




Refrigerant System Tests

Special Tool(s)

 <p>ST2738-A</p>	<p>R-134a Refrigerant Center 176-00002 or equivalent</p>
 <p>ST2738A</p>	<p>R-134a Refrigerant Center 023-00174 or equivalent</p>
 <p>ST1928-A</p>	<p>R-134a Manifold Gauge Set 023-00047 or equivalent</p>

Procedure 1 — Ambient Temperature At or Below 38°C (100°F)

NOTE: The system performance can be evaluated and diagnosed by analysis of the compressor suction and discharge pressures. The following procedure is used to determine if the system is operating at normal pressures.

NOTE: The procedure varies depending on the ambient (shop) temperature. If the ambient temperature is 38°C (100°F) or lower, follow procedure 1. If the ambient temperature is over 38°C (100°F), follow procedure 2.

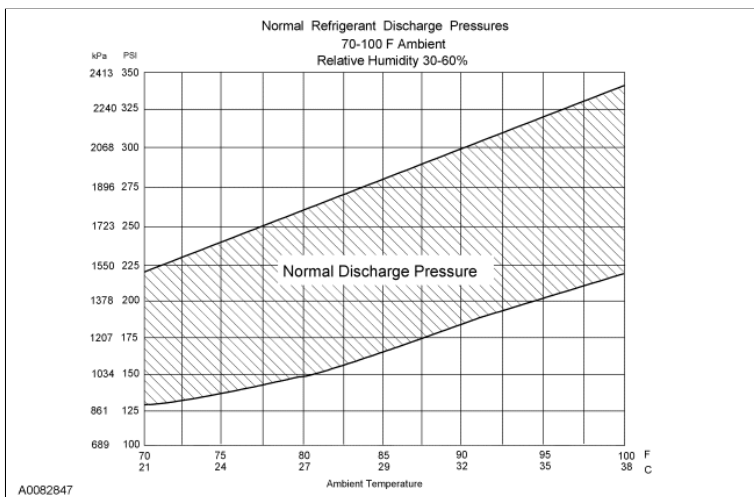
NOTE: If the A/C compressor cycles at any time during this test, refer to the diagnostic table.

All vehicles

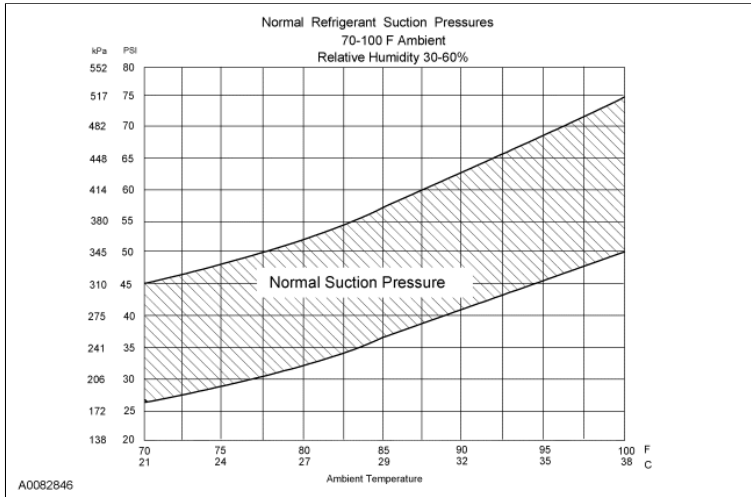
1. Drive the vehicle or run the engine until it reaches normal operating temperature.
2. Connect a manifold gauge set or refrigerant service center with high-pressure and low-pressure gauges to the refrigerant system.
3. Set the climate controls.
 - If equipped with manual climate control, set the A/C controls for normal A/C-PANEL mode, full COOL temperature, FRESH air, HI Blower. If the vehicle has a fresh air/recirc button, set it to FRESH. If the vehicle has an A/C switch or compressor on switch, set it to A/C ON.
 - If equipped with ATC, set temperature to 60° F (15° C) (lowest possible temp setting) with the dual function disabled (if equipped). Manually set blower on high. If the vehicle has a fresh air/recirc button, set it to FRESH. If the vehicle has an A/C switch or compressor on switch, set it to A/C ON.
 - If the vehicle is equipped with auxiliary climate control, set the auxiliary controls to full COOL in the PANEL mode at HI blower speed.
4. Open all vehicle windows and leave the hood open for the test. Open the rear hatch and/or rear doors (if equipped).
5. Confirm the compressor clutch is engaged and the engine cooling fan(s) are operating or engaged. Allow the vehicle to idle until the suction (low-side) and discharge (high-side) pressures are stable or fluctuate in a range that repeats.
6. Record the ambient (shop) temperature.

