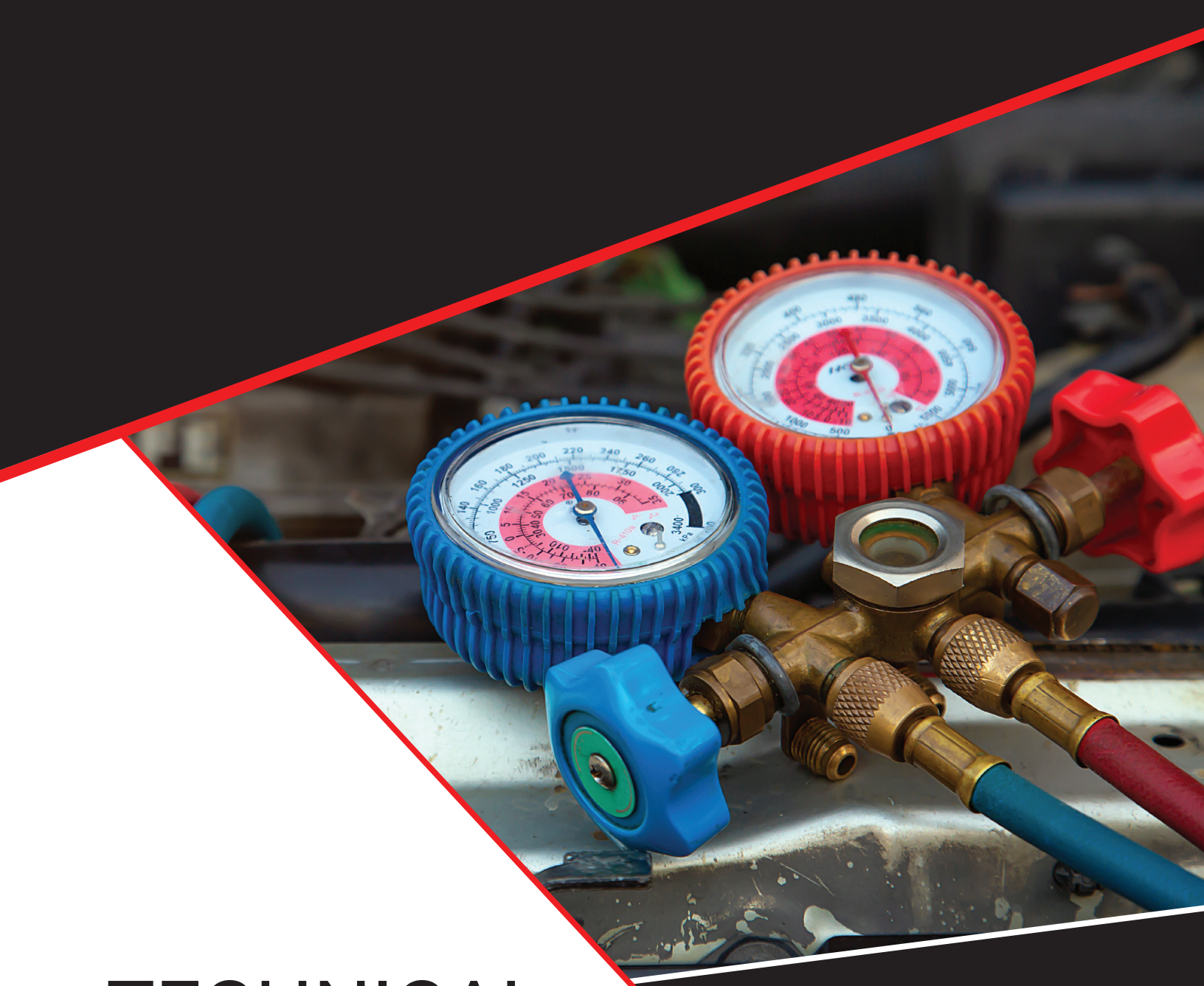


TECHNICAL SUPPORT

Mobile A/C System Overview and Common Problems

AG • TRUCK • OFF ROAD

RedDOT® CORPORATION

KYSOR by Bergstrom

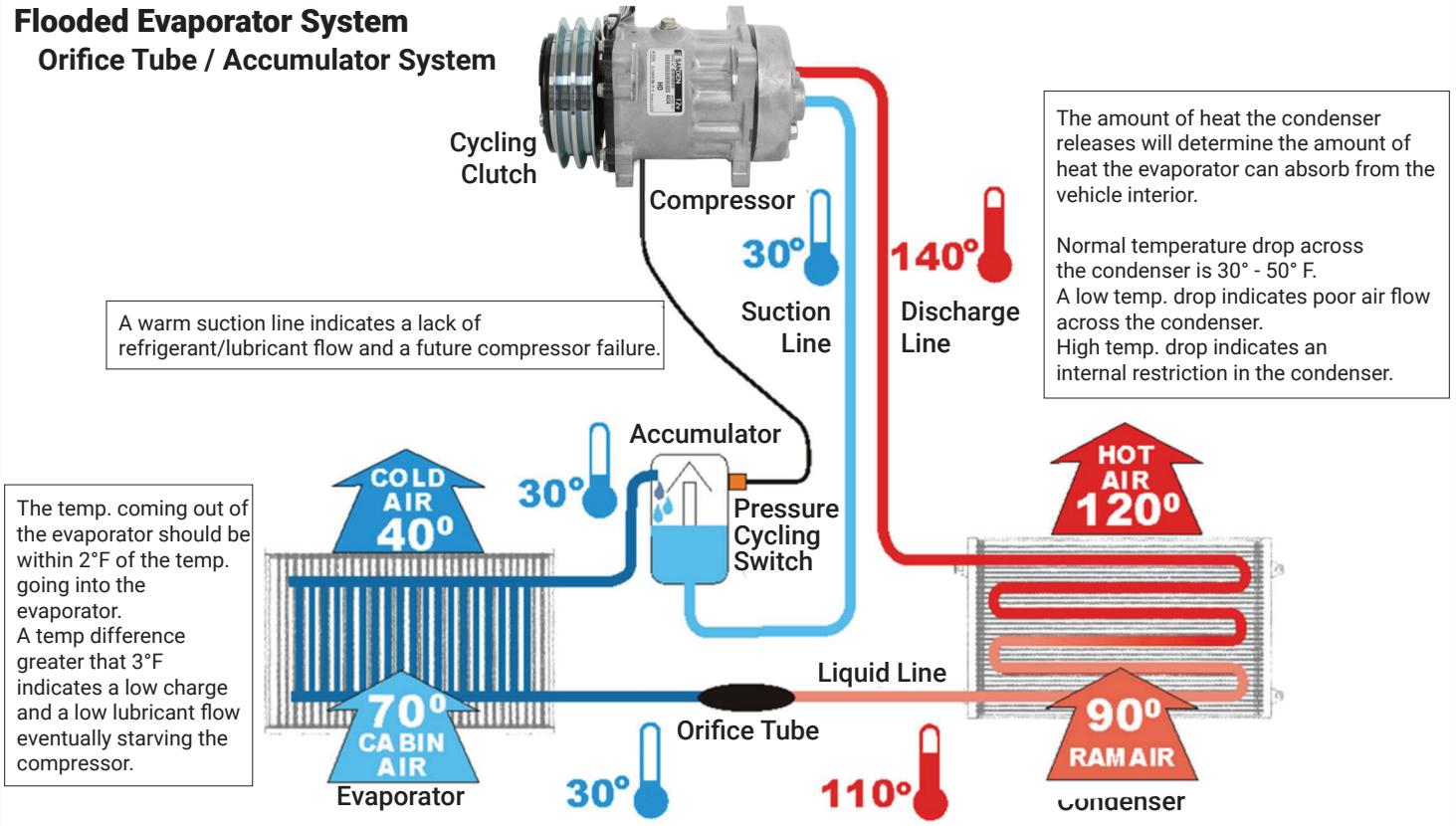
R134a Pressure Temperature Chart

PRESSURE psig (‘Hg)	TEMPERATURE °F
-22	-62.38
-20	-55.02
-18	-48.85
-16	-43.5
-14	-38.76
-12	-34.49
-10	-30.6
-8	-27.02
-6	-23.7
-4	-20.59
-2	-17.67
0	-14.92
5	-3.04
10	6.67
12	10.12
14	13.38
16	16.46
18	19.4
20	22.19
22	24.87
24	27.43
26	29.90
28	32.27
30	34.56
32	36.77
34	38.91
36	40.99
38	43.00
40	44.95
42	46.85
44	48.70
46	50.51
48	52.26
50	53.98
52	55.65
54	57.29
56	58.89
58	60.46
60	62.00
62	63.50
64	64.98
66	66.43

PRESSURE psig (‘Hg)	TEMPERATURE °F
68	67.85
70	69.24
75	72.62
80	75.86
85	78.98
90	81.97
95	84.87
100	86.66
105	90.37
110	92.99
115	95.53
120	98.00
