



APE TOP AUGER DRILL OWNER'S MANUAL

DEEP FOUNDATION SOLUTIONS



800-248-8498

WWW.AMERICANPILEDRIVING.COM

MODEL 50/75/80/100 BB DRILL

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This Quick Reference Guide will assist you in finding the information you’re looking for.

GENERAL INFORMATION

MAINTENANCE

TROUBLE SHOOTING

REPLACEMENT PARTS

REFERENCE / NOTES

REV	DATE	DESCRIPTION
A	2/20/25	Added detail grease location and schedule.

A Table of Contents is included after the Foreword.

Description:
MODEL BLACK BRUIN TOP DRIVE AUGER DRILL



WARRANTY INFORMATION

GENERAL INFORMATION

American Piledriving Equipment, Inc. (APE) warrants new products sold by it to be free from defects in material or workmanship for a period of one (1) years after the date of delivery to the first user and subject to the following conditions:

- APE's obligation and liability under this WARRANTY is expressly limited to repairing or replacing, at APE's option, any parts which appear to APE upon inspection to have been defective in material or workmanship. Such parts shall be provided at no cost to the user, at the business establishment of APE or the authorized APE distributor of the product during regular working hours.
- This WARRANTY shall not apply to component parts or accessories of products not manufactured by APE, and which carry the warranty of the manufacturer thereof, or to normal maintenance (such as engine tune-up) or normal maintenance parts (such as filters).
- Replacement or repair parts installed in the product covered by this WARRANTY are warranted only for the remainder of the warranty as if such parts were original components of said product.
- APE makes no other warranty, expressed or implied, and makes no warranty of merchantability or fitness for any particular purpose.
- APE's obligations under this WARRANTY shall not include any transportation charges, costs of installation, duty, taxes or any other charges whatsoever, or any liability for direct, indirect, incidental or consequential damage or delay.
- If requested by APE, products or parts for which a warranty claim is made are to be returned, transportation prepaid, to APE.

OIL MUST MEET ISO CLEANLINESS CODE 17/15/11. OIL THAT DOES NOT MEET CLEANLINESS CODE WILL **VOID** THE WARRANTY

ANY IMPROPER USE, INCLUDING OPERATION AFTER DISCOVERY OF DEFECTIVE OR WORN PARTS, OPERATION BEYOND RATED CAPACITY, SUBSTITUTION OF ANY PARTS WHATSOEVER, USE OF PARTS NOT APPROVED BY APE OR ANY ALTERATION OR REPAIR BY OTHERS IN SUCH A MANNER AS, IN APE'S JUDGMENT, AFFECTS THE PRODUCT MATERIALLY AND ADVERSELY, SHALL **VOID** THIS WARRANTY.

ANY TYPE OF WELDING ON APE'S EQUIPMENT WILL **VOID** THE WARRANTY UNLESS AUTHORIZED IN WRITING BY APE

NO EMPLOYEE IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGE IS MADE IN WRITING AND SIGNED BY AN OFFICER OF APE, INC.



Foreword

This manual covers **APE BB Auger Drill** safety, operation instructions, lubrication and maintenance information. This manual should be stored in or near the engine area in a literature holder or literature storage area.

The data provided in this manual gives the necessary information to operate and maintain APE equipment. The listed procedures are to be performed by qualified personnel who have an understanding of the equipment and who follow all safety precautions.

Some photographs or illustrations in this manual show details or attachments that may be different from your equipment. Continuing improvement and advancement of product design may have caused changes to your equipment which are not included in this manual. Whenever a question arises regarding your equipment, or this manual, please consult with your APE dealer for the latest available information.

Using this manual:

- Refer to the Table of Contents for the page location of applicable sections.
- All weights and measurements are in English and Metric units.
- Please visit www.americanpiledriving.com for product data sheets and manuals and latest available information.

DISCLAIMER:

This unit was tested and flushed before leaving our facility. In order to help provide years of trouble-free usage, please review the following documentation and make sure to clean and flush the quick disconnect fitting on any equipment before connecting it to the power unit.

Refer to schematic diagrams and the BOM (Bill of Materials) for component part specifications and recommended spare parts.

When calling APE, always have the equipment serial number on hand in order to obtain quicker service.

IDENTIFICATION TAG



Serial No. Can be found here.

CALIFORNIA Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

CALIFORNIA Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer, birth defects and reproductive harm. **Wash hands after handling.**



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Specification

50 Black Bruin

DIMENSIONS

Overall Length	71 in	(180 cm)
Overall Width	46 in	(117 cm)
Overall Height	68 in	(173 cm)

Low Speed High Torque

Torque	9,688 ft-lbs per 1000 PSI	1,339 kgm per 69 bar
Max Pressure	5,800 psi	400 bar
Rotation Speed	36 rpm	
Max Flow	120 gpm @ 3.3 gal / rev	454 lpm @ 12.6 lit / rev
Max Horse Power	406 hp	303 kW

High Speed Low Torque

Torque	4,844 ft-lbs per 1000 PSI	670 kgm per 69 bar
Max Pressure	5,800 PSI	399.6 bar
Rotation Speed	72 rpm	
Max Flow	120 gpm @ 1.7 gal / rev	454 lpm @ 12.6 lit / rev
Max Horse Power	320 hp	239 kW

Misc Specifications

Crowd Force	150,000 lbs	68,039 kg
Suspended Weight	4,530 lbs	2,055 kg
ID of Output Shaft	3 in	76.2 mm
ID of Rotary Joint	3 in	76.2 mm
Adapters	3 inch / 4 inch	



Specification

75 Black Bruin

DIMENSIONS

Overall Length	71 in	(180 cm)
Overall Width	46 in	(117 cm)
Overall Height	68 in	(173 cm)

Low Speed High Torque

Torque	12,150 ft-lbs per 1000 PSI	1,680 kgm per 69 bar
Max Pressure	5,800 psi	400 bar
Rotation Speed	30 rpm	
Max Flow	120 gpm @ 3.3 gal / rev	454 lpm @ 15.8 lit / rev
Max Horse Power	508 hp	379 kW

High Speed Low Torque

Torque	6,075 ft-lbs per 1000 PSI	840 kgm per 69 bar
Max Pressure	5,800 PSI	400 bar
Rotation Speed	60 rpm	
Max Flow	120 gpm @ 1.7 gal / rev	454 lpm @ 7.9 lit / rev
Max Horse Power	406 hp	303 kW

Misc Specifications

Crowd Force	150,000 lbs	68,039 kg
Suspended Weight	4,630 lbs	2,100 kg
ID of Output Shaft	3 in	76.2 mm
ID of Rotary Joint	3 in	76.2 mm
Adapters	3 inch / 4 inch	

Specification

80 Black Bruin

DIMENSIONS

Overall Length	71 in	(180 cm)
Overall Width	46 in	(117 cm)
Overall Height	68 in	(173 cm)

Low Speed High Torque

Torque	14,572 ft-lbs per 1000 PSI	2,015 kgm per 69 bar
Max Pressure	5,075 psi	350 bar
Rotation Speed	30 rpm	
Max Flow	125 gpm @ 5 gal / rev	473 lpm @ 18.9 lit / rev
Max Horse Power	401 hp	300 kW

High Speed Low Torque

Torque	7,266 ft-lbs per 1000 PSI	1,004.56 kgm per 69 bar
Max Pressure	5,075 PSI	350 bar
Rotation Speed	61 rpm	
Max Flow	125 gpm @ 2.5 gal / rev	473 lpm @ 9.5 lit / rev
Max Horse Power	328 hp	245 kW

Misc Specifications

Crowd Force	150,000 lbs	68,039 kg
Suspended Weight	4,630 lbs	2,100 kg
ID of Output Shaft	3 in	76.2 mm
ID of Rotary Joint	3 in	76.2 mm
Adapters	3 inch / 4 inch	

Specification

100 Black Bruin

DIMENSIONS

Overall Length	71 in	(180 cm)
Overall Width	46 in	(117 cm)
Overall Height	68 in	(173 cm)

Low Speed High Torque

Torque	18,182 ft-lbs per 1000 PSI	2,514 kgm per 69 bar
Max Pressure	5,500 psi	379 bar
Rotation Speed	30 rpm	
Max Flow	140 gpm @ 5 gal / rev	530 lpm @ 18.9 lit / rev
Max Horse Power	401 hp	299 kW

High Speed Low Torque

Torque	7,266 ft-lbs per 1000 PSI	1,005 kgm per 69 bar
Max Pressure	4,500 PSI	310 bar
Rotation Speed	61 rpm	
Max Flow	140 gpm @ 2.5 gal / rev	530 lpm @ 9.5 lit / rev
Max Horse Power	465 hp	348 kW

Misc Specifications

Crowd Force	150,000 lbs	68,039 kg
Suspended Weight	5,630 lbs	2,554 kg
ID of Output Shaft	3 in	76.2 mm
ID of Rotary Joint	3 in	76.2 mm
Adapters	3 inch / 4 inch	



General Safety Precautions



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a hazardous situation where injury could occur but is unlikely to be serious or lead to death.



NOTICE indicates information that may help or guide you in the operation or service of the equipment.

