1972 Corvette: Service Bulletin: Blown Thermal Fuse Diagnosis

Subject: Blown Thermal Fuse Diagnosis
Model and Year: 1972 Passenger Car Air Conditioning Systems
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TO: ALL CHEVROLET DEALERS

Beginning with 1972 production, a system is used to disengage the air conditioning compressor clutch in the event of loss [of] refrigerant charge. The system consists of a pressure sensitive switch (superheat switch), located in the suction cavity of the rear compressor head and connected to a time delay fuse (thermal fuse) in the compressor clutch coil electrical feed circuit.

During normal operation, current flows directly through the thermal fuse of the compressor clutch (Figure 1). In the event the suction pressure at the compressor drops abnormally low for any reason, such as a stuck POA valve, stuck closed TX valve or loss of refrigerant, the superheat switch will close (Figure 2) providing a ground for the heater circuit of the thermal fuse (Figure 3). The heat melts the fuse (this takes about 2 minutes) and opens the circuit)Figure 4) causing the compressor clutch to disengage.

Since the operation of the superheat switch and thermal fuse is dependent upon both the electrical and mechanical systems, diagnosing a thermal fuse failure involves diagnosing both systems. However, both systems should be diagnosed separately, using a step by step procedure beginning with the

electrical system as outlined in this bulletin.

Chevrolet Motor Division
General Motors Corporation

ELECTRICAL SYSTEM DIAGNOSIS

If the compressor clutch does not engage and the thermal fuse is suspected to be the cause, remove the thermal fuse, turn the ignition switch and air conditioning system on and proceed as follows:

1. Check for current supply to the thermal fuse connector by connecting a test lamp from the "B" terminal of the connector to ground. Bulb should light. If bulb does not light, check wiring, ambient switch and control head for cause.

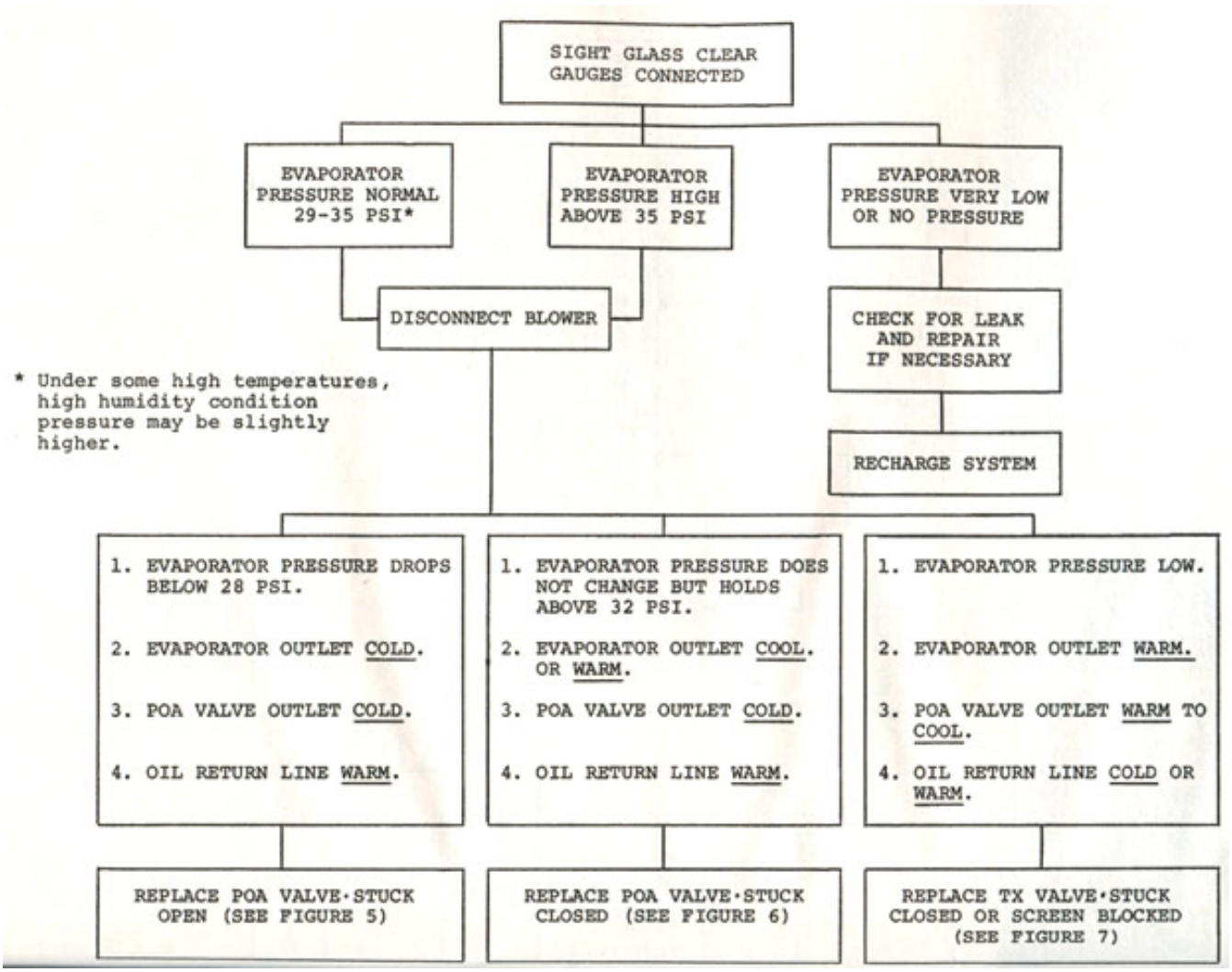
2. Check for failed superheat switch by connecting test lamp from the "B" to the "A" terminals of the connector. Bulb should not light. If bulb lights, replace superheat switch.