125	100.40
130	102.70
135	105.00
140	107.20
145	109.40
150	111.50
155	113.60
160	115.60
165	117.60
170	119.60
175	121.50
180	123.30
185	125.20
190	126.90
195	128.70
200	130.40
205	132.10
210	133.80
215	135.50
220	137.10
225	138.70
230	140.20
235	141.80
240	143.30
245	144.80
250	146.30
255	147.70
260	149.20
265	150.60
270	152.00

PRESSURE psig (‘Hg)	TEMPERATURE °F
275	153.40
280	154.70
295	156.10
300	157.40
305	158.70
310	160.00
315	161.30
320	162.50
325	163.80
330	165.00
335	168.60
340	169.80
345	171.00
350	172.10
355	173.30
360	174.40
365	175.40
370	176.30
380	178.20
385	179.80
390	180.90
395	181.90
400	183.00

Flooded Evaporator System
Orifice Tube / Accumulator System



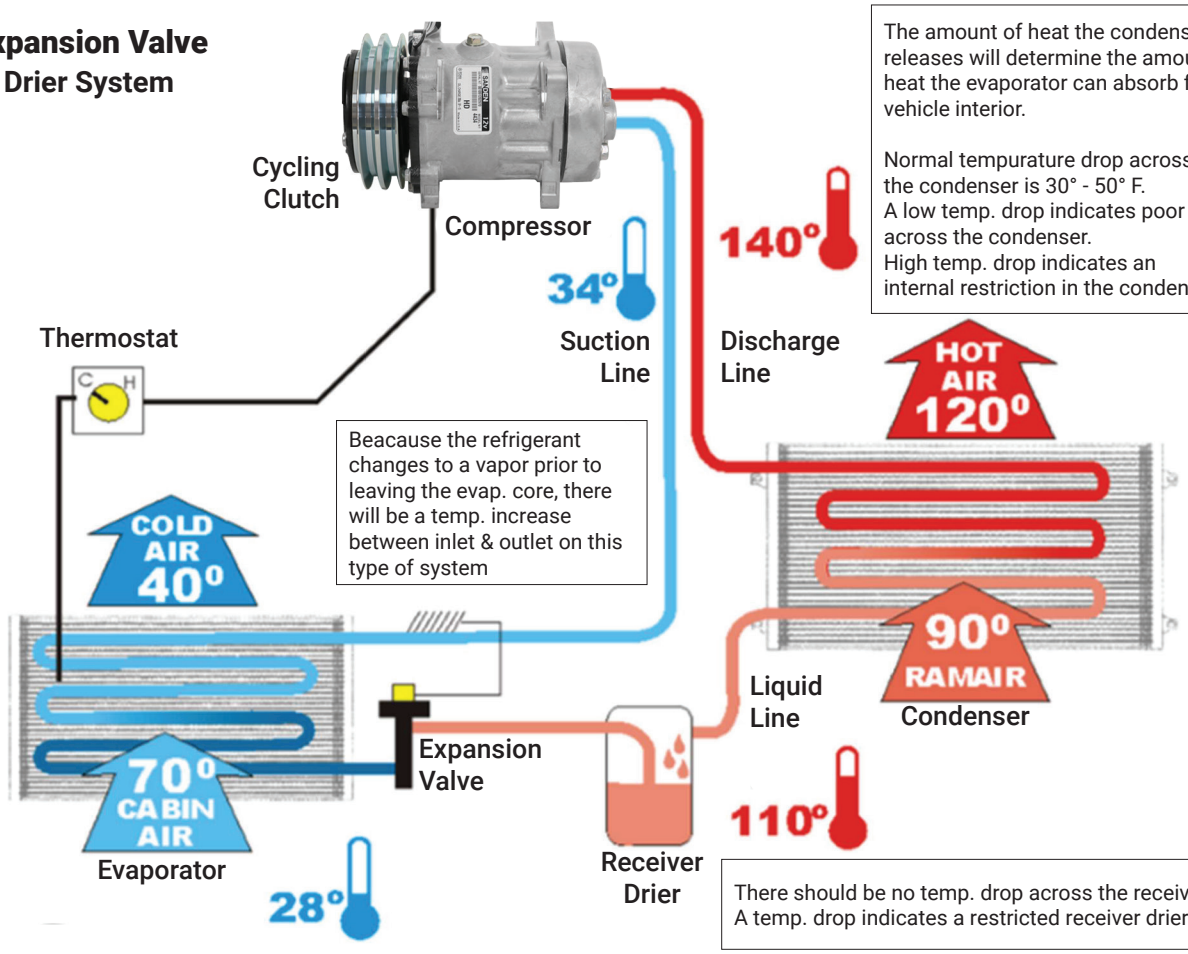
A warm suction line indicates a lack of refrigerant/lubricant flow and a future compressor failure.

