

YORK[®]

S SERIES SINGLE STAGE COMPRESSORS

2⁵/₈" BORE — HERMETIC TYPE
REFRIGERANT-22

MAINTENANCE

Supersedes: Form 180.40-M (670)

1283

Form 180.40-M1

STYLES A & B



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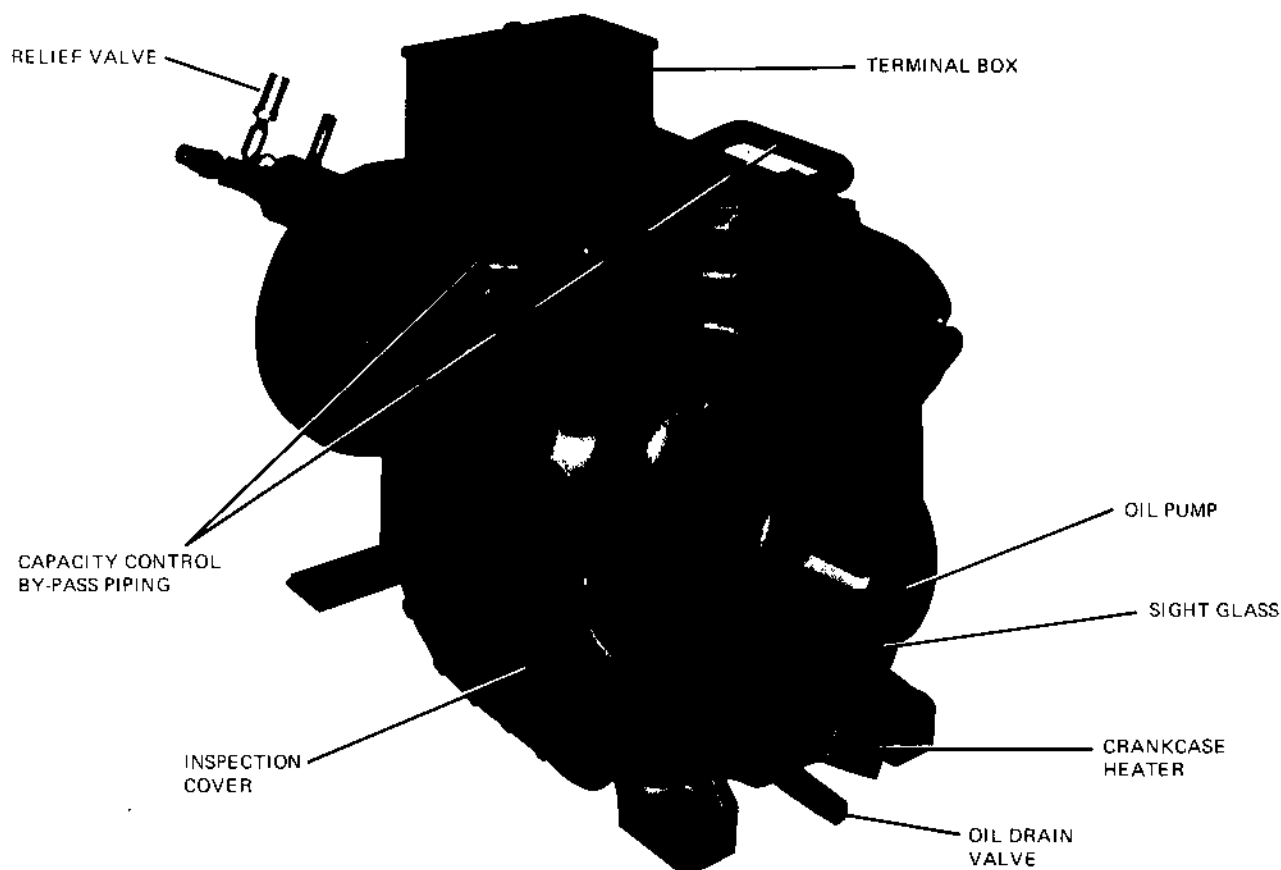


FIG. 1 — 6 CYLINDER S SERIES COMPRESSOR

GENERAL DESCRIPTION & DESIGN HISTORY

York S Series, single stage, V/W hermetic compressors are designed to meet air conditioning requirements in the range of 20 to 40 tons with R-22.

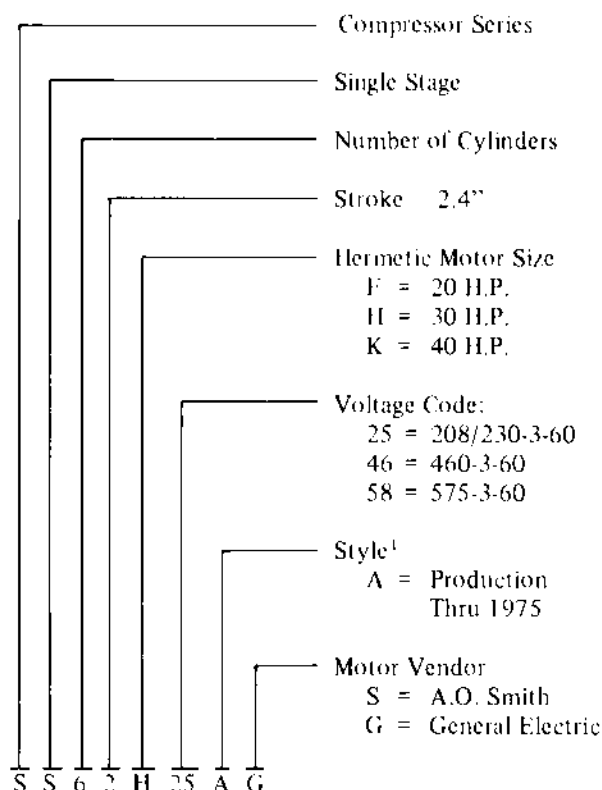
The hermetic motor compressor is furnished in 4, 6 or 8 cylinder sizes, 2-5/8" bore by 2.4" stroke. The compressor is direct-connected to a 1750 RPM hermetic motor with built-in protection, both enclosed in a single cast iron housing. Capacity control is accomplished by by-passing the gas leaving the cylinders to the suction end of the compressor.

(see CAPACITY CONTROL PIPING, page 5) by means of one or more solenoid operated 3-way valves and external manifolding.

Since the introduction of the S Series Compressor in 1970, several design changes have been made to improve performance and reliability. Also the Style designation was changed from A to B in 1975. These changes are described on the following pages. Also refer to Form 180.40-RP1 for Renewal Parts.

NOMENCLATURE

STYLE A

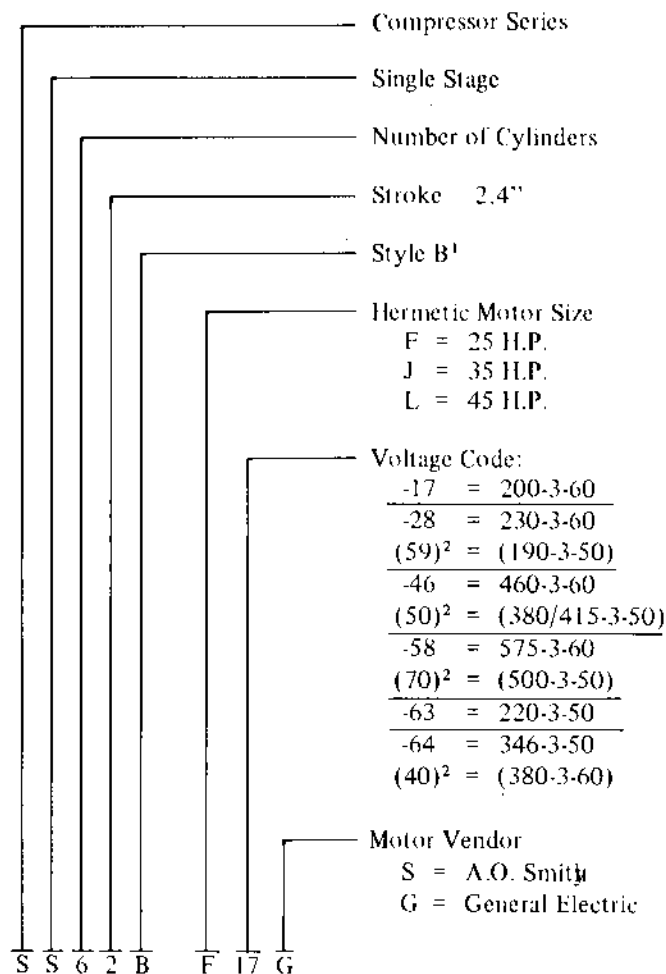


NOTES:

¹Style A compressors that were built (or rebuilt) with Style B motors carry the designation SS42A, SS62A, SS82A.

