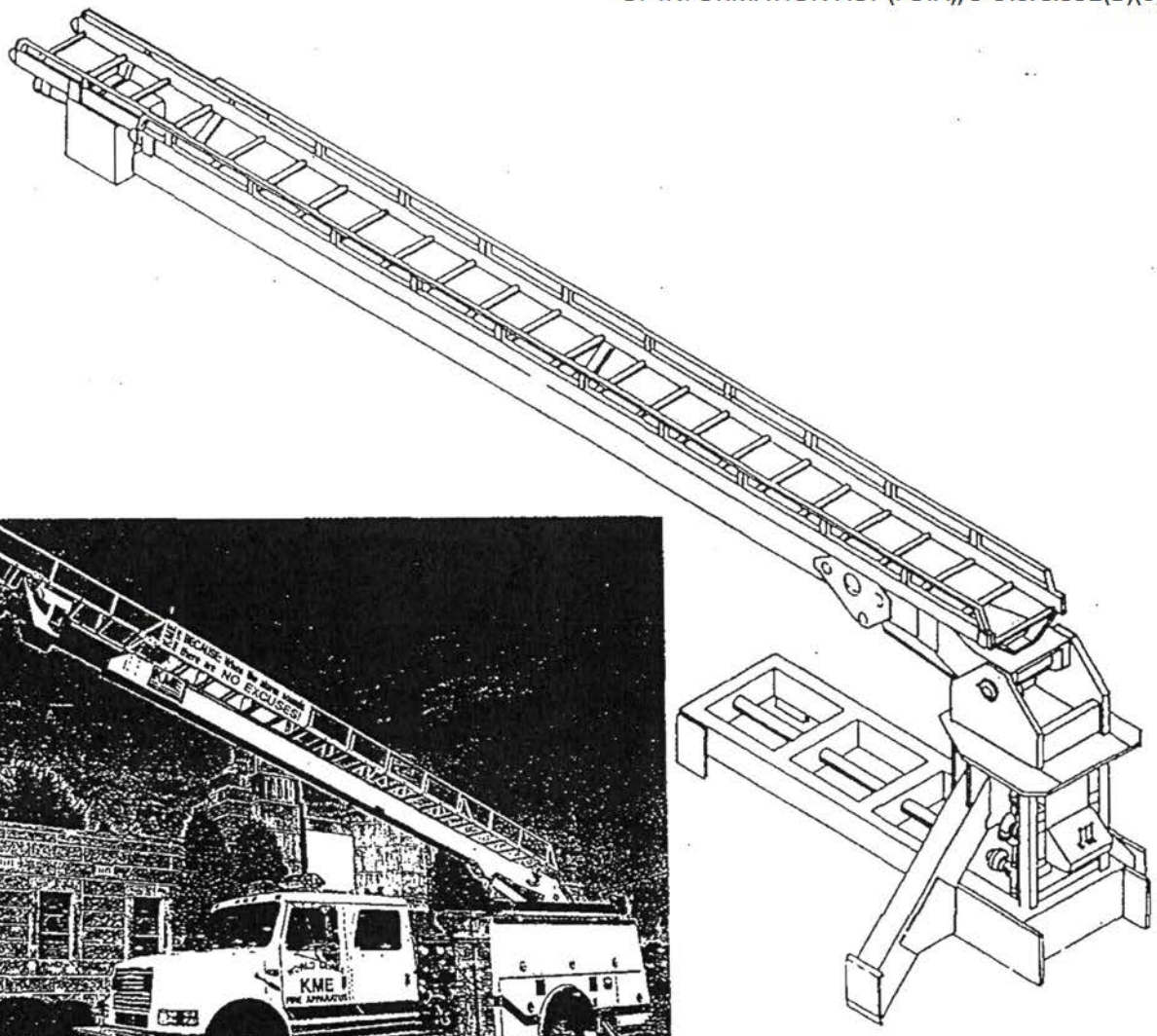


55 FOOT
FIRE STIX
SERVICE AND OPERATORS MANUAL

KOVATCH MOBILE EQUIPMENT
One Industrial Complex
Nesquehoning, PA 18240
<570> 669-9461

1708 Seibel Drive - N.E.
Roanoke, VA 24012
<540> 982-3573

SERVICE AND OPERATORS MANUAL

2S-55' FIRE STIX

S/N _____

KOVATCH MOBILE EQUIPMENT
One Industrial Complex
Nesquehoning, PA 18240
<570> 669-9461

1708 Seibel Drive - N.E.
Roanoke, VA 24012
<540> 982-3573

SAFETY SUMMARY

The following are general safety precautions and instructions that people must understand and apply during many phases of operation and maintenance to ensure personal safety and health. Portions of this may be repeated elsewhere in this publication for emphasis.

WARNING AND CAUTION STATEMENTS

WARNING and CAUTION statements have been strategically placed throughout this text prior to operating or maintenance procedures, practices or conditions considered essential to the protection of personnel (WARNING) or equipment and property (CAUTION). A WARNING or CAUTION will apply each time the related step is repeated. Prior to starting any task, the WARNINGS and CAUTIONS included in this text for that task will be reviewed and understood.

DO NOT WEAR JEWELRY

Remove rings, watches, and other metallic objects which may cause shock or burn hazards.

FINGER RINGS

Snagged finger rings have caused many serious injuries. Unless specifically allowed by shop safety procedures, remove finger rings during all maintenance activity.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment of equipment unless another person capable of rendering aid and resuscitation is present.

DANGEROUS PRESSURES

Pressure systems precautions apply to all ranges of pressure. Care must be taken during testing to ensure that all connections are proper and tight prior to applying pressure to the test setup; all system components must be compatible with pressures applied. Personnel must be protected by a safety shield or located at a distance sufficient to prevent injury.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Wear protective clothing/equipment (gloves, apron, eye protection, etc.) approved for the materials, procedures, and tools being used. Contact supervisor for guidance. If necessary, the Bioenvironmental Engineer or the Base Safety Office would be contacted for guidance.

LEAKS IN EXHAUST MANIFOLDS

Leaks in exhaust manifolds, mufflers, or piping must be corrected immediately. Fumes escaping into the cab can result in carbon monoxide poisioning of operating personnel.

MOUNTING/DISMOUNTING VEHICLE

Use extreme caution when mounting and dismounting vehicle and opening engine and vehicle compartments.

AUXILIARY GENERATOR

Do not connect auxiliary generator to any buildings electrical system without a transfer switch installed by a licensed electrician. Serious injury or death may result to utility workers and others through hazard of electrical backfeed.

TIRES

Never add air to a tire if its pressure has fallen below 20 psi. The lock ring may become unseated and may fly off when pressure is added. If pressure is below 20 psi, have the tire removed and placed in a tire cage before inflating.

KOVATCH MOBILE EQUIPMENT CORPORATION

One Industrial Complex
Nesquehoning, PA 18240
<570> 669-9461

1708 Seibel Drive - N.E.
Roanoke, VA 24012
<540> 982-3573

FORWARD

This manual has been written to familiarize operators and maintenance personnel with the KME Water Tower's characteristics.

The intent of this publication is to outline basic operational procedures, prescribe general safety parameters and to provide guidance or general maintenance and service requirements. No attempt will be made to present detailed operational procedures as circumstances and the ingenuity of those confronted by them will far exced any present concept of application.

Personnel involved in the use of this equipment must be aware of the potential dangers produced by disregard of safety rules, lack of consideration of capacity limitations or improper operational and maintenance procedures.

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION I

GENERAL DESCRIPTIONS

FIGURE 1-1 2S-55' WATER TOWER

FIRE STIX

The KME Water Tower is primarily designed as a water tower and features rescue ladder capability. Integrated with an attack pumper, the KME Water Tower produces an aggressive fire fighting tool; in addition it provides a versatile means of rescue.

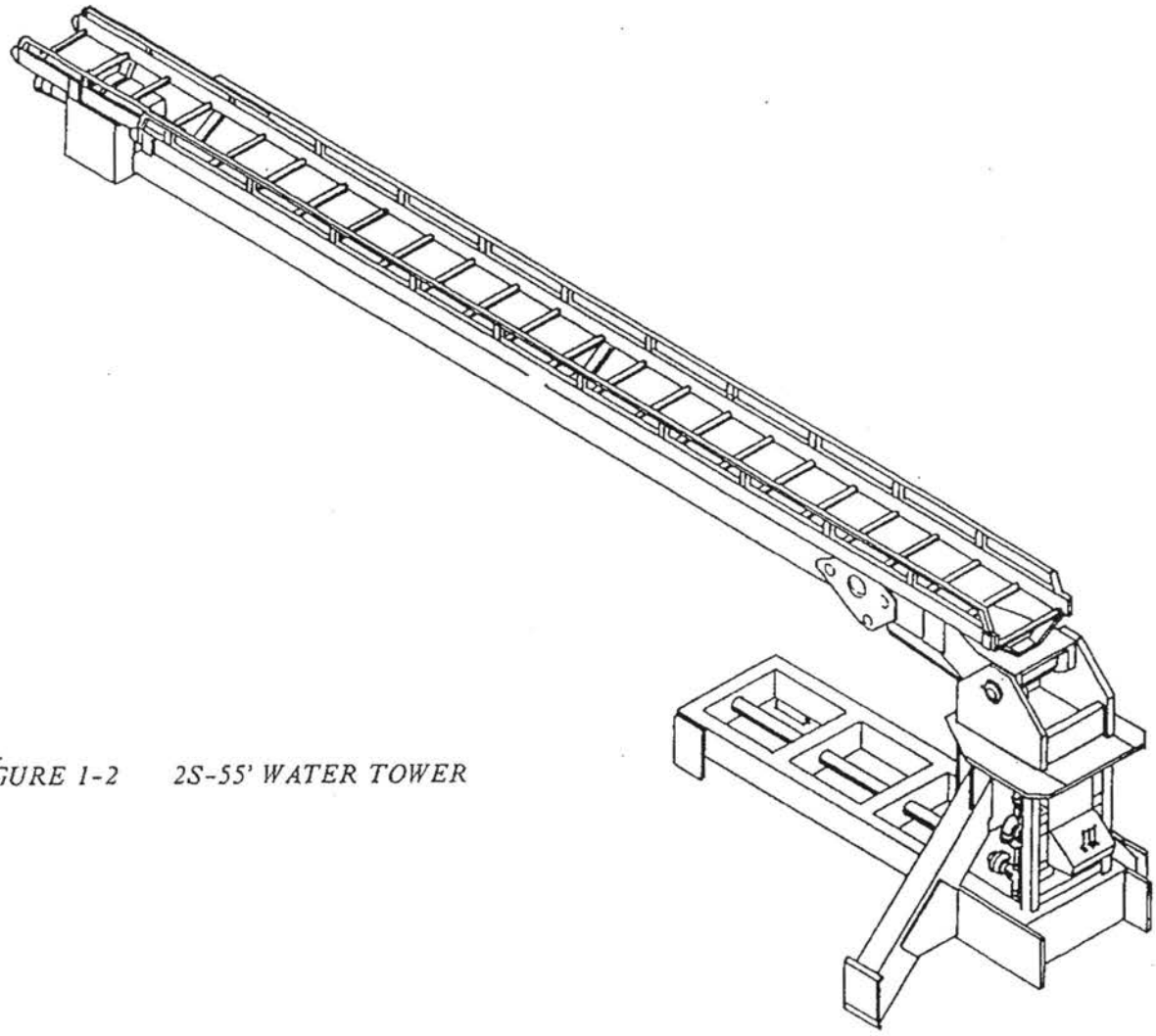


FIGURE 1-2 2S-55' WATER TOWER

All KME devices meet design criteria and incorporate system beyond their rated requirements. Operational design and system function are engineered with consideration of "human factors", realizing the diverse conditions encountered during rescue operations and foreground evolutions.

Principally designed as a water tower, the KME Water Tower delivers high volumes of water for firefighting operations through an aluminum waterway in a two section hydraulically operated telescopic boom. With a wide steel ladder secured to the boom sections, the KME Water Tower immediately responds to rescue situations, requiring safe and rapid evacuation of personnel.

KME Water Tower Systems and component parts are briefly described in the following paragraphs. Understanding the KME Water Tower's basic systems, their relationships to one another and their interface with the pumper to which they have been incorporated, is essential to effective tactical application of the equipment by it's operators.

HYDRAULIC SYSTEM. The main hydraulic system, which operates at pressure up to 2750 PSI consists of the following major components. A PTO driven, fixed displacement pump, delivering volumes up to 20 GPM. The two major operational circuits, the outrigger and the boom circuits, employ four-way/three position, open center directional control valves. The selector valve, is a two position valve which allows operation of one or the other of the two major circuits.

Hydraulic oil is supplied to the boom components located above the rotation point of the turntable through a high pressure hydraulic swivel. Hydraulic oil is stored in a 25 gallon Torque box beam reservoir. All oil is filtered through a 10 micron, in-line high pressure and return oil filter. High pressure is a cartridge type and the return is a canister type.

NEUTRAL SAFETY SYSTEM. Vehicles driven through an automatic transmission incorporate the KME Neutral Safety System. This electrical interlock system, much like that of a fire pump prevents operation of the Water Tower's main hydraulic system or throttle controls, when the transmission range selector is in any position other than neutral, if the fire pump has not been engaged. The interlock system has a second feature which incorporates the air park brake. It must be applied to obtain hydraulic system functions.

OUTRIGGER SYSTEM. Stability required for safe accomplishment of Water Tower Operations is provided by a welded steel pedestal and torque box used to transfer loads imposed by the boom, to the outriggers. Each of the A-frame outriggers is powered by a double-acting 4-inch diameter hydraulic cylinder, incorporating an integral, dual-piloted holding valve. The outrigger cylinders are completely enclosed to prevent damage to the rods.

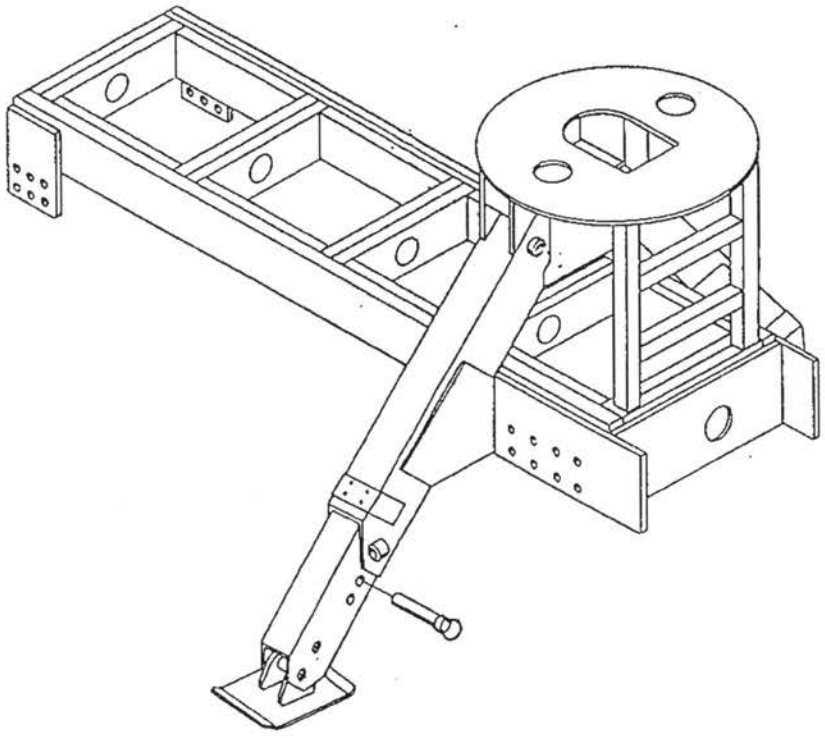


FIGURE 1-3 TORQUE BOX AND OUTRIGGERS

BOOM SECTIONS. The KME Water Tower is comprised of two sections of thin walled, high strength steel tubing. A double-acting 3-1/4 inch diameter hydraulic cylinder provides power to extend and retract the moving boom section. Friction at load transfer points between the two boom sections is reduced by high density nylon wear pads.

The boom will elevate and extend to a nominal height of 55 feet and is capable of providing horizontal reach of 45 feet from the center line of rotation.

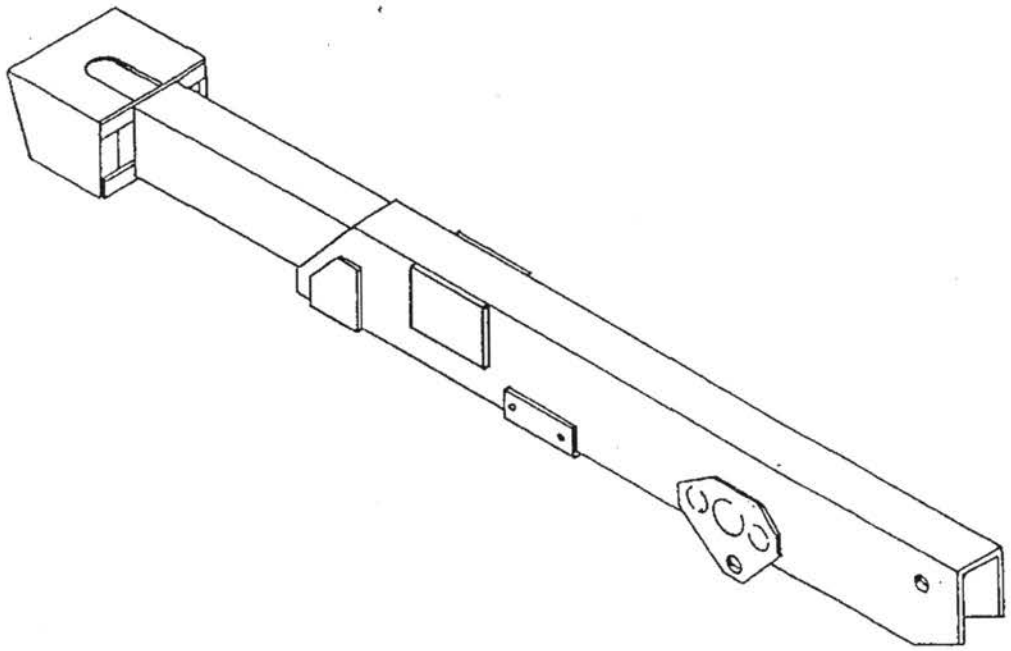


FIGURE 1-4 BOOM SECTIONS

LADDER SECTIONS. A two section steel ladder is mounted to and operates as part of the boom. The minimum width of the ladder is 18-inches and the handrails extend a minimum of 12-inch above the rung center line. Folding steps are provided at the tip end of the fly section.

EXTENSION SYSTEM. Extension and retraction are accomplished by a single, double-acting 3-1/4 inch diameter hydraulic cylinder installed inside the boom section. The extension cylinder is equipped with an integral, pilot operated holding valve to prevent boom retraction in the event of hydraulic line failure. High density nylon wear pads are used at load transfer points, to maximum strength and minimize friction.

ELEVATION SYSTEM. Boom elevation from -10° to 90° is possible at all positions of extension through 55 feet. Power to accomplish elevation of the boom is provided by a single 5-1/2 inch diameter double-acting hydraulic cylinder equipped with an integral pilot operated holding valve. An elevation angle degree indicator is provided on the base section.

ROTATION SYSTEM. A monorace ball bearing attaches the turntable to the pedestal. Swivels installed in the electrical, hydraulic and water supplies to the boom permit unlimited 360° rotation of the turntable in either direction. Rotation is accomplished by means of two planetary drive speed reducer gear boxes. The gears are driven by hydraulic motors which provide infinite speed control of the boom's rotation. Positive holding of the Water Tower during all phases of operation is provided by dual, spring applied, hydraulically released disc brakes.

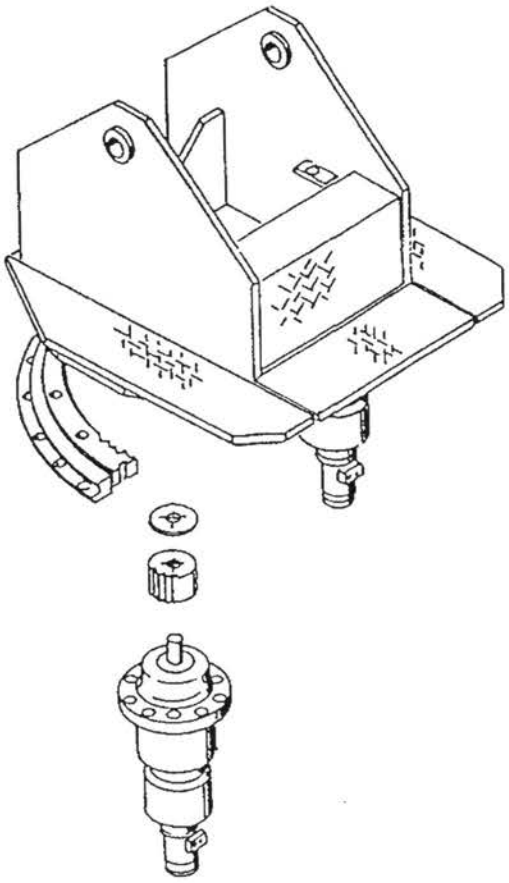


FIGURE 1-5 ROTATION SYSTEM

WATER SYSTEM. A 4-inch main waterway is provided through the torque box and up through the pedestal to the boom. A 4-inch butterfly valve, to regulate flow to the monitor, a relief valve and a water swivel are located in the pedestal. The telescopic waterway, within the boom consists of a 4-inch diameter base section, and a 3-1/2 inch diameter fly section.

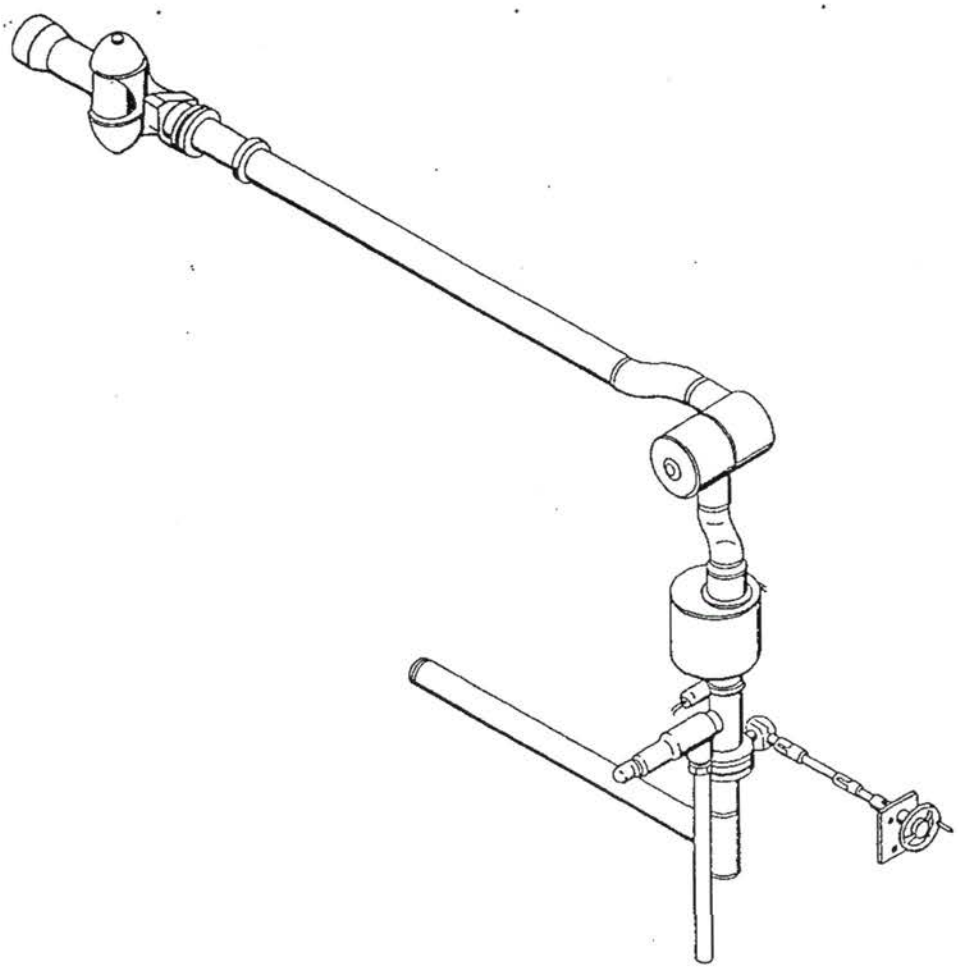


FIGURE 1-6 WATER SYSTEM AND MONITOR

MONITOR. A remote controlled monitor is mounted on the fly section water pipe at the tip of the boom. Flows ranging from 300 to 1000 GPM with nozzle patterns from full fog to straight stream can be realized with the monitor in any of it's operating positions. Vertical travel of the nozzle is 135° and horizontally the nozzle sweep is a full 180°.

