

Installation Instructions

SAFETY CONSIDERATIONS

Absorption liquid chiller/heaters provide safe and reliable service when operated within design specifications. When operating this equipment, use good judgment and safety precautions to avoid damage to equipment and property or injury to personnel.

Be sure you understand and follow the procedures and safety precautions contained in the machine instructions as well as those listed in this guide.

▲ DANGER

DO NOT USE OXYGEN or air to purge lines, leak test, or pressurize a machine. Use nitrogen.

NEVER EXCEED specified test pressures. For the 16DF machine, the maximum pressure is 12 psig (83 kPa). For the chilled/hot water and condensing water piping, the maximum pressure is stamped on the machine.

WEAR goggles and suitable protective clothing when handling lithium bromide, octyl alcohol, inhibitor, lithium hydroxide, and hydrobromic acid. IMMEDIATELY wash any spills from the skin with soap and water. IMMEDIATELY FLUSH EYES with water and consult a physician.

▲ WARNING

DO NOT USE eyebolts or eyebolt holes to rig machine sections or the entire assembly.

DO NOT work on high-voltage equipment unless you are a qualified electrician.

DO NOT WORK ON electrical components, including control panels or switches, until you are sure ALL POWER IS OFF and no residual voltage can leak from capacitors or solid-state components.

LOCK OPEN AND TAG electrical circuits during servicing. IF WORK IS INTERRUPTED, confirm that all circuits are deenergized before resuming work.

NEVER DISCONNECT safety devices or bypass electric interlocks and operate the machine. Also, never operate the machine when any safety devices are not adjusted and functioning normally.

DO NOT REPEAT unsuccessful ignition attempts or restart after flame failure without assurance that post-purge and pre-purge have eliminated combustible gas or oil vapors from the combustion chamber. DO NOT EVER ATTEMPT IGNITION of a burner if there is shutdown leakage of gas or oil through the fuel shutoff valves or from the fuel lines.

DO NOT syphon lithium bromide or any other chemical by mouth.

BE SURE all hydrogen has been exhausted before cutting into pure chambers. Hydrogen mixed with air can explode when ignited.

WHEN FLAMECUTTING OR WELDING on an absorption machine, some noxious fumes may be produced. Ventilate the area thoroughly to avoid breathing concentrated fumes.

DO NOT perform any welding or flamecutting to a machine while it is under a vacuum or pressurized condition.

NEVER APPLY an open flame or live steam to a refrigerant cylinder. Dangerous overpressure can result. When necessary to heat a cylinder, use only warm (110 F [43 C]) water.

DO NOT REUSE disposable (nonreturnable) cylinders or attempt to refill them. It is DANGEROUS AND ILLEGAL. When cylinder is emptied, bleed off remaining gas pressure, loosen the collar and unscrew and discard the valve stem. DO NOT INCINERATE.

DO NOT ATTEMPT TO REMOVE fittings, covers, etc., while machine is under pressure or while machine is running. DO NOT OPERATE or pressurize a machine without all cover plates or bolts in place.

▲ CAUTION

DO NOT climb over a machine. Use platform, catwalk, or staging. Follow safe practices when using ladders.

DO NOT STEP ON machine piping. It might break or bend and cause personal injury.

USE MECHANICAL EQUIPMENT (crane, hoist, etc.) to lift or move inspection covers or other heavy components. Even if components are light, use such equipment when there is a risk of slipping or losing your balance.

VALVE OFF AND TAG steam, water, or brine lines before opening them.

DO NOT LOOSEN water box cover bolt until the water box has been completely drained.

DO NOT VENT OR DRAIN water boxes containing industrial brines, liquid, gases, or semisolids without permission of your process control group.

BE AWARE that certain automatic start arrangements can engage starters. Open the disconnects ahead of the starters in addition to shutting off the machine or pump.

INVESTIGATE THE CAUSE of flame failure or any other safety shutdown before attempting a restart.

KEEP EYES sufficiently away from sight tubes or burner openings, and wear a protective shield or safety glasses when viewing a burner flame.

USE only repaired or replacement parts that meet the code requirements of the original equipment.

DO NOT ALLOW UNAUTHORIZED PERSONS to tamper with burner equipment or machine safeties, or to make major repairs.

PERIODICALLY INSPECT all valves, fittings, piping, and relief devices for corrosion, rust, leaks, or damage.

PROVIDE A DRAIN connection in the vent line near each pressure relief device to prevent a build-up of condensate or rain water.

IMMEDIATELY wipe or flush the floor if lithium bromide or octyl alcohol is spilled on it.

BE SURE combustion air inlets to the equipment room are open and clear of any blockage.

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INTRODUCTION

General — The 16DF machine is factory assembled, wired, and leak tested. Installation (not by Carrier) consists primarily of establishing water, fuel, exhaust, and electrical services to the machine as well as mounting and connecting the burner. Rigging, installation, insulation, painting, field wiring, and field piping are the responsibility of the contractor and/or customer. Carrier has no installation responsibilities for the equipment.

Job Data — Necessary information consists of: machine location drawings, piping drawings, field wiring diagrams, and rigging guide.

RECEIVING THE MACHINE AND BURNER

NOTE: The chiller/heater machine and the burner are shipped separately from different sources.

Identify Machine and Burner — The machine and burner model numbers and serial numbers are stamped on machine identification plates. Check this information against shipping papers and job data.

Inspect Shipment — (Fig. 1). *Single-piece machines are at a deep vacuum when shipped. Do not open any valves until the vacuum has been noted. Refer to Check Shipping Vacuum section, below. Machines shipped in 2 pieces are under nitrogen pressure.*

Inspect for shipping damage while machine and burner are still on shipping conveyance. If either appears to be damaged or has been torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. Manufacturer is not responsible for any damage incurred in transit.

Check all items against shipping list. Immediately notify your Carrier office if any item is missing.

To prevent loss or damage, leave all parts in original packages until installation.

Check Shipping Vacuum — To check for leaks that have occurred during shipment on single-piece machines:

1. Connect an absolute pressure gage to a service valve.
2. Record the absolute pressure of the assembly. If vessel pressure is greater than 0.28 in. (7 mm) of mercury, the machine has acquired a leak in shipping, and must be leak tested. Refer to the Machine Leak Test procedure for instructions.

Check Shipping Pressure — To check for leaks that have occurred during shipment on 2-piece machines:

1. Connect a pressure gage (30 psig [200 k Pa]) to a service valve on each piece.
2. If the vessel has lost its pressure, it has acquired a leak during shipping and must be leak tested after positioning and assembly. Refer to the Machine Leak Test section for instructions.

Provide Machine Protection — If the machine will not be installed immediately, it is very important to use a drop cloth or plastic covering to protect the machine from construction dirt and moisture before installation. *Also, do not remove protective shipping cover on control panel until ready to use.*

