

BJVE FAMILY

SELF ROTARY SWIVELS USER MANUAL



BJVE-P16
10K (700 bar)

BJVE-P12
15K (1000 bar)

BJVE-MP12
22K (1500 bar)

BJVE-M24
22K (1500 bar)

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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).

Updated manuals can be downloaded at:

<https://www.stoneagetools.com/manuals>

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BJVE Model Specifications

MODEL	BJVE-P16		BJVE-P12		BJVE-M24		BJVE-MP12	
Units	US	Metric	US	Metric	US	Metric	US	Metric
Pressure Range	2-10k psi	140-700 bar	2k-15k psi	140-1000 bar	2k-22k psi	140-1500 bar	2k-22k psi	140-1500 bar
Flow Range	20-200 gpm	76-757 lpm	12-100 gpm	45-380 lpm	12-100 gpm	45-380 lpm	12-100 gpm	45-380 lpm
Swivel Diameter	3 in.	76 mm	3 in.	76 mm	3 in.	76 mm	3 in.	76 mm
Swivel Length	8.8 in.	224 mm	8.8 in.	224 mm	8.8 in.	224 mm	8.8 in.	224 mm
Swivel Weight	8.5 lb	4 kgs	8.5 lbs	4 kgs	8.5 lbs	4 kgs	8.5 lbs	4 kgs
Head Weight	3.3 lbs	1.5 kgs	3.3 lbs	1.5 kgs	3.3 lbs	1.5 kgs	3.3 lbs	1.5 kgs
Maximum Water Temp.	160 °F	70 °C	160 °F	70 °C	160 °F	70 °C	160 °F	70 °C
Flow Coefficient	7.5 Cv		4.6 Cv		4.6 Cv		4.6 Cv	
Inlet Connection	1 NPT		3/4 NPT		M24		3/4 MP	
Port Size	1/4 NPT (P4) 1/2 NPT (P8)		1/4 NPT (P4) 1/2 NPT (P8)		1/4 NPT (P4) G12		1/4 NPT (P4) G12	
Nozzle Types	AP4, APF4, OC8-P8, OC8-P12		AP4, APF4, OC8-P8, OC8-P12		AP4, APF4		AP4, APF4	
Port Plug	GP 025-P4SS GP 025-P8SS		GP 025-P4SS GP 025-P8SS		GP 025-P4SS SA 058-G12		GP 025-P4SS SA 058-G12	

DESCRIPTION OF EQUIPMENT AND INTENDED USE

The **BJVE** tool line is our most versatile line of pipe cleaning tools. They are designed for the widest range of pipe diameters, pressures, flows, and configurations. A variety of head options allows for pulling ring connections, customized porting and multiple jetting options. Different viscous fluid options allow operators the ability to change the speed of rotation for hard or easy applications. This tool has a wide range of centralizer, backout preventers, and automated delivery systems. **BJVE** tools can also be used in tank and stack cleaning applications.

KEY FEATURES

- **Easy Field Service**- High Pressure Seal, Carbide, and Shaft Seat can all be replaced in under 3 minutes with only a hex key and wrench.
- **Multiple jetting configurations**- Same tool can be re-jetted to match a wide variety of cleaning applications. Great for when you need more pulling force or forward hitting power.
- **Streamlined body design**- helps prevent tool from catching inside of pipe.
- **Patented speed control**- has been optimized to deliver consistent rotation speed over broad speed and torque window and temperature range – which means better cleaning under adverse conditions.

WARNING AND SAFETY INSTRUCTIONS

⚠ WARNING

BJVE Models can turn around in large pipes and come back at the operator at a high rate of speed. If cleaning larger pipes, a rigid “stinger” should be used between the hose and the tool. It is recommended that the rigid length of the tool including hose end is 1-½ times the inside diameter of the pipe being cleaned (see below).

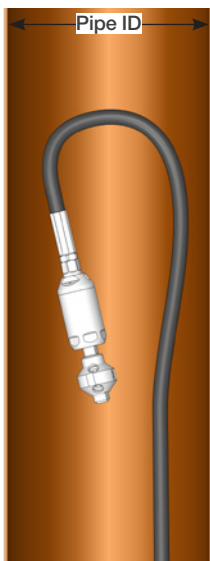
Make sure there is an operator controlled dump in the system, operated by the person closest to the cleaning job. Flush out the high pressure hoses before connecting the BJVE. It is recommended that the hose be marked a few feet from the end with a piece of tape so the operator knows when to stop when retracting the tool. Position the tool in the pipe opening. Close the dump and slowly bring up to pressure the first time to make sure no nozzles are plugged and the jet thrust is correct. The BJVE should begin to slowly rotate. Once operating pressure is reached, feed the tool into the pipe to begin the cleaning job. Allow the jets time to do their work by feeding the hose out at a controlled rate. The StoneAge ABX-500 Hose Control Device can be used to achieve consistent feed rates for pipe cleaning. When the work is complete and the tool is disconnected from the hose, blow out all water to prolong the life of the tool. A small amount of lubricant can be blown into the tool as well as an added measure to maximize tool life.

It is strongly recommended to use a backout prevention device. Please see the “Accessories” section of this manual for a list of backout preventers available through StoneAge Tools.

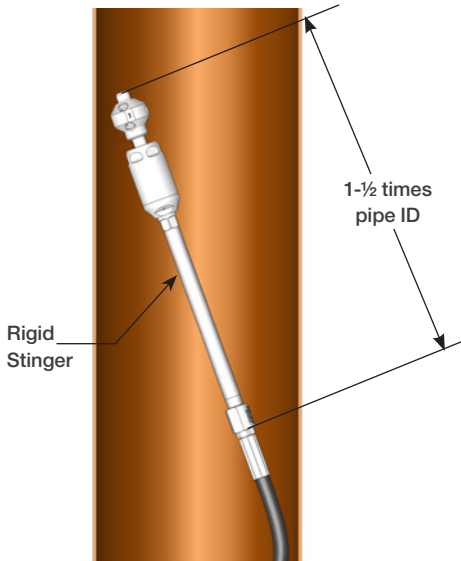
⚠ DANGER

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.



IMPROPER USE:
BJVE will turn around in
large diameter pipe
VERY DANGEROUS!

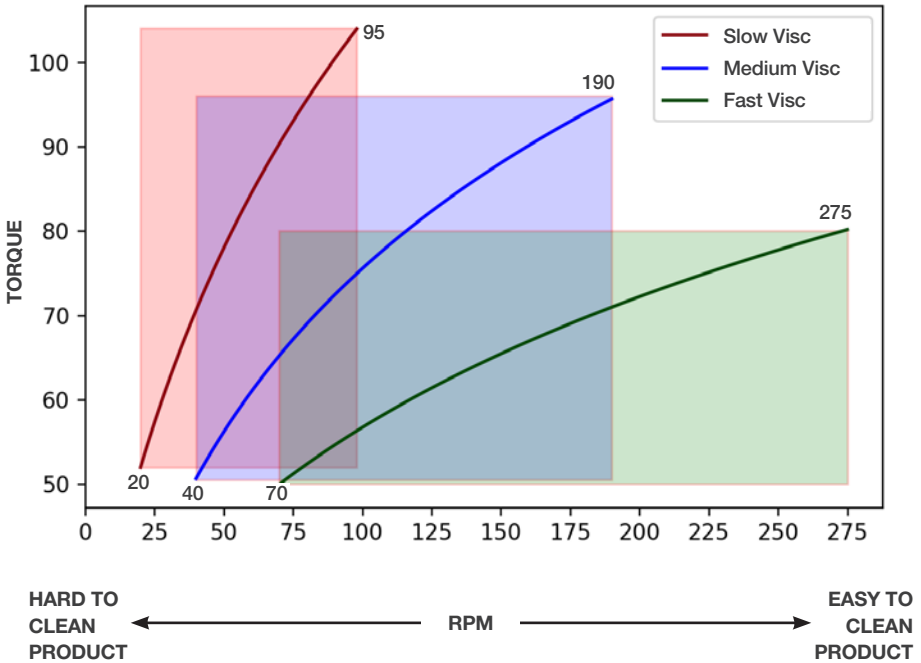


PROPER USE:
BJVE with rigid “stinger”
to prevent turnaround.

SWIVEL VISCIOUS FLUID TYPE INFORMATION

TYPES OF APPLICATIONS FOR VISCOSITY FLUID OPTIONS

All BJVE models come standard with Medium viscosity fluid to cover the most complete range of Torque and RPM values. However, to maximize cleaning efficiency for a wider variety of jobs, StoneAge offers two additional fluid viscosity options. Slower rotation speeds are recommended for hard to clean or plugged pipes, and faster rotation speeds are recommended for flushing, polishing, and/or easy to clean pipes. The chart below indicates general Torque and RPM ranges for Slow, Medium, and Fast viscosity fluids.



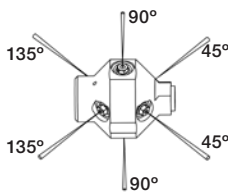
TYPES OF PRODUCT

Target materials will vary greatly in hardness, composition, thickness, and the structures to which they are attached. Materials such as concrete, coke, and mineral scale, have a high level of porosity. Water-blasting finds the path of least resistance and expands natural fractures and air pockets to penetrate behind and effectively remove these materials. On the opposite side of the spectrum are polymer type materials, such as rubber. These materials need to be cut from their substrates due to their lack of porosity. The thickness of a material will dictate tool jetting factors. The quantity and size of the jets are specified for different types of jobs. Thicker materials generally require few jets with larger orifices. Thin materials such as coatings or paint, can be removed more quickly with more jets. Differences in pressure, flow, and RPM can affect the efficiency of the material removal.

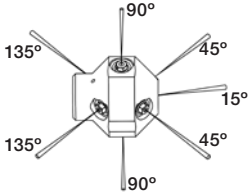
HEAD OPTION INFORMATION

HEAD OPTIONS PER SWIVEL TYPE:

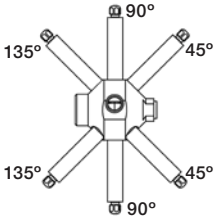
There are four standard head configurations, with custom heads available on request. The correct head specification is based on the pressure and flow of the pump and the required port size. Heads with P8 or G12 ports require extension arms or plugs.



