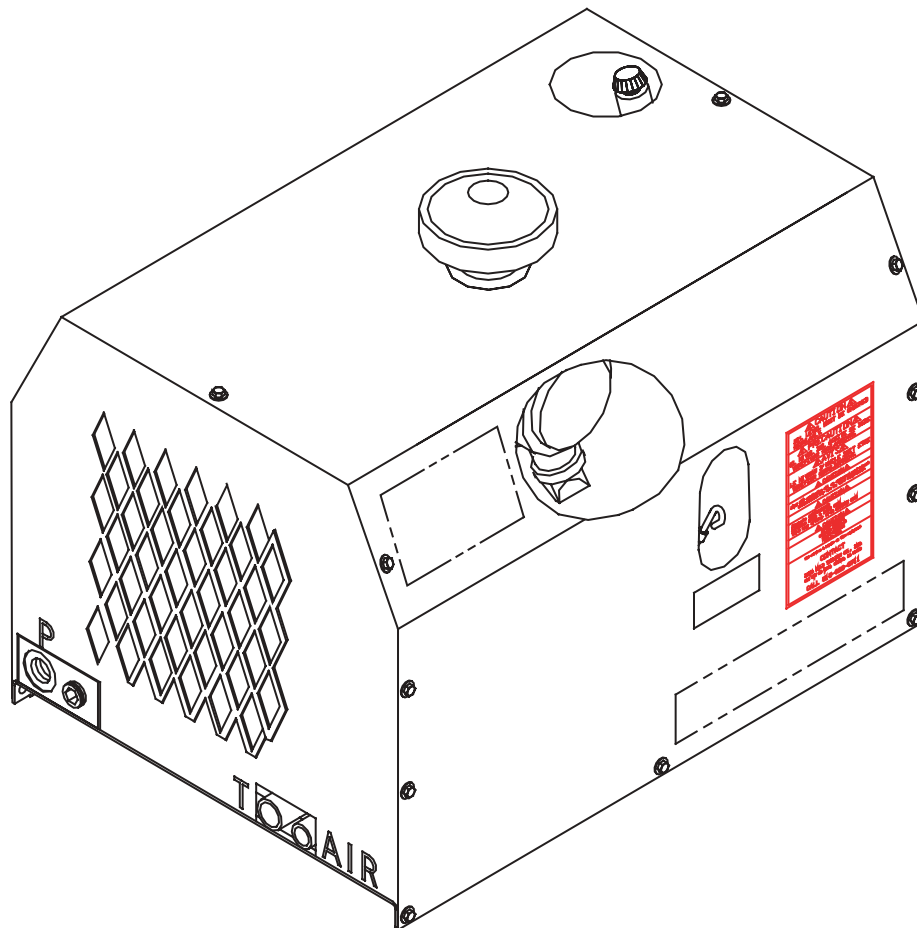




CAS435HA Air Compressor

(PART NO. 20013)

(Single Cooler - 10GPM)



IOWA MOLD TOOLING CO., INC.

BOX 189, 500 HWY 18 WEST, GARNER, IA 50438

TEL: 641-923-3711

MANUAL PART NUMBER 99901219

Iowa Mold Tooling Co., Inc. is an Oshkosh Corporation company.

REVISIONS LIST

DATE	LOCATION	DESCRIPTION OF CHANGE
20000731	4-10	I2 70395091 WAS 73095091 ID DECAL
20010925	4-2	EN-1365 - CHANGED BLOCK TO 301996, SOLENOID TO 301997, VALVE TO 301998
	4-3	UPDATED ITEMS M6, M11, M24, M25
	4-4	M46 WAS 90° F ELBOW, IS NOW ELBOW 3/4JIC X 3/4NPT
	4-5	UPDATED DRAWING
	4-7	EN-1369 - CHANGED BOLTS TO SS STAR DRIVE 1/4-20x3/4, ADDED 1/4 SS WASHER
	4-9	ADDED DRAWING NO. TO BOM
	4-10	ADDED AIR, HYDRAULIC TANK, HYDRAULIC PRESSURE DECALS
	4-11	NEW HYDRAULIC INSTALLATION KIT DRAWING, BOM
20020328	Section 4	UPDATED, IMPROVED DRAWING QUALITY
20030715	4-10	ADDED DECAL KIT NUMBER TO DECAL PLACEMENT DRAWING
20040408	4-5	ADDED "M" TO ITEM #66, RUBBER CAP
20050630	4-9 through 4-14	ECN 9835 - UPDATE CONNECTIONS ON 99901281, ADD HARNESS 304710, ADD CONNECTOR CHART, ADD 99903712
	6-1 through 6-8	REMOVED RELAY BOARD SECTION - OUTDATED
20061127	4-4,5	ADDED ITEM 67 - 70392665 - RUBBER COUPLING TO 20056-2 PARTS LIST, 20056-3 DRAWING
20070405	Throughout	ECN 10421-MANUAL TITLE CHANGED TO CAS435HA

PRECAUTIONS

Read before operating your compressor!

 <p>71393886</p>	<div style="background-color: red; color: white; padding: 5px; text-align: center;">  DANGER </div> <p>EXPLODING TANK WILL CAUSE DEATH, SERIOUS INJURY OR PROPERTY DAMAGE</p> <ul style="list-style-type: none"> ● Drain air tank after each use to prevent moisture build-up and corrosion which leads to tank failure. ● Assure that tank and compressor relief valves work properly, and are at correct pressure settings. ● DO NOT modify or repair air tank. ● NEVER drive vehicle with pressure in air tank.
---	---



Failure to follow operating and maintenance procedures as outlined in this manual could result in equipment damage, personal injury or death. Follow all maintenance procedures and intervals.



Do not use air from this compressor for breathing or food processing. Air from this compressor will cause severe injury or death if used for breathing or food processing.



Maintenance must be performed only by trained and qualified personnel, using correct tools, specified torques and approved replacement parts.



Hot oil under pressure can cause severe injury or death. Shut down, let cool and relieve pressure in compressor before servicing.



All electrical components and cable wiring must be installed and grounded in accordance with NFPA, national electrical codes and applicable state and local codes.



Do not overfill the compressor with oil. Use correct quantity of manufacturer's lubricant. Repair leaks and clean spills immediately.



Before removing guards or servicing the compressor, disconnect all power supplies. Display warning signs and lock out electrical circuits.



Compressors generate high temperatures. Do not touch or otherwise come in contact with hot surfaces. Doing so can cause severe personal injury.



All guards must be in position and secure before and during operation.

TABLE OF CONTENTS

PARA	TITLE	PAGE
SECTION 1. INTRODUCTION AND SPECIFICATIONS		
1-1.	INTRODUCTION	1-1
1-2.	ORDERING REPAIR PARTS	1-1
1-3.	GENERAL INFORMATION	1-1
1-4.	SPECIFICATIONS	1-1
SECTION 2. INSTALLATION		
2-1.	GENERAL	2-1
2-2.	PTO AND PUMP INSTALLATION	2-1
2-2-1.	PTO INSTALLATION	2-1
2-2-2.	DRIVELINE AND PUMP INSTALLATION	2-2
2-3.	COMPRESSOR INSTALLATION	2-2
2-4.	DRIVELINE INSTALLATION TECHNIQUES	2-3
2-4-1.	U-JOINT OPERATING ANGLES	2-3
2-4-2.	SINGLE PLANE AND COMPOUND U-JOINT OPERATING ANGLES	2-3
2-4-3.	ELIMINATING COMPOUND ANGLE INDUCED VIBRATION	2-4
2-4-4.	ANGLE SIZE	2-5
SECTION 3. OPERATION		
3-1.	GENERAL	3-1
3-2.	OPERATION	3-1
SECTION 4. MAINTENANCE & PARTS		
4-1.	GENERAL	4-1
	ROUTINE MAINTENANCE CHECKLIST	4-1
	OIL COOLING SYSTEM..... 200057	4-2
	COMPRESSOR MOUNTING SYSTEM	4-3
	COMPRESSOR ASSEMBLY	4-4
	COMPRESSOR ASSEMBLY	4-5
	COMPRESSOR ASSEMBLY	4-6
	CANOPY SYSTEM.....	4-7
	COMPRESSOR WIRING DIAGRAM	4-8
	INSTALLATION KIT	4-9
	DECAL PLACEMENT	4-10
	HYDRAULIC INSTALLATION KIT	4-11
	DRIVELINE MOUNTING OPTION	4-12
	REPAIR KITS	4-12
SECTION 5. REPAIR		
5-1.	GENERAL	5-1
5-2.	PISTON RING REPLACEMENT	5-1
5-3.	OIL PUMP REPLACEMENT	5-2
5-4.	CRANKSHAFT AND BEARING REPLACEMENT	5-2
5-5.	TROUBLESHOOTING	5-4
SECTION 6. RELAY BOARD OPERATION		
6-1.	INTRODUCTION	6-1
6-2.	OPERATION	6-1
6-2-1.	IGNITION "ON"	6-1
6-2-2.	REMOTE STARTING THE VEHICLE	6-1
6-2-3.	REMOTE ENGINE STOP	6-1
6-2-4.	REMOTE ENGINE SPEED (FROM CRANE)	6-3
6-2-5.	COMPRESSOR ENGINE SPEED CONTROL (COMPRESSOR ONLY)	6-3
6-2-6.	ENGINE SPEED CONTROL (CRANE&COMPRESSOR USED SIMULTANEOUSLY)	6-3
6-3.	INSTALLATION	6-7

SECTION 1. INTRODUCTION AND SPECIFICATIONS

1-1. INTRODUCTION

This manual provides information on the installation, operation and repair of the IMT Model CAS435HA Hydraulic Air Compressor.

Three means are used throughout this manual to gain the attention of operating and service personnel. They are NOTES, CAUTIONS and WARNINGS and are defined as follows:

NOTE

A NOTE IS USED TO EITHER CONVEY ADDITIONAL INFORMATION OR TO PROVIDE FURTHER EMPHASIS FOR A PREVIOUS POINT.

CAUTION

A CAUTION IS USED WHEN THERE IS THE STRONG POSSIBILITY OF DAMAGE TO THE EQUIPMENT OR PREMATURE EQUIPMENT FAILURE.

WARNING

A WARNING IS USED WHEN THERE IS THE POTENTIAL FOR PERSONAL INJURY OR DEATH.

Operate this equipment with respect and service it regularly for a safer working environment and longer equipment life.

1-2. ORDERING INFORMATION

When placing orders or requesting assistance, refer to the information below:

1-3. GENERAL INFORMATION

The IMT CAS435HA air compressor is a single stage, air cooled, 4-cylinder, pressure lubricated, hydraulically driven unit, with a delivery rate of 35 CFM at 100 PSI.

CAUTION

OPERATING THE COMPRESSOR AT PRESSURES ABOVE 150 PSI WILL SHORTEN THE SERVICE LIFE AND VOID THE WARRANTY.

1-4. SPECIFICATIONS

Power Source	Hydraulic Motor
Bore	2-5/8"
Stroke	2-1/2"
Cylinder Configuration	V4
Dimensions	26-1/2"L x 19-1/8"H* x 19-3/4"W
Displacement	44 CFM**
Delivery	35 CFM**
Cooling	Air
Fan Diameter	14-1/8"
Operating Speed	1400 RPM maximum
Lubrication	Oil Pump
Oil Capacity	1-1/3 qts
Weight	200 lbs.
Reservoir requirement	12 Gallon minimum
Normal GPM @1400rpm	9.3 GPM
Normal Operating PSI	1850 PSI
Maximum PSI	2400 PSI

* Add 2-5/8" to height for air filter cap.

** @ 1400 RPM - 100 PSI

TO BE COMPLETED BY DEALER

CHASSIS INFORMATION	
TRANSMISSION MAKE:	MODEL:
PTO NUMBER:	PTO %:
COMPRESSOR AND HYDRAULIC PUMP INFORMATION	
COMPRESSOR MODEL:	SERIAL NUMBER:
PUMP MAKE:	MODEL:
RESERVOIR CAPACITY:	ENGINE RPM:

[illegible]

SECTION 2. INSTALLATION

2-1. GENERAL

This section pertains to the installation of the IMT CAS435HA compressor, PTO and pump. The instructions are intended as a guide to assist you with your particular installation. These instructions will provide only general information.

2-2. PTO AND PUMP INSTALLATION

The pump may either be installed directly on the PTO (see Figure B-1) or, as an optional method, it may be driven by a driveline (see Figure B-2).

2-2-1. PTO INSTALLATION

Power take-off manufacturers provide specific installation instructions for their products. Those instructions should be followed when installing a PTO. Check with the PTO manufacturer's representative for specific instructions regarding your particular make, model and year of vehicle. The following instructions are a guide in this application.

1. If the vehicle is new, drain the transmission oil into a clean container for reuse. If the vehicle is used, drain and dispose of the transmission oil properly.
2. Temporarily install the PTO with the proper gaskets and only two studs. Snug the PTO down and check the backlash for maximum allowance of .006" to .012". If the backlash is excessive, remove gaskets and check backlash again until it is corrected.

3. Remove the PTO and apply Permatex® to the gaskets. If the holes for the studs are tapped through the transmission housing, apply Permatex to the studs and tighten them down. Make certain that the studs do not interfere with the transmission gears.

CAUTION

AVOID CONTACT OF PERMATEX WITH TRANSMISSION FLUID.

Registered Trademark of Permatex Co., Inc., Kansas City, Kansas

4. Install the PTO and gaskets. Torque the nuts to 30 - 35 ft-lbs (4.14 - 4.84 kg-m) for a 6-bolt PTO and 45 - 50 ft-lbs (6.22 - 6.91 kg-m) for 8-bolt PTO's. Recheck the backlash.

5. Install the shifter cable to suit conditions. Always allow for a slight overshift on lever or knob to ensure the PTO is fully disengaged.

CAUTION

IT IS IMPORTANT THAT ADEQUATE SPACE BE ALLOWED FOR FULL ENGAGEMENT OF THE PTO. MODIFY THE EXHAUST OR OTHER OBSTRUCTIONS AS NEEDED.

CAUTION

AVOID SHARP BENDS IN THE SHIFTER CABLE. ALL BENDS SHOULD HAVE AT LEAST A 6" RADIUS. TIGHTER BENDS WILL CAUSE DIFFICULT OPERATION OF THE SHIFTER KNOB.

6. Replace the transmission oil. If the PTO is located below the transmission oil level, an additional quantity of oil will be required.

7. Start the engine, engage the PTO and check for proper PTO rotation. Allow it to run for 5 - 10 minutes. Check for leaks, unusual noise and proper operation.

8. Retorque the mounting bolts.

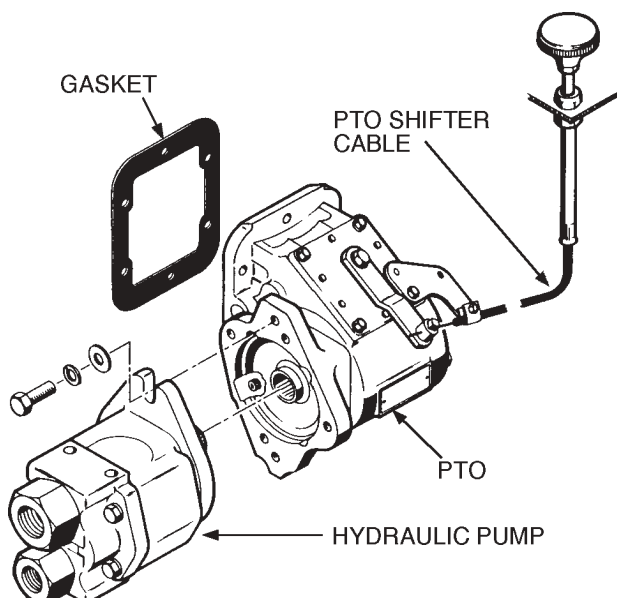


FIGURE B-1. PTO INSTALLATION

2-2-2. DRIVELINE AND PUMP INSTALLATION

The pump may be driven as shown in Figure B-2 as an optional method to the one shown in Figure B-1. The following steps are a guide in this application.

NOTE

BEFORE INSTALLING DRIVELINE, REFER TO PARAGRAPH 2-4 FOR PROPER DRIVELINE INSTALLATION TECHNIQUES.

1. Install the PTO (refer to Paragraph 2-2-1).
2. Loosely bolt the pump mounting bracket (A) to the adjustable bracket (B) in Figure B-2.
3. Bolt the adjustable bracket to the frame at a point that will not exceed 48" (122cm) from the PTO and will not cause a joint angle greater than 3°.
4. Check the pump rotation and install pump, pump end yoke and PTO end yoke.
5. Size, cut and weld the driveline to the necessary length. Ensure driveline balance and run out meet specification. Allow 1" (2.54cm) extra for PTO end yoke.
6. Install driveline in phase with proper operating angle calculations, lock set screws and grease U-joints and mating spline.
7. Ensure all mounting bolts are tight.

2-3. COMPRESSOR INSTALLATION

See Installation Kit Drawing in the Parts Section for specific installation and parts information.

WARNING

THE INSTALLER OF THE DRIVELINE MUST INSPECT THE FINAL POSITION OF THE DRIVELINE TO DETERMINE WHETHER ITS LOCATION PROVIDES SUFFICIENT PROTECTION TO AN OPERATOR, OR OTHER PERSONNEL, FROM HAZARDS ASSOCIATED WITH A ROTATING DRIVELINE. IF PROTECTION IS INSUFFICIENT, THE INSTALLATION OF A GUARD IS REQUIRED. IF YOU ARE UNSURE OF METHODS TO GUARD A ROTATING DRIVELINE, CALL IOWA MOLD TOOLING CO., INC. FOR INSTRUCTIONS. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.