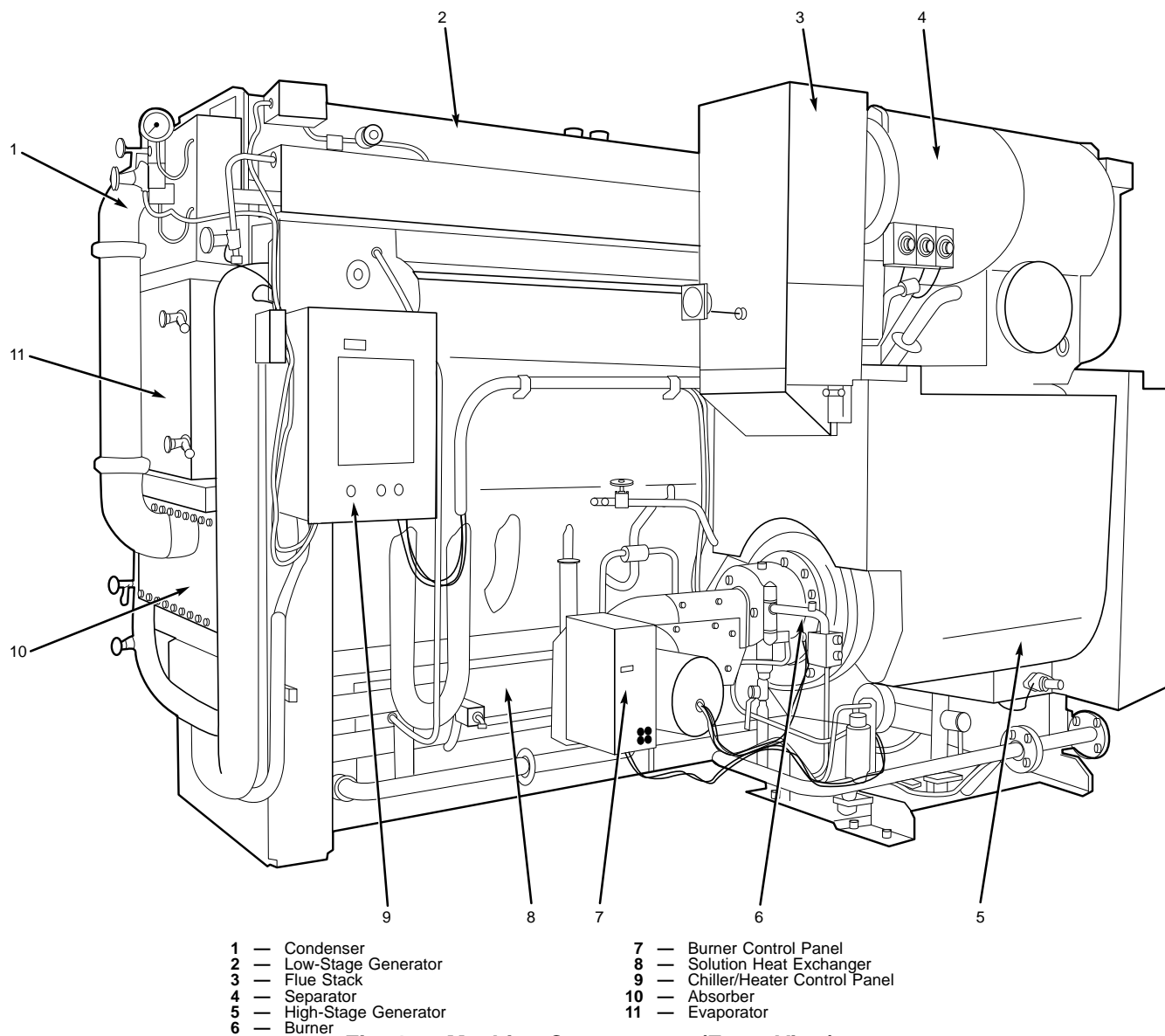


Fig. 1 — Machine Components (Front View)

- | | |
|--------------------------|----------------------------------|
| 1 — Condenser | 7 — Burner Control Panel |
| 2 — Low-Stage Generator | 8 — Solution Heat Exchanger |
| 3 — Flue Stack | 9 — Chiller/Heater Control Panel |
| 4 — Separator | 10 — Absorber |
| 5 — High-Stage Generator | 11 — Evaporator |
| 6 — Burner | |

RIGGING AND POSITIONING

Rigging procedures vary depending on whether the machine is shipped in one or 2 pieces.

⚠ WARNING

Lifting machine from points other than those specified may result in serious damage and personal injury. Rigging equipment and procedure must be adequate for machine weights and sizes. Refer to Table 1 for machine weights, Fig. 2 and Tables 2 and 3 for overall dimensions.

Carefully position cables on machine to avoid damage to small piping, controls, or wiring.

Keep shell horizontal when lifting or lowering so all legs contact the floor at the same time.

Rigging One-Piece Units — Lift entire assembly with cable hooks and shackles connected to the 3 lifting holes on the absorber-evaporator assembly (lower part of machine), and with the center balance point location, as shown in Fig. 3 and 4. Lifting from other holes or locations can damage the machine. See Mounting the Burner section for burner rigging instructions.

Rigging 2-Piece Units

PREPARATION — Two-piece units must be prepared for installation before they can be rigged.

1. Open auxiliary evacuation valves to relieve pressure in absorber-evaporator shell.
2. Open shipping valve on generator assembly to relieve pressure.
3. Remove all piping end plates by flamecutting the end plate and weld flange around their outer diameter. Cut these pieces as shown in Fig. 5 for proper reconnection.
4. Grind the cut pieces smooth for a close fit when the machine pieces are assembled.

⚠ CAUTION

To avoid contaminants and debris getting into chiller, do not leave machine open any longer than necessary.

⚠ CAUTION

Do not remove any stock from pipe ends. Do not get slag inside machine while flamecutting.

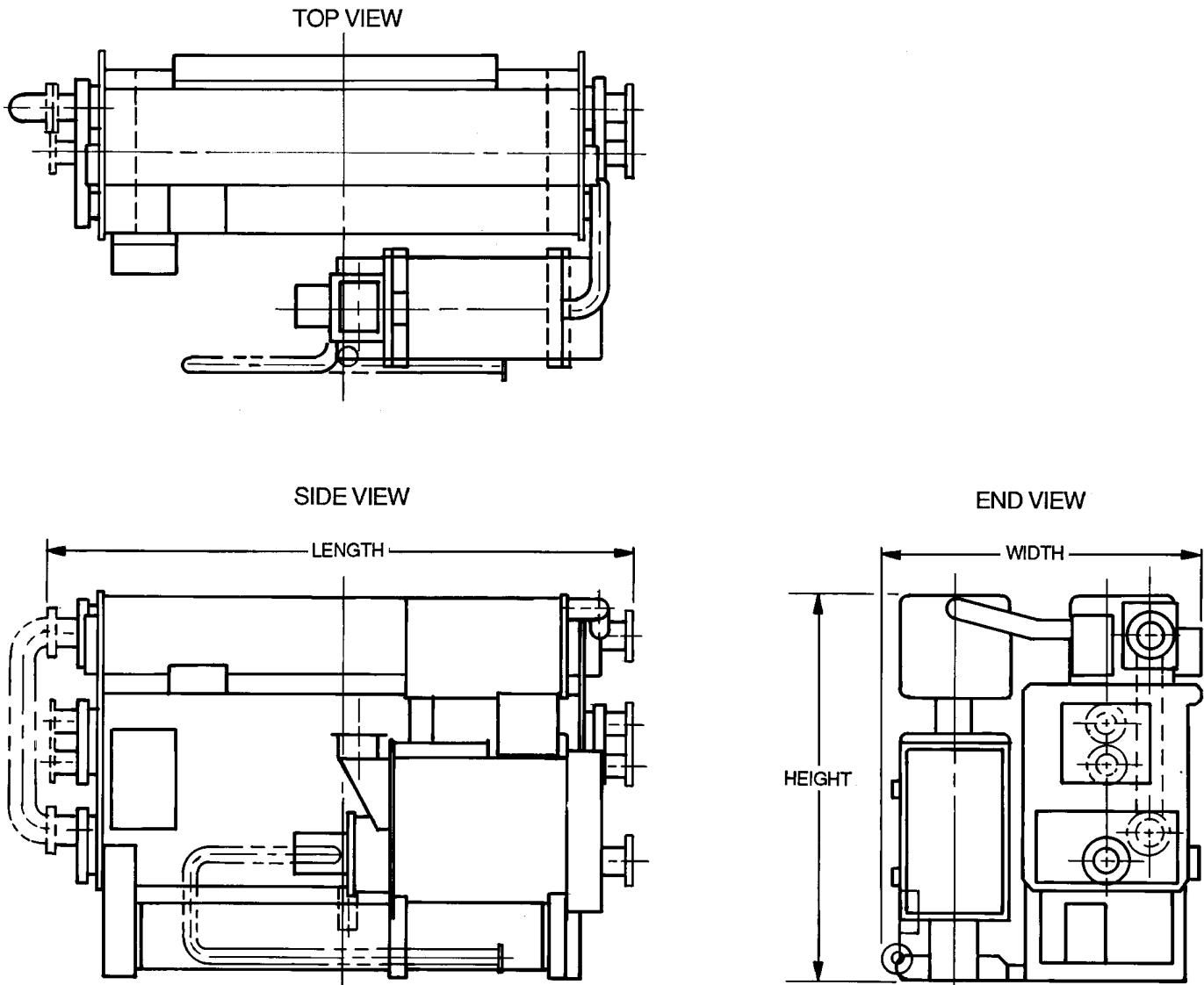
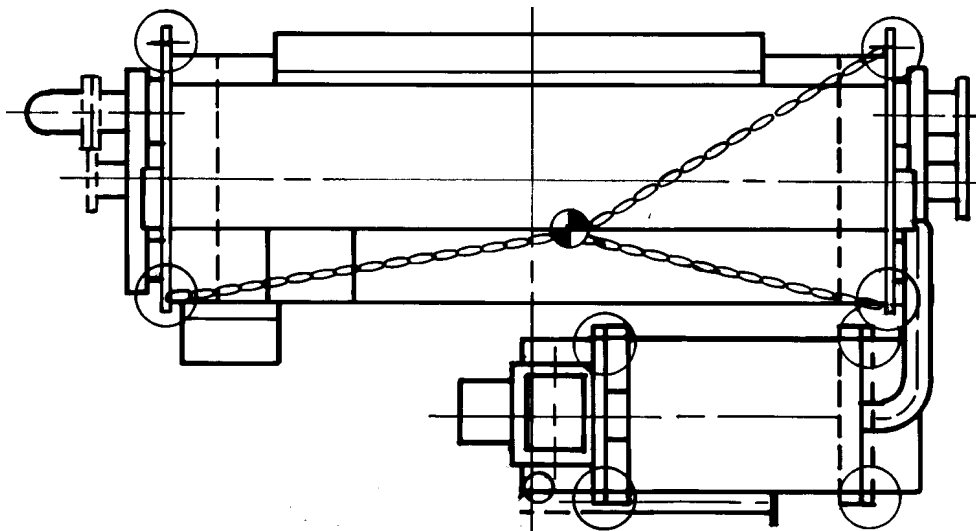