BJ 144-P4-6-Rxx
6-PORT
2 @ 45°
2 @ 90°
2 @ 135°



BJ 144-P4-7-Rxx
7-PORT
1 @ 15°
2 @ 45°
2 @ 90°
2 @ 135°



BJ 145-G12-6-Rxx
or
BJVE 145-P8-6-Rxx
6-PORT
2 @ 45°
2 @ 90°
2 @ 135°

BJVE HEAD OPTIONS PER SWIVEL						
HEAD			BJVE SWIVEL TYPE			
SIZE	DESCRIPTION	PART NUMBER	M24 (15K, 22K)	MP12 (22K)	P12 (10K,15K)	P16 (10K)
3.0" (76 mm) Ø HEADS	(6) ¼ NPT PORTS AP4-XXX NOZZLES	BJ 144-P4-6-R12	✓	✓	✓	✓
		BJ 144-P4-6-R20	✓	✓	✓	✓
		BJ 144-P4-6-R35	✓	✓	✓	✓
		BJ 144-P4-6-R60	✓	✓	✓	✓
	(7) ¼ NPT PORTS AP4-XXX NOZZLES	BJ 144-P4-7-R12	✓	✓	✓	✓
		BJ 144-P4-7-R20	✓	✓	✓	✓
		BJ 144-P4-7-R35	✓	✓	✓	✓
		BJ 144-P4-7-R60	✓	✓	✓	✓
3.5" (89 mm) Ø HEADS	(6) ¾-16 NF PORTS AP4-XXX NOZZLES <i>MUST BE USED WITH G12-P4 EXTENSION ARMS OR G12 PLUGS</i>	BJ 145-G12-R12	✓	✓	—	—
		BJ 145-G12-R20	✓	✓	—	—
		BJ 145-G12-R35	✓	✓	—	—
		BJ 145-G12-R60	✓	✓	—	—
	(6) ½ NPT PORTS AP4-XXX NOZZLES <i>MUST BE USED WITH P8-P4 EXTENSION ARMS OR P8 PLUGS</i>	BJVE 145-P8-R12	—	—	✓	✓
		BJVE 145-P8-R20	—	—	✓	✓
		BJVE 145-P8-R35	—	—	✓	✓
		BJVE 145-P8-R60	—	—	✓	✓

JETTING

The thrust of the jets can be used to pull the tool through a pipe or tube. Little or no pull is needed for cleaning vertically downward, but more pull is needed if cleaning horizontally or climbing upward. The nozzle sizes should be selected based on proportioning the total flow rate between the forward and backward jets to achieve the pulling force needed, but still applying enough power to the material being removed ahead of the tool. For most accurate head and jetting selection, use the StoneAge Jetting App.

<http://jetting.stoneagetools.com>

APPROXIMATIONS OF COMMON JETTING SCENARIOS

BJVE SWIVEL TYPE	PRESSURE		FLOW		HEAD TYPES			
					BJ 144-XX-X-XXX		BJ 145-XX-XXX	BJVE 145-XX-XXX
	kpsi	bar	gpm	lpm	6 x P4 PORTS 3" Ø	7 x P4 PORTS 3" Ø	6 x G12 PORTS 3.5" Ø	6 x P8 PORTS 3.5" Ø
P12 OR P16	5	350	15-35	57-133	P4-6-R60	P4-7-R60	—	P8-R60
			30-50	114-189	P4-6-R35	P4-7-R35	—	P8-R35
			50-100	189-379	P4-6-R20	P4-7-R20	—	P8-R20
			80-170	303-644	P4-6-R12	P4-7-R12	—	P8-R12
P12 OR P16	10	700	15-25	76-113	P4-6-R60	P4-7-R60	—	P8-R60
			20-45	113-189	P4-6-R35	P4-7-R35	—	P8-R35
			35-80	189-379	P4-6-R20	P4-7-R20	—	P8-R20
			55-140	303-606	P4-6-R12	P4-7-R12	—	P8-R12
P12	15	1034	10-20	38-113	P4-6-R60	P4-7-R60	—	P8-R60
			20-40	113-151	P4-6-R35	P4-7-R35	—	P8-R35
			30-70	114-265	P4-6-R20	P4-7-R20	—	P8-R20
			50-120	189-454	P4-6-R12	P4-7-R12	—	P8-R12
MP12 OR M24	22	1517	10-20	38-113	P4-6-R60	P4-7-R60	G12-R60	—
			20-35	113-133	P4-6-R35	P4-7-R35	G12-R35	—
			30-65	114-246	P4-6-R20	P4-7-R20	G12-R20	—
			50-110	189-416	P4-6-R12	P4-7-R12	G12-R12	—

NOZZLES AND PLUGS

BJVE tool heads can be jetted in different configurations depending on the application.

Here are the most commonly used nozzle/plug configurations:

Head Type	15° Ports	45° Ports	90° Ports	135° Ports
6-Port	N/A	2 x Nozzle	2 x Nozzle	2 x Nozzle
		2 x Plug	2 x Nozzle	2 x Nozzle
		2 x Plug	2 x Nozzle	2 x Plug
		2 x Plug	2 x Plug	2 x Nozzle
7-Port	1x Plug	2 x Nozzle	2 x Nozzle	2 x Nozzle
	1 x Nozzle	2 x Plug	2 x Nozzle	2 x Nozzle
	1 x Nozzle	2 x Plug	2 x Nozzle	2 x Plug
	1 x Nozzle	2 x Plug	2 x Plug	2 x Nozzle

OPERATION:

- Make sure there is an operator controlled dump in the system, operated by the person closest to the cleaning job.
- Flush out the high pressure hoses before connecting BJVE to hose end or stinger to eliminate debris.
- It is recommended that the hose be marked a few feet from the end with a piece of tape so the operator knows when to stop on the way back out.
- When cleaning a pipe, a stinger is recommended; a stinger is a rigid piece of pipe or tubing used between the end of the hose and the nozzle. It is typically 2 feet in length, and is primarily a safety device for hand flex lancing. This is illustrated on the "Warning and Safety Instructions" page of this manual.
- Position the BJVE in the pipe while the pressure is being set. The high pressure seal may leak initially; it should stop when pressure is increased and rotation begins.
- Close the dump and slowly bring up to pressure the first time, to make sure no nozzles are plugged and that the jet thrust is correct. The swivel should begin to slowly rotate.
- Once operating pressure is reached, feed the tool into the tube or pipe to begin the cleaning job.
- When using rotating heads in plugged pipes, the BJVE must not be forced into the deposit, as this may stop the rotation of the tool and impede the cutting ability. When the BJVE contacts the deposit, allow it to cut away the material and advance at it's own rate. If it stops advancing, pull back slightly on the hose to pull the head slightly away from the deposit, in case it is being stopped from rotating by the deposit. This also allows the angled jets to attack the deposit at different places.
- When cleaning pipes with scale, it is possible to allow the tool to pass through the pipe at very fast rates; unless the deposit is very hard to remove, this will not completely remove the scale.
- The operator needs to be trained to feed the BJVE through the tube at a rate sufficient to clean the tube.
- Once the work is complete and the BJVE is disconnected from the hose, blow out all water to prolong the life of the tool. A small amount of lubricant can be blown into the inlet nut as well.

LEAKAGE FROM HERE
INDICATES THE HOSE HAS NOT
BEEN PROPERLY CONNECTED

LEAKAGE FROM HERE COULD
INDICATE ANY OF THE FOLLOWING;

- IMPROPER INSTALLATION
- DAMAGED O-RING AND/OR
BACKUP RINGS ON SHAFT



LEAKAGE FROM HERE COULD
INDICATE ANY OF THE FOLLOWING;

- HIGH PRESSURE SEAL NOT
SEATED CORRECTLY
- DAMAGED HIGH PRESSURE SEAL

TROUBLESHOOTING

HIGH-PRESSURE SEALS LEAK	<ul style="list-style-type: none"> -The high pressure seal may leak initially at lower pressures, but should pop closed as pressure is increased. -A continuous leak at operating pressure from the weep holes indicates the need to replace the HP Seal and Seat. -HP Seals wearing out too quickly can be an indication that the cartridge bore is worn, the HP Seat in the seal assembly is installed upside-down, or the tool is over spinning. -Over spinning may be caused by a lack of lubricating fluid, water in the fluid chamber (replace shaft seals), or too much jet torque. Refilling the lubricating fluid during complete overhaul or in cases of contamination is important for proper speed control. -Only use StoneAge recommended lubricating fluids.
SEALS WEAR OUT TOO QUICKLY	<ul style="list-style-type: none"> -The tool must be disassembled and inspected. -Check the carbide seat for correct installation. -Check the carbide seat for any chips or erosion marks on it. -The bore on the Cartridge where the Carbide Seat sits should be inspected. If it is worn to greater than .753"Ø on the P16 model or .628"Ø on the other models, the Cartridge will need to be replaced.
HEAD WILL NOT ROTATE	<ul style="list-style-type: none"> -First try rotating head by hand and see if it feels rough or gritty to turn. -If the tool does not rotate, it must be disassembled and serviced. -If the head starts to rotate but slows down and stops as pressure is increased, it is an indication that the bearings need to be replaced. -If the tool feels okay, check to see if any nozzles are plugged; even if a nozzle is only partially blocked it can keep the head from rotating. Nozzles must be removed from the head to properly clean them. -Check the nozzle sizes and head offset to make sure they are correctly specified. This can be done online at; http://jetting.stoneagetools.com
HEAD SPINS TOO FAST	<ul style="list-style-type: none"> -Check the nozzle sizes and head offset to make sure they are correctly specified. This can be done online at; http://jetting.stoneagetools.com -A significant increase in rotation speed can also mean the speed control mechanism in the tool has lost functionality. This can be a result of fluid loss or fluid contamination. Operation of the tool in this state can cause damage to other components and accelerated wear of the high pressure seal. If this occurs, the first step is to flush the tool with new viscous fluid as shown in the "Lubricant Replacement" instructions in this manual.

TOOL SERVICE INFORMATION

TOOL SERVICE

Product training and proper tools are required to service this nozzle. If you are uncomfortable performing the service, send in or bring the tool to your authorized dealer. StoneAge provides maintenance videos for the BJVE models online.

<https://www.stoneagetools.com/bjv>

The use of a bench vice and an arbor press is recommended. Take care throughout the entire procedure to keep the internals clean and free from grit, lint, and contamination. Failure to do so could result in premature failure after service.

