WARNINGS

* **WARNING!** Federal law (49 cfr part 571) requires that the Final Stage Manufacturer of a vehicle certify that the vehicle complies with all applicable federal regulations. Any modifications performed on the vehicle prior to the final state are also considered intermediate stage manufacturing and must be certified as to compliance. The installer of this crane and body is considered on of the manufacturers of the vehicle. As such a manufacturer, the installer is responsible for compliance with all applicable federal and state regulations, and is required to certify that the vehicle is in compliance.

* **WARNING!** It is the further responsiblity of the installer to comply with the OSHA Truck Crane Stability Requirements as specified by 29 CFR part 1910.180 (C) (1).

* **WARNING! NEVER OPERATE THE CRANE NEAR ELECTRICAL POWER LINES!** **Death** or serious injury will result from boom, line, or load contacting electric lines. Do not use crane within 10 feet (3.05m) of electric power lines carrying up to 50,000 volts. One foot additional clearance is required for every additional 30,000 volts or less. **SEE DANGER DECAL (P/N 040529)** in this Owner's Manual.

* **WARNING! NEVER.....**
  * **EXCEED** load chart capacities (centerline of rotation to hoist hook).
  * Un-reel last 5 wraps of cable from drum!
  * Wrap cable around load!
  * Attempt to lift or drag a load from the side! The boom can fail far below its rated capacity.
  * Weld, modify, or use unauthorized components on any Auto Crane unit! This will void any warranty or liability. Also failure of the crane may result.
  * Place a chain link on the tip of the hook and try to lift a load!
  * Use a sling bar or anything larger than the hook throat that could prevent the hook latch from closing, thus negating the safety feature!
  * Hold on any pendant Select Switch that will cause unsafe operating conditions!

* **WARNING!** In using a hook with latch, **ALWAYS** make sure that the hook throat is closed before lifting a load! Proper attention and common sense applied to the use of the hoist hook and various slings will prevent possible damage to material being hoisted and may prevent injury to personnel.

* **WARNING!** Failure to correctly plumb and wire crane can cause inadvertent operation and damage to crane and/or personnel!

* **WARNING!** Auto Crane Company remote controlled cranes are not designed or intended to be used for any applications involving the lifting or moving of personnell.

* **WARNING! ALWAYS** operate the crane in compliance with the load capacity chart. **DO NOT USE** the overload shutdown device to determine maximum rated loads, if the crane is equipped with this type of device.

READ THIS PAGE!

TABLE OF CONTENTS
3203 PR/PRX SERIES

INTRODUCTION
3203 PR/PRX SERIES

Auto Crane products are designed to provide many years of safe, trouble-free, dependable service when properly used and maintained.

To assist you in obtaining the best service from your crane and to avoid untimely crane and/or vehicle failure, this manual provides the following operating and service instructions. It is **specifically recommended** that all operating and service personnel consider this manual as mandatory material for reading and study before operating or servicing Auto Crane products. It is **highly recommended** that crane owners, equipment managers and supervisors also read this manual.

Auto Crane has incorporated several safety features in the **3203P/PR/PRX Series** cranes for your protection. The choice of materials and the design of the electrical system minimizes weight and lengthens durability. The hydraulic components meet or exceed a **3.5:1 safety factor.** Holding valves prevent the load from dropping if a hose should fail. The reservoir has a **40u air filter** in the filler cap. The pump has a **100 mesh strainer** in the suction line.

For your convenience the overall dimensions of the **3203P/PR/PRX Series** cranes are on the General Dimension Drawing. Maximum turning radius is shown at the outside edge of the guard (PR/PRX models) and the outside point of the hoist actuator (P model).

Remember, the crane adds weight to the vehicle. Adding weight may change the driving and riding characteristics of the vehicle unless the appropriate overload spring(s) are installed on the truck. The payload of the vehicle is reduced by the weight of the crane. The operator should exercise care when loading the vehicle. Distributing the payload on the vehicle evenly will greatly improve the driving and riding characteristics of the vehicle. **A minimum G.V.W. of 8,000 lbs. with two rear jacklegs (or outriggers) is recommended for mounting the 3203P/PR/PRX cranes.**

The **3203P/PR/PRX** series cranes are attached directly to your 12 volt truck electrical system. The power cable and retaining clips are included with the crane. A typical power cable mounting and hookup is shown on page 2-1.0.0. The performance of your new crane depends on the truck electrical system. The use of the low maintenance battery is not recommended for use on any Auto Crane product. The recommended alternator and battery that will give the longest life with the most useful duty cycle is a 60 amp. alternator with a 120 minute reserve capacity, deep cycle battery. These specifications should be considered minimum.

Auto Crane Company issues a limited warranty certificate with each unit sold. See last page for warranty policy.

It has always been Auto Crane Company policy to handle all warranty claims we receive as promptly as possible. If a warranty claim involves discrepant material or workmanship, Auto Crane will take immediate corrective action. It is understandable that Auto Crane company cannot assume responsibility of liability when it is obvious that our products have been abused, mis-used, overloaded or otherwise damaged by inexperienced persons trying to operate the equipment without reading the manual.

Auto Crane will not assume responsibility or liability for any modifications or changes made to unit, or installation of component parts done without authorization.

Auto Crane maintains a strong distributor network and a knowledgeable Customer Service Department. In most cases, an equipment problem is solved via phone conversation with our customer service department. The customer service department also has the ability to bring a local distributor, a regional sales manager, or a factory serviceman into the solution of an equipment problem. If, through no fault of Auto crane company, it is necessary to send an experienced factory serviceman on a field service call, the rates stated in the Auto Crane Distributor's Flat Rate Manual will apply.

Auto Crane Company's extensive Research and Development Program allow our customers to use the best equipment on the market. Our Engineering Staff and our knowledgeable sales people, are always available to our customers in solving crane and winch-type application problems. When in doubt, call the Auto Crane factory.

DISTRIBUTOR ASSISTANCE:

Should you require any assistance not given in this manual, we recommend that you consult your nearest Auto Crane Distributor. Our distributors sell authorized parts and have service departments that can solve almost any needed repair.

NOTE:* *THIS MANUAL SHOULD REMAIN WITH THE CRANE AT ALL TIMES.

This manual does not cover all maintenance, operating, or repair instructions pertinent to all possible situations. If you require additional information, please contact the **Auto Crane Company** at the following telephone number: **(918) 836-0463**. The information contained in the manual is in effect at the time of this printing. Auto Crane Company reserves the right to update this material without notice or obligation.

GENERAL SPECIFICATIONS
3203 PR/PRX SERIES

Dimensions

Width: [PR/PRX] 24 in (.61 m)
Height: [PR] 26.75 in (.68 m)
[PRX] 33.25 in (.85 m)
Length: 8 ft 6 in (2.59 m) [boom(s) stored]
Weight: PR 7-11-15 550 lbs (250 kg)
PRX 7-11-15 695 lbs (315 kg)
[Add 5 lbs (2. 5 kg) for cable length of 75 feet (23 m)]

Capacity

10,000 ft lbs (1.4 ton/m)
[ft lbs = horizontal distance from centerline of rotation to free hanging weight (feet) x amount of weight (pounds)]

LIFTING CAPACITIES			
ft	lbs	ft	lbs
3	3,200	10	1,000
4	2,500	11	900
5	2,000	12	830
6	1,670	13	770
7	1,500	14	710
8	1,250	15	660
9	1,100		

Reach

Second boom will reach 7 ft to 11 ft
Third boom will reach from 11 ft to 15 ft

Cable

62 ft (18.9 m) of 7/32" diameter aircraft quality cable is standard (75 ft optional). This cable has a single line breaking strength of 5,600 lbs (2,540 kg).

Chassis Requirements

8,800 lbs (3,992 kg) GVWR minimum

Hydraulic System

Pressure: 2100 psi (1,448 kPa) relief setting
Flow: 0.75 to 1.2 gpm (2.84 to 4.54 lpm) [output depends on psi]
Filtration: Suction line strainer 100 mesh
Reservoir filler cap air filter 40*u*
Reservoir Capacity: 6 quarts (5.7 l)
Oil type: 10w Hydraulic Oil [Mobile DTE 13, Sun 2015, Dextron II]
Hoist Motor: 2.2 cid gerotor
Rotation Motor: 11.3 cid gerotor

Electrical System

Hoist Motor: 12 volt DC series wound
Pump Motor: 12 volt DC closed-coupled

Electrical System Requirements

Alternator: 60 amp (minimum)
Battery: 100 minute reserve capacity (minimum) Maintenance type

--- IMPORTANT ---
OPERATING PRACTICES & WARNINGS

1. Make certain the vehicle meets minimum chassis requirements. (These requirements do not guarantee unit stability)
2. Make certain the crane is installed per factory specifications. Contact your local Distributor or the Auto Crane factory if any questions arise.
3. Keep the vehicle in as level a position as possible while loading or unloading.
4. **ALWAYS** set the vehicle emergency brake before beginning crane operations.
5. **ALWAYS** use outriggers from vehicle to the ground during crane operation. Make sure they are firmly positioned on solid footings.
6. All load ratings are based on crane capacity, **NOT** truck/crane stability.
7. Keep objects and personnel clear of crane path during operation.
8. Keep hoist cable pulled tight at all times.
9. **REMEMBER**, in lifting a heavy load, the weight can create enough tipping momentum to overturn the vehicle.
10. **ALWAYS** keep load as close to ground as possible.
11. Oil gears as required.
12. Periodic adjustment of hoist worm brake may be required (see automatic safety brake drawing in this manual).
13. Hydraulic hoses need to be inspected frequently for signs of deterioration, and be replaced as required.
14. The hoist hook is an important item that an operator should consider and use properly. It should be checked on a daily basis for distortion or cracks.
15. **ALWAYS** store outriggers before road travel.
16. **WARNING! NEVER OPERATE THE CRANE NEAR ELECTRICAL POWER LINES!** Death or serious injury will result from boom, line, or load contacting electric lines. Do not use crane within 10 feet (3.05m) of electric power lines carrying up to 50,000 volts. One foot additional clearance is required for every additional 30,000 volts or less.
17. **WARNING! NEVER EXCEED** load chart capacities (centerline of rotation to hoist hook).
18. **WARNING! NEVER** un-reel last 5 wraps of cable from drum!
19. **WARNING! NEVER** wrap cable around load!
20. **WARNING! NEVER** attempt to lift or drag a load from the side! The boom can fail far below its rated capacity.
21. **WARNING! NEVER** weld, modify, or use unauthorized components on any Auto Crane unit! This will void any warranty or liability. Also failure of the crane may result.
22. **WARNING! NEVER** place a chain link on the tip of the hook and try to lift a load!
23. **WARNING! NEVER** use a sling bar or anything larger than the hook throat that could prevent the hook latch from closing, thus negating the safety feature!
24. **WARNING!** In using a hook with latch, **ALWAYS** insure that the hook throat is closed before lifting a load! Proper attention and common sense applied to the use of the hoist hook and various slings will prevent possible damage to material being hoisted and may prevent injury to personnel.
25. **WARNING! NEVER** hold any pendant Select Switch on that will cause unsafe operating conditions!

WARNING!

Auto Crane Company remote controlled, stiff boom cranes are not designed or intended to be used for any applications involving the lifting or moving of personnel.

--- IMPORTANT ---
OPERATION OF UNIT

1. Make sure this manual has been thoroughly read by all crane operating personnel and supervisors.
2. A routine inspection of the crane should be mandatory before each operating day. Any defects should be corrected immediately.
3. At a job site the vehicle should be positioned so that the crane can adequately reach the load within the rated capacity (centerline of rotation to hoist hook).
4. Keep the vehicle as level as possible during operation.
5. For electric cranes, **engage emergency brake** and leave ignition on with transmission in neutral (or in park for automatic transmissions). Activate any crane power switches. For Auto Crane units requiring battery and hydraulic operation, **engage emergency brake,** place gear selector in neutral, press clutch, activate PTO, release clutch and after hydraulic fluid is warm, set throttle control to proper engine speed.
6. Always use outriggers from the truck to the ground. Be sure these are firm and adequately positioned. When rotating, **keep load as low to the ground as possible.**
7. Remove pendant control from cab or storage area. On smaller units, plug pendant into receptacle on crane. On larger units, remove pendant control from guard and unwrap cable from boom. Do not operate crane until cable is unwound completely. On all cranes, detach hook from dead man. Crane is now ready for operation.
8. Always boom up before rotating so the boom will clear the required boom support.
9. When extending the boom, always maintain clearance between the boom crown and the traveling block or hoist hook.
10. Always observe safe and practical operation to avoid possible accidents. Refer to Safety Tips and Precautions.
11. After completing lifting operations, return the boom to stowed position on the boom support. Avoid unneeded pressure on the boom support.
12. Store pendant control on proper location (in cab or on crane).
13. Return outriggers to stowed position. Make sure they are pinned in place or jacklegs are returned to compartment.
14. Check work area for any tools or equipment not stored.
15. Release throttle control, depress clutch and disengage PTO. Deactivate any crane power switches.
16. Report any unusual occurrence during crane operation that may indicate required maintenance or repair.
17. **NEVER** use two cranes to support a load too large for either crane.
18. Spray all electrical equipment with special corrosion resistant coating. This eliminates rust or corrosion due to melting and freezing action of condensation.

OPERATION OF OUTRIGGERS

Prior to operating outriggers, detach crane hook from dead man.

For hydraulic outriggers:

1. Shift crane/outrigger selector valve to "outrigger" position.
2. While operating the outrigger control valves (located on the outrigger cylinders) simultaneously operate the boom-up control switch. This will allow the hydraulic system to build pressure.
3. After outriggers are positioned, return crane/outrigger selector to "crane" position
4. Crane is now ready to operate.

For manual outriggers:

1. Pull lock pins to release jack leg or drop down outrigger and move to outermost lock position.
2. Make sure lock pins are reinstalled properly.
3. Lower outrigger pad to firm ground and adjust foot to take out slack.
4. Crane is now ready to operate.

QUALIFICATIONS FOR & CONDUCT OF OPERATORS & OPERATING PRACTICES

OPERATORS

1 **Crane operation shall be limited to personnel with the following minimum qualifications:**

- A. designated persons
- B. trainees under the direct supervision of a designated person
- C. maintenance and test personnel (when it is necessary in the performance of their duties)
- D. inspectors (crane).

2 **No one other than the personnel specified above shall enter the operating area of a crane with the exception of persons such as oilers, supervisors, and those specified persons authorized by supervisors whose duties require them to do so and then only in the performance of their duties and with the knowledge of the operator or other persons.**

QUALIFICATIONS FOR OPERATORS

3 **Operators shall be required by the employer to pass a practical operating examination. Qualifications shall be limited to the specific type of equipment for which examined.**

4 **Operators and operator trainees shall meet the following physical qualifications:**

- A. Vision of at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses.
- B. Ability to distinguish colors, regardless of position, if colors differentiation is required for operation.
- C. Adequate hearing with or without hearing aid for the specific operation.

5 **Evidence of physical defects or emotional instability which render a hazard to operator or others, which in the opinion of the examiner could interfere with the operator's performance may be sufficient cause for disqualification. In such cases, specialized clinical or medical judgment and tests may be required.**

6 **Evidence that the operator is subject to seizures or loss of physical control shall be sufficient reason for disqualification. Specialized medical tests may be required to determine these conditions.**

7 **Operators and operator trainees should have normal depth perception, coordination, and no tendencies to dizziness or similar undesirable characteristics.**

8 **In addition to the above listed requirements, the operator shall:**

- A. Demonstrate the ability to comprehend and interpret all labels, operator's manuals, safety codes and other information pertinent to correct crane operations.
- B. Possess knowledge of emergency procedures and implementation of same.
- C. Demonstrate to the employer the ability to operate the specific type of equipment.
- D. Be familiar with the applicable safety regulations.
- E. Understand responsibility for maintenance requirements of crane.
- F. Be thoroughly familiar with the crane and its control functions.
- G. Understand the operating procedures as outlined by the manufacturer.

CONDUCT OF OPERATORS

9 **The operator shall not engage in any practice which will divert his attention while actually operating the crane.**

10 **Each operator shall be responsible for those operations under the operator's direct control. Whenever there is any doubt as to safety, the operator shall consult with the supervisor before handling the loads.**

11 **The operator should not leave a suspended load unattended unless specific precautions have been instituted and are in place.**

12 **If there is a warning sign on the switch or engine starting controls, the operator shall not close the switch or start the engine until the warning sign has been removed by the appointed person.**

13 **Before closing the switch or starting the engine, the operator shall see that all controls are in the "OFF" or neutral position and all personnel are in the clear.**

14 **If power fails during operation, the operator shall:**

- A. move power controls to the "OFF" or neutral position.

QUALIFICATIONS FOR & CONDUCT OF OPERATORS & OPERATING PRACTICES

B. land the suspended load and boom, if practical.

15 The operator shall be familiar with the equipment and its proper care. If adjustments or repairs are necessary, the operator shall report the same promptly to the appointed person, and shall also notify the next operator.

16 All controls shall be tested by the operator at the start of each shift. If any controls do not operate properly, they shall be adjusted or repaired before operations are begun.

17 Stabilizers shall be visible to the operator while extending or setting unless operator is assisted by a signal person.

OPERATING PRACTICES

HANDLING THE LOAD

18 Size of load

A. No crane shall be loaded beyond the rated load except for test purposes.

B. The load to be lifted is to be within the rated load of the crane and its existing configuration.

C. When loads which are not accurately known are to be lifted, the person responsible for the job shall ascertain that the weight of the load does not exceed the crane rated load at the radius at which the load is to be lifted.

19 Attaching the load

A. The load shall be attached to the hook by means of slings or other devices of sufficient capacity.

B. Hoist rope shall not be wrapped around the load.

20 Moving the load

A. The operator shall determine that:

B. The crane is level and, where necessary, the vehicle/carrier is blocked properly.

C. The load is well secured and balanced in the sling or lifting device before it is lifted more than a few inches.

D. Means are provided to hold the vehicle stationary while operating the crane.

E. Before starting to lift, the hook shall brought over the load in such a manner as to minimize swinging.

F. During lifting care shall be taken that:

1. **there is no sudden acceleration or deceleration of the moving load.**
2. **load, boom or other parts of the crane do not contact any obstruction.**

G. Cranes shall not be used for dragging loads sideways.

H. This standard recognizes that articulating boom cranes are designed and intended for handling materials. They do not meet personnel lift or elevator requirements. Therefore, no lifting, lowering, swinging or traveling shall be done while a person is on the hook or load. Hook attached suspended work platforms (baskets) shall not be used with cranes covered by this standard. Work platforms attached to the boom must be approved by crane manufacturer.

I. The operator should avoid carrying loads over people.

J. When the crane is so equipped, the stabilizers shall be fully extended and set. Blocking under stabilizers shall meet the requirements as follows:

1. **strong enough to prevent crushing.**
2. **of such thickness, width and length as to completely support the stabilizer pad.**

K. Firm footing under all tires, or individual stabilizer pads should be level. Where such a footing is not otherwise supplied, it should be provided by timbers, cribbing, or other structural members to distribute the load so as to not exceed allowable bearing capacity or the underlying material.

L. In transit, the boom shall be carried in stowed position.

M. When rotating the crane, sudden starts and stops shall be avoided. rotational speed shall be such that the load does not swing out beyond the radius at which it can be controlled.

N. The crane shall not be transported with a load on the hook unless recommended by the manufacturer.

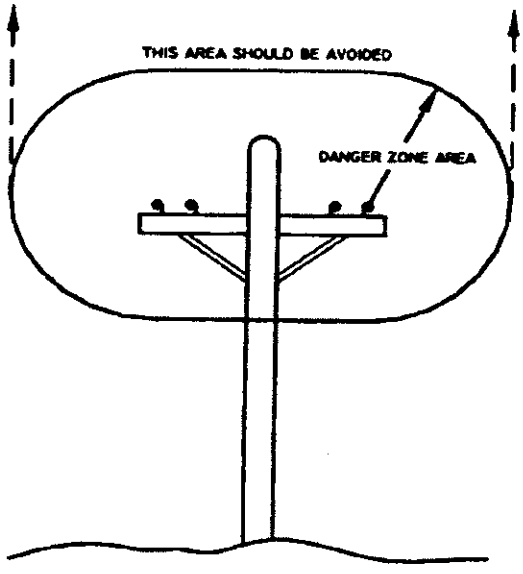
O. No person should be permitted to stand or pass under a suspended load.

21 Stowing procedure. Follow the manufacturer's procedure and sequence when stowing and un-stowing the crane.

QUALIFICATIONS FOR & CONDUCT OF OPERATORS & OPERATING PRACTICES

MISCELLANEOUS

OPERATING NEAR ELECTRICAL POWER LINES



22 Cranes shall be operated so that no part of the crane or load enters into the danger zone shown above.

EXCEPTIONS

A. **The danger zone may be entered after confirmation by an appointed person that the electrical distribution and transmission lines have been de-energized and visibly grounded at the point of work; or**

B. **The danger zone may be entered if insulating barriers (not a part of nor an attachment to the crane) have been erected to prevent physical contact with the lines.**

23 For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load (including handling appendages) shall be 10 ft. (3m). For higher voltages, see Table 1.

24 Caution shall be excercised when working near overhead lines, because they can move horizontally or vertically due to wind, moving the danger zone to new positions.

25 In transit with no load and boom lowered the clearance shall be specified in Table 1.

26 A qualified signalperson shall be assigned to observe the clearance and give warning before approaching the above limits.

A. **Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities verify that it is not an energized line.**

B. **Exceptions to this procedure, if approved by the administrative or regulatory authority if the alternate procedure provides equivalent protection and set forth in writing.**

C. **Durable signs shall be installed at the operator's station and on the outside of the crane, warning that electrocution or serious bodily injury may occur unless a minimum clearance of 10 ft. (3.0m) between the crane or the load being handled and energized power lines. Greater clearances are required because of higher voltage as stated above. These signs shall be revised but not removed when local jurisdiction requires greater clearances.**

TABLE 1

normal voltage, kV (phase to phase)	minimum required clearance ft	(m)
when operating near high voltage power lines		
over to 50	10	(3.05)
over 50 to 200	15	(4.6)
over 200 to 350	20	(6.1)
over 350 to 500	25	(7.62)
over 500 to 750	35	(10.67)
over 750 to 1000	45	(13.72)
while in transit with no load and boom lowered		
over to 0.75	4	(1.22)
over 0.75 to 50	6	(1.83)
over 50 to 345	10	(3.83)
over 345 to 750	16	(4.87)
over 750 to 1000	20	(6.1)

GENERAL
INSPECTION, TESTING & MAINTENANCE

INSPECTION CLASSIFICATION

1 **Initial inspection. Prior to initial use, all new, altered, modified or extensively repaired cranes shall be inspected by a designated person to insure compliance with provisions of this standard.**

2 **Regular inspection. Inspection procedure for cranes in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as "frequent" and "periodic" with respective intervals between inspections as defined below.**

A. frequent inspection - daily to monthly intervals

B. periodic inspection - one to twelve intervals, or as specifically recommended by the manufacturer

FREQUENT INSPECTION

3 **Inspection shall be performed by designated personnel.**

A. control mechanisms for maladjustment interfering with proper operation - daily, when used

B. control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter

C. safety devices for malfunction

D. all hydraulic hoses, particularly those which flex in normal operation of crane functions, should be visually inspected once every working day, when used

E. hooks and latches for deformation, chemical damage, cracks, and wear. Refer to ANSI/ASME B30.10

F. rope reeving for compliance with crane manufacturer's specifications, if optional winch is used

G. electrical apparatus for malfunctioning, signs of excessive deterioration, dirt and moisture accumulation

H. hydraulic system for proper oil level and leaks daily

I. tires for recommended inflation pressure, cuts and loose wheel nuts

J. connecting pins and locking device for wear and damage

PERIODIC INSPECTION

4 **Deformed, cracked or corroded members in the crane structure and carrier.**

5 **Loose bolts, particularly mounting bolts.**

6 **Cracked or worn sheaves and drums.**

7 **Worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers and devices.**

8 **Excessive wear on brake and clutch system parts and lining.**

9 **Crane hooks inspected for cracks.**

10 **Travel steering, braking, and locking devices, for malfunction.**

11 **Excessively worn or damaged tires.**

12 **Hydraulic and pneumatic hose, fittings, and tubing inspection.**

A. evidence of leakage at the surface of the flexible hose or its junction with metal and coupling

B. blistering, or abnormal deformation to the outer covering of the hydraulic or pneumatic hose

C. leakage at threaded or clamped joints that cannot be eliminated by normal tightening or recommended procedures

D. evidence or excessive abrasion or scrubbing on the outer surface of a hose, rigid tube, or fitting. Means shall be taken to eliminate the interference of

elements in contact or otherwise protect the components

13 Hydraulic and pneumatic pumps and motors inspection.

A. loose bolts or fasteners

B. leaks at joints between sections

C. shaft seal leaks

D. unusual noises or vibrations

E. loss of operating speed

F. excessive heating of the fluid

G. loss of pressure

14 Hydraulic and pneumatic valves inspection.

A. cracks in valve housing

B. improper return of spool to neutral position

C. leaks at spools or joints

D. sticking spools

E. failure of relief valves to attain or maintain correct pressure setting

F. relief valve pressure shall be checked as specified by the manufacturers

15 Hydraulic and pneumatic cylinders inspection.

A. drifting caused by fluid leaking across piston

B. rod seals leaking

C. leaks at welding joints

D. scored, nicked, or dented cylinder rods

E. damaged case (barrel)

F. loose or deformed rod eyes or connecting joints

16 Hydraulic filters. Evidence of rubber particles on the filter elements may indicate hose, "O" ring, or other rubber component deterioration. Metal chips or pieces on the filter may denote failure in pumps, motors, or cylinders. Further checking will be necessary to determine origin of the problem before corrective action can be taken.

