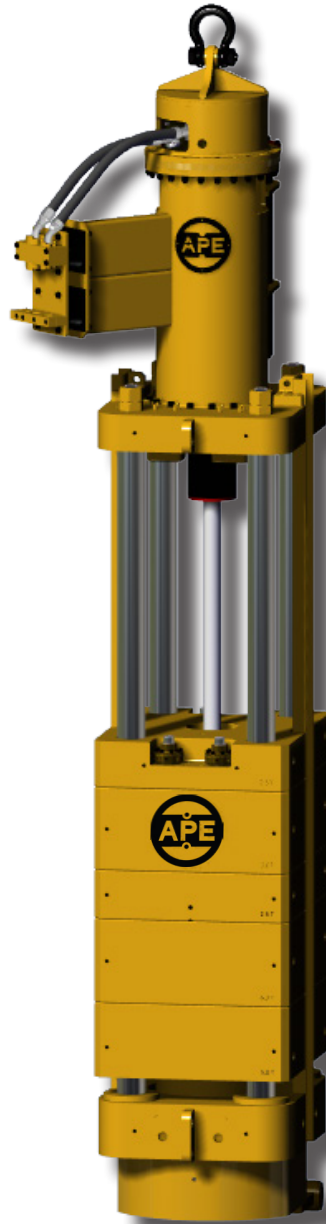




HYDRAULIC IMPACT HAMMER OWNER'S MANUAL

DEEP FOUNDATION
SOLUTIONS



800-248-8498

WWW.AMERICANPILEDIVING.COM

MODEL 20-5 HIH

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Quick Reference Guide

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

GENERAL INFORMATION

MAINTENANCE & TROUBLESHOOTING

REPLACEMENT PARTS

REFERENCE / NOTES

A Table of Contents is included after the Foreword.

Description:

MODEL 20-5 Hydraulic Impact Hammer

Page 1





WARRANTY 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 of 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 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.



(These precautions must be followed at all times to ensure personal and equipment safety.)



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.



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

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



Do NOT WELD OR FLAME CUT ON THIS EQUIPMENT.

8. Do **NOT** use or store flammable liquids on or near the engine.
9. Ensure that all lifting equipment, including cranes, wire rope, slings, hooks, shackles, etc., are properly sized for the worst case loads anticipated during operations.
10. If there are any questions about the weights, specifications or performance of the unit, contact APE before handling and/or operating the equipment.
11. Check wire rope clips for tightness and wire ropes for wear daily.



WHEN OPERATING IN AN ENCLOSED AREA, EXHAUST FUMES SHOULD BE PIPED OUTSIDE. CONTINUED BREATHING OF EXHAUST FUMES MAY PROVE FATAL.

(These precautions must be followed at all times to ensure personal and equipment safety.)

12. Ensure that ground vibrations will not damage or collapse adjacent structures or excavations.
13. Remove all tools, parts and electrical cords before starting the unit.
14. Do **NOT** smoke or use an open flame while servicing batteries. Batteries generate explosive gas during charging. Keep the area ventilated.
15. When filling the fuel tank do **NOT** smoke or use an open flame in the vicinity.
16. If abnormal equipment operation is observed, stop use immediately and correct the problem.
17. Store oily rags in approved containers and away from the engine exhaust system.
18. Do **NOT** adjust the hydraulic pressures higher or lower than those specified in this manual.
19. Do **NOT** operate this equipment with hydraulic hoses that are damaged or 'kinked'. Replace damaged hoses immediately.
20. Do **NOT** support hydraulic hoses with wire rope.
21. Do **NOT** allow hydraulic hoses to snag during movement of the unit.
22. Do **NOT** pull on and/or attempt to move equipment with the hydraulic hoses.
23. 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.
24. Do **NOT** attempt to repair leaks while the equipment is in operation.
25. Do **NOT** attempt to tighten and/or loosen fittings and/or hoses when the machine is in operation.
26. When moving and/or transporting this equipment, insure that the vehicle or vessel is of sufficient capacity to handle the load. Make sure that the equipment is properly tied down.
27. When moving 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 properly secured before shipment. Unsecured parts may vibrate loose and fall causing injury and/or property damage.
28. Rounded and/or damaged bolt heads and nuts should be replaced. Proper torque values are necessary to prevent parts on this equipment, leads, and crane booms from loosening and falling. Refer to the torque chart in this manual.
29. Keep limbs and tools clear of the clamp jaws.

NOTICE

A PROPERLY MAINTAINED FIRE EXTINGUISHER, SUITABLE FOR OIL FIRES, MUST BE KEPT IN THE IMMEDIATE VICINITY OF OPERATIONS.

30. Do **NOT** allow clothing, hoses, ropes, etc., to become entangled in moving components, including the clamp and suppressor.
31. Keep excavator, piles, vibrator, wire rope, and other equipment at least 15 feet (5 meters) from electrical power lines, transformers, and other electrical equipment, or at such distance as required by applicable safety codes.
32. Never disconnect the excavator and vibrator while the vibrator is on pile. Loss of hydraulic pressure will cause vibrator to fall. Lay vibrator down when not in use.
33. When extracting piles always attach a safety line between the pile and the excavator.
34. When extracting piles, check excavator load/radius tables to be sure capacity is adequate for maximum allowable extraction pull.
35. When extracting or driving piles always be sure that the excavator bucket pivot pin is aligned with the centerline of the pile. Do not side load the vibrator. Vibrator damage will result.
36. When extracting piles, do not exceed the capacity of the vibrator suppressor.
37. Check vibrator suppressor for broken or damaged elastomers daily. Do not operator vibrator with damaged elastomers.
38. Always start both driving and extraction of piles in an unloaded condition.
39. Do **NOT** run the vibrator without clamp jaws closed.
40. Guide the vibrator with a tag line when possible.



DO NOT ATTEMPT TO LIFT OR WALK WITH PILES EXCEEDING 10 TONS WEIGHT.



KEEP HANDS, FEET, AND/OR TOOLS WELL CLEAR OF ALL CLAMP JAWS AND SUPPRESSOR ELASTOMERS.

(These precautions must be followed at all times to ensure personal and equipment safety.)

NOTICE

**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.
- Visually inspect all suppressor elastomers.
- Tighten bolts holding gripping jaws to the hydraulic clamp.
- Check the oil level in the vibration case and add oil if required. The oil level should be in the middle of the sight glass. Change oil if it is milky or contaminated.
- * **DO NOT OVERFILL.**
- 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 it with a new fitting.
- Check the hydraulic motor and hydraulic manifold for leaks.

NOTICE

**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.



Foreword

This manual covers the APE 10-4 Hydraulic Impact Hammer installation, maintenance and use.

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.

All information given in this manual is current and valid according to the information available at the time of publication. American Piledriving Equipment, Inc. Reserves the rights to implement changes without prior notice.

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.
- Any revisions to this manual will appear on the Revision Record page at the back of this manual.
- Please visit www.americanpiledriving.com for product data sheets and manual.

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.

COMMON ABBREVIATIONS AND TERMS

APE : American Piledriving Equipment
Vibro : Vibrator
QD : Quick Disconnect
HCLW : High Collar Lock Washer
SHCS : Socket Head Cap Screw
BOM : Bill of Materials
P.O. : Pilot Operated
Lbs : Pounds
In : Inches
Psi : pound per Square Inch
Mm : Millimeters

Cm : Centimeters
M : Meters
Kg : Kilogram
kN : Kilo-newton
Rpm : Revolutions per Minute
Vpm : Vibrations per Minute
Cyl : Cylinder
Eng : Engine
Mtg : Mounting
Sol : Solenoid
S/N : Serial Number

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

DIMENSIONS

Overall Length	252 in	(640 cm)
Overall Width	22 in	(56 cm)
Overall Height	71.40 in	(181.36 cm)

SPECIFICATIONS

Ram Weight	40,000 lbs	(18,144 kg)
Rated Energy	200,000 ft-lbs	(271 kNm)
Stroke at Rated Energy	60 in.	(152.4 cm)
Blows Per Minute	30 - 60 / Min - Max	
Weight Without Insert	62,000 lbs	(28,123 kg)
Standard Lead Size	8" x 37"	

-5 Size Options available

SPECIFICATIONS					
Model	10-4	15-5	20-5	25-5	30-5
Ram Weight	20,000 lbs (9,071 kg)	30,000 lbs (13,607 kg)	40,000 lbs (18,144 kg)	50,000 lbs (22,680kg)	60,000 lbs (27,215 kg)
Hammer Weight	30,000 lbs (13,607 kg)	46,000 lbs (20,865 kg)	62,000 lbs (28,123 kg)	72,000 lbs (32,659 kg)	82,000 lbs (37,194 kg)
Ft-Lbs Energy	80,000 ft-lbs (108 kNm)	150,000 ft-lbs (203 kNm)	200,000 ft-lbs (271 kNm)	250,000 ft-lbs (339 kNm)	300,000 ft-lbs (407 kNm)
Stroke Height	48 inch (121.92 cm)	60 inch (152.4 cm)	60 inch (152.4 cm)	60 inch (152.4 cm)	60 inch (152.4 cm)
Bare Hammer Length	144 inch (365.76 cm)	234 inch (579.12 cm)	252 inch (640 cm)	270 inch (685.8 cm)	288 inch (731.5 cm)
Leads (Minimum)	26 inch (66.04 cm)	37 inch (93.98 cm)	37 inch (93.98 cm)	37 inch (93.98 cm)	37 inch (93.98 cm)

General Information

SAFETY / WARNING LABELS



This plate contains numbers key to identifying the unit. This information is important when contacting APE for replacement parts or repair instructions.



Do not use the vibro as a lifting device. The clamp may lose pressure and drop the load, causing property damage, serious injury, or death.



Do not weld on or around the equipment unless authorized in writing by APE. Doing so will void all warranties and may cause damage to the equipment.

