SERVICE MANUAL
Model 4000 Crane

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REVISED
09-01-90
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MANUAL PART NUMBER 99900267

PARTS ORDERING INFORMATION

Before placing an order, make certain the following information is recorded.
This information should then be given to an IMT representative when placing your order.

CRANE MODEL NUMBER	
CRANE SERIAL NUMBER	
DATE OF PURCHASE	

To more efficiently process your order, the following information determined in advance will be appreciated.

PART NUMBER, DESCRIPTION AND QUANTITY OF PARTS REQUIRED.

REFER TO SECTION 6 FOR ADDITIONAL INFORMATION.

PLEASE, CONTACT IMT AT THE FOLLOWING ADDRESS:

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SECTION 1. Specifications

1-1. GENERAL

REACH - FROM CENTERLINE OF ROTATION		6'-0"	(1.83m)
MANUAL EXTENSION		18"	(46.0cm)
LIFTING HEIGHT - FROM BASE OF CRANE		9'-0"	(2.74m)
CRANE WEIGHT		470 lbs	(213 kg)
*CRANE STORAGE HEIGHT		7'-10"	(2.39 m)
MOUNTING SPACE REQUIRED FOR BASE		15" x 18"	(38.1cm x 45.7cm)
OPTIMUM PUMP CAPACITY		2.5 US Gallons/minute	(9.5 liters/minute)
OIL RESERVOIR CAPACITY		.75 US Gallons	(2.8 liters)
** DESIGN FACTOR			
	PINS & HYDRAULICS	4/1	4/1
	STRUCTURAL MATL	3/1	3/1

* Based on a 34" (86.4cm) truck bed height
** Based on rated capacities.

1-2. LIFTING CAPACITY (from centerline of rotation)

3'-0" (0.91m)	4000 lbs (1814 kg)
4'-1" (1.24m)	3000 lbs (1361 kg)
6'-0" (1.83m)	1800 lbs (816 kg)

1-3. PERFORMANCE CHARACTERISTICS

ROTATION	360^{o} (6.28 Rad.)	manual
LOWER BOOM ELEVATION	-90^{o} to $+46^{o}$ (-1.57 Rad. to +.80 Rad.)	18 seconds
EXTENSION BOOM	18" manual (45.7cm)	manual

1-4. HYDRAULIC SYSTEM

Open centered, full pressure system that requires 2.5 GPM (9.5 liters/min.) optimum oil flow at 2300 PSI (158.1 kgs/cm^2). Operated by a remote control system with a 15' (4.57m) umbilical cord and includes hydraulic pump with reservoir, solenoid valves and main cylinder.

1-5. POWER SOURCE

Power is supplied to the Electric/Hydraulic Power Unit by a solenoid connected to the 12 Volt truck battery.

1-6. ROTATION SYSTEM

Manually operated 360^{o}(6.28 Rad.) rotation with locking mechanism.

1-7. CYLINDER

	BORE	STROKE
LOWER BOOM CYLINDER	3" (7.62cm)	27-7/8" (70.8 cm)

1-8. MINIMUM CHASSIS SPECIFICATIONS

BODY STYLE	Conventional Cab	Conventional Cab
WHEELBASE	137" to 161"	(3.48m to 4.09m)
CAB-TO-AXLE	60" to 80"	(1.52m to 2.03m)
FRAME SECTION MODULUS	5.44 $in.^3$	(89cm^3)
R B M	195,840 in.-lbs	(2253 kg-m)
FRONT AXLE RATING	3850 lbs	(1746 kg)
REAR AXLE RATING	7400 lbs	(3356 kg)
TRANSMISSION	4-speed	4-speed

In addition to these specifications, a heavy-duty alternator and battery are required.

IMT reserves the right to change specifications and design without notice.

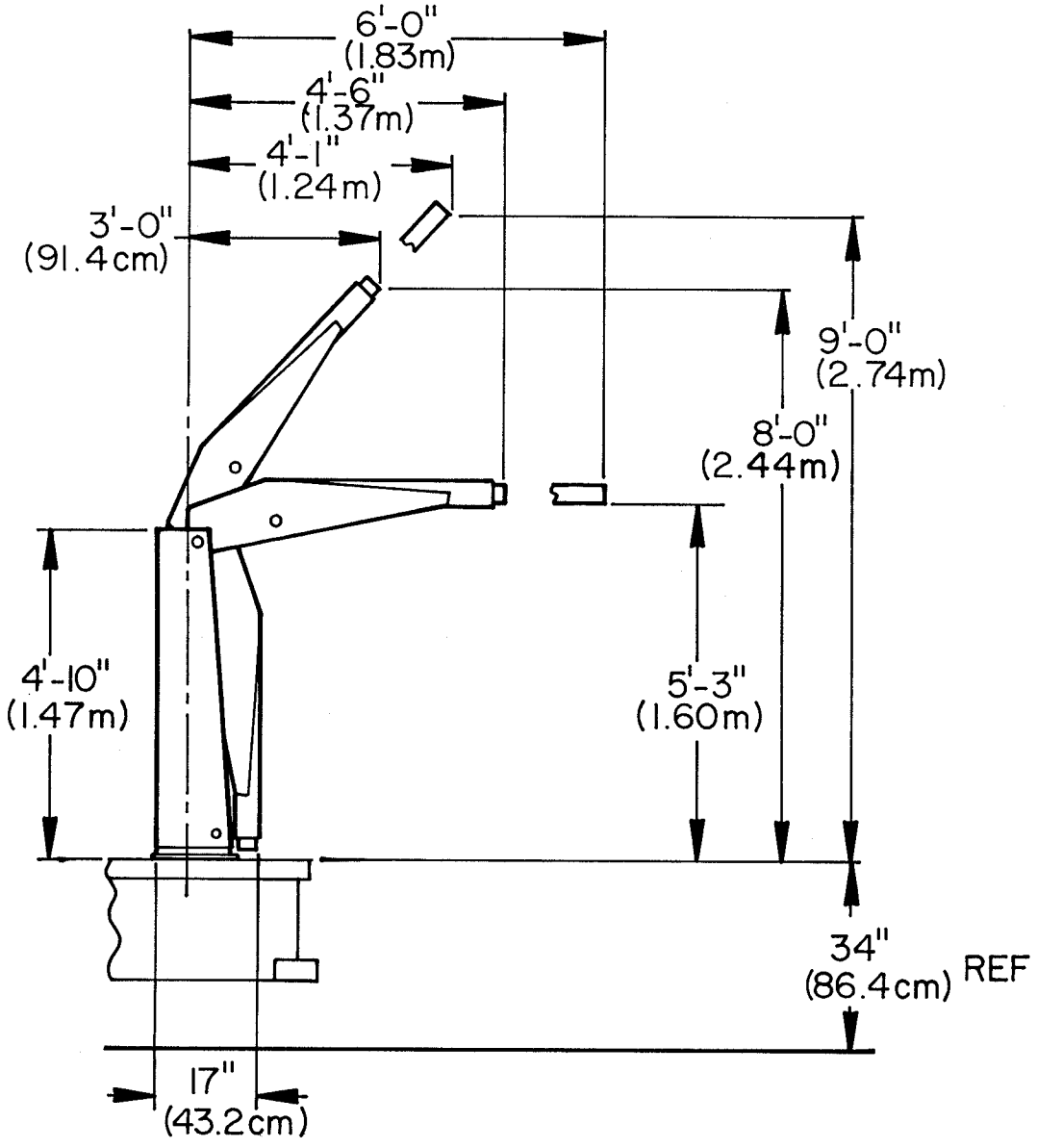


Figure A-1. Geometric Configuration - 4000 Crane

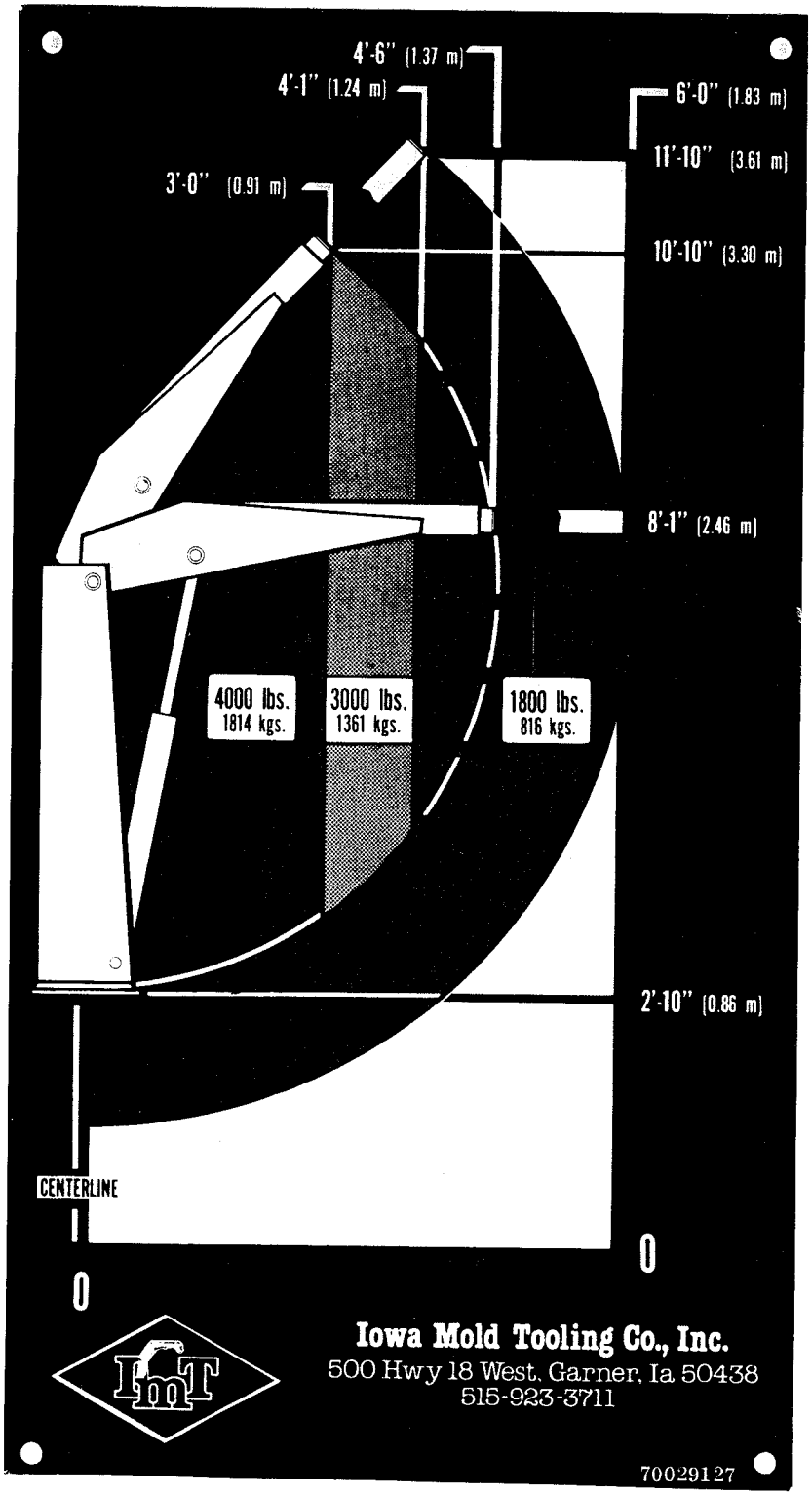


Figure A-2. Capacity Chart - Model 4000 Crane

SECTION 2. Crane Description

2-1. GENERAL

This section describes the assemblies that make up the IMT Model 4000 Crane. Figure B-1 illustrates the locations of the assemblies.

2-2. BASE

The base provides the means for mounting the crane to the carrier vehicle. It incorporates a manual rotation locking device.

2-3. MAST

The mast provides necessary elevation for crane operation as well as a hinge point for the lower boom.

2-4. LOWER BOOM

The lower boom provides for insertion of the extension boom and may be articulated by use of the lower boom cylinder which is controlled by a remote control switch. The degree of articulation is specified in Section 1.

2-5. EXTENSION BOOM

The extension boom provides the operating range of the crane from 4'-6" (1.37m) to 6'-0" (1.83m), a range of 18" (45.7cm). The extension boom is operated manually and provides for the mounting of a hook and chain assembly.

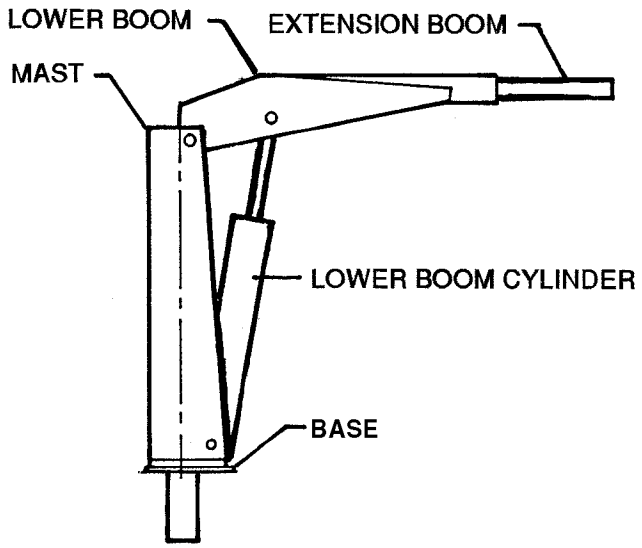


Figure B-1. Model 4000 Crane Group

SECTION 3. Operation

3-1. GENERAL

This section provides operation information and related procedures and safety information. The safety precautions contained in this section should be read carefully, understood and observed at all times during unit operation.

3-2. VEHICLE CONTROLS

HAND BRAKE - Securely set the vehicle's hand brake prior to crane operation.

3-3. REMOTE CONTROL SWITCH

The standard remote control switch (Figure C-1) consists of a hand-held unit containing a toggle switch for elevating and lowering the lower boom. Pushing the switch in the "UP" position raises the lower boom and pushing the switch in the "DOWN" position lowers the lower boom.

3-4. OPERATION

The crane is relatively easy to operate, however, prior to putting the crane into service at the job site, the operator must thoroughly familiarize himself with the control operations, load limitations, prescribed operating procedures and safety precautions applicable to the unit. In addition, simulated job operations should be performed by the operator before putting the unit into a work situation. The operator's understanding of emergency measures is essential. The operator must be prepared to take emergency action at any time.

