

## U.S.C.G. Merchant Marine Exam

### QMED

### Q803 Refrigerating Engineer

### (Sample Examination)

**Choose the best answer to the following Multiple Choice Questions.**

1. What must be done to use standard leak detection methods on a low-pressure refrigeration system charged with refrigerant?
- (A) lower the pressure in the system below atmospheric
  - (B) add nitrogen to the system
  - (C) raise the pressure in the system above atmospheric
  - (D) cool the refrigerant

*If choice C is selected set score to 1.*

2. Vapor bubbles present in the liquid upon arrival to the thermal expansion valve in a refrigeration system may cause erosion of the expansion valve's needle and seat. This, in turn, could cause what condition?
- (A) TXV overheating
  - (B) TXV freezing shut
  - (C) TXV hunting
  - (D) TXV freezing open

*If choice C is selected set score to 1.*

3. R-134a is often the replacement for which older type of refrigerant?
- (A) R-11
  - (B) R-12
  - (C) R-22
  - (D) R-123

*If choice B is selected set score to 1.*

4. If the combination moisture indicator and sight glass indicates an accumulation of moisture within the system, which of the listed procedures would be the most practical to follow?
- (A) Secure the system, disassemble and de-ice the thermostatic expansion valve.
  - (B) Using a vacuum pump, draw the entire system down to 1,270 microns for a period of three hours.
  - (C) Close the king valve, pump down the system, isolate the drier, remove the desiccant core and replace with new drier cartridge.
  - (D) Purge the entire system to the atmosphere, replace the drier cartridge, and recharge the system with refrigerant.

*If choice C is selected set score to 1.*

5. Sludge may form in the crankcase of an air conditioning compressor as a result of what condition?

- (A) lowered compressor operating temperatures
- (B) excessive foaming of the oil in the crankcase
- (C) reducing the cloud or floc point of the oil
- (D) overheating and carbonization of the oil in the crankcase

*If choice D is selected set score to 1.*

6. When using nitrogen to pressure leak test a system, the nitrogen cylinder should always be equipped with what device or feature?

- (A) blue top
- (B) pressure regulator
- (C) level indicator
- (D) temperature indicator

*If choice B is selected set score to 1.*

7. During operating periods of a multi-box refrigeration system using a capacity controlled compressor, when all of the evaporators of a four box plant are actively being fed with liquid refrigerant, the control oil pressure acting on the hydraulic relay piston will be at what value? Illustration GS-RA-13

- (A) the lowest
- (B) at its mid-range
- (C) the highest
- (D) of no consequence as the lube oil is not used in the operation of the unloader

*If choice C is selected set score to 1.*

8. What is the maximum volume to which refillable refrigeration cylinders should be filled?

- (A) 60% full
- (B) 70% full
- (C) 80% full
- (D) 90% full

*If choice C is selected set score to 1.*

9. Of the various possible methods shown in the illustration, which is the correct method of attaching a TXV feeler bulb to a small large line (7/8" and larger) with a horizontal run? Illustration GS-RA-50

- (A) A
- (B) B
- (C) C
- (D) D

*If choice C is selected set score to 1.*

**10.** In general, the thermal bulb for a thermal expansion valve used in a reciprocating air conditioning system is usually charged with what substance?

- (A) the same refrigerant as the system
- (B) bees wax
- (C) distilled water
- (D) mercuric sulfate

*If choice A is selected set score to 1.*

**11.** Expansion tanks when used in a ships hot water heating system may be of the open or closed type. In a closed type system, what would be the normal temperature range of the water?

- (A) 180°F to 212°F
- (B) 220°F to 240°F
- (C) 260°F to 280°F
- (D) 320°F to 360°F

*If choice B is selected set score to 1.*

**12.** Overfilling a refrigerant container is extremely dangerous because of the high pressures generated. The generation of pressure is the result of what?

- (A) hydrostatic pressure of the expanding liquid
- (B) vapor pressure of the refrigerant at saturation temperature
- (C) discharge pressure from the recovery cylinder
- (D) discharge pressure of the recovery compressor

*If choice A is selected set score to 1.*

**13.** A tank has been sealed and unventilated for a long period of time. Which of the following statements is true?

- (A) The tank is especially dangerous to enter.
- (B) Carbon monoxide is present.
- (C) Water vapor present when the tank was sealed has oxidized.
- (D) The tank is safe to enter.

*If choice A is selected set score to 1.*

- 14.** The compressor used in a water-cooled air conditioning system is short-cycling. A service check determines that the suction pressure remains above the normal cut-in point during cycling and that the discharge pressure rapidly builds up to the cut-out point while running and gradually falls to the cut-in point during the off cycle. What is likely the cause?
- (A) back seated discharge service valve
  - (B) reduction in condenser water flow (scaled condenser)
  - (C) front seated liquid line service valve
  - (D) loosely fitted compressor drive belt

*If choice B is selected set score to 1.*

- 15.** The sudden reduction of pressure occurring within the crankcase of a refrigeration compressor during starting causes what condition?
- (A) sudden evaporation of entrapped air in the lubricant
  - (B) sudden evaporation of wax crystals in the lubricant
  - (C) release of dissolved lubricant from the refrigerant
  - (D) lube oil to foam due to the release of dissolved refrigerant in the lubricating oil

*If choice D is selected set score to 1.*

- 16.** If an abnormally large difference is maintained between the evaporator refrigerant temperature and the box air temperature within the refrigerated compartment, what will be the result?
- (A) the evaporator coil will tend to excessively frost
  - (B) the box temperature will be pulled down too low
  - (C) the compressor will tend to trip out on high head pressure
  - (D) the compressor will tend to overheat due to high suction temperature

*If choice A is selected set score to 1.*

- 17.** Which statement describes the function of the filler material used in acetylene cylinders?
- (A) It is fire resistant and reduces fire hazards.
  - (B) It neutralizes the gas to render it harmless.
  - (C) It reduces the danger of explosion.
  - (D) It chemically reacts with acetone to produce acetylene.

*If choice C is selected set score to 1.*

- 18.** Moisture is removed from a refrigeration system by what action?
- (A) cutting in the dehydrator
  - (B) draining refrigerant from the bottom of the condenser
  - (C) condensing the water in the heat exchanger
  - (D) opening a drain petcock on the oil separator

*If choice A is selected set score to 1.*

**19.** Which of the lettered components shown in the illustration indicates the high-pressure cut-out?  
Illustration GS-RA-12

- (A) W
- (B) X
- (C) Y
- (D) Z

*If choice B is selected set score to 1.*

**20.** If one box in a multiple box, direct expansion type refrigeration system was experiencing an excessively low temperature, this could be a result of which of the following?

- (A) an oversized expansion valve
- (B) excessive frost on the cooling coils
- (C) a leaking hand expansion valve
- (D) liquid refrigerant returning to the compressor

*If choice C is selected set score to 1.*

**21.** Refrigeration systems using forced air circulation evaporators have a tendency to cause rapid dehydration of produce in chill boxes. Which of the following will minimize this dehydration?

- (A) the air is circulated rapidly over a small evaporator with a minimum temperature differential
- (B) the air is circulated rapidly over a small evaporator with a maximum temperature differential
- (C) the air is circulated slowly over a large evaporator with a maximum temperature differential
- (D) the air is circulated slowly over a large evaporator with a minimum temperature differential

*If choice D is selected set score to 1.*

**22.** The valve depicted in the illustration shown is a \_\_\_\_\_. Illustration GS-0055

- (A) gate valve
- (B) butterfly valve
- (C) globe valve
- (D) check valve

*If choice B is selected set score to 1.*

**23.** During tests to discover why a refrigeration compressor is running continuously, it is determined that the refrigerated space temperature is slightly above normal without ever reaching the desired minimum temperature. Suction and discharge pressures are normal for the corresponding box temperature. In this situation, what should you suspect?

- (A) high cooling water temperature
- (B) a shortage of refrigerant
- (C) air in the system
- (D) leaking door gaskets

*If choice D is selected set score to 1.*

**24.** Moisture entering a typical refrigeration system will most likely produce what effect?

- (A) cause sweating and frost on the evaporator coils
- (B) freeze in the expansion valve
- (C) boil in the condenser
- (D) be removed by the liquid line strainers

*If choice B is selected set score to 1.*

**25.** Low compressor head pressure in a refrigeration system can be caused by which of the following?

- (A) insufficient condenser cooling water flow
- (B) air in the refrigeration system
- (C) excessive condenser cooling water flow
- (D) excessive refrigerant in the system

*If choice C is selected set score to 1.*

**26.** When pumping down an air conditioning system to test the low-pressure cut-out switch, assuming that the compressor is running, what should be done to initiate the test?

