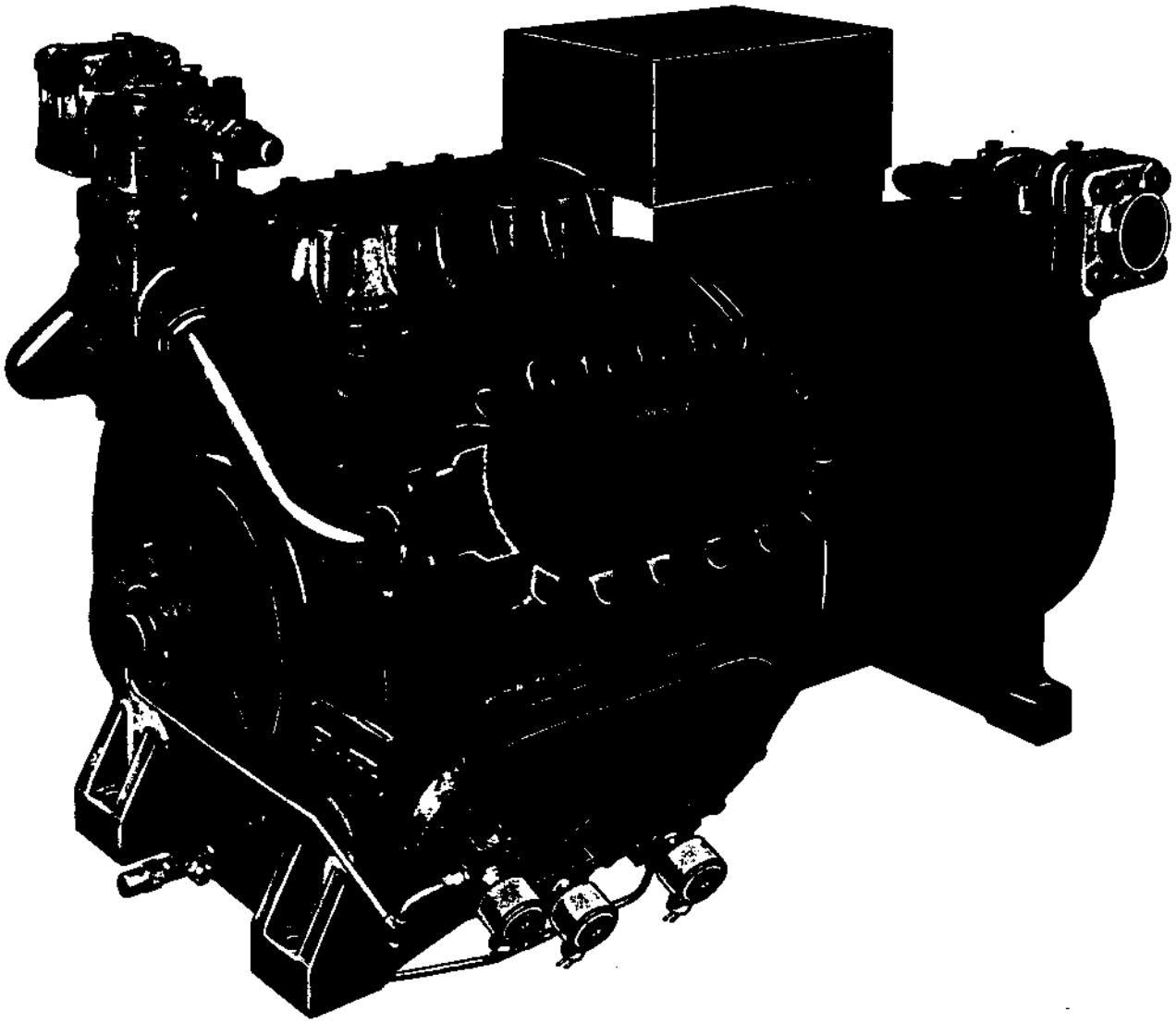
YORK®

MODEL J
HERMETIC COMPRESSORS

MAINTENANCE	Supersedes: Form 180.23-M (286)	1092	Form 180.23-M1

MODELS
JS43, JS53, JS63, JS73, JS83 (STYLE A, B, C, D — SHORT STROKE)
JS44, JS54, JS64, JS74, JS84 (STYLE C & D — LONG STROKE)



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For Renewal Parts — See Form 180.23-RP1.

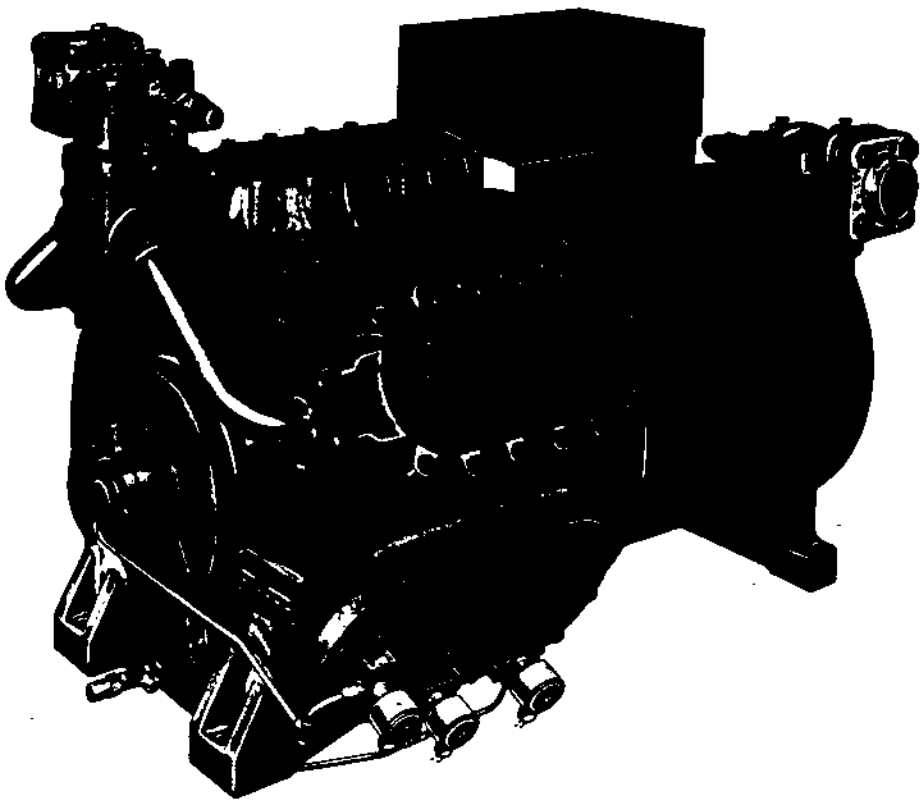


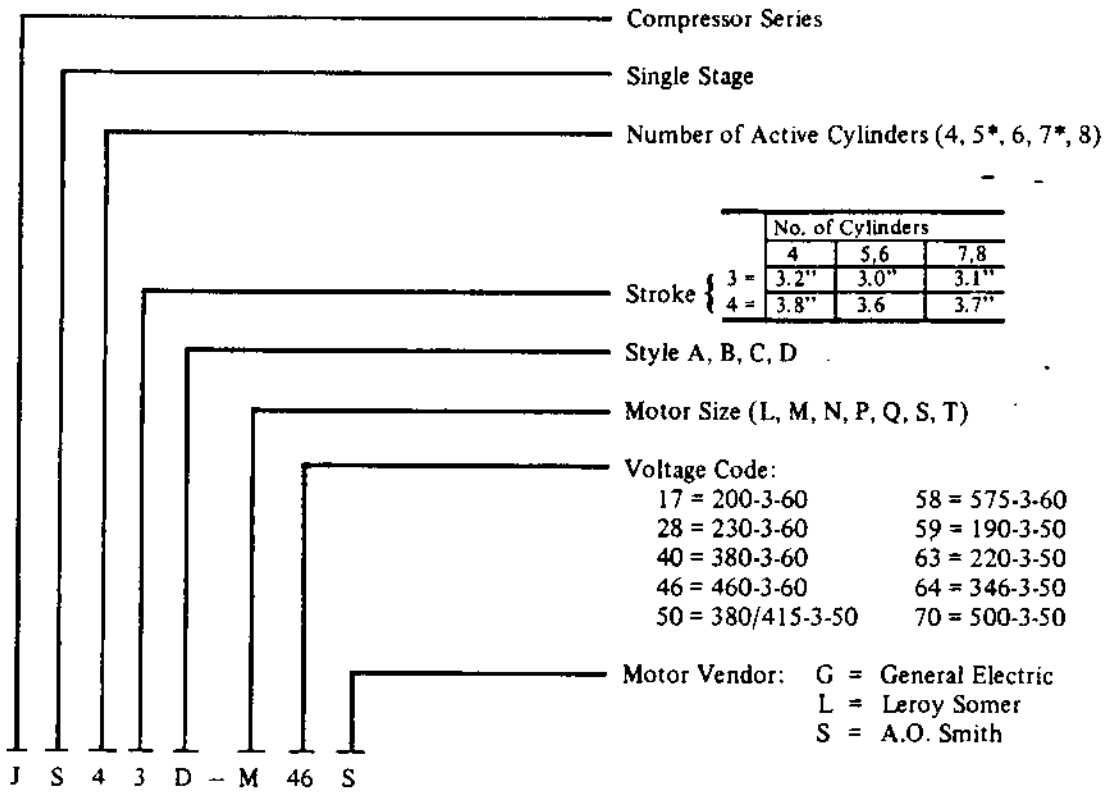
FIG. 1 — MODEL JS63 COMPRESSOR (STYLE B)

GENERAL DESCRIPTION

YORK Model J hermetic compressors are designed to meet air conditioning requirements in the range of 10 to 62 tons with R-12 or 27 to 100 tons with R-22. The hermetic motor-compressor is available in 4, 5, 6, 7 or 8 active cylinder sizes. Capacity control is available as suction pressure[1] actuated or by solenoids. Nominal operating speed is 1750 RPM with 60 Hertz power supply.

[1] Suction pressure actuated capacity control no longer available.

NOMENCLATURE



Stroke	No. of Cylinders: 4	5,6	7,8
3 =	3.2"	3.0"	3.1"
4 =	3.8"	3.6	3.7"

*The 5 and 7 cylinder compressors each have one cylinder which is permanently unloaded. The unloaded cylinder does not contain suction valve, suction valve springs, unloader sleeve, unloader device or lift pins.

PHYSICAL DATA

COMPRESSOR MODEL	JS43 & JS44		JS53 & JS54		JS63 & JS64		JS73 & JS74		JS83 & JS84	
Refrigerants	-12	-22	-12,	-22	-12,	-22	-12,	-22	-12,	-22
No. of Active Cylinders	4		5		6		7		8	
Nom. CFM Displacement**	143		168		202		243		278	
Bore (Inches)	3-3/4		3-3/4		3-3/4		3-3/4		3-3/4	
Stroke (Inches)	3.2	3.8	3.0	3.6	3.0	3.6	3.1	3.7	3.1	3.7
Suction Conn. (ODF)	3-1/8		3-1/8		3-1/8		3-5/8		3-5/8	
Discharge Conn. (ODF)	2-5/8		2-5/8		2-5/8		3-1/8		3-1/8	
Oil Charge (Gals.)	3		3-1/2		3-1/2		3-1/2		3-1/2	
Weight (Lbs.)	1370		1480		1480		1640		1640	

** "3" Stroke models operate at 1750 RPM; "4" Stroke models operate at 1470 RPM.

LIMITATIONS

VOLTAGE LIMITATIONS

The following voltage limitations are absolute and operation beyond these limits may cause serious damage to the compressor or motor.