Hydraulic Impact Hammer Equipment Information

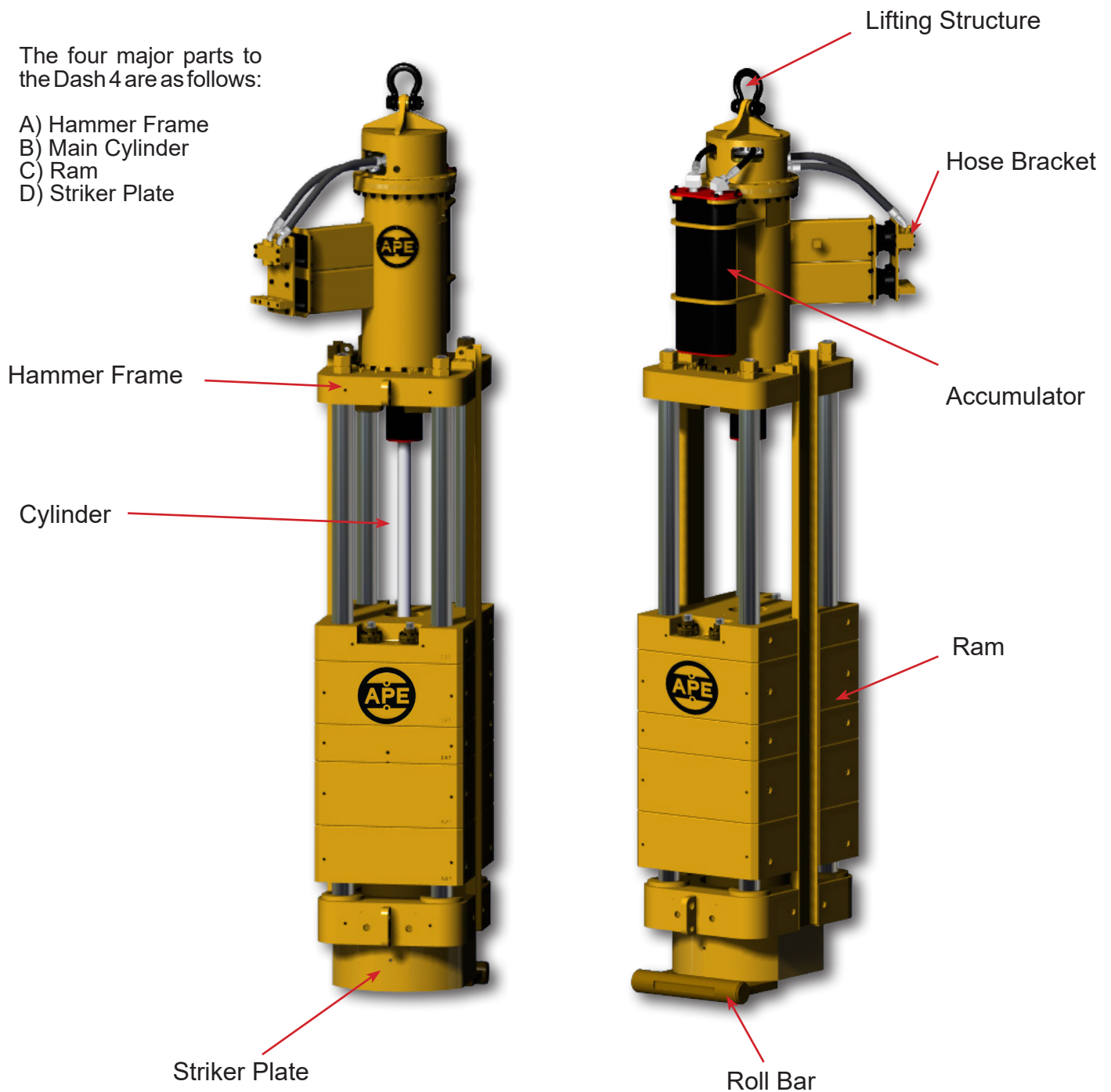
HYDRAULIC IMPACT HAMMER OVERVIEW

The APE Dash 5 is a variable stroke, hydraulically-operated and controlled pile driver. In addition, the hammer can be used for soil compaction, installing well casings and testing piers.

The Dash 5 operates in a range of approximately 35 to 60 cycles per minute depending on the hydraulic flow and desired stroke.

The four major parts to the Dash 4 are as follows:

- A) Hammer Frame
- B) Main Cylinder
- C) Ram
- D) Striker Plate



GENERAL INFORMATION

Hydraulic Impact Hammer Checklist

IMPACT HAMMER CHECKLIST PRIOR TO SHIPMENT



APE HYDRAULIC IMPACT HAMMER INSPECTION / TEST SHEET



MUST BE COMPLETED & SIGNED PRIOR TO SHIPMENT

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

- Removed All Wire Rope for Insurances Reasons
- Checked All Bolts on Lead Guide Rails
- Inspected All Wire Rope Nuts.....
- Inspected Ram for Cracks.....
- Inspected Lead Guide Rails and Welds for Cracks.....
- Inspected all Hoses and Fittings on Cyl. Manifold.....
- Checked Retainer Ring Bolts.....
- Checked the Striker Plate.....
- Checked Ram Connection Bolts
- Removed Any Welding Attached by Customer
- Serial Number Stamped/Welded On.....
- 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
- Drive Pressure: _____
- Cycles Per Minute: _____
- Temperature Of Hydraulic Oil at Time of Test _____

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. In cold weather operations, we must use a softer o-ring to handle the colder temperatures.

Inspector Signature: _____

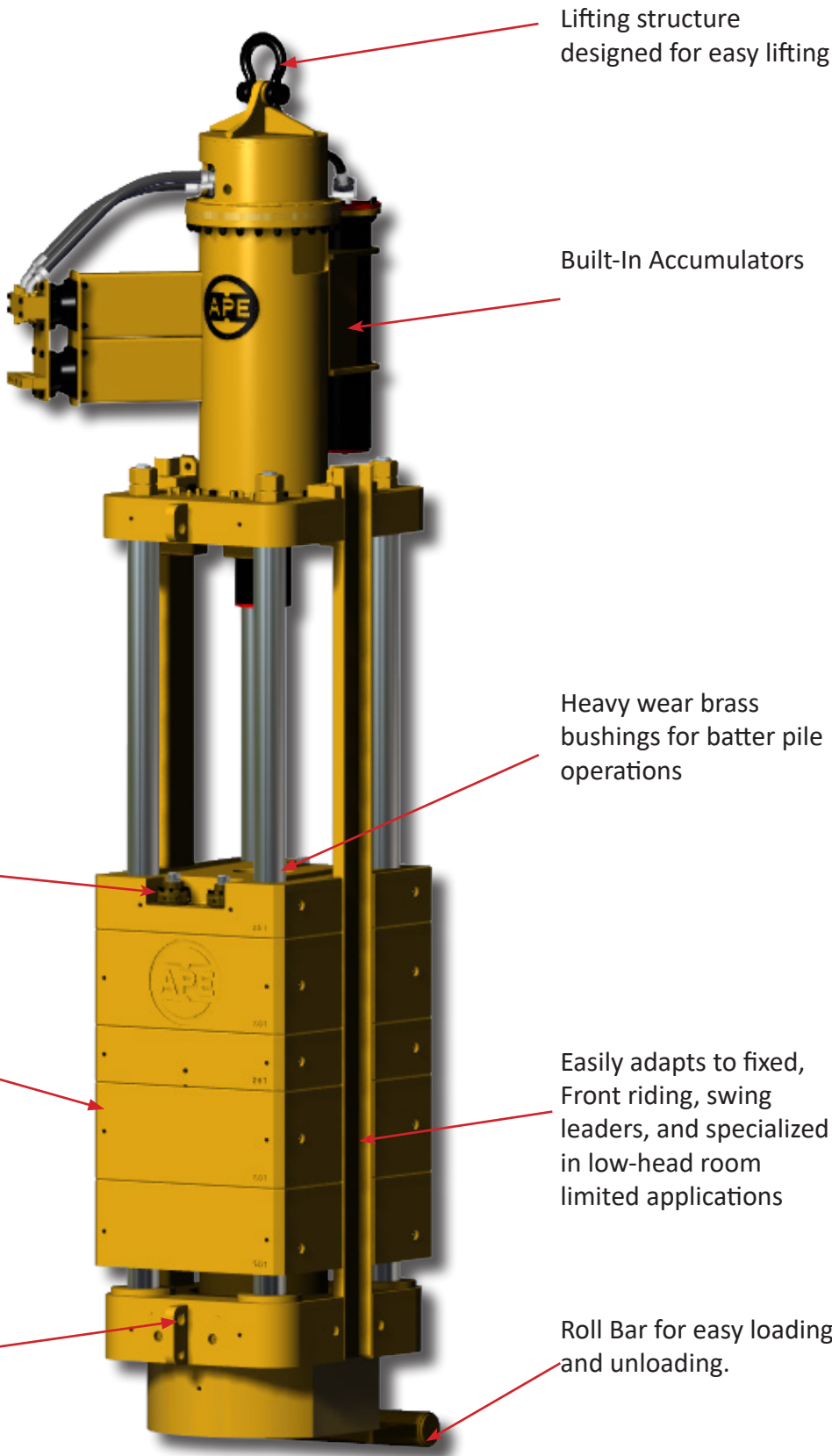
Date: _____

GENERAL INFORMATION



Hydraulic Impact Hammer Features

GENERAL INFORMATION



Lifting structure designed for easy lifting

Built-In Accumulators

Heavy wear brass bushings for batter pile operations

Pre-Stressed Cable Design

Ram Weight Ranges from 20,000 - 60,000lbs.

Easily adapts to fixed, Front riding, swing leaders, and specialized in low-head room limited applications

Cable Pad eyes to lash up drive base and insert

Roll Bar for easy loading and unloading.



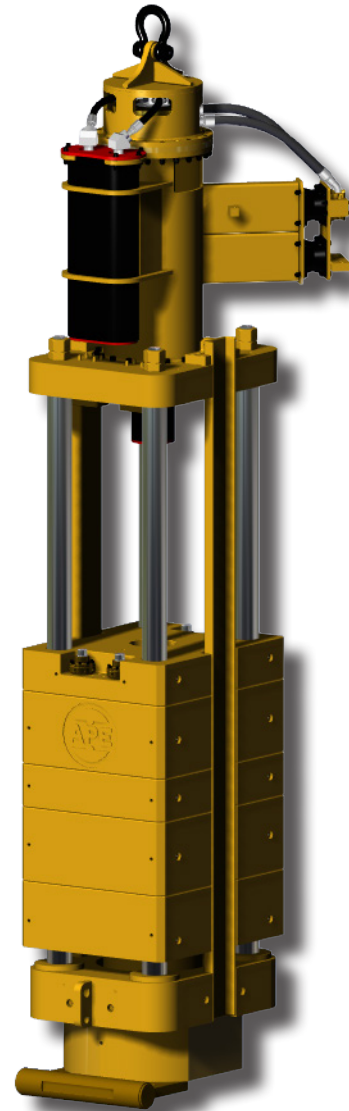
Understanding Hydraulics

CONNECTING THE HYDRAULIC HOSES

Before connecting the hoses to the power unit ensure that the power unit is powered off. The quick disconnect couplers must be clean and free on any dirt or contaminants. Clean the quick disconnect couplers with brake wash if necessary.

The hydraulic impact hammer is usually shipped with the hoses attached to the hammer. If the hoses have been shipped separately, they must be connected as shown.

There are three hoses leading from the hammer that must be connected to the power unit to begin operation. The hoses attach to the power unit by screwing the quick disconnect couplers onto the proper couplers of the power unit. The couplers on the power unit are mated with the couplers on the hammer, so there is no chance of putting them on backwards.



GENERAL INFORMATION

Attention!

Connecting the hoses is one of the most critical aspects of commissioning an APE equipment. 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.

New hydraulic fluid is NOT clean oil!

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

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.