3. Check for complete circuit through the compressor clutch coil by connecting test lamp from the "B" to the "C" terminals. Bulb should light. if bulb does not light, check clutch coil and wiring.

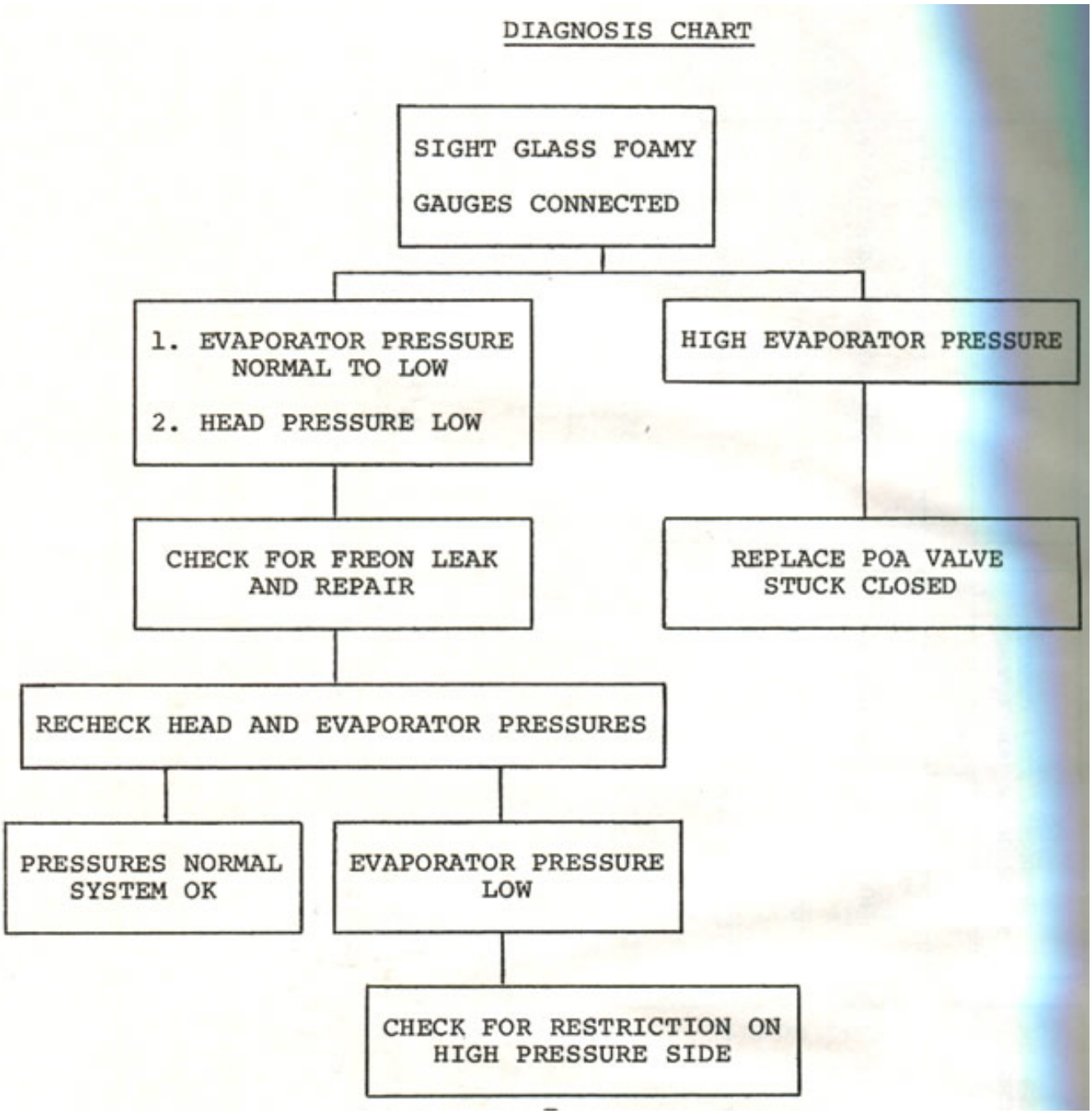
MECHANICAL DIAGNOSIS

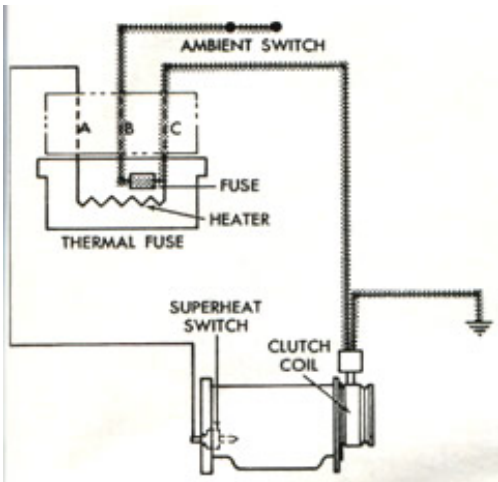
if the electrical system appears to be satisfactory, disconnect the thermal fuse lead from the superheat switch, install a known good thermal fuse and connect pressure gauges. Then operate the air conditioning system on maximum cool at an engine speed of 1200 to 1500 RPM, check the sight glass on the receiver dehydrator and proceed using the appropriate diagnosis cart in this bulletin.

NOTE: If after completing the "Mechanical Diagnosis" the cause of the blown fuse cannot be determined, immediately check the superheat switch terminal for ground. if the terminal is grounded, replace the switch.

