CUES

CPR Transporter

Compact Pipe Ranger

OPERATION & MAINTENANCE MANUAL

P/N WM920, Revision 1: 062320

**For use on CPR P/N WM360

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FYI

CUES® equipment is designed to be easy to use during day to day operation. However, it is powered electrically and thus must be operated with care and safety. PLEASE READ THE INFORMATION ON SAFETY AND MAINTENANCE EVEN IF THE SYSTEM IS SET UP BY SOMEONE ELSE.

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INTRODUCTION: CPR (COMPACT PIPE RANGER)

Multi-Conductor Wheeled Transporter

This manual includes setup, operation, troubleshooting, and maintenance instructions for the CUES Compact Pipe Ranger transporter. CUES uses proven video technology to provide a versatile tool to assist with sewer line inspections.

The instructions provided in this manual are for *multi-conductor* systems. First, determine if the existing system is multi-conductor or single conductor before proceeding. The multi-conductor cable is approximately ½" in diameter and contains 8 to 12 conductors depending on the age of the system. If uncertain about the type of system, please call CUES Customer Service Department at 1-800-327-7791.

If the transporter is being used with an existing TV system, modifications might need to be made to the end of the TV cable and/or the truck's electrical wiring, depending on the specific system. If you're uncertain about the modifications required for the system or need more information regarding a retrofit, please call our Customer Service Department at 1-800-327-7791.

The Compact Pipe Ranger (CPR) is designed to:

- Operate as one component of a multi-conductor inspection system.
- Inspect 6 inch diameter relined pipe and storm drains/wastewater pipelines up to 30 inches.
- Operate on a maximum 1200' of CUES multi conductor cable.
- Operate with your CUES OZIII and Nite Lite III cameras.
- Operate with multiple wheel sets to maximize bottom-clearance, traction, and optimum camera position.

In Q1 2016, CUES changed the Compact Pipe Ranger motors to utilize new technology to optimize field performance resulting in increased speed while maintaining the strongest torque in the industry for a compact transporter. Transporters with the new motor are labeled P/N WM360 and are covered by this manual. Legacy transporters are labeled WM350, and are covered by the WM901 manual. All CPRs can be upgraded to use the new motor technology, and beyond controller settings operation and compatibility are similar.

Compact Pipe Ranger Shown in the 10" Configuration

2 SYSTEM DESCRIPTION

The Compact Pipe Ranger (CPR) is a lightweight, compact, and rugged steerable CCTV camera transporter that is used to inspect sanitary and storm sewers. It is designed to traverse long distances and tough pipe conditions and to facilitate ease of handling during insertion and retrieval. The transporter can operate as part of any new or existing CUES multi-conductor system. All existing CUES systems can be retrofitted to operate the transporter.

The Compact Pipe Ranger (CPR) is designed to operate on a maximum 1200' of CUES multi-conductor TV cable to inspect 6" relined pipe through 30" diameter pipe. It's unique two-speed transmission doubles the torque of the unit to produce maximum pulling power in the larger diameter pipes. The Compact Pipe Ranger (CPR) includes full-proportional steering to traverse meandering pipe and 45 and 90 degree turns.

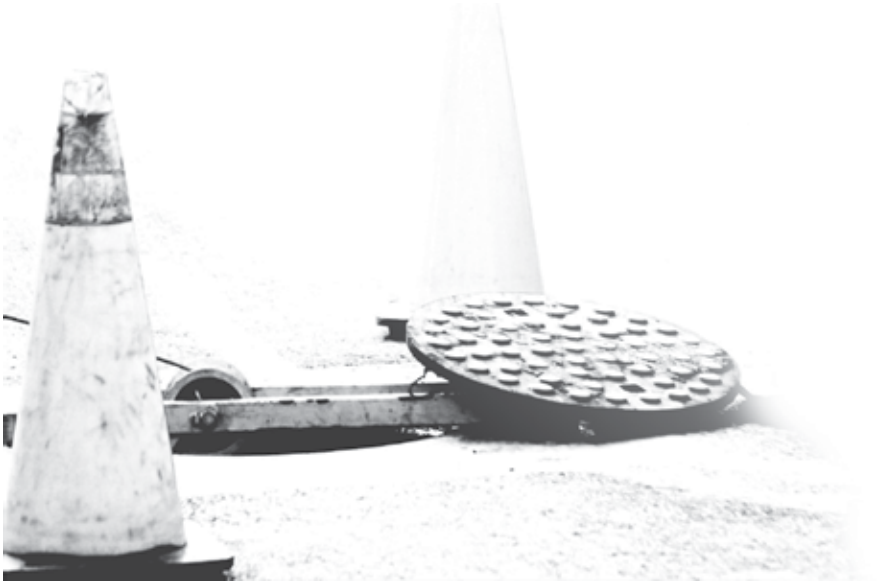
When assembled with the CUES OZIII zoom pan and tilt camera, the CPR has a length of only 19 1/2", enabling the unit to negotiate most difficult entry conditions and standard sweeps.

The superior pulling power of the CPR, combined with the optics and directional lighting of the compact OZ III zoom pan and tilt camera (with the ability to rotate in a 4" circle), creates video inspection quality that's unsurpassed in the industry.

Multiple wheel sets are available to maximize bottom-clearance, traction, and optimum camera position. Ease of operation is accomplished with one joystick control for all transporter and camera movements. A variable "cruise control" setting is also available for transporter speed for hands-off operation.

Compact Pipe Ranger in the 15" Configuration

Compact Pipe Ranger in the 6" Configuration



Compact Pipe Ranger (CPR)

Features/Benefits:

- Superior pulling power
- Operates with CUES multi conductor systems
- Operates with the CUES OZ III zoom pan and tilt camera
- Designed to traverse sanitary sewers, storm drains and pipe with debris and silt
- Freewheel, powered reverse, forward variable speed control
- Rugged, durable and sealed to eliminate water intrusion
- Locking bayonet-style rear bulkhead connector and camera locking latch secures the camera at two points, forward and aft
- Provides clearance in a 6” diameter relined pipe; can inspect up to 30” diameter pipe
- All-wheel drive is enclosed and sealed; all brass and stainless steel construction
- Use with your multi-conductor TV inspection vehicle to perform sewerline inspections
- Two-speed transmission doubles the torque and maximizes traction in larger diameter pipe or in tough conditions
- Can turn 360° within its own radius; pinpoint control maximizes the ability to traverse challenging pipe conditions
- The Flight Stick (Legacy) and gamepad (K2/K3) controllers control both transporter and camera movements, providing operational simplicity
- Multiple wheel sets to accommodate your needs; for small, intermediate, and large diameter pipes
- Optional high traction wheels available for slippery PVC pipe
- Wheels and spacers can be easily installed/removed with one screw
- Locking rear tip-up bulkhead connector minimizes strain on the cable connection during insertion and retrieval of the unit
- Transporter assembly is a compact length of 19.5” with the optical zoom pan and tilt camera installed
- Compact camera/transporter length with optical zoom pan & tilt camera (OZ III) facilitates entry into small inverts, small manholes, dead end lines, and traversal of sweeps
- Full proportional steering control to traverse meandering pipe with 45° and 90° turns; minimizes transporter turnover in small diameter pipe
- Transporter motors are equipped with self-resetting over-voltage protection designed to disengage the drive motors during over-voltage conditions.

3 EQUIPMENT OVERVIEW

The Compact Pipe Ranger consists of the following equipment:

A. Self-propelled camera carrier with all-wheel drive - The self-propelled camera carrier transports the pan and tilt camera through storm drains/wastewater pipelines during inspection. The carrier is equipped with all-wheel gear drive and has full, variable speed in power forward or power reverse modes.

B. The transporter utilizes six tires, six steel wheels, or four pneumatic wheel assemblies, depending on the transporter configuration for the pipe size to be inspected. The six tires/steel wheels are used in 6 - 15” pipe sizes. The pneumatic wheel assemblies are available to maximize traction in pipes ranging from 12” - 30” in diameter.

C. Two-speed transmission - The transporter includes a quick-changing two-speed transmission to double the torque and optimize traction in difficult pipe conditions or in larger diameter pipe. The protected manual shifter assembly on the transporter is used to facilitate quick gear ratio changes.
NOTE: The gears in the transmission were designed for maximum durability. For this reason, they do not have a synchronizing apparatus. Refer to the Compact Pipe Ranger Operations chapter for important gear change instructions.

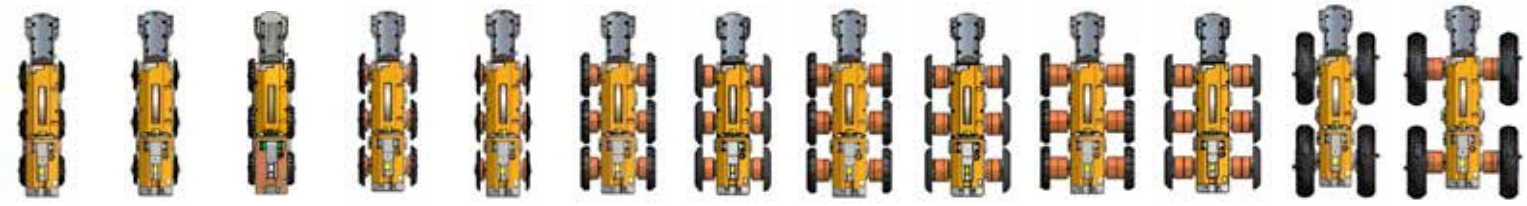
D. Electrical connection for a camera - An electrical connection for a camera, located in the transporter camera cradle, is provided with the transporter.

E. Transporter/Camera Controller - The hand-held controller is used to control the various movements of the transporter and camera. Refer to additional controller instructions in the Functional Checkout chapter.

Wheel Matrix for Compact Pipe Ranger (CPR)

Installation Configuration Matrix

Configuration	6" Relined	6" Relined	6" RUBBER	8" RUBBER	8" STEEL	10" RUBBER	10" STEEL	12" RUBBER	12" STEEL	15" RUBBER	15" STEEL	12" PNEU	15" PNEU
KIT Number	WM907	WM307-1	N/A	WM308	WS906	WM310	WM310-2	WM310	WM310-2	WM310	WM310-2	WM312	WM312
HUB, Inner	none	None	none	WM089 (6 ea.)	None	WM089 (6 ea.)	none	WM089 (6 ea.)	none	WM089 (6 ea.)	none	WM100 (4 ea.)	WM100 (4 ea.)
HUB, Outer	none	None	none	WM090 (6 ea.)	None	WM091 (6 ea.)	none	WM091 (6 ea.)	none	WM091 (6 ea.)	none	none	none
WHEEL/TIRE	WM097 (6 ea.)	WM096-1 (6 ea.)	WM209 (6 ea.)	WM092 (6 ea.)	WS112-1 (6 ea.)	WM093 (6 ea.)	WM108-1 (6 ea.)	WM093 (6 ea.)	WM108-1 (6 ea.)	WM093 (6 ea.)	WM108-1 (6 ea.)	WT331 (4 ea.)	WT331 (4 ea.)
SPACERS (NOT IN KITS) REQUIRED FOR PIPE SIZE CONFIG.	none	none	none	WM058 (6 ea.)	WM058 (6 ea.)	WM061 (6 ea.)	WM061 (6 ea.)	WM058 (6 ea.) WM061 (6 ea.)	WM058 (6 ea.) WM061 (6 ea.)	WM061 (12 ea.)	WM061 (12 ea.)	none	WM058 (4 ea.) WM061 (4 ea.)
HUB SCREWS	none	none	none	103052 (18 ea.)	None	102001 (18 ea.)	none	102001 (18 ea.)	none	102001 (18 ea.)	none	none	none
CAPTIVE SCREW	WM098-1 (6 ea.)	WM098-1 (6 ea.)	WM098-1 (6 ea.)	WM099-1 (6 ea.)	HW2819 (6 ea.)	none	none	none	none	none	none	none	none
ATTACHMENT SCREW	none	none	none	none	none	HW1567 (6 ea.) 1.5" length	HW1567 (6 ea.) 1.5" length	HW1568 (6 ea.) 2.0" length	HW1568 (6 ea.) 2.0" length	HW1569 (6 ea.) 2.5" length	HW1569 (6 ea.) 2.5" length	HW1568 (4 ea.) 2.0" length	HW1570 (4 ea.) 3.5" length



NOTE: 1.1Spacer kits (WM317 or WM317-1) are required and include all spacers and screws for 8"-15" configurations.
1.2 When setting up for relined pipe select configuration for next smallest pipe and add 6x WM223 wheel spacers (included in WM317).

TITLE:	INSTR. SHT, WHEEL MATRIX FOR COMPACT PIPE RANGER	DFTSMN:		DATE:	
DWG. NO.:	WM902-INST	CHKR:		DATE:	
ECN:	14356	ENGR:	PS	DATE:	06/11/20
REV.:	F	MFG:		DATE:	
MATERIAL:	NONE	MAT'L:		DATE:	
FINISH:	NONE				
PRODUCT:	CPR				
NEXT ASSY / USED ON:	WM360 AND WM360-1				

Kit Inventory Checklist

Kit No.	*Qty.*	*Part Number*	*Nomenclature*
WM307-1	6 ea.	WM096-1	Wheel, Steel, 6" Relined Pipe
(6" relined pipe)	* (included)	WM098-1	Screw, Captive, Hex Head, 5/16-24UNF x 0.625
WM308	6 ea.	WM089	Hub, Inner, 8-15"
(8" pipe)	6 ea.	WM090	Hub. Outer, 8"
	6 ea.	WM092	Tire, Rubber, 8" Pipe
	18 ea.	103052	Screw, Flat, Phillips, 10-32UNF x 1/2
	6 ea.	WM099-1	Screw, Captive, Hex, 5/16-24UNF x 1.000
WS906	6 ea.	WS112-1	Wheel, Steel, 8" Pipe
(8" pipe)	* (included)	HW2819	Screw, Captive, Hex, 5/16-24UNF x 1.0, 17-4 PH
WM310	6 ea.	WM089	Hub, Inner, 8-15"
(10-15" pipe)	6 ea.	WM091	Hub, Outer, 10-15"
	6 ea.	WM093	Tire, Rubber, 10-15" Pipe
	18 ea.	102001	Screw, SHCS, 10-32UNF x 1/2
WM310-2	6 ea.	WM108-1	Wheel, Steel, 10-15" Pipe
(10-15" pipe)	.		
WM312	4 ea.	WM100	Adapter, Hub, Pneu. Wheels
(pneu. 12-15" pipe)	4 ea.	WT331	Pneumatic Wheel Assy

Kit No.	*Qty.*	*Part Number*	*Nomenclature*
WM907	6 ea	WM097	Wheel, Rubber, 6" Relined Pipe
(6" relined pipe)	* (included)	WM098-1	Screw, Captive, Hex Head, 5/16-24UNF x 0.625

*Note: Captive Screw is contained within wheel

BRASS AND ALUMINUM 6"-15" PIPE SPACER KITS

WM317 (BRASS)	6 ea.	WM058	Spacer, .5",Quick Change,CPR,Brass
(6"-15" pipe)	12 ea.	WM061	Spacer,1", Quick Change,CPR,Brass
	6 ea.	WM223	Spacer,.25,Quick Change,CPR/LAMPII
	12 ea.	HW1567	Screw,SHCS,5/16-24UNF X 1.50,SS
	12 ea.	HW1568	Screw,SHCS,5/16-24UNF X 2.00,SS
	12 ea.	HW1569	Screw,SHCS,5/16-24UNF X 2.50,SS
	8 ea.	HW1570	Screw,SHCS,5/16-24UNF X 3.50,SS

WM317-1 (ALUM)	6 ea.	WM058-1	Spacer, .5",Quick Change,CPR,Alum
(6"-15" pipe)	12 ea.	WM061-1	Spacer,1", Quick Change,CPR,Alum
	6 ea.	WM223	Spacer,.25,Quick Change,CPR/LAMPII
	12 ea.	HW1567	Screw,SHCS,5/16-24UNF X 1.50,SS
	12 ea.	HW1568	Screw,SHCS,5/16-24UNF X 2.00,SS
	12 ea.	HW1569	Screw,SHCS,5/16-24UNF X 2.50,SS
	8 ea.	HW1570	Screw,SHCS,5/16-24UNF X 3.50,SS

CPR CAMERA, TRANSPORTER AND WHEEL KIT WEIGHT	
Transporter Assembly	
WM360 – Mini Transporter Assy. w/6" Rubber Wheels	37.1 lb.
Transporter Assembly individual parts	
WM097 – 6" Rubber Wheel and Captive Screw (6 Count)	1.8 lb.
WM071 – Housing, Brass	11.6 lb.
WM071-1 – Housing, Aluminum	3.8 lb.
WM088 – Saddle, Camera, Brass	4.4 lb.
WM088 -1 – Saddle, Camera, Aluminum	N/A
WM008 –1 Clamp, Camera, Brass	3.5 lb.
WM008 – Clamp, Camera, Aluminum	N/A
Camera Assembly	
MZ330 – Camera Assembly	10.0 lb.
Complete Transporter and Camera Assembly	
WM360 – Mini Transporter Assy. w/6" Rubber Wheels	37.1 lb.
MZ330 – Camera Assembly	10.0 lb.
Total	47.1lb.
Wheel Kits by Individual Part Number	
WM307 - KIT, WHEEL, STEEL, 6" PIPE	2.3 lb.
WM308 - KIT, WHEEL, RUBBER & STEEL, 8" PIPE	
WM310 - KIT, WHEEL, RUBBER & STEEL, 10-15" Pipe	
WM312 - KIT, TIRE, 200MM X 50MM, 12"+, PNEU	28.4 lb.
WM315 - KIT, COMP WHEEL SET, Q/C, 6-15", CPR	52.0 lb.
WM904 - Manual Camera Lift	11.05 lb.

3 EQUIPMENT OVERVIEW CONTINUED

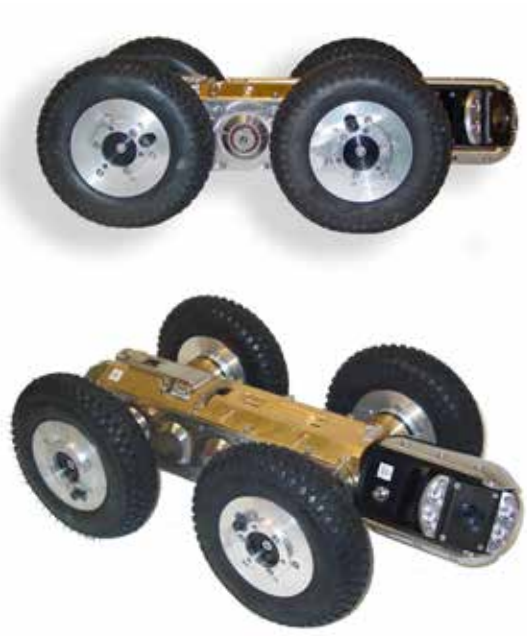
*NOTE: Additional configurations are available.

Compact Pipe Ranger (CPR)
6” Rubber Configuration

Compact Pipe Ranger (CPR)
10” Rubber Configuration

Compact Pipe Ranger (CPR)
6” Steel Configuration

Compact Pipe Ranger (CPR)
15” Pneumatic Configuration



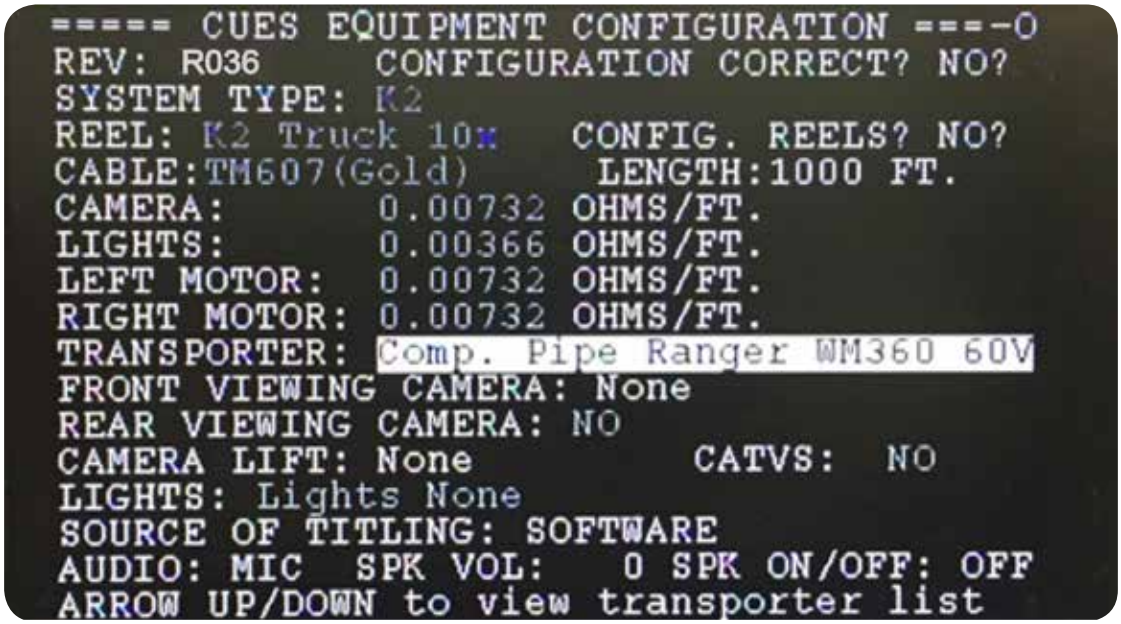
ELECTRICAL AND PHYSICAL CONNECTIONS

If the CPR is installed on an existing TV system, modifications may need to be made to the truck equipment layout and electrical wiring, depending on the specific system. If you're uncertain about the modifications that are required for the system or need more information regarding a retrofit, please contact CUES Customer Service Department at 1-800-327-7791.

CONTROLLER SETUP

Prior to connecting the Compact Pipe Ranger to the 12-pin TV cable, ensure that the controller is set up to power the CPR properly by doing the following:

K2/K3: Select "Comp. Pipe Ranger WM360 60V" as the TRANSPORTER type in the Equipment Configuration screen. NOTE: power is applied to the system when this screen is exited.



Legacy Controller (P/N TM370): Power the system ON and verify that the Calibrate LED on the front panel is periodically flashing two times to indicate `60V CPR' mode. If it's not, power the system back OFF. Then, to switch modes, power the system ON while holding down the Calibrate switch and release the Calibrate switch after the LED turns off. After verifying the Calibrate LED is now periodically flashing two times, power the system OFF again.

4 SYSTEM SET-UP & INSTALLATION

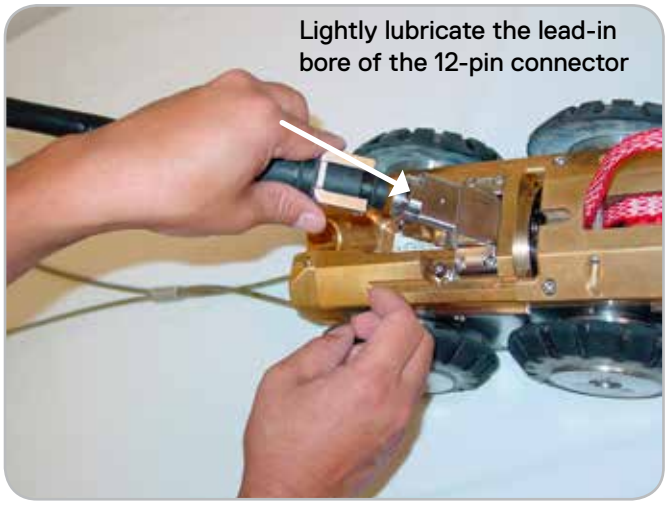
ELECTRICAL AND PHYSICAL CONNECTIONS - CONTINUED

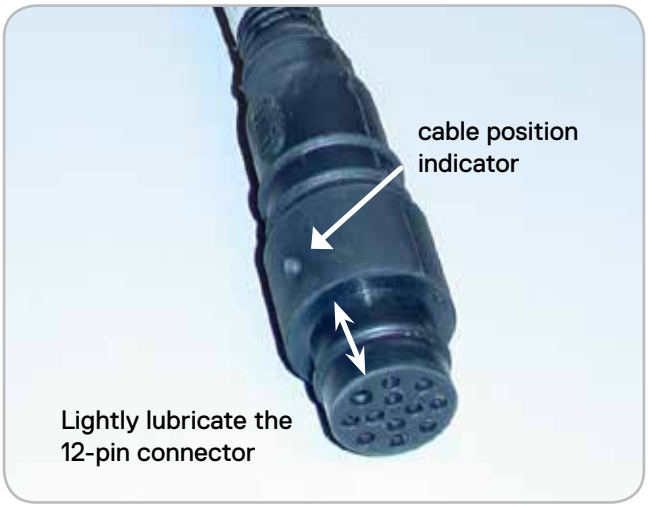
CONNECTING THE SYSTEM (MULTI-CONDUCTOR CPR)

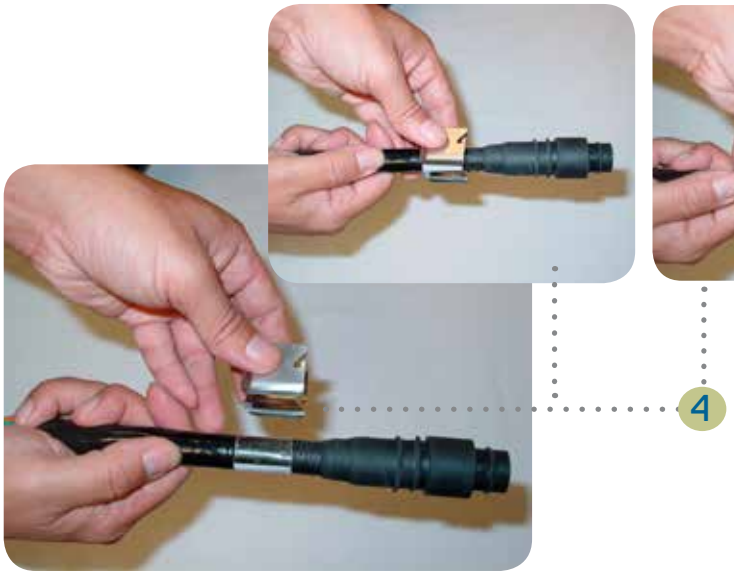
To connect the 12-pin female TV cable to the 12-pin male connector located at the rear of the transporter, perform the following:

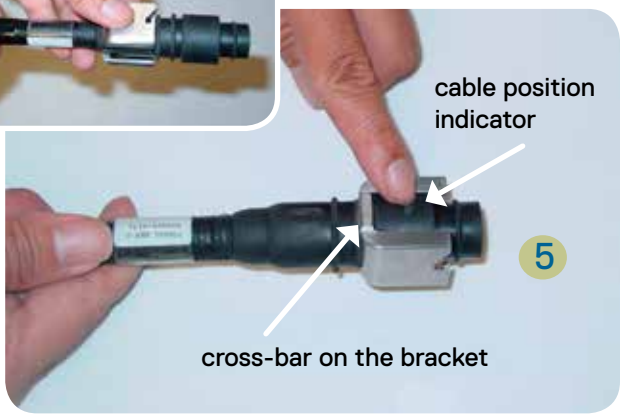
1. Ensure that all of the equipment is OFF (0) before making any of the necessary connections involving the Compact Pipe Ranger transporter.
2. Depending on the specific TV system, the Compact Pipe Ranger controller should already be connected. For K2/K3 systems the wired or wireless gamepad should be plugged into a USB port. For legacy systems the Flight Stick should be plugged into the 15pin connector on the front of the controller.
3. Lightly lubricate the lead-in bore of the 12-pin TV connector and mating pigtail with a non-conductive lubricant (CUES P/N 940700) prior to connecting to the transporter. NOTE: Do not over-lubricate! Reapply on a regular basis to prevent cable damage and easier insertion.
4. Place the 12-pin locking/retaining bracket over the 12-pin TV cable as shown.
5. Ensure that the cable position indicator on the top of the cable is located on the same side as the crossbar on the bracket.
6. Align the 12-pin cable position indicator with the top of the transporter 12-pin connector (12 o'clock position).
7. Push the 12-pin TV cable connector into the transporter 12-pin connector. Align the slots on the locking/retaining bracket with the two external side pins on the transporter connector. Push and twist the locking/retaining bracket until it locks into position (*do not twist the 12-pin TV cable connector when it's plugged into the 12-pin transporter connector*).
8. A strain relief with quick link is fixed on the TV cable near the connector (not shown). Loosen the four cap screws and move the ring so that the tow cables on the back of the transporter can be connected to it. Now slide the ring a little closer to the transporter so that the TV cable has two or three inches of slack between the ring and the transporter when the tow cables are taut. Fix the strain relief ring in place by tightening down the four
   Allen screws. The Compact Pipe Ranger and multiconductor camera are now ready for use.
9. Physically attach the tow cables with quick link (not shown).
10. Turn the controller power switch ON. NOTE: Perform the functional check out in the next chapter before placing the transporter in the pipe!

3 CPR lubrication maintenance to be performed prior to each use.









Align the side pins and slots on the bracket.

Push and twist until locked into place.

