

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.

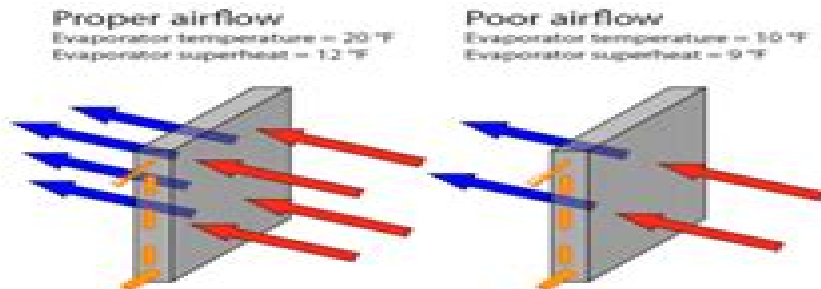


Figure 1

Figure 1 shows two identical evaporators being fed by a TXV with the evaporator on the left getting 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 refrigerant 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.

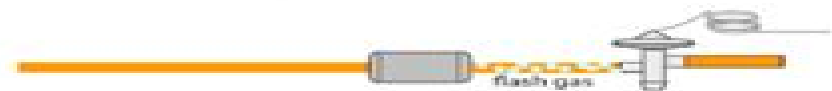


Figure 3

Valve 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

Craig Migliaccio



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preventive measures routine maintenance schedules and the signs that indicate a need for repair or replacement Additionally the book offers valuable tips on selecting the right tools safety precautions and understanding when to call in a professional With The Complete Guide to HVAC Troubleshooting readers will gain the confidence to tackle various HVAC issues head on ensuring their systems run smoothly and efficiently all year round This book is more than just a troubleshooting manual it s a comprehensive reference for anyone committed to understanding and caring for their HVAC system Get ready to turn the page and take control of your home s comfort and air quality

Refrigerant Charging and Service Procedures for Air Conditioning 2nd Edition Craig Migliaccio, 2025-01-08 The 2nd Edition of the Refrigerant Charging and Service Procedures for Air Conditioning has 450 images on 344 pages It includes over a hundred more pages and double the amount of images to cover A2L Refrigerant Changes R 32 and R 454B R 410A and R 22 More Step by Step Procedures Wireless Probes Gauge Stubs Tees All In One Digital Manifold Set use Compound Manifold Gauge Sets More Images and Procedures Charging and Recovery with Manifolds Charging and Recovery with Tees and Probes Detailed Troubleshooting Scenarios More Methods to Determine Problems More Airflow Testing Procedures This book is dedicated to those who are eager to learn the HVAC trade and refrigerant charging troubleshooting practices This book contains step by step procedures that include preparing air conditioning and heat pump systems for refrigerant measuring system refrigerant charges and troubleshooting systems by measuring refrigerant charge indicators air temperature measurements and airflow Manifold gauge sets digital manifold sets digital gauge stubs and wireless probes are discussed and utilized in examples This book differs from others in that it provides key insights into each procedure along with tool usage from a technician s perspective in language that is easy to understand Concepts are examined such as refrigerant properties the refrigeration cycle of an air conditioner and heat pump energy transfer airflow requirements components within systems and common problems

Hvac: Comprehensive Insights on Residential & Commercial Systems (Installation and Troubleshooting With a Practical Step-by-step Training Manual to Master Heating)

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HVAC Chiller Components: A Comprehensive Guide Charles Nehme, The chiller is often considered the single most critical and complex piece of equipment in any large Heating Ventilating and Air Conditioning HVAC system Its performance dictates not only the comfort of the occupants but also the operational cost and overall energy footprint of the entire facility HVAC Chiller Components A Comprehensive Guide is designed to move beyond the system level overview offering a deep component by component analysis necessary for true mastery of these machines Modern chiller technology driven by innovations like Variable Frequency Drives VFDs and high efficiency refrigerants demands that professionals understand the intricate engineering and thermodynamic principles governing each part from the core compressor types to the essential oil management systems and sophisticated electronic expansion valves This book is structured to guide the reader through the foundational thermodynamics a detailed exploration of all major and auxiliary components critical aspects of troubleshooting and the latest trends in energy efficiency and sustainability Whether you are designing a new plant commissioning a complex system or performing critical maintenance this guide provides the detailed knowledge required to ensure optimal performance reliability and longevity of your chiller assets

Basic Refrigeration & Charging Procedures John Tomczyk, 2002-02-01 This program provides the knowledge to accurately perform system installation basic repair and the information necessary to properly charge modern equipment Basic

Refrigeration and Charging Procedures covers refrigerant pressures states and conditions how they apply to the refrigeration system vapor pressures subcooling superheat saturation latent heat sensible heat and the refrigeration cycle Basic system components their functions and applications are included Detailed explanations of each point in the refrigeration cycle will clarify questions the reader may have

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Air Conditioning Heating & Refrigeration News, 1988 *Heating, Ventilating, and Air-conditioning Fundamentals* Raymond A. Havrella, 1981 ***Heating, Cooling, and Ventilating***, 1987 *Automotive Heating, Ventilation, and Air Conditioning Systems*, 1991-02 ***Troubleshooting and Servicing Heat Pumps*** Richard Jazwin, 2002

This unique field guide discusses in detail the various aspects of heat pump selection installation and service This book covers basic heat pump operation including a review of the refrigeration cycle heat pump configurations four way valves electrical schematics defrost systems controls and accessories the scroll compressor and service and troubleshooting

Your Personal Hvac Troubleshoot Guide johnnie thomas, 2024-08-01 Whether you're a DIY enthusiast a curious homeowner or just someone tired of paying exorbitant repair bills this book offers a refreshing take on home maintenance It's packed with smooth easy to follow instructions that feel more like a conversation with an old friend than a technical lecture You'll uncover impractical yet charming tidbits about HVAC systems that will make you the star of your next dinner party

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