIRING DIAGRAM (GENERAL LAYOUT)

Figure 1



WIRING DIAGRAM (GENERAL LAYOUT)

Figure 2



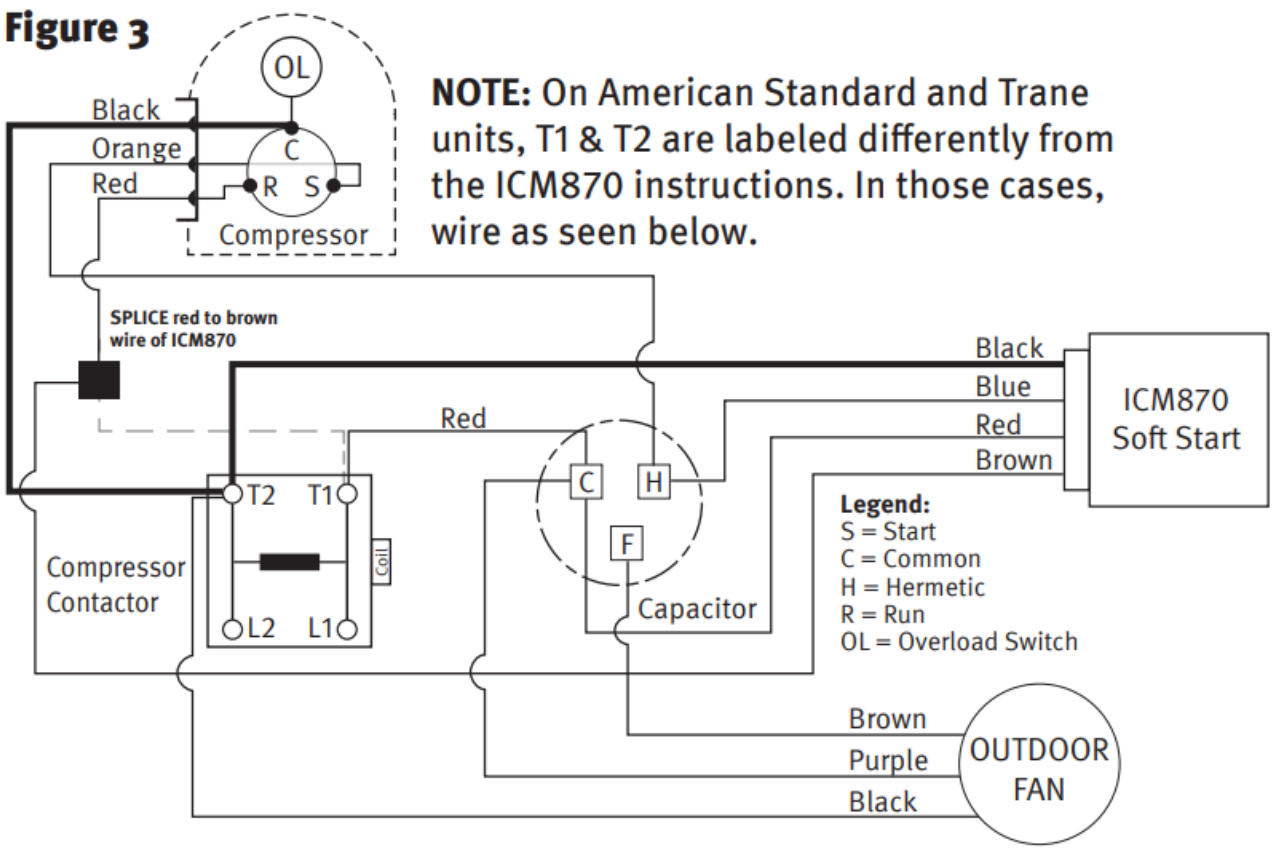
Special attention should be made concerning the termination of the field wiring leads, only at terminals suitable for a 90°C wire at minimum.

TYPICAL INSTALLATION

NOTE: For Trane or American Standard units, T1 and T2 are labeled differently from Figure 1. Wire according to Figure 3 for those units.

- **Step #1** Connect the (ICM870 RED WIRE) > to the run capacitor terminal (c/common/T2). See Figure 3 for Trane and American Standard (on these units the common will be T1).
- **Step #2**
  - **a**) Disconnect factory factory-installed compressor run wire from the contactor terminal (T2). See Figure 3 for Trane and American Standard (removal of the compressor run wire on these units will be from T1 on the contactor).
  - **b**) Splice the (ICM870 BROWN WIRE) > to the compressor run wire previously disconnected in (Step 2A) If there is a Start Capacitor and/or Start Relay already in place, disconnect them before installing the ICM870.
- **Step #**3 Connect the (ICM870 BLUE WIRE) > to the run capacitor terminal (herm/hermetic/start)
- **Step #**4 Connect or splice the (ICM870 BLACK WIRE) > to the contactor terminal (T1). See Figure 3 for Trane and American Standard (on these models the ICM870 BLACK wire will connect to T2).

WIRING DIAGRAM FOR TRANE & AMERICAN STANDARD HVAC UNITS



INSTALLATION

Step #1

- **a)** Disconnect factory-installed compressor run wire from the common run capacitor / L2 terminal
- **b)** Splice the ICM870 BROWN WIRE > to the factory-installed compressor run wire previously disconnected in step #1A.

  If there is a Start Capacitor and/or Start Relay already in place, additional steps will be required to disconnect

them.

Step #2 ICM870 RED WIRE > to the run capacitor (c/common/L2) terminal
Step #3 Connect the ICM870 BLUE WIRE > to the run capacitor (herm/hermetic/start) terminal
Step #4 Splice the ICM870 BLACK WIRE > with the factory install compressor Overload Switch wire (OL/L1)

WHICH MODEL DO I NEED?

- **ICM870-9A**: For ACs with a Compressor Rated Load Amps (RLA) of up to 9A
- **ICM870-16A**: For ACs with a Compressor Rated Load Amps (RLA) of 9.1-16A
- **ICM870-32A**: For ACs with a Compressor Rated Load Amps (RLA) of 16.1-32A
- This chart reflects average conversions of Single-Phase Air Conditioning and Heat Pump Tonnage, BTUs, HP, and RLA. Please refer to your user manual or service panel to determine your actual RLA before deciding which model ICM870 you need.

Air Conditioning & Heat Pump Loads – Average

Size	BTU	RLA	ICM870 Model
3 Ton *	36,000	16	16A
4 Ton	48,000	22	32A
5 Ton	60,000	26	32A
6 Ton	72,000	32	32A

NOTE: for 3-ton units, use ICM870-32A if RLA exceeds 16A
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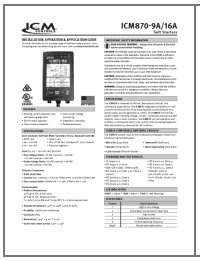
FAQ

- **Q: What should I do if I encounter high or low voltage flashes?**
  - **A:** Check for compressor not sensed or open fuse, and ensure proper voltage levels.
- **Q: How can I prevent control failure due to water exposure?**
  - **A:** Mount the ICM870 in a protected area away from water or elements.

Documents / Resources

	ICM CONTROLS ICM870-9A Soft Starters [pdf] Installation Guide ICM870-9A, ICM870-9A Soft Starters, Soft Starters, Starters

References

- **User Manual**