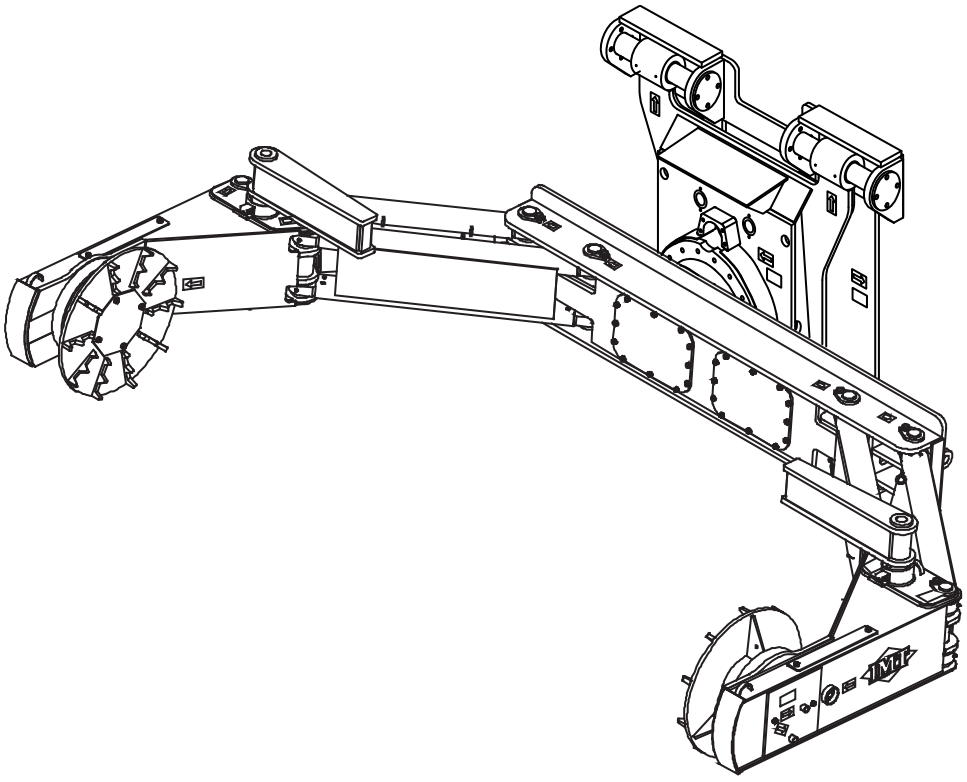
0TH2551B:99900777: 20130716

Tirehand 2551B

SERVICE MANUAL

Section 1 SPECIFICATIONS
Section 2 INSTALLATION
Section 3 OPERATION
Section 4 MAINTENANCE
Section 5 PARTS
Section 6 REPAIR
Section 7 CAMERA OPTION



IOWA MOLD TOOLING CO., INC.
BOX 189, GARNER, IA 50438-0189
TEL: 641-923-3711
TECHNICAL SUPPORT FAX: 641-923-2424
MANUAL PART NUMBER 99900777

INTRODUCTION - READ CAREFULLY!

This manual is provided to assist you in the identification and ordering of parts, for your IMT equipment. It contains information such as specifications, parts lists, capacities, and parts identification.

It is the user's responsibility to maintain and operate this equipment in a manner that will result in the safest working conditions possible.

Warranty of this equipment will be void on any part of the unit subjected to overloading, abuse, lack of maintenance and unauthorized modifications. No warranty - verbal, written, or implied - other than the official, published IMT new machinery and equipment warranty will be valid on this unit.

In addition, it is also the user's responsibility to be aware of existing Federal, State, and Local codes and regulations governing the safe use and maintenance of this equipment.

Three means are used throughout this manual to gain the attention of personnel. They are NOTE's, CAUTION's, and WARNING's and are defined as follows:

NOTE

A NOTE is used to either convey additional information or to provide further emphasis for a previous point.

CAUTION

A CAUTION is used when there is the very strong possibility of damage to the equipment or premature equipment failure.

WARNING

A WARNING is used when there is the potential for personal injury or death.

Treat this equipment with respect and service it regularly. These two things can add up to a safer work environment.

REVISIONS LIST

DATE	LOCATION	DESCRIPTION OF CHANGE
20020206	5-5,6	ADDED MOBILTAC NOTE
	7-1,20	WARRANTY
20051205	5-11	ECN 9984 - CHANGE TO 91712545 DRAWING
20070323	COVER, 3-3	NEW OWNERSHIP STATEMENT, NEW SERIAL NUMBER TAG
20080212	1-5	ECN 10661 - NEW CAPACITY CHART
20080505	11,12,18	ECN 10681, 10690 - ORIENTATION OF VB SECTIONS, ADDED FITTINGS TO 91712545, 90713678, 90713667
20081103	5-11	ECN 10816 - ADDED VALVEBANK SPARE PARTS TO 91712545 HYD KIT, ADDED ADDITIONAL ITEM #32 HOSES.
20081231	1-3	UPDATED TIREHAND SPECIFICATIONS.
20090424	5-8	ECN 11001 - ADDED FALL BACK ARMS TO CLAMP ASM 40712518
20090819	5-8	ECN 11082 - CORRECTED FB ARM BOM 40712518
20101220	5-11	ECN 11354-UPDATED HYD SCHEMATIC 91712545 TO REV M
20110209	5-11	ECN 11375, 11381 - CHANGE IN HOSES, BUSHINGS
20120522	THROUGHOUT	UPDATED OPERATION SECTION, ADDED CROSS-FLOW RELIEF VALVE TO HYDRAULICS, UPDATED CYLINDER TO REPLACE WAFER LOCK WITH STOP TUBE.
20130716	SECTION 7	ADDED SECTION 7 PER ENGINEERING MARKUP

SECTION 1. TIREHAND 2551B SPECIFICATIONS

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GEOMETRIC CONFIGURATION 4
CAPACITY CHART 5

NOTES

TIREHAND 2551B SPECIFICATIONS

GENERAL SPECIFICATIONS

TIREHAND MAXIMUM CAPACITY	10,000 lb (4536 kg)
BODY ROTATION	350° (6.11 Rad)
CLAMPING SPAN	52" to 135" (132.1 - 342.9cm)
METHOD OF CLAMPING	Parallelogram
CLAMPING PAD ROTATION	360° (6.28 Rad.) continuous
SIDE SHIFT (standard on loader, optional on forklift)	12" (30.5cm) lateral movement
CLAMPING LOAD HOLDING VALVES	Counterbalance valve
HYDRAULIC CONTROL VALVE	Located in body
HYDRAULIC CONTROLS	Cab-mounted 4-function remote control
ROTATION SYSTEM	Spur gear drive
TIREHAND WEIGHT	8640 lbs (3920 kg)
TIREHAND HORIZONTAL CENTER OF GRAVITY FROM VEHICLE ATTACHMENT POINT	38" (96.5cm)
TIREHAND HORIZONTAL CENTER OF GRAVITY WITH 36.00-51 TIRE FROM VEHICLE ATTACHMENT POINT	96" (243.8cm)
OPTIMUM PUMP CAPACITY	12 U.S. GPM @ 3000 PSI (45.4 liters/min @ 207 bar)
COUNTERWEIGHT NEEDED	As required for stabilization
ALLOWABLE BEAD BREAKING METHOD	Push Bar, ONLY

CYLINDERS

	BORE	STROKE
CLAMPING	4" (10.16cm)	18-1/2" (47.00cm)
SIDE SHIFT (optional)	4" (10.16cm)	12" (30.48cm)

VEHICLE COMPATABILITY

The Tirehand 2551B will permanently adapt to either a forklift truck or a front-end loader. When mounting to a forklift truck, it is recommended that the truck be equipped with a sideshifter. If adapted to a front-end loader, quick couplers are available which enable the disconnection of the Tirehand so that the original bucket can be quickly coupled to the machine for normal operations.

IMT reserves the right to change specifications and design without notice. Where applicable, specifications are in accordance with SAE standards.

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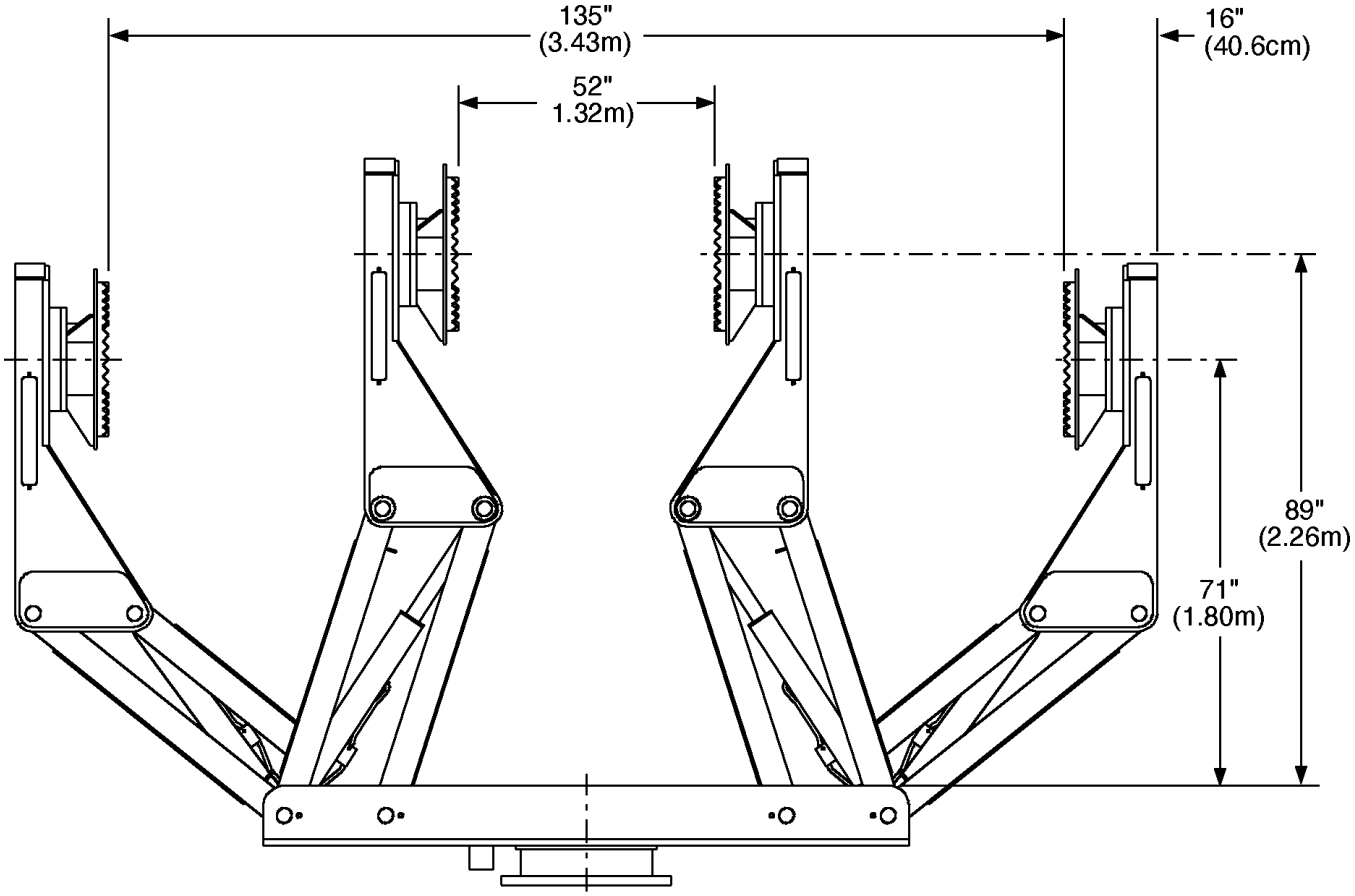
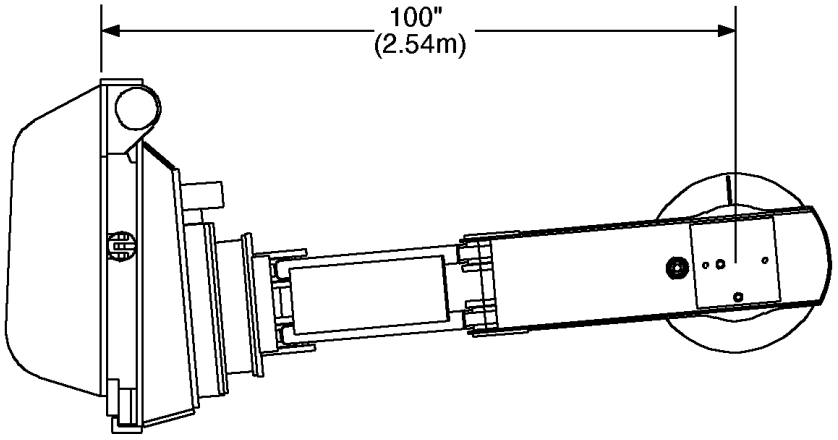
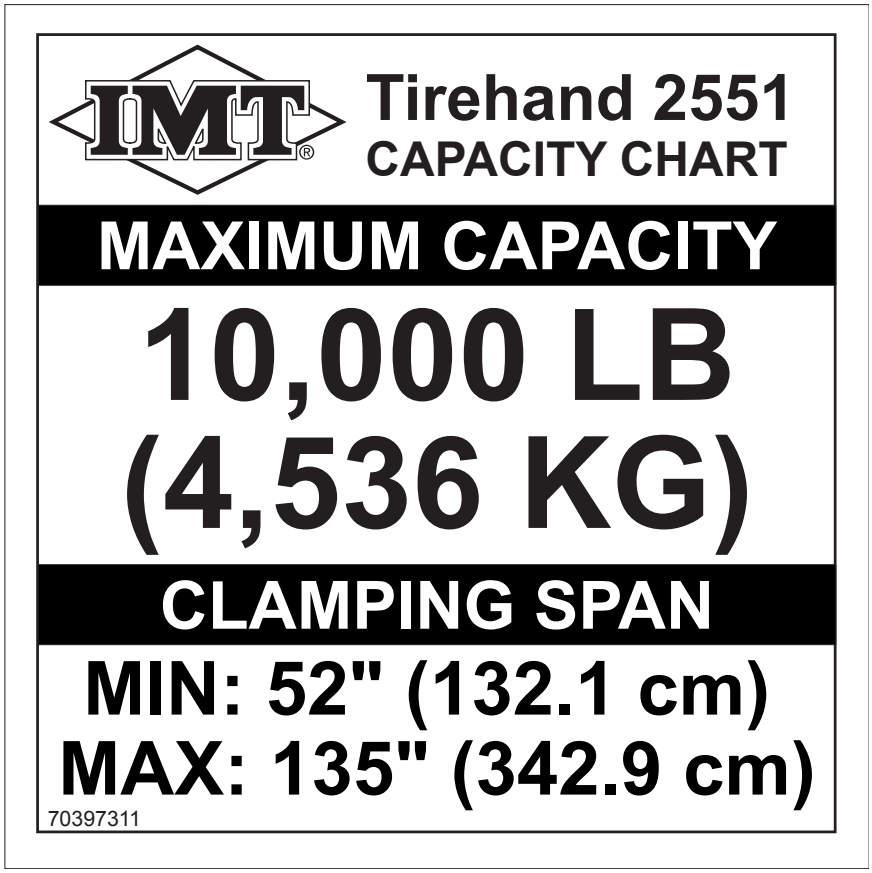
GEOMETRIC CONFIGURATION






IMT
Tirehand 2551
CAPACITY CHART
MAXIMUM CAPACITY
10,000 LB
(4,536 KG)
CLAMPING SPAN
MIN: 52" (132.1 cm)
MAX: 135" (342.9 cm)
70397311

NOTES

SECTION 2. TIREHAND 2551B INSTALLATION

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NOTES

GENERAL

Each installation of the IMT Tirehand may differ slightly. Therefore, this section contains only general information, and should be used as a reference for your particular installation. Carefully read and understand this section before attempting to install the Tirehand.

VEHICLE COMPATABILITY

The tirehand will permanently adapt to either a forklift truck or a front-end loader which has sufficient capacity and stability per the tirehand specifications. When mounting to a forklift truck, it is recommended that the truck be equipped with a sideshift. If adapted to a front-end loader, quick couplers are available which enable the disconnection of the tirehand so that the original bucket can be quickly coupled to the machine for normal operations.

Typical tirehand hydraulic installations include:

- Bulkhead plate hydraulic installation - all of the tirehand hydraulics hoses connect together in a bulkhead plate, which then connects hydraulically to the loader or forklift. With a bulkhead plate installation, the valvebank is part of the forklift or loader rather than the tirehand. In many cases, bulkhead installations are used on forklifts.

- Valvebank hydraulic installation - when the valvebank is part of the tirehand, rather than the loader or forklift. The forklift or loader must be equipped with a pressure line and a return line which connects the forklift or loader hydraulic system to the valvebank in the tirehand. In many cases, valvebank hydraulic installations are used on loaders.

Typical tirehand controls include:

- Hydraulic cab controls, where additional functions in forklift or loader control valves are hydraulically connected to the tirehand.
- Electric cab controls, which includes a control box with toggles used to control the tirehand.

For all installations, the tirehand requires 12 GPM (45.4 lpm) of hydraulic fluid at 3000 PSI (207 bar). A flow divider may be required if the forklift or loader pump provides excess flow. Contact IMT for specific installation instructions on any type of installation.

Prior to connecting any electrical connections between the tirehand and the loader or forklift, check the tirehand voltage. IMT tirehands may be 12V or 24V.

VALVE BANK INSTALLATION

Carefully examine the interior of the cab of the carrier vehicle to determine the best possible location for the valvebank, or valvebank remote control box. Consider the following:

1. Ease of operation.
2. Ease of installation.
3. Possible interference with other controls in the vicinity.

After selecting the best location for the control box, fabricate a mounting bracket, if necessary. Whether the valve, or control box, is mounted directly to the existing panel, or mounted using a fabricated bracket, it must be held rigidly and be accessible to the hydraulic hoses, or electrical cables. Complete the installation.

CARRIER VEHICLE

The Tirehand may be installed on any loader, or forklift, having sufficient lifting capacity and stability. The Tirehand is usually equipped with a base, unless specified by the customer. The function of the base is to interface the Tirehand with a particular carrier vehicle. The base is mounted, by use of pins, to the carrier vehicle thereby providing the means for installing the Tirehand sub-base. The sub-base is mounted to the base through side shift shafts, riding on linear bushings. Remember that each installation may vary.

1. Install the Tirehand to the carrier vehicle, as described above.

2. Check all lubrication points for adequate lubrication.

3. Operate the carrier vehicle to check for unobstructed vertical movement. Determine whether stop blocks may be required in order to prevent the Tirehand from coming in contact with the carrier vehicle. Install stop blocks if necessary, to prevent damage to the Tirehand and/or carrier vehicle.

TESTING

Raise the Tirehand to provide adequate clearance for operating all Tirehand functions. Operate all Tirehand functions and check for leaks.

WARNING

STAY CLEAR OF ALL PINCH POINTS WHILE OPERATING THIS UNIT. FAILURE TO COMPLY MAY CAUSE SERIOUS INJURY OR DEATH.

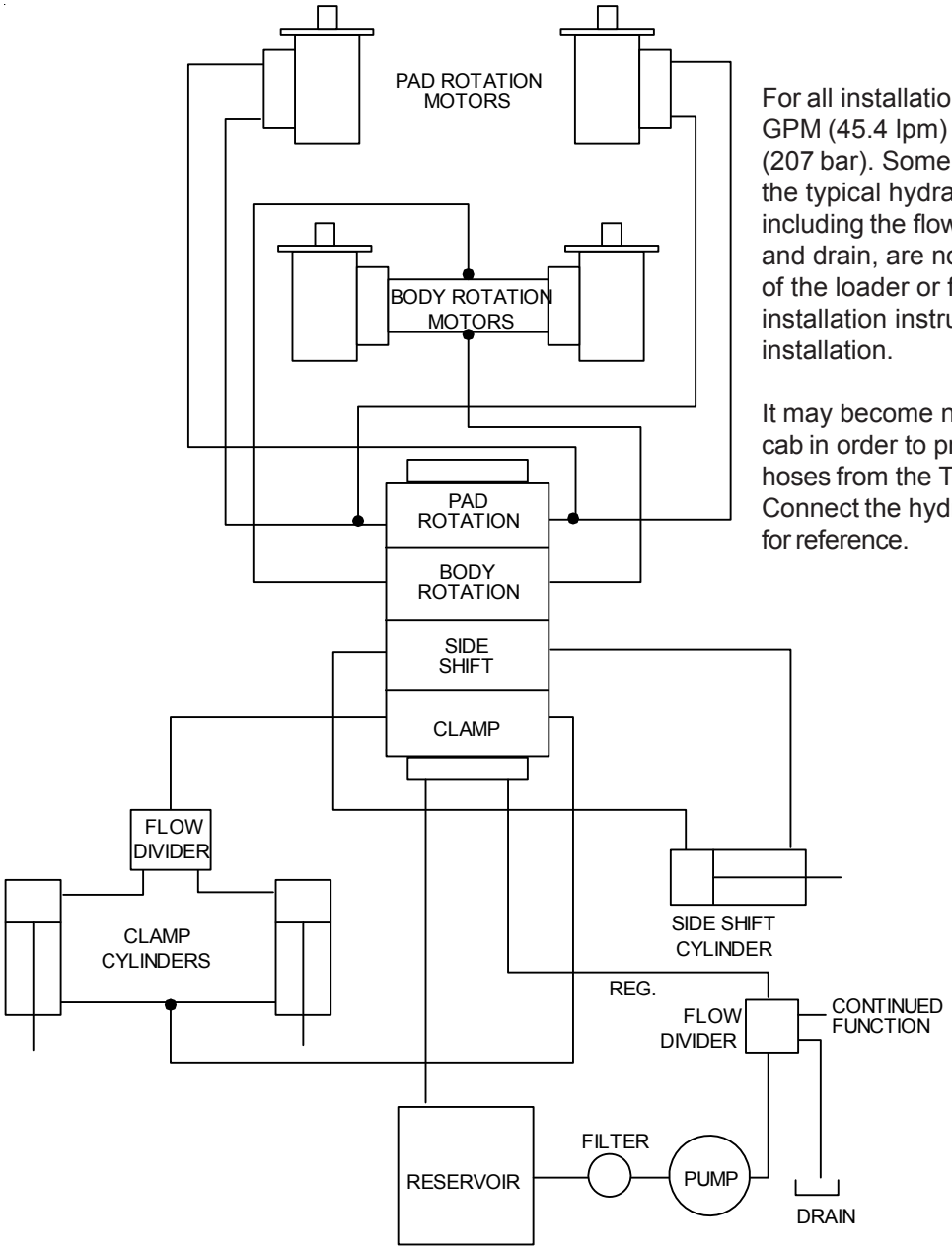
NOTE

IF THE OPERATION OF THE TIREHAND FUNCTIONS APPEARS ERRATIC, IT MAY BE NECESSARY TO ELIMINATE AIR FROM THE SYSTEM.

Test the unit at rated capacity, and note any points of instability. Add counterweights if needed.

If the carrier vehicle is articulating, make certain that steering of the vehicle is not hindered by the routing of the hydraulic hoses. Check for any possible point where hoses may be subjected to excessive wear

TYPICAL HYDRAULIC INSTALLATION



For all installations, the TH2551B requires 12 GPM (45.4 lpm) of hydraulic fluid at 3000 PSI (207 bar). Some of the components shown on the typical hydraulic installation drawing, including the flow dividers, reservoir, filter, pump, and drain, are not provided by IMT but are part of the loader or forklift. Contact IMT for specific installation instructions on any type of installation.

It may become necessary to cut a hole in the cab in order to provide for routing the hydraulic hoses from the Tirehand to the control valve. Connect the hydraulic hoses, using the drawing for reference.

LOADER INSTALLATION

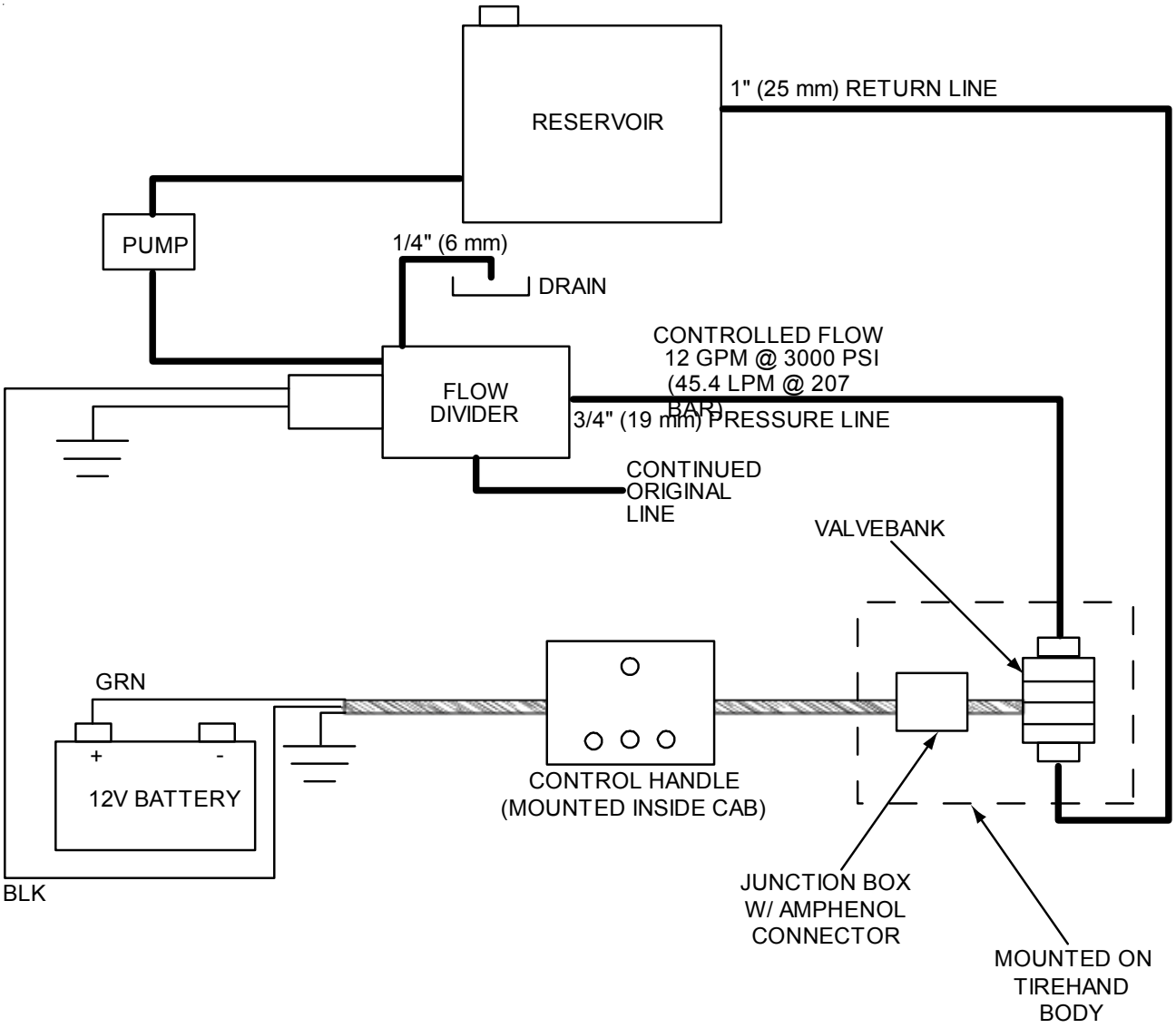
NOTE: Tirehand installations vary based on the carrier vehicle. Contact IMT for specific installation assistance.

1 Mount the Tirehand to loader arms using the original loader pins.
2 Splice the flow control divider into the existing pressure line. Continue the original line to its original destination (bucket, etc.), and route the controlled line (with 12 gpm (45.4 lpm) at 3000 psi (207 bar)) to the tirehand valvebank.
3 Route the hoses as shown in figure.
4 Locate the control handle inside the cab where convenient to operate.
5 Connect the 3-wire power cable to 12-volt power. The green wire to 12V positive, the black wire to the coil on the flow divider, and the white wire to ground.

NOTE

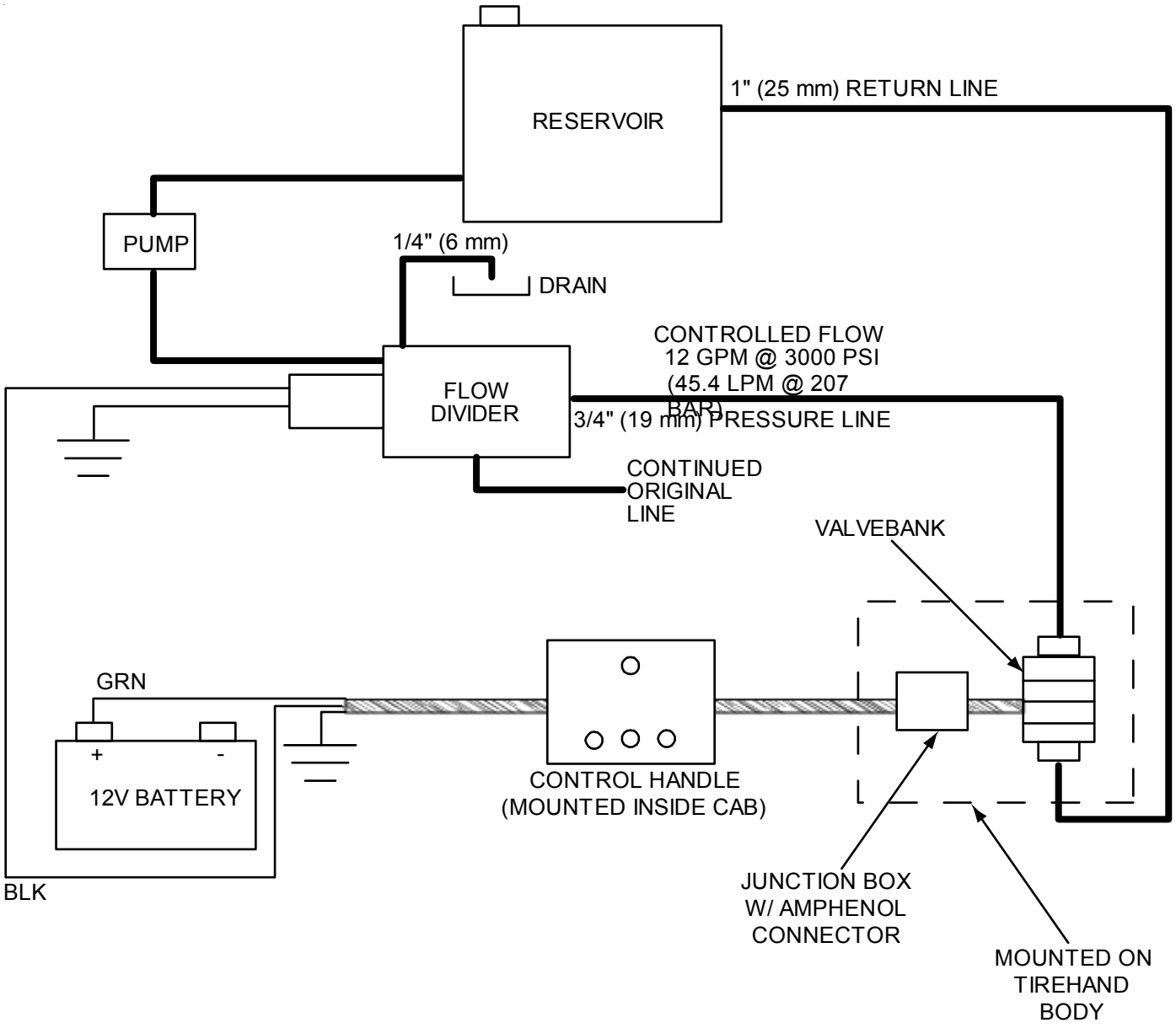
WELD STOP BLOCKS TO THE LOADER ARMS TO LIMIT ARTICULATION, IF NECESSARY. LOCATIONS AND SIZES OF STOPS TO BE DETERMINED AT TIME OF INSTALLATION.