3-5. SAFETY FACTORS

Three important factors in the safe operation of the unit are:

1. A competent operator.
2. Mechanical soundness of the crane.
3. Assurance that the loads placed on the crane do not exceed the rated capacity of the crane.

3-6. LOAD LIMITS

This crane is designed to give satisfactory service if operated within the maximum allowable load specifications stated on the crane's capacity placard. The placard must be studied before lifting operations are performed. Overloading will result in potentially serious safety hazards and shortened service life of the unit. Exceeding the stated load capacities for a given radius can cause tipping or structural failure resulting in equipment damage, serious injury or death.

Warranty of the unit will be void on any part of the unit subjected to misuse due to overloading, abuse or lack of maintenance.

3-7. EQUIPMENT INSPECTION

Before operating the unit, always perform the safety checks outlined below. These procedures are vital to the detection of equipment malfunction and damage which may present safety hazards.

1. STRUCTURAL SOUNDNESS - Inspect the unit for damaged members and loose nuts and bolts.
2. HYDRAULIC OIL SUPPLY - Check the oil level before use and fill if necessary.
3. LEAKAGE - Examine all visible hydraulic hoses for frays and blisters. Check for any signs of hydraulic fluid leakage and repair before operation.
4. CONTROLS - Make certain the control unit is functioning properly before operation.
5. REPAIRS - Before putting the unit into service, correct all observed defects and malfunctions.

This equipment check should be performed before every operation and as a periodic preventive maintenance procedure.

3-8. WORK STATION POSITIONING

The best location for the working unit is on firm, level and dry pavement or ground close to the job. Overhead obstructions on the work side of the unit should be avoided as much as possible.

Wheel chocks should be used when parking the unit on a slope. If parking on a curbed roadway, turn the front wheels toward the curb when parked with the front of the truck downgrade, and away from the curb when parked with the rear of the truck downgrade. At the work site, the vehicle should be parked with the grade. When cross-grade parking is necessary, restricted operation will be required to compensate for increased risk of tipping.

WARNING

When operating the crane with the carrier vehicle on a slope, exercise extreme caution when lifting a load. Cranes with manual rotation may swing due to the grade.

3-9. POWER LINE PROXIMITY

Except where the electrical distribution and transmission lines have been de-energized and visibly grounded at point of work, or where insulating barriers not a part of or an attachment to the crane have been erected to prevent physical contact with the lines, cranes shall be operated proximate to, under, over, by, or near power lines only in accordance with the following:

1. For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or its load shall be 10 feet (3.05m).

2. For lines rated over 50 kV, minimum clearance between the lines and any part of the crane and its load shall be 10 feet (3.05m) plus 0.4 inch (1cm) for each 1 kV over 50 kV, or use twice the length of the insulator but never less than 10 feet (3.05m).

3. In transit with no load and boom lowered, the clearance shall be a minimum of 4 feet (1.22m).

4. It is recommended that a person be designated to observe the clearance and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.

In addition to the above mentioned safety measures, the operator must take into account sag, sway, and deflection factors in allowing for proper clearances.

3-10. BEGINNING OPERATION

1. Choose a unit operating location with two factors considered:

   A. Vehicle position should permit, if possible, total task performance without repositioning.

   B. The terrain should be firm, dry and level for proper stabilization throughout the operation

2. Securely set the truck hand brake and set any auxiliary device, if supplied. Adjacent to curbing, turn front wheels to further secure the vehicle. Wheel chocks should be firmly placed.

3. Outriggers should be extended until firm ground contact is made.

WARNING

DO NOT operate the crane until the vehicle is firmly stabilized.

3-11. VEHICLE ENGINE

It is recommended that the truck engine be allowed to idle while the crane is in operation. This will prevent excessive battery drainage.

3-12. LOAD LIFTING

Capacity placards are located on the unit. The structural capacities and permissible radii of operation stated on the placard should be carefully studied and strictly adhered to during equipment operation.

NOTE

Capacity placards are intentionally located near the operator to assure ready reference in determining when a load can or cannot be handled.

It is implicit in all load ratings that the following conditions have been met:

1. The unit has been correctly installed on a factory approved vehicle.

2. A satisfactory stability test has been performed.

3. The intended operation is to be performed on level, solid footing with proper outrigger placement.

It should be understood that each stated capacity is directly related to the radius of a given operation. The radius is measured from the centerline of rotation to loadline on the horizontal plane.

3-13. STABILITY RATINGS

Capacity ratings project unit stability to no more than 85% of tipping, provided:

1. The vehicle on which the unit is mounted complies with factory specifications.

2. Factory installation instructions are followed when the unit is mounted to the vehicle.

3. Counter weight sufficient to supplement vehicle weight has been installed and meets factory requirements.

4. Tire inflation pressures meet requirements stipulated in "TIRE INFLATION TABLE" in the appendix.

5. The outriggers are in use, making proper contact with firm, level ground.

The load capacity chart ratings depend upon compliance with the curb weights coupled with truck size. Adherence to minimum chassis specifications and/or requirements is necessary to maintain safe stabilization.

WARNING

The minimum curb weights shown do not ensure the unit will be stable. Actual stability ratings will be obtained from the initial start-up and testing procedures.

3-14. STABILIZER INFORMATION

The crane may be installed on several weight and size class vehicles. Stabilization requirements will vary with application. The Model 4000 Crane mounted on larger vehicles generally do not require additional outrigger stabilization. Cranes on smaller vehicles will require at minimum a swing-style outrigger assembly mounted on the crane side of the vehicle.

SECTION 4. Periodic Maintenance

4-1. GENERAL

Proper maintenance on a regular schedule is essential to keep your unit operating at peak efficiency. This section outlines required maintenance information and service intervals. Personnel responsible for care of the unit should familiarize themselves with the frequency and type of lubrication and maintenance operations to be performed.

4-2. LUBRICATION

Maintaining the proper lubrication schedule will vary with climatic conditions and frequency of use. The lubrication table is intended to serve as a schedule for a normal work load and moderate weather conditions. Periods of heavy use and severe environmental conditions will shorten service intervals. See Figure D-1 for lubrication points.

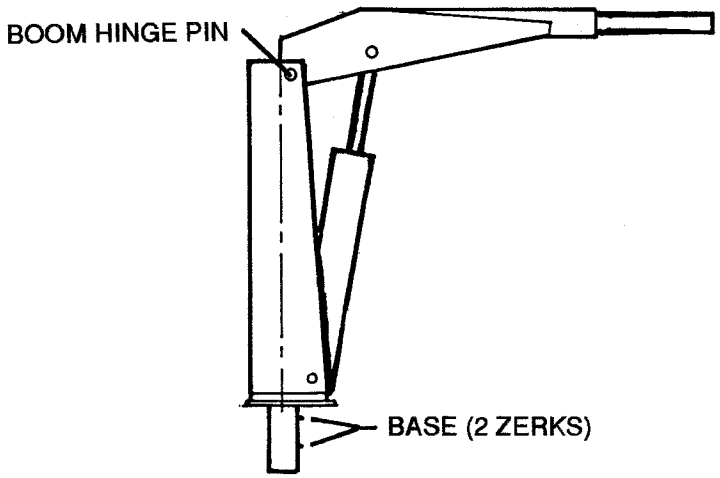


Figure D-1. Lubrication Points

Table D-1. Lubrication Information

APPLICATION POINT	LUBRICATION PRODUCT	APPLICATION MEANS	INTERVAL
BOOM HINGE PIN	SHELL ALVANIA 2EP OR SHELL RETINAX "A" OR EQUIVALENT	HAND GREASE GUN OR PNEUMATIC PRESSURE GUN	MONTHLY
BASE			

Table D-2. Hydraulic Oil Specifications

AMBIENT TEMPERATURE RANGE	0-90	BELOW 32	32-90	ABOVE 90
MAX. POUR POINT, °F	-30	-25 +	+10	+10
MAX. VISCOSITY, SSU @ 0°F	4000	4000	---	---
MIN. VISCOSITY, SSU @ 100°F	140-195	100-130	150-200	200-315
MIN. VISCOSITY, SSU @ 210°F	48	41	43	47
MIN. VISCOSITY INDEX	139	90	90	90

4-3. HYDRAULIC SYSTEM

Minimum viscosity specifications for hydraulic oil to be used in the IMT 4000 Crane are given in Table D-2. Any major oil company can supply products which meet these requirements.

Oil selected by the user for this class of equipment, in addition to meeting viscosity requirements, should have the following additives:

1. Antifoam Inhibitors
2. Antioxidant Inhibitors
3. Rust Resistant Additives
4. Antiwear Additives

Table D-2 provides oil specifications for a full range of operating temperatures encountered in the temperate zones. Arctic conditions present special requirements which are not within the scope of the table and must be given special consideration and individual analysis. Consult your oil supplier for the proper fluid for working under these severe conditions.

4-4. HYDRAULIC OIL DETERIORATION

Contamination of the hydraulic oil by solvents, water, dust or other abrasives will result in a premature breakdown of the oil's antifoam, lubrication, anti-rust and viscosity properties. Prolonged exposure to water or high operating temperatures (above 180°F) will cause an increase in the oxidation rate, producing varnish forming materials and sludge in the oil.

Periodically a sample of the hydraulic oil in the system should be drawn off and its condition checked for breakdown. To check oil quality:

1. Place oil sample in a clean glass.
2. Smell oil to detect a burnt or rancid odor.
3. Examine the oil for a cloudy or dark color.
4. Allow the sample to stand for several minutes and inspect it for water which will settle to the bottom. Water can result from a leak in the system or condensation due to temperature extremes.

When any of these conditions is observed, the system should be purged and filled with new oil.

In addition, the oil should be changed in the reservoir and complete system after 800 hours of operation (or every six months, whichever occurs first) and after pump or other major hydraulic component failure.

4-5. HYDRAULIC SYSTEM PURGING

Purging the hydraulic system on the IMT 4000 Crane requires an oil supply sufficient to completely fill the reservoir, lines and cylinder, about 8 quarts and another 4 quarts for the auxiliary reservoir (if used). Purging the crane is accomplished in the following manner:

1. Raise the main boom to the horizontal position. Support the boom with a crane or other overhead lifting device.
2. Remove the retaining rings and machinery bushings on the cylinder rod-end pin and on the boom hinge pin. Drive out the cylinder pin and carefully lower the cylinder to the horizontal position. Drive out the boom hinge pin and set the boom to one side.

3. Disconnect the battery cable to the electric/hydraulic power unit solenoids and disconnect the remote control cable. Disconnect the supply and return hoses at the cylinder.

NOTE

If an auxiliary reservoir is used, disconnect the hose from the power unit and direct the discharge from the auxiliary reservoir into a waste container.

4. Support the power unit and remove the bolts that secure the unit in place. Raise the unit and lift it out of the top of the mast, carefully feeding the cylinder hoses through the mast.

NOTE

Auxiliary reservoir mounting bolts may interfere and prevent lifting of the unit. Loosen bolts where necessary to gain the necessary clearance.

5. Stand the power unit on end (reservoir on the bottom) near the edge of a workbench. Place an empty container (6-quart capacity approximately) under the bottom of the reservoir. Unscrew the bolt in the bottom of the reservoir to drain.

NOTE

This bolt secures the reservoir to the pump. Removing the bolt completely will allow the reservoir to drop and may result in fluid spillage.

6. Remove the reservoir and wipe down the inside with a clean, lint free cloth. Make certain that any sediment on the bottom of the reservoir is removed.

7. Remove and wash the suction line screens in warm, soapy water. Rinse thoroughly in clean water, blow dry and reinstall.

8. Install the reservoir on the power unit.

9. Lower the power unit through the top of the mast and into position. Install both bolts and tighten them securely. Route the hoses through the bottom of the mast and connect them to the cylinder. Connect the battery cable and remote control cable to the solenoid. Tighten all of the bolts that were loosened to facilitate removal.

10. Pour approximately 5 quarts of clean hydraulic oil into the power unit's reservoir through the breather tube.

NOTE

Add an additional 4 quarts to the auxiliary hydraulic reservoir if used.

11. Position the boom so the hinge pin holes are aligned and drive in the boom hinge pin.

12. Lift the rod end of the cylinder until the pin boss lines up with the holes in the boom. Drive in the pin. Install the machinery bushngs and retaining rings on the boom hinge pin and cylinder pin.

13. Disconnect the cylinder return hose at the bottom of the power unit assembly. Direct this hose into a waste container. Plug the return port.

NOTE

The pressure hose may be identified by the flow control valve. The return hose is next to the pressure hose.

14. Depress the control switch to the "DOWN" position until the cylinder is completely retracted. Place the control switch in the "UP" position until the cylinder is fully extended.

15. Reconnect the return hose to the power unit and add another 2 quarts of hydraulic oil to the reservoir through the breather tube.

CAUTION

If the reservoir is over-filled, the unit will leak. Insert a straight piece of wire into the breather tube. If the oil is high enough that it begins to fill the breather tube, it is too full. Dump some of the oil through the return hose from the cylinder (refer to step 13 and 14).

16. Raise and lower the lower boom a few times to evacuate air that is trapped in the system.

17. Pick up a load, raise the boom slightly to just raise the load off the ground and check for leaks.

4-6. PREVENTIVE MAINTENANCE

The following inspection check list is designed to assist you in keeping the vehicle and crane in safe operating condition. Items which apply to the unit should be checked before operation and the carrier vehicle should be inspected before moving the equipment.

CAUTION

Failure to comply with these instructions may result in excessive wear and premature failure of the unit, resulting in expensive repairs and down-time.

4-7. REGULAR INSPECTION

Every three months or more often when equipment is subjected to heavy use, the following inspections should be performed in addition to the routine Inspection Check List.