LIST OF TOOLS:

- Bench Vise (recommended)
- Arbor Press (recommended)
- Automotive Sliding Wrench (Crescent® C718 or equivalent)
- Large Adjustable End Wrench
- Medium size flat-head screw driver
- T-Handle Hex Allen, 8mm (10mm for P16)
- 90° Pick
- 1 Inch Socket
- BJVE 612 Tool Kit:
 - WGR 186 HP Seal Puller
 - BJVE 180 Installation Press Tool

LIST OF MATERIALS:

- Clean lint free rags or shop towels
- BJ 048- (F, M, or S) Viscous Fluid
- Anti-Seize - Swagelok® Blue Goop® StoneAge PN (GP 043)
- Grease - Chevron Multifak® EP1 StoneAge PN (GP 049)

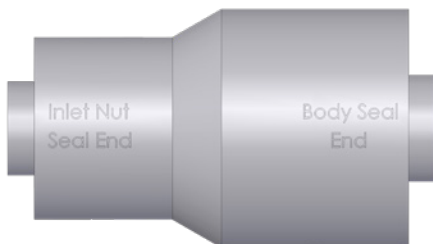
*Multifak® is a registered trademark of Chevron® Corporation.
Blue Goop® is a registered trademark of Swagelok® Company*

BJVE 612

TOOL KIT (INCLUDES)



WGR 186
HP Seal Puller



BJVE 180
Installation Press Tube

TO REPLACE THE HIGH PRESSURE SEAL:

1. Clamp the flats of the Inlet Nut Cartridge down in a bench vise with the Shaft end facing up.
2. Grab the flats on the Inlet Nut with a large Adjustable End Wrench and rotate the Body off in a counter-clockwise direction.
DO NOT USE THE FLATS ON THE BODY TO REMOVE AS IT WILL SEPARATE THE BODY FROM THE INLET NUT.
3. Remove the Carbide Seat and High Pressure Seal from inside the Inlet Nut Cartridge with the WGR 186 Seal Puller tool. It's possible that the Carbide might still be adhered to the inside of the Inlet Nut.
4. Inspect the Carbide Seat and Seal surface for chips or erosion and replace if damaged.
5. Apply grease to the O-Ring on a new High Pressure Seal and press it into the Inlet Cartridge with the O-Ring Side down. Press it in until the top of the Seal is approximately 1/16" below the bottom of the chamfer.
6. Apply grease to the flat face of the Carbide Seat and install with this flat face against the top of the H.P. Seal.
7. Apply Anti-seize to the threads of the Inlet Nut Cartridge.
8. Screw the Body Assembly back onto the Inlet Nut Cartridge and tighten the Body by the flats of the Inlet Nut with a Large Adjustable End wrench.

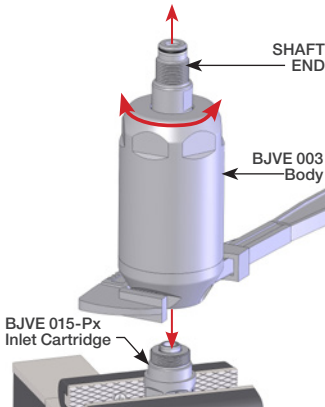


Figure 1: For Steps 1-2 and 8

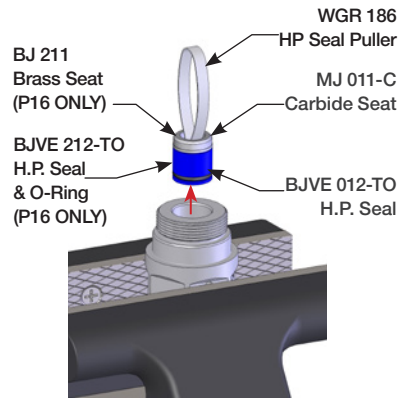


Figure 2: For Step 3

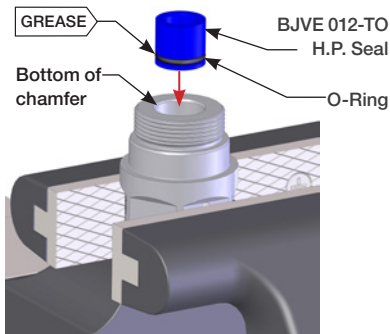


Figure 3: For Step 5

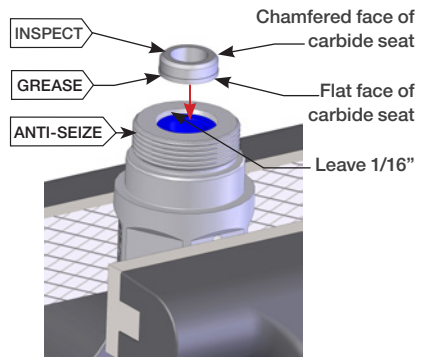


Figure 4: For Steps 6-7

DISASSEMBLY

1. Remove the Head by clamping it in a vise with the Inlet Nut facing up.
2. Use an adjustable wrench on the flats of the Shaft to loosen the Swivel from the Head. Unscrew the body from the head by hand.

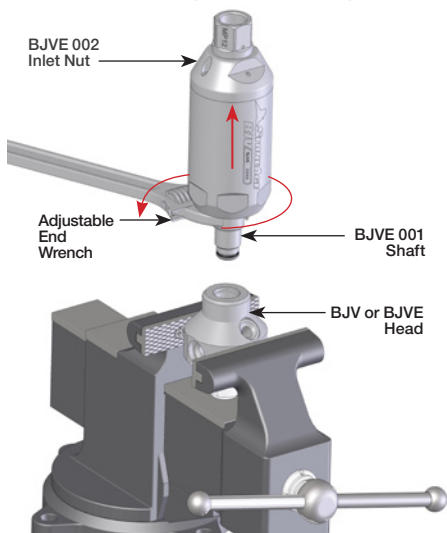


Figure 6: For Steps 1-2

3. Clamp the flats of the Inlet Nut Cartridge down in a bench vise with the Shaft end facing up.
4. Use an Automotive Sliding Wrench on the flats of the Inlet Nut and rotate the Body off of the Inlet Nut Cartridge in a counter-clockwise direction. Use caution not to lose the Carbide Seat on the Shaft.

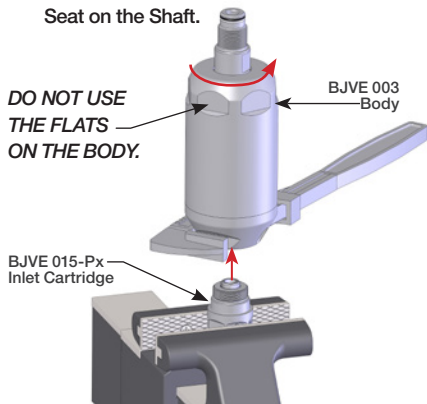


Figure 7: For Steps 3-4

5. Remove the Carbide Seat and High Pressure Seal and from inside the Inlet Nut Cartridge with the WGR 186 Seal Puller tool.

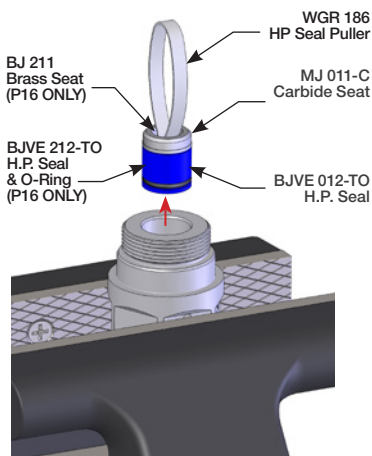


Figure 7: For Step 5

6. If the Carbide Seat is not on top of the High Pressure Seal after the Body is removed, pop it out from inside the Inlet Nut. Inspect the Carbide Seat and seal surface for chips or erosion and replace if damaged.

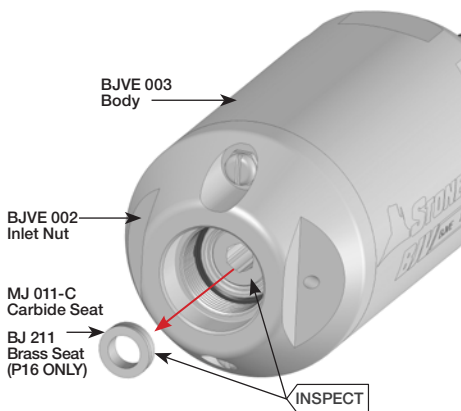


Figure 8: For Step 6

- Keep the Shaft from rotating with an Adjustable End Wrench. Remove the Seat Face Assembly with a Hex wrench.

All models are 8mm except P16 which is 10mm.

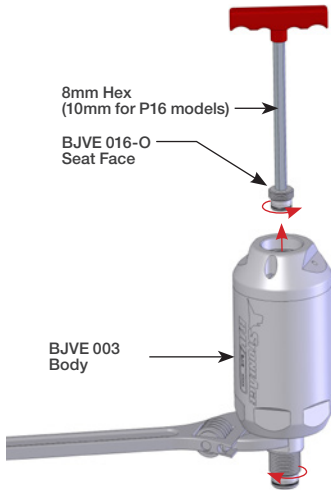


Figure 9: For Step 7

NOTICE

DO NOT clamp the Body down in vise too tightly. It is extremely important not to ovalize the Body. This can cause the shaft to gall against the Body and premature failure of the tool.

- Remove the Inlet Nut Assembly from the Body with an Automotive Sliding Wrench.

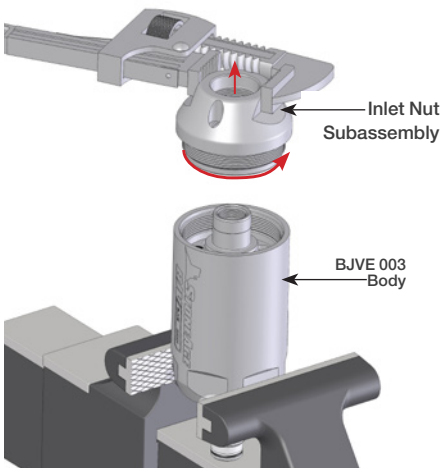


Figure 10: For Step 8

- Remove the Body from the vise and flip it over a tub or an area where the viscous fluid can drain out.

- The Shaft will slip out of the Body.

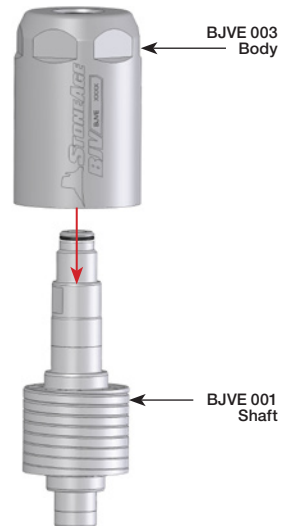


Figure 11: For Steps 9-10

- Use a small 90° pick to remove the Shaft Seal from inside the Body.