²Voltage codes in () do not appear in Model Number. They are shown here for information only. The comparable electrical characteristic is stamped on the second line of the data plate.

STYLE B



DESIGN HISTORY (Cont'd.)

MOTOR

Style A compressors were available with a dual voltage (208/230-3-60) motor. Style B compressors are available with either a 200-3-60 or a 230-3-60 motor. (See Table below.)

NOTE: When replacing a 208/230-3-60 (Code 25) Style A compressor with a Style A/B compressor, the actual line voltage must be specified; either 200-3-60 (Code 17) or 230-3-60 (Code 28). Operating range of single voltage motors is $\pm 10\%$ of data plate voltage.

STYLE A		STYLE A/B	
Voltage Code	Voltage	Voltage Code	Voltage
25	208/230-3-60	17 28	200-3-60 230-3-60

The Style B motor is shorter than the Style A motor. When using a Style B motor in a Style A compressor (also see section on CRANKSHAFT) a spacer must be added between the rotor and the end of the crankshaft. Part numbers of spacers are:

4 Cyl 065-24691
6 Cyl 065-24692
8 Cyl 065-24794

Also the rotor key must be cut to the lengths shown:

4 Cyl 2-1/2"
6 Cyl 1"
8 Cyl 1-1/4"

Style A rotors or stators cannot be used with Style B rotors or stators.

A.O. Smith rotors or stators cannot be used with G.E. rotors or stators.

All Style B compressors have 6 lead motors.

Style A compressors have either 3 lead or 6 lead motors. The following Style A compressors have 3 lead motors:

4 Cylinder	6 Cylinder
460-3-60	460-3-60
575-3-60	575-3-60
380/415-3-50	380/415-3-50

All other Style A compressors have 6 lead motors.

If a compressor with a 3 lead motor (or a motor) is replaced with one having 6 leads, jumper wires Part No. 363-37026-030 are available from YORK. (3 required.)

CRANKSHAFT

The crankshaft used in Style B compressors is shorter on the motor end than the crankshaft used in Style A compressors. (See section on MOTOR.) Replacement Style A crankshafts are no longer available. If a Style A crankshaft is damaged beyond use, a Style B crankshaft must be substituted. A Style B crankshaft can be used in a Style A compressor provided that the following changes are made:

1. A longer cap screw is required to hold the rotor to the crankshaft. Required cap screw sizes are:

4 Cylinder – 9/16" - 12 x 3-3/4"
6 Cylinder – 9/16" - 12 x 5-3/4"
8 Cylinder – 9/16" - 12 x 5-1/2"

2. Longer keys are required to retain the key between the rotor and the shaft. Key sizes are as follows:

4 Cylinder – 3/8" x 3/8" x 4-3/8"
6 Cylinder – 3/8" x 3/8" x 6-7/8"
8 Cylinder – 3/8" x 3/8" x 6-7/8"

3. The bearing head should be revised as follows:

- a. Remove the thrust collar.
- b. Remove the roll pin (if used) that locates the thrust collar.
- c. Push the pump end bearing further into the bearing head so that it is recessed 1/8" below the bearing surface.

BEARING HEAD ASSEMBLY AND OIL PUMP

The Style B bearing head assembly does not use a thrust collar. Consequently the roll pin locating the thrust collar has been eliminated and the bearing is pressed in below the bearing surface on the bearing head. A new oil pump, York Part No. 026-20297, is also used.

If the Style A bearing head is used, the original YORK oil pump may be reused (if suitable), or a replacement oil pump (York Part No. 365-24582) explained in Form 180.40-M (Supl. 1) dated 875 may be used. Replacement Style A bearing head assemblies are presently available.

CRANKCASE HEATER

Style A compressors have a 240 volt immersion type crankcase heater. Style B compressors are available with a 120 volt or 240 volt heater. The heater on Style B compressors is located in a well in the housing; it is not in contact with the oil. Because of this difference in design, crankcase heaters are not part of replacement Style B compressors. Part numbers of Style B heaters are:

120 Volt – 025-19347-001
240 Volt – 025-19347-002

DESIGN HISTORY (Cont'd.)

DISCHARGE VALVES, CAGES AND PLATES

Beginning with production in 1976, the cylinder sleeve gaskets which fit between the compressor housing and the cylinder sleeve and between the cylinder sleeve and the suction valve plate have been eliminated. Discharge valve cages, suction valve plates, discharge valve springs, and suction valve springs are affected by this change. New discharge valve cages can be identified by a bevel cut from each corner. The new suction valve plates can be identified by a shallow V-groove machined on the O.D. of the plate. New valve springs must be used with the new cages and plates. Old style cages and plates are no longer available; however, old valve springs are still available for old style cages and plates.

CAPACITY CONTROL PIPING

Earliest design S compressor capacity control piping was furnished with compression fittings and used an Alco solenoid valve. Later design capacity control piping was furnished with flare fittings and used a P.E. solenoid valve. (See Form 180.40-RP1 for part numbers.) Both the above designs returned the by-passed gas into the compressor motor housing.

Starting in November 1980, all S compressors furnished in YORK LCH, LCHA, & YCHA chillers were furnished with re-designed capacity control piping that returned the by-passed cylinder gas into the suction line ahead of the compressor suction stop valve.

PHYSICAL DATA

COMPRESSOR MODEL	SS42	SS62	SS82
Number of Cylinders	4	6	8
CFM Displacement at 1750 RPM	52	78	104
Bore (inches)	2-5/8	2-5/8	2-5/8
Stroke (inches)	2.4	2.4	2.4
Suction Connection (ODF)	1-5/8	2-1/8	2-5/8
Discharge Connection (ODF)	1-1/8	1-3/8	2-1/8
Oil Charge (gal.) *	1-3/8	1-3/4	1.80
Weight (lbs.)	500	615	738

* York Type "C"

LIMITATIONS

The "S" compressor is designed for air conditioning duty only.

1. Maximum operating differential: 340 psi
2. Maximum discharge temperature: 275°F
3. Maximum oil temperature (crankcase): 150°F
4. Maximum saturated condensing temperature:
150°F (384.6 psig)
5. Minimum saturated evaporating temperature:
+10°F (32.9 psig)
6. Maximum superheat: 50°F
7. Minimum ambient temperature: 0°F
8. Maximum ambient temperature: 120°F
9. Electrical limitations on voltage: (See MOTOR DATA)
10. Lubrication system pressure 30 psi min. above crankcase pressure.

MOTOR DATA

STYLE A

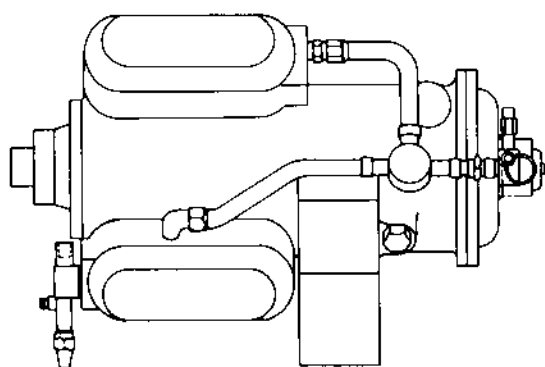
COMPRESSOR	HP	VOLTAGE			TYPE START	LOCKED ROTOR AMPS
		NAMEPLATE	MIN.	MAX.		
SS42	20	208/230	187	253	PW	330
		460	414	506	AL	170
		575	518	600	AL	135
SS62	30	208/230	187	253	PW	490
		460	414	506	AL	245
		575	518	600	AL	195
SS82	40	208/230	187	253	PW	590
		460	414	506	AL	295
		575	518	600	AL	235

