

# BTE OPERATIONS AND PARTS MANUAL



## BTE 308-WT HI-RAIL EXCAVATOR

BTE-308-WT  
BTE HI-RAIL S/N: 141971  
CAT SN: GG802227 & UP



FOR MORE INFORMATION OR TO ORDER PARTS  
**+1 636.937.0505    Sales@BTEquip.com    www.BTEquip.com**

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## General Specifications

Weight:	26,000 lbs	[10,886 kg]
Width:	7'-6"	[2300 mm]
Height:	8'-4"	[2520 mm]
Length:	23'-6"	[7180 mm]

# SAFETY AND FRA COMPLIANCE

## IMPORTANT SAFETY INFORMATION

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards, including human factors that can affect safety. This person or operator should also have the necessary training, skills and tools to perform these functions properly.

**Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.**

**Do not operate or perform any lubrication, maintenance or repair on this product, until you verify that you are authorized to perform this work, and have read and understood the operation, lubrication, maintenance and repair information.**

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the "Safety Alert Symbol" and followed by a "Signal Word" such as "DANGER", "WARNING" or "CAUTION". The Safety Alert "WARNING" label is shown below.



The meaning of this safety alert symbol is as follows:

**Attention! Become Alert! Your Safety is Involved.**

The message that appears near the warning explains the hazard and can be either written or pictorially presented.

A non-exhaustive list of warnings, cautions, operations that may cause product damage or injury are identified and called out in this publication. If you become aware of any others items that are not listed, please send BTE any and all suggestions to improve this manual.

**Ballast Tools Equipment cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. You must not use this product in any manner different from that considered by this manual without first satisfying yourself and your employer that you have considered all safety rules and precautions applicable to the operation of the product in the location of use, including site-specific rules and precautions applicable to the worksite. If a tool, procedure, work method or operating technique that is not specifically recommended by Ballast tools is used, you must satisfy yourself that it is safe for you, your company and for others. You should also ensure that you are authorized to perform this work, and that the product will not be damaged or become unsafe by the operation, lubrication, maintenance or repair procedures that you intend to use.**

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Please contact Ballast Tools Equipment for the most current information available.

When replacement parts are required for this product Ballast Tools Equipment recommends using CAT and BTE or other OEM replacement parts only. Failure to follow this warning may lead to premature failures, product damage, personal injury or death.

# SAFETY AND FRA COMPLIANCE

## FRA COMPLIANCE - FOR REFERENCE

### **214.525 Towing with on-track roadway maintenance machines or hi-rail vehicles.**

a) When used to tow pushcars or other maintenance-of-way equipment, each on-track roadway maintenance machine or hi-rail vehicle shall be equipped with a towing bar or other coupling device that provides a safe and secure attachment.

(b) An on-track roadway maintenance machine or hi-rail vehicle shall not be used to tow pushcars or other maintenance-of-way equipment if the towing would cause the machine or hi-rail vehicle to exceed the capabilities of its braking system. In determining the limit of the braking system, the employer must consider the track grade (slope), as well as the number and weight of pushcars or other equipment to be towed.

### **214.527 On-track roadway maintenance machines; inspection for compliance and schedule for repairs.**

(a) The operator of an on-track roadway maintenance machine shall check the machine components for compliance with this subpart, prior to using the machine at the start of the operator's work shift.

(b) Any non-complying condition that cannot be repaired immediately shall be tagged and dated in a manner prescribed by the employer and reported to the designated official.

(c) The operation of an on-track roadway maintenance machine with a non-complying condition shall be governed by the following requirements:

(1) An on-track roadway maintenance machine with headlights or work lights that are not in compliance may be operated for a period not exceeding 7 calendar days and only during the period between one-half hour before sunrise and one-half hour after sunset;

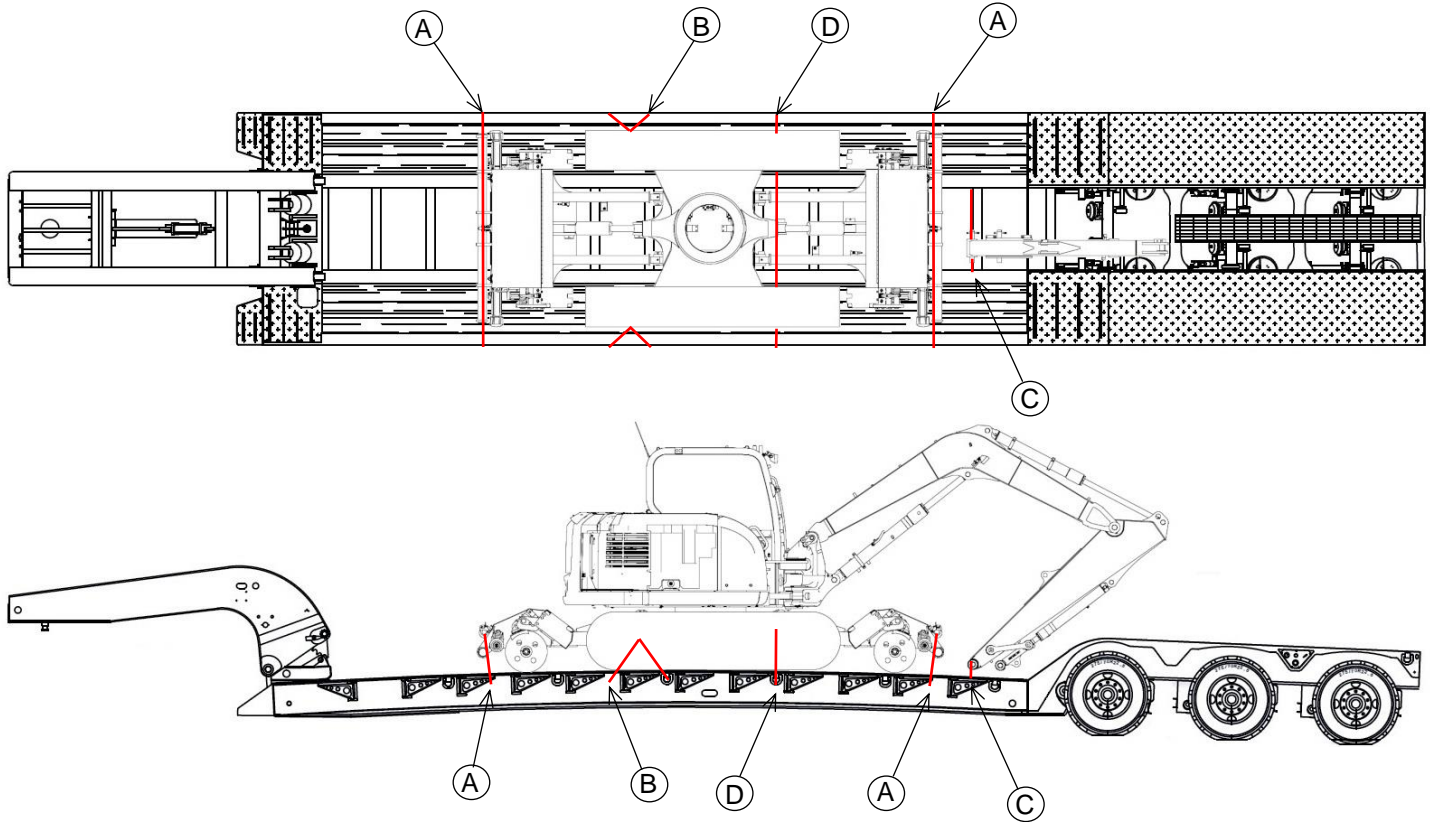
(2) A portable horn may be substituted for a non-complying or missing horn for a period not exceeding seven calendar days;

(3) A fire extinguisher readily available for use may temporarily replace a missing, defective or discharged fire extinguisher on a new on-track roadway maintenance machine for a period not exceeding 7 calendar days, pending the permanent replacement or repair of the missing, defective or used fire extinguisher;

(4) Non-complying automatic change-of-direction alarms, backup alarms, and 360-degree intermittent warning lights or beacons shall be repaired or replaced as soon as practicable within 7 calendar days; and

(5) A structurally defective or missing operator's seat shall be replaced or repaired within 24 hours or by the start of the machine's next tour of duty, whichever is later. The machine may be operated for the remainder of the operator's tour of duty if the defective or missing operator's seat does not prevent its safe operation.

# BTE-308-WT RECOMMENDED TIE DOWN PLAN



Item	No. of Pcs.	Description
A	2	1/2" Alloy tie down chain and binder with minimum working load limit of 11,300 lb. Locate one chain through pintle hitch on each end of machine and secure to outboard trailer tie downs .
B	2	1/2" Alloy tie down chain and binder with minimum working load limit of 11,300 lb. Locate one chain through tie down of track frame on each side of machine and secure to outboard trailer tie downs.
C	1	1/2" Alloy tie down chain and binder with minimum working load limit of 11,300 lb. Locate one chain over stick of machine and secure to inboard trailer tie downs .
D	1	1/2" Alloy tie down chain and binder with minimum working load limit of 11,300 lb. Locate one chain across both track frames and secure to outboard trailer tie downs.

## Notes and Additional Requirements:

1. Ensure drive boxes are down and contacting the bed of the trailer.
2. Pull chains as tight as possible by hand and attach hook into appropriate link in the chain. All chain tie-downs must be made taut by tightening the turnbuckles. After chains are tightened, they should be struck with a hammer or bar to eliminate any possible misalignment of links. Further tightening may be required to take up any slack that develops due to link alignment.
3. All tie-down assemblies are to be in line across the trailer. The angle of tie-downs must be as close to 45° as possible.
4. Turnbuckles not equipped with self locking devices must be wired or locked to prevent loosening.

# EMERGENCY AND SYSTEM FAILURE PROCEDURES

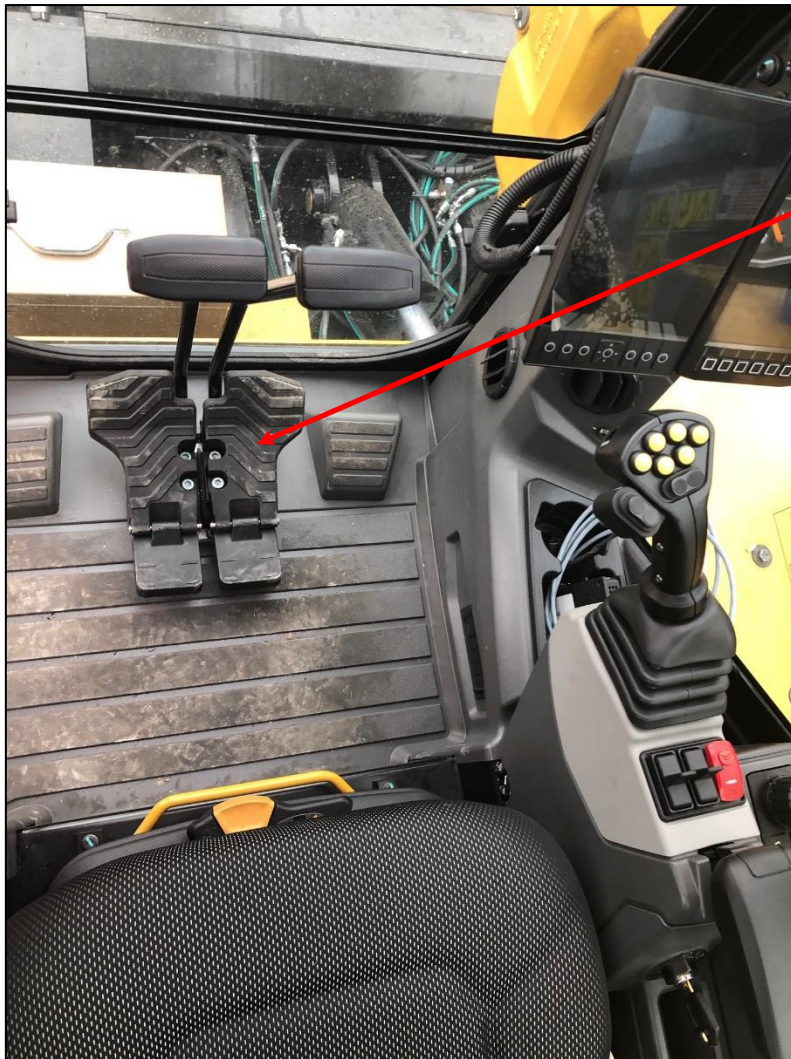
## PARKING ON RAIL

### Setting Hi-Rail Parking Brake

- Parking brake automatically applies when machine comes to a complete stop and the travel pedal/lever remains in the neutral position.

### Releasing Hi-Rail Parking Brake

- Ensure area is clear prior to releasing brakes.
- Parking brake automatically releases when the travel pedal/lever is actuated forward or backward.



TRAVEL PEDAL/LEVER

# EMERGENCY AND SYSTEM FAILURE PROCEDURES

## TOWING MACHINE

### Towing Guidelines

When used to tow pushcars or other maintenance-of-way equipment, each on-track roadway maintenance machine or hi-rail vehicle shall be equipped with a towing bar or other coupling device that provides a safe and secure attachment.

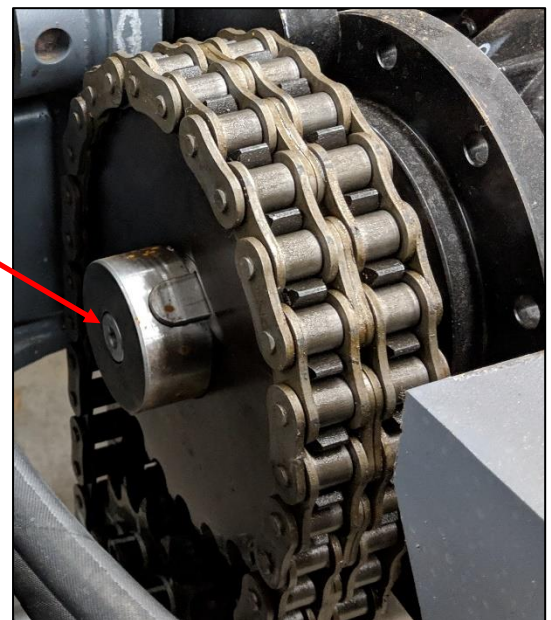
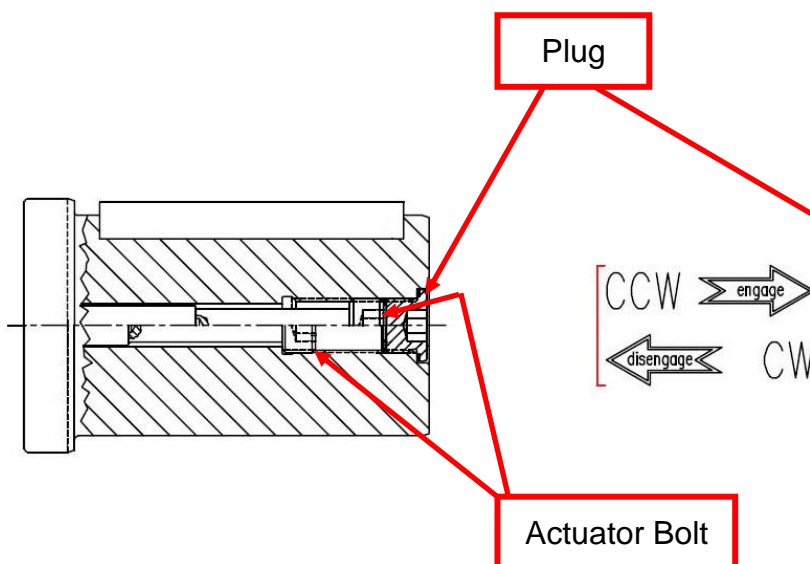
An on-track roadway maintenance machine or hi-rail vehicle shall not be used to tow pushcars or other maintenance-of-way equipment if the towing would cause the machine or hi-rail vehicle to exceed the capabilities of its braking system. In determining the limit of the braking system, the employer must consider the track grade (slope), as well as the number and weight of pushcars or other equipment to be towed.

