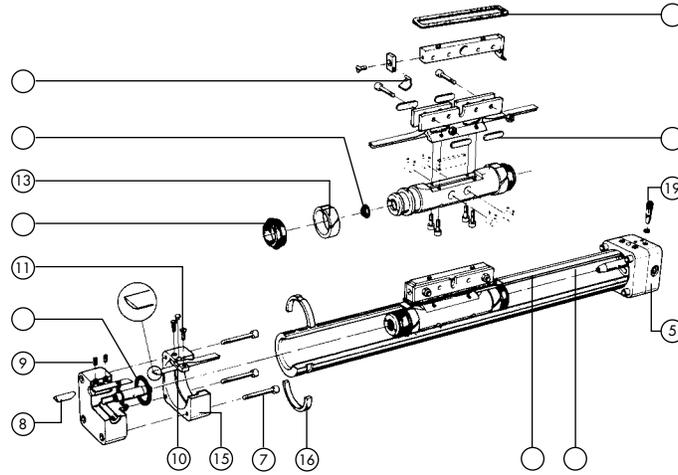


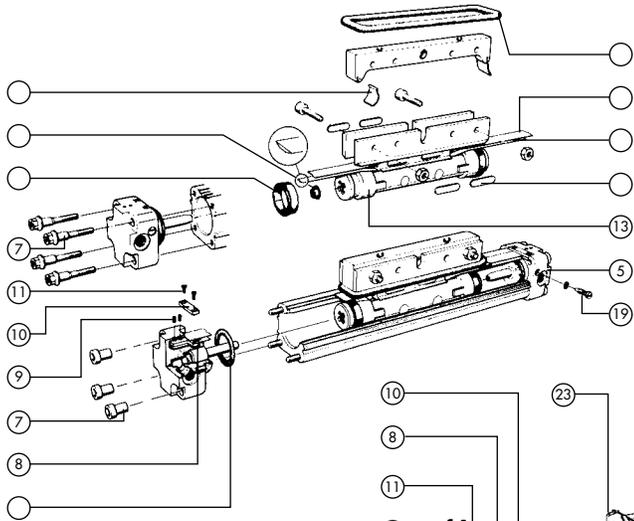
**Assembly Instructions: Series P120, Series P210, and Series 2000**



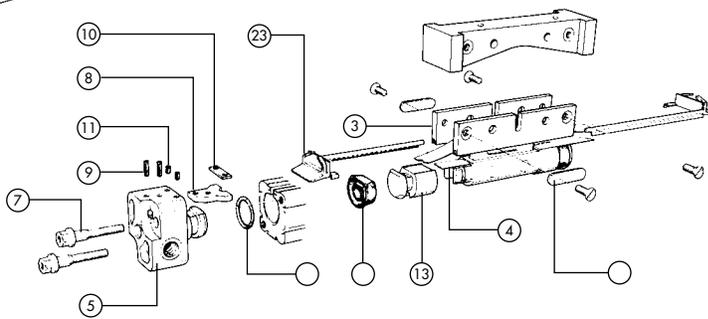
**Series P120**  
 $\varnothing$  40-80mm



**Series 2000 and Series P210**  
 $\varnothing$  16



$\varnothing$  10mm



○ Denotes items available in seal kit or service pack only

## Assembly Instructions (Series P120, Series P210, Series 2000)

Typified by ideally matched materials and fully developed design details, Origa cylinders have a very long operational life. However, the service life may be reduced by extreme and demanding environmental conditions, therefore occasional maintenance is recommended.

### Dismantling of the cylinder

Comply with local safety regulations:

1. Disconnect air and electrical supplies.
2. Remove cylinder from framework.
3. Remove piston mounting (27).
4. Remove outer band (3) by removing band locking screws at each end.
5. Loosen inner band locking screws (11) at each end.
6. Remove screws, nuts and bolts at each end.
7. Gently remove end caps (5) - avoid tilting.
8. For series **P120**. Push inboard cap rings (15). Remove locking rings and slide the cap ring off the barrel.
9. Slide out piston and inner band (4). Use caution when handling the inner band - edges are sharp.