17 Labels are to be in place and legible.

CRANES NOT IN REGULAR USE

18 A crane which has been idle for a period of over one month or more, but not less than six months, shall be given an inspection conforming with the initial-regular- frequent inspections.

19 A crane which has been idle for a period of over six months shall be given a complete inspection conforming with the initial-regular-frequent inspection requirements.

INSPECTION RECORDS

20 Dated records for periodic inspection should be made on critical items such as brakes, crane hooks, rope, hydraulic and pneumatic cylinders, and hydraulic and pneumatic relief pressure valves. Records should be kept available to an appointed person.

OPERATIONAL TESTS

21 Prior to initial use, all new, altered, modified, or extensively repaired cranes shall be tested for compliance with the operational requirements of this section, including functions such as the following:

A. load lifting and lowering mechanisms

B. boom lifting and lowering mechanisms

C. boom extension and retraction mechanisms

D. swing mechanisms

E. safety devices

F. operating controls comply with appropriate function labels

Operational crane test results shall be made available to an appointed person.

RATED TEST LOAD

GENERAL
INSPECTION, TESTING & MAINTENANCE

Prior to initial use, altered, modified, or extensively repaired cranes shall be load tested by or under the direction of an appointed person.

22 Test loads shall not exceed 110% of the manufacturer's load ratings.

23 Written reports shall be maintained showing test procedures and confirming the adequacy of repairs.

MAINTENANCE

PREVENTIVE MAINTENANCE

24 Before adjustment and repairs are started on a crane, the following precautions shall be taken as applicable:

A. crane placed where it will cause the least interference with other equipment or operations

B. all controls at the "off" position

C. starting means rendered inoperative

D. boom lowered to the ground if possible or otherwise secured against dropping

E. relieve hydraulic oil pressure from all hydraulic circuits before loosening or removing hydraulic components

25 Warning or "OUT OF ORDER" signs shall be placed on the crane controls.

26 After adjustments and repairs have been made, the crane shall not be returned to service until all guards have been reinstalled, trapped air removed from hydraulic system (if required), safety devices reactivated, and maintenance equipment removed.

ADJUSTMENTS AND REPAIRS

1 Any hazardous conditions disclosed by the inspection requirements shall be corrected before operation of crane is resumed, Adjustments and repairs shall be done only by designated personnel.

2 Adjustments shall be maintained to assure correct functioning of components, The following are examples:

A. functional operating mechanism

B. safety devices

C. control systems

3 Repairs or replacements shall be provided as needed for operation.

The following are examples:

A. critical parts of functional operating mechanisms which are cracked, broken, corroded, bent, or excessively worn

B. critical parts of the crane structure which are cracked, bent, broken, or excessively corroded

C. crane hooks showing cracks, damage, or corrosion shall be taken out of service. Repairs by welding are not recommended

4 Instructions shall be provided by the manufacturer for the removal of air from hydraulic circuits.

LUBRICATION

All moving parts of the crane, for which lubrication is specified, should be regularly lubricated per the manufacturer's recommendations and procedures.

ROPE INSPECTION

5 Frequent Inspection

A. All running ropes in service should be visually inspected once each working day. A visual inspection shall consist of observation of all rope which can be in use during the days operations. These visual observations should be considered with discovering gross damage such as listed below, which may be an immediate hazard.

1. distortion of the rope such as kinking, crushing, un-stranding, birdcaging, main strand displacement, or core protrusion.

Loss of rope diameter in a short length or unevenness of outer strands should be replaced

2. **general corrosion**
3. **broken or cut strands;**
4. **number, distribution and type of visible broken wires. When such damage is discovered, the rope shall either be removed from service or given as inspection.**

B. Care shall be taken when inspecting sections of rapid deterioration such as flange points, crossover points, and repetitive pickup points on drums.

6 Periodic inspection

A. The inspection frequency shall be determined by a qualified person and shall be based on such factors as:

1. **expected rope life as determined by experience on the particular installation or similar installations**
2. **severity of environment**
3. **percentage of capacity lifts**
4. **frequency rates of operation**
5. **exposure to shock loads**

Inspection need not be at equal calendar intervals and should be more frequent as the rope approaches the end of it's service life. This inspection shall be made at least annually.

B. Periodic inspection shall be performed by a designated person. This inspection shall cover the entire length of the rope. Only the surface wires need be inspected. No attempt should be made to open the rope. Any deterioration results in appreciable loss of original strength, such as described below, shall be noted and determination made as to whether use of the rope would constitute a hazard: points listed above reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires; severely corroded, cracked, bent, worn or improperly applied connections;

C. Care shall be taken when inspecting sections subject to rapid deterioration such as the following:

1. **sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited**
2. **sections of the rope at or near terminal ends where corroded or broken wires may protrude**

ROPE REPLACEMENT

7 No precise rules can be given for determination of the exact time for replacement of rope, since many variable factors are involved.

Continued use in this respect depends upon good judgment by a designated person in evaluating remaining strength in a used rope after allowance for deterioration disclosed by inspection. Continued rope operation depends upon this remaining strength.

8 Conditions such as the following shall be reason for questioning continued use of the rope or increasing the frequency of inspection:

A. in running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay

B. one outer wire broken at the contact point with the core of the rope structure and protrudes or loops out of the rope structure. Additional inspection of this section is required

C. wear of one third of the original diameter of the outside individual wire

D. kinking, crushing, birdcaging, or any other damage resulting in distortion of the rope structure

E. evidence of any heat damage from any cause

F. reduction from nominal diameter of more than 1/64 in. (0.4mm) for diameters up to and including 5/16 in. (8 mm), 1/32 in. (0.8 mm) for diameter 3/8 in. (9.5 mm) to and including 1/2 in. (13 mm), 3/64 in.

(1.2 mm) for diameter 9/16 in. (14.5 mm) to and including 3/4 in. (19 mm). 1/16 in. (1.6 mm) for diameter 7/8 in. (22 mm) to and including 11/8 in. (29 mm), 3/32 in. (2.4 mm) for diameters 11/4 in. (32 mm) to and including 11/2 in. (38 mm)

G. In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.

H. Replacement rope shall have a strength rating at least as great as the original rope furnished or recommended by the crane manufacturer. Any deviation from the original size, grade, or construction shall be specified by a rope manufacturer, or a qualified person.

9 Rope not in regular use: all rope which has been idle for a period of a month or more due to shutdown or storage of a crane on which it is installed, shall be given and inspection in accordance with above information before it is placed in service. This inspection shall be for all types of deterioration and shall be performed by a qualified person.

10 Inspection records

A. frequent inspection- no records required

B. periodic inspections- in order to establish data as a basis for judging the proper time for replacement, a dated report condition at each periodic inspection should be kept on file. This report shall cover points of deterioration listed above.

ROPE MAINTENANCE

11 Rope should be stored to prevent damage or deterioration.

12 Unreeling or uncoiling of rope shall be done as recommended by the rope manufacturer and with care to avoid kinking or inducing twist.

13 Before cutting a rope, seizing shall be placed on each side of the place where the rope is to be cut to prevent unlaying of the strands. On pre-formed rope, one seizing on each side of the cut is required. On non-preformed ropes of 7/8 in. (22 mm) diameter or smaller, two seizings on each side of the cut are required, and for non-preformed rope 1 in. (25 mm) diameter or larger, three seizings on each side of the cut are required.

14 During installation care should be exercised to avoid dragging of the rope in the dirt or around objects which will scrape, nick crush or induce sharp bends in it.

15 Rope should be maintained in a well-lubricated condition. It is important that lubricant applied as a part of a maintenance program shall be compatible with the original lubricant and to this end the rope manufacturer should be consulted. Lubricant applied shall be the type which does not hinder visual inspection. Those sections of rope which are located over sheaves or otherwise hidden during inspection and maintenance procedures require special attention when lubricating rope. The object of rope lubrication is to reduce internal friction and to prevent corrosion.

16 When an operating rope shows greater wear or well defined localized areas than on the remainder of the rope, rope life can be extended in cases where a section at the worn end, and thus shifting the wear to different areas of the rope.

LIFE OF WIRE LINE

So many variable factors can cause the deterioration of wire line cable that it is not possible to determine a definite life expectancy. Some of these factors are:

1. **Load being handled.**
2. **Corrosive conditions.**
3. **Maintenance of the unit.**
   - A. Keep the sheaves turning freely
   - B. Maintain tension on cable to insure proper spooling
   - C. Avoid kinks in cable
   - D. Avoid abrasive action and contact with sharp corners
4. **Frequency of use.**

Auto Crane units, up to 2,400 pound ratings, use 3/16 inch diameter galvanized pre-formed 7 x 19 aircraft cable. This cable has a working strength, when new, of 4,200 pounds. It is recommended when 1,200 pound loads are exceeded to use a two part line with a traveling block. This will ensure a 3.5 to 1 safety factor when the cable is new.

Keeping the above factor of safety in mind and knowing the kind of loads that will be handled, the user can determine by inspection of the cable as to when it should be replaced.

Items to look for while inspecting the cables are:

1. **Broken strands.**
2. **Kinks and flattened sections.**
3. **Corrosion and abrasion.**

WIRE LINE LUBRICATION

Lubrication of the wire line serves two important purposes: (1) helps to prevent corrosion; (2) lubricates the cable strands to reduce wear due to flexing and abrasion caused by contact with the sheaves, rollers, and cable on the drum.

PREPARATION:

Remove rust and foreign matter with a wire brush and wipe clean. Be sure cable is dry.

APPLICATION:

Method 1: A light weight motor oil may be used by dipping a brush into the lubricant and applying. In some cases, a rag or piece of sheepskin is dipped in the lubricant and used to swab the lubricant on to the rope.

Method 2: A heavier lubricant such as a grease gun lubricant may be used by applying with hands while wearing leather gloves. (Leather gloves are preferred to canvas because of greater protection and less penetration of the grease)

MAINTENANCE OF BATTERIES

Maintenance of Auto Crane unit batteries differs very little from the generally prescribed maintenance of any lead acid battery. All batteries must be kept *properly charged, properly filled with water, and relatively clean.*

Keep Properly Charged

Many things affect the proper charge to a battery, such as:

1 Regulator settings

2 Proper tightness of belts on the alternator or generator

3 Good, clean connections of all cables and wires at the following places:
A. Battery
B. Regulator
C. Starting motor
D. Alternator or generator
E. Ground connections (most important)

It is of extreme importance to keep the battery as fully charged as possible without overcharging, especially when vehicles are left outside for extended periods in extremely cold climates. A battery *can* freeze. Freezing points for various specific gravities of acid are as follows:

Specific Gravity (Corrected to 80°F)	Freezing Temp. Degrees F.
1.280	-90°F
1.250	-62°F
1.200	-16°F
1.150	5°F
1.100	19°F

As shown, a half-charged battery (about 1.200 specific gravity) cannot stand for any length of time at 20°F or it will freeze.

The *main reason* for keeping the battery as fully charged as possible without over-charging is to ensure that power is available even though the vehicle has been standing for some time.

Keep Properly Filled with Water

The battery should *always* be properly filled with water. If the electrolyte level is allowed to fall below the top of the plates, the results become threefold:

1 The exposed portion of the plate will become sulfated.

2 The portion of the plate exposed is not usable.

3 That portion of the acid remaining becomes more concentrated and may cause more rapid deterioration of the remaining parts of the battery.

Keep A Relatively Clean Battery

The battery should be kept clean. Batteries filled with acid and which are not in use self-discharge to a limited degree because of the nature of the materials within the battery. If dirt is allowed to collect on the top of the battery (and this dirt absorbs moisture) and electrical path can be set up between the various terminals of the battery and the ground. Once such a path has been established, the self-discharge of the battery is accelerated. This also accelerates corrosion of the battery cables at the terminals.

Periodic Maintenance is Needed

A definite program of periodic maintenance of all batteries should be conducted on a regular basis. Periodic maintenance includes:

1 Checking belts for tightness on the charging equipment

2 Checking battery electrolyte levels

3 Checking cables for good connections

4 Cleaning where corrosion is apparent

When corrosion is cleaned off, the cable terminals and battery terminals should be coated with a light coating of petroleum jelly before they are replaced. When terminals are cleaned, the top of the battery should be cleaned with a mild solution of soda water.

MAINTENANCE OF BATTERIES

Low Maintenance Batteries (Maintenance Free)

Low maintenance batteries should not be used on Auto Cranes or trucks equipped with Auto Cranes. The batteries are not designed for "deep" discharge.

Testing Your Battery

If the condition of the battery is in question, it should be removed from the vehicle, taken to the shop, and allowed to reach room temperature. It should then be recharged until specific gravity readings taken at one-half hour intervals. If the specific gravity readings are fairly uniform, the battery should be checked with a high rate tester. Use the tester in accordance with the manufacturer's instructions. The high rate tester is the best method to test a questionable battery.

If, after charging, it is noted that the specific gravity reading of one cell is 30 points less than any of the other cells, it may be assumed that the cell is bad and that the battery should be replaced. If all cells are uniform but not up to full charge, a low rate of charge should be attempted for an extended time. This usually will recover a badly sulfated battery.

Replacing a Battery

If it is necessary to replace a battery, and a dry charge battery is used, the following procedure applies:

1 Fill the battery with electrolyte of the proper specific gravity.

2 Place the battery on charge according to the manufacturer's instructions.

It is essential that the second step above be followed to ensure that the battery going on the vehicle is fully charged.

It is also very important that the battery hold-downs be checked periodically to ensure that the batteries are properly positioned to avoid vibration problems, breakage of cables or terminals. Care must be taken to avoid cracking or breaking containers or covers by tightening hold-down fixtures excessively. They also must not be so loose that breakage results from a hold-down that is too loose.

SAFETY DECAL SECTION
3203 SERIES

ITEM	DESCRIPTION	QTY	FIG
1	DANGER, STAY CLEAR OF BOOM	1	SD-1
2	DANGER, STAY CLEAR OF LOAD	1	SD-2
3	DANGER, SCISSORS POINT	2	SD-3
4	DANGER, ELECTROCUTION HAZARD	2	SD-4
5	DANGER, OPERATION INSTRUCTIONS	2	SD-5
6	DANGER, OPERATOR TRAINING	2	SD-6
7	WARNING, LOAD SENSOR TAMPERING	1	SD-7

SAFETY DECAL SECTION
3203 SERIES

PART NO.: **040517**

DECAL: **STAY CLEAR OF BOOM**

FUNCTION: **To inform the operator of the hazard of proximity or contact with the crane boom during operation.**

QUANTITY: **2**

PLACEMENT: **Both sides of crown**

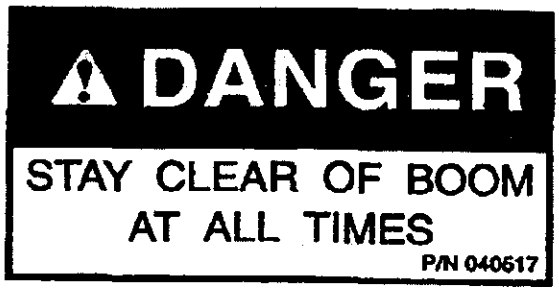


FIG. SD-1.

PART NO.: **040518**

DECAL: **STAY CLEAR OF LOAD**

FUNCTION: **To inform the operator of the hazard of proximity or contact with the crane load during operation.**

QUANTITY: **2**

PLACEMENT: **Both sides of crown plate**

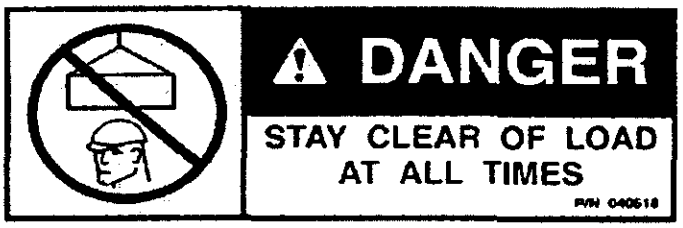


FIG. SD-2.

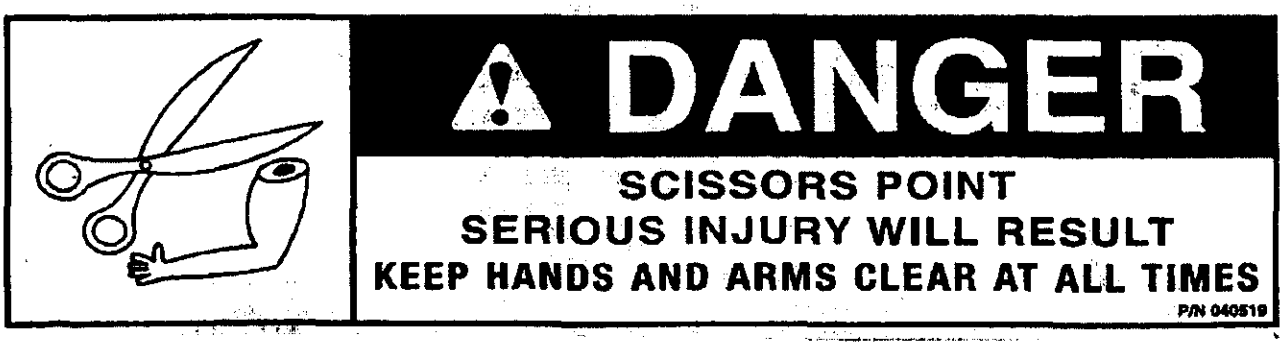
PART NO.: **040519**

DECAL: **SCISSORS POINT**

FUNCTION: **To inform the operator of possible danger at scissors point on crane.**

QUANTITY: **1**

PLACEMENT: **Both sides of lift cylinder**



SAFETY DECAL SECTION
3203 SERIES

PART NO.: **040529**

DECAL: **ELECTROCUTION HAZARD**

FUNCTION: **To inform the operator of the hazard involved with contacting electrical power lines with crane boom.**

QUANTITY: **2**

PLACEMENT: **Both sides of end of lower boom**

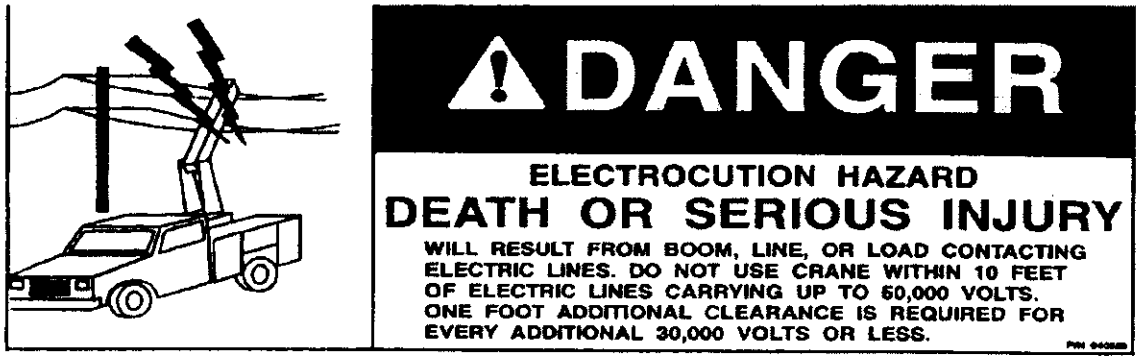


FIG. SD-4.

PART NO.: **040579**

DECAL: **OPERATION INSTRUCTIONS**

FUNCTION: **To inform the operator of the proper procedure to follow for safe operation of the crane.**

QUANTITY: **1**

PLACEMENT: **Left Sideplate**

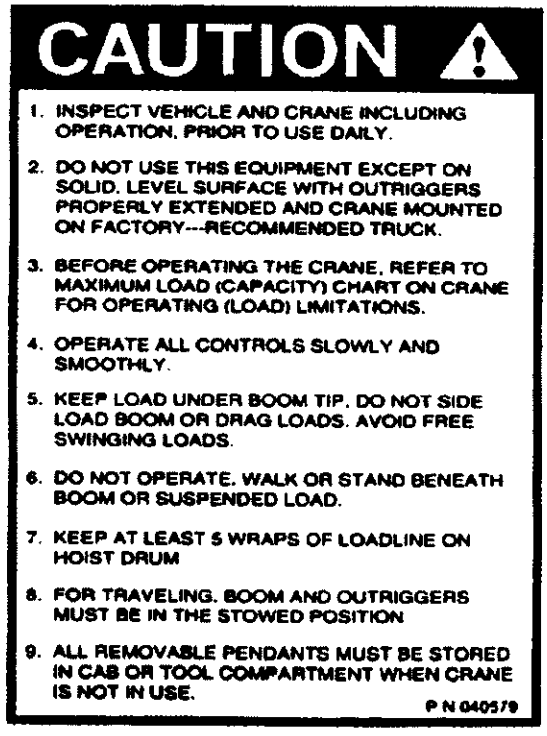


FIG. SD-5.

SAFETY DECAL SECTION
3203 SERIES

PART NO.: 040580

DECAL: OPERATOR TRAINING

FUNCTION: To inform the operator of the need to receive proper training before using the crane.

QUANTITY: 1

PLACEMENT: Left Sideplate

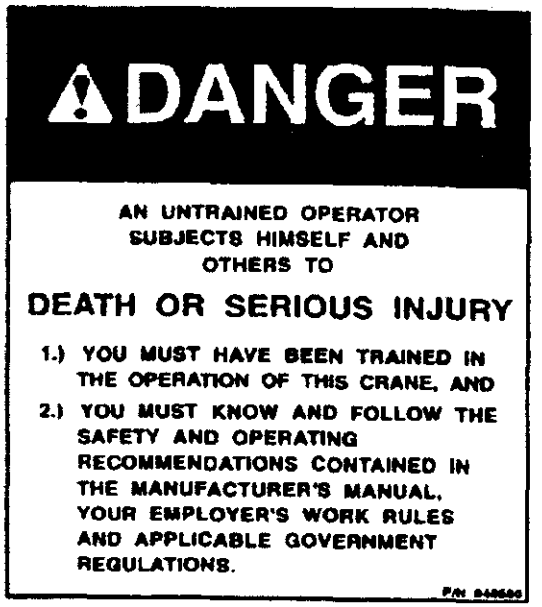


FIG. SD-6.

PART NO.: 040587

DECAL: LOAD SENSOR

FUNCTION: To inform the operator that the load sensor is pre-set and that tampering with the sensor may cause potentially hazardous situation.

QUANTITY: 1

PLACEMENT: On the lift cylinder near the load sensor

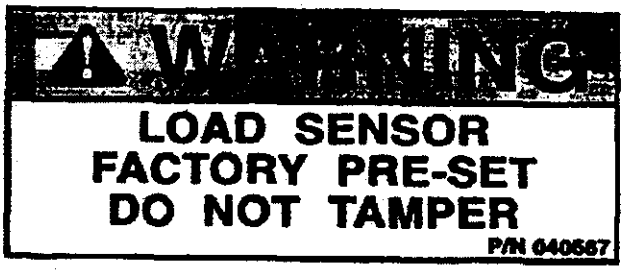
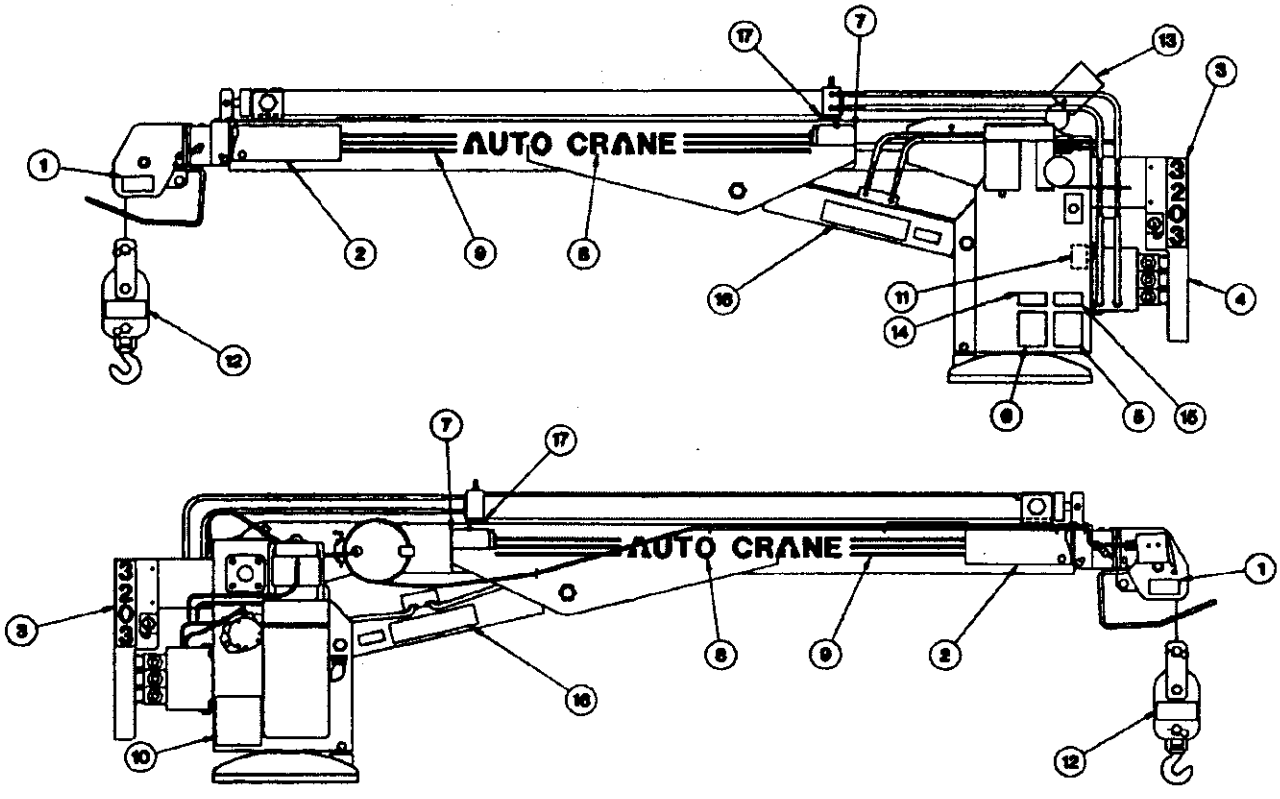


FIG. SD-7.