STYLE B

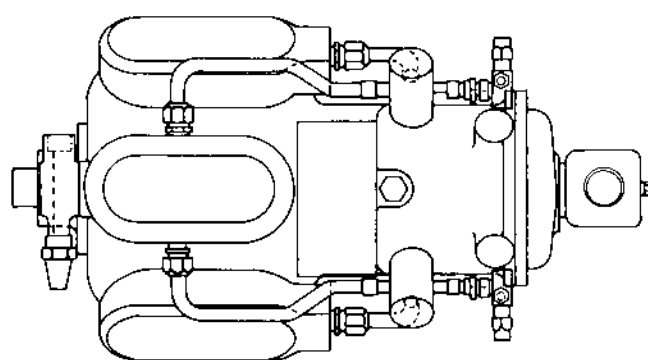
SS42	25	200	180	220	AL	350
		230	207	253	AL	304
		460	414	506	AL	152
		575	517	633	AL	122
SS62	35	200	180	220	AL	510
		230	207	253	AL	450
		460	414	506	AL	225
		575	517	633	AL	183
SS82	45	200	180	220	AL	619
		230	207	253	AL	560
		460	414	506	AL	280
		575	517	633	AL	222

LEGEND FOR FIG. 2

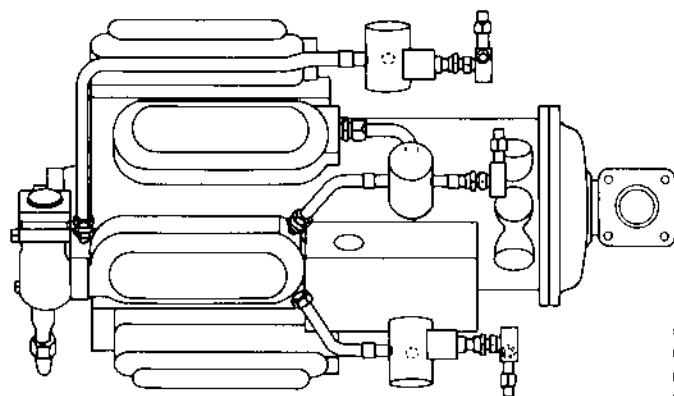
1	DISCHARGE STOP VALVE	10	ROTOR
2	SUCTION-DISCHARGE VALVE ASSEMBLY	11	SUCTION STRAINER GASKETS
3	PISTON	12	SUCTION STRAINER SCREEN
4	CYLINDER SLEEVE	13	MOTOR HOUSING COVER
5	COMPRESSOR TOP HEAD	14	CRANKSHAFT
6	RELIEF VALVE (375 PSI)	15	OIL CHARGING VALVE
7	MOTOR TERMINAL BOX	16	OIL PUMP
8	STATOR LOCKING PLUG	17	BEARING HEAD
9	STATOR		



TOP VIEW - 4 CYLINDER COMPRESSOR



TOP VIEW - 6 CYLINDER COMPRESSOR



TOP VIEW - 8 CYLINDER COMPRESSOR

NOTE:
CAPACITY CONTROL SOLENOID
COILS NOT FURNISHED WITH
REPLACEMENT COMPRESSORS.

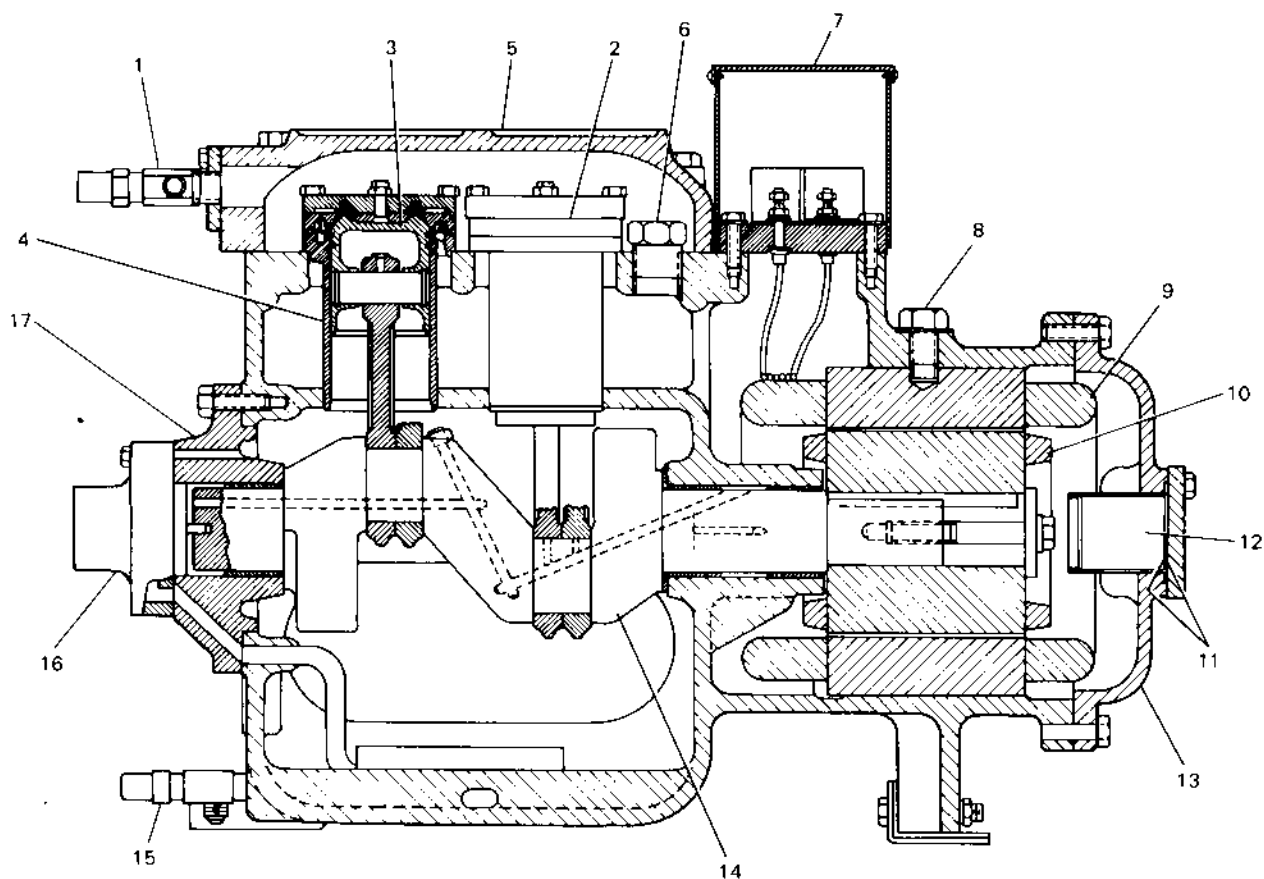
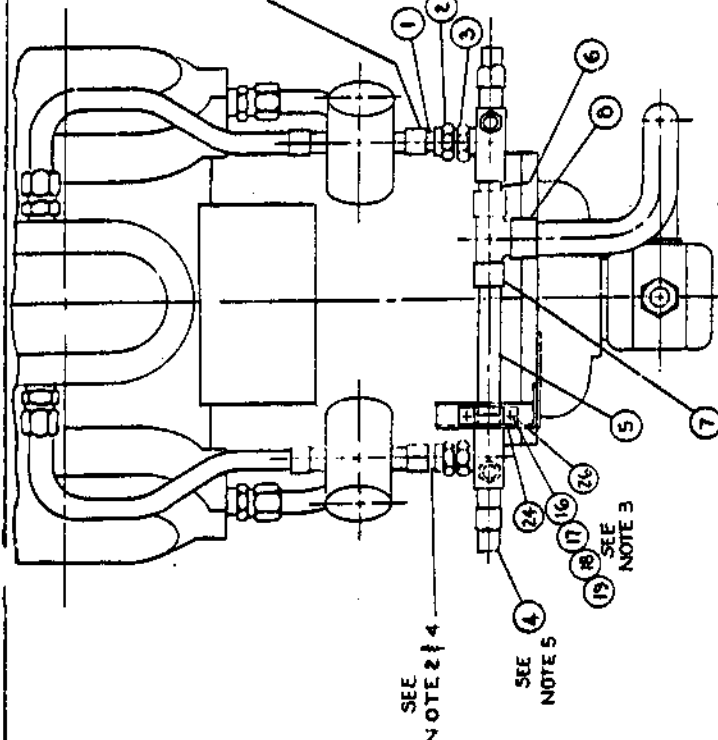
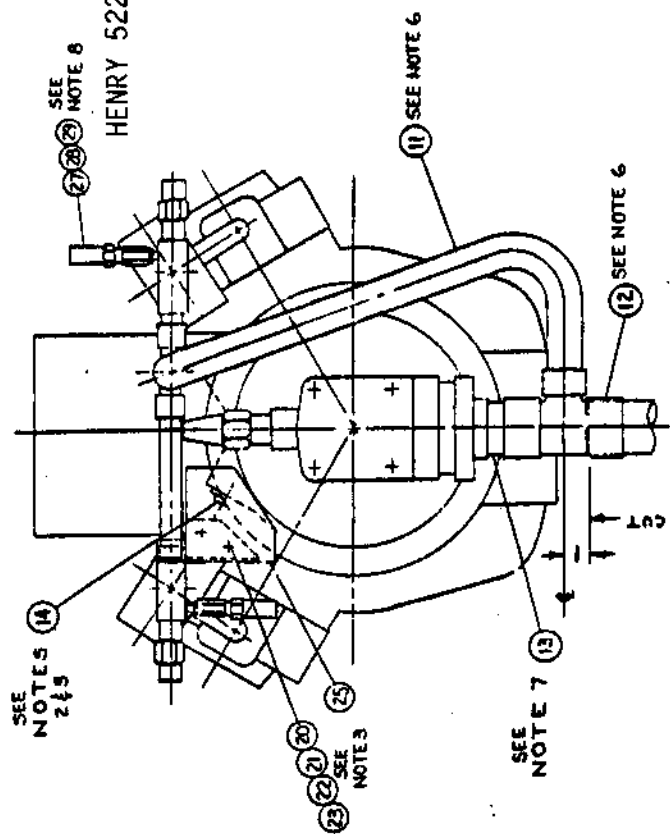


