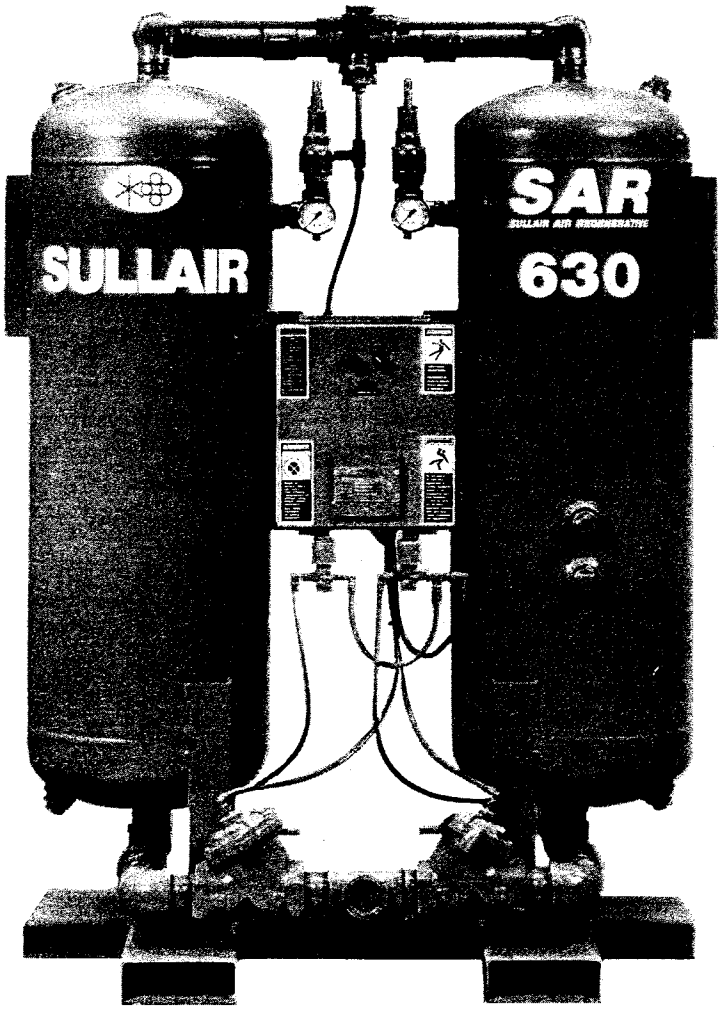
Operators Manual And Parts List

SULLAIR® SAR Regenerative Dryer

Models 105–630



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Section 1
SAFETY

1.1 GENERAL

Sullair® Corporation and its subsidiaries design and manufacture all of its products so they can be operated safely. However, the responsibility for safe operation rests with those who use and maintain these products. The following safety precautions are offered as a guide which, if conscientiously followed, will minimize the possibility of accidents throughout the useful life of this equipment.

The dryer should be operated only by those who have been trained and delegated to do so, and who have read and understand this Operators Manual. Failure to follow the instructions, procedures and safety precautions in this manual can result in accidents and injuries.

NEVER start the dryer unless it is safe to do so. **DO NOT** attempt to operate the dryer with a known unsafe condition. Tag the dryer and render it inoperative by disconnecting and locking out all power at source or otherwise disabling its prime mover so others who may not know of the unsafe condition and will not attempt to operate it until the condition is corrected.

Install, use and operate the dryer only in full compliance with all pertinent OSHA regulations and all applicable Federal, State, and Local codes, standards and regulations.

DO NOT modify the dryer and/or controls in any way except with written factory approval.

While not specifically applicable to all types of dryers with all types of prime movers, most of the precautionary statements contained herein are applicable to most dryers and the concepts behind these statements are generally applicable to all dryers.

1.2 PERSONAL PROTECTIVE EQUIPMENT

Prior to installing or operating the dryer, owners, employers, and users should become familiar with, and comply with, all applicable OSHA regulations and any applicable Federal, State and Local codes, standards, and regulations relative to personal protective equipment, such as eye and face protective equipment, respiratory protective equipment, equipment intended to protect the extremities, protective clothing, protective shields and barriers and electrical protective equipment, as well as noise exposure administrative and/or engineering controls and/or personal hearing protective equipment.

1.3 PRESSURE

A. **DO NOT** hydrostatically test a dryer with desiccant in the dryer. Testing of this nature may damage the desiccant.

B. Before filling with desiccant, relieve pressure and isolate dryer.

C. **DO NOT** tamp or ram desiccant during filling of the dryer.

D. Secure all connections by wire, chain or other suitable retaining devices to prevent tools or hose ends from being accidentally disconnected and expelled.

E. **DO NOT** overpressure unit. Maximum pressure is 140 PSIG (965kPa) for standard machines. Consult factory for high pressure applications.

F. Vent ALL internal pressure prior to opening any line, fitting, hose, valve, drain plug, connection or other component, such as filters and line oilers.

G. Keep personnel out of line with an away from the discharge opening of hoses or tools or other points of compressed air discharge.

H. Use air pressures less than 30 PSIG (207kPa) for cleaning purposes, and then only with effective chip guarding and personal protective equipment per OSHA Standard 29 CFR 1910.242(b).

I. **DO NOT** engage in horseplay with air hose as serious injury or death may result.

J. **DO NOT** pass air through the dryer while the dryer is in the OFF position.

K. **DO NOT** operate a dryer at abnormal conditions. Consult manual for normal operating conditions.

1.4 FIRE AND EXPLOSION

A. Clean up spills of lubricant or other combustible substances immediately, when such spills occur.

B. Shut off the dryer and allow it to cool. Then keep sparks, flames and other sources of ignition away.

C. **DO NOT** permit fluids, including air line anti-icer system antifreeze compound or fluid film to accumulate on under or around external surfaces of the air dryer or on internal surfaces of the enclosure. Wipe down using an aqueous industrial cleaner or steam clean as required. **DO NOT** use flammable solvents for cleaning purposes.

D. Disconnect and lock out all power at source prior to attempting any repairs or cleaning of the dryer or of the inside of the enclosure, if any.

E. Keep electrical wiring, including all terminals and pressure connectors in good condition. Replace any wiring that has cracked, cut abraded or otherwise degraded insulation, or terminals that are worn, discolored or corroded. Keep all terminals and pressure connectors clean and tight.

F. Keep grounded and/or conductive objects such as tools away from exposed live electrical

parts such as terminals to avoid arcing which might serve as a source of ignition.

G. Remove any acoustical material or other material that may be damaged by heat or that may support combustion and is in close proximity, prior to attempting weld repairs.

H. Keep suitable fully charged Class BC or ABC fire extinguisher or extinguishers nearby when servicing and operating the dryer.

I. Keep oily rags, trash, leaves, liter or other combustibles out of and away from the dryer.

J. **DO NOT** attempt to operate the compressor and dryer in any classification of hazardous environment unless the compressor and dryer has been specially designed and manufactured for that duty.

1.5 MOVING PARTS

A. Wear snug fitting clothing and confine long hair when working around this dryer, especially when exposed to hot or moving parts.

B. Keep access doors, if any, closed except when making repairs or adjustments.

C. Make sure all personnel are out of and/or clear of the dryer prior to attempting to start or operate it.

D. Disconnect and lock out all power at source and verify at the dryer that all circuits are de-energized to minimize the possibility of accidental start-up or operation, prior to attempting repairs or adjustments. This is especially important when compressors and dryers are remotely controlled.

E. Keep hands, feet, floors, controls and walking surfaces clean and free of fluid, water, or other liquids to minimize the possibility of slips and falls.

1.6 HOT SURFACES, SHARP EDGES AND SHARP CORNERS

A. Avoid bodily contact with hot fluid, hot coolant, hot surfaces and sharp edges and corners.

B. Keep all parts of the body away from all points of air discharge.

C. Wear personal protective equipment including gloves and head covering when working in, on or around the dryer.

D. Keep a first aid kit handy. Seek medical assistance promptly in case of injury. **DO NOT** ignore small cuts and burns as they may lead to infection.

1.7 TOXIC AND IRRITATING SUBSTANCES

A. **DO NOT** use air from this dryer for respiration (breathing) except in full compliance with OSHA Standards 29 CFR 1910 and any other Federal, State or Local Codes or regulations.

⚠ DANGER

Death or serious injury can result from inhaling compressed air without using proper safety equipment. See OSHA standards on safety equipment.

B. **DO NOT** use air line anti-icer systems in air lines supplying respirators or other breathing air utilization equipment and **DO NOT** discharge air from these systems in unventilated or other confined areas.

C. Operate the dryer only in open or adequately ventilated areas.

1.8 ELECTRICAL SHOCK

A. This dryer should be installed and maintained in full compliance with all applicable Federal, State and Local codes, standards and regulations, including those of the National Electrical Code, and also including those relative to equipment grounding conductors, and only by personnel that are trained, qualified and delegated to do so.

B. Keep all parts of the body and any hand-held tools or other conductive objects away from exposed live parts of electrical system. Maintain dry footing, stand on insulating surfaces and **DO NOT** contact any other portion of the dryer when making adjustments or repairs to exposed live parts of the electrical system. Make all such adjustments or repairs with one hand only, so as to minimize the possibility of creating a current path through the heart.

C. Attempt repairs in clean, dry and well lighted and ventilated areas only.

D. **DO NOT** leave the dryer unattended with open electrical enclosures. If necessary to do so, then disconnect, lock out and tag all power at source so others will not inadvertently restore power.

E. Disconnect, lock out, and tag all power at source prior to attempting repairs or adjustments to rotating machinery and prior to handling any ungrounded conductors.

1.9 LIFTING

A. Dryers to be lifted by helicopter must be supported by slings. In any event, lift and/or handle only in full compliance with OSHA standards 29 CFR 1910 subpart N.

B. Inspect points of attachment for cracked welds and for cracked, bent, corroded or otherwise degraded members and for loose bolts or nuts prior to lifting.

C. Make sure entire lifting, rigging and supporting structure has been inspected, is in good condi-

weight of the dryer. If you are unsure of the weight, then weigh dryer before lifting.

D. Make sure lifting hook has a functional safety latch or equivalent, and is fully engaged and latched on the bail or slings.

E. Use guide ropes or equivalent to prevent twisting or swinging of the dryer once it has been lifted clear of the ground.

F. **DO NOT** attempt to lift in high winds.

G. Keep all personnel out from under and away from the dryer whenever it is suspended.

H. Lift dryer no higher than necessary.

I. Keep lift operator in constant attendance whenever dryer is suspended.

J. Set dryer down only on level surfaces capable of safely supporting at least its weight and unit loading.

K. When moving dryers by forklift truck, utilize fork pockets if provided. Otherwise, utilize pallet if provided. If neither fork pockets or pallet are provided, then make sure dryer is secure and well balanced on forks before attempting to raise or transport it any significant distance.

L. Make sure forklift truck forks are full engaged and tipped back prior to lifting or transporting the dryer.

M. Forklift no higher than necessary to clear obstacles at floor level and transport and corner at minimum practical speeds.

N. Make sure pallet mounted dryers are firmly bolted or otherwise secured to the pallet prior to attempting to forklift or transport them **NEVER** attempt to forklift a dryer that is not secured to its pallet, as uneven floors or sudden stops may cause the dryer to tumble off, possibly causing serious injury or property damage in the process.

1.10 ENTRAPMENT

A. If the dryer enclosure, if any, is large enough to hold a man and if it is necessary to enter it to perform service adjustments, inform other personnel before doing so, or else secure and tag the access door in the open position to avoid the possibility of others closing and possibly latching the door with personnel inside.

B. Make sure all personnel are out of dryer before closing and latching enclosure doors.

Section 2
DESCRIPTION

2.1 INTRODUCTION

The SAR regenerative air dryer provides a continuous supply of dry compressed air by automatically cycling the flow of air through activated alumina desiccant beds contained in twin towers. While air is being dried in one tower, the other is being reactivated by diversion of a small amount of the dried air through the wetted desiccant to desorb the water. This system (also known as pressure swing) eliminates the need for heaters, insulation and equipment guards.

The air which is dried to -40°F (-40°C) pressure dewpoint is ideal for applications wherein the compressed air piping is located outdoors or in processes which require an extremely low dewpoint.

Non-lubricated switching valves provide the cycling of flow between the towers. The SAR regenerative air dryers use diaphragm valves for this purpose. These valves are air actuated through solenoid valves. A control air filter supplies clean air to the actuators.

A non-adjustable solid state timer provides the cycling signal and operates on a 10 minute NEMA cycle.

The purge flow is manually controlled by a needle valve at the top of the towers.