4-8. MAIN BOOM

1. Check structural defect evidenced by weld cracks, dents or bends.

2. Check lower boom cylinder pins for proper installation and worn pivot pin bushings.

4-9. MAINFRAME

1. Check all fittings for oil leakage and tightness.

2. Check all pins and lock rings on main pin assemblies for proper installation.

3. Check torque on all unit mounting bolts.

4. Check for loose bolts, fatigue cracks or corroded structural members.

4-10. MAST AND ROTATION SYSTEM

1. Check mast housing for cracks.

2. Check mounting bolts for tightness.

4-11. HYDRAULIC SYSTEM

1. Cylinders

   A. Check rods for damage such as scarring, nicks, dents and rust on out of service units.

   B. Check for leaks at weld joints and rod seals. Check for drift indicating leakage around piston.

   C. Check cylinder barrel for dents.

2. Hydraulic pump

   A. Check for leaks at shaft seal and section joints.

   B. Check for drop in operating speed.

   C. Check hydraulic oil for excessive heating.

   D. Check bolts and fasteners for tightness and note unusual vibration or noise.

   E. Check electrical connections on electrically driven pumps.

Table D-3. Inspection Check List

VEHICLE CHECK LIST				
ITEM	DESCRIPTION	FREQUENCY		
		DAILY	WEEKLY	MONTHLY
BATTERY	Inspect for correct fluid level. In hot, dry weather increase inspection frequency.		■	■
ENGINE OIL	Check for proper level. Make sure oil level on dip stick is above "add" mark.	■		
BRAKES (SERVICE AND PARKING)	Operate both systems to assure positive, efficient functioning.	■		
RADIATOR	Inspect coolant level. Check for antifreeze protection in cold weather.	■		
SAFETY EQUIPMENT (WARNING SIGNALS AND LIGHTS)	Inspect all devices and lights for proper operation.	■		
SUSPENSION	Check for broken or weak springs.	■		
TIRES AND WHEELS	Inspect tires for bruises, cuts and proper inflation. Check for loose wheel stud nuts, bent wheels and mud lumps or stones between dual wheels.	■		
UNIT CHECK LIST				
WALK AROUND INSPECTION	Visually inspect unit on all sides for hydraulic leaks, loose parts and obvious damage to external structural members.	■		
CYLINDERS	Check securing pins on cylinders and booms for proper installation. Check for proper installation of bolts securing outrigger cylinders (if used).			■
HYDRAULIC HOSES AND FITTINGS	Inspect hose surfaces and metal end coupling junctions for oil leakage. Check outer hose coverings for blistering, excessive wear or flattening.	■		
LOAD HOOK	Check load hook for proper installation. Inspect hook twist exceeding 10^{0} from normal opening. Check for throat opening spread exceeding 15% of normal.	■		
MOUNTING BOLTS	Inspect and check torque. Refer to the Torque Data Table in the Appendix for the torque values for a particular grade and size of bolt.			■
OIL LEAKS	Inspect cylinder for signs of leakage.			■
STRUCTURAL DAMAGE	Inspect all structural members for broken welds or fatique cracks. Check booms for structural defects such as bends, weld cracks or dents.			■

Section 5. REPAIR

5-1. GENERAL

This section includes disassembly, repair and assembly instructions for many components of the 4000 Crane.

5-2. HYDRAULIC SYSTEM

Certain procedures involving the hydraulic system require special consideration for proper functioning and service life of the unit. These steps are to be taken whenever a hydraulic component is disconnected:

1. ALWAYS relieve internal hydraulic pressure before proceeding with the repair.
2. NEVER allow foreign matter - dirt, water, metal particles, etc. - to enter the hydraulic system through the open connection. Seal the connection as tightly as possible.
3. Always cycle the control after completing a repair. This will eliminate air trapped in the cylinder, hoses, etc. and avoid erratic, bumpy behavior during working conditions.
4. ALWAYS check for hydraulic leakage after a repair. A high pressure leak is hazardous and must be repaired before putting the unit into operation.

5-3. CYLINDER

The following list of tools will be a definite asset in the disassembly and repair of all IMT cylinders:

1. SPANNER WRENCH (IMT part number 3Y140510) Fits all IMT cylinders.
2. NEEDLE NOSE PLIERS - For the removal and replacement of seals.
3. ICE PICK or SHARP AWL - For the removal and replacement of seals.
4. PLASTIC HAMMER - Used with the spanner wrench for head and piston installation.

5-4. CYLINDER REMOVAL

1. Support the crane with the mast and boom at a 90° angle.
2. Relieve the internal hydraulic pressure.
3. Disconnect the hydraulic hoses from the cylinder.

WARNING

Get help when removing the cylinder. Avoid dropping the cylinder and causing an injury or damaging the cylinder.

4. Remove the rod-end pin.
   A. Remove the retainer and bushing.
   B. Hold the cylinder up and drive out the rod-end pin.
5. Remove the butt-end pin in the same manner as the rod-end pin.
6. Carefully lower the cylinder.

5-5. CYLINDER DISASSEMBLY

Refer to Figure E-2 for parts reference.

CAUTION

If solvent is used to clean the internal cylinder components, all traces of solvent must be removed. Any residue will damage the seals.

WARNING

Do not use compressed air to assist in withdrawing the piston/rod asembly. The use of compressed air may result in propelling the piston/rod assembly out of the cylinder and may cause serious injury or death.

NOTE

If the cylinder is being repaired due to worn seals, we recommend replacing all components of the seal kit. The small additional expense may save expensive equipment down-time in the future. Refer to the parts section for the seal kit part number.

1. Thoroughly wash the exterior of the cylinder case.

NOTE

After the case has been washed, proceed with the disassembly in a clean enviroment; one that is free of dust and dirt.

2. Place the cylinder on a flat surface near a vise.

3. Slip a pin through the pin-boss and clamp the pin in a vise (Figure E-1).

CAUTION

Do not clamp the cylinder in a vise. It may damage the cylinder.

4. Unscrew the head in a counter-clockwise direction with the spanner wrench. Withdraw the head from the cylinder case.

5. Secure the rod-pin boss in the same manner as the cylinder-pin boss.

6. Unscrew the piston from the rod with a spanner in the same manner as the head.

CAUTION

Do not clamp the machined surface of the rod in a vise. Damage to the rod will result.

7. Remove the wafer-lock and the stop tubes from the rod. The wafer-lock was crushed to secure it and will have to be broken to remove it.

CAUTION

Make certain that the rod is not damaged during removal of the wafer lock.

8. Slide the head off the rod.

9. Inspect the cylinder interior and the rod for dents, nicks, scratches, etc. and replace if necessary.

CAUTION

Failure to replace a damaged rod or cylinder may result in leaks and poor performance. Further equipment down-time will occur to remedy this problem.

NOTE

Futher work should be done in a warm environment (70°F or warmer). This makes the seals easier to work with.

10. Work a slack section into the head seal static o-ring and pick it up out of the groove. Lift the static back-up out of its groove with the needle-nose pliers (Figure E-3).

11. Pinch the lip of the rod wiper with the needle-nose pliers and pull it out of the head.

12. Position the head with the top of the head up and puncture the dynamic rod seal with the ice pick. Pry it out of the groove and push it through the head (Figure E-4).

13. Spread the piston rings, slip them over the land and off the end of the piston nearest to the ring.

14. Carefully lift the dynamic piston seal out of the groove with a thin blade such as a putty knife. Take care not to nick the edges of the groove. Twist and break the seal.

CAUTION

Damaging the edges of the groove is likely to cause premature seal failure.

15. Prick the companion o-ring with a pin or needle and lift it out of the groove. Roll it off the end of the piston.

16. Pry the lock ring from its seat in the bottom of the piston.

17. Clean the piston, head, rod and cylinder. Dress any nicks and gouges in the head and piston that may have occured during disassembly.

5-6. CYLINDER ASSEMBLY

CAUTION

Use all of the seals in the seal kit. It may save expensive down-time in the future.

1. Install the companion o-ring. Make certain it is free of twists.

2. Slide the piston seal carefully into position.

CAUTION

Work the piston seal carefully into position from the top of the piston using the assembly groove. Do not attempt it from the bottom of the piston - you may stretch the seal and render it useless.

3. Slide the piston rings over the lands and allow them to snap into the grooves.

4. Carefully press the lock ring into position

5. Install the static back-up and the o-ring. Make certain there are no twists.

6. Position the head with the rod wiper pocket up. Grasp the dynamic rod seal with the needle-nose pliers(Figure E-5).

CAUTION

Do not apply too much pressure to the rod seal or you may cut it with the needle-nose pliers.

7. Insert the dynamic rod seal into the head and allow it to snap into position. Use your fingers to help it if necessary.

8. Install the rod wiper.

9. Generously lubricate the inside diameter of the head with a non-fibrous bearing grease such as Lubriplate.

10. Carefully slide the head onto the rod. Make certain that the rod wiper does not catch on the rod when it is first started. Slide the head all of the way onto the rod and up to the pin boss.

11. Slide the wafer-lock and stop tubes (if used) onto the rod.

12. Lubricate the entire threaded area of the rod and the inside diameter of the piston with non-fibrous bearing grease.

13. Secure the rod as shown in Figure E-6 and screw the piston onto the rod by hand. You should be able to get the piston almost all the way onto the rod before using the spanner wrench.

CAUTION

Check to make certain that the lock ring stays in position. It must remain in position or leaks may occur resulting in poor performance.

14. Torque the piston onto the rod at 250 ft-lbs of torque. Impact the wrench three times with a heavy plastic hammer while maintaining the torque (Figure E-6).

15. Generously lubricate the outside diameter of both the head and piston with non-fibrous bearing grease. Also lubricate the threads and beveled area of the top of the cylinder case.

16. With a side-to-side or up-and-down motion, work the piston into the cylinder and past the threads and beveled area of the top of the cylinder case.

17. Slide the piston into the cylinder. With a rotating motion, work the o-ring and the back-up past the threads and hand tighten the cylinder head.

18. Secure the cylinder and torque the head in the same manner as the piston.

5-7. CYLINDER INSTALLATION

1. Raise the cylinder until one of the pin bosses lines up with its hole on the crane boom. Drive a pin through the pin boss.

2. Raise the other end of the cylinder until it lines up and insert the pin.

3. Install the bushings and retaining rings.

4. Connect the hydraulic hoses.

5. Cycle the control until the crane operates.

6. Check for hydraulic leaks and repair if necessary.

5-8. CYLINDER PIN BEARINGS

1. Remove the cylinder.

2. Remove the boom hinge pins in the same manner as the cylinder pins.

3. Press the bushings out of the hole with a hydraulic press and install new bushings.

4. Assemble the crane the reverse of disassembly.

5-9. BOOM HINGE PINS AND BUSHINGS

Follow the same procedure listed in paragraph 5-8 of this section.

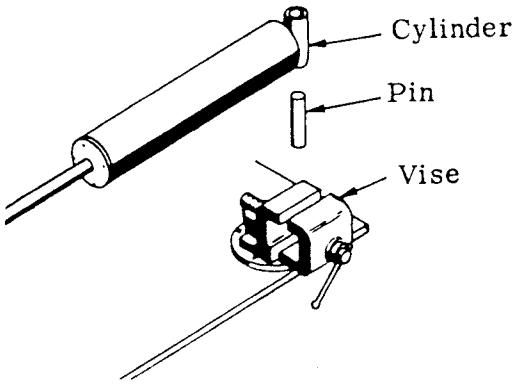


Figure E-1. Securing Cylinder

1. ROD
2. WIPER
3. DYNAMIC ROD SEAL
4. HEAD
5. STATIC BACK-UP
6. STATIC O-RING
7. STOP TUBE
8. PISTON
9. PISTON RINGS
10. DYNAMIC PISTON SEAL
11. COMPANION O-RING
12. LOCK RING
13. WAFER LOCK

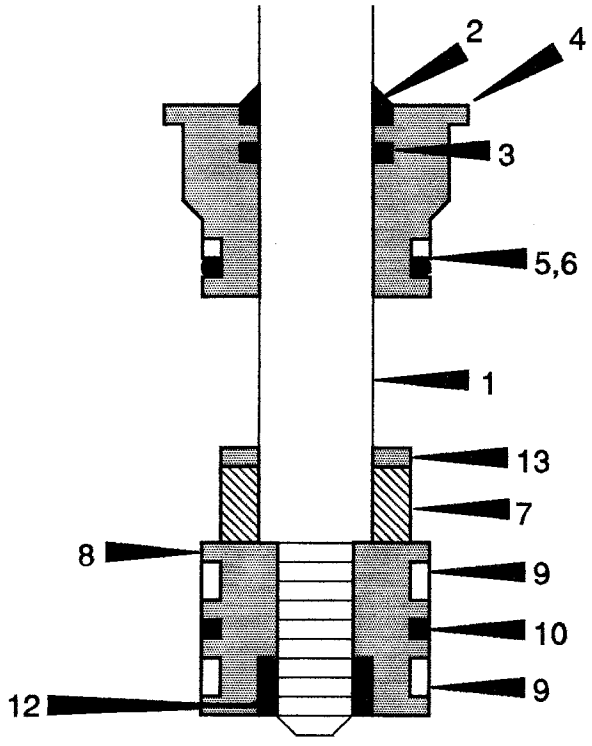


Figure E-2. Cylinder Components

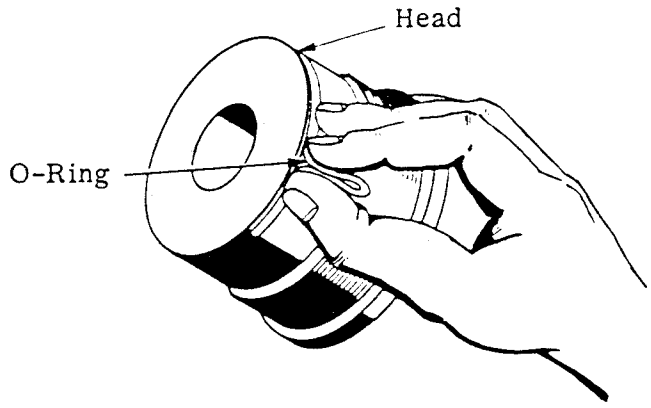


Figure E-3. O-ring Removal

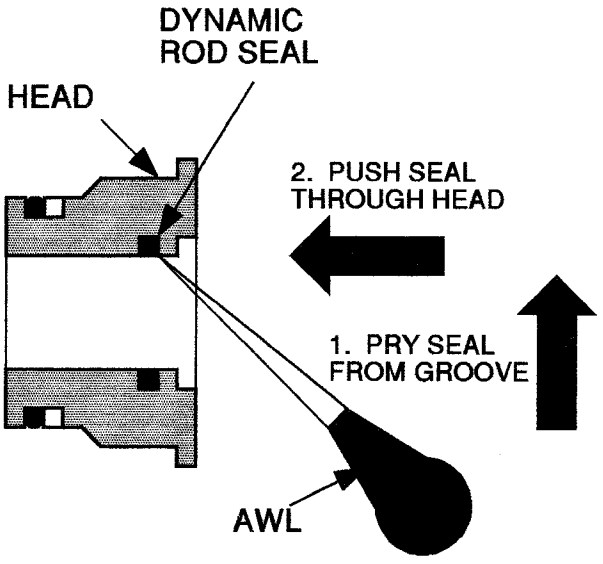


Figure E-4. Dynamic Rod Seal Removal

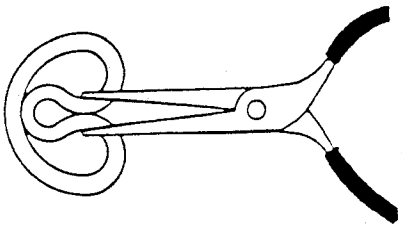


Figure E-5. Rod Seal Installation

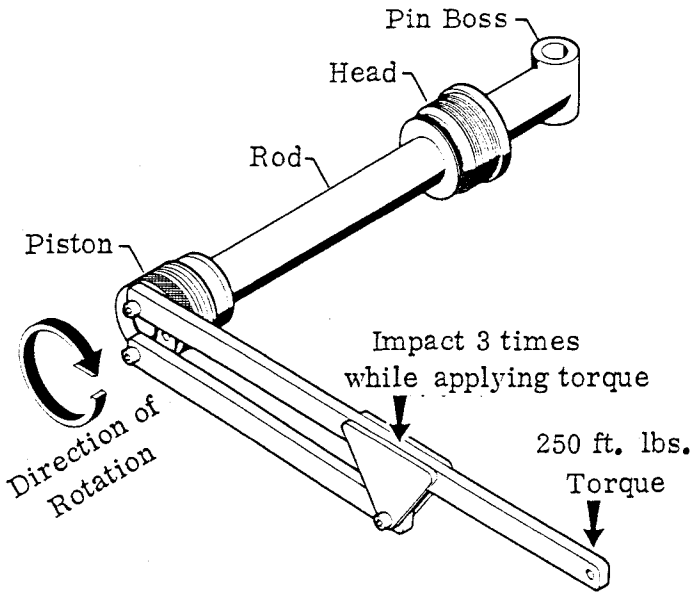


Figure E-6. Piston/Rod Assembly

5-10. TROUBLESHOOTING

Table E-1 is intended for quick reference in diagnosing on-the-job malfunctions. Care has been taken to list the possible causes in the most likely order of occurence.

