Auto Crane Company

P.O. BOX 580697 • TULSA, OKLAHOMA 74158-0697
4707 N. MINGO ROAD • TULSA, OKLAHOMA 74117 U.S.A.
918-836-0463 • TELEX 158108 RAMSEY TUL
SALES FAX 918-438-6688 / SERVICE FAX 918-834-5979

OWNER'S MANUAL

A-50 KNUCKLE BOOM

SERIAL NO. _____

!! DISTRIBUTORS !!

PROTECT YOUR CUSTOMER'S WARRANTY! SUBMIT DELIVERY REPORT WITHIN 15 DAYS.

Mail to: Auto Crane Co.
P.O. Box 581510
Tulsa, Okla. 74158

OR

Fax to: 918-438-6688

Protect your customers warranty - Submit within 15 days from delivery date.

AUTO CRANE COMPANY

DISTRIBUTOR

DELIVERY REPORT

DISTRIBUTOR _____	OWNER _____
ADDRESS _____	CITY/STATE _____
CITY/STATE/ZIP _____	BUSINESS _____

MODEL #	SERIAL #	DATE DELIVERED	UNIT DESTINATION

IMPORTANT: ATTACH SIGNED COPY OF CUSTOMER INVOICE / DELIVERY RECEIPT

AC-109 REPORT AUTHORIZED BY: _____

* REGISTER ONE UNIT ONLY PER CARD *

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 STAGE ARE ALSO CONSIDERED INTERMEDIATE STAGE MANUFACTURING AND MUST BE CERTIFIED AS TO COMPLIANCE. THE INSTALLER OF THIS CRANE AND BODY IS CONSIDERED ONE 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.

IT IS THE FURTHER RESPONSIBILITY OF THE INSTALLER OF THE CRANE TO COMPLY WITH THE OSHA TRUCK CRANE STABILITY REQUIREMENTS AS SPECIFIED BY 29 CFR PART 1910.180 (C) (1).

AW-206
WARNING & DANGER DECALS

DANGER

ELECTROCUTION HAZARD
DEATH OR SERIOUS INJURY
CAN RESULT FROM BOOM, LINE, OR LOAD CONTACTING ELECTRIC LINES. DO NOT USE CRANE WITHIN 10 FEET OF ELECTRIC LINES CARRYING UP TO 50,000 VOLTS. ONE FOOT ADDITIONAL CLEARANCE IS REQUIRED FOR EVERY ADDITIONAL 30,000 VOLTS OR LESS.

P/N 040529

DANGER

SCISSORS POINT
SERIOUS INJURY MAY RESULT.
KEEP HANDS AND ARMS CLEAR AT ALL TIMES.

P/N 040518

DANGER

STAY CLEAR OF BOOM AT ALL TIMES

P/N 040517

CAUTION

1. INSPECT VEHICLE AND CRANE INCLUDING OPERATION, PRIOR TO USE DAILY.
2. DO NOT USE THIS EQUIPMENT EXCEPT ON SOLID, LEVEL SURFACE WITH OUTRIGGERS PROPERLY EXTENDED AND CRANE MOUNTED ON FACTORY-RECOMMENDED TRUCK.
3. BEFORE OPERATING THE CRANE, REFER TO MAXIMUM LOAD (CAPACITY) CHART ON CRANE FOR OPERATING (LOAD) LIMITATIONS.
4. OPERATE ALL CONTROLS SLOWLY AND SMOOTHLY.
5. KEEP LOAD UNDER BOOM TIP. DO NOT SIDE LOAD BOOM OR DRAG LOADS. AVOID FREE SWINGING LOADS.
6. DO NOT OPERATE, WALK ON STAND BENEATH BOOM OR A SUSPENDED LOAD.
7. KEEP AT LEAST 5 WRAPS OF LOADLINE ON HOIST DRUM.
8. FOR TRAVELING, BOOM AND OUTRIGGERS MUST BE IN THE STOWED POSITION.
9. ALL REMOVABLE PENDANTS MUST BE STORED IN CAB OR TOOL COMPARTMENT WHEN CRANE IS NOT IN USE.

P/N 040579

DANGER

AN UNTRAINED OPERATOR SUBJECTS HIMSELF AND OTHERS TO
DEATH OR SERIOUS INJURY

1. YOU MUST HAVE BEEN TRAINED IN THE OPERATION OF THIS CRANE, AND
2. YOU MUST KNOW AND FOLLOW THE SAFETY AND OPERATING RECOMMENDATIONS CONTAINED IN THE MANUFACTURER'S MANUAL, YOUR EMPLOYER'S WORK RULES AND APPLICABLE GOVERNMENT REGULATIONS.

P/N 040580

DANGER

OUTRIGGERS MUST BE EXTENDED TO MAXIMUM OUT POSITION AND PINNED IN PLACE BEFORE OPERATING CRANE.

P/N 759016

DANGER

STAY CLEAR OF BOOM AT ALL TIMES

P/N 367251

AW–207
WARNING & DANGER DECALS

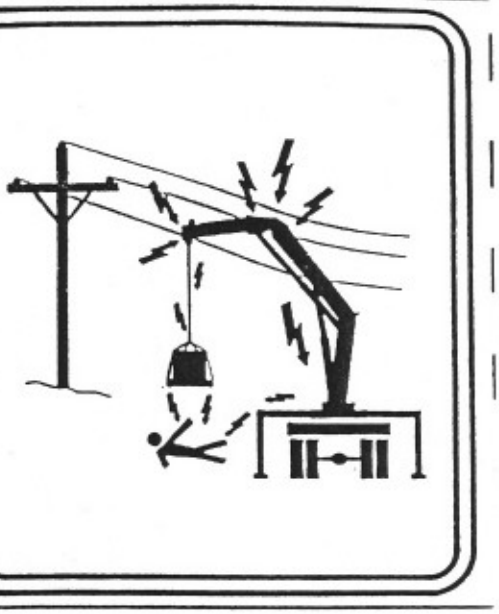
DANGER

THIS MACHINE IS NOT INSULATED

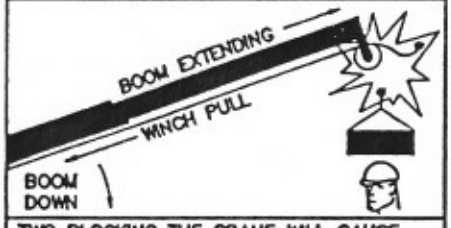
ELECTROCUTION HAZARD

MAINTAIN SAFE CLEARENCES FROM ELECTRICAL LINES AND APPARATUS. YOU MUST ALLOW FOR BOOM SWAY, ROCK OR SAG AND ELECTRICAL LINE AND LOADLINE SWAYING. THIS LIFTING DEVICE DOES NOT PROVIDE PROTECTION FROM CONTACT WITH OR PROXIMITY TO AN ELECTRIC CHARGED CONDUCTOR. DEATH OR SERIOUS INJURY WILL RESULT FROM CONTACT OR INADEQUATE CLEARANCE.

P/N 367241



DANGER



TWO BLOCKING THE CRANE WILL CAUSE DEATH, SERIOUS INJURY OR PROPERTY DAMAGE.

DO NOT ALLOW THE BLOCK TO CONTACT THE BOOM TIP BY HOISTING UP, EXTENDING OR LOWERING THE BOOM. KEEP AT LEAST 3 WRAPS OF LOAD LINE ON WINCH. BOOM FAILURE COULD RESULT WHEN EXTENDING BOOMS UNDER LOAD, WHILE OPERATING WINCH CHECK LOAD CHART FOR LOAD RATINGS.

P/N 367207

DANGER

IMPROPER ⚠

STOWING AND UNFOLDING BOOM WILL CAUSE

DEATH OR SERIOUS INJURY

STAND ON THE OPPOSITE SIDE OF THE BOOM WHEN UNFOLDING OR STOWING THE CRANE.

P/N 367250

DANGER

NEVER RIDE ON HOOK OR ANY DEVICE ATTACHED TO CRANE OR LOADLINE DEATH OR SERIOUS INJURY CAN RESULT

P/N 367246

DANGER

OUTRIGGERS WILL CAUSE SERIOUS CRUSHING INJURY

STAND CLEAR

CRANE EQUIPMENT REGISTRATION FORM

RETAIN WITH MANUAL

INSTALLER TO FILL OUT AT TIME OF INSTALLATION

DISTRIBUTOR:

Invoice No:_____

CHASSIS

Make_____

Model No._____

Serial No._____

Year_____

ENGINE

Make_____

Cylinder No._____

Carburetor Type_____

TRANSMISSION

Make_____

Model No._____

Transfer Case_____

GOVERNOR

Make_____

Type_____

Model No._____

POWER TAKE OFF

Make_____

Model No._____

Serial No._____

BODY

Make_____

Model No._____

Specification No._____

Serial No._____

CUSTOMER:

Date:_____

CRANE

Make_____

Model No._____

Serial No._____

WINCH MOTOR

Make_____

Model No._____

WINCH GEAR BOX

Make_____

Model No._____

Serial No._____

HYDRAULIC PUMP

Make_____

Model No._____

Serial No._____

SPECIAL EQUIPMENT

Make_____

Model No._____

Serial No._____

A-50 SERIES - OWNER'S MANUAL

- CONTENTS -

INTRODUCTION A-50

Auto Crane products have been engineered to provide safe, trouble-free, dependable service for many years when these products are properly used and maintained.

To assist you in obtaining the best service from your crane and to avoid untimely failure of the unit and/or the vehicle on which it is mounted, the following operating and service instructions are herein published, and 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 A-50 series for your protection. The material and electrical systems were designed to minimize weight and lengthen durability. The hydraulic components are designed for a 4:1 safety factor. Holding valves are installed to prevent the load from dropping if a hose should fail. A 10u filter is installed in the hydraulic system to remove dirt and grit that may cause premature failure. The reservoir is protected with a 15u filter in the filter cap, and a 100 mesh strainer in the suction line.

For your convenience the overall dimensions of the A-50 series are included on the General Dimension Drawing. Rotation and turning radius are also listed.

Remember that the crane adds weight to the vehicle and may change driving and riding characteristics of the vehicle on which it is mounted unless this weight is properly provided for in the selection of chassis. The payload of the vehicle is also reduced by the amount that the crane weighs, and as the vehicle is loaded, care should be exercised not to overload the vehicle. Exercising care in distributing the payload on the vehicle will greatly improve the driving and riding characteristics of the vehicle. A minimum G.V.W. of 21,000 lbs is recommended for mounting the A-50 series cranes.

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 material or workmanship is involved, immediate corrective action is taken. It is therefore, understandable that Auto Crane Company cannot assume responsibility or liability when our products have obviously been abused, misused, overloaded or otherwise damaged by inexperienced persons trying to operate the equipment without even reading the manual. The Auto Crane is designed and built to be safe and efficient. Auto Crane will not assume responsibility or liability for any unit which has been modified, changed or which has unauthorized or unapproved components installed.

Auto Crane maintains a strong distributor network and a knowledgeable Customer Service Department. In most cases an equipment problem can be solved through a telephone 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 necessary. 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.

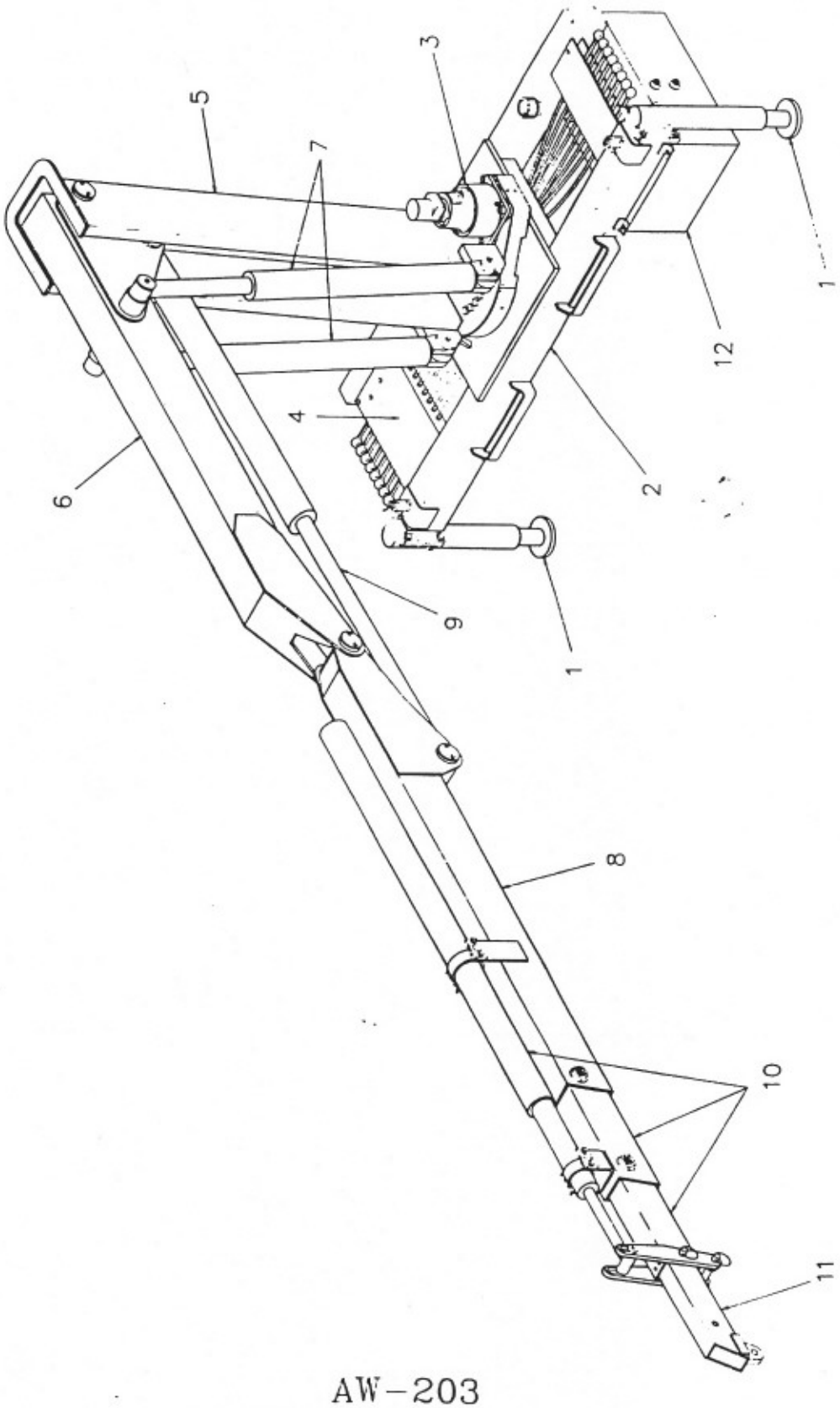
Auto Crane Company's extensive Research and Development Program assures our customers of the best equipment on the market, and our Engineering Staff, as well as our knowledgeable sales people are always available to our customers in solving crane and winch-type application problems. When in doubt - call the Auto Crane factory, 918-836-0463.

DISTRIBUTOR ASSISTANCE:

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

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

The material herein does not imply to cover all maintenance, instructions, operations, or variations pertinent to every possible situation. If additional information is required, please refer to the Auto Crane Company at the following telephone number. 918-438-2760. The information contained in the manual was in effect at the time of printing. Auto Crane Company reserves the right to update this material at any time without prior notice or obligation.



AW–203
GENERAL DESCRIPTION

GENERAL DESCRIPTION

The Auto Crane A-50 knuckle boom is an all-hydraulic crane in the 50,000 ft-lb rating class. It is suitable for both hook and attachment service.

The A-50 comes in the following variations:

A-50 - Single stage hydraulic extension with a horizontal reach of 20' 9" (6.32 m) with "cross-mounted" controls located on each side of crane.

A-50 - Two stage hydraulic extension with a horizontal reach of 26' 2" (7.98 m) with "cross-mounted" controls located on each side of crane.

A-50 - Two stage hydraulic extension with one self-storing manual boom with a horizontal reach of 31' 8" (9.65 m) with "cross-mounted" controls located on each side of crane.

The main components of the crane are:

1. Outriggers
2. Crane Base Assembly
3. Rotation System
4. Control Valve
5. Pedestal Assembly
6. Inner Boom
7. Lift Cylinders
8. Outer Boom
9. Outer Boom Cylinder
10. Telescoping Boom Section (S) & Extension Cylinder
11. Manual Boom
12. Reservoir

OUTRIGGERS

The outriggers are extended manually in the horizontal direction and are raised and lowered hydraulically. (Optional hydraulic in-out). Outriggers are operated by two sections from the main control valve. Outrigger cylinders have mounted directly to them a dual pilot operated check valve which will close if a hose break occurs preventing any uncontrolled movement of outrigger cylinder and to prevent an outrigger cylinder from drifting down once they have been stowed. Outrigger span is 12' (3.66 m) extended on a replaceable slide pad. Once outriggers are extended or retracted to their maximum or minimum span they are locked by a spring loaded hand-operated catch. Outriggers should always be extended to their maximum out position before operating crane.

CRANE BASE ASSEMBLY

The crane base is an all welded structure which consists of mounting brackets to mount crane to truck frame, outrigger cross tube, base plate to mount rotation bearing, mounting plate for hydraulic directional control valve.

ROTATION SYSTEM

Rotation system consists of two main components, a shear ball rotation bearing and a planetary swing drive powered by a high torque low speed rotation motor. Rotation motor has mounted directly to it a dual counter balance motor control valve. Swing drive has a spring applied hydraulically released brake. Both the motor control valve and the brake lock the rotation system in place in the event of a hose failure or loss of hydraulic power. Crane has 370 degrees of rotation with a 10 degre overlap which is adjustable from the front of the truck to rear truck. The centerline of rotation of the crane is at the longitudi centerline of truck frame. All components of the rotation syste are serviceable without removal of the base assembly from truc frame.

CONTROL VALVE

Eight section spool valve, mobile stack type control va with dual controls. Six sections used for crane function a outriggers with two remaining sections available for option Control valve has adjustable inlet relief valve set at 2600 p with built in load check valves on all sections except rotati section. Load check valves keep the load from dropping wh the control valve spool is being shifted and until the inlet pressu is equal to or slightly greater than the pressure developed by t load. At that time the load check will open and movement of t load can be controlled by the control valve spool. Rotation sectio has dual work port relief valve non-adjustable set at 1900 ps Work port relief valves limit the maximum pressure in each wo port. They also prevent pressure build-up in work port when t control valve spool is in neutral. Each rotation work port has restrictor installed to limit flow to the rotation motor. Ea restrictor is constructed to limit flow in one direction wh allowing free flow in the opposite direction.

PEDESTAL ASSEMBLY

The pedestal assembly is an all welded structure consisti of a base plate used to mount the swing drive, two vertic columns which the inner boom is hinged to and the outer boo swings through.

INNER BOOM

Inner boom assembly is an all welded structure consisting an inner boom pivot which is hinged to the pedestal, outer boo pivot and a pivot for the base of outer boom cylinder. Inner boo elevation -51 degrees to +72 degrees. Inner boom is raised ar lowered by twin double acting hydraulic cylinders.

LIFT CYLINDERS

The inner boom is actuated by twin lift cylinders, which ha a bore of 3 1/2" and a stroke of 37 1/8". Each cylinder h mounted directly to it a vented 10:1 single counterbalance valv Both the rod and base ends of cylinders accept a 2" diameter p with the rod eye having a replaceable self- lubricating bushin The replaceable bushing for the base pin is located with pedest assembly.

OUTER BOOM & OUTER BOOM CYLINDER

Outer boom assembly is an all welded structure which hinged to one end of inner boom assembly and is actuated by 1/2" bore and 46 7/8" stroke cylinder. Outer boom will articula through an arc of 157.5 degrees. Outer boom houses th telescoping boom extension section(s) which are controlled b either a single or 2-stage extension cylinder. The outer boom wi pass directly in-between twin cylinders, and twin pedestal leg when stowed in figure 4 (four) position.

TELESCOPING BOOM SECTION(S)

& EXTENSION CYLINDER

Single stage telescoping boom section is inserted into outer boom assembly and is actuated by a single stage hydraulic extension cylinder with a 3" bore and 59 7/8" stroke. Two-stage telescoping boom sections are inserted one inside each other and then into outer boom assembly. Telescoping boom sections are actuated by a two-stage extension cylinder which has two bores of 4 1/2" and 2 1/2" with each section having a stroke of 65".