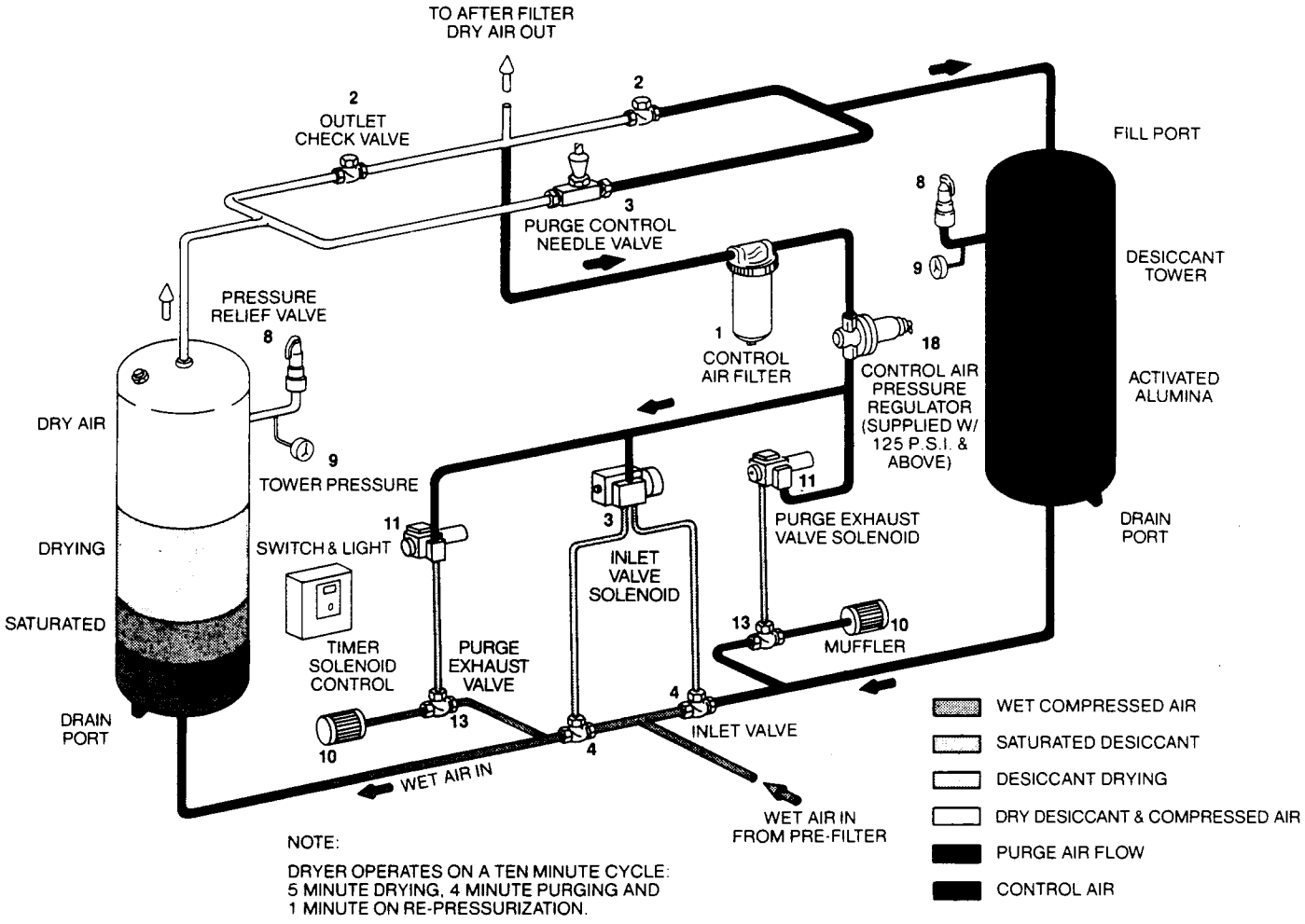
Check valves in the outlet piping control the outlet flow of dried compressed air.

The desiccant towers are ASME code stamped pressure vessels rated for 200 PSIG (138kPa) maximum working pressure. Each towers is fitted with a pressure relief valve, pressure gauge and incorporate heavy gauge perforated stainless steel desiccant retainers and flow distributors at the inlet and outlet connections.

The electrical enclosure is NEMA 4 standard and is wired for 115/60 with a .1 amp fuse, "power on" light and "on/off" switch.

Fill and drain ports are conveniently located on the outer side of the towers.

Figure 2-1 Regenerative Air Dryer (Models SAR 105-630)



REGENERATIVE AIR DRYER - SCHEMATIC DIAGRAM MODEL "SAR"

REGENERATIVE AIR DRYER – TYPICAL SCHEMATIC DIAGRAM MODELS SAR 105-630

Section 3
SPECIFICATIONS

SPECIFICATIONS

	SAR 105	SAR 125	SAR 190	SAR 300
Flow Capacity SCFM at 100 PSIG and 100°F	105	125	190	300
Flow Capacity M^3/hr. at 690kPa and 38°C	178.4	212.4	322.8	509.7
Electrical (volts/phase/Hz)	120/1/60	120/1/60	120/1/60	120/1/60
Desiccant Activated Alumina				
Pounds/Tower	46	54	73	128
Kilograms/Tower	20.86	24.49	33.11	58
Height (inches)	60.5	60.5	60.5	68
Height (mm)	1536.7	1536.7	1536.7	1727
Width (inches)	36	36	36	36
Width (mm)	914	914	914	914
Depth (inches)	25	25	25	25
Depth (mm)	635	635	635	635
Weight (lbs.) w/o Desiccant	235	235	235	570
Weight (kgs.) w/o Dessiccant	107	107	107	259
Air Inlet and Outlet Connections				
F.P.T.	1	1¼	1¼"	1½"
150# Flange	N/A	N/A	N/A	N/A

	SAR 400	SAR 630
Flow Capacity SCFM at 100 PSIG and 100°F	400	630
Flow Capacity M^3/hr. at 690kPa and 38°C	679.6	1070.4
Electrical (volts/phase/Hz)	120/1/60	120/1/60
Desiccant Activated Alumina		
Pounds/Tower	173	273
Kilograms/Tower	78.64	123.8
Height (inches)	68.75	68.75
Height (mm)	1746	1746
Width (inches)	48	48
Width (mm)	1220	1220
Depth (inches)	30	30
Depth (mm)	762	762
Weight (lbs.) w/o Dessiccant	700	710
Weight (kgs.) w/o Desiccant	318	323
Air Inlet and Outlet Connections		
F.P.T.	2	2
150# Flange	N/A	N/A

Section 4
INSTALLATION

4.1 GENERAL
There are no piping loads imposed on the dryer fittings when connecting all piping. Check to see that all pipe and tubing connections are tight as they may have loosened during transit. Make control electric connections.

4.2 LOCATION OF DRYER
The dryer should be located on a level floor free from vibrations. The ambient temperature should fall within the 35°F to 120°F (2°C to 49°C) range. Dryer operating outside this temperature range should be avoided.

Allow three (3) feet on all sides of the dryer to permit making connections and to service components.

4.3 PREFILTRATION
It is important to install a good coalescing prefilter on any regenerative desiccant dryer. Good prefiltration of the inlet air will enhance the dewpoint depression capability and prolong the life of the desiccant. The prefilter should remove all entrained liquids (both water and compressor lubricant) before they can enter the dryer and foul the desiccant.

Connect the aftercooler/separator outlet (on rotary screw compressors) or the outlet from the air receiver (on piston-type compressors) to the prefilter inlet. The prefilter outlet should be connected to the dryer inlet.

The prefilter sump should be piped to a suitable drain using an automatic trap to ensure adequate separated liquid disposal.

4.4 AFTERFILTRATION
All regenerative desiccant dryers gradually produce abrasive desiccant fines. These particulates can readily be removed by a suitable afterfilter. Connect the dryer outlet to the afterfilter inlet and the afterfilter to the compressed air distribution system.

4.5 BLOCK AND BYPASS
Refer to Figure 4-2. Suitable manual block and bypass valving should be installed to facilitate servicing the dryer and filters without interruption of compressed air flow. Bypass valving should be bubble-tight to assure shutoff and prevent migrations of water vapor.

⚠CAUTION

DO NOT service dryer or filters without first reducing internal pressure to 0 PSIG.

4.6 PIPING ARRANGEMENTS
Refer to Figure 4-2. The suggested piping arrangements drawing depicts the proper arrangement for both rotary and piston compressor applications.

4.7 PURGE EXHAUST PIPING
To eliminate either nuisance caused by tower depressurization, purge exhaust noise and/or indoor moisture condensation, the purge exhaust may be piped outdoors with proper equipment to control noise and moisture per Local, State and Federal codes.

The extended purge exhaust piping must be kept as short as possible to prevent harmful tower back pressure build-up during desiccant regeneration.

If the equivalent length of pipe does not exceed 10 feet, the extended purge exhaust piping may be the same size as the purge exhaust valve. If the equivalent length of pipe does not exceed 20 feet, the extended purge exhaust piping should be one pipe size larger than the purge exhaust valve.

For unusual installations, consult your Sullair® representative or the factory.

4.8 START-UP
Before turning the dryer control power switch on, open the block valve upstream of the dryer to gradually pressurize the dryer towers. When the dryer pressure gauges indicated full compressed air line pressure, the dryer outlet block valve can be slowly opened. Then the dryer bypass valve should be closed. Compressed air flow is now though the drying system (refer to Figure 4-2).

Dryer operation should **NEVER** be initiated by suddenly pressurizing the dryer towers from the inlet end as the desiccant beads could be fluidized by the rapid in-rush of high velocity air. Desiccant fluidization will create excessive desiccant fines and hasten the need for desiccant bed replacement.

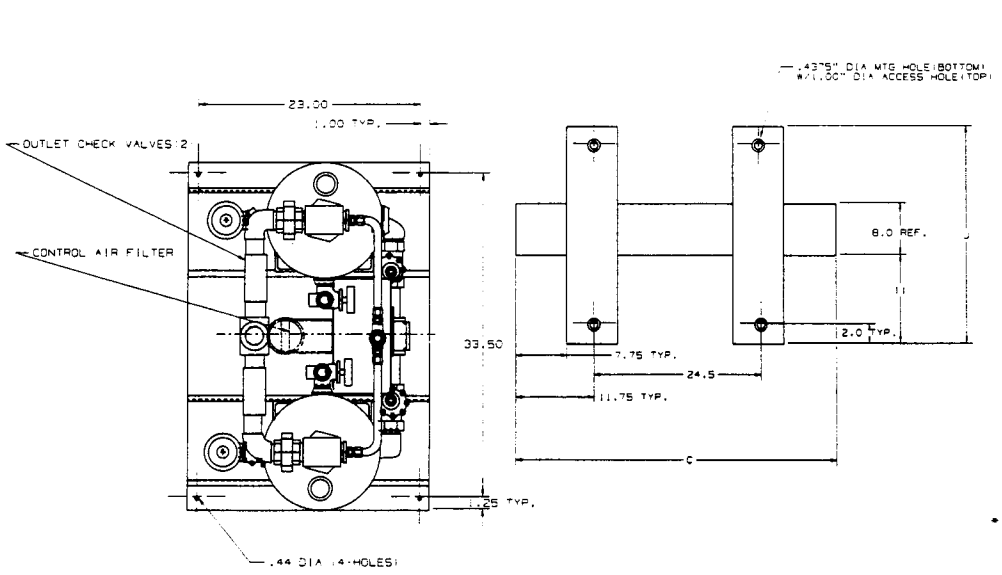
The dryer control power switch should now be turned on. Immediately, or at most, one minute after activating the dryer control circuit, one tower will depressurize to atmospheric pressure through the purge exhaust valve. Purge for air reactivation will then flow through the depressurized tower.

The purge control needle valve should be adjusted for the correct purge flow. The proper adjustment is shown in the table in Figure 4-3.

Dryers equipped with the dewpoint hygrometer option should be operated continuously for one (1) week prior to opening the inlet valve to the hygrometer probe sample block. This will protect the probe against possible damage caused by wet start-ups. On dryers equipped with purge economizer and/or high dewpoint indicator options, the probes should be removed and replaced with plugs for the first week of continuous operation. On machines using two purge economizer probes, special core should be taken to return the probes to their original positions because the probe and its control board are a matched set.