F-Super Duty vehicles

7. Record the discharge pressure. If the pressure is fluctuating, record the average value.
8. Determine if the discharge pressure falls within the normal operating limits using the Normal Refrigerant Discharge Pressures chart.

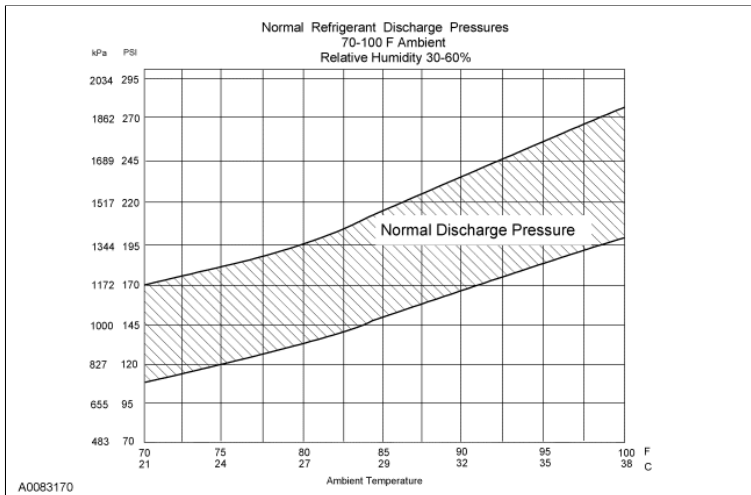


9. Record the suction pressure. If the pressure is fluctuating, record the average value.
10. Determine if the suction pressure falls between normal operating limits using the Normal Refrigerant Suction Pressures chart.

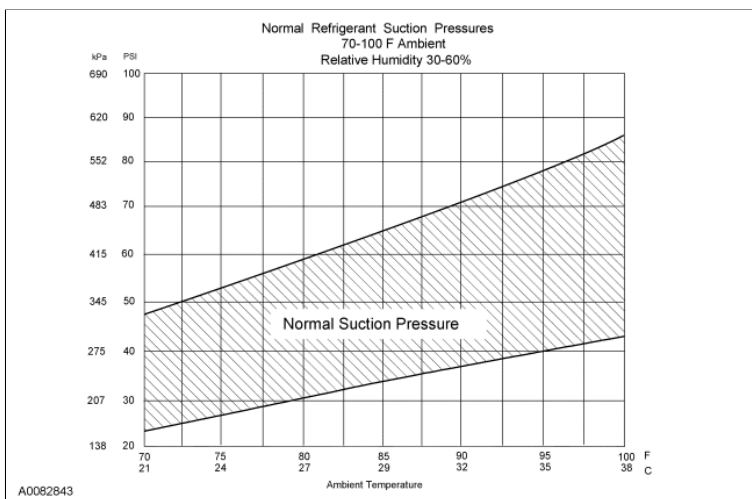


Excursion vehicles

11. Record the discharge pressure. If the pressure is fluctuating, record the average value.
12. Determine if the discharge pressure falls within the normal operating limits using the Normal Refrigerant Discharge Pressures chart.



13. Record the suction pressure. If the pressure is fluctuating, record the average value.
14. Determine if the suction pressure falls between normal operating limits using the Normal Refrigerant Suction Pressures chart.



All vehicles

15. Proceed to the diagnostic table.

Procedure 2 — Ambient Temperature Above 38°C (100°F)

NOTE: The system performance can be evaluated and diagnosed by analysis of the compressor suction and discharge pressures. The following procedure is used to determine if the system is operating at normal pressures.