Fig. 2 — 16DF Views (Typical)



○ — Lifting Holes

Fig. 3 — Rigging One-Piece Units, Typical, Top View

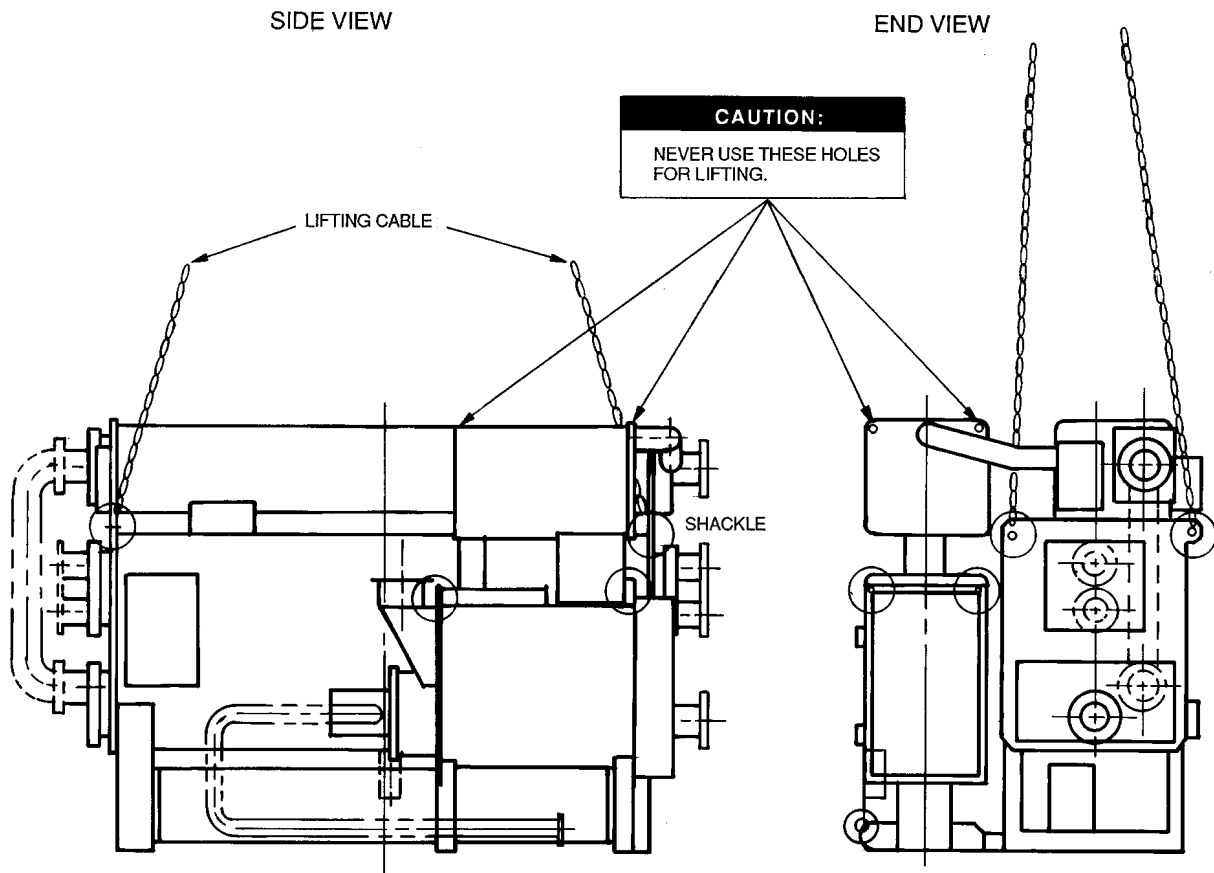


Fig. 4 — Rigging One-Piece Units, Typical, Side and End Views

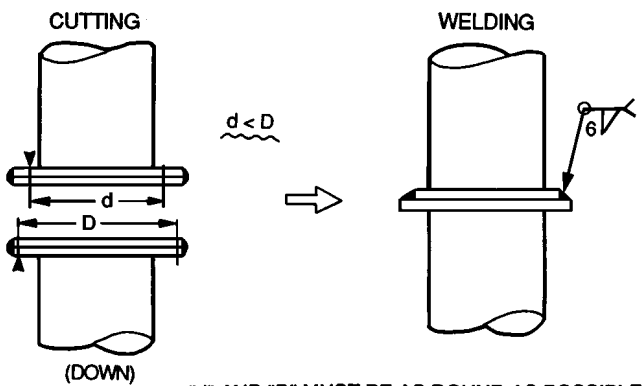
Table 1 — Rigging Weights English

| UNIT 16DF | SHIPPING WEIGHT (lb) | | | OPERATING WEIGHT (lb) |
|--------------|---|---|-----------------|-----------------------------|
| | Absorber- Evaporator Low-Temperature Generator Assembly | High- Temperature Generator- Separator Assembly | Total Weight | |
| 013* | — | — | 13,230 | 17,200 |
| 015* | — | — | 13,450 | 17,420 |
| 018* | — | — | 15,220 | 20,290 |
| 020* | — | — | 15,440 | 20,510 |
| 023 | 14,560 | 3,970 | 18,530 | 24,920 |
| 025 | 14,780 | 3,970 | 18,750 | 25,140 |
| 028 | 16,100 | 8,600 | 24,700 | 32,640 |
| 032 | 16,540 | 8,600 | 25,140 | 33,080 |
| 036 | 18,530 | 8,820 | 27,350 | 37,050 |
| 040 | 18,970 | 8,820 | 27,790 | 37,490 |
| 045 | 21,610 | 10,150 | 31,760 | 43,660 |
| 050 | 22,050 | 10,150 | 32,200 | 44,100 |

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| UNIT 16DF | SHIPPING WEIGHT (kg) | | | OPERATING WEIGHT (kg) |
|--------------|---|---|-----------------|-----------------------------|
| | Absorber- Evaporator Low-Temperature Generator Assembly | High- Temperature Generator- Separator Assembly | Total Weight | |
| 013* | — | — | 6 000 | 7 800 |
| 015* | — | — | 6 100 | 7 900 |
| 018* | — | — | 6 900 | 9 200 |
| 020* | — | — | 7 000 | 9 300 |
| 023 | 6 600 | 1800 | 8 400 | 11 300 |
| 025 | 6 700 | 1800 | 8 500 | 11 400 |
| 028 | 7 300 | 3900 | 11 200 | 14 800 |
| 032 | 7 500 | 3900 | 11 400 | 15 000 |
| 036 | 8 400 | 4000 | 12 400 | 16 800 |
| 040 | 8 600 | 4000 | 12 600 | 17 000 |
| 045 | 9 800 | 4600 | 14 400 | 19 800 |
| 050 | 10 000 | 4600 | 14 600 | 20 000 |

*16 DF013-020 are shipped in one section as standard.



