# OPERATION & PARTS MANUAL

## EX-50 Excavator

**EX50 Excavator SN: 061612A/F62687F**

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**SERVICE • RELIABILITY • INNOVATION**

# Introduction

This manual contains important safety, operation, maintenance and parts information for your Akkerman EX-50 Excavator. You must read and understand this manual and any additional equipment manuals before you operate and maintain this equipment. Keep this manual with your EX-50 Excavator at all times. Additional copies of this manual may be purchased from the Akkerman Aftermarket Support Department, or downloaded from the Akkerman web site at www.akkerman.com.

**The contractor is responsible for the overall safety program on the job site. Use this manual as a part of the safety program.**

The use of second rate parts could affect the efficient performance of the EX-50 Excavator. ALWAYS use genuine Akkerman parts.

Understand safety signal words, DANGER, WARNING, CAUTION, SAFETY INSTRUCTIONS, and NOTICE. When you see these words in this manual or on safety decals mounted on your equipment, follow the safety message to avoid personal injury and/or property damage.

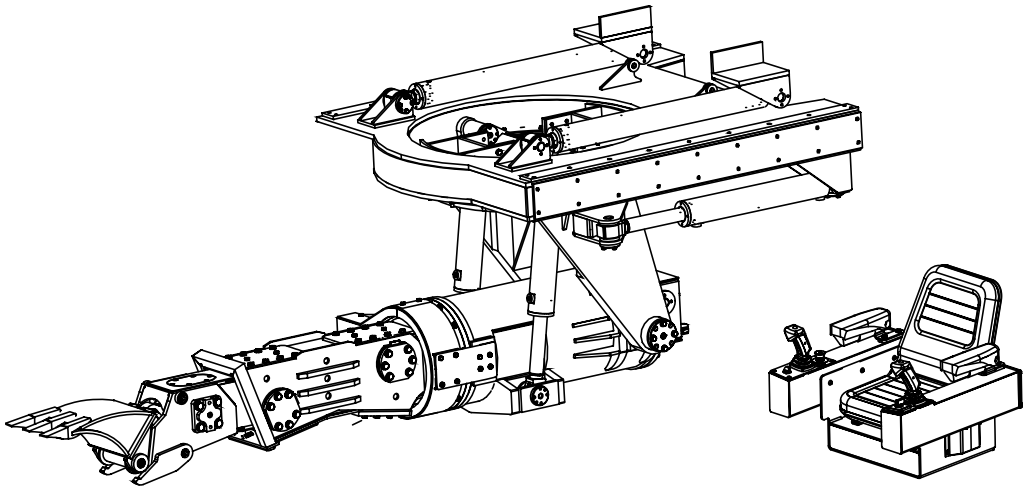
**⚠DANGER** Indicates an extremely hazardous situation which, if not avoided, WILL result in death or serious injury.

**⚠WARNING** Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

**⚠CAUTION** Indicates a potentially hazardous situation, which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.

**SAFETY INSTRUCTIONS** Usually consists of individual messages stating procedures or actions that must be followed for the safe operation of a product.

**NOTICE** Identifies potential property damage and important installation, operator, or maintenance information.



**Akkerman EX-50 Excavator**

This instruction contains important safety, operation, and maintenance information for your Akkerman EX-50 Excavator. The EX-50 Excavator is used with the Excavator Boring Shield (EBS) to excavate soil in the installation of 100-inch and larger pipe jacking, liner plate and ring-beam and lagging tunnel building applications. The EX-50 is mounted to the interior top of the EBS with a slide mount system. The operator in the operator station uses joysticks to hydraulically control the EX-50's bucket, boom, frame and hoist range of motion.

If you find any errors with this manual or have any suggestions for improvement, please let us know. Email your comments via the Akkerman web site (Contact Us web page), or mail your suggestions to: Akkerman Inc, ATTN: Technical Publications, 58256 266th Street, Brownsdale, MN 55918.

Akkerman Inc. reserves the right to improve its product without notice or obligation.

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# NOTES

# Safety

## BE ALERT FOR SAFETY INFORMATION

When you see this safety alert symbol on your equipment or in this manual, be alert to the possibility of personal injury or property damage.

Read all safety information.

Keep safety decals clean and in good condition. Replace missing or damaged safety decals.

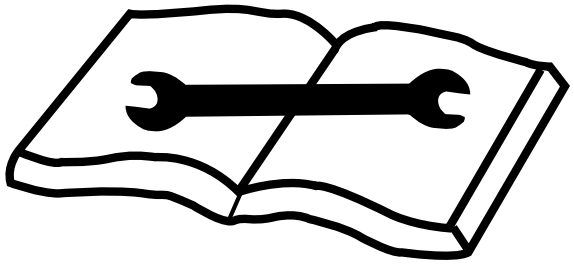
**ATTENTION!**
**BECOME ALERT!**
**YOUR SAFETY IS INVOLVED!**

## READ OPERATOR'S MANUAL

**⚠WARNING** Unsafe operation or maintenance can cause severe injury or death.

Read and understand the Operator's Manual before operating or servicing this equipment.

Any unauthorized modifications will void the warranty.



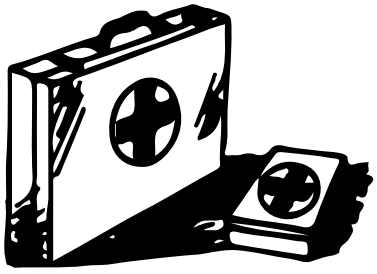
## WEAR PROTECTIVE CLOTHING

Wear OSHA approved protective clothing, such as hard hat, gloves, safety goggles, earmuffs or ear plugs, face shield, and steel-toed boots, when operating and servicing this equipment.

Wear reasonably close fitting clothing and remove jewelry before working on or near this equipment. This will help prevent the danger of catching them in moving parts or controls.

## KEEP FIRST-AID KIT ACCESSIBLE

Keep a first-aid kit handy and properly maintained. Call 9-1-1 for emergencies.



## HYDRAULIC OIL/FLUIDS UNDER PRESSURE

**⚠WARNING** Escaping oil or other fluids under pressure can penetrate your skin causing serious injury or death.

Release all pressure before performing maintenance or repairs. Never weld near pressurized fluid lines.

DO NOT use your hands to check for leaks. When searching for leaks, use a piece of wood or cardboard.

Contact medical help immediately if any oil or fluid is injected into your skin. A serious infection or reaction can emerge without proper medical treatment.

## BEWARE OF SUSPENDED LOADS

**⚠WARNING** Suspended loads may fall and cause severe personal injury or death.

If a hydraulic hose from the boom of a crane or excavator breaks, the boom can fall instantly.

Do not enter area under or around a load.

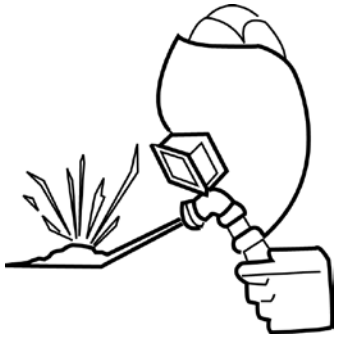
## KEEP PERSONNEL AWAY FROM MOVING PARTS

**⚠WARNING** Crushing hazard.
Keep personnel away from inside of jacking frame. Failure to do so could result in serious personal injury or death.

## UNAUTHORIZED WELDING

**⚠WARNING** Unauthorized welding can cause structural failure resulting in possible injury or death.

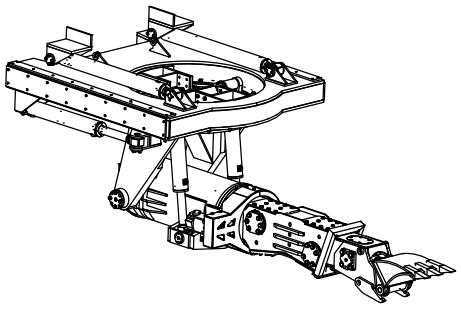
Do not weld on any structural member. Unauthorized welding or repair will void the warranty.



## REGULARLY CLEAN AND INSPECT EQUIPMENT

Remove any grease, oil, or debris buildup to avoid potential injury or equipment damage.

Inspect equipment for damage. If damaged, repair or replace immediately.



## INSPECT ELECTRICAL CONNECTIONS

**⚠WARNING** Regularly inspect electrical connections to be sure they are secure. Failure to do so could cause an explosion if moisture enters an unsecured electrical connection.

## AVOID PINCH POINTS

**⚠WARNING** Moving parts or the mishandling of parts can cause severe personal injury.

Keep hands away from moving parts.

Watch your fingers, hands, and legs while equipment is in operation.

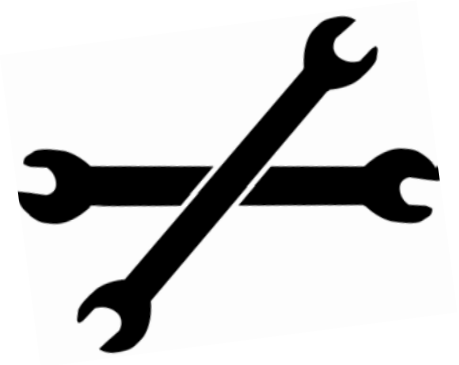
Handle parts carefully to avoid crushing and pinch point hazards.

## STAY AWAY FROM CRANE

**⚠DANGER** Stay away from operating crane. If close to power lines, the crane, load, and ground may become electrified resulting in serious injury or death.

## PRACTICE SAFE MAINTENANCE

**⚠WARNING** Unexpected equipment movement may cause serious personal injury.



LOCKOUT/TAGOUT power before performing any maintenance.

Shut down equipment before making repairs, adjustments, or removing obstructions.

Only trained and qualified personnel should perform any maintenance or repairs.

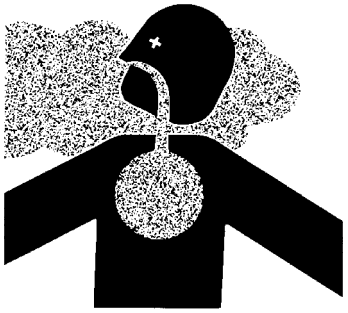
Keep the area around the equipment clean and dry when performing maintenance.

Do not service the machine while it is in motion.

Replace worn or damaged parts. Remove grease, oil, or debris buildup.

## TEST TUNNEL VENTILATION

**⚠WARNING** Keep boring head and tunnel well ventilated at all times.



Use an approved air analyzer to detect hazardous gases and oxygen content.

Before and during the shaft operation, test for combustible and toxic gases and oxygen deficiency.

If the levels exceed OSHA prescribed levels, leave tunnel and shaft immediately! Do not activate or deactivate any electrical or hydraulic devices, since any sparks could cause an explosion.

Once ALL personnel are out of tunnel/shaft, cut power from power source.

Gases must be removed before reentering tunnel/ shaft.

Do not use haul unit to evacuate the tunnel. The electrical contacts with the unit can cause an explosion.

## STORED ENERGY DO NOT USE EX-50 UNSUPPORTED

**⚠DANGER** This equipment contains stored energy. Do not remove hoses with EX-50 boom unsupported.

Failure to do so may cause serious injury or death from escaping oil under pressure and a crush hazard from falling boom.

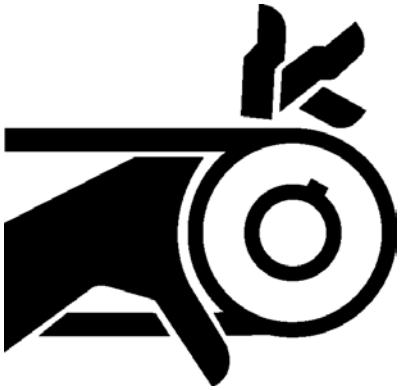
## KEEP AWAY FROM BELT CONVEYOR

**⚠DANGER** Contact with rotating conveyor belt or idler rollers will cause severe injury or death.

Keep hands, body, and objects clear of rotating conveyor.

Do not operate without covers and guards in place.

Lockout tagout power before servicing belt conveyor.



## AVOID TUNNEL WALL CONTACT

**⚠WARNING** Contacting tunnel wall and other pipeline obstructions can cause severe personal injury or death.

Keep all body parts on haul unit while unit is moving.

## WATCH FOR CONVEYOR

**⚠WARNING** Avoid contact with conveyor. Failure to do so could cause severe injury or death.

While moving haul unit into tunnel, avoid hitting the conveyor.

## KEEP JOB SITE CLEAN AND ORGANIZED

**⚠WARNING** Tripping can cause serious personal injury.

Be sure to keep job site clean and organized.

## SLIPPERY WHEN WET

**⚠WARNING** Slips and falls can cause serious personal injury.

Ensure firm footing in wet or slippery conditions.

Replace skid-resistant material if it is damaged or missing to prevent slips and falls.

Remove any buildup of grease, oil, or debris.

## FIRE PREVENTION

**⚠CAUTION** Fires can cause injury or property damage.

Keep equipment clean. Remove all debris from equipment.

Have a fire extinguisher available at all times. Keep the fire extinguisher fully charged.

## NO SMOKING IN SHAFT OR TUNNEL

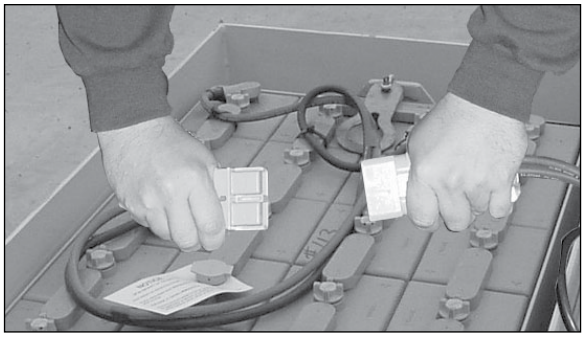
**⚠WARNING** Smoking in shaft or tunnel could cause an explosion if combustible gases are present.

Do not smoke in shaft or tunnel.

## LOCKOUT TAGOUT POWER BEFORE SERVICING HAUL UNIT

**⚠WARNING** Failure to lockout/tagout power before servicing can cause severe personal injury or death.

Disconnect battery harness from contactor harness and remove battery pack from haul unit to LOCKOUT/TAGOUT power before performing any maintenance.



## KEEP RIDERS OFF HAUL UNIT

Allow only operator on operating seat when moving haul unit. Keep riders off.

Riders on haul unit can be easily injured by being struck by objects or being thrown off of the equipment. Riders can also obstruct the operator's view resulting in the equipment being operated in an unsafe manner.

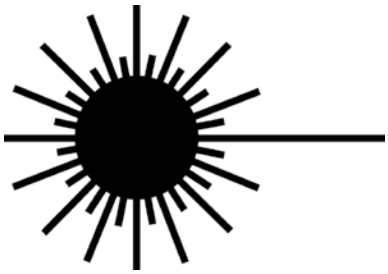
A rider may be allowed in an empty dirt bucket (with contractor approval only), to transport personnel from the tunnel opening to the boring head. If allowed, the rider MUST be fully inside dirt bucket, including head and all other body parts, to avoid contact with obstructions. Also, rider cannot obstruct the operator's view.

## AVOID LASER LIGHT EXPOSURE

**⚠DANGER** Staring into laser light will cause severe injury.

Do not stare into laser guidance system light beam. Avoid direct eye exposure.

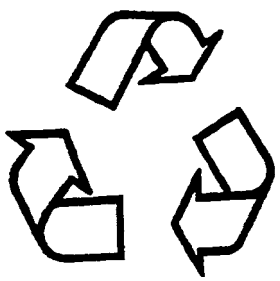
To avoid possible exposure to radiation in excess of acceptable emission limits, all repairs to laser must be performed by the original manufacturer or an authorized service technician.



## RECYCLE WASTE

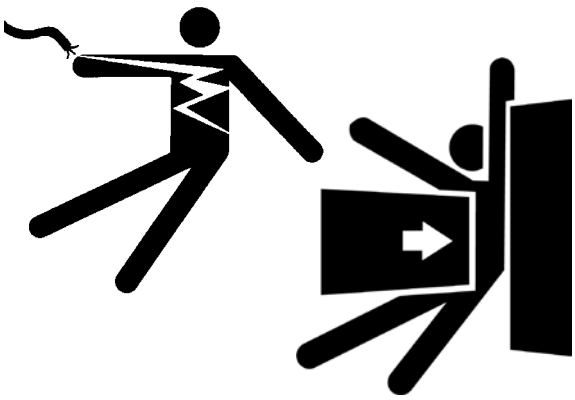
Follow local, state, federal, and international regulations when recycling or disposing of waste. Waste includes fluids/oil, fuel, filters, coolant, and batteries.

Use leakproof containers when draining fluids/oil. Do not pour waste on the ground, down a drain, or into any water source.



# LOCKOUT TAGOUT PROCEDURE GUIDELINE

***LOCKOUT TAGOUT power before attempting to make repairs, service or adjustments. Proper lockout tagout will prevent accidents and save lives.*** OSHA requires equipment placed in lockout tagout when the unexpected machine start up or release of stored energy could injure workers during cleaning, adjustments, repairing and servicing.



**⚠DANGER** Failure to lockout tagout power before adjustments, repairs or servicing WILL cause severe personal injury or death.

LOCKOUT TAGOUT power before adjustments, repairs or servicing. Electrical repairs must be performed only by a certified electrician.

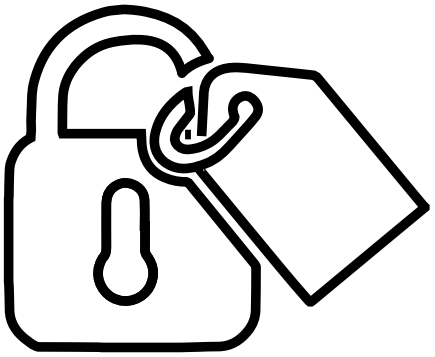
**The contractor is fully responsible for the safety of all personnel on the job site. Use the following as a guideline for a lockout/tagout procedure. The contractor must determine the best lockout tagout practices for their employees on the job site.**

1. Follow all Federal, State and Local safety regulations and procedures.
2. Be sure OSHA prescribed safety personal protective equipment is being worn by all personnel.
3. Be sure the area is safe for operation. Keep work site clean and organized.
4. Set all controls to the OFF or neutral position.
5. Push IN all E-Stop buttons.

6. There are two lockout/tagout options for the EX-50 Excavator and Controls:

   • Lockout/tagout the generator (or other external power source), refer to step 7 for details.

   • Lockout Tagout the EX-50 Main Power Control Box **AND** the 5200 Pump Unit Main Breaker (or other power support equipment) on the Main Power Panel - refer to step 8 for details.

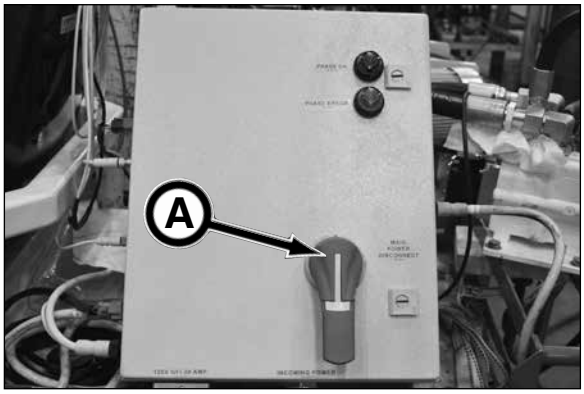


7. ***Lockout Tagout the Power Source Option***

   Lockout/tagout generator (or other external power source). Refer to the power source or generator manufacturer for proper lockout/tagout procedure.

*(continued on next page)*

8. **Lockout Tagout the EX-50 Main Power Control Box <u>AND</u> the 5200 Pump Unit Main Breaker (or other power support equipment) on the Main Power Panel Option**




***• EX-50 Main Power Control Box Lockout Tagout:***

Be sure the main power disconnect switch (A) on the EX-50 main power control box is in the OFF position. Flip safety latch out on main power disconnect switch and install shackle of OSHA approved lock (B) with tag through latch.

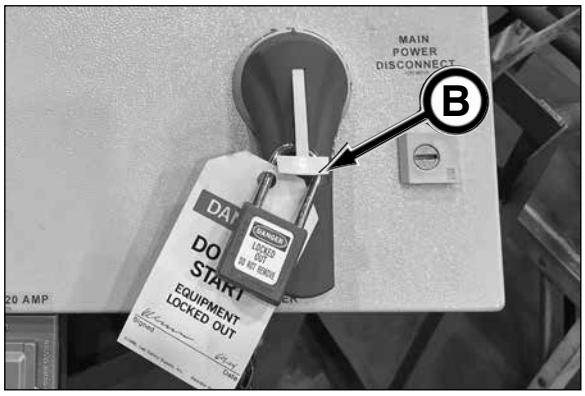
Secure lock by pushing shackle into body of the lock until the shackle is locked into the locking mechanism.

Turn key to lock shackle in place.

Remove key from lock.

Test to be sure shackle is fully secured into lock.

Sign “Equipment Locked Out” tag or equivalent.




***• 5200 Pump Unit Main Breaker Lockout Tagout:***

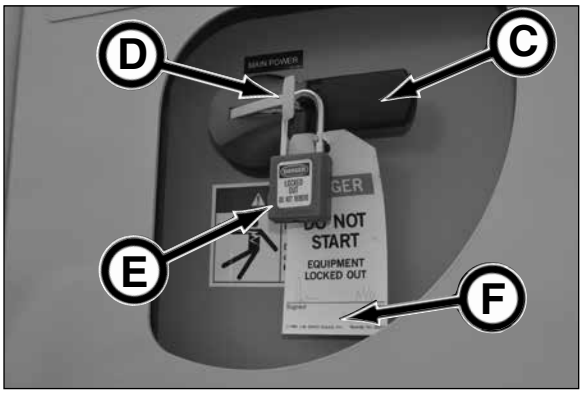
Be sure the main power breaker (C) on the main power electrical panel is in the OFF position. Flip safety latch (D) out on main power breaker and install shackle of OSHA approved lock (E) with tag (F) through latch.

Secure lock by pushing shackle into body of the lock until the shackle is locked into the locking mechanism. Turn key to lock shackle in place.

Remove key from lock.

Test to be sure shackle is fully secured into lock.

Sign “Equipment Locked Out” tag or equivalent.




**IMPORTANT:** By placing lockout/tagout at the Tunnel Power switch (G) on 5200 Pump Unit, ONLY the electrical power (tunnel) from the 5200 to the TBM is locked out. **The hydraulic power from the 5200 to the TBM is still energized and the electrical power on the 5200 is still live.**


***To lockout power to the 5200, the 5200 main power breaker MUST be in lockout/tagout. Refer to 5200 Pump Unit Main Breaker Lockout Tagout above.***

# NOTES

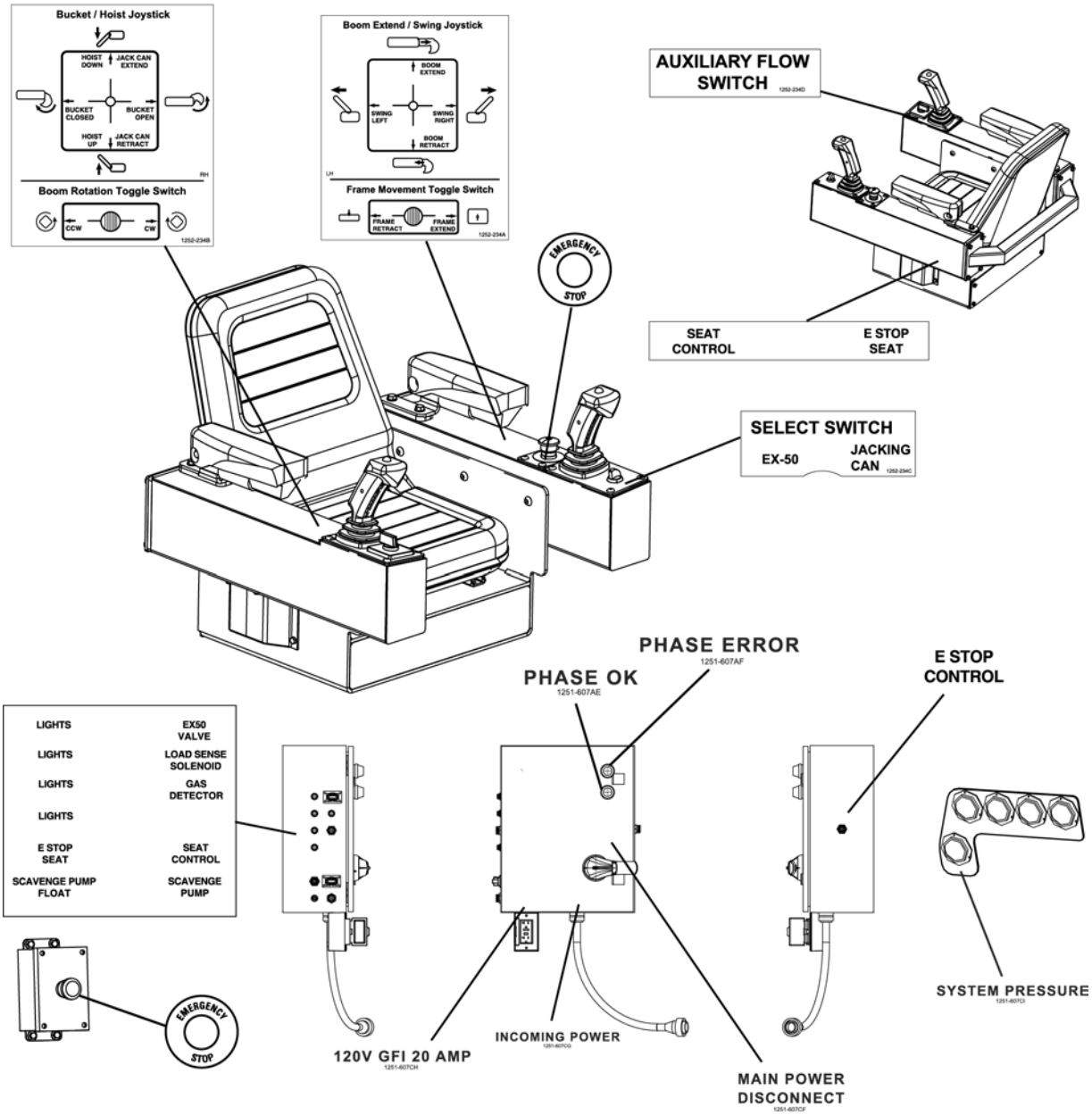
# Decals

Keep all decals clean and readable. Use soft cloth, water, and a mild soap to clean the decals if they are too dirty to read. DO NOT clean decals with solvent. Solvent can damage them. Replace safety decals immediately if they are damaged, missing, or hard to read.

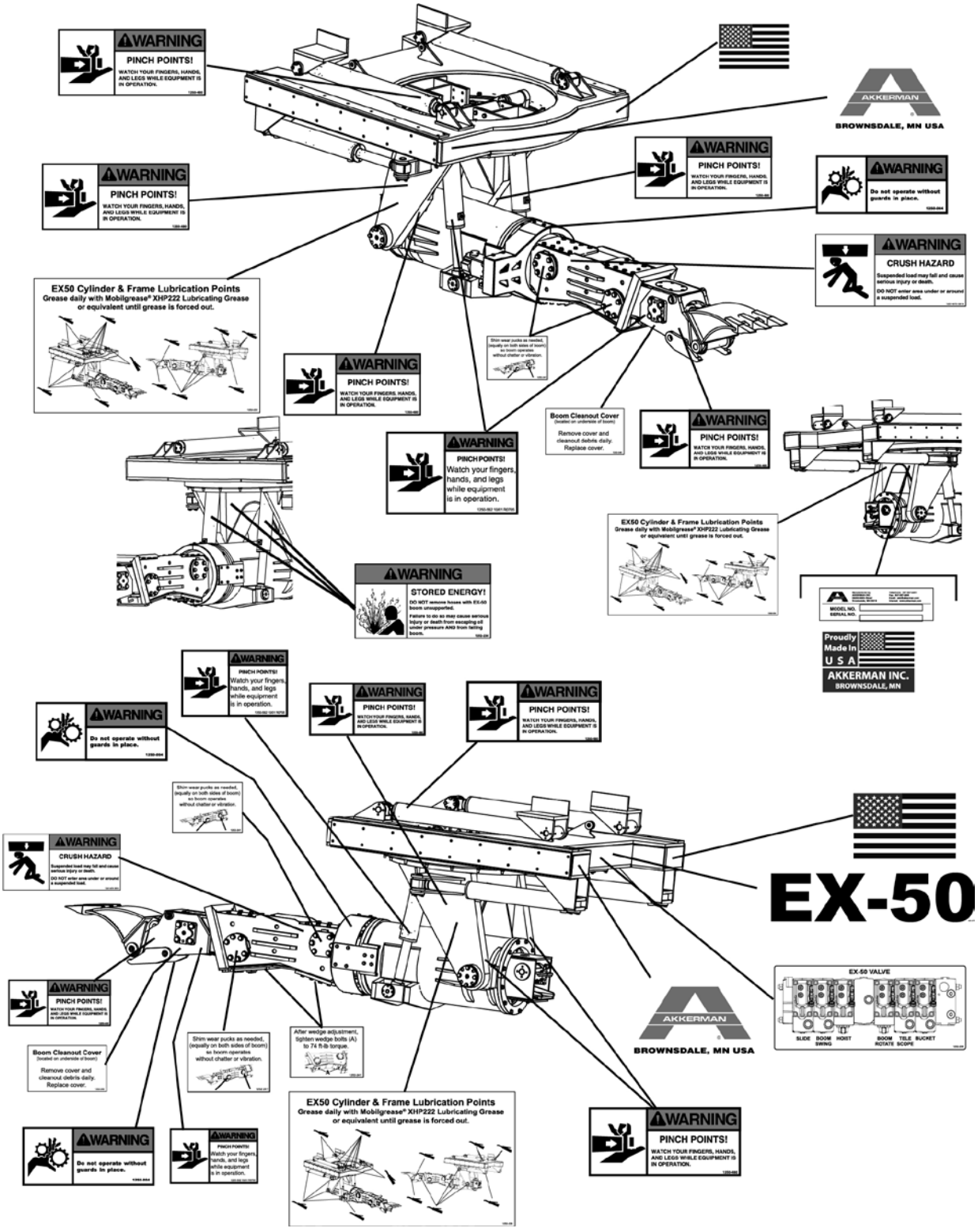
Serious injury or property damage can occur if safety instructions are not followed. Contact Akkerman Aftermarket Support for free replacement safety decals.

If a part is replaced that has a safety decal on it, apply a new safety decal to the replacement part. Before applying a new decal, be sure the surface is clean and dry.

## CONTROL CONSOLE & MAIN POWER CONTROL BOX

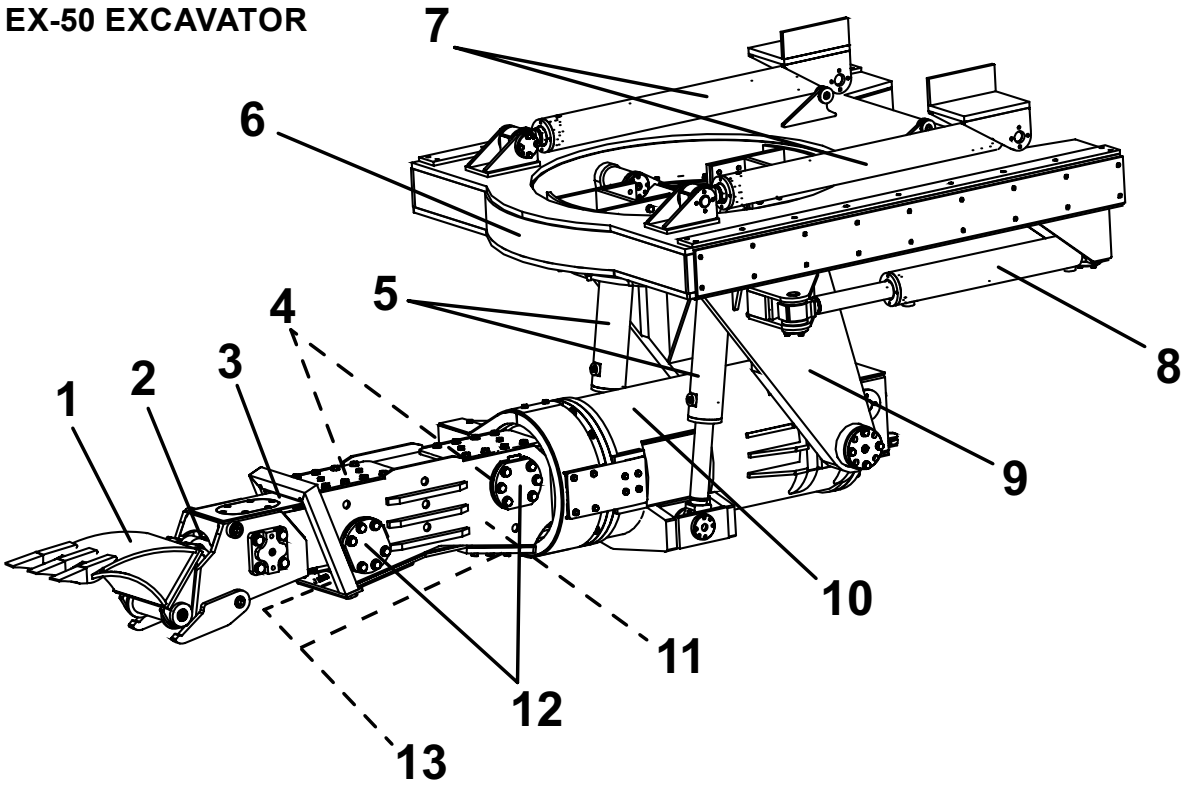


## EX-50 EXCAVATOR

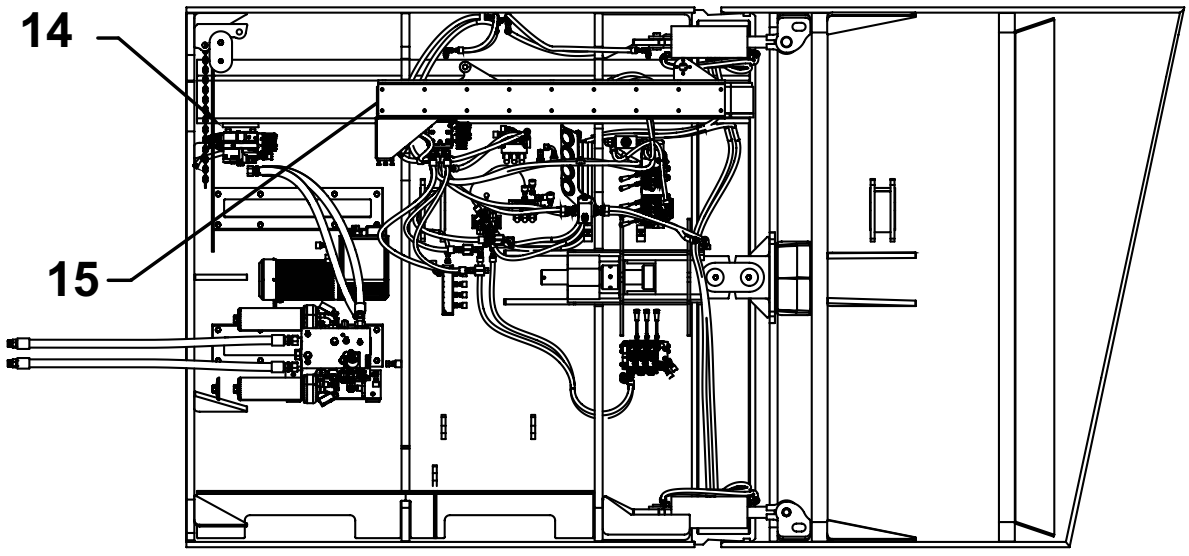


# Terminology

**EX-50 EXCAVATOR**

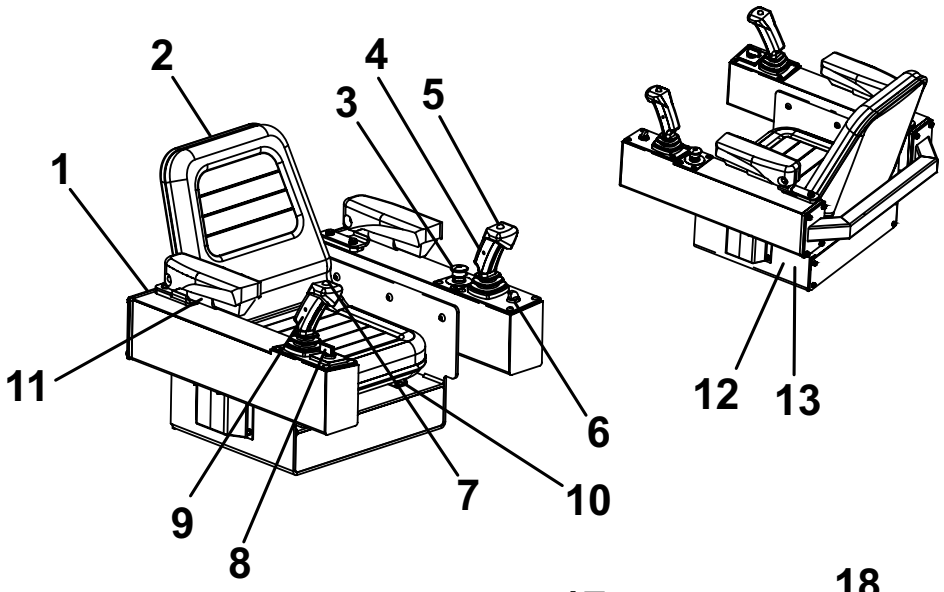


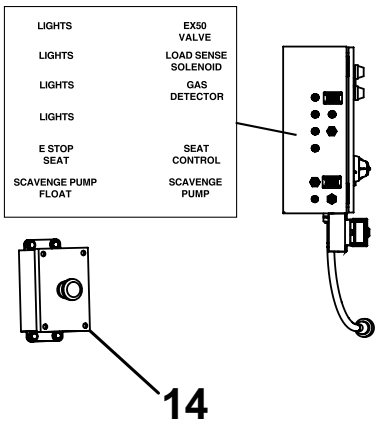

**HYDRAULIC VALVES**



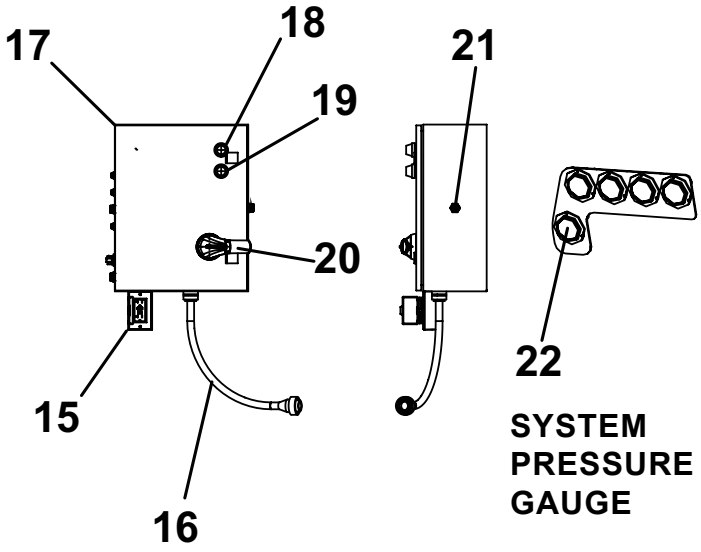

1. Bucket
2. Bucket Cylinder
3. Boom Extension
4. Wear Pads (2)
5. Boom Hoist Cylinder
6. Slide Frame Assembly
7. Frame Slide Cylinder
8. Boom Swing Cylinder
9. Hoist & Swing Frame Assembly
10. Boom Rotation Drive
11. Boom Extension Cylinder
12. Wear Pucks (4)
13. Wear Wedges (2)
14. Jacking & Auxiliary Valve
15. EX-50 Valve

## EX-50 CONTROL CONSOLE




**E-STOP CONTROL BOX ASSEMBLY**




**EX-50 MAIN POWER CONTROL BOX**

**SYSTEM PRESSURE GAUGE**

1. EX-50 Control Console
2. Operator's Seat
3. E-Stop
4. Boom Extend / Swing Joystick
5. Frame Movement Toggle Switch
6. Select Switch (EX-50/Jacking Can)
7. Boom Rotation Toggle Switch
8. Auxiliary Flow Switch
9. Bucket / Hoist Joystick
10. Seat Assembly Adjuster Lever
11. Arm Rest Adjuster
12. Seat Control
13. E-Stop Seat Cable Connection
14. E-Stop Control Box Assembly (Remote E-Stop)
15. 120V GFI 20 AMP
16. Incoming Power
17. EX-50 Main Power Control Box
18. Phase OK Indicator
19. Phase Error Indicator
20. Main Power Disconnect
21. E-Stop Control Cable Connection (Remote E-Stop)
22. System Pressure Gauge

# Controls & Instruments

## EMERGENCY STOP

**⚠WARNING** ALL Emergency Stop (E-Stop) buttons MUST be tested and operating properly BEFORE operating EX-50 Excavator. Failure to do so may cause severe injury or death.