FIG. 2 - COMPRESSOR CROSS SECTION



CAUTION
DO NOT FORCE UNLOADER VALVES
OUT OF NORMAL POSITION WHEN
MAKING FIT UP. DISTORTION OF
UNLOADER VALVE BODY WILL CAUSE
SUBSEQUENT MALFUNCTION. TIGHTEN
TUBING TO REQUIRED LENGTH IF IT
IS TOO LONG.



HENRY 5221 450 PSIG

NOTES:

1. PERFORM ALL BRAZING WITH NITROGEN IN LINES TO AVOID CONTAMINATION OF SYSTEM BY OXIDATION OF COPPER.
2. REMOVE 7/8 O.D. TUBES THAT CONNECT UNLOADING VALVES TO HOUSING AT MOTOR END BY UNBRAZING FROM UNLOADING VALVES AND REMOVE CONNECTORS FROM HOUSING. USE WET RAG TO KEEP HEAT FROM DAMAGING VALVES. PLUG HOLES IN HOUSING WITH ITEM 14, ON PIPE PLUGS, GRADE APP.
3. USE LOCKTITE, GRADE APP.
4. ASSEMBLE TUBES, ITEM 14, AND ON SCREWS, ITEM 16, INTO UNLOADING VALVES AFTER FLUXING. BRAZE BOTH CONNECTIONS AT THE SAME TIME USING WET RAG AS ABOVE.
5. PUT ROTALOCK VALVES IN PLACE. HAND TIGHT WITHOUT USING GASKETS. OPEN VALVES TO PREVENT HEAT DAMAGE TO SEAT. SNAP VALVES WITH WET RAG AND BRAZE HEADER ASSEMBLY. INTERCONNECTING TUBING AND FITTINGS UP TO AND INCLUDING ITEM 8. USE CARE TO INSURE THAT BUSHING IS PROPERLY BRAZED. AFTER HEADER ASSEMBLY, COOL. DISASSEMBLE ROTALOCK VALVES AND INSTALL GASKETS, ITEM 3. LEAK CHECK EACH UNLOADING VALVE AFTER RE-INSTALLATION OF HEADER ASSY.
6. ESTABLISH C OF TEE, ITEM 12, BY PRE-ASSEMBLING WITHOUT BRAZING ITEMS 11 & 12. ADD CUT SUCTION LINE AT DIMENSION SHOWN.
7. UNBRAZE STUD FROM VALVE AND DISCARD. INSTALL ITEM 13 INTO VALVE AND COMPLETE BRAZING OF ENTIRE ASSY.
8. ATTACH ADAPTER ITEM 28 TO ROTALOCK VALVE WITH ITEM 29. ATTACH VALVE ITEM 27 TO ITEM 28 WITH TEFLON TAPE.

ITEM	PART NO.	ITEM	DESCRIPTION
1	062-71530	1	TUBE, CU, ST 7/8 X .0410 X 1 3/8
2	023-07727A	2	SPUD, ROTALOCK
2	028-04836	3	GASKET, TEFLON I.O.D. X 7/51.0.
2	022-01659B	4	VALVE, ROTALOCK
1	062-70045	5	TUBE, CU, LA. 7/8 X .0410 X 2 1/2
1	063-54691	6	TUBE, CU, LA. 7/8 X .0410 X 1 3/4
2	023-05677	7	BUSHING 1 1/8 X 7/8
1	023-00271	8	TEE, SLO. 1 1/8 X 1 1/8 X 1 3/8
		9	
		10	
1	065-24870A	11	CONN., UNLOADING
1	023-10247	12	TEE, SLD. 2 1/8 X 2 1/8 X 1 3/8
1	066-87141	13	TUBE, CU, HT. 2 1/8 X .080 X 3 1/2
2	023-04208	14	PLUG, PIPE 3/4 NPT E SQ. 50C. 53K.
1	035-04514	15	INSTRUCTIONS
2	021-02459	16	SCREW, MACH. RD. RED. 1 1/4 X 24 UNC X 1/2
2	021-05164	17	WASHER, PLAIN
2	021-08292	18	LOCKWASHER
2	021-08282	19	NUT, HEX. 10-24 UNC.
2	021-08381	20	SCREW, CAP. HEX. 1/4-20 X 3/4
2	021-05165	21	WASHER, PLAIN
2	021-08276	22	LOCKWASHER
2	021-00451	23	NUT, HEX. 1/4-20 UNC.
1	065-24892B	24	BRACKET
1	065-24893A	25	SUPPORT
1	065-24895A	26	CLAMP
2	022-04375	27	VALVE, RELIEF
2	023-12134	28	ADAPTER, FEM. 1/4 FLA. X 1/4 NPT
2	028-01259	29	GASKET, FLA. 1/4 O.D. TUBE

SERVICE

GENERAL

Service on these compressors should be attempted only by qualified service personnel, trained in the service of this type of equipment, and equipped with the proper tools and familiar with their use.

Before opening a compressor for repairs, the following paragraphs should be thoroughly checked to aid in locating and correcting the trouble:

1. Check the compressor oil level. Correct oil level is 1/2 the sight glass when the compressor is not in operation. See PHYSICAL DATA.
2. Check the refrigerant charge to be sure the system is fully charged. The unit sight glass should be clean and dry.
3. Be sure the faulty operation of the unit is caused by the compressor and not some other part of the unit. Unit safety and operating controls should be checked for proper operation as explained in the SERVICE INSTRUCTION included with the unit.
4. The voltage at the compressor motor must be within the limits shown on the unit data plate.
5. Check for a burnout in the motor windings. This may be evidenced by discoloration of the compressor oil or by a burnt odor. A further check for motor burnout would be to use an ohmmeter and check if the windings are grounded, or check for an open circuit between the motor terminals. These are an indication of motor burnout. If this occurs, the entire motor-compressor should be replaced.
6. Dismantle only the part of the hermetic compressor necessary to correct the fault.
7. Never open any part of a hermetic compressor which is under vacuum; be sure the pressure is atmospheric. If the compressor is opened while under a vacuum, moisture laden air may be drawn into the system and rapid corrosion of internal machined parts may result. The refrigerant is an excellent cleaning agent and will remove any natural protective coating from the iron or steel, leaving the raw metal exposed.
8. Internal machined parts of the compressor such as valves, pistons and crankshaft must be immediately protected as they are removed from the compressor. Coat the parts with oil and wrap them in clean paper.
9. Before removing the cylinder heads, each head should be match marked in relation to its position on the housing.
10. When assembling a compressor or compressor parts, it is essential to draw all nuts and cap screws to their

proper torque, using an accurate torque wrench. Table 1 shows the recommended torques for this compressor. Insert all cap screws and tighten them lightly. Then using the torque wrench, tighten one cap screw or nut first; and the opposite one next. Then tighten two more on a center line at right angles to the first two. Proceed to draw down opposite and alternate pairs around the flange of the cylinder head or bearing head until all are tightened to the proper torque.