Table E-1. Troubleshooting

SYMPTOM	PROBABLE CAUSE
Controls fail to respond	1. Remote Control unit is not connected. 2. Hydraulic oil supply is low. 3. Hydraulic pressure line is ruptured. 4. Hydraulic pump is faulty. 5. Relief valve is set incorrectly.
Operation slow down	1. Hydraulic oil supply is low. 2. Hydraulic pump is operating at a reduced speed. 3. Relief valve is set too low. 4. Pump or cylinder is worn. 5. Pump is slipping due to excessive oil temperature. This is a factor which will increase with worn components. 6. Filter is dirty.
Boom drifts when loaded and controls neutralize	1. Hydraulic oil is bypassing at piston seal. 2. Leak in hose.
Unusual noise in operation	1. Cavitation is occurring due to low hydraulic oil supply. 2. Loading is excessive. 3. Restriction or collapse of suction line. 4. Suction line strainer is clogged and requires cleaning. 5. Bypass settings on relief valve are too low. 6. Relief valve is damaged. 7. Valve closure is obstructed due to particle accumulation.
Boom jumps or bounces when lowered under load	1. Air in hydraulic system.

Section 6. PARTS

6-1. GENERAL

This section contains the exploded parts drawings and accompanying parts lists for the assemblies used on the crane. These drawings are intended to be used for parts identification and as an aid in ordering parts.

6-2. CYLINDER IDENTIFICATION

To be certain that proper replacements are received, it is necessary to specify the correct letter/number sequence for any parts request. The number stamped on the cylinder case must be used when ordering cylinder parts (See Figure F-2).

6-3. CRANE IDENTIFICATION

Every IMT crane has an identification placard (Figure F-1) attached to the crane in a prominent location. When ordering parts, communicating warranty information, or referring to the unit in correspondence, always include the serial number and model number. All inquiries should be directed to:

Iowa Mold Tooling Co., Inc.
Box 189, Garner, IA 50438-0189
Telephone: 515-923-3711
Product Support Fax: 515-923-3674

or

IMT Cranes Canada, Ltd.
385 West Street South
Orillia, Ontario, L3V 5H2, Canada
Telephone: 705-325-7458
Fax: 705-325-7625

6-4. WELDMENT IDENTIFICATION

Each of the major weldments, base, mast, lower boom and extension boom have a part number stamped on the weldment. The location of the part numbers are shown in Figure F-3.

6-5. ORDERING REPAIR PARTS

When ordering replacement parts it is important to follow the steps as outlined below.

1. Give the model number of the unit.
2. Give the serial number of the unit.
3. Specify the complete part number.
4. Give a complete description of the part.
5. Specify the quantity required.

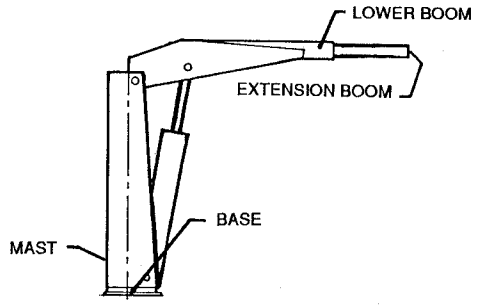


Figure F-3. WELDMENT PART NUMBER LOCATIONS

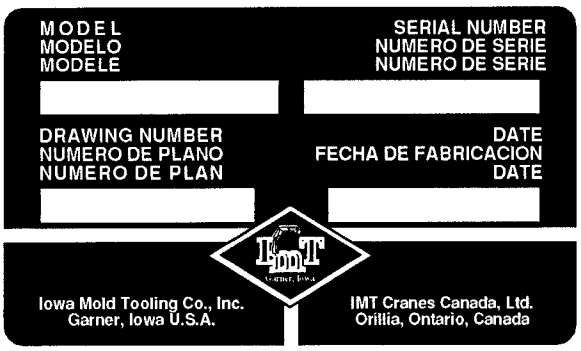


Figure D-1. SERIAL NUMBER PLACARD

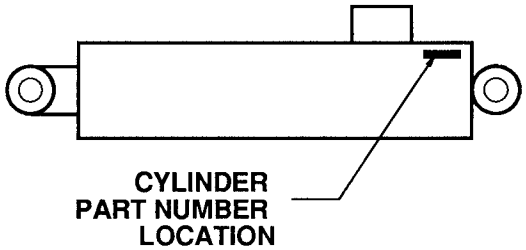
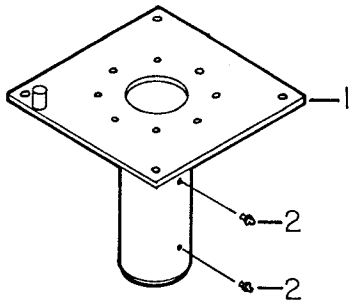
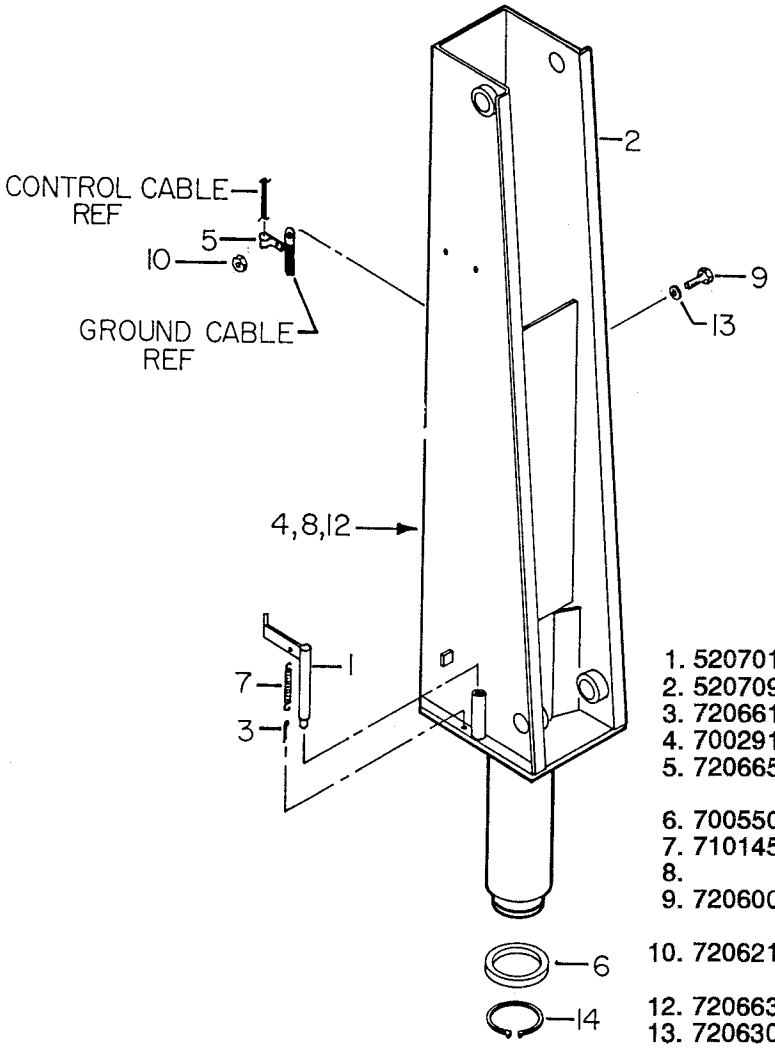


Figure D-2. CYLINDER PART NUMBER LOCATION



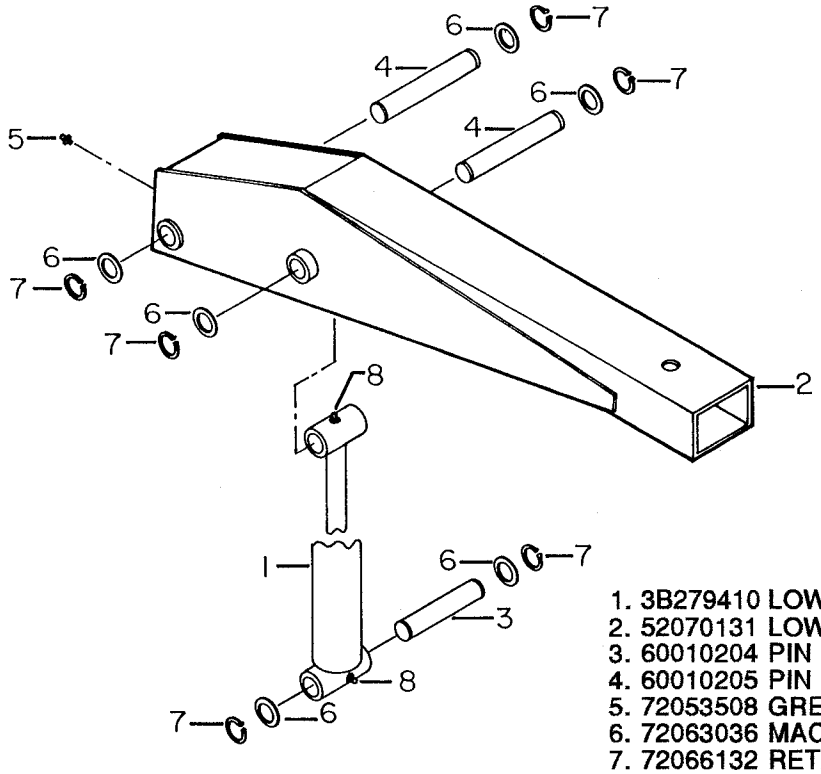
1.	52070953	BASE	1
2.	72053508	GREASE ZERK 1/8NPT	2

Figure F-4. Base Assembly (Part Number 41070126)



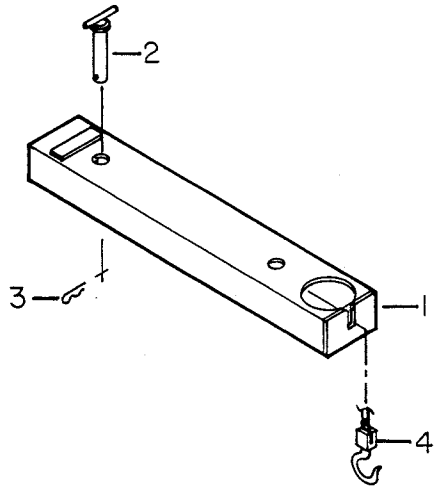
1.	52070136	STOP PIN	1
2.	52070952	MAST	1
3.	72066185	COTTER PIN .16 X 1	1
4.	70029119	SERIAL NUMBER PLACARD	1
5.	72066523	CLAMP 1/4 (PART OF INSTALLATION KIT)	1REF
6.	70055003	BEARING	1
7.	71014586	MAST LOCK SPRING	1
8.		CYLINDER IDENT DECAL	1
9.	72060004	CAP SCR 1/4-20 X 1 HH GR5 (PART OF INSTALLATION KIT)	1REF
10.	72062104	NUT 1/4-20 LOCK (PART OF INSTALLATION KIT)	1REF
12.	72066340	POP RIVET 1/8	2
13.	72063001	WASHER 1/4 WRT (PART OF INSTALLATION KIT)	1REF
14.	72066108	RETAINING RING	1REF

Figure F-4A. Mast Assembly (Part Number 41070128)