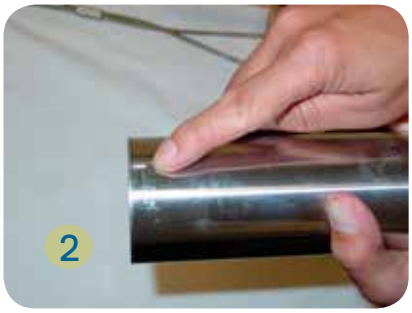
7

4 SYSTEM SET-UP & INSTALLATION

USING AN OZIII CAMERA WITH THE CPR

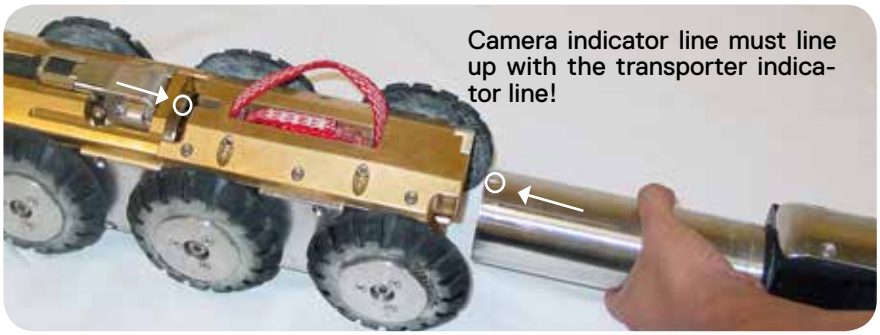
CUES OZIII Optical Zoom Pan & Tilt Camera is 'plug and go' and can be easily installed on the CPR. To connect the OZIII to the CPR, perform the following:

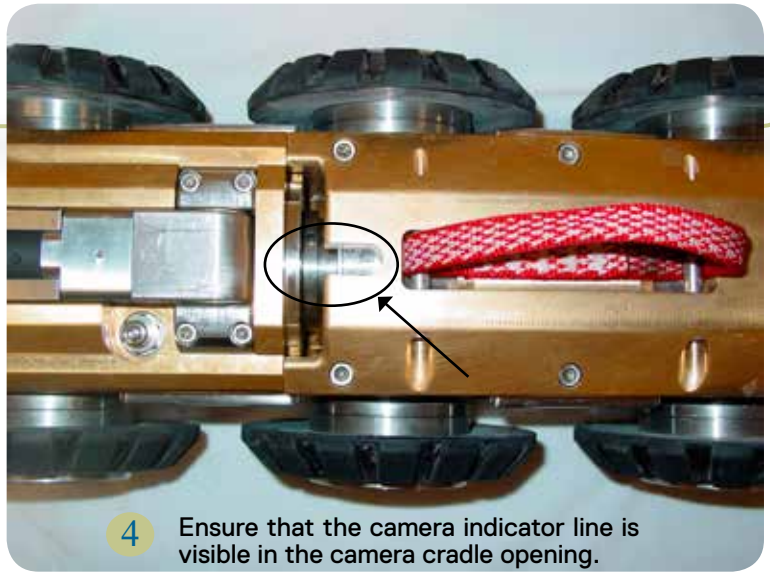
1. Ensure that all of the equipment is OFF (0) before making any of the necessary connections involving the Compact Pipe Ranger or OZIII camera.
2. Locate the indicator line on the top of the camera tube.
3. With the camera indicator line facing upwards, insert the camera into the transporter camera cradle while depressing the camera locking latch. Ensure that the camera indicator line is aligned with the indicator line (located on top of the bulkhead plate).
4. Ensure that the camera and transporter indicator lines are visible in the opening at the top of the camera cradle.


2


Camera indicator line must face upwards!

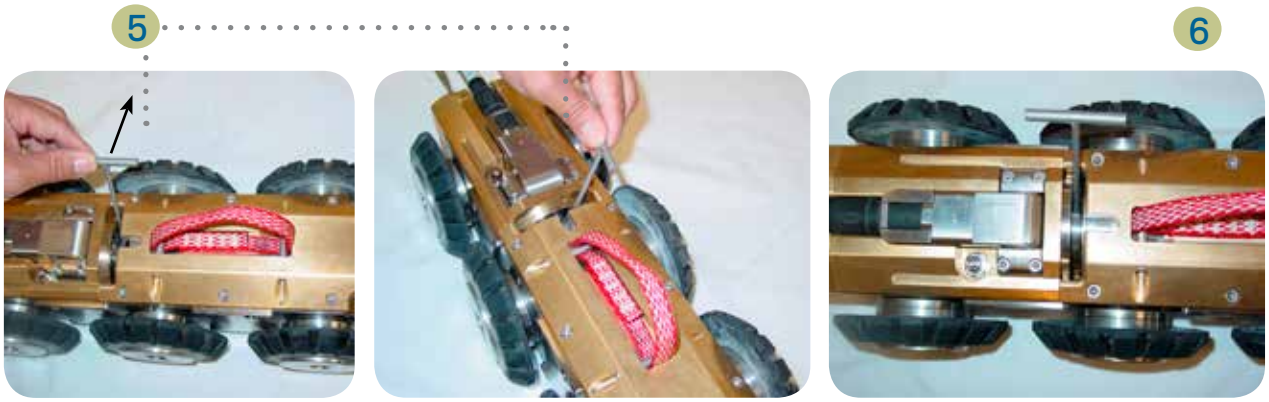
3


Camera indicator line must line up with the transporter indicator line!

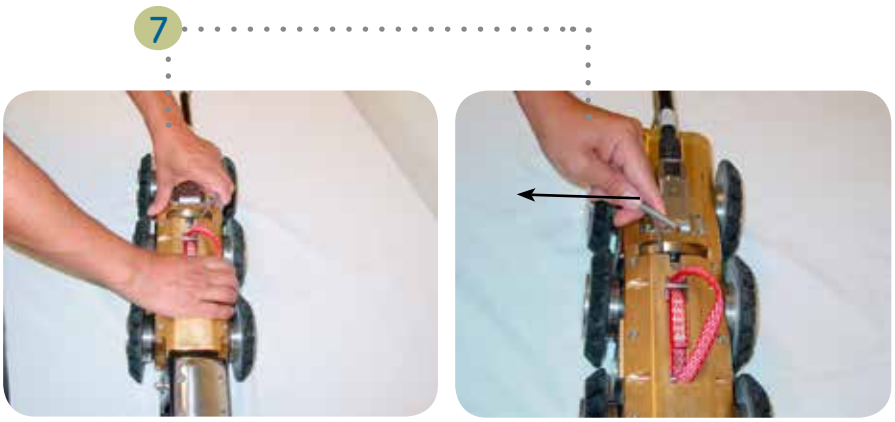

4 Ensure that the camera indicator line is visible in the camera cradle opening.

5. Using the camera connector tool, P/N HW1886, move the transporter locking connector ring to the right.

6. Ensure that the camera is secured to the transporter connector and the forward camera locking latch is engaged with the camera bulkhead.



7. Using the camera connector tool, P/N HW1886, move the locking ring to the left to lock the camera into place. When finished, remove the Camera Connector Tool from the unit.



4 SYSTEM SET-UP & INSTALLATION

ADAPTING THE COMPACT PIPE RANGER TO DIFFERENT PIPE CONFIGURATIONS

IMPORTANT!

When changing wheels, always apply anti-seize compound, P/N CS407, to all screw threads! Torque wheels to 15 ft lbs.

The adaptation of the transporter to different pipe sizes is accomplished by changing the tires. The CPR incorporates the new ***quick-change*** wheel assemblies that are designed for maximum efficiency and ease-of-use.

To Remove the Tires:

1. For 6” - 8” rubber & steel wheel assemblies, loosen the large center captive screw using a wrench. For 10” and larger wheel assemblies, loosen and remove the large center screw using an Allen wrench.
2. Separate the wheel assembly and spacer, if applicable, from the shaft.

To Mount the Tires:

3. Select the appropriate tire, spacer, and screw, if applicable, for the pipe size to be inspected. If necessary, refer to the wheel matrix shown in the previous chapter.
4. a. For 8” and larger pipe configurations, install the spacer, ensuring that the tri-lobe pocket on the spacer is aligned with the tri-lobe on the shaft. For 8” and larger configurations, the wheel assembly tri-lobe pocket needs to align with the raised tri-lobe on the spacer.
   b. For 6” configurations, align the wheel assembly tri-lobe pocket with the tri-lobe on the shaft.
5. Hold the wheel and spacer against the CPR shaft and secure the appropriate screw using an Allen wrench.

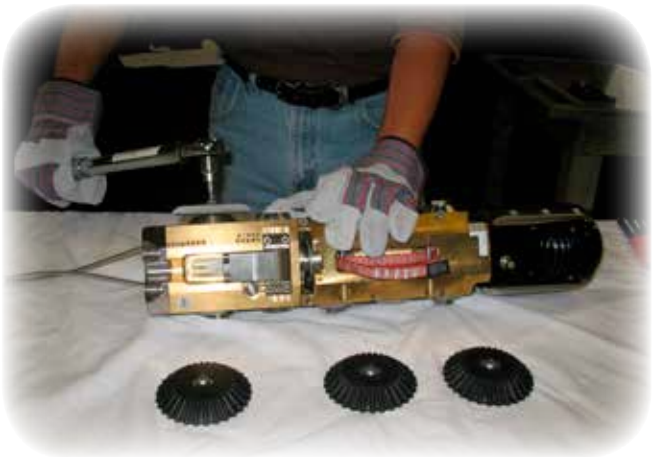
6” Rubber (standard)

8” Steel

IMPORTANT!

When changing wheels, always apply anti-seize compound, P/N CS407, to all screw threads! Torque wheels to 15 ft lbs.

Pictures for the quick-change 6” rubber and steel wheel assemblies:



4 SYSTEM SET-UP & INSTALLATION

ADAPTING THE COMPACT PIPE RANGER TO DIFFERENT PIPE CONFIGURATIONS

IMPORTANT!

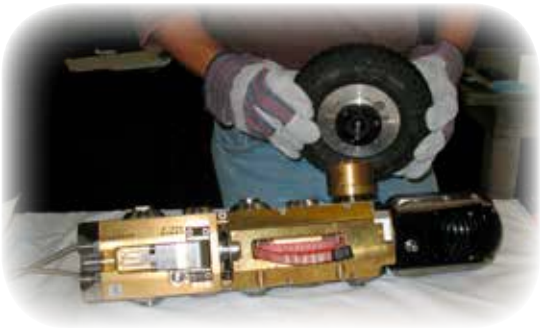
When changing wheels, always apply anti-seize compound, P/N CS407, to all screw threads! Torque wheels to 15 ft lbs.

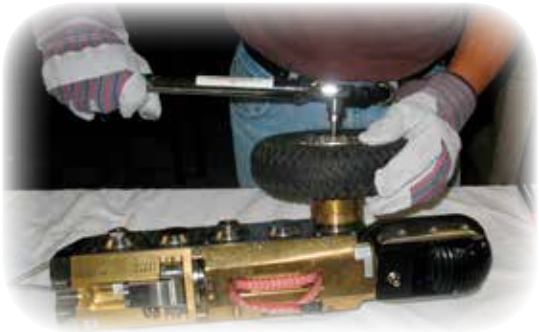
Pictures for the 10" rubber wheel assemblies...note the insertion of the applicable spacer and screw prior to securing to the CPR body:

IMPORTANT!

When changing wheels, always apply anti-seize compound, P/N CS407, to all screw threads! Torque wheels to 15 ft lbs.

Pictures for the 15" pneumatic wheel assemblies...note the insertion of the applicable spacers (2) and screw prior to securing to the CPR body:



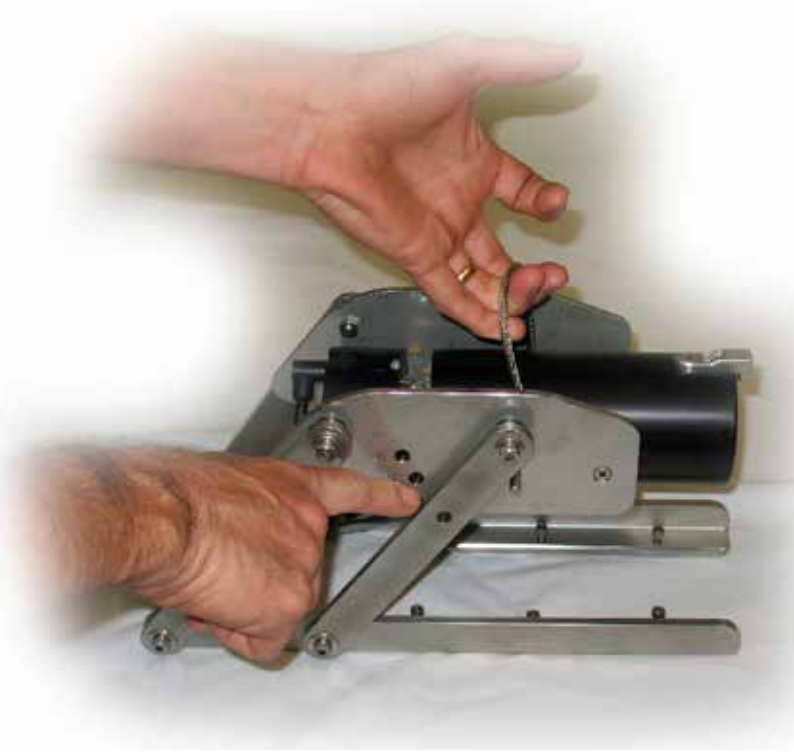


4 SYSTEM SET-UP & INSTALLATION

INSTALLING THE MANUAL CAMERA LIFT

CPR Manual Lift as received.

1. Pull the pipe adjustment pins that are located on both sides of the lift.



2. Locate the 24” hole and align the arm hole with the plate hole. Insert the alignment pins.

How the lift assembly should look prior to installing on the CPR.

NOTE: Remove the camera, if installed. Configure and install the CPR tires per the instruction in WM904-INST. Depending on your specific wheel configuration, the middle wheels and/or spacers may need to be removed/ reconfigured for proper wheel clearance.

3. Loosen the 6 screws located on top of the clam shell. Remove the clam shell.

4 SYSTEM SET-UP & INSTALLATION

INSTALLING THE MANUAL CAMERA LIFT

IMPORTANT!
Prior to installation, apply anti-sieze grease, P/N CS407, to the captive screw threads on the lift.

4. Place the manual lift on top of the unit and align the 6 captive screws with the 6 holes that are located on the CPR body.

5. Starting with the middle screw on each side of the unit, loosely secure by starting and rotating only 2 - 3 revolutions at a time.

   Secure all remaining screws in sequential order, 2-3 revolutions at a time, until all screws are tight.

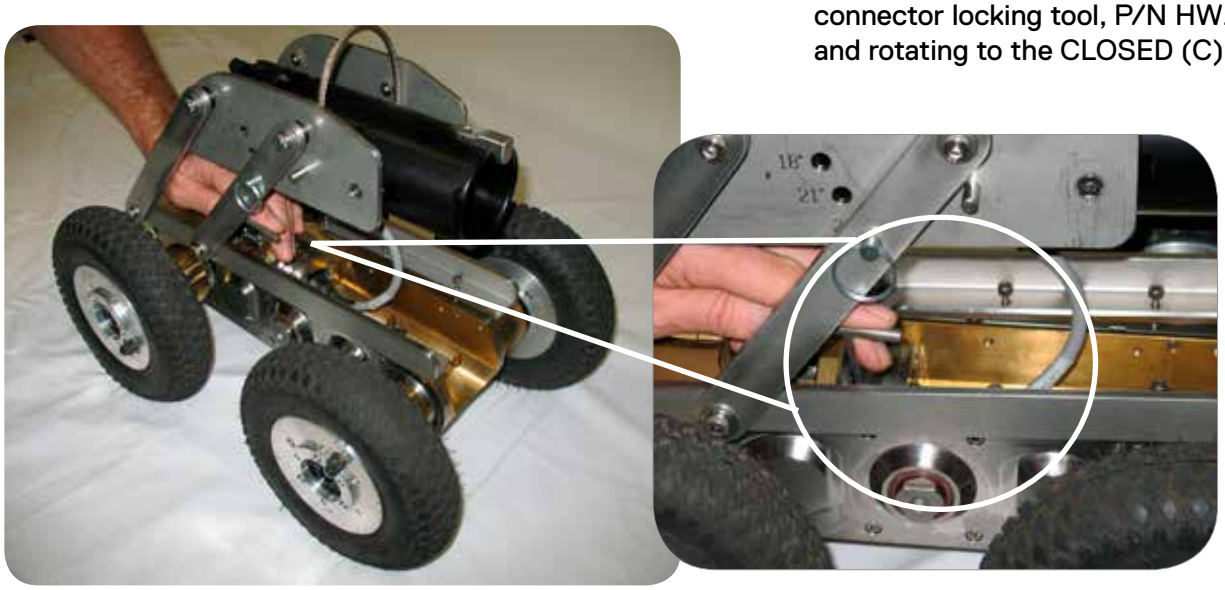
IMPORTANT!
Locate the 'C' and 'O' that's located on the stainless steel plate (near the connector) inside the cradle. Verify that the twist-lock mechanism is in the OPEN (O) position.

6. Locate the scribe mark on the cable connector and rotate in the UP position.

7. Carefully insert the lift connector into the CPR mating connector as shown.

Locate the 'C' and 'O' that's located on the stainless steel plate (near the connector) inside the cradle.

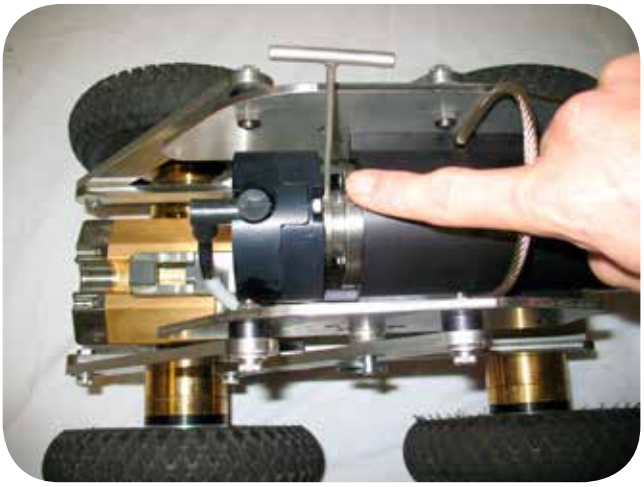
8. Secure the connector by installing the connector locking tool, P/N HW1886, and rotating to the CLOSED (C) position.



9. Using an Allen Wrench, remove the camera retainer from the camera adapter tube that's located on the lift.

4 SYSTEM SET-UP & INSTALLATION

INSTALLING THE MANUAL CAMERA LIFT



Locate the 'C' and 'O' that's located on the adapter tube.

10. Verify that the twist-lock connector is in the OPEN (O) position.

11. Locate the alignment mark on the OZIII camera and align in the UP position.

12. Carefully slide the OZIII camera into the tube assembly and ensure that the marks are aligned.

Locate the 'C' and 'O' that's located on the adapter tube.

13. Move the connector locking tool, P/N HW1886, to the CLOSED (C) postion.

14. Install the camera retainer and secure the screws.

4 SYSTEM SET-UP & INSTALLATION

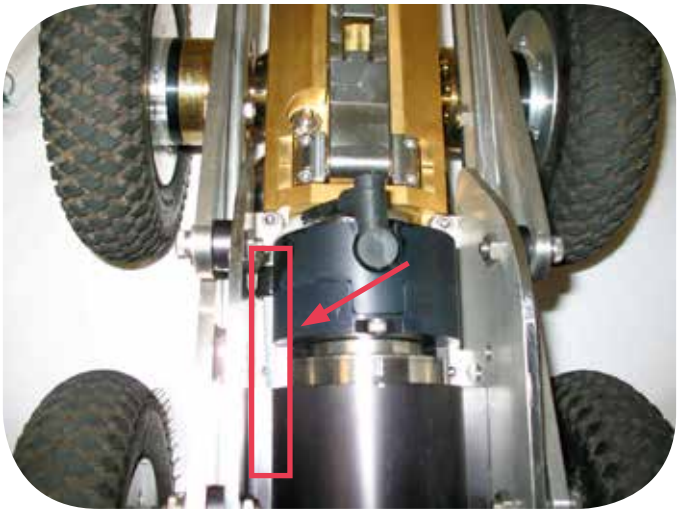
INSTALLING THE MANUAL CAMERA LIFT

15. Pull out the alignment pins and move the unit all the way to the lowest position and ensure that the cables are not pinched or that any rubbing or interference occurs.

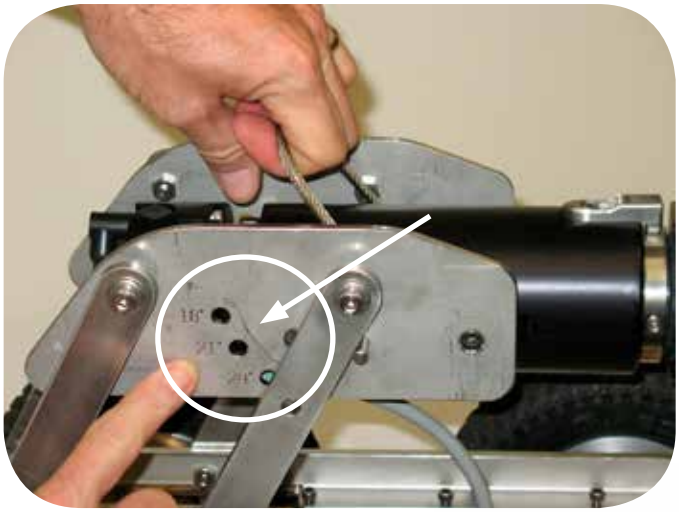
IMPORTANT! In the lowest position, verify free cable movement between the plate and the mounting rails. Adjust the cable routing, if necessary.

The following pictures represent proper cable routing.

Lift / CPR interface cable routing.

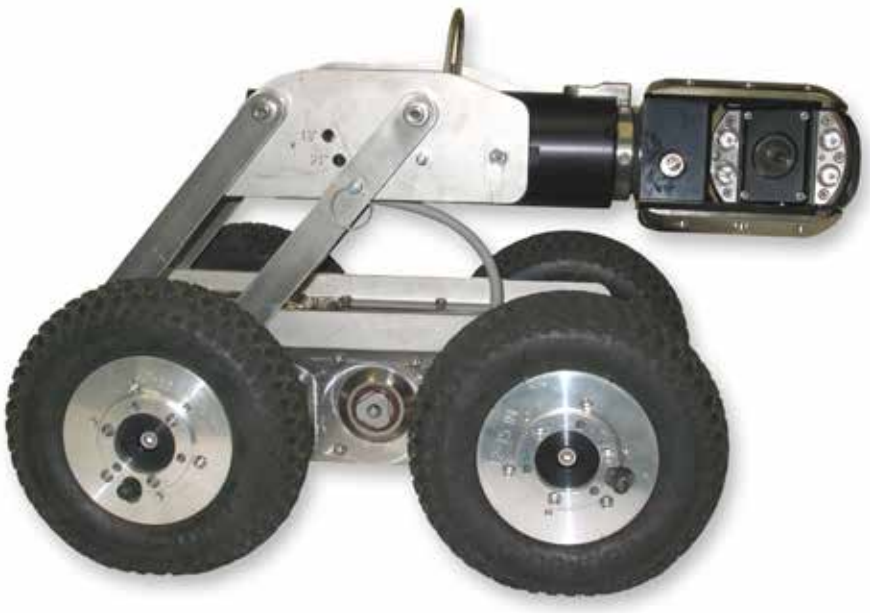


Top-view cable clamp.



16. Move the lift to the applicable pipe size and insert alignment pins to secure.

NOTE:
The approximate centerline positions are achieved only when the lift installation is accompanied with the appropriate wheel spacer (WM061) configuration.



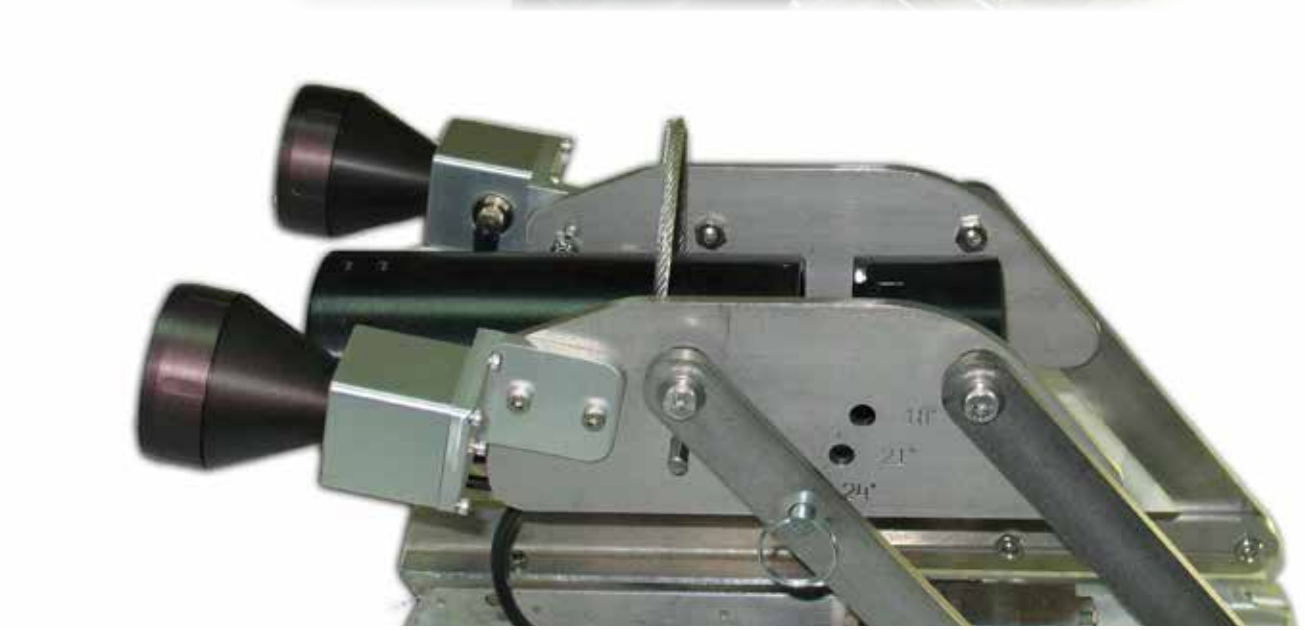
4 SYSTEM SET-UP & INSTALLATION

INSTALLING THE EXTERNAL LIGHTS TO THE MANUAL CAMERA LIFT

To install the external lights to the manual camera lift, perform the following:

1. Using an Allen Wrench and standard wrench, attach the lighthead mounting bracket to the manual lift side plate as shown. Repeat this on both sides for each lighthead.

Refer to WM910-INST for additional instructions or the BOM and exploded view drawing at the back of this manual.



Lights shown in the 15 degree position

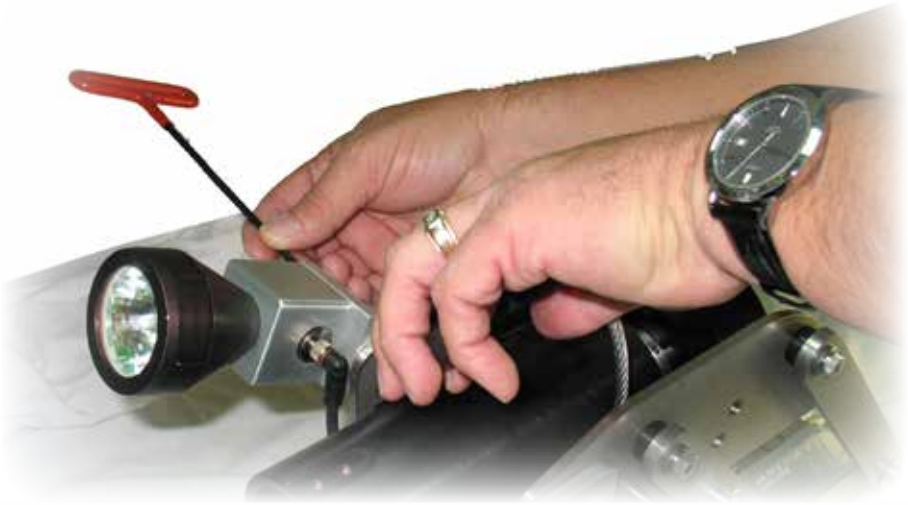
To adjust the external light position on the manual camera lift, perform the following:

The external lights can be placed in one of three different positions: straight forward, 15 degrees upwards, and 30 degrees upwards.

1. Using an Allen Wrench and standard wrench, loosen the nut and screw on each side of the external light mounting brackets.

2. Adjust the lighthead to the desired position, straight forward, 15 degrees upwards, and 30 degrees upwards.

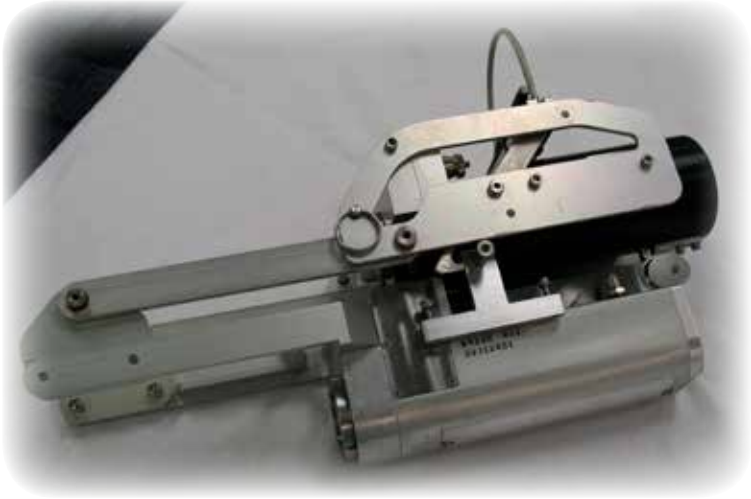
3. Once in position, secure the nut and screw with the Allen wrench and standard wrench.



