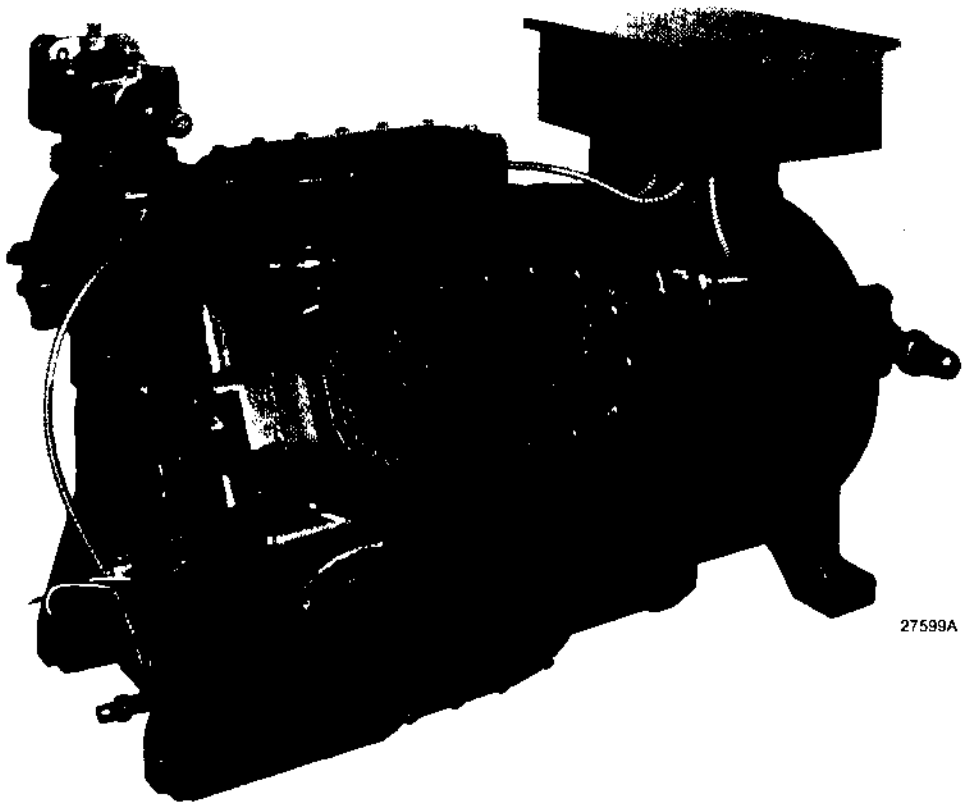
YORK®	MODEL J – STYLE G HERMETIC COMPRESSORS	
MAINTENANCE	Supersedes: 180.23-M4 (795)	Form 180.23-M4 (1298)

MODELS
JG43, JG63, JG83 (SHORT STROKE)
JG44, JG64, JG84 (LONG STROKE)



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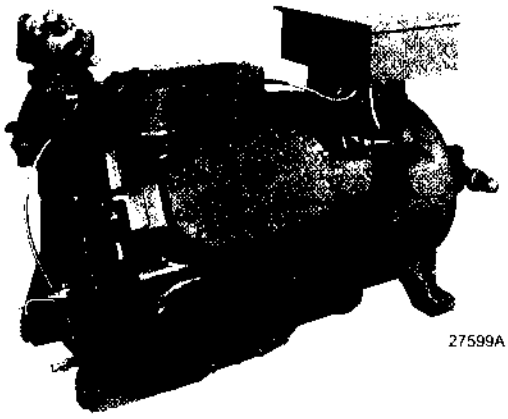


FIG. 1 – 6-CYLINDER MODEL J "G" COMPRESSOR

SECTION I – GENERAL

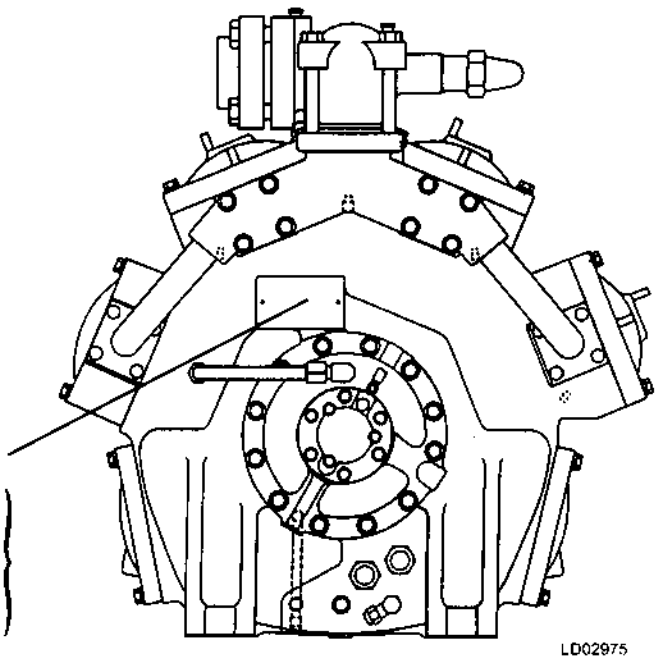
GENERAL DESCRIPTION

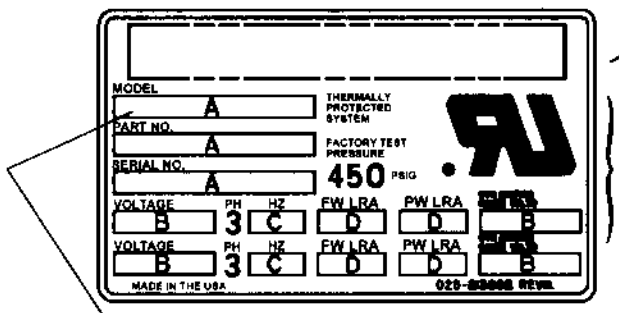
YORK Style G Model J Hermetic Compressors are designed to meet air conditioning requirements using R22. They are available in 4, 6, or 8 cylinder models in either "short stroke" or "long stroke" versions (See NOMENCLATURE). Varying steps of capacity control are available utilizing solenoid valves. (Control of solenoid valves must be by external device.) Nominal compressor speeds are 1750 RPM (60 Hz) and 1460 RPM (50 Hz).

NOMENCLATURE

COMPRESSOR IDENTIFICATION

Each compressor is identified by nomenclature as shown below. The nomenclature is stamped on a data plate which is located next to the oil pump as shown in Fig. 2. When contacting the factory or ordering renewal parts, include the complete Nomenclature, Serial Number, and Date Code as illustrated. Be sure these numbers are copied accurately.





LD03063

Compressor Series

Style G

Number of Cylinders (4, 6, 8)

Stroke

	No. of Cylinders		
	4	6	8
3 =	3.2"	3.0"	3.1"
4 =	3.8"	3.6"	3.7"

Number of Unloaders (1, 2, 3)

Motor Size (M, N, P, Q, S, T, V)

Voltage Code:

17 = 200-3-60	46 = 460-3-60	63 = 220-3-50
28 = 230-3-60	50 = 380/415-3-50	64 = 346-3-50
40 = 380-3-60	58 = 575-3-60	70 = 500-3-50
43 = 440-3-50	59 = 190-3-50	

Motor Vendor

L = Leroy Smith

S = A. O. Smith

J G 4 3 1 – M 46 S

FIG. 2 – COMPRESSOR DATA PLATE

PHYSICAL DATA

COMPRESSOR MODEL		JG43 & JG44		JG63 & JG64		JG83 & JG84	
No. of Cylinders		4		6		8	
Nom. CFM Displacement	60 Hz	143	170	201	242	278	331
	50 Hz	119	140	168	199	232	273
Bore (Inches)		3-3/4		3-3/4		3-3/4	
Stroke (Inches)		3.2	3.8	3.0	3.6	3.1	3.7
Suction Conn. (ODF)		3-1/8		3-1/8		3-5/8	
Discharge Conn. (ODF)		2-5/8		2-5/8		3-1/8	
Oil Charge (Gals.)		3		3		3	
Weight (Lbs.)		1370		1480		1640	

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	MINIMUM 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
440-3-50	396	484

COMPRESSOR OPERATING LIMITATIONS

Maximum Compression Ratio	9.5:1
Maximum Operating Differential (PSI)	325
Maximum Suction Pressure (PSIG)	95
Maximum Discharge Temp. (°F)	275
Superheat (Nominal) (At Compressor)	20°F
Min. Oil Pressure (Above Suction Pressure)	25 psi
Maximum Oil Temperature[1]	160°F
Maximum Sat. Discharge Temp.[2]	155°F
Maximum Ambient	130°F
Minimum Ambient	0°F

[1] Measured externally on pump suction boss as shown in Fig. 3.
[2] Motor selection and operating conditions may limit maximum saturated discharge temperature to lower levels.