TABLE 1 — TORQUE VALUES — CAP SCREWS & NUTS

LOCATION	SIZE	TORQUE
Oil Pump	1/4 — 20	9 ft. lbs.
Connecting Rod	5/16 — 24	15 ft. lbs.
Discharge Valve Cage	3/8 — 16	15 ft. lbs.
Top Head	7/16 — 14	55 ft. lbs.
Oil Pump Bearing Head	7/16 — 14	55 ft. lbs.
Discharge Stop Valve	7/16 — 14	55 ft. lbs.
Hand Hole Cover	7/16 — 14	55 ft. lbs.
Suction Stop Valve	1/2 — 13	70 ft. lbs.
Terminal Bolts (Motor)	—	10 ft. lbs.
Terminal Bolts (Control)	—	15 ft. lbs.
Stator Locking Plug	—	70 ft. lbs.

HANDLING

The compressor should be handled using proper rigging methods as shown in Form 180.02-NO1.

VENTING THE COMPRESSOR

Before opening the compressor for repairs, close the suction and discharge stop valves. Loosen the pressure tap next to the adjusting stem on the suction stop valve and vent the compressor to the atmosphere. (See Fig. 3).

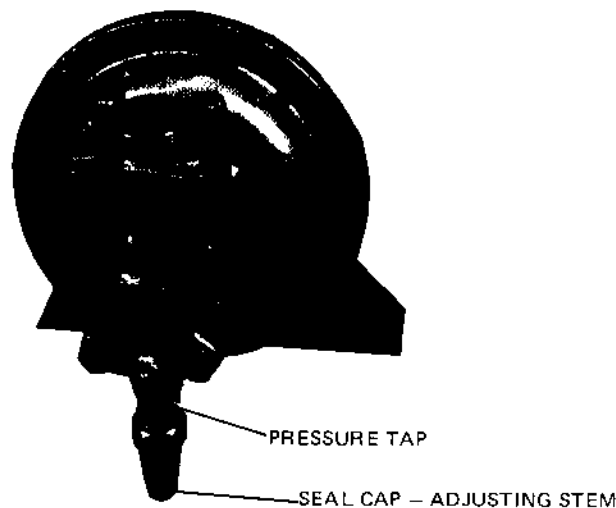


FIG. 3 — SUCTION STOP VALVE

REPLACING THE OIL PUMP (See DESIGN HISTORY)

Style A Compressor

If it becomes necessary to replace the oil pump on a Style A compressor, a replacement pump, Part No. 365-24582 should be ordered. Installation instructions are included with each pump.

Style B Compressor

If it becomes necessary to replace the oil pump on a Style B compressor, a complete new pump assembly, Part No. 026-20297 should be ordered. To replace the oil pump, refer to Fig. 4 and proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.
2. Remove the oil pump cover cap screws and pull the pump assembly out of the bearing head.
3. Install the new oil pump assembly using a new gasket. Be sure that the flat end of the pump drive shaft engages the slot in the end of the compressor crankshaft.
4. Tighten the pump cover cap screws evenly by drawing down opposite and alternate pairs.
5. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

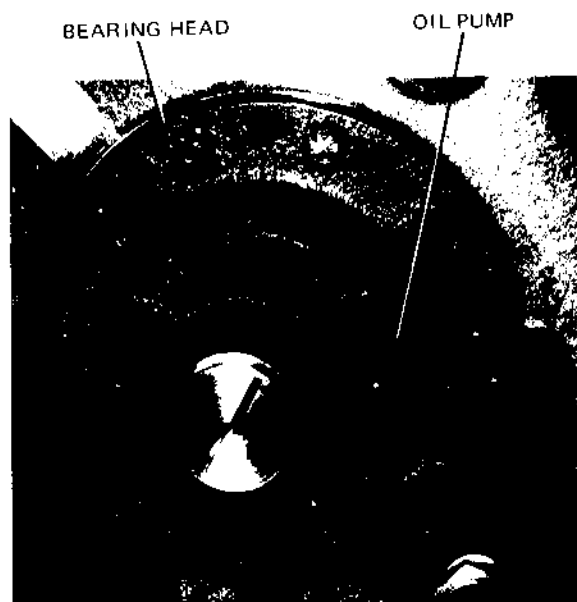


FIG. 4 — OIL PUMP

CAPACITY CONTROL ASSEMBLY

The capacity control solenoid valve is the normally-closed type. It is de-energized to load the compressor.

If it becomes necessary to replace the 3-way capacity control valve, a complete new assembly including the external piping and the solenoid valve must be ordered. (See DESIGN HISTORY.) The solenoid valve cannot be removed from the piping. (See Fig. 5.)

To replace the capacity control assembly proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.
 2. Disconnect the wiring to the solenoid. Remove the coil from the valve.
 3. Remove the compression fitting (or flare fitting) from the compressor top heads and the compressor housing.
 4. Be sure the threads on the fittings on the new manifold are clean.
 5. Install the new manifold and 3-way solenoid valve. Start all fittings before tightening any fitting. Draw all fittings down progressively and evenly until all fittings are tight and free of leaks.
 6. Re-install the solenoid coil. Re-connect the solenoid wiring.
- CAUTION:** Be sure the relief valve on the roto-lock valve is subject to by-pass gas pressure.
7. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)



FIG. 5 — CAPACITY CONTROL PIPING

CRANKCASE OIL HEATER (Style A Compressor)

The crankcase oil heater is located in a threaded hole in the oil pump end of the compressor near the bottom. (See Fig. 1.) The heater should operate whenever the compressor is shut down. After the compressor is shut down, the bottom of the crankcase should continue to feel warm indefinitely. If it is not, an electrical continuity test should be made to determine if the heater is operating.

If replacement of the heater is required, the procedure can most readily be accomplished after the compressor has been removed from the unit. Proceed as follows:

1. Vent the compressor as explained under VENTING THE COMPRESSOR. Drain the oil from the crankcase.
2. Disconnect the electrical wires from the heater.

3. Unscrew the heater from the compressor housing. Due to the small amount of available wrench clearance, it may be necessary to loosen the circular base of the heater terminal box to secure a firm grip on the heater with a suitable wrench. A considerable amount of force may be necessary to loosen the heater from the compressor.
4. Clean the threads on the housing and on the new heater with an approved safety solvent. Apply LOC-TITE to the male threads of the heater body and screw the heater in tightly.
5. Connect the electrical wires, charge the compressor with oil (See PHYSICAL DATA) and evacuate. (See EVACUATION AFTER REPAIRS.)

CRANKCASE OIL HEATER (Style B Compressor)

The crankcase heater is located on the oil pump end of the compressor. The heater is located within a well in the compressor casing; it is not in direct contact with the refrigerant or oil. To replace the heater, remove the cover from the heater electrical box and disconnect the heater wires. Remove the 1/4" Dia. screw holding the electrical box to the compressor casing and pull the box and the heater from the compressor.

When installing the new heater, coat it with heat conductive compound. (York Part No., 013-00898.)

REMOVING THE SUCTION STRAINER

The compressor suction strainer is located in the motor housing cover just under the suction stop valve. (See Fig. 6.) To clean or replace the suction strainer proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.
2. Remove the four bolts which hold the suction stop valve to the motor housing cover.
3. Pull the suction strainer out of the housing and clean with

an approved safety solvent or install a new strainer if required.

4. Replace the suction strainer using new gaskets. Note that two gaskets are used; one between the suction stop valve and the suction strainer, the other between the suction strainer and the compressor housing.
5. Bolt the suction valve in place, making sure that it seats squarely.
6. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

REPLACING THE OIL SIGHT GLASS (Style A)

The oil sight glass is fused into a metal plate which is secured to the crankcase cover plate by means of three cap screws, using an O-ring gasket. This assembly must be replaced as a unit, using a new O-ring gasket. Proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.
2. Drain the compressor oil.
3. Remove the three cap screws, the oil sight glass assembly and the O-ring gasket.
4. Clean the new parts thoroughly and install them in the cover plate, tightening the cap screws evenly.
5. Fill the compressor with new oil.
6. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

REPLACING THE OIL SIGHT GLASS (Style B)

Each Style B compressor is equipped with an oil level sight glass located on the pump end of the compressor. If the sight glass becomes broken or damaged it must be replaced. Proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.
2. Drain the oil level below the sight glass.
3. Remove the damaged sight glass.
4. Clean the threads in the housing and on the new sight glass with an approved safety solvent.
5. Apply LOC-TITE to the threads of the sight glass and screw it into the compressor housing using a socket wrench. Do not over-tighten as this may crack the glass. (Max. torque 100 ft. lb.)
6. Fill the crankcase with clean oil and evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

