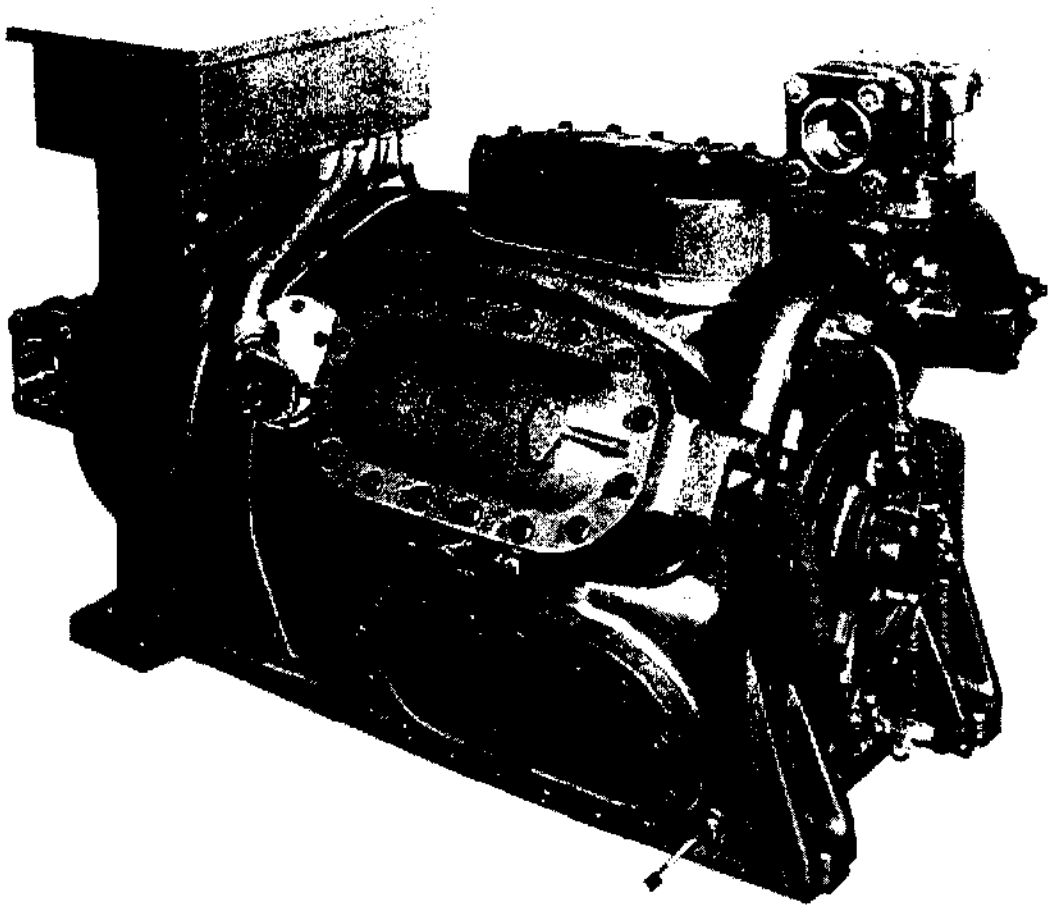
YORK	MODEL P – STYLES A & B HERMETIC COMPRESSORS	
OPERATION, MAINTENANCE, REPAIR PARTS, AND SPECIAL TOOLS LIST	New Release	Form 180.30-RPSTL (1101)

MODELS
P43, 63, 83
P44, 64, 84

(See Page 5 for Complete Model Nomenclature)



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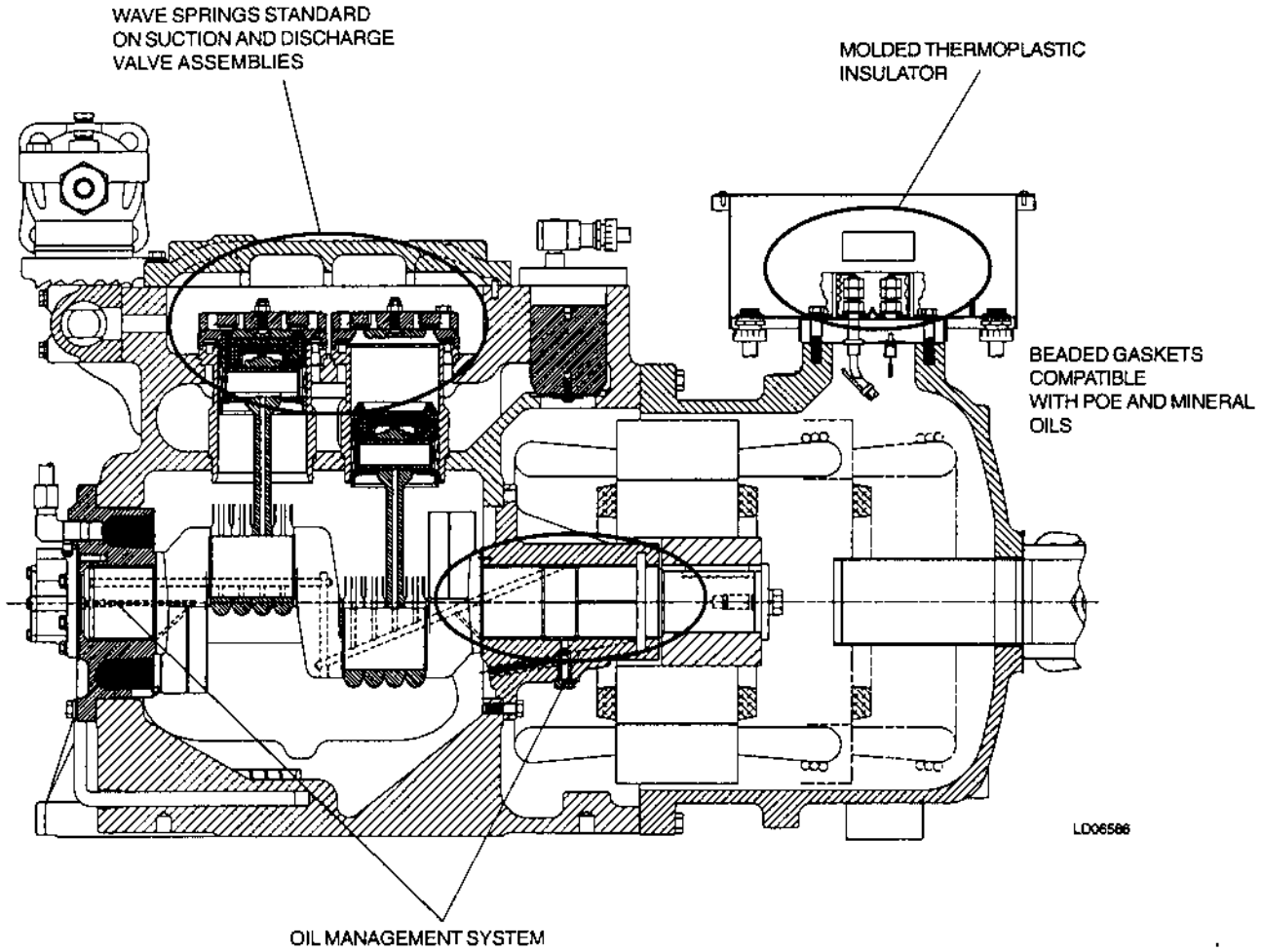


FIG. 9 – 8-CYLINDER MODEL P COMPRESSOR

SECTION 1 – GENERAL DESCRIPTION

Model PA and Model PB compressors share the same compressor bodies and components with the following difference: Model PAs are supplied with a factory-mounted motor protection module and Model PBs are supplied LESS the factory-mounted motor protection module.

YORK Model P Semi Hermetic Compressors are industrial duty reciprocating type compressors designed to meet refrigerating and air conditioning requirements using either R-22, R-134a or R-407C. They are available in 4, 6, and 8 cylinder models in "short stroke" or "long stroke" versions, as designated by the fourth character in the compressor model number.

Model P compressor unloading capabilities allow the compressor flow capacity to modulate as refrigeration load changes occur, improving part load operating efficiency and decreasing operating costs.

Model P compressors incorporate "wave-spring" type suction and discharge valve components in lieu of traditional wire wound coil type springs. This improved design significantly reduces the valve maintenance interval as compared to coil spring designs. Reliability increases significantly as well.

Molded thermoplastic insulators replace the traditional paper/fiber type insulator on the terminal studs.

Gaskets feature a raised bead for improved sealing with mineral oils, POE lubricants, and new refrigerants.

P compressors boast an oil management system for control of oil flow within the compressor, along with an oil temperature safety system. This oil management system significantly decreases oil carry over which improves system heat transfer, operating efficiency, and reliability.

The oil management system consists of a motor end bearing head that incorporates an oil control bearing outboard of the two main bearings, and oil return ports that direct oil back into the crankcase. Oil passes through an eductor prior to entering the crankcase. Oil that may accumulate in the motor housing will be transported to the crankcase via the eductor pickup tube.

Crankcase ventilation incorporates an oil mist precipitator built into the pump end bearing head. Venting from this bearing head to the suction plenum is through an external pipe connection.

For R-22 applications, YORK Type C mineral oil is normally used. Under high ambient conditions, YORK Type E mineral oil is recommended.

For R-134a and R-407C, YORK Type H, POE synthetic lubricant is recommended.

Cylinder o-rings are used on all permanently loaded cylinders as well as the cylinders that can unload.

Connecting rods have a drilled port to provide forced lubrication to the wrist pin. This is essential for POE lubricants.

When used with the ISN Recipak Control Center, oil temperature controls include a 'high oil temp' cutout set at 160°F (71°C) and an 'oil temp inhibit' feature that requires oil temperature to be at least 15°F (8.3°C) above ambient at start up. If this condition is not satisfied, the starting circuit will not engage. This start inhibit safety verifies heater operation and ensures that refrigerant migration during the off cycle will not accumulate excessive refrigerant in the oil. This prevents oil foaming and oil pressure loss.

Normal **commissioning procedures** or start-up after months of off-time should include prelubricating the oil system with a hand pump and allowing the crankcase heater to be energized at least 24 hours prior to start up.

Normal oil pressure range is 50-70 PSID on 60 Hz operation and 40-60 PSID on 50 Hz.

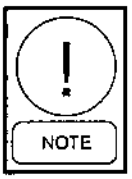
PRE-LUBRICATION

To ensure long compressor life, **pre-lubrication** at commissioning and after long idle periods of several months is recommended. This manual pre-lube is **especially important** on R-134a and R-407C units that employ **POE type lubricants** due to the polar nature of these lubricants. This is accomplished by attaching a hand pump to the core-type access valve (Schrader fitting) on the oil pump.

See pages 35 and 53 for maintenance chart and oil charging/pre-lubing pump.

Renewal parts are listed in a separate SECTION 3. Parts and professional service are available through your local YORK Service Office. Contact your nearest office using the list on page 55. Sales and Service offices are also listed on the web at:

http://www.york.com/



Compressor Styles A and B are identical except for Motor Protector Module; Style A includes Factory-mounted Module; Style B is shipped without Module. (U.L. regulation compliance) See Fig. 12A, page 9.

NOMENCLATURE

COMPRESSOR IDENTIFICATION

Each compressor is identified by nomenclature as shown below. The nomenclature is printed on a data plate which is located near the oil pump as shown in Fig. 10. When contacting the factory or ordering renewal parts, include the complete Model Number and Part Number.

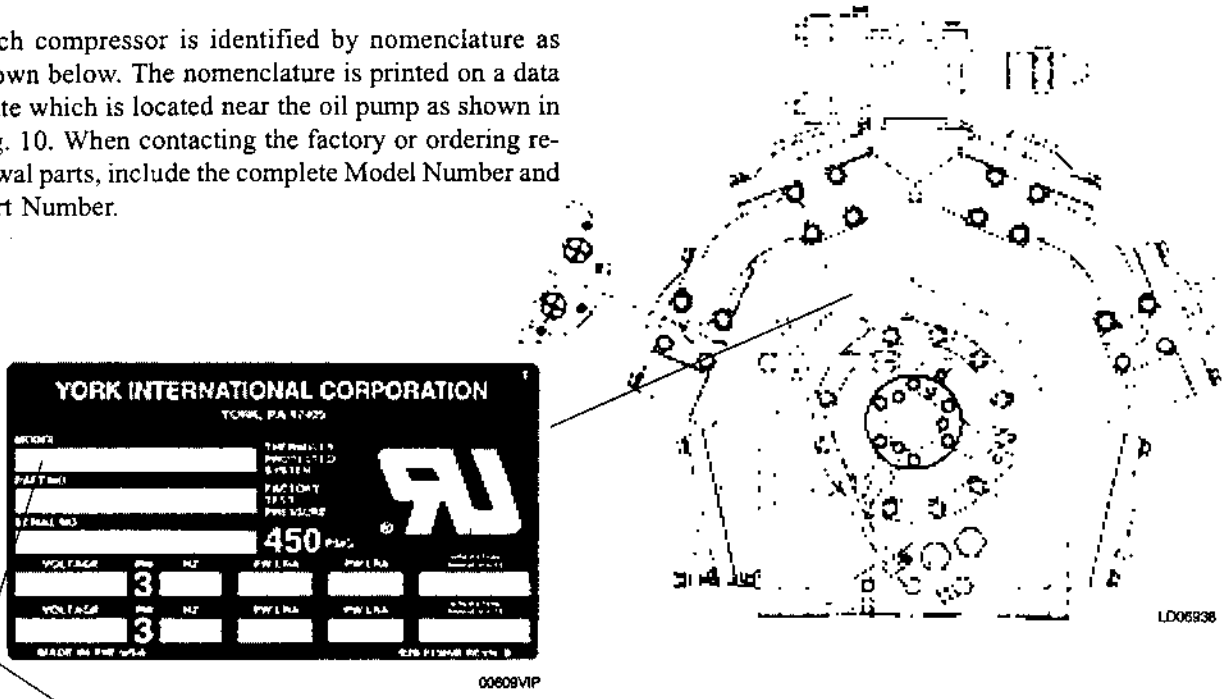


FIG. 10 – COMPRESSOR DATA PLATE

P A 4 3 1 — M H 46/50 S

Compressor Series

Style
A = Model P with Motor Protector
B = Model P without Motor Protector

Number of Cylinders
4, 6, or 8

Displacement Code
3 = Short Stroke
4 = Long Stroke

	NO. OF CYLINDERS		
	4	6	8
3	3.2"	3.0"	3.1"
4	3.8"	3.6"	3.7"

Number of Unloaders
2 = (8 Cyl. Compr.) - % Loading: 100,75,50
2 = (6 Cyl. Compr.) - % Loading: 100,66,33
1 = (8 Cyl. Compr.) - % Loading: 100,50
1 = (6 Cyl. Compr.) - % Loading: 100,66
1 = (4 Cyl. Compr.) - % Loading: 100,50

Motor Size Code
M, N, P, Q, S, T or V

Motor Efficiency Rating
H = High Efficiency
Blank = Standard Efficiency

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

Motor Vendor
S = A. O. Smith

PHYSICAL DATA

COMPRESSOR MODEL		P43	P44	P63	P64	P83	P84
No. of Cylinders		4		6		8	
Nom. Displacement	60 Hz	143 (67.5)	170 (80.2)	201 (94.9)	242 (114.2)	278 (131.2)	331 (156.2)
CFM (l/s)	50 Hz	119 (56.2)	140 (66.1)	168 (79.3)	199 (93.9)	232 (109.5)	273 (128.9)
Bore (Inches) (mm)		3-3/4 (95.3)		3-3/4 (95.3)		3-3/4 (95.3)	
Stroke (Inches) (mm)		3.2 (81.3)	3.8 (96.5)	3.0 (76.2)	3.6 (91.4)	3.1 (78.7)	3.7 (94.0)
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.) (liters)		2.0 (7.6)		2.0 (7.6)		2.0 (7.6)	
Weight (Lbs.) (kg.)		1500 (680)	1560 (708)	1820 (826)	1860 (844)	2040 (926)	2140 (971)

* YORK C for R-22 Air Conditioning Applications. 5 gallon can 011-00312-000 (Mineral)
* YORK H for R-134a and R-407C Air Conditioning Applications. 5 gallon can 011-00549-000 (POE)
* YORK E for R-22 in high ambient environment (115°F and above). 5 gallon can 011-00582-000 (Mineral)

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
380-3-60	355	415
460-3-60	414	506
575-3-60	517	633
190-3-50	171	208
220-3-50	198	242
346-3-50	311	381
380/415-3-50	342	440
440-3-50	396	484
500-3-50	450	550

COMPRESSOR OPERATING LIMITATIONS

Maximum Compression Ratio	9.5:1	
Maximum Operating Differential (PSI) (Bar)	325	(22.8)
Maximum Discharge Temp. (°F) (°C)	275	(135)
Superheat (Nominal) (At Compressor) (°F) (°C)	12 - 18	(6.7 - 10)
Min. Oil Pressure (Above Suction Pressure) (PSIG) (Bar)	25	(1.7)
Maximum Oil Temperature[1] (°F) (°C)	160	(71.1)
Min. Oil Temp (At Start Up) (°F) (°C) (Above Ambient)	15	(8.3)
Maximum Sat. Discharge Temp.[2] (°F) (°C)	155	(68.3)
Maximum Sat. Suction Temp.[2] (°F) (°C)	70	(21.1)
Maximum Ambient (°F) (°C)	130	(54.5)
Minimum Ambient (°F) (°C)	0	(-17.8)

[1] Measured externally on pump suction boss as shown in Fig. 11 or may be a control panel feature on newer units.
[2] Motor selection and operating conditions may limit maximum saturated discharge temperature to lower levels and saturated suction temperature to higher levels.

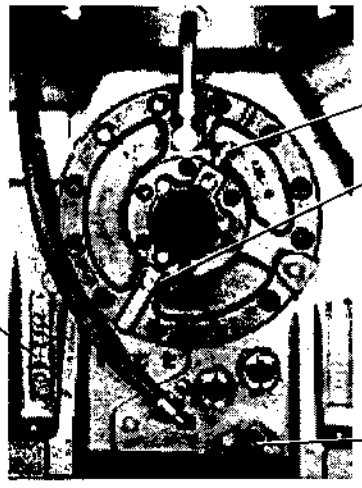


FIG. 11 – CHECKING OIL TEMPERATURE

ELECTRICAL DATA

MOTOR SIZE CODE[1]	VOLTAGE	PHASE	HERTZ	RATED AMPS[2]	LOCKED ROTOR AMPS	
					A/L	PW
M	200	3	60	205	913	731
	230	3	60	178	794	636
	380	3	60	108	480	385
	460	3	60	89	397	318
	575	3	60	71	318	254
	190	3	50	181	757	560
	220	3	50	156	731	540
	346	3	50	100	470	347
	380/415	3	50	86	402	297
	440	3	50	78	366	270
	500	3	50	69	322	238
N	200	3	60	236	1099	782
	230	3	60	206	956	680
	380	3	60	125	579	412
	460	3	60	103	478	340
	575	3	60	82	382	272
	190	3	50	181	885	650
	220	3	50	184	856	629
	346	3	50	118	540	400
	380/415	3	50	102	471	346
	440	3	50	94	428	315
	500	3	50	82	377	277
P	200	3	60	279	1203	888
	230	3	60	242	1046	772
	380	3	60	147	633	467
	460	3	60	121	523	386
	575	3	60	97	418	309
	190	3	50	247	910	670
	220	3	50	214	876	647
	346	3	50	136	557	412
	380/415	3	50	118	482	356
	440	3	50	107	438	323
	500	3	50	94	386	285
Q	200	3	60	319	1495	1095
	230	3	60	277	1332	976
	380	3	60	168	806	591
	460	3	60	139	634	474
	575	3	60	111	533	390
	190	3	50	280	1225	905
	220	3	50	246	1187	876
	346	3	50	160	775	572
	380/415	3	50	135	645	475
	440	3	50	123	594	438
	500	3	50	108	522	386
S	200	3	60	401	1746	1322
	230	3	60	348	1518	1150
	380	3	60	211	919	696
	460	3	60	174	759	575
	575	3	60	140	607	460
	190	3	50	353	1470	1087
	220	3	50	308	1420	1051
	346	3	50	196	903	668
	380/415	3	50	169	781	578
	440	3	50	154	710	526
	500	3	50	135	625	462
T	230	3	60	401	1888	1424
	380	3	60	2425	1143	862
	460	3	60	206	1032	733
	575	3	60	161	755	570
	346	3	50	230	1148	865
	380/415	3	50	197	1006	767
	440	3	50	178	856	645
	500	3	50	156	754	568
V	230	3	60	467	2100	1648
	380	3	60	283	1271	997
	460	3	60	234	1050	824
	575	3	60	187	840	659
	346	3	50	274	1160	950
	380/415	3	50	237	1045	820
	440	3	50	215	950	550
	500	3	50	190	836	656

NOTES: 1. Sixth character in compressor model designation (See NOMENCLATURE).
2. Rated amps = .87 x maximum load amps.

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 nuts and screws 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 access cover/cylinder head, handhole cover, 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. 12 shows the recommended tightening sequence.