### Inspection

1. Clean and inspect all parts
  - seals for wear.
  - bands for nicks and dents
  - tube for wear along the slot and damage to the bore.
2. Replace worn parts.

### Pre-Assembly

1. Apply ample grease to seals and O-rings.
2. Lightly grease cylinder bore
3. Ensure that all bearing rings/piston ends and bearing strips are in position.

### Assembly

1. Insert inner band (4) into the bore with the band washer facing up towards the slot.
2. Draw sufficient band out to thread through the piston, slide the piston (22) into the bore and move to a mid-stroke position.
 

Note: A very small piece of old inner band can be used as a threading strip. Additionally, bend up the first 20mm of band to approx. 30°. This will allow the band to pass freely

through the piston.

3. Pull the inner band (4) through until evenly positioned in the tube.
4. For series **P120**. Fit cap rings (15) lock rings (16) outer band locks (10) fit end cap (5) and tighten retaining screws.
5. Check that the inner band washers are visible through the cap ring top center hole.
6. Fit inner band locks (8).
7. Tighten inner band lock screws (11) on one end only.
8. Insert a small screwdriver through the cap rings top center hole. Gently apply leverage to remove any slackness in the band. Release and tighten the remaining inner band lock screws.

### Series P210 and Series 2000

9. Fit end caps (5)
10. Check inner band washer up to one end cap. Tighten locking screws.
11. At the opposite end use a small screwdriver, gently push the inner band washer towards the end cap. Release and tighten the locking screws.

### Series P120

12. Check that the inner band is laying smooth and that there is no sag. Note: to check for proper tension, depress the band through the slot about 3/16", ensure that it springs back.
13. Fit the outer band (3) and the piston mounting (27). Tighten the locking screws on the mounting and then each end cap.
14. Fit yoke/mounting O-ring (1).
15. Manually move the piston through it's full stroke to insure there is no resistance to it's movement.

### Cleaning if inner band (use eye protection)

During assembly dirt particles may become lodged between the sealing band and the cylinder tube contact surfaces. These particles can cause leaks and must be removed.

1. Remove mounting and outer band (3).
2. Apply 30 PSI (2 bar) air pressure.
3. Insert plastic cleaning tool into the slot and depress where it is leaking. The expelled air will "blow out" any foreign particles, if present.
4. When complete, reinstall the outer band and mounting.

### Note:

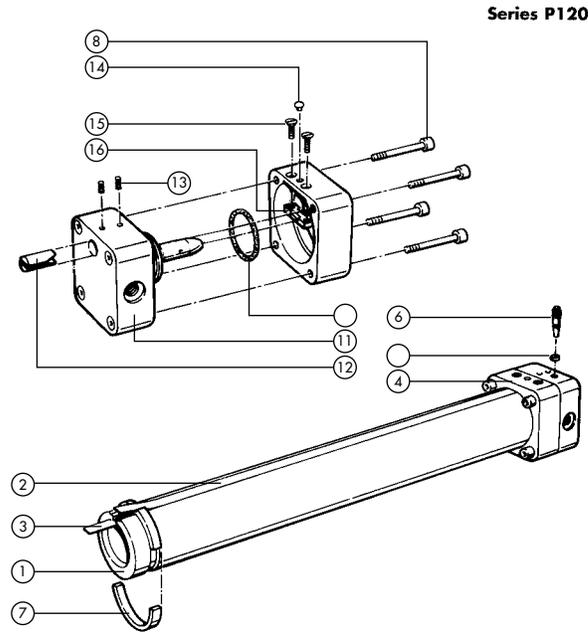
If the band continues to leak, a full cylinder inspection is recommended.

