

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.

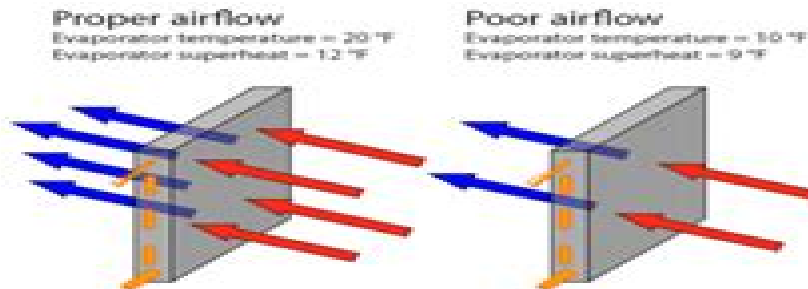


Figure 1

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.

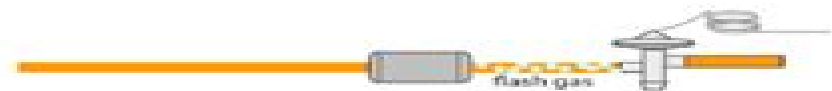


Figure 3

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

John Tomczyk

A red circular graphic with a gradient, appearing as a stylized arrow or a light effect, positioned to the right of the author's name.

Txv Troubleshooting Guide:

Air Conditioning Service Guide 2nd Edition Michael Prokup, 2021-09-01 Now in its Second Edition this training manual was written by industry renowned presenter and author Michael Prokup This e book is a comprehensive reference for servicing R 22 R 410A residential split air conditioning systems and is a must have for every student and service technician Step by step service procedures and quick reference diagrams will help guide technicians through troubleshooting and service 168 pages and fully illustrated Copyright 2022 Topics covered include Mechanical Refrigeration Cycle Basics Refrigerants and Oils Superheat Subcooling and Condensers Refrigerant Piping Charging Diagnosing Refrigeration Circuit Problems High Voltage Circuit Compressors ECM Blower Motors PSC Motors Air Volume **Refrigerant Charging and Service Procedures for Air Conditioning** Craig Migliaccio, 2019-04-24 This Ebook is dedicated to those who are eager to learn the HVACR Trade and Refrigerant Charging Troubleshooting Practices In this book you will find Step by Step Procedures for preparing an air conditioning and heat pump system for refrigerant reading the manifold gauge set measuring the refrigerants charge level and troubleshooting problems with the system s refrigerant flow This book differs from others as it gives key insights into each procedure along with tool use from a technician s perspective in language that the technician can understand This book explains the refrigeration cycle of air conditioners and heat pumps refrigerant properties heat transfer the components included in the system the roles of each component airflow requirements and common problems Procedures Included Pump Down Vacuum and Standing Vacuum Test Recovery and Recovery Bottle Use Refrigerant Manifold Gauge Set and Hose Connections Service Valve Positions and Port Access Preparation of the System for Refrigerant Refrigerant Charging and Recovery on an Active System Troubleshooting the Refrigerant Charge and System Operation **The Complete Guide to HVAC Troubleshooting: A Homeowners Manual** Tim David, 2023-12-29 The Complete Guide to HVAC Troubleshooting is a definitive resource for homeowners and aspiring technicians alike offering in depth insights and practical advice on diagnosing and resolving a wide range of heating ventilation and air conditioning issues This book serves as an indispensable tool for anyone looking to understand maintain and repair their HVAC systems efficiently and effectively Structured to cater to both beginners and those with more technical experience the guide begins by introducing the fundamentals of HVAC systems It outlines the core components how they operate and the common types of HVAC systems found in homes and buildings This foundational knowledge sets the stage for more complex topics ensuring all readers are up to speed Central to the book is a comprehensive troubleshooting section detailing step by step methods to diagnose common and not so common problems From strange noises and inconsistent temperatures to complete system failures the guide provides clear concise instructions to identify issues and implement solutions It covers a range of scenarios including quick fixes that can be handled without professional help and more complex problems requiring expert intervention The guide goes beyond simple fixes delving into the nitty gritty of HVAC maintenance performance optimization and

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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)* Mark Anderson,101-01-01

Are you tired of paying expensive technician fees for problems you could fix yourself Do you feel lost when it comes to understanding heating cooling and ventilation systems in your home or workplace You re not alone most beginners find hvac systems confusing overwhelming and intimidating But here s the truth with the right guidance anyone can learn to handle the basics of installation troubleshooting and maintenance with confidence That s exactly why this guide was created Complete hvac beginner s user guide is your step by step manual to understanding managing and mastering hvac systems without feeling stuck or second guessing yourself Inside you ll discover Complete hvac fundamentals learn the principles behind heating ventilation and air conditioning systems to build a strong foundation for both diy tasks and professional growth Detailed component analysis dive into the structure and functions of hvac components with real world visuals to help you grasp each part s purpose Installation maintenance and troubleshooting step by step guidance to confidently manage installation projects and

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