Operation Information

WARM UP PROCEDURE

Before operation it is necessary to bring the power units hydraulic oil to a working temperature of 80°F. To start and warm up the power unit follow the steps below.

1. On the main control panel turn main power switch to the on position.
2. Press and hold engine start/stop button until engine in running. This should only take a few seconds.
3. Idle power unit in drive until oil temp is above 80°F before doing hard work. Failing to do so may cause seal failures, leaks and excessive pressures through the hydraulic system.



OPERATING TEMPERATURES

The Operating Temperature references the internal temperature of the motor. Take into consideration the following requirements:

- 21°C (70°F) – Operate the Vibro at reduced speed while below this temperature
- 27°C (80°F) – Ideal working temperature.
- 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. Case drain fluid temperature will also have an effect.

Hammer Controls

WIRELESS PENDANT IF EQUIPPED

KEY FEATURES

- Wireless Remote
- USB Magnetic Charging Dock
- Range Distance up to 600'
- Rugged Heavy Duty
- Ergonomic Handheld
- Waterproof
- Shockproof
- High-Impact Rated
- Engine Display
- Hydraulic Display
- Extended Battery Life

GOVERNOR

ENGINE RPM DOWN

Press to decrease RPM by increments of 50 RPM. Hold for Min RPM.

DRIVE STOP

Press DRIVE STOP button to ENGAGE (AUTO MODE)

STROKE DECREASE

Press STROKE DOWN button to decrease stroke time (AUTO MODE)

DWELL DECREASE

Press DWELL DOWN button to decrease dwell time (AUTO MODE)

AUTO/MANUAL

Press AUTO / MANUAL button to toggle between modes.

ENABLE BUTTON REQUIRED

BLUE LED = AUTO MODE ACTIVE

ATTENTION

ENABLE BUTTON

Must be depressed to activate a function:

- ENGINE START
- DRIVE START
- AUTO / MANUAL

AUTO MODE:

1. Press Enable button + Drive Start button = Starts hydraulic flow to the HIH Manifold (nothing moves)
2. Press Enable button + Drive Start button = HIH enters cycle mode. (Stroke and Dwell is active)

MANUAL MODE:

1. Press Enable button + Drive Start button = Starts hydraulic flow to the HIH Manifold (nothing moves)
2. Press Enable button + Drive Start button = Hammer lifts while holding.
3. Release Drive Start button to let hammer fall. (Stroke and Dwell is not active)

POWER / EMERGENCY STOP

ATTENTION:

WILL SHUT OFF ENGINE, DISENGAGE DRIVE AND ALL VALVES INSTANTLY. Control panel will stay on.



GOVERNOR

ENGINE RPM UP

Press to increase RPM by increments of 50 RPM. Hold for Max RPM

DRIVE START

Press DRIVE START button to ENGAGE
ENABLE BUTTON REQUIRED

STROKE INCREASE

Press STROKE UP button to increase stroke time (AUTO MODE)

DWELL INCREASE

Press DWELL UP button to increase dwell time (AUTO MODE)

ENGINE START/STOP

START

Press Engine Start button to start

ENABLE BUTTON IS REQUIRED

STOP

Press Engine Stop button to shut down the engine

GENERAL INFORMATION

NOTE: "WHILE DRIVING" If remote is out of range, Drive will go into neutral, Engine rpm will decrease to idle, and if clamp is active, clamp will stay closed.



Replacement Parts

ORDERING REPLACEMENT PARTS

Unit Information

Provide the serial and model number of the unit when contacting APE for replacement parts. This information can be found on a tag like the one on this page. Confirm all orders in writing to avoid duplicating shipments.

Original and Modified Equipment

The previous equipment breakdowns apply only to equipment originally furnished with the unit. Any equipment that has been changed or upgraded won't be accurate to these schematics.

Shipment

If the shipment recipient and method of shipment isn't stated then APE will use its own judgment.

Shortages

APE does not assume responsibility for any delay, damage, or loss of material while in transit. Damaged or lost material should be refused or a full description made of its condition to the carrier agent on the freight or express bill. Make any such claims immediately upon receipt of parts.

Return of Parts

If for any reason you desire to return parts to the factory or to any distributor from whom these parts were obtained, you must first secure permission to return the parts. Shipping instructions will be given along with this permission. A ten percent handling charge must be assessed against the returned shipment unless an error is made by the factory or by the distributor when filling your order.

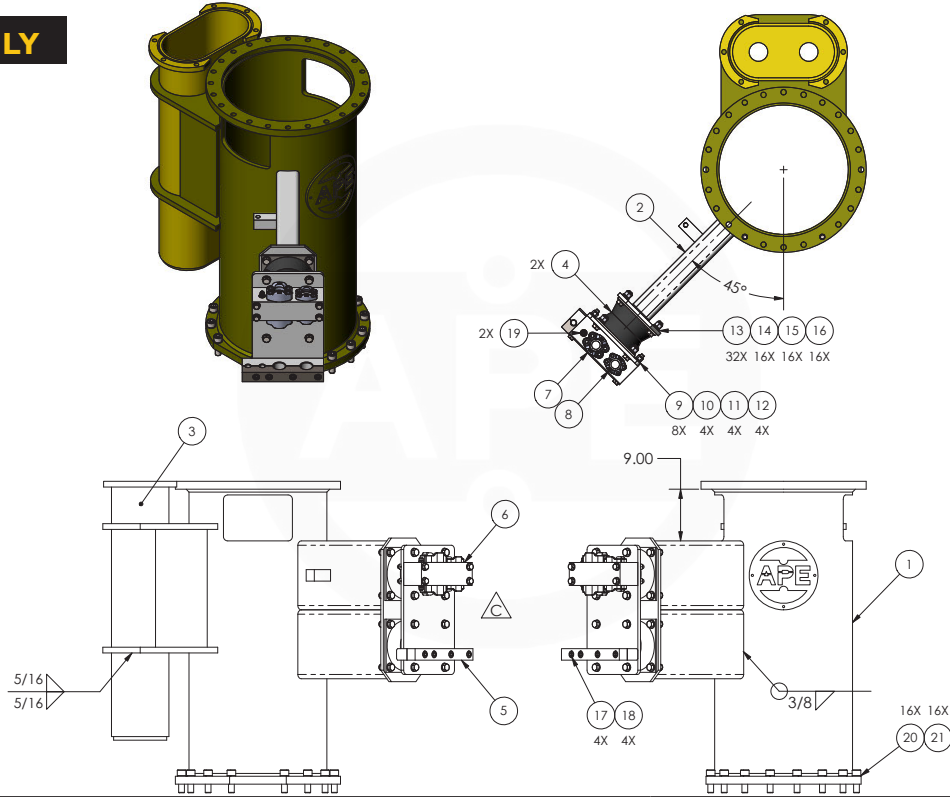


A tag with identifying numbers for the unit.

Replacement Parts

CAGE ASSEMBLY

P/N: 1008774

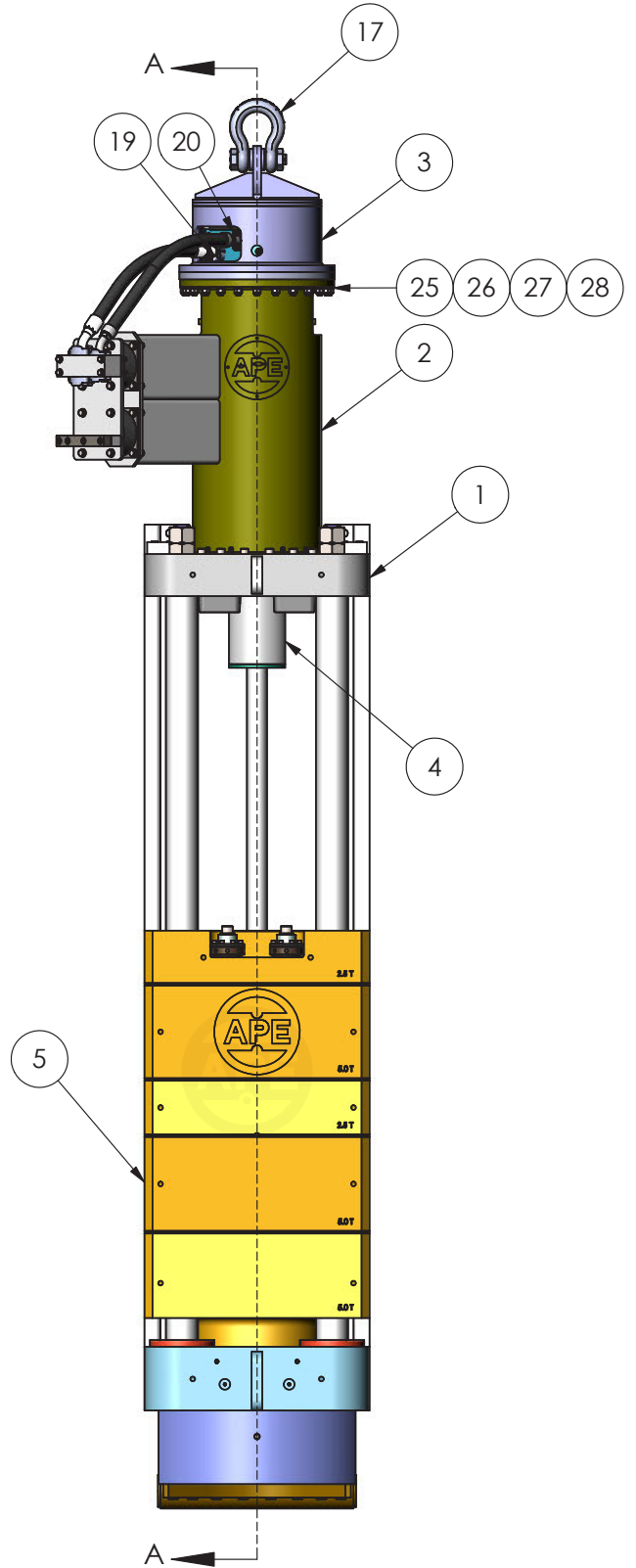
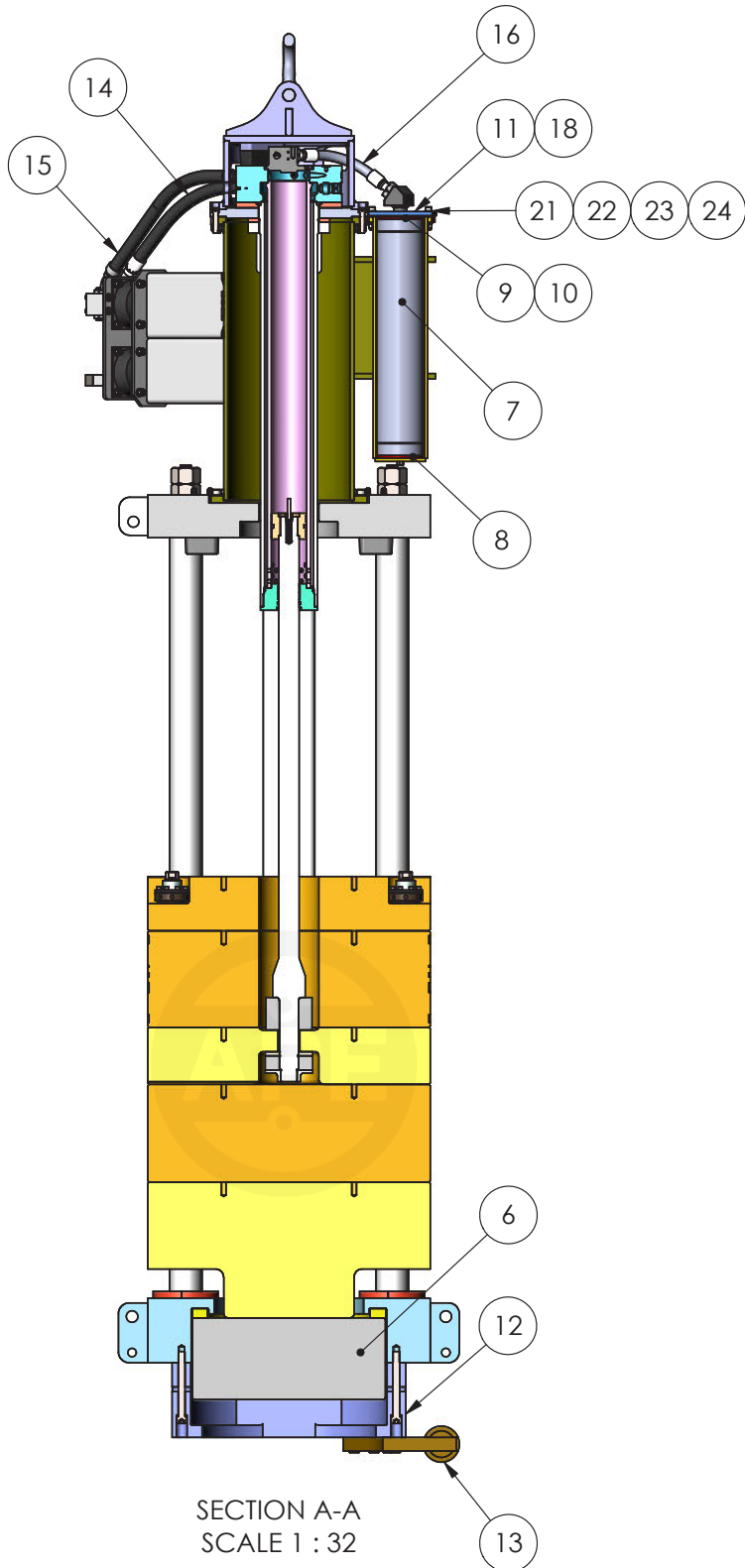