6 Route the control cable to the tirehand and connect.
7 Check all hoses and cables for clearances. Make sure that steering or moving the arms will not pinch or overstress the hoses or cables.
8 Fill the reservoir. Start the loader's engine and operate all controls to purge air from the system. With the loader running, check for leaks and repair if necessary.
9 Recheck all hoses and cables for clearance.
10 Check the reservoir oil level and fill if necessary.
11 Test operate the tirehand.



LIFTGATE INSTALLATION

1. Mount the Tirehand to lift truck using the original carriage pin.
2. Splice the flow control divider into the existing pressure line. Continue the original line to its original destination (forklift function, etc.), and route the controlled line (with 12 gpm (45.4 lpm) at 3000 psi (207 bar)) to the tirehand valvebank .
3. Route the hoses as shown in figure below
4. Locate the control handle inside the cab where convenient to operate.
5. Connect the 3-wire power cable to 12-volt power The green wire connects to 12V positive, the black wire to the coil on the flow divider, and the white wire to ground.
6. Route the control cable to the Tirehand and connect.
7. Check all hoses and cables for clearances. Make sure that steering or other movements of the lift truck will not pinch or overstress the hoses or cables.
8. Fill the reservoir. Start the lift truck's engine and operate all controls to purge air from the system.
9. With the lift truck running, check for leaks and repair if necessary.
10. Re-check all hoses and cables for clearance.
11. Check the reservoir oil level and fill if necessary
12. Test operate the Tirehand.



BULKHEAD INSTALLATION

If the forklift on which the tirehand is installed includes control valves, all of the hydraulic lines from the forklift control valves must culminate at the front of the carriage. The forklift will connect to the tirehad using a bulkhead plate. The forklift manufacturer must furnish oil for all hydraulic functions. Install the tirehand with a bulkhead plate as follows:

1 Install the tirehand on the forklift, using the bulkhead plate for hydraulic connections. The tirehand requires 12 GPM (45.4 lpm) of hydraulic fluid at 3000 PSI (207 bar). See the bulkhead plate drawing (60118044) for connection information.
2 Check lubrication points for adequate lubrication.
3 Operate the forklift to check for vertical obstructions.

TESTING
Raise the Tirehand to provide adequate clearance for operating all Tirehand functions. Operate all Tirehand functions and check for leaks.

WARNING

AVOID SERIOUS INJURY! KEEP CLEAR OF ALL PINCH POINTS WHILE OPERATING THIS UNIT.

NOTE

IF THE TIREHAND OPERATION IS ERRATIC, PURGE AIR FROM THE HYDRAULIC SYSTEM.

Test the unit at rated capacity. Note any points of instability. Add counterweights if needed.
If the carrier vehicle is articulating, make certain that steering of the vehicle is not hindered by the routing of the hydraulic hoses. Check for wear points and re-route if needed.

See the Hydraulic Schematic, Tirehand with Bulkhead (91711202) in the parts section for specific installation information.

VALVEBANK INSTALLATION

When the tirehand has a valvebank, connect the valvebank to the forklift or loader hydraulic system using the hydraulic pressure and return line from the forklift or loader

1 Install the tirehand on the loader or forklift, connecting the suction and return lines from the forklift or loader to the tirehand valvebank. See drawing for hydraulic information for a valvebank installation.
2 Check lubrication points for adequate lubrication.
3 Operate the forklift or loader to check for vertical obstructions. Add stop blocks, if needed, to prevent the Tirehand from contacting the carrier vehicle.

TESTING
Raise the Tirehand to provide adequate clearance for operating all Tirehand functions. Operate all Tirehand functions and check for leaks.

WARNING

AVOID SERIOUS INJURY! KEEP CLEAR OF ALL PINCH POINTS WHILE OPERATING THIS UNIT.

NOTE

IF THE TIREHAND OPERATION IS ERRATIC, PURGE AIR FROM THE HYDRAULIC SYSTEM.

Test the unit at rated capacity. Note any points of instability. Add counterweights if needed.
If the carrier vehicle is articulating, make certain that steering of the vehicle is not hindered by the routing of the hydraulic hoses. Check for wear points and re-route if needed.

SECTION 3. TIREHAND 2551B OPERATION

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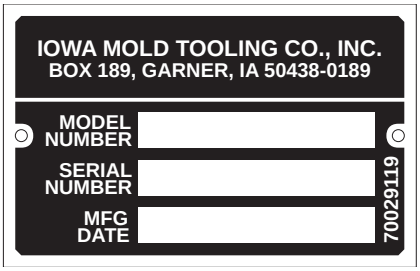
TIREHAND OPERATING RESTRICTIONS 9

NOTES

GENERAL

This Tirehand is a tire lifting and positioning device. It should be used to remove, transport, replace, and storage stack tires. It is designed only as a tire handling device and should not be used for any other purposes. It is intended to permanently attach to either a forklift truck or a front-end loader.

Every Tirehand has an identification placard (drawing below) fastened to the unit between the clamping arms. When ordering parts, communicating warranty information, or referring to the unit in any way, always include the assigned model and serial numbers. All inquiries should be directed to Iowa Mold Tooling Co., Inc., 500 Hwy 18 West, Garner, Iowa 50438.



SAFETY FACTORS

There are three important factors involved in the safe operation of this unit:

1. The operator must have the competence to know the machine and how to safely control it.

2. The Tirehand must be in good mechanical condition.

3. The unit must never be loaded to exceed the maximum rated capacity.

The safety precautions presented in this section should be read and observed at all times during operation.

LOAD LIMITS

The Tirehand is designed to be operated within specific maximum allowable load limits, as noted in Section 1. of this manual. Overloading will result in potentially serious safety hazards and shortened service life of the unit. Exceeding the rated capacity of the Tirehand will cause instability and possible structural failure.

Warranty of this unit will be void on any part determined to have been misused due to overloading, improper operation, or lack of maintenance. No warranty, written, verbal, or implied, other than the published IMT new machinery and equipment warranty will be valid with this unit.

EQUIPMENT INSPECTION

Before operating this unit, always perform the safety checks listed below. They are vital to the detection of equipment malfunction and damage, which may be potential safety hazards.

Structural Soundness - Inspect the unit for damaged, or loose fasteners.

Hydraulic Oil Supply - Check the oil level in the reservoir, and fill if needed.

Controls - Make a short test for proper control operation.

Repairs - Correct all defects or malfunctions before putting the unit into service.

This equipment inspection should be performed before each work task and as a periodic preventative maintainance check.

WORK STATION POSITIONING

A firm, level, and dry surface is the best location from which to operate this equipment. Overhead obstructions should be avoided.

Care should be used to make certain that all personnel are clear of the work area, before the operation begins.

At job sites where the terrain is graded or unfirm, the operation of the Tirehand should be restricted to compensate for instability.

WARNING

THE OPERATOR SHOULD BE ALERT, AT ALL TIMES, FOR THE PRESENCE OF PERSONNEL IN THE WORK AREA. OPERATIONS MUST BE SUSPENDED UNTIL THE WORK AREA IS CLEARED.

OPERATOR TRAINING

The Tirehand is designed for operator simplicity. Prior to operating this unit, the operator must become thoroughly familiar with control functions, operating procedures, and safety precautions. In addition, the operator must be prepared to take any remedial action needed in an emergency situation.

CONTROLS

The controls for the Tirehand, as well as the carrier vehicle, are located in the cab. They should be positioned within easy reach, near the operator station.

VEHICLE CONTROLS

The vehicle is equipped with controls which allow the operator to raise, lower, and tilt the Tirehand.

TIREHAND CONTROLS

The controls for the Tirehand are located in the cab of the carrier vehicle. Their function and operation is as follows:

Clamp-Push the lever to clamp the tire and pull to release.

WARNING

ATTEMPTING TO USE THE CLAMPING ACTION OF THE TIREHAND TO SEAT THE BEAD OF THE TIRE IS A HAZARDOUS PRACTICE, AND SHOULD NOT BE ATTEMPTED.

Side shift-Push the lever for right movement, and pull for left movement.

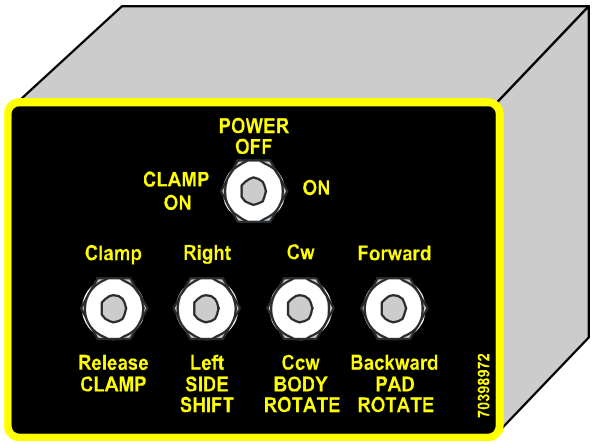
Rotation-Push the lever for clockwise rotation, and pull for counterclockwise rotation.

Axial- Push the lever to rotate the pads forward, and pull the lever to rotate the pads backward.

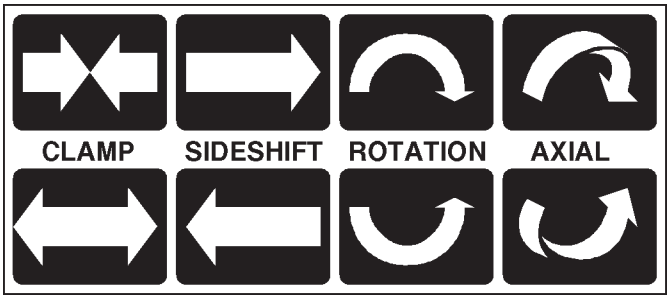
NOTE

DIRECTION OF PAD ROTATION IS AS SEEN FROM THE OPERATOR'S STATION WITH THE "TOP" DECAL POINTING UP. ROTATING THE TIREHAND 180 DEGREES (3.14 RAD.) WILL CAUSE THE PADS TO ROTATE IN A DIRECTION THAT IS OPPOSITE TO THAT SHOWN ON THE CONTROL DECAL.

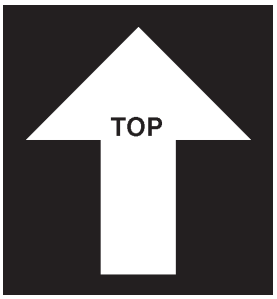
Some Tirehands are operated with a control box which can be mounted in the forklift or loader cab. The Power switch toggles to the right so the side shift, body rotation and pad rotation switches will function. The Power switch toggles to the left so the clamp switch will function. The Power switch is off in the center position.



Tirehand Cab Control Box



CONTROL DECAL



"TOP" DECAL

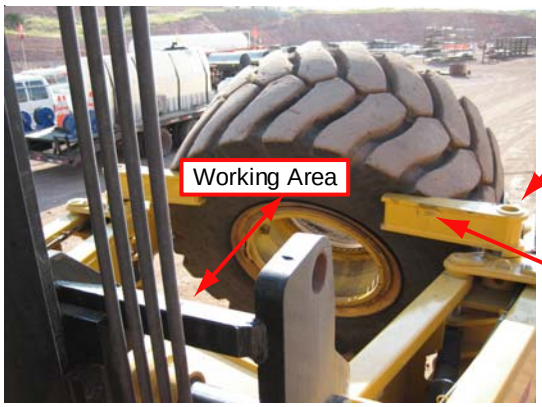
FALLBACK ARMS

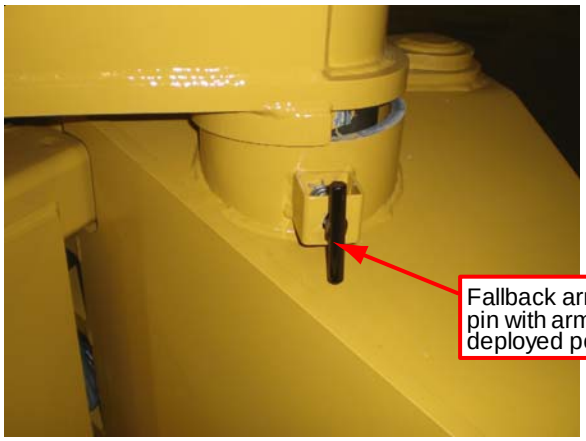
The Tirehand is equipped with fallback arms to prevent tire movement toward the working area between the tire and the back of the tirehand. The fallback arms have 360 degrees of rotation so they can be easily moved out of the way when the tire is rotated. They **must** be deployed and locked in place when the tire is vertical and personnel are in the working area.

The locking pins, located on the front side of each fallback arm, are spring loaded. They will hold the fallback arm in two positions, the stowed position and the deployed position. In any other position, the fallback arm is free to rotate. When moving from the stowed to the deployed position, pull the fallback arm pin and rotate the fallback arm 110 degrees towards the deployed position (if there is room for the fallback arm to clear the tire), or rotate the fallback arm in the other direction 250 degrees. Once the arm reaches the deployed position, the locking pin will snap into place.

DANGER!

DO NOT ENTER THE WORKING AREA UNLESS THE FALLBACK ARMS ARE ENGAGED!





TASK PERFORMANCE

To begin operation:

1) Open the tirehand clamps.
2) Maneuver the vehicle into a position so that the tirehand can be used to clamp the center of the tire with the tirehand body parallel to the ground. Raise the loader or forklift so the tirehand is elevated correctly. Move into position to grasp the tire.

WARNING

Make certain the personnel are clear before continuing the operation.

3) Advance the carrier vehicle and center the clamp pads on the tire. Clamp tire securely.

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4) Remove tire and rim hardware, if needed. Following tire and rim manufacturer instructions, carefully remove the tire and/or rim from the vehicle.

5) To transport tire, rotate so that tire is in horizontal position and close to the ground. If possible, keep the lowest part of the tire approximately 12" (305 mm) from the ground.

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Tire is positioned parallel and low to the ground for transport.

WARNING

If the tire is in a vertical position, the tire blocks operator visibility during transport. **Do Not** transport tire in this position! Rotate the pads so that the tire is in a horizontal position, parallel to the ground, before transporting. It is the operator's responsibility to position the tire and tirehand for maximum visibility when transporting the tire.

6) Place tire per tire manufacturer recommendations.

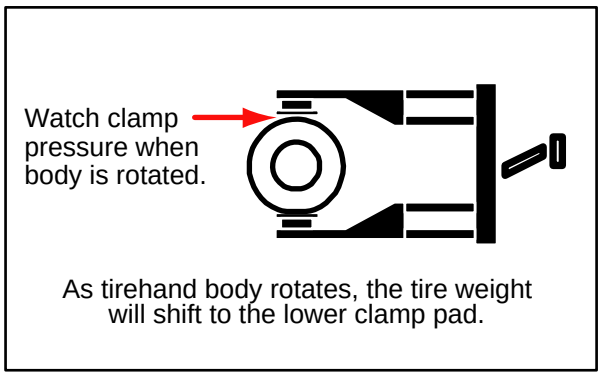
CAUTION

Avoid equipment damage! Never drag or push tire. Make sure the tire is lifted off the ground before moving it.

7) To reinstall tire, rotate pads so the tire is in a vertical position, perpendicular to the ground, and rotate the body so it is parallel to the ground.

CAUTION

Clamp pressure can change as the tire rotates and the weight shifts on the clamps. Observe clamp pressure and adjust if needed.



As tirehand body rotates, the tire weight will shift to the lower clamp pad.

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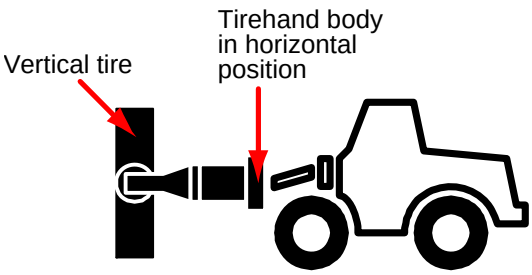


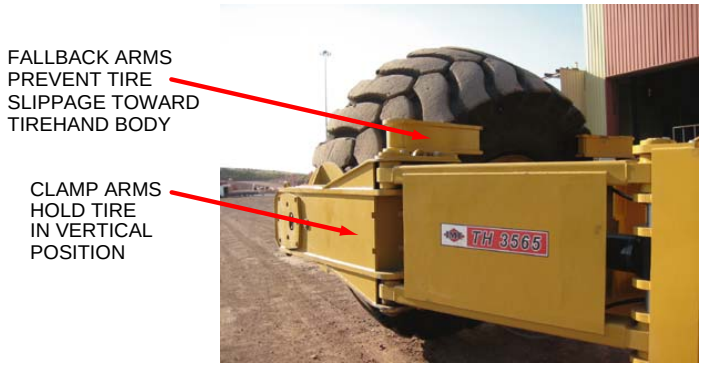
Tire and tirehand in correct position for tire installation

NOTE

The TOP decal on the back of the tirehand points up when the tirehand is oriented in the neutral position. The fallback arms are located at the top. When in the neutral position with the fallback arms at the top, the pad rotation control will operate as shown on the control decal. If the tirehand has been rotated 180 degrees, the top arrows will point down and the pad rotation control will function in the opposite direction of the control decal.

8) Clamp the tire securely. Remember, clamp pressure changes as the weight shifts between the clamps. When the tire is vertical, the fallback arms, a safety device in case of operator error, will prevent the tire from falling into the space between the clamp and the body. Make sure the fallback arms are engaged when the tire is in the vertical position.

.



9) To reinstall a tire, maneuver the forklift or loader so that the tirehand can be used to position the tire back onto the carrier vehicle. Raise the loader or forklift so the tire is elevated correctly. When the tire is in position and secured properly per the tire, rim and vehicle manufacturer recommendations, release the tirehand clamps.

POWER LINE PROXIMITY

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

1. For lines rated 350 kV or below, minimum clearance between the lines and any part or the unit or load shall be twenty (20) feet (6.10 m).

2. For lines rated over 350 kV, minimum clearance between the lines and any part of the unit or load shall be fifty (50) feet (15.25 m).

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

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

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

OPERATING REQUIREMENTS DECAL

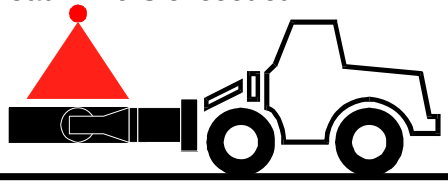
DANGER

FAILURE TO OBEY THE FOLLOWING WILL RESULT IN

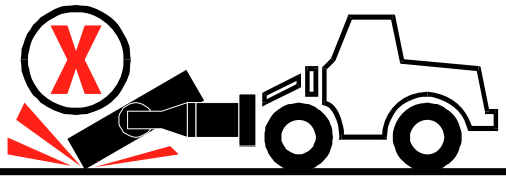
DEATH, SERIOUS INJURY,

INSTABILITY OR EQUIPMENT DAMAGE

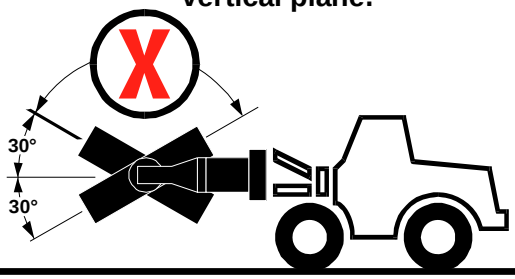
NEVER attempt to handle tires filled with ballast. Stability or structural failure may result if load limit is exceeded.



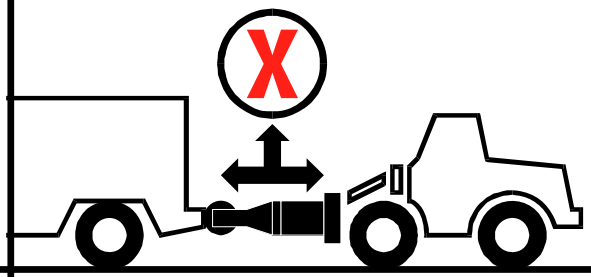
NEVER drag the tire - the unit is designed to lift and carry.



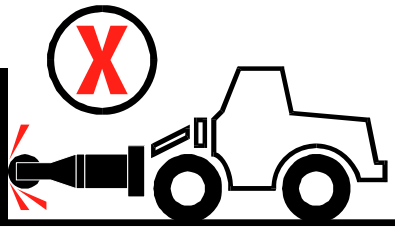
NEVER transport a tire rotatyed more than 30° off the horizontal plane.
FOR EXAMPLE: Do not transport in a vertical plane.



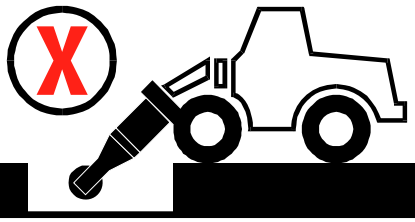
NEVER use the unit for any jacking, pulling or dragging operation involving an object or another vehicle.



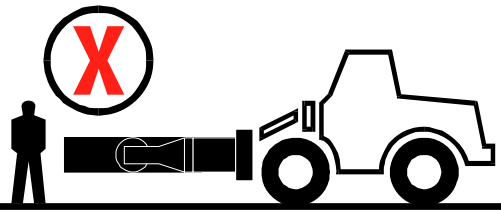
NEVER impact-load or hammer-push with the unit.



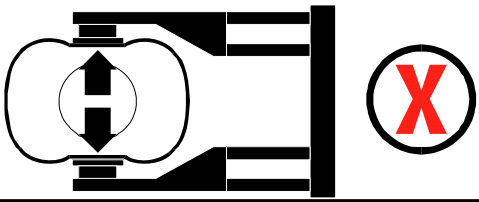
NEVER operate hand below ground level.



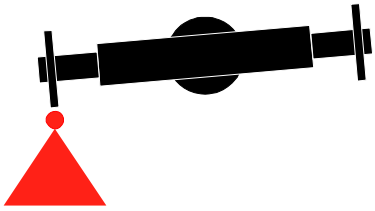
NEVER operate the unit while persons not required for operation are in the work area.



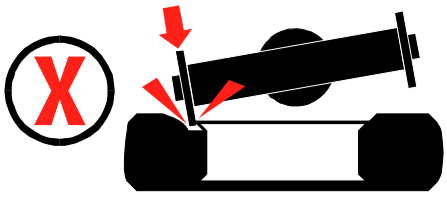
NEVER clamp an uninflated tire and then inflate. Damage or injury WILL result.



NEVER sling a load using one arm of the Tirehand.



NEVER use one arm of the Tirehand to break beads.



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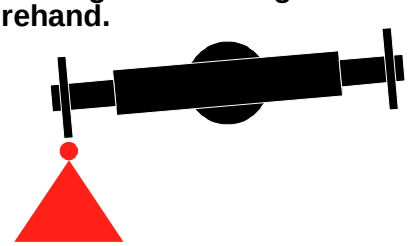
OPERATING RESTRICTIONS DECAL

TIREHAND OPERATING RESTRICTIONS

The Tirehand is intended to be a tire lifting and positioning device. There are possible misapplications of this machine that can cause serious damage to the Tirehand rotation gears. It is possible to break the teeth on the Tirehand rotation bearing by applying forces while attempting to break tire beads **with one arm** of the Tirehand, or by slinging a load **under one arm** of the Tirehand

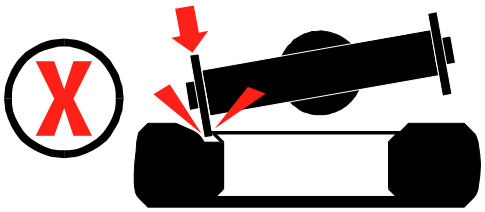
Use of a single Tirehand arm for lifting or carrying a load will void the tire hand warranty.

NEVER sling a load using one arm of the Tirehand.



The rotation system on the Tirehand is designed to allow the user to manipulate large tires. It is a precision function that was not designed to apply high loads. However, the load holding valves that are built into this system to help control the tire during handling will also prevent the body of the Tirehand from rotating freely when loads are applied to a single Tirehand arm. When one arm is used for bead breaking, these forces can translate into torques that attempt to rotate the body of the Tirehand. The load holding valves will not allow this to occur. In this situation, the forces that are created in the Tirehand rotation turntable are well in excess of what the gear teeth can tolerate. **Using one arm of the Tirehand for bead breaking will void the warranty of the Tirehand.**

NEVER use one arm of the Tirehand to break beads.



A separate bead breaker or a push bar that carries the load to both arms of the Tirehand must be used to separate the tire from the rim. It is acceptable to use the Tirehand for holding the sidewall and flange away from the bead while O-rings and locking rings are being installed.

SECTION 4. TIREHAND 2551B MAINTENANCE

GENERAL 3
LUBRICATION POINTS 3
LUBRICATION 3
LUBRICATION CHART 4
HYDRAULIC SYSTEM 4
HYDRAULIC FLUID SPECIFICATIONS 4
PREVENTATIVE MAINTENANCE 6
REGULAR INSPECTION 6
TIREHAND INSPECTION CHECKLIST 7

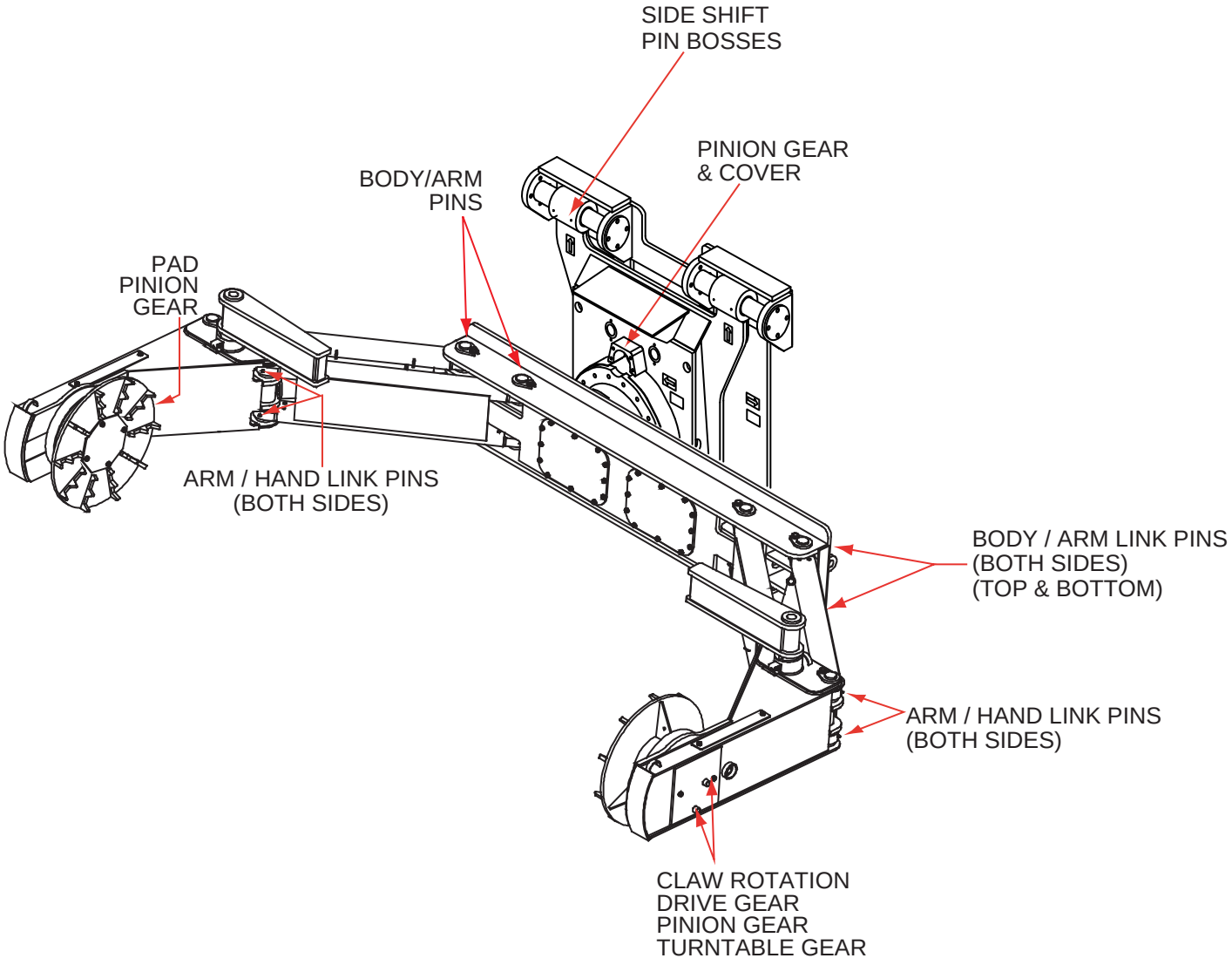
NOTES

GENERAL

Regularly scheduled maintenance is essential to keeping the Tirehand operating efficiently. This section contains information important to the proper maintenance procedures and necessary service intervals. Personnel responsible for the maintenance of this unit should become familiar with the frequency and the type of maintainance needed, and perform these tasks at the recommended intervals.

LUBRICATION

Maintaining the proper lubrication schedule will vary with climatic conditions and frequency of use. The lubrication chart is intended to serve as a schedule for a normal work load, and moderate weather conditions. Periods of heavy use will shorten service intervals.



LUBRICATION POINTS

LUBRICATION CHART

LUBRICATION CHART			
APPLICATION POINT	LUBRICATION	APPLICATION	INTERVAL
Side Shift Pins (if applicable) Body - Arm Link Pins (Top & Bottom, both sides) Arm / Hand Link Pins (Top & Bottom, both sides) Pad Rotation Gear Pad Pinion Gear Body Rotation Turntable Gear Body Drive Gear Body Pinion Gear	Shell Alvania 2EP or Shell Retinax "A" or equivalent	Hand Grease Gun or Pneumatic Pressure Gun	Weekly

HYDRAULIC SYSTEM

HYDRAULIC FLUID SELECTION

Minimum viscosity specifications for hydraulic oil to be used in the Tirehand are indicated in the table below. Any major oil company can supply products which meet these requirements.

