SERVICE MANUAL

Model 1154 Air Compressor
(Dual Cooler - 10 GPM)

IOWA MOLD TOOLING CO., INC.
BOX 189, GARNER, IA 50438
641-923-3711
TECHNICAL SUPPORT FAX: 641-923-2424

MANUAL PART NO. 99900378

REVISED
04-22-91
06-03-91
11-13-91
05-04-92
05-13-92
09-14-92
12-17-92

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

SECTION 1
General Information

1-1. INTRODUCTION

This manual provides information on the installation, operation and repair of the IMT Model 1154-DC10 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. These two things can add up to a safer working environment and longer equipment life.

1-2. ORDERING INFORMATION

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

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:

SECTION 2. Installation and Specifications

2-1. GENERAL

This section deals with the installation of the PTO and pump and the IMT hydraulic compressor. The instructions are intended as a guide to assist you with your particular installation. We can not cover every make, model and year of truck manufactured world-wide, so these instructions will provide only general information. Use this section as a guide only. Also listed in this section are the specifications for the air compressor.

2-2. PTO AND PUMP INSTALLATION

The pump may either be installed directly on the PTO or, as an optional method, it may be driven by a driveline.

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. Some trucks may require modification of the transmission cross-member to provide clearance and the exhaust pipe may need modification. 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.

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 1/32" to 1/16". 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 automatic transmission fluid.

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 allow it to run for 5 - 10 minutes. Check for leaks, unusual noise and proper operation.

8. Retorque the mounting bolts.

® Registered trademark of Permatex Co., Inc., Kansas City, Kansas.

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.

1. Install the PTO (refer to Paragraph 2-2-1).
2. Loosely bolt the pump mounting bracket (A) to the adjustable bracket (B).
3. Bolt the adjustable bracket to the frame at a point that will not exceed 48" (122 cm) from the PTO and will not cause a joint angle greater than 3 degrees.
4. Check 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. Allow 1" (2.54 cm) extra for PTO end yoke.
6. Install driveline, lock set screws and lubricate U-joints.
7. Ensure all mounting bolts are tight.

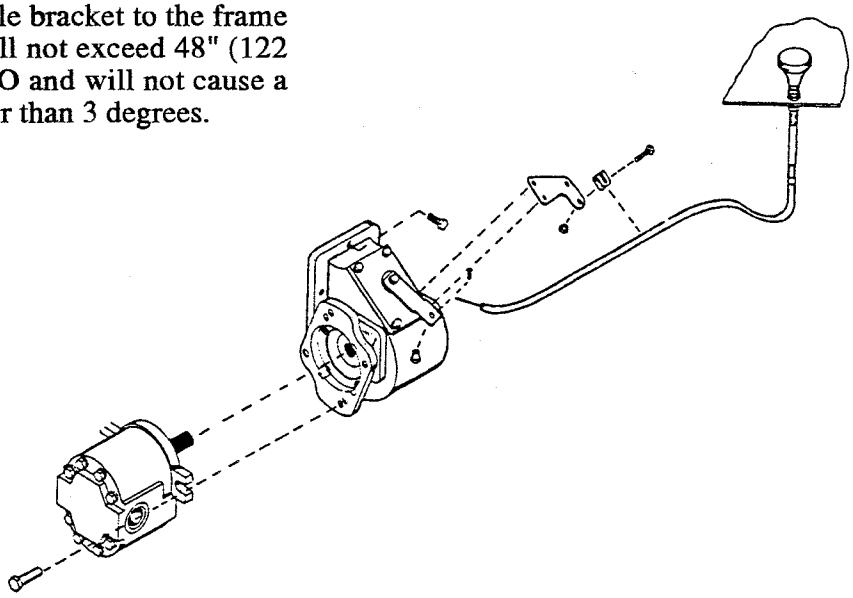


FIGURE B-1. PTO Installation

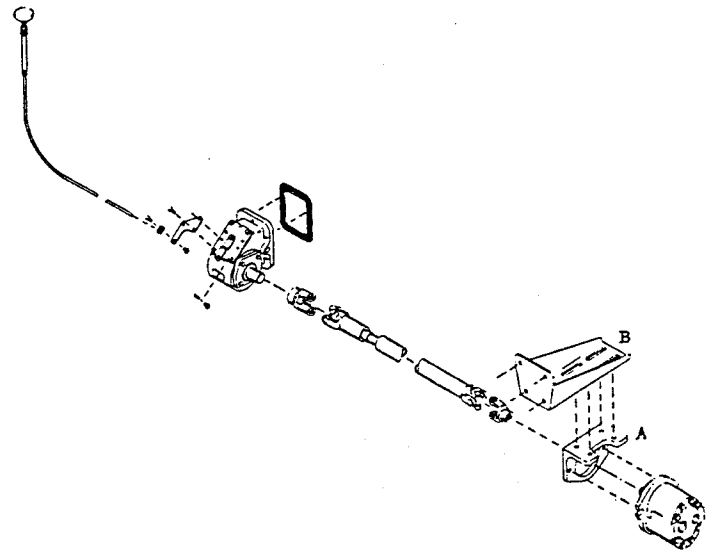


FIGURE B-2. Driveline and Pump Installation

2-3. COMPRESSOR INSTALLATION

1. Prepare the mounting location of the compressor by locating and drilling four (4) holes, 7/16" diameter, as shown in Figure B-3.

2. Position the rubber bumpers on these holes and lift the compressor into place.

3. Using the four (4) 3/8-16 X 2-1/2" cap screws and 3/8" wraught washers, secure the compressor in place by inserting the cap screws from below the mounting surface as shown in Figure E-1.

4. Electrical Connections

   A. Connect the black wire to the vehicle frame or other suitable ground.

   B. Mount the single throw toggle switch in a convenient location. Connect the red wire from the compressor to the switch. Connect the other terminal of the switch to the fuse holder and then to a 12 volt power supply as shown in Figure E-1.

   C. The blue wire is to be connected to the speed control.

CAUTION

Damage may occur if the compressor is not connected to a speed control.

2-4. ELECTRIC SPEED CONTROL

An optional electric speed control (IMT part number 93091419) should be used. This unit is provided with mounting instructions. On units equipped with an electric speed control, the engine speed will automatically increase when the clutch is engaged, and decrease when the clutch is disengaged. See Figure B-3.

2-5. SPECIFICATIONS

The IMT Model 1154 air compressor is a single-stage, four-cylinder, hydraulically driven unit with a delivery rate of 35 CFM at 90 PSI. The compressor is designed for above-deck or below-deck mounting.

The magnetic clutch is engaged and disengaged by use of an air pressure sensing, electric switch. The pressure switch is preset on factory installed units at approximately 120 PSI to engage, and 150 PSI to disengage.

SPECIFICATIONS

POWER SOURCE	HYDRAULIC MOTOR (10 GPM @ 2500PSI)
BORE	2-5/8"
STROKE	2-1/2"
DIMENSIONS	26"L X 18"H X 18"W
WEIGHT	200 LBS
DISPLACEMENT	47.0 CFM
DELIVERY	35 CFM @ 90 PSI
FAN DIAMETER	14"
RESERVOIR REQUIREMENT	12 GAL. MINIMUM

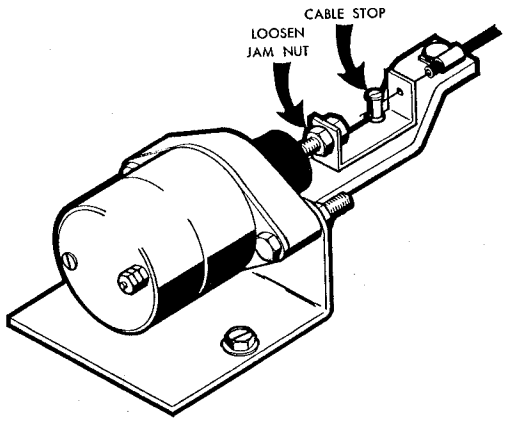


Figure B-3. Electric Speed Contol

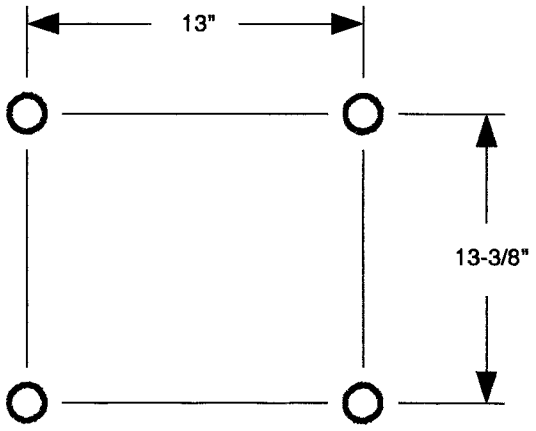


Figure B-4. Mounting Hole Dimensions

Section 3. Preventive Maintenance

3-1. GENERAL

The following table is a list of routine maintenance items, including service intervals. See Section 5 for parts identification and reference.

ROUTINE MAINTENANCE CHECK LIST

Maintenance Operation	Service Intervals		
	Weekly	500/3	1000/6
Air intake - inspect and clean		■	
Crankcase oil - check level, add if needed	■		
Crankcase oil - change		■	
Compressor valves - inspect and clean			■
Cooling vanes (fins) - clean			■
Safety valves - check operation	■		
Safety valves - clean		■	
Electric clutch - check operation		■	
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.

Section 4. REPAIR

4-1. GENERAL

This section describes the disassembly and assembly procedures for the air compressor.

In all cases, remove the compressor from the vehicle and perform disassembly and repair within a clean environment. Refer to Figure E-3 for parts locations.