Nameplate Voltage	Mininum Voltage	Maximum Voltage
200-3-60	180	220
230-3-60	207	253
460-3-60	414	506
575-3-60	517	633
220-3-50	198	242
380-3-60	355	415
380/415-3-50	342	440
190-3-50	171	208
346-3-50	311	381
500-3-50	450	550

COMPRESSOR OPERATING LIMITATIONS

Maximum Compression Ratio	9.5:1
Maximum Operating Differential (PSI)	325
Maximum Suction Pressure[1] (PSIG)	95
Maximum Discharge Temp. (°F)	275
Superheat (Nominal) (At Compressor)	15°F
Min. Oil Pressure (above suction pressure)	20 psi
Oil Temperature[2] (Max.)	160°F
Maximum Sat. Discharge Temp.[3]	
R-12	150°F
R-22	150°F
Maximum Ambient	130°F
Minimum Ambient	0°F

[1] Maximum Operating Suction Pressure is 85 psig attainable with internal suction pressure unloading device.

[2] Measured externally on pump suction boss as shown in Fig. 2.

[3] Motor selection and operating conditions may limit maximum saturated discharge temperature to lower valves.

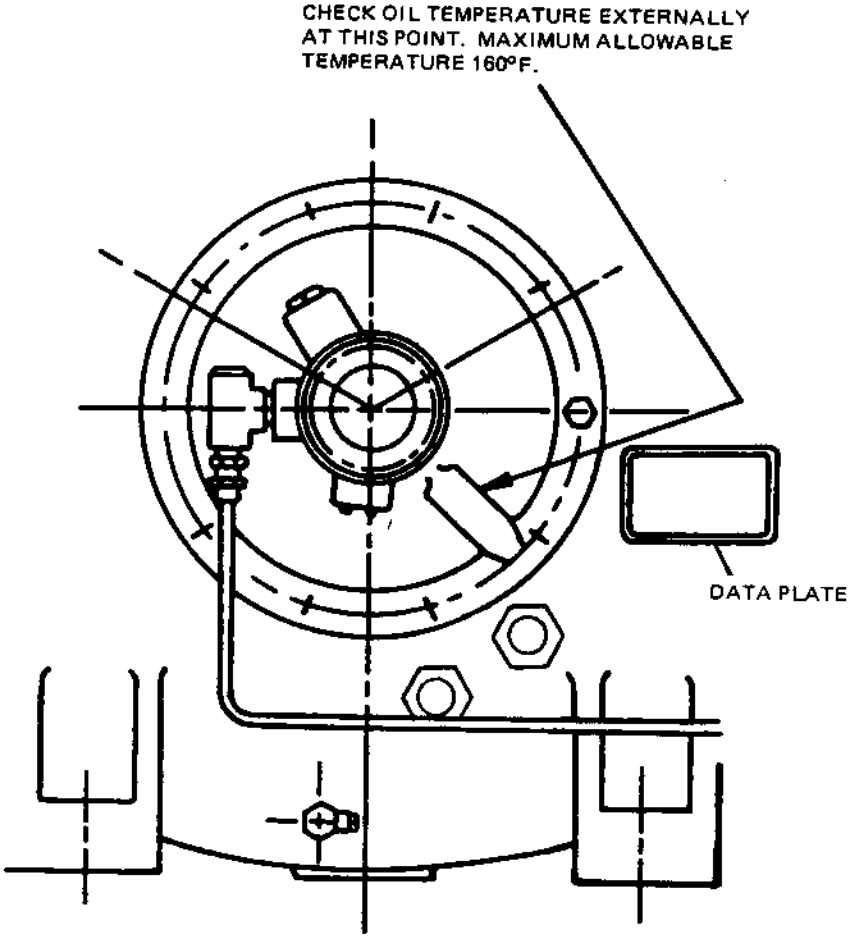


FIG. 2 — CHECKING OIL TEMPERATURE

TABLE 1 — MOTOR CURRENT RATINGS FOR "J" SERIES COMPRESSORS

Motor Size Code	Voltage Code	Voltage	Phase	HZ	Rated Load Amps*	Locked Rotor Amps	
						A/L	PW
M	17	200	3	60	202	860	665
	28	230	3	60	174	777	602
	40	380	3	60	105	471	364
	46	460	3	60	87	389	301
	58	575	3	60	70	311	240
	59	190	3	50	177	760	591
	63	220	3	50	157	706	560
	64	346	3	50	100	449	356
	50	380/415	3	50	87	380	294
	70	500	3	50	68	312	240
N	17	200	3	60	238	1035	865
	28	230	3	60	207	926	752
	40	380	3	60	125	560	455
	46	460	3	60	104	463	362
	58	575	3	60	83	371	300
	59	190	3	50	212	880	734
	63	220	3	50	183	842	659
	64	346	3	50	117	536	419
	50	380/415	3	50	104	452	358
	70	500	3	50	84	370	290
P	17	200	3	60	380	1138	950
	28	230	3	60	244	1022	826
	40	380	3	60	147	618	500
	46	460	3	60	122	511	413
	58	575	3	60	97	396	330
	59	190	3	50	251	1001	821
	63	220	3	50	217	930	709
	64	346	3	50	137	591	451
	50	380/415	3	50	121	500	400
	70	500	3	50	97	391	312
Q	17	200	3	60	318	1541	1101
	28	230	3	60	275	1340	994
	40	380	3	60	166	811	600
	46	460	3	60	137	670	497
	58	575	3	60	110	536	398
	59	190	3	50	279	1324	970
	63	220	3	50	244	1160	905
	64	346	3	50	155	736	575
	50	380/415	3	50	139	640	498
	70	500	3	50	107	511	398
S	17	200	3	60	387	1674	1398
	28	230	3	60	336	1558	1216
	40	380	3	60	204	942	736
	46	460	3	60	168	779	608
	58	575	3	60	134	622	486
	59	190	3	50	339	1598	1320
	63	220	3	50	298	1418	1140
	64	346	3	50	189	901	724
	50	380/415	3	50	159	788	600
	70	500	3	50	131	623	501
T	40	380	3	60	247	1066	805
	46	460	3	60	202	944	712
	58	575	3	60	161	755	570
	64	346	3	50	234	1139	897
	50	380/415	3	50	202	896	675
	43	440	3	50	183	857	568
	70	500	3	50	161	754	605

NOTE: 1. Part winding locked rotor amps is approx 67 - 76% of across the line locked rotor amps.
2. Rated load amps = .87 x max load amps.

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 ½ 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.

6. Dismantle only the part of the hermetic compressor necessary to correct the fault.

TABLE 2 — THREADED FASTENER TORQUE

LOCATION	THREAD	TORQUE	
		IN - LB	FT - LB
Oil Pump Assembly	No. 8 - 32 UNC	30	—
Round Sight Glass (with Screws)	1/4 - 20 UNC	96	8
Hex Sight Glass (Pipe Tap)	1 - 11½ UNC	480 - 600	40 - 50
Solenoid Valve	1/4 - 20 UNC	110 - 129	8
Oil Pump Cover	5/16 - 18 UNC	180	15
Suction Pressure Control	5/16 - 18 UNC	96	8
Motor End Cover	3/8 - 16 UNC	—	30
Motor Housing	3/8 - 16 UNC	—	30
*Valve Assy. Mounting	3/8 - 16 UNC	240	20
Set Screw (Crankshaft)	3/8 - 16 UNC	—	30
Suction Strainer Cover	3/8 - 16 UNC	—	30
*Connecting Rod	3/8 - 24 UNF	260	21 - 22
Discharge Valve Assy.	3/8 - 24 UNF	—	See Note 2
[1] Unloader Power Assy.	3/8 - 24 UNF	180	15
Discharge Manifold	7/16 - 14 UNC	—	55 - 64
Hand Hole Cover	7/16 - 14 UNC	—	55 - 64
Main Bearing Head	7/16 - 14 UNC	—	55 - 64
Pump Bearing Head	7/16 - 14 UNC	—	55 - 64
Terminal Plate	7/16 - 14 UNC	—	55 - 64
Terminal Stud (Nut)	7/16 - 14 UNC	240	20
Top Head	7/16 - 14 UNC	—	55 - 64
Oil Pressure Relief Cap	9/16 - 18 UNF	—	30
Suct. & Disch. Shut-off Valve	5/8 - 11 UNC	—	90
Rotor	5/8 - 11 UNC	—	110
Stator Locking Plug	3/4 - 10 UNC	—	70
Motor Protector Terminal Stud (Nut)	No. 8 - 32 UNC	15	—

NOTES: 1. Assemble With Loctite.
2. Current Design 53-61 lb. ft./
Original Design 35-40 lb. ft., See DESIGN HISTORY.

*Critical Items — Torque Only as Specified.

7. Read DESIGN HISTORY, page 21 before any dis-assembly work is started.

8. Never open any part of a hermetic compressor which is under vacuum; be sure there is some pressure inside the compressor. 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.

9. 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.

10. Before removing the cylinder heads, each head should be match marked in relation to its position on the housing. When reinstalling a head, line it up with the discharge manifold and bolt the head to the manifold before bolting the head to the compressor housing.

11. 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 2 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.

HANDLING

When performing service on the compressor it may be convenient to remove it from the unit base.

When it becomes necessary to remove a compressor from a unit or base, proper rigging methods must be used to avoid damage to the equipment and/or injury to service personnel. Portable cranes must be of adequate capacity and properly positioned and blocked to prevent tipping or slipping while lifting the compressor. Do not attempt to lift a compressor with eye bolts threaded into tapped holes in the compressor casing. Instead, use approved and well maintained slings. Be sure slings are of adequate strength as listed in Form 180.02-NO1. The use of chains or cables is not recommended.

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.)

REPLACING THE OIL PUMP

If it becomes necessary to replace the oil pump, a complete new pump assembly should be installed. 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 and the word "TOP" is at the top.

4. Tighten the pump cover cap screws evenly by drawing down opposite and alternate pairs.

5. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

FIG. 3 — SUCTION STOP VALVE

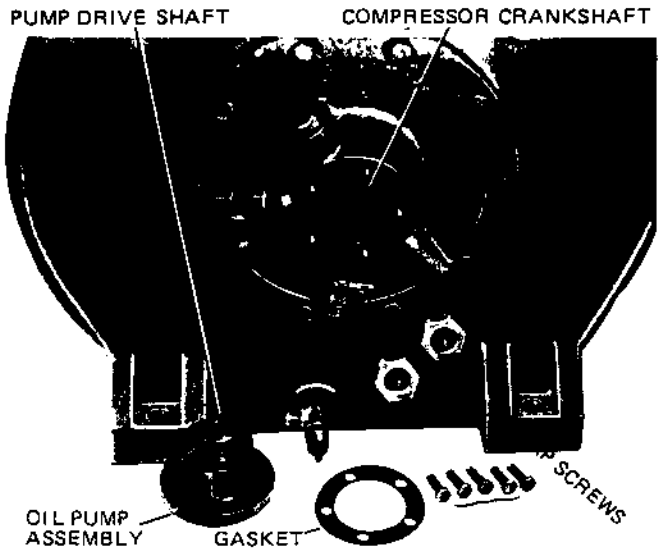


FIG. 4 — COMPRESSOR OIL PUMP

REPLACING THE CAPACITY CONTROL VALVE ASSEMBLY (SUCTION PRESSURE) (Furnished on Style A Compressors only.)