The amount of heat the condenser releases will determine the amount of heat the evaporator can absorb from the vehicle interior.

Normal temperature drop across the condenser is 30° - 50° F.
A low temp. drop indicates poor air flow across the condenser.
High temp. drop indicates an internal restriction in the condenser.

The temp. coming out of the evaporator should be within 2°F of the temp. going into the evaporator.
A temp difference greater that 3°F indicates a low charge and a low lubricant flow eventually starving the compressor.

Typical Expansion Valve
Receiver Drier System



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Normal tempurature drop across the condenser is 30° - 50° F.
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High temp. drop indicates an internal restriction in the condenser.

Beacause the refrigerant changes to a vapor prior to leaving the evap. core, there will be a temp. increase between inlet & outlet on this type of system

There should be no temp. drop across the receiver drier.
A temp. drop indicates a restricted receiver drier.

Overview of mobile A/C systems and common problems

THE RIGHT AMOUNT OF REFRIGERANT

A sight glass in an A/C system is no longer used to tell when the system has the right amount of refrigerant. With today's most common refrigerant being R134a, if a system is over or under charged there will be, in most cases, poor louver temperature and premature compressor failure. If the amount of refrigerant in a system is unknown; recover the refrigerant, evacuate the system, and add the correct refrigerant charge using the pressure temperature chart (see page 2) or the OEM specs for the correct charge.

CAUSES FOR COMPRESSOR FAILURES

Compressor Oil

- Oil breakdown from overheating.
- Low oil charge in the compressor.
- Oil contamination or debris in oil.
- Liquid slugging (hydraulic locking)

Excessive high head pressure

- An A/C system that has been overcharged will have high head pressure.
- An internal blockage between the compressor and expansion device, condenser, or drier.
- **Condenser with electric fans** – Will have electric motors and fan blades bringing fresh air across the condenser fins to remove heat from the refrigerant. Check for worn or burned out motors or missing fan blades that will slow or stop the air flow and cause high head pressures. Replace broken fan blades and worn or burned out motor(s). Use a clamp on DC amp meter to see if the motor(s) are drawing too many amps.
- Check that the condenser fins are not bent and that they are clean. Even a small amount of dirt on them acts like an insulator and will not properly transfer heat.
- **Condenser mounted at the radiator** – Be sure that the condenser fins are straight and free of any debris. Inspect shrouding and that air dams are in place and not missing. The goal is to have 100% of the air flow go through and not around the condenser and radiator. *(Air will take the path of least resistance)*. Check to see if the engine fan blades are not damaged. If equipped with a fan clutch, be sure it's working properly. Check the engine fan drive belt to see if it has the proper tension. Do a visual check for cracks, a glazed belt, or the wrong belt width.

Low Head Pressure

- An undercharged A/C system.
- Faulty expansion valve stuck open.
- Evaporator coil freezing up due to plugged or dirty cab air filter
- Thermostat stuck open and not cycling allowing evaporator to freeze.

REFRIGERANT GAUGES

- Have the proper refrigerant manifold gauges for the specific refrigerant being used.
- Before connecting manifold gauges to an A/C system, do a visual check to see they are in good condition and that the refrigerant hoses are not frayed or damaged.
- Be sure that both high and low manifold gauges are calibrated to zero.

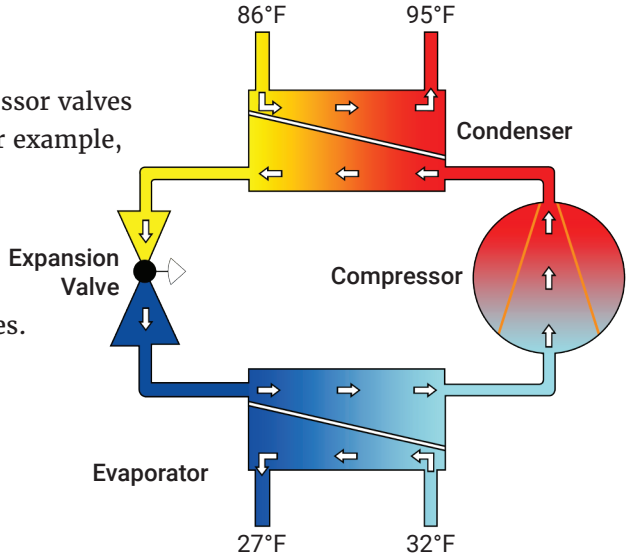
FALSE PRESSURE READINGS

- Valve core depressors and hose gasket may be damaged.
- Are the hoses on the manifold set connected to the correct service ports?
- The system may have more than one type of refrigerant in the system.

  Example: R134a mixed with R12. Check the system with a refrigerant identifier.

WHY CHARGE WITH VAPOR AND NOT LIQUID?

Charging with a liquid can cause severe damage to the compressor valves and have premature failure. When charging an A/C system, for example, using a 30lb cylinder of R134a refrigerant, place it in the upright position. Do **NOT** turn the cylinder upside down. An electric tank heater blanket to wrap around the cylinder of refrigerant is available (part# **530-98250**). This will help change the liquid to a gas and help speed up the charging times.



COMPRESSOR CLUTCH FAILURE AND COMMON CAUSES

Clutch failure can be caused by many things. It is always best to pinpoint the reason for failure. Failure is most often caused by high pressure, voltage issues, or both.

- **Wrong voltage being supplied at the field coil causing the clutch to slip.** Make sure to have the proper voltage that is needed for the field coil. Correct resistance for a 12 volt coil is 3-5 Ω's. Measure the amp draw of the clutch coil.