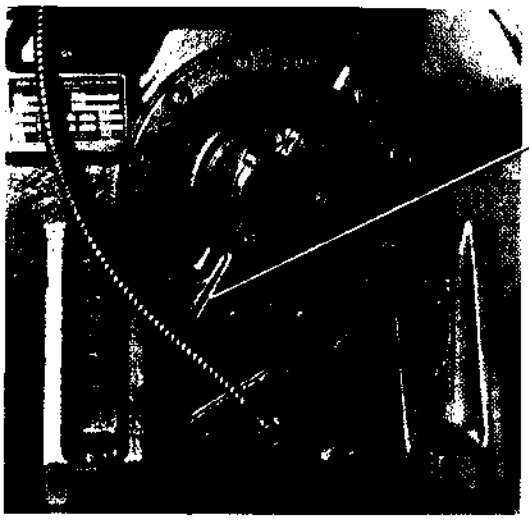


FIG. 3 – CHECKING OIL TEMPERATURE

ELECTRICAL DATA

MOTOR SIZE CODE[2]	VOLTAGE	PHASE	HERTZ	RATED AMPS	LOCKED ROTOR AMPS		MAX. DUAL ELEMENT FUSE SIZE[1]	MIN. CIRCUIT AMPACITY	DISCONNECT SWITCH SIZE (AMPS)[3]
					A/L	PW			
M	200	3	60	202	913	7312	250	253	400
	230	3	60	174	794	636	225	218	400
	380	3	60	105	480	385	125	131	200
	460	3	60	87	397	318	110	109	200
	575	3	60	70	318	254	90	88	100
	190	3	50	177	757	585	225	221	400
	220	3	50	157	731	560	200	196	200
	346	3	50	98	470	347	125	123	200
	380/415	3	50	87	402	297	110	109	200
	500	3	50	68	322	238	90	85	100
N	200	3	60	238	1099	865	300	298	400
	230	3	60	207	956	752	250	259	400
	380	3	60	124	579	412	150	155	200
	460	3	60	104	478	376	125	130	200
	575	3	60	83	382	300	100	104	100
	190	3	50	214	885	712	250	268	400
	220	3	50	183	856	635	225	229	400
	346	3	50	115	540	400	150	144	200
	380/415	3	50	104	471	367	125	130	200
	500	3	50	84	377	277	110	105	200
P	200	3	60	280	1203	950	350	350	400
	230	3	60	244	1046	826	300	305	400
	380	3	60	144	633	467	175	180	200
	460	3	60	122	523	413	150	153	200
	575	3	60	97	418	330	125	121	200
	190	3	50	251	930	776	300	314	400
	220	3	50	217	876	709	250	271	400
	346	3	50	133	557	412	175	166	200
	380/415	3	50	121	501	410	150	151	200
	500	3	50	97	386	310	125	121	200
Q	200	3	60	318	1541	1101	400	398	400
	230	3	60	275	1340	976	350	344	400
	380	3	60	166	806	591	200	208	200
	460	3	60	137	670	488	175	171	200
	575	3	60	110	536	390	150	138	200
	190	3	50	282	1225	908	350	353	400
	220	3	50	244	1187	876	300	305	400
	346	3	50	155	775	572	200	194	200
	380/415	3	50	139	653	482	175	174	200
	500	3	50	108	522	386	125	135	200
S	200	3	60	387	1746	1322	500	484	600
	230	3	60	336	1518	1150	450	420	600
	380	3	60	204	919	696	250	255	400
	460	3	60	168	759	575	225	210	400
	575	3	60	134	607	460	175	168	200
	190	3	50	343	1470	1087	400	429	400
	220	3	50	298	1420	1051	400	373	400
	346	3	50	189	903	668	250	236	400
	380/415	3	50	167	781	585	225	205	400
	440	3	50	148	710	526	200	185	200
	500	3	50	131	625	462	175	164	200
T	380	3	60	247	1143	862	300	309	400
	460	3	60	210	960	724	250	263	400
	575	3	60	168	768	579	200	210	200
	346	3	50	234	1174	917	300	293	400
	380/415	3	50	207	1000	760	250	259	400
	440	3	50	184	856	645	225	230	400
	500	3	50	163	754	568	200	204	200
V	380	3	60	280	1271	997	350	350	400
	460	3	60	238	1050	830	300	298	400
	575	3	60	190	840	664	250	238	400
	346	3	50	269	1160	950	350	336	400
	380/415	3	50	243	1105	875	300	304	400
	440	3	50	213	950	721	250	266	400
	500	3	50	191	836	656	250	239	400

NOTES: 1. When optional external overloads are used, fuse sizes should be increased to approx. 175% of nameplate amps.
2. Sixth character in compressor model designation (See NOMENCLATURE).
3. Based on National Electric Code (NEC). Switch is rated for isolating duty only – Do not Open Under Load.

THREADED FASTENER TORQUES AND SEQUENCE

When assembling a compressor or compressor parts, it is essential to tighten all nuts and screws to their proper torque, using an accurate torque wrench. Table 1 shows the recommended torques for this compressor. All screws and bolts should be lightly oiled unless they are intended for use with a sealing compound. Insert all screws and tighten them lightly. Then, using the torque wrench, tighten each to its proper torque.

When tightening the screws on the top heads, handhole covers, oil pump bearing head, motor cover, and terminal block, it is important that the screws be tightened in the proper sequence. This will help to eliminate leaks and/or damage to the parts or gaskets. Fig. 4 shows the recommended tightening sequence.

It is advisable to "double-check" the torque on all external screws before starting the compressor.

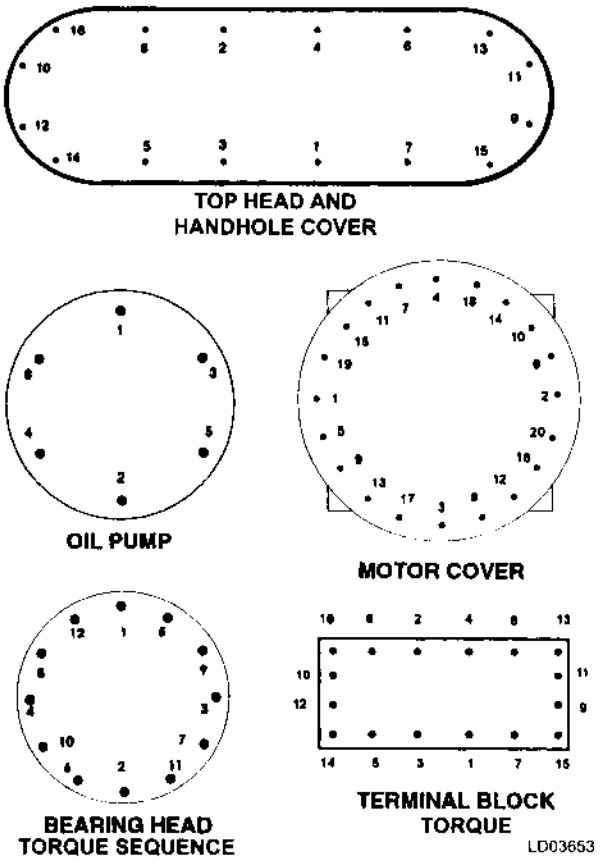


FIG. 4A – SCREW TIGHTENING SEQUENCE

TABLE 1 – THREADED FASTENER TORQUE (SEE FIGS. 4A AND 4B)

LOCATION	ITEM	THREAD	GRADE	TORQUE	
				LB. IN.	LB. FT.
Motor Protector Term. (Nut)[1]	1	No. 8 - 32 UNC	—	30	—
Sight Glass	2	1-11/1/2 NPT	—	—	95-100
Solenoid Valve	3	.375 - 16 UNC	8	—	49-56
Oil Pump	4	.3125 - 18 UNC	8	—	27-32
Valve Assy. Mounting[1]	5	.375 - 16 UNC	5	—	30
Set Screw (Crankshaft)	6	.375 - 16 UNC	—	—	30
Connecting Rod (Screw)[1]	7	.3125 - 18 UNC	5	—	19-22
Connecting Rod (Bolt/Nut)[1]	8	.375 - 24 UNF	—	260	—
Discharge Valve Cage Assy. (Nut)[1]	9A	.375 - 24 UNF	—	—	53-58 (Pre-1996)
Discharge Valve Cage Assy. (Nut)[1]	9B	.375 - 24 UNF	—	—	45-48 (1997 & Later)
Access Cover / Top Head	10	.4375 - 14 UNC	8	—	78-90
Motor End Bearing Head	11	.4375 - 14 UNC	5	—	55-64
Pump End Bearing Head / H. H. Cover	12	.4375 - 14 UNC	8	—	78-90
Terminal Block	13	.375 - 16 UNC	5	—	34-40
Terminal Stud (Nut)	14	.4375 - 20 UNF	—	—	20-25
Stator	15	.4375 - 14 UNC	5	—	55-64
Motor Cover (Screw)	16	.500 - 13 UNC	8	—	119-138
Oil Pressure Relief Cap	17	.5625 - 18 UNF	—	—	30
Service Valve Scr. Lgth. thru 6"	18	.625 - 11 UNC	2	—	107-123
Service Valve Scr. Lgth. over 6"	18	.625 - 11 UNC	2	—	68-78
Rotor	19	.625 - 11 UNC	2	—	107-123
Heater Clamp	20	.25 - 20 UNC	2	73-83	—
Manifold 8, 6, or 4 Cyl.	21	.375 - 16 UNC	5	—	34-40
Motor Cover (Stud / Nut)	22	.500 - 13 UNC	—	—	96-110