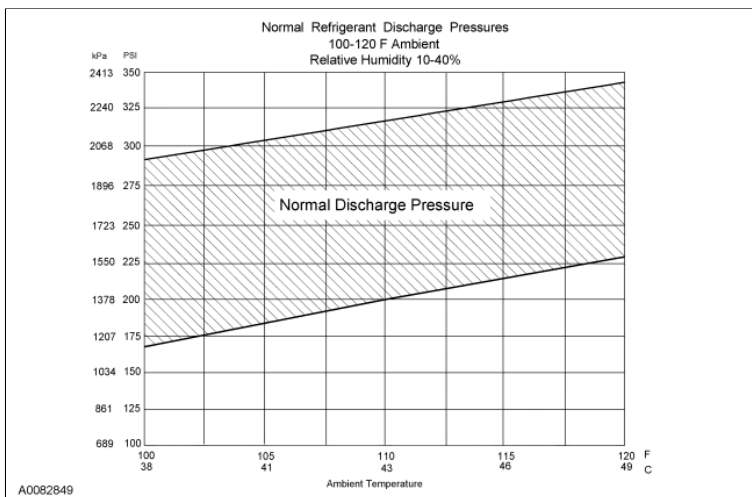
NOTE: The procedure varies depending on the ambient (shop) temperature. If the ambient temperature is 38°C (100°F) or lower, follow procedure 1. If the ambient temperature is over 38°C (100°F), follow procedure 2.

All vehicles

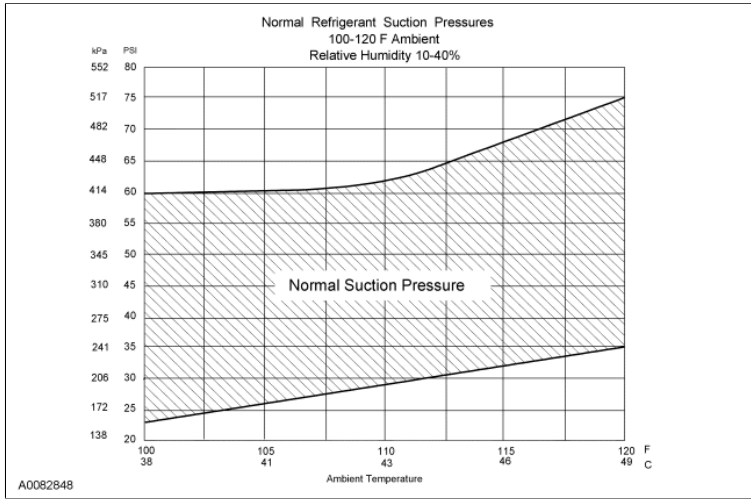
1. Drive the vehicle or run the engine until it reaches normal operating temperature.
2. Connect a manifold gauge set or refrigerant service center with high-pressure and low-pressure gauges to the refrigerant system.
3. Set the climate controls.
 - If equipped with manual climate control, set the A/C controls for normal A/C-PANEL mode, full COOL temperature, FRESH air, MED LO blower. If the vehicle has a fresh air/recirc button, set it to FRESH. If the vehicle has an A/C switch or compressor on switch, set it to A/C ON.
 - If equipped with ATC, set temperature to 60° F (15° C) (lowest possible temp setting). Manually set blower to MED LO (3 to 4 bars). If the vehicle has a fresh air/recirc button, set it to FRESH. If the vehicle has an A/C switch or compressor on switch, set it to A/C ON.
 - If the vehicle is equipped with auxiliary climate control, set the auxiliary controls to full COOL in the PANEL mode at MED LO blower speed.
4. Open all vehicle windows and leave the hood open for the test. Open the rear hatch and/or rear doors (if equipped).
5. Confirm the compressor clutch is engaged and the engine cooling fan(s) are operating or engaged. Allow the vehicle to idle until the suction (low-side) and discharge (high-side) pressures are stable or fluctuate in a range that repeats.
6. Record the ambient (shop) temperature.

F-Super Duty vehicles

7. Record the discharge pressure. If the pressure is fluctuating, record the average value.
8. Determine if the discharge pressure falls within the normal operating limits using the Normal Refrigerant Discharge Pressures chart.

