Component

Maintenance

Manual

with

Illustrated Parts List

for

Z12-8900-SERIES

Motor-Compressor Assembly

Record of Revision

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Z12-8900 COMPONENT MAINTENANCE MANUAL

List of Effective Pages and Table of Contents

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1.0 INTRODUCTION

1.1 This Component Maintenance Manual provides information on the maintenance, maintenance schedules and repair and replacement of parts.

1.2 Refer to the Illustrated Parts List (IPL) in Section 5 when using this manual or ordering replacement parts. Parts are identified in parenthesis (FIG-ITEM NO.).

1.3 This Motor-Compressor Assembly (MC) is part of a vapor cycle air conditioning system. The refrigerant is HFC-134a commonly referred to as R134a. The compressor has a lubricant reservoir which is serviced with 14 ounces of Poloyl Ester (P.O.E.) synthetic oil.

2.0 SPECIAL TOOLS AND EQUIPMENT

2.1 TOOLS: The following special tools are required to perform the maintenance described in this manual.

ITEM	SOURCE
Dip, Stick, Compressor Oil	Refer to 3.2.2.1.
Belt deflection gauge.	Commercially available.
Leak Detector, for HFC-134a	Commercially Available.
Power Supply capable of 28VDC, 50 Amps	Commercially Available.
Refrigerant Recovery/Recycle equipment meeting SAE J1990 or J2209 specifications.	Commercially Available.
Manifold Gauge Set, R-134a, with automotive service connections.	Commercially Available.
Refrigeration Vacuum Pump.	Commercially Available.
Scale with 0.1 lb. increments (minimum).	Commercially Available.

2.1.2 Refer to applicable ZEE SYSTEMS Service Letter(s) for any additional special tools which may be required to service the air conditioning system.

2.2 MATERIALS: The following material may be required to perform maintenance described in this manual.

ITEM	SOURCE
MS20995C25 Lock Wire	Commercially Available.

MS20995C32 Lock Wire	Commercially Available
Refrigerant, HFC-134a	Commercially Available.
Lubricant, Refrigeration, Lubrizol 2916 Castrol SW100, Icematic Alternate P/N:431756C any Poloyl Ester (P.O.E.) refrigerant oil with ISO of 100 or 150.	Commercially Available.
Liquid Detergent, water soluble	Commercially available.
Cloth, lint free	Commercially available.
Tape, Insulation,	Commercially available.

3.0 REPAIR AND REPLACEMENT OF COMPONENTS

CAUTION

AIR CONDITIONING SYSTEM UNDER PRESSURE. APPROPRIATE SAFETY MEASURES SHOULD BE TAKEN WHEN SERVICING THIS EQUIPMENT. ONLY TRAINED PERSONNEL WITH APPROVED SAFETY EQUIPMENT SHOULD PERFORM SERVICING DUTIES.

NOTE

IT IS UNLAWFUL TO RELEASE R-12 OR OTHER REFRIGERANTS TO THE ATMOSPHERE. USE APPROVED RECOVERY/RECYCLE EQUIPMENT TO CAPTURE REFRIGERANTS. USE ONLY LAWFUL MEANS TO DISPOSE OF RECOVERED REFRIGERANTS. CHECK WITH LOCAL AGENCIES FOR APPROVED DISPOSAL PROCEDURES.

NOTE

CAP ALL OPEN LINES TO PREVENT CONTAMINANTS AND MOISTURE FROM ENTERING THE SYSTEM.

NOTE

DUE TO THE TIGHT FIT OF THE MOTOR COMPRESSOR CONDENSER ASSY IT MAY BE NECESSARY TO REMOVE THE MOTOR COMPRESSOR CONDENSER ASSY AND THE EVAPORATOR TO PERFORM SOME OF THE MAINTENANCE DESCRIBED BELOW.

3.1 DRIVE BELT (1-34)

3.1.1 REMOVAL. Extreme care should be taken during maintenance not to strike or use pullers directly against the hardened (black or grey) area of these pulleys as this may crack or chip the anodized surface.

3.1.2 Belt (1-34): Loosen the four bolts (1-19) on the compressor plate, then loosen the adjusting bolt (1-33). Slide the compressor toward the motor and remove the belt from the compressor pulley first then the small pulley on the motor.