DISCLAIMER:

This unit was tested and flushed before leaving our facility. In order to help provide years of trouble free usage, please review the following documentation and make sure to clean and flush the field piping before connecting it to the power unit.

Refer to schematic diagrams and the BOM (Bill of Materials) for component part specifications and recommended spare parts.

When calling APE (American Piledriving Equipment), always inform them of the supplied serial # in order to obtain quicker service

NOTICE

READ THIS MANUAL THOROUGHLY BEFORE OPERATING AND / OR WORKING ON THE EQUIPMENT

1. Only well-trained and experienced personnel should attempt to operate or maintain this equipment.
2. NEVER adjust, lubricate and/or repair the unit when it is in operation or lifted above ground level.
3. NEVER remove, paint over and/or cover warning or safety labels. If labels become damaged or unreadable, replace immediately.
4. All personnel should wear approved safety clothing including HARD HATS, SAFETY SHOES, SAFETY GLASSES and HEARING PROTECTION when near this equipment.
5. Do **NOT** stand any closer to this equipment than necessary when it is in operation. Parts may loosen and fall. **NEVER** stand under operating or elevated equipment.
6. When maintaining and/or repairing the equipment, **NEVER** substitute parts not supplied or approved in writing by APE.

NOTICE

Do NOT weld or flame cut on this equipment.

7. NEVER use or store flammable liquids on or near the engine.
8. Insure that all lifting equipment, including cranes, wire rope, slings, hooks, shackles, etc., are properly sized for the worst caseloads anticipated during operations.
9. If there are any questions about the weights, specifications and/or performance of the unit, contact APE before handling and/or operating the equipment.
10. Check wire rope clips for tightness and wire ropes for wear daily.
11. Remove all tools, parts and/or electrical cords before starting the unit.
12. If abnormal equipment operation is observed, discontinue use immediately and correct the problem.

Safety Section

13. If running an auger/drill, make sure that the Auger rotation switch is in NEUTRAL before starting the Power Unit engine
14. Do **NOT** adjust and/or set the hydraulic pressures higher and/or lower than those specified in this Manual.
15. NEVER operate this equipment with hydraulic hoses that are damaged or 'kinked'. Replace damaged hoses immediately.
16. Do **NOT** lift and/or support hydraulic hoses with wire rope slings.
17. NEVER attempt to connect Quick Disconnects (QDs) when the Power Unit is running.
18. Do **NOT** pull on and/or attempt to move equipment with the hydraulic hoses.
19. Do **NOT** attempt to locate hydraulic leaks with your hands. High-pressure leaks can penetrate skin and cause severe damage, blood poisoning and/or infection.
20. Do **NOT** attempt to repair leaks while the equipment is in operation.
21. Do **NOT** attempt to tighten and/or loosen fittings and/or hoses when the machine is in operation.
22. Power Unit must always be placed on level, stable ground.
23. Do **NOT** remove Power Unit heat shields. Do NOT attempt to use the Power Unit without heat shields. Severe fires may result.
26. Rounded and/or damaged bolt heads and/or nuts should be replaced so that proper torque values may be obtained. Proper torque values are necessary to prevent parts on this equipment, leads and/or crane booms from loosening and/or falling. (Refer to the torque chart in this manual for the proper values.)
27. Keep hands away from rotating flighting auger shaft and/or rotary joint.
28. Do **NOT** allow clothing, hoses, ropes, etc., to be entangled in, or wrap around, rotating flighting, Auger Shaft and /or rotary joint.
29. Never stand under an equipment at any time and keep your eyes on the equipment when it is in operation.

NOTICE

A properly maintained fire extinguisher, suitable for oil fires, MUST be kept in the immediate vicinity of equipment operations.

24. When moving and/or transporting this equipment, insure that the vehicle and/or vessel is of sufficient capacity to handle the load. Make sure that the equipment is properly tied down.
25. When moving and/or transporting this equipment, be sure that the QD Dust Caps are tight and that the cap safety cables are in place. Be sure that all equipment parts are tight and/or properly secured before shipment. Unsecured parts may vibrate loose and fall during transport causing injury and/or property damage.

SAFETY MESSAGES

There may be several specific safety messages on your equipment. The exact location and description of the safety messages are reviewed in this section. Become familiar with all safety messages.

Ensure that all the safety messages are legible. Clean the safety messages or replace the safety messages if the words cannot be read or if the illustrations are not visible. Use a cloth, water and soap to clean the safety messages. Do not use solvents, gasoline, or other harsh chemicals. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the safety messages. The safety messages that are loosened could drop off the equipment.

Replace any safety message that is damaged or missing. If a safety message is attached to a part of the equipment that is replaced, install a new safety message on the replacement part. Your APE dealer can provide new safety messages.



Do not operate or work on this equipment unless you have read and understand the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions or read the warnings could result in injury or death. Contact any APE dealer for replacement manuals. Proper care is your responsibility.

QUICK DISCONNECT NOTICE

NOTICE: QUICK DIS-CONNECTS MUST BE FULLY SEATED TO ALLOW FREE HYDRAULIC FLOW. BLOCKED HYDRAULIC FLOW WILL STOP OR SLOW OPERATIONS AND CAUSE EXCESSIVE HEAT. TO SOLVE PROBLEM, REMOVE CLEAN AND RE INSTALL FITTINGS

Make sure all QD's are installed and connected completely. Failing to do so may cause damage or prevent proper operation.

IDENTIFICATION TAG



This information is important when contacting APE for replacement parts or other information.

- * Model
- * Serial No.

DO NOT WELD



Do **NOT** weld on or around the power unit unless authorized in writing by APE. Doing so will void all warranties and may cause damage to the power unit or vibro.

GENERAL HAZARD INFORMATION



Attach a “Do Not Operate” warning tag to the start switch or controls before the equipment is serviced or repaired. Attach the warning tags to the engine and to each operator control panel. When appropriate disconnect the negative terminal on the battery.

Do not allow unauthorized personnel on the equipment or around the equipment while being serviced.

Cautiously remove the following parts. To help prevent spraying or splashing of pressurized fluids hold a rag over the part that is being removed.

- Filler caps
- Grease fittings
- Pressure taps
- Breathers
- Drain plugs

PRESSURIZED AIR AND WATER

Pressurized air and/or water can cause debris and/or hot water to be blown out which could result in personal injury.

The maximum air pressure for cleaning purposes must be reduced to 30psi (205 kPa) when the air nozzle is deadheaded and used with effective chip guarding (if applicable) and personal protective equipment. The maximum water pressure for cleaning purposes must be below 40psi (275 kPa). When pressurized air and/or pressurized water is used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye

protection includes goggles or a protective face shield. Always wear eye protection for cleaning the cooling system.

Avoid direct spraying of water on electrical connectors, connections, and components. When using air for cleaning, allow the equipment to cool to reduce the possibility of fine debris igniting when redeposited on hot surfaces.

FLUID PENETRATION

Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get medical treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

CONTAINING FLUID SPILLAGE

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the equipment. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

LINES, TUBES, AND HOSES

Do not bend or strike high-pressure lines. Do not install lines, tubes, or hoses that are damaged.

Repair any fuel lines, oil lines, tubes, or hoses that are loose or damaged. Leaks can cause fires or injury.

Safety Section

Inspect all lines, tubes, and hoses carefully. Do not use bare hands to check for leaks. Always use a board or cardboard for checking equipment components for leaks. Tighten all connections to the recommended torque.

Check for the following conditions:

- End fittings that are damaged or leaking
- Outer covering that is chafed or cut
- Wire that is exposed in reinforced hose
- Outer covering that is ballooning locally
- Flexible part of the hose that is kinked or crushed
- Armoring that is embedded in the outer covering

Ensure that all of the clamps, guards, and heat shields are installed correctly. Correct installation of these components will help to prevent these effects: vibration, rubbing against other parts and excessive heat during operation.

INHALATION

Exhaust fumes can be hazardous to your health. If you operate the equipment in an enclosed area, adequate ventilation is necessary,

BURN PREVENTION

Do not touch any part of the equipment during operation. Allow the equipment to cool before any maintenance is performed on the engine. Relieve all pressures in the hydraulic system, fuel system, lubrication system, or cooling system before any lines, fittings, or related items are disconnected.

CRUSHING PREVENTION AND CUTTING PREVENTION

Support the equipment properly when work beneath the equipment is performed.

Unless other maintenance instructions are provided never attempt adjustments while the engine is running.

Stay clear of all rotating parts and moving parts. Leave the guards in place until maintenance is performed. After the maintenance is performed reinstall the guards.

Keep objects away from moving fan blades. The fan blades will throw objects or cut objects.

Wear protective glasses in order to avoid injury to the eyes.

Chips or other debris may fly off objects when objects are struck. Before objects are struck, ensure that no one will be injured by flying debris.

MOUNTING AND DISMOUNTING

Do not climb on the equipment, and do not jump off the equipment. Do not stand on the components which can not support your weight. Mount the equipment and dismount the equipment only at locations that have a ladder or handholds.