Section 4
INSTALLATION

Figure 4-1 Installation Drawing (Models SAR 105-630)



MODEL NO.		SAR 105	SAR 155	SAR 190	SAR 300	SAR 400	SAR 630
CFVS (SEE NOTE 3)		105	155	190	300	400	630
A	IN.	2.00	2.00	2.00	3.00	3.0	3.0
	MM	50.8	50.8	50.8	76.2	76.2	76.2
B	IN.	18.0	18.0	18.0	18.0	24.0	24.0
	MM	457.2	457.2	457.2	457.2	609.6	609.6
C	IN.	36.0	36.0	36.0	36.0	48.0	48.0
	MM	914.4	914.4	914.4	914.4	1219.2	1219.2
D	IN.	8.25	8.25	8.25	8.25	11.25	11.25
	MM	133.4	133.4	133.4	133.4	184.2	184.2
E	IN.	60.5	60.5	60.5	69.0	88.75	88.75
	MM	1536.7	1536.7	1536.7	1727.2	2146.3	2146.3
G	IN.	8.00	8.00	8.00	9.00	11.0	14.5
	MM	203.2	203.2	203.2	228.6	279.4	368.3
H	IN.	14.0	14.0	14.0	14.0	15.0	15.0
	MM	355.6	355.6	355.6	355.6	381.0	381.0
K	IN.	25.0	25.0	25.0	25.0	30.0	30.0
	MM	635.0	635.0	635.0	635.0	762.0	762.0
L	IN.	6.0	6.0	6.0	6.0	6.0	6.0
	MM	152.4	152.4	152.4	152.4	165.1	165.1
L	F.N.P.T.	1.0	1.25	1.25	1.5	2.0	2.0
M	F.N.P.T.	1.0	1.25	1.25	1.5	2.0	2.0
WEIGHT	LBS.	235	235	235	570	700	710
	KG.	106.6	106.6	106.6	258.55	317.5	322.05

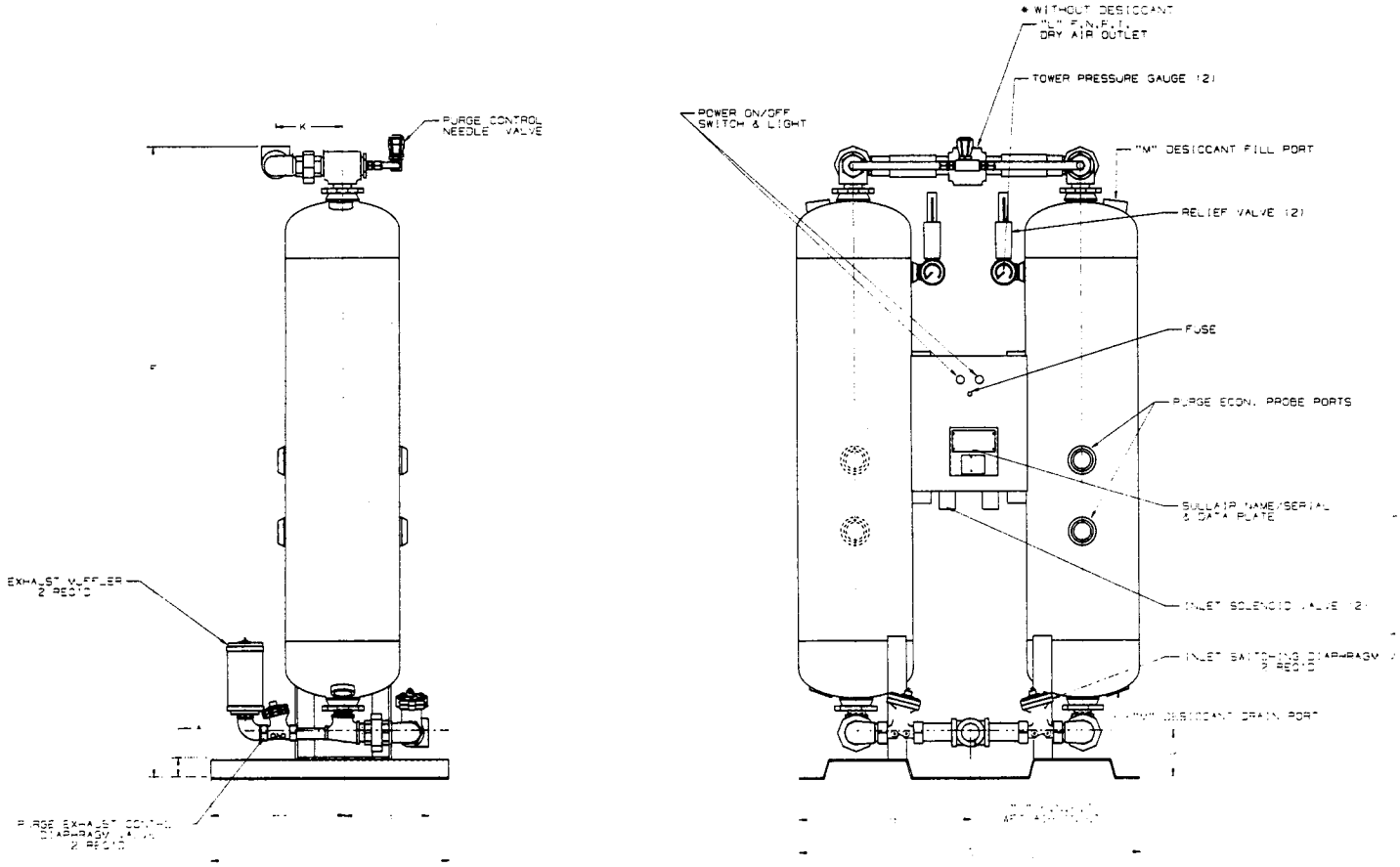
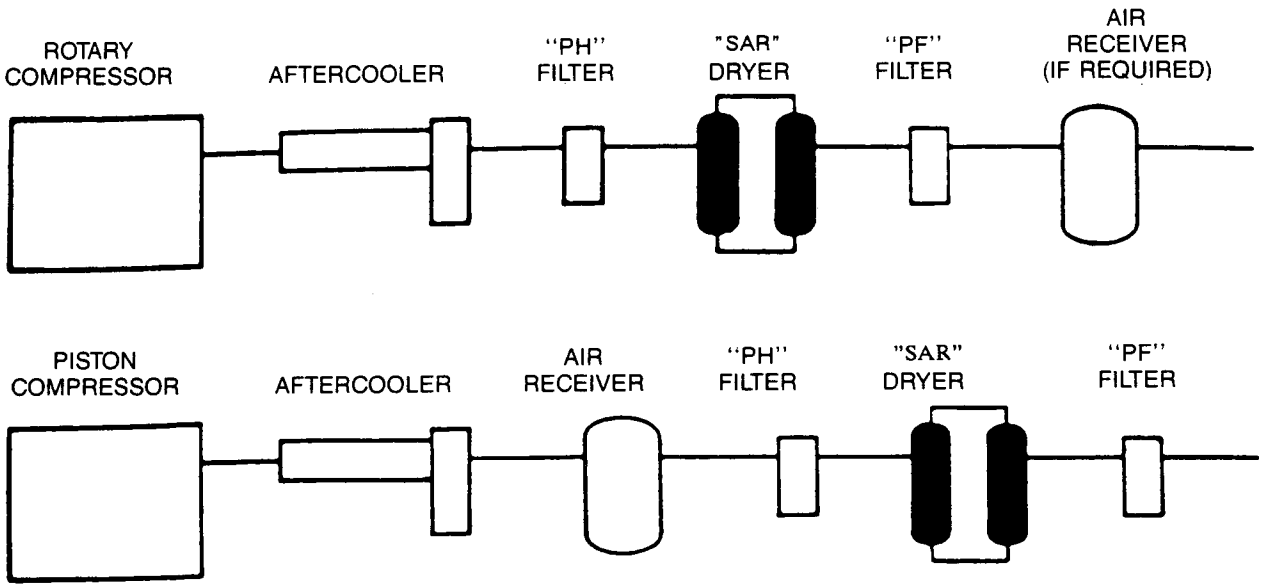
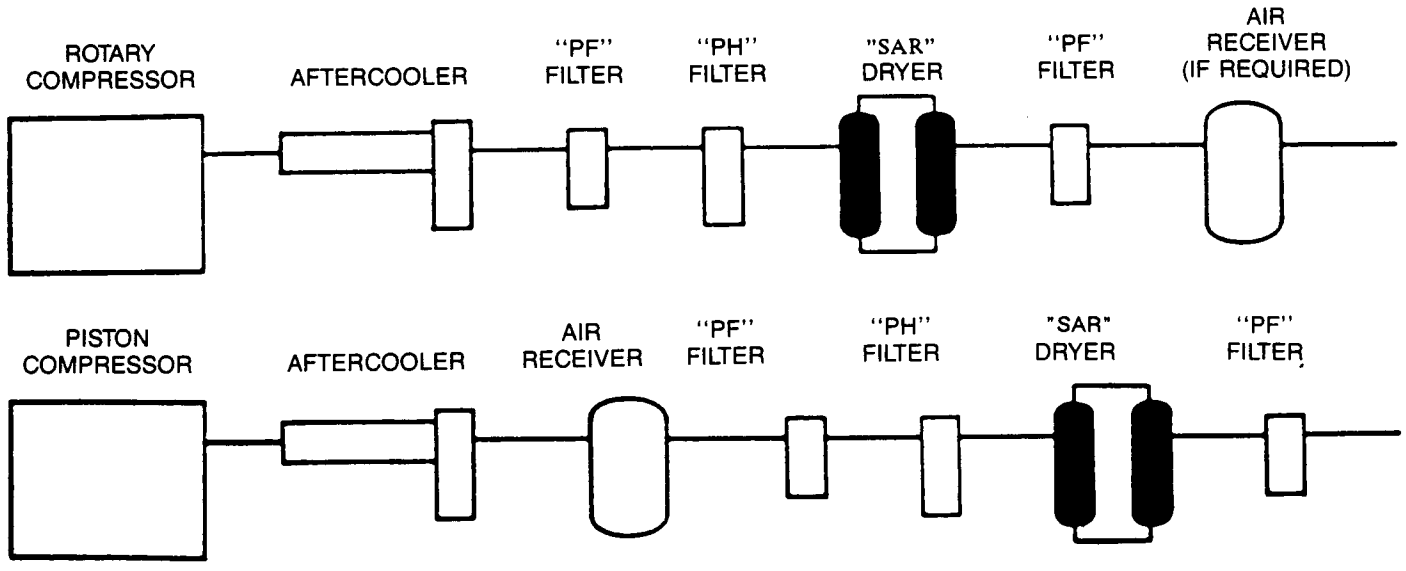


Figure 4–2 Piping Arrangements



CLEAN COMPRESSED AIR APPLICATION



CONTAMINANT FREE COMPRESSED AIR APPLICATION

NOTE: It is suggested that Bypass piping be placed around dryers and filters for ease of servicing.

SUGGESTED PIPING ARRANGEMENTS FOR SAR INSTALLATION

Figure 4-3 Purge Flow Chart

DRYER MODEL	NUMBER OF TURNS OPEN*	MINIMUM VALVE POSITION (TURNS OPEN)**	VALVE SIZE
SAR 105	3½	2	¼"
SAR 125	3¾	3	¼"
SAR 190	4¾	3½	¼"
SAR 300	3½	3	½"
SAR 400	4¼	3½	½"
SAR 630	5	4½	¾"

* For 100 PSIG (689kPa) dryer inlet pressure.

** The valve should not be closed below the minimum position or the towers will not repressurize adequately.

The dryer should operate continuously for several days to condition the desiccant to its dry state. During this step, all residual adsorbed water vapor is stripped from the desiccant. Desiccant "conditioning" may be hastened by employing excess purge. Prior to desiccant "conditioning", the dryer may not perform to specifications.

⚠CAUTION

Never close purge control valve. This valve must be left open far enough to allow repressurization before tank switch over occurs. Otherwise damage to desiccant beads will result.

Section 5
OPERATION

5.1 GENERAL

Refer to Figures 5-1 and 5-2. The operation of the air reactivated desiccant dryer can be easily followed by referring to Figures 5-1 and 5-2. The sequence of operations if fully automatic and is controlled by a non-adjustable solid state timer.

Wet and dirty compressed air leaving the compressor aftercooler and mechanical separator is freed of entrained liquids and aerosols, as well as solid contaminants, by the accessory coalescing prefilter. Liquid contaminants are discharged from the prefilter sump through an automatic drain trap.

The compressed air, still laden with water vapor, enters either the left or right tower of the desiccant dryer, depending upon the position of the inlet switching valve. Assume that the wet compressed air is being dried by the left desiccant tower.

Within the left tower, the compressed air gives up its water vapor to the dry desiccant. The dry compressed air leaving the left tower will have a pressure nominal dewpoint of -40°F (-40°C).

A small portion of this dry compressed air is expanded to near atmospheric pressure by passing through the manually adjusted purge flow control valve. Expansion of this already dry gas to near atmospheric pressure increases the ability of the purge stream to strip previously adsorbed water vapor from the partially saturated desiccant within the right tower. The water vapor removed from the desiccant is passed out of the dryer through he purge exhaust valve and muffler.