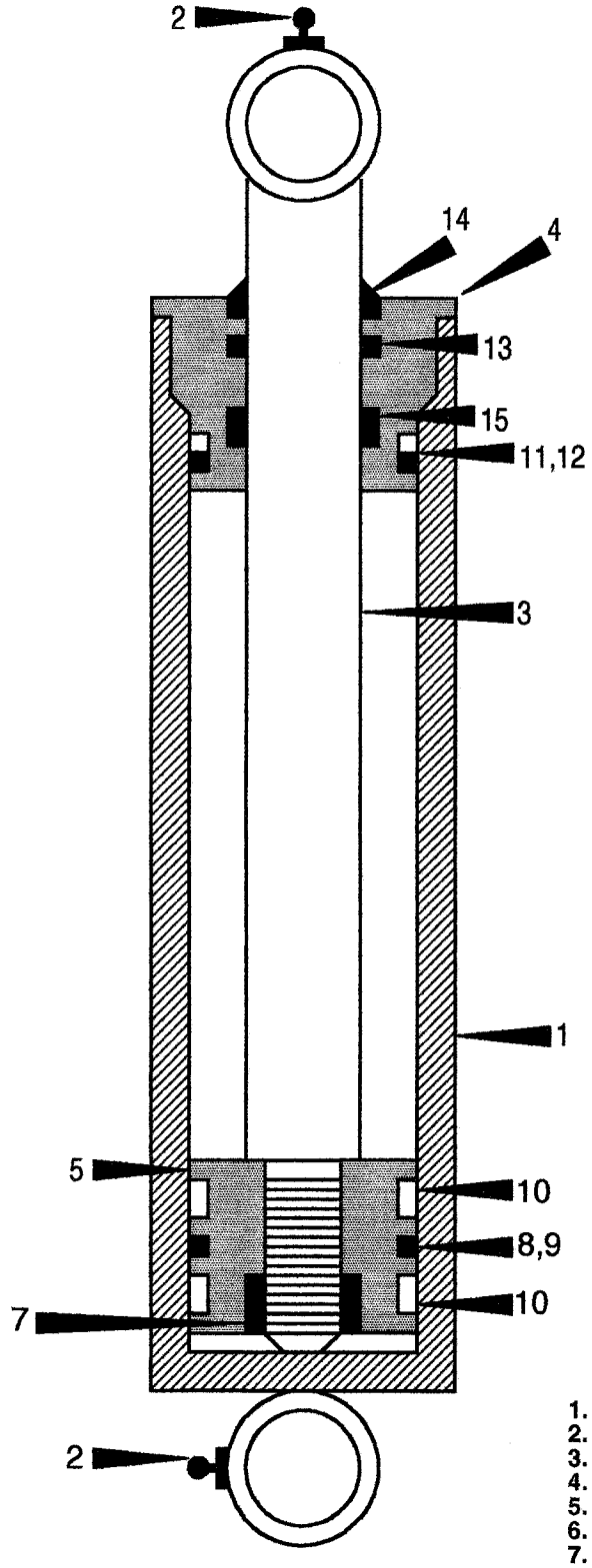
1.	3B279410 LOWER CYLINDER (INCL: 8)	1
2.	52070131 LOWER BOOM	1
3.	60010204 PIN	1
4.	60010205 PIN	2
5.	72053508 GREASE ZERK 1/8NPT	1
6.	72063036 MACH BUSHING 1-1/2 X 14GA	6
7.	72066132 RETAINING RING 1-1/2 EXT	6
8.	72053507 GREASE ZERK 1/4-28 (PART OF 1)	2REF

Figure F-5. Lower Boom Assembly (Part Number 41070130)



1.	52070133 EXTENSION BOOM	1
2.	52070337 PIN	1
3.	72066144 HAIR PIN .16	1
4.	70058066 CHAIN ASM	1

Figure F-6. Extension Boom Assembly (Part Number 41070132)



BORE	3.00"
STROKE	27.88"
CTR-CTR CL	36.00"
ROD DIA	1.50"
PIN DIA	1.50"

NOTE

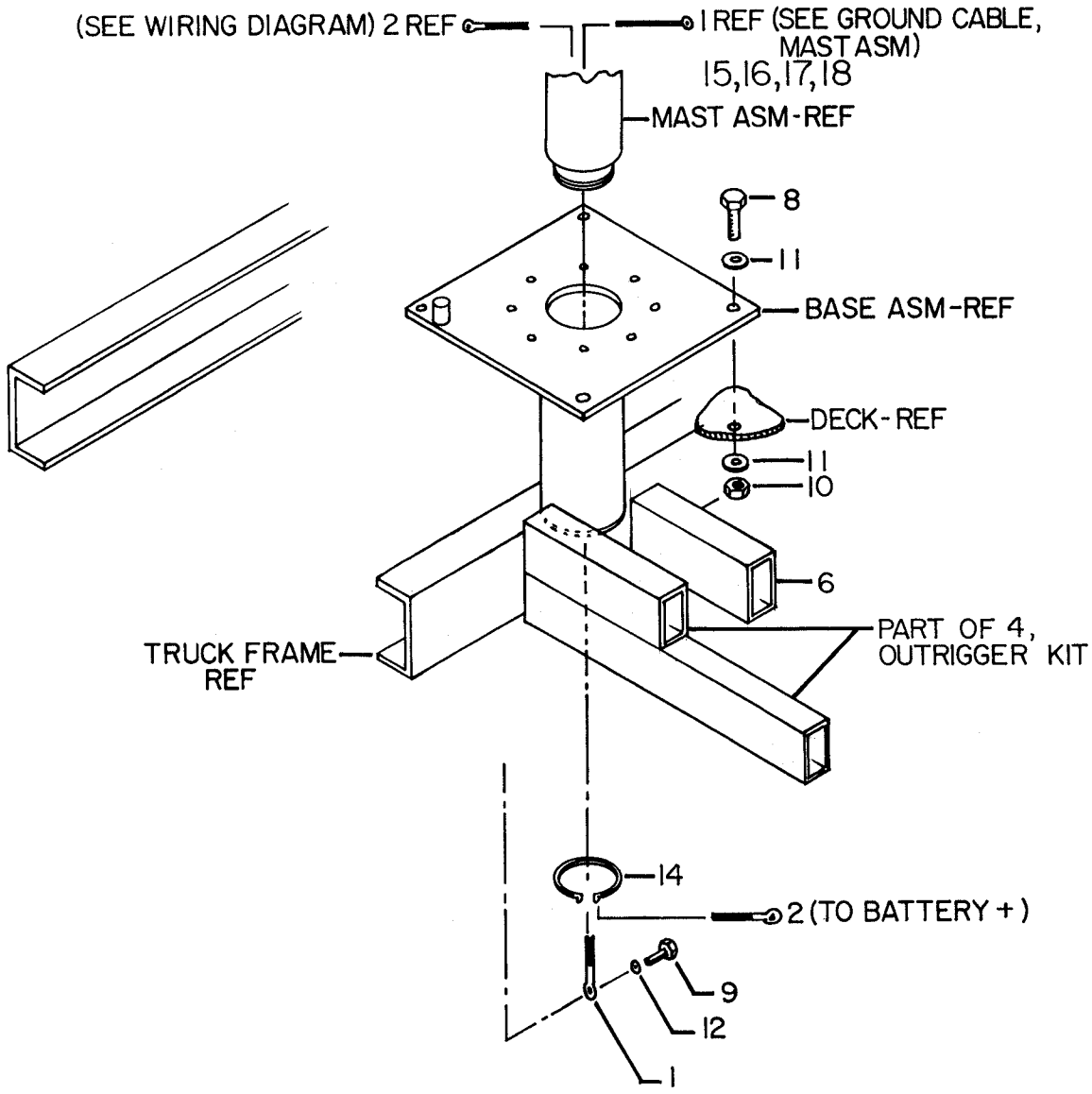
IT IS RECOMMENDED THAT ALL COMPONENTS OF THE SEAL KIT BE REPLACED WHENEVER THE CYLINDER IS DISASSEMBLED. THIS WILL REDUCE FUTURE DOWNTIME.

APPLY "LUBRIPLATE #630-2" MEDIUM HEAVY,MULTI-PURPOSE LUBRICANT OR EQUIVALENT TO ALL PISTON AND HEAD GLANDS, LOCK RING AND ROD THREADS BEFORE ASSEMBLY.

USE "NEVER-SEEZ" OR EQUIVALENT BETWEEN THE HEAD AND THE CASE WHEN ASSEMBLING THE CYLINDER.

1.	4B279410	CASE ASM (INCL: 2)	1
2.	72053507	GREASE ZERK 1/4-28(PART OF 1&3)	2REF
3.	4G279410	ROD ASM (INCL: 2)	1
4.	6H030015	HEAD	1
5.	6I030106	PISTON	1
6.	9A121217	SEAL KIT (INCL: 7-15)	1
7.	7T61N106	LOCK RING (PART OF 6)	1REF
8.	7T66P030	PISTON SEAL (PART OF 6)	1REF
9.	7Q072145	O-RING (PART OF 6)	1REF
10.	7T65I030	PISTON RING (PART OF 6)	2REF
11.	7Q072334	O-RING (PART OF 6)	1REF
12.	7Q10P334	BACK-UP RING (PART OF 6)	1REF
13.	7R546015	U-CUP ROD SEAL (PART OF 6)	1REF
14.	7R14P015	ROD WIPER (PART OF 6)	1REF
15.	7T2N8015	WEAR RING (PART OF 6)	1REF

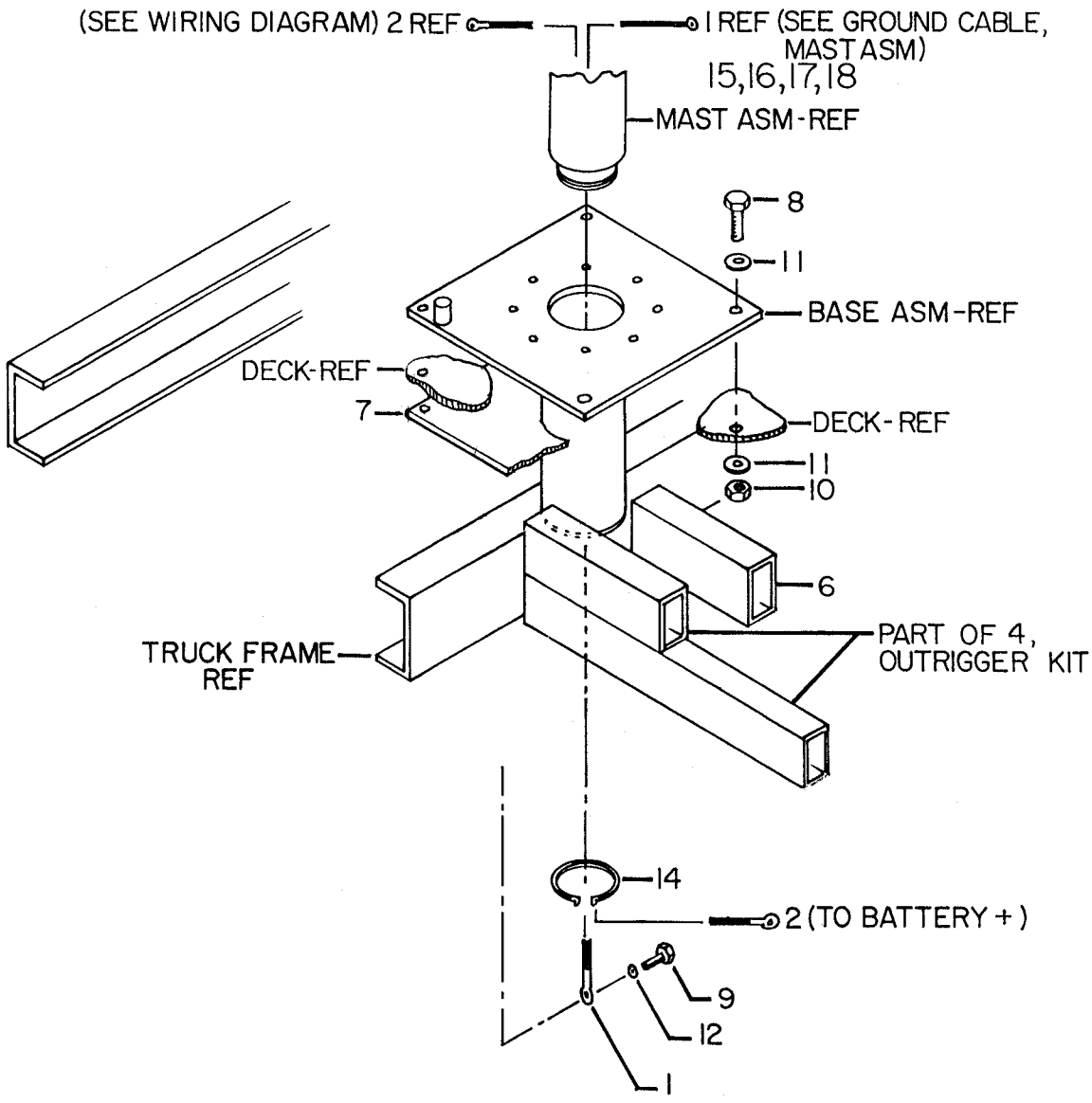
Figure F-7. LOWER BOOM CYLINDER (3B279410)



1.	51705931	CABLE ASM #1 X 52"	1
2.	51701516	BATTERY CABLE #1 X 240"	1
6.	60108421	TUBE	1
8.	72060093	CAP SCR 1/2-13 X 1-1/2 HH GR5	4
9.	72060833	SCREW 5/16-18 X 3/4 HH SLFTPG	1
10.	72062080	NUT 1/2-13 LOCK	4
11.	72063005	WASHER 1/2 WRT	8
12.	72063050	WASHER 5/16 LOCK	1
13.	95708907	DECAL KIT (SEE DWG)	1
14.	72066108	RETAINING RING	1
15.	72063001	WASHER 1/4 WRT	1
16.	72066523	CLAMP	1
17.	72060004	CAP SCR 1/4-20 X 1 HH GR5	1
18.	72062104	NUT 1/4-20 LOCK	1

NOTES: BRACE INSTALLATION MAY REQUIRE MODIFICATION UNDER CERTAIN INSTALLATION CONDITIONS.
OUTRIGGER SUPPORTS MUST BE WELDED TO BODY MOUNT BRACKET AND CRANE WELL.

