

METROPOLITAN NY CHAPTER Refrigeration Service Engineers Society

Continued Education for the HVAC/R Industry

“Better Service Through Knowledge”

March 2009

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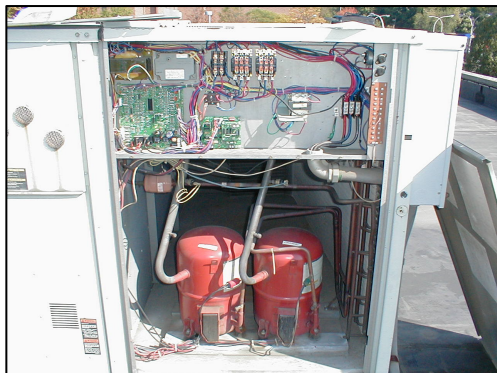
BRANCH-CIRCUIT SHORT-CIRCUIT AND GROUND-FAULT PROTECTION

Where a hermetic refrigerant motor-compressor is the largest load connected to the circuit, the rating or setting of the branch-circuit short-circuit and ground-fault protective device shall not exceed 175% of the motor-compressor rated-load or branch-circuit selection current, whichever is greater for the largest motor-compressor plus the sum of the rated-load or branch-circuit selection current of the other motor-compressor(s) and the rating of the other loads supplied. Where the protection specified is not sufficient for the starting current of the motor, the rating or setting shall be permitted to be increased but shall not exceed 225% of the motor-compressor rated-load or branch-circuit selection current, whichever is greater for the largest motor-compressor plus the sum of the rated-load or branch-circuit selection current of the other motor-compressor(s) and the rating of the other loads supplied.

For example, what would the maximum rating or setting of the branch-circuit short-circuit and ground-fault protective device for packaged rooftop air conditioner with a single compressor. The compressor has a rated-load amperage of 18.7 amperes, outdoor fan motor has a full-load amperage rating of 1.8 amperes and the indoor blower motor has a full-load amperage rating of 2.6 amperes.

**Protection size = (18.7 amperes * 2.25) + 1.8 amperes +
2.6 amperes**

**Protection size = 46.48 amperes, next size down =
45 amperes**



Replacing Fan Motors

When replacing the various types of fan motors typically found on RHVAC systems, it is not uncommon to use a generic replacement motor rather than obtaining the OEM's motor. When choosing a replacement motor the specifications of the replacement must closely match that of the original. Here are some questions that a technician must answer in order to correctly match a replacement motor:

What type of motor is it? - Is the motor a shaded pole motor, permanent split capacitor (PSC) motor or split-phase motor? If necessary, it is generally okay to replace a shaded pole motor with a PSC motor; however, the reverse is not always true. Normally you should not replace a PSC motor with a shaded pole motor.

How is the motor mounted? - Does the motor have a face mounting or is there a belly band which is wrapped around the motor body?

What is the diameter of its body? - Is the body diameter 3-3/8", 4-7/8", 5", 5-5/16" or some other body diameter?

What is the horsepower and amperage draw of the motor? - This information is normally stamped on the original motor. If the horsepower rating is not visible, matching the amperage draw of the motor will normally suffice.

What is the applied voltage? - Is the applied voltage 115 volts, 230 volts or some other voltage? This obvious mistake can cause serious problems for a service technician.

What is the required RPM of the motor? - This must be matched very closely to the original motor. For example, if the original motor is rated at 1075 RPM, the replacement motor must be rated at

(Continued on page 2)

Replacing Fan Motors

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1075 RPM or possibly 1050 RPM. A RPM rating of 1725 or 3450 cannot be used, as it will likely overload the motor.

What is the rotation of the original motor? -

Determining the correct rotation of the motor is essential to the proper operation of the system. It is quite easy to get the rotation wrong. The rotation of a motor is normally stamped on the motor's data plate. It will be stated as being either clockwise (CW) or counter-clockwise (CCW). However this rotation is based on how the motor is viewed—from the shaft end or lead end of the motor. To make it simpler for the technician, some manufacturers include the orientation with the stated rotation. For example a motor stamped "CWLE" means its rotation is clockwise looking at the motor from the lead end of the motor. Whereas "CWSE" means clockwise rotation looking from the shaft end of the motor.