Prior to tower switchover or reversal, the purge exhaust valve is closed and the right chamber is gradually brought back up to line pressure by air flow through the purge circuit. This assures that both towers are at equal pressure before switchover and that no desiccant bed "bumping" can take place upon tower reversal.

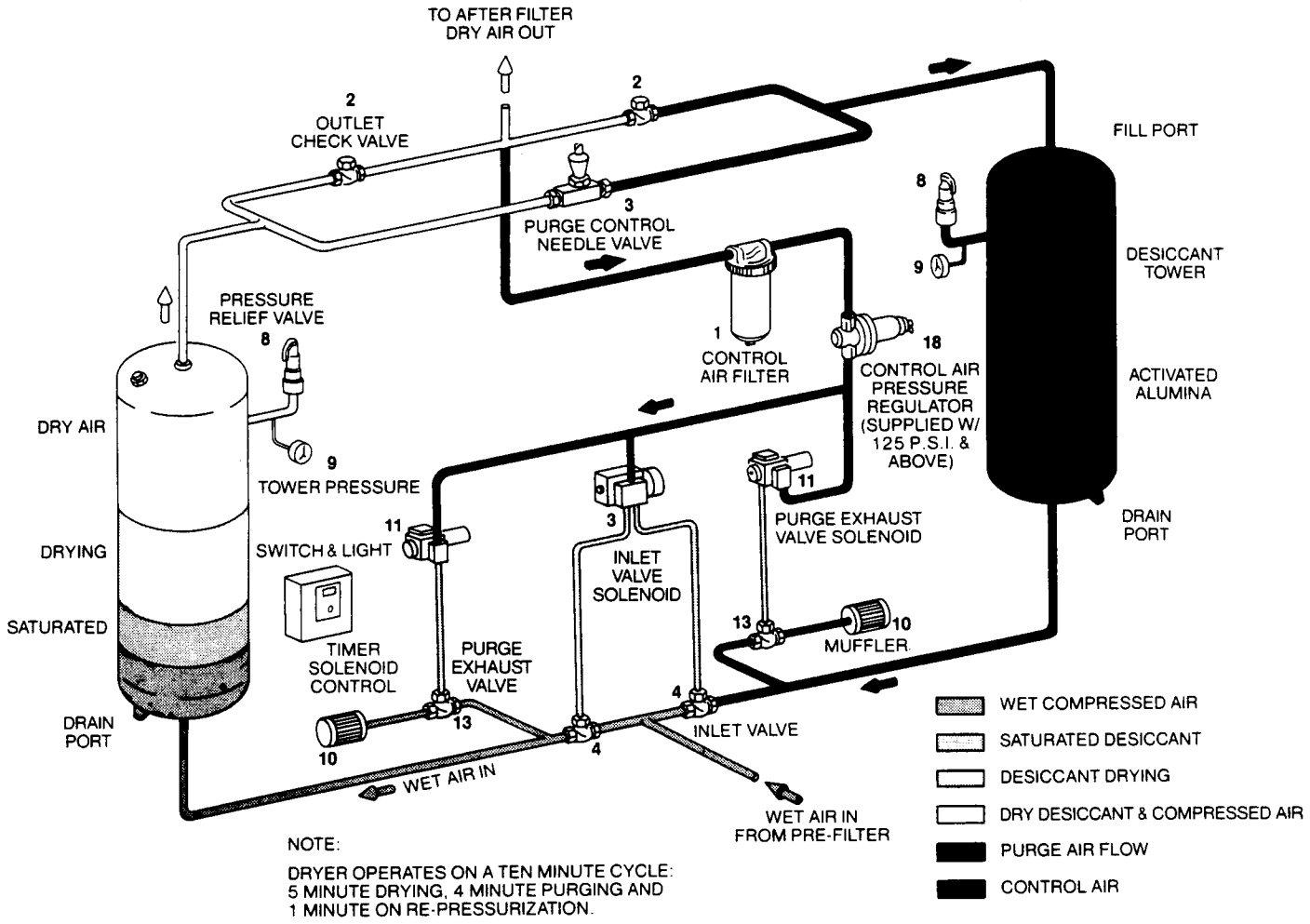
The dryer inlet valve will then switch, diverting wet inlet compressed air flow to the right tower. The purge exhaust valve will then open, depressurizing the left desiccant tower and permitting air reactivation of the desiccant within the left tower.

This process will repeat as long as the control power switch is in the "on" position. Should the control power switch be turned "off", or should an electrical power failure occur, the dryer inlet switching valve will remain "as is" and the purge exhaust valve will automatically close. Compressed air flow can still be effectively dried for several hours before a substantial increase in the outlet dryer air dewpoint will occur.

The dry gas leaving the desiccant dryer should then pass through an accessory afterfilter where all desiccant fines are removed.

Section 5
OPERATION

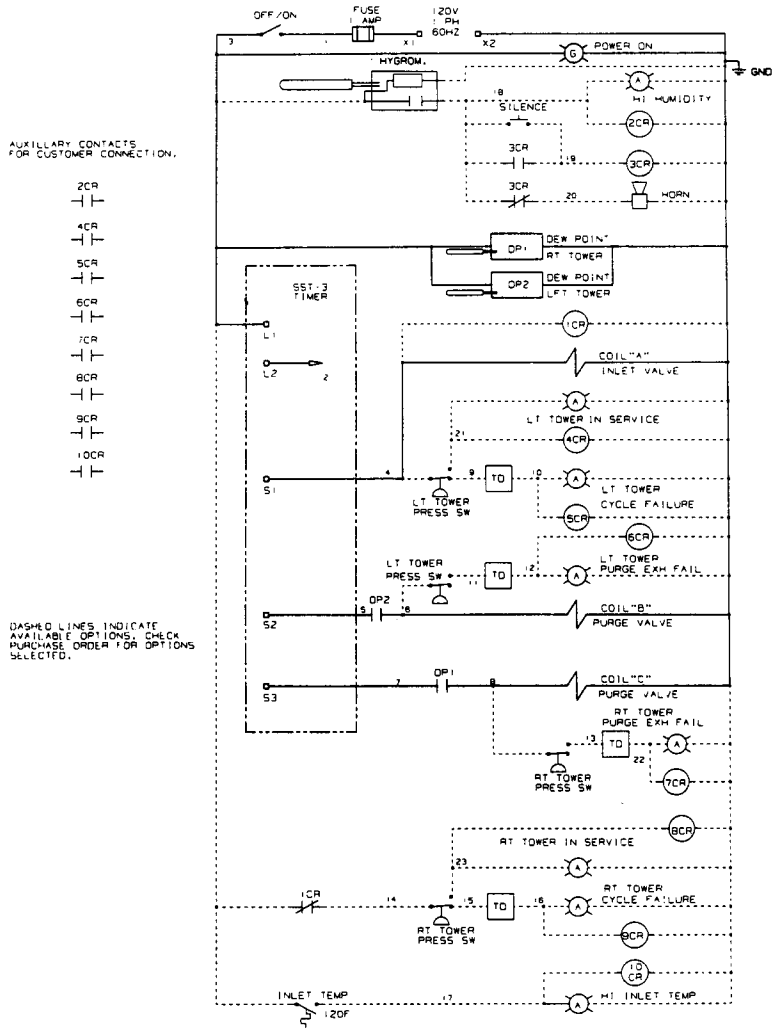
Figure 5-1 Dryer Flow Schematic (Models SAR 105-630)

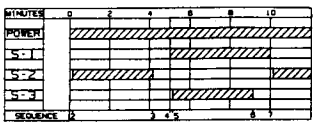


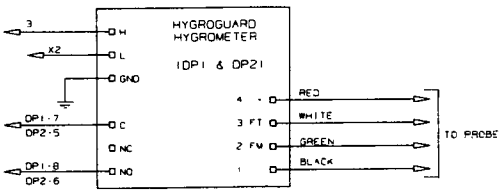
REGENERATIVE AIR DRYER - SCHEMATIC DIAGRAM MODEL "SAR"

REGENERATIVE AIR DRYER - SCHEMATIC DIAGRAM MODELS SAR 105-630

Figure 5-2 Wiring Diagram (Models SAR 105-630)







SEQUENCE

1.) COIL "A" IS DE-ENERGIZED, SATURATED LEFT TOWER IS READY FOR REGENERATION. THE RIGHT TOWER IS DRYING THE COMPRESSED AIR (1=00:00)

2.) COIL "B" IS ENERGIZED, LEFT TOWER DE PRESSURIZES AND REGENERATION OF THE LEFT TOWER BEGINS. (2:00:15)

3.) COIL "B" IS DE-ENERGIZED, REGENERATION TERMINATES AND LEFT TOWER REPRESSURIZES (3=04:15)

4.) COIL "A" IS ENERGIZED. TOWERS TRANSFER, THE LEFT TOWER IS ON LINE, AND THE SATURATED RIGHT TOWER IS READY FOR REGENERATION. (4=05:00)

5.) COIL "C" ENERGIZED. THE RIGHT TOWER DE-PRESSURIZES AND REGENERATION OF THE RIGHT TOWER BEGINS. (5=05:15)

6.) COIL "C" IS DE-ENERGIZED. REGENERATION TERMINATES AND THE RIGHT TOWER REPRESSURIZES. (6=09:15)

7.) COIL "A" IS DE-ENERGIZED. TOWERS TRANSEFER, THE RIGHT TOWER IS ON LINE, AND THE SATURATED LEFT TOWER IS READY FOR REGENERATION. CYCLE REPEATS. (7=10:00 & 00:00)

Section 6
MAINTENANCE

6.1 GENERAL

PREFILTER
The filter elements should be replaced whenever the pressure drop over the prefilter becomes excessive.

NOTE

A pressure differential of 15 PSIG (103kPa) should be considered the maximum allowable.

Filter life can be extended by placing a mechanical separator immediately upstream of the coalescing prefilter, if one has not been provided with the aftercooler.

It is important to check the operation of the automatic drain trap to assure that separated liquids are not accumulating within the prefilter housing sump to be eventually carried over to the dryer, since the dryer cannot remove water in the liquid form.

PURGE RATE
An adequate supply of purge gas is essential for desiccant reactivation and desired dewpoint depression. Readjustment of the purge rate can be made with the manually adjustable purge flow control valve. It is important that the exhaust muffler is checked often for possible plugging. Tank pressures higher than 3 to 5 PSIG (21 to 34kPa) during reactivation indicate a plugged muffler. This will cause a high purge rate to be required for adequate reactivation.

AFTERFILTER
The filter elements should be replaced whenever the pressure drop over the afterfilter becomes excessive.

CONTROL AIR FILTER
Frequent inspection and replacement of the control air filter element will protect the dryer solenoid valves from particulate matter.

SOLENOIDS
Failure of a solenoid to function properly may be caused by:

1. A faulty control circuit; check the electrical system including the timer micro switches to verify that the solenoid is receiving electrical input.
2. A burnt out coil; replace solenoid coil.
3. Improper voltage; input voltage should be within plus or minus 10% of solenoid nameplate voltage. Too low a voltage may cause solenoid chattering.
4. Leakage; take apart valve and clean as required. Replace worn or damaged parts.

CYCLE TIMER
The solid state electronic timer has been accurately set in the factory and cannot be adjusted in the field. Should the timer fail to control tower switching to purge exhaust, replace it with a new timer.

VALVE SEAT AND SEALS
The inlet and purge exhaust valves contain Elastomeric diaphragms and seals. It is recommended that valve rebuilding kits be kept on hand as spares.

DESICCANT REPLACEMENT
The spent desiccant is drained from the towers through the desiccant drain ports. Fresh desiccant is charge to the towers through the desiccant fill ports. The necessary amount of desiccant is specified in Section 7.

Be certain only to employ the special activated alumna desiccant Sullair® supplies. It excels with respect to both dewpoint depression ability and attrition resistance.

6.2 SUGGESTED PREVENTIVE MAINTENANCE

MONTHLY
Check operating conditions of inlet flow, pressure, temperature and purge valve setting.

Check the pressure loss over the prefilters and afterfilters. Replace filter elements if excessive.

Check for plugged muffler. Replace the disseminator element if necessary.

Watch dryer through a complete cycle to assure proper tower switching depressurization, purging and repressurization.

SEMI-ANNUALLY
Blowdown pressure relief valves.

ANNUALLY
Inspect desiccant and replace if it is badly broken up, or fractured, or contaminated with compressor lubricant.

Inspect and clean solenoid valves.

Inspect seats and seals of the inlet diaphragm valves and the purge exhaust diaphragm valves and replace if badly worn or scored. It is recommended that valve rebuilding kits be kept on hand as spares.

6.3 TROUBLESHOOTING

The information contained in the Troubleshooting Chart has been compiled from field report data and factory experience. It contains symptoms and usual causes to the described problems, however, **DO NOT** assume that these are the only problems that may occur. All available data concerning the trouble should be systematically analyzed before undertaking any repairs or component replacement procedures.