- **Air gap between the compressor face plate and pulley is wrong causing the clutch to slip.** Check with O.E. specs and use a non-magnetic feeler gauge and add or remove a plate shim.

- **Bearing Failure.** High heat caused by clutch slippage melts the grease and seals out of the pulley bearing. Check for pulley play or listen for noises around the compressor clutch area.

- **Compressor drive belt :** Wrong width or miss-aligned, slipping and causing high heat.

WHY FLUSH THE SYSTEM?

- Compressor failure
- Plugged expansion valve or orifice tube
- Drier desiccant let loose

Flushing will remove debris, oil, and moisture that may be in the system bringing it back to ground zero. So when installing that new compressor, expansion valve, or orifice tube it will not fail. Make sure you have the correct amount of new fresh oil in the system when finished.

WHY USE A VACUUM PUMP?

Moisture and air are two of the most common problems in an A/C system. Moisture mixed with R134a will create hydrofluoric acid that will slowly eat away at metal components. Moisture will also break the lubricant down and cause contamination and icing inside the system forming a blockage thus restricting refrigerant flow. By using a good vacuum pump it will help eliminate this problem. AP Air recommends using a 2 stage, 6 CFM vacuum pump (part# **530-900662**). Always replace the receiver drier/accumulator when an A/C system is opened or when replacing compressor.

MOISTURE CONTAMINATION

When moisture has contaminated an A/C system, over time it will create a corrosive acid that attacks metal surfaces and breaks down the lubricating qualities of compressor oil. The result is a dark-colored sludge mixture that can gum up the entire system. Flushing the system several times will not remove this sludge. You must replace the condenser and any component contaminated or you will cause this mixture to liquefy when warm and flow out to the liquid line restricting the orifice tube or expansion valve thus damaging the compressor.

RECEIVER DRIER / ACCUMULATOR

Receiver Drier: Use on an "expansion valve" type systems. It can be found mounted inline on the high side of the system. It consists of a filter material and desiccant (XH7 or XH9) to keep the system clear from debris and to trap moisture in the drier.

Accumulator: Used on "orifice tube" type systems. It can be found plumbed in the suction side of the system. Like the drier, it contains desiccant. Its main job is to accumulate the liquid refrigerant/oil that leaves the evaporator and keep it from slugging or damaging the compressor. Accumulators don't typically have filters. They rely on the orifice tube screen to catch any debris.

It is recommended replacing the receiver drier or accumulator annually or in addition to evacuation. This ensures optimum system performance.

EXPANSION VALVES

Expansion Valves, also called TXV (thermostatic expansion valve), can be one of three types, externally equalized, internally equalized or block style. They can be either right angle or block style. The expansion valve's job is to properly meter the right amount of refrigerant entering the evaporator coil. Troubleshooting problems with an expansion valve will require a set of refrigerant gauges attached to the operating A/C system.

Internally Equalized

Externally Equalized

Block Style

ORIFICE TUBE

An orifice tube is a fixed metering device located inside the liquid line between the condenser and evaporator. The orifice tube is enclosed with a plastic housing and protected by a fine mesh filter. The filter helps prevent debris from circulating the system. Orifice tubes are color coded denoting the size of the orifice. An accumulator only or accumulator/receiver drier combination (Cat, Challenger) can be used with an orifice tube.

CORRECT O-RINGS

In the past, only size mattered when choosing the correct o-rings. Nowadays, it's the matter of material. R-12 used a black BUNA-N material. Today's refrigerants use a green, yellow, orange, or red HNBR material because of the higher head pressures and type of oil being used. Use HNBR o-rings for both R-12 and R134a refrigerants.

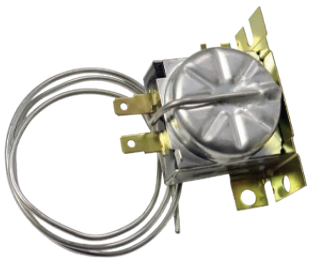
SAFETY PRESSURE/FAN SWITCHES IN AN A/C SYSTEM

High/low pressure and fan switches are used to protect the compressor from becoming damaged due to excessive head pressure or from too little refrigerant in the system. If not protected, the system would have very high superheat while not lubricating and sufficiently cooling the compressor.
(Do not bypass these switches or severe damage to the A/C system can and will occur.)

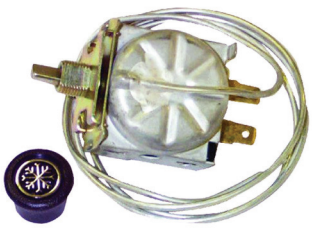
THERMOSTAT SWITCH

The thermostat switch is used to help regulate the outlet air temperature by cycling the compressor clutch on and off. It is also a saftey device to ensure that the evaporator coil does not freeze up on cooler heat load days. If this switch should fail, there will be no voltage at the field coil or the compressor may never cycle out and cause the evaporator to freeze up. The thermostat probe should be placed 3 to 6 inches from the expansion valve into the top middle of the evaporator coil. Make sure you have enough probe entering the evaporator coil while making sure the probe does not go too far through the evaporator coil and into the heater coil.

There is typically two types of thermostat switches used in HD A/C systems:

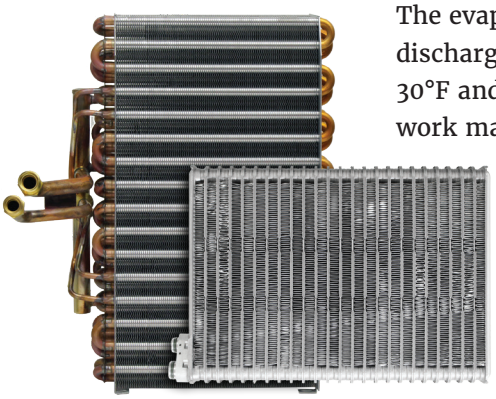


Preset Thermostat
Has no knob or adjustment for temperature control.



Manual Thermostat
Has a knob that can be adjusted to cycle the compressor on and off at different temperatures.

