AIR HANDLING SYSTEMS

Air handling unit transfer the conditioned air to and from the building

The are two types of air handling unit

1.central station air handling unit.

2.Fan coil units.

Central Station Units:

This type uses one or more of the large air handling unit. The unit consist of the following component

1.cooling coil

2.Heating coil

3.Humidifier

4.Mechanical air filter

5.Electronic air

6.Fans and motors

7.Maxing dampers and exhaust dampers

Heating and cooling coils

--The heating coil is usually selected for hot water heating

--The hot water is easier to control.

--Chilled water cooling coils is similar in construction to the heating coil.

More rows deep for cooling coil than heating coil to increase surface are

Maintenance

1.Both the internal and external surface must be clean for coils to deliver the full rated capacity.

2. Chemical or mechanical cleaning of internal surfaces at frequent intervals is necessary .

3. Water coils should be completely drained if freezing conditions are possible.

Cleaning method for coils

1.Surfaces coil may be washed with low pressure water.

2. It may be brushed and cleaned with vacuum cleaner .

3. In restaurants, it is sometimes necessary to remove the coils and wash off the accumulation (grease ,dirt) with steam ,compressed air and water. Or hot water.

Air conditioning system heating and humidifying

Types of heating and humidifying system

There are many types of heating equipment in use regardless of type , heating source must be economical and safe .system which require a minimum of attention by the user are most desirable .

Sources of heat may be classified by fuels :oil ,gas , and electric including resistance , light

(radiant) or heat pump .wood and col –fueled furnaces are becoming obsolete and are not covered in this text.

Maintenance of humidifier :

Humidify is the amount of water vapor within a given air space.

There are four benefits in maintenance the proper humidity occupied space:

1.comfort

2.preservation

3.health

4.energy considerable.

Humidifying devices provide a means of turning water into water vapor and mixing this vapor with air in the occupied space fig(20- 2).shows six method:

1.Exposing a large surface of water to air being humidified .

2.spraying atomized water into air being air humidified .

3.water tray on radiator.

4. water tray in top warm air furnace.

5. wetted revolving screen in a warm air duct.

6.space humidifier, not part of a heating system, water is vaporized by electric heat.

Complete Air Conditioning Equipment May Be Divide In To Six Main Parts

1.Heating equipment

2.Humidifing equipment

3.Filtering and cleaning equipment

4.Circulating equipment.

5. Dehumidifying equipment.

6.Cooling equipment.

Dampers

Without some way of controlling airflow in forced air system ,some spaces would receive
Too much air while others would not get enough. One method of getting even air .distribution is through the use of duct dampers
These dampers balance airflow or the can shut off or open certain ducts for zone control.
Such a damper is shown in fig (22.37) .some are located in the diffuser or grille , some are in the duct itself. They are of three types :

1. *Butterfly*

2. *Multiple blade*

3. *Split damper*

All three type are shown in fig(22.38) .there are two types of multiple blade dampers: The parallel blade type , as in fig (22.39)and the opposed blade type .fig(22.40).detail of the blade design is shown in fig (22.41)

General maintenance procedures for air handling systems

Inspect air handling systems. Inspect for the following

1. ***Obstructions to air paths***
2. ***Obstructions to the face area of coils***
3. ***Dirty strainers (high pressure drop)***
4. ***Damage to or deterioration of equipment housings, fan housings, ducts, expansion joints, etc .that would let air leak from the system***
5. ***Damage to, or deterioration of, ducts, flexible connections, and other components that would .allow air to leak into occupied spaces***
6. ***.. Obstructions in dampers, isolation valves, and device operators that would prevent free .movement of the device***
7. ***Deformed flexible piping connections and expansion joints***
8. ***Misaligned or sagging pipe and duct sections***
9. ***Deformed or broken pipe and duct support devices. (Verify that support devices designed to accommodate movement of the duct are free to operate***

10. *Unusual noise, vibration, or overheating*

11. *loose mechanical or electrical connections*

12. *Missing components*

13. *Misalignment of drives, worn belts and pulleys, and loose drive belts on belt-driven equipment*

14. *Damaged or missing equipment guards*

15. *Damaged or missing insulation*

Damaged or missing equipment tags

صيانة / حماية / آلات التبريد

(8)

Automobile Air-Conditioning

There has been a rapid increase in the use of air- conditioning in automobile. An automobile is relatively small. Yet, when it travels at high speed on a hot days, in summer, it will require a considerable amount of refrigerating capacity to keep the interior at a comfortable temperature level. Likewise, the same car traveling on a cold day in winter will require considerable heating capacity to keep it warm.

The automobile air-conditioning is basically no different from any other type of air-conditioning system .It uses a refrigerating system driven by the cars engine to furnish the cooling action desired. In most cases, warm water from the engine cooling system is used for heating purposes .See Fig (26.1).

Automobile Air - Conditioning Operation:

A comfort cooling unit for automobile is shown in Fig .(26.2)It this installation , the compressor is mounted on the engine and is driven by a belt .The condenser is mounted ahead of the car radiator .

In operation ,liquid refrigerant flows from the condenser the liquid receiver , which dries and filters it. The liquid refrigerant travels through a refrigerant control to the evaporator where it is vaporized and heat is absorbed .The vaporized refrigerant flows back through the section line to the compressor .

Meanwhile, a blower forces air from the inside of the car through the evaporator The cool air produced is circulated to the interior of the car by means of duct and grilles at each end of the instrument panel. A basic refrigeration system for an auto air conditioner is shown in Fig.(26.4).

Low-pressure refrigerant vapor enters the compressor through the suction service valve (low side).The vapor is drawn into the cylinder where it is compressed by the piston ,then discharged through the discharge service valve into the condenser (high side). The heat of compression and the latent heat of vaporization absorbed by the refrigerant are given up to the air flowing past the condenser . The refrigerant is again liquefied, and it moves to the liquid receiver .Fig.(26.5)reveals the condition of the refrigerant in each part of the refrigeration cycle.

12 →

It the air-conditioning system ran continuously ,the temperature in the car would drop to an uncomfortable level, and the evaporator would frost over.
(To prevent this condition ,most system use a magnetic clutch mechanism that causes free wheeling .The clutch is operated by a thermostat that opens the electrical circuit to an electromagnetic clutch on the compressor .This allows the compressor pulley to rotate while the compressor crankshaft remains stationary.)

(When the air condition system is not turned on in winter when the heater is used) the refrigerating mechanism is not in operation .The electromagnetic clutch on compressor is not energized .Instead, hot water is circulated through the heater care, and the same blower and most of the same duct system are utilized for heating as are used for cooling .

Types of systems

Three different basic cycle and mechanical air conditioning system have been used on automobiles :

1. Pressure operated low side pressure regulators
2. Pressure operated bypass
3. Solenoid operated bypass.

These systems vary in size and installation procedures .

olenoid Operated Hot Gas Bypass:

In a solenoid operated bypass system, a thermostat mounted on the evaporator opens a solenoid valve to bypass hot gas from the high side to the low side When the temperature of the evaporator drops to (0.5 C).

The thermostat is mounted With the sensing bulb located in the evaporator outlet air flow . The air temperature is lowered to (0 c), satisfying the thermostat .
It opens the solenoid and allows hot gas from the condenser to bypass back into the suction line.

Since the solenoid valve is either closed or Wide open ,it dose not give the throttling effect of a pressure operated valve .

The solenoid is in a closed position When the thermostat points open (air is Warm). The valve opens When the circuit is closed . The thermostat points ,therefore ,close on temperature drop.

Magnetic clutch:

Automotive air –conditioning compressor have a mechanism that permits the engine to run With the compressor disengaged . A clutch is used to engage the compressor belt drive pulley to the compressor crankshaft or to disengage it. The clutch is operated by forcing a clutch disk against the pulley through the use of electro magnetism. This device is called a magnetic clutch .Its principle of operation is shown in Fig .(26,15). General construction, including the magnetic field circuit, is shown in Fig (26,16).

Receiver----Drier :

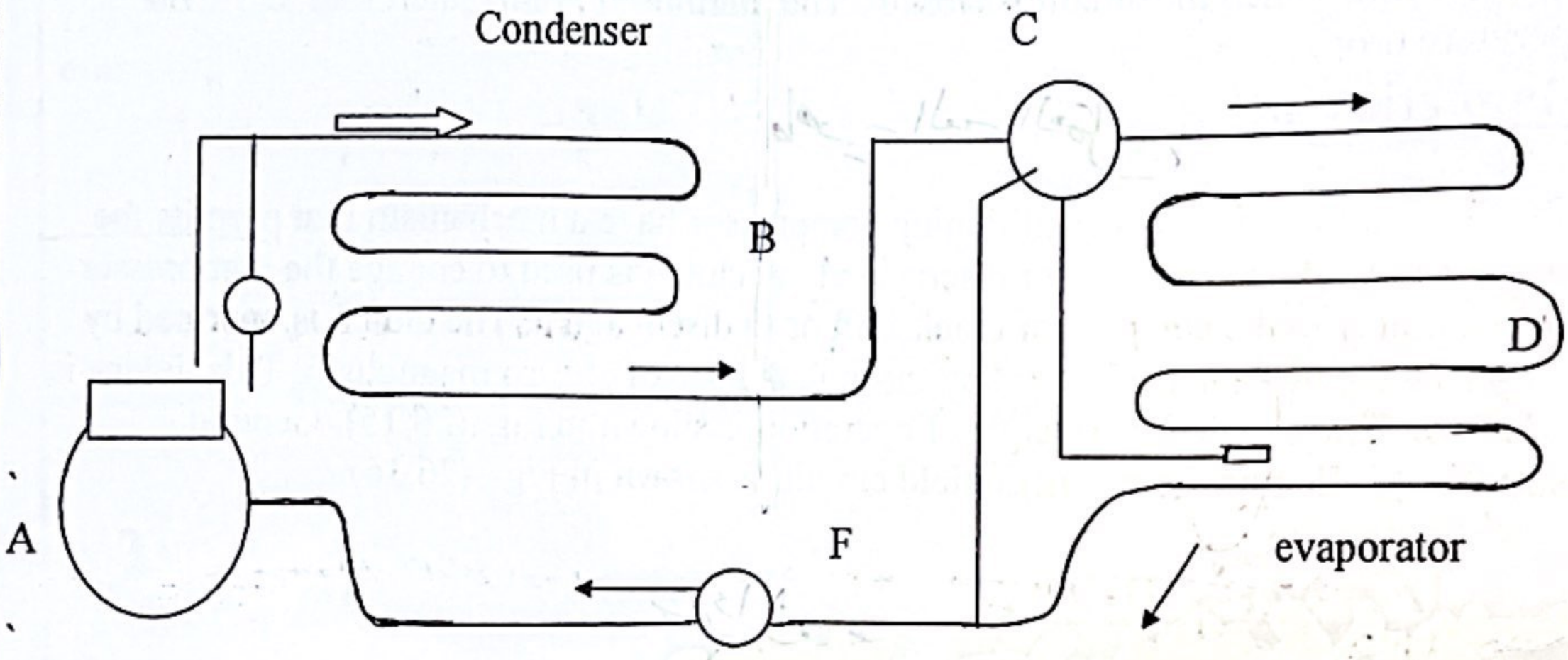
Most automotive air—conditioning system use a receiver located between the condenser and evaporator . Its purpose is to store liquid refrigerant during service operations. The receiver also allows for some changes in refrigerant charge and in liquid volume(caused by expansion and construction of the refrigerant as temperatures change.).