ITEM NO.	PART NO.	DESCRIPTION	DESCRIPTION 2	QTY
1	1008775	Upper Cylinder Housing Machined		1
2	1008673	Hose Arm Weldment		1
3	1008909	Accumulator Mount Tube Assembly		1
4	100796	Elastomer		2
5	1008905	Hose Clamp Half - Removable		1
6	1008653	Hose Flange Black Assembly		1
7	Contact APE	24FL C62 Split Flange Pair		2
8	Contact APE	24FL C61 Split Flange Pair		2
9	Contact APE	Preferred Narrow FW 0.625		8
10	Contact APE	Regular LW 0.625		4
11	Contact APE	HBolt 0.6250-11x6.5x1.75-N		4
12	Contact APE	Nylock Nut 00625-11 UNC		4
13	Contact APE	Preferred Narrow FW 0.75		32
14	Contact APE	Regular LW 0.75		16
15	Contact APE	HBolt 0.7500-10x2.5x1.75-N		16
16	Contact APE	Nylock Nut 00750-10 UNC		16
17	Contact APE	Hi-Collar LW 0.75		4
18	Contact APE	HX-SHCS 0.75-10x2.5x2.5-N		4
19	Contact APE	Fitt2-08M08M 300403		2
20	Contact APE	Hi-Collar LW 1		16
21	Contact APE	HX-SHCS 1-8x3x3-N		16



Replacement Parts

20-5 ASSEMBLY



REPLACEMENT PARTS



Replacement Parts

20-5 TOP LEVEL ASSEMBLY BOM

ITEM NO.	PART NO.	DESCRIPTION	DESCRIPTION 2	QTY
1	1009080	Cage Assembly 20T		1
2	1008774	Upper Cylinder Housing Assembly		1
3	1008734	Lifting Head Complete		1
4	1009552	Cylinder Full Assembly		1
5	1008671	Segment Ram 20-Ton Set up		1
6	1008664	Striker Plate		1
7	Contact APE	SK350-20____-210FCF-VE-18HPart		2
8	1008678	Bottom Urethane Cushion		2
9	1008668	Top Urethane Cushion		2
10	1008733	Accumulator Shim		2
11	1008679	Acc Mount Lid		1
12	1009109	Retainer Ring W/ Bolts		1
13	1003881	Roll Bar ASM W/ Bolts		1
14	Contact APE	Pressure Hose Assembly		1
15	Contact APE	Return Hose Assembly		1
16	Contact APE	Accumulator Hose Assembly		1
17	Contact APE	Crosby G-2130-2-00-1019677		1
18	Contact APE	32FL C61 Split Flange Pair		2
19	Contact APE	24FL C62 Split Flange Pair		1
20	Contact APE	24FL C61 Split Flange Pair		1
21	Contact APE	Preferred Narrow FW 0.75		12
22	Contact APE	Heavy LW 0.75		6
23	Contact APE	HX-SHCS 0.75-10x3.5x2.5-N		6
24	Contact APE	Nylock Nut 00750-10 Nut		6
25	Contact APE	Hi-Collar Lw 0.875		24
26	Contact APE	Preferred Narrow FW 0.875		24
27	Contact APE	HX-SHCS 0.875-9x4.75x2.75-N		12
28	Contact APE	Nylock Nut 00875-9 UNC		24

REPLACEMENT PARTS

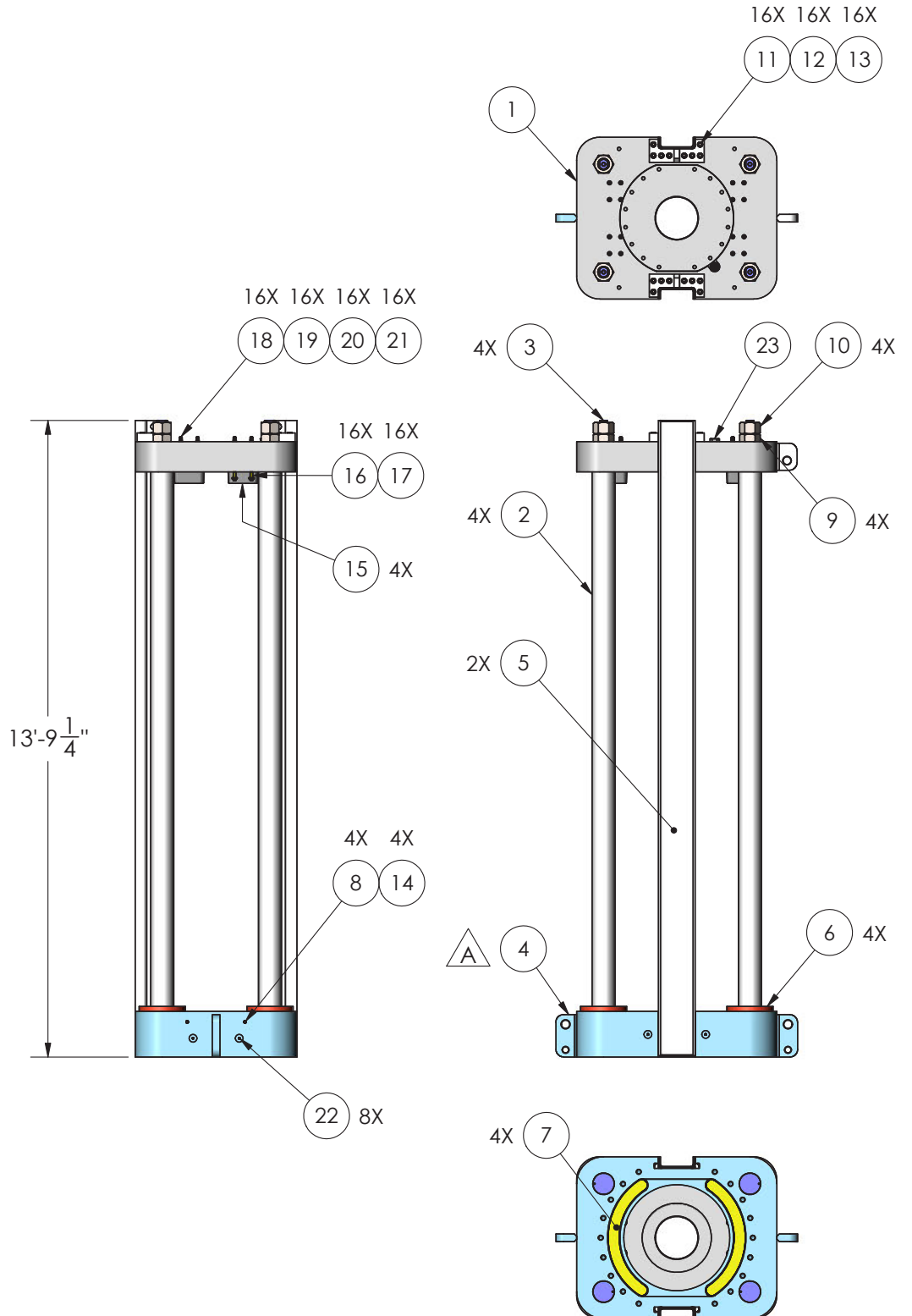
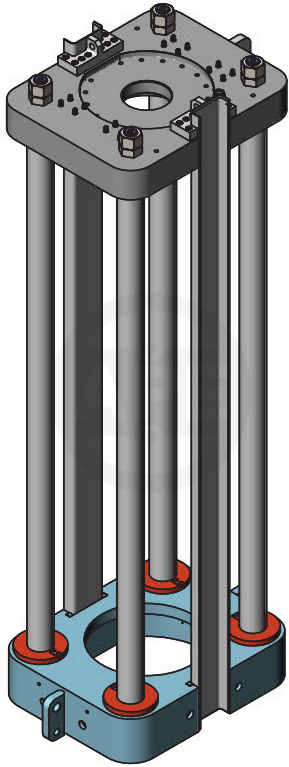