POWER ASSEMBLY (EXTERNAL)

To replace the capacity control valve power assembly, proceed as follows: (See Fig. 5.)

1. Vent the compressor. (See VENTING THE COMPRESSOR.)
2. Remove the two socket head screws which secure the power assembly to the crankcase cover plate.
3. Remove the power assembly complete with valve cage and gaskets.
4. Install the new power assembly making sure that new gaskets are used and that all gaskets are in their proper positions.
5. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

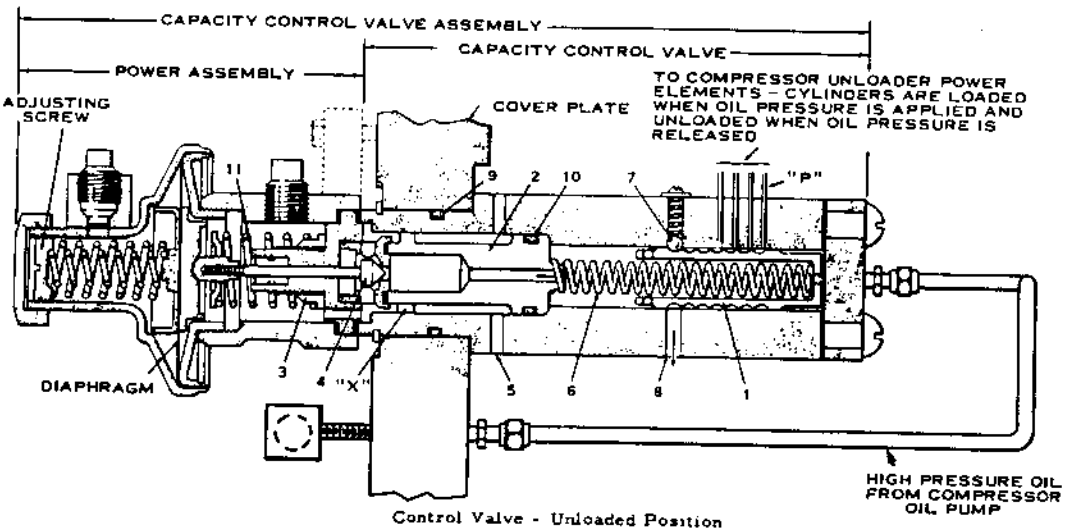
CAPACITY CONTROL VALVE (INTERNAL)

To replace the capacity control valve, proceed as follows: (See Fig. 5.)

1. Vent the compressor and drain the oil from the crankcase. (See VENTING THE COMPRESSOR.)
2. Remove the capacity control valve power assembly as explained above.
3. Disconnect the oil supply line from the cover plate.
4. Remove the crankcase cover plate.
5. Disconnect the oil lines from the capacity control valve.
6. Using the special retaining ring pliers, spread the retaining ring (on the outside of the crankcase) which secures the capacity control valve in position.
7. Remove the capacity control valve from the cover plate.

Installing the capacity control valve.

1. Transfer the fittings for the oil line connections from the old to the new capacity control valve, clean the valve and install a new O-ring.
2. Push the capacity control valve into its hole in the cover plate, using care not to damage the O-ring. Turn the valve to suit the oil line connections.
3. Using the special retaining ring pliers, expand the retaining ring and install it in its groove in the end of the control valve which protrudes to the outside of the cover plate.
4. Install all unloader oil lines in their proper places and the oil feed line at the end of the valve, tightening the connectors securely.
5. Install the capacity control valve power assembly as explained above.
6. Inspect the crankcase, cleaning it if necessary and install the cover plates. Refill with new oil to the proper level.
7. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)



LEGEND

1. Plunger
2. Bushing
3. Power Assembly Cage
4. Power Assembly Cage Valve
5. Oil Drain Hole
6. Spring
7. Spring Loaded Ball(s)
8. Oil Relief Port
9. O-Ring
10. O-Ring
11. Power Assembly Cage Spring

FIG. 5 – CAPACITY CONTROL VALVE (STYLE A COMPRESSORS ONLY)

8. Check the capacity control valve performance, adjusting it for proper operation if necessary.

CAPACITY CONTROL SOLENOIDS

Normally, the coil is the only part of the solenoid valve that requires replacement. To replace the coil, proceed as follows:

1. Place the unit switch in the "OFF" position.
2. Remove the conduit and the wires from the solenoid valve.
3. Remove the screw from the top center of the valve and remove the coil.
4. Install the new coil. Use caution when reconnecting the conduit to avoid placing stress on the valve. Stress on the valve may deform the stem and cause the valve to malfunction. Reconnect the wires.

If the solenoid valve must be replaced, proceed as follows:

1. Close the suction stop valve.
2. Open the discharge stop valve two turns of the stem.
3. Operate the compressor until a pressure of approximately 5 psi is obtained, placing a jumper across the terminals of the low pressure cut-out to prevent stopping before the desired pressure is obtained.
4. Stop the compressor and immediately close the discharge stop valve.
5. Remove the solenoid coil as described above.

CAUTION: Before proceeding to step 6, place a can beneath the solenoid valve to catch the oil. A small amount of oil will leak out when the valve is disconnected, however this should not be objectionable if the serviceman is prepared and works quickly.

6. Disconnect the line connecting the solenoid valve to the oil pump (Styles A, B or C only) and remove the bolts holding the valve to the handhole cover plate.
7. Replace the valve and reconnect the oil supply line (Styles A, B, or C only).
8. Reinstall the solenoid coil.

CRANKCASE OIL HEATER

The crankcase oil heater is located in a hole in the bottom of the motor-compressor housing. At one end of this hole is a ½" ips plug and at the other end, the electrical connection box. (See Fig. 6.) The hole is in the casting only; the heater is not in direct contact with refrigerant or oil. To remove the heater, remove the cover from the electrical connection box and disconnect the heater feed wires. Remove the connection box and the pipe nipple. Pull the heater out of the housing. If the heater is tight in the housing, remove the ½" pipe plug from the opposite end and push the heater out, using a brass rod.

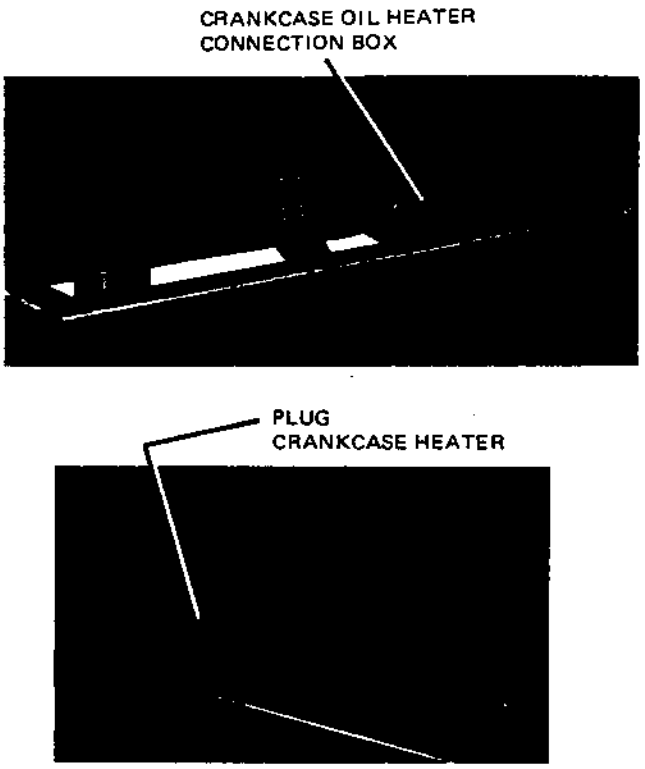


FIG. 6 — CRANKCASE OIL HEATER

When installing a new heater, coat the well in the housing with heat conducting compound (York Part No. 013-00898) before inserting the new heater.

COMPRESSOR OIL STRAINER (Styles A, B, and C)

The compressor oil strainer consists of a large area wire mesh cylinder with sheet metal ends and an internal spring to prevent collapse of the strainer screen if it should become coated with foreign material. (See Fig. 7.) The vortex eliminator and strainer connection are fastened into one end of the strainer. On the outer end of this connection is a flare nut which connects the strainer assembly to a fitting on the lower end of the oil suction tube. The upper end of the oil suction tube is rolled into a hole in the inside wall of the crankcase which communicates with a drilled hole in the oil pump housing to form the passage for the oil pump suction or feed. The compressor oil strainer may be removed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.
2. Drain the oil, remove the cover plate(s) and clean the crankcase.
3. Unscrew the flare nut in the oil strainer suction tubing, using care to prevent movement of the rolled-in portion of this tubing.

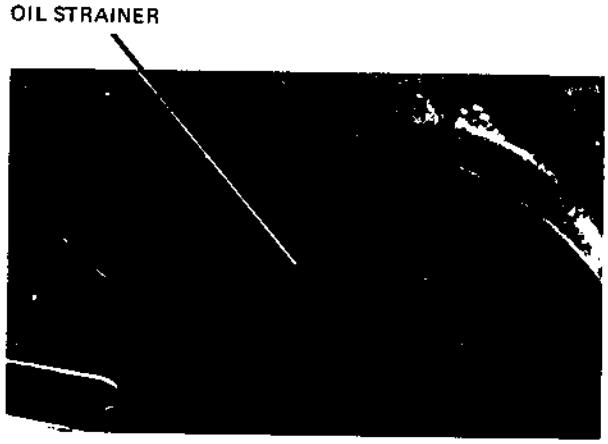


FIG. 7 — CRANKCASE OIL STRAINER (STYLE A, B OR C)

4. Lift out the strainer and clean it thoroughly, using an approved safety solvent. If the strainer is damaged in any way, it must be replaced. The vortex eliminator can be removed from the strainer by removing the screw in the end.

5. Install the strainer, making sure the connection is tight.

6. Install the cover plates using new gaskets and fill the crankcase with new oil.

7. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

(Style D)

The compressor oil strainer on Style D compressors is similiar in construction to the Style A, B, and C. However, it does not contain a flare fitting in the line between the strainer and the compressor crankcase. The one-piece line is rolled into a hole in the compressor crankcase and therefore is not readily removable in the field.

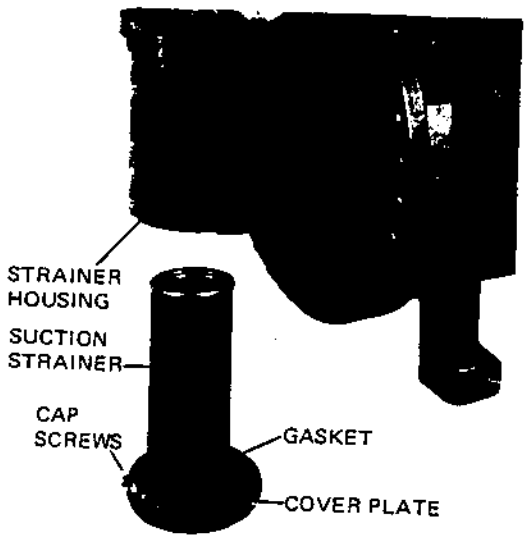


FIG. 8 — SUCTION STRAINER

REMOVING THE SUCTION STRAINER

The compressor suction strainer is located in the motor housing cover just under the suction stop valve. (See Fig. 8.) To clean or replace the suction strainer, proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.

