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ICM CONTROLS ICM870-32A Built In Start Capacitor



Specifications

- **Type:** Semi-Conductor Soft-Start Motor Controller, Form 2, Bypassed Controller
- **Control Type:** Solid State motor control
- **Outputs:** Compressor
- **Model:** ICM870-32A Soft Start

Product Usage Instructions

Important Safety Information

CAUTION: Never mount the ICM870 against a residence or dwelling. The ICM870 must be mounted inside the metal cabinet which houses the compressor or a NEMA Type 3R Metal enclosure.

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: If the ICM870 is to be used with a generator, consult a licensed electrician or qualified professional to properly size the generator for your application. Using an undersized generator or inverter with the ICM870 soft start can result in a dangerous

condition.

Installation Steps

1. Connect the ICM870 RED WIRE to contactor terminal T2.
2. Disconnect factory-installed compressor run wire from the contactor terminal (T2) and splice the ICM870 BROWN WIRE to it.
3. Connect the ICM870 BLUE WIRE to the run capacitor terminal (herm/hermetic/start).
4. Splice the ICM870 BLACK WIRE to the compressor common and L1.

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



FEATURE

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

SPECIFICATION

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

- SCCR: 5kA
- $U_e = 240 \text{ VAC}$
- $U_i = 240 \text{ VAC}$
- $U_{imp} = 4\text{kv}$
- Pollution degree 3

Solid State motor control

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 = 32A
- **Over current limits:** ICM870-32A = 40A

Environmental:

- Ambient temperature:
40°C @ 32 FLA, 8 hour duty
- 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"
- LRA: 130

IMPORTANT SAFETY INFORMATION

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

CAUTION: Never mount the ICM870 against a residence or dwelling. The ICM870 must be mounted inside the metal cabinet which houses the compressor or a NEMA Type 3R Metal enclosure.

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: If the ICM870 is to be used with a generator, consult a licensed electrician or qualified professional to properly size the generator for your application. Using an undersized generator or inverter with the ICM870 soft start can result in a dangerous condition.

Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical Amperes, (Convient à des circuits produisant au plus 5,000 A eff.)240 V maximum when protected by a circuit breaker having not more than 40 A, 240 volts maximum

APPLICATION

The ICM870-32A is intended for Marine, Recreational Vehicle, HVAC and commercial applications. The ICM870-32A integrates compressor in-rush current over startup time, thus reducing peak current demand on a power supply source (such as a generator). The ICM870-32A will monitor system health including voltage, current, compressor startup and self integrity. Upon a fault condition, the ICM870-32A will halt operation and initiate a 4-minute anti-short cycle routine while providing diagnostic fault information by means of an LED indicator.

ICM870-32A COMPARABLE AMPERAGE CROSSES

The ICM870-32A model replaces amperage-corresponding models from the following manufacturers:

- Micro-Air (EasyStart)
- Dometic (SmartStart)
- Network RV (SoftStartRV)
- Hyper Engineering (Sure-Start)
- Carlo Gavazzi (Smooth Starter)

STANDARD AND TEST RESULTS

- UL 60947-1
- UL 60947-4-2
- Altitude: 2000 m
- IP65

- CSA C22.2 NO. 60947-1
- CSA C22.2 NO. 60947-4-2
- AC-58b: 32-180: 420

LED INDICATORS

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

FLASH CODES

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

WIRING DIAGRAM (GENERAL LAYOUT)