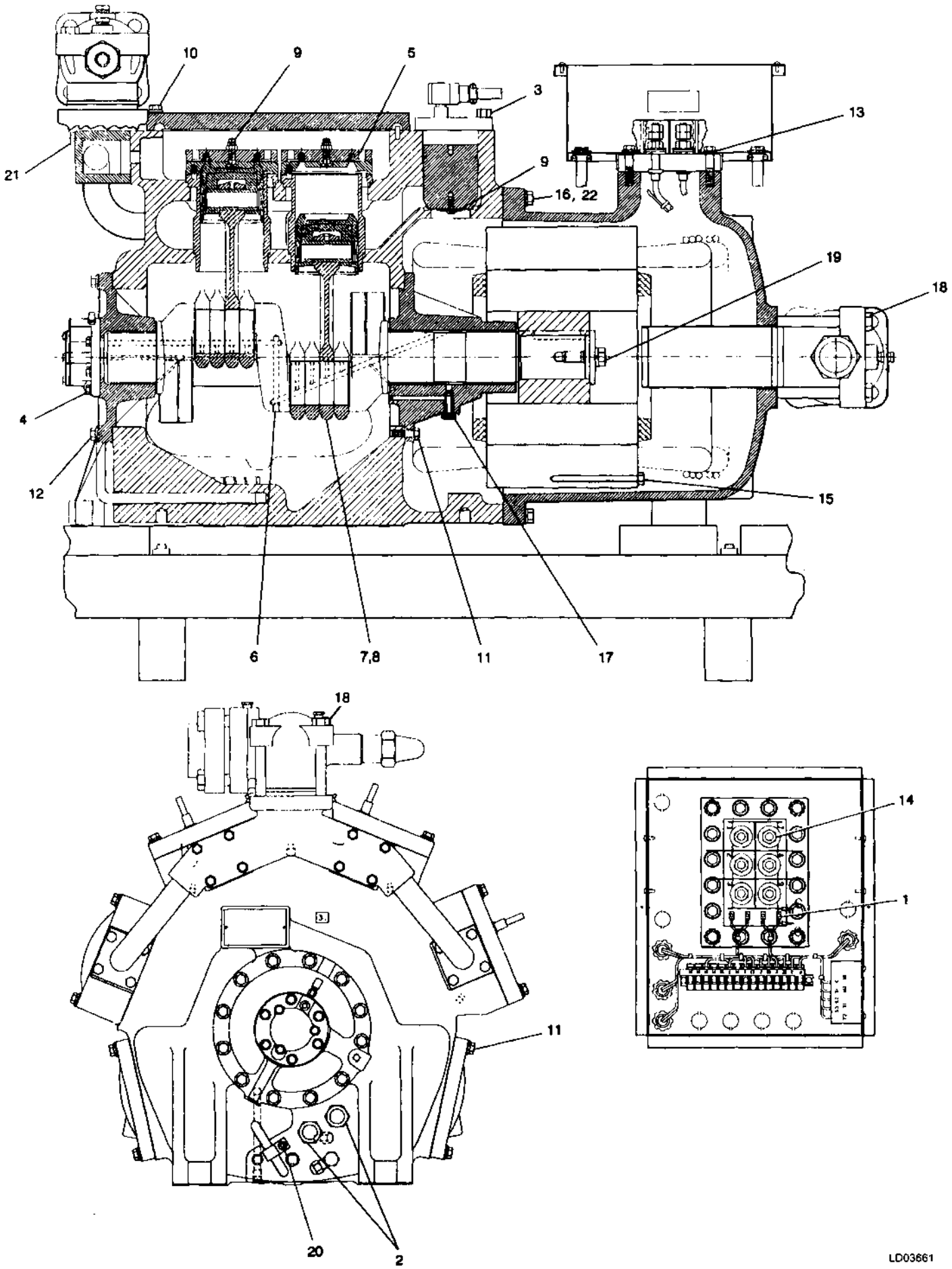


FIG. 4B – FASTENER LOCATIONS ON JG COMPRESSOR

GASKETS AND "O" RINGS

New gaskets and/or "O" rings must be installed each time a compress or part is removed or the compressor is dis-assembled. This will assure that the compressor will function properly when returned to operation. Use care when installing gaskets so that they are installed properly. Be sure that any holes in the gasket for oil passage, etc. are aligned with the matching hole in the related part or parts. Also, check that "O" rings are not cut or damaged in any way. Gaskets and "O" rings should be coated LIGHTLY with YORK "C" oil. Do not soak gaskets or "O" rings in oil. Also, do not apply oil to the mating surfaces. Grease must never be applied to gaskets or "O" rings.

HANDLING COMPRESSOR PARTS

Internal machined parts of the compressor such as valves, pistons, and crankshaft, must be protected from damage due to crushing or scratching. They should be coated with oil, wrapped in clean, tough paper and stored in a safe place.

Before reassembling any compressor part, it should be thoroughly cleaned by immersing or flushing it with an approved safety solvent and allowing it to dry in air without touching any wearing or contact surfaces. After it is cleaned, each part should be carefully examined to be sure it is free from cracks, flaws, bump marks, burrs or distortions and the part be oiled to prevent damage due to rusting or oxidation. New clean oil should be applied to the wearing surfaces of any part just before it is installed.

RIGGING THE COMPRESSOR

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 when 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 as illustrated in Fig. 5. Be sure slings are of adequate strength to safely lift the compressor. Compressor weights are shown in PHYSICAL DATA, page 4. The use of chains or cables is not recommended.

COMPRESSOR OIL SYSTEM

The compressor oil system function is to lubricate all moving parts:

LUBRICATION SYSTEM – See Fig. 6 – The compressor oil supply is contained in the crankcase which is

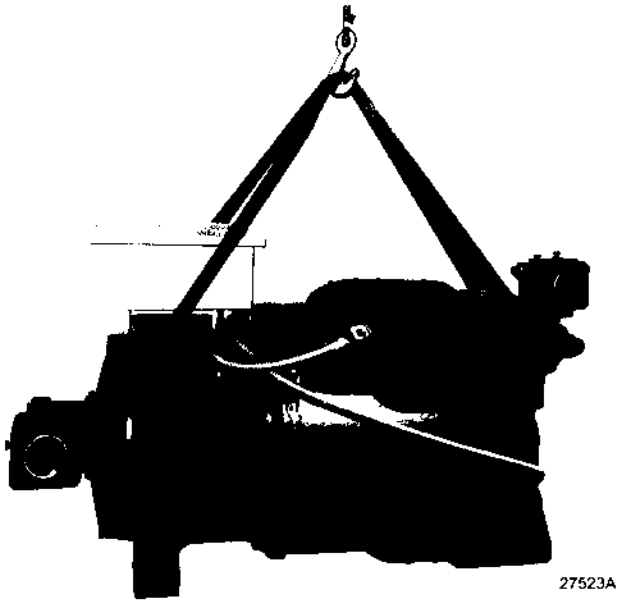


FIG. 5 – RIGGING THE COMPRESSOR

provided with two oil sight glasses (located on the oil pump end of the compressor) to permit a visual check of the oil level.

During unit operation, the **oil level** should be adjusted so that oil-splashing is visible between the middle of the lower sightglass and the middle of the upper sightglass.

1. **YORK REFRIGERATION OIL "C" SHOULD ALWAYS BE USED ON THESE COMPRESSORS ON 60 HZ APPLICATIONS USING R-22. 5 GALLON CAN 011-00312**

2. **TYPE "H" ON R-134a APPLICATIONS. 5 GALLON CAN 011-00549**

The internal gear type compressor oil pump is designed to operate with either clockwise or counterclockwise compressor rotation. It is directly connected to the crankshaft and is located externally on the pump end bearing head.

Internal passages in the pump end bearing housing and compressor housing connect to an internal suction tube which in turn connects to the oil strainer. The oil strainer consists of a large wire mesh cylinder with sheet metal ends and an internal spring to prevent collapse of the strainer screen if it should become covered with foreign material.

LUBRICATION, MAIN BEARINGS, OIL PUMP END & MOTOR END – Oil under pressure leaves the oil pump and flows internally through the pump housing to lubricate the pump end bearing.

Simultaneously, oil is fed through internal oilways in the crankshaft to supply oil to the thrust collar and motor end bearings. An oil relief port machined in the motor

end bearing housing relieves oil pressure back to the crankcase through an eductor. The eductor pickup tube will draw oil from the motor housing, if present. Normal oil pressure is approximately 60 psi minimum above crankcase (suction) pressure.

The thrust collar positions the crankshaft longitudinally in the compressor and takes the thrust forces imposed upon the shaft. Radial grooves for oil are provided on the inner or thrust surface which is in contact with the crankshaft shoulder.

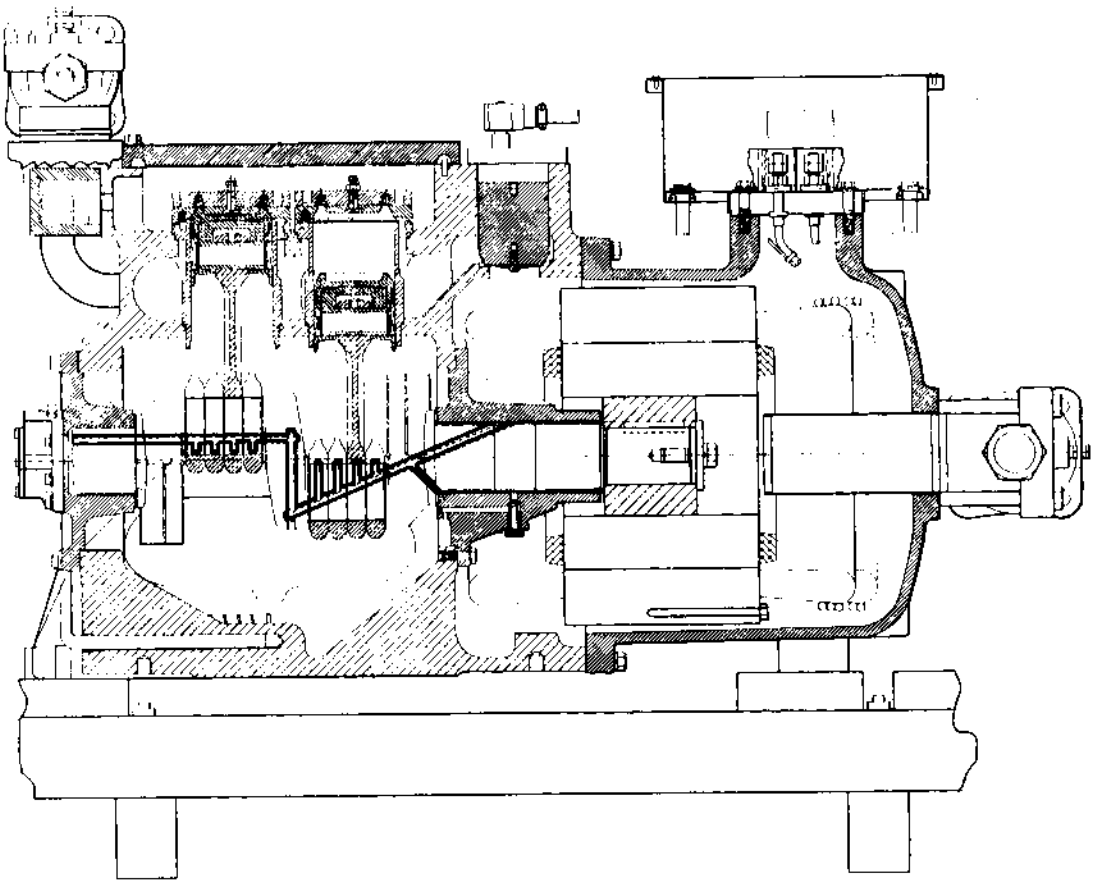
LUBRICATION, CYLINDER WALLS, CONNECTING ROD AND PISTON PIN BEARINGS – Oil under pressure is conducted through drilled oilways in the crankshaft to the crankpins. The crankpin is provided with one radially drilled hole (which connects with the drilled oilway in the crankshaft) for each connecting rod bearing.

Lubrication of the cylinder walls and piston pins is accomplished by the spray from the spaces between the connecting rod bearings and the cheeks of the crankpin as some of the pressurized oil leaves these bearings.

OIL LEVEL

The compressor oil level must be maintained between the middle of the upper and middle of the lower sight glass at all operating conditions.

At part load operating conditions, it is not abnormal for the oil level to be in the lower sight glass. Whereas running the compressor at full load will tend to return more oil to the crankcase.