3.1.2 INSPECTION: Inspect each belt for deterioration, damage and fraying. Replace defective belts.

3.1.3 INSTALLATION: Always place the belt over the smaller diameter pulley first then carefully slide the belt over the larger diameter pulley. Care should be taken to not tear the edges of the belts. Place belt loosely over the pulleys.

3.1.3.1 Tighten the adjusting bolt (1-33)to bring the compressor away from the motor. Tighten the belt to obtain a .12 to .18 deflection with 3-4 lbs. pressure midway between the pulleys. Once the belt is adjusted properly, tightened the four bolts (1-19).

3.1.3.2 Check the belt alignment before running the motor. Turn the compressor pulley by hand to see that belts are properly aligned. Slight striking of the belt against the rim on the small motor pulley is normal but not to the point where chafing occurs. Readjust belts if necessary. Next run the motor and check for smooth operation. If a belt hops or flutters it is too loose. If the belt is too tight against the pulley rim a discharge of fine dust like rubber particles will occur. Check the condition of the smaller pulley rim and readjust belt as necessary.

3.1.5.3 Once a drive is properly adjusted no further maintenance should be required.

3.2 COMPRESSOR (1-11) Refer to SZ206 for repair instructions for the compressor.

3.2.1 REMOVAL: Remove belt (see 3.1.1). Remove the four bolts (1-19) and the adjusting bolt (1-33) and lift the compressor (1-11) and plate (1-9) from the channel assemblies (1-12, 1-13). Separate the compressor from the base plate by loosening and removing the three bolts (NS-10). To remove the pulley (1-7) loosen, but do not completely remove bolt (1-20) and washer (1-1). Evenly pry between the compressor boss and the pulley hub until the pulley is free. Now remove the bolt (1-20), washer (1-1) and pulley (1-7) and set aside to be installed on new compressor.

3.2.2 INSPECTION: Check for signs oil leakage around the fittings.

3.2.2.1 Check oil level. Fashion an oil dip stick from any soft metal bar or rod stock approximately 9-1/4" long. Bend metal as shown in Illustration 1 below. Remove the oil fill plug on top of the compressor, take care not damage the O-ring. Place the dip stick in the opening, make sure the dip stick goes in past the crankshaft and pistons. Minimum oil depth is 13/16"; full is 1-5/8". Refer to Section 6.0 for correct oil level for your system and add oil as necessary. Return and tighten oil fill plug.

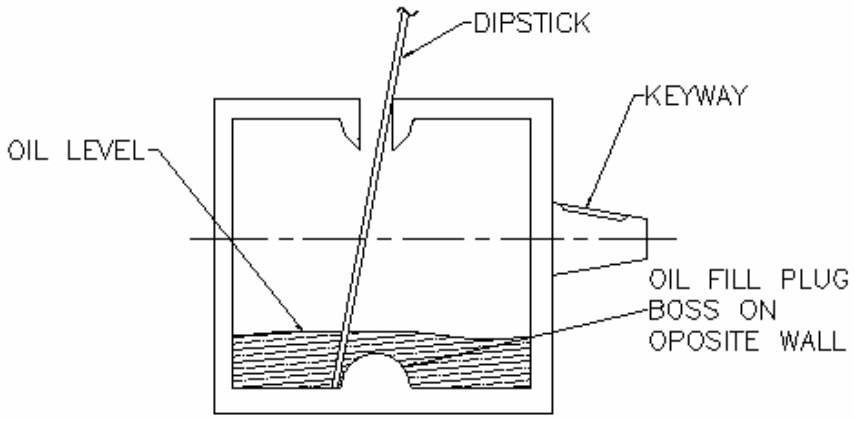

ILLUSTRATION 1.

3.2.3 PULLEY INSTALLATION: Place the pulley on the new compressor and align on the shaft key. Using a block of wood, lightly tap the pulley on the compressor shaft. Take care not to damage pulley or strike tooth rim area. Place washer (1-1) and bolt (1-20) in place and torque to 20 foot-pounds, secure with .032 diameter lock wire screw (1-21).

3.2.4 BASE PLATE REASSEMBLY: Attach the compressor plate (1-9) to the compressor using the three bolts (NS-10), torque to 45 foot-pounds.

3.2.5 INSTALLATION: Set the assembled compressor and base plate (see 3.2.3 and 3.2.4) on the channel assemblies (1-12,1-13) and start the bolts and washers (1-19, 1-29). Install belt in accordance with Section 3.1.3.