A detailed visual inspection is worth performing for almost all problems and may avoid unnecessary additional damage to the dryer.

- Check for loose wiring.
- Check for damaged piping.
- Check for parts damaged by heat or an electrical short circuit, usually apparent by discoloration or a burnt odor.

TROUBLESHOOTING

SYMPTOM	*PROBABLE CAUSE AND REMEDY*
1. Poor dewpoint depression.	1. Entrained water. a. Check mechanical separator. 2. Too little purge. a. Check purge flow control valve for proper setting. 3. Inlet pressure below design. a. Check pressure and reset purge valve. 4. Inlet flow rate too high. a. Check flow rate and reset purge valve. 5. Inlet temperature above 120°F (49°C). a. Check compressor aftercooler operation. 6. Desiccant soaked with compressor lubricant. a. Replace desiccant and check filter elements.
2. High pressure drop over dryer.	1. Excessive inlet flow. a. Check flow rate. 2. Inlet pressure (80 PSIG [552kPa] minimum) below design. a. check pressure.
3. Switching failure.	1. No input power. a. Check fuse, timer and "on/off" switch. 2. No pilot air. a. Check pilot air lines and control air filter. 3. Faulty switching valve. a. Check inlet solenoid valve.
4. Dryer fails to pressurize.	1. Purge exhaust valve fails to close. a. Check timer, solenoid, and purge exhaust valve.
5. Failure to purge.	1. Purge flow control valve closed. a. Open and properly set purge control valve. 2. Purge exhaust valve fails to open. a. Check timer solenoid and purge exhaust valve.
6. Excessive tower back pressure.	1. Clogged muffler disseminator element. a. Replace disseminator. 2. Purge exhaust piping of excessive length for line size. a. Increase pipe and fitting size.

NOTES

Section 7
ILLUSTRATIONS AND PARTS LIST

7.1 PROCEDURE FOR ORDERING PARTS

Parts should be ordered from the nearest Sullair Representative or the Representative from whom the dryer was purchased. If for any reason parts cannot be obtained in this manner, contact the factory directly at the address below.

When ordering parts always indicate the dryer **Serial Number**. This can be obtained from the dryer serial number plate located on the dryer electrical, enclosure or the Bill of Lading.

SULLAIR CORPORATION
Subsidiary of Sundstrand Corporation
3700 East Michigan Boulevard
Michigan City, Indiana 46360

Telephone: (219) 879-5451

SULLAIR CORPORATION
Parts Distribution Division
1625 E. Second Street
Michigan City, Indiana 46360

Telephone: (219) 879-5451

FAX: 1-219-874-1835

7.2 RECOMMENDED SPARE PARTS LIST

Description	*Kit Number*	*Quantity*
element, filter control air	250011-827	1
element, air exhaust muffler		
• ½" replacement disseminator (SAR 105 thru 190)	405815-101	2
• 1" replacement disseminator (SAR 300)	405815-003	2
• 1¼" replacement disseminator(SAR 400)	405815-404	2
• 1½" replacement disseminator (SAR 630)	405815-505	2
coil, replacement 4-way valve	250031-431	1
coil, replacement 3-way valve	250031-738	2
repair kit, diaphragm valve 1" normally open (SAR 105)	250031-394	2
repair kit, diaphragm valve 1¼" normally open (SAR 125 thru 190)	250031-395	2
repair kit, diaphragm valve 1½" normally open (SAR 300)	250031-395	2
repair kit, diaghragm valve 2" normally open (SAR 400)	250031-396	2
repair kit, diaphragm valve 2½" normally open (SAR 630)	250031-396	2
repair kit, diaphragm valve ¾" normally closed (SAR 105 thru 400)	250031-394	2
repair kit, diaphragm valve 1½" normally closed (SAR 630)	250031-395	2
fuse, 1 amp	250025-933	2
desiccant, activated alumina (110 lbs.)	250030-081	*
desiccant, activated alumina (350 lbs.)	250030-082	*

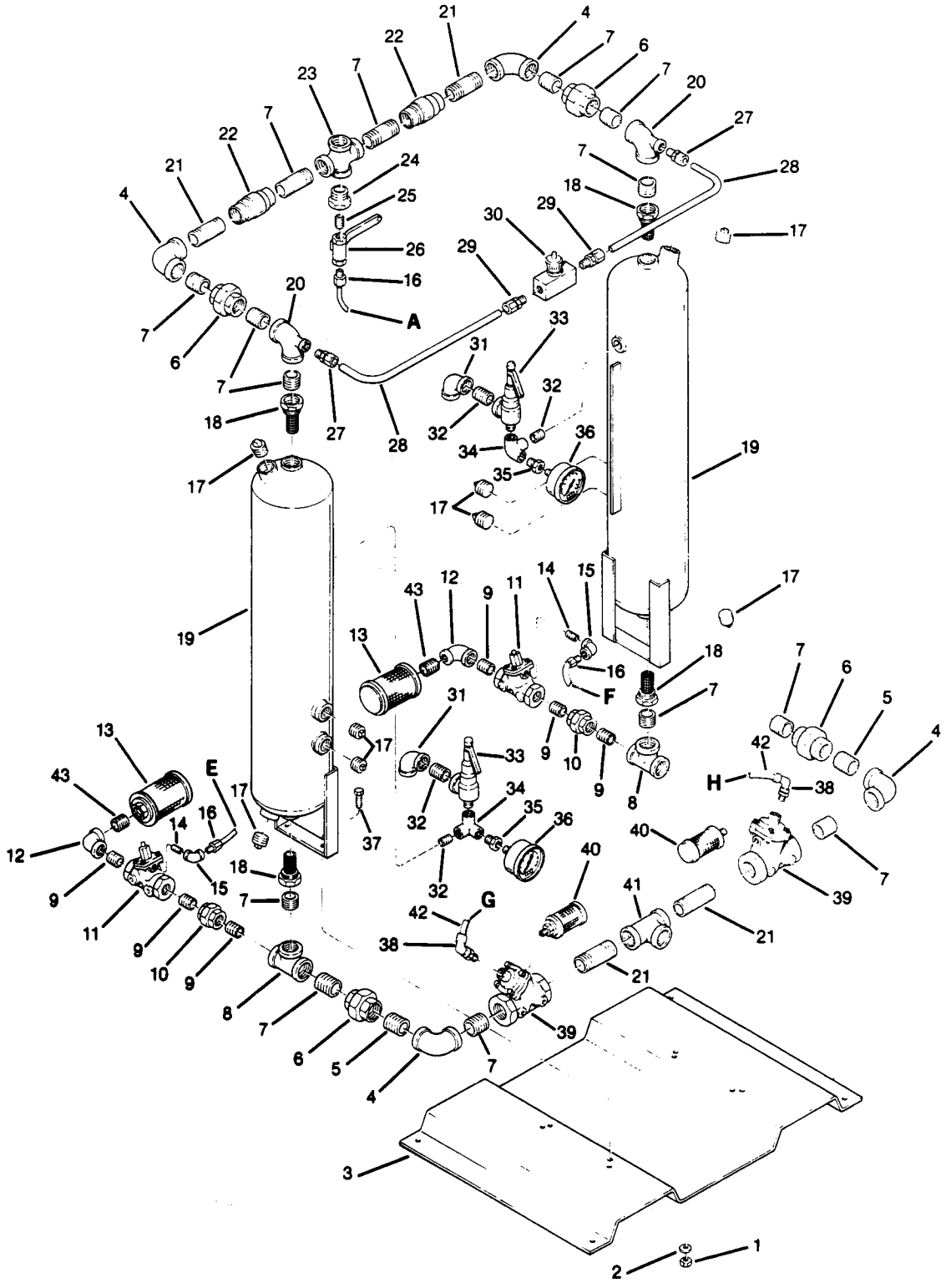
* See Section 3, Specifications to determine desiccant quantities for your dryer.

WHEN ORDERING PARTS, ALWAYS INDICATE SERIAL NUMBER OF MACHINE

Section 7

ILLUSTRATIONS AND PARTS LIST

7.3 BASE, TANKS, PIPING AND PARTS (MODELS SAR 105-300)



7.3 BASE, TANKS, PIPING AND PARTS (MODELS SAR 105-300)

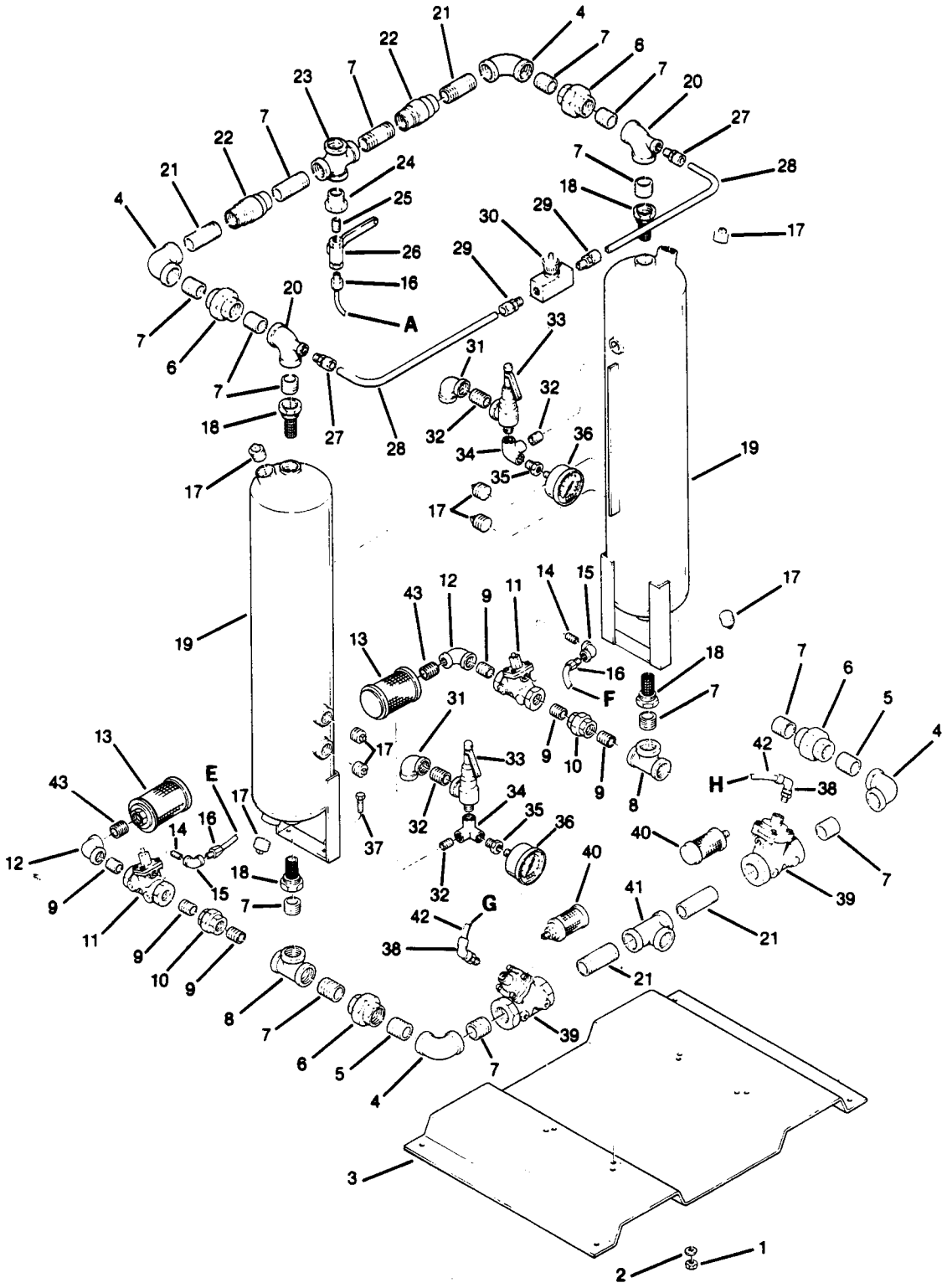
key number	*description*	*part number*	*quantity*
1	nut, hex lock ⅜"-16 (SAR 105-300)	825506-198	4
2	washer, ⅜" (SAR 105-300)	838206-071	4
3	base, frame (SAR 105-300)	250031-357	1
4	elbow, pipe 90° 1" (SAR 105)	801515-040	4
	elbow, pipe 90° 1¼" (SAR 125-190)	801515-050	4
	elbow, pipe 90° 1½" (SAR 300)	801515-060	4
5	nipple, pipe 1" x 2½" (SAR 105)	822116-025	2
	nipple, pipe 1¼" x 2" (SAR 125-190)	822120-020	2
	nipple, pipe 1½" x 4" (SAR 300)	822124-040	2
6	union, pipe 1" (SAR 105)	802515-040	4
	union, pipe 1¼" (SAR 125-190)	802515-050	4
	union, pipe 1½" (SAR 300)	802515-060	4
7	nipple, pipe xs 1" x close (SAR 105)	822216-000	14
	nipple, pipe xs 1¼"x close (SAR 125-190)	822222-000	12
	nipple, pipe xs 1¼" x 3" (SAR 125 -190)	822120-030	2
	nipple, pipe xs 1½" x close (SAR 300)	822224-000	14
8	tee, reducing 1" x ¾" x 1" (SAR 105)	802204-034	2
	tee, reducing 1¼"x¾"x1¼" (SAR 125-190)	802205-035	2
	tee, reducing 1½" x 1" x 1½" (SAR 300)	802206-046	2
9	nipple, pipe xs ¾" x close (SAR 105-190)	822212-000	6
	nipple, pipe xs 1" x close (SAR 300-400)	822216-000	6
10	union, pipe ¾" (SAR 105-190)	802515-030	2
	union, pipe 1" (SAR 300)	802515-040	2
11	valve, diaphragm ¾" (SAR 105-190)	250029-748	2
	valve, diaphragm 1" (SAR 300-400)	250028-958	2
12	elbow, reducing ¾" x ½" (SAR 105-190)	801603-020	2
	elbow, pipe 90° 1" (SAR 300)	801515-040	4
13	muffler, air exhaust ½" (SAR 105-190)	405815-001	2
	muffler, air exhaust 1" (SAR 300)	405815-003	2
14	nipple, galv xs ⅛"x close (SAR 105-300)	823202-000	2
15	elbow, red galv ¼"x ⅛" (SAR 105-300)	801601-005	2