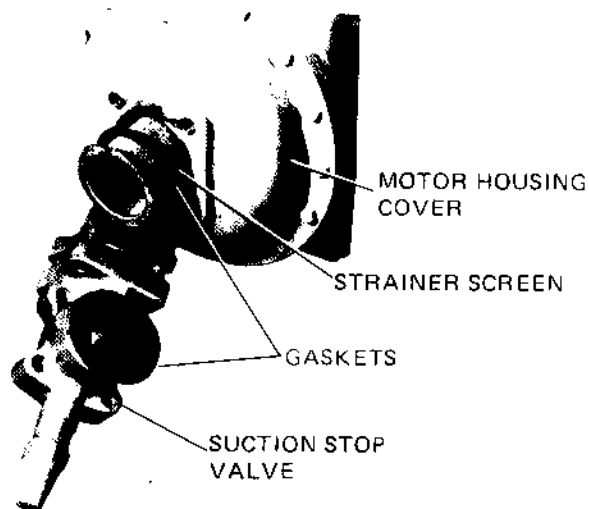


FIG. 6 — COMPRESSOR SUCTION STRAINER

ANALYSIS OF FAULTY COMPRESSOR VALVE OPERATION

If leaking or broken valves are suspected, the heads should be removed and the valves should be examined for breakage.

External indications of trouble within the compressor are as follows:

1. Insufficient capacity.
2. Unusual pressure gauge readings.
3. Unusual noise at various or full load conditions.

If trouble is suspected within the compressor the following procedure should be followed before removing the top heads to check suction and discharge valves.

1. Check the temperature in the air conditioned space.
2. Check and determine operating pressures and temperatures.
3. If the compressor is not making unusual or excessive noise, close the suction stop valve and operate the compressor, letting it pump down until it shuts off on the low pressure cut-out. If the compressor will not pump down to this setting, it may be an indication of broken compressor valves.

REMOVING THE DISCHARGE AND SUCTION VALVE AND CYLINDER SLEEVES (See DESIGN HISTORY)

To remove the valve assemblies and cylinder sleeves, refer to Fig. 7 and proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.
2. Disconnect the discharge valve from the compressor top head and remove the capacity control piping. Remove the top heads from the compressor.
3. Remove the four cap screws which secure the discharge valve cage assembly to the housing and lift out this assembly. The inner discharge valve plate, the discharge valve, and the discharge valve springs will come out with the cage.
4. Remove the discharge valve screw and its beveled gasket. Then lift out the inner discharge valve plate, discharge valve and springs. (See Fig. 7.)
5. Lift off the discharge valve plate, the suction valve springs, and the suction valve.
6. Lift the cylinder sleeve out of the compressor housing.
7. Clean, dry and oil all parts. Inspect the valves for grooves and renew, if necessary.

INSTALLING THE CYLINDER SLEEVES

To install the cylinder sleeves, refer to Figs. 7 and 8 and proceed as follows:

1. Apply a light coating of oil to the inside of the cylinder sleeve.
2. Carefully lower the cylinder sleeve over the piston. Push the cylinder sleeve down until it rests firmly on the com-

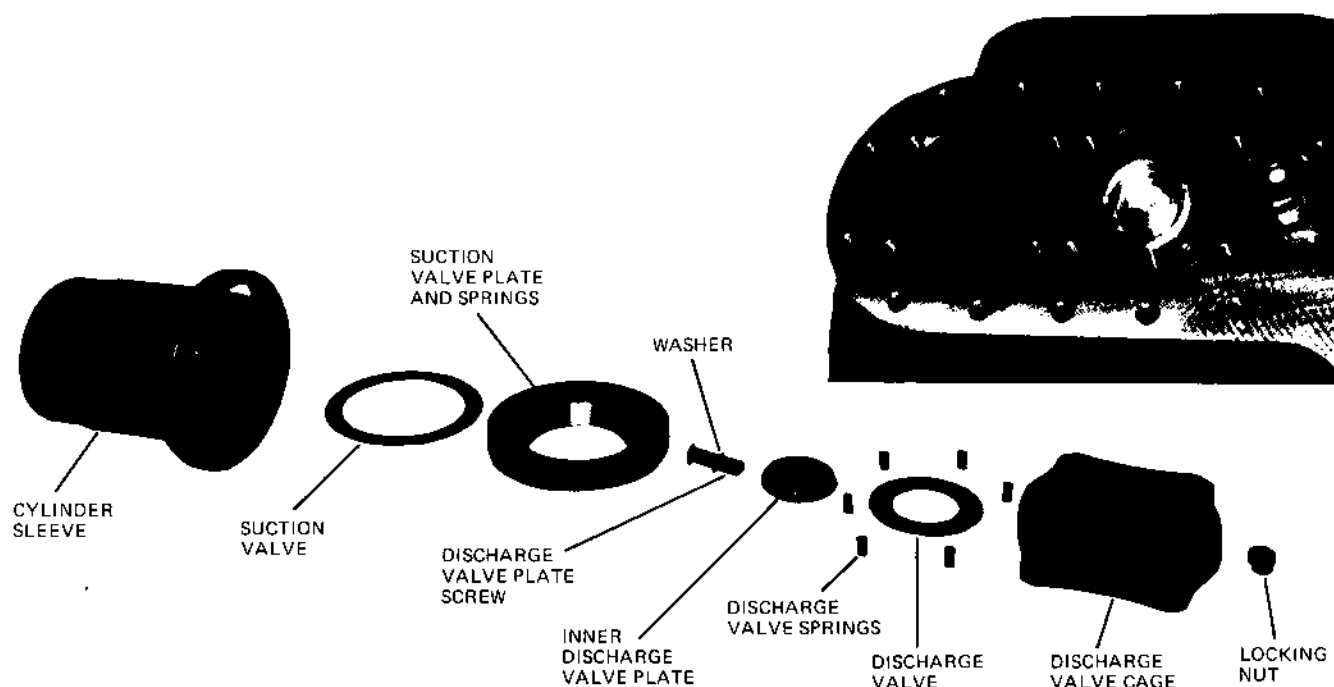


FIG. 7 — REMOVING VALVES & CYLINDER SLEEVES



FIG. 8 — REPLACING CYLINDER SLEEVE

pressor housing. Do not force the cylinder sleeve. The lower end of the sleeve is chamfered to facilitate entering the piston. Enter the sleeve squarely into the housing and rotate the sleeve as it is being lowered.

INSTALLING SUCTION AND DISCHARGE VALVES

To install the suction and discharge valves, refer to Figs. 7 and 9 and proceed as follows:

1. With the spring pocket side of the discharge valve plate up, assemble the suction valve springs in their pockets and set the suction valve in place.
2. To hold the suction valve and springs firmly in place during installation, make up two sheet metal clips to be placed over the discharge valve plate and suction valve as shown in Fig. 9. These clips may be ordered from the Factory — York Part No. 065-01670.
3. Assemble the discharge valve cage assembly.
 - a. Insert the discharge valve springs in their recesses in the valve cage and set the discharge valve in place.
 - b. Insert the discharge valve screw, with beveled gasket, through the inner discharge valve plate.

Then bolt the assembly together, using the self locking nut.

4. Set the suction valve plate, with suction valve clipped in place, on the cylinder sleeve. Then remove the two metal clips.
5. Holding the suction valve plate in place, set the valve cage assembly on the valve plate and bolt the entire assembly (cylinder sleeve, valve plate and valve cage) to the housing using the cap screws and lock washers.
6. Using new gaskets if required, install the compressor heads and re-connect the by-pass piping to them.
7. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

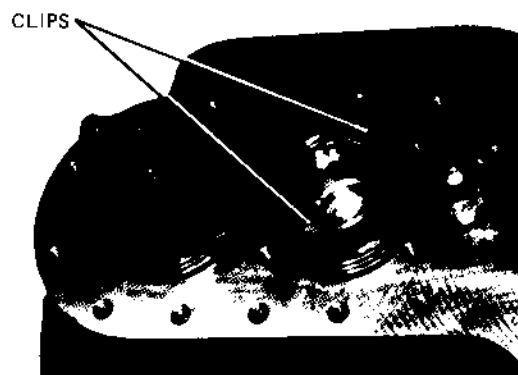


FIG. 9 — INSTALLING SUCTION VALVE

REPLACING THE HIGH PRESSURE RELIEF VALVE

The high pressure relief valve is screwed into the upper machined surface of the cylinder bank under the top head to relieve any abnormally high discharge pressure back to the suction side of the compressor (see Fig 7). It is factory set to open at 375 psi differential pressure. The high pressure relief valve may best be checked for leakage when the compressor is open for repairs or inspection.

