



BLACKHAWK™ (BHK-100)

USER MANUAL

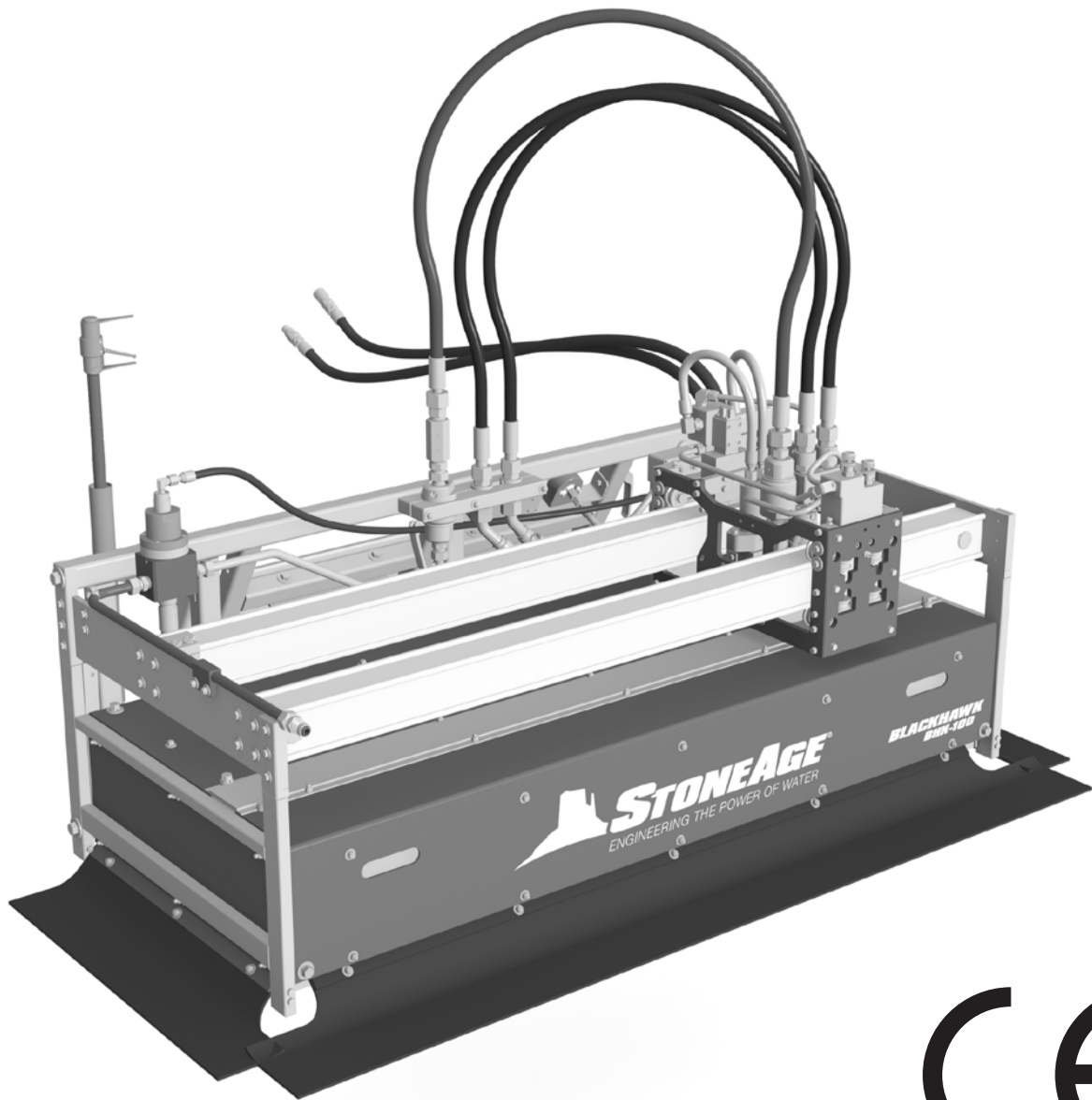


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MANUFACTURER'S INFORMATION

StoneAge Inc.

466 S. Skylane Drive

Durango, CO 81303, USA

Phone: 970-259-2869

Toll Free: 866-795-1586

www.stoneagetools.com

Authorized EU Representative:

Andrew Birt Consulting Ltd.

Worcester, UK

This manual must be used in accordance with all applicable national laws. The manual shall be regarded as a part of the machine and shall be kept for reference until the final dismantling of the machine, as defined by applicable national law(s).

SPECIFICATIONS

- Maximum Water Pressure22,000 psi (1500 bar)
- Maximum Water Flow50 gpm (190 l/min)
- Inlet Connection.....3/4 inch Male MP (M36 & M24 hose connections)
- Required Hydraulic Oil Supply 10 gpm at 600 psi (37.8 l/min at 41.4 Bar)
- Hydraulic Oil ConnectorsFFH08 male and female quick connect
- Dimensions.....66 in H x 76 in W x 48 in D (1.7 m x 1.9 m x 1.2 m), including hoses
- WeightApproximately 1200 lb (544 kg)

DESCRIPTION OF EQUIPMENT AND INTENDED USE

The BlackHawk (BHK-100) is designed to provide a practical means for performing concrete scarification, partial depth cutting, or complete removal of concrete. Using high-pressure water for concrete removal can be more effective than jackhammering for many applications. High-pressure water allows concrete removal without damaging rebar or other reinforcing steel structures and does not introduce fracturing or excessive stress into adjacent structure. The unit employs a rotating nozzle installed to a traversing carriage. The nozzle rotation speed and traverse rate are both adjustable to optimize material removal rates based on job specifics.

The adjustable traverse distance has a maximum cut path of 63 inches (1.6 m). The unit is specifically engineered as an attachment to standard flow hydraulic machines (skid steer, telehandler, backhoe, etc.) to enable application flexibility and offers a significant cost savings over robotic drive systems. The hydraulic controls are completely integrated and controllable by the machine operator including the high-pressure water dump. The BlackHawk (BHK-100) can be used in either a vertical or horizontal orientation by simply adapting to the universal mounting plate.

The BlackHawk (BHK-100) is intended to be used by trained Operators only and is designed to scarify and/or remove concrete using water blasting technology. The basic BlackHawk (BHK-100) operational requirements are listed below:

- A functional standard flow hydraulic machine such as a skid steer or backhoe
- An adequate potable water supply, which is uncontaminated to prevent potential viral or bacterial harm to Operators. Water must not contain particles greater than 5 microns.
- Maximum operating water pressure: 22,000 psi (1500 bar)
- Maximum permissible flow rate: 50 gpm (190 lpm)
- Hydraulic oil supply: 10 gpm at 600 psi (37.8 lpm at 41.4 bar)
- Water inlet connection: ¾ inch male MP (M36 and M24 hose connections)
- Hydraulic oil connectors: FFH08 male and female quick connects

CE DECLARATION OF CONFORMITY

In accordance with BS EN ISO/IEC 17050-1:2010

We: StoneAge, Inc. 466 South Skylane Drive Durango, CO 81303, USA

Declare that:

Equipment: BlackHawk™ System

Model name: BHK-100

Is in accordance with the following Directives:

2006/42/EC Conforms to the Essential Health and Safety Requirements of the Machinery Directive

Has been designed and manufactured to the relevant parts of the following specifications:

EN ISO 12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction

I hereby declare that the equipment named above has been tested and found to comply with the relevant sections of the above referenced specifications and directives.

Signed Andrew B. Birt. Date 3/30/2015

Andrew Birt

Independent Dealer Manager/Authorized EU Representative

StoneAge, Inc., Worcester, UK

The technical file for the BlackHawk (BHK-100) User Manual is maintained at: StoneAge, Inc. 466 South Skylane Drive, Durango, CO 81303, USA.



WARNING AND SAFETY INSTRUCTIONS

DANGER

- High pressure water and debris may be projected at high rates of speed, which can cause serious injury and/or death. Keep away from machinery during operation of the BlackHawk (BHK-100) System.
- Crush Hazard. Death or serious injury could result from being crushed by moving machinery. Clear all personnel from the area before connecting the skid steer or other equipment to the BlackHawk (BHK-100).
- Keep fingers and loose clothing away from the carriage during operation. Rollers, stops, and rotating mechanisms in the carriage are pinch points, and can cause serious injury and/or death.

WARNING

Operations with this equipment can be potentially hazardous. Caution must be exercised prior to and during machine and water jet tool use. Please read and follow all of these instructions, in addition to the guidelines in the WJTA Recommended Practices handbook, available online at www.wjta.org. Deviating from safety instructions and recommended practices can lead to severe injury and/or death.

- Do not exceed the maximum operating pressure specified for any component in a system.
- The immediate work area must be marked off to keep out untrained persons.
- Inspect the equipment for visible signs of deterioration, damage, and improper assembly. Do not operate until repaired. Make sure all threaded connections are tight and free of leaks.
- Users of the BlackHawk (BHK-100) System must be trained and/or experienced in the use or application of high pressure technology and cleaning, as well as all associated safety measures, according to the WJTA Recommended Practices for the use of High Pressure Waterjetting Equipment.
- All operators and persons in close proximity must wear personal protective equipment, including approved protection for body, hands, feet, face, ears, eyes, and air passages. Please refer to the WJTA Recommended Practices, Section 6.
- Inspect the high pressure lines for damage. Only high quality lines intended for waterblast applications should be used.
- The Display Box and the pressure gauge should be in a safe location where the operator has good visibility of the displays. The BlackHawk (BHK-100) must be supervised at all times and should never be left unattended during operation.
- Complete a test run to ensure effective operation and to verify that the hydraulic systems and the dump valve are working properly.

PRE-RUN SAFETY CHECK

- Check that high-pressure water and hydraulic lines are appropriately connected from the clamp to the corresponding fittings of the carriage.
- Check that the dump valve is working properly.
- Ensure no personnel are in the hydroblasting zone.
- Ensure the workplace is free of unnecessary objects (e.g. loose parts, lines, tools).
- Complete a job specific risk assessment and act on the resulting actions.
- Put on correct personal protective equipment.
- Check all high-pressure threaded connections for tightness.
- Check that the hydraulically actuated high-pressure water dump functions properly.