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

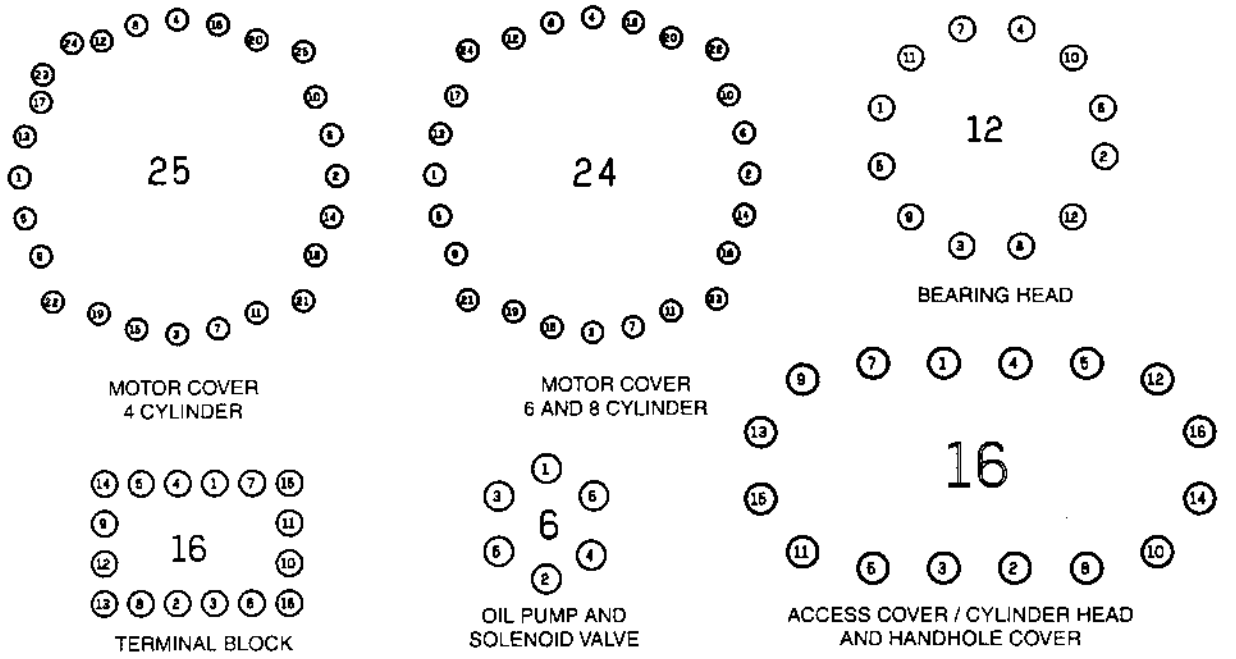


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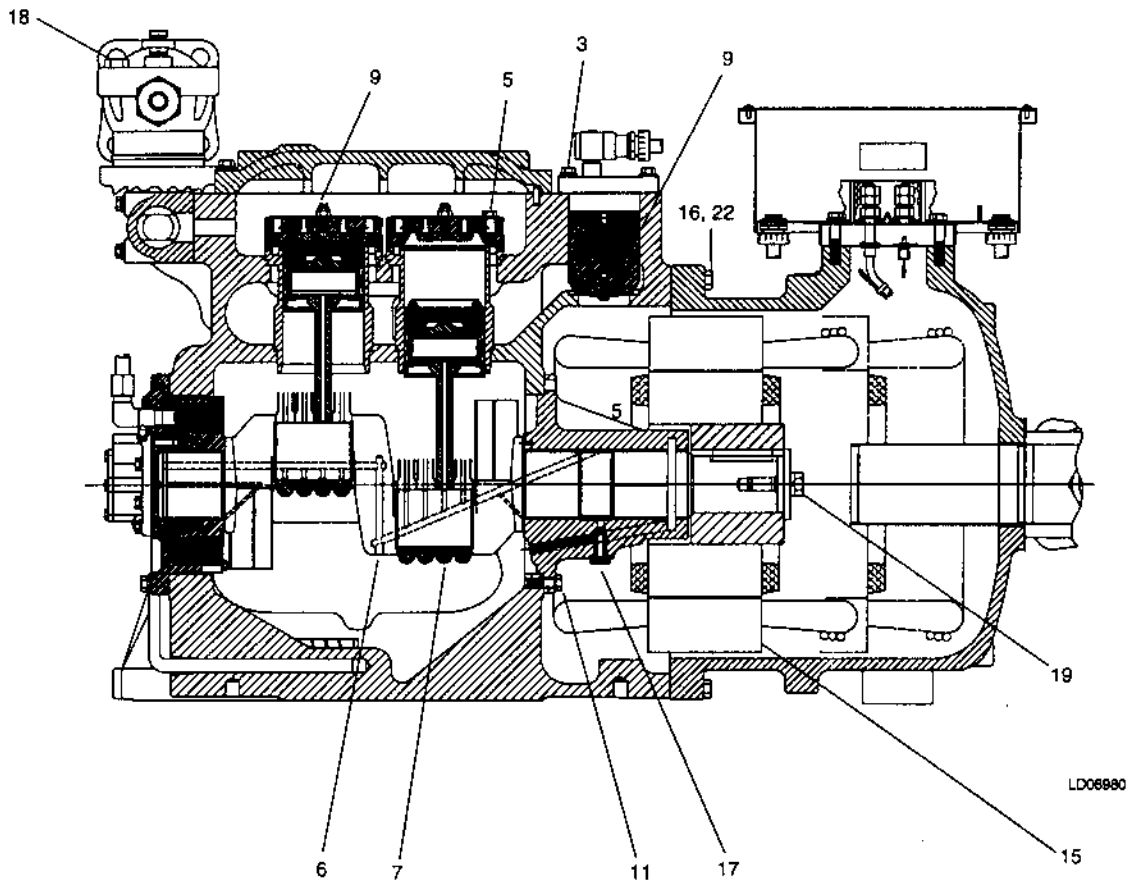
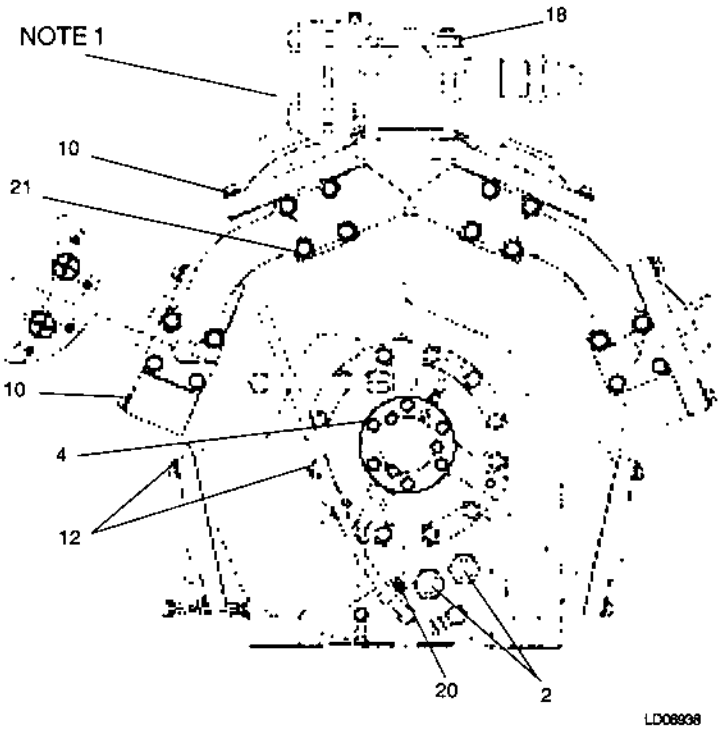
FIG. 12 – SCREW TIGHTENING SEQUENCE

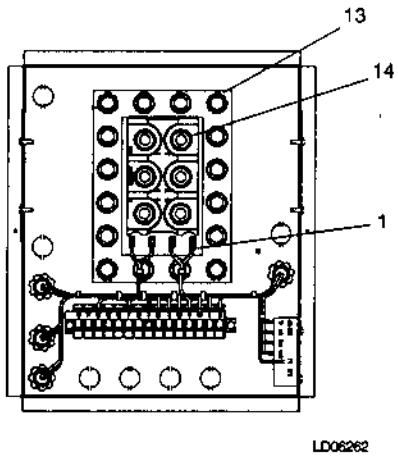
TABLE 1 – THREADED FASTENER TORQUE – SEE FIGS. 12 AND 12A

LOCATION	ITEM	THREAD	GRADE	TORQUE	
				LB. IN. (N/M)	LB. FT. (N/M)
Motor Protector Term. (Nut)[1]	1	No. 8 - 32 UNC	—	30 (3.4)	—
Sight Glass	2	1-11/1/2 NPT	—	—	95-100 (128.8-135.6)
Solenoid Valve	3	.375 - 16 UNC	8	—	49-56 (66.4-75.9)
Oil Pump	4	.3125 - 18 UNC	8	—	27-32 (36.6-43.4)
Valve Assy. Mounting[1]	5	.375 - 16 UNC	5	—	30 (40.7)
Set Screw (Crankshaft)	6	.375 - 16 UNC	—	—	12-15 (16.3-20.3)
Connecting Rod (Screw)[1]	7	.3125 - 18 UNC	5	—	19-22 (25.8-29.8)
Discharge Valve Cage Assy. (Nut)[1]	9	.375 - 24 UNF	—	—	45-48 (61.0-65.1)
Access Cover / Cylinder Head	10	.4375 - 14 UNC	8	—	78-90 (105.8-122.0)
Motor End Bearing Head	11	.4375 - 14 UNC	5	—	55-64 (74.6-98.6)
Pump End Bearing Head / H. H. Cover	12	.4375 - 14 UNC	8	—	78-90 (105.8-122.0)
Terminal Block	13	.375 - 16 UNC	5	—	34-40 (46.1-54.2)
Terminal Bolt (Nut)	14	.4375 - 20 UNF	Cu (Steel)	—	19-22 (25.8-29.8)
Stator	15	.4375 - 14 UNC	5	—	55-64 (74.6-86.8)
Motor Cover (Screw)	16	.500 - 13 UNC	8	—	119-138 (161.3-187.1)
Oil Pressure Relief Cap	17	.5625 - 18 UNF	—	—	30 (40.7)
Service Valve Scr. Lgth. thru 6"	18	.625 - 11 UNC	2	—	107-123 (145.1-166.8)
Service Valve Scr. Lgth. over 6"	18	.625 - 11 UNC	2	—	68-78 (92.2-105.8)
Rotor	19	.625 - 11 UNC	2	—	107-123 (145.1-166.8)
Heater Clamp	20	.250 - 20 UNC	2	73-83 (8.2-9.4)	—
Manifold 8, 6, or 4 Cyl.	21	.375 - 16 UNC	5	—	34-40 (46.1-54.2)
Motor Cover (Stud / Nut)	22	.500 - 13 UNC	8	—	119-138 (161.3-187.1)

[1] Critical Items - Torque ONLY as specified.







NOTE:

1. Brass suction and discharge service valve pipe adapter/gasket by valve manufacturer Mueller.

NOM. VALVE SIZE	ADAPTER	GASKET
2-1/8	A6267	A6261
2-5/8	A6268	A6261
3-1/8	A6269	A6262

FIG. 12A – FASTENER LOCATIONS – USE WITH TABLE 1

GASKETS AND O-RINGS

Gasket material used in P compressors is compatible with R-22, R-134a and R-407C. A **light** coating of oil may be used to facilitate future removal of the gasket and promote sealing.

CAUTION

Excess oil absorbed into the gasket will allow the material to flow and deform when installed, which will result in leakage.

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 distortion and the part should 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. 13. Be sure slings are of adequate strength to safely lift the compressor. Compressor weights are shown in PHYSICAL DATA, page 6. The use of chains or cables is not recommended.

COMPRESSOR OIL SYSTEM

The compressor oil system has two functions as follows:

1. Lubrication of all moving parts.
2. Furnishing a flow stream for operation of an eductor in the oil management system.

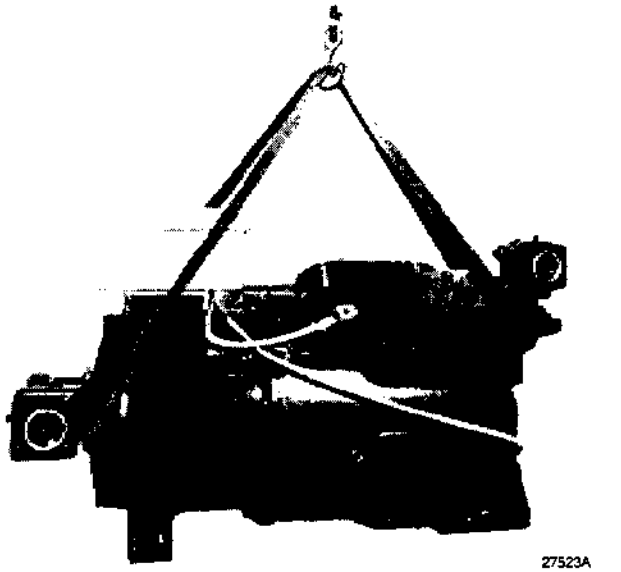


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FIG. 13 – RIGGING THE COMPRESSOR

LUBRICATION SYSTEM – See Fig. 14.

The compressor oil supply is contained in the crankcase which is provided with two oil sight glasses (located in 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 sight glass and the middle of the upper sight glass.

1. **TYPE "C" ON 60 HZ APPLICATIONS USING R-22. FIVE-GALLON CAN, PART NO. 011-00312.**
2. **TYPE "E" OIL FOR HIGH AMBIENT APPLICATIONS ABOVE 115°F USING R-22. FIVE-GALLON CAN, PART NO. 011-00582.**
2. **TYPE "H" ON 60 HZ APPLICATIONS USING R-134a and R-407C. FIVE GALLON CAN, PART NO. 011-00549.**

The internal gear type compressor oil pump is designed to operate in 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 head and compressor housing connect to an internal 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 end bearing head to lubricate the pump end bearing.

Oil is fed through internal oilways in the crankshaft to supply oil to the thrust bearing, motor end bearings and eductor. An oil pressure relief valve, installed in the motor end bearing housing, relieves oil pressure back to the crankcase. A separate oilway supplies an oil flow to the eductor. The eductor pickup tube will draw oil from the motor housing. Normal oil pressure range is 50-70 PSID on 60 Hz operation and 40-60 PSID on 50 Hz.

The thrust bearing 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 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.

Wrist pin lubrication has been enhanced by an oil passage in the connecting rod.

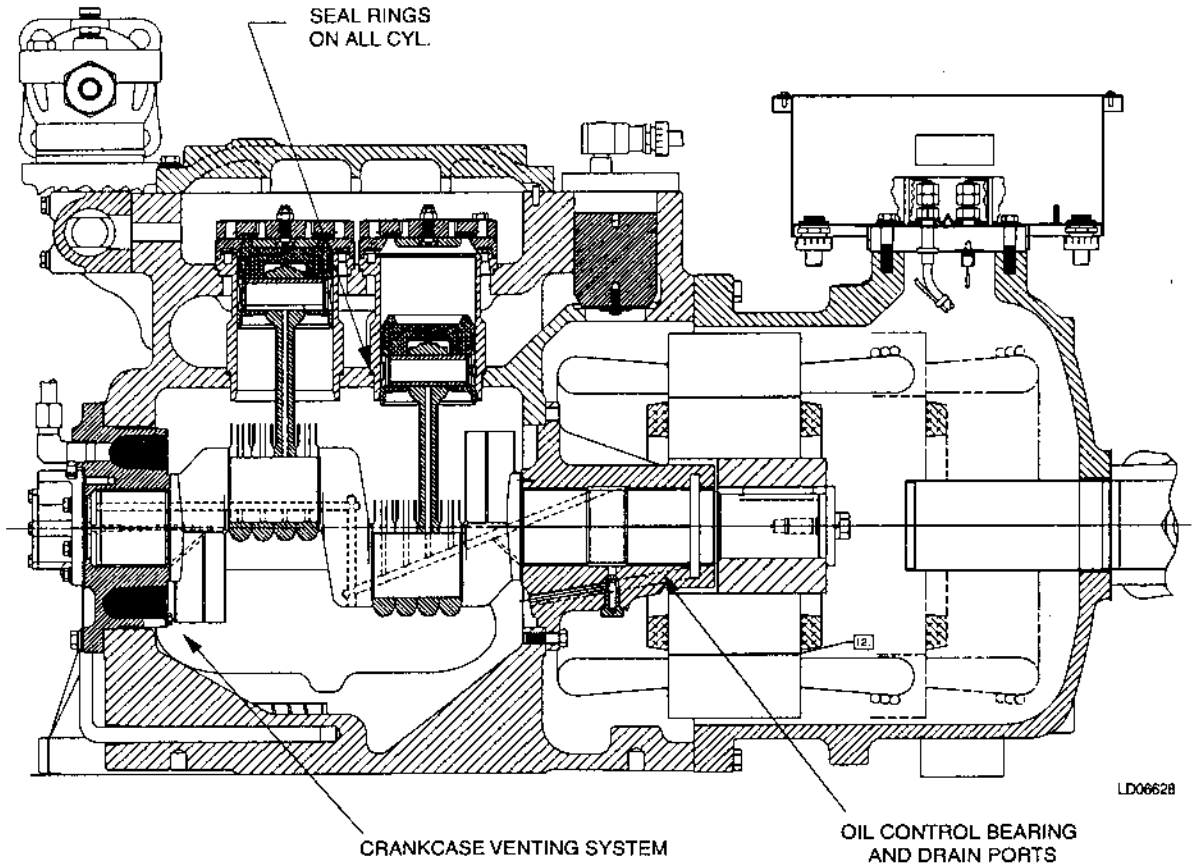


FIG. 14 – P COMPRESSOR CROSS SECTION

CAPACITY CONTROL SYSTEM

Model P compressor unloading capabilities allow the compressor flow capacity to modulate as refrigeration load changes occur, improving part load operating efficiency and decreasing operating costs.

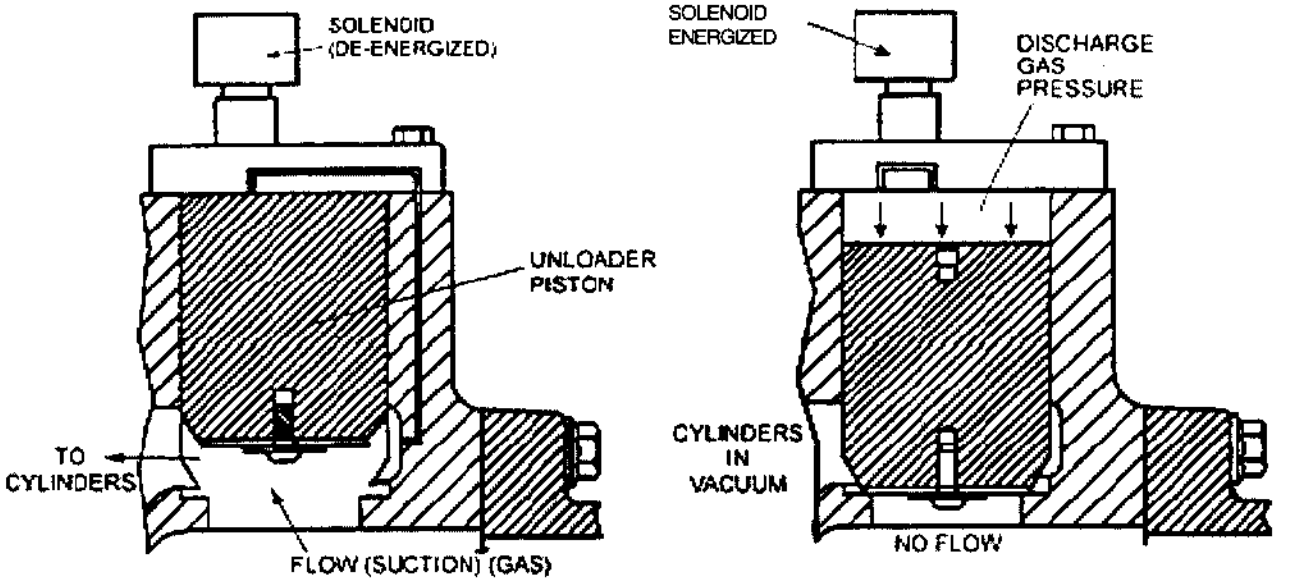
Adjustable capacity control of the YORK Model P compressor is accomplished by preventing (blocking) the suction gas from entering the suction plenums of the compressor. Some cylinder banks are not equipped with unloaders. This is to ensure a minimum flow of cool refrigerant gas at all times for motor cooling. One unloader controls flow to one cylinder bank, with two cylinders per bank.

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 occur in response to features written in the control software, such as high motor current safety. These features will be described in each chiller IOM.

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.

In order to load (reload) a cylinder bank, the high pressure discharge gas acting on the unload piston is released to the suction plenum through the solenoid valve. The pressure difference between the suction cavity (psi) and suction plenum (vacuum) forces the unloader piston up. Suction gas can then flow through the port and into the suction plenum and cylinders. The cylinders are now loaded.

When wiring a 6 cylinder compressor, the capacity control solenoid valves should be wired to energize in the following order: 2 first, followed by 1 if present (See Fig. 16). The valves should be de-energized in the reverse order. This will assure that the compressor cylinders unload and load in the proper sequence.