Oils selected for this equipment, in addition to meeting the viscosity requirements, should have the following additive properties.

1. Antifoam inhibitors
2. Antioxident inhibitors
3. Rust resistant additives
4. Antiwear additives

HYDRAULIC FLUID SPECIFICATIONS

Table above contains oil specifications for a full range of operating temperatures. Arctic conditions present special requirements which are not in the scope of this chart, and must be analyzed individually. Consult your oil supplier for the proper hydraulic oil to be used under these severe conditions. Electric reservoir heaters are available to improve operation at extremely low temperatures.

HYDRAULIC FLUID DETERIORATION

Contamination of the hydraulic oil by solvents, water, dust or other abrasives will cause deterioration of the oil. Sustained presence of these impurities will result in the premature breakdown of the additive properties, and reduce the viscosity index. Introduction of water to the system, or operating at high temperatures (above 180 degrees F), will result in an increase in the oil oxidation rate. Oxidation produces varnish-forming materials and sludge in the oil. Operating the system for any prolonged period, with contaminated or broken down oil, will increase component wear, causing significantly reduced service life. Periodically, draw an oil sample, and check for oil quality.

1. Place the sample in a clean glass container.
2. Smell the oil to detect rancid or burnt odor.
3. Visually examine the oil for a dark, or cloudy, color.
4. Allow the sample to stand for several minutes. Inspect the sample for water, which will settle to the bottom of the glass, if present. Water can result from a leak in the system, or condensation from temperature extremes.

HYDRAULIC FLUID SPECIFICATIONS

Ambient Temperature Range, deg. F	0-90	Below 32	32-90	Above 90
Min. Pour Point, deg. F	-30	-25	+10	+10
Min. Viscosity, SSU @ 0 deg. F	4,000	4,000	- - -	- - -
Min. Viscosity, SSU @ 100 deg. F	140-190	100-130	150-200	200-315
Min. Viscosity, SSU @ 210 deg. F	48	41	43	47
Minimum Viscosity Index	139	90	90	90

When any of these conditions are observed, the system should be purged and filled with new oil. The oil in the complete system, including the reservoir, should be changed:

1. After every 800 hours of operation, or every six months, whichever occurs first.

2. After pump, or other major component failure.

HYDRAULIC SYSTEM PURGING

Purging the hydraulic system requires a new oil sufficient to completely refill the reservoir, hoses, cylinders, and to allow for some loss during this operation. To reduce oil loss during this process, operate the vehicle engine at reduced speed. In purging, new oil is supplied to the pump, and used oil is discharged from the return line. Two operators will be required during this procedure, one to operate the controls, and one to regulate the engine speed.

CAUTION

DO NOT ALLOW THE RESERVOIR TO DROP BELOW 1/3 CAPACITY DURING THIS OPERATION.

Purging is accomplished as follows:

1. Locate the unit in an area that provides solid, level footing, and space to accomodate the full operating range of the unit. Shift the vehicle into neutral.

2. Raise the boom approximately 5 feet above ground level. Operate the side shift function fully in one direction.

3. With the Tirehand right side up, rotate it so that it is 30 degrees off horizontal. Extend the clamping arms to full stroke.

4. Kill the engine, drain the hydraulic reservoir and remove the suction and pressure hoses. Drain and reassemble.

NOTE

THE METHOD OF WASTE OIL DISPOSAL IS LEFT TO THE DISCRETION OF THE SERVICE PERSONNEL.

5. Disconnect the return line and direct it into a waste container. Plug the return line port on the reservoir, and fill with clean oil.

NOTE

BE THOROUGHLY FAMILIAR WITH THE FOLLOWING STEPS, AND BE PREPARED TO PERFORM THEM IN AN UNINTERRUPTED SEQUENCE, OR STOP THE ENGINE AT THE END OF EACH STEP. IF THIS IS NOT DONE, EXCESSIVE OIL WASTE WILL OCCUR.

6. Start the engine and engage the pump if necessary. With the return directed into the waste container, retract the clamp arms, rotate the pads, and operate the side shift full stroke. Rotate the Tirehand back to the horizontal position. Stop the engine.

7. Reconnect the return line to the reservoir, and change the return filter. All components of the Tirehand are now purged.

8. Check the reservoir oil level, and add oil if necessary.

NOTE

THIS SECTION COVERED THE PURGING OF THE TIREHAND. THE CARRIER VEHICLE'S HYDRAULIC SYSTEM SHOULD BE COVERED IN THE MANUFACTURER'S SERVICE MANUAL.

PURGING TRAPPED AIR

Air may be introduced into the system, either through a leak in the system, or due to disconnecting a hydraulic component for servicing. Air in the system will cause erratic operation, and must be corrected.

To purge air from the system, extend and retract the affected cylinder several times. At the end of the stroke, hold the valve open for a few seconds. Repeat this procedure several times, until operation is smooth and continuous.

FILTER ELEMENT REPLACEMENT

NOTE

SOME CARRIER VEHICLES MAY NOT BE EQUIPPED WITH A SUCTION AND RETURN LINE FILTER. THESE INSTRUCTIONS APPLY TO THOSE VEHICLES WHICH REQUIRE IMT INSTALLED FILTERS. IF THE VEHICLE HAS SUCTION AND RETURN LINE FILTERS, REFER TO THE MANUFACTURER'S INSTRUCTIONS.

The hydraulic filters must be serviced regularly, to avoid accumulation of contaminants in the reservoir, or throughout the system. They must be changed after the initial 50 hours of operation, and every 200 hours thereafter. To change filter elements:

1. Close the gate valve and remove the filter element.
2. Install the new element, making certain that the rubber seal is in place.
3. Open the gate valve and check for leaks.

CAUTION

PUMP FAILURE WILL OCCUR IF THE GATE VALVE IS NOT REOPENED BEFORE OPERATION.

PREVENTATIVE MAINTENANCE

The Tirehand Inspection Checklist (next page) is designed to assist in keeping the Tirehand in peak operating condition. The information in this section refers to the Tirehand only. Items which apply to your Tirehand should be checked before it is put into operation. Inspect to the frequency indicated by the darkened block. Consult the manufacturers service guide for information on the carrier vehicle.

REGULAR INSPECTION

Every three months, or more often when the equipment is subjected to heavy use, the following inspections should be performed in addition to the preventative maintenance checklist.

TIREHAND ARM ASSEMBLIES

1. Check for structural defects such as weld cracks, dents, or bends.
2. Check cylinder holding valves.
3. Check cylinders for leaks.
4. Check both internal and external clamping arm bearings for wear and lubrication.
5. Check operating timing. Both clamping arms should function together at the same rate of motion.

AXIAL PAD ROTATION

1. Check for structural defects.
2. Check motors for leaks.
3. Check disc bearings located on support shafts.
4. Check all pins, and their retainers.

HYDRAULIC SYSTEM

CYLINDERS

1. Check rods for damage, such as scarring, and check for rust on out of service units.
2. Check for weld joint and seal leaks.
3. Check for drift, indicating possible leakage around the piston.
4. Check cylinder case for cracks and dents.

HYDRAULIC PUMP

1. Check for leaks at shaft seal and section joints.
2. Check for drop in operating speed.
3. Check system operating pressure.

HYDRAULIC CONTROL VALVES

1. Check for leaks at section joints and spools.
2. Check for ease of spool movement.
3. Check all relief valve settings.

OIL RESERVOIR AND HOSES

1. Check filters for clogged elements.
2. Check oil level in the reservoir.
3. Check all hoses for damage.

CARRIER BOOM AND CYLINDERS

1. Check for structural defects, such as dents, bends, and weld cracks.
2. Check all pins and their retainers.
3. Check cylinder rods for damage, and check for leaks.

SIDE SHIFT ASSEMBLY

1. Check cylinder for leaks and damage.
2. Check linear bushings for damage and lubrication.
3. Check for structural defects.
4. Check cylinder retaining pins.

ROTATION ASSEMBLY

1. Check turntable bolt torque.
2. Check for pinion gear/gear bearing backlash.

TIREHAND INSPECTION CHECKLIST

ITEM (* indicates a critical item)	DESCRIPTION	FREQUENCY		
		DAILY	WEEKLY	MONTHLY
WALK-AROUND INSPECTION	Inspect for hydraulic leaks, loose parts and obvious structural member damage.	■		
*MOUNTING BOLTS	Check torque (power-wrench tight).			■
ROTATION SYSTEM	Check for excessive backlash (play) between pinion gear and turntable gear-bearing. If there is excess play, use a feeler gauge to measure the play and adjust the backlash if needed. Clamp Backlash = 0.006" - 0.010" (0.15 mm / 0.25 mm) Body Backlash = 0.008" - 0.013" (0.20 mm / 0.33 mm)		■	
*STRUCTURAL DAMAGE	Check for broken welds, fatigue cracks, structural defects, bends and dents.			■
CONTROLS	Check for excessive wear and cleanliness.			■
LEAKAGE	Check for hydraulic fluid leaks.	■		
*ROTATION SYSTEM MOUNTING BOLTS	Check torque of top and bottom gear-bearing bolts. (See Torque Data Chart.)			■
ELECTRICAL	Check remote controls, auxiliary lighting, etc. for proper function.	■		
	Check for deterioration, dirt and moisture.		■	
HYDRAULIC FLUID RESERVOIR	Check for proper oil level. (Carrier Vehicle)	■		
HYDRAULIC OIL	Check oil quality. (Carrier Vehicle)			■
HYDRAULIC HOSE	Check for leakage on surface and at ends.	■		
	Check for blistering, deformation and abrasion.		■	
PUMP AND MOTOR	Check for loose bolts, leaks, unusual noises, vibration, reduced operating speed and excessive oil heating.			■
HYDRAULIC FILTER	Check vacuum reading with engine running and PTO engaged. A vacuum of 8" of mercury or higher indicates an obstructed filter. (Carrier Vehicle)	■		
CONTROL VALVES	Check for leaks, cracks and slow return to neutral.	■		
*CYLINDERS	Check for leaks, scores, nicked or dented rods, dented cases, deformed pin bosses, rust on rod.			■
CARRIER VEHICLE	Follow all inspection and maintenance procedures provided by the carrier vehicle manufacturer.	■	■	■

NOTES

SECTION 5. TIREHAND 2551B PARTS

GENERAL 3
CYLINDER IDENTIFICATION 3
WELDMENT IDENTIFICATION 3
CYLINDER PART NUMBER LOCATION 3
ORDERING REPAIR PARTS 3
WELDMENT PART NUMBER LOCATIONS 4
BASE ASM W/SIDE SHIFTER (40714619) 5
BASE ASSEMBLY WITHOUT SIDE SHIFT, STANDARD SUB-BASE (41714376) 6
BASE ASM WITHOUT SIDE SHIFTER, CUSTOM SUB-BASE (41714620) 7
BODY ASM (40712519) 8
CLAMP ASM (40712518) 9
SIDE SHIFT CYLINDER (3B282930) 10
CLAMP CYLINDER (3B340820) 11
HYDRAULIC KIT (91712545) 12
HYDRAULIC KIT WITHOUT VALVEBANK (91712926) 13
CONTROL KIT-CAB & GROUND CONTROL (90713667) 14
HANDLE ASM-CAB CONTROL (51713669) 15
HANDLE ASM-RC (51713432) 16
JIC BOX ASM-DUAL CONTROL (51713668) 17
CONTROL KIT-CAB CONTROL (90713678) 18
HANDLE ASM-CAB CONTROL (51713676) 19
CABLE ASM 18GA/16WIRE X 56 (51713677) 20
TETHERED PROPORTIONAL REMOTE POTENTIOMETER ADJUSTMENT 20
DECAL KIT (95712527) 21

NOTES

GENERAL

This section contains the exploded parts drawings, with accompanying parts lists, for the assemblies used in the manufacture of the Tirehand. These drawing are intended to assist in ordering parts and repairing the unit.

CYLINDER IDENTIFICATION

To be certain that proper replacement are received, it is necessary to specify the correct letter/number sequence for any parts request. The number stamped on the cylinder case must be used when ordering cylinder parts.

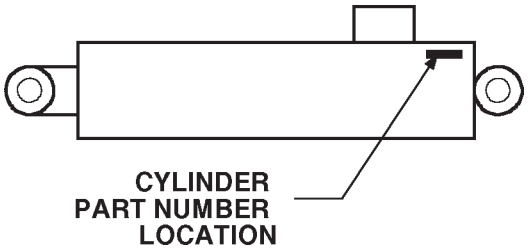
WELDMENT IDENTIFICATION

Each of the major weldments bears a stamped part number. Anytime that a major weldment is replaced, it is necessary to specify the complete part number stamped on that weldment. The locations of the part numbers are as shown on the next page.

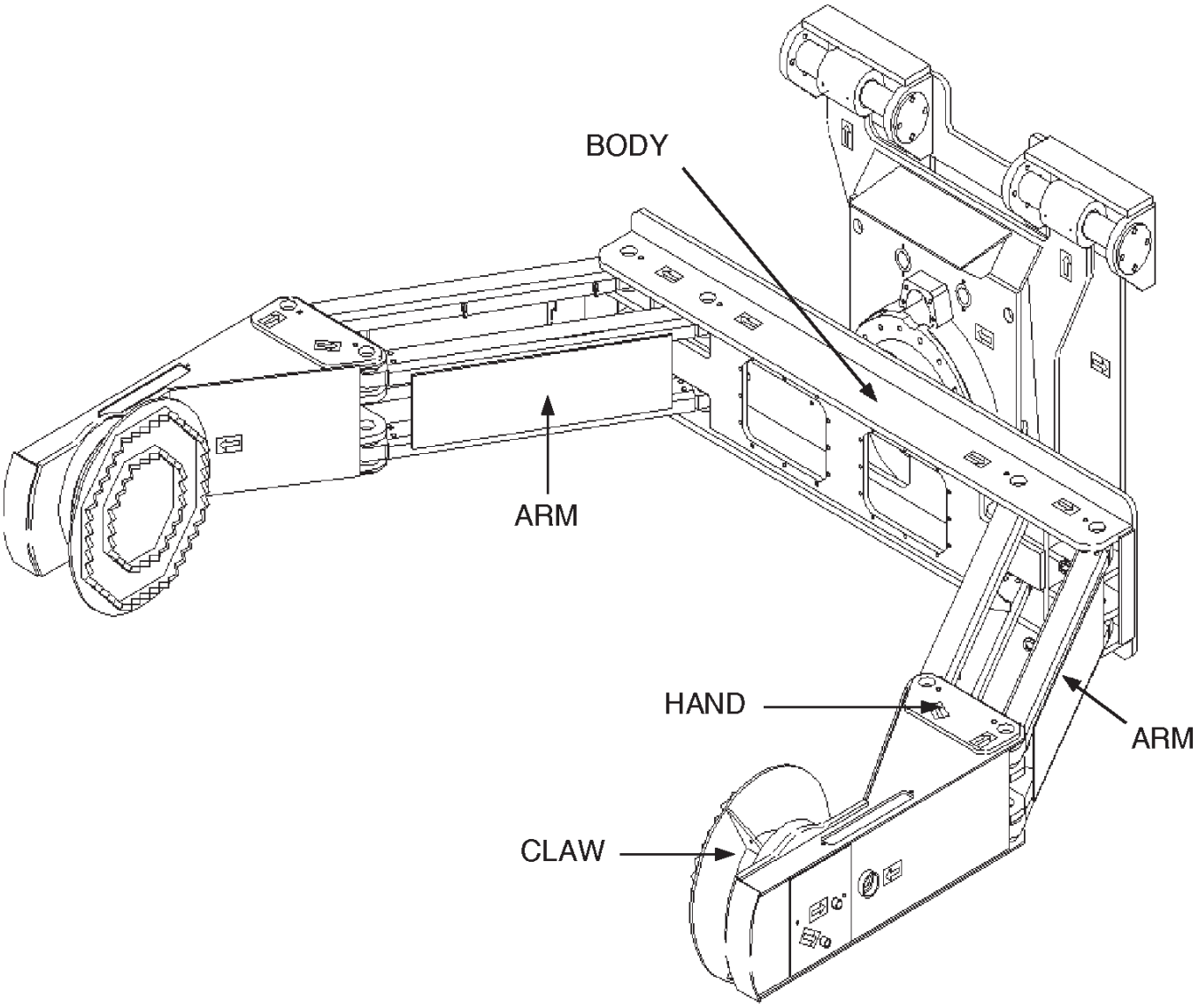
ORDERING REPAIR PARTS

When ordering replacement parts:

1. Give the serial number of the unit.
2. Give the model number of the unit.
3. Specify the complete part number. When ordering cylinder parts, or one of the main weldments, always use the stamped part number.
4. Give a complete description of the part.
5. Specify the quantity required.



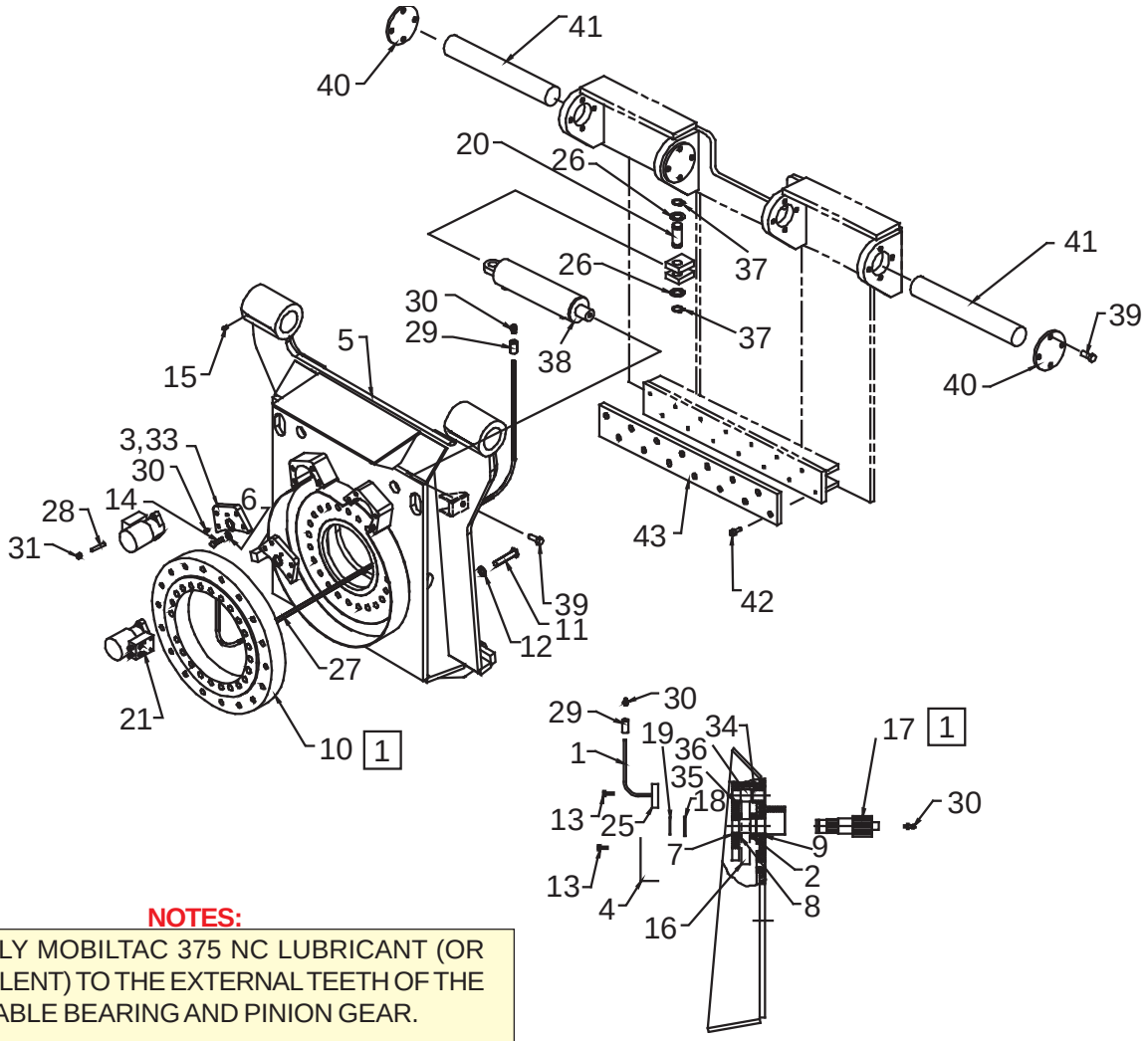
CYLINDER PART NUMBER LOCATION



WELDMENT PART NUMBER LOCATIONS

BASE ASM W/SIDE SHIFTER (40714619)

ITEM	PART NO.	DESCRIPTION	QTY
1.	53000703	GREASE EXT	2
2.	60020236	THRUST WASHER	2
3.	60105964	SUPPORT PLT-PINION	2
4.	60117739	INTERMEDIATE GEAR GUARD	1
5.	52714377	BASE WLDMT	1
6.	72063117	WASHER 9/16 HARD	8
7.	60020122	BUSHING BOTTOM PINION	REF
8.	60020123	THRUST WASHER	2
9.	60020124	BUSHING TOP PINION	REF
10.	70055167	TURNTABLE GEAR	1
11.	72601472	CAP SCR 7/8-9X4-1/2 GR8	23
12.	72063115	WASHER 7/8 HARDENED FLAT	23
13.	72060092	CAP SCR 1/2-13X1-1/4	6
14.	72601144	CAP SCR 9/16-12X2 GR8	8
15.	72053507	GREASE ZERK 1/4-20	4
16.	71056264	INTERMEDIATE GEAR	2
17.	71056073	PINION GEAR	2
18.	72063039	MACH BUSHING 2X10GA	2
19.	72066095	RETAINING RING	2
20.	60118798	PIN-TYPE A 1-1/2X2-15/16	1
21.	73540004	HYD MOTOR (FROM 5-15-98)	2
	73051004	HYD MOTOR (TO 5-15-98)	2
	5V151830	C'BALANCE BLOCK(TO 5-15-98)	2
	72060738	CAP SCR (TO 5-15-98)	8
	73054538	C'BALANCE VALVE (TO 5-15-98)	4
	7Q072112	O-RING (TO 5-15-98)	4
25.	60120423	GREASE PLATE	2
26.	72063037	MACH BUSHING 1-1/2X10GA	2
27.	53000713	GREASE EXT 38OAL	1
28.	60106032	STUD-MOTOR	4
29.	72053301	COUPLING 1/8NPT	3
30.	72053508	ZERK 1/8NPT	7
31.	72062080	NUT 1/2-13 LOCK	4
33.	70034295	BUSHING PINION SUPPORT	REF
34.	60020120	BUSHING DRIVE GEAR-TOP	REF
35.	60020121	BUSHING DRIVE GEAR-BOT	REF
36.	71056074	GEAR DRIVE	REF
37.	72066132	RETAINING RING 1-1/2	2
38.	3B282930	SIDE SHIFT CYLINDER	1
39.	72601485	CAP SCR 3/4-10X1-1/2 GR8	17
40.	60117735	COVER-SIDE SHIFT PIN	4
41.	60117737	PIN-SIDE SHIFTER	2
42.	72060795	CAP SCR 1/2-13X1-1/2 SH	14
43.	60030253	WEAR PAD	1



NOTES:

1) APPLY MOBILTAC 375 NC LUBRICANT (OR EQUIVALENT) TO THE EXTERNAL TEETH OF THE TURNTABLE BEARING AND PINION GEAR.

2) TURNTABLE BEARING BACKLASH - 0.008/ 0.013" (0.20 - 0.33 mm)

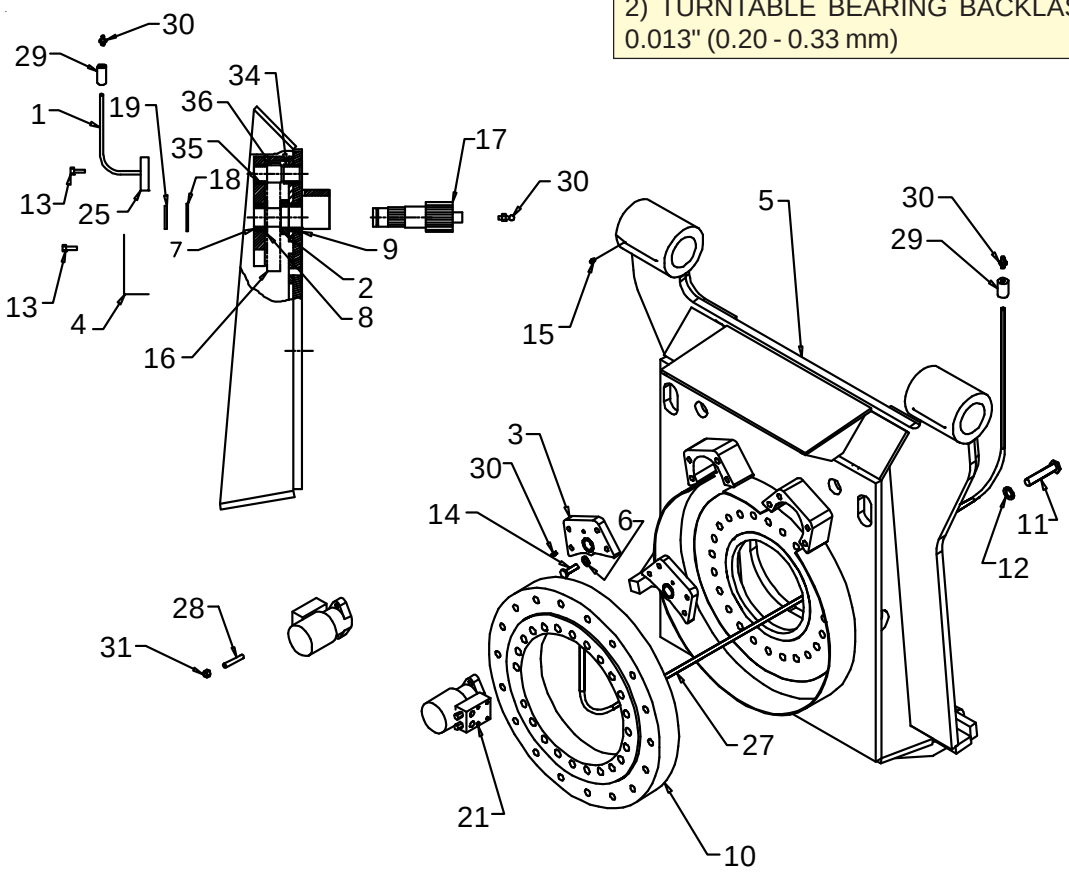
BASE ASSEMBLY WITHOUT SIDE SHIFT, STANDARD SUB-BASE (41714376)

ITEM	PART NO.	DESCRIPTION	QTY
1.	53000703	GREASE EXTENSION	2
2.	60020236	THRUST WASHER	2
3.	60105964	PINION SUPPORT PLATE	2
4.	60117739	INTERMEDIATE GEAR GUARD	1
5.	52714377	BASE	1
6.	72063117	WASHER 9/16 HARD	8
7.	60020122	BUSHING-BOTTOM PINION	REF
8.	60020123	THRUST WASHER	2
9.	60020124	BUSHING-TOP PINION	REF
10.	70055167	TURNTABLE GEAR	1
11.	72601472	CAP SCR 7/8-9X4-1/2 HHGR8	23
12.	72063115	WASHER 7/8 HARD FLAT	23
13.	72060092	CAP SCR 1/2-13X1-1/4	6
14.	72601144	CAP SCR 9/16-12X2 GR8	8
15.	72053507	GREASE ZERK 1/4-20	4
16.	71056264	INTERMEDIATE GEAR	2
17.	71056073	PINION GEAR	2
18.	72063039	MACH BUSHING 2X10GA	2
19.	72066095	RETAINING RING	2
21.	73540004	HYD MOTOR (FROM 5-15-98)	2
	73051004	HYD MOTOR (TO 5-15-98)	2
	5V151830	C'BALANCE BLOCK(TO 5-15-98)	2
	72060738	CAP SCR (TO 5-15-98)	8
	73054538	C'BALANCE VALVE (TO 5-15-98)	4
	7Q072112	O-RING (TO 5-15-98)	4
25.	60120423	GREASE PLATE	2
27.	53000713	GREASE EXTENSION 38 OAL	1
28.	60106032	STUD	4
29.	72053301	COUPLING 1/8NPT	3
30.	72053508	ZERK 1/8NPT	7
31.	72062080	NUT 1/2-13 LOCK	4
33.	70034295	BUSHING-PINION SUPPORT	REF
34.	60020120	BUSHING-TOP DRIVE GEAR	REF
35.	60020121	BUSHING-BOT DRIVE GEAR	REF
36.	71056074	DRIVE GEAR	REF

NOTES:

1) APPLY MOBILTAC 375 NC LUBRICANT (OR EQUIVALENT) TO THE EXTERNAL TEETH OF THE TURNTABLE BEARING AND PINION GEAR.