(continued)

Section 7

ILLUSTRATIONS AND PARTS LIST

7.3 BASE, TANKS PIPING AND PARTS (MODELS SAR 105-300)



7.3 BASE, TANKS, PIPING AND PARTS (MODELS SAR 105-300) (continued)

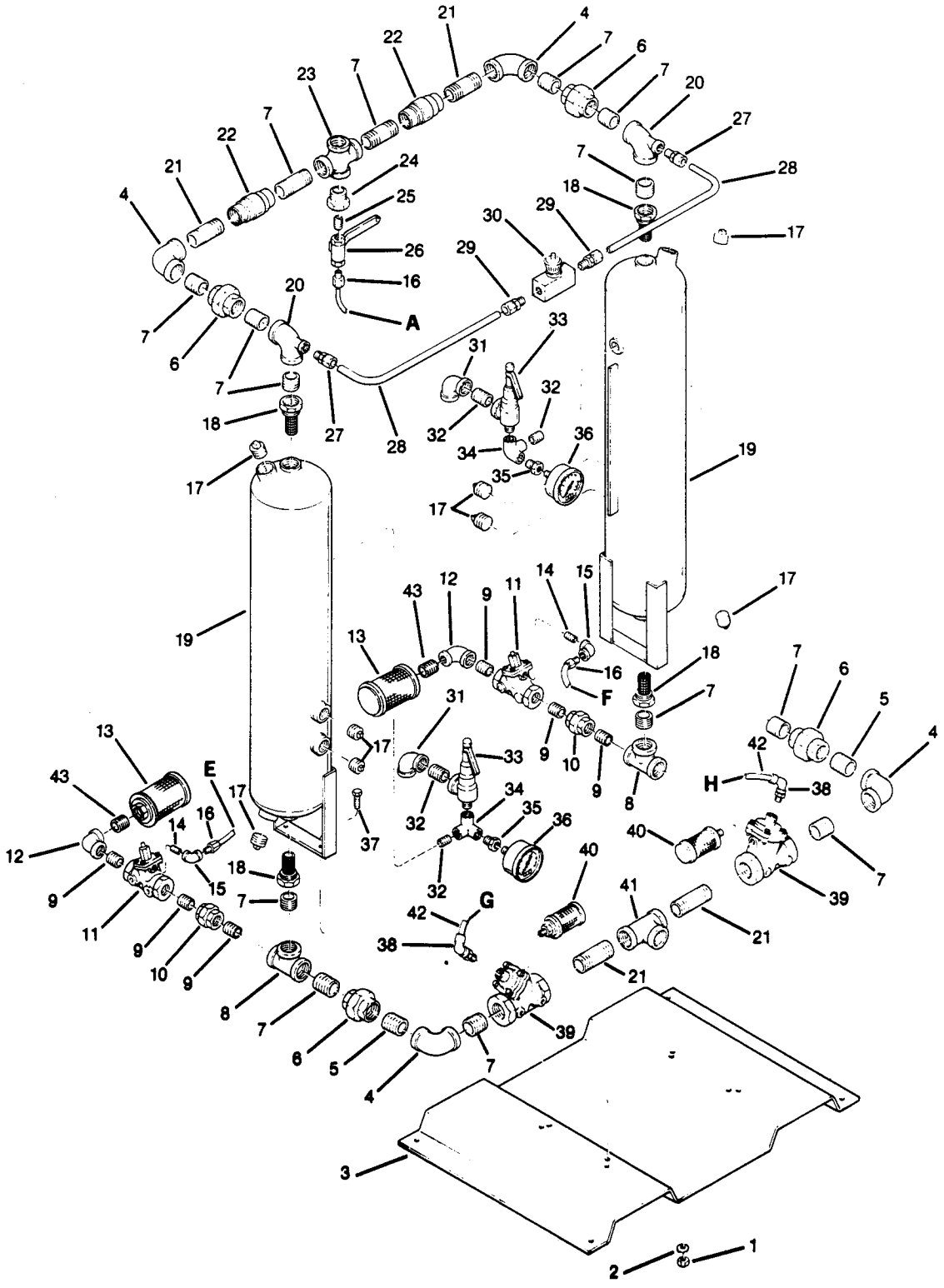
key number	*description*	*part number*	*quantity*
16	conn, tube strt ¼"x ⅜" (SAR 105-300)	250024-690	3
17	plug, pipe 1½" (SAR 105-300)	802815-060	8
18	diffuser, 1½" x 1" bushing (SAR 105)	405927-004	4
	diffuser, 1½" x 1¼" (SAR 125-190)	405927-003	4
	diffuser, 2" x 1½" (SAR 300)	405927-002	4
19	tank, par 125-190 4-way (SAR 105-190)	019139	2
	tank, par 250-350 4-way (SAR 300)	019078	2
20	tee, reducing 1" x ½" x 1" (SAR 105)	802204-024	2
	tee, reducing 1¼"x½"x1¼" (SAR 125-190)	802205-025	2
	tee, reducing 1½" x ½" x 1½" (SAR 300)	802206-026	2
21	nipple, pipe 1" 5½" (SAR 105)	822116-055	4
	nipple, pipe 1¼" x 3½" (SAR 125-190)	822120-035	2
	nipple, pipe 1¼" x 3" (SAR 125-190)	822120-030	2
	nipple, pipe 1½" x 4½" (SAR 300)	822124-045	2
22	valve, check 1" (SAR 105)	405812-003	2
	valve, check 1¼" (SAR 125-190)	405812-004	2
	valve, check 1½" (SAR 300)	405812-005	2
23	cross, pipe 1" (SAR 105)	801315-040	1
	cross, pipe 1¼" (SAR 125-190)	801315-050	1
	cross, pipe 1½" (SAR 300)	801315-060	1
24	bushing, red hex 1" x ¼" (SAR 105)	802104-010	1
	bushing, red hex 1¼" x ¼" (SAR 125-190)	802105-010	1
	bushing, red hex 1½" x ¼" (SAR 300)	802106-010	1
25	nipple, galv xs ¼" x close (SAR105-300)	823204-000	1
26	valve, ball ¼"NPT (SAR 105-300)	047115	1
27	conn, tube-m ½" x ½" (SAR 105-300)	810208-050	2
28	tubing, steel ½" (ft.) (SAR 105-300)	841115-008	2

(continued)

Section 7

ILLUSTRATIONS AND PARTS LIST

7.3 BASE, TANKS, PIPING AND PARTS (MODELS SAR 105-300)



7.3 BASE, TANKS, PIPING AND PARTS (MODELS SAR 105-300) (continued)

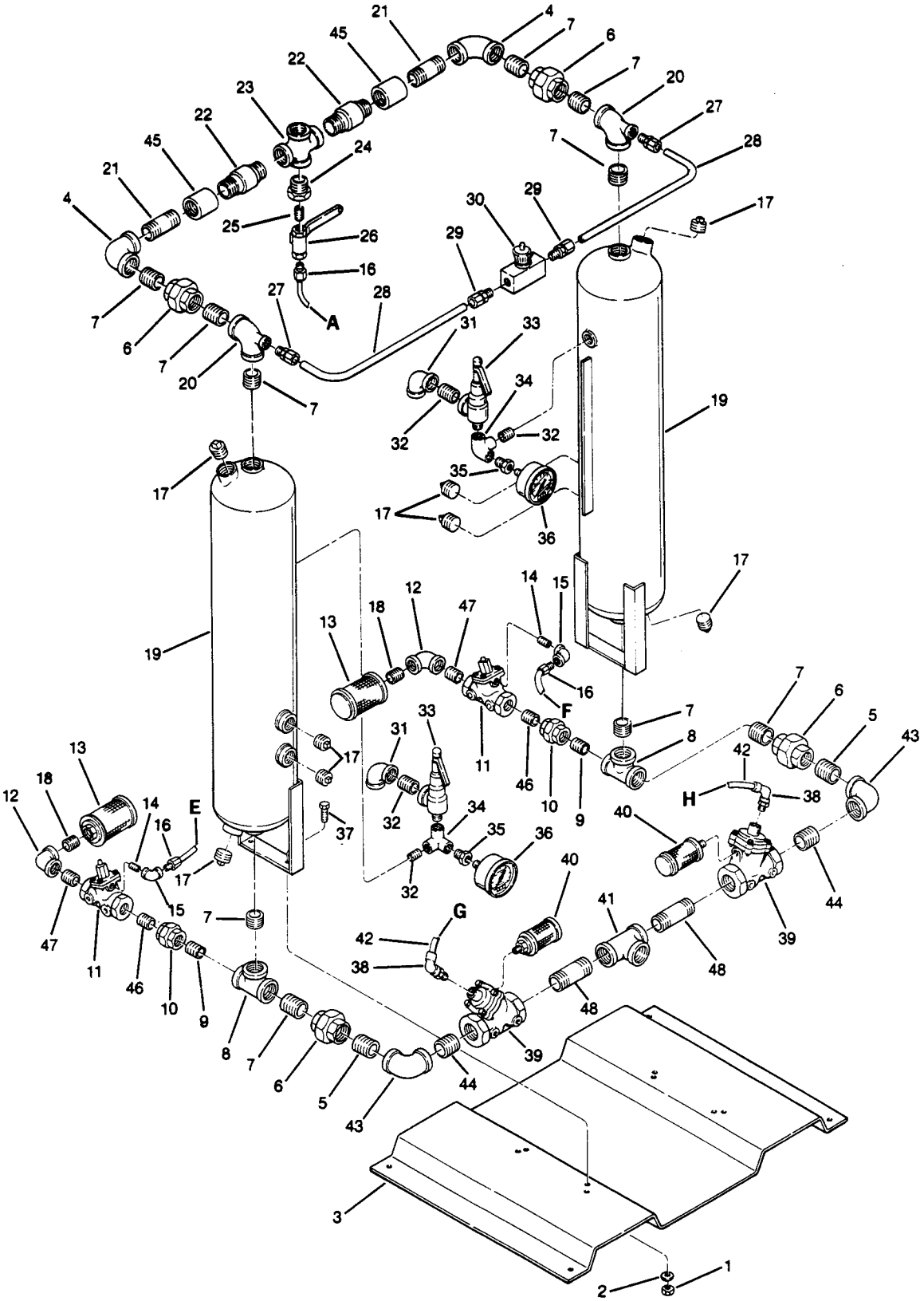
key number	*description*	*part number*	*quantity*
29	conn, tube-m ½" x ¼" (SAR 105-190)	810208-025	2
	conn, tube-m ½" x ½" (SAR 300)	810208-050	2
30	valve, needle ¼" (SAR 105-190)	250026-353	1
	valve, needle ½" (SAR 300)	250026-355	1
31	elbow, pipe 90° ½" (SAR 105-190)	801515-020	2
	elbow, pipe 90° 1" (SAR 300)	801515-040	2
32	nipple, pipe xs ½" x close (SAR 105-190)	822208-000	4
	nipple, pipe xs 1" x close (SAR 300)	822216-000	4
33	valve, relief ½" (SAR 105-190)	405818-001	2
	valve, relief 1" (SAR 300)	405818-002	2
34	elbow, side outlet ½" (SAR105-190)	802615-020	2
	elbow, side outlet 1" (SAR 300)	802615-040	2
35	bushing, reducing ½" x ¼" (SAR 105-190)	807602-010	2
	bushing, reducing 1" (SAR 300)	802104-010	2
36	gauge, pressure (SAR 105-300)	405821-001	2
37	capscrew, hex ⅜"-16x1¼" (SAR 105-300)	828606-125	4
38	connector, tube el ¼"x ⅜"t (SAR 105-300)	250024-709	2
39	valve, diaphragm 1" (SAR 105)	250029-787	2
	valve, diaphragm 1¼" (SAR 125-190)	250029-788	2
	valve, diaphragm 1½" (SAR 300)	250029-790	2
40	silencer, compressor air ⅛" (SAR 105-300)	043196	2
41	tee, pipe 1" (SAR 105)	802415-040	1
	tee, pipe 1¼" (SAR 125-190)	802415-050	1
	tee, pipe 1½" (SAR 300)	802415-060	1
42	tubing, ⅜" od (ft.)	250024-746	12.5
43	nipple, pipe ½" x close (SAR 105-190)	822208-000	2
	nipple, 1" x close (SAR 300)	822216-000	2