The receiver usually has a drier chemical placed inside .This drier chemical (desiccant) will remove moisture from the liquid and hold the moisture). Unless the chemical is heated to a high temperature or unless the water is replaced by a more active chemical, such as alcohol. Most driers have a strainer to remove dirt particles from the refrigerant and oil . Liquid receivers usually have a safety fusible plug that will open and release the refrigerant if heated to about(170 C).

Some of these receivers also have a sight glass as a part of the liquid line outlet . After the system has been operating for a few minutes , bubbles may appear in the sight glass. These vapor bubbles signal that the system is short of refrigerant (no reserve liquid in receiver) . Usually ,the bubbles indicated that the system has lost over half of its charge.

LOW - side pressure control :

In the low- side pressure control system ,an evaporator pressure controlled regulator valve is installed in the section line of the system .The purpose of this valve is to hold a constant pressure in the evaporator .The valve will close if the evaporator tends to go below a certain setting ,there by holding the evaporator at a constant pressure and temperature.



A-Compressor B- Condenser D-Evaporator

System with evaporator pressure –controlled suction line valve .
C-Thermostatic expansion valve F-Evaporator pressure control

The low side pressure control sometimes causes the compressor to produce a high vacuum at high speeds .This might cause the compressor to lose its oil .Fig.(26.11)show a system With a POA(pressure operated altitude) valve, Which maintains a constant evaporator refrigerant pressure .

للتخلص من مالة الفاكيوم

To overcome this vacuum problem, some manufactures use an automatic expansion valve bypass in the system .This valve has a small bleeder hole in the orifice to allow a small amount of refrigerant to enter the section line and to prevent too high a vacuum from forming .See Fig(* *) In this system .the compressor may operate continuously as long as air – conditioning is needed.

ervicing Automobile Air ----Conditioners:

Servicing the automobile air—conditioner is about the same as servicing standard air—conditioning systems.

Servicing usually begins with a customers complaint or during an annual check of the system . Owners complaints received most are:

1. No cooling .
2. Noise.
3. Cooling intermittently .
4. Vibration.

These may be several causes for each complaint .Check the system thoroughly to find the correct cause...

Periodic Maintenance :

The car owner should run the air-condition unit for a few minutes once each month in fall, winter and spring to keep compressor parts (especially the shaft seal) Lubricated.

The owner should check the unit each spring and fall as follows :-

1. Condenser (clean fins and tubes of leaves, lint and insects).
2. Refrigerant lines (should show no signs of chafing or wear).
3. Bellt tension .

The service technician should check the unit each spring and fall or each 10,000 miles as follows:

1. Clean all parts externally , including condenser and evaporator or.
2. straighten fins on condenser and evaporator .
3. check refrigerant charge .

a-sight glass . b-pressure in system.

4. Check oil level in compressor.
5. Check for leak, using a leak detector or color trace.

When a vehicle equipped with an air conditioning system is stored for a long period , the air conditioner should be started very carefully . Sometimes the compressor binds during storage . It is best to raise the hood and watch the compressor and belt while Turning on the air-condition .If the belt starts slipping , stop the engine at once. This indicates that the compressor is turning with difficulty or is frozen (stuck). Try to free the compressor by slow and careful turning . If it will not run, remove it at once for reconditioning .

Charging The System.

Set both manifold gauge valve .

1. After evacuating system and close both high and low side manifold hand valve .

2. Shut off the vacuum pump. Disconnect centre manifold hose from vacuum pump and attach hose to can valve.

3. Now system is under vacuum but hose contains trapped air. Open can valve and purge air from hose by cracking hose connector loose at manifold. Allow air to escape.

4. Open the low side manifold hand valve allowing refrigerant vapor to enter system.

5. Both gauge needles stop rising close the low side manifold hand valve .

6. Start engine and run at fast idle (1500 r.p.m.). turn air conditioner controls for maximum cooling .

7. Open can valve and low side – manifold hand valve to drawn additional refrigerant Through low side .

Note never open high side manifold hand valve when engine is running .(hot water bath not more 50 C^0)

8. Observe high side gauge reading and thermometer reading in engine compartment to avoid overcharge.

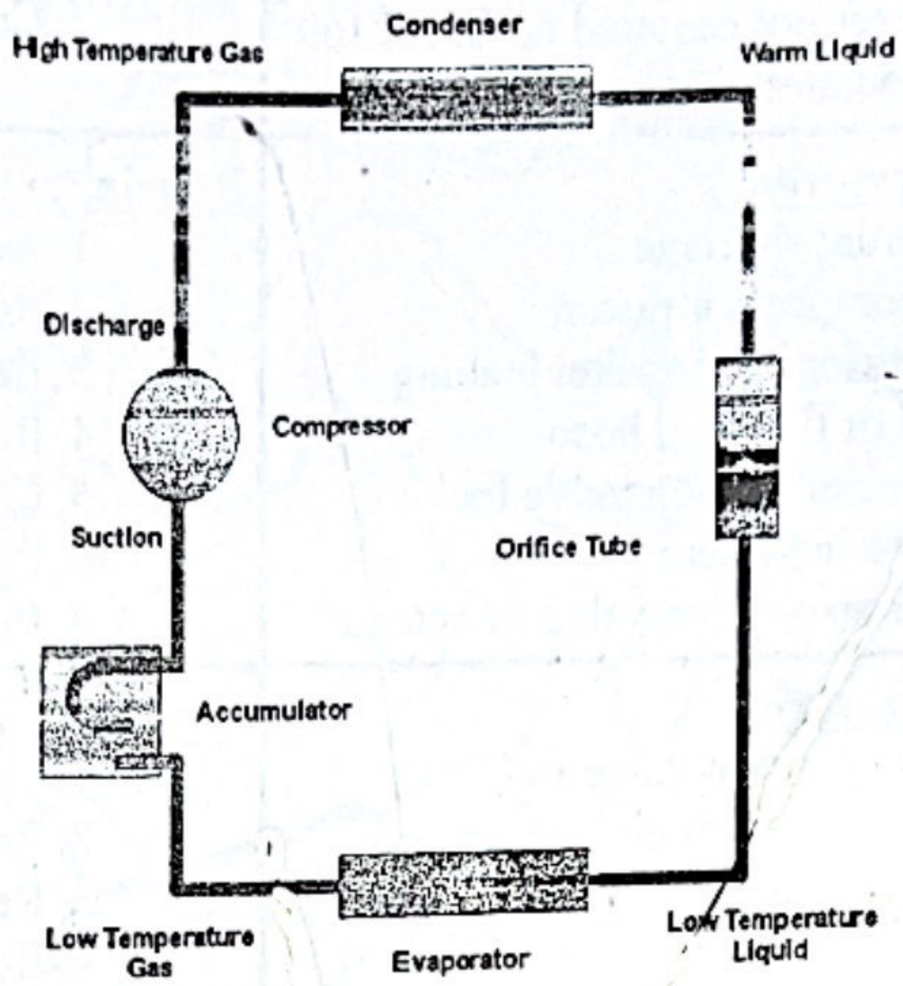
High side pressure should not exceed (230 psi).

Low side pressure should--reach normally (15—25 psi).at 1500 r.p.m

9. Check thermometer reading at air discharge duct near evaporator reading normally at (10 C^0).

10. Shut off the A/C switch and stop engine remove manifold gauge hoses from compressor port fastly to prevent refrigerant from escape.

Orifice Tube Air Conditioning System



Tools

- A/C Gauges and hose set

A/C System Troubleshooting

The following is an general A/C system troubleshooting guide. Realize that it is generic and many of the things listed here may not apply to the 944.

Symptom / Possible Cause	Solutions
Low Compressor Discharge Pressure 1. Leak in system 2. Defective expansion valve 3. Suction valve closed 4. Freon shortage 5. Plugged receiver drier 6. Compressor suction valve leaking 7. Bad reed valves in compressor	**Repair** 1. Repair leak in system 2. Replace valve 3. Open valve 4. Add freon 5. Replace drier 6. Replace valve 7. Replace reed valves
High Compressor Discharge Pressure 1. Air in system 2. Clogged condenser 3. Discharge valve closed 4. Overcharged system 5. Insufficient condenser air	**Repair** 1. Recharge system 2. Clean condenser 3. Open valve 4. Remove some refrigerant 5. Install large fan

(18) (7)

Symptom / Possible Cause	Solutions
6. Loose fan belt 7. Condenser not centered on fan or too far from radiator	6. Tighten fan belt 7. Center and check distance
Low Suction Pressure 1. Refrigerant shortage 2. Worn compressor piston 3. Compressor head gasket leaking 4. Kinked or flattened hose 5. Compressor suction valve leaking 6. Moisture in system 7. Trash in expansion valve or screen	**Repair** 1. Add refrigerant 2. Replace compressor 3. Replace head gasket 4. Replace hose 5. Change valve plate 6. Replace drier 7. Replace drier
High Suction Pressure 1. Loose expansion valve 2. Overcharged system 3. Expansion valve stuck open 4. Compressor reed valves 5. Leaking head gasket on compressor	**Repair** 1. Tighten valve 2. Remove some refrigerant 3. Replace expansion valve 4. Replace reed valves 5. Replace head gasket
Compressor Not Working 1. Broken belt 2. Broken clutch wire or no 12v power 3. Broken compressor piston 4. Bad thermostat 5. Bad clutch coil 6. Low Refrigerant - low pressure switch has cut off clutch power	**Repair** 1. Replace belt 2. Repair wire or check for power 3. Replace compressor 4. Replace thermostat 5. Replace clutch coil 6. Add refrigerant
Evaporator Not Cooling 1. Frozen coil, switch set too high 2. Drive belt slipping 3. Hot air leaks into car 4. Plugged receiver drier 5. Capillary tube broken 6. Shortage of refrigerant 7. High head pressure 8. Low suction pressure 9. High suction pressure 10. Defective expansion valve 11. Frozen expansion valve	**Repair** 1. Turn thermostat switch back 2. Tighten belt 3. Check for holes or open vents 4. Replace drier 5. Replace expansion valve 6. Add refrigerant 7. See problem #2 8. See problem #3 9. See problem #4 10. Replace expansion valve 11. Evacuate and replace drier
Frozen Evaporator Coil 1. Faulty thermostat 2. Thermostat not set properly 3. Insufficient evaporator air	**Repair** 1. Replace thermostat 2. Set to driving condition 3. Check for excessive duct hose length, kink or bend.