***E-Stop on EX-50 Control Console***
Push EX-50 Excavator Control Console E-Stop button (A) IN to stop all electrical and hydraulic functions on the EX-50 Excavator.

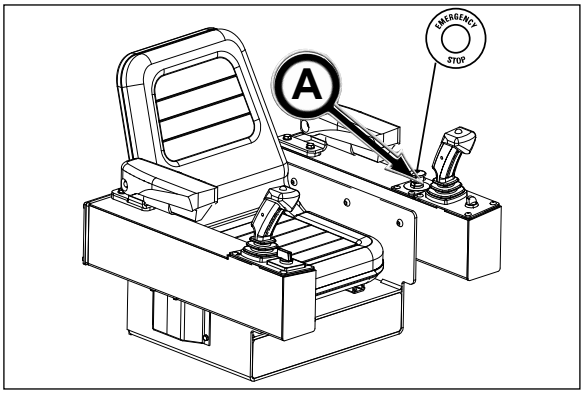
***E-Stop on E-Stop Control Box Assembly***
Push E-Stop Control Box Assembly E-Stop button (B) IN to stop all electrical and hydraulic functions on the EX-50 Excavator.

The E-Stop button will illuminate when it is pulled OUT.

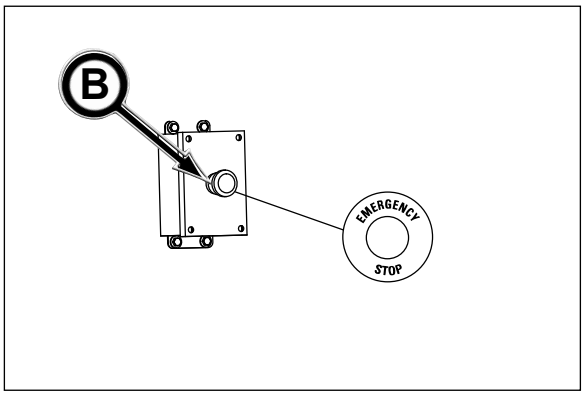
**NOTICE** All E-Stop buttons [EX-50 Control Console (A) and E-Stop Control Box Assembly (B)] MUST be pulled out to restart operation.

**NOTICE** The E-Stop Control Box Assembly must be connected to the E-Stop connection (C) on the EX-50 Main Power Control Box. Failure to do so will prevent the electrical and hydraulic systems from functioning.

**NOTICE** Activating all E-Stop buttons will also extinguish lights powered from the EX-50 Main Power Control Box.



*E-Stop on EX-50 Control Console*



*E-Stop Control Box Assembly*

# POWER PHASE INDICATORS

**⚠DANGER** Hazardous voltage. Disconnect and lockout/tagout power from source before servicing.

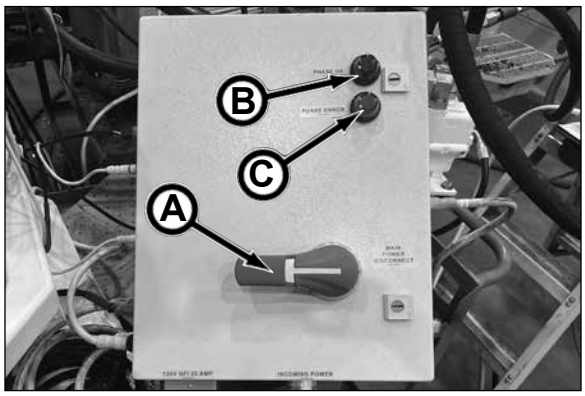
**⚠DANGER** If high voltage cables or cable connections are damaged, contact with cables/ connections may result in electrical shock causing severe injury or death. Disconnect and lockout/tagout power from source before servicing.

**⚠WARNING** Any electrical work performed on the EX-50 Main Power Control Box must be performed by a certified electrician.

The input power on the EX-50 Excavator Main Power Control Box is monitored for proper three-phase electrical power. Therefore, the green Phase OK light **MUST** be illuminated before operating equipment.

**IMPORTANT: DO NOT start up electric components if the green phase indicator light is not illuminated. Doing so will run components backwards causing damage.**

Once the generator (or other external power source) is powered ON and power is connected to the 5200 Pump Unit (or other power support equipment) and turned ON, and connected to the EX-50 Main Power Control Box by tunnel power line, flip the main disconnect switch (A) to the ON position.




If the green Phase OK indicator light (B) on the EX-50 Main Power Control Box is illuminated, this indicates that the external power source phase power is installed correctly and the system is available for use.

If the red Phase Error indicator light (C) is illuminated, flip the main disconnect switch to the OFF position, and lockout/tagout ALL power before attempting to reverse two of the generator power leads on the power circuit.

A - Main Power Disconnect
B - Phase Indicator (Green) (Phase OK)
C - Phase Indicator (Red) (Phase Error)

## MAIN POWER DISCONNECT SWITCH

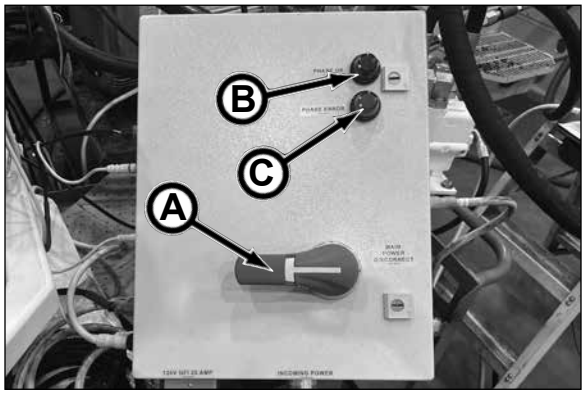
**⚠DANGER** Hazardous voltage. Disconnect and lockout/tagout power from source before servicing.

**⚠DANGER** If high voltage cables or cable connections are damaged, contact with cables/ connections will result in electrical shock causing severe injury or death. Disconnect and lockout/tagout power from source before servicing.

**⚠WARNING** Any electrical work performed on the electrical components must be completed by a certified electrician.

**NOTICE** All Emergency Stop buttons must be pulled out to restart operations.

With the generator (or other external power source) powered ON, connected to the 5200 Pump Unit (or other power support equipment) and turned ON, connected by tunnel power line to the EX-50 Main Power Control Box, flip the main disconnect switch (A) to the ON position.




Check to see that the green Phase OK indicator light (B) is illuminated. This indicates that the external power source phase power is installed correctly and the system is available for use.

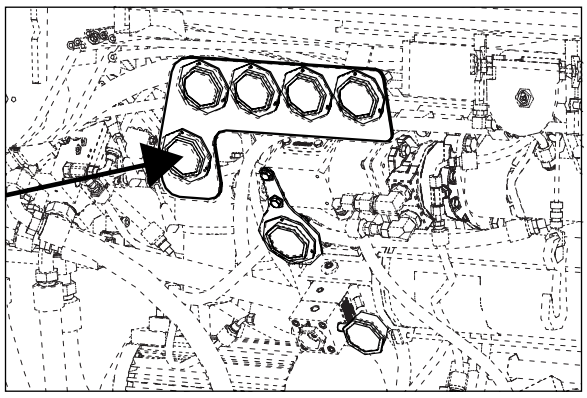
DO NOT flip the main disconnect ON if the red Phase Error light (C) is illuminated. The red light indicates that the generator phase power is installed incorrectly. Disconnect and lockout/tagout ALL power before attempting to reverse the two generator power leads.

A - Main Power Disconnect
B - Phase Indicator (Green) (Phase OK)
C - Phase Indicator (Red) (Phase Error)

## SYSTEM PRESSURE GAUGE

The EX-50 Excavator is equipped with a system pressure gauge to monitor the EX-50 Excavator system pressure pump.

This system is capable of 3,000 psi.



# OPERATOR CONTROL CONSOLE CONTROLS

The EX-50 Excavator is controlled by joysticks and switch controls to remove soil and obstacles at the face of the bore between the boring shield shelves with the boom bucket.

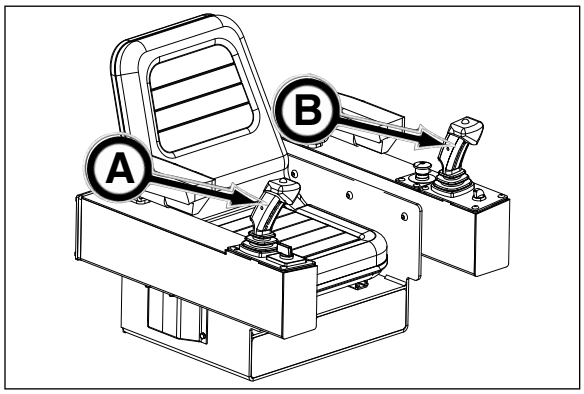
EX-50 Excavator joystick controls:

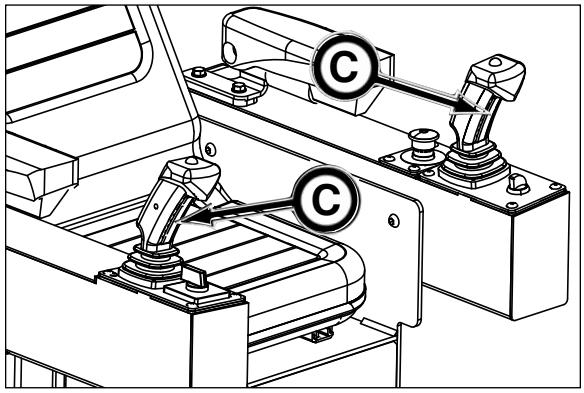
**Left-Hand Joystick (A)**
Boom Extend / Swing Joystick
Frame Movement Toggle Switch

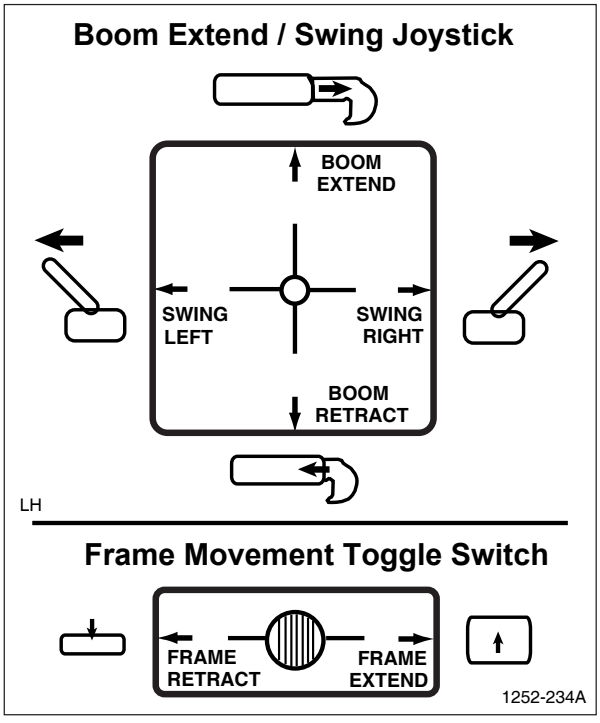
**Right-Hand Joystick (B)**
Bucket / Hoist Joystick
Boom Rotation Toggle Switch

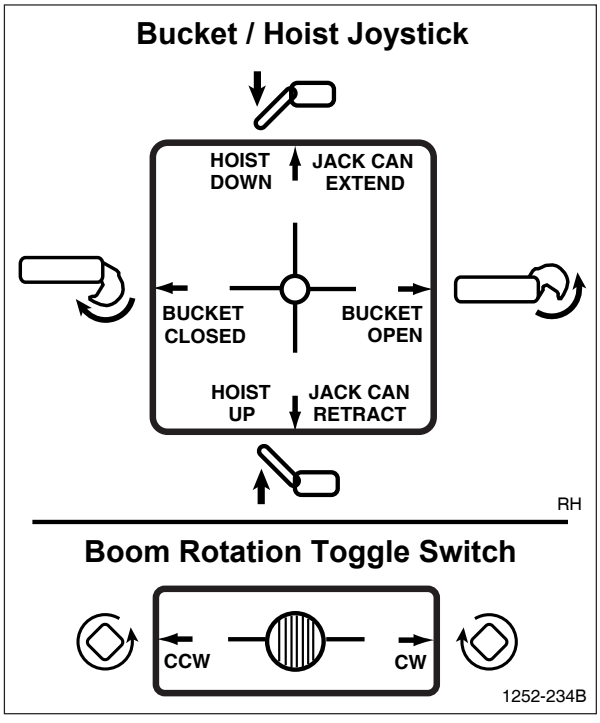
The Operator Control Console joysticks feature operator presense switches. To engage the joystick controls, simultaneously squeeze the operator presense switch lever (C) and move the controls as shown in the diagram below.

The joystick controls are spring, centered, variable control and will return to the neutral position when released.



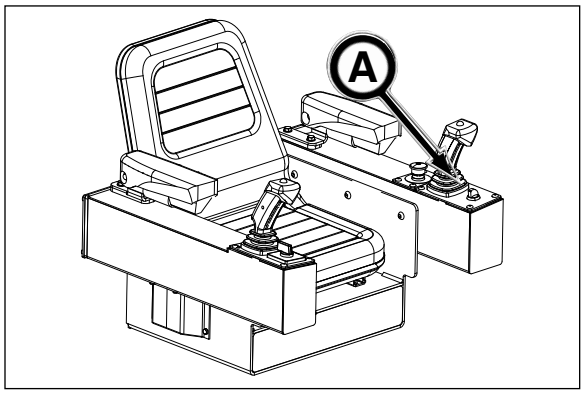

* The Select Switch allows the operator to choose either the EX-50 or Jacking Can operation controls.

## SELECT SWITCH

The Select Switch allows the operator to choose either the EX-50 or Jacking Can operation controls (A).

When the Select Switch is turned to EX-50 (left), the operator can control the EX-50 or auxiliary tooling (using the Auxiliary Flow Switch).

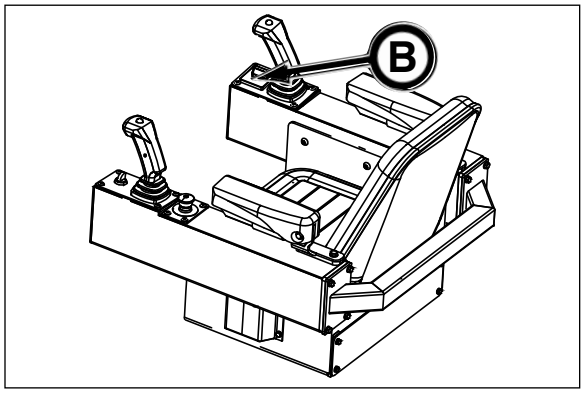
When the Select Switch is turned to Jacking Can (right), the operator can push the right-hand joystick forward (while simultaneously squeezing the operator presense switch lever) in Jack Can Extend mode to hydraulically advance the jacking can cylinders, or pull the right hand-joystick backwards (while simultaneously squeezing the operator presense switch lever) in Jack Can Retract mode to hydraulically retract the jacking can cylinders.




## AUXILIARY FLOW SWITCH

The Auxiliary Flow Switch (B) allows the operator to control the flow rate/speed using numerical sections of customer supplied and connected auxiliary tooling.

**NOTICE** If using rotary tool/powered accessory and the auxiliary flow switch, be sure the operator's shield is installed. Contact Akkerman Aftermarket Support for more information.



# NOTES

# Pre-Start Inspection

**⚠WARNING** Do not operate this equipment until you read, study, and understand this manual and any other equipment manuals that may be used. A daily inspection of the equipment must be performed to prevent severe personal injury or death and equipment damage.

**The contractor is fully responsible for the safety of all personnel on the job site.** Check with the contractor that all site preparation requirements are in place. Be sure to comply with all OSHA regulations, such as: an active safety program is in practice, a confined space permit (if needed) is issued, personal protective equipment is being worn, monitoring of combustible and toxic gases including the depletion of oxygen; flammable, combustible, and hazardous materials are properly stored; and a lockout/tagout procedure is in place (for more information, refer to Safety, section one, Lockout Tagout Procedure Guideline).

Use the following checklist ✓ as a guide for your daily pre-start inspection. Make a copy of this Pre-Start Inspection checklist. Once it is complete, check off, initial and date each item and file the copy as a record of maintenance.

| | |
|---|---|
| | 1. Use “ONE-CALL” notification to check for buried utility lines prior to tunneling. |
| | 2. Check the excavated launch and reception shafts for proper shoring or bracing to prevent slides or cave-ins. |
| | 3. Thoroughly clean equipment of mud and dirt. |
| | 4. Check condition of personal protective equipment. Replace equipment if defective. |
| | 5. Contractor is responsible for all personnel to wear proper protective equipment on the job site. |
| | 6. Remove combustible or flammable materials from equipment. Store materials properly. |
| | 7. Test ALL Emergency Stop (E-Stop) buttons for proper operation at the start of each shift. |
| | 8. Test air monitoring and ventilation detectors for proper operation. Tunnel must be ventilated with fresh air. |
| | 9. Thoroughly inspect all equipment for damage. Repair or replace before operating. |
| | 10. Be sure all covers and guards are in place before operation. |
| | 11. Check for loose or missing hardware. Replace damaged or missing hardware. |
| | 12. Check for worn, loose, or damaged wire connections. Repair or replace wiring. |
| | 13. Tighten loose clamps or fittings. |
| | 14. Check electrical cables for frayed or worn insulation or wiring. Replace damaged or worn harnesses. |
| | 15. Check for fluid leaks. Repair leak or replace components. |
| | 16. Keep job site clean and organized. |
| | 17. Perform all lubrication and maintenance procedures. Refer to Section 9, Periodic Maintenance. |
| | 18. Test each function and control to ensure correct operation. |
| | 19. Check hydraulic hoses and lines for leaks, wear and/or damage. Replace any defective hoses and/or lines. |
| | 20. Be sure the green Phase OK Indicator light is illuminated before starting electrical components. |
| | 21. Check cable for continuity and shorting before each use. Constantly check cables for damage. |
| | 22. Perform pre-start inspection on your equipment. Refer to the equipment operator’s manual. |
| | 23. Decals must be clean and legible. |

# NOTES

# Operation

## OPERATING GUIDELINES

**⚠WARNING** Do not operate this equipment until you read, study, and understand this manual and all other support equipment operation manuals. Failure to do so, could result in severe personal injury or death.

1. Before operating, read and understand the Safety, Pre-Start Inspection, Operation and Maintenance sections.

2. Do not operate this equipment while under the influence of alcohol, drugs, or medication.

3. Follow all Federal, State, and Local safety regulations and procedures.

4. Be sure OSHA prescribed safety protective equipment is being worn by all personnel.

5. Be sure the area is safe for operation. Keep work site clean and orderly.

6. NEVER operate equipment if it has been engulfed with water. Contact your Akkerman Aftermarket Support Representative for proper procedures on how to restore equipment for operation.

7. Have fully charged fire extinguishers on the job site at all times.

8. Be sure the excavated launch and reception shafts are properly shored or braced to prevent slides or cave-ins.

9. Before operation, determine whether the job site has confined spaces. Follow OSHA regulations for proper training required for employees working in and around confined spaces.

10. A fully trained and qualified signal person must direct the crane operator when lifting and lowering equipment into the launch or reception shafts.

11. Never walk or work under any part of the crane and suspended loads.

12. Fresh air must be supplied to all underground work areas in sufficient amounts to prevent any dangerous or harmful accumulation of dusts, fumes, mists, vapor, or gases.

13. Before operating, thoroughly inspect all equipment and repair equipment problems. Check hoses for cuts or bulges. Replace worn or damaged hoses.

14. Before starting equipment, walk completely around all machines and equipment. Let all job site personnel know that you are starting up the equipment. Do not start until all unauthorized personnel are clear of the equipment.

15. Test air monitoring and ventilation detectors for proper operation. Never enter a tunnel without combustible gas detectors and oxygen deficiency detectors.

16. Test all Emergency Stop circuits for proper operation at the start of each shift.

17. Test each control function to make sure they work properly.

18. High pressure hydraulics are used in this EX-50 Excavator. Be sure all covers and guards are in place before operating.

19. Do not make any non-authorized modifications to any Akkerman products. Doing so could cause structural failure and will void the warranty.

*(continued on next page)*

***Operating Guidelines (continued)***

20. Check shields and guards. All must be in place and undamaged.

21. Never leave the EX-50 operator's control console without first releasing hydraulic pressure pressing E-Stop, performing daily system shutdown, and disconnecting the main power supply.

22. Conveyors MUST be secured with four safety chains to conveyor brackets in boring shield.

23. Before operating conveyor, all guards and/or safety devices must be in place and operable to prevent any contact with conveyor.

24. Conveyors must not be started until all personnel have been moved away from the conveyors and have been warned that the conveyors are about to start up.

25. The area around conveyor loading and unloading points must be kept clear of obstructions during conveyor operation.

26. Conveyors must be stopped and the power source in lock out, tagout during maintenance, repair, servicing or attempting to remove a jam or overload.

27. While excavator boring shield and conveyors are operating, the operator must remain seated in normal operating position.

28. **The EX-50 Excavator is designed to move spoils in the tunnel to the conveyor. DO NOT use EX-50 Excavator to aid in moving tunneling equipment or other site preparation equipment or parts. Doing so will result in EX-50 Excavator damage.**

29. When operating the EX-50 Excavator, operate slowly and carefully so the excavator does not hit the operator.

30. In hard ground, use the EX-50 Excavator to scrape the soil around the perimeter of the cutting area so the center spoils will drop to the conveyor.

31. In sand soils, the EX-50 excavator is used more for clean up and guiding spoils to the conveyor.

32. The operator must note and report any slow down of machine operating time that might be an early warning of future problems.

33. When installing ring beam and lagging sections, complete sections must be installed to provide proper thrusting of unit. Failure to do so WILL cause jacking/liner can component damage.

34. Do not make adjustments or repairs to any of the system components while in operation or until all pressure is released and electrical power is in lockout/tagout.

35. Check line and grade often to avoid misalignment. Keep excavator boring shield well ventilated to achieve a consistent temperature throughout the pipeline since changes in temperature inside the pipe can cause laser beam to stray off target.

36. After start-up, observe all gauges, controls and warning devices to assure they are functioning properly and their readings are within the operating range.

37. Before performing maintenance, follow the lockout/tagout procedure guideline in one, Safety.

38. Before servicing electrical components, follow the lockout/tagout procedure guideline in section one, Safety.

39. If this manual becomes lost, contact your Akkerman Aftermarket Support representative for a new manual.

# USING EMERGENCY STOP

**⚠WARNING** ALL Emergency Stop (E-Stop) buttons MUST be tested and operating properly BEFORE operating EX-50 Excavator. Failure to do so may cause severe injury or death.

***E-Stop on EX-50 Control Console***
Push EX-50 Excavator Control Console E-Stop button (A) IN to stop all electrical and hydraulic functions on the EX-50 Excavator.

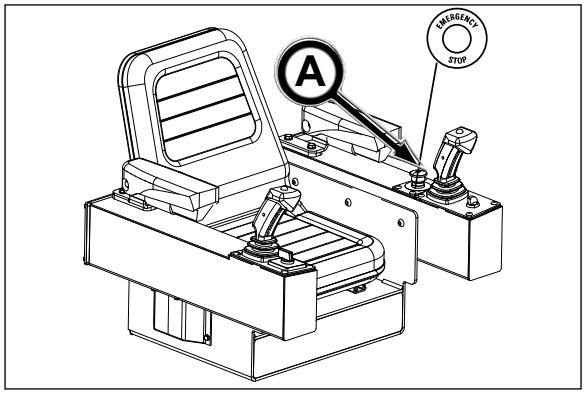
***E-Stop Control Box Assembly***
Push E-Stop Control Box Assembly E-Stop button (B) IN to stop all electrical and hydraulic functions on the auxiliary functions.

The E-Stop button will illuminate when it is pulled OUT.

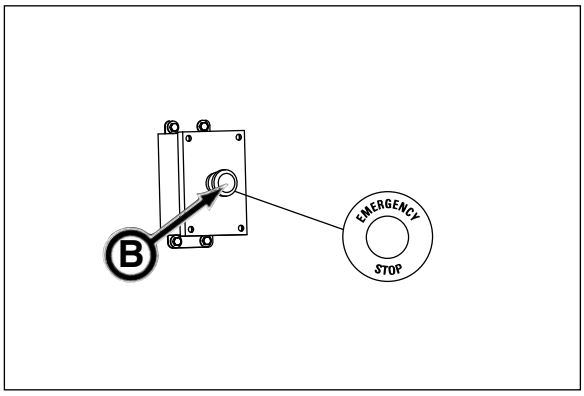
**NOTICE** All E-Stop buttons [EX-50 Control Console (A), E-Stop Control Box Assembly (B)] MUST be pulled out to restart operation.

**NOTICE** The E-Stop Control Box Assembly must be connected to the E-Stop connection (C) on the EX-50 Main Power Control Box. Failure to do so will prevent the electrical and hydraulic systems from functioning.

**NOTICE** Activating all E-Stop buttons will also extinguish lights powered from the EX-50 main control box.



*E-Stop on EX-50 Control Console*



*E-Stop on E-Stop Control Box Assembly*

## SITE PLANNING

It is important to carefully review the site and make sure that it is arranged in the most effective manner possible. Here is a list of equipment and site considerations that are typically needed for a EBS project.

*Equipment:*

- EBS
- Power Pack (if not On-Board)
- Skid and Jacking Frame
- Yoke (if needed)
- Crane
- Portable Welders
- Small Generator
- Fork Lift
- Pipe Lubrication Pump
- Spoil Removal Truck
- Portable Toilet
- Generator Or Power Source

*Other site considerations:*

- Spoil Removal Truck Access
- Launch Shaft Size
- Walkways
- Pipe Unloading area
- Hose Interconnections
- Pipe Staging Area
- Fresh Water Supply
- Electrical Interconnections
- Jacking Shaft Access Area
- Any Traffic or Other Physical Restraints

## SYSTEM SETUP

This is a general overview of a system setup. The operation and installation details are determined by the owner and contractor of the project.

1. The contractor is fully responsible for the design and construction of the OSHA required launch and reception shafts. For setup and installation drawings specific to the project, pipe size and shoring type, contact the Akkerman Sales Department.

**⚠WARNING** Gases may be present during excavation and could cause severe personal injury or death. Use an approved air analyzer to detect hazardous gases on the job site and in the tunnel at all times.

2. After the soil analysis, shaft layout design, and survey are complete, excavate the launch and reception shafts. Be sure the shafts will be well drained and use proper shoring or bracing in accordance with your local, state, and federal regulations.

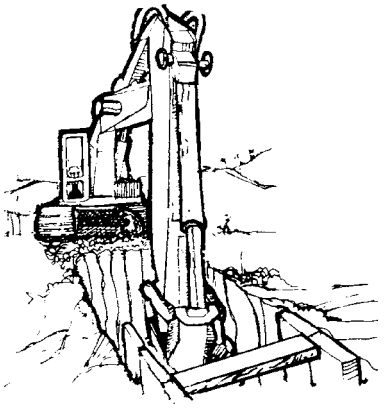
3. Construct a shaft floor with a solid base suitable for the weight of the tunneling equipment. Consult your civil and structural engineers for your shaft floor requirements.

4. Place steel plates on the launch shaft floor for supporting the base of all tunneling equipment components.

5. Construct a concrete thrust block designed to withstand the applied load. A structural engineer must be consulted on the design of this block. This block must be square with the line of the tunnel axis and skid/rail assembly.

**NOTICE** If using a jacking frame, space must be provided for the mounting of the laser behind the jacking frame.

*(continued on next page)*



*AEM is the original author and publisher of the above illustration*

**⚠WARNING** Suspended loads may fall and cause severe injury or death. Do not allow anyone to enter area under or around a suspended load.

**NOTICE** Be sure the crane and all lifting equipment is rated to lift load. Remember, you may be able to lift the load in close at ground level, but as the load radius and elevation change, the lifting capacity of the crane or excavator or other lifting equipment decreases.

6. Lower skid or rail system into launch shaft place against the thrust block. Adjust skid or rail system to line and grade. Be sure there is at least 6 inches between the front of the jacking rails and where the launch seal will be located.
7. Check to be sure skid/rail system is making full contact against thrust block structure.
8. Lower jacking system (if used) onto skid/rail system and be sure the frame is properly centered on rails.
9. (External Power Pack if used) Lower power pack on a level, solid foundation an appropriate distance from the edge of the shaft to prevent shaft cave-in.
10. Place the generator (or other external power source) as far away from the launch shaft as possible. This will reduce the noise to the operator and make it easier to communicate with the launch and reception shaft personnel.
11. Lower the stand for the laser guidance system as close to the rear of the jacking shaft as possible without contacting skid/rail system, jacking system (if used), or thrust block. Be sure the guidance system will not be affected by thrust applied to jacking system.

**NOTICE** For proper guidance system installation, refer to your laser manufacturer's installation requirements. Be sure laser beam has a clear path to target.

12. Install the launch shaft seal and casing in the front of the launch shaft, if required.
13. Lower excavator boring shield (with conveyor installed, if used) onto the front of the skid/rail system.
14. Lower jacking/liner can (with conveyor installed if used) onto rails. Align jacking/liner can to boring shield four alignment pins. Secure boring shield with proper hardware. The jacking/liner can holes are threaded.
15. Recheck the skid/rail system base frame and alignment. Check machine elevation and make final tunnel calculations.
16. Lower support ring between the excavator boring shield and the thrust block/support structure. This support ring provides a thrust support against the complete diameter of the liner plate ring. It is also used to load/unload the dirt bucket.
17. Set up the excavator boring shield to jacking/liner can hydraulic hoses and electrical connections.

**⚠WARNING** Any electrical work performed on the electrical components must be completed by a certified electrician.

18. Connect generator/power source electric cables to the 5200 pump unit (or other power support equipment), then connect the tunnel power line from the 5200 pump unit to the EX-50 main power control box in the excavator boring shield (refer to Connecting Power Pack Electrical Connections on next page).

**NOTICE** If using rotary tool/powered accessory and the auxiliary flow switch, be sure the operator's shield is installed. Contact Akkerman Aftermarket Support for more information.

19. Ensure the excavator boring shield alignment and grade are steered parallel to the rail system base.
20. Be sure the conveyors are properly installed and secured to the lifting cables (four per conveyor). Adjust the conveyor as needed into the operating position.
21. A proper ventilation system must be installed throughout the tunnel. Fresh air must be supplied to all underground work areas in sufficient amounts to prevent any dangerous or harmful accumulation of dusts, fumes, mists, vapor, or gases.

# CONNECTING ELECTRICAL CONNECTIONS

**⚠DANGER** Hazardous voltage.
This system is powered by high voltage electricity.

Failure to lockout/tagout power before connecting power leads will cause severe personal injury or death.

Lockout/tagout main power supply before connecting power leads or servicing. ONLY a qualified and trained technician can operate this equipment. Electrical connections or repairs must be performed only by a certified electrician.

***MAIN POWER FROM GENERATOR***

1. With properly grounded generator (or other external power source), connect generator power cable to the 5200 pump unit (or other power support equipment), then connect tunnel power line to the EX-50 Main Power Control Box.

   ***5200 Recommended Power Requirements***
   • Recommended Operating Power:
   ..... 275kW / 340kVA @ 480VAC

   • Generator Minimum Motor Starting kVA (skVA):
   ..... 385skVA with less than 35% instantaneous voltage dip and greater than 90% sustained voltage

2. Proceed to Setting Up Pump Unit & EX-50 Supply/Return Hydraulics in this section.

# SETTING UP PUMP UNIT & EX-50 SUPPLY/RETURN HYDRAULICS

There are two hydraulic supply/return options available for setting up the 5200 Pump Unit with the EX-50; single and dual feed supply lines. Single feed supplies 60 gpm of low-pressure oil to the EX-50, steering, and conveyor. Dual feed supplies up to an additional 60 gpm of low-pressure oil (for a total of 120 gpm) using the Boring Head 2 motor. Typically, the Boring Head 1 supply will run the EX-50 and steering. Boring Head 2 supply primarily powers the conveyor, though it can power the conveyor and provide additional power to the EX-50.

**⚠WARNING** Escaping oil or other fluids under pressure can penetrate your skin causing serious injury. Contact medical help immediately if any oil or fluid is injected into your skin. Before hooking up the supply hoses to the pump unit ALWAYS use gloves before connecting or disconnecting hydraulic oil hoses/lines.

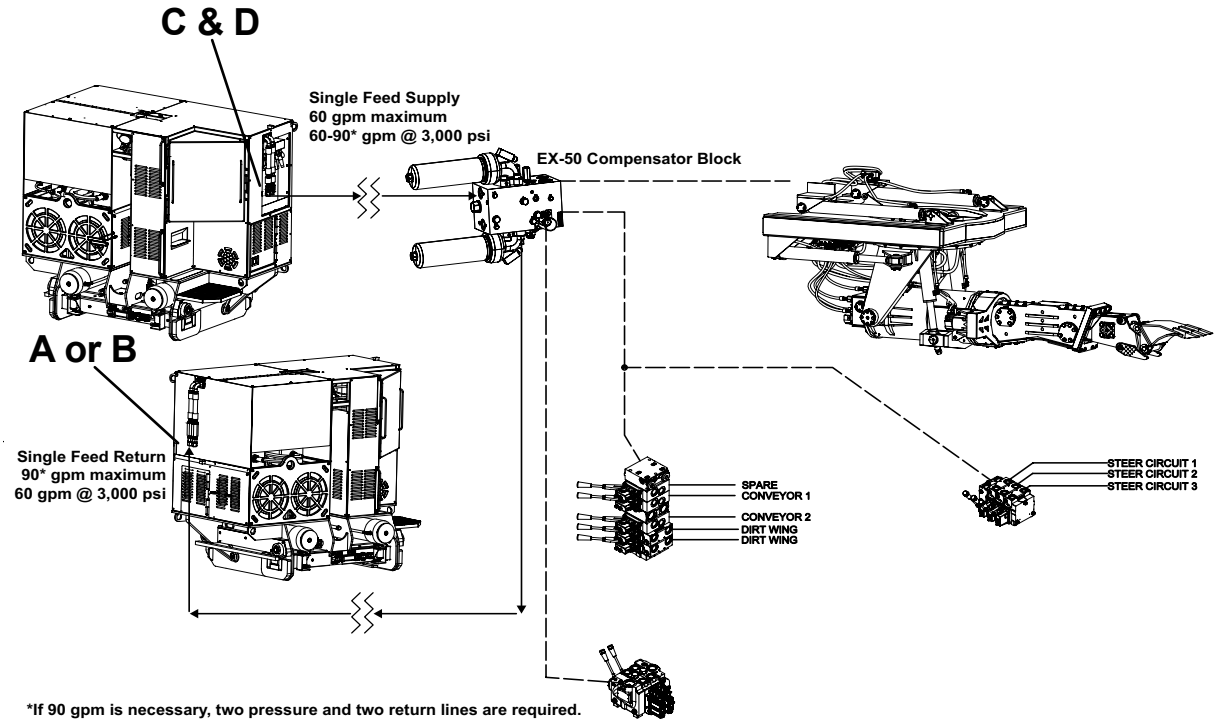
**IMPORTANT:** If switching from single feed to dual feed during drive, BEFORE connecting/disconnecting hoses, the boring head motors must be shut off.

**Single Feed Hydraulics (60 GPM Minimum)**

1. Connect return line quick coupler hose (A or B) to the EX-50 return line quick coupler. Cap other return line quick coupler hose. The pump unit return lines are common, thus either return line hose can be used.

2. Connect Boring Head 1 supply quick coupler hose (C) to the EX-50 supply quick coupler hose. Cap 5200 Pump Unit Boring Head 2 supply quick coupler hose (D) for single feed option.

**NOTICE** Boring Head 2 motor system can be used in place of the Boring Head 1 system. The Boring Head 1 and 2 motor systems are identical 100 HP hydraulic systems. It is critical to use the system that is connected to the TBM pressure and return lines.

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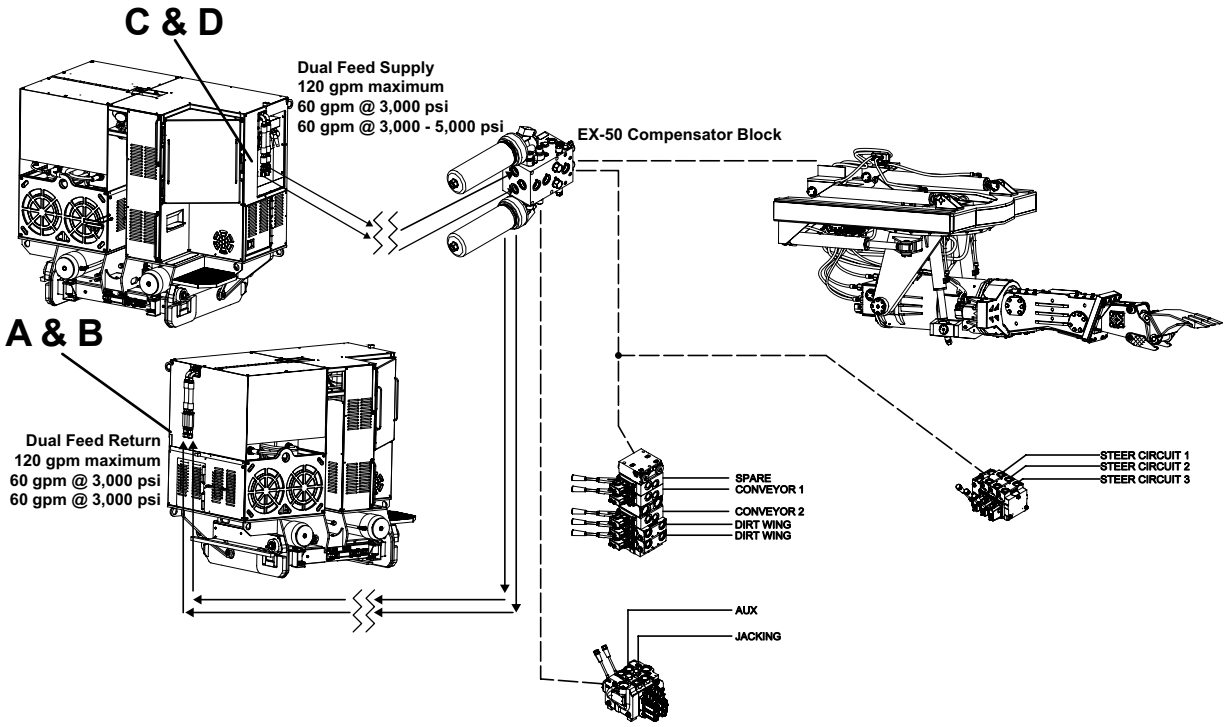
***Setting Up Pump Unit & EX-50 Supply/Return Hydraulics (continued)***

**Dual Feed Hydraulics (120 GPM Maximum)**

1. Connect return line quick coupler hoses (A and B) to the EX-50 return line quick coupler hoses.

2. Connect Boring Head 1 supply quick coupler hose (C) to the EX-50 supply quick coupler hose.

3. Connect Boring Head 2 supply quick coupler hose (D) to the other EX-50 supply quick coupler hose.



## POWER START-UP PROCEDURE

Once proper connection of the generator (or other external power source), to the 5200 Pump Unit (or other power support equipment), to the EX-50 Main Power Control Box, the power can be started as follows:

1. With E-Stop buttons pulled out, power on generator (or other external power source), and 5200 Pump Unit (or other power support equipment), and connect tunnel power line to the EX-50 Main Power Control Box.