To test the relief valve for leakage, remove the valve, and apply air pressure to the valve. Pour an approved safety solvent into the opening through which the valve discharges. If bubbles appear before the solvent evaporates, replace the valve.

To replace the high pressure relief valve when the compressor is not open for repairs or inspection, proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.
2. Remove the discharge valve, the by-pass piping and the top head. The relief valve is located under the top head with the discharge valve.
3. Unscrew the leaking relief valve and screw in the new valve.
4. Re-assemble the top head and the by-pass piping using new gaskets.
5. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

REMOVING PISTONS AND CONNECTING RODS

To remove the pistons and connecting rods, refer to Fig. 2 and proceed as follows:

NOTE: *The width of the connecting rods at their large end, is greater than the inside diameter of the cylinder sleeve. Before a piston and connecting rod assembly can be removed from the compressor housing, the cylinder sleeve must first be removed. Then the piston and connecting rod assembly can be pulled outward from the compressor.*

1. Vent the compressor as explained in VENTING THE COMPRESSOR and drain the oil from the crankcase.
2. Remove the suction and discharge valve assemblies. Allow the cylinder sleeve to remain in place in the housing.
3. Remove the crankcase hand hole cover plate(s).
4. With the cylinder sleeves in place, rotate the crankshaft to a position that will permit ready-access to the connecting rod bolts to be removed. Loosen the nuts and remove the lower half of the connecting rod bearing. Note the identification number stamped on the half-bearing just removed.

5. Using care to make certain that the upper half of the connecting rod bearing remains in place on its crankpin, rotate the crankshaft to the point where the piston is very near the top of its stroke.

6. Remove the cylinder sleeve.

7. Lift out the piston and its connecting rod. Note that the identification number stamped on the upper half of the rod bearing, matches the number on the lower half of the rod bearing. These numbers must ALWAYS match.

CAUTION: *Never rotate the crankshaft when one or more piston and connecting rod assemblies are in place UNLESS the related cylinder sleeve or sleeves are in their proper position in the compressor housing. If this CAUTION is NOT observed, serious damage could occur. Make certain also that when the bottom half of the rod bearing has been removed and it is necessary to rotate the crankshaft, that the upper half of the rod bearing does not leave its proper place on its crankpin.*

8. Remove piston assemblies ONE AT A TIME, repeating the above steps (4) through (7) for each piston assembly. Proceed to step (9).
9. Remove the piston pin retaining rings from the piston.
10. Push the piston pin out of the piston and the small end of the connecting rods.
11. Remove the piston rings.
12. Clean, dry and oil all parts.

INSTALLING PISTONS AND CONNECTING RODS

To install the piston and connecting rod assemblies, refer to Fig. 2 and proceed as follows:

1. Each piston is equipped with two piston rings. The plain (compression) ring sets in the upper groove and the ventilated (oil) ring sets in the lower groove. Install the ventilated ring first; then the plain ring. Use copper or brass strips under the rings and spread the rings only enough to slide them down over the piston.
2. Set the piston with its top surface down on a bench and apply a few drops of oil to the piston pin holes and to the eye in the connecting rod. Insert the small end of the rod into the piston and slide the piston pin into position. The pin is a sliding fit into the piston and rod. Center the piston pin and insert the piston pin retaining rings.
3. Cylinder sleeves and piston assemblies, when reused, should be installed in their original locations in the compressor housing. Remove the lower half of the connecting rod bearing, allowing the connecting rod bolts to remain in position. Check to see that the numbers on the two halves of the bearing are matched and that they

are on the same side of the connecting rod. The connecting rods should be installed so that these numbers are toward the drive end of the compressor. Apply a few drops of oil to the crankpin and to the piston. Insert the piston and connecting rod assembly through the cylinder bore and carefully position the upper half of the connecting rod bearing on its crankpin.

Insert the cylinder sleeve into its position in the compressor housing and push it down over the piston. The chamfer on the lower end of the cylinder sleeve permits easy entrance for the piston and its rings.

4. Install the lower half of the connecting rod bearing as described in step (3) above. Tighten the nuts evenly to a torque of 15 foot pounds. Hand turn the crankshaft to be sure there is no binding. Install all piston assemblies, turning the shaft after each rod is installed, to be sure that no binding exists.
5. Make sure that the compressor crankcase is clean. Install the crankcase hand hole cover plates. Fill the crankcase to the proper level with new oil.
6. Re-install the suction and discharge valves and the compressor top heads, making sure they are in their original locations and re-connect the discharge valve, the by-pass piping, and top heads, using new gaskets as required.
7. Evacuate the compressor of air. (See EVACUATION AFTER REPAIRS.)

REMOVING THE CRANKSHAFT (See DESIGN HISTORY)

Normally, it is not considered advisable to replace the crankshaft in the field, since trouble sufficient to warrant replacement of this item would undoubtedly involve replacing the compressor motor as well. Instead, it is recommended that an exchange motor-compressor be installed and the damaged unit be returned for credit to the nearest hermetic repair station or to the factory.

However, the crankshaft may be removed in the field for inspection if it is so desired. Refer to Fig. 2 and proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR and drain the crankcase.
2. Remove the oil pump, the discharge and suction valve assemblies and the piston and connecting rod assemblies as outlined previously.
3. Disconnect the compressor suction stop valve flange to which the suction line is brazed and move the suction line and flange to provide clearance for the compressor motor housing cover.
4. Remove the suction strainer and its gaskets.

5. Remove the compressor motor housing cover.
6. Remove the rotor from the crankshaft. The rotor is held in position by means of a long cap screw, a spring lock washer, and the shaft coupling washer. (See Fig. 2.) The rotor is provided with two tapped holes, which, in conjunction with two bolts and a suitable metal bar or block, may be used to pull it free of the crankshaft. Remove the key. Use care to prevent dropping the rotor and any sudden or harsh contact with the stator, particularly the exposed stator windings.
7. Remove the cap screws which secure the pump end bearing head to the housing and remove the bearing head. (See Fig. 4.)
8. Carefully pull the crankshaft out of the compressor through the opening for the pump end bearing head.
9. The pump end thrust collar (Style A only) will come out with the pump end bearing head but the motor end collar will probably remain in place on the inboard end of the motor end main bearing. Remove thrust collar(s) from the main bearings. A roll pin prevents the collars from turning with the crankshaft (Style A only). (See Fig. 2.)
10. Re-assemble the compressor by following the above procedure in reverse order.

REMOVING MAIN BEARINGS

Normally, it is not considered advisable to replace main bearings in the field, since trouble sufficient to warrant bearing replacement would undoubtedly involve replacing the compressor motor as well. Instead, it is recommended that an exchange motor-compressor be installed and the damaged unit be returned for credit to the nearest hermetic repair station or to the factory.

However, if required, main bearings may be replaced in the field. Refer to Figs. 10 and 11 and proceed as follows:

1. Vent the compressor as explained under VENTING THE COMPRESSOR.
2. Remove the oil pump, the discharge and suction valve assemblies, the piston and connecting rod assemblies, and the crankshaft as explained in the respective preceding sections of this book.
3. Using the bearing replacing tool (See Fig. 10) pull the worn bearings out of both the pump end bearing head and the compressor bearing housing. Since the outboard opening of the pump end bearing head is smaller than the diameter of the bearing, this bearing must be removed and replaced through the inboard opening using the bearing bar as illustrated in Fig. 11, Detail A. Both bearings at the motor end of the compressor should be removed simultaneously using the bearing plug. (See Fig. 11, Detail B.)