- The Bearing should slide freely and can be removed by hand.

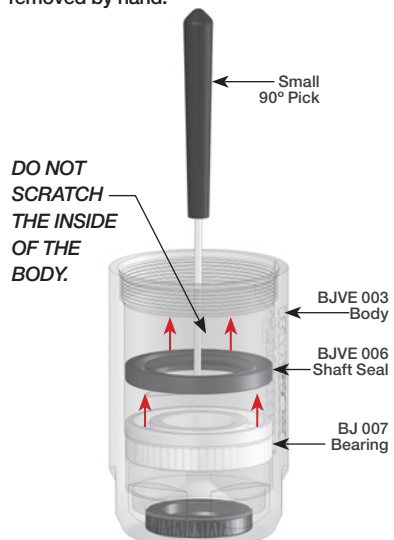


Figure 12: For Steps 11-12

- Place the back of the Body on a flat surface and push the remaining Shaft Seal out with a medium size flat-head screw driver. This seal will be destroyed during removal and must be replaced.

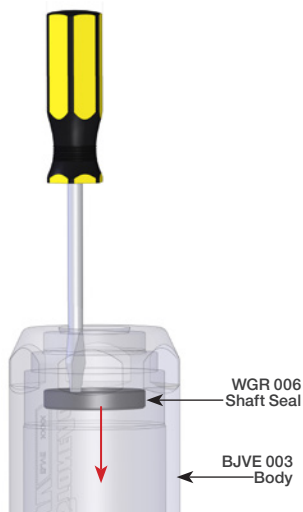


Figure 13: For Step 13

- Pry the Shaft Seal from the Inlet Nut Assembly with a medium size flat-head screw driver.

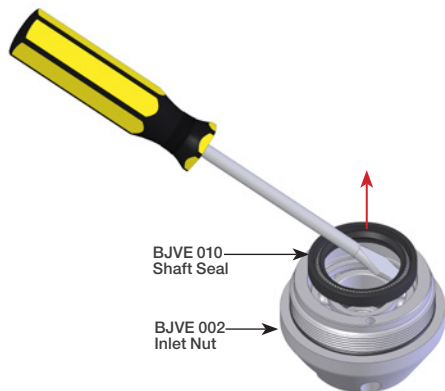


Figure 14: For Step 14

- Remove the Bearing and Wave Spring by hand.
- Remove the external O-Ring from the Inlet Nut with a small pick.



Figure 15: For Steps 15-16

- Pry the WHR Seal from the bottom of the Inlet Nut with a medium size flat-head screw driver. This seal will be destroyed during removal and must be replaced.



Figure 16: For Step 17

NOTICE

Before Assembling the BJEV, wash all appropriate parts in solvent and blow dry and wipe clean with a lint free towel. Always use the new replacement parts from our service kits. See the "Service Kit" section of this manual for a list of available replacement parts.

ASSEMBLY

GREASE = Chevron Multifak® EP1 Tan

ANTI-SEIZE = Swagelock® Blue Goop or *Equal*

1. Press the Shaft Seal, Lip Spring side down, into the bottom of the Body. It is helpful to use a socket and an Arbor Press to tap the Seal evenly into place.

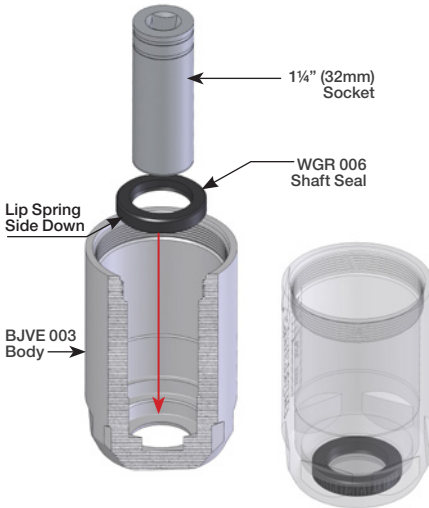


Figure 17: For Step 1

2. Pack the Bearing with grease and Slide it, wide race side down into the Body. The Bearing is slip fit and should not need pressing. There will be a gap between the previously installed Shaft Seal and the Bearing.

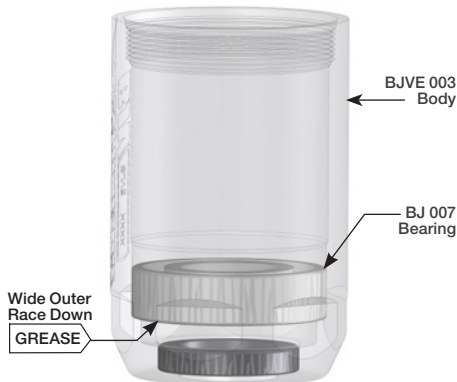


Figure 18: For Step 2

3. Install the Shaft Seal, Lip Spring side up, on top of the Bearing with the Seal Press Tool. Pack grease in the gap between the Bearing and the smaller shaft seal and the inside diameter of the larger Shaft Seal.



Figure 19: For Step 3

4. Press the Shaft Seal, Lip Spring side down, into the bottom of the Inlet Nut. It is helpful to use a socket and an Arbor Press to tap the Seal evenly into place.

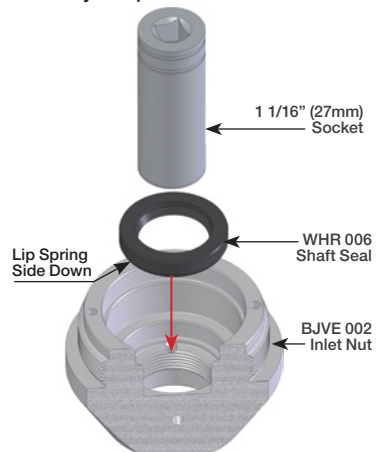


Figure 20: For Step 4

5. Install O-Ring around the outside of the threads on the Inlet Nut.
6. Pack the Bearing with grease.
7. Insert the Wave Spring, Bearing, and Shaft Seal into the Inlet Nut. Use the Inlet Nut end of the Press Tool to install the Shaft Seal.

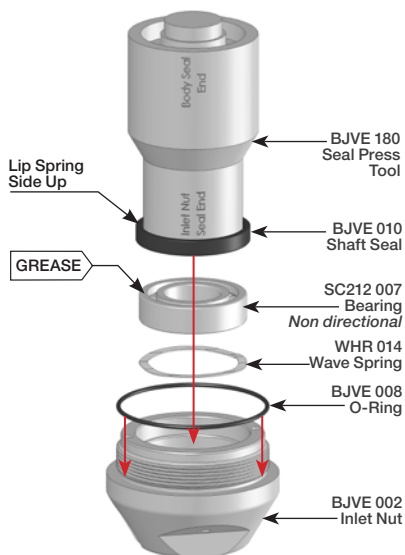


Figure 21: For Steps 5-7

8. Install the Backup Ring and O-Ring onto the end of the Shaft.

NOTICE

Never remove the Retaining Ring or Pistons from the Shaft Assembly.

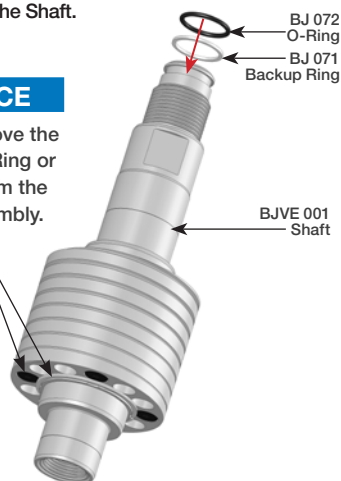
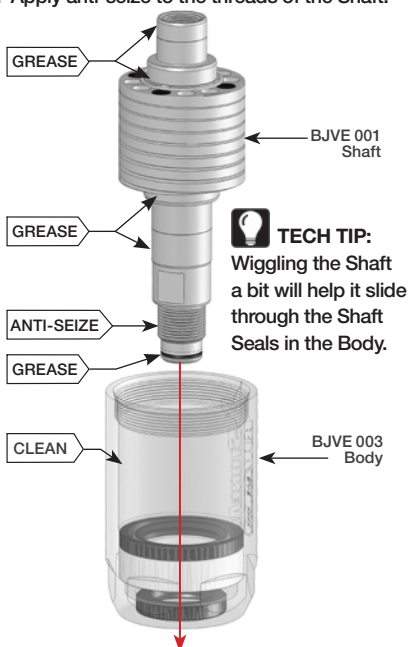


Figure 22: For Step 8

9. Clean the inside of the body thoroughly with a lint free towel.
10. Put a *thin film* of grease on all the Shaft surfaces on the Shaft before inserting it into the Body.
11. Apply anti-seize to the threads of the Shaft.



TECH TIP:
Wiggling the Shaft a bit will help it slide through the Shaft Seals in the Body.

Figure 23: For Steps 9-11

12. Carefully clamp the flats of the Body on one side of the Vise. The Shaft end needs to be accessible in order to twist it during the Viscous fluid fill.

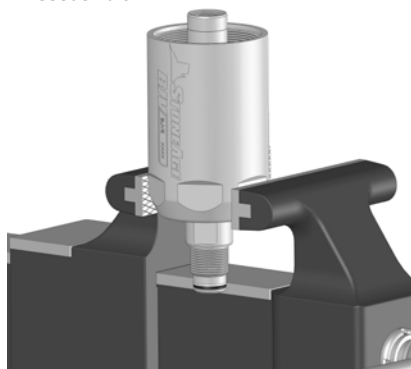


Figure 24: For Step 12

- Fill the Body with Viscous Fluid up to the top taper just below the threads of the Body.

⚠️ This fluid level height is critical.

- Keep rotating the Shaft slowly in a Counterclockwise direction to work the visc into the tool.



