



FOCUS

Expansion Valves



Our Premium Quality

A superior quality range, guaranteed by direct control of the entire process.

Design and production are supervised by the Group's engineers, in compliance with the original equipment specifications. Subsequently, each component undergoes end-of-line validation testing by the Quality team, with the aim of offering a product that always stands out for its quality, reliability, and durability.



Design



Fleet Coverage



Testing



After-Sales Support

What Are They?

Air conditioning system expansion valves are essential components of the cooling circuit. They **regulate and control the flow of refrigerant between two areas of the system** with different pressures, creating the pressure drop required for cooling.





What Are They Used For?

They lower the refrigerant pressure

They regulate the amount of refrigerant according to the evaporator temperature

They reduce the temperature while maintaining constant refrigerant super-heat

This makes it possible to generate the cold air that is then distributed throughout the passenger compartment.

Operating Principle of the System

The vehicle's air conditioning system follows this process:

1 Compressor

Compresses the gas (high pressure, high temperature).

2 Condenser

Cools the gas, which becomes liquid.

3 Receiver Drier

Removes moisture and impurities.

4 Expansion Valve

Suddenly lowers the refrigerant pressure.

5 Evaporator

The refrigerant evaporates by absorbing heat from the air entering the passenger compartment.

The valve is therefore the point where the transition from high to low pressure takes place. Our valves are **Thermostatic Expansion Valves** (TXV).

How To Tell If the Valve Is Faulty

The air coming out is only slightly cold or warm

The pipe after the valve remains only slightly cold

The compressor operates abnormally

The evaporator does not cool properly or has ice on its surface

The low-side and high-side pressures are not within specification, and the pipe temperatures are abnormal

Replacement Procedure

Warning! Refrigerant **must not be released into the atmosphere**: a recovery station is required. Therefore, this operation is recommended **only with suitable equipment** (or in a workshop).

Before installing a new valve, it is recommended to lubricate the O-rings.

1 Visual Inspection and Listening

Check fuses, connectors, wiring, and the condition of the fan blades; with the engine warm, make sure the fan activates correctly.

3 Removal

- Disconnect the refrigerant pipes
- Remove the screws securing the valve
- Remove the valve

Warning: sealing O-rings are present and must always be replaced. They prevent dirt from entering the system.

2 Accessing the Valve

This depends on the vehicle, but it is usually located near the evaporator. It can often also be found behind the dashboard or in the engine compartment, on the firewall. In many cases, it is necessary to remove the cabin filter and covers or part of the dashboard (more time-consuming).

4 Installing the New Valve

- Install the new valve in the same position
- Replace all O-rings (lubricated with specific A/C oil)
- Tighten to the correct torque (without overtightening)

5 System Vacuum (essential)

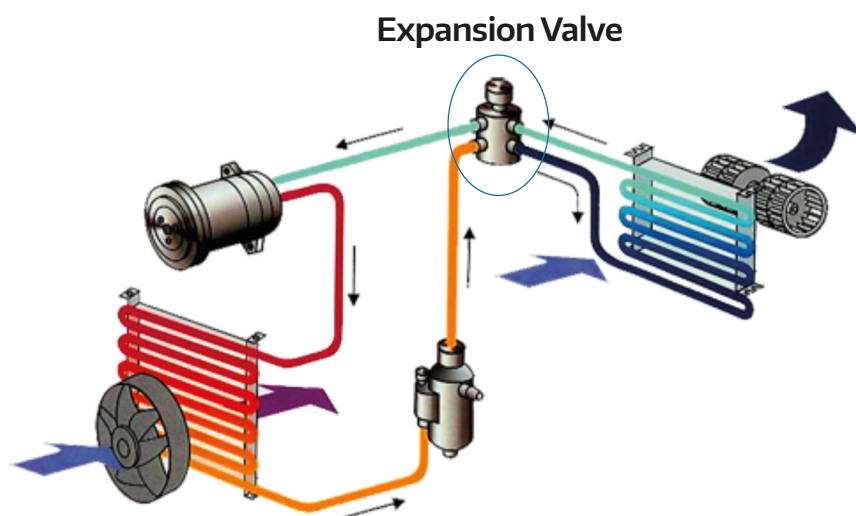
Connect the A/C service station and vacuum the system for 20–30 minutes. This removes air and moisture, which are the main threats to the system.