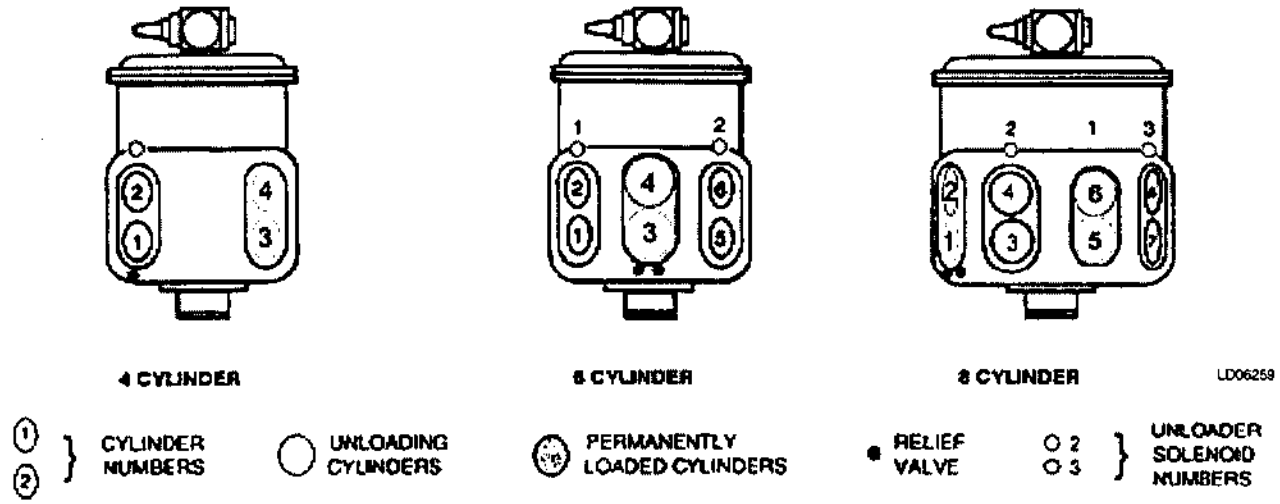


SUMMARY OF OPERATION

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

FIG. 15 – CAPACITY CONTROL OPERATION

When wiring an 8 cylinder compressor, the capacity control solenoid valves should be wired to energize in the following order: 3 first, followed by 2 if present (See Fig. 16). The valves should be de-energized in the reverse order. This will assure that the compressor cylinders unload and load in the proper sequence. Location 1 is permanently loaded and cannot be unloaded.



NUMBER OF CYLINDERS	CAPACITY STEPS (%) STANDARD	CAPACITY STEPS (%) OPTIONAL
4	100, 50	N/A
6	100, 66, 33	100, 66
8	100, 75, 50	100, 50

FIG. 16 – CYLINDER UNLOADING STEPS FOR MODEL P RECIP COMPRESSORS

ANALYSIS OF FAULTY COMPRESSOR VALVE OPERATION, PREVENTATIVE MAINTENANCE

The operator soon becomes accustomed to the sound of the compressor when it is running under normal conditions. 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 measure the cylinder head and access covers temperatures periodically to check for hot spots on one particular cylinder bank which may be running hot. If this condition occurs, it is an indication of broken or leaking valves within that bank of cylinders. **A large temperature difference of 20°F or more between adjacent cylinders may indicate damage, and the unit must be shut down for inspection and servicing.**

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

NOTE

Permanently loaded cylinders are not equipped with unloaders (See Fig. 16) This prevents the possibility of overheating, since a minimum volume of cool refrigerant gas flows through the compressor at all times during operation, regardless of load conditions.

SECTION 2 – DISASSEMBLY & REASSEMBLY

GENERAL

Service of these compressors should be performed 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 (See pages 10 & 17).
2. Check the refrigerant charge to be sure the system is fully charged using subcooling method. The unit sight glass should be clear and bubble free.
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 INSTALLATION, OPERATION, AND MAINTENANCE MANUAL included with the unit.
4. The voltage at the compressor motor must be within the limits shown on the compressor 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 or meggar and check if the windings are grounded, or check for an open circuit between the motor terminals. These are an indication of burning.
6. Disassemble only the part of the hermetic compressor necessary to correct the fault.
7. Never open any part of a hermetic compressor which is under vacuum; be sure 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 or oxidation of internal machined parts may result. The refrigerant is an excellent cleaning agent and will remove any natural protective coating from the iron or steel, leaving the raw metal exposed.
8. Internal machined parts of the compressor such as valves, pistons, and crankshaft must be immediately protected as they are removed from the compressor.
9. When reinstalling a cylinder head, line it up with the discharge manifold and fasten the head to the manifold before fastening the head to the compressor housing.
10. When assembling a compressor or compressor parts, it is essential to draw all nuts and screws to their proper torque, using an accurate torque wrench. See THREADED FASTENER TORQUES AND SEQUENCE, page 8.
11. Two ceramic magnets found in the compressor crankcase should be cleaned and reinstalled.

WARNING

Before disassembling any part of the P Compressor, be sure the following Safety Precautions are read and observed.

HANDLING

When performing service on the compressor it may be convenient to remove it from the unit base. If so, refer to RIGGING THE COMPRESSOR, page 10.

DISCONNECT ELECTRICAL POWER

Before performing any service of the compressor, all disconnect switches must be locked out and tagged to prevent accidental starting of the compressor and/or electrical shock.

RECOVERING REFRIGERANT FROM THE COMPRESSOR BEFORE REPAIRS

Before opening the compressor for repairs, the refrigerant in the compressor must be recovered. Close the suction and discharge stop valves, and remove the refrigerant in accordance with EPA guidelines.

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, page 6.)

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

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

If the compressor is open for more than 24 hours, the compressor should be completely dehydrated; then evacuated to a pressure of 300 microns following procedures outlined in Form 55.05-NM. Do not allow compressors to remain open to the atmosphere for long periods of time.

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. 17 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.

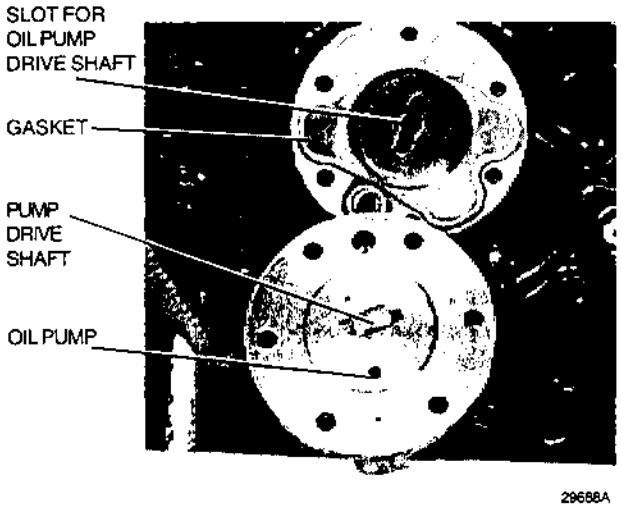


FIG. 17 – COMPRESSOR OIL PUMP (DISMOUNTED)

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. 18A & 18B)

1. Remove the unloader conduit and the wires from the terminal box.
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, the entire plate and valve mechanism is replaced.

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. New gaskets should be used for reassembly. Gaskets may be **lightly** oiled.

2

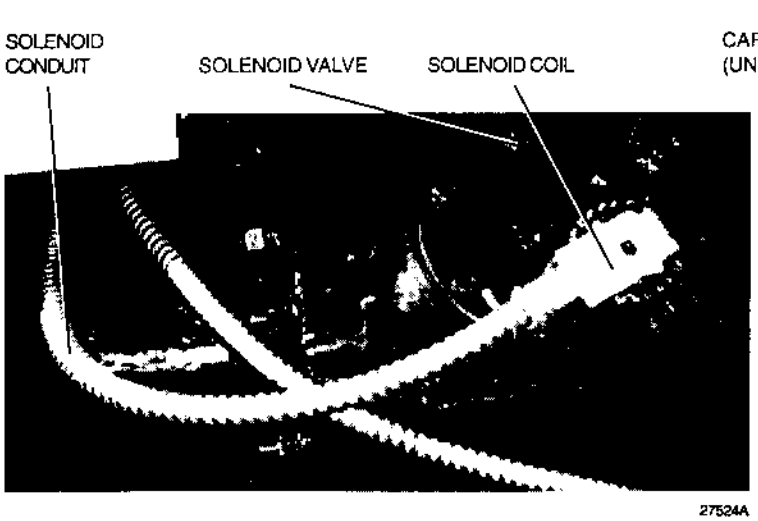


FIG. 18A – CAPACITY CONTROL VALVE

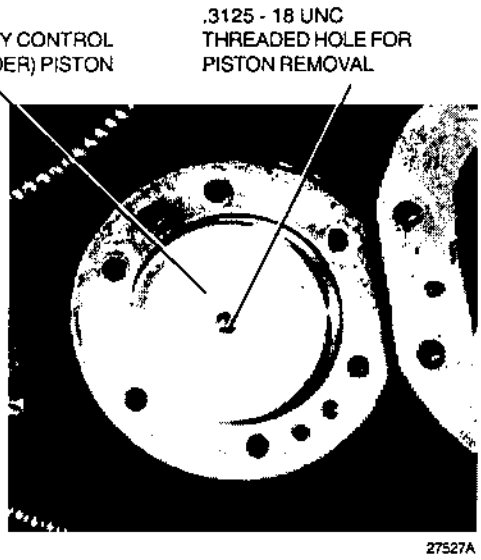


FIG. 18B – UNLOADER PISTON

CRANKCASE OIL HEATER / OIL TEMP SENSOR

The crankcase heater is located on the oil pump end of the compressor. The heater is located within a well in the compressor housing. It is not in direct contact with the refrigerant or oil. To replace the heater, remove the conduit and the heater wires from the terminal box. Pull the heater from the compressor (See Fig. 20). It may be necessary to remove all or part of the defective heater with a Ø .626 - .637 inch (16 mm) drill bit. If so, use extreme care to avoid damaging the well in the housing.

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

The oil temp sensor is in a well, on the side of the compressor. **DO NOT REMOVE THE WELL!**

1. Remove the wire harness from the sensor and the sensor from the well.
2. Loosen the cable clamp nut.
3. Apply a thin coating of heat conductive compound (YORK Part No. 013-00898-000) to the sensing zone of the replacement sensor element.
4. Screw the plastic sensor body into the well hand tight, and then wrench lightly while pushing the sensor toward the bottom of the well. Ensure that the sensing zone of the sensor element lightly contacts the bottom of the well. Inadequate sensor to well contact will give false readings.
5. Hand tighten the cable clamp nut. Connect sensor plug to proper wire harness.

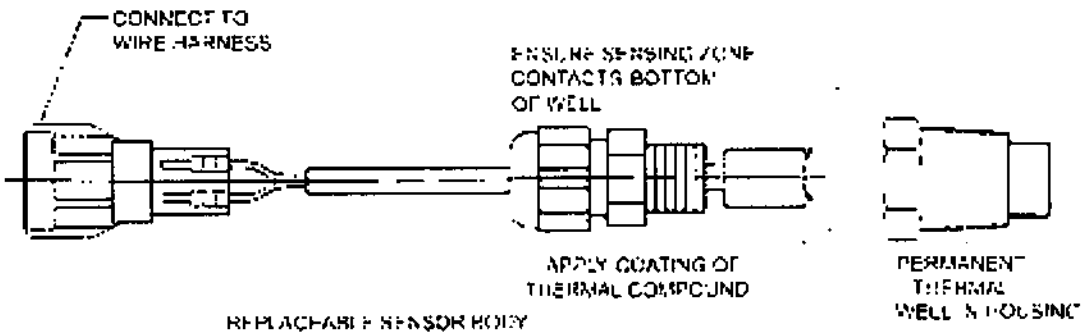


FIG. 19 – OIL TEMPERATURE SENSOR

OIL STRAINER

The compressor oil strainer tube is rolled into a hole in the compressor housing and therefore is not readily removable in the field. However, it can be replaced.

Refrigerant must be recovered, pressure relieved and oil drained before removing and replacing the oil strainer. Remove the .375-18 NPT pipe plug located to the left of the heater well. Drive the oil strainer from the housing using a 1/2" drift pin. (Loctite retaining compound 675 seals housing/tubing interface).

Thoroughly clean and remove oil from hole and pipe threads in housing.

Apply retaining compound (YORK Part No. 013-01752, Loctite 675) to clean surface of tube of replacement strainer that engages housing and insert tube into housing. MAKE CERTAIN TUBE DOES NOT BLOCK VERTICAL OIL HOLE IN HOUSING. Roll copper tube into housing to tighten.

Clean pipe plug with an approved safety solvent (YORK Part No. 013-02899, Loctite 7070). Apply primer (YORK Part No. 013-01753, Loctite N7469) and allow to dry. Apply thread sealant (YORK Part No. 013-02023, Loctite 565) to pipe plug and reinsert/tighten pipe plug in housing.

REMOVING THE SUCTION STRAINER

The compressor suction strainer is located in the motor cover just under the suction stop valve. (See Fig. 21, also Fig. 12A.)

To clean and replace the suction strainer, proceed as follows:

1. Remove the four screws which hold the suction stop valve to the motor cover, and move valve aside. It may be necessary to move the compressor away from the suction line/valve.
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 motor cover.
4. Fasten the suction valve in place, making sure that it seats properly.

REPLACING THE OIL SIGHT GLASS

Compressors are equipped with 2 plug type sight glasses located on the pump end of the compressor. (See Fig. 22) 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 (YORK Part No. 013-02899, Loctite 7070).
4. Apply primer (YORK Part No. 013-01753, Loctite N7469) and allow to dry. Apply thread sealant (YORK Part No. 013-01678, Loctite 243) 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. Refill the crankcase with clean oil or restore the oil level to the top of the lower sight glass or bottom of the upper sight glass.

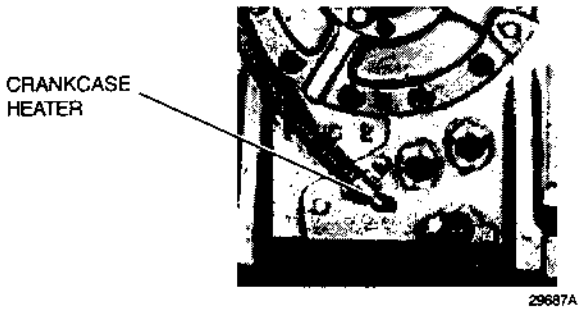


FIG. 20 – CRANKCASE HEATER

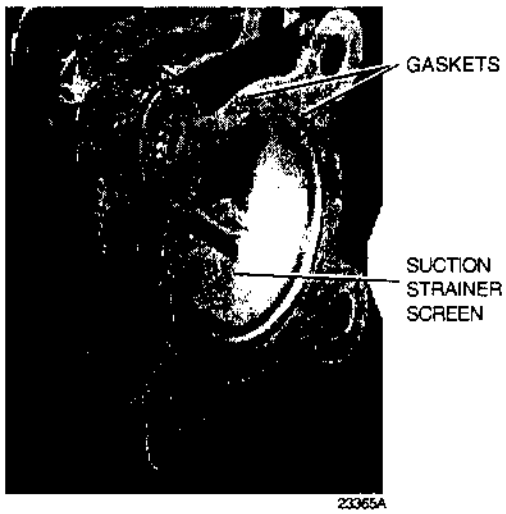


FIG. 21 – COMPRESSOR SUCTION STRAINER

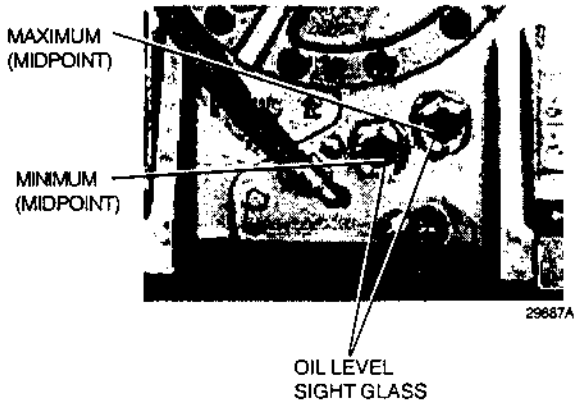


FIG. 22 – OIL LEVEL SIGHT GLASS AND LEVELS

2

REMOVING THE DISCHARGE MANIFOLD, CYLINDER HEAD AND ACCESS COVER(S)

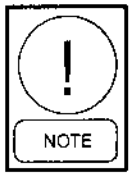
There are two different types of cylinder bank covers. One is a flat access cover. This type of cover has a small dimple on its underside to accept a roll pin mounted in the compressor housing. The second type of head is thicker with no provision for accepting the roll pin. This type of head connects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

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

1. Disconnect the discharge manifold from the compressor cylinder head and remove the cylinder head from the compressor.
2. Disconnect the manifold from the housing.

When reinstalling a cylinder head, secure it to the discharge manifold before fastening the head to the compressor housing. Be sure to use proper tightening sequence as shown in Fig. 12.

REMOVING THE DISCHARGE AND SUCTION VALVES AND CYLINDER SLEEVES



Mark the cylinder sleeves and discharge valve cage and suction valve plate subassemblies with a marker so that they can be reinstalled in their original location.

To remove the valve assemblies and cylinder sleeves, refer to Figs. 23, 24A, 24B and 25 and proceed as follows:

1. Remove the access cover or disconnect the discharge manifold from the compressor cylinder head and remove the cylinder head 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 ring, 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 ring. Lift off the suction valve plate, the suction valve ring and suction valve springs.
4. Lift the cylinder sleeve out of the compressor housing. (Pulling device may be required due to o-ring swelling and or piston ring friction.)
5. Disassemble the discharge valve cage assembly. Remove the locking nut and center screw. Then lift off the inner discharge valve plate, discharge valve ring and springs.
6. Clean, dry and oil all parts. Inspect the valve and springs for damage or wear and replace, if necessary.
7. Assembly is the reverse of removal.

   NOTE: Be sure to properly torque the 4 cap screws holding the discharge valve cage in place using the torque values in Table 1.

INSTALLING CYLINDER SLEEVES

To install the cylinder sleeves proceed as follows:

1. Install a new and generously oiled o-ring on bottom of cylinder. **Do not attempt to reuse o-rings exposed to lubricant and refrigerant.**
2. Carefully lower the cylinder sleeve over the piston.

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.

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. O-rings are required on all cylinders.

INSTALLING SUCTION AND DISCHARGE VALVES

When reinstalling valves, install as originally removed, mating the seats; do not turn over. If wear groove is noticeable, valve ring should be replaced.

To install the suction and discharge valves, refer to Figs. 24A, 24B and 25 through 36 and proceed as follows:

1. With the wave spring, valve ring side of the suction valve plate up, assemble the suction wave springs in their pocket and set the suction valve ring in place. (See pages 19-27)
2. To hold suction valve ring and springs firmly in place during installation, two sheet metal clips should be placed over the suction valve plate and suction valve ring. These clips may be ordered from the Factory (YORK Part No. 064-37274). (See pages 19-27)

3. Assemble the discharge valve cage assembly.
   a. Insert the discharge valve wave springs in their recess in the valve cage and set the discharge valve ring in place.
   b. Place the inner discharge valve plate over the ring and springs. DO NOT pinch the ring or springs between the cage and plate.
   c. 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 nut.

NOTE

Torquing of the center screw/nut is critical. (45 - 48 ft. lbs.)

   d. Verify that neither the ring or springs is pinched and kept from operating freely over inner discharge valve plate pilot diameter.

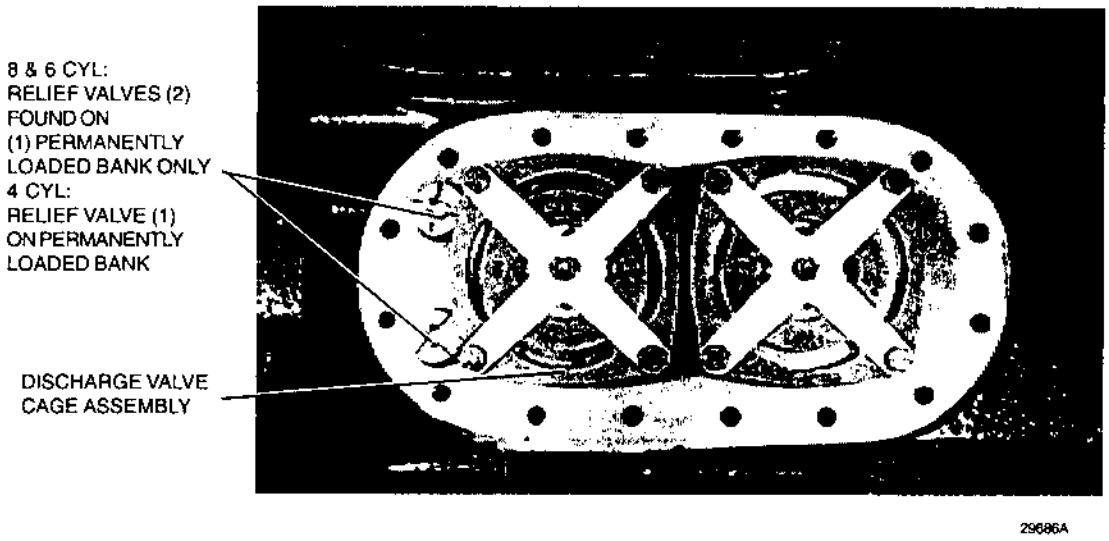


FIG. 23 – CYLINDER BANK WITH VALVE CAGE ASSEMBLIES AND RELIEF VALVES

2

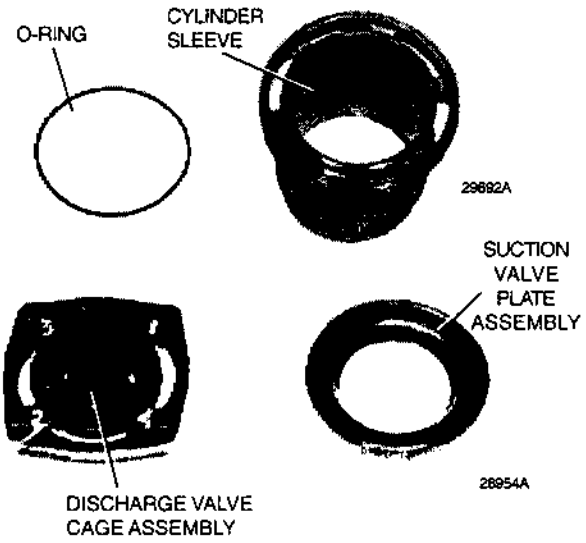


FIG. 24A – CYLINDER SLEEVE, DISCHARGE VALVE CAGE AND SUCTION VALVE PLATE SUBASSEMBLIES

FIG. 24B – DISCHARGE VALVE CAGE ASSEMBLY - (P/N 364- OR 664- FOR SERVICE-49722-000)

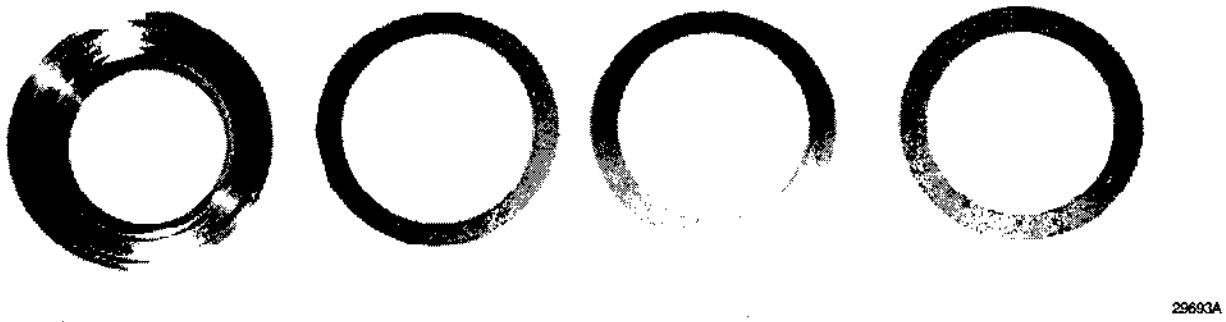


FIG. 25 – SUCTION VALVE PLATE ASSEMBLY - (P/N 364- OR 664- FOR SERVICE -49723-000)

4. It is important that the suction valve ring not be pinched during reassembly. The following steps are recommended.
   a. The piston in the cylinder being reassembled should be close to the bottom of its stroke.
   b. Place the suction valve plate, with suction valve ring and springs 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 plate is seated properly.