MANUAL BOOM (OPTIONAL)

The manual boom is a one piece self-storing boom section which is installed into the last hydraulic telescoping boom extension. It is pinned into place for both storage and extension.

RESERVOIR

Reservoir capacity is 19 gallons (71.9L) minimum with a 100 mesh suction strainer mounted in reservoir, two sight level indicators, a baffle to reduce oil splash, filler tube, and 15u filler tube breather cap assembly.

-IMPORTANT-

SAFETY TIPS AND PRECAUTIONS

WARNING!

This crane is not intended for use in lifting or moving persons. Any such use shall be considered to be improper and the seller shal not be responsible for any claims arising there from. This sale is made with the express understanding that there is no warranty that the goods shall be fit for the purpose of lifting or moving persons or other improper use and there is no implied warranty or responsibilit for such purposes.

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 a level position while loading or unloading.

4. Always set the vehicle emergency brake before beginning crane operation.

5. Always use outriggers from vehicle to the ground during crane operation. Insure that they are firmly positioned on solid footings. Stand clear of outriggers while they are being extended.

6. All load ratings are based on crane capacity, NOT unit stability.

7. Always comply with load chart capacities (centerline of rotation to hook).

8. NEVER OPERATE THE CRANE NEAR ELECTRICAL POWER LINES. Auto Crane Company recommends that a crane never be moved any closer to a power line (including telephone lines) than 20 feet at any point.

9. Keep objects and personnel clear of crane path during operation.

10. No unqualified or unauthorized person should be allowed to operate the crane.

11. Visual inspections should be made each day to determine that the crane is in good condition before it is used.

12. Tests should be conducted at the beginning of each shift to determine that the operating systems are in good working order.

13. Remember in lifting a heavy load, the weight can create enough tipping moment to overturn the vehicle.

14. WARNING: Never attempt to lift or drag a load from the side -- the boom can fail far below its rated capacity.

15. Oil gears as required.

16. Allow truck engine to warm up before operating it.

17. Hydraulic hoses need to be inspected frequently for signs of deterioration, and be replaced as required.

18. 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.

19. An important item which an operator should consider and use properly is the hook. It should be checked on a 30-day basis for distortion or cracks.

20. WARNING: Never place a chain link on the tip of the hook and try to lift a load with the hoist.

21. WARNING: Never use a sling bar or anything larger than the hook throat which could prevent the safety latch from closing, thus negating the safety feature.

22. WARNING: In using a safety hook, ALWAYS insure that the hook throat is closed before lifting a load. Proper attention and common sense applied to the use of the hook and various slings will prevent possible damage to material being hoisted and may prevent injury to personnel.

23. Always store outriggers before road travel.

24. Always store crane into figure 4 position for transportation.

25. Remember the overall height of the unit for garage door clearance or when moving under objects with low overhead.

26. Do not stop the load sharply in midair so that it swings like a pendulum. Meter the controls to avoid this.

27. Do not wrap the wire rope around sharp objects when using winch.

28. Do not take your eyes off a moving load. Look in the direction you are moving.

29. Keep dirt and grit out of moving parts by keeping a clean crane. Make sure machine is free of excess oil, grease, mud and rubbish, thus reducing accidents and fire hazards.

30. Stop all operations when cleaning, adjusting or lubricating the machine.

31. Never leave the crane with a load suspended in the air. Always set load on ground when you leave the machine.

32. Never swing a load over people.

33. Observe operating area obstructions or power lines that might be a hazard.

34. If any outrigger, when extended, rests on a curb or other object that prevents it from extending to its maximum distance, consider the shortened bearing or fulcrum point and reduce the maximum load accordingly.

35. When an outrigger will not reach the ground due to holes or grades, it must be blocked up to provide level and firm support for the truck.

36. When working in soft earth use wide pads under outriggers to prevent sinking.

37. Locate the truck at the work site for the best stability possible.

38. If a hydraulic break occurs, leave the area of the break and do no attempt to stop the break by hand as the hydraulic oil may be hot. Shut the system down as soon as possible.

39. If crane is equipped with an OPTIONAL winch, DO NOT extend boom without reeling off line at the same time when using winch.

40. When a new cable is installed, operate first with a light load to let the cable adjust to itself.

41. Always keep the boom at least 10 feet (3 m) from all overhead wires.

42. Crane boom length should be kept as short as possible for maximum lifting capacity and greater safety. Longer booms require additional care in accelerating and decelerating the swing motion, and thus slow down the working cycle and tend to reduce production.

43. Keep the load directly and vertically under the boom point at all times. Crane booms are designed primarily to handle vertical loads, not side lifts.

44. Be sure all loads are securely attached before lifting.

45. Do not lift personnel with any wire rope attachment or hook. There is no implied warranty or responsibility for such purposes.

46. Disengage power takeoff (PTO) before moving truck.

47. Always walk around vehicle before moving.

48. Never use crane for towing or pulling load side ways.

49. Never drive with a load suspended from crane.

MOUNTING AND INSTALLATION A-50

1. Vehicle should meet minimum GVW rating of 21,000 lbs. (9,525.5 kg) with a front axle rating of 7,000 lbs. (3,175 kg), rear axle rating 14,000 lbs. (6,350 kg), wheel base 167 - 171 in. (4.09 - 4.34 m), cab to axle 102 in. (2.59 m), frame section modulus 16 in3 (262.2 cc), frame resistance to bending 820,000 in-lbs. (92,647 NM), dual rear wheels and tires, engine tachometer and throttle control, and front and rear springs to match axle ratings.

2. Make sure frame is clear of all obstructions in the area where the crane is to be mounted.

3. Distance required between back of cab and front of flatbed or body is 38 in. (96.52 cm).

4. To install A-50 knuckle boom safely make sure work area and truck frame are ready to mount the crane.

5. Maximum A-50 knuckle boom weight is:

   a) 3,450 lbs. (1565 kg.) with single stage extension cylinder.

   b) 3,750 lbs. (1701 kg.) with two-stage extension cylinder.

   c) 3,850 lbs. (1746 kg.) with two-stage extension cylinder and manual boom.

6. To lift A-50 use a sling or chain to wrap around the lift cylinder pin bosses on the inner boom. Move the truck into position and lower A-50 into position. Making sure that the wear plate (800265-007) is mounted in between the crane base and the top of truck frame. NOTE: Never weld on truck frame.

7. Install frame spacer (800096-010) - 4 required on the inside of truck frame. Spacer may need to be cut to length to fit tightly inside truck frame flanges.

8. Weld the 4, 1" X 2" X 3" Tabs (800299-00) on the ends of wear plates (800265-007), flush with the crane base. Wear plates may need to be cut to length for proper fit. The tabs are to keep the crane base in position. NOTE: Never weld on truck frame.

9. Install tie bolts (367182) as shown in diagram at right. On installations where clearance of the tie bolts is a problem, the 1" Hex Nuts may be welded directly to the 1" Tie Bolts.

   Optional: Use four U-Bolts (3/8 Min.) through truck frame to hold tie bolts in place, along with 16 pieces of 3/8 X 1 1/2 lg. keystock tack welded to the top and bottom mounting pads in order to keep the nuts from rotating loose.

10. Mounting tie bolts and nuts should be torqued to 225 ft- lbs. (305 NM). The torque should be rechecked after initial installation testing is performed, after first 10 hours of operation, and once a year thereafter.

11. Suction - pressure - return hoses and fittings are not furnished with crane. These items are normally calculated, (length) at installation.

NOTE: After installation of the pump/PTO and reservoir is complete, connect the pressure and return lines together. Circulate the hydraulic oil for 30 minutes to trap any contaminates in the system before hooking the pressure and return lines to the crane. Be sure to check filters after purging the system.

A. Suction hose from pump to reservoir. Hose size - 16 (SAE 100 R4) at desired length. Fittings - one hose adapter - 16 JIC female swivel fitting (pump end). ONE - 16 90 degree adapter (reservoir end). Four hose clamps - 16 (two each end)

B. Pressure Hose from pump to control valve inlet. Hose size - 10 (SAE100R2 type AT) at desired length. Fittings - two - 10 JIC female swivel fittings.

C. Return Hose from crane to reservoir. Hose size - 12 (SAE 100R2 type AT) at desired length. Two - 12 JIC Female swivel fitting (reservoir and crane end.

NOTE: If no pressure received at reservoir, alternate hose connections at pump.

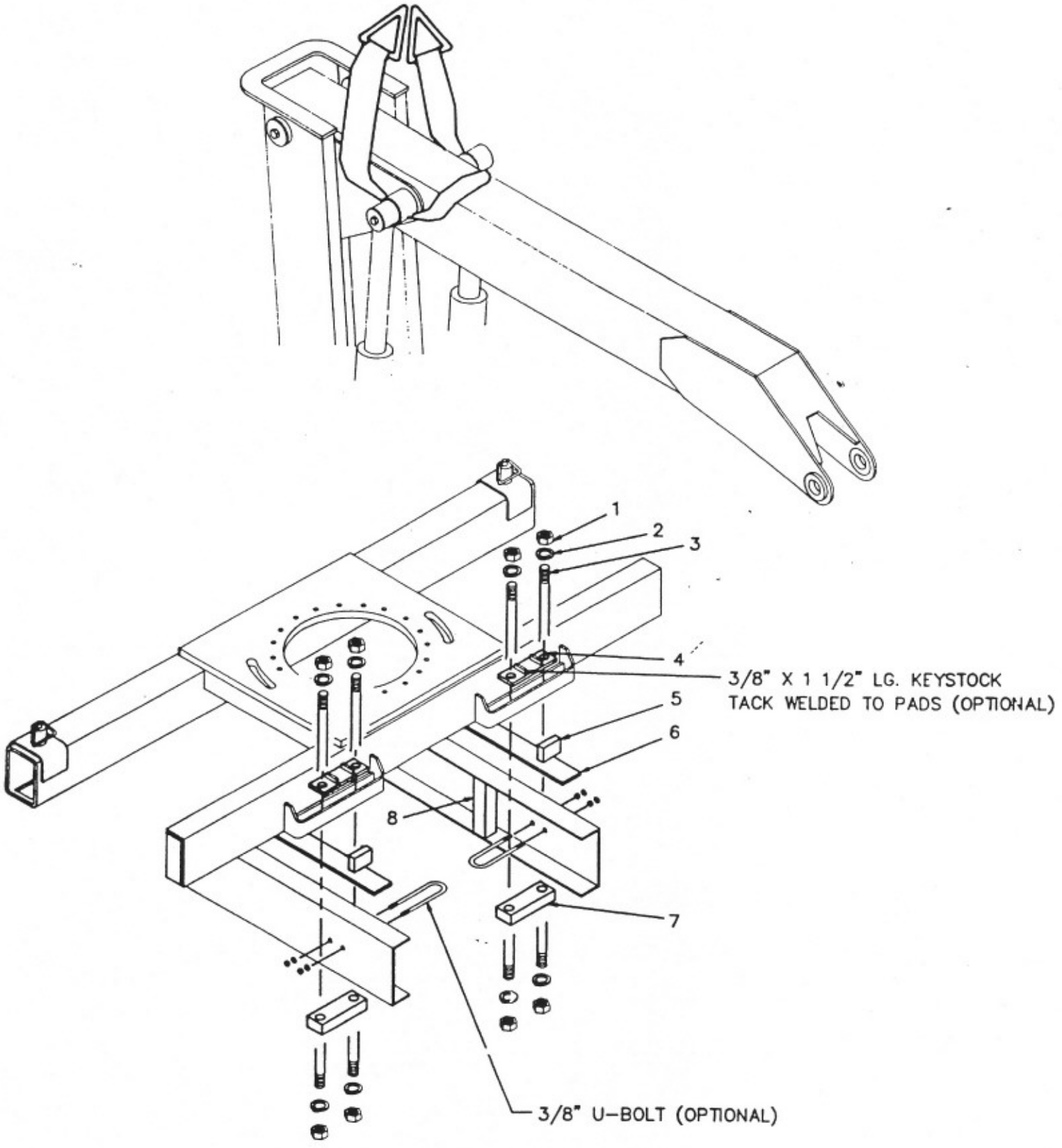
12. Install PTO following PTO's manufacturers installation instructions. It is recommended that PTO mounting bolts be safety wired to prevent bolts from becoming lose. Always check to make sure that there is no transmission oil leaking around the PTO mounting.

13. Crane operation requires 9 GPM (34 litre/min.) at 2600 PSI (183 kg/cm2).

14. Pump speed 925 RPM ref. pump 367215 2.46 in3/rev. (40.3 cm3/rev).

15. To ensure proper crane operation and crane performance, the vehicle shall be equipped with an engine speed control and tachometer.

16. Always store the crane in the figure 4 position when not in operation.



AW-186
INSTALLATION DIAGRAM

3-2.0.0

OPERATION OF UNIT

1. Make sure all crane operating personnel have thoroughly read and understood the information contained in this manual. Crane to be operated by qualified personnel only.
2. A routine daily inspection of the crane should be mandatory before each operating day. Any defects should be corrected immediately before operating the crane.
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 hook). Job site should be checked for any hazards which might create an unsafe situation for the operator such as any overhead electrical lines, underground electrical lines, any electrical source(s), soft or unlevel ground, and any unauthorized personnel who might enter the job site. When cross grade parking is necessary, restrict the load to compensate for the increased tipping risk of the vehicle.
4. Keep vehicle as level as possible during operation.
5. Chock rear wheels, engage emergency brake, place gear selector into neutral, press clutch and PTO knob in gear, release clutch and set throttle control to proper engine speed.

WARNING: DO NOT EXCEED ENGINE SPEED NECESSARY TO MEET PUMP RPM REQUIREMENT (see hydraulic section) POSSIBLE DAMAGE MAY RESULT.

6. Always use outriggers from the crane to the ground. Be sure outriggers are in firm contact with ground and are adequately positioned.
7. Unstowing knuckle boom first begin by retracting extension cylinder, retracting outer boom cylinder which raises the outer boom up in the ramp and purges any air out of the outer boom cylinder, extend lift cylinders to raise inner boom. Once inner boom is clear of the base then knuckle boom can be rotated into a work ready position. Always raise inner boom up before rotating.
8. Always observe safe and practical operation to avoid possible accidents. Refer to safety tips and precautions.
9. After completing lifting operations return the knuckle boom into figure four position for travel. When stowing, begin by retracting the extension cylinder, retracting outer boom cylinder, rotating crane into position by aligning the rotation arrows up on the rotation bearing cover and base plate, retract lift cylinders to lower inner boom into figure four position. Always stand on opposite side of inner boom when stowing or unstowing.
10. Return outriggers to stowed position. Make sure they are pinned in place (if required) for travel.
11. Check job site for any tools or equipment not stored. Store all wheel chocks.
12. Press clutch and disengage PTO. Release throttle control, and emergency brake.
13. Report any unusual occurrence during crane operation that may indicate required maintenance or repair.

QUALIFICATIONS FOR AND CONDUCT OF OPERATORS AND OPERATING PRACTICES

OPERATORS

(a) Crane operation shall be limited to personnel with the following minimum qualifications:

(1) designated persons;
(2) trainees under the direct supervision of a designated person;
(3) maintenance and test personnel (when it is necessary in the performance of their duties);
(4) inspectors (crane).

(b) No one other than the personnel specified in (a) 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 person.

QUALIFICATIONS FOR OPERATORS

(a) 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.

(b) Operators and operator trainees shall meet the following physical qualifications:

(1) vision of at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses;
(2) ability to distinguish colors, regardless of position, if color differentiation is required for operation;
(3) adequate hearing, with or without hearing aid, for the specific operation.

(c) 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 judgement and tests may be required.

(d) Evidence that an 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.

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

(f) In addition to the above listed requirements, the operator shall:

(1) demonstrate the ability to comprehend and interpret all labels, operator's manuals, safety codes, and other information pertinent to correct crane operations;
(2) possess knowledge of emergency procedures and implementation of same;
(3) demonstrate to the employer the ability to operate the specific type of equipment;
(4) be familiar with applicable safety regulations;
(5) understand responsibility for maintenance requirements of the crane;
(6) be thoroughly familiar with the crane and its control functions;
(7) understand the operating procedures as outlined by the manufacturer.

CONDUCT OF OPERATORS

(a) The operator shall not engage in any practice which will divert his attention while actually engaged in operating the crane.

(b) 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.

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

(d) 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.

(e) 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.

(f) If power fails during operation, the operator shall:

(1) move power controls to "Off" or neutral position;
(2) land the suspended load and boom, if practical.

(g) 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.

(h) 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.

(i) Stabilizers shall be visible to the operator while extending or setting unless the operator is assisted by a signalperson.

OPERATING PRACTICES

HANDLING THE LOAD

(a) Size of Load

(1) No crane shall be loaded beyond the rated load except for test purposes.
(2) the load to be lifted is to be within the rated load of the crane in its existing configuration.
(3) 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.

(b) Attaching the load

(1) The load shall be attached to the hook by means of slings or other devices of sufficient capacity.
(2) Hoist rope shall not be wrapped around the load.

(c) Moving the load

(1) The operator shall determine that:
(a) the crane is level and, where necessary, the vehicle/carrier is blocked properly;
(b) the load is well secured and balanced in the sling or lifting device before it is lifted more than a few inches (mm);
(c) means are provided to hold the vehicle stationary while operating the crane.
(2) Before starting to lift, the hook shall be brought over the load in such a manner as to minimize swinging.
(3) During lifting, care shall be taken that:
(a) there is no sudden acceleration or deceleration of the moving load;
(b) load, boom or other parts of the crane do not contact any obstruction.
(4) Cranes shall not be used for dragging loads sideways.
(5) 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 (baskets) attached to the boom must be approved by the crane manufacturer.
(6) The operator should avoid carrying loads over people.

(7) When the crane is so equipped, the stabilizers shall be fully extended and set. Blocking under stabilizers shall meet the requirements as follows:
(a) strong enough to prevent crushing;
(b) of such thickness, width, and length as to completely support the stabilizer pad.
(8) 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 not to exceed allowable bearing capacity or the underlying material.
(9) In transit, the boom shall be carried in stowed position.
(10) 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.
(11) The crane shall not be transported with a load on the hook unless recommended by the manufacturer.
(12) No person should be permitted to stand or pass under a suspended load.

(d) Stowing Procedure. Follow the manufacturer's procedure and sequence when stowing and un-stowing the crane.

MISCELLANEOUS

OPERATING NEAR ELECTRIC POWER LINES

(a) Except where the electrical distribution and transmission lines have been de-energized and visibly grounded at point of work or where insulating barriers not a part of, or an attachment to, the crane have been erected to prevent physical contact with the lines, cranes shall operate so that no part of the crane or load enters within 20 ft (6.1 m).

(1) Caution shall be exercised when working near overhead lines having long spans as they tend to move laterally or vertically due to the wind which would breach the safety zone.
(2) In transit with no load and boom lowered the clearance shall be 10 ft. (3.0 m).
(3) A qualified signal person shall be assigned to observe the 20 ft (6.1 m) clearance and give warning before approaching the above.

(b) 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.

(c) Exceptions to this procedure, if approved by the administrative or regulatory authority if the alternate procedure provides equivalent protection and is set forth in writing.

(d) 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 in (a) above. These signs shall be revised but not removed when local jurisdiction requires greater clearances.

INSPECTION, TESTING AND MAINTENANCE
GENERAL

INSPECTION CLASSIFICATION

(a) 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.

(b) 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.

(1) frequent inspection - daily to monthly intervals;

(2) periodic inspection - one to twelve-month intervals, or as specifically recommended by the manufacturer.

(c) Inspection shall be performed by designated personnel.

FREQUENT INSPECTION

(1) control mechanisms for maladjustment interfering with proper operation - daily, when used;
(2) control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter;
(3) safety devices for malfunction;

(4) all hydraulic hoses, particularly those which flex in normal operation of crane functions, should be visually inspected once every working day, when used;
(5) hooks and latches for deformation, chemical damage, cracks, and wear. Refer to ANSI/ASME B30.10;
(6) rope reeving for compliance with crane manufacturer's specifications, if optional winch is used;
(7) electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, and moisture accumulation.
(8) hydraulic system for proper oil level and leaks daily;
(9) tires for recommended inflation pressure, cuts, and loose wheel nuts;
(10) connecting pins and locking device for wear and damage.

PERIODIC INSPECTION

(a) deformed, cracked, or corroded members in the crane structure and carrier;

(b) loose bolts, particularly mounting bolts;

(c) cracked or worn sheaves and drums;

(d) worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers, and devices;

(e) excessive wear on brake and clutch system parts and lining

(f) crane hooks inspected for cracks;

(g) travel steering, braking, and locking devices, for malfunction;

(h) excessively worn or damaged tires.