(8)

Fig 26.1

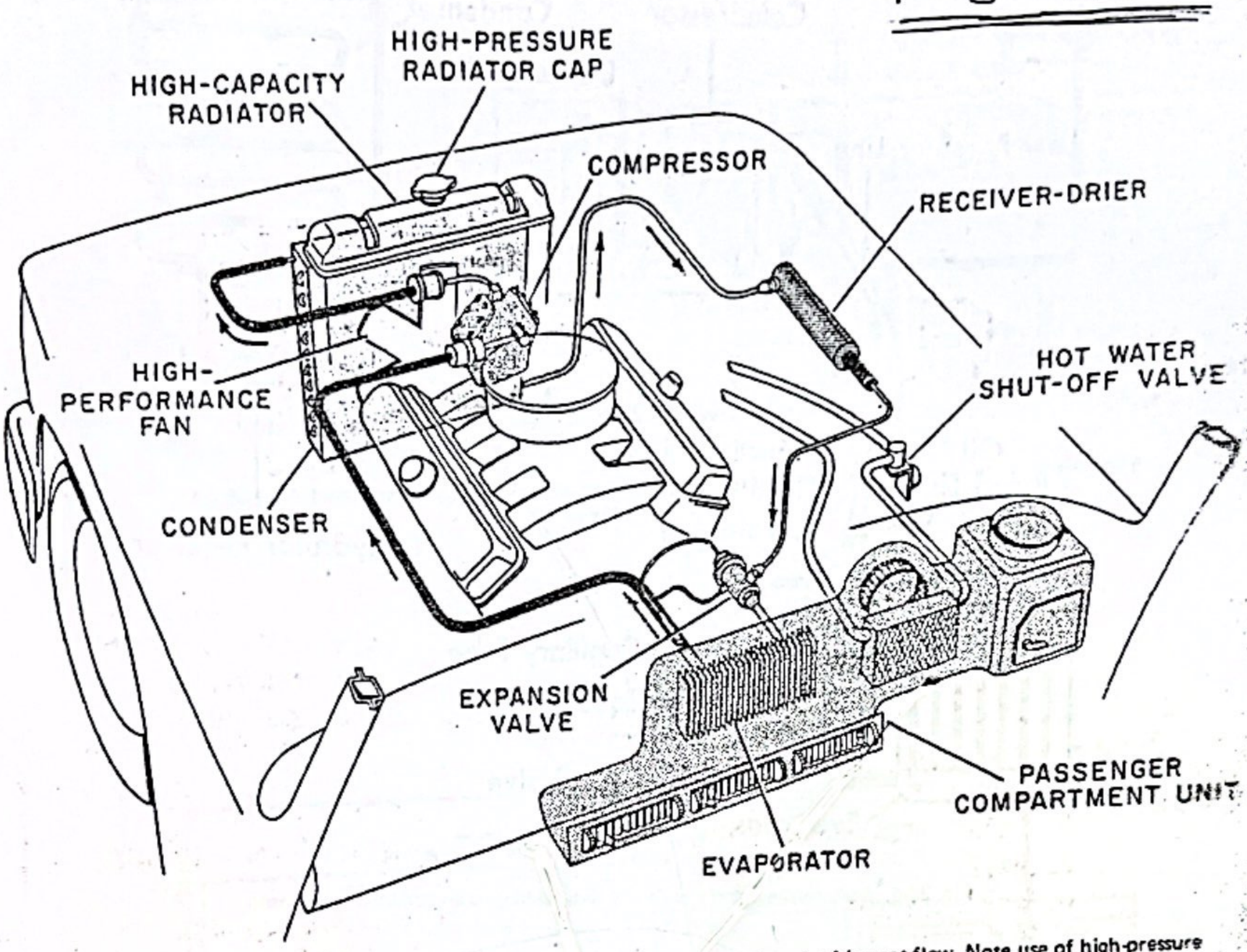


Fig. 26-1. An automotive air conditioning system. Arrows indicate direction of refrigerant flow. Note use of high-pressure radiator cap, large fan and high-capacity radiator. Also, note heating system at right. (Dodge Div., Chrysler Corp.)

Fig 26.2

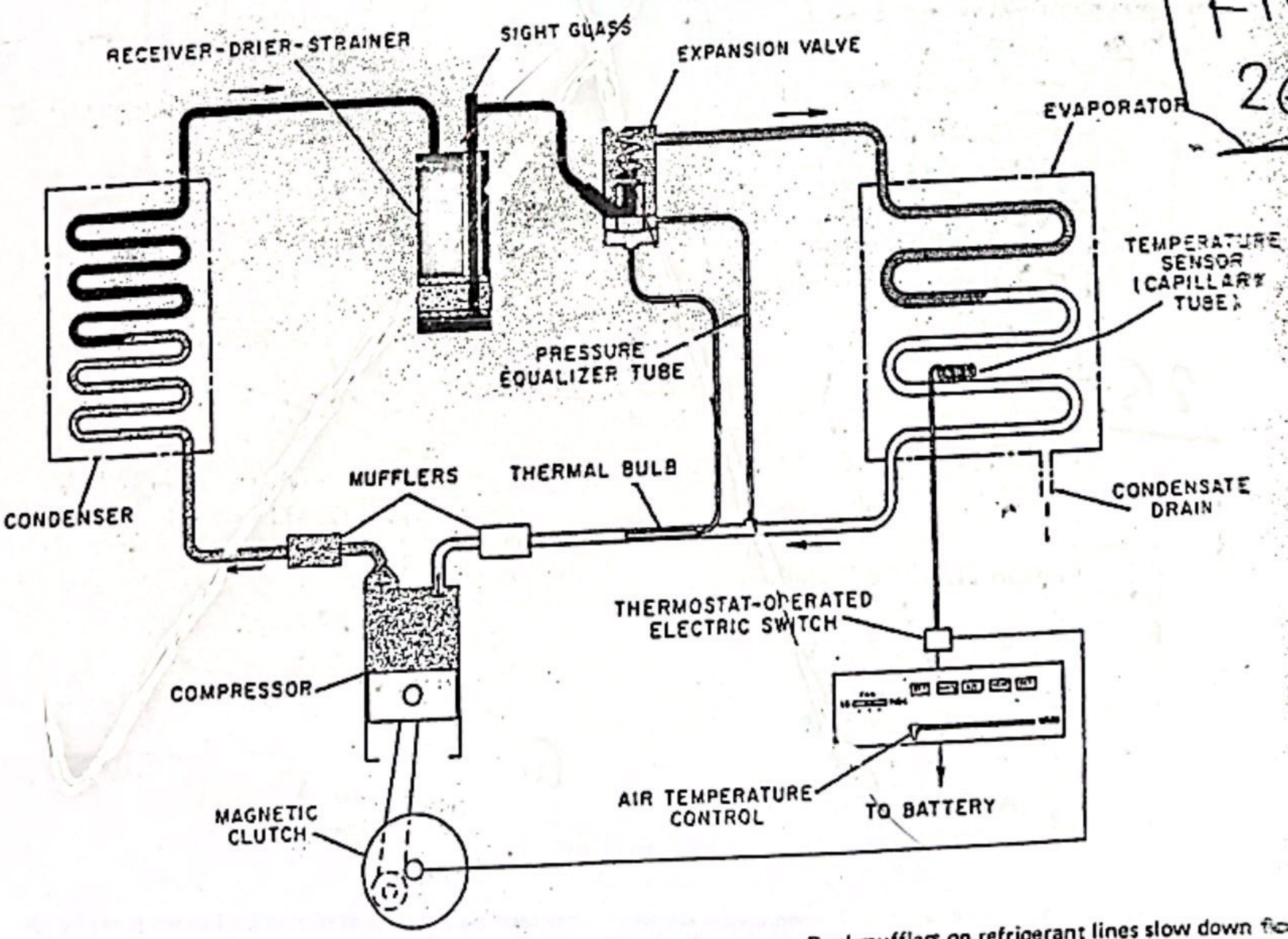


Fig. 26-2. Schematic drawing of modern automotive air conditioning system. Dual mufflers on refrigerant lines slow down flow of refrigerant vapor to reduce the amount of noise caused by unit. (Chrysler Corp.)

(896) 9

26.4

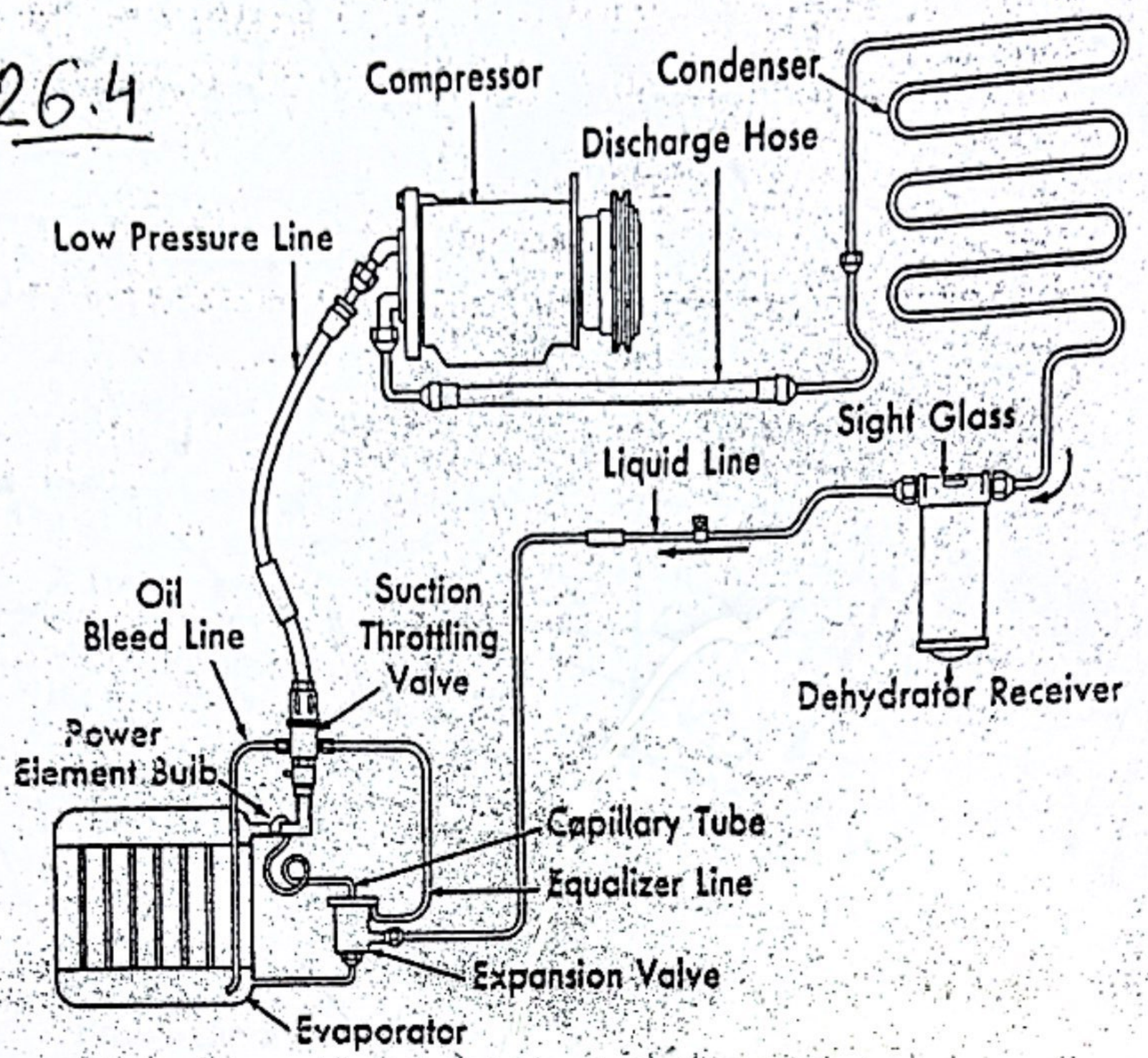


Fig. 26-4. Basic refrigeration circuit of a General Motors air conditioning system.