### Defect Diagnosis

Defect	Cause	Correction
Audible leak in stopped position	Leakage at inner band due to dirt	Clean inner band with LRF cleaning tool
	Leakage at inner band due to abrasion	Replace inner band
	Leakage at end cap	Replace end cap O-ring
	Leakage at piston	Replace piston seals
Cylinder speed is inconsistent	Insufficient lubrication	Relubricate
	Piston seals worn out	Replace piston seals
Cylinder impacts in end position	Overloaded	Reduce overload or install hydraulic shocks
	Incorrect setting of cushion screws	Reset
	Insufficient buildup of backpressure	Install flow controls or readjust existing ones
	Cushion seal defect	Replace cushion seals

## Parts Breakdown

### Series P120 - Basic Cylinder - Ø40mm - Ø80mm



○ Denotes items available in seal kit or service pack only

Item	Description	40mm	63mm	80mm
1	Cylinder Barrel S/	2152-0403+S	2152-0602+S	2152-0801+S
1.1	Cylinder Barrel L/	2153-0452+S	2153-0651+S	2153-0851+S
1.2	Magnet Strip	2244+0401+S	2244-0601+S	2244-0801+S
2	Outer Band S/	2080-0403+S	2080-0603+S	2080-0801+S
2.1	Outer Band L/	2081-0451+S	2081-0651+S	2081-0851+S
3	Inner Band S/	2192-0402+S	2192-0602+S	2192-0802+S
3.1	Inner Band L/	2193-0451+S	2193-0652+S	2193-0851+S
4	End Cap - Right (B)	2164-0454-R	2164-0654-R	2164-0852-R
4.1	End Cap - Right (V)	2714-0452-R	2714-0652-R	2714-0851-R
6	Cushion Screw	1213	1257	1257
7	Lock Ring - Upper/Lower	2012-0404	2012-0604	2012-0802
8	Screw - End Cap	1004-0718	1004-0920	1004-1124
9	Cap Ring	2008-0406	2008-0606	2008-0802
11	End Cap - Left (B)	2164-0454-L	2164-0654-L	2164-0852-L
11.1	End Cap - Left (V)	2714-0452-L	2714-0652-L	2714-0851-L
12	Inner Band Lock	2078-0403	2078-0603	2078-0803
13	Screw - Inner Band Lock	1024-0605	1024-0605	1024-0807
14	Plug - Cap Ring	2068-0401	2068-0401	2068-0401
15	Screw - Outer Band Lock	1033-0505	1033-0506	1033-0506
16	Outer Band Lock	2062-0401	2062-0401	2062-0401

(B) = Buna-N

(V) = Viton

## Parts Breakdown

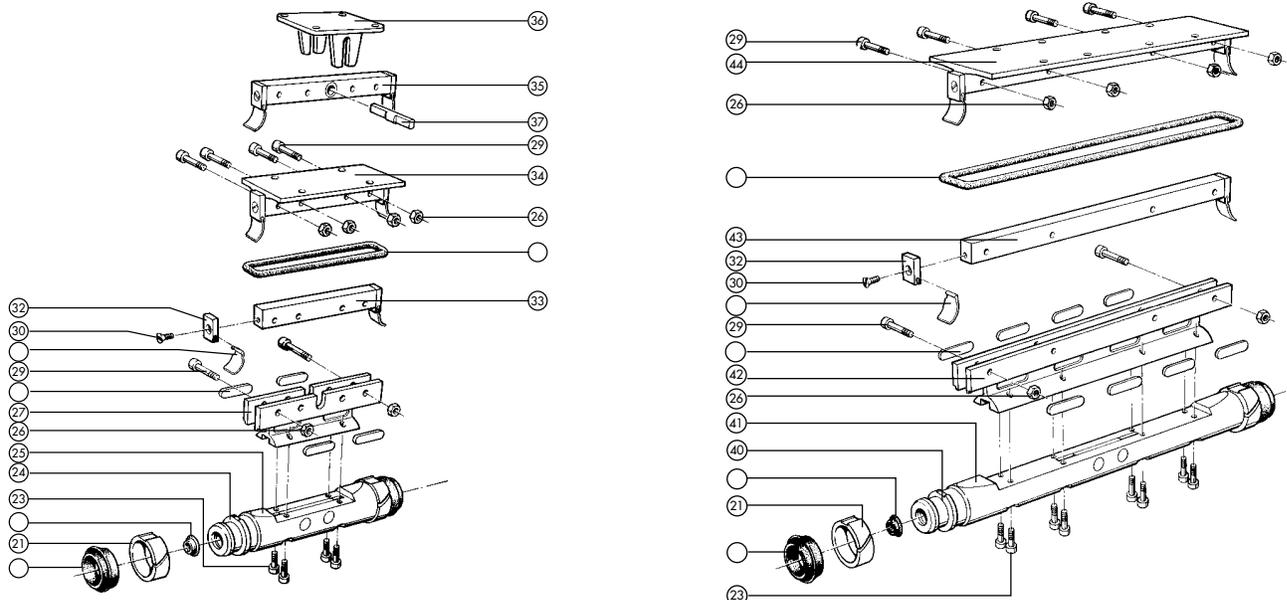
### Series P120 - Short Piston - Ø40mm - Ø80mm