(i) Hydraulic and Pneumatic Hose, Fittings, and Tubing Inspection.

(1) evidence of leakage at the surface of the flexible hose or its junction with metal and couplings;
(2) blistering or abnormal deformation to the outer covering of the hydraulic or pneumatic hose;
(3) leakage at threaded or clamped joints that cannot be eliminated by normal tightening or recommended procedures;
(4) 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.

(j) Hydraulic and Pneumatic Pumps and Motors Inspection

(1) loose bolts or fasteners;
(2) leaks at joints between sections;
(3) shaft seal leaks;
(4) unusual noises or vibrations;
(5) loss of operating speed;
(6) excessive heating of the fluid;
(7) loss of pressure.

(k) Hydraulic and Pneumatic Valves Inspection

(1) cracks in valve housing;
(2) improper return of spool to neutral position;
(3) leaks at spools or joints;
(4) sticking spools;
(5) failure of relief valves to attain or maintain correct pressure setting;
(6) relief valve pressure shall be checked as specified by the manufacturers.

(l) Hydraulic and Pneumatic Cylinders Inspection

(1) drifting caused by fluid leaking across piston;
(2) rod seals leaking;
(3) leaks at welding joints;
(4) scored, nicked, or dented cylinder rods;
(5) damaged case (barrel);
(6) loose or deformed rod eyes or connecting joints.

(m) Hydraulic Filters. Evidence of rubber particles on the filter element 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.

(n) Labels are to be in place and legible.

CRANES NOT IN REGULAR USE

(a) A crane which has been idle for a period of 1 month or more, but less than 6 months, shall be given an inspection conforming with the initial-regular-frequent inspections.

(b) A crane which has been idle for a period of over 6 months shall be given a complete inspection conforming with the initial - regular - frequent inspection requirements.

INSPECTION RECORDS

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

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

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

(a) Test loads shall not exceed 110% of the manufacturer's load ratings.

(b) Written reports shall be maintained showing test procedures and confirming the adequacy of repairs.

MAINTENANCE

PREVENTIVE MAINTENANCE

(a) Before adjustments and repairs are started on a crane, the following precautions shall be taken as applicable:

(1) crane placed where it will cause the least interference with other equipment or operations;
(2) all controls at the "off" position;
(3) starting means rendered inoperative;
(4) boom lowered to the ground if possible or otherwise secured against dropping;
(5) relieve hydraulic oil pressure from all hydraulic circuits before loosening or removing hydraulic components.

(b) Warning or "out of order" signs shall be placed on the crane controls.

(c) 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

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

(b) Adjustments shall be maintained to assure correct functioning of components. The following are examples:

(1) functional operating mechanism;
(2) safety devices;
(3) control systems.

(c) Repairs or replacements shall be provided as needed for operation.

The following are examples:

(1) critical parts of functional operating mechanisms which are cracked, broken, corroded, bent, or excessively worn;
(2) critical parts of the crane structure which are cracked, bent, broken, or excessively corroded;
(3) crane hooks showing cracks, damage, or corrosion shall be taken out of service. Repairs by welding are not recommended.

(d) 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.

INSPECTION

(a) Frequent Inspection

(1) 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 day's operations. These visual observations should be considered with discovering gross damage such as listed below, which may be an immediate hazard;
(a) distortion of the rope such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion. Loss of rope diameter in a short rope length or unevenness of outer strands should provide evidence that the rope or ropes need to be replaced;
(b) general corrosion;
(c) broken or cut strands;
(d) number, distribution and type of visible broken wires. When such damage is discovered, the rope shall either be moved from service or given an inspection.

(2) care shall be taken when inspecting sections of rapid deterioration such as flange points, crossover points, and repetitive pickup points on drums.

(b) Periodic Inspection

(1) the inspection frequency shall be determined by a qualified person and shall be based on such factors as:
(a) expected rope life as determined by experience on the particular installation or similar installations;
(b) severity of environment;
(c) percentage of capacity lifts;
(d) frequency rates of operation;
(e) exposure to shock loads.

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

(2) Periodic inspection shall be performed by a designated person. This inspection shall cover the entire length of 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:
(a) points listed in (a) (1) (a) above;
(b) reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires;
(c) severely corroded or broken wires at end connections;
(d) severely corroded, cracked, bent, worn, or improperly applied end connections.

(3) care shall be taken when inspecting sections subject to rapid deterioration such as the following:
(a) sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited;
(b) sections of the rope at or near terminal ends where corroded or broken wires may protrude.

ROPE REPLACEMENT

(a) 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 judgemer by a designated person in evaluating remaining strength in used rope after allowance for deterioration disclosed b inspection. Continued rope operation depends upon thi remaining strength.

(b) conditions such as the following shall be reason for questioning continued use of the rope or increasing the frequency of inspection:

(1) in running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay:

(2) one outer wire broken at the contact point with the core of the rope which has worked its way out of the rope structure and protrudes or loops out from the rope structure. Additional inspection of this section is required;

(3) wear of one-third the original diameter of outside individual wires;

(4) kinking, crushing, birdcaging, or any other damage resulting in distortion of the rope structure;

(5) evidence of any heat damage from any cause;

(6) Reduction from nominal diameter of more than 1/64 in. (0.4 mm) 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).

(7) 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.

(8) 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, the crane manufacturer, or a qualified person.

(c) Ropes 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 an inspection in accordance with (b) above before it is placed in service. This inspection shall be for all types of deterioration and shall be performed by a designated person.

(d) Inspection Records

(1) Frequent Inspection - no records required.

(2) Periodic Inspection - 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 in (b) above.

ROPE MAINTENANCE

(a) Rope should be stored to prevent damage or deterioration.

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

(c) 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 preformed rope, one seizing on each side of the cut is required. On nonpreformed ropes of 7/8 in. (22 mm) diameter or smaller, two seizings on each side of the cut are required, and for nonpreformed rope 1 in. (25 mm) diameter or larger, three seizings on each side of the cut are required.

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

(e) Rope should be maintained in a well-lubricated condition. It is important that lubricant applied as 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.

(f) 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 reduced rope length is adequate, by cutting off a section at the worn end, and thus shifting the wear to different areas of the rope.

OIL SELECTION

Oil Identification

All Weather Oils

MOBIL DTE 13
MOBIL DTE 15
TEXACO - URSA SUPER 3 SAE 10W
GULF - XHD 10W30
TEXACO RONDO HDAZ-32
ESSO UNIVIS J 26

Warm Weather Oils

MOBIL DELVAC 1210
TEXACO URSATEX 10W30
ESSO NUTO H 32
MOBIL DELVAC SPECIAL 10W30
UNIVERSAL TRACTOR FLUID

Cold Weather Oils

MOBIL DTE 11
CONOCO DN 600
ESSO UNIVIS J 13

CAUTION

Do not add kerosene or other "THINNERS" to hydraulic oil. These fluids will cause swelling and rapid deterioration of "O" rings and other seals in the hydraulic system.

The reservoir of the crane contains approximately 19-25 gals. (72 - 95 liters) of hydraulic oil, depending on the model. Oil level should be maintained at the full mark shown on the sight gauge with all cylinders in the retracted or stowed position.

If there is any question regarding the condition of the hydraulic oil, drain some of the oil from the bottom of the reservoir into a glass container and inspect for the following indications of oil deterioration:

1. Dark color or cloudy appearance
2. A rancid or burned odor
3. Foreign particles or other visible contaminants
4. A loss of viscosity
5. A separation of water or other fluids from the oil

If the sample checked exhibits any of the above characteristics, an oil change is recommended as outlined previously.

HYDRAULIC OIL

Hydraulic oil is the "LIFEBLOOD" of the crane. Proper selection and care is important to provide the most efficient operation and the longest life from each of the hydraulic components in the crane. Hydraulic oil not only transmits the energy required to operate the machine from the pump to the various cylinders and motors, but also provides for lubrication and cooling of the components. It is often said that oil does not wear out and can be left in a crane indefinitely, providing the filters are changed regularly. Good filtration does prolong the life of hydraulic oil, but its lubrication characteristics are diminished as it becomes diluted by condensation, acids and other non-filterables which form during normal use of the crane.

It is recommended that the hydraulic reservoir be drained and refilled with new oil after each 500 hours of operation. In climates that have a wide variation of operating temperature, it is recommended that oil of the appropriate weight be used for cold and warm weather operation.

In the event that the hydraulic system becomes contaminated with metallic particles due to a motor, pump or other component failure, the following should be done immediately to prevent failure to the crane:

1. Drain the oil reservoir completely.
2. Fill the reservoir 1/2 full with clean hydraulic oil to flush the contaminated oil from the cylinders and hydraulic liners of the system.

   NOTE: Operate each function to the full open and closed position several time.

3. Operate the system at a slow RPM to prevent cavitation of the pump.
4. Drain the reservoir completely again.
5. Change the return and suction filters.
6. Refill the reservoir to the full line on sight glass.
7. Allow the new oil to circulate through the system for several minutes before operating the unit.
8. Change the return line filter again after approximately 25 hours of operation.

ROTATION BEARING/SWING DRIVE LUBRICATION

ROTATION BEARING RACE

1. Lubricate bearing race at the grease zerk located on top of pedestal base plate.

2. Listed in the chart below are several lubricants which are acceptable for both rust inhibiting and extreme pressure characteristics:

   A. Lubricate the inner race daily if the crane is used on a daily basis or weekly with normal use.
   B. Lubricate the inner race every 30 days if the crane is used intermittently.
   C. Rotate the bearing through two or more rotations during lubrication process.

NOTE: Regular periodic lubrication is the most effective way to increase the life and service ability of the rotation bearing. Most bearings are used outdoors and under conditions likely to produce internal condensation.

GEAR

1. The chart below lists several lubricants for the gear. It is recommended that the teeth be lubricated with a small amount of grease every 8 hours if the crane is used daily, or weekly with normal use. The grease is purged from the teeth by the very nature of being exposed to the elements. Therefore close attention to gear lubricant will provide a longer tooth life. Grease the rotation bearing gear teeth and the pinion with a spray lubricant through the grease holes in the front and rear rotation bearing guards.

	MOBIL	TEXACO	SUNOCO	PURE	SOHIO
RACE	Mobil Plex EP2	MARFAC MP 2	Prestige 742 EP	Poco HT EP 2	Sohitran EP 1
GEAR	Mobilcote-S	Crater Compound	407 Compound B	Poco Gearshield	Sohitac 1

2. Backlash between rotation bearing and swing drive pinion to be set at .006 min. - .008 avg. - .010 max. Set backlash of the swing drive pinion and the rotation bearing at the high point of the rotation bearing gear teeth. Identified by a yellow paint mark on the high tooth of bearing. Adjust backlash by using eccentric ring to move swing drive pinion into tolerance with rotation bearing gear. Backlash may be measured by inserting a 10-12 inch long piece of solder in between the swing drive pinion and the rotation bearing gear and rotating the crane around to crush solder between the rotation bearing gear and the swing drive pinion. Then measure the flat places along the solder with a micrometer. Care should be taken when inserting solder in-between pinion and gear and rotating crane due to the presence of a finger trap.

SWING DRIVE LUBRICATION SELECTION

1. Lubricant specification: MIL - L2105C or

   API - GL-5

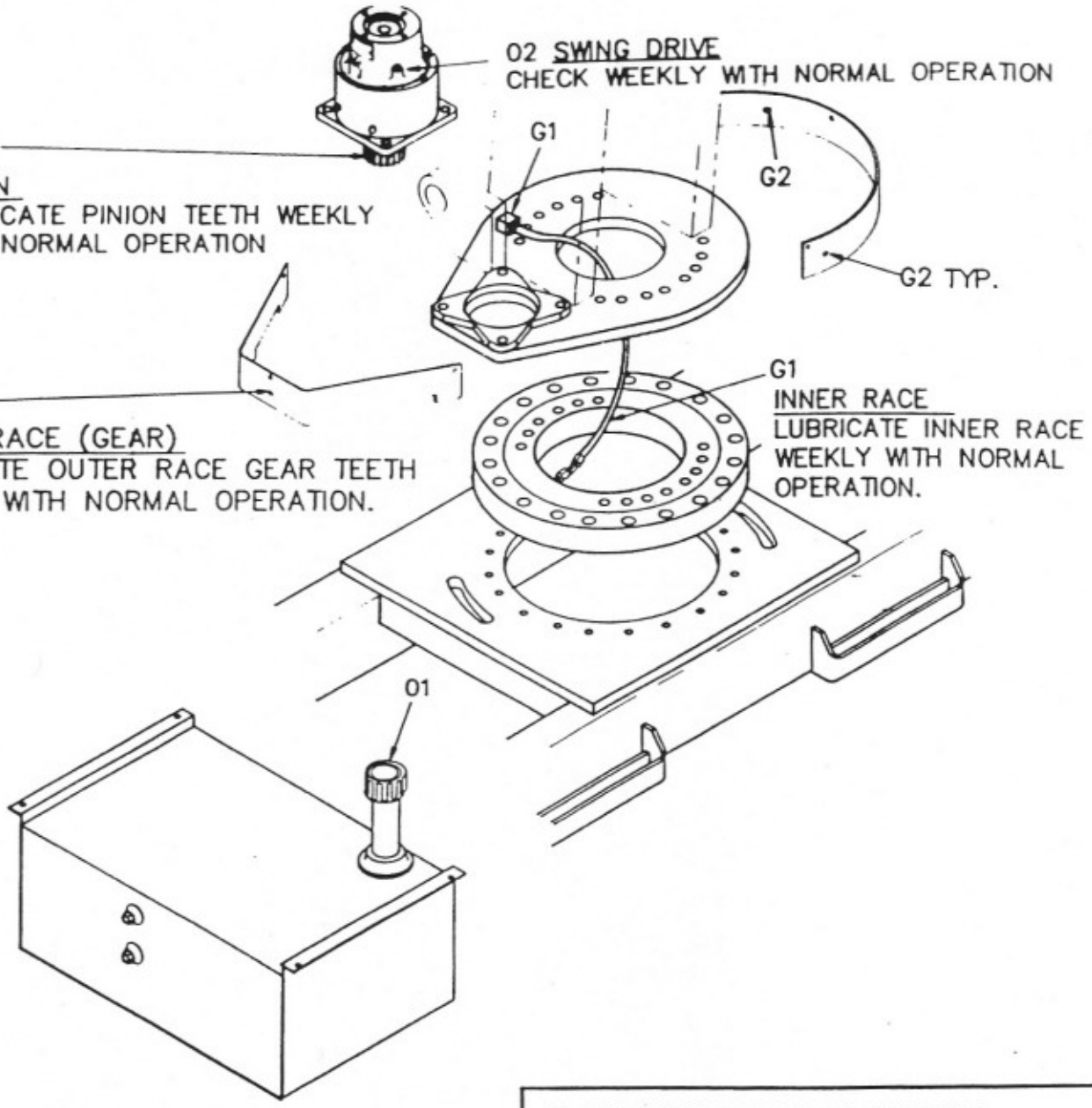
2. Below -10 degrees F (-23 degrees C) use 75W

   -10 to 100 degrees F (37.8 degrees C) use 80W-90

   +100 degrees F use 85W-140

3. Swing Drive (P/N 367005) oil capacity 1 quart U.S. (.946 liters)

4. Swing drive lubricant should be serviced:
   A. **After first 100 hours of operation; drain and flush swing drive. Flush swing drive using 5W oil.**
   B. After first 100 hours drain and flush every six months (normal operation).
   C. Check fluid level weekly (normal operation).
   D. Drain and flush swing drive lubricant anytime there are any indications of lubricant deterioration:
      a. Dark color or cloudy appearance
      b. A rancid or burnt odor.
      c. Foreign particles or other visible contaminants.
      d. A loss of viscosity.
      e. Presence of water in lubricant.



RESERVOIR FILTER
10 MICRON SPIN ON FILTER REQUIRED. REPLACE EVERY SIX MONTHS. SEE RESERVOIR ASSEMBLY FOR PART NUMBER.

RESERVOIR FLUID
KEEP LEVEL IN BETWEEN THE BOTTOM AND TOP SIGHT GAUGES. CHECK DAILY. RESERVOIR SHOULD BE FLUSHED AND NEW FLUID ADDED ONCE YEARLY WITH NORMAL OPERATION OR AFTER A HYDRAULIC FAILURE OCCURS.

01	HYDRAULIC FLUID SEE OIL SELECTION
02	**SWING DRIVE LUBRICANT: SEE SWING DRIVE LUBRICATION SELECTION.**
03	INNER RACE LUBRICANT
04	OUTER RACE & PINION TEETH:SEE ROTATION BEARING LUBRICATION SECTION.

AW-196
LUBRICATION MAINTENANCE

INSTALLATION OF ROTATION BEARING

1. MAKE SURE MOUNTING SURFACES ARE FLAT AND CLEAR OF DEBRIS.

2. INSTALL BEARING SUCH THAT THE YELLOW TOOTH IS TO THE SIDE INDICATED BELOW. INSTALL REMOTE GREASE ZERK HOSE AND FITTINGS AS REQUIRED.

3. INSTALL OUTER RACE BOLTS AND TORQUE TO APPROXIMATELY 70% OF THE RATED TORQUE USING THE TORQUE SEQUENCE LISTED. ONCE ALL BOLTS ARE TORQUE TO 70% VALUE RETORQUE TO 100% RATED VALUE.

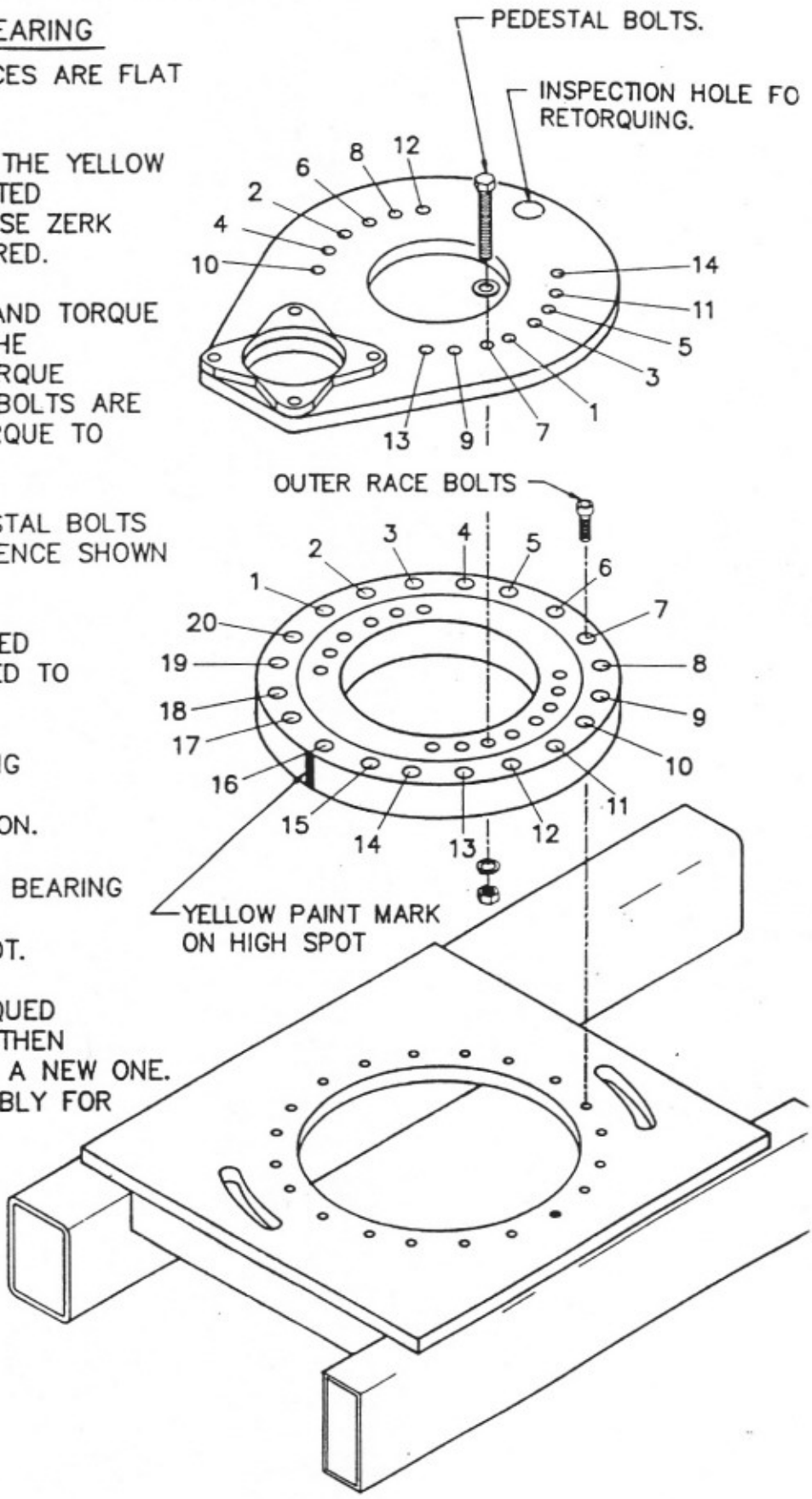
4. INSTALL PEDESTAL AND PEDESTAL BOLTS FOLLOWING THE TORQUE SEQUENCE SHOWN AND LISTED IN (3).