"d" AND "D" MUST BE AS ROUND AS POSSIBLE

Fig. 5 — Flamecutting and Welding Detail

Table 2 — Overall Dimensions, 16DF013-025 English

| UNIT 16DF | OVERALL DIMENSIONS (ft-in.) | | | | | |
|--------------|-----------------------------|-------|-------|-------|-------|-------|
| | 013 | 015 | 018 | 020 | 023 | 025 |
| LENGTH | 11-10 | 11-10 | 11-10 | 11-10 | 11-10 | 11-10 |
| WIDTH | 6- 7 | 6- 7 | 7- 8 | 7- 8 | 8- 3 | 8- 3 |
| HEIGHT | 7- 9 | 7- 9 | 7- 9 | 7- 9 | 8- 3 | 8- 3 |

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| UNIT 16DF | OVERALL DIMENSIONS (mm) | | | | | |
|--------------|-------------------------|------|------|------|------|------|
| | 013 | 015 | 018 | 020 | 023 | 025 |
| LENGTH | 3600 | 3600 | 3600 | 3600 | 3600 | 3600 |
| WIDTH | 1995 | 1995 | 2330 | 2330 | 2520 | 2520 |
| HEIGHT | 2350 | 2350 | 2350 | 2350 | 2500 | 2500 |

Table 3 — Overall Dimensions, 16DF028-050 English

| UNIT 16DF | OVERALL DIMENSIONS (ft-in.) | | | | | |
|--------------|-----------------------------|------|-------|-------|------|------|
| | 028 | 032 | 036 | 040 | 045 | 050 |
| LENGTH | 15-4 | 15-4 | 15- 4 | 15- 4 | 15-4 | 15-4 |
| WIDTH | 9-4 | 9-4 | 9-10 | 9-10 | 10-6 | 10-6 |
| HEIGHT | 8-6 | 8-6 | 8-10 | 8-10 | 9-8 | 9-8 |

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| UNIT 16DF | OVERALL DIMENSIONS (mm) | | | | | |
|--------------|-------------------------|------|------|------|------|------|
| | 028 | 032 | 036 | 040 | 045 | 050 |
| LENGTH | 4660 | 4660 | 4660 | 4660 | 4660 | 4660 |
| WIDTH | 2850 | 2850 | 3000 | 3000 | 3200 | 3200 |
| HEIGHT | 2595 | 2595 | 2695 | 2695 | 2950 | 2950 |

RIGGING — The 2 pieces are the high-temperature generator-separator assembly and absorber-evaporator low-temperature generator assembly (Fig. 6).

1. Lift each assembly with cable, hooks, and shackles connected to the 4 lifting holes on each assembly. Lifting from other holes or locations can damage the machine.
2. Position and level the absorber-evaporator-assembly first. See Position and Level the Equipment section.
3. Move the generator-separator assembly into place beside the absorber-evaporator assembly.
4. Align connecting piping for generator-separator and absorber-evaporator assemblies. Make sure serial numbers correspond on both assemblies.
5. See Mounting the Burner section for burner rigging instructions.

Position and Level the Equipment — Isolation pads are not necessary for most installations. However, for cases where isolation pads are required, refer to Fig. 7 for typical installation.

Both 16DF machine assemblies must be level within 1/4 in. per 20 ft (6.3 mm per 6 m), both lengthwise and diagonally. To level the machine, proceed as follows:

1. Completely fill 50-ft (15 m) length of clear flexible tubing with water.
2. Use water gage and leveling reference points stamped on tube sheets to level machine.
3. Level machine with shims until requirements are met. If isolation assembly is used, shim under the soleplate. Be sure matching piping is in alignment.

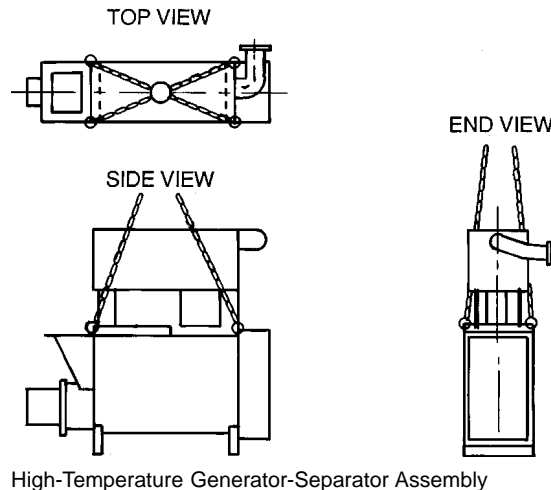
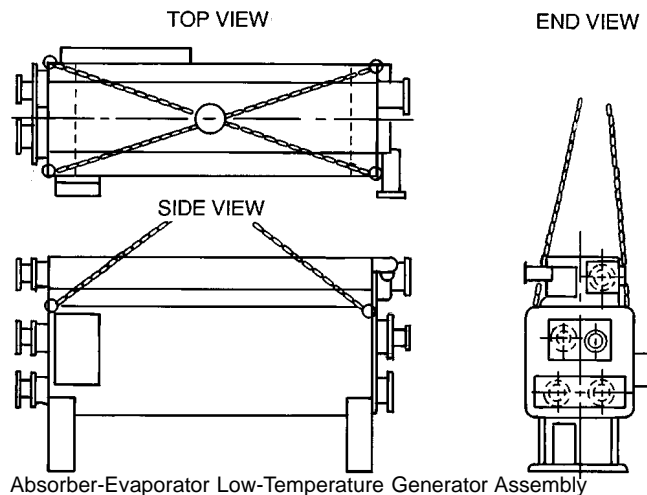


Fig. 6 — Rigging 2-Piece Units, Sizes 16DF023-050

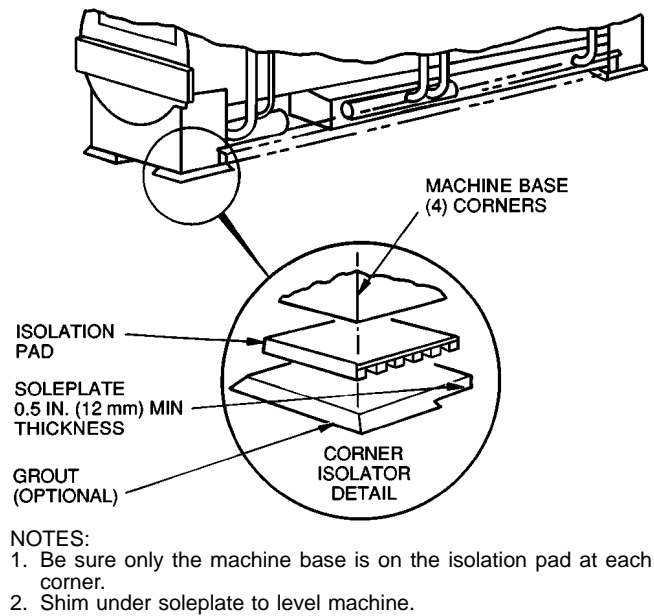


Fig. 7 — Typical Isolation Assembly

MACHINE ASSEMBLY

No assembly is required for one-piece units (16DF013-020) other than installing the burner. See Mounting the Burner section.

Assemble 2-Piece Units (Fig. 8 and 9)

1. Weld piping connections and make sure weld connections are vacuum leak tight.
2. Install the burner. See Mounting the Burner section.