AUXILIARY CONTROL STATION. KME Water Tower may be equipped with a remote operators station, in addition to the main control station at the rear of the vehicle. From this auxiliary control station, the fire pump operator is able to operate the boom control valve and the monitor. Control of the boom from the auxiliary control station is accomplished through electrically operated hand controllers. The controllers are equipped with a spring loaded lock, to prevent accidental movement of the boom.

The main control station operator, by virtue of the manual control of the boom control valve at the tailboard position, is able to override any boom control signal originating at the auxiliary control station. The main control valve has an unintentional movement control mounted on the tail board.

OUTRIGGER/BOOM INTERLOCK. An electrical interlock is provided to prevent the operator of the Water Tower from deploying the boom before the outriggers have been extended. This circuit also prevents inadvertent operation of the outrigger system after the boom has been elevated, until the boom is returned to the cradle.

Micro switches under the outrigger tubes close when the jack tubes are extended. This energizes a normally open solenoid valve at the bottom of the torque box pedestal allowing pressure to be developed in the boom control valve. Upon elevating the boom, a micro switch mounted to the cradle opens, de-energizing a normally open solenoid valve, also at the bottom of the pedestal, preventing pressure from being developed in the outrigger system.

Override knobs are mounted to the normally open solenoid valves to enable the operators to return the boom to it's cradle in the event of outrigger/boom interlock malfunction. Override buttons are located on the outrigger valve. There are four (4) buttons, two (2) on top of the valve and two (2) on the bottom of the valve. The upper left button controls the left jack **DOWN FUNCTION**. The lower left button controls the left jack **UP FUNCTION**. The same is typical of the right side buttons.

TABLE OF CONTENTS

SECTION II

SAFETY PRECAUTIONS

SAFETY PRECAUTIONS

It is impossible to prescribe a complete list of safety precautions which will cover all situations. Due to diverse operating conditions and tasks to be performed, safe fireground management of aerial equipment is the prime responsibility of the operator. Constant avoidance of basic known hazardous conditions and correct reaction to unexpected circumstances are the result of training and experience. All personnel that work with this equipment should be educated in safety rules and trained to perform their tasks without creating dangerous situations.

The following list of safety rules has been complied to aid the operator in safe and efficient utilization of the KME Water Tower.

Promote the safe operation and use of your KME Water Tower at all times....**Perfect safety records are not an accident.**

1. Set-Up

A. **Always position and set outriggers before attempting any boom function.**
Water Tower chassis are spring mounted and furnish no stability for boom operations.

B. **Keep away from dangerous banks or places where uncertain support may exist.**

2. Capacities.

A. **Know your capacities.**
Even though load charts are installed on the equipment, it is the responsibility of the operators to know the load capabilities of the unit before placing themselves into service.

B. **Do not exceed rated load capacities.**
Regardless of design safety factors, exceeding published load limitations must be avoided at all times.

WARNING

Do not rely upon apparatus tipping to determine maximum boom load capacity.

3. Boom Operation.

A. **Know the location of alternate controls and their operation.**
Emergency operation might be required without warning. Know the "backup system" and controls well enough to instinctively operate them.

B. **A qualified operator should remain at the main control console at all times.**
If the Water tower is being operated from an auxiliary control station, a second operator should remain at the rear control for emergency operations.

C. **Watch the boom at all times.**
Watch the boom while it is in motion. Should you have to look in another direction, stop operation immediately.

D. **Make all movement of the boom deliberate and precise.**

1. Use smooth, even pressure when actuating controls. Boom position and speed can be deceiving when viewed from the base.

2. Sudden starts and stops can create high inertial forces, endangering both equipment and personnel.

E. **Never get on or off the machine while it is in motion.**
Never get on or off a moving machine. When getting on or off use both hands and be assured of your footing.

F. **Never rapidly reverse swing direction.**
Damage to the swing system will result from rapidly reversing the direction of the boom without allowing the unit to stop between functions.

G. **Never fully support the boom against any structure.**
This unit is designed to be used in the unsupported configuration. "Reverse loading" introduces component stresses and can reduce capacity. The **unsupported configuration** is a safety feature, keeping the unit in the air should the wall collapse.

4. **Personnel on the Boom.**

A. **Position the boom, then climb.**
Never allow climbing operations during any boom function.

B. **Never extend or retract with personnel on the ladder.**
The power available to extend or retract the boom is sufficient to sever or mangle an arm or leg which may have slipped between the rungs.

C. Water Reaction.
Personnel at the tip of the boom must be considered if the monitor position must be changed during water tower operations, to ensure that they will not be "off-guard" to possible shifts in boom tip position.

D. Ladder Elevation.
Never allow ladder climbing when boom operations are being carried out at elevations above 75°.

5. Hazards.

A. **Overhead Wiring.**
Always keep the boom at least ten feet away from energized wiring. If the boom should contact these lines, all personnel on the vehicle should remain in position until the boom is freed or the power is shut off. Keep all ground personnel away from the apparatus. If no one is on the ladder and the operator must leave the deck, **JUMP-DO NOT STEP OFF.** As with all aerial devices, personnel involved with it's operation should be positioned fully on the vehicle or fully off the vehicle.

B. **Ice Deposits.**
Ice deposits reduce capacities. Whenever excessive ice deposits begin to accumulate on the boom during water tower operations, shut down or reduce water discharge and slowly retract and extend the boom to remove the ice. Never allow ice deposits to become excessive, eliminating rescue capability because of excess weight.

6. Hazardous Uses of Booms.

A. **Never pull sideways with a boom or use the boom as a ram.**
Boom sections are not designed for side loading or opposing pressure against the telescopic cylinder. Excessive pressure will cause the boom to fail.

B. **Do not use the boom as a crane.**

7. Boom in Use.

A. **Do not leave the controls with the boom in the air.**
Always retract and stow the boom prior to leaving the controls. An elevated and extended boom occasionally fascinates by-standers who will want to demonstrate their skills, without invitation.

8. Transporting the Boom.

A. **Always retract and stow the boom before moving the vehicle.**
Assure that the boom is firmly cradled before traveling. Never move the truck with the boom out of the stowed position as whipping loads can impose stresses which would result in structural damage to the water tower or to the chassis.

B. **Always stow the outriggers before moving the vehicle.**
Always ascertain that the outriggers have been raised and retracted fully before moving the apparatus out of position.

9. Equipment Servicing.

A. **Avoid greasy equipment.**
Keep operational decks, support rails and ladder rungs free from mud, grease or foreign substances to prevent slipping and falling.

B. **Replace guards.**
Immediately replace all guards or covers upon completion of lubrication or adjustment. Remove and store all tools before resuming operation.

C. **Use proper cleaning solutions.**
Use only non-flammable solutions for cleaning.

D. **Keep the boom in proper adjustment at all times.**
Serious injury to personnel or damage to equipment can result if adjustments are not properly maintained.

E. **Stop all operations while lubricating or adjusting.**
It is important to stop all operations of the boom while cleaning, lubricating or while adjustments are being made.

CAUTION

These are operating practices which if not strictly observed could result in damage to or destruction of the equipment.

WARNING

These operational procedures if not correctly followed could result in serious personnel injury.

TABLE OF CONTENTS

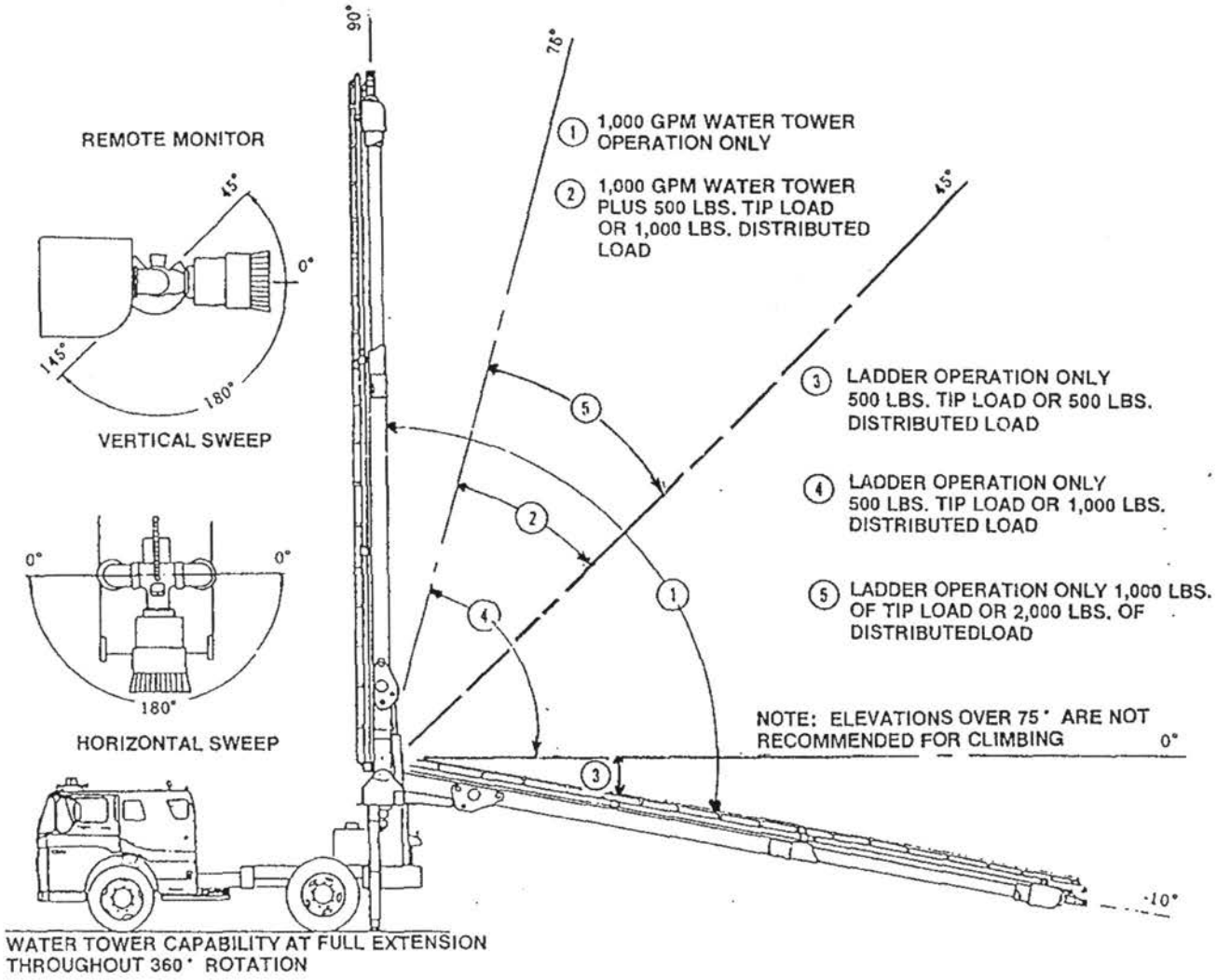
SECTION III

OPERATIONAL PROCEDURES

OPERATIONAL PROCEDURES

1. The KME Water Tower's response to whatever task is at hand will be governed by how well the operator is prepared to apply the device to the circumstances. Good judgement, combined with adherance to basic safety rules is necessary to assure the successful results of the effort.

Operating instructions and load capacities are posted at all control stations, located near the controls. Referring to the capacity chart, it will be noted that as the boom elevation angle increases, permissable loading also increases.



WATER TOWER CAPABILITY AT FULL EXTENSION THROUGHOUT 360° ROTATION

GSO#_____
DATE OF MANUFACTURE:
HYDRAULIC SYSTEM PRESSURE: 2750 PSI
HYDRAULIC OIL: AW46
RESERVOIR CAPACITY: 24 GALLONS

KME 55' FIRESTIX
NON-INSULATED
58' VERTICAL HEIGHT
47' 6-1/2" HORIZONTAL REACH

RATED CAPACITY	
MODE OF OPERATION	PERMISSIBLE ELEVATION AT FULL EXTENSION
1. 1000GPM WATER TOWER OPERATION ONLY	-10 DEGREES TO 90 DEGREES
2. 1000 GPM WATER TOWER OPERATION PLUS 500 LBS. OF TIP LOAD OR 1000 LBS. OF DISTRIBUTED LOAD.	45 DEGREE TO 75 DEGREE NOTE: ELEVATIONS OVER 75 DEGREES NOT RECOMMENDED FOR CLIMBING.
3. LADDER OPERATION ONLY, 500 LBS. OF TIP LOAD OR 500 LBS. OF DISTRIBUTION LOAD.	-10 DEGREES TO 0 DEGREES.
4. LADDER OPERATION ONLY, 500 LBS. OF TIP LOAD OR 1000 LBS. OF DISTRIBUTED LOAD.	0 DEGREES TO 75 DEGREES.
5. LADDER OPERATION ONLY, 1000 LBS. OF TIP LOAD OR 2000 LBS. OF DISTRIBUTED LOAD.	45 DEGREES TO 75 DEGREES. NOTE: ELEVATIONS OVER 75 DEGREES NOT RECOMMENDED FOR CLIMBING.

NOTE: CAPACITIES ARE GOVERNED BY THE FOLLOWING:

1. OUTRIGGERS AT MAXIMUM EXTENSION WITH SHORING PADS IN POSITION, WHEELS OFF THE GROUND AND LOCKING PINS IN PLACE.
2. GRADEABILITY: RATED CAPACITIES ARE ALLOWABLE ON GRADES UP TO 5 DEGREES.
3. OPERATING CONDITIONS: INCLUDING SUPPORTING SURFACES, WIND, HAZARDOUS SURROUNDINGS, ETC.
4. CAPACITY REDUCTIONS MUST BE MADE FOR ICE DEPOSITS.
5. CERTAIN CAPACITIES ARE LIMITED BY STRUCTURAL STRENGTH AND TIPPING SHOULD NOT BE RELIED UPON AS A CAPACITY LIMITATION.

OPERATION INSTRUCTIONS

1. ALWAYS ATTEMPT TO POSITION THE TRUCK FOR OPERATION, "OVER THE REAR".
2. ENGAGE PARKING BRAKE.
3. EXTEND OUTRIGGERS TO MAXIMUM POSITION, SHORE UNDER OUTRIGGER PADS TO ASSURE A FIRM FOUNDATION, INSERT LOCKING PINS.
4. TURN WATER SUPPLY "ON" AND "OFF" SLOWLY.
5. DO NOT RETRACT LADDER DURING WATER OPERATION. ALL OTHER MOVEMENTS OF THE LADDER MAY BE PERFORMED.

EMERGENCY OPERATION

1. THE BOOM CONTROL STATION AUTOMATICALLY OVERRIDES ANY REMOTE STATION.
2. HYDRAULIC FAILURE OVERRIDE SEQUENCE:

   A. CLOSE WATER SUPPLY, DUMP WATER FROM TOWER SYSTEM.
   B. ACTIVATE BATTERY OPERATED PUMP.
   C. ENGAGE BOOM OPERATING LEVER CONTROLS.
   D. DEPRESS SOLENOID VALVE OVERRIDE PIN.

CAUTION:

BATTERY CONDITION CONTROLS DURATION OF OPERATION. LIMIT OPERATION TO RETRACTING AND BEDDING OF TOWER AND OUTRIGGERS.

FIGURE 3-1 CAPACITY CHART

2. **Set-Up Procedure - Aerial Operation, No Fire Pump.**
   A. Position the truck in the best possible location, remembering that "over-the-rear" operation is the most advantageous operating position. Besides affording the most stable operating position, the greatest reach of the boom is realized "over-the-rear". "Over-the-rear" operation is defined as including angles up to 45° to either side of the vehicle center line.

   B. With the engine speed at idle, set the parking brake.

   C. Place the transmission in neutral.

   D. Energize the water tower power switch.

   E. Engage the PTO (most apparatus are equipped with an electric shift PTO which operates from transmission oil pressure).

   F. Engage electric fast idle switch. Throttle adjustment can normally be accomplished by activating the toggle switch in the outrigger control station.

3. **Set-Up Procedure - Aerial Operation Simultaneous with Fire Pump Operation.**
   A. Position the truck in the best possible location remembering that "over-the-rear" operation is the most advantageous operating position. Besides affording the most stable operating position, the greatest reach of the boom is realized "0ver-the-rear". "Over-the rear" operation is defined as including angles up to 45° to either side of the vehicle center line.

   B. With the engine speed at idle, set the parking brake.

   C. Place the transmission in neutral.

   D. Energize the water tower power switch.

   E. Engage the PTO (most apparatus are equipped with an electric shift PTO which operates from transmission oil pressure.)

   F. Move the electric shift switch of the fire pump to the pump position.

   G. Momentarily shift the transmission into reverse (this relieves "shaft torque" and allows the fire pump shift to be completed.)

   H. Shift the transmission into the required pumping gear. Ascertain that the "rear-end locked out" indicator light is illuminated.

4. **Outrigger System Operation.**
   A. Position the selector valve to the outrigger control circuit.

   B. Extend the jacks until the rear axle is slightly removed from the ground. This adds the weight of the wheels and axle to the total counter-weight of the unit.

   C. If the grade permits, level the chassis, by first raising the lower side to slightly above horizontal. Lower the opposite jack to level the unit.

   D. If raising the low side to above horizontal cannot be accomplished due to grade, fully extend the low side jack. The lower the opposite jack, to level the unit as well as the grade will allow, ensuring to "load the outriggers" with as much chassis weight as feasible.

   E. **Outrigger Pins.** Install the safety pins in the outrigger tube. Allow 1/4" minimum clearance above the pin. Continuously operating the water tower on the safety pins will elongate the holes in the tube. The pins are an added measure of protection; integral piloted holding valves in the jack cylinders are designed to support all loads.

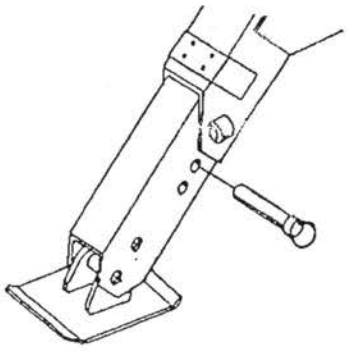


FIGURE 3-2 OUTRIGGER PIN INSTALLATION

5. **Boom Operation.**
   A. Momentarily reduce the engine RPM to idle, position the selector valve to the boom control circuit.

NOTE

Hydraulic oil is diverted to either the outrigger circuit or to the boom control valve.

This configuration forces the operator to perform a deliberate act of selecting boom or outrigger operation. The possibility of placing the boom into operation before the outriggers have been set is reduced, as is the possibility of accidental operation of outriggers after initial set-up is completed.

B. Restore the engine RPM to operational speed.

6. **Basic Rules for Boom Operation.**
   A. With the engine speed adjusted to operating RPM, raise the boom to clear all body cabinetry and fixtures.

   B. Make all starts and stops smoothly.

   C. Never extend or retract the boom with personnel on the ladder.

   D. Never allow personnel to remain on the ladder when operating the water tower at angles of operation above 75°.

   E. An operator should be positioned at the main control console during all water tower and rescue operations. This person must be prepared to respond to unexpected events or to override potentially hazardous situations which may be created by operators at auxiliary control stations.

7. **Operating Capacities.**
   A. As the operator of an aerial device, the safety of many people's lives is entrusted to you. To ensure the safe operation of aerial equipment, it is imperative that the operator be aware of its limitations.

   B. Load capabilities are established at maximum extension and operating throughout 360°.

   It is required that outriggers are set, and the boom not be supported.

   C. **Operating Conditions.** Wind, ice, and other factors affecting stability as well as strength of supporting surfaces and experience of the operator must be considered when applying the KME Water Tower to the fullest of its capabilities.

   D. Certain capacities are limited by structural strength so stability factors (as evidence by tipping) must not be relied upon as the capacity limitation.

   E. Capacity reductions must be made for ice deposits.

   F. Capacities are established with the KME standard installation. The use of alternate monitors or equipment may reduce capacities.

8. **Water Tower Operational Controls and Indicators.**
   A. **Tailboard Control Console.** The tailboard control console is located in the middle of the superstructure at the rear of the vehicle. This control station is the main control station of the aerial device. Control of all boom functions from this station overrides the input signals from auxiliary stations. This allows the main operator of the water tower to safeguard both personnel and equipment from dangers which may not be apparent to operators located at any remote station.

   B. Features of the tailboard control console clearly identified and conveniently situated at the main control console are the following items:

      1. The load capacity and operating instruction chart.
         a. This chart is provided to serve the operator as a convenient reference guide, emphasizing certain basic rules which must be considered by the operator and applied to the conditions indicated by the present situations.

      2. Flow meter calibrated to watertower flow.

      3. Pressure Gauges.
         a. The hydraulic system gauge indicates the pressure being developed by the main hydraulic system.

            1. This gauge indicates only the pressure required to circulate the oil through the system when the control levers are in their neutral positions. Upon activation of a function, pressure developed to perform that operation is indicated by the gauge.

2. Maximum hydraulic system pressure is 2750 PSI.

b. The water system gauge indicates the pressure present in the water system, at the base of the tower. Maximum water system pressure is 200 PSI.

4. **Elevation Control Lever.** The boom elevation control is located to the right of the control console.
   a. Elevation of the boom is affected by pulling the lever toward the operator.

WARNING

Before raising the boom, assure that the area above the boom is clear of obstructions.

Boom elevation from -10° to 90° is controlled by this lever. Boom elevation is maintained while the lever is in neutral by a holding valve integral to the lift cylinder.

b. Pushing the lever forward, away from the operator lowers the boom.

WARNING

Before lowering the boom, assure that the area below the boom is clear of obstructions and personnel.

c. Engine RPM and control lever distance from neutral determines boom raising and lowering speed. Always feather the control lever for smooth starts and stops when operating the boom elevation.

5. **Boom Extension Control Lever.** The boom extension control lever is located to the left of the control console.

   a. Pushing the lever forward, away from the operator, extends the boom.

WARNING

Before extending the boom ensure that the area in the direction of the extension is clear of obstructions and personnel

Desired extension of the boom is maintained by a holding valve built into the extension cylinder within the boom.

b. Retraction of the boom is accomplished by pulling the control lever towards the operator.

WARNING

Never extend or retract the boom while personnel are on the ladder.

c. Engine RPM and control lever distance from neutral determine operating speed. Always feather the controls when operating the extension/retraction system.

6. **Swing Control Lever.** The swing control lever is located in the center of the control console.

   a. Pushing the control lever forward, away from the operator, will swing the boom to the right or clockwise as viewed from above.

   b. Left or counterclockwise rotation is accomplished by pulling the control lever toward the operator.

   c. The boom equipped with a dual swing drive system and rotational position is maintained by two automatically engaged disc brake units.

   d. Engine RPM and control lever distance from neutral determine operating speed. Always feather the controls when operating the swing system.

WARNING

Never rapidly reverse swing direction without allowing the boom to stop between functions.

7. **Monitor Control Switches.** The monitor control switches, located near the boom operational control levers allow direction of the monitor nozzle in the horizontal and vertical axis and control of the stream pattern from 60° fog to straight stream.