- (A) close the "king" valve
- (B) stop the circulating pump
- (C) secure the condenser
- (D) stop the compressor

*If choice A is selected set score to 1.*

**27.** What differentiates "system-dependent" and "self-contained" recovery devices in refrigeration systems?

- (A) self-contained recovery devices usually contain a compressor, system-dependent recovery devices do not
- (B) the system compressor must be working to use system-dependent devices, the system compressor may or may not be operational when self-contained devices are used
- (C) self-contained recovery devices can only be used on large CFC and HCFC units
- (D) there is no difference between the devices

*If choice A is selected set score to 1.*

**28.** A reheater in an air conditioning system performs what function?

- (A) controls the inlet air volume
- (B) controls the inlet air temperature
- (C) restores the conditioned air temperature to a comfortable level
- (D) maintains the relative humidity at 15%

*If choice C is selected set score to 1.*

**29.** Why can CFC or HCFC refrigerants leaking into a confined space or in limited surroundings cause suffocation?

- (A) Refrigerants are heavier than air and displace oxygen.
- (B) Refrigerants lighter than air will rise.
- (C) Refrigerants obnoxious odor prevents breathing.
- (D) Refrigerants contain an acidic substance.

*If choice A is selected set score to 1.*

**30.** If the superheat setting of a thermostatic expansion valve is set too low, what would be the result, assuming that the system has a single evaporator?

- (A) the suction line will be abnormally warm due to a reduced amount of refrigerant returning back to the compressor
- (B) the suction line will be abnormally cold and liquid may flood back to the compressor
- (C) the receiver level will be abnormally high due to a reduced amount of refrigerant returning back to the compressor
- (D) the box temperature will be pulled way down below the normal temperature range

*If choice B is selected set score to 1.*

**31.** Which of the following refrigerants is chlorine free and safe regarding atmospheric ozone depletion?

- (A) R-11
- (B) R-12
- (C) R-22
- (D) R-134a

*If choice D is selected set score to 1.*

**32.** (1.5.3.2-5) When purging a refrigeration gage manifold using system pressure as the source of refrigerant for purging, which of the fittings listed is normally tightened LAST?

- (A) the high-pressure hose fitting at the gage manifold high-pressure connection
- (B) the low-pressure hose fitting at the suction service valve service port
- (C) the low-pressure hose fitting at the gage manifold low-pressure connection
- (D) the high-pressure hose fitting at the discharge service valve service port

*If choice B is selected set score to 1.*

**33.** (1.5.5.4-4) The set point adjustment of the device shown in the illustration is made by rotating what component? Illustration GS-RA-14

- (A) "1"
- (B) "2"
- (C) "3"
- (D) "4"

*If choice B is selected set score to 1.*

**34.** What is the physical state and pressure condition of refrigerant as it leaves a receiver in a typical refrigeration system?

- (A) low-pressure vapor
- (B) high-pressure vapor
- (C) low-pressure liquid
- (D) high-pressure liquid

*If choice D is selected set score to 1.*

**35.** As shown in the illustrated LP centrifugal chiller high efficiency purge recovery unit piping schematic, what statement is true concerning the vacuum pump? Illustration GS-RA-55

- (A) The vacuum pump is designed to remove refrigerant vapor from the carbon filter tank and transfer these vapors to the evaporator to minimize the loss of refrigerant to the atmosphere.
- (B) The vacuum pump is designed to remove air and non-condensable gases from the evaporator and transfer these gases to the carbon filter tank for eventual venting to the atmosphere.
- (C) The vacuum pump is designed to remove refrigerant vapor from the carbon filter tank and transfer these vapors to the purge chamber to blow the float valve clear.
- (D) The vacuum pump is designed to perform a dehydration evacuation on the system prior to charging with refrigerant.

*If choice A is selected set score to 1.*

**36.** In the illustrated refrigeration system, what is the proper name for the component labeled "A"? Illustration GS-RA-12

- (A) condenser
- (B) accumulator
- (C) filter drier
- (D) compressor

*If choice D is selected set score to 1.*

**37.** To prevent motor overload during start-up of a hermetically sealed centrifugal refrigeration system, what is true concerning the compressor suction gas variable inlet guide vanes?

- (A) opened until the motor is connected across the line at full voltage and current drawn is up to full load current
- (B) opened until the motor is connected across the line at full voltage and current drawn is below full load current
- (C) closed until the motor is connected across the line at full voltage and current drawn is below full load current
- (D) closed until the motor is connected across the line at full voltage and current drawn is up to full load current

*If choice C is selected set score to 1.*

**38.** The process of removing refrigerant from a system and storing it without testing or processing it in any way is known as what under the EPA Clean Air Act rule definitions?

- (A) recovering
- (B) recouping
- (C) reclaiming
- (D) recycling

*If choice A is selected set score to 1.*

**39.** When replacing a thermostatic expansion valve power element, what is true concerning the thermal bulb?

- (A) with steel wool or an abrasive cloth remove oxidation on the bulb and suction line
- (B) carefully coat the device with silicone sealant to reduce the effects of convective cooling
- (C) apply a heavy coating of grease to function as a heat sink
- (D) apply a light film of oil to increase heat transfer

*If choice A is selected set score to 1.*

**40.** If a liquid drying agent is used in a refrigeration system already equipped with a solid drying agent, the liquid drying agent will cause what type of reaction?

- (A) it will release the moisture already trapped in the solid drying agent
- (B) it will cause toxic gases to form in the refrigerated space
- (C) it will react violently with the solid drying agent
- (D) it will solidify the refrigerant oil in the compressor crankcase

*If choice A is selected set score to 1.*

**41.** If the running suction pressure at the refrigeration compressor of a TXV controlled air-cooled refrigeration system is below normal, which of the following can be a cause?

- (A) a dirty condenser
- (B) overfeeding by the expansion valve
- (C) a restricted liquid-line strainer
- (D) refrigerant overcharge

*If choice C is selected set score to 1.*

**42.** Concerning the charging of refrigerant into a vapor compression refrigerating system, which of the following is true?

- (A) when charging as a liquid it should be to the low side only
- (B) when charging as a liquid it may be to the low or high side
- (C) when charging as a liquid it should be to the high side only
- (D) when charging as a vapor it should be directly to the receiver only

*If choice C is selected set score to 1.*

**43.** If a condenser coil of an air-cooled container refrigeration system becomes dirty and requires cleaning, what would be an acceptable method of cleaning?

- (A) "Binks" gun with weak acid solvent
- (B) copper wire rotary brush
- (C) high-pressure water wash
- (D) all of the above

*If choice C is selected set score to 1.*

**44.** Concerning the proper installation of the sensing bulb of a thermal expansion valve that is attached to the evaporator tail coil on a horizontal run, what statement is true?

- (A) the bulb should be attached so that the pinched off tubing should be oriented to one side and the capillary tube running to the valve diaphragm should be oriented to the opposite side
- (B) the bulb should be attached with no regard to the orientation of the pinched off tubing or the capillary tube running to the valve diaphragm
- (C) the bulb should be attached so that the pinched off tubing should be oriented down and the capillary tube running to the valve diaphragm should be oriented up
- (D) the bulb should be attached so that the pinched off tubing should be oriented up and the capillary tube running to the valve diaphragm should be oriented down

*If choice C is selected set score to 1.*

**45.** What is the pressure and condition of the refrigerant entering the receiver of a refrigeration system?

- (A) superheated low-pressure vapor
- (B) sub cooled low-pressure liquid
- (C) superheated high-pressure vapor
- (D) sub cooled high-pressure liquid

*If choice D is selected set score to 1.*

**46.** While troubleshooting a refrigeration system for low suction temperature and excessive suction line frosting, liquid refrigerant flooding back to the compressor from the evaporator is determined to be the cause. What should you do?

- (A) purge air from the condenser
- (B) determine if the evaporator coil is in need of defrosting
- (C) add oil to the crankcase
- (D) remove refrigerant from the system

*If choice B is selected set score to 1.*

**47.** Which of the precautions listed should be taken before opening any part of a refrigeration system for the purpose of accomplishing non-major repairs?

- (A) Bring the part of the system to be opened to a pressure corresponding to the ambient temperature.
- (B) Use the hot gas defrost line to remove any frost on the evaporator coils.
- (C) Bring the part of the system to be opened to 0 psig.
- (D) Set the high-pressure cut-out on manual to prevent automatic starting.

*If choice C is selected set score to 1.*

**48.** Some "hot gas" defrost systems reheat the refrigerant just prior to its returning to the compressor for what purpose?

