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# Ball Valves BV4H, BVAH, BVAL, BVH, BVHS, BVMM

Service Bulletin  
Bulletin MSG14-1411-M1/US

September 2021



ENGINEERING YOUR SUCCESS.

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**Parker Hannifin Corporation**  
Hydraulic Valve Division  
Elyria, Ohio, USA

**Table of Contents**

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**Table of Contents**

BV4H ..... 2  
BVAH ..... 4  
BVAL..... 6  
BVH ..... 8  
BVHS..... 10  
BVMM..... 12  
Terms of Sale with Warranty Limitations ..... 15

**BV4H Ball Valve Service Manual**

**⚠ WARNINGS!**

- Do not exceed the maximum service pressure stamped on the side of the valve body.
- Completely relieve the internal pressures of both upstream and downstream ports of the valve **BEFORE** attempting to service or remove the valve.
- Please read this manual in its entirety prior to disassembling valve(s).

**I. OPERATION**

New valves that are not installed and not held securely may have a handle that is not easy to move. The valve is designed to operate best at full-rated line pressure. When the valve handle is in-line with the ports, the valve is OPEN. When the handle is rotated 45°, the valve is closed. The ball valve is not intended for partial movement of the handle for throttling the flow.

**II. SERVICING THE VALVE**

**NOTE:** Prior to installing new components, BE SURE to lubricate all O-rings and seals with hydraulic oil or the lubricant that is appropriate to the process fluid.

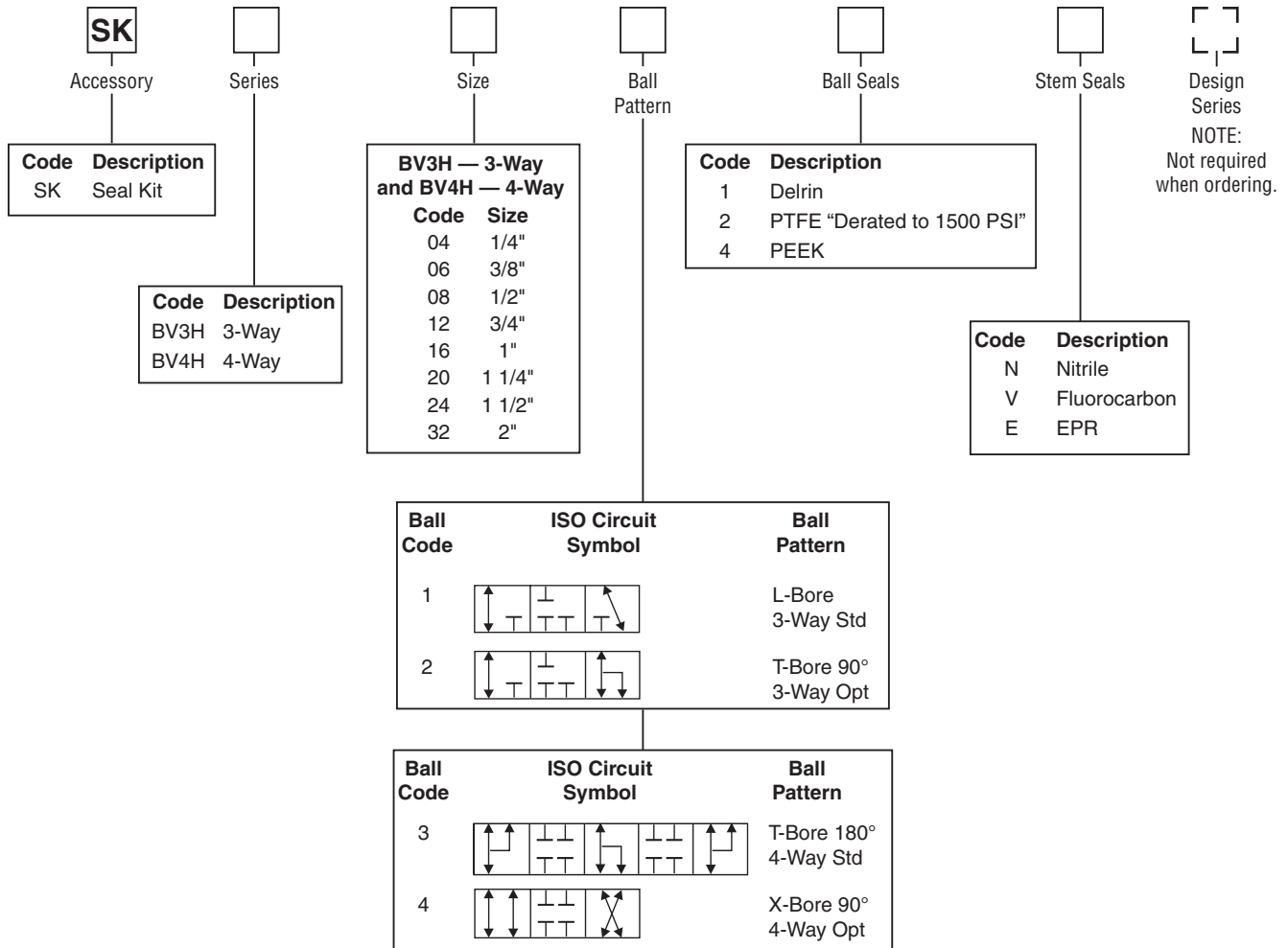
1. Wear gloves, safety goggles, and any other appropriate safety equipment when performing any maintenance or handling the process fluid. Remove the valve from the service line and drain all process fluid from the valve. For valves carrying process fluids that are toxic or require special handling procedures, properly contain and dispose of process fluids in accordance with OSHA, EPA, and other applicable regulations and guidelines.
2. Secure the valve to a service bench with a shop vice or similar device. Remove the handle and any accessories from the top of the valve.
3. Using an appropriate wrench, remove one end connection and then pull out the ball seal components. Some additional process fluid inside the valve cavity may drain from the valve when the end connection and seals are removed. Collect any process fluid inside the valve and handle and dispose of it in an appropriate manner. Remove other end connections using an appropriate wrench. Remove other ball seals and discard accordingly, if they are to be replaced.
4. Remove the top cover from the assembly to access the ball/spindle, and remove it from the valve. Remove and discard O-rings, backup rings, and bushings (if applicable) from the spindle. Clean and dry all valve components.