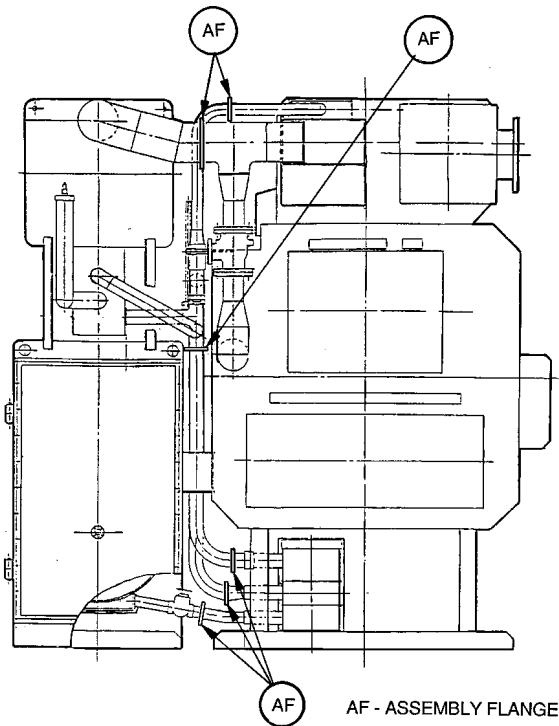


Fig. 8 — Machine Piping Assembly Diagram, End View

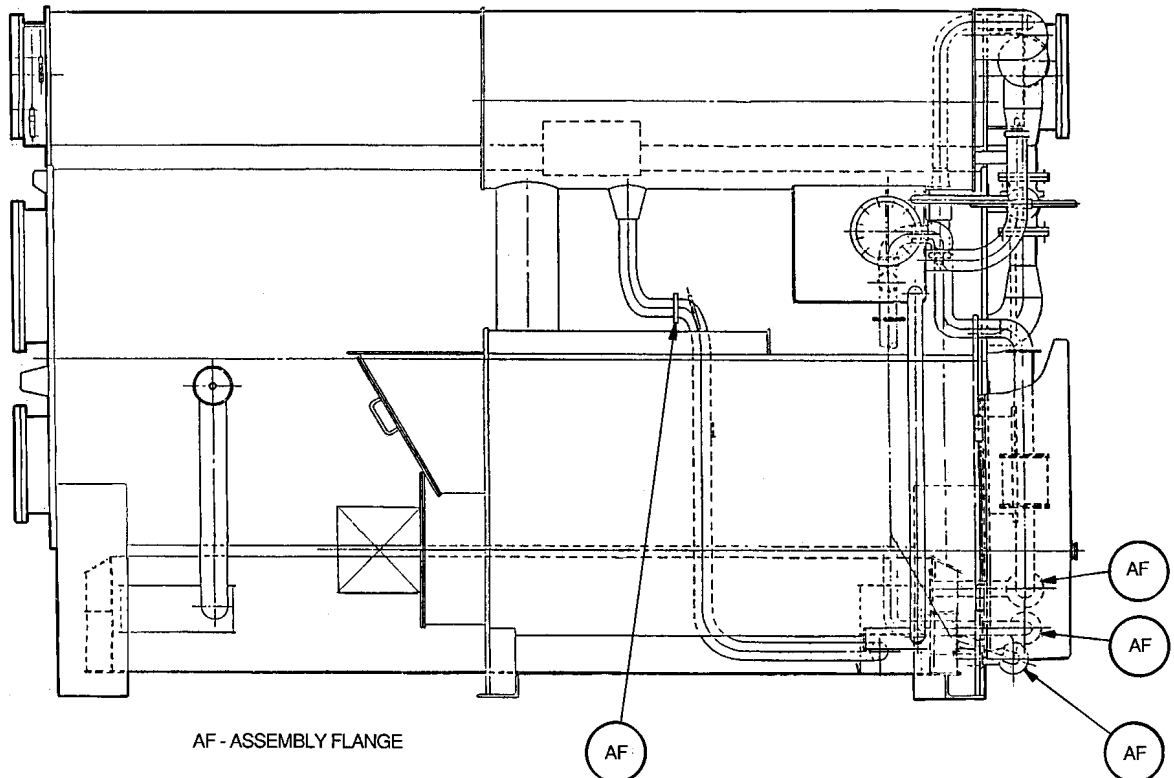


Fig. 9 — Machine Piping Assembly Diagram, Side View

Machine Leak Test — All field-welded joints on the chiller must be leak tested prior to starting the machine. Leak test as follows:

1. Close all external service valves.
2. If machine is under vacuum, bring to atmospheric pressure with dry air or dry nitrogen.
3. Pressurize to 6 psig (40 kPa) with tracer gas. Charge through auxiliary evacuation valve.
4. Increase the machine pressure to 12 psig (80 kPa) with dry air or dry nitrogen.

⚠ WARNING

Exceeding 12 psi (80 kPa) can cause severe damage to chiller.

5. Leak test all field-welded joints with electronic leak detectors or equivalent. *If machine has acquired a leak in shipment or rigging, all joints must be leak tested.*
6. After leak testing has been completed and leaks have been corrected, release the machine pressure.

Machine Evacuation — Removal of non-condensables from the machine is required after machine has been opened. To evacuate the machine, proceed as follows:

1. Connect auxiliary evacuation device (Fig. 10) to auxiliary evacuation valve. Be sure that the line is as short as possible and that line size is not smaller than connection to auxiliary device. A check valve or oil trap must be used on the suction lines to keep vacuum pump oil out of the chiller. Be sure that all connections are vacuum tight.
2. Close external service valve(s).
3. Start auxiliary evacuation device. Open auxiliary evacuation valve. Reduce machine pressure to one in. of mercury absolute or lower. Check pressure with absolute pressure gage at refrigerant pump service valve.

4. Close auxiliary evacuation valve and shut off auxiliary evacuation device.
5. Note and record absolute pressure gage reading.
6. Coat all machine field-welded joints with weld sealant.

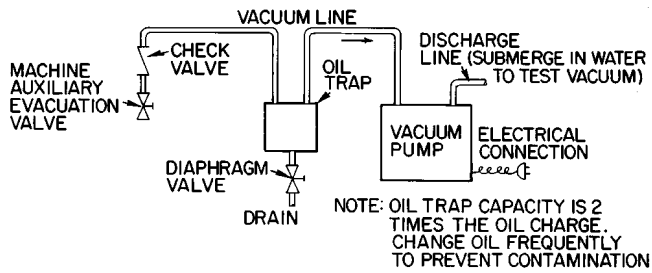


Fig. 10 — Auxiliary Evacuation Device

MOUNTING THE BURNER

The burner is shipped and installed as 3 separate sub-assemblies (Fig. 11):

- front plate and refractory assembly, which is attached to the generator
- burner assembly, which is attached to the frontplate
- gas train and/or oil supply system, which are connected to the burner

Rigging — Rigging should be used to position both the front plate assembly and the burner assembly because of their weights. Refer to the shipping container or paperwork for the weight of these units. For the front plate, either webbed strapping placed around the refractory can or a lifting bar in the center opening may be used.

IMPORTANT: Be careful that the assembly does not slip off.

For burner assemblies which do not have lifting lugs, place webbed strapping around a central balance area of the burner.

IMPORTANT: Be careful to avoid damage to small piping, controls, or wiring.

Frontplate and Burner Installation To prevent leakage of high-temperature combustion gases with this type of forced draft burner, a high-temperature insulating gasket or 1/2-in. Fiberfrax® rope seal is required between the generator and the front plate assembly, and between the front plate and the burner assembly.

Either the gasket or the rope may be provided with the burner, depending on manufacturer's availability.

CAUTION

When using high-temperature insulating rope, it must be wrapped around the flange circumference **INSIDE** of the mounting studs or bolt holes, with overlapping ends, to provide a complete gas tight seal. Wrapping the rope around the outside of the studs or bolt holes could allow high-temperature gas leakage through the holes in the attached plates. Use either gasket cement or masking tape to hold the ropes in place during installation of the front plate and burner assemblies.

1. Place the high-temperature gasket or *insulating* rope on the generator mounting flange, *inside* the bolt holes.
2. Position the frontplate and refractory assembly against the generator mounting flange, with the refractory can extending into the generator fire tube. Secure in place with washers, nuts, and bolts.
3. Place the high-temperature gasket or insulating rope on the frontplate flange, *inside* the studs.
4. Position the burner assembly with the burner head extending into the front plate and refractory assembly, making sure it is plumb. Secure in place with the retaining lugs on the frontplate studs to ensure a rigid mounting. Keep the control panel door closed during the burner installation to avoid damage. Also, it is good practice to remove the flame safeguard chassis during installation and to store it in a safe, dry place until start-up.
5. Measure and fabricate burner support pedestal from pipe(s) with pipe thread on both ends. Screw the support pipe into the support receptacle, and then screw the opposite end into the collar that is welded to the underside of the burner housing. Adjust or shim until the burner is level and firmly supported.