26.5

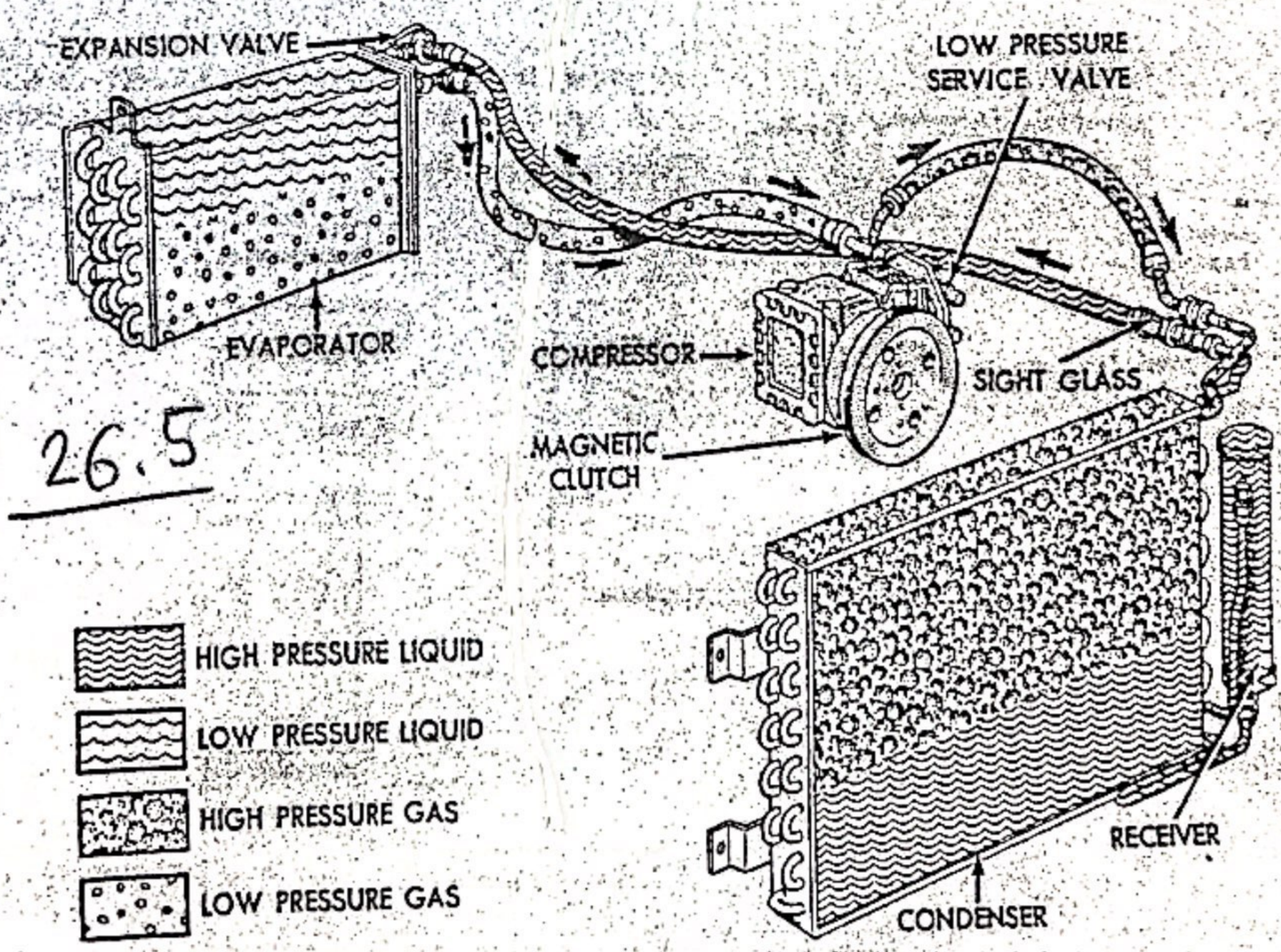


Fig. 26-5. Typical automobile air conditioning system showing condition or state of refrigerant in each part of cycle. (Ford Motor Co.)

(43) 10

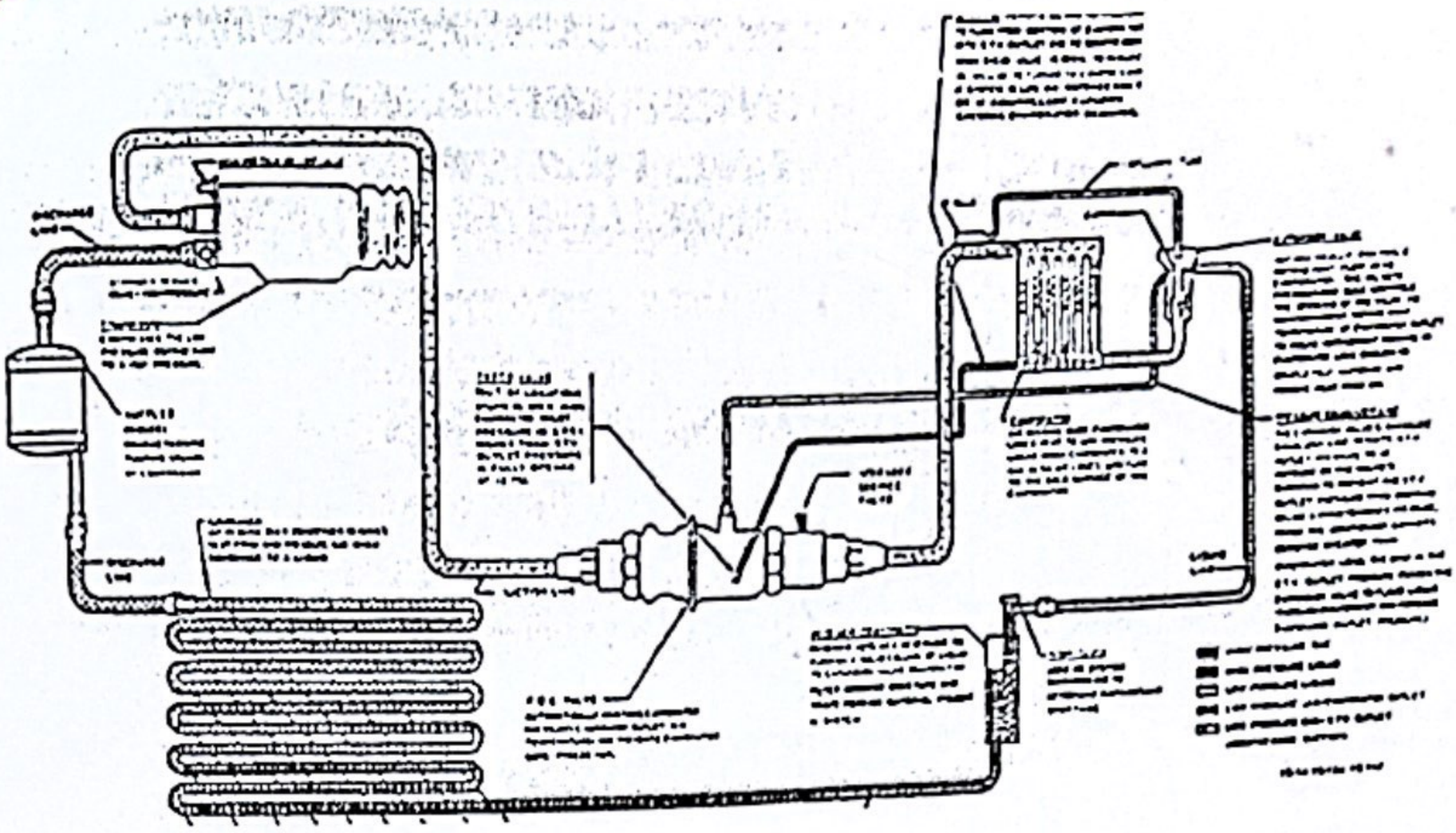
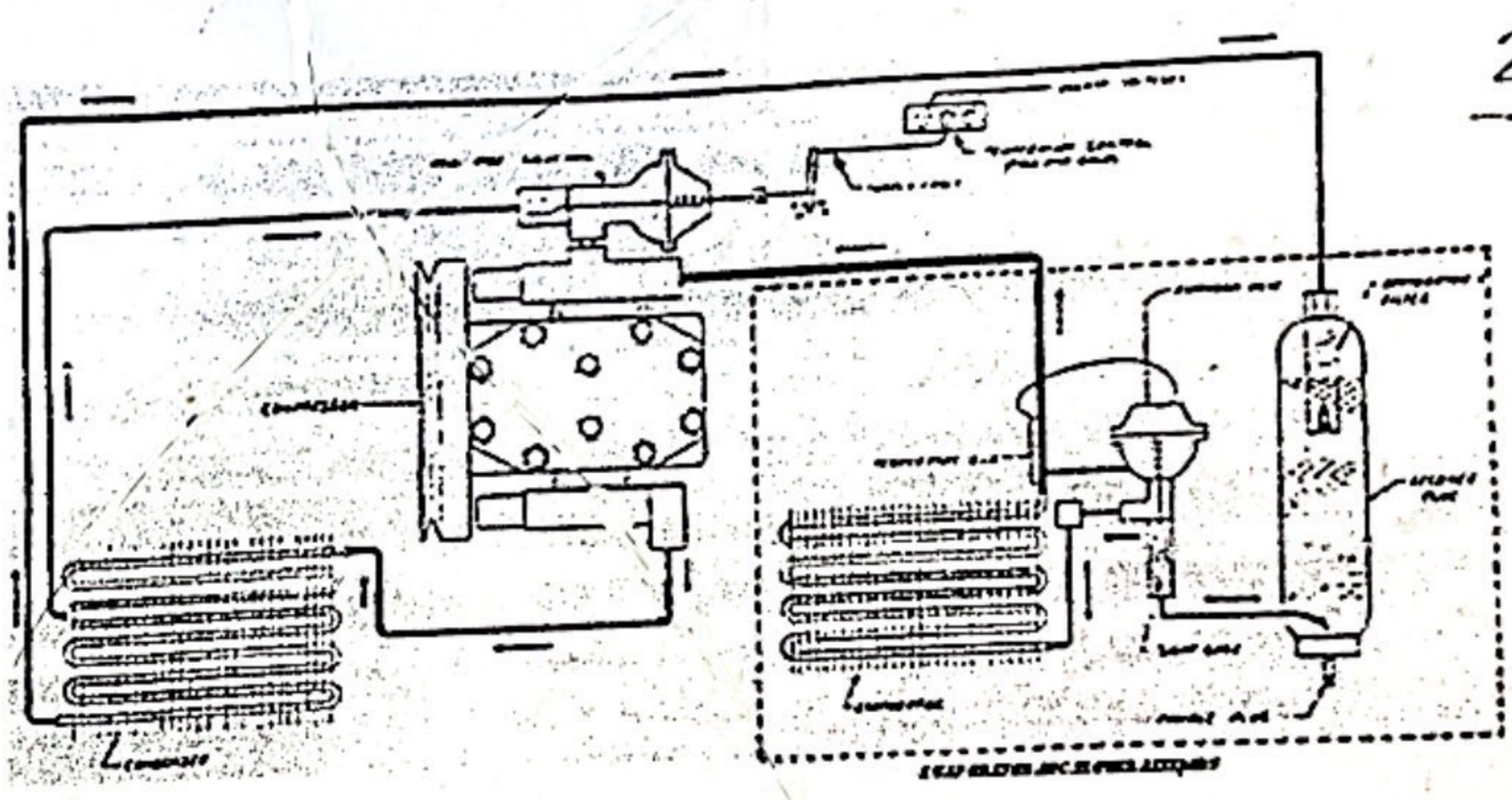