OPERATOR TRAINING

Managers, supervisors, and operators **MUST** be trained in Health and Safety Awareness of High-pressure Water Jetting and hold a copy the Water Jetting Association (WJA) Code of Practice, or equivalent (see www.waterjetting.org.uk).

Operators **MUST** be trained to identify and understand all applicable standards for the equipment supplied. Operators should be trained in manual handling techniques to prevent bodily injury.

Operators **MUST** read, understand, and follow the Operational and Training Requirements (Section 7.0) of WJTA-IMCA's Recommended Practices For The Use Of High-pressure Waterjetting Equipment, or equivalent.

Operators **MUST** read, understand and follow the Warnings, Safety Information, Assembly, Installation, Connection, Operation, Transport, Handling, Storage, and Maintenance Instructions detailed in this manual.

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Use of Personal Protective Equipment (PPE) is dependent on the working pressure of water and the cleaning application. Managers, supervisors, and operators **MUST** carry out a job specific risk assessment to define the exact requirements for PPE. See Protective Equipment for Personnel (Section 6) of WJTA-IMCA's Recommended Practices For The Use Of High-pressure Waterjetting Equipment for additional information.

Hygiene - operators are advised to wash thoroughly after all waterjetting operations to remove any waterblast residue which may contain traces of harmful substances.

First aid provision - users **MUST** be provided with suitable first aid facilities at the operation site.

PPE may include:

- Eye protection Full face visor
- Foot protection..... Kevlar® brand or steel toe capped, waterproof, non-slip safety boots
- Hand protection Waterproof gloves
- Ear protection..... Ear protection for a minimum of 85 dBA
- Head protection Hard hat that accepts a full face visor and ear protection
- Body protection..... Multi-layer waterproof clothing approved for waterjetting
- Hose protection..... Hose shroud
- Respiratory protection Maybe required; refer to risk assessment

WARNING AND SAFETY INSTRUCTIONS

StoneAge has designed and manufactured this equipment considering all hazards associated with its operation. StoneAge assessed these risks and incorporated safety features in the design. StoneAge **WILL NOT** accept responsibility for the results of misuse.

IT IS THE RESPONSIBILITY OF THE INSTALLER/ OPERATOR to conduct a job specific risk assessment prior to use. Job specific risk assessment **MUST** be repeated for each different set up, material, and location.

The risk assessment **MUST** conform to the Health and Safety at Work Act 1974 and other relevant Health and Safety legislation.

The risk assessment **MUST** consider potential material or substance hazards including:

- Aerosols
- Biological and microbiological (viral or bacterial) agents
- Combustible materials
- Dusts
- Explosion
- Fibers
- Flammable substances
- Fluids
- Fumes
- Gases
- Mists
- Oxidizing Agents

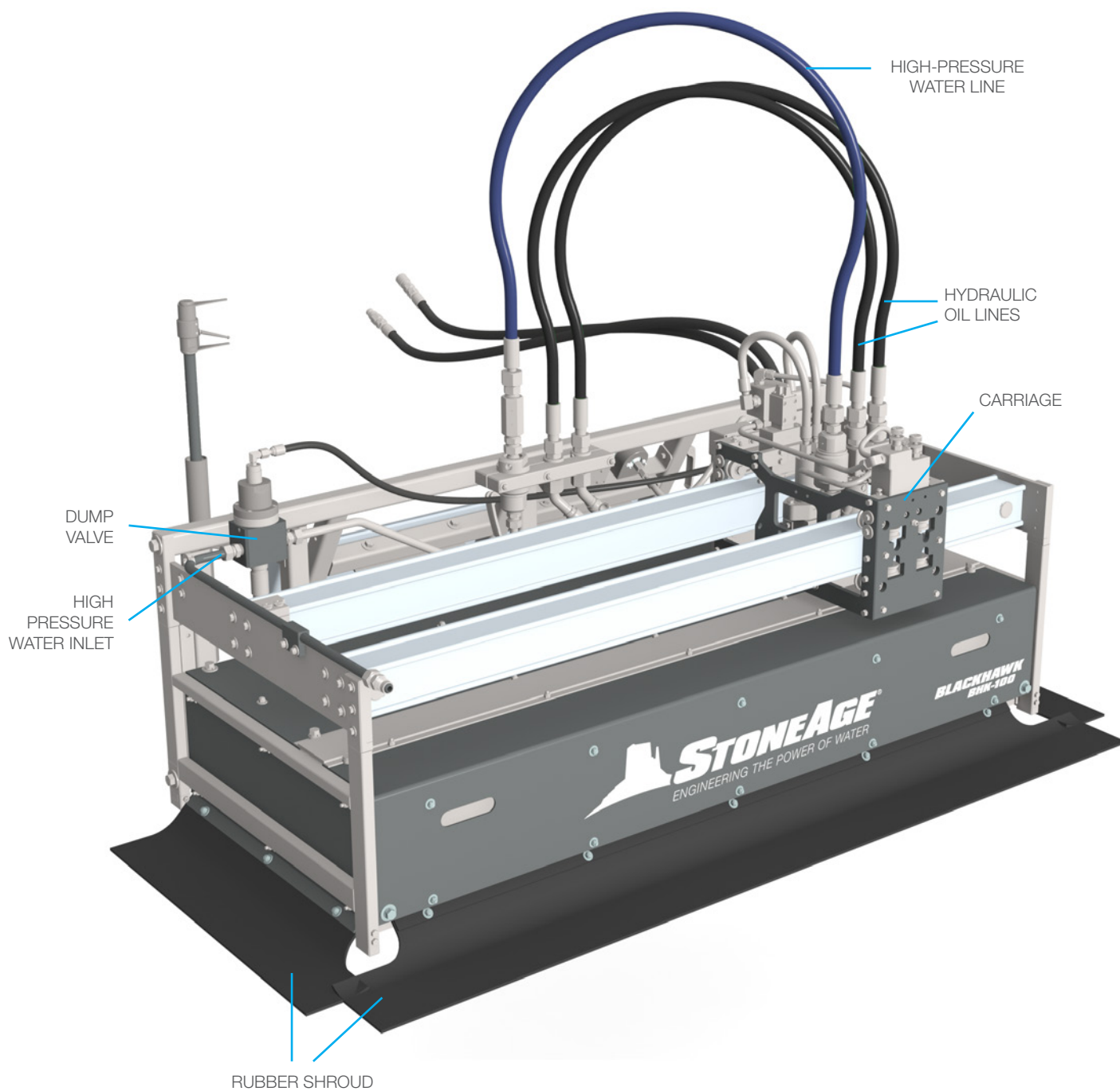
Check all hoses and accessories for damage prior to use. Do not use damaged items.

Ensure all site safety procedures are adhered to.

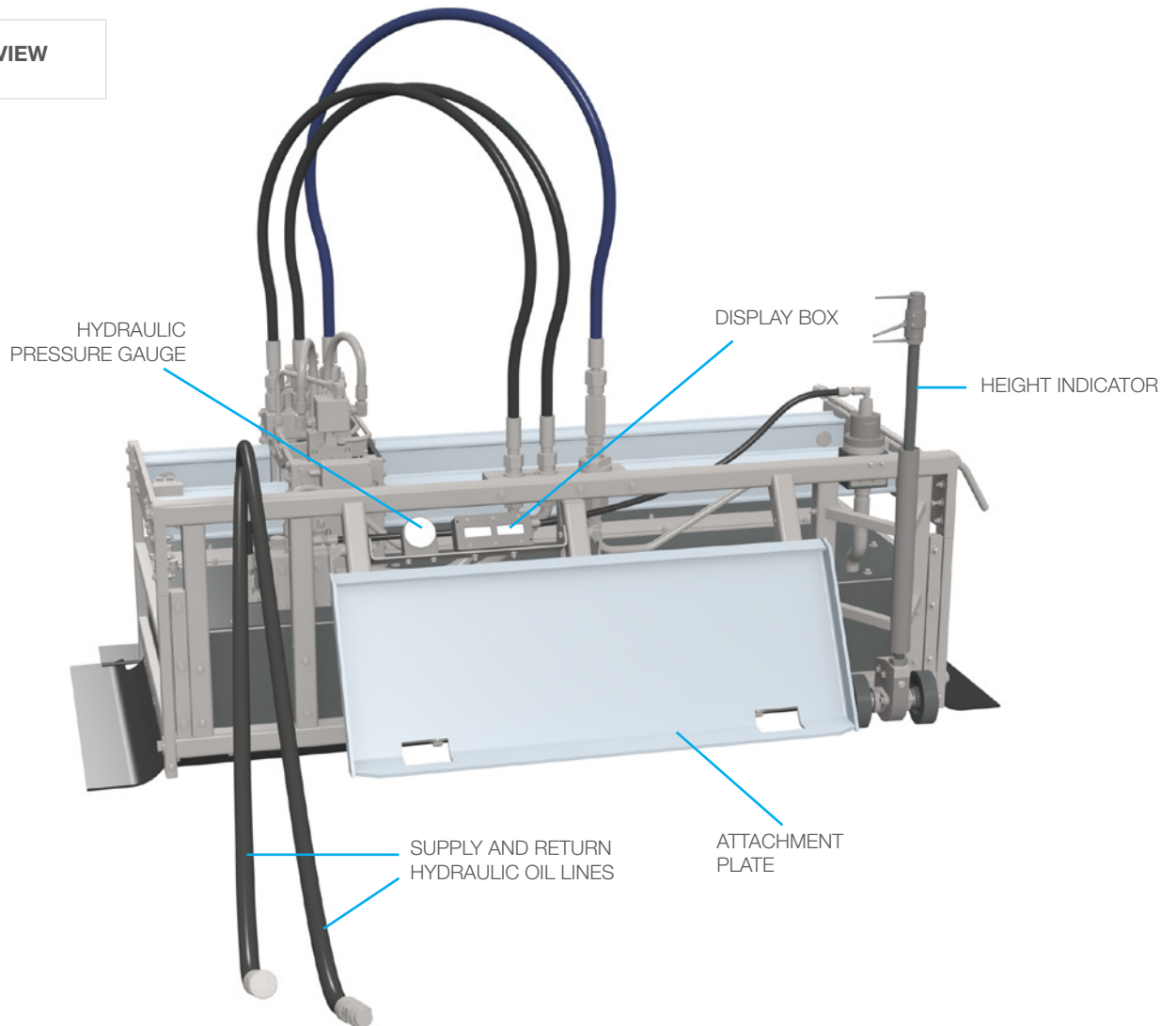
Never connect, disconnect, or tighten hoses, adapters, or accessories with the pump unit running.