5. ALL BOLTS SHOULD BE CHECKED PERIODICALLY AND RETIGHTENED TO PROPER TORQUE.

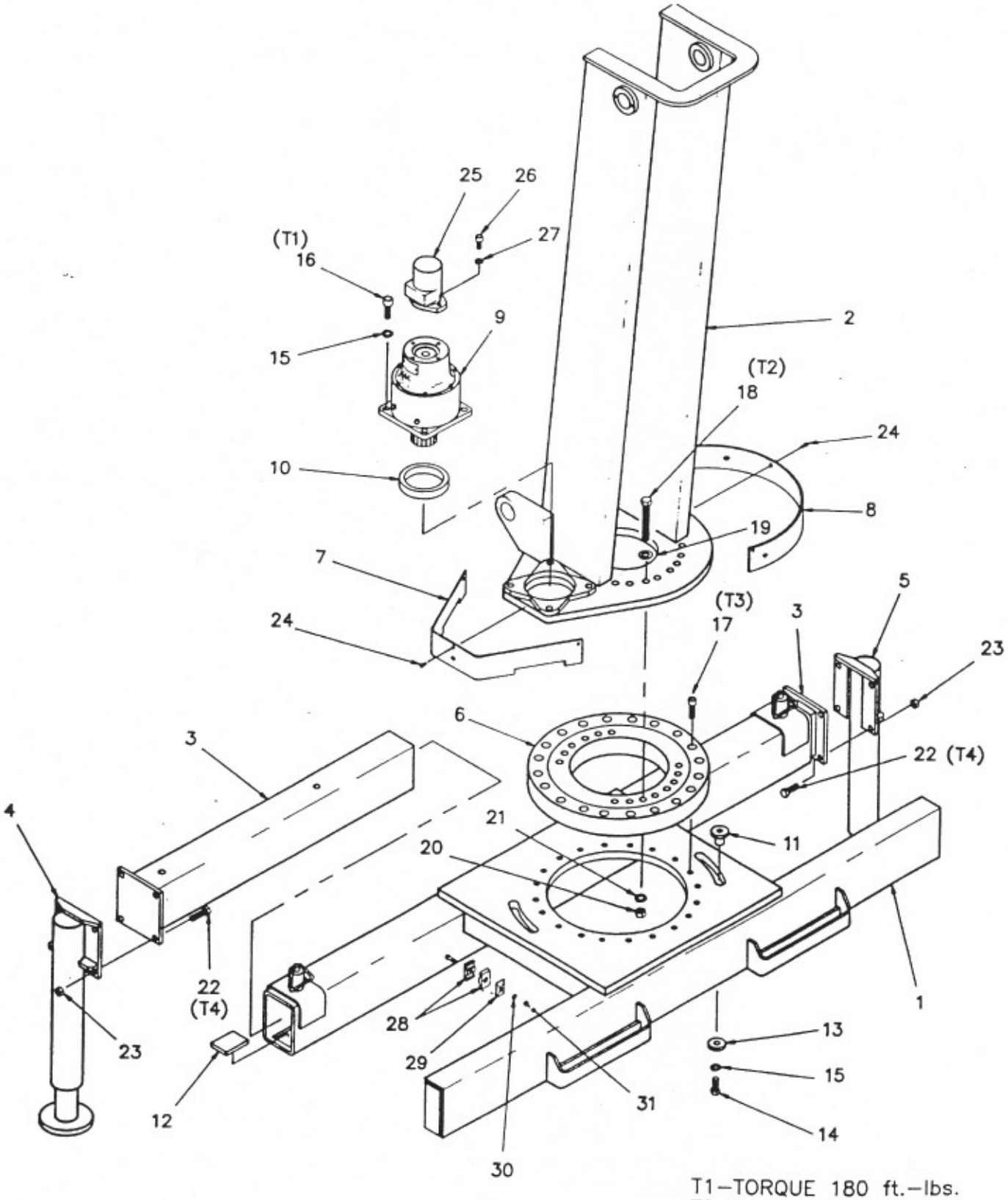
6. GREASE THE ROTATION BEARING ACCORDING TO ROTATION BEARING LUBRICATION SELECTION.

7. SET SWING DRIVE – ROTATION BEARING BACK LASH TO .006 – .010 WITH PINION SET ON HIGH SPOT.

8. ONCE A BOLT HAS BEEN TORQUED TO ITS RATED CAPACITY AND THEN REMOVED REPLACE BOLT WITH A NEW ONE. SEE BASE / PEDESTAL ASSEMBLY FOR BOLT(S) PART NUMBERS.



AW–200
ROTATION BEARING INSTALLATION



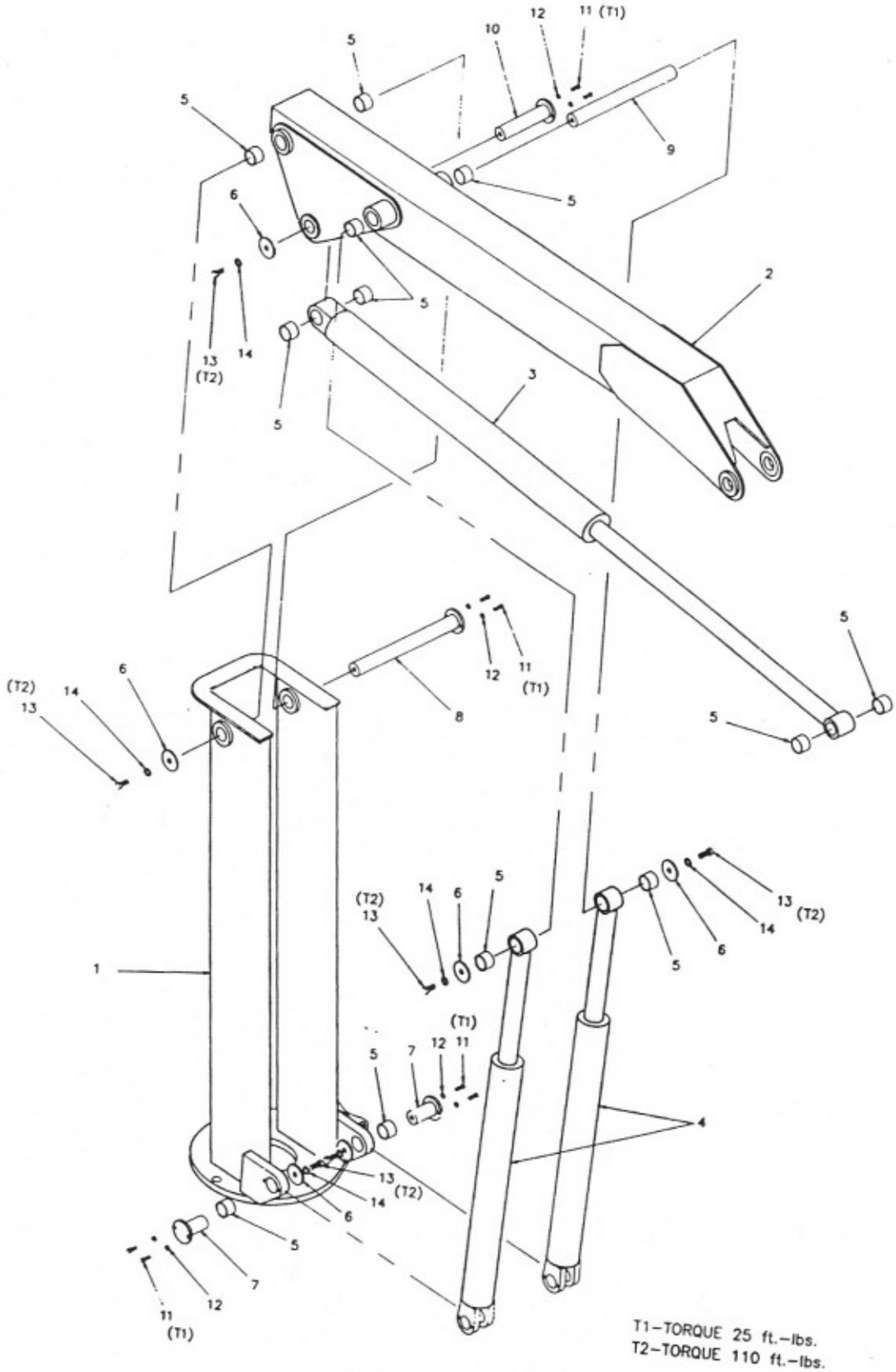
T1–TORQUE 180 ft.–lbs.
T2–TORQUE 280 ft.–lbs.
T3–TORQUE 180 ft.–lbs.
T4–TORQUE 130 ft.–lbs.

AW–181
BASE/PEDESTAL ASSEMBLY

AW-181
BASE/PEDESTAL ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367233	BASE ASSEMBLY
2	1	367117	PEDESTAL
3	2	367025	OUTRIGGER LEG
4	1	367165	OUTRIGGER CYLINDER (SEE NOTE)
5	1	367111	OUTRIGGER CYLINDER (SEE NOTE)
6	1	367076	ROTATION BEARING
7	1	367150	COVER, FRONT
8	1	367151	COVER, BACK
9	1	367005	SWING DRIVE
10	1	367004	ECCENTRIC RING
11	1	367069	SLIDING STOP PIN
12	2	367118	PAD, OUTRIGGER SLIDE
13	1	367067	WASHER, SLIDE STOP
14	1	013508	SCREW, HX. HD 5/8-NC X 1 1/2 G5
15	5	023800	WASHER, SP.LK. 5/8
16	4	367200	SCREW, SOC. HD. 5/8-11 X 2 1/4
17	20	367156	SCREW, SOC. HD. 5/8-11 X 2 3/4
18	14	367155	SCREW, HS. HD. 3/4 X 5
19	14	367152	WASHER, FL. 3/4 HVY.
20	14	367154	NUT, HS. 3/4-10 HVY.
21	14	367153	WASHER, SP. LK. 3/4 HVY.
22	8	013507	SCREW, HX. HD. 5/8-NF X 2 G5
23	8	018300	NUT, HX. LK 5/8-NF
24	11	002608	SCREW, HX. HD. 1/4 X 3/4 S.T.
25	1	367158	HYDRAULIC MOTOR
26	2	367185	SCREW, SOC. HD. 1/2-NC X 1/4 G5
27	2	021500	WASHER, SP. LK. 1/2
28	4	480232	CLAMP HALVES
29	2	480233	PLATE, COVER
30	2	020600	WASHER, SP. LK. 5/16
31	2	016500	NUT, HS. 5/16-NC

NOTES:
1. SEE PAGE 7-7.0.0 FOR CYLINDER COMPONENTS.

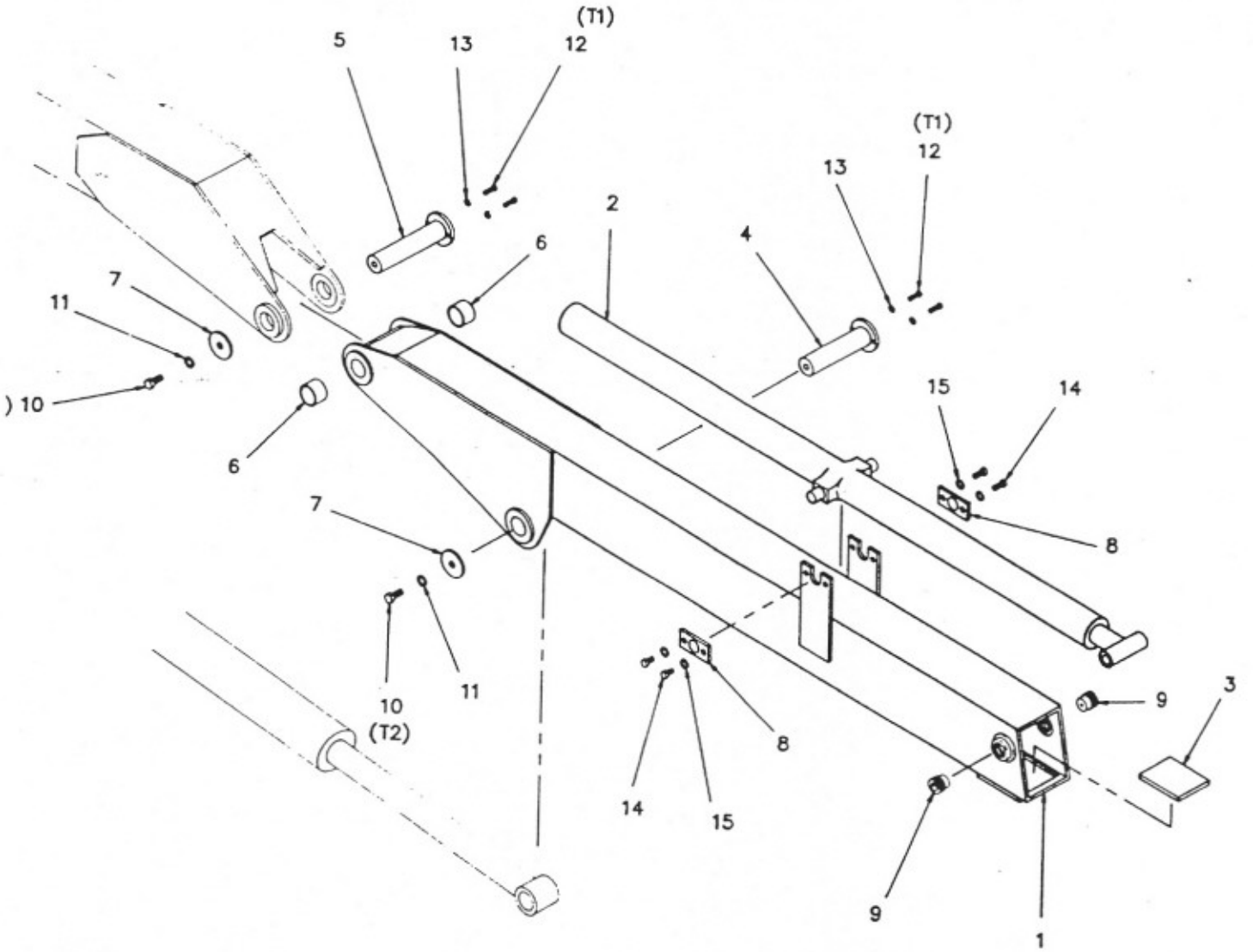


AW–183
INNER BOOM ASSEMBLY

AW183
INNER BOOM ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367117	PEDESTAL
2	1	367115	INNER BOOM
3	1	367110	OUTER BOOM CYLINDER (SEE NOTE 1)
4	2	367109	LIFT CYLINDERS (SEE NOTE 1)
5	12	367149	BUSHING
6	6	367049	WASHER, PIN
7	2	367071	LIFT CYL. BASE PIN
8	1	367047	INNER BOOM PIVOT PIN
9	1	367048	LIFT CYLINDER PIN
10	1	367045	INNER BOOM CYL. PIVOT PIN
11	8	008702	SCREW, HX. HD. 3/8-NC X 1 1/4
12	8	021100	WASHER, SP. LK. 3/8
13	4	013508	SCREW, HX. HD. 5/8-NC X 1 1/2 G5
14	4	023800	WASHER, SP. LK. 5/8

NOTES:
1. SEE PAGE 7-7.0.0 FOR CYLINDER COMPONENTS.



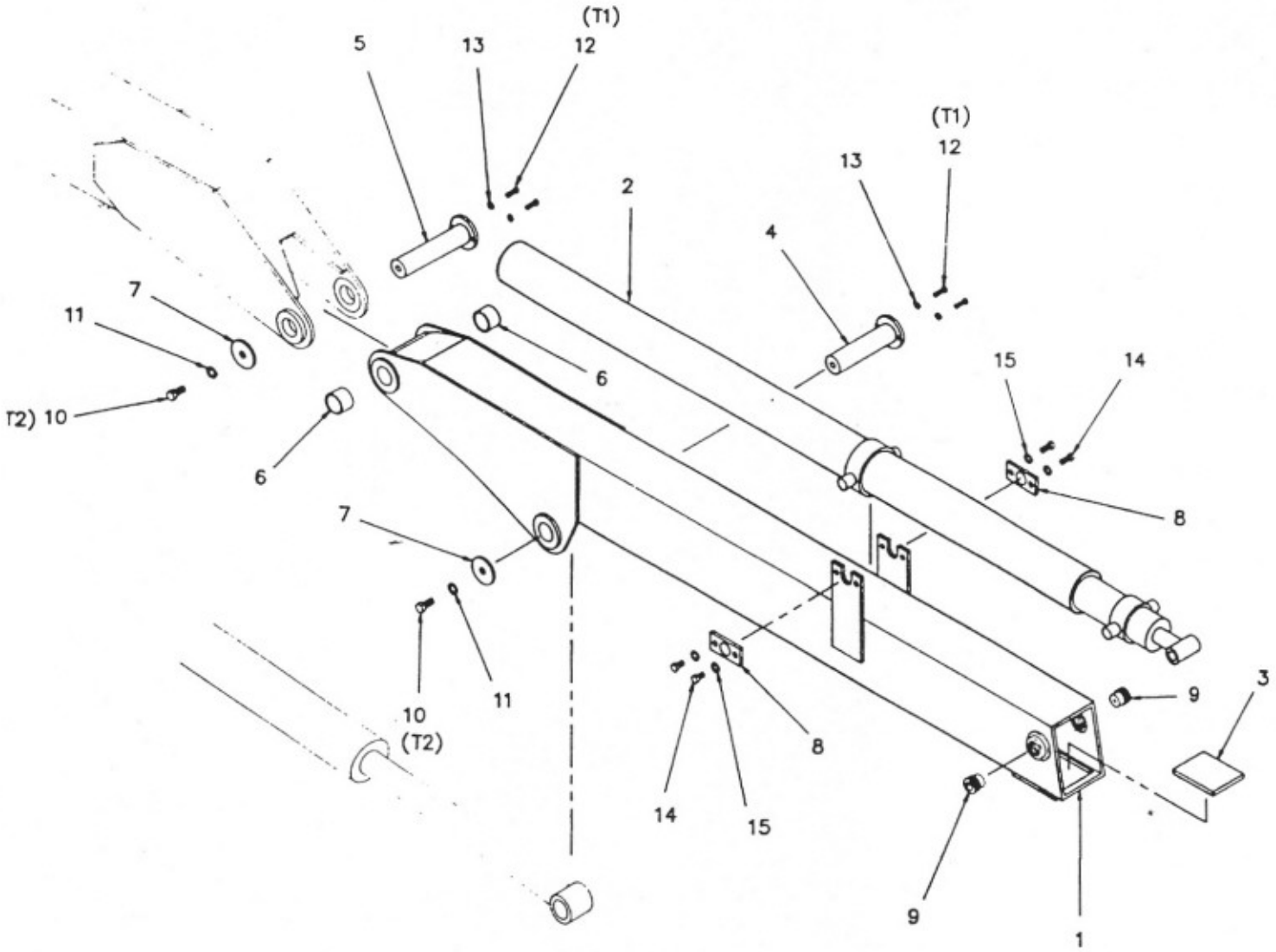
T1–TORQUE 25 ft.–lbs.
T2–TORQUE 110 ft.–lbs.

