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Power  
Products

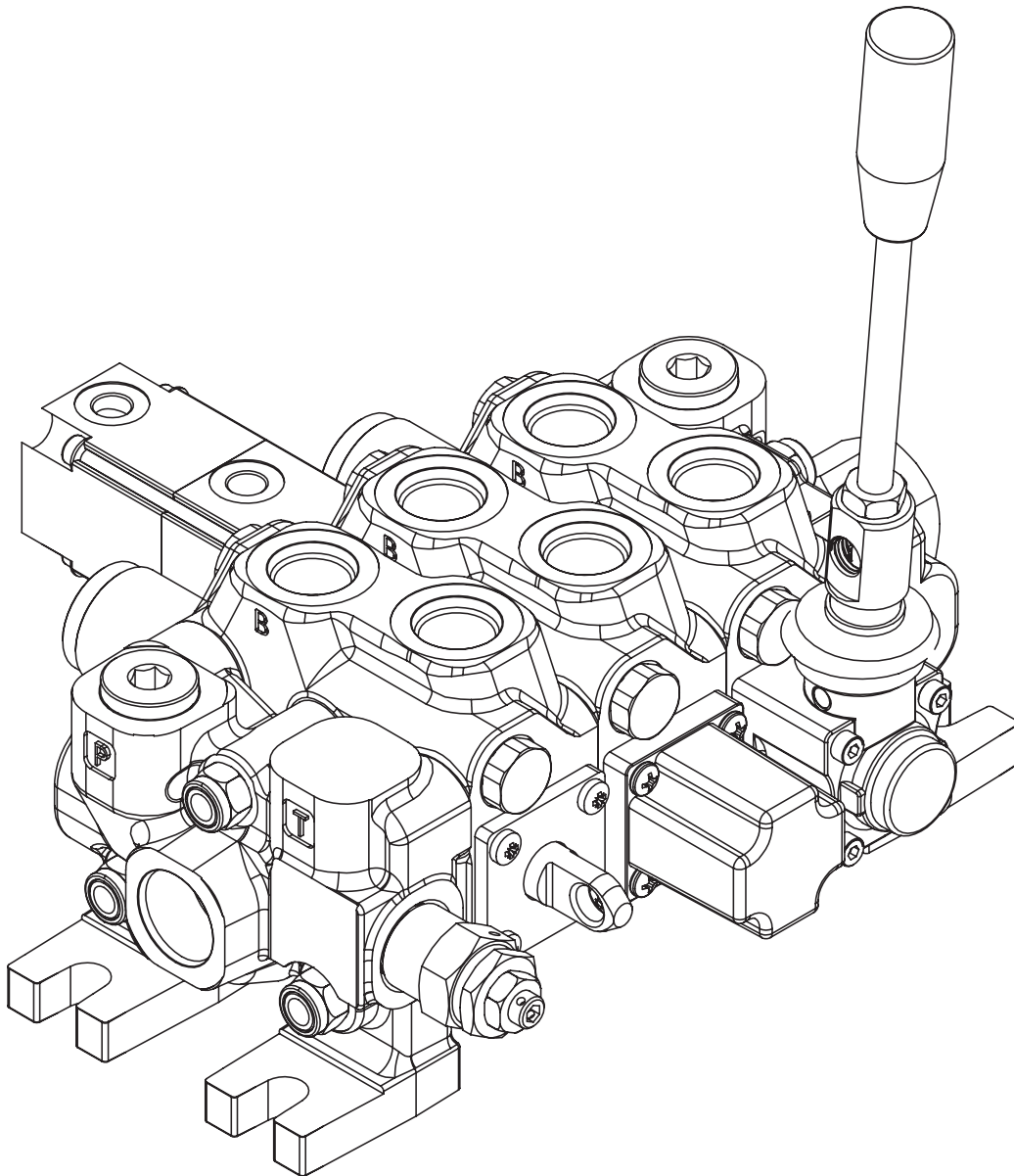
# V050 SERIES

## OPEN CENTER SECTIONAL DIRECTIONAL CONTROL VALVES

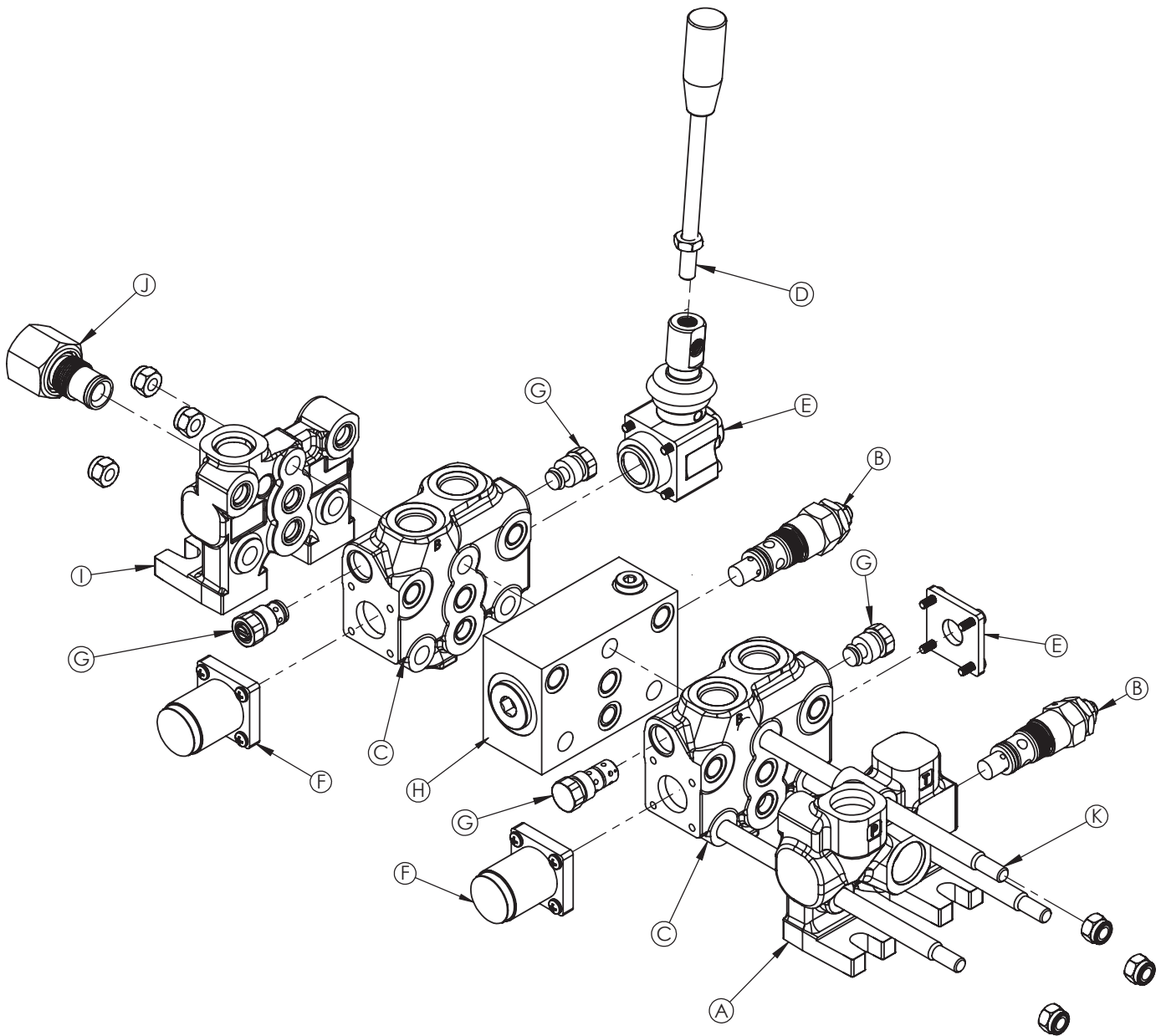
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PARTS LIST AND SERVICE MANUAL

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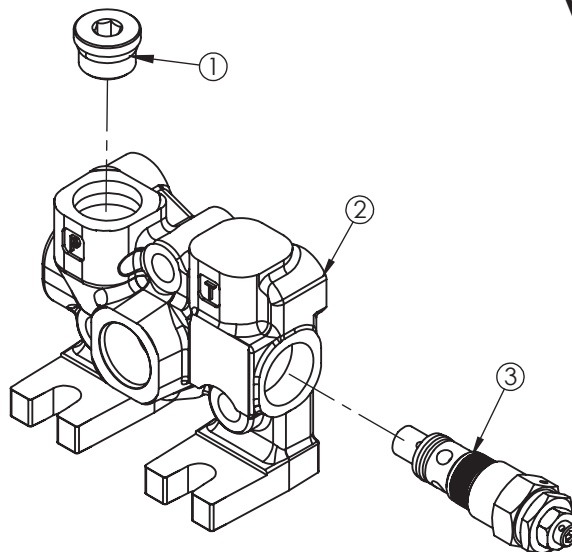
# V050 Assembly - Exploded View



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# Inlet Sections

V050-A-FM-7SX-\*\*\*\*

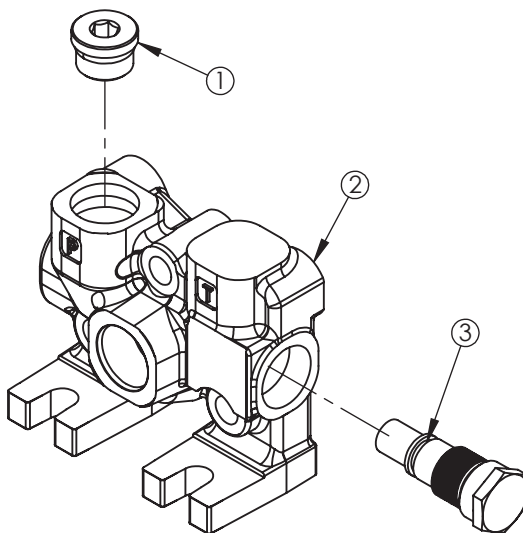


**Kit Part Number**  
**V050-A-FM-7SX-\*\*\*\***  
**Inlet with Relief Valve**

Item	Description	P/N
1	Steel plug with o-ring, -10SAE (1"-10 UN)	HHBP-10Z
2	Inlet with -10SAE (1"-10 UN) end port by -10SAE top port, and relief valve set at 2,175 PSI (150 BAR) <b>STANDARD INLET with STANDARD RELIEF VALVE (RV adjustment range 1,175-2,900 PSI, 81-200 BAR)</b>	V050-A-FM-7SX-N-150
	Inlet with -10SAE (1"-10 UN) end port by -10SAE top port, and relief valve set at 3,045 PSI (210 BAR) <b>WITH HIGH PRESSURE RELIEF VALVE (RV adjustment range 2,915-5,510 PSI, 201-380 BAR)</b>	V050-A-FM-7SX-R-210
3	See page 4 for relief valve information	N/A
<b>Inlet Notes</b>		
Item 1	Torque to 11 ± 1.5 lb.ft. (15 ± 2 Nm)	
Item 2	Assembly includes: Casting & Items 1 & 3	
Item 3	Torque to 28 ± 2.2 lb.ft. (38 ± 2 Nm)	

Note: Two inlet sections used if split flow mid-outlet is being used in the assembly

V050-A-FM-8SX-XXXX



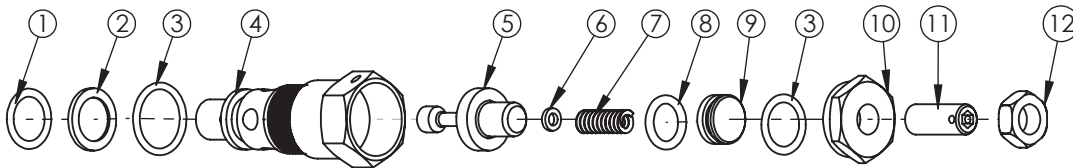
**Kit Part Number**  
**V050-A-FM-8SX-XXXX**  
**Inlet without Relief Valve**