5. Replace with new bushings, backup rings, and O-rings from the new seal kit. Insert the spindle back into the body into valve cavity. Replace the top cover and be sure that the spindle is fully seated into the spindle bore, and the square on the spindle fully protrudes from top of the valve.
6. Take the end connections and replace both O-rings from each sub-assembly with new O-rings. Then take one end connection and place the new ball seal assembly into the ball seal pocket on the end connection. Be sure the ball seal sits securely in the end connection. Thread the end connection into the valve.
7. Rotate the spindle according to the drawing provided (align tang of spindle with ports), and replace all removed accessories from the top of the unit. To get the proper handle motion, pay attention to the stop washer alignment over the spindle square. The top of the spindle square has a slot that indicates the through hole in the ball. When in the open position, this slot will not align with the ports. The slots will align with the ports when the valve is in the closed position. The handle in the open position will be opposite the stop pin/screw and in-line with the port.

**Recommended Minimum Torque for End Connections**

Code	Torque ft. lb.
04 BV4H	120
06 BV4H	120
08 BV4H	160
12 BV4H	200
16 BV4H	250
20 BV4H	580
24 BV4H	895
32 BV4H	1,680

**Seal Kit Accessories**



**Limit Switch**

Part No.	Description
LSB	Limit Switch DM10166 NEMA-4

**Replacement Handles – Standard Steel**

Code	Part Number
BV*H04-08	BVH-HT1
BV*H12-16	BVH-HT2
BV*H20-32	BVH-HT3

**Valve Weights**

BV3H			BV4H		
Code	kg	(lbs)	Code	kg	(lbs)
04	2.0	(4.5)	04	2.2	(4.8)
06	2.4	(5.25)	06	2.7	(6.0)
08	3.4	(7.5)	08	3.6	(8.0)
12	6.8	(15.0)	12	7.3	(16.0)
16	12.2	(27.0)	16	12.6	(27.75)
20	22.2	(49.0)	20	25.4	(56.0)
24	32.7	(72.0)	24	33.3	(73.5)
32	42.9	(94.5)	32	47.6	(105.0)

**BVAH Ball Valve Service Manual**

**⚠ WARNINGS!**

- Do not exceed the maximum service pressure stamped on the side of the valve body.
- Completely relieve the internal pressures of both upstream and downstream ports of the valve BEFORE attempting to service or remove the valve.
- Please read this manual in its entirety prior to disassembling valve(s).

**I. OPERATION**

New valves that are not installed and not held securely may have a handle that is not easy to move. The valve is designed to operate best at full-rated line pressure. When the valve handle is in-line with the ports, the valve is OPEN. When the handle is rotated 90°, the valve is closed. The ball valve is not intended for partial movement of the handle for throttling the flow.

**II. SERVICING THE VALVE**

**NOTE:** Prior to installing new components, BE SURE to lubricate all O-rings and seals with hydraulic oil or the lubricant that is appropriate to the process fluid.

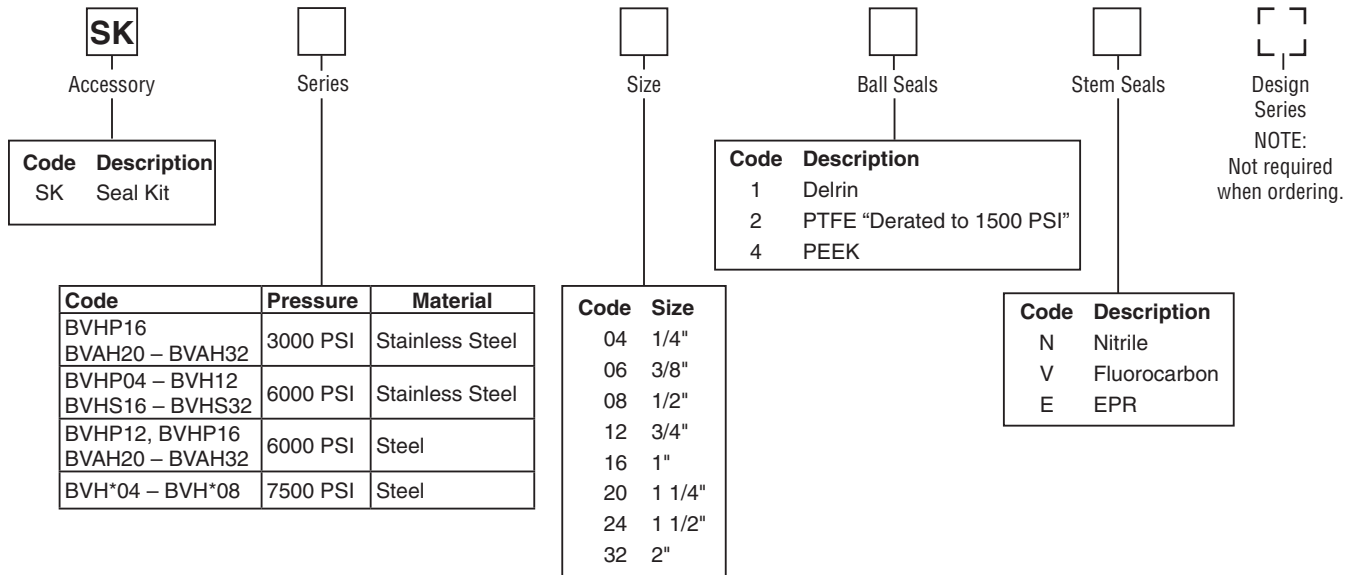
1. Wear gloves, safety goggles, and any other appropriate safety equipment when performing any maintenance or handling the process fluid. Remove the valve from the service line and drain all process fluid from the valve. For valves carrying process fluids that are toxic or require special handling procedures, properly contain and dispose of the process fluids in accordance with OSHA, EPA, and other applicable regulations and guidelines.
2. Secure the valve to a service bench with a shop vice or similar device. Remove the handle and any accessories from the top of the valve. (Accessories are typically attached the valve with cap screws).
3. Using an appropriate wrench, remove one end connection and then pull out the ball seal components. Some additional process fluid inside the valve cavity may drain from the valve when the end connection and seals are removed. Collect any process fluid inside the valve and handle and dispose of it in an appropriate manner. If applicable, remove other end connection using an appropriate wrench. Remove other ball seal and discard accordingly, if they are to be replaced.
4. Remove the ball from the body cavity. (Note: the ball is secured in place with a tang on the spindle shaft. The ball can only be removed from the cavity when the spindle/ball is in the open position.) Depress the top of the spindle into the body, allowing removal, so that the seals may be replaced on the shaft. Remove and discard O-rings, backup rings, and bushings (if applicable) from the spindle. Clean and dry all valve components.