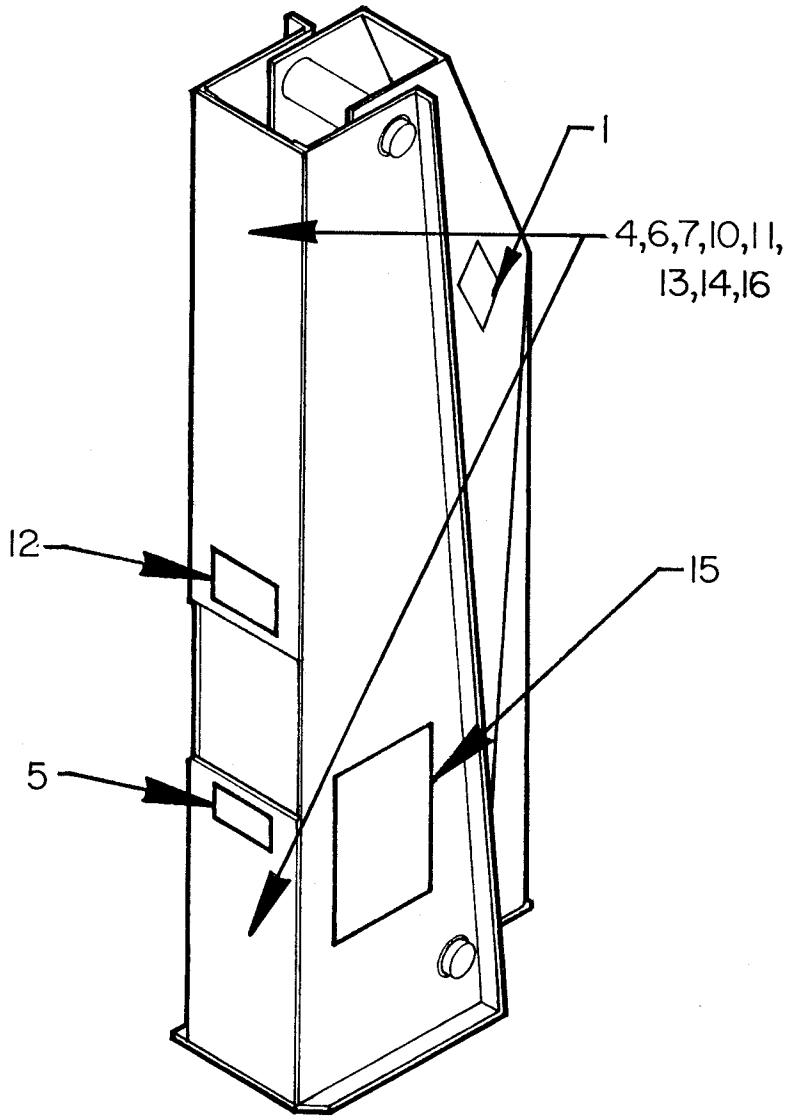
Figure F-8. Installation Kit - Steel Body (Part Number 93705527)



1.	51705931	CABLE ASM #1 X 52"	1
2.	51701516	BATTERY CABLE #1 X 240"	1
6.	60108421	TUBE	1
7.	60111907	BOTTOM PLATE	1
8.	72060093	CAP SCR 1/2-13 X 1-1/2 HH GR5	4
9.	72060833	SCREW 5/16-18 X 3/4 HH SLFTPG	1
10.	72062080	NUT 1/2-13 LOCK	4
11.	72063005	WASHER 1/2 WRT	8
12.	72063050	WASHER 5/16 LOCK	1
13.	95708907	DECAL KIT (SEE DWG)	1
14.	72066108	RETAINING RING	1
15.	72063001	WASHER 1/4 WRT	1
16.	72066523	CLAMP	1
17.	72060004	CAP SCR 1/4-20 X 1 HH GR5	1
18.	72062104	NUT 1/4-20 LOCK	1

NOTES: BRACE INSTALLATION MAY REQUIRE MODIFICATION UNDER CERTAIN INSTALLATION CONDITIONS.
OUTRIGGER SUPPORTS MUST BE WELDED TO BODY MOUNT BRACKET AND CRANE WELL.

Figure F-9. Installation Kit - Fiberglass Body (Part Number 93709250)



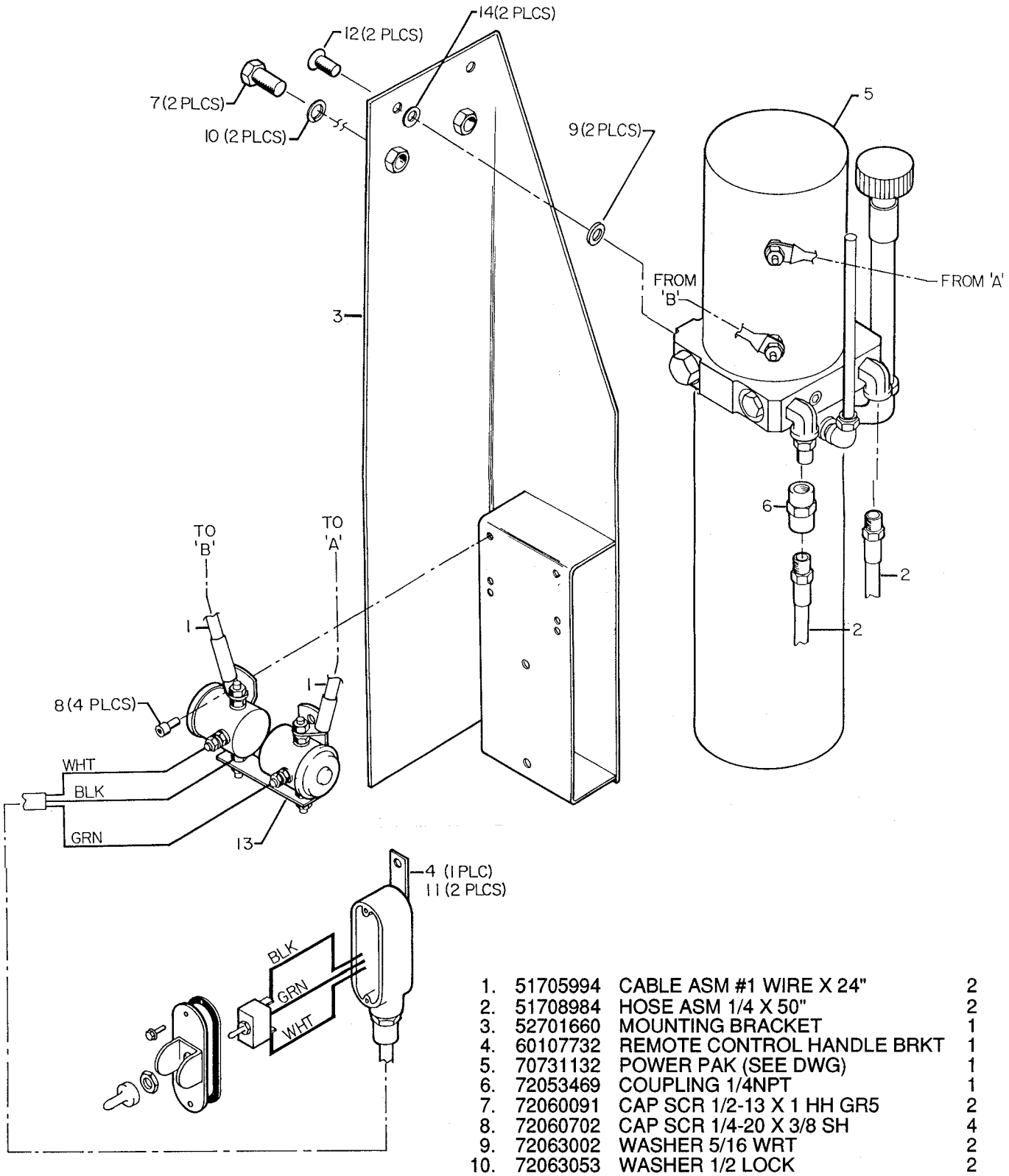
DECAL PLACEMENT	
ITEM NO.	LOCATION
9	ONE ON EACH SIDE OF CARRIER VEHICLE
2,3	AT ALL GREASE ZERKS
8	NEAR OUTRIGGER

1.	70391456	IMT DIAMOND	2
2.	70391612	DECAL - GREASE WKLY LH	3
3.	70391613	DECAL - GREASE WKLY RH	3
4.	70392213	DECAL - CAUTION WASH/WAX	1
5.	70392813	DECAL - DANGER ELECTRO.	1
6.	70392814	DECAL - DANGER OPER TRAINING	1
7.	70392815	DECAL - DANGER OPERATION	1
8.	70392864	DECAL - DANGER OUTRG STD CLR	1
9.	70392865	DECAL - DANGER ELEC HZRD-LG	4
10.	70392866	DECAL - DANGER OPER COND	1
11.	70392888	DECAL - DANGER OPER RESTRICT	1
12.	70392889	DECAL - DANGER RC ELECTRO	1
13.	70392890	DECAL - DANGER STOW/UNFOLD	1
14.	70392982	DECAL - CONTACT IMT	1
15.	71029127	CAPACITY PLACARD 4000	2
16.	71039134	DECAL - CAUTION OIL LEVEL	1

Figure F-10. Decal Kit (Part Number 95708907)

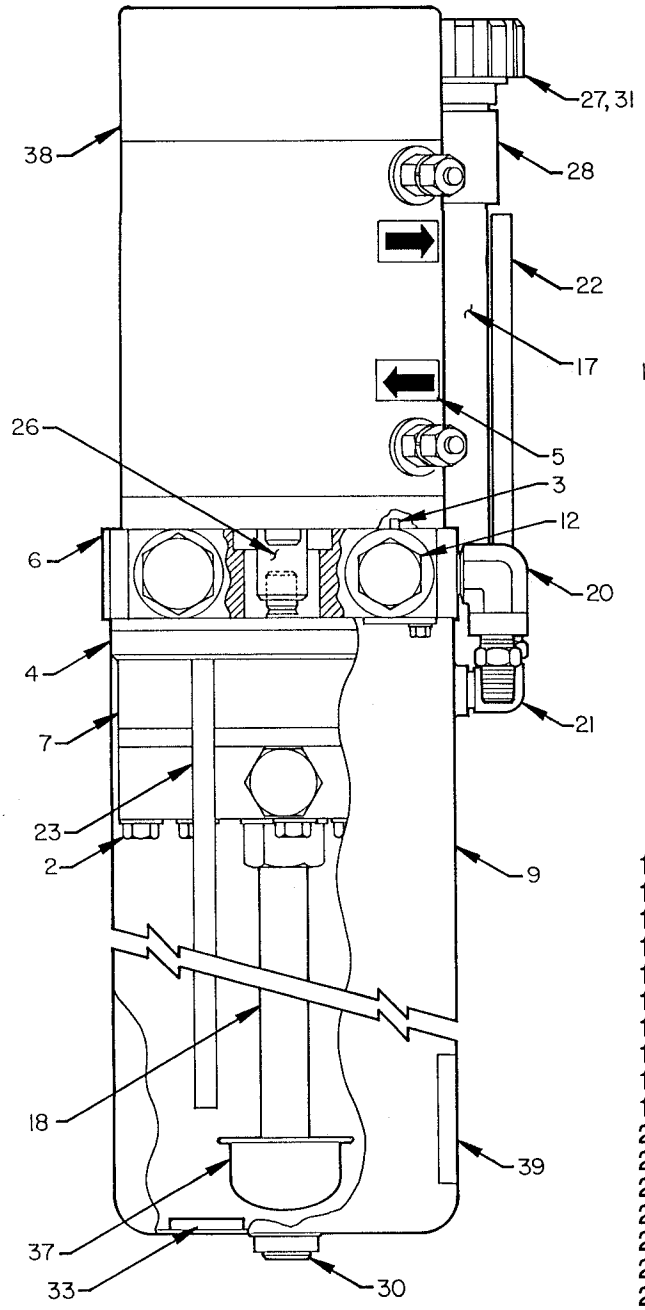
NOTE

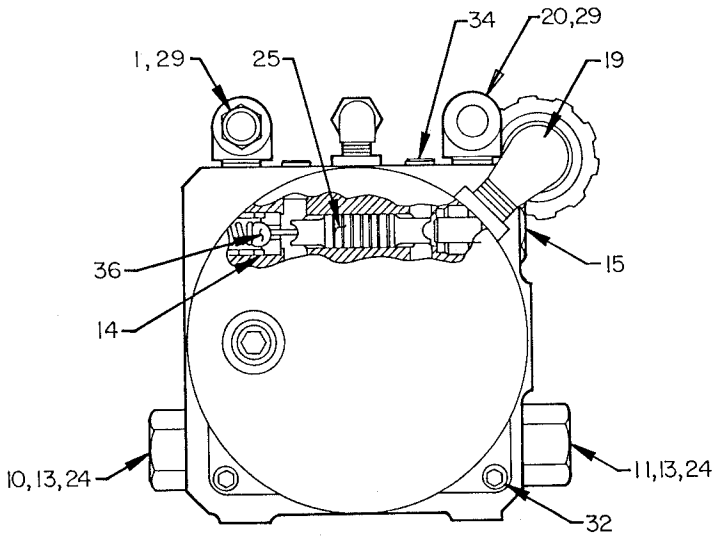
THIS KIT (51702968) HAS BEEN REPLACED WITH POWER KIT 51711597.



1.	51705994	CABLE ASM #1 WIRE X 24"	2
2.	51708984	HOSE ASM 1/4 X 50"	2
3.	52701660	MOUNTING BRACKET	1
4.	60107732	REMOTE CONTROL HANDLE BRKT	1
5.	70731132	POWER PAK (SEE DWG)	1
6.	72053469	COUPLING 1/4NPT	1
7.	72060091	CAP SCR 1/2-13 X 1 HH GR5	2
8.	72060702	CAP SCR 1/4-20 X 3/8 SH	4
9.	72063002	WASHER 5/16 WRT	2
10.	72063053	WASHER 1/2 LOCK	2
11.	72066340	POP RIVET 1/8	2
12.	72601043	CAP SCR 3/8-16 X 3/4 FLH SOC	2
13.	77041001	JUMPER BAR	1
14.	72063005	WASHER 1/2 WRT	2

Figure F-11. OPTION - POWER KIT - STONE (PART NUMBER 51702968)