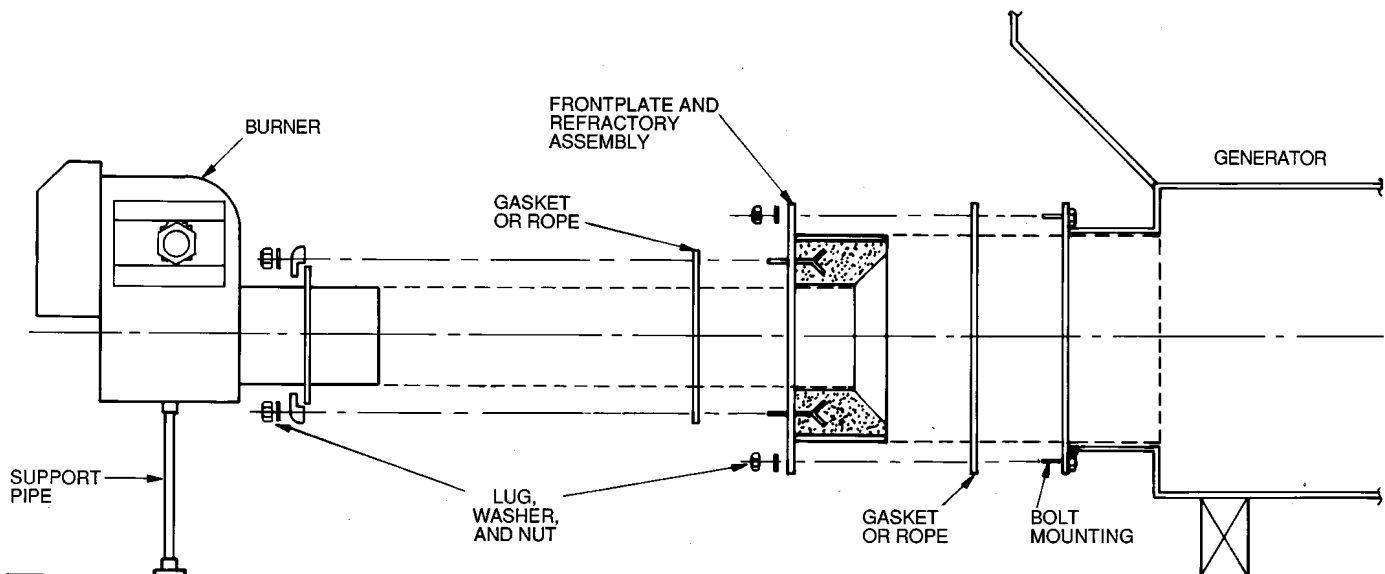


Fig. 11 — Burner Mounting

Fuel System Installation — See Fig. 12-14 for typical gas train and oil supply system arrangements. Refer to burner manual supplied with the burner for installation instructions on the particular version of gas train and/or oil supply system used with your application. These systems are supplied pre-assembled, and with pre-installed interconnection fittings.

⚠ WARNING

Do not use Teflon tape on any threaded connections as a gas or oil pipe sealant. Loose tape pieces can cause valve leakage and are a safety hazard. Use a pipe joint compound.

GAS TRAIN — The high-gas pressure switch is mounted on the gas train piping for convenience only, and does not monitor the gas pressure at that location. A brass pipe tee and a coil of 3/8-in. aluminum tubing with fittings are supplied to connect the sensing line between the pressure switch and the top of the burner manifold, as shown with dashed lines on the gas train piping schematic.

Another coil of 3/8-in. aluminum tubing with compression fittings is provided for the pilot connection between the pilot shutoff valve (mounted ahead of the main manual shutoff valve) and the pilot gas pressure regulator (mounted on the burner).

IMPORTANT: Do not use copper tubing for the gas pilot supply.

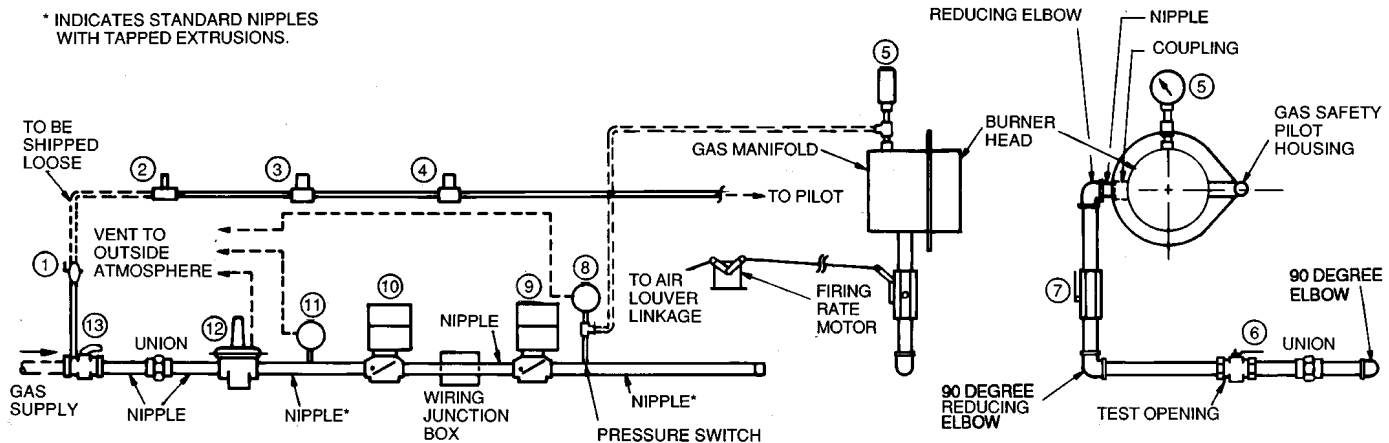
Gas supply and vent connections are discussed under Connect Fuel Piping in the Field Piping section of this manual.

OIL SUPPLY SYSTEM — This burner uses a separate motor-driven oil pump which should be located close to the burner and secured to the floor. The oil pump connections are identified with tags for suction (supply) and return lines. The piping diagram with mounting dimensions and port sizes for your particular application is shown in the burner manual. Oil supply and return connections are discussed under Connect Fuel Piping in the Field Piping section of this manual.

FIELD PIPING

Connect Water Piping — Install piping using job data, piping drawings, and procedures outlined below. A typical piping installation is shown in Fig. 15.

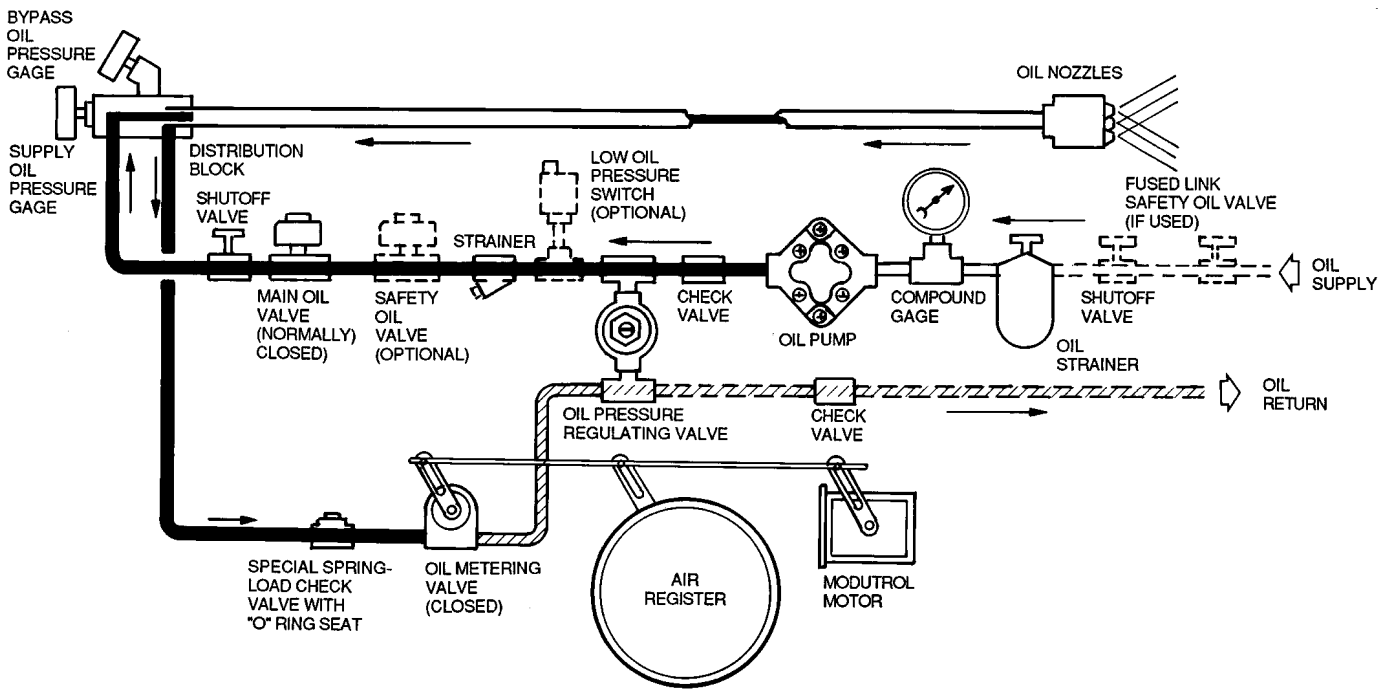
1. Make sure all connections to water box covers allow opening of covers for maintenance.
2. Installation and piping should allow sufficient access for cleaning or replacing tubes.
3. Install pipe hangers where needed. Make sure no weight or stress is placed on water box nozzles or flanges.