5. The new sealing components can now be installed. Replace with new bushings, backup rings, and O-rings from the new seal kit. All O-rings should be inserted with lubrication that is compatible to the process media. Insert the spindle back into the body, ensuring that it is fully seated within the spindle bore, and that the square on the spindle fully protrudes from top of the valve.
6. For “combo” style bodies that have a built in port and require only one end connection, the ball seal should be installed at this stage. The seal should fully seat past the spindle previously installed in the previous step. The ball can now be inserted back into the body cavity.
7. Take the end connections(s) and replace (both) O-rings from each sub-assembly with new O-ring(s). Insert the ball seal into the ball cavity and secure it against the ball by installing the end connection. Be sure the ball seal sits securely against the end connection. Thread the end connection into valve.
8. Rotate the spindle accordingly (align tang of spindle with ports), and replace all removed accessories from the top of the unit. To get the proper handle motion, pay attention to the stop washer alignment over the spindle square. The top of the spindle square has a slot that indicates the through hole in the ball. When in the open position, this slot will align with the ports. The slot will not align with the ports when the valve is in the closed position. The handle in the open position will be opposite the stop pin/screw and in-line with the ports.

**Torque Requirements**

Code	Size (inches)	Material	Torque ft. lb.
04	1/4	Steel/Stainless	120
06	3/8	Steel/Stainless	120
08	1/2	Steel/Stainless	160
12	3/4	Steel/Stainless	200
16	1	Steel/Stainless	250
20	1-1/4	Steel/Stainless	580
24	1-1/2	Steel/Stainless	895
32	2	Steel/Stainless	1,680

**Seal Kit Accessories**



	04	06	08	12	16	20	24	32
<b>Steel - 414 Bar (6000 PSI)</b>	X	X	X	BVHP	BVHP	BVAH	BVAH	BVAH
<b>Steel - 517 Bar (7500 PSI)</b>	BVH*	BVH*	BVH*	X	X	X	X	X
<b>Stainless Steel - 207 Bar (3000 PSI)</b>	X	X	X	X	BVHP	BVAH	BVAH	BVAH
<b>Stainless Steel - 414 Bar (6000 PSI)</b>	BVHP	BVHP	BVHP	BVHP	BVHS	BVHS	BVHS	BVHS

**Locking Handle Kit Accessories**

BVHP/BVAH/BVHS	Standard Locking (Part Number)	
Code	Size	
04	1/4"	BVHPLK-1
06	3/8"	BVHPLK-1
08	1/2"	BVHPLK-1
12	3/4"	BVHPLK-2
16	1"	BVHPLK-2
20	1 1/4"	BVHPLK-3
24	1 1/2"	BVHPLK-3
32	2"	BVHPLK-3

**Valve Weights**

Code	Threaded kg (lbs)	C.61, 3000 psi kg (lbs)	C.62, 6000 psi kg (lbs)
04	0.6 (1.25)	—	—
06	0.7 (1.5)	—	—
08	0.8 (1.75)	0.9 (2.0)	1.3 (2.75)
12	1.9 (4.25)	2.2 (4.75)	2.5 (5.5)
16	2.5 (5.5)	3.2 (7.0)	3.9 (8.5)
20	4.2 (9.25)	5.9 (13.0)	6.8 (15.0)
24	5.2 (11.5)	7.1 (15.7)	8.6 (19.0)
32	8.4 (18.5)	11.8 (24.25)	18.6 (30.0)

**Limit Switch**

Part No.	Description
LSB	Limit Switch DM10166 NEMA-4

**Replacement Handles – Standard Steel Offset**

Code	Part Number
BVHP04-08	BVH-HS1
BVHP12-BVHP/BVHS16	BVH-HS2
BVAH/BVHS20-32	BVH-HS3

**BVAL Ball Valve Service Manual**

**⚠ WARNINGS!**

- Do not exceed the maximum service pressure stamped on the side of the valve body.
- Completely relieve the internal pressures of both upstream and downstream ports of the valve BEFORE attempting to service or remove the valve.
- Please read this manual in its entirety prior to disassembling valve(s).

**I. OPERATION**

New valves that are not installed and not held securely may have a handle that is not easy to move. The valve is designed to operate best at full-rated line pressure. When the valve handle is in-line with the ports, the valve is OPEN. When the handle is rotated 90°, the valve is closed. The ball valve is not intended for partial movement of the handle for throttling the flow.

**II. SERVICING THE VALVE**

**NOTE:** Prior to Installing new components, BE SURE to lubricate all O-rings and seals with hydraulic oil or the lubricant that is appropriate to the process fluid.