Figure 1

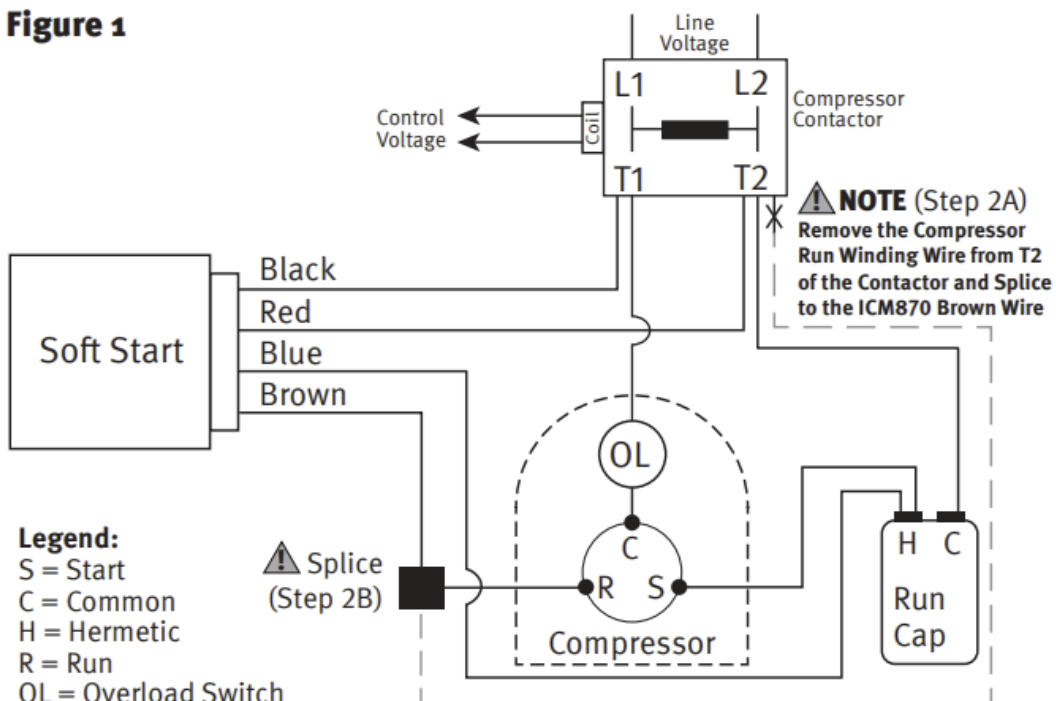
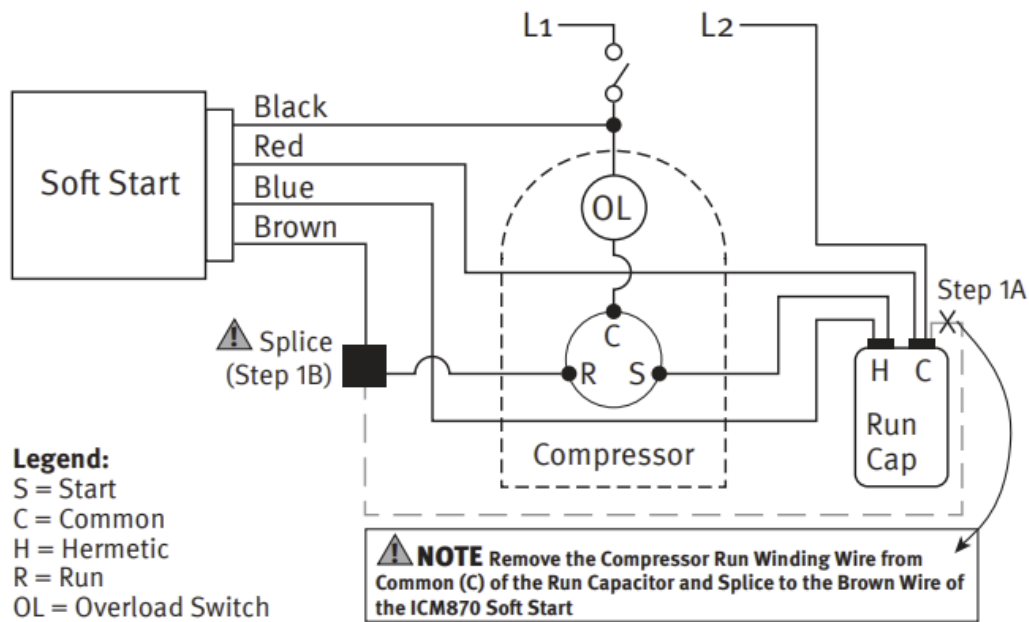


Figure 2



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

TYPICAL INSTALLATION HVAC

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 contactor terminal T2.

See Figure 3 for Trane and American Standard.

Step #2

- Disconnect factory installed compressor run wire from the contactor terminal (T2). See Figure 3 for Trane and American Standard.
- 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.