3.3 MOTOR, COMPRESSOR DRIVE (1-8) For other than brush replacement send this motor to a qualified repair shop.

3.3.1 REMOVAL: Disconnect the positive and negative leads to the motor. Remove the belt (see 3.1.1)

3.3.1.1 Remove the four bolts (1-19). If it is necessary to remove the motor pulley (1-5) hold the pulley with a spanner wrench and loosen and remove hardware (1-22, 1-26). If it is necessary to remove the base (1-2), first note the alignment and spacing of the motor to the base and the straps (1-3) for re-assembly. Loosen and remove the four locknuts (1-16). Slide the straps from the base and remove the motor from the base.

3.3.2 INSPECTION: Refer to Service Letter 58-001 for brush inspection information.

3.3.3 INSTALLATION: If the motor was removed from the base slide the motor (1-8) and straps (1-3) into the base (1-2). Position and align the motor on the base and attach and tighten the hardware (1-16, 1-29).

3.3.3.1 Place the motor and base unit on the motor plate (1-15). Attach and tighten the four mounting bolts (1-19), washer (1-29) and locknuts (1-18) and torque to 45 foot-pounds.

3.3.3.2 Attach the motor pulley (1-5). Using a spanner wrench hold the motor pulley and tighten the hardware (1-22, 1-26).

3.3.3.3 Install and adjust the belt (3.1.3).

4.0 SERVICING - REFRIGERANT CHARGE

CAUTION

AIR CONDITIONING SYSTEM UNDER PRESSURE. APPROPRIATE SAFETY MEASURES SHOULD BE TAKEN WHEN SERVICING THIS EQUIPMENT. ONLY TRAINED PERSONNEL WITH APPROVED SAFETY EQUIPMENT SHOULD PERFORM SERVICING DUTIES.

NOTE

IT IS UNLAWFUL TO RELEASE R-12 OR OTHER REFRIGERANTS TO THE ATMOSPHERE. USE APPROVED RECOVERY/RECYCLE EQUIPMENT TO CAPTURE REFRIGERANTS. USE ONLY LAWFUL MEANS TO DISPOSE OF RECOVERED REFRIGERANTS. CHECK WITH LOCAL AGENCIES FOR APPROVED DISPOSAL PROCEDURES.

NOTE

CAP ALL OPEN LINES TO PREVENT CONTAMINANTS AND MOISTURE FROM ENTERING THE SYSTEM.

4.1 CHARGING INSTRUCTIONS. are basically the same for R-12 (Freon) and CFC-free R-134a refrigerant. However, a sight glass is not used to determine adequate refrigerant charge for R-134a. R-134a systems are charged to a predetermined amount (by weight) of refrigerant. See Section 2.1 and 2.2 for required equipment and materials to service the air conditioning system.

4.1.1 On new installations or whenever the refrigerant has been evacuated from the air conditioning system the oil in the compressor must be checked and replenished as necessary. Check the oil at 100 hours of system operation. Thereafter, check the oil every 500 hours of operation. DO NOT add oil to the refrigerant.

NOTE

REFER TO SERVICE EQUIPMENT MANUFACTURERS INSTRUCTIONS. SOME EQUIPMENT MAY COMBINE FUNCTIONS.

4.1.2 Evacuate the system for a minimum of four hours ***anytime*** the system has been opened to atmosphere. If the system has been opened for component replacement or in high humidity the receiver-dryer should be replaced and the system evacuated for a minimum of 8 hours.

4.1.3 Weigh the refrigerant bottle.

CAUTION

NEVER INVERT THE REFRIGERANT BOTTLE SO THE DISCHARGE VALVE IS ON THE BOTTOM. THE REFRIGERANT BOTTLE MUST BE KEPT UPRIGHT TO PERMIT OF GAS ONLY INTO THE COMPRESSOR. INVERTING THE BOTTLE WILL PERMIT LIQUID TO ENTER THE COMPRESSOR RESULTING POSSIBLE COMPRESSOR DAMAGE. THIS PRACTICE WILL VOID COMPRESSOR WARRANTY.

4.1.4 Static Charge: Shut OFF valve in the manifold set. Attach the manifold line to the refrigerant bottle. Attach the High side manifold line to the Pressure side Service Port and the Low side manifold line to the Suction side of the system.

