



# RAPTOR™

Rumble Strip Handling Machine

## — INSTRUCTION MANUAL —



**CONTACT:**

Call 800.662.6338 to talk to a Customer Service Representative.

**HOURS:**

8 AM to 5 PM (E.T.)  
Monday through Friday



*Innovations for Safety®*

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# 1 - SAFETY INSTRUCTIONS

## 1.1 – SAFETY INSTRUCTIONS & HAZARD WARNINGS

**DANGER**

**DANGER**

**DANGER**

Severe injury or death may result if instructions are not followed.



**WARNING**

**WARNING**



Follow instructions carefully. Serious damage to equipment may result if instructions are not followed properly.

## INSTRUCTIONS

Follow these instructions to work safely and effectively. Keep these instructions available with RAPTOR. These instructions must be followed.

## 1.2 – ADDITIONAL SAFETY INSTRUCTIONS, TRANSPORT AND HANDLING

- » When not attached to a truck, move RAPTOR with a forklift. Do not attempt to move RAPTOR manually.
- » Place forklift forks under RAPTOR's frame, as indicated with "Lift Here" stickers.
- » Set the machine on a firm, level and stable surface only.

## INSTALLATION

- » Only trained operators should install RAPTOR onto the user's truck.
- » Only trained operators should load RoadQuake™ 2F Temporary Portable Rumble Strip (TPRS)\* onto RAPTOR once operators have installed RAPTOR onto truck.

## GETTING STARTED

- » Inspect RAPTOR for damaged parts before every use. Conduct a test of all functions before every use.
- » Use only if RAPTOR's safety and protective systems are in good working order.
- » Report any damage or malfunctions to the proper personnel.
- » After work, secure RAPTOR against any unintended or unauthorized use.
- » Use RAPTOR only for its intended purpose.

## STORAGE

- » Clean and store RAPTOR in a dry area, free of debris.
- » If storing RAPTOR for long periods of time: RAPTOR's wings may open partially, especially if the tray contains rumblestrips. Store RAPTOR in a location in which the wings can freely open, without obstruction. Or, use restraints on the upper ends of the wings to maintain RAPTOR in Transport Mode.

\*Some states may use other acronyms, like PRS, PTRS, or RS, to identify RoadQuake™ Temporary Portable Rumble Strips.

Picture courtesy of Pennsylvania Department of Transportation



## 1.3 – MECHANICAL HAZARDS

**DANGER**

**DANGER**

**DANGER**

**MECHANICAL HAZARD**

### DANGER! INJURIES MAY RESULT FROM

- » Moving parts
- » Pinch points
- » High pressure hydraulics
- » Maintain distance from moving parts.
- » Do not perform work on a moving machine.

## 1.3.1 – ELECTRICAL HAZARDS

Only trained personnel should perform work on RAPTOR's electrical components.

**DANGER**

**DANGER**

**DANGER**

**ELECTRICAL HAZARD**

### INJURIES: DANGER! ELECTROCUTION, ELECTRICAL SHOCK OR BURNS CAUSED BY

- » Direct contact
- » Defective insulation
- » Faulty maintenance or repairs

### CAUSES

- » Contact with uninsulated or live wires
- » Use of uninsulated tools
- » Inadequate inspection after maintenance work
- » Circuit breaker failure

### SAFETY ADVISORY

- » Before performing any maintenance, ensure RAPTOR is completely powered off.
- » Inspect electrical equipment at regular intervals.
- » Replace damaged cables immediately.
- » Always replace blown fuses.
- » Avoid contact with energized components.
- » Use only insulated tools.

# 1 - SAFETY INSTRUCTIONS



## 1.3.2 – NEODYMIUM MAGNET HAZARDS

### PACEMAKERS

- » Magnets may interfere with pacemakers and implanted cardiac defibrillators.

### MAGNETIC FIELDS

- » May damage devices such as cellular phones, laptops, disk drives, payment cards, data storage devices, watches, hearing aids, and speakers.



## 1.3.3 – NOISE LEVEL

Because the noise level of the machine is well below 70 decibels (dB), no hearing protection is required.

## 1.4 – PROPER USE

RAPTOR is designed exclusively for the transport, deployment, and retrieval of RoadQuake™ Temporary Portable Rumble Strips (TPRS). Improper use is prohibited.

### EXAMPLES OF IMPROPER USE INCLUDE:

- » Deployment / removal of other objects
- » Carrying objects other than RoadQuake™ TPRS

## 1.5 – DUTY CYCLE

### ⚠ WARNING WARNING ⚠

**RAPTOR is rated up to 24 continuous cycles. A cycle is one deployment or retrieval of RQ TPRS. RAPTOR must have a 30 minute rest interval to allow the hydraulic pump to cool down**

## 1.6 – PROPER LIFTING OF RAPTOR

Use a forklift to attach or remove RAPTOR from the the host vehicle. Set forklifts at the center and bottom of RAPTOR, where designated by "Lift Here" labels. (See Page 6 for location.)

### DO NOT:

- » Set forklifts in any other place on RAPTOR.
- » Deploy any other lifting device.
- » Use eyelet bolts, located on top of mast of RAPTOR, to lift RAPTOR.

## 1.7 – WARRANTY

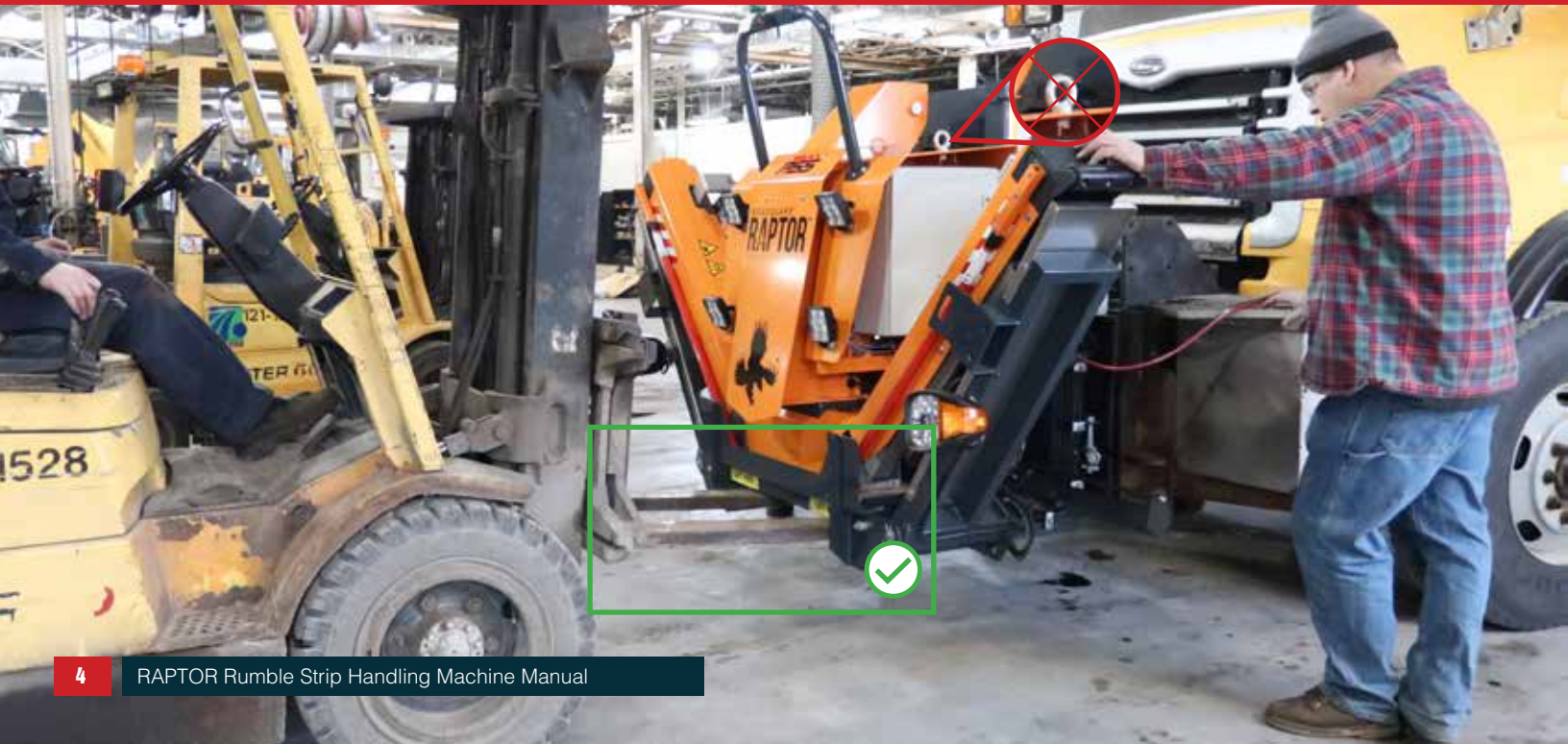
RAPTOR RSHMs sold by PSS are warranted by PSS to be free from defects in material and workmanship for one (1) years from the date of shipment. PSS' warranty does not cover, and PSS makes no warranty with respect to, any defect, failure, or deficiency that is:

1. Not reported to PSS in the applicable warranty period; or
2. Due to misapplication, modification, disassembly, abuse, isuse, improper maintenance or abnormal conditions; or
3. Due to operation either intentional or otherwise, above rated capacities or in an otherwise improper manner. Please refer to this Manual for further guidance."

For more information, please contact PSS at 800-662-6338.

*\*Picture courtesy of Pennsylvania Department of Transportation*

**DO NOT LIFT RAPTOR BY THE EYELETS. ALWAYS USE A FORKLIFT TO LIFT RAPTOR.**



# 2 - INTRODUCTION

## 2.1 – INTRODUCTION

Welcome to the PSS instruction manual for RoadQuake™ RAPTOR™ Rumble Strip Handling Machine.

In this manual, we will discuss RAPTOR's basic features and functions, how it works, and how to troubleshoot and maintain the device. We have also included all necessary parts lists and schematic drawings.

## 2.2 – TO RAPTOR OPERATORS

All RAPTOR operators shall:

- » Be trained in RAPTOR operations.
- » Ensure the regular maintenance of RAPTOR.
- » Avoid all hazards that could cause injury or damage.

Please contact our technical support department with any further questions at 800-662-6338.

## 2.3 – FUNCTIONS OF RAPTOR

In the images to the right, RAPTOR simulates deployment of RQ TPRS:

1. Magnet bar lifts one RQ TRPS from TPRS tray to deploy on road surface.
2. RAPTOR arm extends out from TPRS tray.
3. Arm lowers to deployment location of RQ TPRS.
4. Magnet Bar releases RQ TPRS at installation location.


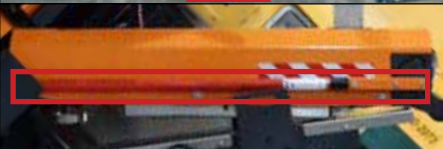





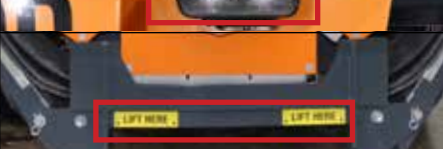



To deploy more strips, return RAPTOR arm to TPRS tray. Lift another strip for installation, repeat until installation is complete.

To retrieve TPRS strips from the roadway, repeat these steps in reverse order.



# 3 - RAPTOR OVERVIEW

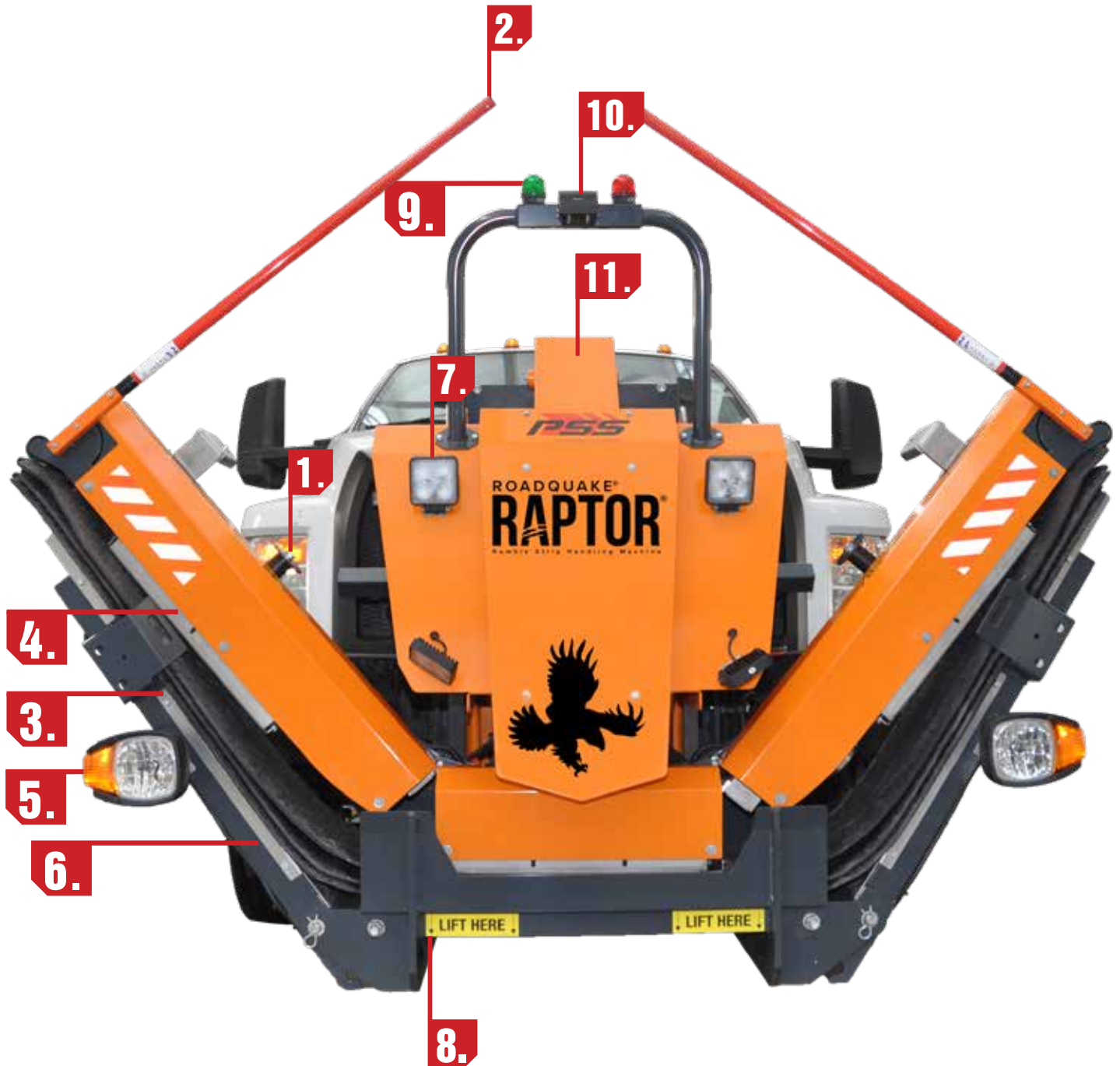
## 3.1 – RAPTOR KEY COMPONENTS

NUM	PIECE NAME	DESCRIPTION	IMAGE
1	Alignment Rod	Component on each wing allows for the realignment of RQ TPRS.	
2	Guide Markers	Component on each wing showing the user the width of RAPTOR	
3	TPRS Tray	Housing location of RQ TPRS within RAPTOR.	
4	Magnet Bar	Component that allows for deployment or retrieval of RQ TPRS and is comprised of eight neodymium magnets.	
5	Auxiliary Headlights	Component on each wing allows for headlight functionality when host vehicle's headlights are obstructed by RAPTOR.	
6	RoadQuake Temporary Portable Rumble Strips	RAPTOR allows for the deployment, realignment, and retrieval RQ TPRS.	
7	Work Lights	Provides additional lighting while working in low light conditions and is comprised of four lights on the mast.	
8	Forklift Support	Structural support designed for lifting with a forklift.	
9	Indicator Lights (Red and Green)	Two components mounted to the forward-facing camera loop indicating functionality. For more information, see page 16.	
10	Forward-Facing Camera	Component shows the approach to deployment area or an array previously deployed.	
11	Downward-Facing Camera	Component shows the realignment or retrieval of an RQ TPRS.	

### 3.2 – RAPTOR IN TRANSPORT MODE (WINGS UP)

Use this mode to transport RAPTOR to and from job sites.

1. Alignment Rod
2. Guide Markers
3. TPRS Tray
4. Magnet Bar
5. Auxiliary Headlights
6. RoadQuake™ Temporary Portable Rumble Strips (TPRS)
7. Work Lights
8. Forklift Support
9. Indicator Lights
10. Forward-Facing Camera
11. Downward-Facing Camera (inside of the arm)

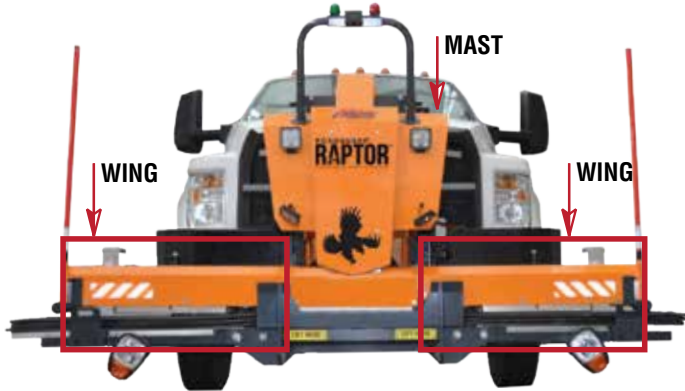


# 3 - RAPTOR OVERVIEW

## 3.3 – OPERATIONAL MODE (WINGS DOWN)

In Operational Mode, RAPTOR deploys, retrieves and realigns RQ TPRS.

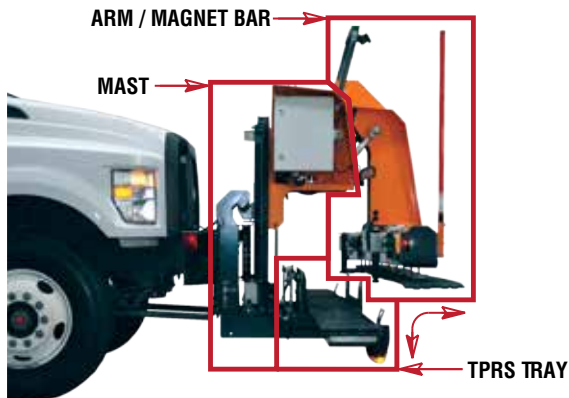
RAPTOR wings contain the magnet bar, TPRS tray and guide markers.



## 3.4 – OPERATIONAL MODE, SIDE VIEW

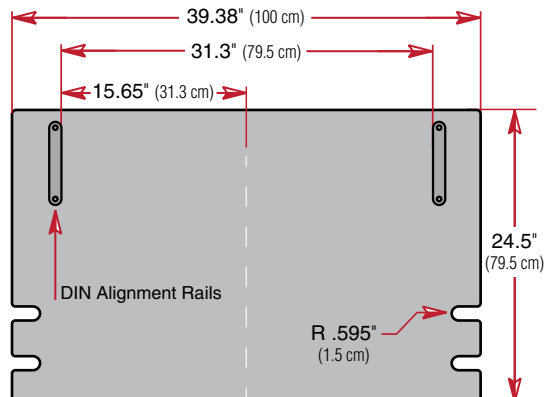
RAPTOR mast contains RAPTOR arm, which extends from the mast to deploy and retrieve RQ TPRS.

The arm features a magnet bar, comprised of eight powerful magnets that move RQ TPRS into position.



## 3.5 – DIN PLATE, FRONT VIEW

DIN Plate is to be made of 1/2 - 5/8" (1.3 - 1.6 cm) Hot Rolled Steel (HRS). Securely Mount to frame of host vehicle. CAD data available upon request.



## 3.6 – RAPTOR SPECIFICATIONS

### RAPTOR SPECIFICATIONS

Brand Name	RoadQuake RAPTOR
Category	Rumble Strip Handling Machine
Function	Transports, deploys, realigns, retrieves RoadQuake 2F TPRS
Capacity	12 RoadQuake TPRS
Operating System	Electric / Self-Contained Hydraulic
Recommended Mounting Height from Road	8-12" (20-25 cm)

### VEHICLE REQUIREMENTS (Provided by user)

Front Axle Load Capacity	3,000 lbs. (1,360 kg)
Power	12 VDC / 140 peak Amp
Mounting	DIN Plate

### WEIGHTS

RAPTOR Weight (Empty)	1,530 lbs. (694 kg)
TPRS Individual Weight	105 lbs (48 kg)
Total Weight (TPRS & RAPTOR)	2,790 lbs. (1,266 kg)

### OTHER FEATURES

Lights	2 Each Aux. Headlights 4 Each Work Lights
Guide Markers	2 each 48" L (122 cm)
Cameras	1 Forward-Facing 1 Downward-Facing
Remote Control	1 Push-Button Remote

### ACCESSORIES

TPRS Spacing Measurement Device	Distance Measuring Equipment (DME not provided by PSS)
---------------------------------	--------------------------------------------------------



# 4 - RAPTOR AND HOST VEHICLE

## 4.1 – SHIPMENT FROM PSS

RAPTOR ships via freight carrier, wrapped and banded to a custom pallet.

Inspect RAPTOR upon arrival. Contact PSS immediately if you discover any damage: PSS Technical Support at 800-662-6338.



## 4.2 – VEHICLE REQUIREMENTS & DIN PLATE

RAPTOR requires a vehicle with a minimum 3,000 lbs (1,361 kg) front axle capacity.

To mount RAPTOR to a vehicle:

- » Attach a DIN\* plate to the front frame rails of the vehicle. A front frame rail extension will make the DIN plate attachment easier.
- » The top of the DIN plate should be 38 in (96.5 cm) - 40 in (102 cm) above the ground when an empty RAPTOR is attached.
- » Preferably, vehicles selected for RAPTOR feature a stationary grille. The vehicle hood can then open around RAPTOR, providing access for any vehicle maintenance work, without removing RAPTOR.

For DIN Plate Dimensions, see drawing on previous page.

\*DIN is an acronym for "Deutsches Institut für Normung", which means "German Institute for Standardization."

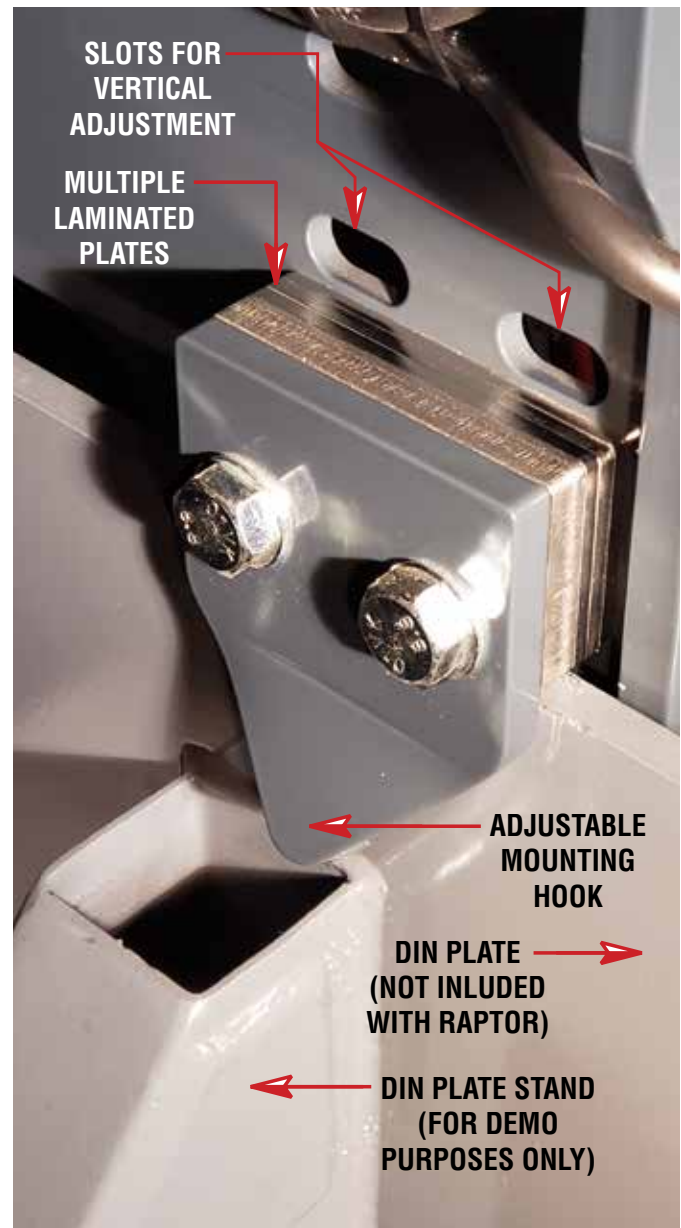
DIN Standards provide specifications for products, procedures and services worldwide.



## 4.3 – ADJUSTABLE MOUNTING HOOKS

Once the DIN plate is attached to the host vehicle:

- » Mount RAPTOR to top of DIN plate by the adjustable mounting hooks, located on each side on the back of RAPTOR's frame. The adjustable mounting hooks contain multiple-laminated plates to accommodate various thicknesses of DIN plates.
- » The adjustable mounting hook spacing must equal DIN plate thickness + 0.015 in to 0.032 in (0.038 cm to 0.081 cm). Use mounting hook spacers (a set of spacers is included with RAPTOR) to adjust the mounting hooks to the appropriate thickness. Use brass shims between plates if needed to achieve clearance. (Shims not supplied by PSS.)
- » Securely tighten mounting hook fasteners before attaching RAPTOR to the DIN plate. Once mounted, tighten all the connections. Routinely check connections for tightness.



# 4 - RAPTOR AND HOST VEHICLE

## 4.3.1 – MOUNT RAPTOR TO DIN PLATE

Use a forklift to lift RAPTOR. Place forks where designated. For instructions, see Section 1.9.

- » Mount RAPTOR to top of DIN plate, as shown in picture on previous page. Use adjustable mounting hooks, as shown on the previous page, to achieve the correct ground clearance as shown in 4.3.2.
- » Place swivel bolts through slots on DIN plate sides to secure RAPTOR to DIN plate.
- » Once RAPTOR is mounted, tighten all connections.
- » Check connections routinely; tighten as necessary.



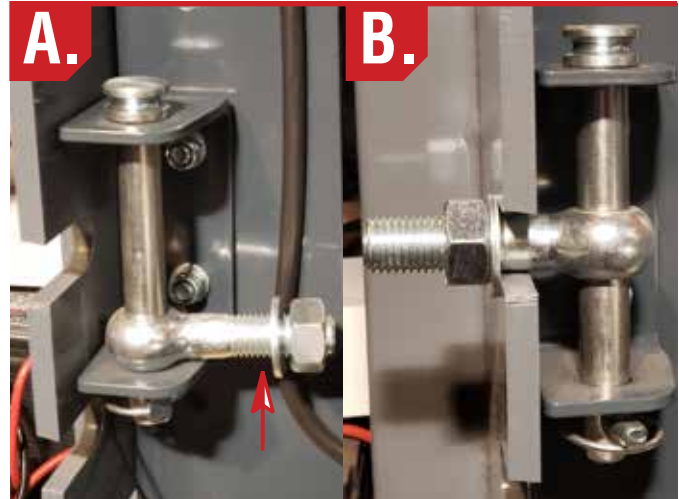
## 4.3.2 – APPROPRIATE MOUNTING HEIGHT

For proper use, an empty-loaded RAPTOR must maintain ground clearance between 8 in (20.32 cm) to 12 in (30.48 cm). Clearance that exceeds the maximum may prevent RAPTOR from retrieving RQ TPRS from the road surface.