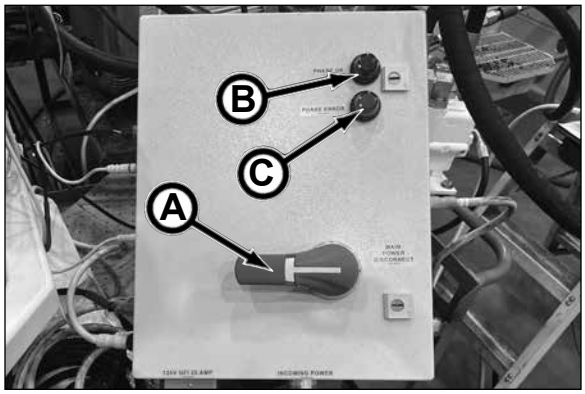
2. Flip the main power disconnect switch (A) to the ON position.

   If the green Phase OK indicator light (B) on the EX-50 Main Power Control Box is illuminated, this indicates that the external power source phase power is installed correctly and the system EX-50 Main Power Control Box can be turned on.

   If the red Phase Error indicator light (C) is illuminated, the external power source is installed incorrectly. Lockout/tagout all power before disconnecting tunnel power line.

   Have a certified electrician reverse the two generator electrical phase conductors on the power circuit and recheck phase power.

   **IMPORTANT: DO NOT start up electric components if the green phase indicator light is not illuminated. Doing so will run components backwards causing damage.**




4. Proceed to Checkout Equipment Prior to Start-Up.

## CHECKOUT EQUIPMENT PRIOR TO START-UP

1. Grease components as shown in Maintenance section.

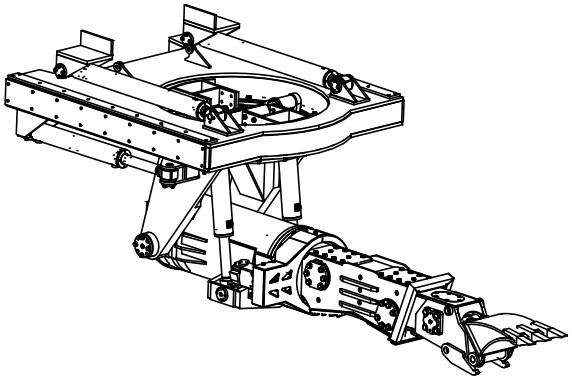
2. Inspect conveyor lift cables daily and replace immediately at the first sign of wear.

3. Inspect all hoses and electrical lines for damage. Replace before operating.

4. Be sure all hydraulic hoses and electrical lines are properly installed.

5. Refer to all support equipment operation manuals for pre-start checks.

6. Proceed to Check Hydraulics After System Start-Up.



# CHECK HYDRAULICS AFTER SYSTEM START-UP

**⚠WARNING** Escaping oil or other fluids under pressure can penetrate your skin causing serious injury or death.

Release all pressure before performing maintenance or repairs, Never weld near pressurized fluid lines.

DO NOT use your hands to check for leaks. When searching for leaks, use a piece of wood or cardboard.

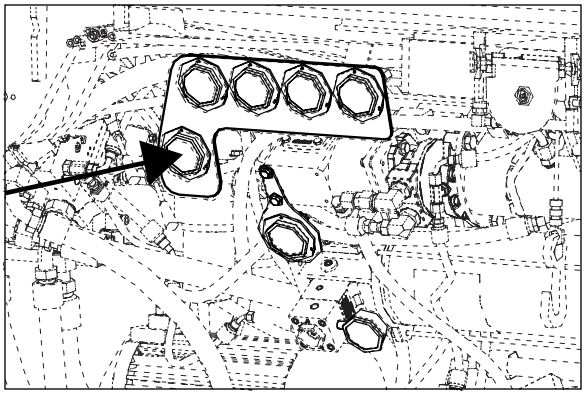
Contact medical help immediately if any oil or fluid is injected into your skin. A serious infection or reaction can emerge without proper medical treatment.

1. If equipped, check all return filter indicators.

2. Check hydraulic components and hoses for leaks. Repair or replace as needed.

3. Check the 5200 Pump Unit (or other power support equipment) hydraulic oil level gauge in hydraulic oil reservoir.

   Fill reservoir with clean, fresh, **FILTERED** hydraulic oil to full mark on gauge. Filling reservoir with unfiltered oil will cause component damage. Do not mix oil manufacturers or grades.



4. Check the EX-50 Excavator pressure gauge for proper hydraulic operation and system pressure. The EX-50 System Pressure Gauge is capable of 3,000 psi.

5. Proceed to Launch & Operation Procedure in this section.

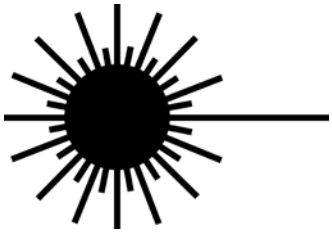
# LAUNCH & OPERATION PROCEDURE

**NOTICE** Be sure that Connecting Electrical Connections, Power Start-Up Procedure, and Check Hydraulics After System Start-Up have been properly performed prior to performing the Launch & Operation Procedure.

**⚠WARNING** Hearing protection MUST be worn by operator while EX-50 Excavator is in operation.

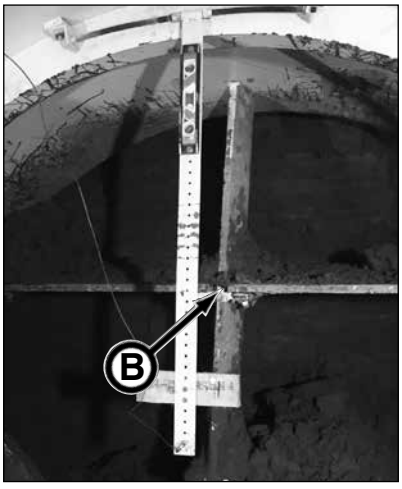
**⚠WARNING** Any electrical work performed on the electrical components must be completed by a certified electrician.

**⚠DANGER** Staring into laser light will cause severe injury. Do not stare into laser guidance system light beam. Avoid direct eye exposure.



This is a general overview of a launch and operation procedure for a ring beam and lagging tunneling project. The actual project may vary. The operation and installation details are determined by the owner and contractor of the project.


1. Set laser guidance system to grade and alignment (A). Be sure the laser beam can be easily seen on the excavator boring shield target bar (B) from the operator's EX-50 control console. Adjust the conveyor as needed.
2. Retract jacking cylinders using jacking control.
3. Assemble the ring beam and lagging section in jacking can.
4. Once the ring beam and lagging section is assembled in the jacking can of the excavator boring shield, turn Select Switch on the EX-50 control console to Jacking Can.
5. In Jacking Can mode, use the right-hand joystick (while simultaneously squeezing the operator presense switch lever) and push it forward to Jack Can Extend to hydraulically extend the Jacking Can cylinders. This applies pressure to the ring beam and lagging section which applies pressure to the thrust block or other support structure, and advances the excavator boring shield forward.




*(continued on next page)*

***Launch & Operation Procedure (continued)***

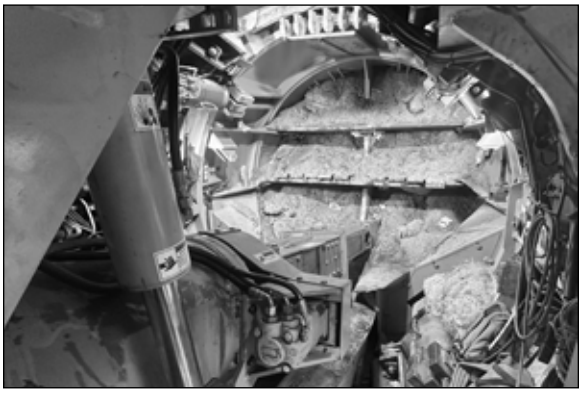
6. Lower the dirt bucket into position behind the conveyor; do not install the haul unit at this time.

**⚠WARNING** Avoid contact with conveyor. Failure to do so could cause severe injury or death. While moving haul unit into tunnel, avoid hitting the conveyor.

7. Operate the conveyor and adjust the conveyor speed as needed.

8. Turn the Select Switch to EX-50.

9. Use the EX-50 Excavator joysticks and toggles to control the EX-50 movements and functions to load spoils onto the conveyor.



   - In sand soils, the EX-50 excavator is used for clean up and guiding spoils to the conveyor.
   - In hard ground, use the EX-50 to excavate around the perimeter of the cutting area so the center spoils will drop to the conveyor.
   - In hard or cobble laden soil, operate the auxiliary tooling attachment using the Auxiliary Flow Switch speed control and joysticks. Auxiliary tooling will require additional flow/supply.

**NOTICE** If using rotary tool/powered accessory and the auxiliary flow switch, be sure the operator's shield is installed. Contact Akkerman Aftermarket Support for more information.

10. When the jacking cylinders are completely extended, retract the cylinders by turning the Select Switch to Jacking Can. Use the right-hand joystick (while simultaneously squeezing the operator presense switch lever) and pull it backward to Jack Can Retract mode to hydraulically retract the Jacking Can cylinders to allows spacing to assemble the next ring beam and lagging section.

11. Check and adjust grade and alignment often, making only minor adjustments.

12. Continue assembling ring beam and lagging sections until the excavator boring shield has been advanced forward enough to lower haul unit into excavator boring shield.

*(continued on next page)*

***Launch & Operation Procedure (continued)***

13. Remove dirt bucket from behind the conveyor.

14. Press E-Stop button IN (A) to shut down excavator boring shield power.

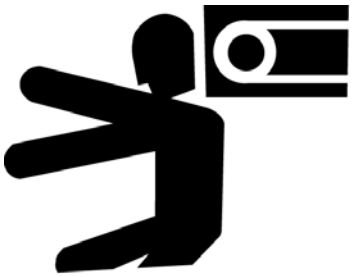
15. Perform lockout/tagout procedure on generator, (or other power source), 5200 pump unit (or other power support equipment) and EX-50 Main Power Control Box.

16. Install the first haul unit track section. Refer to your Haul Unit Operator's Manual for track installation. Sections of track will need to be added as new ring beam and lagging sections are assembled.

17. Lower haul unit onto the track. Refer to your Haul Unit Operator's Manual for haul unit installation.

18. Lower dirt bucket into place on haul unit. Move the haul unit into the tunnel until the dirt bucket is underneath conveyor.

**⚠WARNING** Avoid contact with conveyor. Failure to do so could cause severe injuiry or death. While moving haul unit into tunnel, avoid hitting the conveyor.



19. Perform Power Start-Up Procedure (refer to Power Start-Up Procedure in this section).

20. Unload the dirt bucket once it is full by moving it to the unloading/loading zone in the launch shaft with the haul unit.

21. Recheck laser guidance system accuracy often, with and without forward thrust applied to avoid making improper steering corrections.

22. Continue to install additional ring beam and lagging sections, add power cable and ventilation system as needed until the tunnel is complete.

# COLD WEATHER OPERATION

Freezing temperatures during the tunneling process, creates the necessity to prepare the site and equipment for the cold weather. Failure to do so will cause damage to components and supporting equipment.

There are various methods of keeping equipment from freezing:

- Tent working areas with a heating system when possible.
- When working with water, it needs to be constantly circulated to prevent freezing. Otherwise the equipment must be drained and/or treated with a RV anti-freeze solution to prevent freezing.
- If bentonite pump and/or water cooling pumps will be shut off for a considerable length of time and the temperature is at or below freezing, the fluids must be drained or treated with RV anti-freeze. Refer to pump manufacturer for more information.
- Water tanks must be drained or treated with RV anti-freeze.
- Drain hoses to prevent freezing and keep low areas properly drained to prevent freezing damage.
- For diesel engines, use a diesel conditioner as well as a non-gelling winter fuel.
- For all equipment, use proper lubricant based on ambient temperature to prevent damage.
- Use compressed air to purge a system of water. Be sure the discharge valve is open before doing so.
- Install heaters for hydraulic systems.
- A spoil (muck) dump needs to be located carefully since the wet loose material will freeze forming a pointed pile instead of a mound.

If systems were shut down for freezing weather, be sure to start systems slowly and let them run for at least five minutes to allow for warm up and in the case of a pump, to displace any surface ice that may have accumulated in the fluid before going back to full operation mode.

Remember it is also critical to keep the work site safe and employees comfortable during the freezing weather. Good training, supervision, proper clothing and limiting personal exposure to the weather is essential for keeping personnel and equipment safe on the job site.

# DAILY SHUTDOWN

1. Lower EX-50 Excavator Boom completely until the Boom Bucket rests on the bottom of the excavator boring shield.

2. Push IN E-Stop button (A) on EX-50 control console or E-Stop Control Box Assembly to shut down EX-50 power.

3. Flip the EX-50 Main Power Control Box main disconnect switch to the OFF position (C).

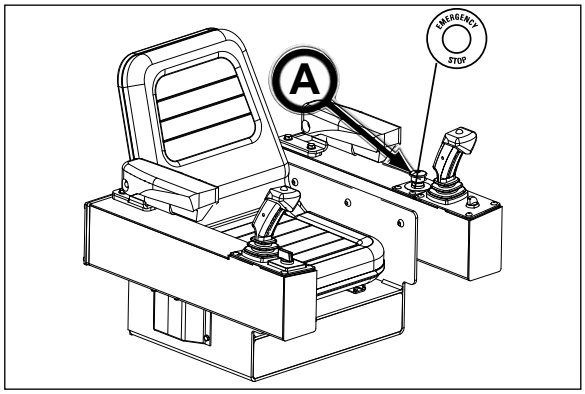
4. Perform lockout/tagout on the EX-50 Main Power Control Box (D).

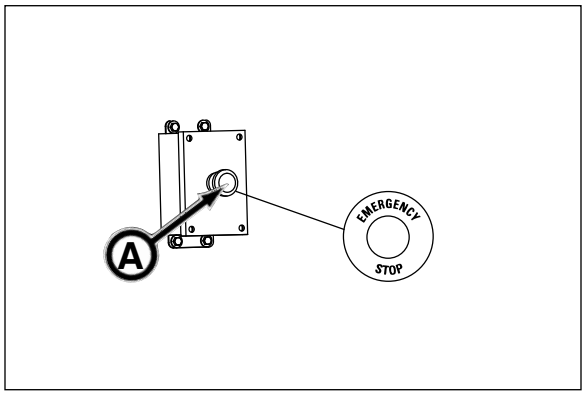
5. Push IN the E-Stop button on the 5200 Pump Unit (or other power support equipment) to shutdown power.

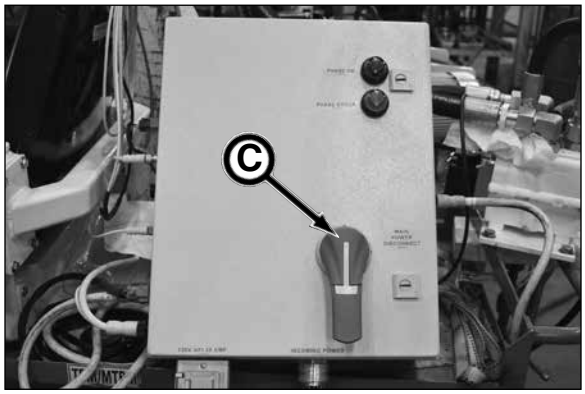
6. Flip the 5200 Pump Unit (or other power support equipment) main power disconnect switch to the OFF position.

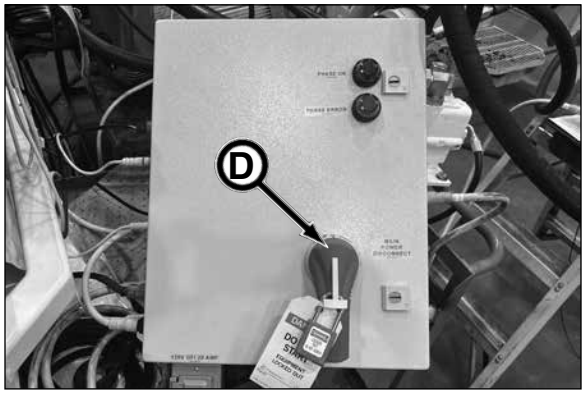
7. Perform lockout/tagout on the generator (or other external power source).

8. Perform a visual machine inspection by checking the fluid levels, hydraulic hose and power cable wear or damage and any machine damage. Make repairs before operating. Also check to be sure all connections are properly connected and secured.



# NOTES

# Transporting

## TRANSPORTING GUIDELINES


**⚠WARNING** Suspended load may fall and cause severe personal injury or death.

Do not enter area under or around a load.

1. Know the local, state, and federal transportation regulations.
2. Obtain required permits for transporting.
3. Remove any obstacles from the trailer floor.
4. Clean debris from equipment.
5. Load and unload on level ground.
6. If lifting equipment with a hoist or other lifting device, the equipment lifting eyes and sling must be inspected for damage before lifting. If damaged, replace before lifting.
7. Ensure EX-50 boom is secured on stand and by chain to the frame lift eye.
8. Securely fasten equipment to trailer floor.
9. Secure all loose items in boring shield and jacking/liner can.
10. Be sure available cradles and supports are in place prior to shipping.
11. Observe the lifting instructions for other tunneling equipment.

# NOTES

# Lubricants

**NOTICE** Use of inferior lubricants can affect the efficient performance of your excavator boring shield. Always use high quality lubricants as specified in this section.

Refer to the Periodic Maintenance section for proper lubrication quantity, maintenance intervals, and procedures.

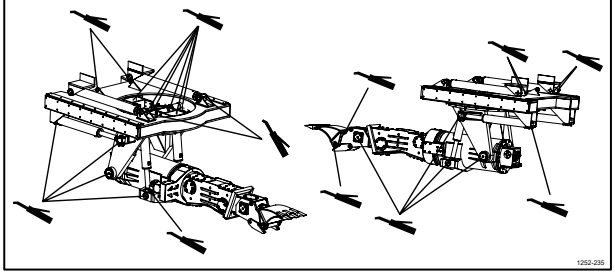
## GREASE

The lubrication points are greased with Mobilgrease® XHP222 Premium Lubricating Grease.

The XHP222 grease is a multi-purpose, high performance, high temperature, lithium grease.

Use Mobilgrease® XHP222 Premium Lubricating Grease or equivalent when lubricating the lubrication points.

**EX50 Cylinder & Frame Lubrication Points**
**Grease daily with Mobilgrease® XHP222 Lubricating Grease or equivalent until grease is forced out.**



## STORING LUBRICANTS

Your equipment can operate at maximum performance only if clean lubricants are used. Use clean containers to handle all lubricants.

Lubricants should be stored in an area protected from dust, moisture, and other contaminates.

Store barrels inside whenever possible or at least under cover. Keep barrel bungs tight.

If barrels must be stored outside, lay barrels on their sides. If barrels cannot be laid on their sides, tilt them slightly so water or other contaminates cannot be drawn in around the bung.

# NOTES

# Periodic Maintenance

**⚠WARNING** Review the Safety section in this manual and read, study, and understand this manual and all other support equipment operation manuals before performing maintenance. Failure to do so, could cause severe injury or death.

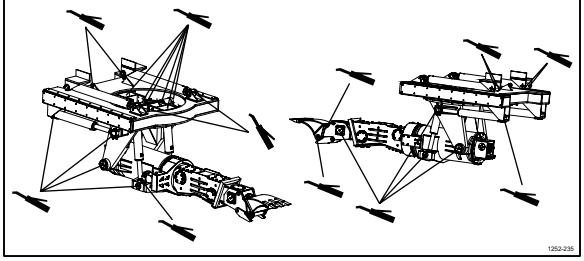
Maintenance and repairs must only be performed by a qualified service technician.

## LUBRICATION & MAINTENANCE INTERVALS

The requirements for lubrication and maintenance are shown on the maintenance charts in this section.

Intervals of maintenance are based on normal operating conditions. If operating under more difficult conditions, use a shorter time interval between maintenance.

**EX50 Cylinder & Frame Lubrication Points**
**Grease daily with Mobilgrease® XHP222 Lubricating Grease or equivalent until grease is forced out.**

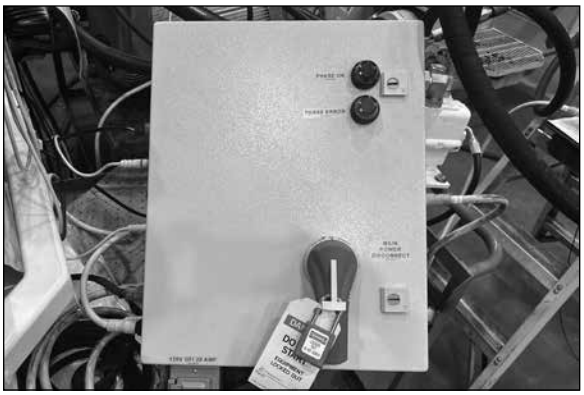


## LOCKOUT TAGOUT POWER BEFORE SERVICING

**⚠WARNING** Severe personal injury or death can result from unexpected pump unit start-up or machine movement.

LOCKOUT, TAGOUT power before attempting to make repairs or adjustments to this equipment, unless otherwise indicated. Proper lockout will prevent accidents and save lives. Performing the lockout will also prevent the equipment from moving or operating unexpectedly.

Refer to the Safety, section one, for the Lockout Tagout Procedure Guidelines.



## BEFORE PERFORMING MAINTENANCE

1. Perform daily shutdown procedure. Refer to Daily Shutdown in the Operation section.

2. Relieve hydraulic pressure.

3. Push in all E-Stop buttons.

4. Do not work on hydraulic system if oil temperature exceeds 150° F (66° C).

5. **Lockout/tagout all power. Refer to the Safety Section II. for the Lockout Tagout Procedure Guidelines.**

## HYDRAULIC OIL/FLUIDS UNDER PRESSURE

**⚠WARNING** Escaping oil or other fluids under pressure can penetrate your skin causing serious injury or death.

Release all pressure before performing maintenance or repairs. Never weld near pressurized fluid lines.

DO NOT use your hands to check for leaks. When searching for leaks, use a piece of wood or cardboard.

Contact medical help immediately if any oil or fluid is injected into your skin. A serious infection or reaction can emerge without proper medical treatment.

## AVOID PINCH POINTS

**⚠WARNING** Moving parts or the mishandling of parts can cause severe personal injury.

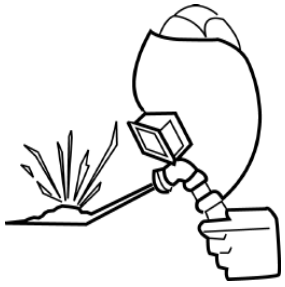
Keep hands away from moving parts.

Watch your fingers, hands, and legs while equipment is in operation.

Handle parts carefully to avoid crushing and pinch point hazards.

## UNAUTHORIZED WELDING

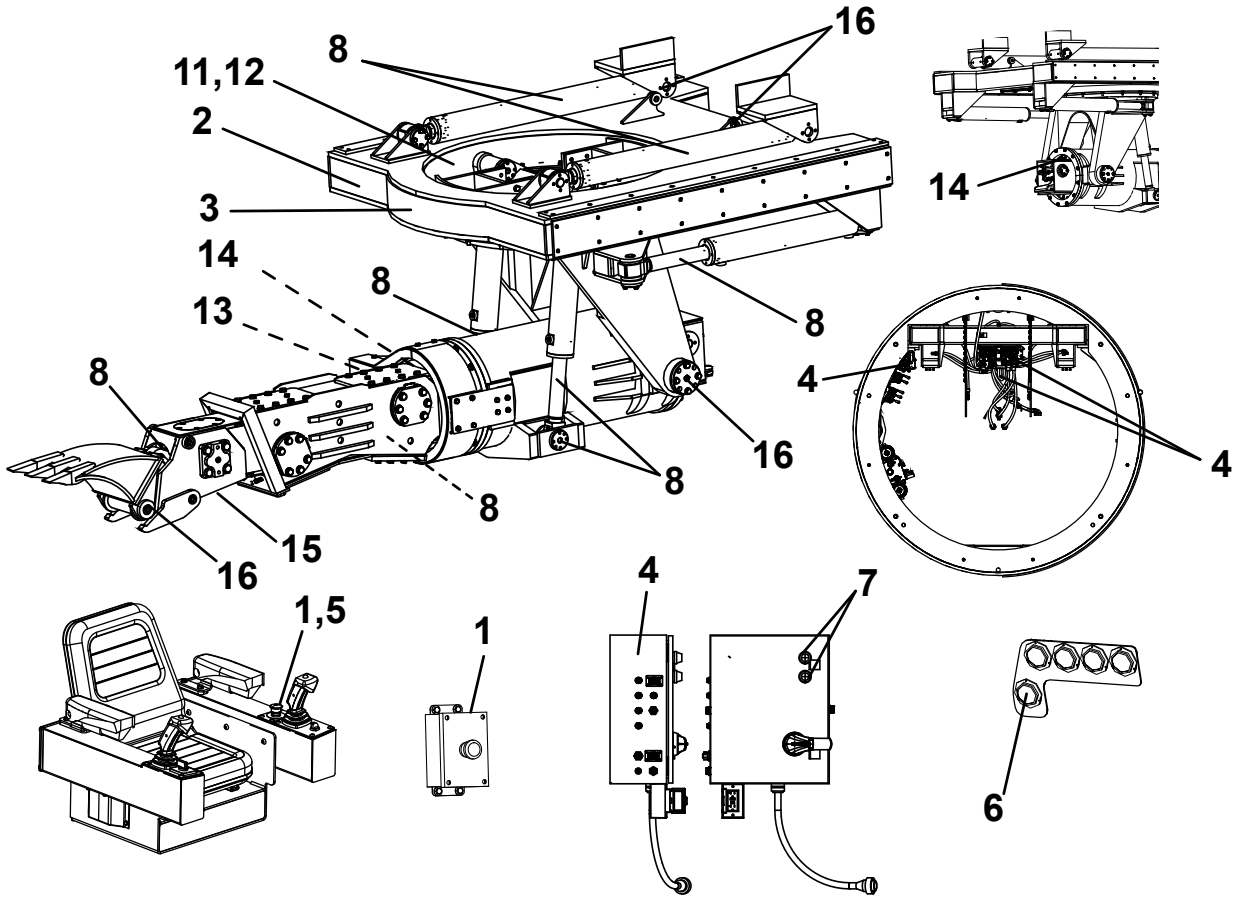
**⚠WARNING** Unauthorized welding can cause structural failure resulting in possible injury or death.



Do not weld on any structural member. Unauthorized welding or repair will void the warranty.

## MAINTENANCE CHARTS

Use the item number in the chart to refer to the detailed maintenance procedures later in this section.



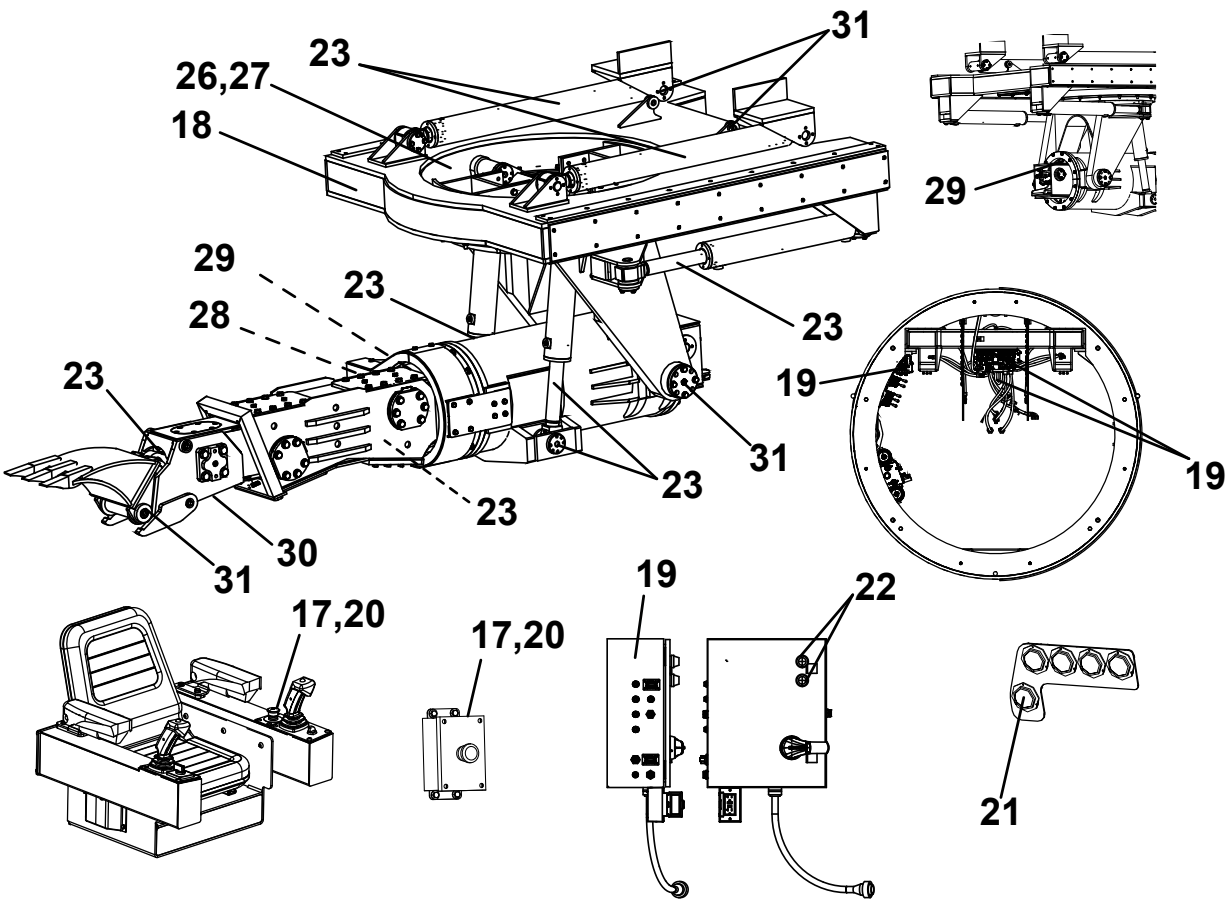

### PRIOR TO EACH JOB LAUNCH

| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|---|---|---|---|---|
| 1. | E-Stop | Check Operation | E-Stop Main Power & Control Box. | |
| 2. | Structures | Inspect for Cracks/Wear | If damaged, repair prior to use. | |
| 3. | Lift Eye | Inspect | If damaged, repair or replace prior to use. | |
| 4. | Elect/Hyd Connect | Check | Connections must be secured. | |
| 5. | Controls | Check Operation | | |
| 6. | Gauges | Check Operation | | |
| 7. | Phase Power | Check | | |
| 8. | Frame, Swing, Hoist, Telescopic, & Bucket Cylinders | Lubricate | Lubricate until grease is forced out. | Mobil XHP222 |
| *9. | Decals | Inspect | Must be legible. Replace as needed. | |
| *10. | Supporting Equip. | Perform Maintenance | Refer to your machine's maintenance manual. | |
| 11. | Swing Bearing | Lubricate | Lubricate until grease is forced out. | Mobil XHP222 |
| **12. | Swing Bearing | Inspect Hardware | Visually inspect hardware. | |
| 13. | Drive Chain | Lubricate | | Lt. Wt. Motor Oil |
| 14. | Thrust Washers | Inspect | If damaged, repair or replace prior to use. | |
| 15. | Cleanout Cover | Clean out | Remove cover, clean out debris. | |
| 16. | Bucket Fittings | Lubricate (2 places) | Lubricate until grease is forced out. | Mobil XHP222 |

* Not shown.

**If hardware is worn or damaged, replace with new, tighten 1/2 inch bolts to 79.8 ft-lbs lubed torque. Do not over tighten.

***Maintenance Charts (continued)***



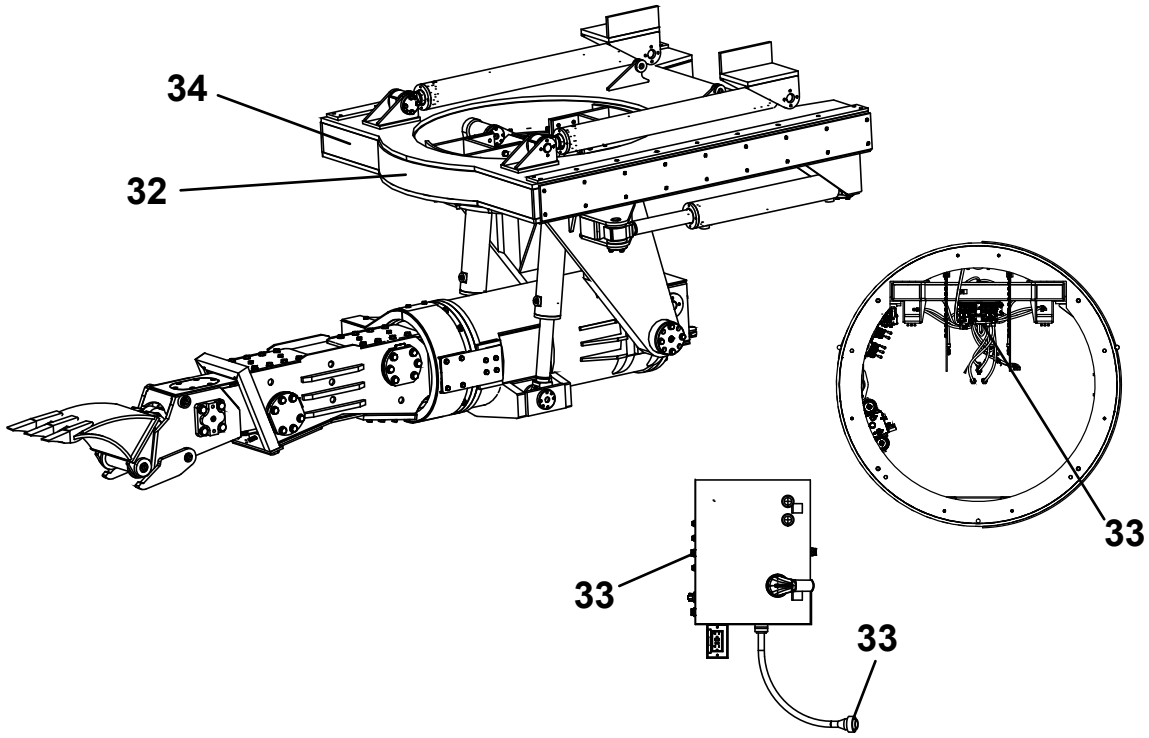

## DAILY OR EVERY 10 HOURS OF OPERATION

| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|---|---|---|---|---|
| 17. | E-Stop | Check Operation | E-Stop Main Power & Control Box. | |
| 18. | Structures | Inspect for Cracks/Wear | If damaged, repair prior to use. | |
| 19. | Elect/Hyd Connect | Check | Connections must be secured. | |
| 20. | Controls | Check Operation | | |
| 21. | Gauges | Check Operation | | |
| 22. | Phase Power | Check | | |
| 23. | Frame, Swing, Hoist, Telescopic, & Bucket Cylinders | Lubricate | Lubricate until grease is forced out. | Mobil XHP222 |
| *24. | Decals | Inspect | Must be legible. Replace as needed. | |
| *25. | Supporting Equip. | Perform Maintenance | Refer to your machine's maintenance manual. | |
| 26. | Swing Bearing | Lubricate | Lubricate until grease is forced out. | Mobil XHP222 |
| **27. | Swing Bearing | Inspect Hardware | Visually inspect hardware. | |
| 28. | Drive Chain | Lubricate | | Lt. Wt. Motor Oil |
| 29. | Thrust Washers | Inspect | If damaged, repair or replace prior to use. | |
| 30. | Cleanout Cover | Clean out | Remove cover, clean out debris. | |
| 31. | Bucket Fittings | Lubricate (2 places) | Lubricate until grease is forced out. | Mobil XHP222 |

* Not shown.

**If hardware is worn or damaged, replace with new, tighten 1/2 inch bolts to 79.8 ft-lbs lubed torque. Do not over tighten.

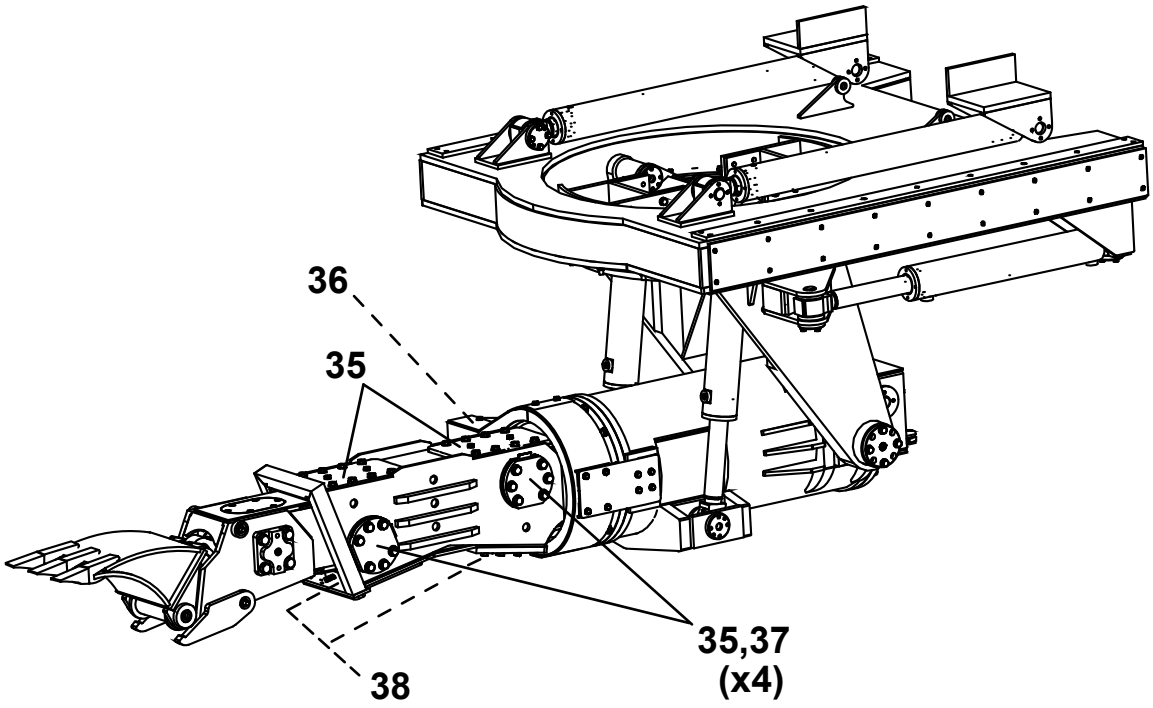
***Maintenance Charts (continued)***




## COMPLETION OF EACH DRIVE

| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|---|---|---|---|---|
| 32. | Lift Eye | Inspect | Repair if damaged before lifting. | |
| 33. | Hoses/Pwr. Cables | Inspect | Replace if damaged before operating. | |
| 34. | Structures | Inspect | If damaged, repair or replace. | |

***Maintenance Charts (continued)***




## AS REQUIRED

| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|---|---|---|---|---|
| 35. | Top & Side Wear Pads & Pucks | Inspect (2 & 4 places) | If damaged, replace prior to use. | |
| 36. | Drive Chain | Check Tension & Lubricate | Adjust to 1/4 inch deflection. | Lt. Wt. Motor Oil |
| 37. | Side Wear Pucks (4) | Chatter/Vibration | Adjust shims for clearance. | |
| 38. | Adjuster Wedges (2) | Chatter/Vibration | Adjust screw for clearance. | |

# PRIOR TO EACH JOB LAUNCH

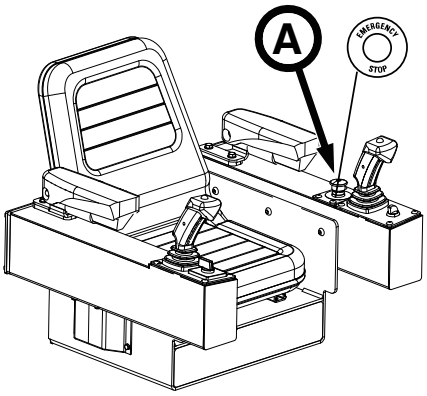
### 1. CHECK EMERGENCY STOP OPERATION

**⚠WARNING** Emergency Stop (E-Stop) buttons MUST function properly BEFORE operating. Failure to do so may cause severe injury or death.

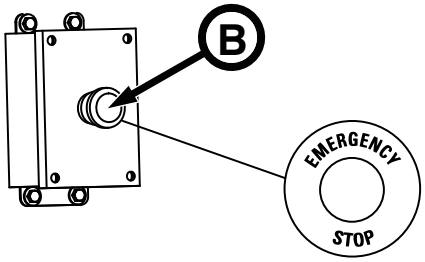
Check E-Stop buttons (A and B) for proper operation. When pushed in, the E-Stop must stop hydraulic and electrical power. Be sure to check the function of both E-Stop buttons, on the control console and control box assembly.