      Proper Seat Check: *While maintaining sufficient pressure, the suction valve plate should rotate smoothly on the cylinder.*

   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.
5. Use new gaskets when installing the compressor access cover and cylinder head and reconnect the discharge manifold to them. ***Note: Secure head to manifold before fastening head to compressor.*** Gasket may be **lightly** oiled.

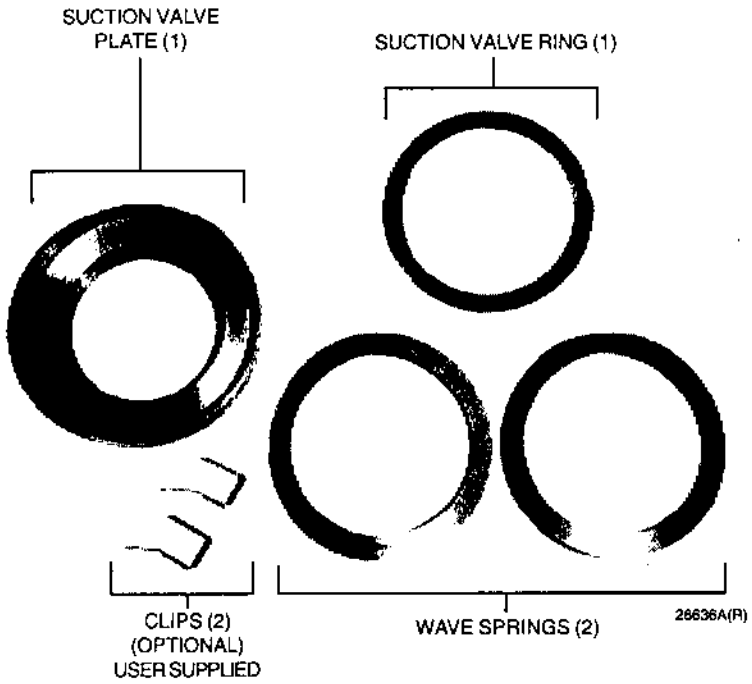


FIG. 26 – SUCTION VALVE WAVE SPRING ASSEMBLY

WAVE SPRING ASSEMBLY INSTRUCTIONS – SUCTION AND DISCHARGE

The wave-spring valve assembly replaces the "J" Compressor Style six helical suction springs with a pair of "wave" springs. The assembly uses a pair of wave springs sandwiched between the cage or valve plate and valve ring. The wave springs are easily identified since they appear to be deformed or bent valve rings.

CAUTION

Proper orientation of the two wave springs is critical. The wave springs must be properly oriented to assure they provide proper force (load) on the valve ring. Once they are properly oriented and installed, they may rotate slightly but will always seek their original position.

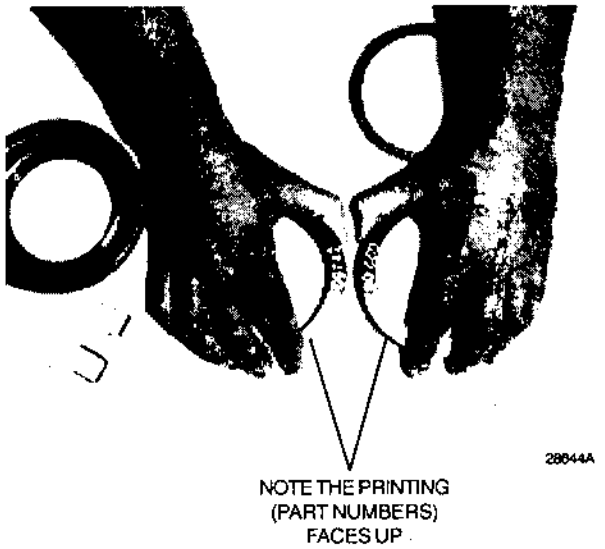
Shown in Figure 24B are the parts of the discharge valve cage subassembly. Shown in Figures 25 and 26 are the parts needed to install the suction valve plate assembly on a single cylinder. The two clips shown in Figure 26 are not part of the assembly and must be reused for each cylinder assembly. The clips must be removed once the assembly is fitted to the cylinder.

To begin assembly, place the valve plate or cage with the machined "back stop" surface **up** and the wave springs with the "printing" on the surface facing **up**.

With the printing on the wave springs facing up, grasp the springs as shown in Figure 27.

29694A

DISCHARGE



28644A

SUCTION

FIG. 27 – SPRING POSITION

Pick up the two springs, and place them lightly together. Make certain the printing on the springs faces the palm of your hands. As you hold the springs lightly together, the edge of the springs facing you may be separated by a small gap.

29695A

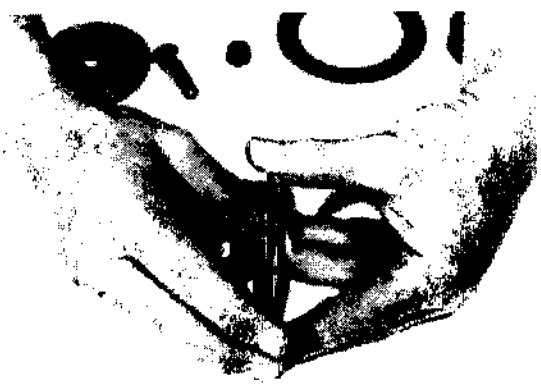
DISCHARGE

28646A

SUCTION

FIG. 28 – GAP BETWEEN SPRINGS

Rotate the springs in one hand until the springs nest together in their most compact manner. The gap between the two rings facing you will minimize such that rotating a spring in either direction will cause the gap to increase.



29696A

DISCHARGE

28645A

SUCTION

2

FIG. 29 – SPRINGS NESTED TOGETHER

Once the springs are properly oriented and appear to be nested together, holding them loosely by the edges as shown will reveal that the spacing between the two wave springs will be approximately **1/8" uniformly around the inner edges** of the two springs. They are now **properly oriented** and should held in this position without rotating them further.

1/8" UNIFORM GAP,
SAME AS SUCTION

Correct Orientation: Note 1/8" uniform gap on inner diameter.

28643A

DISCHARGE

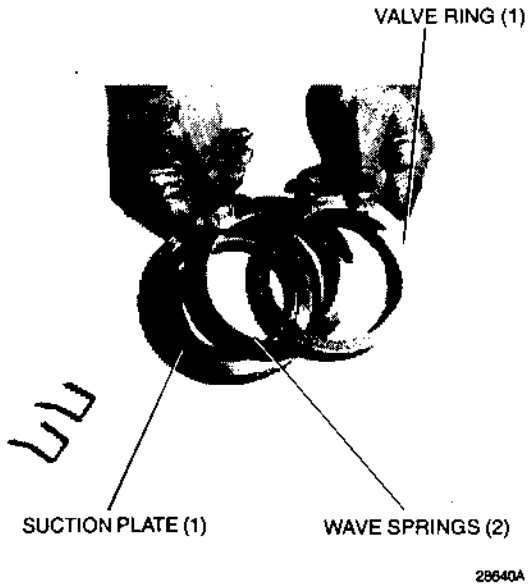
SUCTION

FIG. 30 – CORRECT ORIENTATION

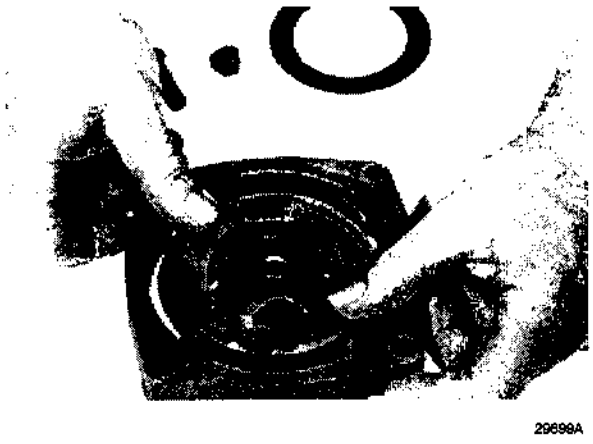
Place the "nested" wave springs over the valve cage pilot diameter. Gently "snap" the two springs down over the pilot with light pressure using your thumbs.

The pair of wave springs should be carefully placed on the valve plate against the "back stop" surface. The valve ring should then be placed on top of the wave springs. The photo below shows the wave springs in the right hand and the valve ring in the left.

DISCHARGE



SUCTION

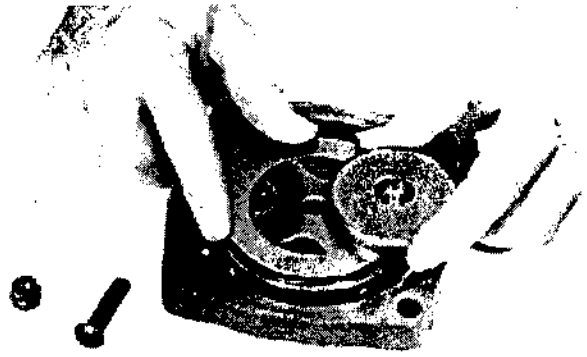


DISCHARGE

NO SUCTION PHOTO

FIG. 31 – SPRINGS AND VALVE RING

Place the discharge valve ring over the wave springs and then locate the inner discharge valve disk over the valve ring. Insert the screw, secure with the self-locking nut and tighten. (See Table 1).



29700A

29701A

Torque per Note on page 24.

29702A

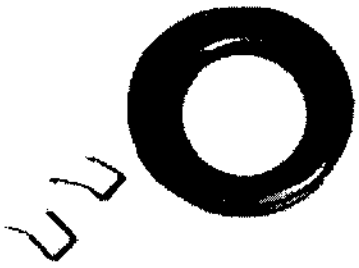
DISCHARGE

FIG. 32 – FASTENING COMPONENTS OF DISCHARGE VALVE CAGE SUBASSEMBLY AND COMPLETED DISCHARGE VALVE CAGE ASSEMBLY

NO SUCTION PHOTO

2

The completed suction valve plate subassembly should look like the photo below:



SUCTION

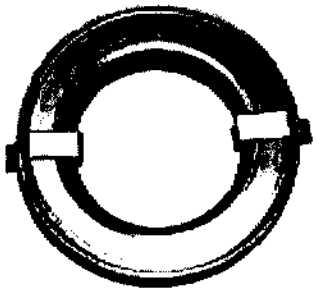
28642A

FIG. 33 – COMPLETED SUCTION ASSEMBLY

OPTIONAL

The clips should now be placed on the suction valve plate assembly, as shown, to keep the valve ring and wave springs from moving during assembly on the cylinder head. The clips should be installed with the shorter arm resting on the suction valve (valve ring), the piston or cylinder side of the assembly.

NO DISCHARGE PHOTO

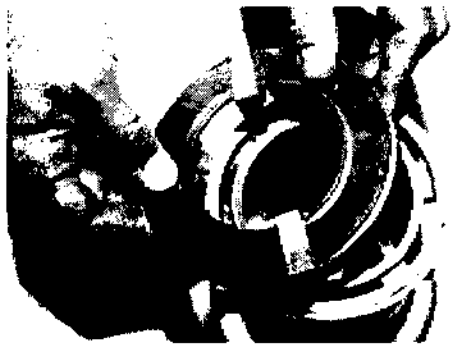


SUCTION

28641A

FIG. 34 – CLIPS INSTALLED ON SUCTION VALVE ASSEMBLY

The entire assembly can then be installed on the cylinder sleeve as shown with the clips. Once seated, the clips can be removed, and the valve cage assembly held against the cylinder sleeve until the discharge valve cage assembly is installed and parts fastened to the housing.



28638A

FIG. 35 – INSTALLATION ON CYLINDER SLEEVE

Once seated on the cylinder, verify that the suction valve is not pinched, by checking that the valve plate assembly can be rotated on the cylinder in a smooth motion.

NO DISCHARGE PHOTOS

28639A

SUCTION

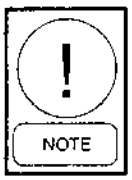
FIG. 36 – FINAL ASSEMBLY OF SUCTION VALVE ASSEMBLY ON CYLINDER SLEEVE. **NOTE:** CYLINDER SLEEVE WILL BE IN COMPRESSOR HOUSING DURING NORMAL INSTALLATION.

REPLACING THE HIGH PRESSURE RELIEF VALVE

The high pressure relief valve is screwed into the upper machined surface of the cylinder bank under the cylinder head to relieve any abnormally high discharge pressure back to the suction side of the compressor (See Figures 16 and 23). It is set to open at 375 psi differential pressure. If leakage of the valve is suspected, replace. Signs of leaking may include hissing noise at shutdown, or high cylinder head temperatures during operation.

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

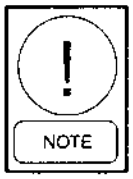
1. Disconnect the discharge manifold from the cylinder head and remove the head.
2. Unscrew the leaking relief valve and screw in the new valve.
3. Reassemble the cylinder head and discharge manifold.



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

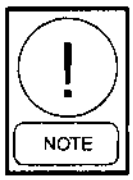
REMOVING PISTONS AND CONNECTING RODS

To remove the pistons and connecting rods, refer to Fig. 37 and proceed as follows:



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 sleeves to remain in place in the housing.
2. Remove the crankcase access (handhole) 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 screws of the assembly(ies) to be removed. Loosen the screws and remove the lower part (cap) of the connecting rod. Note the identification number stamped on the half-bearing just removed.
4. Using care to make certain that the upper part of the connecting rod 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 part of the rod, matches the number on the lower part of the rod. These numbers should ALWAYS match.



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 part of the rod bearing has been removed, and it is necessary to rotate the crankshaft, that the upper part of the rod bearing remains in contact with the crankpin.

7. Remove piston and connecting rod 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 and connecting rod.
10. Remove the piston rings.
11. Clean, dry and inspect all parts.
12. Oil and wrap parts that will be reused.

INSTALLING PISTONS AND CONNECTING RODS

To install the piston and connecting rod assemblies, refer to Fig. 37 and 38, and proceed as follows:

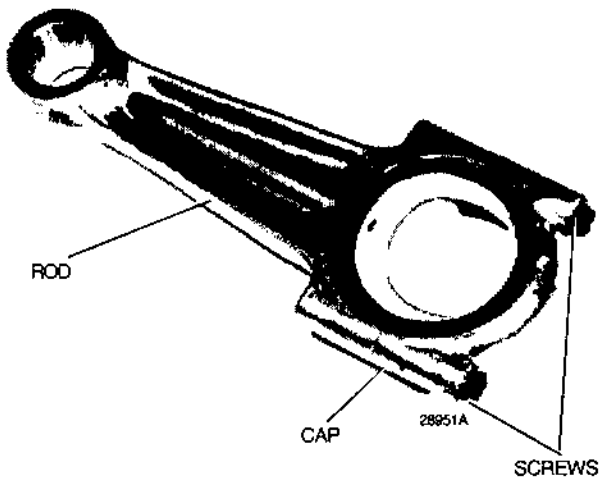
1. Each piston is equipped with two piston rings. When installing the rings, use copper or brass strips under the rings and spread the rings only enough to slide them down over the piston.

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. 38).

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 reused, should be installed in their original locations in the compressor housing. Remove the lower part of the connecting rod bearing, allowing the connecting rod screws to remain in position. Check to see that the numbers on the two parts of the connecting rod match 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 sleeve bore in the housing and carefully position the upper part of the connecting rod bearing on its crankpin. Install o-ring on each cylinder sleeve. (See Figures 14 and 24A). Insert the cylinder sleeve.
4. Install the lower part of the connecting rod bearing as described in step 3 above. Tighten the screws 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 access (handhole) cover plates. Fill the crankcase to the proper level with new oil.
6. Reinstall the suction and discharge valves and the compressor cylinder head and access covers making sure they are in their original locations and reconnect the discharge manifold and cylinder head, using new gaskets as required.

2



Replacement rod must match the remaining rods in any one unit, i.e. long stroke with long stroke, short stroke with short stroke.

FIG. 37 – CONNECTING ROD

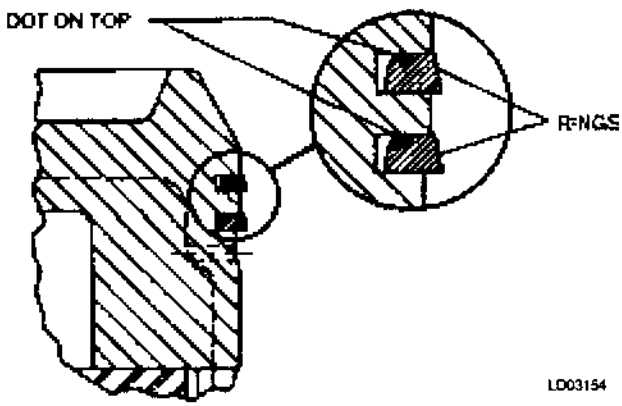


FIG. 38 – PISTON RING INSTALLATION

REMOVING BEARINGS AND CRANKSHAFT

Pump End Bearing

To remove the pump end bearing refer to Fig. 39 and proceed as follows:

1. "Match-mark" the bearing head and compressor housing.
2. Remove the oil pump.
3. Remove the hex flange screws which hold the bearing head to the housing and remove the bearing head.
4. The YORK Bearing Removal Tool (Part Number 364-37260) is required to remove the bearing from the bearing head (See Fig. 42).
5. Using the bearing removal tool as shown in Fig. 40, Detail A, pull the old bearing from the bearing head. Note that the backup plate and the split plates must be installed from the inboard end of the bearing.
6. 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.
7. Using the bearing removal tool as shown in Fig. 40, Detail B, pull the bearing into the bearing head, taking care that the bearing enters the bearing head squarely. The "seam" in the bearing should be at 3 or 9 o'clock. Continue to pull the bearing into the bearing head until the bearing is 0.155" (5/32") below the inboard end surface on the bearing head. Bearing ID after insertion should be: 3.0030 - 3.0045.
8. Inspect both ends of the bearing for and, if present, remove any burrs or metal shavings that result from the insertion.
9. 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. (See Table 1).

Motor End Bearing

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

To remove the motor end bearings, refer to Fig. 41 and proceed as follows:

1. Drain the oil from the compressor and remove the crankcase hand hole cover plates, 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 onto it. Use of the mandrel aids in preventing damage to the stator windings.
5. The motor end thrust collar may 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 in the bearing head prevents the thrust collar from turning with the crankshaft.