What is the shaft length and diameter needed? -

Make sure the diameter of the shaft matches that of the original motor. The length of the shaft is also a concern; however, there is some play with that number as long as the shaft is not too short. A shaft that is too long can normally be cut down to fit if needed.

What type of bearings does it have? -

Does it use a sleeve bearing or a ball bearing? Most light duty motors will use sleeve bearings, which are quieter and more economical than the ball bearings.

By examining the original motor normally all of these questions can easily be answered. Not matching any one of these specifications can potentially cause problems with the motor or the system it is used on. It is usually best to bring the original motor to the supply house to match its replacement. This enables the counter person to assist in obtaining the correct replacement.

Once the replacement motor is installed, it is always a good practice to measure the amperage draw of the new motor and verify that it is operating within its amperage range. The motor should also be examined after approximately two hours of run time to ensure that there are no other problems with the motor. This may not be practical at times, but when possible it should be

TEST YOUR KNOWLEDGE

Forced-Air Duct Systems

Answer the following questions as they relate to Forced Air Duct System Installations

1. *True or False:* When installing a main trunk line, it is usually run at right angles to the building's floor joists.
2. *True or False:* When possible, is it best not to run duct up along an outside wall.
3. *True or False:* When local code permits, framing spaces can be used as return ducts.
4. *True or False:* Never assume that one building is constructed the same as a similar one when cutting access holes.
5. *True or False:* When cutting access holes for ducts, cut the hole to the exact size of the duct, making sure it is no larger than the duct.
6. *True or False:* Wrapping an approved insulation around the outside of the duct is the only way to insulate ducts.
7. *True or False:* The total pressure loss of the duct system components external to the fan assembly is called the external static pressure and is normally expressed in inches of water column (in. w.c.).
8. *True or False:* On completion of a furnace or air conditioner installation, the blower fan speed must be checked and adjusted as needed.
9. *True or False:* 500 to 550 CFM per ton of cooling is the airflow required for a properly operating system.
10. *True or False:* A residential HVAC system's airflow can be balanced using several standard thermometers.
11. *True or False:* Flex duct connectors cannot be used in residential applications.
12. *True or False:* Flex duct must be properly supported to avoid sagging.
13. *True or False:* Supply grills are sized based on the size opening it needs to cover.

RSES International can be contacted at:

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 Des Plaines, IL 50016-3552
 Phone: 800-297-5660 or 847-297-6464
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 Web: www.rses.org

(1) True; (2) True; (3) True; (4) True; (5) False; (6) False; (7) True; (8) True; (9) False; (10) False; (11) False; (12) True; (13) False

ANSWERS TO TEST YOUR KNOWLEDGE

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Wednesday March 11th, 2009 at 7:30pm
at
RICCARDO'S
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**Why Compressors Fail: Get the Latest Information
From the People Who Know**

By
Bruce Reich, Karen Chiappa
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METROPOLITAN NEW YORK CHAPTER, RSES

For Information Call: Stan Hollander, CMS (718) 232-6679

WE NOW HAVE OUR OWN WEBSITE: WWW.METRONYRSES.ORG CHECK IT OUT

YOUR MONTHLY MOTIVATION

It's Possible To Live Your Dreams

First think about what you want.

The beginning is always in your imagination.

Then organize your thoughts into definitive plans.

*Next, it's time to transform your thoughts into reality
by taking some positive action.*

Your mind is your mental workshop.

You can build anything in it that you want.

Visualize in your mind what you want.

See it, feel it, taste it, believe in it.

Make your mental blueprint, and begin to build.

Visualize, then actualize your success.

COMING EVENTS

- Pricing Guidelines
- Scroll Compressors
- Back to the Basics
- Defrost Controls

If you have any suggestions or requests for future programs, please let us know!

PLACE LABEL HERE