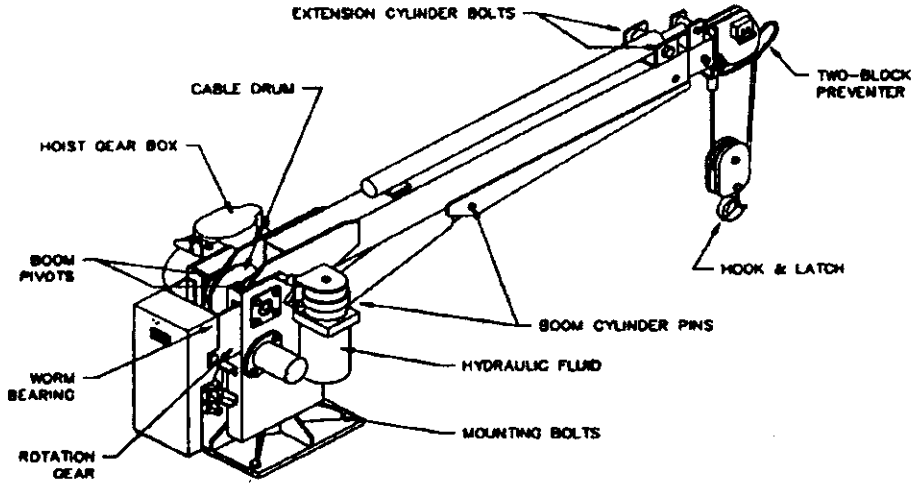
DECAL DRAWING
3203 PR/PRX 320AA4PR

320AA5PRX



ITEM	QTY	P/N	DESCRIPTION
1	2	040517	DANGER "STAY CLEAR OF BOOM" DECAL
2	2	040529	DANGER "ELECTROCUTION HAZARD" DECAL
3	2	360034	3203 DECAL
4	1	320317	A/C LOGO DECAL
5	1	040579	CAUTION "INSPECT VEHICLE..." DECAL
6	1	040580	DANGER "AN UNTRAINED OPERATOR..." DECAL
7	1	320318	ANGLE INDICATOR DECAL
8	2	040624	3M AUTO CRANE DECAL
9	6.5 FT	040620	3M STRIPING DECAL
10	1	320321	3203 LOAD CHART DECAL
11	1	040552	RELAY DECAL
12	2	040518	DANGER "STAY CLEAR OF LOAD" DECAL
13	1	999948	INSTALLATION CHECKLIST CARD
14	1	330622	SERIAL NUMBER DECAL
15	1	040587	WARNING "LOAD SENSOR PRE-SET" DECAL
16	2	040519	DANGER "SCISSORS POINT" DECAL
17	1	340730	ADHESIVE RUBBER PAD

LUBRICATION & MAINTENANCE SCHEDULE
3203 PR/PRX



SERVICE PERFORMED	DAILY	WEEKLY	MONTHLY	6 MONTHS	YEARLY	NOTES
LOAD HOOK	X	–	–	–	–	INSPECT HOOK & LATCH FOR DEFORMATION, CRACKS, AND CORROSION
CABLE DRUM	X	–	–	–	–	MAKE SURE CABLE IS WOUND EVENLY ON DRUM
HOIST CABLE	X	–	–	–	–	CHECK FOR FLATTENING, KINKS, BROKEN STRANDS
MOUNTING BOLTS	X	–	–	–	–	CHECK; TORQUE TO 85 FT-LBS AS REQ'D
HYDRAULIC HOSES	X	–	–	–	–	VISUAL INSPECTION
TWO-BLOCK PREVENTER	X	–	–	–	–	RAISE BAIL AND CHECK THAT EXTEND IS DISABLED
MOTOR CONNECTIONS	–	X	–	–	–	CHECK TERMINALS FOR TIGHT CONNECTIONS
SHEAVE BEARINGS	–	X	–	–	–	SEALED BEARING, REPLACE IF ROUGH OR LOOSE
ALL OTHER BOLTS	–	X	–	–	–	TIGHTEN AS REQUIRED
BATTERY CONNECTIONS	–	X	–	–	–	CHECK FOR CORROSION & TIGHT CONNECTIONS, CLEAN & COAT AS REQUIRED
BOOM CYLINDER	–	X	–	–	–	CHECK AROUND CYLINDER ROD FOR EXCESS FLUID LEAKAGE
BOOM CYLINDER PINS	–	X	–	–	–	GREASE WITH MOBILPLEX EP-2 OR EQUIV. ● ZERKS
BOOM PIVOT	–	X	–	–	–	GREASE WITH MOBILPLEX EP-2 OR EQUIV. ● ZERKS
EXTENSION CYLINDER	–	X	–	–	–	CHECK AROUND CYLINDER ROD FOR EXCESS FLUID LEAKAGE
EXT. CYL. BOLTS	–	X	–	–	–	CHECK TIGHTNESS
ROTATION GEAR	–	–	X	–	–	WATER PROOF BEARING GREASE, OR DRY MOLYLUBE IF DUSTY
POWER CABLE	–	–	X	–	–	CHECK INSULATION FOR DAMAGE OR DETERIORATION
EXT. CYL. BOLTS	–	–	–	X	–	GREASE WITH MOBILPLEX EP-2 OR EQUIV.
ROTATION WORM BRGS.	–	–	–	X	–	GREASE WITH MOBILPLEX EP-2 OR EQUIV. ● ZERKS
HOIST GEARBOX	–	–	–	X	–	WORM GEAR-EP GEAR LUBE SAE 80-90; SPUR GEARS-SAE 30 OIL
HYDRAULIC FLUID	–	–	–	–	X	DRAIN, FLUSH & REFILL WITH MOBIL DTE 13
ROTATION BEARING	–	–	–	–	–	SEALED BEARING, NO MAINTENANCE REQ'D
BOOM SLIDE PADS	–	–	–	–	–	PADS GREASED WHEN REPLACED

CAUTION

Routine maintenance insures trouble-free operation and protects your investment. All warranties are void if maintenance is neglected.

Notes:

Use only authorized parts. Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.

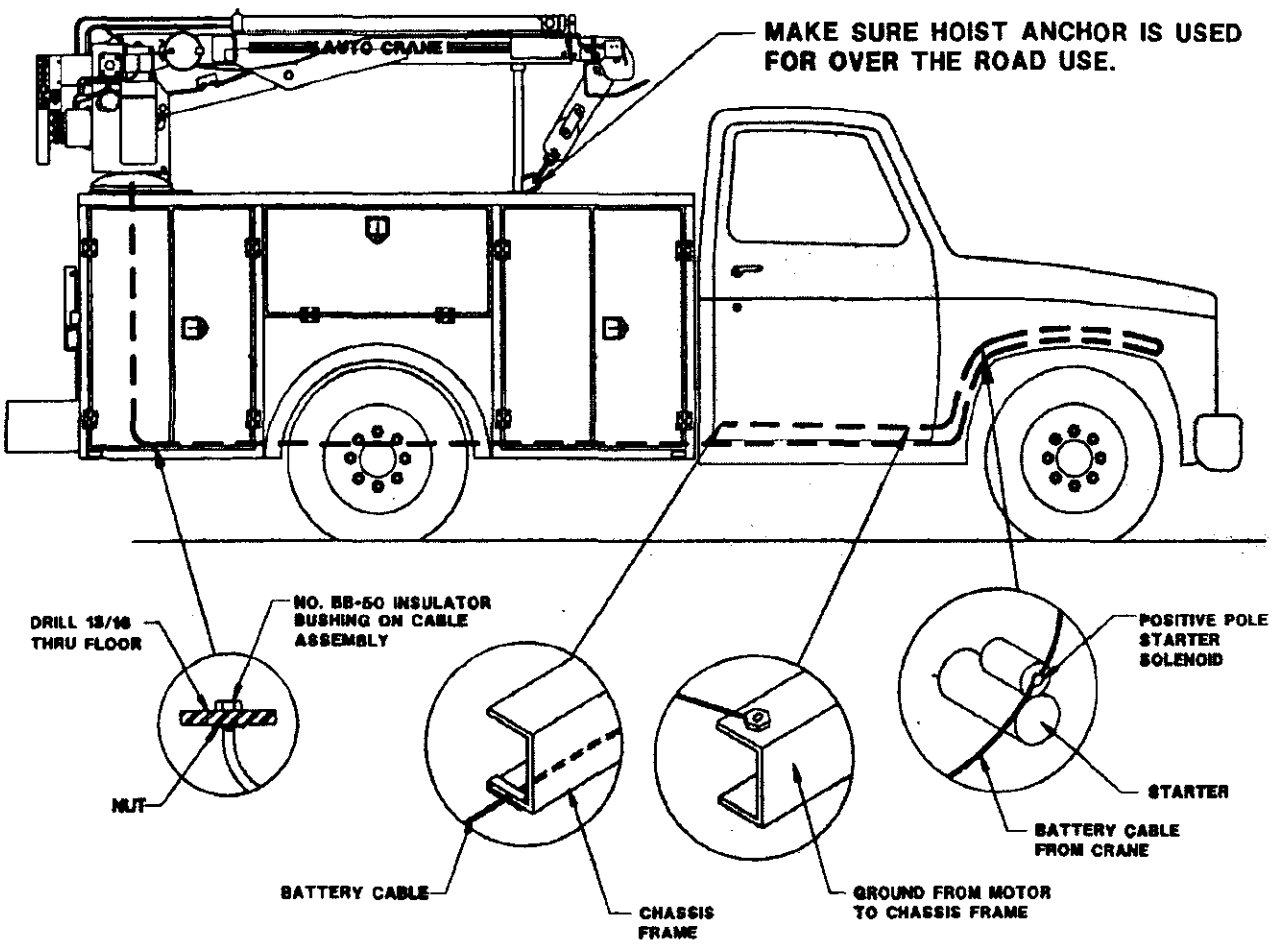
Once a bolt has been torqued to its rated capacity and then removed; the bolt should be replaced with a new one.

Auto Crane Company recommends that this crane be serviced per "Crane Inspection Log" P/N 999947. These logs should be filled in at the intervals noted and kept as a permanent record. Additional copies are available from your local distributor.

MOUNTING & INSTALLATION INSTRUCTIONS
3203 PR/PRX

NOTE: For mounting bolt hole pattern - see page 4-1.0.0.

INSTALLATION - BATTERY CABLE

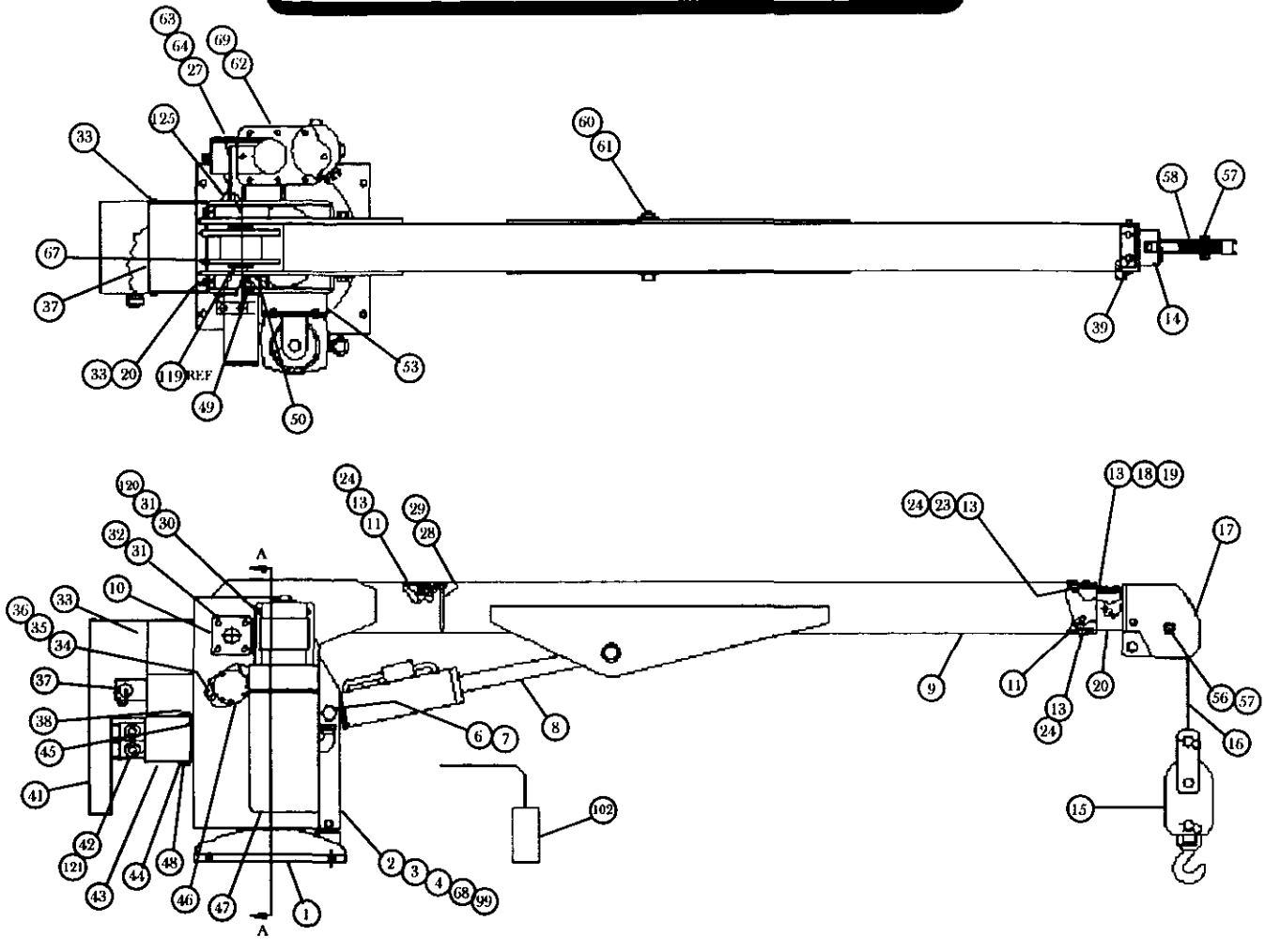


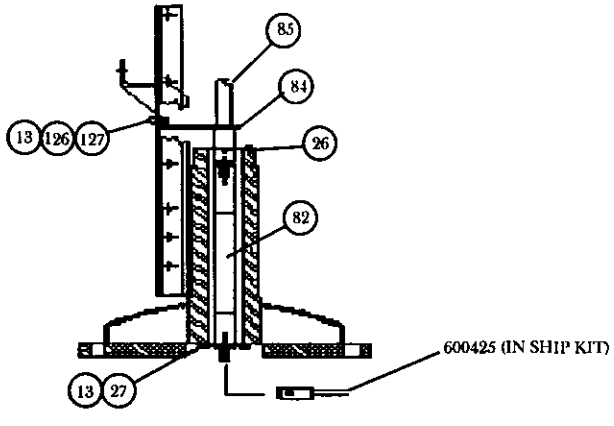
1. Drill 13/16 in. hole in floor. Install bushing, which is connected to cable, so it fits hole snug.

2. Run cable to positive battery terminal. Connect black cable to negative battery terminal or suitable chassis ground point. Locate cables so that they will be protected. Avoid sharp edges. Use the No. 083800 frame clips provided to hold cables securely in place.

3. If the battery is grounded to the engine it may be necessary to add an additional ground cable from the engine to the chassis frame to obtain maximum power at crane

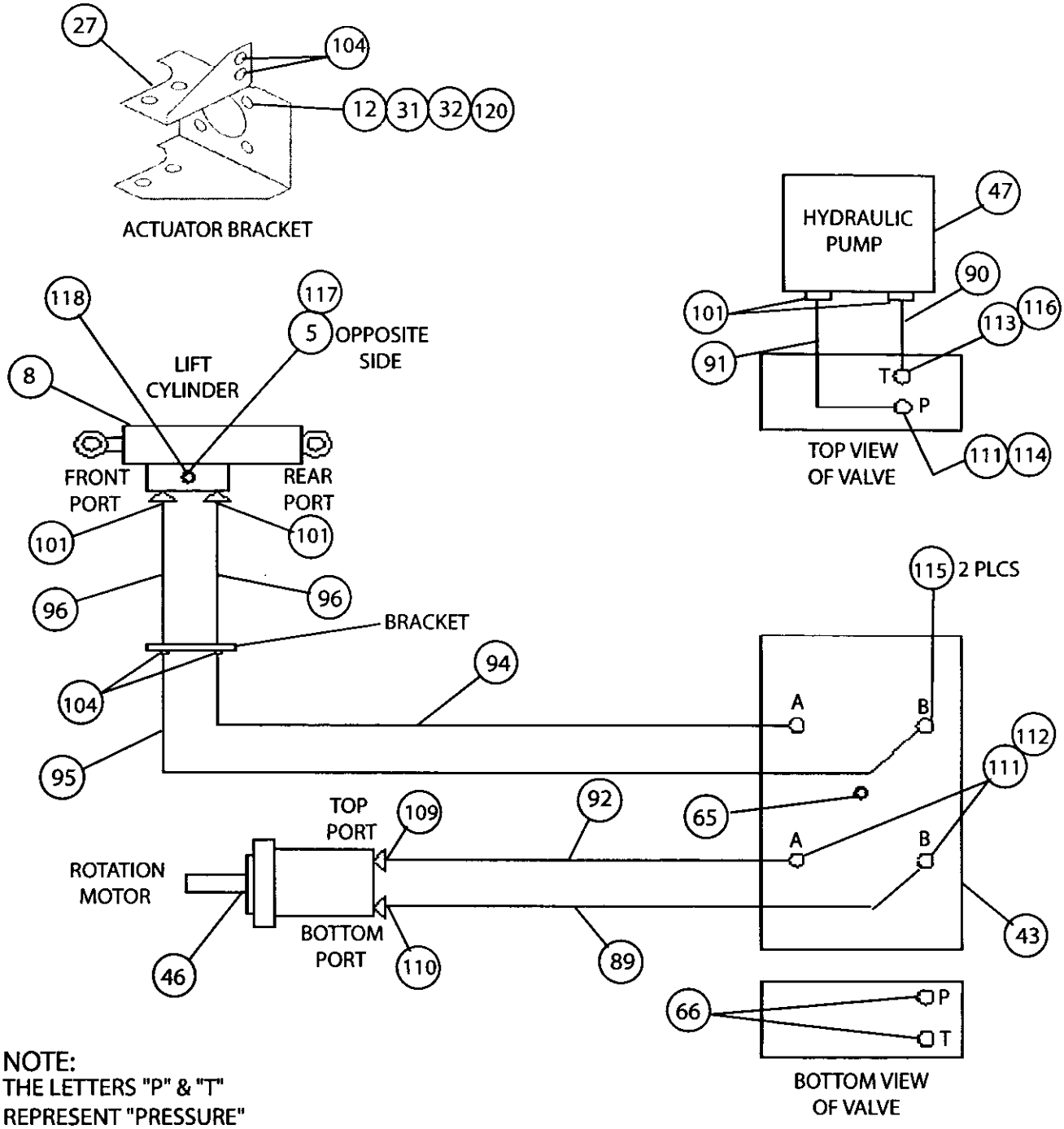
GENERAL ASSEMBLY
P/N 320303 - 3203 PR 7-11-15





SECTION A-A

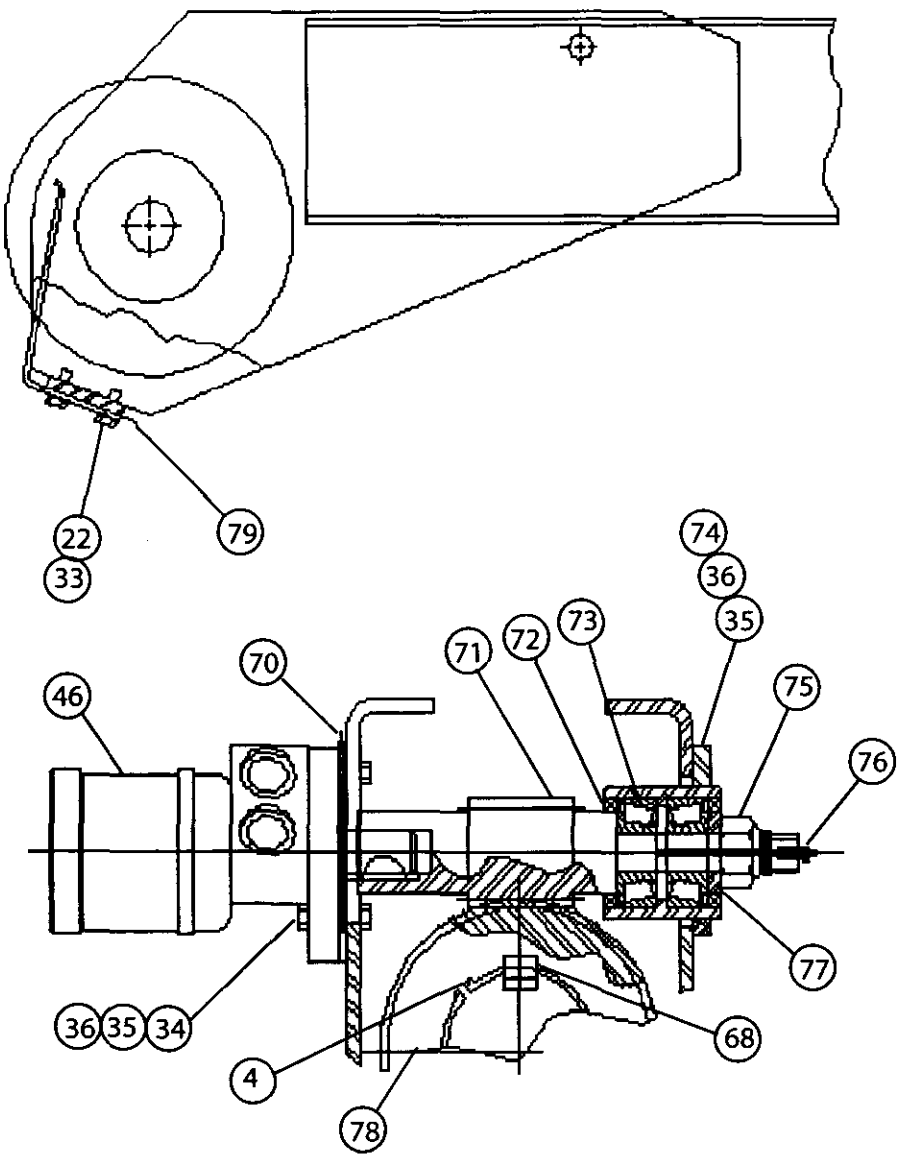
GENERAL ASSEMBLY
P/N 320303 - 3203 PR 7-11-15



NOTE:
THE LETTERS "P" & "T" REPRESENT "PRESSURE" & "TANK". ALL OTHER MATCHING LETTERS REPRESENT CONNECTING POINTS.