Replacement Parts

CAGE ASSEMBLY

P/N: 1009080

REPLACEMENT PARTS



Replacement Parts

CAGE ASSEMBLY BOM

P/N: 1009080

ITEM NO.	PART NO.	DESCRIPTION	DESCRIPTION 2	QTY
1	1008926	Cage Top Plate Machined		1
2	1009082	Guide Column 20T		4
3	1009084	Cage Wire Rope Assembly 20T		4
4	1008929	Cage Bottom Plate - Machined		1
5	1009086	Lead Guide Asm 20T		2
6	1008932	Bottom Bumper		4
7	1008933	Rebound Bumper		4
8	1008934	Pad Pin		4
9	1008924	Centering Nut		4
10	Contact APE	HHnut 3.000-4-D-N		4
11	Contact APE	HI-Collar LW 0.875		28
12	Contact APE	HX-SHCS 0.875-9x9x3-N		16
13	Contact APE	Nylock Nut 00875-9 UNC		16
14	Contact APE	.375 Hex Pipe Plug W ID Threads		4
15	312109	Dock Bumper		4
16	312111	Dock Bumper Insert		16
17	Contact APE	Lock Washer Spring Regular - Al		16
18	Contact APE	1/2 unc x 11 Hex Bolt	11105528-Fastenal-3D-01-14-2021	16
19	Contact APE	Hnut 0.5000-13-D-N		16
20	Contact APE	Nylock Nut 00500-13 UNC		16
21	Contact APE	Preferred Narrow FW 0.5		16
22	221001	1/8 NPT Grease Zerk		8
23	2006064	ToughSonic 14 Ultrasonic Sensor	TPSC-30S1K-485	1

REPLACEMENT PARTS

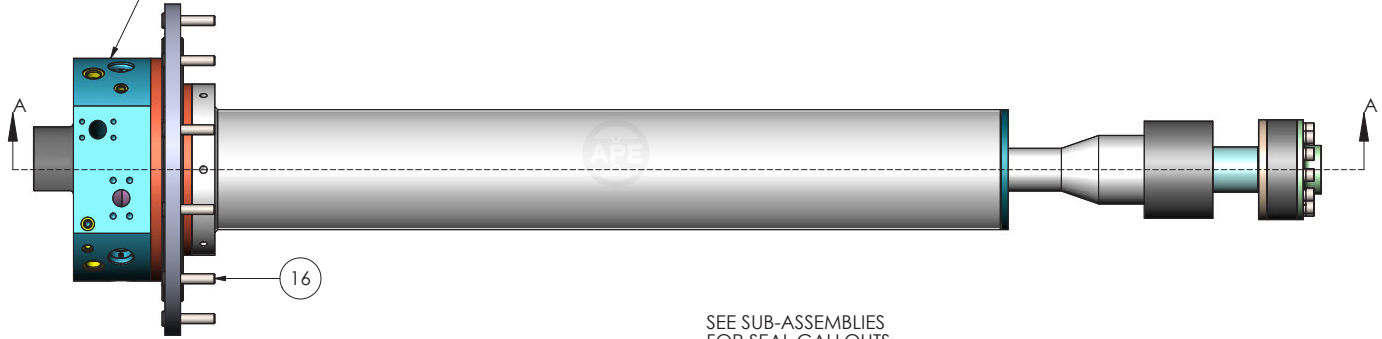


Replacement Parts

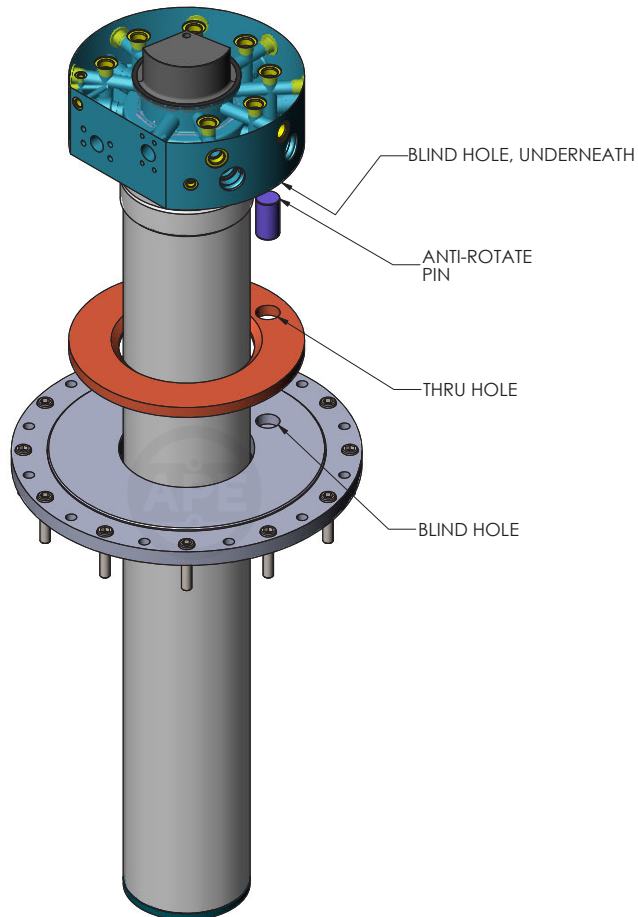
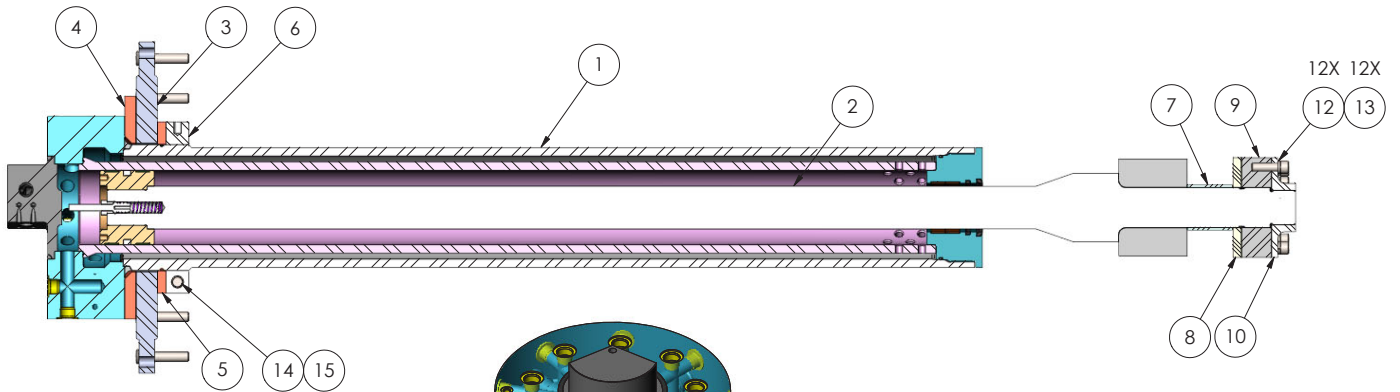
CYLINDER FULL ASSEMBLY

P/N: 1009952

HYDRAULIC FITTINGS & CARTRIDGES
SEE DRAWING 1009055



SEE SUB-ASSEMBLIES
FOR SEAL CALLOUTS



REPLACEMENT PARTS



Replacement Parts

CYLINDER W/ ACCUMULATOR HEAD

P/N: 1009452

ITEM NO.	PART NO.	DESCRIPTION	DESCRIPTION 2	QTY
1	1009553	Cylinder Double Barrel Sub Assembly		1
2	1009404	Rod-Piston Assembly		1
3	1008906	Cylinder head Mounting Plate	A572 Gr50	1
4	1008907	Upper Cushion Top Side	Pur	1
5	1008908	Upper Cushion Bottom Side	Pur	1
6	1008923	Cylinder hold-Down Nut	A36	1
7	1008935	Rod Spacer Bushing	Nylatron NSM	1
8	1008936	Lifting Cushion	Nylatron NSM	1
9	1008937	Lifting Nut	Aisi 4140	1
10	1008938	Lock Nut	Aisi 4140	1
11	1008613	Anti-Rotate Pin	Aisi 4140	1
12	Contact APE	Hi-Collar LW 0.75		12
13	Contact APE	HX-SHCS 0.75-10x2.5x2.5N		12
14	Contact APE	Hi-Collar LW 1		1
15	Contact APE	Hi-Collar 1-8x3.5x2.5-N		1
16	Contact APE	HX-SHCS 0.875-9x3.75x2.75-N		12