EVAPORATOR COIL

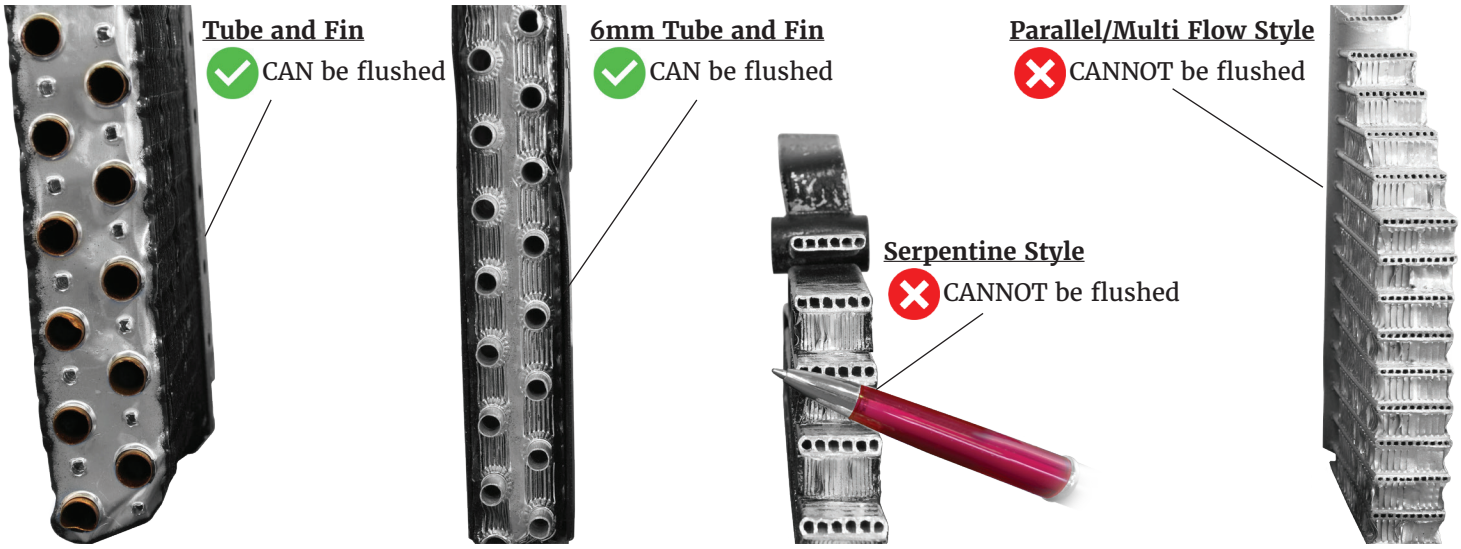


The evaporator coil removes heat from the air that the fan motor(s) pull in and then discharges the cold air out of the louvers. The evaporator usually operates between 30°F and 40°F. Louver temperature should be about 10° warmer than the coil. Long duct work may increase the temperature a few degrees more. If the coil becomes plugged with dirt, mud, ice, or other debris the air being discharged from the louvers will be warmer. Blow out the coil with compressed air (about 60-90 psi) or wash the coil with coil cleaner (part# **F5914**) to ensure that there is good air flow through the coil. Use a fin comb (part# **RW-68**) to straighten any bent evaporator coil fins.

CONDENSER COIL

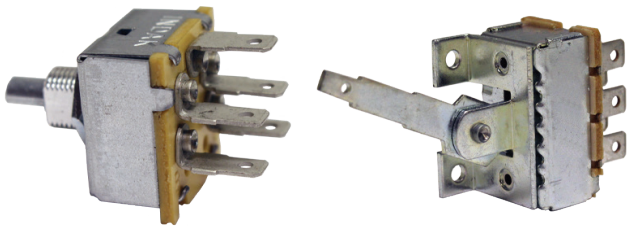
This is also called a heat exchanger that removes heat from refrigerant that is under very high pressure and in a high temperature state. By passing cooler ambient air over the condenser fins this will change the state of the refrigerant from a gas to a liquid. The liquid will then move to the receiver drier and expansion device. If the condenser fins get clogged with mud, debris, or even a fine coating of dirt you will have poor or no cooling out the louvers. Be certain to clean condenser coil with compressed air or wash with water or coil cleaner (part# **F5915**). Keep coil fins straight with a fin comb.

Condensers all work in the same manner but vary in design and fin style. The designs used are tube and fin, serpentine, and multi-flow (parallel flow). The tube and fin style can be flushed out and reused. Serpentine and parallel flow condensers are not flushable and need to be replaced. Flush will take the path of least resistance and go around debris not fully clearing the coil. This may harm any components installed in the future.

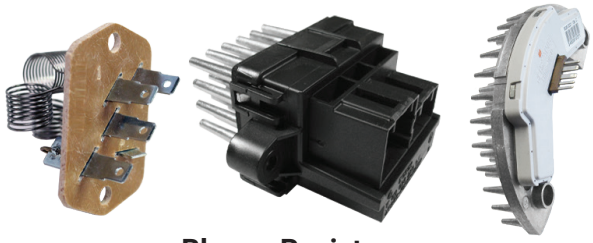


BLOWER FAN SWITCH AND RESISTORS

The blower fan switch controls the blower motor speeds. On the back of many blower switches there will be five posts. "**B**" = power, "**C**" = clutch, "**L**" = low speed, "**M**" medium speed, "**H**" = high speed. The resistor is used to cut the amount of current to the blower motor so you will have high, medium, and low. It will typically be found on the blower unit that houses the motor. Resistors require direct air flow to stay cool.



Blower Switches



Blower Resistors

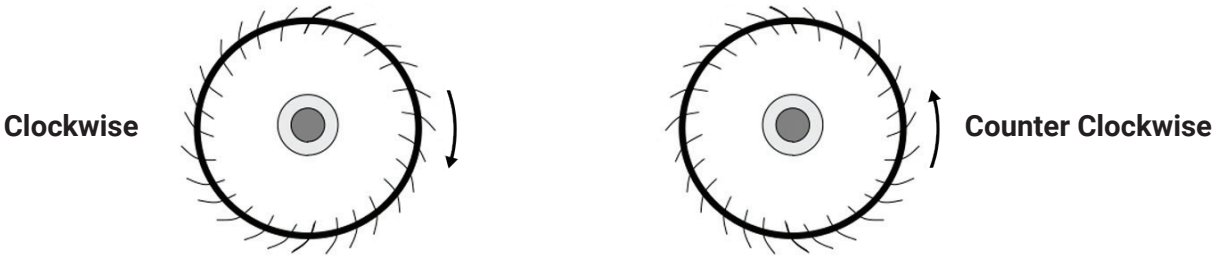
BLOWER MOTORS AND FAN WHEELS

Blower motors control the amount of air flowing across the evaporator and heater coil. If the motor rotation is not correct or the motor, fan wheel, or resistor (if used) malfunctions, not enough air will be drawn across the evaporator coil and it may freeze up. Broken fan wheels or housings will cause the motor assembly to sound very loud and will need to be replaced. There are usually two types motors used in a blower system;

1. **Field wound** - has 4 wires and operated by a fan switch only.
2. **Permanent magnet** - has only two wires and requires a fan switch and a resistor.

