TRANE® AIR CONDITIONING

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LITERATURE FILE NO.
HCOM-SB-28A

GENERAL SERVICE BULLETIN

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SUPERSEDES HCOM-SB-28
DATED 2/23/79

SUBJECT: MODEL E OPEN AND HERMETIC COMPRESSOR, LUBRICATION DESIGN CHANGE

INTRODUCTION

In 1979, the design of the lubrication system for Model E open and hermetic compressors was changed. The changes included an improved oil pump, increased crankpin and main bearing clearances, increased oil flow and improved oil return.

The purpose of this bulletin is to discuss this design change and outline instructions and give parts ordering information for field modernization of Model E lubrication systems.

DISCUSSION

Improved Oil Pump

The oil pump was modified to reduce the possibility of oil pump bearing seizures due to copper plating. The pump bearing area was increased to reduce bearing loading, thereby lowering bearing temperature and decreasing the probability of copper plating on the bearing surface. This increases the life of the oil pump. Instances of copper plating in a refrigeration system usually occur only under abnormal operating conditions. These conditions include excessively high operating temperatures, use of improper oil and the presence of air, moisture or other contaminants in the system.

When rebuilding a Model E compressor, it is not necessary to replace the existing oil pump with the new design pump if the old pump is in good condition.

Increased Bearing Clearances

The compressor crankpin and main bearing clearances were increased to maximize oil flow through the bearings. The increased oil flow rate provides adequate lubrication and assists refrigerant venting from the bearing under conditions of oil dilution by liquid refrigerant.

A comparison of the previous clearances and the revised clearances follows:

	PREVIOUS CLEARANCE	REVISED CLEARANCES
Connecting Rod Bore Diameter (Large End)	2.7520-2.7530	2.7525-2.7535
Crankshaft Crankpin Diameter	2.7500-2.7490	2.7500-2.7490
Diametric Bearing Clearance	0.0020-0.0040	0.0025-0.0045

	PREVIOUS CLEARANCE	REVISED CLEARANCE
Crankshaft Main Bearing	2.8765-2.8780	2.8765-2.8780
Crankshaft Main Bearing Journal	2.8745-2.8750	2.8735-2.8745
Diametric Bearing Clearance	0.0020-0.0030	0.0030-0.0035

Increased Oil Flow

The size of the oil passages throughout the lubrication system were increased to provide higher oil flow rates under all lubrication conditions. This change insures increased oil flow and improved bearing lubrication under all conditions of oil dilution. The following changes were implemented to provide increased oil flow:

1. The diameter of the oil supply hole in the pump end bearing head which feeds the motor end bearing was increased from 5/16" to 7/16".

2. The main oil supply passage diameter in the crankshaft was increased from 5/16" to 3/8".

3. The diameter of the connecting rod crankpin feed holes was increased from 1/8" to 3/16" and are now drilled through the crankshaft crankpin journal.

These changes resulted in a reduced net oil pressure to approximately 50-60 psig because of the reduced restriction in the lubrication system. This lower net oil pressure still leaves the compressor with adequate oil pressure for operation of the unloaders.

Oil Return

The oil return system of all Model "E" compressors was changed to replace the oil return check valve with a stand pipe and to replace the cylinder bank oil drain check valves with orificed plugs.

The use of orifice plugs instead of check valves between the crankcase and suction chamber provides more positive venting to keep the pressure in the crankcase at a lower pressure than the motor barrel. (See Figure 1). The flow of suction gas from the motor barrel cavity to the suction chamber causes a corresponding pressure drop, with the pressure in the suction chamber being lowest. Normal compressor crankcase pressure will be approximately 2" W.C. lower than the motor barrel pressure at minimum load to approximately a 5" W.C. differential at full load.

The stand pipe prevents oil migration from the crankcase to the suction chamber (motor barrel) during the compressor off cycle.

