METROPOLITAN NY CHAPTER
Refrigeration Service Engineers Society

Continued Education for the HVAC/R Industry

"Better Service Through Knowledge"

****

April 2010

WWW.METRONYRSES.ORG

RSES® The HVACR Training Authority
Metropolitan New York Chapter

Answer to You Make the Call (from page 2)

Based on the information listed below, the most likely cause is **a defective SmartValve™**. It is also possible for the igniter/flame rod assembly to be the cause of the problem. Before replacing the SmartValve™ it would be wise to try replacing the igniter/flame rod assembly to see if that is the possible cause.

Replacing Capillary Tubes

A popular metering device used on many fractional horsepower refrigeration systems is the **cap tube**. One field problem encountered with this type of metering device is that it can become plugged with system debris, causing a restriction. When this happens, normally the cap tube will need to be replaced.

When replacing a cap tube, the replacement must match the BTU capacity and flow characteristics of the original. It is usually easiest to obtain the replacement cap tube from the original equipment manufacturer (OEM) to ensure the correct one is used. However, if that is not an option, a replacement cap tube from another source can be used.

The BTU capacity and flow characteristics of a cap tube are based on its length and inside diameter. When choosing a replacement cap tube, it is best to choose one with the same inside diameter and length. However a cap tube with the same inside diameter may not always be readily available. A cap tube with a different inside diameter may be used if it is cut to the appropriate length as directed by the manufacturer. Remember to always follow any applicable notes and directions provided by the manufacturer.

When installing a cap tube metering device, it is common for a technician to braze the tubing into the system. If care is not taken during this process, brazing material and/or other foreign material can enter the end of the cap tube and cause a partial or total restriction. Below are some general guidelines to ensure this does not occur.

New cap tubing is normally shipped with plastic caps on the ends. Leave these caps on until it is time to insert the tubing ends into the connecting tubing. This is helpful when it is necessary to feed the tubing through an opening in the cabinet.

When cutting a cap tube to length, do not use an instrument that can distort the end of the tubing. The best way to cut a cap tube is to use a tool designed especially for cutting this tubing, or to score the tubing with a file at the location to be cut and then flex the tubing back and forth until it breaks. This will prevent the ends from being distorted or plugged.
Be careful where the tubing is placed during the preparation process. Do not place the cap tube in a location where foreign material could easily enter the ends, such as on the floor or on the base of the equipment.

Do not sand the very end of the cap tube. Begin sanding two to three inches back from its end. This serves two purposes: 1) it will prevent any grit from the sanding process from entering the tubing, and 2) during the brazing process, it may help to impede the brazing material from flowing down the cap tube and into the end.

Insert the cap tube at least two to three inches into the connecting tubing.
During the brazing process use only enough filler material to seal the joint. Avoid overfilling the joint--this may lead to filler material entering the end of the tubing.

Replacing cap tubes can be an easy process; however, it does require attention to detail and some patience. Installing the wrong cap tube or mishandling the cap tube during the installation process can cause further system problems or even cause the tube to be replaced again.

Don't Overlook the Obvious

An important piece of advice when troubleshooting refrigeration systems: *Don't overlook the obvious*. Sometimes it's easy to look too deeply into a refrigeration system and overanalyze a problem. Many times the problem is simple, but overanalyzing causes the simple solution to allude you. Look at the whole picture and try not to focus in on one area of the system, such as the compressor or condensing unit. Examine all of the system's components.

Also spend some time with the customer asking some of these pertinent questions:

Has the system been regularly serviced?

When was the last time it was repaired?

Have you heard any strange sounds from the system?

Asking questions definitely helps the troubleshooting process.

Here is a classic example from my own personal experience:

One day early in my career, I was called out to service a walk-in cooler where the interior light was not working. Upon arrival I jumped right into the repair. I decided that the problem must be a loose wire or burnt off terminal. Since the light fixture itself was a little difficult to get to, I started to check the supply voltage coming into the cooler and then worked my way to the light fixture. At each junction I found no problem. There were no breaks in the electrical connection and voltage was present at each point. I spent 45 minutes looking for the electrical disconnect, opening electrical boxes, checking the wiring and voltage supply.

I was becoming frustrated and decided to take a 10-minute break and rethink the problem. As I was walking back into the cooler, I spotted the maintenance person and asked how long the light was out and if he had noticed anything strange when he changed the bulb.

That is when he told me *he never tried changing the bulb*. When I heard this, my mouth dropped open. Could it have been simply the light bulb? Sure enough that was the problem – a burnt out light bulb. If I had tried the light bulb in the first place I would have finished the job in one minute, instead of wasting almost an hour looking for something major.

After that day I decided to never to overlook the obvious. I always check for the obvious problem and speak with the customer to get a history of the system before starting any troubleshooting.

A lesson well learned.

You Make The Call (answer on page 1 sidebar)

You are called out to service the below-listed equipment with the complaint and conditions observed. From the information given, determine what is the most likely cause of the problem.

Equipment to be serviced:

- Residential natural gas forced-air furnace using Honeywell SmartValve™

Customer's complaint:

- No heat -- burners do not light

Conditions observed:

- Outdoor ambient temperature is 45ºF
- Indoor ambient temperature is 60ºF
- Filter is clean
- Indoor blower wheel is clean
- Gas pressure at the inlet of the gas valve is 8" w.c.
- External static pressure across the blower is 0.5" w.c.
- At the SmartValve™, 24 volts measured at the control harness between the 24 volt common and 24 volt thermostat/pressure switch terminals
- At the SmartValve™, 24 volts measured at the control harness between the 24 volt common and the 24 volt hot terminals
- HSI glows on a call for heat; 24 volts is measured at the HSI terminals
- Pilot lights normally
- Pilot flame is making good contact with the pilot flame rod
- Electrical connection through the pilot tubing is okay
- 0 volts measured across R and W terminals at the low voltage terminal block

Safety First

Working on any type of mechanical system--especially heating, air conditioning and refrigeration systems--can be hazardous at times. Working safely should always come first for a technician. A technician should never attempt to make a repair that could place him in an unsafe situation.

Many times a technician will take unnecessary risks either to save time on the job or as a result of simply being lazy. This should be avoided--always take the extra time needed to work safely and avoid being lazy.

Another situation that can cause injury to a technician is trying to do a two man alone. If help is needed, ask. Don't be a hero on a job by not taking help.

Remember: **safety first, no exceptions.**

COMING EVENTS

Troubleshooting Electric Motors

Transitioning from R-22:
Alternatives and Proper Retrofit Procedures

Refrigeration Piping Problems

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

METROPOLITAN NEW YORK CHAPTER, RSES

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

Have you visited our website lately "***WWW.METRONYRSES.ORG***"? Here you can keep up with everything that's happening in our chapter, and, most importantly, where you'll find the latest information regarding changes and/or cancellations of our regular meetings due to weather or other factors. This is the only way we can notify you of any last minute changes. Remember, we meet the 2nd Wednesday of the month, Sept thru May. Scheduled topics are posted on our website.

Wednesday April 14th, 2010 at 7:30pm

at

RICCARDO'S
21-01 24th Avenue, Astoria NY 11102

Troubleshooting Electric Motors

By

Greg Palaski, AO Smith Electric Products Corp.

PLACE LABEL HERE

EDUCATIONAL PROGRAM
Wednesday April 14th, 2010
at 7:30pm
SEE DETAILS — THIS PAGE

RSES
The HVACR Training Authority
Metropolitan New York Chapter
Refrigeration Service Engineers Society
241 Halsey Street
Brooklyn, NY 11216