2) TURNTABLE BEARING BACKLASH - 0.008/ 0.013" (0.20 - 0.33 mm)



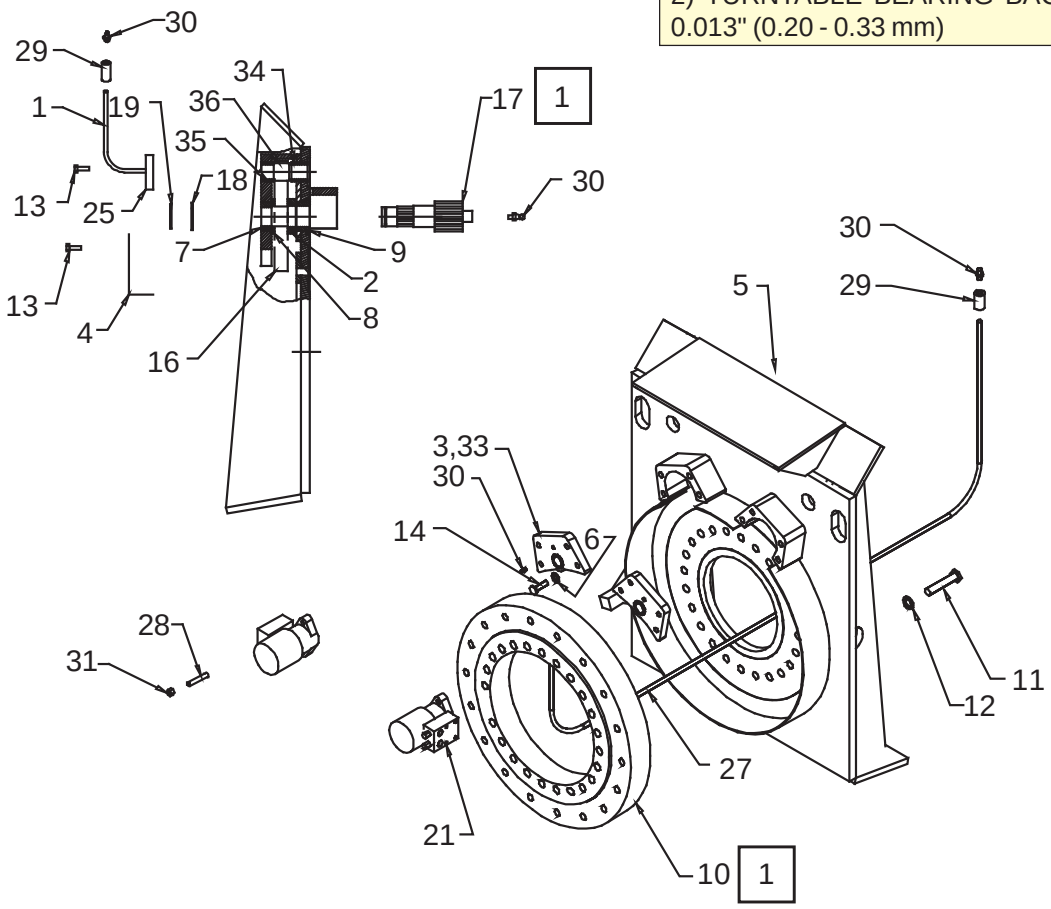
BASE ASM WITHOUT SIDE SHIFTER, CUSTOM SUB-BASE (41714620)

ITEM	PART NO.	DESCRIPTION	QTY
1.	53000703	GREASE EXTENSION	2
2.	60020236	THRUST WASHER	2
3.	60105964	PINION SUPPORT PLATE	2
4.	60117739	INTERMEDIATE GEAR GUARD	1
5.		BASE	1
6.	72063117	WASHER 9/16 HARD	8
7.	60020122	BUSHING-BOTTOM PINION	REF
8.	60020123	THRUST WASHER	2
9.	60020124	BUSHING-TOP PINION	REF
10.	70055167	TURNTABLE GEAR	1
11.	72601472	CAP SCR 7/8-9X4-1/2 HHGR8	23
12.	72063115	WASHER 7/8 HARD FLAT	23
13.	72060092	CAP SCR 1/2-13X1-1/4	6
14.	72601144	CAP SCR 9/16-12X2 GR8	8
16.	71056264	INTERMEDIATE GEAR	2
17.	71056073	PINION GEAR	2
18.	72063039	MACH BUSHING 2X10GA	2
19.	72066095	RETAINING RING	2
21.	73540004	HYD MOTOR (FROM 5-15-98)	2
	73051004	HYD MOTOR (TO 5-15-98)	2
	5V151830	C'BALANCE BLOCK(TO 5-15-98)	2
	72060738	CAP SCR (TO 5-15-98)	8
	73054538	C'BALANCE VALVE (TO 5-15-98)	4
	7Q072112	O-RING (TO 5-15-98)	4
25.	60120423	GREASE PLATE	2
27.	53000713	GREASE EXTENSION 38 OAL	1
28.	60106032	STUD	4
29.	72053301	COUPLING 1/8NPT	3
30.	72053508	ZERK 1/8NPT	7
31.	72062080	NUT 1/2-13 LOCK	4
33.	70034295	BUSHING-PINION SUPPORT	REF
34.	60020120	BUSHING-TOP DRIVE GEAR	REF
35.	60020121	BUSHING-BOT DRIVE GEAR	REF
36.	71056074	DRIVE GEAR	REF

NOTES:

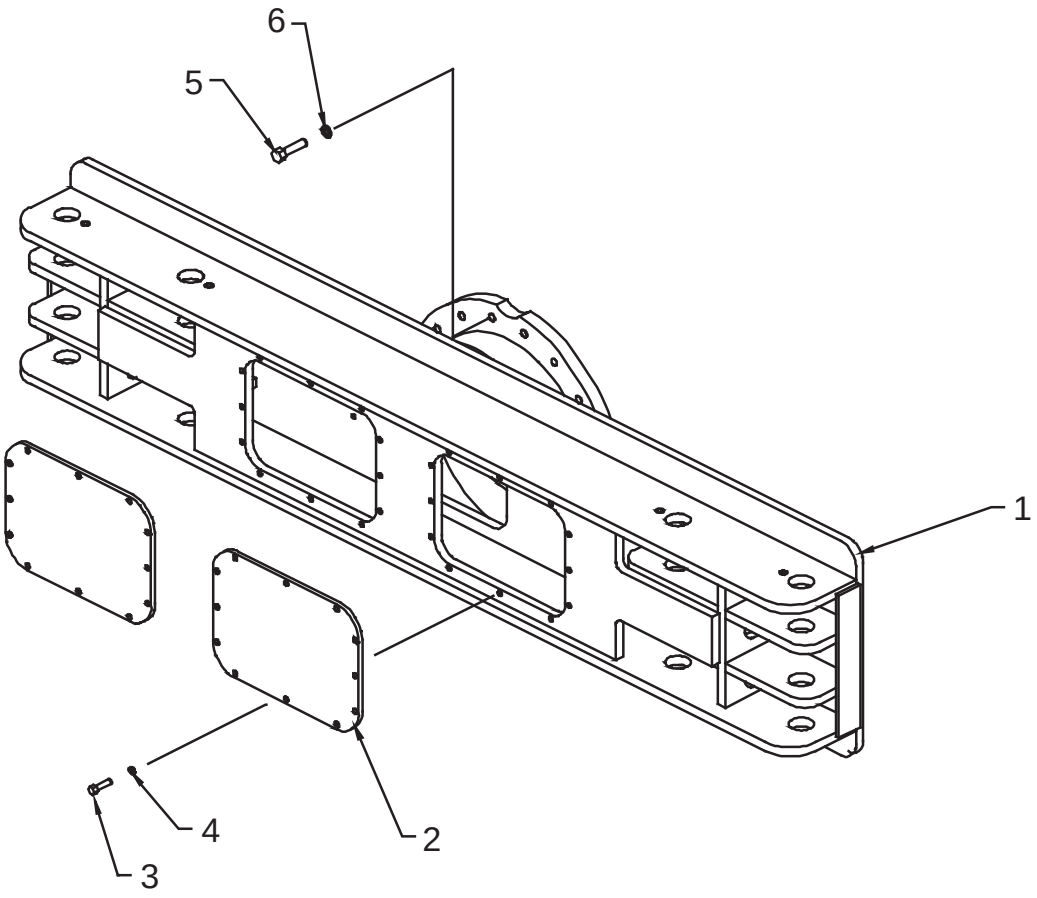
1) APPLY MOBILTAC 375 NC LUBRICANT (OR EQUIVALENT) TO THE EXTERNAL TEETH OF THE TURNTABLE BEARING AND PINION GEAR.

2) TURNTABLE BEARING BACKLASH - 0.008/ 0.013" (0.20 - 0.33 mm)



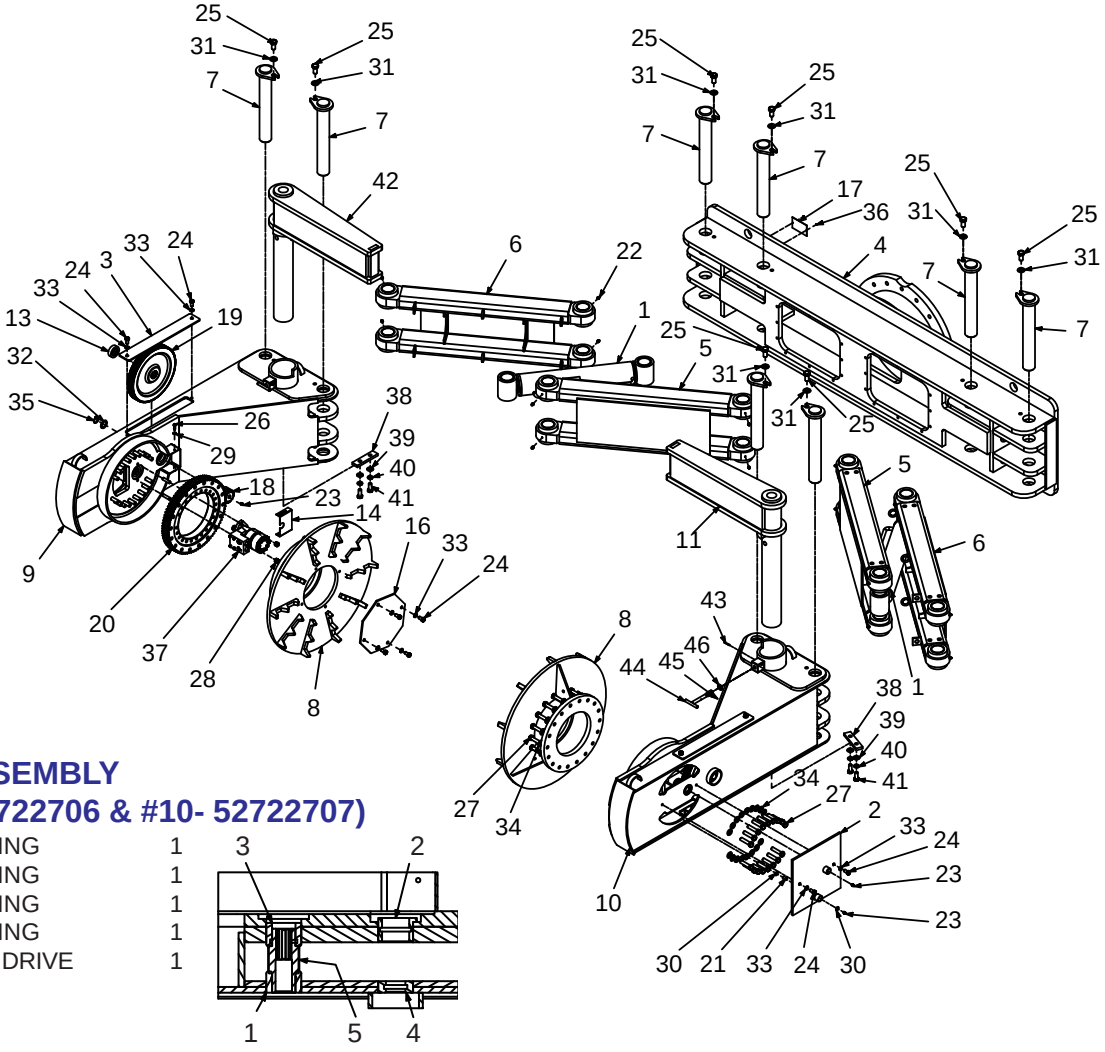
BODY ASM (40712519)

ITEM	PART NO.	DESCRIPTION	QTY
1.	52712520	BODY	1
2.	60117741	COVER PLATE	2
3.	72060092	CAP SCR 1/2-13X1-1/4 HHGR5	24
4.	72063053	WASHER 1/2 LOCK	24
5.	72601468	CAP SCR 3/4-10X4-1/2 HHGR8	18
6.	72063116	WASHER 3/4 HARD FLAT	18



CLAMP ASM (40712518)

	PART #	DESCRIPTION	QTY
1.	3B340820	CYLINDER	2
2.	52704283	COVER-WELDMENT	2
3.	52704284	COVER-INT GEAR	4
4.	52712520	BODY-WELDMENT	1
5.	52712521	ARM WELDMENT	2
6.	52712522	ARM WELDMENT	2
7.	52714330	PIN	8
8.	52714671	CLAW-WELDMENT	2
9.	52722706	HAND WELDMENT-RH W/ ALLBACK (WAS 52721771)	1
10.	52722707	HAND WELDMENT-LH/WITH FALLBACK (WAS 52721772)	1
11.	52722709	FLAG-WELDMENT TH W/ FALLBACK (WAS 52721773)	2
12.	53000701	GREASE EXTENSION	2
13.	60102942	SPACER-BASE	2
14.	60104763	COVER-PINION GEAR	2
15.	60106032	STUD- .50-13X1.75	4
16.	60119984	COVER-ACCESS HOLE CLAW	2
17.	70029119	PLACARD-SERIAL NUMBER	1
18.	71056010	GEAR-PINION	2
19.	71056012	GEAR-INTMD	2
20.	71056389	GEAR-TURNTABLE BEARING	2
21.	72053301	COUPLING-GLV .12 SCH 40	2
22.	72053507	ZERK-STR THD .25-28	16 REF
23.	72053508	ZERK-NPT .12	6
24.	72060091	CAP SCR .50-13X 1.00 HH GR5 Z	20
25.	72060183	CAP SCR .75-10X 1.50 HH GR5 Z	8
26.	72060833	SCR-THRD.CUT.31-18X.75	4
27.	72060931	CAP SCR .62-11X 2.75 HH GR8 Z	72
28.	72062080	NUT .50-13 HEX NYLOCK	4
29.	72063002	WASHER .31 FLAT	4
30.	72063003	WASHER .38 FLAT	4
31.	72063008	WASHER .75 FLAT	8
32.	72063035	MACHY BUSHING 1.25X10 GA NR	2
33.	72063053	WASHER .50 LOCK	20
34.	72063119	WASHER .62 FLAT ASTM F436	72
35.	72066084	RETAINING RING-EXT 1.25 STD	2
36.	72661638	TACK-METAL	2
37.	73540004	HYD MOTOR (EFF 5-15-98)	2
	73051004	HYD MOTOR (TO 5-15-98)	2
	5V151830	C'BALANCE BLOCK (TO 5-15-98)	2
	73054538	C'BALANCE VALVE (TO 5-15-98)	4
	72060738	CAP SCR (TO 5-15-98)	8
	7Q072112	O-RING (TO 5-15-98)	4
38.	60134725	BAR-STOP 3565 W/FALLBACK	2
39.	72063007	WASHER .62 FLAT	4
40.	72063055	WASHER .62 LOCK	4
41.	72060149	CAP SCR .62-11 X 1.5 HHGR5Z	4
42.	52722708	FLAG-WELDMENT TH W/FB	1
43.	72066185	COTTER PIN .16 X 1 PLAIN	1
44.	52721802	PIN	2
45.	60010351	SPRING-COMPRESSION	2
46.	72063028	MACHY BUSHING	2



GEAR DRIVE ASSEMBLY
(PART OF # 9- 52722706 & #10- 52722707)

1.	60020100	BUSHING	1
2.	60020114	BUSHING	1
3.	60020115	BUSHING	1
4.	60020081	BUSHING	1
5.	71056011	GEAR DRIVE	1

SIDE SHIFT CYLINDER (3B282930)

ITEM	PART NO.	DESCRIPTION	QTY
1.	4B282930	CASE	1
2.	5G282930	ROD	1
3.	6I402144	PISTON	1
4.	6H040020	HEAD	1
5.	9B015930	SEAL KIT (INCL:6-15)	1
6.	7T66P400	PISTON SEAL (PART OF 5)	1REF
7.	7T2N4040	WEAR RING (PART OF 5)	2REF
8.	7T61N143	LOCK RING (PART OF 5)	1REF
9.	7Q072127	O-RING (PART OF 5)	1REF
10.	7Q10P342	BACKUP RING (PART OF 5)	1REF
11.	7Q072342	O-RING (PART OF 5)	1REF
12.	7T2N8022	WEAR RING (PART OF 5)	1REF
13.	7R546020	U-CUP SEAL (PART OF 5)	1REF
14.	7R14P020	ROD WIPER (PART OF 5)	1REF
15.	60138274	STOP TUBE (PART OF 5) (WAS 6A025020)	1REF
16.	60125699	PIN-LOCK TUBE (PART OF 5)	1REF

NOTE

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

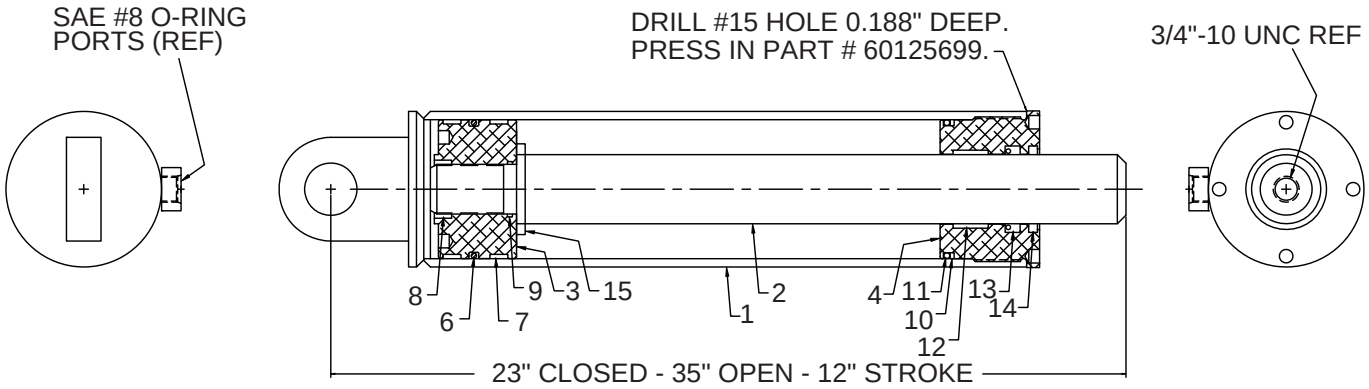
APPLY “LUBRIPLATE #630-2” MEDIUM HEAVY,MULTI-PURPOSE LUBRICANT OR EQUIVALENT TO ALL PISTON AND HEAD GLANDS, LOCK RING AND ROD THREADS BEFORE ASSEMBLY.

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

ITEM #15, STOP TUBE, REPLACES 6A025020 WAFER LOCK. USE STOP TUBE INSTEAD OF WAFER LOCK WHEN RESEALING CYLINDER.

PRESS LOCKING PIN (ITEM #16) INTO #15 HOLE DRILLED 0.188" DEEP.

TORQUE PISTON TO 710-740 FT-LB AND HEAD TO 400 FT-LB.



CLAMP CYLINDER (3B340820)

ITEM	PART NO.	DESCRIPTION	QTY
1.	4B340820	CASE (INCL: 18&20)	1
2.	4G340820	ROD (INCL: 18)	1
3.	6H040025	HEAD	1
4.	6I040143	PISTON	1
6.	73054242	COUNTERBALANCE VALVE	1
7.	9C162023	SEAL KIT (INCL:8-17)	1
8.	7T66P040	PISTON SEAL (PART OF 7)	1REF
9.	7T65I040	WEAR RING (PART OF 7)	1REF
10.	7T61N143	LOCK RING (PART OF 7)	1REF
11.	7R546025	U-CUP SEAL (PART OF 7)	1REF
12.	7R14P025	ROD WIPER (PART OF 7)	1REF
13.	7Q10P342	BACKUP RING (PART OF 7)	1REF
14.	7Q072342	O-RING (PART OF 7)	1REF
15.	7Q072153	O-RING (PART OF 7)	1REF
16.	7T2N8027	WEAR RING (PART OF 7)	1REF
17.	60138276	STOP TUBE (PART OF 7) (WAS 6A025025)	1REF
18.	70034283	BEARING-GARMAX (PART OF 1&2) (FROM 5-1-98)	4REF
	60020196	BUSHING (TO 5-1-98)	4REF
	72053507	ZERK 1/4-28 (TO 5-1-98)	2REF
19.	60125699	PIN-LOCKING TUBE (PART OF 7)	1REF
20.	7PNPXT02	PLUG 1/8NPT (PART OF 1)	3REF

NOTE

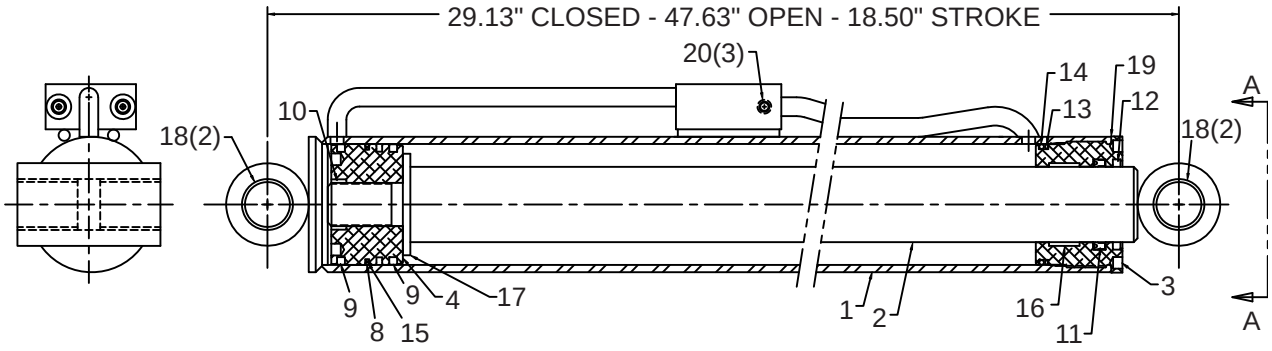
IT IS RECOMMENDED THAT ALL COMPONENTS OF THE SEAL KIT BE REPLACED WHENEVER THE CYLINDER IS DISASSEMBLED. THIS WILL REDUCE FUTURE DOWNTIME.

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

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

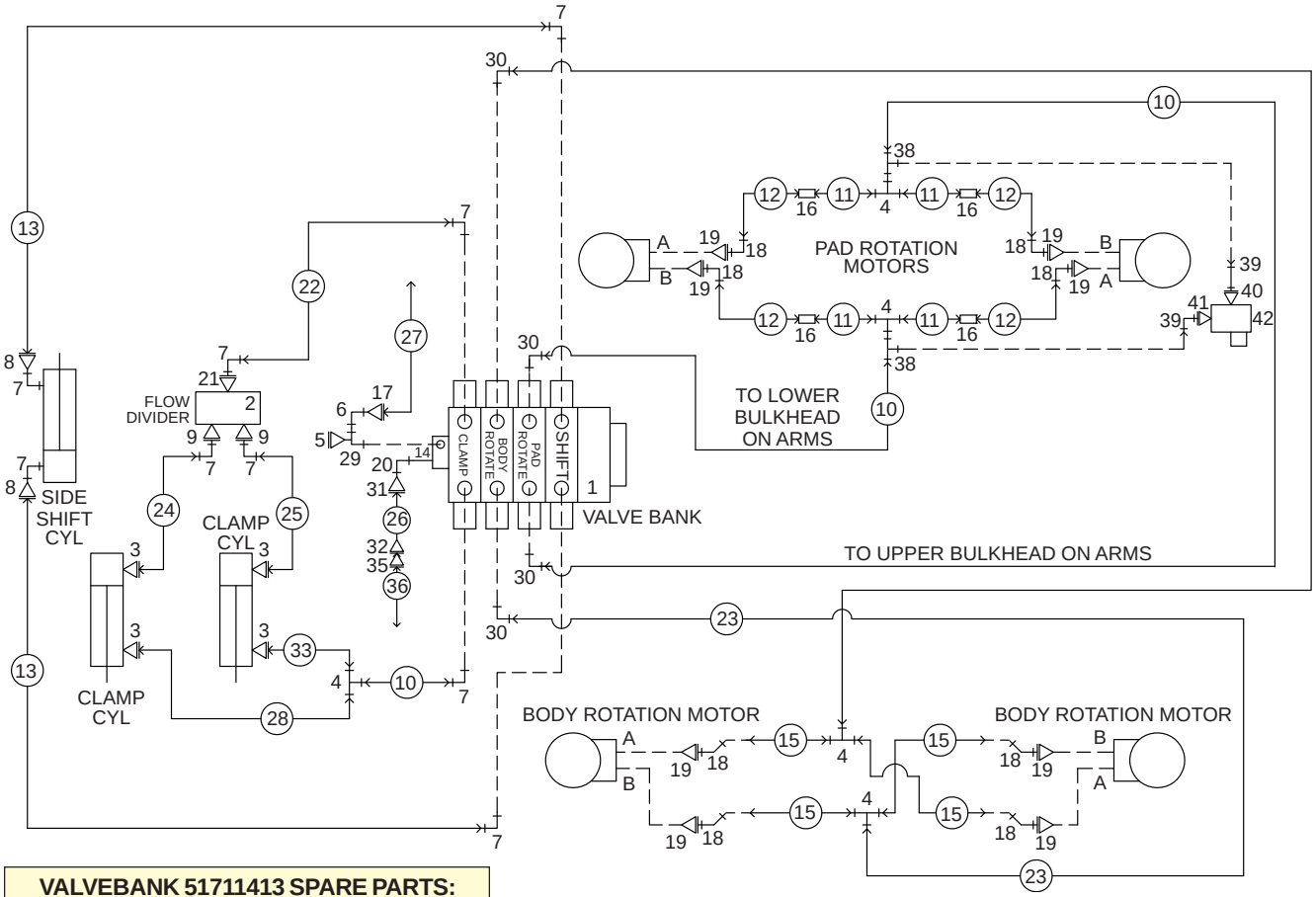
ITEM #17, STOP TUBE, REPLACES 6A025025 WAFER LOCK. USE STOP TUBE INSTEAD OF WAFER LOCK WHEN RESEALING CYLINDER.

PRESS LOCKING PIN (ITEM #19) INTO #15 HOLE DRILLED 0.188" DEEP.



HYDRAULIC KIT (91712545)

ITEM	PART NO.	DESCRIPTION	QTY
1.	51711413	VALVEBANK (SEE BELOW)	1
2.	73054915	FLOW DIVIDER	1
3.	72532358	ADAPTER #8MSTR #8MJIC	4
4.	72531205	TEE #8MJIC	5
5.	72532987	NIPPLE-DIAGNOSTIC	1
6.	72532696	ELBOW #12MJIC #12FJIC 90°	1
7.	72053763	ELBOW #8MJIC #8MSTR 90°	9
8.	72532980	PRESSURE SWIVEL	2
9.	72532951	ADAPTER #12MSTR #8FSTR	2
10.	51395042	HOSE 1/2X15 8F8F(PART OF 34)	3REF
11.	51395055	HOSE 3/8X85 8F8F(PART OF 34)	4REF
12.	51394617	HOSE 3/8X63 6F8F(PART OF 34)	4REF
13.	51394591	HOSE 3/8X50 8F8F(PART OF 34)	2REF
14.	72532369	ADPTR-M STR/M JIC 12 16	1
15.	51395048	HOSE 3/8X43 6F8F(PART OF 34)	4REF
16.	72533373	UNION-BULKHEAD #8JIC	4
17.	72532973	PRESSURE SWIVEL #12	1
18.	72053760	ELBOW #6MJIC #6MSTR 90° (WAS 4)	8
19.	72532992	ADAPTER #4MSTR #6FSTR	8
20.	72532971	ELBOW #16MJIC #16FJIC 90° (WAS 72053776)	1
21.	72532963	ADAPTER #16MSTR #8FSTR	1
22.	51395047	HOSE 1/2X28 8F8F(PART OF 34)	1REF
23.	51395041	HOSE 1/2X33 8F8F(PART OF 34)	2REF
24.	51395044	HOSE 1/2X46 8F8F(PART OF 34)	1REF
25.	51395046	HOSE 1/2X70 8F8F(PART OF 34)	1REF
26.	51397345	HOSE ASM 1X10.5 (PART OF34)	1REF
27.	51395043	HOSE 3/4X75 12F12F(PART 34)	1REF
28.	51395586	HOSE 1/2X57 8F8F (PART 34)	1REF
29.	60114669	ELBOW-PRESSURE GAUGE	1
30.	72532666	ELBOW #8MSTR #8MJIC 90°	4
31.	72533208	PRESSURE SWIVEL #16	1
32.	73540435	VALVE-CHECK INLINE 3500 PSI	1
33.	51395054	HOSE 1/2X63 8F8F(PART OF 34)	1REF
34.	51714629	HOSE KIT (INCL: 10-13,15,22-27,32,33,36)	1
35.	72534780	ADAPTR-#16MJIC / #16MJIC	1
36.	51399098	HOSE-FF 1X67 16-16 100R4 (PART OF 34)	1
37.	51724339	KIT-CROSS PORT RELIEF	1
38.	72532657	TEE-SWVL NUT RUN 8 (# 37)	2
39.	72534371	UNION-#8FJIC/SWVL/#8FJIC (#37)	2
40.	72532357	ADPTR-#6MSTR/#8MJIC (#37)	1
41.	72053762	ELBOW-#6MSTR/#8MJIC (#37)	1
42.	73540465	VALVE-BI DIRECT RELIEF (#37)	1



VALVEBANK 51711413 SPARE PARTS:

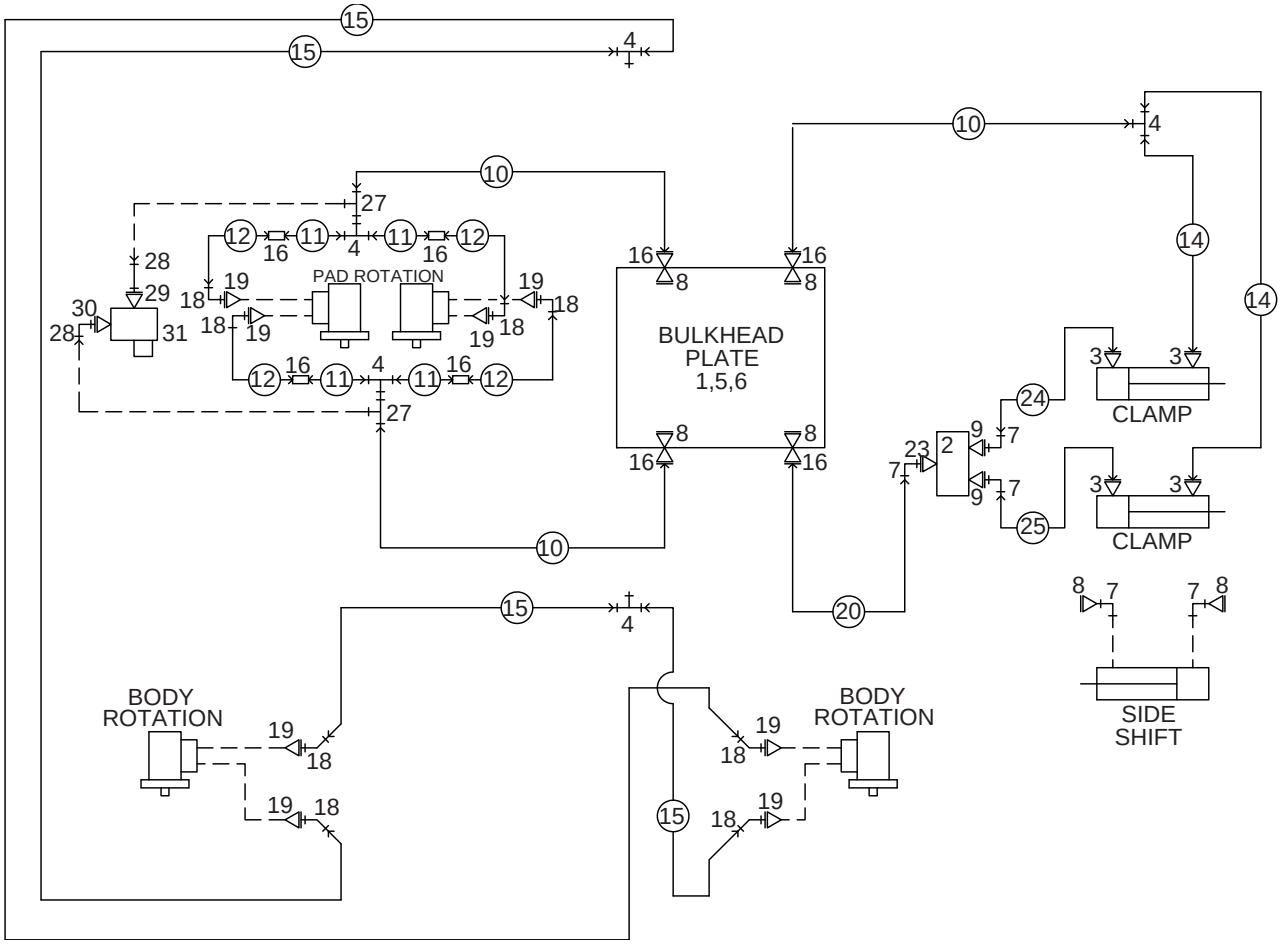
77041284 - COIL FOR 12V VALVE PILOT
77041770 - COIL FOR 24V VALVE PILOT
77040469 - COIL FOR 12V VALVE SPOOLS
73540030 - COIL FOR 12V VALVE SPOOLS WITH CARTRIDGE
77040523 - COIL FOR 24V VALVE SPOOLS WITH CARTRIDGE