4-2. 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 degrees 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 D-1. Piston Ring Gap Orientation

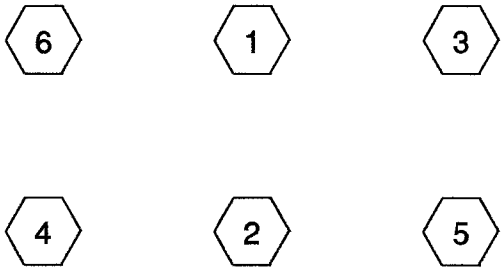


Figure D-2. Head Bolt Torque Sequence

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 inch pounds in the sequence shown. Do not torque to the full 180 inch pounds all at once. Torque in 25 - 50 pound increments.
12. Position the gaskets and valve plate on top of the cylinder. Position the head on the cylinder and turn all of the bolts finger tight. Torque in the same manner described in step 11 (See Fig. D-2).

NOTE

Install the valve plate with the marked surface facing up.

13. Install the pulsation tank, and torque to 180 inch pounds.
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.

4-3. 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.
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 inch pounds. The bolts should be torqued in a diagonal pattern.

4-4. 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.
3. Remove the pump cover, oil pump, sleeve, spring, and rear bearing housing.
4. Remove the clutch and pulley assembly, 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 inch pounds. Torque the bolts as shown in Figure D-3.

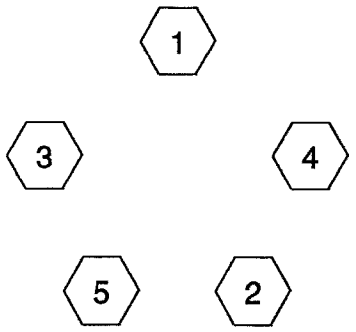


Figure D-3. Housing Torque Sequence

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

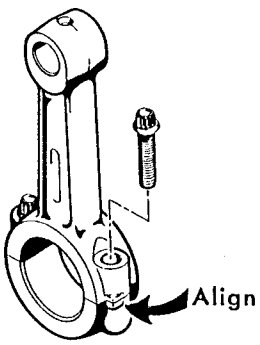


Figure D-4. Rod Alignment Tabs

4-5. CLUTCH REPLACEMENT

CAUTION

Clutch failure may be due to a leaking check valve. Make certain that the check valves are functioning properly before installing the new clutch. The check valves may be checked by pressurizing the tank and shutting off the compressor. There should be no air escaping from the unloader valve. If there is air escaping, the check valves are faulty.

The clutch assembly can be removed while the compressor is still on the vehicle. The following procedure should be used.

WARNING

Attempting to start the engine while the clutch is being removed will cause serious injury.

1. Turn on the ignition switch, and move the compressor switch to the on position. This will engage the clutch, and make for easier removal.
2. Remove the bolt in the center of the pulley and insert a 5/8-11 bolt.
3. Tighten the 5/8-11 bolt until the pulley is forced off the crankshaft.
4. Loosen the drive belt and remove the pulley.

NOTE

If the drive belt is loosened before the pulley is loose, it will be difficult to hold the pulley stationary while tightening the 5/8-11 bolt.

CAUTION

Do not use a wheel puller on the outer rim of the pulley. This can result in damage to the clutch bearing.

5. Remove the four (4) bolts holding the coil assembly to the front of the compressor.

To reinstall the clutch:

1. Position the magnetic coil assembly over the front bearing housing and secure the assembly with the 1/4-20 bolts. Torque to 85 - 120 inch pounds.
2. Insert the woodruff key into the crankshaft slot.
3. Slide the pulley, spacer, and lock washer onto the end of crankshaft. Be certain that the pulley slot aligns with the woodruff key. Secure them with the 5/16-18 bolts.
4. Rotate the pulley assembly manually to check for interference between the pulley and the coil. If there is interference, disassemble the clutch and repeat the procedure.
5. Install and tighten the drive belts.
6. Connect the coil wire to the air pressure switch.
7. Move the compressor switch in the cab to the on position to activate the clutch. Tighten the center bolt in the pulley.
8. Test the unit for proper operation.

NOTE

If there is excessive clearance between the coil and the pulley, the clutch will not engage. Use three 1/4" flat washer as shims between the coil and the front bearing housing. Retest the unit. If the clutch operates properly, order four spacers to replace the washer shims.

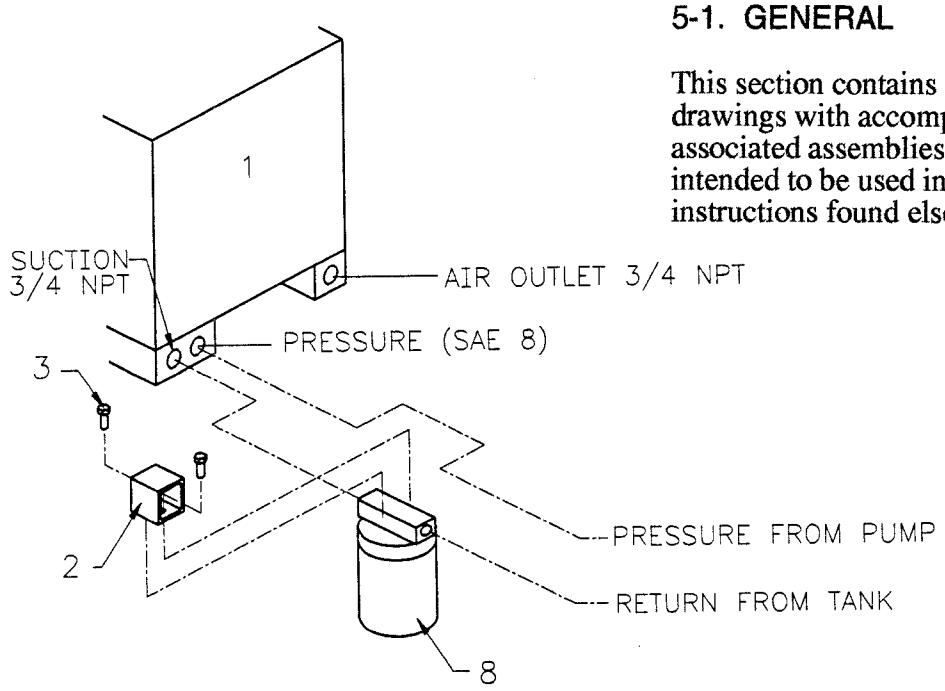
4-6. TROUBLESHOOTING

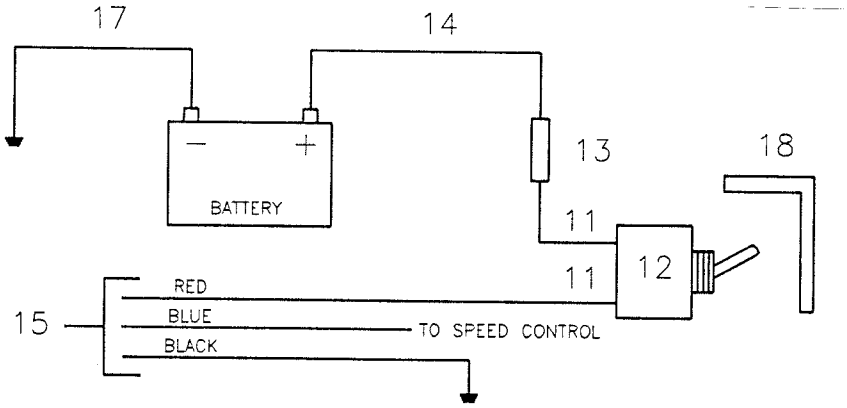
SYMPTOM	PROBABLE CAUSE
Low oil pressure	Low oil level
	Loose pipe plug on oil pump cover
	Worn or defective oil pump
	Crack or scratch on oil pump cover
No oil pressure	Defective oil pump
	Blocked oil passage
	Damaged oil pump drive pin
Compressor will not engage	Blown fuse
	Defective clutch
	Defective pressure switch or underhood switch
Compressor engages but will	Air leak in plumbing
not pressurize air tank	Worn piston rings or valve plates
	Defective check valve
Compressor does not recover	Defective check valve
pressure as fast as it should	Dirty filters
	Air leak in plumbing
	Worn valve plates or piston rings

Section 5. PARTS

5-1. GENERAL

This section contains the exploded parts drawings with accompanying parts lists for associated assemblies. These drawings are intended to be used in conjunction with the instructions found elsewhere in this manual.





ITEM	PART NO.	DESCRIPTION	QTY
1.	51709572	COMPRESSOR - MODEL 1154 DC10 (SEE DRAWING)	1
2.	60110673	FILTER BRACKET	2
3.	72060023	CAP SCR 5/16-18X3/4 HH GR5	4
4.	51709743	FILTER 100-MESH	1
5.	72060052	CAP SCR 3/8-16 X 2-1/2 HH GR5	4
6.	99900378	MANUAL	1
7.	72063003	WASHER 3/8 WRT	4
8.	73052000	FILTER 10-MICRON	1
9.	76391527	RUBBER BUMPER	4
10.	77040048	BUTT CONNECTOR 16-14GA	2
11.	77040000	TERMINAL SPD #10 16-14GA	2
12.	77041004	TOGGLE SWITCH ST	1
13.	77041056	IN-LINE FUSE 20AMP	1
14.	89044233	CABLE 14GA BRN	24"
15.	89044371	CABLE 14GA 3WIRE	25'
16.	77040052	TERMINAL RING 3/8 12-10GA	1
17.	89044274	WIRE 14GA BLK	24"
18.	60103535	SWITCH BRACKET	1