OVERVIEW - BLACKHAWK™ (BHK-100)

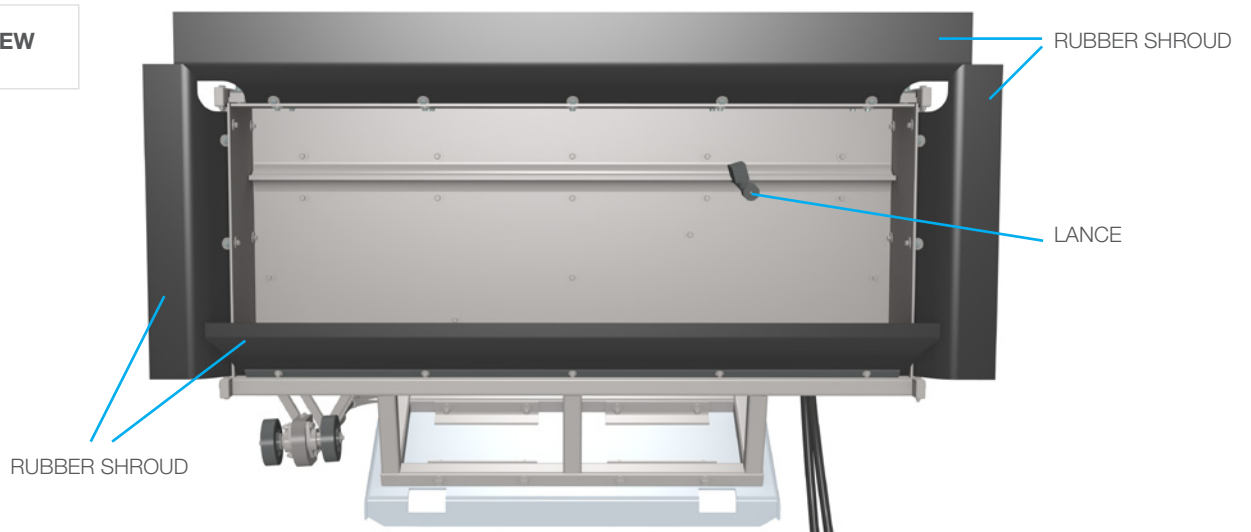
FRONT VIEW



REAR VIEW



BOTTOM VIEW

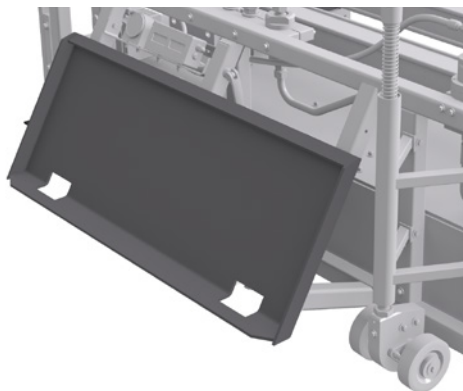


ATTACHMENT PLATE

1. The BlackHawk (BHK-100) is equipped with a Universal skid steer attachment plate to mount to the skid steer or other equipment.
2. Use a quick catch or other custom adapter to attach to the BlackHawk (BHK-100) attachment plate. For a quick catch, hook the top edge of plate, then position the bottom into the openings of the plate. Engage the lock pins into the larger (outermost) holes in bottom edge of plate. Utilize the smaller holes in the plate to bolt on other adapters.
3. The universal skid steer attachment plate can be removed and another plate of choice can be mounted.

DANGER

Crush Hazard. Death or serious injury could result from being crushed by moving machinery. Clear all personnel from the area before connecting the skid steer or other equipment to the BlackHawk (BHK-100).

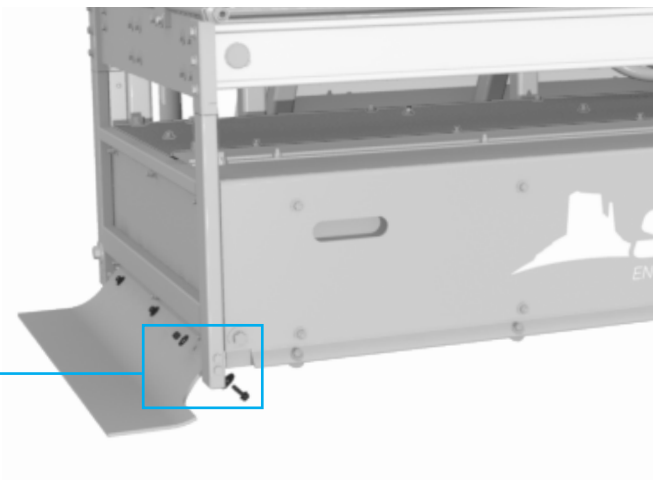
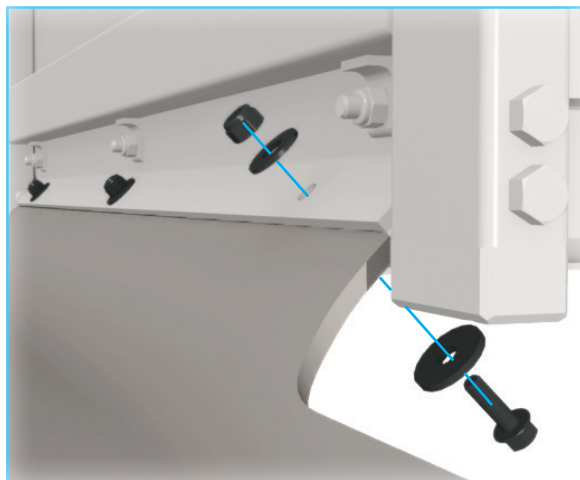


RUBBER SHROUD

The rubber shroud serves to contain debris, reduce noise, and extend the life of the metal frame. It may be removed to cut closer to an edge or wall, or to preserve the sections of rubber shroud in conditions where they may be getting damaged.

NOTE: The section of rubber shroud that is closest to the attachment plate is factory installed and should not be removed.

1. Use a skid steer or other equipment to lift the BlackHawk (BHK-100) off the ground in order to install the three sections of the rubber shroud.
2. Align the bolt holes of the rubber shroud with the bolt holes at the base of the frame.
3. Install the bolts with the nuts facing out and the bolt heads facing in, as illustrated below. Use a 1/2 inch wrench to tighten the bolts.



CLAMP AND CARRIAGE LINES

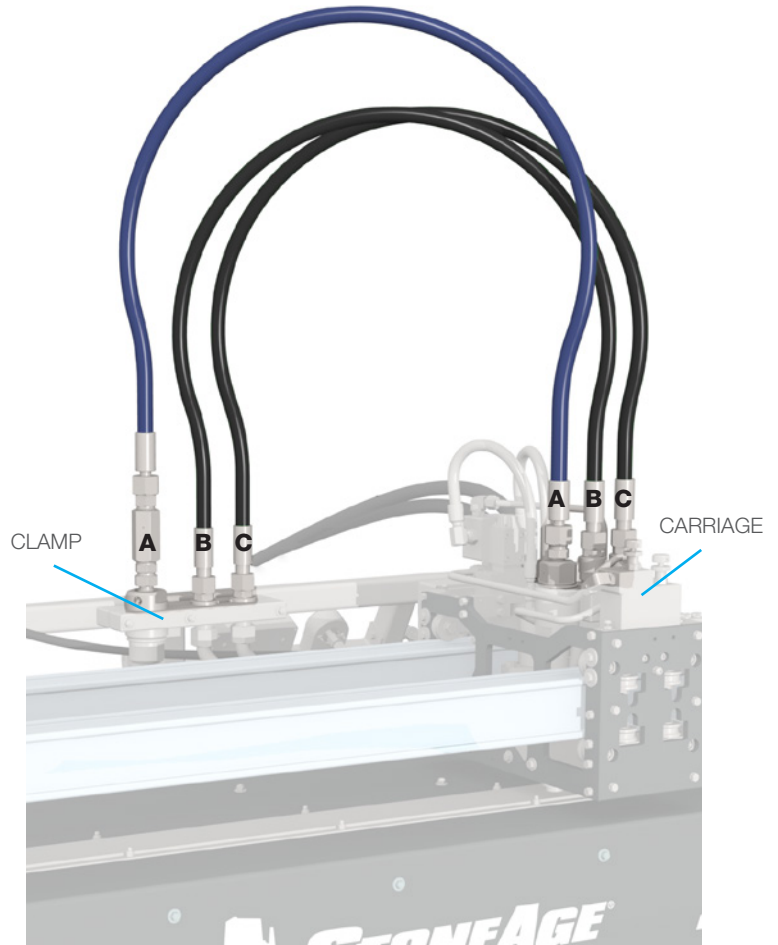
The BlackHawk (BHK-100) will ship with a blue high-pressure water line and two black hydraulic lines.

1. Apply blue anti-seize to the male threads on both ends of the blue high-pressure water line.
2. Use a two wrenches to connect the lines onto the fittings at the clamp and the corresponding fittings at the carriage, as illustrated. Tighten the fittings to 108 N·m (80 ft-lb).

NOTICE

Make sure the lines are connected from the clamp to the corresponding fittings of the carriage, as illustrated, or the BlackHawk (BHK-100) can become damaged.