HYDRAULIC SCHEMATIC & CONNECTIONS

GENERAL ASSEMBLY
P/N 320303 - 3203 PR 7-11-15



DETAIL TURNER ASSEMBLY

GENERAL ASSEMBLY
P/N 320303 - 3203 PR 7-11-15

ITEM #	QTY.	P/N	DESCRIPTION
1	1	320710	PED WDMT
2	1	320428	SIDE PLT'S/HSG
3	2	320330	BRG BALL SEALED
4	1	320333	SNAP RING
5	1	REF	SBAL VLV CARTRIDGE (480188)
6	1	018600	NUT HLF-LOCK 3/4-16 UNF
7	1	014304	SCW HEX HD 3/4-16 UNF X 6 GR 5
8	1	320712	CYL LIFT 3203H
9	1	320432	BOOM LWR WDMT
10	1	320368	BRG RETAINER
11	2	480036	PAD BOOM NYLATRON
12	4	021200	WSHR FL 3/8
13	18	020200	WSHR SPLIT LOCK 1/4
14	1	370002	PIN ASSY W/LANYARD
15	1	REF	TRVLG BLC (320433)
16	62 FT	320338	CBL
17	1	320423	BOOM MAN WDMT W/CROWN
18	1	320415	RETAINER MAN BOOM
19	3	005501	SCW HEX HD 1/4-28 UNF X 3/4
20	1	320449	BOOM MID WDMT
21	4	750100-004	WSHR FL 5/16
22	6	736272	NUTSERT 1/4-20 UNC
23	1	320391	RETAINER MID BOOM
24	4	005406	SCW HEX HD 1/4-28 UNF X 1/2
25	N/A	N/A	N/A
26	1	002900	SCW HEX HD 1/4-20 UNC X 3/8
27	1	320464	BRKT ACTUATOR
28	1	320453	INDRT ANGLE
29	5	016300	NUT HEX LOCK 1/4-20 UNC
30	3	008400	SCW HEX HD 3/8-16 UNC X 3/4 GR 8
31	12	021100	WSHR SPLIT LOCK 3/8
32	8	330394	SCW HEX HD 3/8-16 UNC X 1 1-2

GENERAL ASSEMBLY
P/N 320303 - 3203 PR 7-11-15

33	8	005510	SCRW, HX WHZ LK 1/4-20 X 3/4
34	6	011603	SCW HEX HD 1/2-13 UNC X 1 3/4
35	4	021500	RLY PNL ASSY
36	6	017701	NUT HEX 1/2-13 UNC
37	1	320809	WSHR SPLIT LOCK 1/2
38	1	320392	BRKT VLV BANK TOP
39	1	320328	POSTION PIN
40	N/A	N/A	N/A
41	1	320431	CVR WDMT
42	2	REF	DIR VLV ASSY (300204)
43	1	330306	MANIF SERIES
44	1	320393	BRKT MANIF BTM
45	4	002614	SCW HEX HD 5/16 UNC X 5/8 SELF TAB
46	1	480027	HYD MTR ROT
47	1	320336	HYD PUMP RESVR
48	N/A	N/A	N/A
49	2	400500	BRG BOOM PIVOT
50	2	320411	BOOM PIVOT
51	N/A	N/A	N/A
52	N/A	N/A	N/A
53	N/A	N/A	N/A
54	N/A	N/A	N/A
55	N/A	N/A	N/A
56	1	012199	SCW HEX HD 5/8-11 UNC X 1 3/4 GR 5
57	1	018200	NUT HLF-LOCK 5/8-11 UNC
58	1	227401	SHV ASSY REF BRG ONLY #200100
59	N/A	N/A	N/A
60	1	330185	SCW HEX HD 1-14 UNF X 5 1/2 GR 5
61	1	019106	NUT HLF-LK 1-14 UNF
62	1	320324	ACATUATOR ASSY
63	6	007807	SCW HEX HD 5/16-18 UNC X 3/4
64	6	020600	WSHR SPLIT LOCK 5/16
65	1	REF	PIPE PLUG SOCKET (000209)
66	2	330072	PLUG HEX HD -10 ORB

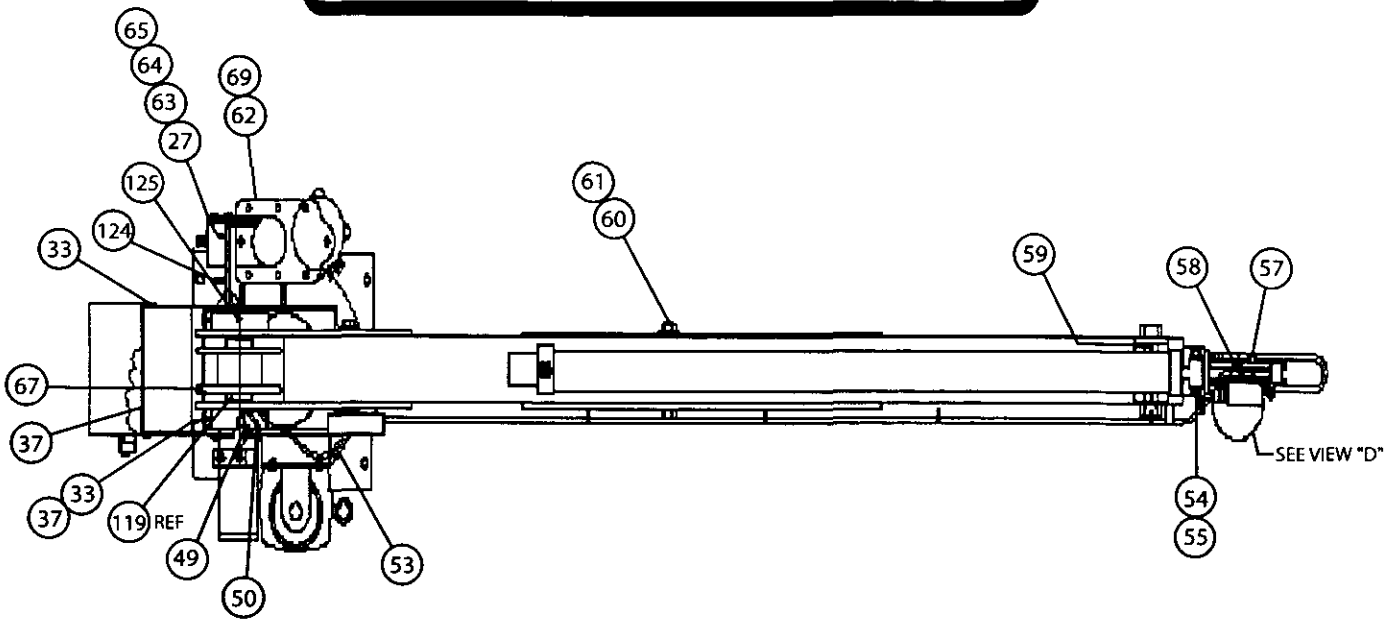
GENERAL ASSEMBLY
P/N 320303 - 3203 PR 7-11-15

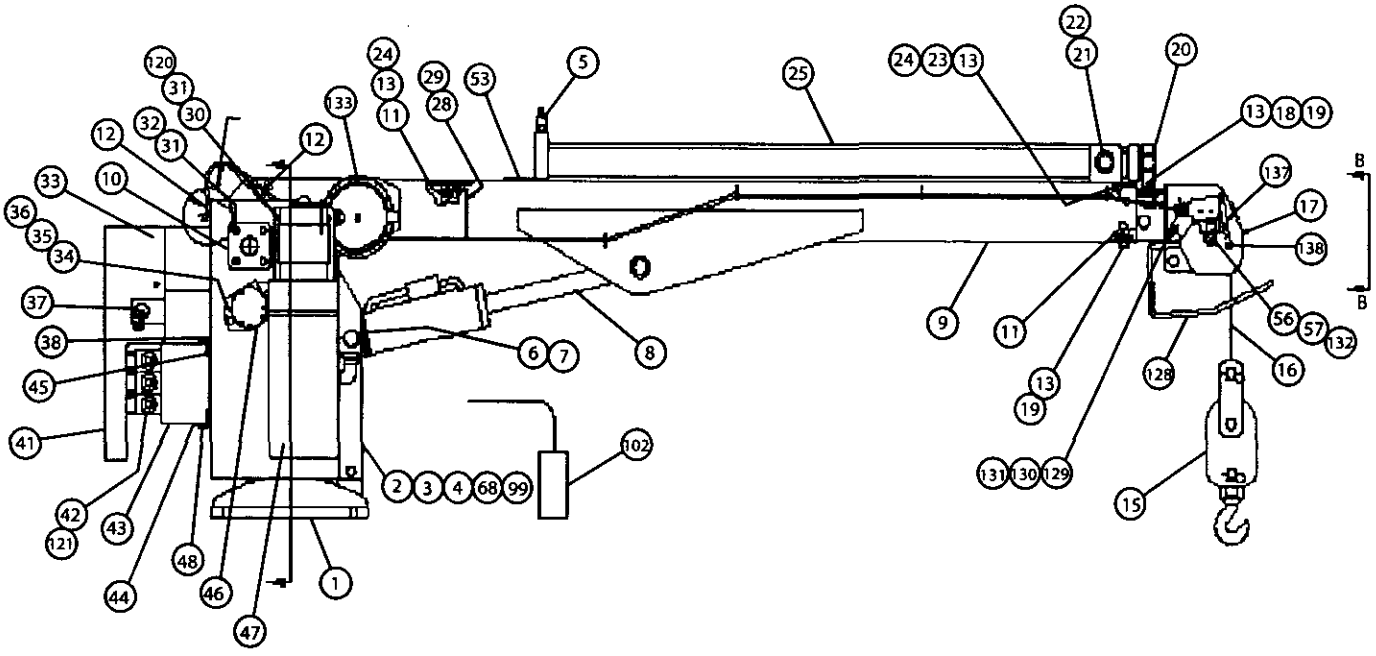
67	1	320379	DRUM
68	1	340602	KEY SQ 3/4
69	1	REF	KEY SQ 1/4 (340523)
70	1	330484	SPACER
71	1	330420	SHAFT WORM
72	2	330486	SEAL OIL
73	2	330485	BRG CONE
74	1	330472	HSG W/CUPS
75	1	019000	NUT HEX 7/8-14 UNF GR 5
76	1	239300	ZERK GREASE
77	1	330483	SPACER
78	1	320334	GEAR WORM
79	1	320442	CBL RETAINER GUARD
80	N/A	N/A	N/A
81	N/A	N/A	N/A
82	1	320488	CABLE PWR ASSY
83	N/A	N/A	N/A
84	1	330212	BRKT TWECO UP
85	1	330258	MALE CONN TWECO
86	N/A	N/A	N/A
87	N/A	N/A	N/A
88	N/A	N/A	N/A
89	1	320407	HYD TUBE ASSY
90	1	320408-001	HYD TUBE ASSY
91	1	320409	HYD TUBE ASSY
92	1	320410	HYD TUBE ASSY
93	N/A	N/A	N/A
94	1	320491	HYD TUBE ASSY
95	1	320490	HYD TUBE ASSY
96	2	812209-027	HYD HOSE ASSY
97	N/A	N/A	N/A
98	N/A	N/A	N/A
99	1	320332	RING RETAINING BRG

GENERAL ASSEMBLY
P/N 320303 - 3203 PR 7-11-15

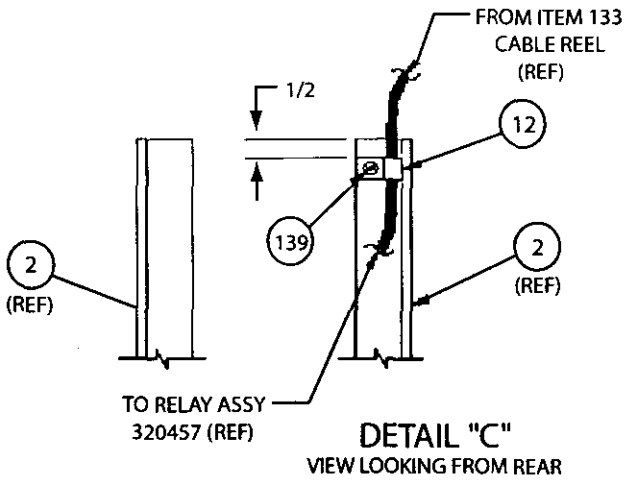
100	1	320444	DCL DWG
101	4	200876	HYD FTG ADPT
102	1	REF	PEND (680064)
103	N/A	N/A	N/A
104	2	241170	BLKHD UNION
105	N/A	N/A	N/A
106	N/A	N/A	N/A
107	N/A	N/A	N/A
108	N/A	N/A	N/A
109	1	320350	45 DEGREE ELL 1/2 NPTM/-6 JIC
110	1	202759	90 DEGREE ELL 1/2 NPTM/-6 JIC
111	3	330272	90 DEGREE ELL -8 ORB/-6 JIC
112	2	480194	90 DEGREE ELL -6 SWIVEL/-6 JIC
113	1	241175	90 DEGREE ELL -6 ORB/-6 JIC
114	1	330274	RED BUSH -10 ORB/-8 ORP
115	2	202756	ADPT 3/4 ORB/ 9/16 37 DEGREE JIC
116	1	330058	RED BUSH -10 ORB/-6 ORP
117	1	320543	LOAD SENSOR N.O. 2350 PSI
118	1	366032	LOAD SENSOR N.C. 2500 PSI
119	2	330468	COLLAR SPLIT LOCK
120	3	330372	NUT HEX 3/8-16 UNC
121	1	320481	WRNG DIAGRAM SOL VLV ASSY
122	N/A	N/A	N/A
123	1	680061	SHIP KIT
124	N/A	N/A	N/A
125	2	239000	ZERK DRIVE
126	2	015900	NUT HX HD 1/4-20 UNC
127	2	005500	SCW HX HD 1/4-20 UNC X 3/4
128	N/A	N/A	N/A
129	N/A	N/A	N/A
130	N/A	N/A	N/A

GENERAL ASSEMBLY
P/N 320304 - 3203 PRX 7-11-15

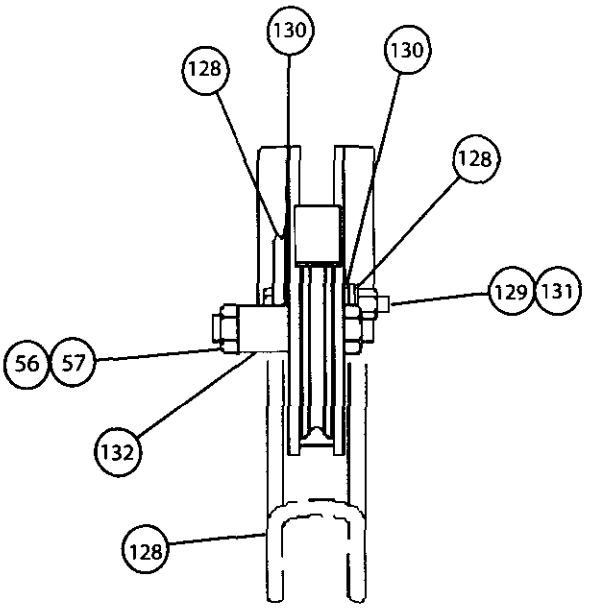




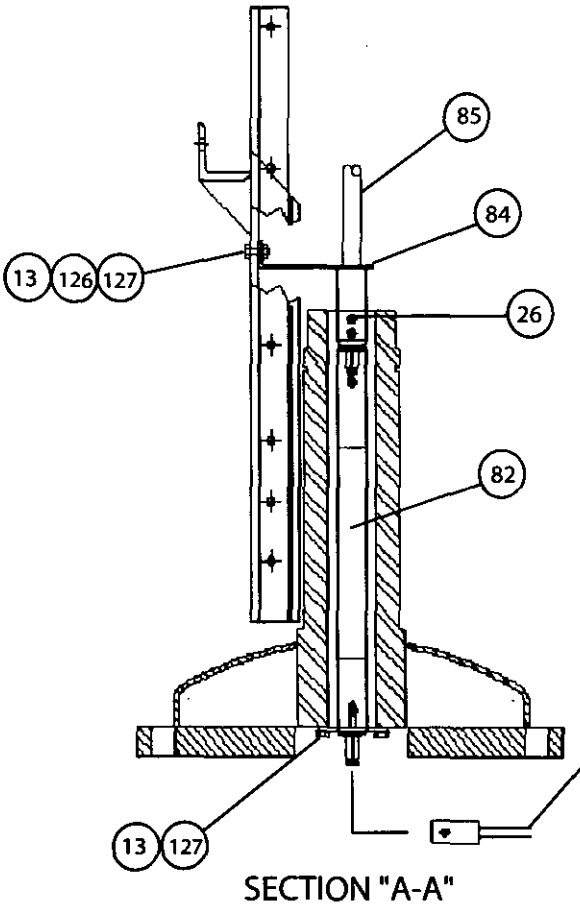
GENERAL ASSEMBLY
P/N 320304 - 3203 PRX 7-11-15



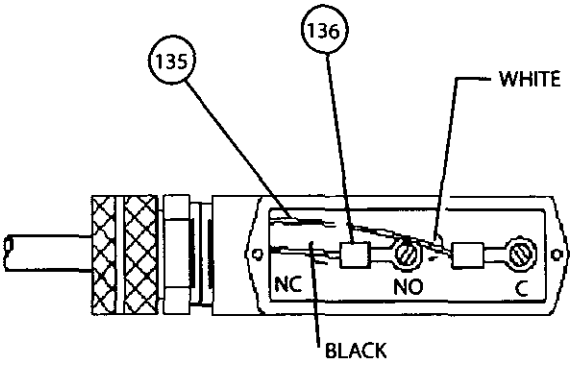
DETAIL "C"
VIEW LOOKING FROM REAR



VIEW "B-B"

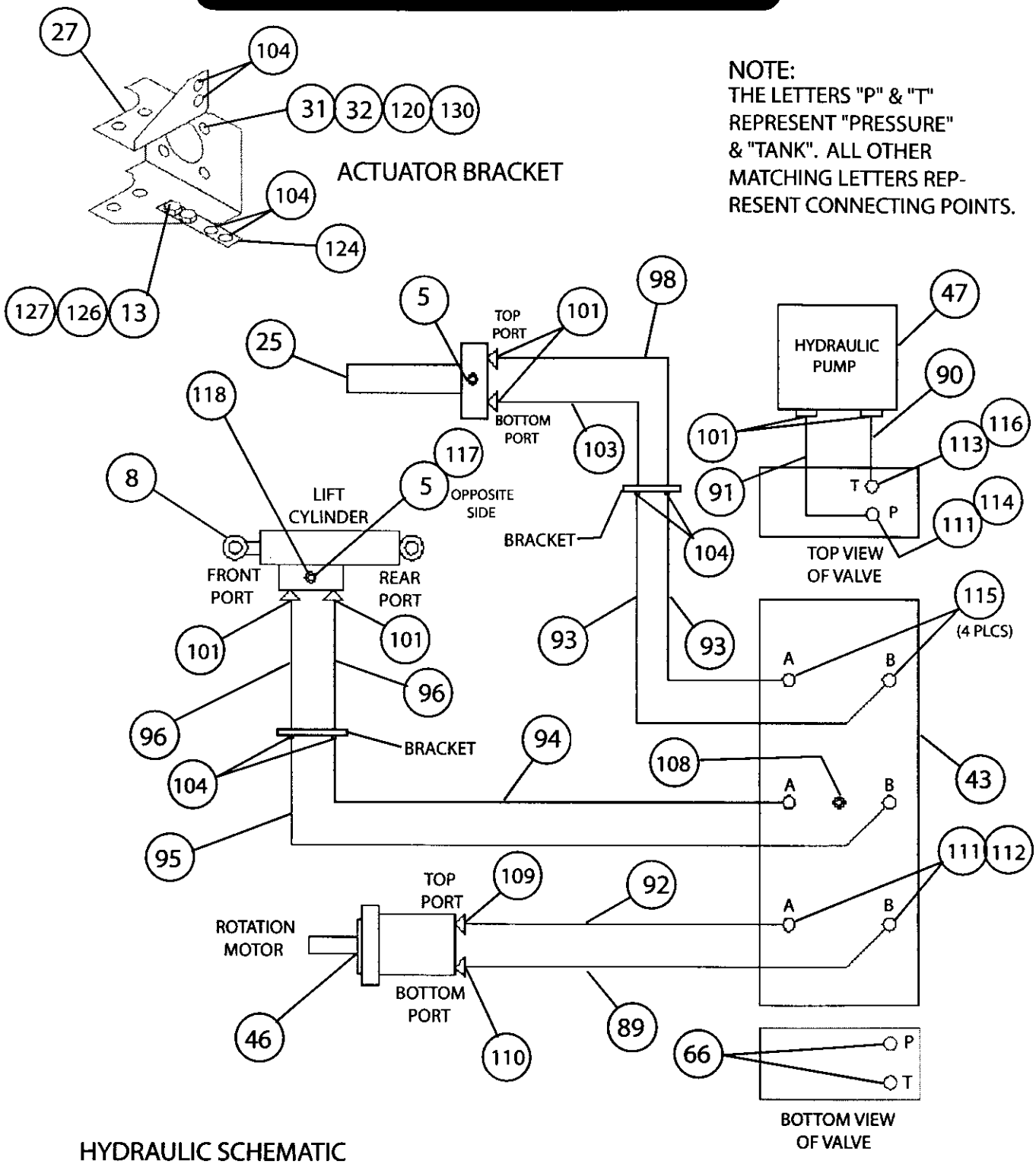


SECTION "A-A"



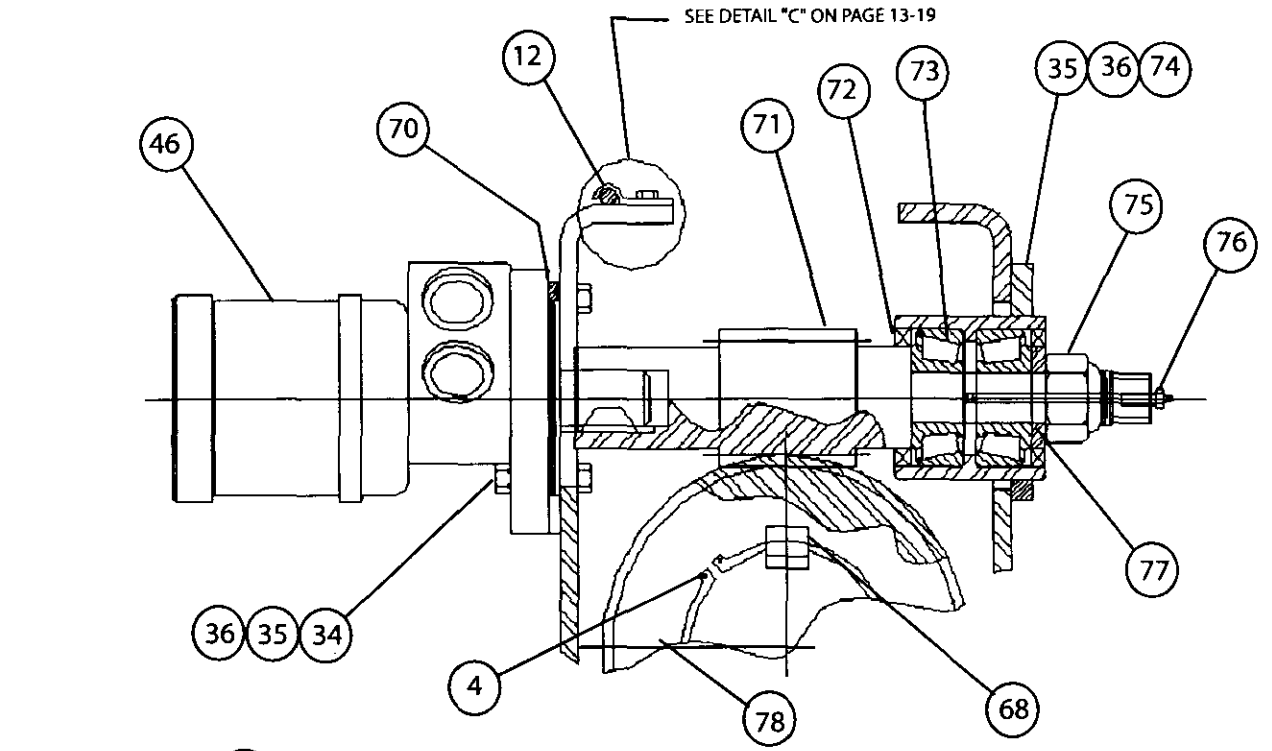
VIEW "D"

GENERAL ASSEMBLY
P/N 320304 - 3203 PRX 7-11-15

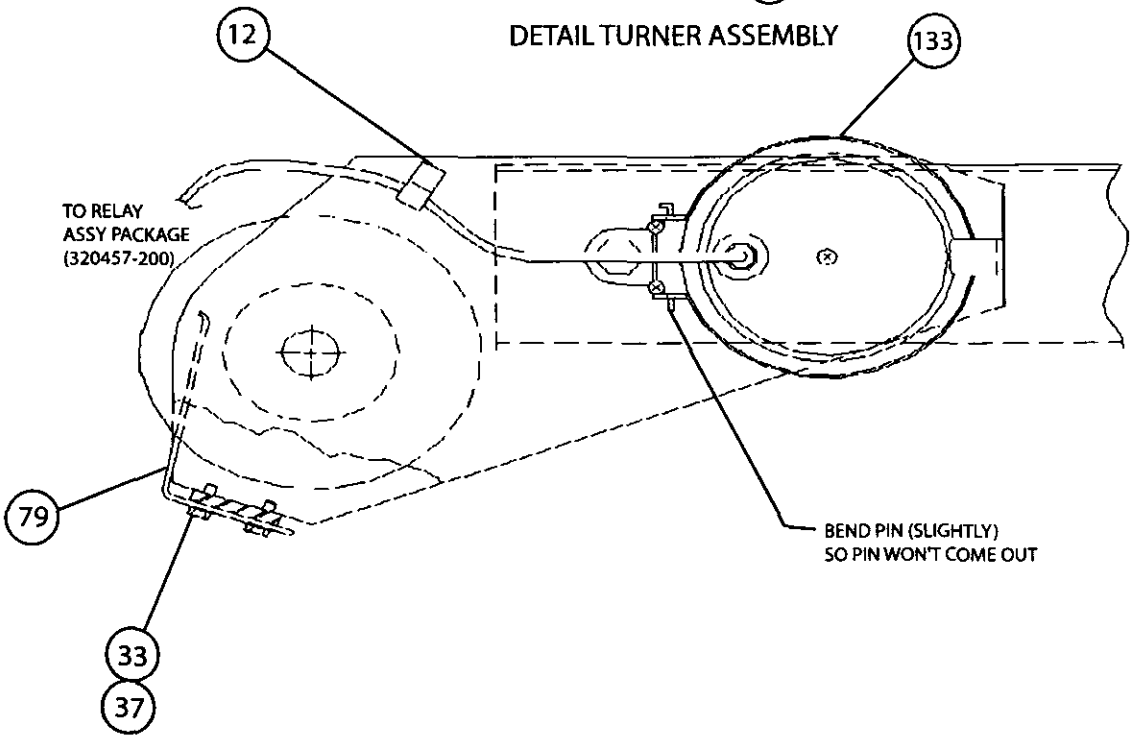


HYDRAULIC SCHEMATIC & CONNECTIONS

GENERAL ASSEMBLY
P/N 320304 - 3203 PRX 7-11-15



DETAIL TURNER ASSEMBLY



GENERAL ASSEMBLY
P/N 320304 - 3203 PRX 7-11-15

ITEM #	QTY.	P/N	DESCRIPTION
1	1	320710	PED WDMT
2	1	320428	SIDE PLT'S/HSG
3	2	320330	BRG BALL SEALED
4	1	320333	SNAP RING
5	2	REF	CBAL VLV CARTRIDGE (480188)
6	1	018600	NUT HEX-LOCK 3/4-16 UNF
7	1	014304	SCW HEX HD 3/4-16 UNF X 6 GR 5
8	1	320712	CYL LIFT 3203H
9	1	320420	BOOM LWR WDMT
10	1	320368	BRG RETAINER
11	2	480036	PAD BOOM NYLATRON
12	2	000115	CLIP
13	20	020200	WSHR SPLIT LOCK 1/4
14	1	370002	PIN ASSY W/LANYARD
15	1	REF	TRAVEL BLOCK (320433)
16	62FT	320338	CBL
17	1	320423-001	BOOM MAN WDMT W/CROWN
18	1	320415	RETAINER MAN BOOM
19	3	005501	SCW HEX HD 1/4-28 UNF X 3/4
20	1	320421	BOOM MID WDMT
21	2	015017	SCW HEX HD 1-8 UNC X 1 1/8 GR 5
22	2	022502	WSHR FLAT 1
23	1	320391	RETAINER MID BOOM
24	4	005406	SCW HEX HD 1/4-28 UNF X 1/2
25	1	320713	CYL EXT
26	1	002900	SCW HEX HD 1/4-20UNC X 3/8
27	1	320464	BRKT ACTUATOR
28	1	320453	INDTR ANGLE
29	5	016300	NUT HEX-LOCK 1/4-20 UNC
30	3	008400	SCW HEX HD 3/8-16 UNC X 3/4 GR 8
31	12	021100	WSHR SPLIT LOCK 3/8
32	8	330394	SCW HEX HD 3/8-16 UNC X 1 1/2
33	8	005510	SCRW HX WHZ LK 1/4-20 X 3/4
34	6	011603	SCW HEX HD 1/2-13 UNC X 1 3/4