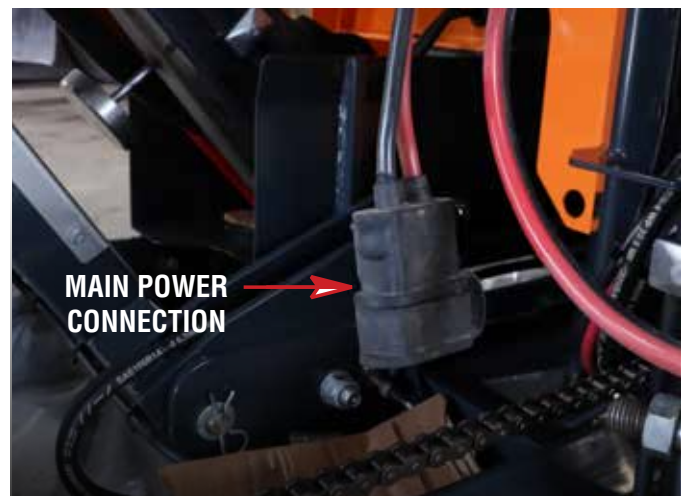
## 4.3.3 – ADJUSTABLE SWIVEL BOLTS

Adjust swivel bolts as necessary, by sliding the bolt up or down the pin (A.). Rotate the bolt into the slot on the DIN plate and tighten the nut (B.). If more movement is required, move the swivel bolt mounting bracket up or down on RAPTOR's frame.



## 4.4 – ELECTRICAL CONNECTIONS

RAPTOR operates on 12V DC power, and so requires a 12V DC electrical connection to the vehicle. RAPTOR is supplied with #2 gauge wires to accommodate the 140 peak Amps required to run the machine. Use the proper-size electrical cable to minimize voltage drop. PSS recommends a power-pole type connector. (Not included with RAPTOR.) When driving the vehicle without RAPTOR attached, operators should not allow any electrical cables to drag from the vehicle.



## 4.5 – DETACH RAPTOR FROM VEHICLE

To detach RAPTOR, reverse the steps in Section 3.2. Unplug and loosen all power connectors. Loosen and pivot the swivel bolts out of the way. Lastly, use a forklift to lift RAPTOR off the DIN plate. Place RAPTOR in short or long-term storage.

# 5 - FEATURES OF RAPTOR



**DME**

**RAPTOR OPERATIONS ARE DRIVEN BY A SYSTEM OF REMOTE CONTROL, CAMERA AND MONITOR SYSTEM, AND DISTANCE MEASURING EQUIPMENT (OPTIONAL).**

## 5.1 – CAMERA SYSTEM

For ease of operation, and safety, RAPTOR features a camera system, comprised of:

- » 2 wireless cameras
- » 1 monitor

Cameras are used primarily to retrieve RQ TPRS from the road surface:

- » Forward-facing camera shows the approach of RAPTOR to the TPRS array.
- » Downward-facing camera displays strip location for magnet bar alignment.

For installation of camera receivers and monitor, please refer manufacturer's instructions.



## 5.2 – CAMERA SYSTEM MONITOR

Install the monitor in the RAPTOR host vehicle.

- » Wire the monitor harness to a 12V DC connection.
- » Ensure ignition is on and engine is running prior to turning on the monitor.

In split-screen display, the monitor shows:

- » The forward-facing camera broadcast, and the vehicle's approach to the array.
- » The downward-facing camera broadcast, used to retrieve and align RQ TPRS.

## 5.3 – DISTANCE MEASURING EQUIPMENT (DME)

To measure distances between strips while deploying them, PSS recommends that operators install an (optional) Distance Measuring Equipment (DME) device in the RAPTOR vehicle.



# 5 - FEATURES OF RAPTOR

## 5.4 – FUNCTIONS OF REMOTE CONTROL

RAPTOR operates with a wireless remote control transmitter that features eight multi-functional buttons. The battery status light, located in the middle of the top row, is the only battery status light programmed at this time.

The battery status light flashes green when not in use, steady-green when any buttons are depressed, and turns red to indicate low battery status.

The wireless remote will function for approximately 100 hours on a set of three AAA alkaline batteries batteries.

### MULTI-FUNCTIONAL BUTTONS:

**Button 1:** Arrow Down (↓)

Unfolds wings from Transport to Operational Mode to initiate strip deployment.

**Button 2:** Arrow Up (↑)

Unfolds wings from Transport to Operational Mode to initiate strip retrieval.

**Button 3:** Arrow Left (←)

Unfolds wings and moves arm laterally toward driver's side.

**Button 4:** Arrow Right (→)

Unfolds wings and moves arm laterally toward passenger side.

**Button 5:** R

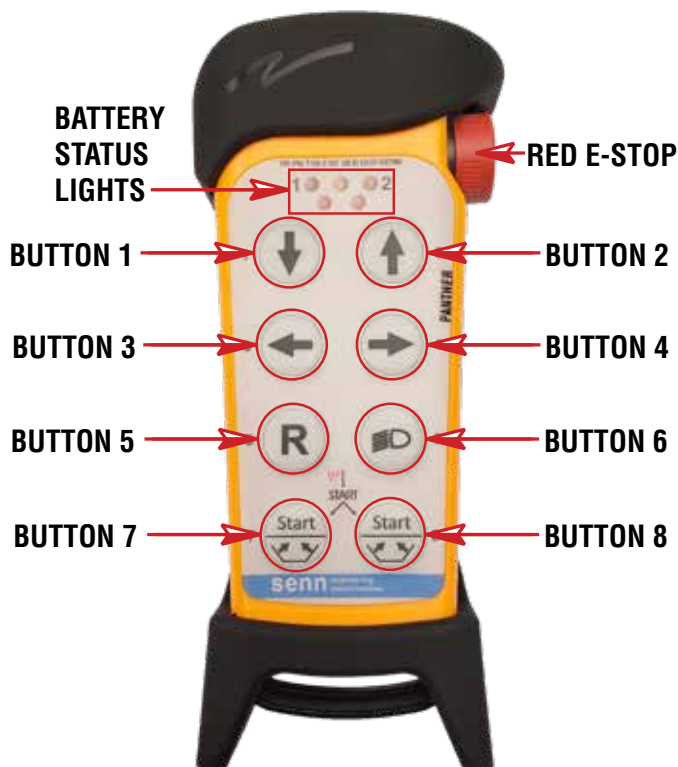
Reset. Used only for troubleshooting. See Section 10 on page 18.

**Button 6:** Light icon

Turns work lights on and off.

**Buttons 7 & 8:** Start button

Folds wings from Operational Mode to Transport Mode.



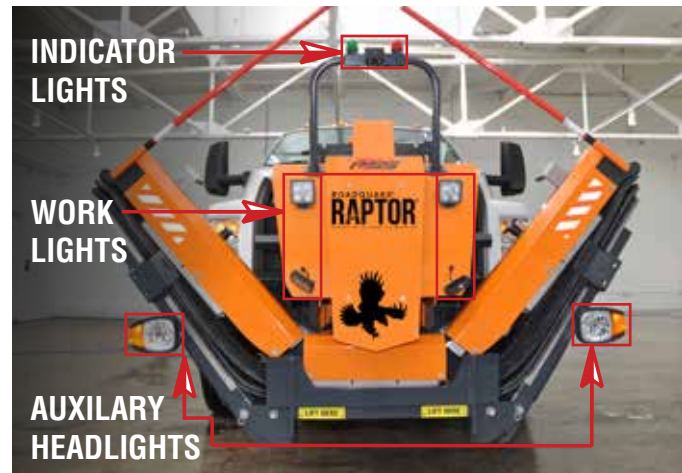
## 5.5 – USE OF REMOTE

- » To turn the remote on, release the red E-Stop button, turn clockwise ¼ turn, as shown on its side. See previous section for location.
- » Depress the two START buttons (buttons 7 & 8) simultaneously, hold them for approximately one second, then release. The remote and RAPTOR are now synced. There may be a 15 second delay for RAPTOR's PLC (programmable logic controller) to turn on. The marker lights and strobe lights of the magnet bar will turn on when RAPTOR is on.
- » Always maintain visual contact with RAPTOR when using the remote control.

## 5.6 – AUXILIARY HEADLIGHTS

When RAPTOR is loaded to capacity with 12 RQ TPRS, and the wings are folded for transport, the wings cover the headlights on most vehicles.

RAPTOR features auxiliary headlights mounted to the wings on the TPRS tray. Each auxiliary headlight has an electrical cable exiting the machine, which contains wires for high beams, low beams, turn signals and parking lamps. The user is responsible for wiring these into the host vehicle.



## 5.7 – WORK LIGHTS

RAPTOR features work lights, which are located on the right and left sides of the mast. Press button 6 to turn lights on and off.

## 5.8 – INDICATOR LIGHTS

RAPTOR features two indicator lights, located at the top of the forward-facing camera bar:

- » Steady-green indicates RAPTOR status is ready for use.
- » Flashing green indicates RAPTOR is mid-function.
- » Flashing red indicates an error message.

# 6 - PRIOR TO USE IN A WORK ZONE

## 6.1 – NEW, NEVER-DEPLOYED RQ TPRS

The polymers in a brand-new RQ TPRS may cause them to temporarily stick together in the TPRS tray. Strips may temporarily stick together so that the magnets in RAPTOR cannot deploy a strip.

Operators should drive over brand-new strips several times prior to use in RAPTOR. Once driven over, individual strips should no longer stick together.

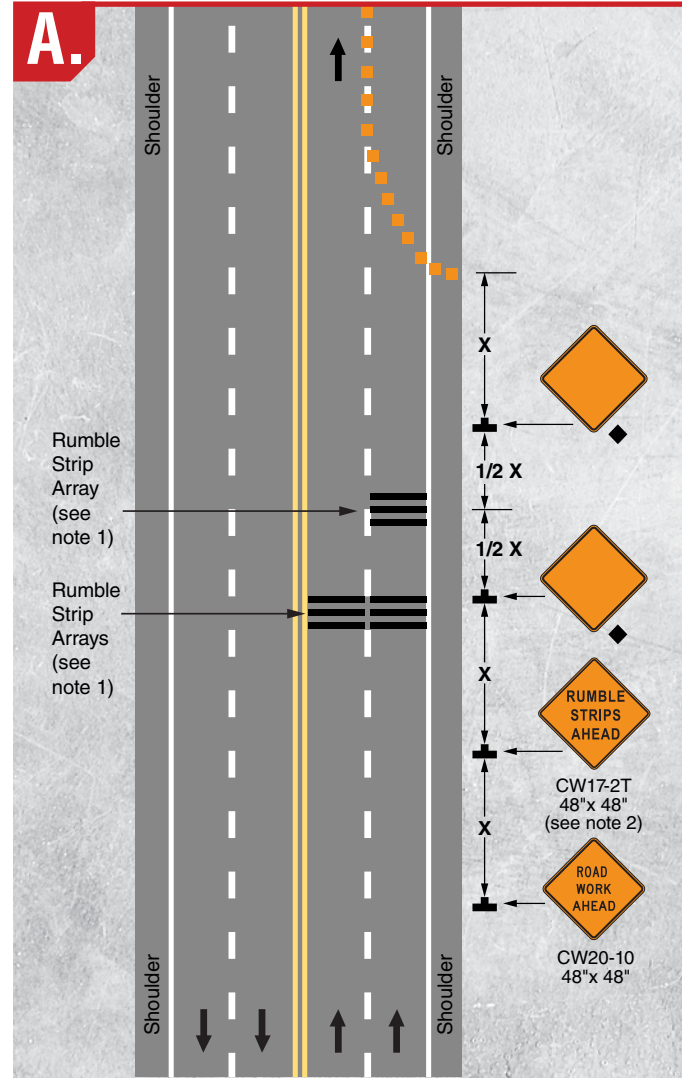
## 6.2 – DETERMINING YOUR TRAFFIC CONTROL PLAN

Review the specific traffic control plan for use of RQ TPRS in work zones. If no TTC plan exists, use the PSS "RoadQuake: Best Practices for Optimal Use" guide book to determine distances between strips.

See figure A to the right for an example.

## 6.3 – TRUCK MOUNTED ATTENUATOR

We recommend to deploy a Truck Mounted Attenuator (TMA) with RAPTOR. RAPTOR vehicle **(1.)** can accommodate a TMA attached to its back. Or, deploy a "shadow" TMA vehicle **(2.)** to follow RAPTOR. Always follow the controlling agency's requirements for the use of a TMA in active work zones. See figure B for an example.



# 7 - OPERATING RAPTOR



## 7.1 – POWER RAPTOR ON

To start RAPTOR, the operator must leave the cab, or, from the cab, direct a co-worker outside the vehicle to perform the following steps:

- » On the driver side of the vehicle, locate the rotary switch on the electrical cabinet.
- » Turn the switch clockwise to the ON position.

## 7.2 – TRANSPORT AND OPERATIONAL MODES

To drive RAPTOR and the host vehicle to and from workzones, set RAPTOR to Transport Mode with wings in the folded-up position.

For TPRS deployment, retrieval, and realignment, set RAPTOR in Operational Mode with wings in the horizontal position. See Remote functions on page 12 for instructions.

In the images on the right, RAPTOR is shown in operational mode demonstrating the steps of RQ TPRS deployment:

1. Magnet bar pulls one RQ TRPS from TPRS tray to deploy on road surface.
2. RAPTOR arm moves out from and in front of TPRS tray
3. The arm moves down to deployment location of RQ TPRS.
4. Magnet bar releases RQ TPRS at installation location.

To deploy more strips, return RAPTOR arm and magnet bar to TPRS tray. Repeat until installation is complete.



# 8 - OPERATING RAPTOR - DEPLOYMENT

## 8.1 – DEPLOYING RQ TPRS

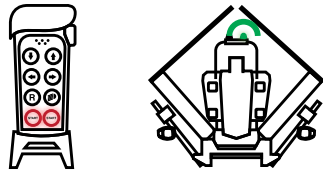
An individual RoadQuake Rumble Strip measures 11 ft (31 cm) long, and covers an entire lane of traffic. Before deploying a strip, position the vehicle so that it is centered in the lane.

With RAPTOR at a full stop, at the location of the TPRS deployment:

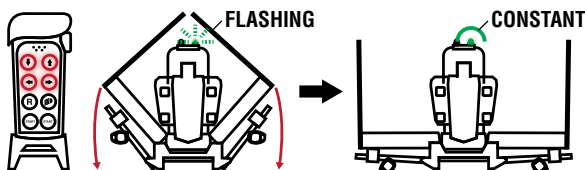
**⚠ WARNING      WARNING      ⚠**

**Bring RAPTOR vehicle to a full stop  
before deploying or retrieving each RQ TPRS.**

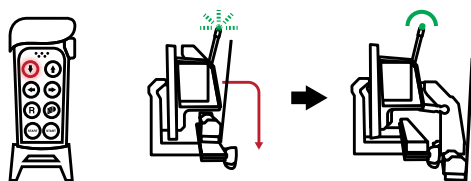
1. Synchronize your remote and RAPTOR by pressing buttons 7 and 8 simultaneously. There will be an approximately 15-second wait for RAPTOR's PLC to turn on. The marker lights and strobe lights of the magnet bar will turn on when RAPTOR is on. The green indicator light will be constantly on.



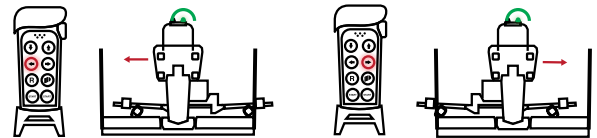
2. Engage RAPTOR in Operational Mode by pressing and holding any individual directional button (1 (↓), 2 (↑), 3 (←), or 4 (→)) until the wings are fully lowered. The green indicator light will begin flashing. Once the wings are fully down, wait for the green indicator light to be constantly on, then release the button.



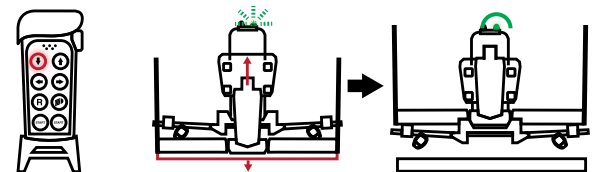
3. To raise the arm and the first RQ TPRS up and out of the tray, press and hold button 1 (↓) to start the cycle of deploying RQ TPRS. The green indicator light will begin flashing. When the arm is fully extended and stops moving, wait for the green indicator light to burn constantly, then release button 1 (↓).



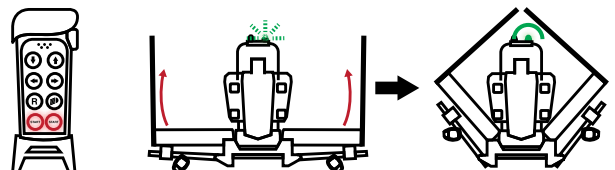
4. If your RAPTOR is not centered in the deployment area, press and hold buttons 3 (←) or 4 (→) to laterally move the arm left or right. **NOTE: Lateral movement functions (buttons 3 (←) or 4 (→)) will only work when RAPTOR arm is fully extended in front of TPRS tray during deployment, and in float position during retrieval. Direction of Lateral Movement is oriented towards the machine and will be reversed when inside the cab of the RAPTOR host vehicle.**



5. Once the RAPTOR is in the correct deployment position, press and hold button 1 (↓) to retract the magnets and release the TPRS in front of RAPTOR. The green indicator light will begin flashing. With button 1 (↓) still depressed after the TPRS is released, the arm will return to the TPRS tray centered. Once the green indicator light changes from flashing to constantly on, release button 1 (↓).



6. To deploy additional TPRS, move your vehicle to the appropriate distance established by the state specification. To measure distance between strips, reset DME (optional) to zero after deployment of each strip. Drive forward slowly until the required distance is reached.
7. Stop the vehicle and repeat steps 3-6 for the rest of your TPRS array.
8. Once you have completed the deployment of your array and the arm of RAPTOR has been returned to the TPRS tray, press and hold button 7 or 8. The green indicator light will be flashing. The wings will raise to return to transport mode. Release button 7 or 8 once the guide markers are centered in the middle. for RAPTOR. **NOTE: RAPTOR and remote will turn off functionality after three minutes of no input from the remote.**



## 8.2 – AFTER DEPLOYMENT

To power RAPTOR off: Drive to a safe location so that the operator may exit the vehicle. The On/Off switch is located on the driver-side electrical cabinet. Rotate the switch counter-clockwise to power RAPTOR off. Return guide markers to the transport position. Or, perform these functions upon returning to the yard.

# 9 - OPERATING RAPTOR - RETRIEVAL

## 9.1 – BEFORE RETRIEVING RQ TPRS

PSS recommends the removal of all RQ TPRS from the roadway when work concludes each day. Do not leave RQ TPRS arrays on the roadway of an inactive work zone.

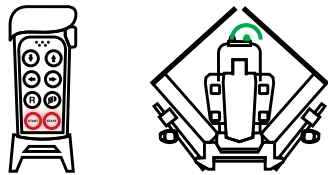
## 9.2 – RETRIEVING RQ TPRS

### ⚠ WARNING WARNING ⚠

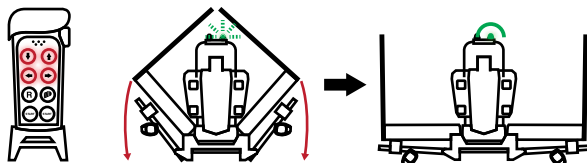
Bring RAPTOR vehicle to a full stop before deploying and retrieving each RQ TPRS.

To retrieve a strip:

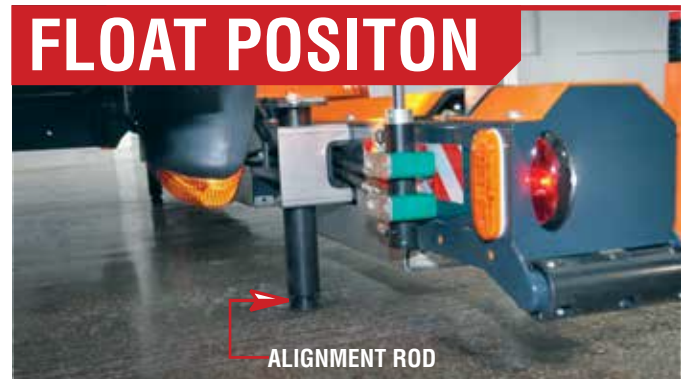
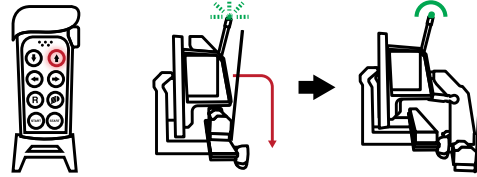
1. Approach RQ TPRS array. Use the split-screen camera monitor to center the vehicle with the strip. Once the strip disappears under the line-of-sight of the vehicle, stop the vehicle. Synchronize your remote and RAPTOR by pressing buttons 7 and 8 simultaneously. There will be an approximately 15-second wait for RAPTOR's PLC to turn on. The marker lights and strobe lights of the magnet bar will turn on when RAPTOR is on. The green indicator light will burn constant. RAPTOR's forward-facing camera will show the location of the magnet bar in relation to the strip or road surface.



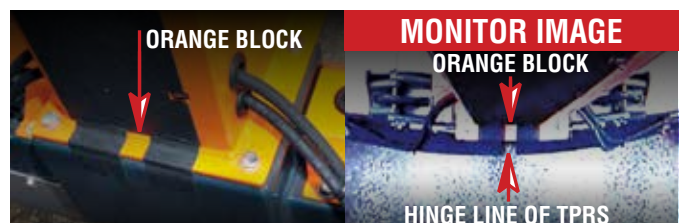
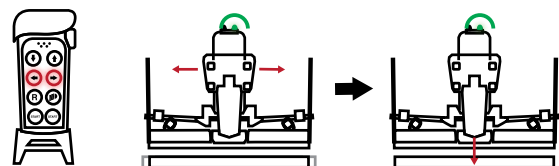
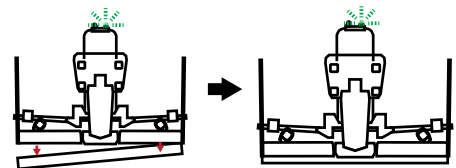
2. Put RAPTOR in Operational Mode by pressing and holding any directional button (1 (↓), 2 (↑), 3 (←), or 4 (→)) until the wings are fully lowered. The green indicator light will begin flashing. Once the wings are fully down and the green indicator light is burning constant, release the button.



3. Press and hold button 2 (↑) to raise the arm up and out of the tray. The green indicator light will begin flashing. When the arm is fully extended and stops moving, the green indicator light will burn constant, release button 2 (↑). RAPTOR is now in float position.



4. Slowly drive forward until both alignment rods touch the TPRS. If the TPRS is skewed, continue driving forward until the RQ TPRS makes contact with both alignment rods. If your RAPTOR is not centered on the TPRS being retrieved, press and hold buttons 3 (←) or 4 (→) to laterally move the arm left or right to align the magnet bar to the strip. Use the "orange block", shown on the downward-facing monitor, on the back of the magnet bar to center the hinge location at the center of RQ TPRS. Center the magnet bar to the strip to 1 in / 2.5 cm (+, -). **NOTE:** Lateral movement functions (buttons 3 (←) or 4 (→)) will only work when RAPTOR arm is fully extended in front of TPRS tray during deployment, and in float position during retrieval.

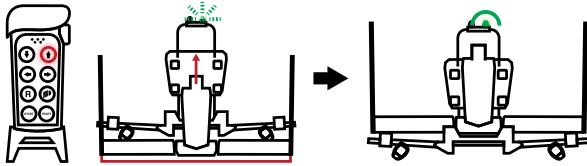




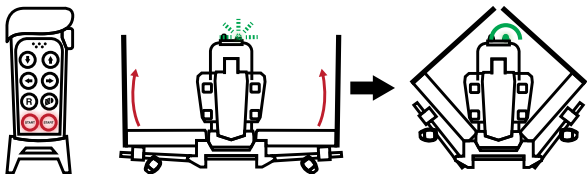
# 9 - OPERATING RAPTOR - RETRIEVAL

## 9.2 – RETRIEVING RQ TPRS (CON'T)

5. With the magnet bar centered over RQ TPRS, press and hold button 2 (↑) of remote to begin the cycle to retrieve a RQ TPRS from the roadway. The green indicator light will begin flashing. The RAPTOR arm will descend from Float Position to the top side of the strip. The arm will then deploy the magnet bar, raise the strip off the roadway, and return it to the TPRS tray centered. Once the arm has returned to the TPRS tray, wait for the the green indicator light will burn constant, release button 2 (↑).



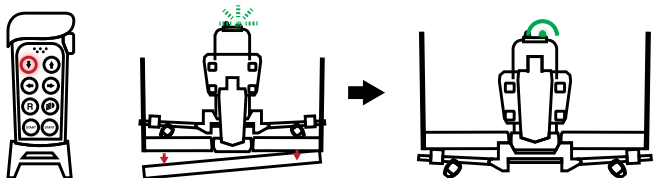
6. Repeat steps 3-5 for the rest of your TPRS array.
7. Once you have completed the retrieval of your array and the arm of RAPTOR has been returned to the TPRS tray, press and hold button 7 or 8. The green indicator light will begin flashing. The wings will raise to return to transport mode. Release button 7 or 8 once the guidemarkers are centered on RAPTOR. **NOTE:** RAPTOR and remote will turn off functionality after three minute of no input from the remote.



## 9.3 – REALIGNING RQ TPRS

RQ TPRS may skew during use in an active work zone. **See PSS Best Practices Guide for acceptable movement.**

Operators can realign skewed strips during the day. If required, follow the steps in Section 9.2 up to step 4. Once the TPRS is realigned, press and hold button 1 (↓) to return the arm back to the TPRS tray. The green indicator light will begin flashing. Once the arm has returned to the TPRS tray, release button 1 (↓). The green indicator light will burn constant. Repeat for all skewed strips.



## 9.4 – AFTER RETRIEVAL OR REALIGNMENT

Power RAPTOR Off: Drive to a location safe enough for the operator to exit the cab. The On/Off switch is located on the driver-side electrical cabinet on the mast. Rotate the switch counter-clockwise to power RAPTOR off and return guide markers to down position.



# 10 - TROUBLESHOOTING

## 10.1 – MANUALLY RESTORE RAPTOR TO TRANSPORT MODE

**⚠ WARNING WARNING ⚠**  
During restoration, once valve operator is depressed, mast will lower by gravity.

In the unlikely event that RAPTOR's hydraulic pump or electronics fail, leaving RAPTOR without power, operators can manually return RAPTOR to Transport Mode for transportation to a repair facility. Operator must safely exit the cab to restore RAPTOR manually. Examine the hydraulic hoses, to ensure they are undamaged. The following instructions will not work with a broken hose or leaking hydraulic system.

### To manually restore RAPTOR to transport:

- » One function can be manually restored at a time
- » Open the hydraulic cabinet on the passenger side of RAPTOR to access the hydraulic valves
- » Each hydraulic valve needed for this process is labeled accordingly. Determine which function requires restoration. Depress and turn the valve operator to lock it open
- » Remove the handle extension, located inside the cabinet, on the left side. Attach the handle extension to the pump, located outside the cabinet, on its right
- » To operate the pump, move the handle up and down, and fully extend it in both directions
- » Once the function is achieved, restore the valve operator to its unlocked position. Repeat for any other function.



**HANDLE FOR HAND PUMP STORES IN PASSENGER SIDE HYDRAULIC CABINET**

## 10.2 – ELECTRICAL TROUBLESHOOTING MODE

RAPTOR features a Troubleshooting Mode, which allows operators to test every hydraulic function.

**DANGER DANGER DANGER**  
This mode bypasses the programming of RAPTOR. The Operator is responsible for moving the machine in a sequence that will not damage RAPTOR.

To activate the Troubleshooting Mode, open the electrical cabinet on the driver side of RAPTOR while RAPTOR is on. Locate the troubleshoot switch, on the top of the PLC. See picture below.