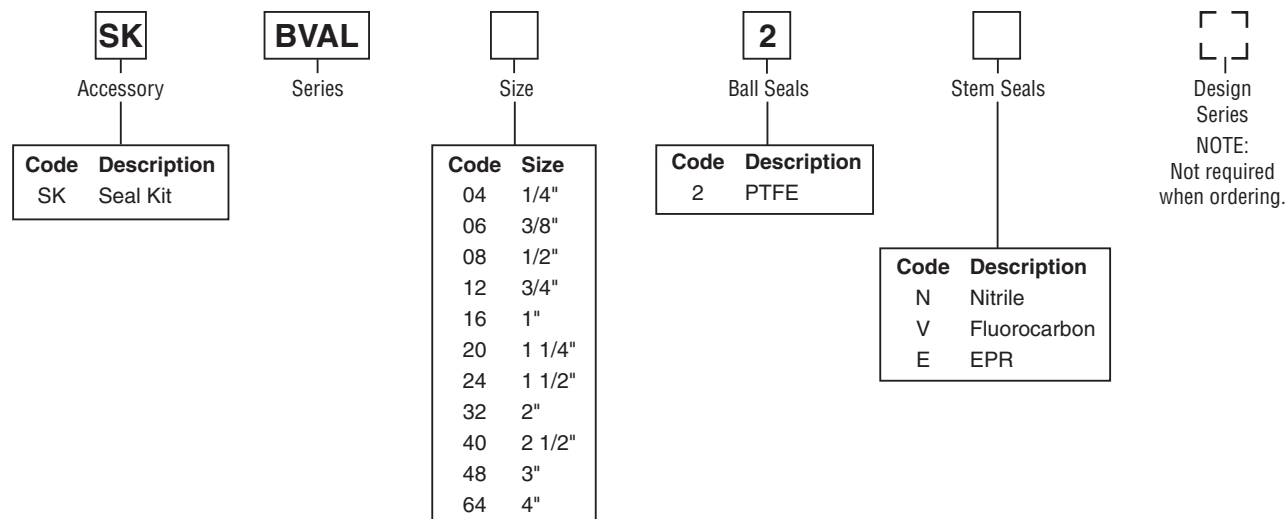
1. Wear gloves, safety goggles, and any other appropriate safety equipment when performing any maintenance or handling the process fluid. Remove the valve from the service line and drain all process fluid from the valve. For valves carrying process fluids that are toxic or require special handling procedures, properly contain and dispose of process fluids in accordance with OSHA, EPA, and other applicable regulations and guidelines.
2. Secure the valve to a service bench with a shop vice or similar device. Remove the handle and any accessories from the top of the valve. (Accessories are typically attached the valve with cap screws.)
3. Using an appropriate wrench, remove one end connection and then pull out the ball seal components. Some additional process fluid inside the valve cavity may drain from the valve when the end connection and seals are removed. Collect any process fluid inside the valve and handle and dispose of it in an appropriate manner. If applicable, remove the other end connection using an appropriate wrench. Remove the other ball seal and discard accordingly if they are to be replaced.
4. Remove the ball from the body cavity. (Note: the ball is secured in place with a tang on the spindle shaft. The ball can only be removed from the cavity when the spindle/ball is in the open position.) Depress the top of the spindle into the body, allowing removal, so that the seals may be replaced on the shaft. Remove and discard O-rings, backup rings, and bushings (if applicable) from the spindle. Clean and dry all valve components.

5. The new sealing components can now be installed. Replace with new bushings, backup rings, and O-rings from the new seal kit. All O-rings should be inserted with lubrication that is compatible to the process media. Insert the spindle back into the body, ensuring that it is fully seated within the spindle bore and that the square on the spindle fully protrudes from top of Valve.
6. For “combo” style bodies that have a built in port and require only one end connection, the ball seal should be installed at this stage. The seal should fully seat past the spindle previously installed in the previous step. The ball can now be inserted back into the body cavity.
7. Take the end connections(s) and replace (both) O-rings from each sub-assembly with new O-ring(s). Insert the ball seal into the ball cavity and secure it against the ball by installing the end connection. Be sure the ball seal sits securely against the end connection. Thread the end connection into valve.
8. Rotate the spindle according to the drawing provided (align tang of spindle with ports), and replace all removed accessories from the top of the unit. To get the proper handle motion, pay attention to the stop washer alignment over the spindle square. The top of the spindle square has a slot that indicates the through hole in the ball. When in the open position, this slot will align with the ports. The slot will not align with the ports when the valve is in the closed position. The handle in the open position, will be opposite the stop pin/screw and in-line with the ports.

**Recommended Minimum Torque for End Connections**

Code	Torque ft. lb.	Code	Torque ft. lb.
04	40	24	225
06	40	32	410
08	40	40	560
12	100	48	1,070
16	120	64	1,900
20	150		

**Seal Kit Accessories**



**Locking Handle Kit Accessories**

BVAL		Standard Locking
Code	Size	(Part Number)
04	1/4"	BVHPLK-1
06	3/8"	BVHPLK-1
08	1/2"	BVHPLK-1
12	3/4"	BVHPLK-1
16	1"	BVHPLK-1
20	1 1/4"	BVHPLK-2
24	1 1/2"	BVHPLK-2
32	2"	BVHPLK-2
40	2 1/2"	BVHPLK-3
48	3"	BVHPLK-3
64	4"	BVHPLK-3

**Valve Weights**

Weight			Weight			Weight		
Code	kg	(lbs.)	Code	kg	(lbs.)	Code	kg	(lbs.)
4	0.2	(0.5)	16	0.5	(1.0)	40	3.5	(7.75)
6	0.2	(0.5)	20	0.8	(1.75)	48	4.8	(10.5)
8	0.2	(0.5)	24	1.1	(2.5)	64	7.4	(16.25)
12	0.3	(0.75)	32	1.8	(4.0)			

**Limit Switch**

Part No.	Description
LSB	Limit Switch DM10166 NEMA-4

## BVH Ball Valve Service Manual

### WARNINGS!

- Do not exceed the maximum service pressure stamped on the side of the valve body.
- Completely relieve the internal pressures of both upstream and downstream ports of the valve BEFORE attempting to service or remove the valve.
- Please read this manual in its entirety prior to disassembling valve(s).

### I. OPERATION

New valves that are not installed and not held securely may have a handle that is not easy to move. The valve is designed to operate best at full-rated line pressure. When the valve handle is in-line with the ports, the valve is OPEN. When the handle is rotated 90°, the valve is closed. The ball valve is not intended for partial movement of the handle for throttling the flow.

### II. SERVICING THE VALVE

**NOTE:** Prior to installing new components, BE SURE to lubricate all O-rings and seals with hydraulic oil or the lubricant that is appropriate to the process fluid.