4.1.5 With motor OFF, OPEN the High Pressure and Low Pressure manifold valve. Allow the system to take a static charge. When the pressures equalize or if the maximum charge weight is achieved CLOSE both the High and Low pressure valves at the manifold.

4.1.6 Using a leak detector check for leaks. Correct any problems. Perform 4.1.4 and 4.1.5 until a tight system with no leaks is achieved.

4.1.7 With the High and Low pressure manifold valves CLOSED, turn ON the compressor motor and evaporator blowers. OPEN only the **Low** pressure manifold valve until the Manifold gauge reads 30-40 pounds pressure.

4.1.7.1 Keep close watch on the scale and when the target weight is reached immediately CLOSE the Low pressure manifold valve.

4.1.8 Disconnect the servicing equipment. Replace the High side (red), Low side (blue) service port caps and back seat valve caps.

4.2 TOPPING OFF: To top off the charge check the refrigerant charge by running the system with an ambient air temperature of at least 80F.

4.2.1 Place a temperature measuring device to read the ambient air temperature entering the condenser.

4.2.2 Connect the High side manifold line to the Discharge pressure port. Connect the Low side manifold line to the Suction port.

4.2.3 Using the TEMPERATURE-PRESSURE CHART, ILLUSTRATION 2. convert the High side pressure reading into temperature.

4.2.4 Calculate the Temperature Difference (TD) by subtracting the air inlet temperature from the temperature determined in 4.3.3. The TD should be less than 30F. If the TD is higher than 30F the system is overcharged or there is an obstructed air flow over the condenser.

4.2.4.1 If the system is overcharged remove refrigerant using recovery equipment by approved methods.

4.2.4.1 If the TD is less than 20F open the Low side manifold until the gauge reads 30-40 PSIG. Continue to charge until the TD is 25F.

4.2.5 When service is complete disconnect the service hoses and replace the High side (red), Low side (blue) service port caps and back seat valve caps.

4.3 INSPECTION: With the system running check for leaks, proper belt alignments, vibration, and high current draw.

TEMP F	R-134a PRESSURE	TEMP F	R-134a PRESSURE
50	45.5	100	124.3
52	47.7	102	128.5
54	50.1	104	132.9
56	52.3	106	137.3
58	55.0	108	142.8
60	57.5	110	146.5
62	60.1	112	151.3
64	62.7	114	156.1
66	65.5	116	161.1
68	68.6	118	166.1
70	71.2	120	171.3
72	74.2	122	176.6
74	77.2	124	182.0
76	80.3	126	187.5
78	83.5	128	193.1
80	86.8	130	198.9
82	90.2	132	204.7
84	93.6	134	210.7
86	97.1	136	216.8
88	100.7	138	223.0
90	104.4	140	229.4
92	108.2	142	235.8
94	112.1	144	242.4
96	116.1	146	249.2
98	120.1	148	256.0
		150	263.0

ILLUSTRATION 2.

5.0 SERVICE SCHEDULES

5.1 MAINTENANCE SCHEDULE

ITEM DESCRIPTION	INSPECTION INTERVAL *	R&R/T.B.O. HRS
Z12-8900 M-C	FIRST 100 HRS* AFTER OH OR NEW - CHECK OIL LEVEL, REPLENISH AS NECESSARY.	2500
	EVERY 250 HRS* - INSPECT FOR LOOSE, DAMAGED ITEMS. CHECK FOR AND REMOVE ANY DEBRIS OR OBSTRUCT-IONS TO THE CONDENSER COILS. CHECK FOR SIGNS OF OIL LEAKS. BELT CONDITION AND ALIGNMENT OF PULLEYS.	
DRIVE BELT**	EVERY 250 HRS* - INSPECT AS PER SECTION 3.1.2	800
MOTOR **	EVERY 1000 HRS* - INSPECT AS PER SECTION 3.3.2 AND SERVICE LETTER 58-001.	1500
COMPRESSOR**	AFTER THE FIRST 100 HOURS - INSPECT AS PER SECTION 3.2.2.1	
	EVERY 500 HRS - INSPECT AS PER SECTION 3.2.2	1500

* UNIT OPERATING TIME

** COMPONENT IS PART OF THE M-C

6.0 TOLERANCES

6.1 COMPRESSOR OIL. The minimum compressor oil depth is 13/16" (20mm). The Maximum is 1-5/8” (41mm). Replenish as necessary.