AW–184
OUTER BOOM ASSEMBLY
SINGLE STAGE EXTENSION CYLINDER

AW-184
OUTER BOOM ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367116	OUTER BOOM
2	1	367189	EXTENSION CYLINDER (SEE NOTE 1)
3	1	367062	PAD, OUTER BOOM
4	1	367041	OUTER BOOM PIVOT PIN
5	1	367043	OUTER BOOM PIVOT PIN
6	2	367149	BUSHING
7	2	367049	WASHER, PIN
8	2	367052	CAP, TRUNNION
9	2	367113	SLIDING PUCK ASSEMBLY
10	2	013508	SCREW, HX. HD. 5/8-NC X 1 1/2 G5
11	2	023800	WASHER, SP. LK. 5/8
12	4	008702	SCREW, HX. HD. 3/8-NC X 1 1/4
13	4	021100	WASHER, SP. LK. 1/4
14	4	010202	SCREW, HX. HD. 1/2-NC X 1 G5
15	4	021500	WASHER, SP. LK. 1/2

NOTES:
1. SEE PAGE 7-7.0.0 FOR CYLINDER COMPONENTS.



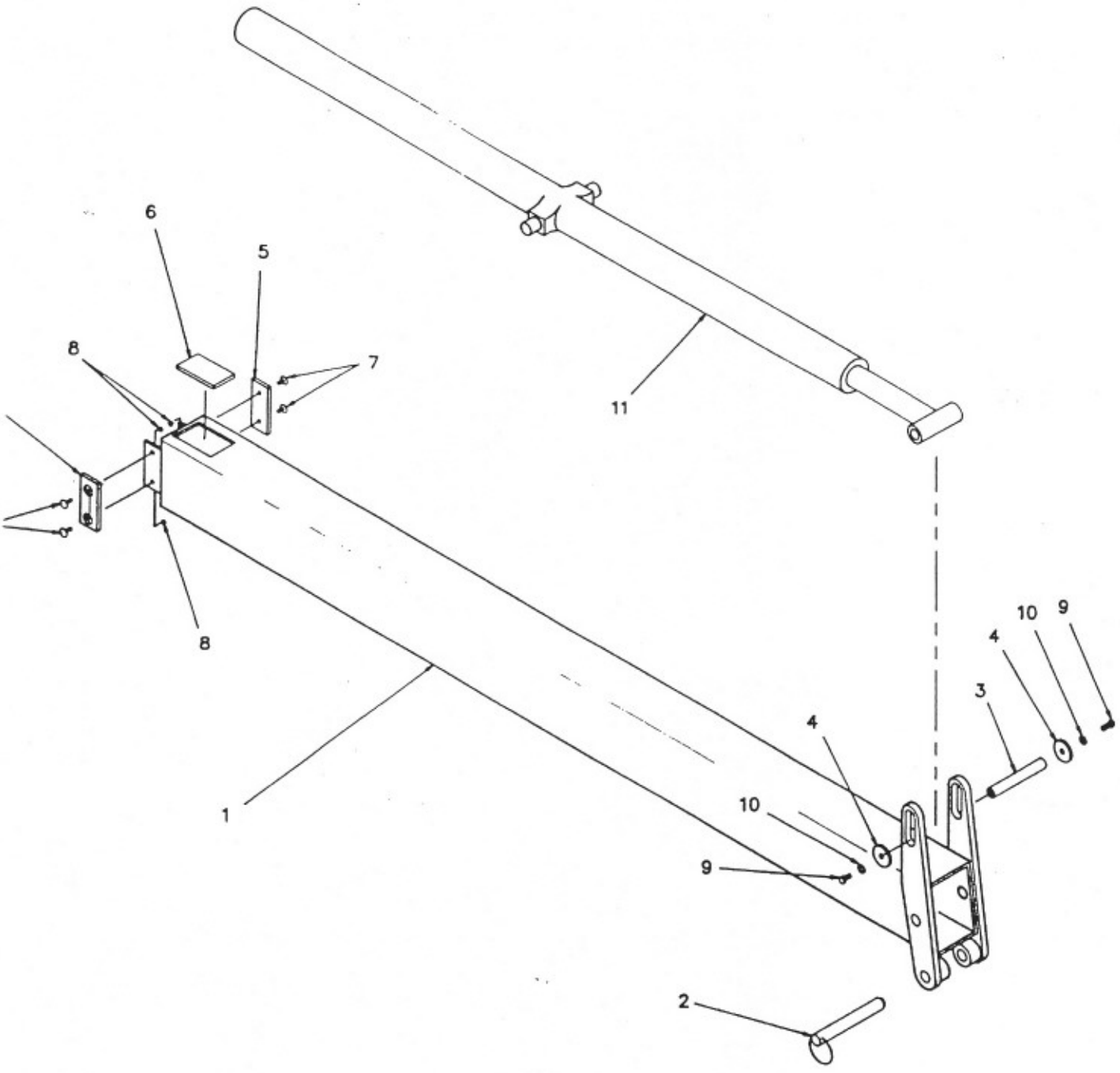
T1–TORQUE 25 ft.–lbs.
T2–TORQUE 110 ft.–lbs.

AW–190
OUTER BOOM ASSEMBLY
TWO STAGE EXTENSION CYLINDER

AW-190
OUTER BOOM ASSEMBLY (TWO STAGE CYLINDER)

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367116	OUTER BOOM
2	1	367112	EXTENSION CYLINDER (SEE NOTE 1)
3	1	367062	PAD, OUTER BOOM
4	1	367041	OUTER BOOM PIVOT PIN
5	1	367043	OUTER BOOM PIVOT PIN
6	2	367149	BUSHING
7	2	367049	WASHER, PIN
8	2	367052	CAP, TRUNNION
9	2	367113	SLIDING PUCK ASSEMBLY
10	2	013508	SCREW, HX. HD. 5/8-NC X 1 1/2"
11	2	023800	WASHER, SP. LK. 5/8
12	4	008702	SCREW, HX. HD. 3/8-NC X 1 1/4"
13	4	021100	WASHER, SP. LK. 1/4
14	4	010202	SCREW, HX. HD. 1/2-NC X 1" G5
15	4	021500	WASHER, SP. LK. 1/2

NOTES:
1. SEE PAGE 7-7.0.0 FOR CYLINDER COMPONENTS.

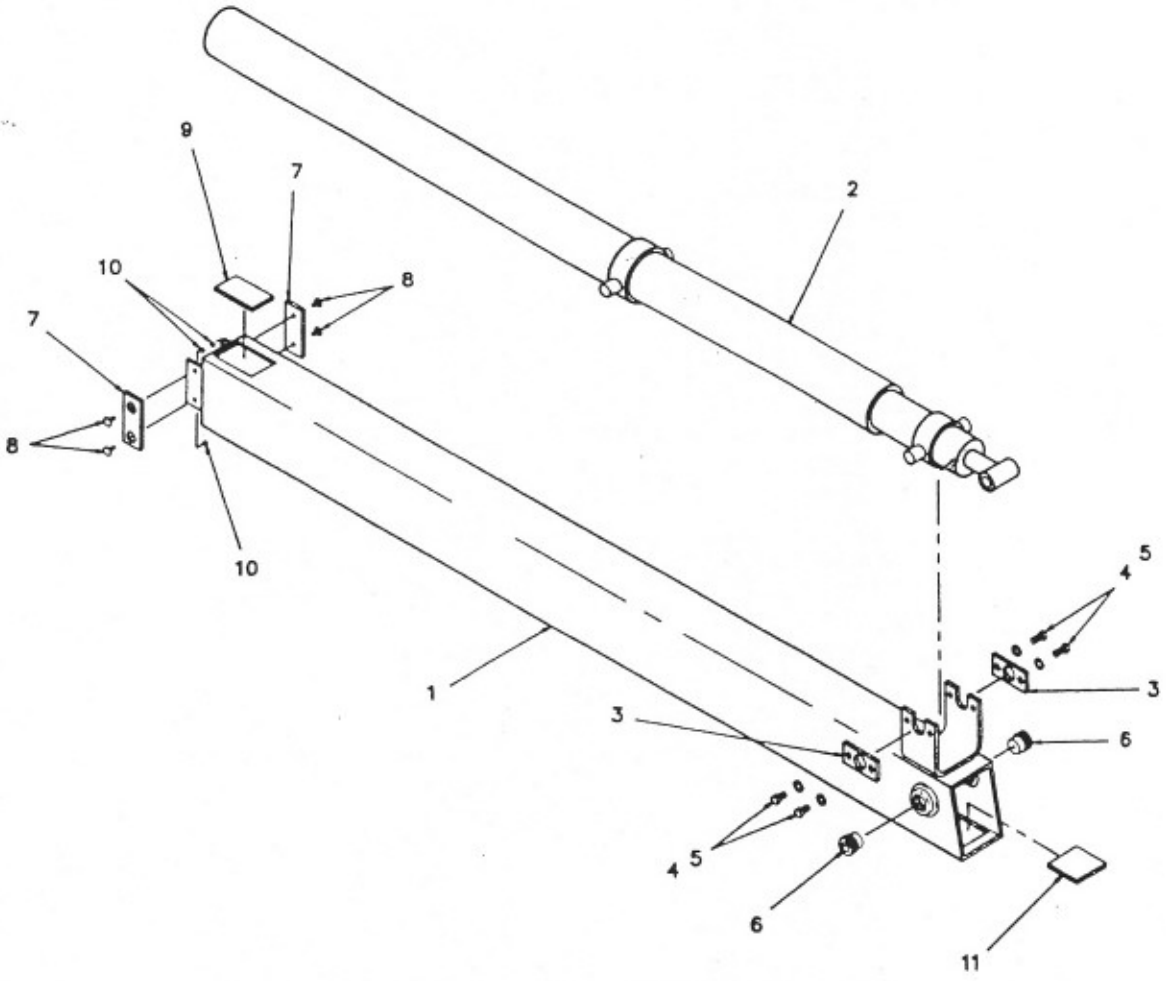


AW–185
SINGLE STAGE BOOM ASSEMBLY

AW-185
SINGLE STAGE BOOM ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367186	FIRST STAGE BOOM
2	1	367193	PIN, MANUAL BOOM
3	1	368086	PIN, SECOND STAGE EXTENSION
4	2	367106	WASHER, SECOND STAGE EXT.
5	2	367054	WEAR PAD
6	1	367060	SLIDE PAD
7	4	367119	ELEVATOR BOLT
8	4	016300	NUT, HX. LK. 1/4-20
9	2	008701	SCREW, HX. HD. 3/8-11 X 2 3/4
10	2	021100	WASHER, SP. LK. 3/8
11	1	367189	EXTENSION CYLINDER (SEE NOTE 1)

NOTES:
1. SEE PAGE 7-7.0.0 FOR CYLINDER COMPONENTS.

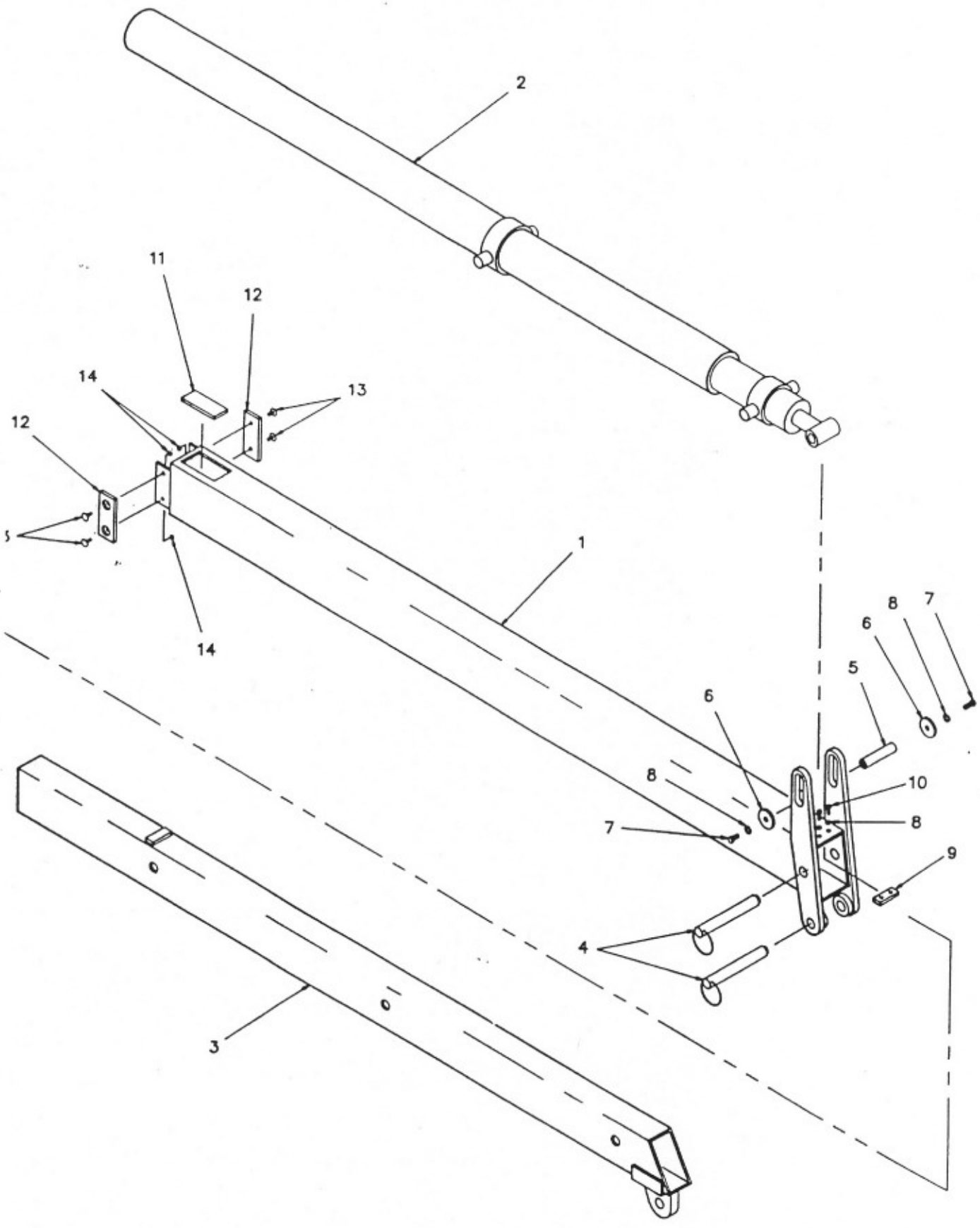


AW–189
FIRST STAGE BOOM EXTENSION ASSEMBLY
(2–STAGE EXTENSION CYLINDER)

AW-189
FIRST STAGE BOOM EXTENSION ASSEMBLY
(TWO STAGE EXTENSION CYLINDER)

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367080	FIRST STAGE BOOM
2	1	367112	TWO STAGE EXTENSION CYLINDER (SEE NOTE 1)
3	2	367052	CAP, TRUNNION
4	4	010202	SCREW, HX. HD. 1/2-NC X 1" G5
5	4	021500	WASHER, SP. LK. 1/2
6	2	367113	SLIDING PUCK ASSEMBLY
7	2	367054	PAD, WEAR
8	4	367119	ELEVATOR BOLT
9	1	367060	PAD, FIRST STAGE REAR
10	4	016300	NUT, HX. LK. 1/4-NC
11	1	367064	PAD, FIRST STAGE SLIDE

NOTES:
1. SEE PAGE 7-7.0.0 FOR CYLINDER COMPONENTS.

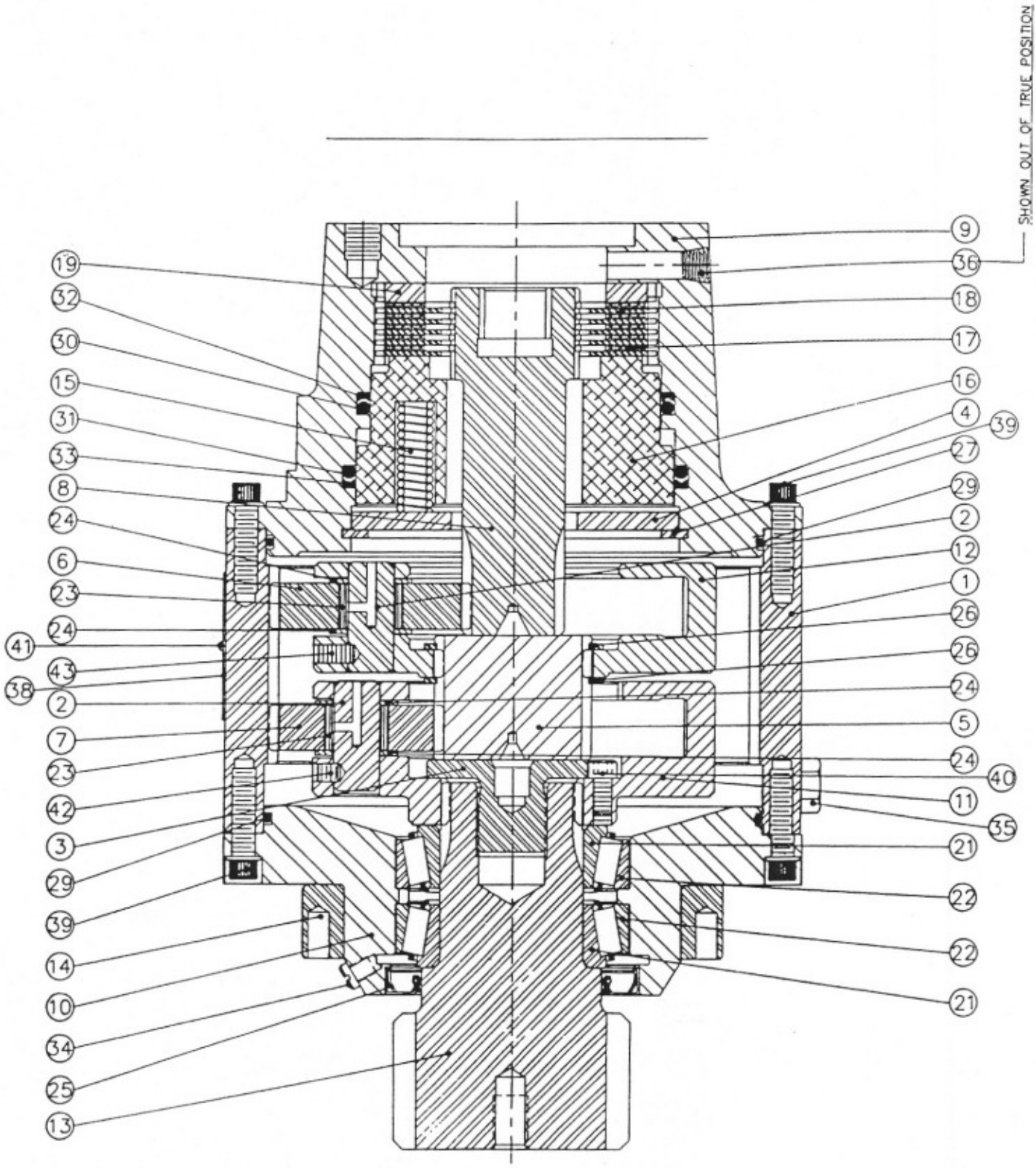


AW–188
SECOND STAGE BOOM EXTENSION ASSEMBLY

AW-188
SECOND STAGE BOOM EXTENSION ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367079	SECOND STAGE BOOM
2	1	367112	TWO STAGE EXTENSION CYLINDER (SEE NOTE 1)
3	1	367088	OPTIONAL MANUAL BOOM
4	2	367114	BOOM PIN
5	1	367100	PIN, SECOND STAGE
6	2	367106	WASHER, SECOND STAGE
7	2	008701	SCREW, HX. HD. 3/8-NC X 1" G5
8	4	021100	WASHER, SP. LK. 3/8
9	1	367094	BOOM STOP
10	2	008400	SCREW, HX. HD. 3/8-NC X 1/2 G5
11	1	367061	PAD, SECOND STAGE REAR
12	2	367054	PAD, WEAR
13	4	367119	ELEVATOR BOLT
14	4	016300	NUT, HX. LK. 1/4-NC