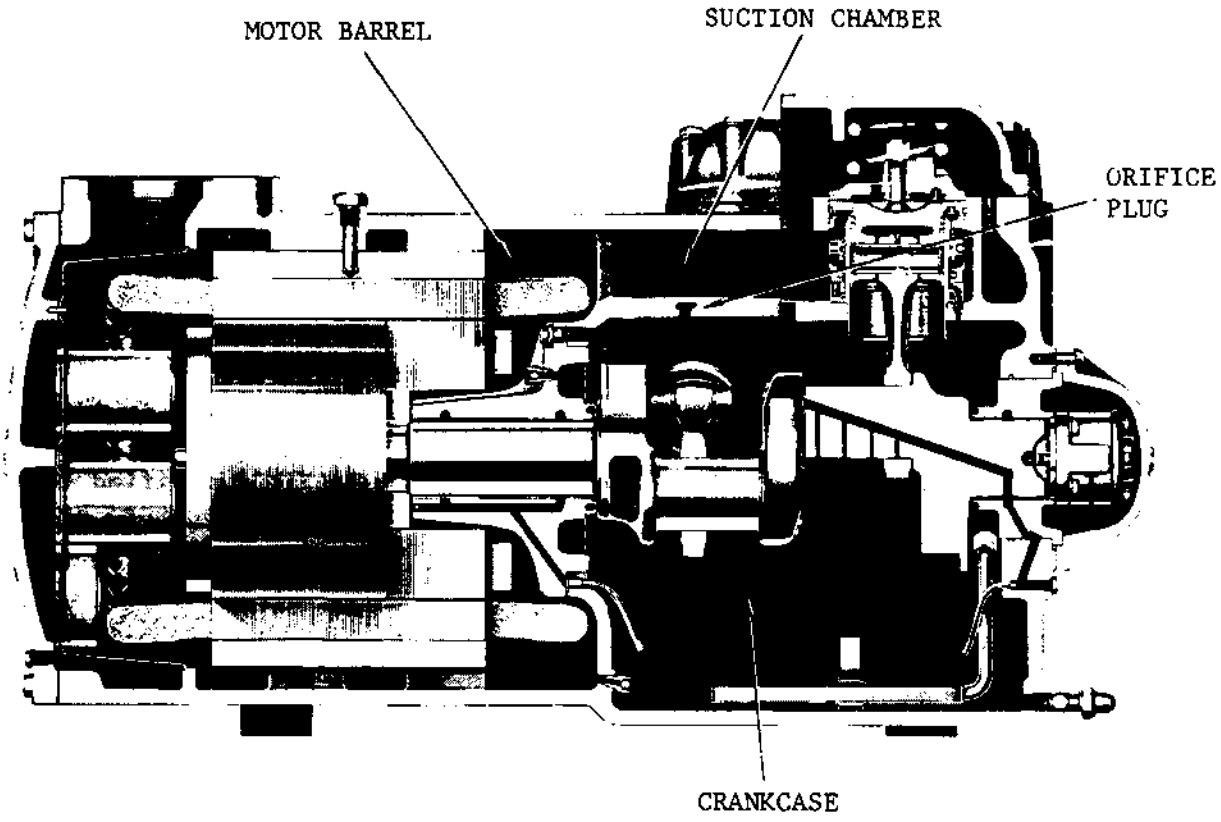

FIGURE 1

NEW PRODUCTION

The changes can be identified by the design designator in the serial number.

Model "E"	Change	Design Designator	Approx. Changeover Date
All	Improved Oil Pump	U	March, 77
E-4,5,6,cyl.	Cyl bank & check valve removed Orifice & tube assy. added	V	Feb., 78
All	Con rod crankpin bore diameter change	W	Feb., 78
All	Crankshaft oil feed holes increased and drilled through	Y	June, 78

EXAMPLE: S/N G 8 J 0 6 Y 7 6 1

Motor manufacturer — G

Year of Production — 8

Month of Year — J

Number of Cyliners — 06

Design Designator — Y

Production Sequence — 761

FIELD CONVERSION:

Whenever Model "E" compressors are dismantled for scheduled inspection and overhaul or when subjected to abnormal operating conditions which may result in refrigerant dilution of the oil, the compressors may be field modified to modernize the lubrication system. The conversion procedure is discussed below:

Oil Return Modification

On the Hermetic Compressor, the oil return check valve should be removed and replaced with an oil stand pipe tube assembly and street elbow (See Figure 2). The two upper ball check valves should also be replaced with oil drain orifices (See Figure 3).