6.2 REFRIGERANT CHARGE. Refrigerant charge target weight of R-134a into a dry system varies. Consult installers maintenance instructions.

6.3 BRUSH LENGTH, COMPRESSOR DRIVE MOTOR. The minimum brush length on the drive motor is 0.750" (19mm). Refer to SIL 58-001.

6.4 TORQUE VALUES. Use standard torque values for bolts. Refer to Manual SZ206 for torque values and torque sequence for the compressor.

7.0 TROUBLE SHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Compressor Motor trips circuit breaker.	Motor shorted. Motor brushes worn beyond limits.	Replace Motor.
Compressor Motor trips current limiter.	Short in wiring.	Check wiring to motor, repair as required.
Compressor Motor inoperative.	Motor open. Motor brushes worn beyond limits.	Replace Motor.
	Short in wiring.	Check wiring to motor, repair as required.
Excessive vibration at Motor/Compressor.	Improper belt tension.	Adjust belt to correct tension.
	Worn, damaged or loose or over tightened mounts.	Adjust or replace mounts.
Quick refrigerant loss.	Open in system.	Check compressor head gasket. Check Hoses or tubing for holes. Check connections. Replace defective component. Service system
Defective O-Ring.	Replace defective O-Ring. Service system	
	Loose connections.	Tighten connections. Service system
Slow refrigerant loss.	Loose connections.	Tighten connections. Service system

8.0 ILLUSTRATED PARTS LIST

8.1 EXPLANATION OF SYMBOLS:
ALT - The Part Number shown is an approved alternate, either part number may be used.
MOD "X" Refers to modification information of this part as applicable to this assembly.
NP - Not Procurable individually, see next higher assembly.
NS - Not Shown
OBS - Obsolete
USAGE/QTY - This identifies parts used on specific applications (not common to all units). If no code is noted the item is used on all units.
.. - Part of higher assembly.
*/# - See explanation at end of parts list.

FIG-ITEM		*PART NUMBER*	*NOMENCLATURE*		*QTY*	*USAGE*
		Z12-8900-1	MOTOR COMPRESSOR CONDENSER ASSY			A
		Z12-8900-2	MOTOR COMPRESSOR CONDENSER ASSY			B
1	-1	SZ37-014-3	WASHER		1	
1	-2	SZ38-004-3	BASE, MOTOR		1	
1	-3	SZ38-010-1	STRAP		2	
1	-4	SZ41-019-5	SPACER		1	
1	-5	SZ43-008-3	PULLEY, MOTOR		1	
1	-6	SZ44-008-5	BAR		1	
1	-7	SZ43-013-3	PULLEY, COMPRESSOR		1	
1	-8	SZ58-003-1	MOTOR ASSY, COMP. DRIVE		1	
1	-9	SZ58-009-3	PLATE, COMPRESSOR		1	
NS	-10	SZ58-440-1	BOLT		3	
1	-11	SZ84-913QJ-1	COMPRESSOR		1	
		*-SCF206T-21905	COMPRESSOR			
1	-12	Z12-325-1	CHANNEL ASSY		1	
1	-13	Z12-325-2	CHANNEL ASSY		1	
1	-14	Z12-326-1	CHANNEL		2	B
1	-15	Z12-327-1	PLATE, MOTOR		1	
1	-16	AN365-524A	LOCKNUT	ALT: MS21044N5	4	
1	-17	AN364-624A	LOCKNUT	ALT: MS21083N6	1	
1	-18	AN364-820	LOCKNUT	ALT: MS21083N8	4	A
					12	B
1	-19	AN5-5A	BOLT		8	A
					16	B
1	-20	AN5H5A	BOLT		1	
1	-21	AN501A10-6	SCREW	ALT: MS35266-61	1	
1	-22	AN6-6A	BOLT		1	
1	-23	AN6-10A	BOLT		4	

1	-24	AN935-416	WASHER, LOCK ALT: MS35338-44	3	
FIG-ITEM		***PART NUMBER***	***NOMENCLATURE***	***QTY***	***USAGE***
1	-25	AN935-516	WASHER, LOCK ALT: MS35338-45		
1	-26	AN935-616	WASHER, LOCK ALT: MS35338-46	3	
1	-27	AN960-416L	WASHER, FLAT ALT: NAS1149F0432P	3	
1	-28	AN960-516	WASHER, FLAT ALT: NAS1149FO532P		
1	-29	AN960-516L	WASHER, FLAT ALT: NAS1149F0532P	24	A
				8	B
1	-30	AN960-616L	WASHER, FLAT ALT: NAS1149F0632P	8	
1	-31	NAS1352-4H-16P	SCREW	2	
1	-32	5/16 X3/4	WASHER, FLAT	4	
1	-33	1/4-20UNC-2A X 2.25	BOLT (ANSI)	1	
1	-34	240L100	BELT	1	
NS	-35	SZ96-031-3	SWITCH ASSY	1	
NS		MS20995C25	LOCK WIRE	AR	

* Use this part number to order replacement compressor without fittings.