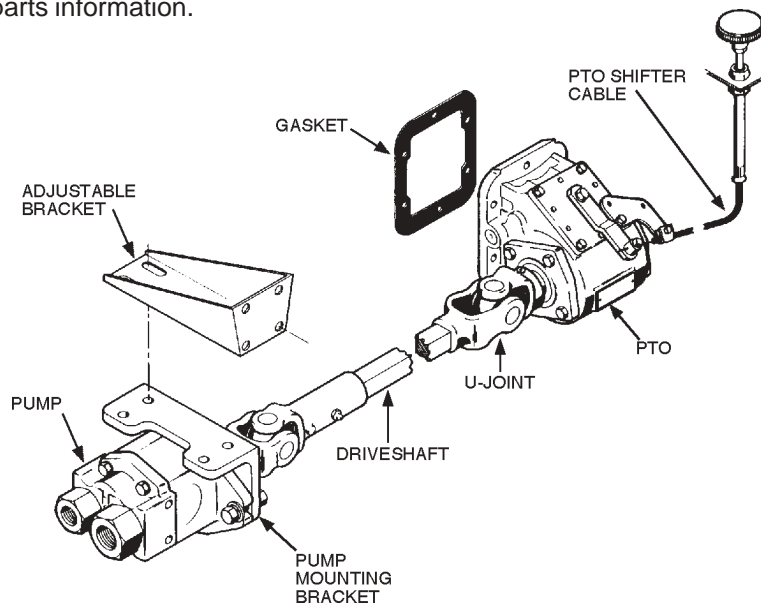


FIGURE B-2. DRIVELINE & PUMP INSTALLATION

2-4. DRIVELINE INSTALLATION TECHNIQUES

2-4-1. U-JOINT OPERATING ANGLES

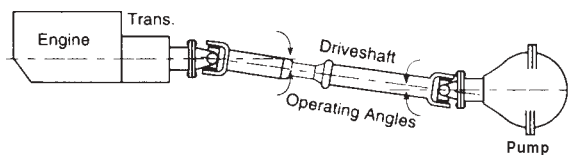
Every U-joint that operates at an angle creates vibration.

U-joint operating angles are probably the most common cause for driveline vibration in vehicles that have been reworked or that have had auxiliary equipment installed.

When reworking a chassis or installing a new driveshaft in a vehicle, make sure that you follow the basic rules that apply to u-joint operating angles, as follows:

1. U-joint operating angles at each end of a shaft should always be at least 1° .
2. U-joint operating angles on each end of a driveshaft should always be equal within 1° of each other.
3. U-joint operating angles should not be larger than 3° . If more than 3° , make sure they do not exceed the maximum recommended angles for the RPM at which they will be operating.

A u-joint operating angle is the angle that occurs at each end of a driveshaft when the output shaft of the transmission and the input shaft of the pump are not in line. See figure.

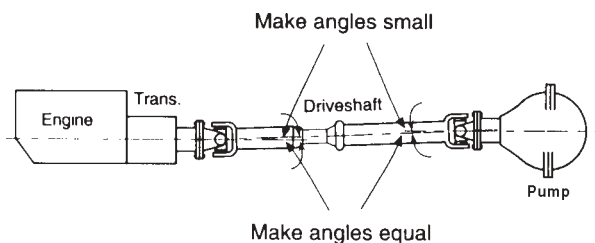


The connecting driveshaft operates with an angle at each u-joint. It is that angle that creates a vibration.

REDUCING AND CANCELING VIBRATION

A key point to remember about u-joint operating angles: To reduce the amount of vibration, the angles on each end of a driveshaft should always be **SMALL**.

To cancel an angle vibration, the u-joint operating angles need to be **EQUAL** within 1° at each end of a shaft. See figure.



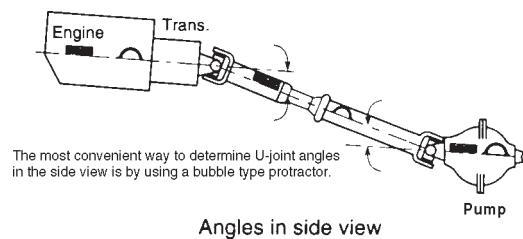
2-4-2. SINGLE PLANE AND COMPOUND U-JOINT OPERATING ANGLES

There are two types of u-joint operating angles, single plane and compound.

SINGLE PLANE

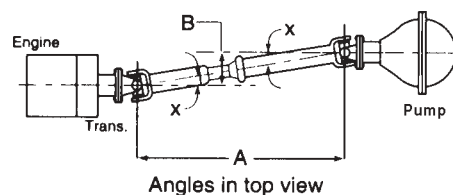
Single plane angles occur when the transmission and pump components are in line when viewed from either the top or side, but not both.

Determine the u-joint operating angle in an application where the components are in line when viewed from the top, but not in line when viewed from the side, is as simple as measuring the slope of the components in the side view, and adding or subtracting those slopes to determine the angle. See figure.



These angles should be **SMALL** and equal within 1° .

Determine the u-joint operating angles on a shaft that is straight when viewed from the side and offset when viewed from the top requires the use of a special chart (See accompanying chart). In this type of application, the centerlines of the connected components must be parallel when viewed from the top, as shown. These angles should also be **SMALL** and equal within 1° . See figure.



Look at the angle chart and note that the smaller the offset, the smaller the resultant angle.

To reduce the possibility of vibration, keep any offset between connected points to a minimum.

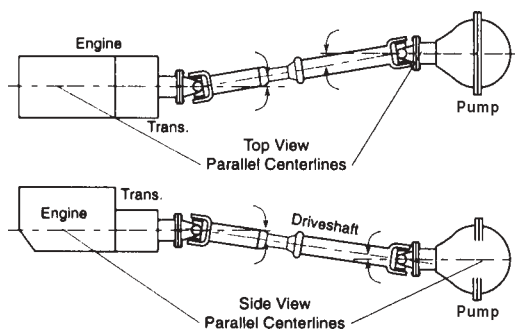
There are two things which can be done to make certain single plane angles are **SMALL** and **EQUAL**:

Make sure that the transmission and pump are mounted so that their centerlines are parallel when viewed from both the side and the top.

Make sure the offset between them is small in both views.

COMPOUND ANGLES

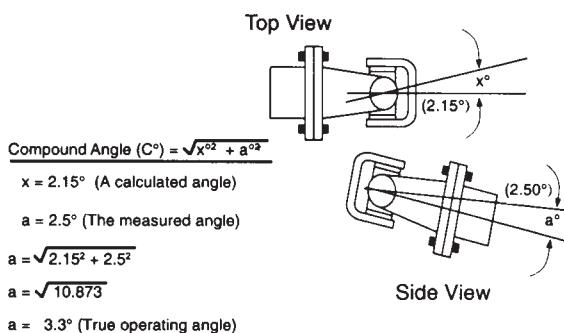
Compound u-joint operating angles occur when the transmission and pump are not in line when viewed from both, the top and side. Their centerlines, however, are parallel in both views. See figure.



TRUE U-JOINT OPERATING ANGLE

The true u-joint operating angle, which must be calculated for each end of the shaft with compound angles, is a combination of the u-joint operating angle in the top view, as determined from the chart, and the measured u-joint operating angle in the side view.

To determine the true u-joint operating angle for one end of a shaft, (compound angle C° in the formula shown in figure below) insert the u-joint operating angle measurement obtained in the side view and the u-joint operating angle obtained from the chart into the formula.



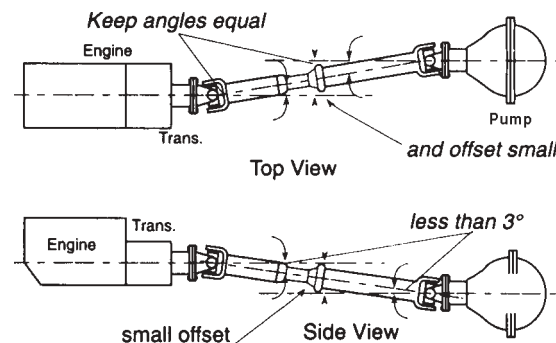
Do the same for the other end of the shaft. Compare the resultant calculated u-joint operating angle for each end. They should be **EQUAL** within 1° . If they are not, the driveshaft will vibrate.

2-4-3. ELIMINATING COMPOUND ANGLE INDUCED VIBRATIONS

Compound u-joint operating angles are one of the most common causes for driveline vibration. To avoid these problems, remember these important considerations:

When setting up an application that requires compound u-joint operating angles, always keep the centerlines of the transmission and pump parallel in both views.

Always keep the offset between their horizontal and vertical centerlines small.



NOTE

CENTERLINES OF TRANSMISSION AND AXLE MUST BE PARALLEL IN BOTH TOP AND SIDE VIEWS TO USE THIS METHOD OF DETERMINING TRUE U-JOINT OPERATING ANGLE. CONTACT IMT TECHNICAL SUPPORT IF YOU HAVE AN APPLICATION WHICH CANNOT BE INSTALLED WITH THEIR CENTERLINES PARALLEL.

2-4-4. ANGLE SIZE

The magnitude of a vibration created by a u-joint operating angle is proportional to the size of the u-joint operating angle. IMT recommends true u-joint operating angles of 3° or less.

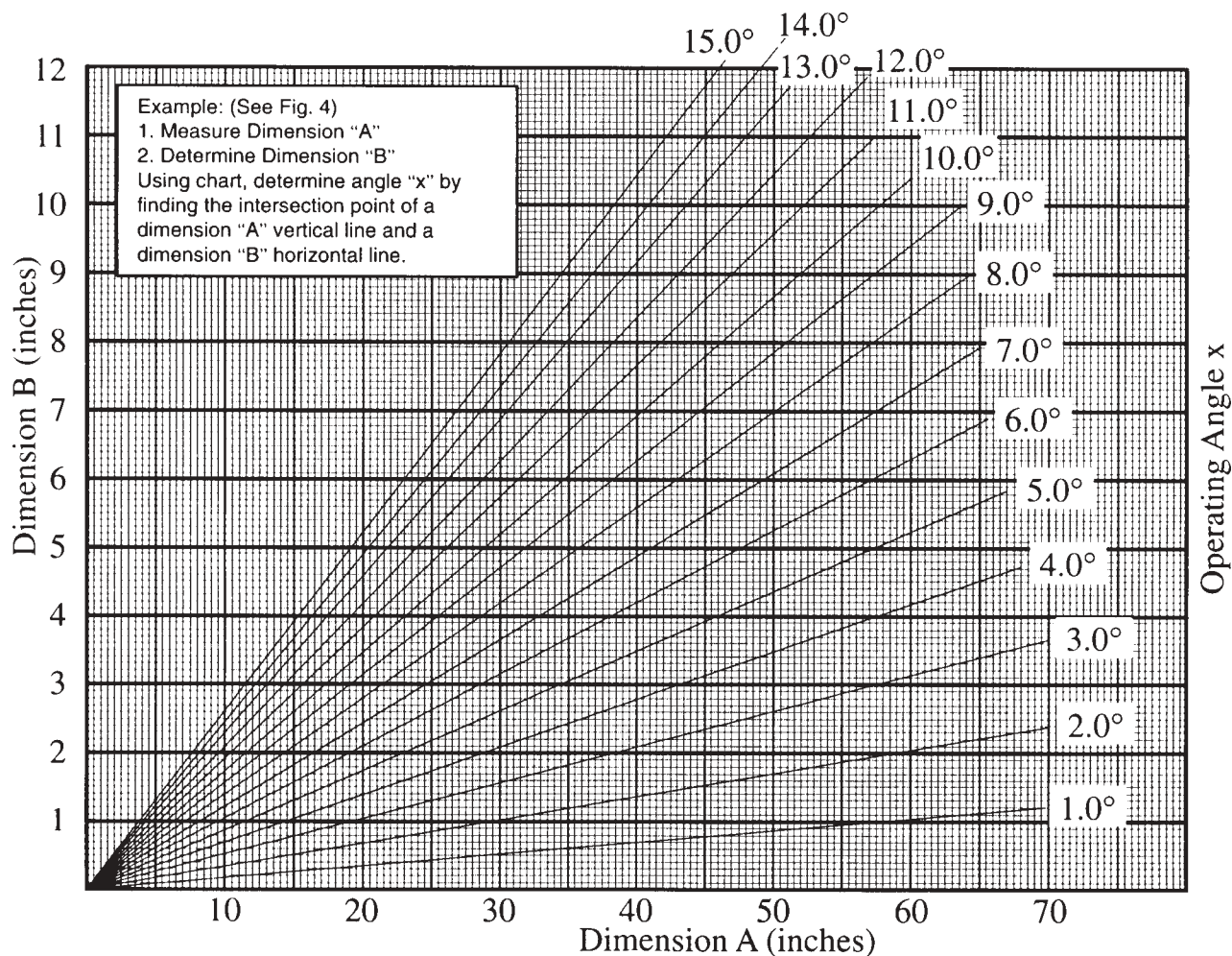
Obtain the true u-joint operating angle, as explained above, and if it is greater than 3° , compare it to the following chart.

DRIVESHAFT RPM	MAXIMUM OPERATING ANGLE
5000	3.2°
4500	3.7°
4000	4.2°
3500	5.0°
3000	5.8°
2500	7.0°
2000	8.7°
1500	11.5°

The angles shown on the chart are the MAXIMUM u-joint operating angles recommended by IMT and are directly related to the speed of the driveshaft. Any u-joint operating angle greater than 3° will lower u-joint life and may cause vibration. Remember to check maximum safe driveshaft RPM as recommended by the driveshaft manufacturer.

ANGLE CHART

FOR DRIVESHAFTS HAVING AN ANGLE IN THE TOP VIEW



SECTION 3. OPERATION

3-1. GENERAL

Each compressor is bench tested under load at the factory to ensure proper break-in and operation. While it is not necessary to follow any break-in procedure, the following checks should be made before putting the unit into service, as well as, periodically during use.

1. Before start-up:

- A. Check the oil level in the compressor crankcase with the dipstick on the unit. If oil is needed, use only IMT's synthetic compressor oil. Always check compressor oil level with the truck and compressor on level ground.
- B. Check the air intake filter to make certain that it is clean and unobstructed. A dirty filter is a possible cause of reduced air output.
- C. Avoid operating the compressor package when the side-to-side or front-to-rear tilt is greater than 20°.

2. With the compressor engaged:

Adjust engine speed to ensure that compressor speed does not exceed 1400 RPM (max) under load. Crack open air discharge valve until air pressure drops to 140 PSI and maintains this pressure without cycling. Doing so simulates a maximum load condition.

If engine speed increase is required, readjust air discharge valve to 140 PSI after speed has been increased. Repeat until appropriate compressor RPM (NOT engine) is achieved.

Checking compressor RPM can be done using a phototach on the drive coupling through the air cleaner access hole. A hydraulic flow meter can be used, but is not as accurate.

3-2. OPERATION

To use the compressor, start the vehicle engine and engage the compressor by operating the compressor switch.

The system will now function automatically. It will engage the hydraulic solenoid when the air pressure is below 120 psi, and disengage when the air pressure reaches 150 psi.

CAUTION

OPERATING THIS UNIT IN EXCESS OF 1400 RPM, WILL VOID THE WARRANTY, AND WILL SHORTEN THE NORMAL SERVICE LIFE OF THE COMPRESSOR.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Section 4. MAINTENANCE & PARTS

4-1. GENERAL

The following table provides list of routine maintenance items, including service intervals. The remainder of Section 4 includes a part lists and assembly drawings of the compressor.

MAINTENANCE OPERATION	SERVICE INTERVALS			
	DAILY	WEEKLY	250/3	500/6
INSPECT DRIVE COUPLING FOR WEAR				
AIR CLEANER - CHANGE				
AIR INTAKE - INSPECT				
CRANKCASE OIL LEVEL - CHECK, ADD IF NEEDED				
CRANKCASE OIL - CHANGE (SEE NOTE 1)				
CHECK CYLINDER HEAD STUD TORQUE (SEE NOTE 2)				
COOLING VANES (FINS) - CLEAN				
SAFETY VALVES - CHECK OPERATION				
SAFETY VALVES - CLEAN				
AIR RECEIVER - DRAIN CONDENSATION				
RECEIVER SAFETY VALVES - CHECK OPERATION				
TIGHTEN AND CHECK ALL VALVES				
CHECK ALL ELECTRICAL CONNECTIONS				
CHECK FITTINGS AND AIR LINES FOR LEAKS				
INSPECT CHECK VALVES FOR PROPER OPERATION				
INSPECT CHECK VALVES FOR CARBON BUILDUP				

Service intervals are listed as hours/months, whichever occurs first.

Use only IMT's synthetic compressor oil. The use of any other oil causes excessive carbon buildup, and will void the warranty on the compressor.