Product Information

Inspection Sheet



APE DRILL INSPECTION / TEST



MUST BE COMPLETED & SIGNED PRIOR TO SHIPMENT

Date: _____ Job / Sales Order No.: _____ Equipment No.: _____ Serial No.: _____
Drill Model: _____ Inspector : _____ Customer: _____

- Removed All Wire Rope for Insurances Reasons ☐
- Checked All Bolts on Lead Guides..... ☐
- Inspected Skid for Cracks and Deformities..... ☐
- Drill Sheave in Good Condition..... ☐
- Inspected Lead Guide Rails and Welds for Cracks..... ☐
- Checked All Bolts, Nuts, and Screws..... ☐
- Checked Bolts Fastening Housing to Bale Assembly.. ☐
- Checked API Adapter Bolts..... ☐
- Checked Output Shaft and All Grout Clamp Bolts..... ☐
- Inspected All Hydraulic Hoses and Fittings for Leaks.... ☐
- Removed Any Welding Attached by Customer ☐
- Serial Number/Patent Plate Legible..... ☐
- Check and Cleaned Quick Disconnects ☐
- Checked Caps and Plugs..... ☐
- Checked O-Ring on QDs ☐
- Put Spare O-Ring Kit in Tool Box of Power Unit ☐
- Grout Hose Clear of Build Up..... ☐
- Check Case Drain - Remove QD..... ☐
- Drill Shift Pressure Gauge..... ☐

Rotations Per Minute:

Low: _____ High: _____

RPM:

80BB

Low Speed: 36

High Speed: 72

75BB

Low Speed: 30

High Speed: 60

50BB

Low Speed: 30

High Speed: 61

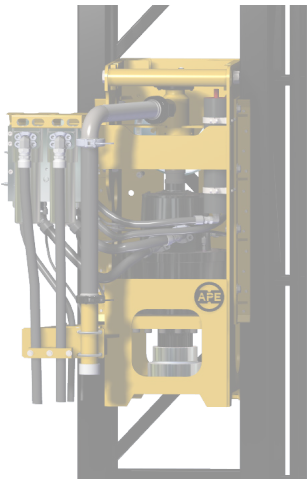
NOTES

LOADING EQUIPMENT CHECK LIST

Prior to the equipment going out on rent it must look like new condition. If the paint appears bad then paint it. If the paint surface is bad then have it sand blasted. Do not allow the equipment to go out looking bad. Any bad hoses should be replaced. The most important thing is the condition of the hoses. Should be new or in new condition.

COLD WEATHER

If this unit is going to operate in cold weather then please make sure the proper oils have been used.



Inspector Signature: _____

Date: _____



Daily Checklist



Check the entire unit prior to and during set-up each day or at the beginning of each shift

Prior to starting the unit or at the beginning of each shift, check the following:

- Visually inspect all bolts, nuts and screws.
- Grease Sheave pin.
- Grease Grout Swivel
- Visually inspect all hydraulic fittings for leaks. If a leak is found or suspected, shutdown the power unit. If a fitting appears to be damaged, replace with a new fitting.



It is absolutely imperative that no dirt or other impurities be permitted to contaminate the hydraulic fluid. Any contamination will drastically shorten the life of the high-pressure hydraulic system.



Vibration loosens bolts. Check them thoroughly.

Lifting and Storage

The following instructions apply to all procedures associated with the motor. Read these instructions carefully and follow them closely.

- Use necessary Personal Protective Equipment (PPE) when working with the motor.
- Support the motor properly. Make sure that the motor cannot fall over or accidentally turn around.
- Use only appropriate equipment and attachments for lifting and transferring the motor.
- Always use the lifting equipment properly and check the load bearing capacity.
- Prevent unintended use of the motor during installation and maintenance procedures by preventing the pressurization of the hydraulic lines.
- The operating temperature of the motor may be over 60° C (140° F) which is hot enough to cause severe burns.



Beware of hot hydraulic fluid when disconnecting the hydraulic connections

Connecting the Hydraulics

Connecting the hoses is one of the most critical aspects of commissioning an APE driver. Take extreme care to keep these connections absolutely clean. This procedure is one of the most common ways for foreign particles to be introduced into a hydraulic system.

Attention!

New hydraulic fluid is NOT clean oil!

***Oil must meet ISO cleanliness code
17/15/11***

- Connect the hose bundle. Make sure all connections are properly tightened
- Fill the motor case with clean hydraulic fluid



CAUTION

While filling the hydraulic lines, the drill motor shaft will rotate.

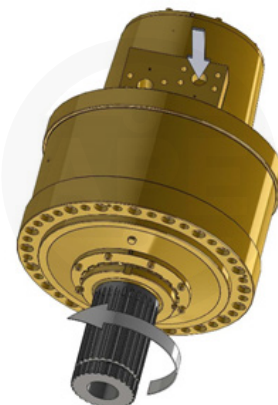
Please do the following:

- Set the engine at idle
- Run at idle for about 10 minutes to fill the lines
- Energize 'Drive Fwd' - The motor shaft will rotate slowly and push any remaining air in the lines back to the reservoir

Attention!

Pressurizing the system while there is air entrained in the fluid may cause damage to the components.

Let the system run at idle for an additional 10 minutes to allow the air to rise into the airspace of the hydraulic reservoir.



Commissioning Procedure

Attention!

Do not start the motor if the air bleeding procedure has not been carried out.

Stressing an unused motor with full power may cause premature wear or failure.

Ensure that the following steps are met before starting a new or rebuilt auger drill:

- The hydraulic circuit of the motor is flushed
- The motor is installed appropriately
- An air bleeding procedure is carried out
- The reservoir of the hydraulic system is full

During the initial stages of starting a new or rebuilt helical driver, please consider the following:

- Do **NOT** run the motor immediately with full power
- Increase the load and speed of rotation gradually
- Observe the motor and the hydraulic system for external leaks or abnormal noises during the commissioning procedure
- Start the motor break-in period

Flushing the Hydraulic System

Prior to connecting the motor as part of the hydraulic system, the hydraulic circuit of the motor must always be flushed. This is done by circulating the hydraulic fluid through a filter installed in place of the motor.

Flushing the hydraulic system should be performed after every service and/or repair.

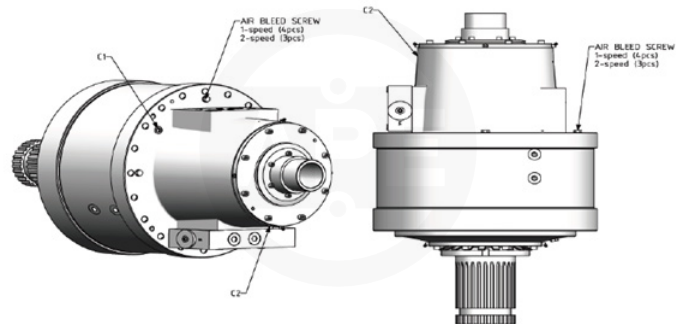
The helical pile driver is usually shipped with the drive motor hoses full of hydraulic oil and the unit may be used immediately.

If the drive hoses have been removed from the driver motor they will need to be filled before full speed operation.

Air Bleed Procedure

The air bleeding procedure is carried out to completely fill the housing of the motor with hydraulic fluid. Air is removed from the housing with air bleeding screws as follows:

- Connect port 'C2' to a drain line and feed hydraulic fluid into the motor via port 'C1' throughout the air bleeding procedure.
 - Locate the topmost air bleed screw of the housing
 - Unscrew the air bleeding screw by half a turn and let the air escape from the housing
 - Close the screw when only hydraulic fluid is pouring through it
 - Tighten the screw to a torque of 28 lbf/ft (39 +/- 3 Nm)



Break-In Period

New motors require a break in procedure.

The motor achieves its final properties during the first hours of use. All new and reconditioned motors should go through an initial break-in period.

Items to consider during this period:

- Break-in should last for, at least, **the first 8 hours of use.**
- The power output should remain under **50% of the maximum power capacity** of the motor.
- To limit the power output, constrain the working pressure, speed of rotation or both.
- The working pressure should be curbed so that pressure peaks which last over 2 seconds (2s) remain under 75% of the allowed pressure.



During this break-in period, the moving parts of the motor wear against each other. This means the wear of the parts sets to a stable state for the entire service life of the motor.

Break-In Period



***It is imperative that the hydraulic fluid is kept clean to a minimum
ISO Code 17/15/11***

New hydraulic fluid is NOT clean oil

(See attached document 'Understanding ISO Codes)

(See Warranty document regarding fluid cleanliness)

Bulk oil does not typically meet the cleanliness standards required by APE equipment.

Operating Pressures

Charge Pressure

The charge pressure is used to ensure that the pistons of the motor stay constantly engaged to the cam ring. Depending upon the operation function, the charge pressure is required either in the feed or return line (working line ports A or B).

The recommended charge pressure is **200PSI or 13.8 bar higher than the case pressure**. The actual required charge pressure depends upon the viscosity and flow rate of the hydraulic fluid.

The required charge pressure in the return line (back pressure) is only 73psi (5 bar) higher than the case pressure if the motor is **NOT** switched to partial displacement or short circuit connection.

Attention!

Charge pressure that is too low may cause the pistons to disengage from the cam ring causing A clattering noise when the pistons re-engage. This condition will cause damage to the driver motor.