Fig. 26-11. Operation of refrigerating system, showing high and low pressures, POA valve and state of refrigerant. (Buick Motor Div., General Motors Corp.)

(26.11)

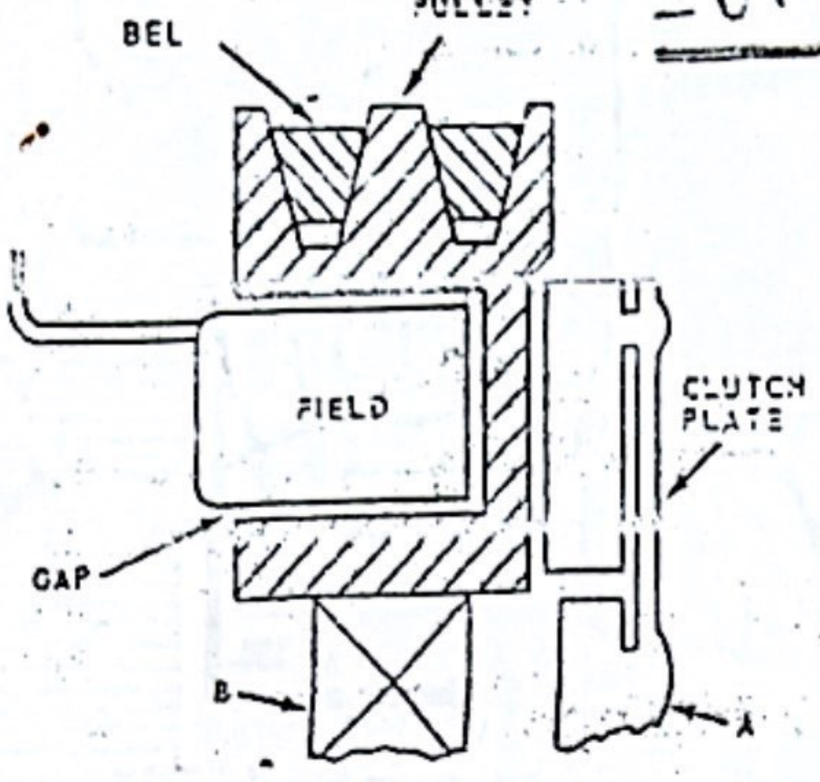


26.13

Fig. 26-13. Cycle diagram for manually adjusted evaporator pressure operated bypass. Modulator valve is controlled by the driver. Note solid core dehydrator and filter at entrance to liquid receiver.

FIG(26.13)

(11)



26.15

Fig. 26-15. Schematic of an electromagnetic clutch. Note stationary magnetic field. A-Clutch plate. B-Pulley rides on bearing.

FIG(26.15)

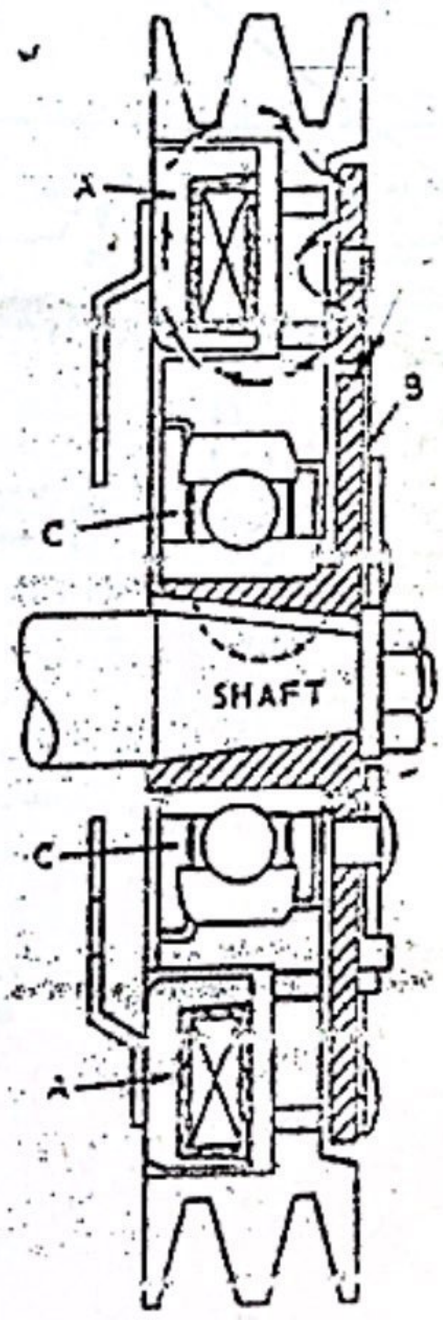


Fig. 26-16. Compressor pulley with stationary electromagnet, showing magnetic field. A—Electromagnetic coil. B—Clutch disk. C—Bearings.

FIG(26.16)

rubber

(15) (12)

Maintenance of domestic refrigerator

- A domestic refrigeration system is a hermetic system .it consists primarily of three parts
- **1.The cabinet .**
- **2.The mechanism(condensing unit and evaporator)**
- **3.The electrical circuit.**

There are two common methods for manually defrosting the refrigertors

1-*the refrigerators is turned off and allowed to remain off overnight .a drip pan must be used to catch the condensation that comes from defrosting the refrigerator.*

2.Turn 0ff the refrigerator and place a pan of hot water in or near the evaporator .

- *Always check the system data before trying to locate the cause of the trouble. Servicing of hermetic refrigerator may be divided into two major area:*
- *1.External servicing*
- *2.Internal servicing*

- *External Servicing Operations:*
- *Some of the more common external service operations are:*
- *1.Cabinet hardware.*
- *2.Cleaning*
- *3.Noise .*
- *4. Electrical.*

- **Power in circuit.**
- **Thermostat.**
- **Defrost thermostat**
- **Interior light and circuit.**
- **Fan motor and circuit. .**
- **Motor compressor**
- **Defroster heater coil**
- **Cabinet heaters .**
- **Condenser fan circuit.**
- **Butter conditioner**

INTERNAL SERVICE OPERATIONS

To remove any part of a hermetic system ,or to find out if there is air in the system ,a lack of refrigerant, clogged drier -filter or capillary tube, one must attach gauges and servicing devices. These include vacuum pumps, refrigerant cylinders.

Before attempting any field service operations which require opening the system *:*

1. Thoroughly clean all connections and valve fitting .
2.1nstall a piercing valve .
3. Install a gauge manifold.

Most common maintenance operations

- 1.locating and repairing refrigerant leaks.
- 2. charging .and discharging refrigerant.
- 3.Cleaning or replacing capillary tube.
- 4.Replacing a compressor .
- 5.Replacing filter-drier
- 6.Evacuating.
- 7.Adding oil.
- 8.Replacing a condenser.

Methods used to add refrigerant are the following :

- **1). Evacuate the system .**
- **By:**
- **a-connecting the manifold gauge (low side pressure gauge)by flexible tube to the service opening.**
- **b-connecting the middle opening of the manifold to vacuum pump.**
- **c-Turn the low side hand valve and the vacuum pump on .**
- **d. Evacuate the system for at least 10 min. after the gauge reading is (-28inch)**
- **e .Turn the low side hand valve first off and after the vacuum pump off to prevent air and moisture from return through the pump.**
- **2) . Charging the system .**

1) Connect a refrigerant cylinder to the charging manifold gauge at the middle opening

2) turn the high side hand valve on for a few second to remove air moisture and dirt out of the manifold and lines to out the system.

3) Charge with refrigerant

4) Start the unit and open the line service valve ,gauge manifold valve and refrigerant cylinder valve . watch the low pressure side gauge so that not more than 5 to 8 psi is created .This pressure is controlled by adjusting the refrigerant cylinder valve.