- (A) to increase the circulation of liquid refrigerant
- (B) to prevent the damaging effects of liquid slugging
- (C) to improve the efficiency of the expansion valve
- (D) to prevent chill shocking the compressor suction valves

*If choice B is selected set score to 1.*

**49.** A refrigeration unit will tend to short cycle when operating under what conditions?

- (A) under heavy loads
- (B) lack of refrigerant
- (C) during hot gas defrost
- (D) during starting conditions

*If choice B is selected set score to 1.*

**50.** (1.5.5.3-9) A container unit's microprocessor-controlled temperature controller is set at  $-28.9^{\circ}\text{C}$ , appropriate for a frozen cargo of ice cream. In this mode of operation, according to the illustrated temperature controller functional diagrams, what should be the operational status of the unit if the actual box temperature is  $-18.0^{\circ}\text{C}$ ? Illustration GS-RA-35

- (A) cooling mode
- (B) heating mode
- (C) modulating cooling mode
- (D) air circulation mode

*If choice A is selected set score to 1.*

**51.** If it is necessary to increase the operating head pressure of the refrigeration system using the device shown in the illustration, what should be done? Illustration GS-RA-14

- (A) "4" should be rotated to compress the enclosed bellows
- (B) "2" should be turned to relax the compression of the spring
- (C) "2" should be turned to further compress the spring
- (D) "4" should be rotated to relax the enclosed bellows

*If choice C is selected set score to 1.*

**52.** What is the purpose of running a refrigeration compressor in short intermittent spurts or throttling the suction isolation valve when starting the system after a prolonged shutdown?

- (A) prevent liquid slugging or overloading the compressor
- (B) determine actual compressor oil level
- (C) let the refrigerated compartment cool gradually
- (D) allow refrigerant vapor cycling time

*If choice A is selected set score to 1.*

**53.** Unless the system is designed for such operation, two compressors should not be operated in parallel in a refrigeration system for what reason?

- (A) lubricating oil may be transferred from one compressor to the other
- (B) condenser pressure will be too high causing condenser failure
- (C) operation of two compressors will overload the expansion valves
- (D) the evaporators would fail due to excessively low suction pressure

*If choice A is selected set score to 1.*

**54.** What must be done, at a minimum, before a system can legally be opened up for repairs while adhering to the prohibition against the venting of halogenated fluorocarbon refrigerants to the atmosphere?

- (A) reclamation of the refrigerant
- (B) destruction of the refrigerant
- (C) recycling of the refrigerant
- (D) recovery of the refrigerant

*If choice D is selected set score to 1.*

**55.** Which pair of the illustrated service gauge manifold sets would require switching hoses when transitioning from a dehydration evacuation to refrigerant charging? Illustration GS-RA-30

- (A) A and B
- (B) B and D
- (C) C and D
- (D) D and A

*If choice B is selected set score to 1.*

**56.** If outside air at 80 degrees F and 70 percent relative humidity is conditioned, what will be the resulting dew point temperature of the air just before it comes into contact with the cooling coil?  
Illustration GS-RA-22

- (A) 64 degrees F
- (B) 67 degrees F
- (C) 70 degrees F
- (D) 73 degrees F

*If choice C is selected set score to 1.*

**57.** A box solenoid valve used in a refrigeration system should be installed in what manner?

- (A) upright, controlled by a thermostat sensing the temperature of the box, and downstream of the thermal expansion valve
- (B) with the axis of the solenoid horizontal, controlled by a thermostat sensing the temperature of the box, and upstream of the thermal expansion valve
- (C) upright, controlled by a thermostat sensing the temperature of the box, and upstream of the thermal expansion valve
- (D) upright, controlled by a thermostat sensing evaporator superheat, and upstream of the thermal expansion valve

*If choice C is selected set score to 1.*

**58.** What type of valve is shown in the illustration? Illustration GS-0047

- (A) Check valve
- (B) Butterfly valve
- (C) Globe valve
- (D) Gate valve

*If choice D is selected set score to 1.*

**59.** To detect the presence of explosive gases in any space, tank, or compartment, you should use a \_\_\_\_\_.

- (A) flame scanner
- (B) halide torch
- (C) combustible gas indicator
- (D) detector filament

*If choice C is selected set score to 1.*

**60.** Under what conditions is a DANGER tag installed at equipment control stations in preparation for performing maintenance or repairs?

- (A) When operation of the equipment will endanger personnel OR harm the equipment.
- (B) When operation of the equipment requires unusual caution to be exercised.
- (C) When operation of the equipment will harm the equipment ONLY.
- (D) When operation of the equipment will endanger personnel ONLY.

*If choice A is selected set score to 1.*

**61.** Which of the hand valve configurations for the gauge manifold set is the correct set up for monitoring both the low and high system pressures? Illustration GS-RA-03

- (A) A
- (B) B
- (C) C
- (D) D

*If choice D is selected set score to 1.*

**62.** The FIRST thing to do to ensure that a refrigeration unit will not start while undergoing repairs is to do what?

- (A) inform all persons in the area not to start the unit
- (B) place a crow bar in the flywheel of the unit
- (C) make a logbook entry
- (D) secure and tag the electrical circuit

*If choice D is selected set score to 1.*

**63.** Under what conditions is a CAUTION tag installed at equipment control stations in preparation for performing maintenance or repairs?

- (A) When operation of the equipment will harm the equipment ONLY.
- (B) When operation of the equipment will endanger personnel ONLY.
- (C) When operation of the equipment will endanger personnel OR harm the equipment.
- (D) When operation of the equipment requires temporary special instructions to be provided.

*If choice D is selected set score to 1.*

**64.** The term "oil foaming" in refrigeration practice, is used to describe what event?

- (A) release of dissolved lubricant from the refrigerant in the crankcase
- (B) sudden evaporation of entrapped moisture from the crankcase lubricant
- (C) sudden evaporation of entrapped air from the refrigerant liquid
- (D) release of miscible refrigerant from the lubricant in the crankcase

*If choice D is selected set score to 1.*

**65.** Which of the following illustrated expansion valves is designed to maintain a constant evaporator pressure rather than a constant evaporator superheat? Illustration GS-RA-24

- (A) A
- (B) B
- (C) C
- (D) D

*If choice C is selected set score to 1.*

**66.** If the discharge reed valves used in a refrigeration compressor are leaking badly, what statement is true?

- (A) the reed valves should be reground and relapped
- (B) the low side pressure will indicate below normal
- (C) the high-pressure cut-out setting should be lowered
- (D) the reed valves should be replaced

*If choice D is selected set score to 1.*

**67.** Which of the illustrated devices would be the LEAST accurate for the purposes of weighing-in a refrigerant charge? Illustration GS-RA-45

- (A) A
- (B) B
- (C) C
- (D) D

*If choice C is selected set score to 1.*

**68.** When one belt of a multiple V-belt drive requires replacing, what will be required?

- (A) ensure the seasoned belts are reinstalled in their proper sequence
- (B) season the new belt prior to installation
- (C) replace the entire belt set
- (D) ensure the proper belt dressing is applied

*If choice C is selected set score to 1.*

**69.** When securing an oxyacetylene cutting outfit for an extended period, you should close the \_\_\_\_\_.

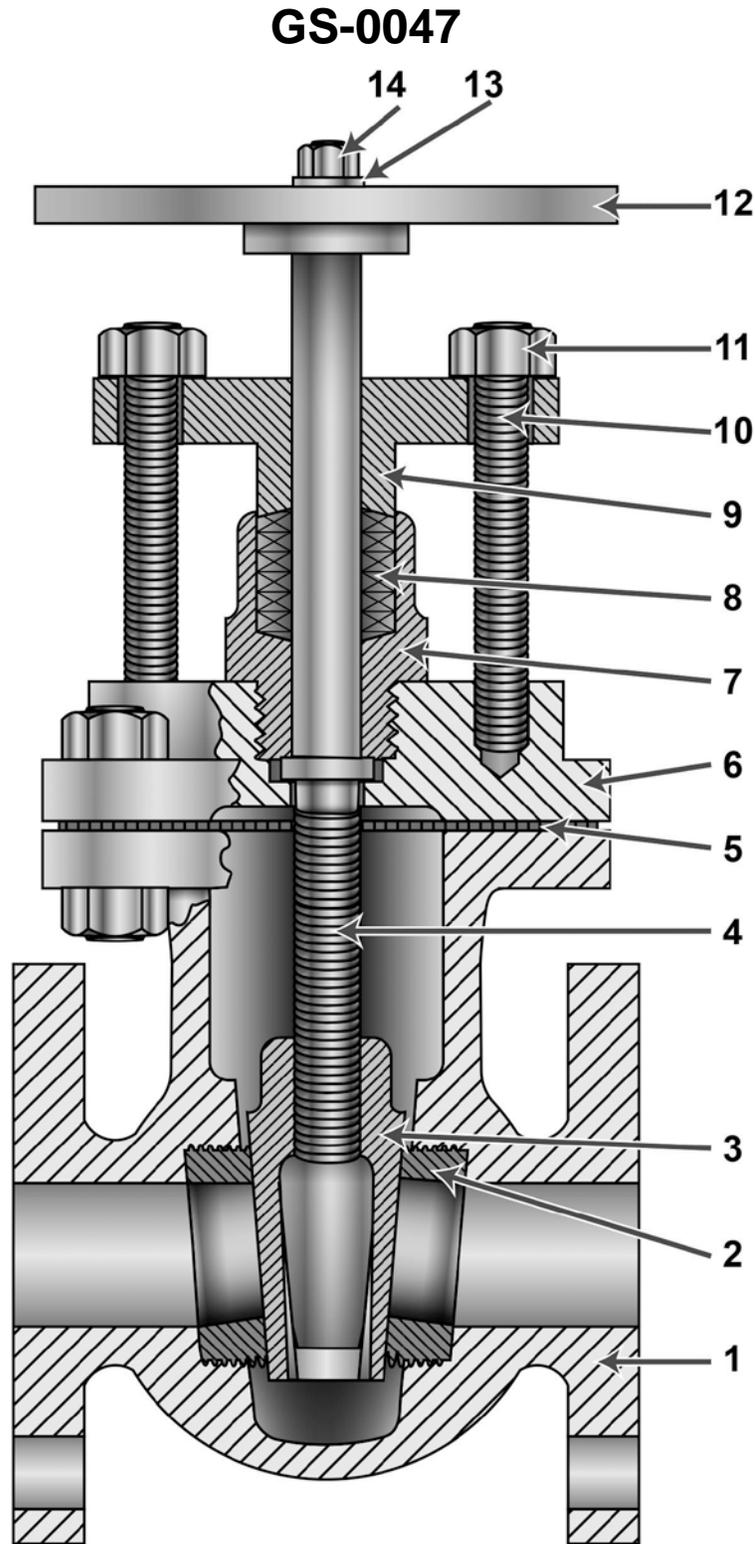
- (A) cylinder valves and close torch valves when pressure in hoses and regulators is zero
- (B) cylinder valves and close torch valves with 4 to 5 pounds of pressure in the hoses
- (C) cylinder valves only
- (D) hand valves on the torch only