TECH TIP:

The viscosity of the fluid is very thick and can take a while to sink down into the tool. Air bubbles may rise between the Shaft and Body

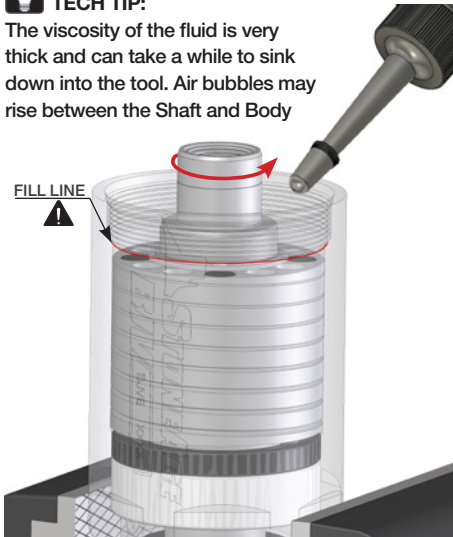


Figure 25: For Steps 13-14

- Remove the Port Screw that does not have the bushing nut underneath it before installing on the Body. DO NOT remove that Port Plug.

NOTICE

Never remove the Port Plug with the Bushing.

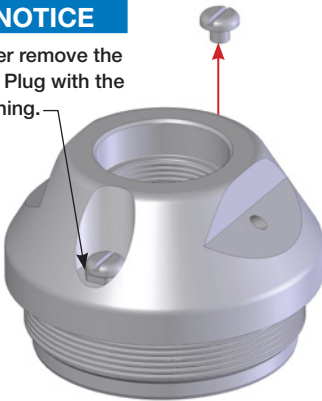


Figure 26: For Step 15

- Apply Anti-Seize to the Inlet Nut threads and wipe off any residual lubricants from the seal side.
- Install the Inlet Nut Assembly slowly by hand onto the Body. Visc will ooze out of the Port. If no viscous fluid comes out, then more needs to be added to the Body. Return to Step 13.
- Tighten fully with an Automotive Sliding Wrench and reinstall the Port Screw. Leave the assembly in the Vise.

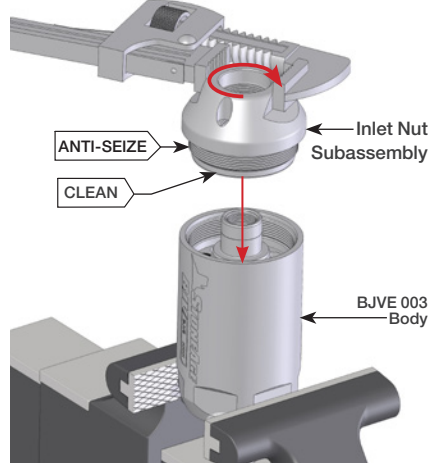


Figure 27: For Steps 16-18

- Before installing the Seat Face assembly into the Shaft, inspect the Backup Ring, O-Ring, and Seat face surface. Replace any or all damaged parts.
- Install the Backup Ring on the Seat Face and then the O-Ring.
- Grease the O-Ring but make sure the Seal Surface is clean before installing into the Shaft.

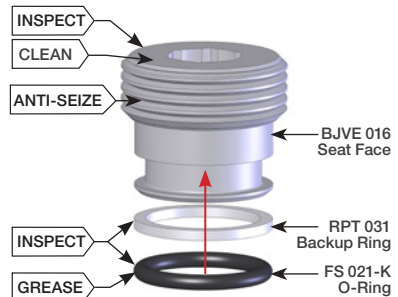


Figure 28: For Steps 19-21

22. Carefully insert a T-Handle Hex Wrench all the way into the Seat Face Assembly.

All models are 8mm except P16 which is 10mm

23. Apply Anti-Seize to the threads on the Seat Face.
24. Install the Seat Face Assembly with a Hex wrench. Remove the Assembly from the Vise.

NOTICE

It is extremely important that there is no damage to this seal face



Figure 29: For Steps 22-24

25. Clamp the flats on the Inlet Cartridge in the vise with the Seal Bore facing up.

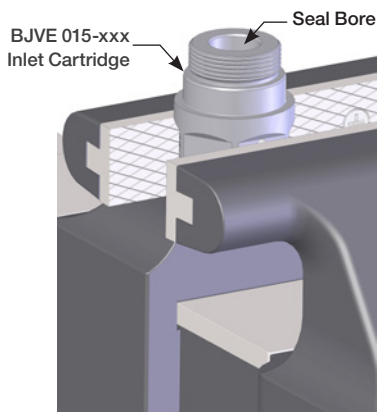


Figure 30: For Step 25

26. Apply grease to the O-Ring on a new High Pressure Seal and press it into the Inlet Cartridge with the O-Ring Side down. Press it in until the top of the Seal is approximately 1/16" below the bottom of the chamfer.

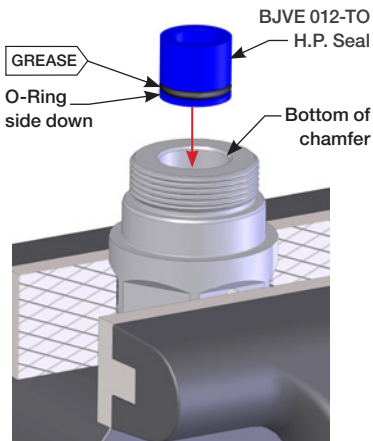


Figure 31: For Step 26

27. Apply grease to the flat face of the Carbide Seat and install with this flat face against the top of the H.P. Seal.
28. Apply Anti-seize to the threads of the Inlet Nut Cartridge.

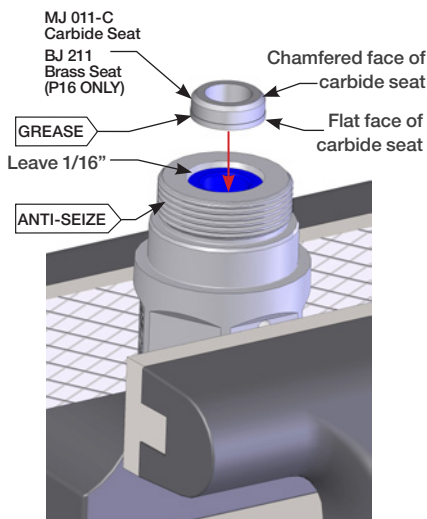


Figure 32: For Steps 27-28

29. Screw the Body assembly onto the Inlet Nut Cartridge by hand first, then tighten all the way with and Automotive Sliding Wrench.

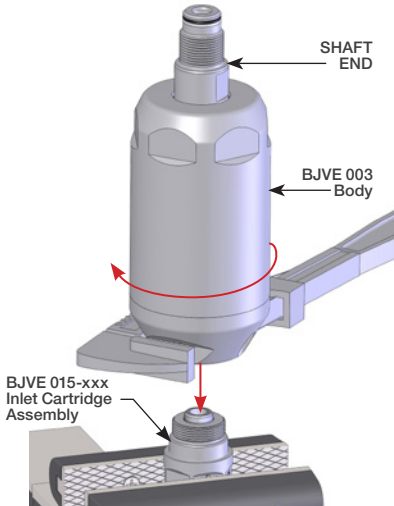


Figure 33: For Step 29

30. Clamp the flats of the Head in a vise with the threaded inlet facing up.
31. Screw the Shaft into the head by hand. Use an adjustable wrench on the flats of the Shaft to tighten the Swivel to the Head.

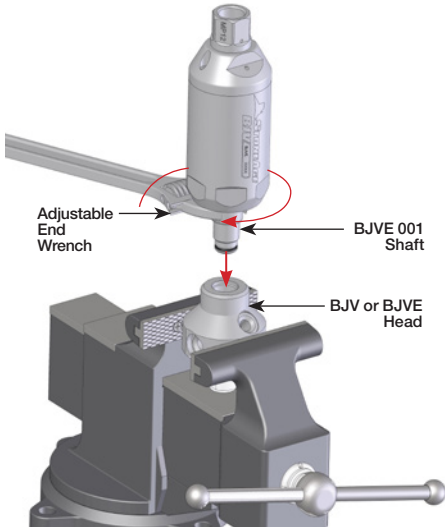


Figure 34: For Steps 30-31



Completed Assembly

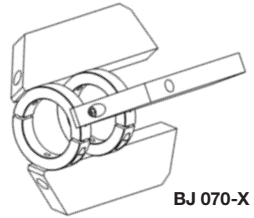
KITS		PART NUMBER OVERVIEW	
BJVE 602 SEAL KIT (P12, MP12, M24)		<div>APF4-XXX or AP4-XXX Nozzles</div> <div>BJ 144-XX, BJ 145-XX, or BJVE 145-XX Head</div> <div>BJ 145-XX and BJVE 145-XX Heads Must be used with Extension Arms or Plugs</div> <div>BJVE 003 Body</div> <div>WGR 006 Shaft Seal</div> <div>BJ 007 Bearing</div> <div>BJVE 006 Shaft Seal</div> <div>BJ 072 O-Ring</div> <div>BJ 071 Backup O-Ring</div> <div>BJVE 001 Shaft</div> <div>BJVE 016 or BJVE 016-HF-O Seat Face</div>	
1 BJVE 012-TO HP Seal 1 MJ 011-C Carbide Seat 1 BJ 071 Backup Ring 1 BJ 072 O-Ring			
BJVE 603 SEAL KIT (P16 ONLY)			
1 BJVE 212-TO HP Seal 1 BJ 211 Brass Seat 1 BJ 071 Backup Ring 1 BJ 072 O-Ring			
BJVE 604-XXX SEAL OVERHAUL KIT (P12, MP12, M24)		<div>SC212 007 Bearing</div> <div>WHR 014 Wave Spring</div> <div>BJVE 010 Shaft Seal</div> <div>WHR 006 Shaft Seal</div> <div>BJVE 008 O-Ring</div> <div>BJVE 002 Inlet Nut</div> <div>BJ 211 Brass Seat (P16 ONLY)</div> <div>BJVE 026 Port Screw</div> <div>MJ 011-C Carbide Seat</div> <div>BJVE 012-TO H.P. Seal & O-Ring (P16 ONLY)</div> <div>BJVE 015-XXXX Inlet Nut Cartridge</div>	
1 BJVE 012-TO HP Seal 1 MJ 011-C Carbide Seat 1 BJ 071 Backup Ring 1 BJ 072 O-Ring 1 BJVE 016-O Shaft Seal 1 BJVE 015-XXX Inlet Nut Cartridge			
BJVE 605 SEAL OVERHAUL KIT (P16 ONLY)			
1 BJVE 212-TO HP Seal 1 BJ 211 Brass Seat 1 BJ 071 Backup Ring 1 BJ 072 O-Ring 1 BJVE 016-HF-O High Flow Shaft Seat 1 BJVE 015-P16 Inlet Nut Cartridge			
BJVE 610 SWIVEL OVERHAUL KIT (ALL MODELS)			
1 BJ 007 Front Bearing 1 SC212 007 Rear Bearing 1 WGR 006 Front-Outer Shaft Seal 1 BJVE 006 Front-Inner Shaft Seal 1 BJVE 010 Rear-Inner Shaft Seal 1 WHR 006 Rear-Outer Shaft Seal 1 BJ 008 O-Ring, Inlet Nut 1 BJ 071 Backup O-Ring 1 BJ 072 O-Ring 2 BJVE 026 Port Plugs 1 WHR 014 Wave Spring 1 BJ 048-M Medium Visc - 6 oz 1 GP 043 Blue Goop 2 oz 1 GP 049.1 GP 049.1 Syringe, .68oz 1 GP 049.2 Cap, Syringe, Lock Cap			
BJVE 612 TOOL KIT (ALL MODELS)			
1 WGR 186 HP Seal Puller 1 BJVE 180 Installation Press Tool			

CENTRALIZER OPTIONS

A centralizer helps to protect the tool as it passes through the pipe and balances jet standoff distance for more consistent cleaning. In cases where pipe size is more than 1.5 times the diameter of the tool, a centralizer is an important safety device, preventing the tool from turning around and thrusting backwards out of the pipe.