### Towing 308 on Rail

1. Ensure brakes are set and connect tow bar to machine being towed.
2. Ensure all components are up and locked
3. Connect tow bar to machine being towed to machine pulling. (Pull machine being towed and not push)
4. Before towing machine disengage rear drive motor:
  - a. Remove Plug
  - b. Screw in Actuator Bolt (13.5 TURNS CW)
  - c. Re-Install Plug



5. If machine being towed is disabled, manually release brakes. See procedure on next page.
6. Test your brakes prior to travel.



# EMERGENCY AND SYSTEM FAILURE PROCEDURES

## MANUAL BRAKE RELEASE PROCEDURE



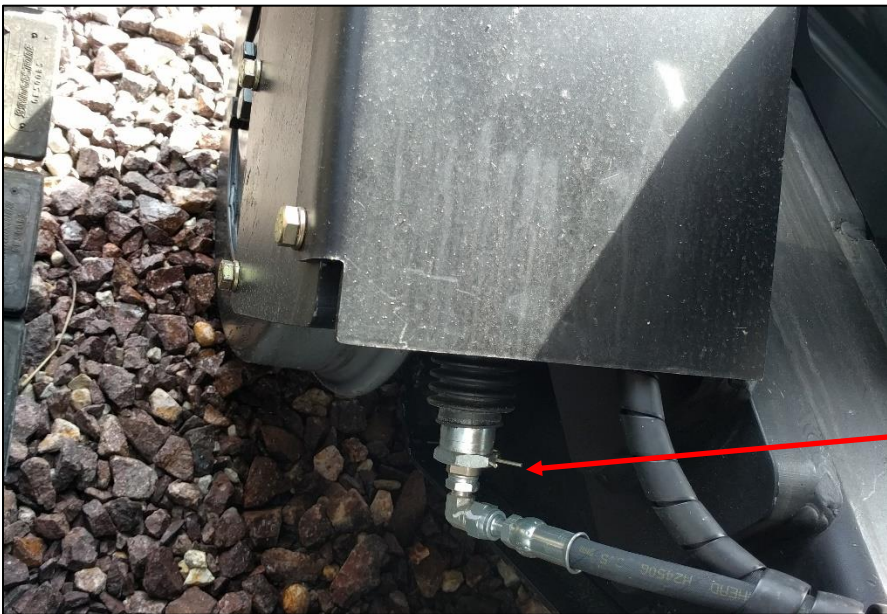
**This is a spring applied, hydraulically released brake system. Use extreme caution when servicing brake canisters due to large spring with stored potential energy. Only certified service technicians and mechanics should service these units.**

### Releasing Brakes in Case of Hydraulic Failure

In case of machine hydraulic failure, the brake system will automatically engage.

To release brakes after hydraulic failure:

- Remove R-clip.
- Use 1-7/16" or 36mm wrench to turn nut clockwise until the brake pad is no longer putting pressure against the wheel.
- Repeat the process on the other brake assemblies.
- Use extreme caution when servicing brakes due to large spring and stored potential energy.



Remove R-clip and tighten nut to release brake.



# EMERGENCY AND SYSTEM FAILURE PROCEDURES

## LOCKOUT / TAGOUT – ENERGY CONTROL PROCEDURE

### LOCKOUT / TAGOUT REQUIREMENTS

The following list recommends lockout procedures to use on all mechanisms of the machine that require lockout due to the varieties of energy flowing through it. It is your company's obligation to perform Lockout/Tagout Procedures based on these instructions, to train you in their exact and safe use, and to periodically check your work area to confirm that you are complying with the correct process. Lockout/Tagout Procedures must be followed! BTE has provided the instruments to lockout this machine. BTE cannot be held accountable for injury caused by failure to conform with your company's Lockout/Tagout Procedures.



### ENERGY CONTROL PROCEDURE

1. Position equipment on level ground. Apply parking brake.
2. Lower boom/stick and attachment if applicable to contact the ground.
3. Lower Hi-Rail gear, front and rear, to contact the ground. (Do not raise crawler tracks off ground, if applicable).



### ALWAYS LOWER HI-RAIL WHEELS ONE END OF THE MACHINE AT A TIME

### **NEVER LOWER BOTH ENDS SIMULTANEOUSLY!**

4. Turn the ignition switch off.
5. Turn ignition switch to on position. (Do not start engine)
6. Engage safety bar and press the A, B, C and D buttons on the left and right joystick (this relieves hydraulic pressure trapped in the auxiliary lines).
7. Turn ignition switch off.
8. Chock the wheels/tracks to prevent accidental movement of machine.
9. Place a tag-out card on the ignition switch.
10. Turn the battery Disconnect Switch to the off position (the switch location can be found next to the battery) and install lock.
11. Verify all mechanical, electrical, hydraulic and pneumatic energy is isolated.
12. Follow all of your company's Lockout/Tagout rules before proceeding.

Note: When working on machine mechanisms, be aware that moving components during repairs may create energy (i.e., moving a hydraulic cylinder). Proper precautions should be taken.

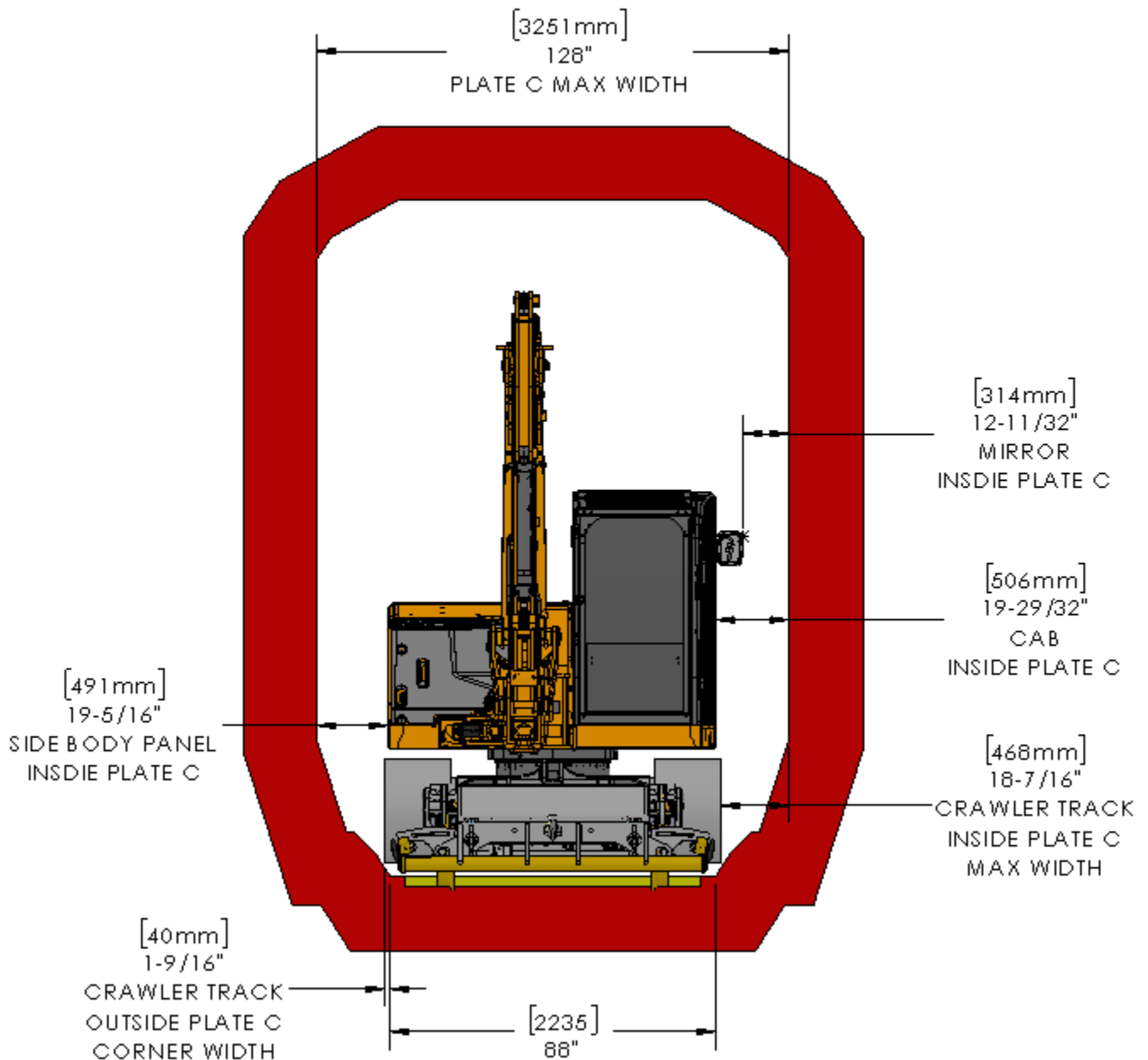
# BTE-308-WT AND PLATE C

(BOOM PARALLEL TO THE RAIL)



- Use caution when traveling.
- Must comply with all railroad company safety rules.

## BTE-308-WT HI-RAIL EXCAVATOR PLATE C DIAGRAM FRONT VIEW



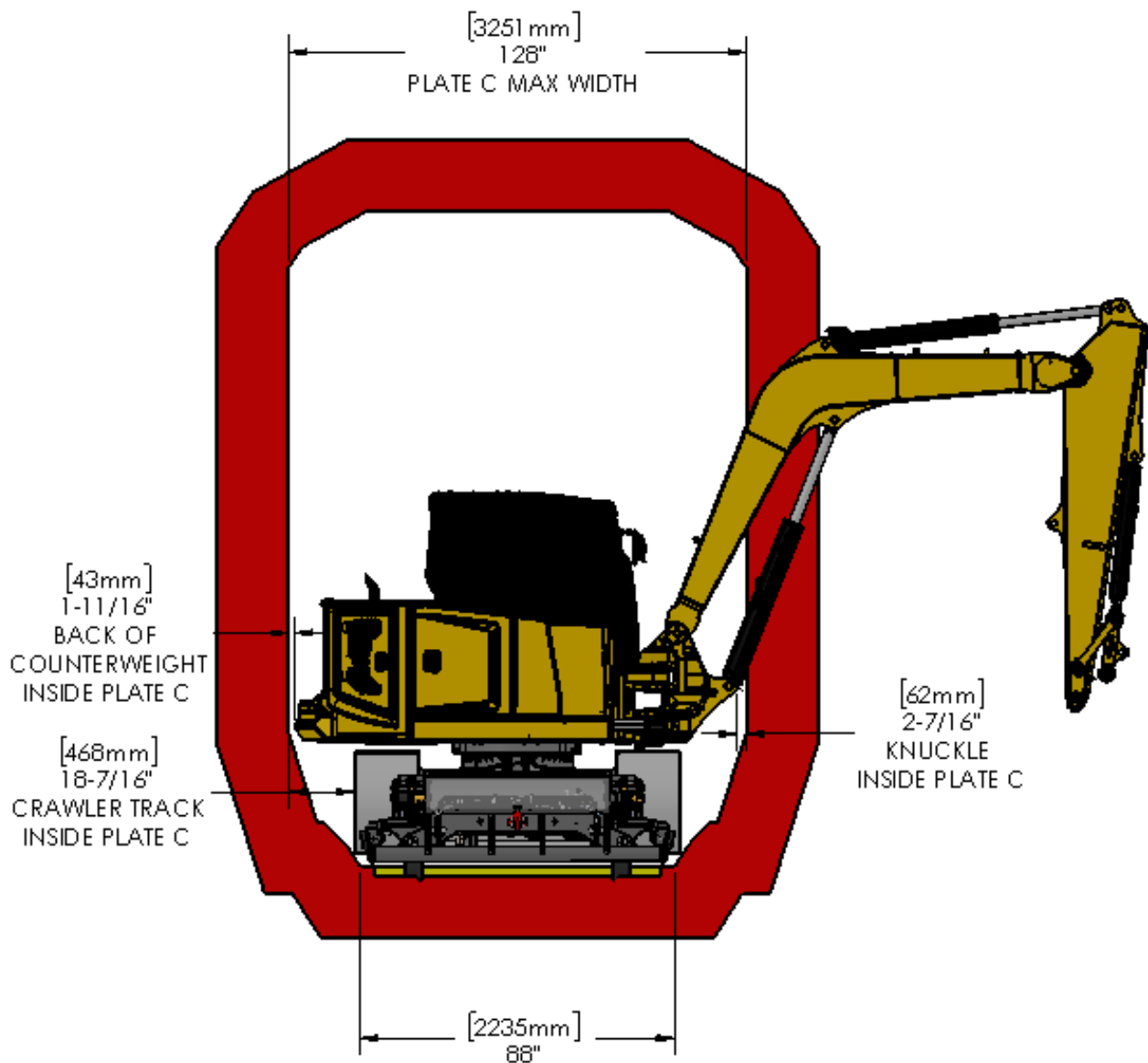
# BTE-308-WT AND PLATE C

(BOOM PERPENDICULAR TO THE RAIL)



- Machine fouls maximum width (10'-8") [3251 mm] of Plate C. Use caution when traveling.
- Must comply with all railroad company safety rules.

BTE-308-WT HI-RAIL EXCAVATOR  
PLATE C DIAGRAM  
SIDE VIEW



# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## GENERAL OPERATIONS

**Prior to fouling any Railroad, ensure you have attained proper authority and protection!**



### **OPERATION – Getting on the track.**

- With the excavator in excavator mode, position the excavator so that the crawler tracks are straddling the railroad tracks.
- Lower the front Hi-Rail gear down until the desired height is reached.
- Lower the rear Hi-Rail gear down until the desired height is reached.
- Enter into Hi-Rail mode.

### **OPERATION – Getting off the track.**

- With the excavator in excavator mode, raise the rear Hi-Rail gear up all the way.
- Raise the front Hi-Rail gear up all the way.
- Dismount track

**IT IS RECOMMENDED THAT BOTH GETTING ON AND OFF THE TRACK ARE PERFORMED AT A LEVEL CROSSING.**



**ALWAYS LOWER HI-RAIL WHEELS ONE END OF THE MACHINE AT A TIME.  
NEVER LOWER BOTH ENDS SIMULTANEOUSLY!**



# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## CONNECTING AN ATTACHMENT

- Position equipment boom parallel with side plate of attachment.
- Open the quick coupler attachment.
- Slowly lower the quick coupler down over the coupler pins until the coupler is resting on the pins on top of the attachment.
- Close the quick coupler.
- Position the attachment so the hydraulic connections can be safely and easily reached.
- Turn the equipment off.
- Turn ignition switch to the on position (do not start), and engage the safety bar.
- Activate all auxiliary functions in all directions (this relieves hydraulic pressure trapped in the auxiliary lines.) Alternatively (if applicable) the Depressurize Enable button can be used instead.
- Turn ignition switch off.
- Verify hydraulic lines are free of dirt and other contaminants. Attach the hydraulic lines to the excavator. Attach electrical plug (if applicable)

ATTACH HYDRAULIC LINES



## DISCONNECTING AN ATTACHMENT

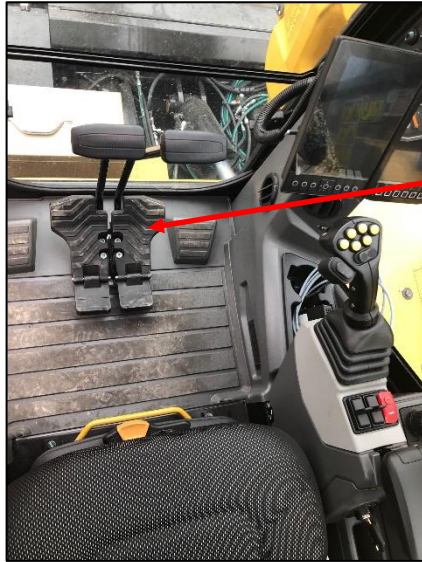
- Position the attachment so the hydraulic connections can be safely and easily reached.
- Turn the equipment off
- Turn ignition switch to the on position (do not start), and engage the safety bar.
- Activate all auxiliary functions in all directions (this relieves hydraulic pressure trapped in the auxiliary lines.) Alternatively (if applicable) the Depressurize Enable button can be used instead.
- Turn ignition switch off.
- Verify hydraulic lines are free of dirt and other contaminants. Detach the hydraulic lines and electrical plug (if applicable) from the equipment. Install all dust caps and plugs on quick disconnects.
- Position the attachment in/on its stand or on stable level ground which the attachment will be stored.
- Open the quick coupler.
- Uncurl quick coupler from the coupler pins, raise the boom a few inches of the attachment and verify the coupler is fully disengaged and the hydraulic lines and electrical plug (if applicable) are detached before pulling the boom away.
- Slowly lower the quick coupler down to the ground.