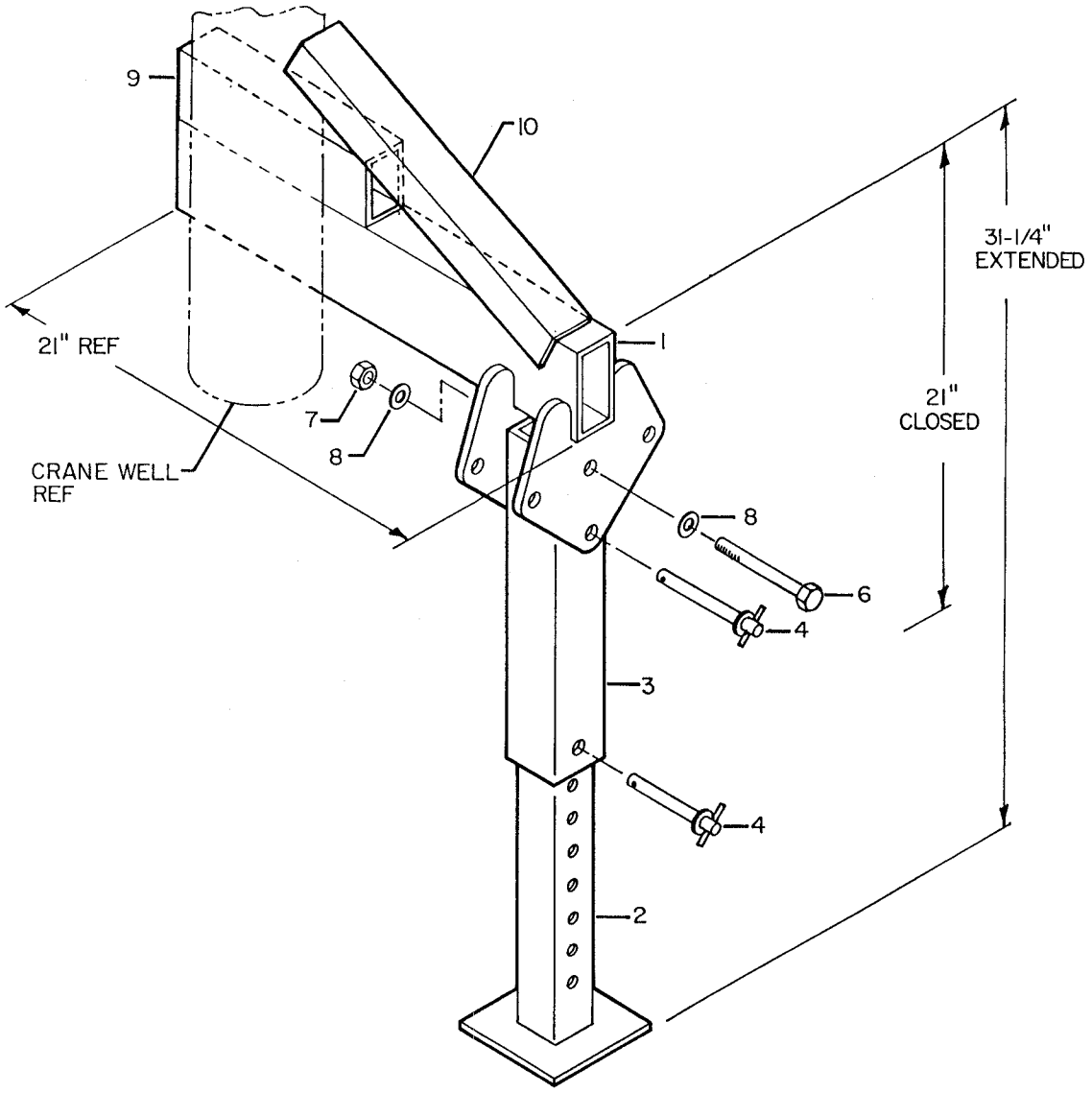
ITEM 8 NOT SHOWN.
SEE 51702968 (POWER KIT) FOR ITEMS 16 & 35.

1.	73054401	CHECK VALVE	1
2.	72061364	CCAP SCR 5/16-24 X 2-1/2 HEX WH	2
3.	70143546	PIN	1
4.	76393063	O-RING	1
5.	70392299	DECAL - ROTATION DIRECTION	2
6.	70143547	HEAD END	1
7.	70143551	CASE	1
8.	70393064	INSTRUCTION CARD	1
9.	70142342	RESERVOIR	1
10.	70731400	SPRING/BALL ASM	1
11.	70731394	SPRING/BALL	1
12.	70731395	CHECK CAP ASM	1
13.	73054493	RELIEF CAP	2
14.	70731397	SEAT ASM	1
15.	70731398	CHECK PLUG	1
16.	77041072	REMOTE CTRL W/CABLE	1
17.	72533093	NIPPLE	1
18.	72533094	NIPPLE 3/8 X 9"	1
19.	72533095	STRT ELBOW	1
20.	70143548	BUSHING	2
21.	72533096	STRT ELBOW	1
22.	70143549	TUBE	1
23.	70143550	RETURN TUBE	2
24.	72601257	ADJUSTING SCREW	2
25.	70142344	PISTON	1
26.	70143142	COUPLING	1
27.	70048140	BREATHER	1
28.	72533097	COUPLING 3/8NPT	1
29.	70034361	PLUG 1/4	2
30.	70034363	PLUG 3/8NPT	1
31.	70034362	PLUG	1
32.	72601256	CAP SCREW	4
33.	73052052	MAGNET	1
34.	70034364	PLUG 1/8	2
35.	77041382	SOLENOID 12VDC	2
36.	70732107	SPRING/BALL ASM	1
37.	73052043	FILTER	1
38.	77043023	ELECTRIC MOTOR	1
39.	70029542	SERIAL NO. NAMEPLATE	1

NOTE

THIS POWER PAK (70731132) HAS BEEN REPLACED WITH POWER PAK (70732797) AND ITS POWER KIT (51711597).

Figure F-12. POWER PAK - STONE (PART NUMBER 70731132)



1.	52701717	SUPPORT	1
2.	52701718	LEG	1
3.	60103578	HOUSING	1
4.	71731461	PIN - QUICK RELEASE	2
5.	70392864	DECAL - DANGER OUTRG STD CLR	1
6.	72060100	CAP SCR 1/2-13 X 4-1/2 HH GR5	1
7.	72062080	NUT 1/2-13 LOCK	1
8.	72063005	WASHER 1/2 WRT	2
9.	60107651	TUBE	1
10.	60108334	ANGLE	1

NOTES: POSITION THE ANGLE (ITEM 10) AFTER THE CRANE IS POSITIONED.
POSITION DECAL (ITEM 5) AT THE OUTRIGGER AND IN CLEAR VIEW OF THE OPERATOR.

Figure F-13. Option - Manual Swing-Down Outrigger Kit (Part Number 90701596)

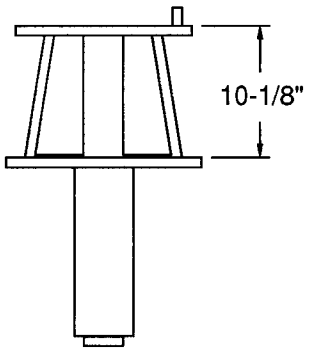
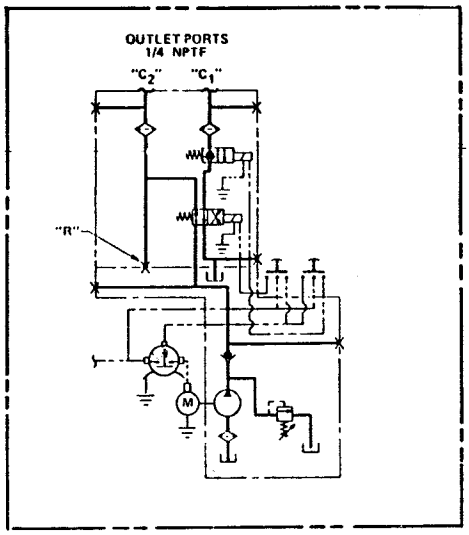
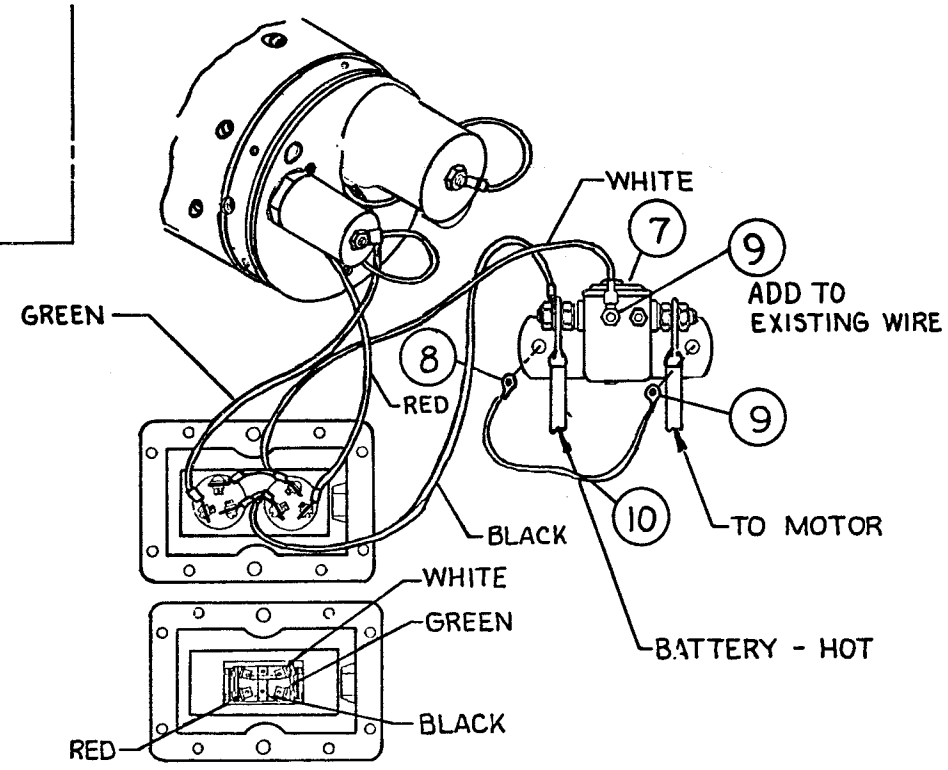


Figure F-14.
OPTION - ELEVATED CRANE BASE WELDMENT (52704020)



HYDRAULIC AND
WIRING SCHEMATIC



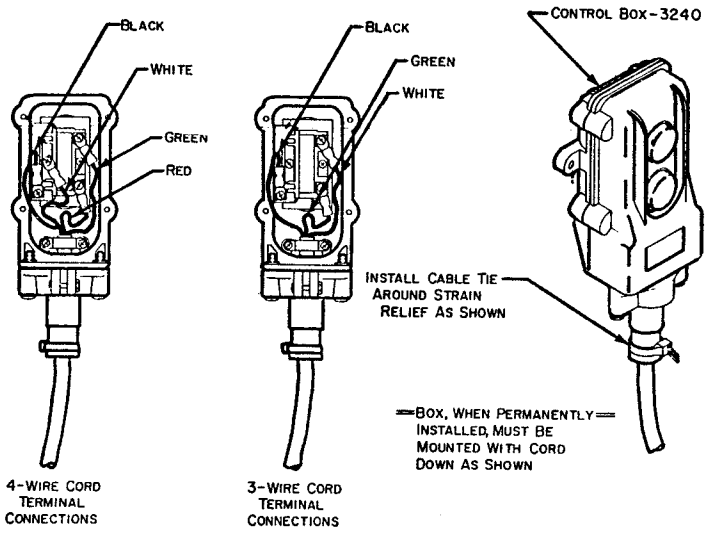
ITEM	PART NO.	DESCRIPTION	QTY
1.	70732797	POWER PAK-MONARCH	1
2.	72060047	CAP SCR 3/8-16X1-1/4 HHGR5	2
3.	72062002	NUT 3/8-16 HEX	2
4.	72062103	NUT 3/8-16 LOCK	2
5.	72063003	WASHER 3/8 WRT	2
6.	60117101	BRACKET	1
7.	77041237	SOLENOID 12V 80% 150A	1
8.	77040051	TERMINAL SPRSPD	1
9.	77040053	TERMINAL RING	2
10.	89044214	WIRE 18GA GRN	5"
11.	51704784	CABLE ASM #1WIRE X 6"	1
12.	51711595	HOSE ASM 1/4X36 AC	2
13.	72531131	STREET ELBOW 1/4NPT 90°	2
14.		CONTROL BOX (PART OF 1)	REF
15.		MAST-MODIFIED	REF

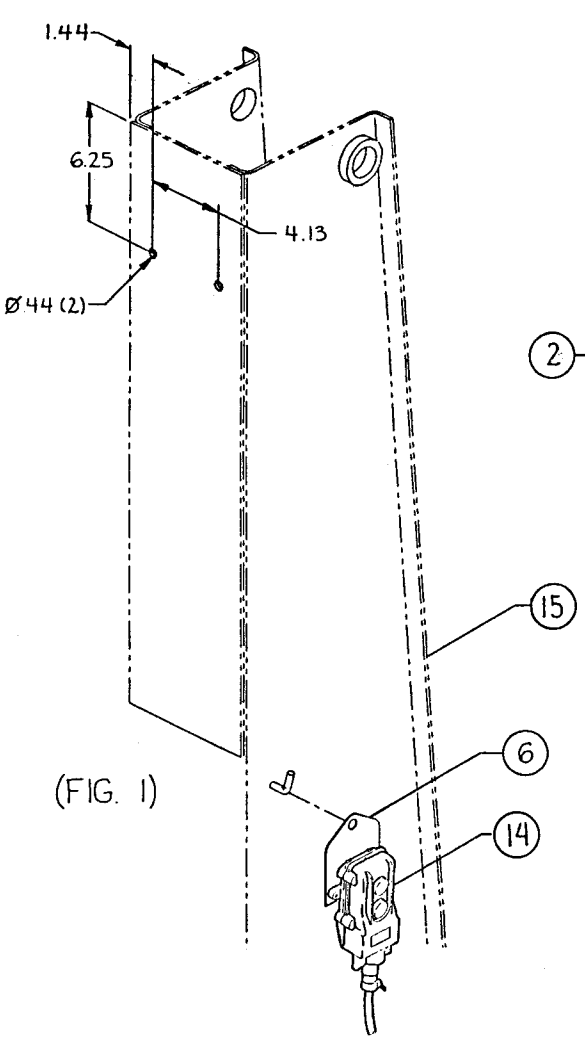
SEE FOLLOWING PAGE FOR ADDITIONAL DRAWINGS.

RETRO-FIT INSTRUCTIONS

1. REMOVE OLD UNIT.
2. DRILL TWO 7/16 DIA MOUNTING HOLES NEAR TOP OF MAST AS SHOWN IN FIG. 1.
3. MOUNT POWER UNIT AS SHOWN IN FIG. 2.
4. PLUMB UNIT WITH HOSES SUPPLIED.
5. CUSTOMER TO SUPPLY EXTRA LENGTH POWER WIRE.