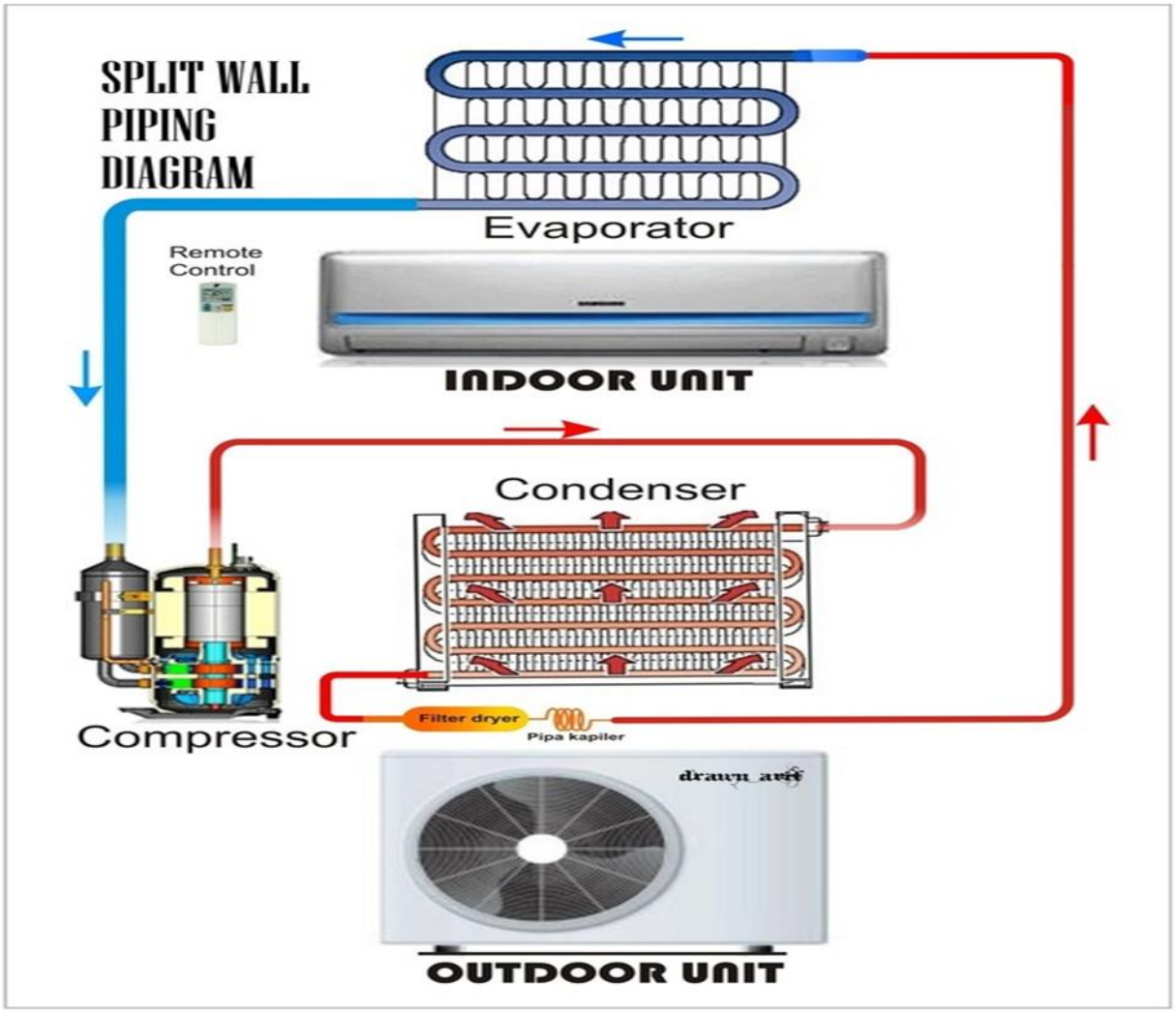
5) After the time, close the gauge manifold valve .Allow the unit to operate and check the suction line on the evaporator if the suction line is frozen, repeat the charging for until to sweat

- **A hermetic unit needs refrigerant if there is:**

- **1. partially frosted evaporator.**
- **2. low head pressure .**
- **3. low pressure in the low-side pressure .**
- **4. leak.**

REFRIGERATOR - ELECTRICAL CIRCUITS

Split Unit


SPLIT WALL
PIPING
DIAGRAM
Evaporator
Remote
Control
INDOOR UNIT
Condenser
Filter dryer
Pipa kapiler
Compressor
OUTDOOR UNIT

Split system consists of:

1. Air –Cooled condensing unit mount at outside of building.

2.Evaporating unit inside the building.

3.Connecting refrigerant piping between it

Malfunctions	Reason
The compressor is not working	1.Capacitor damage 2.Cut electrical connections 3.Compressor coil damaged 4.Malfunction of the mechanical part of the compressor 5.Electronic system malfunction
An error code appears on the internal screen	Faults for each device are on the paper
External fan not working	Malfunction of the capacitor of the external fan
Not converting cooling to heating and vice versa	Reverse solenoid valve malfunction
Freezing occurs on the suction line	Low refrigerant charge
Partial freezing of the evaporator	Dust collecting
Water droplets from the indoor unit	Flow stopped due to dust accumulation

Type of split unit air conditioner

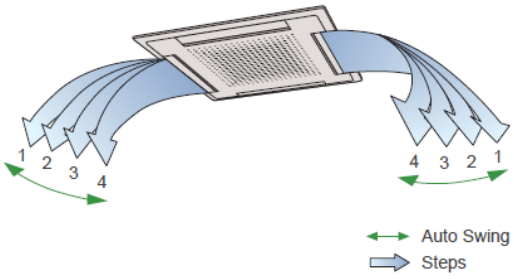
Wall

Cassette

Comfortable airflow

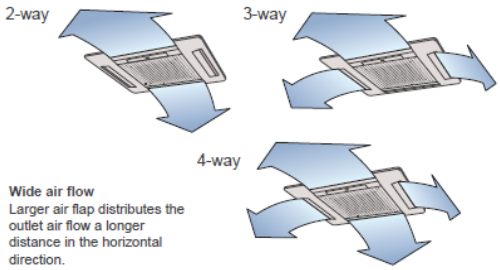
4 step swing

Auto air flow direction and auto swing



2-4 way air flow system

Select 2-way, 3-way or 4-way air flow to suit your needs.

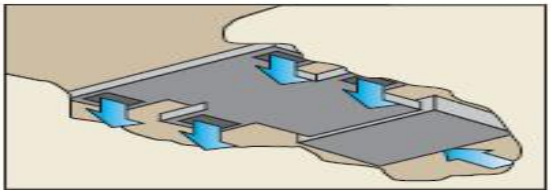


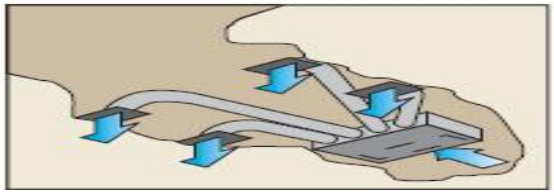
Wide air flow
Larger air flap distributes the outlet air flow a longer distance in the horizontal direction.