The button will function as follows:

| | |
|---|---|
| STOP | - Push button IN |
| Power for Start Circuit | - Pull button OUT |




*EX-50 Control Console E-Stop (A)*




*E-Stop Control Box Assembly/Remote E-Stop (B)*

### 2. INSPECT STRUCTURES

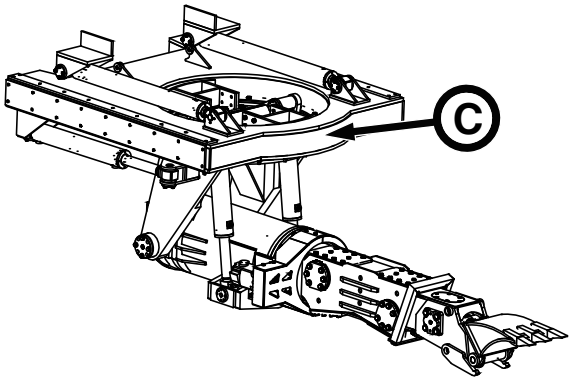
Perform a visual inspection of the EX-50 excavator, boring shield and all other system components for cracks, wear or other damage. Repair or replace BEFORE operation.

Check for oil leaks and debris buildup. Make repairs as needed and remove debris.

Check for loose, damaged or missing parts. Repair or replace any defective parts as necessary.


### 3. INSPECT LIFTING EYES

Inspect lifting eyes (C) for wear or damage. Worn or damaged lifting eyes MUST be replaced before lifting.

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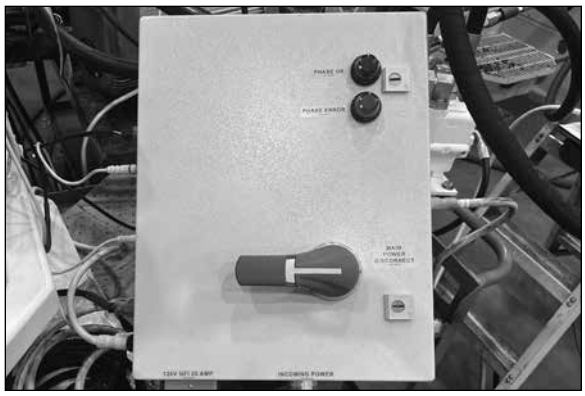
***Prior To Each Job Launch (continued)***

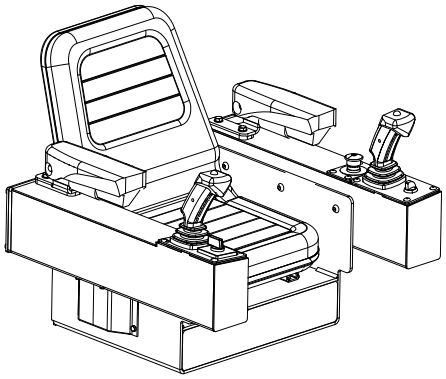
**4. CHECK ELECTRIC/HYDRAULIC CONNECTIONS**



**⚠DANGER** If high volage cables or cable connections are frayed, worn or damaged, contact with cables/connections will results in electrical shock causing sevese injuiry or death.

With power in lockout tagout, check EX-50 Main Power Control Box cable connections for fraying, wear or damage. If damaged, the cables must be replaced BEFORE operation. Be sure connections are secure.

**5. CHECK CONTROL OPERATIONS**



**⚠WARNING** BEFORE checking control operations, be sure all personnel are away from machine. Unexpected movement may cause severe injuiry or death.

Check all controls for proper operation. If controls do not function properly, repair or replace BEFORE operation.

**6. CHECK GAUGE OPERATION**

Check system pressures for proper operation. If systems are not functioning properly, repair or replace system components BEFORE operation.

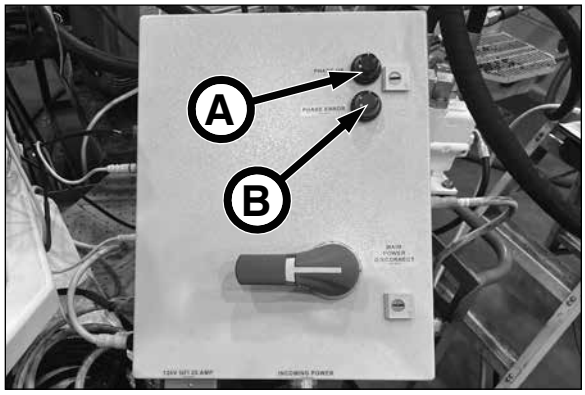
Check pressure gauges for proper hydraulic operation.

*(continued on next page)*

***Prior To Each Job Launch (continued)***

**7. CHECK PHASE POWER**

The input power on the EX-50 Excavator Main Power Control Box is monitored for proper three-phase electrical power. Therefore, the green Phase OK indicator **MUST** be illuminated before operating equipment.



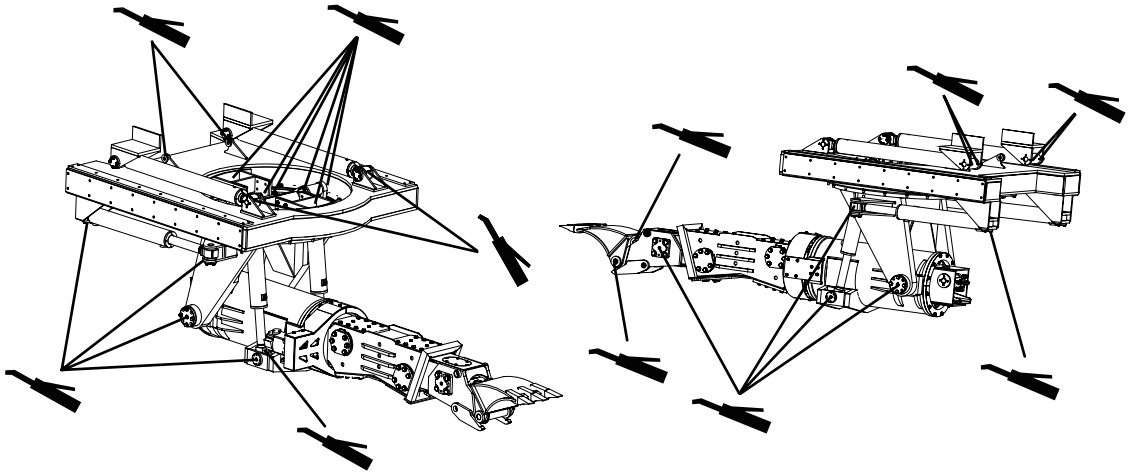

**IMPORTANT: DO NOT start up electric components if the green phase indicator light is not illuminated. Doing so will run components backwards causing damage.**

If the green Phase OK indicator light (A) on the EX-50 Main Power Control Box is illuminated, this indicates that the external power source phase power is installed correctly and the system is available for use.

If the red Phase Error indicator light (B) is illuminated, this indicates that the external power source is installed incorrectly. Lockout, tagout all power before disconnecting power lead cables. Have a certified electrician reverse the two generator electrical phase conductors on the power circuit and recheck phase power.

**8. LUBRICATE EX-50 FRAME LUBRICATION POINTS**

Lubricate EX-50 frame, swing, and hoist, telescopic and bucket cylinders with Mobilegrease® XHP222 or equivelent until grease is forced out.



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***Prior To Each Job Launch (continued)***

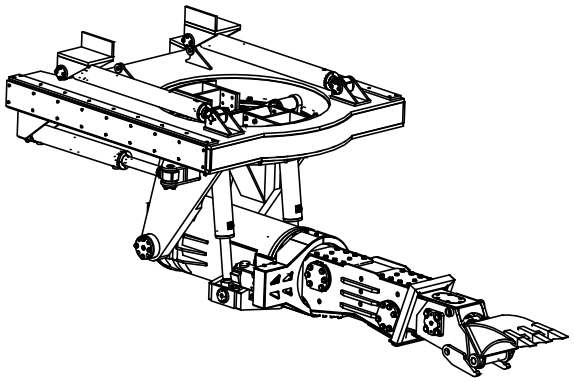
**9. INSPECT DECALS**

Inspect ALL decals, operational and safety decals to be sure they are clean and readable.

Use soft cloth, water and mild soap to clean the decals if they are too dirty to read. DO NOT clean safety decals with solvent. Solvent will damage decals. Replace decals immediately if they are damaged, missing, or hard to read.

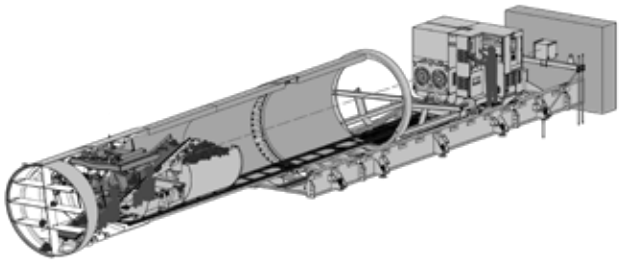
Before applying a new decal, be sure the surface is clean and dry.

Contact Akkerman Aftermarket Support for free replacement safety decals.



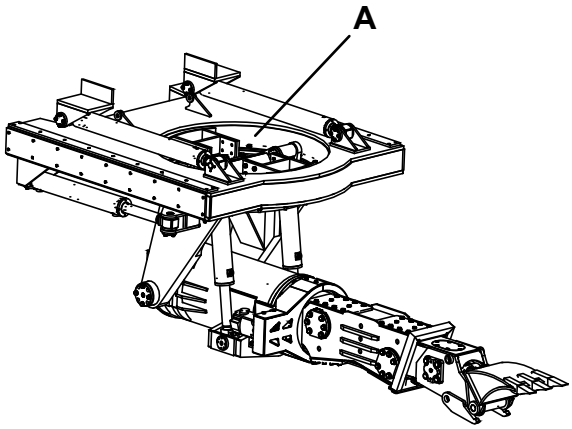
**10. PERFORM MAINTENANCE ON ALL SUPPORTING EQUIPMENT**

Be sure ALL supporting equipment such as the haul unit, jacking frame, and generator are properly operarting and maintained. Be sure to repair or replace equipment before operation. Refer to the operation and maintenance manauls of all supporting equipment.



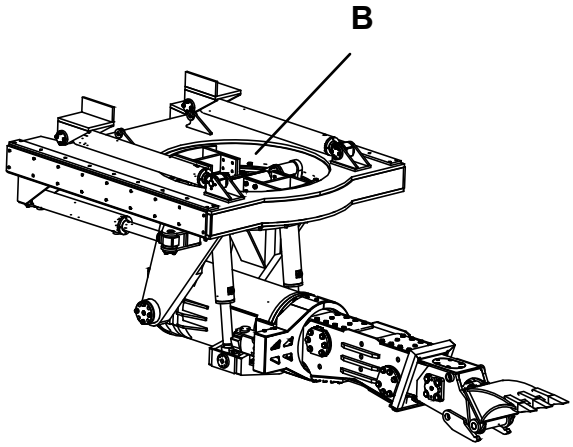
**11. LUBRICATE SWING BEARING**

Lubricate EX-50 swing bearing (A) with Mobilegrease® XHP222 or equivelent until grease is forced out.




**12. INSPECT SWING BEARING HARDWARE**

Visually inspect swing bearing (B) hardware for damage. If damaged, or missing, replace with new.

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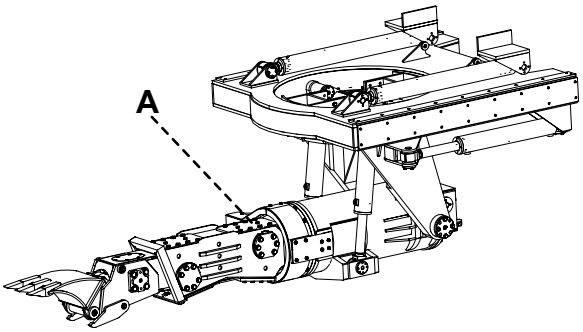
***Prior To Each Job Launch (continued)***

**13. LUBRICATE DRIVE CHAIN**

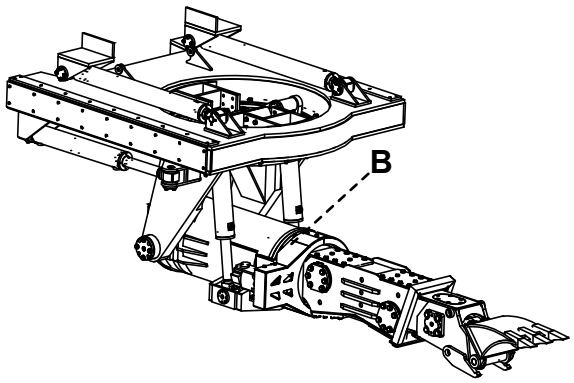
Thoroughly lubricate drive chain (A) with a high quality chain lubricant.

Replace drive chain guard before operating.



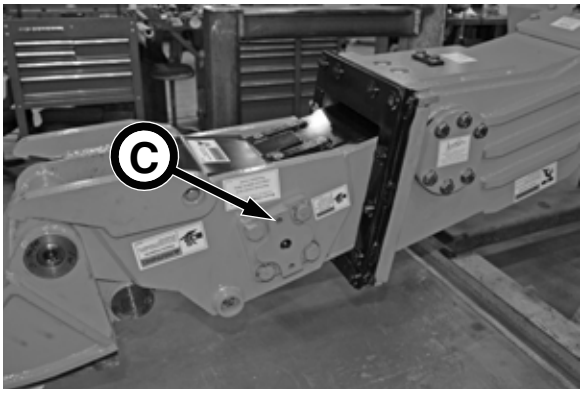

**14. INSPECT THRUST WASHERS**

Visually inspect thrust washers (B) (under rotary boom chain guard) for damage. If damaged, or missing, replace with new.



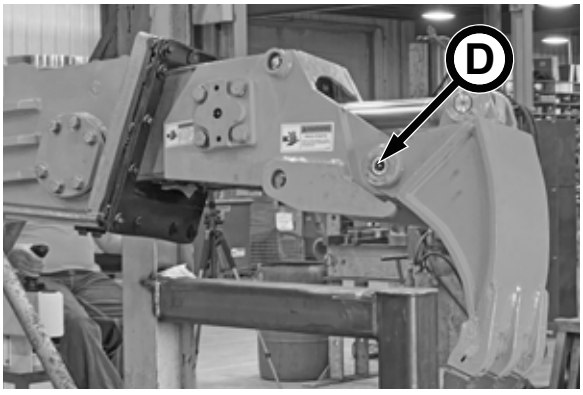

**15. CLEAN OUT CLEANOUT COVER**

Remove cleanout cover (C), and clean out debris. Be sure to replace cover when complete.




**16. LUBRICATE BUCKET FITTINGS**

Lubricate bucket fittings (D) (2 places) with Mobilegrease® XHP222 or equivelent until grease is forced out.




*(continued on next page)*

# DAILY OR EVERY 10 HOURS OF OPERATION

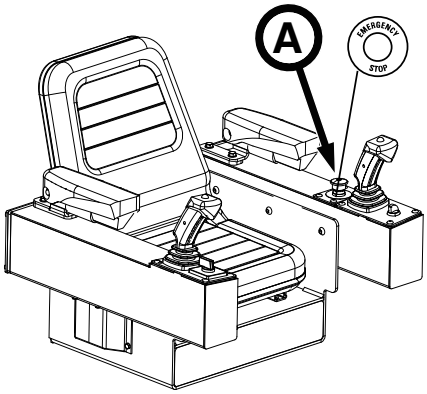
### 17. CHECK EMERGENCY STOP OPERATION

**⚠WARNING** Emergency Stop (E-Stop) buttons MUST function properly BEFORE operating. Failure to do so may cause severe injury or death.

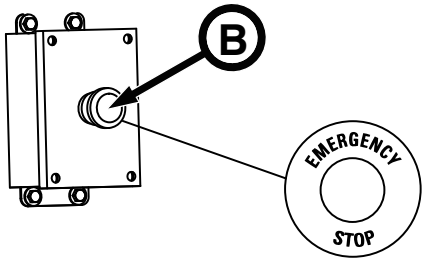
Check E-Stop buttons (A and B) for proper operation. When pushed in, the E-Stop must stop hydraulic and electrical power. Be sure to check the function of both E-Stop buttons, on the control console and control box assembly.

The button will function as follows:

| | |
|---|---|
| STOP | - Push button IN |
| Power for Start Circuit | - Pull button OUT |




*EX-50 Control Console E-Stop (A)*




*E-Stop Control Box Assembly/Remote E-Stop (B)*

### 18. INSPECT STRUCTURES

Perform a visual inspection of the EX-50 excavator, boring shield and all other system components for cracks, wear or other damage. Repair or replace BEFORE operation.

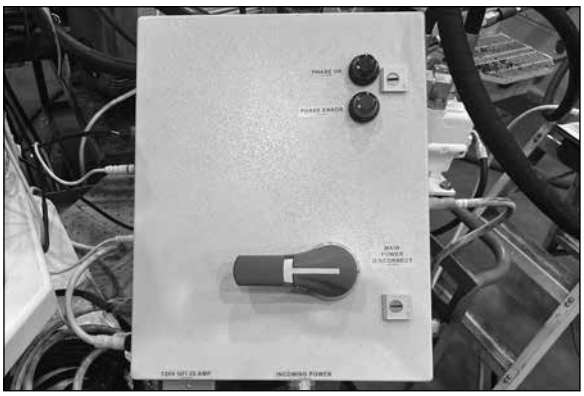
Check for oil leaks and debris buildup. Make repairs as needed and remove debris.

Check for loose, damaged or missing parts. Repair or replace any defective parts as necessary.


### 19. CHECK ELECTRIC/HYDRAULIC CONNECTIONS

**⚠DANGER** If high volage cables or cable connections are frayed, worn or damaged, contact with cables/connections will results in electrical shock causing sevese injuiry or death.

With power in lockout/tagout, check EX-50 Main Power Control Box cable connections for fraying, wear or damage. If damaged, the cables must be replaced BEFORE operation. Be sure connections are secure.



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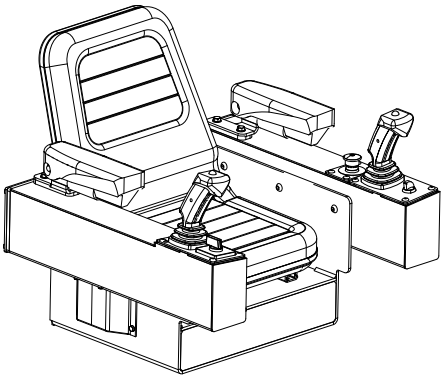
***Daily Or Every 10 Hours Of Operation (continued)***

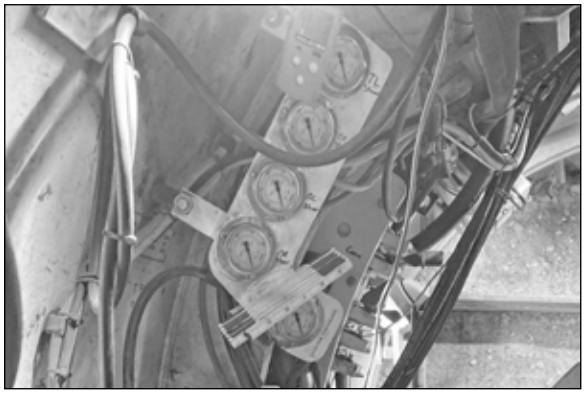
**20. CHECK CONTROL OPERATIONS**



**⚠WARNING** BEFORE checking control operations, be sure all personnel are away from machine. Unexpected movement may cause severe injuiry or death.

Check all controls for proper operation. If controls do not function properly, repair or replace BEFORE operation.

**21. CHECK GAUGE OPERATION**

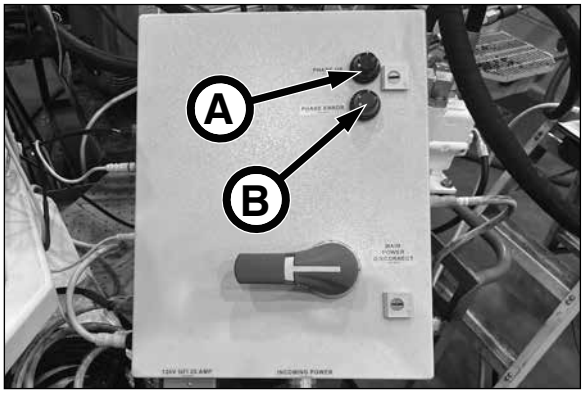


Check system pressures for proper operation. If systems are not functioning properly, repair or replace system components BEFORE operation.

Check pressure gauges for proper hydraulic operation.

**22. CHECK PHASE POWER**

The input power on the EX-50 Excavator Main Power Control Box is monitored for proper three-phase electrical power. Therefore, the green Phase OK indicator **MUST** be illuminated before operating equipment.




**IMPORTANT: DO NOT start up electric components if the green phase indicator light is not illuminated. Doing so will run components backwards causing damage.**

If the green Phase OK indicator light (A) on the EX-50 Main Power Control Box is illuminated, this indicates that the external power source phase power is installed correctly and the system is available for use.

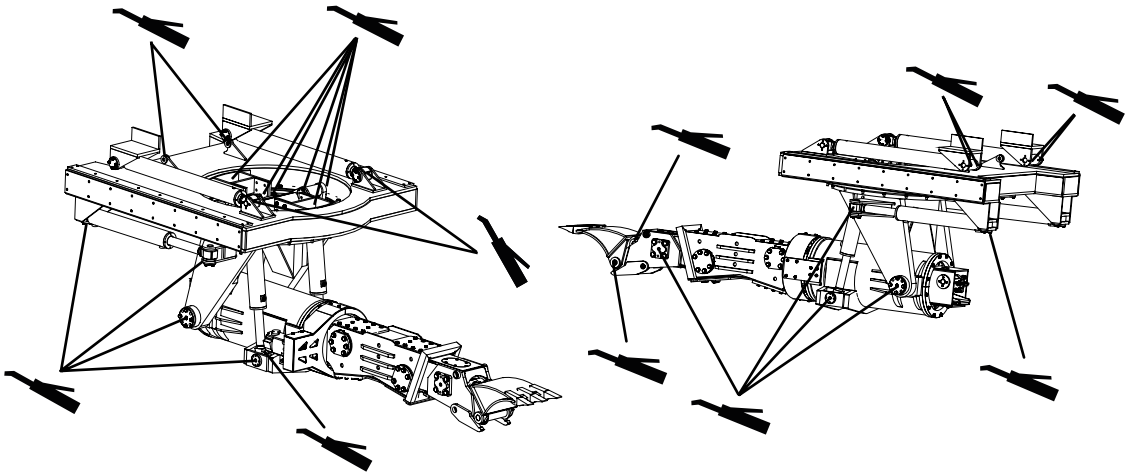
If the red Phase Error indicator light (B) is illuminated, this indicates that the external power source is installed incorrectly. Lockout, tagout all power before disconnecting power lead cables. Have a certified electrician reverse the two generator electrical phase conductors on the power circuit and recheck phase power.

*(continued on next page)*

***Daily Or Every 10 Hours Of Operation (continued)***

**23. LUBRICATE EX-50 FRAME LUBRICATION POINTS**

Lubricate EX-50 frame, swing, and hoist, telescopic and bucket cylinders with Mobilegrease® XHP222 or equivelent until grease is forced out.



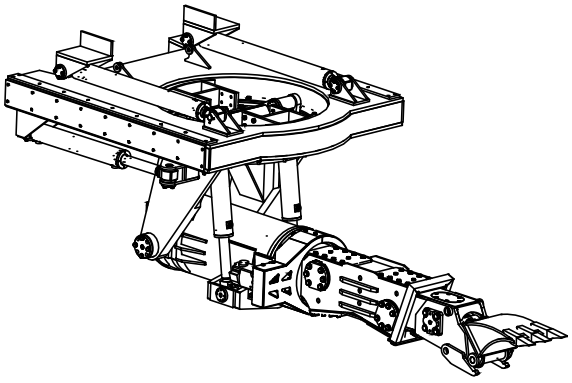
**24. INSPECT DECALS**

Inspect ALL decals, operational and safety decals to be sure they are clean and readable.

Use soft cloth, water and mild soap to clean the decals if they are too dirty to read. DO NOT clean safety decals with solvent. Solvent will damage decals. Replace decals immediately if they are damaged, missing, or hard to read.

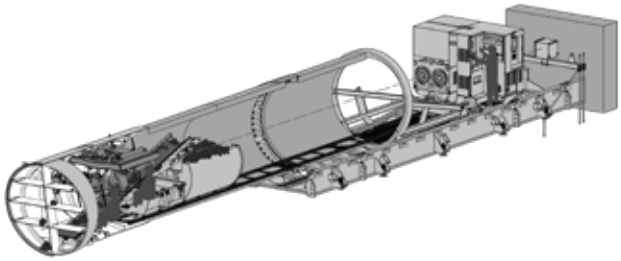
Before applying a new decal, be sure the surface is clean and dry.

Contact Akkerman Aftermarket Support for free replacement safety decals.



**25. PERFORM MAINTENANCE ON ALL SUPPORTING EQUIPMENT**

Be sure ALL supporting equipment such as the haul unit, jacking frame, and generator are properly operarting and maintained. Be sure to repair or replace equipment before operation. Refer to the operation and maintenance manauls of all supporting equipment.

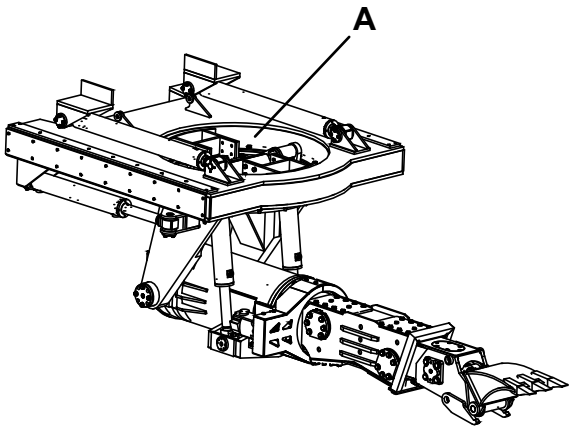


*(continued on next page)*

***Daily Or Every 10 Hours Of Operation (continued)***

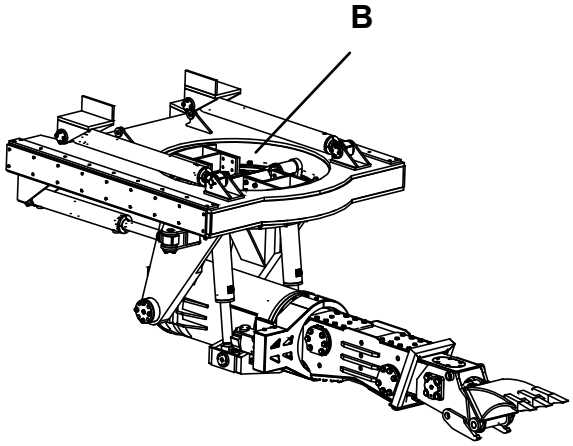
**26. LUBRICATE SWING BEARING**

Lubricate EX-50 swing bearing (A) with Mobilegrease® XHP222 or equivelent until grease is forced out.




**27. INSPECT SWING BEARING HARDWARE**

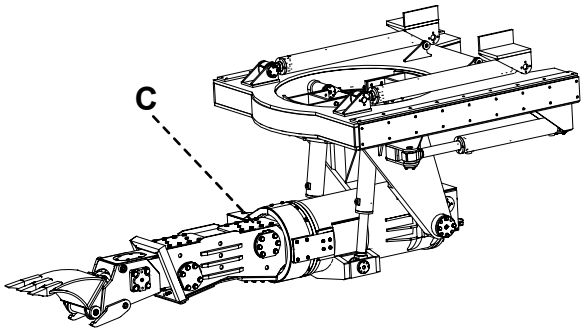
Visually inspect swing bearing (B) hardware for damage. If damaged, or missing, replace with new.




**28. LUBRICATE DRIVE CHAIN**

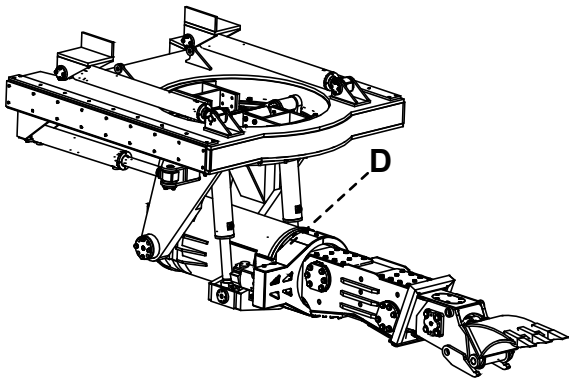
Thoroughly lubricate drive chain (C) with a high quality chain lubricant.

Replace drive chain guard before operating.




**29. INSPECT THRUST WASHERS**

Visually inspect thrust washers (D) (under rotary boom chain guard) for damage. If damaged, or missing, replace with new.

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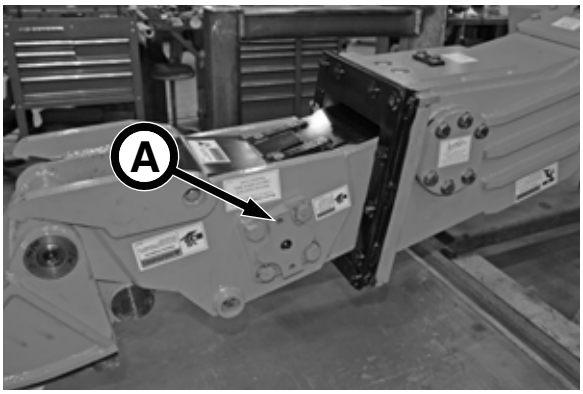
***Daily Or Every 10 Hours Of Operation (continued)***

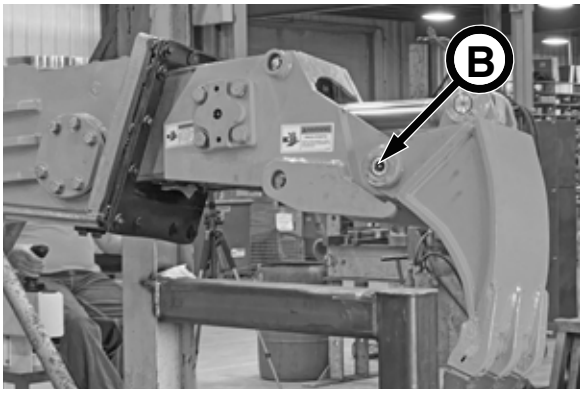
**30. CLEAN OUT CLEANOUT COVER**

Remove cleanout cover (A), and clean out debris. Be sure to replace cover when complete.

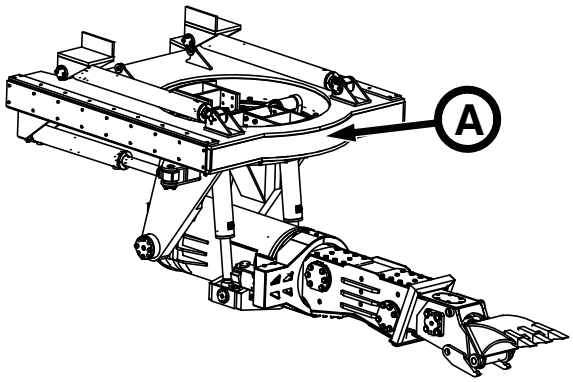



**31. LUBRICATE BUCKET FITTINGS**

Lubricate bucket fittings (B) (2 places) with Mobilegrease® XHP222 or equivelent until grease is forced out.



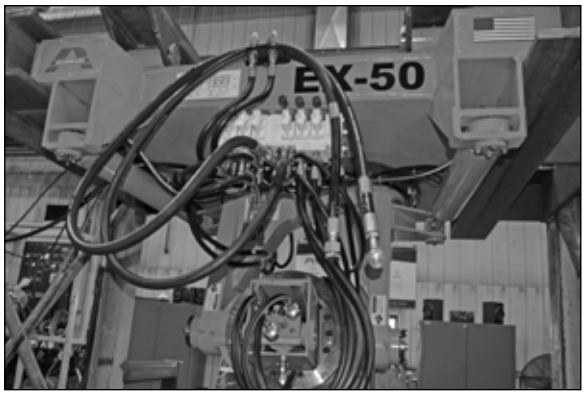
# COMPLETION OF EACH DRIVE




### 32. INSPECT LIFTING EYES

Inspect lifting eyes (C) for wear or damage. Worn or damaged lifting eyes MUST be replaced before lifting.

### 33. INSPECT HYDRAULIC HOSES & POWER CABLES




**⚠DANGER** If high voltage cables or cable connections are frayed, worn or damaged, contact with cables/connections will result in electrical shock causing severe injury or death.

With power in lockout, tagout, check electrical power cables and connections for fraying, wear or damage. If damaged, the cables must be replaced BEFORE operation. Be sure connections are secured.

Inspect ALL hydraulic hoses for cracks, wear or other damage. Repair or replace BEFORE operation.

### 34. INSPECT STRUCTURES


Perform a visual inspection of the EX-50 excavator, boring shield and all other system components for cracks, wear or other damage. Repair or replace BEFORE operation.

Check for oil leaks and debris buildup. Make repairs as needed and remove debris.

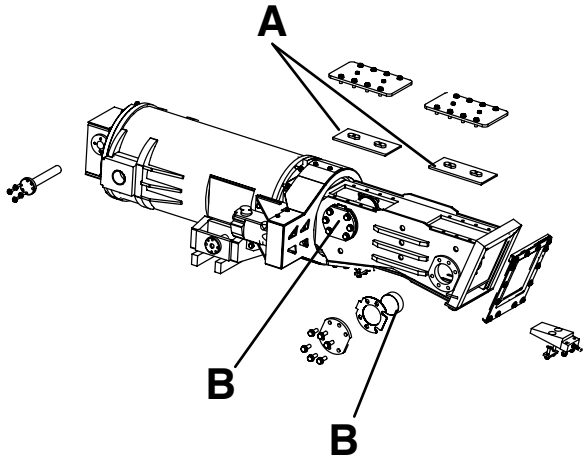
Check for loose, damaged or missing parts. Repair or replace any defective parts as necessary.

*(continued on next page)*

# AS REQUIRED

### 35. INSPECT TOP & SIDE WEAR PADS

Inspect the boom assembly top wear pads (A) (2 places) and side wear pucks (B) (4 places) for cracks, wear or other damage. If cracked, worn or damaged, replace BEFORE operation.




### 36. CHECK DRIVE TRAIN TENSION & LUBRICATE

1. Remove drive chain guard (not shown).

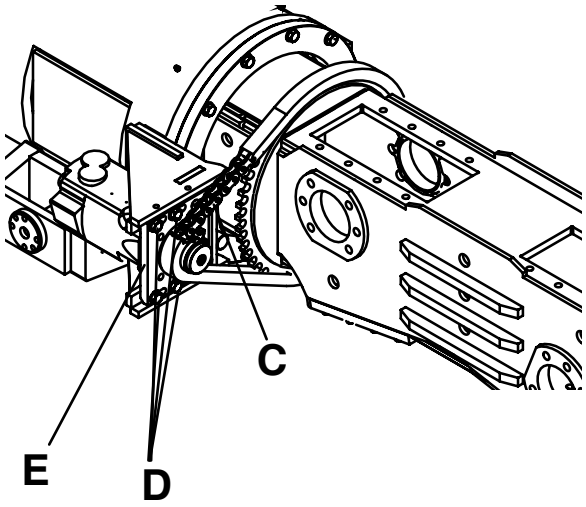
2. Inspect drive chain (C). If worn or damaged, replace with new.

3. Check chain tension. The center of the chain should have a maximum deflection of 1/4 in. (6.4 mm).

To adjust chain tension, loosen motor mount plate bolts (D) on motor mount plate (E) and tighten chain until the 1/4 in. (6.4 mm) deflection is achieved. Then retighten motor mount plate bolts.

4. Thoroughly lubricate drive chain (C) with a high quality chain lubricant.

Replace drive chain guard before operating (not shown).




*(continued on next page)*

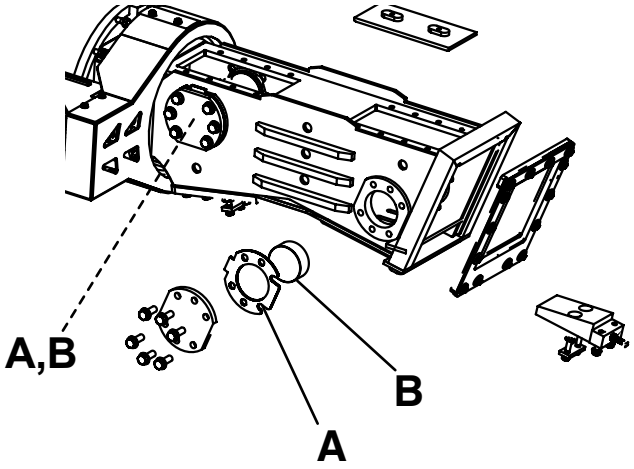
***As Required (continued)***

**37. ADJUST SIDE WEAR PUCKS**

1. Install equal number of shims (A) on each side wear puck (B) location.

2. Check that the boom can slide without chatter or vibration. If the boom is too tight, add an 0.02 inch shim (A) to each side's wear pads to achieve the closest possible clearance for the boom to operate without chatter/vibration. Repeat on the other side until the chatter/ vibration is alleviated.

**NOTE:** Wear pucks and shims contain wear resistant properties. Do not grease or lubricate wear pucks or shims.




**38. ADJUST ADJUSTER WEDGES**

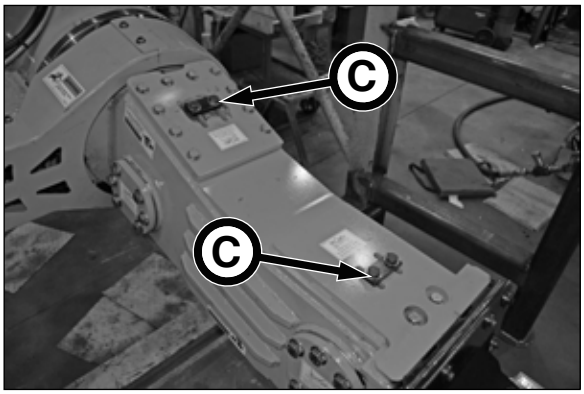
Adjust adjuster wedges (2 places) to achieve the closest possible clearance for the boom to operate without chatter/vibration.

1. To adjust adjuster wedges, loosen screws (C) (4 total) on the bottom side of the wedge ramps and tighten the wedge adjuster screws (D) on the back side of the wedges.

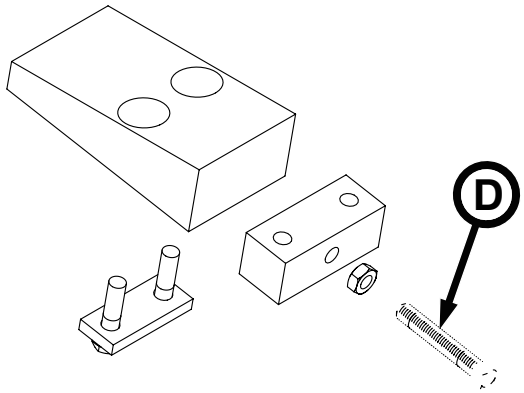
2. Repeat on the other adjuster wedge until chatter/ vibration is alleviated.

3. Re-tighten the bottom bolts (C) (4 total) to 74 ft-lb. (100 N·m) of torque after the adjustment has been made.

**NOTE:** Adjuster wedges contain wear resistant properties. Do not grease or lubricate adjuster wedges.




*Bottom side of EX-50 Boom Shown*




*Adjuster Wedge Assembly*

# NOTES

# Storage

## PREPARING FOR STORAGE

**NOTICE** Follow the lubrication and maintenance requirements in the Periodic Maintenance section.

1. Repair worn or damaged parts.
2. Wash all equipment thoroughly.
3. Lubricate all grease points. Grease threads on bolts used for adjustments.
4. Retract all hydraulic cylinders if possible. If not, coat exposed cylinder rods with a corrosion preventive.
5. Repaint equipment where necessary.
6. Drain hydraulic oil, flush oil reservoirs, change hydraulic filters, and refill hydraulic reservoirs. Check for leaks.
7. Wipe up lube spills. Dispose of rags and trash properly. Store oily rags and other flammable material in protective containers.
8. If possible, store equipment under cover and out of the weather in a ventilated area.
9. Remove laser guidance system and place it in the storage box.
10. Do not smoke in areas where flammable materials are stored.
11. Store fuels and lubricants in properly marked containers.