Item	Description	P/N
1	Steel plug with o-ring, -10SAE (1"-10UN)	HHBP-10Z
2	Inlet with -10SAE (1"-10 UN) end port by -10SAE (1"-10 UN) top port, and NO relief valve	V050-A-FX-8SX-XXXX
3	Steel plug used in place of main relief valve (See page 4 for more information)	V050-AB-X-XXX
<b>Inlet Notes</b>		
Item 1	Torque to 11 ± 1.5 lb.ft. (15 ± 2 Nm)	
Item 2	Assembly includes: Casting and Items 1 & 3	
Item 3	Torque to 28 ± 2.2 lb.ft. (38 ± 2 Nm)	

Note: Two inlet sections used if split flow mid-outlet is being used in the assembly

# Inlet Relief Valve

V050-AB-\*\*\*\*



Part Number

V050-AB-\*\*\*\*

## Inlet Relief Valve

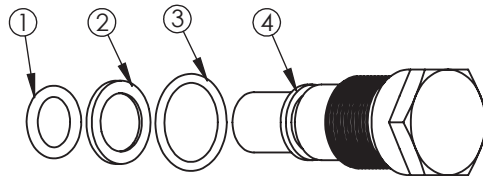
Item	Description	P/N	Qty.
1	O-ring, VITON, 70°Sh, 0.07" x 0.44" (1.78 x 11.11mm)	N/A	1
2	Back-up ring, VLP 35S	N/A	1
3	O-ring, VITON, 70°Sh, 0.07" x 0.61" (1.78 x 15.60mm)	N/A	2
4	Main RV cartridge body	N/A	1
5	Main RV poppet	N/A	1
6	Washer	N/A	1
7	Main RV spring, code "B", Adj range 145-1,160 PSI (10-80 BAR)	V050-AB-BSPG	1
	Main RV spring, code "N", Adj range 1,175-2,900 PSI (81-200 BAR)	V050-AB-NSPG	
	Main RV spring code "R", Adj range 2,915-5,510 PSI (201-380 BAR)	V050-AB-RSPG	
8	O-ring, 70°Sh, 0.07" x 0.36" (1.78 x 9.25mm)	N/A	1
9	Spring seat	N/A	1
10	Main relief valve plug	N/A	1
11	Main relief adjusting screw	N/A	1
12	Jam nut	N/A	1

### Inlet Relief Valve Notes

Item 4	Torque to 28 ± 2.2 lb.ft. (38 ± 3 Nm)
Item 10	Torque to 15 ± 1.5 lb.ft. (20 ± 2 Nm)
Item 12	Torque to 11 ± 1.5 lb.ft. (15 ± 2 Nm)

### Inlet Relief Valve Options

Part Number	Cartridge Valve Set Point	Cartridge Valve Adjustment Range
V050-AB-B080	Set @ 1,160 PSI (80 BAR)	Adj range from 145, 1,160 PSI (10-80 BAR)
V050-AB-N150	Set @ 2,175 PSI (150 BAR)	Adj range 1,175-2,900 PSI (81-200 BAR)
V050-AB-R210	Set @ 3,000 PSI (210 BAR)	Adj range 2,915-5,510 PSI (201-380 BAR)



V050-AB-XXXX

Part Number

V050-AB-XXXX

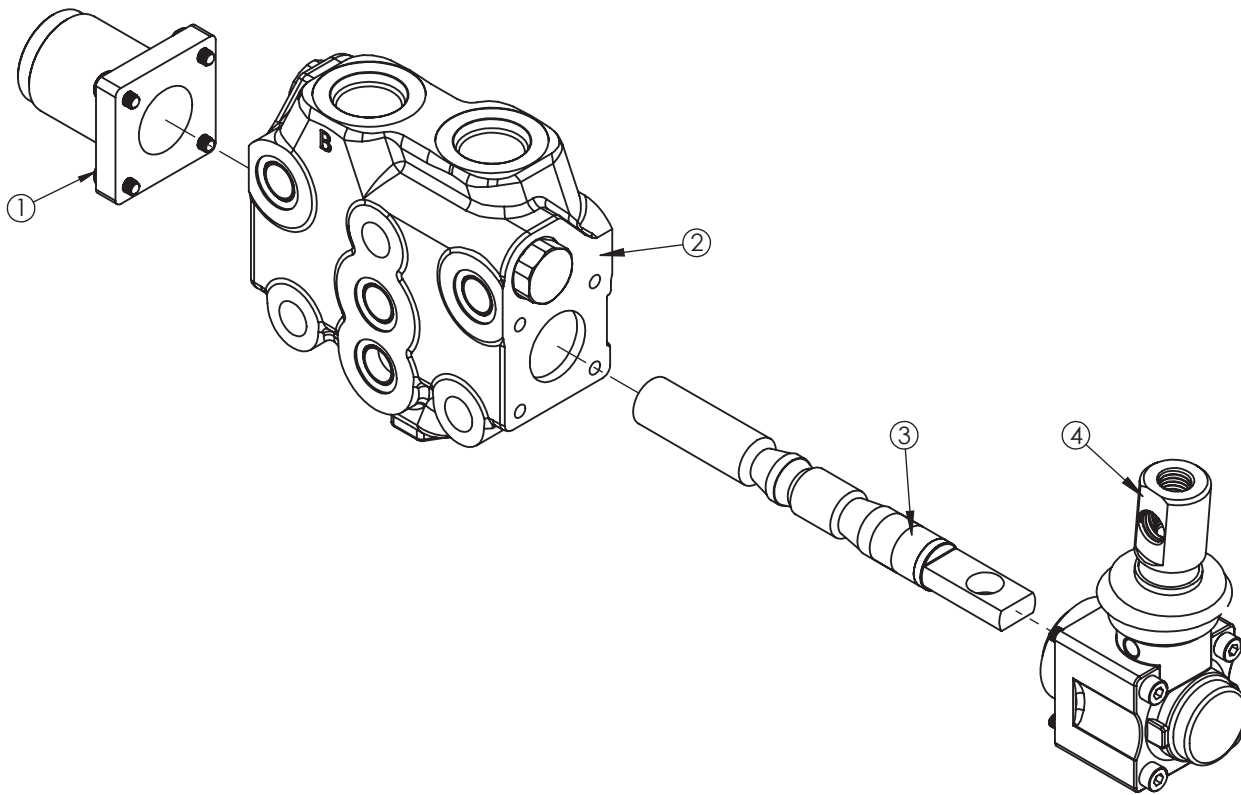
## Inlet Plug

Item	Description	P/N	Qty.
1	O-ring, VITON, 70°Sh, 0.07" x 0.44" (1.78 x 11.11mm)	N/A	1
2	Back-up ring, VLP 35S	N/A	1
3	O-ring, VITON, 70°Sh, 0.07" x 0.61" (1.78 x 15.60mm)	N/A	1
4	Main RV plug used in place of RV	N/A	1

### Inlet Steel Plug Notes

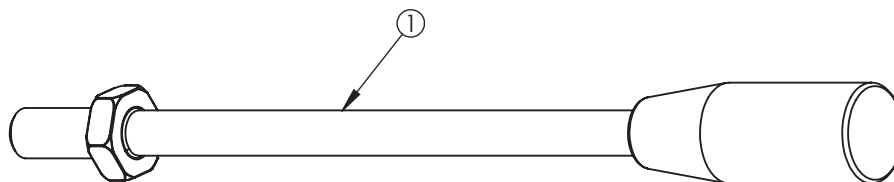
Item 4	Torque to 28 ± 2.2 lb.ft. (39 ± 3 Nm)
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# V050 Work Section



Item	Description	P/N
1	Back-cap option (see pages 10-15 for more information)	N/A
2	Work section casting machined for work port options with -8SAE ports	N/A
	Work section casting machined for work port options with -10SAE ports	N/A
3	3P3W, single acting cylinder, pressure out "B" port	V050-SPL-AB
	3P3W, single acting cylinder spool, pressure out "B" port for use w/ solenoid control	V050-SPL-AB-35
	3P4W, double acting cylinder	V050-SPL-AC
	3P4W, double acting cylinder for use w/ solenoid control	V050-SPL-AC-36
	3P4W, bi-rotational motor spool (work ports connected to tank in neutral)	V050-SPL-AJ
	3P4W, bi-rotational motor spool for use w/ solenoid control	V050-SPL-AJ-37
	4P4W, double acting cylinder w/ float (4th pos. detent)	V050-SPL-AM
4	Control options (See pages 6-9 for more information)	N/A

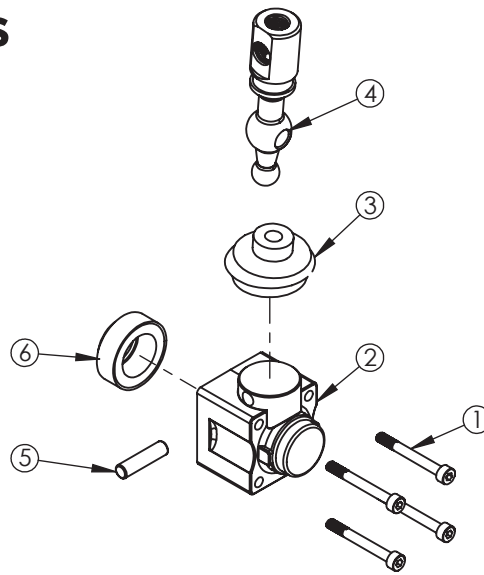
## Valve Handle Kit VLVH-O\*B\*\*\*



Item	Description	P/N
1	6.5in (164mm) lever handle (Standard Option)	VLVH-01B-164
	7.0in (180mm) lever handle	VLVH-01B-180
	9.5in (240mm) lever handle	VLVH-01B-240
	6.9in (175mm) lever handle with lens cap	VLVH-02B-175

# Control Options

V050-CT-AA



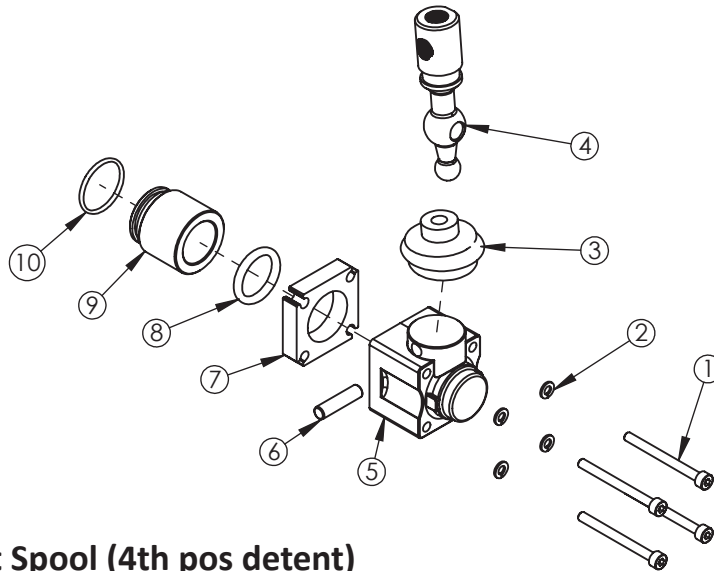
**Kit Part Number**  
**V050-CT-AA**  
**Standard Lever Cap**

Item	Description	P/N	Qty.
1	Screw, M4 x 35 gr. 8.8 (UNI 5931)	N/A	4
2	Lever cap control housing	N/A	1
3	Rubber dust boot	N/A	1
4	Handle receiver & spool connector	N/A	1
5	Pivot pin	N/A	1
6	Spacer bushing	N/A	1

**Control Notes**

Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)
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V050-CT-AB



**Kit Part Number**  
**V050-CT-AB**  
**Lever Cap for Float Spool (4th pos detent)**

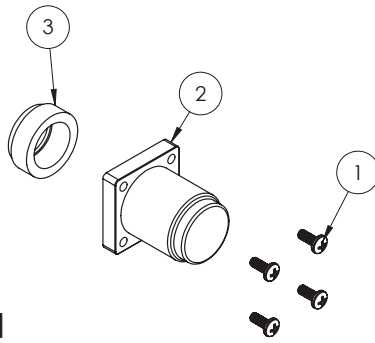
Item	Description	P/N	Qty.
1	Screw, M4 x 45 gr. 8.8 (UNI 5931)	N/A	4
2	Washer, 5mm diameter	N/A	4
3	Rubber dust boot	N/A	1
4	Handle receiver & spool connector	N/A	1
5	Lever cap control housing	N/A	1
6	Pivot pin	N/A	1
7	Spacer plate used for 4 position spools	N/A	1
8	O-ring, VITON, 90°Sh, 0.103" x 0.703" (2.62 x 17.86mm)	N/A	1
9	Spacer bushing	N/A	1
10	O-ring, NBR, 70°Sh, 0.070" x 0.739" (1.78 x 18.77mm)	12T36879	1