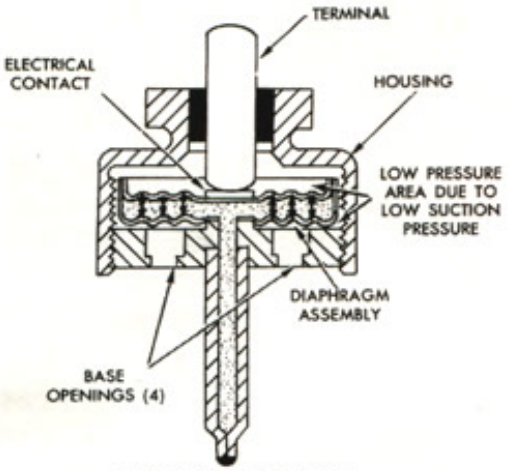

SIGHT GLASS CLEAR
GAUGES CONNECTED
EVAPORATOR PRESSURE NORMAL 29-35 PSI*
EVAPORATOR PRESSURE HIGH ABOVE 35 PSI
EVAPORATOR PRESSURE VERY LOW OR NO PRESSURE
DISCONNECT BLOWER
CHECK FOR LEAK AND REPAIR IF NECESSARY
RECHARGE SYSTEM
* Under some high temperatures, high humidity condition pressure may be slightly higher.
1. EVAPORATOR PRESSURE DROPS BELOW 28 PSI.
2. EVAPORATOR OUTLET COLD.
3. POA VALVE OUTLET COLD.
4. OIL RETURN LINE WARM.
1. EVAPORATOR PRESSURE DOES NOT CHANGE BUT HOLDS ABOVE 32 PSI.
2. EVAPORATOR OUTLET COOL. OR WARM.
3. POA VALVE OUTLET COLD.
4. OIL RETURN LINE WARM.
1. EVAPORATOR PRESSURE LOW.
2. EVAPORATOR OUTLET WARM.
3. POA VALVE OUTLET WARM TO COOL.
4. OIL RETURN LINE COLD OR WARM.
REPLACE POA VALVE·STUCK OPEN (SEE FIGURE 5)
REPLACE POA VALVE·STUCK CLOSED (SEE FIGURE 6)
REPLACE TX VALVE·STUCK CLOSED OR SCREEN BLOCKED (SEE FIGURE 7)