LD03662

FIG. 6 – LUBRICATION PATHWAYS

CAPACITY CONTROL SYSTEM

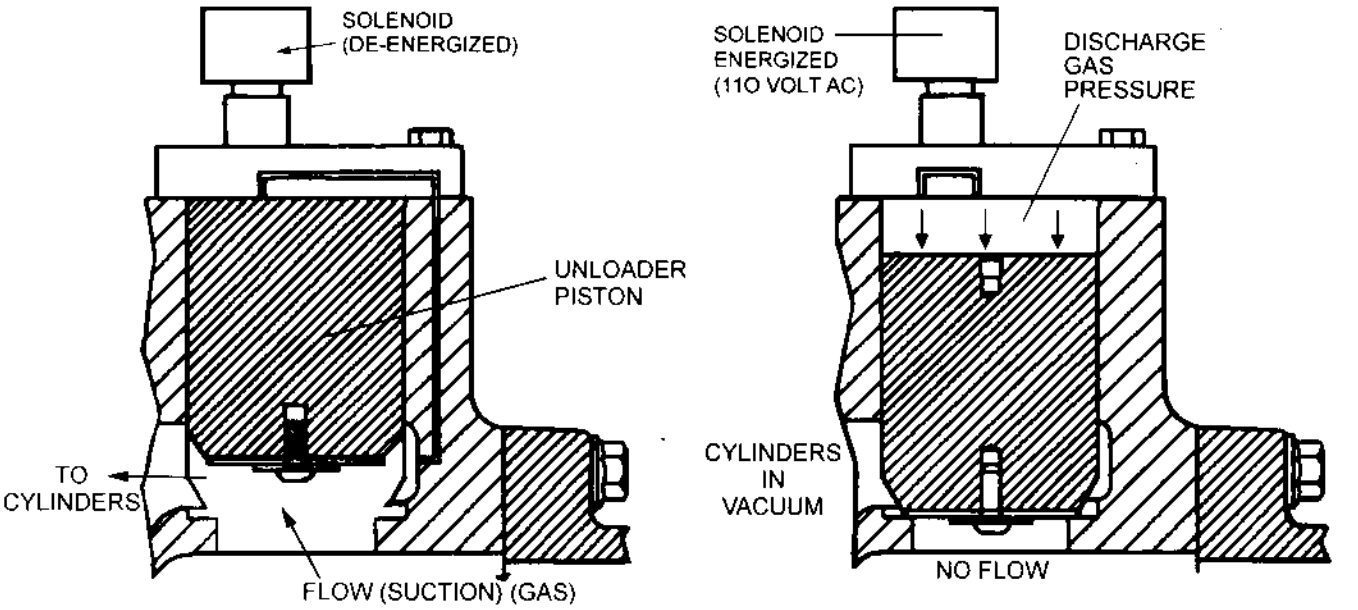
Adjustable capacity control of the YORK Model J Style "G" compressor is accomplished by preventing (blocking) the suction gas from entering the suction plenums of the compressor. Some cylinder banks are never equipped with unloaders. This is to ensure a definite minimum flow of cool refrigerant gas at all times for motor cooling. One unloader controls flow to one cylinder bank, with two cylinders per bank.

The unloader mechanism consists of a solenoid valve mounted on the outside of the compressor housing, an internal piston, and internal gas passage ways. The system is actuated by means of high pressure discharge gas applied to the top of the unloader piston.

On YORK Chillers and condensing units, normal capacity control steps are made in response to water temperature or suction pressure setpoints as programmed at the control panel. Other unloading measures may be taken in response to features written in the control software such as high motor current safety. These features will be described in the particular chiller IOM.

The pressure difference created by the suction stroke forces the unloader piston up, uncovering the recessed opening which allows the suction gas to flow through the port and into the cylinders. The cylinders are now loaded.

When wiring a standard 6 cylinder compressor, the capacity control solenoid valves (LDSV) should be wired so the solenoid No. 2 is energized first and solenoid No. 1 is energized last. (See Fig. 8) They should be de-energized in the reverse order. This will assure that the compressor cylinders load (and unload) in the proper sequence.



SUMMARY OF OPERATION

LOADED	UNLOADED
SOLENOID DE-ENERGIZED	SOLENOID ENERGIZED
GAS PRESSURE APPLIED TO SUCTION PLENUM	GAS PRESSURE APPLIED TO UNLOADER PISTON
UNLOADER PISTON UNSEATED (UP), FLOW PATH OPEN	UNLOADER PISTON SEATED (DOWN), FLOW STOPPED

FIG. 7 – CAPACITY CONTROL OPERATION

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. 9 and proceed as follows:

1. Remove the oil pump cap screws and pull the pump assembly out of the bearing head.
2. 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.
3. Tighten the pump cover cap screws evenly by drawing down opposite and alternate pairs.

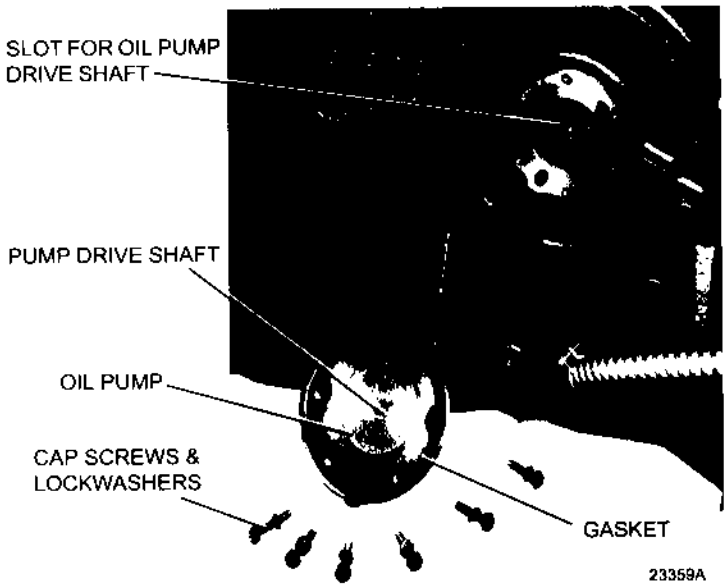


FIG. 9 – COMPRESSOR OIL PUMP

CAPACITY CONTROL SOLENOIDS & UNLOADERS

Normally, the coil is the only part of the solenoid valve that requires replacement. To replace the coil, proceed as follows: (See Fig. 10)

1. Remove the conduit and the wires from the solenoid valve.
2. Remove the screw from the top center of the valve and remove the coil.
3. 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. Remove six screws from the valve plate.
2. Remove valve from compressor housing.

If the unloader piston must be replaced or serviced, proceed as follows:

1. Insert screw into the threaded hole on top of the piston.
2. Remove piston.
3. Remove button screw, flat washer, and gasket on the bottom of the piston.

Assembly and installation is the reverse of disassembly and removal.

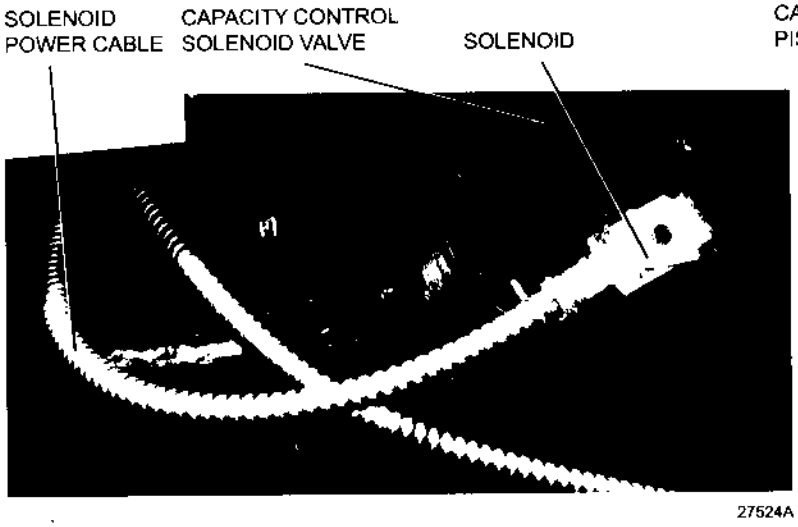


FIG. 10A – CAPACITY CONTROL SOLENOID

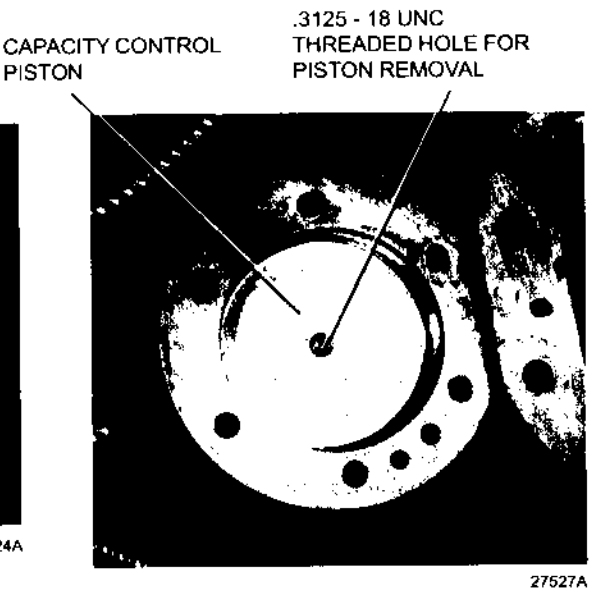


FIG. 10B – UNLOADER PISTON

CRANKCASE OIL HEATER

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 conduit and disconnect the heater wires. Pull the heater from the compressor (See Fig. 11).

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

OIL STRAINER

The compressor oil strainer 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.

REMOVING THE SUCTION STRAINER

The compressor suction strainer is located in the motor housing cover just under the suction stop valve. (See Fig. 12) To clean and replace the suction strainer, proceed as follows:

1. Remove the four bolts which hold the suction stop valve to the motor housing cover.
2. Pull the suction strainer out of the housing and clean with an approved safety solvent or install a new strainer if required.
3. 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.
4. Bolt the suction valve in place, making sure that it seats separately.

REPLACING THE OIL SIGHT GLASS

Compressors are equipped with 2 plug type sight glasses located on the pump end of the compressor. (See Fig. 13) If they become broken or damaged in any way, they must be replaced. Proceed as follows:

1. Drain the oil level below the sight glass that is to be replaced.
2. Remove the damaged sight glass(es).
3. Clean the threads in the housing and on the new sight glass with an approved safety solvent.
4. Apply LOCTITE to the threads of the sight glass and screw it into the compressor housing using a socket wrench. Do not overtighten as this may crack the glass.
5. Fill the crankcase with clean oil.