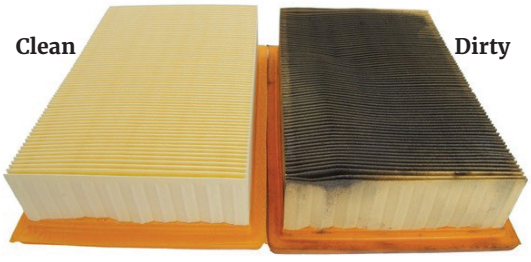
Always make sure to have the right motor and resistor for the voltage.

Blower wheel rotation is determined by facing the hub



RECIRCULATION AIR FILTER

The recirculation air filter(s) will be found inside the operator's cab located at the evaporator box. It is very important to keep this filter very clean. Most of these filters are made of open cell foam though some of the newer filters are made of paper. Most foam and paper filters can be blown out with 20 to 30 pounds of air pressure. Most foam filters can be washed out with water. Failure to service these filters will cause the evaporator coil to plug up with dirt, mud, and other debris which causes poor or no cooling.



FRESH AIR FILTER

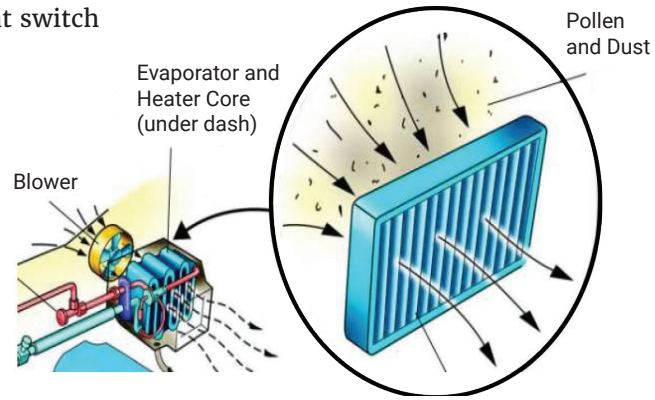
Fresh air filters will be found outside the operator's cab. It allows clean fresh air to enter the cab area. Most of these filters are made of paper and filter particles down to about 19 microns. They must be removed and cleaned daily if the machine is operated for more than 10 hours or in dusty conditions.

Remember, equipment that has the capabilities of bringing in fresh air into the cab also brings in the ambient temperature as well.

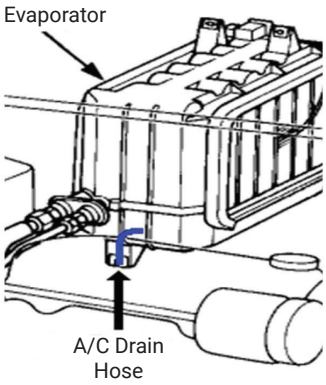
LOW AIR FLOW

Complaint "It used to blow air harder!" - Things to check:

- Obstruction at the air return; plugged or dirty filter
- Debris in the evaporator coil that blocks air circulation
- Icing of the evaporator coil due to a bad thermostat switch
- Air leak or obstruction in air duct hose
- Defective blower relay/ blown fuse
- Blower wheel loose on motor shaft
- Blower wheel rotation wrong
- Blower motor shaft rotation wrong
- Blower motor worn out, turning slower
- Low blower motor voltage due to poor ground
- Using a 24 volt motor on a 12 volt system



DRAIN PAN AND DRAIN LINES



The drain pan collects condensed water from the evaporator coil and channels it out of the cab. If the pan leaks or drain lines become plugged with debris the water that has condensed off the evaporator coil will enter the cab area.
The drain tubes should be flushed with water and or compressed air.
Check drain lines for kinks, holes, sharp bends, flat runs, or uphill runs.

THE REFRIGERANT OIL

The internal components of an A/C system must be properly lubricated with the correct refrigerant oil. There are several types on the market today; PAG, Ester, and Mineral oil. Make sure you choose the right oil for the type of refrigerant that is in the system.

R-12: The oil is absorbed into the refrigerant that carries it though the compressor as a mist.
R134a, YF1234a: The oil is pushed along the system flowing with the refrigerant.

If a system is over charged or undercharged with oil, it can damage the compressor. Compatibility of refrigerant oil is determined by its ability to remain oil when mixed with the refrigerant and not become separated by a chemical reaction. R-12 refrigerant uses a mineral oil made for that refrigerant and is not compatible with R134a systems. R134a systems use either PAG oil or Ester oil.

Note the following: PAG oils absorb moisture 100 times greater than mineral oil
(in effect absorbing 1% water within 15 hours). Ester oil will mix up to 50% with all PAG types.

REFRIGERANT LEAKS

Refrigerant leaks can cost a lot of down time and money if not found and quickly repaired. A good halogen leak detector will pick up leaks under static conditions. However, some may only leak when the system is in operation. There are other ways of finding a refrigerant leak. Use a visual inspection. Look around the refrigerant fittings and hoses for spots of refrigerant oil and dirt. Check the front clutch plate of the compressor for oil and dirt. If the air conditioning system is completely empty use dry nitrogen to pump up the system. Try to hear a leak or check with bubbling leak detector spray. Also, florescent dye can be used to detect a leak.

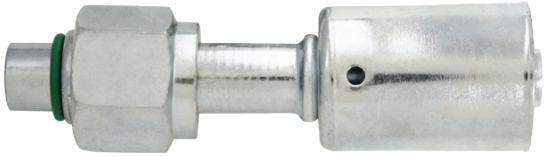
Note: to see the dye stain you need a UV lamp and the leak must be where the light can reach it. It helps to make the work area as dark as possible.

HOSES AND FITTINGS

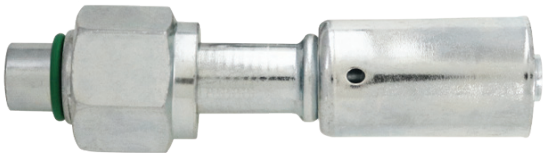
Refrigerant hoses carry the refrigerant and oil from one component to the next. Barrier hose should be used with R134a refrigerant. There are many types of A/C fittings and hose (as seen below).