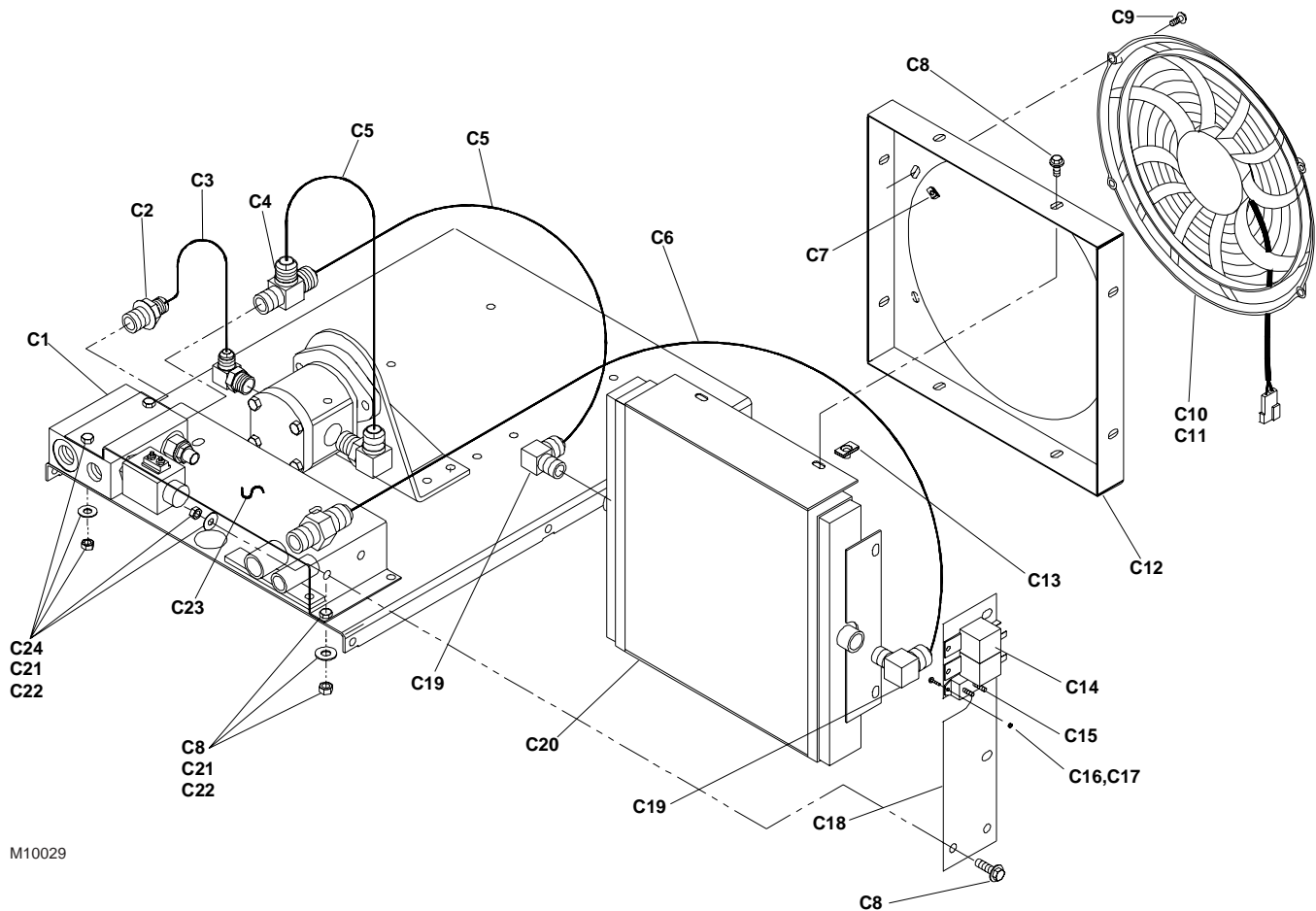
NOTE 1.
Under normal operating conditions, oil changes are required every 3 months. When operating in a dirty environment, change the oil and air filter more frequently as your particular operating conditions dictate. Oil capacity is 1-1/3 quarts.

NOTE 2.
Cylinder head stud torque MUST be checked after the initial 8-10 hours of operation. The compressor must be cold (room temperature) before retorquing of studs. Torque studs to 240 in-lbs plus or minus 10 in-lbs.

FIGURE D-1. ROUTINE MAINTENANCE CHECKLIST

OIL COOLING SYSTEM (200057)

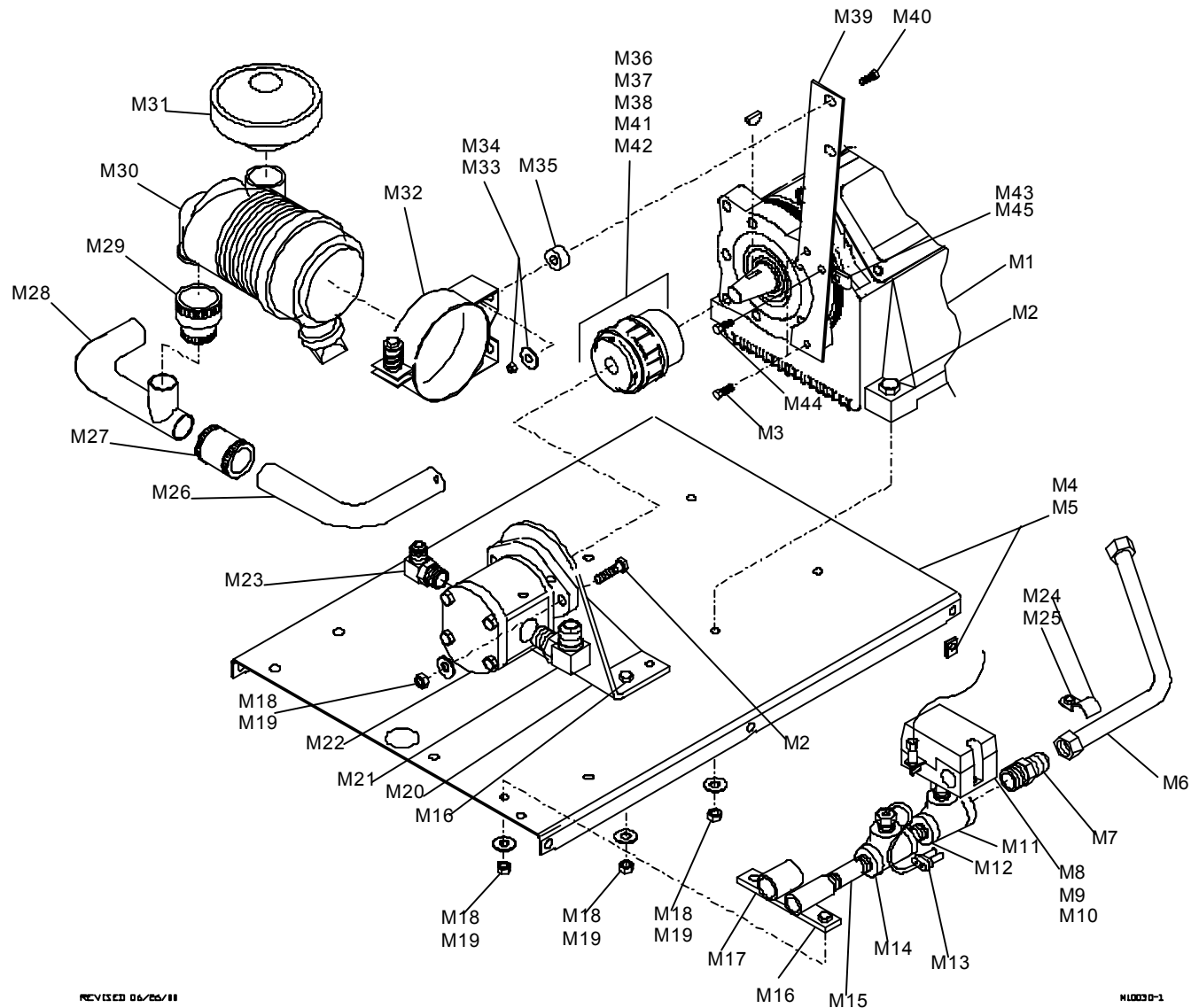
ITEM	PART NO.	DESCRIPTION	QTY
	200057	OIL COOLING SYSTEM	1
C1	80021	KIT HYD BLK N.O. SLND	1
	301996	BLOCK-HYDRAULIC VALVE	1
	301997	SOLENOID-HYDRAULIC 12VDC N.O.	1
	301998	VALVE-RELIEF PILOTED SPOOL	1
C2	970508-106	CONNECTOR 1/2JIC 3/4SAE	1
C3	975508-019	HOSE ASM 1/2X19 SXE	1
C4	976512-1212	TEE 3/4NPT 3/4JIC MALE RUN	1
C5	975412-021	HOSE ASM 3/4X21"	2
C6	975412-029	HOSE ASM 1/2X29 SXS	1
C7	961504-090	NUT 1/4-20 TINNERMAN	4
C8	929705-075	BOLT 5/16-18X3 WHIZLOCK GR5	12
C9	974604-088	BOLT 1/4-20 HEX W/PL WASHER	4
C10	301577	FAN PUSHER	1
C11	300444	TAPE 1/16X3/4 CLOSED CELLO	2FT
C12	301434	SHROUD-OIL COOLER/FAN ASM 13	1
C13	961505-140	NUT 5/16-18 TINNERMAN	8
C14	300211	RELAY-POWER	2
C15	300909-025	CIRCUIT BREAKER 25A	1
C16	931600-050	SCREW 6-32X1/2 MACHINE	4
C17	973700-063	NUT #6-32 HEX NYLOC	1
C18	301433	BRACKET-OIL COOLER SIDE 35/17	1
C19	960212-050	ELBOW 1/2NPT 3/4JIC	2
C20	300836	OIL COOLER 12X13.5	1
C21	938205-071	WASHER 5/16 FLAT	6
C22	924305-166	NUT 5/16-18 NYLOC GR5	6
C23	301432	SUPPORT-OIL COOLER 35/175 RS	1
C24	929105-275	BOLT 5/16-18X2-3/4 HHGR5	2



COMPRESSOR MTG SYSTEM (200056-1)

ITEM	PART NO.	DESCRIPTION	QTY
M1	70000-001	COMPRESSOR	REF
M2	929806-150	BOLT 3/8-16X1-1/2 HHGR8	6
M3	929704-050	BOLT 1/4-20X1/2 WHIZLOC	2
M4	301405	BASE	1
M5	961504-090	NUT 1/4-20 TINNEMAN	6
M6	978512-023	HOSE ASSY SS 3/4	1
M7	910212-075	CONNECTOR-TUBE 3/4X3/4NPT	1
M8	77041369	PRESSURE SWITCH W/UNLOADER	1
M9	961608-025	REDUCING NIPPLE 1/2X1/4NPT	1
M10	975200-025	INSERT-BRASS	2
M11	902203-022	REDUCER TEE 3/4X1/2X1/2	1
M12	922108-020	NIPPLE 1/2X2 SCH40	1
M13	301578	SWITCH-TEMP	1
M14	902415-020	TEE-PIPE 1/2	1
M15	922108-050	PIPE NIPPLE 1/2X5 SCH40	1
M16	929806-125	BOLT 3/8-16X1-1/4 HH	6
M17	301260	BRACKET	1
M18	938206-071	WASHER 3/8 FLAT	12
M19	925506-198	NUT 3/8-16 NYLOC GR8	12
M20	301248	BRACKET-HYD MTR MNT	1
M21	970412-106	ELBOW SAE#12 3/4JIC	1

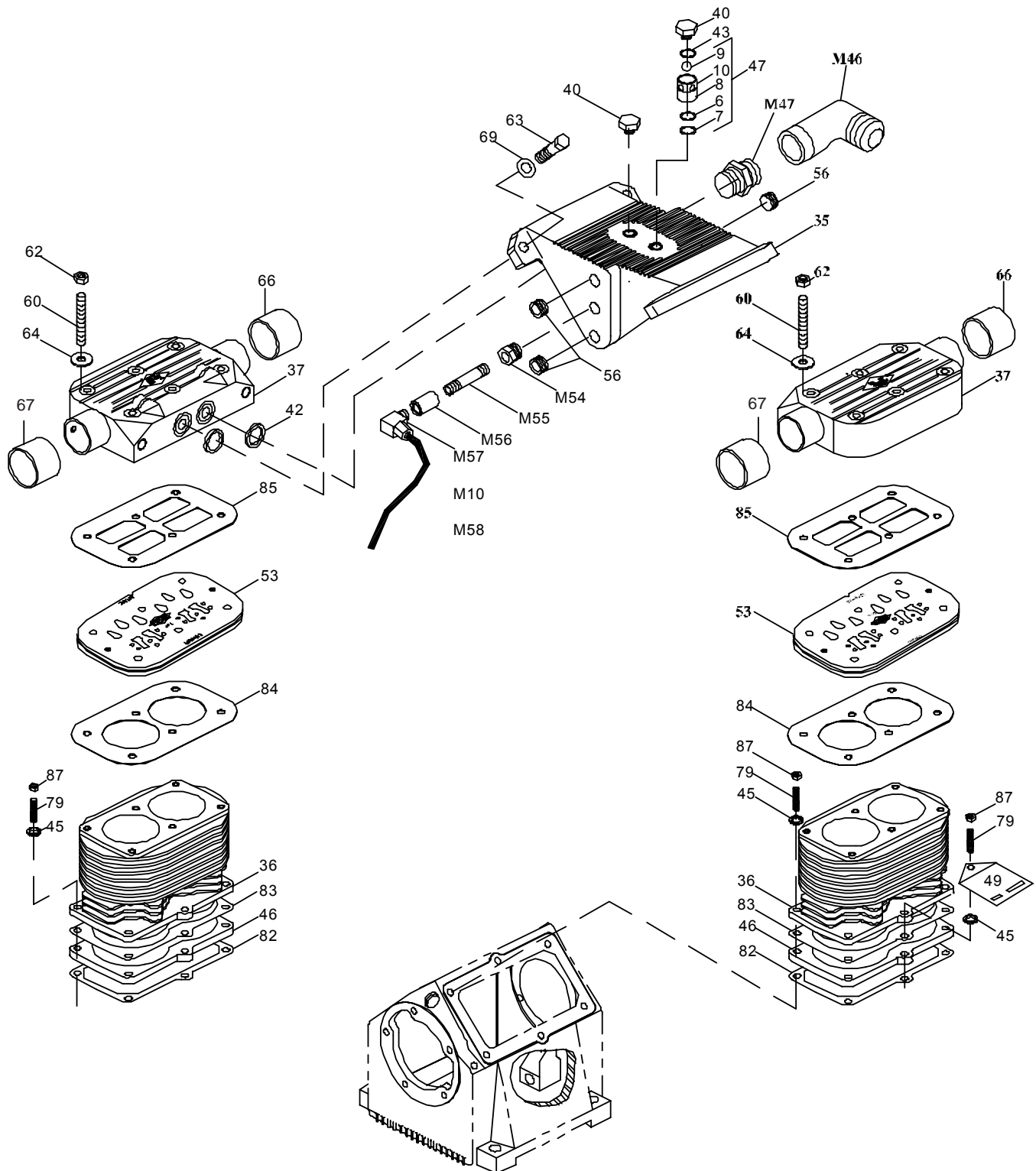
ITEM	PART NO.	DESCRIPTION	QTY
M22	301665	MOTOR-HYDRAULIC	1
M23	970408-088	ELBOW SAE#10 1/2JIC	1
M24	301928-125	CLAMP CONDUIT 1 1/4	1
M25	934504-075	SCREW TAP 1/4X3/4	1
M26	301430	TUBE-AIR INLET	1
M27	301418	SLEEVE	1
M28	301419	TUBE W/EXT	1
M29	301417	SLEEVE 1.75 ID X 1.25 ID	1
M30	301438	AIR FILTER W/90° ELBOW	1
M31	300857	CAP-AIR FILTER	1
M32	300855	BAND-AIR FILTER MTG	1
M33	924305-166	NUT 5/16-18 NYLOC GR5	2
M34	938205-071	WASHER 5/16 FLAT	2
M35	301602	ISOLATOR	2
M36	301266	HUB-HYD MTR	1
M37	301267	SPIDER	1
M38	301265	HUB-CPRSR COUPLING	1
M39	301446	BRACKET-AIR FILTER	1
M40	929105-125	BOLT 5/16-18X1-1/4 HHGR5	2
M41	929405-125	BOLT5/16-24X1-1/4 HHGR5	1
M42	301628	WASHER-HUB RECIP	1
M43	300570-075	CLAMP 3/4 HOSE	1
M44	929105-100	BOLT 5/16-18X1 HHGR5	1
M45	925305-283	NUT 5/16-18 WHIZLOC	1