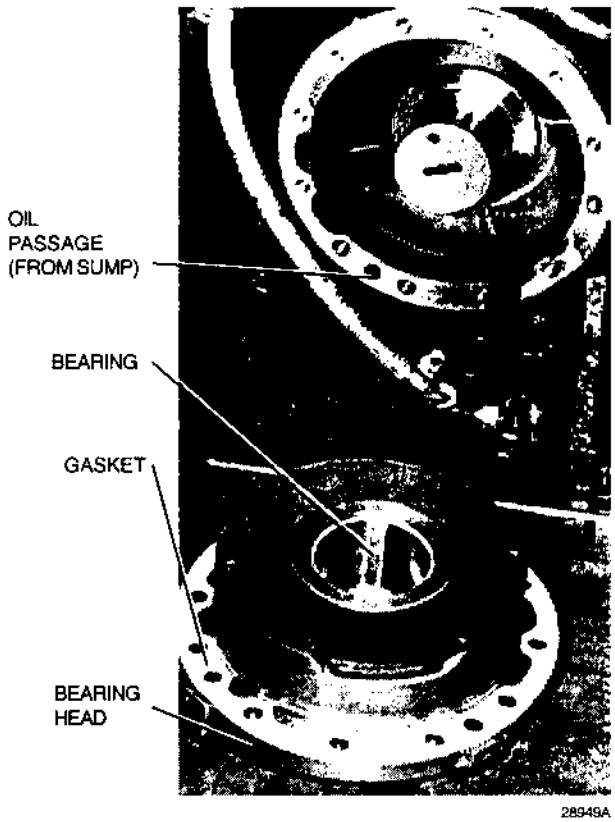
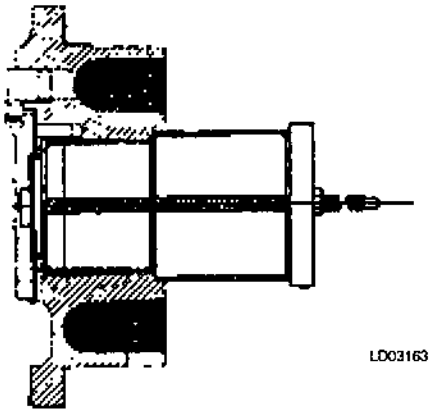


FIG. 39 – REMOVING PUMP END BEARING

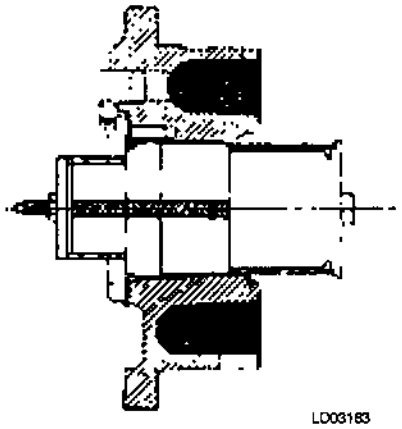
FIG. 40 – PUMP END BEARING



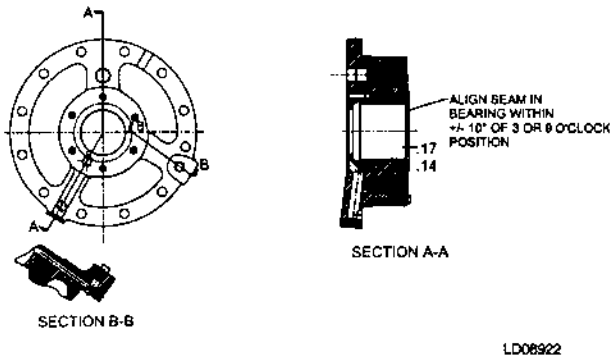
DETAIL A – PUMP END BEARING (REMOVAL)

NOTES:

1. Axial force required to assemble bearing into housing is 1500 min. to 3500 max. lbs.
2. Bearing dia. shall be 3.0030 / 3.0045 (ref.) after insertion into housing and accept a full depth (2.5 min.) plug gauge. Go dia.: 3.0022.

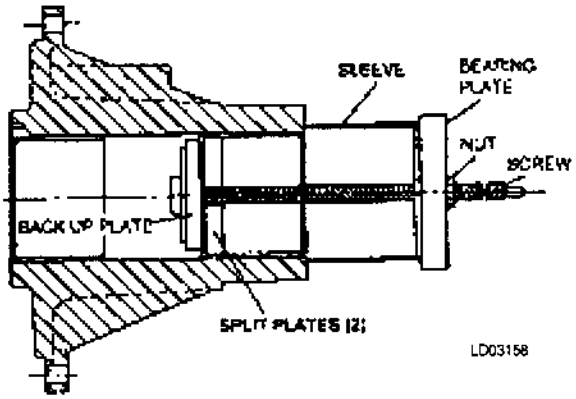


DETAIL B – PUMP END BEARING (INSTALLATION)



DETAIL C – PUMP END BEARING COMPLETE

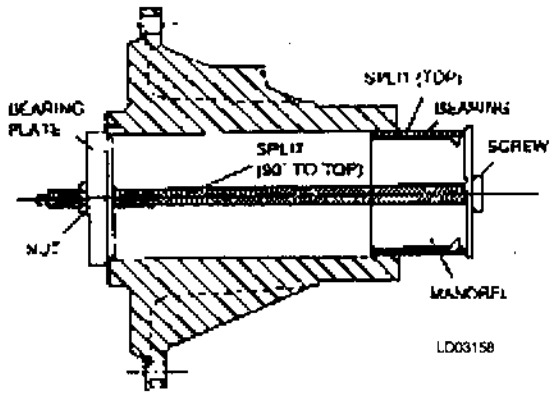
FIG. 41 – MOTOR END BEARINGS



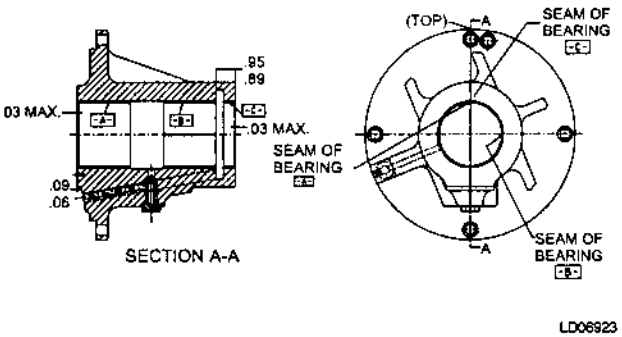
DETAIL A – MOTOR END BEARING (REMOVAL)

NOTES:

1. Align seam of bearing -C- within +/- 10° of the top.
2. Align seam of bearings -A- and -B- at 90° +/- 10° from the top, on either side of vertical centerline.
3. Axial force required to assemble bearing into housing is 1500 min. to 3500 max. lbs.
4. Bearing dia. shall be 3.0030 / 3.0045 (ref.) after insertion into housing. Bearing -A- must accept a full depth (2.5 min) plug gauge. Go dia.: 3.0022. Bearings -B- and -C- must accept a full depth (3.5 min.). Plug gauge. Go dia.: 3.0022.



DETAIL B – MOTOR END BEARING (INSTALLATION)



DETAIL C – MOTOR END BEARING COMPLETE

6. Using the bearing removal tool as shown in Fig. 41, 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 bearing 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. 41, Detail B, pull the bearings into the bearing head one at a time from opposite ends, taking care that the bearings enter the bearing head squarely. The "seam" in bearing -C- should be at the top; the "seam" in bearings -A- and -B- should be turned 90° to either side. Continue to pull the bearings into the head until they are positioned as shown in Fig. 41, Detail C.
9. Inspect both ends of the bearings for and, if present, remove any burrs or metal shavings that result from the insertion.
10. Reinstall the bearing head. Be sure the bearing head is properly aligned with the oil passages (oil pressure regulating valve is at 6 o'clock position).

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 hand hole cover plates, discharge manifold, cylinder head, access covers, suction and discharge valve assemblies, pistons and connecting rods, motor cover, and rotor following procedures outlined previously.
2. Using suitable timber, support the crankshaft 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 following procedures outlined previously.
4. Using two people, carefully remove the crankshaft from the compressor.
5. If the crankshaft is 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".
6. Reassemble the compressor by following the above procedure in reverse order.

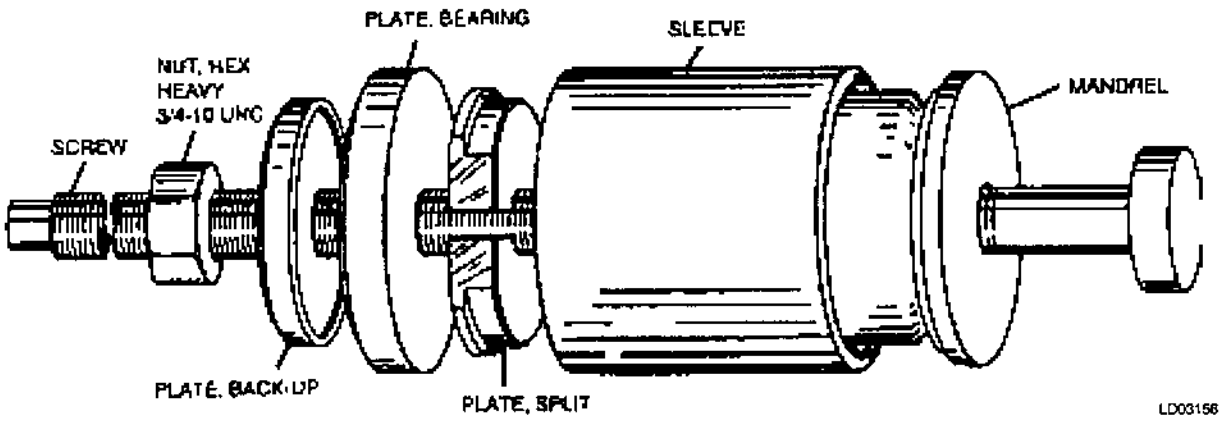


FIG. 42 – BEARING REMOVAL TOOL (PART NO. 364-37260-000)

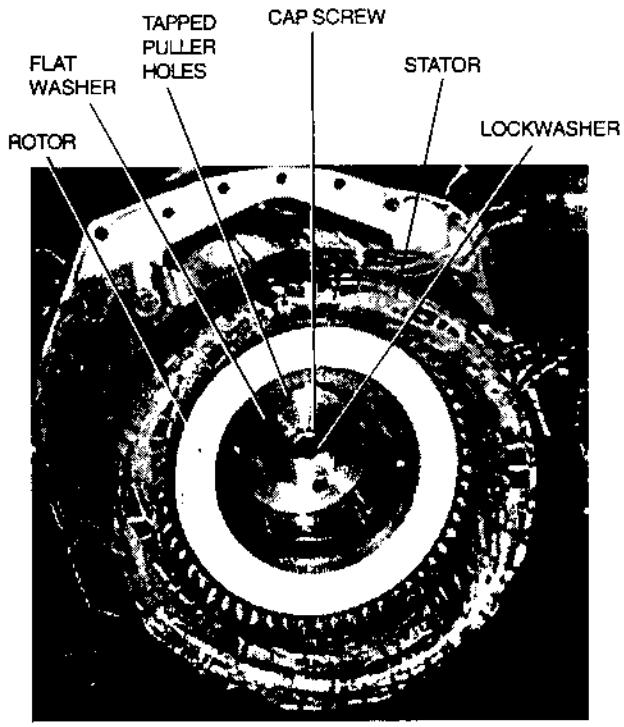


FIG. 43 – MOTOR END OF COMPRESSOR

REMOVING ROTOR

The motor rotor must be removed in order to remove the crankshaft and/or motor end bearing head. 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 stop valve, suction strainer screen and gaskets.
2. Disconnect the unit power wiring from the motor terminal bolts.
3. Disconnect the motor protector wiring from the protector terminal screws.
4. Mark each terminal bolt with the correct lead number. (Ex. 1, 2, 3, 7, 8, 9)
5. Mark each protector terminal screw with the correct lead number. (Ex. C, S1, S2, S3)
6. Disconnect any other compressor or unit wiring that will interfere with or prevent removal of the terminal box from the motor cover.
7. Remove the terminal box and loosen the terminal block.
8. Remove the nuts from the terminal bolts and the protector terminal screws. Lift the terminal block off the motor cover and push the bolts and screws down through the holes in the terminal block. DO NOT allow the bolts and screws to come in direct contact with the stator windings.
9. Support the compressor housing using a crane or other suitable method. Loosen, but do not remove, the cap screws and nuts that hold the motor cover to the compressor housing. Remove two diagonally opposite screws (preferably at the 3 and 9 o'clock locations) and insert guide pins (1/2" - 16) into the screw holes. Remove remaining screws and nuts. Remove the motor cover sliding it over the guide pins, taking care not to damage the stator windings. Keep in mind that any contact with stator can damage it.
10. Remove the cap screw, lockwasher and flat washer that hold the rotor to the crankshaft.
11. Insert 2 cap screws (.500 - 13) into the tapped holes in the end of the rotor.
12. Screw the rotor mandrel (YORK Part Number 364-37273) into the end of the crankshaft and slide the rotor onto it. It is not advisable to attempt to remove the rotor without using the rotor mandrel.
13. To reinstall the rotor or to install a new rotor follow steps 10 and 12 in reverse order.
14. Reinstall the motor cover and a new gasket using two diagonally opposite guide pins. TAKE CARE in installing the motor cover to avoid damaging the motor stator windings. Keep in mind that any contact with the stator can damage it. DO NOT reuse the old gasket. Be sure motor cover is properly located on the compressor housing.
15. Pull all terminal bolts and protective terminal screws up through the terminal box opening in the motor cover.
16. Be sure to place a new terminal block gasket in position before inserting the terminal bolts and protector terminal screws into the terminal block.
17. Reinstall the terminal bolts and terminal screws. Be sure the terminal bolts are reinstalled in the correct location (1, 2, 3, 7, 8, or 9). Refer to Figs. 45 & 57 to be certain all components are installed properly.
18. Reinstall the terminal block, terminal box, power wiring and cover.
19. Replace the suction strainer screen, gaskets and stop valve.

REMOVING THE STATOR
(See Fig. 44B)

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:

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

1. It is advisable to remove the compressor from the unit before attempting to remove the stator.
2. Remove the motor cover and rotor, using procedures outlined previously.
3. The compressor may be placed in a vertical position, on the pump end. DO NOT rest the compressor on the oil pump.
4. Remove the 2 diagonally opposite cap screws and lock washers that hold the stator to the compressor housing. Insert guide pins (7/16 - 14 x 9") into the diagonally opposite holes. Remove remaining 2 cap screws and lock washers that hold the stator to the compressor housing. **(Largest stator weight approximately 300 lbs.)**
5. If removing in a vertical orientation, install the expanding mandrel (YORK Part No. 029-13597) inside the stator and tighten the mandrel.
6. Using a hoist or crane attached to the mandrel or a sling around the stator OD, 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. 44A & 44B).
8. Using the mandrel or sling and guide pins, move the stator into position, being careful not to damage the windings. Keep in mind that any contact with metal can damage the stator. Be sure the stator is properly positioned on the compressor housing with respect to motor leads and terminal block location.
9. Insert 2 cap screws and lock washers and tighten them to the proper torque. Remove the hoist, mandrel (if used) and guide pins. Insert the remaining 2 cap screws and lock washers and tighten them to the proper torque.
10. Reassemble the compressor using procedures previously described in the respective sections of this manual. Also see Fig. 45 before connecting power wiring.

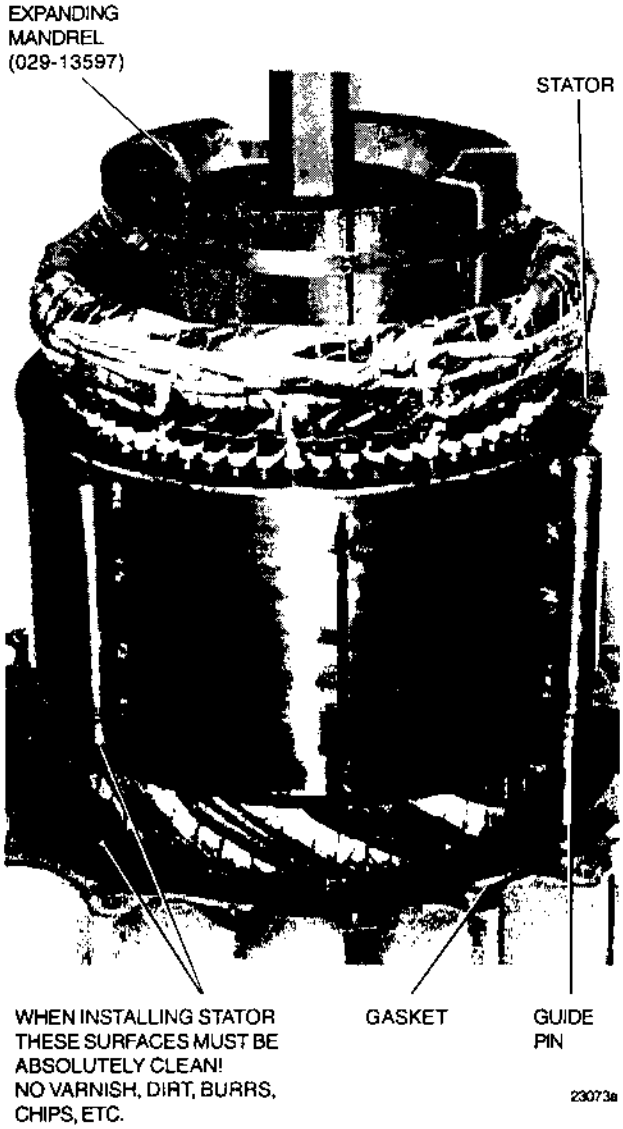


FIG. 44A – REMOVING THE STATOR (Vertically)

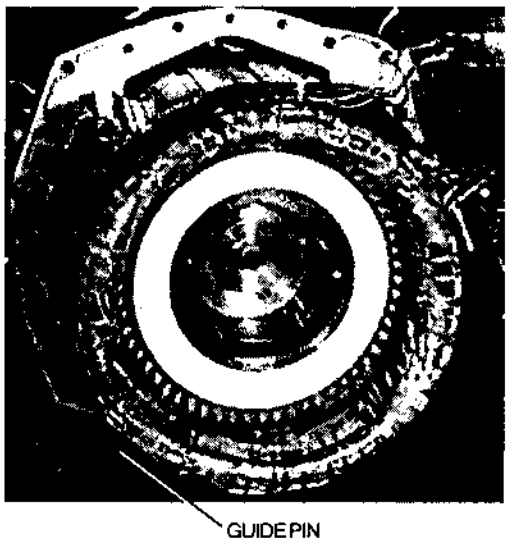


FIG. 44B – REMOVING THE STATOR (Horizontally)

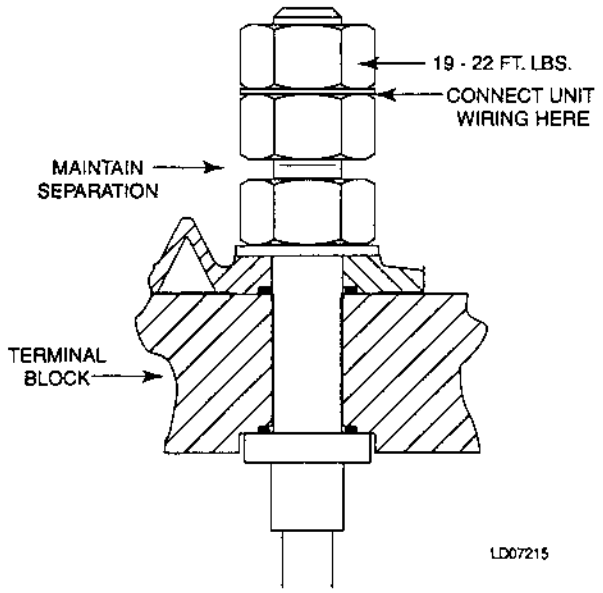


FIG. 45 – TERMINAL BOLT ASSEMBLY, CROSS SECTION VIEW

MAINTENANCE REQUIREMENTS FOR YORK MODEL P RECIPROCATING COMPRESSORS

2

PROCEDURE	MONTHLY	QUARTERLY	SEMI-ANNUALLY	PER APPLICATION	EVERY ___* HOURS
Leak Check		X			
Check Oil Level	X[1]				
Check Oil Appearance	X[2]				
Check Compressor Superheat			X[3]		
Record Operating Pressures, Temperatures, and Motor Current Readings		X			
Check Oil Temperatures		X[4]			
Change Oil				X[2]	
Service Suction / Discharge Rings and Springs †				X[5]	

NOTES:

A. PRE-LUBRICATION – To ensure long compressor life, pre-lubrication at start-up and after long idle periods of several months is recommended. This manual pre-lube is **especially important** on **R-134a** and **R-407C** units that employ **POE-type lubricants** due to the polar nature of these lubricants. (See "Oil Charging/Pre-lubing Pump")

B. Run hours and starts must be recorded on all maintenance and repair records for warranty reimbursement.

† An Industry Certified Technician should perform this service. Proof of maintenance fulfillment may be required for warranty validation purposes.

* Reserved for any special site determined requirements.

[1] During unit operations, maintain oil level between the middle of the lower sight glass and the middle of the upper sight glass.

[2] Oil should be golden colored and relatively clear. If contamination is suspected, take an oil sample.

[3] On typical air conditioning applications, superheat should be 12° to 18°F.

[4] During shutdown, the crankcase oil heater should maintain an oil temperature 15° to 30°F above ambient. During compressor operation, maximum oil temperature is 160°F.

[5] Wave springs used in reciprocating compressor suction and discharge valve assemblies should be replaced every 15,000 hours when used on normal chilled water (40° to 50°F LWT) air conditioning applications. Other applications that may operate at higher-pressure ratios such as low temp brine (20° to 39°F LWT), and units operating under high ambient conditions (ambient temps above 115°F) should have more frequent maintenance intervals, i.e., 10 - 12,000 hrs.

DESIGN HISTORY

Access and Handhole Covers

P Compressors, Styles A and B, were produced with the access and handhole covers machined from two different castings through September 2001. The flange thickness of the access cover is greater than that of the handhole covers and requires longer screws.

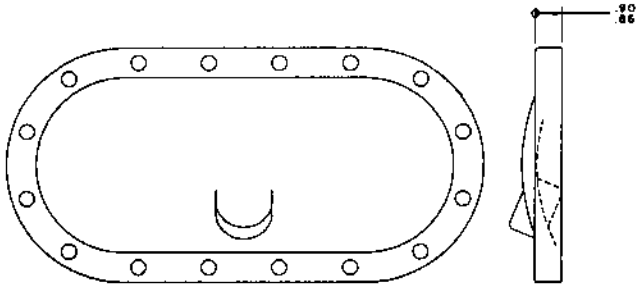
Beginning in October 2001, P Compressors use only access covers. Handhole covers will no longer be produced and should not, under any circumstances, be used to service P compressors produced after September 2001.