6 Refrigerant Recharge

Charge the exact amount of refrigerant and compressor oil if required. Then check pressures and operation.

7 Final Test

- Check air temperature
- Verify high-side/low-side pressures
- Check for leaks





Related Products

Compressor



Meat | Hoffer K11400A

Condenser



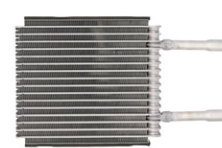
Meat | Hoffer 991034

Receiver Driers



Meat | Hoffer K132006

Evaporator



Meat | Hoffer 997001

O-Ring Kit



Meat | Hoffer K79311

How To Rule Out the Pressure Switch?

The pressure switch is a simple **safety switch** that monitors refrigerant pressure. If it detects values that are too high or too low, **it cuts power to the compressor** to protect it.

The Definitive Test

Connect the OBD diagnostic tool to the vehicle (or use workshop pressure gauges) to read the actual system pressure. If the gauges indicate the pressure is correct (e.g. 15 bar on the high-pressure line), but the pressure switch reports 0 bar to the control unit (thus switching off the compressor), the pressure switch is faulty.



If the compressor engages

If the compressor clutch engages normally, the pressure switch is working and is providing authorization. If the air is still warm, the problem shifts to the **expansion valve** or **insufficient refrigerant**.

How To Rule Out the Evaporator?

The evaporator is a passive aluminum heat exchanger hidden under the dashboard. It has no moving mechanical or electrical parts, so it can only fail in two ways: **it develops a leak** (loses refrigerant) or **it becomes externally clogged** (preventing airflow from the blower).

Leak Check

If the system is empty, use an electronic leak detector or UV tracer dye to determine whether the evaporator is leaking. If it holds vacuum, the evaporator is physically sound.

Airflow

If air comes out of the vents with good force (even if warm or lukewarm), the evaporator is not blocked by leaves or mud.



Clear Symptoms Of a Faulty Expansion Valve

Once you have confirmed that the pressure switch is communicating correctly and the evaporator is not leaking, the expansion valve **is solely responsible for regulating the cooling**. It can fail in two different ways:

Scenario A: Valve stuck closed (or blocked by debris)

The refrigerant cannot pass to the evaporator.

Visual/tactile symptom: The high-pressure pipe (the thin one coming from the compressor) becomes extremely hot, while the low-pressure pipe (the larger one returning to the compressor) remains at room temperature or only warm. Under normal conditions, it should be icy cold.

Pressure gauge symptom: The high-pressure gauge rises significantly (the compressor is pumping), while the low-pressure gauge drops dramatically to zero or into vacuum (indicating the compressor is drawing but not receiving refrigerant because the valve is acting as a blockage).

Scenario B: Valve stuck open

The valve "floods" the evaporator by injecting too much liquid refrigerant without reducing its pressure.

Visual symptom: A thick layer of ice or frost forms on the pipes in the engine compartment or directly near the expansion valve. You may also notice a light cold mist coming from the dashboard vents before the airflow stops completely due to the evaporator being completely frozen.

Pressure gauge symptom: High-side and low-side pressures tend to equalize or remain very close to each other because the valve can no longer create the pressure drop required to produce cooling.

Fault Codes

In the case of the expansion valve (TXV), there is almost **never a direct OBD fault code** such as "faulty valve" because it is a mechanical component **without a dedicated sensor**. Faults are identified through indirect codes (climate sensors and pressure readings).

Diagnostic Trouble Codes (DTCs) are divided into:

Bxxxx (Body)

Climate control, comfort, passenger compartment

Pxxxx (Powertrain)

Compressor, pressure, engine sensors

Evaporator / Temperature Sensors

- **B1413:** Evaporator temperature sensor
 - **B1230:** Faulty evaporator sensor
- If these are out of range, the valve will operate incorrectly.

Refrigerant Pressure Sensor

- **B1423/P0530:** A/C pressure sensor
 - **P0532/P0533:** Pressure too low/high
- Typical when the valve is stuck or the system is obstructed.



Compressor Problems

- **B1422:** Compressor locked
- **B1451:** Compressor solenoid
If the valve supplies too much or too little refrigerant, the compressor will not operate correctly.