8. **Emergency Power Unit Switch.** The emergency power unit (EPU) switch is a momentary contact switch which is held in the closed position by the operator, while the boom is returned to the stowed position, using the control levers at the main control station.

9. **Rung Alignment Indicator.** When light is illuminated rungs are aligned for climbing.

9. **Water Tower Operation/Water Tower Capabilities.**
The following water tower load capacities have been established with the outriggers lowered to relieve chassis weight from the axles, the truck level (within 0° to -5° grade) and the boom sections unsupported.

NOTE

Certain capacities are limited by structural strength, so stability factors (as evidenced by tipping) must not be relied upon as the capacity limitation.

Capacity reduction must be made for ice deposits, wind conditions, uncertain support or other adverse conditions presented by the circumstances.

Capacities are established with the KME standard installation, Use of alternate monitors or equipment may reduce capacities.

A. **Water Tower Operation.**
Many of the basic rules for safe water tower operation are based upon water reaction force. "Reaction Force" must be appreciated and respected by the operator in order to safeguard both personnel and equipment from serious consequences.

1. Turn water supply on and off slowly; abrupt changes in water supply can create "water hammer" which greatly increases reaction force and can cause boom whip.

2. Ice deposits reduce capabilities because of excess weight.

3. Never allow water in the water system to become frozen.

4. An operator must remain at the main control station during water tower operations.

10. **Stowing Procedures.**
A. Upon completion of fire fighting activities or training exercises, the following procedures are recommended for readying the vehicle for over the road operation.

1. Drain the waterway of water from water tower operations.

2. Return the boom to the cradle.

3. Adjust engine RPM to idle.

4. Pull the selector valve to the outrigger circuit.

5. Remove and store the outrigger safety pins.

6. Restore engine RPM to operational speed.

7. Raise the stabilizing jack cylinders to full retraction.

8. Return the engine RPM to idle.

9. Disengage the PTO.

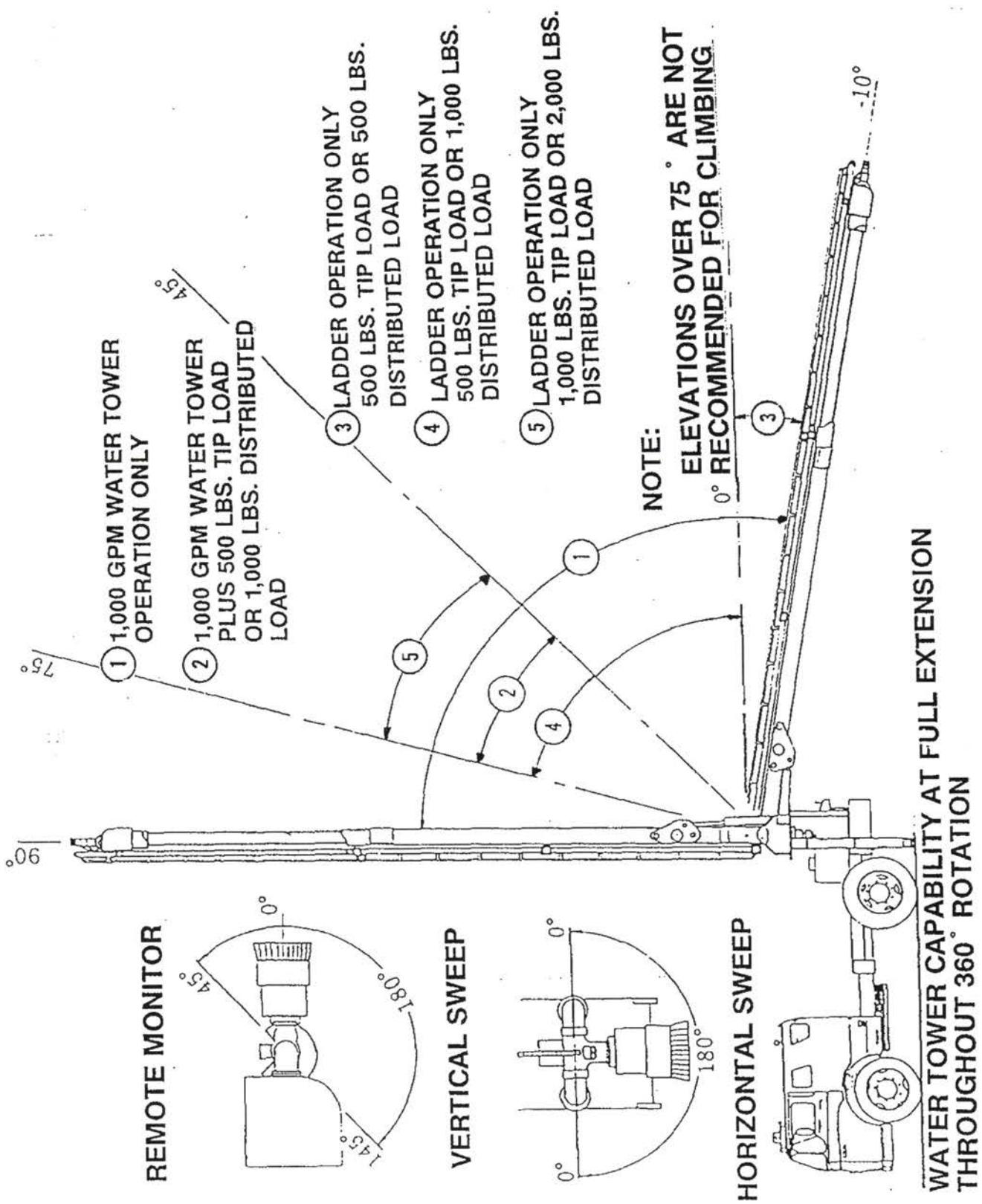


FIGURE 3-3 WATER TOWER CAPABILITIES

10. De-energize the water tower power switch. If fire pump has been in operation during aerial operations:

    a. Shift transmission to neutral.

    b. Place the fire pump switch in the road position.

11. **Emergency Systems Operation.**

The KME Water Tower is equipped with an electric motor driven hydraulic pump which will provide hydraulic power in the event of a major breakdown of the vehicle's main power plant during operations. The pump will provide sufficient oil to operate all hydraulic functions, but at a slower than normal rate.

This pump should be used only in the event of failure of the main hydraulic pump or the truck engine. It's use should be limited to returning the boom to it's cradle and to stow the outriggers.

A. **Operating Procedure.**

1. Ignition Switch On. Disengage the PTO driven main hydraulic pump.

2. Ladder Power On. Engage the "emergency power unit" with the electric on/off switch located on the main control console.

3. Operate the main hydraulic control levers in the normal manner.

4. De-energize the "emergency power unit" as soon as possible upon completion of operations.

CAUTION

Never operate the "emergency power unit" while the main hydraulic pump is in operation.

WARNING

The emergency hydraulic pump is designed for limited use. The 12 volt DC motor has a design limit of seven (7) minutes operation at 275 AMPS after which it must be allowed to cool for 1-1/2 hours to ambient temperature.

TABLE OF CONTENTS

SECTION IV

WATER TOWER MAINTENANCE

KME WATER TOWER MAINTENANCE AND INSPECTION.

The key to unit reliability, trouble-free operation and long component life is regular and proper lubrication and accomplishment of preventative maintenance procedures.

This section will set forth a guideline prescribed to provide the water tower with a maintenance program which will ensure it's continued performance as the versatile firefighting and rescue tool that it is intended to be.

Key areas of maintenance importance are:

1. Hydraulic System.

   Particular care and attention must be paid to the hydraulic system, in respect to cleanliness and filtration.

   Although ages old in concept, hydraulic system development represents one of the most dynamic sciences of the present day. Hydraulic systems operate near silently, while developing tremendous power with incomparable smoothness and ease of control. The only power lost in a properly maintained hydraulic system is due to friction of the fluid as it is moved through the system and the drag of the seals required to contain the working pressures in the various components.

   The greatest enemy of any hydraulic system is contamination. Design and manufacturing tolerances of working parts in hydraulic systems are very close. Even small amounts of foreign materials in a hydraulic system will cause wear and damage to hydraulic pumps, motors and component parts, resulting in faulty operation.

   Contaminants can enter a hydraulic system through addition of unfiltered oils, allowing moisture to enter the system, condensation, especially inside the hydraulic reservoir, installation of components or lines which have not been stored or handled properly, use of improper fluids, excessively high oil temperature, resulting in oxidation or by allowing pump cavitation because of improper warm up or leaking suction lines.

   The maintenance and service personnel responsible for the Water Tower must be on guard to assure the integrity of the hydraulic system. Care must be taken that only oils of the proper viscosity suitable for the climate are used, and that filter elements, provided in the system are replaced at regular intervals.

2. Lubrication.

   Proper lubrication represents the most beneficial preventative maintenance which is prescribed for the Water Tower.

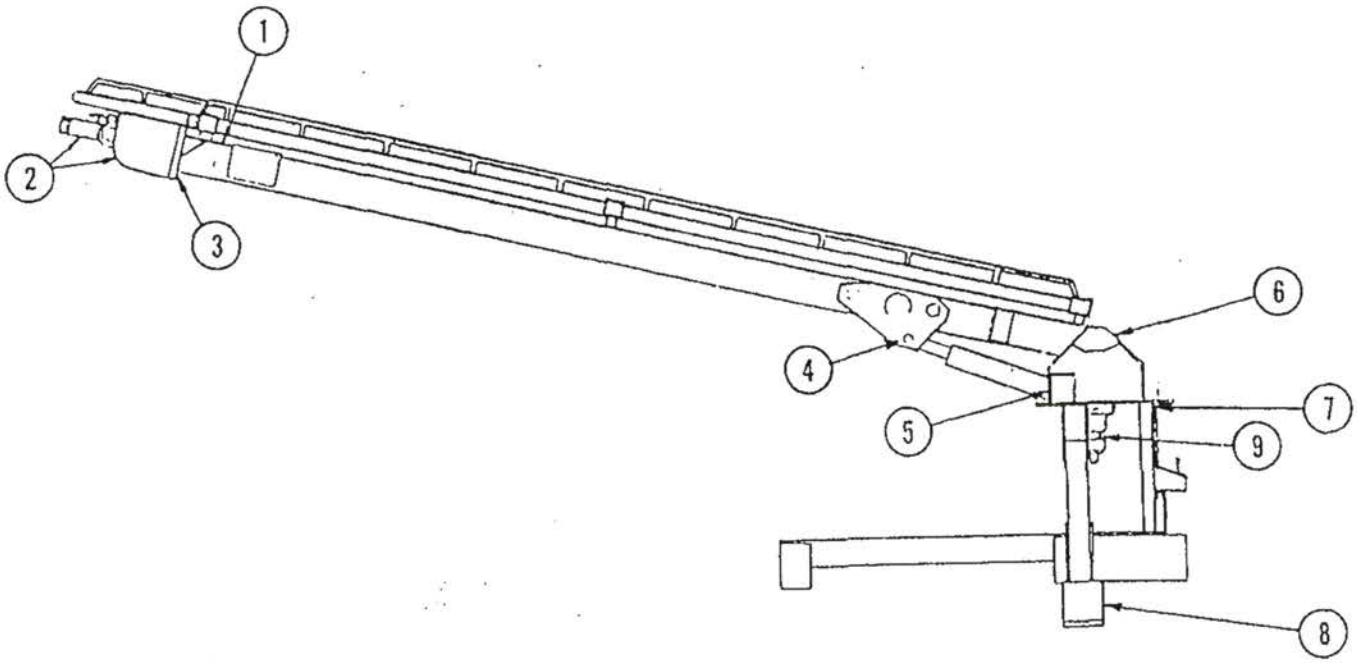
   Lubrication guidelines set forth are specified for normal operation where moderate temperature, humidity and atmospheric conditions prevail. In areas of extreme heat and humidity or in extremely cold regions, the servicing intervals and lubricant specifications should be adjusted to satisfy existing conditions.

   The importance of proper lubrication, at specified time intervals, cannot be over emphasized. Efficient unit operation depends greatly upon how well lubrication recommendations, as set forth by the manufacturer are followed.

LUBRICANT SPECIFICATIONS

Key	Specification
EP(LSB)	A multi-purpose type grease, having a minimum dripping point of 350°F (176.6°C) excellent water resistance, and of an extreme pressure type (minimum Timken OK load 40 pounds). For normal ambient temperatures: NLGI No.1 or No.2 grade. For above 100°F (37.8°C) temperatures: NLGI No.2 or No.3 grade. For -0°F (-17.8°C) temperatures: NLGI No.0 grade.
EPGL	A multi-purpose extreme pressure gear oil designed to meet the requirements of military-specification MIL-L-2105C.

Recommended lubricant for lubrication points specifying EP lubricant is KME Long-Life Multi-Purpose Moly Compound Grease.



LUBRICATION DIAGRAM

No.	Nomenclature	Lube Points	Lubricant
1	Waterway (access through fly tube)	1	EP
2	Monitor	3	EP
3	Slide Pads/Fly tube	-	EP
4	Lift Cylinder Bushing	1	EP
5	Lift Cylinder Bushing	1	EP
6	Heel Pin	2	EP
7	Turntable Bearing	3	EP
8	Outrigger Pad	1 ea.	EP
9	Swing Drive	1	EPGL

FIGURE 4-1 LUBRICATION CHART

KME Long-Life Multi-Purpose Grease is a superior lubricant, designed for year round use under the most demanding applications.

The lubricant is an extreme pressure, anti-wear, high load carrying lubricant, containing molybenum compounds and is highly resistant to water, rust and corrosion.

KME grease is available throughout the KME Service Network.

3. Waterway.

Aluminum is used extensively in the KME Water System because of the weight advantage which it affords. Extruded aluminum tubing and aluminum fittings are used throughout the boom assembly. The monitor assembly used with the Water Tower is made up of aluminum alloy castings.

Aluminum is subject to abrasion and corrosion,, therefore it is imperative that an on-going program of preventive maintenance and lubrication be established to protect the piping from the ravaging effects of unclean water and neglect.

A. After each use of the Water System, particularly any time water has been pumped from draft, hydrant or in relay which was dirty, abrasive or corrosive, the Water Tower must be extended to it's full length, positioned below 0° and flushed thoroughly with fresh water.

B. A grease zert is located at the far end of the base section and is accessible through a hole in the top of the fly section of the boom. Grease should be applied at this point after each use of the water system. If the water system has not been charged, the fitting should be greased after each five (5) hours of aerial operation. This zert provides lubrication to the main seals of the telescopic pipe.

NOTE

These are maintenance procedures intended to extend the life of the water system components. These measures will help to avoid equipment "down-time" and costly seal or tube replacement. Therefore, take time to properly maintain your water system.

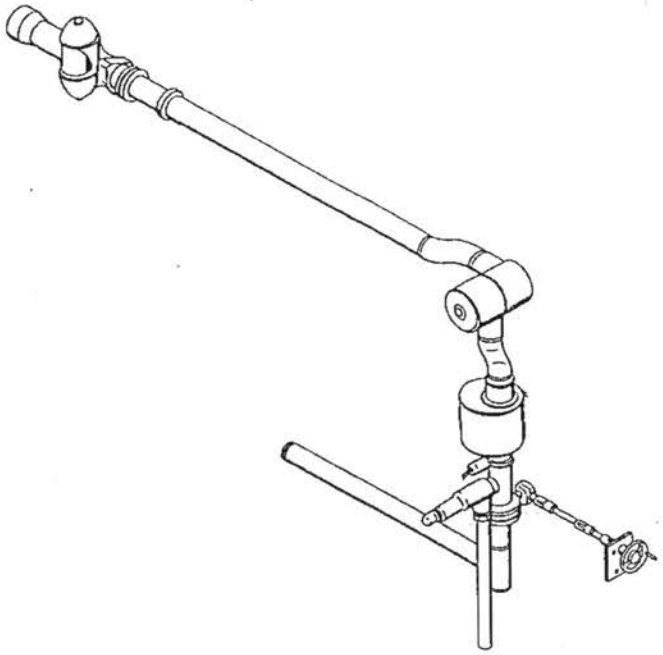


FIGURE 4-2 ALUMINUM WATER SYSTEM AND MONITOR

C. The maintenance guidelines set forth for the aluminum waterway are also applicable to the monitor assembly. The rotation points of the monitor should be lubricated after each use of the water tower.

4. **Inspection and Maintenance Schedule.**

A. After each use of the KME Water Tower which involved aerial operations, lubricate the waterway and monitor.

1. This is accomplished, with the outriggers set, by extending the boom approximately 6" to align the hole in the of the fly section boom tube with the grease fitting at the end of the base section pipe.

2. Use a hand grease gun for the water system lube points. Approximately four (4) to six (6) pumps of grease into the water pipe fitting should suffice. Monitor rotation points should be greased using the normal visual indicators for the guidelines as to quantity of lube injected.

B. 10-Hour Inspection/Maintenance.

1. After each 10-hours of aerial operation: Clean the entire aerial device. Remove any mud and grease from operating decks and ladder rungs. Check the overall appearance of the boom and outrigger assemblies for visible damage, loose, worn or missing parts.

   a. Check the hydraulic reservoir oil level. Maintain the fluid level at the high mark on the dipstick.

NOTE

The hydraulic oil level should be checked with the boom "cradled", the outriggers stowed and the truck engine shut down.

   b. Engage the PTO and hydraulic pump.

      1. Test the neutral safety system by shifting the transmission range selector into a driving gear position. Ensure that the PTO indicator light goes out when the range selector is moved from neutral.

WARNING

The neutral safety system test must be accomplished with the engine at idle speed, and with the parking brake set.

      2. Engage the fire pump, momentarily, ensure that the PTO indicator light remain slighted during the time that the "rear end locked out" indicator light is illuminated.

   c. Operate the outriggers.

      1. Check for smoothness of operation during extension and retraction.

      2. Check the outrigger safety pins for integrity to their mounting brackets.

   d. Test outrigger/boom interlock.

      1. With the outriggers stowed, shift the selector valve to the boom control valve circuit.

      2. Move the elevation control lever forward to the lowering position. Hydraulic pressure to lower the boom should not be developed on the gauge on the main operator's console.

      3. Shift the selector back to the outrigger control valve circuit.

      4. Set the outriggers and install the safety pins so that they are 1/2" from the outer jack box.

      5. Shift the selector valve to the boom control valve circuit.

      6. Raise the boom, just clear of the "cradle ears".

      7. Shift the selector valve back to the outrigger control valve circuit.

      8. Attempt to raise the outriggers into the safety pins. No motion of the outriggers is acceptable.

   e. Check the Water Tower's controls for security, switches for proper operation and instruments for visible damage.

   f. Test operate the boom lift, telescope and swing controls. Ensure that all control stations are operative.

   g. Check the monitor for proper operation and integrity, ensure that all control stations are functioning properly.

   h. Locate and repair any hydraulic fluid leaks.

   i. Test operate the emergency power unit.

CAUTION

De-energize the main hydraulic pump before operating the 12 volt emergency pump.

   j. Lubricate entire unit (refer to lubrication chart).

C. 50-Hour Inspection/Maintenance.

After 50-hours of Water Tower operation, in addition to the regularly scheduled 10-hour inspection and maintenance, perform the following inspection procedures and maintenance operations:

1. Inspect the PTO and hydraulic pump for mounting security and leakage.

2. Visually inspect the lift cylinder, throughout its' operating range from -10° to 90°.

3. Inspect the extension cylinder for visible damage, proper rigging and security. Inspect slide blocks for visible damage, security or wear.

4. Inspect the swing drive units for evidence of leakage and mounting security.

5. Inspect the hydraulic electrical swivel for damage, evidence of leakage and security. Check electrical connections for visible damage. Check the hydraulic swivel linkage to the torque box pedestal and swivel to turntable bolts for security.

6. Check the "dirt indicator" gauges on the return filter housing and high pressure filter housing for indication of filter element condition.

D. 100-Hour Inspection/Maintenance.

After each 100-hours of operation, combine the scheduled 10 and 50-hour inspection and maintenance procedures and include the following:

1. Inspect all welds for evidence of cracks or defect.

2. Replace the return filter canister element. Replace the high pressure filter element.

E. 500-Hour Inspection/Maintenance.

Following 500-hours of Water Tower operations, preform the following inspection procedures and maintenance operations:

1. Perform all inspection and maintenance procedures previously outlined.

2. Retorque the turntable bolts.

3. Retorque the swing drive bolts.

4. Retorque the torque box frame mounting bolts (for items 2,3 and 4, refer to the Stressed Fastener Maintenance Manual supplied with the Service and Parts Manual).

5. Have a sample of hydraulic oil analyzed for contamination, oxidation or deterioration.

Operational problems which may arise during Water Tower operation, that are not due to operator error should be reported to the personnel charged with equipment maintenance, for immediate corrective measures to be taken. In order not to compromise the safety of those involved with the operation of the device, the firefighters of the public whom they serve to protect, the material condition of the device must be continually guarded and maintained.

Effective tactical application of the KME Water Tower as the aggressive firefighting tool and versatile means of rescue, which is its design intent, is dependent upon both the personnel charged with it's maintenance and upkeep and the proficiency of the operating personnel.

Promote the safe operation and use of your KME Water Tower and remember.....**A PERFECT SAFETY RECORD IS NO ACCIDENT!**

OPERATOR TROUBLESHOOTING GUIDE

The following outline represents operational difficulties which may arise during deployment of the KME Water Tower. It is not a comprehensive list meant to exhaust every possible malfunction of the equipment, but is a "quick check list" intended to allow operating personnel to ensure that operator error is not preventing safe deployment of the unit.

1. PTO will not engage.	A. Water Tower power switch not energized. B. Transmission range selector not in neutral. C. Air Park Brake not engaged.
2. Outrigger circuit will not operate.	A. PTO not engaged (see above). B. Selector valve in boom control position. C. Outrigger/boom interlock malfunction(utilize override button on solenoid valves).
3. Boom control circuit will not operate.	A. PTO not engaged (see above). B. Selector valve in outrigger control position. C. Outriggers not set. D. Outrigger/boom interlock malfunction (utilize override button on solenoid valves).
4. Auxiliary control station boom control valve circuit inoperative.	A. Follow steps A through D as outlined above.
5. Monitor will not operate.	A. Electrical power failure. B. Monitor battery pack discharged.

TABLE OF CONTENTS

SECTION V

STRESSED FASTENER MAINTENANCE

1. Stressed Fastener Maintenance.

The purpose of this section is to emphasize the importance of the role which nut and bolt combinations play in providing the structural strength required by KME aerial devices. These fasteners are not only critical for structural strength, they seriously affect performance and reliability. Variation in torque may cause distortion, binding or fatigue failure of components.

2. Proper Torque of All Sizes and Grades of Bolts.

Identification of bolt grade is always necessary. When marked as a high strength fastener (Grade 5, Grade 8, etc) the mechanic must be aware, these are highly stressed components and they must be torqued accordingly.

Special attention is to be given to lubrication, plating and other factors which would dictate deviation from standard torque values.

3. Torque Value Chart.

When using the torque value charts, values close to mid-range are recommended, to allow for wrench calibration tolerance. Erratic or jerking motion of the torque wrench can easily result in excessive torque values. Always use slow, even wrench movement and stop when the pre-determined value has been reached.

A. Upper Bearing Mounting Bolts.

Hex Head Grade 8, Black or Uncoated

1/2-13 Torqued 110 Foot Pounds

B. Lower Bearing Mounting Bolts.

Hex Head Grade 8, Black or Uncoated

5/8-11 Torqued 225 Foot Pounds

C. Swing Drive Mounting Bolts.

Hex Head Grade 5, Black or Uncoated

1/2-13 Torqued 75 Foot Pounds

D. Torque Box Mounting Bolts.

Hex Head Washered Grade 8, Black or Uncoated

1/2-20 Torqued 110 Foot Pounds

The following torque value chart is approved by KME and are used in production on original equipment installations.