Constant use with a charge pressure that is too low may cause premature wear or failure of the motor.

Case Drain

The case drain line is the return line for the driver housing cavity. Case pressure is induced by the pressure drop in the case drain line. The case drain line is connected to port 'C2' on the motor and 'DR2' port on the drive manifold.

It is imperative that the case drain has an unobstructed route back to the hydraulic reservoir. If a case drain filter is required, consult the factory for proper sizing.

Operating Temperatures

The Operating Temperature references the internal temperature of the motor.

Take into consideration the following requirements:

- 70°C (158°F) – Avoid going over this Operating Temperature for improved service life
- 85°C (185°F) – Highest permissible intermittent Operating Temperature
- -35°C (-31°F) – Lowest permissible Operating Temperature
- 60°C (140°F) – Temperature difference between the motor and the hydraulic fluid

The Operating Temperature may be measured from the hydraulic fluid returning from the motor. Take into account the temperature of the hydraulic fluid returning from the case drain line.



The APE Auger Drill has a 2-speed direct drive Radial Piston Motor.

Full Displacement Mode:

- All of the pistons are engaged to deliver maximum torque
- Full displacement mode is limited to ½ maximum output speed

Half Displacement Mode:

- ½ of the pistons are engaged to deliver double speed
- Half displacement mode is limited to ½ maximum output torque

Changing displacement while drilling is permissible. To 'shift on the fly' it is necessary to hold the displacement shift spool in position with a minimum of 650PSI.

A 2-position, 4-way, Pilot Valve is required to select displacement.

Full Displacement	Activate Port: Y2	Drain Port: Y1
-------------------	-------------------	----------------

Half Displacement	Activate Port: Y1	Drain Port: Y2
-------------------	-------------------	----------------



NOTE: In some applications the maximum pressure setting for half displacement mode must be lowered due to through-put horsepower limitations internal to the motor. Refer to the data sheet of the specific motor installed.

When the motor is transitioning from full displacement to half displacement, the load induced pressure will double.

When the motor is transitioning from half displacement to full displacement, the flow requirement will double.

AVOID SHIFTING FROM HALF TO FULL WHEN THE MOTOR IS TURNING IN EXCESS OF ½ OF THE MAXIMUM SPEED.

Valves

The drill has an integral valve package designed to protect the motor from damage. (Refer to the hydraulic schematic Figure 7 / Page 19 for details)

- Pressure filters clean the hydraulic fluid going to the drill motor and manifold in the forward and reverse directions.
- Vented Relief Valves - VR1 and VR2: Limit the maximum pressure that the drill motor is exposed to. When the load induced pressure exceeds the setting of the vented relief, the valve will open creating a short circuit around the drill motor.
- The vented Relief Valve may be set to a lower setting by energizing the Directional Valve (DV1) which connects the pilot section of VR1 and VR2 to the secondary Pilot Relief Valve (RV1).
- Some motors are limited in their capacity to carry 'through-out horsepower' when they are in the high speed/half displacement mode.
- Check Valves - CV2 and CV3: These isolate the pilot sections of VR1 and VR2 from each other.
- Counterbalance Valves - CB1 and CB2: These are in-line with the drill motor and set at 400PSI. Their primary function is to maintain 'charge pressure' to the drill motor.
- Hot Oil Shuttle Valve - HOS1: This will shift when the drill is activated to direct oil flow from the low-pressure side to flush the case of the drill motor.
- Flow Control Valve - FC2: This regulates the amount of case flushing flow.
- Check Valves - CV4 and CV5: These connect the high-pressure side when the drill is activated. This will supply the Accumulator with pressurized hydraulic fluid to be stored for additional charge pressure.
- Flow Control Valve - FC1: This limits the rate of flow being diverted to the Accumulator.
- Pressure Reducing Valve – PRV: This is a normally open valve that will close when the pressure being stored in the Accumulator exceeds the PRV setting. If the pressure in either motor line drops below this setting, the PRV will open thus allowing the fluid stored in the Accumulator to keep the motor ports pressurized.
- Check Valves - CV6 and CV7: These create direct flow from the Accumulator circuit to the low-pressure side of the drill motor.
- Pop Off Valve - PO1: This is intended to protect the drill motor case from over-pressurization.

Storage



Preventative maintenance includes normal servicing that will keep the power unit in peak operative condition and prevent unnecessary trouble from developing. This servicing consists of periodic lubrication and inspection of moving parts and accessories of the unit.

Lubrication is an essential part of preventative maintenance controlling, to a great extent, the useful life of the unit. Different lubricants are needed and some components in the unit require more frequent lubrication than others. Therefore, it is important that the instructions regarding types of lubricants and frequency of their application be closely followed.

To prevent minor irregularities from developing into serious conditions that might involve shutdown and major repair, several other services or inspections are recommended for the same intervals as the periodic lubrications. The purpose of these services or inspections is to assure the uninterrupted operation of the unit.

- Thoroughly clean all lubrication fittings, caps, filler and level plugs along with their surrounding surfaces before servicing.
- Prevent dirt from entering with lubricants and coolants.

The intervals given in the schedule are based upon normal operation.

Perform these services, inspections, etc., More often as needed for operation under abnormal or severe conditions.

During short-term storage of a power unit, the following should be taken into consideration:

- Cover any pressure openings and open threaded holes with suitable caps.
- Protect the unpainted surfaces from dirt and moisture.
- Do NOT store the power unit in an area with substances that have an aggressive corrosive nature, i.e. solvents, acids, alkalies or salts.

For long-term storage (over 9 months), the following additional actions are recommended:

- Repair any damage to surface paint before item is stored.
- Protect the unpainted surfaces with suitable anti-corrosion treatment such as CRC SP-350, CorrosionX corrosion inhibitor, or WD-40 Long Term Corrosion Inhibitor.
- Fill the power unit completely with hydraulic fluid.



If these instructions are followed to the letter, the motor may be stored for approximately 2-years. However, as storage conditions do have a significant effect, all suggested time frames should only be considered as guide values.

Hydraulic Schematic

1. These pressure settings are specific to the Black Bruin (BB) Drill
2. Maximum flow rate is up to 140 GPM depending on which size drill motor you have in your drill. Please see page specification for more information.



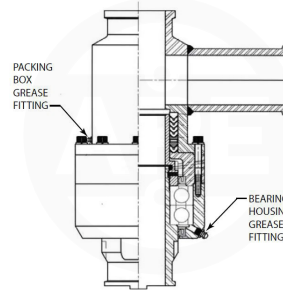
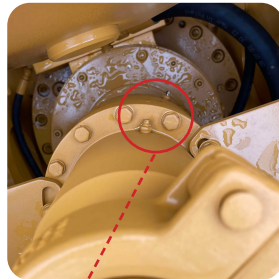
Maintenance Chart

DAILY	WEEKLY OR 40 HOURS	250 HOURS OR 6 MONTHS	1500 HOURS OR 1 YEAR	3000 HOURS OR 2 YEARS	6000 HOURS OR 3 YEARS
<ul style="list-style-type: none"> Visually inspect guide strips Inspect loose bolts and nuts Inspect loose hoses and fittings Inspect Grease ports Grease drill, sheave, and swivel 	<ul style="list-style-type: none"> Grease drill Grease sheave Grease swivel Visually check all hoses for damages Check hose connection Check nitrogen pre-charge filter 	<ul style="list-style-type: none"> Change lubricating oil Change hydraulic filters Inspect/replace hoses and clamps Grease drill, sheave, and swivel 	<ul style="list-style-type: none"> Replace hoses as required Grease drill, sheave, and swivel Change hydraulic filters Change lubricating oil 	<ul style="list-style-type: none"> Grease drill, sheave, and swivel Change hydraulic filters Change lubricating oil 	<ul style="list-style-type: none"> Grease drill, sheave, and swivel Change hydraulic filters Change lubricating oil
<p>Follow the manufacturer's recommended maintenance procedures. At each scheduled maintenance interval preform all previous checks which are due for scheduled maintenance.</p>					