| ITEM | DESCRIPTION |
|------|---|
| 1 | Pilot Shutoff Cock |
| 2 | Pilot Gas Pressure Regulator |
| 3 | Second Safety Shutoff Pilot Valve (if used) |
| 4 | Safety Shutoff Pilot Valve |
| 5 | Gas Pressure Gage (if used) |
| 6 | Manual Leak Test Valve |
| 7 | Butterfly Gas Valve |
| 8 | High Gas Pressure Switch |
| 9 | Safety Shutoff Gas Valve |
| 10 | Second Safety Shutoff Gas Valve |
| 11 | Low Gas Pressure Switch |
| 12 | Gas Pressure Regulator |
| 13 | Manual Gas Shutoff Valve |

- NOTES:**
1. Piping and fittings shown dashed to be supplied and installed by the burner installation contractor.
 2. For proper regulation and performance, regulators with internal control require at least 5 pipe diameters of straight pipe on the outlet side uninterrupted with fittings, elbows, etc.
 3. The outlet screwed connections must conform with good piping practices, free of excess thread engagement.
 4. The top cap at the spring must be in place or unstable operation can occur.
 5. For parts not identified, see burner manufacturer's material list.

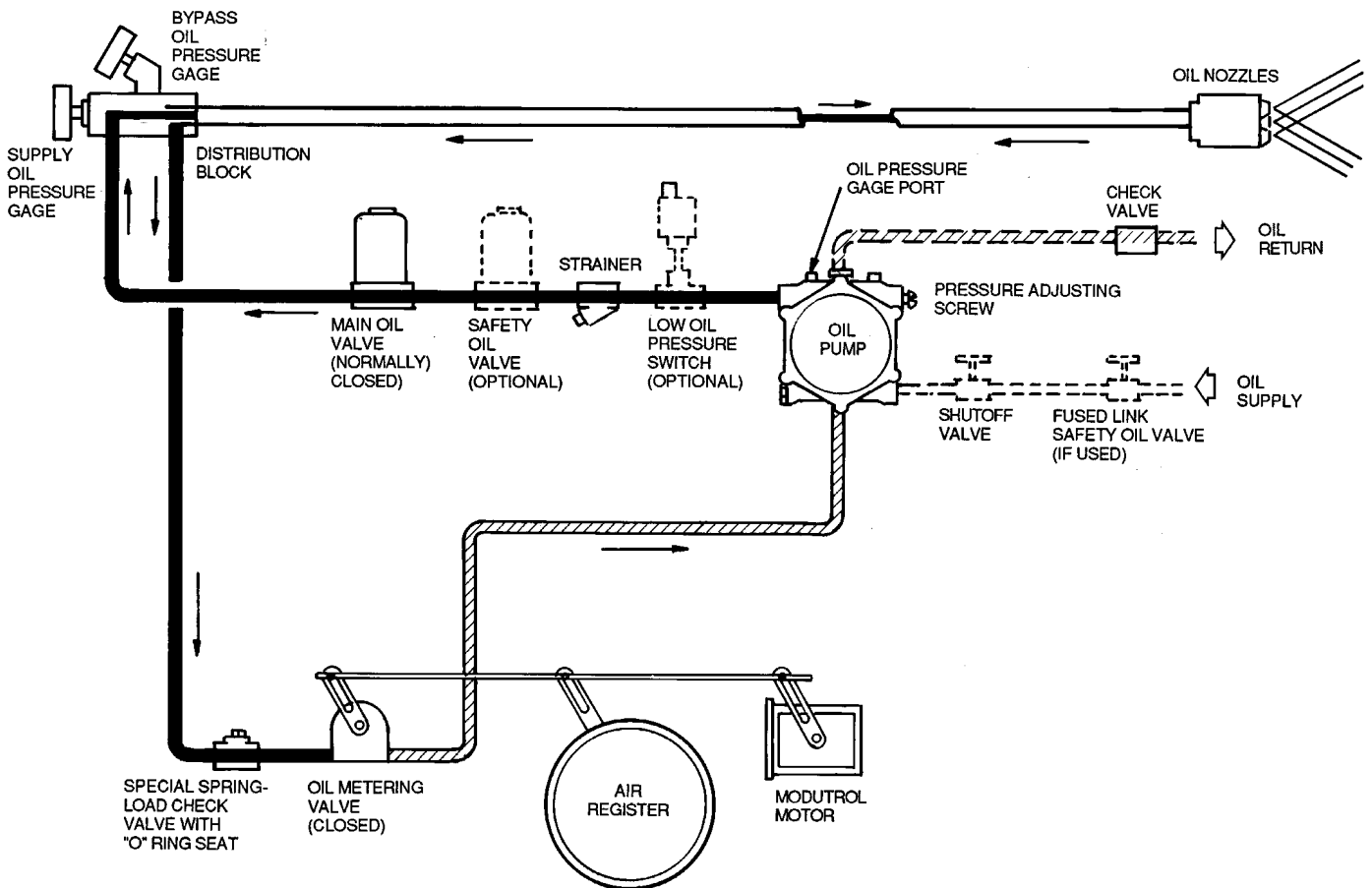
Fig. 12 — Gas Train, Typical



NOTES:

1. Oil system schematic shown in high fire position.
2. Supply pressure must not exceed 3 psi (20 kPa) or pump seals may be damaged.

Fig. 13 — Mechanical Pressure Atomizing, Light Oil (Pump with External Regulating Relief Valve)



NOTES:

1. Oil system schematic shown in high fire position.
2. Supply pressure must not exceed 3 psi (20 kPa) or pump seals may be damaged.

Fig. 14 — Mechanical Pressure Atomizing, Light Oil (Pump with Integral Regulating Relief Valve)

4. Water flow direction must be as specified in job flow diagrams or water flow markings on water boxes, and connections must be to the correct entering and leaving water box nozzles.
5. Install water box vent and drain piping in accordance with individual job data. Air vents should be at all high points in piping to eliminate water hammer.
6. Location of the chilled hot water and cooling water pumps as well as the expansion tank must allow for the hydrostatic and water heads, to ensure that the total pressure does not exceed the water box design working pressure.
7. A cooling tower bypass valve should be installed if the cooling water temperature might fall below 59 F (15 C) during chiller operation.
8. Install thermometer wells and thermometers on the entering and leaving chilled/hot water pipes, absorber entering and leaving cooling water pipes, and condenser leaving cooling water pipe. Thermometer wells should extend into the pipe a minimum of 1/3 pipe diameter.
9. Install pressure gage taps and pressure gages on the entering and leaving chilled/hot water pipes and cooling water pipes.

2. Do not loosen or disconnect fusible plug while connecting relief pipe to it.
3. Make sure connections to fusible plug are threaded and allow easy piping removal for leak test and maintenance.
4. Install pipe hangers where needed to be sure no weight or stress is placed on the fusible plug.