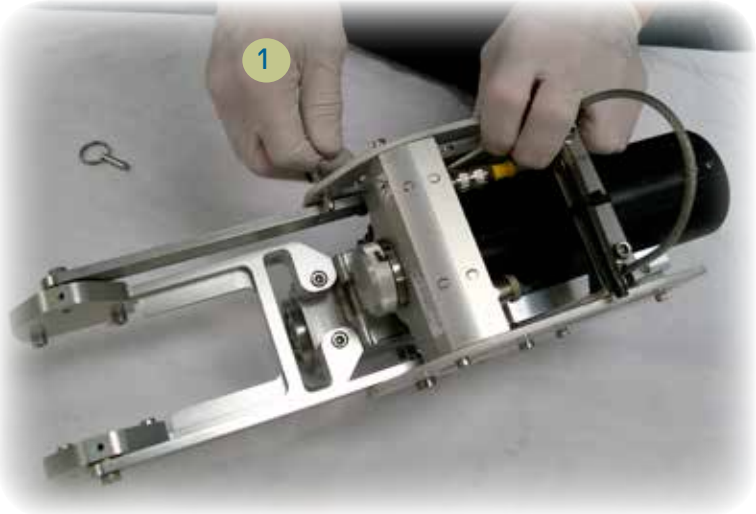
Lights shown in the 30 degree position

4 SYSTEM SET-UP & INSTALLATION

INSTALLING THE POWER CAMERA LIFT



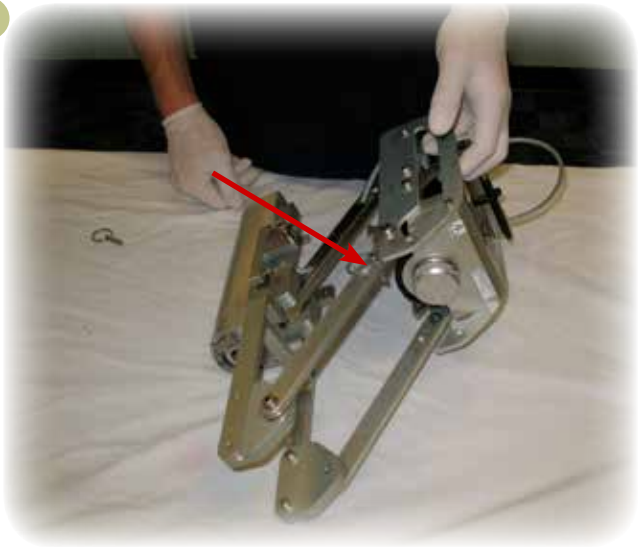
CPR Power Lift as received.



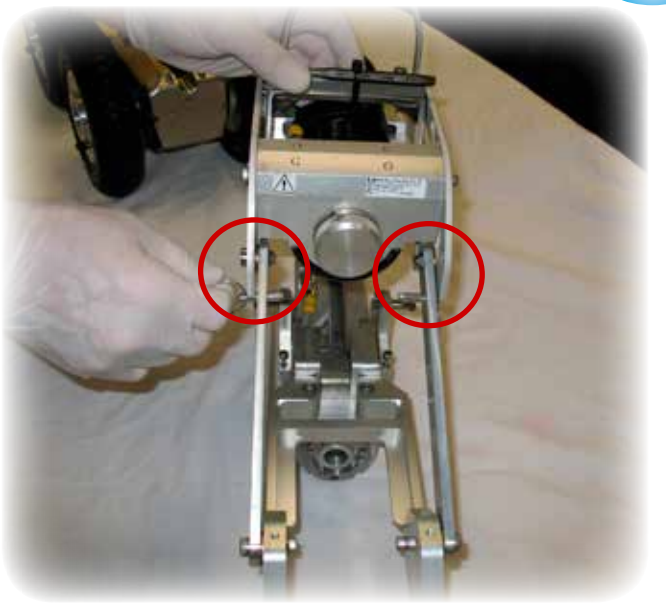
1. Pull the quick release pins that are located on both sides of the lift.

2. Insert the quick release pins into the lock holes located on the rear arms as shown to lock the lift in the elevated position.

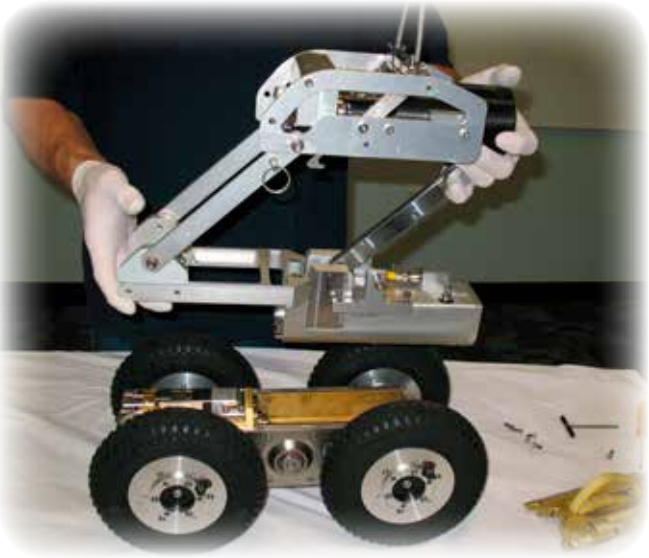
2



Quick release pins in the lock holes on both rear arms:



How the lift assembly should look prior to installing on the CPR (see note below).



NOTE: Remove the camera, if installed. Configure and install the CPR tires per the instruction in WM904-INST. Depending on your specific wheel configuration, the middle wheels and/or spacers may need to be removed/ reconfigured for proper wheel clearance.

3. Loosen the 4 screws located on top of the clam shell. Remove the clam shell.

4 SYSTEM SET-UP & INSTALLATION

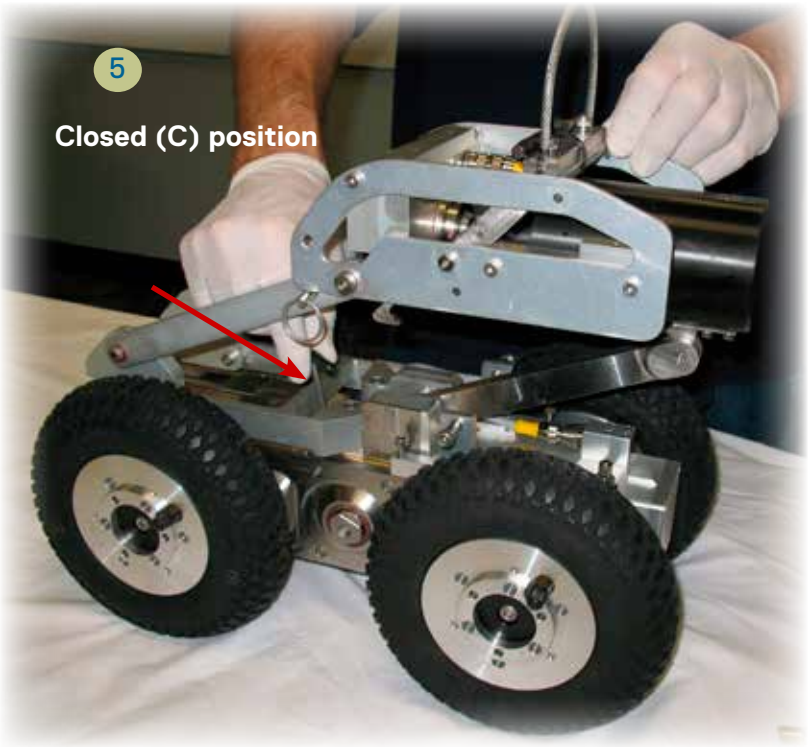
INSTALLING THE POWER CAMERA LIFT

IMPORTANT!
Prior to installation, apply anti-sieze grease, P/N CS407, to the captive screw threads on the lift.

4. Place the power lift on top of the unit and align the 4 captive screws (two on each side, both sides, CUES P/N HW134) with the 4 holes that are located on the CPR body.

IMPORTANT!
Locate the 'C' and 'O' that's located on the stainless steel plate (near the connector) inside the cradle. Verify that the twist-lock mechanism is in the OPEN (O) position.

5. Secure the connector by installing the connector locking tool, P/N HW1886, and rotating to the CLOSED (C) position.



Secure the power lift assembly to the CPR transporter:

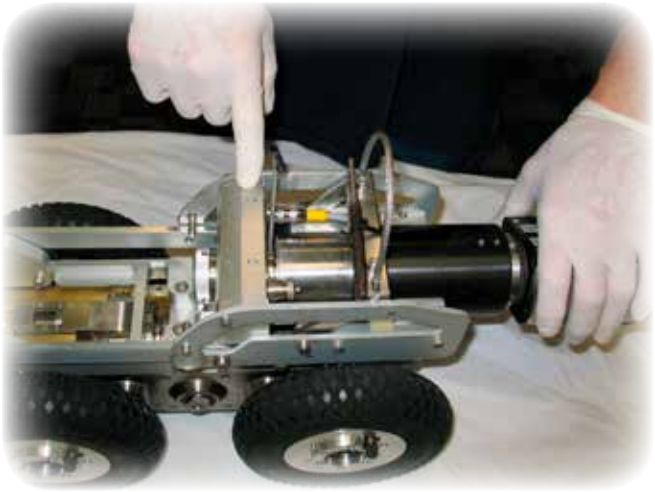
6. Secure the (4) screws in sequential order, 2-3 revolutions at a time, until all screws are tight.

Place the lift in the lowered position:

7. Do the reverse procedures in step #1 and #2 (remove the *quick release pins from the lock holes located on the rear arms*).

INSTALLING THE POWER CAMERA LIFT

1. Using an Allen Wrench, remove the camera retainer from the camera adapter tube that's located on the lift.



Locate the 'C' and 'O' that's located on the power lift bulkhead.

2. Verify that the twist-lock connector is in the OPEN (O) position.

3. Locate the alignment mark on the OZIII camera and align in the UP position.

4. Carefully slide the OZIII camera into the tube assembly and ensure that the marks are aligned.

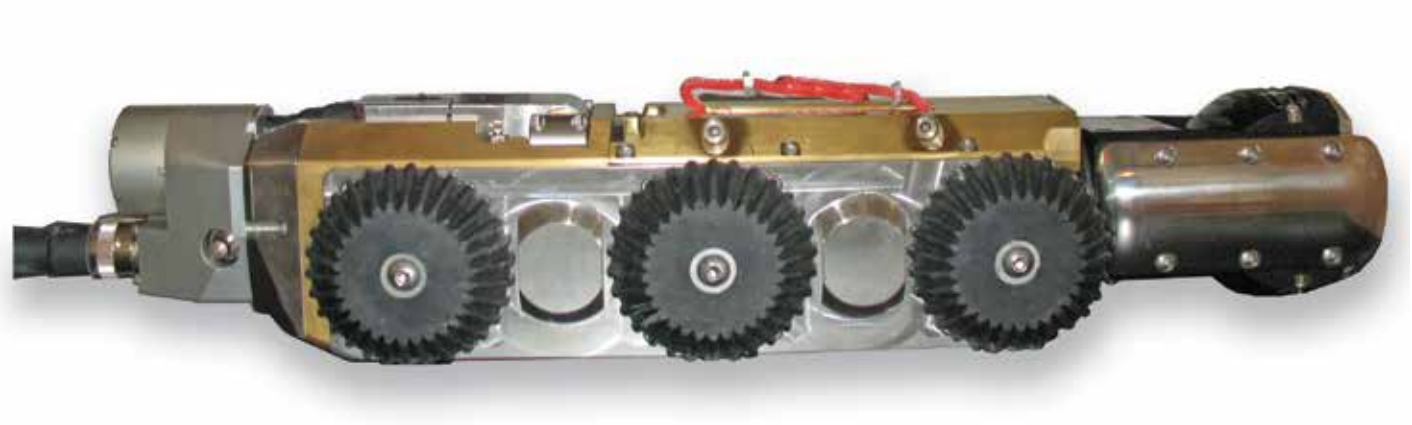
Locate the 'C' and 'O' that's located on the power lift bulkhead.

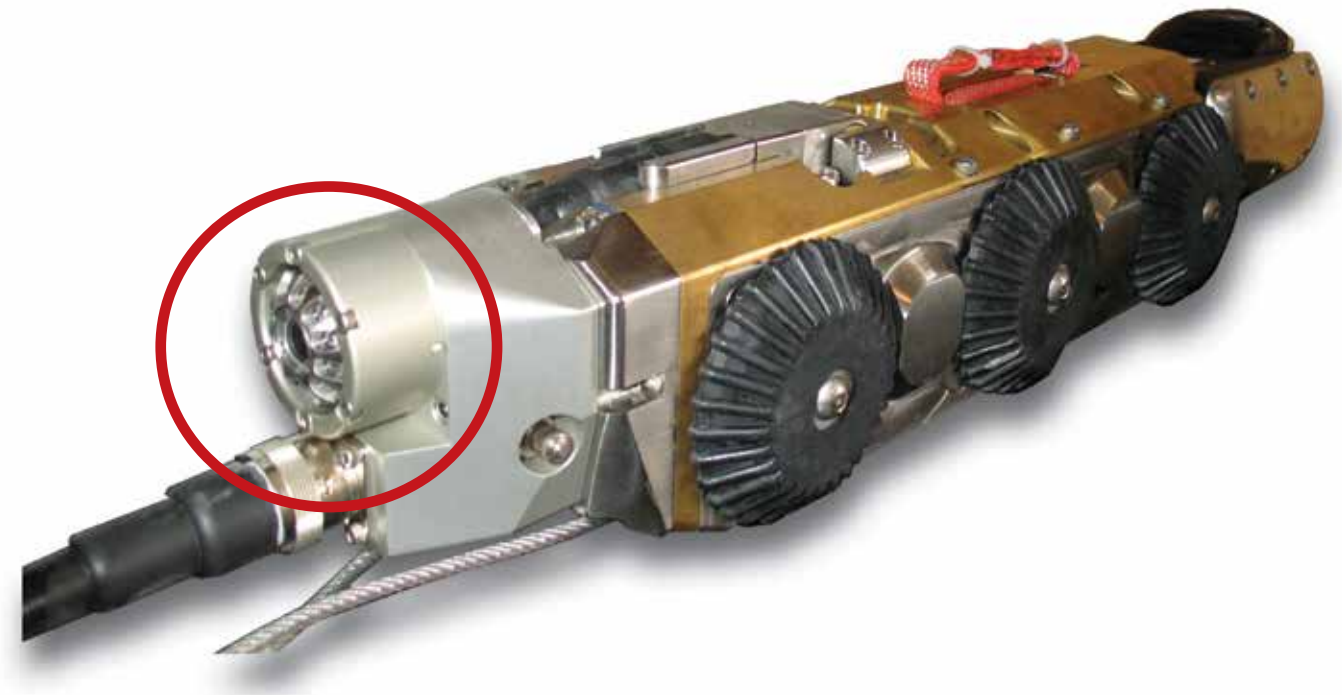
5. Move the connector locking tool, P/N HW1886, to the CLOSED (C) postion.

6. Install the camera retainer and secure the screws.

4 SYSTEM SET-UP & INSTALLATION

INSTALLING THE CPR REAR-VIEWING CAMERA

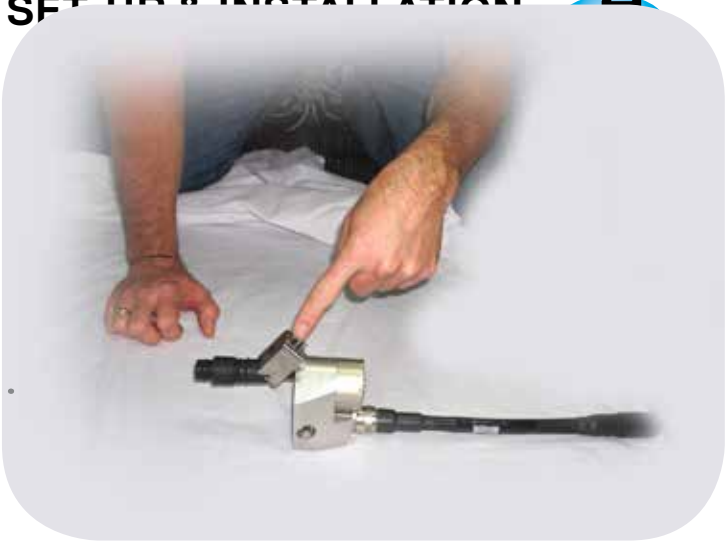




NOTE: The rear-viewing camera can be used on both aluminum and brass CPR transporters.

At the rear of the transporter, perform the following:

1. Verify that the swivel lock is installed on the interconnect cable as shown.
2. Attach the interconnect cable to the 12-pin conector as shown.



1

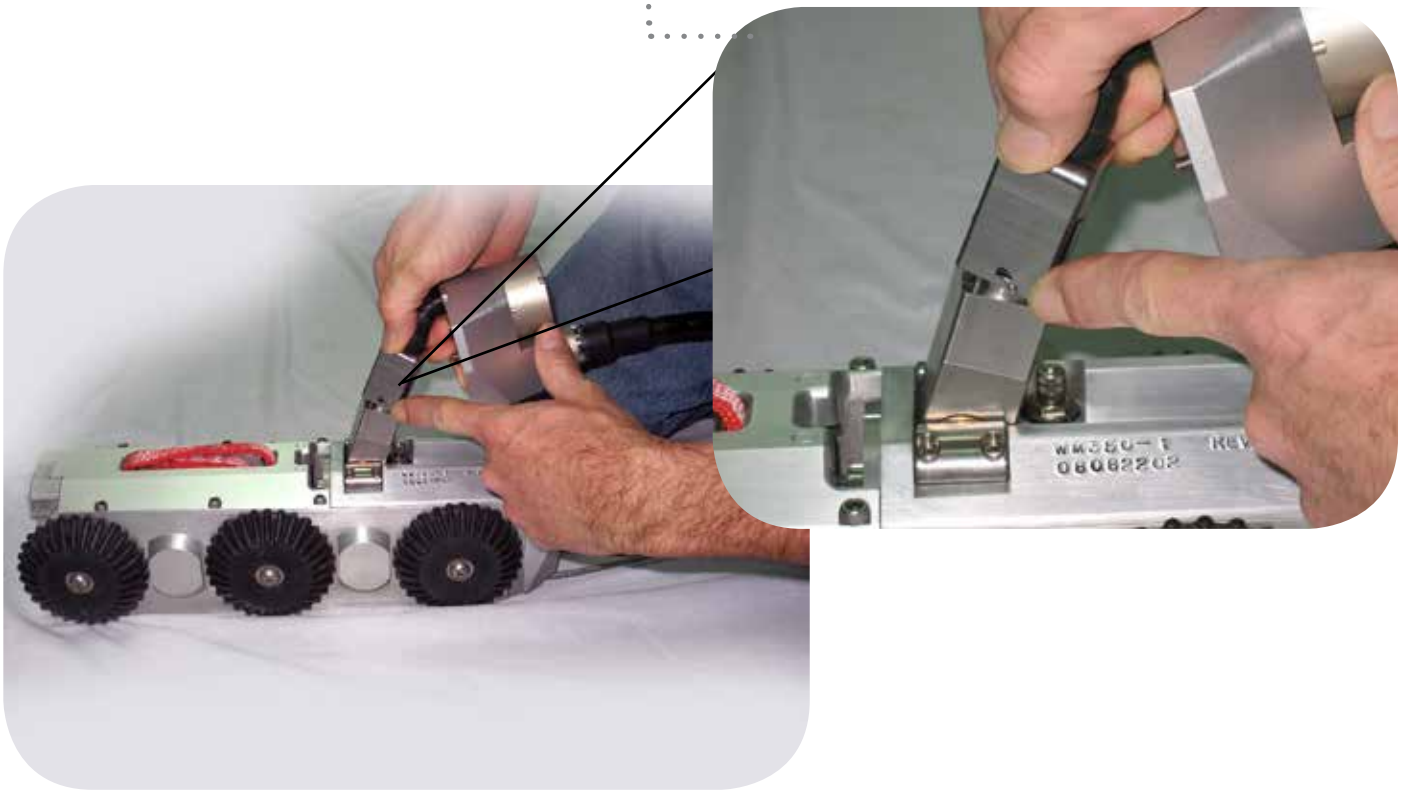
2

INSTALLING THE CPR REAR-VIEWING CAMERA

3. Ensure that pin 1 is aligned on the swivel connector and the rear view camera 12-pin connector.

   Push down and insert the connector as shown. Align the pins on the swivel lock and rotate to the locked position.

3



4. Push the camera down to secure.

5. Secure the 2 allen head screws at the rear of the unit.

6. Verify that the bayonet connector on the adapter is connected properly.

7. Align pin 1 and and insert the 12-pin connector from the mainline cable to the adapter cable.

8. It might be necessary to re-adjust the strain relief on the mainline cable. Loosen the screws on the strain relief.

9. Move the strain relief to obtain proper slack to prevent damage to the connectors/cable.

10. Tighten the screws.

    NOTE: the rear view camera lights will remain ON at all times.

11. To switch from forward to rear video, perform one of the following depending on your specific system:

- For a K2 system with game pad controller: Holding down the “VIEW” button, you can move the DPAD to the “+” direction for main camera and the “-“ direction for rear view camera. If you have not selected a rear viewing camera in the K2 configuration screen, the “-” button will not be operational.

- For a K2 system with CUES hand held controller: Select the camera you wish to view by pressing “MAIN CAMERA” or “REAR CAMERA” buttons. If you have not selected a rear viewing camera in the K2 configuration screen, the “REAR CAMERA” button will not be operational.

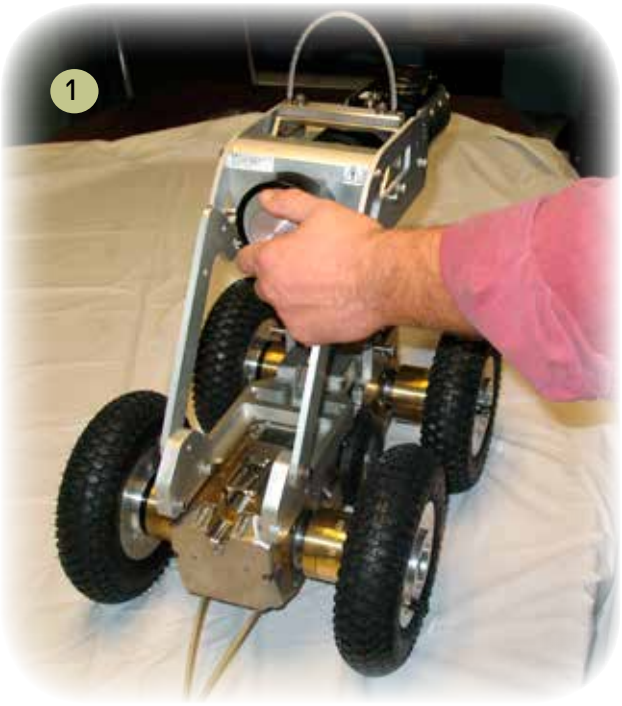
- For a non-K2 system: A panel mounted toggle switch labeled “MAIN CAMERA” and “REARVIEW CAMERA” will allow you to select which camera to view. NOTE: camera switching is controlled by reversing light power polarity, with the “MAIN CAMERA” position being positive polarity. Switch should be left in “MAIN CAMERA” position when rearview camera is not being used.

4 SYSTEM SET-UP & INSTALLATION

INSTALLING THE CPR REAR-VIEWING CAMERA FOR THE ELECTRIC LIFT

To install rear view camera PN WM345 or WM385:

1. Remove the end cap, P/N WM285, by rotating counter clockwise.
2. Position the camera connector locking ring, P/N WM021, in the “O” OPEN position as shown with the camera connector tool, P/N HW2271.
3. Grasp and pull open the safety spring plunger pin, P/N HW2271.
4. Insert the rear viewing camera with the orientation shown. Use the air-fill valve as the alignment reference.
5. Push and seat the camera into the conector and release the safety pin.
6. Lock the rear viewing camera onto the bulkhead by rotating the camera connector locking ring, P/N WM021, counter-clockwise from the “O” OPEN position to the “C” CLOSED position.

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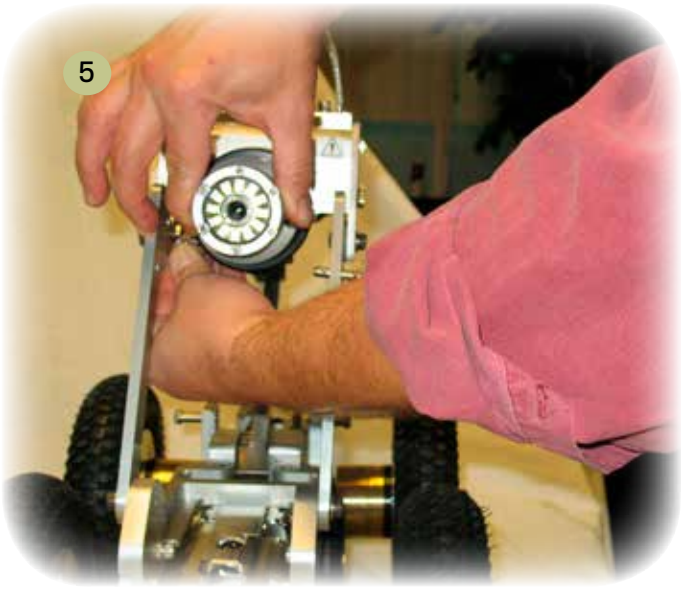
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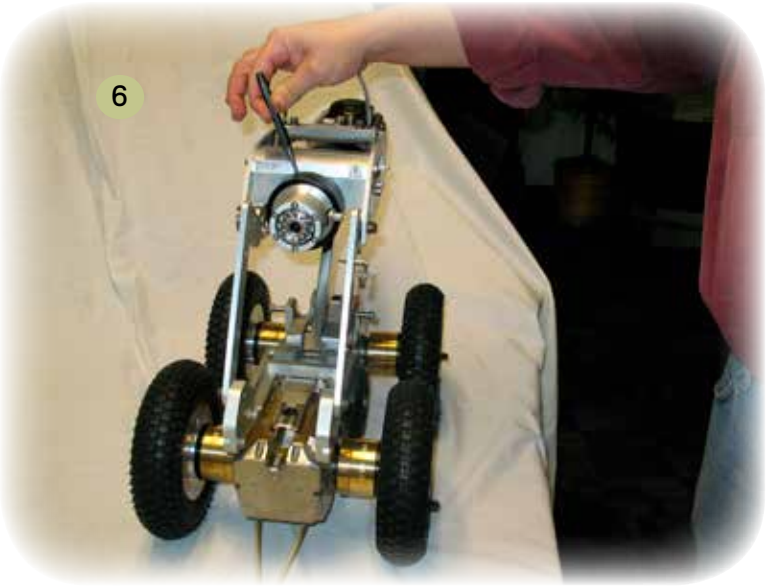

6

5 FUNCTIONAL CHECKOUT

CPR FUNCTIONAL CHECKOUT

Check to make sure that all equipment, including the generator, is OFF (0) before making any of the necessary connections involving the Compact Pipe Ranger system. Changing connections with power to the system can cause harm to the operator and/or equipment failure.

Depending on your specific system, please refer to the following quick cards for additional operating instructions:

MD912 - K2/K3 MAINLINE LAMINATED QUICK CARD
LM912 - K2/K3 LM2 MINI/MICRO P&T,QUICK CARD
CK912 - K2/K3 CURRAHEE LAMINATED QUICK CARD

OPERATING THE CPR

1. First make sure that the power has been turned OFF.
2. Make all necessary electrical connections, including the camera, if applicable.
3. Attach the tow cables and ensure that the TV cable has at least three or four inches of slack when the tow cables are taut.
4. Set the transporter into the pipeline and power up the system.
5. To move the transporter, gently move the joystick forward. When you intend to advance at full throttle, gently accelerate to speed. This helps to reduce wear on the motor and other electrical components.

When changing from forward to reverse freewheel, allow the transporter to come to a complete stop. After the transporter has stopped, move the joystick to reverse for about four seconds to disengage the clutches. The transporter is now ready to freewheel. To maintain freewheel, do not engage the joystick. Now you can use your winch or reel to pull the transporter back towards the control point and entry manhole (see note below). To use the power reverse, move the joystick backward.

NOTE: To verify that both drive trains are in freewheel, pan the camera to observe the left drive wheel and right drive wheel as the transporter is pulled back slowly with the reel. Both sides should be rolling freely. If one or both sides are not rolling freely, discontinue the reel operation and repeat the operation to shift into freewheel. ***Failure to ensure that both drives are in freewheel can cause damage to the drive train.***

NOTE: The transporter was not designed to plow through heavy grease or other obstructions. Damage to the equipment will result from improper use.

IMPORTANT!
Slowly accelerate to speed to reduce wear on the motor and other electrical components!

CRITICAL!
When shifting gears, make sure to follow all instructions in the *Gear Shifting* procedure!

OVERLOAD PROTECTION CIRCUIT

Your CPR transporter is equipped with either a solid state current limiting circuit or a thermal fuse for protection of the motor and drive train components. This feature is designed to protect the transporter motors during extreme temperature/current overload conditions by disabling the voltage to each motor independently. If the protection circuit has been activated, one or both drives will not be operational. Transporters manufactured or serviced after January 11, 2011 have the solid state protection circuit.

Solid State Overload Protection: Reset the circuit by momentarily moving the joystick in the opposite direction of travel through the neutral or center position as if you were reversing direction. You can then resume moving in the original direction.

Thermal Fuse Version: The circuit will automatically reset itself within 5 – 10 minutes, allowing normal operation to continue.

If the overload protection circuit has been activated, do not attempt to retrieve the transporter unless the transporter is in freewheel mode. ***Failure to verify that both transporter drives are in freewheel can cause damage to the drivetrain.***

6 OPERATING THE COMPACT PIPE RANGER

JOYSTICK CALIBRATION

Due to normal wear of the transporter equipment and the fact that the transporter is designed with 2 separate motor clutches that are controlled through the joystick to “steer” the transporter, the joystick may periodically require calibration. If the transporter creeps or runs when the joystick is in the “centered’ position, the joystick will need to be calibrated as outlined below.

CAUTION! Prior to performing the calibration procedure, disconnect the transporter from the 12-pin cable. This will reduce the risk of injury, property, and/or equipment damage.