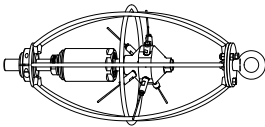
Two types of centralizers are available for BJVE tools

CENTRALIZER WITH SKIDS AND COLLARS						
Pipe Size		Centralizer (Complete)	Weight		Collar*	Skid**
inches	mm		lbs	kgs		
6	152	BJ 070-6	3.8	0.9	BJ 070.2	BJ 070.1-6
8	203	BJ 070-8	4.8	1.0	BJ 070.2	BJ 070.1-8
10	254	BJ 070-10	6.2	3.0	BJ 070.2	BJ 070.1-10
12	305	BJ 070-12	4.0	1.8	BJ 070.2	BJ 070.1-12



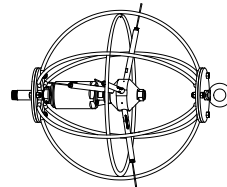
BJ 070-X

*Set of 2 collars **Set of 3 skids with 6 screws



BJ 408-MP12/H9
BJ 408-P12/M24

CAGE
CENTRALIZERS



BJ 100-SS AND BJ 100-SS-MP

Require a custom collar to
function on the BJVE inlet Nuts.

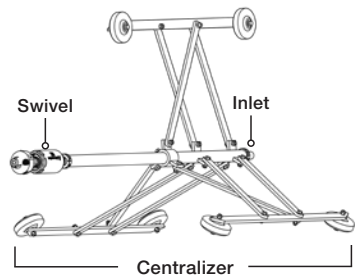
CAGE CENTRALIZERS										
Part ID	BJVE Swivel	Required Inlet Extension*	Maximum Extension		Diameter		Length		Weight	
			inch	mm	inch	mm	inch	mm	lbs	kgs
BJ 408-MP12	MP12	N/A	3	76	12	300	20	510	10	4.5
BJ 408-P12/M24*	P12	SA 366-P12P12-6 (3/4 NPT Male)	3	76	12	300	20	510	10	4.5
	M24	SA 368-M24M24-6 (M24 Male)								
BJ 100-SS	P12	N/A	6	152	20	510	24	610	11	5.0
BJ 100-SS-MP	P16 MP12 M24									

*Requires specified extension nipple on the inlet

ACCESSORIES

6-WHEEL CENTRALIZER

6-wheel BJV centralizers utilize a scissor style aluminum frame for diameter adjustment. These centralizers come in three sizes – Small, Medium, and Large – and are suitable for straight pipes as large as 5 feet (1.5 m). Larger custom sizes are available.

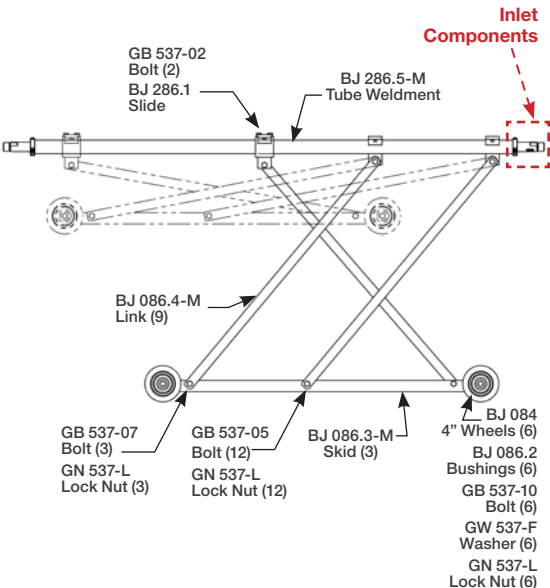


BJVE Swivel	Thread Size	Ø RANGE		Centralizer	Weight	
		inch	mm		lbs	kgs
P12	3/4 NPT Male x 3/4 NPT Male	9–18	230–460	BJ 286-S-P12	22	10
		13–40	330–1000	BJ 286-M-P12	34	15
		16–60	410–1500	BJ 286-L-P12	45	20
M24	M24 Male x M24 Female	9–18	230–460	BJ 286-S-M24	22	10
		13–40	330–1000	BJ 286-M-M24	34	15
		16–60	410–1500	BJ 286-L-M24	45	20
MP12	3/4 MP Male x 3/4 MP Male	9–18	230–460	BJ 286-S-MP12	20	9
		13–40	330–1000	BJ 286-M-MP12	32	15
		16–60	410–1500	BJ 286-L-MP12	40	18

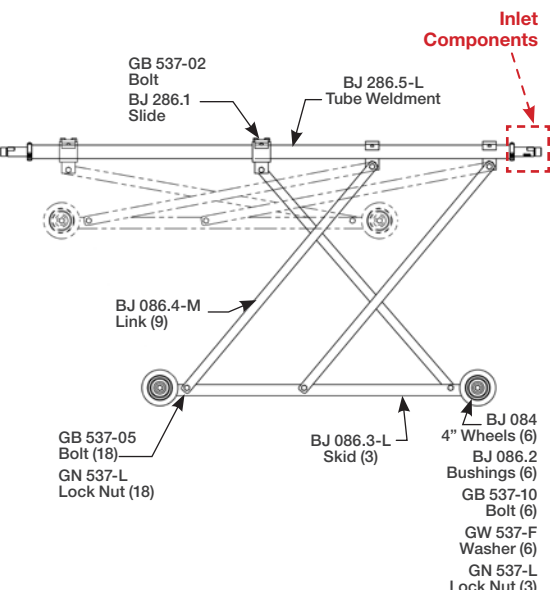
SMALL (BJ 286-S) 6-WHEEL CENTRALIZER COMPONENT PARTS

Centralizer Components	Inlet Size	Inlet Components
<p>GB 537-02 Bolt BJ 286.1 Slide BJ 286.5-S Tube Weldment BJ 086.4-M Link (9) GB 537-07 Bolt (3) GN 537-L Lock Nut (3) GB 537-05 Bolt (3) GN 537-L Lock Nut (12) BJ 086.3-S Skid (3) 3" Wheels (6) BJ 086.2 Bushings (6) GB 537-10 Bolt (6) GW 537-F Washer (6) GN 537-L Lock Nut (3)</p>	P12	SA 366-P12P12-30 Nipple (1) GC-SP-17-F Collar (2)
	MP12	SA 577-MP12LMP12L-32 Nipple (1) GC-SP-12-F Collar (2) GP 086-1218 Bushing (2) AF 071-MP12 Collar (2) AF 072-MP12 Antivibe gland (2)
	M24	SA 368-M24M24-30 Nipple (1) GP252 M24M24 Coupler (1) M24x1.5 1800 bar GC-SP-17-F Collar (2)

MEDIUM (BJ 286-M) 6-WHEEL CENTRALIZER COMPONENT PARTS

Centralizer Components	Inlet Size	Inlet Components
 <p>Inlet Components</p> <p>GB 537-02 Bolt (2) BJ 286.1 Slide BJ 286.5-M Tube Weldment BJ 086.4-M Link (9) GB 537-07 Bolt (3) GN 537-L Lock Nut (3) GB 537-05 Bolt (12) GN 537-L Lock Nut (12) BJ 086.3-M Skid (3) 4" Wheels (6) BJ 086.2 Bushings (6) GB 537-10 Bolt (6) GW 537-F Washer (6) GN 537-L Lock Nut (6)</p>	P12	<p>SA 366-P12P12-44 Nipple (1) GC-SP-17-F Collar (2)</p>
	MP12	<p>SA 577-MP12LMP12L-48 Nipple (1) GC-SP-12-F Collar (2) GP 086-1218 Bushing (2) AF 071-MP12 Collar (2) AF 072-MP12 Antivibe gland (2)</p>
	M24	<p>SA 368-M24M24-48 Nipple (1) GP252 M24M24 Coupler (1) GC-SP-17-F Collar (2)</p>

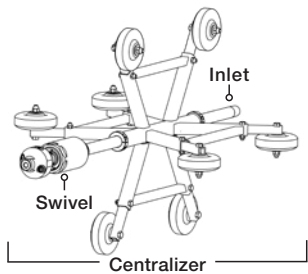
LARGE (BJ 286-L) 6-WHEEL CENTRALIZER COMPONENT PARTS

Centralizer Components	Inlet Size	Inlet Components
 <p>Inlet Components</p> <p>GB 537-02 Bolt BJ 286.1 Slide BJ 286.5-L Tube Weldment BJ 086.4-M Link (9) GB 537-05 Bolt (18) GN 537-L Lock Nut (18) BJ 086.3-L Skid (3) 4" Wheels (6) BJ 086.2 Bushings (6) GB 537-10 Bolt (6) GW 537-F Washer (6) GN 537-L Lock Nut (3)</p>	P12	<p>SA 366-P12P12-60 Nipple (1) GC-SP-17-F Collar (2)</p>
	MP12	<p>SA 577-MP12LMP12L-60 Nipple (1) GC-SP-12-F Collar (2) GP 086-1218 Bushing (2) AF 071-MP12 Collar (2) AF 072-MP12 Antivibe gland (2)</p>
	M24	<p>SA 368-M24M24-60 Nipple (1) GP252 M24M24 Coupler (1) GC-SP-17-F Collar (2)</p>

ACCESSORIES

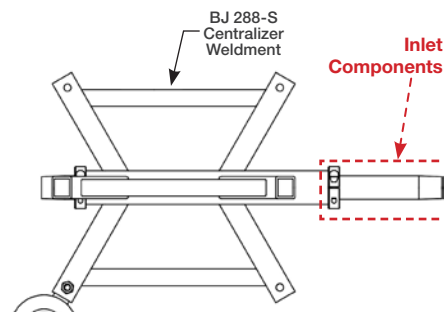
8-WHEEL CENTRALIZER

8-wheel BJV centralizers are suitable for pipes with bends as well as straight pipes. These centralizers come in three sizes — Small, Medium, and Large, and feature telescopic steel legs for fine-tuning diameter adjustment.