2. Remove the bolts which hold the cover plate 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 and cover plate using a new gasket.

5. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

REPLACING THE OIL SIGHT GLASS

EARLY MODELS (See Fig. 9)

The oil sight glass on early design models is fused into a metal plate which is secured to the compressor housing 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, drawing the cap screws evenly.

5. Fill the compressor with new oil.

6. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

LATER MODELS (See Fig. 9)

Later model compressors were equipped with 1 or 2 plug type sight glasses located on the pump end of the compressor. If they become broken or damaged in any way, they 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 that is to be replaced.

3. Remove the damaged sight glass(es).

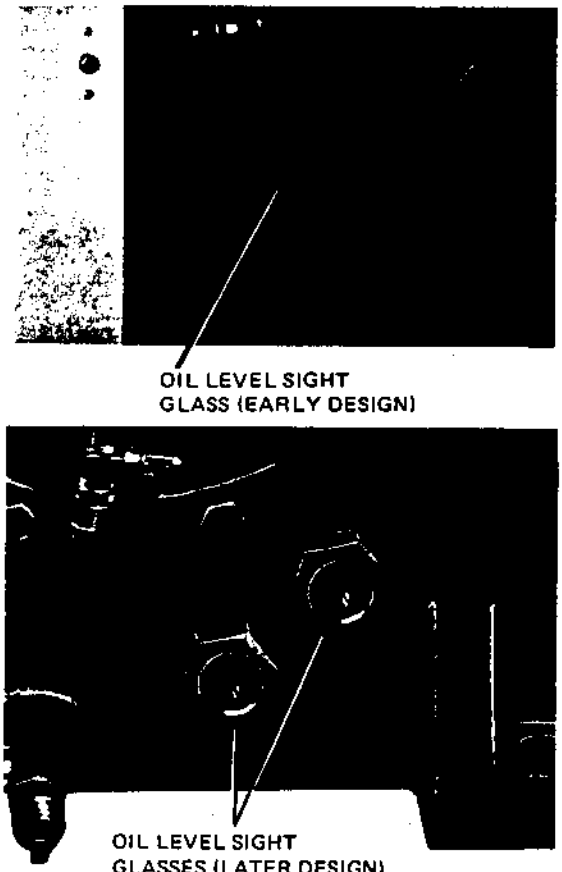


FIG. 9 — OIL LEVEL SIGHT GLASS(ES)

4. Clean the threads in the housing and on the new sight glass with an approved safety solvent.

5. Apply LOCTITE 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. (See Table 2)

6. Fill the crankcase with clean oil and evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

REMOVING THE DISCHARGE MANIFOLD AND TOP HEADS

To remove the discharge manifold and the compressor top heads, proceed as follows:

1. Vent the compressor as explained in VENTING THE COMPRESSOR.

2. Disconnect the discharge manifold from the compressor top heads and remove the top heads from the compressor. Before removing the cylinder heads, each head should be match marked in relation to its position on the housing. When reinstalling a head, line it up with the discharge manifold before bolting the head to the compressor housing.

3. Some compressors were equipped with orifice plates in the top heads. Be sure these plates are re-installed in the proper locations.

ANALYSIS OF FAULTY COMPRESSOR VALVE OPERATION

The operator soon becomes accustomed to the sound of the compressor when it is running under normal conditions. As long as the compressor runs normally, and the sound does not change, it can safely be assumed that the compressor is operating properly. Any unusual noise within the compressor should be investigated immediately.

External indications of trouble within the compressor are as follows:

1. When operating on suction pressure control, long "on" cycles with short "off" periods may indicate leaking or broken compressor valves, piston rings or both.

2. A definite rise in temperature of the discharge gas may indicate defective suction or discharge valves, or a leaking relief valve, or both.

3. Failure to pull down is a possible indication of a broken suction or discharge valve, or both.

4. Unusual pressure gauge readings.

5. The operator should feel the heads periodically to check for hot spots or one particular head which is running hot. If this condition occurs, it is an indication of broken or leaking valves within that bank of cylinders.

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

NOTE: Some cylinders are not equipped with unloaders. (See Fig. 13.) This prevents the possibility of overheating, since a definite minimum volume of cool refrigerant gas flows through the compressor at all times during operation, regardless of load conditions. The permanently loaded cylinders do not have unloader sleeves, unloader device, or lift pins.

The 5 and 7 cylinder compressors each have one cylinder which is permanently unloaded. The unloaded cylinder does not contain suction valve, suction valve springs, unloader sleeve, unloader device (power unit) or lift pins.

REMOVING THE DISCHARGE AND SUCTION VALVES, CYLINDER SLEEVES AND UNLOADER SLEEVES

To remove the valve assemblies, cylinder sleeves and unloader sleeves, refer to Figs. 10, 11 and 12 and proceed as follows:

1. Vent the compressor (See VENTING THE COMPRESSOR.)

2. Disconnect the discharge manifold from the compressor top heads and remove the top heads from the compressor.

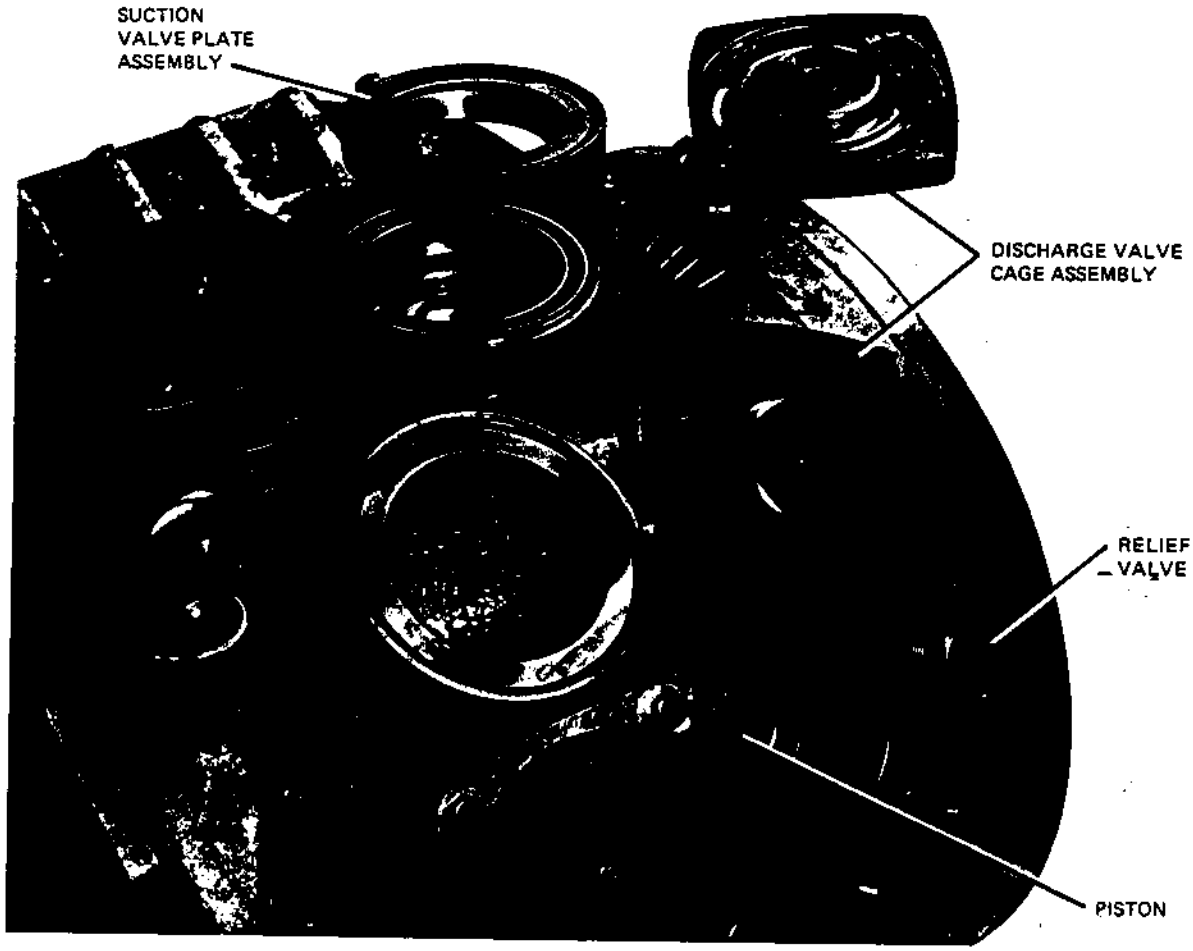


FIG. 10 — SUCTION AND DISCHARGE VALVES

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 as an assembly. Remove the discharge valve screw and its beveled gasket. Then lift out the inner discharge valve plate, discharge valve and springs.

4. Slip the fingers inside the suction valve plate and under the suction valve. Lift off the suction valve plate, the suction valve, and suction valve springs.

5. Lift the cylinder sleeve, with unloader lift pins, out of the compressor housing. The lift pins are fastened in place by a retaining ring at each end. To remove the lift pins, push the pin up against the spring, remove the upper retaining ring and pull the pin and spring out from the bottom.

6. Lift the unloader sleeve out of the housing.

7. Clean, dry and oil all parts. If it was necessary to remove the lift pins, replace the retaining rings. Inspect the valves for grooves and replace, if necessary.

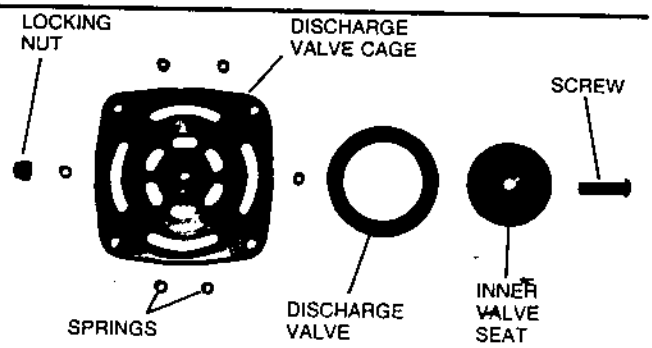


FIG. 11A — CURRENT DISCHARGE VALVE CAGE ASSEMBLY

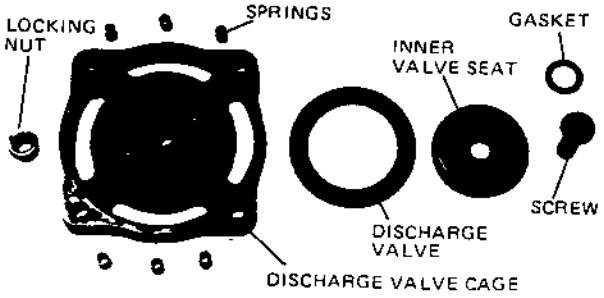


FIG. 11B — ORIGINAL DISCHARGE VALVE CAGE ASSEMBLY

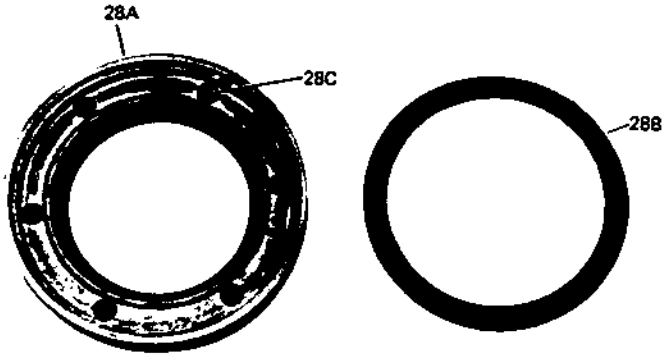
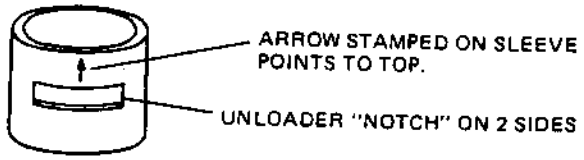