Perform the “quick” joystick calibration at the front panel:

1. Press the calibration button. The calibration LED will light up and calibration will begin.
2. Press the calibration button with the joystick at each diagonal extreme. The calibration LED will extinguish momentarily.
3. Press the calibration button with the joystick at center. The calibration LED will extinguish momentarily.
4. After a minimum of 3-5 presses, the calibration LED will either extinguish or flash:
   LED extinguishes: indicates that the “quick” calibration is valid.
   LED flashes and then extinguishes: indicates the “quick” calibration is invalid.
5. If the “quick” calibration is invalid, repeat all steps listed above until the calibration is valid.

COMPACT PIPE RANGER GEAR SHIFTING

When switching from small tires to large tires, perform the following gear shifting procedure to maintain transporter pulling power.

* **Use low speed for 12" + pneumatic tires**
* **Use high speed for small tires and steel wheels (6" - 15" pipes)**

1. Place the transporter on a 2 x 4 wood block with the transporter cable connected.
2. Turn the transporter power ON.
3. Insert a flat head screwdriver into the shifter screw that's located at the rear of the transporter as shown below. Depending on the tires being used, small or larger, turn the screwdriver as follows:

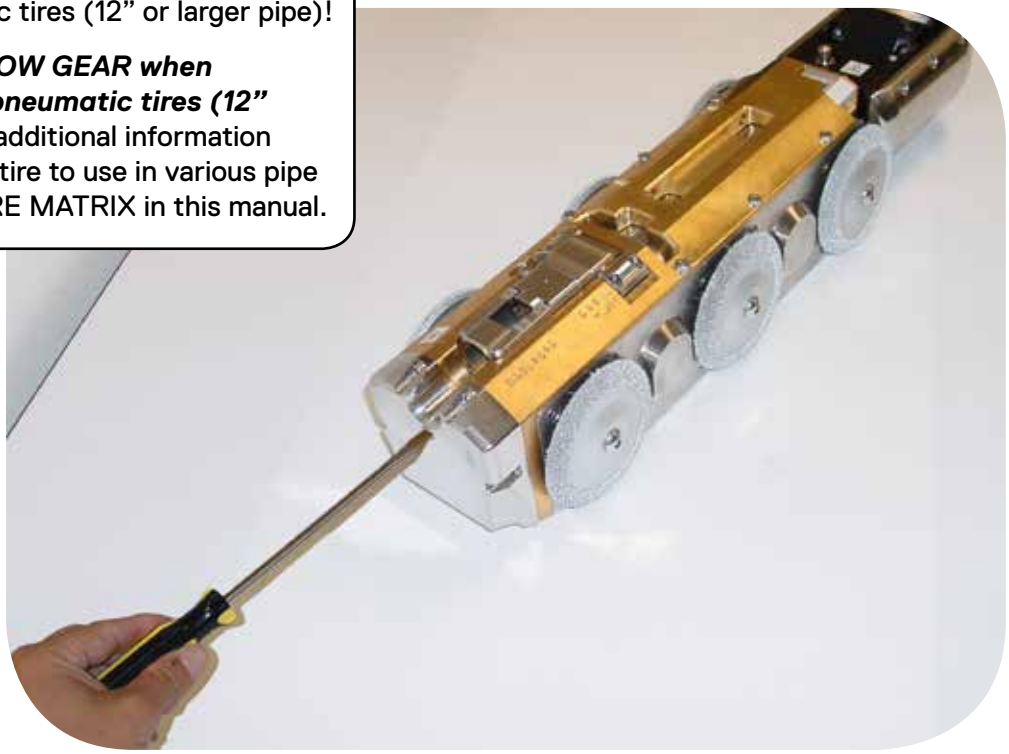
LOW GEAR - turn the flat head screwdriver CLOCKWISE (approximately 3/4 turn)
HIGH GEAR - turn the flat head screwdriver COUNTER-CLOCKWISE (approximately 3/4 turn)

4. Slowly pull the joystick back until the motor starts while attempting to shift the gear with the screwdriver. Repeat this process until the gears are fully engaged.
5. Remove the screwdriver from the rear of the transporter.

CRITICAL!

To prevent equipment damage, DO NOT operate the transporter in high gear when utilizing the larger pneumatic tires (12" or larger pipe)!

Always operate in LOW GEAR when utilizing the larger pneumatic tires (12" or larger pipe)! For additional information regarding the proper tire to use in various pipe sizes, refer to the TIRE MATRIX in this manual.

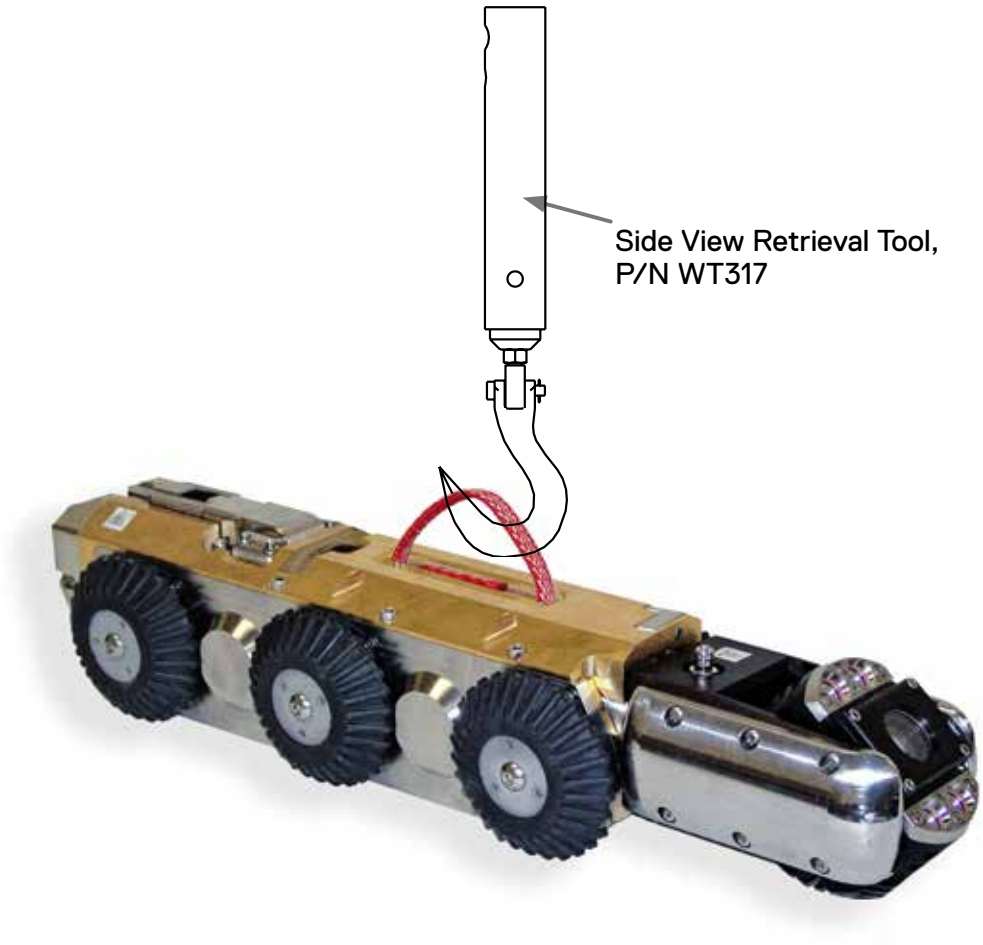


6 OPERATING THE COMPACT PIPE RANGER

RETRIEVING THE COMPACT PIPE RANGER

Always shut the system down before retrieving the Pipe Ranger from the manhole. This will help protect personnel and equipment from electrical shock. Do not carry the Pipe Ranger transporter by the TV cable or camera!

If desired, use the optional retrieval tool, P/N WT317, shown on this page. The retrieval tool is an extendible pole with one hook at one end that attaches to the lift loop that's located at the top of the Compact Pipe Ranger transporter. The retrieval tool can be extended to the needed length by adding sections. Ensure that the pole is firmly locked at the new length before attempting to lift the transporter.

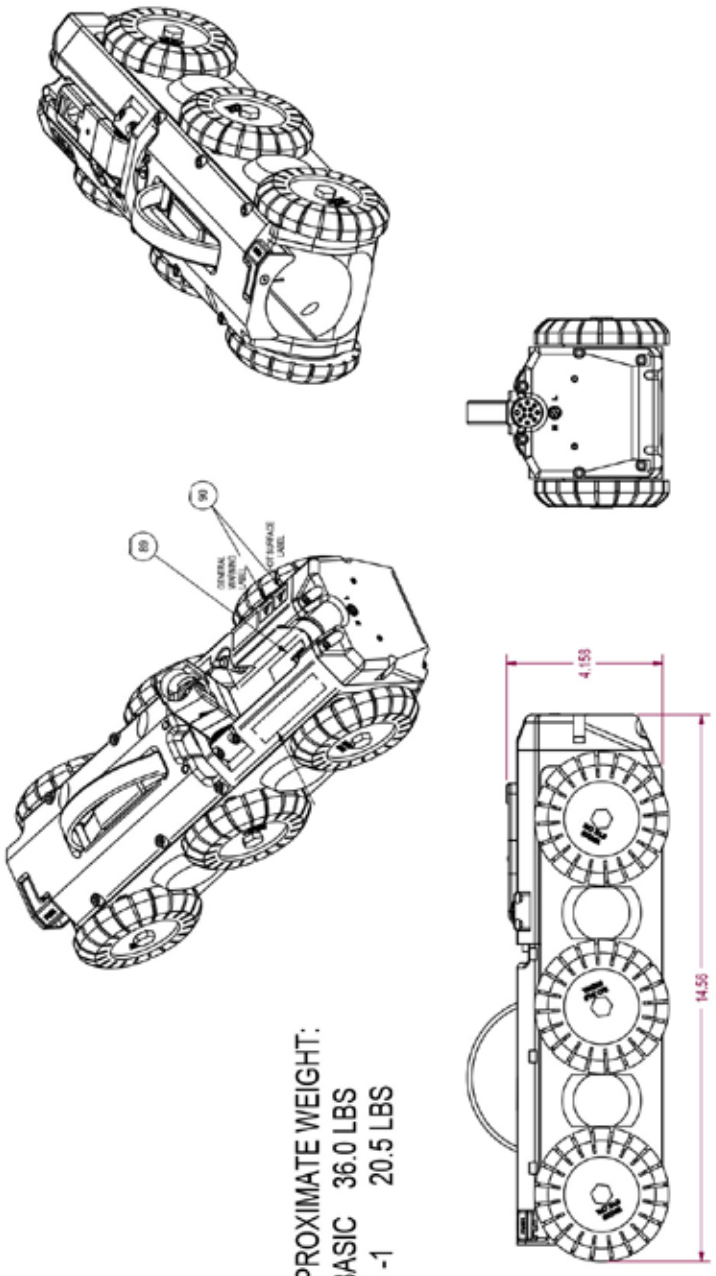


COMPACT PIPE RANGER EQUIPMENT MAINTENANCE

1. Adjust the mobile generator to deliver a steady 110 to 120 volts. See the generator manual for the proper adjustments or contact authorized service personnel.
2. Clean the camera, lighthead, and transporter with detergent and water after each day of use.
3. Prior to use, check all of the cables coming from the motor housing for cut or worn areas. If wear on the cables is evident, the cables should be repaired or replaced immediately. Do not operate the Compact Pipe Ranger transporter with worn or cut cables.

   NOTE: Never remove the cover from the transporter motor or camera controller. Each of these areas contains delicate electronic components. Opening any of these areas will result in the warranty being voided.

FIGURE 1A. TRANSPORTER ASSY, CPR 60V, WM360



APPROXIMATE WEIGHT:
BASIC 36.0 LBS
-1 20.5 LBS

CONFIGURATION TABLE	
PART NO.	DESCRIPTION
WM360	TRANSPORTER ASSY,CPR,60 VOLT,BRASS
WM360-1	TRANSPORTER ASSY,CPR,60 VOLT,ALUMINUM