GENERAL ASSEMBLY
P/N 320304 - 3203 PRX 7-11-15

35	4	021500	WSHR SPLIT LOCK 1/2
36	6	017701	NUT HEX 1/2-13 UNC
37	6	736272	NUTSERT 1/4-20 UNC
38	1	320392	BRKT VLV BANK TOP
39	N/A	N/A	N/A
40	N/A	N/A	N/A
41	1	320431	CVR WDMT
42	3	REF	DIR VLV ASSY (300204)
43	1	202710	MANIF SERIES
44	1	320393	BRKT MANIF BTM
45	8	002612	SCW HEX HD 5/16 UNC X 5/8 SELF TAP
46	1	480027	HYD MTR ROT
47	1	320336	HYD PUMP & RESVR
48	N/A	N/A	N/A
49	2	400500	BRG BOOM PIVOT
50	2	320411	BOOM PIVOT
51	N/A	N/A	N/A
52	1	320808	RELAY PANEL ASSY
53	1	340730	PAD ADHESIVE
54	1	330057	SCW HEX HD 1-8 UNC X 4 GR 5
55	1	019105	NUT HEX 1-8 UNC
56	1	012700	SCW HEX HD 5/8-11 UNC X 3 GR 5
57	1	018200	NUT HLF-LOCK 5/8-11 UNC
58	1	227401	SHV ASSY REF BRG ONLY #200100
59	2	002905	SET SCW
60	1	330185	SCW HEX HD 1-14 UNF X 5 1/2 GR 5
61	1	019106	NUT HLF-LK 1-14 UNF
62	1	320324	ACTUATOR ASSY
63	6	007807	SCW HEX HD 5/16-18 UNC X 3/4
64	6	020600	WSHR SPLIT LOCK 5/16
65	4	750100-004	WSHR FK 5/16
66	2	330072	PLUG HEX HD -10 ORB
67	1	320379	DRUM
68	1	340602	KEY SQ 3/4
69	1	REF	KEY SQ 1/4 (340523)

GENERAL ASSEMBLY
P/N 320304 - 3203 PRX 7-11-15

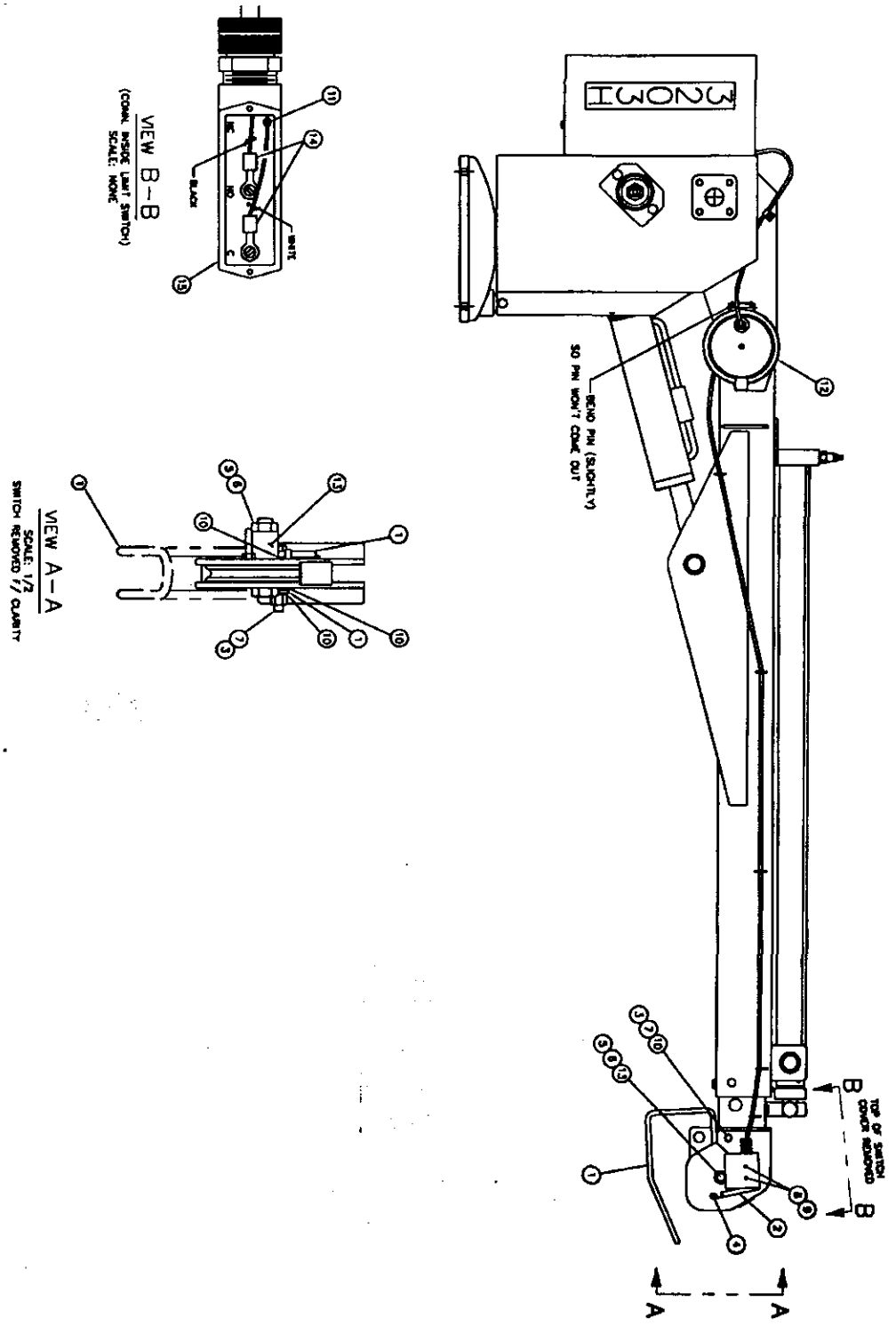
70	1	330484	SPACER
71	1	330420	SHAFT WORM
72	2	330486	SEAL OIL
73	2	330485	BRG CONE
74	1	330472	HSG W/CUPS
75	1	019000	NUT HEX 7/8-14 UNF GR 5
76	1	239300	ZERK GREASE
77	1	330483	SPACER
78	1	320334	GEAR WORM
79	1	320442	CBL RETAINER GUARD
80	1	320448	BACK-UP RETAINER
81	N/A	N/A	N/A
82	1	320488	CABLE PWR ASSY
83	N/A	N/A	N/A
84	1	330212	BRKT TWECO UP
85	1	330258	MALE CONN TWECO
86	N/A	N/A	N/A
87	N/A	N/A	N/A
88	N/A	N/A	N/A
89	1	320407	HYD TUBE ASSY
90	1	320408-001	HYD TUBE ASSY
91	1	320409	HYD TUBE ASSY
92	1	320410	HYD TUBE ASSY
93	2	320489	HYD TUBE ASSY
94	1	320491	HYD TUBE ASSY
95	1	320490	HYD TUBE ASSY
96	2	812209-027	HYD HOSE ASSY
97	N/A	N/A	N/A
98	1	812206-041	HYD HOSE ASSY EXT OUT
99	1	320332	RING RETAINING BRG
100	1	320445	DCL DWG
101	6	200876	HYD FTG ADPT
102	1	REF	PEND (680065)
103	1	812206-038	HYD HOSE ASSY EXT IN
104	4	241170	BLKHD UNION

GENERAL ASSEMBLY
P/N 320304 - 3203 PRX 7-11-15

105	N/A	N/A	N/A
106	N/A	N/A	N/A
107	N/A	N/A	N/A
108	1	000209	PLUG PIPE SOC 1/4
109	1	320350	45 DEGREE ELL 1/2 NPTM/-6 JIC
110	1	202759	90 DEGREE ELL 1/2 NPTM/-6 JIC
111	3	330272	90 DEGREE ELL -8 ORB/-6 JIC
112	2	480194	90 DEGREE ELL -6 SWIVEL/-6 JIC
113	1	241175	90 DEGREE -6 ORB/-6 JIC
114	1	330274	RED BUSH -10 ORB/-8 ORB
115	4	202756	ADPT 3/4 ORB/ 9/16 37 DEGREE JIC
116	1	330058	RED BUSH -10 ORB/-6 ORB
117	1	320543	LOAD SENSOR N.O. 2350 PSI
118	1	366032	LOAD SENSOR N.C. 2500 PSI
119	2	330468	COLLAR SPLIT LOCK
120	4	330372	NUT HEX 3/8-16 UNC
121	1	320480	WRNG DIAGRAM SOL VLV ASSY
122	N/A	N/A	N/A
123	1	680058	SHIP KIT
124	1	320483	BRKT HYD TBG
125	2	239000	ZERK DRIVE
126	6	015900	NUT HX HD 1/4-20 UNC
127	4	005500	SCW HX HD 1/4-20 UNC X 3/4
128	1	320556	SWITCH BAIL ASSY
129	1	759132	SCW HX HD 3/8-UNC X 2 1/2
130	7	021200	WASHER FL 3/8
131	1	330372	NUT HX HD LK 3/8-UNC
132	1	340295	TBG RD 1 1/16 X .188 W X 1 3/16
133	1	320521	REEL CABLE
134	N/A	N/A	N/A
135	1	000302	TERM WIRE BUTT SPLICE
136	2	000101	TERM WIRE 14-16R
137	1	320054	SPRING RETURN
138	2	016300	NUT HX LK 1/4-20 UNC
139	1	330038	#10 SLF-DRL & THR 3/4 HX HD SLOT

2-BLOCK ASSEMBLY

3203PRX & 3203H SERIES



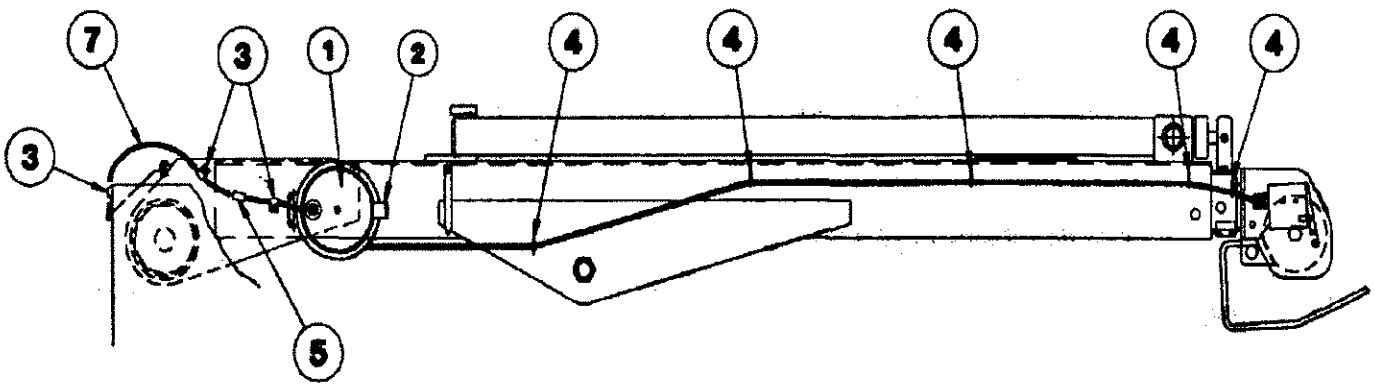
2-BLOCK ASSEMBLY

3203PRX & 3203H SERIES

320579000 A150 2703

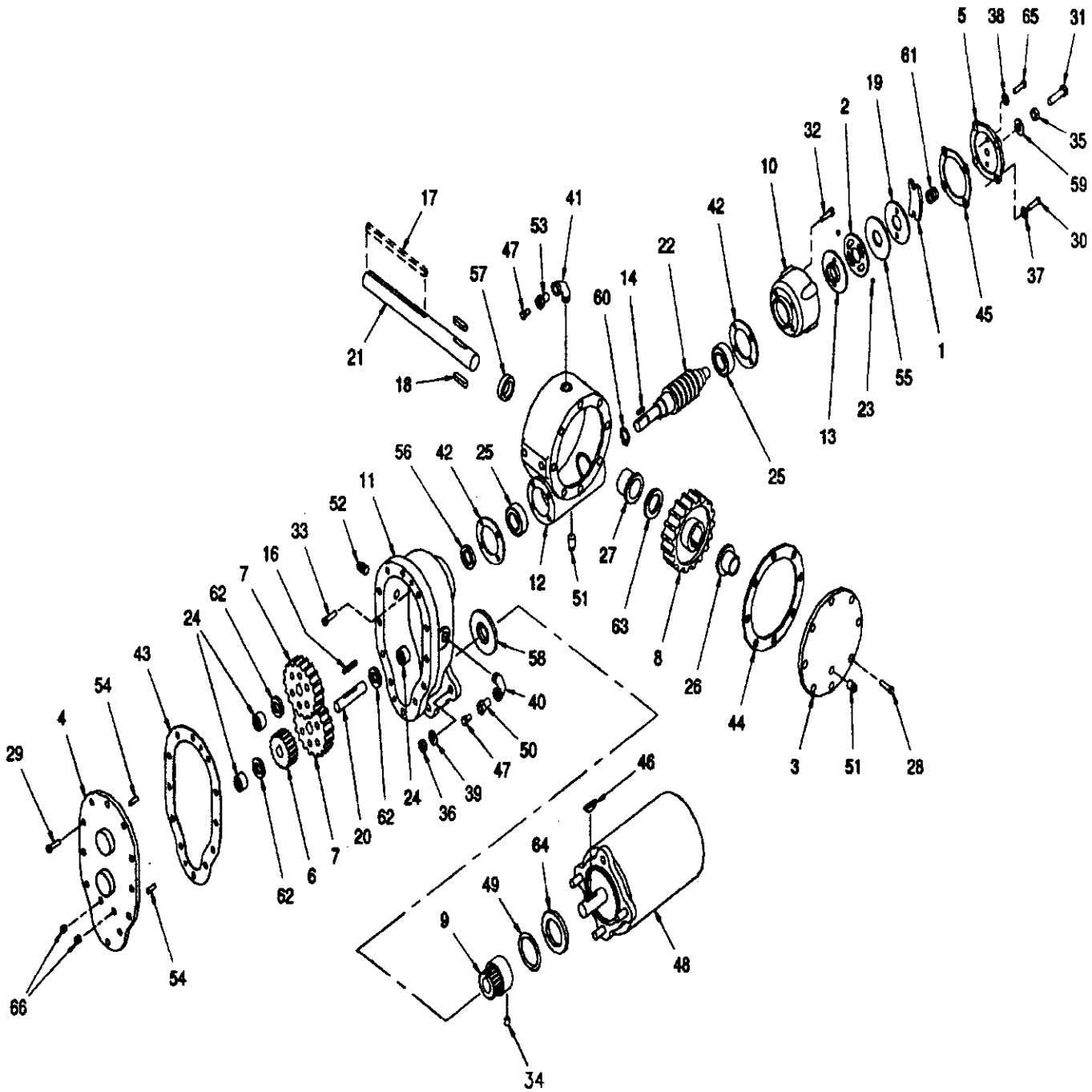
ITEM	QTY	P/N	DESCRIPTION
1	1	320556	BAIL / SWITCH ASSEMBLY
2	1	320554	SPRING, RETURN
3	1	330372	NUT HX LK 3/8 NC
4	2	016300	NUT HX LK ¼ NC
5	1	018200	NUT HLF LK 5/8-11NC
6	1	012700	SCW HX HD 5/8-11NC X 3 LG
7	1	759132	SCW HX HD 3/8-11NC X 2 ½ LG
8	2	019600	WASHER LK #6
9	2	002602	SCW RD HD #6-32NC X 1 ¼ LG
10	3	021200	WASHER FL 3/8
11	1	000302	TERM WIRE BUTT SPLICE 14GA
12	1	366973-001	CORD REEL ASSY W/WHTR PACK CONN
13	1	340295	TUBING RD 1 1/16 X .188W X 1 3/16 LG
14	2	101	TERM RING 14 - 16 GA
15	1	646900	SWITCH

2-BLOCK REEL INSTALLATION
3203 PRX & 3203H SERIES



ITEM	QTY	P/N	DESCRIPTION
1	1	320521	CABLE REEL
2	1	320551	REEL MOUNT BRACKET
3	3	000115	#15 JIFFY CLIP
4	5	320570	D-RING
5	2	000302	BUTT SPLICE WIRE TERMINAL
6	1	000300	WIRE TERMINAL
7	3 FT	800626	16GA 2 CONDUCTOR CABLE 300V TYPE SJO BLACK

HOIST ACTUATOR ASSEMBLY
P/N 320324 - 3203 SERIES



HOIST ACTUATOR ASSEMBLY
P/N 320324 - 3203 SERIES

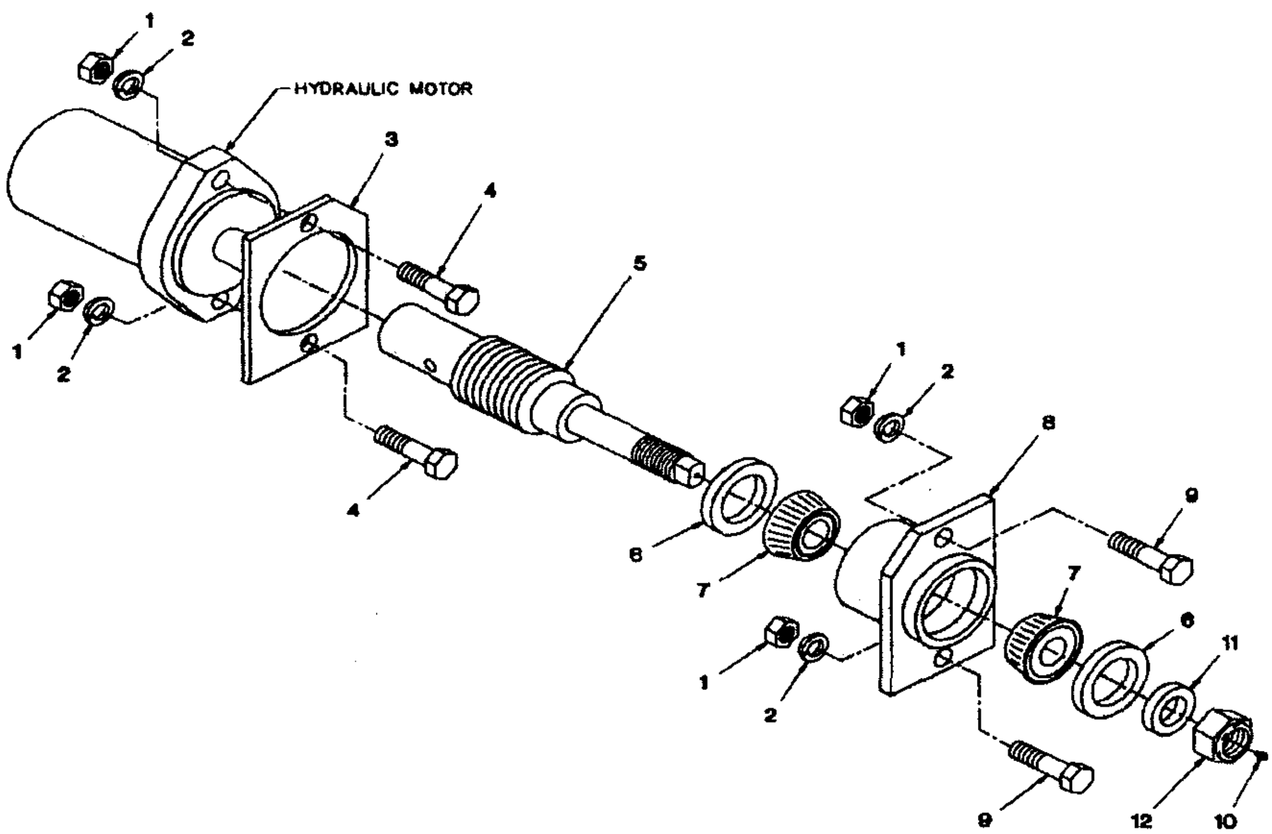
ITEM	QTY	P/N	DESCRIPTION
1	1	360637	FLAT SPRING
2	1	360331	CAM PLATE
3	1	300041	GEAR HOUSING COVER
4	1	300042	SPUR GEAR HOUSING COVER
5	1	360450	BRAKE COVER
6	1	300043	IDLER GEAR
7	2	300044	SPUR GEAR
8	1	300045	WORM R.H. GEAR
9	1	300046	PINION GEAR
10	1	360336	BRAKE HOUSING
11	1	300047	SPUR GEAR HOUSING
12	1	300048	GEAR HOUSING
13	1	360339	BRAKE HUB
14	1	300049	KEY 3/16 SQ x 1/2 LG
15	-	-	-
16	1	300050	KEY 3/16 SQ x 1 9/16 LG
17	1	800479-001	HR FLAT BAR 44 x ¾ x 5 13/16 LG
18	2	300052	KEY RD 5/16 x 5/16 x 15/16 LG
19	1	360342	RETAINER PLATE
20	1	300053	SPUR GEAR SHAFT
21	1	320323	OUTPUT SHAFT
22	1	320312	RIGHT HAND WORM GEAR
23	2	360345	BALL
24	3	300056	NEEDLE BEARING
25	2	300057	BALL BEARING
26	1	300058	BUSHING
27	1	300059	BUSHING
28	10	320313	CAPSCREW 1/4-20 NC x 3/4 LG NYLOCK
29	12	005500	CAPSCREW 1/4-20 NC x 3/4 LG
30	4	005604	CAPSCREW 1/4-20 NC x 1 LG
31	1	320311	CAPSCREW 3/8 x 1 1/2 LG ALL THREAD
32	4	320310	CAPSCREW 1/4-20 NC x 1 LG
33	4	300060	SOCKET HEAD SCREW 1/4-20 NC x 3/4 LG LOC-WEL
34	1	300061	SETSCREW 1/4-20 NC x 5/16 LG LOC-WEL
35	1	360353	HEX JAM NUT 3/8-16 NC
36	3	071012	HEX NUT 3/8-24 NF
37	4	360354	SPLIT LOCK WASHER 1/4 MED SECT
38	2	360455	FLAT WASHER 1/4 ALUM

HOIST ACTUATOR ASSEMBLY
P/N 320324 - 3203 SERIES

(1) 160269 Speed Red

ITEM	QTY	P/N	DESCRIPTION
39	3	021100	SPLIT LOCK WASHER 3/8
40	1	320314	90° ELBOW 3/8-18 NPT BOTH ENDS
41	1	320315	90° ELBOW 1/4-18 NPT BOTH ENDS
42	2	300062	GASKET BEARING
43	1	300063	SPUR GEAR HOUSING GASKET
44	1	300064	GEAR HOUSING COVER GASKET
45	1	360359	BRAKE COVER GASKET
46	1	300065	WOODRUFF KEY
47	2	300066	RELIEF FITTING
48	1	~~300067~~ 458071	12V MOTOR ← 458071
49	1	300068	O-RING 1 OD x 1/8 THICK
50	1	300069	REDUCER -6 NPT / -2 NPT
51	2	300070	PLUG PIPE -4 NPT SQ HD
52	1	300073	PLUG PIPE -6 NPT HEX SOC HEADLESS
53	1	300074	REDUCER -4 NPT / -2 NPT
54	2	300075	DOWEL PIN
55	2	360364	THRUST PLATE
56	1	300076	OIL SEAL 3/4 ID x 1 1/4 OD x 1/4 THICK
57	1	300077	OIL SEAL 1 1/4 ID x 1 3/4 OD x 1/4 THICK
58	1	300078	OIL SEAL 1 1/2 ID x 2 1/4 OD x 5/16 THICK
59	1	360371	THREAD SEAL
60	1	300079	SNAP RING
61	1	360368	SPRING
62	3	300080	THRUST WASHER
63	1	300081	THRUST WASHER
64	1	300082	FIBER WASHER
65	2	360456	SCREW 1/4-20 NC x 1 LG ALL THREAD
66	2	320382	PIPE PLUG