**Control Notes**

Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)
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# Control Options

V050-CT-AE



Kit Part Number

V050-CT-AE

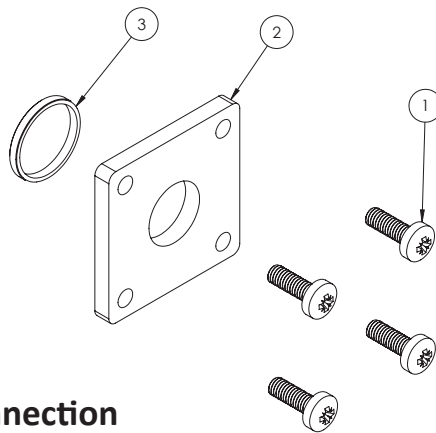
Spool Cover for Back-cap Control

Item	Description	P/N	Qty.
1	Screw M4 x 12 gr. 8.8 (UNI 5931)	N/A	4
2	Spool cover	N/A	1
3	Spacer bushing	N/A	1

**Control Notes**

Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)		
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V050-CT-AJ



Kit Part Number

V050-CT-AJ

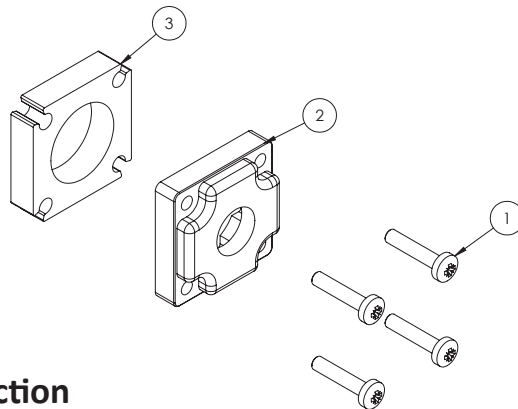
Spool Eye Only for Direct Connection

Item	Description	P/N	Qty.
1	Screw M4 x 12 gr. 8.8 (UNI 5931)	N/A	4
2	Control plate and spool o-ring retainer	N/A	1
3	O-ring Spacer	N/A	1

**Control Notes**

Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)		
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V050-CT-AK



Kit Part Number

V050-CT-AK

Spool Eye for Direct Connection

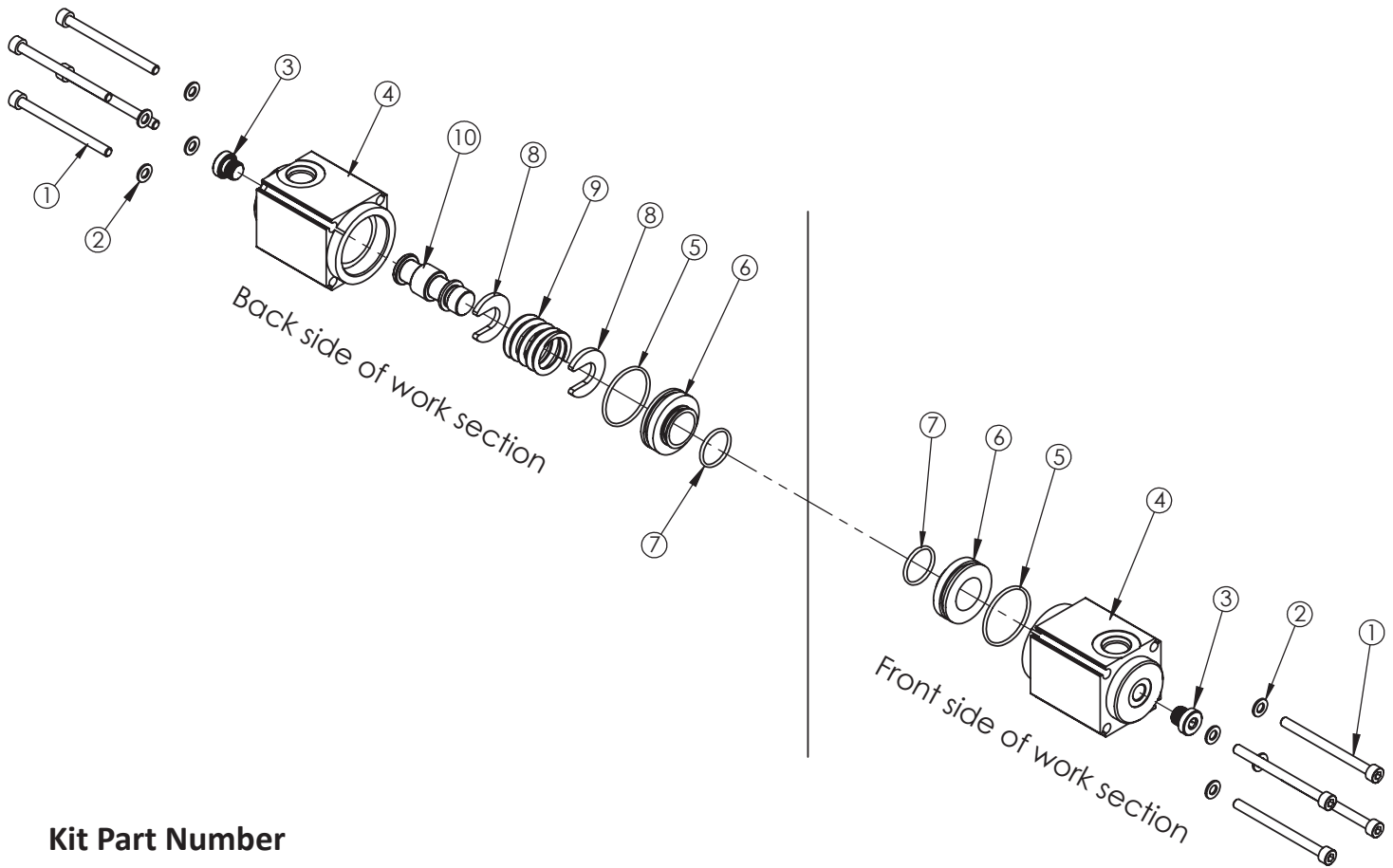
Item	Description	P/N	Qty.
1	Screw M4 x 12 gr. 8.8 (UNI 5931)	N/A	4
2	Control plate and spool o-ring retainer	N/A	1
3	Spacer plate	N/A	1

**Control Notes**

Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)		
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# Control Options

V050-CT-BG



## Kit Part Number

V050-CT-BG

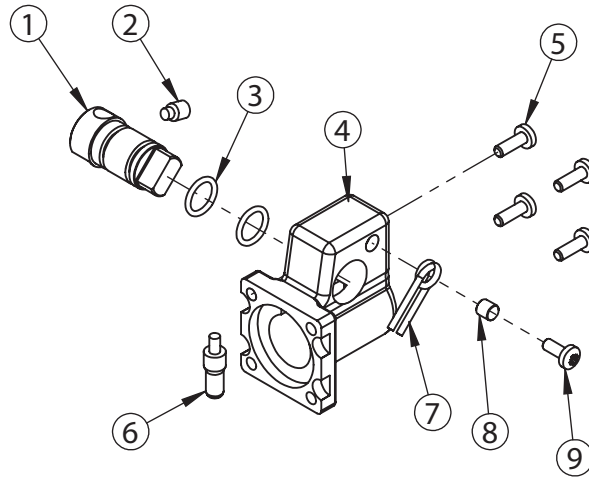
## Low Pressure, Dual Sided, Hydraulic Control

Item	Description	P/N	Qty.
1	Screw, M4 x 50 gr. 8.8 (UNI 5931)	N/A	8
2	Washer, 5mm diameter	N/A	8
3	Pressure gauge port plug w/ o-ring, 1/8" GAS thread	N/A	2
4	Hydraulic control caps	N/A	2
5	O-ring, 70°Sh, 0.070" x 1.176" (1.78 x 29.87mm)	N/A	2
6	Spacer bushing	N/A	2
7	O-ring, 70°Sh, 0.070" x 0.864" (1.78 x 21.95mm)	12T35949	2
8	Washer for spring compressing	N/A	2
9	Positioning spring	N/A	1
10	Back-cap spool connector	N/A	1

### Control Notes

Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)
Item 3	Torque to 7.5 ± 0.4 lb.ft. (10 ± 0.5 Nm)
Item 9	Apply multi-purpose grease to the spring prior to assembly.
Item 10	Clean the threads on item 10 and in the spool seat with a degreasing product.
	<i>For parallel and single spools</i>
	Apply 2 drops of Loctite 242 and torque item 10 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
	Be sure not to scratch or damage the spool.
	<i>For series and series-parallel spools</i>
	Assemble the o-ring (90°Sh, 0.070" x 0.426") supplied with the spool, and apply 2 drop of Loctite 242. Be sure to avoid applying Loctite to the o-ring area.
	Torque item 10 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
Be sure not to scratch or damage the spool.	

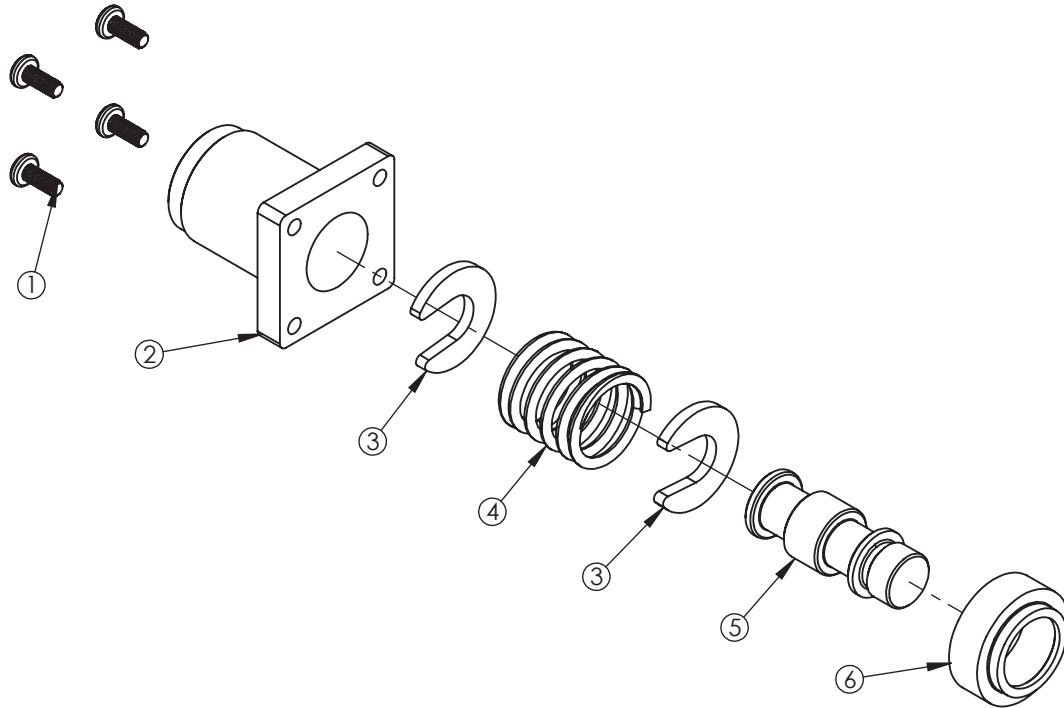




**Kit Part Number**  
**V050-CT-DE**  
**Standard Lever Cap**

Item	Description	P/N	Qty.
1	Pivot Pin	N/A	1
2	Set Screw, M6x010 (UNI 5925)	N/A	1
3	O-ring, 1.78 x 12.42 70°Sh NBR	N/A	2
4	Lever cap control housing	N/A	1
5	Screw, M4x12 gr. 8.8 (UNI 5931)	N/A	4
6	Spool connector	N/A	1
7	Spring	N/A	1
8	Spacer	N/A	1
9	Scre, M4x12 gr. 8.8 (UNI 7687)	N/A	1

<b>Control Notes</b>			
Item 5 & 9	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)		
Item 6	Clean the threads on item 6, apply 2 drops of Loctite 242 and torque item 6 to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm).		