Generic Climate Performance-Related Codes (not specific but related)

- **P0534:** Insufficient refrigerant
- **P0597-P0599:** Temperature control system problems

Cabin / Ambient Temperature Sensor

- **B1411:** Interior temperature sensor
- **B1412:** Outside temperature sensor
These can simulate an expansion valve fault.

Important

The expansion valve **rarely generates a direct fault code**; it usually causes pressure codes, temperature codes, or problems without any fault codes. This is because DTCs indicate where the control unit detects an anomaly, not necessarily the faulty component.

Practical Example

Valve Stuck Closed

- **P0532** (Low pressure)
- Warm air

Valve Stuck Open

- **P0533** (High pressure)
- Frozen evaporator

Most Common Expansion Valves

Fiat / PSA / Opel Group

Very common in Europe.

- 13248299 | **993173 MEAT**
One of the best-selling expansion valves overall, it is practically a standard for many 2000–2015.
Applications: Fiat, Opel, Alfa, PSA.
- 8A0 820 177 AA | **993176 MEAT**
Among the best-selling products in the European aftermarket.
Applications: Fiat, Alfa, PSA.

VAG Group (VW / Audi / Seat / Skoda)

- 1K0 820 803 N | **993023 MEAT**
Very common, used on Golf, Passat, Audi A3/A4, etc.

Stellantis

- 77365149 / 60779304 | **993028 MEAT**
- 6461G9 | **993035 MEAT**
- 6461H5 | **993072 MEAT**
Applications
 - Punto, Panda, 147, 156
 - Peugeot 206/307
 - Citroën C3/C4



Mercedes-Benz

- 1688300284 | **993055 MEAT**
- 2308300184 | **993057 MEAT**

Applications: C-Class, E-Class, ML, Sprinter

Asian Vehicles

- 447500-2370 | **993186 MEAT**
Very common because Denso is the OEM.
- Applications:** Suzuki, Fiat

BMW

- 64119226078 | **993063 MEAT**
- 64503452759 | **993048 MEAT**
High aftermarket volume (3 Series / 5 Series / X3 / X5)

Production Testing

An expansion valve is validated for **leak tightness, flow/regulation, long-term durability, and thermal performance**. The real critical point is ensuring precise regulation and preventing any contamination.

In the production process of automotive air conditioning expansion valves (TXV), testing is essential to guarantee **precision, reliability, and safety** because they operate under critical pressures and temperatures.

Climate Chamber Test

Used to guarantee **OE interchangeability**.

What is checked

- Dimensions (critical measurements, tolerances)
- Threads and sealing surfaces
- Visual defects (burrs, cracks, oxidation)

Inspections are carried out using gauges, micrometers, 3D measuring machines (CMM), and automatic vision systems.

Leak Test

The objective is to verify that the valve does not leak.

Methods

- Nitrogen pressure test
- Helium test
- Water immersion test (bubble test)

Typical Tests

- Pressure: 10-30 bar (or higher)
- Leak measurement: micro leaks (μ bar)

Flow Test

Used to verify that the valve meters the refrigerant correctly.

What is checked

- Refrigerant flow rate
- Regulation capability
- Flow stability

Testing is performed on a test bench with evaporator simulation. Inlet and outlet pressure, temperature, and flow rate are measured.

Thermostatic Test (TXV)

Test for valves with a sensing bulb, essential for "intelligent" TXVs.

What is checked

- Temperature response
- Correct opening/closing
- Calibration (Superheat)

The test involves heating and cooling the sensing bulb to measure changes in valve opening.

Thermal Cycling Test

Used to verify resistance under real operating conditions by simulating years of use. The expansion valve is subjected to repeated hot (80–120°C) and cold (-30°C) cycles hundreds or thousands of times.

Life Test

The objective is to verify service life by subjecting the expansion valve to thousands or millions of opening and closing cycles, simulating real use. This identifies wear and performance loss.

Vibration and Shock Test

To measure mechanical strength, vibration tables and simulated impacts are used.

Contamination Test

Simulates the presence of dirt, metal particles, and moisture. Critical for verifying resistance to blockage and long-term reliability.

- Particles introduced into the fluid
- Valve operation test

Performance Test

Simulates operation in a real vehicle by measuring cooling efficiency, thermal capacity, and pressure stability.

Chemical Compatibility

Compatibility with refrigerants (R134a, R1234yf) and oils (PAG, POE) is tested to prevent corrosion and seal degradation.