FIGURE 1B. TRANSPORTER ASSY, CPR 60V, WM360

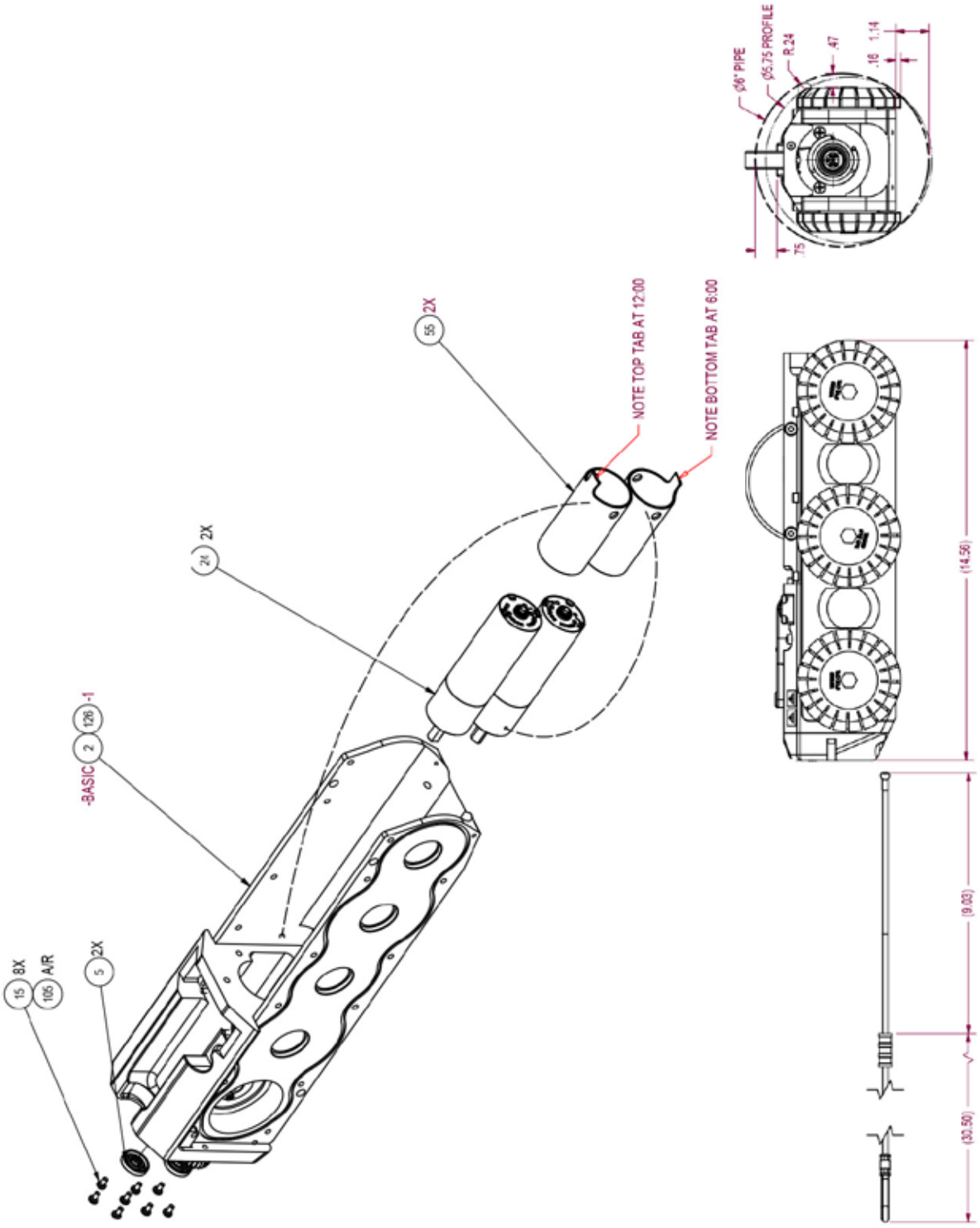


FIGURE 1C. TRANSPORTER ASSY, CPR 60V, WM360

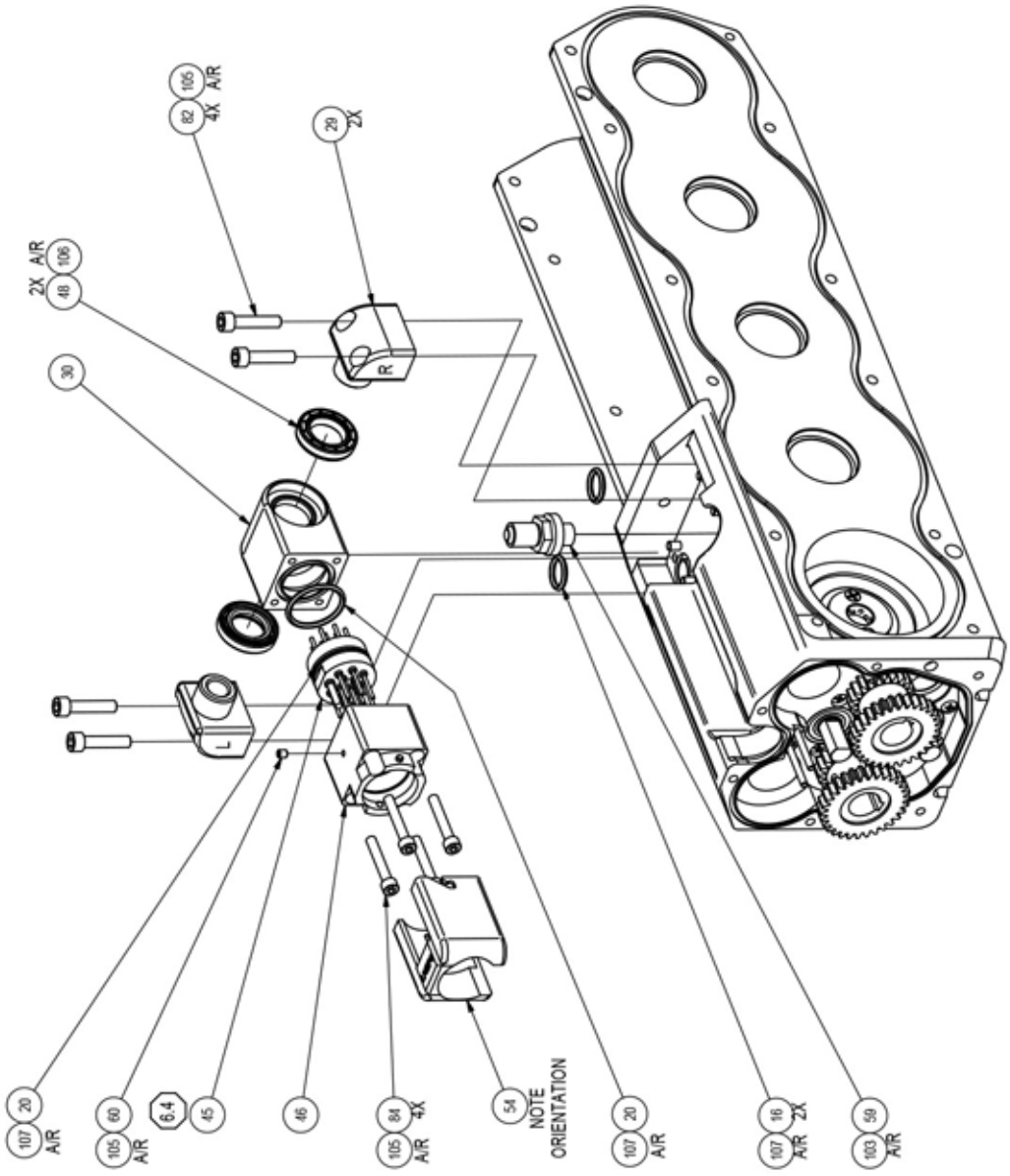


FIGURE 1D. TRANSPORTER ASSY, CPR 60V, WM360

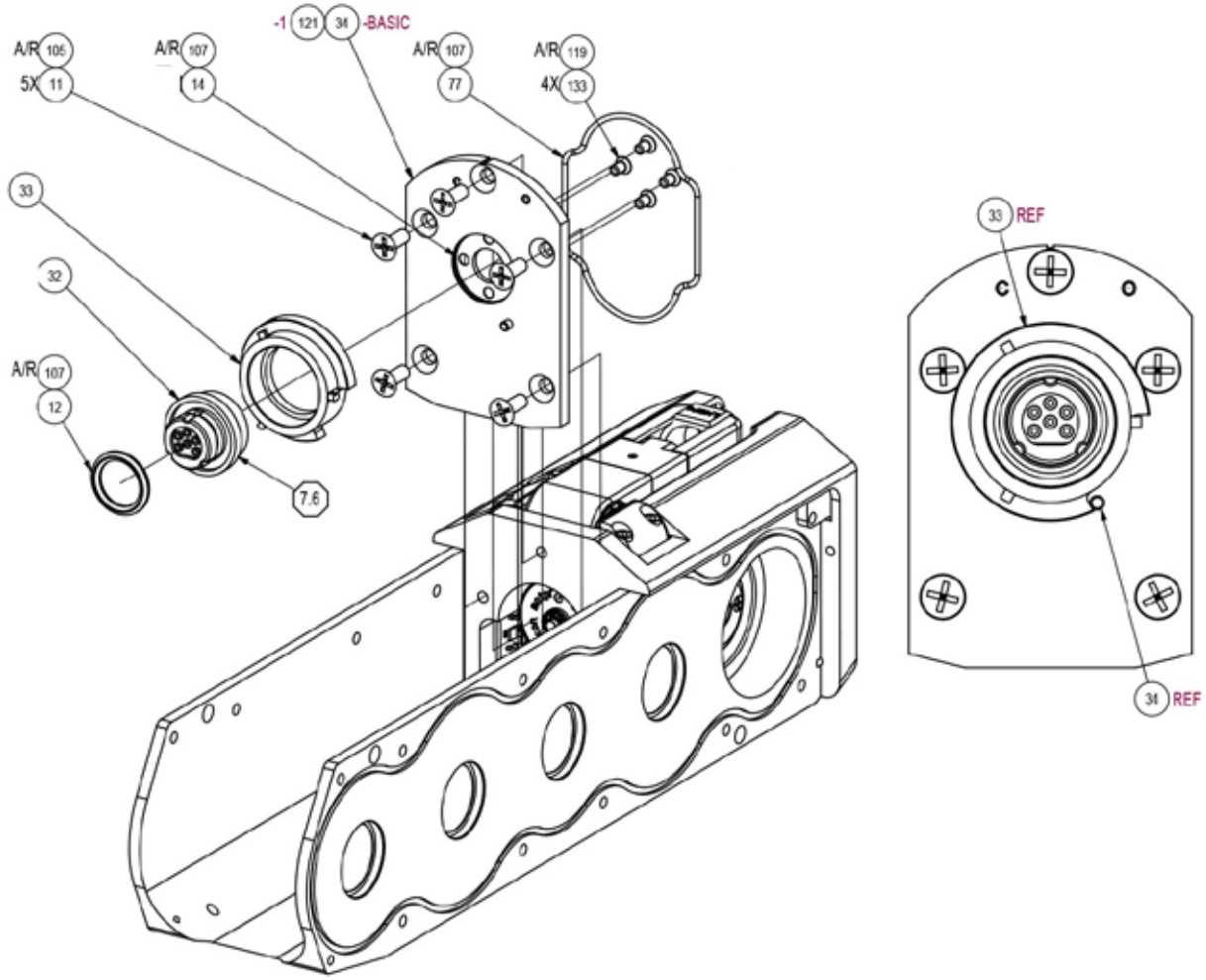


FIGURE 1E. TRANSPORTER ASSY, CPR 60V, WM360

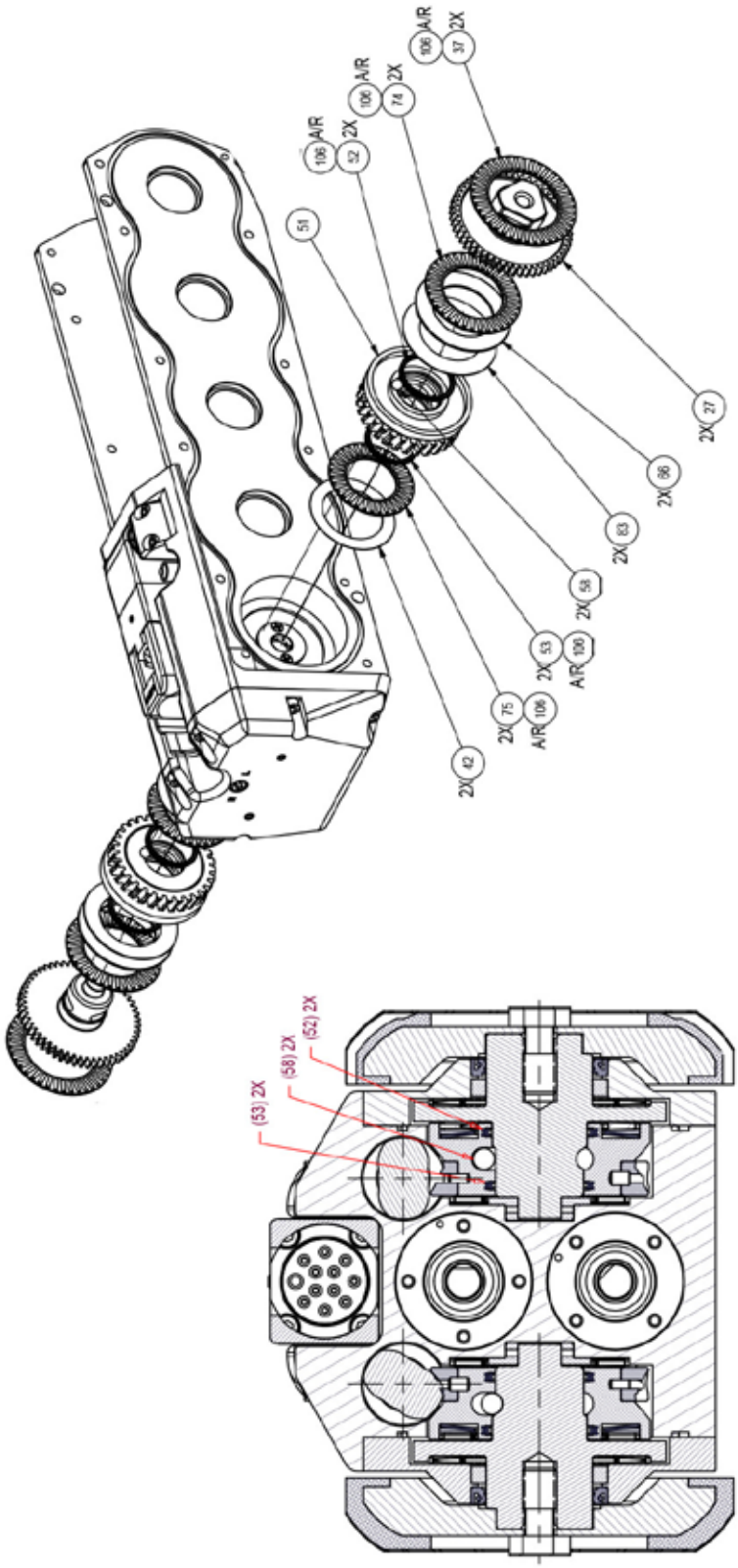


FIGURE 1F. TRANSPORTER ASSY, CPR 60V, WM360

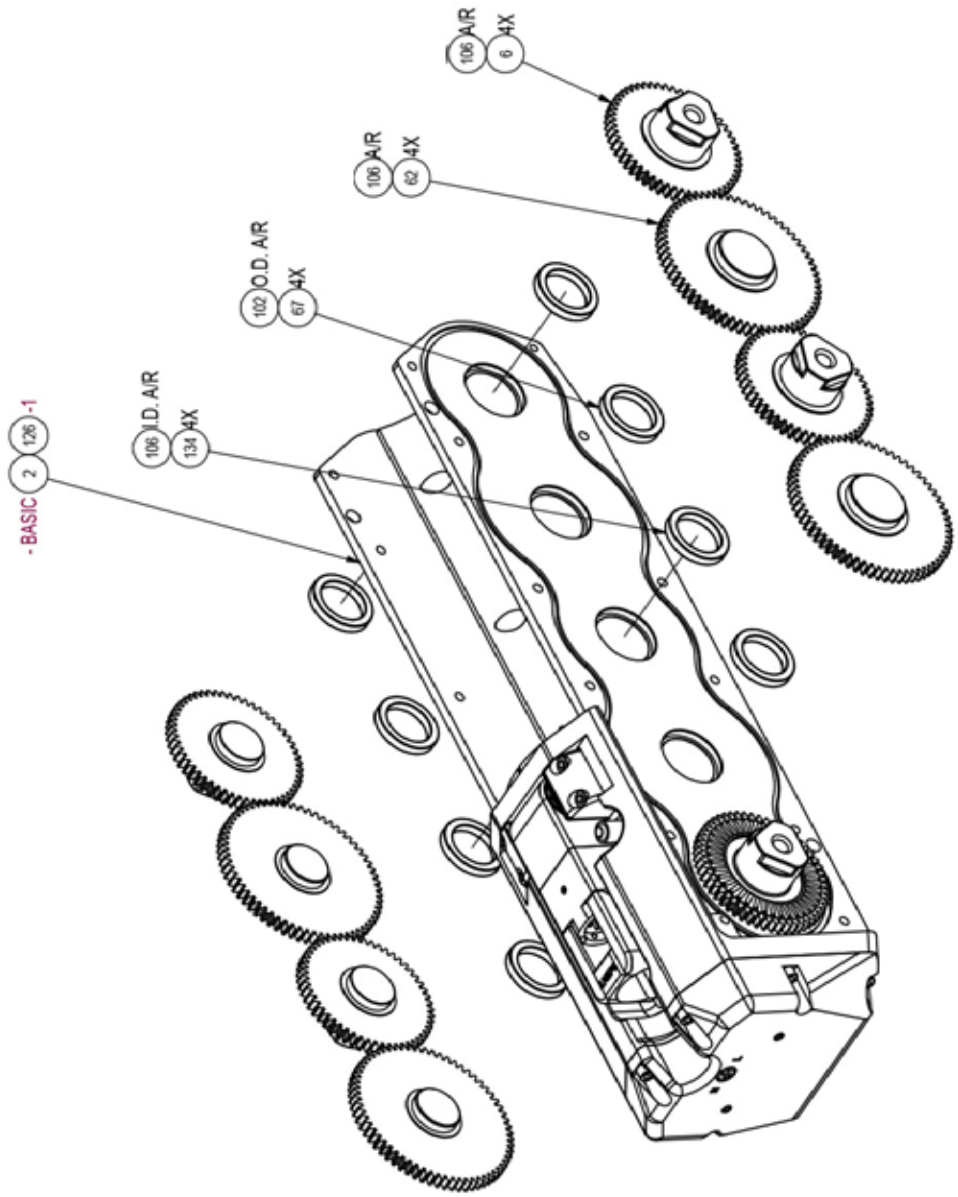


FIGURE 1G. TRANSPORTER ASSY, CPR 60V, WM360

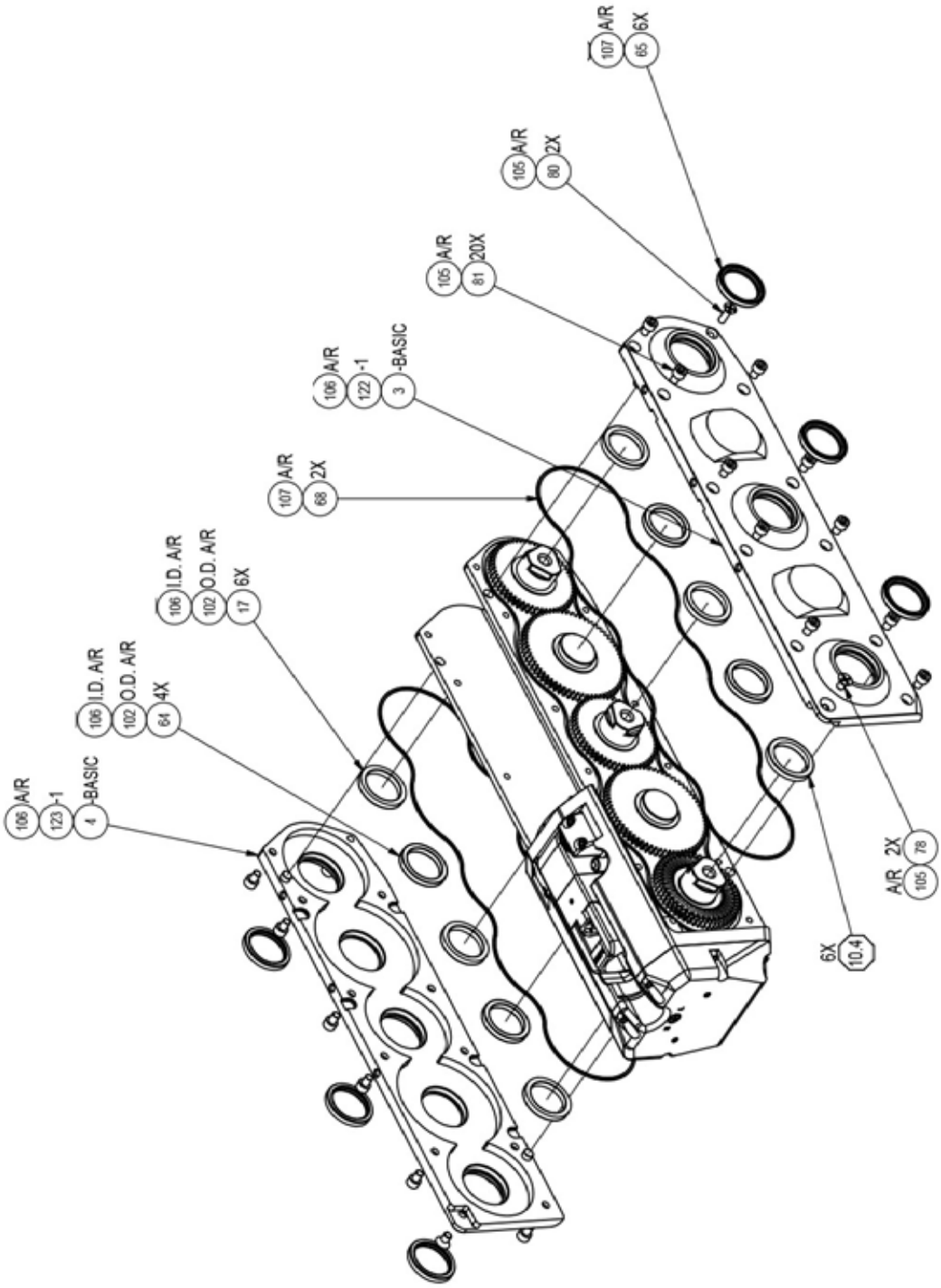


FIGURE 1H. TRANSPORTER ASSY, CPR 60V, WM360

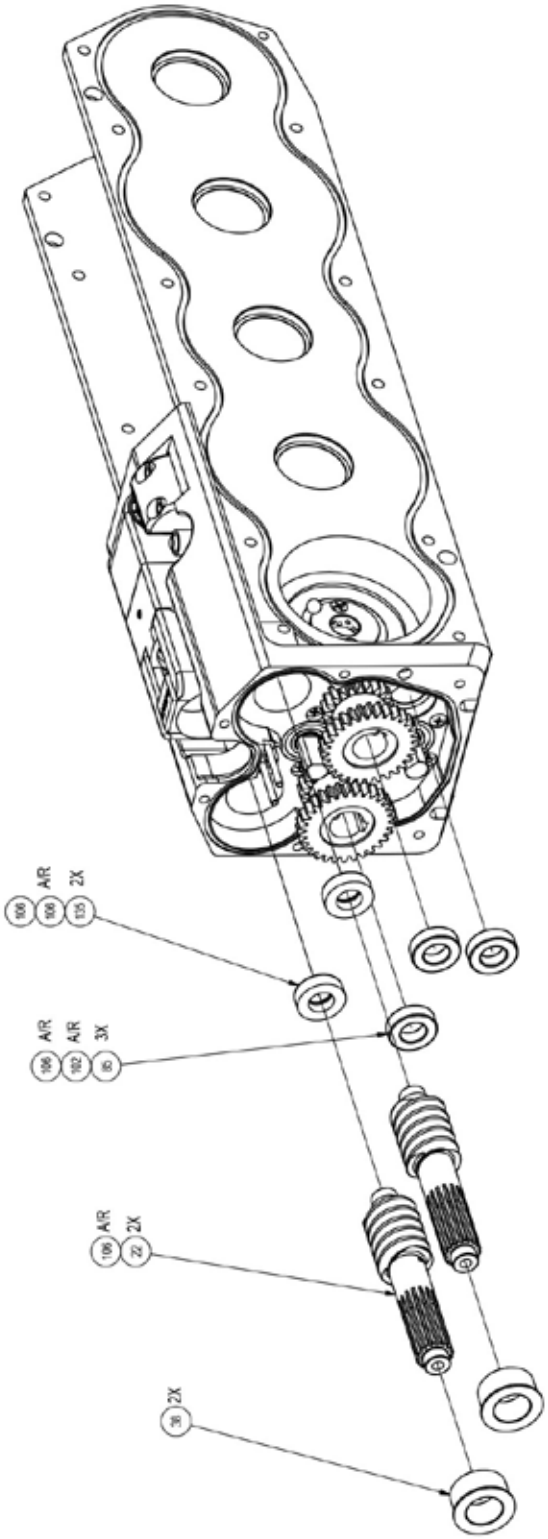


FIGURE 1I. TRANSPORTER ASSY, CPR 60V, WM360

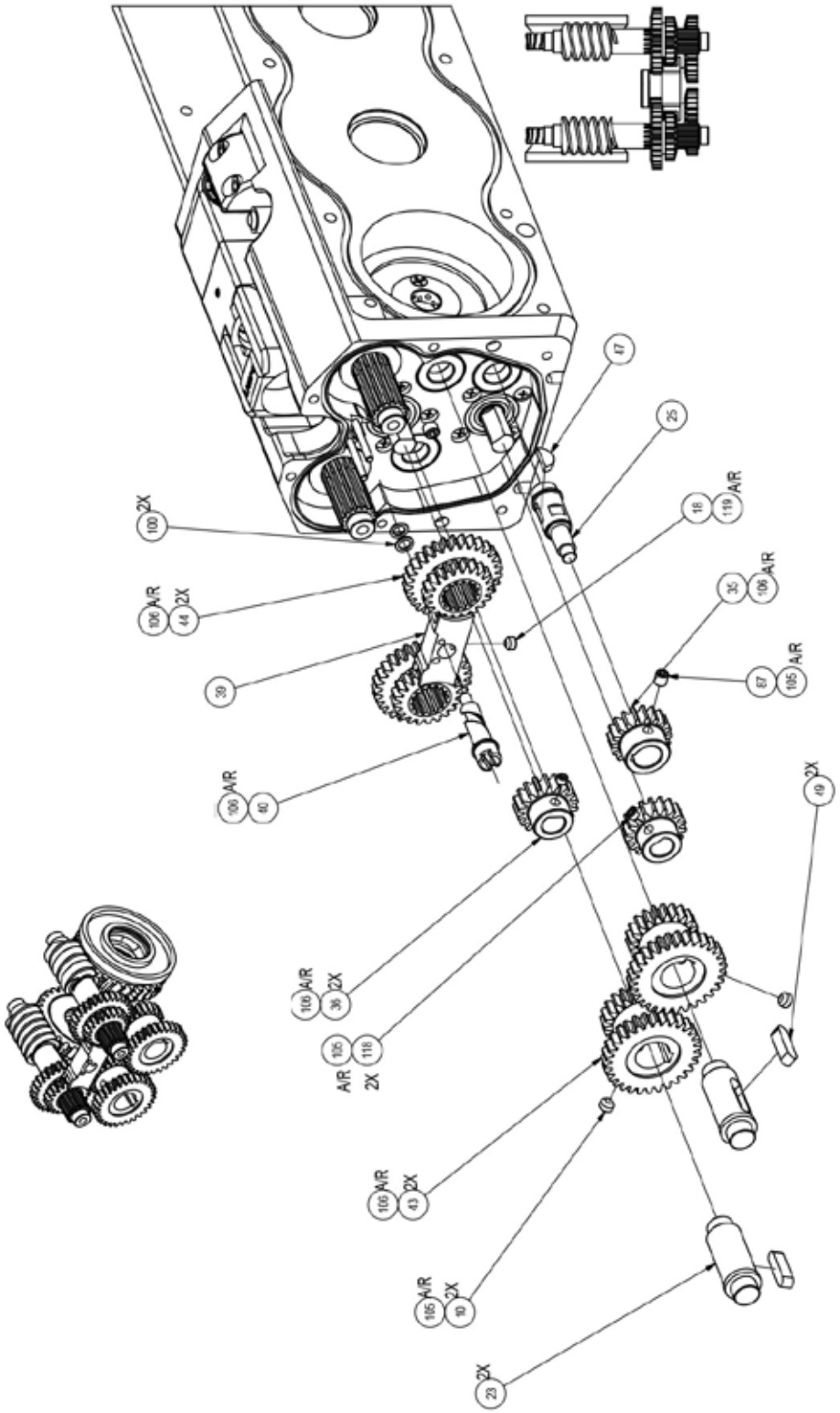


FIGURE 1J. TRANSPORTER ASSY, CPR 60V, WM360

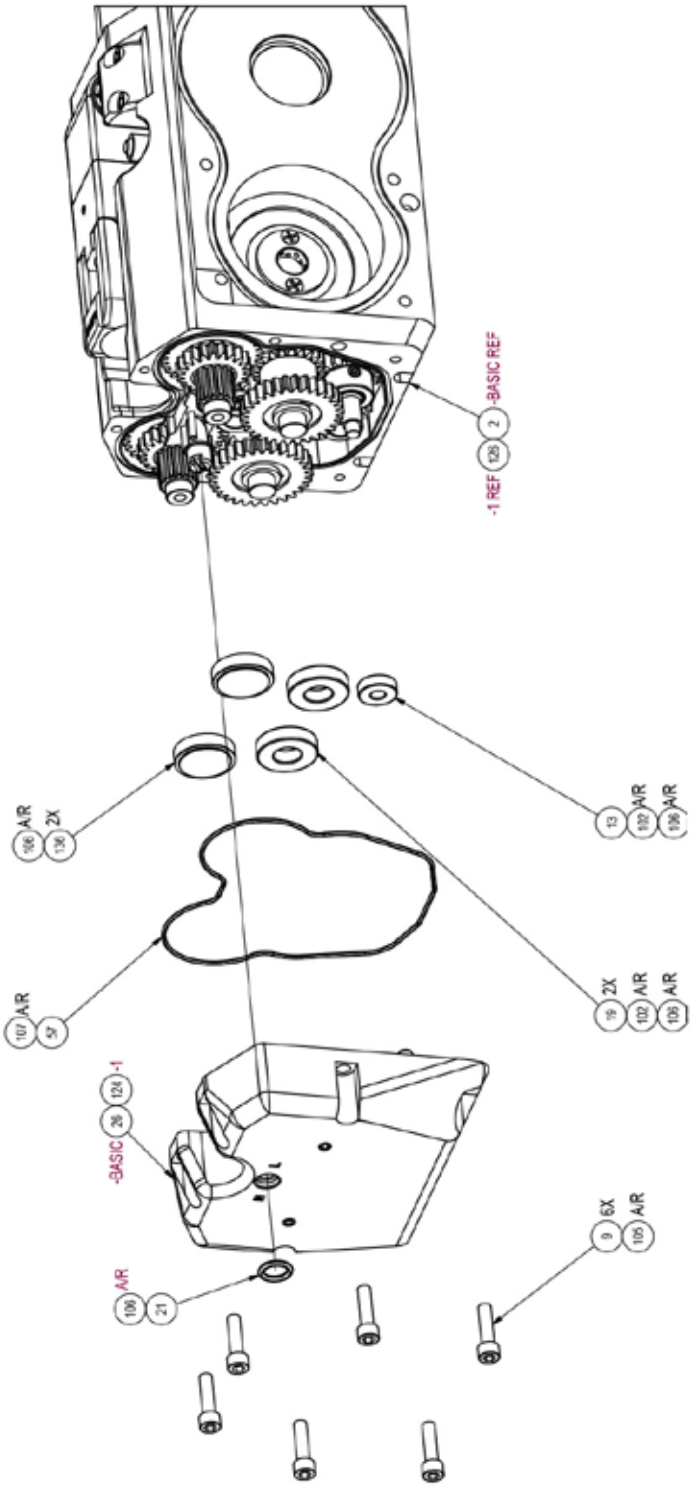


FIGURE 1K. TRANSPORTER ASSY, CPR 60V, WM360

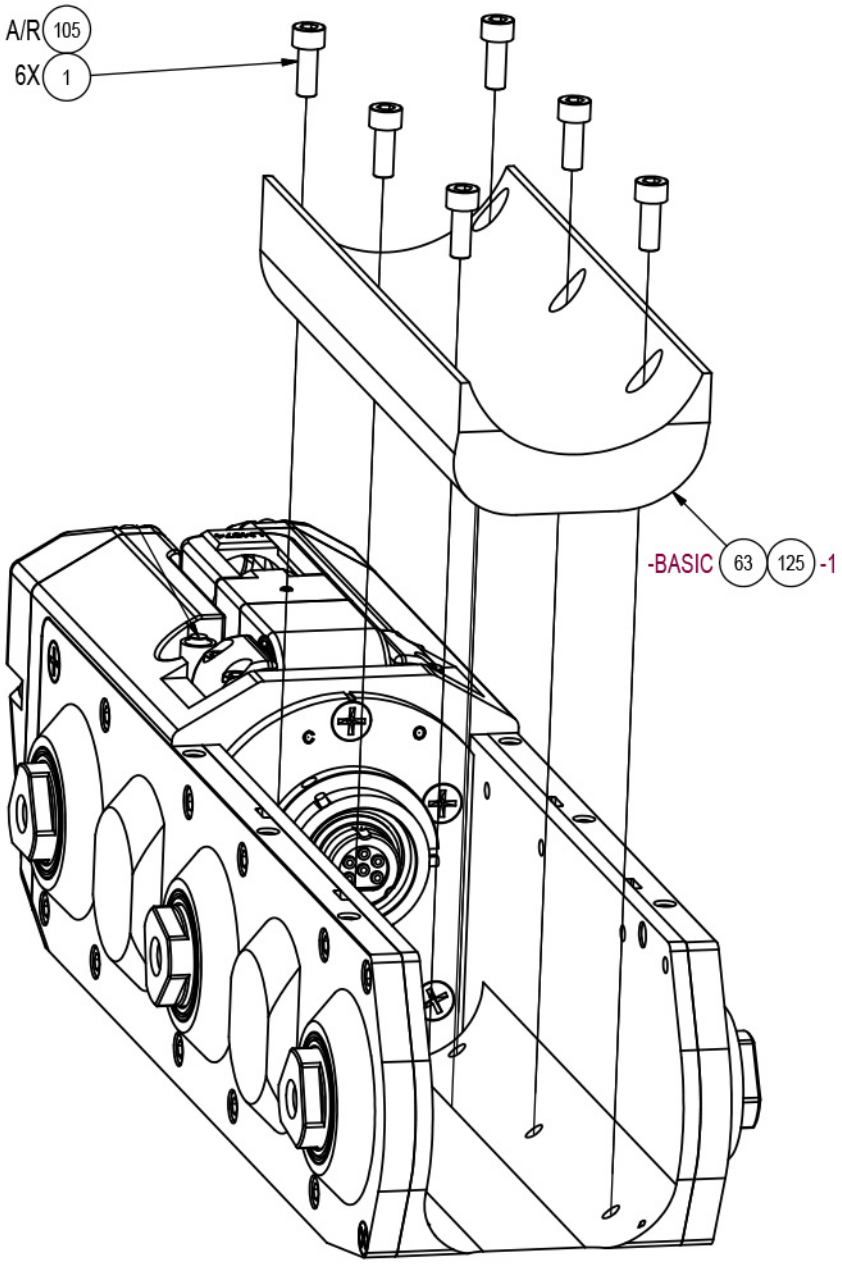


FIGURE 1L. TRANSPORTER ASSY, CPR 60V, WM360

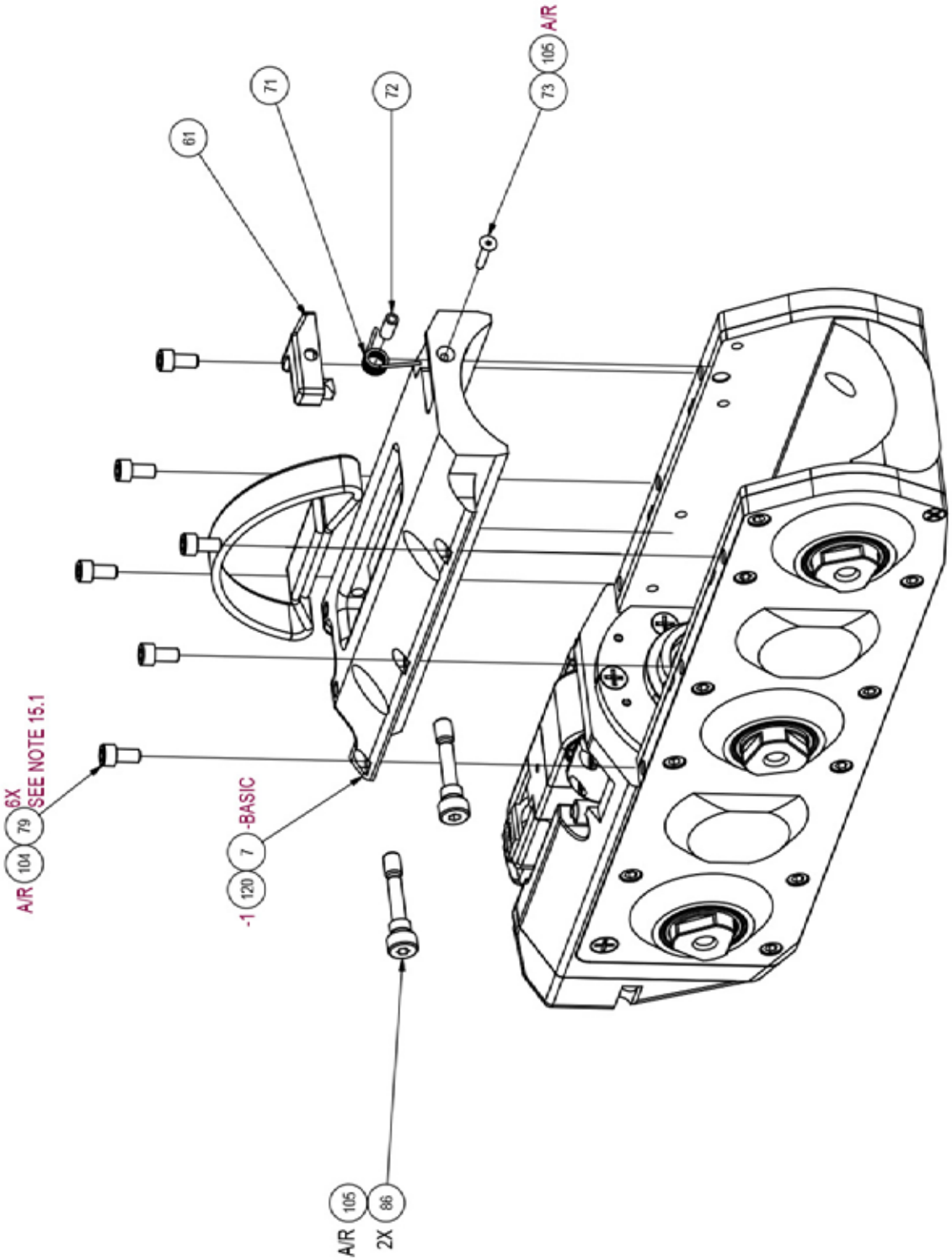
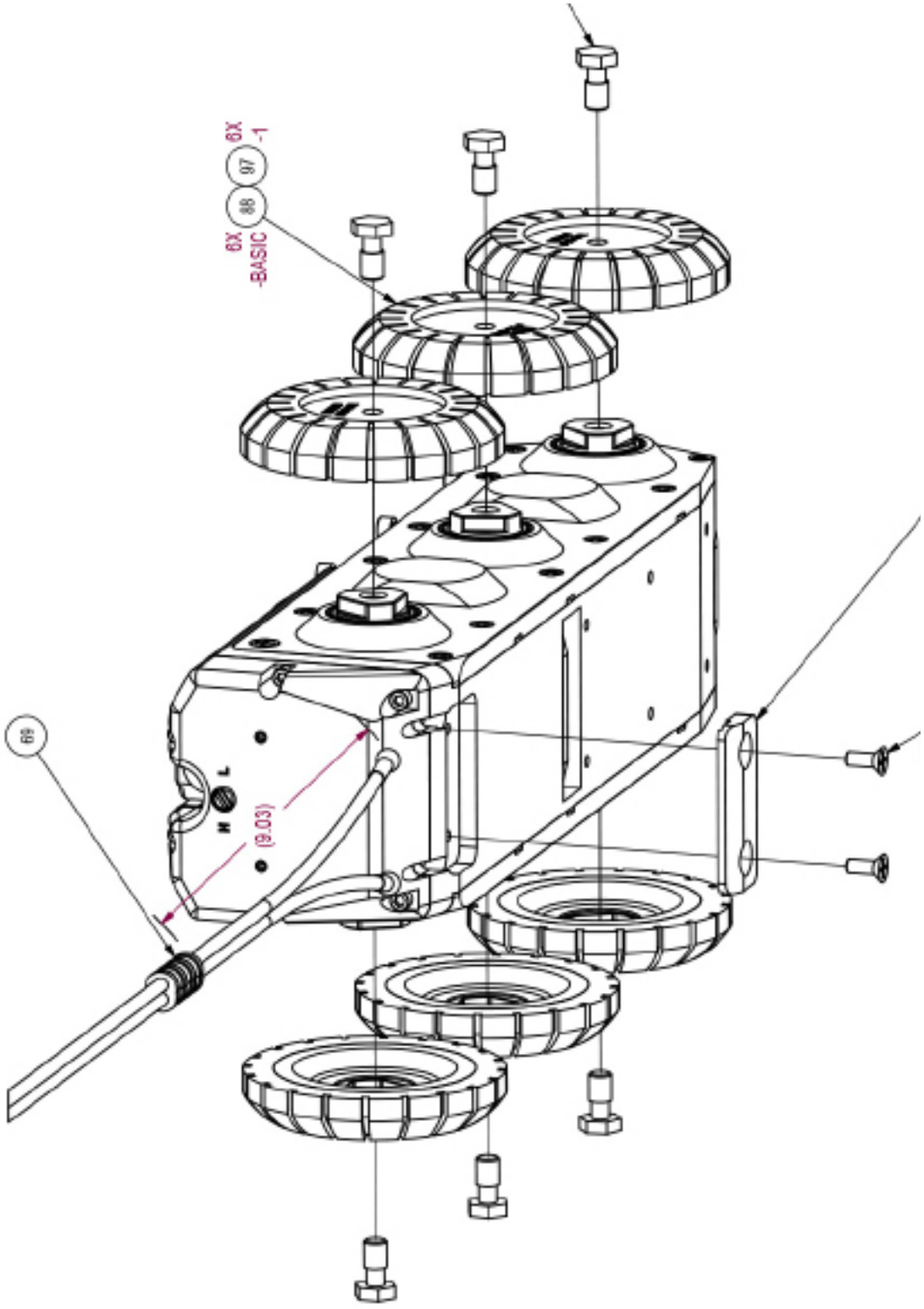


FIGURE 1M. TRANSPORTER ASSY, CPR 60V, WM360



TRANSPORTER ASSY, CPR 60V (See Figure 1),Rev. -, WM360			
Item #	Description	P/N	Qty
0001	SCREW,CAP,SKT HD,10-32X1/2,SST	102001	6
0002	HOUSING ASSY,XPRTR,BRASS,CPR	WM329	1
0003	COVER,SIDE,RIGHT,UNIBODY,CPR,SS	WM072	1
0004	COVER,SIDE,LEFT,UNIBODY CPR	WM073	1
0005	SEAL,OIL,.315X.750X.157 VC	HW2366	2
0006	GEARED SHAFT,IDLE WHEEL DRIVE,CPR	WM278	4
0007	CLAMP,CAMERA(NAVAL BRASS)	WM008-1	1
0008	SCREW,CAPT,HEX,5/16-24UNF X 0.625	WM098-1	6
0009	SCREW,CAP,SKT HD,8-32X5/8,SST	100141	6
0010	SCREW,SET,10-32X1/8 SST	101027	2
0011	SCREW,FLAT,10-32X1/2 SST	103052	7
0012	O-RING,17MM ID X3MMW,BUNA,SHOREA70	HW1772	1
0013	BEARING,BALL,3/16 ID X 1/2 OD X5/32	300280	1
0014	O-RING,2-022 BUNA	712565	1
0015	SCREW,M3X.5X6-4601,SELF-SEAL,SS,MOD	HW2364	8
0016	O-RING,2-012,BUNA-N	HW1092	2
0017	BEARING,BUSH,OUTER,WHL SHAFT,CPR	WM217	6
0018	SCREW,SET,8-32 X 3/16,POG POINT,SST	HW1453	1
0019	BEARING,BALL,9MMX20MMX6MM,DBL SHD	HW1541	2
0020	O-RING,2-018,SILICONE	HW683	2
0021	O-RING,2-011,SILICONE	PM209	1
0022	SHAFT,WORM DRIVE,MINI MAINLINE	WM001	2
0023	SHAFT,IDLER GEAR,MINI MAINLINE	WM002	2
0024	GEARMTR,60VDC,2.17A,530RPM,214OZ-IN	WM296-1	2
0025	SHAFT,IDLER MINI MAINLINE	WM005	1
0026	COVER,REAR W/PINS,SS,CPR	WM084-2	1
0027	AXLE,MAIN DRIVE,CPR	WM276	2
0029	CLEVIS,SIDE	WM017	2
0030	HOUSING,SWIVEL,REAR,12-PIN	WM018	1
0032	CONNECTOR,TWIST LOCK,FEMALE,6 SCKT	WM300	1
0033	NUT,TWIST LOCK,6-PIN	WM021	1
0034	BULKHEAD,TWIST LOCK CONN,SS	WM022	1
0035	GEAR,SPUR,24DP 18T 14.5PA,KEYED	WM024	1
0036	GEAR,SPUR,24DP 18T 14.5PA,D-HOLE	WM025	2
0037	BEARING,THRUST,NDL,35MMX52MMX2MM	HW2048	2
0038	BUSHING,WORM SHAFT	WM029	2
0039	BRACKET,GEAR CHANGE	WM031	1
0040	SHAFT,LEAD SHIFTER	WM032	1
0041	KEEPER,TOW CABLES,WHLD MINI XPTR	WM035	1