FIG. 12 — SUCTION VALVE

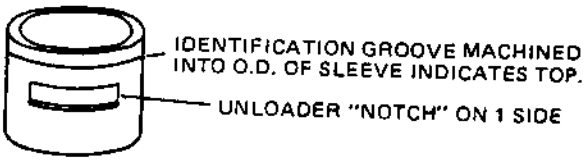
INSTALLING UNLOADER SLEEVES AND CYLINDER SLEEVES (See DESIGN HISTORY)

To install the unloader sleeves and cylinder sleeves, refer to Figs 10, 11, 12, and 14 and proceed as follows:

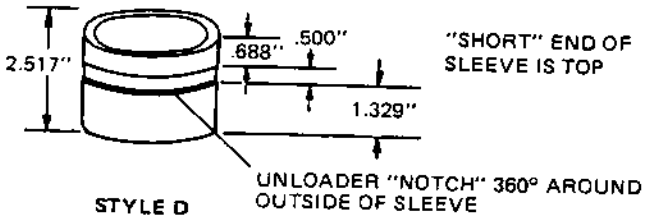
1. Unloader sleeves are of 3 different designs. It is important that the unloader sleeves be installed properly, with the correct end "up" (toward the top of the cylinder sleeve) as shown in the illustration below. *Note that Style A, B, and C unloader sleeves are no longer available.*



STYLE A & B (No Longer Available)



STYLE C (No Longer Available)



STYLE D

Set the unloader sleeve in the compressor housing (with the correct end up) and the notch engaged on the shoulder on the unloader device. Be sure the unloader sleeve is centered in the bored recess in the compressor deck.

2. Be sure the lift pins, with springs and retainer rings are inserted into the cylinder sleeves. (Refer to DESIGN HISTORY to be sure lift pins are compatible with unloader sleeve.)

3. Carefully lower the cylinder sleeve over the piston and inside of the unloader sleeve. (If the compressor is of early design, using cylinder sleeve gaskets, be sure the gasket is in place under the flange of the cylinder sleeve. See DESIGN HISTORY.)

   Push the cylinder sleeve down until it enters the hole in the lower compressor deck. Do not force the cylinder sleeve. The lower end of the cylinder sleeve is chamfered to facilitate compressing the piston rings and entering the compressor deck. Enter the sleeve squarely into the housing and rotate it as it is being lowered. If the cylinder sleeve is properly seated in the housing, it should not bind but should spring up approximately 1/8" due to the action of the unloader device.

INSTALLING SUCTION AND DISCHARGE VALVES

When re-installing valves, install as originally removed, mating the seats; do not turn over.

To install the suction and discharge valves, refer to Figs. 10, 11 and 12 and proceed as follows:

1. With the spring pocket side of the suction valve plate up, assemble the suction valve springs in their pockets and set the suction valve in place. Expanded coil is to be located in the bottom of the spring pocket. Push spring gently into hole until the expanded coil snaps to retain the spring.

2. To hold the suction valve and springs firmly in place during installation, two sheet metal clips should be placed over the suction valve plate and suction valve. These clips may be ordered from the Factory – York Part No. 064-37274.

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 and the discharge valve cage. Then bolt the assembly together, using the self locking nut.
   c. See DESIGN HISTORY for torques on discharge valve locknut.

4. Install the suction valve spacer gasket (if used; see DESIGN HISTORY) and set the suction valve plate, with suction valve clipped in place, on the spacer gasket. Then remove the two metal clips.

5. Holding the suction valve plate in place, set the discharge 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 top heads and reconnect the discharge manifold to them.

7. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

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. 13). It is factory set to open at 375 psi differential pressure. If leakage of the valve is suspected, replace.

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

1. Vent the compressor (See VENTING THE COMPRESSOR).

2. Disconnect the discharge manifold from the proper top head and remove the top head.

3. Unscrew the leaking relief valve and screw in the new valve.

4. Reassemble the top head and the discharge manifold.

5. Evacuate the compressor (See EVACUATION AFTER REPAIRS).

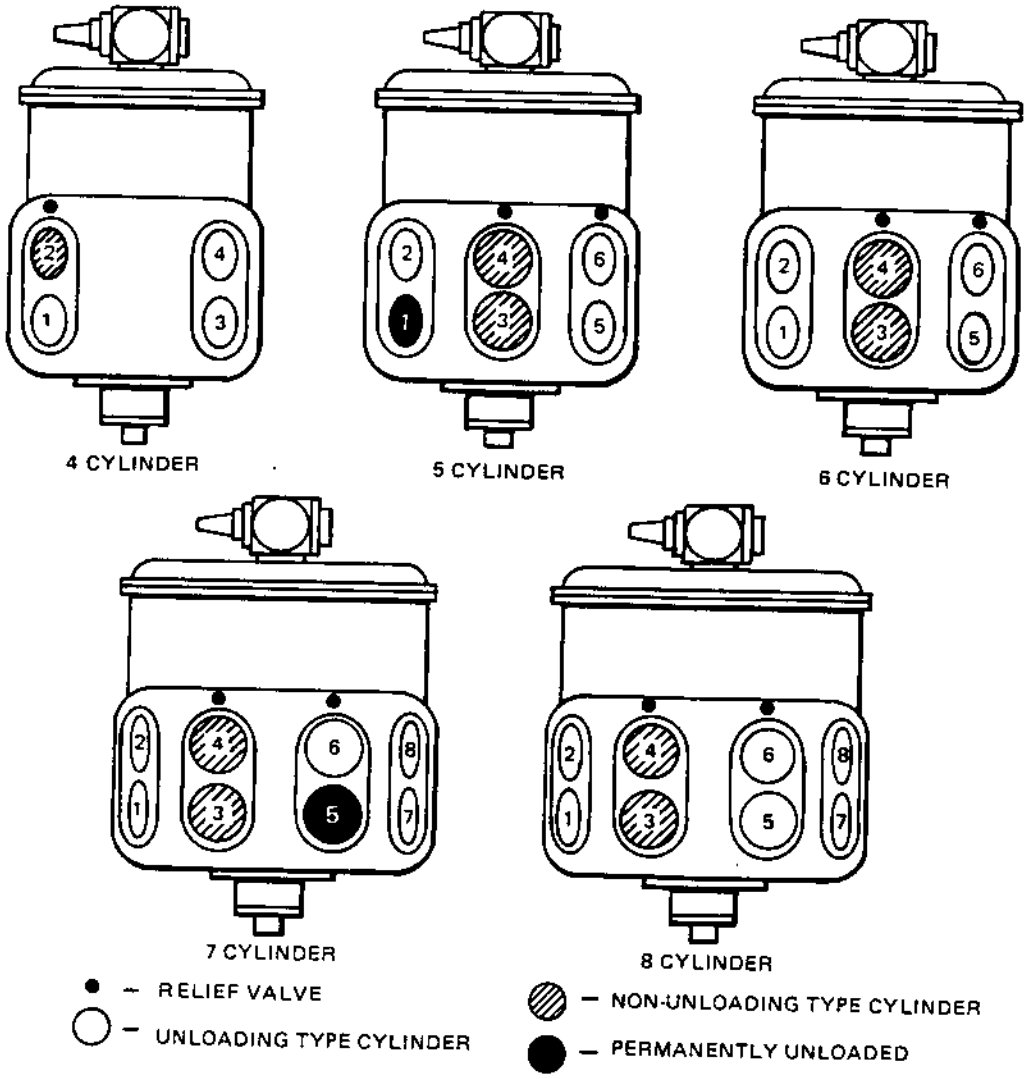


FIG. 13 – UNLOADER LOCATIONS

REMOVING PISTONS AND CONNECTING RODS

To remove the pistons and connecting rods, refer to Figs. 14 and 15 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 and drain the oil from the crankcase. (See VENTING THE COMPRESSOR.)

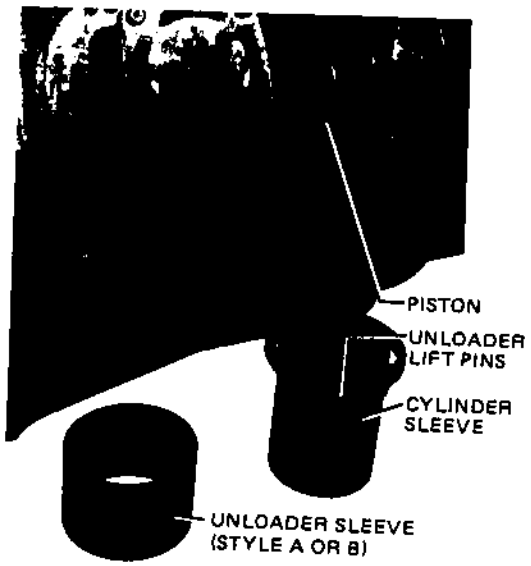


FIG. 14 — CYLINDER SLEEVE AND UNLOADER SLEEVE

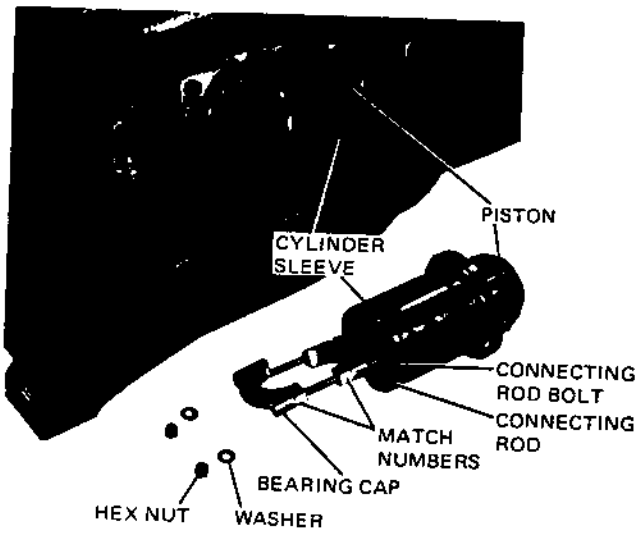


FIG. 15 — REMOVING PISTONS AND CONNECTING RODS

2. Remove the suction and discharge valve assemblies. Allow the cylinder sleeve and unloader 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 and unloader 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 should ALWAYS match. Pistons have a tapped hole in the top. A bolt screwed into the hole will aid in removing and replacing pistons.

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.

10. Push the piston pin out of the piston.

11. Remove the piston rings.

12. Clean, dry and oil all parts.

REPLACING THE UNLOADER DEVICE (POWER UNITS)

If an unloader device (power unit) fails to function, a complete unit will be furnished for replacement purposes. Replacement can be accomplished most easily when the pistons and connecting rods have been removed as described above. Then proceed as follows. (See Fig. 16.)