HYDRAULIC KIT WITHOUT VALVEBANK (91712926)

ITEM	PART NO.	DESCRIPTION	QTY
1.	60118044	BULKHEAD PLATE	1
2.	73054915	FLOW DIVIDER	1
3.	72532358	ADAPTER #8MSTR #8MJIC	4
4.	72531205	TEE #8MJIC	5
5.	72060091	CAP SCR 1/2-13X1 HHGR5	2
6.	72063005	WASHER 1/2 WRT	2
7.	72053763	ELBOW #8MJIC #8MSTR 90°	5
8.	72532980	PRESSURE SWIVEL	6
9.	72532951	ADAPTER #12MSTR #8FSTR	2
10.	51394422	HOSE ASM 1/2X13	3
11.	51395055	HOSE ASM 3/8X85	4
12.	51395040	HOSE ASM 3/8X57	4
14.	51395045	HOSE ASM 1/2X59	2
15.	51395048	HOSE ASM 3/8X43	4
16.	72533373	UNION-BULKHEAD 3/4JIC 37°	8
18.	72053760	ELBOW #6MJIC #6MSTR 90°	8
19.	72532992	ADAPTER #4MSTR #6FSTR	8
20.	51395444	HOSE ASM 1/2X21	1
23.	72532963	ADAPTER #16MSTR #8FSTR	1
24.	51395044	HOSE ASM 1/2X46	1
25.	51395046	HOSE ASM 1/2X70	1
26.	51724339	KIT-CROSS PORT RELIEF (INCL 27-31)	1
27.	72532657	TEE-#8SWVL NUT RUN JIC	2
28.	72534371	UNION-#8FJIC/SW/#8FJIC	2
29.	72532357	ADPTR-#6MSTR/#8MJIC	1
30.	72053762	ELBOW-#6MSTR/#8MJIC	1
31.	73540465	VALVE-BI DIR RLF #6	1

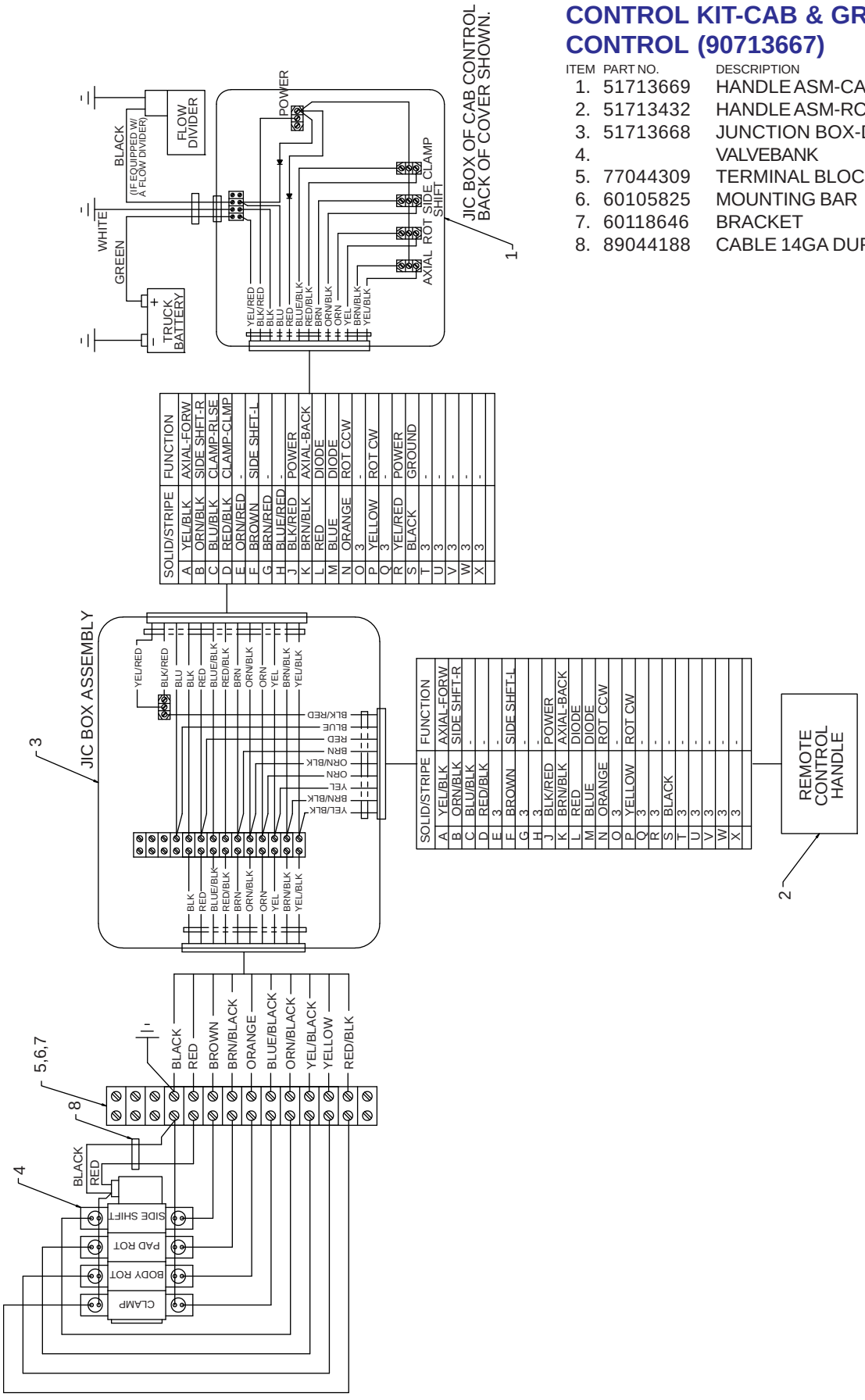
NOTE

BULKHEAD VALVEBANK TO BE PROVIDED BY CUSTOMER.



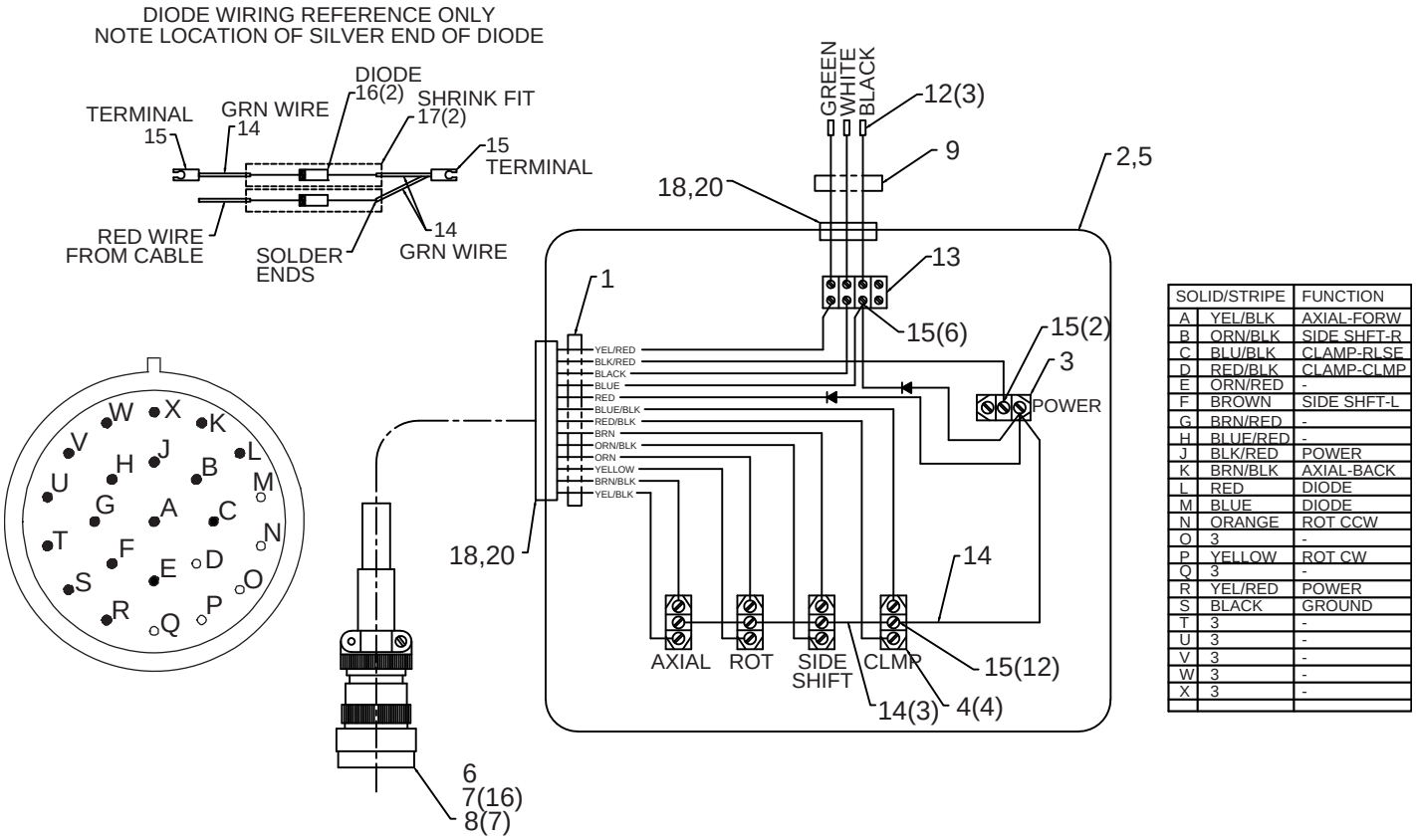
CONTROL KIT-CAB & GROUND CONTROL (90713667)

ITEM	PART NO.	DESCRIPTION	QTY
1.	51713669	HANDLE ASM-CAB CONTROL	1
2.	51713432	HANDLE ASM-RC	1
3.	51713668	JUNCTION BOX-DUAL CTRLS	1
4.		VALVEBANK	REF
5.	77044309	TERMINAL BLOCK-14 TERM	1
6.	60105825	MOUNTING BAR	1
7.	60118646	BRACKET	1
8.	89044188	CABLE 14GA DUPLEX X 18	1



HANDLE ASM-CAB CONTROL (51713669)

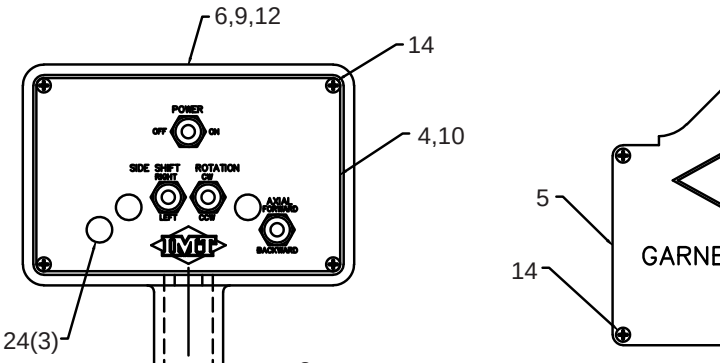
ITEM	PART NO.	DESCRIPTION	QTY
1.	89044116	CABLE 18GA/16WIRE X 408	1
2.	70392812	DECAL-CONTROL	1
3.	77040373	TOGGLE SWITCH SPDT	1
4.	77040372	TOGGLE SWITCH SPDT	4
5.	60111300	JIC BOX	1
6.	77044579	CONNECTOR	1
7.	77044621	PIN	16
8.	77044668	PLUG-SEALING	7
9.	89044053	CABLE 14AWG 3WIRE	20"
12.	77040186	TERM 1/4 FSLPON 16-14GA	3
13.	77044341	TERMINAL BLOCK-4	1
14.	60045031	WIRE GRN X 4	7
15.	77040051	TERM #8 SPRSPD 16-14GA	22
16.	77044556	DIODE 2.2A 274V	2
17.	83034392	SHRINK FIT	2
18.	77044018	STRAIN RELIEF 3/8-1/2	2
20.	77044201	NUT 1/2 ELEC	2

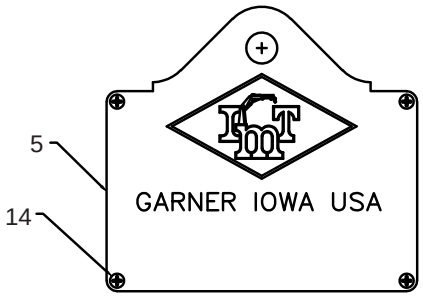


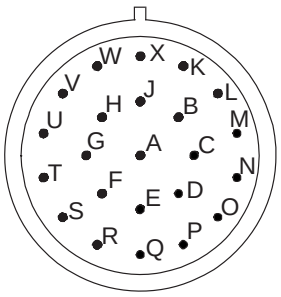
SOLID/STRIPE		FUNCTION
A	YEL/BLK	AXIAL-FORW
B	ORN/BLK	SIDE SHFT-R
C	BLU/BLK	CLAMP-RLSE
D	RED/BLK	CLAMP-CLMP
E	ORN/RED	-
F	BROWN	SIDE SHFT-L
G	BRN/RED	-
H	BLUE/RED	-
J	BLK/RED	POWER
K	BRN/BLK	AXIAL-BACK
L	RED	DIODE
M	BLUE	DIODE
N	ORANGE	ROT CCW
O	3	-
P	YELLOW	ROT CW
Q	3	-
R	YEL/RED	POWER
S	BLACK	GROUND
T	3	-
U	3	-
V	3	-
W	3	-
X	3	-

HANDLE ASM-RC (51713432)

ITEM	PART NO.	DESCRIPTION	QTY
1.	60045031	WIRE 18GA X 4 GRN	5
2.	60119335	CONTROL HANDLE	1
3.	77044668	PLUG-SEALING	11
4.	60119277	COVER-RC HANDLE FRONT	1
5.	70034306	BACK COVER-RC HANDLE	1
6.	70029119	PLACARD-SERIAL NO.	1
8.	77044621	PIN	12
9.	70392862	DECAL-DGR RC ELECTRO SM	1
10.	71394285	DECAL-RC HANDLE	1
12.	72066340	POP RIVET 1/8X3/8	2
14.	72061009	SHT MTL SCR #6X3/4 PH	8
15.	77040051	TERM #8 SPRSPD 16-14GA	12
17.	77040372	TOGGLE SWITCH SPDT	3
18.	77040373	TOGGLE SWITCH SPST	1
20.	77044579	CONNECTOR	1
21.	89044136	CABLE 18GA/12WIRE X 25'	1
22.	77044556	DIODE 2.2A 274V	2
23.	83034392	PIPE-PVC 1/8 EXP HEAT SHRINK	2
24.	70392785	PLUG 1/2	3
25.	77044195	CONNECTOR-3/4 STR RLF	1

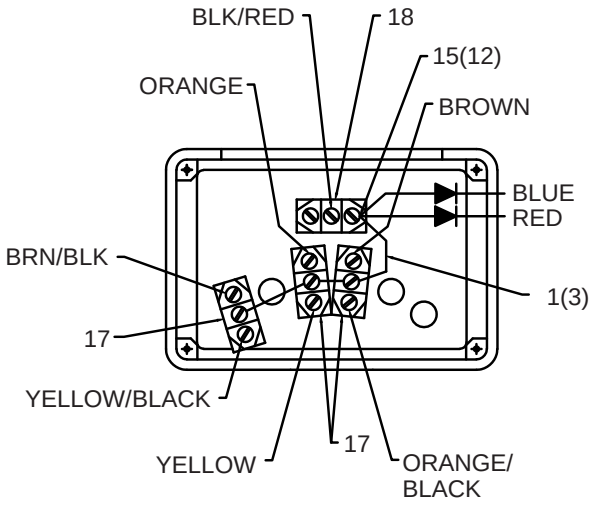


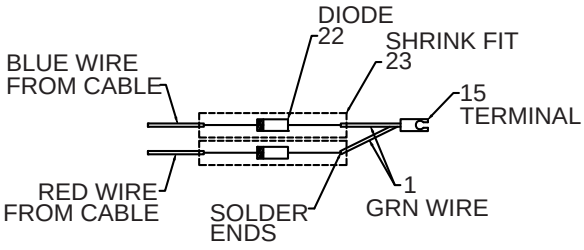




INSTALL #3-PLUG, SEALING PER CHART.

SOLID/STRIPE		FUNCTION
A	YEL/BLK	AXIAL-FORW
B	ORN/BLK	SIDE SHFT-R
C	BLU/BLK	-
D	RED/BLK	-
E	3	-
F	BROWN	SIDE SHFT-L
G	3	-
H	3	-
J	BLK/RED	POWER
K	BRN/BLK	AXIAL-BACK
L	RED	DIODE
M	BLUE	DIODE
N	ORANGE	ROT CCW
O	3	-
P	YELLOW	ROT CW
Q	3	-
R	3	-
S	BLACK	-
T	3	-
U	3	-
V	3	-
W	3	-
X	3	-





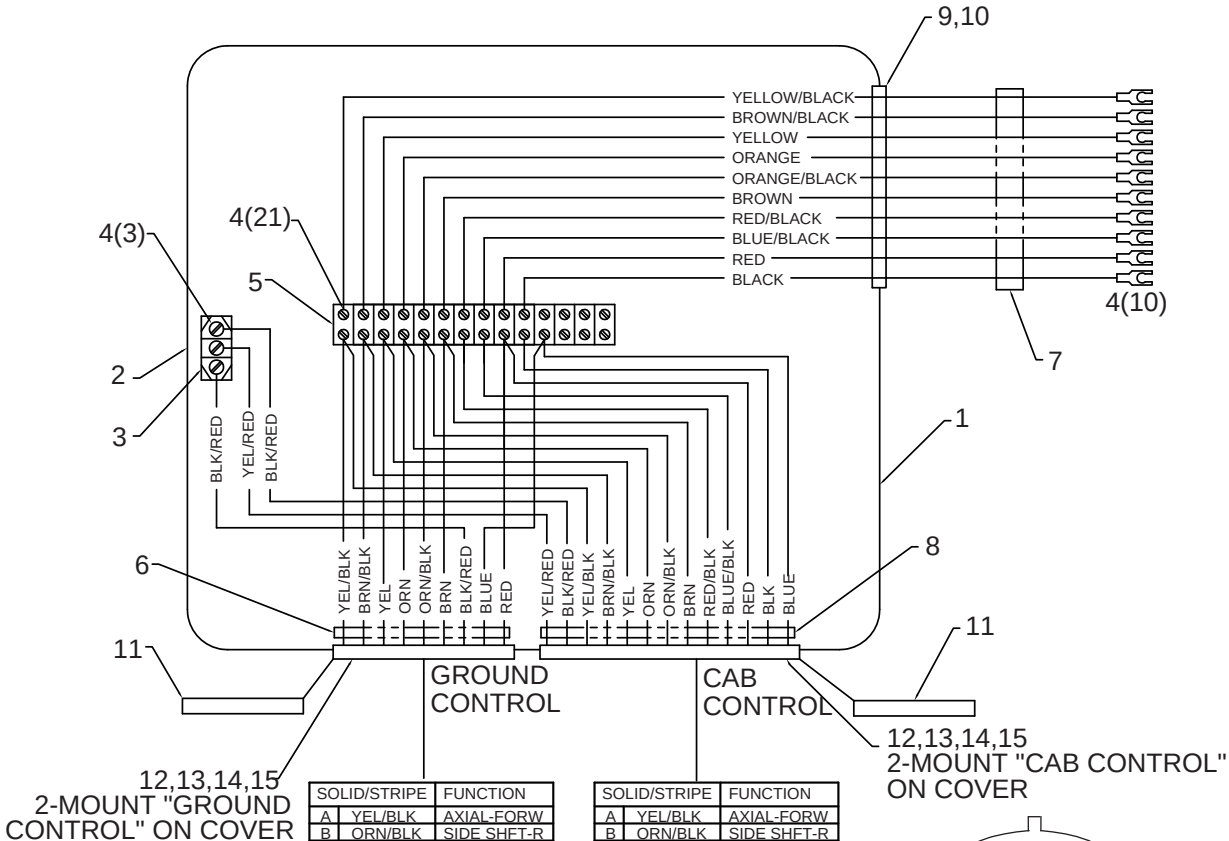
DIODE WIRING REFERENCE ONLY
NOTE LOCATION OF SILVER END OF DIODE

JIC BOX ASM-DUAL CONTROL (51713668)

1.	60119433	JIC BOX	1
2.	70393722	DECAL-GROUND/CAB CTRL	2
3.	77040374	TOGGLE SWITCH SPDT	1
4.	77040051	TERMINAL #8 SPRSPD 16-14GA	34
5.	77044309	TERMINAL STRIP-14	1
6.	89044136	CABLE 18GA 12WIRE	1FT
7.	89044136	CABLE 18GA 12WIRE	6FT
8.	89044116	CABLE 18GA 16WIRE	1FT
9.	77044201	NUT 1/2 ELEC LOCK	1
10.	77044018	STRAIN RELIEF 1/2	1
11.	77044667	PLUG CAP	2
12.	77044620	CONNECTOR	2
13.	60119809	MTG PLATE	2
14.	72601725	MACHSCR #6-32X1/2RDHDPHIL	8
15.	72601726	NUT #6-32 HEX LOCK	8

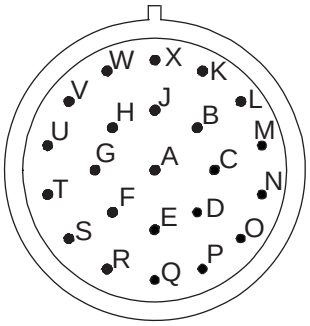
NOTE:

CUT DECAL 709393722 IN HALF AND MOUNT ON BOX COVER ABOVE EACH DEUTSCH CONNECTOR. MOUNT OTHER DECAL OVER TOGGLE SWITCH.



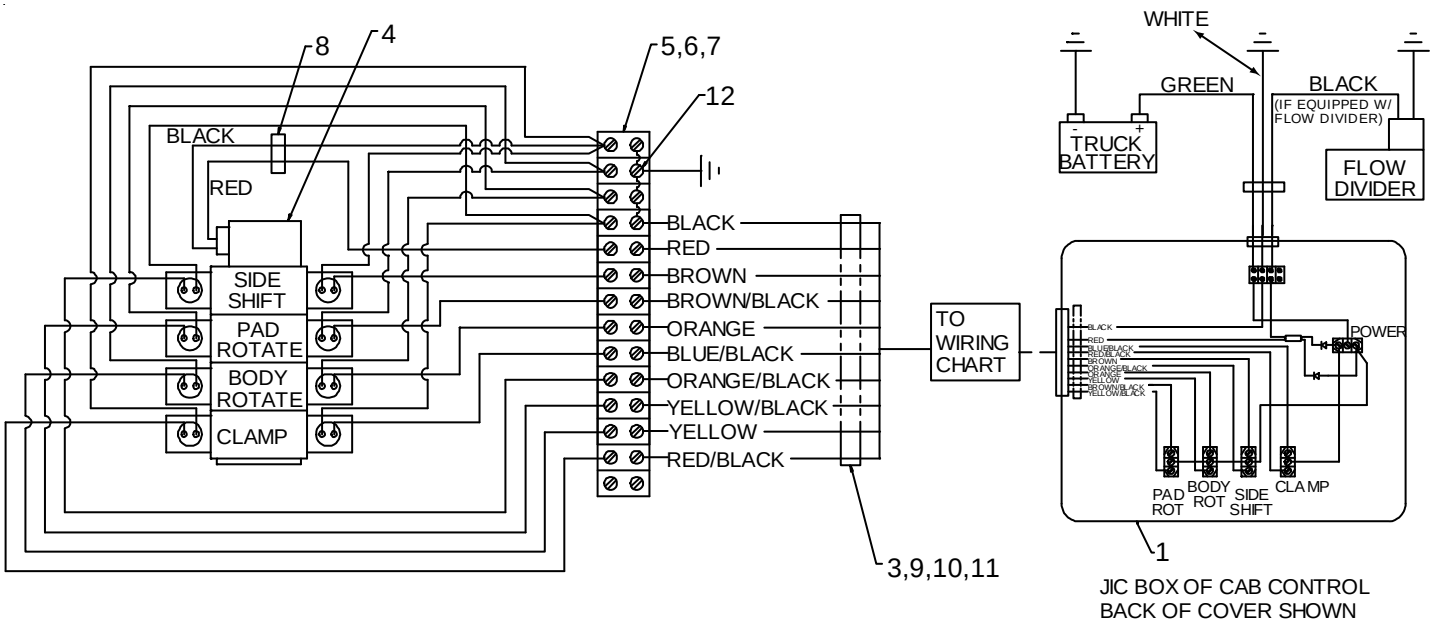
SOLID/STRIPE		FUNCTION
A	YEL/BLK	AXIAL-FORW
B	ORN/BLK	SIDE SHFT-R
C	BLU/BLK	-
D	RED/BLK	-
E	3	-
F	BROWN	SIDE SHFT-L
G	3	-
H	3	-
J	BLK/RED	POWER
K	BRN/BLK	AXIAL-BACK
L	RED	DIODE
M	BLUE	DIODE
N	ORANGE	ROT CCW
O	3	-
P	YELLOW	ROT CW
Q	3	-
R	3	-
S	BLACK	-
T	3	-
U	3	-
V	3	-
W	3	-
X	3	-

SOLID/STRIPE		FUNCTION
A	YEL/BLK	AXIAL-FORW
B	ORN/BLK	SIDE SHFT-R
C	BLU/BLK	CLAMP-RLSE
D	RED/BLK	CLAMP-CLMP
E	ORN/RED	-
F	BROWN	SIDE SHFT-L
G	BRN/RED	-
H	BLUE/RED	-
J	BLK/RED	POWER
K	BRN/BLK	AXIAL-BACK
L	RED	DIODE
M	BLUE	DIODE
N	ORANGE	ROT CCW
O	3	-
P	YELLOW	ROT CW
Q	3	-
R	YEL/RED	POWER
S	BLACK	GROUND
T	3	-
U	3	-
V	3	-
W	3	-
X	3	-



CONTROL KIT-CAB CONTROL (90713678)

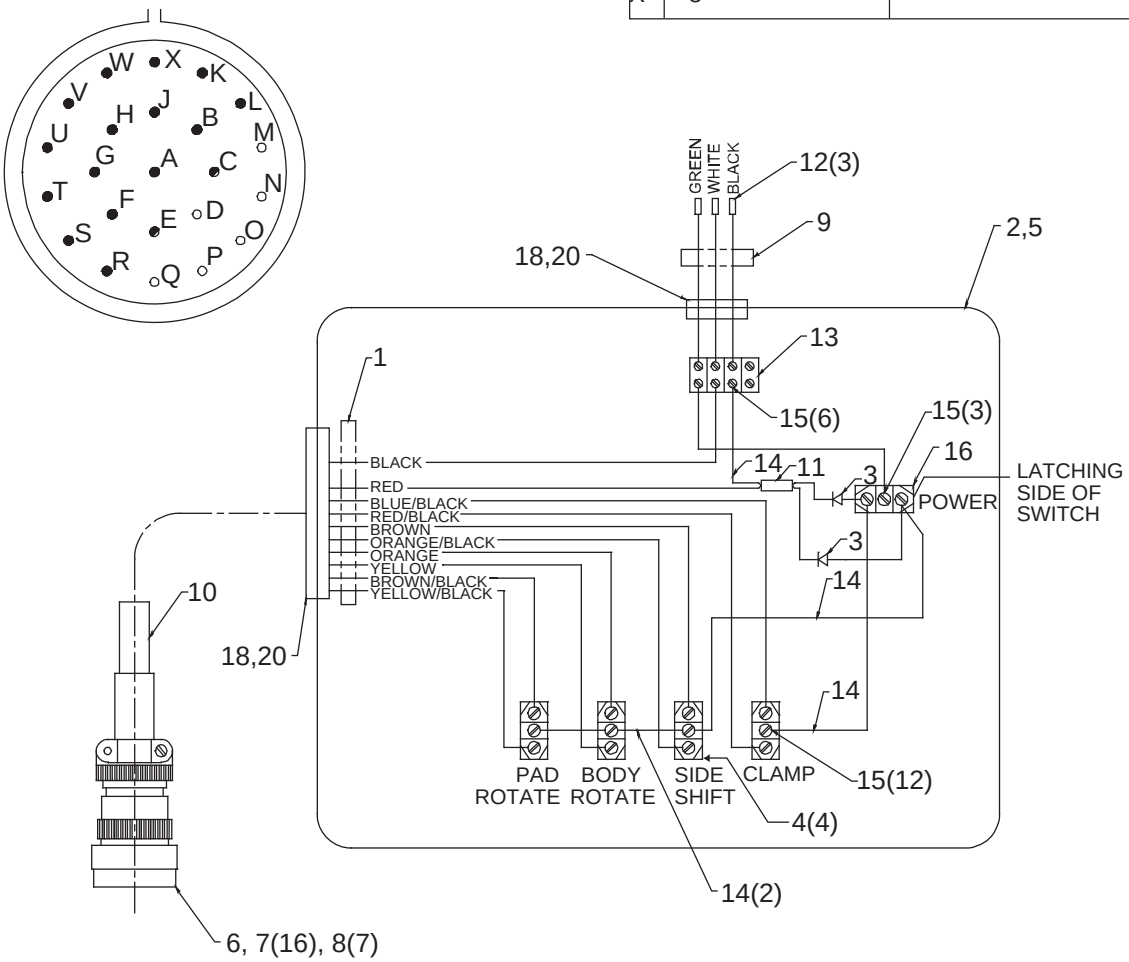
ITEM	PART NO.	DESCRIPTION	QTY
1.	51713676	HANDLA ASM-CAB	1
3.	51713677	CABLE ASM 18GA 16WIRE X 56	1
4.		VALVEBANK	REF
5.	77044309	TERMINAL BLOCK-14	1
6.	60105825	MOUNTING BAR-TERM BLOCK	1
7.	60118646	TERM MTG BRACKET	1
8.	89044188	CABLE 14AWG DUPLEX X 18	1
9.	60119806	MTG BRACKET-CONNECTOR	1
10.	72060004	CAP SCR 1/4-20X1 HHGR5	2
11.	72062104	NUT 1/4-20 LOCK	2
12.	77040051	TERMINAL #8SPRSPD 16-14GA	28