The access cover flange is nominally .17 inch (.13 - .21 inch) thicker than the handhole cover flange. The screw used with the access cover is nominally .25 inch (.19 - .31 inch) longer than the screw used with the handhole cover. The shorter screw, previously specified for use with the handhole cover, may not have adequate thread engagement if used with the access cover. The longer screw, specified for use with the access cover, may "bottom out" in the threaded hole tapped for the shorter screw. Make certain all of the sixteen (16) longer screws, securing an access cover replacing a handhole cover, do NOT "BOTTOM OUT". Increase the depth of the threaded hole by manually tapping additional threads if necessary. Failure to observe this precaution may result in gasket leaks.

HANDHOLE COVER THROUGH SEPTEMBER 2001		
ITEM	DESCRIPTION	PART NO.
207	HANDHOLE COVER	064-21645-000
35	SCREW, HEX FLANGE, .4375-14 X 1.75	021-17692-000

NOTE:

Item numbers correspond to those specified in SECTION 3 – RENEWAL PARTS, Figure 47 and Table 2. Torque Item 35 to 78 – 90 lb.-ft.



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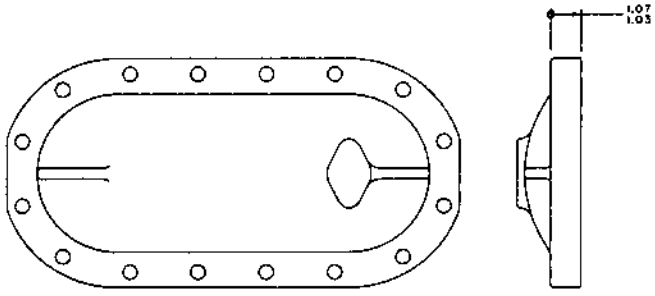
ACCESS COVER AND HANDHOLE COVER (AFTER SEPTEMBER 2001)		
ITEM	DESCRIPTION	PART NO.
25	ACCESS COVER	064-48176-000
27	SCREW, HEX FLANGE, .4375-14 X 2.00	021-17693-000

NOTE:

Item numbers correspond to those specified in SECTION 3 – RENEWAL PARTS, Figure 47 and Table 2. Torque Item 27 to 78 – 90 lb.-ft.

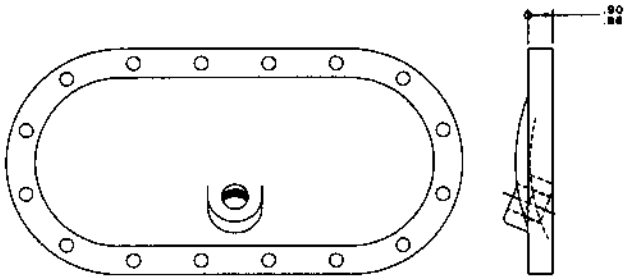


LD07217

HANDHOLE COVER, FOR CRANKCASE FLOAT SUBASSEMBLY THROUGH SPEPTEMBER 2001		
ITEM	DESCRIPTION	PART NO.
1	HANDHOLE COVER	064-26808-000
35	SCREW, HEX FLANGE, .4375-14 X 1.75	021-17692-000

NOTE:

Item number 1 corresponds to same item specified in SECTION 3 – RENEWAL PARTS, Figure 58. Item number 35 corresponds to same item specified in SECTION 3 – RENEWAL PARTS, Figure 47 and Table 2. Torque Item 35 to 78 – 90 lb.-ft.

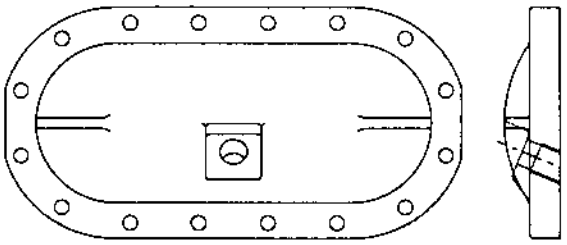


LD07218

HANDHOLE COVER FOR CRANKCASE FLOAT SUBASSEMBLY, AFTER SEPTEMBER 2001		
ITEM	DESCRIPTION	PART NO.
1	HANDHOLE COVER	064-50344-000
27	SCREW, HEX FLANGE, .4375-14 X 2.00	021-17692-000

NOTE:

Item number 1 corresponds to same item specified in SECTION 3 – RENEWAL PARTS, Figure 58. Item number 35 corresponds to same item specified in SECTION 3 – RENEWAL PARTS, Figure 47 and Table 2. Torque Item 27 to 78 – 90 lb.-ft.



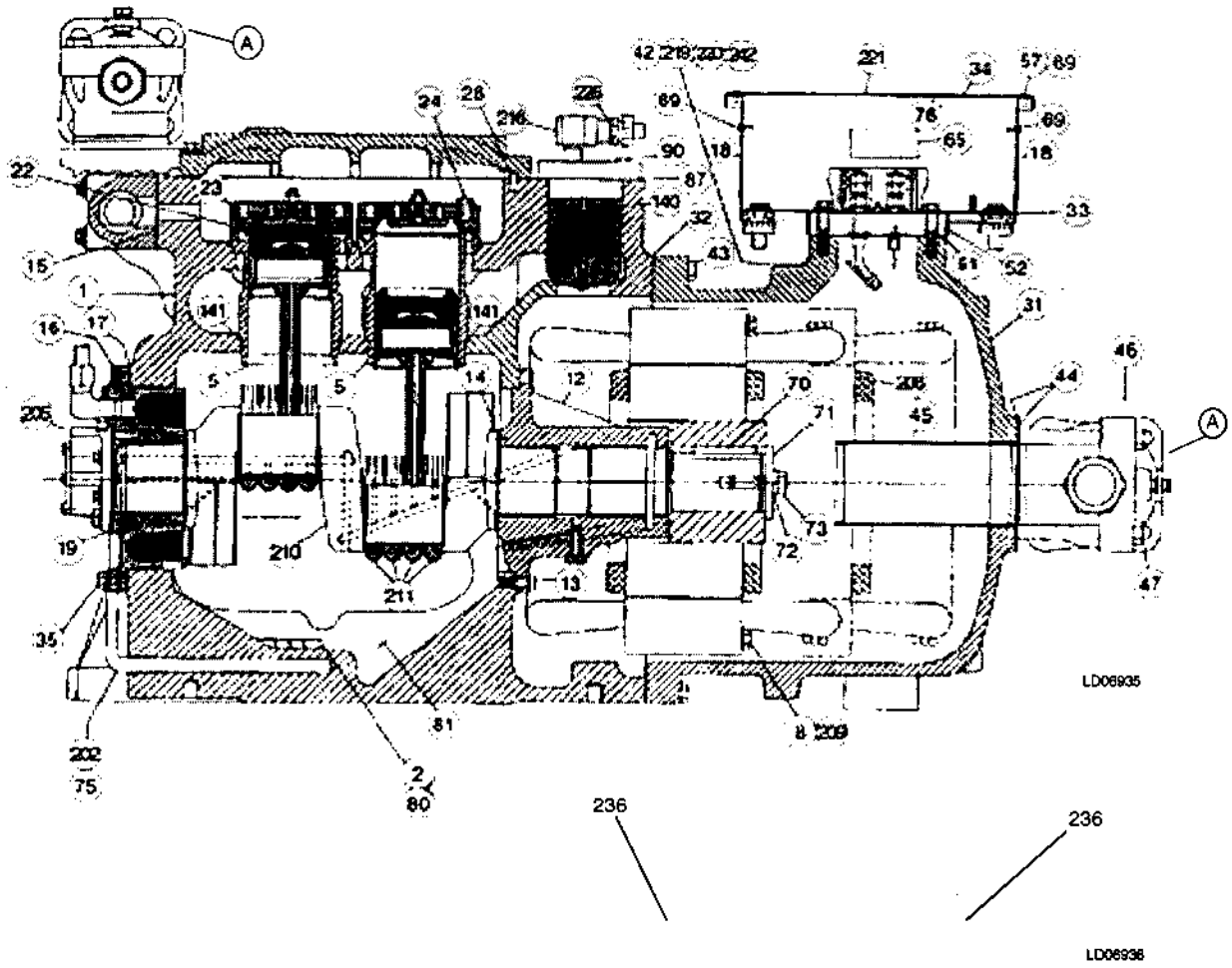
LD07219

2

SECTION 3 – RENEWAL PARTS

ORDERING RENEWAL PARTS

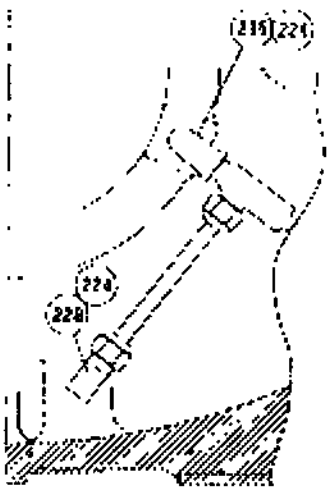
All compressor parts are designed and manufactured for a specific application. They are selected to withstand the pressures normally associated with compressor operation. The substitution of nonstandard parts is not authorized as these parts could cause serious damage to the compressor or operator. Parts should be replaced with genuine YORK Renewal Parts. This section lists replacement parts for these compressors. When ordering parts, be sure to include the complete Nomenclature: Model, Part Number and Serial Number. Be sure that these numbers are copied accurately and completely.



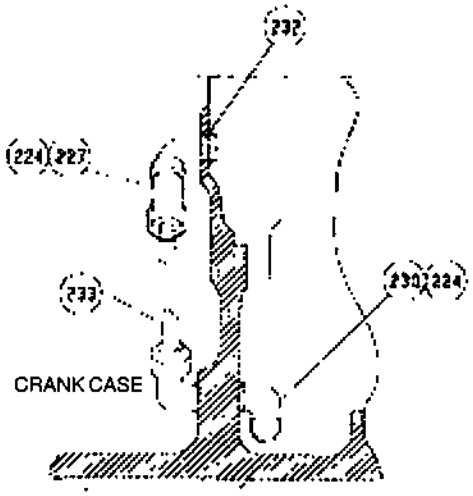
NOTE A:

1. Brass suction and discharge service valve pipe adapter/ gasket by valve manufacturer Mueller. Also See NOTE 1 callout on Fig. 12A, regarding critical torque.

NOM. VALVE SIZE	ADAPTER	GASKET
2-1/8	A6267	A6261
2-5/8	A6268	A6261
3-1/8	A6269	A6262



VIEW A - A EDUCATOR



VIEW B - B

FIG. 46 – COMPRESSOR

LD06937

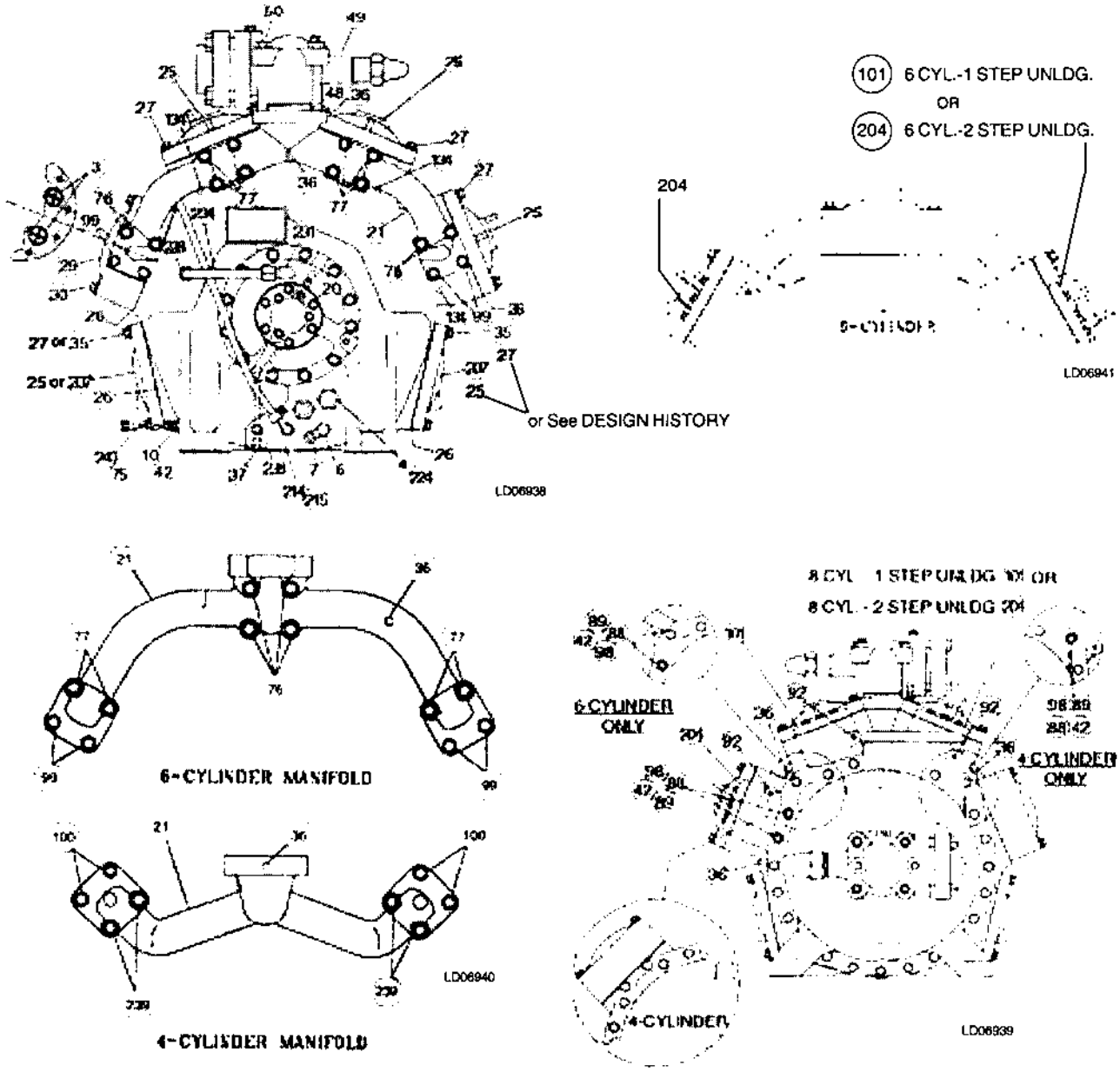
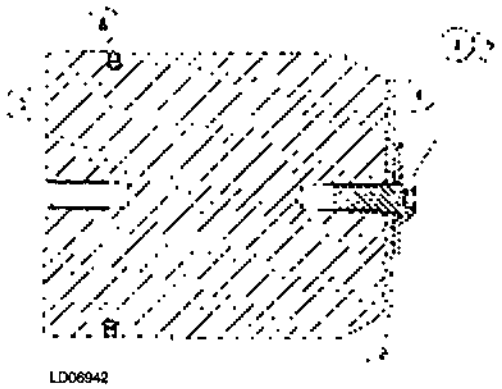


FIG. 47 – COMPRESSOR END VIEWS



ITEM NO.	DESCRIPTION	PART NUMBER
1	Piston	064-48189-000
2	Washer, Seal	028-12560-000
3	Screw, 5/16 Socket Button Cap	021-17396-000
4	Washer, Plain	021-17220-000
5[1]	Sealer, Loctite	013-01671-000
6[2]	Ring, Compression	029-20999-000
[3]140 (Table 1)	Unloader, Blocked Suction, Assembly Includes Items 1 – 6	364-48190-000

NOTES:
[3] = Recommended Stock Spare Part
[1] = Same as ITEM NO. 42 (TABLE 2)
[2] = Includes Compression Ring and O-Ring

FIG. 48 – UNLOADING DEVICE ASSEMBLY

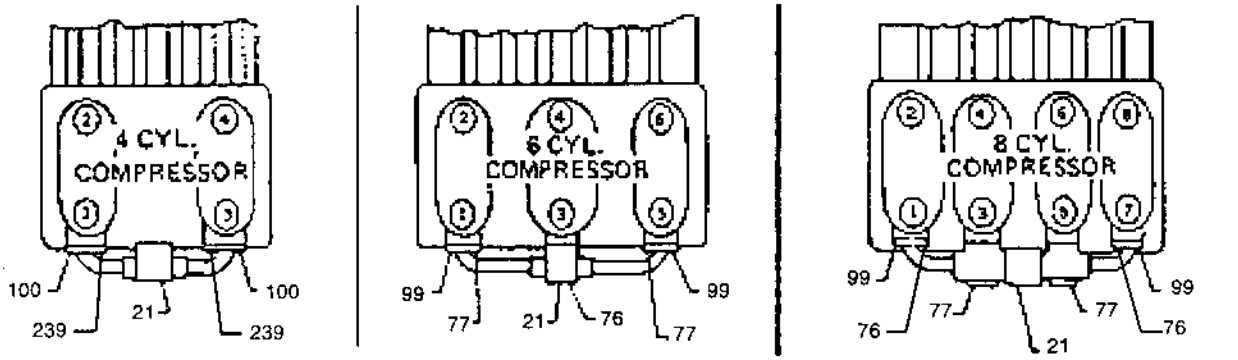


FIG. 49 – MANIFOLD ARRANGEMENTS

TABLE 2 – COMPRESSOR COMPONENTS, GENERAL (SEE FIGURES 46, 47, 48 & 49)

ITEM NO.	DESCRIPTION	COMPRESSOR		
		4 CYLINDER	6 CYLINDER	8 CYLINDER
1	Housing	064-49269-000	064-49270-000	064-49271-000
§2	Screen, Oil Strainer	029-20032-000	029-20032-000	029-20032-000
§3	Valve, Relief	022-03871-000	022-03871-000	022-03871-000
	No. Required Per Compressor	1	2	2
§4	Sight Glass, Oil (2 Required)	026-17581-000	026-17581-000	026-17581-000
5	Sleeve, Cylinder	064-49655-000	064-49655-000	064-49655-000
	No. Required Per Compressor	4	6	8
§6	Valve, Oil Charging	022-01582-000	022-01582-000	022-01582-000
7	Cap, Oil Charging Valve	023-00977-000	023-00977-000	023-00977-000
8	Lockwasher, 7/16 (4 Required)	021-05270-000	021-05270-000	021-05270-000
10	Well, Oil Temp. Sensor	068-09987-000	068-09987-000	068-09987-000
11	Sealant, Refrigerant Pipe[1]	013-02023-000	013-02023-000	013-02023-000
12	Bearing Head, Motor End		See Figure 56	
13	Screw, 7/16 Hex Cap (4 Required)	021-10387-000	021-10387-000	021-10387-000
14	Washer, Thrust	029-11098-000	029-11098-000	029-11098-000
15	Gasket, Disch. Manifold	064-49546-000	064-49546-000	064-49546-000
	No. Required Per Compressor	2	3	4
16	Bearing Head, Oil Pump End		See Figure 54	
17	Gasket, Bearing Head, Oil Pump End	064-49543-000	064-49543-000	064-49543-000
19	Gasket, Oil Pump	064-49544-000	064-49544-000	064-49544-000
20	Screw, 5/16 Hex Flange (6 Required)	021-17689-000	021-17689-000	021-17689-000
21	Manifold, Discharge	064-48340-000	064-48320-000	064-48341-000
22	Valve Plate Assembly (Suction)		See Figure 51	
	No. Required Per Compressor	4	6	8
23	Valve Cage Assembly (Discharge)		See Figure 50	
	No. Required Per Compressor	4	6	8
24	Screw, 3/8 Hex Cap	021-16827-000	021-16827-000	021-16827-000
	No. Required Per Compressor	16	24	32
25	Cover, Access[3]	064-48176-000	064-48176-000	064-48176-000
	No. Required Per Compressor	1 or 3	2 or 4	3 or 5
26	Gasket, Access & Handhole Covers & Head	064-49542-000	064-49542-000	064-49542-000
	No. Required Per Compressor	4	5	6
27	Screw, 7/16 Hex Flange[3]	021-17693-000	021-17693-000	021-17693-000
	No. Required Per Compressor	16 or 48	32 or 64	48 or 80
28	Pin, Coiled Spring	029-21378-000	029-21378-000	029-21378-000
	No. Required Per Compressor	1	2	3
29	Head, Cylinder	064-48321-000	064-48321-000	064-48321-000
30	Screw, 7/16 Hex Flange (16 Required)	021-17783-000	021-17783-000	021-17783-000
31	Cover, Motor	064-49951-000	064-49949-000	064-49950-000

NOTES: § = Recommended Stock Spare Part
[1] = Not shown. Used for threaded pipe joints unless otherwise specified.
[2] = Used to Replace Solenoid Valves for Reduced Steps of Unloading.
[3] = See DESIGN HISTORY

3

TABLE 2 – COMPRESSOR COMPONENTS, GENERAL (SEE FIGURES 46, 47, 48 & 49)