Indicator lights will flash red and green. To test a specific hydraulic function, press and hold the appropriate button for approximately two seconds:

- » Button 3 - Head up and down
- » Button 4 - Arm in and out
- » Button 6 - Magnets in and out
- » Button 7 - Move mast left and right
- » Button 8 - Wings up and down

Then press button 1 or 2 to test movement of that function.

To exit a function, press button 5, the reset button. You can select a new function at this point.

To exit Troubleshooting Mode, exit the function you are testing by pressing button 5, then turn the Troubleshoot Mode switch counterclockwise to the off position.

# 11 - RAPTOR OVERALL MAINTENANCE

## 11.1 – GENERAL MAINTENANCE AND REPAIR

Repair RAPTOR malfunctions immediately as they can affect operations as well as safety.

### **⚠ WARNING WARNING ⚠**

The RAPTOR must be serviced only by qualified personnel.

User shall not alter, add or modify RAPTOR without the manufacturer's prior approval.

The manufacturer will not be held liable for any unauthorized structural modifications in the event of an accident.

**WARRANTY APPLIES ONLY TO ORIGINAL EQUIPMENT MANUFACTURER (OEM) PARTS, OR PRE-APPROVED SUBSTITUTES IN EXTENUATING CIRCUMSTANCES.**

**Moreover, PSS expressly states that Non-OEM parts and accessories have not been tested.**

## 11.2 – GENERAL INFORMATION

Proper maintenance operations are required as preventative measures to preserve the reliability of the RAPTOR.

Failure to follow maintenance routines may lead to reduced performance and damage.

Perform maintenance operations according to instructions, at specified intervals. **See section 11.3.**

When servicing RAPTOR, follow all general accident prevention rules, special safety rules, and hazard prevention guidelines. All maintenance work must include visual inspection and cleaning.

Maintenance work is performed in addition to functional checks. During functional checks, all fasteners and cable clamps must be intact. Cables must be inspected for wear, abrasion and cracks in insulation. Grease fittings and points must be greased.

## 11.3 – MAINTENANCE

Perform the following operations at regular intervals:

### **Weekly:**

- » Check remote control – Change batteries as required
- » Check alignment rods – Inspect to ensure the rods engage the road surface. Replace as required. PSS recommends operators carry a spare set in the RAPTOR vehicle.
- » Inspect electrical cabinet for accumulated moisture

### **Monthly:**

- » Check fasteners – tighten as needed
- » Grease the Zerk fitting at the arm pivot points
- » Use a spray grease on the horizontal and vertical slides
- » Apply a chain lube to the lateral movement chain
- » Inspect hydraulic system – Check oil level and leaks

### **Annually:**

- » Check hydraulic hoses for abrasions or leaks

**For additional maintenance concerns, contact PSS for a qualified repair technician.**

## 11.4 – SAFETY HANDLE



RAPTORs produced after S/N RPT-029 now include an integrated Safety Handle to secure the position of the Mast when maintenance is performed. Please continue to use Cribbing to secure the Mast on any RAPTORs that do not feature the Safety Handle.

To secure the Mast in a raised position for any maintenance to the Mast, Arm or Tray:

- » Remove the Red Safety Handle from the passenger's side of the Mast Frame (See Figure A)
- » Raise the Mast to the top of its vertical stroke by manual pumping or utilizing Trouble Shoot Mode
- » Insert the Safety Handle into the exposed slots (to the right of the lift cylinder) in the Mast frame. **NOTE:** The Safety Handle can only be inserted in the slots of the Mast Frame with the notched end pointing up
- » Lower the Safety Handle to engage the Slots in the handle, engaging the thickness of the Mast Frame.
- » Lower the Mast until it makes contact with the top of the Safety Handle. (See Figure B)



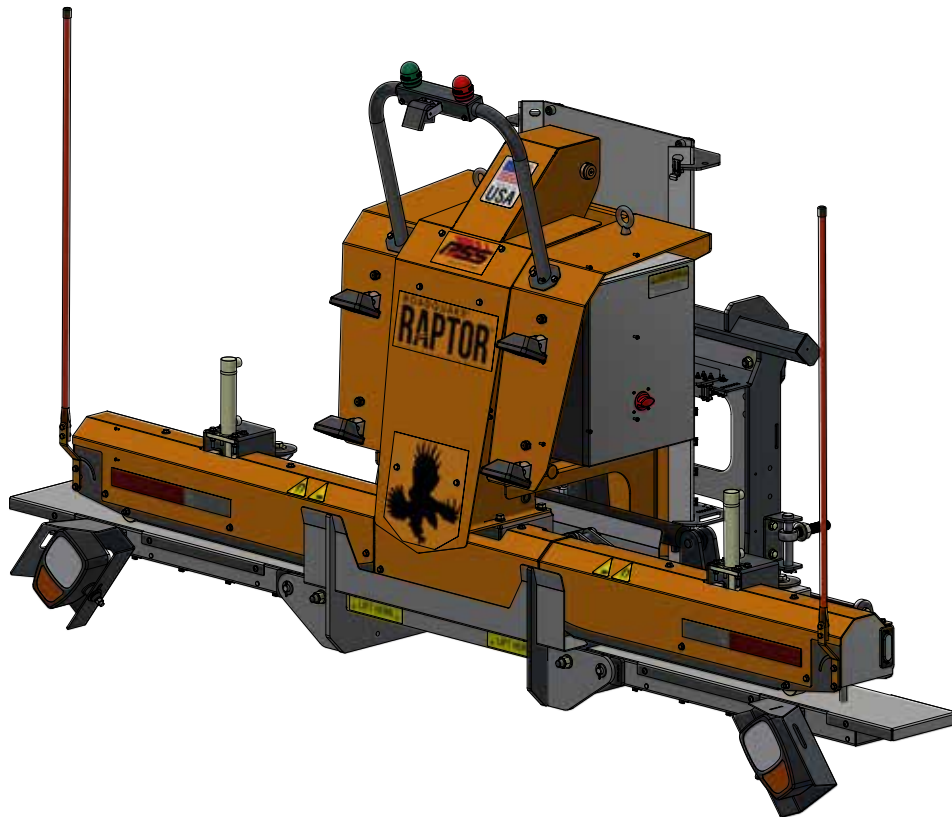
To remove the Mast:

- » Raise the Mast to the upper limit of its vertical travel
- » Lift the Safety Handle to disengage the slots in the handle from the Mast frame and remove
- » Reinstall the Safety Handle on the Passenger's side of the RAPTOR frame.

## 11.5 – ORDERING PARTS

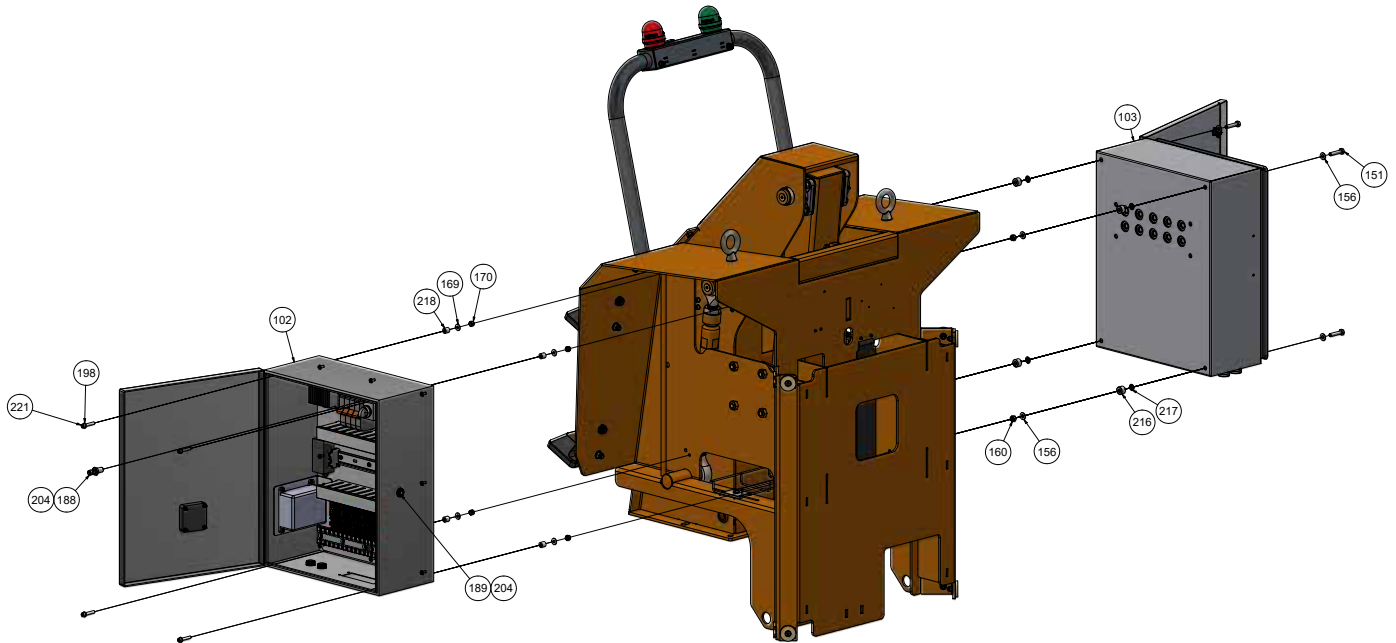
- » To order spare or replacement parts, contact PSS at 800.662.6338.

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Lift frame, Shift Frame & Frame Assembly	22	Magnet Hydraulic Header & Cylinder Hoses	40
LH Magnet Bar Assembly	23	Power Unit Manifold Connections	41
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## LIFT FRAME MASTER ASSEMBLY:



### PARTS LIST

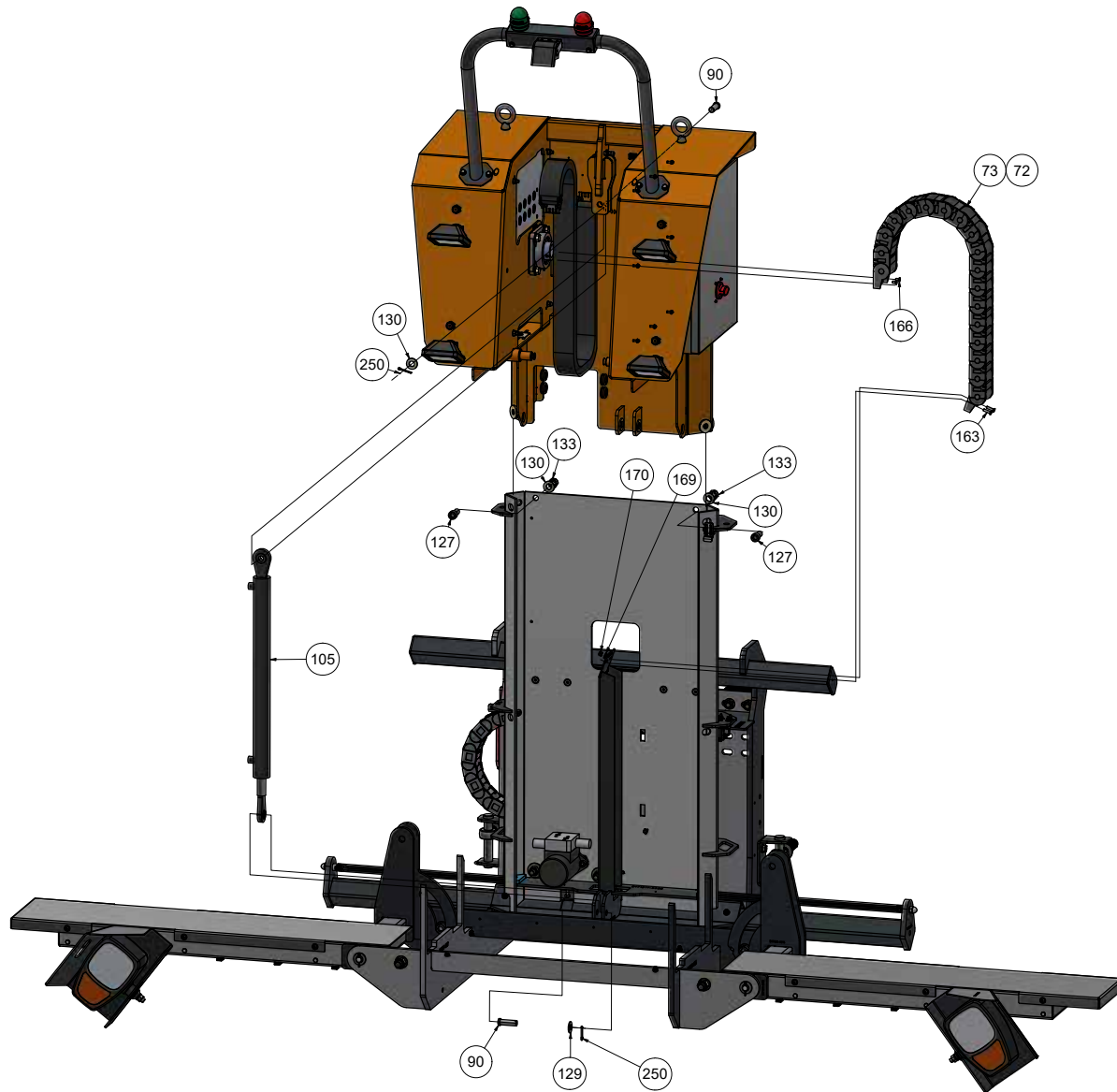
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102	1	ELECTRICAL PANEL	RPT-7001
103	1	HYDRAULIC POWER UNIT	RPT-80001
151	4	BOLT	RPT-19994
156	125	WASHER	RPT-12647
160	50	HEX NUT	RPT-17000
169	28	WASHER	RPT-12644
170	20	HEX NUT	RPT-16999
188	6	SENSOR	RPT-40192

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
189	3	SENSOR	RPT-40191
198	12	WASHER	RPT-12723
204	4	CABLE	RPT-40200
216	4	SPACER	RPT-40273
217	4	PUSH NUT	RPT-40274
218	4	SPACER	RPT-40275
221	4	SCREW	RPT-12816

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## LIFT FRAME, SHIFT FRAME & FRAME ASSEMBLY:



### PARTS LIST

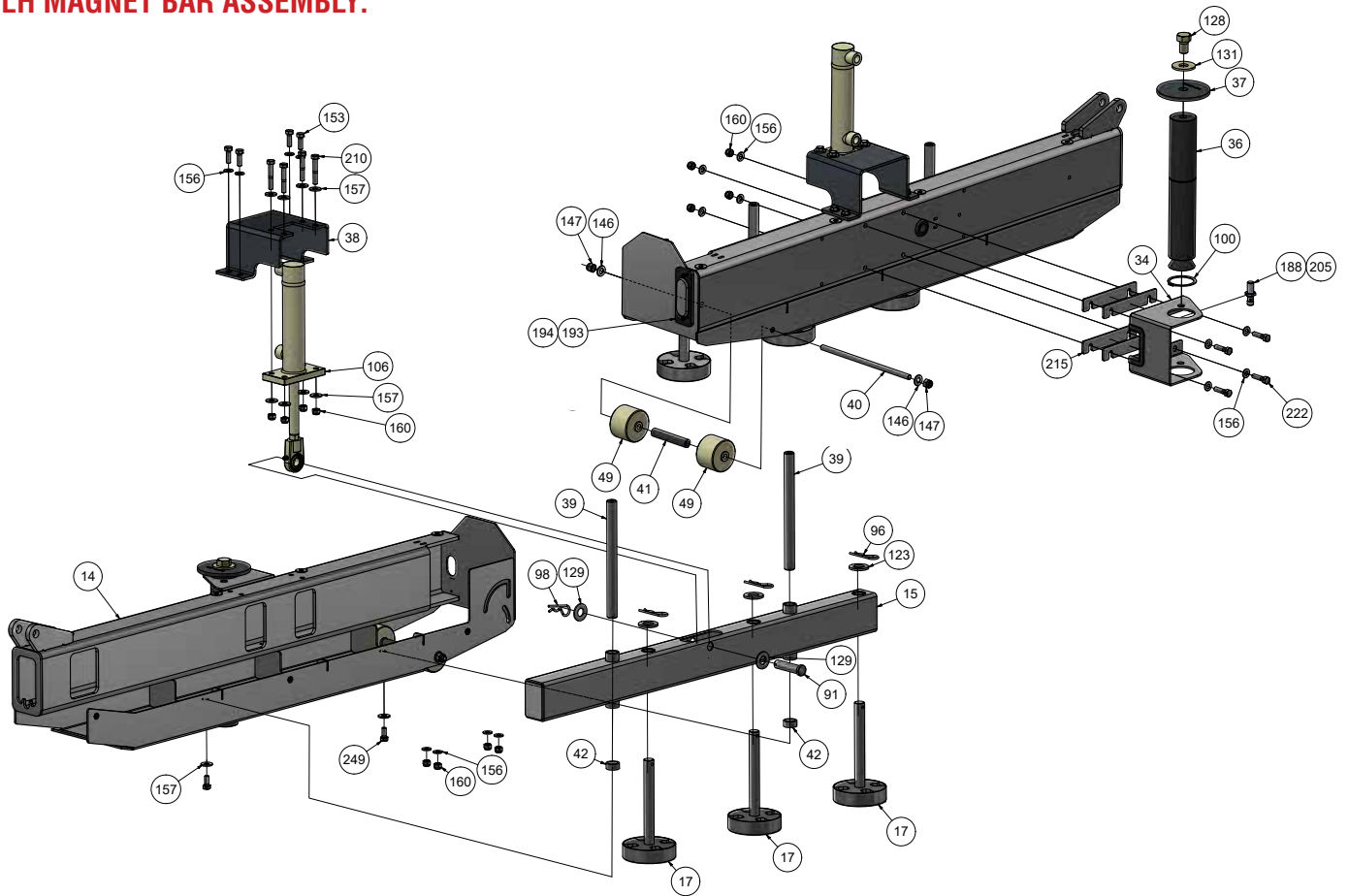
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72	1	E-CHAIN MOUNTING BRACKET	RPT-40122
73	1	E-CHAIN	RPT-40123
90	2	CLEVIS PIN	RPT-40149
105	1	HYDRAULIC CYLINDER	RPT-40164
127	2	SCREW	RPT-12947
129	15	WASHER	RPT-12657
130	3	WASHER	RPT-12614

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
133	6	HEX NUT	RPT-16969
163	12	BOLT	RPT-13702
166	4	BOLT	RPT-13698
169	28	WASHER	RPT-12644
170	20	HEX NUT	RPT-16999
250	14	PIN	RPT-40277

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## LH MAGNET BAR ASSEMBLY:



### PARTS LIST

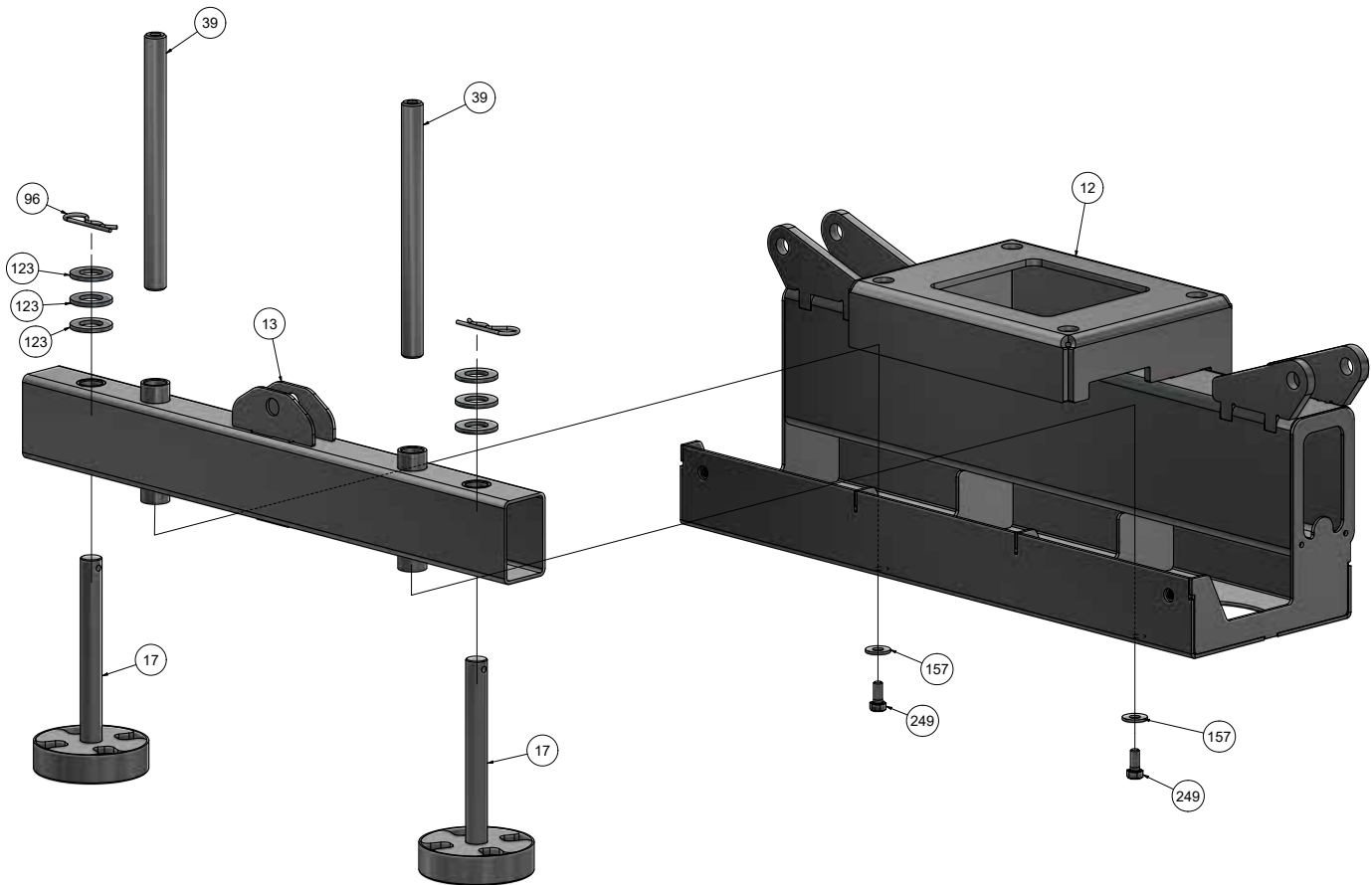
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
14	1	LEFT MAGNET BAR FRAME	RPT-20014
15	2	MAGNET BAR	RPT-20015
17	8	MAGNET ASSEMBLY	RPT-20017
34	2	SCRAPER MOUNT	RPT-30017
36	2	SCRAPER	RPT-30019
37	2	SCRAPER RETAINING WASHER	RPT-30020
38	2	MAGNET CYLINDER MOUNTING BRACKET	RPT-30021
39	6	MAGNET GUIDE ROD	RPT-30022
40	2	OUTRIGGER ROLLER ROD	RPT-30023
41	2	OUTRIGGER ROLLER SPACER	RPT-30024
42	4	CYLINDER DEADSTOP SPACER	RPT-30025
49	4	MAGNET WING ROLLER	RPT-30032
91	2	CLEVIS PIN	RPT-40150
96	8	HAIRPIN	RPT-40155
98	2	HAIRPIN	RPT-40157
100	2	SNAPRING	RPT-40159

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
106	2	HYDRAULIC CYLINDER	RPT-40165
123	12	WASHER	RPT-12658
128	2	BOLT	RPT-11579
129	15	WASHER	RPT-12657
131	10	WASHER	RPT-12613
146	26	WASHER	RPT-12649
147	16	HEX NUT	RPT-17001
153	68	BOLT	RPT-10166
156	125	WASHER	RPT-12647
157	28	WASHER	RPT-12646
160	50	HEX NUT	RPT-1700
188	6	SENSOR	RPT-40192
193	2	AMBER LIGHT	RPT-40180
194	90'	CABLE	RPT-40184
205	2	CORDSET	RPT-40253
210	8	BOLT	RPT-10170
215	8	SPACER	RPT-30039
222	8	BOLT	RPT-10167
249	12	BOLT	RPT-10164

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## CENTER MAGNET BAR ASSEMBLY:



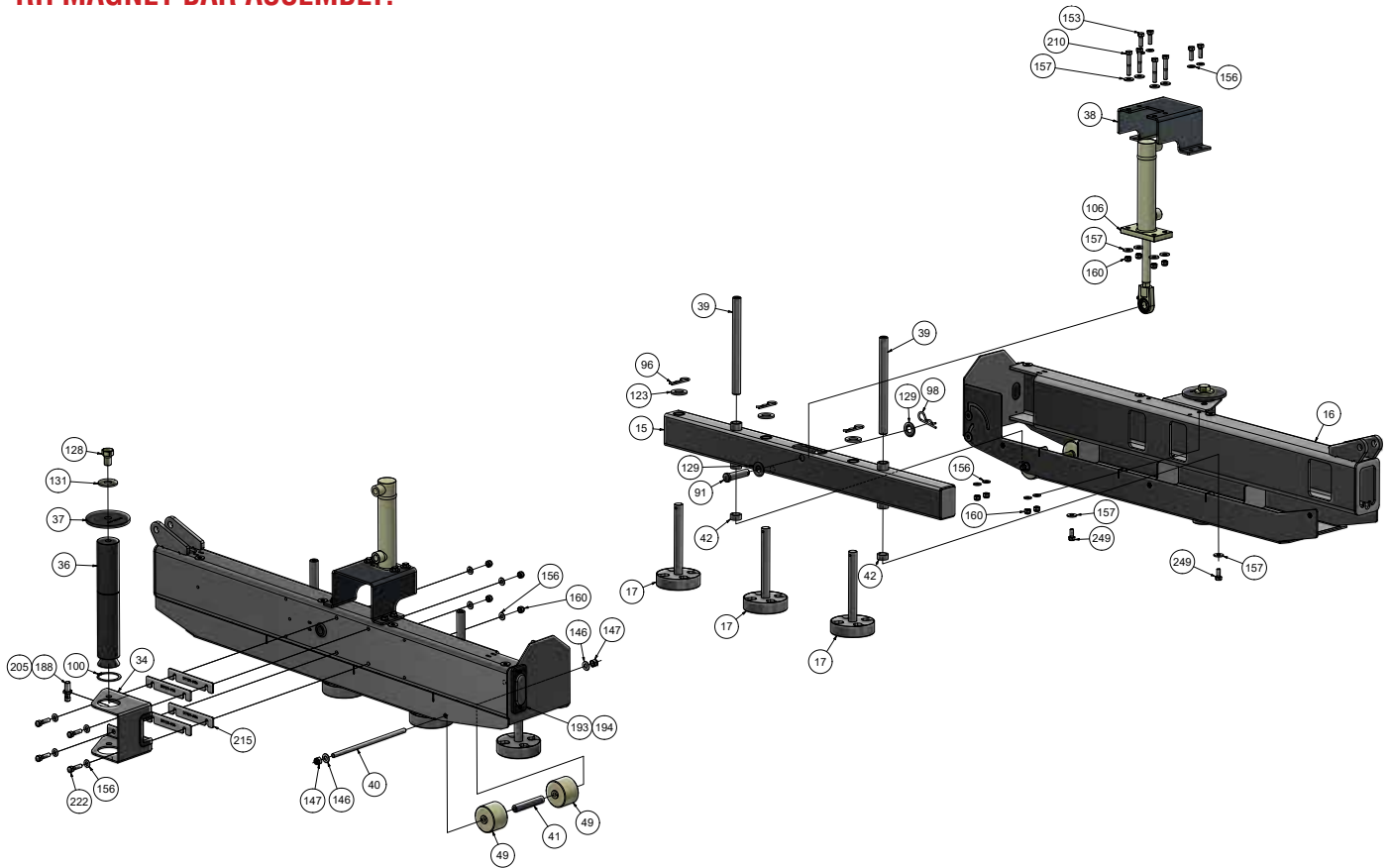
PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
12	1	CENTER MAGNET FRAME	RPT-20012
13	1	CENTER MAGNET BAR	RPT-20013
17	8	MAGNET ASSEMBLY	RPT-20017
39	6	MAGNET GUIDE ROD	RPT-30022