Item	Description	40mm	63mm	80mm
21	Bearing Ring	2042-0402	2042-0602	2042-0801
23	Screw - Yoke	1000-0612	1000-0816	1000-0818
24	Piston Axle (non-magnetic) S/	2020-0404	2155-0604	2155-0802
24.1	Piston Axle (magnet 1 side) S/	N/A	2668-0602	2668-0802
25	Piston Axle (magnet 2 side) S/	2668-0402	2668-0602/D	2668-0802/D
26	Nut - Piston Mount	1040-0600	1040-0800	1040-1000
27	Piston Yoke	2031-0403	2031-0603	2031-0801
29	Screw - Piston Mount	1000-0616	1000-0816	1000-1018
30	Screw - Piston Mount End	1038-0507	1038-0507	1038-0507
32	Piston Mount End Plate	2040-0404	2040-0604	2040-0801
33	Piston Mount - S/20	2778-0401	2778-0601	2778-0801
34	Piston Mount - S/22	2782-0401	2782-0601	2782-0801
35	Piston Mount - S/25	2788-0401	2788-0601	2788-0801
36	Fork Bracket	2120-0401	2120-0601	2120-0802
37	Carrier Pin	2122-0401	2122-0601	2122-0801

### Series P120 - Long Piston - Ø40mm - Ø80mm

Item	Description	40mm	63mm	80mm
40	Piston Axle (non-magnetic) L/	2022-0452	2157-0652	2157-0852
40.1	Piston Axle (magnet 1 side) L/	N/A	2669-0651	2669-0851
41	Piston Axle (magnet 2 side) L/	2669-0451	2669-0651/D	2669-0851/D
42	Piston Yoke	2033-0403	2033-0603	2033-0801
43	Piston Mount - L/26	2780-0401	2780-0601	2780-0801
44	Piston Mount - L/28	2784-0401	2784-0601	2784-0801

○ Denotes items available in seal kit or service pack only



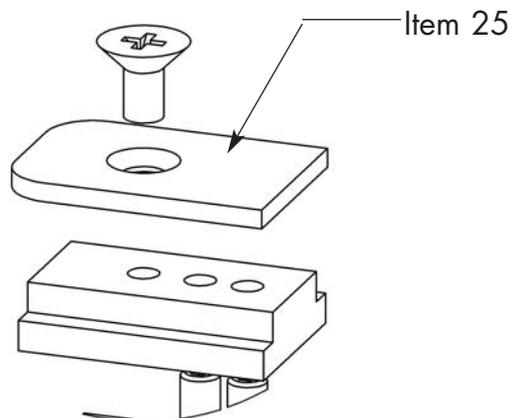
## **THE NEW REVISED 2000 RODLESS VERSION**

In the spirit of continuous improvement, Hoerbiger-Origa Corporation has upgraded its 2000 series Rodless cylinder. Current customers needing the old version 2000 repaired, rebuilt or remanufactured will need the following information. The following are answers to some anticipated questions:

*How do I distinguish the old 2000 from the revised 2000 version? Or how do I know if I already have the revised version?*

The most obvious distinguishing feature of the revised 2000 is its newly shaped outer band lock (item 25), which is fastened by one flat head screw. See Figures 1 & 3.