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## RAIL TRAVELING

Once the machine has been put on the rail and the Hi-Rail boxes have be lowered to raise the crawler tracks, the machine can begin rail traveling.

- The machine must be in Hi-Rail Mode to move on the rail.
- Use the lever/pedal on the right (see image below) to track travel the machine forward and reverse.
- The parking brake system also functions as a service brake in track mode.



TRAVEL LEVER/PEDAL



**Rapid or sudden changes in controls will result in corresponding actions with the machine. A sudden stop of the wheels during movement may result in undesired sliding of machine on the train rails.**

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## LIFTING A LOAD

- Reference the load chart in the machine based upon the lifting scenario. Load chart is provided for when the machine is resting on the crawler tracks.

## LIFTING ON RAIL

- Lifting on level and stable track is recommended.
- Raise Hi-Rail so tracks are in contact with the ground for more stability.

## LIFTING OFF RAIL

- Lifting on level and stable ground is recommended.
- Ensure work area is properly marked in location of lift to be made.
- Make lift in accordance with the CAT Operation Manual Load and Swing chart.



**FAILURE TO FOLLOW THE LOAD LIMITS AS OUTLINED IN THE APPROPRIATE LOAD CHART CAN RESULT IN SEVERE DAMAGE TO THE MACHINE AND/OR SERIOUS INJURY TO THE OPERATOR.**

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Description of Operations

There are two modes of operation on the CAT 308, hi-rail mode & excavator mode. If hi-rail mode is enabled the 308 will travel via the hi-rail motors. If hi-rail mode is not enabled the 308 will be in excavator mode and travel with the crawler tracks. During excavator mode the operator can travel with the travel pedals or with the left joystick when stick steer is enabled. To enable stick steer the operator must press button #1 on the left joystick and acknowledge the stick steer request on the CAT HMI screen. Once acknowledge the left joystick will operate as the primary mode of traveling. Stick steer travel is also allowed while traveling on the hi-rail.

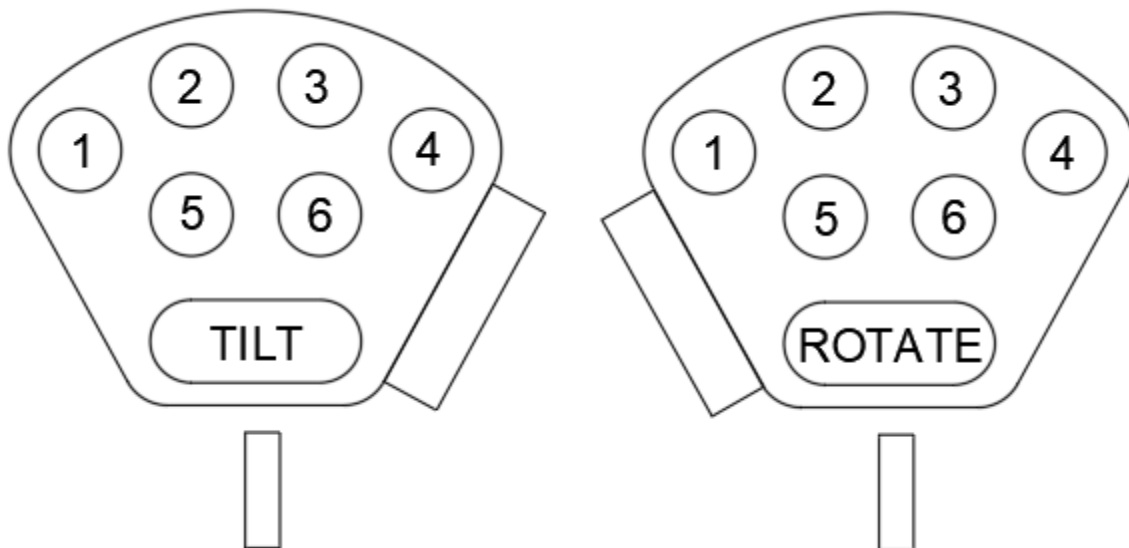
The 308 has multiple attachments available to be ran with the Rototilt. When the corresponding attachment is selected the machine will adjust the flow and pressure settings used by the high flow hydraulic circuit to optimize this attachment's functionality. The attachment selection may also be used to determine how the joystick is configured for the attachment. The current attachments available for selection on the 308 are:

- 1.) Bucket / No Tool
- 2.) Culvert Cleaner
- 3.) Tamper
- 4.) Tie Head
- 5.) Tower Shear
- 6.) Tube Talon
- 7.) Magnet
- 8.) Snow Blower
- 9.) Broom
- 10.) Brush Cutter
- 11.) Guard Rail Cleaner



# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

Both the Left and Right Joysticks have 6 buttons, horizontal & vertical rocker, & a trigger.



## Standard Buttons for all Attachments

### Left Joystick

- Button #1 – Stick Steer Mode
- Button #2 – Track Jack Raise
- Button #3 – Track Jack Lower
- Button #4 – Cruise Control (Only available in Excavator Mode)
- Horizontal Rocker – Tilt Rototilt
- Vertical Rocker – Boom / House Swing

### Right Joystick

- Button #1 – Horn
- Button #2 – Track Jack Rail Raise
- Button #3 – Track Jack Rail Lower
- Button #4 – Rabbit / Turtle
- Button #5 – Track Jack Rail Clamps Open
- Button #6 – Track Jack Rail Clamps Close
- Horizontal Rocker – Rotate Rototilt
- Vertical Rocker – Aux 1 / Stick Control

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Joystick Layout for Attachments – All Buttons to be Momentary Unless Noted

### Culvert Cleaner

Button #5 Left Joystick – Jog Forward

Button #6 Left Joystick – Jog Reverse

Left Trigger – Auger Reverse – Toggle On/Toggle Off

Right Trigger – Auger Forward – Toggle On/Toggle Off

### Tamper

Button #5 Left Joystick – Vibrator Motors Toggle On/Toggle Off

Button #6 Left Joystick – Tamper Automatic Cycle Start – Open and Close Tamper 3 times

Left Trigger – Open Tamper

Right Trigger – Close Tamper

### Tie Head

Left Trigger – Open Tie Head

Right Trigger – Close Tie Head

### Tower Shear

Left Trigger – Open Tower Shear

Right Trigger – Close Tower Shear

### Tube Talon

Button #6 Left Joystick – Tube Talon Extend

Button #5 Left Joystick – Tube Talon Retract

Right Trigger – Tube Talon Head Close

Left Trigger – Tube Talon Head Open

### Magnet

Right Joystick – Magnet On/Off

### Snow Blower

Right Joystick – Snow Blower On/Off

### Broom

Right Trigger – Broom On/Off

### Brush Cutter

Button #5 Left Joystick – Door Open

Button #6 Left Joystick – Door Close

Right Trigger – Motor On / Off

### Guard Rail Cleaner

Right Trigger – Guard Rail Cleaner Extend

Left Trigger – Guard Rail Cleaner Retract

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Hi – Rail Gear / Rail Clamps

To raise and lower the hi-rail the operator will use the switches at the base of the right hand joystick. The front hi-rail is operated with the switch closest to the operator’s seat. Pushing the switch towards the front window will lower the hi-rail gear, and pulling the switch towards the back of the cab will raise the hi-rail gear. The operation for the rail clamps is at the base of the left hand joystick. The front rail clamps are located at the base of the left hand joystick. The front rail clamps are operated via the switch closest to the operator. Pushing the switch towards the front window will engage the rail clamps, pulling the switches towards the rear of the cab will disengage the rail clamps.

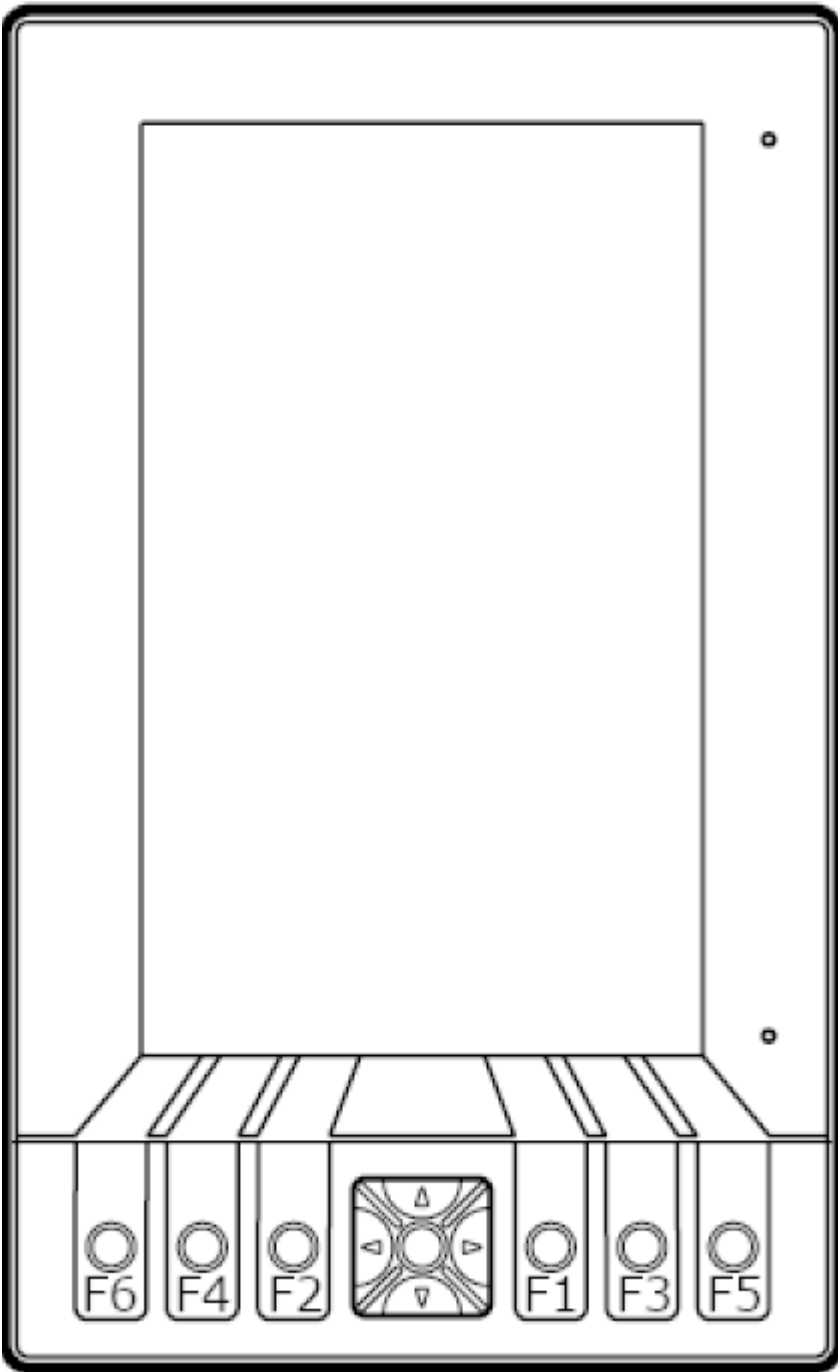


LOWER		LOWER
REAR RAIL CLAMPS		FRONT RAIL CLAMPS
RAISE		RAISE

LOWER	LOWER	UNCOUPLE
FRONT HI-RAIL	REAR HI-RAIL	COUPLER SWITCH
RAISE	RAISE	COUPLE

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Display/Operator Interface

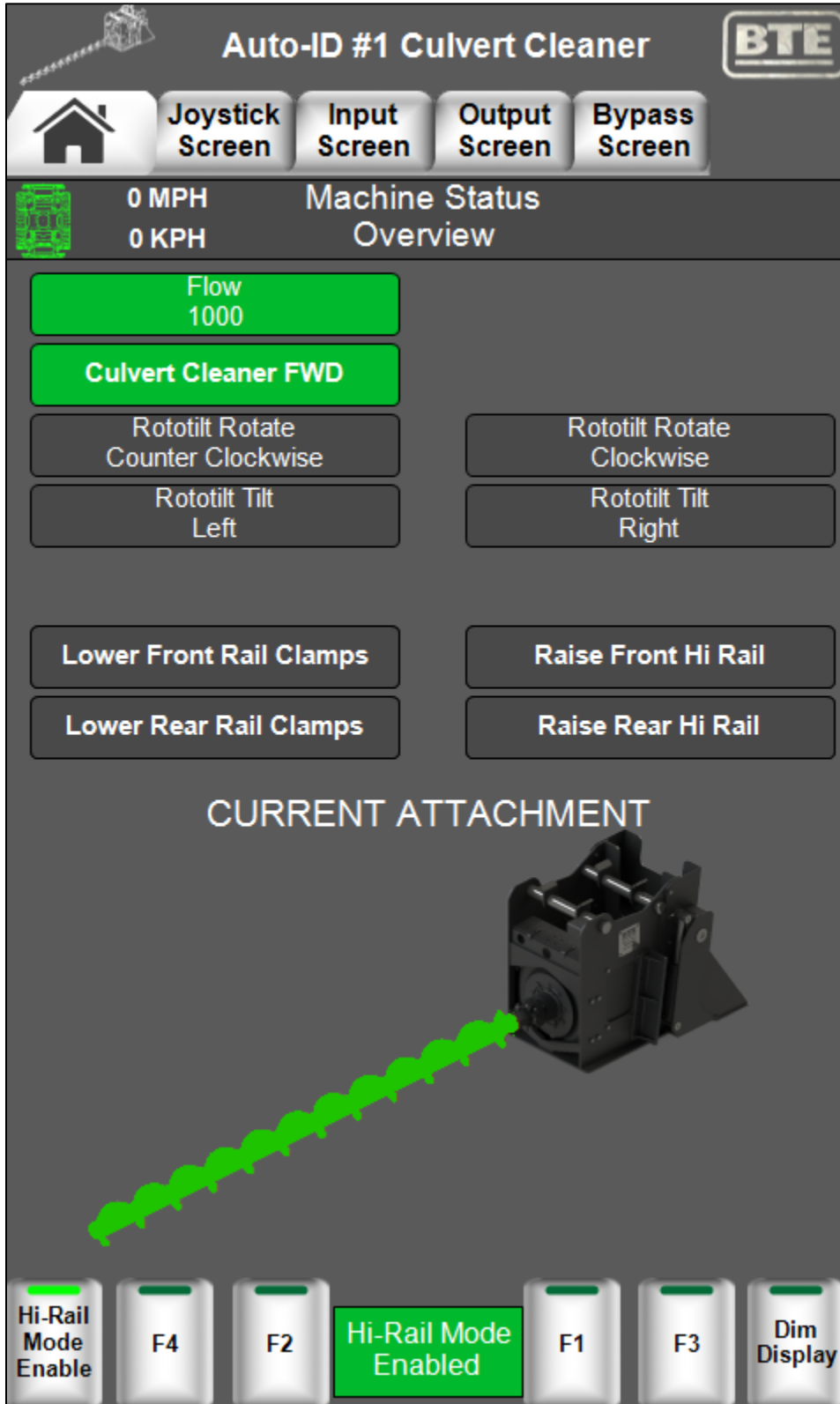


The BTE HMI screen has six buttons across the bottom of the display and a D-PAD in the center of the buttons. The buttons have dedicated operations depending on which screen the operator is on. The HMI is also touch screen and is the primary method to navigate between screens. Regardless of which screen the operator is on the center button on the D-PAD will take the operator back to screen #1 if held for 1.5 seconds.

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Display Screen Descriptions

### Screen #1



# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Main Overview Screen

The operator will notice that there is a text and a visual representation of the attachment on the top of the screen. At the bottom of the screen there is a larger visualization of the current selected attachment. When the attachment is turned on the corresponding moving parts of the attachment will turn green. If the attachment is off the “Flow” visual box and the box below it will not be visible.