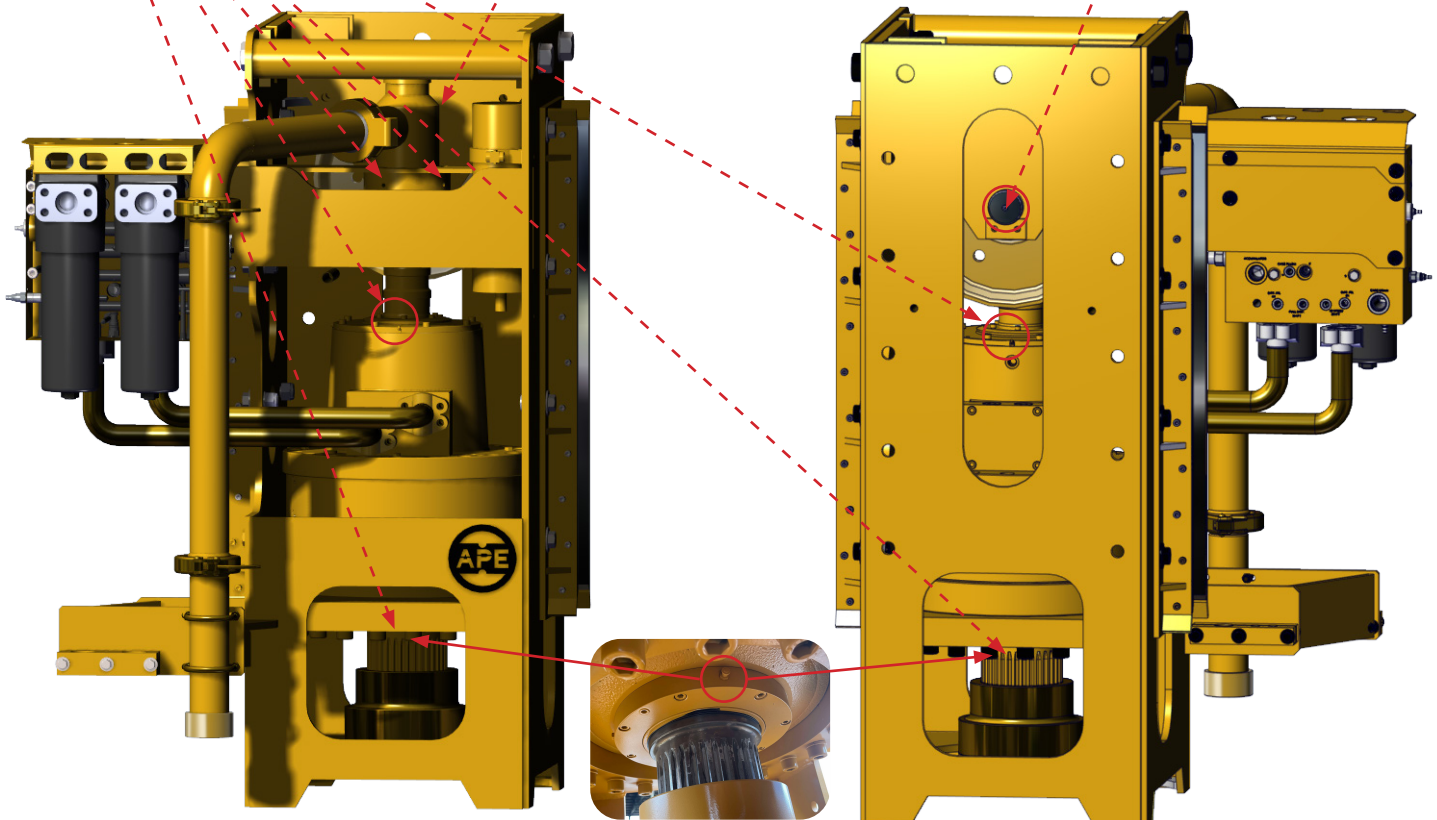
Grease Locations

Grease here every 4 working hours.

Grout Swivel



Grease here daily



Note: there are two sides

Routine Maintenance

APE recommends using grease having the following requirements:

- Operating temperature range: -40°F - 320°F
- Mineral oil based lithium soap grease
- Consistency class: NLGI #1
- Meet DIN KP2.5K-30 or ISO-L-XCCIB2.5 standard specifications

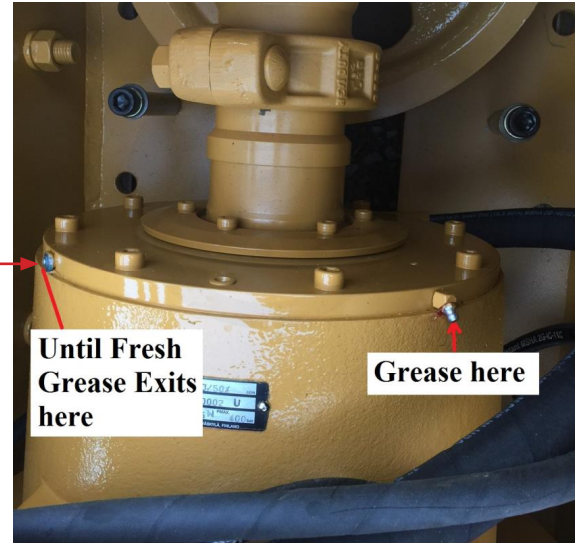
Attention!

**DO NOT USE A PNEUMATIC GREASE GUN
SEAL DAMAGE MAY OCCUR**

Every 4 working hours, do the following:

- Grease the top seal by pumping grease into either grease fitting until clean grease comes out of the Relief Valves. (Figure 11)
- When the Top Drive Auger is washed down, it is very important and helpful to grease the top seal to see the water come out along with clean grease out of the Relief Valves.
- Visually check all hoses for signs of damage or cuts that might cause hose failure during operation. Be sure that all connections are tight.
- Grease the rotary joint packing box (the upper fitting) with 3 to 5 shots of any good multi-purpose grease at the beginning of the shift and then every 2-4 hours always while rotating under no pressure (Figure 12).
- Grease the rotary joint bearing housing (the lower fitting) with any good multi-purpose grease after 1-hour of rotating until grease exits the bearing housing.
- **Check the nitrogen pre-charge every filter element change. Nitrogen pressure should be 150 PSI.**

Grease Relief Valve



Recommended Grease:
74402 - Red Grease II Cartridge

Hi-Temp Applications

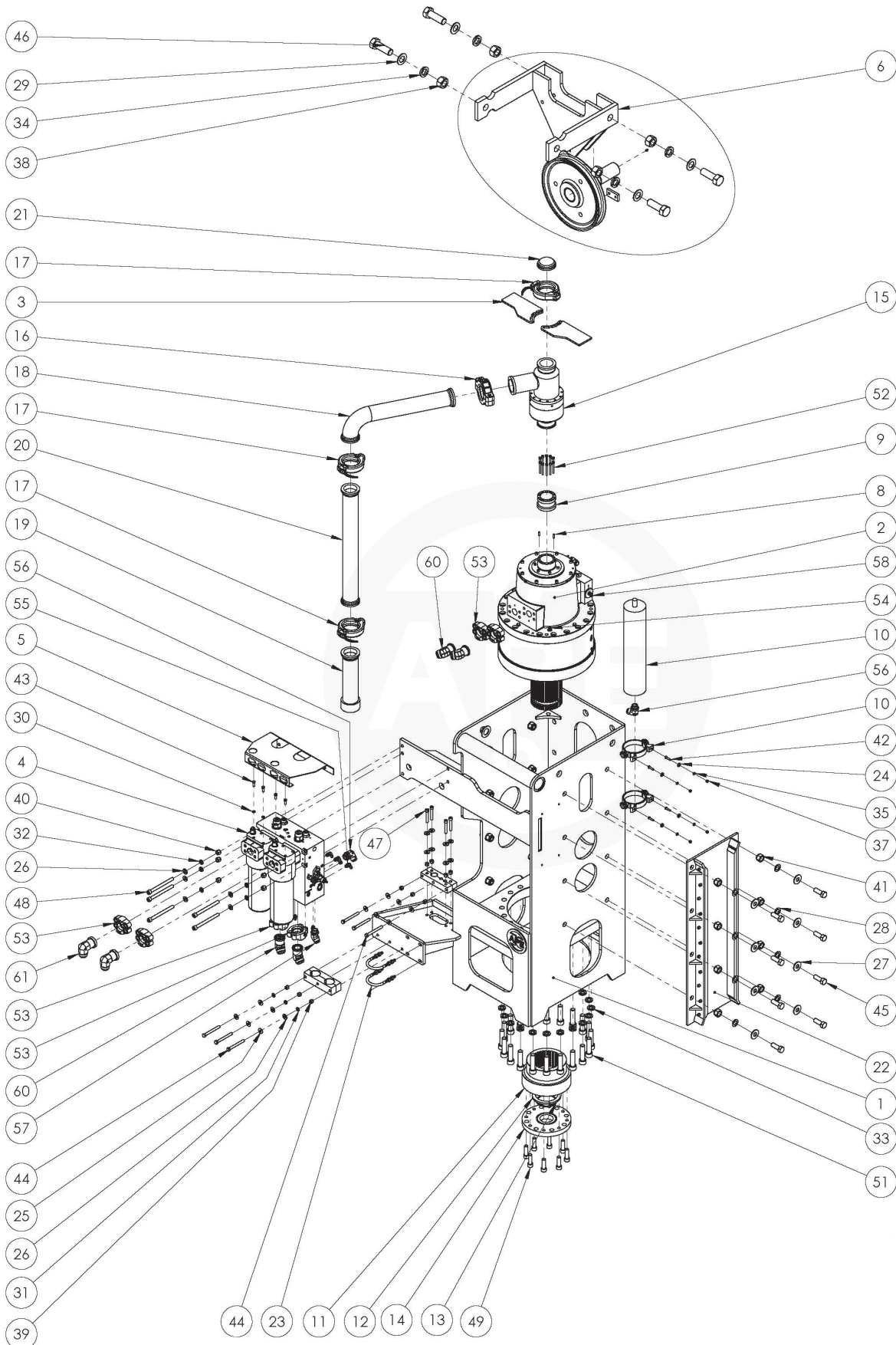
Red Grease II is an all purpose heavy-duty non-melt lubricant specially formulated with extreme pressure and anti-wear additives.