1. Remove the hex nut which connects the oil supply tubing to the bottom of the unloader device fitting (inside the crankcase).

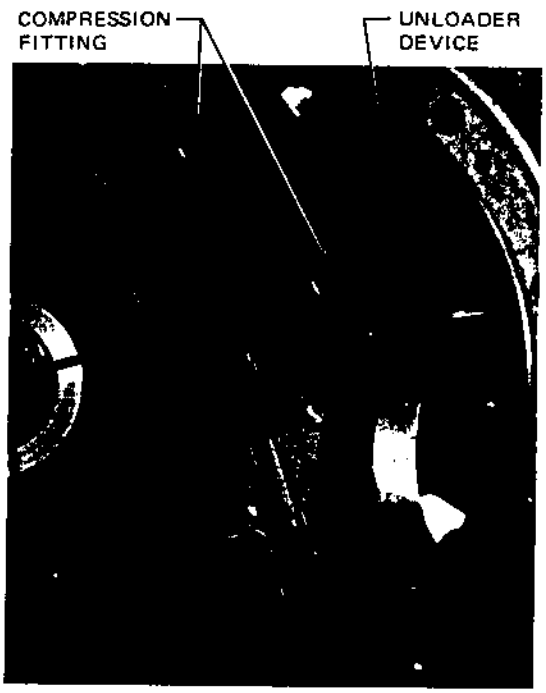


FIG. 16 — UNLOADER DEVICE

2. Hold the hex on the bottom of the fitting with a socket wrench, and using a short handled open end wrench, remove the unloader device.

3. When replacing the unloader device ALWAYS install a new fitting.

4. Be sure all threads are clean. Apply a thread sealing compound such as LOCTITE to the male threads, then install the unloader device and reconnect the oil supply tubing.

5. When an unloader device (power unit) is replaced, the unloader function of the lift pins must be checked. Temporarily replace the cylinder sleeve, and unloader sleeve with the cylinder sleeve clamped securely to the housing. Apply air pressure to the unloader device. The lift pins must retract at least .015" below the suction valve seat. When air pressure is released the lift pins must extend at least .120" above the suction valve seat.

INSTALLING PISTONS AND CONNECTING RODS (See DESIGN HISTORY)

To install the piston and connecting rod assemblies, refer to Figs. 14 and 15 and proceed as follows:

1. Each piston is equipped with two piston rings. When installing the rings, 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. 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. Install the retaining rings in each side of the piston.

3. Cylinder sleeves and piston assemblies, when re-used, 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. Apply a few drops of oil to the crankpin. 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 unloader sleeve and cylinder sleeve. (Refer to INSTALLING THE UNLOADER AND CYLINDER SLEEVES.)

4. Install the lower half of the connecting rod bearing as described in step 3 above. Tighten the nuts evenly to a torque of 260 inch 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 reconnect the discharge manifold and top heads, using new gaskets as required.

7. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

REMOVING ROTOR (See Fig. 17)

If it becomes necessary to replace the rotor or stator, both rotor and stator must be replaced. To remove the rotor, proceed as follows:

1. Vent the compressor as explained under VENTING THE COMPRESSOR.

2. Remove the bolts that hold the suction stop valve to the motor end cover.

3. Remove the motor end cover from the motor housing.

4. Remove the cap screw, lockwasher and flat washer that hold the rotor to the crankshaft.

5. Insert two bolts or similar item into the tapped holes in the end of the rotor.

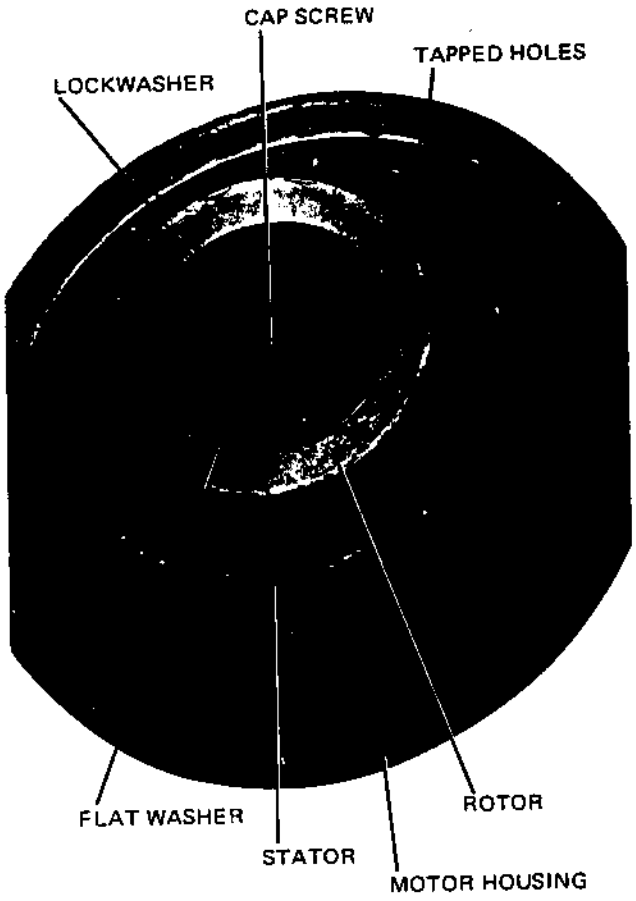


FIG. 17 — MOTOR END OF COMPRESSOR

FIG. 18 — REMOVING PUMP END BEARINGS

6. It is not advisable to attempt to remove the rotor without using the rotor mandrel (York Part Number 364-37273). Screw the rotor mandrel into the end of the crankshaft and slide the rotor onto it.

7. To replace the rotor, follow the above steps in reverse order.

8. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

REMOVING BEARINGS AND CRANKSHAFT (See DESIGN HISTORY)

PUMP END BEARING

To remove the pump end bearing refer to Fig. 18 and proceed as follows:

1. Vent the compressor. (See VENTING THE COMPRESSOR.)

2. Disconnect the oil lines from the bearing head.

3. Remove the cap screws which hold the bearing head to the housing and remove the bearing head.

4. The pump end thrust collar (Styles A, B, and C only) will possibly come out with the bearing head. If it does not, pull it off the crankshaft. Examine the thrust collar and replace if necessary. A roll pin prevents the collar from turning with the crankshaft.

5. The YORK Bearing Removal Tool (Part Number 364-37260) is required to remove the bearing from the bearing head. (See Fig. 19.)

6. Using the bearing removal tool as shown in Fig. 20, Detail A, pull the old bearing from the bearing head. Note that the back-up plate and the split plates must be installed from the inboard end of the bearing head.

7. Apply clean oil to the outside surface of the new bearing and to the inside portions of the bearing head into which the bearing is to be pressed.

8. Using the bearing removal tool as shown in Fig. 20, Detail B, pull the bearing into the bearing head, taking care

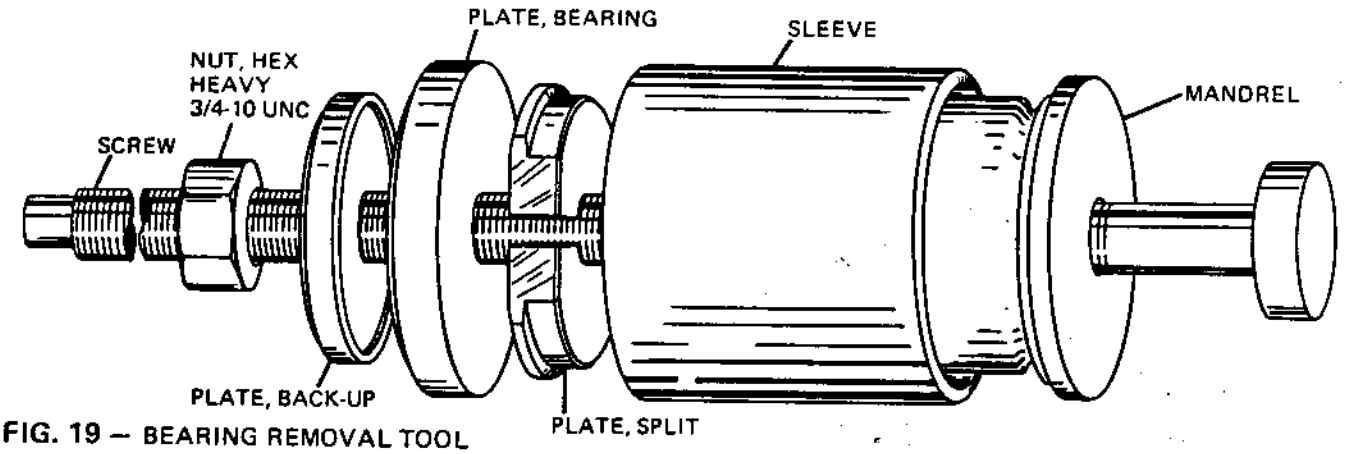
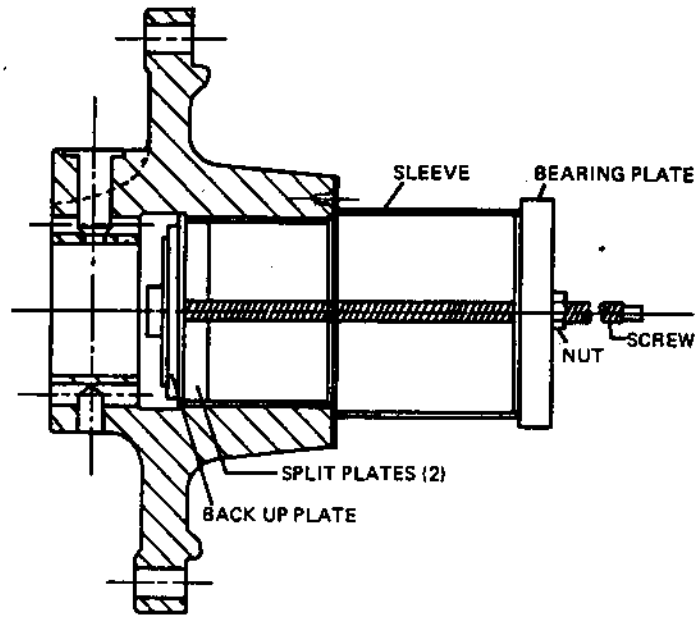
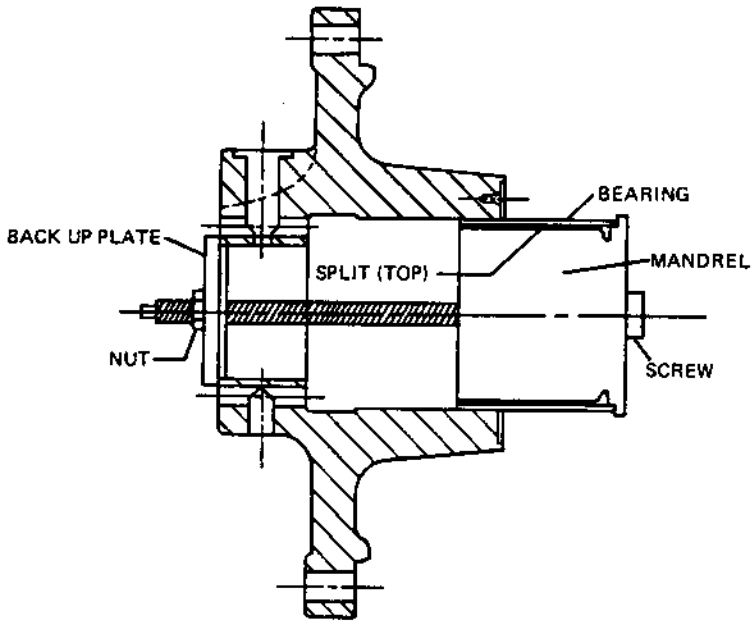


FIG. 19 – BEARING REMOVAL TOOL



DETAIL A – PUMP END BEARING (REMOVAL)



DETAIL B – PUMP END BEARING (INSTALLATION)

FIG. 20 – PUMP END BEARINGS

that the bearing enters the bearing head squarely. Note that the "split" in the bearing should be at the top of the bearing head. Continue to pull the bearing into the bearing head until the bearing is 1/32" (Style A, B, or C) .15" (Style D) below the surface on the inboard end of the bearing head.