When the operator operates the hi-rail functions, rail gear up/down or rail clamps up/down a status box will appear with the corresponding function and highlighted green while on.

The operator is also able to enable hi-rail mode on this screen. In excavator Mode the machine utilizes the crawler tracks for movement, when in hi-rail mode the hi-rail motors are enabled. To utilize the hi-rail motors, the operator will use the right travel pedal. The operator can use the left joystick to drive up and down the rail as well by enabling stick steer. To enable stick steer the operator presses the left joystick button #1. If this is the first time since the machine has been turned on the operator must acknowledge the stick steer request on the CAT HMI screen. Once acknowledged, the operator will notice a green icon on the CAT HMI screen as well as a green undercarriage icon on the BTE HMI screen to represent stick steer is enabled.

While in stick steer mode it should be mentioned that hi-rail functions such as rail gear up/down and rail clamps up/down will be disabled. Please turn off stick steer to raise and lower each function, then stick steer can be re-enabled.

To navigate between screens, the operator will touch the tab at the top of the screen for the desired screen to go to.

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Joystick Screen



# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Joystick Screen

At the top of the screen there is the same visual and text representation of the attachment as screen #1 and will be on each screen. The stick steer visual is also here to let the operator know that it is enabled.

When the buttons are pressed on the joystick the corresponding button will be outlined in green, notice the shown left joystick button #5 being pressed.

On the left joystick, button #4 is cruise-control. While in stick steer mode and in rail mode the operator is not allowed to use cruise-control. To travel via cruise-control the operator must not be in rail mode. Once the operator is in excavator mode, cruise-control needs to be enabled on CAT's HMI screen. Now that cruise-control mode is enabled while traveling with the crawler tracks pressing button #4 will set the cruise-control speed.

While in stick steer mode the vertical slider on the right hand joystick controls the stick movement. The slider is not used outside of stick steer mode.

To navigate between screens, the operator will touch the tab at the top of the screen for the desired screen to go to.



# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Input Screen

**Auto-ID #1 Culvert Cleaner** **BTE**

Home Joystick Screen **Input Screen** Output Screen Bypass Screen

GPS SPEED 0	L. Joystick #1 IN0801	R. Joystick #5 IN0603
<b>Safety Bar Is Up IN0001</b>	L. Joystick #2 IN0100	R. Joystick #6 IN0700
Coupler Switch IN0002	L. Joystick #3 IN0101	<b>R. Joystick Trigger IN0701</b>
Raise Front H.R. SW IN0003	L. Joystick #4 IN0102	R. Joystick Rocker 2500
Lower Front H.R. SW IN0500	L. Joystick #5 IN0103	R. Joystick Side Rkr 2500
Raise Rear H.R. SW IN0501	L. Joystick #6 IN0200	
Lower Rear H.R. SW IN0502	L. Joystick Trigger IN0201	RT TRVL PDL SIG 1 2500
Raise FRC SW IN0503	L. Joystick Rocker 2500	LT TRVL PDL SIG 1 2500
Lower FRC SW IN0400	L. Joystick Side Rkr 2500	RT TRVL PDL SIG 2 2500
Raise RRC SW IN0401	R. Joystick #2 IN0600	LT TRVL PDL SIG 2 2500
Lower RRC SW IN0900	R. Joystick #3 IN0601	L. JYSTK X AXIS 2500
<b>Key Power IN0800</b>	R. Joystick #4 IN0602	L. JYSTK Y AXIS 2500

F6 F4 F2 F1 F3 F5

## Input & Output Screens

The input & output screen is used for troubleshooting and helps the operator verify if the inputs and outputs are getting to and from the PLC. When an input / output is on the status box will turn green.

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Bypass Screen

**Auto-ID #1 Culvert Cleaner** **BTE**

Home Joystick Screen Input Screen Output Screen **Bypass Screen**

**HOLD F5 & F6 TO DEPRESSURIZE**

VBB15 Voltage 14.0 VDC	Total Hi-Rail Seconds 5400
VBB30 Voltage 14.0 VDC	Total Hi-Rail Run Time Hours 1.5
VBB0 Voltage 14.0 VDC	Hi-Rail 10HR Maintenance Due in 8.5 Hours
VBB1 Voltage 14.0 VDC	Hi-Rail 40HR Maintenance Due in 31.5 Hours
VBB2 Voltage 14.0 VDC	Hi-Rail 250HR Maintenance Due in 241.5 Hours
VBB3 Voltage 14.0 VDC	

**CURRENT ATTACHMENT**  
Up & Down Arrows change attachments

F6 F5

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Bypass Screen

The bypass screen allows the operator to change the current attachment. Here the operator will have a visualization just as the main screen. This screen also shows the voltage of each required voltage for the PLC. When the voltage drops below the minimum amount an alarm will become visible to alert the operator to navigate to this page for troubleshooting.

Hi-rail maintenance is very important for BTE machines. Hi-rail hours are tracked to let the operator know when the required maintenance should be completed. Upon maintenance completion a button will become visible to reset the maintenance alarm and reset the corresponding hi-rail hours.

To depressurize the attachments must not be running. Once all attachments are in the stopped condition, the operator must hold F5 & F6 until "Depressurize Enabled" appears on the screen.

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## Troubleshooting the NGH 308 Machine:

**Symptom:** The Attachment does not function correctly.

Check to see if the Display shows that the correct attachment is selected.

**Symptom:** When the 308 is running the display does not power up.

- 1.) Check to see if the 10 amp circuit breaker "102-1CB" has tripped. To check it see if the Black Tab in the center of the Circuit Breaker has pop outwards approximately  $\frac{1}{4}$ ". If so it can be reset by pressing in on the black tab to reset it.
- 2.) If the 10 amp circuit was not tripped then check to see if power is going to the keyswitch.

**Symptom:** Some or one of the outputs is not coming on.

- 1.) Check the Circuit Breakers to see if any of them are tripped. The Black Tab in the center of the Circuit Breaker will pop outwards approximately  $\frac{1}{4}$ " if it is tripped. If so it can be reset by pressing in on the black tab to reset it. The Circuit Breakers are divided up between the following outputs of the Modules:
  - A.) 104-1CB is used for outputs 0200 – 0208.
  - B.) 106-1CB is used for outputs 0000 – 0008.
  - C.) 107-1CB is used for outputs 0100 – 0108.
  - D.) 109-1CB is used for outputs 0300 – 0308.

**Symptom:** The top of the screens has a red "PLC COMMUNICATION FAULTED"

- 1.) Turn the machine off for 1 minute. Turn the machine back on and check for the fault.
- 2.) If the fault comes back, check the LEDs on the PLC in the enclosure on top of the machine and call BTE for support.

**Symptom:** The machine travels slowly on the rail.

- 1.) The system thinks the rail clamps are down.
  - a. Hold the raise rail clamp switches for one second to allow the rail clamps to be opened and reset the rail clamp position.

# BTE-308-WT HI-RAIL OPERATING INSTRUCTIONS

## HMI Warnings / Prompts

1. Coupler Messages:
  - a. Attachment must be unplugged to uncouple from the boom.
    - i. Solution:
      1. Make sure the hydraulic and electrical connections are disconnected from the boom.
  - b. Uncouple switch must be turned off and then on to uncouple
    - i. Solution:
      1. The coupler switch was turned on and Bucket / No tool wasn't selected. Turn the coupler switch off and back on for it to work.
  - c. Uncouple Solenoid is on.
    - i. Machine is uncoupling
2. 10 / 40 / or 250-hour maintenance interval message
  - a. Perform the maintenance described in the BTE manual for the hour interval that is required. Once the maintenance is performed, press and hold F4 for 3 seconds on screens 1, 2, or 12.
3. Tamper / or Brush Cutter Lubrication alarm
  - a. Perform the maintenance described in the BTE manual for the attachment selected. Once the maintenance is performed, press and hold F4 for 3 seconds on screens 1, 2, or 12.
4. Stick steer alarm
  - a. Stick steer cannot be enabled while raising or lowering the hi-rail gear or rail clamps.
5. Operations must be used independently
  - a. Operator cannot operate the hi-rail, rail clamps, or track jack at the same time.
6. Open rail clamps to raise or lower hi-rail
  - a. The system allows the operator to raise or lower the hi-rail while rail clamps are down but it does warn the operator it is happening.

# MAINTENANCE

<b><u>HI-RAIL MAINTENANCE SCHEDULE 308-WT</u></b>			
<b>Operation</b>	<b>10 HRS OR DAILY</b>	<b>40 HRS OR WEEKLY</b>	<b>250 HRS OR MONTHLY</b>
Grease Hi-Rail Pivot Points (See Page 32)	Action Required		
Grease Hi-Rail Bearings (See Page 32)	Action Required		
Inspect Hi-Rail Brakes and Adjust or Replace Pads as Needed (See Page 33)	Action Required		
Inspect Hi-rail wheels for wear and deformities.	Action Required		
Inspect Hi-Rail wheel flanges for any cracks, sharp flange sections and wheel delamination	Action Required		
Check Tension of Hi-Rail Drive Chain (See Page 34)		Action Required	
Inspect Sprockets on Hi-Rail Drive		Action Required	
Lubricate Drive Chain (See Page 34)		Action Required	
Inspect wheels for any lateral or vertical movement (wheel bearing play)		Action Required	
Change Hi-Rail Gearbox Oil (See Page 35)			Action Required
Inspect Hi-Rail Gear for Any Loose Fasteners			Action Required
Inspect Hi-Rail Gear for Any Wear			Action Required
Inspect Safety Appliances for condition and function (See Page 35)			Action Required

# MAINTENANCE

## DAILY EQUIPMENT INSPECTION

- It is important for maintenance measures to be carried out daily.
- Inspect Hi-Rail and attachments daily. Pay attention to visible defects.
- Inspect Hi-rail wheels and flanges for wear and deformities.
- Inspect hoses, fittings, cylinders, etc. daily for wear, leaks, excessive dirt.
- Check that there are no oil leaks.
- Do not operate machinery that is not in good working condition.

## LUBRICATION INFORMATION

Before operating the equipment, make sure it is properly lubricated and thoroughly inspected. Only a minimum amount of time and effort is required to regularly lubricate and maintain this machine to provide long life and trouble free operation.

Do not let excess grease collect on or around parts, particularly when operating in sandy areas. The accompanying photographs show lubrication points. It takes very little time to insure that the equipment is lubricated weekly, based upon normal conditions. Severe or unusual conditions may require more frequent lubrication.

## LUBRICATION SCHEDULE

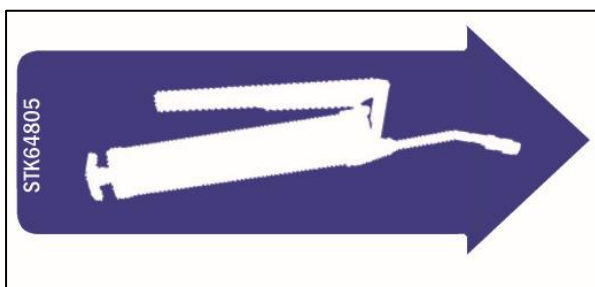
The equipment must be serviced daily to achieve the best operation and longest life. Good, quality grease from a hand grease gun should be sufficient. Wipe excess grease and dirt off of moving components.

Lubrication points on this machine are identified with a blue arrow with a white grease gun symbol.

The sticker and how it is used are shown below.



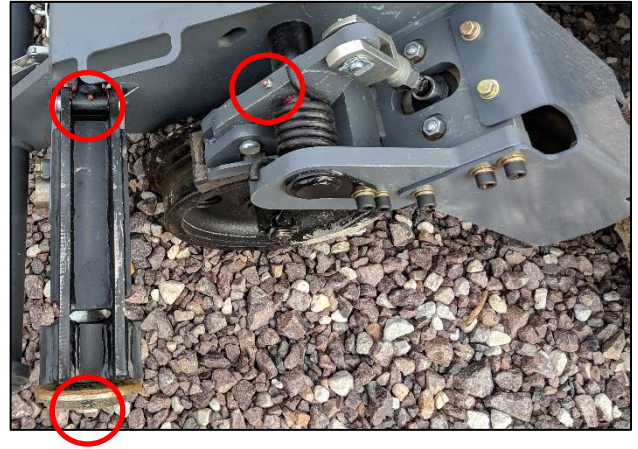
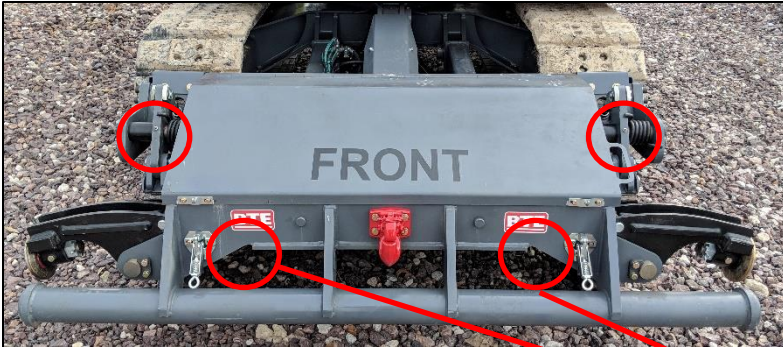
GREASE AXLE BEARINGS,  
CYLINDERS AND PIVOT PINS  
ON BOTH ENDS OF MACHINE



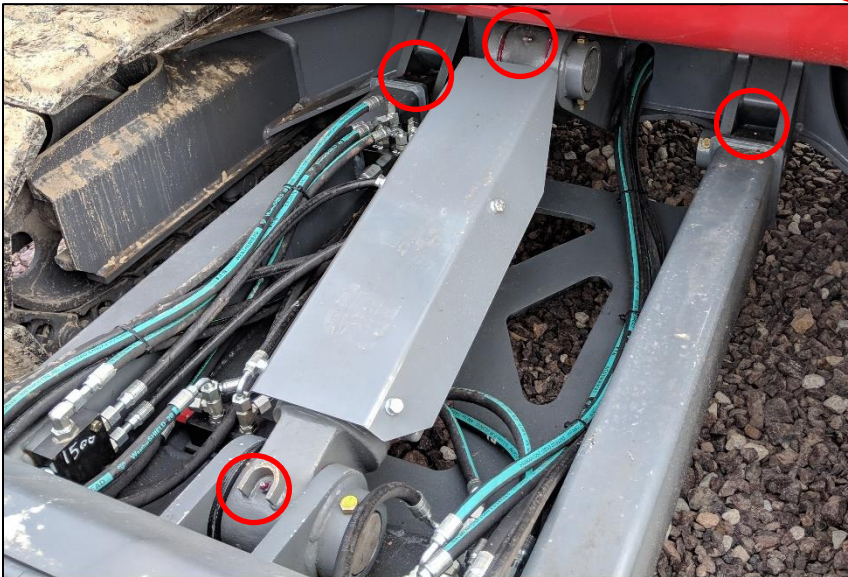
# MAINTENANCE

## DAILY MAINTENANCE

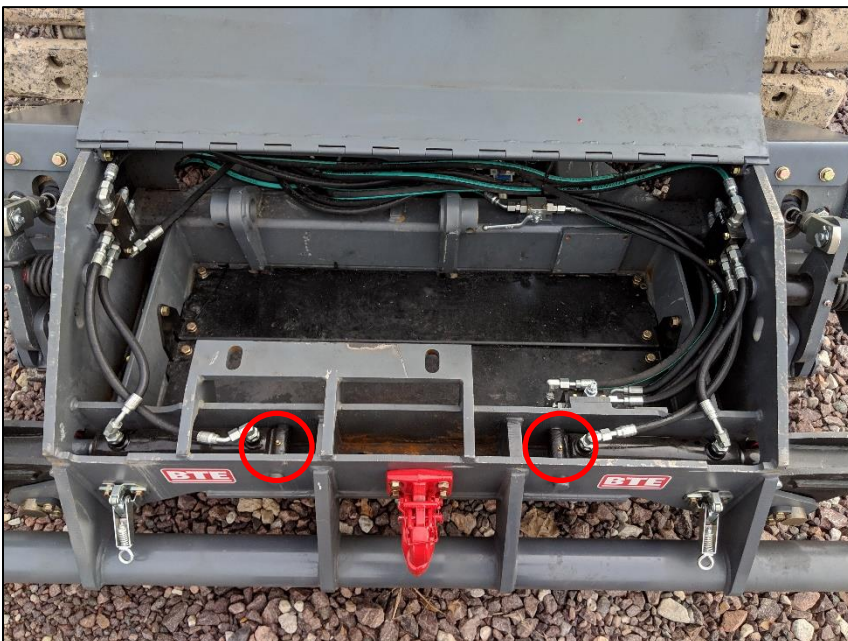
### GREASE POINTS



GREASE POINTS ARE ON AXLE PILLOW BLOCK BEARINGS



GREASE POINTS ARE THE SAME FRONT AND BACK OF MACHINE



SEE OEM OPERATOR'S MANUAL FOR ADDITIONAL MAINTENANCE



# MAINTENANCE

## DAILY MAINTENANCE – CONTINUED

### BRAKE INSPECTION AND ADJUSTMENT

Use of the Brake System over time creates normal wear on the brake pad. It is important to inspect the brake pads and the spacing to the rail wheel and adjust the pads for optimal braking.