HANDLE ASM-CAB CONTROL (51713676)

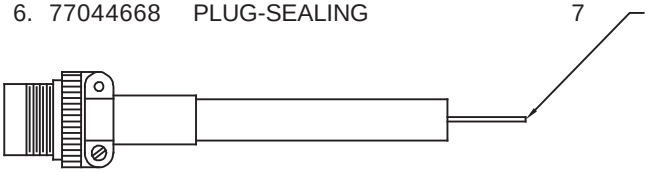
ITEM	PART NO.	DESCRIPTION	QTY
1.	89044116	CABLE 18GA/16WIRE X 408	1
2.	70392812	DECAL-CONTROL	1
3.	77040373	TOGGLE SWITCH SPDT	1
4.	77040372	TOGGLE SWITCH SPDT	4
5.	60111300	JIC BOX	1
6.	77044579	CONNECTOR	1
7.	77044621	PIN	16
8.	77044668	PLUG-SEALING	7
9.	89044053	CABLE 14AWG 3WIRE	20"
12.	77040186	TERM 1/4 FSLPON 16-14GA	3
13.	77044341	TERMINAL BLOCK-4	1
14.	60045031	WIRE GRN X 4	5
15.	77040051	TERML #8 SPRSPD 16-14GA	21
18.	77044018	STRAIN RELIEF 3/8-1/2	2
20.	77044201	NUT 1/2 ELEC	2

WIRING CHART SOLID/STRIPE		FUNCTION
A	YELLOW/BLACK	PAD ROTATION - FORWARD
B	ORANGE/BLACK	SIDE SHIFT - RIGHT
C	BLUE/BLACK	CLAMP-RELEASE
D	RED/BLACK	CLAMP-CLAMP
E	ORANGE/RED	—
F	BROWN	SIDE SHIFT-LEFT
G	BROWN/RED	—
H	BLUE/RED	—
J	BLACK/RED	—
K	BROWN/BLACK	PAD ROTATION-BACK
L	RED	POWER
M	BLUE	—
N	ORANGE	BODY ROTATE - CCW
O	8	—
P	YELLOW	BODY ROTATE-CW
Q	8	—
R	YELLOW/RED	—
S	BLACK	GROUND
T	8	—
U	8	—
V	8	—
W	8	—
X	8	—



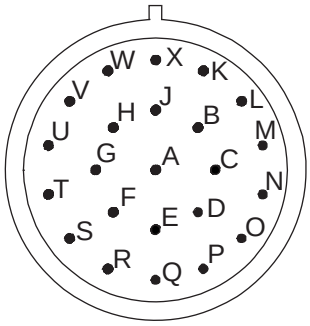
CABLE ASM 18GA/16WIRE X 56 (51713677)

ITEM	PART NO.	DESCRIPTION	QTY
1.	89044116	CABLE 18GA/16WIRE X 56"	1
3.	77040051	TERM #8 SPRSPD 16-14GA	10
4.	77044620	CONNECTOR	1
5.	77044580	SOCKET	16
6.	77044668	PLUG-SEALING	7



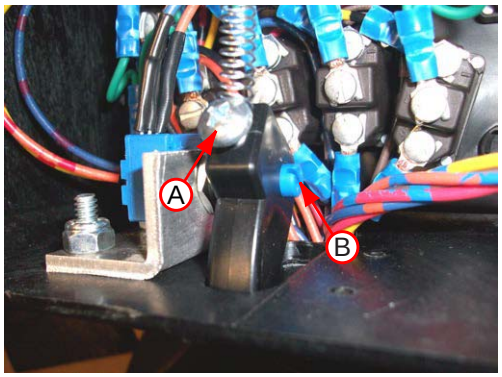
INSTALL #6-PLUG, SEALING PER CHART.

SOLID/STRIPE		FUNCTION
A	YEL/BLK	3
B	ORN/BLK	3
C	BLU/BLK	3
D	RED/BLK	3
E	ORN/RED	-
F	BROWN	3
G	BRN/RED	-
H	BLUE/RED	-
J	BLK/RED	-
K	BRN/BLK	3
L	RED	3
M	BLUE	-
N	ORANGE	3
O	6	-
P	YELLOW	3
Q	6	-
R	YEL/RED	-
S	BLACK	3
T	6	-
U	6	-
V	6	-
W	6	-
X	6	-



TETHERED PROPORTIONAL REMOTE POTENTIOMETER ADJUSTMENT

NOTES: ONLY use this procedure to set the low-end output on the remote handle assembly if crane functions operate without pulling the proportional trigger.
You may need a second operator to help with steps 4 and 5.



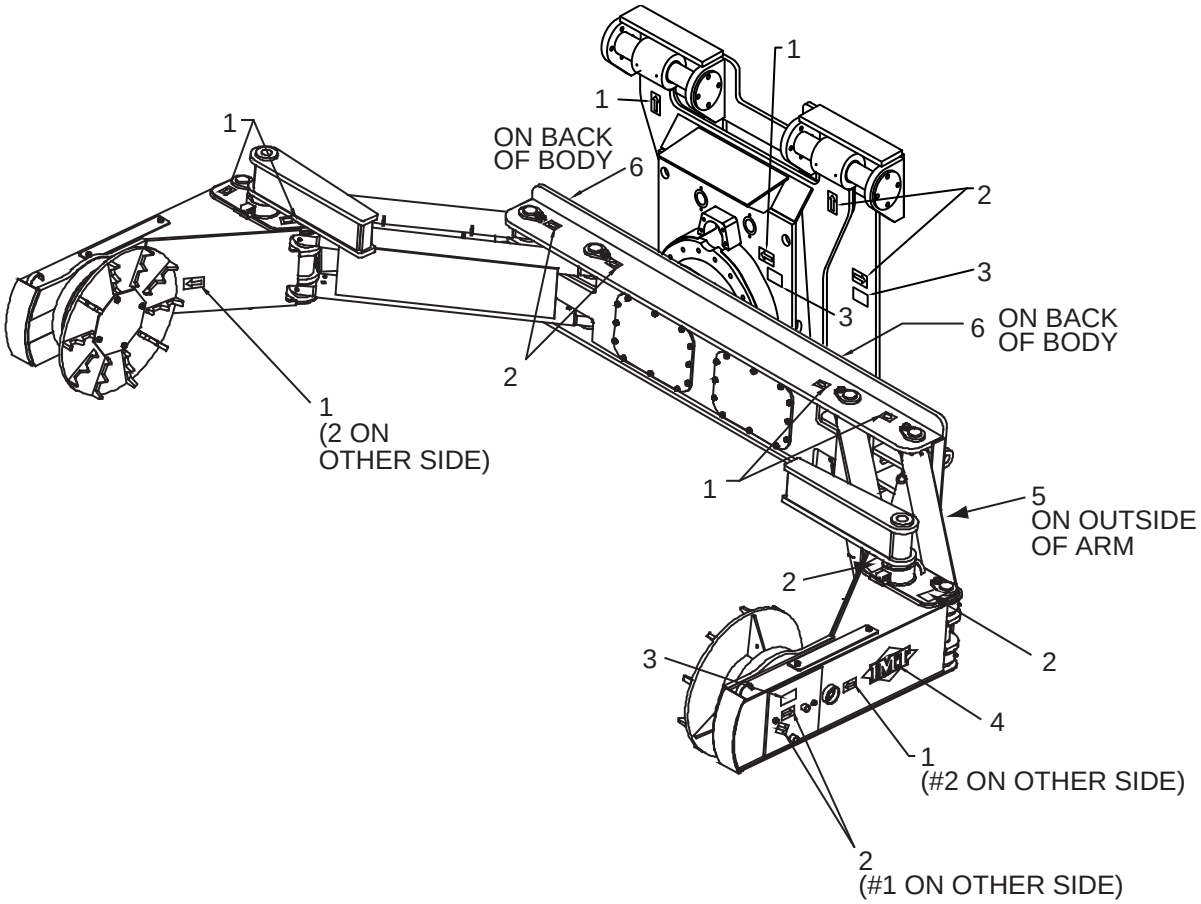
1. Following proper crane and stabilizer set-up, with the PTO engaged and the truck running, move the crane from the stowed position to a position off to the side of the truck. Unstow the winch cable hook and lower the winch approx (6) six feet.
2. Remove the back cover of the remote control handle.
3. Loosen screw “A” slightly. (Note: Screw style may vary).
4. While holding “WINCH DOWN” function, very slowly, rotate screw “B” clockwise until all movement has stopped.
5. Release “WINCH DOWN” function.
6. Tighten screw “A”
7. Test by operating “WINCH DOWN”, “WINCH UP”, “ROTATE CCW”, and “ROTATE CW” without pulling the trigger. If any of these functions move, repeat steps 2 through 6.
8. Replace control back cover and properly stow the crane and stabilizers.

DECAL KIT (95712527)

ITEM	PART NO.	DESCRIPTION	QTY
1.	70391612	DECAL-GREASE WEEKLY LH	10
2.	70391613	DECAL-GREASE WEEKLY RH	11
3.	70392524	DECAL-ROTATE/GREASE	4
4.	70392887	IMT DIAMOND	2
5.	71393991	DECAL-TH2551B IDENT	2
6.	70393704	DECAL-TOP	4
7.	70393671	DECAL-TH OPERATION	2
8.	70393672	DECAL-DANGER TH OPER	2
9.	70397311	CAPACITY PLACARD	2

NOTE

PLACE ITEMS 7-9 AT TIREHAND CONTROLS.



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NOTES

6-1. GENERAL

This section describes disassembly, repair and assembly of many of the components used on the Tirehand. Some information presented here may not apply to your model of Tirehand.

6-2. HYDRAULIC SYSTEM

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

1. ALWAYS relieve internal hydraulic pressure before proceeding with the repair.

2. NEVER allow foreign matter - dirt, water, metal particles, etc. - to enter the hydraulic system through the open connection. Seal the connection as tightly as possible. If dirt does get in, a filter change is required after about 50 hours of operation.

3. ALWAYS cycle all of the controls after completing a repair. This will eliminate air that is trapped in the cylinders, hoses, spool valves, etc. and avoid bumpy, erratic behavior during actual working conditions.

4. ALWAYS check for hydraulic leaks after a repair. A high pressure leak is hazardous and must be repaired before putting the unit to work.

6-2-1. CYLINDERS

All of the cylinders used on the Tirehand are of the same basic type; therefore, the same disassembly and repair instructions apply. Check the PARTS section for specific information. The following list of tools will be a definite asset in the disassembly and repair of all IMT cylinders.

SPANNER WRENCH - IMT Part Number 3Y140510.

NEEDLE-NOSE PLIERS - For removal and replacement of seals.

ICE PICK or SHARP AWL - For removal and replacement of seals.

PLASTIC HAMMER - Used with the spanner wrench for head and piston assembly.

6-2-1-1. CLAMP CYLINDER REMOVAL AND INSTALLATION

1. Rotate the Tirehand until the clamp cylinder is in a horizontal position.

2. Extend the cylinder full stroke.

3. Shut off the carrier vehicle's engine. Relieve internal hydraulic pressure by cycling the controls.

4. Remove the cover from the body (refer to the appropriate body drawing) and disconnect the hydraulic hoses at the cylinder port block. Cap the hydraulic hoses.

5. Support the hand assembly with a lifting device and straps capable of supporting the assembly. Take up slack in the lifting device

6. Disconnect and cap any hydraulic lines leading to the pad rotation mechanism.

7. Remove the cylinder rod pin by removing the 3/4-10 cap screws and washer securing the pin. Drive out the pin.

8. Make certain the hand assembly is well supported, then remove the two smaller hand/arm pins by removing the 3/4-10 cap screws securing the pins. Drive out the pins.

9. Lift the hand assembly away and place on a clean surface, taking care to keep dirt from the bushing surfaces.

10. Support the clamp cylinder with a lifting device and straps capable of supporting the cylinder.

11. Remove the cylinder base pin securing screw and washer. Drive the pin only far enough to release the cylinder.

12. Lift the cylinder away and repair as necessary.

To install the clamp cylinder:

1. Position the cylinder in the slings of the lifting device and line up the base end pin boss and pin. Seat the pin and secure using the 3/4-10 cap screw and washer. Torque to 265 ft-lb.

2. Lift the hand assembly with the slings and position the pin bosses in line with the pins. Drive in the pins and secure using the 3/4-10 hardware. Torque to 265 ft-lbs.

3. Connect the hydraulic hoses to the clamp cylinder and axial rotation motor.

4. Start the engine, cycle the CLAMP and AXIAL controls through at least five cycles to purge any air trapped in the system. Check for leaks.

5. Check the hydraulic fluid level with all cylinders retracted. Fill if necessary.

6. Test the unit with a simulated job operation before proceeding to the job site.

6-2-1-2. SIDE SHIFT CYLINDER REMOVAL AND INSTALLATION

Cylinder removal is accomplished as follows:

1. Rotate the Tirehand so that the side shift cylinder is in a horizontal position.

2. Disconnect the hydraulic hoses from the cylinder port. Cap the hoses.

3. Remove the retaining rings and bushings from the rod end and base end of the cylinder. Drive out the pins.

4. Disassemble and repair the cylinder.

To install the cylinder:

1. Line up the cylinder base-end pin boss with the holes in the base. Drive in the pin and install the machinery bushing and retaining ring.

2. Connect the hydraulic hoses to the cylinder port.

3. Extend and retract the cylinder until the rod-end pin boss lines up with the holes in the sub-base. Drive in the pin and install the machinery bushing and retaining ring.

4. Extend and retract the cylinder through five (5) complete cycles to purge air that may be trapped in the system. Check for leaks.

5. Check the hydraulic reservoir fluid level with all cylinders retracted. Fill if necessary.

6. Conduct a simulated job operation before proceeding to the job site.

6-2-1-3. CYLINDER DISASSEMBLY

CAUTION

IF SOLVENT IS USED TO CLEAN THE INTERNAL CYLINDER COMPONENTS, ALL TRACES OF SOLVENT MUST BE REMOVED. ANY RESIDUE WILL DAMAGE THE SEALS.

WARNING

DO NOT USE COMPRESSED AIR TO ASSIST IN WITHDRAWING THE PISTON/ROD ASSEMBLY. THE USE OF COMPRESSED AIR MAY RESULT IN PROPELLING THE PISTON/ROD ASSEMBLY OUT OF THE CYLINDER AND MAY CAUSE SERIOUS INJURY OR DEATH.

NOTE

IF THE CYLINDER IS BEING REPAIRED DUE TO A WORN SEAL, WE RECOMMEND REPLACING ALL COMPONENTS FOUND IN THE SEAL KIT. THE SMALL ADDITIONAL EXPENSE MAY SAVE EXPENSIVE EQUIPMENT DOWN-TIME IN THE NEAR FUTURE. REFER TO THE PARTS SECTION FOR SEAL KIT NUMBERS.

1. Thoroughly wash the exterior of the cylinder case.

NOTE

AFTER THE CASE HAS BEEN WASHED, PROCEED WITH DISASSEMBLY IN A CLEAN ENVIRONMENT, ONE THAT IS FREE OF DUST AND DIRT.

2. Remove counterbalance valve if disassembling the clamp cylinder.

3. Place the cylinder on a flat surface near a vise. Slip a pin through the pin boss and clamp the pin in a vise (Figure G-1).

CAUTION

DO NOT CLAMP THE CYLINDER IN A VISE. IT MAY DAMAGE THE CYLINDER CASE.

4. Unscrew the head (Item 4, Figure G-2) in a counterclockwise direction with the spanner wrench. Withdraw the head from the cylinder case.

5. Secure the rod pin boss in the same manner as the cylinder pin boss (Figure G-1).

6. Unscrew the piston (Item 8, Figure G-2) from the rod with the spanner wrench in the same manner as the head (Step 4).

CAUTION

DO NOT CLAMP THE MACHINED SURFACE OF THE ROD IN A VISE. DAMAGE TO THE ROD WILL RESULT.

7. Remove the wafer lock/stop tube ring (Item 13) and the stop tubes (Item 7) from the rod (item 1). The wafer lock/stop tube ring was crushed to secure it and will have to be broken to remove it.

CAUTION

MAKE CERTAIN THE ROD IS NOT DAMAGED DURING REMOVAL OF THE WAFER LOCK/STOP TUBE RING.

8. Slide the head off the rod.

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

CAUTION

FAILURE TO REPLACE A DAMAGED ROD OR CYLINDER MAY RESULT IN LEAKS AND POOR PERFORMANCE THAT WILL HAVE TO BE REPAIRED.

NOTE

FURTHER WORK SHOULD BE DONE IN A WARM ENVIRONMENT (70°F OR WARMER). THIS MAKES THE SEALS MORE PLIABLE AND EASIER TO WORK WITH.

10. Work a slack section into the head seal static o-ring (item 6) and pick it up out of the groove (Figure G-3). Lift the static back-up out of its groove with the needle-nose pliers.

11. Pinch the lip of the rod wiper (Item 2) with the needle-nose pliers and pull it out of the head.

12. Position the head with the top of the head up and lift the wear ring (item 11) with the ice pick. Pry it out of the groove and push it through the head. Remove the rod seal as shown in Figure G-4.

13. Spread the piston rings (item 9) and slide them over the land and off the end of the piston nearest to the ring.

14. Carefully lift the dynamic piston seal (item 10) out of the groove with a thin blade such as a putty knife. Take care not to nick the edges of the groove. Twist and break the seal.

CAUTION

DAMAGING THE EDGES OF THE GROOVE IS LIKELY TO CAUSE PREMATURE SEAL FAILURE.

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

16. Pry the lock ring (item 12) from its seat in the bottom of the piston.

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

6-2-1-4. CYLINDER ASSEMBLY

CAUTION

USE ALL OF THE SEALS IN THE SEAL KIT. IT MAY SAVE EXPENSIVE DOWN-TIME IN THE FUTURE.

1. Install the wear ring (item 11). Make certain it is seated properly.

2. Slide the piston seal (item 10) carefully into position.

CAUTION

WORK THE PISTON SEAL CAREFULLY INTO POSITION FROM THE TOP OF THE PISTON USING THE ASSEMBLY GROOVE. DO NOT ATTEMPT TO INSTALL IT FROM THE BOTTOM OF THE PISTON. YOU MAY STRETCH THE SEAL AND RENDER IT USELESS.

3. Slide the piston rings (item 9) over the lands and allow them to snap into position.

4. Carefully press the lock ring (item 12) into position.

5. Install the static back-up (item 5) and the o-ring (item 6). Make certain that there are no twists.

6. Position the head with the rod wiper pocket up. Grasp the dynamic rod seal (item 3) with the needle-nose pliers (Figure G-5).

CAUTION

DO NOT APPLY TOO MUCH PRESSURE TO THE ROD SEAL OR YOU MAY CUT IT WITH THE NEEDLE-NOSE PLIERS.

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

8. Install the rod wiper (item 2).

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

10. Carefully slide the head onto the rod. Make certain that the rod wiper (item 2) does not catch on the rod when it is first started. Slide the head all of the way onto the rod and up to the pin boss.

11. Slide the stop tube ring (item 13) and stop tubes (item 7 - if applicable) onto the rod.

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

13. Secure the rod as shown in Figure G-1 and screw the piston onto the rod by hand. You should be able to get the piston almost all the way onto the rod before using the spanner wrench.

CAUTION

CHECK TO MAKE CERTAIN THAT THE LOCK RING (ITEM 12) STAYS IN POSITION. IT MUST REMAIN IN POSITION OR LEAKS MAY OCCUR RESULTING IN POOR PERFORMANCE.

14. Torque the piston onto the rod at 250 ft-lbs of torque (Figure G-6).

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

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

17. Slide the piston into the cylinder. With a rotating motion, work the o-ring (item 6) and the back-up (item 5) past the threads and hand tighten the cylinder head.

18. Secure the cylinder (Figure G-1) and torque the head in the same manner as the piston (step 14, Figure G-6).

19. Install the holding valves and their o-rings. Make certain that the o-rings are in good position and properly positioned.

6-2-2. COUNTERBALANCE VALVES

Counterbalance valves are considered non-repairable and must be replaced if defective.

6-2-3. HYDRAULIC PUMP

The installer or manufacturer of the carrier vehicle is to make provisions to supply 12 GPM of hydraulic fluid at 3000 PSI.

6-2-4. HYDRAULIC MOTORS

Four hydraulic motors are used on the Tirehand: two for Tirehand rotation and one each side for axial (pad) rotation. These motors are not considered field-repairable and should be replaced if defective.

6-2-4-1. HYDRAULIC MOTOR REMOVAL AND REPLACEMENT

To remove rotation motor:

1. Disconnect and cap the hydraulic hoses.
2. Remove the two motor mounting bolts.
3. Remove the counterbalance block and hose fittings from the old motor.

To install the new motor:

1. Install the counterbalance block and hose fittings from the old motor. Do not use the old o-rings, they should be replaced.

2. Position the motor on the base and install the two mounting bolts. Torque them to the proper value (See Torque Table).

3. Connect the hoses.

4. Start the engine, rotate the Tirehand five (5) times in both directions and check for leaks.

5. With all cylinders retracted, check the fluid level in the reservoir and fill if necessary.

6-2-5. RELIEF VALVE ADJUSTMENT

The hydraulic system is designed to operate at a pressure requirement of 3000 PSI with an optimum oil flow of 12 GPM. If the unit pressure is less than 3000, the unit relief valve may require adjustment or replacement.

The following procedure is recommended for relief valve adjustment:

1. Start the vehicle and engage the pump.

2. With the vehicle transmission in neutral, operate any function full stroke and, with function lever still engaged at end of stroke, read the pressure on the gauge at the control valve. It should read between 3000 PSI.

3. If the pressure reading is low, shut off the engine and remove the relief valve plug (Figure G-8). Install one 0.010" shim which will provide a 125 PSI increase.

4. Reinstall the relief valve plug and start the engine. If the pressure has not increased by 125 PSI, the malfunction indicates pump slippage.

5. If the 125 PSI increase is achieved, add shims as necessary to bring the pressure up to the required 3000 PSI minimum.

6-3. BEARINGS

This paragraph covers the removal and installation of turntable gear-bearings and bushings.

6-3-1. TURNTABLE GEAR-BEARING

To remove the Tirehand rotation gear-bearing:

1. Disconnect and cap the hydraulic hoses from the valvebank.

2. Support the clamp arms with an overhead lifting device capable of supporting the weight of the unit. Take up the slack in the lifting device.

WARNING

THE LIFTING DEVICE MUST BE FASTENED TO THE TIREHAND IN SUCH A MANNER THAT WILL PREVENT SHIFTING OF THE LOAD DUE TO SLIPPAGE.

3. Remove the cover then remove the 18 bolts that secure the body to the gear-bearing. Slowly work the hoses out of the rotation adapter while simultaneously withdrawing the body. Set the body carefully to one side.

4. Disconnect the grease fitting extension from the turntable gear-bearing.

5. Remove the 23 gear-bearing mounting bolts and remove the gear bearing.

To install the gear-bearing:

1. Position the gear-bearing and torque the 41 mounting bolts (see Torque Table).

2. Install the grease fitting extension.

3. Carefully position the body and clamp arms until the holes in the body line up with the holes in the gear-bearing. Install the mounting bolts and torque to the proper value (see Torque Table).

4. Connect the hydraulic hoses to the valvebank.

5. Start the engine and cycle all of the Tirehand controls at least five (5) times in both directions to purge the air in the system.

6. Check the system for leaks and repair any that are found.

7. With all cylinders retracted, check the fluid level in the reservoir and fill if necessary.

6-3-1-2. AXIAL ROTATION GEAR-BEARING

To remove the axial rotation gear-bearing:

1. Remove the 18 pad mounting bolts.

2. Disconnect the grease fitting extension.

3. Remove the 18 gear-bearing mounting bolts and remove the bearing.

To install the bearing:

1. Position the bearing so that the holes align with those in the arm. The grease fitting extension port must be toward the pinion gear. Install and torque the mounting bolts (see Torque Table).

2. Install the grease fitting extension.

3. Position the pad over the gear-bearing, install and torque the mounting bolts (see Torque Table).

6-3-2. BUSHING REMOVAL AND INSTALLATION

To replace a bushing:

1. Remove the weldment containing the bushing.

2. Position the bushing removal tool as shown in Figure G-9 and extract the bushing.

3. To install the bushing, assemble the tool as shown in Figure G-10 and press the bushing in.

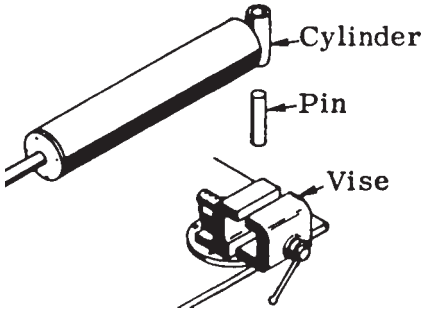


FIGURE G-1. SECURING CYLINDER

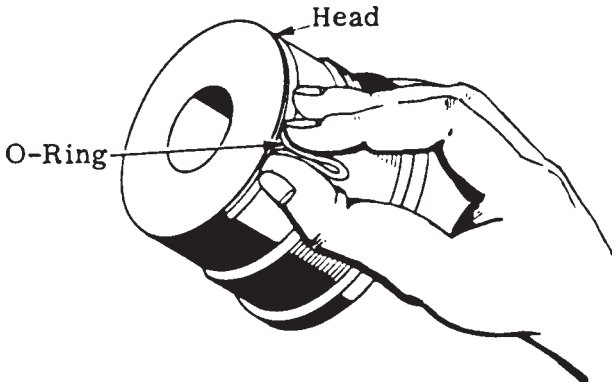


FIGURE G-3. O-RING REMOVAL

1. ROD
2. WIPER
3. DYNAMIC ROD SEAL
4. HEAD
5. STATIC BACK-UP
6. STATIC O-RING
7. STOP TUBE
8. PISTON
9. PISTON RINGS
10. DYNAMIC PISTON SEAL
11. WEAR RING
12. LOCK RING
13. STOP TUBE RING
    (NOTE: WAS WAFER LOCK. REPLACE WAFER LOCK WITH STOP TUBE RING WHEN RESEALING CYLINDER.