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
96	8	HAIRBIN	RPT-40155
123	12	WASHER	RPT-12658
157	28	WASHER	RPT-12646
249	12	BOLT	RPT-10164



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## RH MAGNET BAR ASSEMBLY:



### PARTS LIST

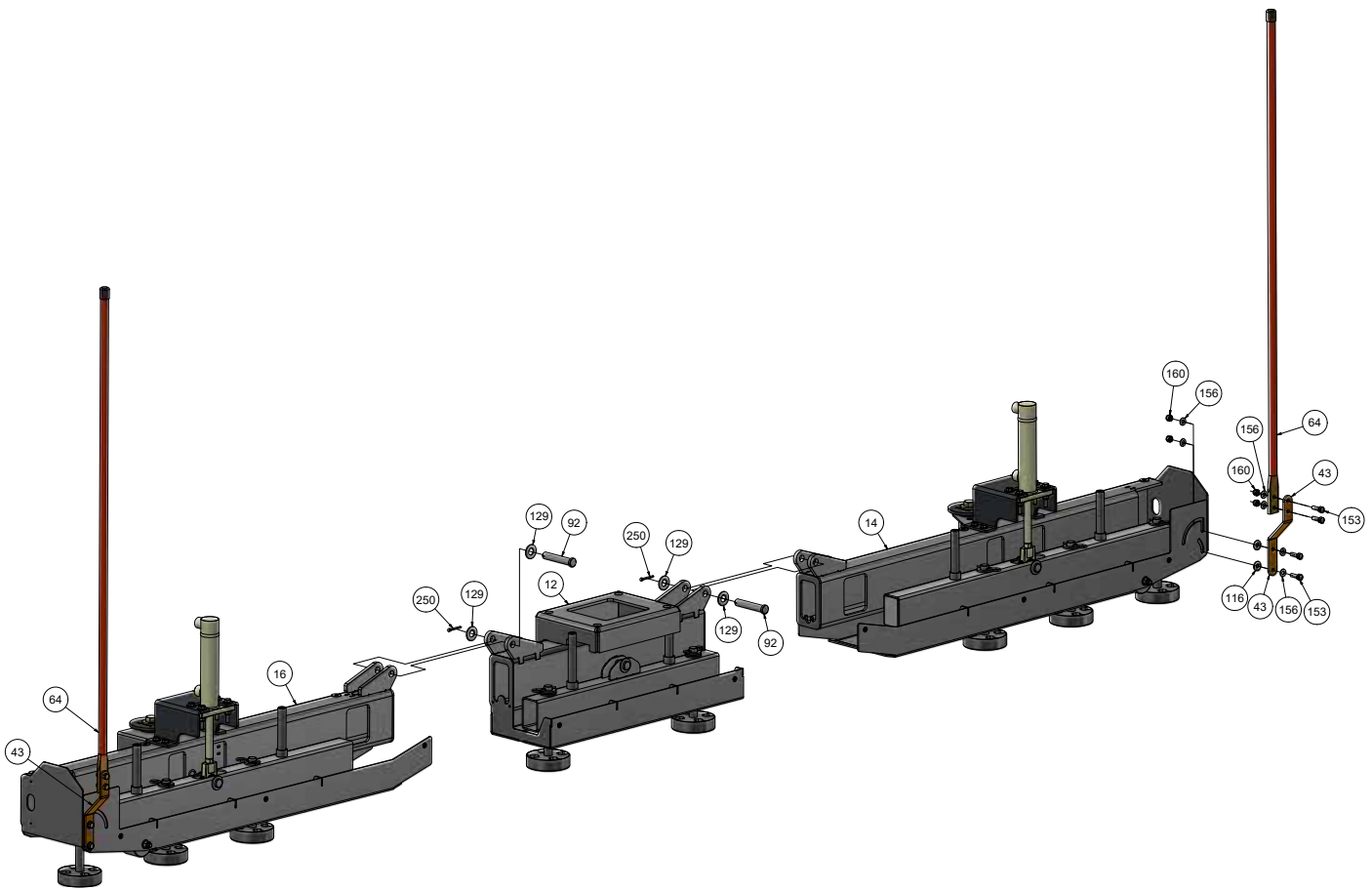
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
15	2	MAGNET BAR	RPT-20015
16	1	RIGHTMAGNET BAR FRAME	RPT-20016
17	8	MAGNET ASSEMBLY	RPT-20017
34	2	SCRAPER MOUNT	RPT-30017
36	2	SCRAPER	RPT-30019
37	2	SCRAPER RETAINING WASHER	RPT-30020
38	2	MAGNET CYLINDER MOUNTING BRACKET	RPT-30021
39	6	MAGNET GUIDE ROD	RPT-30022
40	2	OUTRIGGER ROLLER ROD	RPT-30023
41	2	OUTRIGGER ROLLER SPACER	RPT-30024
42	4	CYLINDER DEADSTOP SPACER	RPT-30025
49	4	MAGNET WING ROLLER	RPT-30032
91	2	CLEVIS PIN	RPT-40150
96	8	HAIRPIN	RPT-40155
98	2	HAIRPIN	RPT-40157
100	2	SNAP RING	RPT-40159

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
106	2	HYDRAULIC CYLINDER	RPT-40165
123	12	WASHER	RPT-12658
128	2	BOLT	RPT-11579
129	15	WASHER	RPT-12657
131	10	WASHER	RPT-12613
146	26	WASHER	RPT-12649
147	16	HEX NUT	RPT-17001
153	68	BOLT	RPT-10166
156	125	WASHER	RPT-12647
157	28	WASHER	RPT-12646
160	50	HEX NUT	RPT-17000
188	6	SENSOR	RPT-40192
193	2	AMBER LIGHT	RPT-40180
194	90'	CABLE	RPT-40184
205	2	CORDSET	RPT-40253
210	8	BOLT	RPT-10170
215	8	SPACER	RPT-30039
222	8	BOLT	RPT-10167
249	12	BOLT	RPT-10164

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## MAGNET BAR COMPLETE ASSEMBLY:

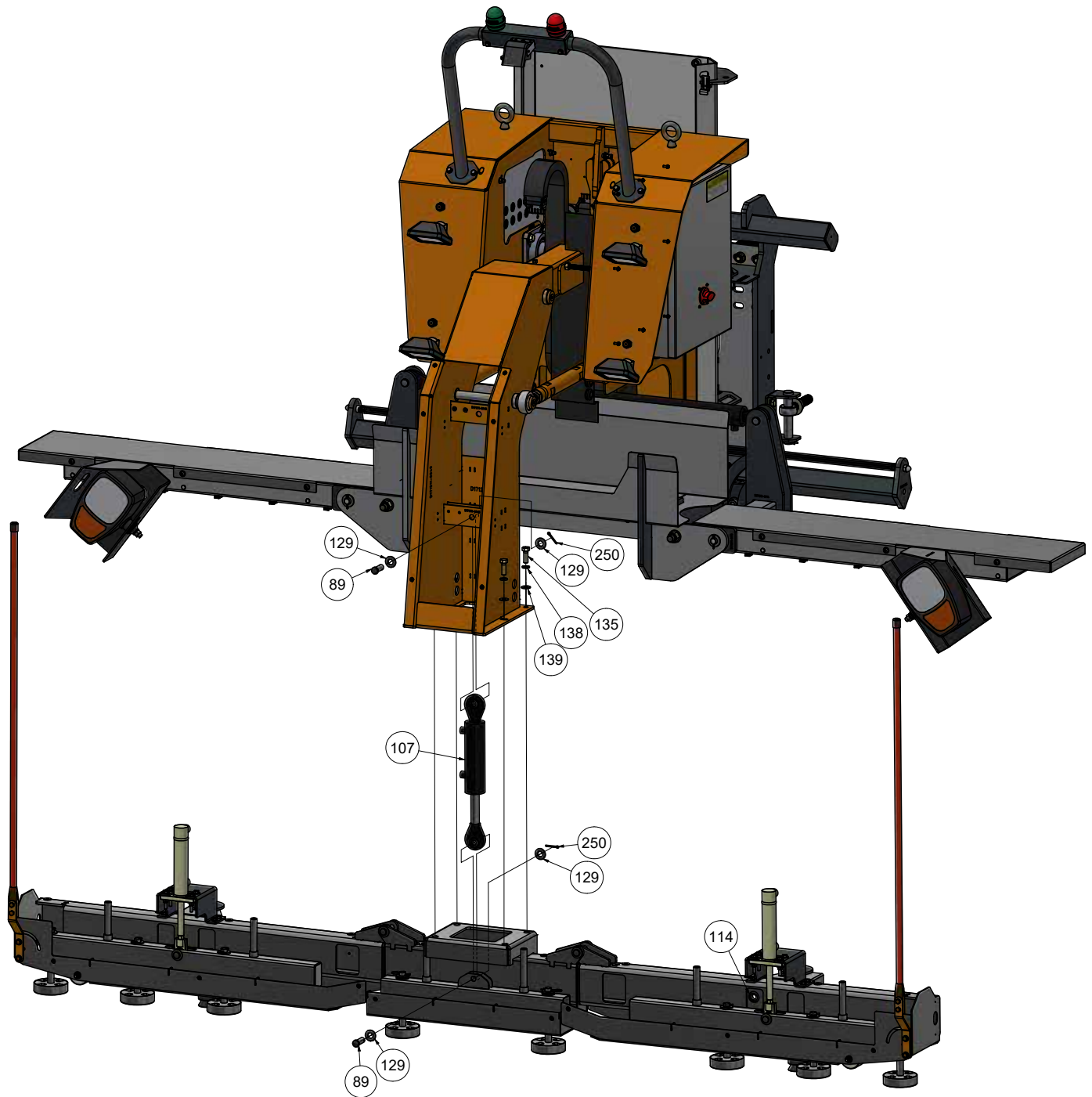


PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
12	1	CENTER MAGNET FRAME	RPT-20012
14	1	LEFT MAGNET BAR FRAME	RPT-20014
16	1	RIGHT MAGNET BAR FRAME	RPT-20016
43	2	MARKER POLE MOUNT	RPT-30026
64	2	GUIDE POLE	RPT-40113
92	2	CLEVIS PIN	RPT-40151

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
116	4	WASHER	RPT-40264
129	15	WASHER	RPT-12657
153	68	BOLT	RPT-10166
156	125	WASHER	RPT-12647
160	50	HEX NUT	RPT-1700
250	14	PIN	RPT-40277

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## LIFT FRAME, SHIFT FRAME, BASE FRAME & MAGNET BAR ASSEMBLY:



### PARTS LIST

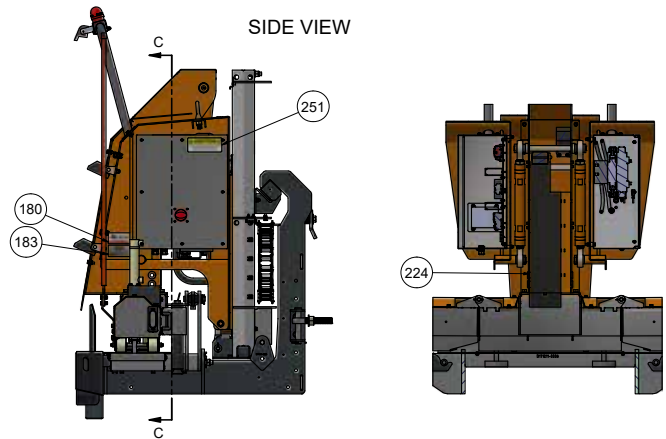
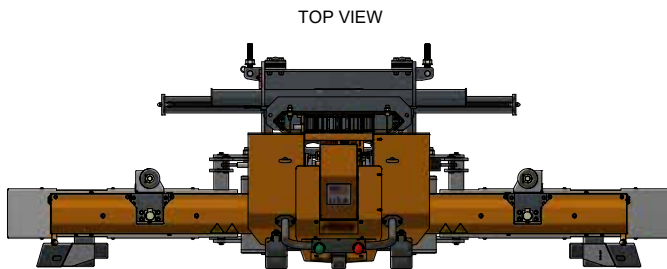
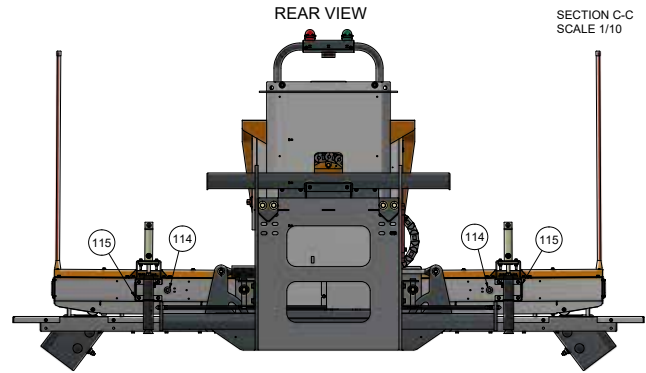
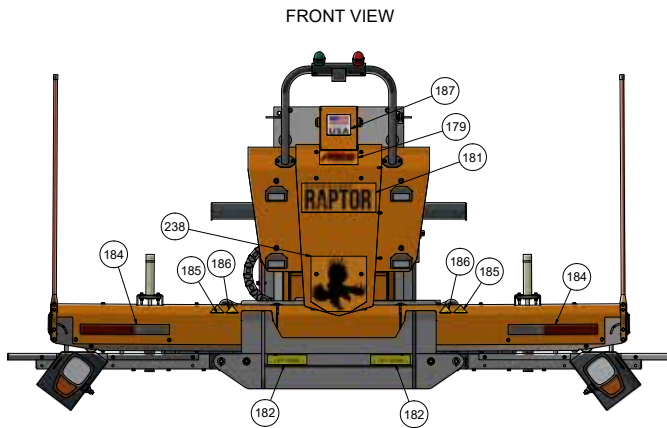
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
89	2	CLEVIS PIN	RPT-40148
107	1	HYDRAULIC CYLINDER	RPT-40166
114	6	GROMMET	RPT-40262
129	15	WASHER	RPT-12657

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
135	12	BOLT	RPT-11522
138	4	WASHER	RPT-12691
139	14	WASHER	RPT-12609
250	14	PIN	RPT-40277

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## DECAL & GROMMET PLACEMENT:



### PARTS LIST

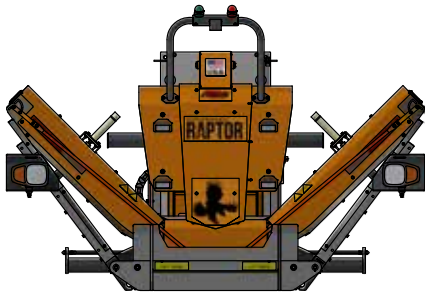
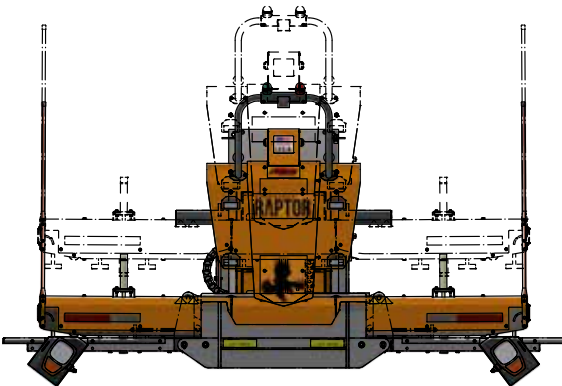
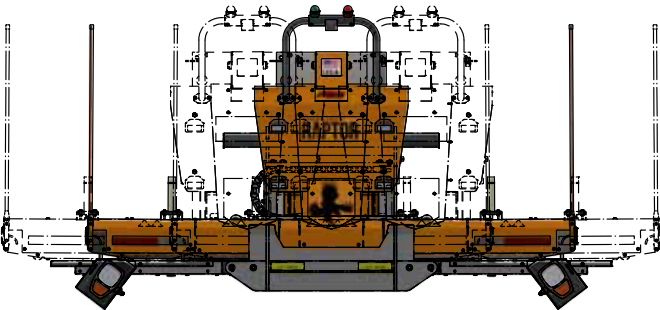
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
114	6	GROMMET	RPT-40262
115	2	GROMMET	RPT-40263
179	1	STICKER	RPT-40220
180	1	STICKER	RPT-40221
181	1	STICKER	RPT-40222
182	2	STICKER	RPT-40223
183	1	ID TAG	RPT-40225

### PARTS LIST

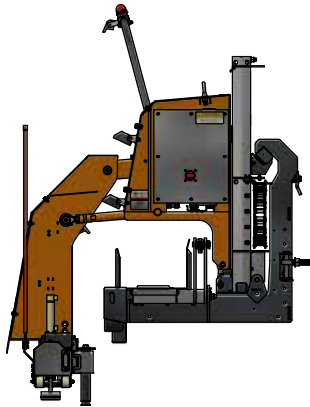
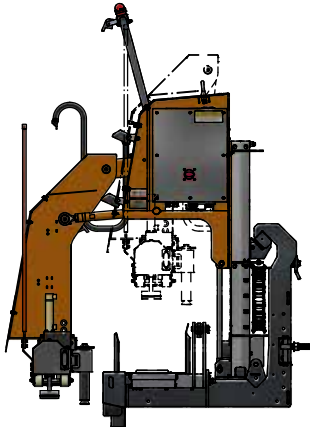
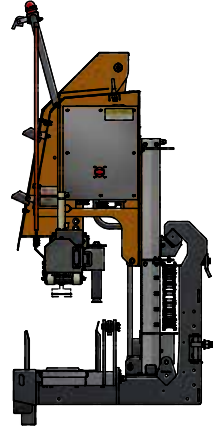
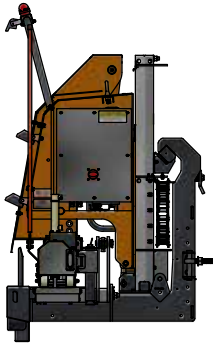
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
184	2	STICKER	RPT-40254
185	2	STICKER	RPT-40255
186	3	STICKER	RPT-40256
187	1	STICKER	RPT-40257
224	1	TAPE	RPT-40258
238	1	STICKER	RPT-40276
251	2	STICKER	RPT-40278

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## POSITIONAL VIEWS - FRONT:

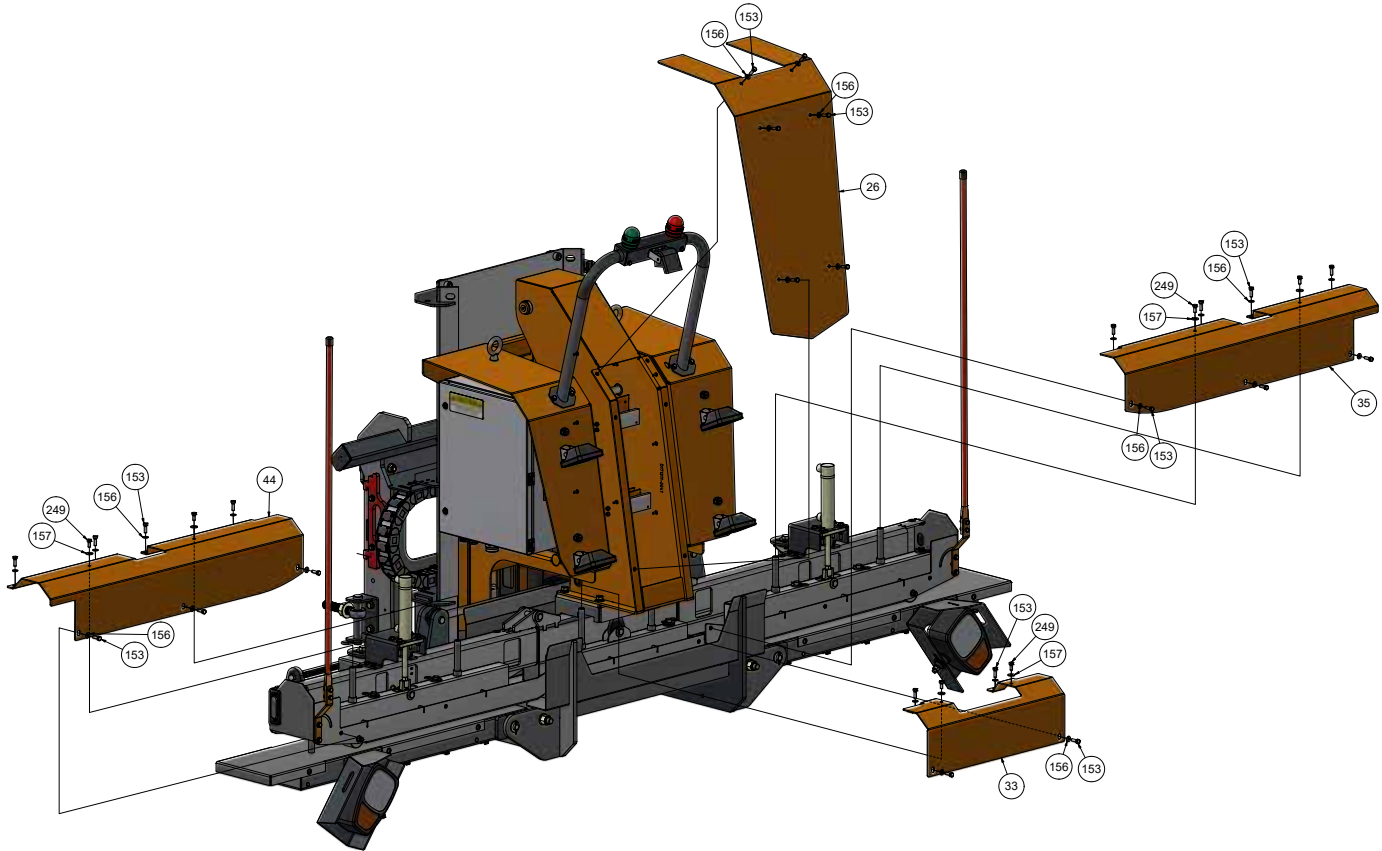


## POSITIONAL VIEWS - SIDE:



# INDEX

## COVER PANEL ASSEMBLY:

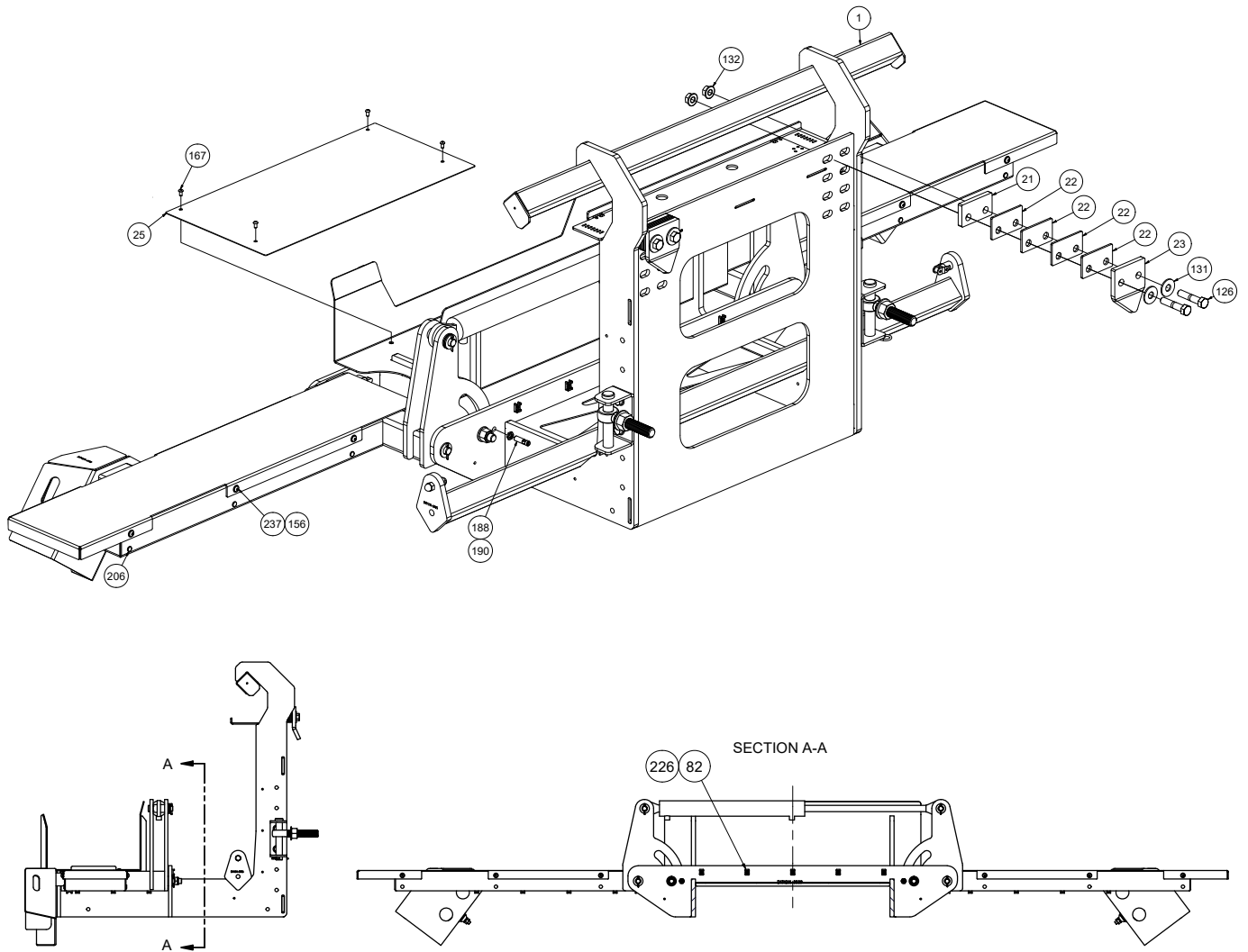


PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
26	1	EXTENSION ARM COVER PLATE	RPT-30009
33	1	MIDDLE MAGNET FRAME COVER PLATE	RPT-30016
35	1	LH MAGNET FRAME COVER PLATE	RPT-30018
44	1	RH MAGNET FRAME COVER PLATE	RPT-30027

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
153	68	BOLT	RPT-10166
156	125	WASHER	RPT-12647
157	29	WASHER	RPT-12646
249	12	BOLT	RPT-10164

# INDEX

## BASE FRAME ASSEMBLY:



### PARTS LIST

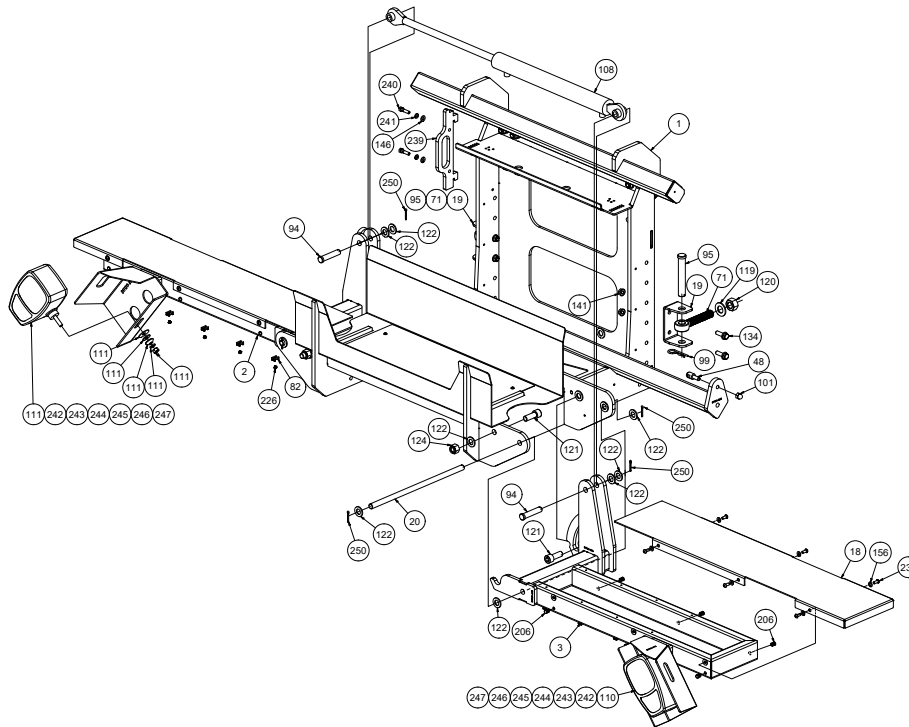
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
1	1	BASE FRAME	RPT-20001
21	2	SPACER	RPT-30004
22	8	SPACER	RPT-30005
23	2	FORMED HOOK	RPT-30006
25	1	MIDDLE COVER PLATE	RPT-30008
82	25	CABLE TIE MOUNT	RPT-40137
126	4	BOLT	RPT-11587
131	10	WASHER	RPT-12613