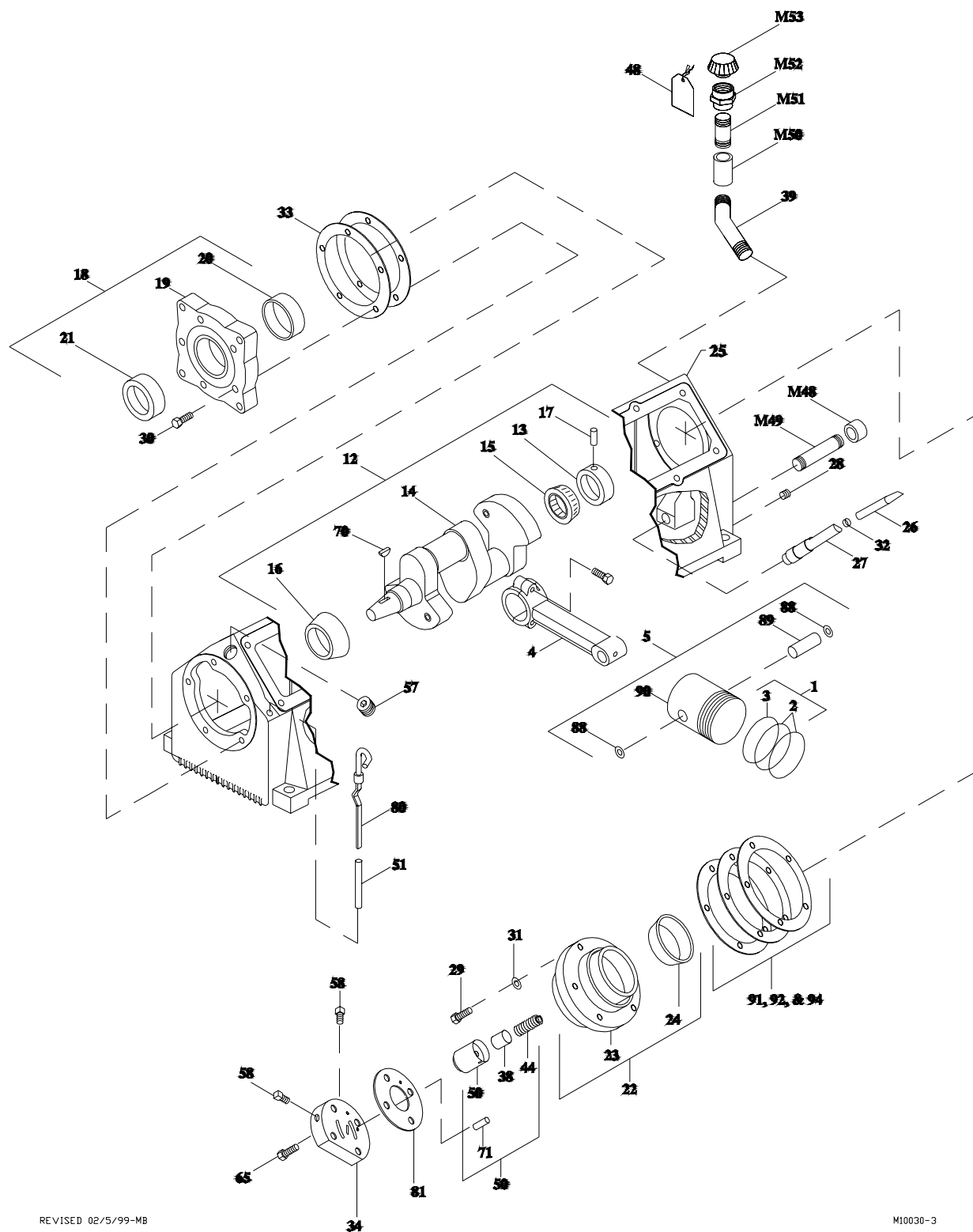


COMPRESSOR ASM (200056-2)

ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
	200056	COMPRESSOR & MTG SYS	REF	44.	70014583	OIL PUMP SPRING	1
	70000-001	COMPRESSOR	REF	45.	70024122	WASHER .33X.5X.03 COPPER	12
1.	51014947	RING SET-3 (INCL:2-3)	1	46.	70029293	CYL BLOCK SPACER	2
2.	70014599	COMPRESSION RING (part of 1)	8REF	47.	51714023	INSERT ASM (INCL:6-10)	2
3.	70014600	OIL RING (part of 1)	4REF	48.	70039124	TAG-SYNTHETIC OIL	1REF
4.	51029283	CONNECTING ROD ASM	4	49.	70039300	DECAL-PATENT	1
5.	51029285	PISTON ASM (INCL:88-90)	4	50.	70051006	OIL PUMP	1
6.	7Q073017	O-RING (part of 47)	2REF	51.	70143153	DIPSICK	1
7.	70029468	SHIM (part of 47)	2REF	53.	70733069	REED VALVE ASM	2
8.	76393085	O-RING (part of 47)	2REF	56.	72053403	PLUG 3/8 SH	4
9.	72066426	BALL 19/32 STL (part of 47)	2REF	57.	72053404	PLUG 1/2 SH	1
10.	70029593	INSERT (part of 47)	2REF	58.	72053411	PLUG 1/8 SQHD	2
11.	51706913	CRANKCASE/CRANKSHAFT ASM (INCL:12-33,91-94)	1	60.	72601708	STUD 5/16-18X3-1/2	12
12.	51705661	CRANKSHAFT (part of 11,INCL:13-17)	1REF	62.	72062001	NUT 5/16-18 HEX	12
13.	60101269	OIL PUMP COLLAR (part of 12)	1REF	63.	72060063	CAP SCR 7/16-14X1-1/4 HHGR5	4
14.	60108748	CRANKSHAFT (part of 12)	1REF	64.	72063001	WASHER 1/4 WRT	12
15.	70055009	CONE BEARING (part of 12)	1REF	65.	72060731	CAP SCR 5/16-18X3/4 SH	4
16.	70055012	CONE BEARING (part of 12)	1REF	66.	70392654M	CAP 1-3/4 RUBBER	2REF
17.	72066307	ROLL PIN .16X.44 (part of 12)	1REF	67.	70392654	COUPLING RUBBER	2REF
18.	51705709	FRT BRG HSG ASM (part of 11,INCL:19-21)	1REF	69.	72063052	WASHER 7/16 LOCK	4
19.	60025007	FRT BRG HSG (part of 18)	1REF	70.	72066267	WOODRUFF KEY .16X.62(part of 12)	1
20.	70055011	CUP BEARING (part of 18)	1REF	71.	72661487	DRIVE PIN	1
21.	76039119	SEAL (part of 18)	1REF	79.	72601060	STUD 5/16X2 NC GR5	12
22.	51705710	REAR BRG HSG ASM (part of 11,INCL:23-24)	1REF	80.	73731843	DIPSTICK ASM	1
23.	60025005	REAR BRG HSG (part of 22)	1REF	81.	76039093	PUMP COVER GASKET	1
24.	70055010	CUP BEARING (part of 22)	1REF	82.	76039111	CYL BLOCK GASKET-BOTTOM	2
25.	60025012	CRANKCASE (part of 11)	1REF	83.	76392119	CYLINDER BLOCK GASKET	2
26.	60120138	OIL SCREEN TUBE (part of 11)	1REF	84.	76392641	REED VALVE/CYL GASKET	2
27.	60120289	OIL SCREEN (part of 11)	1REF	85.	76392642	REED VALVE/HEAD GASKET	2
28.	72053403	PLUG 3/8 SH (part of 11)	1REF	87.	72062036	NUT 5/16-24 HEX	12
29.	929105-100	CAP SCR 5/16-18X1 (part of 11)	5REF	88.	72066018	RET'G RING 5/8 STD INT(part of 5)	8REF
30.	72060731	CAP SCR 5/16-18X3/4 SH(part of 11)	5REF	89.	70014627	PISTON PIN (part of 5)	4REF
31.	938005-078	WASHER 5/16 LOCK (part of 11)	5REF	90.	70029062	PISTON (part of 5)	4REF
32.	72066008	OIL SCREEN CLAMP (part of 11)	1REF	91.	76039092	GASKET .006 (part of 11)	1REF
33.	76039112	FRT BRG HSG GASKET(part of 11)	2REF	92.	76039094	GASKET .010 (part of 11)	1REF
34.	60025006	REAR BRG HSG COVER	1	94.	76039144	GASKET .020 (part of 11)	4REF
35.	60025193	PULSATION TANK	1				
36.	60025194	CYLINDER BLOCK	2	M10	975200-025	INSERT-BRASS	2
37.	60025492	HEAD	2	M46	981412-075	ELBOW-3/4JIC X 3/4 NPT LG 90°	1
38.	60101505	PLUNGER TRANSFER BUSHING	1	M47	960412-075	NIPPLE 3/4MPT 3/4MPT HEX	1
39.	60101507	BREATHING PIPE	1	M48	906130-015	PIPE CAP 3/8NPT	1
40.	60106933	CHECK VALVE INSERT CAP	2	M49	922106-030	PIPE NIPPLE 3/8NPT X 3	1
42.	7Q072212	O-RING	4	M50	907215-020	PIPE COUPLING 1/2NPT SCH40	1
43.	76393107	O-RING	2	M51	923108-030	PIPE NIPPLE 1/2X3 GALV	1
				M52	72531856	REDUCER COUPLING 3/4FPT	1
				M53	70143495	BREATHING CAP	1
				M54	907601-005	REDUCER BUSHING 3/8 1/8NPT	1
				M55	922102-020	PIPE NIPPLE 1/8NPT X 2 SCH40	1
				M56	907215-005	PIPE COUPLING 1/8 SCH40 GALV	1
				M57	975104-012	ELBOW 1/8 X 1/4 90° COMPRN	1
				M58	89034176	TUBING 1/4 AIR BRAKE	.75FT

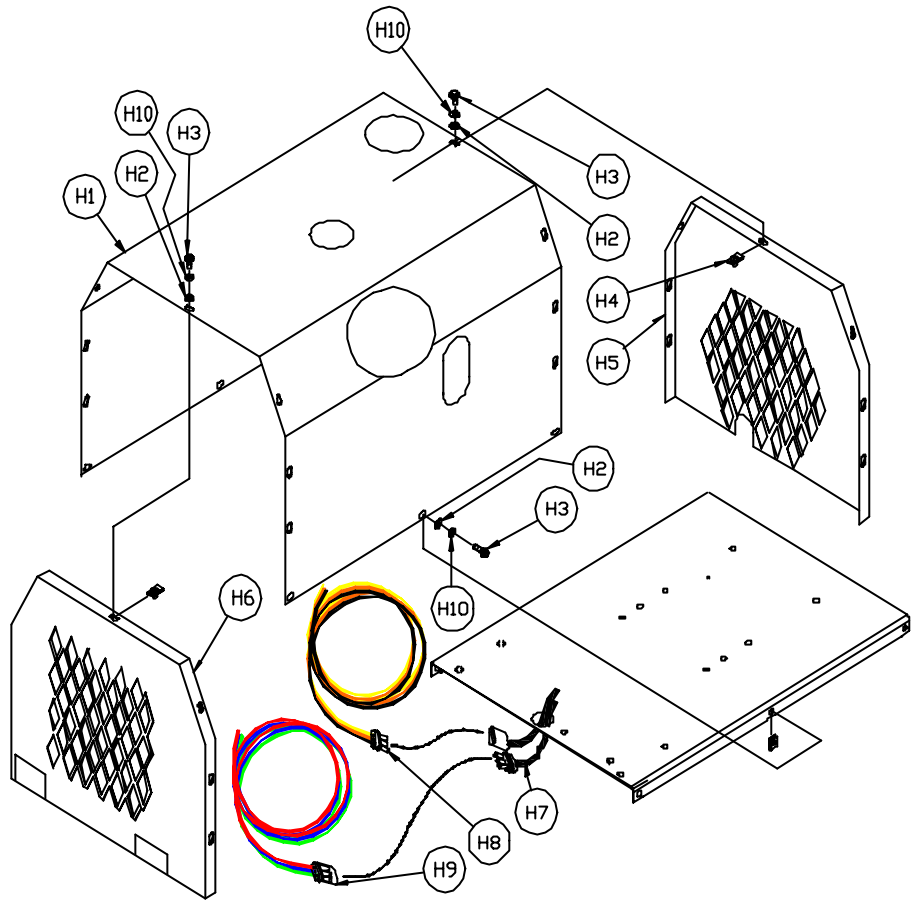
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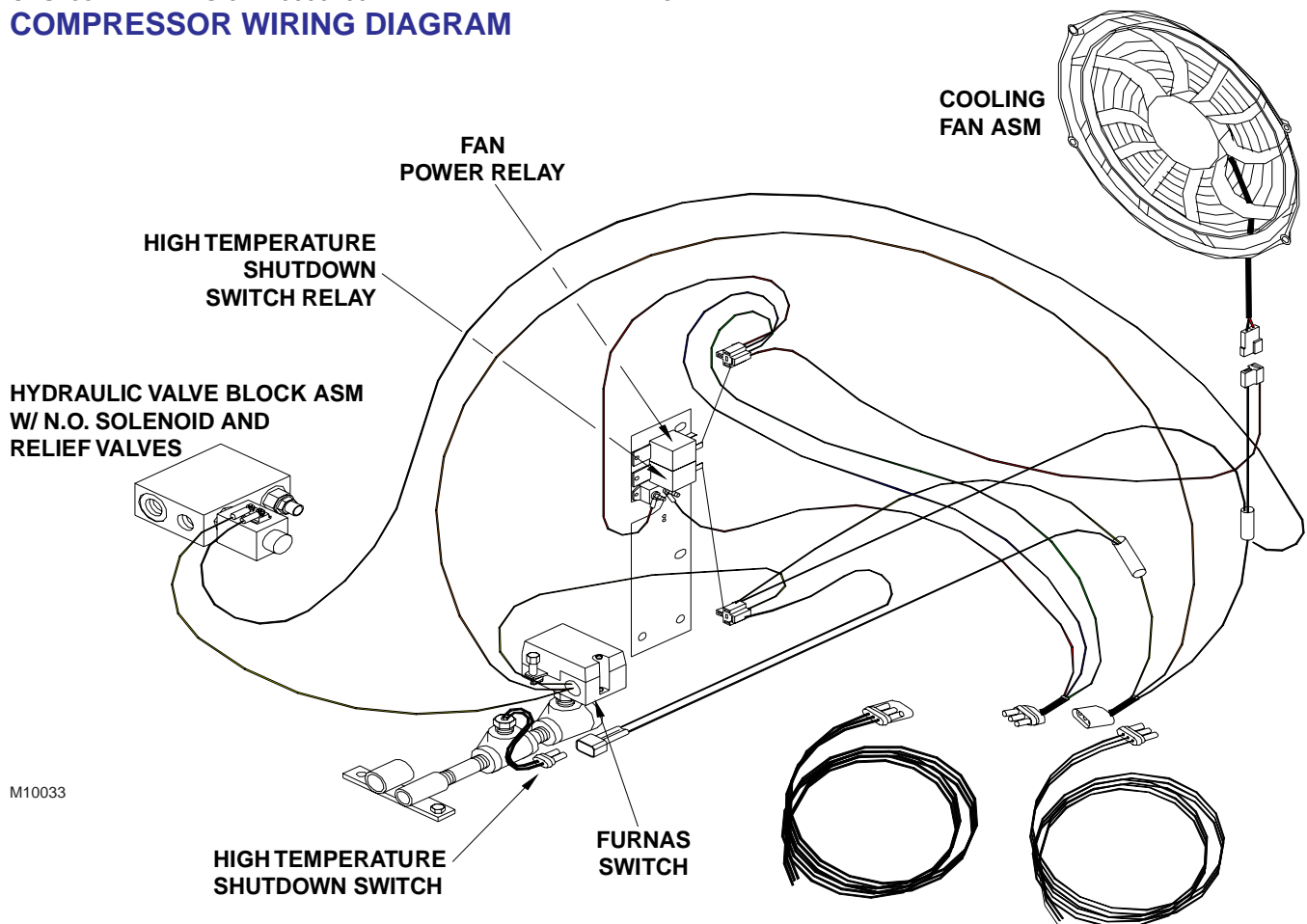


CANOPY SYSTEM

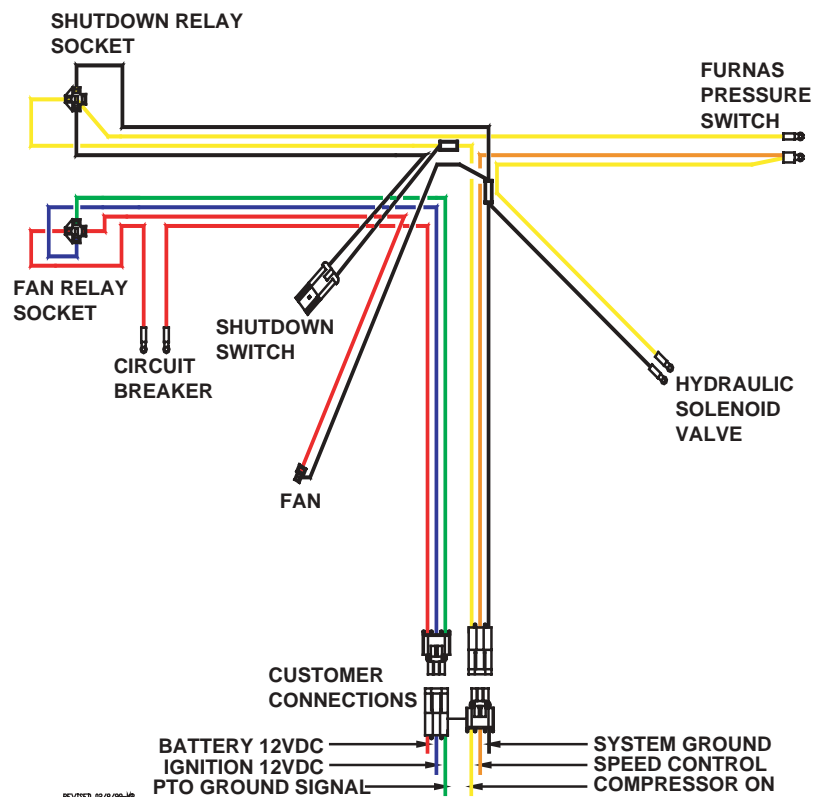
H1	301437	CANOPY	1
H2	977004-062	WASHER 1/4X.062X5/8	20
H3	983904-075	BOLT, STAR DRIVE 1/4-20 x 3/4	20
H4	961504-090	NUT 1/4-20 TINNEMAN	14
H5	301436	PANEL-END RECIP	1
H6	301435	PANEL-END COOLER	1
H7	301381	HARNESS-35 RECIP	1
H8	301581	HARNESS-TOWER 3-WAY	1
H9	301607	HARNESS-SHROUD 3-WAY	1
H10	98404-071	WASHER, FLAT WIDE 1/4" SS	20