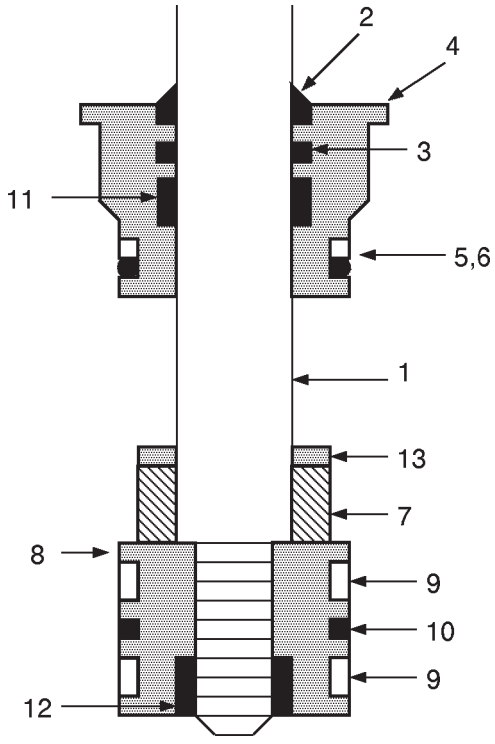


FIGURE G-2. CYLINDER COMPONENTS

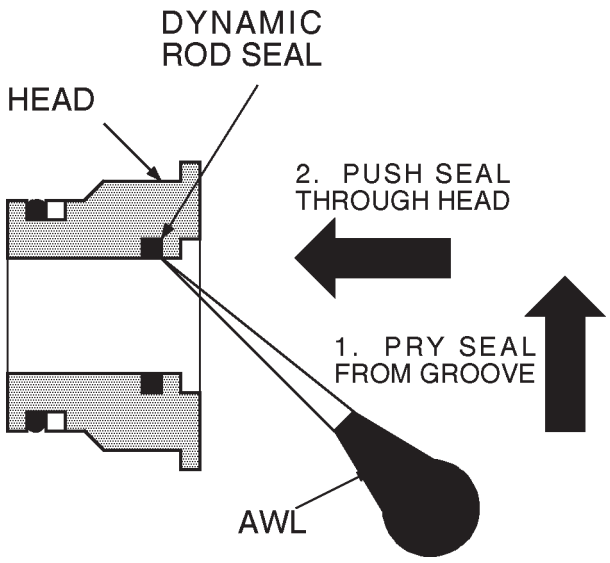


FIGURE G-4. DYNAMIC ROD SEAL REMOVAL

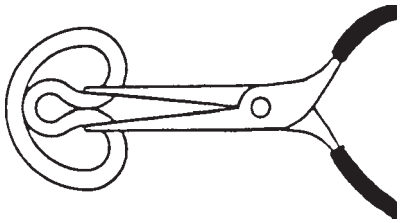


FIGURE G-5. ROD SEAL INSTALLATION

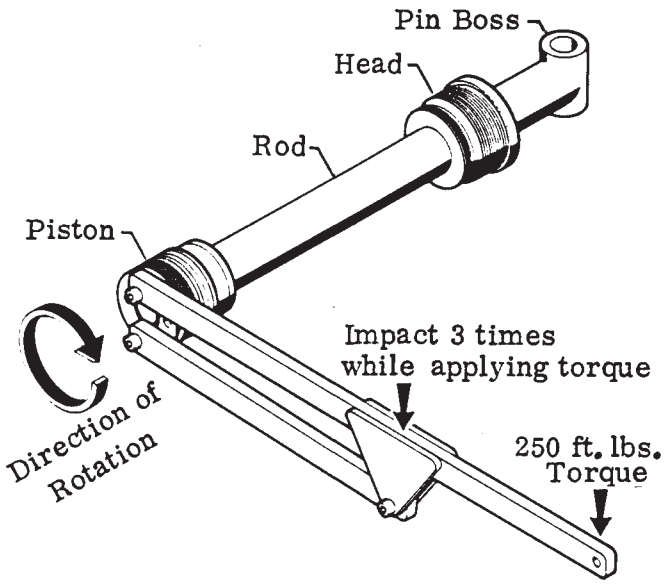


FIGURE G-6. PISTON/ROD ASSEMBLY

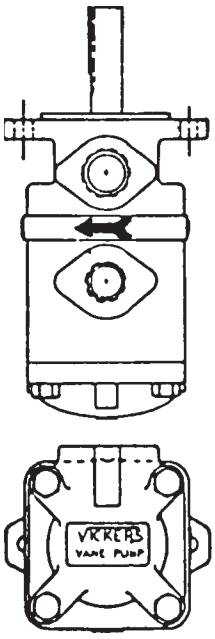


FIGURE G-7. HYDRAULIC PUMP

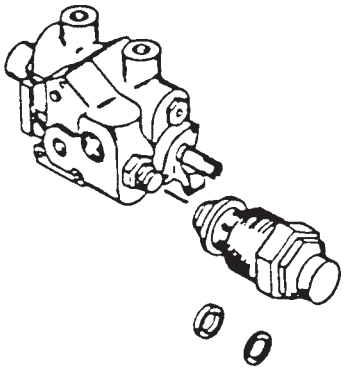


FIGURE G-8. RELIEF VALVE ADJUSTMENT

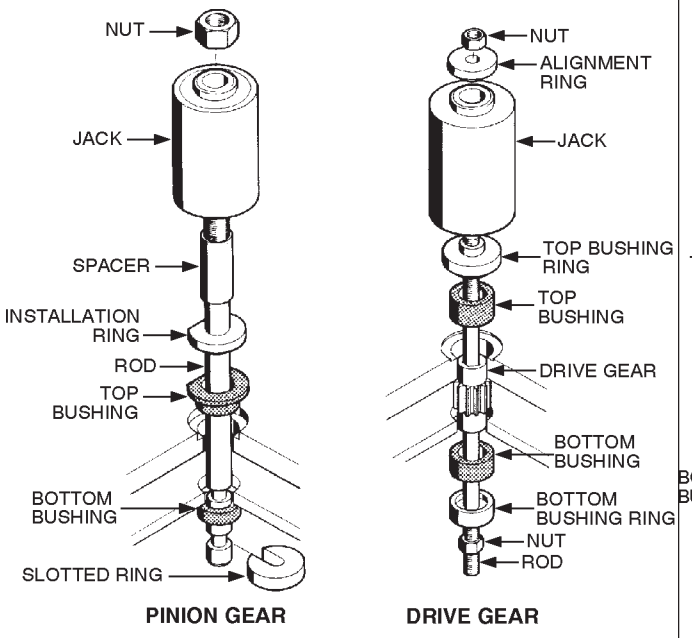


FIGURE G-9. BUSHING REMOVAL

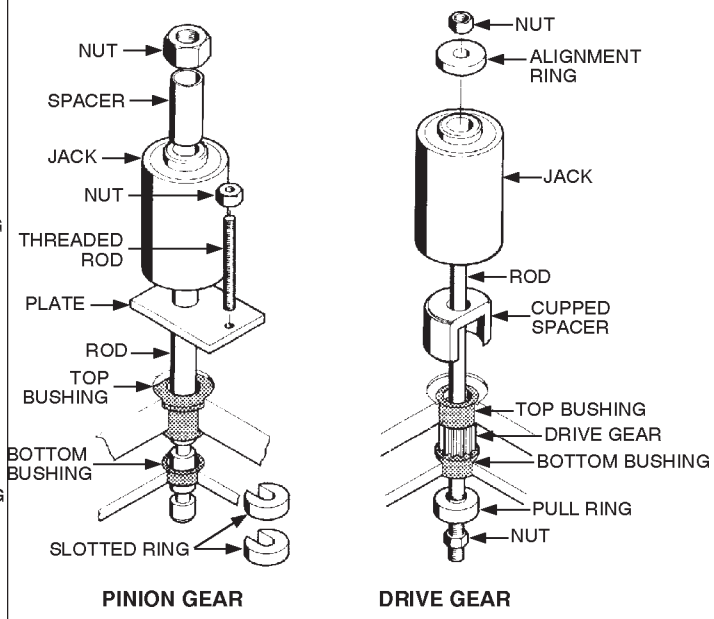


FIGURE G-10. BUSHING INSTALLATION

6-4. TROUBLESHOOTING

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

TABLE G-1. TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE
Controls fail to respond	1. Pump not engaged - if supplied with electric clutch. 2. Hydraulic oil supply is low. 3. Hydraulic pressure line is ruptured. 4. Suction line shut-off valve is obstructed. 5. Hydraulic pump is faulty. 6. Relief valve is set incorrectly.
Operation slow down	1. Hydraulic oil supply is low. 2. Hydraulic pump is operating at a reduced speed. 3. Relief valve is set too low.. 4. Pump or cylinder is worn. 5. Pump is slipping due to excessive oil temperature. This is a factor which will increase with worn components. 6. Filter is dirty. 7. Valve spools are inoperative. 8. Obstructed cylinder holding valve.
Rotation control slowed or erratic	1. Internal port orifices are clogged. 2. Rotation gears are locked or damaged.
Arms and pads drift when loaded and controls neutralized	1. Hydraulic oil is bypassing at piston rings. 2. Cylinder holding valves are defective or contaminated.
Unusual noise in operation	1. Cavitation is occurring due to low hydraulic oil supply. 2. Loading is excessive. 3. Restriction or collapse of suction line. 4. Bypass settings on relief valve are too low. 5. Relief valve is damaged. 6. Valve closure is obstructed due to particle accumulation.
Side step chatter or slow	1. Bearings need lubrication. 2. Mechanical damage to bracket. 3. Lower cylinder damaged.
Arm chatter or noise	1. Arms need both internal and external lubrication. 2. Bearing damaged.

TORQUE DATA CHART - DOMESTIC

FINE THREAD BOLTS

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

COARSE THREAD BOLTS

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

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

1. Bolt manufacturer's particular specifications should be consulted when provided.

2. Flat washers of equal strength must be used.

3. All torque measurements are given in foot-pounds. To convert to inch-pounds, multiply by 12.

4. Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress ability, such as Never-Seez compound graphite and oil, molybdenum disulphite, collodial copper or white lead are applied, multiply the torque values in the charts by the factor .90. The use of Loctite does not affect the torque values listed above.

5. Torque values for socket-head capscrews are the same as for Grade 8 capscrews.

WARNING

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

TORQUE DATA CHART - METRIC

FINE THREAD BOLTS

SIZE (DIA-TPI)	BOLT DIA (INCHES)	TIGHTENING TORQUE SAE J429 GRADE 5 PLAIN (KG-M)	SAE J429 GRADE 5 PLATED (KG-M)	SAE J429 GRADE 8 PLAIN (KG-M)	SAE J429 GRADE 8 PLATED (KG-M)
5/16-24	0.3125	3	2	4	3
3/8-24	0.3750	5	4	7	5
7/16-20	0.4375	8	6	11	8
1/2-20	0.5000	12	9	17	12
9/16-18	0.5625	17	12	24	18
5/8-18	0.6250	24	18	33	25
3/4-16	0.7500	41	31	58	44
7/8-11	0.8750	62	45	93	69
1-12	1.0000	89	67	138	103
1 1/8-12	1.1250	123	93	200	150
1 1/4-12	1.2500	171	129	278	209
1-3/8-12	1.3750	232	174	375	281
1 1/2-12	1.5000	304	228	492	369

COARSE THREAD BOLTS

SIZE (DIA-TPI)	BOLT DIA (INCHES)	TIGHTENING TORQUE SAE J429 GRADE 5 PLAIN (KG-M)	SAE J429 GRADE 5 PLATED (KG-M)	SAE J429 GRADE 8 PLAIN (KG-M)	SAE J429 GRADE 8 PLATED (KG-M)
5/16-18	0.3125	2	2	3	2
3/8-16	0.3750	4	3	6	5
7/16-14	0.4375	7	5	10	7
1/2-13	0.5000	10	8	15	11
9/16-12	0.5625	15	11	21	16
5/8-11	0.6250	21	16	30	22
3/4-10	0.7500	37	28	52	39
7/8-9	0.8750	55	41	84	63
1-8	1.0000	82	62	126	94
1 1/8-7	1.1250	110	82	178	133
1 1/4-7	1.2500	155	116	251	188
1-3/8-6	1.3750	203	152	329	246
1 1/2-6	1.5000	270	210	438	328

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

1. Bolt manufacturer's particular specifications should be consulted when provided.

2. Flat washers of equal strength must be used.

3. All torque measurements are given in kilogram-meters.

4. Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress ability, such as Never-Seez compound graphite and oil, molybdenum disulphite, collodial copper or white lead are applied, multiply the torque values in the charts by the factor .90. The use of Loctite does not affect the torque values listed above.

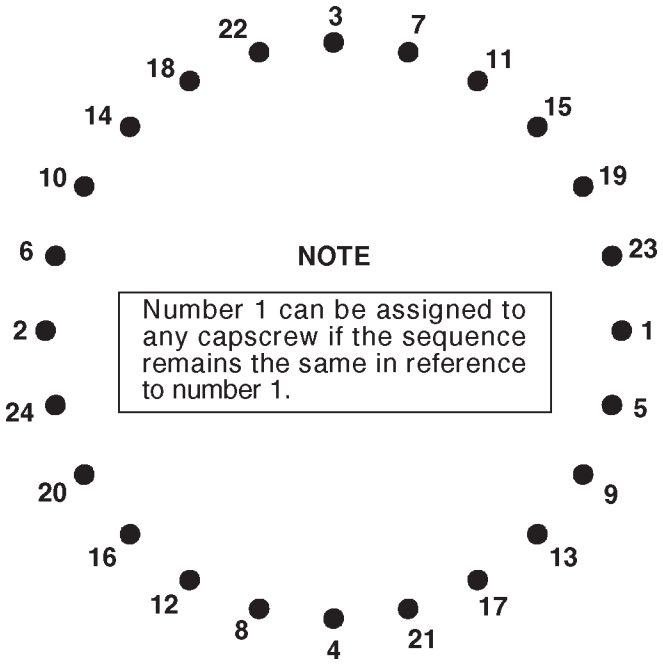
5. Torque values for socket-head capscrews are the same as for Grade 8 capscrews.

WARNING

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

TURNTABLE BEARING FASTENER TIGHTENING SEQUENCE

Refer to the diagram below for proper tightening/torqueing sequence of the turntable bearing to the crane base and crane mast. The total quantity of cap screws varies dependent on crane model.



TIGHTENING PROCEDURE:

1. Refer to the Torque Data Chart to determine the proper torque value to apply to the size of capscrew used.

2. Follow the tightening sequence shown in the diagram. Note that the quantity of capscrews may differ from the diagram, but the sequence must follow the criss-cross pattern as shown in the diagram.

3. Torque all capscrews to approximately 40% of the specified torque value, by following the sequence.
   (EXAMPLE: .40 x 265 FT-LBS = 106 FT-LBS)
   (EXAMPLE-METRIC: .40 x 36 KG-M = 14.4 KG-M)

4. Repeat Step 3, but torqueing all capscrews to 75% of the specified torque value. Continue to follow the tightening sequence.
   (EXAMPLE: .75 x 265 FT-LBS = 199 FT-LBS)
   (EXAMPLE-METRIC: .75 x 36 KG-M = 27 KG-M)

5. Using the proper sequence, torque all capscrews to the listed torque value as determined from the Torque Data Chart.

TURNTABLE BEARING INSPECTION FOR REPLACEMENT

Before a bearing is removed from a crane for inspection, one of the following conditions should be evident:

1. Metal particles present in the bearing lubricant.
2. Increased drive power required to rotate the crane.
3. Noise emitting from the bearing during crane rotation.
4. Rough crane rotation.
5. Uneven or excessive wear between the pinion gear and turntable gear.

If none of the above conditions exists, the bearing is functioning properly and need not be replaced. But, if one or more of the above conditions exists, inspection may be required. Limits are measured in "TILT" which is dependent on the internal clearances of the bearing. TILT is the most practical determination of a bearings internal clearance once mounted on a crane.

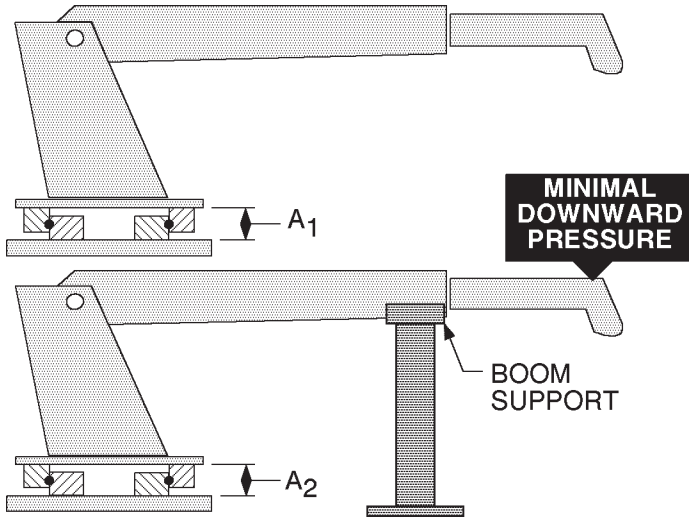
Periodic readings indicating a steady increase in TILT may be an indicator of bearing wear. Note that a bearing found to have no raceway cracks or other structural irregularities should be reassembled and returned to service.

TEST PROCEDURE

STEP 1.
With the crane horizontal and fully extended, measure between the top and bottom mounting surfaces of the turntable bearing (A1), using a dial indicator for accuracy.

STEP 2.
Reverse the load by applying minimal downward pressure on the boom while the boom is in the boom support or on a solid surface. Again measure A2.

STEP 3.
Subtract A1 from A2 to determine tilt and compare the result with the accompanying chart.



COMPARISON CHART - MODEL TO MEASURED TILT DIMENSION

NOTE	IMT CRANE, LOADER OR TIREHAND MODEL				
THE FIGURES LISTED IN THIS CHART ARE SERVICE GUIDELINES AND DO NOT, IN THEMSELVES, REQUIRE THAT THE BEARING BE INSPECTED. IF THERE IS REASON TO SUSPECT AN EXCESS OF BEARING WEAR AND THE MEASURED TILT DIMENSION EXCEEDS THE DIMENSION LISTED, REMOVE THE BEARING FOR INSPECTION.		1007 1014 2015 2015GH 2109 2200 3000 3016 321GH 3816 425 4300 5016 6016 TH7 BODY ROT'N TH1449 BODY ROT'N TH15B CLAMP TH2551B CLAMP TH2557A CLAMP	5200 5200R 5217 5800 7020 7025 7200 7415 9000 TH10 BODY ROT'N TH14 BODY ROT'N	16035 16042 32018 32030 T30 T40	9800 12916 13031 13034 14000 15000 18000 20017 H1200 H1200RR T50 TH2551B BODY ROT'N TH2557B BODY ROT'N TH2557A BODY ROT'N
	BALL DIA. (REF)	.875" (22mm)	1.00" (25mm)	1.18"-1.25" (30-32mm)	1.75" (44mm)
	TILT DIM. (A_1-A_2)	**.060" (1.524mm)**	**.070" (1.778mm)**	**.075" (1.905mm)**	**.090" (2.286mm)**

RECOMMENDED SPARE PARTS LIST

1 YEAR SUPPLY
TIREHAND 2551B
FOR MANUAL: 99900777

This spare parts list does not necessarily indicate that the items can be expected to fail in the course of a year. It is intended to provide the user with a stock of parts sufficient to keep the unit operating with the minimal down-time waiting for parts. There may be parts failures not covered by this list. Parts not listed are considered as not being Critical or Normal Wear items during the first year of operations and you need to contact the distributor or manufacturer for availability.

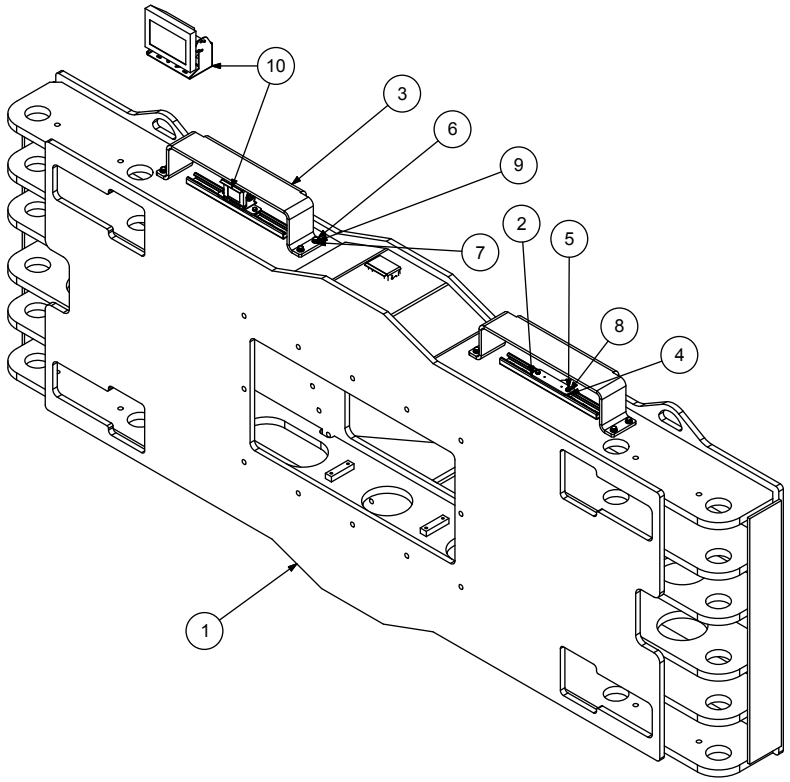
ASSEMBLY DESIGNATION	ITEM NO.	PART NO.	DESCRIPTION	QTY	CODE	SHELF LIFE (MO)	ORDER QTY
40714619.01.19980204	**BASE ASM W/SIDE SHIFTER**						
	2	60020236	THRUST WASHER	2			
	6	72063117	WASHER	8			
	7	60020122	BUSHING	1			
	8	60020123	THRUST WASHER	2			
	9	60020124	BUSHING	1			
	11	72601472	CAP SCR	23			
	12	72063115	WASHER	23			
	14	72601144	CAP SCR	8			
	24	73054538	C'BALANCE VALVE	4			
	32	7Q072112	O-RING	4			
	33	70034295	BUSHING	1			
	34	60020120	BUSHING	1			
	35	60020121	BUSHING	1			
	39	72601485	CAP SCR	17			
	43	60030253	WEAR PAD	1			
41714620.01.19980204	**BASE ASM USING FORKLIFT SIDE SHIFTER**						
	2	60020236	THRUST WASHER	2			
	6	72063117	WASHER	8			
	7	60020122	BUSHING	1			
	8	60020123	THRUST WASHER	2			
	9	60020124	BUSHING	1			
	11	72601472	CAP SCR	23			
	12	72063115	WASHER	23			
	14	72601144	CAP SCR	8			
	24	73054538	C'BALANCE VALVE	4			
	32	7Q072112	O-RING	4			
	33	70034295	BUSHING	1			
	34	60020120	BUSHING	1			
	35	60020121	BUSHING	1			
40712519.01.19940901	**BODY ASM**						
	5	72601468	CAP SCR	18			
	6	72063116	WASHER	18			
40712518.01.19980106	**CLAMP ASM**						
	5	60020167	BUSHING	16			
	20	73051004	HYD MOTOR	2			
	22	73054538	C'BALANCE VALVE	4			
	25	71056010	PINION GEAR	2			
	26	71056012	INTERMEDIATE GEAR	2			
	27	71056389	TURNTABLE GEAR BEARING	2			
	31	72060931	CAP SCR	72			
	32	72063119	WASHER	72			
	41	71056011	DRIVE GEAR	2			
	42	60020115	BUSHING	2			
	43	60020100	BUSHING	2			
	44	60020114	BUSHING	2			
	45	60020081	BUSHING	2			
3B282930.01.19940901	**SIDESHIFT CYLINDER**						
	5	9B015930	SEAL KIT	1			
3B340820.01.19941011	**CLAMP CYLINDER**						
	3	60020196	BUSHING	8			
	9	73054242	C'BALANCE VALVE	2			
	10	9C162023	SEAL KIT	2			

SECTION 7. CAMERA OPTION

CAMERA KIT (40724922).....2
MONITOR-DUAL VISION (77734784) 3
CAMERA-FOR DUAL VISION MONITOR (77734785).....27
CABLE-COAX 65’ FOR DUAL VISION MONITOR (77734786) 31

CAMERA KIT (40724922)

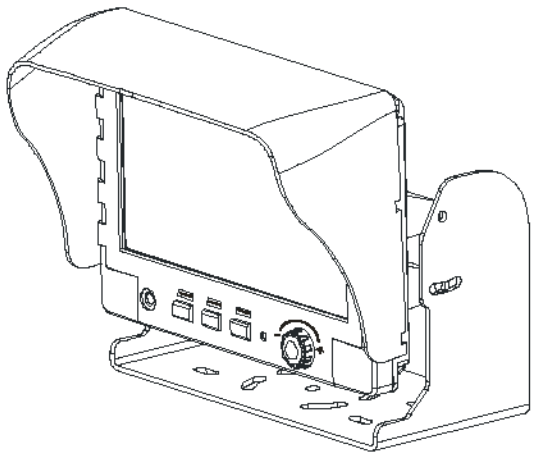
ITEM	PART	DESCRIPTION	QTY
1.	52724835	WLDMT-BODY TH10	1
2.	60136590	CAMERA MOUNT	2
3.	60139306	GUARD-CAMERA MNT	2
4.	71414717	NUT- 0.25-20 CHANNEL	4
5.	72060004	CAP SCR 0.25-20X 1.00 HH GR5 Z	4
6.	72060046	CAP SCR 0.38-16X 1.00 HH GR5 Z	8
7.	72063003	WASHER 0.38 FLAT	8
8.	72063049	WASHER 0.25 LOCK	4
9.	72063051	WASHER 0.38 LOCK	8
10.	77734564	CAMERA OPTION-DUAL	1



Thank you for purchasing our product.
Please read this User's Manual before using the product.
Change without Notice

AWT07MLED

7" Q TFT LCD MONITOR (LED Backlighted)
USER MANUAL



SAFETY PRECAUTIONS

Federal Communications Commission (FCC) Statement

This Equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency
energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

- You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and,
(2) This device must accept any interference received, including interference that may cause undesired operation

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MONITOR-DUAL VISION (77734784)

FEATURE

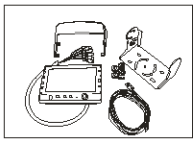
- Advanced OSD Menu for easy use
- Support up to 4 CCD Camera inputs (Mini din connector)
- Extra RCA input for multimedia while parking (VCD, DVD, Game device)
- Provide 2 Video / 1 Audio Signal Output (Live Out)
- Support Single / Dual / Triple / Quad Screen (Cam Out)
- Signal Trigger for Side / Rear View
- Auto Day & Night Control via Photo Diode Sensor
- Auto Detection for NTSC / PAL System
- OSD Control for Individual Normal / Mirror Camera Image for every camera
- Auto power on when users are making left turn or right turn even reverse
- Able to select CAM A / B/C / R's monitoring screen
- Supported 9.6V~32V Car power system working
- Professional Metal Case with Anti Shocking Design

MONITOR-DUAL VISION (77734784)

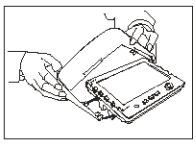
1. Package Contents

Item	Qty.
1. 7" LCD Monitor	1
2. Sun-Hood	1
3. Mounting Bracket	1
4. Accessories	1
5. Control Cable	1
6. User Manual	1

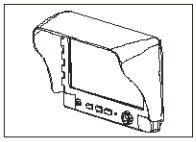
2. TFT Installation



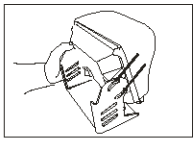
Step 1
Check the package and make sure all parts are included.



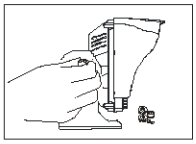
Step 2
Clip the sun-hood on to the monitor.



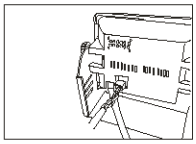
Step 3
Make sure it is installed properly.



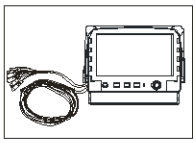
Step 4
Install the monitor on to the bracket.



Step 5
Adjust the monitor to an appropriate / comfortable viewing angle before tightening the screws.

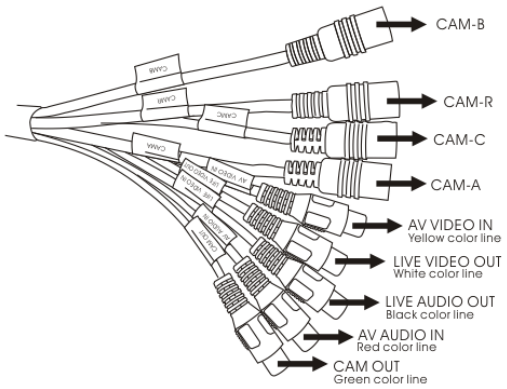


Step 6
Connect the control cable included to the power socket which located at rear side of monitor.



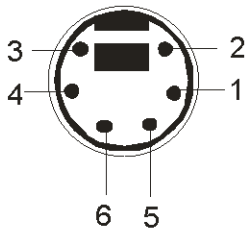
Step 7
Monitor installation is now completed. Each control cable wire is attached with a sticker to indicate its signal function. Referred to the identification sticker for further installation.

3. Signal Cable Description



1. CAM R (Mini din) (NTSC/PAL system presume by this car rear CCD)
   For 1st camera connection
2. CAM A (Mini din)
   For 2nd camera connection
3. CAM B (Mini din)
   For 3rd camera connection
4. CAM C (Mini din)
   For 4th camera connection
5. LIVE VIDEO OUT (White Color RCA Jack)
   On screen video loop out (for recording, second monitor or other device)
6. LIVE AUDIO OUT (Black Color RCA Jack)
   On screen audio loop out (for recording, second monitor or other device)
7. AV VIDEO IN (Yellow Color RCA Jack)
   Connection for any Video signal (DVD, VCD, Game)
8. AV AUDIO IN (Red Color RCA Jack)
   Connection for any Audio signal (such as DVD, VCD, Game)
9. CAM OUT (Green Color RCA Jack)
   Video loop out (for recording, second monitor or other device)

Mini Din Pin Assignment



*** Type 1 (Standard):**

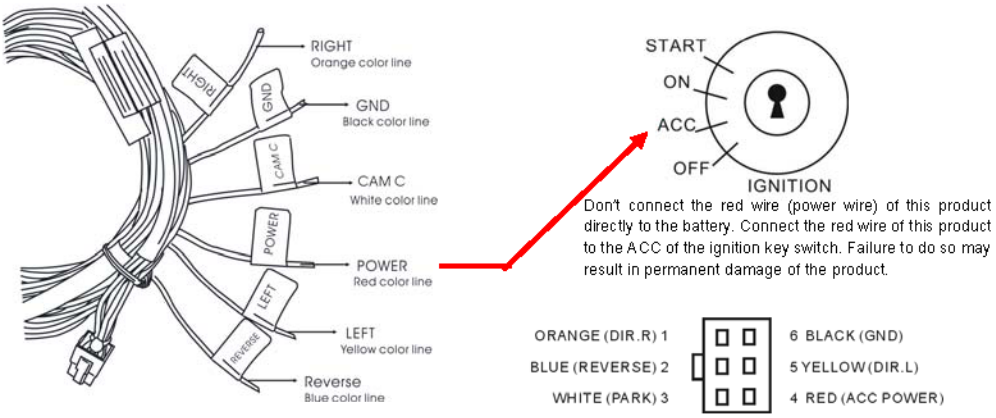
1. Video	4. +12V
2. -------	5. GND
3. Audio	6. -------

Function of the Audio

Cam A	Audio from Cam A
Cam B	Audio from Cam B
Cam C	Audio from Cam C
Cam R	Audio from Cam R
Cam A + Cam B	Audio from Cam A
Cam C+ Cam R	Audio from Cam R
Cam A+ Cam R	Audio from Cam R
Cam R+ Cam B	Audio from Cam R
Cam A + Cam C	Audio from Cam A
Cam C+ Cam B	Audio from Cam C
Cam R / Cam AB	Audio from Cam R
Quad	Audio from Cam R
AV	Audio from AV

※ Cam Out: Composite video loop out signal to recorder, monitor or other device.
※ Live Video/Audio Out: On screen video/audio signal loop out to recorder, monitor or other device.

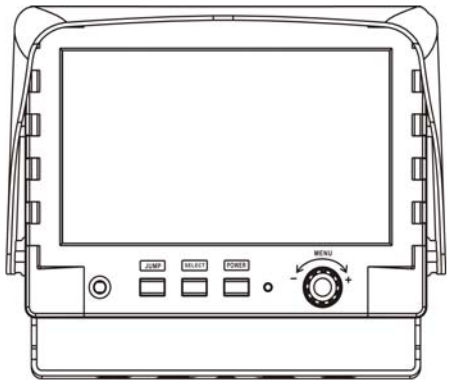
4. Control cable Description



WIRE COLOR	FUNCTION	REMARK	ON SCREEN VIEW
RED	ACC POWER		
BLACK	GND		
WHITE	SW Control	Active Power Level Connect to CAM C	
BLUE	Reverse Control	Active Power Level Connect to Reverse Light	
ORANGE	Right Turn Control	Active Power Level Connect to Direction Light (R)	
YELLOW	Left Turn Control	Active Power Level Connect to Direction Light (L)	

1. The control cable sequence: Reverse > Right / Left / CAM C when Priority is ON. Right / Left / CAM C > Reverse when Priority is OFF.
2. With car power is on, the monitor power is off, when making a reverse / right / left turn, the monitor will display default screen.
3. You may push the "JUMP" button under event trigger when Priority is OFF.

5. Front Panel Control



POWER Press the power button to activate the monitor or to keep the monitor under stand by mode (In Red Led).

SELECT With power on, press this button to select image sequence as below~ AV→CAM A+B→CAM C+R→CAM A+R→CAM R+B→CAM A+C→ CAM C+B→CAM R/AB→CAM R+AB→CAM A→CAM B→CAM C→ CAM R →AV……

Prerequisite：Display menu →Priority option is "ON"

JUMP Press this button to display defined camera input, user can select QUAD→SEQ→CAM A+B→CAM C+R→CAM A+R→CAM R+B→ CAM A+C→CAM C+B→CAM R/AB →CAM R+AB →CAM A →CAM B CAM C→CAM R via OSD as default value.