(continued)

Section 7

ILLUSTRATIONS AND PARTS LIST

7.4 BASE, TANKS, PIPING AND PARTS (MODELS SAR 400-630)



7.4 BASE, TANKS, PIPING AND PARTS (MODLES SAR 400-630)

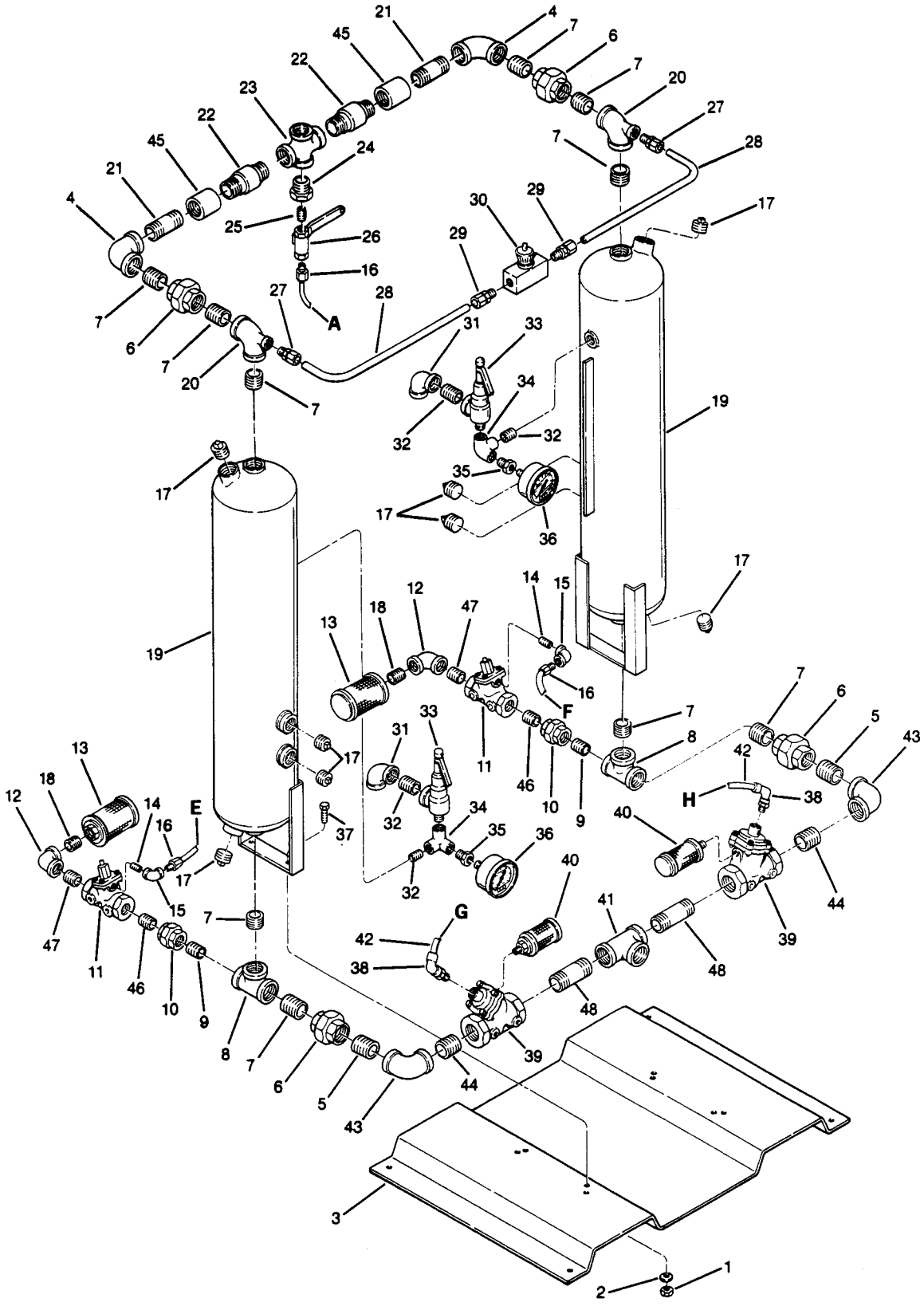
key number	*description*	*part number*	*quantity*
1	nut, hex lock ½"-13 (SAR 400-630)	824208-448	4
2	washer, ½" (SAR 400-630)	837208-112	4
3	base, frame (SAR 400-630)	250022-098	1
4	elbow, pipe 90° 2" (SAR 400-630)	801515-080	2
5	nipple, pipe 2" x 4½" (SAR 400-630)	822132-045	2
6	union, pipe 2" (SAR 400-630)	802515-080	4
7	nipple, pipe xs 2" x close (SAR 400) nipple, pipe 2-½" x 3" (SAR 630)	822232-000 822140-030	10 4
8	tee, reducing 2"x1 x 2" (SAR 400-630) tee, reducing 2 x 1½" x 2" (SAR 630)	802208-048 802208-068	2 2
9	nipple, pipe 1" x close (SAR 400) nipple, pipe xs 1½" x close (SAR 630)	822216-000 822224-000	2 6
10	union, pipe 1" (SAR 400) union, pipe 1½" (SAR 630)	802515-030 802515-060	2 2
11	valve, diaphragm 1" (SAR 400) valve, diaphragm 1½" (SAR 630)	250028-958 250028-806	2 2
12	elbow, reducing 1¼" x 1" (SAR 400) elbow, pipe 90° 1½" (SAR 630)	801605-040 801915-165	2 4
13	muffler, air exhaust 1¼" (SAR 400) muffler, air exhaust 1½" (SAR 630)	405815-004 405815-005	2 2
14	nipple, galv xs ⅛"x close (SAR 400-630)	823202-000	2
15	elbow, red galv ¼"x⅛" (SAR 400-630)	801601-005	2
16	conn, tube strt ¼"x ⅜" (SAR 400-630)	250024-690	3
17	plug, pipe 2" (SAR 400-630) plug, pipe 1½" (SAR 400-630)	802815-000 802815-060	4 4
18	nipple, pipe 1¼" x close (SAR 400) nipple, pipe 1½" x close (SAR 630)	822220-000 822224-000	2 2

(continued)

Section 7

ILLUSTRATIONS AND PARTS LIST

7.4 BASE, TANKS, PIPING AND PARTS (MODELS SAR 400-630)



7.4 BASE, TANKS, PIPING AND PARTS (MODELS SAR 400-630) (continued)

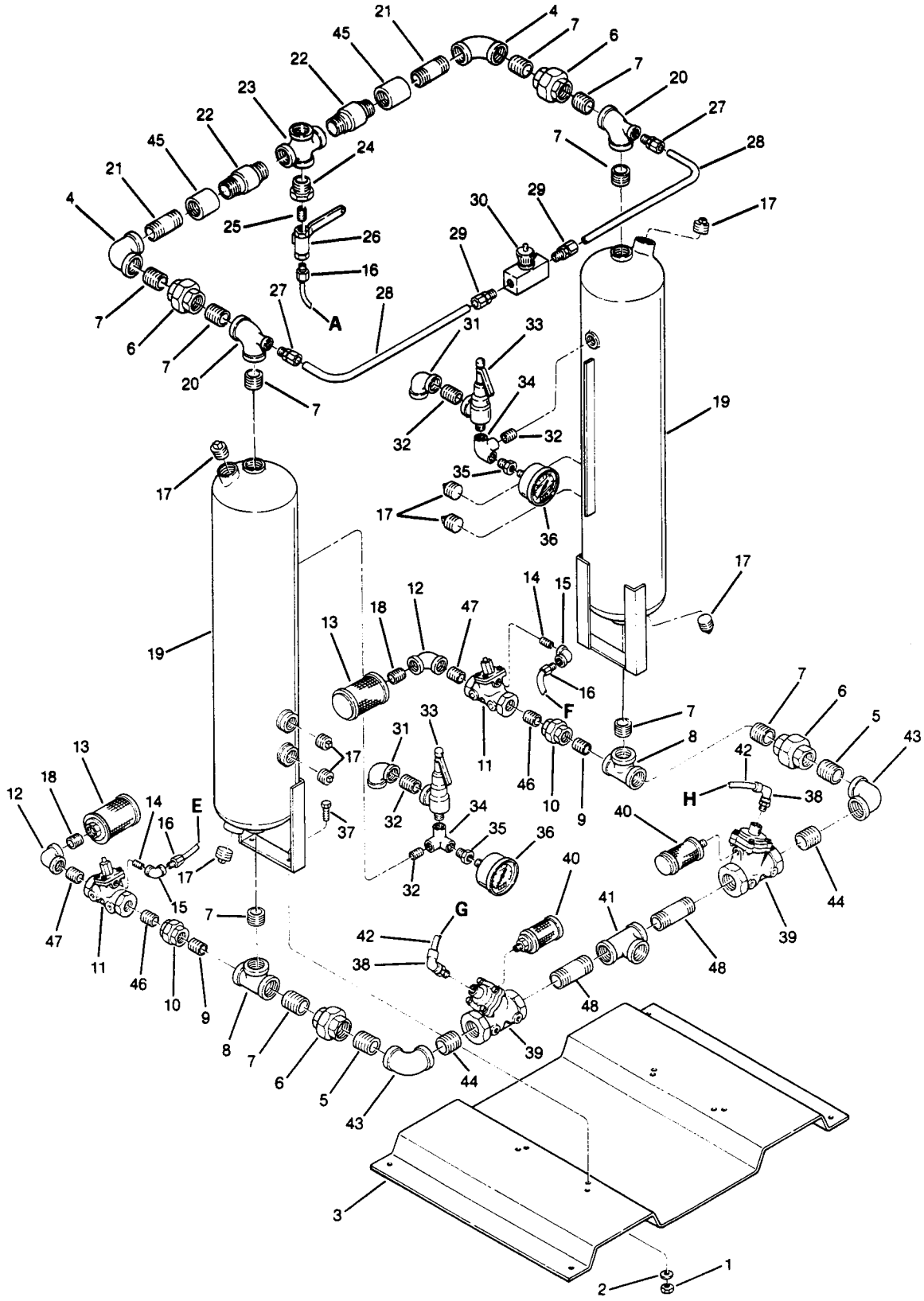
key number	*description*	*part number*	*quantity*
19	tank. par 500-600 4-way (SAR 400-630)	019082	2
20	tee, reducing 2" x ¾" x 2" (SAR 400-630)	802208-038	2
21	nipple, pipe 2" x 7" (SAR 400-630)	822132-070	2
22	valve, check 2" (SAR 400-630)	250008-401	2
23	cross, pipe 2" (SAR 400-630)	801315-080	1
24	bushing, red hex 2" x ¼" (SAR 400-630)	802108-010	1
25	nipple, galv xs ¼" x close (SAR 400-630)	823204-000	1
26	valve, ball ¼"NPT (SAR 400-630)	047115	1
27	conn, tube-m ¾" x ¾" (SAR 400-630)	810212-075	2
28	tubing, steel ¾" (ft.) (SAR 400-630)	841115-012	4
29	conn, tube-m ¾" x ¾" (SAR 400-630)	810212-075	2
30	valve, needle ¾" (SAR 400-630)	250026-356	1
31	elbow, pipe 90° 1¼" (SAR 400-630)	801515-080	2
32	nipple, pipe xs 1¼" x close (SAR 400-630)	822220-000	4
33	valve, relief 1¼" (SAR 400-630)	405818-003	2
34	elbow, side outlet 1¼" (SAR 400-630)	802615-050	2
35	bushing, reducing 1¼" (SAR 400-630)	802105-010	2
36	gauge, pressure (SAR 400-630)	405821-001	2
37	capscrew, hex ½"-13x1½" (SAR 400-630)	828608-150	4
38	conn, tube el ¼" x ⅜"t (SAR 400-630)	250024-709	2
39	valve, diaphragm 2" (SAR 400) valve, diaphragm 2½" (SAR 630)	250028-957 250028-805	2 2
40	silencer, compressor air (SAR 400-630)	044916	2