#### Daily Inspection

With the brake disengaged and the machine setting on the crawler tracks measure the distance between the brake pad and rail wheel. This should measure between 1/16”-1/8”.

- If the measurement is greater than 1/8”, adjust brakes as detailed below.
- If the pad cannot be adjusted to get it close enough to the wheel then it must be replaced.

**Use extreme caution when servicing brake canisters due to large spring with stored potential energy. Only certified service technicians and mechanics should service these units.**

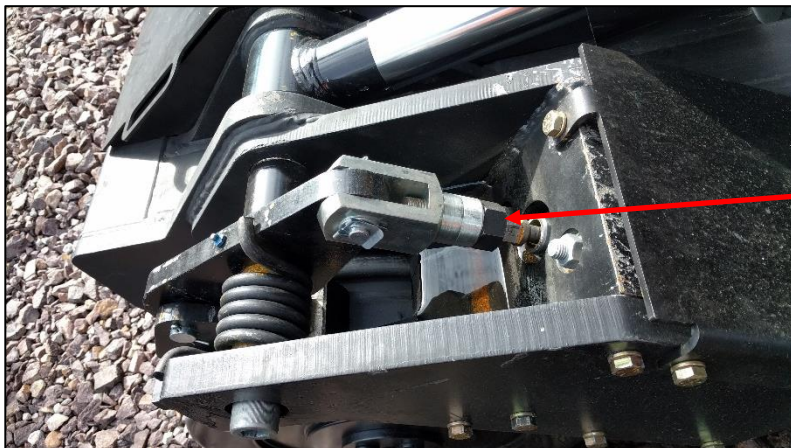


#### Adjustment

The Brake System has an adjustment to keep the system in full operation. The clevis may be adjusted by turning the adjustment nut near the base, causing the brake to be closer or further away from the wheel.

Adjusting the Brake System:

- Make sure the Emergency Brake System is fully disengaged and not touching the Rail Wheel (machine in Track Mode and safety bar engaged. It is best to do this on level ground with the Hi-Rail gear up i.e. excavator on crawler tracks so it won't roll away).V
- Adjust the nut to allow a maximum 1/8” gap between the Brake Pads and the Rail Wheel.



Turn jam nut and clevis to compensate for brake pad condition

# MAINTENANCE

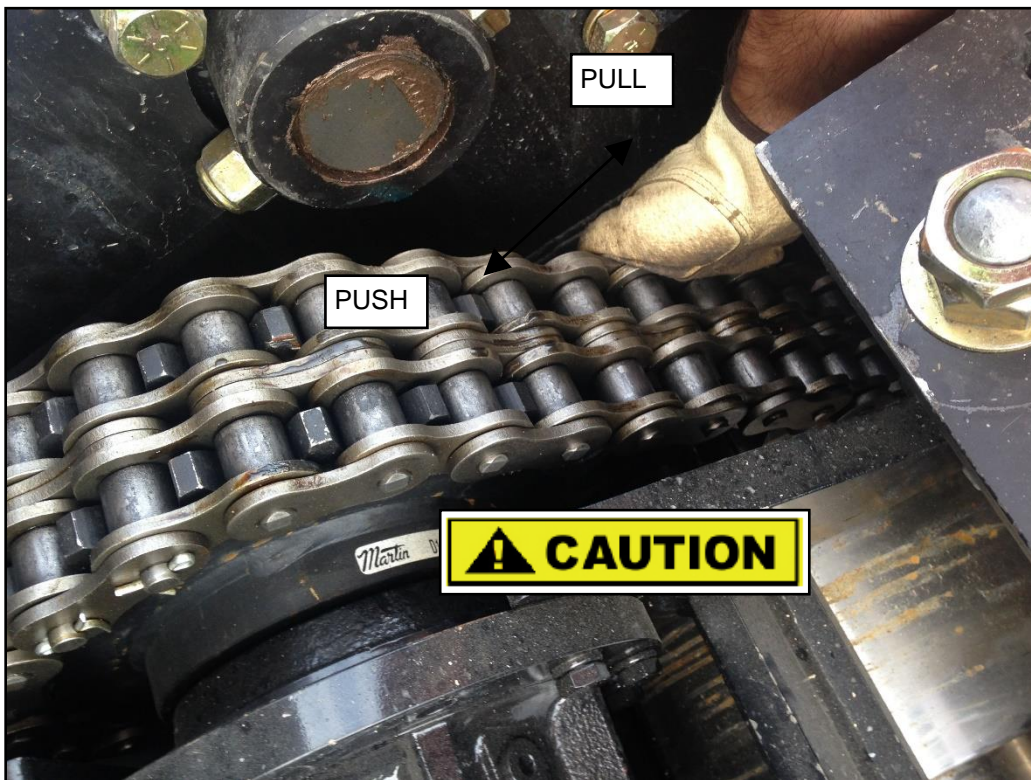
## WEEKLY MAINTENANCE

### Drive Chain Tension & Lube

- **Machine must be Locked Out and Tagged Out.**
- Push or pull on the drive chain midway between the sprockets.
- There should be 1/8 inch (3.5 mm) to 1/4 inch (7 mm) of movement in the chain in each direction when it is pushed or pulled.

**If more chain tension is needed, follow the procedure below.**

- 1) Loosen the jam nut on the turnbuckles.
  - 2) Loosen the nut on the underside of the turnbuckle plate.
  - 3) Use the turnbuckle closet to the chain to set the tension.
  - 4) Adjust the other turnbuckle to match the turnbuckle closet to the chain.
    - a. This turnbuckle is only to stabilize the motor, **DO NOT ADD TENSION WITH THIS TURNBUCKLE.**
  - 5) Tighten nuts on the underside of the turnbuckle plate.
  - 6) Tighten turnbuckle jam nuts.
- Inspect the sprocket and chain for any wear. Especially look at the teeth on the sprockets when performing the inspection.
  - Lubricate chain after inspection with chain lube like in picture below or equivalent.



# MAINTENANCE

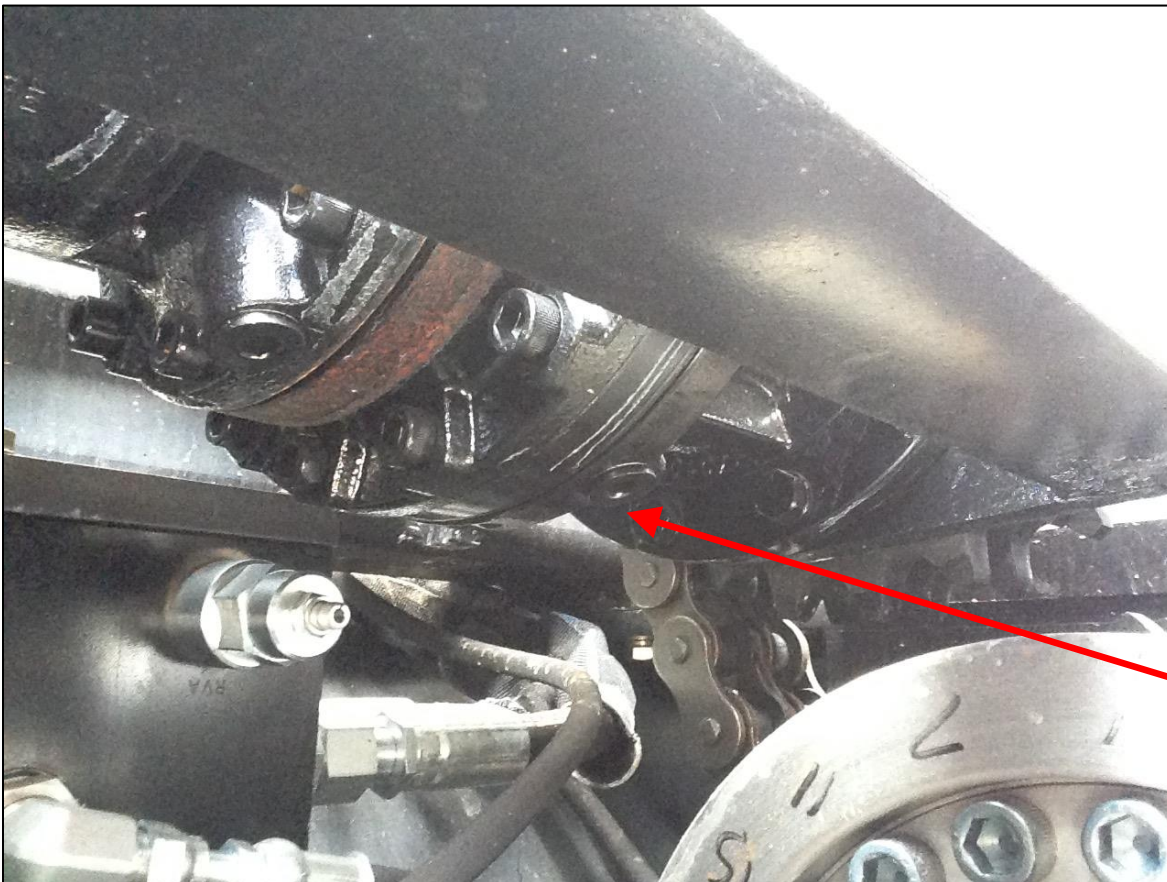
## 250 HOUR MAINTENANCE

### Hi-Rail Gear Box Oil Change

- Remove drain plug on gear box and drain oil.
- Replace plug and fill gear box with 80W-90 oil or API GL-5, MT-1 equivalent.
  - **Gear Box Capacity—1 quarts.**
- Inspect the hardware on the compression hub, sprocket, axle bearing housing, hi-rail wheels and hi-rail motor and carriage. Re-torque bolts as needed.
- Inspect hi-rail components (drive chain, sprockets, rail wheels, etc.) for any signs of significant wear. ( Replace as needed)

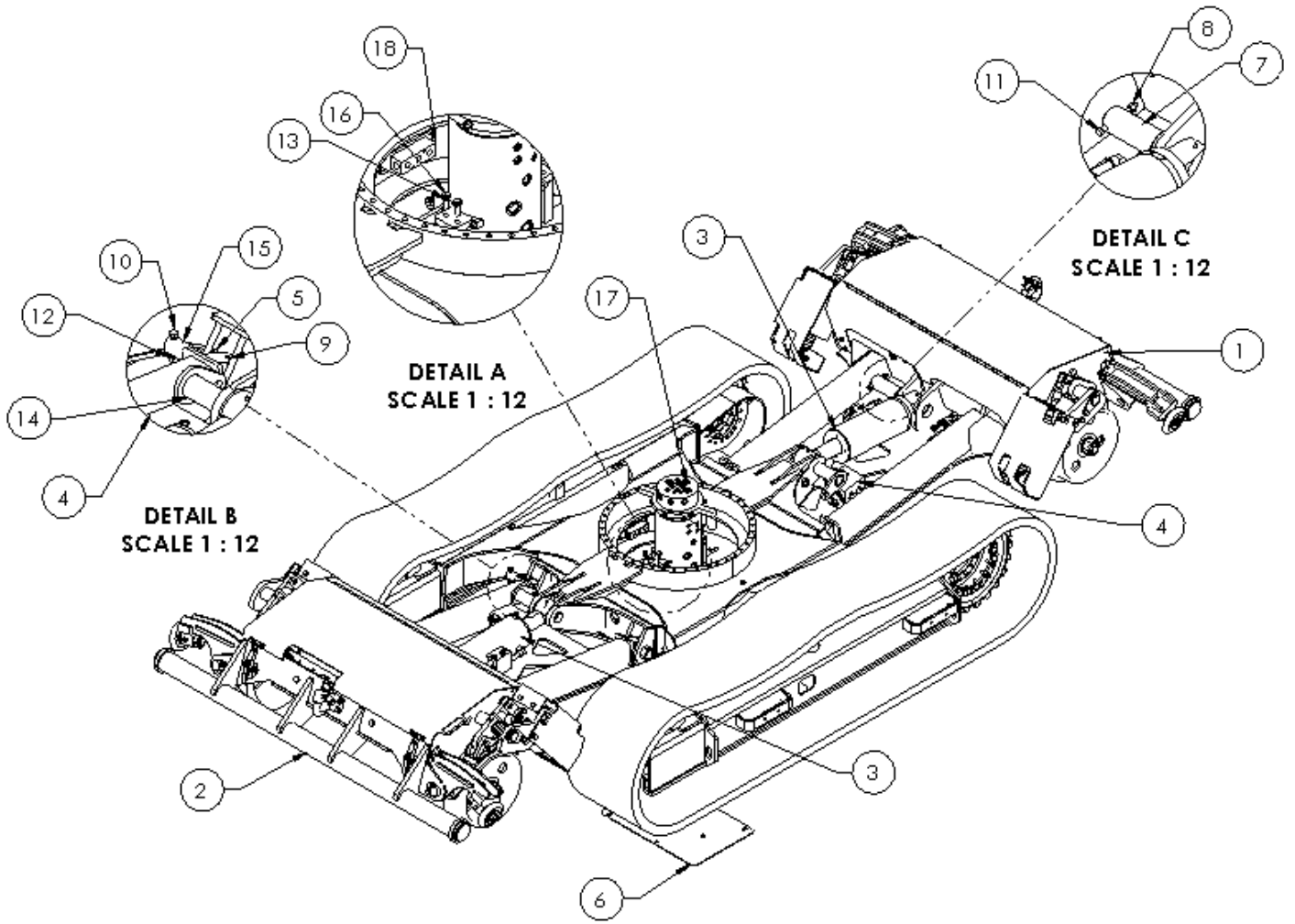
### Inspect Safety Appliances for condition and function

- Change of direction or back up alarm
- Horn
- Lights (front and rear)
- 360-degree beacon
- Flagging kit
- Operational and safety manuals are available within the vehicle