DIAGNOSIS CHART

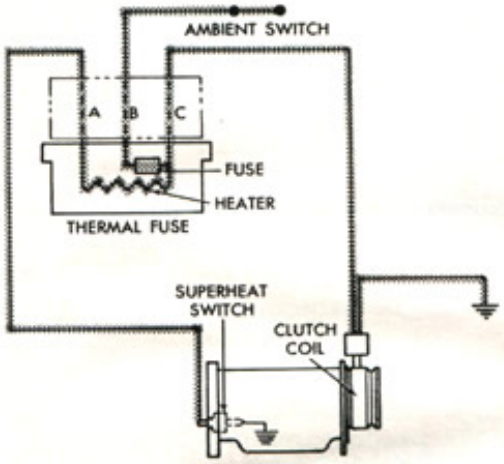




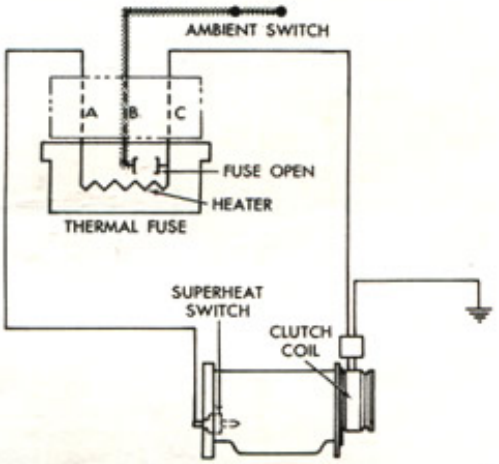
NORMAL CURRENT FLOW
FIG. 1



SUPER HEAT SWITCH CLOSED
FIG. 2



CURRENT FLOW, SUPERHEAT SWITCH CLOSED
FIG. 3



THERMAL FUSE BLOWN
FIG. 4

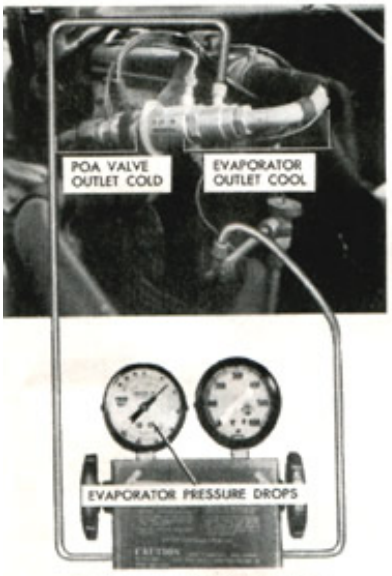


FIGURE 5—POA VALVE STUCK OPEN