H10821 6/20/15

COMPRESSOR WIRING DIAGRAM

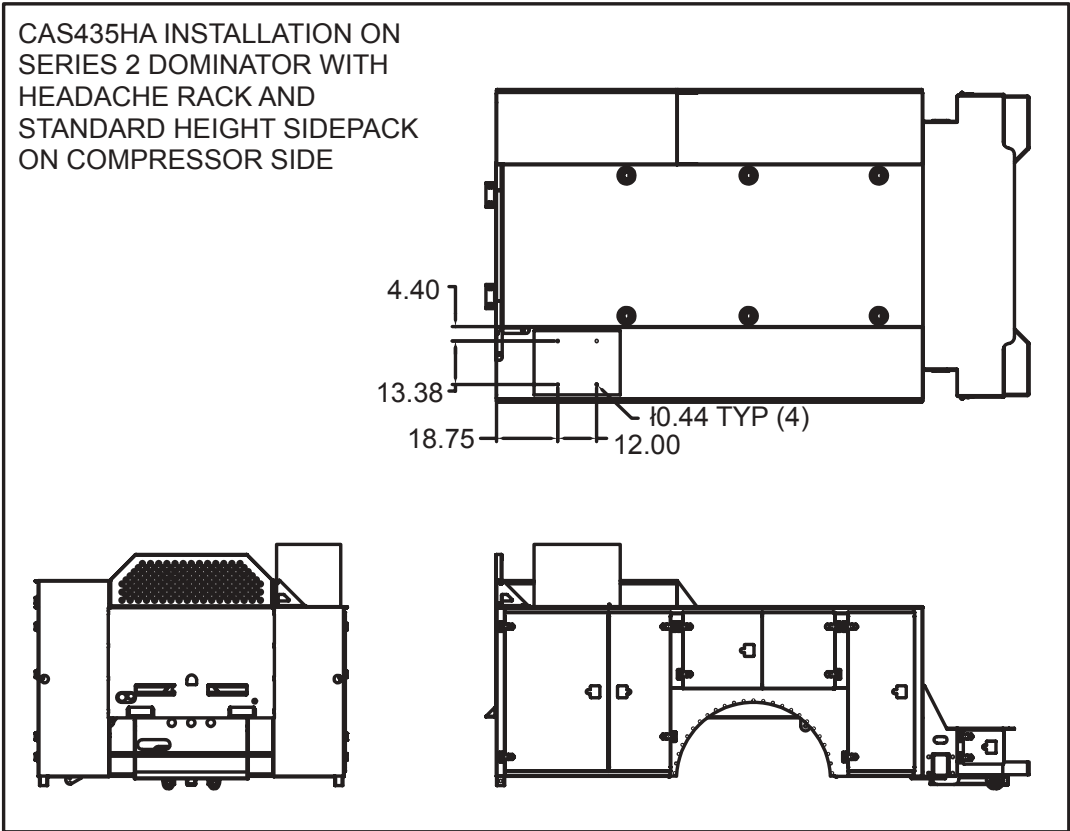
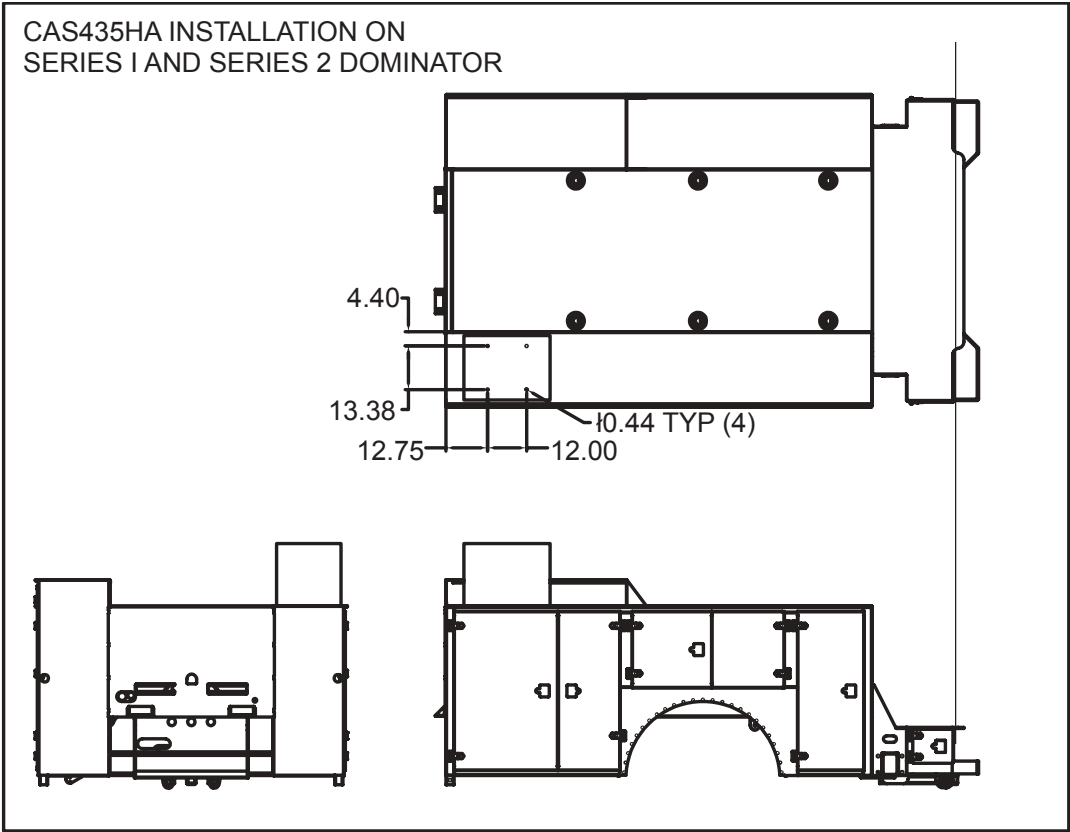
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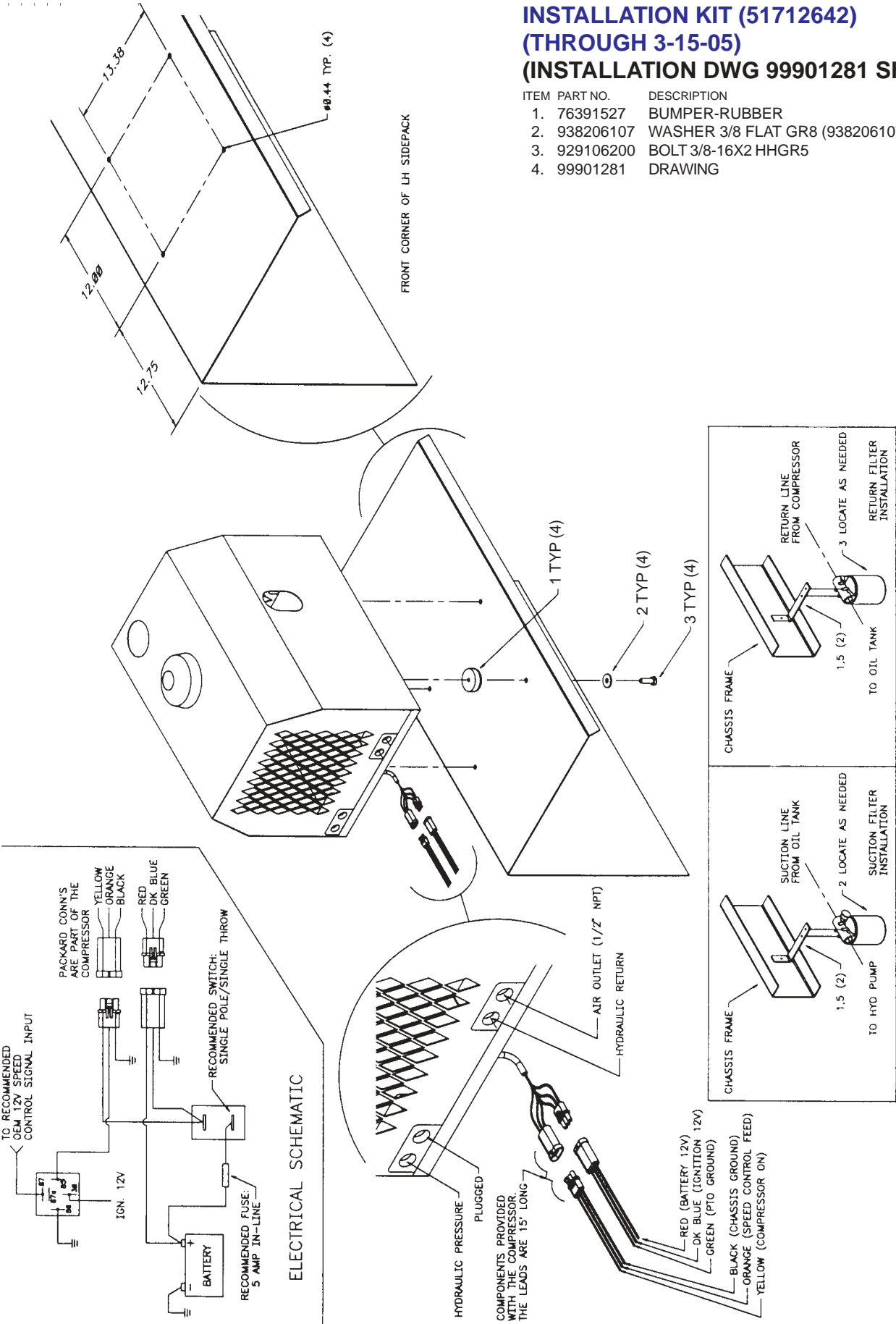
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**CAS435HA MOUNTING LOCATIONS
(99903712)**



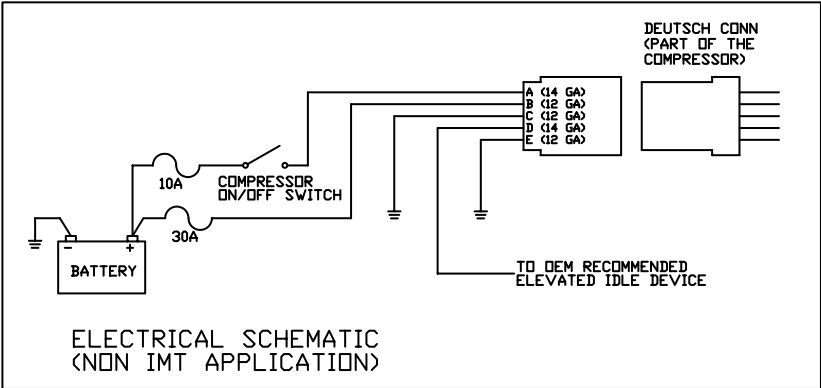
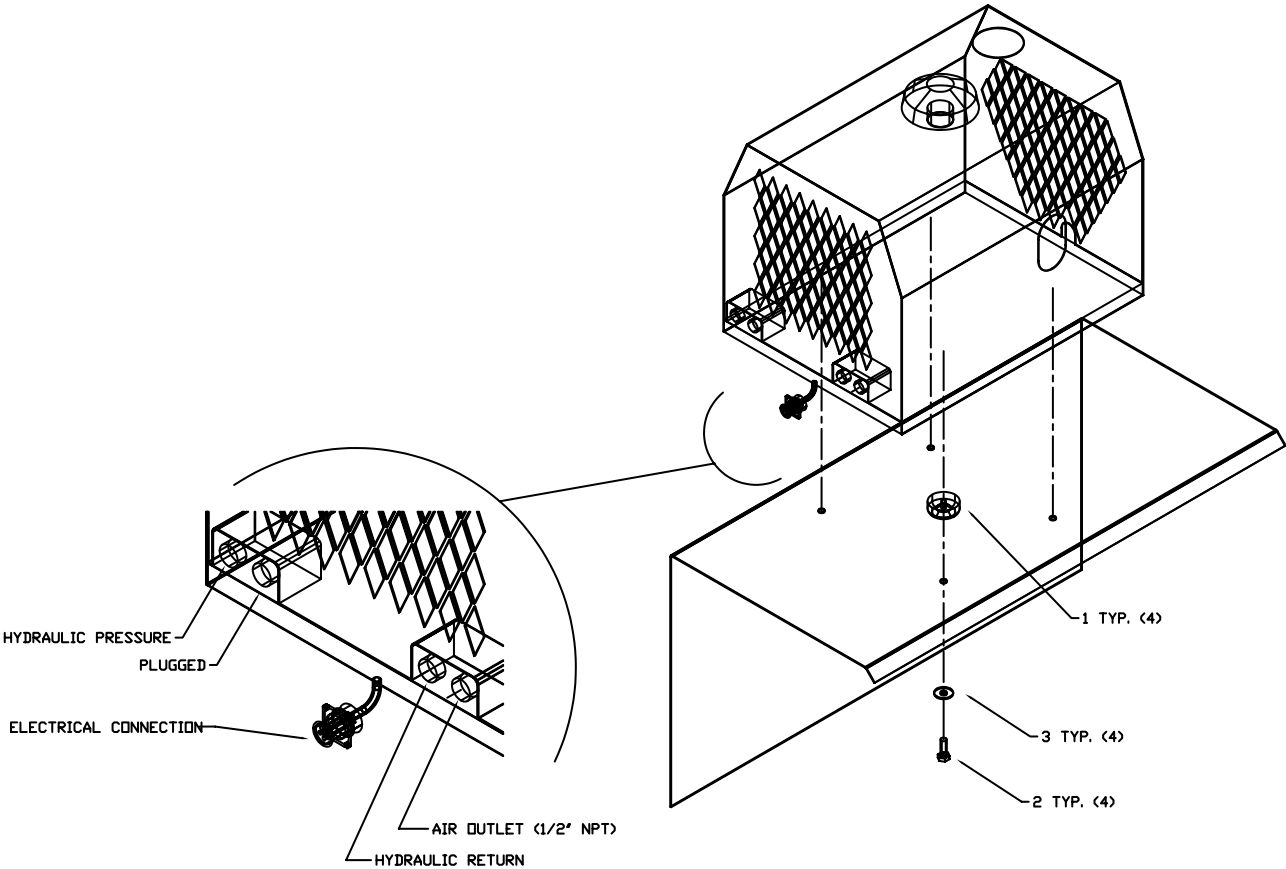
**INSTALLATION KIT (51712642)
(THROUGH 3-15-05)
(INSTALLATION DWG 99901281 SHOWN)**

ITEM	PART NO.	DESCRIPTION	QTY
1.	76391527	BUMPER-RUBBER	4
2.	938206107	WASHER 3/8 FLAT GR8 (938206107)	4
3.	929106200	BOLT 3/8-16X2 HHGR5	4
4.	99901281	DRAWING	1



INSTALLATION KIT (51712642)
(EFFECTIVE 3-15-05)
(INSTALLATION DWG 99901281 SHOWN)

ITEM	PART NO.	DESCRIPTION	QTY
1.	76391527	BUMPER-RUBBER	4
2.	929106200	BOLT 3/8-16X2 HHGR5	4
3.	938206107	WASHER 3/8 FLAT GR8	4



COMPRESSOR HARNESS CHART

Effective March 15, 2005, the connectors in the harnesses used on the CAS435HA were upgraded. The old and new connectors are not interchangeable, so for replacement parts, the correct harness and/or jumper must be ordered.

Use the following chart to determine the correct harness and/or jumper.

If your CAS435HA connector looks like Connector A:



and your body connector looks like this:



No jumper is needed.

and your body connector looks like this:



Use jumper # 77441160.

If you are not using an IMT body and your connector looks like Connector A, use jumpers 301581 and 301607.

COMPRESSOR HARNESS CHART, CONTINUED

If your CAS435HA connector looks like Connector B:



and your body connector looks like this:



Use jumper # 77441158.