NOTE

When maximum torque values have been exceeded, the fastener MUST be replaced.

FINE OR COURSE THREAD FASTENER	GRADE DESIGNATION	TENSILE STRENGTH MINIMUM	MATERIAL	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1¼	1½
				TORQUE FOOT/POUNDS (MIN-MAX)									
 CAP SCREW	S.A.E. 2 A.S.T.M. A-307 STEEL	64,000 PSI	LOW CARBON STEEL	17 19	26 30	41 45	56 66	83 93	140 150	182 202	270 300	449 500	718 797
 CAP SCREW	S.A.E. 3 STEEL	100,000 PSI	MEDIUM CARBON STEEL	26 30	43 47	59 69	93 103	135 145	214 234	332 372	491 551	822 922	1327 1471
 CAP SCREW	A.S.T.M. A-449 S.A.E. 5 STEEL	105,000 PSI	MEDIUM CARBON STEEL OR LOW ALLOY HEAT TREATED	27	46	65	100	140	220	338	523	747	1194
 CAP SCREW	A.S.T.M. 354BB STEEL			31	50	75	110	150	250	378	583	833	1323
 CAP SCREW	A.S.T.M. A-325			--	--	90 100	---	180 200	305 355	465 525	710 790	1019 1134	1771 1973
 CAP SCREW	A.S.T.M. A-354-BC STEEL	125,000 PSI	LOW ALLOY OR MED. CARB. QUENCHED TEMPERED	30 34	50 54	71 81	109 119	147 167	239 269	377 427	574 644	1024 1053	1522 1695
 CAP SCREW	S.A.E. 6 STEEL	133,000 PSI	MED. CARBON STEEL QUENCHED TEMPERED	39	59	96	140	189	310	490	735	1242	1989
 CAP SCREW	S.A.E. 7 STEEL		MED. CARBON ALLOY QUENCHED TEMPERED ROLL THREADED	43	69	106	150	209	350	550	825	1372	2205
 CAP SCREW	S.A.E. 8 STEEL	150,000 PSI	MED. CARBON ALLOY QUENCHED TEMPERED	42 46	65 75	105 115	145 165	185 225	330 370	531 591	803 893	1331 1486	2153 2383
 SOCKET CAP SCREW	SOCKET HEAD CAP SCREW ALSO N.A.S. AIRCRAFT STD.	160,000 PSI	HIGH CARBON ALLOY QUENCHED TEMPERED	46	71	111	156	210	345	569	864	1304	2947
 CAP SCREW	N.A.S. 144 AIRCRAFT STD. MS 20000 MIL-STD			50	81	121	176	240	395	629	964	1964	3147
 CAP SCREW	N.A.S. 624 NATIONAL AIRCRAFT STANDARD STEEL	180,000 PSI	HIGH CARBON ALLOY QUENCHED TEMPERED	52 56	81 91	126 136	188 198	255 270	419 444	668 708	1025 1085	2105 2255	3355 3855

FIGURE 5-1 TORQUE VALUE CHART

SERVICE PARTS CATALOG

2S-55' WATER TOWER

FIRE STIX

KOVATCH MOBILE EQUIPMENT
One Industrial Complex
Nesquehoning, PA 18240
<570> 669-9461

1708 Seibel Drive - N.E.
Roanoke, VA 24012
<540> 982-3573

TABLE OF CONTENTS

Service Parts

LIST OF ILLUSTRATIONS

2S-55' Water Tower

PARTS ORDERING PROCEDURE

Please be advised that all part orders must be made through an authorized Kovatch Mobile Equipment (KME) Sales/Service Coordination Center. For the name and location of the SSCC in your area, please contact Kovatch Mobile Equipment, One Industrial Complex, Nesquehoning, PA 18240 (570) 669-9461.

KME requires certain information in order to process the parts ordered from an SSCC, and you may be asked to supply the following:

1. Your Fire Department/Company's name and address, along with a shipping address, if it differs from a billing address. All parts shipped from KME will be billed to the SSCC, who will in turn bill your Fire Department or Company.

2. The name of the responsible party to contact concerning the part(s) ordered and the phone number where they can be reached.

3. Your purchase order number.

4. The aerial device serial number and model number.

5. Shipping instructions.

6. KME part number, description and quantity of the part desired.

KME will not ship COD direct to a customer. If such shipment is required, KME will ship the part(s) to the SSCC pre-paid and the SSCC may then forward to the customer on this basis.

Routine part orders may be placed through KME, weekdays from 7:00 a.m. to 3:30 p.m. All emergency part orders will receive priority processing.

KME does advise all customers to place orders for parts of a routine nature through an SSCC. Emergency orders for parts will be handled direct, when necessary, and acknowledgement of such orders will be mailed to the SSCC situated in the geographic region.

All non-authorized dealers or repair facilities will be directed to place part orders through an SSCC.

Due to processing expense, all orders will be subject to a $25.00 (list) minimum.

Parts returned to KME will be subject to a 20% (of list price) restocking charge in addition to freight charges incurred.

NOTE

KME reserves the right to substitute components of equal or better operational design.

GENERAL INFORMATION

Abbreviations Used In This Catalog

Gr.	Grade, used to designate bolt hardness grade, as in Gr.5
SS	Stainless steel, used in describing a fastener (bolt, nut, or washer material)
Mach.	Machine, used when describing type of machine screw.
Hd.	Head, used when describing type of head on fastener.
Rd.	Round, used when describing type of head on fastener.
Sq. Hd.	Square head
NPT	National Pipe Thread
NPTF	National Pipe Thread, female
NPTM	National Pipe Thread, male
A/R	As required, indicates that the number to be used varies.
N.S.S.	Not serviced separately.
Coml	Commercially purchased.

Fastener Replacement

When replacing bolts, cap screws, nuts, washers and other parts designated SS, Gr5 or Gr.8, the specified fastener grade is the minimum grade allowed.

Dimensions

All dimensions shown in this catalog are in United States inch/foot units, unless otherwise noted.

Right and Left

Right and left when applied to KME AERIAL CAT LADDER/ PLATFORM products is determined by standing at the base of the turntable end of the ladder and facing toward the tip of the ladder, with the ladder at rest in the cradle.

KME is always striving to improve its products. Therefore, it reserves the right to change its products or their specifications without notice or obligation.

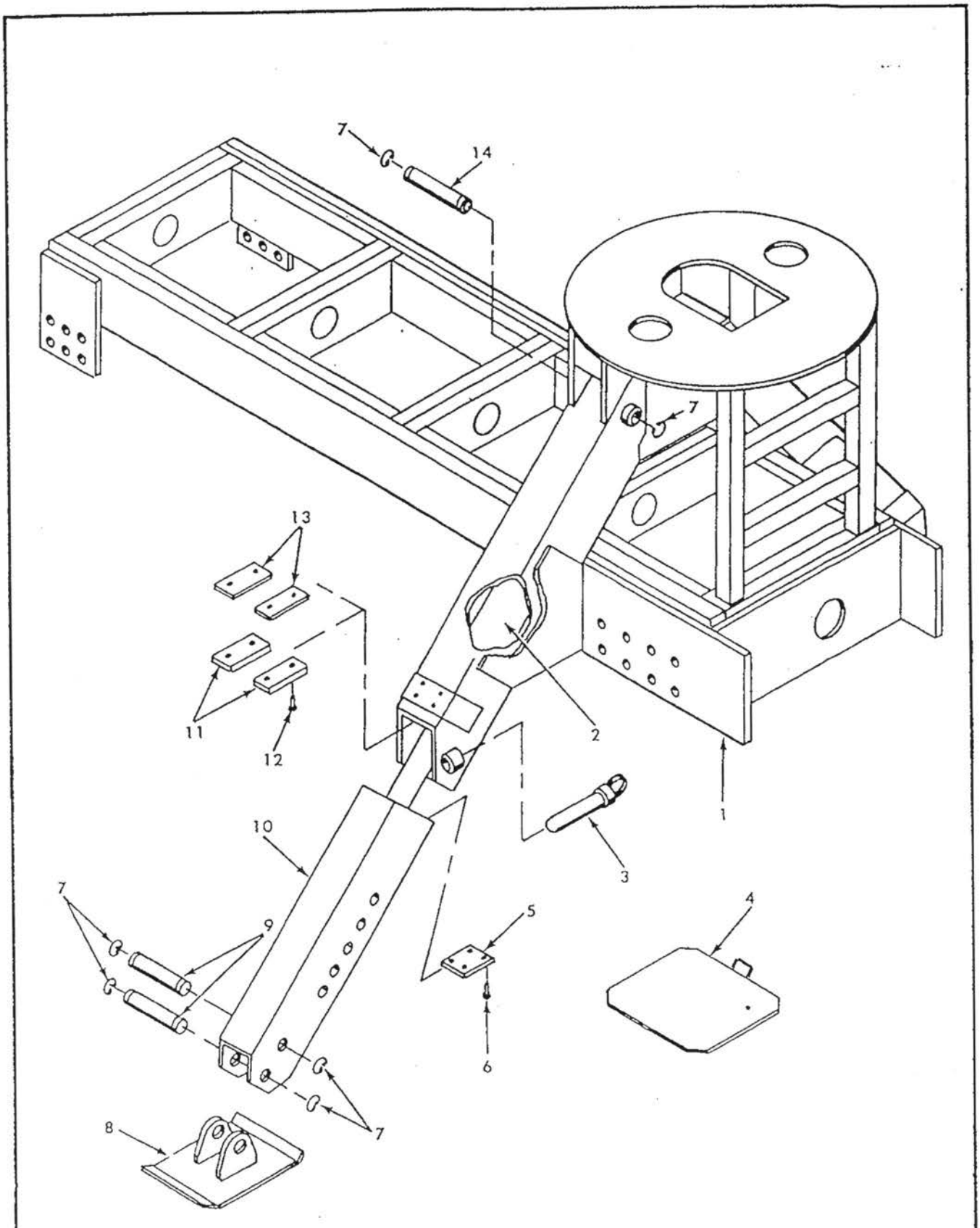


FIGURE 1 OUTRIGGER AND TORQUE BOX ASSEMBLY

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
1-	2125100015	OUTRIGGER AND TORQUE BOX ASSEMBLY-A	1
	2125100036	OUTRIGGER AND TORQUE BOX ASSEMBLY-B	1
	2125100045	OUTRIGGER AND TORQUE BOX ASSEMBLY-C	1
	2125100038	OUTRIGGER AND TORQUE BOX ASSEMBLY-D	1
1	022595A	OUTRIGGER AND TORQUE BOX WELD, 46" x 119" **(FOR ASSEMBLY A ONLY)**	1
	022597A	OUTRIGGER AND TORQUE BOX WELD, 50" x 119" **(FOR ASSEMBLY B ONLY)**	1
	022601A	OUTRIGGER AND TORQUE BOX WELD, 53.5" X 119" **(FOR ASSEMBLY C ONLY)**	1
	022599A	OUTRIGGER AND TORQUE BOX WELD, 57.5" x 119" **(FOR ASSEMBLY D ONLY)**	1
2	7372000078	CYLINDER, 4" Bore x 38-1/2" Stroke	2
3	2740100041	MECHANICAL LOCK PIN W/CHAIN	2
4	2701100038	AUXILIARY OUTRIGGER PAD	2
5	4125100079	SLIDE WEAR PAD, Lower	2
6	MS24628-64	SCREW, Phillips Head, Tapping, Stainless Steel 1/4-20UNC x 3/4" Long	4
7	7730500001	RING, Snap	12
8	2125100004	OUTRIGGER PAD WELDMENT	2
9	4125100035	PIN, Lower	4
10	2125100010	LOWER OUTRIGGER WELD ASSEMBLY	2
11	4125100077	SLIDE PAD, Outrigger	4
12	MS24693-C100	SCREW, Pan Head Phillips, Countersunk, Stainless Steel, 1/4-20UNC x 1-1/4" Long	2
	MS35338-139	WASHER, Lock, Stainless Steel, 1/4"	2

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
Cont'd			
	MS24679-25	NUT, Acorn, Stainless Steel, 1/4-20UNC	2
13	4125100078	PLATE, Shim	4
14	4125100036	PIN, Outrigger, Upper	2

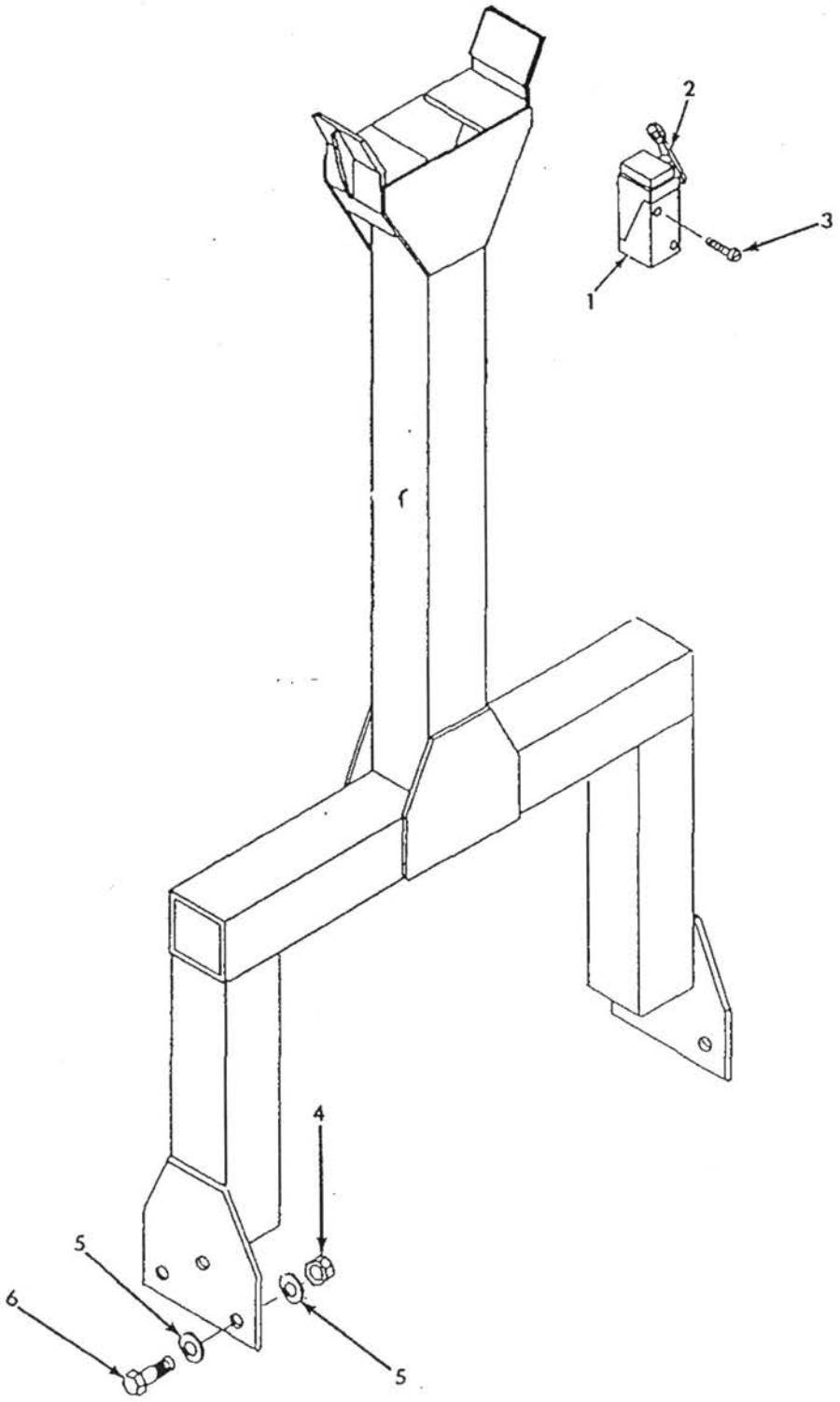


FIGURE 2 LADDER CRADLE (COMPLETE)

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
2-	017471W	LADDER CRADLE COMPLETE, 49-INCHES	1
	017382W	LADDER CRADLE COMPLETE, 53-INCHES	1
1	7872000170	SWITCH, Limit	1
2	7872000185	SWITCH ARM ASSEMBLY	1
3	MS51958-68	SCREW, Machine, Pan Head, Stainless Steel No.10-32UNF x 1-1/4-inches Long	2
4	MS51922-53	NUT, Hex, Lock, Grade 8, 5/8-18UNF	6
5	MS9320-16	WASHER, Flat, Hardened, 5/8"	12
6	MS90727-165	SCREW, Cap, Hex Head, Grade 8 5/8-18UNF x 2-1/4 inch Long	6

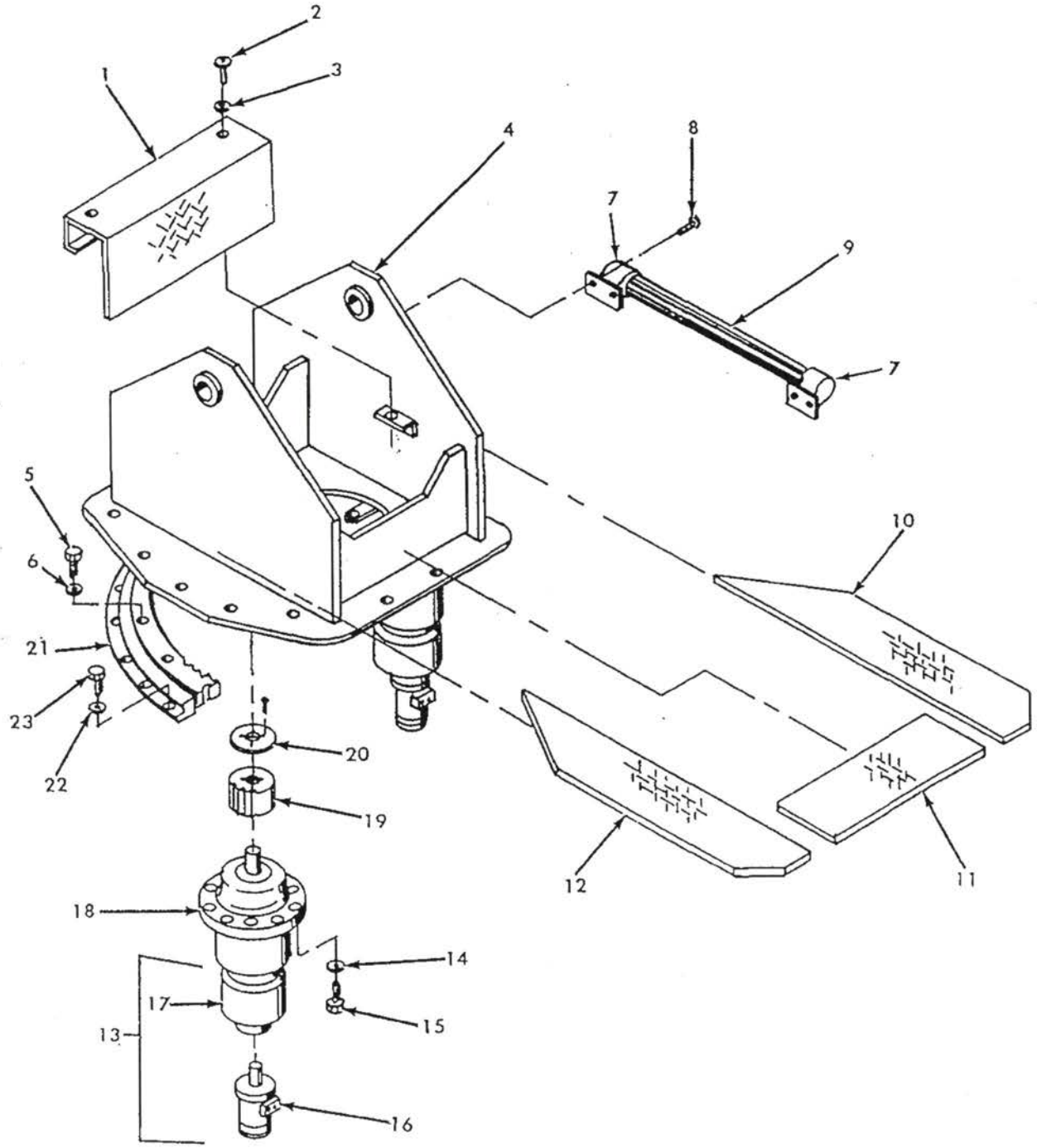


FIGURE 3 TURNTABLE AND SWING DRIVE ASSEMBLY

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
3-		TURNTABLE AND SWING DRIVE ASSEMBLY	
1	4125200051	STEP ASSEMBLY, Treadplate, Aluminum	1
2	MS51957-81	SCREW, Pan Head, Phillips, Stainless Steel 1/4-20UNC x 3/4-inch Long	2
3	MS35338-139	WASHER, Lock, Stainless Steel, 1/4"	2
4	2125200017	TURNTABLE WELDMENT	1
5	7118181450	SCREW, Cap, Hex Head, Grade 8 1/2-13 x 1-3/4 inches Long (Not Shown)	18
6	7950180152	WASHER, Flat, Hardened, 1/2" (Not Shown)	18
7	016462V001	BRACKET, Handrail	4
	016462V002	GASKET, Bracket (Not Shown)	4
8	MS51957-84	SCREW, Machine, Pan Head, Stainless Steel 1/4-20UNC x 1-1/4 inches Long	8
9	016462V	TUBE	2
10	4125200043	TURNTABLE TREADPLATE, Right Hand	1
11	4125200045	FLOOR PLATE, Rear Turntable	1
12	4125200044	TURNTABLE TREADPLATE, Left Hand	1
13	7734000055	SWING DRIVE ASSEMBLY Includes Item Nos. 14 and 15	2
14	7950180152	WASHER, Flat, Hardened, 1/2"	18
15	7115181650	SCREW, Cap, Hex Head, Grade 5 1/2-13 x 2-inches Long	18
16	7632000016	MOTOR, Hydraulic	2
	7115181250	SCREW, Cap, Grade 5, (Not Shown) 1/2-13 x 1-1/2-inches Long	4
	7950180152	WASHER, Flat, Hardened, 1/2" (Not Shown)	4

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
(cont'd)			
17	78710003	MULTIPLE DISC BRAKE	2
18	025436P	TORQUE-HUB FINAL DRIVE	2
19	7490000015	PINION	2
	7115140407	SCREW, Flat Head, Machine, Grade 5 1/4-20 x 1/2-inch Long (Not Shown)	4
20	4125100002	RETAINER, Pinion	2
21	7069000122	BEARING, Swing	1
22	7950200142	WASHER, Flat, Hardened, 5/8"	18
23	7118201450	SCREW, Cap, Hex Head, Grade 8 5/8-11 x 1-3/4 inches Long	18