9. Install the bearing head by following steps 2, 3 and 4 above in reverse order.

10. Evacuate the compressor. See EVACUATION AFTER REPAIRS.

MOTOR END BEARINGS

To remove the motor end bearings, refer to Fig. 21 and proceed as follows:

1. Vent the compressor. (See VENTING THE COMPRESSOR.)

2. Drain the oil from the compressor and remove the crankcase cover plates, the motor end cover, and the rotor, following procedures described in the applicable sections of this manual.

3. Using suitable timber, support the crankshaft inside the crankcase.

4. Remove the bolts that hold the bearing head assembly to the compressor housing.

5. Screw the rotor mandrel (YORK Part No. 364-37273) into the end of the crankshaft and pull the bearing head out onto it. Use of the mandrel aids in preventing damage to the stator windings.

6. The motor end thrust collar will possibly come out with the bearing head. If it does not, pull it off the crankshaft. Examine the thrust collar and replace if necessary. A roll pin prevents the thrust collar from turning with the crankshaft.

7. Using the bearing removal tool as shown in Fig. 22, Detail A, remove the old bearings from the housing. Bearings are removed one at a time in a similar manner from opposite ends of the bearings head.

8. Apply clean oil to the outside surface of the new bearings and to the inside portions of the bearing head into which the bearings are to be pressed.

9. Using the bearing removal tool as shown in Fig. 22, Detail B, pull the bearings into the bearing head one at a time from opposite ends, taking care that the bearings enter to bearing head squarely. Note that the "split" in one bearing should be at the top; the "split" in the second bearing should be turned 90° to either side. Continue to pull the bearings into the head until they are 1/32" below the end surfaces of the bearing head.

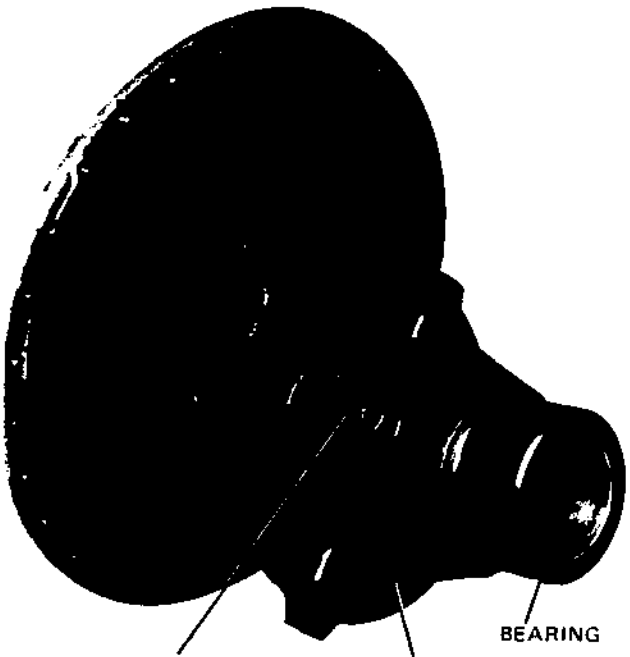


FIG. 21 — MOTOR END BEARING ASSEMBLY

10. Reassemble the compressor by following steps 2, 3, 4, 5 and 6 above in reverse order.

11. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

CRANKSHAFT (See DESIGN HISTORY)

The compressor crankshaft can be removed from either end of the compressor depending on which end is more accessible. To remove the crankshaft, proceed as follows:

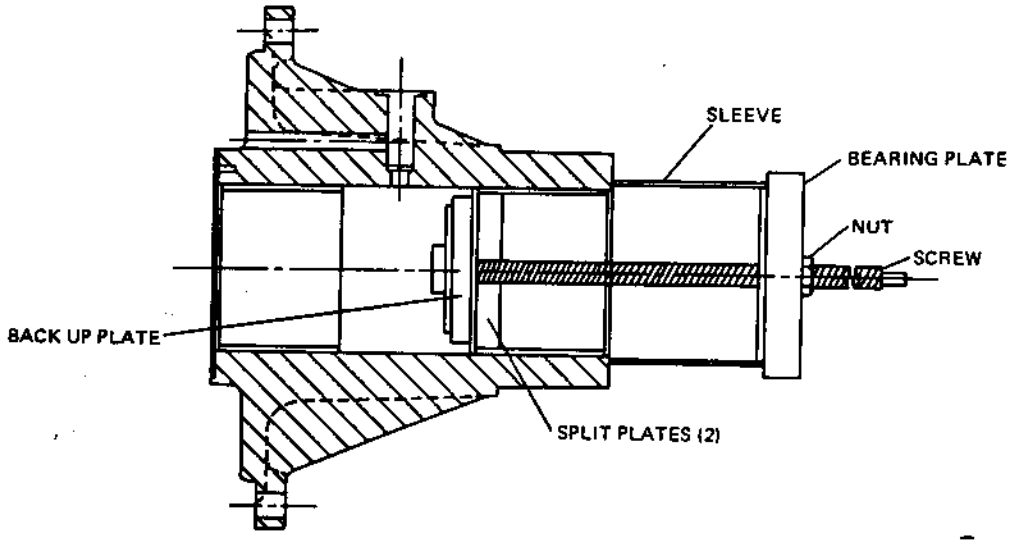
1. Vent the compressor. (See VENTING THE COMPRESSOR.)

2. Drain the oil from the compressor. Remove the crankcase cover plates, discharge manifold, top heads, suction and discharge valve assemblies, pistons and connecting rods, motor end cover, and rotor following procedures outlined previously.

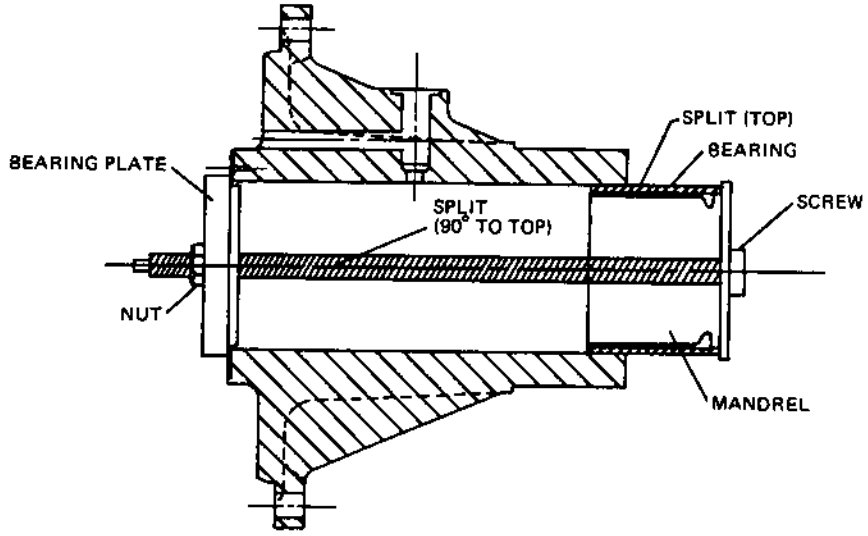
3. Using suitable timber, support the crankshaft solidly inside the crankcase.

4. Determine from which end the crankshaft is to be removed and remove the bearing head from that end of the compressor.

5. Screw the rotor mandrel (YORK Part No. 364-37273) into the end of the crankshaft.



DETAIL A – MOTOR END BEARING (REMOVAL)



DETAIL B – MOTOR END BEARING (INSTALLATION)

FIG. 22 – MOTOR END BEARINGS

6. Using two men, carefully remove the crankshaft from the compressor.

7. The thrust collar will probably remain in place in the compressor on the end opposite from which the crankshaft was removed. (See DESIGN HISTORY) Be sure that this thrust collar is properly positioned on the roll pin before re-installing the crankshaft.

8. Reassemble the compressor by following the above procedure in reverse order.

9. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

REMOVING THE STATOR

Normally it should not be necessary to replace the stator unless a complete motor failure (burn-out) occurs. If it becomes necessary to replace the stator, a new rotor must also be installed. To replace the stator proceed as follows:

1. Vent the compressor. (See VENTING THE COMPRESSOR.)

2. Drain the oil from the compressor. Remove the crankcase cover plates, discharge manifold, top heads, suction and discharge valve assemblies, pistons and connecting rods, motor end cover, rotor, bearing heads, and crank-

shaft using procedures outlined previously.

3. Disconnect the motor leads and remove the compressor from the unit.

4. Be certain that the compressor is sitting solidly; then remove the motor housing from the compressor housing.

5. Stand the motor housing on the compressor end, being careful not to damage the gasket surfaces, and remove the stator locking plug and gasket.

6. Remove the nuts and washers from the terminal bolts and overload protector connections. Note the relative positions of all parts. Pull the motor leads and overload protection wires into the motor housing. (See Fig. 23.)

7. Install the expanding mandrel (YORK Part No. 029-13597) inside the stator, and adjust the mandrel so that it is tight within the stator.

8. Using a torch with a large tip, quickly heat the motor housing evenly around its entire circumference until the stator can be lifted out by means of a hoist hooked to the mandrel.

9. Before re-assembling any motor parts, the inside of the motor housing must be thoroughly cleaned with an approved safety solvent. After cleaning, the inside of the motor housing must be thoroughly dried to remove all traces of the cleaning fluid.

10. Before lowering the new stator into the heated motor housing, be sure the stator is properly lined up with respect to the terminal bolt position and the stator locking plug hole is lined up with the tapped hole in the motor housing for the stator locking plug.

11. Lower the motor stator to its proper location as determined by the stator locking plug.

12. The leads of the replacement motor are marked. When connecting these leads, be sure each lead is connected to its corresponding terminal on the terminal plate. Connect the overload protectors. (See Fig. 23.)

13. Reassemble the compressor by following the above procedures in reverse order.

14. Evacuate the compressor. (See EVACUATION AFTER REPAIRS.)

EVACUATION AFTER REPAIRS

During the compressor repair procedure, the crankcase and oil should be examined for the presence of metal particles. This would indicate wearing of parts within the compressor. 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.

If the compressor was open for only a few hours, it should be evacuated to a pressure of 300 microns using a quality vacuum pump and following the procedure outlined in instruction Form 55.05-NM.