On the Open Compressor, the oil return check valve should be removed and replaced with a street elbow and coupling half union. The two upper ball check valves should also be replaced with oil drain orifices (See Figure 3).

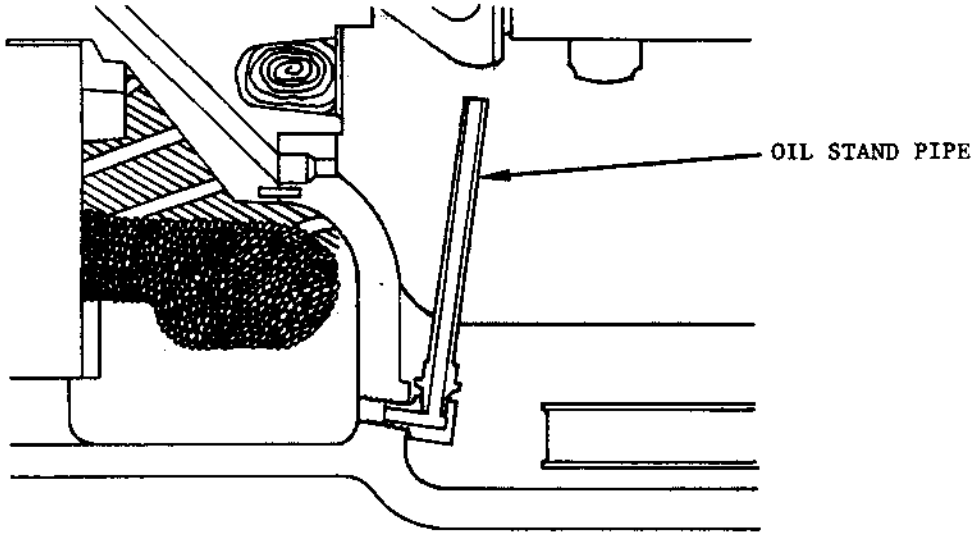

FIGURE 2

Figure 2 illustrated the oil stand pipe for Model E Hermetic only. The open version has a 1/2" coupling and elbow located closer to the crankshaft.