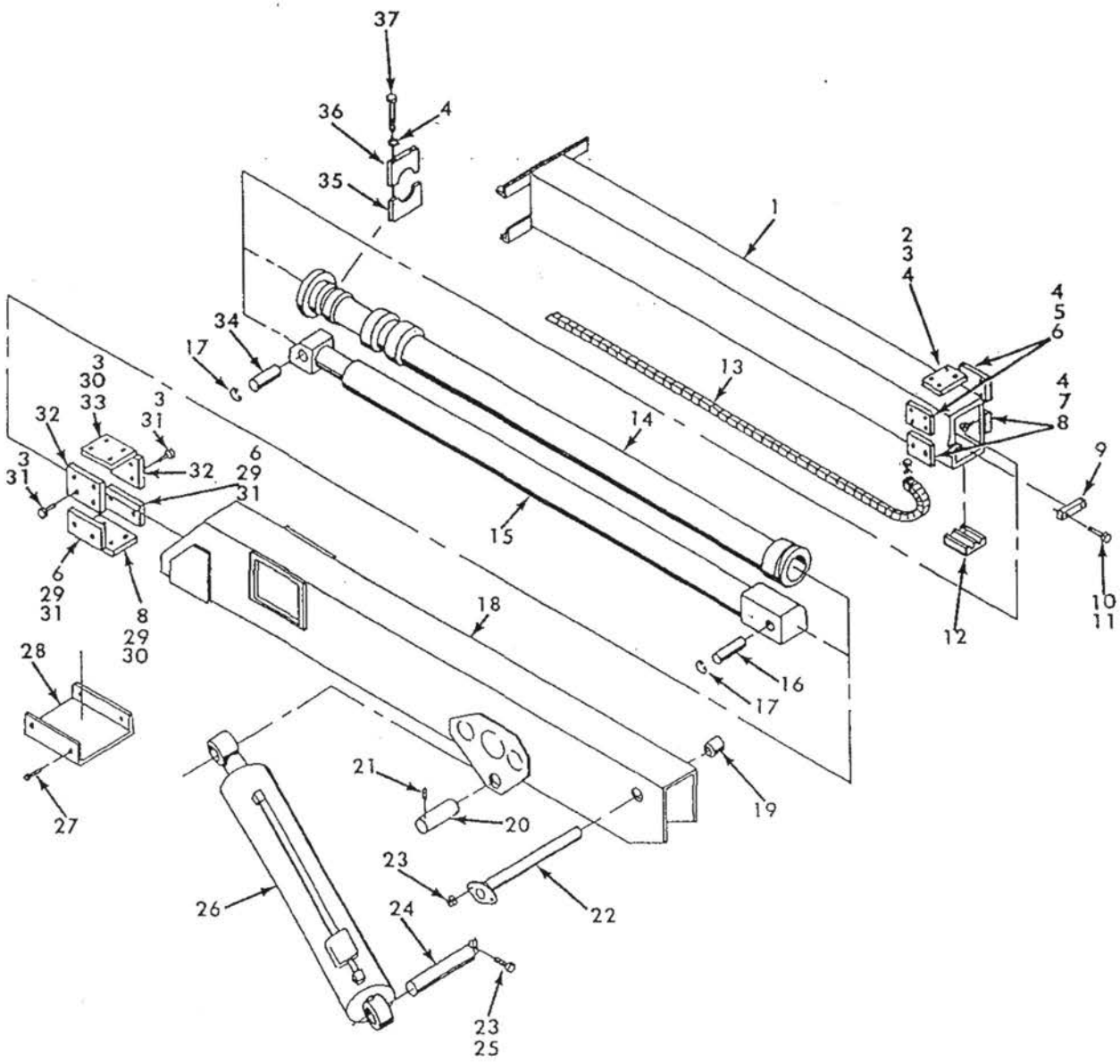


FIGURE 4 BOOM ASSEMBLY

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
4-	2125000020	BOOM ASSEMBLY	1
1	2125800001	FLY SECTION WELDMENT	1
2	2125800023	PAD, Top Slide	1
3	MS35307-357	SCREW, Hex Head, Machine, Stainless Steel 3/8-16UNC x 5/8" Long	16
4	MS35338-141	WASHER, Lock, Stainless Steel, 3/8"	18
5	2125800024	PAD, Side Side Top	2
6	MS35307-359	SCREW, Hex Head, Machine, Stainless Steel 3/8-16UNC x 7/8" Long	12
7	2125800023	PAD, Side Slide Lower	2
8	MS35307-360	SCREW, Hex Head, Machine, Stainless Steel 3/8-16UNC x 1" Long	8
9	4125800012	RETAINER, Bottom Slide Pad	1
10	MS90725-36	SCREW, Hex Head, Grade 5 5/16-18UNC x 1-1/4" Long	2
11	MS35338-140	WASHER, Lock, Stainless Steel	2
12	4125800088	PAD, Bottom Slide	1
13	7125000001	CABLE CARRIER	1
	MS51958-65	SCREW, Pan Head, Stainless Steel No.10-32 x 3/4" Long	4
	MS35333-73	WASHER, Internal Tooth, Stainless Steel, No.10	4
	MS51866-8C	NUT, Lock, Nylon, Stainless Steel, No.10-32	4
14	2697000031	UPPER WATERWAY ASSEMBLY (See Figure 7 for detailed breakdown)	1
15	7372000135	HYDRAULIC CYLINDER, Boom Extension	1
16	4125500035	PIN, Body End, Boom Extension Cylinder	1

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
(Cont'd)			
17	7730500001	RETAINING RING, Extension Cylinder Pin	4
18	2125500005	BASE SECTION WELD ASSEMBLY (Not Serviced by Components)	1
19	4125500028	BUSHING, Heel Pin	2
20	4125500006	PIN, Cylinder To Boom	1
21	025203V	ROLL PIN, Stainless Steel, 1/4 x 3" Long	1
22	2125200002	HEEL PIN WELDMENT, Boom To Turntable	1
23	MS9321-12	WASHER, Flat, Stainless Steel, 3/8"	2
	MS17830-6C	NUT, Lock, Nylon, Stainless Steel, 3/8-16UNC	2
24	2125200018	PIN AND RETAINER WELDMENT	1
25	MS35307-366	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 2" Long	1
26	7372000140	CYLINDER, Boom Lift	1
27	MS51959-77	SCREW, Phillips Flat Head, Stainless Steel 1/4-20UNC x 3/8" Long	4
28	4125000002	SCUFF PLATE	1
29	2125500014	PAD, Bottom Slide	1
30	MS51859-8	WASHER, Nylon, 3/8"	4
31	2125800023	PAD, Side Slide Bottom	2
32	2125800024	PAD, Side Slide Top	2
33	2125800022	PAD, Top Slide	1
34	4125800012	PIN, Rod End Boom Extension Cylinder	1
35	4125800015	BRACKET, Lower, Fly End Waterway Mounting	1
36	4125800014	BRACKET, Upper, Fly End Waterway Mounting	1

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
(Cont'd) 37	MS35307-372	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 3-1/2-inches Long	2

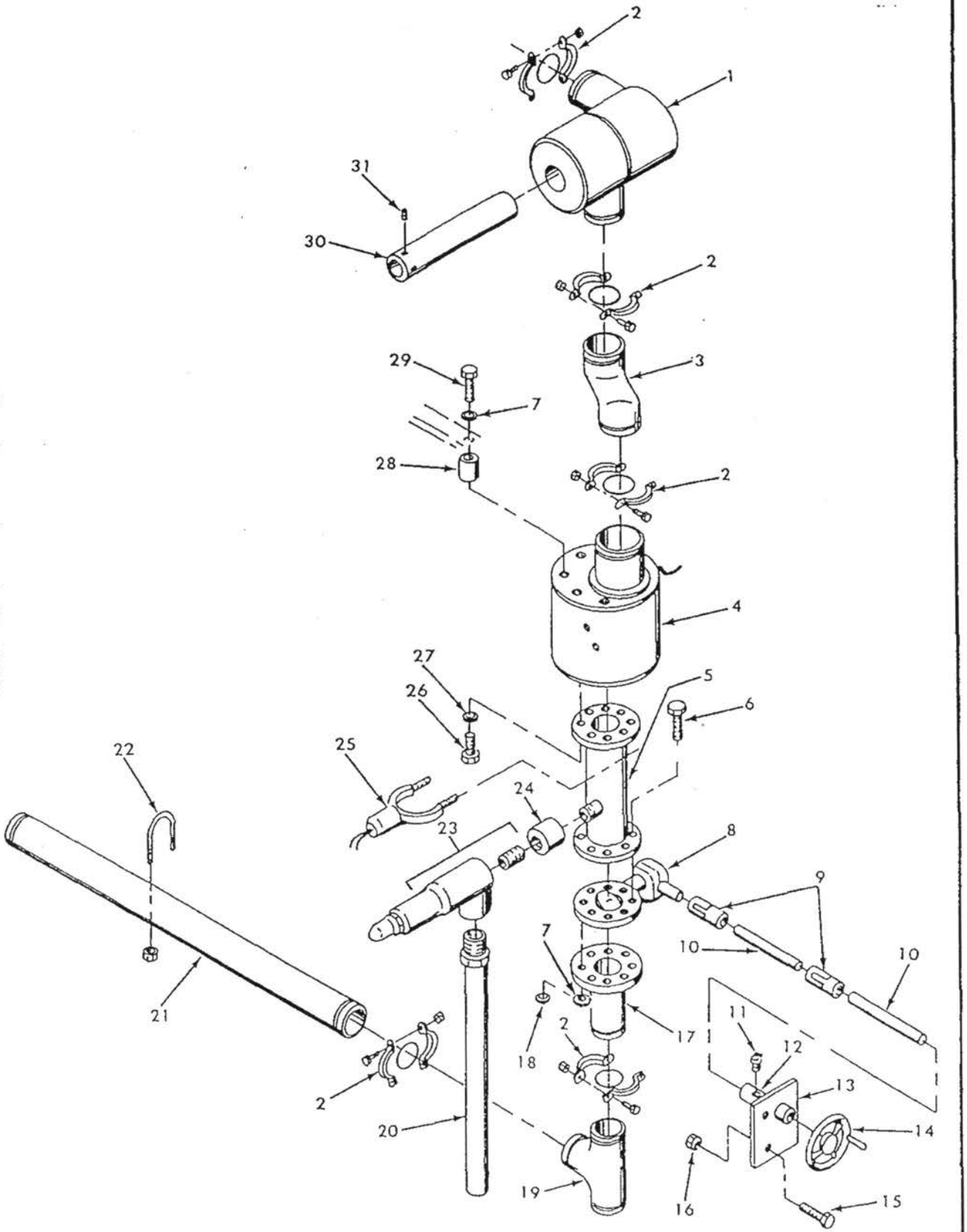


FIGURE 5 LOWER WATERWAY ASSEMBLY

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
5-	2125100017	LOWER WATERWAY ASSEMBLY-A	1
	2125100035	LOWER WATERWAY ASSEMBLY-B	1
	2125100046	LOWER WATERWAY ASSEMBLY-C	1
	2125100039	LOWER WATERWAY ASSEMBLY-D	1
1	2697000032	WATER SWIVEL ASSEMBLY	1
2	7697000294	VICTAULIC COUPLING, Style 75	5
3	2697000279	OFFSET PIPE WELDMENT	1
4	7364000455	ROTARY SWIVEL, 4-Port	1
5	2697000280	SWIVEL CONNECTOR, Pie Weld x 17.875 (FOR LOWER WATERWAY ASSEMBLY A AND D ONLY)	1
	2697000281	SWIVEL CONNECTOR, Pie Weld x 21.875 (FOR LOWER WATERWAY ASSEMBLY B ONLY)	1
	2697000305	SWIVEL CONNECTOR, Pie Weld x 25.375 (FOR LOWER WATERWAY ASSEMBLY C ONLY)	1
6	7114204050	BOLT, Hex Head, Plated, Grade 5, 5/8-11UNC x 5" Long	8
7	7950200153	WASHER, Lock, Plated, 5/8"	11
8	7738900005	VALVE, Butterfly, 4-Inch	1
9	7308000032	UNIVERSAL JOINT, 1-1/8" O.D.	2
10	7697000435	SHAFT	2
11	7440120000	FITTING, Grease	1
12	4125100043	BUSHING, Control, Butterfly Valve	1
13	019109F	BRACKET, Handwheel	1
14	7697000442	HANDWHEEL, Chrome, 5-Inch Diameter	1
15	MS35307-360	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 1" Long	2

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
Cont'd 16	MS17830-06C	NUT, Lock, Plastic ESNA	2
17	2697000352	FLANGE WELDMENT, 6.875 **(FOR A, B AND C ONLY)**	1
	2697000353	FLANGE WELDMENT, 18.375 **(FOR D ONLY)**	1
18	7660200004	NUT, Hex, Plated, 5/8-11UNC	8
19	7697000522	VICTAULIC TEE, Steel, 4-Inch	1
20	NSS	NO.60 HOSE ASSEMBLY, Length As Required **(PURCHASE LOCALLY)**	1
21	7697000443	PIPE W/VICTAULIC ENDS, Steel, 4-Inch, 100.5"	1
22	6099000103	U-BOLT, 4-Inch Diameter, Hardware Included	3
23	7697000488	VALVE, Relief, Brass, 1-1/2" NPTF	1
24	403-00029-8	COUPLING, Pipe, 1-1/2" FMNPT	1
25	025183V	SENDING UNIT, Flow Meter	1
26	7114161050	BOLT, Hex Head, Stainless Steel 3/8-16UNC x 1-1/4" Long	8
27	MS35338-141	WASHER, Lock, Stainless Steel, 3/8"	8
28	4738200170	SPACER, 1" O.D. x 3/4" I.D.	4
29	7115202650	BOLT, Hex Head, Grade 5, Plated 5/8-11UNC x 3-1/4" Long	4
30	4125200041	PIN SLEEVE, Swivel, 4" O.D. x 2" I.D.	1
31	7785162000	SET SCREW, 3/8-16UNC x 1-1/4' Long	2

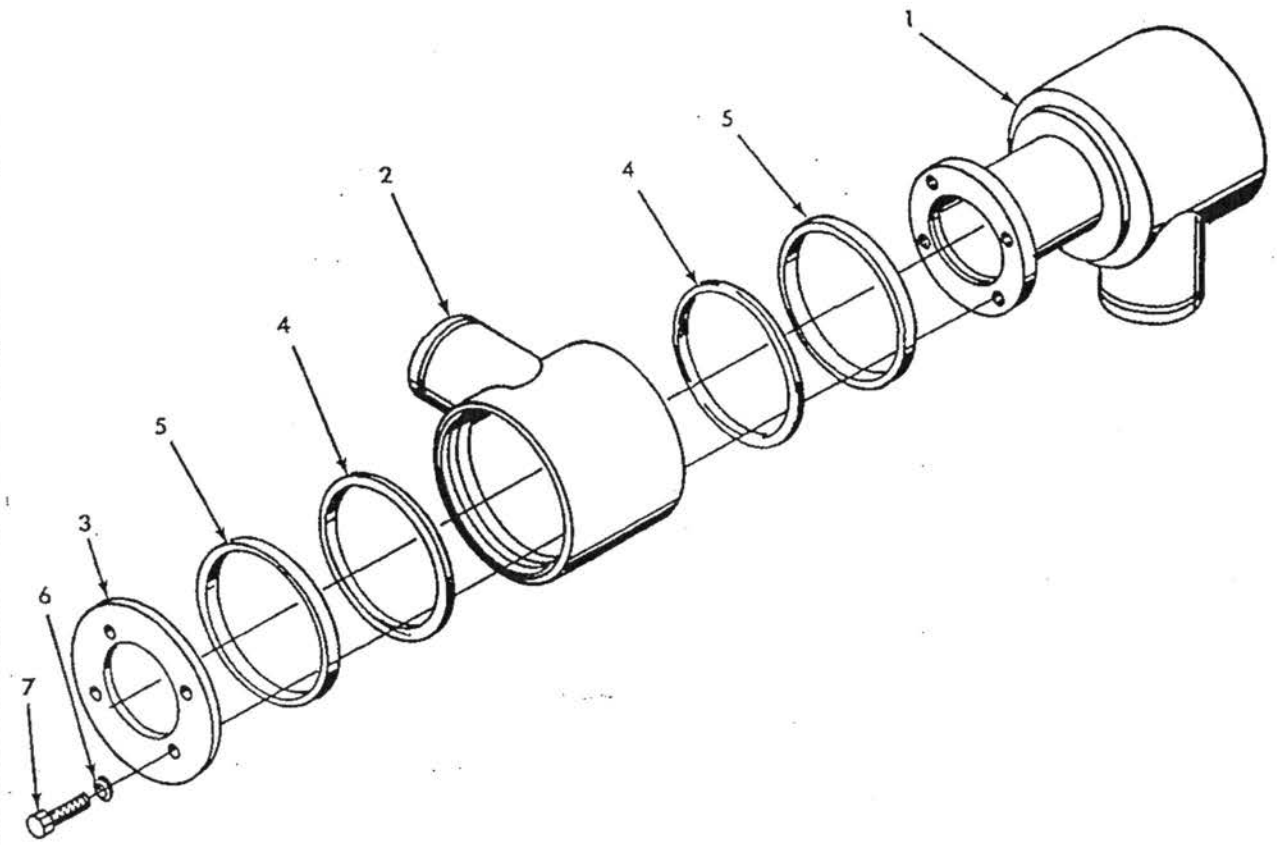


FIGURE 6 WATER SWIVEL ASSEMBLY

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
6-	2697000032*	WATER SWIVEL ASSEMBLY, Complete	1
1	2697000033	INLET BODY ASSEMBLY	1
2	2697000041	DISCHARGE BODY ASSEMBLY	1
3	4697000016	COVER	1
	7785160600	SETSCREW, Socket Head, 3/8-16 x 3/8" Long (NOT SHOWN)	2
4	7754000086	SEAL	2
5	7069000123	BALL BEARING	2
6	7950140003	WASHER, Lock, Stainless Steel, 1/4"	4
7	7114140605	SCREW, Cap, Hex Socket Head, Stainless Steel 1/4-20 x 3/4" Long	4

*NOTE: When ordering a complete Water Swivel, it may be necessary to order item 13, Figure 5, "Swivel to Pin Sleeve", as this item has replaced two existing bearings used on older manufactured units.

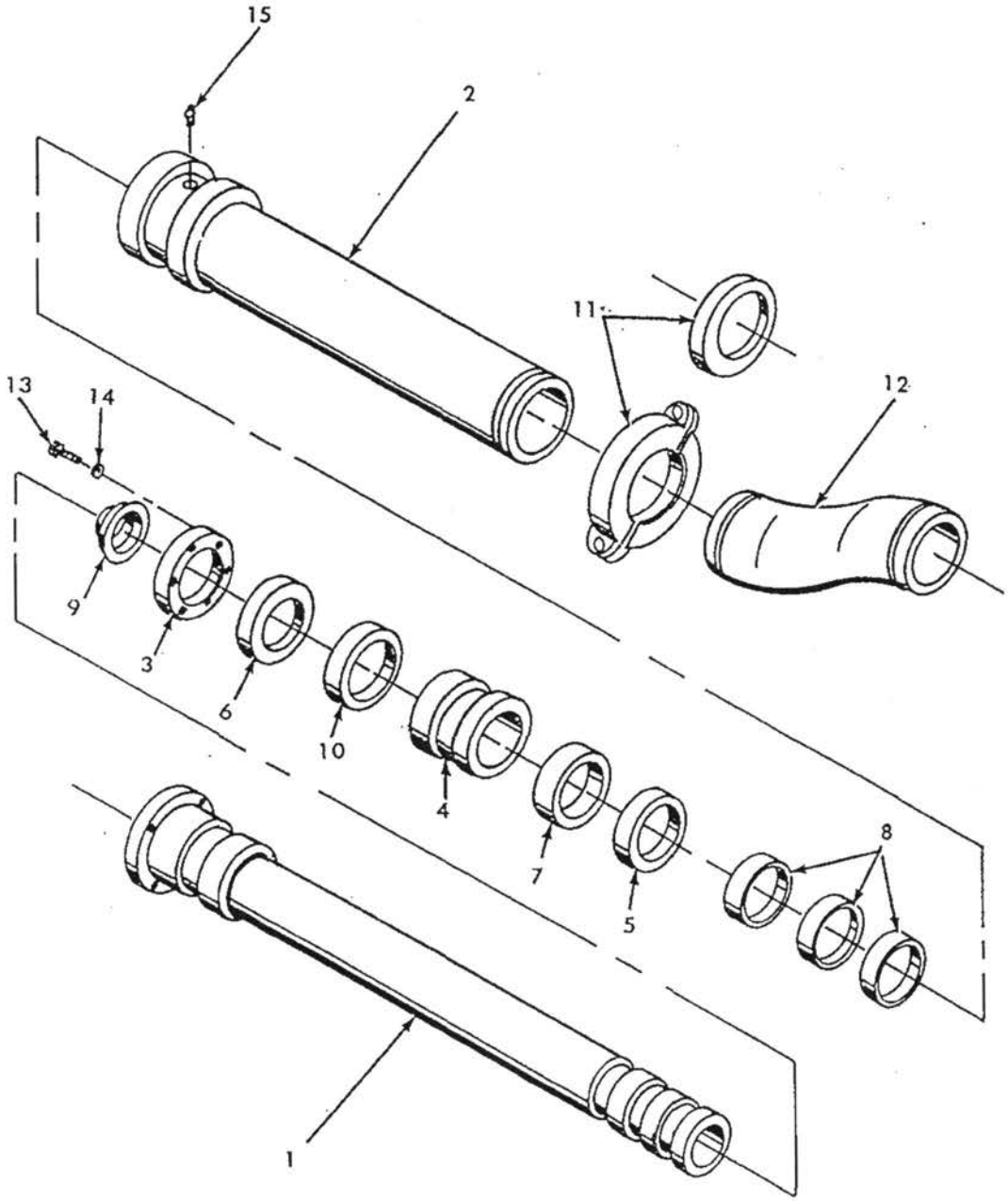


FIGURE 7 UPPER WATERWAY ASSEMBLY

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
7-	2697000031	UPPER WATERWAY ASSEMBLY, Complete (See Figure 5 for Next Higher Assembly)	REF
	7440120000	FITTING, Lubrication (NOT SHOWN)	1
1	2697000010	FLY SECTION WATERWAY	1
2	2697000013	BASE SECTION WATERWAY	1
	779400059	REPAIR KIT, Contains Item Nos. 6 thru 10	1
3	B4697000010	RETAINER	1
4	B4697000009	SPACER	1
5	B4697000008	SPACER	1
6	NSS	WEAR BAND	1
7	NSS	SEAL	1
8	NSS	WEAR BAND	3
9	NSS	WIPER RING	1
10	NSS	SEAL	1
11	7697000294	VICTAULIC COUPLING, Style #75	2
12	2697000011	OFF-SET PIPE WELDMENT	1
13	7114080805	SCREW, Cap, Hex Socket Head, Stainless Steel No.8-24 x 1" Long	6
14	7950080003	WASHER, Lock, Stainless Steel, No.8	6
15	7440120000	FITTING, Lubrication	1