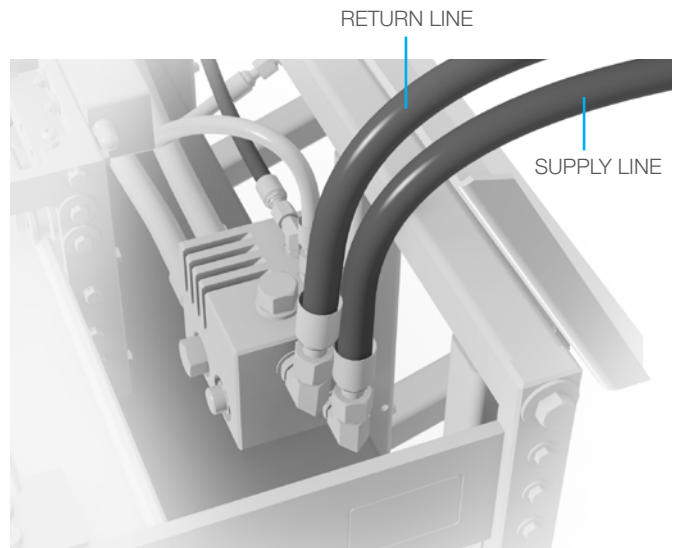
A - HIGH-PRESSURE WATER LINE
B - HYDRAULIC OIL SUPPLY LINE
C - HYDRAULIC OIL RETURN LINE



INLET LINES

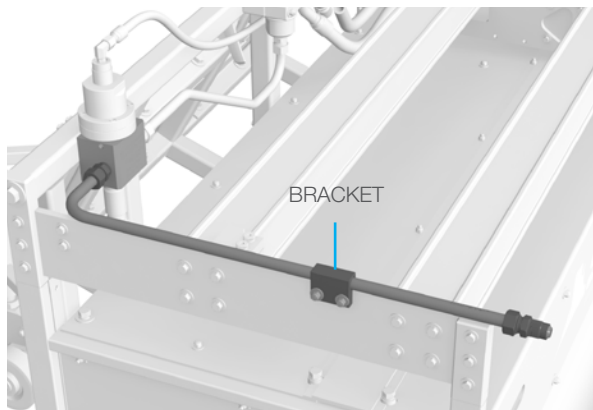
The two black hydraulic lines are factory installed on the BlackHawk (BHK-100) and carry oil from the skid steer to provide the power for the carriage. As the carriage traverses, it moves the lance along the cutting path of the removal area.

The hydraulic oil also controls the dump valve, which will divert high pressure water away from the lance whenever the carriage stops moving. They are equipped with male and female quick-disconnect couplings. Connect the couplings to the hydraulic fittings of the skid steer or other equipment. The quick-disconnect couplings can be interchanged to accommodate pump fitting configurations.



HIGH-PRESSURE WATER SUPPLY LINE

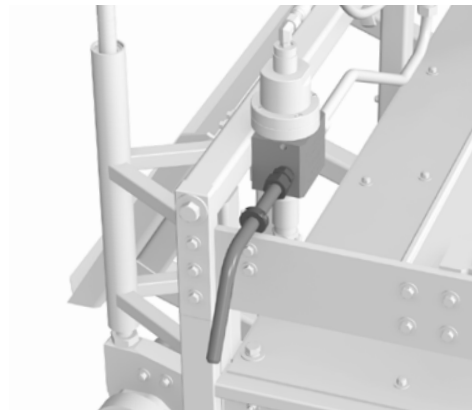
Connect the high-pressure water line once the BlackHawk (BHK-100) has been transported and setup at the waterjet blasting location. There are two options to connect the high-pressure water line from the pump to the dump valve. The short extension adapter is recommended for normal use and will allow the high-pressure water line to be oriented in any direction. A long extension adapter is an available option for operating the device close to a wall or other surface.



LONG EXTENSION
ADAPTER

1. Pry the orange cap out of the dump valve.
2. Apply blue anti-seize to the male threads of the high pressure water line and adapter.
3. Use a wrench to tighten the fitting into the dump valve to 108 N·m (80 ft-lb).

For the long extension adapter, use a 7/16 inch end wrench to bolt the bracket onto the frame of the BlackHawk (BHK-100), and tighten the bolts to 11 N·m (8 ft-lb).



SHORT EXTENSION
ADAPTER

DISPLAY BOX AND PRESSURE GAUGE

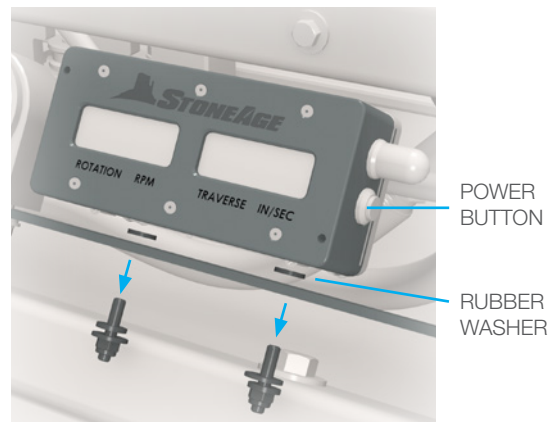
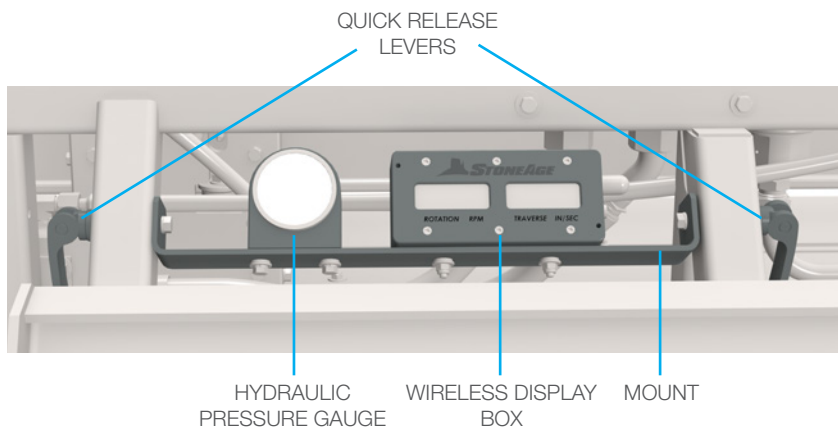
The display box will show the rotation speed (in/sec) and traverse speed (rpm) regulated by the Traverse and Rotation Controls (see page 15). The display box has a power button and will automatically shut off after a few minutes. The pressure gauge displays the hydraulic oil pressure (psi) coming from the skid steer or other equipment.

The display box and pressure gauge mount is equipped with quick release levers on each side to adjust the position of the mount for viewing access. The wireless option for the display

box can be removed and placed inside the cab of the skid steer or other equipment for viewing access. To remove the display box, use a 7/16 inch end wrench to remove the two bolts.

NOTICE

Be careful when removing the two washers near the bolt heads and the rubber washers between the mount and the display box, as small parts can become lost. Put the parts in a safe place until future use.

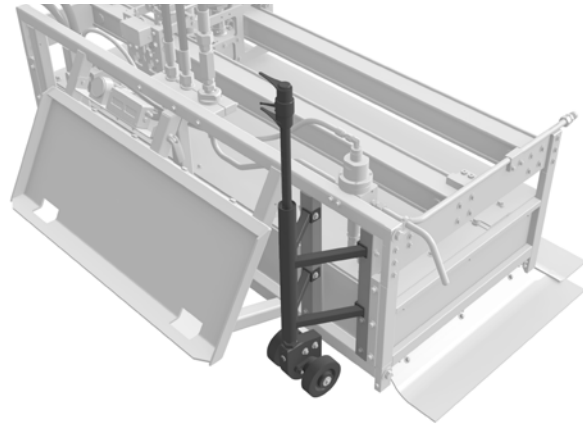
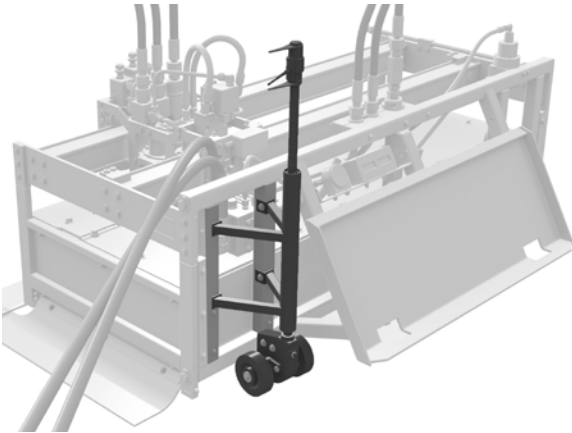


HEIGHT INDICATOR

The Height Indicator can be used for any precision or controlled depth application (see pages 15-17). It can be bolted onto either side of the attachment plate. Use the four included 1/4 inch bolts and washers to install the Height Indicator in one of the orientations illustrated below. Use a 7/16 inch end wrench to tighten the bolts to 11 N·m (8 ft-lb).

⚠ CAUTION

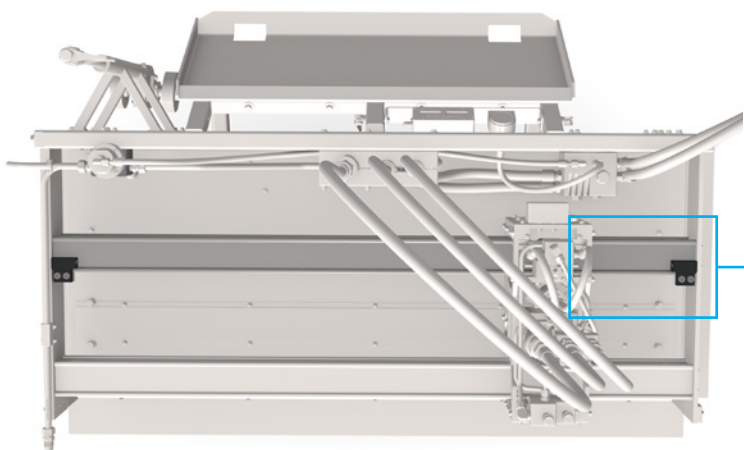
Pinch hazard. Keep fingers clear of the movable shaft of the Height Indicator, it can rebound quickly and pinch skin.



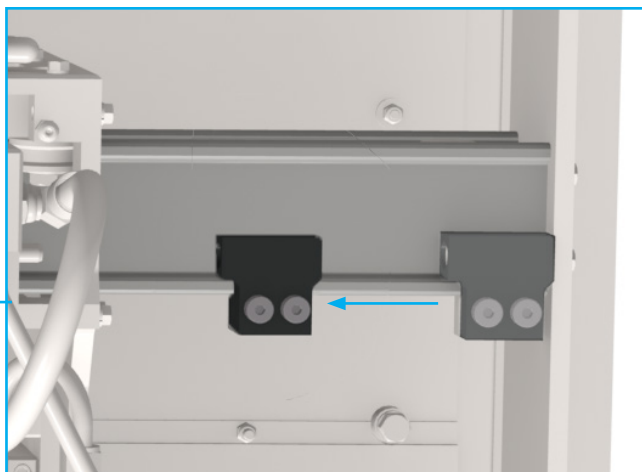
SETTING THE STOPS

The distance the carriage traverses controls the **length of the cutting path**. Adjust the stops on the rails to create a more narrow cutting path. Use a 1/4 inch hex key to loosen the two bolts on the stops and slide them to the desired position.