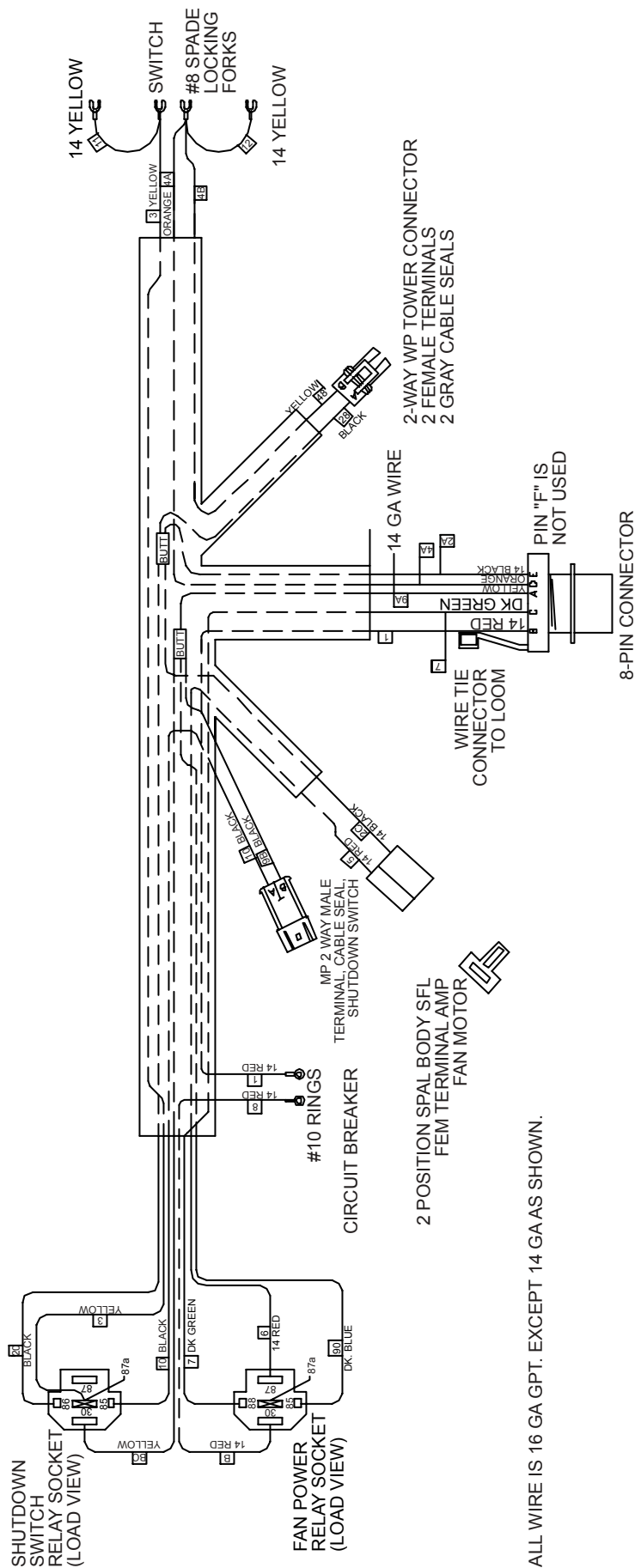
and your body connector looks like this:



No jumper is needed.

If you are not using an IMT body and your connector looks like Connector B, use jumper 77441157.

HARNESS (304710) EFFECTIVE 3/15/05

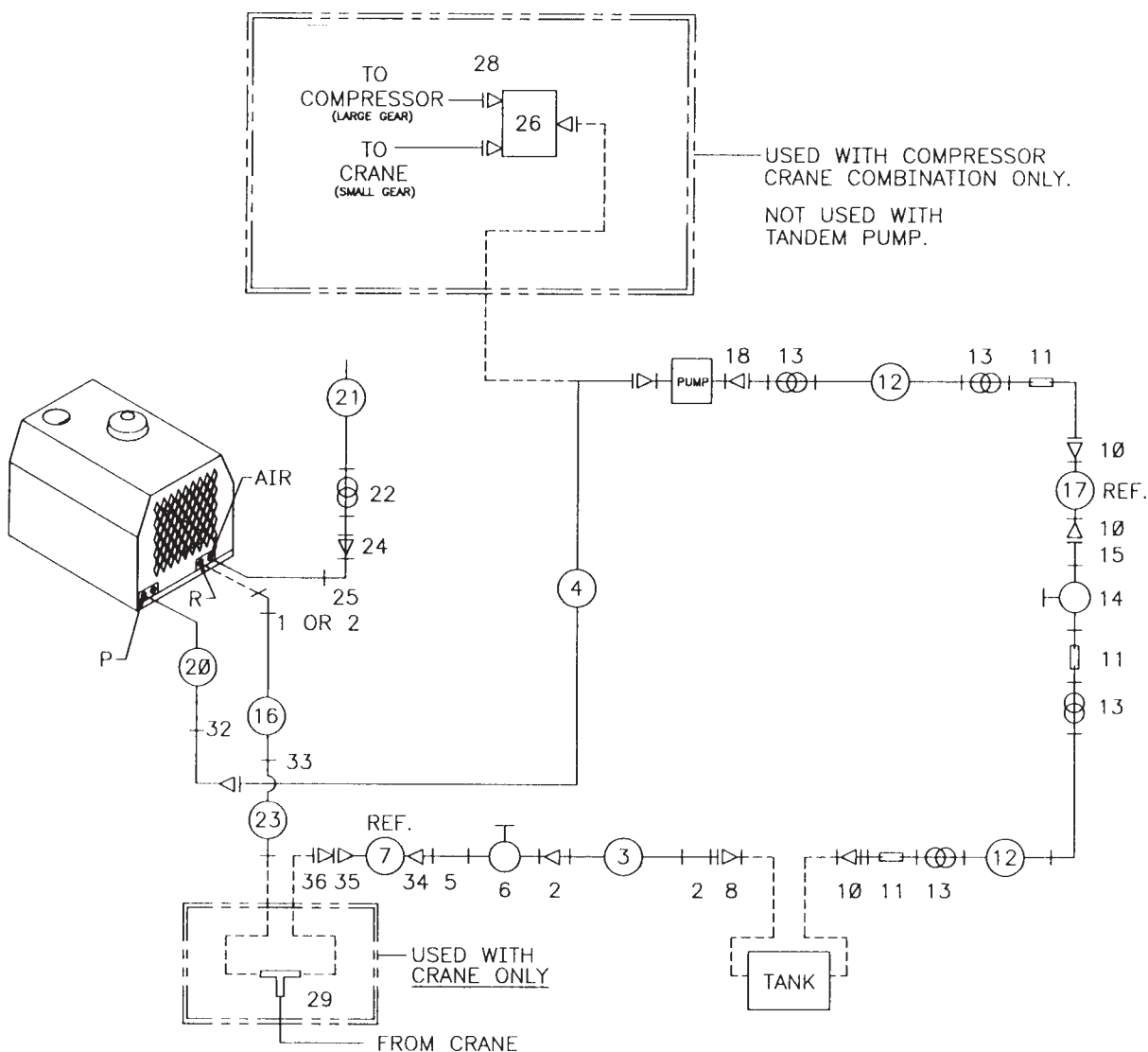


ITEM	LOCATION
14	HOSE REEL COMPARTMENT
15	HOSE REEL COMPARTMENT
16	INSIDE CANOPY
17	INSIDE CANOPY

This exploded view diagram illustrates the components of the H1804L power supply unit. The main unit is shown with its top cover, side panels, and internal components. Key features include a large cooling fan on the left side, a power input connector on the right side, and a red label with technical specifications. The diagram includes callouts for various parts: I2 (top cover), I3 (side panel), I9 (power input connector), I10 (power input cable), I11 (power input cable), I12 (power input cable), and I18 (red label). The unit is shown in an exploded view to show the assembly sequence.

HYDRAULIC INSTALLATION KIT (91707052)

1.	72531427	ELBOW 3/4NPT #12MJIC	1	18.	72532712	BEAD NIPPLE #16MSTR 1" 45°	1
2.	72053676	ADAPTER 3/4MPT #12MJIC	3	20.	51706981	HOSE ASM 1/2X35	1
3.	51707317	HOSE ASM 3/4X100	1	21.	89392349	HOSE 3/4 300#	17"
4.	51703585	HOSE ASM 1/2X220 FF	1	22.	72066000	HOSE CLAMP SAE#12	1
5.	72053141	PIPE NIPPLE 3/4NPT X CL	1	23.	51704576	HOSE ASM 3/4X72FF	1
6.	73054129	GATE VALVE 3/4NPT	1	24.	72053458	BARB NIPPLE 3/4MPT 3/4HOSE	1
7.	73052040	HYD FILTR 25MIC 1-1/4FPT	1REF	25.	72053556	STREET ELBOW 3/4NPT 90°	1
8.	72053180	REDUCER BUSHING 1-1/4 3/4	1	26.	73054685	ROTARY FLOW DIVIDER	1REF
9.	72532658	ELBOW #8MJIC #8FJIC (NOT SHOWN)	2	27.	72532358	ADAPTER	3REF
10.	72053377	REDUCER BUSHING 1-1/4 1	3	28.	72532376	HOSE FITTING	4REF
11.	72431549	BARB NIPPLE 1MPT 1HOSE	3	29.	72532695	TEE MJIC	1REF
12.	89039481	HOSE 1" 100R4	14FT	30.	51711092	KIT-RELAY BRD	1REF
13.	72066515	HOSE CLAMP 1" 2-BOLT	4	31.	93710121	INSTALLATION KIT W/CRANE (INCLUDES 26-30)	1REF
14.	73054001	GATE VALVE 1NPT	1	32.	72533373	UNION BULKHD #8JIC	1
15.	72053185	PIPE NIPPLE 1NPTXCL	1	33.	72533371	UNION BULKHD #12JIC	1
16.	51706446	HOSE ASM 3/4X35FF	1	34.	72531836	RED BUSHING 1-1/4 3/4NPT	1
17.	51709743	FILTER ASM 100-MESH	1REF	35.	72533564	ADAPTER 1-1/4MPT #16MJIC	1
				36.	72533028	ADAPTER #12MJIC #16FJIC	1

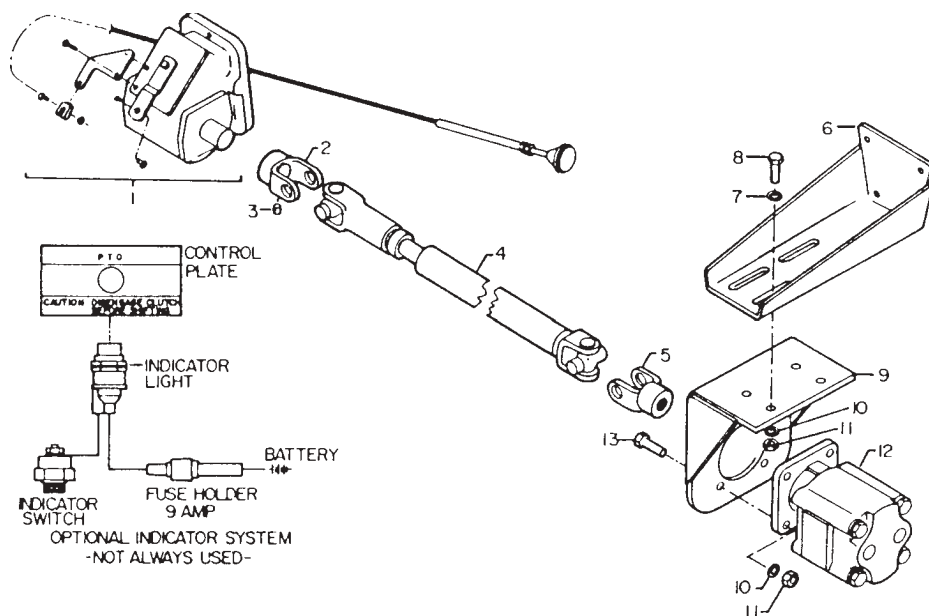


DRIVELINE MOUNTING OPTION (31701761)

ITEM	PART NO.	DESCRIPTION	QTY
1.		POWER TAKE-OFF	REF
2.	70058146	END YOKE	1
3.	72060578	SET SCR 3/8-16X3/8 HH	1
4.	70058195	DRIVESHAFT ASM	1
5.	70058094	END YOKE	1
6.	60101988	MOUNTING BRACKET	1
7.	72063005	WASHER 1/2 WRT	4
8.	72060093	CAP SCR 1/2-13X1/2 HHGR5	4
9.	52703382	PUMP MOUNTING BRACKET	1
10.	72063053	WASHER 1/2 LOCK	8
11.	72062004	NUT 1/2-13 HEX	8
12.		HYDRAULIC PUMP	REF
13.	72060094	CAP SCR 1/2-13X1-3/4 HHGR5	4

WARNING

THE INSTALLER OF THE DRIVELINE MUST INSPECT THE FINAL POSITION OF THE DRIVELINE TO DETERMINE WHETHER ITS LOCATION PROVIDES SUFFICIENT PROTECTION TO AN OPERATOR, OR OTHER PERSONNEL, FROM HAZARDS ASSOCIATED WITH A ROTATING DRIVELINE. IF PROTECTION IS INSUFFICIENT, THE INSTALLATION OF A GUARD IS REQUIRED. IF YOU ARE UNSURE OF METHODS TO GUARD A ROTATING DRIVELINE, CALL IOWA MOLD TOOLING CO., INC. FOR INSTRUCTIONS. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.



! DANGER



CONTACT WITH A ROTATING DRIVELINE
WILL CAUSE
DEATH OR SERIOUS INJURY
KEEP AWAY

- Keep clear of rotating drive shaft.
- Never work on or near an installed power take-off or driveline with the engine running.

70392891

REPAIR KITS

GASKET KIT (51393217)

7Q072212	O-RING - CYL HEAD	4
76039092	GASKET-REAR BRG HSG .006	2
76039093	GASKET-PUMP COVER	1
76039094	GASKET-REAR BRG HSG .010	2
76039111	GASKET-CYL BLOCK BOTTOM	2
76039112	GASKET-FRT BRG HSG	2
76039119	SEAL	1
76039143	GASKET-REAR BRG HSG .015	2
76039144	GASKET-REAR BRG HSG .020	2
76392119	GASKET-CYL BLOCK	2
76392641	GASKET-REED VALVE/CYL	2
76392642	GASKET-REED VALVE/HEAD	2

PISTON RING SET (51014947)

70014599	COMPRESSION RING	8
70014600	OIL RING	4

CRANKSHAFT KIT (51705743)

51705742	CRANKSHAFT ASM(INCL: KEY & CRANK)	1
70055010	BEARING-REAR CUP	1
70055011	BEARING-FRT CUP	1
70055012	BEARING-FRT CONE	1
70055009	BEARING-REAR CONE	1
72066307	DRIVE PIN	1
60101269	OIL PUMP COLLAR	1

RECOMMENDED SPARE PARTS LIST

Model CAS435HA Air Compressor

ASSEMBLY						SHELF	ORDER
DESIGNATION	ITEM NO.	PART NO.	DESCRIPTION	QTY	CODE	LIFE (MO)	QTY
0020057.01.19990209 OIL COOLING SYSTEM							
	C1	80009	CONTROLS-HYDRAULIC	1	C	N/A	
	C10	301577	FAN PUSHER	1	C	N/A	
	C11	300444	TAPE 1/16X3/4 CLOSED CELLO	2FT	C	N/A	
	C14	300211	RELAY-POWER	2	C	N/A	
	C15	300909-025	CIRCUIT BREAKER 25A	1	C	N/A	
	C20	300836	OIL COOLER 12X13.5	1	C	N/A	
00200056.01.19990209 COMPRESSOR MTG SYSTEM							
	M6	301605	TUBE ¾ AIR DISCHARGE	1	P	N/A	
	M8	77041369	PRESSURE SWITCH W/UNLOADER	1	C	N/A	
	M13	301578	SWITCH-TEMP	1	C	N/A	
	M22	301665	MOTOR-HYDRAULIC	1	C	N/A	
	M31	300857	CAP-AIR FILTER	1	C	N/A	
	N/A	300854	REPLACEMENT AIR FILTER ELEMENT	1	C	N/A	
00200056.02.19990209 COMPRESSOR ASM							
	2	70014599	COMPRESSION RING	8	W	N/A	N/A
	3	70014600	OIL RING		4	W	
	11	51706913	CRANKCASE/CRANKSHAFT ASM	1	W	N/A	
	36	60025194	CYLINDER BLOCK	2	C	N/A	
	38	60101505	PLUBGER TRANSFER BUSHING	1	C	N/A	
	42	7Q072212	O-RING	4	C	N/A	
	44	70014583	OIL PUMP SPRING	1	W	N/A	
	45	70024122	WASHER .33X.5X.03 COPPER	12	W	N/A	
	46	70029293	CYL BLOCK SPACER	2	W	N/A	
	47	51714023	INSERT ASM	2	W	N/A	
	50	70051006	OIL PUMP	1	C	N/A	
	53	70733069	REED VALVE ASM	2	W	N/A	
	66	70392654	CAP 1-3/4 RUBBER	2	C	N/A	
	71	72661487	DRIVE PIN	1	C	N/A	
	81	76039093	PUMP COVER GASKET	1	C	N/A	
	82	76039111	CYL BLOCK GASKET-BOTTOM	2	C	N/A	
	83	76392119	CYLINDER BLOCK GASKET	2	C	N/A	
	84	76392641	REED VALVE/CYL GASKET	2	C	N/A	
	85	76392642	REED VALVE/HEAD GASKET	2	C	N/A	
	M53	70143495	BREATHER CAP	1	C	N/A	
CANOPY.01.19980930 CANOPY SYSTEM							
	H7	301381	HARNESS-35 RECIP	1	C	N/A	
	H8	301581	HARNESS-TOWER 3-WAY	1	C	N/A	
	H9	301607	HARNESS-SHROUD 3-WAY	1	C	N/A	
51712642.01.19990209 INSTALLATION KIT							
	1	76391527	BUMPER-RUBBER	4	W	N/A	
	2	938206107	WASHER 3/8 FLAT GR8	4	W	N/A	
	3	929106200	BOLT 3/8-16X2 HHGR5	4	W	N/A	
91707052.01.19980930 HYDRAULIC INSTALLATION KIT							
	17	51709743	FILTER ASM 100-MESH	1	P	N/A	
	7	73052091	HYD FILTER 25/MIC-1 ¼ FPT	1	P	N/A	

For additional instructions, see DOMINSTALL: 99901223: 19990812

SECTION 5. REPAIR

5-1. GENERAL

This section describes the disassembly and assembly procedures for the air compressor. In all cases, remove the compressor from the vehicle before proceeding with disassembly and repair within a clean environment. Refer to the parts drawing in section 4 of this manual for parts locations.