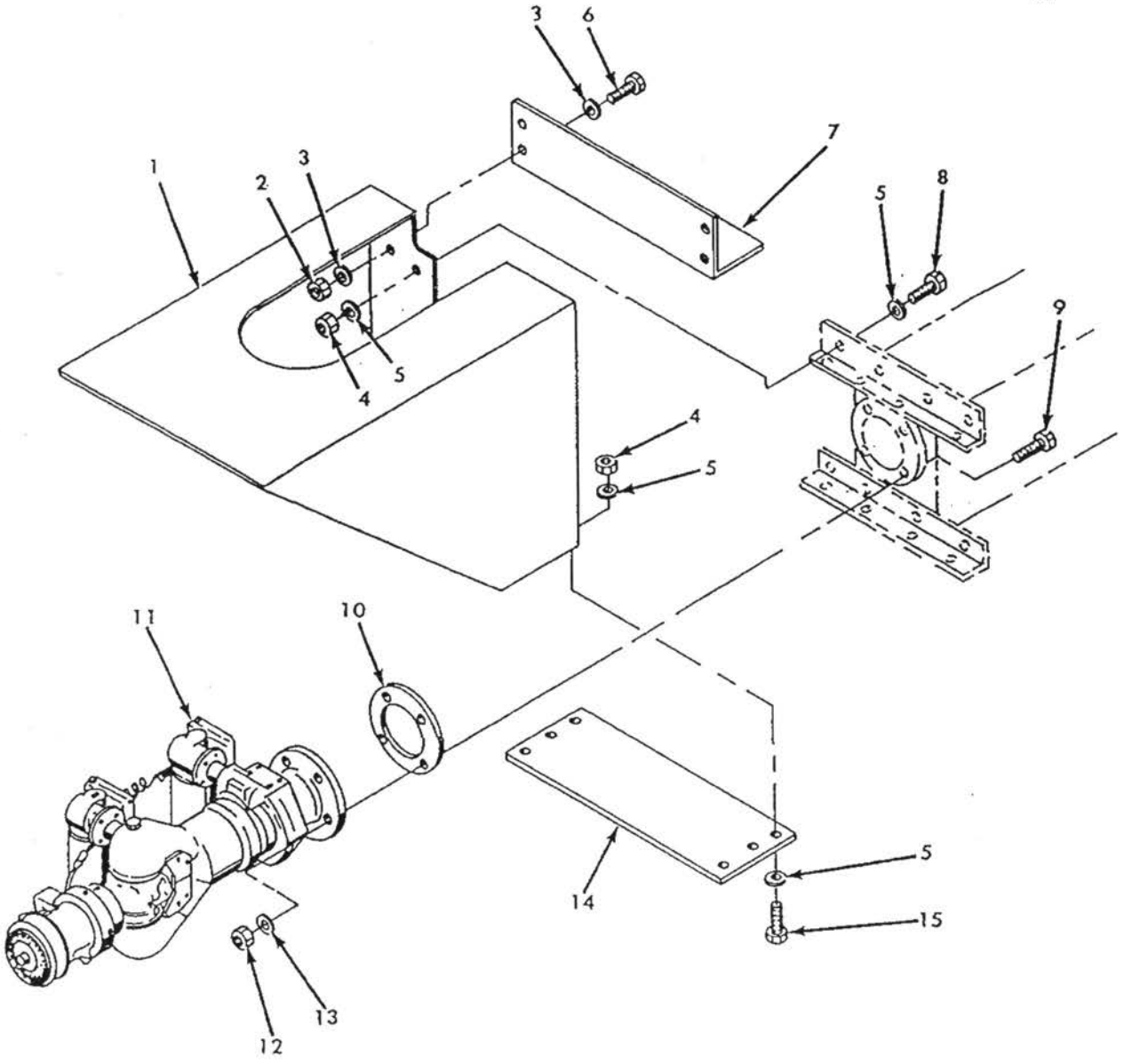


FIGURE 8 MONITOR GROUP

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
8-		MONITOR GROUP	1
1	2125800064	SHROUD, Monitor	1
2	MS35649-2254	NUT, Lock, Stainless Steel, 1/4-20UNC	4
3	MS15795-809	WASHER, Flat, Stainless Steel, 1/4"	8
4	MS35649-2384	NUT, Lock, Stainless Steel, 3/8-16unc	14
5	MS15795-813	WASHER, Flat, Stainless Steel, 3/8"	22
6	MS51957-81	SCREW, Phillips Head, Stainless Steel 1/4-20UNC x 3/4-inch Long	4
7	4125800136	BRACKET, Mounting, Monitor Control	1
8	MS16208-52	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 1-1/4-inches Long	16
9	MS90728-169	SCREW, Cap, Hex Head, Grade 8 5/8-11UNC x 3-1/4-inches Long	4
10	7697000388	GASKET	1
11	7872000306	MONITOR	1
12	MS17829-10C	NUT, Hex, 5/8-11UNC	4
13	MS35338-50	WASHER, Lock, 5/8"	4
14	4125800129	PLATE, Bottom, Monitor Shroud	1
15	MS16208-51	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 1-inch Long	10

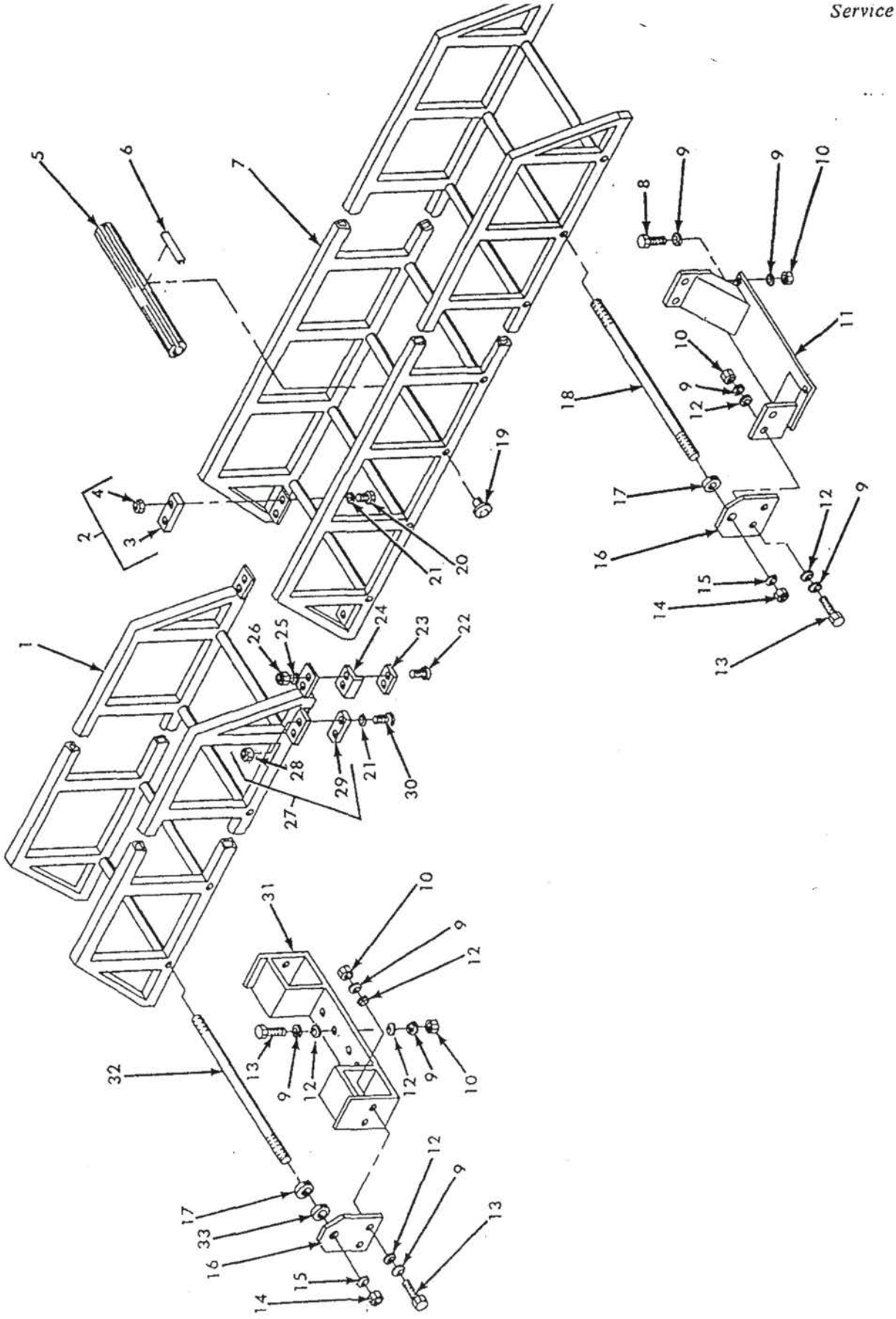


FIGURE 9 STEEL LADDER ASSEMBLY MOUNTING (CONFIGURATION 1)

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
9.		STEEL LADDER ASSEMBLY, Mounting (Configuration No.1)	
1	2125800049	WELDMENT, Fly Section	1
2	2125500020	SLIDE PAD ASSEMBLY	2
3	4125500062	PAD, Slide	1
4	7660140004	NUT, Hex, Stainless Steel, 1/4-20UNC	2
5	7125500005	COVER, Rung	42
6	730000080	CLAMP, Rung Cover	168
7	2125500018	WELDMENT, Base Section	1
8	MS16208-52	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 1-1/4-inches Long	12
9	MS9321-12	WASHER, Flat, Stainless Steel, 3/8"	52
10	17830-6C	NUT, Lock, Nylon, Stainless Steel, 3/8-16UNC	30
11	023915W	BRACKET, Mounting, Base Section Weldment	3
12	025454V	WASHER, Flat, PVC, 3/8"	40
13	MS16208-51	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 1-inch Long	16
14	MS17830-12C	NUT, Lock, Stainless Steel, 3/4"-10	16
15	MS9321-17	WASHER, Flat, Stainless Steel, 3/4"	16
16	024878F	MOUNTING PLATE, Ladder	8
17	024864F	BUSHING, Ladder Rung	8
18	024865F001	ROD, Threaded, Base Section	3
19	025456V	CAP, Tapered, Plastic, Red	84
20	MS16208-7	SCREW, Cap, Hex Head, Stainless Steel 1/4-20UNC x 1-inch Long	4

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
(Cont'd)			
21	MS35338-139	WASHER, Lock, Stainless Steel, 1/4"	6
22	MS51959-81	SCREW, Phillips, Flat Head, Stainless Steel 1/4-20UNC x 3/4-inch Long	4
23	4125800110	PAD, Mounting	2
24	4125800111	PAD, Slide	2
25	MS9321-10	WASHER, Flat, Stainless Steel, 1/4"	4
26	MS17830-4C	NUT, Lock, Nylon, Stainless Steel, 1/4-20UNC	4
27	2125800051	SLIDE PAD ASSEMBLY	2
28	7660140004	NUT, Hex, Stainless Steel, 1/4-20UNC	2
29	4125800107	BLOCK, Slide	1
30	MS16208-5	SCREW, Cap, Hex Head, Stainless Steel 1/4-20UNC x 3/4-inch Long	4
31	023915W	BRACKET, Mounting, Fly Section	1
32	024865F	ROD, Threaded, Fly Section	1
33	024879F	SHIM, Fly Support	1

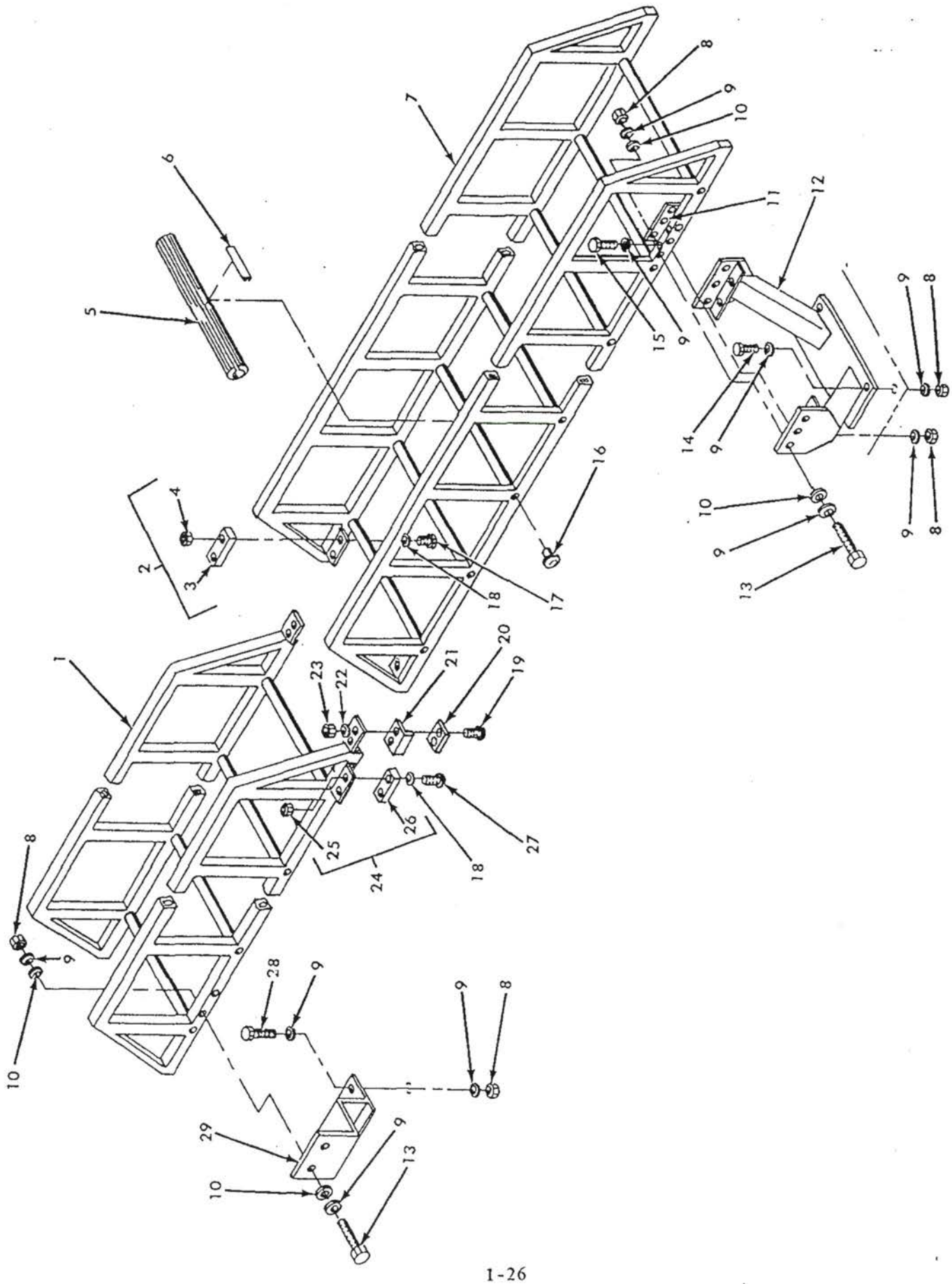


FIGURE 10 STEEL LADDER ASSEMBLY MOUNTING (CONFIGURATION 2)

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
10-		STEEL LADDER ASSEMBLY, Mounting (Configuation No.2)	
1	2125800049	WELDMENT, Fly Section	1
2	2125500020	SLIDE PAD ASSEMBLY	2
3	4125500062	PAD, Slide	1
4	7660140004	NUT, Hex, Stainless Steel, 1/4-20UNC	2
5	7125500005	COVER, Rung	42
6	730000080	CLAMP, Rung Cover	168
7	2125500018	WELDMENT, Base Section	1
8	MS17830-6C	NUT, Lock, Nylon, Stainless Steel, 3/8-16UNC	AR
9	MS9321-12	WASHER, Flat, Stainless Steel, 3/8"	AR
10	025454V	WASHER, Flat, PVC, 3/8"	AR
11	4125500068	PLATE, Backing	8
12	2125500021	WELDMENT, Ladder Support	3
13	MS16208-55	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 2-inches Long	20
14	MS16208-52	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 1-1/4-inch Long	6
15	MS16208-53	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 1-1/2-inches Long	36
16	025456V	CAP, Tapered, Plastic, Red	84
17	MS16208-7	SCREW, Cap, Hex Head, Stainless Steel 1/4-20UNC x 1-inch Long	4
18	MS35338-139	WASHER, Lock, Stainless Steel, 1/4"	6
19	MS51959-81	SCREW, Phillips, Flat Head, Stainless Steel 1/4-20UNC x 3/4-inch Long	4

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
(Cont'd) 20	4125800110	PAD, Mounting	2
21	4125800111	PAD, Slide	2
22	MS9321-10	WASHER, Flat, Stainless Steel, 1/4"	4
23	MS17830-4C	NUT, Lock, Nylon, Stainless Steel, 1/4-20UNC	4
24	2125800051	SLIDE PAD ASSEMBLY	2
25	7660140004	NUT, Hex, Stainless Steel, 1/4-20UNC	2
26	4125800107	BLOCK, Slide	1
27	MS16208-5	SCREW, Cap, Hex Head, Stainless Steel 1/4-20UNC x 3/4-inch Long	4
28	MS16208-51	SCREW, Cap, Hex Head, Stainless Steel 3/8-16UNC x 1-inch Long	2
29	2125800065	WELDMENT, Fly Ladder Support	1

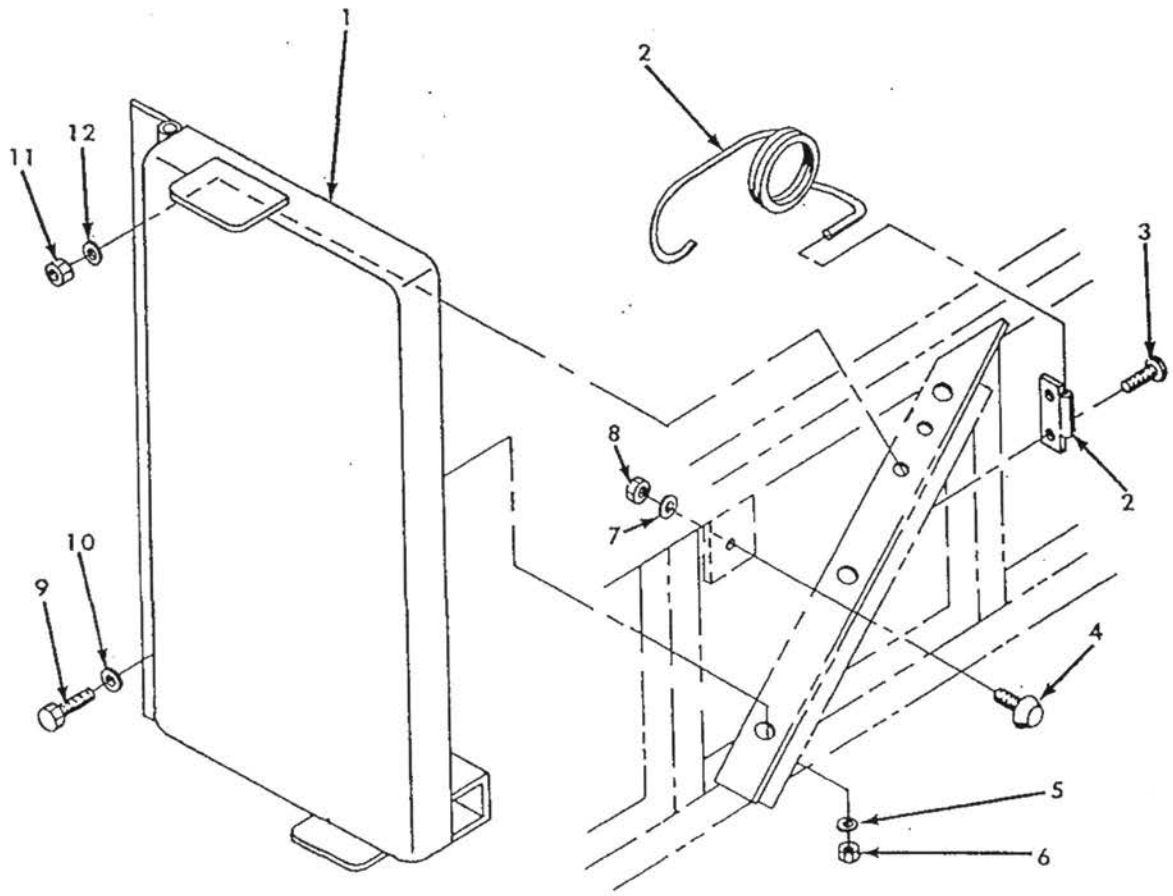


FIGURE 11 FOLDING STEP ASSEMBLY

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
11-		FOLDING STEP ASSEMBLY	
1	2125900012	FOLDING STEP, Right Hand	1
	2125900011	FOLDING STEP, Left Hand	1
2	7834000094	SPRING	2
3	MS51958-65	SCREW, Pan Head, Phillips, Stainless Steel No.10-32UNF x 3/4-inch Long	4
4	019026V	RUBBER BUMPER	1
5	MS35338-139	WASHER, Lock, Stainless Steel, 1/4"	3
6	MS17830-4C	NUT, Lock, Nylon, Stainless Steel, 1/4-20UNC	3
7	MS35338-137	WASHER, Lock, Stainless Steel, No.8	1
8	MS21045-C08	NUT, Hex, Lock, Stainless Steel, No.8-32	1
9	MS51957-83	SCREW, Pan Head, Phillip, Stainless Steel 1/4-20UNC x 1-inch Long	3
10	MS9321-10	WASHER, Flat, Stainless Steel, 1/4"	3
11	MS21044-C3	NUT, Hex, Stainless Steel, No.10-32UNC	4
12	MS35338-138	WASHER, Lock, Stainless Steel, No.10	4

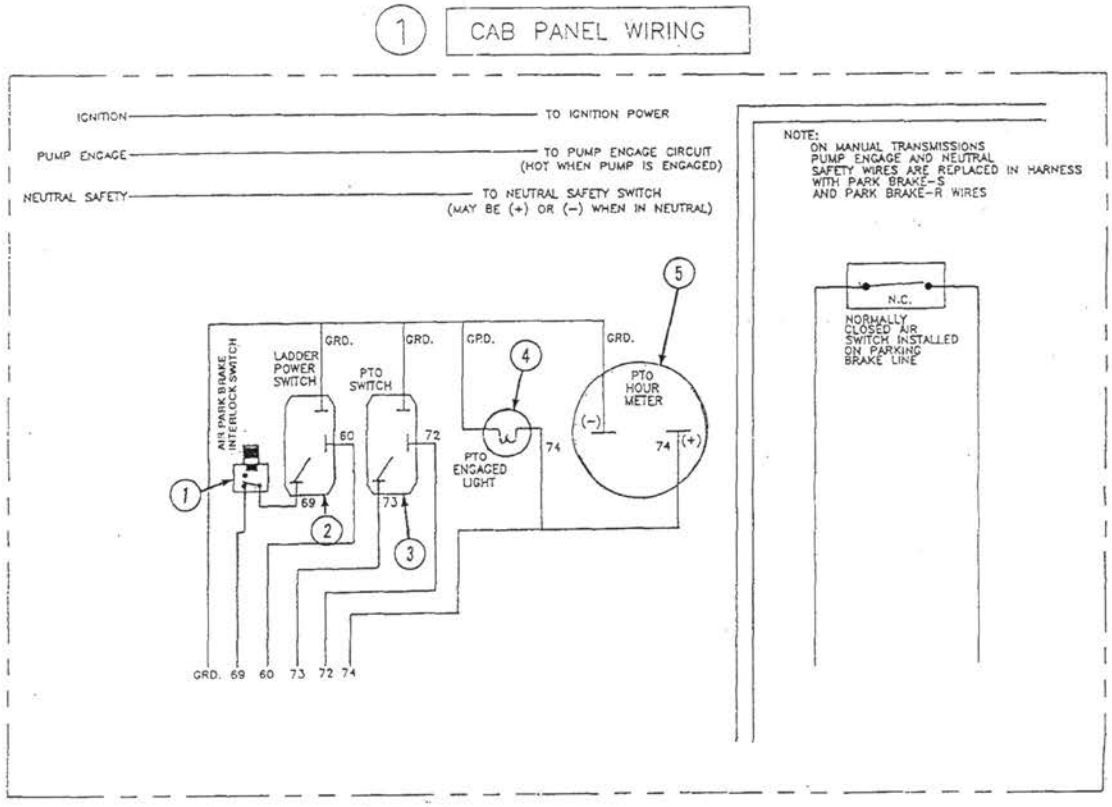


FIGURE 12 ELECTRICAL SYSTEM (Sheet 1 of 9)