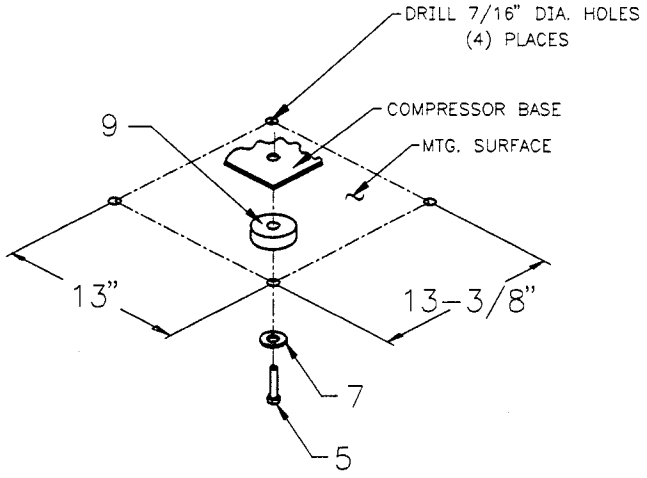


Figure E-1. COMPRESSOR - MODEL 1154 DC10 COMPLETE (23115410)

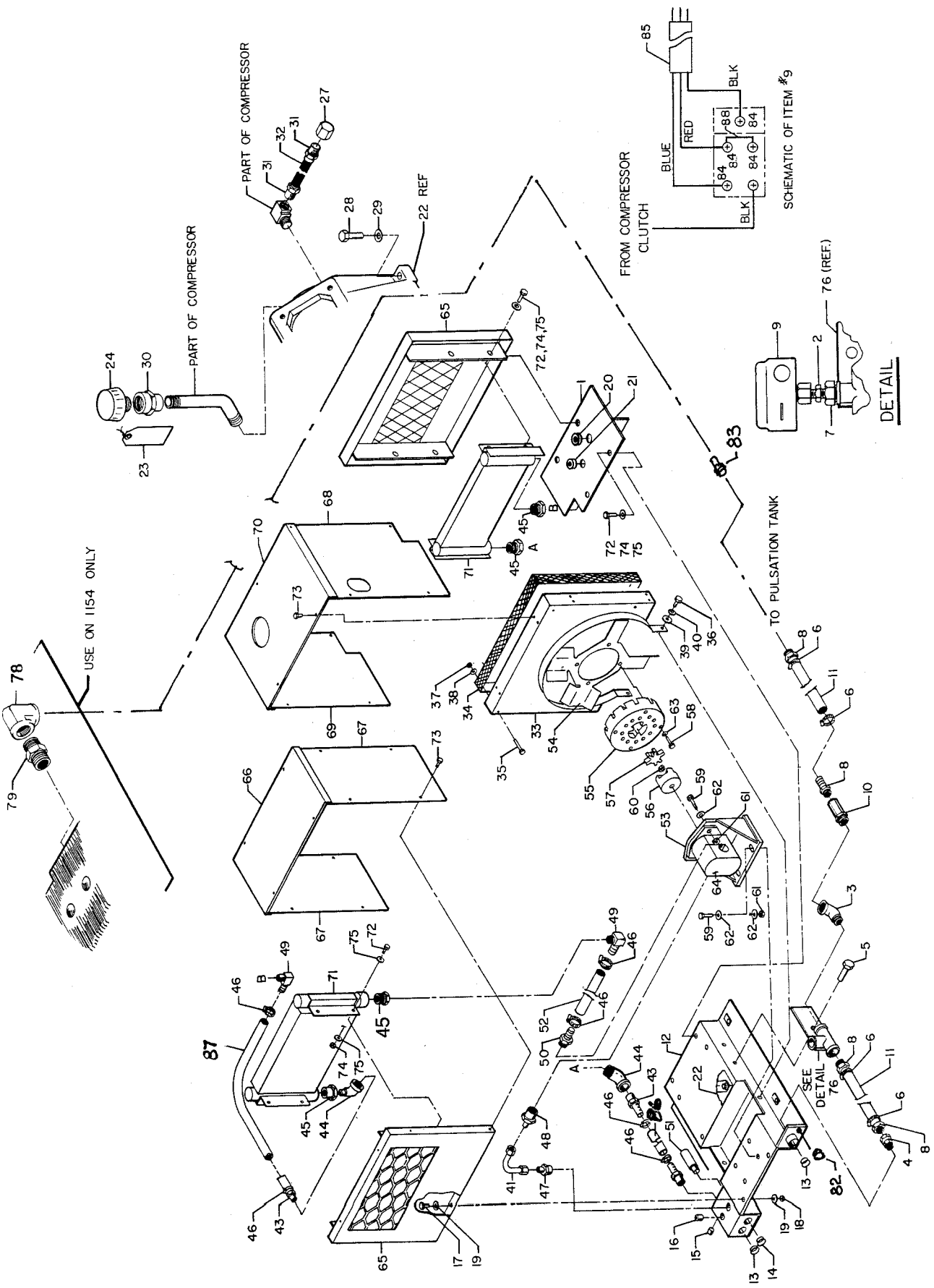


Figure E-2. 1154 DC10 Compressor Assembly (Part Number 51709572)

1154 - DC10 COMPRESSOR ASSEMBLY
PART NUMBER 51709572

ITEM NO.	PART NO.	DESCRIPTION	QTY
1.	52709542	REAR COOLER MTG PLATE	1
2.	72053517	ADAPTER 1/4MPT X 1/4MPT	1
3.	72053535	STREET ELBOW 3/4 X 45^{0}	1
4.	72053645	ADAPTER 3/4MPT X 3/4FPT SWVL	1
5.	72060046	CAP SCREW 3/8-16 X 1 HH GR5	1
6.	72066000	HOSE CLAMP 1/2 - 1-1/4 SAE#12	4
7.	72531831	REDUCER BUSHING 3/4 X 1/4	1
8.	72532832	HOSE FITTING 3/4 X 3/4	4
9.	77041369	PRESSURE SWITCH	1
10.	77041392	LOAD GENIE	1
11.	89392349	HOSE 3/4 300PSI X 7"	1
12.	52707036	BASE	1
13.	70034293	PLASTIC PLUG 3/4NPT	2
14.	70034294	PLASTIC PLUG 3/4STR	1
15.	72053241	PIPE PLUG 1/4 HOL HEX	1
16.	72053243	PIPE PLUG 1/2 HOL HEX	1
17.	72060025	CAP SCREW 5/16-18 X 1 HH GR5	2
18.	72062109	NUT 5/16-18 LOCK	2
19.	72063002	WASHER 5/16 WRT	4
20.	76391173	RUBBER GROMMET	1
21.	76393038	GROMMET 7/16	1
22.	51706914	COMPRESSOR (SEE DRAWING)	1
23.	70039124	TAG - SYNTHETIC OIL	1
24.	70143495	BREATHER CAP	1
27.	72053819	PIPE CAP 3/8	1
28.	72060048	CAP SCREW 3/8-16 X 1-1/2 HH GR5	4
29.	72063051	WASHER 3/8 LOCK	4
30.	72531856	REDUCER COUPLING 3/4 X 1/2	1
31.	72532555	HOSE FITTING 3/8 X 3/8 TYPE O	2
32.	89392426	HOSE 3/8 200PSI X 10"	1
33.	52707035	FAN SHROUD	1
34.	60110392	FAN GUARD	1
35.	72060009	CAP SCREW 1/4-20 X 2-1/4 HH GR5	4
36.	72060044	CAP SCREW 3/8-16 X 3/4 HH GR5	2
37.	72062104	NUT 1/4-20 LOCK	4
38.	72063001	WASHER 1/4 WRT	4
39.	72063003	WASHER 3/8 WRT	2
40.	72063051	WASHER 3/8 LOCK	2
41.	70143157	TUBE ASM	1
43.	72053458	BARB NIPPLE 3/4NPT X 3/4	3
44.	72053535	STREET ELBOW 3/4 X 45^{0}	2
45.	72053559	REDUCER BUSHING 1" X 3/4	4
46.	72066000	HOSE CLAMP 1/2 X 1-1/4 SAE#12	6
47.	72532358	ADAPTER 3/4MSTR X 3/4MJIC	1
48.	72532360	ADAPTER 1-1/16MSTR X 3/4MJIC	1
49.	72533116	ELBOW 3/4MPT X 3/4 BARB	2
50.	72533117	BARB NIPPLE	1
51.	73054583	RELIEF VALVE	1
52.	60350006	HOSE 3/4 100R4 X 4-1/2"	1
53.	52706924	MOTOR MOUNT	1
54.	60015015	FAN	1
55.	60025506	CLUTCH ADAPTER	1
56.	60110379	MOTOR ADAPTER	1
57.	70143145	SPIDER	1
58.	72060030	CAP SCREW 5/16-18 X 2-1/4 HH GR5	4
59.	72060048	CAP SCREW 3/8-16 X 1-1/2 HH GR5	6
60.	72062038	NUT 7/16-20 HEX	1
61.	72062103	NUT 3/8-16 LOCK	6
62.	72063003	WASHER 3/8 WRT	10
63.	72063050	WASHER 5/16 LOCK	4
64.	73051505	MOTOR 10GPM	1
65.	52707034	FRONT ENCLOSURE PANEL	2
66.	60110354	HALF ENCLOSURE PANEL - TOP	1
67.	60110356	HALF ENCLOSURE PANEL - RH	2
68.	60113798	SIDE PANEL - LH	1
69.	60113799	SIDE PANEL - RH	1
70.	60113800	TOP PANEL	1
71.	70143144	OIL COOLER	2
72.	72060025	CAP SCREW 5/16-18 X 1 HH GR5	12
73.	72061096	SELF TAPPING SCREW #12-12 X 1/2	24
74.	72062109	NUT 5/16-18 LOCK	12
75.	72063002	WASHER 5/16 WRT	24
76.	52709541	MOUNTING BRACKET - PR SW	1
77.	51086090	SYNTHETIC COMPRESSOR OIL-1 QT	2
78.	72053335	ELBOW 3/4 X 90^{0}	1
79.	72053558	ADAPTER 3/4MPT X 3/4MPT	1
80.	70029117	PLACARD-IDENT(NOT SHWN)	1
81.	72066340	POP RIVET 1/8 (NOT SHOWN)	2
82.	76392227	GROMMET - RUBBER	1
83.	72053645	ADAPTER MPT/FPT SWVL 3/4	1
84.	77040050	TERMINAL - SPADE #10 STUD	6
85.	89044371	CABLE 14GA/3WIRE	2'
86.	60350007	HOSE 3/4 100R4 X 17-1/2"	1
87.	60350008	HOSE 3/4 100R4 X 31"	1
88.	89044232	WIRE 14GA RED	3"

CAUTION

REED VALVES (ITEM 53) ARE MARKED WITH "TOP", "INTAKE", "EXHAUST", AND A NOTCH ON ONE SIDE. "INTAKE" GOES TOWARD PULSATION TANK (ITEM 35). "EXHAUST" AND NOTCH GO TO THE OUTSIDE. "TOP" GOES UP.