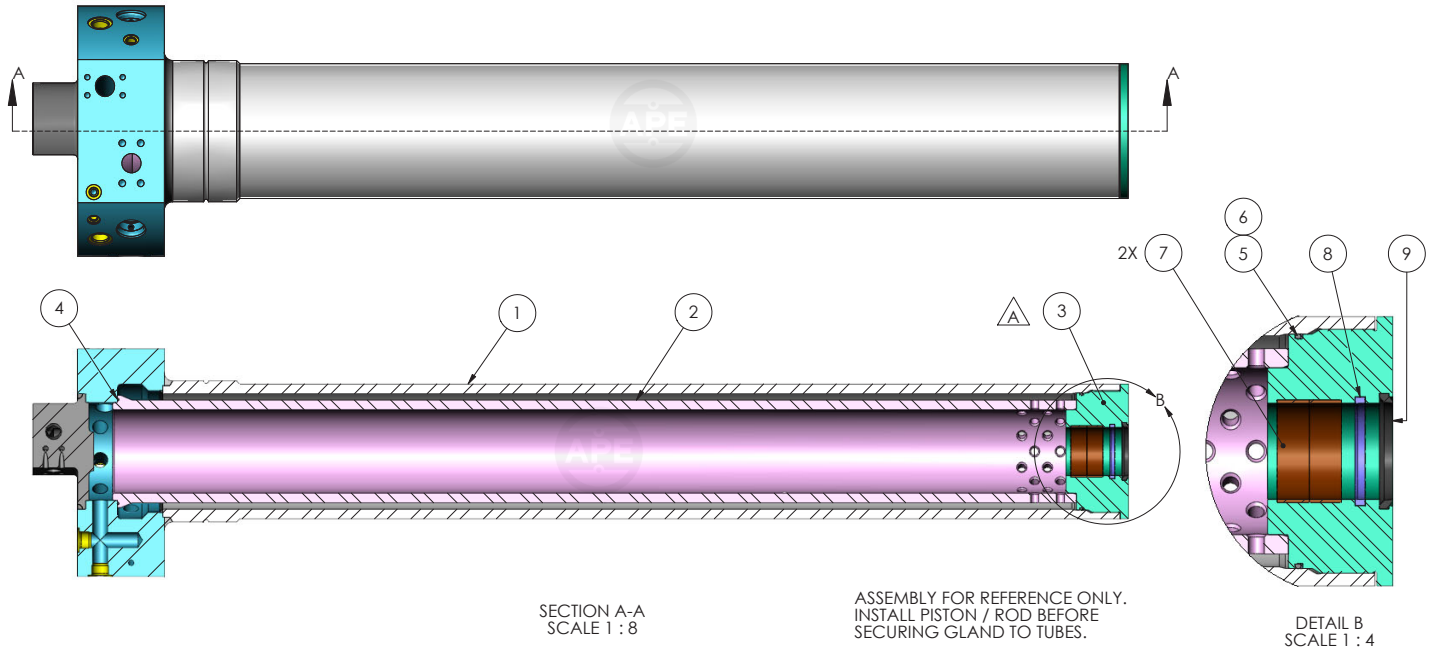
REPLACEMENT PARTS



Replacement Parts

CYLINDER DOUBLE BARREL

P/N: 1009553



REPLACEMENT PARTS

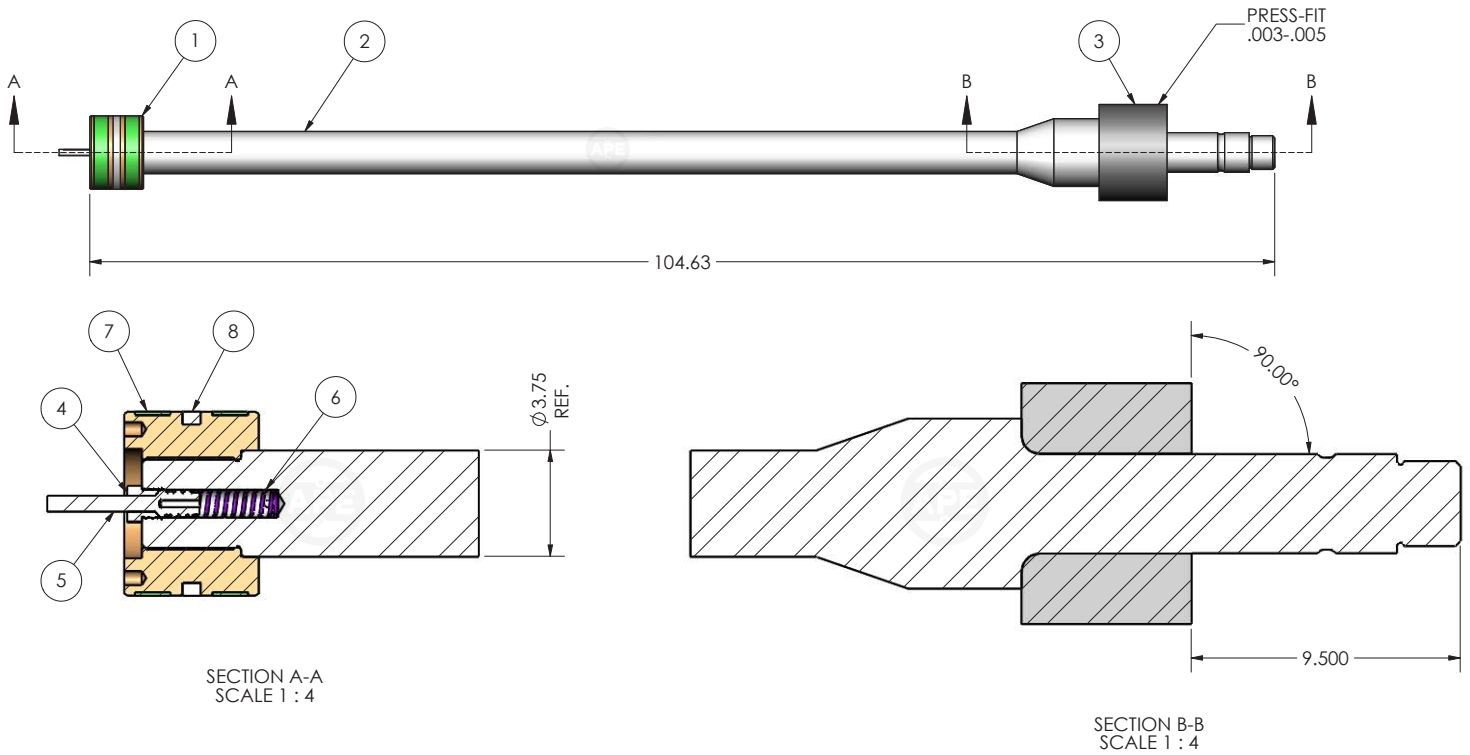
ITEM NO.	PART NO.	DESCRIPTION	DESCRIPTION 2	QTY
1	1009554	Cylinder Outer Weldment		1
2	1009054	Inner Barrel Pre-Mach	A1026	1
3	1009058	Gland	A36	1
4	100167	O-Ring 2-266	NBR	1
5	Contact APE	O-Ring 2-372	NBR	1
6	Contact APE	O-Ring 8-372	NBR	1
7	Contact APE	Wear Band WRT125-3750-1250	Nylon	2
8	4790810	Hallite 621 Rod Seal	Pur	1
9	Contact APE	Wiper SHD3750	Viton	1



Replacement Parts

ROD-PISTON ASSEMBLY

P/N: 1009404



REPLACEMENT PARTS

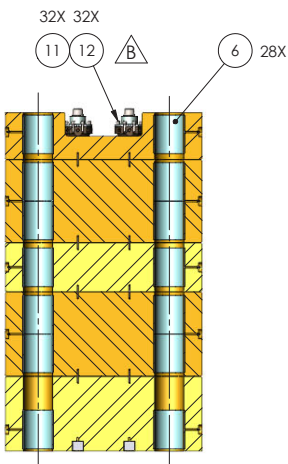
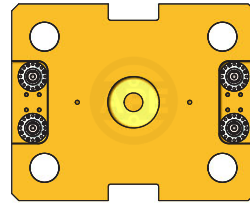
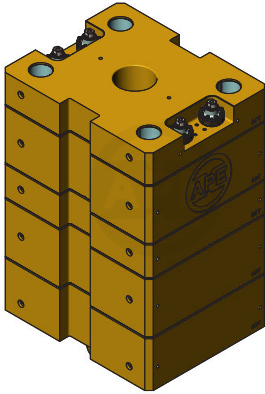
ITEM NO.	PART NO.	DESCRIPTION	DESCRIPTION 2	QTY
1	1009338	Piston	Ductile Iron	1
2	1009057	Cylinder Rod	AISI 4140	1
3	1008920	Rod impact Bushing	AISI 4140	1
4	1000671	Rod Plunger Guide	A36	1
5	1008939	Rod Plunger	AISI 4140	1
6	Contact APE	Century 72446CS	Spring Steel	1
7	Contact APE	Wear Band WPT125-06500-1250	Nylon	2
8	Contact APE	CAT Seal CTC 8J8703	PTFE	1



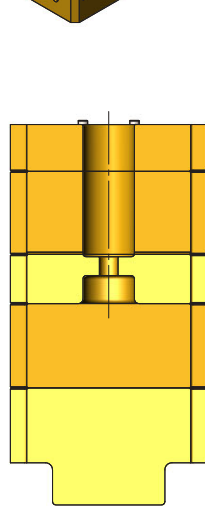
Replacement Parts

SEGMENT RAM 20-TON SET UP

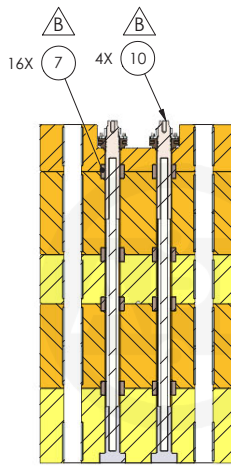
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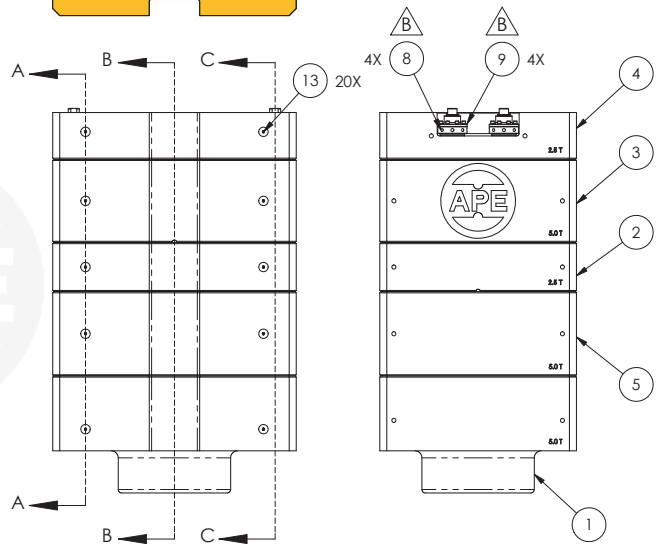
SECTION A-A



SECTION B-B



SECTION C-C



REPLACEMENT PARTS

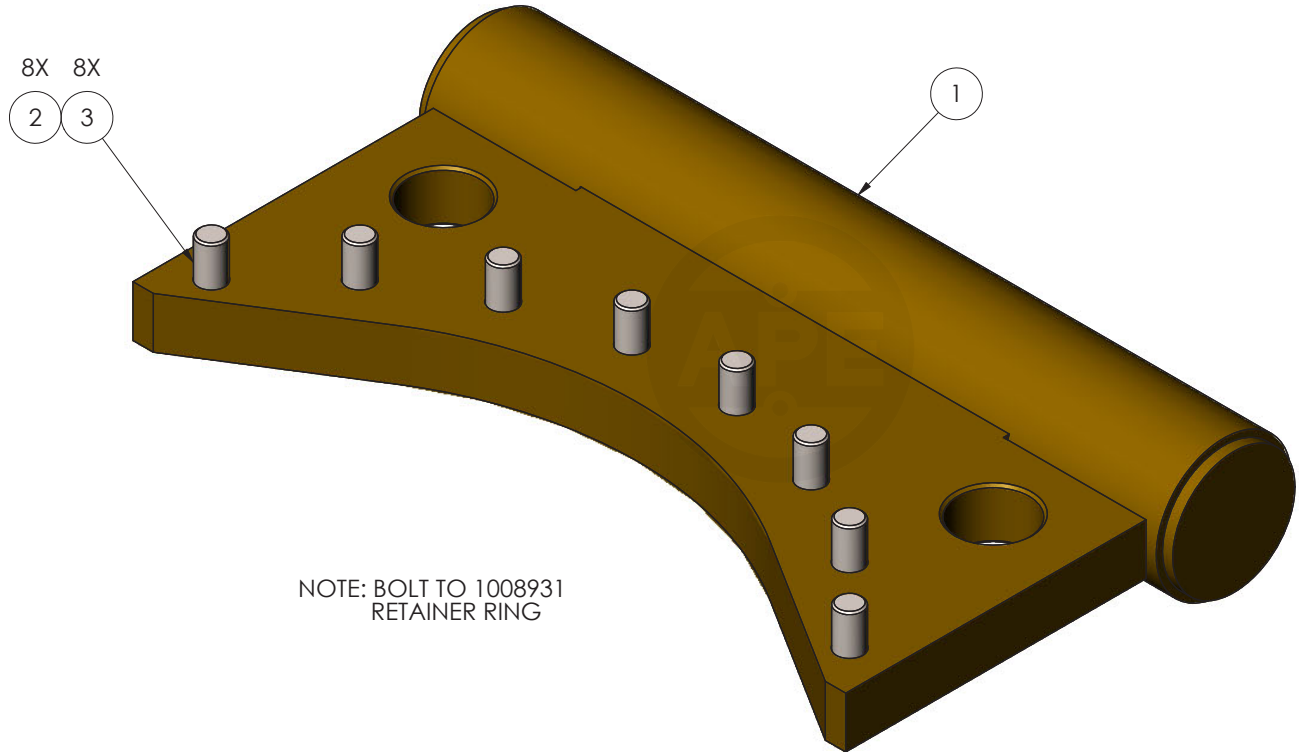
ITEM NO.	PART NO.	DESCRIPTION	DESCRIPTION 2	QTY
1	1008660	Ram Tip		1
2	1008661	Lift Plate		1
3	1008662	5 Ton Primary		1
4	1008665	Top Plate		1
5	1008674-5	5 Ton Added Section		1
6	160447	Column Bearing		28
7	1008840	Dowel - Type II		16
8	2006923	-5 HIH Wire Rope Primary Nut		4
9	2006924	-5 HIH Wire Rope Lock Nut		4
10	2006920	20-5 Ram Wire Rope Assembly		4
11	Contact APE	Hi- Collar LW 0.5		32
12	Contact APE	HX-SHCS 0.5-13x1.75x1.75-N		32
13	Contact APE	1/8 NPT Grease Zerk		20



