TECHNICALLY SPEAKING

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2010 Issue 4
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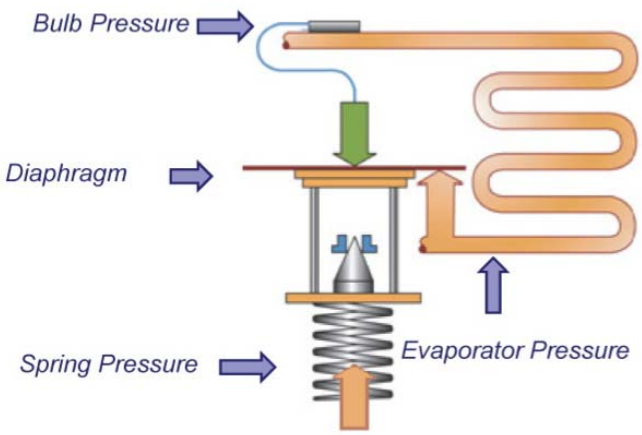
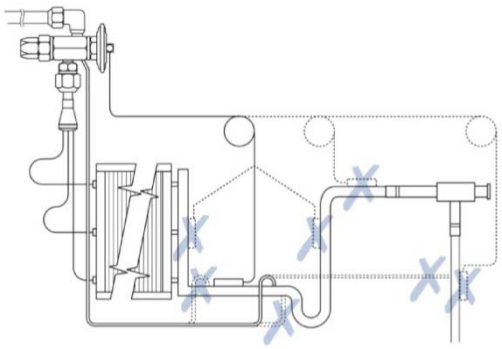
TEV Service Diagram (Thermostatic Expansion Valves, also known as TXV)

■ TEV's automatically adjust refrigerant flow over varying loads to achieve complete vaporization of the refrigerant and maintain a constant superheat at the outlet of the evaporator.
■ In order for the valve to maintain proper superheat the valve must be supplied with sub-cooled refrigerant





■ **Normal superheats**

➢ Air conditioning 8°F - 12°F at outlet of evaporator
➢ Refrigeration 6°F - 10°F at outlet of evaporator
➢ Low temp. 4°F - 8°F at outlet of evaporator

■ **Normal A/C Evap. Delta T of 17-23 degrees**

➢ Best location for the sensing bulb is on a horizontal line at 2, 4, 8 or 10 o'clock. Not on the top or bottom of the pipe
➢ If you must put on vertical line, remember:
- ◻ Oil in line <u>may</u> affect operation
- ◻ Cap tube must come off top of bulb on vertical applications

■ **Sub-Cooling:**

➢ is an indication of how much liquid refrigerant is in the system.
➢ There must be adequate sub-cooling supplied to the TXV to maintain proper super heat
➢ Sub-cooling will vary depending on outdoor air temperature and load on the evaporator.
➢ Typical sub-cooling at 95°F outdoor air temperature with and adequate load on the evaporator is 10°F

Measuring Sub-Cooling

Measurements you will need:
- ◻ High side pressure
- ◻ High side /Condensing temperature (converted from a PT Chart)
- ◻ Liquid line temperature measured with a thermometer

Sub-Cooling =
High side saturation temp. - Liquid line temp.

Measuring Superheat

Measurements you will need

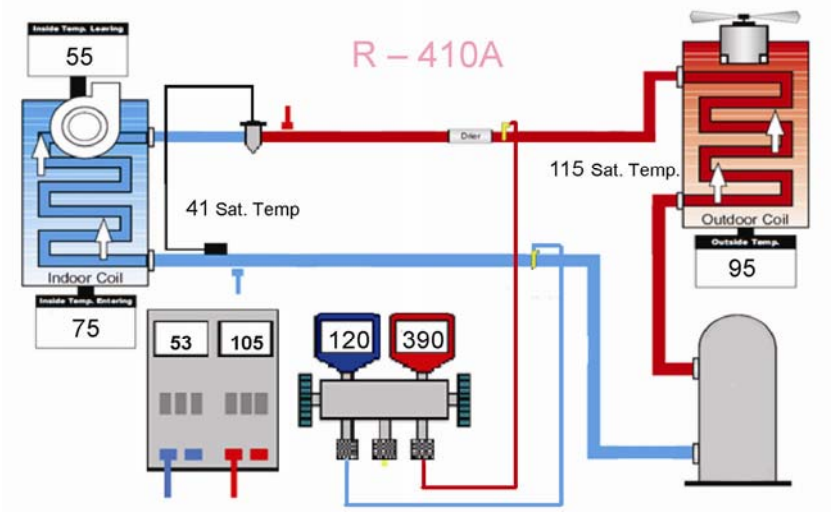
- Suction pressure
- Low side /Evaporator saturation temperature (converted from a PT chart)
- Suction line temperature (measured with a thermometer)

Superheat =

Suction Line Temp. – Evaporator Saturation temp.

Adjusting Superheat:

- To lower superheat:
  - Decrease spring pressure
  - Increases liquid refrigerant in evaporator
- Increase superheat:
  - Increase spring pressure
  - Decreases refrigerant in evaporator
  - Less liquid is available in the evaporator
  - Evaporator pressure will be reduced



EXAMPLE:

Superheat:

53 – 41 = 12°F Superheat

Sub-Cooling:

115 – 105 = 10°F Sub-Cooling

Evap. Delta T:

75 – 55 = 20°F Delta T

** For additional support contact Meier Supply at any of our locations **

PRECAUTIONS:

- Allow system to equalize before adjusting superheat.
- Wait at least 10 minutes between adjustments.
- Make small adjustments
- Head pressure should be raised to simulate an OAT of 90°F during low ambient conditions (Block condenser discharge air until high side saturation temp is between 110-120°F)
- There must be an adequate load on the evaporator
- Set superheat at design set point for specific application

In conclusion, troubleshooting a TEV can be quite simple. The first step is to verify that the valve is being supplied with the proper amount of sub-cooled liquid. Then check the superheat of the valve at the sensing bulb. If the superheat is high and there is adequate sub-cooling then the problem lies in or after the valve. If superheat is high and there is no adequate sub-cooling then the problem lies before the valve.
Be sure to read my next newsletter to see a handy reference for troubleshooting TEV's!

If you have any questions, please contact:
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