METROPOLITAN NY CHAPTER
Refrigeration Service Engineers Society

Continued Education for the HVAC/R Industry

"Better Service Through Knowledge"

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EMPIRE KEYSTONE ASSOCIATION BETTER SERVICE THROUGH KNOWLEDGE

OVERHEATED COMPRESSORS

While troubleshooting a single-phase permanent-split capacitor compressor, many times a technician will measure the resistance of the compressor's windings to check their integrity. An infinite ohm reading on either winding using a standard ohmmeter can indicate an open winding and the need to replace the compressor.

However, if the compressor is extremely hot it is possible for its motor windings to be open on its internal overload protector. This may also give an infinite reading with a standard ohmmeter depending on which compressor terminal the technician is measuring the resistance. In this case, the windings of the compressor may be okay and the compressor needs to cool down.

The technician may not need to replace the compressor, just simply find out why it overheated.

Before condemning a compressor based simply on the resistance reading of its winding, it is best to make sure the compressor body is cool and there is not a possibility of the compressor being electrically open due to its internal overload protection. This may save a technician from changing out a good compressor. <<

QUICK RIDDLES

Q. What do you call a boomerang that doesn't work?

A. A stick.

Q. How do crazy people go through the forest?

A. They take the psycho path.

FIRST STEPS OF A SERVICE CALL

Troubleshooting heating, air conditioning and refrigeration systems is all about gathering information and using that information to determine the cause of a problem. Technicians are always measuring voltages, amperages, pressures, and various temperatures to help determine the cause of a problem. Besides these important measurements there are other pieces of information a technician should also gather while troubleshooting a system. He should speak with the customer and obtain some system history. This information can be extremely useful during the troubleshooting process. Knowing what work was done on the system previously, or how the system had been operating up to the breakdown, can help lead a technician in determining the current system malfunction.

Upon arrival at a service call, a technician should spend some time with the customer and ask pertinent questions about the system. The answers to these questions can be very useful as a technician begins the troubleshooting process. Some questions a technician can ask a customer include: When was the system last repaired and what service was performed? Was the unit making any strange sounds before it broke down, or was it cooling effectively just before it failed?

For example, suppose a technician discovers that last week another technician added refrigerant to a system and did not repair any known leaks. It is a very good possibility the current problem is a low refrigerant charge and now the technician will need to locate and repair the system leak before adding refrigerant into the system.

Another example, suppose a technician is working a residential split system air conditioner and discovers the indoor fan was making a strange sound but the system seem to be working okay. Now the sound is gone; however, the system is not working. This might lead a technician to first look at the indoor blower as being the cause of the problem. Perhaps the bearing of the motor were failing, thus producing the strange sounds and now the motor has totally locked up and does not turn.

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INSTALLING ICE MACHINES

One of the many types of refrigeration equipment a technician may be asked to install is the self-contained commercial ice machine. Installing this type of ice machine is not normally difficult, but does require a technician to follow the directions as outlined in the manufacturer's installation literature. This is an important part of the process; reading and following the directions will ensure the proper operation of the ice machine and prevent future problems from developing.

There are some general installation guidelines that apply to many self-contained commercial ice machines. Reviewing some of these common guidelines may help to avoid some of the common problems encountered with their installations.

It is generally a good practice to verify that the capacity of the ice machine meets the needs of the customer. Verifying this with the customer before installing the ice machine may help to avoid installing one that has an ice production capacity that is too small for the customer.

Also, before installing the ice machine make sure the location is adequate for the installation. Make sure the ambient air temperature does not fall outside the manufacturer's guidelines. If the area is too warm or too cold the ice machine may not operate properly. Also make sure that there is sufficient clearance surrounding the ice machine for both service and ventilation purposes. This is especially important for a machine with an air cooled condenser. There must be adequate airflow through the machine's condenser for proper operation. If the location is not adequate notify the customer and discuss an alternate one.

Another concern while installing an ice machine is the supply water line. Verify that the supply line is of the proper diameter and that the inlet water temperature will not exceed the limits as specified by the manufacturer. As the inlet water temperature increases the ice production of the machine will decrease, so for maximum ice production, cooler inlet water is preferred. It is also generally recommended that an appropriate style water filter be installed in the supply water line. The type of water filter installed is normally based on the condition of the water being supplied to the machine. Again follow the manufacturer's guidelines for their recommendations.

The drain line must also be properly configured and installed. Here it is also important to follow any local plumbing codes as well as the manufacturer's instructions. Normally ice machine drains are connected to an open type drain with some type of air vent teed into the drain line.

When installing the ice machine, make sure it is level. This will ensure that water will not be lost from its water trough. It will also ensure that the water will drain properly out from any of its drain lines.

Once the machine is installed a technician should allow it to operate for at least two batches before leaving the job. During this time the technician can go over with the customer the proper cleaning procedure for the machine. It is important for the technician to stress the importance of cleaning the ice machine on a regular basis. Regularly cleaning is the number one way to prevent future failures.

Following these basic guidelines and those covered in the manufacturer's installation manual will help to avoid some of the common problems associated with ice machine installations. <<

"Many of life's failures are people who did not realize how close they were to success when they gave up."
-Thomas Edison

FIRST STEPS OF A SERVICE CALL

Continued from page 1:

This is an example where asking some questions up front may prevent a "call back" or a return service call: Suppose a technician is working on a residential split system air conditioner and discovers that there has always been one room that was never really cold enough, even when the system was operating normally. But now the entire system is not operating. The technician then looks at the system and discovers the compressor is defective. He then quotes the customer a price to replace the compressor. But he also informs the customer that replacing the compressor will solve the problem of the entire system not operating, but it probably will not solve the problem with that one room which was always warmer than the rest. This could help prevent a misunderstanding between the customer and the technician. The customer may assume that since they are spending all this money on replacing the compressor that all the system problems will be resolved and expect that one room to be as cool as the others.

There are many other situations where asking a few pertinent questions can lead to discovering a system problem in a more proficient manner and prevent a misunderstanding between a customer and a technician. Spending a little extra time with a customer is definitely a valuable service tool. <<

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REPLACEMENT RULES FOR CAPACITORS

1. The voltage rating of the replacement capacitor must be equal to or greater than the original capacitor.
2. The microfarad (strength) rating of a replacement run capacitor may vary plus or minus 10% from the original run capacitor.
3. The microfarad (strength) rating of a replacement start capacitor must be equal to or no greater than 20% of the original start capacitor.
4. If capacitors are wired in parallel the total capacitance (microfarad rating) is equal to the sum of the individual capacitors. The voltage rating of each capacitor must be equal to or greater than the original voltage rating.
5. If capacitors are wired in series then the total capacitance is equal the reciprocal of the sum of the reciprocals of the individual capacitors. The formula $1/C_T = 1/C_1 + 1/C_2 + 1/C_3 + \ldots$ can be used to determine the total capacitance.

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