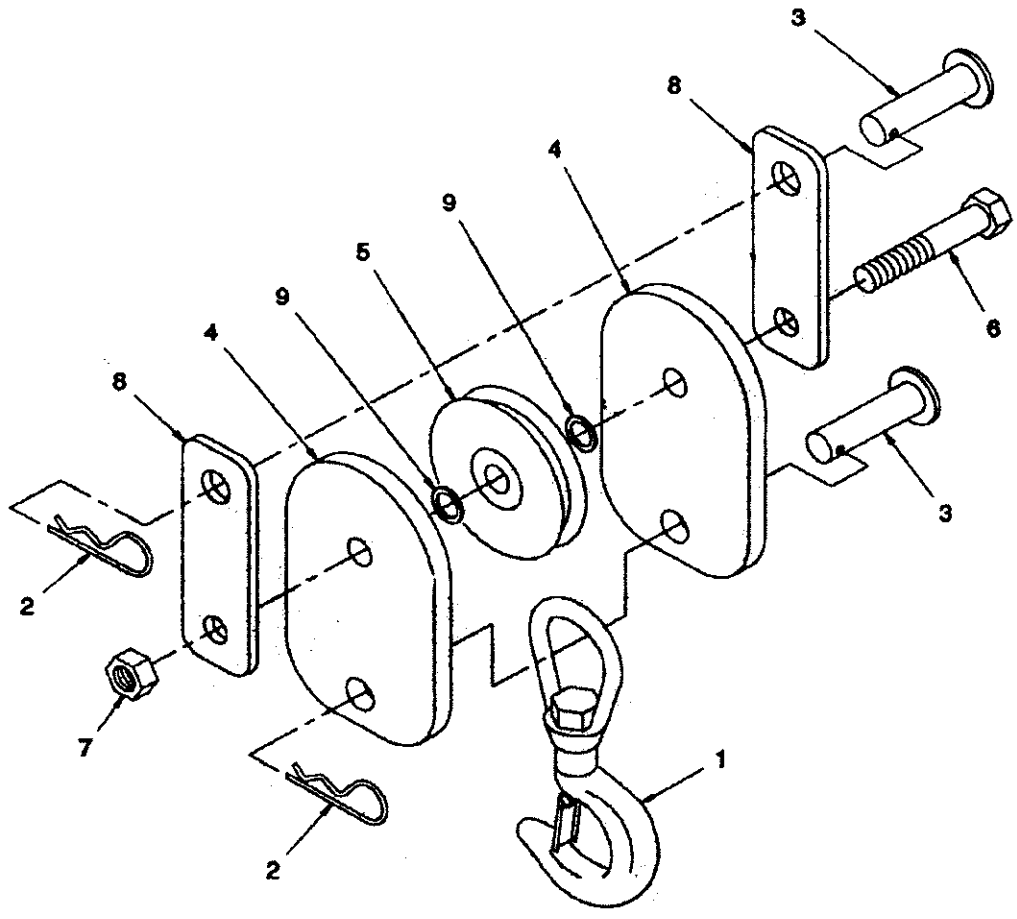
TURNER ASSEMBLY (HYDRAULIC)
3203 PR/PRX



ITEM	QTY	P/N	DESCRIPTION
1	4	017701	HEX NUT 1/2-13NC
2	4	021500	LOCK WASHER 1/2
3	1	330484	SPACER
4	2	011603	CAPSCREW 1/2-13NC x 1 3/4
5	1	330420	SHAFT ASSEMBLY
6	2	330486	OIL SEAL
7	2	330485	BEARING
8	1	330472	HOUSING
9	2	010201	CAPSCREW 1/2-13NC x 1 1/2
10	1	239300	GREASE ZERK
11	1	330483	SPACER
12	1	019000	HEX LOCK NUT 7/8-14NF

11 1/2 width
11 Length
10 1/2" shaft
wider

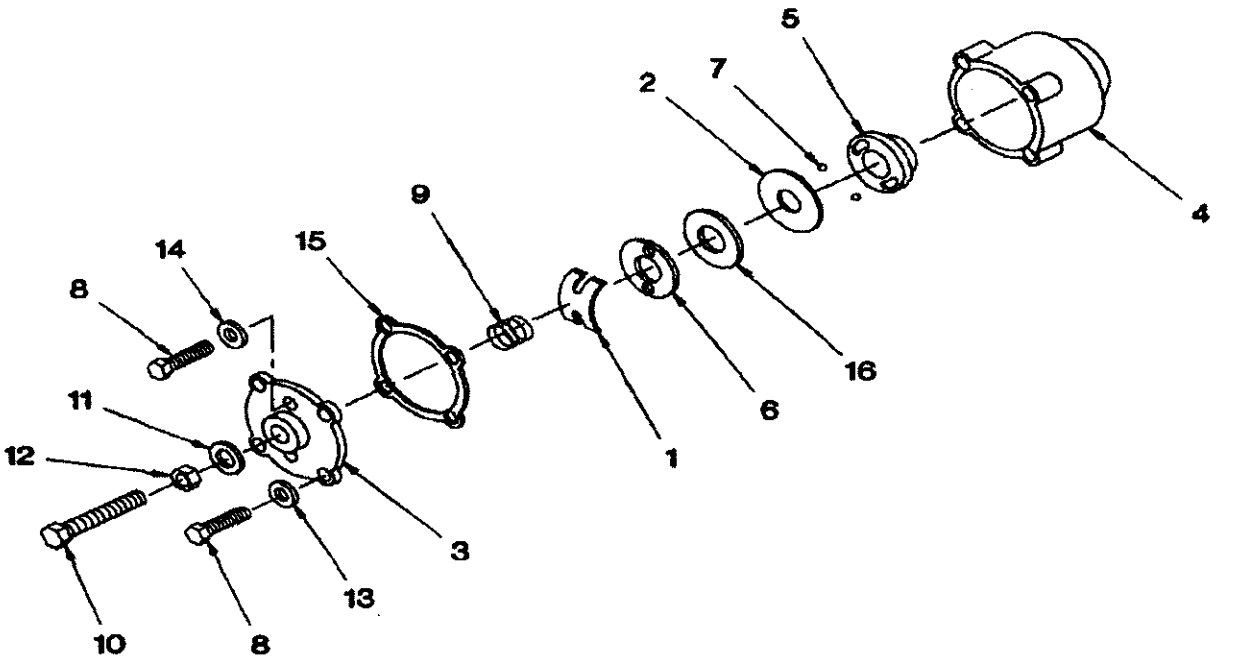
TRAVELING BLOCK ASSEMBLY
P/N 320433



ITEM	QTY	P/N	DESCRIPTION
1	1	100309	SWIVEL HOOK
2	2	360124	HITCH PIN
3	2	320434	BLOCK PIN
4	2	320403	TRAVELING BLOCK
5	1	200909	SHEAVE ASSEMBLY w/ BEARING
6	1	013512	HEX HEAD CAP SCREW 5/8 NC x 3 1/2
7	1	018200	HEX HALF LOCK NUT 5/8 NC
8	2	320404	BLOCK
9	2	330100	5/8 FLAT WASHER

NOTE: **STANDARD 62' CABLE ASSEMBLY** MAY BE ORDERED USING **P/N 320338.**
OPTIONAL 75' CABLE ASSEMBLY MAY BE ORDERED USING **P/N 320339.**

AUTOMATIC SAFETY BRAKE ASSEMBLY (OIL COOLED) HOIST



ITEM	QTY	P/N	DESCRIPTION
1	1	360367	FLAT SPRING
2	1	360331	CAM PLATE
3	1	360450	HOUSING COVER
4	1	360336	BRAKE HOUSING
5	1	360339	BRAKE HUB
6	1	360342	RETAINER PLATE
7	2	360345	BRAKE BALL
8	6	360453	CAPSCREW 1/4 NC x 1
9	1	360368	COIL SPRING
10	1	360456	CAPSCREW 3/8 NC x 1 1/2
11	1	360371	THREAD SEAL
12	1	360353	JAM NUT 3/8 NC
13	4	360465	THREAD SEAL
14	2	360455	WASHER FLAT 1/4 ALUM
15	1	360359	GASKET
16	1	360364	THRUST PLATE

AUTOMATIC SAFETY BRAKE ASSEMBLY (OIL COOLED) HOIST

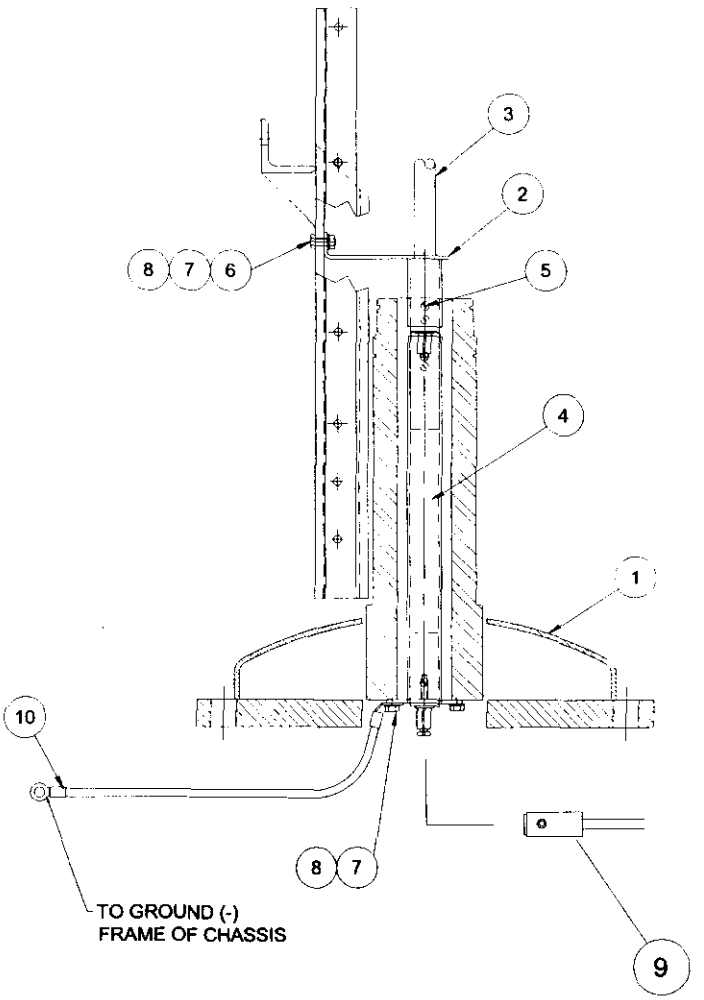
ASSEMBLY INSTRUCTIONS:

1. Winch has right hand worm and gear. Cable spools over drum. Use number one slots for brake balls(7) in cam plate(2).
2. Install brake hub(5) through brake housing(4) on winch worm with key.
3. Assemble balls(7) in cam plate(2) using hard grease to hold balls in place.
4. Place cam plate(2) on brake hub(5), matching its holes with the balls.
5. Install thrust plate(16).
6. Thread capscrew(10) with jam nut (12) and thread seal (11) through housing cover(3).
7. Place gasket(15) on housing cover(3).
8. Install coil spring(9) on capscrew(10).
9. Install flat spring(1) on capscrew(10).
10. Secure retainer plate(6) and flat spring(1) to housing cover(3) using capscrews(8) and washers(14).
11. Using capscrews(8) and thread seals(13) attach housing cover(3) to brake housing(4).
12. Test brake by shifting winch to UP then DOWN to see if brake is working in proper rotation. If not, remove housing cover(3) and locate brake balls(7) in opposite set of slots of cam plate(2).
13. Adjust to suit by tightening or loosening capscrew(10) on outside of housing cover(3). When proper adjustment is obtained, secure capscrew(10) with jam nut(12).

TWECO

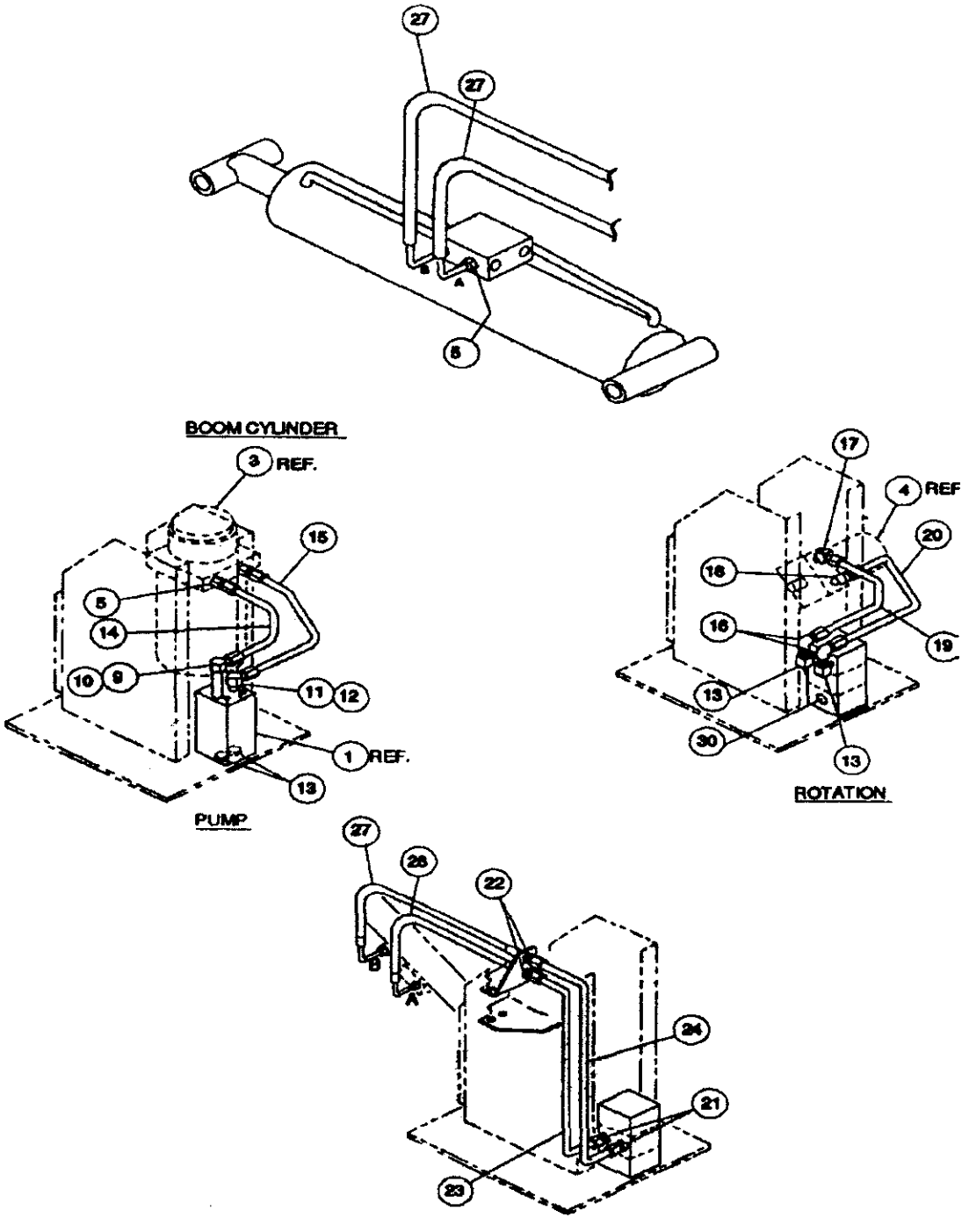
ASSEMBLY

669200 FEMALE
669300 MALE



ITEM	QTY	P/N	DESCRIPTION
1	1	REF	PEDESTAL WELDMENT (320710)
2	1	330212	TWECO BRACKET
3	1	330258	TWECO POWER CONNECTOR
4	1	330488	POWER CABLE ASSEMBLY
5	1	002900	SCREW 1/4 NC x 3/8
6	1	015900	NUT 1/4 NC
7	2	005500	SCREW 1/4 NC x 3/4
8	2	021500	WASHER SP LK 1/4
9	1	600425	CABLE POWER TWECO
10	1	320806	CONDUCTOR ASSY 10 GA X 48 BLK

HYDRAULIC ASSEMBLY
3203 PR

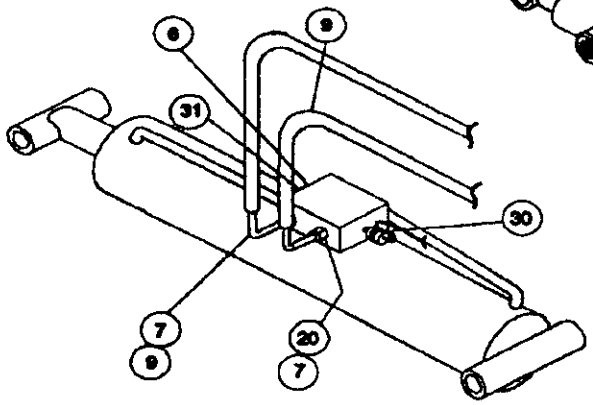


HYDRAULIC ASSEMBLY

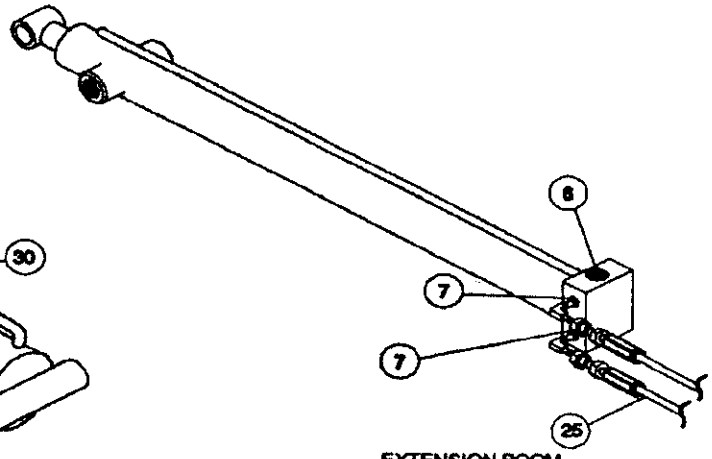
3203PR

ITEM	QTY	P/N	DESCRIPTION
1	1	330306	MANIFOLD (REF)
2	1	320712	BOOM CYLINDER (REF)
3	1	320336	HYDRAULIC PUMP & RESERVOIR (REF)
4	1	404008	HYDRAULIC PUMP & RESERVOIR (REF)
5	4	200876	ADAPTER -6 ORB/-6 JIC
6	1	REF	COUNTER BALANCE VALVE CARTRIDGE (480188)
7	1	330274	REDUCER -10 ORB/-8 ORP
8	3	330272	90° ELBOW -8 ORB/-6 JIC
9	1	330058	REDUCER -10 ORB/-6 ORP
10	1	241175	90° ELBOW -6 ORB/-6 JIC
11	2	330072	HEX HEAD PLUG -10 ORB
12	1	320409	HYDRAULIC TUBE ASSEMBLY
13	1	320408-001	HYDRAULIC TUBE ASSEMBLY
14	2	480194	90° ELBOW -6 SWIVEL/-6 JIC
15	1	320350	45° ELBOW -8 NPTM/-6 JIC
16	1	202759	90° ELBOW -8 NPTM/-6 JIC
17	1	320410	HYDRAULIC TUBE ASSEMBLY
18	1	320407	HYDRAULIC TUBE ASSEMBLY
19	2	202756	ADAPTER -8 ORB/-6 JIC
20	2	241170	BULKHEAD UNION
21	1	320490	HYDRAULIC TUBE ASSEMBLY
22	1	320491	HYDRAULIC TUBE ASSEMBLY
23	2	812209-027	HOSE ASSEMBLY
24	1	366032	LOAD SENSOR (REF)
25	1	000209	SOCKET HEAD PIPE PLUG ¼ (REF)
26	1	320469	HYDRAULIC TUBE ASSEMBLY

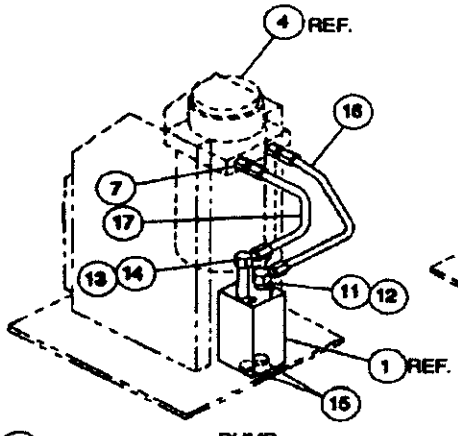
HYDRAULIC SCHEMATIC
3203 PRX



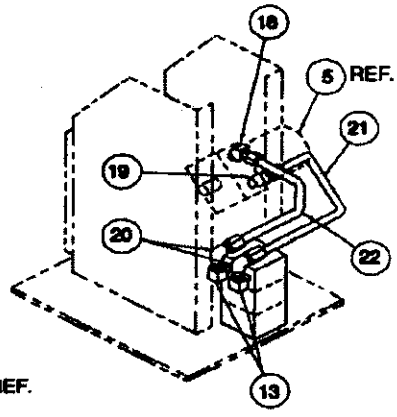
BOOM CYLINDER



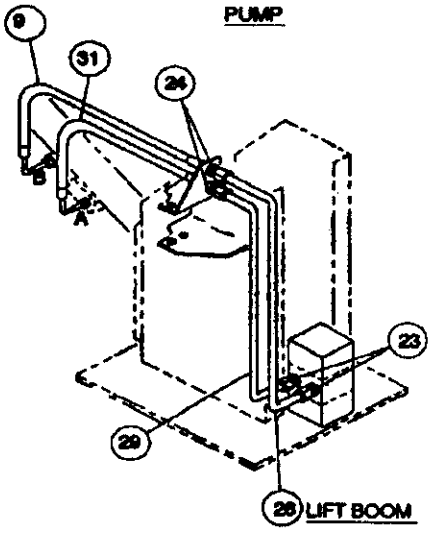
EXTENSION BOOM



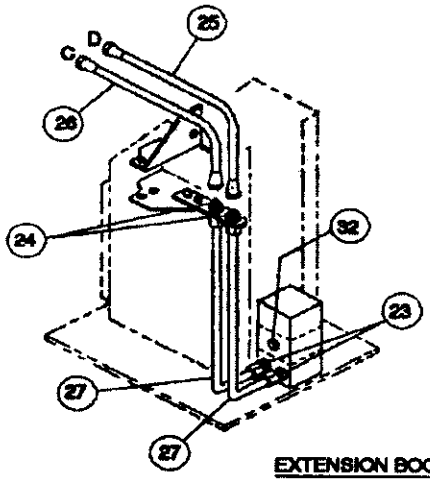
PUMP



ROTATION



LIFT BOOM



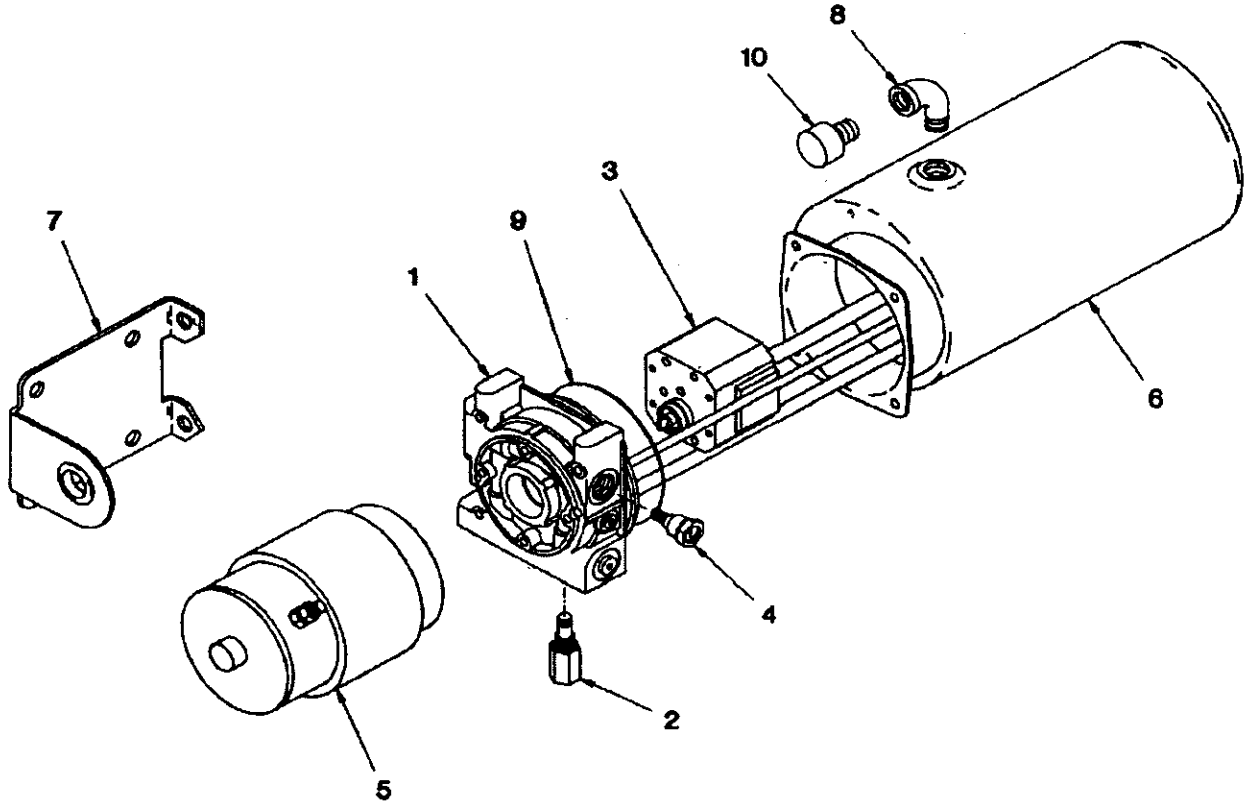
EXTENSION BOOM

HYDRAULIC SCHEMATIC

3203PRX

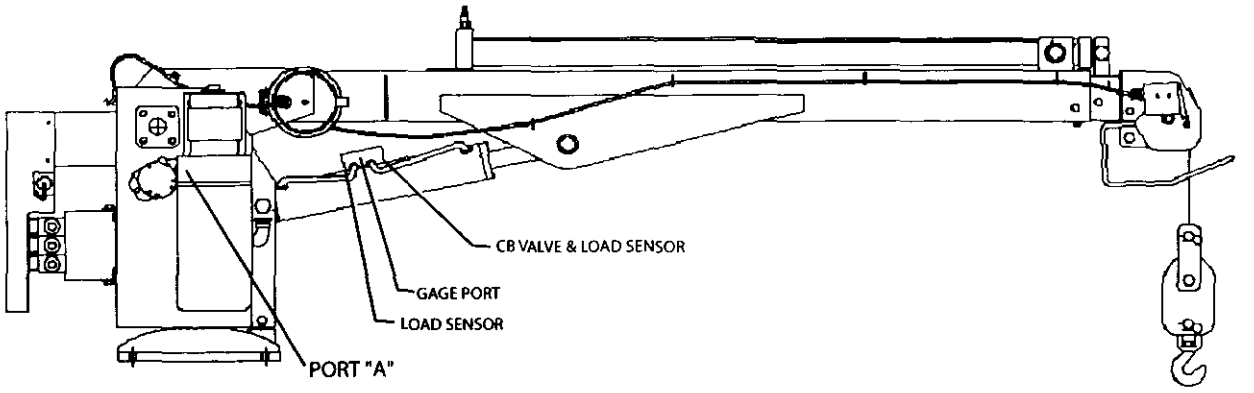
ITEM	QTY	P/N	DESCRIPTION
1	1	202710	MANIFOLD (REF)
2	1	320713	EXTENSION CYLINDER (REF)
3	1	320712	BOOM CYLINDER (REF)
4	1	320336	HYDRAULIC PUMP & RESERVOIR (REF)
5	1	404008	HYDRAULIC PUMP & RESERVOIR (REF)
6	1	480027	HYDRAULIC ROTAION MOTOR (REF)
7	2	REF	CARTRIDGE (480188)
8	6	200876	ADAPTER -6 ORB/-6 JIC
9	2	812209-027	HOSE ASSEMBLY
10	1	241175	90° ELBOW -6 ORB/-6 JIC
11	1	330058	REDUCER -10 ORB/-6 ORP
12	3	330272	90° ELBOW -8 ORB/-6 JIC
13	1	330274	REDUCER -10 ORB/-8 ORP
14	2	330072	HEX HEAD PLUG -10 ORB
15	1	320408-001	HYDRAULIC TUBE ASSEMBLY
16	1	320409	HYDRAULIC TUBE ASSEMBLY
17	1	320350	45° ELBOW -8 NPTM/-6 JIC
18	1	202759	90° ELBOW -8 NPTM/-6 JIC
19	2	480194	90° ELBOW -6 SWIVEL/-6 JIC
20	1	320407	HYDRAULIC TUBE ASSEMBLY
21	1	320410	HYDRAULIC TUBE ASSEMBLY
22	4	202756	ADAPTER -8 ORB/-6 JIC
23	4	241170	BULKHEAD UNION
24	2	812203-038	HOSE ASSEMBLY - 6, 38 in.
25	1	320466	HOSE ASSEMBLY - 6, 39 in.
26	2	320489	HYDRAULIC TUBE ASSEMBLY
27	1	320490	HYDRAULIC TUBE ASSEMBLY
28	1	320491	HYDRAULIC TUBE ASSEMBLY
29	1	366032	LOAD SENSOR ASSEMBLY (2500 PSI)
30	1	320543	LOAD SENSOR (2350 PSI)
3	1	000209	PIPE PLUG SOCKET - 1/4