## REMOVING FROM STORAGE

**NOTICE** Follow the lubrication and maintenance requirements in the Periodic Maintenance section.

1. Clean equipment thoroughly.
2. Check to make sure all decals including safety decals are clean and readable.
3. Check condition of wires and cables. Repair or replace as necessary.
4. Remove the cylinder corrosion preventive from the cylinder rods if it is not compatible with hydraulic oil or seal materials.
5. Check for leaks. Repair or replace as necessary.
6. Check hydraulic oil level in reservoir. If fluid is low, check for leaks and add oil as required. Refer to Lubricants section.
7. Perform a oil analysis on the oil in the hydraulic reservoir. Replace the hydraulic oil and filters if the test reveals contamination.
8. Check the return filter indicators. Replace filter(s) as needed.
9. Check condition of all hoses and connections. Tighten, repair or replace with new as needed.
10. Before operating, cycle hydraulic functions several times to purge air from the hydraulic system.
11. Review this Operator's Manual.

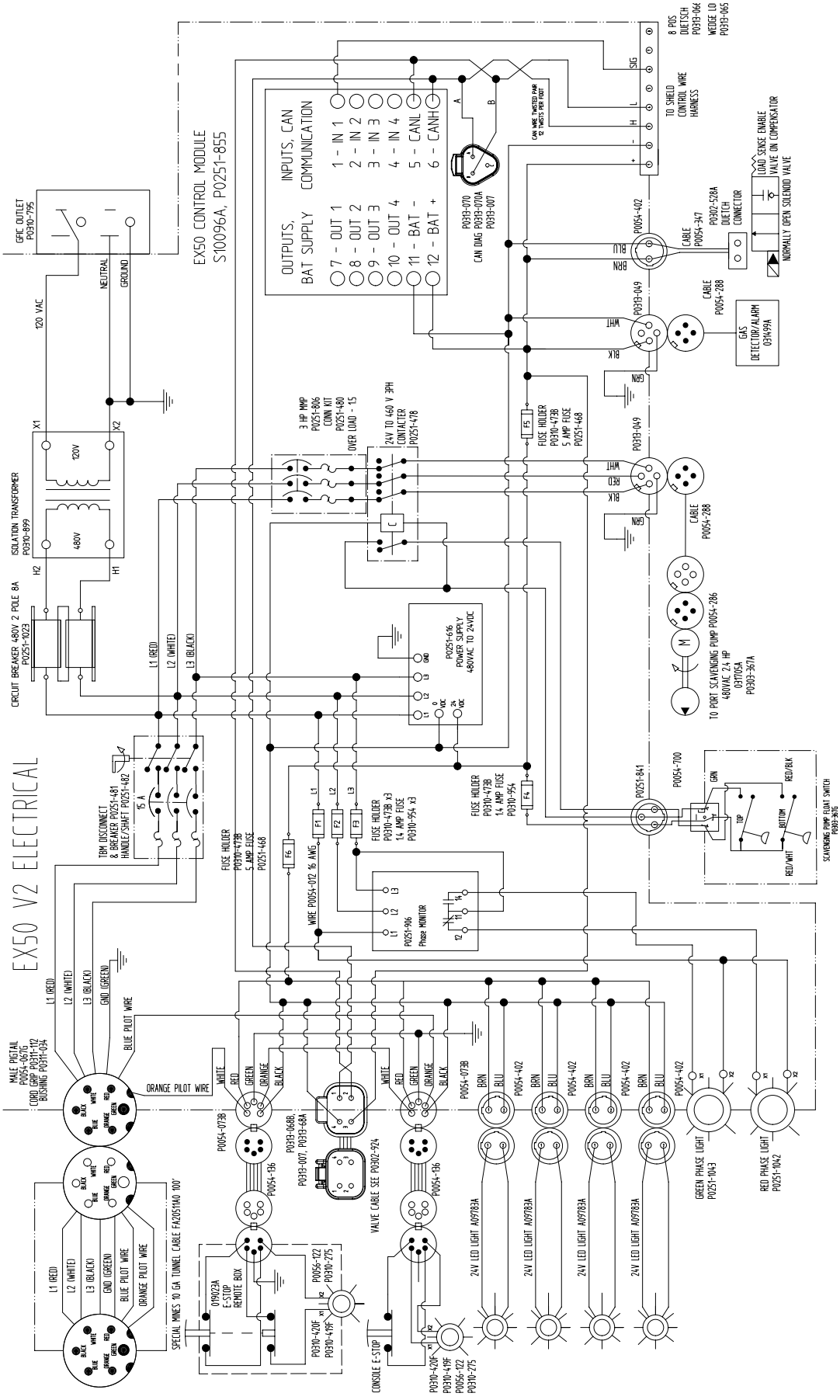
# NOTES

# Troubleshooting

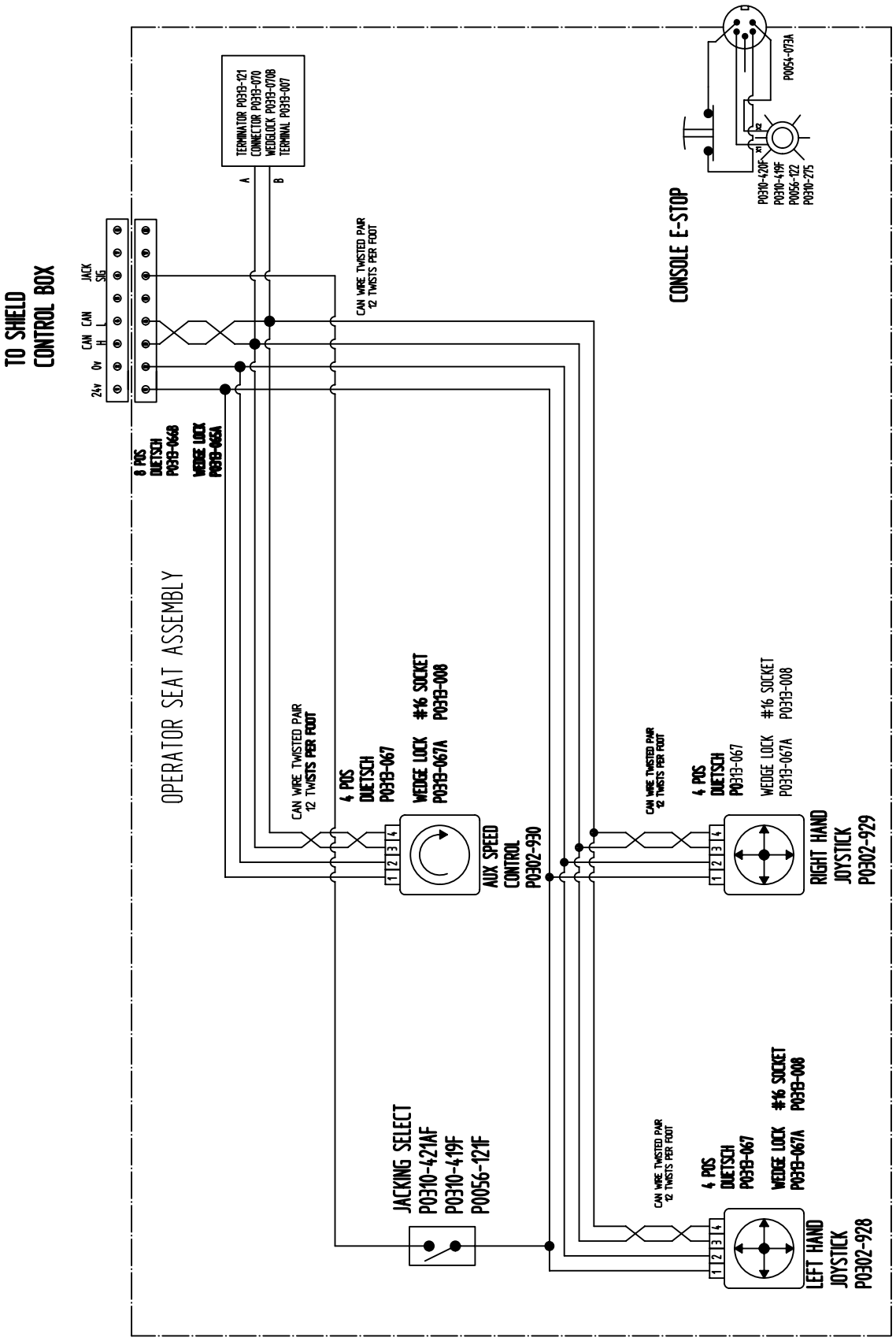
## EX-50 EXCAVATOR

| Problem | Cause | Solution |
|---|---|---|
| Excavator does not operate. | Improper phase power. | Contact electrician to correct phase. |
| | Power source is OFF. | Turn on power source. |
| | Motor is OFF. | Turn motor ON. |
| | Pump(s) are OFF. | Turn pumps ON. |
| | Improper motor rotation. | Electrician must re-wire motor for clockwise motor rotation. |
| | E-Stop is pushed in. | Pull out E-Stop button. |
| | CAN bus communication issue. | Correct CAN bus network issues. Ensure each node is seeing 60 ohms of resistance between CAN high and CAN low. |
| | Joystick operator presense switch issue. | Operator presense switch levers must be OFF when the system powers on. One switch must be on to operate EX-50 functions. |
| Joysticks movement does not cause EX-50 to move. | Operator's presense lever is not engaged. | Engage operator's presense lever and move joystick. |
| | Load sense hose is kinked, pinched or disconnected. | Unkink, unpinch or plug in load sense hose/cable. |
| Noise, chatter or vibration in EX-50 boom. | Additional clearance is needed. for wear pucks. | Added shims to either side of boom until resolved. |
| | Additional clearance is need for boom wedges. | Tighten or re-tighten the wedges to add or reduce clearance until resolved. |

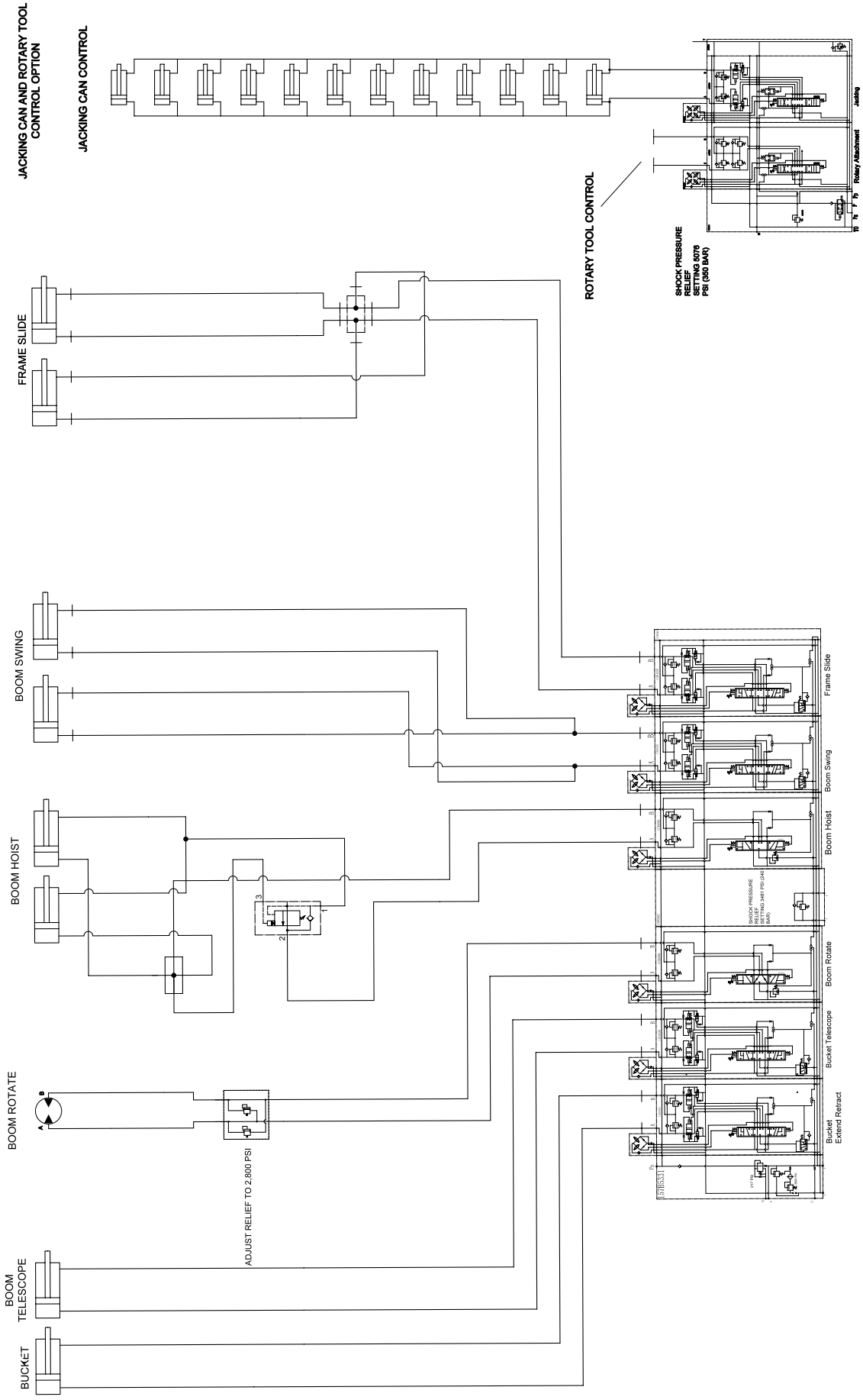
# ELECTRICAL - EX-50 MAIN POWER CONTROL BOX



# ELECTRICAL - EX-50 CONTROL CONSOLE

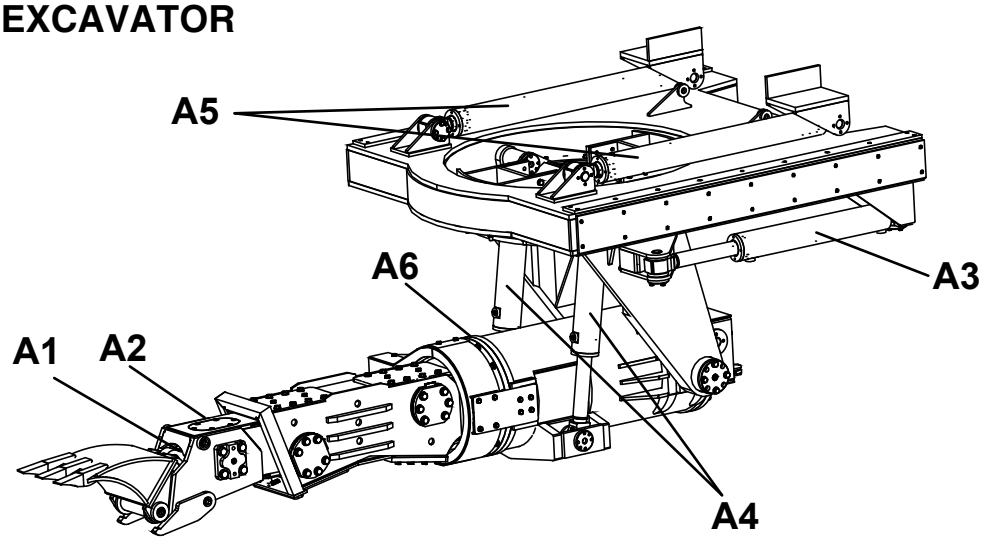


# HYDRAULICS - EX-50 BOOM



# Specifications

## EX-50 EXCAVATOR




**Excavating Power (Primary Functions) (in Pounds Force)**

Weight .....7,500 lbs

Bucket Cylinder (**A1**) ..... 11,600 lbf

Boom Extension Cylinder (**A2**) - 48 in.
- Extension ..... 24,000 lbf
- Retraction ..... 12,000 lbf

Boom Swing Cylinder (**A3**)

| Bucket Position | Bucket Ready | Bucket Rolled |
|---|---|---|
| Boom Retracted | 8,900 lbf | 10,700 lbf |
| Boom Extended | 5,800 lbf | 6,500 lbf |

Boom Hoist Cylinder (**A4**) - Bucket is ready

| Hoist Motion | Hoist Up | Hoist Down |
|---|---|---|
| Boom Retracted | 5,400 lbf. | 11,600 lbf |
| Boom Extended | 3,700 lbf | 7,900 lbf |

Frame Advance Cylinder (**A5**) - 36 in.
- Extension ..... 48,000 lbf
- Retraction ..... 24,000 lbf

**Boom Rotation** (**A6**) ..... Bi-Directional, 225 degrees

**Hydraulic Controls**

The EX-50 supply is fed by the 5200 pump unit (or other power support equipment) where the oil is dispersed to the main valve bank. Primary functions are proportionally controlled from the joysticks. Position functions are on/off controls.

A. Six Section Valve Bank ..... 30 gpm @ 3,000 psi
1. Boom Swing Control ..... Primary Function
2. Boom Extension Control ..... Primary Function
3. Boom Rotation Control .....Positioning Function
4. Bucket Control ..... Primary Function
5. Hoist Control ..... Primary Function
6. Frame Extension Control ..... Positioning Function

*Akkerman Inc. reserves the right to improve its product without notice or obligation.*

# TORQUE CHART

Use these torque values as a guideline when tightening hardware unless otherwise specified in this manual.

| Lubricated Coarse UNC Threads Grade 8 Fasteners | | | Lubricated Fine UNF Threads Grade 8 Fasteners | | |
|---|---|---|---|---|---|
| **Bolt Size** | **Torque ft. lbs.** | **(N·m)** | **Bolt Size** | **Torque ft. lbs.** | **(N·m)** |
| 1/4 - 20 | 10 | (14) | 1/4 - 28 | 11 | (15) |
| 5/16 - 18 | 20 | (27) | 5/16 - 24 | 22 | (30) |
| 3/8 - 16 | 35 | (47) | 3/8 - 24 | 39 | (53) |
| 7/16 - 14 | 56 | (76) | 7/16 - 20 | 62 | (84) |
| 1/2 - 13 | 85 | (115) | 1/2 - 20 | 96 | (130) |
| 9/16 - 12 | 123 | (167) | 9/16 - 18 | 137 | (186) |
| 5/8 - 11 | 170 | (231) | 5/8 - 18 | 192 | (260) |
| 3/4 - 10 | 301 | (408) | 3/4 - 16 | 336 | (456) |
| 7/8 - 9 | 450 | (610) | 7/8 - 14 | 500 | (678) |
| 1 - 8 | 680 | (922) | 1 - 12 | 740 | (1003) |
| 1-1/8 - 7 | 960 | (1302) | 1-1/8 - 12 | 1030 | (1397) |
| 1-1/4 - 7 | 1360 | (1844) | 1-1/4 - 12 | 1500 | (2034) |
| 1-1/2 - 6 | 2360 | (3200) | 1-1/2 - 12 | 2660 | (3607) |

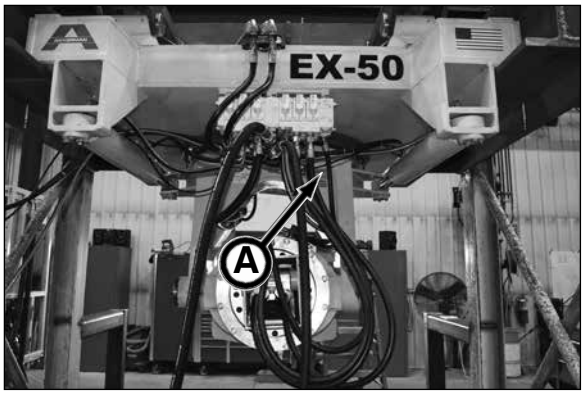
# Identification Numbers

Model and serial numbers are required when ordering parts or requesting service information. Record your model and serial number below.

**EX-50 EXCAVATOR (A)**

Model Number _____

Serial Number _____



# NOTES

# Safety Data Sheets

The Federal Occupational, Safety, and Health Administration (OSHA) Standard 29 CFR 1910.1200, require that specific safety data sheets (SDS) be available to employees before operating this equipment. This may include information on substances contained in this equipment such as fuel and gear lubricant.

Akkerman Inc. will provide, at no cost, SDS which apply to its product line. Simply contact your Akkerman Aftermarket Support representative for a copy.

To ensure a prompt response to your SDS request, include your return address (including zip or postal code) and the equipment's model numbers and serial numbers with your request.

# NOTES

# Warranty

Akkerman warrants that all equipment manufactured by it be free from defects due to workmanship or material when normally used and serviced for a period of 90 days from the date of shipment by Akkerman. Normal wear and tear to the equipment, including, but not limited to, wear on the cutter face tooling, hydraulic filters, augers, casings, slurry line and seals is not covered by this warranty. Akkerman does not warrant that the equipment meets the requirements of any particular safety code or rule governing equipment classification. If the Customer has questions about local safety codes, rules or ordinances, authorities local to the project should be consulted.

In order to be considered as a potential warranty claim, the component in question must be returned to Akkerman (freight prepaid) for factory inspection and analysis, and determination of warranty applicability. No warranty is provided for electronics or electrical components of any kind. The validity of all warranty claims are subject to the discretion and determination of the Akkerman Aftermarket Support Department. All such determinations are final.

# NOTES

# Parts
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# INTRODUCTION

This parts section of the manual contains assembly illustrations of the Akkerman EX-50 Excavator. The illustrations in this section are intended to show typical construction of various parts. In some instances, the details of parts illustrated may not exactly represent their actual appearance, but will help to identify parts performing the same functions.

LOCATING PARTS

This manual is organized to help you locate parts information quickly. An Alphabetical Index, Section 17, is provided to determine the page number of the assembly a part is used. If the part number is known, the Numerical Index, Section 18, can also be utilized to find the page number of the assembly.

USE GENUINE AKKERMAN PARTS

The use of second-rate parts could affect the efficient performance of the EX-50 Excavator. ALWAYS use genuine Akkerman parts.

PARTS ORDERING

To order fast, accurate, and reliable parts service, call (800) 533-0386, (507) 567-2261, or fax (507) 567-2720, and provide the following information.

1. Model Number
2. Serial Number
3. Part Number, Description, and Quantity
4. Shipping Preference

MEASUREMENTS

The unit of measure in this manual is in inches unless indicated otherwise.

HARDWARE SPECIFICATION

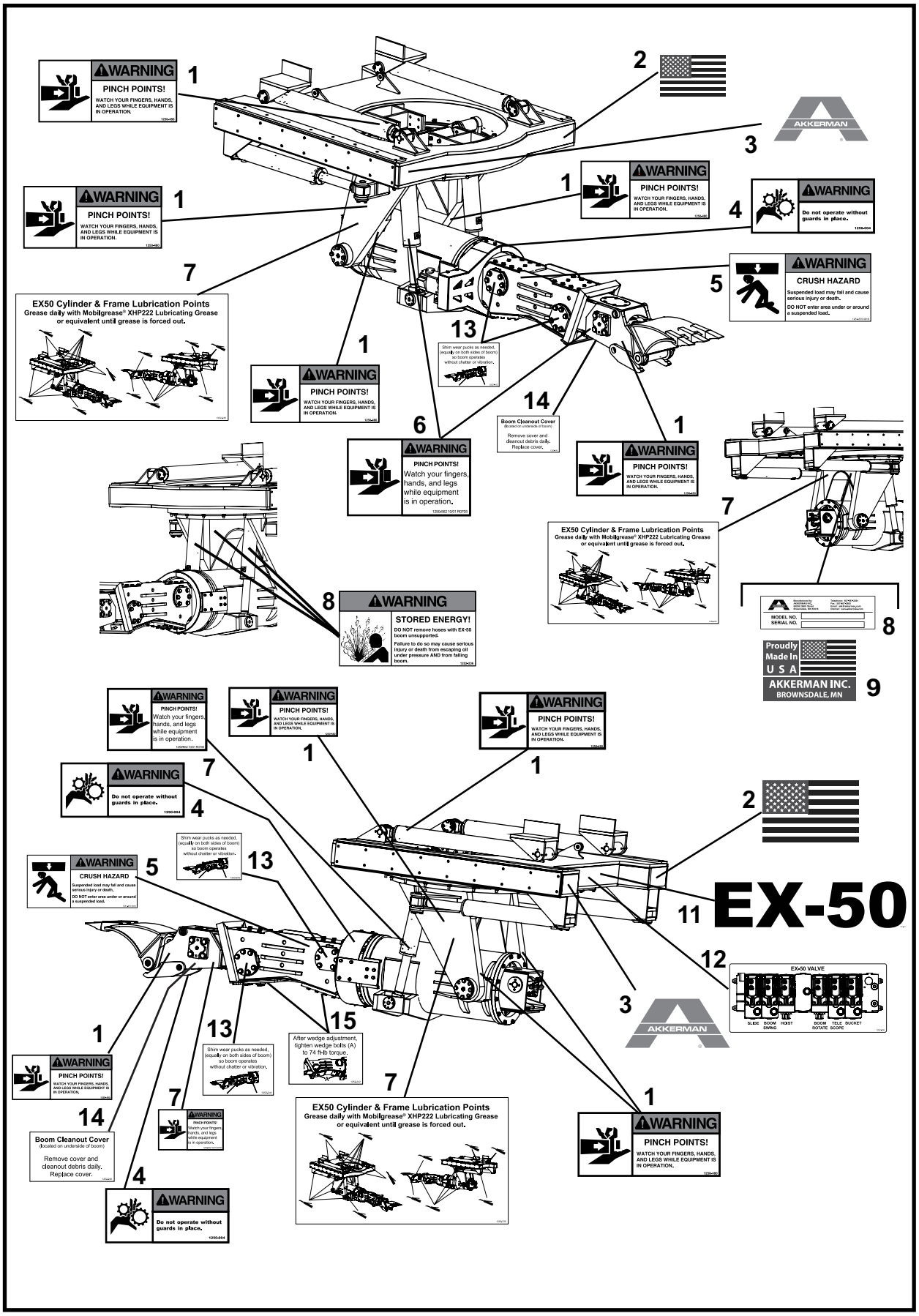
All Akkerman products are assembled with SAE Grade 8 bolts, nuts, and washers. ALWAYS use matched fastener hardware when replacing or repairing the unit.

If you find any errors with this manual or have any suggestions for improvement, please let us know. Mail your suggestions to:
Akkerman Inc., ATTN: Technical Publications, 58256 266th Street, Brownsdale, MN 55918.

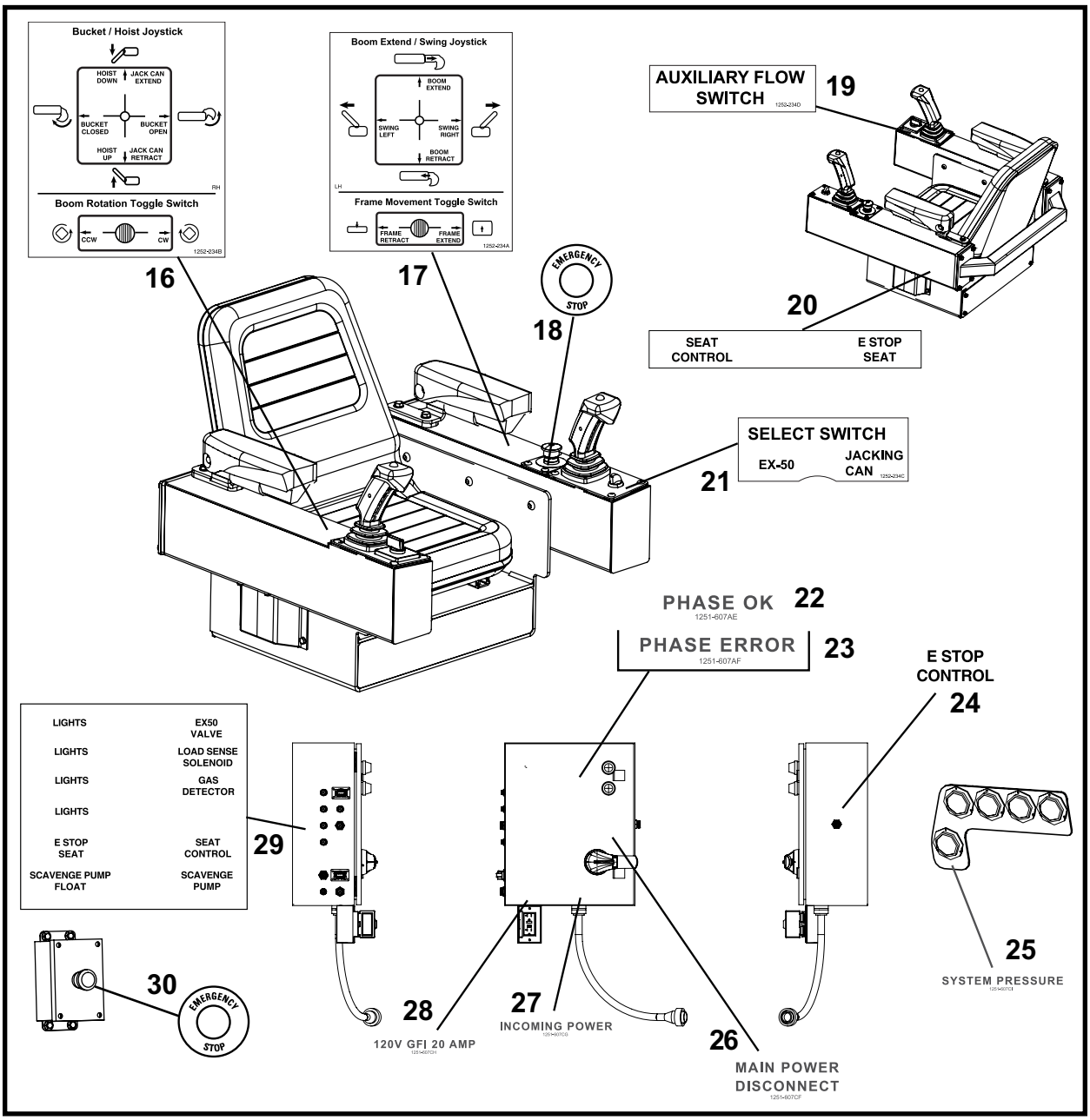
*Akkerman Inc. reserves the right to improve its product without notice or obligation.*

# NOTES

# EX-50 DECAL KIT, 1255-136



# EX-50 DECAL KIT, 1255-136



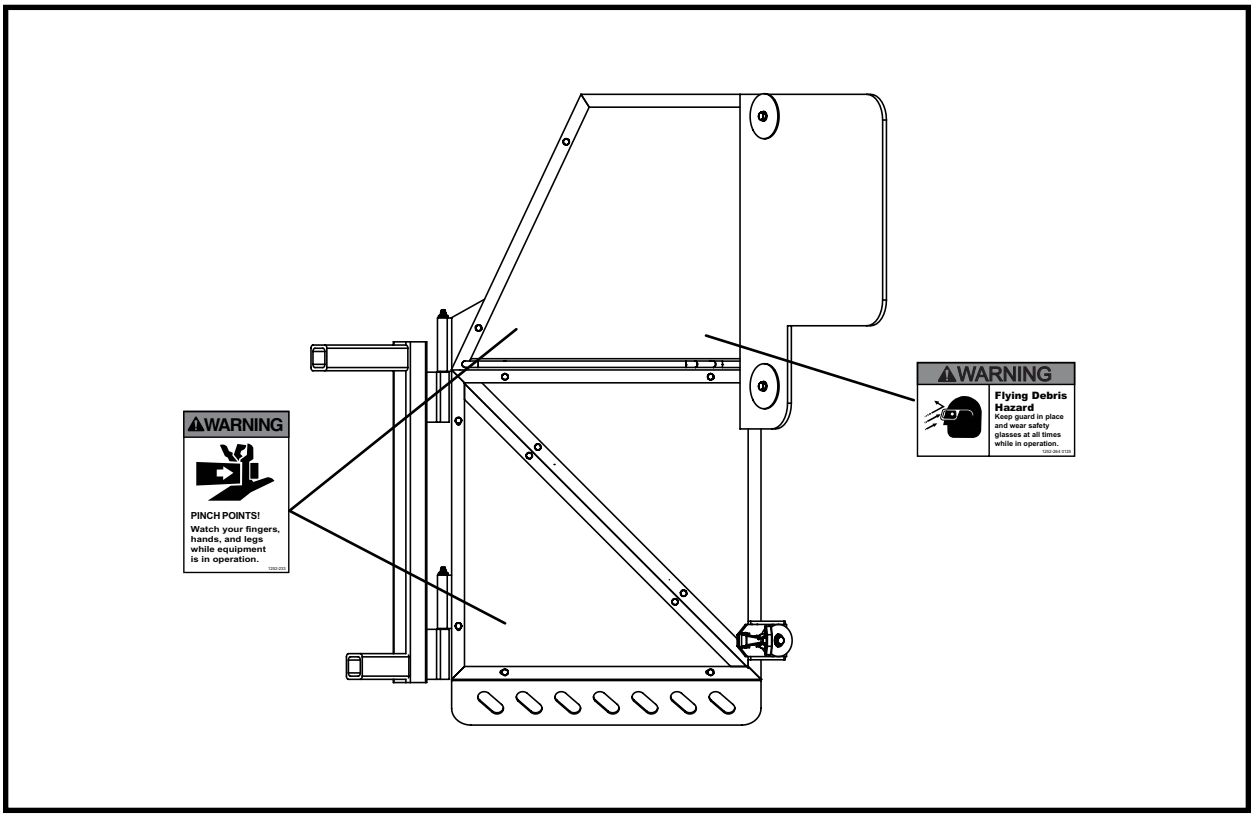

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 1255-136 | KIT, Decal EX-50 |
| 1 | 10 | 1250-480 | DECAL, Warning Pinch Points |
| 2 | 2 | 1250-558 | DECAL, Flag |
| 3 | 2 | 1251-246 | DECAL, Akkerman Logo - Large |
| 4 | 3 | 1250-004 | DECAL, Warning Guards In Place |
| 5 | 2 | 1251-875 | DECAL, Warning Suspended Load |
| 6 | 4 | 1250-562 | DECAL, Warning Pinch Points |
| 7 | 3 | 1252-235 | DECAL, EX-50 Cylinder & Frame Lube Points |
| 8 | 3 | 1252-236 | DECAL, Warning Stored Energy |
| 9 | 1 | - | PLATE, Serial Number |
| 10 | 1 | 1250-544 | DECAL, Made In USA |
| 11 | 1 | 1251-377 | DECAL, Model EX-50 |
| 12 | 1 | 1252-238 | DECAL, EX-50 Valve |

*(Continued on next page)*

# EX-50 DECAL KIT, 1255-136

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 13 | 4 | 1252-242 | DECAL, Shim Wear Pucks |
| 14 | 2 | 1252-240 | DECAL, Boom Cleanout Cover |
| 15 | 2 | 1252-241 | DECAL, Wedge Bolt Torque |
| 16 | 1 | 1252-234B | DECAL, Bucket Hoist Joystick |
| 17 | 1 | 1252-234A | DECAL, Boom Extend - Swing Joystick |
| 18 | 1 | P0310-474F | DECAL, Emergency Stop |
| 19 | 1 | 1252-234D | DECAL, Aux Flow Switch |
| 20 | 1 | 1252-237B | DECAL, Seat Control - E-Stop |
| 21 | 1 | 1252-234C | DECAL, Select Switch |
| 22 | 1 | 1251-607AE | DECAL, Phase OK. |
| 23 | 1 | 1251-607AF | DECAL, Phase Error |
| 24 | 1 | 1252-237C | DECAL, E-Stop Control |
| 25 | 1 | 1251-607CI | DECAL, System Pressure |
| 26 | 1 | 1251-607CF | DECAL, Main Power Disconnect |
| 27 | 1 | 1251-607CG | DECAL, Incoming Power |
| 28 | 1 | 1251-607CH | DECAL, 120V GFI 20 AMP |
| 29 | 1 | 1252-237A | DECAL, Electric Box Labels |
| 30 | 1 | P0310-474F | DECAL, Emergency Stop |

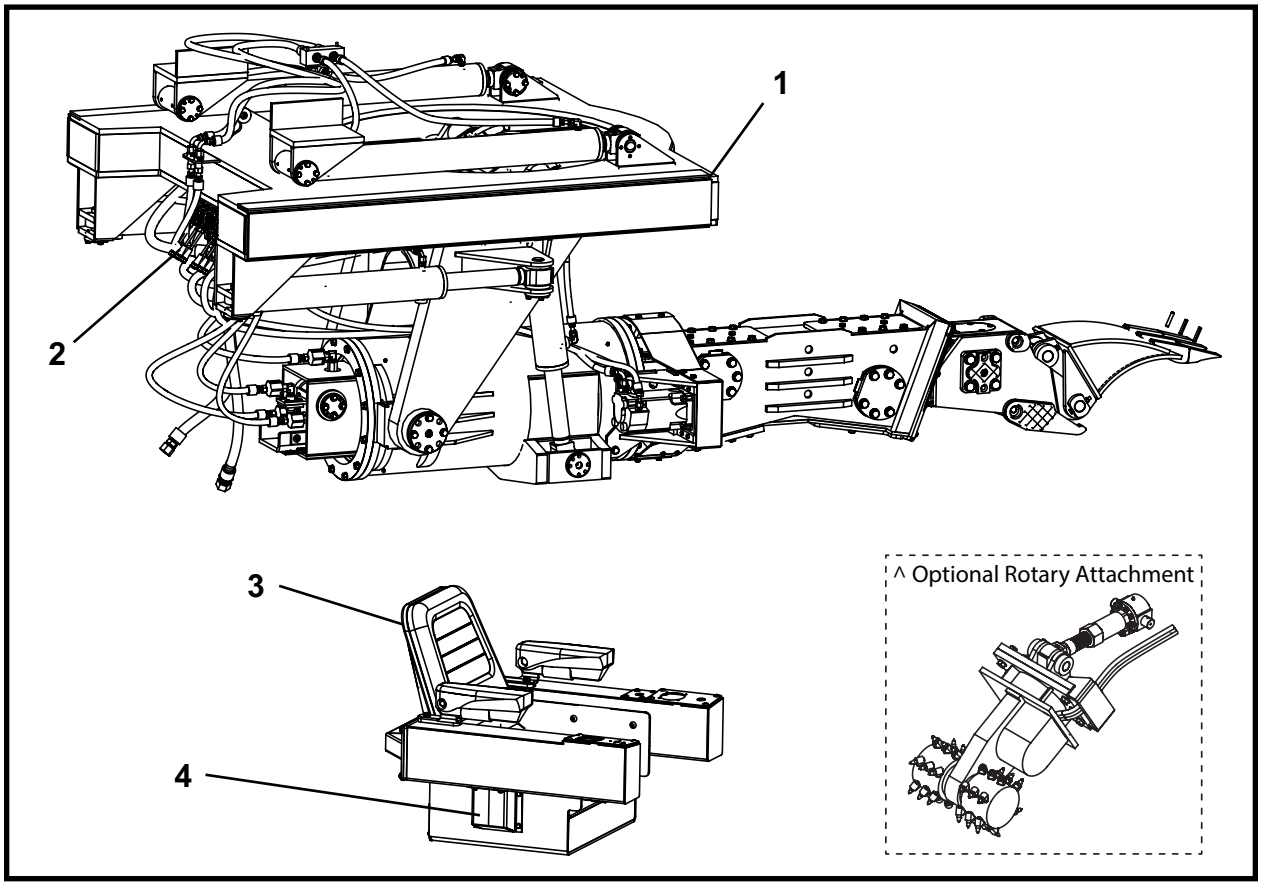
# EX-50 OPERATOR SHIELD DECAL KIT, 1255-142




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 1255-142 | KIT, Decal EX-50 Operator Shield Rotary Tool |
| 1 | 2 | 1252-233 | DECAL, Warning, Pinch Points Vertical |
| 2 | 1 | 1252-264 | DECAL, Warning, Flying Debris |

# NOTES

# ARM & HYDRAULICS ASSEMBLY, F62687F

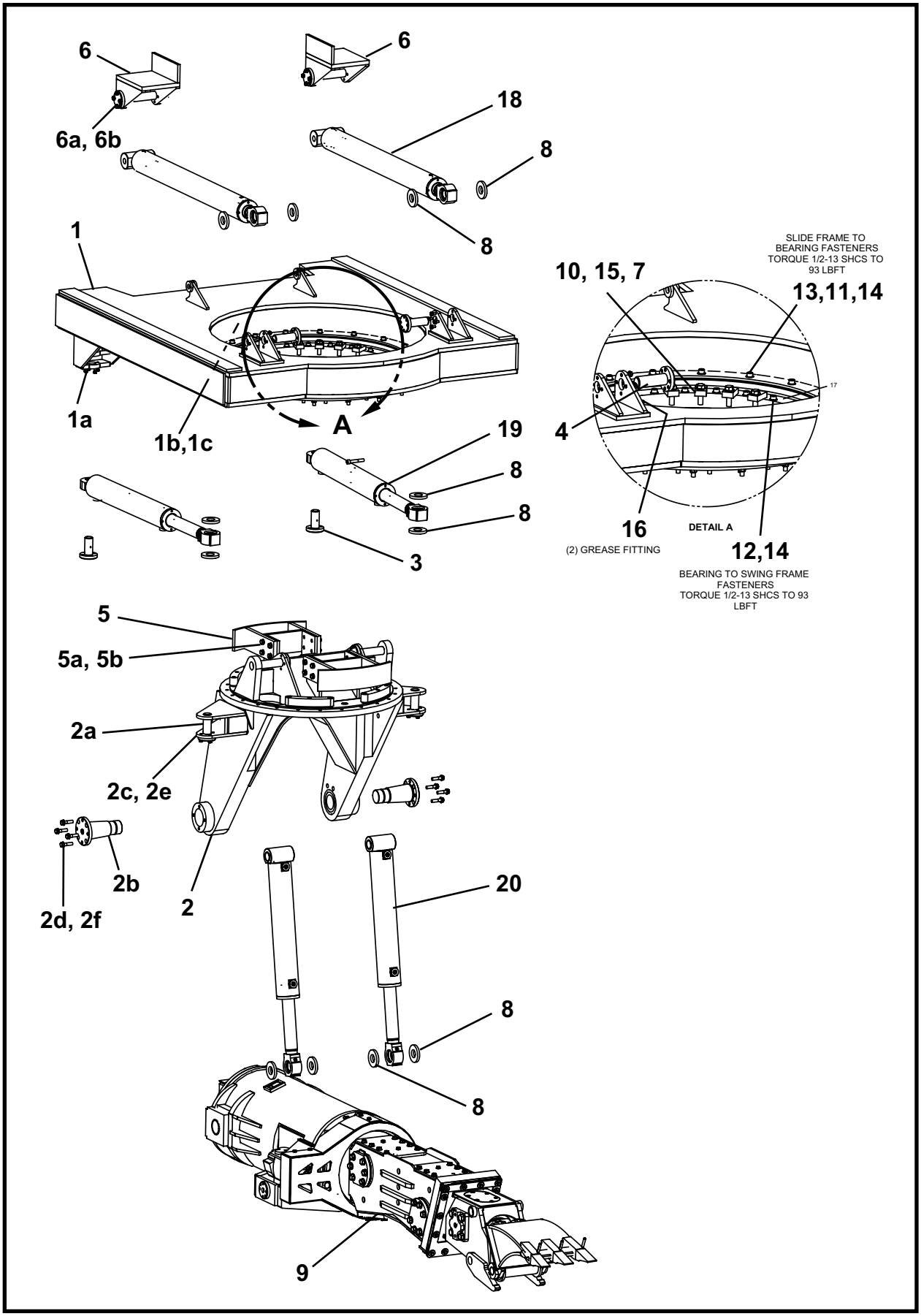



| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | F62687F | ARM & HYDRAULIC - EX-50 ASSEMBLY |
| 1* | 1 | 061612A | ASSEMBLY, Excavator & Hoist |
| 2* | 1 | 062155A | ASSEMBLY, Boom Hydraulics |
| 3* | 1 | 062158A | ASSEMBLY, Operator Seat |
| 4** | 1 | 062212A | ASSEMBLY, Electrical EX-50 |

* Refer to this section for parts information.
** Not part of F62687F assembly.