If the compressor was open for more than 24 hours, the compressor should be completely dehydrated; then evacuated to a pressure of 300 microns following the procedures outlined in Form 55.05-NM.

DESIGN HISTORY

Since the introduction of the J Series compressors, several design changes have been made to improve performance and/or reliability. These changes are described below. Be sure to read this section thoroughly before attempting to service the compressor.

1. Driveline Components – Styles A, B &C compressors were equipped with a thrust collar at both ends of the compressor. Style D compressors are equipped with a thrust collar on the motor end only. On Style D compressors the pump end bearing housing has been increased in length to compensate for the elimination of the thrust collar on that end.

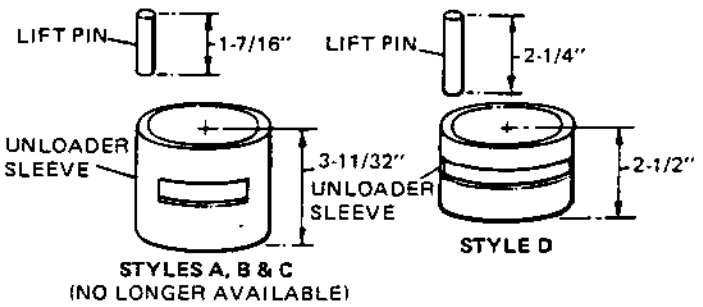
   Crankshafts for Style D can also be used in Style A, B, & C compressors. The Style D crankshaft can be used as a direct substitution in a Style C compressor (but not vice versa).

   However, when substituting a Style D crankshaft in a Style A or B compressor, it is also necessary to replace original cast iron pistons with aluminum pistons. (See Para. 3). Style A, B & C crankshafts are no longer available.

   Motor End bearing assemblies for Style D can also be used in Style A, B or C; however an increase in oil pressure (approx. 20 lb. increase) will occur.

   Pump End bearing assemblies for Style A, B, & C are not interchangeable with Style D.

2. Unloader Sleeves, and Unloader Lift Pins – The length of the unloader sleeve and the length of the unloader lift pin have been changed on Style D compressors. See following sketch:



Unloader lift pins and unloader sleeves are no longer available for Style A, B of C compressors. If either the lift pins or the unloader sleeve must be replaced on a Style A, B or C compressor, both the lift pins and the unloader sleeve must be replaced with the Style D design.

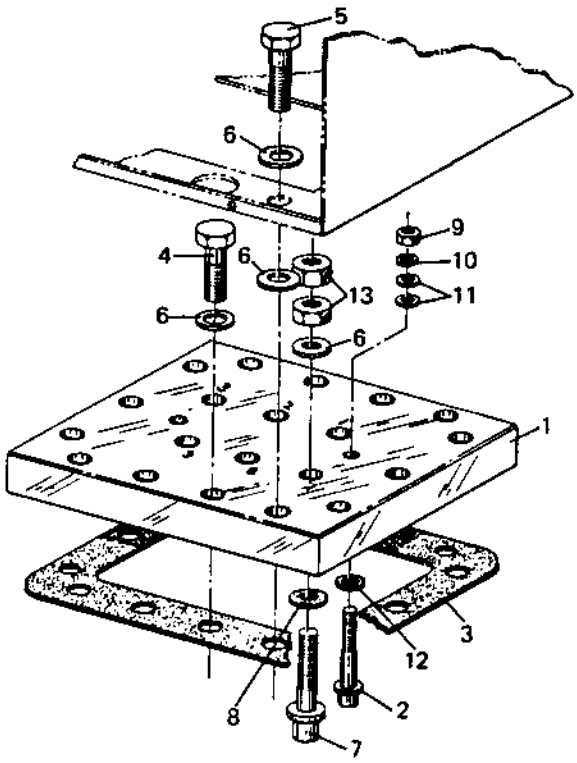
3. Pistons – Style A & B compressors were equipped with cast iron pistons. Style C & D compressors are equipped with aluminum pistons. Cast iron and aluminum pistons cannot be mixed within a compressor due to the difference in weight. Also pistons must be used with the proper crankshaft. (See Para. 1.)

4. Discharge Valve Cages, Suction Valve Plates, and Gaskets – Original design J compressors were equipped with gaskets between the compressor housing and the cylinder sleeve flangee; and between the cylinder sleeve flange and the suction valve plate. These gaskets were eliminated in 1976.

At the same time, the suction valve plate thickness was increased .020". These new valve plates have 2 grooves in the circumference for identification. When replacing old suction valve plates with new plates, be sure to discard the gaskets described in the above paragraph.

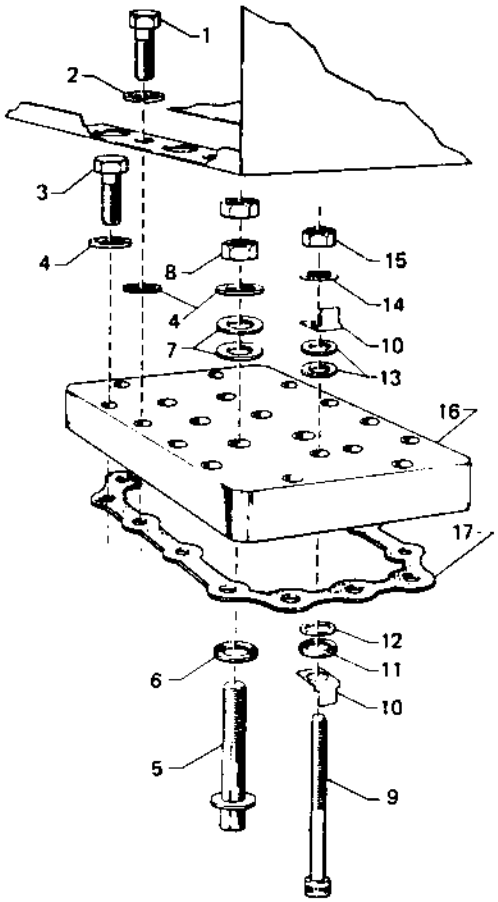
Also, the discharge valve cages were re-designed. The thickness was increased 1/8" and the cage now has 4 larger core ports (rather than 8 small ports). The length of the center bolt and the 4 hold down bolts was increased 1/8".

During the year 1992, discharge valve cap screw and discharge valve plate were redesigned to eliminate taper and provide flat mating surfaces between bolt and discharge valve plate. Torque value for discharge valve locknut torque varies for flat head bolt versus tapered bolt.



ITEM NO.	DESCRIPTION
1	Block, Terminal
2	Terminal, Overload Protector
3	Gasket, Terminal Block
4	Screw, Cap – Terminal Block to Motor Housing 7/16 - 14 x 1-5/8
5	Screw, Cap - Terminal Block to Motor Housing 7/16 - 14 x 1-3/4
6	Washer, Plain
7	Bolt Terminal
8	Gasket, Terminal Bolt
9	Nut, Overload Protector
10	Washer Lock, Overload Protector
11	Washers, Flat
12	Gaskets
13	Nut, Terminal Bolt (12 Req'd.)

ORIGINAL DESIGN



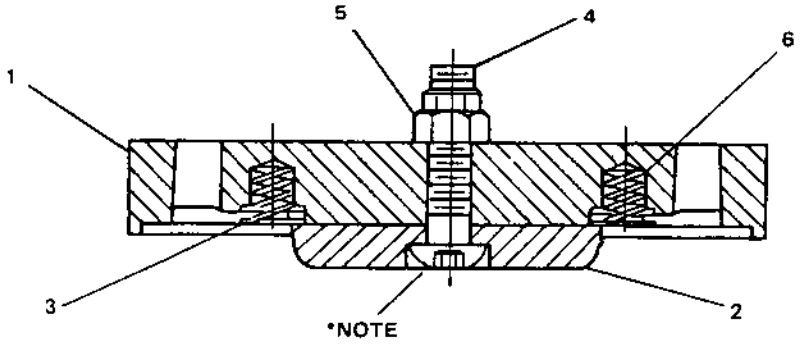
ITEM NO.	DESCRIPTION	
1	Screw–7/16 X 1-3/4	(4 Req'd.)
2	Lockwasher – 7/16	(4 Req'd.)
3	Screw – 7/16 X 1-5/8	(10 Req'd.)
4	Washer, Plain – 7/16	(20 Req'd.)
5	Bolt, Terminal	(6 Req'd.)
6	Gasket, Terminal Bolt	(6 Req'd.)
7	Washer, Terminal Bolt	(12 Req'd.)
8	Nut, Hex	(12 Req'd)
9	Screw, Overload Protector	(2 Req'd.)
10	Terminal, Overload	(4 Req'd.)
11	Washer, Plain	(2 Req'd.)
12	Seal, O-Ring	(2 Req'd.)
13	Washer, Terminal	(4 Req'd.)
14	Lockwasher	(2 Req'd.)
15	Nut, Hex	(2 Req'd.)
16	Block, Terminal	
17	Gasket, Terminal Block	
18	Hex Connector (Short)	Not Shown
19	Hex Connector (Long)	Not Shown

PRESENT DESIGN

FIG. 23 – TERMINAL BOX

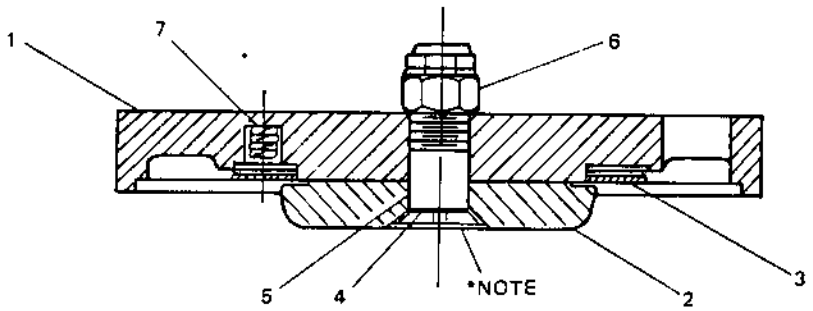
CURRENT DESIGN – ITEM #5 TORQUE TO BE 53 - 61 LB. FT.

1st PRODUCTION DATE	J Compressor Date: 8/1/92	G Compressor Date: 8/12/92
1st SERIAL NUMBER	J Compressor Ser. No.: 93536601	G Compressor Ser. No.: 84246301



ITEM	COMPONENT	DESCRIPTION
!	064-43146-000	Cage Valve Discharge
2	064-48032-000	Plate Valve
3	064-43012-000	Valve Discharge
4	021-17649-000	Screw Cap Bu
5	021-09932-000	Nut Hex Self
6	028-13248-000	Spring Hel C
*	064-48037-000	Dwg. - Cage Discharge (Current Design)

ORIGINAL DESIGN – ITEM #6 TORQUE TO BE 35 - 40 LB. FT.



ITEM	PART NO.	DESCRIPTION	QUAN. PER UNIT
1	064-43146C	Cage, Discharge Valve	1
2	064-46281B	Plate, Discharge Valve	1
3	064-43012A	Valve, Discharge	1
4	028-08386	Gasket	1
5	021-13856A	Screw, Inner Discharge	1
6	021-09932A	Nut, Self-locking, Hex	1
7	029-13248A	Spring, Helical	6
*	364-42306	Dwg. - Cage Discharge (Original Design)	

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FORM 180.23-M1(1092)
SUPERSEDES: 180.23-M(286)

FAH 4M 1092 1.20
CODE: SN3