*If choice A is selected set score to 1.*

**70.** Personnel servicing refrigeration systems and subject to the exposure to commonly used refrigerants should wear what type of personal protective equipment?

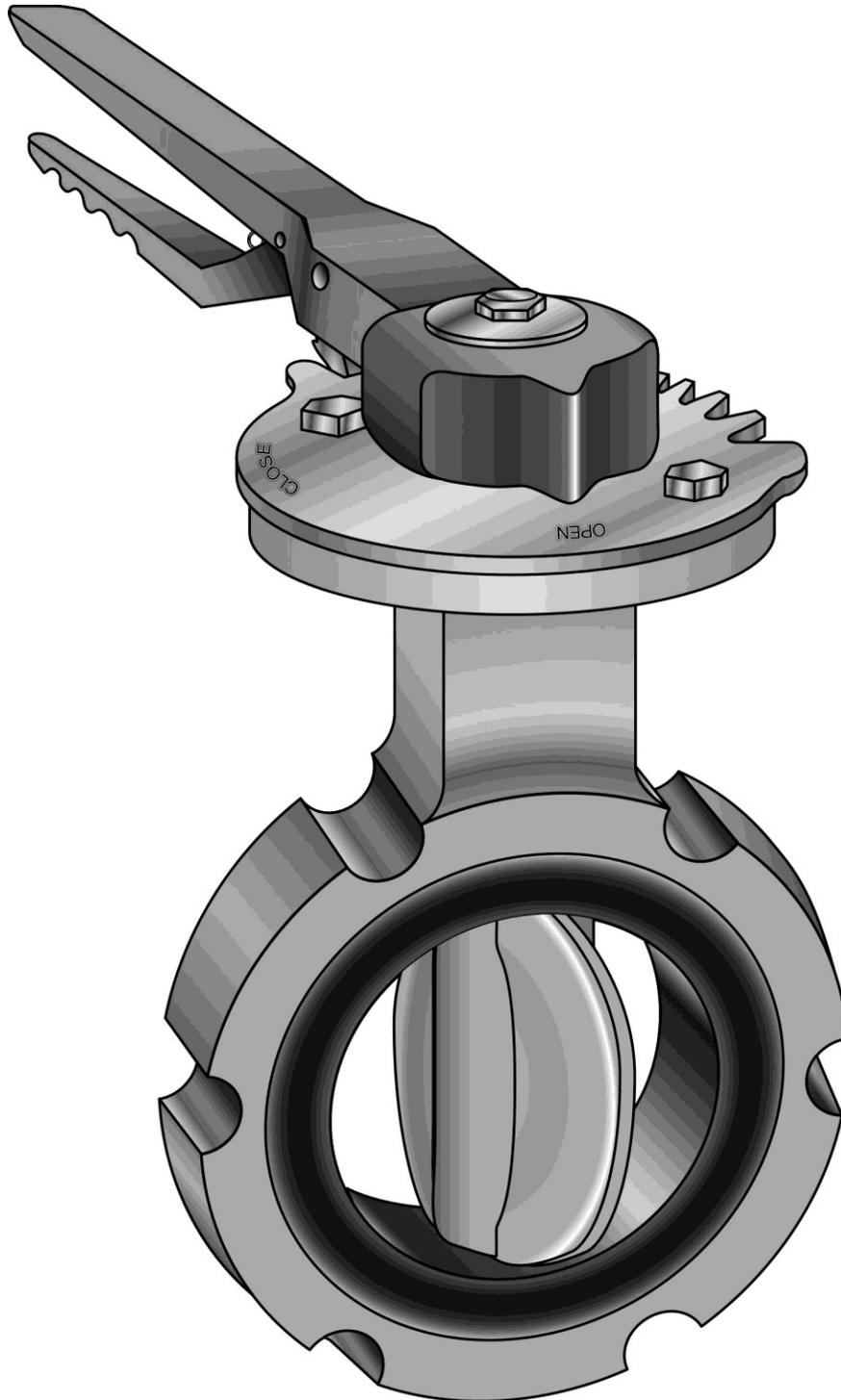
- (A) an all purpose gas mask
- (B) goggles and gloves
- (C) rubber soled shoes
- (D) a respirator

*If choice B is selected set score to 1.*



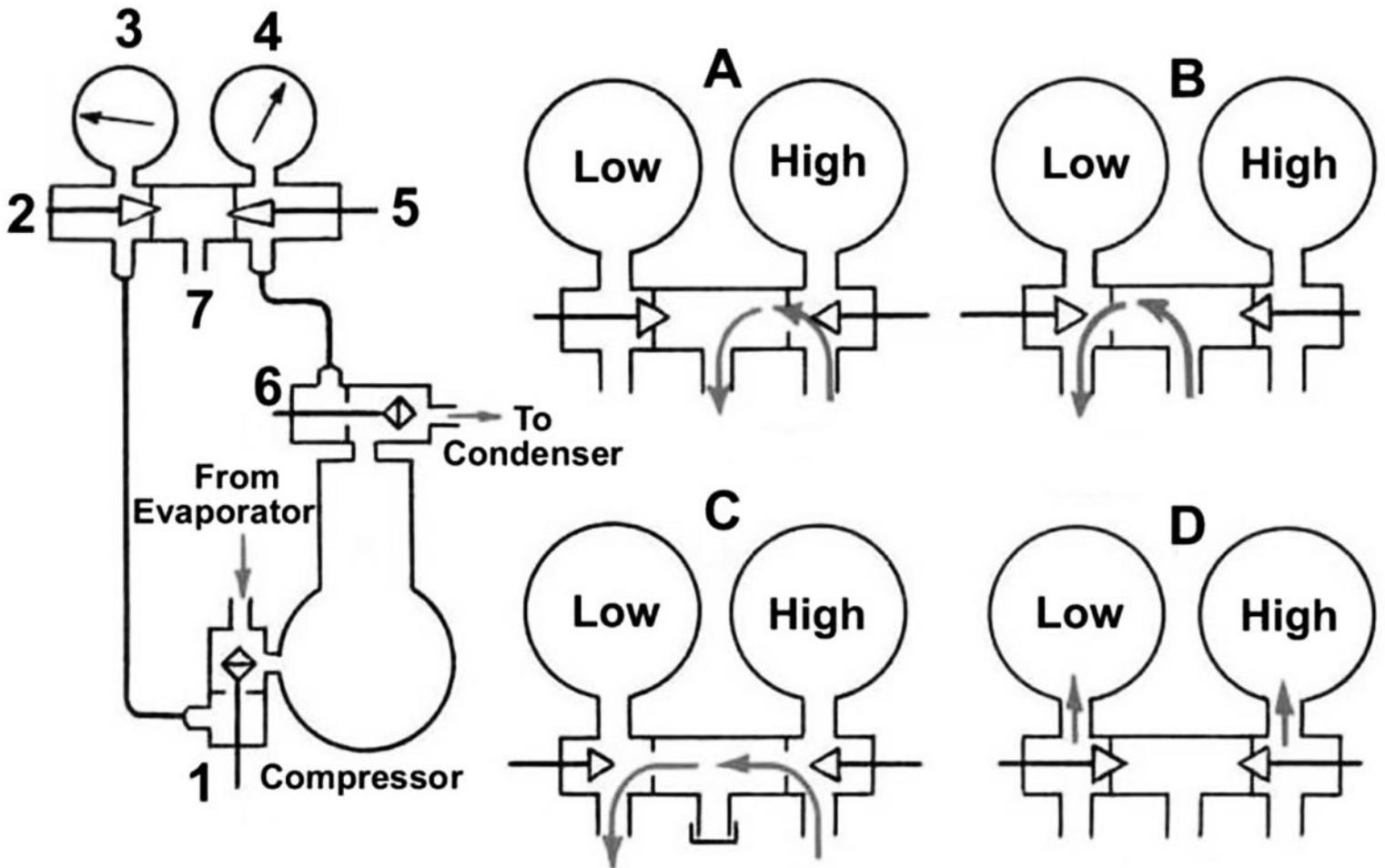
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## GS-0055