FIG. 11 – CRANKCASE HEATER

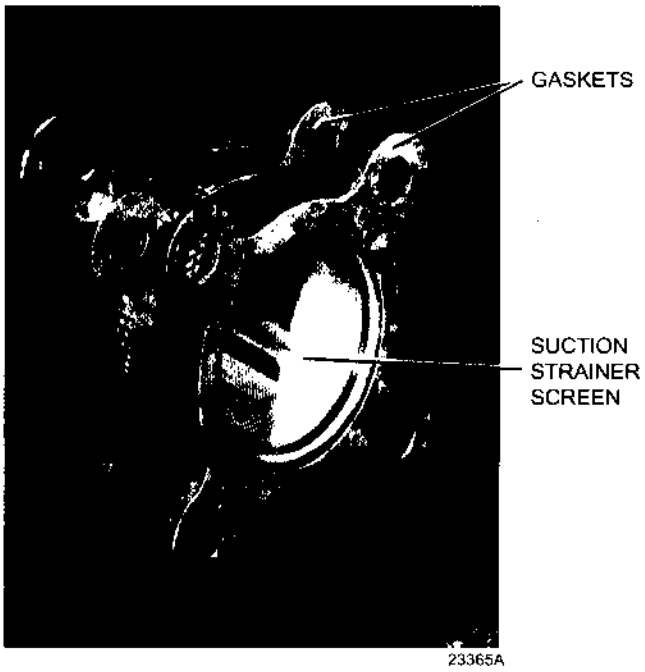
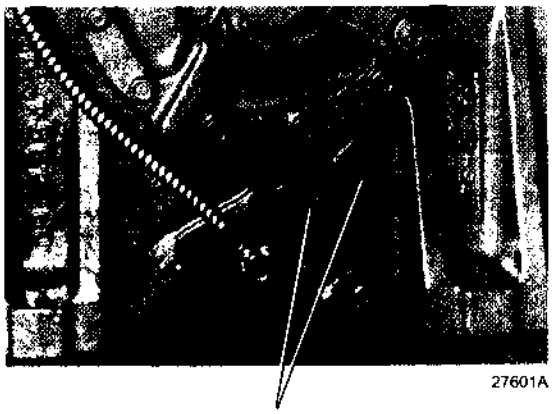


FIG. 12 – COMPRESSOR SUCTION STRAINER

REMOVING THE DISCHARGE MANIFOLD AND TOP HEADS

There are two different types of cylinder covers. Cylinders with unloading have a thin flat access cover. This type of cover also has a small dimple on its underside to accept a roll pin mounted in the compressor housing. The second type of head is thicker with no provision for accepting the roll pin. This type of head connects to the discharge manifold. Access covers are not connected to the discharge manifold.



OIL LEVEL SIGHT GLASS

FIG. 13 – OIL LEVEL SIGHT GLASS AND LEVELS

To remove the discharge manifold and the compressor cylinder covers, proceed as follows:

1. Disconnect the discharge manifold from the compressor top head and remove the top head from the compressor.

Before removing the cylinder head, 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. Be sure to use proper tightening sequence as shown in Fig. 4.

REMOVING THE DISCHARGE AND SUCTION VALVES AND CYLINDER SLEEVES

NOTE: Mark the cylinder sleeves, discharge valves and suction valves with a marker so that they can be reinstalled in their original location.

To remove the valve assemblies and cylinder sleeves, refer to Figs. 14, 15, and 16 and proceed as follows:

1. Disconnect the discharge manifold from the compressor top head and remove the top head and access cover from the compressor.
2. Remove the four cap screws which secure the discharge valve cage assembly to the housing, then 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.
3. 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.
4. Lift the cylinder sleeve out of the compressor housing.
5. Disassemble the discharge valve cage assembly. Remove the locking nut and center screw. Then lift out the inner discharge valve plate, discharge valve and springs.
6. Clean, dry and oil all parts. Inspect the valves for wear and replace, if necessary.

NOTE: Torquing of the center screw/nut is critical.

7. Assembly is the reverse of removal.

INSTALLING CYLINDER SLEEVES

To install the cylinder sleeves, refer to Figs. 14, 15, and 16 and proceed as follows:

1. Carefully lower the cylinder sleeve over the piston.

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. Guide 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 slightly due to o-ring compression. On Style G, O-rings are used only on cylinders that have the ability to unload.

INSTALLING SUCTION AND DISCHARGE VALVES

Helical coil springs used in discharge valve assemblies should be replaced every 5,000 - 7,000 hours on normal chilled water (40°- 50°F LWT) air conditioning applications. Process applications, units operating at higher-pressure ratios such as low temp brine (20°- 39°F LWT), and units operating under high ambient conditions (ambient temps above 115°F) should have more frequent maintenance intervals.

To install the suction and discharge valves, refer to Figs. 15 and 16 and proceed as follows:

1. With the spring pocket side of the suction valve plate up, assemble the suction valve springs in the pocket and set the suction valve in place.
2. To hold 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. 064-03447.
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 making sure valve is not pinched.

   NOTE: Torquing of the center screw/nut is critical. (See Table 1, page 6 and Fig. 15B.)

   b. Insert the discharge valve screw through the inner discharge valve plate and the discharge valve cage. Then bolt the assembly together using the self locking unit.

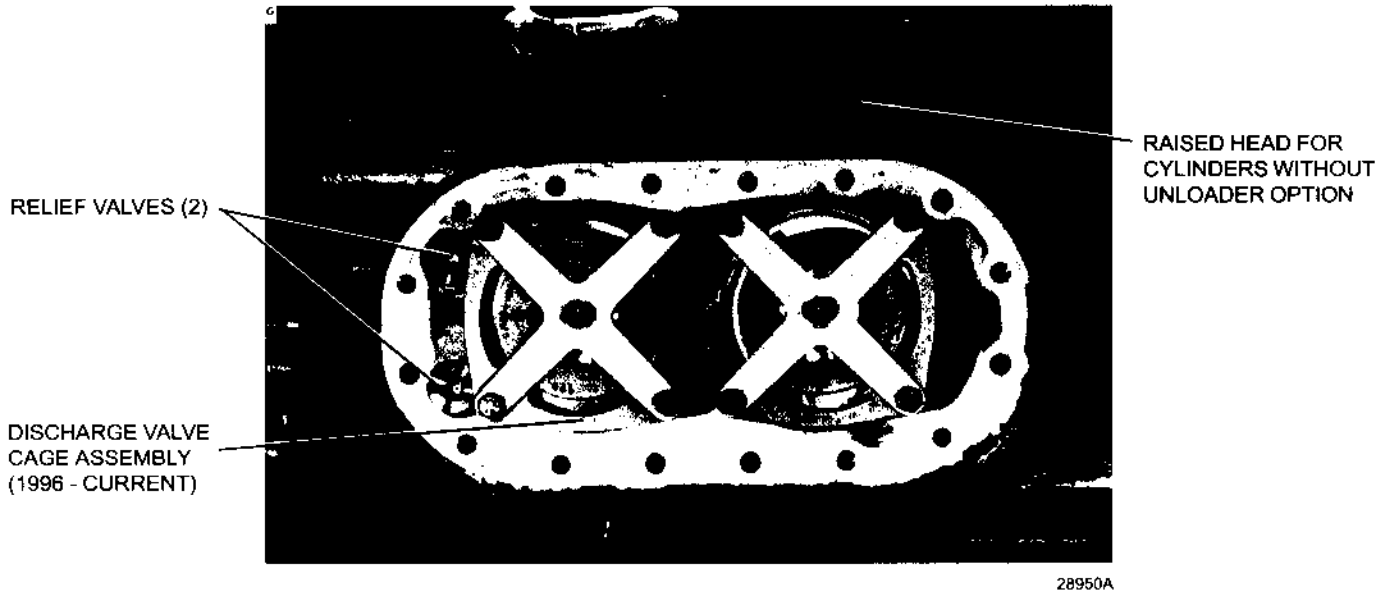


FIG. 14 – SUCTION AND DISCHARGE VALVES AND RELIEF VALVES

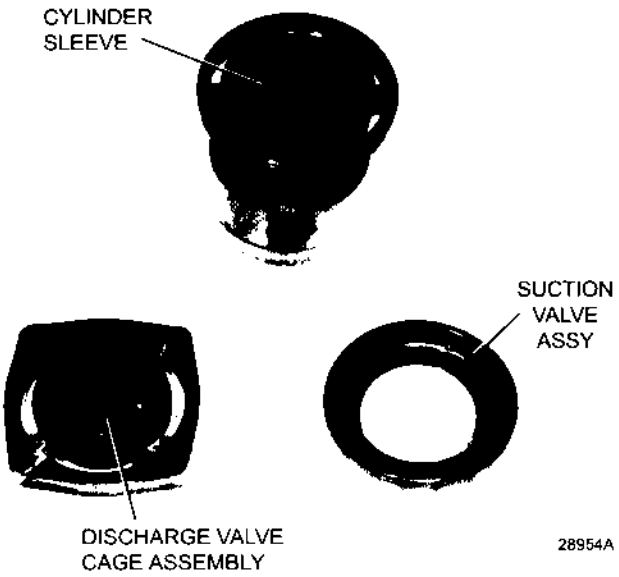


FIG. 15A – CYLINDER SLEEVE ASSEMBLY

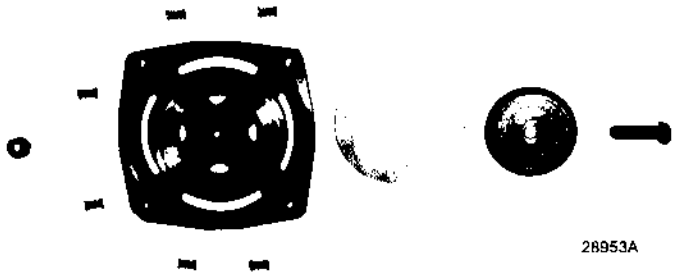


FIG. 15B – DISCHARGE VALVE CAGE ASSEMBLY 1996 - CURRENT

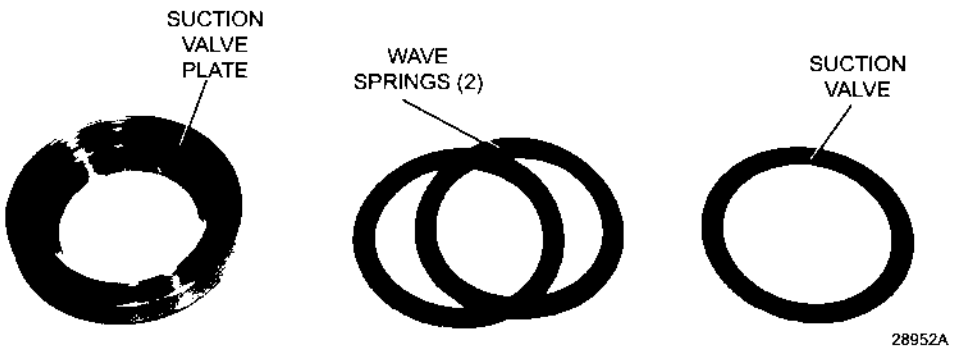


FIG. 16 – WAVE SUCTION VALVE ASSEMBLY 664-44291-000 (1998 - CURRENT)

INSTALL THE VANE ASSEMBLIES ON CYLINDER

4. It is important that the suction valve not be pinched during reassembly. The following steps are recommended.
   a. The piston in the respective cylinder should be close to the bottom of its stroke.