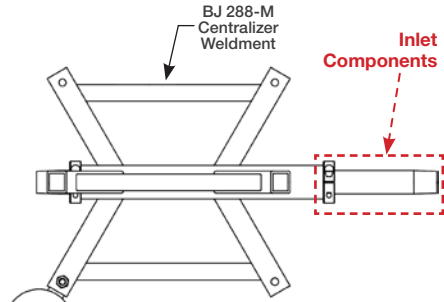
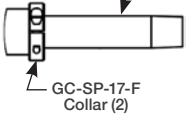
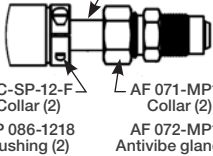
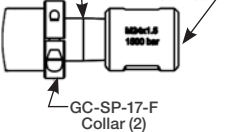


BJVE Swivel	Thread Size	Ø RANGE		Centralizer	Weight	
		inch	mm		lbs	kgs
P12	3/4 NPT Male x 3/4 NPT Male	16-21	410-530	BJ 288-S-P12	19	9
		22-29	560-740	BJ 288-M-P12	27	12
		30-37	770-940	BJ 288-L-P12	36	16
M24	M24 Male x M24 Female	16-21	410-530	BJ 288-S-M24	20	9
		22-29	560-740	BJ 288-M-M24	28	13
		30-37	770-940	BJ 288-L-M24	37	17
MP12	3/4 MP Male x 3/4 MP Male	16-21	410-530	BJ 288-S-MP12	18	8
		22-29	560-740	BJ 288-M-MP12	25	11
		30-37	770-940	BJ 288-L-MP12	28	13
P16	1" NPT MALE x 1" NPT	22-29	560-740	BJ 288-M-P16	28	13

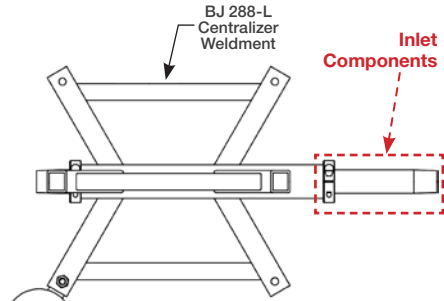
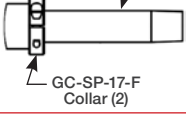
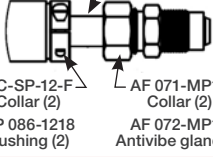
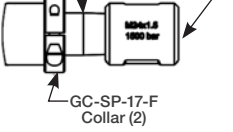
SMALL (BJ 288-S) 8-WHEEL CENTRALIZER COMPONENT PARTS

Centralizer Components	Inlet Size	Inlet Components
 BJ 288-S Centralizer Weldment BJ 288.1-S Wheel Tube (8) BJ 083 Wheel (8) BJ 086.2 Bushing (8) GB 537-12 Screw (8) GW 537-F Washer (8) GN 537-L Nut (8) GB 531-06 Screw (8) GN 531-L Nut (8)	P12	SA 366-P12P12-18 Nipple (1) GC-SP-17-F Collar (2)
	MP12	SA 577-MP12LMP12L-19 Nipple (1) GC-SP-12-F Collar (2) GP 086-1218 Bushing (2) AF 071-MP12 Collar (2) AF 072-MP12 Antivibe gland (2)
	M24	SA 368-M24M24-18 Nipple (1) GP252 M24M24 Coupler (1) GC-SP-17-F Collar (2)

MEDIUM (BJ 288-M) 8-WHEEL CENTRALIZER COMPONENT PARTS

Centralizer Components	Inlet Size	Inlet Components
 <p>BJ 288-M Centralizer Weldment</p> <p>Inlet Components</p> <p>BJ 288.1-M Wheel Tube (8) BJ 084 Wheel (8) BJ 086.2 Bushing (8) GB 537-12 Screw (8) GW 537-F Washer (8) GN 537-L Nut (8) GB 531-06 Screw (8) GN 531-L Nut (8)</p>	P12	<p>SA 366-P12P12-30 Nipple (1)</p>  <p>GC-SP-17-F Collar (2)</p>
	MP12	<p>SA 577-MP12LMP12L-32 Nipple (1)</p>  <p>GC-SP-12-F Collar (2) AF 071-MP12 Collar (2) GP 086-1218 Bushing (2) AF 072-MP12 Antivibe gland (2)</p>
	M24	<p>SA 368-M24M24-30 Nipple (1)</p>  <p>GP252 M24M24 Coupler (1) GC-SP-17-F Collar (2)</p>

LARGE (BJ 288-L) 8-WHEEL CENTRALIZER COMPONENT PARTS

Centralizer Components	Inlet Size	Inlet Components
 <p>BJ 288-L Centralizer Weldment</p> <p>Inlet Components</p> <p>BJ 288.1-L Wheel Tube (8) BJ 084 Wheel (8) BJ 086.2 Bushing (8) GB 537-12 Screw (8) GW 537-F Washer (8) GN 537-L Nut (8) GB 531-06 Screw (8) GN 531-L Nut (8)</p>	P12	<p>SA 366-P12P12-30 Nipple (1)</p>  <p>GC-SP-17-F Collar (2)</p>
	MP12	<p>SA 577-MP12LMP12L-32 Nipple (1)</p>  <p>GC-SP-12-F Collar (2) AF 071-MP12 Collar (2) GP 086-1218 Bushing (2) AF 072-MP12 Antivibe gland (2)</p>
	M24	<p>SA 368-M24M24-30 Nipple (1)</p>  <p>GP252 M24M24 Coupler (1) GC-SP-17-F Collar (2)</p>

ACCESSORIES

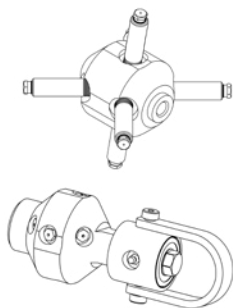
EXTENSION NIPPLES

Extension nipples are available for use with all BJVE tools. See *Nozzles and Extensions* for a complete list of extension options.

A pulling ring is available for 6-port and 8-port BJV heads.

PULLING RING

Description	Part ID	Weight
Pulling ring for 6-port or 8-port BJV head	HC 090	2.0 lb 0.9 kg



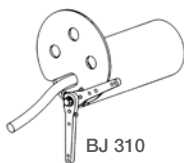
SAFETY OPTIONS

Backout preventers increase operator safety by keeping the tool from backing out of the pipe. Several options are available including fixtures for small diameter pipes, pipes with various flange bolt circle diameters, and adapters for pipes with no-flange entry.

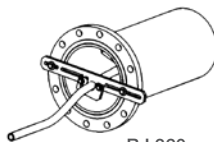
BACKOUT PREVENTERS

Pipe Size		Hose OD		Backout Preventer	Description	Weight	
inch	mm	inch	mm			lbs	kgs
4-8	100-200	0.3-1.5	8-38	BJ 310	Backout preventer for small to medium pipes	7.6	3.4
5-17	130-430	0.3-1.5	8-38	BJ 320	Backout preventer for medium to large pipes	6.3	2.9
15-36	380-910	N/A		BJ 325	Extension kit for BJ 320 backout preventer	8.5	3.6
8-36	130-910	N/A		BJ 340	No-flange kit for BJ 320 backout preventer	17	7.7

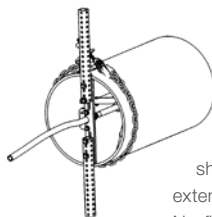
*Securing device not supplied



BJ 310



BJ 320



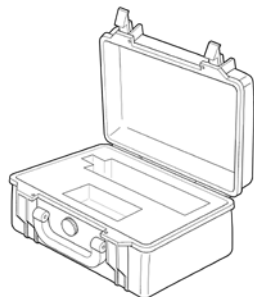
BJ 320
shown with BJ 325
extension kit and BJ 340
No-flange attachment kit

STORAGE

A Pelican™ brand protection/carrying case with custom cut foam insert is available for BJVE tool models.

CARRYING CASE

Exterior Dimensions (L x W x D)	Interior Dimensions (L x W x D)	Color	Case Part ID
17.5 x 11.7 x 7.1 in. 44.5 x 29.7 x 18.0 cm	16.9 x 10.0 x 6.5 in. 42.9 x 25.4 x 16.5 cm	Black	BJ 080



TERMS AND CONDITIONS AND WARRANTY INFORMATION

BJV-P16, BJV-P12, BJV-M24, BJV-MP12

1. Acceptance of Terms and Conditions. Receipt of these Terms and Conditions of Sale ("Terms and Conditions") shall operate as the acceptance by StoneAge, Inc. ("Seller") of the order submitted by the purchaser ("Buyer"). Such acceptance is made expressly conditional on assent by Buyer to these Terms and Conditions. Such assent shall be deemed to have been given unless written notice of objection to any of these 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 Buyer with prompt and efficient service. However, to individually negotiate the terms of each sales contract would substantially impair Seller's ability to provide such service. Accordingly, the product(s) furnished by Seller are sold only according to the terms and conditions stated herein and with the terms and conditions stated in any effective StoneAge Dealer Agreement or StoneAge Reseller Agreement, if applicable. Notwithstanding any terms and conditions on Buyer's order, Seller's performance of any contract is expressly made conditional on Buyer's agreement to these Terms and Conditions 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.

2. Payment/Prices. Unless other arrangements have been made in writing between Seller and Buyer, payment for the product(s) shall be made upon receipt of invoice. The prices shown on the face hereof are those currently in effect. Prices invoiced shall be per pricelist 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 the product(s), and the collection of which Seller is or may be responsible to provide to any governmental authority, unless acceptable exemption certificates are provided by Buyer in accordance with applicable 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 product(s) being purchased, whether now in effect or hereafter imposed by any governmental authority, foreign or domestic.