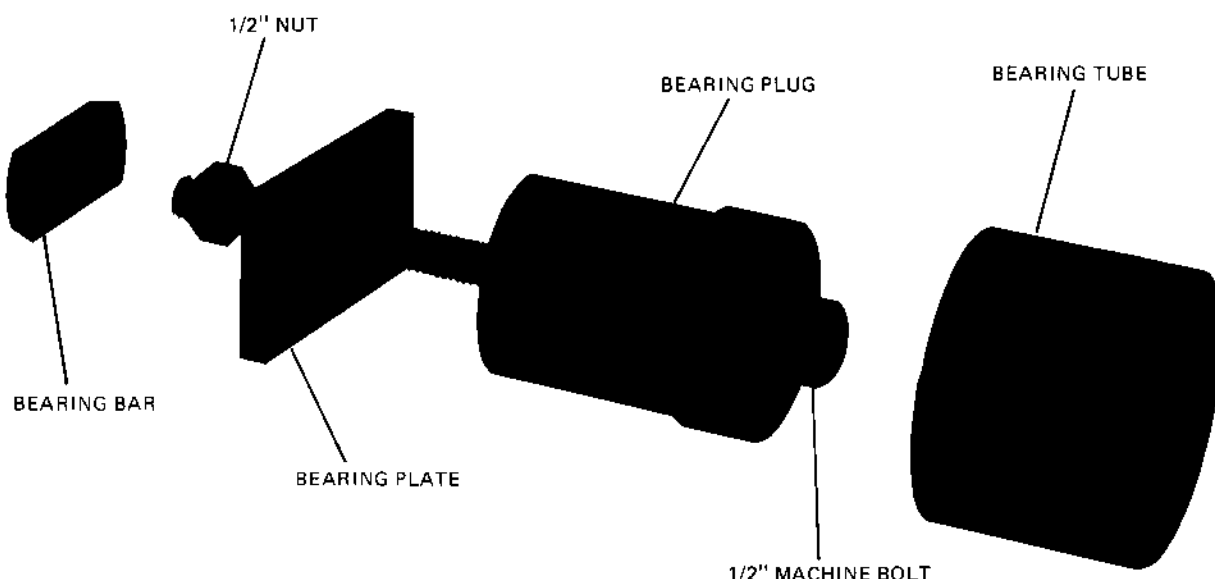


FIG. 10 — BEARING REPLACEMENT TOOL

INSTALLING MAIN BEARINGS

Before installing new bearings, apply clean oil to the outside surface of the bearings and to the inside portions of the pump end bearing head and the compressor bearing housing into which the bearings are to be pressed.

PUMP END BEARING

Using the bearing replacing tool as shown in Fig. 11, Detail C; pull the pump end bearing into the pump end bearing head, taking care to enter the bearing evenly and squarely. Note that the bearing must be drawn in 1/8" below the inside of the bearing head.

MOTOR END BEARINGS

The OUTBOARD bearing must be installed before installing the inboard bearing. Using the bearing replacing tool as shown in Fig. 11, Detail D; install the OUTBOARD bearing, pulling it in evenly and squarely until it is flush with the bearing housing. After the outboard bearing is installed properly, install the inboard bearing (using the bearing replacing tool as shown in Fig. 11, Detail E) drawing it in evenly and squarely until it protrudes 1/16" beyond the inside of the bearing housing. This 1/16" serves to locate the thrust collar.

Coat the bearings with clean oil and install the thrust collar.

NOTE: Slot in thrust collar must face crankshaft thrust face.

Re-assemble the compressor by following the preceding disassembly procedures in reverse order.

EVACUATION AFTER REPAIRS

During the compressor repair procedure the crankshaft and oil should be examined for the presence of metal particles. This could indicate wearing of parts within the compressor or system contamination. New oil should be charged into the compressor using the oil charging valve. (See PHYSICAL DATA.)

The compressor should be given a thorough leak test as explained in instruction Form 55.05-NM.

The compressor should then be evacuated to a pressure of 300 microns using a quality vacuum pump and following the procedure outlined in instruction Form 55.05-NM.

ISOLATORS

York designed springs, color coded, are to be used with the S compressor are as follows:

COMPRESSOR SIZE	PUMP END	MOTOR END
SS42	Gray (2 Req'd.)	Orange (2 Req'd.)
SS62	Gray (2 Req'd.)	Blue (2 Req'd.)
SS82	Brown (2 Req'd.)	Blue (2 Req'd.)

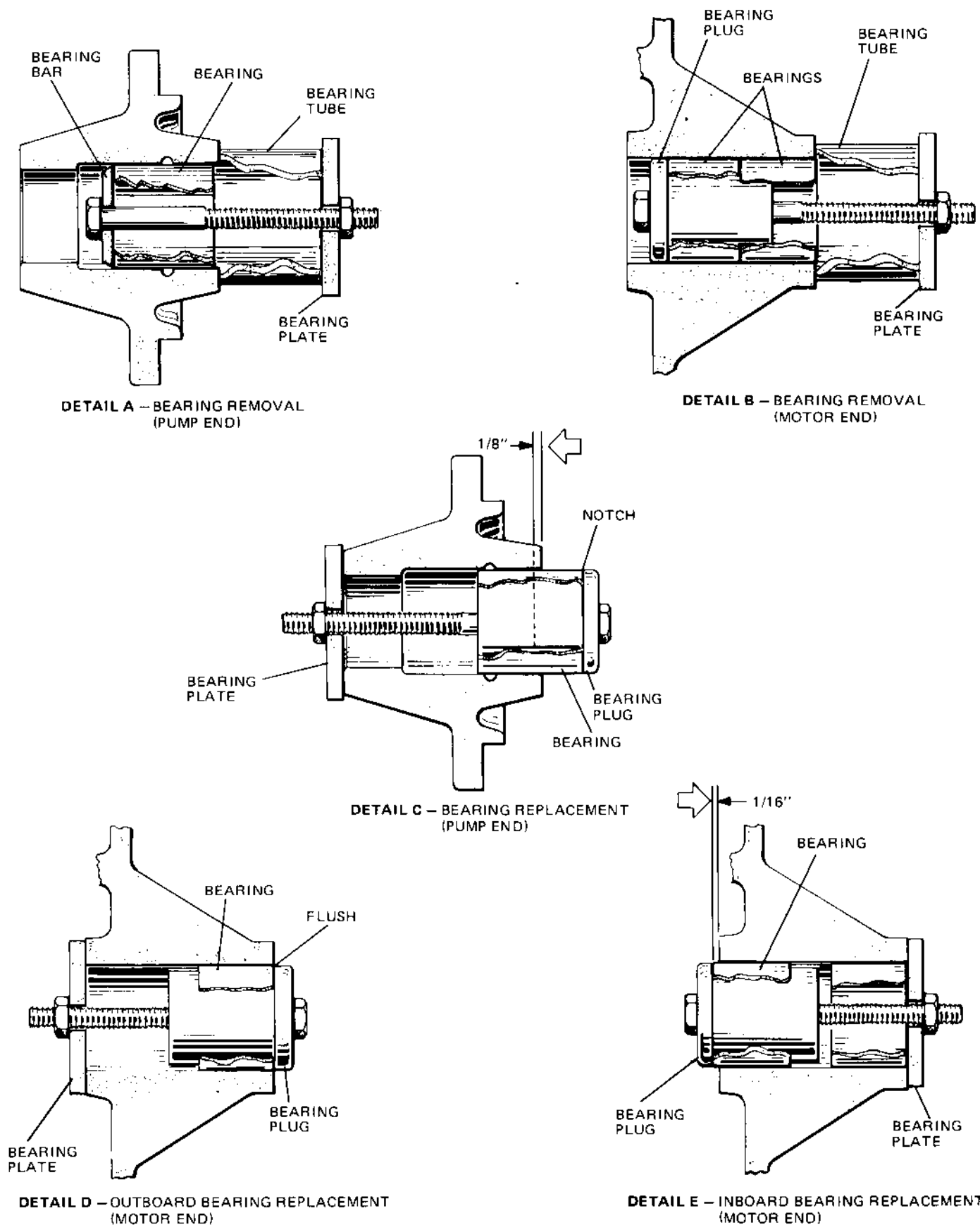


FIG. 11 – BEARING REMOVAL AND REPLACEMENT



File in SRC Manual(s).

SERVICE BULLETIN

94-29

Supersedes: Nothing

1294

Form 180.11-RP (SB1)

File with Forms: 180.11-RP, 180.15-RP1, 180.40-RP1 & 2, 185.10-RP, 185.15-RP1 (SB1)

DATE: December 19, 1994
TO: A. S. Service Districts
FROM: D. C. Bull - 36BE
SUBJECT: * DISCHARGE VALVE CENTER BOLT
021-01068 2 5/8 COMPRESSOR

The subject bolt is part of Discharge Valve Cage Assembly 365-24678-000. Engineering has changed the torque requirement for this bolt to 20-22 ft. lbs. Exceeding this requirement may result in damage to the bolt and a failure of the compressor.

Please distribute this information to your Service Technicians and mark your manuals accordingly.

* Compressors where used:
FN, F, H, S, FC & HC


D. C. Bull - 36BE