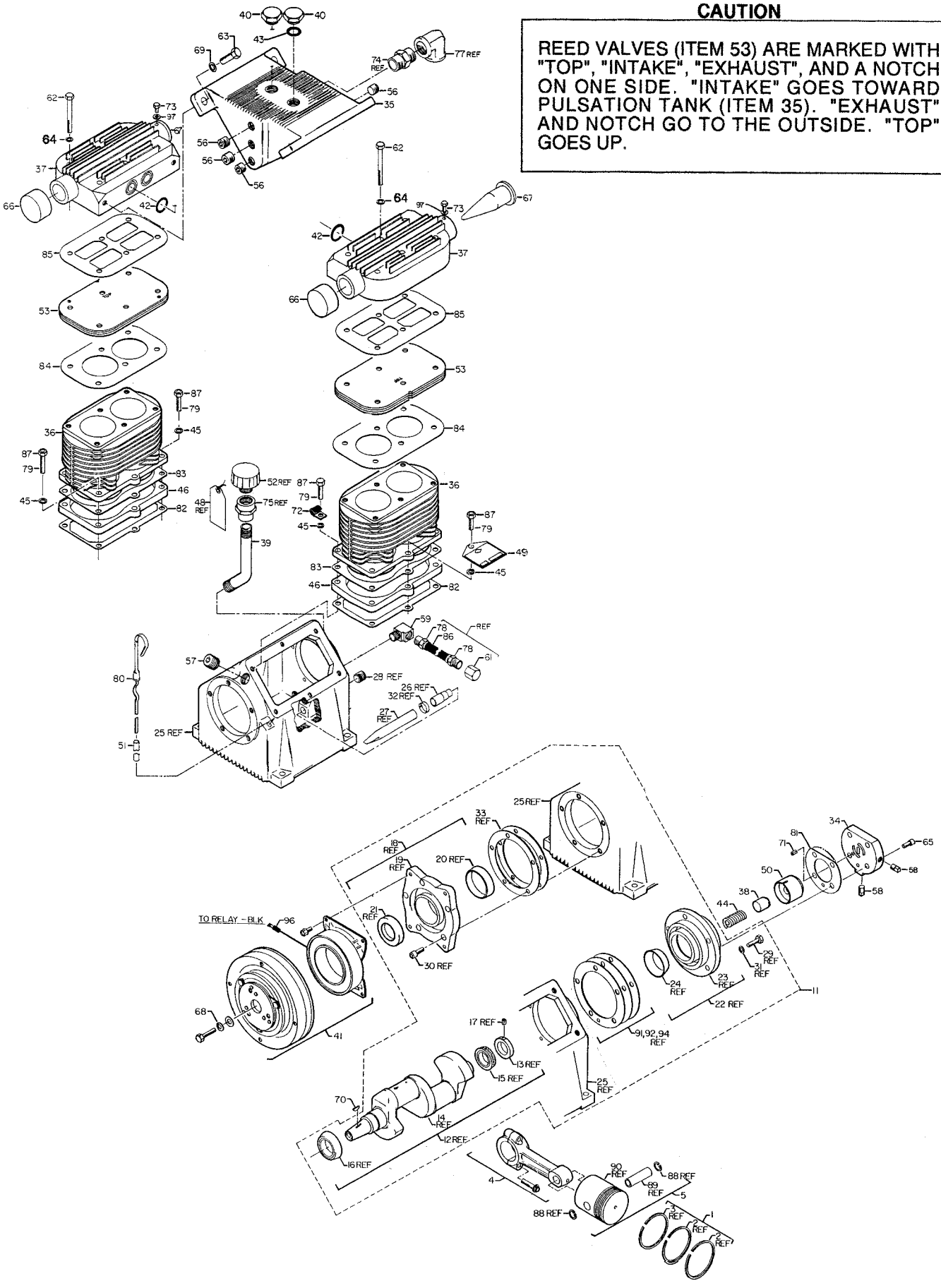
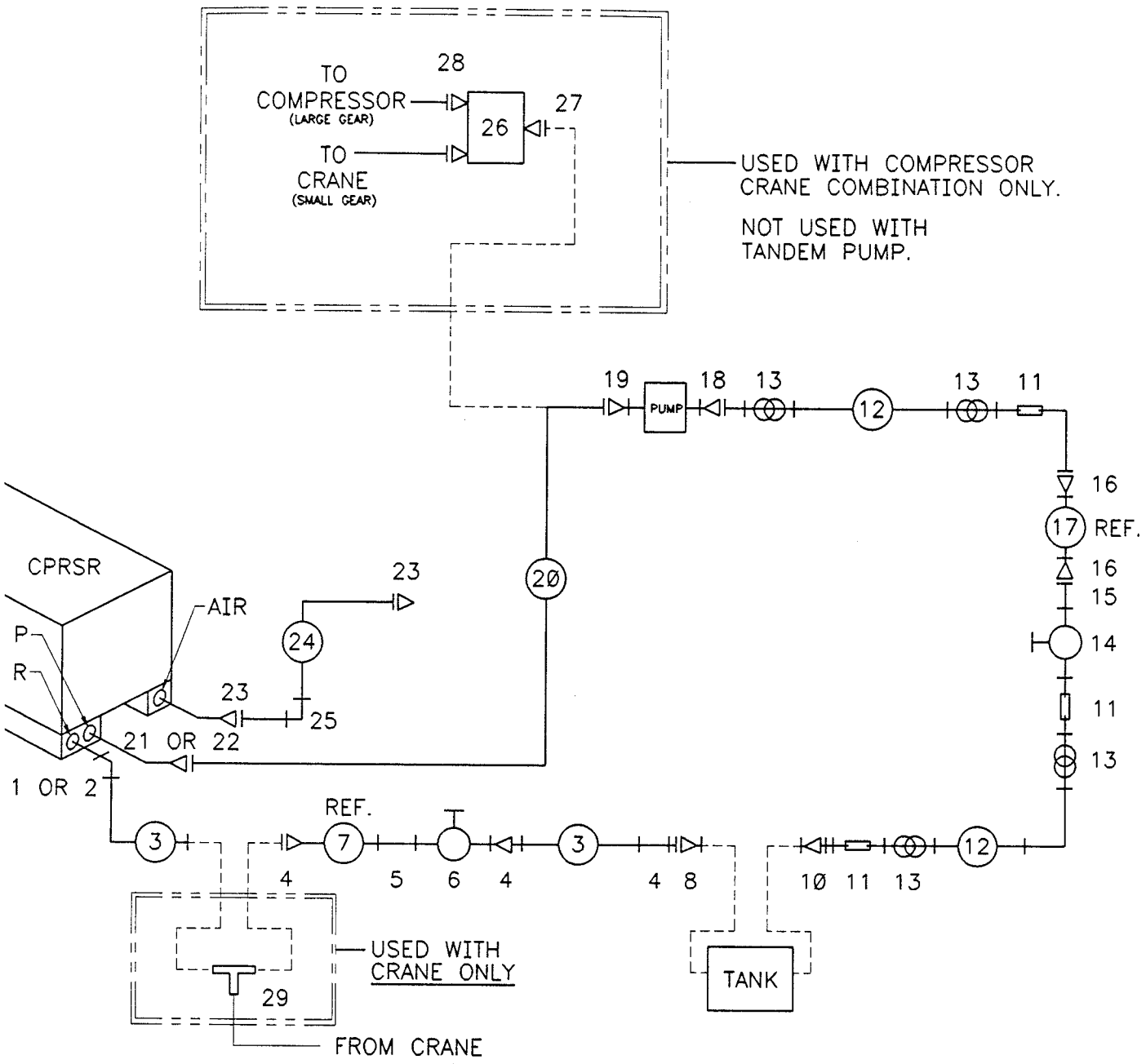


Figure E-3. 1154 COMPRESSOR UNIT (51706914)