3. Warranty. SELLER MAKES NO WARRANTIES OR REPRESENTATIONS AS TO THE PERFORMANCE OF ANY PRODUCT EXCEPT AS SET FORTH IN THE STONEAGE LIMITED WARRANTY PROVIDED IN THIS DOCUMENT

4. 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. The proposed shipment date is an estimate. Seller will notify Buyer promptly of any material delay and will specify the revised delivery date as soon as practicable. 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).

All product(s) will be shipped F.O.B. point of origin, unless specifically agreed otherwise, and Buyer shall pay all shipping costs and insurance costs from that point. Seller, in its sole discretion, will determine and arrange the means and manner of transportation of the product(s). Buyer shall bear all risk of loss commencing with the shipment or distribution of the product(s) from Seller's warehouse. Order shortages or errors must be reported within fifteen (15) business days from receipt of shipment to secure adjustment. No product(s) may be returned without securing written approval from Seller.

5. Modification. These Terms and Conditions are intended by Seller and Buyer to constitute a final, complete and exclusive expression of agreement relating to the subject matter hereof and cannot be supplemented or amended without Seller's prior written approval.

6. Omission. Seller's waiver of any breach or Seller's failure to enforce any of these 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 hereof.

7. Severability. If any provision of these Terms and Conditions is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

TERMS AND CONDITIONS AND WARRANTY INFORMATION

8. Disputes. Seller and Buyer shall attempt in good faith to promptly resolve any dispute arising under these Terms and Conditions by negotiations between representatives who have authority to settle the controversy. If unsuccessful, Seller and Buyer 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 Seller and Buyer.

9. Governing Law. 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.

10. Jurisdiction and Venue. Seller and Buyer agree that the state or federal courts located within the City and County of Denver, Colorado shall have sole and exclusive jurisdiction over any litigation concerning any dispute arising under these Terms and Conditions not otherwise resolved pursuant to Section 9 as well as any alleged defects of any Products or damages sustained as a result of such alleged defects. Seller and Buyer further agree that should any litigation be commenced in connection with such a dispute, it shall only be commenced in such courts. Seller and Buyer agree to the exclusive jurisdiction of such courts and neither will raise any objection to the jurisdiction and venue of such courts, including as a result of inconvenience.

11. Attorney's Fees. 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 mediation.

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>

STONEAGE TERMS AND WARRANTY

View StoneAge's Terms and Warranty Conditions online.

<http://www.stoneagetools.com/terms>

<http://www.stoneagetools.com/warranty>

TERMS AND CONDITIONS AND WARRANTY INFORMATION

WARRANTY:

Warranties set forth herein extend only to End-Users, meaning customers acquiring, or that have previously acquired, a product manufactured by StoneAge ("Product") for their own use and not for resale, either directly from StoneAge Inc. ("StoneAge") or from a StoneAge Authorized Dealer or Reseller ("Dealer"). No warranty of any kind or nature is made by StoneAge beyond those expressly stated herein.

1. LIMITED WARRANTY PERIOD.

One (1) year high pressure seal and seat parts as described within the following kits.

BJVE 604-XXX SEAL OVERHAUL Kit (P12, MP12 M24)

BJVE 605 SEAL OVERHAUL KIT (P16 ONLY).

Three (3) years for all other parts in the Product including the speed control mechanism.

Subject to the limitations and conditions hereinafter set forth, StoneAge warrants the Product to be free from defects in workmanship and material from the date of purchase by the End-User within the limited warranty period and is claimed no later than six (6) months from the period's expiration date. All replacement parts which are furnished under this Limited Warranty and properly installed shall be warranted to the same extent as the original Product under this Limited Warranty if, and only if, the original parts were found to be defective within the original Limited Warranty Period covering the original Product. Replacement parts are warranted for the remainder of the original Limited Warranty Period. This Limited Warranty does not cover any component part of any Product not manufactured by StoneAge. Any such component part is subject exclusively to the component manufacturer's warranty terms and conditions.

2. LIMITED WARRANTY COVERAGE. StoneAge's sole obligation under this Limited Warranty shall be, at StoneAge's option and upon StoneAge's inspection, to repair, replace or issue a credit for any Product which is determined by StoneAge to be defective in material or workmanship. StoneAge reserves the right to examine the alleged defective Product to determine whether this Limited Warranty is applicable, and final determination of limited warranty coverage lies solely with StoneAge. No statement or recommendation made by a StoneAge representative, Dealer or agent to End-User shall constitute a warranty by StoneAge or a waiver or modification to any of the provisions hereof or create any liability for StoneAge.

3. WARRANTY SERVICE PROVIDERS. Service and repair of the Product is to be performed only by StoneAge authorized service representatives, including Dealers who are authorized repair centers, with StoneAge approved parts. Information about StoneAge authorized service representatives can be obtained through the StoneAge website at www.stoneagetools.com/service. Unauthorized service, repair or modification of the Product or use of parts not approved by StoneAge will void this Limited Warranty. StoneAge reserves the right to change or improve the material and design of the Product at any time without notice to End-User, and StoneAge is not obligated to make the same improvements during warranty service to any Product previously manufactured.

4. WARRANTY EXCLUSIONS. This Limited Warranty does not cover, and StoneAge shall not be responsible for the following, or damage caused by the following: (1) any Product that has been altered or modified in any way not approved by StoneAge in advance in writing; (2) any Product that has been operated under more severe conditions or beyond the rated capacity specified for that Product; (3) depreciation or damage caused by normal wear and tear, failure to follow operation or installation instructions, misuse, negligence or lack of proper protection during storage; (4) exposure to fire, moisture, water intrusion, electrical stress, insects, explosions, extraordinary weather and/or environmental conditions including, but not limited to lightning, natural disasters, storms, windstorms, hail, earthquakes, acts of God or any other force majeure event;

(5) damage to any Product caused by any attempt to repair, replace, or service the Product by persons other than StoneAge authorized service representatives; (6) costs of normal maintenance parts and services; (7) damage sustained during unloading, shipment or transit of the Product; or (8) failure to perform the recommended periodic maintenance procedures listed in the Operator's Manual accompanying the Product.

5. REQUIRED WARRANTY PROCEDURES. To be eligible for warranty service, the End-User must: (1) report the Product defect to the entity where the Product was purchased (i.e. StoneAge or the Dealer) within the Limited Warranty Period specified in this Limited Warranty; (2) submit the original invoice to establish ownership and date of purchase; and (3) make the Product available to a StoneAge authorized service representative for inspection to determine eligibility for coverage under this Limited Warranty. This Limited Warranty shall not extend to any person or entity who fails to provide proof of original purchase from StoneAge or a Dealer. No Product may be returned for credit or adjustment without prior written permission from StoneAge.

TERMS AND CONDITIONS AND WARRANTY INFORMATION

6. **DISCLAIMER OF IMPLIED WARRANTIES AND OTHER REMEDIES.** EXCEPT AS EXPRESSLY STATED HEREIN (AND TO THE FULLEST EXTENT ALLOWED UNDER APPLICABLE LAW), STONEAGE HEREBY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY AND ALL WARRANTIES, REPRESENTATIONS OR PROMISES AS TO THE QUALITY, PERFORMANCE OR FREEDOM FROM DEFECT OF THE PRODUCT COVERED BY THIS LIMITED WARRANTY. STONEAGE FURTHER DISCLAIMS ALL IMPLIED INDEMNITIES.

7. **LIMITATION OF LIABILITY.** End-User specifically acknowledges that the Product may be operated at high speeds and/or pressures, and that as such it may be inherently dangerous if not used correctly. End-User shall familiarize itself with all operation materials provided by StoneAge and shall at all times use and require its agents, employees and contractors to use all necessary and appropriate safety devices, guards and proper safe operating procedures. In no event shall StoneAge be responsible for any injuries to persons or property caused directly or indirectly by the operation of the Product if End-User or any agent, employee, or contractor of End-User: (1) fails to use all necessary and appropriate safety devices, guards and proper safe operating procedures; (2) fails to maintain in good working order such safety devices and guards; (3) alters or modifies the Product in any way not approved by StoneAge in advance in writing; (4) allows the Product to be operated under more severe conditions or beyond the rated capacity specified for the Product; or (5) otherwise negligently operates the Product. End-User shall

indemnify and hold StoneAge harmless from any and all liability or obligation incurred by or against StoneAge, including costs and attorneys' fees, to or by any person so injured.

TO THE FULL EXTENT ALLOWED BY APPLICABLE LAW, STONEAGE SHALL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES (INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF GOODWILL, DIMINUTION OF VALUE, WORK STOPPAGE, INTERRUPTION OF BUSINESS, RENTAL OF SUBSTITUTE PRODUCT, OR OTHER COMMERCIAL LOSS EVEN TO THE EXTENT SUCH DAMAGES WOULD CONSTITUTE DIRECT DAMAGES), WITH RESPECT TO THE COVERED STONEAGE PRODUCT, OR OTHERWISE IN CONNECTION WITH THIS LIMITED WARRANTY, REGARDLESS OF WHETHER STONEAGE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

IT IS UNDERSTOOD THAT STONEAGE'S LIABILITY, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE, OR OTHERWISE SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE PAID BY THE END-USER FOR THE PRODUCT. STONEAGE'S MAXIMUM LIABILITY SHALL NOT EXCEED, AND END-USER'S REMEDY IS LIMITED TO EITHER (1) REPAIR OR REPLACEMENT OF THE DEFECTIVE WORKMANSHIP OR MATERIAL OR, AT STONEAGE'S OPTION, (2) REFUND OF THE PURCHASE PRICE, OR (3) ISSUANCE OF A CREDIT FOR THE PURCHASE PRICE, AND SUCH REMEDIES SHALL BE END-USER'S ENTIRE AND EXCLUSIVE REMEDY.

YOU, THE END-USER, UNDERSTAND AND EXPRESSLY AGREE THAT THE FOREGOING LIMITATIONS ON LIABILITY ARE PART OF THE CONSIDERATION IN THE PRICE OF THE STONEAGE PRODUCT YOU PURCHASED.

Some jurisdictions do not allow the limitation or exclusion of liability for certain damages, so the above limitations and exclusions may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction. If any provisions of this Limited Warranty is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.



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