Drain plug

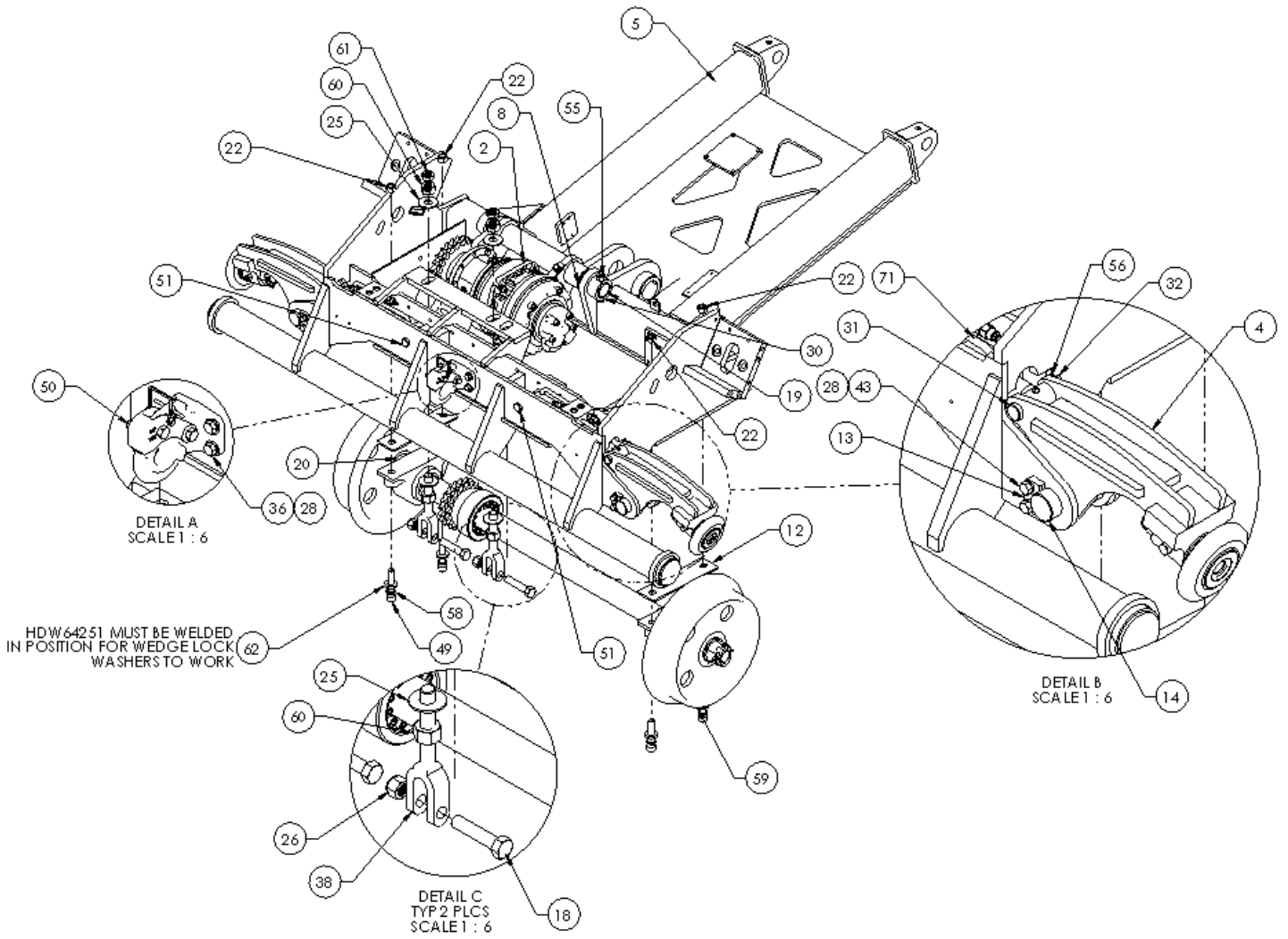
# PARTS DIAGRAMS



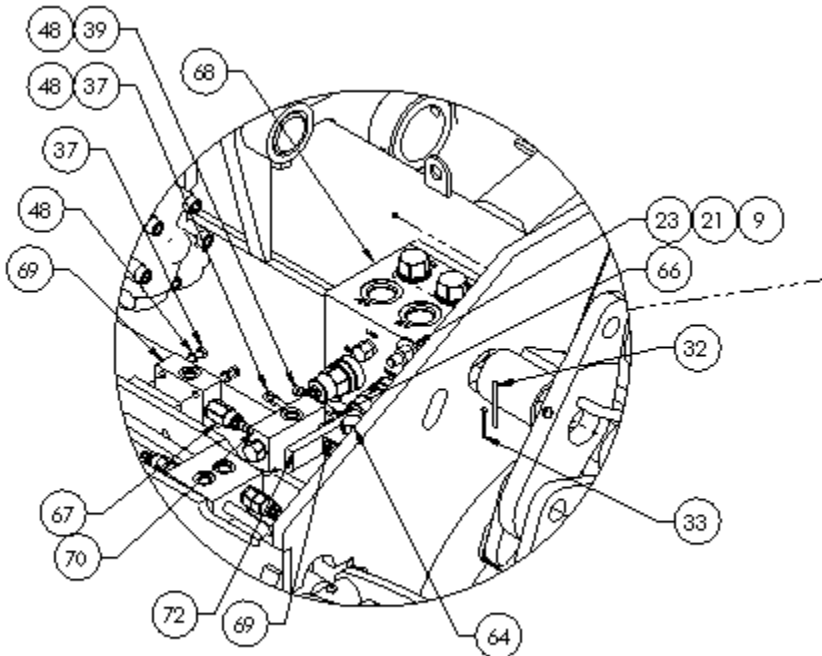
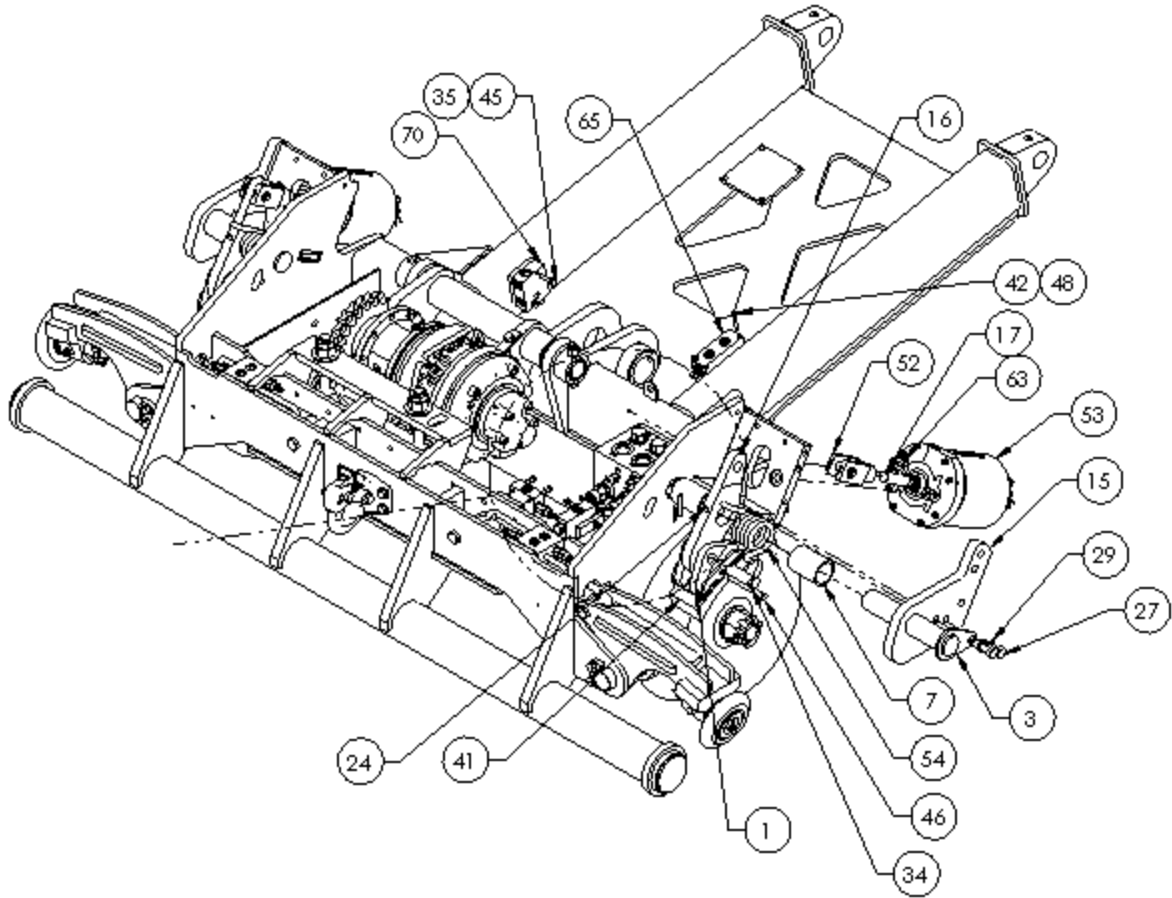
# PARTS DIAGRAMS

ITEM	DESCRIPTION	PART NO.	QTY.
1	BTE BTE-305490 DRIVE BOX	BTE-305485	1
2	BTE BTE-305490 IDLER BOX	BTE-305500	1
3	BTE BTE-305490 HI-RAIL CYLINDER	BTE-305489	2
4	BTE-305498 PILOT CNTRL DIVERTER	BTE-305498	2
5	BOD TB290 HR SPACERS	BOD69352	8
6	BOD BTE-305491 BELLY PAN	BOD77794	1
7	MAC MINI X CYL PIN	MAC67340	2
8	HDW NUT HEX 1/2-13	HDW0223	2
9	HDW GREASE FITTING 1/8" PIPE	HDW14160	4
10	HDW SCREW HHC 1/2-13 X 3-1/2	HDW23508	4
11	HDW BOLT HH 1/2-13 x 5	HDW29137	2
12	HDW NUT HEX 1/2-20	HDW48048	4
13	HDW WASHER WEDGE LOCK M12	HDW63310	4
14	HDW CAT 308 CYLINDER PIN	HDW76842	2
15	HDW CAT 308 PIVOT PIN	HDW76843	4
16	HDW BOLT HH M12X1.75X35mm	HDW77761	4
17	HYD 11 PORT UNION FOR 308	HYD77228	1
18	HYD MANIFOLD - 3 SIDE PORT BLK	HYD24466	1

# PARTS DIAGRAMS

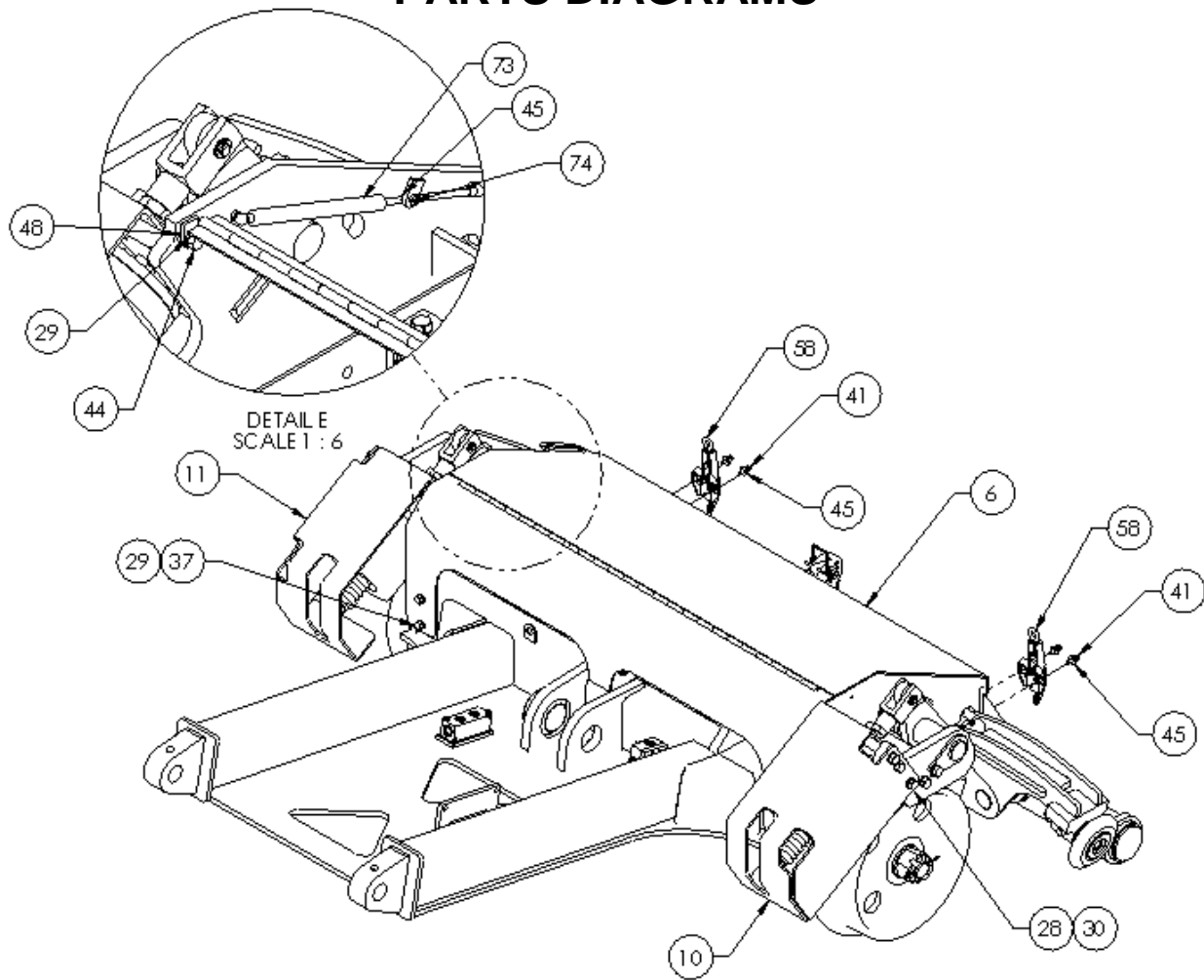


# PARTS DIAGRAMS



DETAIL D  
SCALE 1 : 6

# PARTS DIAGRAMS



ITEM	DESCRIPTION	PART NO.	QTY
1	ASY BTE-302007 BRAKE HOLDER	ASY28315	2
2	ASY MINI X DRIVE MOTOR	ASY62372	1
3	ASY ASY66322 BRAKE ARM PIN	ASY66583	2
4	ASY ROLLER RAIL CLAMP	ASY74018	2
5	ASY ASY76803 DRIVE BOX FRAME	ASY76790	1
6	ASY ASY76803 DRIVE BOX COVER	ASY76852	1
7	BOD ASY47500 SPACER TUBE	BOD47529	4
8	BOD ASY55586 SPACER	BOD56540	1
9	BOD ASY55586 MANIFOLD MNT ROD	BOD60470	2
10	BOD BTE-303303 GUARD RHS	BOD65379	1
11	BOD BTE-303302 GUARD LHS	BOD65386	1
12	BOD ASY66002 1/2" PAD	BOD70224	2
13	MAC BTE-302680 PIN TAB	MAC36333	2
14	MAC ASY39310 CLAMP PIVOT PIN	MAC39191	2
15	MAC ASY47500 OUTSIDE TRUN PLT	MAC47499	2