HYDRAULIC PUMP & RESERVOIR
P/N 320336 - 3203 PRX 7-11-15
BARNES PUMP



ITEM	QTY	P/N	DESCRIPTION
1	1	320336-005	ADAPTER KIT
2	1	320336-002	RETURN PORT PLUG KIT
3	1	320335-003	PUMP KIT
4	1	320336-003	RELIEF VALVE KIT
5	1	320335-005	MOTOR
6	1	320336-006	RESERVOIR KIT
7	1	320335-007	MOUNTING BRACKET KIT
8	1	320335-008	ELBOW FITTING
9	1	320335-010	O-RING
10	1	200545	BREATHER CAP

COUNTERBALANCE VALVE SETTING
3203 SERIES



CAUTION:
IF COUNTERBALANCE VALVE IS REPLACED, THE CORRECT PRESSURE SETTING MUST BE MADE BEFORE CRANE IS IN SAFE WORKING CONDITION.

IMPORTANT

Crane boom must be supported and pump system disengaged during the removal and installation of the pressure gage port plug, pressure gage, pressure switch's and counterbalance valve.

Valve Setting

To set counterbalance valve:

1 Supported with boom, remove -6 ORP plug on cylinger block next to valve and install a pressure gauge; 2500 psi capacity minimum and/or remove plug (5/16 allen wrench) from port "A" of hydraulic pump. Install a pressure gauge of 2500 psi capacity minimum into the port (-6 o-ring port) after installed.

2 Boom up until boom cylinder is fully elevated.

3 Boom down in small increments while reading pressure gauge.

4 Loosen the 9/16" nut on end of valve, adjust 5/32" allen screw and retighten nut. To increase the CB valve setting, loosen nut and turn allen head screw counter clockwise. Turning adjustment screw too far will cause valve to come apart inside. This condition is **NOT** repairable. To reduce the CB valve setting, loosen nut and turn allen head screw clockwise. Repeat procedure until pressure reading is a constant 1000 psi. If valve is not set and boom reaches the full down position, boom up and keep trying.

5 Support boom, remove gauge and replace plug when adjustment is complete.

Repeat procedure if needed to obtain the proper pressure setting

NOTE: 3203 PRX extendible boom cylinder (480188) requires no adjustment to counterbalance valve if replaced. Counterbalance valve is preset.

TROUBLESHOOTING GUIDE
3203 PRX

1 CRANE FAILS TO OPERATE (ALL FUNCTIONS)

A. Check power to crane - 12v to ground at upper left power terminal of pump relay

1. If ok go to B.
2. If not check continuity back to battery at Tweco and battery connections.

B. If there is power at pump relay (left side) and no functions are operable the most likely cause is in the control circuits (pendant or receptacle).

1. Verify by touching jumper from hot side of pump relay to left side control terminal(small) on pump relay. Pump should run but crane should not move unless a valve is stuck open. Also test by jumping from hot side of pump relay to left side control terminal of hoist down relay. hoist should operate down.

C. If previous tests are ok, then remove pendant and check at receptacle on crane with jumper and test light.

1. Check for voltage from pin "D" of socket to ground.
   - i. If not successful, then receptacle assembly is bad.
   - ii. If ok, jumper from "D" to "F" (hoist down), or "D" to "J" (pump). Other functions can be checked also by probing receptacle with jumper. See P/N 680065 page 7-6.0.0. Hydraulic functions require that pump and valve are both activated.

D. If receptacle tests are ok, then fault is in pendant hot wire. Either a break in the wire or it is not attached inside of the pendant (goes to center terminal of rotation switch from pin "D").

2 HOIST UP, BOOM DOWN, & EXTEND (OUT) DON'T OPERATE BUT ALL OTHER FUNCTIONS OPERATE. PUMP RUNS WHEN BOOM DOWN AND EXTEND FUNCTIONS ARE TRIED. THESE FUNCTIONS ARE TIED INTO THE ANTI-TWO BLOCK AND CRANE OVERLOAD SENSOR SYSTEMS. THE CRANE IS SHUT DOWN WHEN THE SENSORS OPEN THE GROUND CIRCUIT FROM THE FUNCTIONS.

A. Check two-block bail and switch at end of boom to verify they move freely. Switch should make audible click when operated. Try operating crane while pulling cord out of cord reel to check for possible bad spots in cord reel slip rings.

B. If the three functions work, check both Pressure Switch's by taking an ohm reading on the two wires comming from each individual switch. The 2,350 psi Switch (P/N 320543) has normally open contacts, so the reading should be the minimum ("open"). If greater than the minimum ohm reading is indicated (usually a dead short), replace the switch. The 2,500 psi switch (P/N 366032) has normally closed contacts, so the reading should be maximum. If less than the maximum ohm reading is indicated (usually an "open") replace the switch.

WARNING: BE SURE BOOM IS SUPPORTED BEFORE REMOVING SWITCH OR BOOM WILL FALL.

TROUBLESHOOTING GUIDE
3203 PRX

C. Test Drop Out Relay - Pull socket off Relay. Test continuity with power on between 30 & 87. If no continuity then replace relay. With power off check continuity between 30 & 87a. If no continuity then replace relay.

3 HOIST FAILS TO OPERATE IN EITHER DIRECTION BUT ALL HYDRAULIC FUNCTIONS OPERATE.

A. Listen for relay click for hoist up and hoist down. If relay doesn't click check for voltage at left side control terminal(small) when function is selected, if no voltage then use procedure for checking receptacle and pendant given in 1.C.

B. Check terminal A2 of hoist motor for power when operating either hoist up or hoist down. If there is voltage but motor does not try to run or get hot then motor is bad. If motor tries to run or gets hot then voltage reading at A2 will be less than 12 volts and motor may be dirty or have oil in it from failed oil seal.

C. If there is no power at A2 only on hoist up, then put test light across bottom power terminals of hoist down relay. If light comes on when hoist up is picked, then hoist down relay is bad. If test light doesn't light, put light across upper power terminals of hoist up relay and pick hoist up. If light comes on, replace hoist up relay.

D. If there is no power at A2 only on hoist down then put test light across bottom power terminals of hoist up relay. If light comes on when hoist down is picked, then hoist up relay is bad. If test light doesn't light, put light across upper power terminals of hoist down relay and pick hoist down. If light comes on, replace hoist down relay.

NOTE: THERE ARE OTHER WAYS TO TEST FOR CIRCUIT CONTINUITY SUCH AS USING VOLT METER OR TEST LIGHT AND FOLLOWING CIRCUIT THROUGH BY TESTING AT EACH POINT FOR VOLTAGE TO GROUND.

4 ALL HYDRAULIC FUNCTIONS INOPERABLE.

A. Pump does not run, pump relay does not click. Jumper from upper left power terminal of pump relay to left side relay control terminal. If relay doesn't click, replace relay. If relay clicks and pump runs, check receptacle and pendant. (see 1.C.)

B. If relay clicks but pump doesn't run, check for voltage at pump motor terminal. If no voltage replace pump relay. If voltage is present, pump motor is bad or pump is locked. If pump is locked motor will get hot and voltage at motor terminal will much lower than 12 volts.

5 PUMP RUNS BUT SINGLE HYDRAULIC FUNCTION DOESN'T WORK.

A. Select inoperable function with pendant switch and push manual override of valve in question-if function works use procedure 1.C. to check receptacle and pendant. If receptacle checks out and function can not be run by using jumper at receptacle, then valve or harness may be bad. Check for 12 volt at valve junction box. If no voltage present-check for loose wire at back of receptacle or terminal strip.

B. If voltage is present at valve, then valve may be bad. This can be checked by swapping valve positions on manifold but leaving

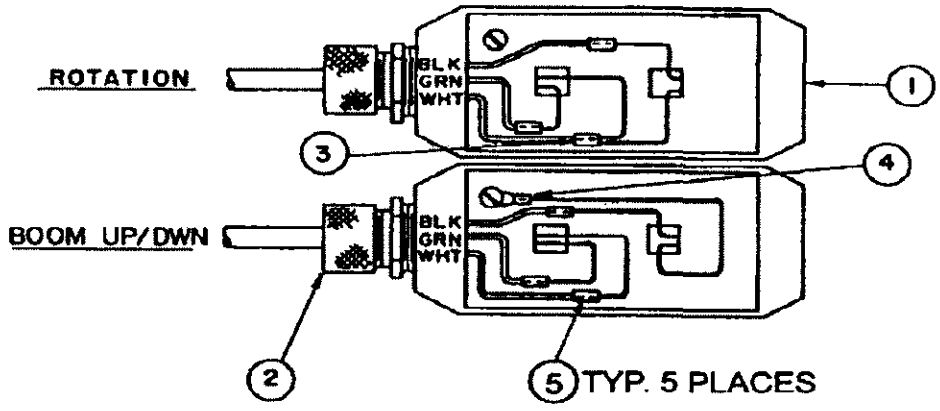
wiring attached. If trouble moves with valve, then valve is bad.

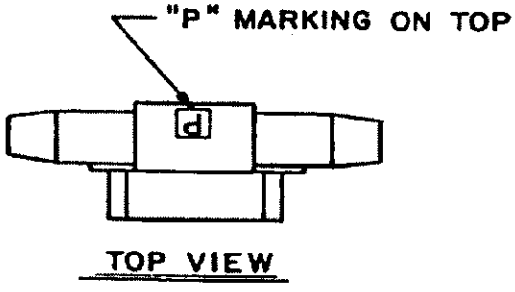
C. If boom retract or boom down functions don't work, then check for low hydraulic pressure at pump. These two functions have the highest pressure requirements for an unloaded crane because they must overcome the set pressures of the counter balance valves.

D. If hydraulic functions are more intermittent when cylinders are extended, then check hydraulic fluid level.

E. Boom locks up and won't come down when fully raised. This is caused by too high pump pressure which causes overload system to activate. Set relief pressure at 2100 psi. Unlock boom by disconnecting wire from terminal #6 of timing relay. Reconnect wire after boom is moved. If pressure is correct and problem continues, then replace overload pressure switch.

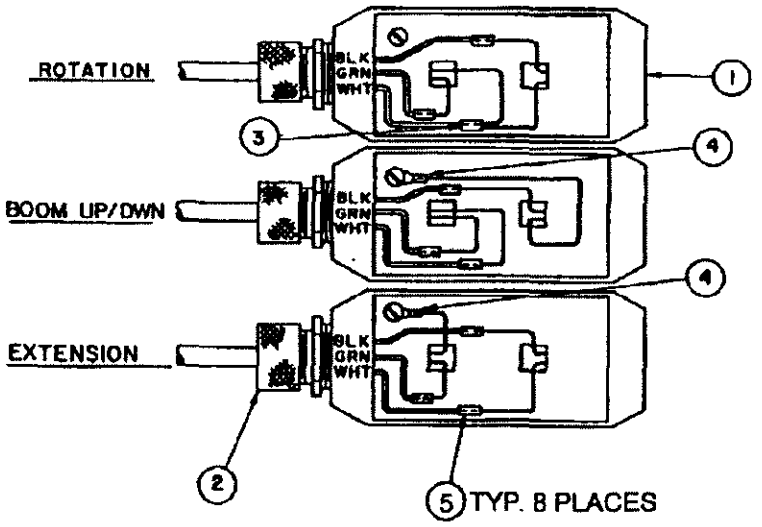
SOLENOID VALVES WIRING DIAGRAM
P/N 320481 - 3203 PR

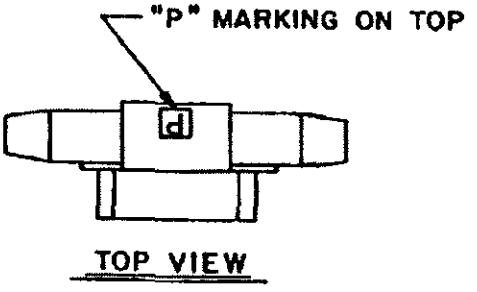




ITEM	QTY	P/N	DESCRIPTION
1	2	300204	SOLENOID VALVE
2	2	642908	CORD CONNECTOR
3	1	001102	WIRE TERMINAL 2RC-10
4	1	000300	WIRE TERMINAL
5	5	000302	WIRE TERMINAL 2R814

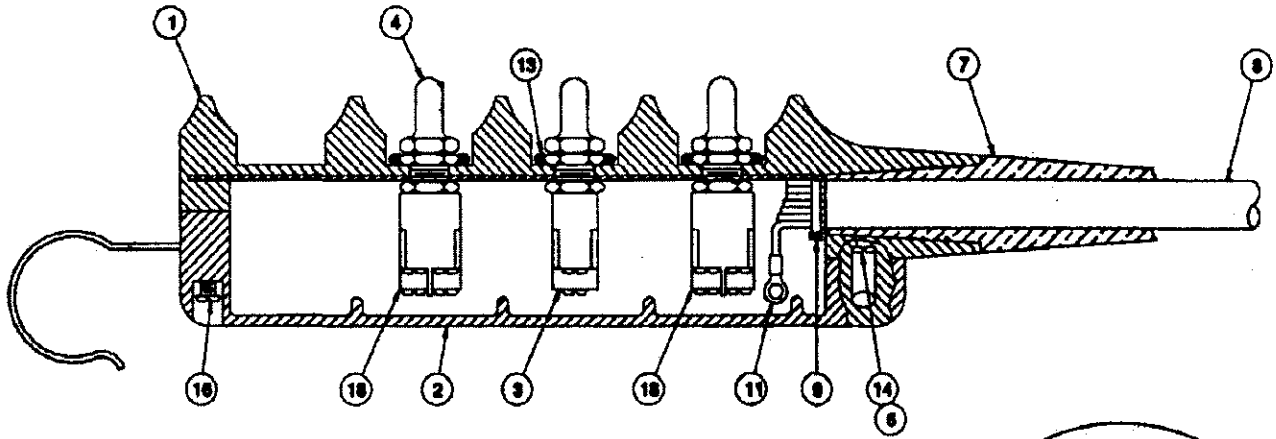
SOLENOID VALVES WIRING DIAGRAM
P/N 320480 - 3203 PRX

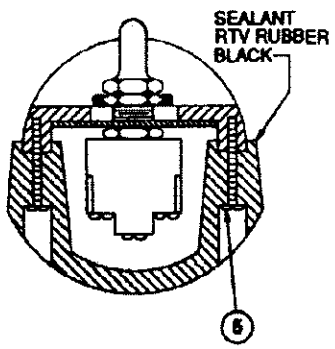


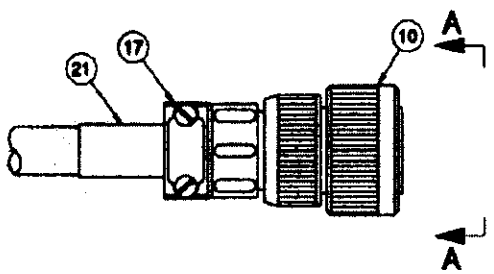


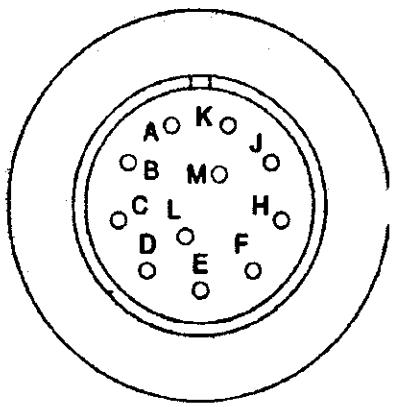
ITEM	QTY	P/N	DESCRIPTION
1	3	300204	SOLENOID VALVE
2	3	642908	CORD CONNECTOR
3	1	001102	WIRE TERMINAL 2RC-10
4	2	000300	WIRE TERMINAL
5	8	000302	WIRE TERMINAL 2R814

PENDANT ASSEMBLY
P/N 680064 - 3203 PR

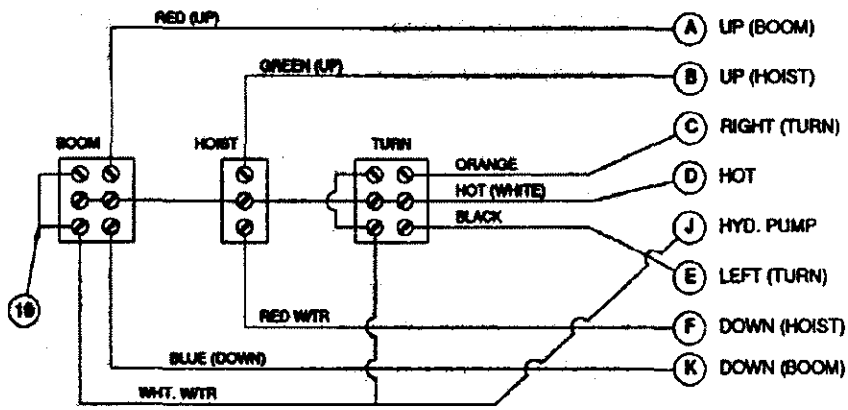








VIEW A-A

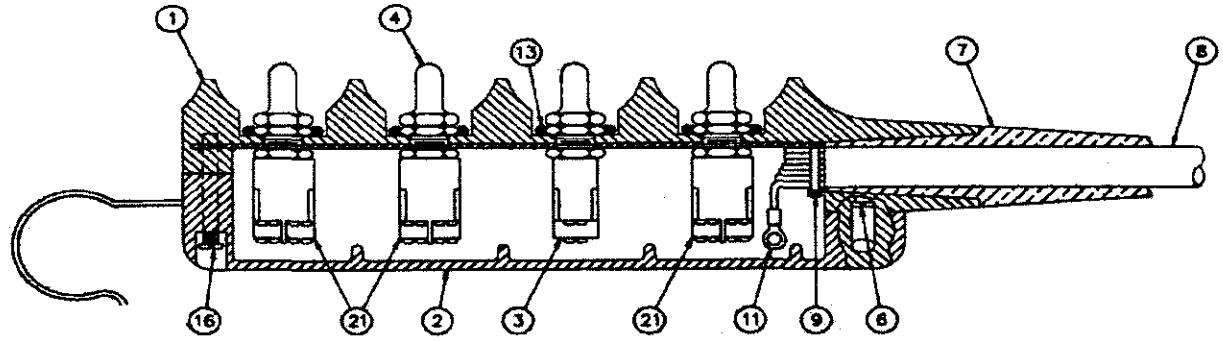


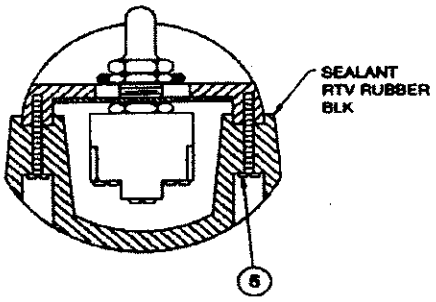
VIEW FROM BOTTOM

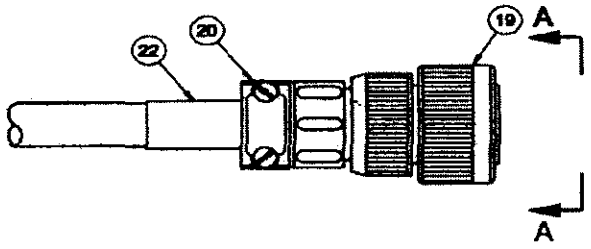
PENDANT ASSEMBLY
P/N 680064 - 3203 PR

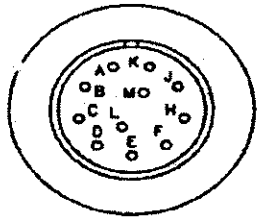
ITEM	QTY	P/N	DESCRIPTION
1	1	631602	PENDANT HOUSING
2	1	631700	BOTTOM COVER
3	1	622000	TOGGLE SWITCH
4	3	640300	BOOT-TOGGLE SWITCH
5	10	001004	PAN HEAD SCREW #6 x 3/4
6	2	005101	PAN HEAD SCREW #8 x 1 1/4
7	1	633801	CABLE ADAPTER
8	18 FT	800630	CONDUCTOR CABLE
9	2	634401	TY-RAP CABLE TIE
10	1	320563	11 PIN BAYONET PLUG
11	15	000101	TERMINALS T & B
12	-	-	-
13	3	642100	O-RING
14	1	019700	SPLIT LOCK WASHER #8 PLATED
15			
16	1	004700	PAN HEAD SCREW #8 x 1 1/2
17	1	480515	CABLE CLAMP
18	2	634200	TOGGLE SWITCH
19	2	636600	JUMPER BAR
20	3 in.	800592	WHITE 16G 600V 1C WIRE
21	6 in.	490243	TUBING HEAT SHRINK