## Kit Part Number

V050-BC-01

## Standard 3 Position Spring Return

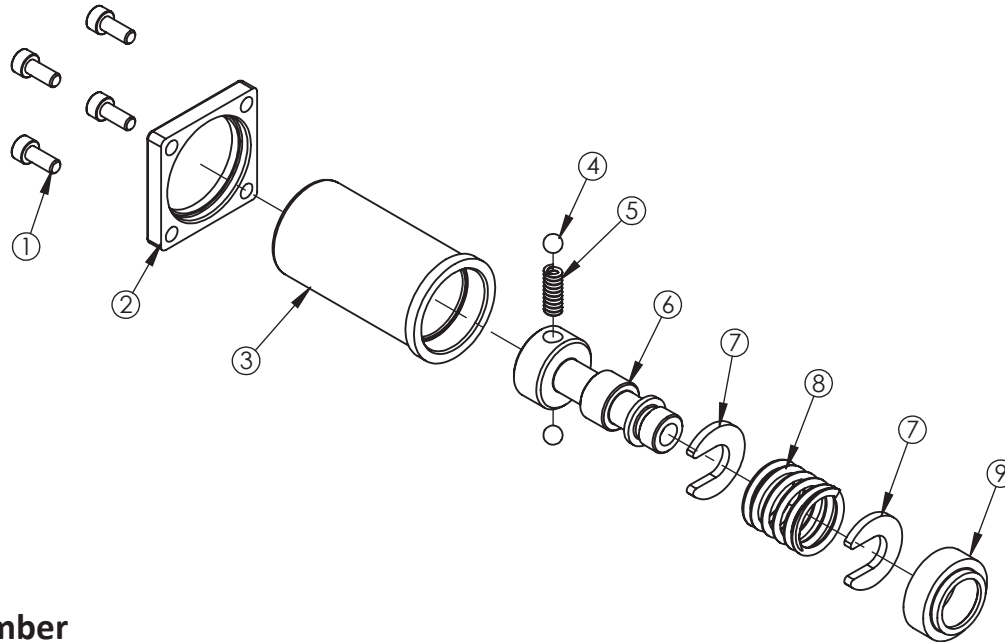
Item	Description	P/N	Qty.
1	Screw, M4 x 12 gr. 8.8 (UNI 5931)	N/A	4
2	Back-cap housing	N/A	1
3	Standard washer for spring compressing	N/A	2
4	Positioning spring	N/A	1
5	Back-cap spool connector	N/A	1
6	Standard spacer bushing	N/A	1

### Back-cap Notes

Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)
Item 4	Generously apply multi-purpose grease to the spring prior to assembly.
Item 5	Clean the threads on item 5 and in the spool seat with a degreasing product.
	<i>For parallel and single spools</i>
	Apply 2 drops of Loctite 242 and torque item 5 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
	Be sure not to scratch or damage the spool.
	<i>For series and series-parallel spools</i>
	Assemble the o-ring (90°Sh, 0.070" x 0.426") supplied with the spool, and apply 2 drop of Loctite 242. Be sure to avoid applying Loctite to the o-ring area
	Torque item 5 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
	Be sure not to scratch or damage the spool.

# Back-cap Positioners

V050-BC-06  
V050-BC-07



## Kit Part Number

V050-BC-06, Detent Spool "IN", Spring Spool "OUT"

V050-BC-07, Detent Spool "OUT", Spring Spool "IN"

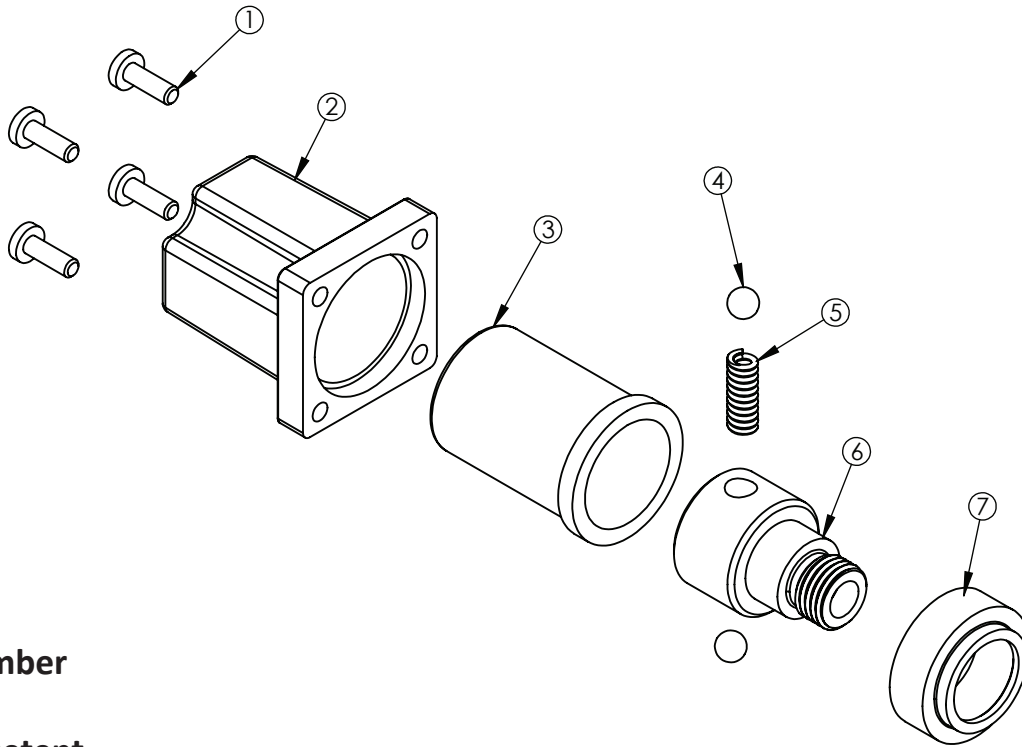
Item	Description	P/N	Qty.
1	Screw, M4 x 12 gr. 8.8 (UNI 5931)	N/A	4
2	Back cap mounting plate	N/A	1
3	Back cap housing for detent "IN", spring "OUT", option 06	N/A	1
	Back cap housing for detent "OUT", spring "IN", option 07	N/A	
4	Detent ball	N/A	2
5	Detent spring	N/A	1
6	Back cap spool connector for detent "IN", spring "OUT", option 06	N/A	1
	Back cap spool connector for detent "OUT", spring "IN", option 07	N/A	
7	Standard washer for spring compressing	N/A	2
8	Positioning spring	N/A	1
9	Standard spacer bushing	N/A	1

### Back-cap Notes

Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)
Item 4 & 5	Generously apply multi-purpose grease to the spring and detent balls prior to assembly to aid in the assembly process.
Item 6	Clean the threads on item 6 and in the spool seat with a degreasing product.
	<i>For parallel and single spools</i>
	Apply 2 drops of Loctite 242 and torque item 6 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
	Be sure not to scratch or damage the spool.
	<i>For series and series-parallel spools</i>
	Assemble the o-ring (90°Sh, 0.070" x 0.426") supplied with the spool, and apply 1 drop of Loctite 242. Be sure to avoid applying Loctite to the o-ring area.
	Torque item 6 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
Be sure not to scratch or damage the spool.	
Item 8	Apply multi-purpose grease to the spring prior to assembly.

# Back-cap Positioners

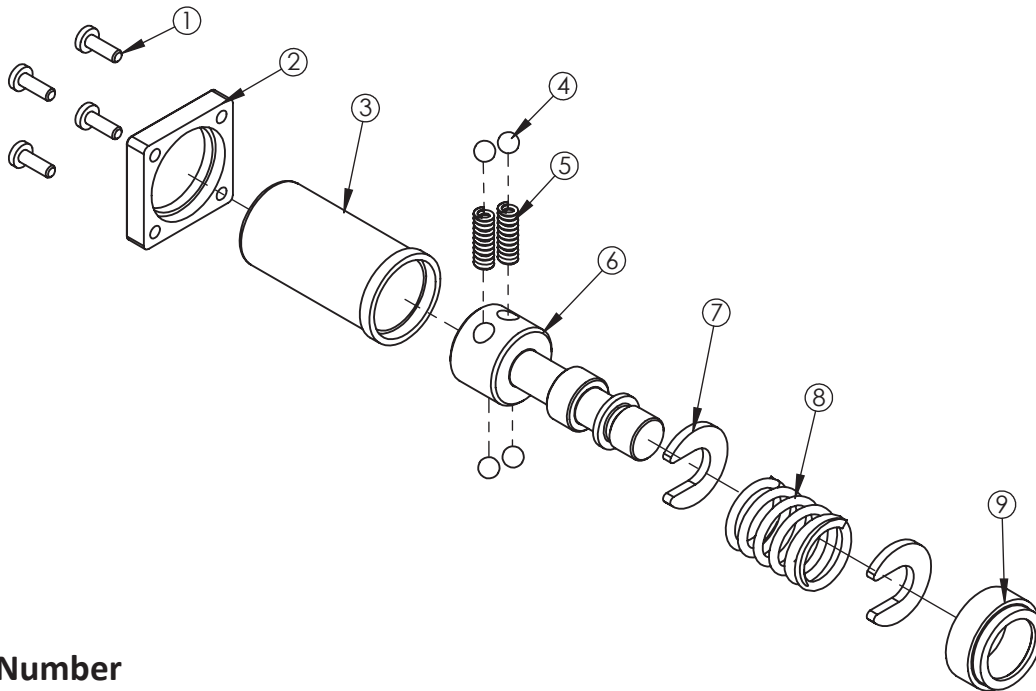
V050-BC-08



**Kit Part Number**  
**V050-BC-08**  
**3 Position Detent**

Item	Description	P/N	Qty.
1	Screw, M4 x 12 gr. 8.8 (UNI 5931)	N/A	4
2	Back-cap mounting fixture	N/A	1
3	Back-cap housing	N/A	1
4	Detent ball	N/A	2
5	Detent spring	N/A	1
6	Back-cap spool connector	N/A	1
7	Standard spacer bushing	N/A	1

<b>Back-cap Notes</b>	
Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)
Item 4 & 5	Generously apply multi-purpose grease to the spring and detent balls prior to assembly to aid in the assembly process.
Item 6	Clean the threads on item 6 and in the spool seat with a degreasing product.
	<i>For parallel and single spools</i>
	Apply 2 drops of Loctite 242 and torque item 6 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
	Be sure not to scratch or damage the spool.
	<i>For series and series-parallel spools</i>
	Assemble the o-ring (90°Sh, 0.070" x 0.426") supplied with the spool, and apply 1 drop of Loctite 242. Be sure to avoid applying Loctite to the o-ring area.
	Torque item 6 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
	Be sure not to scratch or damage the spool.