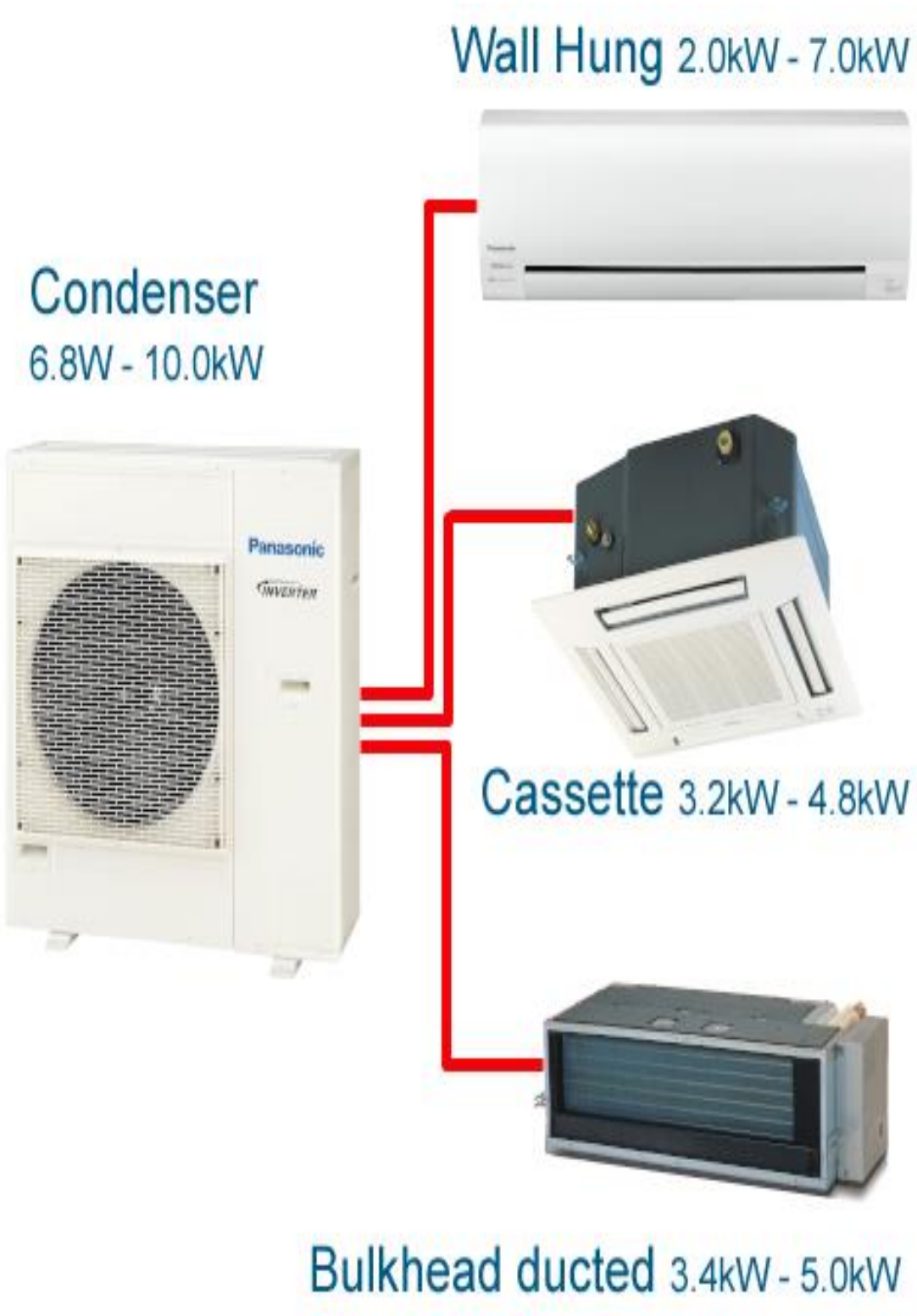
Duct

High Static Pressure Duct

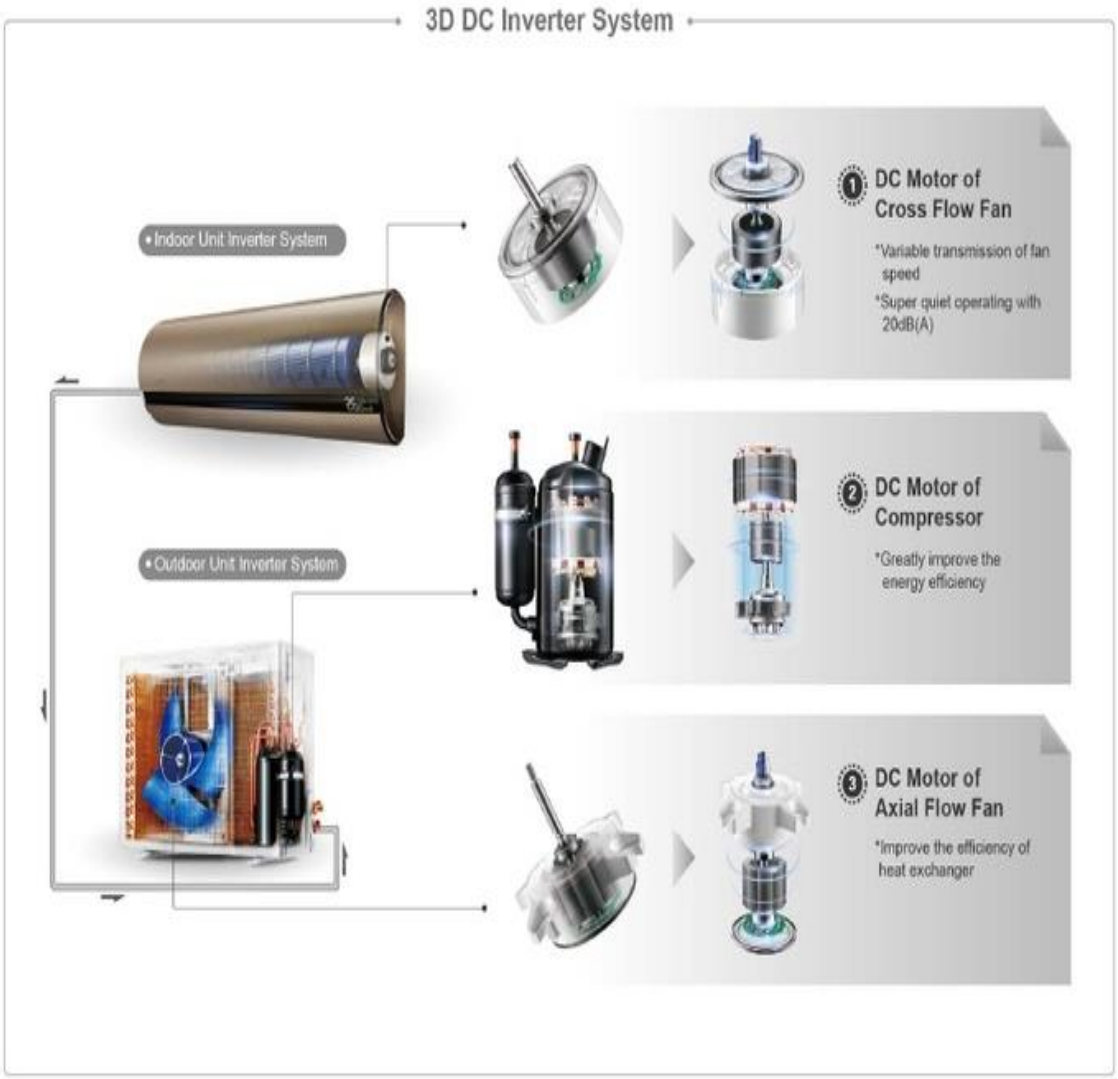
MAX. 250pa



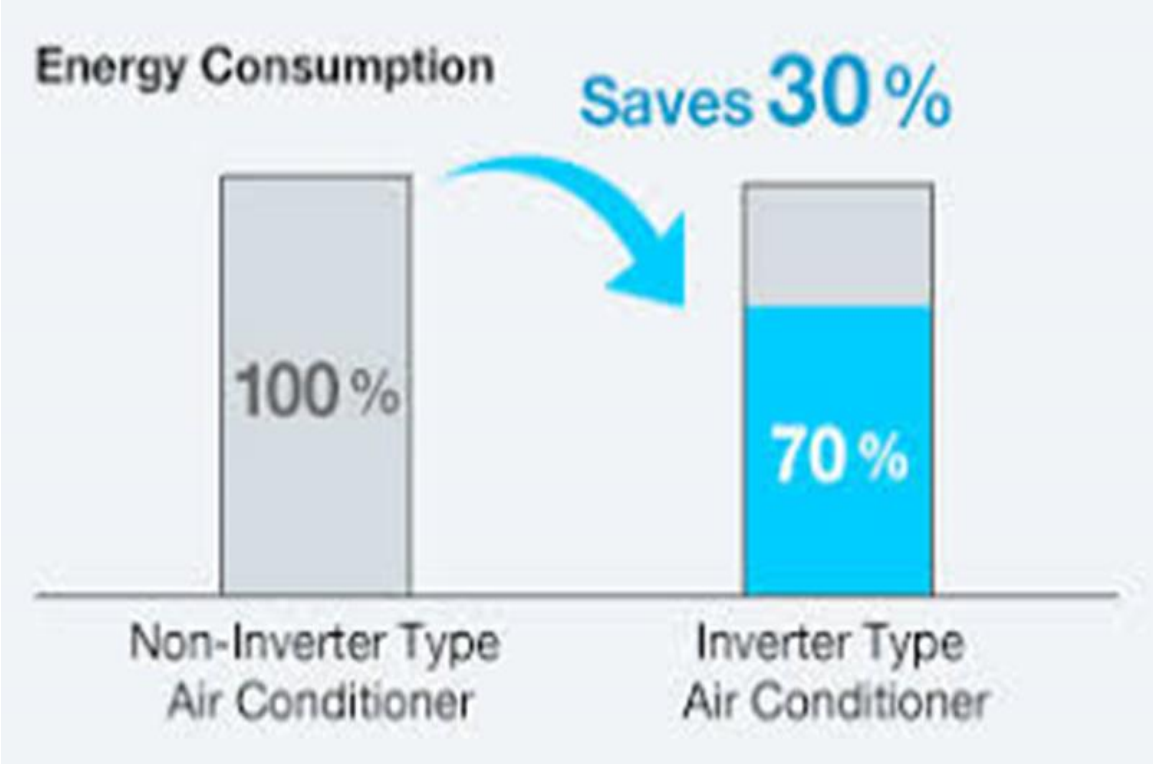



Wall Hung 2.0kW - 7.0kW
Condenser
6.8W - 10.0kW
Panasonic
Cassette 3.2kW - 4.8kW
Bulkhead ducted 3.4kW - 5.0kW

Compressor DC inverter



Saving in energy



What is the difference between inverter AC and non-inverter AC?

* WATER COOLER

The water cooler cabinet usually has a metal housing built around a steel frame work. Inside this metal housing there is usually the following part.

1- Condensing unit :

Located near the floor Contained of Hermetic compressor , Air coold condenser with a fan and the electrical control part.

2- The water cooling mechanism:

Located above the condensing unit. this part is insulated with foamed plastic with 1 - 2 inch thickness

A water cooler using a plumbing supply and drain connection must be installed according to National plumbing

A hand shutoff valve should be installed in fresh water line and drain pipe at least $1\frac{1}{2}$" inch diameter

The bubbler opening must be above the drain hole

Heat exchangers are frequently used on water coolers to make use of the low temperature of waste water to precool the fresh water line to evaporator.

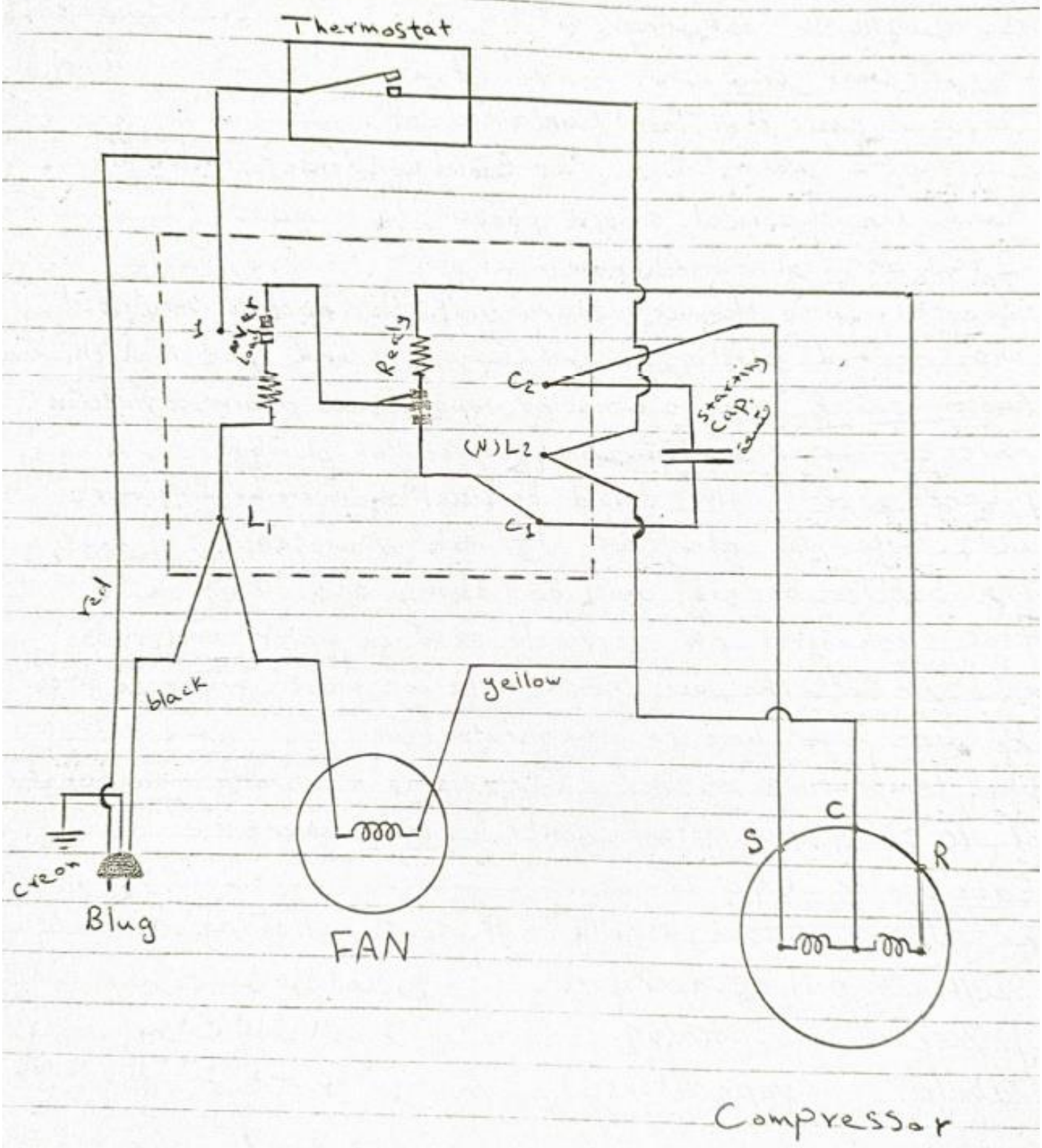
The temprature of the cooled water is usually maintained at 10°C by thermostat controls temprature

3- Evaporator unit

The evaporators are usually of the following kind.

1- Shell and coil - evaporators
2- Immersed evaporators.
3- Tubillar evaporators.