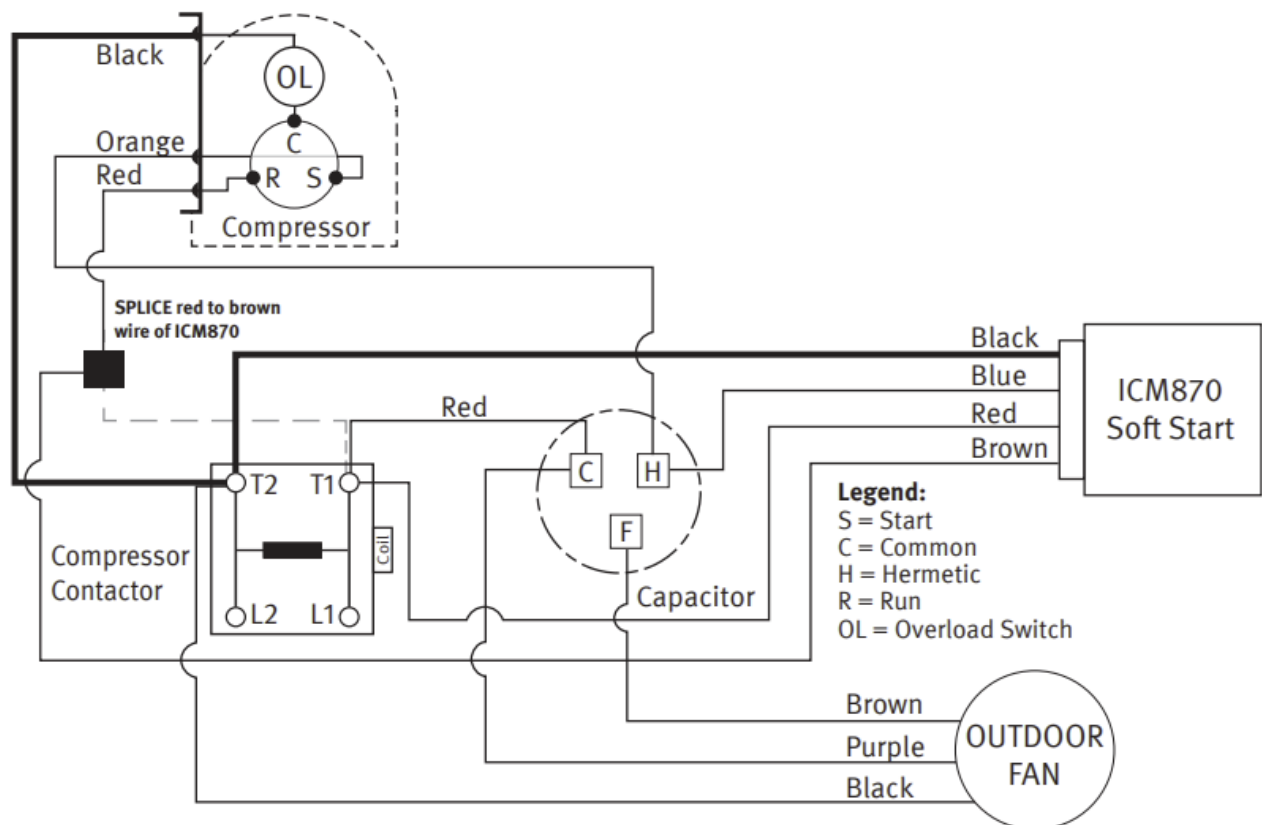
Step #3 Connect the ICM870 BLUE WIRE > to the run capacitor terminal (herm/hermetic/start)

Step #4 Splice the ICM870 BLACK WIRE to the compressor common and 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, wire as seen below.

Figure 3



INSTALLATION FOR RV & MARINE

Step #1 Connect the ICM870 RED WIRE > to the run capacitor (c/common/L2) terminal.

Step #2

- Disconnect factory installed compressor run wire from the common run capacitor / L2 terminal.
- 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 #3 Connect the ICM870 BLUE WIRE > to the run capacitor (herm/hermetic/start) terminal

Step #4 Splice the ICM870 BLACK WIRE > with the factory installed compressor Overload Switch wire (OL/L1)

WHICH MODEL DO I NEED?

- **ICM870-9A:** For AC's with a Compressor Rated Load Amps (RLA) of up to 9A
- **ICM870-16A:** For AC's with a Compressor Rated Load Amps (RLA) of 9.1-16A
- **ICM870-32A:** For AC's 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, BTU's, 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
Up to 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

What are the rapid flash conditions indicated by the diagnostic indicators?

The rapid flash conditions include high or low voltage,compressor not sensed or open fuse, high current, compressor start error, invalid operating frequency, and normal start delay active.

Documents / Resources

	ICM CONTROLS ICM870-32A Built In Start Capacitor [pdf] User Manual ICM870-32A, ICM870-32A Built In Start Capacitor, ICM870-32A, Built In Start Capacitor, Start Capacitor, Capacitor
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References

- [User Manual](#)

ICM CONTROLS
Built-In Start Capacitor, Capacitor, ICM CONTROLS, ICM870-32A, ICM870-32A Built In Start Capacitor, Start Capacitor

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