1154 COMPRESSOR
PART NUMBER 51706914

ITEM	PART NO.	DESCRIPTION	QTY
1.	51014947	RING SET (3) (INCL: 2 & 3)	1
2.	70014599	COMPRESSION RING (PART OF 1)	8 REF
3.	70014600	OIL RING (PART OF 1)	4 REF
4.	51029283	CONNECTING ROD ASM	4
5.	51029285	PISTON ASM (INCL: 88-90)	4
11.	51706913	CRANKCASE/CRANKSHAFT ASM (INCL: 12-33,91-94)	1
12.	51705661	CRANKSHAFT (PART OF 11) (INCL:13-17)	1 REF
13.	60101296	OIL PUMP COLLAR (PART OF 12)	1 REF
14.	60108748	CRANKSHAFT (PART OF 12)	1 REF
15.	70055009	BEARING CONE (PART OF 12)	1 REF
16.	70055012	BEARING CONE (PART OF 12)	1 REF
17.	72066307	ROLL PIN (PART OF 12)	1 REF
18.	51705709	FRT BRG HSG ASM (PART OF 11) (INCL:19-21)	1 REF
19.	60025007	FRT BRG HSG (PART OF 18)	1 REF
20.	70055011	BEARING CUP (PART OF 18)	1 REF
21.	76039119	SEAL (PART OF 18)	1 REF
22.	51705710	REAR BRG HSG ASM (PART OF 22)	1 REF
23.	60025005	REAR BRG HSG (PART OF 22)	1 REF
24.	70055010	BEARING CUP (PART OF 22)	1 REF
25.	60025491	CRANKCASE (PART OF 11)	1 REF
26.	60101270	OIL SCREEN TUBE (PART OF 11)	1 REF
27.	70014610	OIL SCREEN (PART OF 11)	1 REF
28.	72053403	PIPE PLUG 3/8NPT SH (PART OF 11)	1 REF
29.	72060025	CAP SCR 5/16-18X1 HH GR8 (PART OF 11)	5 REF
30.	72060731	CAP SCR 5/16-18X3/4 SH(PART OF 11)	5 REF
31.	72063050	WASHER 5/16 LOCK (PART OF 11)	5 REF
32.	72066008	OIL SCREEN CLAMP (PART OF 11)	1 REF
33.	76039112	FRT BRG HSG GASKET (PART OF 11)	2 REF
34.	60025006	REAR BRG HSG COVER	1
35.	60025193	PULSATION TANK	1
36.	60025194	CYLINDER BLOCK	2
37.	60025492	HEAD	2
38.	60101505	PLUNGER TRNSFR BUSHING	1
39.	60101507	BREATHER PIPE	1
40.	60106933	CHECK VALVE INSERT CAP	2
41.	51712861	CLUTCH	1
42.	7Q072212	O-RING	4
43.	76393107	O-RING	2
44.	70014583	OIL PUMP SPRING	1
45.	70024122	COPPER WASHER	12
46.	70029293	CYL BLOCK SPACER	2
48.	70039124	TAG - SYNTHETIC OIL	1 REF
49.	70039300	DECAL - PATENT	1
50.	70051006	OIL PUMP	1
51.	70143153	DIPSTICK TUBE	1
52.	70143495	BREATHER CAP	1 REF
53.	70731842	REED VALVE ASM	2
56.	72053403	PIPE PLUG 3/8NPT SH	4
57.	72053404	PIPE PLUG 1/2NPT SH	1
58.	72053411	PIPE PLUG 1/8NPT SQHD	2
59.	72053590	STREET ELBOW 3/8NPT 90°	1
61.	72053819	PIPE CAP 3/8NPT	1 REF
62.	72060032	CAP SCR 5/16-18X2-3/4 HH GR5	12
63.	72060063	CAP SCR 7/16-14X-1/4 HH GR5	4
64.	72063001	WASHER 1/4 FLAT	12
65.	72060731	CAP SCR 5/16-18X3/4 SH	4
66.	70392654	RUBBER CAP 1-3/4	2
67.	70048117	AIR INTAKE FILTER	2
68.	72063050	WASHER 5/16 LOCK	1
69.	72063052	WASHER 7/16 LOCK	4
70.	72066267	WOODRUFF KEY	1
71.	72066307	ROLL PIN	1
72.	72066537	J-CLIP	2
73.	72060270	CAP SCR 1/4-20X1/2 HH GR5	2
74.	72053558	ADAPTER 3/4MPT 3/4MPT	1 REF
75.	72531856	REDUCER COUPLING 3/4X1/2	1 REF
76.	72532261	SIGHT GAUGE	1
77.	72053335	ELBOW 3/4 X 90°	1 REF
78.	72532890	HOSE FITTING 3/8X3/8	2 REF
79.	72601060	STUD 5/16-24X2	12
80.	73731843	DIPSTICK ASM	1
81.	76039093	PUMP COVER GASKET	1
82.	76039111	CYL BLOCK BOTTOM GASKET	2
83.	76392119	CYL BLOCK GASKET	2
84.	76392641	REED VALVE/CYL GASKET	2
85.	76392642	REED VALVE/HEADGASKET	2
86.	89392426	HOSE 3/8 200PSI X 10"	1 REF
87.	72062036	NUT 5/16-24 HEX	12
88.	72066018	RETAINING RING 5/8 STD (PART OF 5)	8 REF
89.	70014627	PISTON PIN (PART OF 5)	4 REF
90.	70029062	PISTON (PART OF 5)	4 REF
91.	76039092	GASKET .006 (PART OF 11)	1 REF
92.	76039094	GASKET .010 (PART OF 11)	1 REF
94.	76039144	GASKET .020 (PART OF 11)	4 REF
96.	77040050	SPADE TERMINAL	1
97.	72063049	WASHER 1/4 LOCK	2

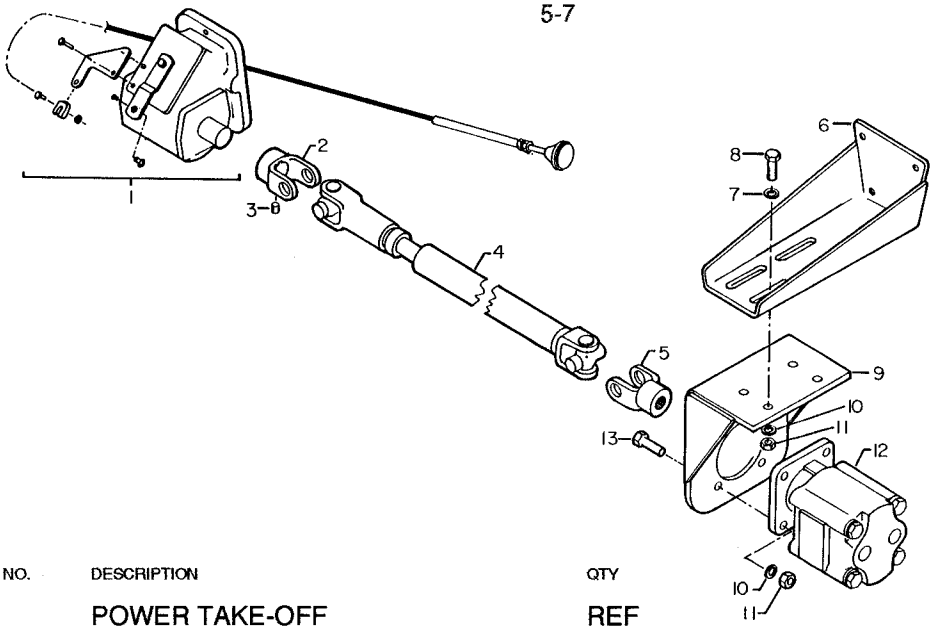
NOTE: SEE PAGE 5-7 FOR OPTIONAL AIR FILTER KIT WHICH AFFECTS THE USAGE OF ITEMS 67, 73 AND 97.



ITEM	PART NO.	DESCRIPTION	QTY
1.	72531427	ELBOW 3/4MPT #12MJIC	1
2.	72053676	ADAPTER 3/4MPT #12MJIC	2
3.	51707317	HOSE ASM 3/4X100	2
4.	72053676	ADAPTER 3/4MPT#12MJIC	3
5.	72053141	PIPE NIPPLE 3/4NPT X CL	1
6.	73054129	GATE VALVE 3/4NPT	1
7.	73052000	RETURN FILTER 10-MICRON	1REF
8.	72053180	REDUCER BUSHING 1-1/4 3/4	1
9.	72532658	ELBOW #8MJIC #8FJIC (NOT SHOWN)	2
10.	72053377	REDUCER BUSHING1-1/4 1	1
11.	72531549	BARB NIPPLE 1MPT 1HOSE	3
12.	89039481	HOSE 1" 100R4	14'
13.	72066515	HOSE CLAMP 1" 2-BOLT	4
14.	73054001	GATE VALVE 1NPT	1
15.	72053185	PIPE NIPPLE 1 X CLOSE	1

ITEM	PART NO.	DESCRIPTION	QTY
16.	72053377	REDUCER BUSHING 1-1/4 1	2
17.	51709743	FILTER ASM 100-MESH	1REF
18.	72532712	BEAD NIPPLE #16MSTR 1" 45°	1
19.	72532360	ADAPTER #12MSTR #8MJIC	1
20.	51703614	HOSE ASM 1/2X240	1
21.	72532358	ADAPTER #8MSTR #8MJIC	1
22.	72532666	ELBOW #8MSTR #8MJIC XLG	1
23.	72053676	ADAPTER 3/4MPT #12MJIC	2
24.	51703945	HOSE ASM 3/4X17	1
25.	72532696	ELBOW #12MJIC #12FJIC	1
26.	73054685	ROTARY FLOW DIVIDER (PART OF 30)	1REF
27.	72532358	ADAPTER (PART OF 30)	3REF
28.	72532376	HOSE FITTING (PART OF 30)	4REF
29.	72532695	TEE MJIC (PART OF 30)	1REF
30.	93710121	INSTALLATION KIT W/CRANE (INCL: 26-29)	1REF

Figure E-4. OPTIONAL HYDRAULIC INSTALLATION KIT (91707052) OPTIONAL INSTALLATION KIT WITH CRANE (93710121)



ITEM	PART NO.	DESCRIPTION	QTY
1.		POWER TAKE-OFF	REF
2.	70058146	END YOKE	1
3.	72060578	SET SCREW 3/8-16 X 3/8 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 SCREW 1/2-13 X 1/2 HH GR5	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 SCREW 1/2-13 X 1-3/4 HH GR5	4