ITEM NO.	DESCRIPTION	COMPRESSOR		
		4 CYLINDER	6 CYLINDER	8 CYLINDER
32	Gasket, Motor Cover	064-49549-000	064-49548-000	064-49548-000
33	Terminal Box	See Figures 46, 57A and 57B and Table 4		
35	Screw, 7/16 Hex Flange (12 or 44 Required)[3]	021-17692-000	021-17692-000	021-17692-000
36	Pipe Plug, 1/4 Square Head No. Required Per Compressor	023-01972-000 3	023-01972-000 4	023-01972-000 5
37	Pipe Plug, 1/4 Hex Socket	023-01973-000	023-01973-000	023-01973-000
42	Sealer, Loctite (Use with Items 10, 12-8, 16-3, 16-5, 88, 140-3 and 242)	013-01671-000	013-01671-000	013-01671-000
43	Screw, 1/2 Hex Cap No. Required Per Compressor	021-18021-000 24	021-18021-000 23	021-18021-000 22
44	Gasket (2 Required)	064-47079-000	064-47079-000	064-47204-000
45	Screen, Suction	026-28473-000	026-28473-000	026-28474-000
46	Valve, Suction Stop Valve Size	022-02844-000 3-1/8"	022-02844-000 3-1/8"	022-02845-000 3-5/8"
47	Screw, 5/8 Hex Cap (4 Required)	021-16817-000	021-16817-000	021-16818-000
48	Gasket, Discharge Valve	064-47078-000	064-47078-000	064-47079-000
49	Valve, Discharge Stop Valve Size	022-01394-000 2-5/8"	022-01394-000 2-5/8"	022-02844-000 3-1/8"
50	Screw, 5/8 Hex Cap (4 Required)	021-16821-000	021-16821-000	021-16817-000
51	Gasket, Terminal Block	064-49545-000	064-49545-000	064-49545-000
52	Terminal Block	025-30402-000	025-30402-000	025-30402-000
70	Key, Motor	064-26560-000	064-26560-000	064-26560-000
71	Washer, Shaft	064-21835-000	064-21835-000	064-21835-000
72	Lockwasher, 5/8, Shaft	021-05295-000	021-05295-000	021-05295-000
73	Screw, 5/8 Hex Cap	021-01630-000	021-01630-000	021-01630-000
75	Heat Conductive Compound (Use with Items 202 & 240)	013-00898-000	013-00898-000	013-00898-000
76	Screw, 3/8 Hex Flange No. Required Per Compressor	— —	021-17782-000 4	021-17781-000 4
77	Screw, 3/8 Hex Flange No. Required Per Compressor	— —	021-17781-000 4	021-19637-000 8
80	Retaining Cmpd, Loctite (Use with Item 2)	013-01752-000	013-01752-000	013-01752-000
§87	Gasket, Solenoid Valve No. Required Per Compressor	064-49541-000 1	064-49541-000 2	064-49541-000 3
88	Stud, 1/2 No. Required Per Compressor	021-30172-000 1	021-30172-000 1	021-30172-000 2
89	Nut, 1/2 Hex No. Required Per Compressor	021-11154-000 1	021-11154-000 1	021-11154-000 2
90	Screw, 3/8 Hex Cap No. Required Per Compressor	021-17690-000 6	021-17690-000 12	021-17690-000 18
92	Pipe Plug, 1/8 Hex Socket No. Required Per Compressor	023-01970-000 1	023-01970-000 2	023-01970-000 3
98	Washer, 1/2, Clipped Circular No. Required Per Compressor	021-17774-000 1	021-17774-000 1	021-17774-000 2
99	Screw, 3/8 Hex Flange No. Required Per Compressor	— —	021-17784-000 4	021-17784-000 4
100	Screw, 3/8 Hex Flange No. Required Per Compressor	021-17784-000 4	— —	— —
101	Cover Plate, Blank[2] No. Required Per Compressor	064-48187-000	064-48187-000 See Table 3	064-48187-000
134	Drain Orifice Plug, .022" No. Required Per Compressor	064-47349-000 1	064-47349-000 2	064-47349-000 3
136	Conduit w/Connectors No. Required Per Compressor	064-49020-001	064-49020-001 See Figure 57B and Table 3	064-49020-001
137	Conduit w/Connectors No. Required Per Compressor	—	064-49020-002 See Figure 57B and Table 3	064-49020-002
§140	Unloader Piston No. Required Per Compressor	364-48190-000	364-48190-000 See Figure 48 and Table 3	364-48190-000
141	Seal, O-ring, Cylinder Sleeve No. Required Per Compressor	028-12259-000 4	028-12259-000 6	028-12259-000 8

NOTES: § = Recommended Stock Spare Part
[1] = Not shown. Used for threaded pipe joints unless otherwise specified.
[2] = Used to Replace Solenoid Valves for Reduced Steps of Unloading.
[3] = See DESIGN HISTORY

TABLE 2 – COMPRESSOR COMPONENTS, GENERAL (SEE FIGURES 46, 47, 48 & 49)

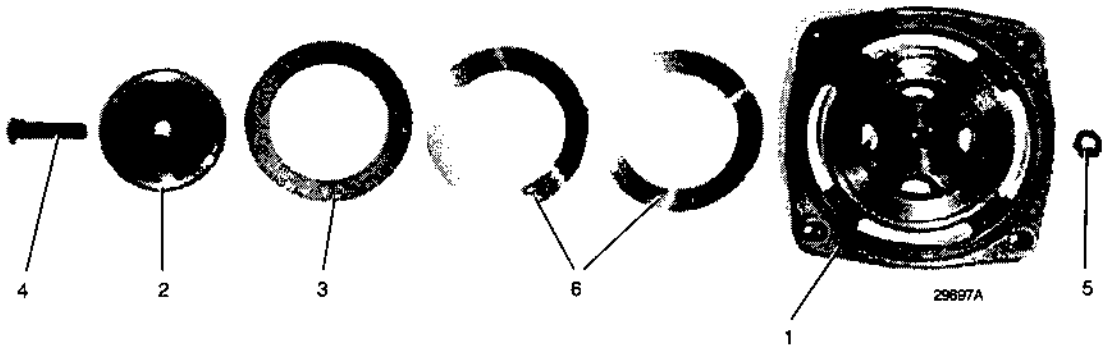
ITEM NO.	DESCRIPTION	COMPRESSOR		
		4 CYLINDER	6 CYLINDER	8 CYLINDER
202	Crankcase Heater - 120V	025-32938-000	025-32938-000	025-32938-000
	- 240V	025-32939-000	025-32939-000	025-32939-000
§204	Valve, Solenoid	025-29999-000	025-29999-000	025-29999-000
	No. Required Per Compressor	See Table 3		
205	Pump, Oil	See Figure 55		
207	Cover, Handhole (0 or 2 Required)[3]	064-21645-000	064-21645-000	064-21645-000
§208	Motor	See Table 5		
209	Screw, 7/16 Hex Cap for Motor Size Codes M, N and P (4 Req'd)	021-16819-000	021-16819-000	Not Required
	Motor Size Codes Q, S, T and V (4 Required)	Not Required	021-16820-000	021-16820-000
§210	Crankshaft			
	Stroke 3	364-49221-000	364-49222-000	364-49223-000
	Stroke 4	364-49224-000	364-49225-000	364-49226-000
§211	Piston Assembly	See Figure 52		
	Connecting Rod Assembly	See Figure 53		
214	Clamp, 7/8	023-18276-000	023-18276-000	023-18276-000
215	Screw, 1/4 Hex Cap	021-16174-000	021-16174-000	021-16174-000
§216	Coil, Solenoid (Less Valve)			
	120 Volt	025-30976-000	025-30976-000	025-30976-000
	240 Volt	025-30977-000	025-30977-000	025-30977-000
	No. Required Per Compressor	See Table 3		
219	Nut, 3/8 Hex	021-00466-000	021-00466-000	021-00466-000
220	Washer, 3/8 Plain	021-01267-000	021-01267-000	021-01267-000
224	Sealer, Removable Thread (Use with Items 4, 16-4, 205-2, 227, 228, 230 and 235)	013-01678-000	013-01678-000	013-01678-000
226	Seal, O-Ring, conduit seal	028-03292-000	028-03292-000	028-03292-000
	No. Required per Compressor	See Table 3		
227	Eductor, Oil Return	022-09716-000	022-09716-000	022-09716-000
228	Valve, Check	022-09741-000	022-09741-000	022-09741-000
229	Connector, 5/8 Flare	023-18955-000	023-18955-000	023-18955-000
	No. Required per Compressor	2	1	1
230	Elbow, 3/8 fla	023-00868-000	023-00868-000	023-00868-000
231	Elbow, 5/8 Flare	Not Required	023-18956-000	023-18956-000
232	Seal, O-Ring	028-13896-000	028-13896-000	028-13896-000
233	Connection, Eductor to Check Valve	364-49345-000	364-49345-000	364-49345-000
234	Connection, Bearing Head to Housing	364-49283-000	364-49284-000	364-49285-000
235	Elbow, 1/4 x 1/4 Street	023-01685-000	023-01685-000	023-01685-000
236	Magnet (2 Required)	029-22748-000	029-22748-000	029-22748-000
238	Pipe Plug, 3/8 Hex Socket	023-04298-000	023-04298-000	023-04298-000
239	Screw, 3/8 Hex Flange	021-17781-000	—	—
	No. Required Per Compressor	4	—	—
240	Sensor, Oil Temp.	025-34177-000	025-34177-000	025-34177-000
242	Stud, 3/8	021-30147-000	021-30147-000	021-30147-000

NOTES: § = Recommended Stock Spare Part
[1] = Not shown. Used for threaded pipe joints unless otherwise specified.
[2] = Used to Replace Solenoid Valves for Reduced Steps of Unloading.
[3] = See DESIGN HISTORY

TABLE 3 – PART QUANTITIES FOR VARIOUS STEPS OF UNLOADING

STEPS OF UNLOADING	ITEM NUMBER												
	101			135	136			137		140	204	216	226
	4 Cyl	6 Cyl	8 Cyl		4 Cyl	6 Cyl	8 Cyl	6 Cyl	8 Cyl				
1	0	1	2	11	1	1	1	0	0	1	1	1	1
2	0	0	1	13	0	1	0	1	2	2	2	2	2

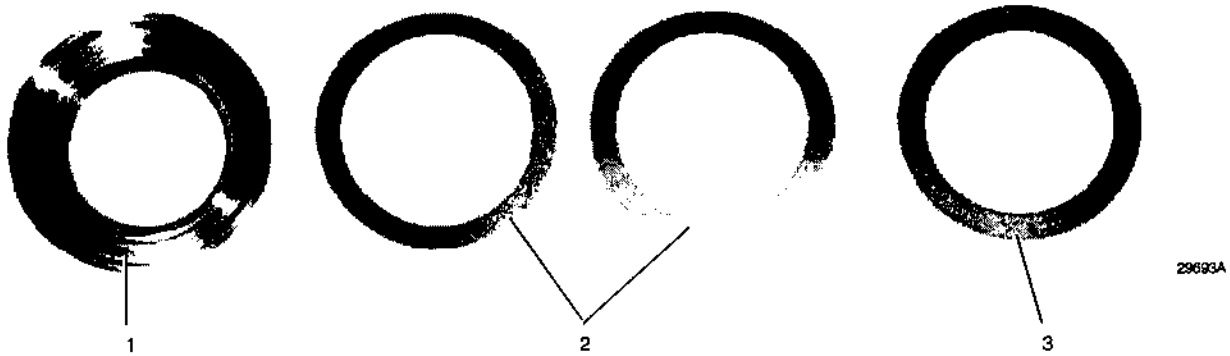
3



ITEM NO.	DESCRIPTION	PART NUMBER
1	Cage, Discharge Valve	064-49658-000
2	Plate, Inner Valve	064-48032-000
3	Ring, Discharge Valve	064-43012-000
4	Screw, 3/8 Socket Button Cap	021-17649-000
5	Nut, 3/8 Hex Self Locking	021-09932-000
6	Spring, Wave (2 Required)	022-10021-000
[5]23 (Table 2)	Cage, Discharge Valve, Assembly Includes Items 1 through 6	664-49722-000

[5] = Recommended Stock Spare Part

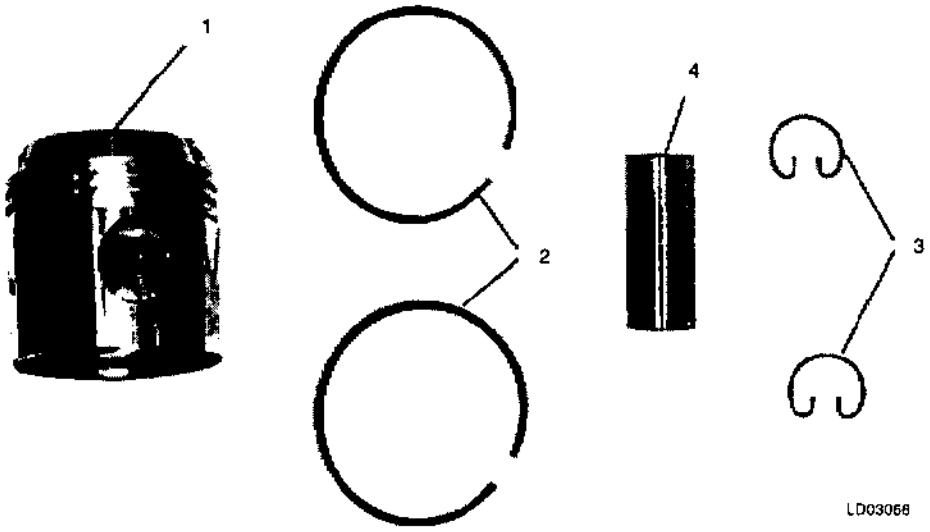
FIG. 50 – DISCHARGE VALVE CAGE ASSEMBLY (SEE TABLES 6 & 7)



ITEM NO.	DESCRIPTION	PART NUMBER
1	Plate, Valve	064-49657-000
2	Spring, Wave (2 Required)	022-09742-800
3	Ring, Suction Valve	022-10020-000
[5]22 (Table 2)	Plate, Suction Valve, Assembly Includes Items 1 through 3	664-49723-000

[5] = Recommended Stock Spare Part

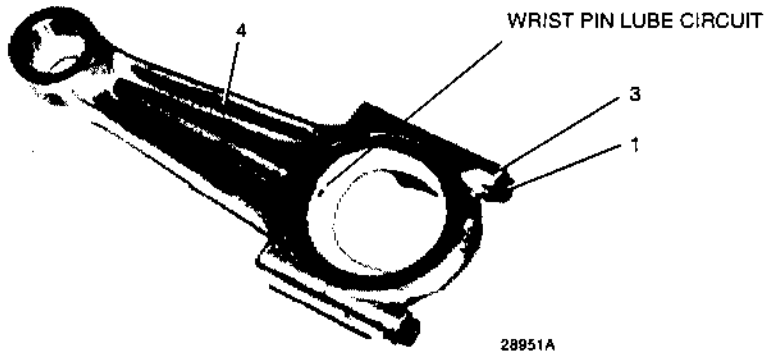
FIG. 51 – SUCTION VALVE PLATE ASSEMBLY (SEE TABLES 6 & 7)



ITEM NO.	DESCRIPTION	PART NUMBER
1	Piston, Bare	064-46538-000
2	Ring, Piston (2 Required)	029-15175-000
3	Spring, Retaining (2 Required)	029-13091-000
4	Pin, Piston	029-13090-000
*	Piston, Assembly Includes Items 1 through 4	364-46757-000

* = Recommended Stock Spare Part

FIG. 52 – PISTON ASSEMBLY (Part of Item 211, Table 2)

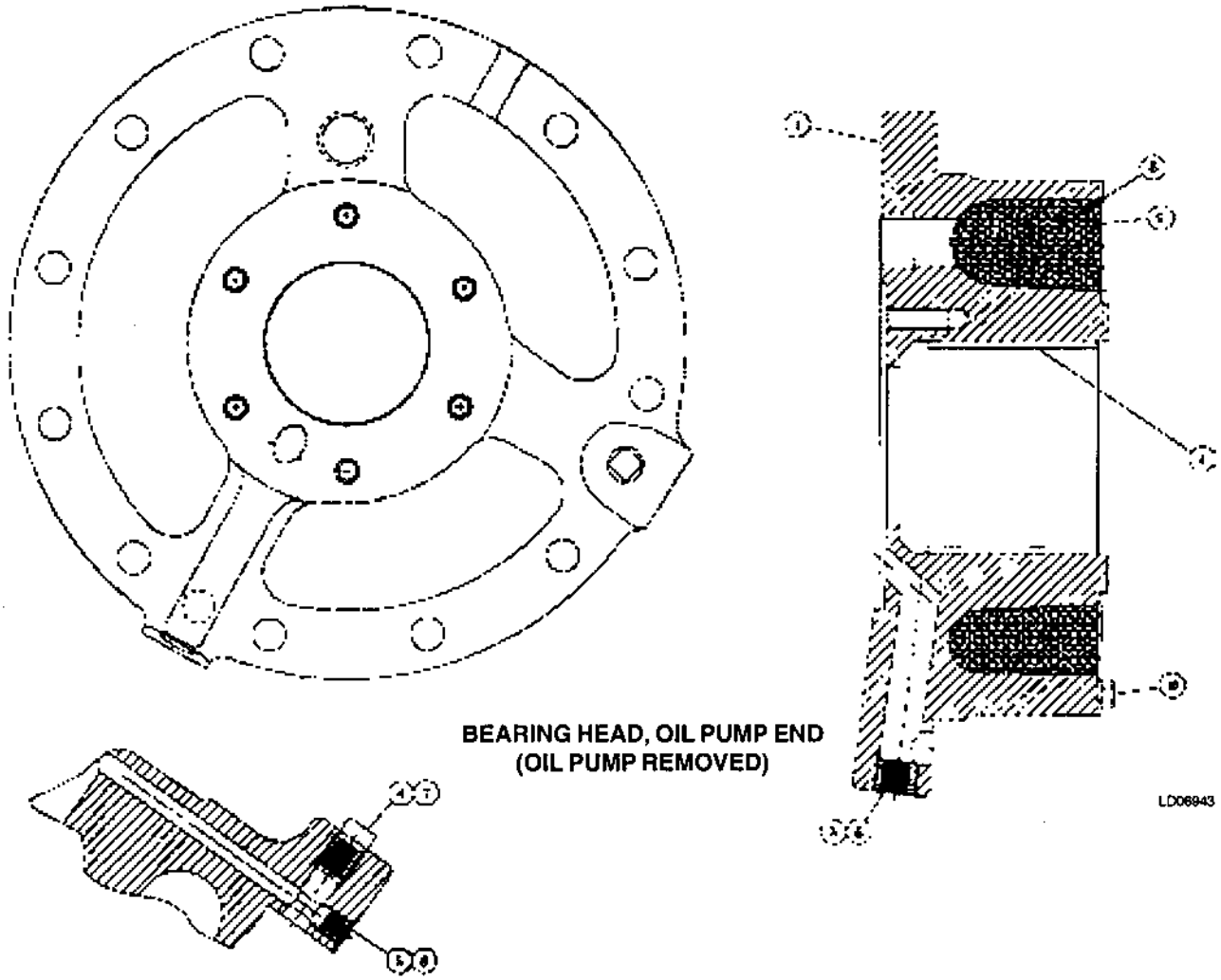


ITEM NO.	DESCRIPTION	PART NUMBER	
		Short Stroke	Long Stroke
1	Screw, 5/16 Hex Cap	021-13665-000	021-13665-000
	No. Required Per Connecting Rod	2	2
2	Dowel Pin (Not Shown)	029-22432-000	029-22432-000
	No. Required Per Connecting Rod	2	2
3	Washer, 5/16 Plain (Package of 10)	221-01262-800	221-01262-800
	No. Required Per Connecting Rod	2	2
4	Connecting Rod Assembly Includes Items 1, 2 and 3	664-49011-000	664-49012-000

* = Recommended Stock Spare Part

FIG. 53 – CONNECTING ROD ASSEMBLY (Part of Item 211, Table 2)

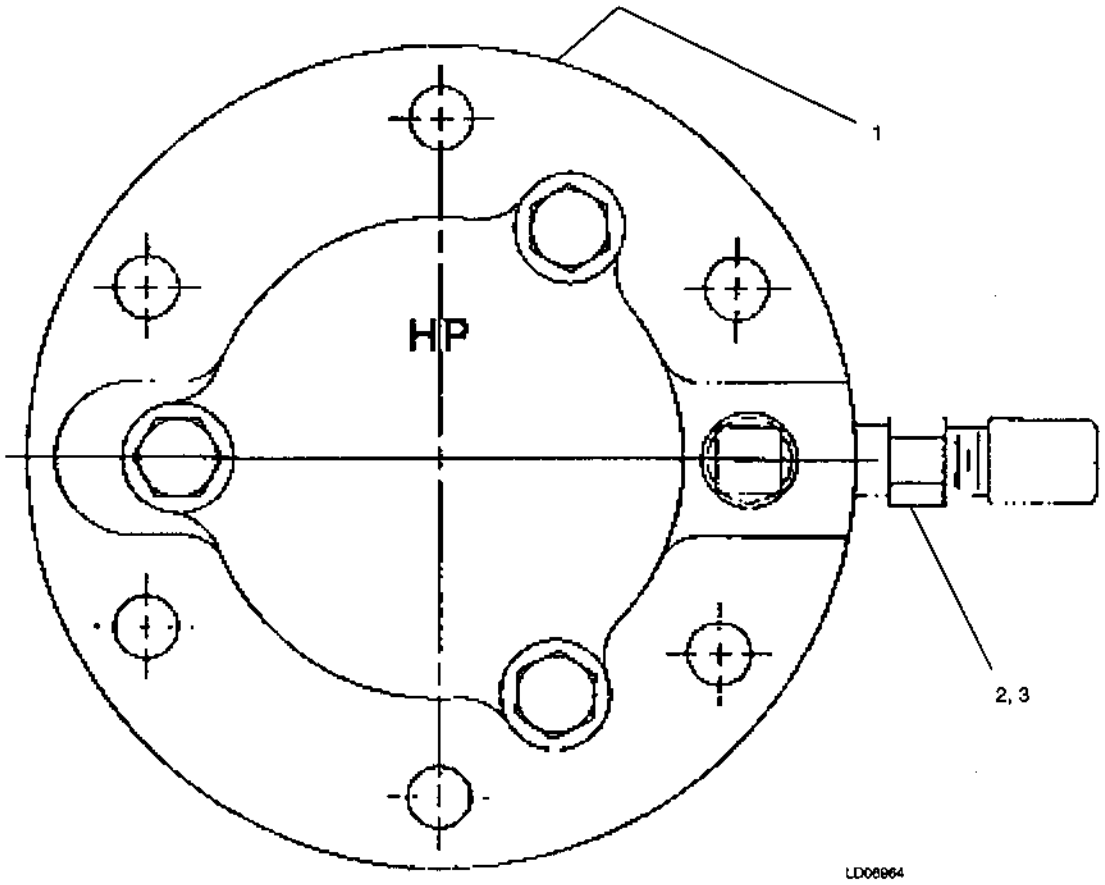
3



ITEM NO.	DESCRIPTION	PART NUMBER
1	Head, Bearing (Oil Pump End)	064-49260-000
[5]2	Bearing, Crankshaft	029-23755-000
3[1]	Pipe Plug, 3/8 Hex Socket	023-04298-000
4[2]	Pipe Plug, 1/4 Square Head	023-01972-000
5[3]	Pipe Plug, 1/8 Hex Socket	023-01970-000
6[4]	Sealer, Loctite (Use with Items 3 and 5)	013-01671-000
7[5]	Sealer, Removable Thread (Use with Item 4)	013-01678-000
8	Precipitator, Wire Mesh	026-35313-000
9	Cover	064-49267-000
10	Screw, 1/4 Hex Cap (6 Required)	021-01361-000
16 (Table 2)	Head, Bearing Assembly (Oil Pump End) Includes Items 1 through 10	364-50042-000