TRANSPORTER ASSY, CPR 60V (See Figure 1),Rev. -, WM360			
Item #	Description	P/N	Qty
0042	SHIM,30MMX42MMX0.2MM,18-8SS	HW2055	2
0043	GEAR,21/30T,DRIVE,STEERABLE PR	WS009	2
0044	GEAR,21/30T,SPLINED,SPR	WS022	2
0045	PLUG,INSERT, MALE,12 PIN	WT038	1
0046	CAP,SWIVEL,MML	WM014	1
0047	KEY,WOODRUFF, 3/32 X 3/8,SS	BT024	1
0048	SEAL,SHAFT,2 LIP,.562X.875X.187,NBR	HW2845	2
0049	KEY,RND ENDS,METRIC,4MM SQX16MM L	HW1515	2
0050	LOOP,LIFTING,WEBBING,U-SHTY,WTR,CPR	MC223	1
0051	CLUTCH WORM GEAR ASSY,CPR	WM335	2
0052	O-RING,QUAD,2-021,BUNA-N	HW2011	2
0053	SEAL,QUAD,2-20,BUNA-N	HW1759	2
0054	CONNECTOR,QUICK,12PIN,LAMP II/CPR	LM074	1
0055	HEAT SINK, BRASS, CPR	WM155	2
0056	PCB ASSY,OVERVOLTAGE PROTECT PRGMD	WM407-1	2
0057	O-RING,3.645ID,VITON,BACK COVER	WM106	1
0058	BALL,5MM,TUNGSTEN CARBIDE,GRADE 25	HW2276	2
0059	VALVE,PURGE,P&T	CP063	1
0060	SCREW,SET,4-40X1/8 SST	100050	1
0061	BUTTON,LATCH CAMERA	WM086	1
0062	GEARED SHAFT,IDLER,CPR	WM279	4
0063	CRADLE,CAMERA,CPR	WM088	1
0064	BEARING,BALL,25MM ID X32ODX4MM,SEAL	HW1562	4
0065	SEAL,25ID X 32OD X 4MM W,RUBBER	HW1563	6
0066	WASHER,THRUST,STL,30MMX47MMX1MM	HW2049	2
0067	BEARING,BALL,20MM IDX27ODX4MM,SEAL	HW1565	4
0068	O-RING,MOLDED,UNIBODY SIDE PLATE	WM101	2
0069	CABLE,TOW,PR,SPR+CPR 39.5 JND PAIR	WS062	1
0071	SPRING,TORSION,.357 OD X .045,MOD	WM102	1
0072	SPACER,.188 OD X .115 ID X .406 LG	HW1581	1
0073	SCREW,CAP,4-40 X 5/8LG,FH,SS	HW1582	1
0074	BEARING,THRUST,NDL,30MMX47MMX2MM	HW2047	2
0075	BEARING,THRSUT,NDL,25MMX42MMX2MM	HW2046	2
0077	O-RING,MOLDED,BULKHEAD	WM103	1
0078	SCREW,FLATHEAD,10-32X5/16 PHIL SST	101426	2
0079	SCREW,CAP,SKT HD,10-32X3/8,SST	103030	6
0080	SCREW,8-32X1/2 FL,PH,SS	103062	2

TRANSPORTER ASSY, CPR 60V (See Figure 1),Rev. -, WM360			
Item #	Description	P/N	Qty
0081	SCREW,CAP,SKT HD,10-32 X 1/4,SST	HW1345	20
0082	SCREW,CAP,SKT HD,#8-32 X 3/4 SST	HW809	4
0083	WASHER,BELL,STL,30MMX47MMX0.6MM	HW2050	2
0084	SCREW,CAP,SKT HD,#6-32X.88LG SST	100128	4
0085	BEARING,BALL,9X17X5,SEALED	HW457	3
0086	SCREW,SHOULDER LIFT STRAP,CPR	WM107	2
0087	SCREW,SET,8-32X3/16 SST	101927	1
0088	WHEEL,RBR,75D,6",H-BTM CLR,CPR&LMII	WM209	6
0089	LABEL,THERMAL XFR,1.500"W X .500"H	CS221	1
0090	LABEL,LASERTAB MARKER, .560 X .560	CS222	2
0091	TUBE,SHRINK,BLACK 3/16"RNF	712577	1
0092	WIRE,20AWG,RED/BLK,PVC	EC280	1
0093	WIRE,20AWG,BLK/WHT,PVC	EC279	1
0094	WIRE,#20 RED BU	713319	1
0095	WIRE,#20 BLACK STRANDED 600V	713317	1
0096	TOOL,CHISEL,5/32TIP X 5/16HEX X5L	HW1886	1
0099	MANUAL,COMPACT PIPE RANGER- 060115	WM901	1
0100	SHIM,ROUND,.167ID X .248 OD X .020	HW1595	2
0102	MRO-RET.COMP,.005GP,ND530125-50,GRN	440072	1
0103	MRO-GASKET MAKER,FASTGASKET,BLK	445067	1
0104	MRO-ANTI-SEIZE,LPS NICKEL,P/N 03908	CS407	1
0105	MRO-REMOVABLE LCK,ND 121200-50,BLUE	440061	1
0106	MRO-GREASE,SYNTH,SIL-PTFE,14-OZ	CS476	1
0107	MRO-LUBRICANT,O-RING 2 OZ TUBE	439986	1
0108	TUBE,SHRINK,BLACK 3/32"	712595	1
0110	WIRE,#24 RED TEFLON	713337	1
0111	WIRE,#24 WHITE TEFLON	713344	1
0112	WIRE,#24 BLACK TEFLON	713335	1
0113	WIRE,#22,GREEN,TEFLON	EC1619	1
0114	WIRE,#22,ORANGE,TEFLON	EC1618	1
0115	WIRE,#24 GRAY 250'TEFLON	713347	1
0116	TUBE,SHRINK,BLUE 1.5"	715039	1
0117	MRO-TAG WARNING NO HI GEAR&12"PNEU	WT095-1	1
0118	SCREW,SET,CUP PT,#6-32X1/8LG SST	100046	2
0119	MRO-PERMANENT LOCK,ND 140500-2,RED	CS238	1
0133	SCREW,FLT UNDCUT,6.32X.25,18-8,SS	HW1975	4
0134	BEARING,INNER,WHEELED SHAFT,CPR	WM220	4
0135	BEARING,BUSH,INNER,WORM SHAFT,CPR	WM221	2
0136	BEARING,OUTER,WORM SHAFT,CPR	WM222	2

TRANSPORTER ASSY, CPR 60V (See Figure 1),Rev. -, WM360			
Item #	Description	P/N	Qty
0138	TOOL,TORQUE WRENCH,3/8”DR.MICROMETR	CS472	1
0139	TOOL,3/8”DR,1/4”HEX BIT SOCKET	CS474	1
0140	TOOL,3/8DR,1/2”X6POINT SOCKET	CS486	1
0141	TUBE,SHRINK,RED 3/16”RNF	712591	1
0142	ANTI-SEIZE,BRSH,NICKL GRAF,2 OZ	CS488	1
0143	LABEL,1-1/8”X3-1/2”,AVERY 4150	CS491	1
0144	MRO-THERMAL COMPOUND-ARCTIC SILVER5	CS608	1

FIGURE 2. INSTR.SHT,CPR,18-24",W/MANUAL LIFT,WM904-INST

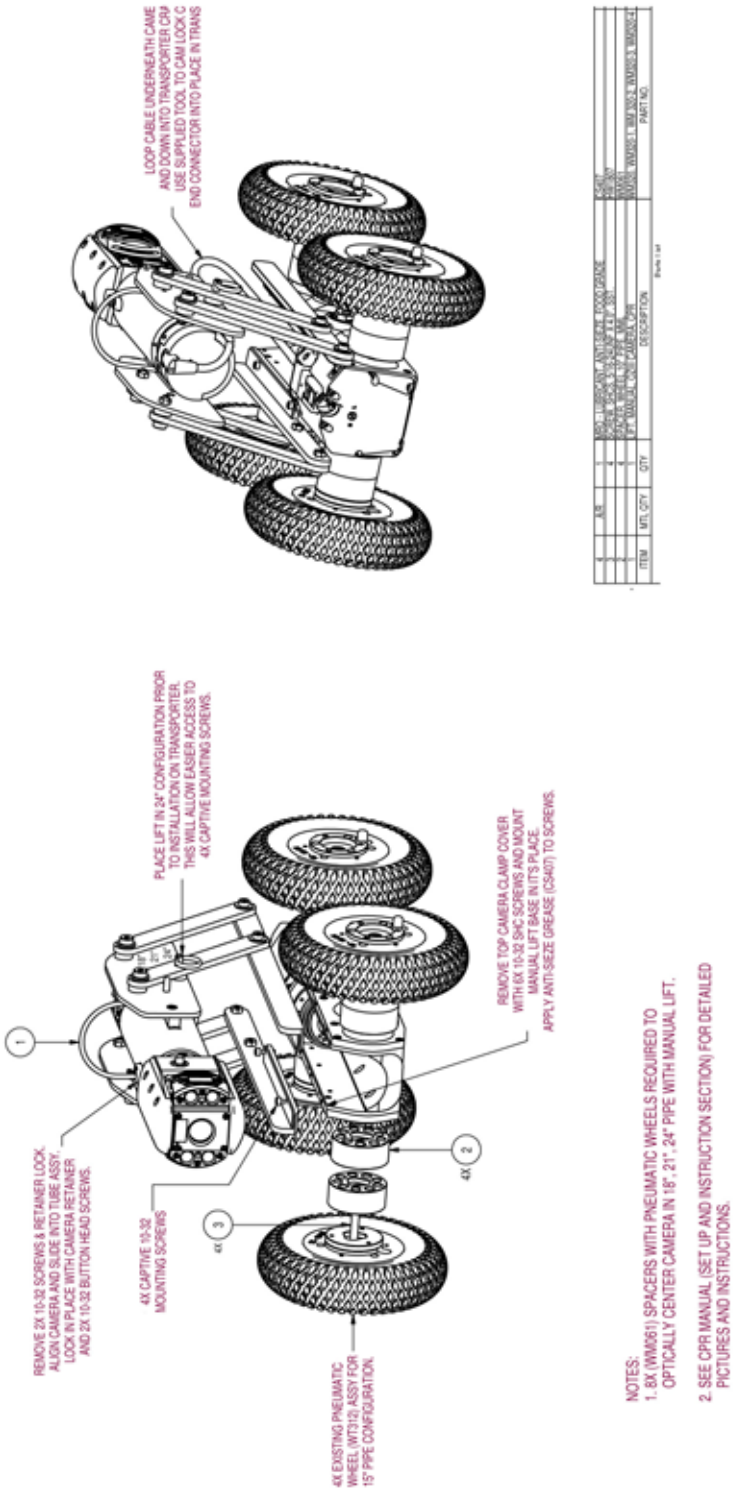
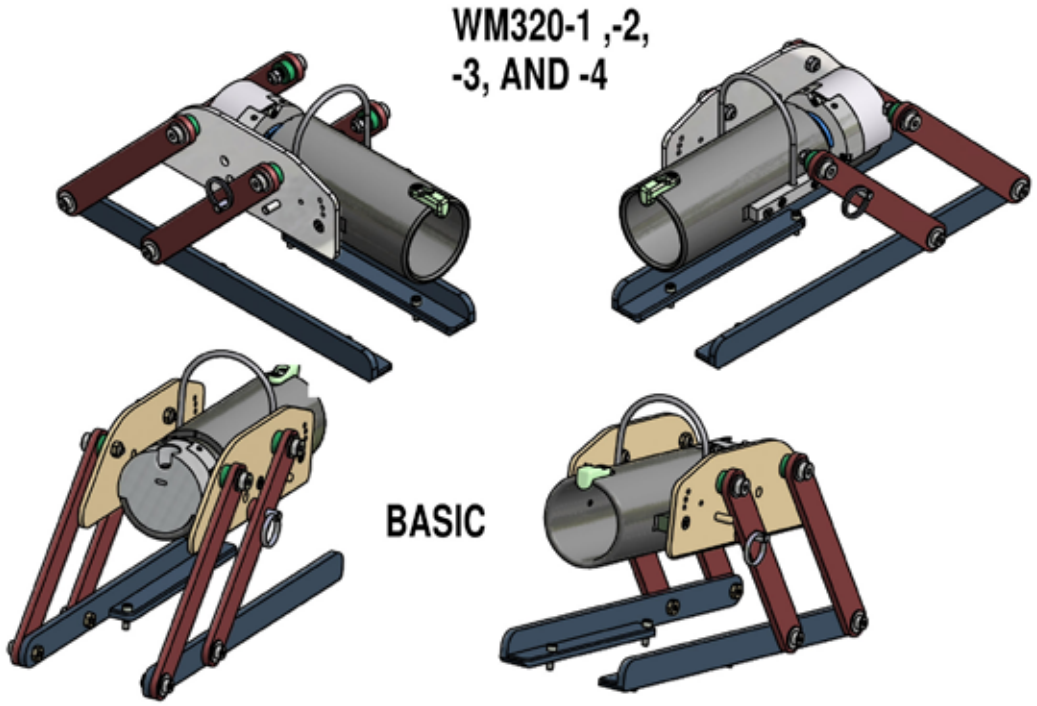


FIGURE 3A. LIFT,MANUAL,OZ III CAM,CPR, WM320



CONFIGURATION LIST		
PART NUMBER	DESCRIPTION	CONFIGURATION
WM320	LIFT, MANUAL, OZIII CAMERA, CPR. SST OBSOLETE	BASIC
WM320-1	LIFT, MANUAL, OZIII CAMERA, CPR.ALUM, REAR MNT CONN	-1
WM320-2	LIFT, MANUAL, OZIII CAMERA, CPR, SST, REAR MNT CONN	-2
WM320-3	LIFT, MANUAL, OZIII CAMERA, CPR.ALUM, REAR MNT CONN, SONDE	-3
WM320-4	LIFT, MANUAL, OZIII CAMERA, CPR.SST, REAR MNT CONN, SONDE	-4

FIGURE 3B. LIFT,MANUAL,OZ III CAM,CPR, WM320

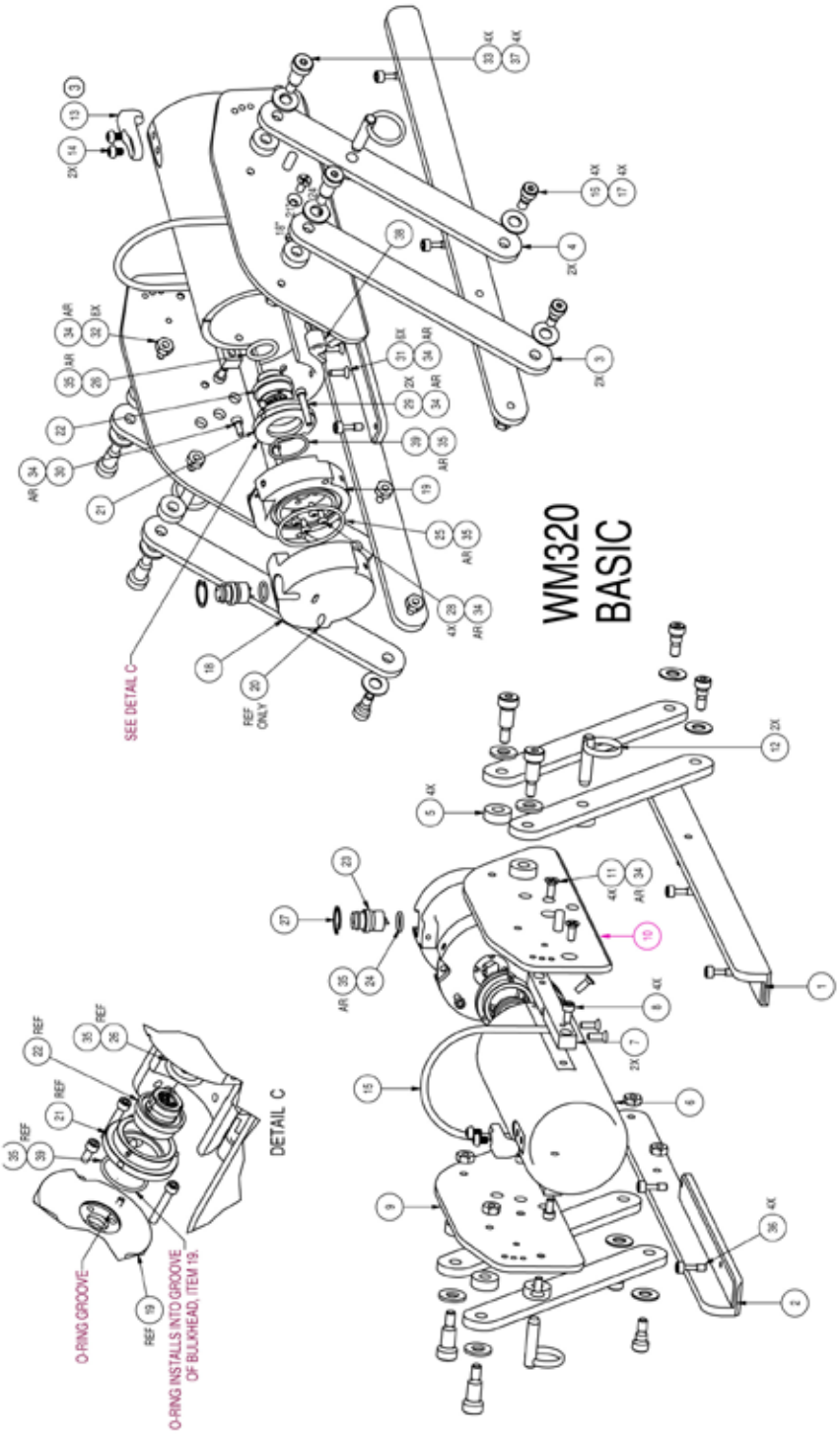
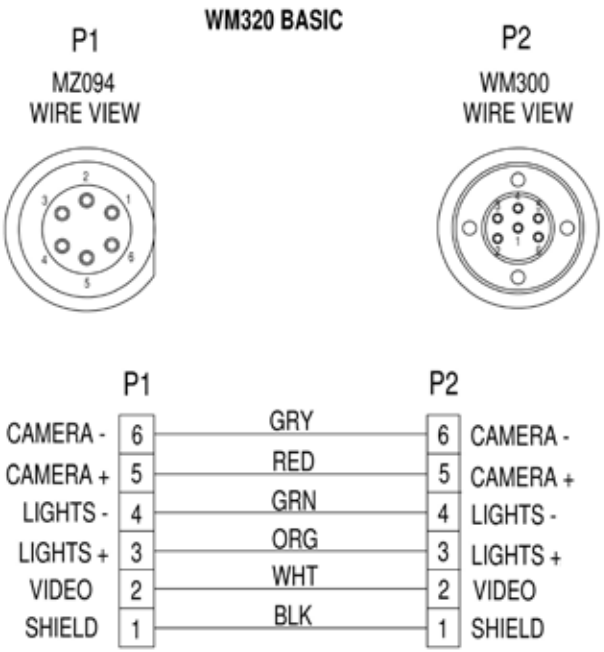


FIGURE 3C. LIFT,MANUAL,OZ III CAM,CPR, WM320



WM309 CABLE LOCKING ADAPTER PARTS

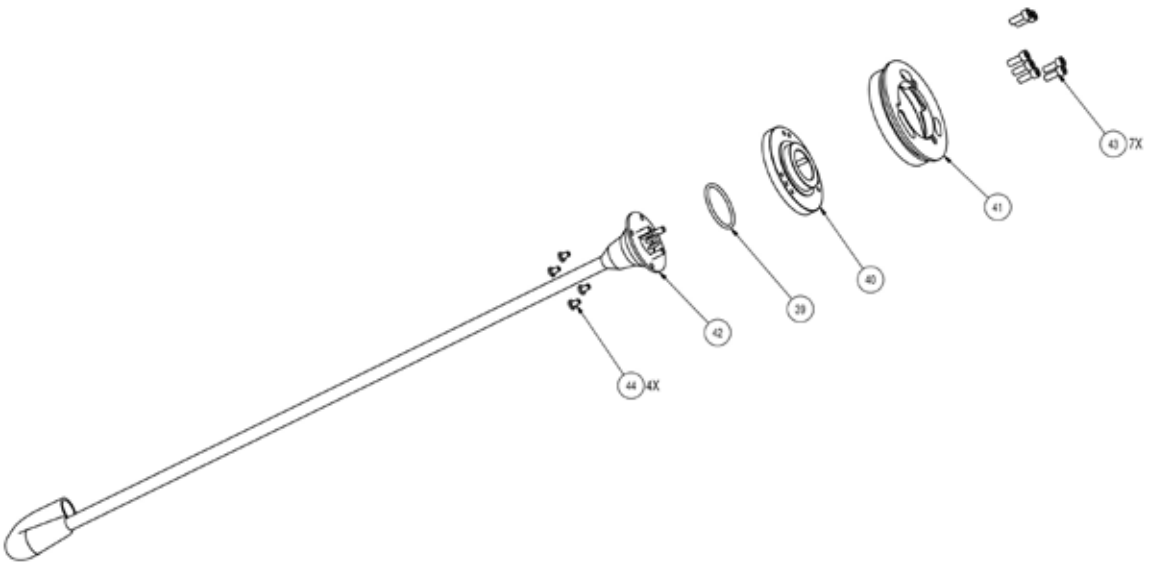
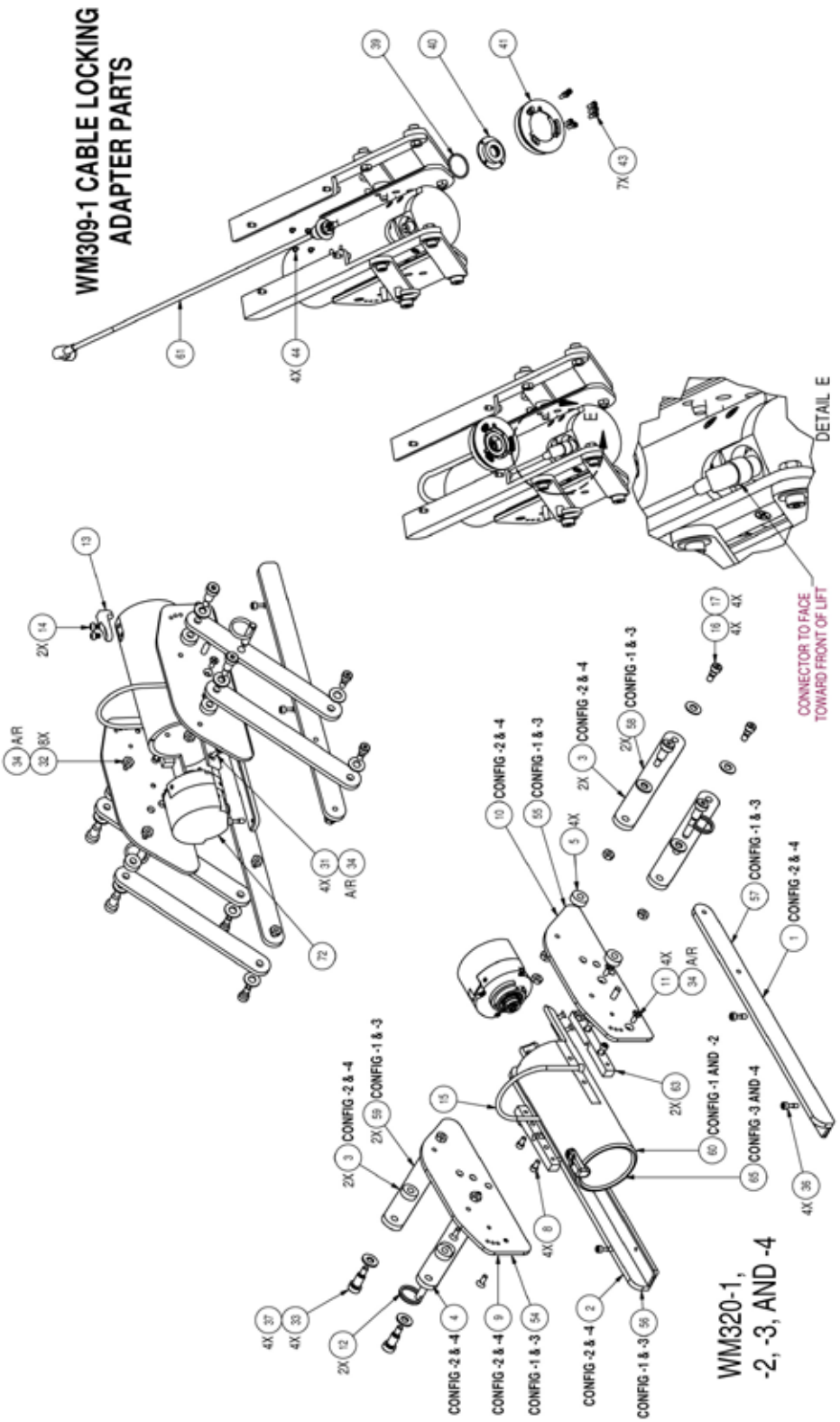


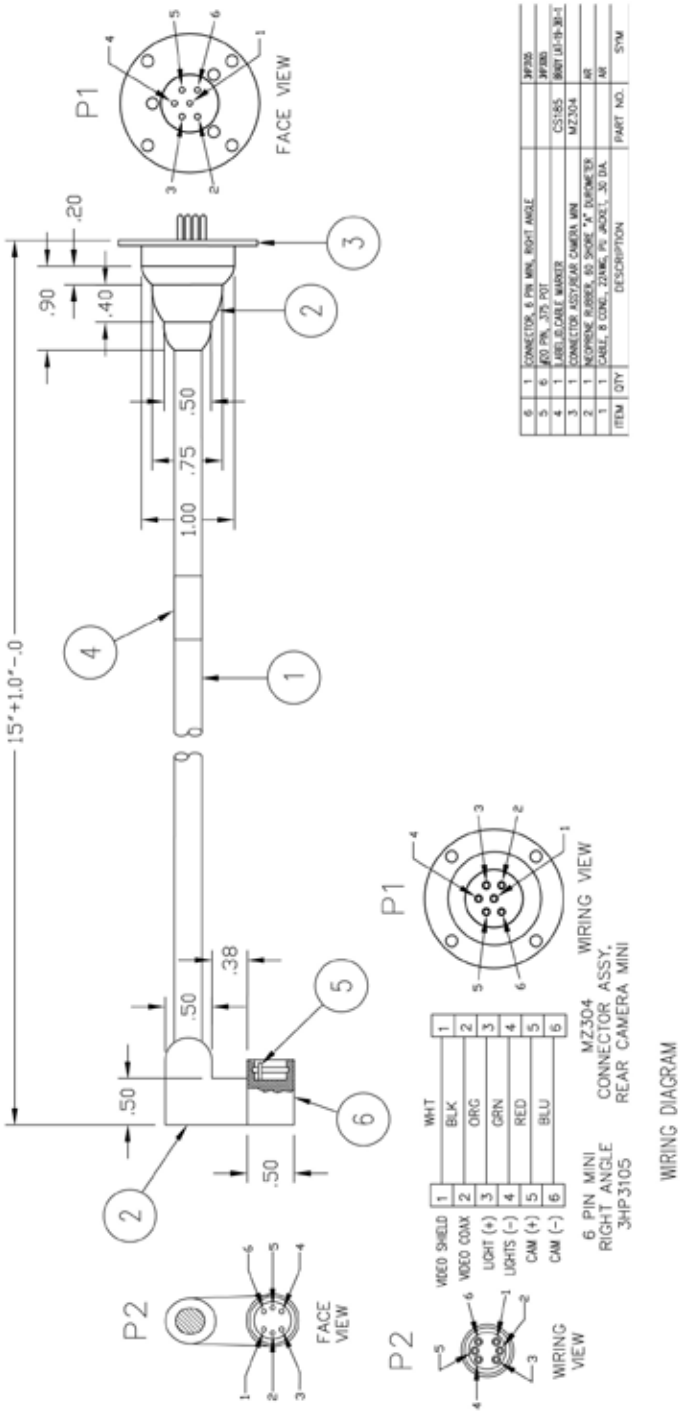
FIGURE 3D. LIFT,MANUAL,OZ III CAM,CPR, WM320



LIFT,MANUAL,OZ III CAM,CPR (See Figure 3), Rev. J, WM320			
ITEM #	DESCRIPTION	P/N	QTY
1	BASE,MOUNTING,RIGHT,LIFT,CPR	WM113-1	1
2	BASE,MOUNTING,LEFT,LIFT,CPR	WM113	1
3	ARM,REAR,MANUAL LIFT,CPR	WM114	2
4	ARM,FRONT,MANUAL LIFT,CPR	WM114-1	2
5	SPACER,ARM,MANUAL LIFT,CPR	WM111	4
6	TUBE,MOD,OZIII,MAN LIFT,CPR,OBS	WM110	1
7	BAR,MOUNT,CAM TUBE,CPR,OBS	WM115	2
8	SCREW,CAP,SKT HD,10-32X3/8,SST	103030	4
9	PLATE,SIDE,LEFT,CAM,LIFT,CPR	WM112	1
10	PLATE,SIDE,RIGHT,CAM,LIFT,CPR	WM112-1	1
11	SCREW,FLAT,10-32X1/2 SST	103052	4
12	PIN,QUICK RELEASE,5/16 X 0.8 LG	HW1775	2
13	RETAINER,CAMERA,OZIII-US 21 KIT	MZ097	1
14	SCREW,BUTTN HD,SKT,10-32 X ¼,SST	HW1520	2
15	CABLE,TOW,F/6”(150MM)PACKER	120106	1
16	BOLT,SHOULDER,5/16X5/16X1/4-20,SST	HW1774	4
17	WASHER,FLAT,5/16 SST	101741	4
18	BULKHEAD,REAR,OZIII-US 21 KIT	MZ095	1
19	BULKHEAD,FRONT,OZIII-US 21 KIT	MZ096	1
21	NUT,TWIST LOCK,6-PIN	WM021	1
22	CONNECTOR,TWIST LOCK,FEMALE,6 SCKT	WM300	1
23	CONNECTOR,BULKHD,6P,OZIII-US 21 KIT	MZ094	1
24	O-RING,2-013,SILICONE	HW1658	1
25	O-RING,2-132,SILICONE	HW1659	1
26	O-RING,17MM ID X3MMW,BUNA,SHOREA70	HW1772	1
27	RING,RETAINING,INT,11/16,SST	HW1670	1
28	SCREW,BUTTON HD 6-32X5/16 SST SKT	HW770	4
29	SCREW,CAP,SKT HD,8-32X1.00,SST	103068	2
30	SCREW,SHCS,8-32X3/8 SST	100448	1
31	SCREW,8-32X1/2 FL,PH,SS	103062	6
32	NUT,JAM,1/4-20,SST	HW1291	8
33	BOLT,SHOULDER,5/16 X 5/8,18-8 SST	HW1714	4
34	MRO-REMOVABLE LCK,ND 121200-50,BLUE	440061	1
35	MRO-LUBRICANT,O-RING 2 OZ TUBE	439986	1
36	SCREW,CAPTIVE,SHCS,10-32X5/8 SST	HW838	4
37	WASHER,FLAT,THICK,5/16 X .082-.104	HW1773	4
38	CLAMP,TUBING INSULATED,1/4”	121107	1
39	O-RING,2-022 BUNA	712565	2

