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ICM CONTROLS ICM870-9A Soft Start Motor Controller



Specifications

• Product: ICM870-9A/16A Soft Starters

• 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 where it will not be exposed to
 water or the elements. Exposure to water can cause control failure and pose electrical
 safety hazards.
- **WARNING:** Installation must be done by a certified HVAC technician or licensed electrician in compliance with electrical codes.

Application

 The ICM870 soft starters are suitable for use on circuits 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.

Wiring Diagram

 Refer to the wiring diagrams provided for the general layout of connecting the ICM870 soft starter to your system. Ensure proper connections as per the instructions.

Installation Steps

1. **Step #1:** Connect the ICM870 RED WIRE to the run capacitor terminal (C/Common/T2).

2. Step #2:

- 1. Disconnect the factory-installed compressor run wire from the contactor terminal (T2).
- 2. Splice the ICM870 BROWN WIRE to the compressor run wire previously disconnected.
- 3. **Step #3:** Connect the ICM870 BLUE WIRE to the run capacitor terminal (H/Hermetic/Start).

INTRODUCTION

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 the 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 in accordance with local, state, and national electrical codes.
- **WARNING:** Using an undersized generator or inverter 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

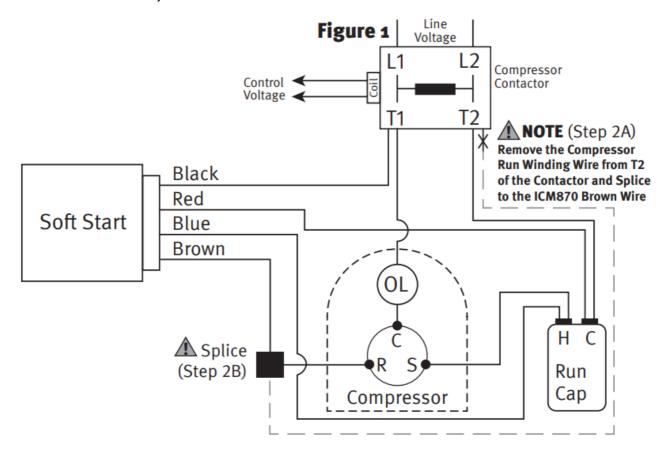
- START = Green
- RUN = Green
- **FAULT** = Red (flashing)

FLASH CODES

Flashes	Flash Conditions
1	High or low voltage
2	The compressor is not sensing or open fuse
3	High current
4	Compressor start error
5	Invalid operating frequency
Rapid	Normal start delay active

WIRING DIAGRAM

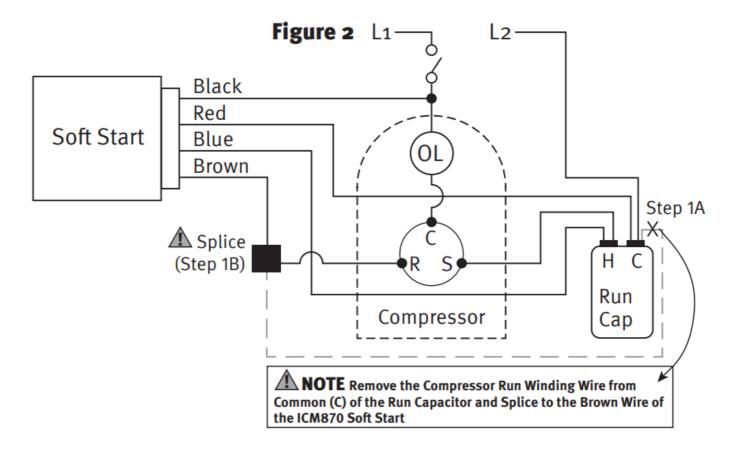
(GENERAL LAYOUT)



Legend:

- **S** = Start
- C = Common
- **H** = Hermetic
- **R** = Run
- **OL** = Overload Switch

WIRING DIAGRAM (GENERAL LAYOUT)



Legend:

- **S** = Start
- C = Common
- H = Hermetic
- **R** = Run
- OL = Overload Switch
- Special attention should be made to the termination of the field wiring leads, only at terminals suitable for a 90°C wire at a minimum.

TYPICAL INSTALLATION

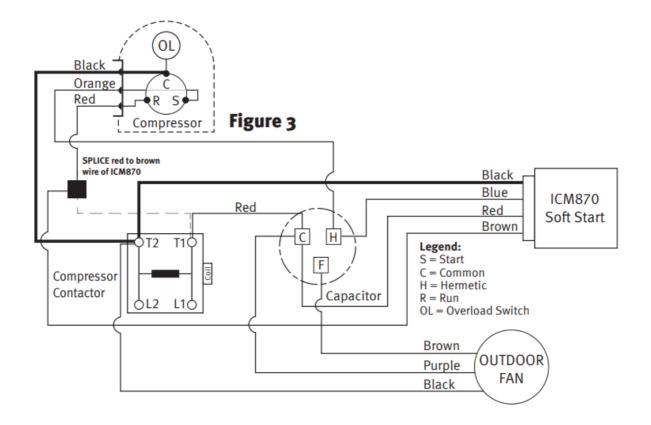
- **NOTE:** For Trane or American Standard units, T1 and T2 are labeled differently from Figure 1. Wire according to Figure 3 for those units.
- Step #1 Connect the (ICM870 RED WIRE) > to the run capacitor terminal (c/common/T2). See Figure 3 for Trane and American Standard (on these units, the common will be T1).
- Step #2 a) Disconnect factory 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 prior to 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 this model, the ICM870 BLACK wire will connect to T2).

INSTALLATION

- 1. **Step #1 a)** Disconnect factory 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.
- 2. Step #2 ICM870 RED WIRE > to the run capacitor (c/common/L2) terminal
- 3. **Step #3** Connect the ICM870 BLUE WIRE > to the run capacitor (herm/hermetic/start) terminal
- 4. **Step #4** Splice the ICM870 BLACK WIRE > with the factory-installed compressor Overload Switch wire (OL/L1)

WIRING DIAGRAM FOR TRANE & AMERICAN STANDARD HVAC UNITS



• **NOTE:** On American Standard and Trane units, T1 & T2 are labeled differently from the ICM870 instructions. In those cases, the wire is as seen below.

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 ICM870 model you need.

Air Conditioning & Heat Pump Loads – Average

Size	вти	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
- 7313 William Barry Blvd., North Syracuse, NY 13212 8003655525
- www.icmcontrols.com

Frequently Asked Questions

- What should I do if I encounter high current or low voltage flashing codes?
 - If you encounter high current or low voltage flashing codes, check for compressor start errors and ensure there are no open fuses. Verify the operating frequency and inspect for any abnormal start delays.
- Can I use the ICM870 soft start on residential A/C units?
 - Yes, the ICM870 soft start is suitable for use on residential A/C units as well as RV & Marine A/C units. Follow the wiring diagrams provided for proper installation.

Documents / Resources



ICM CONTROLS ICM870-9A Soft Start Motor Controller [pdf] Installation Guide

ICM870-9A, ICM870-16A, ICM870-9A Soft Start Motor Controller, Soft St art Motor Controller, Start Motor Controller, Motor Controller, Controller

References

- User Manual
- ICM

CONTROLS

• controller, ICM CONTROLS, ICM870 9A, ICM870-16A, ICM870-9A Soft Start Motor Controller, Motor Controller, Soft Start Motor Controller, Start Motor Controller

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ICM CONTROLS ICM2820 Furnace Control Board Installation Guide

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