METROPOLITAN NY CHAPTER
Refrigeration Service Engineers Society

Continuing Education for the HVAC/R Industry

"Better Service Through Knowledge"

****

October 2014

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RSES® The HVACR Training Authority Metropolitan New York Chapter

EMPIRE KEYSTONE ASSOCIATION — BETTER SERVICE THROUGH KNOWLEDGE

Potential Motor Overloading

When servicing HVAC/R equipment, technicians are sometimes required to increase the airflow of a system. This may be necessary in order to correct some type of system problem or to achieve the designed airflow upon start up.

An easy method for increasing the airflow on a centrifugal blower application is to increase the RPM of the drive motor. There is a direct relationship between the RPM of the motor and the CFM of airflow delivered by the fan system. If you increase to fan's RPM by 10% you increase the CFM delivered by 10%. However, there is a potential problem with this easy solution. There is also a relationship between the CFM of airflow produced and the required brake horsepower of the drive motor. As the CFM is increased the required brake horsepower will increase by the cube of the CFM increase. For example, if the CFM is increased 50% the required brake horsepower will have increased by approximately 300%. This increase can easily overload a motor and cause it to fail. Any time a service technician increases the RPM of a motor in order to increase CFM capacity of the fan system, he must make sure the motor can handle the increase. A technician can calculate the projected required brake horsepower by using this formula:

$$BHP_{new} = (CFM_{new}/CFM_{old})^3 \times BHP_{old}$$

For example, if the original airflow equals 1000 CFM and it needs to be increased to 1400 CFM, and the original calculated horsepower requirement of the motor is .5 HP (the horsepower requirements may need to be calculated separately since the nameplate HP does not always equal the required horsepower), the new horsepower requirement is:

$$BHP_{new} = (1400/1000)^3 \times .5$$
$$BHP_{new} = 1.4\ HP$$

If the original motor is not rated at 1.4 HP or higher, the motor will be overloaded.

An easy way for a technician to ensure a motor is not overloaded is to measure the amperage draw of the motor. As long the motor does not go 10% beyond it rated amperage draw, it will work satisfactory and will not become overloaded.

A motor should also be checked to see that it is not underloaded. The current draw should not fall below 25% of its rated amperage draw. If the existing motor cannot be adjusted to provide the necessary CFM requirements within the operating limits of the motor, the motor should be replaced with one that is suitable for the required application and CFM requirements.

Any time a technician replaces a fan motor he should also check the amperage draw of the installed replacement motor under operating conditions before leaving the job. This will ensure that the motor has been properly sized for the application and will not be underloaded nor overloaded. The motor should be tested under a full load condition. This may require the technician to close all the access doors to the unit and then measure the amperage draw. Sometimes this is hard to do, but will give a true indication of the amperage draw of the motor. If possible, the motor should be rechecked after approximately two hours of operation, as most motor problems develop within this time frame.

Want to be a better technician?
KEEP ON LEARNING!

Lock-out/Tag-out

When working on electrical circuits, safety should always be first on your mind. Electrical circuits should always be de-energized before repairing or replacing any electrical component or wiring. De-energize the circuit at the system's disconnect and then follow standard "Lock-out/Tag-out" procedures.

Lock out the circuit by placing a padlock on the disconnect, which will prevent anyone from accidentally energizing the circuit while you are working on it.

Place a tag on the disconnect so any other building or maintenance personnel know the system is being serviced and who de-energized the circuit and the system. When following the basic "Lock-out/Tag-out" procedure always follow the guidelines set forth by the agency having jurisdiction.

Before working on any electrical circuit, always verify with a voltmeter that the circuit is truly de-energized. The disconnect may appear to have disconnected the voltage, but there maybe an internal defect in the disconnect that may cause one or more of the hot legs to remain energized.

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HVACR Electricians
HVACR Contractors
HVACR Students

SATURDAY,
October 25th, 2014
8:30am – 5:00pm

FULL DAY
with Hot Lunch served

Location:
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This program utilizes lecture, field examples, computerized demonstrations, handout materials and encourages audience participation. A certificate of completion will be mailed to all participants.

The cost for full program, including morning & afternoon refreshment breaks and full service, hot sit-down lunch is:
$130 - ($105 for RSES members)

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For Further Information Call:
Stan Hollander @ 718 232-6679

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

We are fortunate to have Joe Marchese, CMS present the all-day Seminar on Computer-Room Air Conditioning shown on page 3. Joe was the Trainer for Stulz Air Technology Systems, Inc., a major manufacturer of highly regarded and widely used computer room air conditioning systems—Yes, Joe is eminently qualified to speak on this subject. He is a friend of our Chapter and has graciously offered to present this program for the Metropolitan New York Chapter, RSES.

Joe has many years' experience in the training arena, and is a sought after speaker and writer of columns and articles in the HVACR trade organizations and publications. He was also our Regional Director at RSES, and is currently the International President of RSES.

Wednesday October 8th, 2014 at 7:30pm

at

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Duct Smoke Detection Technology

By

System Sensor, Inc.

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EDUCATIONAL PROGRAM
Wednesday October 8th, 2014
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SEE DETAILS—THIS PAGE

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