PENDANT ASSEMBLY
P/N 680065 - 3203 PRX

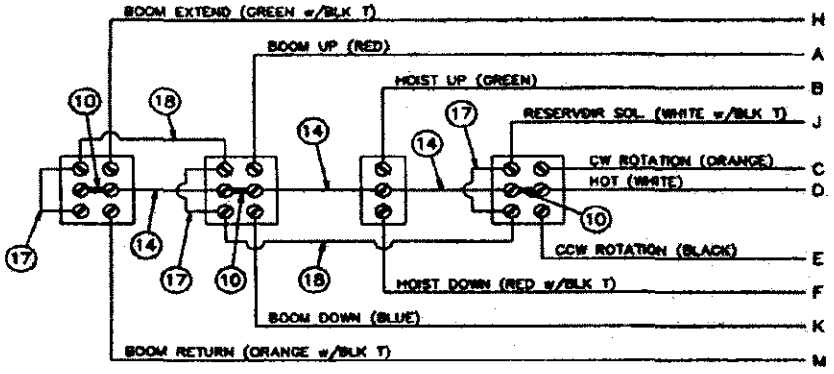








VIEW A–A

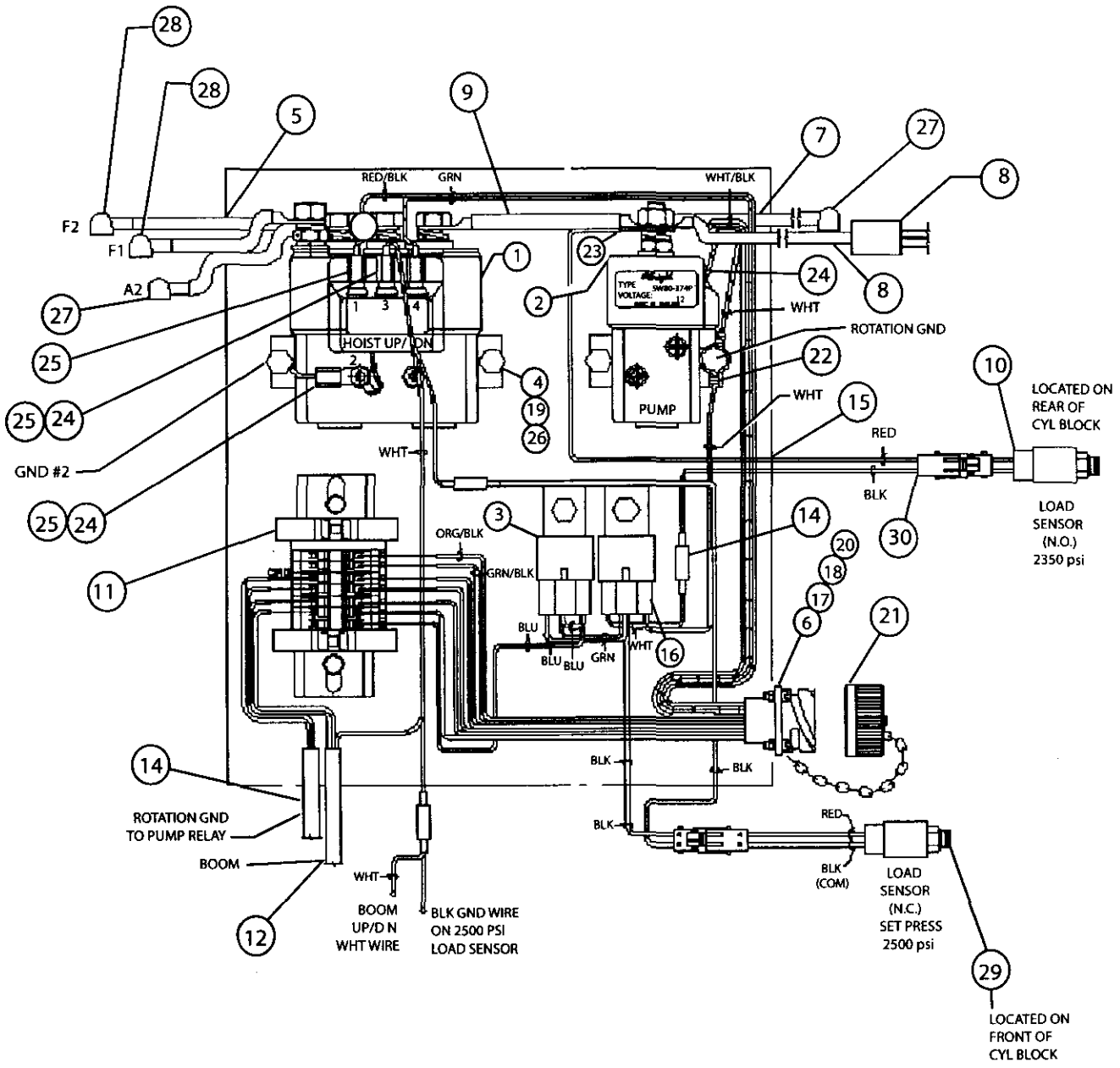


VIEW FROM BOTTOM

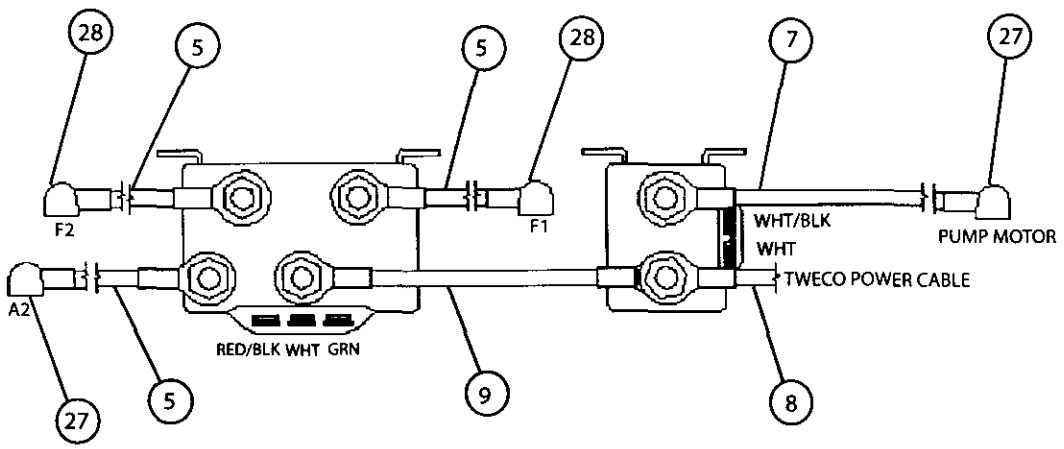
PENDANT ASSEMBLY
P/N 680065 - 3203 PRX

ITEM	QTY	P/N	DESCRIPTION
1	1	631601	PENDANT HOUSING
2	1	631700	BOTTOM COVER
3	1	622000	TOGGLE SWITCH
4	4	640300	BOOT-TOGGLE SWITCH
5	10	001004	PAN HEAD SCREW #6 x 3/4
6	2	005101	PAN HEAD SCREW #8 x 1 1/4
7	1	633801	CABLE ADAPTER
8	18 ft.	800630	CONDUCTOR CABLE
9	2	634401	TY-RAP CABLE TIE
10	3	636600	JUMPER
11	24	000101	TERMINALS T & B
12	-	-	-
13	4	642100	O-RING
14	1 ft.	800592	WHITE 16 GA 600V 1C WIRE
15			
16	1	004700	PAN HEAD SCREW #8 x 1 1/2
17	3	622346	CONDUCTOR ASSEMBLY 2 1/8
18	2	622347	CONDUCTOR ASSEMBLY 3 1/8
19	1	320563	11 PIN BAYONET PLUG
20	1	480515	CABLE CLAMP
21	3	634200	TOGGLE SWITCH
22	6 in.	490243	TUBING HEAT SHRINK

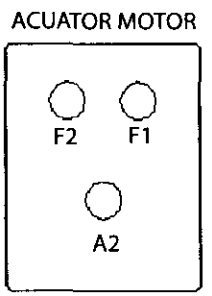
RELAY PANEL ASSEMBLY
P/N 320809 - 3203 PR

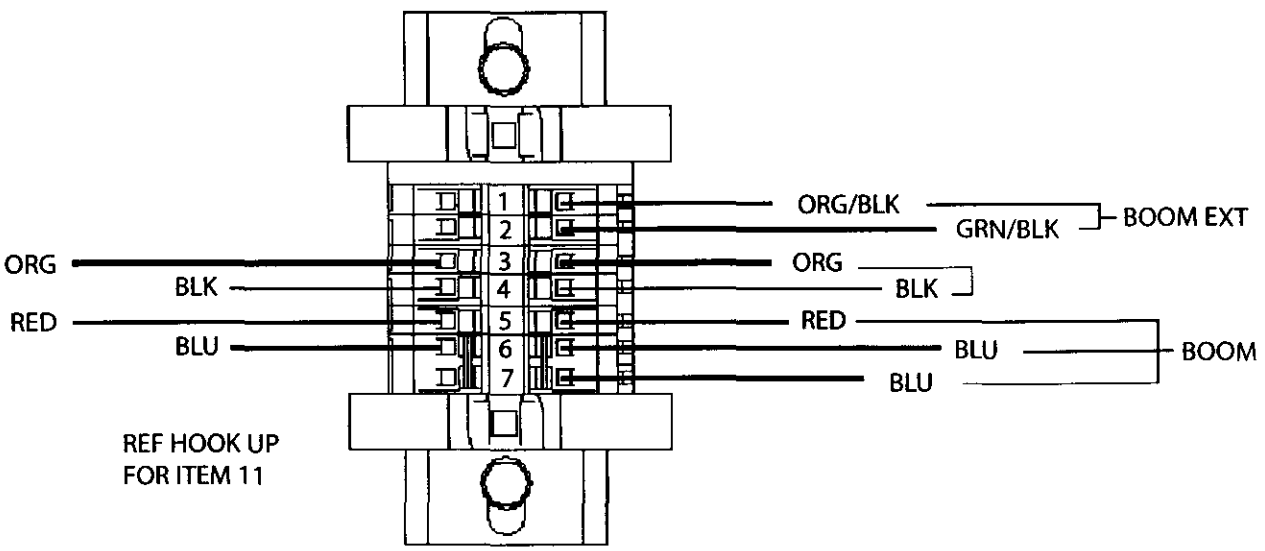


RELAY PANEL ASSEMBLY
P/N 320809 - 3203 PR



WIRING OF MAIN TERMINALS

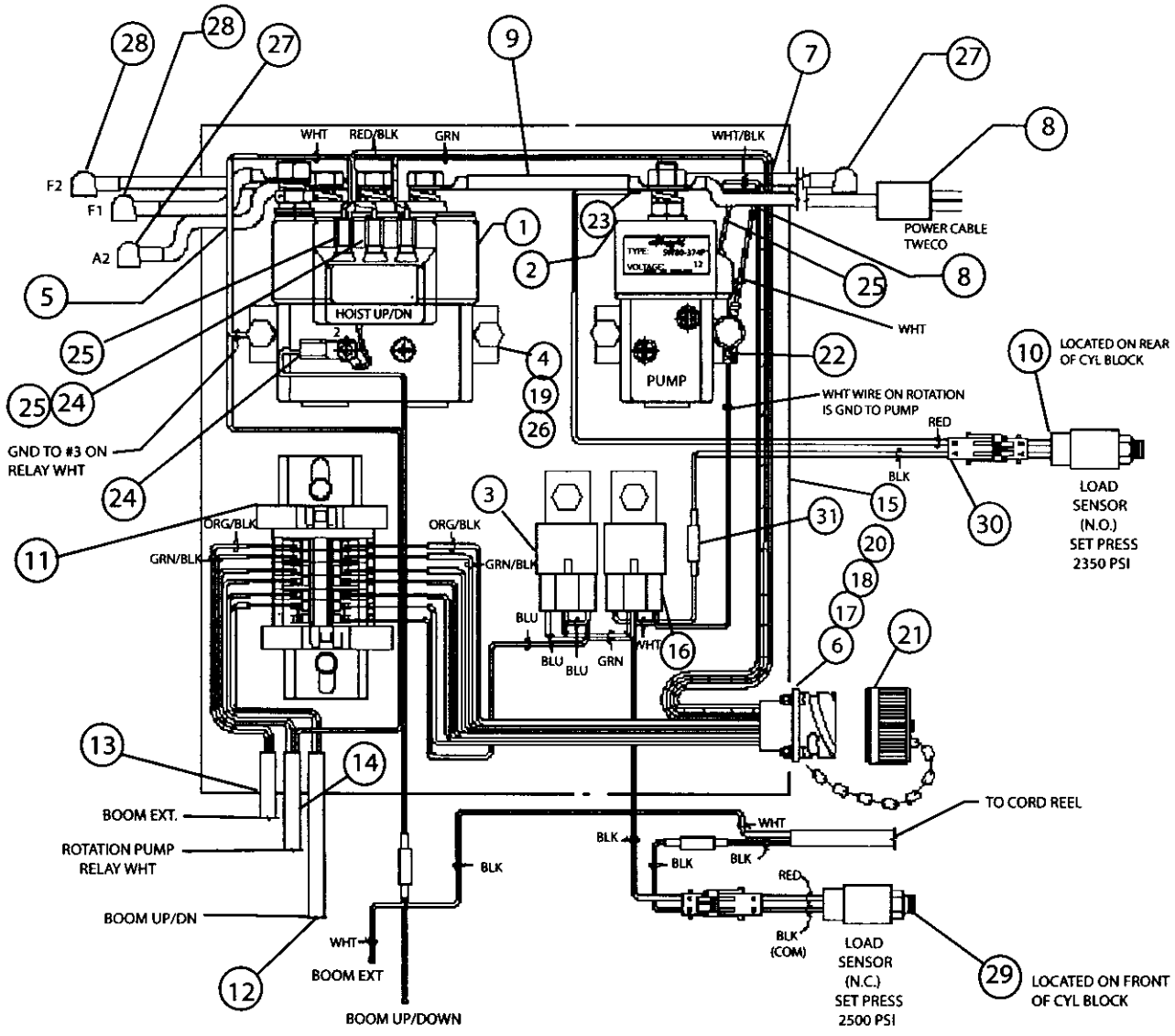




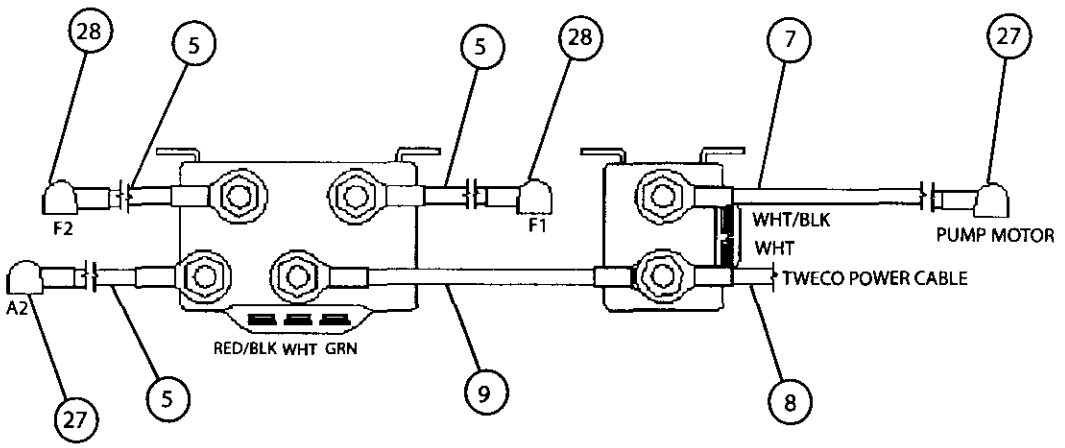
RELAY PANEL ASSEMBLY
P/N 320809 - 3203 PR

ITEM #	QTY.	P/N	DESCRIPTION
1	1	320589	RELAY DOUBLE SEALED 100 AMP
2	1	320584	RELAY SINGLE SEALED 100 AMP
3	2	320355	RELAY BOSCH
4	8	005500	SCREW, HEX 1/4 - 20 X 3/4 GR5
5	3	622323	CBL 6 GA BLK X 26 IN
6	2	000404	SCREW, HEX 6 - 32 UNC X 5/8
7	1	622259	CBL 6 GA BLK X 28 IN
8	1	330258	TWECO CONN ASSY
9	1	622258	CBL 6 GA BLK X 3 IN
10	1	320543	LOAD SENSOR ASSY 2350 PSI
11	1	320804	BOARD TERMINAL QUICK INSERT
12	1	320792	COND ASSY BOOM 16 IN
13	2	480510	CONN BUTT FEMALE
14	1	320794	COND ASSY ROATATION 14 IN
15	1	320805	PANEL RELAY
16	1	320790	HARNESS RELAY WIRING 3203 PR, PRX
17	2	015400	NUT HEX #6 - 32 UNC
18	1	320811	RECEPT ASSY 10 WIRE
19	6	020200	WASHER SP LK 1/4
20	2	019600	WASHER SP LK #6
21	1	320564	CAP RECEPT
22	2	000300	TERM WIRE RB14 - 10
23	2	000601	TERM WIRE RB14 - 38
24	3	366980	TERM WIRE SPADE DOUBLE
25	5	320356	TERM WIRE SPADE SINGLE
26	12	736272	NUT INSERT 1/4 X 20
27	2	270326	INSULATER BOOT BLK
28	2	270326-001	INSULATER BOOT RED
29	1	366032	LOAD SENSOR ASSY 2500 PSI
30	1	320783	COND LOAD SENSOR

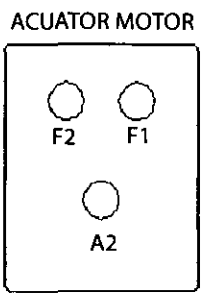
RELAY PANEL ASSEMBLY
P/N 320808 - 3203 PRX

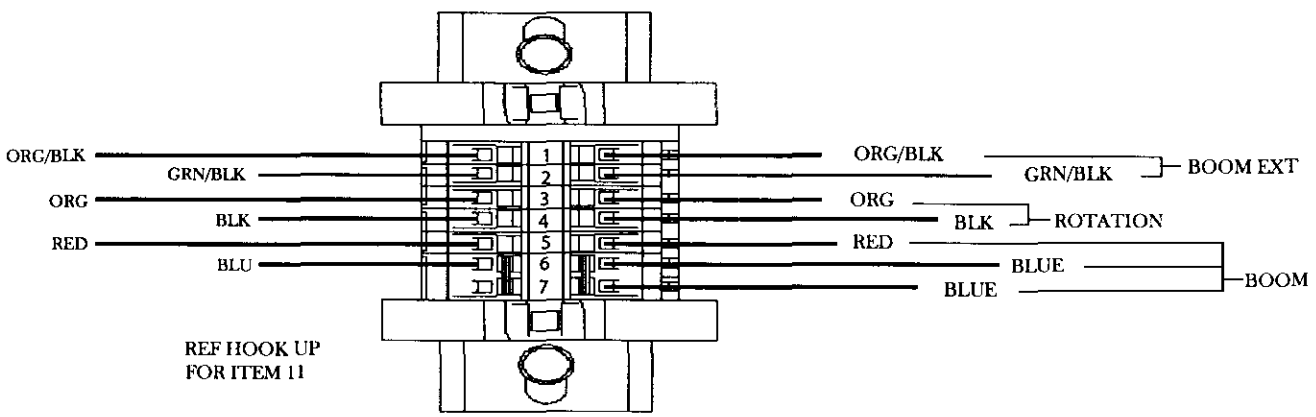


RELAY PANEL ASSEMBLY
P/N 320808 - 3203 PRX



WIRING OF MAIN TERMINALS





RELAY PANEL ASSEMBLY
P/N 320808 - 3203 PRX

ITEM #	QTY.	P/N	DESCRIPTION
1	1	320589	RELAY DOUBLE SEALED 100 AMP
2	1	320584	RELAY SINGLE SEALED 100 AMP
3	2	320355	RELAY BOSCH
4	8	360493	WHIZ-LOCK CAPSCREW 1/4 - 20 UNC X 1/2
5	3	622323	CBL 6 GA BLK 26 IN
6	2	000404	SCREW HEX 6 - 32 UNC X 5/8
7	1	622259	CBL 6 GA BLK X 28 IN
8	1	330258	TWECO CONN ASSY
9	1	622258	CBL 6 GA BLK X 3 IN
10	1	320543	LOAD SENSOR ASSY 2350 PSI
11	1	320804	BOARD TERMINAL QUICK INSERT
12	1	320792	COND ASSY BOOM 16 IN
13	1	320793	COND ASSY EXT 18 IN
14	1	320794	COND ASSY ROATATION 14 IN
15	1	320805	PANEL RELAY
16	1	320790	HARNESS RELAY WIRING 3203 PR, PRX
17	2	015400	NUT HEX #6 - 32 UNC
18	1	320811	RECEPT ASSY 10 WIRE
19	6	020200	WASHER SP LK 1/4
20	2	019600	WASHER SP LK #6
21	1	320564	CAP RECEPT
22	2	000300	TERM WIRE RB14 - 10
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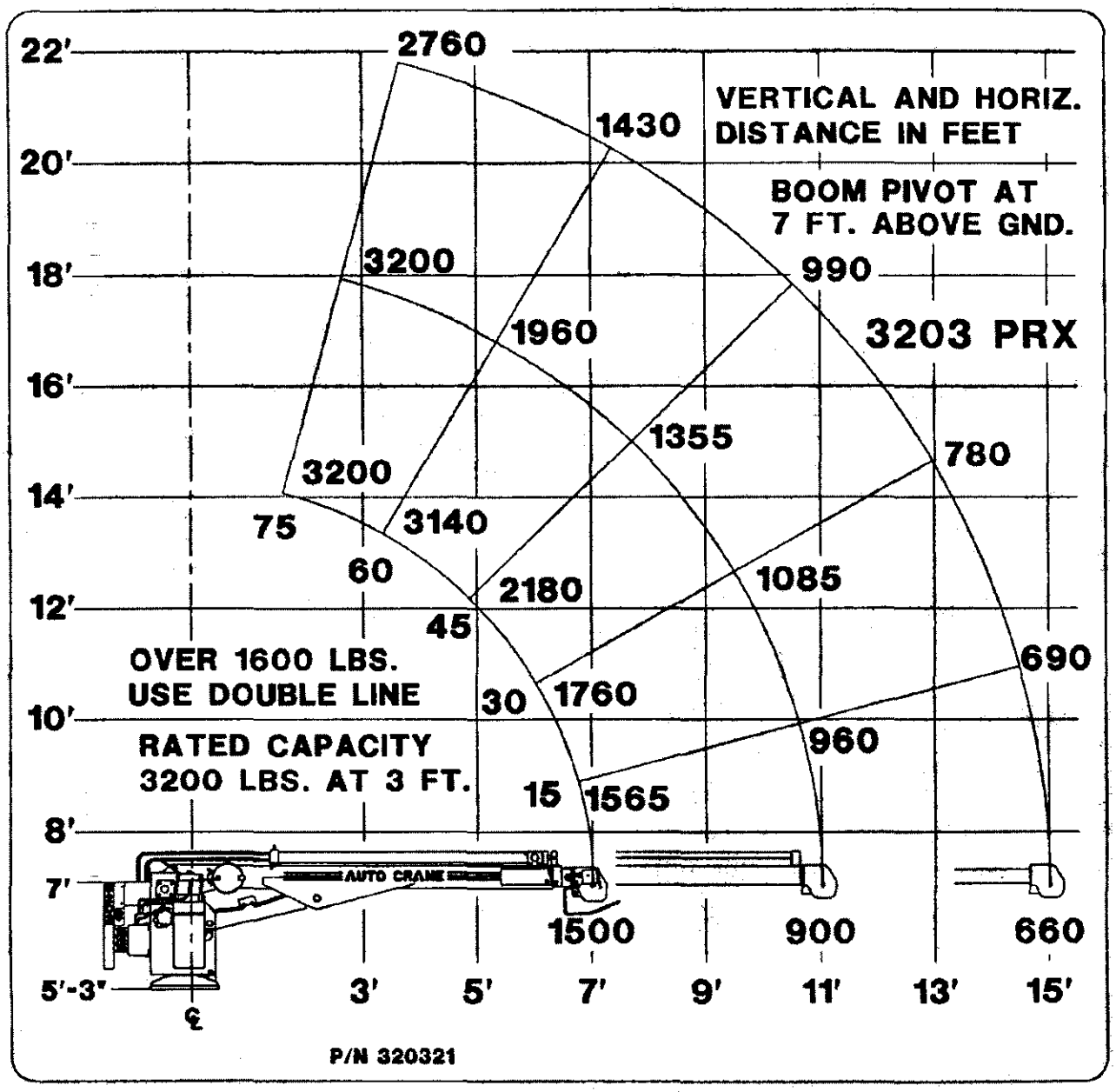
24	4	366980	TERM WIRE SPADE DOUBLE
25	5	320356	TERM WIRE SPADE SINGLE
26	12	736272	NUT INSERT 1/4 X 20
27	2	270326	INSULATER BOOT BLK
28	2	270326-001	INSULATER BOOT RED
29	1	366032	LOAD SENSOR ASSY 2500 PSI
30	1	320783	COND LOAD SENSOR
31	1	480510	CONN BUTT FEMALE

LOAD CHART
3203 PR/PRX



AUTO CRANE COMPANY
P. O. BOX 581510 • TULSA, OKLAHOMA 74158

Limited Warranty

Auto Crane will warranty to consumer for a period of twelve months from date of purchase that each new Auto Crane product it sells will be free under normal use and service, from defects in material and workmanship. Date of purchase will be honored as either date of purchase by distributor or his date of sale of the product as substantiated by Distributor Delivery Report.

Obligation of Auto Crane under this warranty is limited to replacement or repair of parts that appear to manufacturer after review and/ or inspection to be defective. This warranty does does not obligate Auto Crane to bear the cost of labor or transportation charges in connection with the replacement or repair of defective parts. Responsibility for customer's claims arising from misapplication, abuse, misuse or alteration of equipment or parts lies with the distributor or user and no warranty obligation is assumed in the circumstances by Auto Crane.

Auto Crane will in no event be liable for any consequential damages or contingent liabilities arising out of the failure of any Auto Crane product or parts to operate properly.

Auto Crane makes no warranty in respect to component accessories, same being subject to the warranties of their respective manufacturers.

If field service, at the request of buyer, is rendered and fault is found not to be with Auto Crane's product, the buyer shall pay the time and expense of the field representative. Claims for service labor or other expenses that have been incurred by the buyer without approval or authorization of Auto Crane will not be accepted.

AUTO CRANE COMPANY IS UNDER NO OBLIGATION TO EXTEND THIS WARRANTY TO ANY CUSTOMER FOR WHICH AN AUTO CRANE WARRANTY REGISTRATION CARD HAS NOT BEEN COMPLETED AND MAILED TO AUTO CRANE COMPANY WITHIN FIFTEEN (15) DAYS AFTER DATE OF PURCHASE.