1. Wear gloves, safety goggles, and any other appropriate safety equipment when performing any maintenance or handling the process fluid. Remove the valve from the service line and drain all process fluid from the valve. For valves carrying process fluids that are toxic or require special handling procedures, properly contain and dispose of process fluids in accordance with OSHA, EPA, and other applicable regulations and guidelines.
2. Secure the valve to a service bench with a shop vice or similar device. Remove the handle and any accessories from the top of the valve. (Accessories are typically attached the valve with cap screws).
3. Using an appropriate wrench, remove one end connection, and then pull out the ball seal components. Some additional process fluid inside the valve cavity may drain from the valve when the end connection and seals are removed. Collect any process fluid inside the valve and handle and dispose of it in an appropriate manner. If applicable, remove the other end connection using an appropriate wrench. Remove the other ball seal and discard accordingly if they are to be replaced.
4. Remove the ball from the body cavity. (Note: the ball is secured in place with a tang on the spindle shaft. The ball can only be removed from the cavity when the spindle/ball is in the Open position.) Depress the top of the spindle into the body, allowing removal, so that the seals may be replaced on the shaft. Remove and discard O-rings, backup rings, and bushings (if applicable) from the spindle. Clean and dry all valve components.

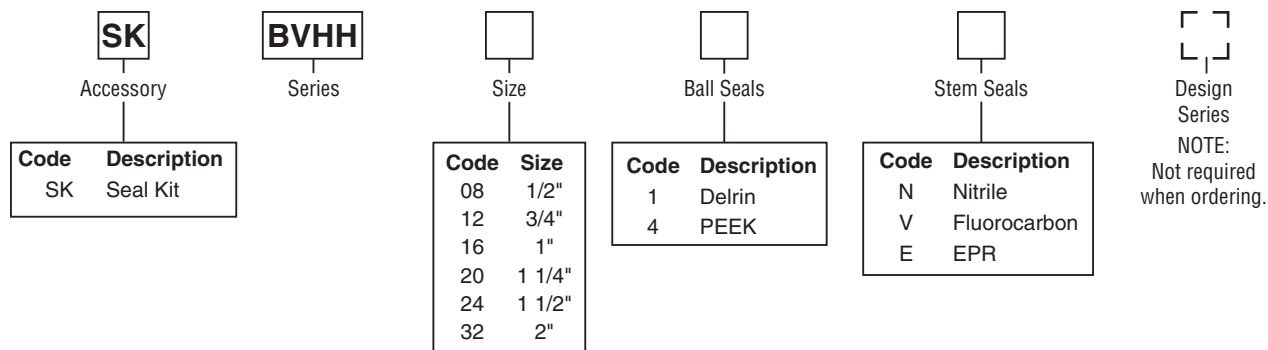
5. The new sealing components can now be installed. Replace with new bushings, backup rings, and O-rings from the new seal kit. All O-rings should be inserted with lubrication that is compatible to the process media. Insert the spindle back into the body, ensuring that it is fully seated within the spindle bore, and that the square on the spindle fully protrudes from top of valve.
6. For “combo” style bodies that have a built in port and require only one end connection, the ball seal should be installed at this stage. The seal should fully seat past the spindle previously installed in the previous step. The ball can now be inserted back into the body cavity.
7. Take the end connections(s) and replace (both) O-rings from each sub-assembly with new O-ring(s). Insert the ball seal into the ball cavity and secure it against the ball by installing the end connection. Be sure the ball seal sits securely against the end connection. Thread the end connection into the valve.
8. Rotate the spindle accordingly (align tang of spindle with ports), and replace all removed accessories from the top of the unit. To get the proper handle motion, pay attention to the stop washer alignment over the spindle square. The top of the spindle square has a slot that indicates the through hole in the ball. When in the open position, this slot will align with the ports. The slot will not align with the ports when the valve is in the closed position. The handle in the open position will be opposite the stop pin/screw and in-line with the ports.

### Torque Requirements

Size (inches)	Torque ft. lb.
08	160
12	200
16	250
20	*
24	*
32	*

\* Consult factory.

### Seal Kit Accessories



### Locking Handle Kit Accessories

BVHH		Standard Locking (Part Number)
Code	Size	
08	1/2"	BVHPLK-1
12	3/4"	BVHPLK-2
16	1"	BVHPLK-2
20	1 1/4"	BVHPLK-3
24	1 1/2"	BVHPLK-3
32	2"	BVHPLK-3

### Valve Weights

Code	kg (lbs)
08	1.6 (3.5)
12	2.0 (4.5)
16	3.2 (7.0)
20	7.9 (17.5)
24	8.7 (19.3)
32	8.4 (21.5)

### Limit Switch

Part No.	Description
LSB	Limit Switch DM10166 NEMA-4

### Replacement Handles – Standard Steel Offset

Code	Part Number
BVHH-08	BVH-HS1
BVHH12-16	BVH-HS2
BVHH20-32	BVH-HS3

**BVHS Ball Valve Service Manual**

**⚠ WARNINGS!**

- Do not exceed the maximum service pressure stamped on the side of the valve body.
- Completely relieve the internal pressures of both upstream and downstream ports of the valve BEFORE attempting to service or remove the valve.
- Please read this manual in its entirety prior to disassembling valve(s).

**I. OPERATION**

New valves that are not installed and not held securely may have a handle that is not easy to move. The valve is designed to operate best at full-rated line pressure. When the valve handle is in-line with the ports, the valve is OPEN. When the handle is rotated 90°, the valve is closed. The ball valve is not intended for partial movement of the handle for throttling the flow.

**II. SERVICING THE VALVE**

**NOTE:** Prior to installing new components, BE SURE to lubricate all O-rings and seals with hydraulic oil or the lubricant that is appropriate to the process fluid.