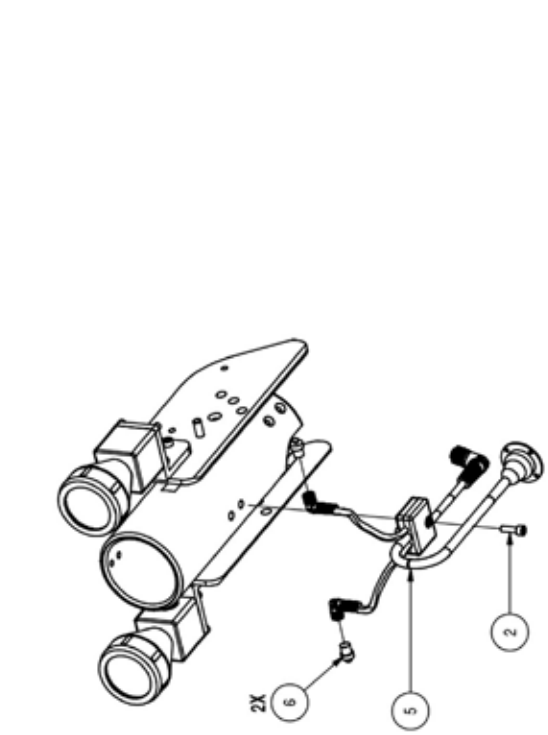
LIFT,MANUAL,OZ III CAM,CPR (See Figure 3), Rev. J, WM320			
ITEM #	DESCRIPTION	P/N	QTY
43	SCREW,CAP,SKT HD,6-32X3/8,SST	105071	7
44	SCREW,PAN,4-40X3/16 SST	HW236	4
45	TOOL,CHISEL,5/32TIP X 5/16HEX X5L	HW1886	1
46	WIRE,#24 GRAY 250'TEFLON	713347	1
47	WIRE,#24 RED TEFLON	713337	1
48	WIRE,#24 GREEN TEFLON	713340	1
49	WIRE,#24 ORANGE TEFLON	713338	1
50	WIRE,#24 WHITE TEFLON	713344	1
51	WIRE,#24 BLACK TEFLON	713335	1
52	TUBE,SHRINK,BLACK 3/32"	712595	1
53	TUBE,SHRINK,BLACK 1/8"	712789	1
68	INSTR.SHT,CPR,18-24",W/MANUAL LIFT	WM904-INST	1
69	SCREW,SHCS,5/16-24UNF X 4.0",SST	HW1807	4
70	ANTI-SEIZE, BRSH NICKEL GRAF, 2 OZ	CS488	1
72	BULKHEAD ASSY, OZIII CAMERA, TUBE MOUNT	WM334	1

FIGURE 4. CABLE ASSY,CPR WITH MANUAL LIFT, WM309



ITEM	QTY	DESCRIPTION	PART NO.	SYM
6	1	CONNECTOR, 6 PIN MINI, RIGHT ANGLE	3HP305	
5	6	.100 PIN, .375 POST	3HP380	
4	1	LABEL,ID,CABLE MARKER	CS1865	BRADY LAT-19-361-1
3	1	CONNECTOR ASSY,REAR CAMERA MINI	MZ304	
2	1	NEOPRENE RUBBER, 65 SHORE "A" DUROMETER		AR
1	1	CABLE, 8 COND., 22AWG, PU JACKET, .30 DIA.		AR

FIGURE 5A. INSTRUCTION SHEET, KIT, EXTERNAL LIGHT, CPR MANUAL LIFT, WM910-



ITEM	QTY	DESCRIPTION	PART NO.	NOTES
1	1	LIGHT HEAD ASSY, EXTERIOR LIGHT HEAD, CPR MANUAL LIFT	WM340	
2	5	SCREW, STD CAP, HEX SKT, 10-32 X .625, 18-8 SS	#W134	
3	1	LIGHT HEAD ASSY, EXTERIOR LIGHT HEAD, CPR MANUAL LIFT	WM340-1	
4	1	-	-	
5	1	CABLE ASSY, CPR TO WAND LIFT, EXT LIGHT	WW333	
6	1	CAP, CLOSURE, 3MM, MALE THREAD, TORX PSG-CC	EC1881	REFERENCE ONLY
7	4	SCREW, PAN PHIL, 4-40 X .187, 18-8 SS	#W236	REFERENCE ONLY
8	1	O-RING, 2-222, BUNA-N, SHORE A 70	#Y2565	REFERENCE ONLY
9	1	BULKHEAD REAR CONNECTOR, QWIK	#W116	REFERENCE ONLY
10	1	LOCK RING, REAR CONNECTOR, MINI QV CAMERA	MV039	REFERENCE ONLY
11	1	SCREW, STD CAP, HEX SKT, 6-32 X .375, 18-8, SST	105071	REFERENCE ONLY
12	1	MRO-REMOVABLE LOCKNUT 212200-50 BLUE	#40061	AR