**Kit Part Number**

**V050-BC-12**

**3 Position Spring Return w/ 4th Position Detent**

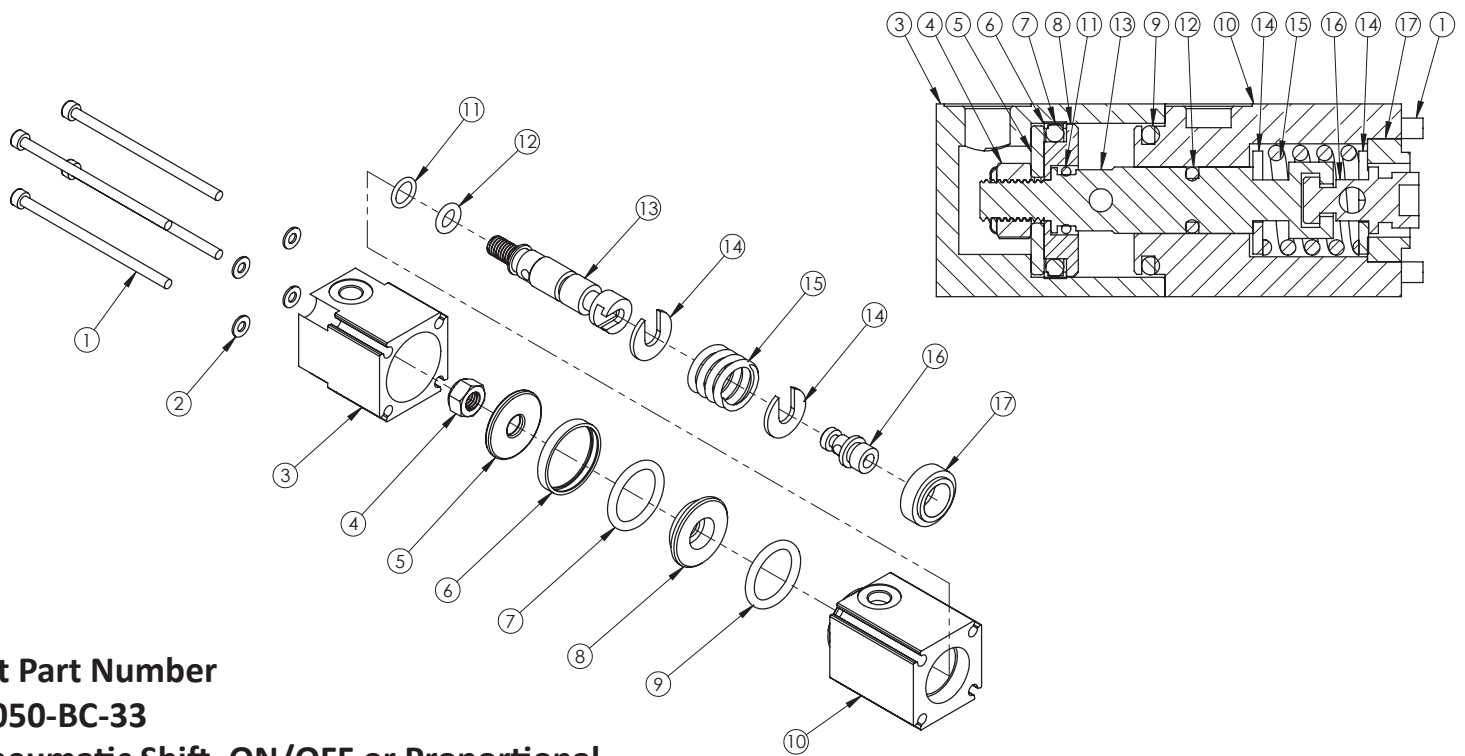
Item	Description	P/N	Qty.
1	Screw, M4 x 12 gr. 8.8 (UNI 5931)	N/A	4
2	Back-cap mounting plate	N/A	1
3	Back-cap housing	N/A	1
4	Detent ball	N/A	4
5	Detent spring	N/A	2
6	Back-cap spool connector	N/A	1
7	Standard washer for spring compressing	N/A	2
8	Standards positioning spring	N/A	1
9	Standard spacer bushing	N/A	1

**Back-cap Notes**

Item 1	Torque to 1.5 ± 0.15 lb.ft. (2 ± 0.2 Nm)
Item 4 & 5	Generously apply multi-purpose grease to the spring and detent balls prior to assembly to aid in the assembly process.
Item 6	Clean the threads on item 6 and in the spool seat with a degreasing product.
	<i>For parallel and single spools</i>
	Apply 2 drops of Loctite 242 and torque item 6 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
	Be sure not to scratch or damage the spool.
	<i>For series and series-parallel spools</i>
	Assemble the o-ring (90°Sh, 0.070" x 0.426") supplied with the spool, and apply 1 drop of Loctite 242. Be sure to avoid applying Loctite to the o-ring area.
	Torque item 6 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
Be sure not to scratch or damage the spool.	

# Back-cap Positioners

V050-BC-33



**Kit Part Number**

**V050-BC-33**

**Pneumatic Shift, ON/OFF or Proportional**

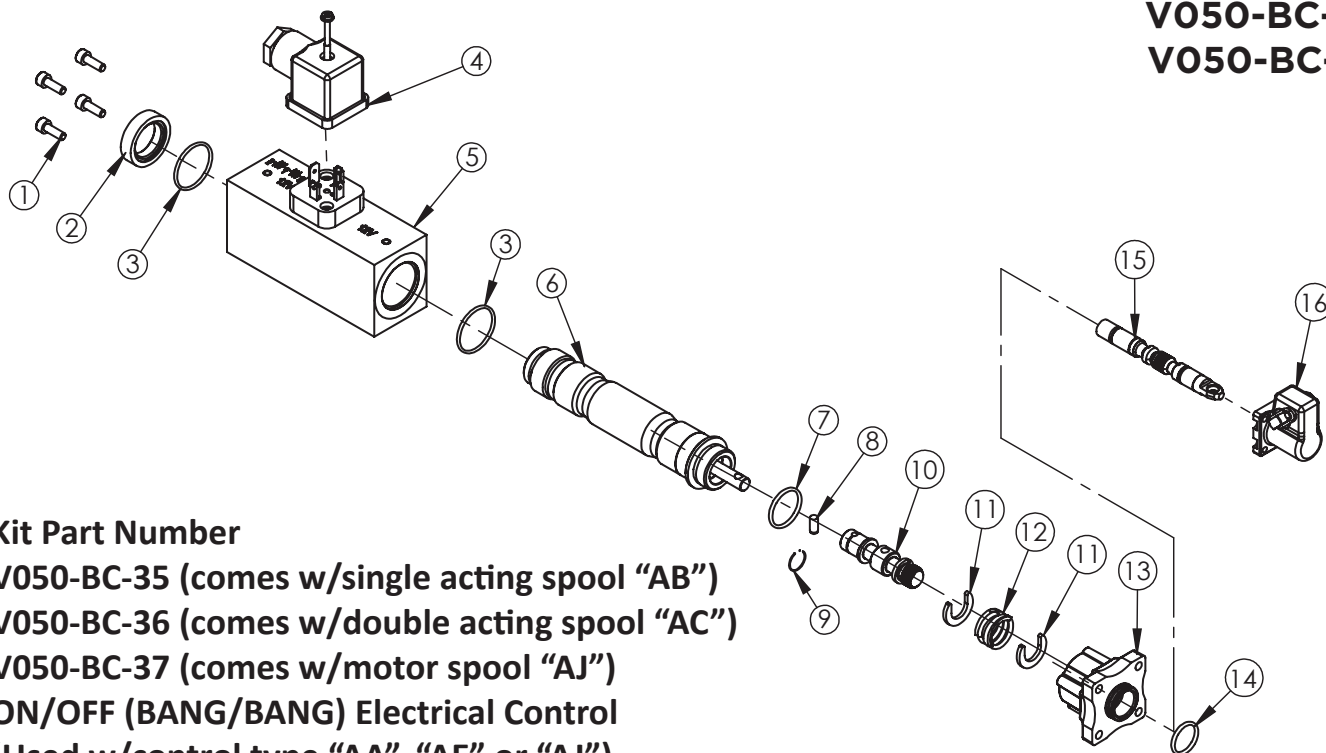
Item	Description	P/N	Qty.
1	Screw, M4 x 80 gr. 8.8 (UNI 5931)	N/A	4
2	Washer, 5mm ID x 10mm OD	N/A	4
3	Pneumatic control cylinder housing	N/A	1
4	Lock nut, M8 thread	N/A	1
5	Washer, 8mm ID x 14mm OD	N/A	1
6	Piston seal	N/A	1
7	O-ring, 70°Sh, 0.14" x 0.92" (3.53 x 23.40mm)	N/A	1
8	Piston for pneumatic control	N/A	1
9	O-ring, 70°Sh, 0.070" x 1.05" (1.78 x 23.40mm)	N/A	1
10	Back-cap housing for pneumatic control	N/A	1
11	O-ring, 70°Sh, 0.070" x 0.34" (1.78 x 8.73mm)	N/A	1
12	O-ring, 70°Sh, 0.103" x 0.299" (2.62 x 7.59mm)	N/A	1
13	Back-cap spool connector for pneumatic control	N/A	1
14	Standard washer for spring compressing	N/A	2
15	Positioning spring for pneumatic control (proportional or on/off)	N/A	1
16	Piston rod for pneumatic cylinder	N/A	1
17	Standard spacer bushing	N/A	1

**Back-cap Notes**

Item 1	Torque to 1.5 ± 0.15 ft.lb. (2 ± 0.2 Nm)
Item 4	Torque to 14.75 ± 2.2 ft.lb. (20 ± 3 Nm)
Item 15	Apply multi-purpose grease to the spring prior to assembly.
Item 16	Clean the threads on item 16 and in the spool seat with a degreasing product.
	<i>For parallel and single spools</i>
	Apply 2 drops of Loctite 242 and torque item 16 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
	Be sure not to scratch or damage the spool.
	<i>For series and series-parallel spools</i>
	Assemble the o-ring (90°Sh, 0.070" x 0.426") supplied with the spool, and apply 1 drop of Loctite 242. Be sure to avoid applying Loctite to the o-ring area.
	Torque item 16 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
Be sure not to scratch or damage the spool.	

# Back-cap Positioners

V050-BC-35  
V050-BC-36  
V050-BC-37



## Kit Part Number

V050-BC-35 (comes w/single acting spool "AB")

V050-BC-36 (comes w/double acting spool "AC")

V050-BC-37 (comes w/motor spool "AJ")

ON/OFF (BANG/BANG) Electrical Control

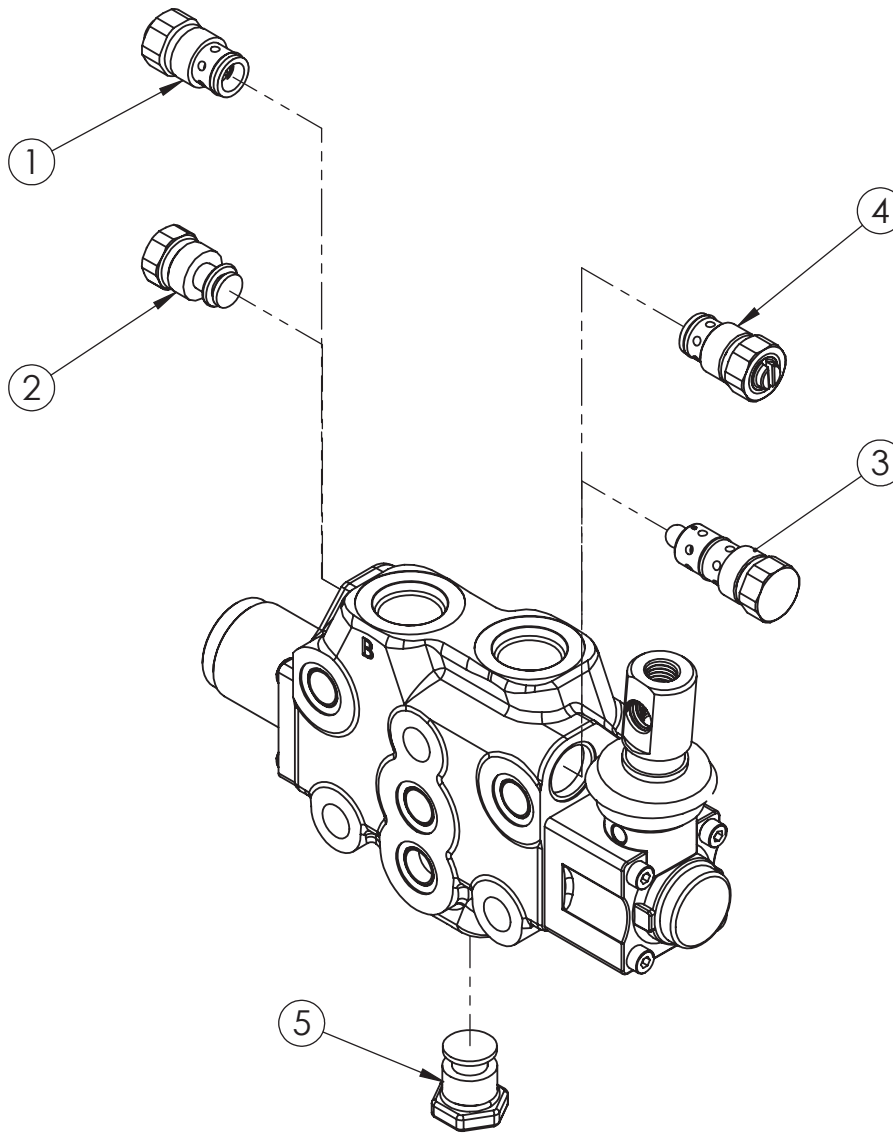
(Used w/control type "AA", "AE" or "AJ")