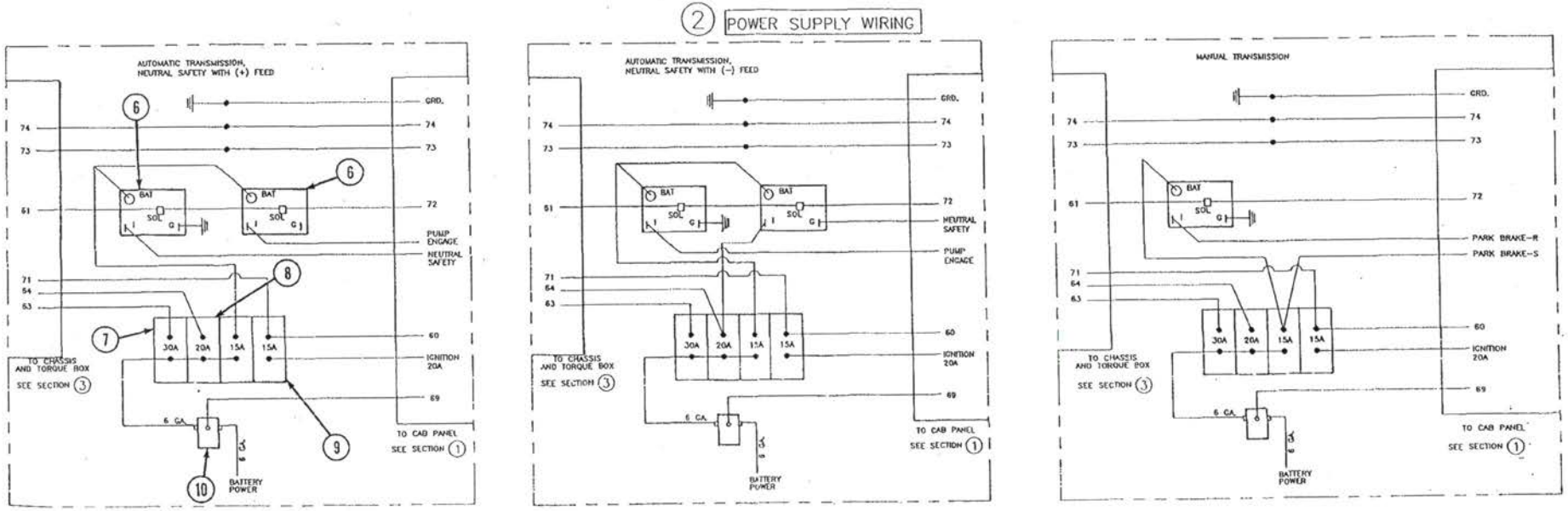


FIGURE 12 ELECTRICAL SYSTEM (Sheet 2 of 9)

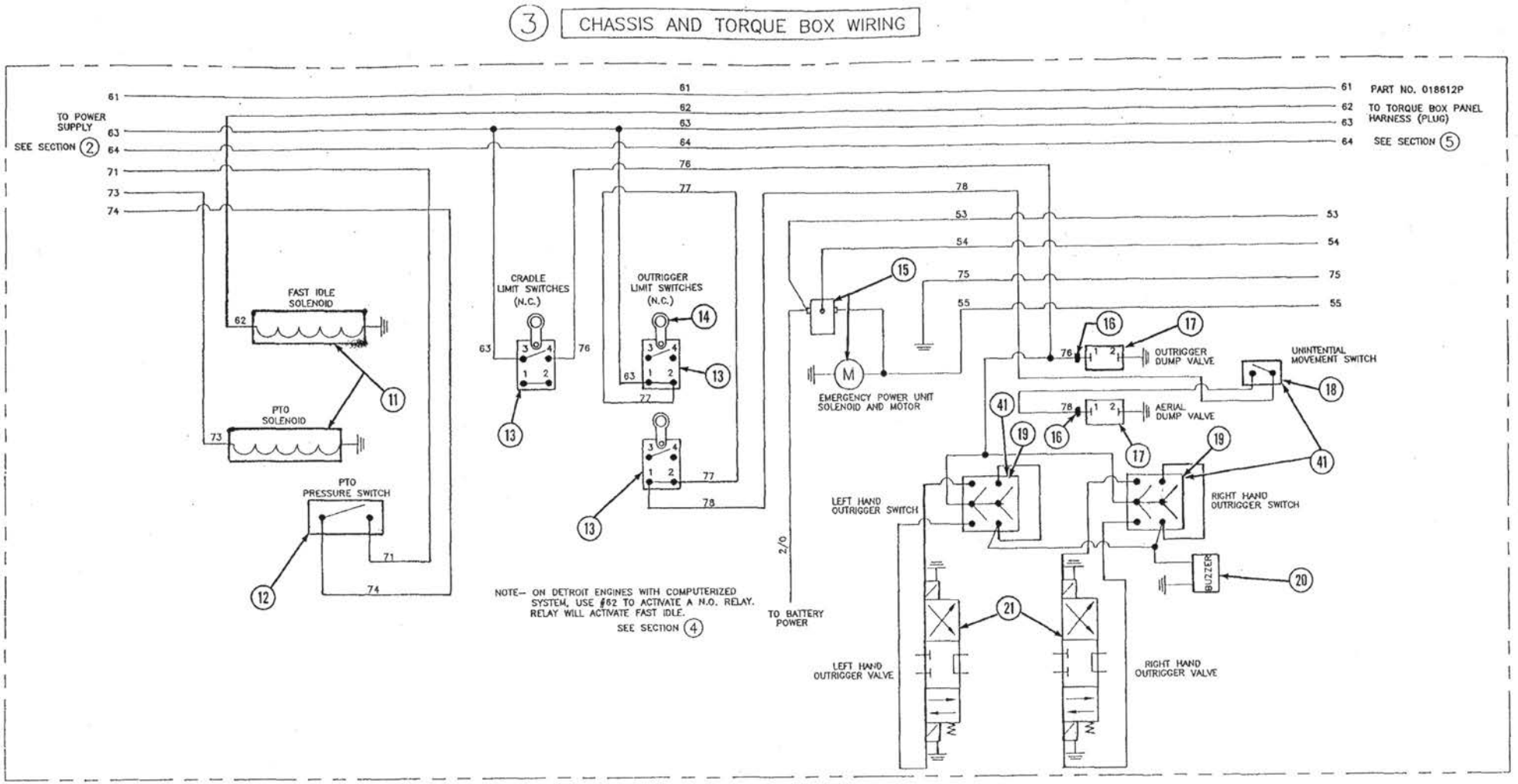


FIGURE 12 ELECTRICAL SYSTEM (Sheet 3 of 9)

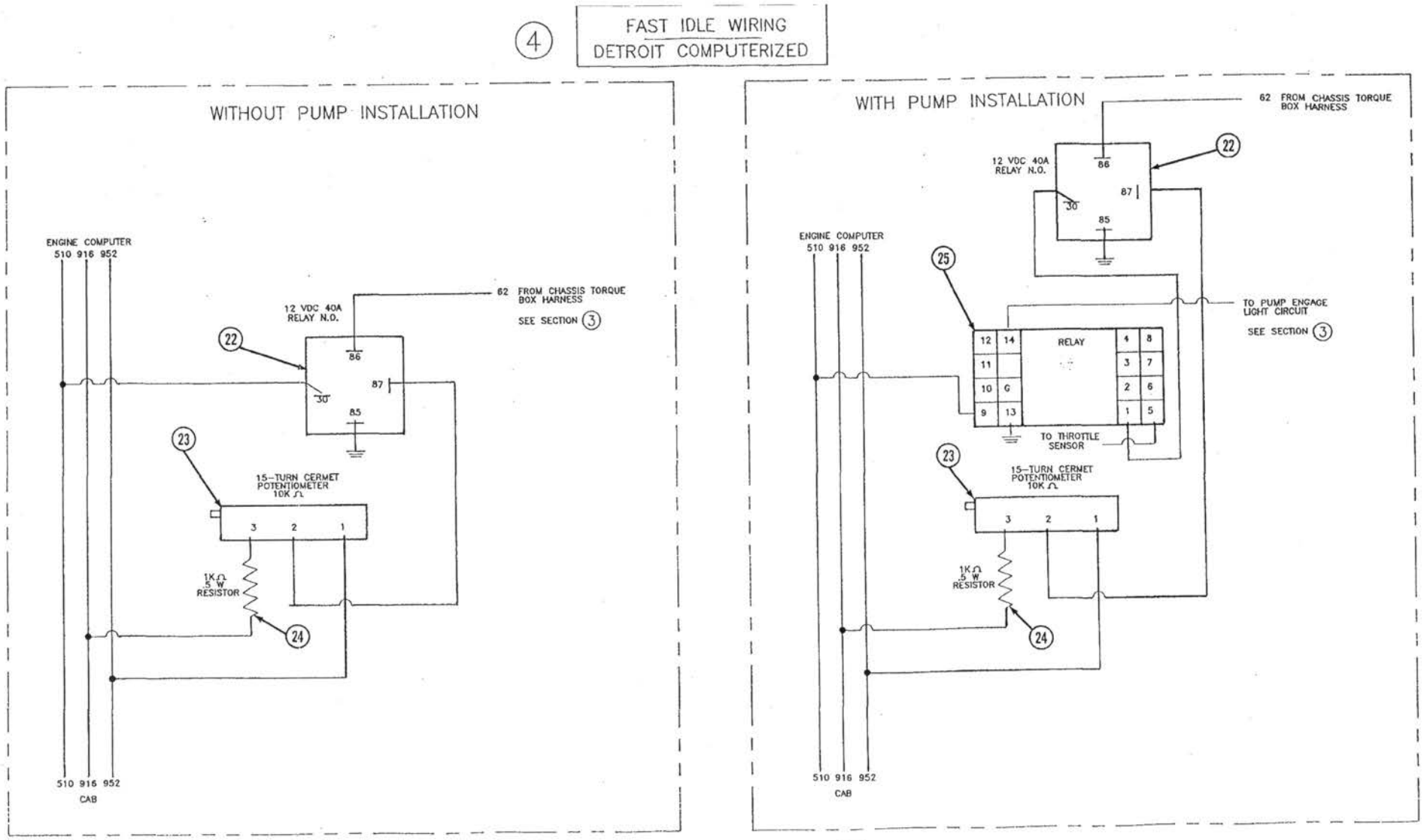
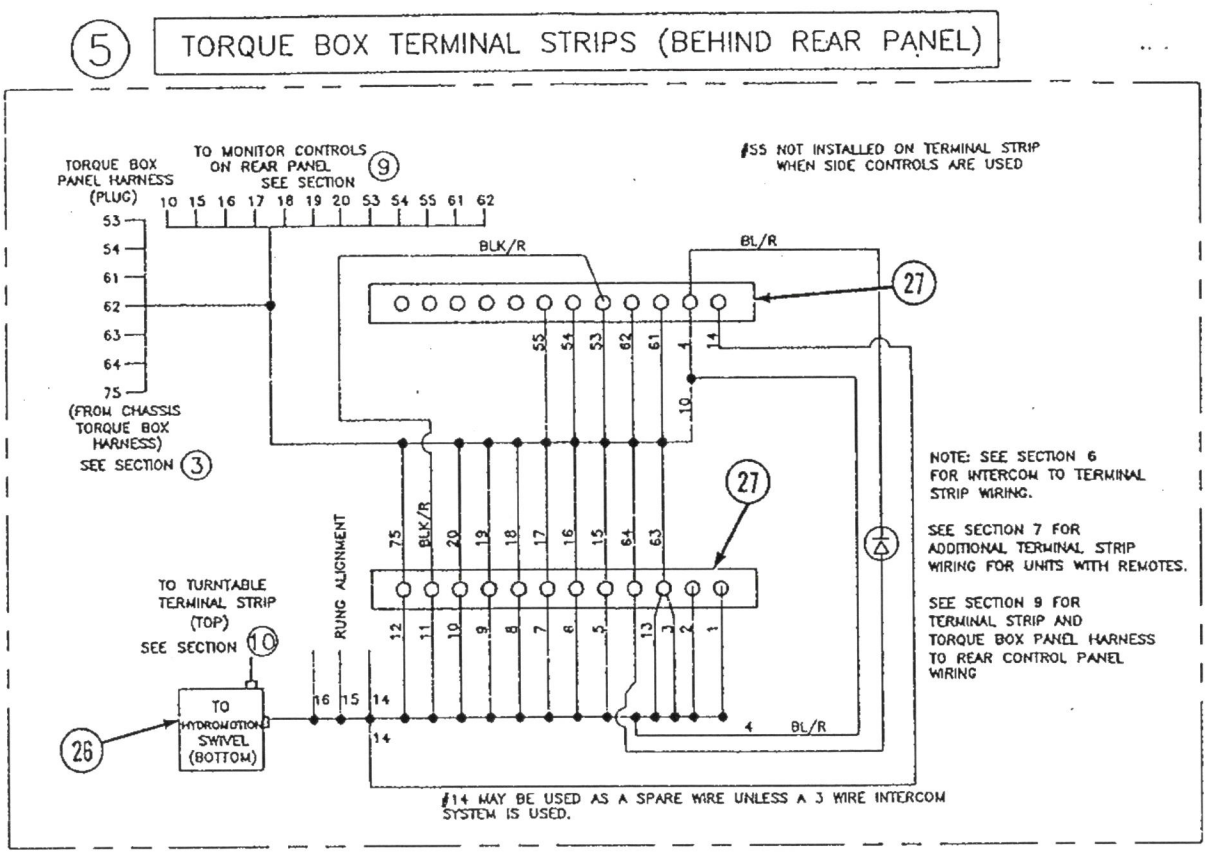


FIGURE 12 ELECTRICAL SYSTEM (Sheet 4 of 9)



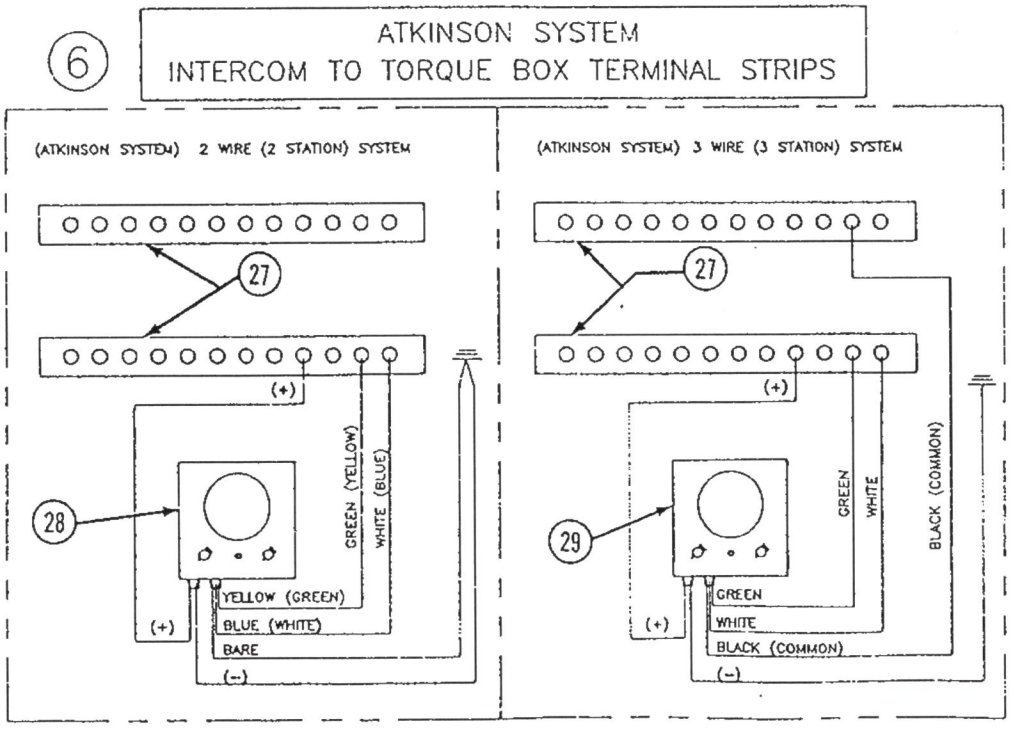


FIGURE 12 ELECTRICAL SYSTEM (Sheet 5 of 9)

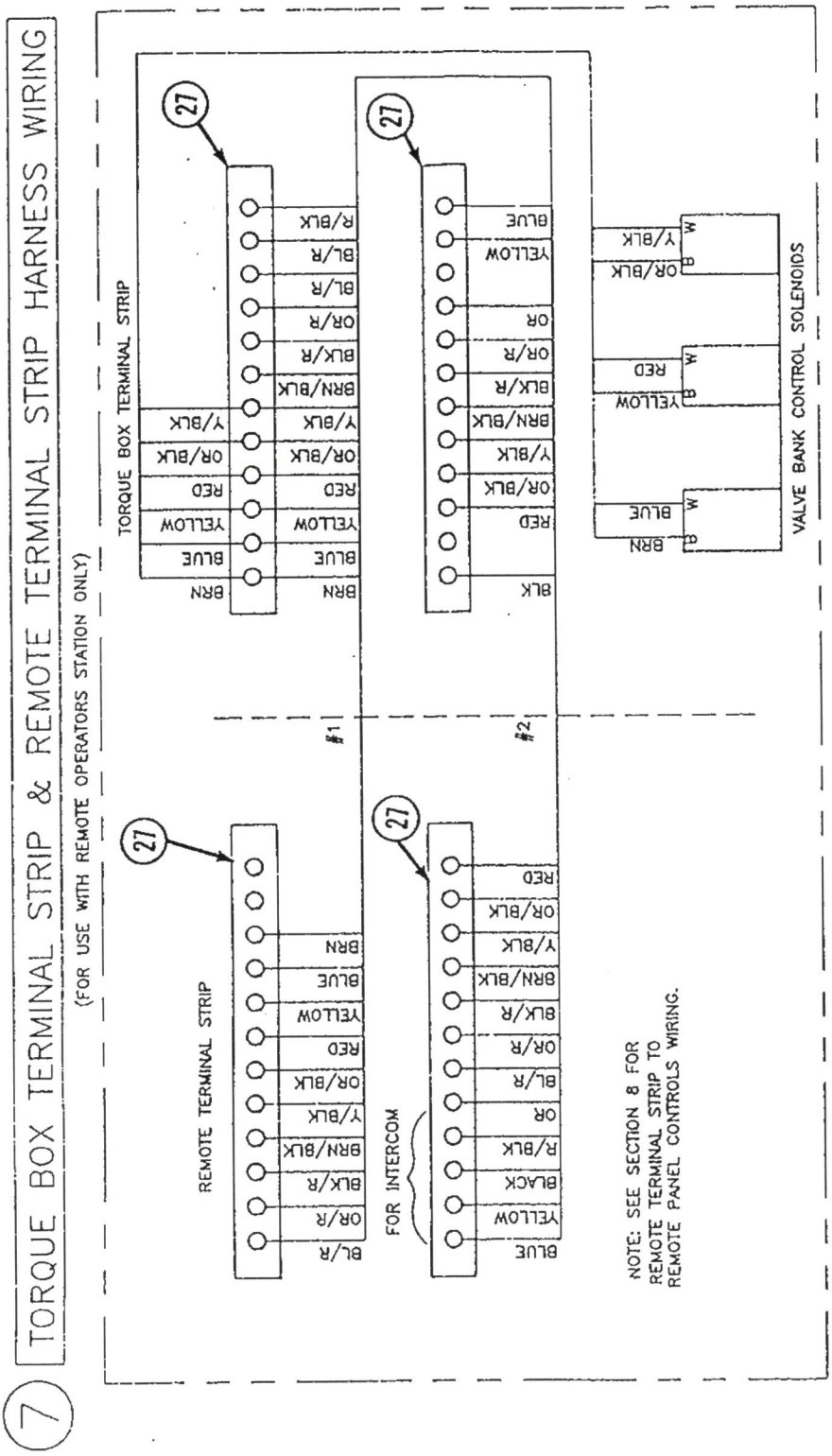


FIGURE 12 ELECTRICAL SYSTEM (Sheet 6 of 9)

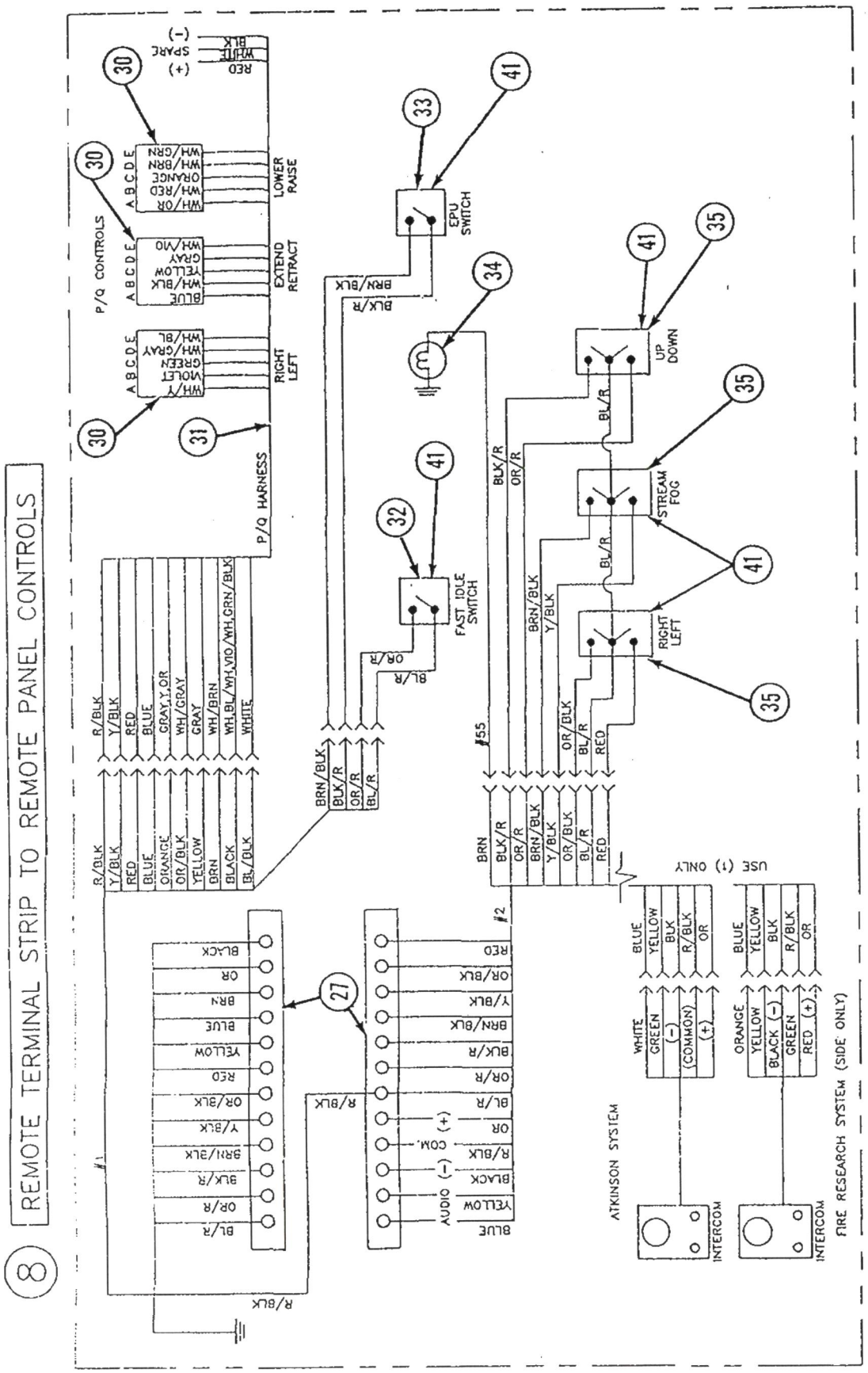
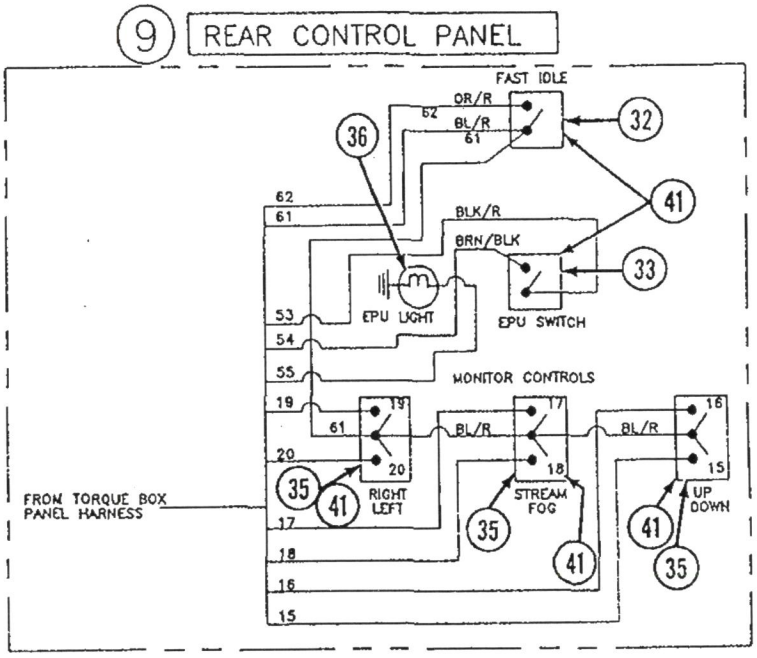