Meets Mil Spec:
MIL-G-18709
MIL-G-24139
MIL-G-4906



MAINTENANCE

50/75/80/100 Top Drive Auger Assembly



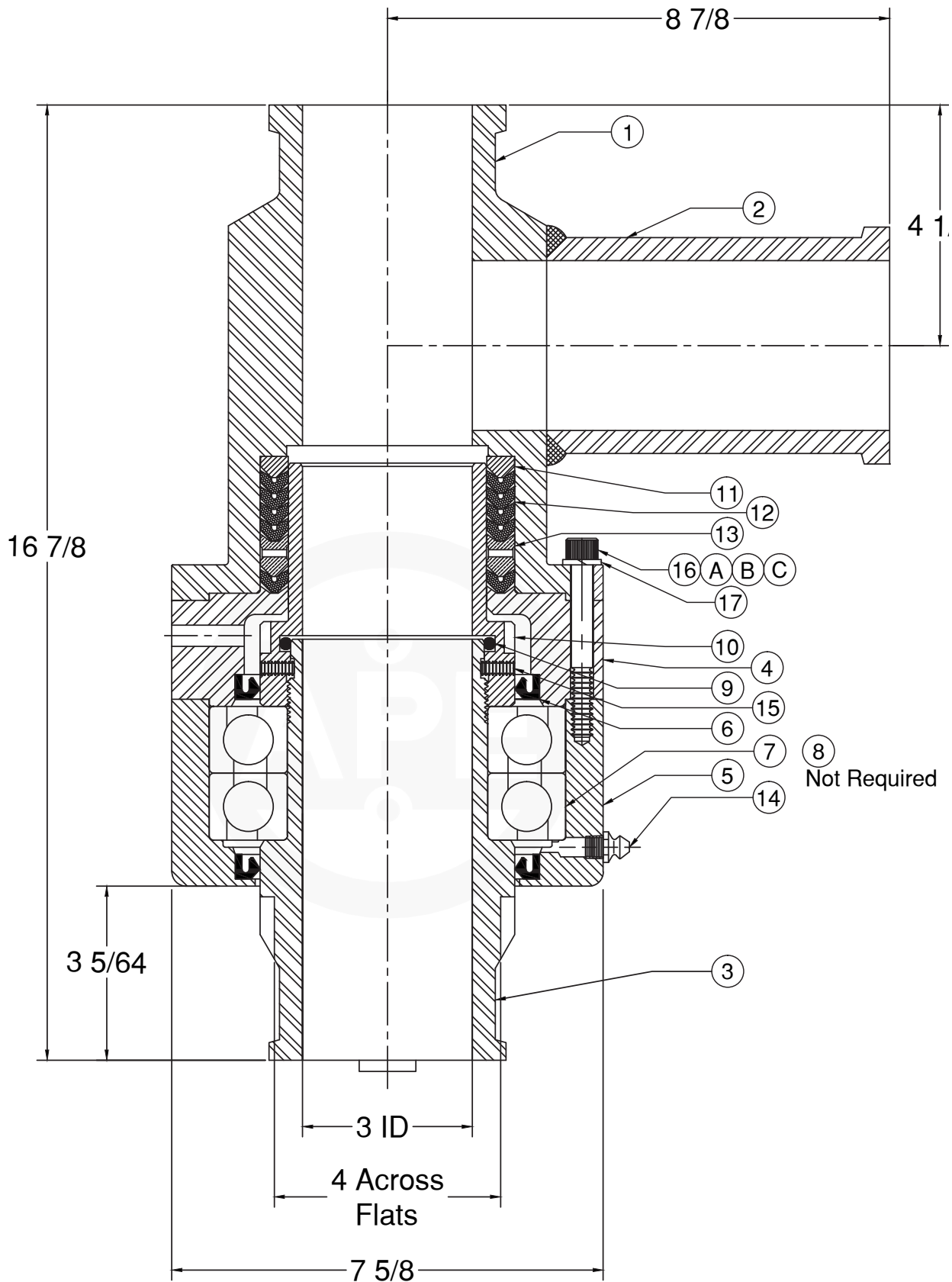
50/75/80/100 Top Drive Auger Assembly BOM

CALLOUT	PART NUMBER	DESCRIPTION	QTY
1	2000557	BB AUGER SKID	1
2	1001135 / 1001062 / 1001063 / 1009329	50/70/80/100 BB MOTOR	1
3	2000558	ANTI-ROTATIONAL STOP	2
4	021184	MANIFOLD	1
5	1004275	MANIFOLD GUARD	1
6	1004271	LIFTING BALE ASM	1
7	1006092	CABLE GUIDE SPACER	2
8	1001557	8MM X 25MM HARDENED PIN	2
9	1000595	GROUT ADAPTER BLACK BRUIN	1
10	10000952	ACCUMULATOR ASM	1
11	630501BB	SPLINED OUTPUT FLANGE BB	1
12	630511	SPLIT RING	1
13	1001401	SEAL PLATE O-RING	1
14	630514	SEAL PLATE	1
15	630001	GROUT SWIVEL	1
16	631057	2 BOLT HOSE CLAMP HALF	2
17	631051	HD CAM LOCK 3"	3
18	1005015	BB AUGER GROUT TUBE	1
19	2000559	LOWER GROUT TUBE	1
20	1000135	GROUT HOSE	1
21	631052P	3" GROUT PLUG	1
22	2001339	SERVICEABLE GUIDE RAIL ASM	2
23	2003197	1/2-13 3-9/16 ID UBOLT	2
24	Regular FW 0.3125		4
25	Regular FW 0.5		18
26	Narrow FW 0.625		7
27	Regular FW 0.875		16
28	Narrow FW 1		14
29	Narrow FW 1.5		6
30	Regular LW 0.375		4
31	Regular LW 0.5		3
32	Regular LW 0.625		5
33	Regular LW 1		20
34	Regular LW 1.5		4
35	Heavy LW 0.3125		4
36	Heavy LW 0.75		2
37	HNUT 0.3125-18-D-N		4
38	HNUT 1.5000-6-D-N		4
39	Nylock Nut 00500-13 UNC		10
40	Nylock Nut 00625-11 UNC		5
41	Nylock Nut 01000-8 UNC		16
42	HBOLT 0.3125-18x1.25x0.875-N		4
43	HBOLT 0.3750-16x1x1-N		4
44	HBOLT 0.5000-13x4.75x1.25-N		6
45	HBOLT 0.8750-9x2.5x2-N		16
46	HBOLT 1.5000-6x4.5x3.25-N		4
47	HX-SHCS 0.5-13x3x1.5-N		4
48	HX-SHCS 0.625-11x7.25x2-N		5
49	HX-SHCS 0.75-10x2.5x2.5-N		8
50	HX-SHCS 0.75-10x6x2-N		2
51	HX-SHCS 1-8x4x3-N		20
52	B18.3.1M-8X1.25X70 HEX SHCS-28NHX		10
53	24FL C62 SPLIT FLANGE PAIR		6
54	6400-06-06		3
55	6801-06-06-NWO-FG		3
56	6801-16-16-NWO-FG		4
57	6802-16-16-NWO-FG		1
58	6802-06-06-NWO-FG		2
59	FITT2P-06R 400992		4
60	340-24-25		4
61	1804-24-24 FG		2