Replacement Parts

HOSE BRACKET ASSEMBLY

P/N: 2000435



REPLACEMENT PARTS

ITEM NO.	PART NO.	DESCRIPTION	DESCRIPTION 2	QTY
1	1003880	Roll Bar -5 Series HIH		1
2	Contact APE	Hi-Collar LW 1.25		8
3	Contact APE	HX-SHCS 1.25-7x3.5x3.5-N		8



Maintenance

MAINTENANCE CHART

NOTICE

In addition to keeping the unit in ideal condition, regular maintenance will help prevent unexpected machine downtime by finding minor issues before they can develop into serious or dangerous problems. Lubrication, inspection, and replacement of key parts are the major steps of this maintenance.

Lubrication is especially important and different components have their own schedules and lubrication types. Pay special attention to the lubrication steps noted in the chart above.

At each scheduled interval perform all previous checks which are due.

During all steps be sure to:

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

These service intervals are for normal operating conditions. Reduce the time by half when:

- The average temperature is above 80°F (26°C) or below -10°F (-23°C).
- Operating in a dusty or sandy area.
- Operating for more than 12 hours per day.

Environments that are humid and/or salty do not change the service intervals. However, during all procedures check the components for corrosion.

DAILY

- Grease Guide Column at all grease fittings in the ram
- Grease Striker plate 20-30 shots at the beginning of shift and 4 shots every 2 hours
- Grease Lead Guides
- Check Condition of Cushion
- Check Ram Connection Cushion and Bolts
- Check all bolts on lead guide rails.
- Inspected lead guide rails and welds for cracks
- Inspected all hoses and fittings on cylinder manifold
- Check Retaining Ring Bolts

Maintenance Conditions and Storage

SEVERE CONDITIONS

The servicing intervals are specified on normal operation conditions. Operation under severe conditions require shorter service intervals.

- When the average outside temperature is above 80 F (26 C) or below -10 F (-23 C), reduce service time intervals by one-half.
- When operating in the presence of dust or sand, reduce service time intervals by one-half.
- When operating in air with high salt or moisture the service intervals do not need to be changed. However the unit should be inspected weekly to determine if additional servicing is required.

OIL RECOMMENDATIONS

Hydraulic Oil Cleanliness

When adding or changing hydraulic fluid, APE uses only Biodegradable Envirologic 146 hydraulic fluid. Consult your local oil supplier for recommendations on mixing hydraulic oils. See the warranty document at the beginning of this manual concerning fluid cleanliness, and Understanding ISO Codes at the rear of this manual.

NOTICE

**NEW HYDRAULIC FLUID IS NOT CLEAN OIL!
OIL MUST MEET ISO CLEANLINESS CODE 17/15/11**

STORAGE

During short-term storage of a HIH, 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.
- The hammer should not be stored in an area with substances that have an aggressive corrosive nature; solvents, acids, alkalies and/or salts.

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

- Damages to surface paint must be repaired 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 hammer may be stored for approximately 2-years. However, as storage conditions do have a significant effect, all suggested time frames should be considered as guide values only.

Pile Bearing Chart

Hammer Energy Output and Pile Bearing Chart APE Model 20-5 Hydraulic Impact Hammer

The energy output is based on the identical Piston/Travel calculations utilized in the **FHWA Gates Formula**.

The pile bearing chart is based on the FHWA Gates Formula for pile bearing and is provided for the user's convenience only.

$$\text{Pile Bearing (tons)} = ((1.75 * \text{SQRT "E" LOG}_{10} * 10N) - 100) / 2$$

E = Developed Energy and N = Number of Blows Per Inch

APE has no preference for these particular formulas and calculations over any other.

RAM WEIGHT (LBS): 40,000

(feet)	(ft-lbs)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0.25	10,000	64	79	90	99	106	111	117	121	125	129	132	135	138	140	143	145	147	149	151
0.50	20,000	111	133	148	160	170	178	185	192	197	203	207	212	216	219	223	226	229	232	235
0.75	30,000	147	174	193	207	219	230	238	246	253	259	265	270	275	280	284	288	292	295	299
1.00	40,000	178	208	230	247	261	273	283	292	300	307	314	320	326	331	336	340	345	349	353
1.25	50,000	205	239	263	282	298	311	322	332	341	349	357	364	370	376	381	386	391	396	400
1.50	60,000	229	267	293	314	331	345	358	369	379	388	396	403	410	416	422	428	433	438	443
1.75	70,000	251	292	321	343	362	377	391	402	413	423	431	439	447	454	460	466	472	478	483
2.00	80,000	272	316	346	370	390	407	421	434	445	455	465	473	481	489	495	502	508	514	519
2.25	90,000	292	338	371	396	417	434	450	463	475	486	496	505	513	521	529	535	542	548	554
2.50	100,000	310	359	393	420	442	461	477	491	503	515	525	535	544	552	560	567	574	581	587
2.75	110,000	328	379	415	443	466	485	502	517	530	542	553	563	573	582	590	597	604	611	618
3.00	120,000	344	398	436	465	489	509	527	542	556	569	580	591	601	610	618	626	634	641	647
3.25	130,000	360	416	455	486	511	532	550	567	581	594	606	617	627	637	645	654	662	669	676
3.50	140,000	376	434	475	506	532	554	573	590	605	618	631	642	653	662	672	680	688	696	703
3.75	150,000	391	451	493	526	553	575	595	612	628	642	655	666	677	687	697	706	714	722	730
4.00	160,000	405	467	511	545	572	596	616	634	650	664	678	690	701	712	721	731	739	748	755
4.25	170,000	419	483	528	563	592	616	637	655	672	686	700	713	724	735	745	755	764	772	780
4.50	180,000	433	498	545	581	610	635	656	675	692	708	722	735	747	758	768	778	787	796	804
4.75	190,000	446	513	561	598	628	654	676	695	713	729	743	756	769	780	791	801	810	819	828
5.00	200,000	459	528	577	615	646	672	695	715	733	749	764	777	790	802	812	823	833	842	850

REFERENCES & NOTES



UNDERSTANDING ISO CODES

The ISO cleanliness code is used to quantify particulate contamination levels per milliliter of fluid at 3 sizes 4 μ [c], 6 μ [c], and 14 μ [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
4 μ [c]	151773	80000~160000	24
6 μ [c]	38363	20000~40000	22
10 μ [c]	8229		
14 μ [c]	3339	2500~5000	19
21 μ [c]	1048		
38 μ [c]	112		

Sample 2 (see photo 2)

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

Photo 1

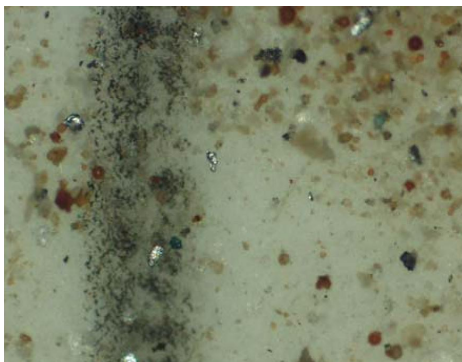


Photo 2



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	Media	Pressure	Media	Pressure	Media
	< 140 bar	βx[c] = 1000	212 bar	βx[c] = 1000	> 212 bar	βx[c] = 1000
	< 2000 psi	(βx = 200)	3000 psi	(βx = 200)	> 3000 psi	(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	Adjust down one class, combination
	High ingestion rate	17/15/12 of critical nature, severe conditions

Bolt Reference

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 caused 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.



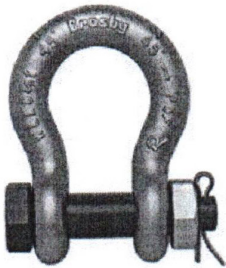
WARNING: USING OTHER TYPES OF ANTI-SEIZE NOT RECOMMENDED BY APE CAN LEAD TO EQUIPMENT FAILURE OR PERSONAL INJURY. WARRANTY WILL BE VOIDED AND FEES MAY APPLY.

REFERENCES & NOTES



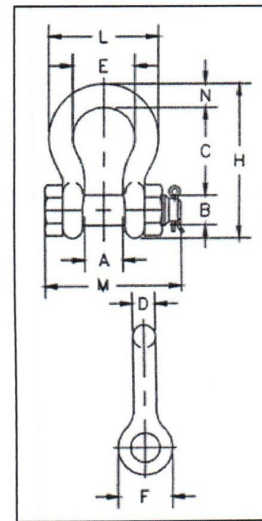
Reference / Notes

Crosby® Bolt Type Shackles



G-2130 / S-2130
Bolt Type Anchor shackles with thin head bolt - nut with cotter pin. Meets the performance requirements of Federal Specification RR-C 271G, Type IVA, Grade A, Class 3, except for those provisions required of the contractor. For additional information, see page 452.