Item	Description	P/N	Qty.
1	Screw, M4 x 12 gr. 8.8 (UNI 5931)	N/A	4
2	Armature tube retainer cap	N/A	1
3	O-ring, 70°Sh, 0.070" x 0.86" (1.78 x 21.95mm)	12T35949	2
4	DIN connector 43650	34T65499	1
5	12VDC solenoid coil (ON/OFF, BANG-BANG only)	N/A	1
6	Armature tube assembly	N/A	1
7	O-ring, VITON, 70°Sh, 0.070" x 0.739" (1.78 x 18.77mm)	12T36879	1
8	Stem connector pin	N/A	1
9	Spring wire	N/A	1
10	Back-cap spool connector for electronic solenoid control	N/A	1
11	Washer for spring compressing	N/A	2
12	Standard positioning spring	N/A	1
13	Back-cap housing	N/A	1
14	O-Ring, VITON, 70°Sh, 0.070" x 0.55" (1.78 x 15mm)	12T37021	1
15	Special "AB" single acting cylinder spool used with electric solenoid kit V050BC35	V050-SPL-AB-35	1
	Special "AC" double acting cylinder spool used with electric solenoid kit V050BC36	V050-SPL-AC-36	1
	Special "AJ" double acting motor spool used with electric solenoid kit V050BC37	V050-SPL-AJ-37	1
16	Lever cap control option (standard part in V050BC35/36/37 kits)	V050-CT-DE	1

## Back-cap Notes

Item 1	Torque to 2.2 ± 0.15 lb.ft. (3.0 ± 0.2 Nm)
Item 2	Torque to 2.2 ± 0.15 lb.ft. (3.0 ± 0.2 Nm)
Item 10	Clean the threads on item 10 and in the spool seat with a degreasing product.
	<i>For parallel and single spools</i>
	Apply 2 drops of Loctite 242 and torque item 10 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
	Be sure not to scratch or damage the spool.
	<i>For series and series-parallel spools</i>
	Assemble the o-ring (90°Sh, 0.070" x 0.426") supplied with the spool, and apply 1 drop of Loctite 242. Be sure to avoid applying Loctite to the o-ring area.
	Torque item 10 to 22 ± 1.5 lb.ft. (30 ± 2 Nm).
Be sure not to scratch or damage the spool.	
Item 12	Apply multi-purpose grease to the spring prior to assembly.

# Cartridge Valves

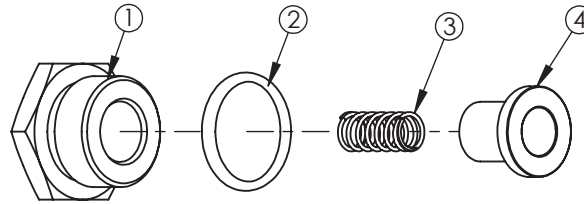


Item	Part Number/Description	Page	Qty.
1	V050-W33-****	19	1 or 2
2	V050-WCX-XXXX	17	1 or 2
3	V050-W04-XXXXX	17	1 or 2
4	V050-W30-****	18	1 or 2
5	V050-CHK-XXXX	17	1
<b>Cartridge Valve Notes</b>			
Item 1-4	Torque to 14.75 ± 2.2 lb.ft. (20 ± 3 Nm)		



# Cartridge Valves

V050-CHK-XXXX



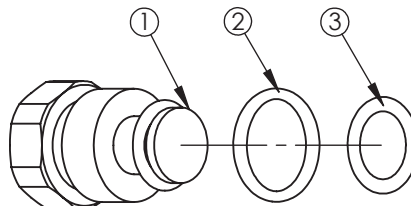
**Part Number**  
**V050-CHK-XXXX**  
**Work Port Check Valve**

Item	Description	P/N	Qty.
1	Check valve plug	N/A	1
2	O-ring, VITON, 70°Sh, 0.07" x 0.437" (1.78 x 11.11mm)	N/A	1
3	Check valve spring	N/A	1
4	Check valve	N/A	1

**Cartridge Valve Notes**

Item 1	Torque to 14.75 ± 2.2 lb.ft. (20 ± 3 Nm)
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V050-WCX-XXXX



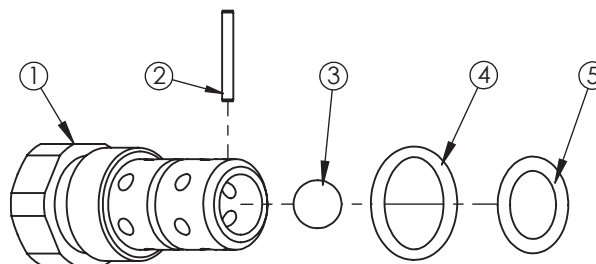
**Part Number**  
**V050-WCX-XXXX**  
**Work Port Steel Plug**

Item	Description	P/N	Qty.
1	Work port plug body	N/A	1
2	O-ring, VITON, 70°Sh, 0.070" x 0.437" (1.78 x 11.11mm)	N/A	1
3	O-ring, VITON, 90°Sh, 0.070" x 0.344" (1.78 x 8.74mm)	N/A	1

**Cartridge Valve Notes**

Item 1	Torque to 14.75 ± 2.2 lb.ft. (20 ± 3 Nm)
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V050-W04-XXXX



**Part Number**  
**V050-W04-XXXX**  
**Work Port Anti-Cavitation Valve**

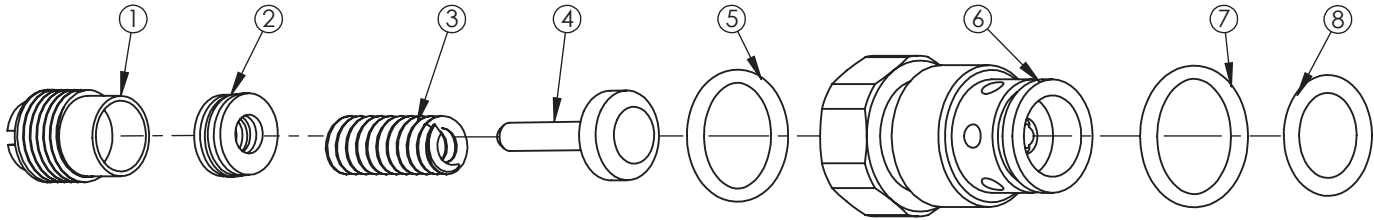
Item	Description	P/N	Qty.
1	Anti-cavitation body valve	N/A	1
2	Anti-cavitation check ball retainer pin, 0.06" x 0.39" (1.5 x 10mm)	N/A	1
3	Anti-cavitation check ball, ¼" diameter, S2 class A	N/A	1
4	O-ring, 70°Sh, 0.070" x 0.437" (1.78 x 11.11mm)	N/A	1
5	O-ring, 90°Sh, 0.070" x 0.344" (1.78 x 8.73mm)	N/A	1

**Cartridge Valve Notes**

Item 1	Torque to 14.75 ± 2.2 lb.ft. (20 ± 3 Nm)
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# Cartridge Valves

V050-W30-\*\*\*\*



## Part Number

V050-W30-\*\*\*\*

## Work Port Relief Valve

Item	Description	P/N	Qty.
1	Adjusting screw	N/A	1
2	Spacer kit	V050-W30-SHIMKIT	1
3	Work port RV+AC white spring, code "B" Adj from 145-1,160 PSI (10-80 BAR)	V050-W30-BSPG	1
	Work port RV+AC black spring, code "N" Adj from 1,175-2,900 PSI (81-200 BAR)	V050-W30-NSPG	
	Work port RV+AC red spring, code "R" Adj from 2,915-5,510 PSI (201-380 BAR)	V050-W30-RSPG	
4	Relief valve cone	N/A	1
5	O-ring, VITON, 70°Sh, 0.059" x 0.394" (1.5 x 10.00mm)	N/A	1
6	Anti-cavitation body valve	N/A	1
7	O-ring, VITON, 70°Sh, 0.070" x 0.437" (1.78 x 11.11mm)	N/A	1
8	O-ring, VITON, 90°Sh, 0.070" x 0.344" (1.78 x 8.73mm)	N/A	1

### Cartridge Valve Notes

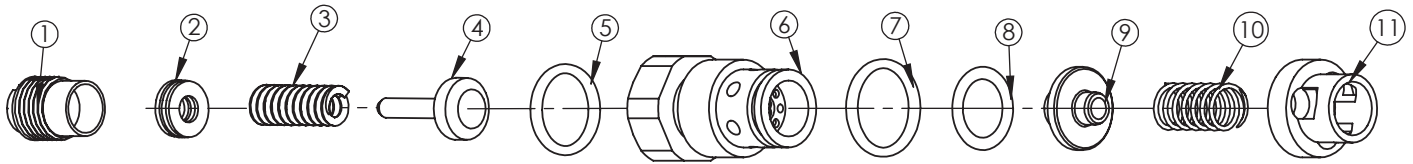
Item 1	Torque to 14.75 ± 2.2 lb.ft. (20 ± 3 Nm)
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### Work Port Relief with Anti-Cavitation Valve Options

Part Number	Relief Valve Set Point	Relief Valve Adjustment Range
V050-W30-B035	Set @ 507 PSI (35 BAR)	Adj range 145 - 1,160 PSI (10 - 80 BAR)
V050-W30-B070	Set @ 1,015 PSI (70 BAR)	
V050-W30-N125	Set @ 1,812 PSI (125 BAR)	Adj range 1,174 - 2,900 PSI (81 - 200 BAR)
V050-W30-N150	Set @ 2,175 PSI (150 BAR)	
V050-W30-N170	Set @ 2,465 PSI (170 BAR)	
V050-W30-R210	Set @ 3,045 PSI (210 BAR)	Adj range 2,915 - 5,511 PSI (201 - 380 BAR)

# Cartridge Valves

V050-W33-\*\*\*\*



## Part Number

V050-W33-\*\*\*\*

## Work Port Relief Valve + AC Valve

Item	Description	P/N	Qty.
1	Adjusting screw	N/A	1
2	Spacer kit	N/A	1
3	Work port RV+AC white spring, code "B" Adj from 145-1,160 PSI (10-80 BAR)	V050-W30-BSPG	1
	Work port RV+AC black spring, code "N" Adj from 1,175-2,900 PSI (81-200 BAR)	V050-W30-NSPG	
	Work port RV+AC red spring, code "R" Adj from 2,915-5,519 PSI (201-380 BAR)	V050-W30-RSPG	
4	Anti-cavitation valve cone	N/A	1
5	O-ring, VITON, 70°Sh, 0.059" x 0.394" (1.5 x 10.00mm)	N/A	1
6	Anti-cavitation body valve	N/A	1
7	O-ring, VITON, 70°Sh, 0.070" x 0.437" (1.78 x 11.11mm)	N/A	1
8	O-ring, VITON, 90°Sh, 0.070" x 0.344" (1.78 x 8.73mm)	N/A	1
9	Washer for anti-cavitation valve	N/A	1
10	Spring for check valve	N/A	1
11	Cover	N/A	1