REPLACEMENT PARTS



Grout Swivel Assembly



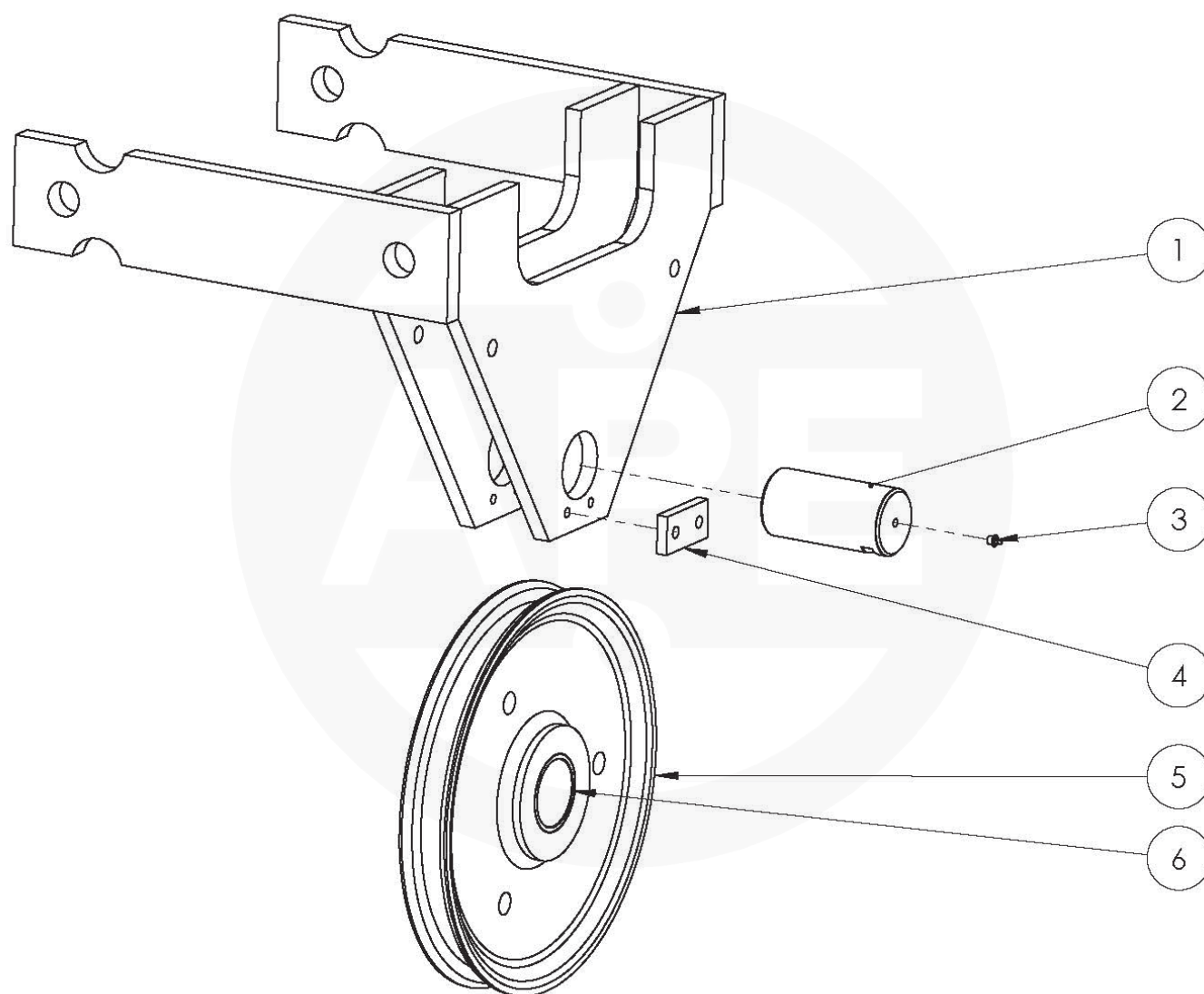
Grout Swivel Assembly BOM

CALLOUT	PART #	APE PART NUMBER	DESCRIPTION	QTY
1	3WRAM-01C		Goose neck w/ Side Connection	1
2	3WRAM-01A		Side Connection	1
3	3WRAM-08A	630808A	Spindle 3" VIC	1
4	3WRAM-04		Adapter Plate	1
5	3WRAM-14		Bearing Housing	1
6	3WRAM07	630812	Grease Seal (Housing)	2
7	3BLW-12	630805	Bearing	2
8			Bearing Shim (not required)	1
9	OR-340	630810A	O-Ring (f wash pipe)	1
10	3WRAM-25	630809	Wash pipe w/ Set Screws	1
11	5JW-06S	630802	Packing Adapter (Steel)	1
12	3WRAM-20	630807	Packing (4 Rings)	SET
13	5JW-21	630808	Lantern Ring	1
14	S-FITTINGS-.12		Grease Fitting	2
15	S-SHSS-0.25X0.62		Set Screw (Washpipe)	2
16A	S-HHCS8-0.38-3.00		Bolt-Bearing Housing	10
16B	S-STUD8-0.38-4.00		Stud	2
16C	S-NUT8-0.38		Nuts	2
17	S-LW-0.38		Lock Washer	12

REPLACEMENT PARTS

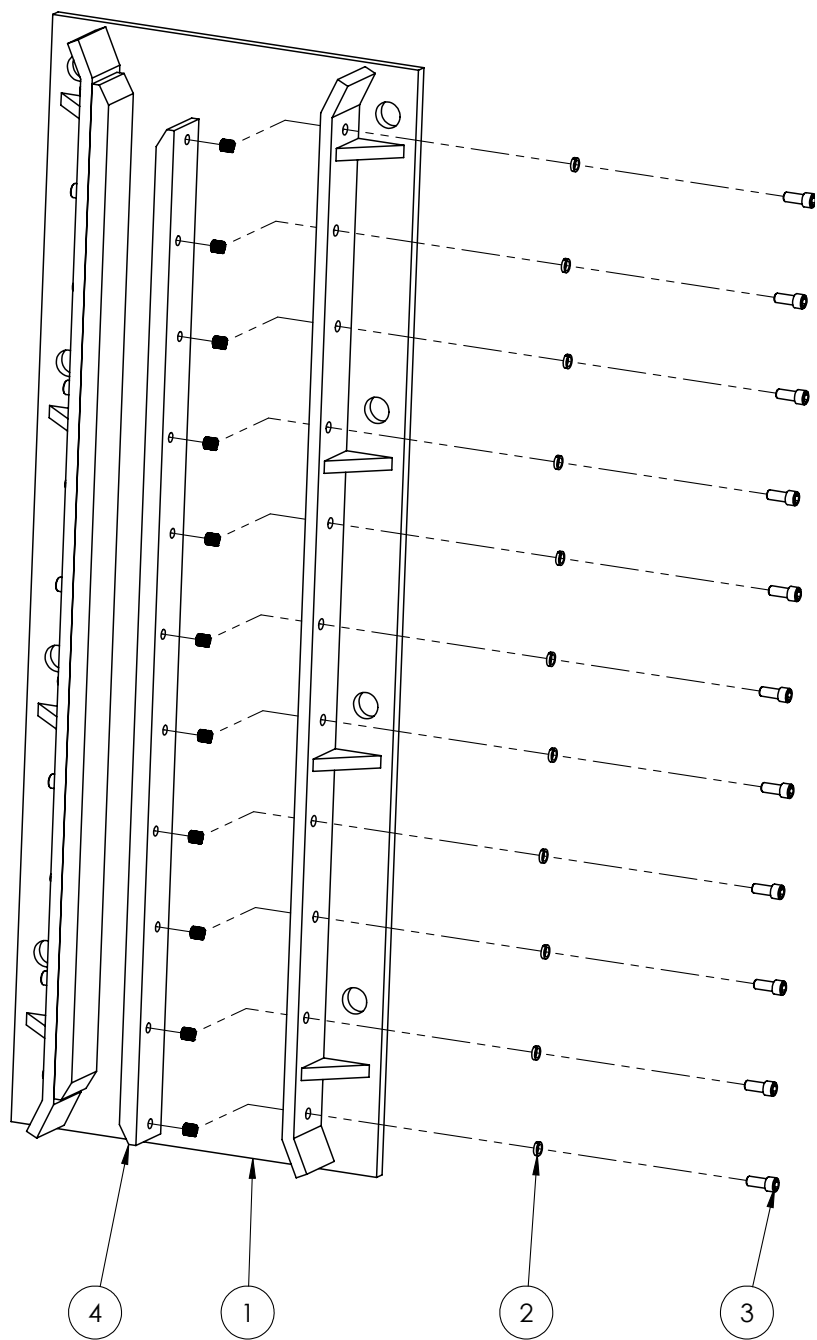


Lifting Bale Assembly



CALLOUT	APE PART NUMBER	DESCRIPTION	QTY
1	1004274	Lifting Bale Housing	2
2	1005021	Sheave Pin	1
3	221001	Grease Fitting-1/8 NPT Zerk	1
4	1005022	Sheave Pin Keeper	1
5	950901	Sheave-Finished 18"	1
6	950903	Sheave Pin Bushing	1

Guide Rail Assembly



NOTE: EACH DRILL REQUIRES 2 COMPLETE ASSEMBLY.

CALLOUT	APE PART NUMBER	DESCRIPTION	QTY
1	2001440	Serviceable Guide Rail	1
2		3/8 HCLW	22
3		3/8-16 X .875 SHCS	22
4	2001441	Serviceable Guide Rail Plastic	2

TARGET ISO CLEANLINESS CODES

When setting target ISO fluid cleanliness codes for hydraulic and lubrication systems it is important keep in mind the objectives to be achieved. Maximizing equipment reliability and safety, minimizing repair and replacement costs, extending useful fluid life, satisfying warranty requirements, and minimizing production down-time are attainable goals. Once a target ISO cleanliness code is set following a progression of steps to achieve that target, monitor it, and maintain it justifiable rewards will be yours.

Set the Target.

The first step in identifying a target ISO code for a system is to identify the most sensitive on an individual system, or the most sensitive component supplied by a central reservoir. If a central reservoir supplies several systems the overall cleanliness must be maintained, or the most sensitive component must be protected by filtration that cleans the fluid to the target before reaching that component.

Other Considerations

Table 1 recommends conservative target ISO cleanliness codes based on a several component manufacturers guidelines and extensive field studies for standard industrial operating conditions in systems using petroleum based fluids. If a non-petroleum based fluid is used (i.e. water glycol) the target ISO code should be set one value lower for each size (4 μ[c]/6μ[c]/14μ[c]). If a combination of the following conditions exists in the system the target ISO code should also be set one value lower:

- Component is critical to safety or overall system reliability.
- Frequent cold start.
- Excessive shock or vibration.
- Other Severe operation conditions.