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
132	4	HEX NUT	RPT-12478
156	125	WASHER	RPT-12647
167	4	SCREW	RPT-13181
188	6	SENSOR	RPT-40192
190	1	CABLE	RPT-40193
206	12	PLUG	RPT-40272
226	25	SCREW	RPT-19987
237	12	SCREW	RPT-19985

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## BASE FRAME ASSEMBLY:



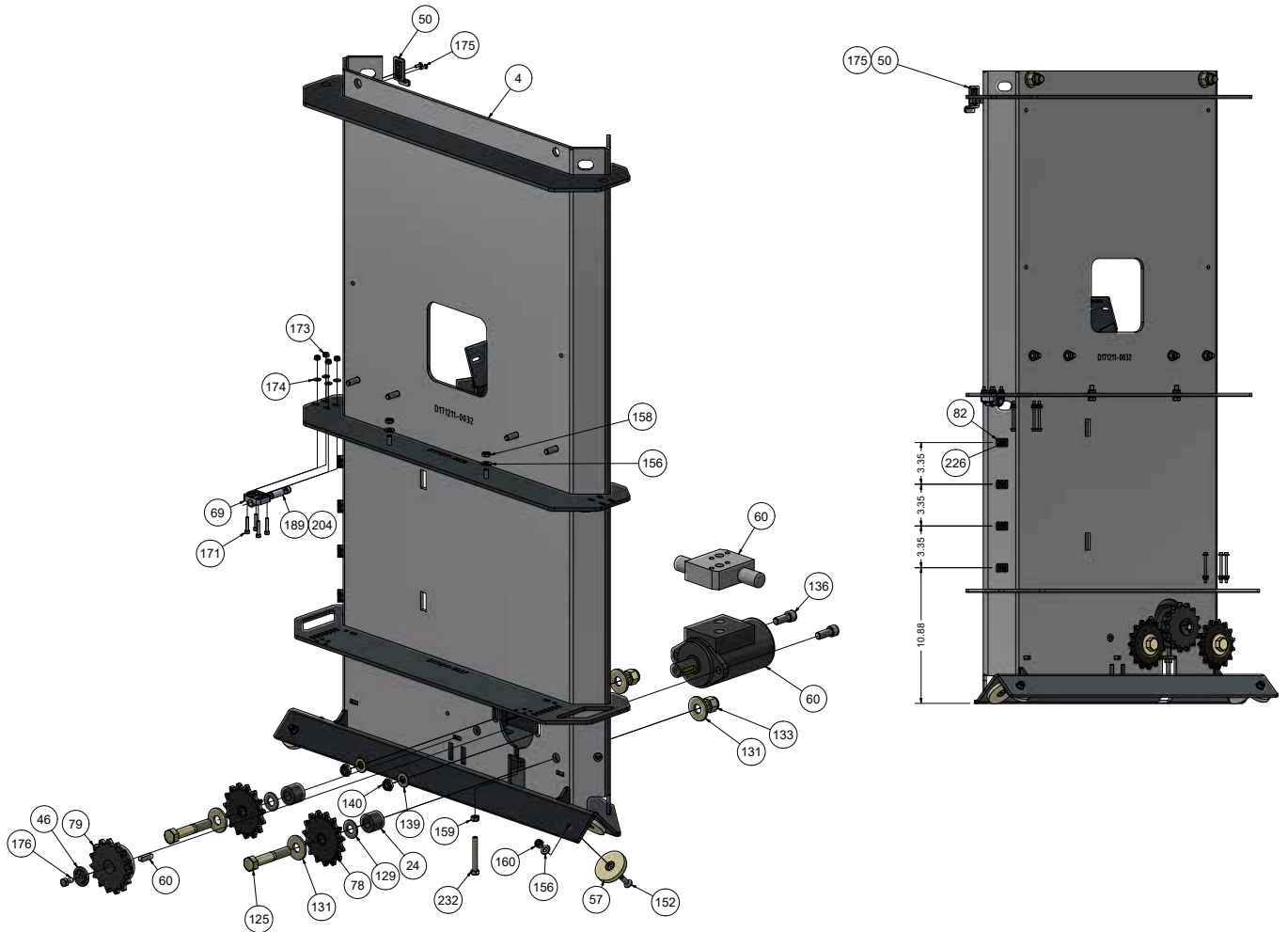
PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
1	1	BASE FAME	RPT-20001
2	1	RIGHT OUTRIGGER FRAME	RPT-20002
3	1	LEFT OUTRIGGER FRAME	RPT-20003
18	2	OUTRIGGER COVER PLATE	RPT-30001
19	2	SWIVEL BOLT MOUNT	RPT-30002
20	2	OUTRIGGER HINGE PIN	RPT-30003
48	2	CHAIN BOLT	RPT-30031
71	2	THREADED ROD END	RPT-40121
82	25	CABLE TIE MOUNT	RPT-40137
94	2	CLEVIS PIN	RPT-40153
95	2	CLEVIS PIN	RPT-40154
99	2	HAIRPIN	RPT-40158
101	2	CAP NUT	RPT-40160
108	1	HYDRAULIC CYLINDER	RPT-40167
110	1	LH HEADLIGHT	RPT-40169
111	1	RH HEADLIGHT	RPT-40170
119	2	WASHER	RPT-12619
120	2	HEX NUT	RPT-12558
121	4	SCREW	RPT-12970
122	22	WASHER	RPT-12615

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
124	4	HEX NUT	RPT-16970
134	4	BOLT	RPT-11099
141	4	HEX NUT	RPT-12477
146	26	WASHER	RPT-12649
156	125	WASHER	RPT-12647
206	12	PLUG	RPT-40272
226	25	SCREW	RPT-19987
237	12	SCREW	RPT-19985
239	1	SAFETY HANDLE	RPT-30046
240	2	BOLT	RPT-10218
241	2	WASHER	RPT-12725
242	4	ELECTRICAL PLUG MALE HOUSING	RPT-40196
243	4	ELECTRICAL PLUG MALE WEDGE	RPT-40204
244	55	ELECTRICAL PLUG CONTACT	RPT-40119
245	2	ELECTRICAL PLUG FEMALE HOUSING	RPT-70142
246	2	ELECTRICAL PLUG FEMALE WEDGE	RPT-70143
247	45	ELECTRICAL PLUG SOCKET	RPT-40198
250	14	PIN	RPT-40277



# INDEX

## SHIFT FRAME ASSEMBLY:



### PARTS LIST

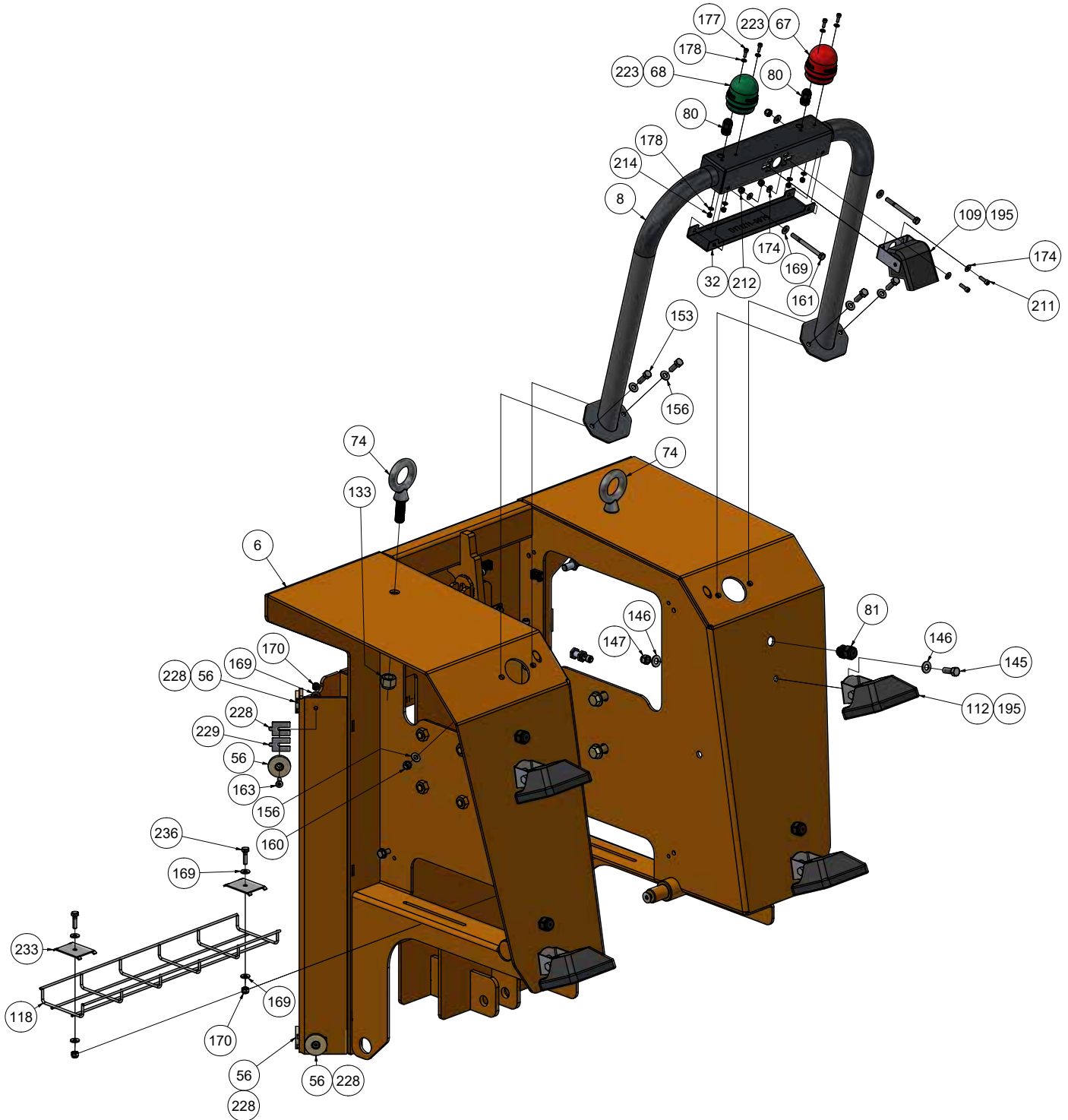
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
4	1	SHIFT FRAME	RPT-20004
24	2	SPROCKET STANDOFF	RPT-30007
46	1	RETAINING WASHER	RPT-30029
50	1	SENSOR FLAG	RPT-30034
57	8	S;IDE PAD	RPT-40105
60	1	HYDRAULIC MOTOR	RPT-80038
69	1	SENSOR MOUNT	RPT-40118
78	2	IDLE SPROCKET	RPT-40131
79	1	SPROCKET	RPT-40132
82	25	CABLE TIE MOUNT	RPT-40137
125	2	BOLT	RPT-11589
129	15	WASHER	RPT-12657
131	10	WASHER	RPT-12613
133	6	HEX NUT	RPT-16969
136	2	SCREW	RPT-12918
139	14	WASHER	RPT-12609

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
140	2	HEX NUT	RPT-19996
152	8	BOLT	RPT-13748
156	125	WASHER	RPT-12647
158	3	HEX NUT	RPT-19997
159	1	HEX NUT	RPT-12488
160	50	HEX NUT	RPT-17000
171	4	SCREW	RPT-12782
173	4	HEX NUT	RPT-16998
174	12	WASHER	RPT-12642
175	2	SCREW	RPT-13149
176	1	BOLT	RPT-15980
189	3	SENSOR	RPT-40191
204	4	CABLE	RPT-40200
226	25	SCREW	RPT-19987
232	1	BOLT	RPT-18438

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## LIFT FRAME ASSEMBLY:



# INDEX

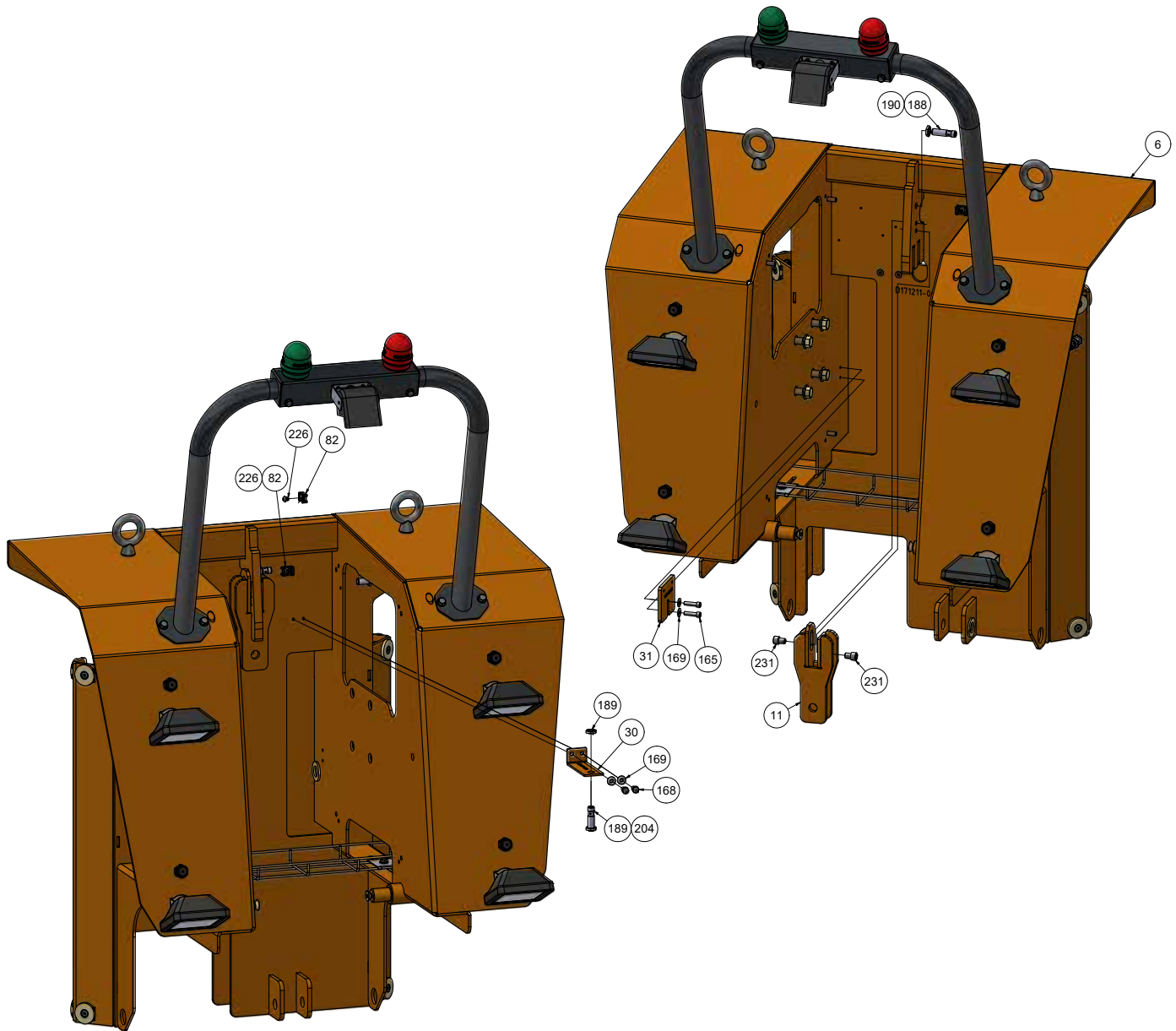
## LIFT FRAME ASSEMBLY:

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
6	1	LIFTING FRAME	RPT-20006
8	1	HALO BAR	RPT-20008
32	1	SIGNAL LIGHT CAP	RPT-30015
56	8	SLIDE PAD	RPT-40104
67	1	RED WARNING LIGHT	RPT-40179
68	1	GREEN WARNING LIGHT	RPT-40178
74	2	STEEL EYEBOLT	RPT-40124
80	2	CORD GRIP	RPT-40133
81	4	CORD GRIP	RPT-40134
109	1	CAMERA SYSTEM	RPT-40168
112	4	LIGHT	RPT-40172
118	1	CABLE TRAY	RPT-40175
133	6	HEX NUT	RPT-16969
145	4	BOLT	RPT-10216
146	26	WASHER	RPT-12649
147	16	HEX NUT	RPT-17001
153	68	BOLT	RPT-10166
156	125	WASHER	RPT-12647

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
160	50	HEX NUT	RPT-17000
161	2	BOLT	RPT-10124
163	12	BOLT	RPT-13702
169	28	WASHER	RPT-12644
170	20	HEX NUT	RPT-16999
174	12	WASHER	RPT-12642
177	4	SCREW	RPT-16377
178	8	WASHER	RPT-16247
195	40'	CABLE	RPT-40185
211	2	SCREW	RPT-12794
212	4	HEX NUT	RPT-17016
214	4	HEX NUT	RPT-16820
223	2	LIGHT BULB	RPT-40202
228	8	SHIM	RPT-30042
229	4	SHIM	RPT-30041
233	2	TRAY CLIP	RPT-30044
236	2	BOLT	RPT-10116

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## LIFT FRAME ASSEMBLY:

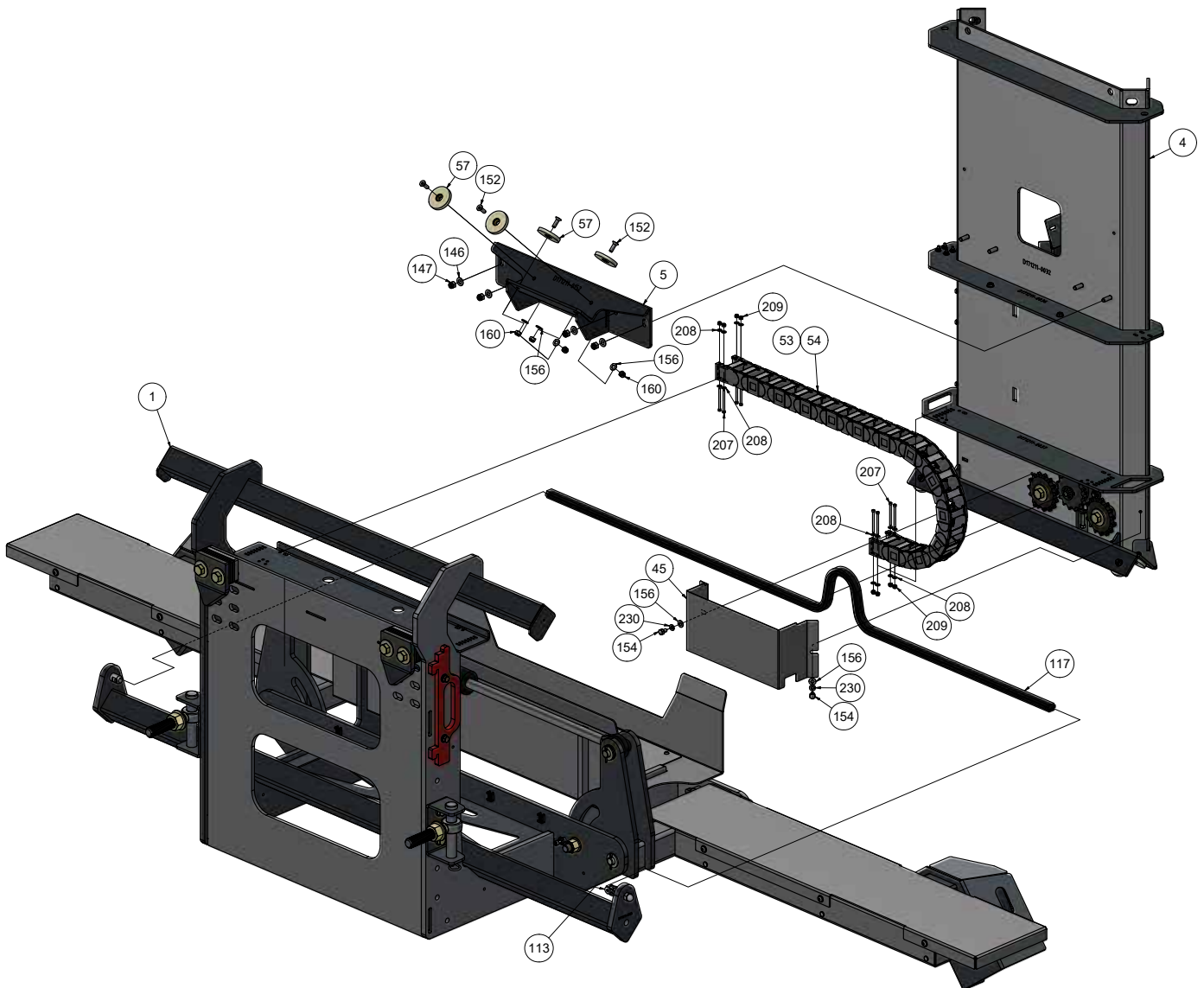


PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
6	1	LIFTING FRAME	RPT-20006
11	1	LIFT CYLINDER TOP MOUNT	RPT-20011
30	1	SENSOR BRACKET	RPT-30013
31	1	E-CHAIN MOUNTING PLATE	RPT-30014
82	25	CABLE TIE MOUNT	RPT-40137
165	2	SCREW	RPT-12813
168	2	BOLT	RPT-10112

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
169	28	WASHER	RPT-12644
188	6	SENSOR	RPT-40192
189	3	SENSOR	RPT-40191
190	1	CABLE	RPT-40193
204	4	CABLE	RPT-40200
226	25	SCREW	RPT-19987
231	2	SCREW	RPT-12873

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## BASE & SHIFT FRAME ASSEMBLY:



### PARTS LIST

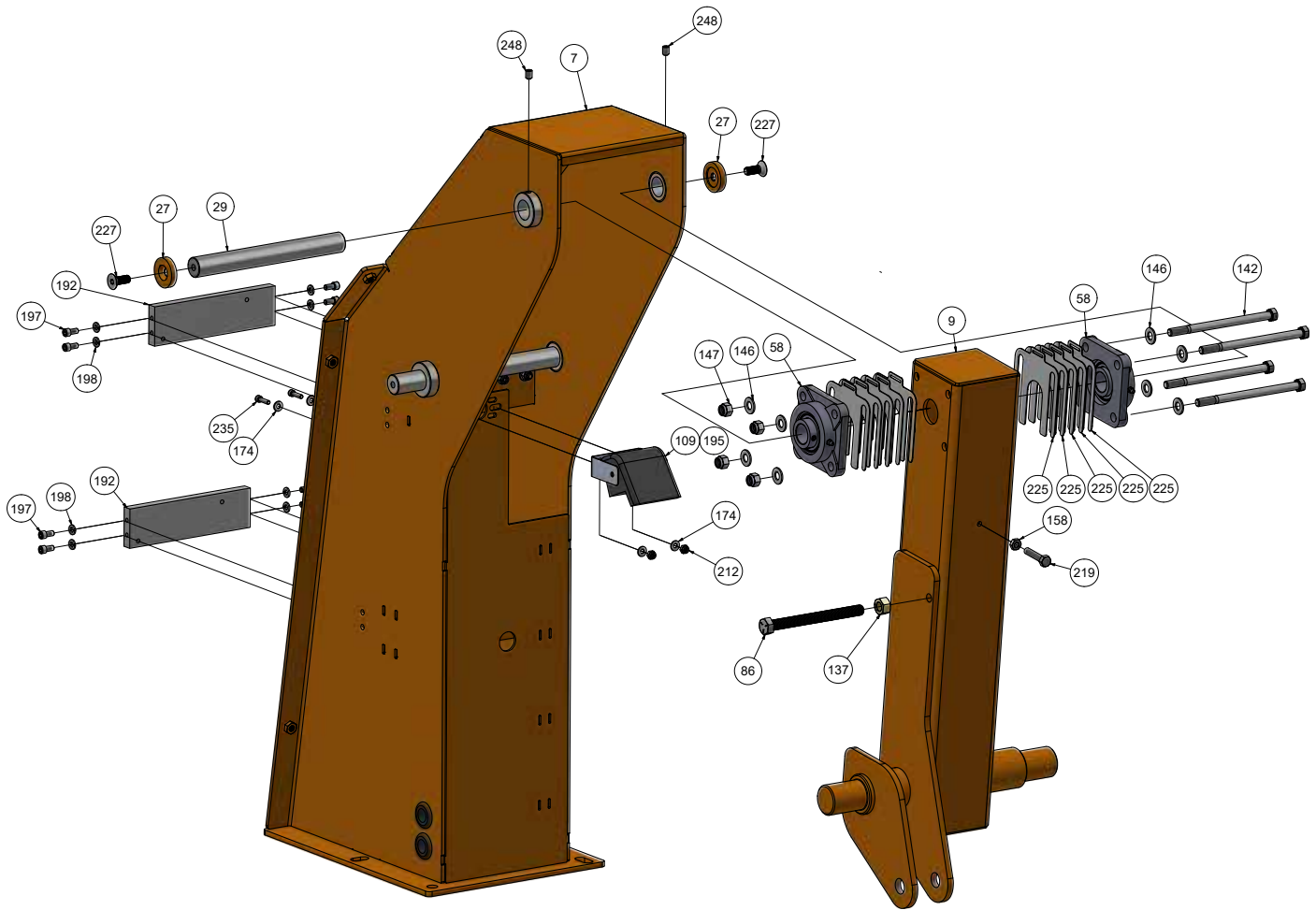
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
1	1	BASE FRAME	RPT-20001
4	1	SHIFT FRAME	RPT-20004
5	1	UPPER SLIDING BEARING MOUNT	RPT-20005
45	1	SHIFT MOTOR SPROCKET COVER	RPT-30028
53	1	E-CHAIN MOUNTING BRACKET	RPT-40100
54	1	E-CHAIN	RPT-40101
57	8	SLIDE PAD	RPT-40105
113	1	CHAIN LINK	RPT-40203
117	1	CHAIN	RPT-40174

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
146	26	WASHER	RPT-12649
147	16	HEX NUT	RPT-17001
152	8	BOLT	RPT-13748
154	2	BOLT	RPT-10162
156	125	WASHER	RPT-12647
160	50	HEX NUT	RPT-17000
207	8	SCREW	RPT-12775
208	16	WASHER	RPT-12641
209	8	HEX NUT	RPT-16997
230	2	WASHER	RPT-12724

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## EXTENDING ARM ASSEMBLY:



### PARTS LIST

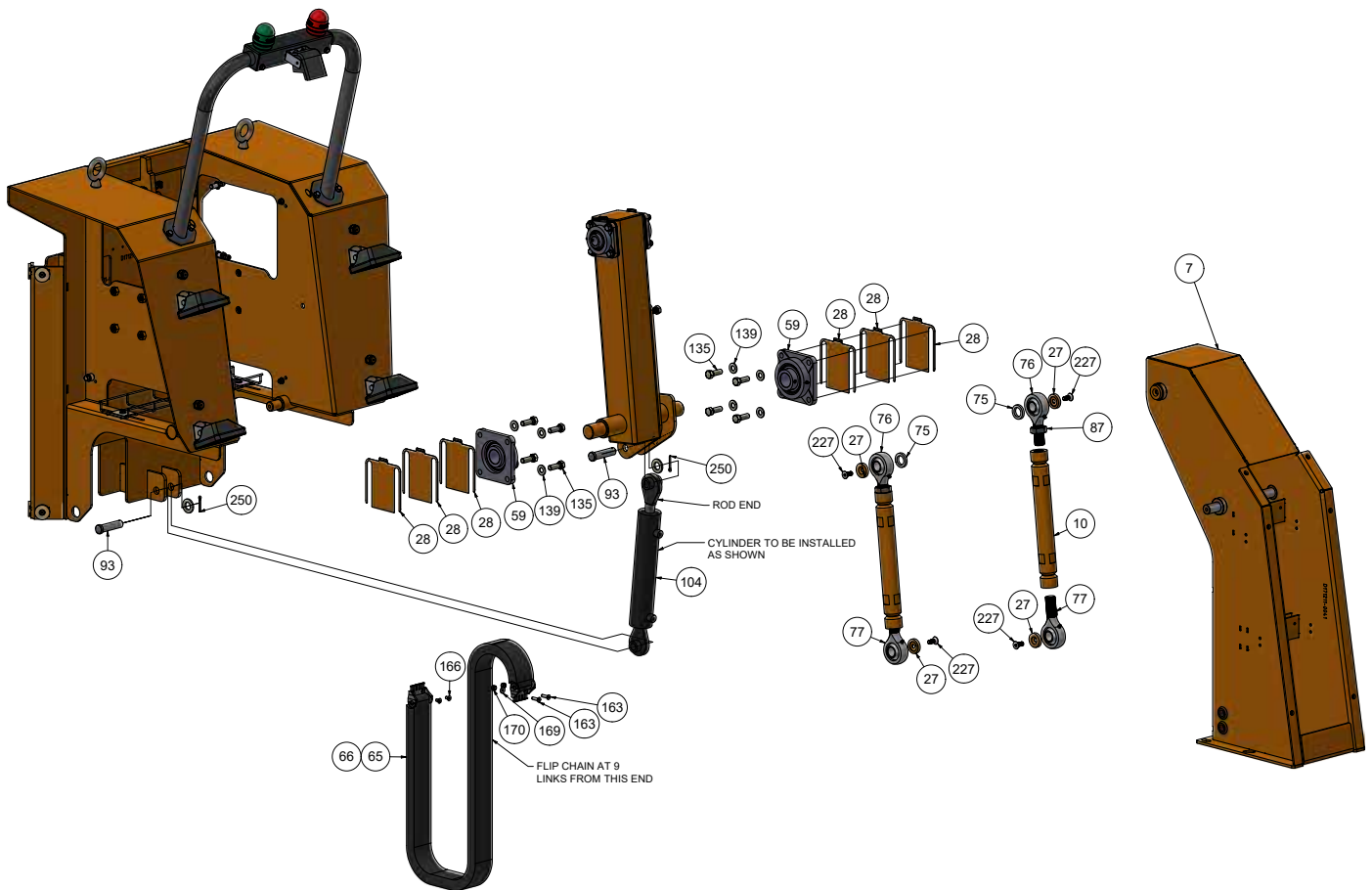
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
7	1	OUTER EXTENSION ARM	RPT-20007
9	1	INNER EXTENSION ARM	RPT-2009
27	6	CAPTIVE WASHER	RPT-30010
29	1	EXTENSION ARM SHAFT	RPT-30012
58	2	FLANGE BEARING	RPT-40106
86	1	BOLT	RPT-40143
109	1	CAMERA SYSTEM	RPT-40168
137	1	HEX NUT	RPT-12548
142	4	BOLT	RPT-10232
146	26	WASHER	RPT-12649
147	16	HEX NUT	RPT-17001
158	3	HEX NUT	RPT-19997

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
174	12	WASHER	RPT-12642
192	2	MOUNTING PLATE	RPT-300038
195	40'	CABLE	RPT-40185
197	8	SCREW	RPT-12809
198	12	WASHER	RPT-12723
212	4	HEX NUT	RPT-17016
219	1	BOLT	RPT-19994
225	10	SHIM	RPT-30040
227	6	SCREW	RPT-19986
235	2	SCREW	RPT-12765
248	2	SET SCREW	RPT-15206

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## LIFT FRAME & EXTENDING ARM ASSEMBLY:



### PARTS LIST

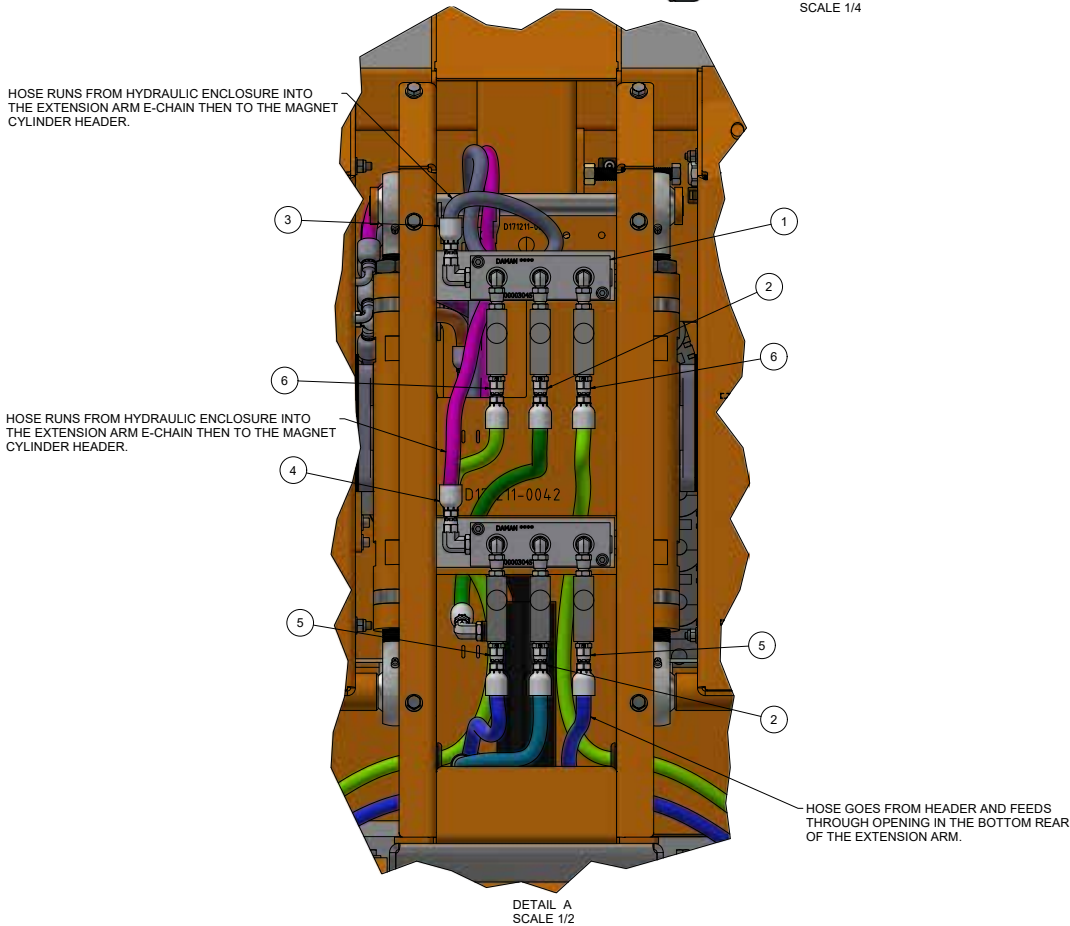
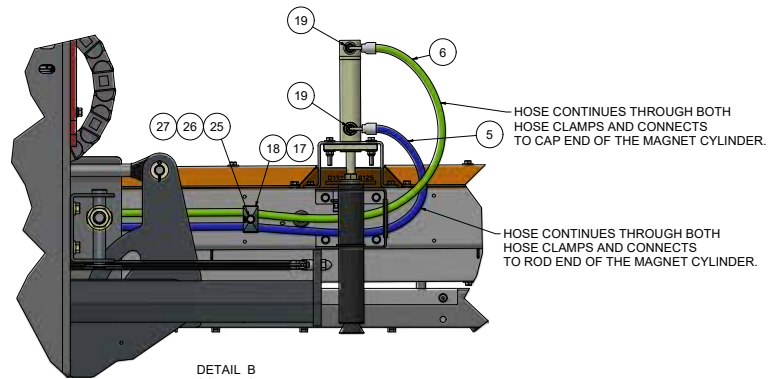
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
7	1	OUTER EXTENSION ARM	RPT-20007
10	2	EXTENSION ARM TIE ROD	RPT-20010
27	6	CAPTIVE WASHER	RPT-30010
28	6	SHIM	RPT-30011
59	2	FLANGE BEARING	RPT-40107
65	1	E-CHAIN	RPT-40114
66	1	E-CHAIN MOUNTING BRACKET	RPT-40115
75	2	RING SHIM	RPT-40125
76	2	RH STEEL BALL JOINT ROD END	RPT-40128
77	2	LH STEEL BALL JOINT ROD END	RPT-40129

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
87	2	THIN HEX NUT	RPT-40156
93	2	CLEVIS PIN	RPT-40152
104	1	HYDRAULIC CYLINDER	RPT-40163
135	12	BOLT	RPT-11522
139	14	WASHER	RPT-12609
163	12	BOLT	RPT-13702
166	4	BOLT	RPT-13698
169	28	WASHER	RPT-12644
179	20	HEX NUT	RPT-16999
227	6	SCREW	RPT-19986
250	14	PIN	RPT-40277

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## MAGNET HYDRAULIC HEADER AND CYLINDER HOSES:



### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
1	2	MANIFOLD	RPT-80068
2	2	HYDRAULIC HOSE	RPT-88531
3	2	HYDRAULIC HOSE	RPT-88510
4	1	HYDRAULIC HOSE	RPT-88511
5	2	HYDRAULIC HOSE	RPT-80069
6	2	HYDRAULIC HOSE	RPT-80070

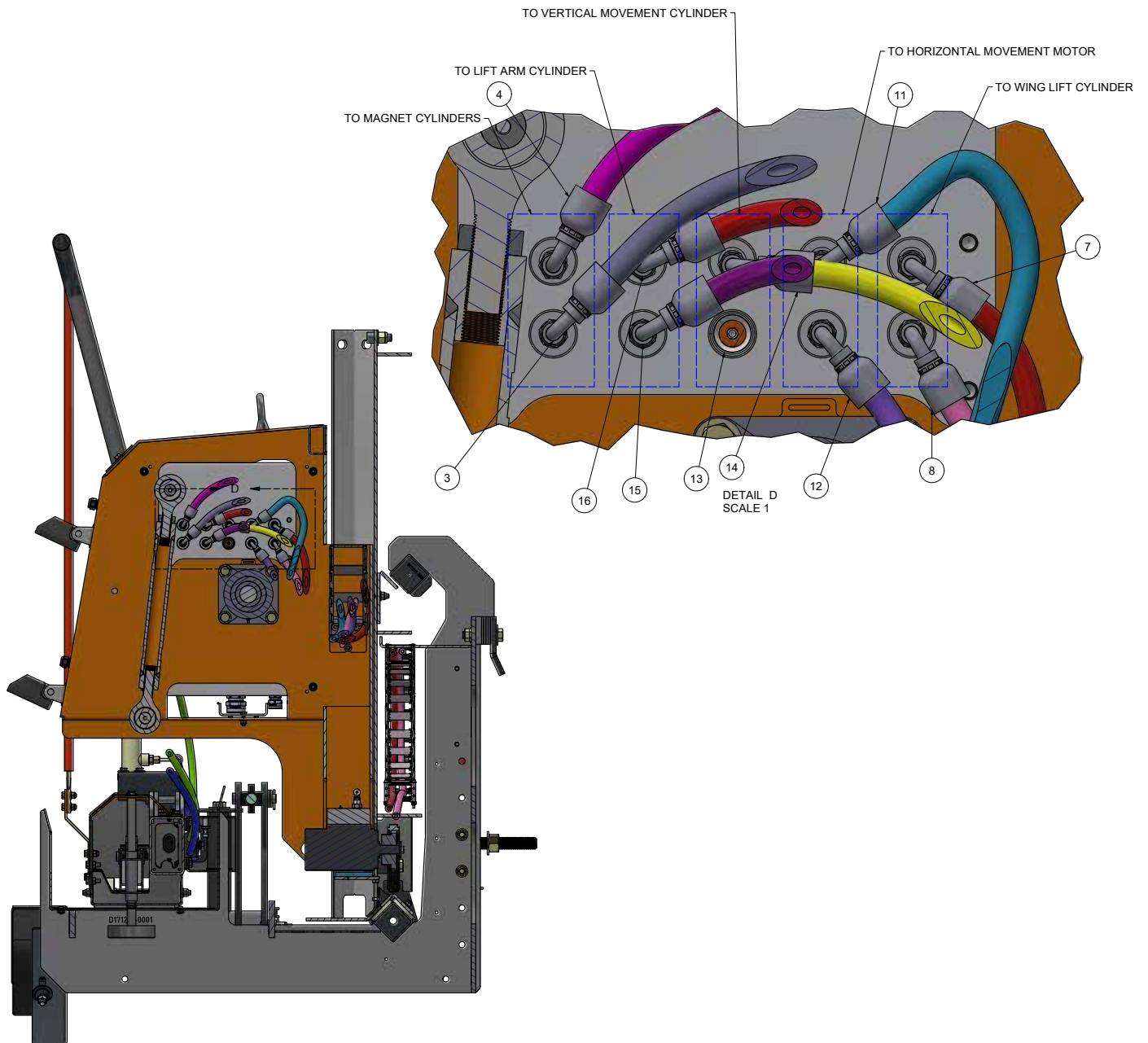
### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
17	18	HOSE CLAMP	RPT-80009
18	9	HOSE CLAMP PLATE	RPT-80010
19	7	STRAIGHT FITTING	RPT-80003
25	4	BOLT	RPT-10170
26	5	WASHER	RPT-12724
27	9	WASHER	RPT-12647



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## POWER UNIT MANIFOLD CONNECTIONS



### PARTS LIST

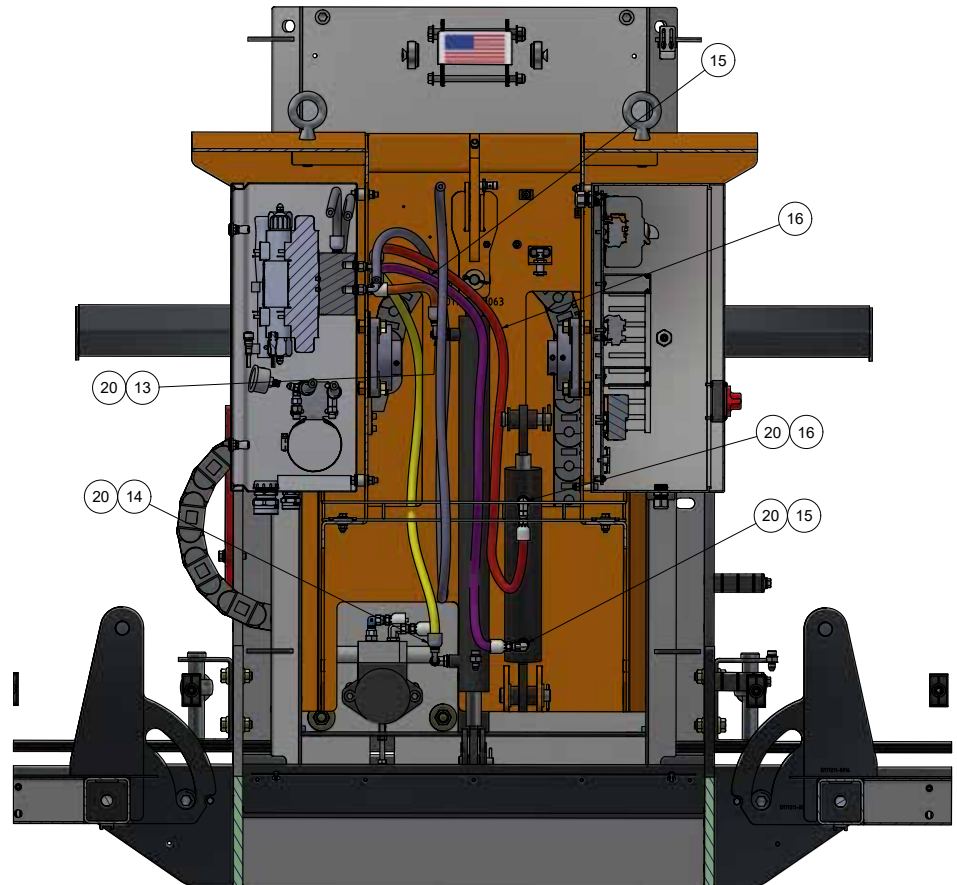
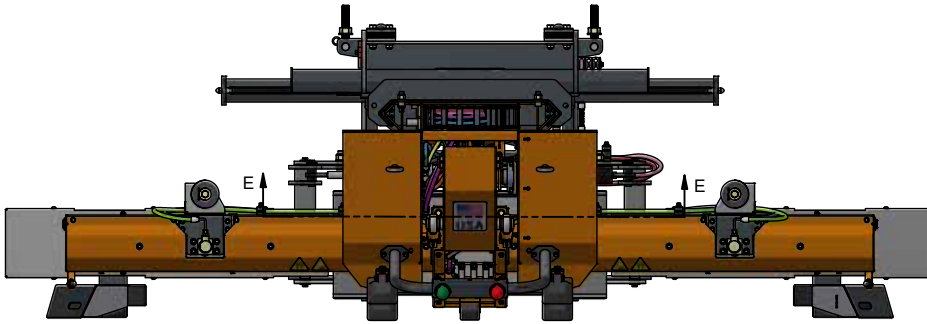
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
3	2	HYDRAULIC HOSE	RPT-88510
4	1	HYDRAULIC HOSE	RPT-88511
7	1	HYDRAULIC HOSE	RPT-88517
8	1	HYDRAULIC HOSE	RPT-88516
11	1	HYDRAULIC HOSE	RPT-88521

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
12	1	HYDRAULIC HOSE	RPT-88520
13	1	HYDRAULIC HOSE	RPT-88522
14	1	HYDRAULIC HOSE	RPT-88523
15	1	HYDRAULIC HOSE	RPT-88525
16	1	HYDRAULIC HOSE	RPT-88524

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## LIFT AND EXTENSION ARM CYLINDER HOSES:



### NOTE:

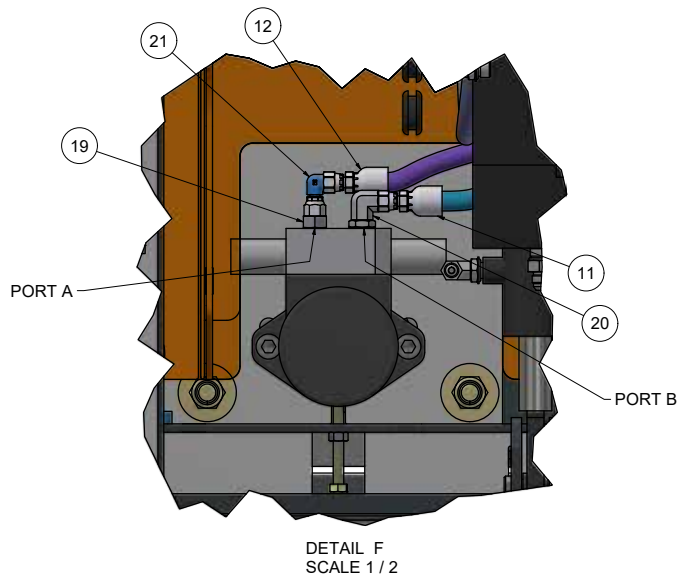
PARTS AND EXTRA HOISING REMOVED FOR CLARITY

## PARTS LIST

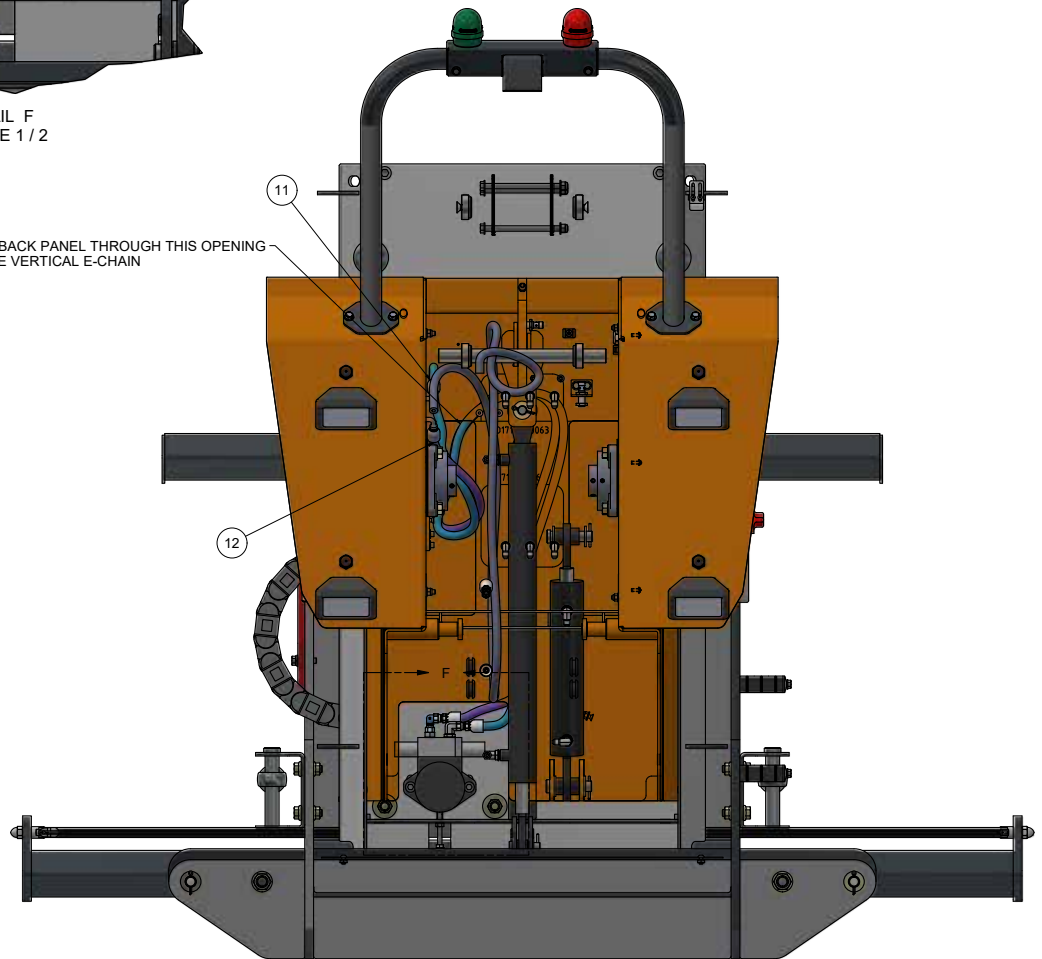
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
13	1	HYDAULIC HOSE	RPT-88522
14	1	HYDAULIC HOSE	RPT-88523
15	1	HYDAULIC HOSE	RPT-88525
16	1	HYDAULIC HOSE	RPT-88524
20	7	ELBOW	RPT-80002

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## HYDRAULIC MOTOR HOSES:



HOSE GOES BEHIND BACK PANEL THROUGH THIS OPENING AND FEEDS INTO THE VERTICAL E-CHAIN

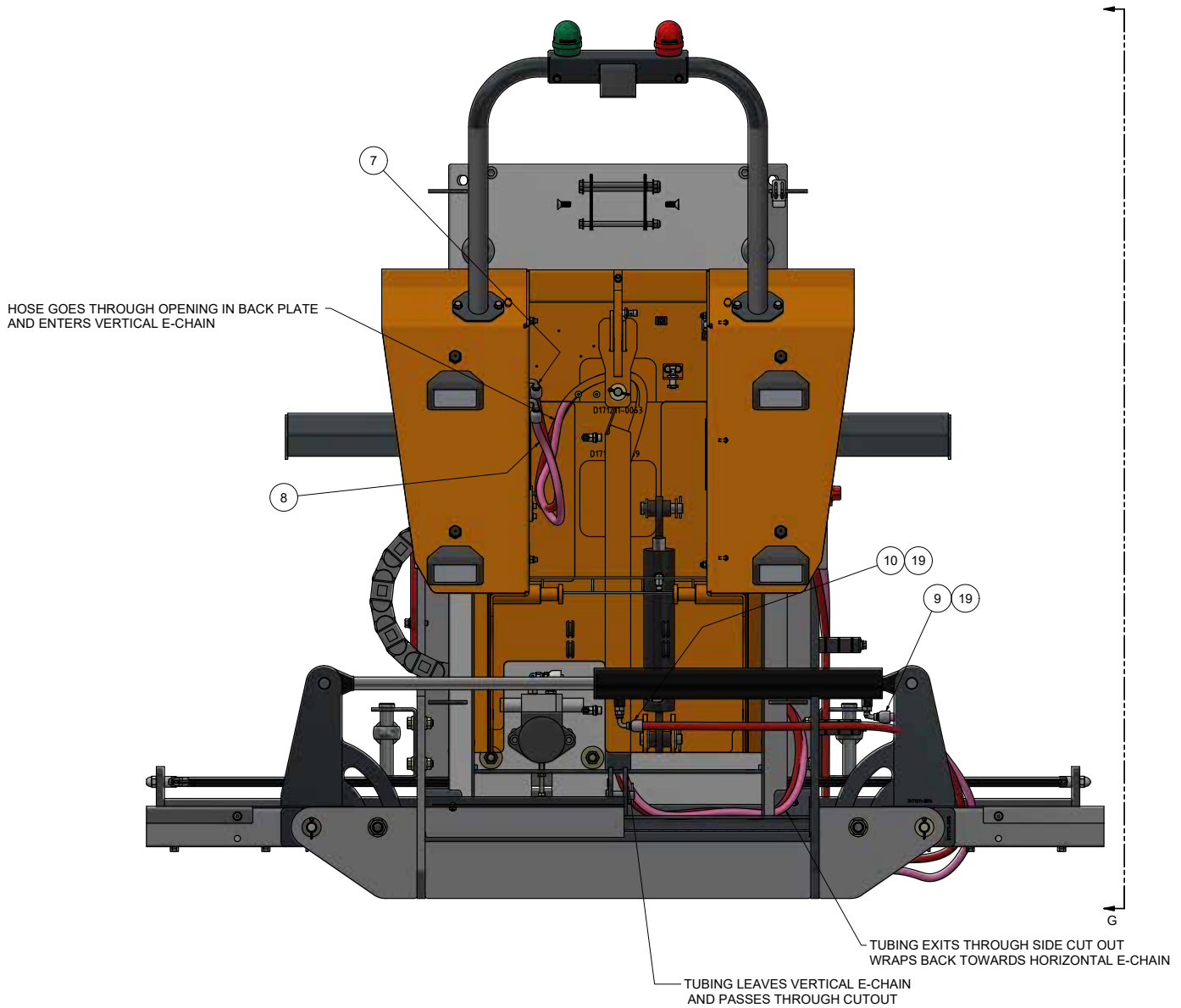


### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
11	1	HYDAULIC HOSE	RPT-88521
12	1	HYDAULIC HOSE	RPT-88520
19	7	HYDAULIC HOSE	RPT-80003
20	7	ELBOW	RPT-80002
21	1	ELBOW	RPT-80006

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## FOLDING WING CYLINDER HOSES 1:

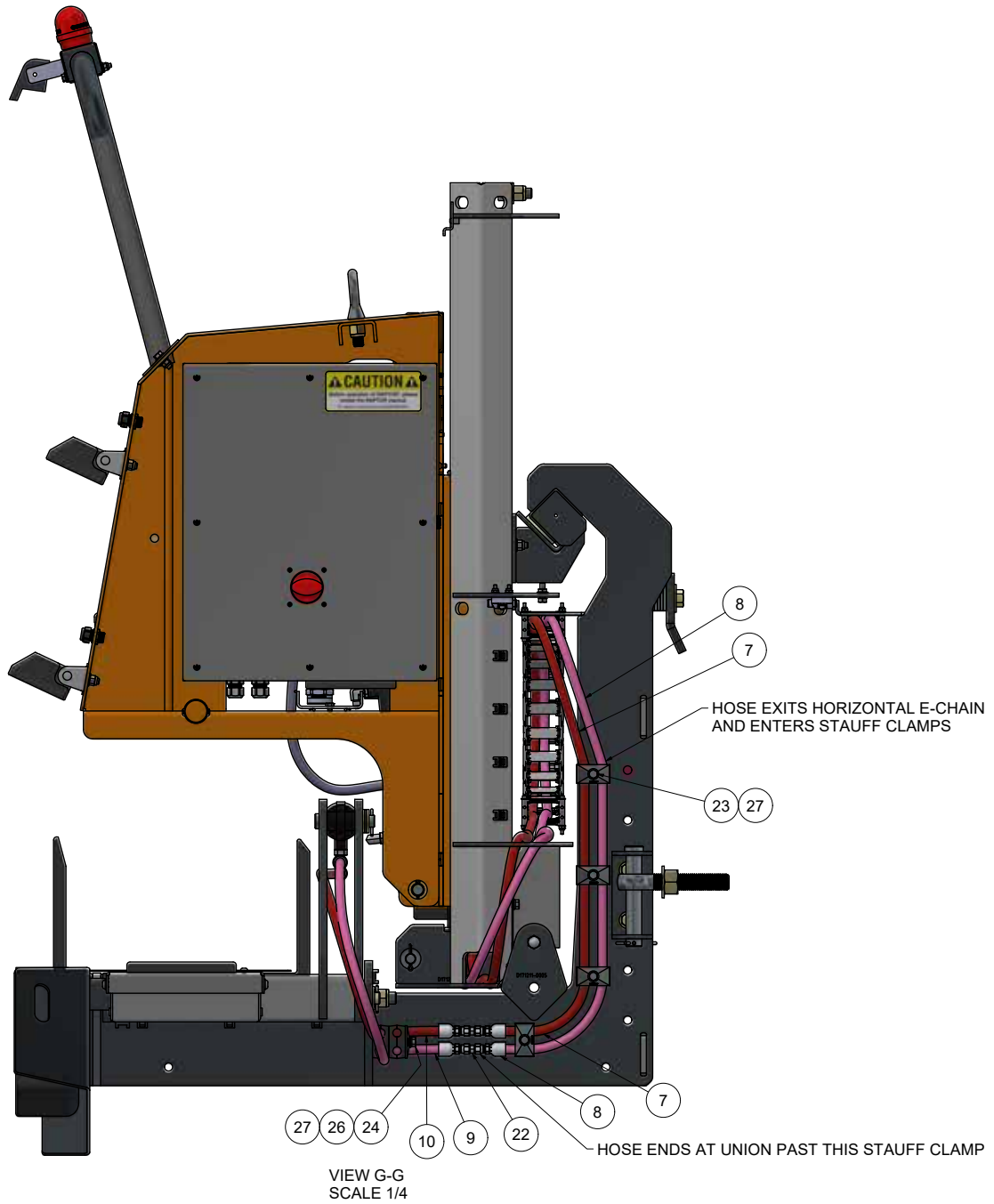


### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
7	1	HYDAULIC HOSE	RPT-88517
8	1	HYDAULIC HOSE	RPT-88516
9	1	HYDAULIC HOSE	RPT-88518
10	1	HYDAULIC HOSE	RPT-88519
19	7	STRAIGHT FITTING	RPT-80003

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## FOLDING WING CYLINDER HOSES 2



### PARTS LIST

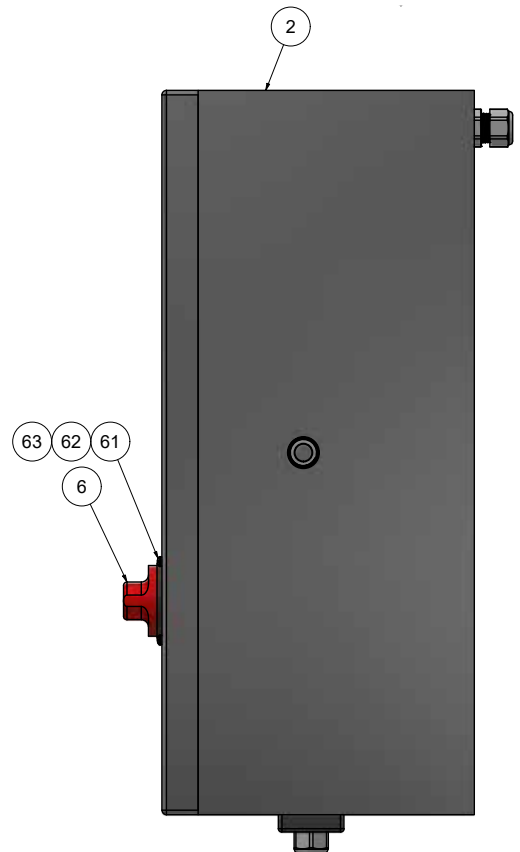
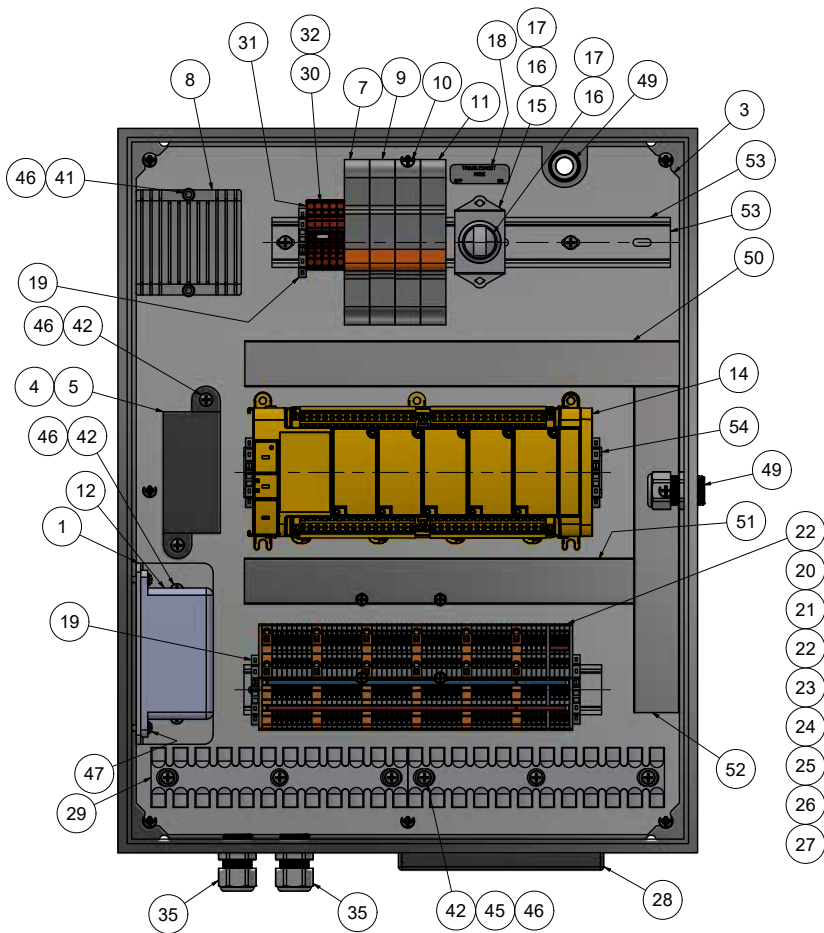
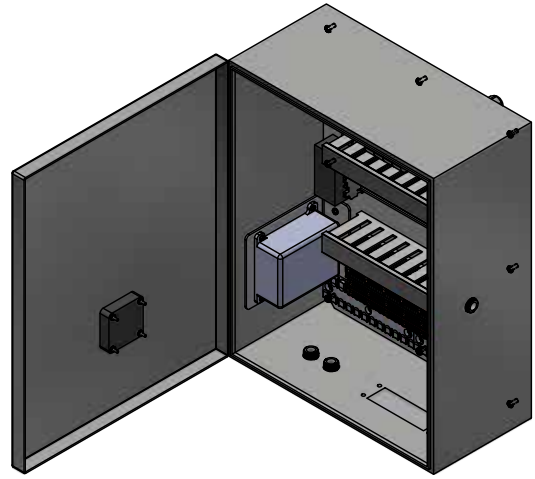
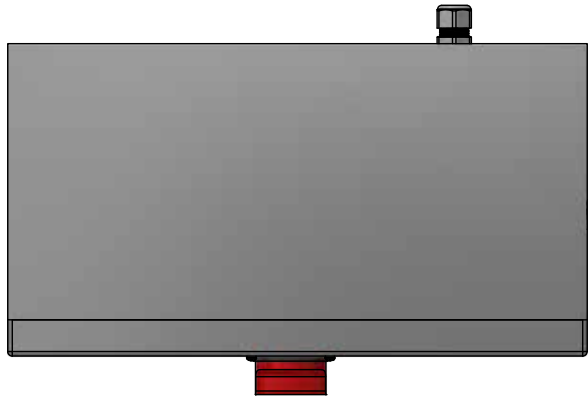
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
7	1	HYDAULIC HOSE	RPT-88517
8	1	HYDAULIC HOSE	RPT-88516
9	1	HYDAULIC HOSE	RPT-88518
10	1	HYDAULIC HOSE	RPT-88519
22	2	UNION	RPT-80008

### PARTS LIST

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
23	4	BOLT	RPT-10178
24	1	BOLT	RPT-10173
26	5	WASHER	RPT-12724
27	9	WASHER	RPT-12647

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## ELECTRICAL PANEL:



### NOTE:

ITEMS #13, AND #55 - #60 ARE NOT SHOWN ON DRAWING

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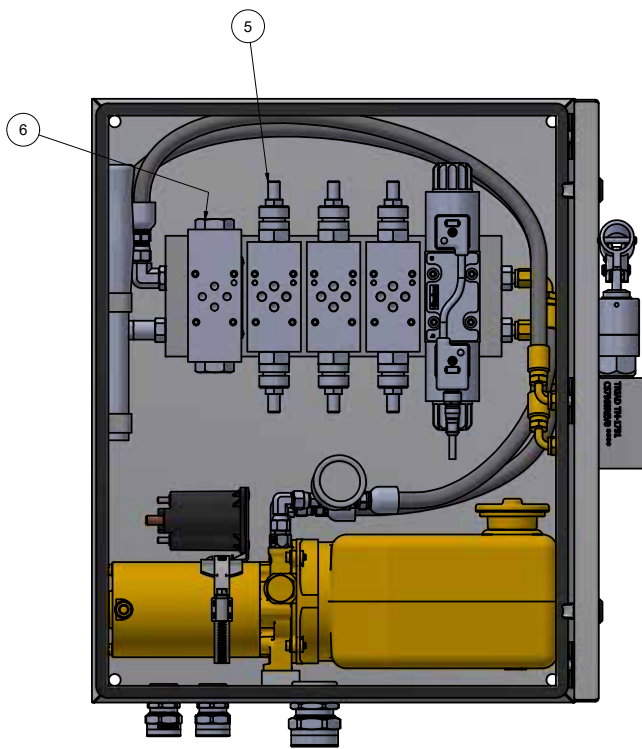
## ELECTRICAL PANEL CONT'D:

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
1	1	REMOTE CONTROL BRACKET	RPT-30037
2	1	ELECTRICAL ENCLOSURE	RPT-70002
3	1	BACKPLATE	RPT-70003
4	1	FUSE HODLER	RPT-70004
5	1	FUSE	RPT-70005
6	1	MAIN BATTERY SWITCH	RPT-70006
7	1	CIRCUIT BREAKER	RPT-70007
8	1	POWER CONVERTER	RPT-70008
9	1	CIRCUIT BREAKER	RPT-70009
10	1	CIRCUIT BREAKER	RPT-70010
11	1	CIRCUIT BREAKER	RPT-70014
12	1	REMOTE CONTROL SYSTEM	RPT-70015
13	1	REMOTE GRAPHIC	RPT-70017
14	1	PROGRAMMABLE LOGIC CONTROLLER	RPT-70023
15	1	SWITCH ADAPTER	RPT-70029
16	1	SWITCH	RPT-70030
17	1	CONTACT BLOCK	RPT-70031
18	1	LEGEND PLATE	RPT-70032
19	8	END ANCHOR	RPT-70033
20	3	END BARRIER	RPT-70034
21	6	TERMINAL BLOCK	RPT-70035
22	49	TERMINAL BLOCK	RPT-70036
23	1	TERMINAL BLOCK JUMPER	RPT-70037
24	1	TERMINAL BLOCK JUMPER	RPT-70038
25	1	TERMINAL BLOCK JUMPER	RPT-70039
26	1	TERMINAL BLOCK JUMPER	RPT-70040
27	1	TERMINAL BLOCK JUMPER	RPT-70041
28	1	CABLE ENTRY ASSEMBLY	RPT-70047
29	2	STRAIN RELIEF PLATE	RPT-70048
30	5	TERMINAL BLOCK	RPT-70056

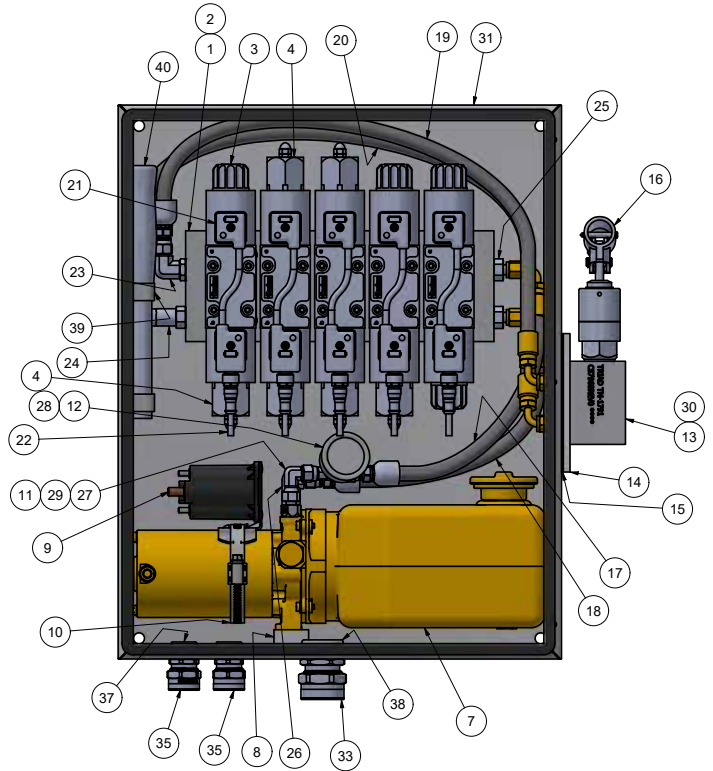
PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
31	1	END BARRIER	RPT-70057
32	1	TERMINAL BLOCK JUMPER	RPT-70058
33		REMOVED	
34		REMOVED	
35	2	CORD GRIP	RPT-70063
36		REMOVED	
37		REMOVED	
38		REMOVED	
39		REMOVED	
40		REMOVED	
41	2	SCREW	RPT-12794
42	27	SCREW	RPT-40267
43		REMOVED	
44		REMOVED	
45	6	WASHER	RPT-12642
46	12	WASHER	RPT-12722
47	4	SCREW	RPT-40268
48		REMOVED	
49	2	CORD GRIP	RPT-70144
50	1	WIRE DUCT	RPT-70147
51	1	WIRE DUCT	RPT-70148
52	1	WIRE DUCT	RPT-70149
53	1	DIN RAIL	RPT-70150
54	2	DIN RAIL	RPT-70151
55	1	CABLE	RPT-70145
56	1	CABLE	RPT-70133
57	1	CABLE	RPT-70146
58	1	CABLE	RPT-70134
59	1	CABLE	RPT-70123
60	1	CABLE	RPT-70130
61	4	SCREW	RPT-19982
62	4	WASHER	RPT-12720
63	4	HEX NUT	RPT-18046

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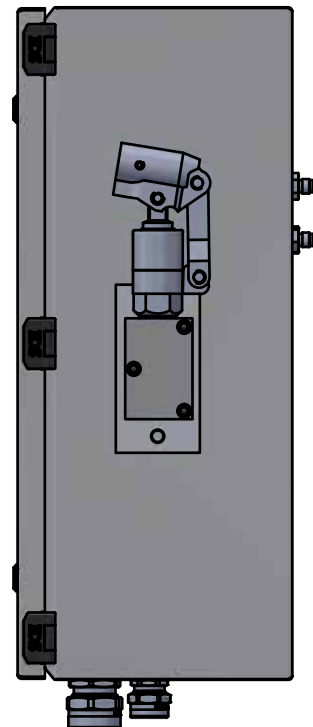
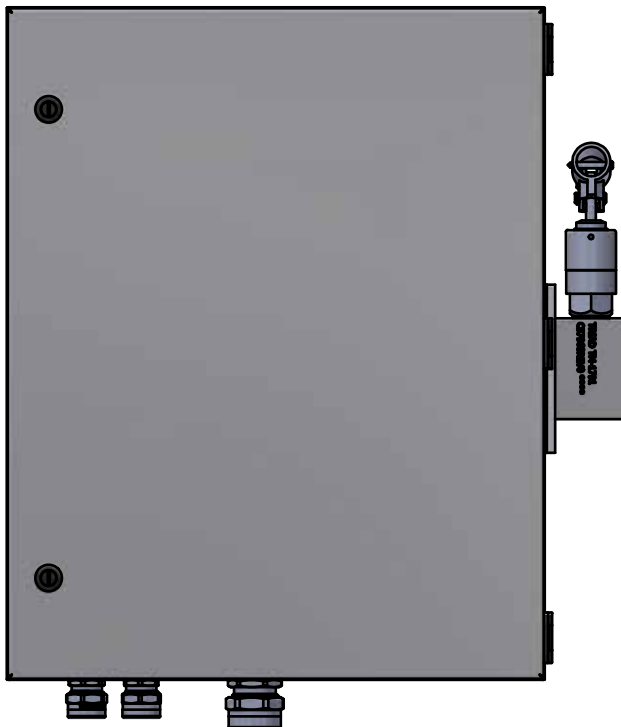
## HYDRAULIC CONTROL SYSTEM ASSEMBLY:



**NOTE:**  
ITEM #3 REMOVED TO SHOW PARTS UNDERNEATH THEM



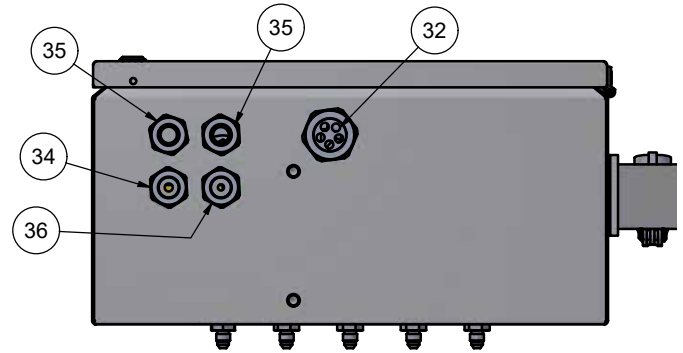
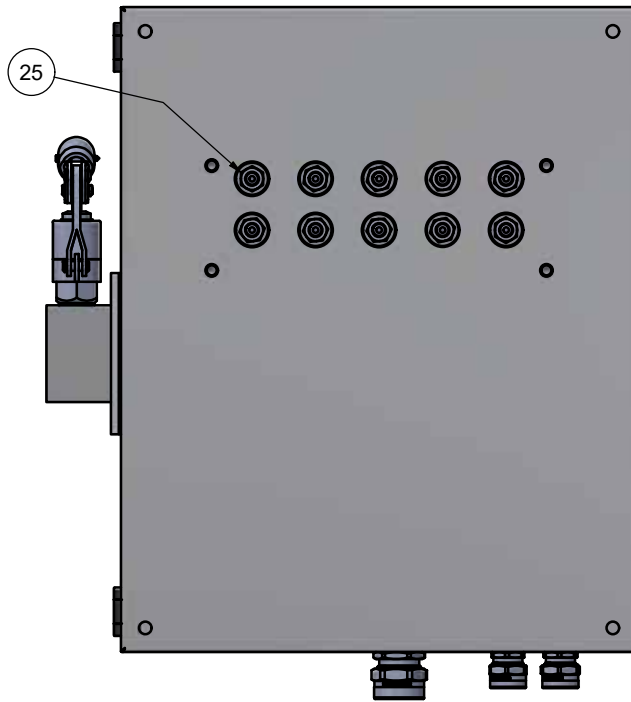
**NOTE:**  
DOOR REMOVED FOR VISIBILITY





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## HYDRAULIC CONTROL SYSTEM ASSEMBLY CONT'D:



### PARTS LIST

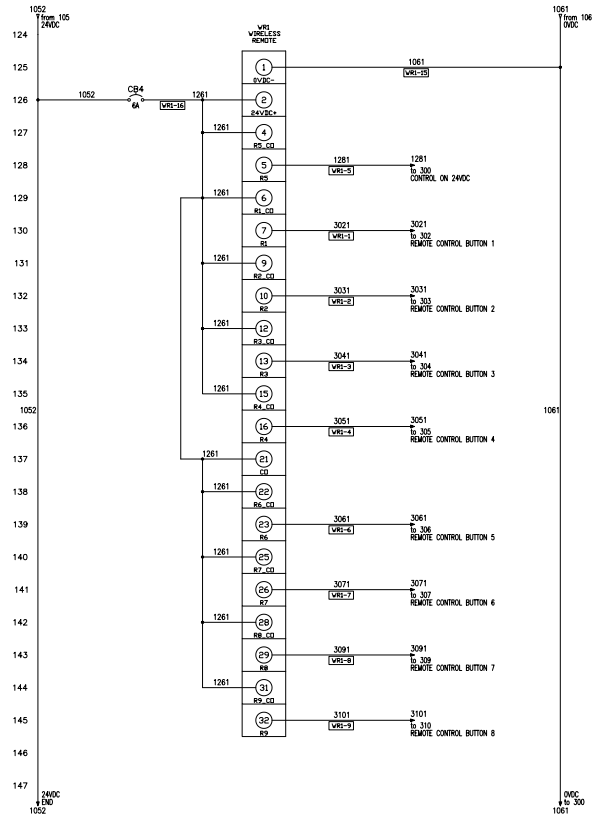
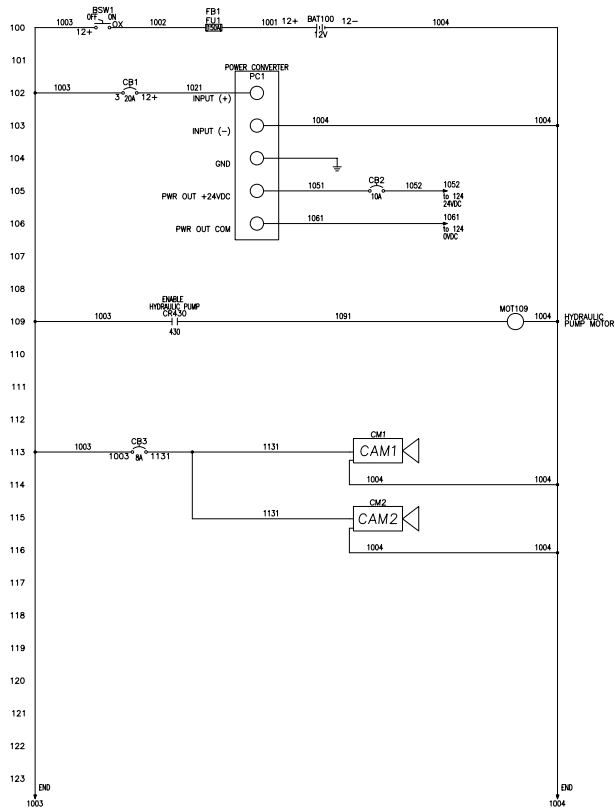
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
1	1	MANIFOLD	RPT-80024
2	1	GASKET	RPT-80051
3	5	VALVE	RPT-80026
4	6	VALVE OVERRIDE	RPT-80027
5	3	FLOW CONTROL	RPT-80028
6	1	VALVE CHECK	RPT-80029
7	1	POWER UNIT	RPT-80013
8	1	MOUNTING PLATE	RPT-80019
9	1	SOLENOID	RPT-80049
10	1	CLAMP	RPT-80020
11	1	CHECK VALVE	RPT-80021
12	1	GAUGE	RPT-80050
13	1	PUMP BODY	RPT-80034
14	1	MOUNTING PLATE	RPT-80056
15	1	GASKET	RPT-80057
16	1	HAND PUMP	RPT-80032
17	1	HOSE	RPT-88526
18	1	HOSE	RPT-88527
19	1	HOSE	RPT-88528
20	1	HOSE	RPT-88529

### PARTS LIST

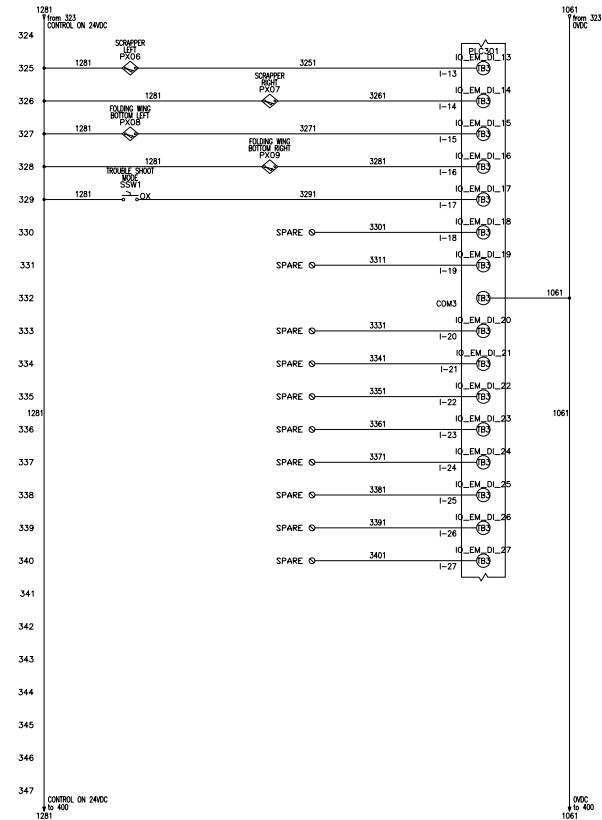
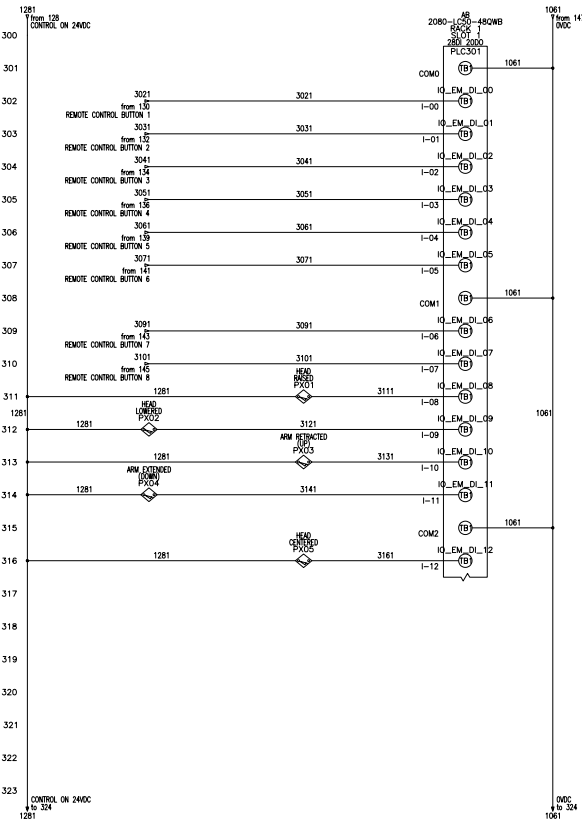
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
21	5	CORDSET	RPT-80054
22	55	CORDSET	RPT-80055
23	1	ELBOW	RPT-80002
24	1	ELBOW	RPT-80042
25	12	STRAIGHT	RPT-80003
26	1	ELBOW	RPT-80075
27	1	ELBOW	RPT-80006
28	1	STRAIGHT	RPT-80076
29	1	TEE	RPT-80077
30	2	STRAIGHT	RPT-80004
31	1	ENCLOSURE	RPT-80058
32	1	CORDGRIP INSERT	RPT-80059
33	1	CORDGRIP	RPT-80060
34	1	CORDGRIP	RPT-80061
35	2	CORDGRIP	RPT-80062
36	1	CORDGRIP	RPT-80063
37	4	BUSHING	RPT-80064
38	1	BUSHING	RPT-80065
39	2	HANDLE HOLDER	RPT-80039
40	1	HANDLE	RPT-80033