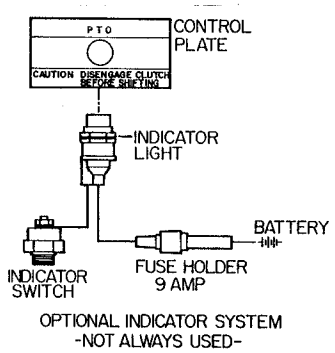
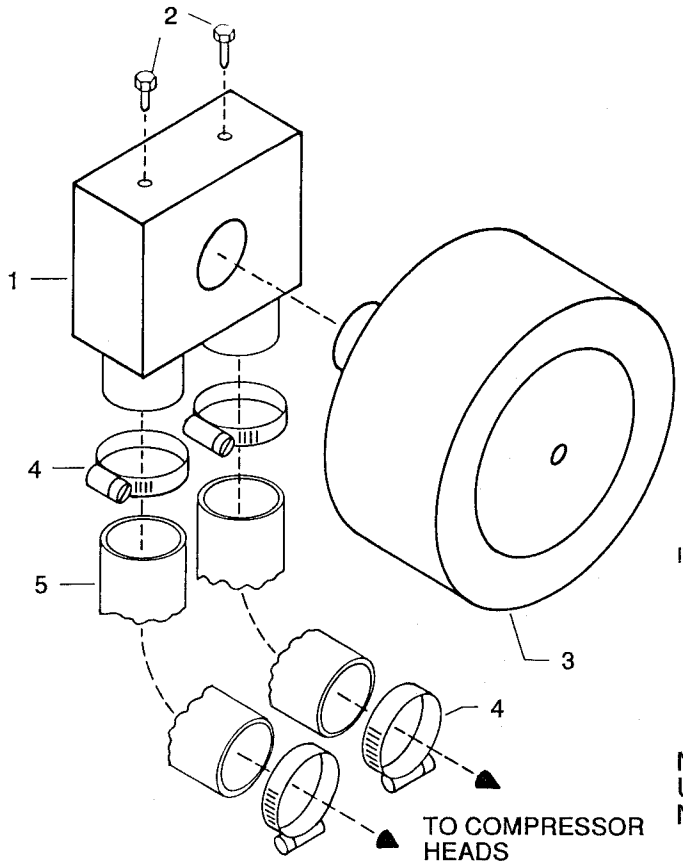


Figure E-5. DRIVELINE MOUNTING OPTION (31701761)



ITEM	PART	DESCRIPTION	QTY
1.	**51707706**	**AIR INTAKE MANIFOLD ASM**	**1**
2.	**72061004**	**SHT MTL SCREW #14 X 3/4**	**2**
3.	**70048007**	**SOLBERG FILTER F-18P-100**	**1**
4.	**72066001**	**HOSE CLAMP #24**	**4**
5.	**76391332**	**HOSE**	**2**

NOTE: WHEN THIS OPTIONAL FILTER KIT IS USED, ITEMS 67, 73 AND 97 ON PAGE 5-4 ARE NOT USED.

Figure E-6. OPTIONAL SOLBERG AIR FILTER KIT (51709435)

REPAIR KITS

GASKET KIT - 51393217

7Q072212	O-RING	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
70055012	BEARING-FRT CONE	1
70055009	BEARING-REAR CONE	1
72066307	DRIVE PIN	1
60101269	OIL PUMP COLLAR	1
70055010	BEARING-REAR CUP	1
70055011	BEARING-FRT CUP	1

ITEM	PART NO.	DESCRIPTION	QTY
1.	77041378	RELAY BOARD	1
2.	77041383	RELAY	8
3.	77041100	FUSE 20AMP	1
4.	72601576	SHT MTL SCR #10 X 1-1/2	4
5.	99900661	INSTALLATION INSTRUCTIONS	1

NOTE: THIS OPTION IS REQUIRED WHEN COMPRESSOR IS COMBINED WITH CRANE INSTALLATION.

Figure E-7. OPTION - RELAY BOARD KIT (51711092)

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.

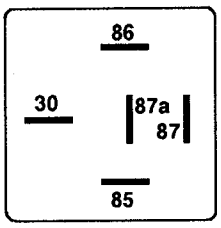


Figure F-1.
BOTTOM VIEW OF RELAY

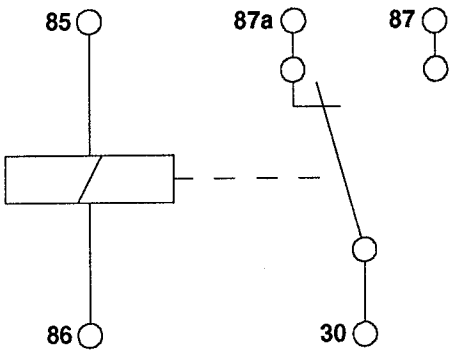


Figure F-2.
INTERNAL WIRING

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.

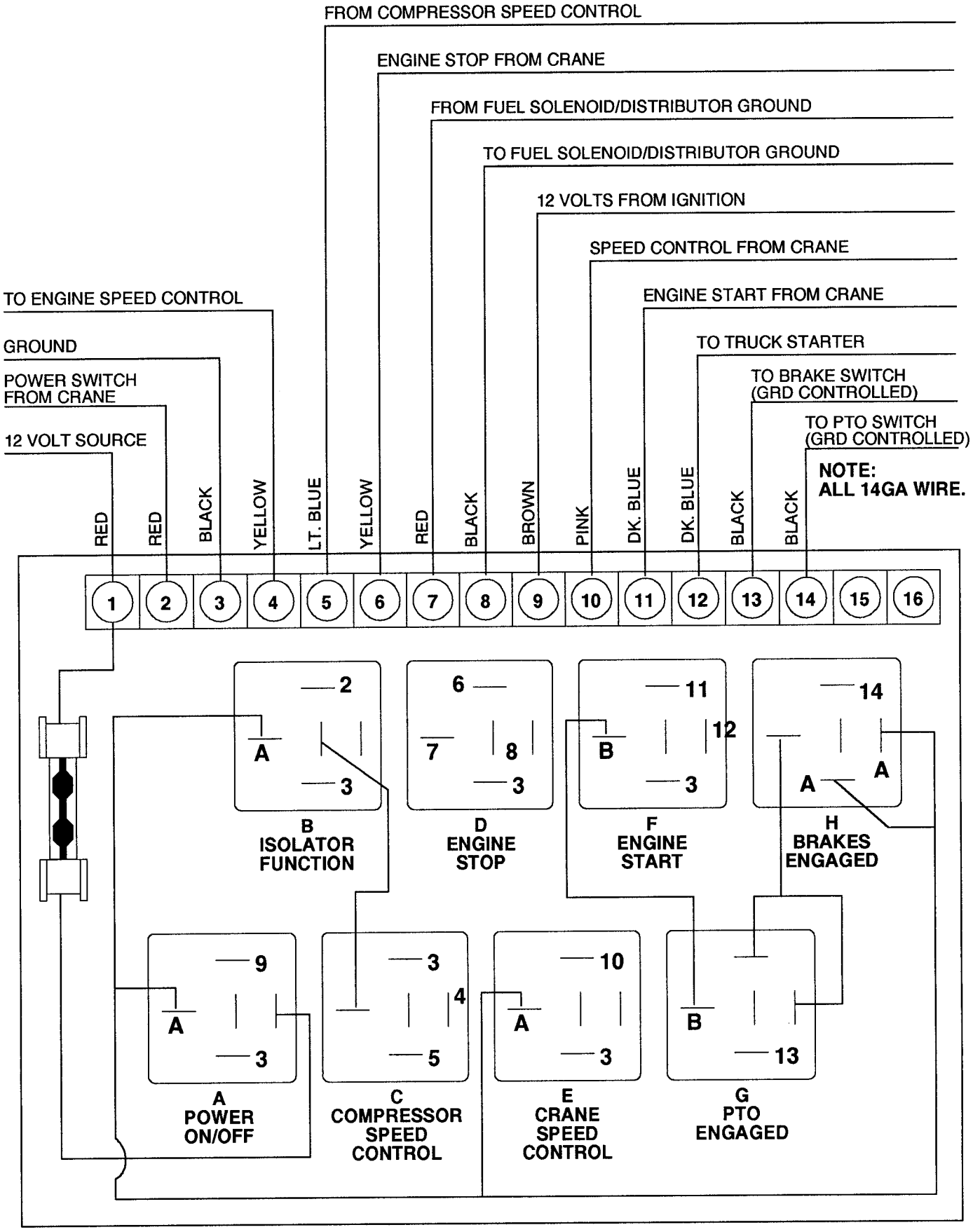


Figure F-3. RELAY BOARD - COMPONENTS & WIRING

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 "Synchro-Start" 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.