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## GS-RA-03

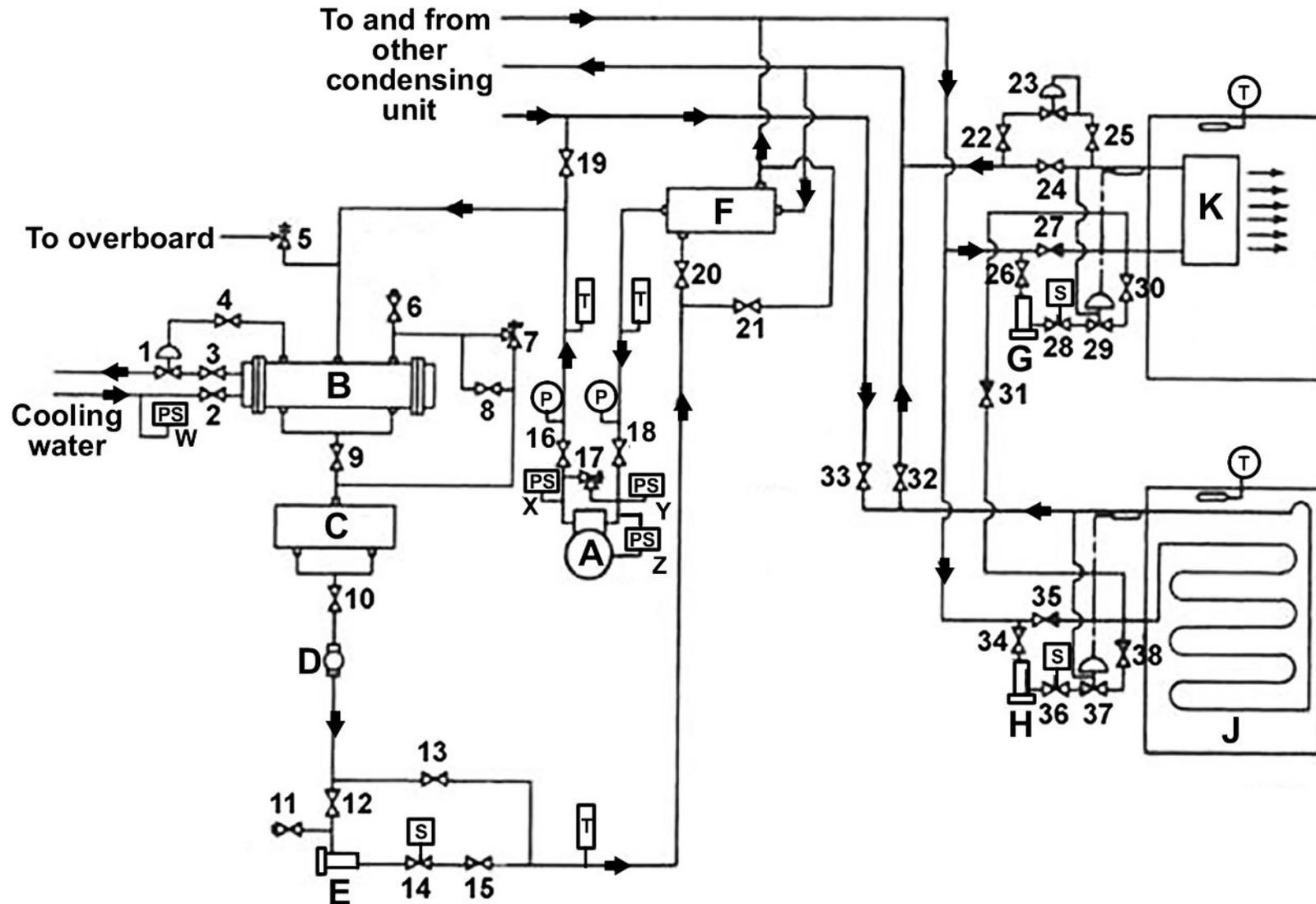


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## GS-RA-12



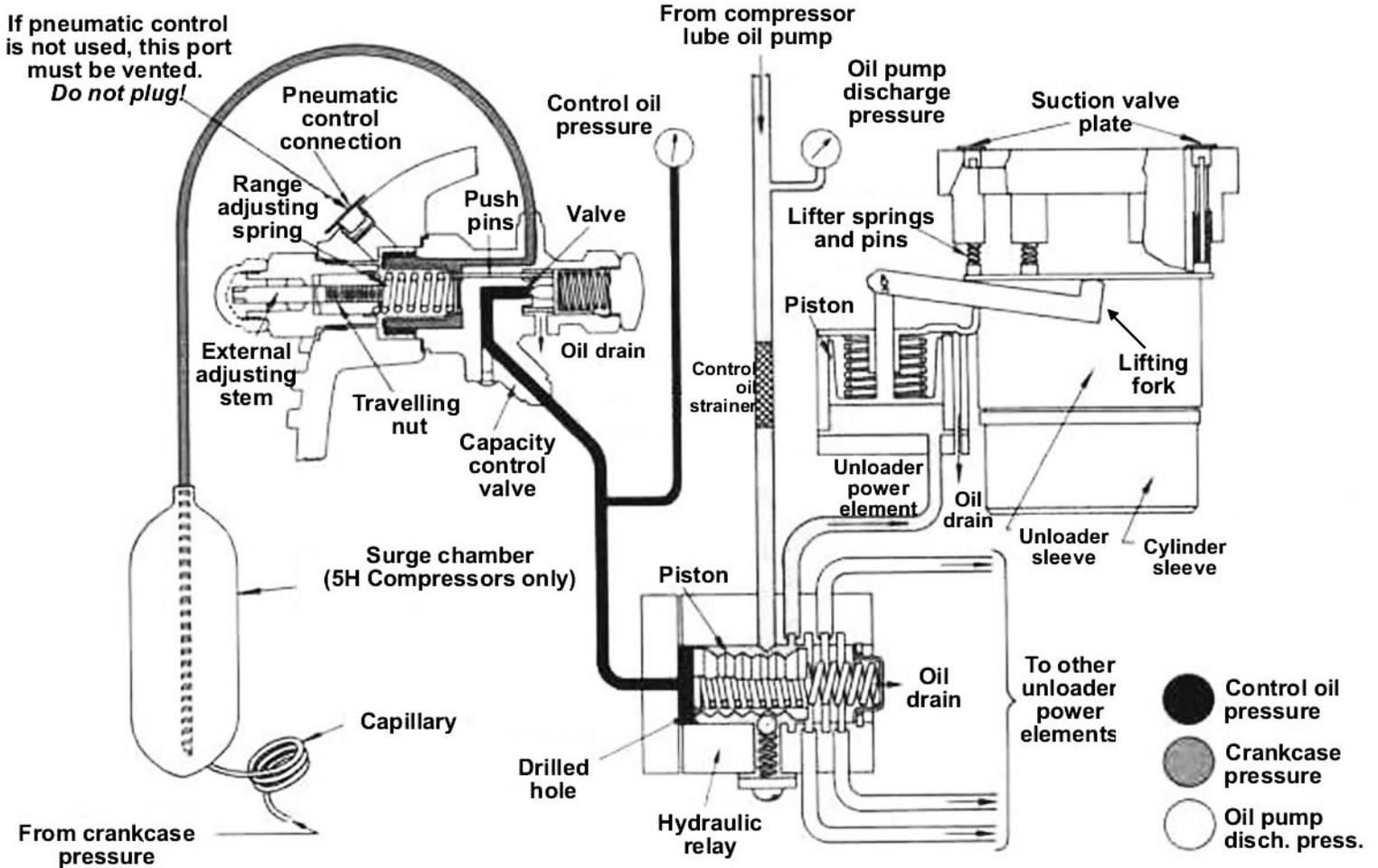
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## GS-RA-13

