

Technical Article | Thermostatic Expansion Valves

## Thermostatic Expansion Valve Troubleshooting

Tips and tricks for TXVs in air conditioning systems:

Thermostatic expansion valves (TXVs) are often misdiagnosed as the root problem in poorly performing air conditioning and heat pump systems. The truth is that two-thirds of TXVs returned to Danfoss show no signs of failure. For this reason, Danfoss recommends taking a system-wide approach when troubleshooting. Eliminate all other components as a source of the system's performance issues before investigating the TXV as the culprit.

#### Low airflow

Low airflow is one sign that the cooling system is not functioning properly that has nothing to do with the TXV.

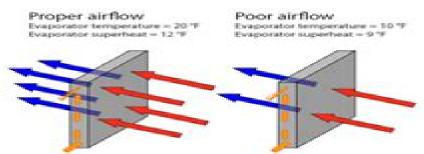


Figure 1

Figure 1 shows two identical evaporators being fied by a TXV with the evaporator on the left gettling adequate airflow while the one on the right has inadequate airflow (note the superheat values and evaporator temperatures). Low airflow can be caused by a dirty or clogged air filter or a malfunctioning fan or blower motor, so be sure to investigate those components as the source of insufficient airflow. Low refrigetant charge

#### Low refrigerant charge

Proper charge	Poor charge
Evaporator temperature = 20 °F	Evaporator temperature = 5 °F
Evaporator superheat = 12 'F	Evaporator superheat = 28 °F
Condenser subcooling = 12 °F	Condenser subcooling = 2 °F

Figure 2:

As seen in the table in Figure 2, a low refrigerant charge will result in a higher superheat and a lower subcooling and lower evaporator pressure. The biggest difference between low airflow and low charge is the level of superheat and subcooling. In a poor refrigerant charge scenario, the load is still there, but there is not enough refrigerant to absorb the heat. If signs point to the refrigerant charge being low, charge the system while following proper field procedures or original equipment manufacturer's (OEM's) recommendation.

#### Upstream obstructions

An obstruction in the liquid line, such as a clogged filter drier or smashed or crimped liquid line tubing, can produce flash gas (see Figure 3), even though there is a proper refrigerant charge. Make sure to check upstream for blockages if there is flash gas at the TXV inlet. Check subcooling at both the condenser outlet and the TXV inlet prior to adding any refrigerant. A dirty or clogged filter drier is a potential culprit, especially since they are most often installed upstream from TXVs.



Figure 3

#### Walve installation

Ensure that the valve has been correctly installed: inadequately brazed fittings or mounted bulbs will all negatively affect the TXV's ability to operate. Inspect the valve, looking for physical signs of damage, such as dents in the power element, kinks in the tubing, or signs of overheating like discoloration.

# **Txv Troubleshooting Guide**

**Charles Nehme** 

#### **Txv Troubleshooting Guide:**

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