### Cartridge Valve Notes

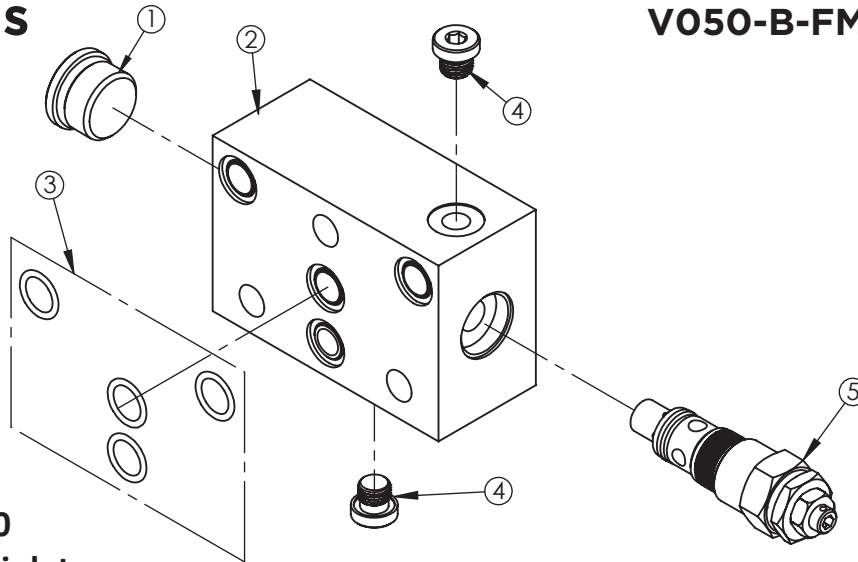
Item 1	Torque to 14.75 ± 2.2 lb.ft. (20 ± 3 Nm)
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### Work Port Relief with Anti-Cavitation Valve Options

Part Number	Relief Valve Set Point	Relief Valve Adjustment Range
V050-W33-B035	Set @ 507 PSI (35 BAR)	Adj range 145 - 1,160 PSI (10 - 80 BAR)
V050-W33-B070	Set @ 1,015 PSI (70 BAR)	
V050-W33-N125	Set @ 1,812 PSI (125 BAR)	Adj range 1,174 - 2,900 PSI (81 - 200 BAR)
V050-W33-N150	Set @ 2,175 PSI (150 BAR)	
V050-W33-N170	Set @ 2,465 PSI (170 BAR)	
V050-W33-R210	Set @ 3,045 PSI (210 BAR)	Adj range 2,915 - 5,511 PSI (201 - 380 BAR)

# Mid-Sections

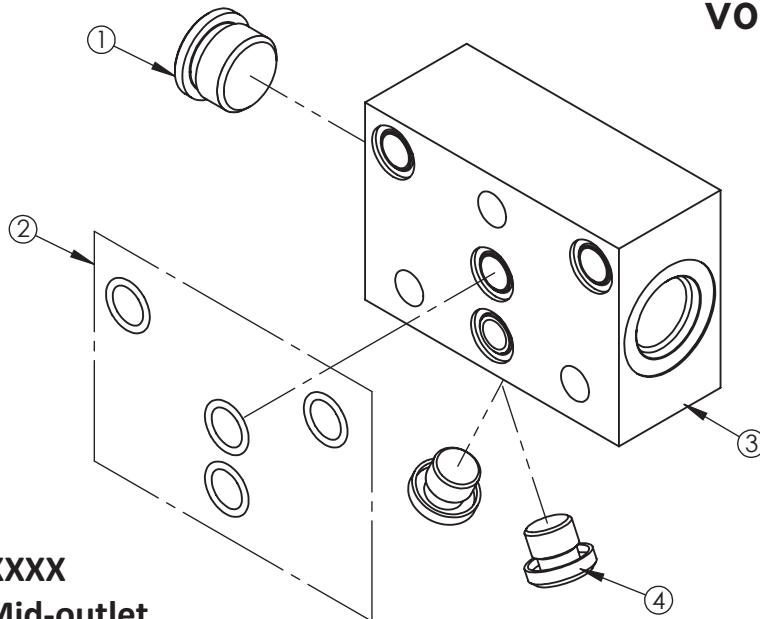
V050-B-FM-E53-N150



**Kit Part Number**  
**V050-B-FM-E53-N150**  
**Combined Flow Mid-inlet**

Item	Description	P/N	Qty.
1	Steel plug assembly with o-ring - 10SAE (7/8" -14 UNF)	HHBP-10Z	1
2	Combined flow mid-inlet casting with -10SAE (1 1/16" -12 UN) top and side ports	N/A	1
3	Outlet seal kit (See page 23 for more information)	N/A	1
4	Steel plug with o-ring, -6SAE (3/8" -12 UN)	HHBP-6Z	1
5	Inlet relief valve (See page 4 for more information)	N/A	1
<b>Mid-Section Notes</b>			
Item 1 & 4	Torque to 14.75 ± 2.2 lb.ft. (20 ± 3 Nm)		
Item 5	Torque to 28 ± 2.2 lb.ft. (38 ± 3 Nm)		

V050-B-FM-E51-XXXX

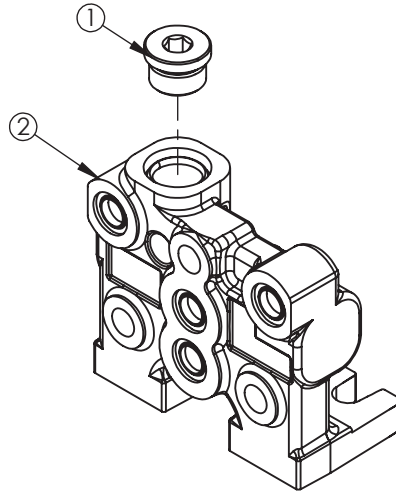


**Kit Part Number**  
**V050-B-FM-E51-XXXX**  
**Combined Flow Mid-outlet**

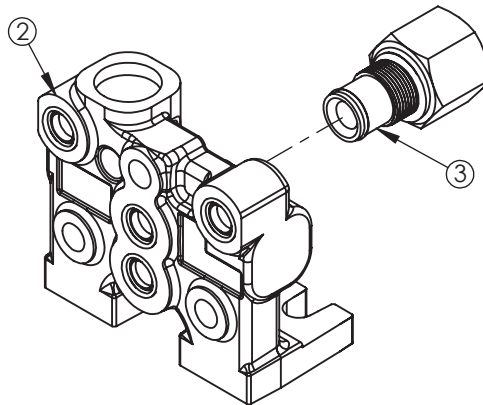
Item	Description	P/N	Qty.
1	Steel plug with o-ring, -10SAE (7/8" -14 UNF)	HHBP-10Z	1
2	Outlet seal kit (See page 23 for more information)	N/A	1
3	Split flow mid-outlet casting with -10SAE (1 1/16" -12 UN) side ports	N/A	1
4	Steel plug with o-ring, -6SAE (3/8" -12 UN)	HHBP-6Z	2
<b>Mid-Section Notes</b>			
Item 1	Torque to 30 ± 2.2 lb.ft. (40 ± 3 Nm)		
Item 4	Torque to 22 ± 2.2 lb.ft. (30 ± 3 Nm)		

# Outlets

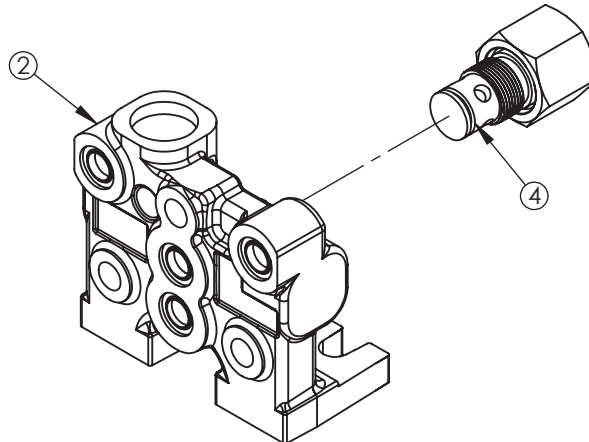
## V050-C-FL-3DX-XXX Standard Outlet



## V050-C-FC-6DX-XXX or V050-C-FL-6DX-XXX Outlet with Power Beyond Plug



## V050-C-FC-16D-XXX or V050-C-FL-16D-XXX Outlet with Closed Center Plug

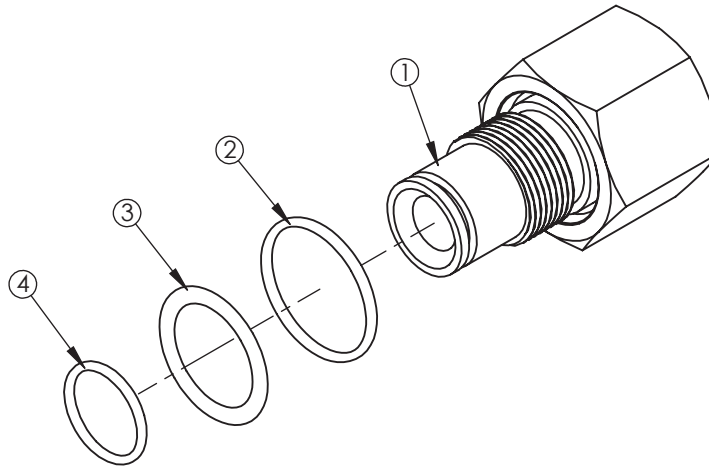


Item	Description	P/N	Qty.
1	Steel plug with o-ring, -8SAE (3/4" -16 UNF)	HHBP-8Z	1
2	Outlet casting with -8SAE x -10SAE (3/4" -16 UN x 7/8" -14 UN) top & end port	N/A	1
3	Power beyond plug (See page 22 for more information)	N/A	1
4	Closed center plug (See page 22 for more information)	N/A	1
<b>Outlet Notes</b>			
Item 1,3,4	Torque to 29.5 ± 2.2 lb.ft. (40 ± 3 Nm)		

# Outlets

**V050-C-PBS-04**

**V050-C-PBS-05**



## Kit Part Number

**V050-C-PBS-04 (SAE - 10x-8)**

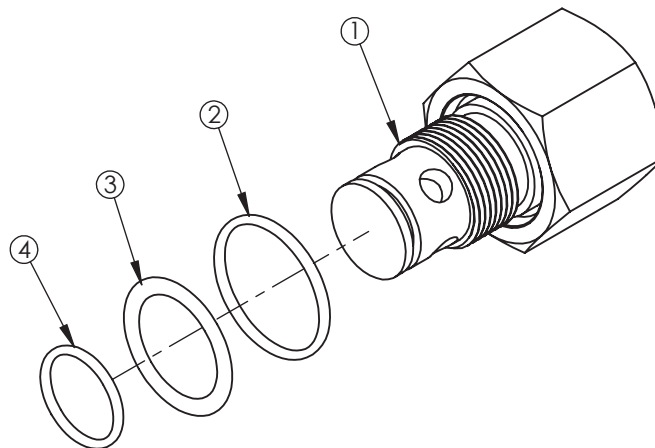
**V050-C-PBS-05 (SAE - 10x-10)**

## HPCO Plug (Power Beyond Plug)

Item	Description	P/N	Qty.
1	"04" Option: -10SAE Power Beyond Plug with -8SAE outlet port (plug only)	V050-C-PBS-04	1
	"05" Option: -10SAE Power Beyond Plug with -10SAE outlet port (plug only)	V050-C-PBS-05	
2	O-ring, VITON, 70°Sh, 0.07" x 0.864" (1.78 x 21.95mm)	12T35949	1
3	Back-up ring Parback	N/A	1
4	O-ring, VITON, 70°Sh, 0.07" x 0.551" (1.78 x 14mm)	12T37021	1
<b>Outlet Notes</b>			
Item 1	Torque to 29.5 ± 2.2 lb.ft. (40 ± 3 Nm)		