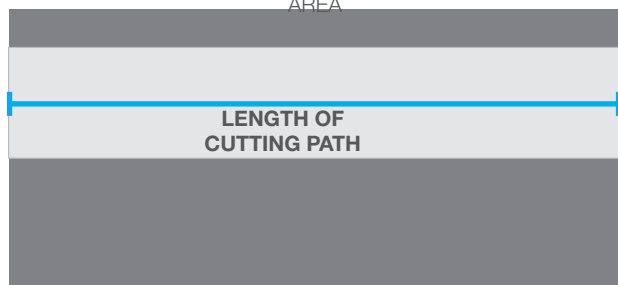
Re-tighten the bolts to 20 N·m (15 ft-lb). Adjusting the stops will not affect the diameter of the cutting path, which is controlled by the stand-off distance (see page 16).



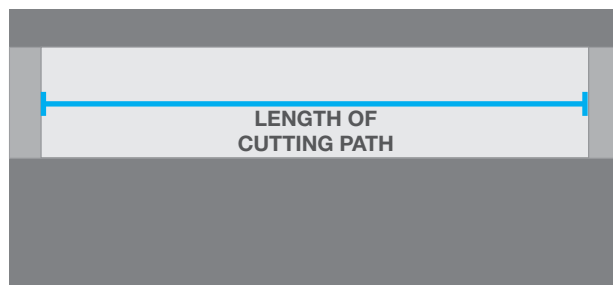
SETTING STOPS MORE NARROW



TOP VIEW OF REMOVAL
AREA



SETTING STOPS MORE NARROW



⚠ DANGER

High pressure water and debris may be projected at high rates of speed, which can cause serious injury and/or death. Keep away from machinery during operation of the BlackHawk (BHK-100).

Crush Hazard. Death or serious injury could result from being crushed by moving machinery. Clear all personnel from the area before connecting the skid steer or other equipment to the BlackHawk (BHK-100).

⚠ WARNING

Keep fingers and loose clothing away from the carriage during operation. Rollers, stops, and rotating mechanisms in the carriage are pinch points, and can cause serious injury and/or death.

PRE-RUN SAFETY CHECK

- Check that high-pressure water and hydraulic lines are appropriately connected from the clamp to the corresponding fittings of the carriage.
- Check that the dump valve is working properly.
- Ensure no personnel are in the hydroblasting zone.
- Ensure the workplace is free of unnecessary objects (e.g. loose parts, lines, tools).
- Complete a job specific risk assessment and act on the resulting actions.
- Put on correct personal protective equipment.
- Check all high-pressure threaded connections for tightness.
- Check that the hydraulically actuated high-pressure water dump functions properly.

APPLICATIONS AND ORIENTATION

The BlackHawk (BHK-100) can be used for scarification purposes, the removal of a thin layer to provide a good bonding surface, and partial depth cuts to expose rebar and remove weak areas. The BlackHawk (BHK-100) can completely remove concrete up to 1 foot deep, or greater, depending on pressure, flow, and grade of concrete.

Use skid steer, or other equipment, to orient the BlackHawk (BHK-100) System vertically or horizontally, according to the

application. Use the horizontal orientation for applications such as bridge decks, parking structures, and bike paths. Use the vertical orientation for applications such as piers, buildings, tanks, and walls.

The Height Indicator should be used for all precision or controlled depth applications. It does not need to be used for demolition or when complete removal is performed.

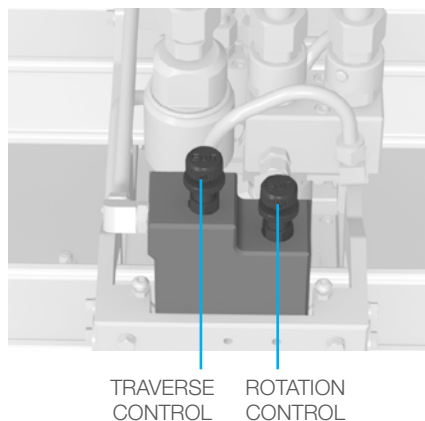
TRAVERSE AND ROTATION CONTROLS

The traverse control adjusts the speed (in/sec) of the carriage as it traverses along the rails during high pressure water flow. The rotation control adjusts the rotational speed (rpm) of the lance during high pressure water flow.

Turn the controls clockwise to increase the traverse speed of the carriage and increase the rotation speed of the lance. View the traverse and rotation speeds on the display box.

Test at high pressure for cut depth and removal rate. Fine tune the rotation speed, traverse rate, stand-off height, and number of passes to achieve desired results.

To cut consistently, time or count the number of times the carriage traverses. Move the unit at determined intervals.

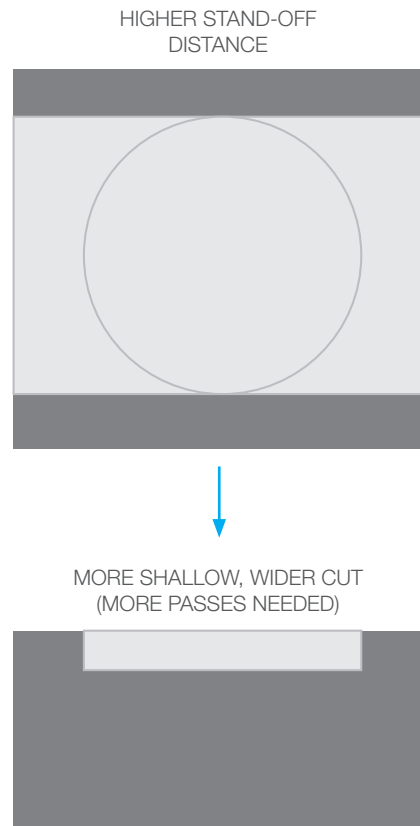
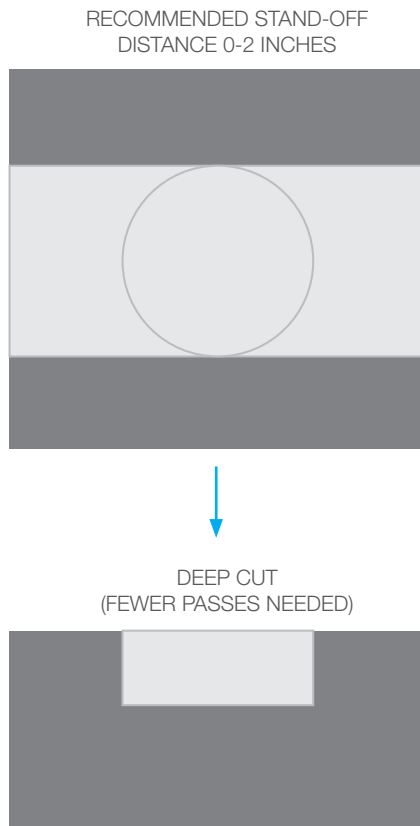


OPERATION

STAND-OFF DISTANCE

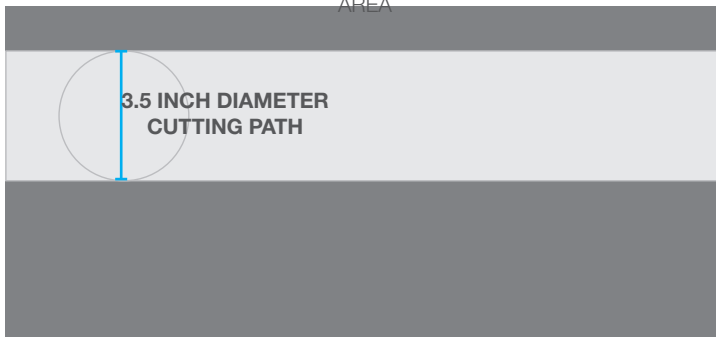
Stand-off distance is the height of the unit above the ground, and is indicated by the numbering (inches) on the shaft of the Height Indicator. The stand-off distance affects the **width of the cutting path**, or the diameter of the waterblasting as the lance traverses over the removal area.

The stand-off height should be between 0-2 inches (0-5 cm), resulting in a 3.5 inch (9 cm) diameter for the cutting path. For the highest production rate, reposition the BlackHawk (BHK-100) half the distance of the cut diameter (1.75 inch (4 cm), in this case). This will prevent the removal area from having a residual “ridge” between cutting paths. If the stand-off height is higher, the cutting path will become wider and less effective (requiring more passes).



The needle at the top of the height indicator module will move up **or** down as the wheels of the Height Indicator roll forward and backward. Needle movement up **or** down represents 1.75 inches of distance the BlackHawk (BHK-100) has traveled and repositioned for the next cutting path.

TOP VIEW OF REMOVAL AREA



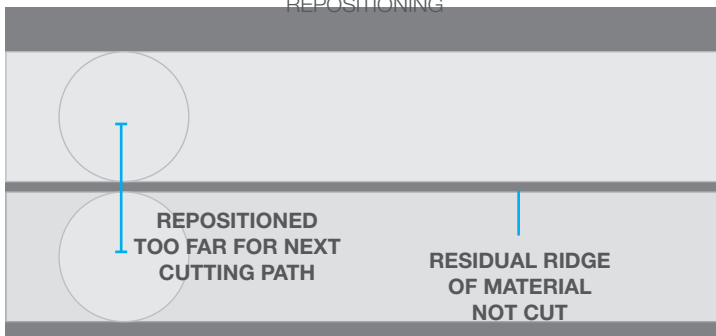
HIGHEST PRODUCTION RATE



= 1.75 INCH REPOSITION =



INEFFICIENT REPOSITIONING



OPERATION

PRE-RUN SAFETY CHECK

- Check that high-pressure water and hydraulic lines are appropriately connected from the clamp to the corresponding fittings of the carriage.
- Check that the dump valve is working properly.
- Ensure no personnel are in the hydroblasting zone.
- Ensure the workplace is free of unnecessary objects (e.g. loose parts, lines, tools).
- Complete a job specific risk assessment and act on the resulting actions.
- Put on correct personal protective equipment.
- Check all high-pressure threaded connections for tightness.
- Check that the hydraulically actuated high-pressure water dump functions properly.