FIGURE 5B. INSTRUCTION SHEET, KIT, EXTERNAL LIGHT, CPR MANUAL LIFT,

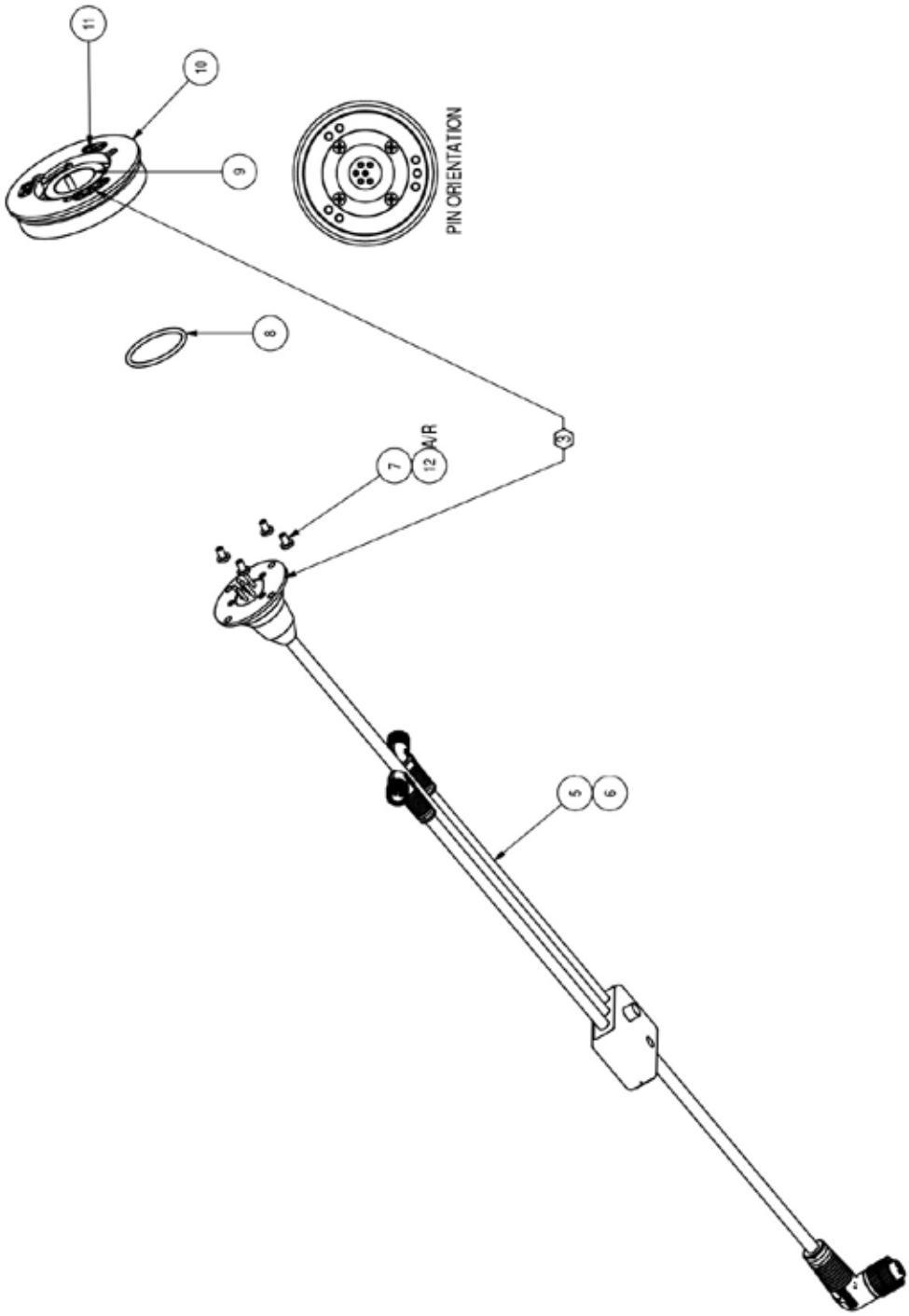


FIGURE 6. INSTRUCTION SHEET, KIT, CPR POWER LIFT, WM330-INST

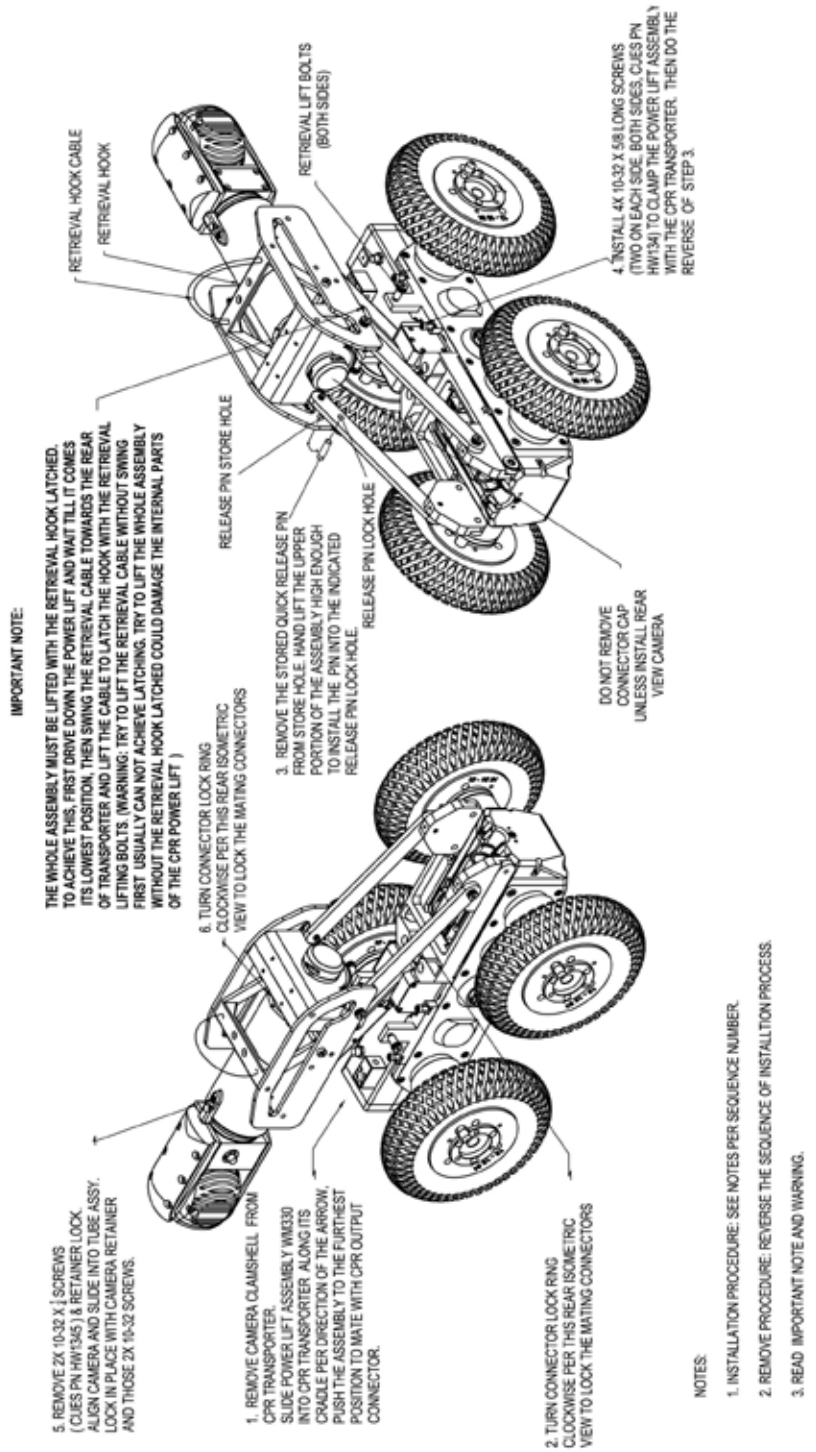


FIGURE 7A. POWER LIFT ASSEMBLY, MINI TRANSPORTER, WM330

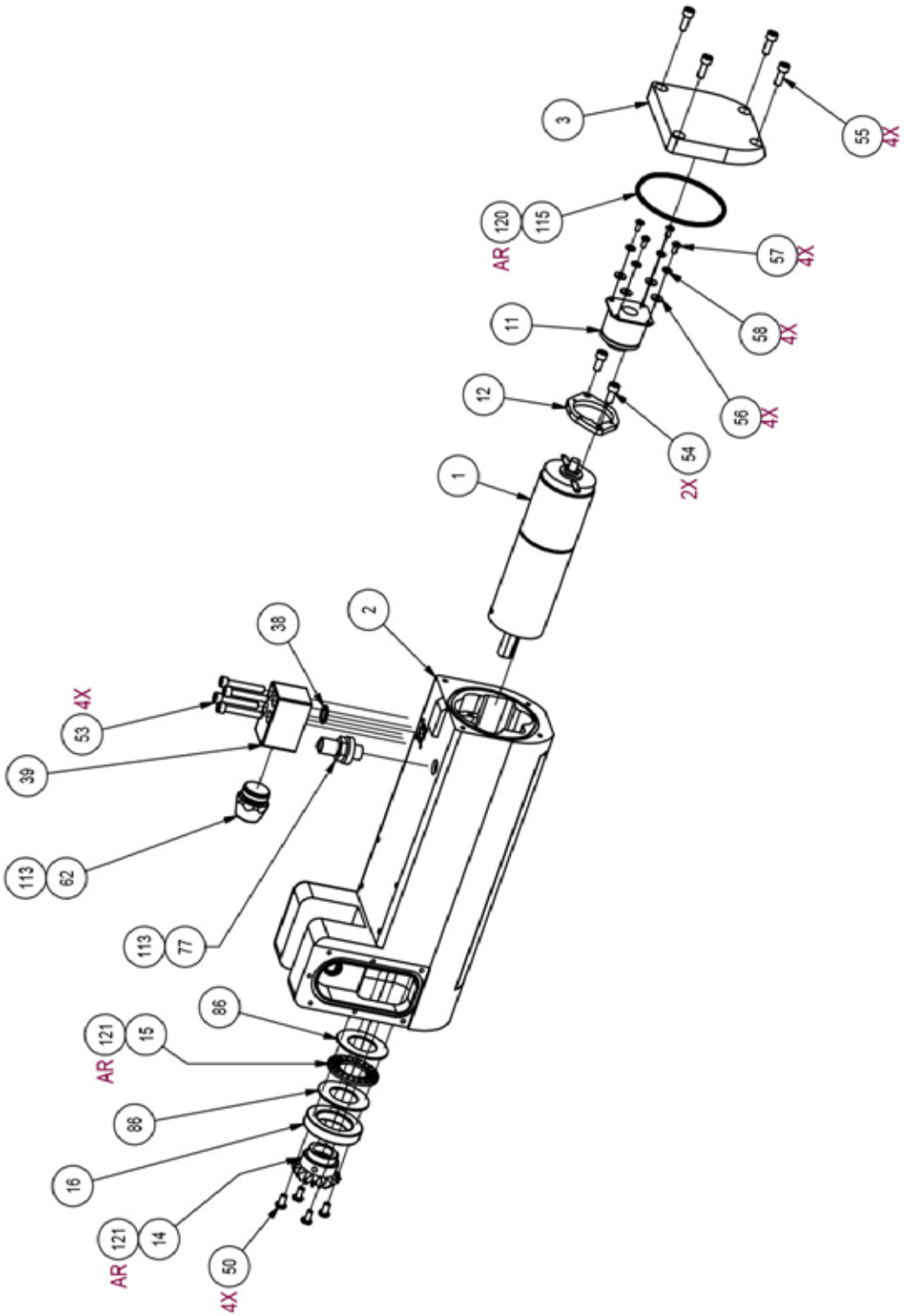


FIGURE 7B. POWER LIFT ASSEMBLY, MINI TRANSPORTER, WM330

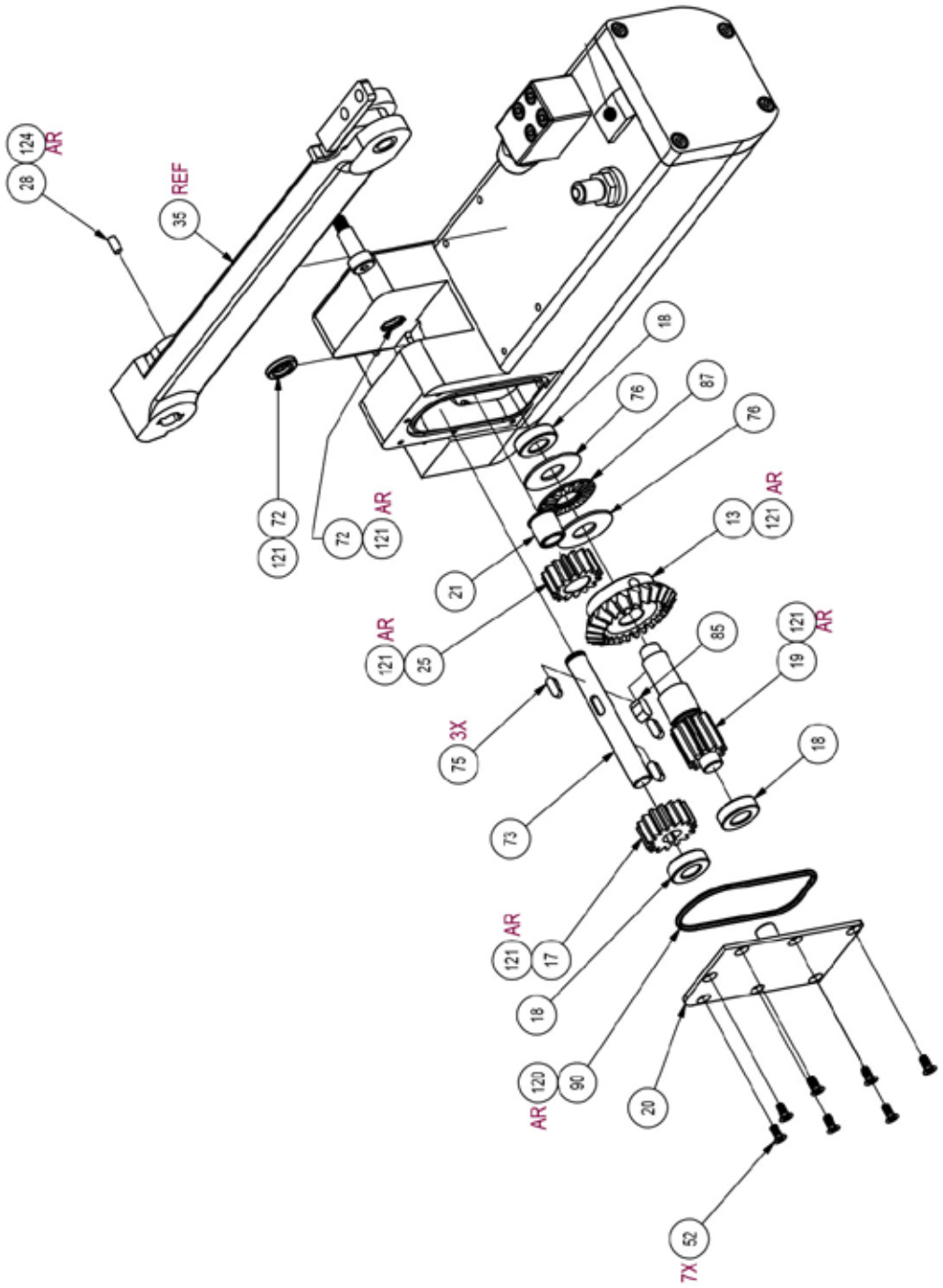


FIGURE 7C. POWER LIFT ASSEMBLY, MINI TRANSPORTER, WM330

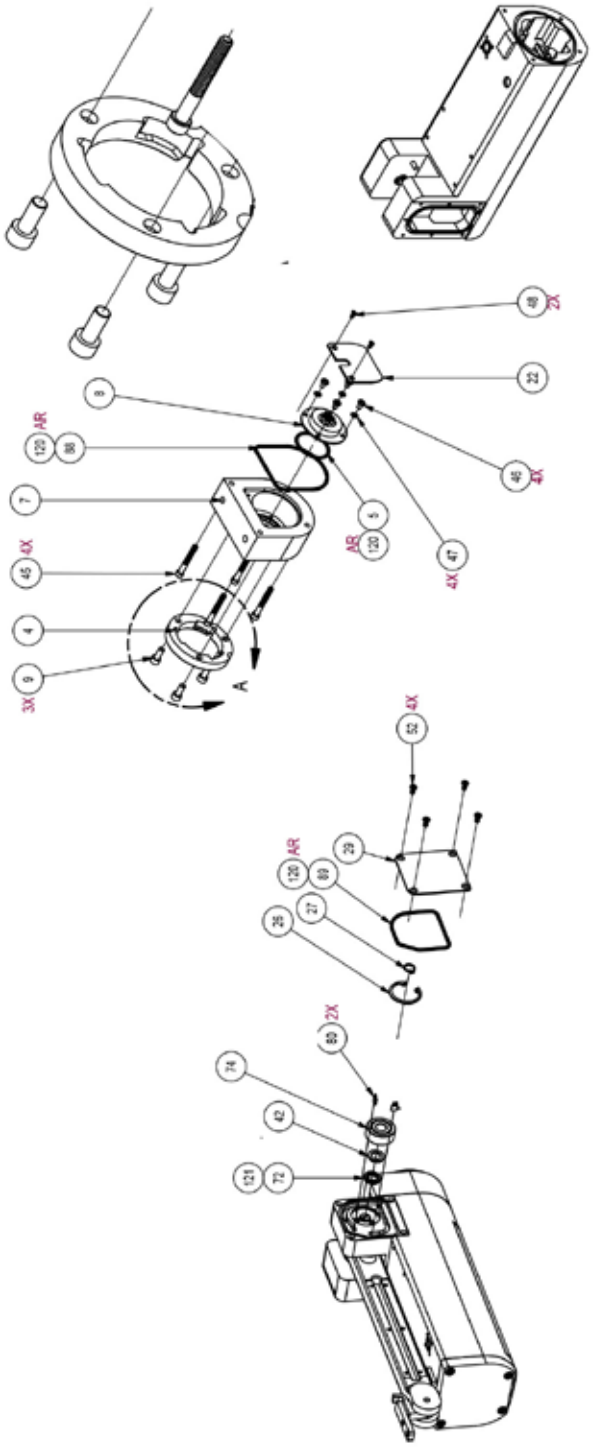


FIGURE 7D. POWER LIFT ASSEMBLY, MINI TRANSPORTER, WM330

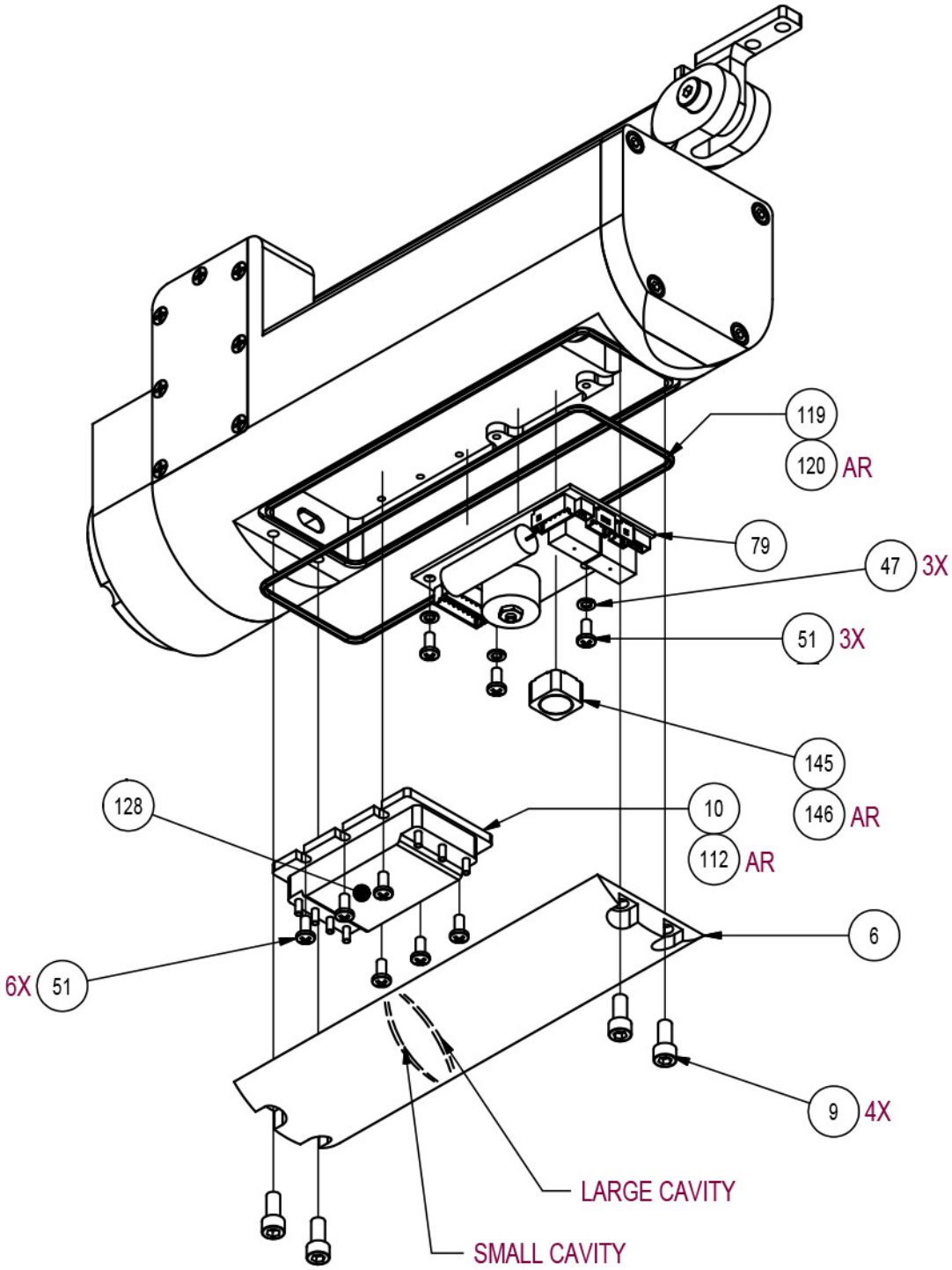


FIGURE 7E. POWER LIFT ASSEMBLY, MINI TRANSPORTER, WM330

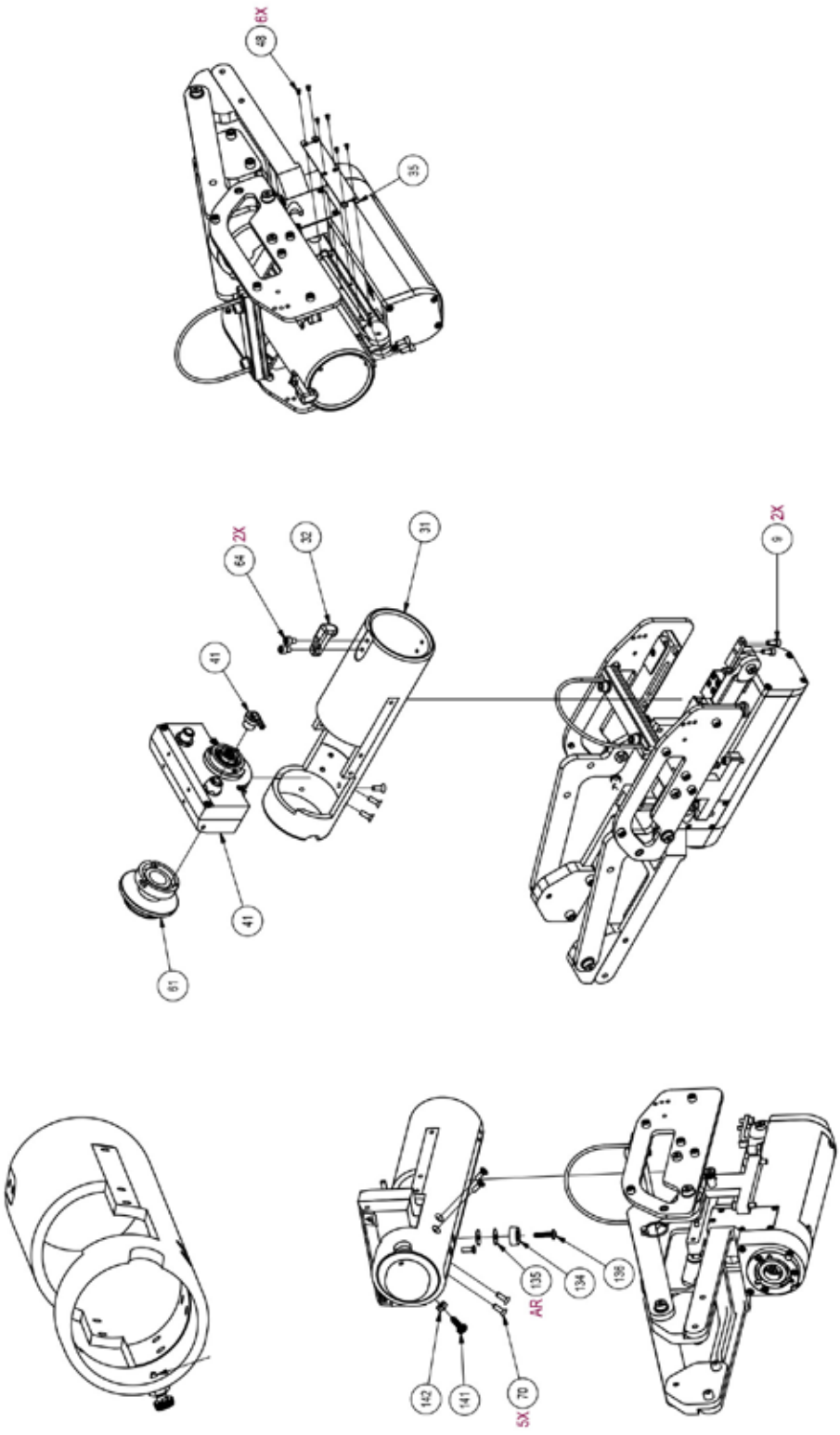
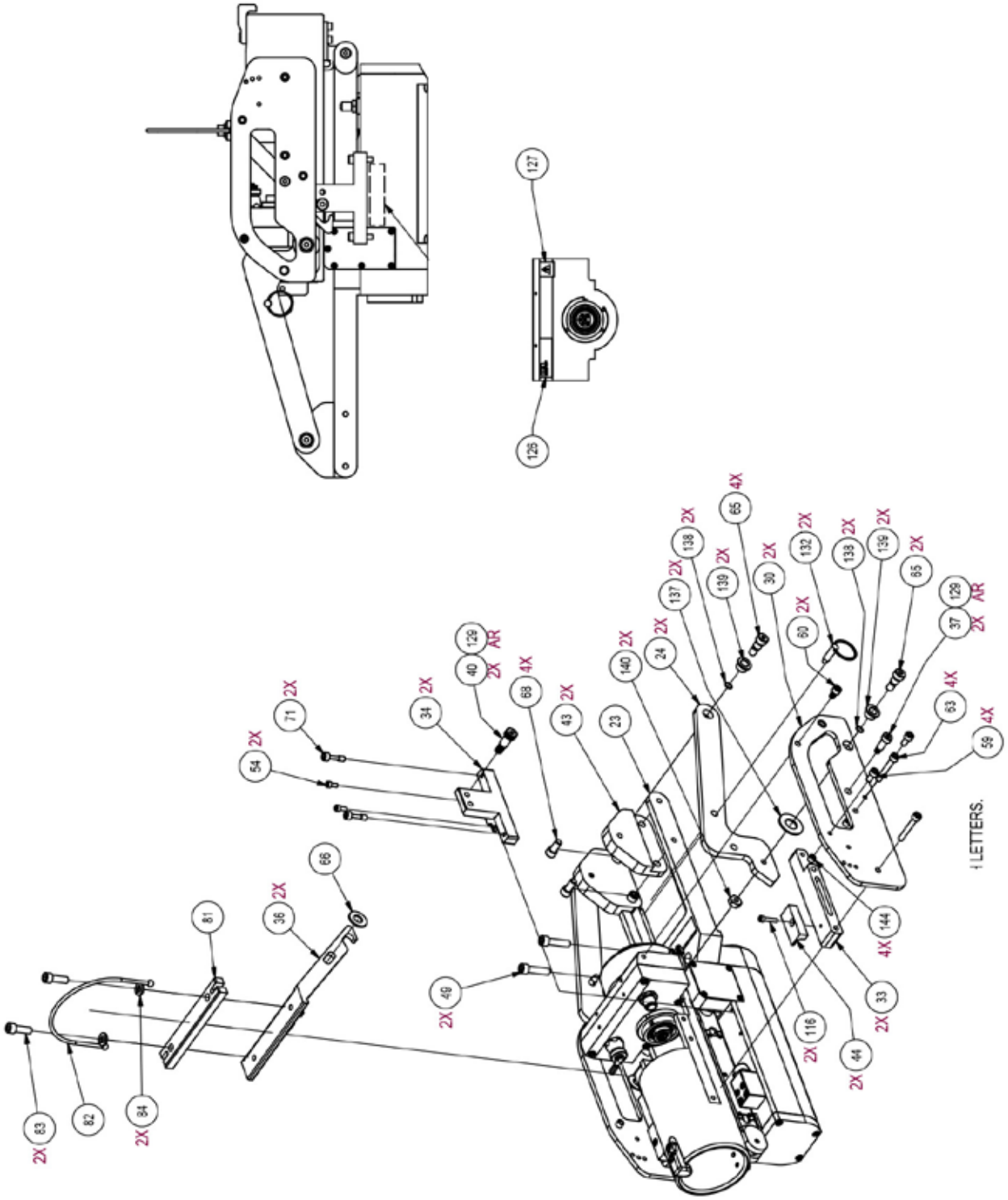


FIGURE 7F. POWER LIFT ASSEMBLY, MINI TRANSPORTER, WM330



POWER LIFT ASSEMBLY, MINI TRANSPORTER (See Figure 7), Rev. J, WM330			
Item #	Description	P/N	Qty
0001	MOTOR,GEAR,246:1 RAT,24VDC,W/PINS	WS042-1	1
0002	HOUSING,DR MODULE,PWR LIFT,CPR	WM230	1
0003	COVER,END,PWR LIFT,CPR	WM233	1
0004	LOCKRING,MODULE,PWR LIFT,CPR	WM246	1
0005	O-RING,2-022 BUNA	712565	1
0006	COVER,BOTTOM,PWR LIFT,CPR	WM232	1
0007	HOUSING,MODULE CONN,PWR LIFT,CPR	WM231	1
0008	CONNECTOR ASSY,REAR CAMERA MINI	MZ304	1
0009	SCREW,SHCS,8-32X3/8 SST	100448	9
0010	CONVERTER,DC-DC,15V,2A	EC1785	1
0011	BRAKE,FLNG MNT,5MM BORE,CPR LIFT	WM259	1
0012	BRACKET,BREAK,PWR LIFT,CPR	WM256	1
0013	GEAR,BEVEL,24T,PWR LIFT,CPR	WM235	1
0014	GEAR,BEVEL,16T,PWR LIFT,CPR	WM236	1
0015	BEARING,THRUST,17MM ID	HW2027	1
0016	BEARING,GEARHD RAD SUPRT,P-LIFT,CPR	WM260	1
0017	GEAR,SPUR,15T,PWR LIFT,CPR	WM237	1
0018	BUSHING,5/16IDX.65ODX.2T,P-LIFT,CPR	WM262	3
0019	SHAFT,BEVEL GEAR,PWR LIFT,CPR	WM238	1
0020	COVER,GEAR BEARING SPPRT,P.LIFT,CPR	WM234	1
0021	BUSHING,IDLE GEAR,PWR LIFT,CPR	WM261	1
0022	PLATE,PARTITION,CONN HOUSG,P.L.CPR	WM243	1
0023	BRACKET,REAR LIFTING,PWR LIFT,CPR	WM253	1
0024	ARM,REAR,CPR POWER LIFT	WM283	2
0025	IDLE GEAR,SPUR,15T,PWR LIFT,CPR	WM252	1
0026	RING,SNAP,INT,7/8”BORE,SS	HW2069	1
0027	RING,SNAP,EXT,5/16”SHAFT,SS	HW2068	1
0028	MAGNET,ROD,NDFEB,.125 DIAX.25L,PLT	HW2205	1
0029	COVER,LIFTING SENSOR,PWR LIFT,CPR	WM254	1
0030	PLATE,SIDE,PWR LIFT,CPR	WM250	2
0031	TUBE,CAM HLDR,CPR P-LFT,R.VIEW CAM	WM284	1
0032	RETAINER,CAMERA,OZIII-US 21 KIT	MZ097	1
0033	SPACER,SIDE PLATE,PWR LIFT,CPR	WM251	2
0034	BRACKET,DR MODULE MNT,PWR LIFT,CPR	WM257	2
0035	ARM,CENTRAL LIFTING,PWR LIFT,CPR	WM240	1
0036	HOOK, ASSEM LIFTING, PWR LIFT,CPR	WM258	1
0037	SCREW,SHLD,1/4DIA X 1/2L,10-32,SS	HW2074	2
0038	O-RING,8MM IDX10MM ODX1MM W,BUNA-N	HW1824	1

POWER LIFT ASSEMBLY, MINI TRANSPORTER (See Figure 7), Rev. J, WM330			
Item #	Description	P/N	Qty
0039	BULKHEAD,DR MODULE,PWR LIFT,CPR	WM255	1
0040	BOLT,SHLD,5/16X5/8X1/4 SS	HW767	2
0041	BULKHEAD ASSY,CPR POWER LIFT	WM328	1
0042	SPACER,O-RING SEAL,CPR PWR LIFT	WM263	1
0043	BUMPER,REAR,PWR LIFT,CPR	WM266	2
0044	CABLE RETAINER,PWR LIFT,CPR	WM268	2
0045	SCREW,SKT HD CAP,6-32X1-1/8,SS	HW1995	4
0046	SCREW,PAN,4-40X3/16 SST	HW236	4
0047	WASHER,SPLIT #4 SST	100170	7
0048	SCREW,FLAT,PHIL,2-56X3/16",SST	HW1758	8
0049	SCREW,CAP,SKT HD,1/4-20X1,SST	101065	2
0050	SCREW,BTN,SKT,M3X6MM,STEEL	HW1894	4
0051	SCREW,PAN,4-40X1/4 MACHINE	HW227	9
0052	SCREW,FLAT,4-40X1/4 PHIL	712402	11
0053	SCREW,CAP,SKT HD,#6-32X.88LG SST	100128	4
0054	SCREW,CAP,SKT HD,6-32X5/16,SST	HW475	6
0055	SCREW,CAP,SKT HD,6-32X3/8,SST	105071	4
0056	WASHER,FLAT,NARROW #2 SST	100174	4
0057	SCREW,PAN,2-56X3/16 PHIL SST	103017	4
0058	WASHER,SPLIT LOCK,#2 SST	100438	4
0059	SCREW,CAP,SKT HD,10-32X3/8,SST	103030	4
0060	SCREW,CAP,HX,SKT,10-32X0.312,18-8SS	HW1882	2
0061	CAP,REAR VIEW CAM,BLKHD,CPR P-LFT	WM285	1
0062	RECEPTACLE,FRNT MNT,10-P,FEMALE	EC1758	1
0063	SCREW,CAP,SKT HD,10-32X1-1/4,SST	103040	4
0064	SCREW,CAP,SKT HD,10-32 X 1/4,SST	HW1345	2
0065	BOLT,SHLD,5/16 X 5/16,W/NYLOCK,PTCH	HW1061	4
0066	WASHER,THRUST,3/8IDX3/4OD,SAE 841	HW1852	2
0068	SCREW,CAP,SKT HD,1/4-20X1/2,SST	101001	4
0069	NUT,LOCK FLEX-TOP,1/4-20",18-8 SS	HW1286	2
0070	SCREW,8-32X1/2 FL,PH,SS	103062	5
0071	SCREW,CAPTIVE,SKT HD,10-32 X .75,SS	HW585	4
0072	O-RING,QUAD 3/32X5/16X½,BUNA-N 70A	HW2075	2
0073	SHAFT,CENTRAL LIFT ARM,PWR LIFT,CPR	WM239	1
0074	BEARING,BALL,5/16IDX7/8ODX11/32THK	HW2025	1
0075	KEY,UNDERSIZE,1/8X1/8X.320,SS	WM265	3
0076	WASHER,24MM OD X 10MM ID X 1MM THK	HW2066	2
0077	VALVE,PURGE,P&T	CP063	1

POWER LIFT ASSEMBLY, MINI TRANSPORTER (See Figure 7), Rev. J, WM330			
Item #	Description	P/N	Qty
0079	PCB ASSY,LIFT CNTRL,CPR PWR LIFT	WM404	1
0080	SENSOR,MAGNETORESISTIVE,F/700316	EC2233	2
0081	RETAINER,CABLE,LIFT HOOK	WS069	1
0082	CABLE,TOW,F/6"PACKER/PR&SPR LIFTS	120106	1
0083	SCREW,CAP,SKT HD,1/4-20X3/4,SST	101022	2
0084	WASHER,SPLIT LOCK,1/4"SST	101740	2
0085	KEY,UNDERSIZE,3/16X3/16X.335,SS	WM264	1
0086	WASHER,30MM OD X 17MM ID X1MM THK	HW2067	2
0087	BEARING,THRUST,10MM ID	HW2026	1
0088	O-RING,2-034,SILICONE	HW682	1
0089	O-RING,2-031 SILICONE	130150	1
0090	O-RING,2-032,SILICONE	HW2078	1
0091	WIRE,#24 BLACK TEFLON	713335	1
0092	WIRE,#24 RED TEFLON	713337	1
0093	WIRE,#24 WHITE TEFLON	713344	1
0094	WIRE,#24 GRAY	713343	1
0095	WIRE,#24 GREEN TEFLON	713340	1
0096	WIRE,#24 YELLOW TEFLON	713339	1
0097	WIRE,#24 ORANGE TEFLON	713338	1
0098	WIRE,#24 BROWN TEFLON	713336	1
0099	WIRE,#30 GREEN TEFLON	713210	1
0100	WIRE,#30 RED TEFLON	713207	1
0101	WIRE,#30 WHITE/GREEN TEFLON	713215	1
0102	WIRE,#30 WHITE/ORANGE TEFLON	713216	1
0103	RECEPTACLE,10PIN,MOLEX .079	EL635	1
0104	RECEPTACLE,6PIN,MOLEX .079CTN	EL634	1
0105	HOUSING,2-PIN,2MM	712864	1
0106	RECEPTACLE,3PIN,MOLEX .079CTN	EL633	1
0107	CONNECTOR,RECEPT,HOUSING,3-PIN	EC1652	1
0108	CONN,RECEPT,HOUSING,4 PIN	EC548	1
0109	CONTACT	715087	21
0110	SOCKET,CRIMP,F/DF13,1.25MM CONN	EC549	6
0111	MRO-REMOVABLE LCK,ND 121200-50,BLUE	440061	1
0112	MRO-COMPOUND,SILCONE HEATSINK	445079	1
0113	MRO-SEAL.HGH PRESS,ND 440400-50,BRN	445091	1
0114	HOUSING,8-PIN,2MM MOLEX	EC1427	1
0115	O-RING,2-033 SILICONE	132220	1
0116	SCREW,CAP,SKT HD,#6-32X5/8 LONG	101136	2

POWER LIFT ASSEMBLY, MINI TRANSPORTER (See Figure 7), Rev. J, WM330			
Item #	Description	P/N	Qty
0117	CABLE ASSY,10-P TO 10-P,POLYURETHNE	EC1760	1
0118	TOOL,CHISEL,5/32TIP X 5/16HEX X5L	HW1886	1
0119	O-RING,2-046 SILICONE	HW2077	1
0120	MRO-LUBRICANT,O-RING 2 OZ TUBE	439986	1
0121	MRO-GREASE,MOBIL 1 SYNTHETIC	CS419	1
0122	MRO-RET.COMP,.015GP,ND541200-50,GRN	CS092	1
0123	TUBE,SHRINK,1/16”	712593	1
0124	MRO-ADHES.INSTANT,ND 310035-28,CLR	440094	1
0125	INSTRUCTION SHEET,CPR PWR LIFT	WM330-INST	1
0126	LABEL,THERMAL XFR,1.500”W X .500”H	CS221	1
0127	LABEL,LASERTAB MARKER, .560 X .560	CS222	1
0128	DESSICANT,.25G	MS116	1
0129	MRO-PERMANENT LOCK,ND 140500-50,RED	440060	1
0130	WIRE,#30 ORANGE TEFLON	713208	1
0131	WIRE,#30 WHITE/RED TEFLON	713217	1
0132	PIN,QUICK RELEASE,.25X.6,SST	HW2215	2
0134	BUMPER,POLYURETHANE	130055	1
0135	WASHER,FLAT,.188IDX.625ODX.063T,STL	HW2143	2
0136	SCREW,TRUSS HEAD,8-32,3/4”LG,SST	HW2266	1
0137	BEARING,THRST,.050X1.00X.062,UHMW	HW2267	2
0138	WASHER,SHIM,.234X.303X.005,18-8,SST	HW2270	4
0139	BUSHING,FLANGE,FF-411-1	WS038	4
0140	NUT,JAM,1/4-20,SST	HW1291	2
0141	PIN,SPRING PLUGNER,10-32,KNOB,SST	HW2271	1
0142	NUT,JAM,10-32,SST	8799	1
0143	SAFETY WALK,BLACK MDM GR 6INX60FT	010550	1
0144	SPACER,THREADED,10-32X.187 AL	HW779	4
0145	INDUCTOR,POWER,1000UH,0.68A SMD	EC2009	1
0146	TUBE,SHRINK,BLACK 1/2”	712578	1

CUES STANDARD 12 MONTH WARRANTY

CUES ("CUES") warrants that all parts, components, and equipment manufactured by CUES shall be free from defects in material and workmanship under normal use and service for which it was intended for a period of twelve (12) months from the date of shipment of materials by CUES to the purchaser. CUES' obligation under this warranty is limited, at CUES' option, to replacing or repairing, free of charge, any defective materials returned, freight prepaid, to the CUES designated service facility. For all warranty claims, the materials must be returned in accordance with CUES Material Return Policy.

Major items of equipment, such as vehicles, generators, etc., furnished, but not manufactured by CUES, will be covered only under the warranty of the third party manufacturer of such equipment. Expendable parts, such as light bulbs, fuses, connectors, etc., are excluded from this warranty.

Purchaser must notify CUES of a breach of warranty not later than the last day of the warranty period; otherwise, such claims shall be deemed waived.

CUES does not warrant the materials to meet the requirements of the safety codes of any federal, state, municipal or other governmental or administrative jurisdiction. Purchaser assumes all risk and liability whatsoever resulting from the use of its products, whether used singly or in combination with other products, machines or equipment.

This Warranty shall not apply to any materials, or parts thereof, which have; (a) been repaired or altered by anyone other than CUES without CUES' written consent; (b) been subject to misuse, abuse, negligence, accident, or damage; (c) not been installed or operated in accordance with CUES' printed instructions, or; (d) been operated under conditions exceeding or more severe than those set forth in the specifications of design tolerance of the equipment.

THIS WARRANTY AND THE OBLIGATION AND LIABILITIES OF CUES HEREUNDER ARE EXCLUSIVE AND IN LIEU OF (AND PURCHASER HEREBY WAIVES) ALL OTHER WARRANTIES, GUARANTEES, REPRESENTATIONS, OBLIGATIONS, OR LIABILITIES, EXPRESSED OR IMPLIED, ARISING BY LAW OR OTHERWISE, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, REGARDLESS WHETHER OR NOT OCCASIONED BY CUES' NEGLIGENCE.

CUES SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE RESULTING, DIRECTLY OR INDIRECTLY, FROM THE USE OR LOSS OF USE OF THE MATERIALS, OR FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, ECONOMIC LOSSES, LOSS OF PROFITS, LOSS OF BUSINESS, OR LOSS OF BUSINESS OPPORTUNITY. Without limiting the generality of the foregoing, this exclusion from liability embraces Purchaser's expenses for downtime or for making up downtime, damages to property, and injury to or death of any persons.

CUES neither assumes nor authorizes any person (including employees, agents, or representatives of CUES) to assume for it any other liability, guarantee, or warranty in connection with the sale or use of the materials, and no oral agreements, warranties, or understandings exist collateral to or affecting this warranty.

This warranty shall not be extended, altered, modified, or waived except by a written instrument signed by CUES.

SAFETY PRECAUTIONS

Precautions must always be taken when operating electronic equipment. Exposed wires, damaged equipment, or improper operation can lead to a dangerous situation.

Please take a few minutes and read this entire manual prior to operating the equipment. Follow all safety procedures and thoroughly inspect equipment prior to use each day. This will help the equipment retain it's full value and will reduce the risk of injury, property, and/or equipment damage.

- Read the entire manual before attempting to connect or operate any equipment.
- Connect and disconnect cables only when the electric power is turned OFF.
- Never remove protection covers from the equipment or power generator. Internal repairs should only be done by an authorized CUES technician.
- If using a portable generator, always place it in an open area away from other equipment, manholes or obstructions prior to start-up; do not use a portable generator in an enclosed area.
- Upon receipt of the equipment, check for visible damage. If there is any evidence of rough handling, if damage is found, or if any equipment is missing, please contact the CUES Customer Service at 1-800-327-7791.

PERSONAL SAFETY EQUIPMENT & TRAINING

CUES stresses the use of appropriate safety equipment while working in and around manholes and during system operation. Safety should constantly remain the utmost priority. NOTE: The user of CUES products is responsible for all training and operation under federal, state and local guidelines and regulations for both confined space entry and traffic control. Recommended safety equipment includes but is not limited to the following:

- Safety goggles
- Work gloves
- Steel-toed boots
- Reflective vests
- Hard hats
- Filter masks (full respirators may be necessary)
- Flashlights
- Safety lines
- Traffic warning signs
- Traffic cones
- Gas detectors
- Ventilation fans

CUES ® makes no warranty for the use of its products and assumes no responsibility for any errors or omissions in this document or for incidental or consequential damages resulting from misuse of the products.

CUES MATERIAL RETURN POLICY

To ensure the orderly return of CUES products from our customers and to assure proper credit and warranty replacements handled in a timely manner, CUES has implemented a MATERIAL RETURN AUTHORIZATION (MRA) SYSTEM. Please read and follow the instructions below to ensure your MRA is handled properly and efficiently:

1. Once it is determined that a CUES product needs to be returned, call the CUES Parts Department in Orlando at 1-800-327-7791.
2. CUES will provide an MRA number by phone and ask a few questions.
3. CUES will then mail or fax the MATERIAL RETURN AUTHORIZATION (MRA) FORM with the MRA number, or include it with the replacement parts, if applicable.
4. Follow all instructions on the MRA Form. Make 2 copies - one for your records and the other will be used as a packing list.
5. Place an MRA sheet in with the parts that are shipped back to CUES along with a copy of the original packing slip or invoice, if possible. Send only the parts originally agreed upon with your Parts Representative. Any deviations/changes will require an additional MRA.
6. Make sure to include a copy of the MRA form for a packing slip.
7. Write the MRA number on the outside of the box.
8. Please take care in packing the parts that are to be shipped back to CUES. Parts must be individually protected from each other and appropriate packing material must be used to prevent damage during shipping.
9. Freight on the material returned is to be prepaid by the customer. Depending on the warranty determination, CUES, at its' option, may credit freight charges both ways.
10. The parts must be returned to CUES within 5 days of receipt of the MRA for credit to be granted.

Under normal circumstances, a warranty determination can be made within 30 days, and if under warranty, the part will be replaced at no charge. A credit will be issued if you have already received a replacement part. No credits will be issued until CUES receives the defective part.

*******NOTE*******

CUES will not warrant look-alike parts sold by competitors and reserves the right to charge a restocking fee. CUES shall not be liable for any loss or damage resulting, directly or indirectly, from the use of the materials, or for special, indirect, or consequential damages, economic losses, loss of profits, loss of business, or loss of business opportunity.

Without limiting the generality of the foregoing, this exclusion from liability embraces purchaser's expenses for downtime or for making up downtime, damages to property, and injury to or death of any persons.

CUES neither assumes nor authorizes any person (including employees, agents, or representatives of CUES) to assume for it any other liability, guarantee, or warranty in connection with the sale or use of the materials, and no oral agreements, warranties, or understandings exist collateral to or affecting this warranty. This warranty shall not be extended, altered, modified, or waived except by a written instrument signed by an authorized CUES representative.

CUES MATERIAL RETURN AUTHORIZATION

Cust #:	Name:			Contact:	Date: 4/21/2004
Original SO #: N/A	SO Orig:	Dated:	New SO #:	S.O. To Be Credited:	
Return For:	Reason:	Territory	Prod. Ref. Cd: 51200	Orig:	
Explanation:					

	Items Returned
1 2 3 4 5 6	

To ensure your MRA is handled properly and efficiently, please follow the instructions below.

1. Ship parts back within five (5) business days of receiving your MRA number. Parts ordered in error are subject to a restocking fee.
2. Send only the parts originally agreed upon with your customer service representative. Any deviations will require an additional MRA.
3. Make a copy of this sheet and keep the original for your records. Use the copy as a packing slip.
4. Write the MRA number on the outside of the box.
5. Parts must be individually protected from each other (original packaging would be best) and appropriate packing material must be used to prevent against damage during shipping.
Note: If parts are not well protected and arrive at our facility damaged in any manner, we will automatically reject them and return them to you without credit.

PARTS WILL BE RETURNED TO CUSTOMER AT CUSTOMER EXPENSE WITHOUT AN MRA NUMBER DOCUMENTED ON BOX. CUES IS NOT RESPONSIBLE FOR SHIPMENT FROM CUSTOMER TO CUES.

Use this section as a Packing Slip.

Please remember to write the MRA number on the box.

MRA #:
XXXX

Return To:

Cues
3600 Rio Vista Avenue
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(407) 849-0190
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CUES PARTS & SERVICE

At CUES, we realize your return on investment is directly related to daily production in the field. By stocking the largest inventory of OEM equipment in our industry, CUES strives to ship all parts orders on the same day or within 24 hours after receipt of the order.

Whether you need a camera or a fuse, CUES will quickly process and ship your order in accordance with your schedule requirements! Our experienced parts professionals can help you with parts identification, shipping methods, equipment operation questions, and connect you to the correct specialist for troubleshooting!

CUES offers four convenient stocking locations that contain a large assortment of parts, finished products, portable, and truck mounted systems. Texas, Arizona, Oklahoma and Louisiana customers can be serviced by our local dealerships. Contact us at your most convenient stocking location! For authorized dealer locations, log onto our website at
www.cuesinc.com.

Parts can be ordered via phone or facsimile! For operating hours, contact information, and locations, log onto our website at www.cuesinc.com. Contact us at your most convenient stocking location! Log onto our website at www.cuesinc.com to view the CUES Parts Department & Dealers hours & locations.

CUES Parts Department: Parts turnaround is normally within 24 hours after receipt of order. Please note that special shipping arrangements can be made at the time of the order. All return shipments received at CUES freight collect will be refused upon delivery unless previously authorized by CUES personnel. Normal operating hours are 8am to 5pm, EST., Phone: 800-327-7791, Fax: 800-831-1184.

CUES Service Depot: Service turnaround is normally 72 hours or less upon receipt at our depot, excluding weekends and holidays. All return shipments received at CUES freight collect will be refused upon delivery unless previously authorized by CUES personnel. Normal operating hours are 8am to 5pm, EST., Phone: 800-327-7791.

West Coast

For West Coast Customers:
The parts and service depot is located at 1943 S. Augusta Court, Ontario, CA, 91761. Normal operating hours are 8am to 5pm, PST
Phone: 800-544-8695

Canada

For Canadian Customers:
The parts and service depot is located at 1675 Sismet Road, Unit 2 & 3, Mississauga, Ontario L4W1P9
Phone: 905-238-9178

Midwest

CUES Midwest:
www.cuesmidwest.com
2325 Parklawn Drive, Suite K
Waukesha, WI 53186
Phone: 262-717-3165
Fax: 262-717-3167

CUES RECORD OF REVISIONS

This Record of Revision page is designed to allow the manual user to determine the engineering/ manufacturing level to which the manual is written. As engineering changes to this hardware are made at CUES, necessary information in the manual will be revised to reflect those changes. The latest change level and the rationale for any change(s) will be explained in tabular format on this page to allow the manual user to be better equipped should the need arise to call CUES regarding technical information.

Original Manual	Revision	Revision Date	Change Description
Compact Pipe Ranger 60V Motor WM360	Original	031516	Initial Release
	1	062320	Updated manual to current configurations, procedures, matrices and drawings.

Innovation for over 50 Years

CUES is the world's leading manufacturer of closed circuit television video (CCTV) inspection, rehabilitation, pipe profiling equipment and asset inspection/decision support software. For over 50 years, CUES has provided innovative pipeline inspection technology and solutions to enable accurate condition assessment and proactive maintenance programs for buried infrastructure.

In addition to inspection equipment, CUES also designs, manufactures, and sells a broad range of pipeline rehabilitation and profiling equipment. These include chemical grouting systems for sewer line pipe joints capable of using a wide variety of grouting products. CUES also manufactures lateral reinstatement cutting systems which enable the reinstating of laterals in mainline sewers after they have been relined with any of a wide variety of liner materials. Pipe profiling is accomplished via Laser for Sonar based systems.

CUES has the most locations and dealers available to serve you! To find a local CUES facility, find the operating hours for a particular location, or to contact us at your most convenient stocking location, please log onto our website at www.cuesinc.com or call the CUES Corporate Headquarters in Orlando, Florida for more information.