^ A rotary cutter attachment option is available. Refer to Drum Cutter Kit, 06003A in this section.

# EXCAVATOR & HOIST ASSEMBLY, 061612A



# EXCAVATOR & HOIST ASSEMBLY, 061612A

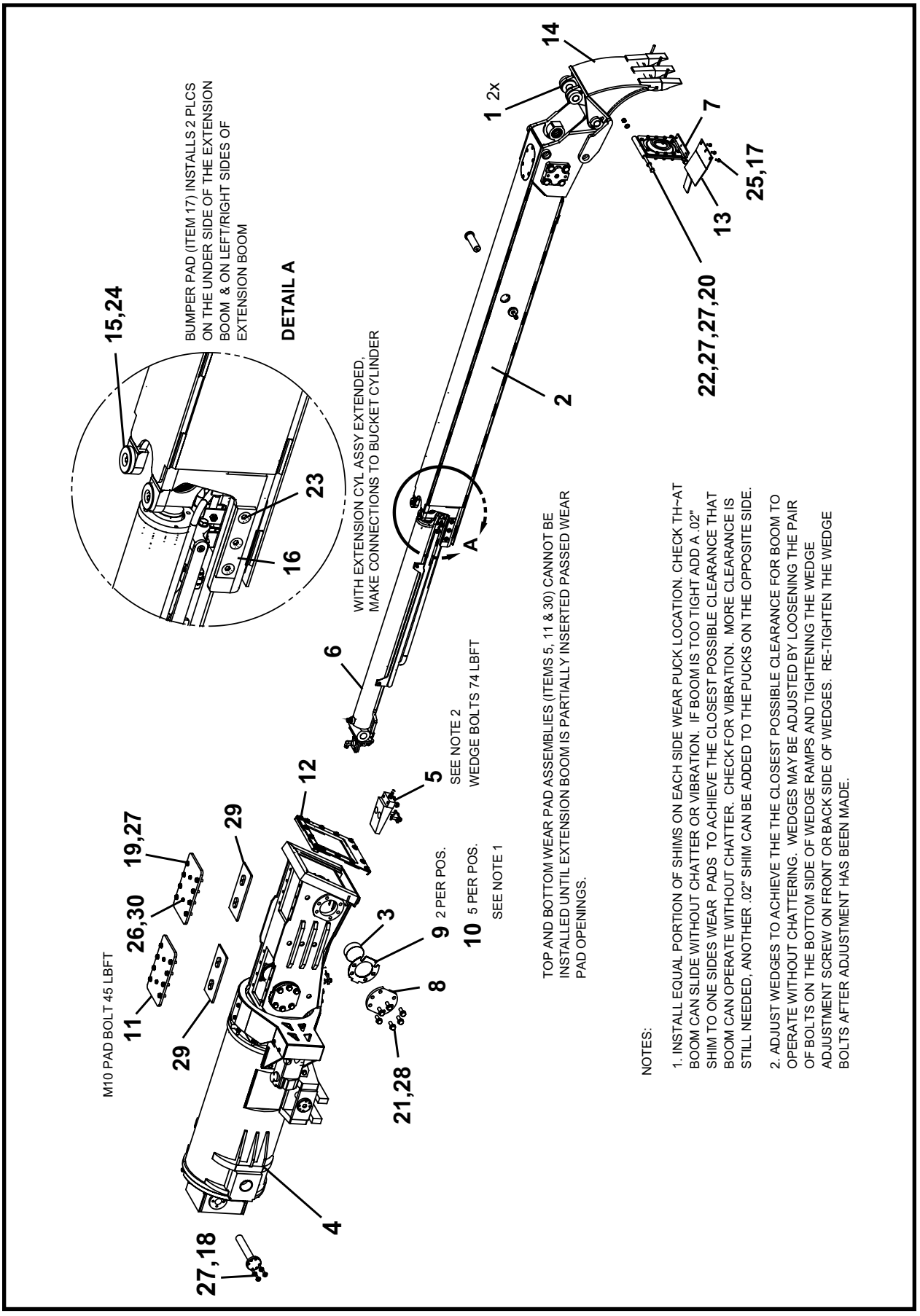
| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 061612A | EXCAVATOR & HOIST ASSEMBLY |
| 1 | 1 | 008805A01 | FRAME, Slide (Includes items 1a - 1c) (Standard) |
| 1a | 8 | P0001-06-005 | BOLT, Hex 3/8 UNC x 1.25 |
| 1b | 6 | P0040-005 | WASHER, Hardened Flat 5/16 |
| 1c | 6 | P0001-05-003 | BOLT, Hex 5/16 UNC x .75 |
| 2 | 1 | 008810A05 | FRAME, Hoist & Swing (Includes items 2a - 2f) |
| 2a | 2 | 008957P00 | PIN, Frame Slide |
| 2b | 2 | 061575P | PIN, Hoist Pivot |
| 2c | 8 | P0001-06-005 | BOLT, Hex 3/8 UNC x 1.25 |
| 2d | 8 | P0001-08-008 | BOLT, Hex 1/2 UNC x 2 |
| 2e | 8 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 2f | 8 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 3 | 2 | 008879P00 | PIN, Swing Cylinder |
| 4 | 2 | 008957P00 | PIN, Frame Slide |
| 5 | 2 | 009080A00 | HANGER, Safety (Includes items 5a - 5b) |
| 5a | 8 | P0001-08-006 | SCREW, Hex Cap 1/2 UNC x 1.5 |
| 5b | 8 | P0045-008 | WASHER, Lock 1/2 |
| 6 | 2 | 009822A00 | FRAME SLIDE, Back Clevis (Includes items 6a - 6b) |
| 6a | 1 | 008958P00 | PIN, Frame Slide |
| 6b | 4 | P0001-06-005 | BOLT, Hex 3/8 UNC x 1.25 |
| 7 | 14 | 011115P00 | BAR, Safety |
| 8 | 12 | 021057P00 | ROD |
| 9* | 1 | 061510A | ASSEMBLY, Boom |
| 10 | 14 | P0001-10-009 | BOLT, Hex 5/8 UNC x 2.25 |
| 11 | 18 | P0013-08-000 | NUT, Lock Flex 1/2 |
| 12 | 24 | P0031-08-012 | SCREW, Socket Head Cap 1/2 UNC x 3 |
| 13 | 18 | P0031-08-018 | SCREW, Socket Head Cap 1/2 UNC x 4.5 |
| 14 | 78 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 15 | 14 | P0040-010 | WASHER, Hardened Flat 5/8 |
| 16 | 2 | P0063-004 | FITTING, Grease 1/8-NPT Straight |
| 17 | 1 | P0065-069 | BEARING |
| 18^ | 2 | P0307-247 | CYLINDER, Frame Slide |
| 19^ | 2 | P0307-248 | CYLINDER, Swing Frame |
| 20^ | 2 | P0307-249 | CYLINDER, Boom Hoist |
| 21** | 1 | 1255-136 | KIT, Decal EX-50 V2 (Not Shown) |

* The 2” slide frame, 013252A is available by special request. The 013252A slide frame is used in smaller shield units, 102” diameter and less. Contact your Akkerman Aftermarket Support representative for more information.

** Refer to this section for parts information.

^ This cylinder uses Seal Kit, P0307-254.

# BOOM ASSEMBLY, 061510A

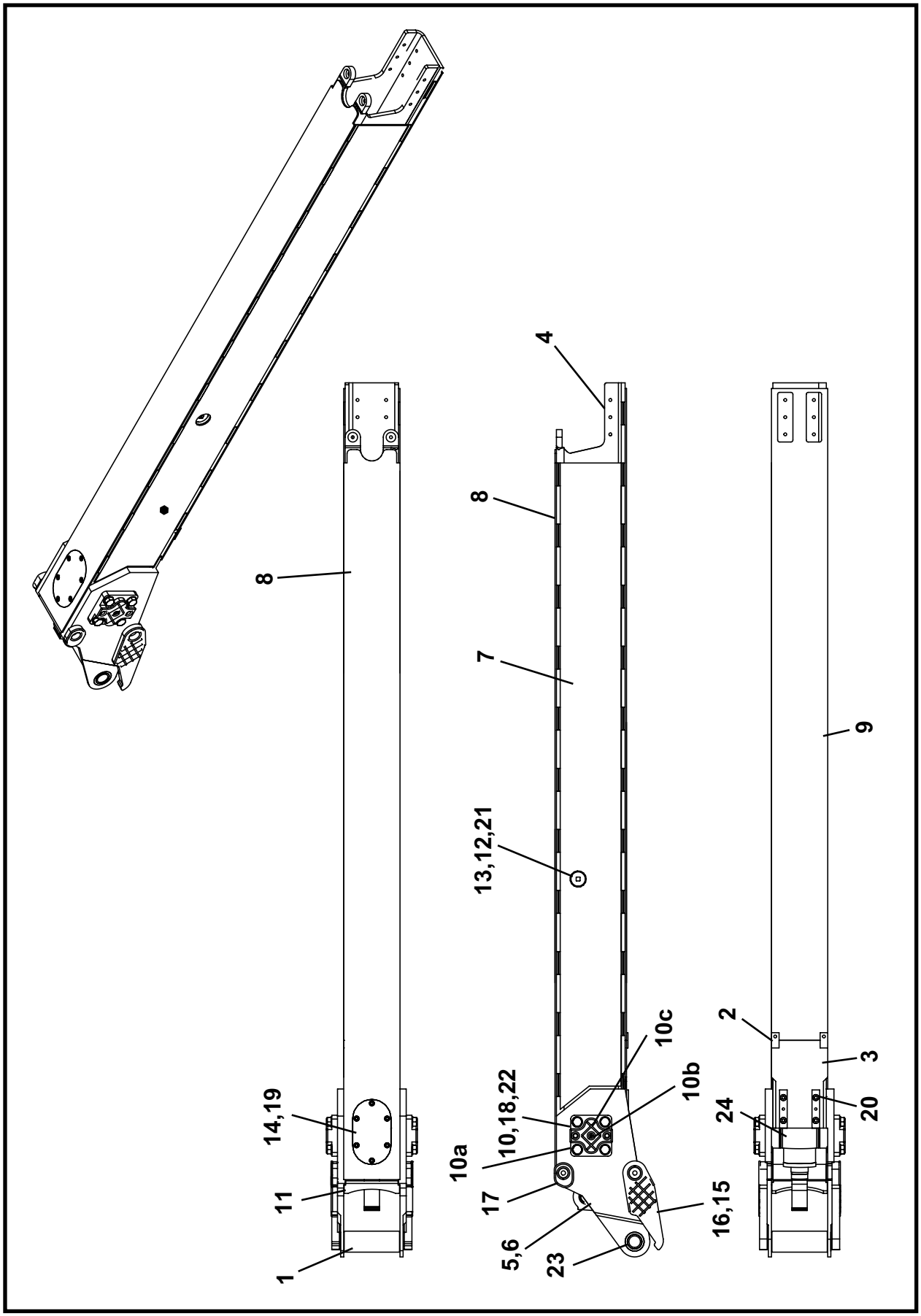


# BOOM ASSEMBLY, 061510A

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 061510A | BOOM ASSEMBLY, EX-50-02 |
| 1 | 2 | 021057P00 | ROD |
| 2* | 1 | 061383A | BOOM, Inner |
| 3 | 4 | 061444P | PUCK, Wear 4 |
| 4* | 1 | 061448A | BOOM, Rotary |
| 5* | 2 | 061456A | ADJUSTER, Wedge |
| 6* | 1 | 061489A | ASSEMBLY, Extend Cylinder & Power Chain |
| 7* | 1 | 061503A | GUARD, Dirt |
| 8 | 4 | 061504P | COVER, Wear Puck |
| 9 | 8 | 061505P | SHIM, Puck Cover - 1 mm |
| 10 | 20 | 061506P | SHIM, Puck Cover -1/2 mm |
| 11 | 2 | 061507P | MOUNT, Wear Pad |
| 12* | 1 | 062317A | SEAL, Telescopic Boom |
| 13 | 1 | 062330P | PLATE, Cleanout |
| 14* | 1 | 062412A | BUCKET, Standard |
| 15 | 2 | 062454P | BUMPER, Telescopic Boom |
| 16 | 4 | 062456P | PAD, Telescopic Boom Bumper |
| 17 | 3 | P0001-05-003 | BOLT, Hex 5/16 UNC x .75 |
| 18 | 4 | P0001-06-006 | BOLT, Hex 3/8 UNC x 1.5 |
| 19 | 16 | P0001-08-005 | SCREW, Hex Cap 1/2 UNC x 1.25 |
| 20 | 2 | P0001-08-040 | BOLT, Hex 1/2 UNC x 10 |
| 21 | 24 | P0001-10-007 | BOLT, Hex 5/8 UNC x 1.75 |
| 22 | 2 | P0003-08-000 | NUT, Hex 1/2 UNC |
| 23 | 12 | P0030-06-003 | SCREW, Flat Head Socket Cap 3/8 x .75 |
| 24 | 2 | P0030-06-004 | SCREW, Flat Head Cap 3/8 UNC x 1 |
| 25 | 3 | P0040-005 | WASHER, Hardened Flat 5/16 |
| 26 | 4 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 27 | 24 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 28 | 24 | P0040-010 | WASHER, Hardened Flat 5/8 |
| 29 | 2 | P0066-134 | PAD, Wear |
| 30 | 4 | PM10A-1.50-020 | BOLT, Hex M10 x 1.50 x 20 10.9 |

* Refer to this section for parts information.

# INNER BOOM ASSEMBLY, 061383A

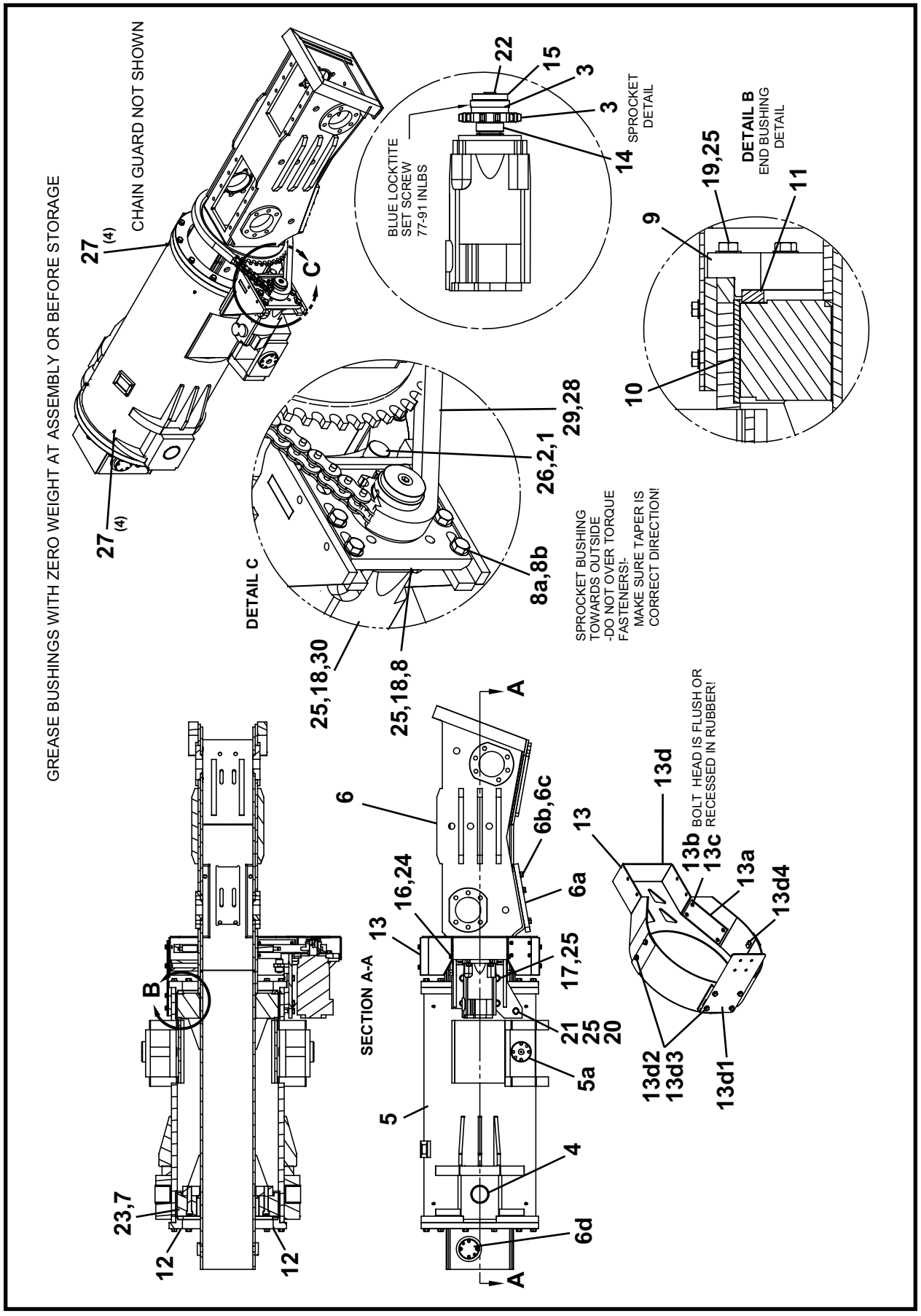


# INNER BOOM ASSEMBLY, 061383A

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 061383A | INNER BOOM ASSEMBLY |
| 1 | 1 | - | BUSHING, Bucket Mounting - Extension Boom |
| 2 | 2 | - | BAR, Mount |
| 3 | 1 | - | EXTENSION, Wear Plate |
| 4 | 1 | - | CORE, Extension Boom |
| 5 | 1 | - | PLATE, Boom End - Right |
| 6 | 1 | - | PLATE, Boom End - Left |
| 7 | 2 | - | WEAR PLATE, Inner Boom - Side |
| 8 | 1 | - | WEAR PLATE, Inner Boom - Top |
| 9 | 1 | - | WEAR PLATE, Inner Boom - Bottom |
| 10 | 2 | 061400A | BEARING, Bucket Cylinder (Includes items 10a - 10c) |
| 10a | 1 | 061399P | MOUNT, Bucket Cylinder Flange |
| 10b | 1 | P0063-001 | FITTING, Grease 1/4-28 Straight |
| 10c | 1 | P0065-086 | BEARING |
| 11 | 1 | - | GUSSET, Inner Boom |
| 12 | 1 | 061402P | BUSHING, Pin Retainer |
| 13 | 1 | 061403P | PIN, Extension Cylinder - Inner Boom |
| 14 | 1 | 061492P | COVER, Top Access |
| 15 | 1 | - | STOP, Bucket - Right |
| 16 | 1 | - | STOP, Bucket - Left |
| 17 | 2 | - | GUARD, Bolt Head |
| 18 | 8 | P0001-12-007 | BOLT, Hex 3/4 UNC x 1.75 |
| 19 | 6 | P0030-05-003 | SCREW, FLAT Socket Head Cap 5/16 UNC x .75 |
| 20 | 4 | P0030-06-003 | SCREW, FLAT Head Socket Head Cap 3/8 UNC x .75 |
| 21 | 1 | P0031-08-005 | SCREW, Socket Head Cap 1/2 UNC x 1.25 |
| 22 | 8 | P0040-012 | WASHER, Hardened Flat 3/4 |
| 23 | 2 | P0066-046 | BUSHING |
| 24* | 1 | P0307-246 | ASSEMBLY, Trunnion Mount Cylinder |

* This cylinder uses Seal Kit, P0307-254.

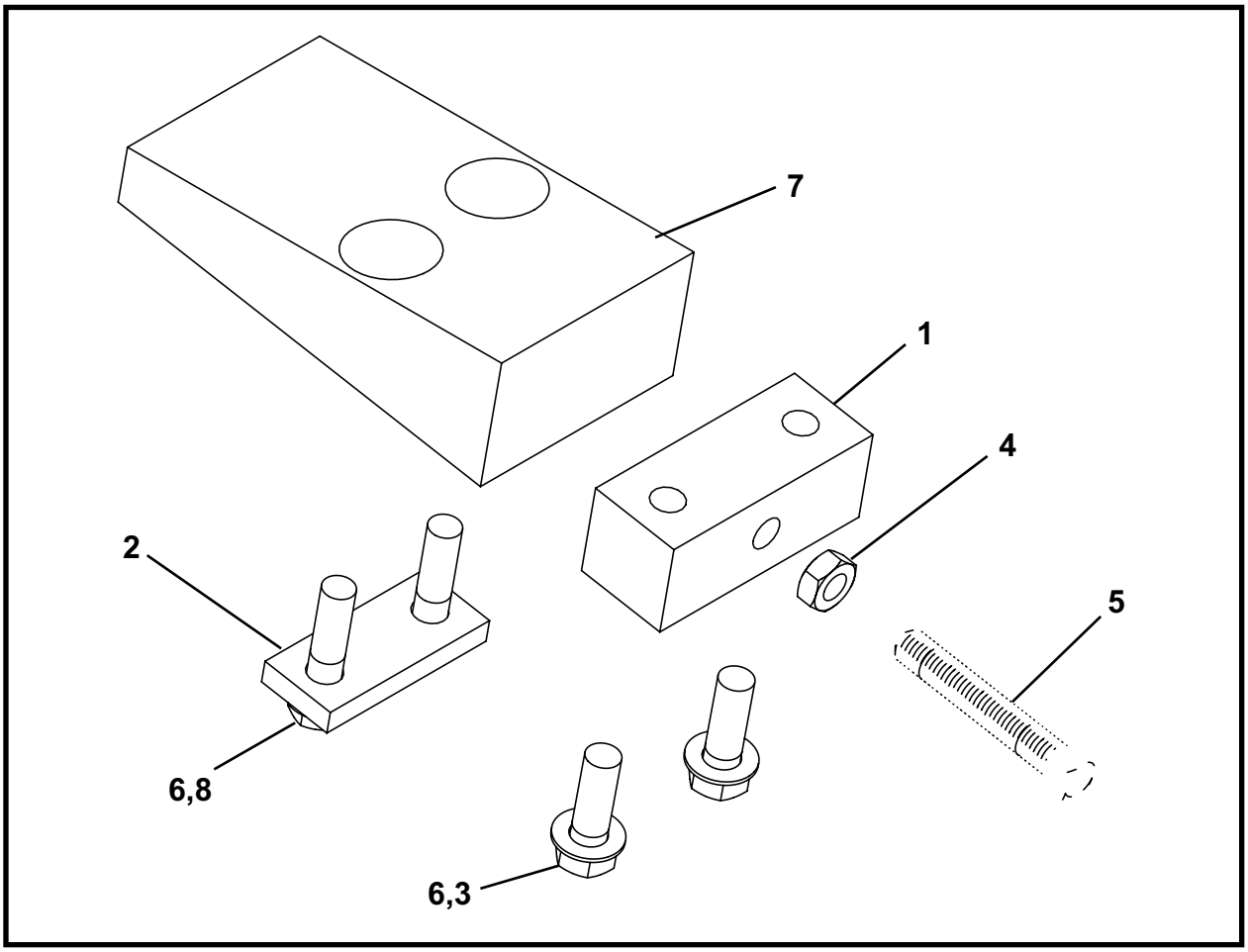
# ROTARY BOOM ASSEMBLY, 061448A



# ROTARY BOOM ASSEMBLY, 061448A

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 061448A | ROTARY BOOM ASSEMBLY |
| 1 | 1 | 007551P00 | STOP, Boom |
| 2 | 1 | 007552P00 | STOP, Boom |
| 3 | 1 | 011074P00 | SPROCKET |
| 4 | 2 | 061418P | BUSHING, Excavator Pivot |
| 5 | 1 | 061419A | HOUSING, Rotator (Includes item 5a) |
| 5a | 2 | 008877P00 | PIN, Hoist Cylinder |
| 6 | 1 | 061423A | OUTER BOOM - Excavator (Includes items 6a -6d) |
| 6a | 1 | 061439P | PLATE, Bottom |
| 6b | 8 | P0001-08-006 | SCREW, Hex Cap 1/2 UNC x 1.5 |
| 6c | 8 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 6d | 1 | 008878P00 | PIN, Boom Extension Cylinder |
| 7 | 1 | 061430P | PLATE, Rear Rotary Boom |
| 8 | 1 | 061445A | MOUNT, Motor - Rotation Drive (Includes items 8a - 8b) |
| 8a | 6 | P0001-08-006 | SCREW, Hex Cap 1/2 UNC x 1.5 |
| 8b | 4 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 9 | 1 | 061446P | RETAINER RING, Rotator Housing |
| 10 | 2 | 061447P | BUSHING, Rotator Housing |
| 11 | 2 | 061449P | WASHER, Rotary Boom Thrust |
| 12 | 1 | 062407P | RETAINER RING, REAR-ROTATOR |
| 13 | 1 | 062479A | GUARD, Chain (Includes items 13a - 13d) |
| 13a | 1 | 062478P | PAD, Chain Guard |
| 13b | 4 | P0030-04-003 | SCREW, Flat Head Cap 1/4 UNC x .75 |
| 13c | 4 | P0013-04-000 | NUT, Nylock 1/4 |
| 13d | 1 | 061601A | GUARD, Chain (Includes items 13d1 - 13d4) |
| 13d1 | 1 | 061602P | PLATE, Guard Mount |
| 13d2 | 8 | P0001-06-003 | BOLT, Hex 3/8 UNC x .75 |
| 13d3 | 8 | P0011-006C | NUT, Tab Weld 3/8-16 |
| 13d4 | 8 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 14 | 1 | 062737P | SPACER, Arbor |
| 15 | 1 | 062738P | WASHER, Shaft Sprocket Retaining |
| 16 | 8 | P0001-06-003 | BOLT, Hex 3/8 UNC x .75 |
| 17 | 4 | P0001-08-005 | SCREW, Hex Cap 1/2 UNC x 1.25 |
| 18 | 8 | P0001-08-006 | SCREW, Hex Cap 1/2 UNC x 1.5 |
| 19 | 24 | P0001-08-007 | BOLT, Hex 1/2 UNC x 1.75 |
| 20 | 1 | P0001-08-008 | BOLT, Hex 1/2 UNC x 2 |
| 21 | 1 | P0003-08-000 | NUT, Hex 1/2 UNC |
| 22 | 1 | P0030-06-003 | SCREW, Flat Head Socket Cap 3/8 UNC x .75 |
| 23 | 12 | P0031-10-016 | SCREW, Socket Head Cap 5/8 UNC x 4 |
| 24 | 8 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 25 | 38 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 26 | 1 | P0049-081 | PIN, Spring/Roll 3/16 x 1.25 |
| 27 | 8 | P0063-001 | FITTING, Grease 1/4-28 Straight |
| 28 | 68 | P0078-003 | CHAIN, Single #80 Riv. |
| 29 | 1 | P0078-006 | LINK, Repair #80 |
| 30 | 1 | P0304-134 | MOTOR, Excavator 24 C.I.D. |

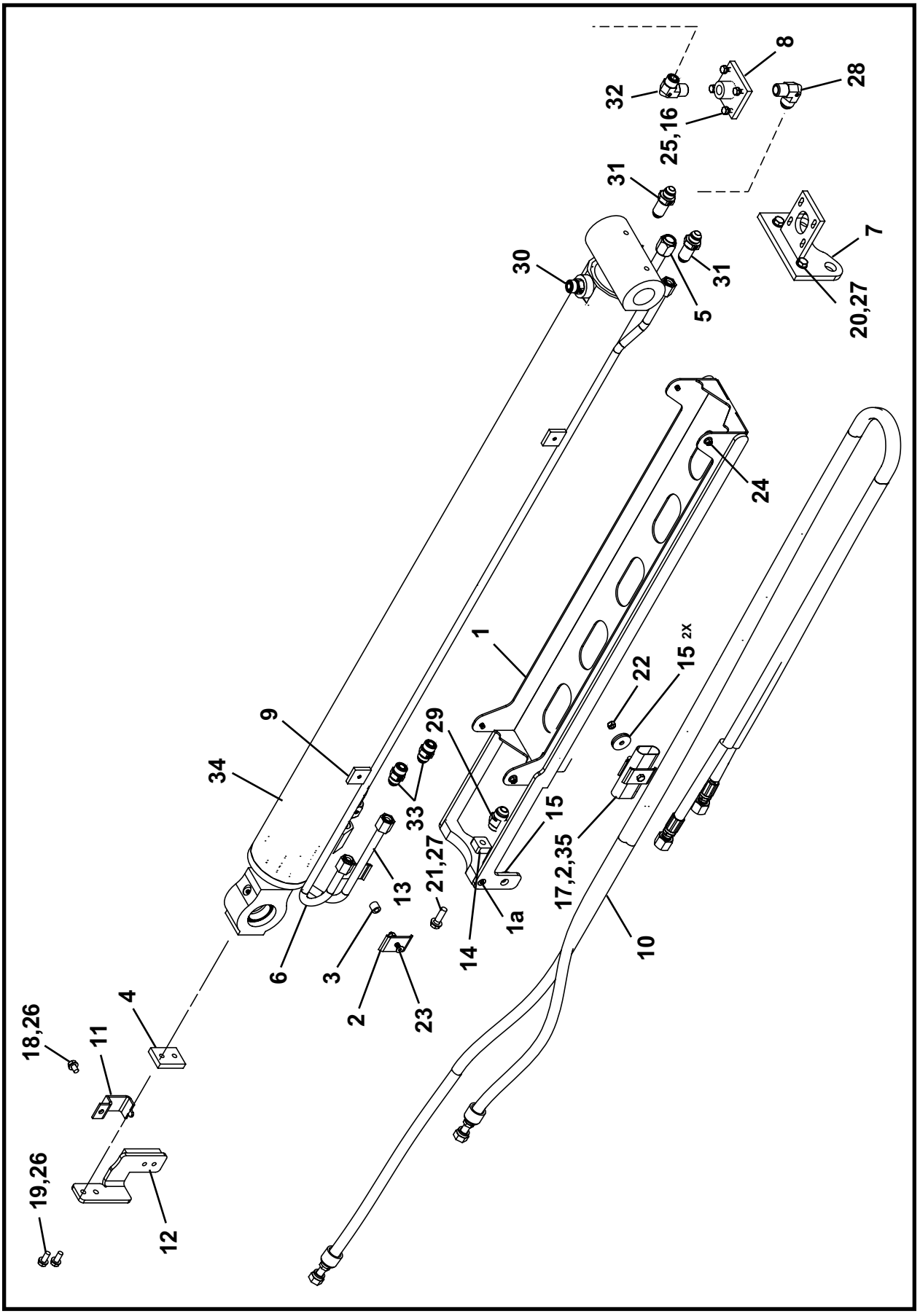
# WEDGE ADJUSTER ASSEMBLY, 061456A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 061456A | WEDGE ADJUSTER ASSEMBLY |
| 1 | 1 | 061457P | BLOCK |
| 2 | 1 | 061509P | BAR |
| 3 | 2 | P0001-08-006 | SCREW, Hex Cap 1/2 UNC x 1.5 |
| 4 | 1 | P0007-08-000 | NUT, Jam 1/2 UNC |
| 5 | 1 | P0034-08-012 | SCREW, Square Head Set 1/2 UNC x 3 |
| 6 | 5 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 7 | 1 | P0066-135 | ASSEMBLY, Wedge |
| 8 | 2 | PM12A-1.75-050 | SCREW, Hex Head M12-1.75 x 50 -12.9 |

# NOTES

## EXTEND CYLINDER & POWER CHAIN ASSEMBLY, 061489A



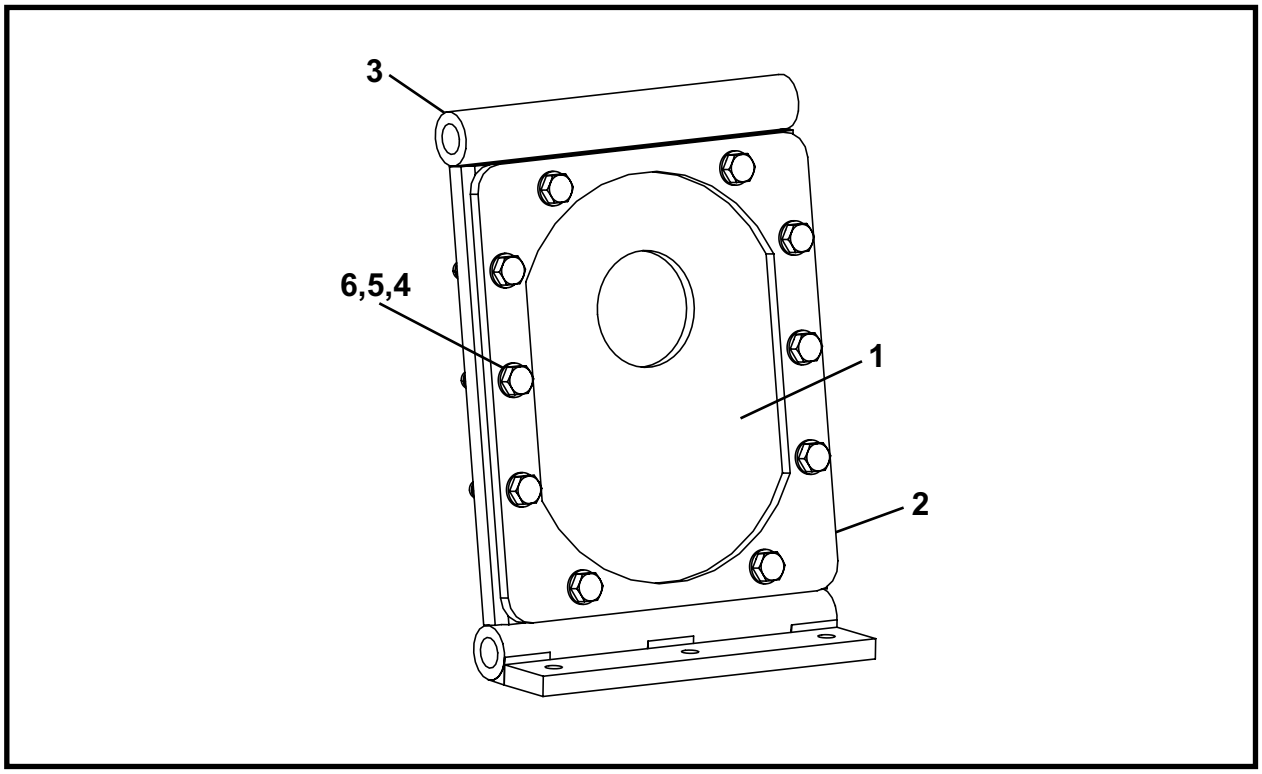
# EXTEND CYLINDER & POWER CHAIN ASSEMBLY, 061489A

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 061489A | EXTEND CYLINDER & POWER CHAIN ASSEMBLY |
| 1 | 1 | 061467A | GUIDE, Hose Chain (Includes item 1a) |
| 1a | 2 | P0030-04-003 | SCREW, Flat Head Cap 1/4 UNC x .75 |
| 2 | 4 | 061476P | BAR, Line Retainer |
| 3 | 1 | 061477P | SPACER BUSHING, Line Clamp |
| 4 | 1 | 061478P | MOUNT, Hose Chain Bracket |
| 5 | 1 | 061479A | ASSEMBLY, Hydraulic Tube - Boom Retract |
| 6 | 1 | 061480A | ASSEMBLY, Hydraulic Tube - Boom Acc - Left |
| 7 | 1 | 061484A | BULKHEAD, Hydraulic Tube |
| 8 | 1 | 061486A | UNION, Retract Tube |
| 9 | 4 | 061487P | TAB, Weld 1/4-20 |
| 10 | 1 | 062408A | ASSEMBLy, Twin Hose |
| 11 | 1 | 062409P | CLAMP, Twin Hose |
| 12 | 1 | 062411A | BRACKET, Hose Guide |
| 13 | 1 | 062416A | ASSEMBLY, Hydraulic Tube - Boom Acc - Right |
| 14 | 1 | 062429P | BAR, Line Mount |
| 15 | 3 | 062452P | WASHER, Spacer - Line Mount |
| 16 | 4 | P0001-04-004 | BOLT, Hex 1/4 UNC x 1 |
| 17 | 1 | P0001-04-007 | SCREW, Hex Head 1/4 UNC x 1.75 |
| 18 | 1 | P0001-05-002 | BOLT, Hex 5/16 UNC x .5 |
| 19 | 2 | P0001-05-003 | BOLT, Hex 5/16 UNC x .75 |
| 20 | 2 | P0001-06-004 | BOLT, Hex 3/8 UNC x 1 |
| 21 | 1 | P0001-06-005 | BOLT, Hex 3/8 UNC x 1.25 |
| 22 | 2 | P0013-04-000 | NUT, Nylock 1/4 |
| 23 | 1 | P0030-04-006 | SCREW, Flat Head Socket 1/4 UNC x 1.5 |
| 24 | 4 | P0035-016 | BOLT, Flanged Head 1/4 UNC x .375 |
| 25 | 4 | P0040-004 | WASHER, Hardened Flat 1/4 |
| 26 | 3 | P0040-005 | WASHER, Hardened Flat 5/16 |
| 27 | 3 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 28 | 1 | P0300-143 | FITTING, 10MJ-08MP90 |
| 29 | 1 | P0300-200 | FITTING, 10MJ-08MB |
| 30 | 1 | P0300-305 | FITTING, 08MFOR-08MB |
| 31 | 2 | P0300-325 | FITTING, 08MJ-08MJBKHD |
| 32 | 1 | P0300-340 | FITTING, 08MFOR-08MP90 |
| 33 | 2 | P0300-923 | FITTING, 08MFFOR-08MJ |
| 34* | 1 | P0307-245 | CYLINDER, Boom Extension |
| 35 | 120 LI | P0313-142 | SLEEVE, Abrasion Resistant |

LI - Linear Inch

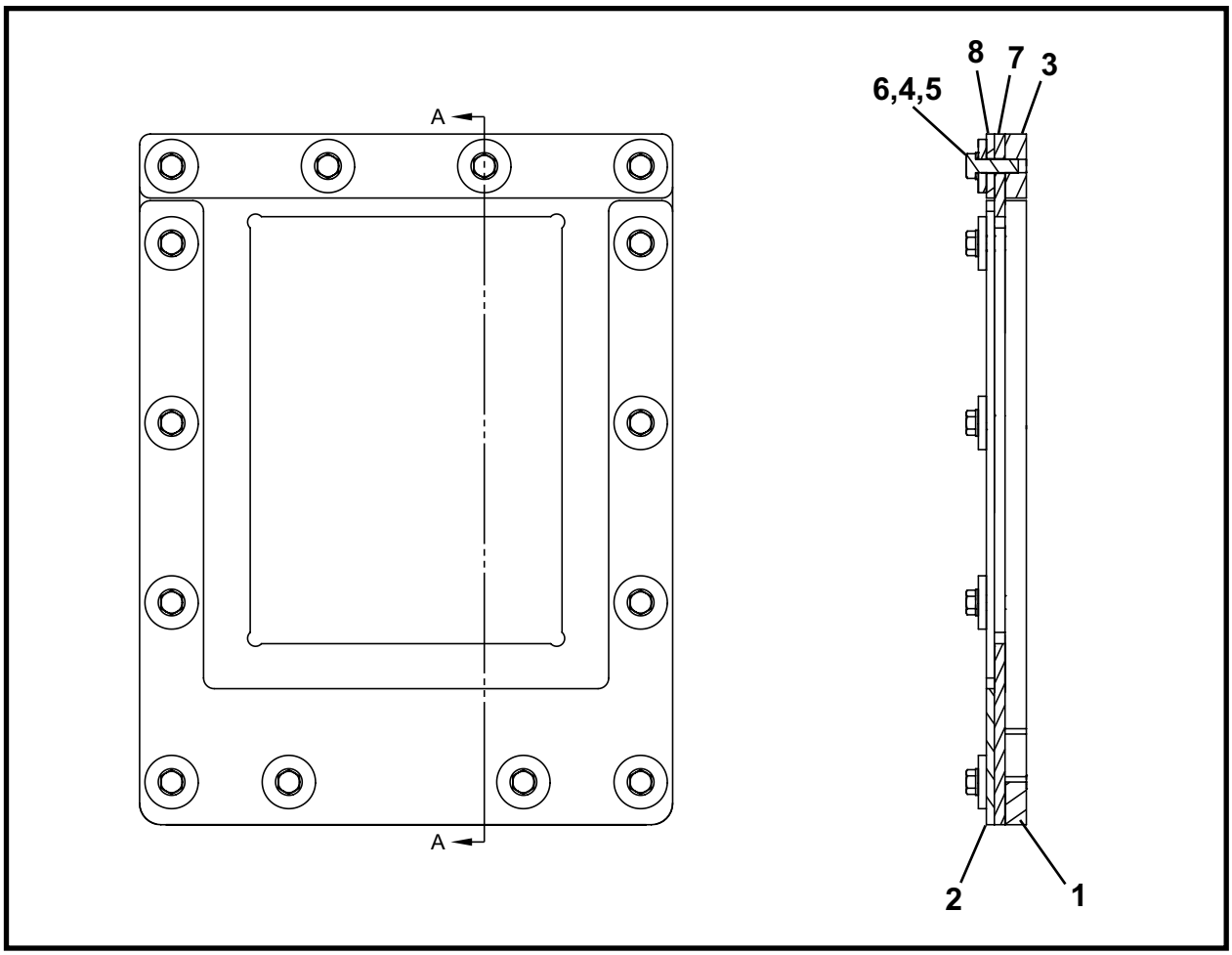
^ This cylinder uses Seal Kit, P0307-254.