* The electrical diagram of the water-cool



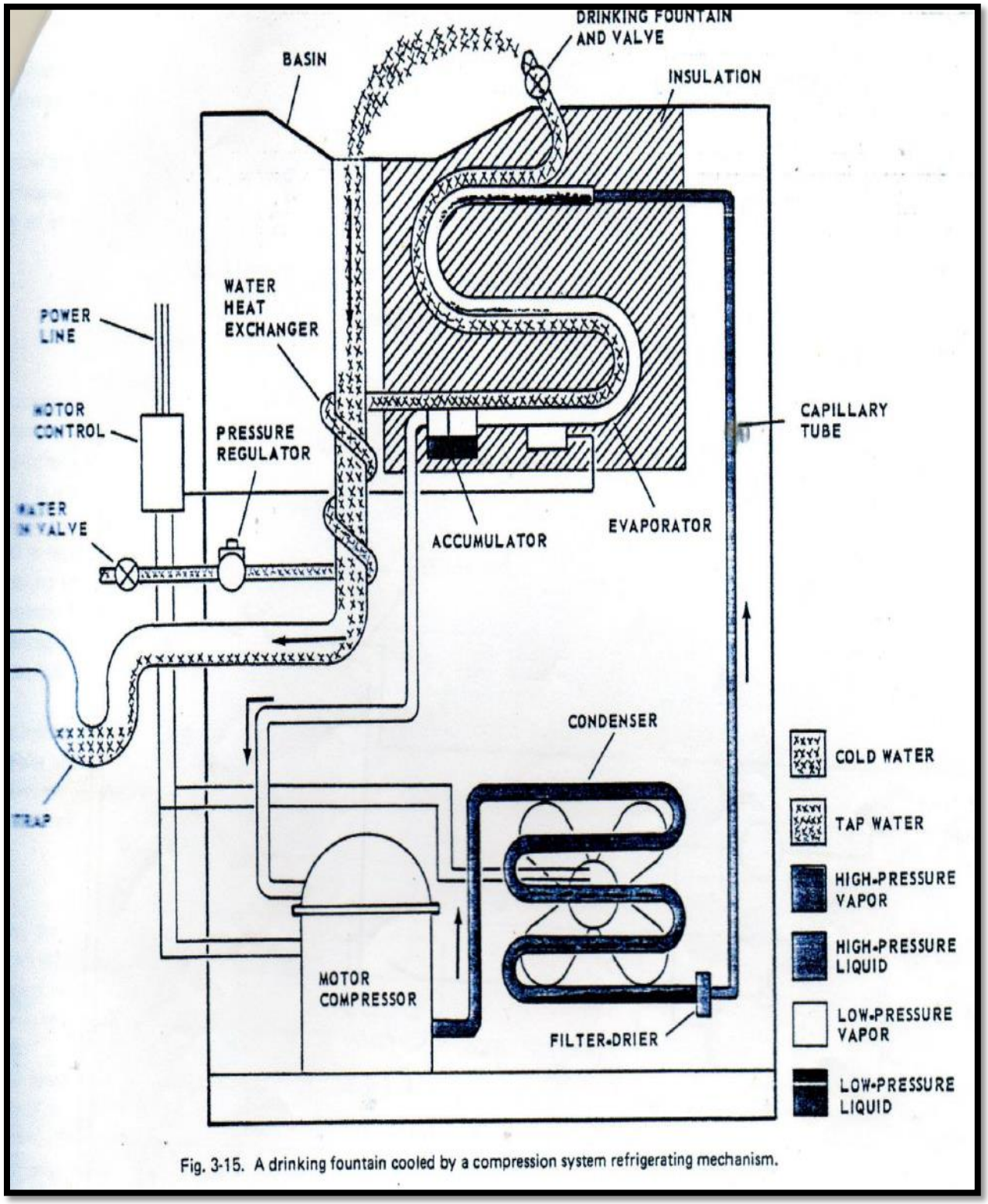


Fig. 3-15. A drinking fountain cooled by a compression system refrigerating mechanism.

Two basic types of water coolers

a) Pressure water type which employs an outside source of water.

b) The bottle type which has a self-water source.

The following differences between two types

the refrigeration cycle, the water cooling cycle and electric circuit of bottle type water cooler are same as pressure type water cooler

- A bottle of water located on the top of unit is the source of supply rather than the city water line used with the pressure type.
-
- A waste water receptacle is located in front of unit and it replaces the drain waste of the pressure cooler. The receptacle lifts off for emptying. Thus with the bottle cooler no outside plumbing is needed
- Pressure water type the condensing unit is air cooled the condenser fan is used to increase the condenser capacity .The fan is connected into the electrical circuit and runs whenever the condensing unit is running .
-
- A thermostat with the control bulb attached to the water dispensing tube maintains the desired drinking water temperature in the bubbler .Water leaving the bubbler should be at approximately (10 ˚C).

Window units

The window or wall -mounted comfort cooler is very popular. The window unit mounts on a windowsill and installation is relatively easy .The condenser is located in the section of the cabinet that is outside the building . Outside air is forced over the condenser by a fan .In side the room another fan draws air in through a filter and forces it over the evaporator .

The two air flow fans may be driven by the some motor or each my have its own motor

Window units are available in several types

One type cools and filters the air and has a fresh air intake .Another type has these same devices but ,in addition ,has an electrical resistance heating unit Third type uses a reverse cycle system (heat pump) to permit the use of refrigerating units both for comfort cooling and heating .

Servicing Window Units:

Servicing window unit is similar to the servicing of hermetic refrigerating s Some of the external service operation are as follows:

1.semianual cleaning or replacement of the filer(usually done by the owner)

2.Annual cleaning of the evaporator, condenser, fan blades, fan motor ,motor compressor and casing. The unit is removed from its casing for these operation

3.Inspect fan motor or motors and lubricate then unless they have sealed for-life bearings. Always wipe away excess oil. Oil mist on the fan blades collects lint's and reduces air moment efficiency .

4.Inspect the drain .It must be clean .Remove lint from the drain hole and tube using a soft wire .check all bolts, nuts and screws for tightness.

5.Befoer replacing the unit in the cabinet, run it to check for noise. Find its source and stop the noise.

Troubles inside the unit may include:

1.Lack of refrigerant.

2. Stuck compressor

3.Inefficient compressor

4.Clogged refrigerant circuit.

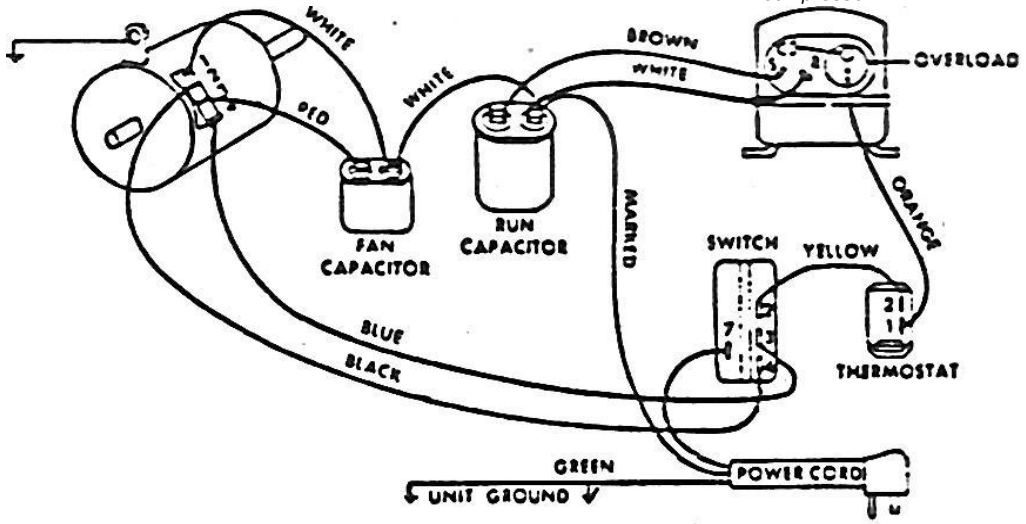
5.Shorted , open circuit or grounded motor windings

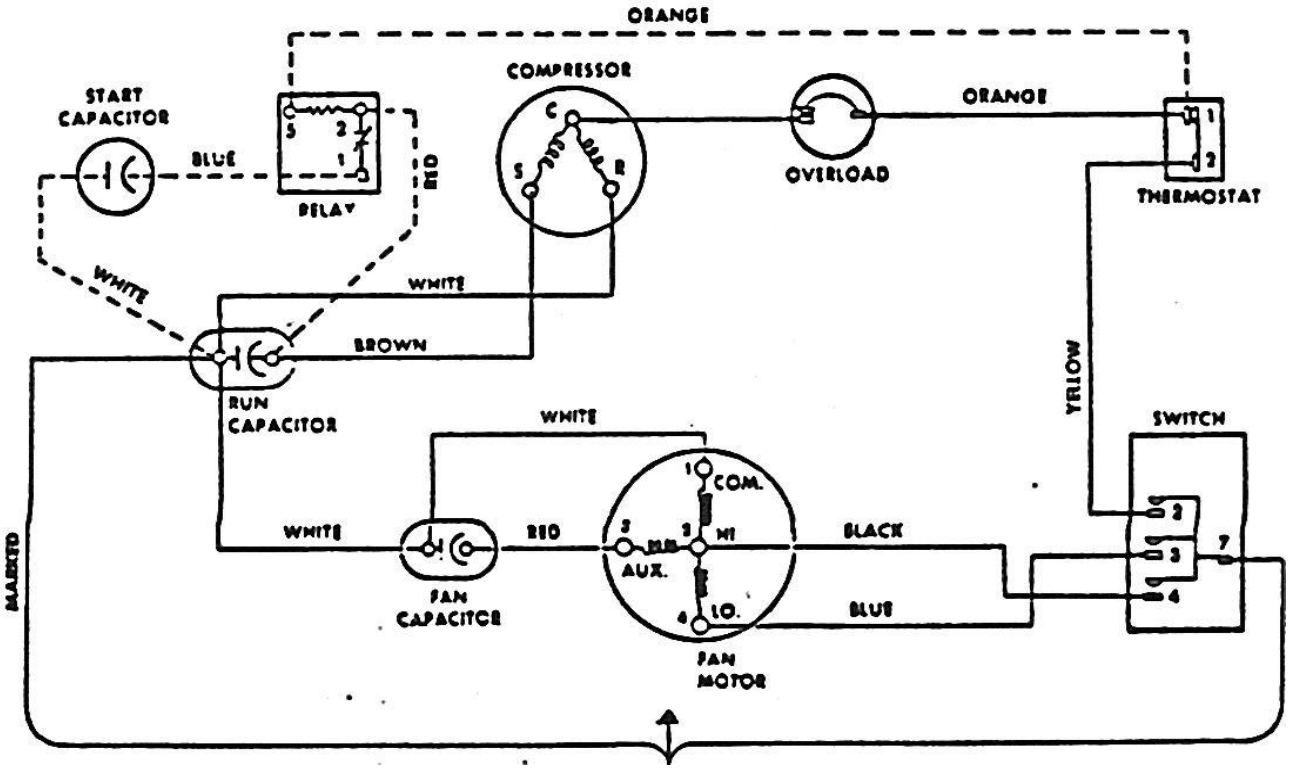
The wiring of a window unit is very similar to other refrigerating units. External electrical servicing procedures are usually the same as for domestic units except that:

1.Fan motors usually have two or three speeds .

2.some systems have three capacitor: starting capacitor .running capacitor and fan motor capacitor.

compressorl





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