FIGURE 12 ELECTRICAL SYSTEM (Sheet 7 of 9)



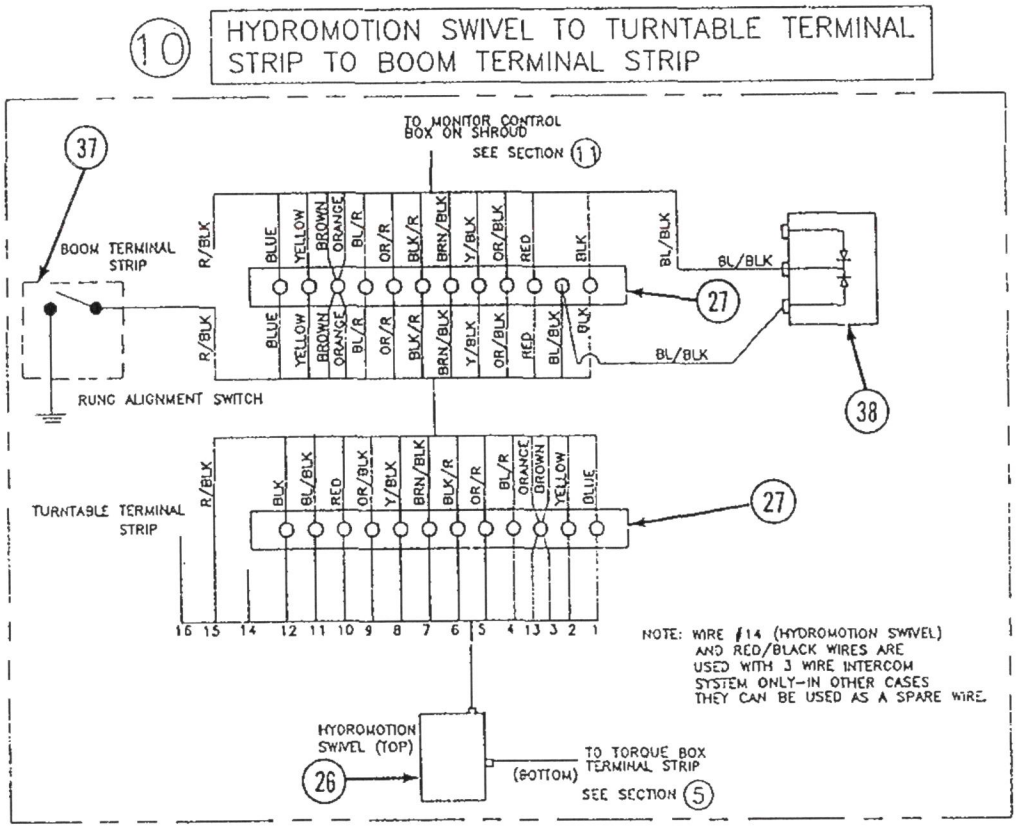
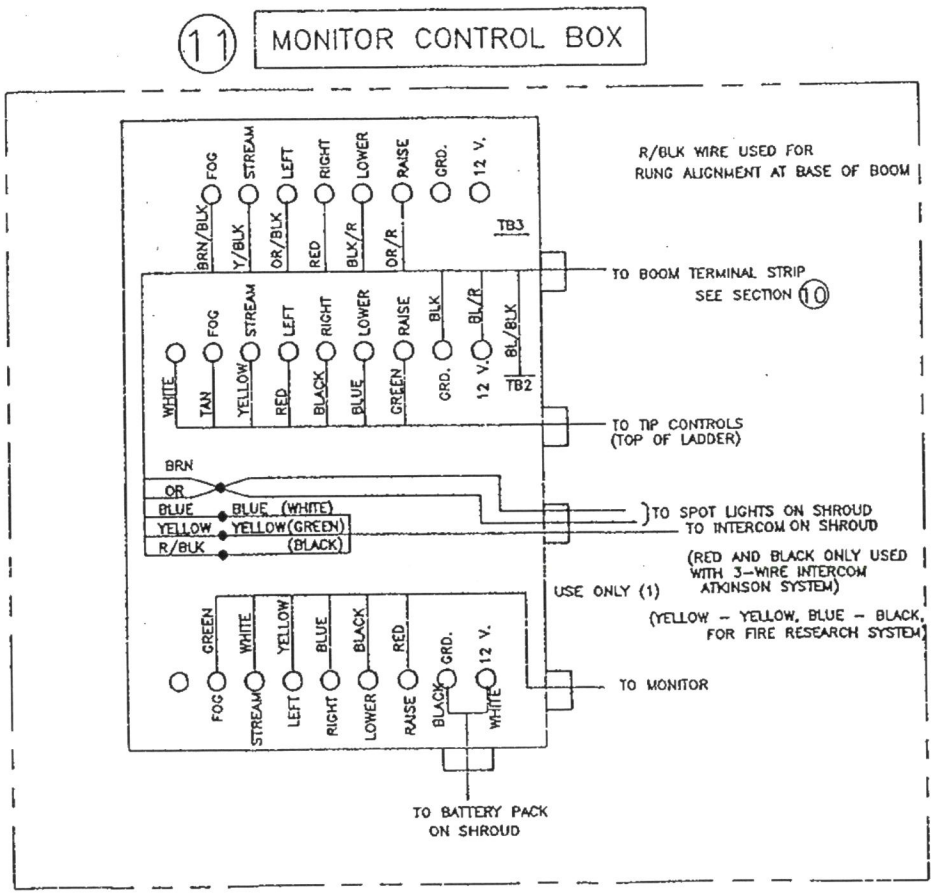


FIGURE 12 ELECTRICAL SYSTEM (Sheet 8 of 9)



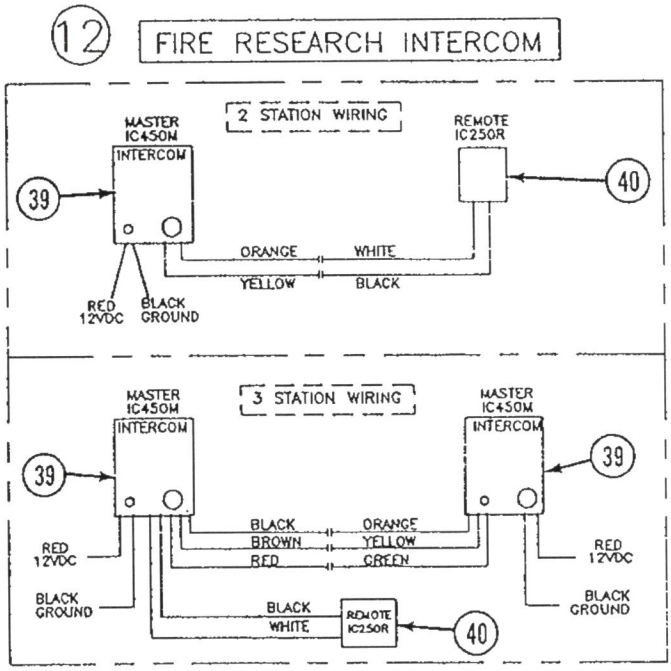


FIGURE 12 ELECTRICAL SYSTEM (Sheet 9 of 9)

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
12-		ELECTRICAL SYSTEM	REF
1	023885V	SWITCH, Interlock, Air Park Brake	1
2	007556V	SWITCH, Red Rocker, Ladder Power	1
3	007556V	SWITCH, Red Rocker, PTO	1
4	025482V	LIGHT, PTO Engaged	1
5	31933-0	PTO HOUR METER	1
6	7750000001	RELAY, PTO Engage and Water Pump Engage	2
7	010523V007	BREAKER, Circuit, 30 AMP	1
8	010523V005	BREAKER, Circuit, 20 AMP	1
9	010523V004	BREAKER, Circuit, 15 AMP	2
	008708V003	BRACKET, Circuit Breaker (NOT SHOWN)	1
10	7872000270	RELAY, Solenoid, Ladder Power	1
11	003672V	SOLENOID, Fast Idle, Air	1
	003672V	SOLENOID, PTO, Hydraulic	1
12	7872000236	SWITCH, Pressure, PTO	1
13	7872000176	SWITCH, Limit	3
14	7872000185	SWITCH, Limit, 2-1/2-inch Long Lever	3
15	7722000117	E.P.U. (EMERGENCY POWER UNIT)	1
16	025483V	PLUG, Interlock Diverter Valve	2
17	7926000904	VALVE, Interlock Diverter	2
18	025490V	SWITCH, Foot, Unintential Movement Control (See Item No.41)	1
19	025484V	SWITCH, Toggle, Outrigger Control (See Item No.41)	2
20	005700V009	ALARM, Outrigger Movement	1

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
(Cont'd)			
21	022965V	VALVE, Outrigger (See Figure 20, Hydraulic System)	REF
22	025485V	RELAY, Fast Idle Circuit	1
23	011038V	POTENTIOMETER, Fast Idle Adjustment	1
24	018883V	RESISTOR	1
25	88850-1	RELAY, 12 Pin	1
	88850-2	SOCKET, Relay, 12 Pin	1
26	024090V	HYDROMOTION SWIVEL (See Figure 20, Hydraulic System)	REF
27	7738400044	TERMINAL STRIP, 12 Block	5
28	025486V	INTERCOM, Master, 2-Way (ATKINSON)	AR
	7327000021	REMOTE, Speaker, 2-Way	AR
29	025487V	REMOTE, Slave Speaker, 3-Way System	AR
	7327000027	MASTER, Intercom, 3-Way (ATKINSON)	AR
30	7872000171	CONTROL, P/Q	3
31	02600088005	HARNESS, Wire, P/Q	1
32	7872000209	SWITCH, Toggle, Fast Idle (See Item No.41)	2
33	7872000210	SWITCH, Toggle, E.P.U. (See Item No.41)	2
34	025482V	LIGHT, Indicator, Green, Rung Alignment	2
35	7872000202	SWITCH, Toggle, Monitor Controls (See Item No.41)	6
36	7581000003	LIGHT, Pilot, Red, E.P.U.	2
37	023851V	SWITCH, Rung Alignment	1
38	025488V	DIODE, Battery Pack Control	1
39	025009V	INTERCOM, Master (FIRE RESEARCH)	AR

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
(Cont'd)			
40	025010V	REMOTE, Intercom (FIRE RESEARCH)	1
41	7172000001	BOOT, Toggle Switch Seal (See Item Nos.18,19,32,33 and 35)	13

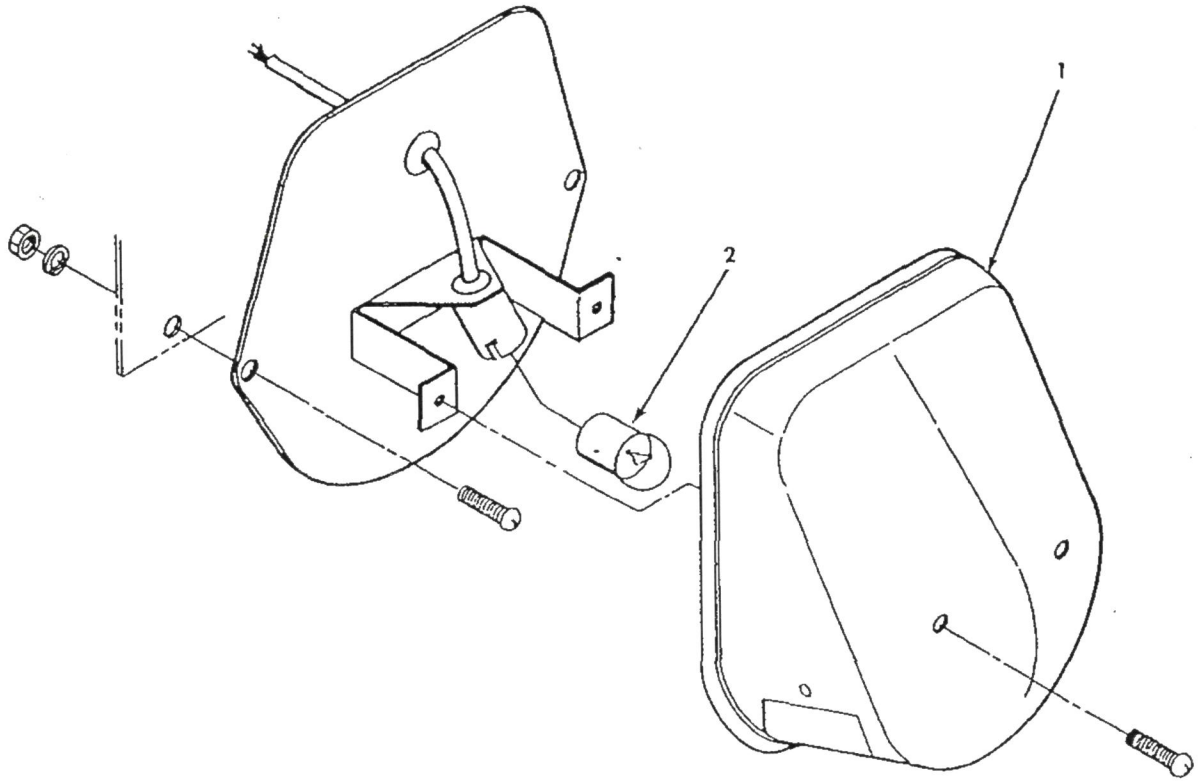


FIGURE 13 TURNTABLE WORKLIGHTS

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
13-		WORKLIGHT ASSEMBLY	2
1	7581000075	WORKLIGHT	1
2	67	BULB, Replacement	AR

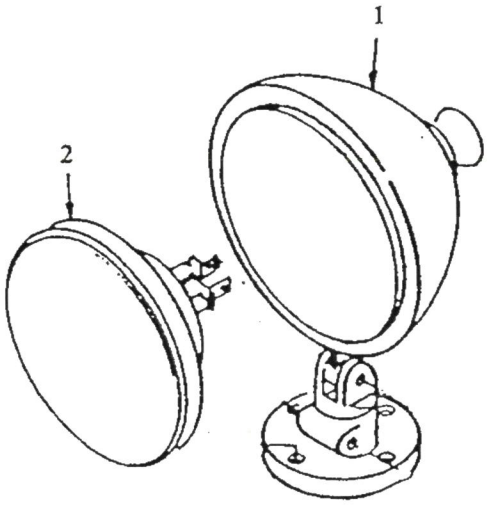


FIGURE 14 SPOTLIGHT

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
14-		SPOTLIGHT	
1	152-00003-3	HOUSING	1
2	152-00003-2	LAMP, Sealed Beam	1

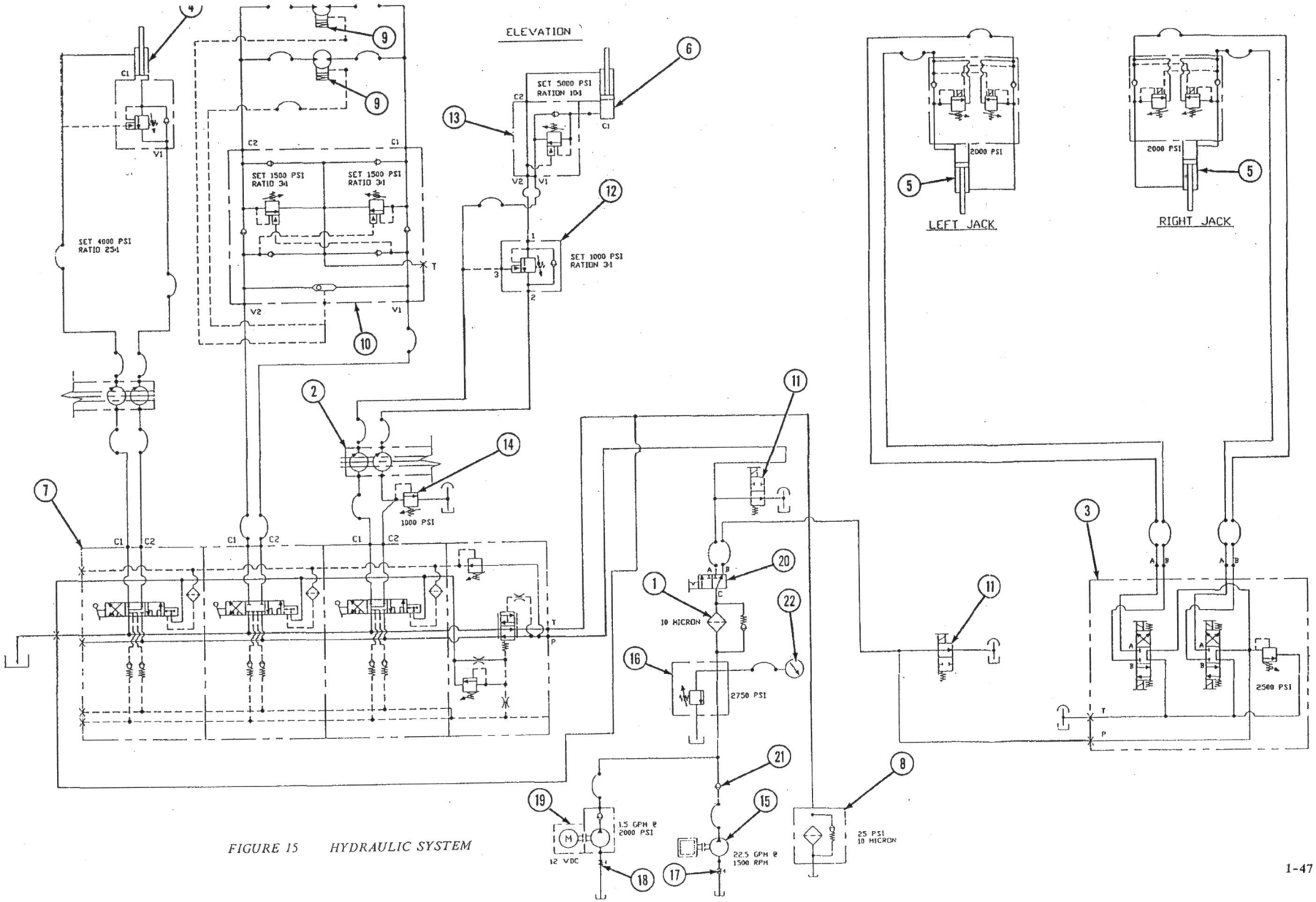


FIGURE 15 HYDRAULIC SYSTEM

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
15-		HYDRAULIC SYSTEM	REF
1	7437000068	FILTER ASSEMBLY, High Pressure Inline	1
	7437000069	ELEMENT, Filter, High Pressure (NOT SHOWN)	1
2	024090V	ROTARY SWIVEL, 4-Port, 16-Circuit	1
3	022965V	VALVE BANK, Outrigger Control	1
4	7372000135	CYLINDER, Ladder Extension	1
5	7372000078	CYLINDER, Outrigger	2
6	7372000140	CYLINDER, Lift	1
7	7926000637	CONTROL VALVE, Boom (Electrical)	AR
	7926000647	CONTROL VALVE, Boom (Manual)	AR
8	024103V	FILTER, Return Line	1
	024103V001	ELEMENT, Filter, Return (NOT SHOWN)	1
9	78710003	SWING DRIVE	2
10	7926000605	MOTION CONTROL AND LOCK VALVE	1
11	7926000904	SOLENOID VALVE, Normally Open, 2-Way	2
12	7926000911	COUNTERBALANCE VALVE, Line Mounted, 3:1 Pilot Ratio	1
13	7926000651	COUNTERBALANCE VALVE	1
14	7926000620	RELIEF VALVE	1
15	77220001000	OIL PUMP, Hydraulic	1
16	7926000856	RELIEF VALVE, Main System Pressure	1
17	7926000899	BALL VALVE, Inline, 1-1/2-inch NPT	1
18	7926000902	BALL VALVE, Inline, 3/4-inch NPT	1
19	7722000117	HYDRAULIC POWER SUPPLY, 12 VDC, E.P.U.	1

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
(Cont'd)			
20	7926000630	SELECTOR VALVE, Outrigger or Boom	1
21	7926000079	CHECK VALVE, 3/4-inch	1
22	7486000283	PRESSURE GAUGE, 0-5000 PSI	2

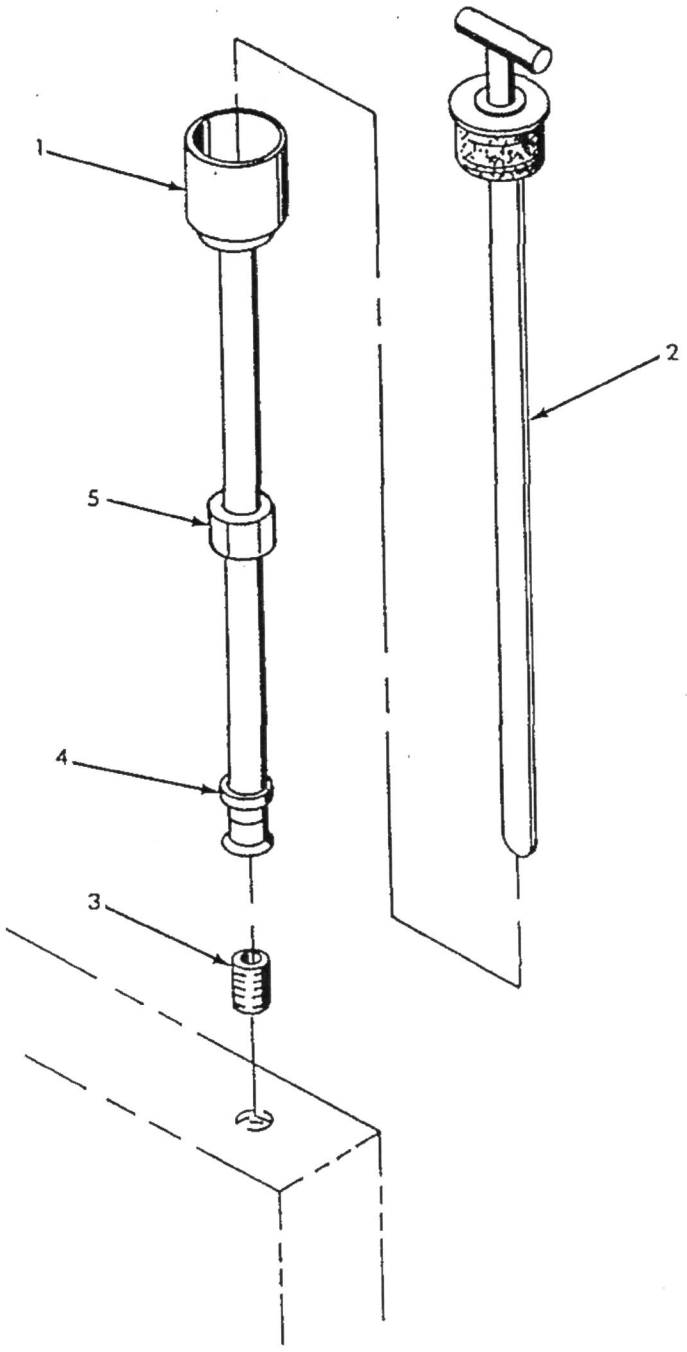


FIGURE 16 DIPSTICK ASSEMBLY

INDEX NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
16-		DIPSTICK ASSEMBLY	
1	023857M	TUBE, Dipstick	1
2	023853M	DIPSTICK	1
3	2021-8-8S	CONNECTOR	1
4	900605-8S	SLEEVE	1
5	1290-8S	NUT	1