   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.

   b. Place the suction valve plate, with suction valve clipped in place, on the cylinder sleeve. Using one hand, hold the suction valve plate firmly against the cylinder sleeve, but do not push the cylinder sleeve down against the housing. With your free hand remove the valve clips. A distinct click will be heard as the clips are removed, if the valve is seated properly.
   c. Holding the suction valve plate in place on top of the cylinder sleeve (do not allow the sleeve to slip down against the compressor housing) place the discharge valve cage assembly on top of the suction valve plate. Insert two cap screws through holes in diagonally opposite corners of the discharge valve cage and tighten them "finger-tight."
   d. Push the discharge valve cage, suction valve plate and cylinder sleeve down firmly against the compressor housing. Insert remaining cap screws and tighten all caps screws to their proper torque. See Table 1, page 6.
5. Use new gasket when installing the compressor access cover and top heads and reconnect the discharge manifold to them.

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 Figs. 8 and 14). 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. Disconnect the discharge manifold from the proper top head and remove the top head.

   CAUTION: DO NOT use any thread locking sealer on the high pressure relief valve.

2. Unscrew the leaking relief valve and screw in the new valve.
3. Reassemble the top head and the discharge manifold.

REMOVING PISTONS AND CONNECTING RODS

To remove the pistons and connecting rods, refer to Fig. 17 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. Remove the suction and discharge valve assemblies. Allow the cylinder sleeve to remain in place in the housing.
2. Remove the crankcase hand hole cover plate(s).
3. 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.
4. 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.
5. Remove the cylinder sleeve.
6. 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.

NOTE: 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 the 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.

7. Remove piston assemblies ONE AT A TIME, repeating the above steps 3 through 6 for each piston assembly. Proceed to step 8.
8. Remove the piston pin retaining rings.
9. Push piston pin out of the piston.
10. Remove the piston rings.
11. Clean, dry and oil all parts.

INSTALLING PISTONS AND CONNECTING RODS

To install the piston and connecting rod assemblies, refer to Fig. 17, and proceed as follows:

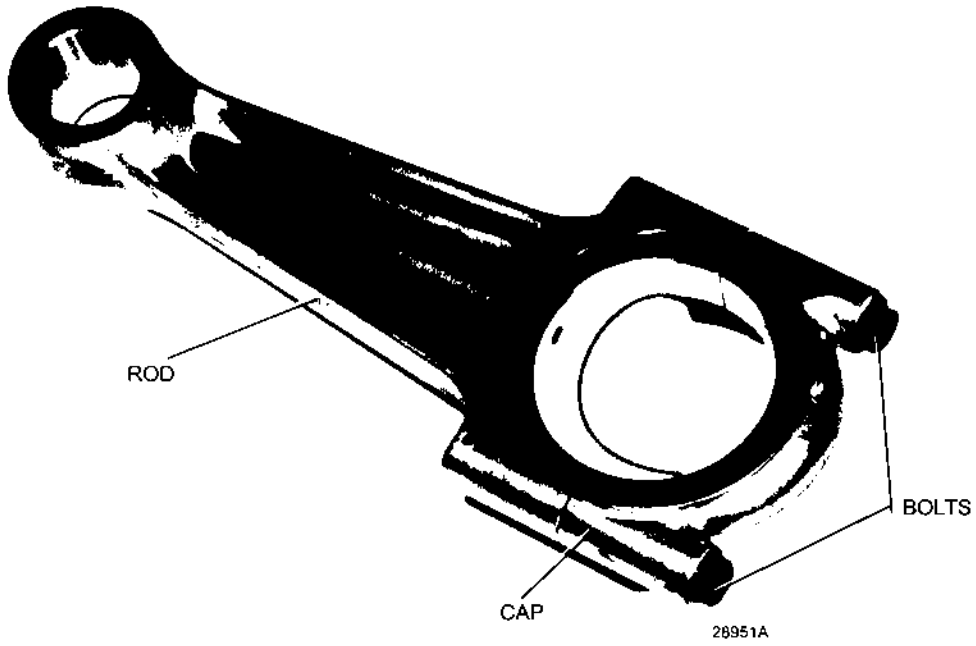
1. Each piston is equipped with two piston rings. When installing the rings, use copper or brass strips under the rings and spread the rings only enough to slide them down over the piston.

NOTE: Piston rings are tapered and must be installed correctly. The wider part of the ring must be down. The top surface of the ring is stamped with a dot (See Fig. 18).

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. Bearing surface of the connecting rod, piston, and wrist pin must be well-oiled prior to reassembly.
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 cylinder sleeve. (Refer to INSTALLING THE CYLINDER SLEEVES).
4. Install the lower half of the connecting rod bearing as described in step 3 above. Tighten the screws (or nuts) evenly to the proper torque. (See Table 1). 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. Reinstall the suction and discharge valves and the compressor top head and covers making sure they are in their original locations and reconnect the discharge manifold and top head, using new gaskets as required.



Replacement rods must match the remaining rods in any one unit, i.e. long stroke with long stroke, short stroke with short stroke. Drilled rods for wrist pin lubrication (1997 and newer) may be mixed with non-drilled on R-22 applications. Drilled rods are required on all applications that use POE type oils, such as R-134a and R407C.

FIG. 17 – CONNECTING ROD

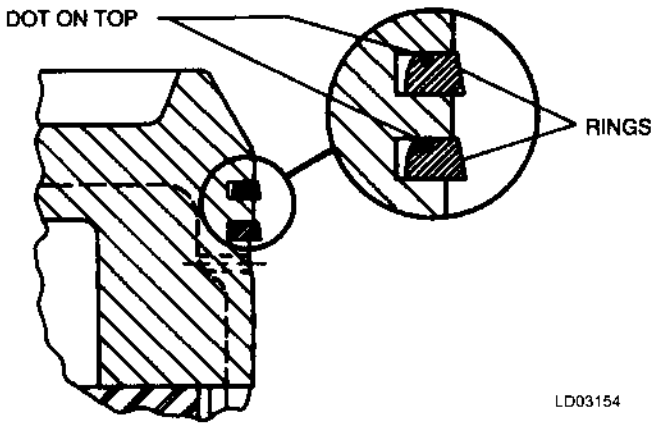


FIG. 18 – PISTON RING INSTALLATION

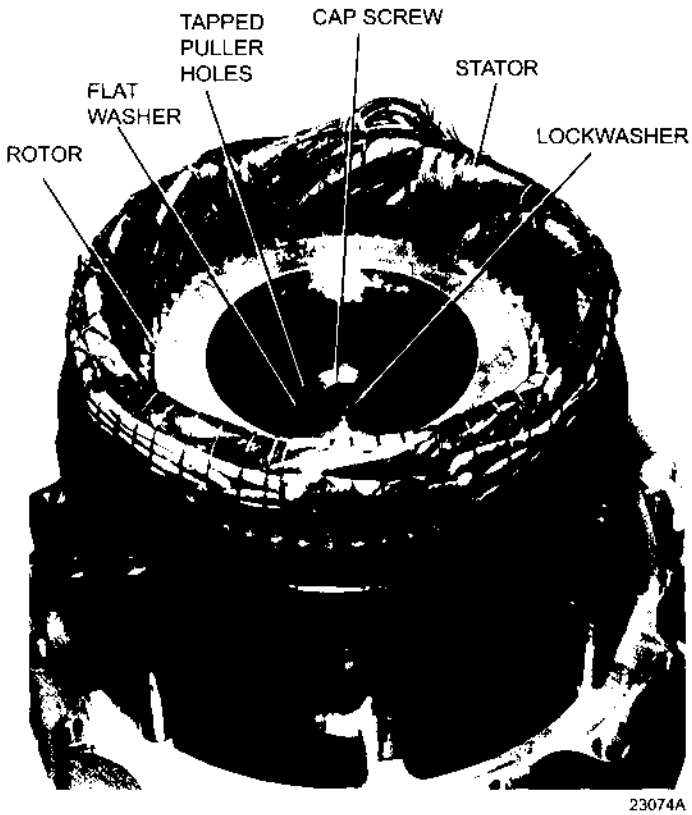


FIG. 19 – MOTOR END OF COMPRESSOR

REMOVING ROTOR

It is necessary to remove the rotor in order to remove the crankshaft and/or motor end bearings. Also, if it becomes necessary to replace the rotor or stator, both rotor and stator must be replaced. To remove the rotor, proceed as follows:

> ***WARNING***
> *Be sure electrical power to unit has been disconnected.*

1. Remove the cap screws that hold the suction stop valve to the motor cover. Remove the suction strainer screen and gaskets.
2. Disconnect the power wiring from the motor terminal bolts.
3. Mark each terminal bolt with the correct lead number. (Ex. 1, 2, 3, 7, 8, 9)
4. Mark each protector terminal screws with correct numbers. (Ex. S1, S2, S3)
5. Remove the terminal box and loosen the terminal plate.
6. Remove the nuts from the terminal bolts and the protector terminal screws and push these down through the holes in the terminal plate.
7. Support the main body of the compressor using a crane or other suitable method. Loosen, but do not remove, the cap screws and nuts and bolts that hold the motor cover to the compressor housing. Insert guide pins (1/2" – 16) into 2 of the screw holes before removing the cap screws. Remove the motor cover, taking care not to damage the stator windings.
8. Remove the cap screw, lockwasher and flat washer that hold the rotor to the crankshaft.
9. Insert 2 cap screws (9/16" – 12) or similar item into the trapped holes in the end of the rotor.
10. It is not advisable to attempt to remove the rotor without using the rotor mandrel (YORK Part Number 364-27273). Screw the rotor mandrel into the end of the crankshaft and slide the rotor into it.
11. To reinstall the rotor or to install a new rotor follow steps 7, 8, & 9 in reverse order.
12. Reinstall the motor cover using a new gasket. Be sure motor cover is properly located on the compressor housing.
13. Pull all power terminals and overload connectors up through the terminal box opening.
14. Be sure to place a new terminal block gasket in position **before** inserting the power terminal and overload protectors into the terminal plate.
15. Reinstall the terminal bolts and overload protectors. Be sure the terminal bolts are reinstalled in the correct hold (1, 2, 3, 7, 8, or 9). Refer to Fig. 20 to be certain all gaskets, washers, seals, etc. are installed properly.
16. Reinstall the terminal plate, terminal box, power wiring and cover.
17. Replace the suction strainer screen, gaskets and stop valve.