TEST RUN PROCEDURE

- Run the high pressure water to perform a cut test for cutting depth and removal rates before beginning the job.
- Set the stops to the desired traverse width.
- Fine tune the rotation speed, traverse rate, standoff height and number of passes to achieve desired cutting results.
- Use slower traverse and rotation speeds for deeper cuts.
- Use faster traverse and rotation speeds for more shallow, even, and consistent cuts.
- Determine the desired stand-off height.
- Time or count the number of traverses the carriage makes to cut to the desired depth.
- Use the Height Indicator to reposition the BlackHawk (BHK-100) for the next cutting path location.
- Moving the indicated distance (half the width of the cut path), at the determined interval, to yield the highest production rate and the most consistent cut depth.

STORAGE, TRANSPORTATION, AND HANDLING

When moving the BlackHawk (BHK-100), use the appropriate equipment to lift with care and prevent damage.

The BlackHawk (BHK-100) is shipped in a custom wooden crate and should be stored upright in the same crate between jobs.

When storing the unit, use compressed air to blow out the water lines to remove debris and water. Use mild soapy water to clean the exterior of the machine in order to remove corrosive buildup and concrete scale. Store the unit in a covered area, out of direct sunlight, to prolong the life of the lines, seals, rubber and plastic parts, and component finishes.

Maintenance Item	Frequency	Maintenance Required
Dump valve	After each use	Use compressed air to blow out the system at the high pressure water inlet of the dump valve
Hydraulic oil lines	After each use	Remove the hydraulic oil lines to the skid steer, but allow the lines to remain attached on the BlackHawk (BHK-100) System
Carbide nozzle	Periodically	Replace when the water jet quality and/or removal rate deteriorates
Carbide nozzle	After each use or every 50 hours	Replace when the face thickness recedes to the wear line indicator
Rails and carriage bolts	After each use or every 50 hours	Check for wear of the rails and adjust the tensioner bolts on the carriage to remove play. Replace rails when necessary
Hydraulic fittings	Every 100 hours	Check for leaks and tighten or replace as necessary
Bolts	Every 50 hours	Check tightness; bolts can loosen over time due to the vibration created during operation
Zerks	Every week, every 40 hours, or before long term storage	Grease all Zerks with 1/2 to 1 pump of Mobil® SHC™ PM 460 synthetic grease
Rotation gearbox oil	Check before every use, change every 250 hours	Check the rotation gearbox oil level and use DEXRON® III ATF as necessary
Traverse gearbox oil	Check before every use, change every 250 hours	Check the traverse gearbox oil level and use Mobil® SHC™ 634 synthetic gear oil as necessary
BHK 161 Nozzle Guard, BHK 262 High Pressure Water Hose, BHK 342 Rail, BHK 343 Drive Rail, BR 055 Rollers	After 120 hours of operation or as needed with signs of wear	Inspect and replace worn components as necessary

Parts included in the BlackHawk (BHK-100) Extra Parts Package and recommended to have on hand during operation:

- OC8 Carbide Nozzle (variety pack of four)
- WS 210 O-Ring (Seals between the face of Lance and Nozzle Guard)
- RJ 404-K O-Ring (Seals between the Carbide Nozzle and the Nozzle Guard)
- SG 600-CCN Swivel Service Kit

Contact StoneAge, Inc for Safety Data Sheets for the following:

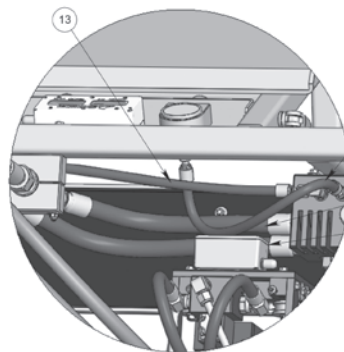
- Consumable materials (oil, grease, etc.)
- A complete list of spare part numbers
- Service instructions for the BlackHawk (BHK-100)

DEXRON® is a registered trademark of General Motors Corporation.

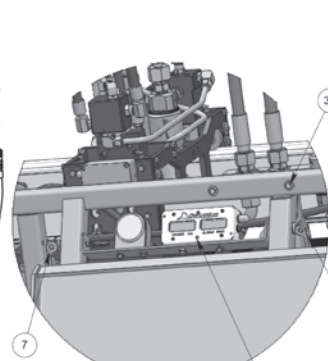
Mobil® and SCH™ are registered trademarks and/or trademarks of ExxonMobil®.

PARTS DIAGRAM

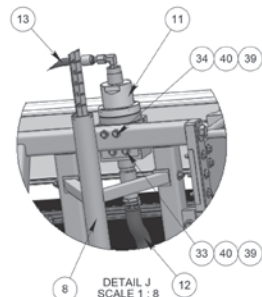
ITEM NO.	PART NUMBER	QTY.
1	AF 064-MP16 Adapter 1.31 Type M to MP16	1
2	AF 071-MP12 Collar .75 MP	4
3	AF 072-MP12 Gland Assy, Antivibe	4
4	AF 073-MP16 Coupling	1
5	BHK 101 Complete Carriage Assy	1
6	BHK 165 Hydraulic Swivel	2
7	BHK 190 Display Cluster Assy	1
8	BHK 200 Height Indicator Assy	1
9	BHK 240 Primary Valve Manifold Assy	1
10	BHK 248 Hose Adapter	1
11	BHK 250 Hydraulic Diverter Valve (JetStream 60078)	1
12	BHK 251 Dump Water Hose Assy	1
13	BHK 252 Dump Valve Hyd Hose	1
14	BHK 253 Pressure Gauge Hyd Hose	1
15	BHK 254 Skid Steer Hyd Hose	2
16	BHK 255 Carriage Hyd Return Hose	1
17	BHK 255 Carriage Hyd Supply Hose	1
18	BHK 256 Primary Pressure Hyd Hose	1
19	BHK 257 Primary Return Hyd Hose	1
20	BHK 260 Inlet Water Tube	1
21	BHK 261 Dump to Swivel Water Tube	1
22	BHK 262 High Pressure Water Hose	1
23	BHK 265 Swivel Triple Clamp	2
24	BHK 266 Inlet HPW Tube Block	1
25	BHK 300 Complete Frame Assy	1
26	BHK 355 Inlet Tube Clamp	1
27	BHK 357 Angled Inlet Water Tube	1
28	BHK 358-F Quick Connect, Female	1
29	BHK 358-M Quick Connect, Male	1
30	BHK 362 Serial Plate	1
31	BUD 260-L Rail Stop Assy, Left	1
32	BUD 260-R Rail Stop Assy, Right	1
33	GB 525-03 Bolt, Hex .25-20 x .75	2
34	GB 525-10 Bolt, Hex .25-20 x 2.50	2
35	GB 531-05 Bolt, Hex .31-18 x 1.25	2
36	GB 531-06 Bolt, Hex .31-18 x 1.50	2
37	GB 531-26 Bolt, Hex .31-18 x 6.50	3
38	GN 531-L Nylok Nut	7
39	GW 525-F Flat Washer	4
40	GW 525-L Lock Washer	4
41	GW 531-F Flat Washer	14
42	SG-MP12AV16-62-0 Swivel	1



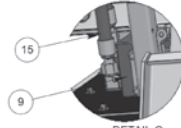
DETAIL F
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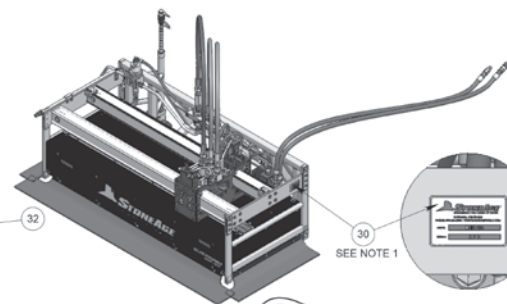
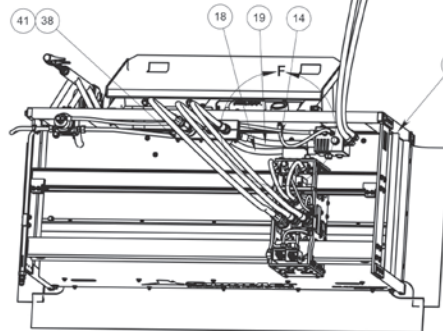
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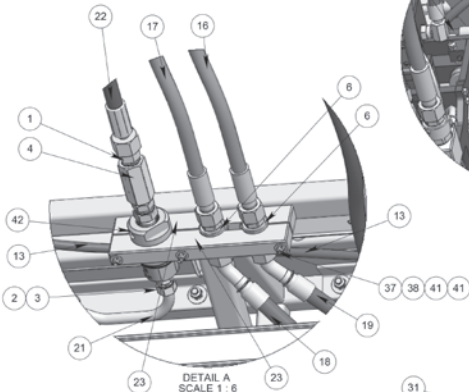
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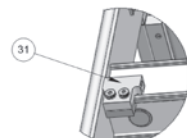
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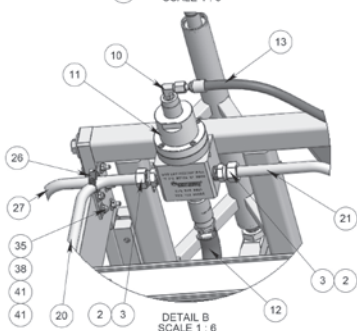
SEE NOTE 1