5-2. PISTON RING REPLACEMENT

1. Remove the pulsation tank.
2. Unscrew the head bolts and remove the heads.

NOTE

A RUBBER FACED Mallet WILL HELP WHEN REMOVING THE HEAD. TAP THE SIDES OF THE HEAD CAREFULLY UNTIL THE HEAD IS LOOSE. LIFT OFF THE HEADS.

3. Remove the cylinder bolts. Tap the sides of the cylinder several times to break it loose from the gasket. Rock the cylinder back and forth and lift until it is free. Lift it off the pistons.

4. Use a single edged razor blade, or sharp putty knife, to remove the old gasket material.

CAUTION

DO NOT ALLOW THE GASKET MATERIAL TO FALL INTO THE CRANKCASE. DO NOT NICK THE HEAD, CYLINDER, OR CRANKCASE MATING FACES WHILE REMOVING THE OLD GASKET. REMOVE ALL OF THE OLD GASKET MATERIAL TO PROVIDE A SMOOTH, CLEAN SURFACE FOR THE NEW GASKET. FAILURE TO FOLLOW THIS PROCEDURE MAY RESULT IN THE NEED TO RESEAL THE UNIT LATER.

5. Hone the cylinder to break the glaze and to remove the buildup at the top of the cylinders.
6. Measure the inside diameter of the cylinder for roundness and excessive wear. The bore should be 2.625" (0.0025" tolerance). If the bore is oversized, the cylinder must be replaced.

7. With a ring expander, remove the compression and oil rings.

8. With the ring expander, install the new ring kit. Make certain that the oil ring is on the bottom and the beveled inside edge of the compression ring is toward the top of the piston.

9. Position the cylinder base gasket on the crankcase. Use a few drops of oil to hold it in position. Install the cylinder block spacer and gasket on the crankcase.

10. Rotate the rings so that the gaps of the three rings are 120° apart. Lightly lubricate the inside of the cylinder. Rotate the crankshaft so that a piston is at the top of the stroke. Compress the rings with a ring compressor, and slide the cylinder over the piston. Repeat for the other piston.

CAUTION

DO NOT LUBRICATE THE RINGS. USE A LIGHT LUBRICANT, SUCH AS WD-40 ONLY, ON THE CYLINDER WALLS. OILING THE RINGS WILL PREVENT THEM FROM SEATING AND CAUSE EXCESSIVE OIL CONSUMPTION.

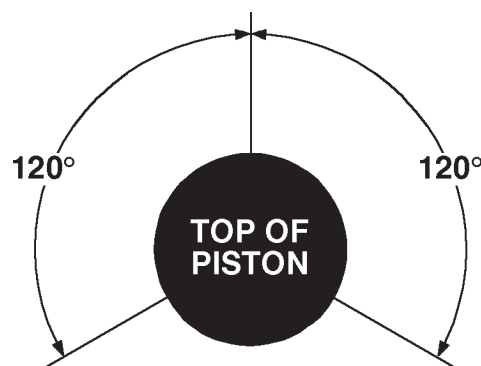


FIGURE E-1. PISTON RING ORIENTATION



FIGURE E-2. CYLINDER HEAD TORQUE SEQUENCE

11. Slide the cylinder down until it mates with the crankcase. Start all cylinder mounting bolts, until they are snug. Torque the bolts to 180 in-lbs in the sequence shown. Do not torque to the full 180 in-lbs all at once, but in 25-50 in-lb increments.

12. Position the gaskets and valve plate on top of the cylinder. Position the head on the cylinder and turn studs finger tight. Torque the studs/nuts to 240 in-lbs in 25-50 pound increments per Figure E-2.

NOTE

INSTALL THE VALVE PLATE WITH THE MARKED SURFACE FACING UP.

13. Install the pulsation tank, and torque to 180 in-lbs.

14. Install the compressor, connect the wiring and the air lines. Test the unit.

NOTE

IF PRESSURE FAILS TO BUILD AND THE COMPRESSOR IS EXCESSIVELY NOISY, CHECK THE VALVE PLATE. IT MAY HAVE BEEN INSTALLED UPSIDE DOWN.

5-3. OIL PUMP REPLACEMENT

1. Remove the bolts and lift off the pump cover.
2. With a single edged razor blade, or sharp putty knife, remove the old gasket material. Take care not to damage the machined surfaces.
3. Lift the pump out of the cavity.
4. Position a new gasket on the rear bearing housing.
5. Insert the pump into the cavity. Position the pump slightly to one side, using a common screwdriver. Wedge the pump into position so that it partially compresses the spring. Note that the driver pin and slot in pump must be in line.
6. Place the pump cover into position and start two bolts (bolts must be diagonally opposed). Strike the pump cover with a rubber faced mallet to jar the pump loose. When the tension spring can be felt against the pump cover, the pump is loose.

7. Insert the two remaining bolts and torque to 180 in-lbs. The bolts should be torqued in a diagonal pattern.

8. Install the air compressor in the vehicle. Connect the air lines and wiring.

5-4. CRANKSHAFT AND BEARING REPLACEMENT

If it is necessary to replace the crankshaft, related components must also be replaced. Replace both bearings, both races, the key, pump collar and pump drive pin.

NOTE

DEPENDING ON THE CONDITION OF THE CRANKSHAFT, BEARING MAY BE REPLACED WITHOUT REPLACING THE CRANKSHAFT. REPLACE THE BEARING RACES WHENEVER THE BEARINGS ARE REPLACED.

1. Remove the pulsation tank, both heads, cylinders, and pistons.
2. Remove the bolts on the connecting rods, and lift them out. Reassemble the connecting rods to be certain that the matched parts remain together on the same crankshaft journals.
3. Remove the pump cover, oil pump, sleeve, spring, and rear bearing housing.
4. Remove the hydraulic motor hub (#301266), and the front bearing housing.
5. Pull the crankshaft from the crankcase.
6. Remove all gasket material with a single edged razor blade, or sharp putty knife.

CAUTION

DO NOT GOUGE THE MACHINED SURFACES WHEN REMOVING THE GASKETS. THIS MAY CAUSE LEAKS.

7. Press the bearing races out of the bearing housing.
8. Press the tapered roller bearings off of the crankshaft if only the bearings are being replaced. If the crankshaft is to be replaced, discard the entire assembly.
9. Press the new bearings into position.

NOTE

THE CRANKSHAFT SHOULD HAVE NEW BEARINGS INSTALLED. IF NOT, PRESS THE NEW BEARINGS INTO POSITION ON THE CRANKSHAFT.

10. Generously oil the front bearing race and install the front bearing housing with gasket. Torque the bolts to 180 in-lbs. Torque the bolts as shown in the pattern below.

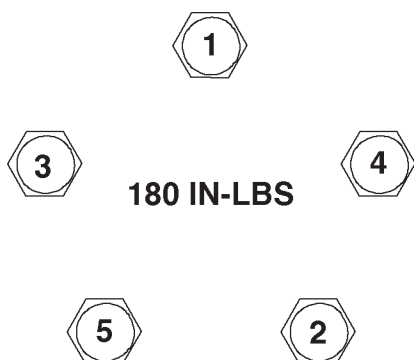


FIGURE E-3. BEARING HOUSING TORQUE SEQUENCE

11. Slide the crankshaft into the crankcase. Generously lubricate the bearing race and install the rear bearing housing and gaskets.

NOTE

GASKET KITS ARE SUPPLIED WITH TWO (2) EACH OF .006, .010, .015, AND .020 GASKETS. USE THESE REAR BEARING GASKETS IN ANY COMBINATION AND QUANTITY TO LIMIT ALL PLAY FRONT TO REAR, BUT STILL ALLOW THE CRANKSHAFT TO TURN FREELY.

12. Install the oil pump (See paragraph 5-3).

13. Install the connecting rods. Thoroughly oil the crankshaft and rods before installing them. When installing the rods, make certain that the tabs are aligned on the same side of the rod as shown below.

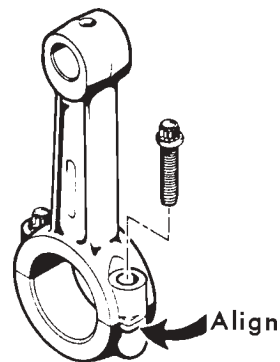


FIGURE E-4. ROD ALIGNMENT

14. Install the pistons, rings, heads and pulsation tank.

5-5. TROUBLESHOOTING

LOW OIL PRESSURE	LOW OIL LEVEL
	LOOSE PIPE PLUG ON OIL PUMP COVER
	WORN OR DEFECTIVE OIL PUMP
	CRACK OR SCRATCH ON OIL PUMP COVER
NO OIL PRESSURE	DEFECTIVE OIL PUMP
	BLOCKED OIL PASSAGE
	DAMAGED OIL PUMP DRIVE PIN
COMPRESSOR WILL NOT ENGAGE	NO POWER SUPPLIED TO COMPRESSOR
	INTERNAL CIRCUIT BREAKER TRIPPED
	PTO SWITCH NOT ENGAGED
	DEFECTIVE PRESSURE SWITCH OR UNDERHOOD SWITCH
COMPRESSOR ENGAGES BUT WILL NOT PRESSURIZE TANK	COMPRESSOR RELIEF VALVE ENGAGED
	AIR LEAK IN PLUMBING
	WORN PISTON RINGS OR VALVE PLATES
COMPRESSOR DOES NOT RECOVER PRESSURE AS FAST AS IT SHOULD	DEFECTIVE CHECK VALVE / VALVES
	DIRTY FILTER
	AIR LEAK IN PLUMBING
	WORN VALVE PLATES OR PISTON RINGS

FIGURE E-5. TROUBLESHOOTING CHART

SECTION 6. RELAY BOARD OPERATION

6-1. INTRODUCTION

To understand how the relay board operates, it is necessary to understand how the individual relays function.

The Bosch relay (part number 77041251) is a normally open relay between terminals 30 and 87 and normally closed between terminals 30 and 87a. Terminals 85 and 86 energize the relay through the coil. See Figure F-1 and F-2.

Figure F-3 shows the relay board with eight relays identified with the letters “A” through “G” and by their basic function. Example: Relay “A” is the “Power ON/OFF” relay, “C” is the “Compressor Speed Control”, etc. The small numbers shown on the individual terminals of the relay indicate where that terminal is connected through the circuit board, to the terminal bar. Example: Relay “A” top terminal (#9) is connected to terminal 9 of the terminal bar. The terminal bar is provided with 16 individual terminals of which the last two (15 and 16) are not used. Wires connected to the terminal bar have been identified according to their function in the circuit. The number of terminals used vary with each application. Solid lines between relay terminals indicate existing wiring connections, through the circuit board.

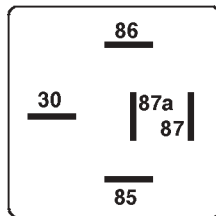


FIGURE F-1. BOTTOM VIEW OF RELAY

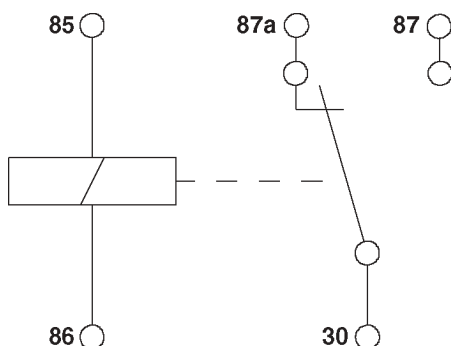


FIGURE F-2. INTERNAL WIRING

The relay board is primarily used on vehicles with remote controlled cranes and remote control cranes and compressors. The circuitry prevents remote starting of the truck engine unless the brakes are applied and the PTO is engaged. It also isolates the crane speed control from the compressor speed control.

6-2. OPERATION

6-2-1. IGNITION “ON”

When the ignition switch of the vehicle is turned “ON”, terminal 9 of the terminal bar is “HOT”. The coil of relay “A” is energized and voltage from terminal 1 of the terminal bar becomes present at terminals “A” of relays “A”, “B”, “E” and “H”. See Figure F-4.

6-2-2. REMOTE STARTING THE VEHICLE

The vehicle can be remotely started from the remote control handle after the power is turned “ON” at the handle.

To start the vehicle, the engine start switch at the handle must be depressed. When this is accomplished, terminal 11 of the terminal block becomes “HOT”. See Figure F-6.

The truck starter is energized when terminals 11 and 12 of the terminal bar are connected through the relay board. When terminal 11 is “HOT”, the coil in relay “F” is energized connecting relay terminal 12 and “B” on relays “F” and “G”. If terminal 14 of relay “H” and terminal 13 of relay “G” are grounded (brakes and PTO engaged) terminals “B” of relays “F” and “G” are “HOT”. Since terminal “B” of relay “F” is “HOT”, the truck starter solenoid is activated. Energized circuits are shown as bold in Figure F-6.

6-2-3. REMOTE ENGINE STOP

When the engine stop button is depressed on the remote control handle, voltage is applied to terminal 6 of the terminal block and of relay “D”. The coil in relay “D” is energized and the ground of the fuel solenoid/distributor coil is interrupted because current can no longer flow from terminal 7 to 8. Relay “D” is normally closed between terminals 7 and 8. See Figure F-3.

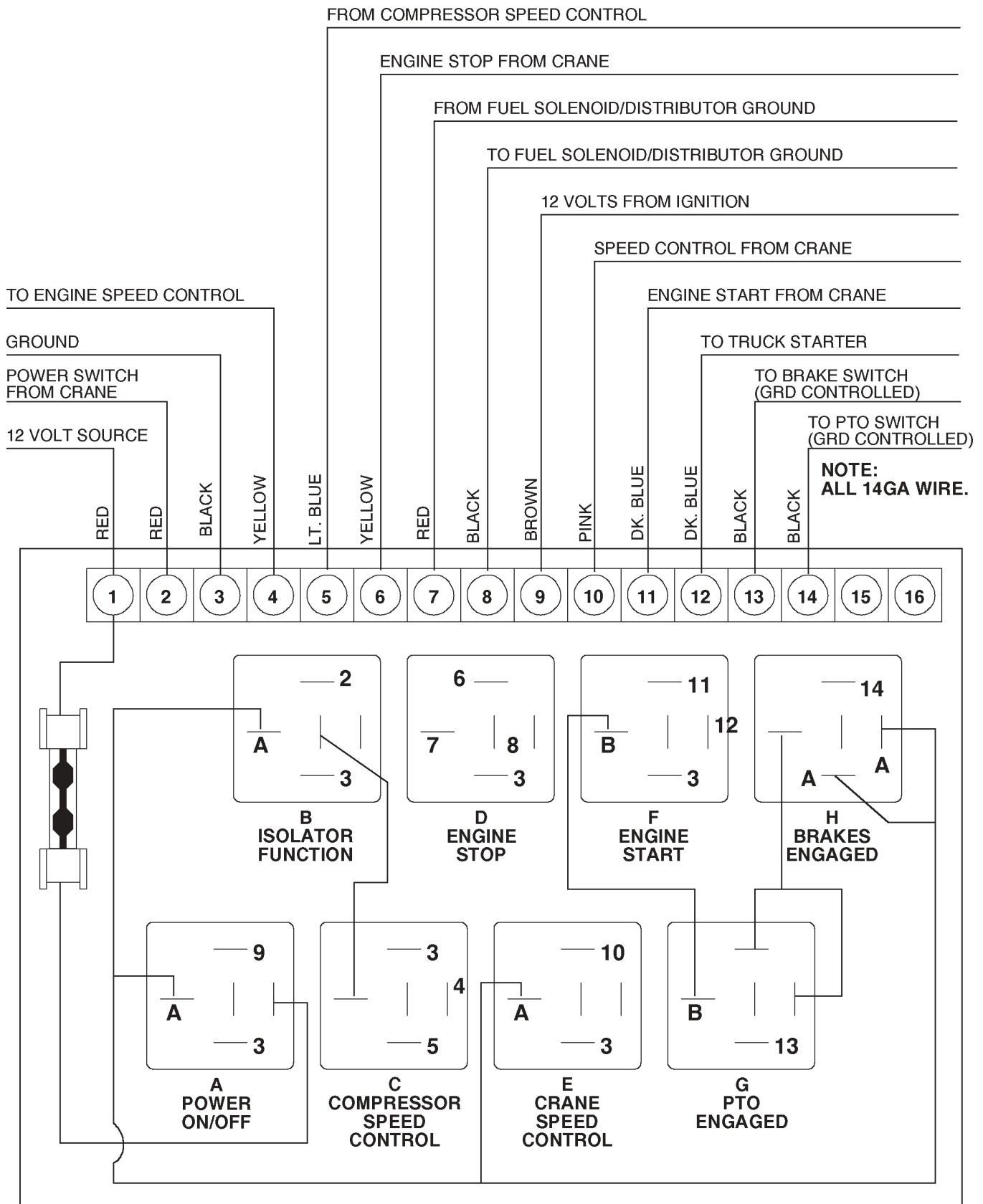


FIGURE F-3. RELAY BOARD - COMPONENTS & WIRING

6-2-4. REMOTE ENGINE SPEED (FROM CRANE)

Engine speed can be controlled from the remote control handle. When the engine speed switch is activated, voltage is applied at terminal 10 of relay “E”. The coil of relay “E” is energized and current is allowed to flow to the speed control coil. The speed of the engine will remain higher as long as the engine speed switch in the remote control handle is allowed to remain in the same position. If this switch is returned to its original position, the engine speed control coil will be de-energized through relay “E”.