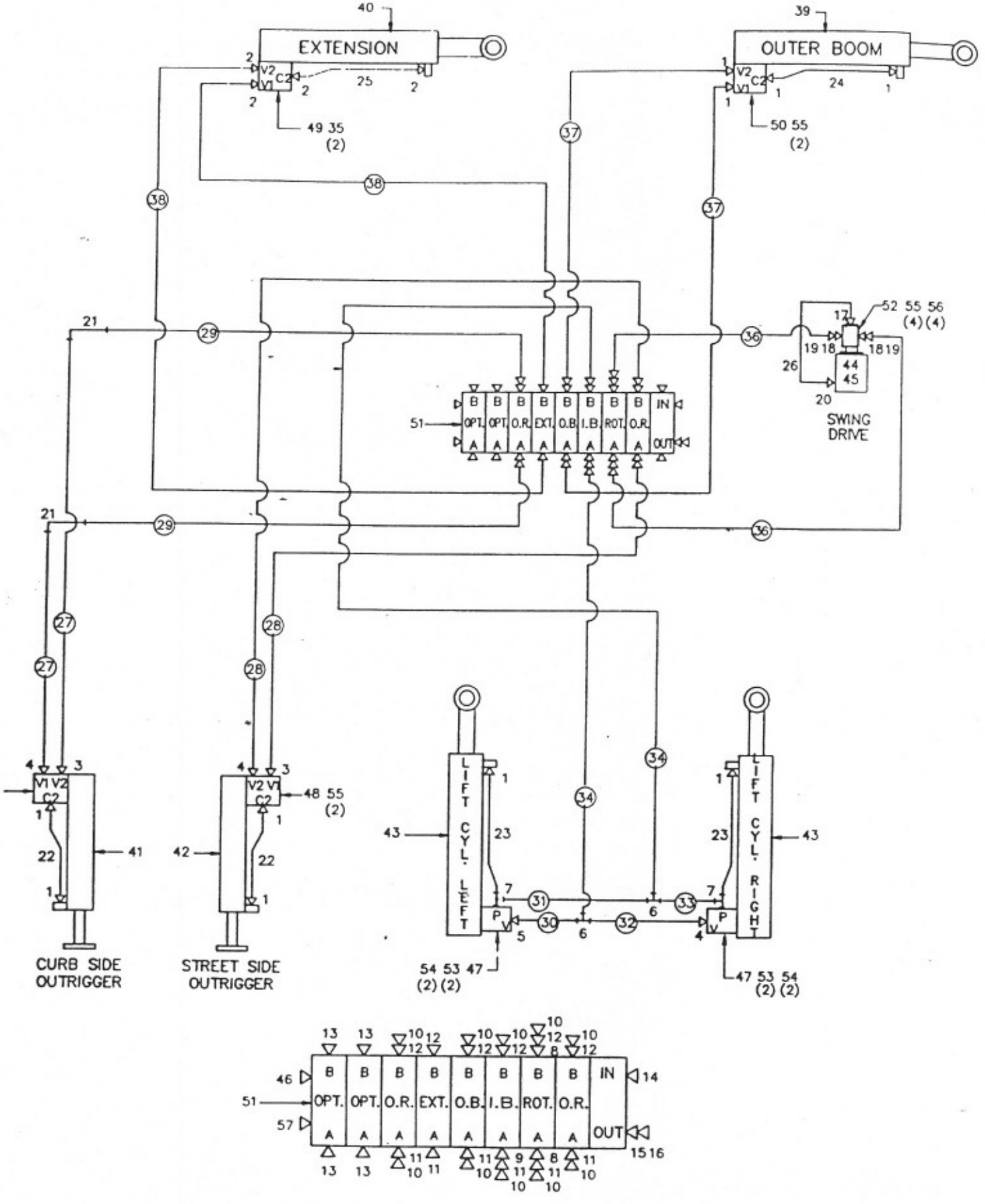
NOTES:
1. SEE PAGE 7.7.0.0 FOR CYLINDER COMPONENTS.



AW--367005
SWING DRIVE

AW-367005
SWING DRIVE

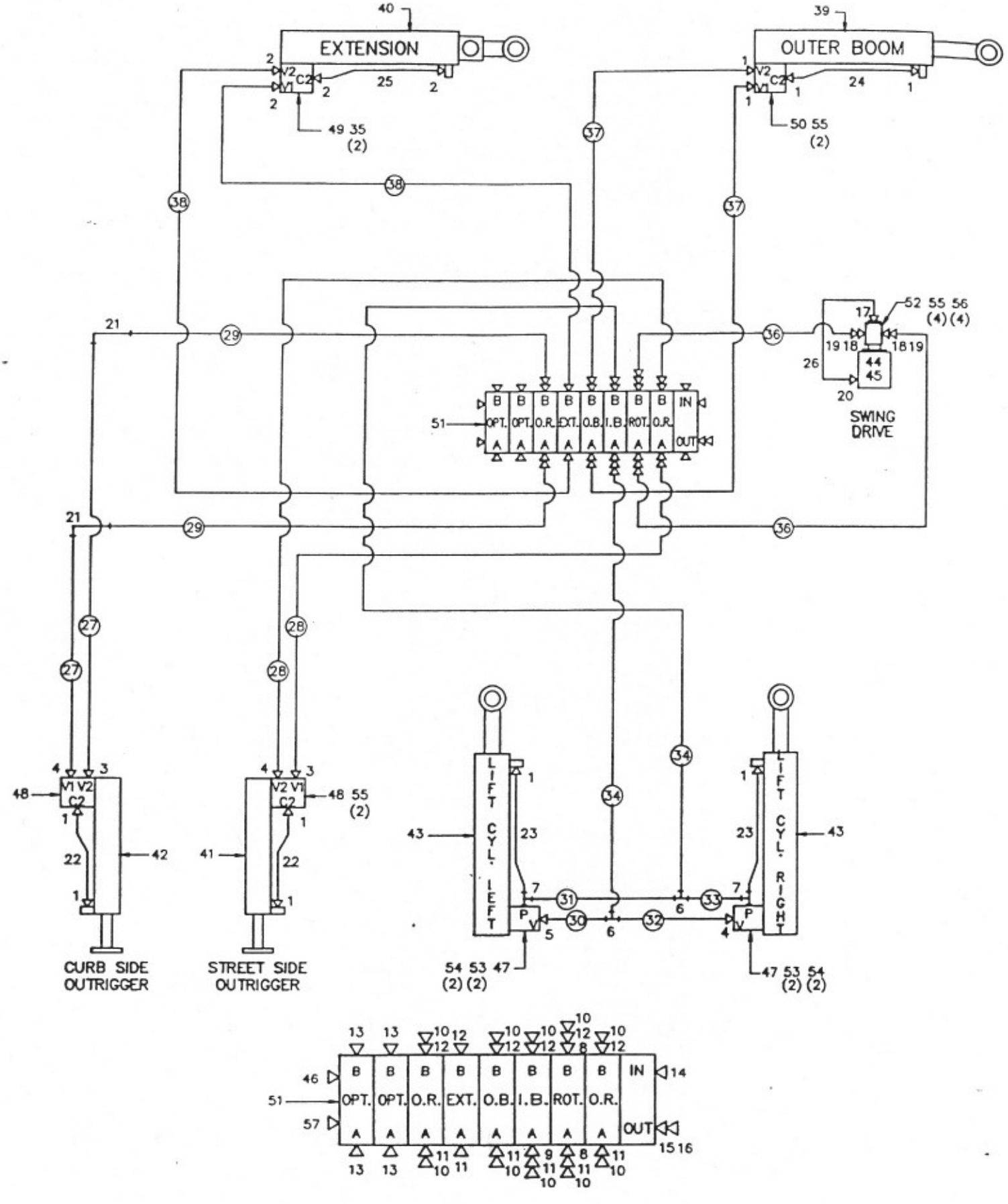
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367005-001	HOUSING
2	6	367005-002	SHAFT, PLANET
3	1	367005-003	BOLT, SPECIAL
4	1	367005-004	PLATE, SPRING
5	1	367005-005	GEAR, OUTPUT SUN
6	3	367005-006	GEAR, PLANET
7	3	367005-007	GEAR, PLANET
8	1	367005-008	GEAR, INPUT
9	1	367005-009	HOUSING, BRAKE
10	1	367005-010	BASE
11	1	367005-011	CARRIER, SEC. PLANET
12	1	367005-012	CARRIER, PRI. PLANET
13	1	367005-013	SHAFT, OUTPUT
14	1	367004	RING, ECCENTRIC
15	11	367005-014	SPRING, BRAKE
16	1	367005-015	PISTON, BRAKE
17	5	367005-016	PLATE, BRAKE DRIVING
18	5	367005-017	DISC BRAKE
19	1	367005-018	PLATE, BACK-UP
20	2	367005-019	STUD
21	2	367005-020	BEARING, CONE
22	2	367005-021	BEARING, CUP
23	108	367005-022	ROLLER BEARING
24	12	367005-023	WASHER, THR.
25	1	367005-024	SEAL
26	2	367005-025	RING, SNAP
27	1	367005-026	RING, SNAP
28	1	367005-027	GASKET, HYD. MTR.
29	2	367005-028	O-RING
30	1	367005-029	O-RING
31	1	367005-030	O-RING
32	1	367005-031	RING, BACK-UP
33	1	367005-032	RING, BACK-UP
34	1	367005-033	ZERK, ALEMITE
35	3	367005-034	PLUG, STR.THD.
36	1	367005-035	PLUG, PIPE 1/8-27
37	1	367005-036	COVER, SHIPPING
38	1	367005-037	LABEL PLATE
39	14	367005-038	CAPSCREW, FERRY 5/16 - NC X 1
40	1	367005-039	CAPSCREW, SKT. 1/4 - NC X 1/2
41	2	367005-040	DRIVE SCREW
42	3	367005-041	SETSCREW, SKT. FP. 1/4-NC X 1/4
43	3	367005-042	SETSCREW, SKT. FP. 1/4 - NC X 1/2
44	2	367005-043	NUT, HX. 1/2 - NF
45	2	367005-044	WASHER, LK. 1/2



AW–195
HYDRAULIC ASSEMBLY
SINGLE STAGE EXTENSION CYLINDER

AW-195
HYDRAULIC ASSEMBLY
SINGLE STAGE EXTENSION CYLINDER

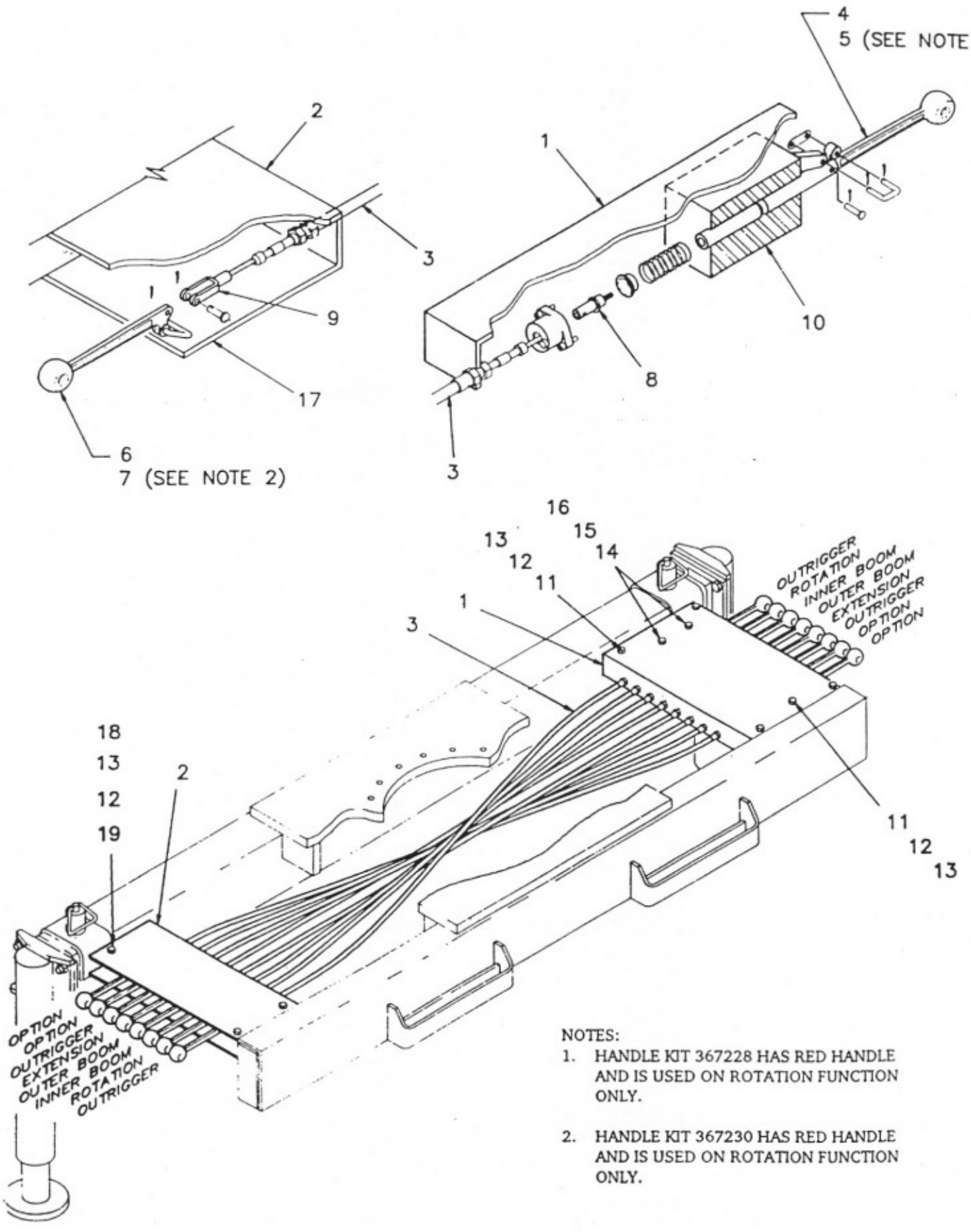
ITEM	QTY.	PART NO.	DESCRIPTION
1	10	200876	ADAPTER, STR - 60RM/ -6JICM
2	4	367145	ADAPTER, STR - 80RM/ -8JICM
3	2	330645	ELL, 90 DEGREE LONG -6 ORM/ -6JICM
4	3	241175	ELL, 90 DEGREE -6 ORM/ -6JICM
5	1	480195	ELL, 45 DEGREE -6 ORM/ -6JICM
6	2	367134	TEE, -6 JIC M
7	2	200877	TEE, -6 ORM/ -6 JIC M
8	2	367205	FLOW RESTRICTOR, .062 ORIFICE
9	1	367226	FLOW RESTRICTOR .120 ORIFICE
10	10	750413	REDUCER, -8 NPTM/ -6 NPTF
11	6	367202	ELL, 90 DEGREE X-LONG -10 ORM/ -8NPTF
12	6	367201	ELL,90 DEGREE -10 ORM/ -8 NPTF
13	4	330072	PLUG, -10 ORM
14	1	367139	ELL, 90 DEGREE -12 ORM/ -10 JICM
15	1	367137	ADAPTER, STR -12 ORM/ -12 NPTF
16	1	367146	ELL, X-LONG -12 NPT/ -12 JICM
17	1	367140	ELL, 90 DEGREE -4 ORM/ -6 JICM
18	2	330274	ADAPTER, STR -10 ORM/ -8 ORB F
19	2	330272	ELL, 90 DEGREE -8 ORM/ -6 JIC M
20	1	367144	ADAPTER, STR -4 ORM/ -6 JIC M
21	2	367180	TUBE ASSEMBLY
22	2	367179	TUBE ASSEMBLY
23	2	367168	TUBE ASSEMBLY
24	1	367167	TUBE ASSEMBLY
25	1	367194	TUBE ASSEMBLY
26	1	367166	TUBE ASSEMBLY
27	2	812204-063	HOSE ASSEMBLY
28	2	812201-074	HOSE ASSEMBLY
29	2	812200-026	HOSE ASSEMBLY
30	1	812203-027	HOSE ASSEMBLY
31	1	812203-036	HOSE ASSEMBLY
32	1	812203-038	HOSE ASSEMBLY
33	1	812203-026	HOSE ASSEMBLY
34	2	812201-052	HOSE ASSEMBLY
35	2	367164	SCREW, SOC. HD. 3/8-NC X 2 3/4"
36	2	812201-064	HOSE ASSEMBLY
37	2	812201-134	HOSE ASSEMBLY
38	2	812301-255	HOSE ASSEMBLY
39	1	367110	HYDRAULIC CYLINDER, OUTER BOOM
40	1	367189	HYD. CYLINDER, SINGLE STAGE
41	1	367111	HYD. CYLINDER, OUTRIGGER (STREET)
42	1	367165	HYD. CYLINDER, OUTRIGGER (CURB)
43	2	367109	HYDRAULIC CYLINDER, LIFT
44	1	367005	SWING DRIVE
45	1	367158	HYDRAULIC MOTOR
46	1	750478	PLUG, -12 O-RING
47	2	367122	COUNTERBALANCE VALVE
48	2	367123	COUNTERBALANCE VALVE
49	1	367121	COUNTERBALANCE VALVE
50	1	367120	COUNTERBALANCE VALVE
51	1	367234	CONTROL VALVE
52	1	367124	COUNTERBALANCE VALVE
53	4	005804	SCREW, HX. HD. 1/4-NC X 1 1/2
54	4	020200	WASHER, SP. LK. 1/4
55	10	367163	SCREW, SOC. HD. 5/16-NC X 2 1/4
56	4	020601	WASHER, SP. LK. 5/16
57	1	367204	PLUG, -14 O-RING



AW–193
HYDRAULIC ASSEMBLY
TWO STAGE EXTENSION CYLINDER

AW-193
HYDRAULIC ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION
1	10	200876	ADAPTER, STR - 60RM/ -6JICM
2	4	367145	ADAPTER, STR - 80RM/ -8JICM
3	2	330645	ELL, 90 DEGREE LONG -6 ORM/ -6JICM
4	3	241175	ELL, 90 DEGREE -6 ORM/ -6JICM
5	1	480195	ELL, 45 DEGREE -6 ORM/ -6JICM
6	2	367134	TEE, -6 JIC M
7	2	200877	TEE, -6 ORM/ -6 JIC M
8	2	367205	FLOW RESTRICTOR, .062 ORIFICE
9	1	367226	FLOW RESTRICTOR .120 ORIFICE
10	10	750413	REDUCER, -8 NPTM/ -6 NPTF
11	6	367202	ELL, 90 DEGREE X-LONG -10 ORM/ -8 NPTF
12	6	367201	ELL,90 DEGREE -10 ORM/ -8 NPTF
13	4	330072	PLUG, -10 ORM
14	1	367139	ELL, 90 DEGREE -12 ORM/ -10 JICM
15	1	367137	ADAPTER, STR -12 ORM/ -12 NPTF
16	1	367146	ELL, X-LONG -12 NPT/ -12 JICM
17	1	367140	ELL, 90 DEGREE -4 ORM/ -6 JICM
18	2	330274	ADAPTER, STR -10 ORM/ -8 ORB F
19	2	330272	ELL, 90 DEGREE -8 ORM/ -6 JIC M
20	1	367144	ADAPTER, STR -4 ORM/ -6 JIC M
21	2	367180	TUBE ASSEMBLY
22	2	367179	TUBE ASSEMBLY
23	2	367168	TUBE ASSEMBLY
24	1	367167	TUBE ASSEMBLY
25	1	367181	TUBE ASSEMBLY
26	1	367166	TUBE ASSEMBLY
27	2	812204-063	HOSE ASSEMBLY
28	2	812201-074	HOSE ASSEMBLY
29	2	812200-026	HOSE ASSEMBLY
30	1	812203-027	HOSE ASSEMBLY
31	1	812203-036	HOSE ASSEMBLY
32	1	812203-038	HOSE ASSEMBLY
33	1	812203-026	HOSE ASSEMBLY
34	2	812201-052	HOSE ASSEMBLY
35	2	367164	SCREW, SOC. HD. 3/8-NC X 2 3/4"
36	2	812201-064	HOSE ASSEMBLY
37	2	812201-134	HOSE ASSEMBLY
38	2	812301-243	HOSE ASSEMBLY
39	1	367110	HYDRAULIC CYLINDER, OUTER BOOM
40	1	367112	HYD. CYLINDER, TWO STAGE EXTENSION
41	1	367111	HYD. CYLINDER, OUTRIGGER (STREET)
42	1	367165	HYD. CYLINDER, OUTRIGGER (CURB)
43	2	367109	HYDRAULIC CYLINDER, LIFT
44	1	367005	SWING DRIVE
45	1	367158	HYDRAULIC MOTOR
46	1	750478	PLUG, -12 O-RING
47	2	367122	COUNTERBALANCE VALVE
48	2	367123	COUNTERBALANCE VALVE
49	1	367121	COUNTERBALANCE VALVE
50	1	367120	COUNTERBALANCE VALVE
51	1	367234	CONTROL VALVE
52	1	367124	COUNTERBALANCE VALVE
53	4	005804	SCREW, HX. HD. 1/4-NC X 1 1/2
54	4	020200	WASHER, SP. LK. 1/4
55	10	367163	SCREW, SOC. HD. 5/16-NC X 2 1/4
56	4	020601	WASHER, SP. LK. 5/16
57	1	367204	PLUG, -14 O-RING