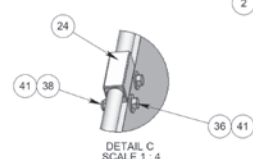
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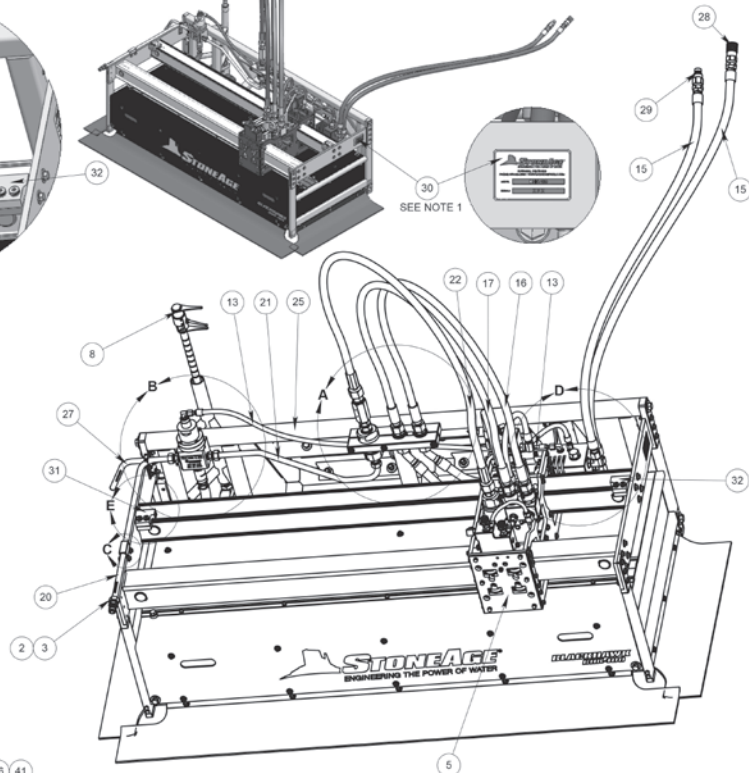
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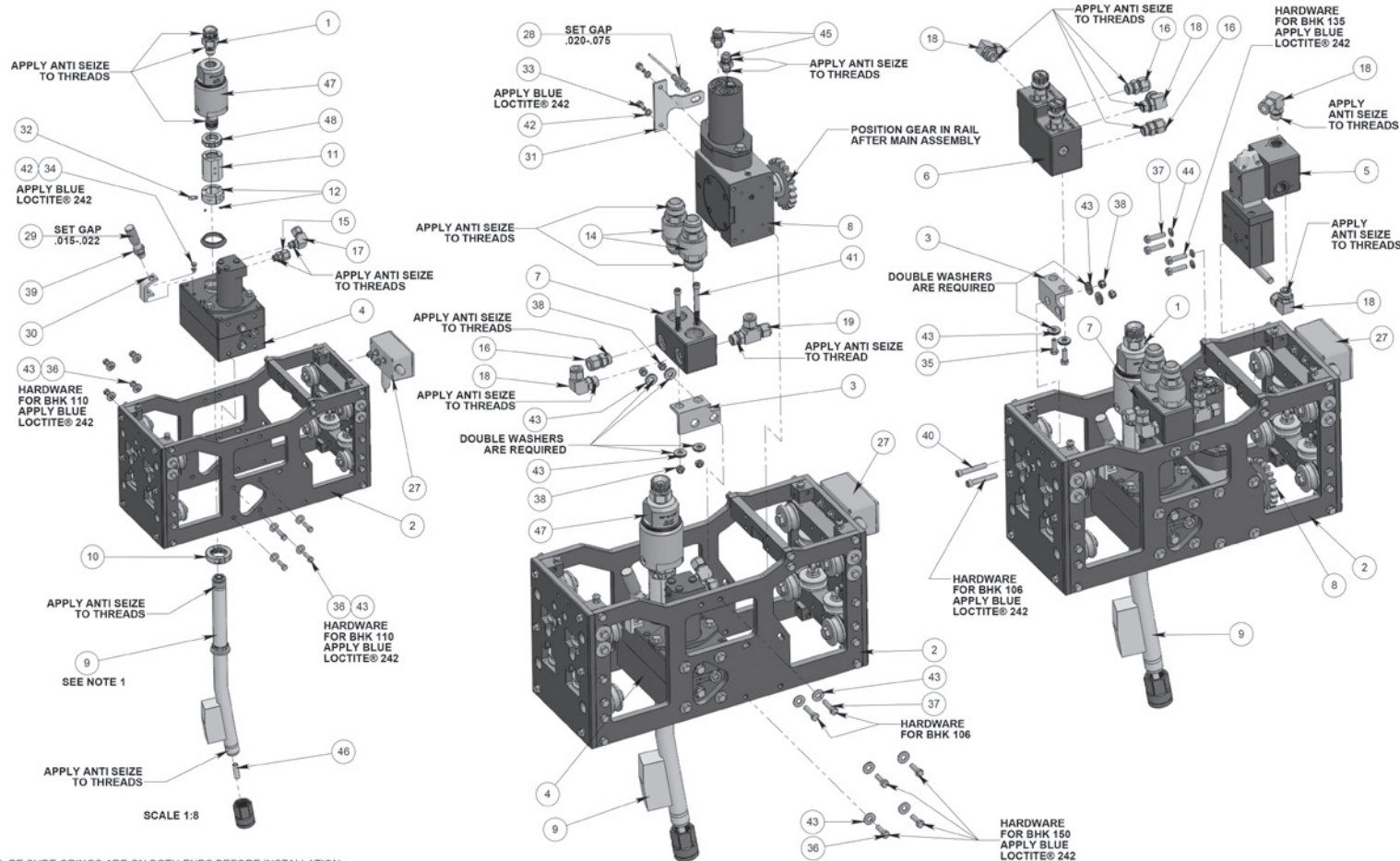
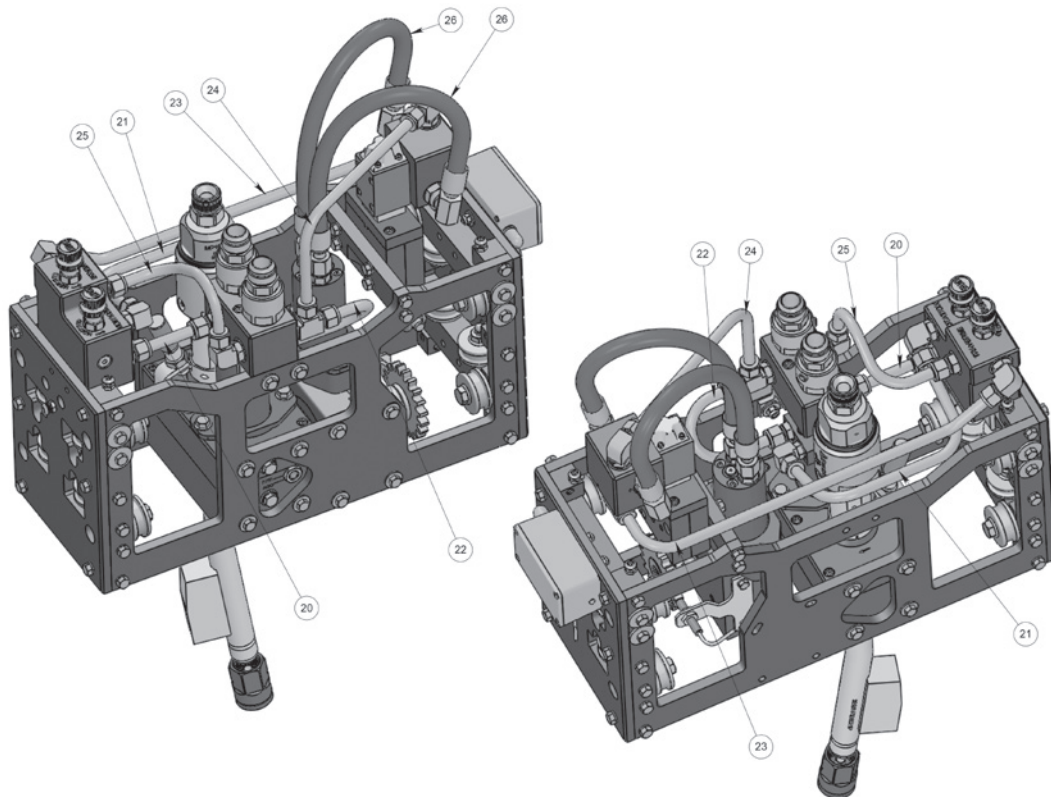
DETAIL B
SCALE 1 : 6



DETAIL C
SCALE 1 : 4



ITEM NO.	PART NUMBER	Default/Qty.
1	AF 064-MP12 Adapter 1.31 Type M to MP12	1
2	BHK 102 Carriage Frame Assy	1
3	BHK 106 Valve Manifold Bracket	2
4	BHK 110 Rotation Gearbox Assy	1
5	BHK 135 Hydraulic Switch Unit	1
6	BHK 145 Secondary Valve Manifold Assy	1
7	BHK 149 Swivel Block	1
8	BHK 150 Traverse Drive Assy	1
9	BHK 155 Bent Lance Assy	1
10	BHK 157 Threaded Collar	1
11	BHK 158 Bent Lance Coupler	1
12	BHK 159 Lance Collar Assy	1
13	BHK 161 Nozzle Guard	1
14	BHK 165 Hydraulic Swivel	2
15	BHK 166 Tube Fitting	1
16	BHK 167 Tube Fitting	3
17	BHK 168 Tube Fitting	1
18	BHK 169 Tube Fitting	5
19	BHK 170 Tube Fitting	1
20	BHK 171 Manifold Inlet Tube	1
21	BHK 172 Rotation Inlet Tube	1
22	BHK 173 Rotation Return Tube	1
23	BHK 174 Switch Valve P Port Tube	1
24	BHK 175 Switch Valve T Port Tube	1
25	BHK 176 Manifold Return Tube	1
26	BHK 177 Switch Valve Hose	2
27	BHK 180 Transmitter Box Assy	1
28	BHK 181 Traverse Sensor	1
29	BHK 182 Rotation Sensor	1
30	BHK 186 Rotation Sensor Mount	1
31	BHK 187 Traverse Sensor Mount	1
32	BHK 188 Magnetic Rotation Sensor Pick-Up	1
33	GB 525-025 Bolt, Hex 25-20 x .62	2
34	GB 525-03 Bolt, Hex 25-20 x .75	1
35	GB 531-035 Bolt, Hex 31-18 x .88	2
36	GB 531-04 Bolt, Hex 31-18 x 1.00	12
37	GB 531-05 Bolt, Hex 31-18 x 1.25	6
38	GN 531-L Nylok Nut	6
39	GN 562-H-18 Hex Jam Nut (CY 051)	1
40	GS 531-08 SHCS 31-18 x 2.00 Z	2
41	GS 531-12 SHCS 31-18 x 3.00 Z	2
42	GW 525-L Lock Washer	3
43	GW 531-F Flat Washer	30
44	GW 531-L Lock Washer	4
45	LM 123 Fitting Hyd	2
46	OCB XXX Carbide	1
47	SG-CCN-MP12K-0 Swivel	1
48	SRT 323 Coupler Collar	1



1. BE SURE ORINGS ARE ON BOTH ENDS BEFORE INSTALLATION.
NOTES:

TERMS AND CONDITIONS

1. Acceptance of Terms and Conditions. These Terms and Conditions shall operate as Seller's acceptance of Buyer's purchase order, and such acceptance is made expressly conditional on assent by Buyer to the Terms and Conditions. Such assent shall be deemed to have been given unless written notice of objection to any of such Terms and Conditions (including inconsistencies between Buyer's purchase order and this acceptance) is given by Buyer to Seller promptly on receipt hereof.