6-2-5. COMPRESSOR ENGINE SPEED CONTROL (COMPRESSOR ONLY)

When the compressor “kicks in” or goes into the charging mode, the engine speed of the vehicle is increased; when it “kicks out” or goes in the unloading mode, the engine speed is reduced.

When the compressor goes into the charging mode, terminal 5 of relay “C” energizes the coil in the relay, connecting terminal 4 to terminal “C” of the relay which is “HOT” from relay “B”. Reference Figure F-7 showing circuits energized (in bold) when engine speed is increased by the compressor.

6-2-6. ENGINE SPEED CONTROL WHEN BOTH CRANE AND COMPRESSOR ARE USED SIMULTANEOUSLY

When the engine speed has been increased from the remote control handle to operate the crane, it (the speed) will remain unchanged regardless of the speed signals received from the compressor.

If, however, the crane is operated at slow engine speed simultaneously with the compressor, the speed increase signals from the compressor will increase engine speed. To prevent the compressor from unexpectedly increasing the engine speed when handling a load with the crane, an isolator (relay “B”) has been placed in the circuit. This relay “B” is energized separately from the crane compartment.

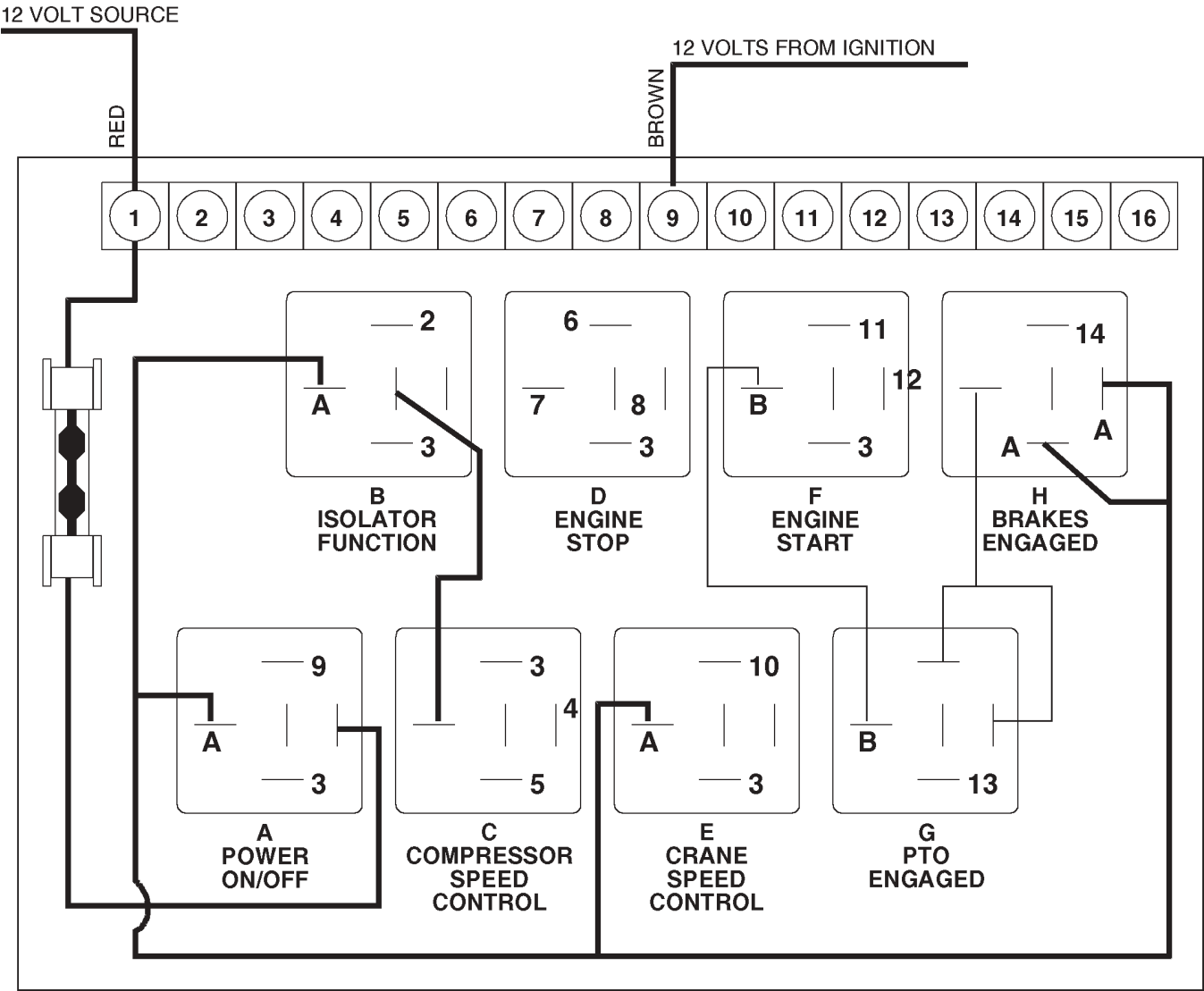


FIGURE F-4. IGNITION “ON”

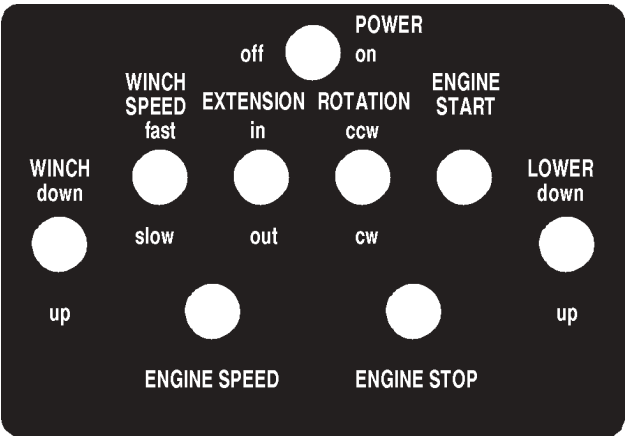
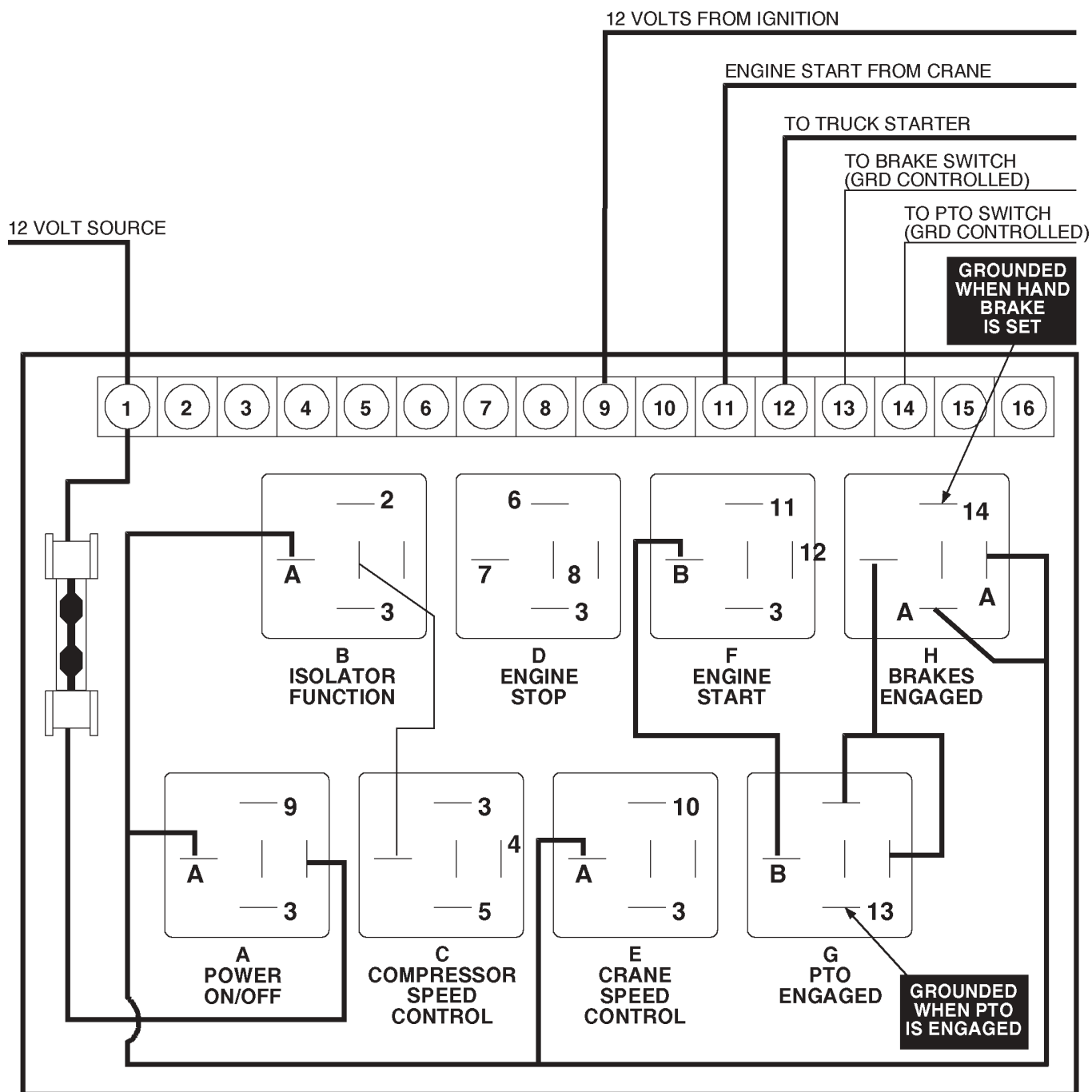


FIGURE F-5. REMOTE CONTROL HANDLE - TYPICAL

**FIGURE F-6. REMOTE STARTING OF VEHICLE - IGNITION "ON"**

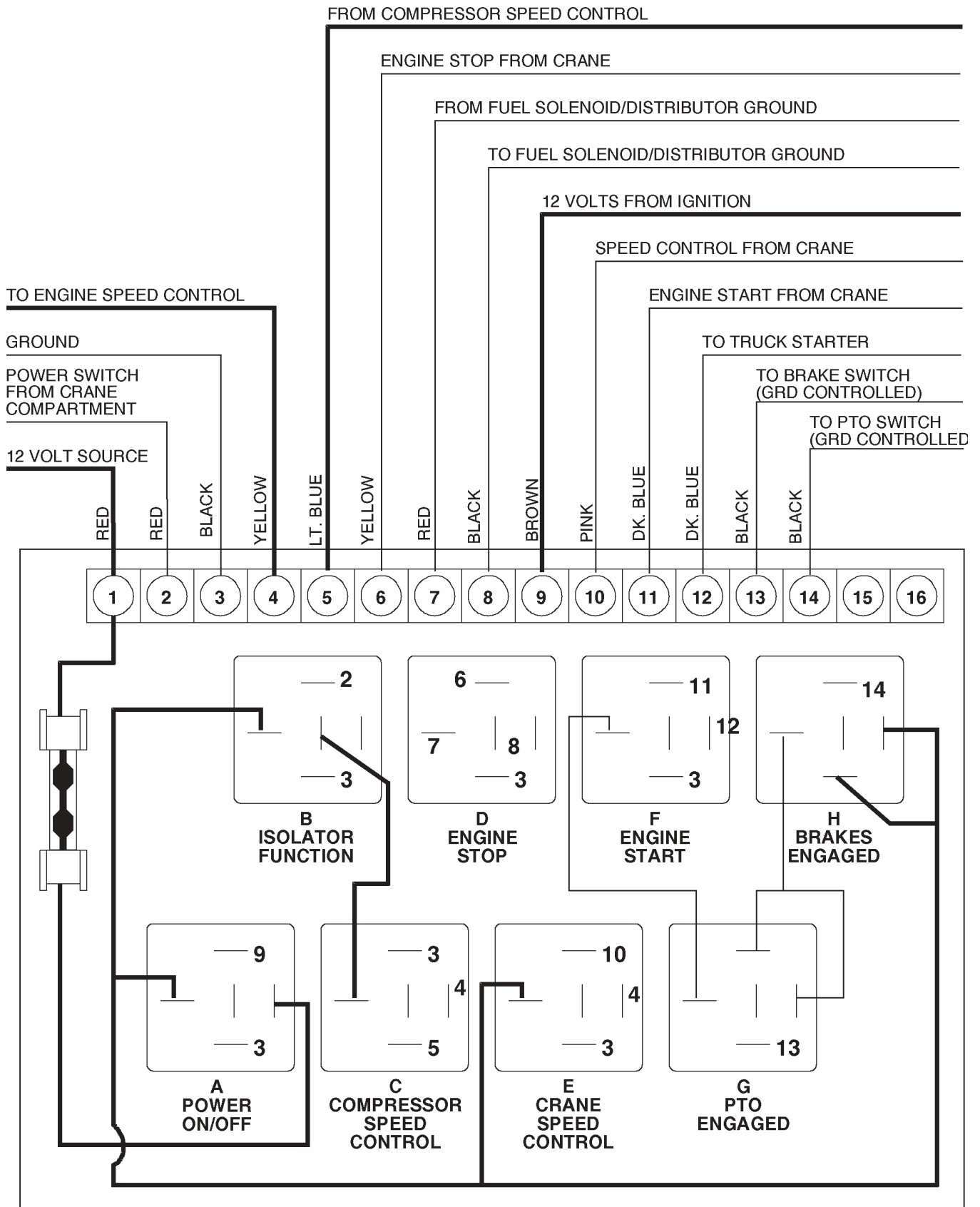


FIGURE F-7. SPEED CONTROL - COMPRESSOR ONLY

WIRING CHART

TERM	WIRING CONNECTION
1	12-VOLT
2	POWER SWITCH FROM CRANE
3	GROUND
4	TO SPEED CONTROL
5	SPEED CONTROL FROM COMPRESSOR
6	ENGINE STOP FROM CRANE
7	FROM FUEL SOLENOID / DISTRIBUTOR GRD
8	TO FUEL SOLENOID / DISTRIBUTOR GRD
9	12-VOLT FROM IGNITION
10	SPEED CONTROL FROM CRANE
11	ENGINE START FROM CRANE
12	TO TRUCK STARTER
13	TO BRAKE SWITCH, CONTROLLED
14	TO PTO SWITCH, CONTROLLED
15	NC
16	NC

RELAY	FUNCTION
A	ON / OFF, POWER
B	ISOLATION, SPEED CONTROL
C	COMPRESSOR, SPEED CONTROL
D	ENGINE STOP
E	CRANE SPEED CONTROL
F	ENGINE START
G	BRAKE SWITCH, CONTROLLED
H	PTO SWITCH

WARNING

* NOTES

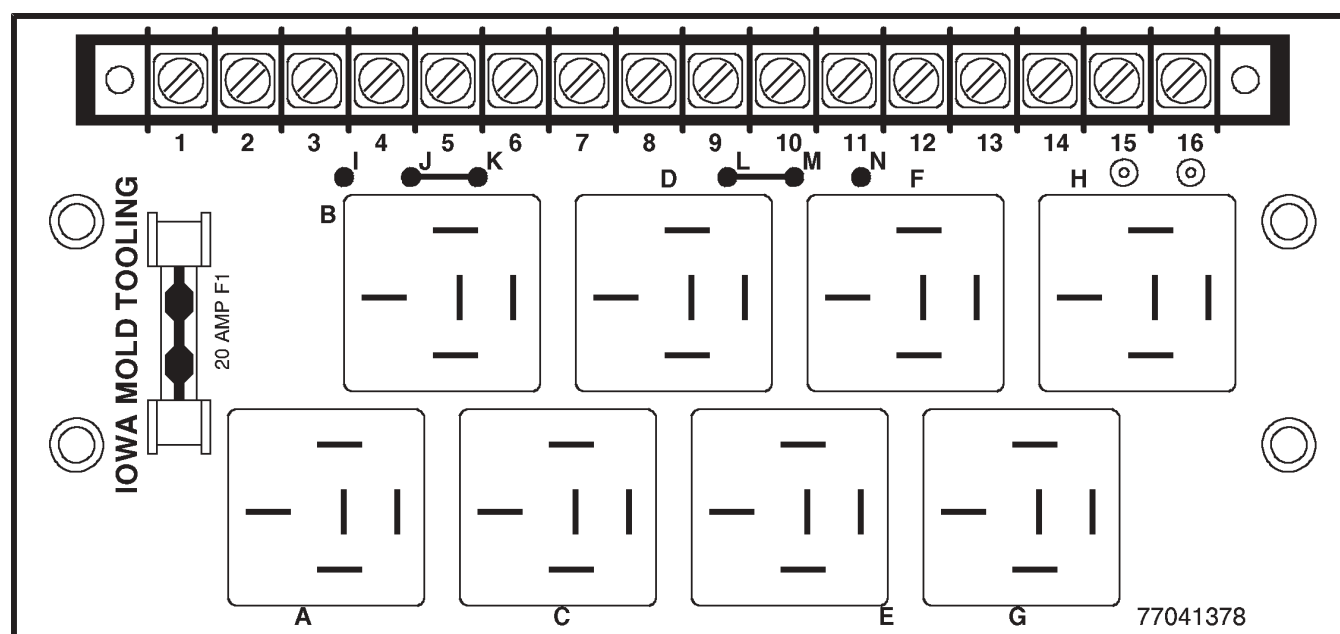


FIGURE F-8. RELAY BOARD (77041378) WIRING INSTRUCTIONS

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