NOTES:

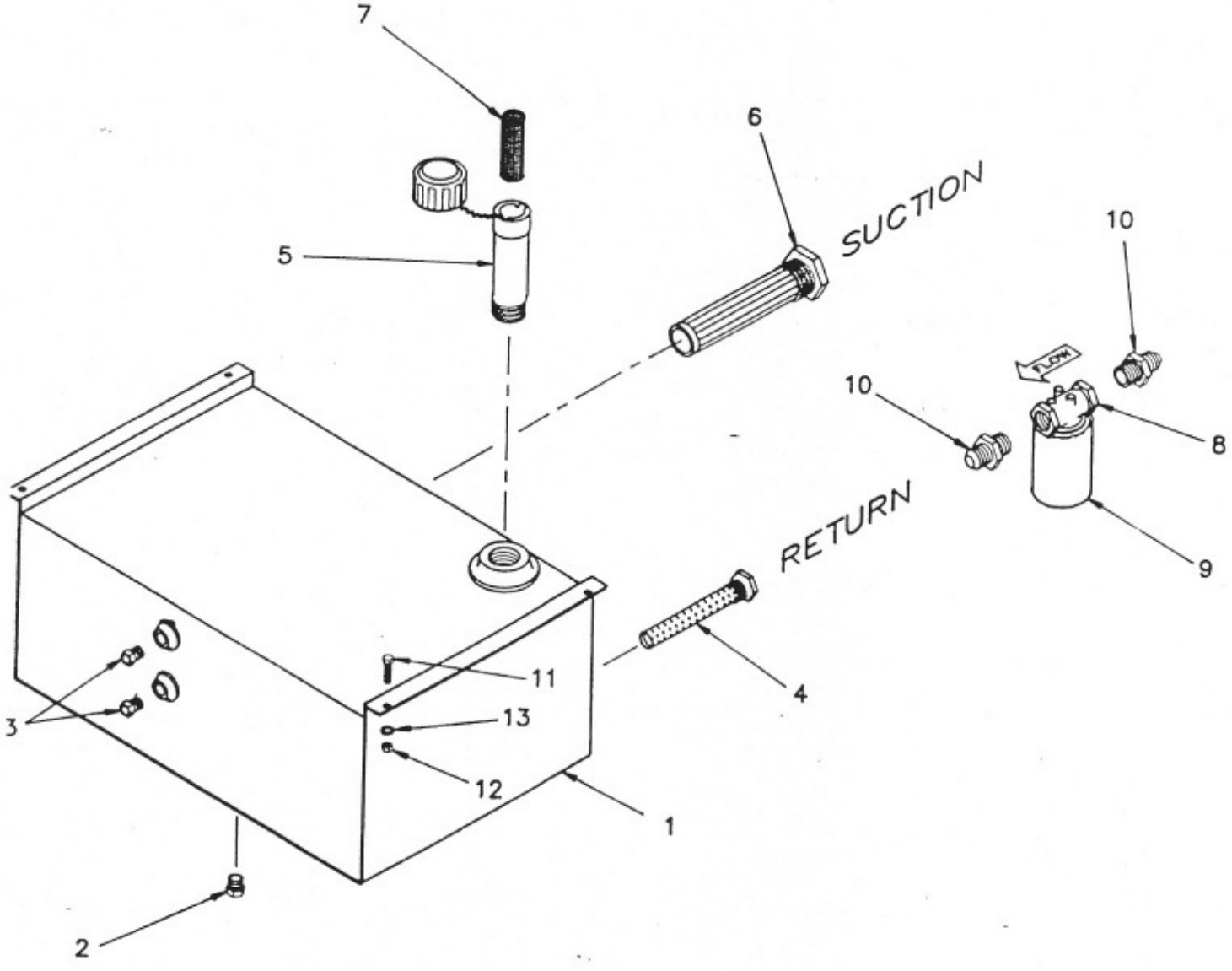
1. HANDLE KIT 367228 HAS RED HANDLE AND IS USED ON ROTATION FUNCTION ONLY.

2. HANDLE KIT 367230 HAS RED HANDLE AND IS USED ON ROTATION FUNCTION ONLY.

AW-192
CONTROL HANDLE ASSEMBLY

AW-192
CONTROL HANDLE ASSEMBLY

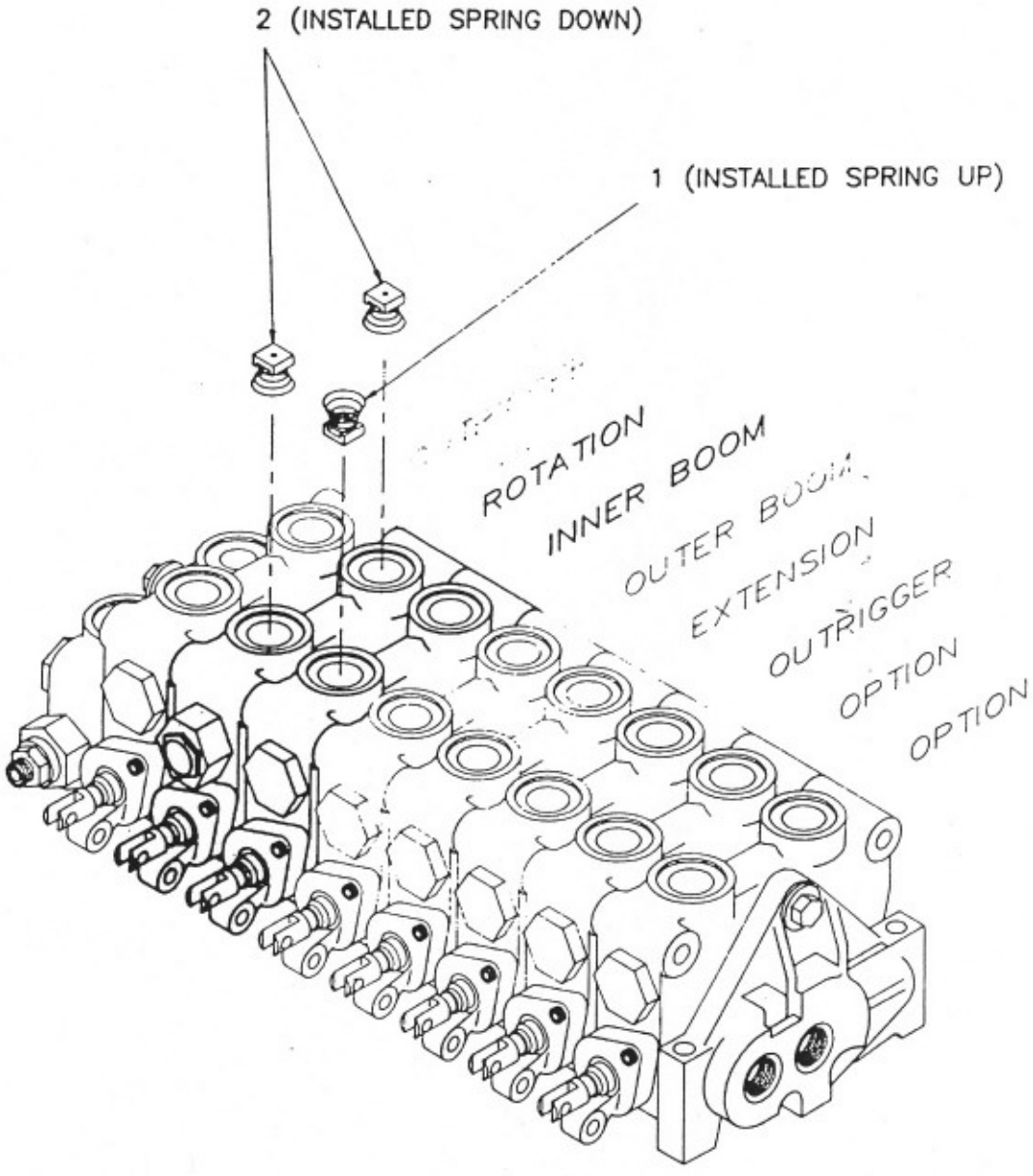
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367191	BASE, CONTROL VALVE
2	1	367192	COVER, CONTROL HANDLE
3	8	367206	CONTROL CABLE
4	7	367227	CONTROL VALVE HANDLE KIT
5	1	367228	CONTROL VALVE HANDLE KIT (ROTATION)
6	7	367229	CURBSIDE HANDLE KIT
7	1	367230	CURB SIDE HANDLE KIT (ROTATION)
8	8	368094	ROD END, CONTROL VALVE
9	8	367231	CLEVIS, CABLE
10	1	367234	CONTROL VALVE (MODIFIED)
11	7	330371	SCREW, HX. HD. 3/8-NC X 1"
12	7	017100	NUT, HX. 3/8-NC
13	7	021100	WASHER, SP. LK. 3/8
14	3	811020	SCREW, HX. HD. 5/16-NC X 3"
15	3	020600	WASHER, SP. LK 5/16
16	3	016500	NUT, HX. 5/16-NC
17	1	367232	CONTROL HANDLE BASE WELDMENT
18	3	368113	SPACER
19	3	811023	SCREW, HX. HD. 3/8-NC X 4"



AW–367218
RESERVOIR ASSEMBLY

AW-367218
RESERVOIR ASSEMBLY

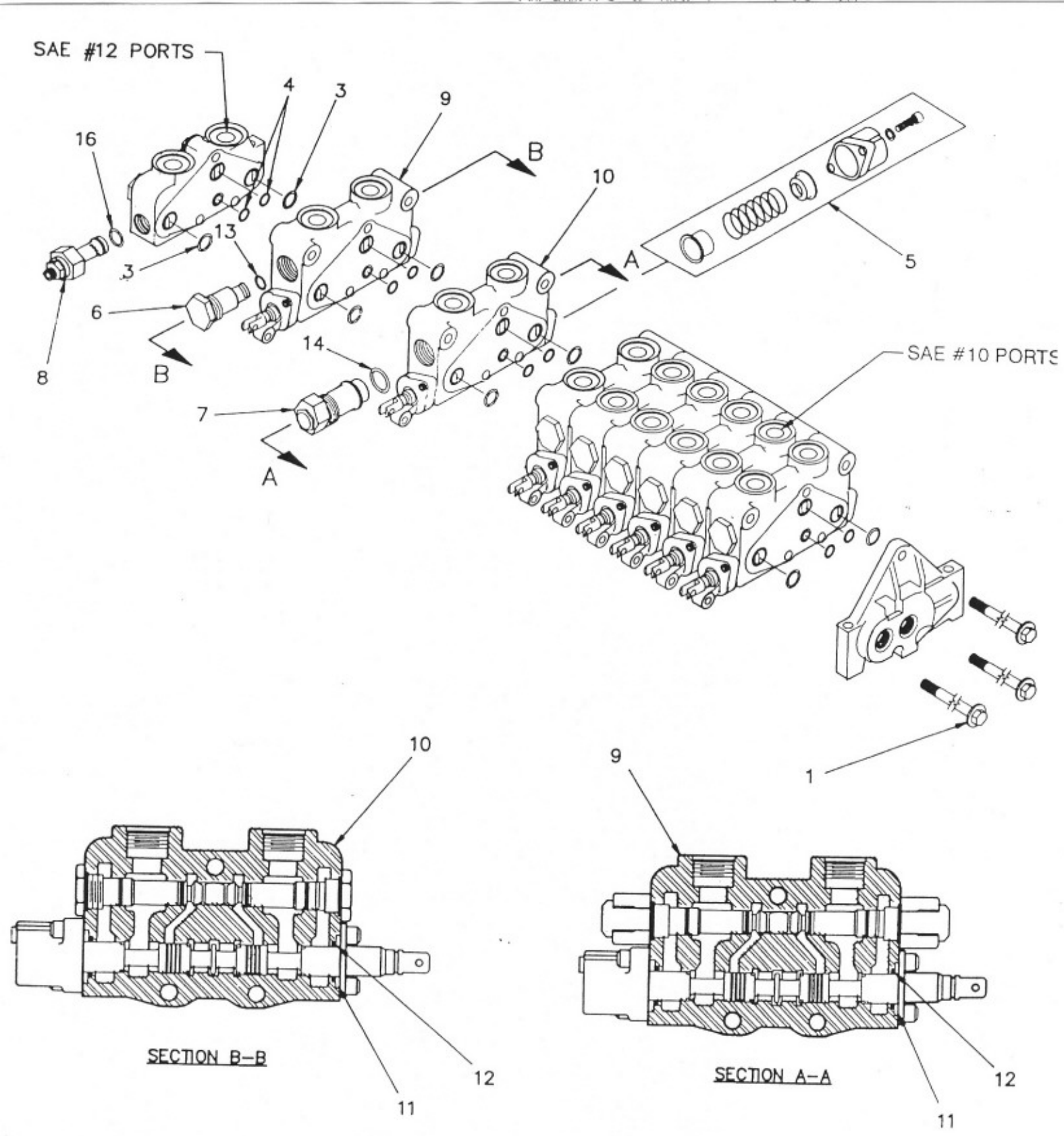
ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367107	RESERVOIR WELDMENT
2	1	750477	PLUG, PIPE
3	2	360150	PLUG, SIGHT
4	1	750708	STRAINER, DIFFUSER
5	1	367219	FILLER NECK ASSEMBLY
6	1	750707	STRAINER, SUCTION
7	1	367170	SCREEN, INLET FILLNECK
8	1	367209	FILTER HEAD
9	1	360277	SPIN ON FILTER (10 MICRON)
10	2	367210	ADAPTER, STR. -160RM/ -12JIC
11	4	330371	SCREW, HX. HD. 3/8-NC X 1"
12	4	017100	NUT, HX. 3/8 - NC
13	4	021100	WASHER, SP. LK. 3/8



AW–194
RESTRICTOR ASSEMBLY

AW-194
FLOW RESTRICTOR ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367226	FLOW RESTRICTOR .120 ORIFICE
2	2	367205	FLOW RESTRICTOR .062 ORIFICE



AW–367234
CONTROL VALVE ASSEMBLY

AW-367234
CONTROL VALVE ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	367024-001	STUD KIT
2	1	367024-002	INLET, COVER
3	18	367024-003	O-RING, RETURN (LARGE)
4	18	367024-004	O-RING, PRESSURE (SMALL)
5	8	367024-005	POSITIONER, STD.
6	14	367024-006	LOAD CHECK PLUG
7	2	367024-007	WORK PORT RELIEF
8	1	367024-008	INLET RELIEF VALVE
9	7	367024-009	VALVE SECT. 4-WAY, 3 POS. CYL.
10	1	367024-010	VALVE SECT. 4-WAY, 3 POS. FR. FL.
11	16	367024-012	RETAINER PLATE, WASHER SPOOL
12	16	367024-013	SEAL AND WASHER SPOOL.
13	14	367024-014	SEAL KIT, LOAD PLUG
14	2	367024-015	SEAL KIT, PORT RELIEF
15	2	367024-016	SERVICE KIT, PORT RELIEF
16	2	367024-017	SEAL KIT, INLET RELIEF

AW-202
HYDRAULIC CYLINDER COMPONENTS

LIFT

CYLINDER	COMPONENT	QTY.	PART NO.
367109	CASE	1	367109-001
	ROD	1	367109-002
	HEAD GLAND	1	367109-003
	PISTON	1	367109-004
	SEAL KIT	1	367175

OUTER BOOM

CYLINDER	COMPONENT	QTY.	PART NO.
367110	CASE	1	367110-001
	ROD	1	367110-002
	HEAD GLAND	1	367110-003
	PISTON	1	367110-004
	SEAL KIT	1	367176

OUTRIGGER, STREET

CYLINDER	COMPONENT	QTY.	PART NO.
367111	CASE	1	367111-001
	ROD	1	367111-002
	HEAD GLAND	1	367111-003
	PISTON	1	367111-004
	SEAL KIT	1	367177

EXTENSION, 2-STAGE

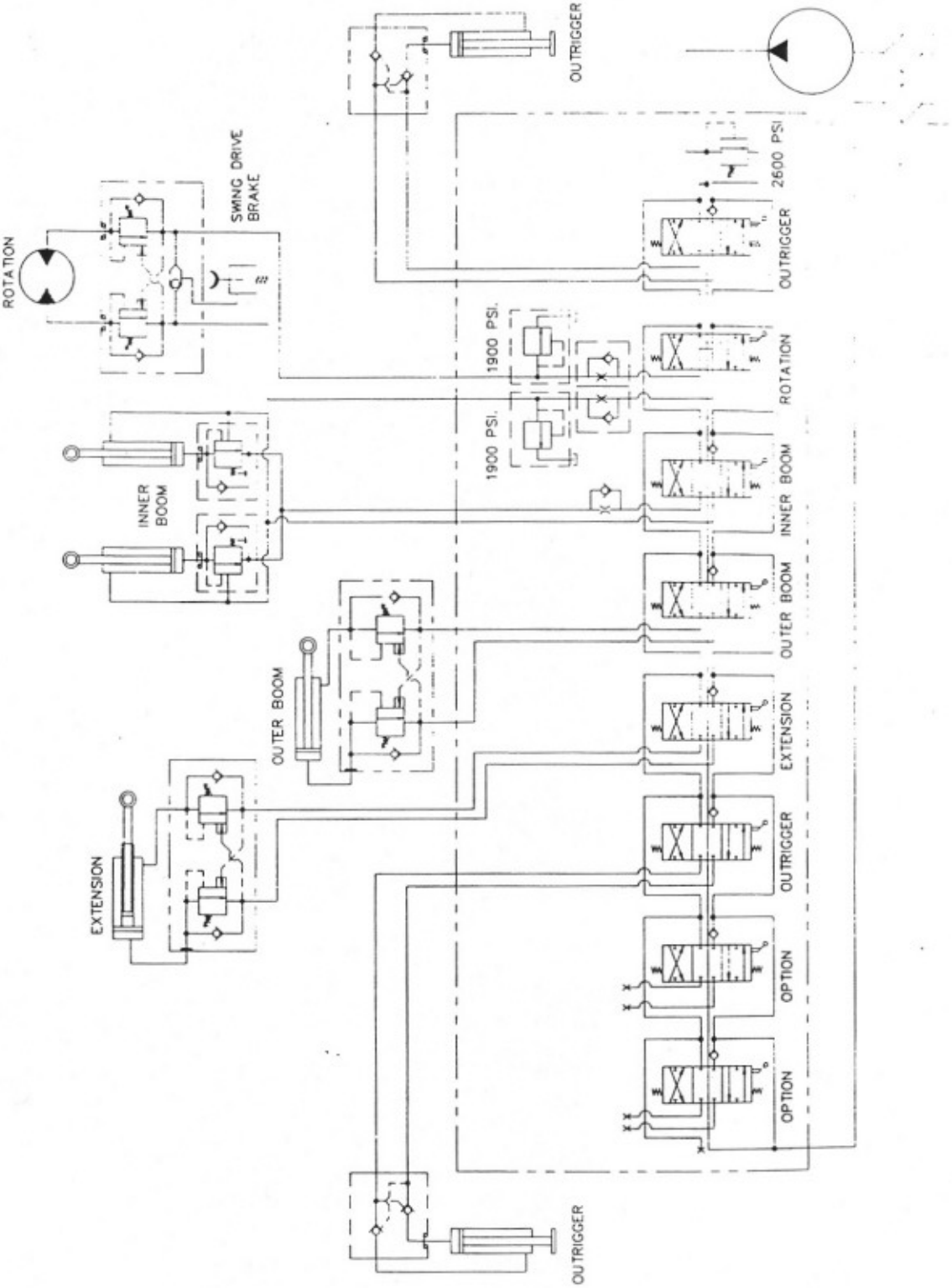
CYLINDER	COMPONENT	QTY.	PART NO.
367112	CASE	1	367112-001
	ROD	1	367112-002
	HEAD GLAND	1	367112-003
	PISTON	1	367112-004
	SEAL KIT	1	367178