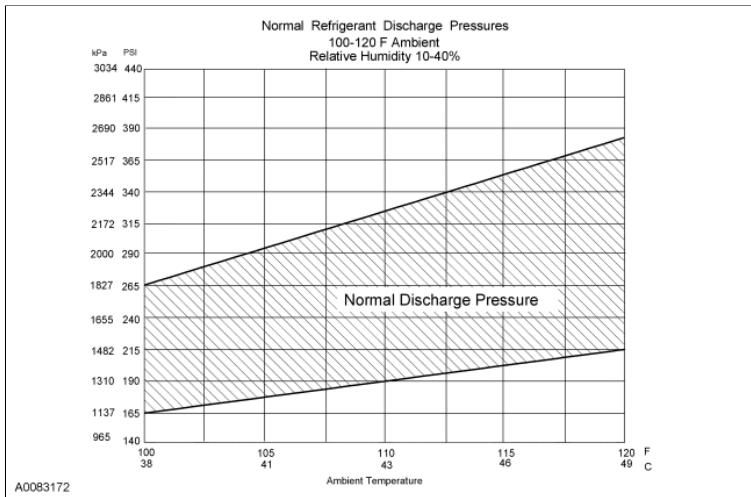


9. Record the suction pressure. If the pressure is fluctuating, record the average value.
10. Determine if the suction pressure falls between normal operating limits using the Normal Refrigerant Suction Pressures chart.

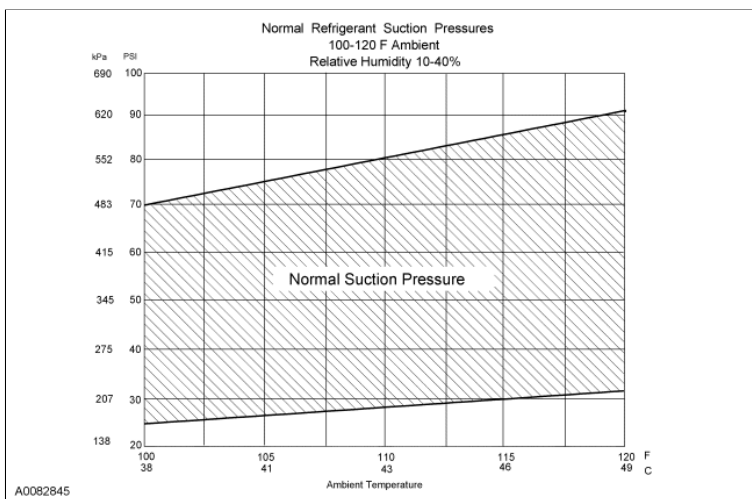


Excursion vehicles

11. Record the discharge pressure. If the pressure is fluctuating, record the average value.
12. Determine if the discharge pressure falls within the normal operating limits using the Normal Refrigerant Discharge Pressures chart.



13. Record the suction pressure. If the pressure is fluctuating, record the average value.
14. Determine if the suction pressure falls between normal operating limits using the Normal Refrigerant Suction Pressures chart.



All vehicles

- Proceed to the diagnostic table.

Diagnostic Table

- NOTE:** The following table is used to guide diagnosis of the refrigerant system if operating pressures are outside normal limits.

Refer to the chart below.

High (Discharge) Pressure	Low (Suction) Pressure	Component — Causes
High or clutch cycling	High	Condenser — inadequate airflow.
High	Normal to high	Engine — overheating.
Normal to high	Normal	Refrigerant overcharge — air in refrigerant.
Normal to low	High	Fixed orifice tube — missing O-rings leaking/missing.
Normal to low	Normal to high	A/C suction line — partially restricted or plugged. ^a
Normal to low	Low or clutch cycling	Low refrigerant charge, A/C suction line — partially restricted or plugged A/C cycling switch — sticking closed. ^b
Erratic operation or compressor not running	A/C cycling switch — poor connection at A/C clutch connector or clutch cycling switch connector. A/C electrical circuit erratic — see A/C Electrical Circuit Wiring Diagram.	
Normal to low	High	Compressor — low performance.
Additional Possible Cause Components Associated With Inadequate Compressor Operation		
<ul style="list-style-type: none"> • Compressor drive belt — loose • Compressor clutch — slipping • Clutch coil open — shorted, or loose mounting • Control assembly switch — dirty contacts or sticking open • Clutch wiring circuit — high resistance, open or blown fuse • Compressor operation interrupted by engine computer 		
Additional Possible Cause Components Associated With a Damaged Compressor		
<ul style="list-style-type: none"> • Incorrect clutch air-gap • Suction accumulator — refrigerant oil bleed hose plugged • Refrigerant leaks 		

^a Low pressure reading will be normal to high if pressure is taken at accumulator and if restriction is downstream of service access valve.

^b Low pressure reading will be low if pressure is taken near the compressor and restriction is upstream of service access valve.