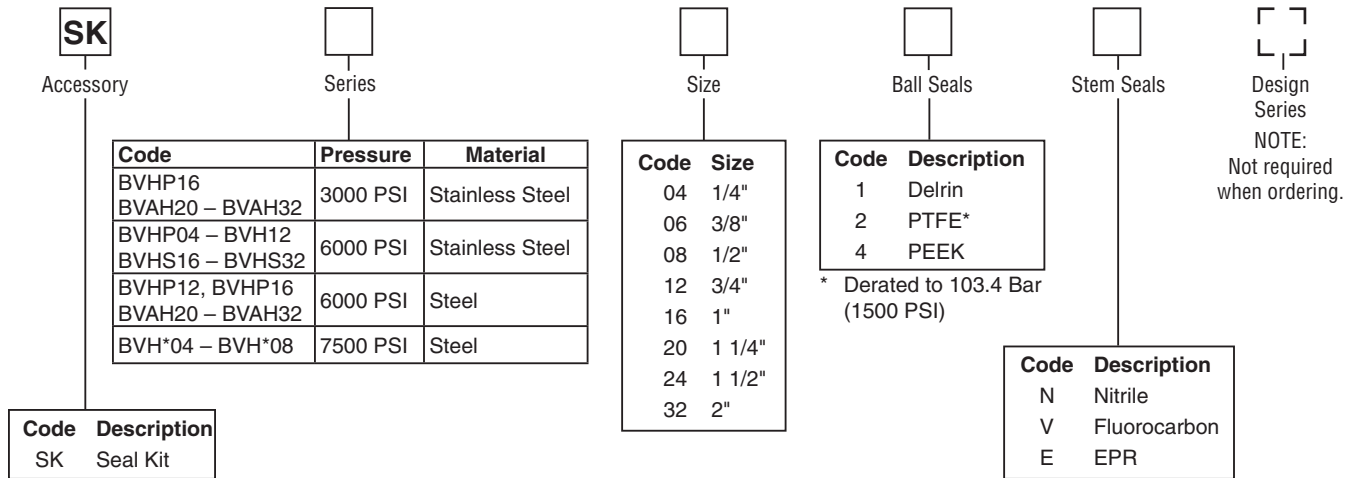
1. Wear gloves, safety goggles, and any other appropriate safety equipment when performing any maintenance or handling the process fluid. Remove the valve from the service line and drain all process fluid from the valve. For valves carrying process fluids that are toxic or require special handling procedures, properly contain and dispose of process fluids in accordance with OSHA, EPA, and other applicable regulations and guidelines.
2. Secure the valve to a service bench with a shop vice or similar device. Remove the handle and any accessories from the top of the valve. (Accessories are typically attached the valve with cap screws).
3. Using an appropriate wrench, remove one end connection and then pull out the ball seal components. Some additional process fluid inside the valve cavity may drain from the valve when the end connection and seals are removed. Collect any process fluid inside the valve and handle and dispose of it in an appropriate manner. If applicable, remove the other end connection using an appropriate wrench. Remove the other ball seal and discard accordingly, if they are to be replaced.
4. Remove the ball from the body cavity. (Note: the ball is secured in place with a tang on the spindle shaft. The ball can only be removed from the cavity when the spindle/ball is in the Open position.) Depress the top of the spindle into the body, allowing removal, so that the seals may be replaced on the shaft. Remove and discard O-rings, backup rings, and bushings (if applicable) from the spindle. Clean and dry all valve components.

5. The new sealing components can now be installed. Replace with new bushings, backup rings, and O-rings from the new seal kit. All O-rings should be inserted with lubrication that is compatible to the process media. Insert the spindle back into the body, ensuring that it is fully seated within the spindle bore, and that the square on the spindle fully protrudes from top of the valve.
6. For “combo” style bodies that have a built in port and require only one end connection, the ball seal should be installed at this stage. The seal should fully seat past the spindle previously installed in the previous step. The ball can now be inserted back into the body cavity.
7. Take the end connections(s) and replace (both) O-rings from each sub-assembly with new O-ring(s). Insert the ball seal into the ball cavity and secure it against the ball by installing the end connection. Be sure the ball seal sits securely against the end connection. Thread the end connection into the valve.
8. Rotate the spindle accordingly (align tang of spindle with ports), and replace all removed accessories from the top of the unit. To get the proper handle motion, pay attention to the stop washer alignment over the spindle square. The top of the spindle square has a slot that indicates the through hole in the ball. When in the open position, this slot will align with the ports. The slot will not align with the ports when the valve is in the closed position. The handle in the open position, will be opposite the stop pin/screw and in-line with the ports.

**Torque Requirements**

Size (inches)	Torque ft. lb.
04	120 ± 15
06	120 ± 15
08	160 ± 15
12	200 ± 15
16	250 ± 15
20	580 ± 15
24	895 ± 15
32	1,680 ± 15

**Seal Kit Accessories**



	4	6	8	12	16	20	24	32
<b>Steel - 414 Bar (6000 PSI)</b>	X	X	X	BVHP	BVHP	BVAH	BVAH	BVAH
<b>Steel - 517 Bar (7500 PSI)</b>	BVH*	BVH*	BVH*	X	X	X	X	X
<b>Stainless Steel - 207 Bar (3000 PSI)</b>	X	X	X	X	BVHP	BVAH	BVAH	BVAH
<b>Stainless Steel - 414 Bar (6000 PSI)</b>	BVHP	BVHP	BVHP	BVHP	BVHS	BVHS	BVHS	BVHS

**Locking Handle Kit Accessories**

BVHP/BVAH/BVHS Code	Size	Standard Locking (Part Number)
04	1/4"	BVHPLK-1
06	3/8"	BVHPLK-1
08	1/2"	BVHPLK-1
12	3/4"	BVHPLK-2
16	1"	BVHPLK-2
20	1 1/4"	BVHPLK-3
24	1 1/2"	BVHPLK-3
32	2"	BVHPLK-3

**Valve Weights**

Code	Threaded kg (lbs)	C.61, 3000 psi kg (lbs)	C.62, 6000 psi kg (lbs)
04	0.6 (1.25)	—	—
06	0.7 (1.5)	—	—
08	0.8 (1.75)	0.9 (2.0)	1.3 (2.75)
12	1.9 (4.25)	2.2 (4.75)	2.5 (5.5)
16	2.5 (5.5)	3.2 (7.0)	3.9 (8.5)
20	4.2 (9.25)	5.9 (13.0)	6.8 (15.0)
24	5.2 (11.5)	7.1 (15.7)	8.6 (19.0)
32	8.4 (18.5)	11.8 (24.25)	18.6 (30.0)

**Limit Switch**

Part No.	Description
LSB	Limit Switch DM10166 NEMA-4

**Replacement Handles – Standard Steel Offset**

Code	Part Number
BVHP04-08	BVH-HS1
BVHP12-BVHP/BVHS16	BVH-HS2
BVAH/BVHS20-32	BVH-HS3

**BVMM Ball Valve Service Manual**

**⚠ WARNINGS!**

- Do not exceed the maximum service pressure stamped on the side of the valve body.
- Completely relieve the internal pressures of both upstream and downstream ports of the valve BEFORE attempting to service or remove the valve.
- Please read this manual in its entirety prior to disassembling valve(s).