REMOVING BEARINGS AND CRANKSHAFT

Pump End Bearing

To remove the pump end bearing refer to Fig. 21 and proceed as follows:

1. "Match-mark" the bearing head and compressor housing.
2. Remove the hex flange screws which hold the bearing head to the housing and remove the bearing head.
3. The YORK Bearing Removal Tool (Part Number 364-37260) is required to remove the bearing from the bearing head (See Fig. 22).
4. Using the bearing removal tool as shown in Fig. 23, Detail A, pull that 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.
5. 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.
6. Using the bearing removal tool as shown in Fig. 23, Detail B, pull the bearing into the bearing head, taking care that the bearing enters the bearing head squarely. Note 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 0.15" below the surface on the inboard head.
7. Reinstall the bearing head using a new gasket. Be sure the gasket and bearing head are properly aligned with the oil passages. Tighten the hex flange screws to the proper torque.

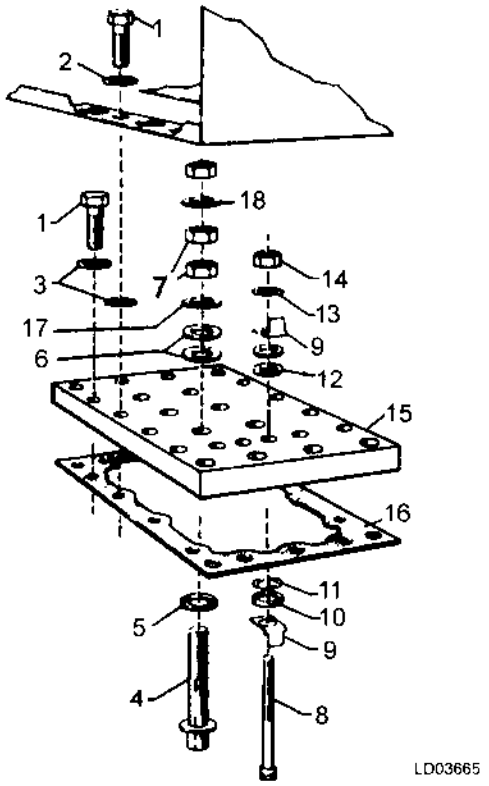


FIG. 20 – MOTOR TERMINAL PLATE DETAIL

ITEM NO.	DESCRIPTION
1	Screw - 7/16 - 14 x 2 (16 Req'd)
2	Lockwasher - 7/16 (4 Req'd)
3	Washer, Plain - 7/16 (16 Req'd)
4	Bolt, Terminal (6 Req'd)
5	Gasket, Terminal Bolt (6 Req'd)
6	Washer, Terminal Block (12 Req'd)
7	Nut, Hex (18 Req'd)
8	Screw, Protector Terminal (2 Req'd Style G) Screw, Protector Terminal (4 Req'd Style G)
9	Terminal, Overload (4 Req'd Style G) Terminal, Overload (8 Req'd Style G)
10	Washer, Plain (4 Req'd Style G)
11	Seal, O-Ring (4 Req'd Style G)
12	Washer Terminal (8 Req'd Style G)
13	Lockwasher (4 Req'd Style G)
14	Nut, Hex (4 Req'd Style G)
15	Block, Terminal
16	Gasket, Terminal Block
17	Washer, Plain (6 Req'd)
18	Lockwasher

Motor End Bearing

To remove the motor end bearings, refer to Fig. 24 and proceed as follows:

1. Drain the oil from the compressor and remove the crankcase cover plate, the motor cover, and the rotor, following procedures described in the applicable sections of this manual.
2. Using suitable timber, support the crankshaft inside the crankcase.
3. Remove the cap screws that hold the bearing head assembly to the compressor housing.
4. 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.
5. 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.
6. Using the bearing removal tool as shown in Fig. 25, 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.
7. 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.
8. Using the bearing removal tool as shown in Fig. 26, 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 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.
9. Reassemble the compressor by following steps 1, 2, 3, 4, and 5 above in reverse order. Be sure that the oil pressure regulating relief valve is at the bottom of the compressor.

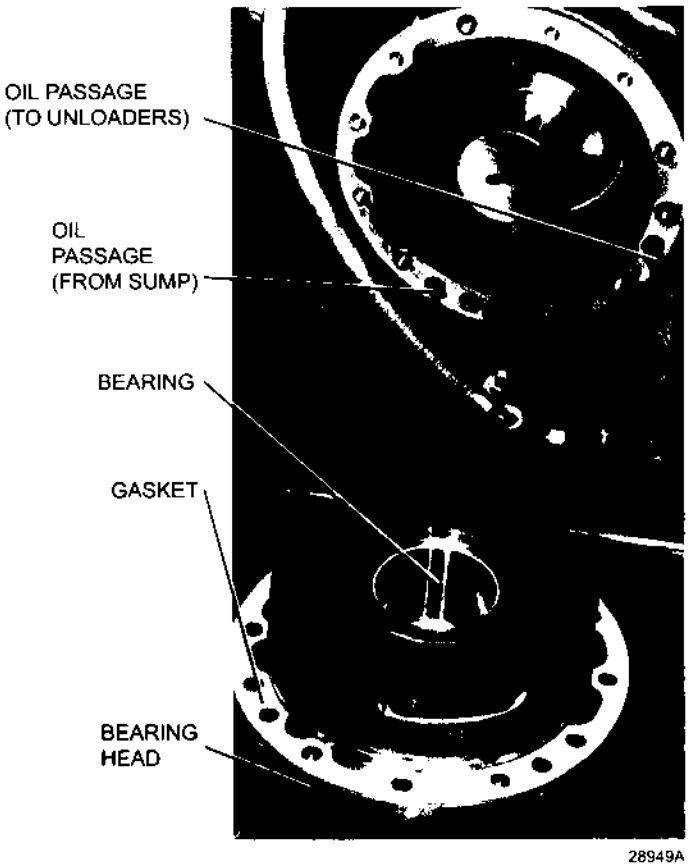


FIG. 21 – REMOVING PUMP END BEARINGS

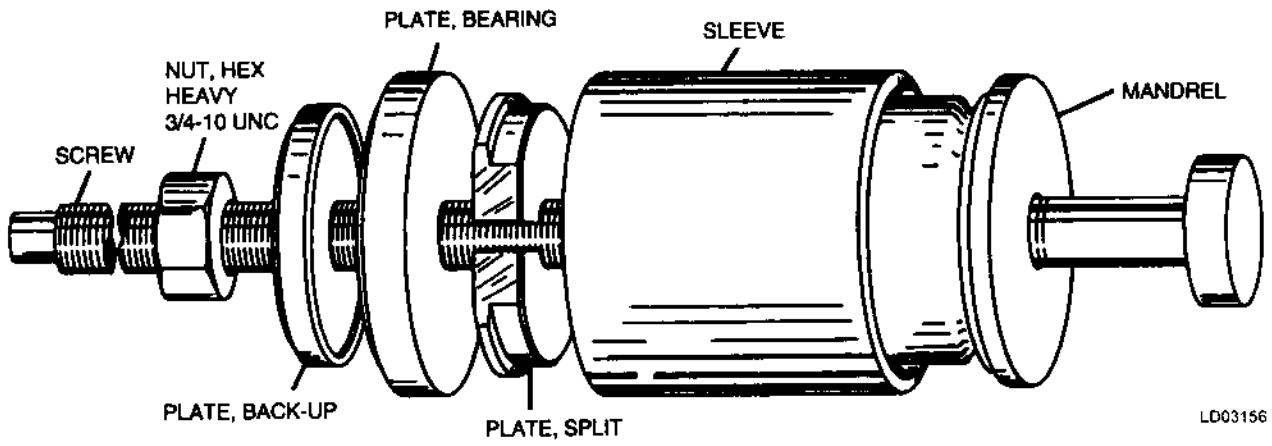
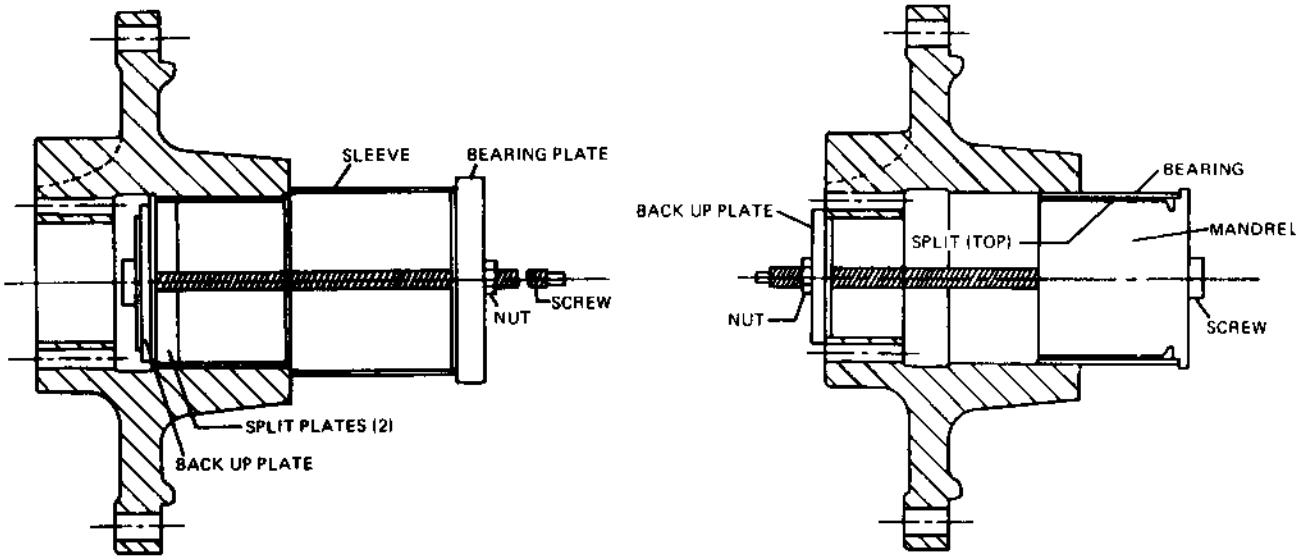