# DIRT GUARD ASSEMBLY, 061503A



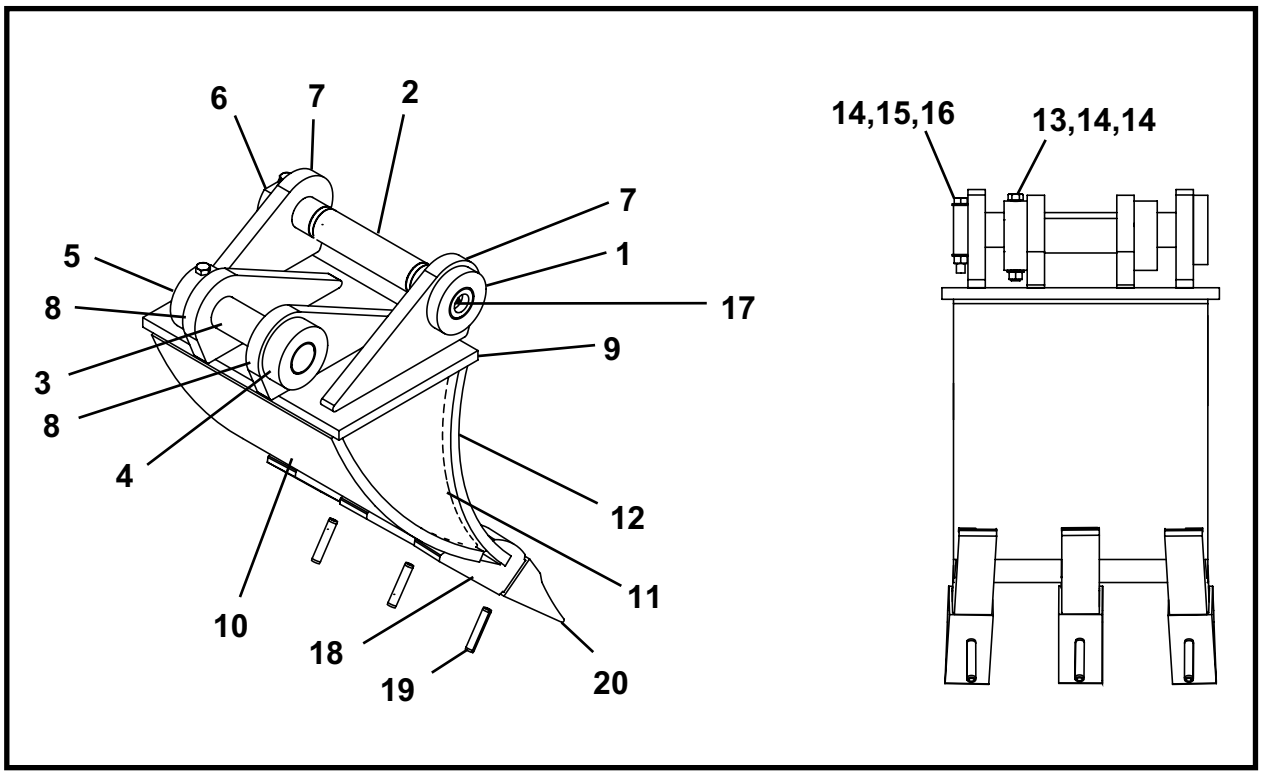

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 061503A | DIRT GUARD ASSEMBLY |
| 1 | 1 | 061511P | RUBBER |
| 2 | 1 | 061512P | RETAINER, Bellow |
| 3 | 1 | 061516A | SHELL, Dirt Guard |
| 4 | 10 | P0001-05-006 | BOLT, Hex 5/16 UNC x 1.5 |
| 5 | 10 | P0013-05-000 | NUT, Nylock 5/16 |
| 6 | 20 | P0040-005 | WASHER, Hardened Flat 5/16 |

# TELESCOPIC BOOM SEAL ASSEMBLY, 062317A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 062317A | TELESCOPIC BOOM SEAL ASSEMBLY |
| 1 | 1 | 062320P | MOUNT, Seal |
| 2 | 1 | 062319P | RETAINER, Seal |
| 3 | 1 | 062318P | BAR, Seal Mount |
| 4 | 14 | P0040-005 | WASHER, Hardened Flat 5/16 |
| 5 | 14 | P0001-05-004 | BOLT, Hex 5/16 UNC x 1 |
| 6 | 14 | 002624P00 | WASHER |
| 7 | 1 | 062321P | RUBBER, Seal |
| 8 | 1 | 062322P | BAR, Seal Retainer |

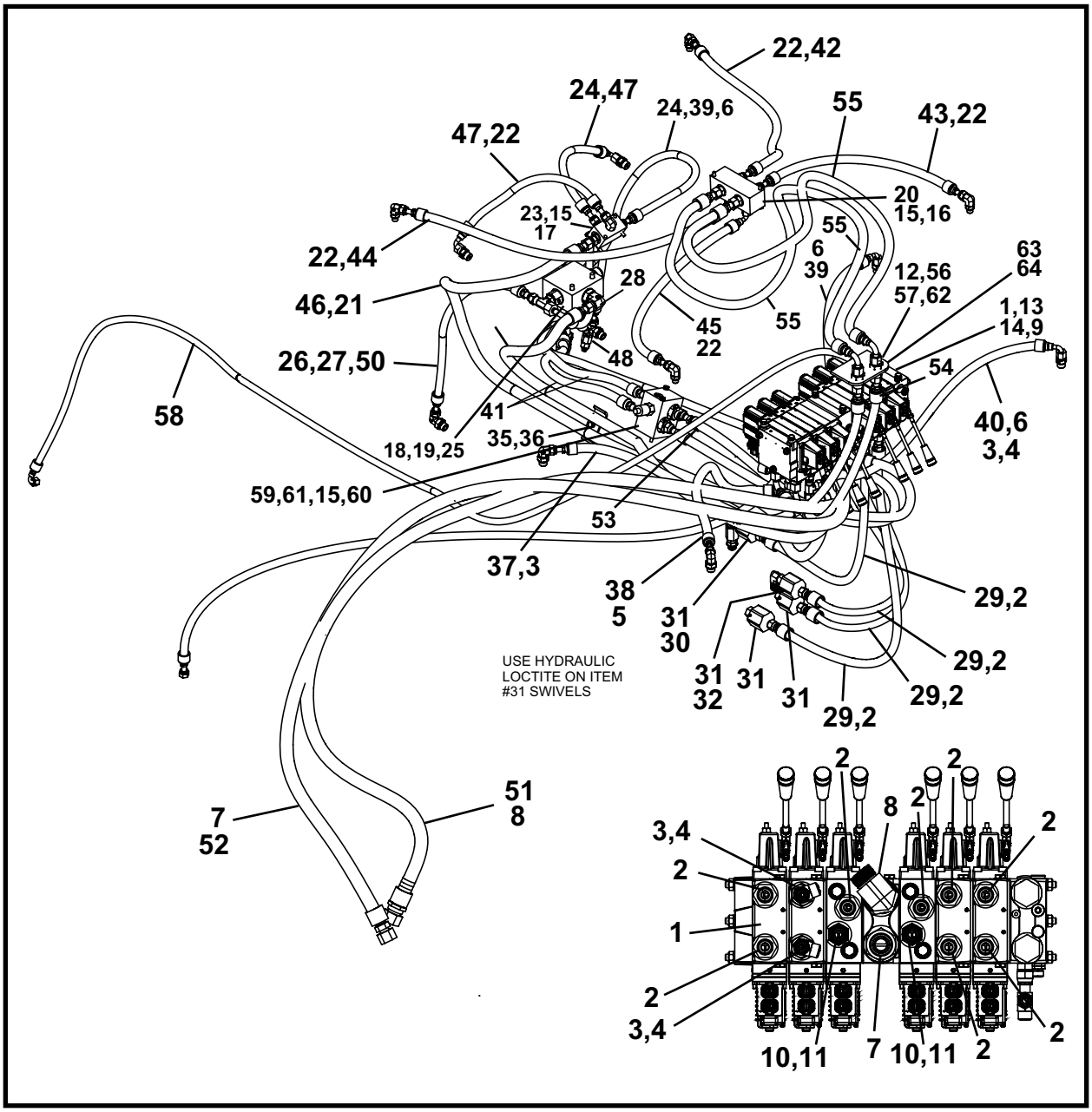
## STANDARD BUCKET, 062412A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 062412A | STANDARD BUCKET |
| 1 | 1 | 011156P01 | BUSHING, Bucket |
| 2 | 1 | 011160P01 | PIN, Bucket - Excavator |
| 3 | 1 | 062325P | PIN, Bucket Cylinder |
| 4 | 1 | 011170P00 | BUSHING, Bucket - Excavator\ |
| 5 | 1 | 011171P00 | BUSHING, Bucket - Excavator |
| 6 | 1 | 011172P00 | BUSHING, Bucket - Excavator |
| 7 | 2 | - | PLATE, Backhoe Bucket |
| 8 | 2 | - | PLATE, Backhoe Bucket |
| 9 | 1 | - | PLATE, Backhoe Bucket |
| 10 | 1 | - | PLATE, Backhoe Bucket |
| 11 | 2 | - | PLATE, Backhoe Bucket |
| 12 | 1 | - | PLATE, Backhoe Bucket |
| 13 | 2 | P0001-06-014 | BOLT, Hex 3/8 UNC x 3.5 |
| 14 | 1 | P0003-06-000 | NUT, Hex 3/8 |
| 15 | 4 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 16 | 1 | P0001-06-012 | BOLT, Hex 3/8 UNC x 3 |
| 17 | 1 | P0063-004 | FITTING, Grease 1/8 NPT Straight |
| 18 | 3 | P0051-007 | HOLDER, Tooth |
| 19 | 3 | P0051-008 | PINS, Excavator |
| 20 | 3 | P0050-023 | TEETH, Cutter |

# NOTES

# EX-50 BOOM HYDRAULIC ASSEMBLY, 062155A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 062155A | EX-50 BOOM HYDRAULIC ASSEMBLY |
| 1 | 1 | P0302-924 | VALVE, 6 Section |
| 2 | 8 | P0300-300 | FITTING, 08MFOR-10MB |
| 3 | 2 | P0300-634 | FITTING, 06MFOR-10MB |
| 4 | 3 | P0300-613 | FITTING, 06MFOR-06FFORX-06MFOR |
| 5 | 4 | P0300-717 | FITTING, 6MFFOR-8MB90 |
| 6 | 11 | P0300-430 | FITTING, 06MFOR-08MB |
| 7 | 1 | P0300-378 | FITTING, 12MFFOR-16MB |
| 8 | 1 | P0300-632 | FITTING, 12MFFOR-16MB90 |
| 9 | 1 | P0300-883 | FITTING, 06MFFOR-05MB |
| 10 | 2 | P0300-788 | FITTING, 10MB-08FB |
| 11 | 2 | P0300-400 | FITTING, 08MFOR-08MB-LONG |
| 12 | 1 | P0300-314 | FITTING, 04MFOR-05MB |
| 13 | 7 | P0001-05-003 | BOLT, Hex 5/16 UNC x .75 |

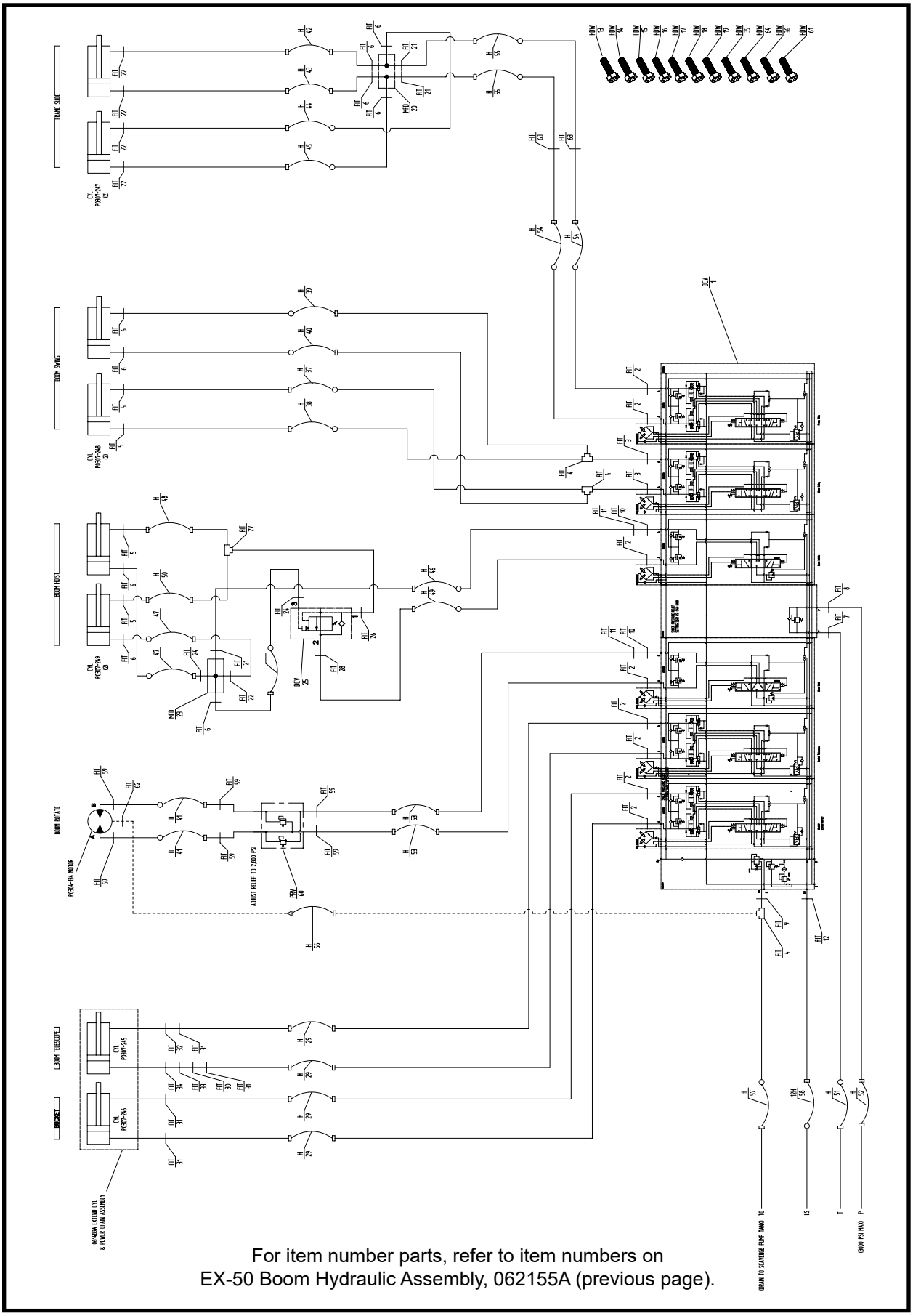
*(Continued on next page)*

# EX-50 BOOM HYDRAULIC ASSEMBLY, 062155A

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 14 | 6 | P0040-005 | WASHER, Hardened Flat 5/16 |
| 15 | 6 | P0040-004 | WASHER, Hardened Flat 1/4 |
| 16 | 2 | P0001-04-010 | BOLT, Hex 1/4 UNC x 2.5 |
| 17 | 2 | P0001-04-009 | BOLT, Hex 1/4 UNC x 2.25 |
| 18 | 2 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 19 | 2 | P0001-06-011 | BOLT, Hex 3/8 UNC x 2.75 |
| 20 | 1 | 062294P | MANIFOLD, Junction |
| 21 | 5 | P0300-305 | FITTING, 08MFOR-08MB |
| 22 | 5 | P0300-355 | FITTING, 06MFOR-06MB90 |
| 23 | 1 | 062292P | MANIFOLD, Right Angle |
| 24 | 2 | P0300-356 | FITTING, 06MFOR-06MB |
| 25 | 1 | P0302-174B | VALVE |
| 26 | 1 | P0300-565 | FITTING, 12MORB-08FORB |
| 27 | 1 | P0300-726 | FITTING, 08MFOR-08MFOR-08MB |
| 28 | 1 | P0300-373 | FITTING, 08MFOR-12MB90 |
| 29 | 4 | A10368A-060 | HOSE ASSEMBLY, 1/2 x 60 |
| 30 | 1 | P0300-877 | FITTING, 8MJ-8MB90 |
| 31 | 4 | P0302-819 | JOINT, Swivel 8 x 8 JIC |
| 32 | 1 | P0300-116 | FITTING, 08MJ-08MP90 |
| 33 | 1 | P0300-945 | FITTING, 08FB-08FB |
| 34 | 1 | P0300-542 | FITTING, 08MB-08MB |
| 35 | 4 | P0004-05-000 | NUT, Hex 5/16 UNF |
| 36 | 4 | 002269P01 | CLAMP, Line |
| 37 | 1 | A10079A-031 | HOSE ASSEMBLY, 3/8 x 31 |
| 38 | 1 | A10079A-026 | HOSE ASSEMBLY, 3/8 x 26 |
| 39 | 2 | A10079A-042 | HOSE ASSEMBLY, 3/8 x 42 |
| 40 | 1 | A10079A-048 | HOSE ASSEMBLY, 3/8 x 48 |
| 41 | 2 | A10474A-028 | HOSE ASSEMBLY, 3/8 x 28 |
| 42 | 1 | A10313A-036 | HOSE ASSEMBLY, 3/8 x 36 |
| 43 | 1 | A10313A-025 | HOSE ASSEMBLY, 3/8 x 25 |
| 44 | 1 | A10079A-036 | HOSE ASSEMBLY, 3/8 x 36 |
| 45 | 1 | A10079A-025 | HOSE ASSEMBLY, 3/8 x 25 |
| 46 | 1 | A10324A-098 | HOSE ASSEMBLY, 1/2 x 98 |
| 47 | 2 | A10079A-018 | HOSE ASSEMBLY, 3/8 x 18 |
| 48 | 1 | A10366A-032 | HOSE ASSEMBLY, 3/8 x 32 |
| 49 | 1 | A10324A-066 | HOSE ASSEMBLY, 1/2 x 66 |
| 50 | 1 | A10388A-017 | HOSE ASSEMBLY, 3/8 x 17 |
| 51 | 1 | A61746A-116 | HOSE ASSEMBLY, 3/4 x 116 |
| 52 | 1 | A10464A-104 | HOSE ASSEMBLY, 3/4 x 104 |
| 53 | 2 | A10474A-046 | HOSE ASSEMBLY, 3/8 x 46 |
| 54 | 2 | A10324A-025 | HOSE ASSEMBLY, 1/2 x 25 |
| 55 | 2 | A10324A-078 | HOSE ASSEMBLY, 1/2 x 78 |
| 56 | 1 | A10082A-076 | HOSE ASSEMBLY, 3/8 x 76 |
| 57 | 1 | A10079A-090 | HOSE ASSEMBLY, 3/8 x 90 |
| 58 | 1 | A09889A-156 | HOSE ASSEMBLY, 1/4 x 156 |
| 59 | 6 | P0300-375 | FITTING, 08MFOR-12MB |
| 60 | 1 | P0302-496 | RELIEF, Dual Crossover - 5000PSI |
| 61 | 2 | P0001-04-015 | BOLT, Hex 1/4 UNC x 4.5 |
| 62 | 1 | P0300-735 | FITTING, 06MFFOR-04MB |
| 63 | 2 | P0300-595 | FITTING, 8MFFOR-8MFFOR-BKHD |
| 64 | 1 | 062332P | PLATE, Bulkhead Fitting |

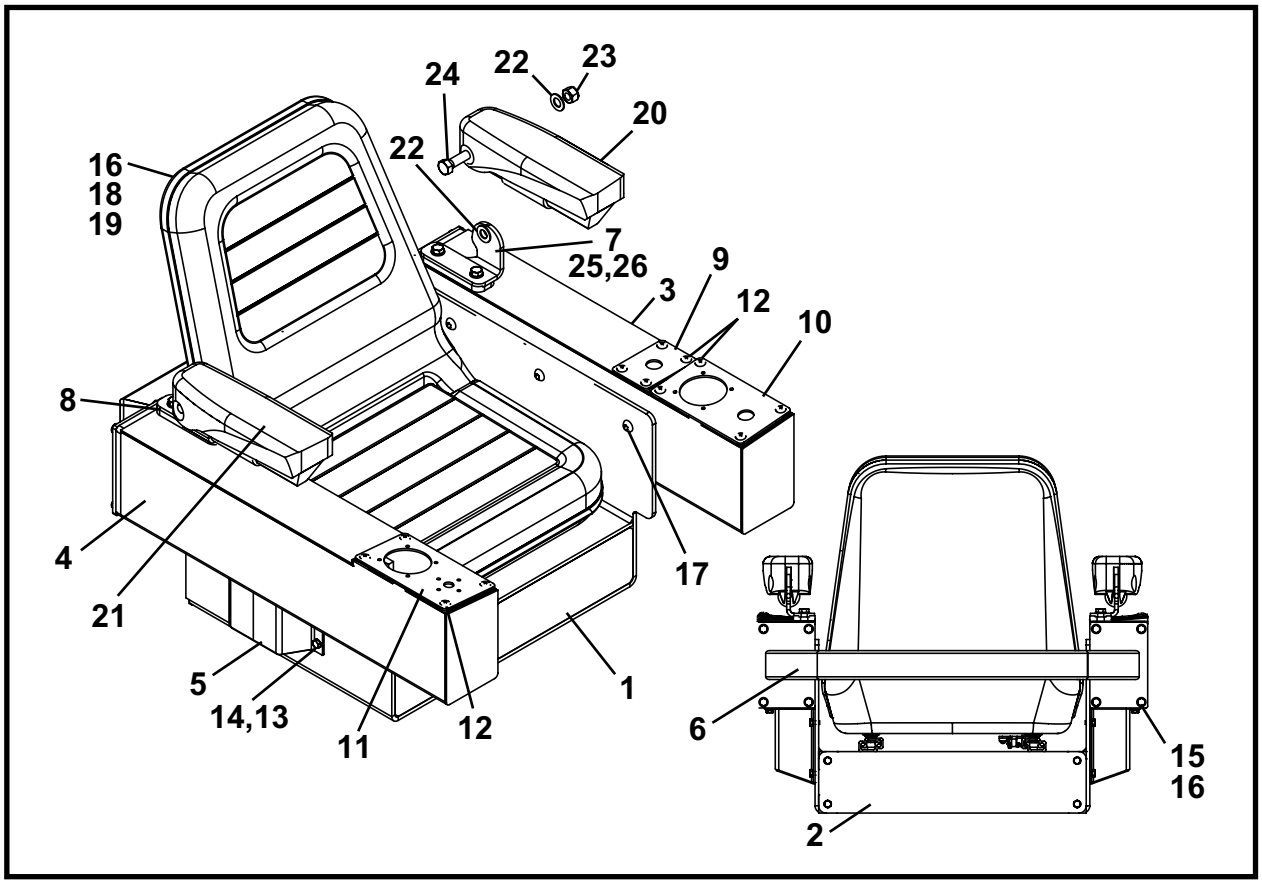
NOTE: Refer to 062206P, Hydraulic Schematic on next page.

# EX-50 BOOM HYDRAULIC SCHEMATIC, 062206P



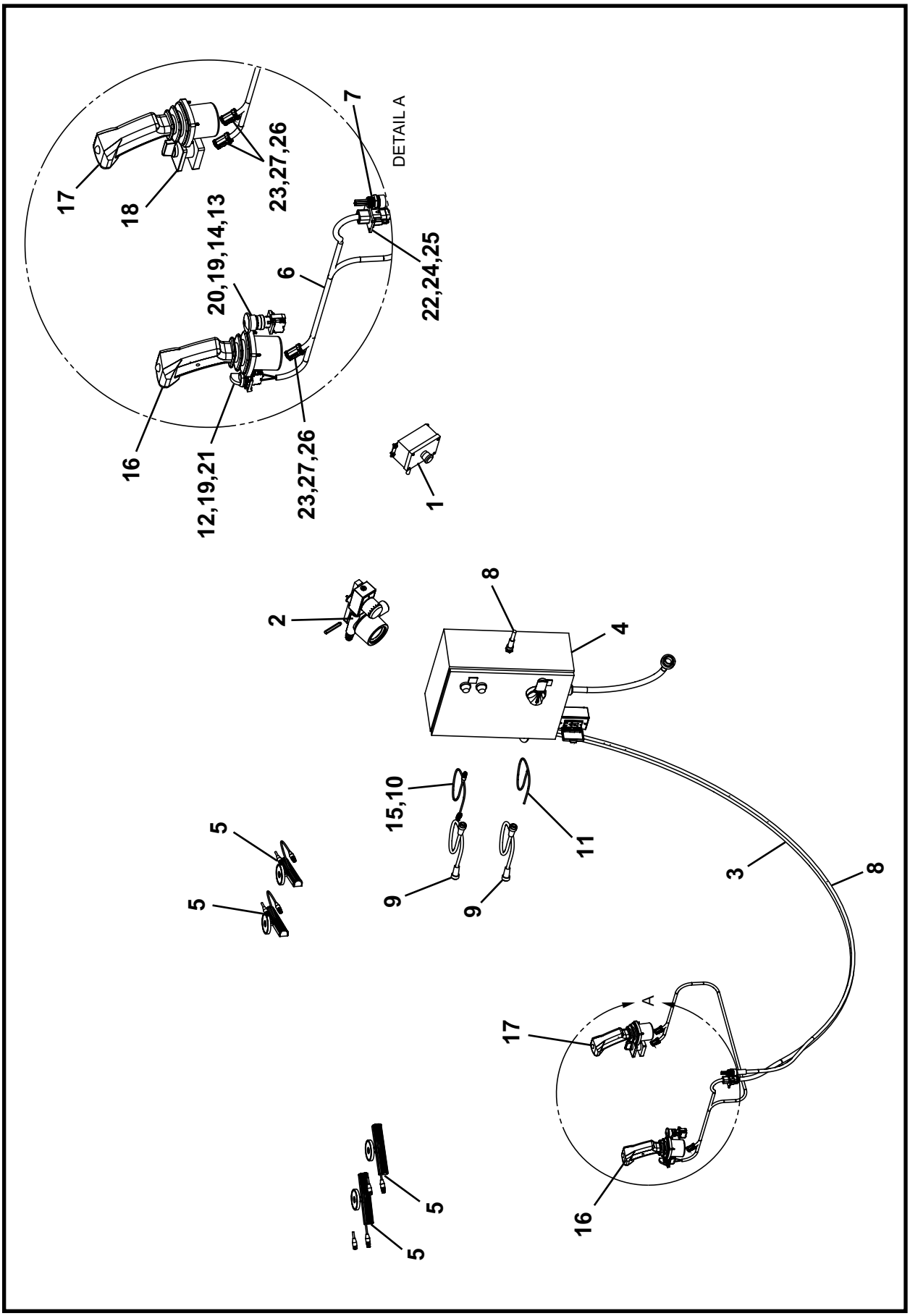
For item number parts, refer to item numbers on
EX-50 Boom Hydraulic Assembly, 062155A (previous page).

# OPERATOR SEAT ASSEMBLY, 062158A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 062158A | OPERATOR SEAT ASSEMBLY |
| 1 | 1 | 062159A | BASE, Seat |
| 2 | 1 | 062165P | PLATE, Seat Base Removable |
| 3 | 1 | 062166A | CONSOLE, Left |
| 4 | 1 | 062167A | CONSOLE, Right |
| 5 | 2 | 062186A | SUPPORT, Console |
| 6 | 1 | 062187A | SUPPORT, Rear |
| 7 | 1 | 062194P | BRACKET, Arm Rest - Left |
| 8 | 1 | 062195P | BRACKET, Arm Rest - Right |
| 9 | 1 | 062196P | MOUNT, E-Stop |
| 10 | 1 | 062197P | PLATE, Joystick 2 Position Switch |
| 11 | 1 | 062198P | PLATE, Joystick With Rotary |
| 12 | 12 | P0020-14-202 | SCREW, Machine Truss HD 1/4 x .5 |
| 13 | 16 | P0040-004 | WASHER, Hardened Flat 1/4 |
| 14 | 16 | P0001-04-002 | BOLT, Hex 1/4 UNC x .5 |
| 15 | 8 | P0001-05-003 | BOLT, Hex 5/16 UNC x .75 |
| 16 | 12 | P0040-005 | WASHER, Hardened Flat 5/16 |
| 17 | 6 | P0030-06-004A | SCREW, Button Head 3/8 UNC x 1 |
| 18 | 1 | P0113-006 | SEAT |
| 19 | 4 | P0003-05-000 | NUT, Hex 5/16 UNC |
| 20 | 1 | P0315-002 | ARMREST, Left |
| 21 | 1 | P0315-004 | ARMREST, Right |
| 22 | 4 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 23 | 2 | P0013-08-000 | NUT, Lock Flex 1/2 UNC |
| 24 | 2 | P0001-08-006 | SCREW, Hex Cap 1/2 UNC x 1.5 |
| 25 | 4 | P0001-06-004 | BOLT, Hex 3/8 UNC x 1 |
| 26 | 4 | P0040-006 | WASHER, Hardened Flat 3/8 |

# EX-50 ELECTRICAL ASSEMBLY, 062212A



# EX-50 ELECTRICAL ASSEMBLY, 062212A

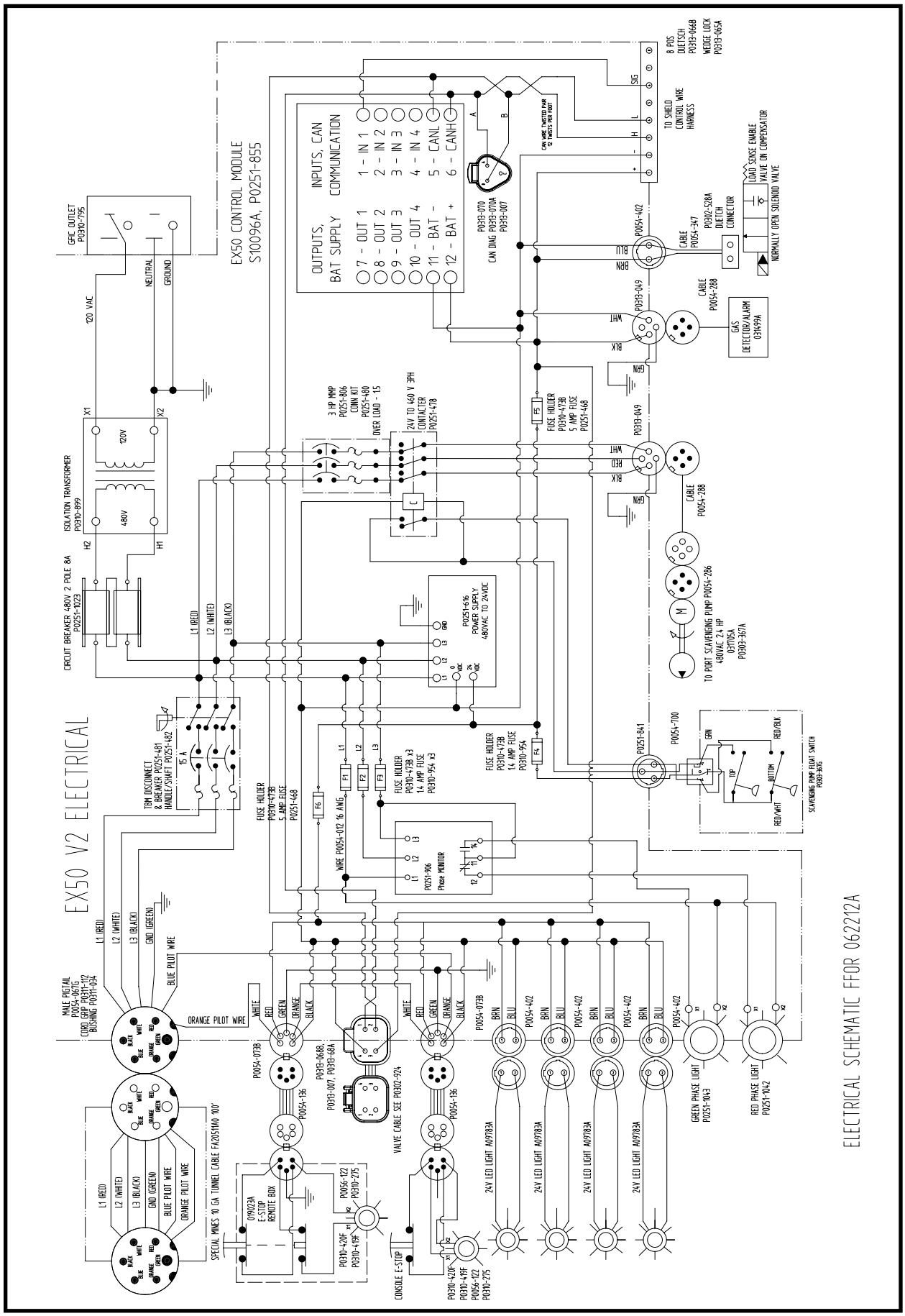
| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 062212A | EX-50 ELECTRICAL ASSEMBLY |
| 1* | 1 | 019023A | ASSEMBLY, Electrical Box - E-Stop |
| 2* | 1 | 031499A | ASSEMBLY, Gas Detector With Alarm |
| 3^ | 1 | 062242A | HARNESS. Extension Control |
| 4* | 1 | 062243A | ENCLOSURE, Electrical |
| 5 | 4 | A09783A | ASSEMBLY, 24V LED Light |
| 6 | 144 LI | P0054-012 | WIRE, Standard 16 GA |
| 7 | 1 | P0054-073A | RECEPTACLE, 5 C 16 GA Mini Male SK x 12 |
| 8^ | 2 | P0054-136 | CABLE, 5C 16 GA Mini Fem SK x 12 ft |
| 9^ | 2 | P0054-288 | CABLE, 4 C 16 GA Mini M/F SK 12 ft |
| 10^ | 1 | P0054-347 | CABLE, 2C 22G Micro M/F DK Ext 12 ft |
| 11^ | 1 | P0054-700 | CABLE, 3P MM AC AWM 22/3 20 ft |
| 12 | 1 | P0056-121F | CONTACT, N. O. |
| 13 | 1 | P0056-122F | BLOCK, Contact - Normally Closed |
| 14 | 1 | P0251-171 | MODULE, LED |
| 15 | 1 | P0302-528A | ASSEMBLY, Connector |
| 16 | 1 | P0302-928 | JOYSTICK, Left |
| 17 | 1 | P0302-929 | JOYSTICK, Right |
| 18 | 1 | P0302-930 | CONTROL, Rotary Speed |
| 19 | 2 | P0310-419F | LATCH, Mounting |
| 20 | 1 | P0310-420F | E-STOP, Pushbutton, Illuminated |
| 21 | 1 | P0310-421AF | SWITCH 2 Position |
| 22 | 5 | P0313-007 | PINS #16 |
| 23 | 12 | P0313-008 | SOCKET #16 |
| 24 | 1 | P0313-066A | RECEPTACLE, Wedgelock 8 Way |
| 25 | 1 | P0313-066B | RECEPTACLE, 8 Way Flange |
| 26 | 3 | P0313-067 | PLUG, 4 Way |
| 27 | 3 | P0313-067A | PLUG, Wedgelock 4 Way |

* Refer to this section for parts information.
^ Cable lengths may vary depending on shield diameter. Contact your Akkerman Aftermarket Support representative for more information.