Standard barrier | Reduced barrier | Quick Clip | EZ Clip

Each must use its corresponding hose type. Most air conditioning systems use the #6 (5/16" ID), #8 (13/32" ID) or #10 (1/2" ID) refrigerant hose. Hoses need to be inspected occasionally for blistering, bulges, dry rot, chaffing, swelling, and or hardening. Check around hose fittings for traces of oil and dirt that may indicate a refrigerant leak. Keep hoses away from hot spots, moving parts, sharp edges, and oil leaks.
Watch hose routings on machines that articulate.



Standard Barrier Beadlock Fitting



Reduced Barrier Beadlock Fitting

Quick Clip Fittings

EZ Clip Fittings

Quick Clip and EZ Clip fittings are interchangeable with reduced barrier and EZ Clip hoses. They can be used to repair a hose using reduced barrier beadlock fittings. Both Quick Clip and EZ Clip fittings are the easiest to use in field repairs and building new lines.

Reduced barrier hose, EZ Clip hose, and fittings have the same ID as standard barrier A/C hoses. However, the wall thickness of a reduced barrier hose and EZ Clip hose are thinner which creates a smaller OD hose. This allows for a cleaner look that takes less space and can make tighter bends than standard barrier A/C hoses.

REFRIGERANT RECOVERY

The EPA has issued regulations under Section 609 of the Clean Air Act establishing standards and requirements regarding the servicing of mobile vehicle air conditioners (MVAC). Technicians who repair or service "Mobile Vehicle Air Conditioners" must recover the refrigerant and either recycle it on-site, or send it off-site to a reclamation facility. Technicians must use EPA-approved equipment to perform the refrigerant recovery and recycling. Technicians who service MVAC or MVAC-like appliances ("Farm & Heavy Equipment") must be properly trained and certified by an EPA-approved technician certification program.

CHARGING AN A/C SYSTEM

After following the rules set by EPA Section 609 and the repair is made, a refrigerant manifold set or AC Machine is needed. Attach the low and high side manifold couplings to the service ports on the A/C system. Attach the middle hose to a good 2-stage vacuum pump, turn it on, and open both the low and high side manifold knobs. Check the low side gauge to make sure it is going into a vacuum which is achieved when the needle goes below -0. Draw the system down to or be close to 29.9 inches of vacuum. Let the pump run for at least 30 to 45 minutes. Note that at higher altitudes it will not achieve -29.9 inches of vacuum. If above 3,000 feet in altitude, let the vacuum pump run at least 15 minutes longer. After it has achieved a good vacuum, close both high and low side manifold knobs. Check the low side gauge and note where the needle is. After at least 5 minutes recheck the needle. If it is losing vacuum the gauge will be moving back to zero. That will indicate a leak in the A/C system (repair and start evacuation again). When repaired and ready to charge, remove the center hose from the vacuum pump and attach it to the refrigerant keg. Make sure to purge the center hose at the manifold gauge to let any trapped air out (just crack open and close). Charge with vapor only, NOT liquid. Next, open the low side manifold knob. Notice that the high side gauge needle will start to move up (away from zero). After the low and high side needle are equalize, or close to it, it is now ready to charge. Start the engine and turn the A/C switch on and the fan speed on high. Check with the A/C system manufacturer for how much refrigerant the system requires. If that information cannot be obtained, see the section below on charging an A/C system using a pressure temperature chart.

CHARGING AN A/C SYSTEM USING PRESSURE TEMPERATURE CHART

After following the steps in the section **CHARGING AN A/C SYSTEM** measure the fresh air intake at the condenser. Make sure it is reading the cool air coming in and not the warm air leaving the condenser. Add 35°F-40°F to the temperature measured at the condenser. For example, let's use R-134a and the temperature reading at 90°F, add 40°F, which results in 130°F. Then look at a R-134a temperature pressure chart (see page 2) and find 130°F. On the chart 130°F is approximately 200 PSIG. When your high side gauge reads 200 PSI, close the low side manifold knob which will stop the refrigerant flow from entering the system. Take the louver temperature, then check the high side gauge. If its below 200 PSI keep adding a little more refrigerant to the system until it reaches 200 PSI. Be careful not to overcharge the system. Keep checking your louver temperature. If the temperature rises with the compressor engaged, that could indicate the system is overcharged and can cause damage to the compressor.

8 Warning Signs Which Indicate Trouble

Train your drivers/operators to recognize warning signs of an impending climate control disaster. The following conditions require the immediate attention of a qualified service professional:

- **Vibration or noise from engine compartment**
  Vibration or noise from engine compartment when A/C is on can indicate a compressor or mount problem.

- **Vibration or noise from evaporators**
  Vibration or noise from the evaporator area indicates a blower or motor problem.

- **Oil residue**
  Oil found around the refrigeration hose connections can indicate a refrigerant leak.

- **Dripping water inside cab**
  Condensate is not draining due to plugged or kinked drain lines.

- **Poor performance**
  Noticeable decrease in performance is usually attributable to freon leaks or motor failures.

- **Warning lights**
  Warning lights, indicators reflective of high or low pressure system shutdown.

- **Poor air flow**
  Reduced airflow is indicative of clogged filters, evaporator coil, or failed blower motor.

- **Unusual odors**
  Can be caused by failing belts, hoses too close to heat source, or possibly electrical problems.

10 Ideas to Upgrade Existing A/C System Performance

Tried everything and still not happy with your climate control?
Here are some ideas to try to improve your system:

- **Upgrade condensers**
  Upgrade undersized condensers, add a second condenser, or change to a cleanable fin design.

- **Add evaporator**
  Add supplemental evaporator to improve air flow. Add an evaporator just for the operator.

- **Add fast idle kit**
  Additional RPM's spin compressor faster and increase volume of ref rigerant flowing.

- **Upgrade compressor**
  Additional displacement improves capacity 10 CID to 13 CID **- or -** 13 CID to 15 CID.

- **Add air diverters**
  Add downward air diverters to evaporator to cool below the unit.

- **Open up the air inlet**
  Move, relocate, or modify anything that restricts air to evaporator.

- **Seal condenser to skirt**
  Sealing or baffling condenser to the skirts stops capacity robbing recirculation of air.