FIG. 22 – BEARING REMOVAL TOOL (PART NO. 364-37260-000)



DETAIL A - PUMP END BEARING (REMOVAL)

DETAIL B - PUMP END BEARING (INSTALLATION)

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FIG. 23 – PUMP END BEARINGS

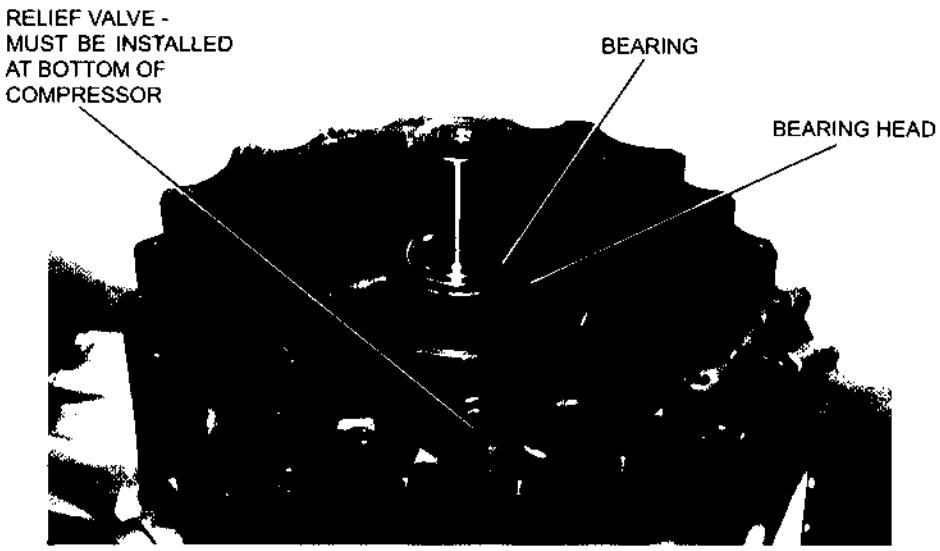

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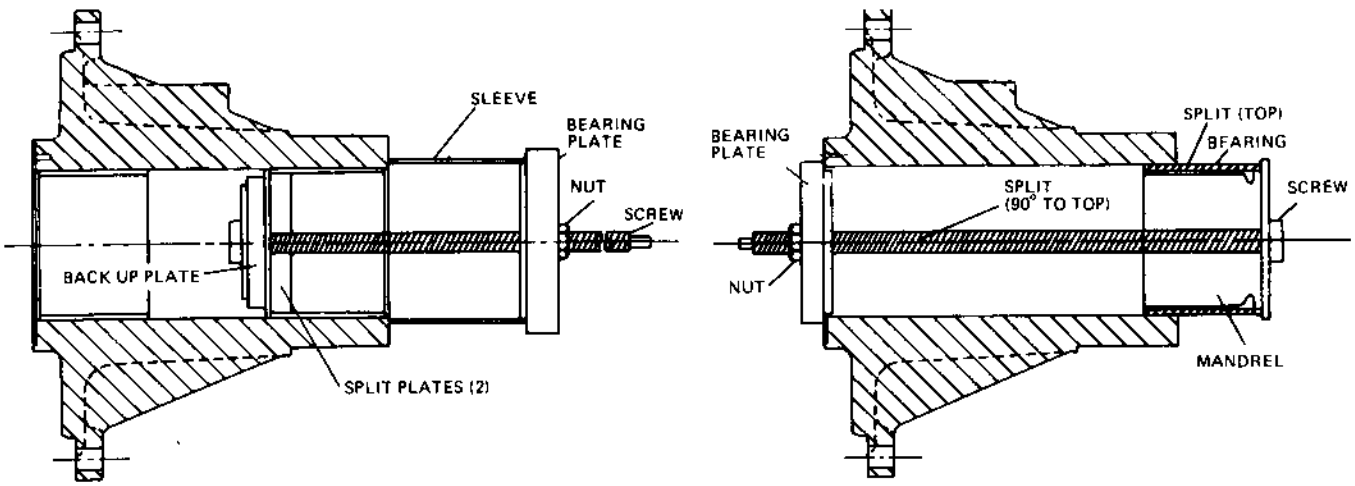
FIG. 24 – MOTOR END BEARING ASSEMBLY



DETAIL A - MOTOR END BEARING (REMOVAL)

DETAIL B - MOTOR END BEARING (INSTALLATION)

LD03664

FIG. 25 – MOTOR END BEARING

Crankshaft

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. 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 cover, and rotor following procedures outlined previously.
2. Using suitable timber, support the crankshaft solidly inside the crankcase.
3. Determine from which end the crankshaft is to be removed and remove the bearing head from that end of the compressor.
4. Screw the rotor mandrel (YORK Part No. 364-37273) into the end of the crankshaft and remove the motor rotor.
5. Using two people, carefully remove the crankshaft from the compressor.
6. If the crankshaft was removed through the pump end, the thrust collar will probably remain in place in the compressor on the motor end. Be sure that this thrust collar is properly positioned on the roll pin before reinstalling the crankshaft. Check thrust clearance, after reassembly for allowable range of .013 - .038".
7. Reassemble the compressor by following the above procedure in reverse order.

Removing The Stator (See Fig. 26)

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

1. It is advisable to remove the compressor from the unit before attempting to remove the stator.
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 cover and rotor, using procedures outlined previously.
3. The compressor should now be placed in a vertical position, on the pump end.

> ***WARNING***
> *Be sure the compressor is supported and blocked adequately so that it does not tip or fall during the disassembly procedure.*

4. Remove the 4 cap screws that hold the stator to the compressor housing. Insert guide pins (7/16 - 14 x 9") into 2 diagonally opposite holes. (Largest stator weight approximately 300 lbs.)

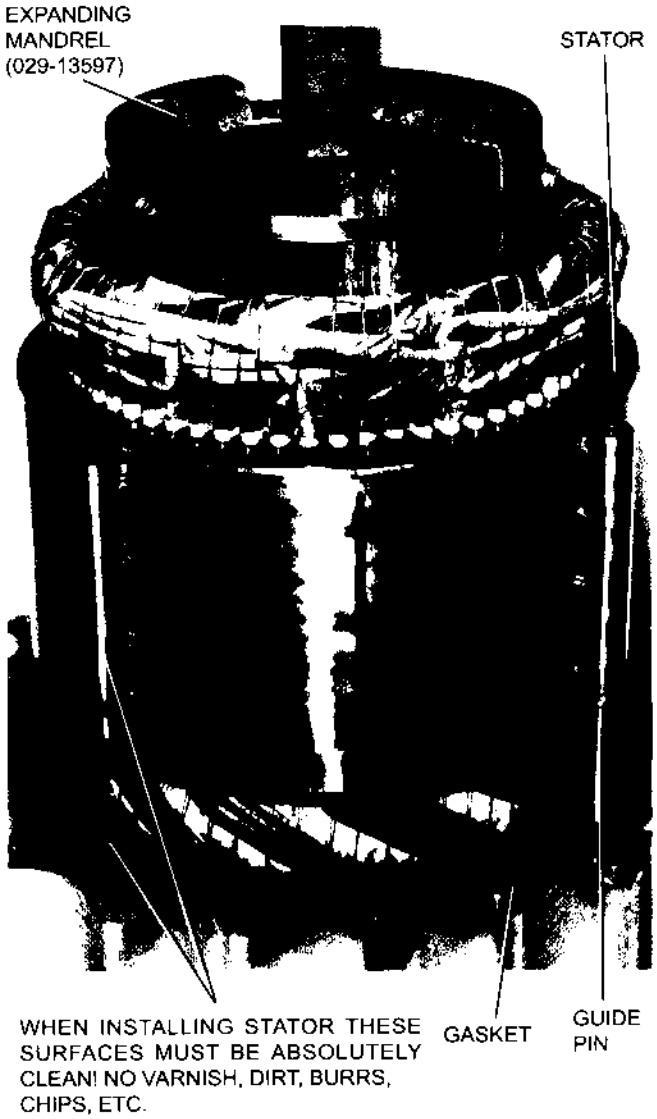


FIG. 26 – REMOVING THE STATOR

5. Install the expanding mandrel (YORK Part No. 029-13597) inside the stator, and adjust the mandrel so that it is tight within the stator.
6. Using a hoist or crane attached to the mandrel, remove the stator from the housing being careful not to damage the windings. Do not rest the stator on the windings.
7. When installing a stator, the surfaces where the stator rests on the housing must be absolutely clean, free of varnish, dirt, etc. (See Fig. 26).
8. Using the mandrel and guide pins, lower the stator into position, being careful not to damage the windings. Be sure the stator is properly positioned with respect to motor leads.
9. Remove the hoist, mandrel and guide pins. Insert the 4 cap screws and tighten them to the proper torque.
10. Reassemble the compressor using procedures described in the respective sections of this manual. Use a new gasket between the motor cover and compressor housing.

ORDERING RENEWAL PARTS

All compressor parts are designed and manufactured for a specific application. They are selected to withstand the pressures normally associated with compressor operation. The substitution of non-standard parts is not authorized as these parts could cause serious damage to the compressor or operator. Parts should be replaced with genuine YORK Renewal Parts. The Renewal Parts Manual Form 180.23-RP4 lists replacement parts for these compressors. When ordering parts, be sure to follow all instructions included in the Renewal Parts Manual.

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RPC 4M 1298 1.68
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