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## POWER DISTRIBUTION:

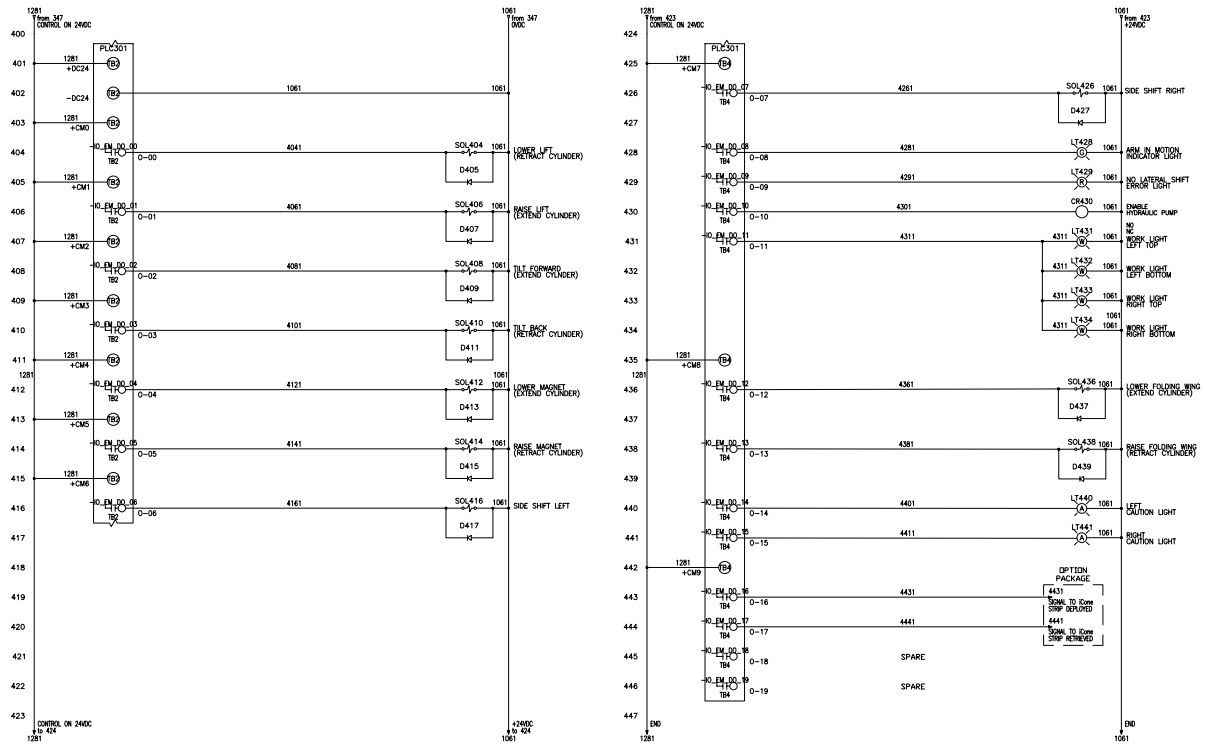


## PLC I/O ASSIGNMENTS:



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## PLC I/O ASSIGNMENTS:

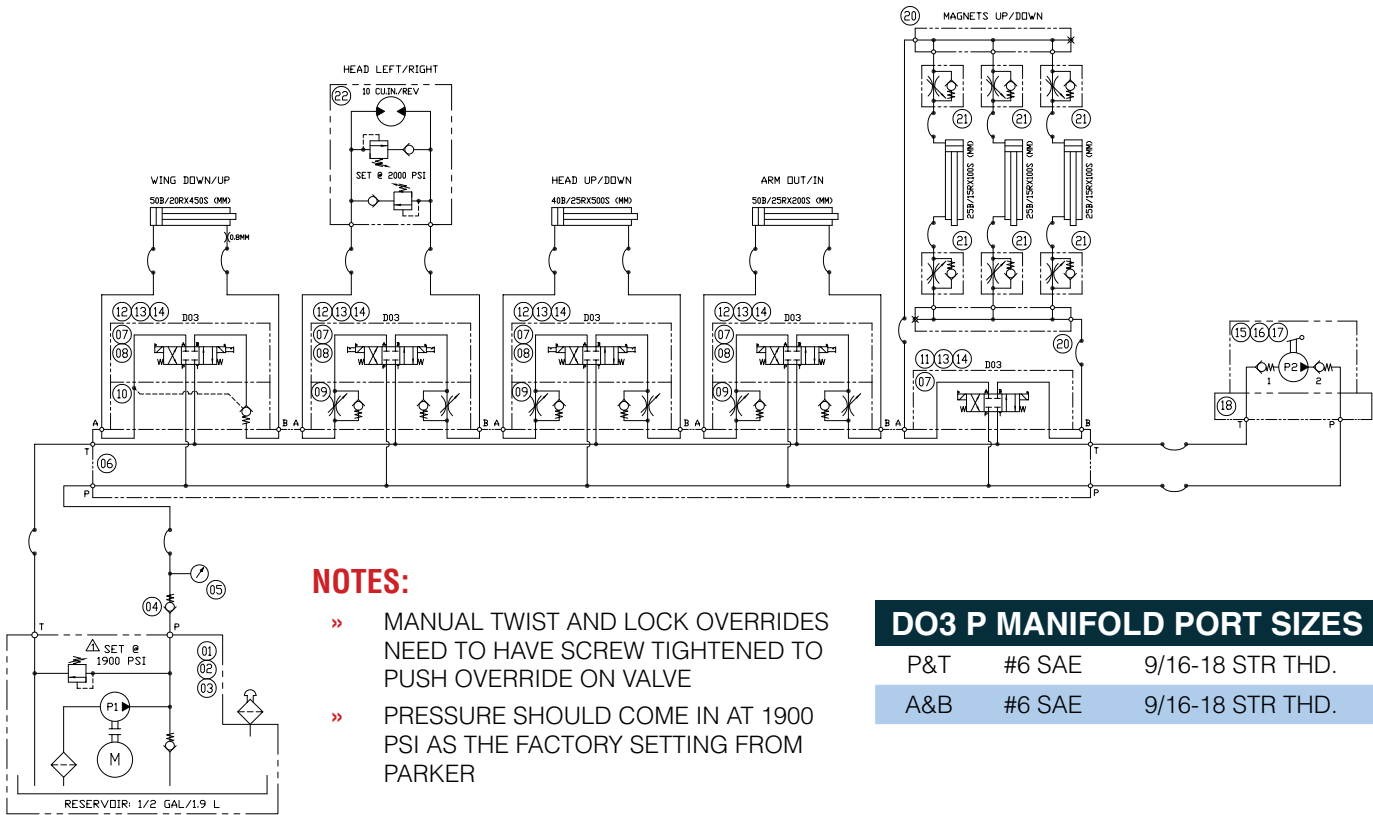


## BILL OF MATERIAL

TAG	QTY	REC. SPARE PARTS	PART NUMBER	DESCRIPTION
	1		RPT-70001	ELECTRICAL CONTROL SYSTEM ASSEMBLED <b>(CONSISTS OF ALL "RPT" ITEMS BELOW)</b> (NOT SHOWN ON SCHEMATIC)
ENC1	1		RPT-70002	MAIN ELECTRICAL ENCLOSURE (NOT SHOWN ON SCHEMATIC)
ENC1	1		RPT-70003	MAIN ENCLOSURE PANEL (NOT SHOWN ON SCHEMATIC)
FB1	1		RPT-70004	150-AMP FUSE HOLDER
FU1	1	1	RPT-70005	150 AMP FUSE
BSW1	1		RPT-70006	BATTERY ON/OFF SWITCH
CB1	1	1	RPT-70007	20-AMP CIRCUIT BREAKER
PC1	1	1	RPT-70008	240-WATT DC POWER CONVERTER
CB2	1	1	RPT-70009	10-AMP CIRCUIT BREAKER
CB3	1	1	RPT-70010	8-AMP CIRCUIT BREAKER
CB4	1	1	RPT-70014	6-AMP CIRCUIT BREAKER
WR1	1	1	RPT-70015	WIRELESS REMOTE CONTROL SYSTEM (NOT SHOWN ON SCHEMATIC)
WR1	1	1	RPT-70016	WIRELESS PUSHBUTTON REMOTE <b>(COMES W/KIT RP-70015)</b> (NOT SHOWN ON SCHEMATIC)
WR1	1		RPT-70017	CUSTOM REMOTE GRAPHIC (NOT SHOWN ON SCHEMATIC)
WR1	1		RPT-70018	WIRELESS RECIEVER <b>(COMES W/KIT RP-70015)</b>
PLC301	1	1	RPT-70023	PROGRAMMABLE LOGIC CONTROL
SSW1	1		RPT-70029	DIN RAIL SWITCH ADAPTER
SSW1	1	1	RPT-70030	22MM SELECTOR SWITCH
SSW1	1	1	RPT-70031	N.O CONTACT BLOCK
SSW1	1		RPT-70032	TROUBLESHOOT MODE OFF/ON LEGEND PLATE

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## HYDRAULIC SCHEMATIC:



### NOTES:

- » MANUAL TWIST AND LOCK OVERRIDES NEED TO HAVE SCREW TIGHTENED TO PUSH OVERRIDE ON VALVE
- » PRESSURE SHOULD COME IN AT 1900 PSI AS THE FACTORY SETTING FROM PARKER

### DO3 P MANIFOLD PORT SIZES

P&T	#6 SAE	9/16-18 STR THD.
A&B	#6 SAE	9/16-18 STR THD.

## PUMP INFORMATION

COMMENT	TYPE	DISPLACEMENT	MAX FLOW	SET FLOW	MAX PRESSURE	SET PRESSURE
P1	GEAR	.023 CU.IN/REV	0.45 GPM	0.45 GPM	1900 PSI	1650 PSI
P2	HAND	.442 CU.IN/REV	0.002 GALLONS PER CYCLE	0.002 GALLONS PER CYCLE	5000 PSI	1750 PSI @ 65 FT-LB

## ELECTRIC MOTOR INFORMATION

COMMENT	HP	RPM	MOTOR VOLTAGE	FULL LOAD AMPS	COIL COLTAGE	MAX IN-RUSH	DUTY CYCLE
M	1 HP	3153	12 VDC	200 A	24 VDC	600 A	CONTINUOUS

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## HYDRAULIC SCHEMATIC CONT'D::

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
01	1	POWER UNIT	RPT-80013
	1	AY MOTOR	RPT-80014
	1	PUMP	RPT-80015
	1	PUMP KIT, INCLUDES PUMP, SCREW, COUPLING	RPT-80016
	1	RESERVOIR TANK, 1 GALLON RESERVOIR TANK KIT, INCLUDES TANK, SCREWS SEAL, FILLER CAP, SUCTION FILTER	RPT-80017
	1	SEAL KIT, INCLUDES ALL SOFT PARTS, POPPETS, CHECK VALVE SPRINGS	RPT-80018
02	1	MOUNTING PLATE, POWER UNIT	RPT-80019
03	1	DC MOTOR STARTER	RPT-80049
	1	CLAMP	RPT-80020
04	1	CHACK VALVE	RPT-80021
05	1	GAGUE, 1-1/2 FACE, 3000 PSI, REAR	RPT-80050
06	1	MANIFOLD	RPT-80024
	1	VALVE MANIFOLD GASKET	RPT-80051
07	5	VALVE, DIRECTIONAL	RPT-80026
08	6	VALVE MANUAL OVERRIDE	RPT-80027
09	3	VALVE, FLOW CONTROL	RPT-80028
10	1	VALVE, PO CHECK	RPT-80029
11	1	BOLT KIT, D1VW VALVE	RPT-80052
12	4	BOLT KIT, D1VM VALVE + 1 SANDWICH VALVE	RPT-80053
13	5	CORDSET, DUAL DIN "A", 24VDC W/LED	RPT-80054

PARTS LIST			
ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
14	5	CORDSET	RPT-80055
15	1	HAND PUMP, CARTRIDGE	RPT-80032
16	1	HANDLE, HAND PUMP, 9" LENGTH	RPT-80033
	1	HANDLE HOLDER, PKG OF 10	RPT-80039
17	1	BODY, HAND PUMP	RPT-80034
18	1	MOUNTING PLATE, HAND PUMP	RPT-80056
	1	HAND PUMP ANIFOLD GASKET	RPT-80057
19	1	ELJ ENCLOSURE, 20H X 16W X8D	RPT-80058
	1	CORD GRIP	RPT-80059
	1	CORD GRIP	RPT-80060
	1	CORD GRIP	RPT-80061
	2	CORD GRIP	RPT-80062
	1	CORD GRIP	RPT-80063
	4	INSULATING THROAT BUSHING, 1/2"	RPT-80064
	1	INSULATING THROAT BUSHING, 1"	RPT-80065
	1	TAG, REAR ENCLOSURE MOUNTED	RPT-80066
	1	TAG KIT, VALVE MOUNTED	RPT-80067
20	2	HEADER, 3 STATION, ALUMINUM	RPT-80043
21	6	VALVE, INLINE FLOW CONTROL	RPT-80047
22	1	HYDRAULIC MOTOR	RPT-80038

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## GENERAL PARTS PT 1

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
1	1	BASE FRAME	RPT-20001
2	1	RIGHT OUTRIGGER FRAME	RPT-20002
3	1	LEFT OUTRIGGER FRAME	RPT-20003
4	1	SHIFT FRAME	RPT-20004
5	1	UPPER SLIDING BEARING MOUNT	RPT-20005
6	1	LIFTING FRAME	RPT-20006
7	1	OUTER EXTENSION ARM	RPT-20007
8	1	HALO BAR	RPT-20008
9	1	INNER EXTENSION ARM	RPT-20009
10	2	EXTENSION ARM TIE ROD	RPT-20010
11	1	LIFT CYLINDER TOP MOUNT	RPT-20011
12	1	CENTER MAGNET FRAME	RPT-20012
13	1	CENTER MAGNET BAR	RPT-20013
14	1	LEFT MAGNET BAR FRAME	RPT-20014
15	5	MAGNET BAR	RPT-20015
16	1	RIGHT MAGNET BAR FRAME	RPT-20016
17	8	MAGNET ASSEMBLY	RPT-20017
18	2	OUTRIGGER COVER PLATE	RPT-30001
19	2	SWIVEL BOLT MOUNT	RPT-30002
20	2	OUTRIGGER HINGE PIN	RPT-30003
21	2	SPACER	RPT-30004
22	8	SPACER	RPT-30005
23	2	FORMED HOOK	RPT-30006
24	2	SPROCKET STANDOFF	RPT-30007
25	1	MIDDLE COVER PLATE	RPT-30008
26	1	EXTENSION ARM COVER PLATE	RPT-30009
27	6	CAPTIVE WASHER	RPT-30010
28	6	SHIM	RPT-30011
29	1	EXTENSION ARM SHAFT	RPT-30012
30	1	SENSOR BRACKET	RPT-30013
31	1	E-CHAIN MOUNTING PLATE	RPT-30014
32	1	SIGNAL LIGHT CAP	RPT-30015
33	1	MIDDLE MAGNET FRAME COVER PLATE	RPT-30016
34	2	SCRAPER MOUNT	RPT-30017
35	1	LH MAGNET FRAME COVER PLATE	RPT-30018
36	2	SCRAPER	RPT-30019

## GENERAL PARTS PT 1 CONT'D

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
37	2	SCRAPER RETAINING WASHER	RPT-30020
38	2	MAGNET CYLINDER MOUNTING BRACKET	RPT-30021
39	6	MAGNET GUIDE ROD	RPT-30022
40	2	OUTRIGGER ROLLER ROD	RPT-30023
41	2	OUTRIGGER ROLLER SPACER	RPT-30024
42	4	CYLINDER DEADSTOP SPACER	RPT-30025
43	2	MARKER POLE MOUNT	RPT-30026
44	1	RH MAGNET FRAME COVER PLATE	RPT-30027
45	1	SHIFT MOTOR SPROCKET COVER	RPT-30028
46	1	RETAINING WASHER	RPT-30029
47		REMOVER	
48	2	CHAIN BOLT	RPT-30031
49	4	MAGNET WING ROLLER	RPT-30032
50	1	SENSOR FLAG	RPT-30034
192	2	MOUNTING PLATE	RPT-30038
215	8	SPACER	RPT-30039
225	10	SHIM	RPT-30040
228	8	SHIM	RPT-30042
229	4	SHIM	RPT-30041
233	2	TRAY CLIP	RPT-30044
234		REMOVED	REMOVED
239	1	SAFETY HANDLE	RPT-30046

## GENERAL PARTS PT 2

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
50	1	SENSOR FLAG	RPT-30034
51		REMOVED	REMOVED
52		REMOVED	REMOVED
56	8	SLIDE PAD	RPT-40104
57	8	SLIDE PAD	RPT-40105
58	2	FLANGE BEARING	RPT-40106
59	2	FLANGE BEARING	RPT-40107
64	2	GUIDE POLE	RPT-40113
71	2	THREADED ROD END	RPT-40121
74	2	STEEL EYEBOLT	RPT-40124
75	2	RING SHIM	RPT-40125
76	2	RH STEEL BALL JOINT ROD END	RPT-40128

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## GENERAL PARTS PT 2 CONT'D

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
77	2	LH STEEL BALL JOINT ROD END	RPT-40129
78	2	IDLE SPROCKET	RPT-40131
79	1	SPROCKET	RPT-40132
84		REMOVED	REMOVED
113	1	CHAIN LINK	RPT-40203
114	6	GROMMET	RPT-40262
115	2	GROMMET	RPT-40263
116	4	WASHER	RPT-40264
117	1	CHAIN	RPT-40174
118	1	CABLE TRAY	RPT-40175
179	1	STICKER	RPT-40220
180	1	STICKER	RPT-40221
181	1	STICKER	RPT-40222
182	2	STICKER	RPT-40223
183	1	ID TAG	RPT-40225
184	2	STICKER	RPT-40254
185	2	STICKER	RPT-40255
186	3	STICKER	RPT-40256
187	1	STICKER	RPT-40257
191		REMOVED	REMOVED
196		REMOVED	REMOVED
199		REMOVED	REMOVED
206	12	PLUG	RPT-40272
216	4	SPCER	RPT-40273
217	4	PUSH NUT	RPT-40274
218	4	SPACER	RPT-40275
224	1	TAPE	RPT-40258
238	1	STICKER	RPT-40276
250	14	PIN	RPT-40277
251	2	STICKER	RPT-40278

## HARDWARE

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
83		REMOVED	REMOVED
85		REMOVED	REMOVED
86	1	BOLT	RPT-40143
87	2	THIN HEX NUT	RPT-40145
88		REMOVED	REMOVED
89	2	CLEVIS PIN	RPT-40148
90	2	CLEVIS PIN	RPT-40149
81	2	CLEVIS PIN	RPT-40150
92	2	CLEVIS PIN	RPT-40151
93	2	CLEVIS PIN	RPT-40152
94	2	CLEVIS PIN	RPT-40153
95	2	CLEVIS PIN	RPT-40154
96	8	HAIRPIN	RPT-40155
97		REMOVED	REMOVED
98	2	HAIRPIN	RPT-40157
99	2	HAIRPIN	RPT-40157
100	2	SNAP RING	RPT-401590
101	2	CAP NUT	RPT-40160
118	1	CABLE TRAY	RPT-40175
119	2	WASHER	RPT-12619
120	2	HEX NUT	RPT-12558
121	4	SCREW	RPT-12970
122	22	WASHER	RPT-12615
123	12	WASHER	RPT-12658
124	4	HEX NUT	RPT-16970
125	2	BOLT	RPT-11589
126	4	BOLT	RPT-11587
127	2	SCREW	RPT-12947
128	2	BOLT	RPT-11579
129	15	WASHER	RPT-12657
130	3	WASHER	RPT-12614
131	10	WASHER	RPT-12613
132	4	HEX NUT	RPT-12478
133	6	HEX NUT	RPT-16969
134	4	BOLT	RPT-10099
135	12	BOLT	RPT-11522
136	2	SCREW	RPT-12918
137	1	HEX NUT	RPT-12548
138	4	WASHER	RPT-12691
139	14	WASHER	RPT-12609
140	2	HEX NUT	RPT-19996
141	4	HEX NUT	RPT-12477

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## HARDWARE PT 1 CONT'D

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
142	4	BOLT	RPT-10232
143		REMOVED	REMOVED
144		REMOVED	REMOVED
145	4	BOLT	RPT-12216
146	26	WASHER	RPT-12649
147	16	HEX NUT	RPT-17001
151	4	BOLT	RPT-19994
152	8	BOLT	RPT-13748
153	68	BOLT	RPT-10166
154	2	BOLT	RPT-10162
155		REMOVED	REMOVED
156	125	WASHER	RPT-12647
157	28	WASHER	RPT-12646
158	3	HEX NUT	RPT-19997

## HARDWARE PT 2

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
159	1	HEX NUT	RPT-12488
160	50	HEX NUT	RPT-1700
161	2	BOLT	RPT-10124
162		REMOVED	REMOVED
163	12	BOLT	RPT-13702
164		REMOVED	REMOVED
165	2	SCREW	RPT-12813
166	4	BOLT	RPT-13698
167	4	SCREW	RPT-13181
168	2	BOLT	RPT-10112
169	28	WASHER	RPT-12644
170	20	HEX NUT	RPT-16999
171	4	SCREW	RPT-12782
172		REMOVED	REMOVED
173	4	HEX NUT	RPT-16998
174	12	WASHER	RPT-12642
175	2	SCREW	RPT-13159
176	1	BOLT	RPT-15980
177	4	SCREW	RPT-16377
178	8	WASHER	RPT-16247
191		REMOVED	REMOVED
197	8	SCREW	RPT-12809
198	12	WASHER	RPT-12723
199		REMOVED	REMOVED

## HARDWARE PT 2 CONT'D

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
207	8	SCREW	RPT-12775
207	16	WASHER	RPT-12641
209	8	HEX NUT	RPT-16997
210	8	BOLT	RPT-10170
211	2	SCREW	RPT-12794
212	4	HEX NUT	RPT-17016
214	4	HEX NUT	RPT-16820
219	1	BOLT	RPT-19994
220		REMOVED	REMOVED
221	4	SCREW	RPT-12816
222	8	BOLT	RPT-10167
226	25	SCREW	RPT-19987
227	6	SCREW	RPT-19986
230	2	WASHER	RPT-12724
231	2	SCREW	RPT-12873
232	1	BOLT	RPT-18438
233	2	TRAY CIP	RPT-30044
234		REMOVED	REMOVED
235	2	SCREW	RPT-12795
236	2	BOLT	RPT-10116
237	12	SCREW	RPT-19985
238	1	STICKER	RPT-40276
239	1	SAFETY HANDLE	RPT-30046
240	2	BOLT	RPT-10218
241	2	WASHER	RPT-12725
248	2	SET SCREW	RPT-15206
249	12	BOLT	RPT-10164
250	14	PIN	RPT-40277
251	2	STICKER	RPT-40278



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## ELECTRICAL PARTS

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
47		REMOVED	REMOVED
52		REMOVED	REMOVED
53	1	E-CHAIN MOUNTING BRACKET	RPT-40100
54	1	E-CHAIN	RPT-40101
61		REMOVED	REMOVED
62		REMOVED	REMOVED
63		REMOVED	REMOVED
65	1	E-CHAIN	RPT-40114
66	1	E-CHAIN MOUNTING BRACKET	RPT-40115
67	1	RED WARNING LIGHT	RPT-40179
68	1	GREEN WARNING LIGHT	RPT-40178
69	1	SENSOR MOUNT	RPT-40118
72	1	E-CHAIN MOUNTING BRACKET	RPT-40122
73	1	E-CHAIN	RPT-40123
80	2	CORD GRIP	RPT-40133
81	4	CORD GRIP	RPT-40134
82	25	CABLE TIE MOUNT	RPT-40137
102	1	ELECTRICAL PANEL	RPT-7001
109	1	CAMERA SYSTEM	RPT-40168
110	1	LH HEADLIGHT	RPT-40169
111	1	RH HEADLIGHT	RPT-40170
112	4	LIGHT	RPT-40172
188	6	SENSOR	RPT-40192
189	3	SENSOR	RPT-40191
190	1	CABLE	RPT-40193
191		REMOVED	REMOVED
193	2	AMBER LIGHT	RPT-40180
194	90'	CABLE	RPT-40184
195	40'	CABLE	RPT-40185
199		REMOVED	REMOVED
202	28'	WIRE LOOM	RPT-40187
203	7'	WIRE LOOM	RPT-40188
204	4	CABLE	RPT-40200
205	2	CORDSET	RPT-40253
223	2	LIGHT BULB	RPT-40202
234		REMOVED	REMOVED
242	4	ELECTRICAL PLUG MALE HOUSING	RPT-40196
243	4	ELECTRICAL PLUG MALE WEDGE	RPT-40204

## ELECTRICAL PARTS CONT'D

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
244	55	ELECTRICAL PLUG CONTACT	RPT-40199
245	2	ELECTRICAL PLUG FEMALE HOUSING	RPT-70142
246	2	ELECTRICAL PLUG FEMALE WEDGE	RPT-70153
247	45	ELECTRICAL PLUG SOCKET	RPT-40198
252	8	2 PIN MSLR PLUG	RPT-70280
253	8	2 PIN FEMALE PLUG	RPT-70271
254	8	2 PIN MALE WEDGE	RPT-70274
255	8	2 PIN FEMALE WEDGE	RPT-70272

## HYDRAULIC PARTS

ITEM	QTY	ITEM DESCRIPTION	RPT NUMBER
55		REMOVED	REMOVED
60	1	HYDRAULIC MOTOT	RPT-80038
70		REMOVED	REMOVED
103	1	HYDRAULIC POWER UNIT	RPT-80001
104	1	HYDRAULIC CYLINDER	RPT-40163
105	1	HYDRAULIC CYLINDER	RPT-40164
106	2	HYDRAULIC CYLINDER	RPT-40165
107	1	HYDRAULIC CYLINDER	RPT-40166
108	1	HYDRAULIC CYLINDER	RPT-40167
148		REMOVED	REMOVED
149		REMOVED	REMOVED
150		REMOVED	REMOVED
200	1	HYDRAULIC HOSE KIT	RPT-80073
201	1	HYDRAULIC OIL	RPT-80074



**CONTACT:**

Call 800.662.6338 to talk to a Customer Service Representative.

**HOURS:**

8 AM to 5 PM (E.T.)  
Monday through Friday

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