Seller desires to provide its Buyer with prompt and efficient service. However, to negotiate individually the terms of each sales contract would substantially impair Seller's ability to provide such service. Accordingly, products furnished and services rendered by Seller are sold only on the Terms and Conditions stated herein. Notwithstanding any Terms or Conditions on Buyer's order, Seller's performance of any contract is expressly made conditional on Buyer's agreement to Seller's Terms and Conditions of sale unless otherwise specifically agreed to in writing by Seller. In the absence of such agreement, commencement of performance, shipment and/or delivery shall be for Buyer's convenience only and shall not be deemed or construed to be an acceptance of Buyer's Terms and Conditions. PRODUCTS SOLD BY SELLER ARE DESIGNED AND INTENDED TO BE USED AT HIGH PRESSURES AND SPEEDS, AND MAY BE DANGEROUS IF OPERATED IMPROPERLY OR WITHOUT THE USE OF APPROPRIATE SAFETY DEVICES AND GUARDS. BUYER IS CAUTIONED TO CAREFULLY READ AND UNDERSTAND THESE TERMS AND CONDITIONS, AS THEY HAVE IMPORTANT LEGAL CONSEQUENCES.

2. Payment/Prices. Unless other arrangements have been made in writing between Seller and Buyer, payment for product delivered shall be made upon receipt of invoice. The prices shown on the face hereof are those currently in effect. Prices invoiced shall be per price list in effect at the time of shipment. Prices are subject to increase for inclusion of any and all taxes which are applicable and which arise from the sale, delivery or use of Seller's products or services and for the collection of which Seller is or may be responsible to any governmental authority unless acceptable exemption certificates are provided by Buyer in accordance with law. Buyer shall pay all charges for transportation and delivery and all excise, order, occupation, use or similar taxes, duties, levies, charges or surcharges applicable to the equipment or services being purchased, whether now in effect or hereafter imposed by any governmental authority, foreign or domestic.

3. Warranty. Subject to the limitations and conditions hereinafter set forth, Seller warrants to the original Buyer that its products are free from defects in workmanship and material for a period of one (1) year months from shipment. Seller's obligation under this warranty shall be limited to repairing, replacing or issuing a credit for, at Seller's option, any products or services it finds to be defective in material or workmanship. In no event shall Seller be liable for any incidental, consequential or indirect damages of any kind. THIS WARRANTY SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY FOR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. No statement or recommendation made by Seller or its representative to Buyer or User shall constitute a warranty by Seller or a waiver or modification to any of the provisions hereof or create any liability for Seller. All warranty claims are subject to the exclusions and limitations set forth below:

a. The warranty shall not apply if the product or service (1) has been subject to misuse, negligence or accident; (2) has not been installed or operated in accordance with Seller's recommendations; (3) has been operated under more severe conditions than those specified for the particular product or service; (4) has been operated beyond the rated capacity of the product; or (5) has been repaired or altered outside Seller's facilities or in any way so as, in Seller's judgment, to affect its stability or reliability.

b. Products that Seller furnishes, but does not manufacture, carry only the warranty of the manufacturer of such products. Where other manufacturers' or suppliers' products used in Seller's products or services prove defective, Seller's liability shall exist only to the extent that Seller is able to recover from such manufacturers or suppliers for such defects.

c. Any warranty granted by Seller to the Buyer shall be deemed void if any goods covered by such warranty are used for any purpose not recommended or permitted. In addition, the Buyer shall indemnify Seller and hold Seller harmless from and against any and all claims, damages, losses, costs, expenses and other liability of whatever nature that Seller suffers or incurs by reason of any such unintended use.

d. Notice of defective product or service must be given in writing to Seller by Buyer or User within fifteen (15) business days following receipt of goods. Buyer or User shall keep such products or services in an unaltered condition for examination by Seller's representative. No goods may be returned for credit or adjustment without prior written permission from Seller.

4. Product Liability. Buyer specifically acknowledges that the products being purchased may be operated at high speeds and/or pressures, and that as such they may be inherently dangerous if not used correctly. Buyer shall be solely responsible for the safe operation of the products at all times and for determining the safety devices and guards that may be required for the safe operation of the products. Buyer shall undertake to specify and order all safety devices and guards necessary for the safe operation of the equipment covered. All safety devices and guards offered in Seller's quotations are recommended for purchase. Seller may provide necessary safety devices and guards not offered in this quotation at an extra price in accordance with the specifications of Buyer. Buyer shall at all times use and require its employees to use all necessary and appropriate safety devices, guards and proper safe operating procedures. Buyer shall not remove or modify any such devices, guards or warning signs and shall insist on safe operating practices on the part of its personnel. In no event shall Seller be responsible for any injuries to persons or property caused by defects in any equipment, including by way of illustration and not limitation, any pumps, compressors, fittings, connections, components, piping or hoses up to the point that same are connected to the product. Buyer agrees to indemnify and to save Seller harmless from any and all liability or obligation incurred by or against Seller, including costs and attorneys' fees, to or by any persons injured directly or indirectly in the operation of the equipment furnished under the following conditions:

a. if Buyer fails to purchase and use necessary and appropriate safety devices and guards as determined and/or recommended by Seller;

b. if Buyer fails to maintain in good working order such safety devices and guards as are purchased from Seller;

c. if Buyer adds, omits, repairs, modifies, replaces or substitutes any components on the equipment without permission from Seller;

d. if Buyer exceeds at any time the maximum safe loads, pressures or speeds recommended by Seller for the equipment furnished hereunder without the specific written consent of Seller; or

e. if Buyer otherwise fails to operate the product or equipment in accordance with Seller's printed instructions or otherwise negligently operates the equipment.

5. Delivery. Seller is not obligated to make delivery by a specified date, but will always use its best efforts to make delivery within the time requested. All deliveries are based on F.O.B. Seller's factory, unless specifically agreed otherwise, and Buyer shall pay all shipping costs and insurance from that point. Seller, in its sole discretion, will determine and arrange the means and manner of transportation of the products. Responsibility of Seller shall cease and Buyer assumes all risk of loss or damages upon Seller's delivery to and receipt by a common carrier. Carriers shall be responsible for goods lost or damaged in transit and Buyer shall immediately notify the carrier in writing of such loss or damage. At Buyer's request Seller will offer its assistance. THE PROPOSED SHIPMENT DATE IS AN ESTIMATE. UNDER NO CIRCUMSTANCES SHALL SELLER HAVE ANY LIABILITY WHATSOEVER FOR LOSS OF USE OR FOR ANY DIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM DELAY REGARDLESS OF THE REASON(S). Shortages or errors must be reported within fifteen (15) business days from receipt of shipment to secure adjustment. No merchandise may be returned without securing written approval from Seller. Seller will notify Buyer promptly of any material delay and will specify the revised delivery date as soon as practicable. Seller shall not be liable for any delay in delivery or performance, or for any failure to manufacture, deliver or perform due to (a) any cause beyond its reasonable control; (b) any act of God, act of Buyer, act of civil or military authority, governmental priority, strike or other labor disturbance, flood, epidemic, war, riot, delay in transportation or car shortage; or (c) inability on account of any cause beyond the reasonable control of Seller to obtain necessary materials, components, services or facilities. In the event of any such delay, the date of delivery or of performance shall be extended for a period equal to the time lost by reason of the delay.

6. Technical Advice. All technical advice, recommendations and services of Seller are intended for use by persons having adequate skill, at their own risk, and Seller assumes no responsibility, and Buyer hereby waives all claims against Seller, for results obtained or damages incurred from the use of Seller's advice, recommendations and services.

7. Modification. These Terms and Conditions are intended by Seller and Buyer to constitute a final, complete and exclusive expression of agreement and cannot be supplemented or amended without Seller's prior written approval. Seller's waiver of any breach, or failure to enforce any of the Terms and Conditions at any time, shall not in any way affect, limit or waive Seller's right thereafter to enforce and compel strict compliance with every Term and Condition thereof. If any provisions of these Terms and Conditions are held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

8. Disputes. Buyer and Seller shall attempt in good faith promptly to resolve any dispute arising under these Terms and Conditions by negotiations between representatives who have authority to settle the controversy. If unsuccessful, Buyer and Seller shall further attempt in good faith to settle the dispute by nonbinding third-party mediation, with fees and expenses of such mediation apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms hereof. These

procedures are the exclusive procedures for the resolution of all such disputes between the parties. All sales, agreements for sale, offers to sell, proposals, acknowledgments and contracts of sale, including, but not limited to, purchase orders accepted by Seller, shall be considered a contract under the laws of the State of Colorado and the rights and duties of all persons, and the construction and effect of all provisions hereof shall be governed by and construed according to the laws of such state. A state or federal court located within the State of Colorado shall have sole and exclusive jurisdiction over any litigation concerning any such matters as well as any alleged defects of any products or equipment covered thereby or damages sustained as a result of such alleged defects. If any litigation is commenced between Seller and Buyer, or their personal representatives, concerning any provision hereof, the party prevailing in the litigation shall be entitled, in addition to such other relief that is granted, to a reasonable sum as and for their attorneys' fees and costs in such litigation or arbitration.

STONEAGE TRADEMARK LIST

View the list of StoneAge's trademarks and service marks and learn how the trademarks should be used. Use of StoneAge trademarks may be prohibited, unless expressly authorized.

<http://www.StoneAgetools.com/trademark-list/>

STONEAGE PATENT DATA

View the list of StoneAge's current U.S. patent numbers and descriptions.

<http://www.sapatents.com>



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