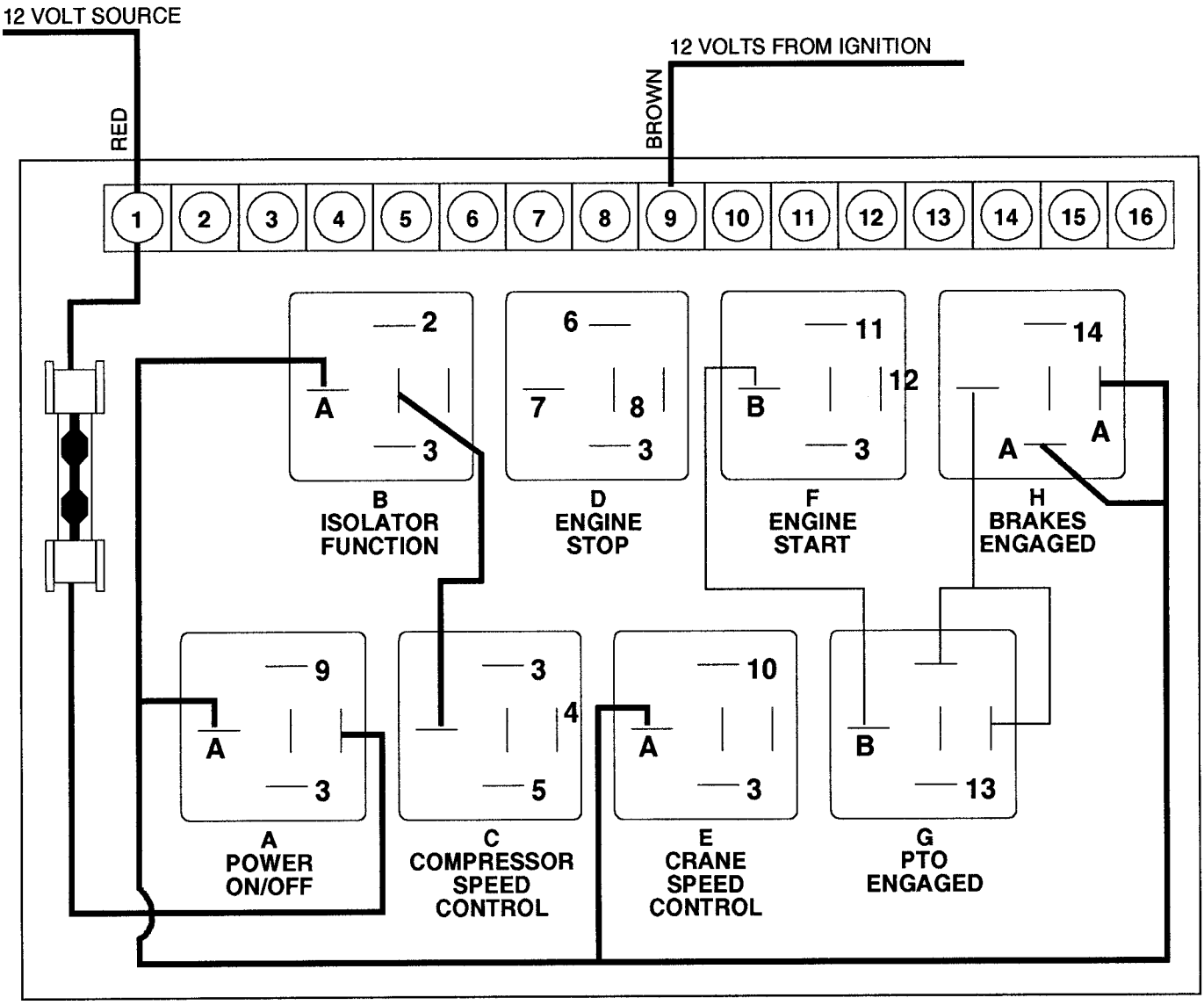


Figure F-4. IGNITION "ON"

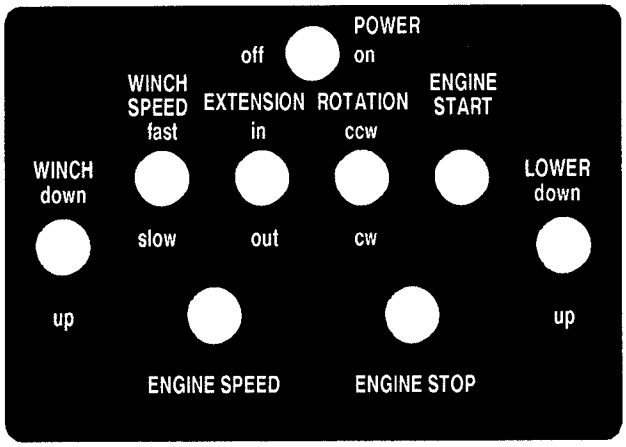


Figure F-5. REMOTE CONTROL HANDLE - TYPICAL

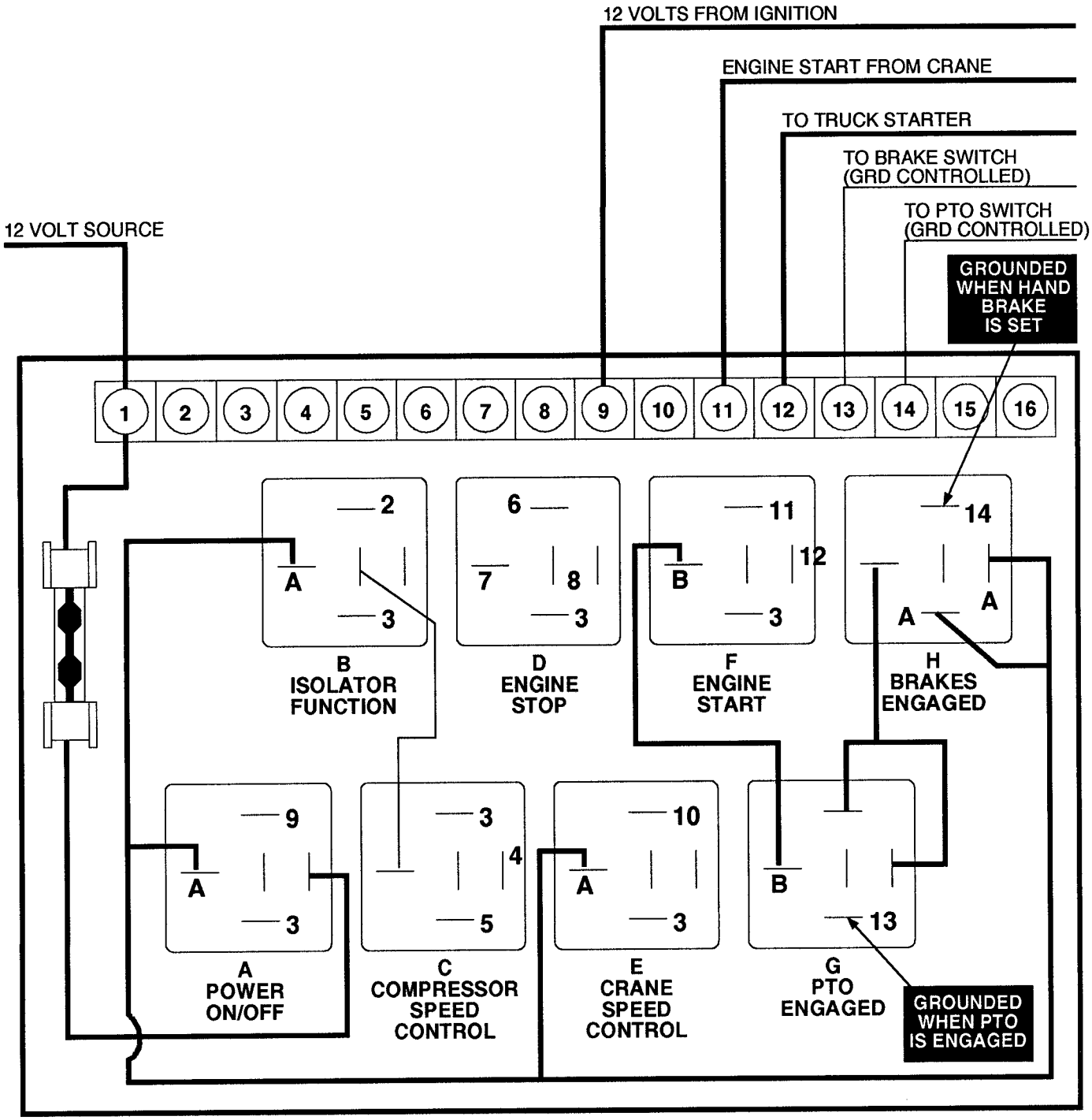


Figure F-6. REMOTE STARTING OF VEHICLE - IGNITION "ON"

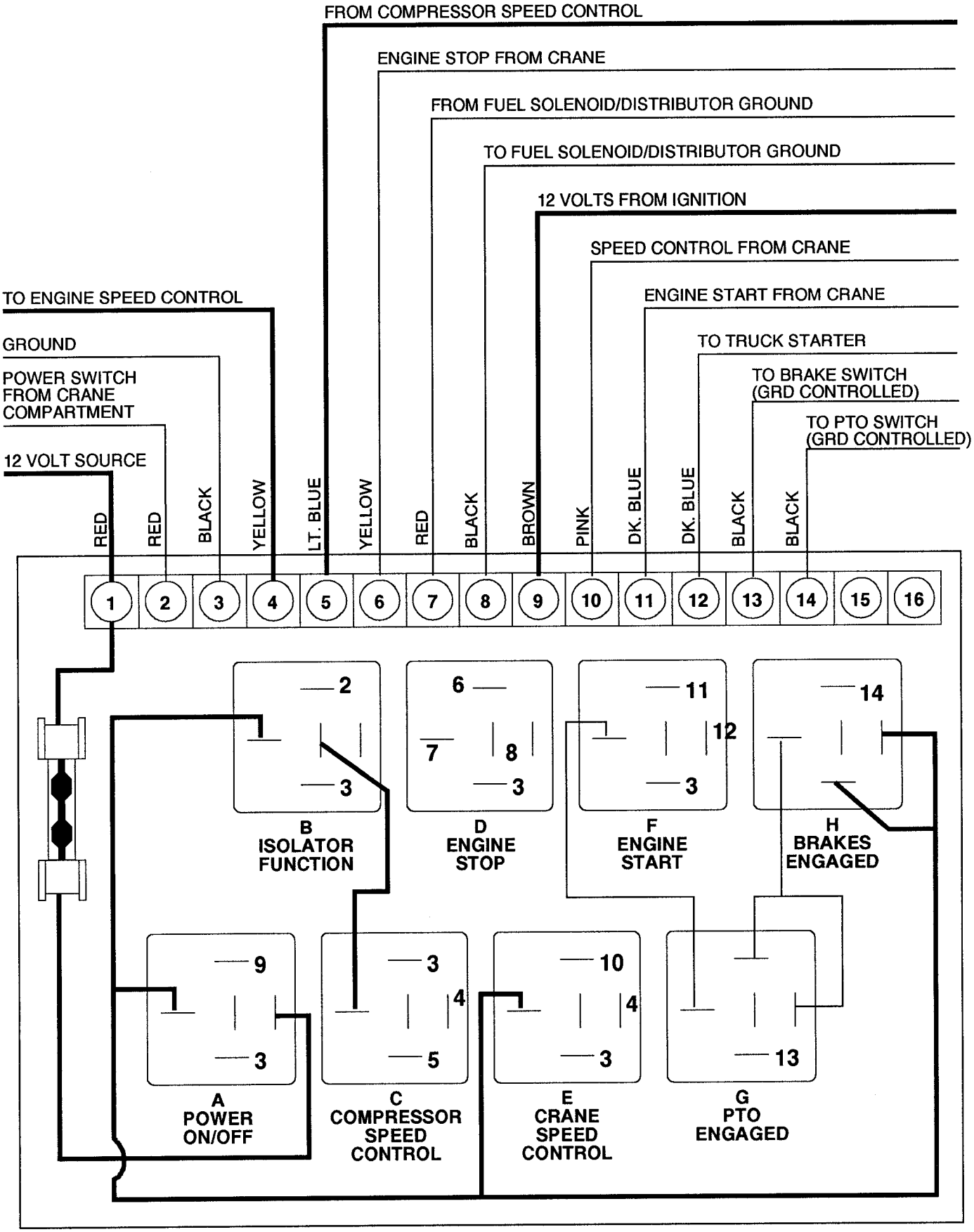


Figure F-7. SPEED CONTROL - COMPRESSOR ONLY

6-3. INSTALLATION

1. Locate an area in the engine compartment that will both provide some protection against damage and accessibility for wiring.