Prerequisite：Display menu →Priority option is "ON"

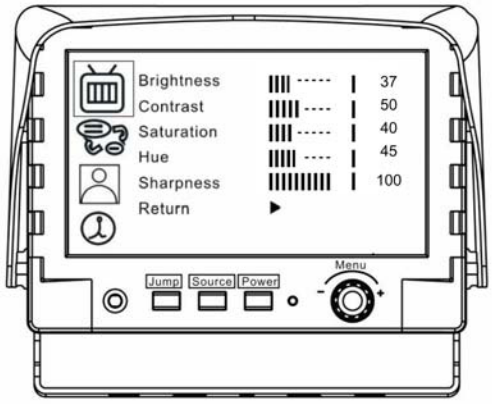
MENU This encoder switch provides the following function:

1. Activate OSD menu: Press the Menu switch to activate the OSD menu. After the OSD menu is activated, in case users does not proceed for further set up, the OSD menu will then automatically turn off within 20 seconds.
2. Enter Function: Press the encoder switch to act as "Enter" function under the OSD menu.
3. Volume Value: Exit the OSD menu, user can turn this switch left or right to adjust the volume value.

OSD Menu

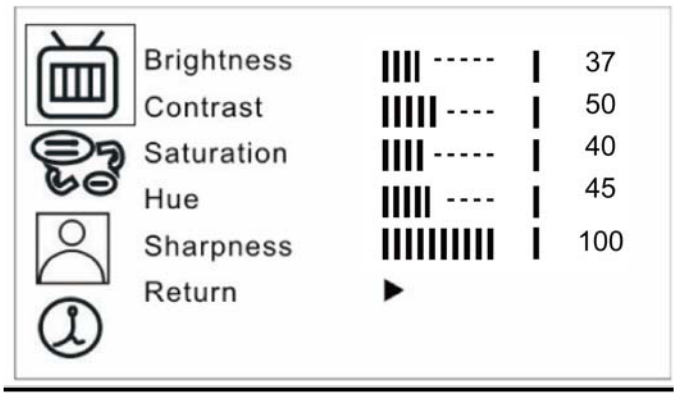
1. Press the MENU button to enter to the OSD Menu
2. Turn the MENU button left or right to select the setting you wish to proceed. The color of the content will turns YELLOW to identify your selection. Turn the MENU button left or right to adjust your setting value.
3. Press the MENU button once back to submenu and then press menu button again in order to return to OSD menu.

Enter to Main menu:



SCREEN Menu

This menu set up contains different setting for the TFT LCD.



Brightness
Provide adjustment for shade and brightness level of TFT display.
Setting value from 0 ~ 100. Default value is 37.

Contrast
Provide adjustment for the light and dark level of the TFT display.
Setting value from 0 ~ 100. Default value is 50.

Saturation
Provide adjustment for the light intensity level of TFT display.
Setting value from 0 ~ 100. Default value is 40.

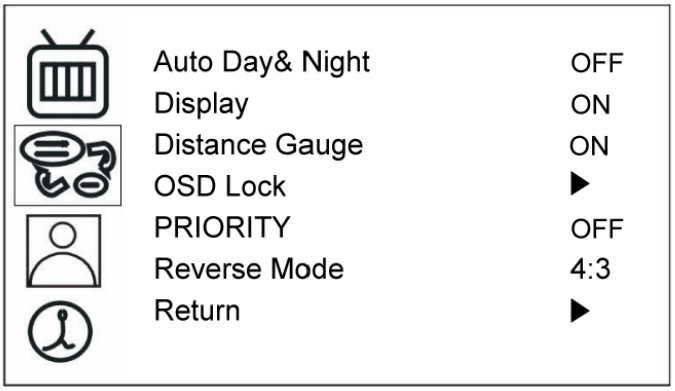
Hue
Provide adjustment for the lightness and colorfulness level of TFT display.
Setting value from 0 ~ 100. Default value is 45.
(Only in NTSC system is available.)

Sharpness
Provide adjustment for the edge contrast (acutance) level of TFT display.
Setting value from 0 ~ 100. Default value is 100.

Return
Return to OSD menu selection screen.

DISPLAY Menu

This menu set up contains the on screen identification and the activation of the distance gauge.



Auto Day&Night

Select “ON” to activate the auto day & night function or “OFF” to deactivate it. Default value is OFF.

Display

Select “ON” to show the SELECT of video input title on screen or “OFF” to keep it invisible. Default value is ON.

Distance Gauge

Set the distance gauge “ON” to show the distance gauge on screen while reserving or “OFF” to deactivate. Default value is ON.
(This “DISTANCE GAUGE” is for user’s reference only)

OSD Lock

This function provides protection when an unauthorized person tries to access the OSD settings. JUMP and SELECT key press simultaneously for over 5 seconds to unlock. Default value is OFF.

※Users must turn on LCD in order to run unlock process. All function buttons are still working during OSD Menu lock up period.

PRIORITY

If Priority is ON

a. Press SOURCE button to select image sequence as below~
AV→CAM A+B→CAM C+R→CAM A+R→CAM R+B→CAM A+C→
CAM C+B→CAM R/AB→CAM R+AB→CAM A→CAM B→CAM C→
CAM R →AV.....
b. Triggered mode priority: Reverse > Right/Left / CAM C
c. JUMP mode: QUAD
d. OSD Lock mode: OFF

If Priority is OFF

a. Press SOURCE button to select image sequence is as below~
AV→ CAM A→CAM B→CAM C→CAM R →AV.....
b. Triggered mode priority: Right/Left/CAM C > Reverse
c. JUMP mode: CAM R
d. OSD Lock mode: ON

Default value is “ON”.
Notice：When you choose “OFF” mode also enable OSD Lock function.

REVERSE MODE

When reversing select LCD profile ratio 4:3 the display show in size 4:3(default), select LCD profile ratio 16:9 the display show in size 16:9

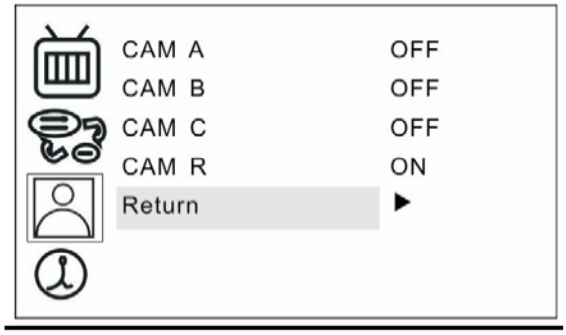
Return

Return to OSD menu selection screen.

CAMERA Menu

This menu set up contains the on Camera and Jump setting.

Mirror



Select "ON" to activate the mirror function for different cameras or "OFF" for a normal image. Default values are following below setting.

CAM A	"OFF"
CAM B	"OFF"
CAM C	"OFF"
CAM R	"ON"

Dir Image

The screen image setting of this panel during left / right turn:

TRIPLE: When you are making a right turn or left turn, the screen of panel will display triple images for left hand side, right hand side and rear view when you are making a right turn or left turn.

DUAL: With proper wiring, the screen will display dual image for both rear and right hand side view when making a right turn. While left turning, the screen will show dual image for both rear and left hand side view.

SINGLE: Screen of touch panel shows only single picture on direction turn. The screen will show only left side view on left turn and only right side view on right turn.

Default value is SINGLE.

Rear Setup

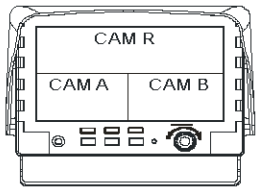
The screen image setting of this panel during reverse gear:

R: Screen will display single image for Cam R only.

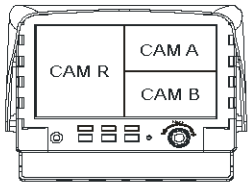
R+A: Screen will display dual image for both Cam R and Cam A.

R+B: Screen will display dual image for both Cam R and Cam B.

R/AB Screen will display triple image from Cam R、Cam A、Cam B.



R+AB Screen will display triple image from Cam R、Cam A、Cam B.



Default value is R.

Jump

By pressing this button, the driver will be able to obtain the image selected under this setting.

QUAD	Obtain image from all camera input in quad picture while pressing the JUMP button and press again to return the default screen.
SEQ.	Corresponding with “SEQ. Timer Step” setting to jump channel by time sequence.
CAM A	Obtain image from camera A while pressing the JUMP button and press again to return the default screen.
CAM B	Obtain image from camera B while pressing the JUMP button and press again to return the default screen.
CAM C	Obtain image from camera C while pressing the JUMP button and press again to return the default screen.
CAM R	Obtain image from camera R while pressing the JUMP button and press again to return the default screen.
CAM A+B	Obtain image from camera A+B in dual picture while pressing the JUMP button and press again to return the default screen.
CAM C+R	Obtain image from camera C+R in dual picture while pressing the JUMP button and press again to return the default screen.
CAM A+R	Obtain image from camera A+R in dual picture while pressing the JUMP button and press again to return the default screen.
CAM R+B	Obtain image from camera R+B in dual picture while pressing the JUMP button and press again to return the default screen.
CAM A+C	Obtain image from camera A+C in dual picture while pressing the JUMP button and press again to return the default screen.
CAM C+B	Obtain image from camera C+B in dual picture while pressing the JUMP button and press again to return the default screen.
CAM R/AB	Obtain image from camera R+A+B in triple picture while pressing the JUMP button and press again to return the default screen.
CAM R+AB	Obtain image from camera R+A+B in triple picture while pressing the JUMP button and press again to return the default screen.

Default value is QUAD.

Cam Out

Composite video loop out to recorder, monitor or other device.

QUAD	Recording or viewing from the output device in quad mode
CAM A	Recording or viewing from the output device for CAM A image
CAM B	Recording or viewing from the output device for CAM B image
CAM C	Recording or viewing from the output device for CAM C image
CAM R	Recording or viewing from the output device for CAM R image

Default value is QUAD.

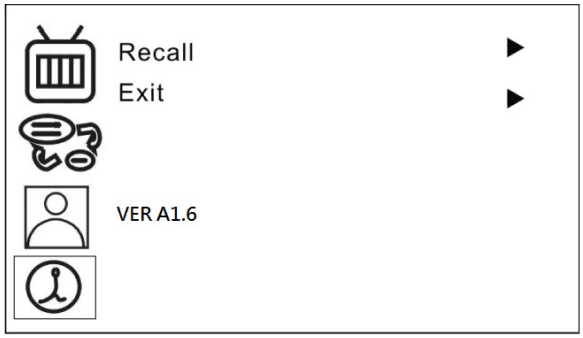
SEQ Time Step

Select Cam A/B/C/R switching time setting value from 02~100
Default value is “02”

Return

Return to OSD menu selection screen.

Information
This menu set up contains Recall & Exit function.

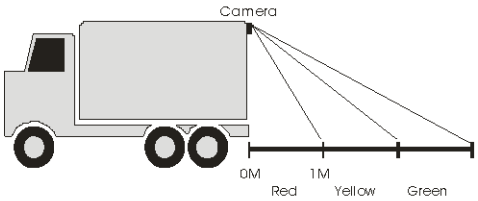


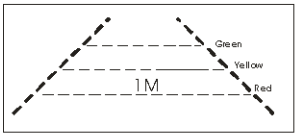
Recall
Recall factory default.

Exit
Exit OSD menu.

Notice：Firmware version has shown on last column.

6. Vehicle Installation



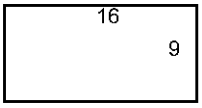


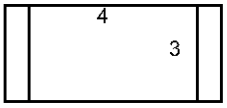
(This " DISTANCE GAUGE" is for user's reference only)

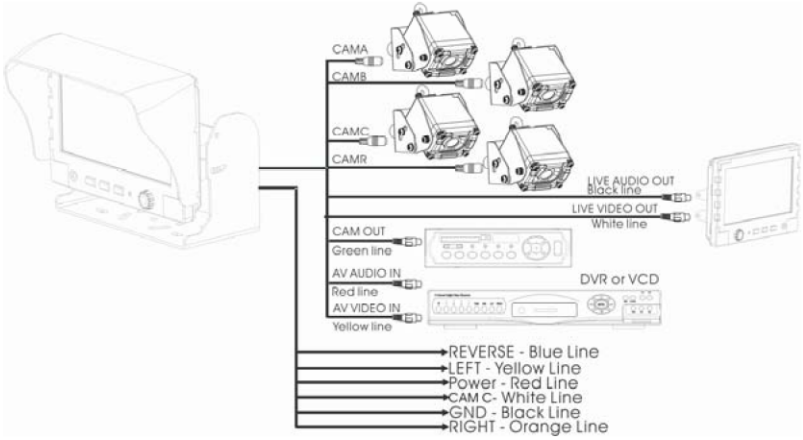
a. Install Camera R (for rear view)
b. Use a measuring tool to mark out the distance behind the vehicle.
c. Adjust the viewing angle of the camera so that the distance gauge shown from the TFT match to the distance marks behind the vehicle.

Switch to Rear view with SELECT button, the screen always display on 16:9
While rear viewing, the screen always display on 4:3 to correct size percentage

SELECT button: Rear viewing:







7. Specification

Screen size	7 Inch Touch Panel (diagonal)
Active area	154.08(H) x 86.58(V)
Pixel configuration	0.107 x 0.370
Resolution	1440(W) x 234 (H)
Viewing angle	UP:40° / Down:60° / Left: 60° / Right:60°
Power source:	DC9.6V ~DC32V
Contrast ratio	300:1 ※
Brightness	450 cd/m^2 ※
AV Video In	
Connector	RCA
Input Signal	1Vpp
Impedance	75 Ohms
Camera MINI DIN In	
Connector	6 PIN MINI DIN (Standard)
Input video signal level	1Vpp
Impedance	75 Ohms
Input audio signal level	1Vpp
Power output for camera	DC12V 350mA
AV Audio In	
Connector	RCA
Input video signal level	1Vpp
Impedance	1K Ohms
Live Video Out	
Connector	RCA
Input signal level	1Vpp
Impedance	75 Ohms
CAM OUT	
Connector	RCA
Input signal level	1Vpp
Impedance	75 Ohms
LIVE Audio Out	
Connector	RCA
Input signal level	1Vpp
Impedance	1K Ohms
Dimension	
W x H x D :	192 x140.5 x 51.8mm
Weight	N.W./G.W.: 2kg/ 2.28kg
Environmental:	
Operation temperature	-10℃~70℃
Storage temperature	-30℃~80℃
Humidity	20%-80%

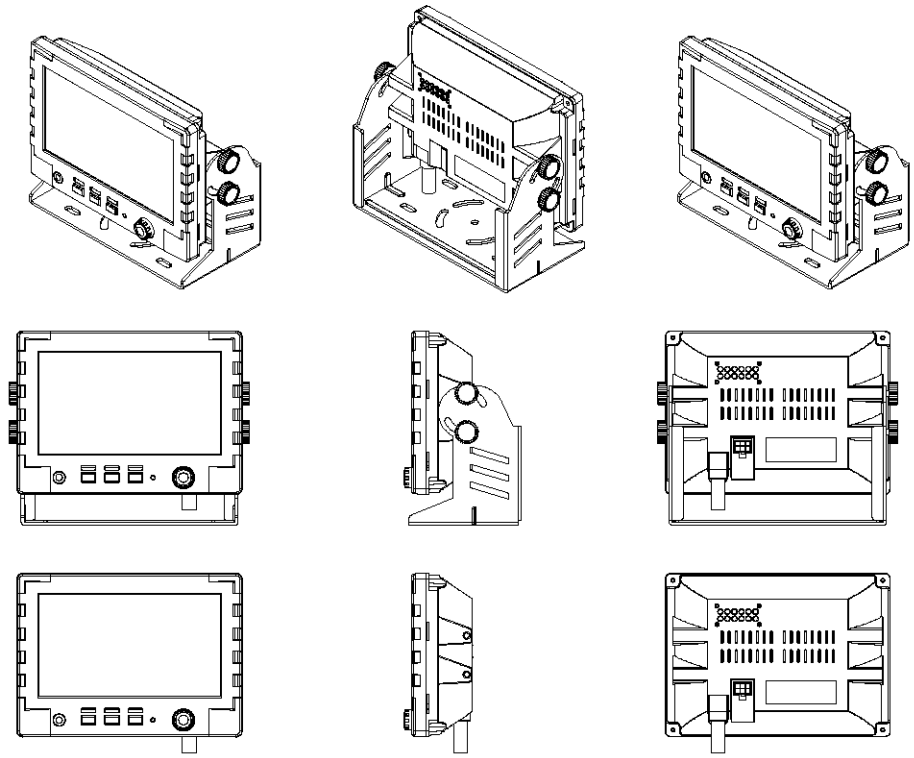
※The brightness and contrast ratio specifications are from panel specification.

Design and Specifications are subject to change without notice.

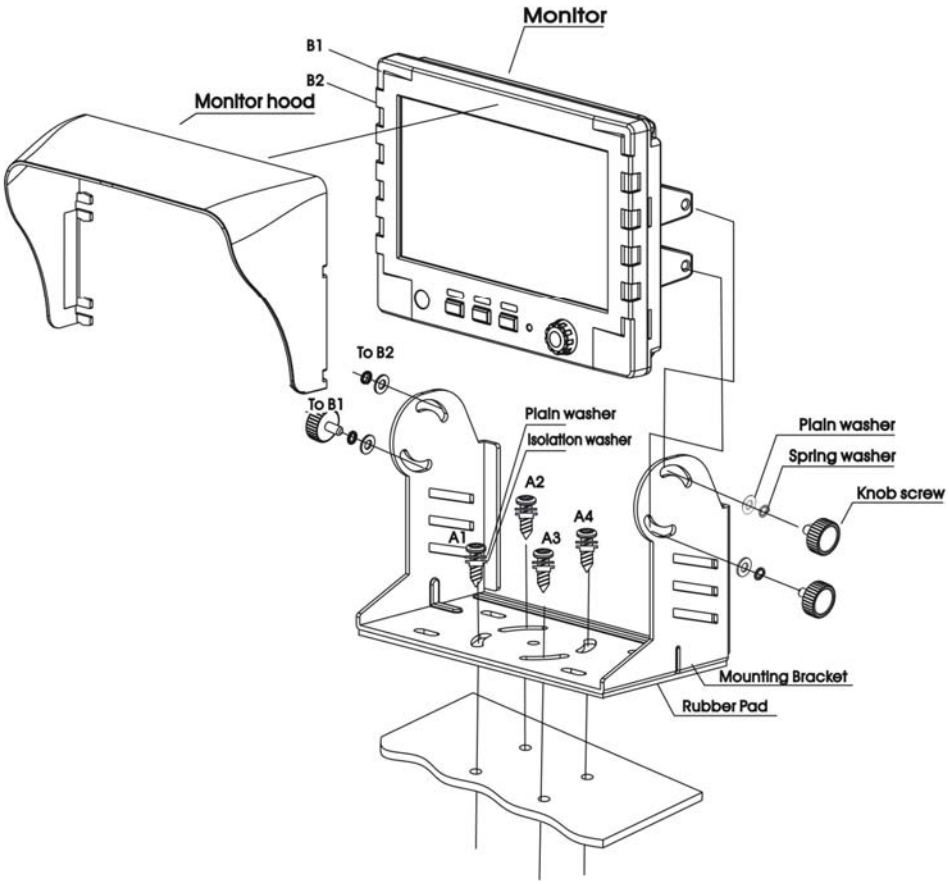
A1.6

8. ATTACHMENT

Attachment 1: Dimension Chart



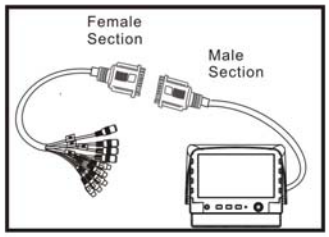
Attachment 2: Installation Chart



Notice:

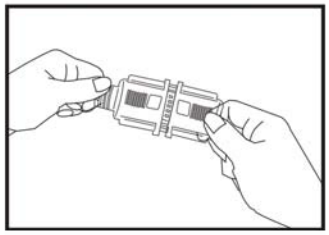
Please proceed with suggested installation instruction according to above picture to avoid any malfunction of the product.

Connecting Steps for Cable of Two-Sections-in-One.



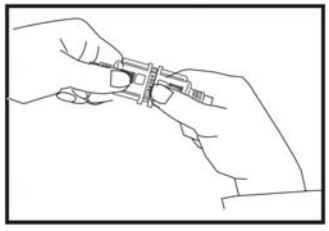
A. The first part of the cable which connected with the LCD Monitor, herewith we called the Male Section

B. The second part of the cable which ended with the RCA/MINI DIN connectors, herewith we called the Female Section.



Connection Steps are:

1. Please connect the "Male Section" to the "Female Section.



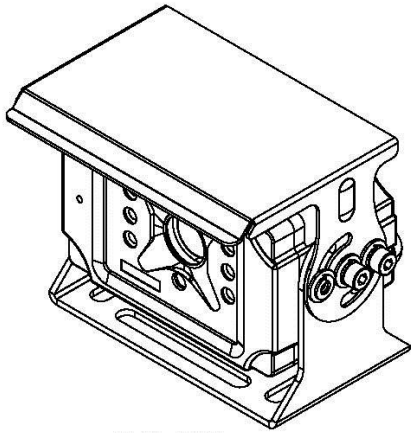
2. Please tight up the side screws.

The Cable should be stored in a dry place and please try to avoid the water and humidity, otherwise, it may cause problem of the product itself or even more dangerous.

CAMERA-FOR DUAL VISION MONITOR (77734785)

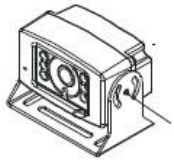
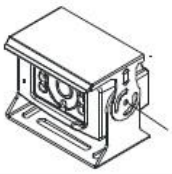
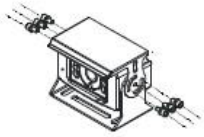
Thank you for purchasing our product.
Please read this User's Manual before
using the product. Change without Notice

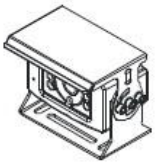
CAR REAR VISION COLOR CCD CAMERA
INSTRUCTION MANUAL



CAMERA-FOR DUAL VISION MONITOR (77734785)

Installation

		
Step 1 Confirm part quantities	**Step 2** Hold the bracket and to aim at middle of screw hole.	**Step 3** Make sure it's on the middle position.
		
Step 4 Put the protection cover on the top of camera.	**Step 5** To aim at middle of screw hole. Same as like step 2	**Step 6** Make screws to aim at all holes each site has 3 screws hole.

	Camera Mirror (M) / Normal (N) Adjustment  
Step 7 Screws tight and done.	1. Screw 2.Unscrew   3. For Mirror Function Turn Arrow to M 4. For Normal Function Turn Arrow to N

CAMERA-FOR DUAL VISION MONITOR (77734785)

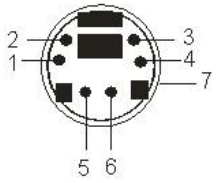
Specification

- Fisheye distortion correction optional
- For Use With 1/3" Format Camera
- Min. Illumination 0 Lux at F2.0 (IR LED ON)
- With 600 TV Lines Horizontal Resolution
- Automatic white balance
- IP 67 weatherproof

Pick up device	1/3" interline transfer CCD	
Total Pixels	NTSC: 811(H) x 508(V) PAL: 795(H) x 598 (V)	
Effective Pixels	NTSC: 768(H) x 494(V) PAL: 752(H) x 582(V)	
Resolution	600 TV lines	
Sync. System	Internal	
Scanning System	2:1 Interlace	
S/N Ratio	More than 50 dB (AGC OFF)	
Electronic Shutter	Auto Electronic Shutter 1/60 (1/50) ~1/100,000 sec.	
Min. Illumination	0Lux (F2.0) with IR LED ON	
Video Output	Composite 1.0 Vp-p / 75 ohm	
Automatic Gain Control	ON	
Aperture Correction	Yes	
Frequency Horizontal	NTSC: 15.734 KHz ; PAL: 15.625 Khz	
Frequency Vertical	NTSC: 59.94Hz ; PAL: 50Hz	
LED Angle	4 PCS 70° / 2PCS 50° total 6PCS LED	
Lens Mount Type	2.27mm F2.0,	2.13mm F2.0
DC power Source	DC9.6~12V	
Power Consumption	3W (Max IR ON)	
Current	250mA (max IR ON))	
Audio Out	700mV (10k OHM)	
Dimension	103.2(W) x 76.05(H) x 79.75(D)mm	
Operation Temperature	-20 to 70℃ (-4 to 158℉)	
Storage Temperature	-30 to 80℃ (-22 to 176℉)	

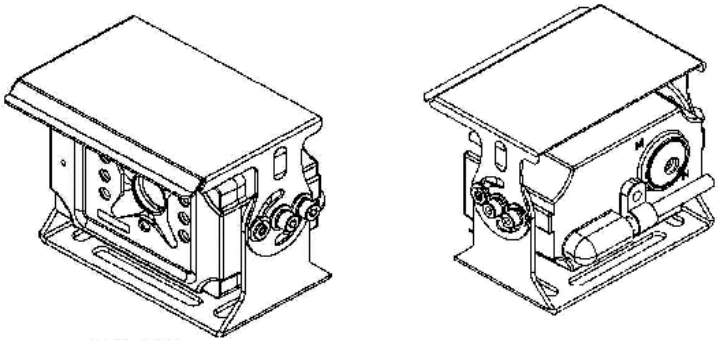
CAMERA-FOR DUAL VISION MONITOR (77734785)

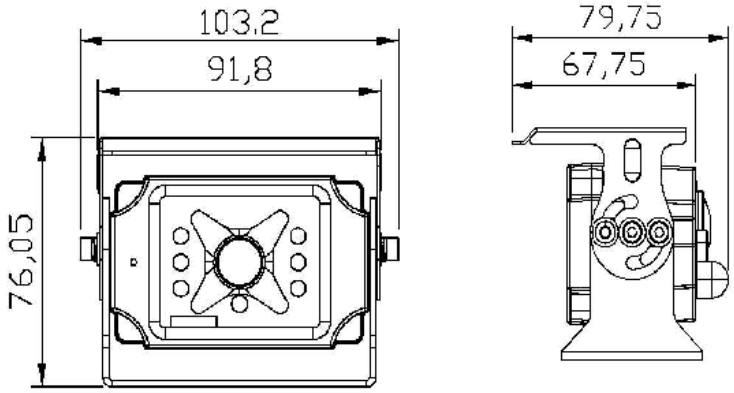
CABLE PIN FUNCITON



1	Video
2	N/A
3	Audio
4	Power
5	GND
6	N/A
7	N/A

Dimension





CABLE-COAX 65' FOR DUAL VISION MONITOR (77734786)

ADAPTER PROGRAM AND ACCESSORIES

"Plug 'N Play" has never been easier. Our custom built adapters fit all major competitor brands allowing you to effortlessly upgrade your current system to the industry leading 3rd Eye MobileVision™ brand.

*Please specify which camera system you are currently using when ordering

AWTCAGE
Heavy Duty Camera Cage

AWTMIRRMNT
Camera Mount for Side Mirrors

AWT-CabMnt
Camera Mount for Side of Cab (Must Specify Side)

AWT-AllyCamMnt
Camera Mount for the Tailgate of the Truck (Must Specify Side)

AWTSVLHD
Heavy Duty Swivel Mount

Standard Cable
AWT06ST - 6S ft.
AWT042T - 42 ft.
AWT025T - 25 ft.
AWT010T - 10 ft.

Extension Cable
AWT06STT - 6S ft.
AWT042TT - 42 ft.
AWT025TT - 25 ft.
AWT010TT - 10 ft.

AWT-WinMnt
Glass Mount for Slim Line Monitors (Removable)

BODY BUILDER CABLE

WHAT IS THE BODY BUILDER CABLE?

Body Builder Cable: The most advanced wiring and connector standard

At the request of several national refuse fleets, 3rd Eye MobileVision™ developed a "Pass-Thru" cable to act as the single "Communication Backbone" between the truck chassis and body for advanced video safety systems.

PURPOSE AND SCOPE

A single "Pass-Thru" cable terminated with heavy duty connectors would be the single "communications backbone" between the truck chassis and body.

The cable would support multiple electrical signals including analog video, audio and digital data. The cable is to be installed by the truck chassis OEM when an appropriate cable path is clearly visible.

The cab pre-wire cable is routed with the wiring loom of the truck cab when the truck chassis is manufactured.

The custom multi-conductor cable has 21 circuits that provide multiple functions including: DC low voltage power, ground video, audio, both analog and digital.

Non-proprietary connectors provide easy access and economical connectivity for advanced video, radar sensors and digital information technologies.

CAB ADAPTER #29086

EXT CABLE #29073

SENSORS INTERFACE

3RD EYE #AWT030TT CABLE

BB CAB PRE-WIRE CABLE

BB EXTENSION CABLE #29089

TAILGATE ADAPTER #29059

6 PIN Power Plug

Port "A" Camera In 6 Pin mini DIN
Port "B" Camera In 6 Pin mini DIN
Port "C" Camera In 6 Pin mini DIN
Port "R" Camera In 6 Pin mini DIN

Live Video Out (RCA - White Wire)
Live Audio Out (RCA - Black Wire)
A/V Video In (RCA - Yellow Wire)
A/V Audio In (RCA - Red Wire)
Camera Out (RCA - Green Wire)

CAMERA & A/V INTERFACE HARNESS

POWER & CONTROL CABLE HARNESS

Ignition Power (+9.6~32VDC - Red Wire)
Chassis Ground (GND - Black Wire)
Reverse Trigger (+9.6~32VDC - Blue Wire)
"A" Port Trigger (+9.6~32VDC - Yellow Wire)
"B" Port Trigger (+9.6~32VDC - Orange Wire)
"C" Port Trigger (GND - White Wire)

The Preferred mounting location for the AWT/3rd Eye monitor is overhead. Dual Steer trucks require the use of a swivel base. Camera and monitor controls are to be located for easy access within reasonable reach in all driving positions. If the truck cab has been pre-wired with the AWT Body-Builder Cable kit please contact AWT for in-depth documentation that will assist you.

NOTES

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

MANUAL CHANGE REQUEST

DATE	PRODUCT MANUAL	MANUAL PART NO.
SUBMITTED BY		
COMPANY		
ADDRESS		
CITY, STATE, ZIP		
TELEPHONE		

☐ ERROR FOUND

LOCATION OF ERROR (page no.): _____

DESCRIPTION OF ERROR: _____

☐ REQUEST FOR ADDITION TO MANUAL

DESCRIPTION OF ADDITION: _____

REASON FOR ADDITION: _____

MAIL TO: IOWA MOLD TOOLING Co., Inc.
Box 189,
Garner IA 50438-0189
ATTN: Technical Publications

IOWA MOLD TOOLING CO., INC.
BOX 189, GARNER, IA 50438-0189
TEL: 641-923-3711
TECHNICAL SUPPORT FAX: 641-923-2424