Figure F-15. POWER KIT (51711597)





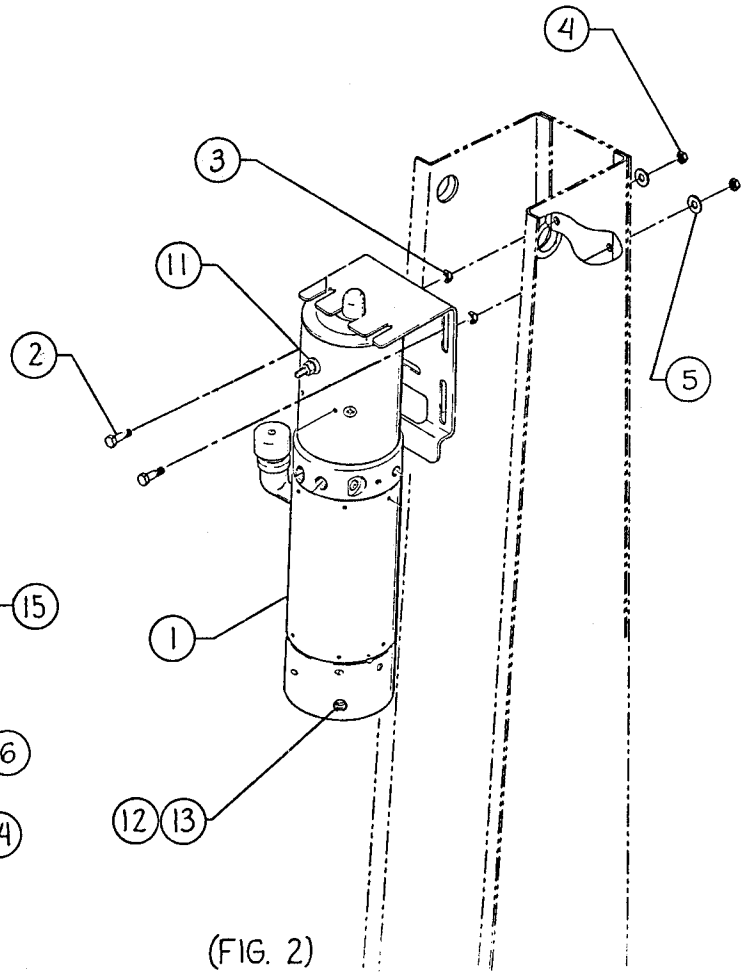


Figure F-15A. POWER KIT (51711597)

SECTION 7. Installation

7-1. GENERAL

Satisfacory performance of the IMT 4000 Crane depends to a great measure on the correct installation, servicing, inspection and testing of the unit prior to operation.

During all phases of installation, systematic double checking of work should be employed to minimize any necessity for rework. All inspection and tests should be meticulously performed and any malfunctions corrected immediately upon detection. Adherence to detail during crane installation will do much to ensure proper unit performance when placed in service

This section contains specific installation instructions applicable to IMT metal and fiberglass bodies only. See installation kit drawings in the Parts section for additional reference and location of parts.

7-2. BASIC INSTALLATION

These installation instructions apply only to IMT metal and fiberglass truck bodies.

1. Inspect the carrier vehicle for conformance to the requirements in paragraph 1-8of the Specificatios section of this manual.

2. Locate the center point of the base approximately 17-1/2" (44.5cm) from the sidewall of the body and 10-1/2" (26.7cm) from the rear edge of the body.

CAUTION

Before cutting the hole, make certain it will not interfere with the body frame members. Do not cut any frame members when cutting the hole.

NOTE

Since the fiberglass body deck consists of fiberglass impregnated expanded metal, use a metal cutting blade on the saw.

4. Insert the base assembly in the hole and on steel bodies also weld the base to the deck. On fiberglass bodies an underdeck plate is provided which is to be bolted to the base by sandwiching the deck-plate between the base and plate (See Figure F-9).

CAUTION

Fiberglass bodies will only be bolted. The deck-plate is also fiberglass and will be damaged by welding, if attempted.

5. Position support members so the bottom plate rests flat on the support members. Weld these members to the chassis, bottom plate and crane base.

6. Position the crane on the base and install the retaining ring on the bottom of the mast.

7. Spray paint or otherwise protect all unpainted surfaces.

8. Feed the battery cable up through the base and connect it to the control solenoids (See Figure G-1). Connect the other end to the positive side of the battery.

9. Connect the remote control cable to the solenoids.

10. Install all of the placards and decals of the Decal Kit.

11. Check for proper lubrication and hydraulic fluid levels.

12. Test the unit for structural strength, stability and proper operation.

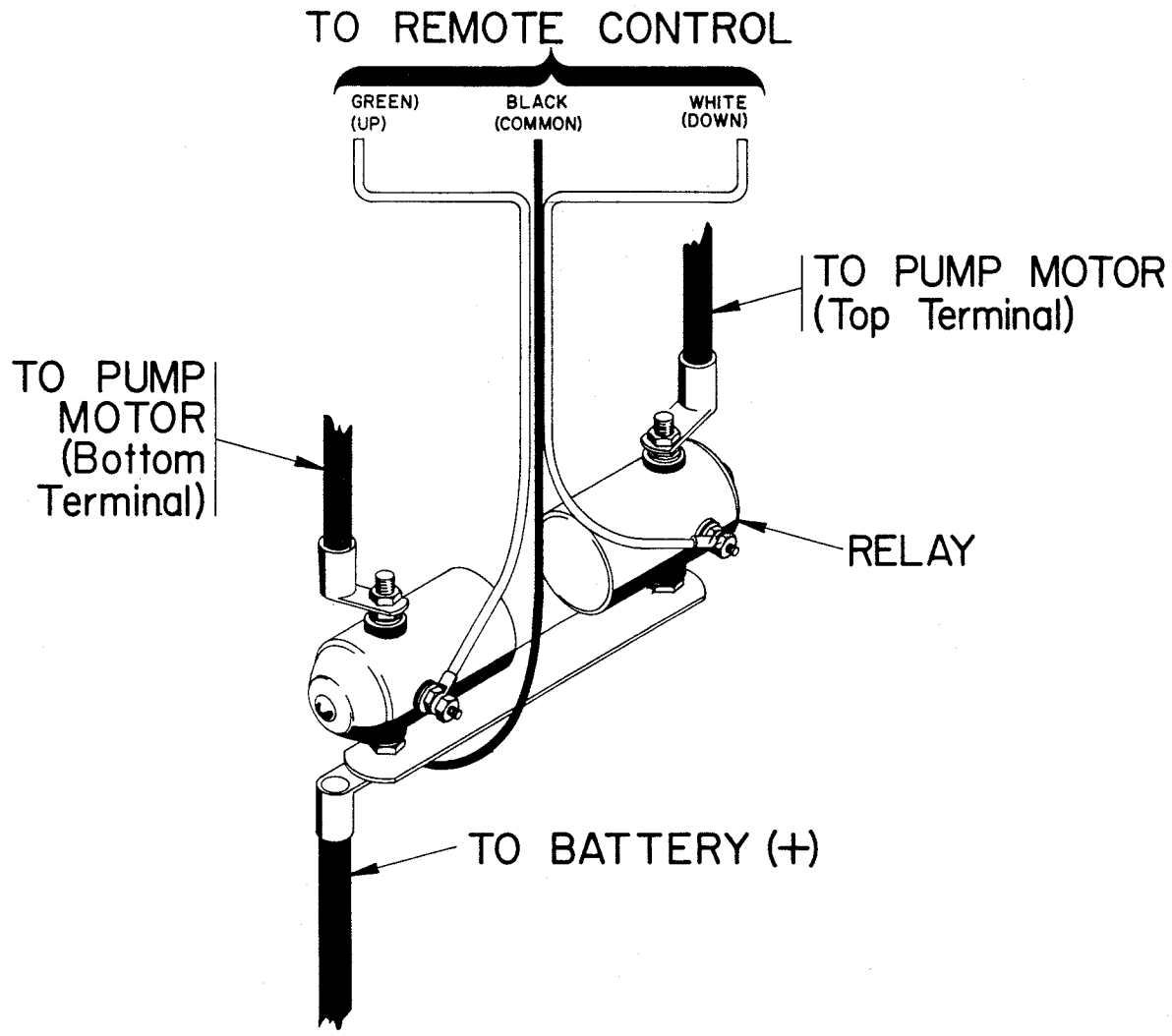


Figure G-1. Wiring Diagram

SECTION 8. Appendix

FINE THREAD BOLTS

SIZE (DIA-TPI)	BOLT DIA (INCHES)	TIGHTENING TORQUE SAE J429 GRADE 5 PLAIN (LB FT)	SAE J429 GRADE 5 PLATED (LB FT)	SAE J429 GRADE 8 PLAIN (LB FT)	SAE J429 GRADE 8 PLATED (LB FT)
5/16-24	0.3125	19	14	27	20
3/8-24	0.3750	35	26	49	35
7/16-20	0.4375	55	41	78	58
1/2-20	0.5000	90	64	120	90
9/16-18	0.5625	120	90	170	130
5/8-18	0.6250	170	130	240	180
3/4-16	0.7500	300	225	420	315
7/8-11	0.8750	445	325	670	500
1-12	1.0000	645	485	995	745
1 1/8-12	1.1250	890	670	1445	1085
1 1/4-12	1.2500	1240	930	2010	1510
1-3/8-12	1.3750	1675	1255	2710	2035
1 1/2-12	1.5000	2195	1645	3560	2670

COARSE THREAD BOLTS

SIZE (DIA-TPI)	BOLT DIA (INCHES)	TIGHTENING TORQUE SAE J429 GRADE 5 PLAIN (LB FT)	SAE J429 GRADE 5 PLATED (LB FT)	SAE J429 GRADE 8 PLAIN (LB FT)	SAE J429 GRADE 8 PLATED (LB FT)
5/16-18	0.3125	17	13	25	18
3/8-16	0.3750	31	23	44	33
7/16-14	0.4375	49	37	70	52
1/2-13	0.5000	75	57	105	80
9/16-12	0.5625	110	82	155	115
5/8-11	0.6250	150	115	220	160
3/4-10	0.7500	265	200	375	280
7/8-9	0.8750	395	295	605	455
1-8	1.0000	590	445	910	680
1 1/8-7	1.1250	795	595	1290	965
1 1/4-7	1.2500	1120	840	1815	1360
1-3/8-6	1.3750	1470	1100	2380	1780
1 1/2-6	1.5000	1950	1460	3160	2370

When using the torque data in the charts above, the following rules should be observed.

1. Bolt manufacturer's particular specifications should be consulted when provided.
2. Flat washers of equal strength must be used.
3. All torque measurements are given in foot-pounds. To convert to inch-pounds, multiply by 12.
4. Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress ability, such as Never-Seez compound graphite and oil, molybdenum disulphite, collodial copper or white lead are applied, multiply the torque values in the charts by the factor .90. The use of Loctite does not affect the torque values listed above.
5. Torque values for socket-head capscrews are the same as for Grade 8 capscrews.

WARNING

Anytime a gear-bearing bolt is removed, it must be replaced with a new bolt of the identical grade and size. Once a bolt has been torqued to 75% of its proof load and then removed, the torque coefficient may no longer be the same as when the bolt was new thus giving indeterminate clamp loads after torquing. Failure to replace gear-bearing bolts may result in bolt failure due to metal fatique causing serious injury or DEATH.

Table H-1. TORQUE DATA CHART

Definite tire inflation pressures are established for each tire size depending upon the load imposed on the tire. For greater stability, riding comfort and prolonged tire life, tires should be inflated for the loads carried. The "Load and Inflation Table" shown below, indicates the proper inflation pressures.

Table H-2. Tire Load and Inflation Pressure

SINGLE TIRES FOR TRUCKS IN HIGHWAY SERVICE											
TIRE SIZE/ LOAD RANGE	TIRE LOAD LIMITS AT VARIOUS INFLATION PRESSURES										
	50	55	60	65	70	75	80	85	90	95	100
7.00-20 / D	2100	2260	2390	2530	2670	2790					
7.00-20 / E	2100	2260	2390	2530	2670	2920	3030	3150			
7.50-20 / D	2360	2530	2680	2840	2990	3140					
7.50-20 / E	2360	2530	2680	2840	2990	3140	3270	3410	3530		
8.25-20 / E	2800	3010	3190	3370	3560	3730	3890	4050			
8.25-20 / F	2800	3010	3190	3370	3560	3730	3890	4050	4210	4350	4500
9.00-20 / E		3560	3770	4000	4210	4410	4610				
9.00-20 / F		3560	3770	4000	4210	4410	4610	4790	4970	5150	
10.00-20 / F			4290	4530	4770	4990	5220	5430			
10.00-20 / G			4290	4530	4770	4990	5220	5430	5640	5840	6040
11.00-20 / F			4670	4940	5200	5450	5690	5920			
11.00-20 / G			4670	4940	5200	5450	5690	5920	6140	6370	6590
11.00-22 / F			4960	5240	5520	5790	6040	6290			
11.00-22 / G			4960	5240	5520	5790	6040	6290	6530	6770	7000

DUAL TIRES FOR TRUCKS IN HIGHWAY SERVICE											
TIRE SIZE/ LOAD RANGE	TIRE LOAD LIMITS AT VARIOUS INFLATION PRESSURES										
	40	45	50	55	60	65	70	75	80	85	90
7.00-20 / D	1840	1980	2100	2220	2340	2450					
7.00-20 / E	1840	1980	2100	2220	2340	2450	2560	2660	2760		
7.50-20 / D	2070	2220	2350	2490	2620	2750					
7.50-20 / E	2070	2220	2350	2490	2620	2750	2870	2990	3100		
8.25-20 / E	2460	2640	2800	2960	3120	3270	3410	3550			
8.25-20 / F	2460	2640	2800	2960	3120	3270	3410	3550	3690	3820	3950
9.00-20 / E		3120	3310	3510	3690	3870	4040				
9.00-20 / F		3120	3310	3510	3690	3870	4040	4200	4360	5420	
10.00-20 / F			3760	3970	4180	4380	4580	4760			
10.00-20 / G			3760	3970	4180	4380	4580	4760	4950	5120	5300
11.00-20 / F			4100	4330	4560	4780	4990	5190			
11.00-20 / G			4100	4330	4560	4780	4990	5190	5390	5590	5780
11.00-22 / F			4350	4600	4840	5080	5300	5520			
11.00-22 / G			4350	4600	4840	5080	5300	5520	5730	5940	6140

TIRE AND RIM ASSOCIATION STANDARD TIRE LOADS AT VARIOUS INFLATION PRESSURES. LOAD RANGE LETTERS AND CORRESPONDING PLY RATING (D = 8 PLY, E = 10 PLY, F = 12 PLY AND G = 14 PLY).

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 4000 Crane	MANUAL PART NO. 99900267-9/90
SUBMITTED BY		
COMPANY		
ADDRESS		
CITY, STATE, ZIP		
TELEPHONE		

☐ ERROR FOUND

LOCATION OF ERROR (page no.): _____

DESCRIPTION OF ERROR: _____

_____

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☐ 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.
BOX 189, GARNER, IA 50438-0189
TEL: 515-923-3711
PRODUCT SUPPORT FAX: 515-923-3674