[5] = Recommended Stock Spare Part
[1] = Same as ITEM NO. 238 (Table 2)
[2] = Same as ITEM NO. 36 (Table 2)
[3] = Same as ITEM NO. 92 (Table 2)
[4] = Same as ITEM NO. 42 (Table 2)
[5] = Same as ITEM NO. 224 (Table 2)

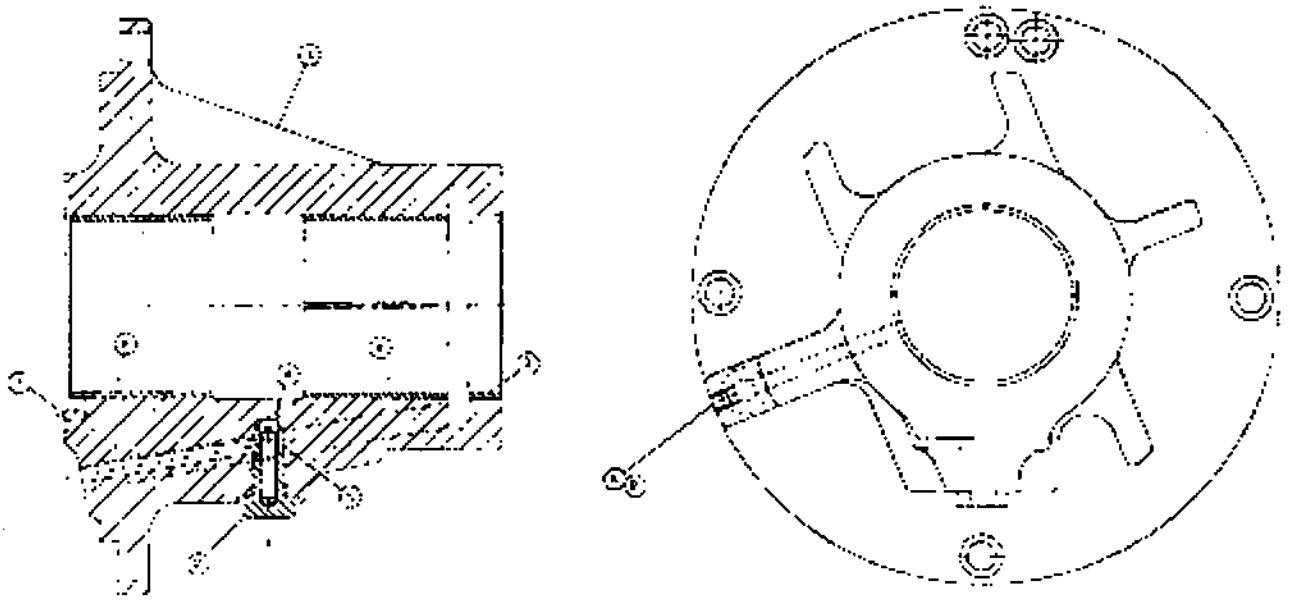
FIG. 54 – OIL PUMP END BEARING HEAD ASSEMBLY



ITEM NO.	DESCRIPTION	PART NUMBER
1	Oil Pump	026-35351-000
2	Valve, Access	022-04521-000
3[1]	Sealer, Removable Thread (Use with Item 2)	013-01678-000
205 (Table 2)	Oil Pump Assembly Includes Items 1 through 3	364-49026-000

[1] = Same as ITEM NO. 224 (Table 2)

FIG. 55 – OIL PUMP ASSEMBLY



LD08944

ITEM NO.	DESCRIPTION	PART NUMBER
1	Head, Bearing (Motor End)	064-49227-000
2	Cap, Seal, Oil Relief Valve	065-06394-000
[S]3	Bearing, Crankshaft, Oil Control	029-23756-000
4	Plunger, Oil Relief Valve	065-01331-000
5	Spring, Helical	029-06143-000
[S]6	Bearing, Crankshaft (2 Required)	029-23755-000
7	Pin, Slot 1/8 Spring	029-05395-000
8	Pipe Plug, 1/16 Hex Socket	023-05366-000
9[1]	Sealer, Loctite (Use with Item 8)	013-01671-000
12 (Table 2)	Head, Bearing Assembly (Motor End) Includes Items 1 through 9	364-50041-000

[S] = Recommended Stock Spare Part

[1] = Same as ITEM NO. 42 (Table 2)

FIG. 56 – MOTOR END BEARING HEAD ASSEMBLY

TABLE 4 – COMPRESSOR MOTOR TERMINAL BOX MODEL – A OR B (How to Determine)

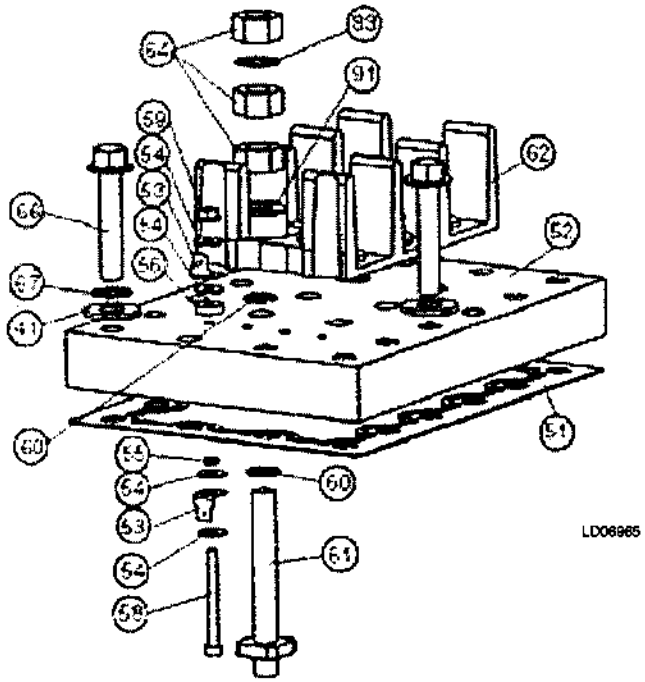
VOLT CODE	MOTOR SIZE (See Page 10, Motor Size Code and Motor Efficiency Rating)														
	M	N	P	Q	S	T	V	VOLT CODE	M	N	P	Q	S	T	V
	STANDARD MOTOR								HIGH EFFICIENCY MOTOR						
17	A	A	A	A	A	Not Available		17	B	B	B	B	B	Not Available	
28/59	A	A	A	A	A	B	B	28	A	A	B	B	B	B	B
40	A	A	A	A	A	A	A	40	A	A	A	A	A	A	B
46/50	A	A	A	A	A	A	A	46	A	A	A	A	A	A	A
58/70	A	A	A	A	A	A	A	58	A	A	A	A	A	A	A
63	A	A	A	A	A	Not Available			Not Available						
43	A	A	A	A	A	A	A		Not Available						
64	A	A	A	A	A	A	A		Not Available						

COMPRESSOR MOTOR TERMINAL BOX COMPONENTS (See Figs. 46, 57A and 57B)

ITEM NO.	DESCRIPTION	QTY.	TERMINAL BOX	
			A	B
			PART NUMBER	
18	Knockout Cover	2	064-47460-000	064-47460-000
33*	Terminal Box	1	364-48175-000	364-48704-000
34	Cover, Terminal Box	1	064-47459-000	064-47459-000
41	Washer, 3/8 Plain	16	021-01267-000	021-01267-000
51	Gasket, Terminal Block	1	064-49545-000	064-49545-000
52	Terminal Block	1	025-30402-000	025-30402-000
53	Terminal, Push-On Protector	8	025-18650-000	025-18650-000
54	Washer, 3/16 Plain (Package of 5) Number of Washers Required Per Compressor	— 16	221-18694-800 —	221-18694-800 —
55	Seal, O-Ring, 5/32 ID	4	028-09347-000	028-09347-000
56	Washer, Terminal (Package of 10) Number of Washers Required Per Compressor	— 4	228-09525-800 —	228-09525-800 —
57	Lockwasher, Internal Tooth	2	021-01133-000	021-01133-000
58	Screw, Cap Hex Soc Hd (Package of 5) Number of Screws Required Per Compressor	— 4	221-14817-800 —	221-14817-800 —
59	Nut, Flange, Serrated	4	021-18936-000	021-18936-000
60	Seal, O-Ring, 7/16 ID	12	028-12551-000	028-12551-000
61	Bolt, Terminal	6	021-18660-000	021-18473-000
62	Spacer, Insulating	1	025-30978-000	025-30978-000
64	Nut, 7/16 Hex (Package of 6) Number of Nuts Required Per Compressor	— 18	221-12724-800 —	221-12724-800 —
65	Label, Caution	1	035-05548-000	035-05548-000
66	Screw, 3/8 Hex Flange	16	021-17691-000	021-17691-000
67	Lockwasher, 3/8 Internal Tooth	4	021-01155-000	021-01155-000
68	Terminal Block End	1	025-20946-000	025-20946-000
69	Screw, Tap	9	021-13784-000	021-13784-000
78	Label, Field Wiring	1	035-17153-000	035-17153-000
79	Screw, Tap (Style PA Only) Cap, Sealing (Style PB Only)	2 2	021-12068-000 028-13952-000	021-12068-000 028-13952-000
83	Lockwasher, 7/16 Internal Tooth	6	021-16246-000	021-16246-000
84	Wiring, Protector Terminals (Style PA Only)	1	564-47602-001	564-47602-001
85	Strip, Marker	1	025-30960-000	025-30960-000
91	Washer, 7/16 Plain	6	021-14111-000	021-14111-000
135	Terminal Block, Flat Base	Note 1	025-20944-000	025-20944-000
136*	Conduit w/Connectors (2) 1-Step Unloading, 4, 6 and 8 Cylinder and 2-Step Unloading, 6 Cylinder Only	1	064-49020-001	064-49020-001
137*	Conduit w/Connectors (2) 2-Step Unloading, 6 Cylinder 2-Step Unloading, 8 Cylinder	1 2	064-49020-002	064-49020-002
138	Wiring, Common Jumper 1-Step Unloading 2-Step Unloading	1 1	565-25211-003 565-25211-004	565-25211-003 565-25211-004
203	Module, Motor Protector (Style PA Only) 115V/230V	1	025-35149-000	025-35149-000
217	Connector, Conduit	1	025-31309-000	025-31309-000
221	Label, Warning	1	035-00929-000	035-00929-000
—	Bar, Jumper (See Note 2)	1	064-47424-000	064-47424-000

NOTES: [1] = See Table 3
[2] = Not Shown. Used in Across-the-Line Applications
[*] = Also listed in Table 2

3



NOTE:
Insulate terminal bolts to prevent condensation and reduce arcing potential. In low temp. applications and high humidity environments. Use 3M Scotchfil Electrical Insulation Putty UPN #15140 or equivalent.

FIG. 57A – MOTOR TERMINAL BLOCK DETAIL

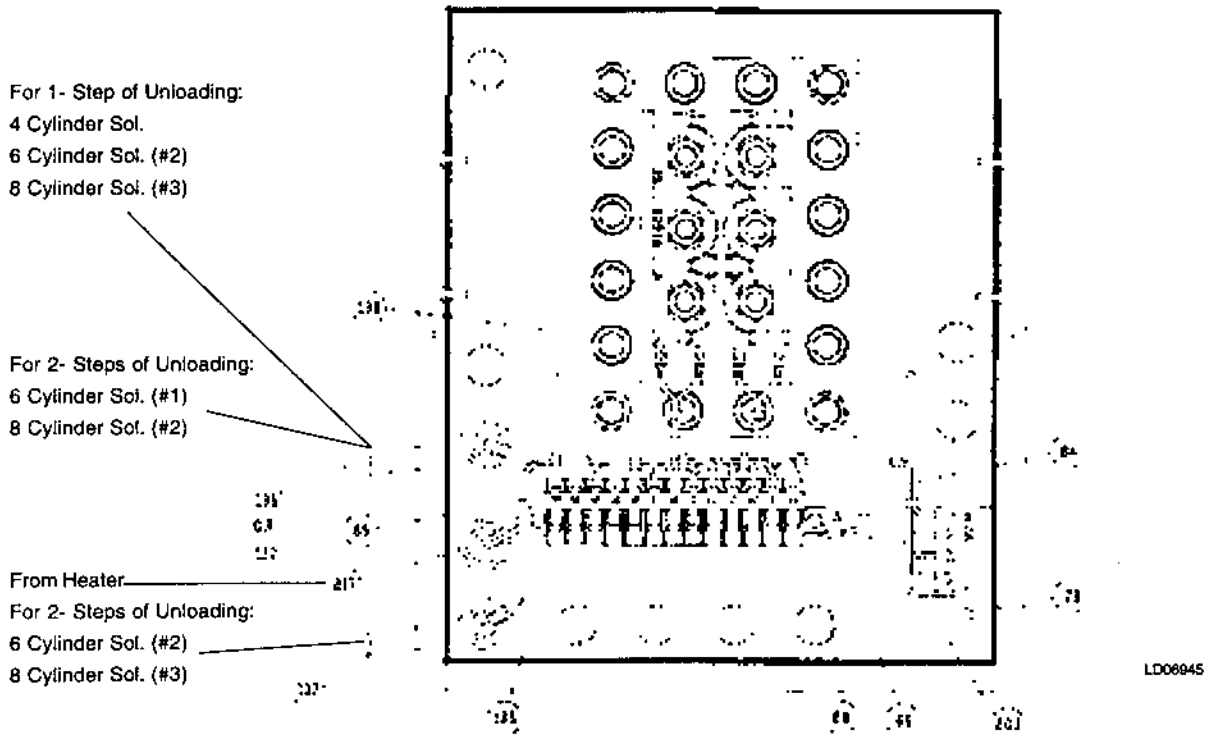


FIG. 57B – TERMINAL BOX (PLAN VIEW OF INTERIOR)

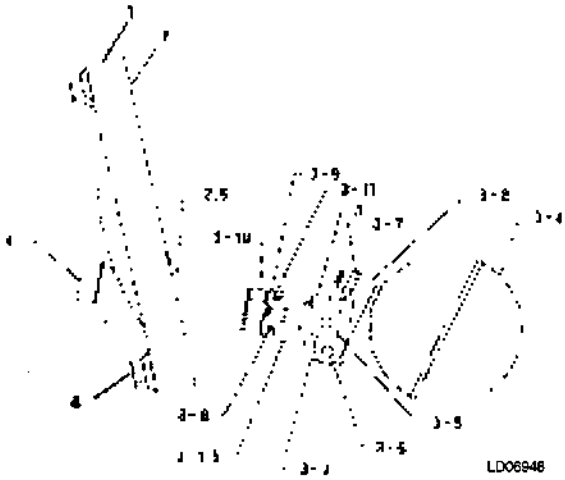


FIG. 58 – CRANKCASE FLOAT ASSEMBLY

[1] = See Design History (pages 36 and 37)
[2] = Same as ITEM No. 42 (Table 2)
[3] = Same as ITEM No. 27 (Table 2)
[4] = Same as ITEM No. 26 (Table 2)

ITEM NO.	DESCRIPTION	PART NO.
	Handhole Cover with Crankcase Float Includes Items 1 through 5	364-26809-000
1[1]	Cover, Handhole (Through September 2001)	6 64-26808-000
	Cover, Access for Oil Float Assembly (After September 2001)	664-50344-000
2	Adaptor	064-26807-000
3	Float Assembly	364-45530-000
3-1	Valve Body	064-45531-000
3-2	Lever, Float	068-04542-000
3-3	Valve, Float	068-04545-000
3-4	Ball, Float	022-00530-000
3-5	Pin, Valve	068-01594-000
3-6	Pin, Lever	064-02071-000
3-7	Nut, 5/16 Hex Self-Locking (Package of 5)	221-09610-800
3-8	Gasket, Copper	028-03014-000
3-9	Lockwasher, 5/8	021-05273-000
3-10	Nut, 5/8 Hex Jam (Package of 10)	221-08073-800
3-11	Pin, Roll (Package of 5)	229-08228-800
4	Cap, Sealing	028-05013-000
5[2]	Sealer, Loctite (Use with Items 2 and 3-1)	013-01671-000
6[3], [1]	Screw, 7/16 Hex Flange (16 Required)	021-17693-000
7[4], [1]	Gasket	064-04942-000
8[1]	Instruction 180.23-NM1	035-18182-000

TABLE 5 – REPLACEMENT MOTORS (ROTOR & STATOR)[1]

VOLTAGE	VOLT CODE	MOTOR SIZE CODE[2]						
		M	N	P	Q	S	T	V
STANDARD MOTORS								
200-3-60	17	364-47924-001	364-47924-008	364-47924-015	364-47924-022	364-47924-029	Not Available	
230-3-60/190-3-50	28/59	364-47924-002	364-47924-009	364-47924-016	364-47924-023	364-47924-030	364-47924-038	364-47924-046
380-3-60	40	364-47924-003	364-47924-010	364-47924-017	364-47924-024	364-47924-031	364-47924-039	364-47924-047
460-3-60/380/415-3-50	46/50	364-47924-004	364-47924-011	364-47924-018	364-47924-025	364-47924-032	364-47924-040	364-47924-048
575-3-60/500-3-50	58/70	364-47924-005	364-47924-012	364-47924-019	364-47924-026	364-47924-033	364-47924-041	364-47924-049
220-3-50	63	364-47924-006	364-47924-013	364-47924-020	364-47924-027	364-47924-034	Not Available	
440-3-50	43	364-47924-007	364-47924-014	364-47924-021	364-47924-028	364-47924-035	364-47924-043	364-47924-051
346-3-50	64	364-47924-101	364-47924-102	364-47924-103	364-47924-104	364-47924-105	364-47924-106	364-47924-107
HIGH EFFICIENCY MOTORS								
200-3-60	17	364-49053-001	364-49053-008	364-49053-015	364-49053-022	364-49053-029	Not Available	
230-3-60	28	364-49053-002	364-49053-009	364-49053-016	364-49053-023	364-49053-030	364-49053-038	364-49053-046
380-3-60	40	364-49053-003	364-49053-010	364-49053-017	364-49053-024	364-49053-031	364-49053-039	364-49053-047
460-3-60	46	364-49053-004	364-49053-011	364-49053-018	364-49053-025	364-49053-032	364-49053-040	364-49053-048
575-3-60	58	364-49053-005	364-49053-012	364-49053-019	364-49053-026	364-49053-033	364-49053-041	364-49053-049

NOTES:

[1] = Replacement motor must be the same size code, identified by the sixth character or sixth and seventh characters of the Model Number, and voltage code, identified by the numbers following the size code, as the original motor. Rotors and stators are not available separately. Replacement motors include ITEM NO. 61. (See Fig. 57A.)

[2] = The unused protector leads should be cut off in the area where they exit the bundle. They should be cut off at different lengths (approximately 1/4" difference) to prevent the exposed ends from touching any other component.

TABLE 6 – SERVICE AIDS

GASKET KIT** COMPRESSOR MODEL			VALVE RETAINING CLIP	BEARING REMOVAL TOOL	ROTOR MANDREL*	STATOR REMOVAL TOOL	OIL CHARGING/ PRE-LUBING PUMP
4-CYLINDER	6-CYLINDER	8-CYLINDER					
364-50183-000	364-50184-000	364-50185-000	064-37274-000	364-37260-000	364-37273-000	029-13597-000	470-10654-000

* Screws Into End of Crankshaft to Aid in Removing / Installing Rotor
** Depending on application, not all gaskets may be required.

"VALVE REPLACEMENT" KITS & "OVERHAUL" KITS

The "Valve Replacement" Kit listed in Table 7 contains the suction and discharge valve rings and springs and gaskets required to service one deck (two cylinders).

The "Overhaul" Kit listed in Table 8 contains the suction valve rings and springs, suction valve plates, discharge valve cage assemblies, gaskets and screws required to service one deck (two cylinders).

Included with each kit is a table of threaded torque values.

If servicing a complete compressor, order the Quantities listed in the Table.

TABLE 7 – "VALVE REPLACEMENT" KIT

KIT PART NO.	364-47667-016		
	4 CYL	6 CYL	8 CYL
NO. OF KITS REQUIRED PER COMPRESSOR	2	3	4

TABLE 8 – "OVERHAUL" KIT

KIT PART NO.	364-47666-022		
	4 CYL	6 CYL	8 CYL
NO. OF KITS REQUIRED PER COMPRESSOR	2	3	4

YORK OIL (Item No. 81)

Mineral Oil, Type C, 5-gallon can – 011-00312-000, for R-22 applications

Mineral Oil, Type E, 5-gallon can – 011-00582-000, for R-22 high ambient applications above 115°F

POE Lubricant, Type H, 5-gallon can – 011-00549-000, for R-134a and R407C applications

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