- **Insulate refrigerant lines**
  Keep engine heat out of refrigerant. Insulate hoses in engine compartment.

- **Duct extension**
  Add an additional driver's duct extension to keep the driver cooler.
  Target the cool air at the chest or face area for optimum cooling.

- **Add insulation**
  Engine heat makes your system work overtime. Add insulation to your dog box.

A/C Troubleshoot Data Sheet
TXV Valve System with Receiver Drier

1. Refrigerant charge amount installed?		_____
2. Test is being done with cab doors opened and/or closed?		_____
3. Engine RPM (recommended 1500 rpm)		_____**RPM**
4. Engine operating temperature		_____
5. Percent humidity outside		_____**%**
6. Blower fan speed setting		_____
7. Ambient air temperature 2" (50mm) in front of condenser		_____
8. Compressor low side and high side pressure	High side	_____**psi**
	Low side	_____**psi**
9. Compressor suction line temperature		_____
10. Convert high side to temperature (use temperature chart, page 2)		_____
11. Compressor housing temperature		_____
12. Condenser inlet line temperature		_____
13. Condenser outlet line temperature		_____
14. Temperature drop across the receiver drier		_____
15. Evaporator inlet line temperature		_____
16. Evaporator outlet line temperature		_____
17. Evaporator air inlet temperature		_____
18. Evaporator air outlet (vent) temperature		_____

A/C Troubleshoot Data Sheet
TXV Valve System with Desiccant Bag

1. Refrigerant charge amount installed?		_____
2. Test is being done with cab doors opened and/or closed?		_____
3. Engine RPM (recommended 1500 rpm)		_____**RPM**
4. Engine operating temperature		_____
5. Percent humidity outside		_____**%**
6. Blower fan speed setting		_____
7. Ambient air temperature 2" (50mm) in front of condenser		_____
8. Compressor low side and high side pressure	High side	_____**psi**
	Low side	_____**psi**
9. Compressor suction line temperature		_____
10. Convert high side to temperature (use temperature chart, page 2)		_____
11. Compressor housing temperature		_____
12. Condenser inlet line temperature		_____
13. Condenser outlet line temperature		_____
14. Evaporator inlet line temperature		_____
15. Evaporator outlet line temperature		_____
16. Evaporator air inlet temperature		_____
17. Evaporator air outlet (vent) temperature		_____

A/C Troubleshoot Data Sheet
Orifice Tube System

1. Refrigerant charge amount installed?		_____
2. Test is being done with cab doors opened and/or closed?		_____
3. Engine RPM (recommended 1500 rpm)		_____**RPM**
4. Engine operating temperature		_____
5. Percent humidity outside		_____**%**
6. Blower fan speed setting		_____
7. Ambient air temperature 2" (50mm) in front of condenser		_____
8. Compressor low side and high side pressure	High side	_____**psi**
	Low side	_____**psi**
9. Compressor suction line temperature		_____
10. Convert high side to temperature (use temperature chart, page 2)		_____
11. Compressor housing temperature		_____
12. Condenser inlet line temperature		_____
13. Condenser outlet line temperature		_____
14. Evaporator inlet line temperature		_____
15. Evaporator outlet line temperature		_____
16. Evaporator air inlet temperature		_____
17. Evaporator air outlet (vent) temperature		_____
18. Suction accumulator inlet line temperature		_____
19. Suction accumulator outlet line temperature		_____

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- Charge Air Coolers
- Compressors
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- Compressor Clutches
- Compressor Components
- Condensers
- Engine Fans/Clutches
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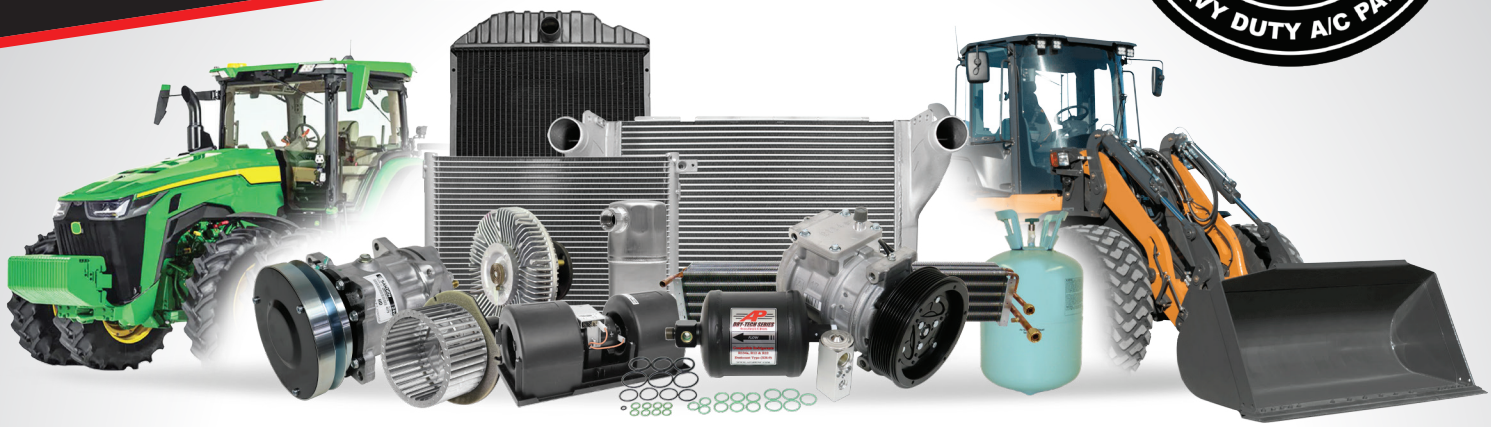
- Expansion Valves
- Freon
- Heaters, Heater Cores
- Kysor/Bergstrom - A/C Add On Units
- Lights/HD LED
- Oil Coolers
- Oil, Flush and Dye
- O-Rings, Gaskets
- Quick Coupler Fittings
- Radiators
- Rec Driers/Accumulators
- Red Dot - A/C Add On Units

Look for the refrigeriant charge amount and compressor oil amount after searching the application.

JOHN DEERE 4440 TRACTOR

Model Specifications			
Compressor Type	R134 Refrigeration (lbs)	Compressor Oil (oz)	Compressor Oil Viscosity
A6	3.25	11	100
Sanden Kit	3.0	8	100
Delco A6 Replacement	3.25	8	46/100



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- Freon
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