(continued)

Section 7

ILLUSTRATIONS AND PARTS LIST

7.4 BASE, TANKS, PIPING AND PARTS (MODELS SAR 400-630)



7.4 BASE, TANKS, PIPING AND PARTS (MODELS SAR 400-630) (continued)

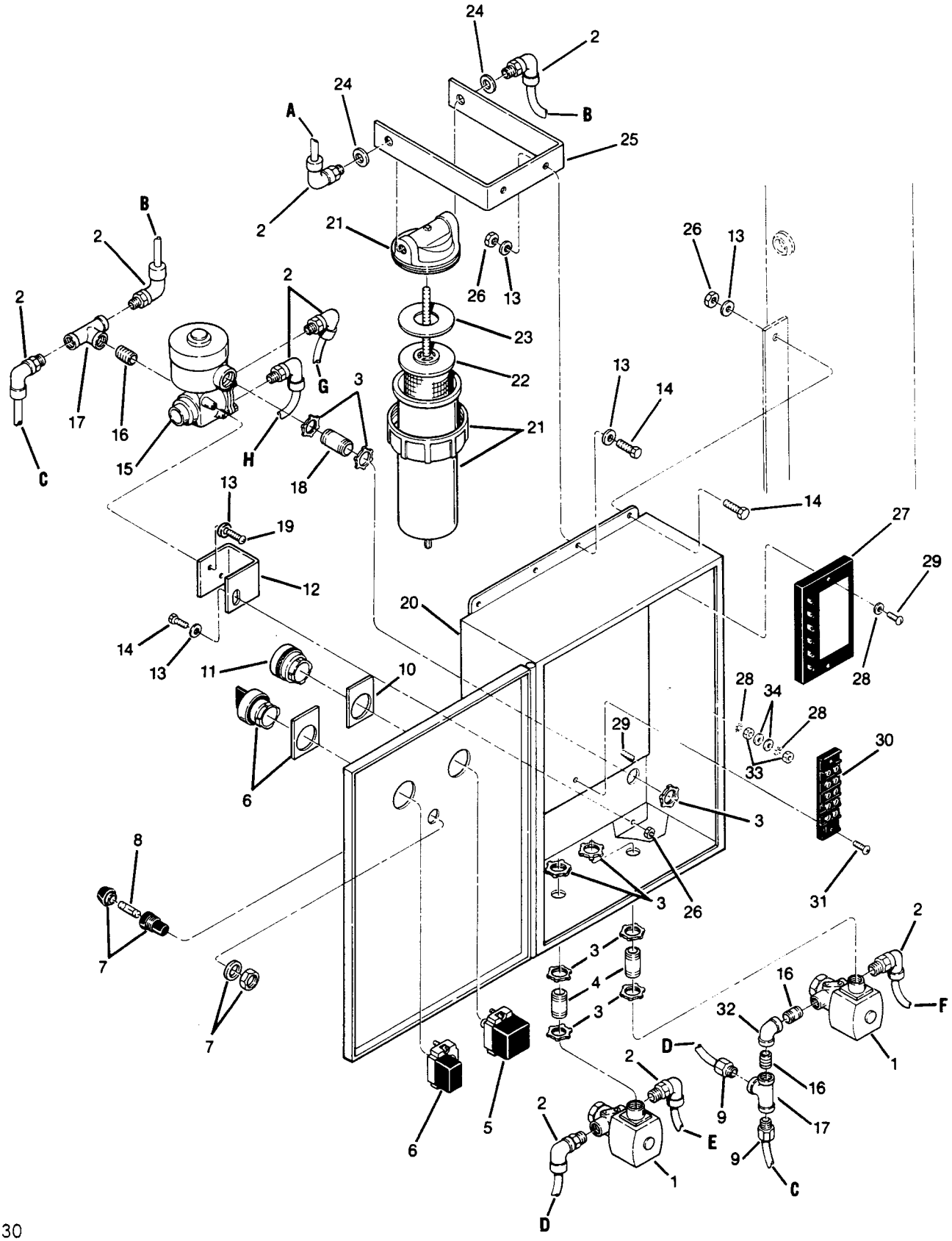
key number	*description*	*part number*	*quantity*
41	tee, pipe 2" (SAR 400)	802415-080	1
	tee, pipe red 2½" x 2½" x 2" (SAR 630)	802210-108	1
42	tubing, ⅜" od (ft.) (SAR 400-630)	250024-746	12.5
43	elbow, pipe 90° 2" (SAR 400)	801515-080	2
	elbow, pipe 90° 2½" x 2" (SAR 630)	801610-080	2
44	nipple, pipe 2" x 3½" SAR 400)	822132-035	2
	nipple, pipe 2½" x 3" (SAR 630)	822140-030	2
45	coupling, pipe 2" 150# (SAR 400-630)	801215-080	2
46	nipple, pipe 1" x 2½" (SAR 400)	822116-025	2
	nipple, pipe 1½" x 2½" (SAR 630)	822124-025	2
47	nipple, pipe 1" x 2" (SAR 400)	822116-020	2
	nipple, pipe 1½" x 2" (SAR 630)	822124-020	2
48	nipple, pipe 2" x 3" (SAR 400)	822132-030	2
	nipple, pipe 2½" x close (SAR 630)	822240-000	2

WHEN ORDERING PARTS, INDICATE SERIAL NUMBER OF MACHINE

Section 7

ILLUSTRATIONS AND PARTS LIST

7.5 ELECTRICAL BOX



7.5 ELECTRICAL BOX

key number	*description*	*part number*	*quantity*
1	valve, solenoid	250031-695	2
2	connector, tube-el ¼" x ⅜"t	250024-709	9
3	locknut, conduit ½"	847200-050	19
4	nipple, conduit ½" x 1½"	250007-169	2
5	bulb, assembly power on	250027-544	1
6	switch, on/off	406054	1
7	holder, fuse	250022-212	1
8	fuse	250025-933	1
9	connector, tube ¼" x ⅜"t	250024-690	2
10	nameplate, power on	406036-001	1
11	lens, power on	250026-994	1
12	bracket, support solenoid	250031-370	1
13	washer, regular ¼"	837204-071	15
14	capscrew, hex ¼"-20 x ¾"	829104-075	7
15	valve, solenoid 4-way ¼" *	250025-516	1
16	nipple, galvanized xs ¼" x close	823204-000	3
17	tee, pipe galvanized ¼"	804415-010	2
18	nipple, conduit ½" x 3"	250007-168	1
19	screw, hex head	829104-050	2
20	box, electrical	250031-367	1
21	filter, air	250023-345	1
22	element, air filter	250011-827	1
23	gasket, element air filter	250011-841	1
24	washer, brass	233133	2
25	bracket, air filter (SAR 105-630)	250028-446	1

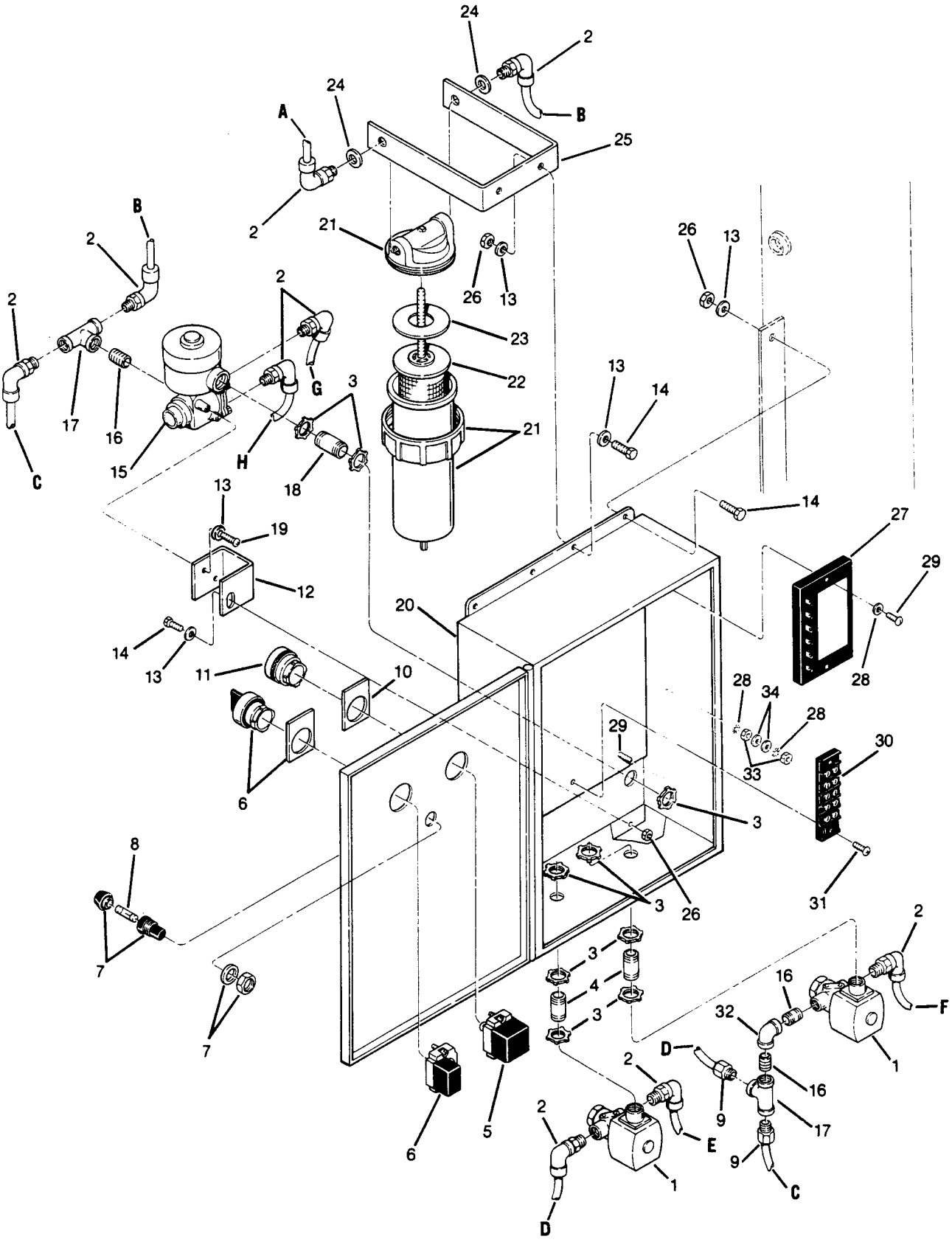
(continued)

* For maintenance on 4-way solenoid vavle No. 250025-516, order repair kit No. 250031-431.

Section 7

ILLUSTRATIONS AND PARTS LIST

7.5 ELECTRICAL BOX



7.5 ELECTRICAL BOX (continued)

key number	*description*	*part number*	*quantity*
26	nut, hex lock ¼"-20	825504-145	7
27	timer	250030-405	1
28	washer, lock ext tooth	838402-025	3
29	screw, machine rod 1"	831601-100	3
30	block, terminal	019242	1
31	screw, machine rod ⅜"	835601-038	2
32	elbow, pipe galvanized 90° ¼"	803515-010	1
33	nut, hex plated 8-32 unc	825201-130	2
34	washer, pl-b regular plated	838201-045	1

WHEN ORDERING PARTS, INDICATE SERIAL NUMBER OF MACHINE

Section 7
ILLUSTRATIONS AND PARTS LIST

7.6 DECAL GROUP

7.6 DECAL GROUP

key number	*description*	*part number*	*quantity*
1	decal, "105"	250031-313	1
	decal, "125"	250031-314	1
	decal, "190"	250031-315	1
	decal, "300"	250031-381	1
	decal, "400"	250031-382	1
	decal, "630"	250031-383	1
2	decal, "Sullair" w/logo 3.5" x 9"	250031-359	1
	decal, "Sullair" w/logo 5" x 16"	250031-360	1
3	decal, "SAR" 3.25" x 6"	250031-309	1
	decal, "SAR" 5" x 11"	250031-310	1
	decal, "SAR" 6" x 13"	250031-311	1
4	decal, caution pars-pneu	406432	1
5	sign, danger electrocution	049850	1
6	sign, warning "food grade" lube	250003-144	1
7	decal, danger breath air	250027-935	1

WHEN ORDERING PARTS, INDICATE SERIAL NUMBER OF MACHINE

WORLDWIDE SALES AND SERVICE

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