### Capacity Control System

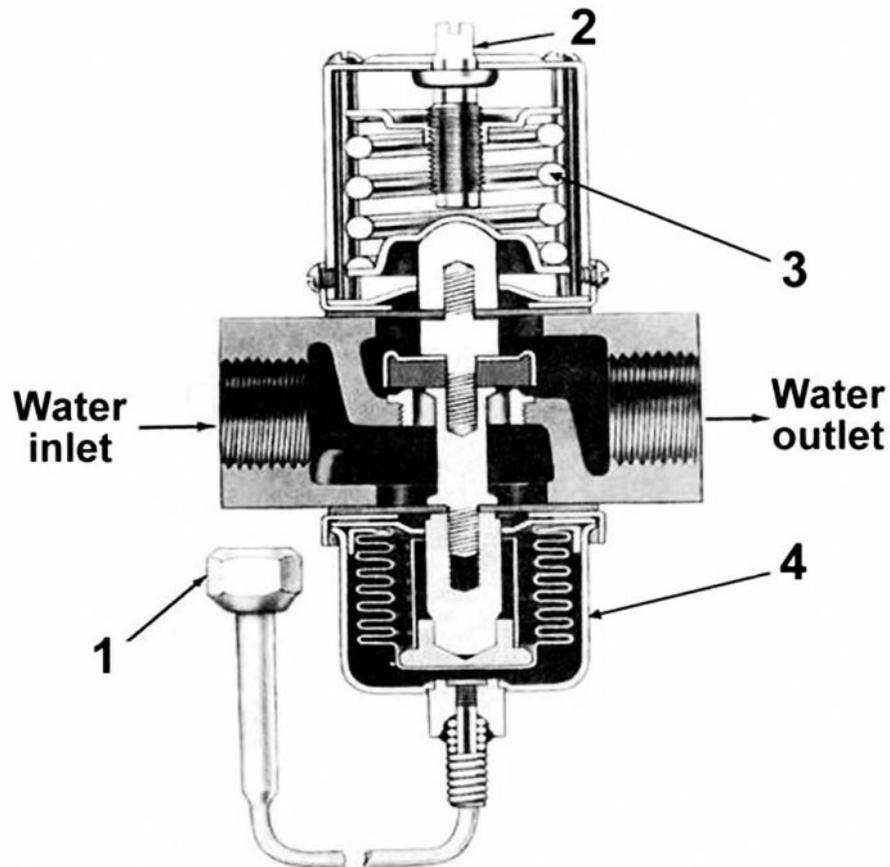


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## GS-RA-14

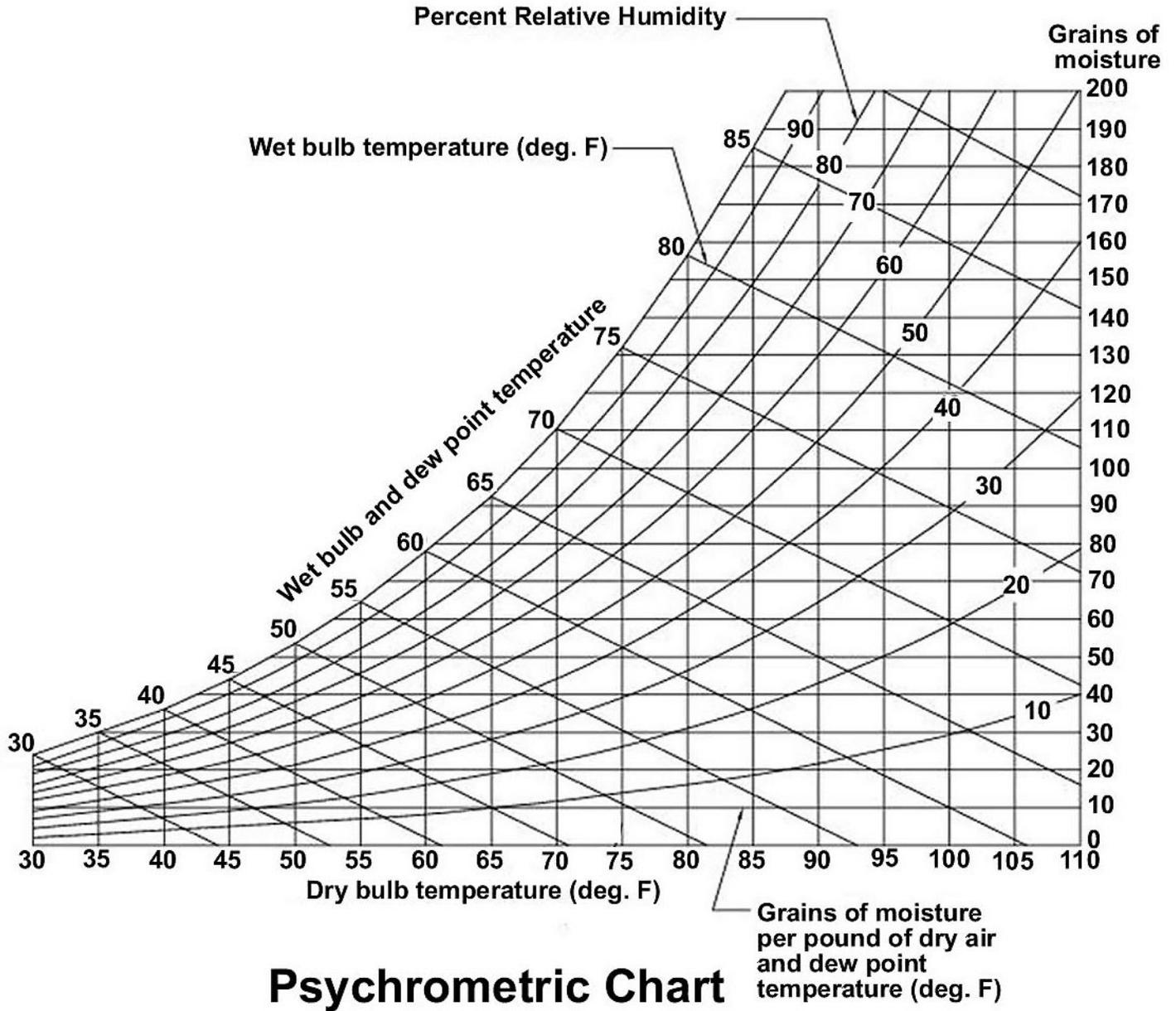


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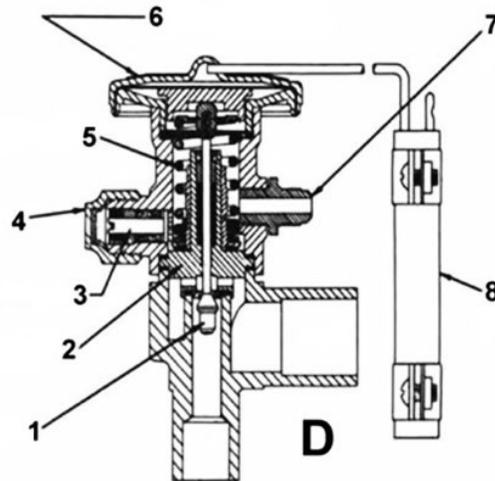
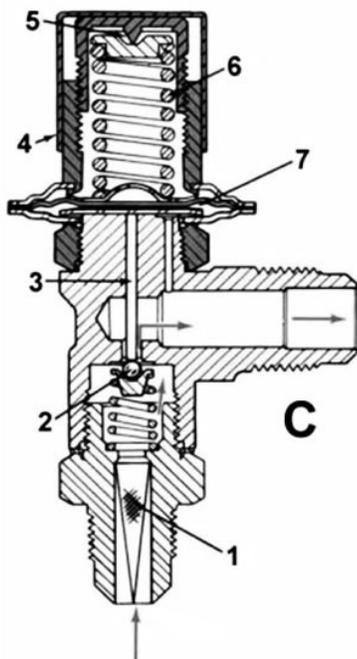
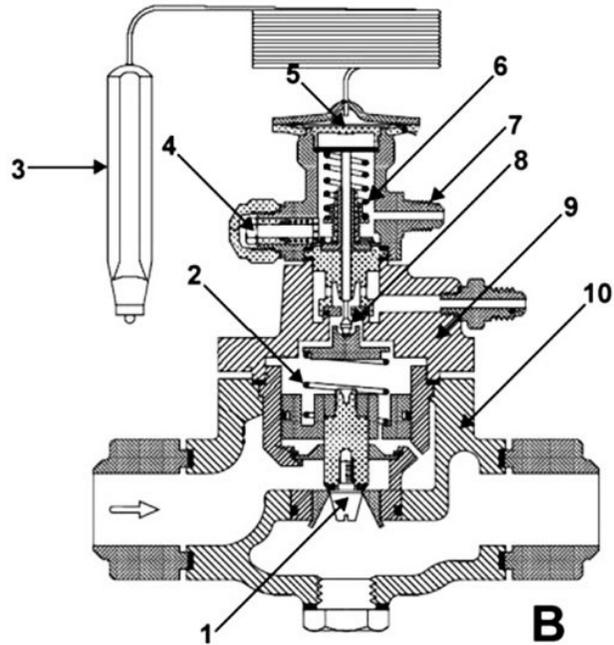
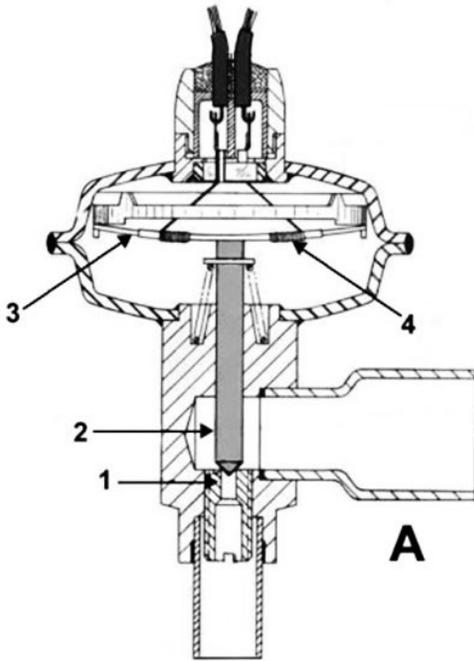
## GS-RA-22