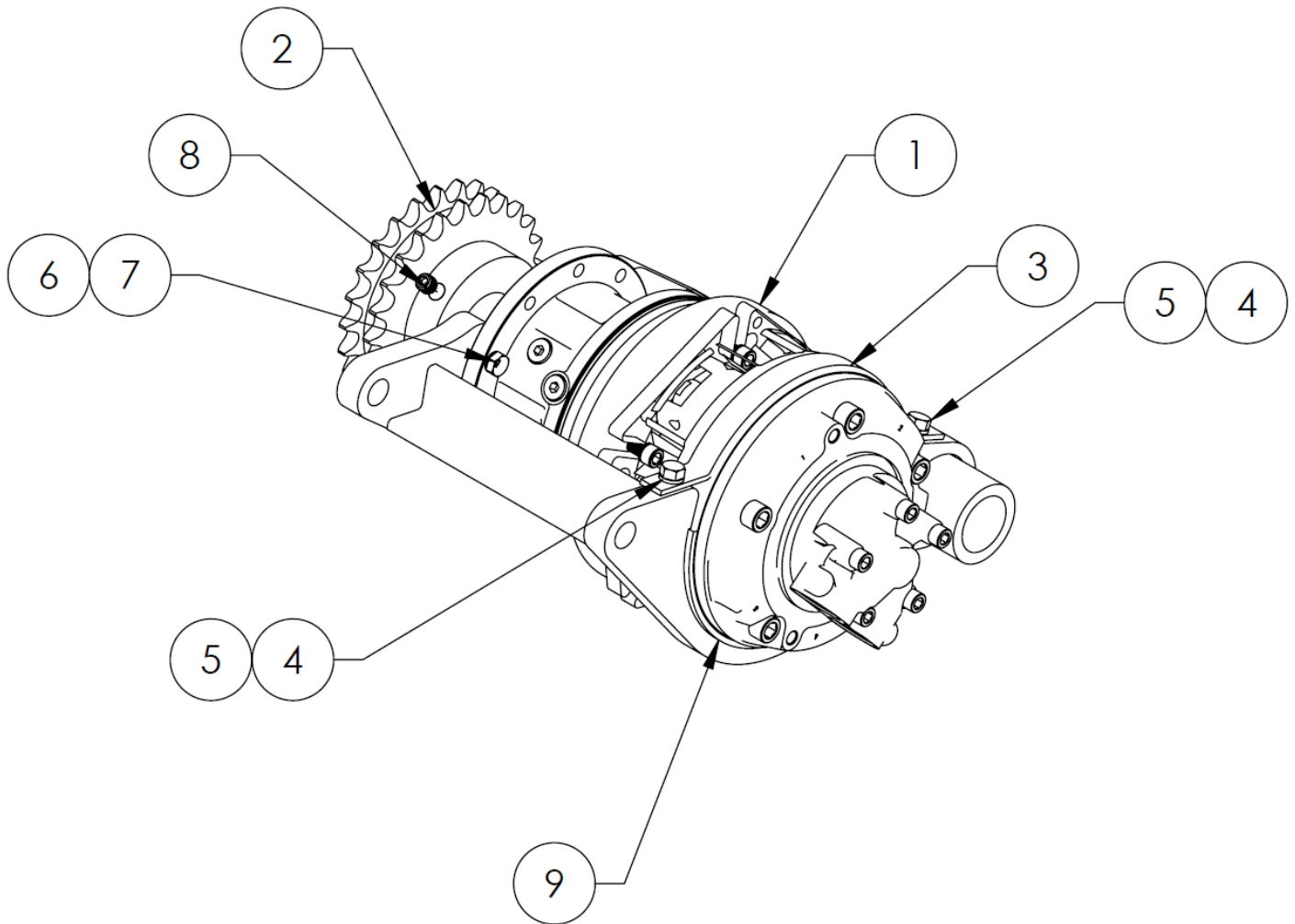


## PARTS DIAGRAMS

ITEM	DESCRIPTION	PART NO.	QTY
16	MAC ASY47500 ROCKER ARM	MAC47505	2
17	MAC ASY48686 BRAKE PUSH ROD	MAC48676	2
18	MAC TURNBUCKLE JAW PIN	MAC60415	2
19	MAC ASY66002 MOTOR MNT PIN	MAC66811	1
20	MAC TB290 AXLE SHIM	MAC71537	2
21	MAC PR VALVE MNT PLT	MAC71516	1
22	HDW NUT HEX 1/2-13	HDW0223	2
23	HDW NUT HEX 3/4-10	HDW0296	4
24	HDW WASHER 1/2" GRD 8	HDW0298	2
25	HDW GREASE FITTING 1/8" PIPE	HDW14160	2
26	HDW WASHER 1"	HDW14632	4
27	HDW NUT LOCK 7/8-9	HDW1948	2
28	HDW BOLT HH 5/8-11 x 2	HDW20638	10
29	HDW WASHER SPLT LK 1/2"	HDW2064	18
30	HDW WASHER SPLT LK 5/8"	HDW2082	10
31	HDW BOLT-HEX HEAD 5/8-11 X 4" LG	HDW21336	1
32	HDW CLEVIS PIN 1" DIA x 4"	HDW21957	2
33	HDW COTTER PIN 3/16"x2"LONG	HDW22909	6
34	HDW COTTER PIN 1/8"x1-1/4"long	HDW22912	2
35	HDW CLEVIS PIN 1" DIA x 3"	HDW23009	2
36	HDW WASHER SPLT LK 5/16	HDW23519	2
37	HDW BOLT HH 1/2-13 x 1-1/4	HDW23697	12
38	HDW SCREW HHC 1/4-20 X 1-3/4	HDW25038	4
39	HDW TURNBUCKLE JAW END	HDW25273	2
40	HDW BOLT HH 1/4-20 X 2-1/4	HDW26099	2
41	HDW BOLT HH 5/16-18 x 1	HDW27099	4
42	HDW BRAKE PAD FOR 16" WHEEL	HDW28318	2
43	HDW BOLT HH 1/4-20 X 2	HDW28341	2
44	HDW BOLT HH 1/2-13 X 1"	HDW28391	6
45	HDW WASHER 5/16" GRD 8	HDW28714	4
46	HDW BOLT HH 5/16-18 x 1-1/2	HDW28728	2
47	HDW PIN CLEVIS 1/2 x 4-1/2	HDW28744	2
48	HDW WASHER 1/2" SAE GR8	HDW33160	2
49	HDW WASHER SPLT LK 1/4"	HDW3336	8
50	HDW SCREW SHCS 3/4-10 X 4	HDW33864	4

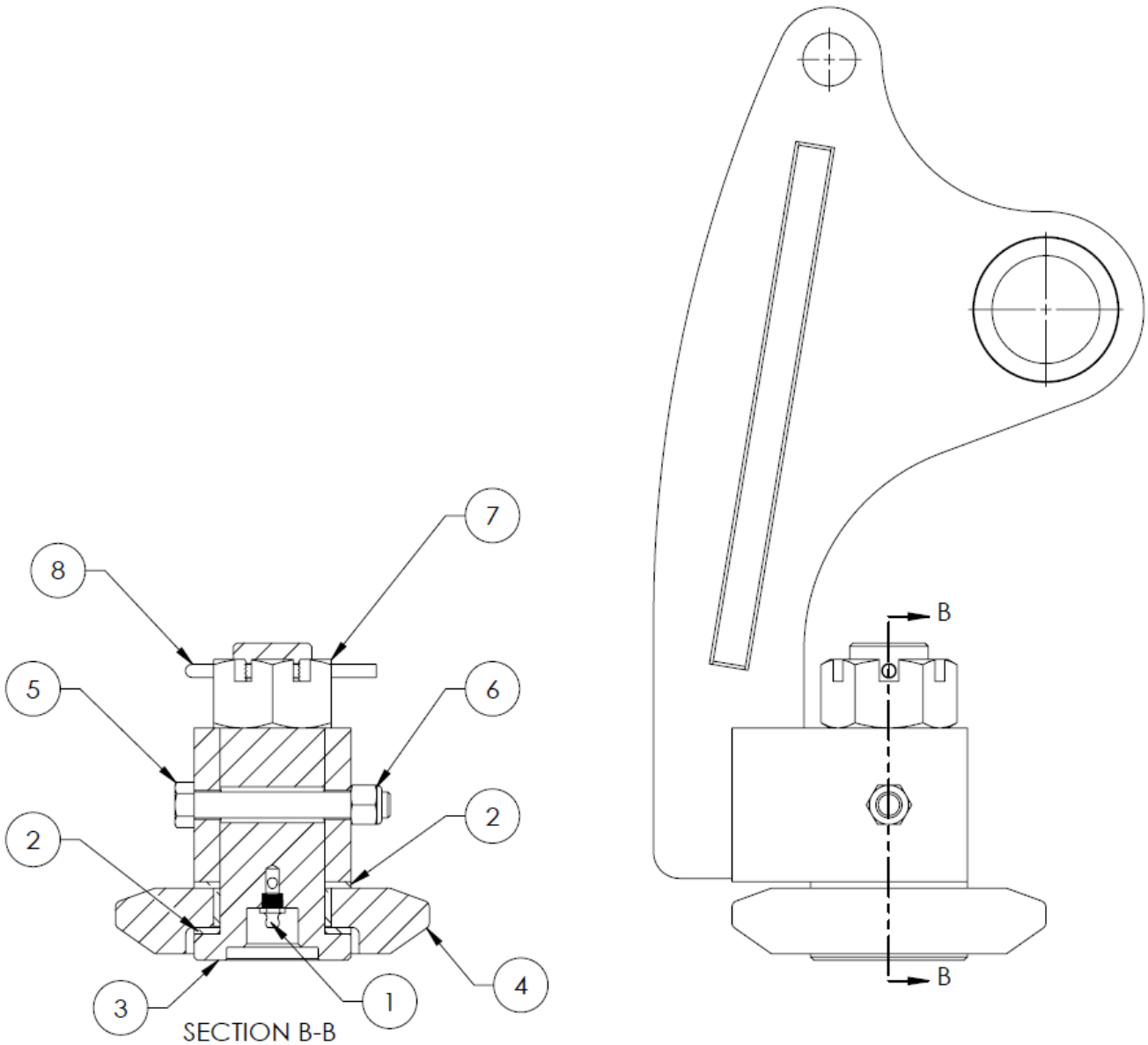
## PARTS DIAGRAMS

ITEM	DESCRIPTION	PART NO.	QTY
51	HDW BOLT ON PINTLE HOOK W/	HDW36536	1
52	HDW PIN CLEVIS 1 x 5	HDW39451	2
53	HDW CLEVIS FOR SAFIM CYLINDER	HDW47511	2
54	HDW SAFIM BRAKE CYLINDER	HDW47513	2
55	HDW SWIVEL MOUNT SPRING	HDW47898	2
56	HDW NUT HEX 5/8-11 GR8	HDW47956	1
57	HDW WASHER 1" ID X 2" OD	HDW54148	4
58	HDW CAT312 LOCKING HOOD LATCH	HDW59236	2
59	HDW WASHER WEDGE LOCK 3/4"	HDW60353	4
60	HDW 20,000 LBS AXLE ASSEMBLY	HDW62989	1
61	HDW 1"-8 GALVANIZED HEX NUT	HDW63581	4
62	HDW 1"-8 GALVANIZED HEX JAM NUT	HDW63612	2
63	HDW WASHER 3/4	HDW64251	4
64	HDW NUT JAM 1-12	HDW69414	2
65	HYD SUN CART SHUTTLE VALVE	HYD25455	1
66	HYD MANIFOLD 0° 2 STATION	HYD35809	1
67	HYD SUN CART PRESSURE REDUCING	HYD42337	1
68	HYD CART PRESSURE REDUCING	HYD48297	1
69	HYD BTE 312HI-RAIL DRIVE MOTOR	HYD49541	1
70	HYD MANIFOLD NINETY DEGREE	HYD51098	2
71	HYD 90 DEG MANIFOLD W/REVERSE	HYD58438	2
72	HYD CYL 2-1/2"BORE x 8"STROKE	HYD76854	2
73	HDW GAS SPRING W/BALL JOINT	HDW51031	1
74	HDW NUT HEX 5/16-18 THIN	HDW64778	1



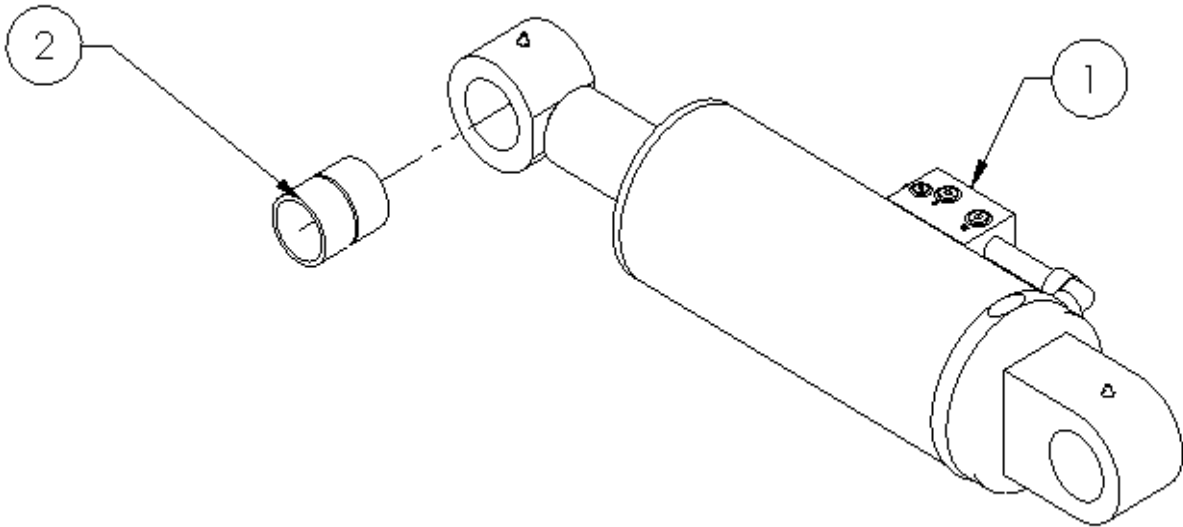
ITEM	DESCRIPTION	PART NO.	QTY.
1	HYD MOTOR/GEARBOX COMBO	HYD66831	1
2	HDW SPROCKET NO.80-1" PITCH	HDW64348	1
3	MAC FS30 MOTOR STRAP	MAC71554	1
4	HDW WASHER SPLT LK 1/2"	HDW2064	2
5	HDW BOLT HH 1/2-13 x 1-1/4	HDW23697	2
6	HDW WASHER WEDGE LOCK M12	HDW63310	7
7	HDW SCREW HHC M12x1.75x50mm	HDW66819	7
8	HDW SCREW 5/8-11 CUP POINT	HDW66820	2
9	MAC MOTOR MOUNT ISOLATOR	MAC71552	1

# PARTS DIAGRAMS



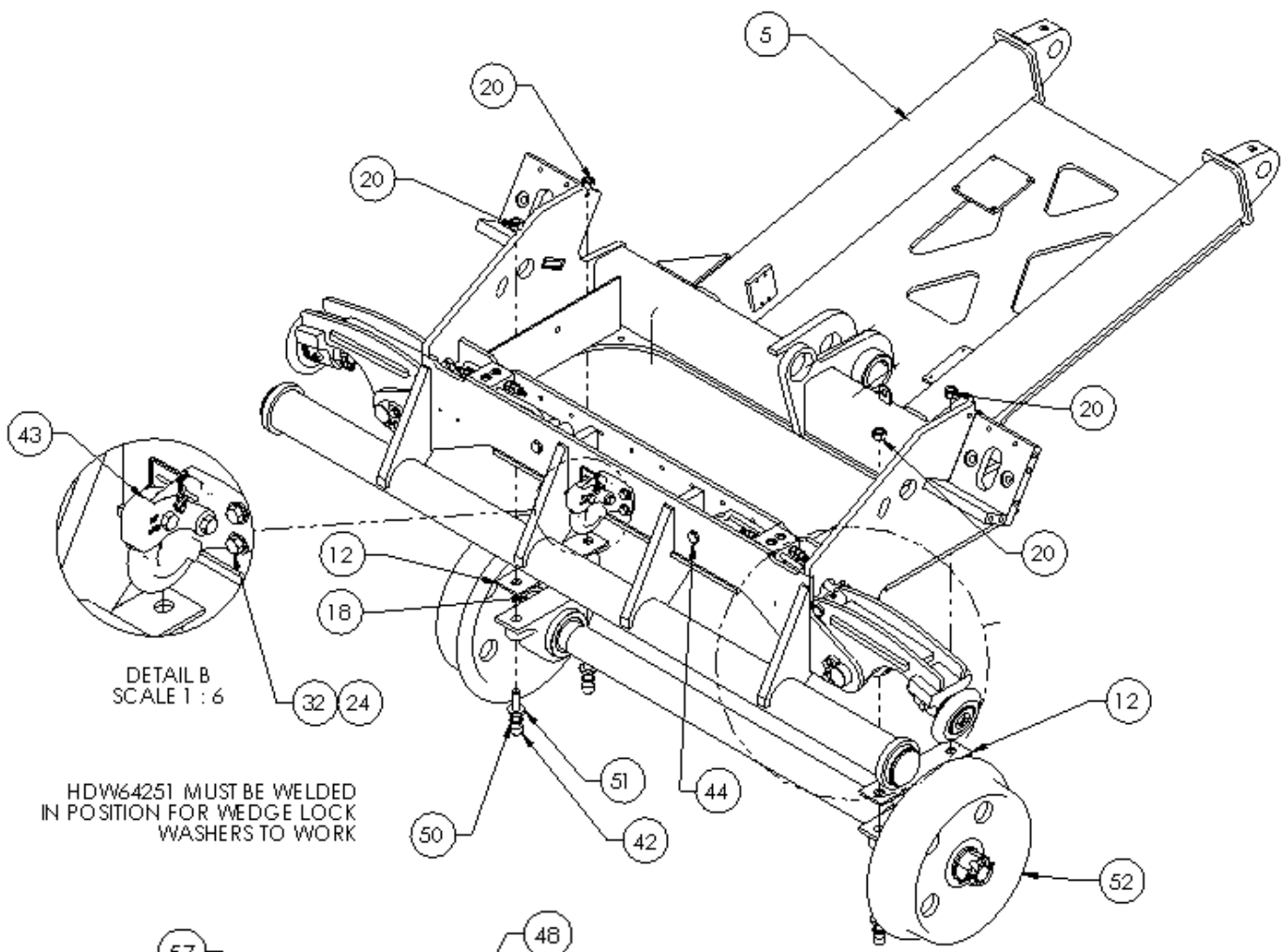
ITEM	DESCRIPTION	PART NO.	QTY.
1	HDW GREASE FITTING 1/8" PIPE	HDW14160	2
2	HDW BRONZE THRUST WASHER	HDW36645	2
3	MAC ASY36640 ROLLER PIN	MAC36642	1
4	ASY ASY36640 ROLLER ASSEMBLY	ASY36710	1
5	HDW SCREW HHC 1/2-13 X 3-3/4	HDW22291	1
6	HDW NUT HEX 1/2-13	HDW0223	1
7	HDW NUT CASTLE 1-1/2-12	HDW36692	1
8	HDW PIN COTTER 1/4x3"	HDW36687	1