Recommended* Target ISO Cleanliness Codes and media selection for systems using petroleum based fluids per ISO4406:1999 for particle sizes 4μ[c] / 6μ[c] / 14μ[c]

	Pressure < 140 bar < 2000 psi	Media βx[c] = 1000 (βx = 200)	Pressure 212 bar 3000 psi	Media βx[c] = 1000 (βx = 200)	Pressure > 212 bar > 3000 psi	Media βx[c] = 1000 (βx = 200)
Pumps						
Fixed Gear	20/18/15	22μ[c] (25 μ)	19/17/15	12μ[c] (12 μ)	-	-
Fixed Piston	19/17/14	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)	17/15/12	7μ[c] (6 μ)
Fixed Vane	20/18/15	22μ[c] (25 μ)	19/17/14	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)
Variable Piston	18/16/13	7μ[c] (6 μ)	17/15/13	5μ[c] (3 μ)	16/14/12	7μ[c] (6 μ)
Variable Vane	18/16/13	7μ[c] (6 μ)	17/15/12	5μ[c] (3 μ)	-	-
Valves						
Cartridge	18/16/13	12μ[c] (12 μ)	17/15/12	7μ[c] (6 μ)	17/15/12	7μ[c] (6 μ)
Check Valve	20/18/15	22μ[c] (25 μ)	20/18/15	22μ[c] (25 μ)	19/17/14	12μ[c] (12 μ)
Directional (solenoid)	20/18/15	22μ[c] (25 μ)	19/17/14	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)
Flow Control	19/17/14	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)
Pressure Control (modulating)	19/17/14	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)	17/15/12	7μ[c] (6 μ)
Proportional Cartridge Valve	17/15/12	7μ[c] (6 μ)	17/15/12	7μ[c] (6 μ)	16/14/11	5μ[c] (3 μ)
Proportional Directional	17/15/12	7μ[c] (6 μ)	17/15/12	7μ[c] (6 μ)	16/14/11	5μ[c] (3 μ)
Proportional Flow Control	17/15/12	7μ[c] (6 μ)	17/15/12	7μ[c] (6 μ)	16/14/11	5μ[c] (3 μ)
Proportional Pressure Control	17/15/12	7μ[c] (6 μ)	17/15/12	7μ[c] (6 μ)	16/14/11	5μ[c] (3 μ)
Servo Valve	16/14/11	7μ[c] (6 μ)	16/14/11	5μ[c] (3 μ)	15/13/10	5μ[c] (3 μ)
Bearings						
Ball Bearing	15/13/10	5μ[c] (3 μ)	-	-	-	-
Gearbox (industrial)	17/16/13	12μ[c] (12 μ)	-	-	-	-
Journal Bearing (high speed)	17/15/12	7μ[c] (6 μ)	-	-	-	-
Journal Bearing (low speed)	17/15/12	7μ[c] (6 μ)	-	-	-	-
Roller Bearing	16/14/11	7μ[c] (6 μ)	-	-	-	-
Actuators						
Cylinders	17/15/12	7μ[c] (6 μ)	16/14/11	5μ[c] (3 μ)	15/13/10	5μ[c] (3 μ)
Vane Motors	20/18/15	22μ[c] (25 μ)	19/17/14	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)
Axial Piston Motors	19/17/14	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)	17/15/12	7μ[c] (6 μ)
Gear Motors	20/18/14	22μ[c] (25 μ)	19/17/13	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)
Radial Piston Motors	20/18/15	22μ[c] (25 μ)	19/17/14	12μ[c] (12 μ)	18/16/13	12μ[c] (12 μ)
Test Stands, Hydrostatic						
Test Stands	15/13/10	5μ[c] (3 μ)	15/13/10	5μ[c] (3 μ)	15/13/10	5μ[c] (3 μ)
Hydrostatic Transmissions	17/15/13	7μ[c] (6 μ)	16/14/11	5μ[c] (3 μ)	16/14/11	5μ[c] (3 μ)

*Depending upon system volume and severity of operating conditions a combination of filters with varying degrees of filtration efficiency might be required (i.e. pressure, return, and off-line filters) to achieve and maintain the desired fluid cleanliness.

Example	ISO Code	Comments
Operating Pressure	156 bar, 2200 psi	
Most Sensitive Component	Directional Solenoid	19/17/14 recommended baseline ISO Code
Fluid Type	Water Glycol	18/16/13 Adjust down one class
Operating Conditions	Remote location, repair difficult High ingress rate	17/15/12 Adjust down one class, combination of critical nature, severe conditions

UNDERSTANDING ISO CODES

The ISO cleanliness code is used to quantify particulate contamination levels per milliliter of fluid at 3 sizes 4μ[c], 6μ[c], and 14μ[c]. The ISO code is expressed in 3 numbers (ie 19/17/14). Each number represents a contaminant level code for the correlating particle size. The code includes all particles of the specified size and larger. It is important to note that each time a code increases the quantity range of particles is doubling.

ISO 4406 Chart		
Range Code	Particles per milliliter	
	More than	Up to/including
24	80000	160000
23	40000	80000
22	20000	40000
21	10000	20000
20	5000	10000
19	2500	5000
18	1300	2500
17	640	1300
16	320	640
15	160	320
14	80	160
13	40	80
12	20	40
11	10	20
10	5	10
9	2.5	5
8	1.3	2.5
7	0.64	1.3
6	0.32	0.64

Sample 1 (see photo 1)

Particle Size	Particles per ml*	ISO 4406 Code range	ISO Code
4μ[c]	151773	80000~160000	24
6μ[c]	38363	20000~40000	22
10μ[c]	8229		
14μ[c]	3339	2500~5000	19
21μ[c]	1048		
38μ[c]	112		

Sample 2 (see photo 2)

Particle Size	Particles per ml*	ISO 4406 Code range	ISO Code
4μ[c]	492	320 ~ 640	16
6μ[c]	149	80 ~ 160	14
10μ[c]	41		
14μ[c]	15	10 ~ 20	11
21μ[c]	5		
38μ[c]	1		

Photo 1

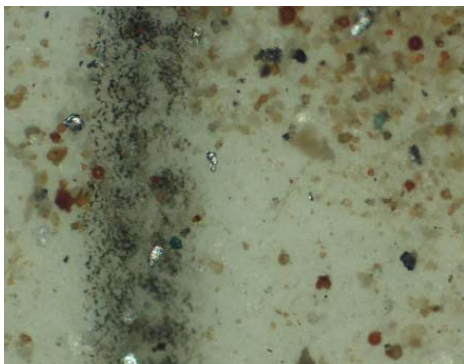


Photo 2



RECOMMENDED BOLT TIGHTENING TORQUE

“LUBRICATED SHCS”

Socket Head Cap Screws



When installing any APE equipment or parts apply lubricant and use APE standard **Anti-Seize** torque specs.
See Tightening Torque Spec below. Failure to follow tightening torque spec can result in under / over tightening fasteners, leading to equipment failure or personal injury.

COARSE THREADS

Nominal Screw Size	Nominal Socket Size	Tightening Torque (ft-lbs)
#10-24	5/32	6
.25-20	3/16	10
.31-18	1/4	22
.38-16	5/16	38
.44-14	3/8	61
.50-13	3/8	93
.63-11	1/2	179
.75-10	5/8	317
.88-9	3/4	511
1.00-8	3/4	767
1.25-7	7/8	1,533
1.50-6	1	2,668

FINE THREADS

Nominal Screw Size	Nominal Socket Size	Tightening Torque (ft-lbs)
#10-32	5/32	6
.25-28	3/16	12
.31-24	1/4	24
.38-24	5/16	43
.44-20	3/8	68
.50-20	3/8	105
.63-18	1/2	202
.75-16	5/8	354
.88-14	3/4	564
1.00-12	3/4	860
1.25-12	7/8	1,697
1.50-12	1	3,001

RECOMMENDED ANTI-SEIZE LUBRICANT

BENEFITS & FEATURES

- Excellent Anti-Seize Prevents seizing causing by galling, galvanic action, fretting, fusion, pitting, thread distortion, breakage, rust, and corrosion.
- Water Resistant Provides long term protection with just one application, outdoors or indoors, even in the damp areas or against salt spray. Will not wash off.
- Wide Temperature Range Coating withstands temperatures of -65 Degree F to 2100 Degree F. (-54 C to 1100 C)
- Stable Coating Will not harden or fuse to metal, cake, evaporate or separate
- Compatible with many materials Can be used as an anti-seize on the threads of steel, stainless steel, steel alloy, cast iron, aluminum, copper brass, and titanium parts and reduces friction and wear on plastic.
- Environmentally Desirable Past contains no lead compounds traditionally found in this type of product.



WARNING: USING OTHER TYPES OF ANTI-SEIZE NOT RECOMMENDED BY APE CAN LEAD TO EQUIPMENT FAILURE OR PERSONAL INJURY. WARRANTY WILL BE VOIDED AND FEES MAY APPLY.

REFERENCE / NOTES



All information given in this Manual is current and valid per the information available at the time of publication. (Please check the updated revision date at the bottom of each page.)

American Piledriving Equipment (APE) reserves the right to implement changes without prior notice.

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