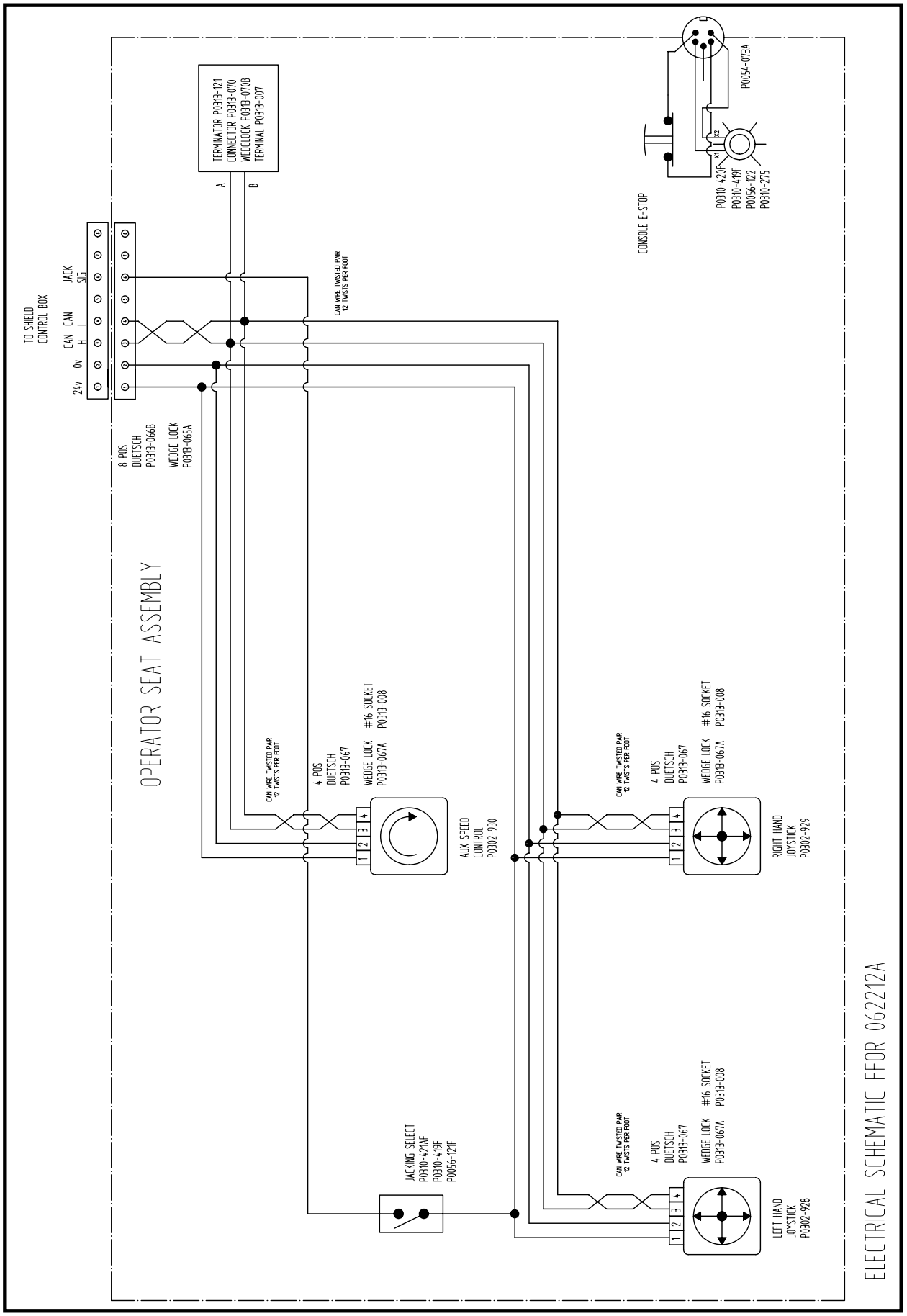
LI - Linear Inch

For electrical schematic, refer to EX-50 Electrical Schematic 062244P, on next page.

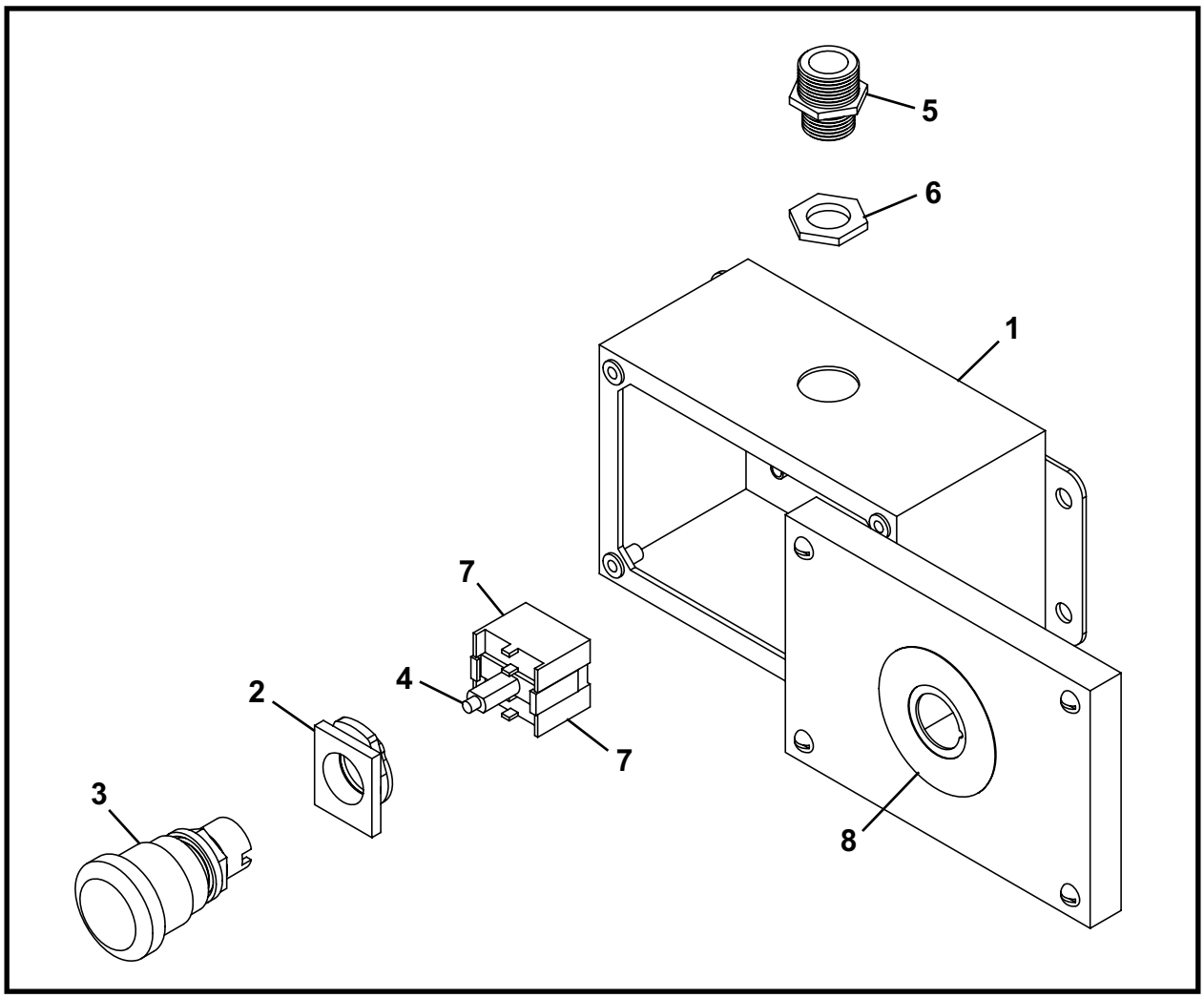
# EX-50 ELECTRICAL SCHEMATIC, 062244P



# EX-50 ELECTRICAL SCHEMATIC, 062244P

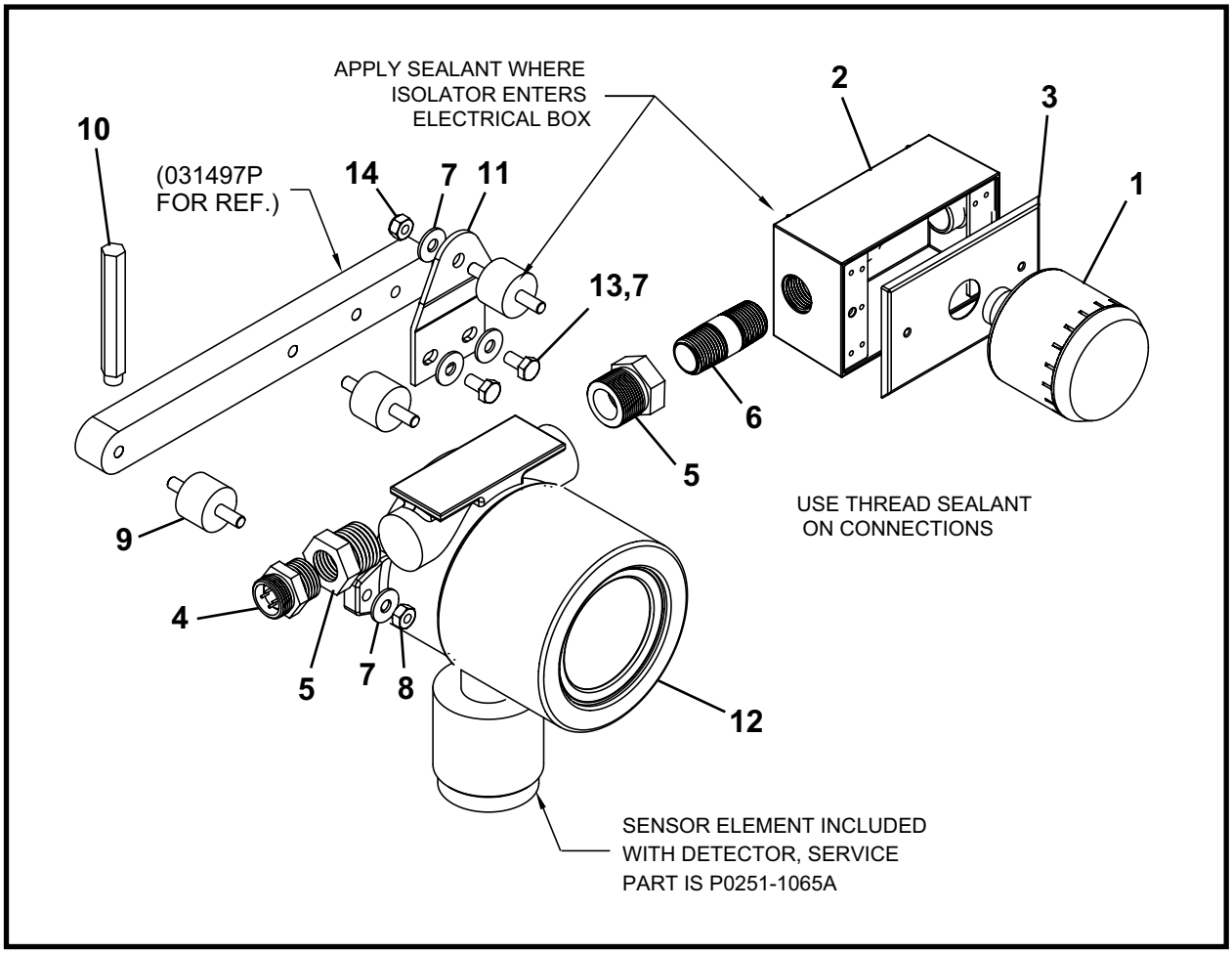


# ELECTRICAL BOX - E-STOP ASSEMBLY, 019023A



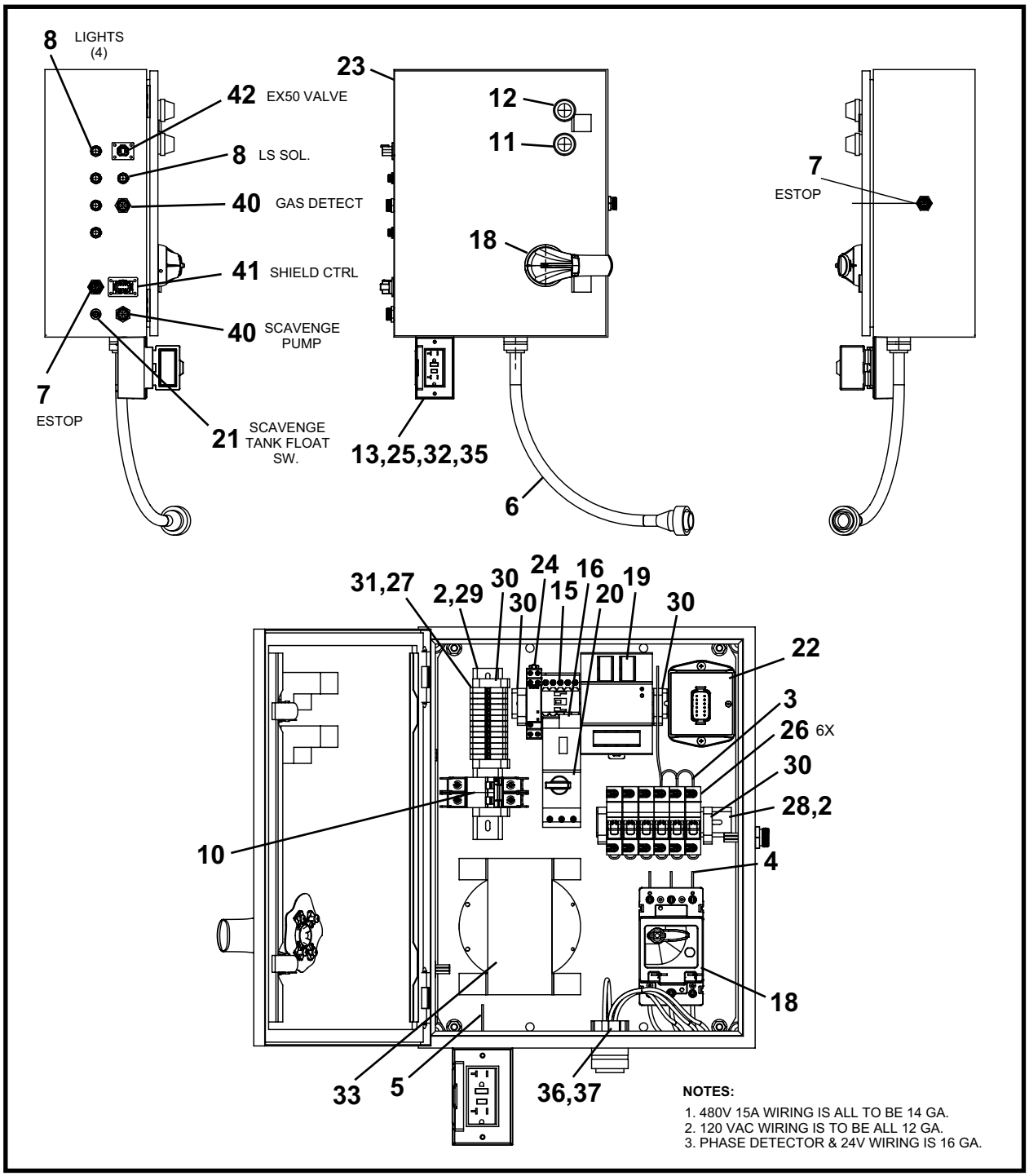

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 019023A | ELECTRICAL BOX - E-STOP ASSEMBLY |
| 1 | 1 | 019024P | BOX |
| 2 | 1 | P0310-419F | LATCH, Mounting |
| 3 | 1 | P0310-420F | E-STOP, Pushbutton, Illuminated |
| 4 | 1 | P0251-171 | MODULE, LED |
| 5 | 1 | P0054-073A | RECEPTACLE, 5 C 16 GA Mini Male SK 12 |
| 6 | 1 | P0311-018 | NUT, Lock 1/2 |
| 7 | 2 | P0056-122F | BLOCK, Contact - Normally Closed |
| 8 | 1 | P0310-474F | DECAL, E-Stop |

# GAS DETECTOR WITH ALARM ASSEMBLY, 031499A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 031499A | GAS DETECTOR WITH ALARM ASSEMBLY |
| 1 | 1 | P0251-861 | SOUNDER, Panel Mount with LED |
| 2 | 1 | P0310-105 | BOX |
| 3 | 1 | P0310-154 | COVER |
| 4 | 1 | P0054-286 | RECEPTACLE, 4 C 16 GA Mini Male SK 12 |
| 5 | 2 | P0300-012 | FITTING, 12MP-08FPS |
| 6 | 1 | P0405-002 | NIPPLE, 1/2 x 2 |
| 7 | 6 | P0040-004 | WASHER, Hardened Flat 1/4 |
| 8 | 3 | P0003-04-000 | NUT, Hex 1/4 UNC |
| 9 | 3 | P0070-065 | MOUNT, Vibration Isolation |
| 10 | 1 | P0310-283B | MAGNET, Pickup |
| 11 | 1 | 031645P | BRACKET, Beacon |
| 12 | 1 | S10057A | ASSEMBLY, Gas Max Detector (Includes item 12 a) |
| 12a | 1 | P0251-1065 | DETECTOR, Gas, Methane, IR, 24VDC (Includes item 12 a1) |
| 12a1 | 1 | P0251-1065A | ELEMENT, Sensor |
| 13 | 2 | P0001-04-002 | BOLT, Hex 1/4 UNC x .5 |
| 14 | 1 | P0013-04-000 | NUT, Nylock 1/4 |

## ENCLOSURE ASSEMBLY, 062243A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 062243A | ENCLOSURE ASSEMBLY |
| 1 | 1 | P0017-14-204 | SCREW, Machine 1/4-20 x .75 |
| 2 | 6 | P0020-83-022 | SCREW, Truss Head 8-32 x .375 |
| 3 | 48 | P0054-012 | WIRE, Standard 16 GA |
| 4 | 24 | P0054-013 | WIRE, 14 GA |
| 5 | 24 | P0054-014 | WIRE, Black & White 12 GA |
| 6 | 1 | P0054-067G | PIGTAIL, 6 C 10 GA Chan-Out |
| 7 | 2 | P0054-073B | RECEPTACLE, 5 C 16 GA Mini Fem SK 3 ft |
| 8 | 5 | P0054-402 | RECEPTACLE, 2C 18G Micro Fem DK 3 ft |

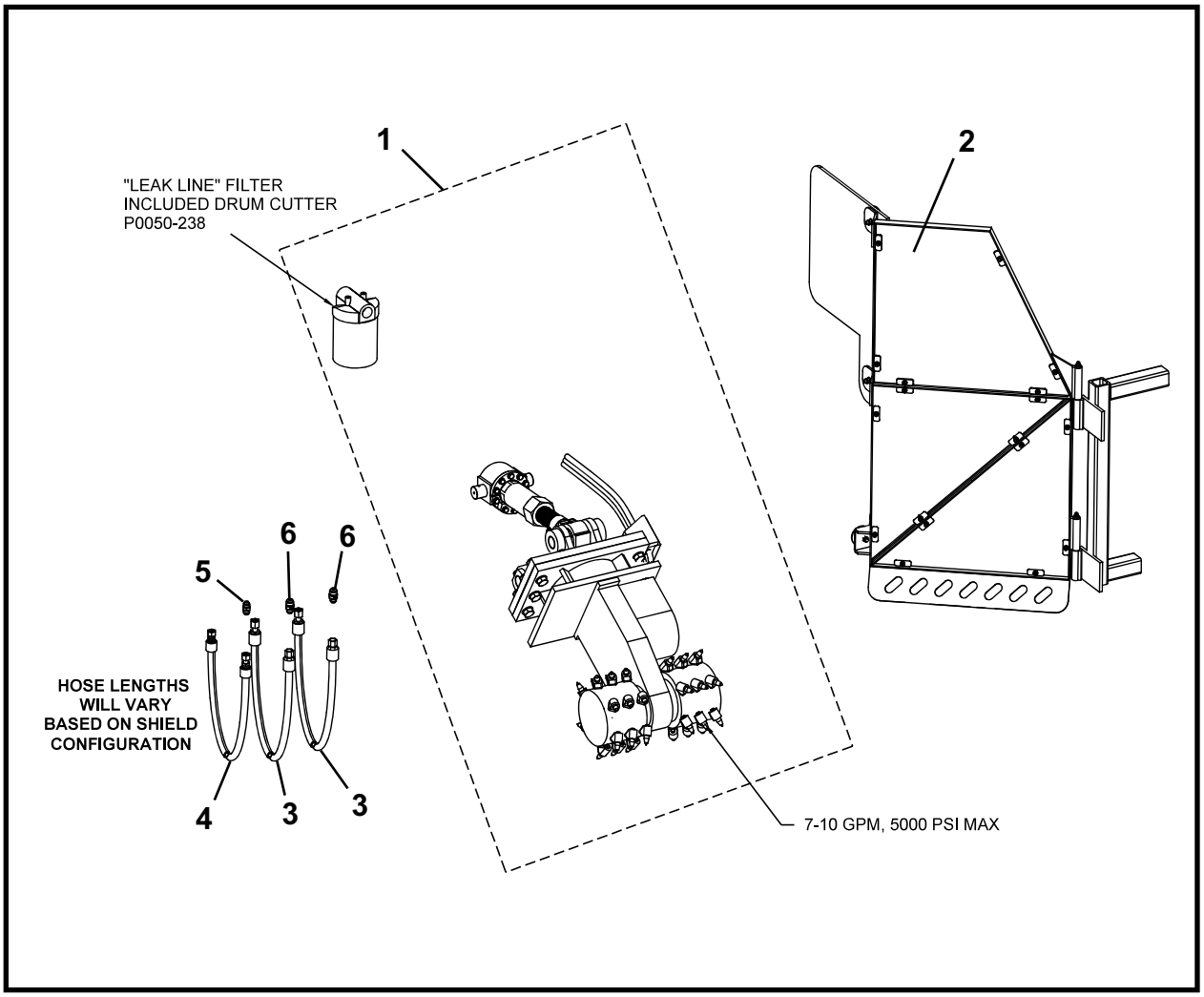
*(Continued on next page)*

# ENCLOSURE ASSEMBLY, 062243A

| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 9 | 1 | P0055-157 | LUGS, 1 GA |
| 10 | 1 | P0251-1023 | BREAKER, Circuit 480V 2 Pole 8A |
| 11 | 1 | P0251-1042 | PILOT, LED, 480V, Red |
| 12 | 1 | P0251-1043 | PILOT, LED, 480V, Green |
| 13 | 1 | P0251-1047 | COVER, GFCI Weatherproof |
| 14 | 2 | P0251-468 | FUSE |
| 15 | 1 | P0251-478 | CONTACTOR, 3/4 HP 480V 3 PH 24VDC |
| 16 | 1 | P0251-480 | KIT, Connector |
| 17 | 1 | P0251-481 | BREAKER, 480V 3PH 15/3 W/Lugs |
| 18 | 1 | P0251-482 | BREAKER, Handle & Shaft |
| 19 | 1 | P0251-616 | POWER SUPPLY, 24V, 10 AMP |
| 20 | 1 | P0251-806 | MMP, 3HP, 480V, 3PH, 4-6.3A |
| 21 | 1 | P0251-841 | RECEPTACLE, 3 22G Fem DK Mic-1/2 NPT |
| 22 | 1 | P0251-855 | MODULE, Electrical IO |
| 23 | 1 | P0251-901 | ENCLOSURE |
| 24 | 1 | P0251-906 | PHASE MONITOR 500VAC |
| 25 | 1 | P0310-105 | BOX |
| 26 | 6 | P0310-473B | HOLDER, Fuse DIN Rail Midget |
| 27 | 13 | P0310-500 | BLOCK, Terminal DIN Rail |
| 28 | 1 | P0310-503-006 | RAIL, DIN - 6.0 |
| 29 | 2 | P0310-503-008 | RAIL, DIN - 8.0 |
| 30 | 7 | P0310-571 | STOP, Fuse Holder End |
| 1 | 13 | P0310-573 | JUMPERS, Terminal Strip |
| 32 | 1 | P0310-795 | OUTLET, Ground Fault 20A |
| 33 | 1 | P0310-899 | TRANSFORMER, Isolation |
| 34 | 4 | P0310-954 | FUSE, Time Delay 1.4 AMP |
| 35 | 1 | P0311-013 | NIPPLE, Chase 1/2 |
| 36 | 1 | P0311-020 | NUT, Lock 1 |
| 37 | 1 | P0311-034 | BUSHING, Insulating 1 |
| 38 | 1 | P0311-112 | CORD GRIP 1 NPT |
| 39 | 12 | P0313-007 | PINS #16 |
| 40 | 2 | P0313-049 | RECEPTACLE, 4 Cond Female |
| 41 | 1 | P0313-066B | RECEPTACLE, 8 Way Flange |
| 42 | 1 | P0313-068B | RECEPTACLE, 4 Way Flange |
| 43 | 1 | P0313-068A | RECEPTACLE, Wedgelock 4 Way |

# NOTES

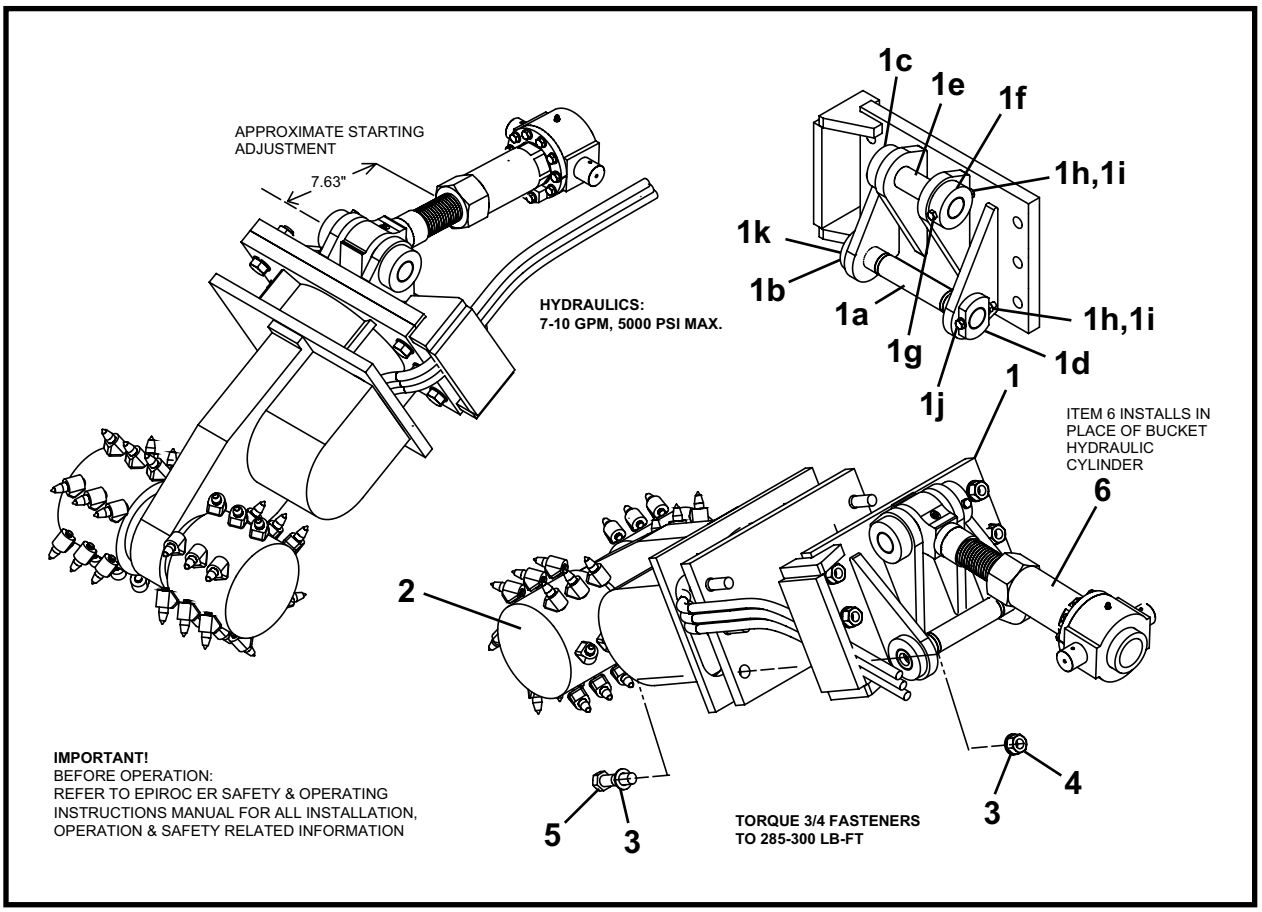
# DRUM CUTTER KIT, 063003A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 063003A | DRUM CUTTER KIT |
| 1* | 1 | 062621A | ASSEMBLY, Drum Cutter & Mounting (Includes items 1a - 1b) |
| 1a | 1 | P0050-238A | FILTER, Leak Line |
| 1b | 1 | P0050-238B | TOOTH SET, Drum Cutter |
| 2* | 1 | 062638A | ASSEMBLY, Operator Shield |
| 3** | 2 | A10329A-XXX | HOSE ASSEMBLY, 1/2 x |
| 4** | 2 | A10368A-XXX | HOSE ASSEMBLY, 1/2 x |
| 5 | 1 | P0300-438 | FITTING, 08MJ-08MJ |
| 6 | 1 | P0300-202 | FITTING, 10MJ-10MJ |

* Refer to this section for parts information.
** Hose assembly lengths may vary depending on shield diameter. Contact your Akkerman Aftermarket Support representative for more information.

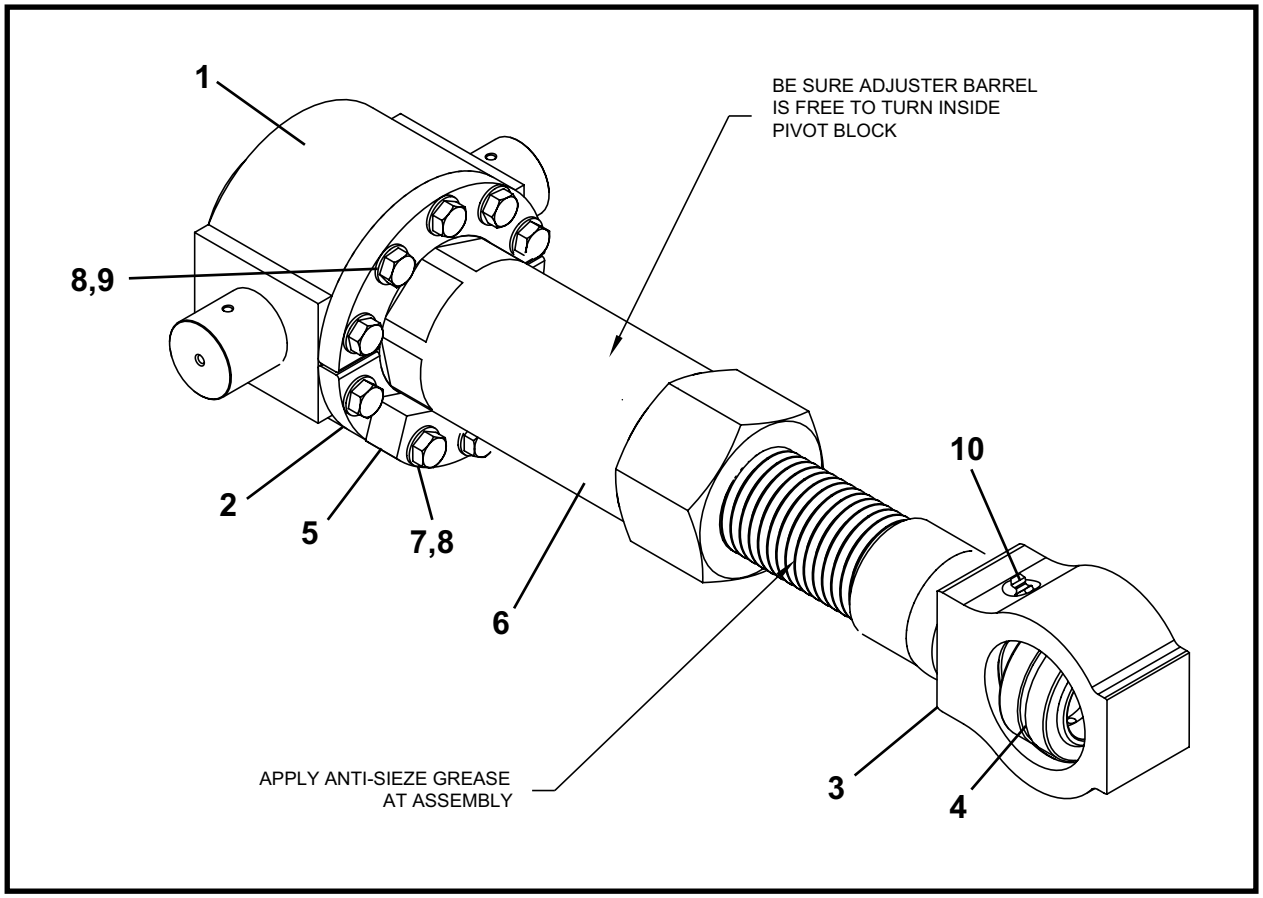
# DRUM CUTTER & MOUNTING ASSEMBLY, 062621A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 062621A | DRUM CUTTER & MOUNTING ASSEMBLY |
| 1 | 1 | 062577A | MOUNT, Cutter (Includes items 1a - 1k) |
| 1a | 1 | 011160P01 | PIN, Bucket-Excavator |
| 1b | 1 | 011156P01 | BUSHING, Bucket-Excavator |
| 1c | 1 | 011170P00 | BUSHING, Bucket-Excavator |
| 1d | 1 | 011172P00 | BUSHING, Bucket-Excavator |
| 1e | 1 | 062325P | PIN, Bucket Cylinder |
| 1f | 1 | 011171P00 | BUSHING, Bucket-Excavator |
| 1g | 1 | P0001-06-014 | BOLT, Hex 3/8 UNC x 3.5 |
| 1h | 2 | P0003-06-000 | NUT, Hex 3/8 UNC |
| 1i | 3 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 1j | 1 | P0001-06-012 | BOLT, Hex 3/8 UNC x 3 |
| 1k | 1 | P0063-004 | FITTING, Grease 1/8-NPT Straight |
| 2 | 1 | P0050-238 | ASSEMBLY, Drum Cutter(Includes item 2a - 2b) |
| 2a | 1 | P0050-238A | FILTER, Leak Line |
| 2b | 1 | P0050-238B | TOOTH SET, Drum Cutter |
| 3 | 12 | P0040-012 | WASHER, Hardened Flat 3/4 |
| 4 | 6 | P0003-12-000 | NUT, Hex 3/4 UNC |
| 5 | 6 | P0001-12-012 | BOLT, Hex 3/4 UNC x 3 |
| 6* | 1 | 062576A | ASSEMBLY, Fixed Link |

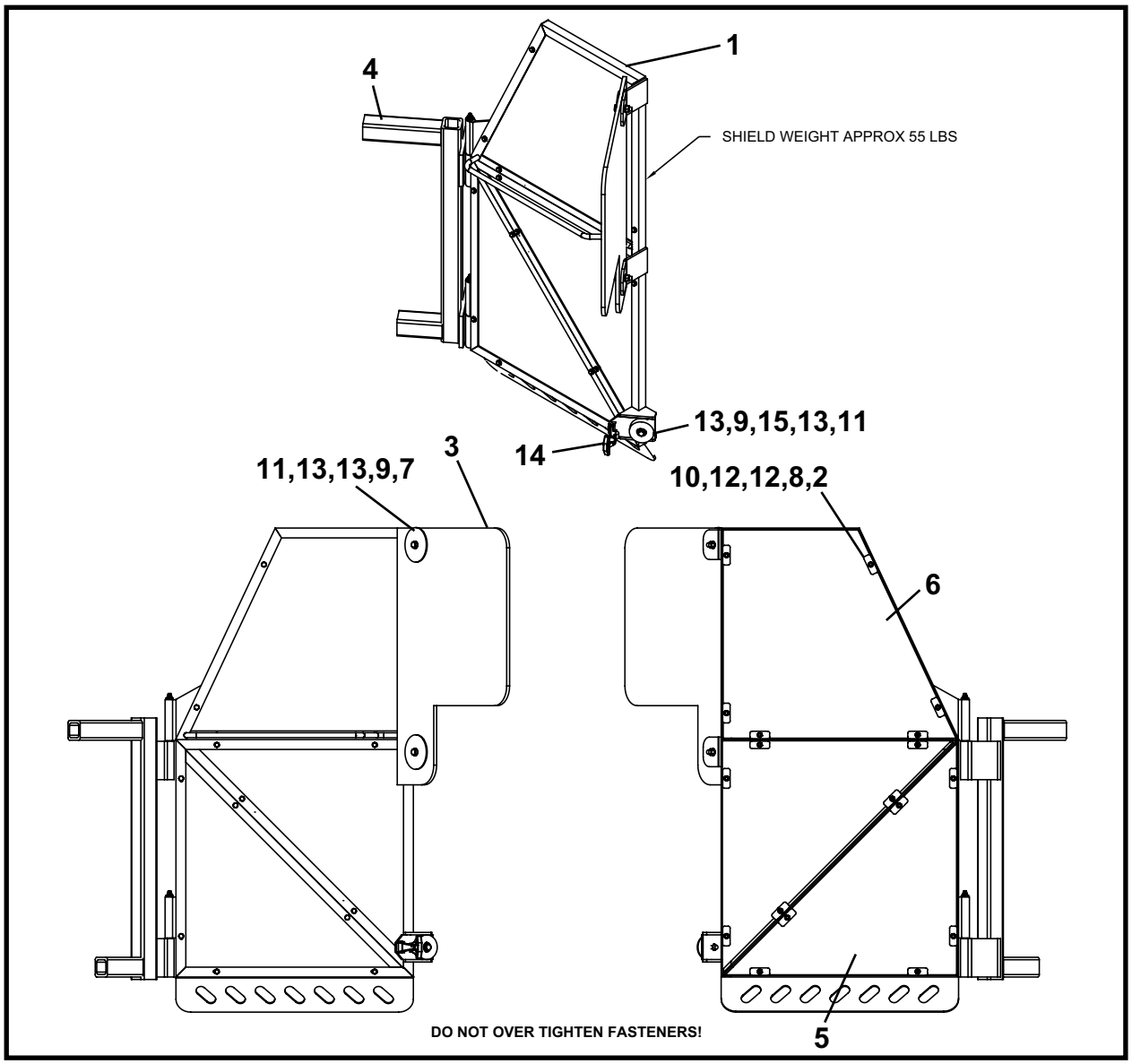
* Refer to this section for parts information.

# FIXED LINK ASSEMBLY, 062576A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 062576A | FIXED LINK ASSEMBLY |
| 1 | 1 | 062615P | MOUNT, Trunion Link |
| 2 | 1 | 062614P | RING, Retainer |
| 3 | 1 | P0065-086 | BEARING |
| 4 | 1 | P0076-050 | SNAP RING, Internal |
| 5 | 2 | P0063-001 | FITTING, Grease 1/4-28 Straight |
| 6 | 1 | 062611P | BAR, Lock-Adjuster |
| 7 | 1 | 062610P | ADJUSTER, Trunion Link |
| 8 | 2 | P0001-06-008 | BOLT, Hex 3/8 UNC x 2 |
| 9 | 10 | P0040-006 | WASHER, Hardened FLat 3/8 |
| 10 | 8 | P0001-06-005 | BOLT, Hex 3/8 UNC x 1.25 |
| 11 | 1 | 062613A | TIE-ROD, Trunion Link |

# OPERATOR SHIELD ASSEMBLY, 062638A




| ITEM | QTY | PART NO. | DESCRIPTION |
|---|---|---|---|
| 0 | 1 | 062638A | OPERATOR SHIELD ASSEMBLY |
| 1 | 1 | 062639A | FRAME, Operator Screen |
| 2 | 18 | 062656P | SUPPORT, Lexan |
| 3 | 1 | 062657P | SCREEN, Lexan - Side |
| 4 | 1 | 062658A | MOUNT, Screen |
| 5 | 2 | 062659P | SCREEN, Lexan - Lower |
| 6 | 1 | 062660P | SCREEN, Lexan - Top |
| 7 | 2 | A11570P | WASHER |
| 8 | 18 | P0001-04-005 | BOLT, Hex 1/4 UNC x 1.25 |
| 9 | 3 | P0001-06-006 | BOLT, Hex 3/8 UNC x 1.5 |
| 10 | 18 | P0013-04-000 | NUT, Nylock 1/4 |
| 11 | 3 | P0013-06A-000 | NUT, Nylock 3/8 UNC |
| 12 | 36 | P0040-004 | WASHER, Hardened Flat 1/4 |
| 13 | 6 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 14 | 1 | P0059-031 | FASTENER, Rubber Hood |
| 15 | 1 | P0253-112 | BUMPER, Rubber |
| 16* | 1 | 1255-142 | KIT, Decal EX-50 Shield (Not Shown) |

* Refer to this section for parts information.

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