# PARTS DIAGRAMS

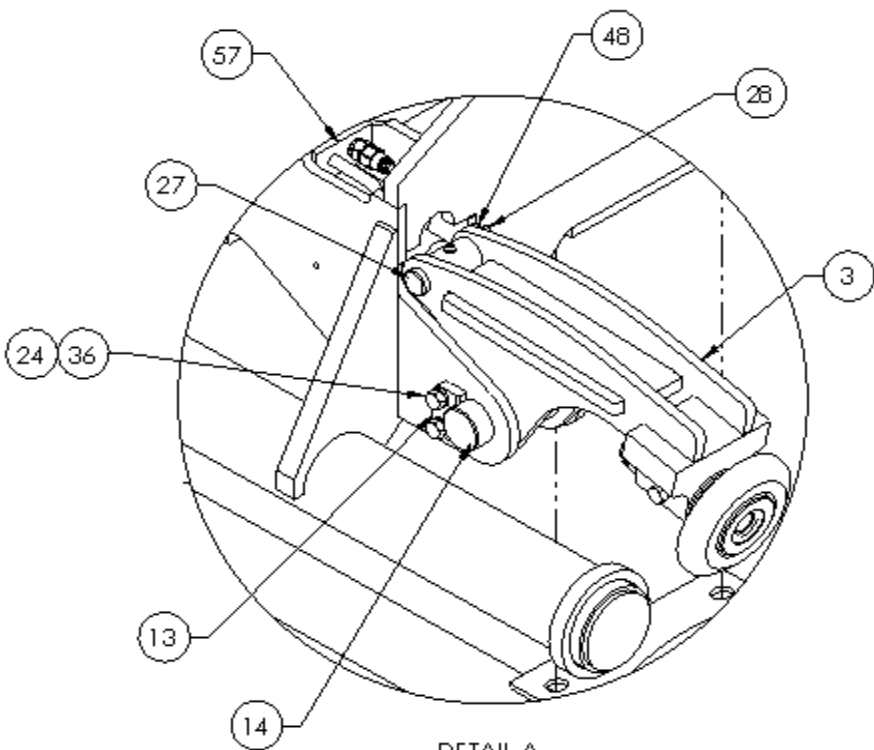


ITEM	DESCRIPTION	PART NO.	QTY.
1	HYD 308 HR CYL	HYD71703	1
2	MAC BTE-305489 BRONZE BUSHING	MAC76840	1

# PARTS DIAGRAMS

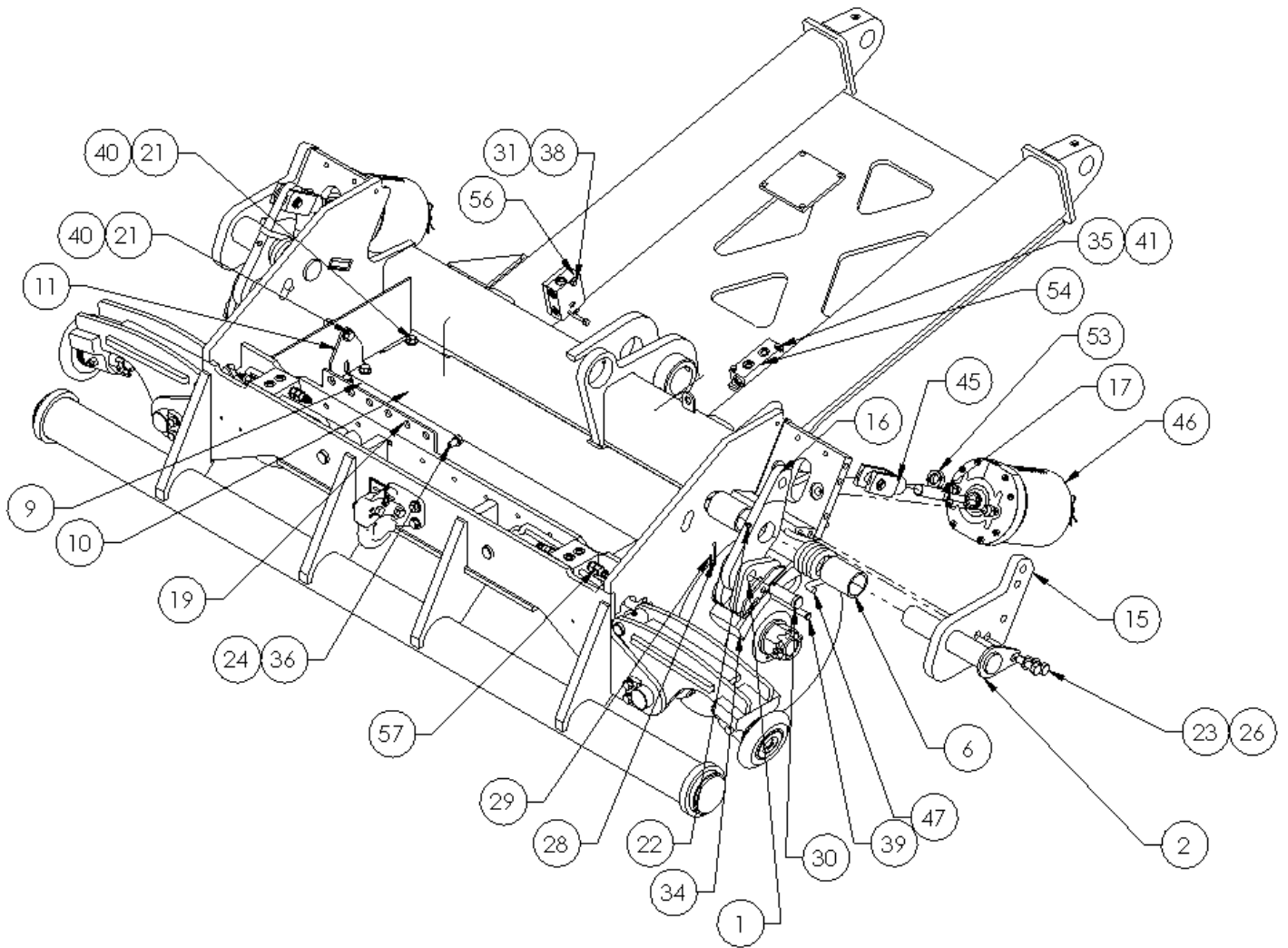


HDW64251 MUST BE WELDED  
IN POSITION FOR WEDGE LOCK  
WASHERS TO WORK

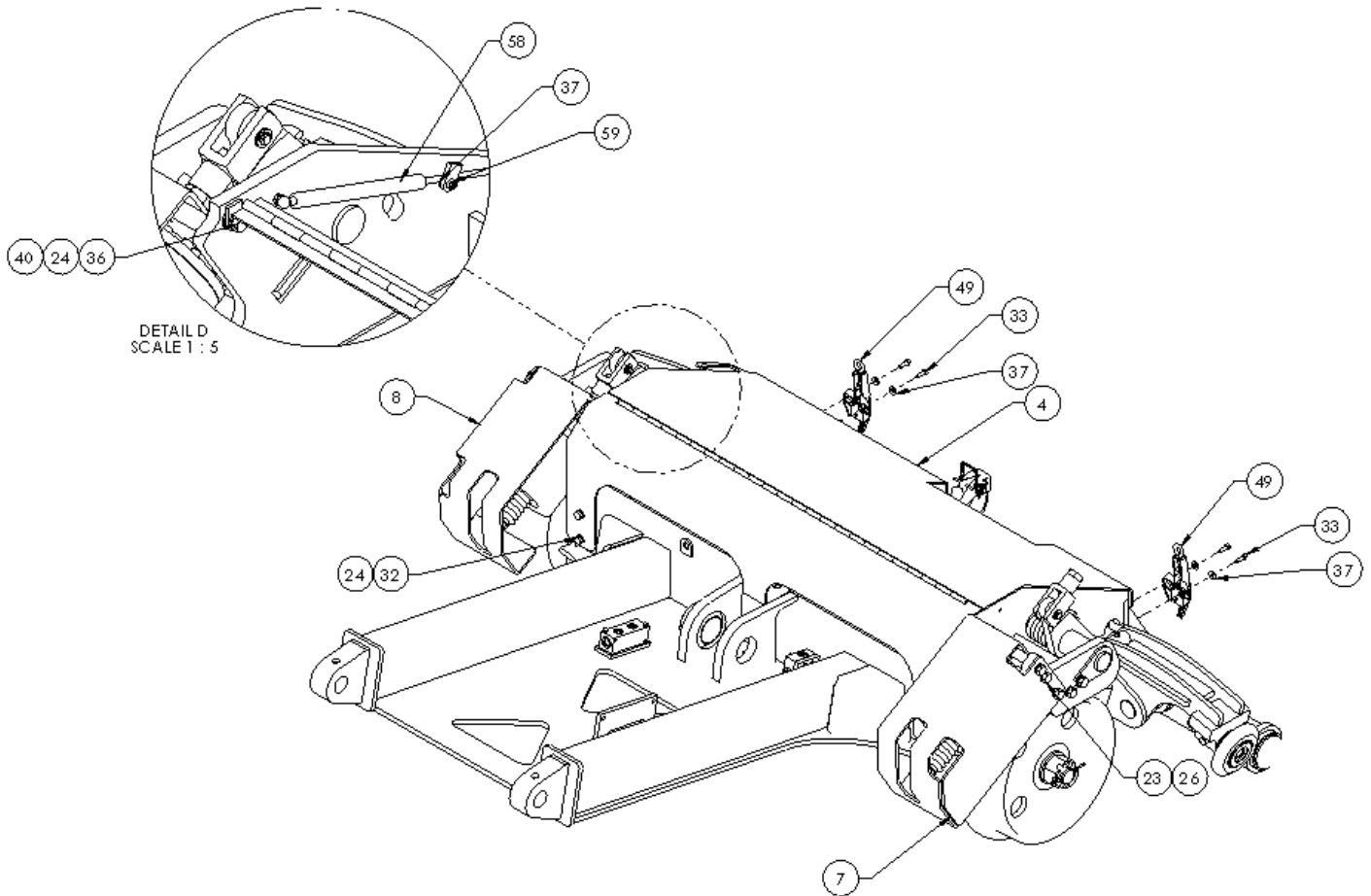


DETAIL A  
SCALE 1 : 6

# PARTS DIAGRAMS



# PARTS DIAGRAMS



ITEM	DESCRIPTION	PART NO.	QTY.
1	ASY BTE-302007 BRAKE HOLDER	ASY28315	2
2	ASY ASY66322 BRAKE ARM PIN	ASY66583	2
3	ASY ROLLER RAIL CLAMP	ASY74018	2
4	ASY ASY76778 DRIVE BOX COVER	ASY76834	1
5	ASY BASE HI-RAIL FRAME FOR 308	ASY76844	1
6	BOD ASY47500 SPACER TUBE	BOD47529	4
7	BOD BTE-303303 GUARD RHS	BOD65379	1
8	BOD BTE-303302 GUARD LHS	BOD65386	1
9	BOD TB290 FRONT TB PLT	BOD69680	1
10	BOD BTE-305500 REAR TB PLT	BOD77803	1
11	BOD MINIX FRONT TOOLBOX	BOD69686	2
12	BOD ASY66002 1/2" PAD	BOD70224	2
13	MAC BTE-302680 PIN TAB	MAC36333	2
14	MAC ASY39310 CLAMP PIVOT PIN	MAC39191	2
15	MAC ASY47500 OUTSIDE TRUN PLT	MAC47499	2



## PARTS DIAGRAMS

ITEM	DESCRIPTION	PART NO.	QTY.
16	MAC ASY47500 ROCKER ARM	MAC47505	2
17	MAC ASY48686 BRAKE PUSH ROD	MAC48676	2
18	MAC TB290 AXLE SHIM	MAC71537	2
19	MAC ASY76788 QD MNT PLT	MAC76836	1
20	HDW NUT HEX 3/4-10	HDW0296	4
21	HDW SCREW HHC 1/2-13x1-1/2	HDW0881	6
22	HDW GREASE FITTING 1/8" PIPE	HDW14160	2
23	HDW BOLT HH 5/8-11 x 2	HDW20638	10
24	HDW WASHER SPLT LK 1/2"	HDW2064	39
25	HDW NUT-HEX 1/2-13 UNC GR8	HDW2065	15
26	HDW WASHER SPLT LK 5/8"	HDW2082	10
27	HDW CLEVIS PIN 1" DIA x 4"	HDW21957	2
28	HDW COTTER PIN 3/16"x2"LONG	HDW22909	6
29	HDW COTTER PIN 1/8"x1-1/4"long	HDW22912	2
30	HDW CLEVIS PIN 1" DIA x 3"	HDW23009	2
31	HDW WASHER SPLT LK 5/16	HDW23519	2
32	HDW BOLT HH 1/2-13 x 1-1/4	HDW23697	23
33	HDW BOLT HH 5/16-18 x 1	HDW27099	4
34	HDW BRAKE PAD FOR 16" WHEEL	HDW28318	2
35	HDW BOLT HH 1/4-20 X 2	HDW28341	2
36	HDW BOLT HH 1/2-13 X 1"	HDW28391	10
37	HDW WASHER 5/16" GRD 8	HDW28714	4
38	HDW BOLT HH 5/16-18 x 1-1/2	HDW28728	2
39	HDW PIN CLEVIS 1/2 x 4-1/2	HDW28744	2
40	HDW WASHER 1/2" SAE GR8	HDW33160	17
41	HDW WASHER SPLT LK 1/4"	HDW3336	2
42	HDW SCREW SHCS 3/4-10 X 4	HDW33864	4
43	HDW BOLT ON PINTLE HOOK W/	HDW36536	1
44	HDW PIN CLEVIS 1 x 5	HDW39451	2
45	HDW CLEVIS FOR SAFIM CYLINDER	HDW47511	2
46	HDW SAFIM BRAKE CYLINDER	HDW47513	2
47	HDW SWIVEL MOUNT SPRING	HDW47898	2
48	HDW WASHER 1" ID X 2" OD	HDW54148	4
49	HDW CAT312 LOCKING HOOD LATCH	HDW59236	2
50	HDW WASHER WEDGE LOCK 3/4"	HDW60353	4
51	HDW WASHER 3/4	HDW64251	4
52	HWD 20,000 LBS IDLER AXLE ASY	HDW67289	1
53	HDW NUT JAM 1-12	HDW69414	2
54	HYD MANIFOLD 0° 2 STATION	HYD35809	1
55	HYD SUN CART PRESSURE REDUCING	HYD42337	1
56	HYD 90 DEG MANIFOLD W/REVERSE	HYD58438	1
57	HYD CYL 2-1/2"BORE x 8"STROKE	HYD76854	2
58	HDW GAS SPRING W/BALL JOINT	HDW51031	1
59	HDW NUT HEX 5/16-18 THIN	HDW64778	1