- Capacities 1/3 thru 150 metric tons, grade 6.
- Working Load Limit and grade "6" permanently shown on every shackle.
- Forged – Quenched and Tempered, with alloy bolts.
- Hot Dip galvanized or self colored. (85, 120, and 150 metric ton shackles are all hot dip galvanized bows and the bolts are Dimetcoated® and painted red)
- Sizes 3/8 and below are mechanically galvanized.
- Fatigue rated (1/3t - 55t).
- Shackles 25t and larger are **RFID EQUIPPED**.
- Approved for use at -40° C (-40° F) to 204° C (400° F).
- Meets or exceeds all requirements of ASME B30.26.
- Shackles 85 metric tons and larger are individually proof tested to 2.0 times the working load limit.
- Type Approval certification in accordance with ABS 2016 Steel Vessel Rules ABS Guide for Certification of Lifting Appliances available. Certificates available when requested at time of order and may include additional charges.
- 3.1 Certification as standard available for charpy and statistical proof test from 3.25t up to 25 tons to DNV2.7-1 and EN13889.
- Crosby 3.25t through 25t G2130OC anchor shackles are type approved to DNV Certification Notes 2.7-1- Offshore Containers. These Crosby shackles are statistical proof and impact tested to 42 Joules (31 ft•lbf) min. avg. at -20° C (-4° F). The tests are conducted by Crosby and 3.1 test certification is available upon request. Refer to page 87 for Crosby COLD TUFF® shackles that meet the additional requirements of DNV for certification of lifting applications - Loose Gear.
- All other 2130 shackles can meet charpy requirements of 42 Joules (31 ft•lbf) avg at -20° C (-4° F) when requested at time of order.
- Look for the Red Pin® . . . the mark of genuine Crosby quality.



Shackles

REFERENCES & NOTES



SEE APPLICATION INFORMATION
On Page 92 of the General Catalog
Para Español: www.thecrosbygroup.com

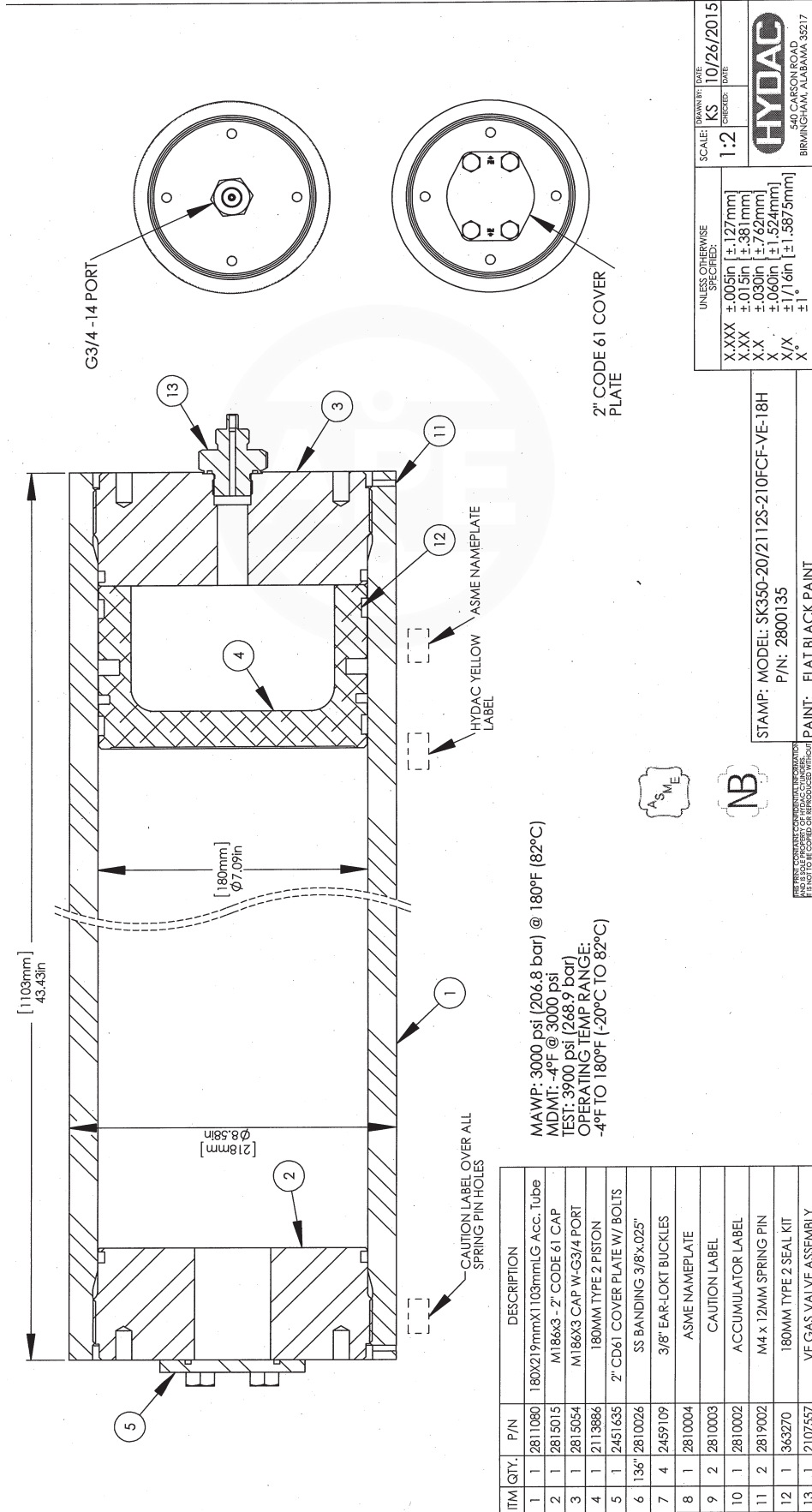
G-2130 / S-2130 Bolt Type Anchor Shackles

Nominal Size (in)	Working Load Limit (t)*	Stock No.			Weight Each (lb)	Dimensions (in)										Tolerance +/-	
		G-2130	S-2130	G-2130OC		A	B	C	D	E	F	H	L	M	N	C	A
3/16	1/3 ‡	1019464	-	-	.06	.38	.25	.88	.19	.60	.56	1.47	.98	1.29	.19	.06	.06
1/4	1/2	1019466	-	-	.11	.47	.31	1.13	.25	.78	.61	1.84	1.28	1.56	.25	.06	.06
5/16	3/4	1019468	-	-	.22	.53	.38	1.22	.31	.84	.75	2.09	1.47	1.82	.31	.06	.06
3/8	1	1019470	-	-	.33	.66	.44	1.44	.38	1.03	.91	2.49	1.78	2.17	.38	.13	.06
7/16	1-1/2	1019471	-	-	.49	.75	.50	1.69	.44	1.16	1.06	2.91	2.03	2.51	.44	.13	.06
1/2	2	1019472	1019481	-	.79	.81	.64	1.88	.50	1.31	1.19	3.28	2.31	2.80	.50	.13	.06
5/8	3-1/4	1019490	1019506	1262013	1.68	1.06	.77	2.38	.63	1.69	1.50	4.19	2.94	3.56	.69	.13	.06
3/4	4-3/4	1019515	1019524	1262022	2.72	1.25	.89	2.81	.75	2.00	1.81	4.97	3.50	4.15	.81	.25	.06
7/8	6-1/2	1019533	1019542	1262031	3.95	1.44	1.02	3.31	.88	2.28	2.09	5.83	4.03	4.82	.97	.25	.06
1	8-1/2	1019551	1019560	1262040	5.66	1.69	1.15	3.75	1.00	2.69	2.38	6.56	4.69	5.39	1.06	.25	.06
1-1/8	9-1/2	1019579	1019588	1262059	8.27	1.81	1.25	4.25	1.13	2.91	2.69	7.47	5.16	5.90	1.25	.25	.06
1-1/4	12	1019597	1019604	1262068	11.71	2.03	1.40	4.69	1.29	3.25	3.00	8.25	5.75	6.69	1.38	.25	.06
1-3/8	13-1/2	1019613	1019622	1262077	15.83	2.25	1.53	5.25	1.42	3.63	3.31	9.16	6.38	7.21	1.50	.25	.13
1-1/2	17	1019631	1019640	1262086	19.00	2.38	1.66	5.75	1.53	3.88	3.63	10.00	6.88	7.73	1.62	.25	.13
1-3/4	25	1019659	1019668	1262095	33.91	2.88	2.04	7.00	1.84	5.00	4.19	12.34	8.80	9.68	2.25	.25	.13
2	35	1019677	1019686	-	52.25	3.25	2.30	7.75	2.08	5.75	4.81	13.68	10.15	10.81	2.40	.25	.13
2-1/2	55	1019695	1019702	-	98.25	4.13	2.80	10.50	2.71	7.25	5.69	17.90	12.75	13.58	3.13	.25	.25
3	† 85	1019711	-	-	154.00	5.00	3.30	13.00	3.12	7.88	6.50	21.50	14.62	15.13	3.62	.25	.25
3-1/2	† 120 ‡	1019739	-	-	265.00	5.25	3.76	14.63	3.62	9.00	8.00	24.88	17.02	17.00	4.38	.25	.25
4	† 150 ‡	1019757	-	-	338.00	5.50	4.26	14.50	4.00	10.00	9.00	25.68	18.00	17.75	4.56	.25	.25

* NOTE: Maximum Proof Load is 2 times the Working Load Limit. Minimum Ultimate Strength is 6 times the Working Load Limit. For Working Load Limit reduction due to side loading applications, see page 94. † Individually Proof Tested with certification. ‡ Furnished in Anchor style only and furnished with eyebolts for handling.



Reference / Notes



ITEM	QTY.	P/N	DESCRIPTION
1	1	2811080	180X219mmX1103mmLG Acc. Tube
2	1	2815015	M18x3- 2" CODE 61 CAP
3	1	2815054	M18x3 CAP W-G3/4 PORT
4	1	2113886	180MM TYPE 2 PISTON
5	1	2451635	2" CD61 COVER PLATE W/ BOLTS
6	136"	2810026	SS BANDING 3/8"x.025"
7	4	2459109	3/8" EAR-LOKT BUCKLES
8	1	2810004	ASME NAMEPLATE
9	2	2810003	CAUTION LABEL
10	1	2810002	ACCUMULATOR LABEL
11	2	2819002	M4 x 12MM SPRING PIN
12	1	363270	180MM TYPE 2 SEAL KIT
13	1	2107557	VE GAS VALVE ASSEMBLY

MAWP: 3000 psi (206.8 bar) @ 180°F (82°C)
 MDMT: -4°F @ 3000 psi
 TEST: 3900 psi (268.9 bar)
 OPERATING TEMP RANGE:
 -4°F TO 180°F (-20°C TO 82°C)



UNLESS OTHERWISE SPECIFIED:
 X.XXX ±.005in [±.127mm]
 X.XX ±.015in [±.381mm]
 X.X ±.030in [±.762mm]
 X.X ±.060in [±1.524mm]
 X.X ±1/16in [±1.5875mm]
 X.X ±1"

SCALE: 1:2
 DRAWN BY: KS
 CHECKED: [blank]
 DATE: 10/26/2015

HYDAC
 540 CARSON ROAD
 BIRMINGHAM, ALABAMA 35217

STAMP: MODEL: SK350-20/2112S-210FCF-VE-18H
 P/N: 2800135
 PAINT: FLAT BLACK PAINT

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REFERENCES & 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.)

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