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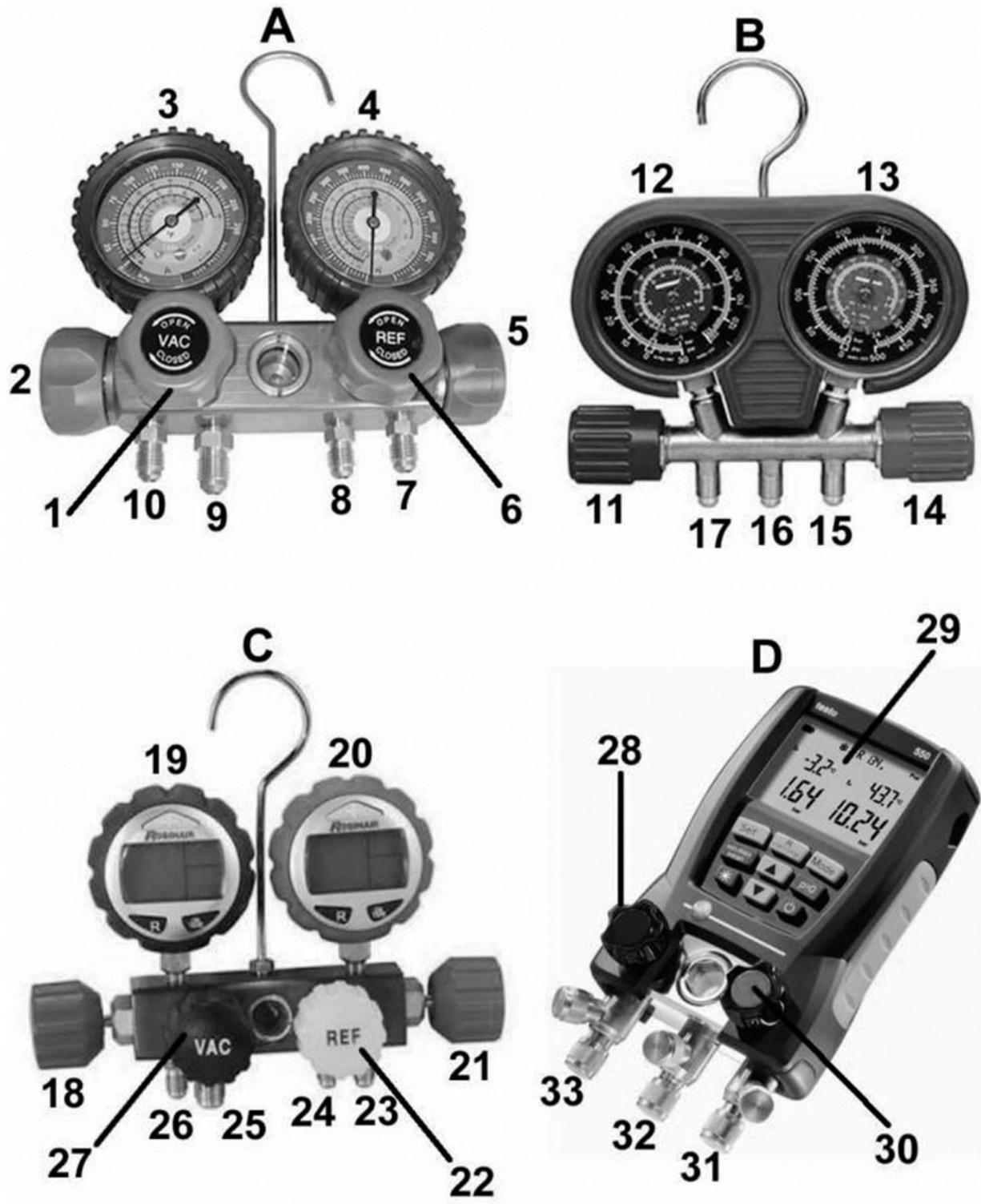
## GS-RA-24



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Figure D: Adapted for testing purposes only from HARBACH, Marine Refrigeration and Air-Conditioning. Copyright © 2005 by Cornell Maritime Press. Further reproduction prohibited without permission