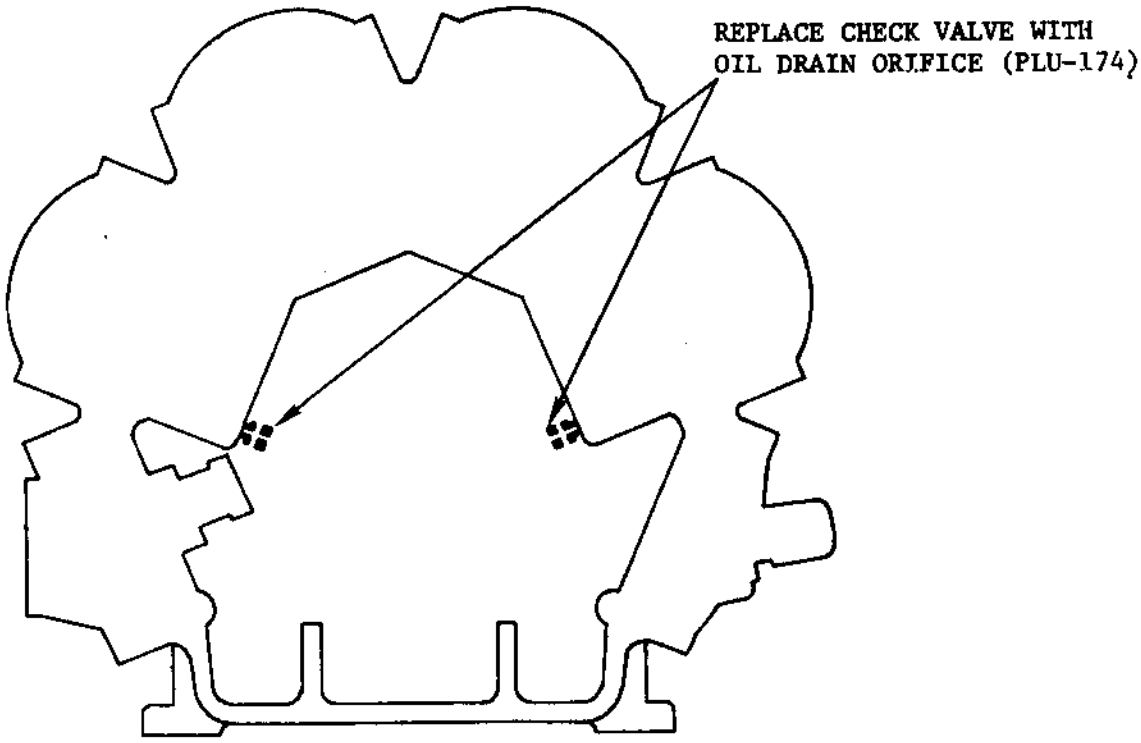

FIGURE 3

Crankshaft Crankpin Oil Feed Holes

When rebuilding previous design sequence compressors, oil feed holes should be drilled through the crankshaft (See Figure 4). This can be accomplished with an industrial high speed drill bit. Use the present oil feed holes in the crankshaft as pilot holes. Drill the holes through with a 1/8" drill then redrill with a 3/16" drill. After the holes have been drilled through, break and smooth the oil feed holes with a 45° chamfer using a countersink drill or equivalent. After the drilling has been completed, lightly polish the crankshaft journal with crocus cloth to remove any burrs or nicks. Remove the magnetic plugs and wash the crankshaft with solvent, then blow out any filings that remain in the oil feed passages with compressed air or nitrogen.

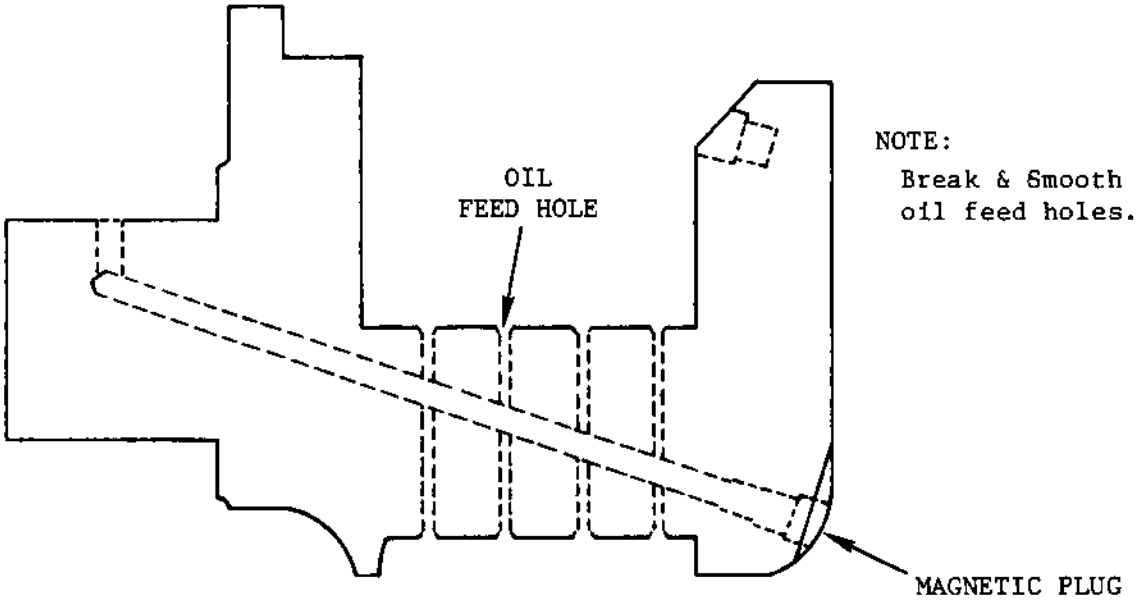

FIGURE 4

PARTS ORDERING INFORMATION:

This design change does not affect part interchangeability.

Hermetic Compressor

Street elbow	ELL-125	1 required
Tube assembly	PIP-164	1 required
Oil drain orifice	PLU-174	2 required

Open Compressor

Street elbow	ELL-125	1 required
Coupling half union	ADP-12	1 required
Oil drain orifice	PLU-174	2 required