**V050-C-CCP-04**

**V050-C-CCP-05**



## Part Number

**V050-C-CCP-04 (SAE - 10x-10)**

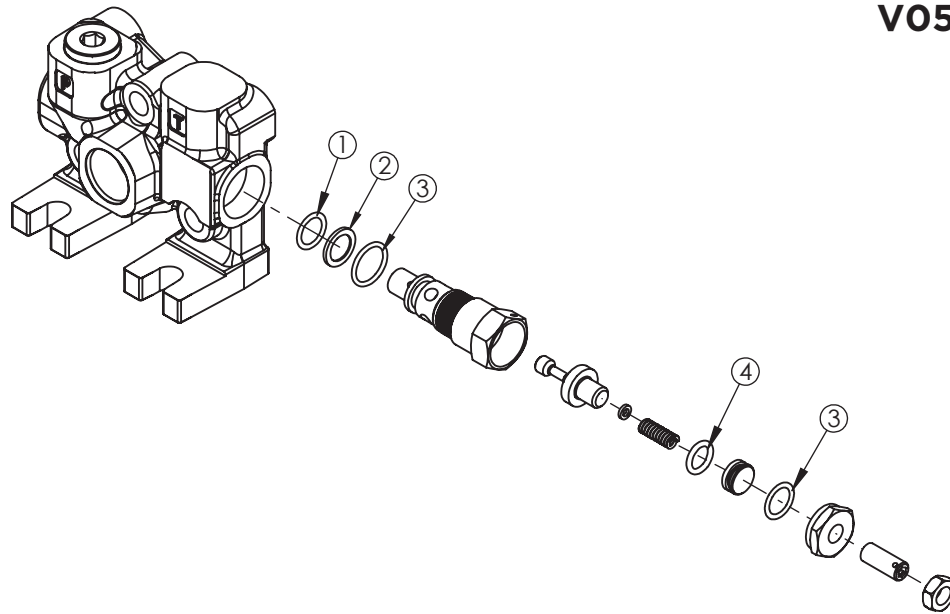
**V050-C-CCP-05 (SAE - 10x-10)**

## Closed Center Plug

Item	Description	P/N	Qty.
1	"04" Option: -10SAE closed center plug with -8SAE outlet port (plug only)	V050-C-CCP-04	1
	"05" Option: -10SAE closed center plug with -10SAE outlet port (plug only)	V050-C-CCP-05	
2	O-ring, VITON, 70°Sh, 0.07" x 0.864" (1.78 x 21.95mm)	12T35949	1
3	Back-up ring Parback	N/A	1
4	O-ring, VITON, 70°Sh, 0.07" x 0.551" (1.78 x 14mm)	12T37021	1
<b>Outlet Notes</b>			
Item 1	Torque to 29.5 ± 2.2 lb.ft. (40 ± 3 Nm)		

# Seal Kits

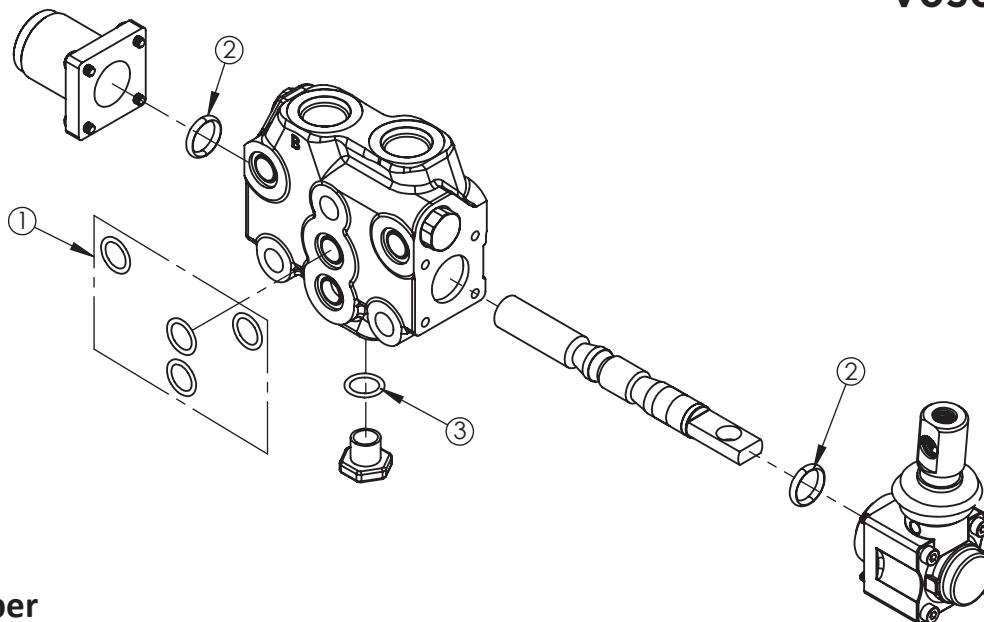
V050-GSK-IN



**Kit Part Number**  
**V050-GSK-IN**  
**Inlet Seal Kit**

Item	Description	P/N	Qty.
1	O-ring, VITON, 70°Sh, 0.070" x 0.44" (1.78 x 11.11mm)	N/A	1
2	Back-up ring, VLP 35S	N/A	1
3	O-ring, 70°Sh, 0.070" x 0.61" (1.78 x 15.60mm)	12T64426	1
4	O-ring, 70°Sh, 0.070" x 0.36" (1.78 x 9.25mm)	N/A	1

V050-GSK-WS

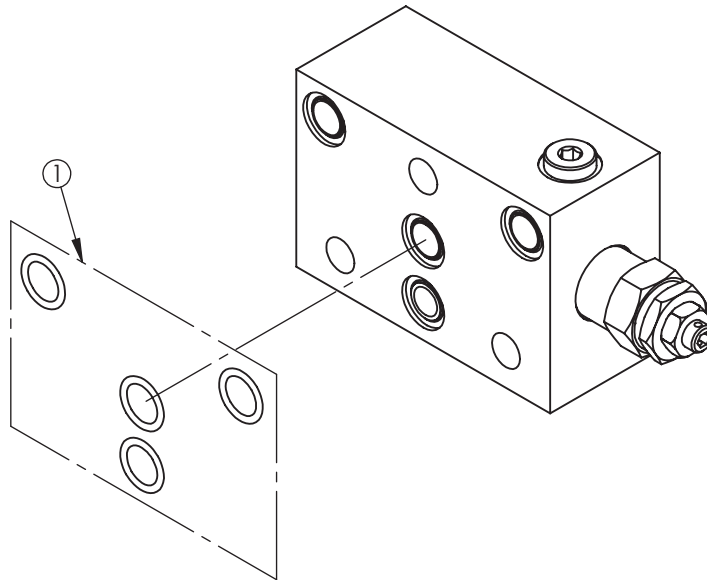


**Kit Part Number**  
**V050-GSK-WS**  
**Work Section Seal Kit**

Item	Description	P/N	Qty.
1	O-ring, VITON, 70°Sh, 0.070" x 0.489" (1.78 x 12.42mm)	12T36526	4
2	O-ring, VITON, 70°Sh, 0.103" x 0.549" (2.62 x 13.95mm)	12T37021	2
3	O-ring, VITON, 70°Sh, 0.070" x 0.364" (1.78 x 11.11mm)	12T36881	1

# Seal Kits

V050-GSK-OUT



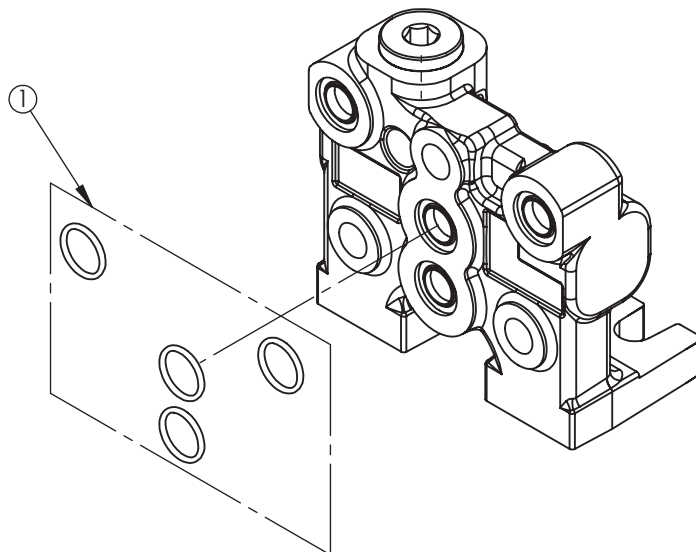
## Kit Part Number

V050-GSK-OUT

Outlet Seal Kit (used with Mid-section)

Item	Description	P/N	Qty.
1	O-ring, VITON, 70°Sh, 0.070" x 0.489" (1.78 x 12.42mm)	12T36526	4

V050-GSK-OUT



## Kit Part Number

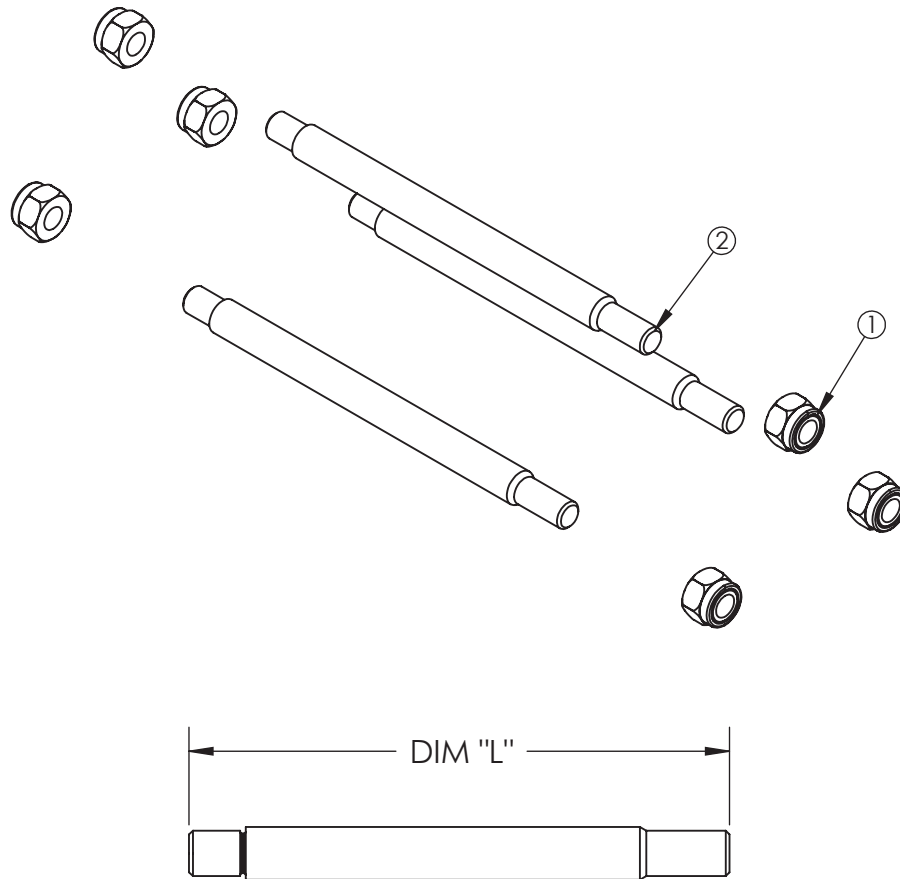
V050-GSK-OUT

Outlet Seal Kit

Item	Description	P/N	Qty.
1	O-ring, VITON, 70°Sh, 0.070" x 0.489" (1.78 x 12.42mm)	12T36526	4



# Stud Kits



Item	Description	P/N	Qty.
1	Lock-nut, MB (UNI 7473)	N/A	6
2	Tie Rod	N/A	3
KIT INFO			
Item	Description	KIT P/N	DIM "L" IN (mm)
N/A	1 work section assembly stud kit	V050-T01	4.59 (116.5)
	2 work section assembly stud kit	V050-T02	6.20 (157.5)
	3 work section assembly stud kit	V050-T03	7.81 (198.5)
	4 work section assembly stud kit	V050-T04	9.43 (239.5)
	5 work section assembly stud kit	V050-T05	11.04 (280.5)
	6 work section assembly stud kit	V050-T06	12.66 (321.5)
	7 work section assembly stud kit	V050-T07	14.27 (362.5)
	8 work section assembly stud kit	V050-T08	15.88 (403.5)
	9 work section assembly stud kit	V050-T09	17.50 (444.5)
	10 work section assembly stud kit	V050-T10	19.11(485.5)
Stud Kit Notes			
Item 1	Torque to 14.75 ± 2.2 lb.ft. (20 ± 3 Nm)		







*A Member of the Interpump Group*

SP18-06 (Rev. 09-20)

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