2. Provide adequate space between the mounting surface and the back of the circuit board in order to prevent electrical contact. Failure to do so will cause erratic operation and/or circuit board failure.

3. Connect control wiring as indicated in Wiring Chart.

4. Jumper wires connections:

4-1. Jumper wires must connect J to K, and L to M for 12 volts excited systems. Remove the connecting wires between I to J and M to N.

4-2. Jumper wires must connect I to J, and M to N for ground excited systems*. Remove the connecting wires between J to K and L to M.

WARNING

Failure to remove the extra connecting wire will cause the relay board to fail. Check jumper wire connections of relay board being replaced. (Most relay boards are wired as stated in item 4-1.)

*** NOTES**

- Circuits that could be ground excited are 6 - 10 & 11.
- Quick Check: (Before connecting wires to circuit board) Activate the engine stop switch from the crane. If terminal 6 is hot, wire per 4-1. If not, wire per 4-2.

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 GROUND
8	TO FUEL SOLENOID / DISTRIBUTOR GROUND
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

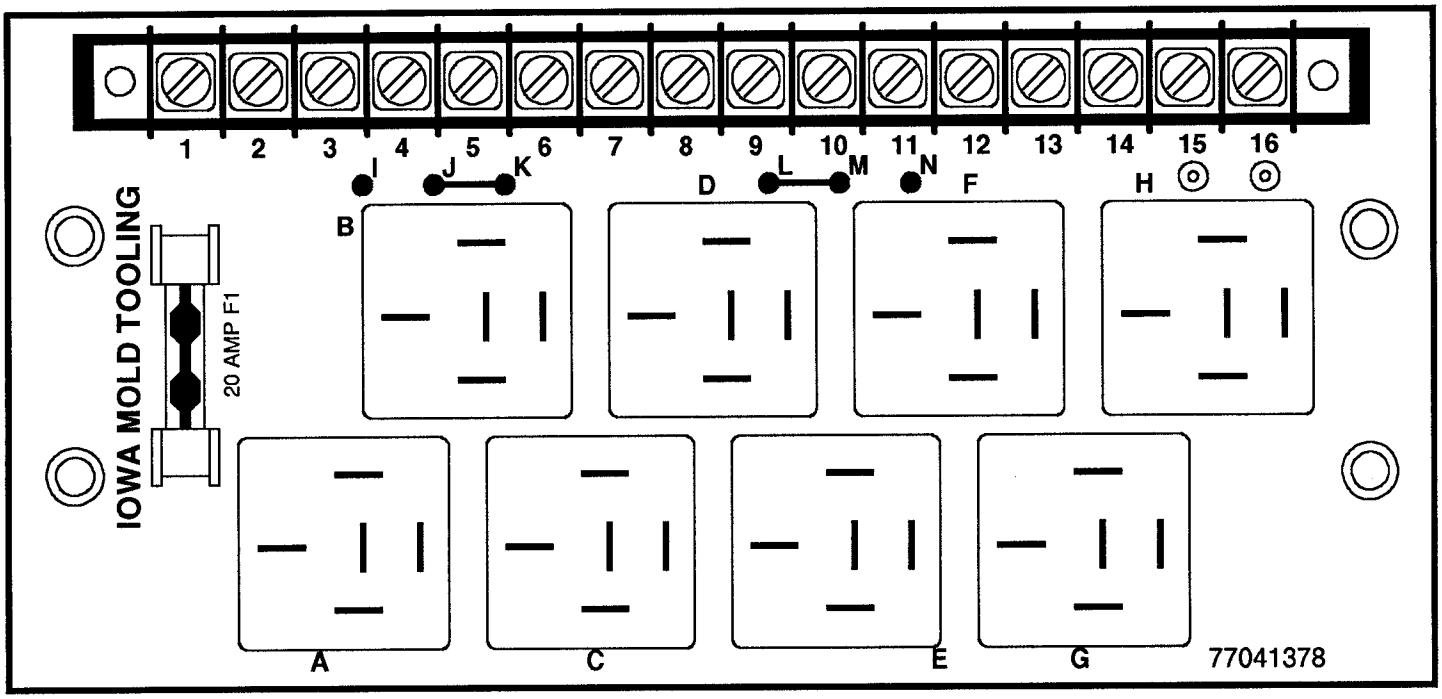


Figure F-8. RELAY BOARD (77041378) WIRING INSTRUCTIONS

The information within this manual has been compiled and checked but errors do occur. To provide our customers with a method of communicating those errors we have provided the Manual Change Request form below. In addition to error reporting, you are encouraged to suggest changes or additions to the manual which would be of benefit to you. We cannot guarantee that these additions will be made but we do promise to consider them. When completing the form, please write or print clearly. Submit a copy of the completed form to the address listed below.

MANUAL CHANGE REQUEST

DATE	PRODUCT MANUAL	1154-DC10	MANUAL PART NO.	99900378-11/90
SUBMITTED BY				
COMPANY				
ADDRESS				
CITY, STATE, ZIP				
TELEPHONE				

☐ ERROR FOUND

LOCATION OF ERROR (page no.): _____

DESCRIPTION OF ERROR: _____

_____

_____

_____

_____

_____

_____

_____

☐ REQUEST FOR ADDITION TO MANUAL

DESCRIPTION OF ADDITION: _____

_____

_____

_____

REASON FOR ADDITION: _____

_____

_____

_____

MAIL TO: IOWA MOLD TOOLING Co., Inc.
Box 189,
Garner IA 50438
ATTN: Technical Publications

MANUFACTURER'S LIMITED WARRANTY

WARRANTY COVERAGE - Products manufactured by Iowa Mold Tooling Co., Inc. (IMT) are warranted to be free from defects in material and workmanship, under proper use, application and maintenance in accordance with IMT's written recommendations, instructions and specifications as follows:

1. Ninety (90) days; labor on IMT workmanship from the date of delivery to the end user.

2. One (1) year; original IMT parts from the date of delivery to the end user.

IMT's obligation under this warranty is limited to, and the sole remedy for any such defect shall be the repair or replacement (at IMT's option) of unaltered parts returned to IMT, freight prepaid, provided such defect occurs within the above stated warranty period and is reported within fourteen (14) days of its occurence.

IMPLIED WARRANTY EXCLUDED - This is the only authorized IMT warranty and is in lieu of all other express or implied warranties or representations, including any implied warranties of merchantability or fitness for any particular purpose or of any other obligations on the part of IMT.

ITEMS EXCLUDED - The manufacturer gives no warranty on any components or parts purchased by the manufacturer, and such components as are covered only by the warranties of their respective manufacturers.

WARRANTY CLAIMS - Warranty claims must be submitted and shall be processed in accordance with IMT's established warranty claim procedure.

WARRANTY SERVICE - Warranty service will be performed by any IMT distributor authorized to sell new IMT products of the type involved or by any IMT Service Center authorized to service the type of product involved or by IMT in the event of direct sales made by IMT. At the time of requesting warranty service, the purchaser must present evidence of the date of delivery of the product. The purchaser shall pay any premium for overtime labor requested by the purchaser, any charge for making service calls and for transporting the equipment to the place where warranty work is performed.

WARRANTY VOIDED - All obligations of IMT under this warranty shall be terminated:(1) if service other than normal maintenance or normal replacement of service items is performed by someone other than an authorized IMT dealer, (2) if product is modified or altered in ways not approved by IMT.

PURCHASER'S RESPONSIBILITY - This warranty covers only defective material and workmanship. It does not cover depreciation or damage caused by normal wear, accident, improper protection in storage, or improper use. The purchaser has the obligation of performing the care and maintenance duties discussed in IMT's written recommendations, instructions and specifications. Any damage which results because of purchaser's failure to perform such duties shall not be covered by this warranty. The cost of normal maintenance and normal replacement of service items such as filters, belts, etc. shall be paid by the purchaser.

CONSEQUENTIAL DAMAGES - The only remedies the purchaser has in connection with the breach or performance of any warranty on IMT products are those set forth above. In no event will the dealer, IMT or any company affiliated with IMT, be liable for business interruptions, loss of sales and/or profits, rental or substitute equipment, costs of delay or for any other special, indirect, incidental or consequential losses, costs or damages.

REPRESENTATIONS EXCLUDED - IMT products are subject to no expressed, implied or statutory warranty other than herein set forth, and no agent, representative or distributor of the manufacturer has any authority to alter the terms of this warranty in any way whatsoever or to make any representations or promises, express or implied, as to the quality or performance of IMT products other than those set forth above.

CHANGE IN DESIGN - IMT reserves the right to make changes in design or improvements upon its products without imposing any obligation upon itself to install the same upon its products theretofore manufactured.

Effective January, 1984

IOWA MOLD TOOLING Co., Inc.

500 HWY 18 WEST - GARNER - IOWA - 50438

515 - 923 - 3711