**I. OPERATION**

New valves that are not installed and not held securely may have a handle that is difficult to move. The valve is designed to operate best at full-rated line pressure. When the valve handle is in-line with the ports, the valve is OPEN. When the handle is rotated 90°, the valve is closed. The ball valve is not intended for partial movement of the handle for throttling of flow.

**II. SERVICING THE VALVE**

**NOTE:** Prior to Installing new components, BE SURE to lubricate all O-rings and seals with hydraulic oil or the lubricant that is appropriate to the process fluid.

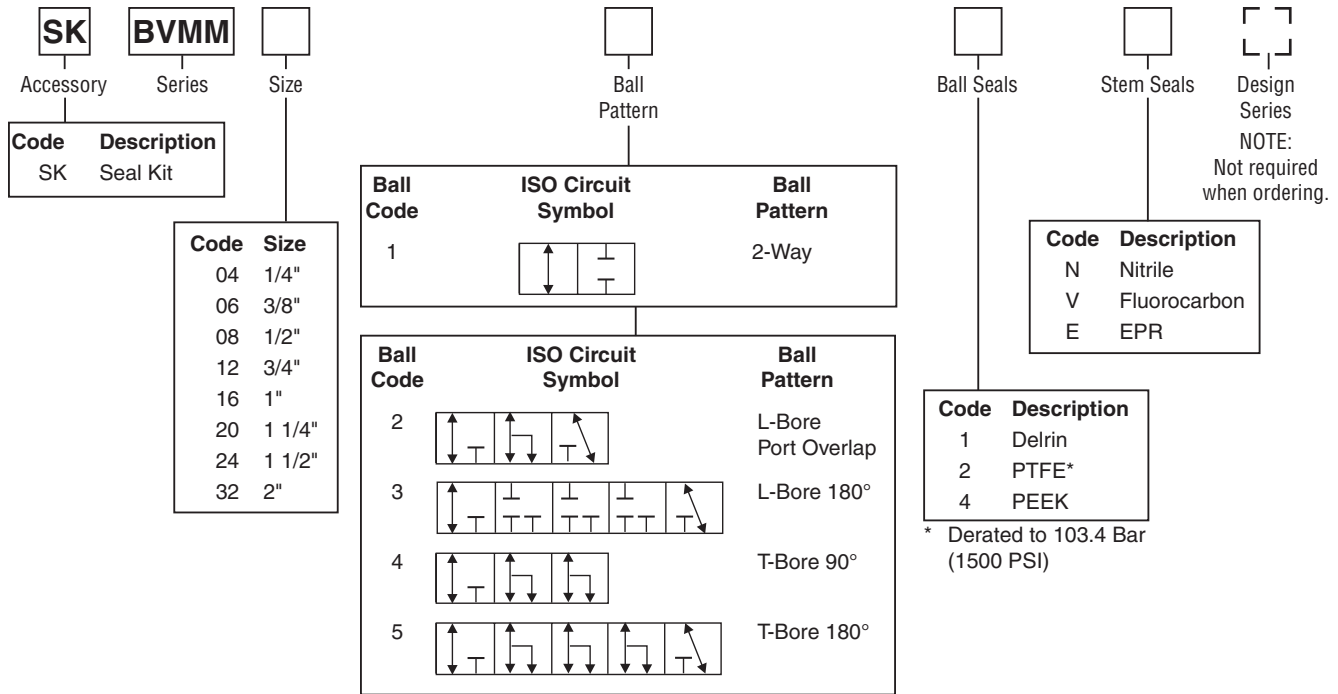
1. Wear gloves, safety goggles, and any other appropriate safety equipment when performing any maintenance or handling the process fluid. Remove the valve from the service line and drain all process fluid from the valve. For valves carrying process fluids that are toxic or require special handling procedures, properly contain and dispose of process fluids in accordance with OSHA, EPA, and other applicable regulations and guidelines.
2. Secure the valve to a service bench with a shop vice. Remove the handle and any accessories from the top of the valve. (Accessories are typically attached to the valve with cap screws.)
3. Using an appropriate wrench, remove screws to release one end connection. The end connection has a tapped hole on center to aid in removing it from the valve body. A screw or bolt may be used to free it from the valve body. Some additional process fluid inside the valve cavity may drain from the valve when the end connection and seals are removed. Collect any process fluid inside the valve and handle and dispose of it in an appropriate manner. If applicable, remove the other end connection using an appropriate wrench. Remove the other ball seal and discard accordingly, if they are to be replaced.
4. Remove the ball from the body cavity. (Note: the ball is secured in place with a tang on the spindle shaft. The ball can only be removed from the cavity when the spindle/ball is in the closed position.) Depress the top of the spindle into the body, allowing removal, so that the seals may be replaced on the shaft. Remove and discard O-rings, backup rings, and bushings (if applicable) from the spindle. Clean and dry all valve components. Visually inspect all components for damage or wear and proceed to the next step.

5. The new sealing components can now be installed. Replace with new bushings, backup rings, and O-rings from the new seal kit. All O-rings should be inserted with lubrication that is compatible to the process media. Insert the spindle back into the body, ensuring that it is fully seated within the spindle bore, and that the square on the spindle fully protrudes from top of the valve body.
6. For “combo” style bodies that have a built in port and require only one end connection, the ball seal should be installed at this stage. The seal should fully seat past the spindle previously installed in the previous step. The ball can now be inserted back into the body cavity.
7. Take the end connections(s) and replace all O-rings from each sub-assembly with new O-ring(s). Insert the ball seal into the ball cavity and secure it against the ball by installing the end connection back into the valve body. Orient the end, ensuring that the flow path is open from the manifold port. Be sure the ball seal sits securely against the end connection. Tighten the screws to secure the end(s) to the valve body.
8. Rotate the spindle according to the drawing provided (align tang of spindle with ports), and replace all removed accessories from the top of the unit. To get the proper handle motion, pay attention to the stop washer alignment over the spindle square. The top of the spindle square has a slot that indicates the through hole in the ball. When in the open position, this slot will align with the ports. The slot will not align with the ports when the valve is in the closed position. The handle in the open position, will be opposite the stop pin/screw and in-line with the ports.