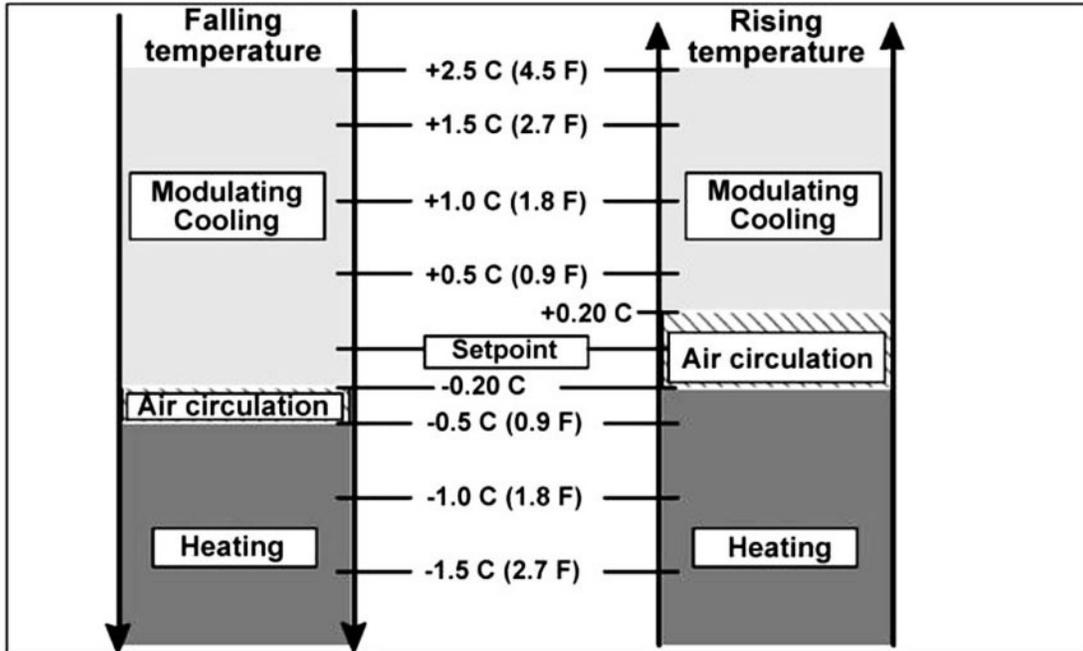
## GS-RA-30



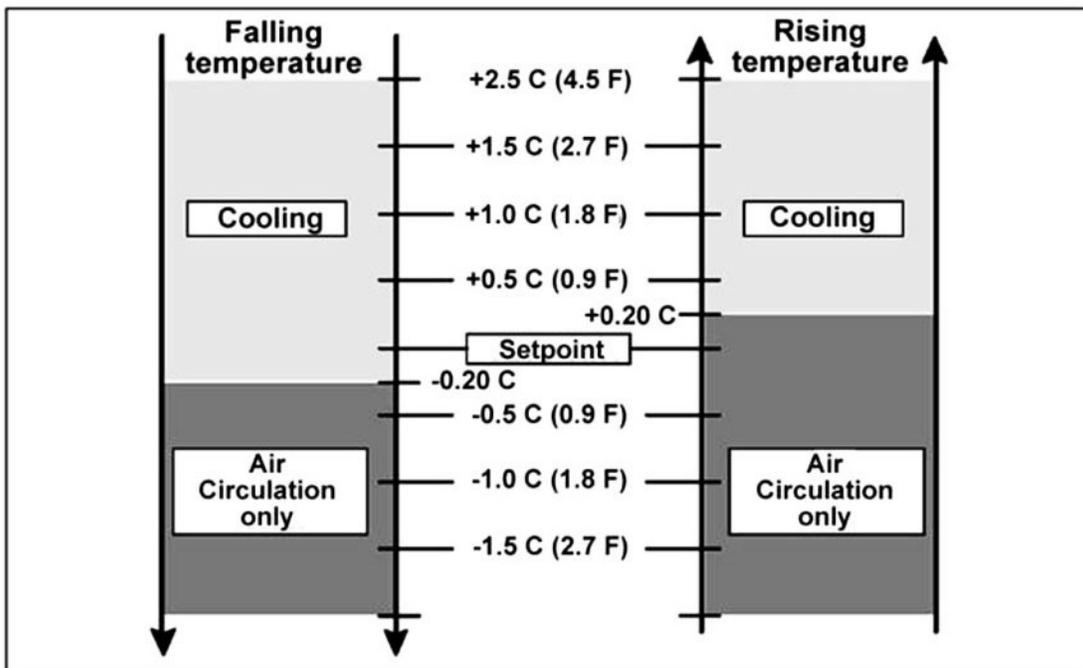
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## GS-RA-35



**A**



**B**

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69NT40-541-300 to 399 Container Refrigeration Units

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## GS-RA-45



**A**



**B**

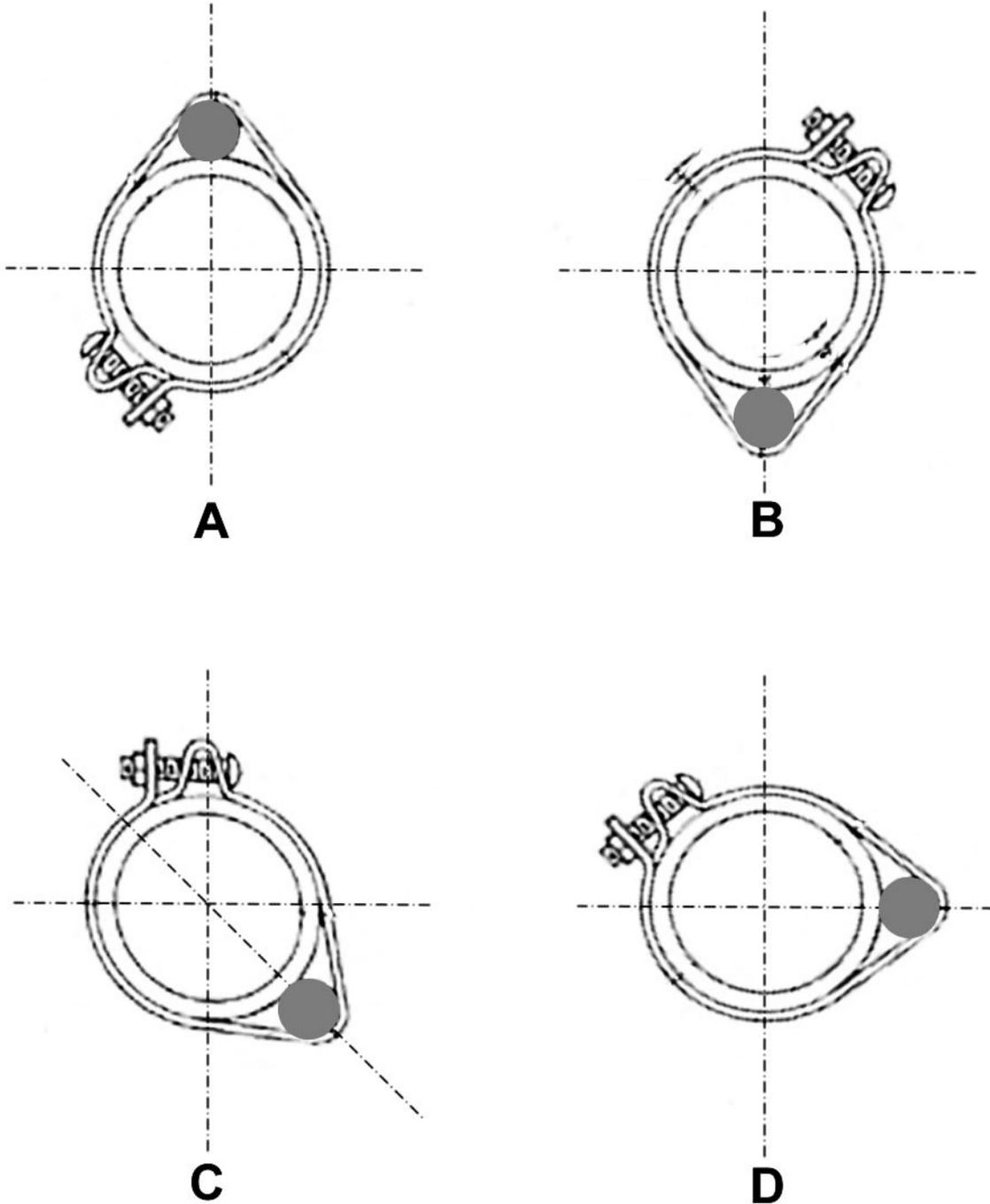


**C**



**D**

## GS-RA-50



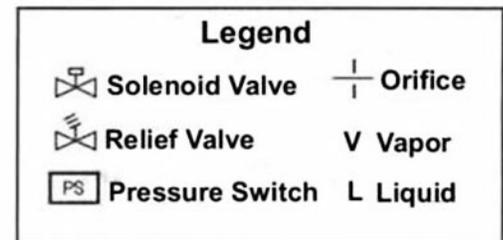
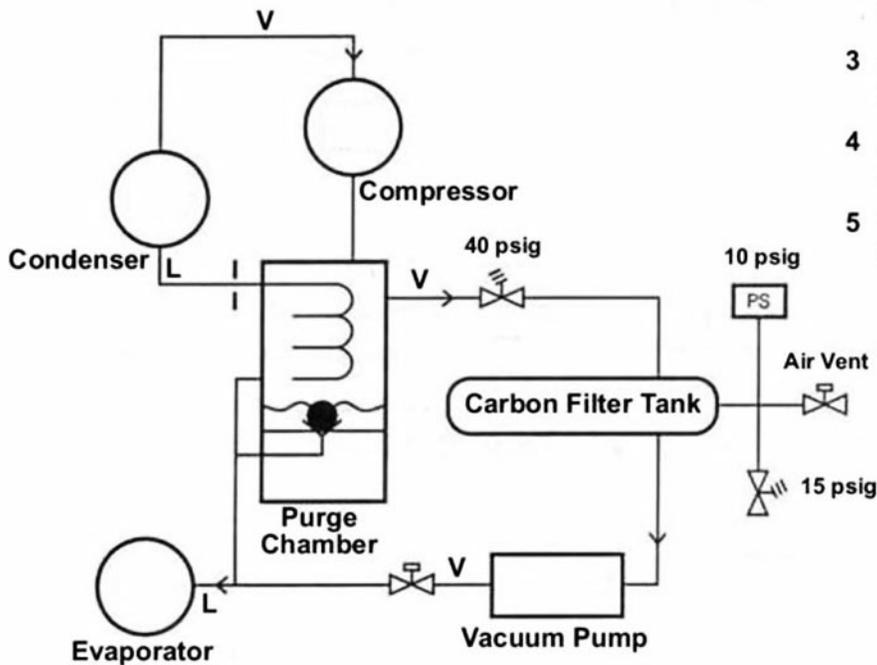
### TXV Feeler Bulb on Large Suction Line (7/8" and larger)

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Marine Refrigeration and Air Conditioning  
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## GS-RA-55

### Operational Steps

- 1 PreVent compressor increases pressure in existing purge chamber to 40+ psig.
- 2 40 psig relief valve vents purge mixture into carbon filter tank
- 3 Carbon in carbon filter tank absorbs refrigerant. Pressure increases.
- 4 At 10 psig in carbon filter tank, vent opens. Air and noncondensables are purged.
- 5 Vent closes. Vacuum pump cycles on for ten minutes returning vapor to chiller evaporator.



## LP Centrifugal Chiller High Efficiency Purge Recovery Unit

Adapted for testing purposes only from CARR, Refrigerants and the Environment

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