OUTRIGGER, CURB

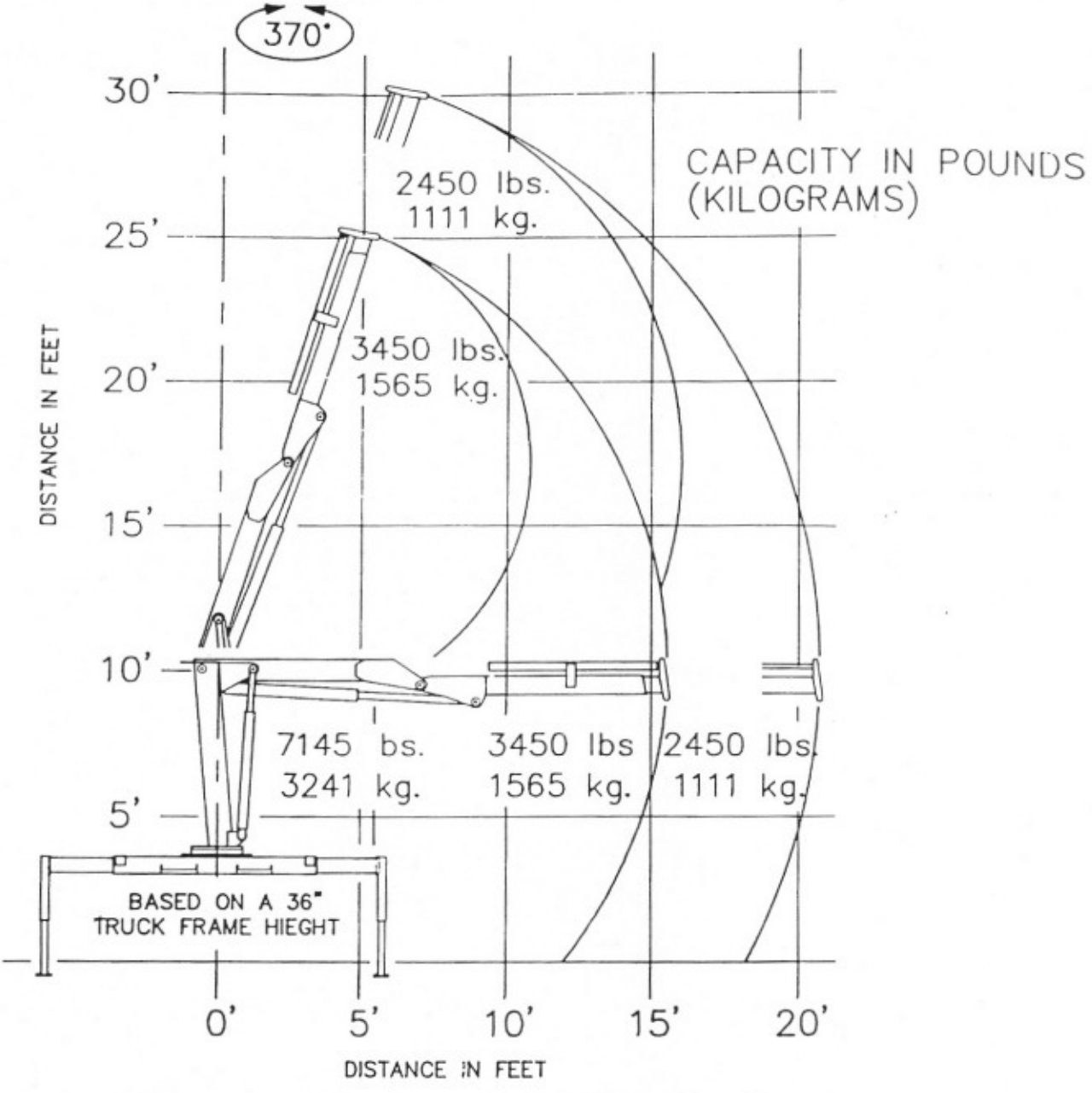
CYLINDER	COMPONENT	QTY.	PART NO.
367165	CASE	1	367165-001
	ROD	1	367165-002
	HEAD GLAND	1	367165-003
	PISTON	1	367165-004
	SEAL KIT	1	367177

EXTENSION, SINGLE STAGE

CYLINDER	COMPONENT	QTY.	PART NO.
367189	CASE	1	367189-001
	ROD	1	367189-002
	HEAD GLAND	1	367189-003
	PISTON	1	367189-004
	SEAL KIT	1	367245

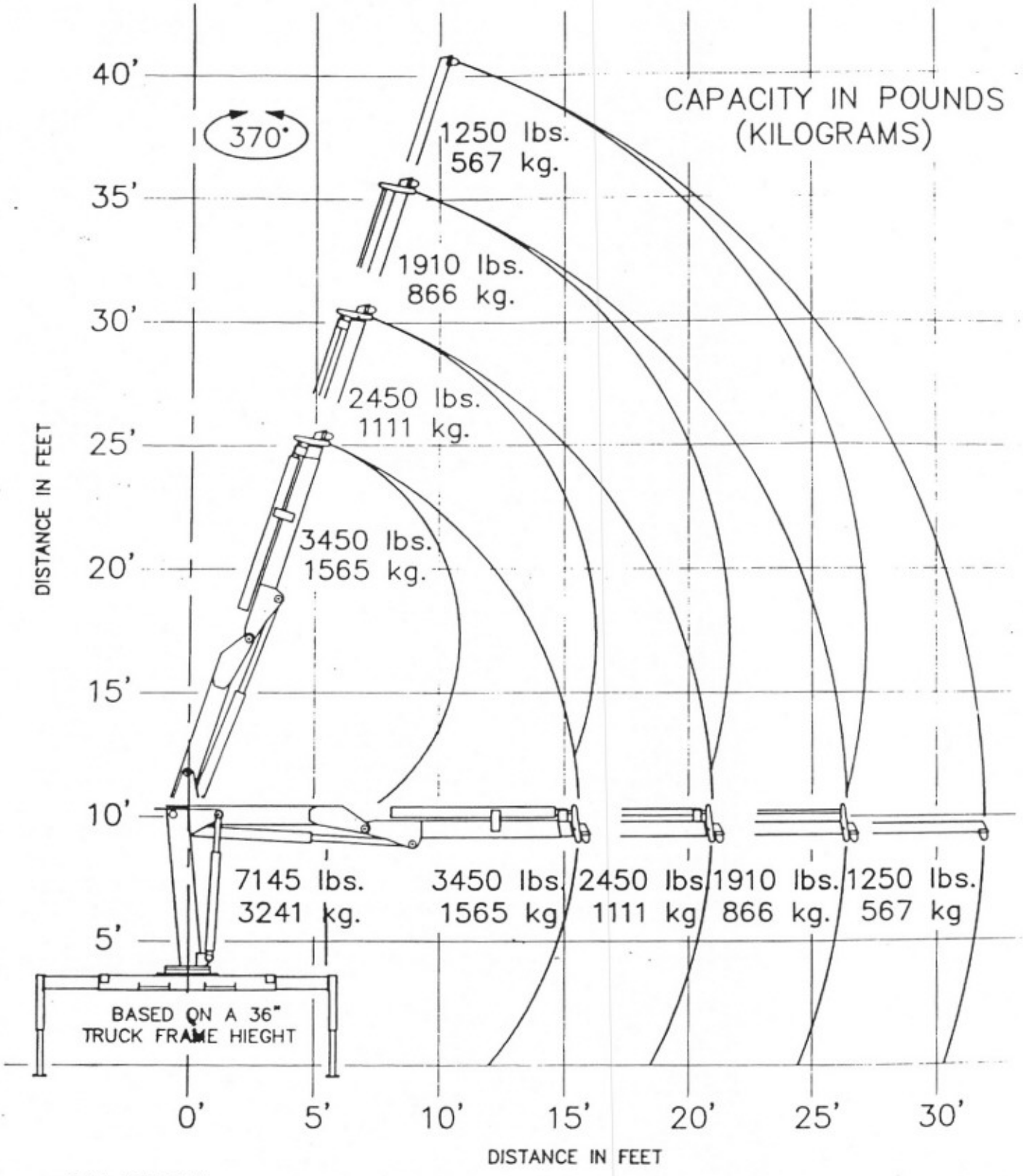


AW-205
HYDRAULIC SCHEMATIC



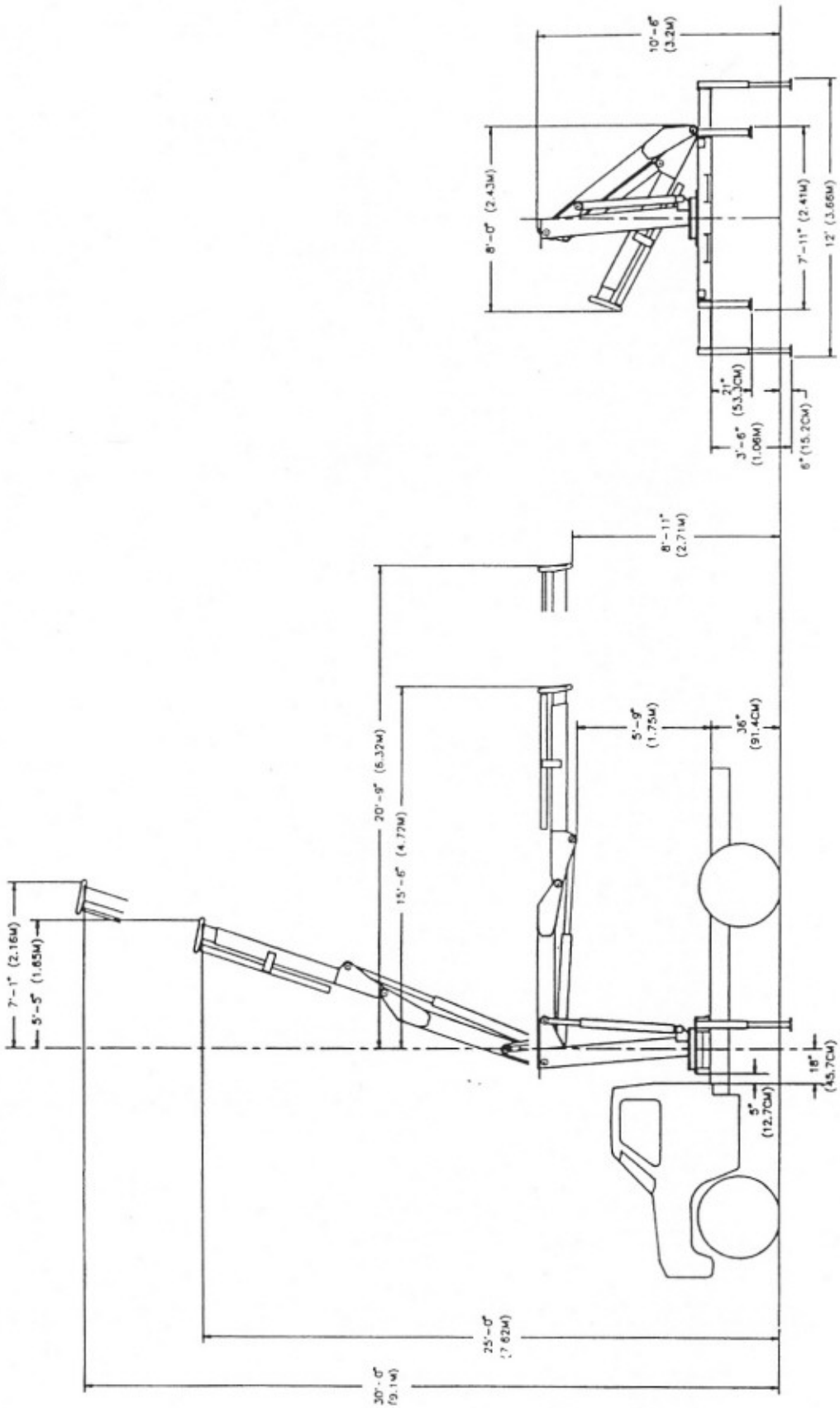
CAUTION! DO NOT OPERATE CRANE UNTIL OUTRIGGER LEGS HAVE BEEN EXTENDED WITH POSITIVE CONTACT ON A FIRM SURFACE AND WHEN CRANE IS MOUNTED AS SPECIFIED BY THE MANUFACTURER.

AW-198
LOAD CAPACITIES
SINGLE STAGE EXTENSION

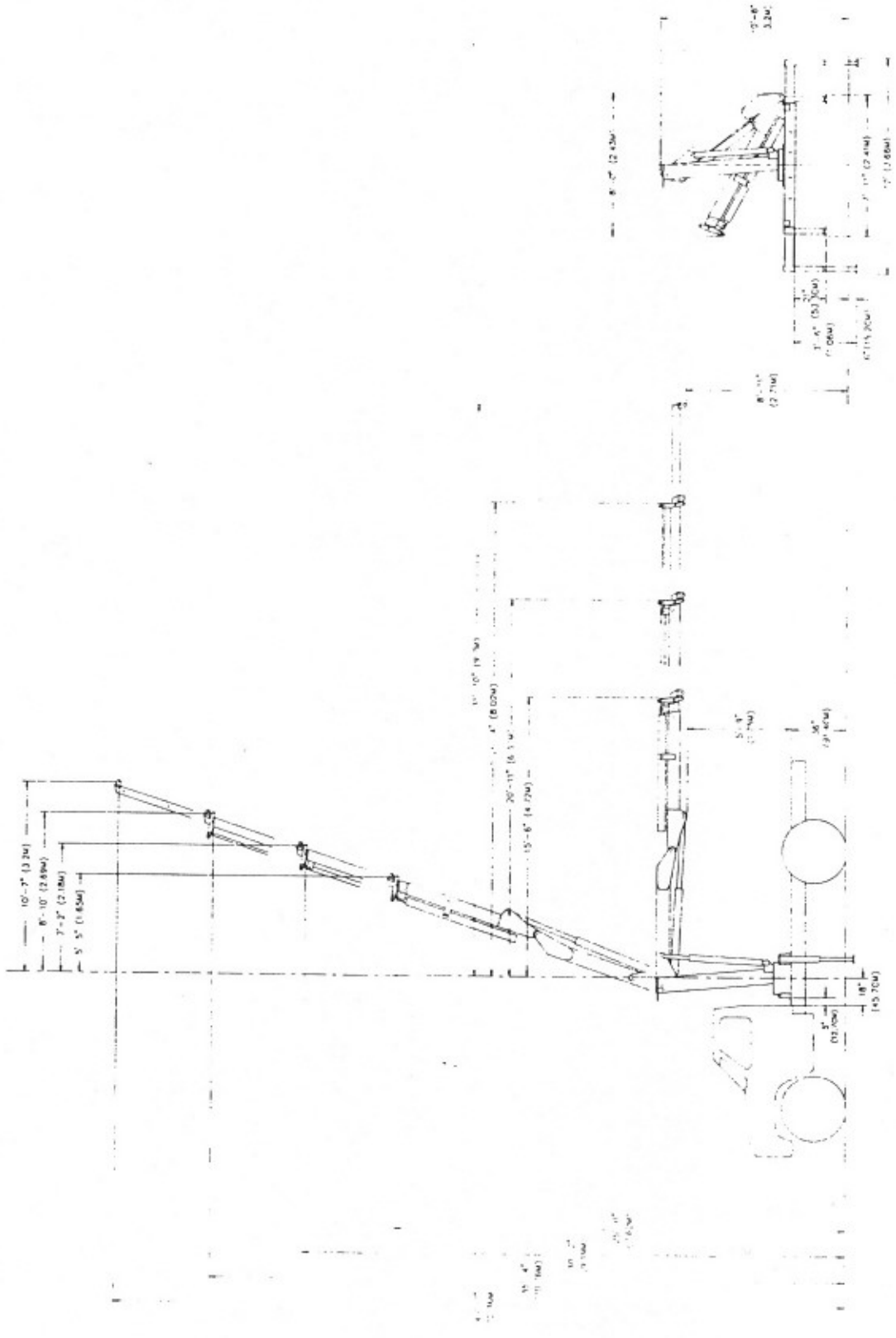


CAUTION! DO NOT OPERATE CRANE UNTIL OUTRIGGER LEGS HAVE BEEN EXTENDED WITH POSITIVE CONTACT ON A FIRM SURFACE AND WHEN CRANE IS MOUNTED AS SPECIFIED BY THE MANUFACTURER.

AW–199
LOAD CAPACITIES
TWO STAGE EXTENSION



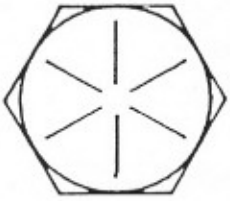
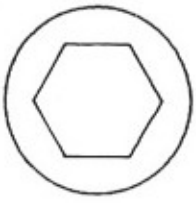
AW–197
GENERAL DIMENSIONS
SINGLE STAGE EXTENSION



AW 191
GENERAL DIMENSIONS
TWO STAGE EXTENSION

AUTO CRANE COMPANY™

COARSE THREAD
BOLT TORQUE RATING CHART
FOR AUTO CRANE ASSEMBLY

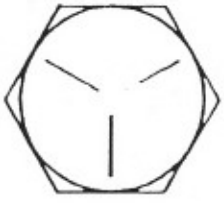
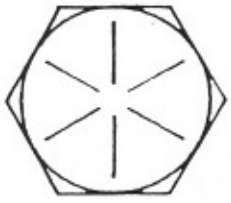
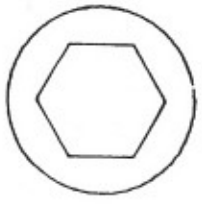
BOLT GRADE	SAE GRADE 5	SAE GRADE 8	SOCKET HEAD CAP SCREW
			
MIN. TENSILE STRENGTH	105,000 P.S.I.	150,000 P.S.I.	170,000 P.S.I.

BOLT SIZE	GRADE 5		GRADE 8		SOCKET HEAD CAP SCREW	
UNRC	IN./LB.	FT./LB.	IN./LB.	FT./LB.	IN./LB.	FT./LB.
3/8 – 16	276	23	420	35	420	35
7/16 – 14	420	35	660	55	720	60
1/2 – 13	660	55	960	80	1,080	90
9/16 – 12	960	80	1,320	110	1,560	130
5/8 – 11	1,320	110	2,040	170	2,160	180
3/4 – 10	2,400	200	3,360	280	3,840	320
7/8 – 9	3,600	300	5,520	460	6,240	520
1 – 8	5,280	440	8,160	680	9,240	770
1 1/8 – 7	7,200	600	11,520	960	13,200	1,100
1 1/4 – 7	10,080	840	16,320	1,30	18,600	1,550
1 3/8 – 6	13,200	1,100	21,360	1,780	24,360	2,030
1 1/2 – 6	17,520	1,460	28,320	2,360	32,280	2,690

NOTE: ALL ABOVE TORQUE VALUES ARE BASED ON PLATED AND/OR LIGHTLY LUBRICATED THREADS.
ONCE A BOLT HAS BEEN TORQUED TO ITS RATED CAPACITY AND THEN REMOVED REPLACE BOLT WITH A NEW ONE.

AUTO CRANE COMPANY™

FINE THREAD
BOLT TORQUE RATING CHART
FOR AUTO CRANE ASSEMBLY

BOLT GRADE	SAE GRADE 5	SAE GRADE 8	SOCKET HEAD CAP SCREW
			
MIN. TENSILE STRENGTH	105,000 P.S.I.	150,000 P.S.I.	170,000 P.S.I.

BOLT SIZE	GRADE 5		GRADE 8		SOCKET HEAD CAP SCREW	
UNRF	IN./LB.	FT./LB.	IN./LB.	FT./LB.	IN./LB.	FT./LB.
3/8 – 24	312	26	444	37	430	35
7/16 – 20	492	41	696	58	680	56
1/2 – 20	768	64	1,080	90	1,030	85
9/16 – 18	1,092	91	1,548	129	1,480	123
5/8 – 18	1,536	128	2,160	180	2,000	166
3/4 – 16	2,676	223	3,780	315	3,600	300
7/8 – 9	4,260	355	6,012	501	5,700	475
1 – 12	6,348	529	8,952	746	8,300	691
1 – 14	6,492	541	9,168	764		
1 1/8 – 12	8,016	668	12,996	1,083	12,500	1,041
1 1/4 – 12	11,160	930	18,108	1,509	17,000	1,416
1 3/8 – 12	15,048	1,254	24,408	2,034	22,000	1,833
1 1/2 – 12	19,740	1,645	32,016	2,668	29,500	2,458

NOTE: ALL ABOVE TORQUE VALUES ARE BASED ON PLATED AND/OR LIGHTLY LUBRICATED THREADS.
ONCE A BOLT HAS BEEN TORQUED TO ITS RATED CAPACITY AND THEN REMOVED REPLACE BOLT WITH A NEW ONE.

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.