**Recommended Minimum Torque for End Connections Screws (Steel/Coarse Thread):**

Code	Torque ft. lb.	Code	Torque ft. lb.
04 BVMM	10	16 BVMM	10
06 BVMM	10	20 BVMM	37
08 BVMM	10	24 BVMM	37
12 BVMM	10	32 BVMM	58

**Seal Kit Accessories**



**Locking Handle Kit Accessories**

BVMM		Standard Locking (Part Number)
Code	Size	
04	1/4"	BVDMLH1
06	3/8"	BVDMLH1
08	1/2"	BVDMLH1
12	3/4"	BVDMLH2
16	1"	BVDMLH2
20	1 1/4"	BVDMLH3
24	1 1/2"	BVDMLH3
32	2"	BVDMLH3

**Valve Weights**

Code	kg	(lbs)
04	1.1	(2.5)
06	1.9	(4.3)
08	2.3	(5.1)
12	5.2	(11.5)
16	7.9	(16.5)
20	15.0	(33.0)
24	25.4	(56.0)
32	33.3	(73.5)

**Limit Switch**

Part No.	Description
LSB	Limit Switch DM10166 NEMA-4

**Replacement Handles – Standard Steel Offset**

Code	Part Number
BVMM04-08	BVH-HS1
BVMM12-16	BVH-HS2
BVMM20-32	BVH-HS3



## Terms of Sale with Warranty Limitations

### PARKER-HANNIFIN CORPORATION — HYDRAULIC VALVE DIVISION OFFER OF SALE

1. **Definitions.** As used herein, the following terms have the meanings indicated.

- Buyer:** means any customer receiving a Quote for Products from Seller.  
**Goods:** means any tangible part, system or component to be supplied by the Seller.  
**Products:** means the Goods, Services and/or Software as described in a Quote provided by the Seller.  
**Quote:** means the offer or proposal made by Seller to Buyer for the supply of Products.  
**Seller:** means Parker-Hannifin Corporation, including all divisions and businesses thereof.  
**Services:** means any services to be supplied by the Seller.  
**Software:** means any software related to the Products, whether embedded or separately downloaded.  
**Terms:** means the terms and conditions of this Offer of Sale or any newer version of the same as published by Seller electronically at [www.parker.com/sale/terms](http://www.parker.com/sale/terms).

2. **Terms.** All sales of Products by Seller are contingent upon, and will be governed by, these Terms and, these Terms are incorporated into any Quote provided by Seller to any Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic data interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.

3. **Price; Payment.** The Products set forth in Seller's Quote are offered for sale at the prices indicated in Seller's Quote. Unless otherwise specifically stated in Seller's Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). All sales are contingent upon credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

4. **Shipment; Delivery; Title and Risk of Loss.** All delivery dates are approximate. Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the shipment carrier at Seller's facility. Unless otherwise agreed, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferral of shipment at Buyer's request beyond the respective indicated shipping date will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

5. **Warranty.** The warranty related to the Products is as follows: (i) Goods are warranted against defects in material or workmanship for a period of eighteen (18) months from the date of delivery; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the completion of the Services by Seller; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer:

**DISCLAIMER OF WARRANTY: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULT-TOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED. BUYER AGREES AND ACKNOWLEDGES THAT UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".**

6. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to the Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. **LIMITATION OF LIABILITY.** IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. **IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, NON-COMPLETION OF SERVICES, USE, LOSS OF USE OF, OR INABILITY TO USE THE PRODUCTS OR ANY PART THEREOF, LOSS OF DATA, IDENTITY, PRIVACY, OR CONFIDENTIALITY, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.**

8. **Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which are or become Buyer's property, will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. **Special Tooling.** Special Tooling includes but is not limited to tooling, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Products. A tooling charge may be imposed for any Special Tooling. Such Special Tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in Special Tooling belonging to Seller that is utilized in the manufacture of the Products, even if such Special Tooling has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property in its sole discretion at any time.

10. **Security Interest.** To secure payment of all sums due, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. **User Responsibility.** The Buyer through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. The Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and other technical information provided with the Product. If Seller provides Product options based upon data or specifications provided

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by the Buyer, the Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event the Buyer is not the end-user, Buyer will ensure such end-user complies with this paragraph.

12. **Use of Products.** Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Products. Unauthorized Uses. If Buyer uses or resells the Products for any uses prohibited in Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products provided by Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tooling, equipment, plans, drawings, designs or specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing or tampering with the Products for any reason; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

13. **Cancellations and Changes.** Buyer may not cancel or modify any order for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller, at any time, may change Product features, specifications, designs and availability.

14. **Limitation on Assignment.** Buyer may not assign its rights or obligations without the prior written consent of Seller.

15. **Force Majeure.** Seller does not assume the risk and is not liable for delay or failure to perform any of Seller's obligations by reason of events or circumstances beyond its reasonable control ("Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

16. **Waiver and Severability.** Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of these Terms by legislation or other rule of law shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

17. **Termination.** Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or one if filed by a third party (d) makes an assignment for the benefit of creditors; or (e) dissolves its business or liquidates all or a majority of its assets.

18. **Ownership of Software.** Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

19. **Indemnity for Infringement of Intellectual Property Rights.** Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by the Seller to the Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for such claims of infringement of Intellectual Property Rights.

20. **Governing Law.** These Terms and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

21. **Entire Agreement.** These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

22. **Compliance with Laws.** Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Product from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws.

5/17







Parker Hannifin Corporation  
**Hydraulic Valve Division**  
520 Ternes Avenue  
Elyria, Ohio 44035 USA  
Tel: 440-366-5100  
Fax: 440-366-5253  
[www.parker.com/hydraulicvalve](http://www.parker.com/hydraulicvalve)