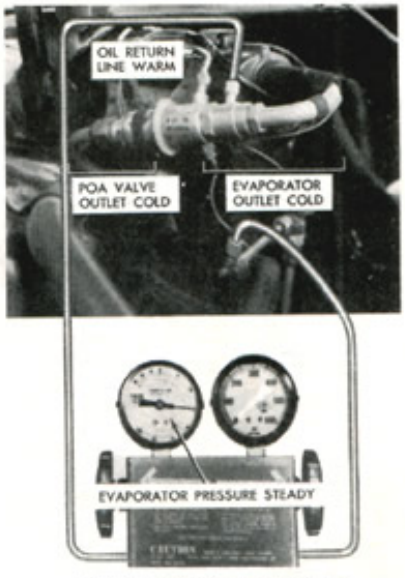


FIGURE 6—POA VALVE STUCK CLOSED

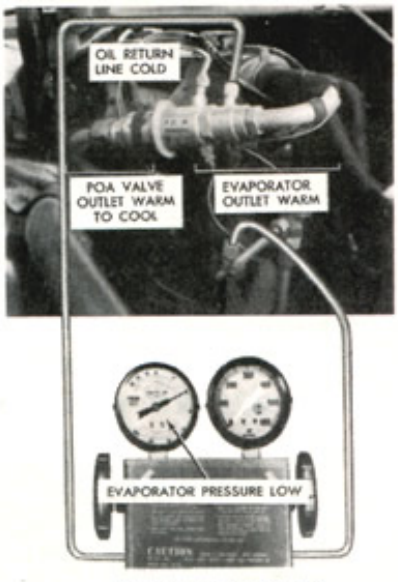


FIGURE 7—TXV STUCK CLOSED

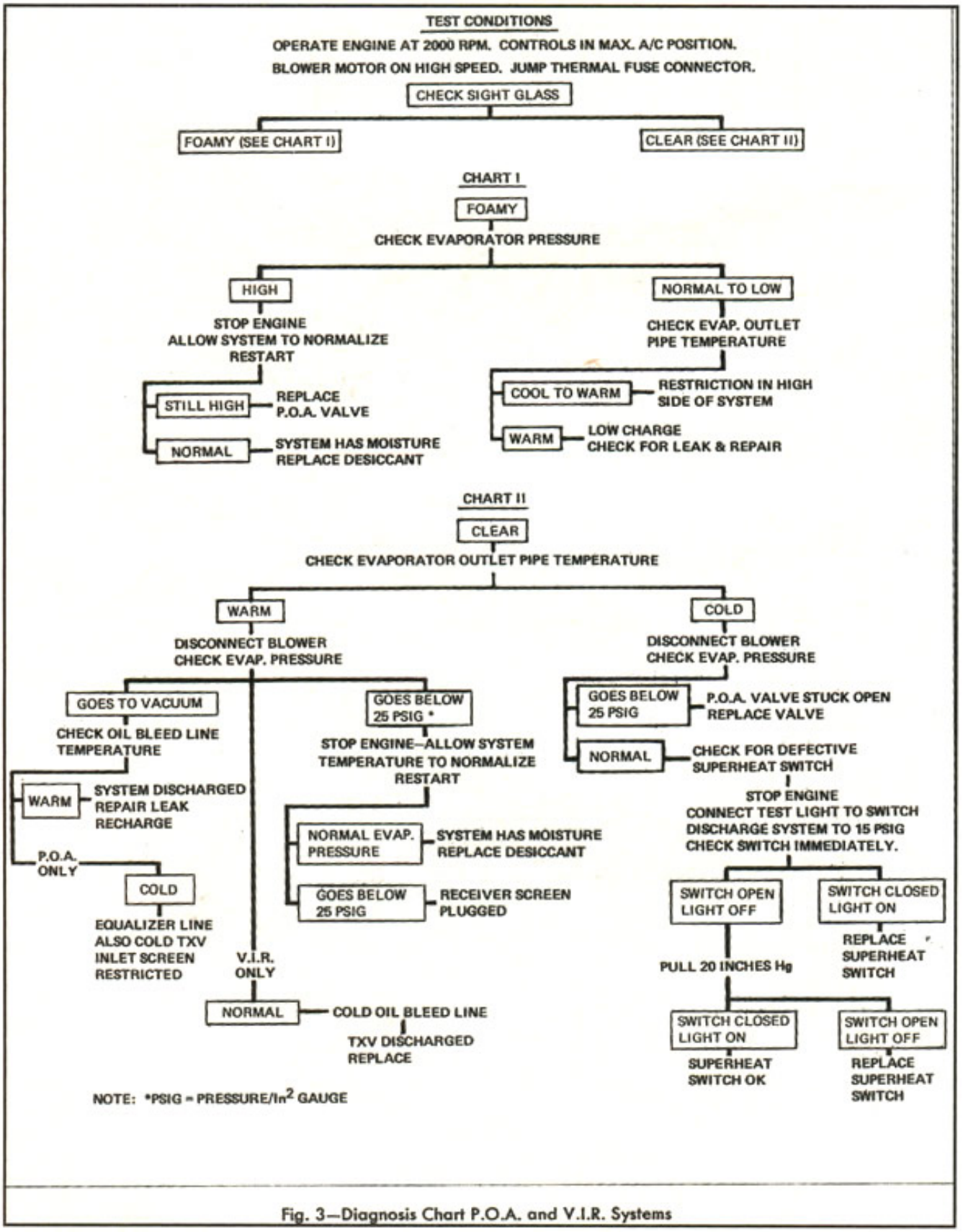


Fig. 3—Diagnosis Chart P.O.A. and V.I.R. Systems

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