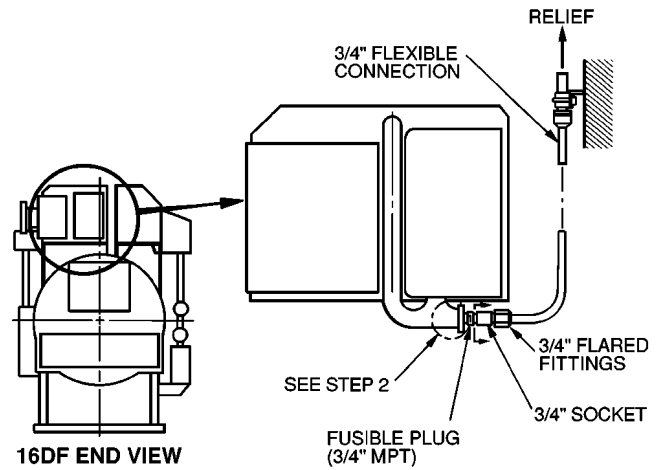


Fig. 16 — Fusible Plug Drain Piping

Fusible Plug Drain Piping (Fig. 16)

1. Connect drain piping to discharge hot water to safe area.

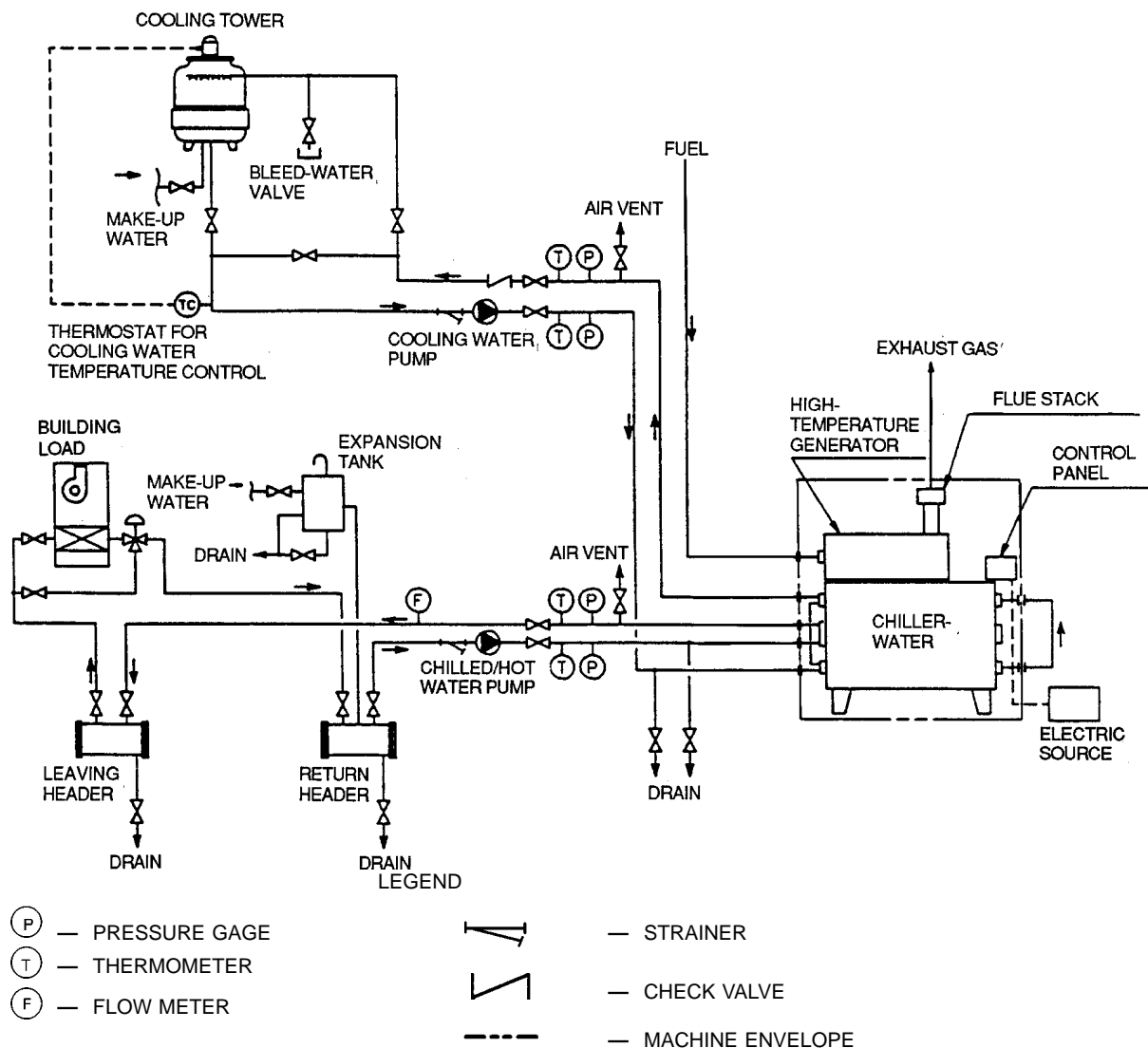


Fig. 15 — Piping Flow Schematic

Connect Rupture Disc Piping — Vent rupture disc to the outside of the building for safety. Model 16DF machines sometimes are factory equipped with a rupture disc assembly on the generator-vapor transfer area.

1. Add a flexible connection and adequate support to pipe, as required, to eliminate any piping stress on rupture disc. Provide fittings so vent piping can be disconnected periodically for inspection of disc. Provide pipe plug on outlet side of relief device for leak testing.
2. Cover outdoor vent with a rain cap to prevent excessive moisture from entering the vent line.
3. Place a condensate drain at the low point in the piping to prevent any water build-up on the atmospheric side of the disc assembly.

Connect Fuel Piping — Connect fuel lines to burner fuel system and install separate fuel fittings using job data, piping drawings, and general guidelines found in the burner manual supplied by the burner manufacturer. Installation requirements will vary for local building and insurance codes, and for different application conditions.

⚠ WARNING

Do not use Teflon Tape as an oil or gas pipe sealant. Tape can cause valves to fail, creating a safety hazard. Use a pipe joint compound.

1. Use a full size dirt pocket or trap in gas piping *ahead* of the main manual shutoff.
2. Piping must be sized to provide the minimum specified oil or gas pressure at the main manual shutoff when operating at the maximum input.
3. A 2-pipe system with suction and return lines must be used for oil burners, and the lines should be run in a trench or under the floor when possible. Copper tubing with flare fittings should be used for oil lines.
4. Hand valves must not be installed on discharge side of oil pump or return line without a bypass relief installed to the tank. An oil shut-off valve should be provided in the suction line near the burner.
5. Oil suction lines should be pitched back slightly to the tank and care should be taken to avoid any air traps in the line.
6. The fuel system must be pressure tested with air or inert gas and proven leak tight. Gas systems should be tested for at least 3 times the gas pressure that will be used.

Connect Exhaust Duct — Connect combustion exhaust ducting using job data and piping drawings. Systems will vary for different application conditions.

1. Sharp bends and restrictions should be avoided to allow smooth gas flow.
2. The outlet should be arranged to prevent rainwater entry into the machine exhaust, and drains should be provided to remove condensate or water.
3. Exhaust gas dampers and draft regulators must be installed correctly for proper operation.

INSULATION AND PAINT

Insulation (If Required) — Apply insulation as indicated in job data, after machine assembly and field piping have been completed. If shipping vacuum or pressure test indicate possible leakage, do not apply insulation until leak has been corrected.

Most of the machine surfaces become hot during the heating cycle and those areas should be insulated with heat-resistant material. High-temperature, fire resistant material should be used in areas near the burner, refractory door, and exhaust. All wiring should be external to the finished insulation. The insulation should be applied so all flanged service connections can be easily opened, and all valves, controls, and sensor locations should be easily accessible.

Final Paint Coat (If Required) — Paint machine as indicated in job data, after installation assembly, leak testing, and insulation have been completed. Use specified paint, making sure only high-temperature paint is applied to areas with hot surfaces.

ELECTRICAL CONNECTIONS

Field wiring must be installed in accordance with job and machine/burner wiring diagrams, and all applicable electrical codes.

Check Available Power Supply and Safety-Interlocks — Available power supply and safety interlocks must match the machine equipment. Job voltage, amperage, and values are stated on the machine and burner wiring diagrams.

Machine Control Panel External Wiring — All machine sensors and controls are factory installed. External field wiring connections to machine control panel wiring terminals include:

- three-phase power supply
- control start/stop interlocks for chilled/hot water pump(s), cooling water pump(s), and cooling tower fan(s)
- high-temperature generator sensors on machines shipped in 2 pieces
- remote start/stop (when used)
- remote status indicators (when used)

Burner Control Panel Wiring — Field wiring connections between wiring terminals in the machine and burner control panels include:

- three-phase blower motor and oil pump motor power supply
- burner control power supply and burner start/stop signal
- open/close signals for firing rate positioning motor
- burner alarm and firing rate limit position signals for machine/burner vs chiller heater microprocessor controls

There are also field wiring connections between the high-stage generator's low-level probe and its relay contacts in the burner control panel, and between the burner control panel and the fuel line connector box.

INITIAL SOLUTION AND REFRIGERANT CHARGING

Lithium bromide solution and refrigerant (water) will be placed in the machine at initial start-up. *Do not charge solution into the machine until the unit is ready for operation.*

⚠ WARNING

Do not start any pump motors until the machine has been charged with solution and refrigerant. The hermetic pumps can be seriously damaged by dry operations.

Refer to 16DF Start-up, Operation, and Maintenance Instructions for charging procedures.