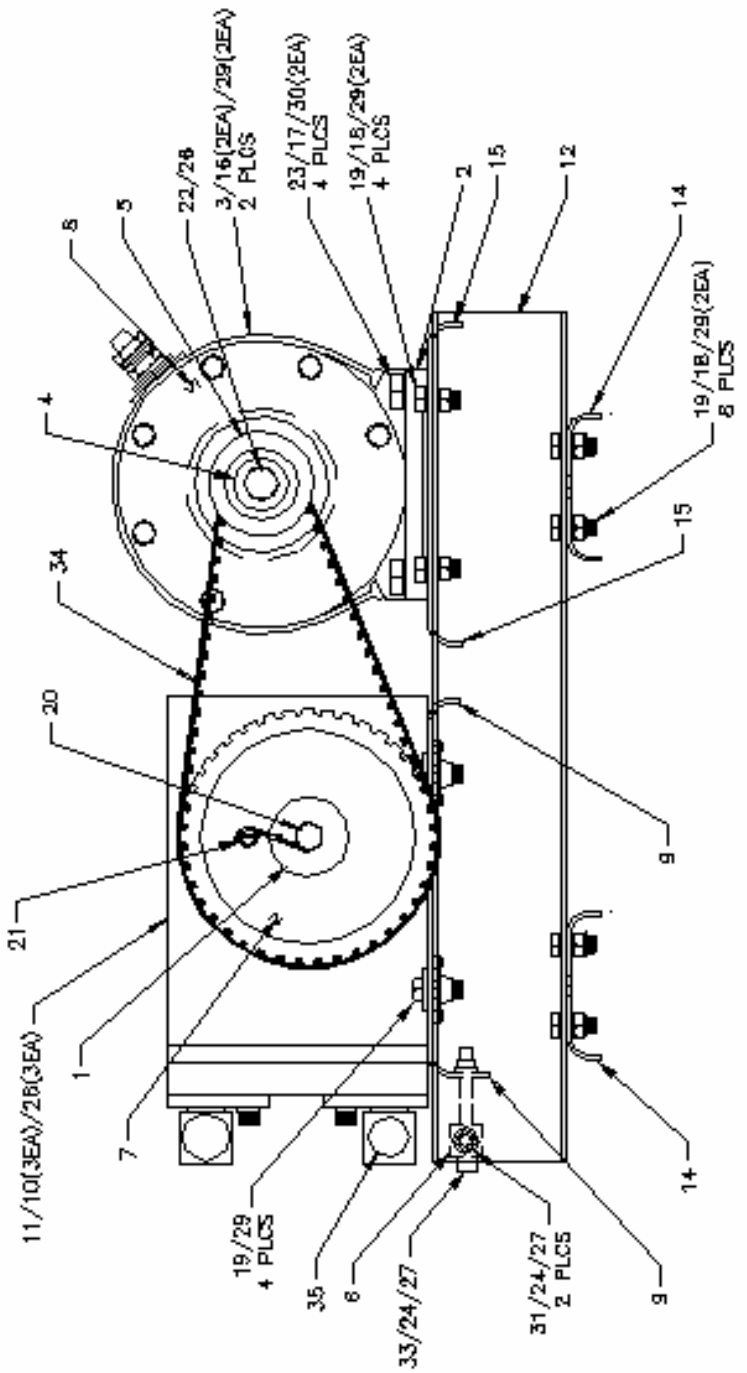
3/16(2EA)/29(3EA)
2 PLCS
22/26
23/17/30(2EA)
4 PLCS
19/18/29(2EA)
4 PLCS
19/18/29(2EA)
8 PLCS
11/10(3EA)/26(3EA)
19/29
4 PLCS
31/24/27
2 PLCS
33/24/27

FIG. 1