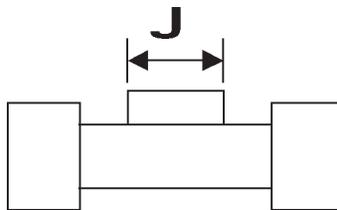
If you don't see this distinguishing feature, then you have the old 2000 series or the P120 series (with the round barrel).



**FIGURE 1**

*Did the envelope dimensions change in the NR20 mount (standard mount)?*

The critical envelope dimensions **did not** change such as overall length, bolt hole patterns, thread sizes and depths, end cap square, etc. The "J" dimension of the 32mm, 40mm and 50mm did change to 6.69, 6.69 and 9.06 respectively. See figure 2. The piston mounting holes did not change. We are confident that most of the changeovers to the revised 2000 will be painless. Nevertheless, if there is a concern, we would be more than happy to listen and accommodate your customer's needs.



**FIGURE 2**

*Were there any changes to the dimensions for the piston mounts NR25, NR30 and NR35?*

The catalog dimensions did not change.

*Were there any changes to the dimensions for the cylinder mounts NR4, NR7 and NR8?*

The catalog dimensions did not change.

*Did the maximum loads and maximum moments change as reflected in the catalog?*

No, they did not.

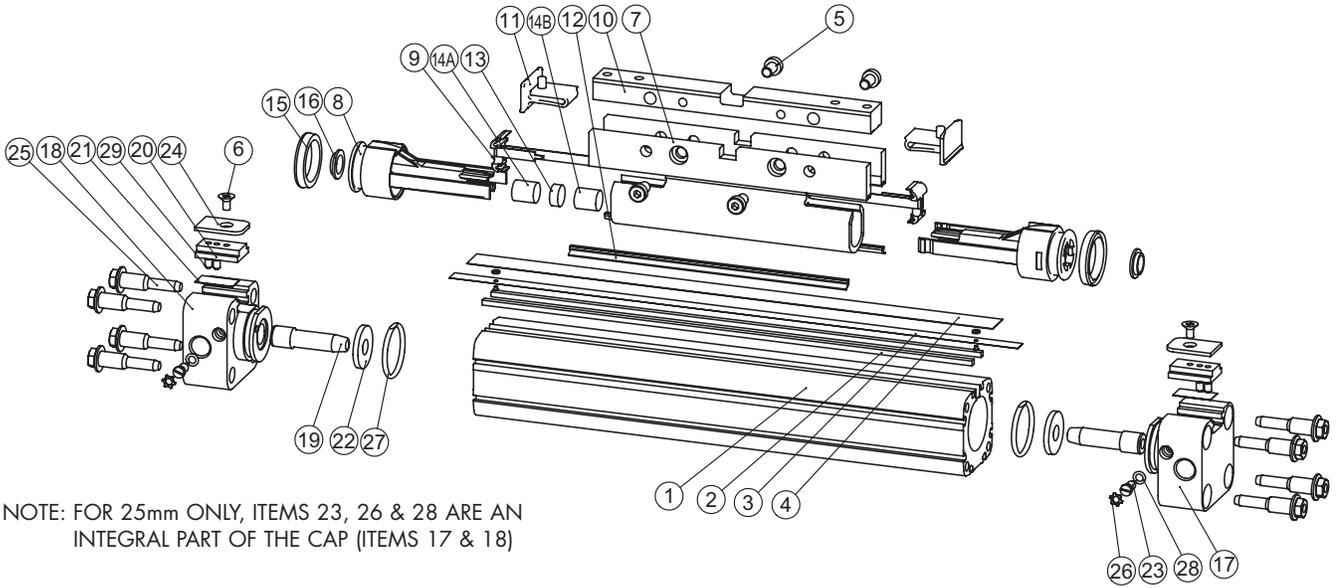
*Will the Clean Room, Joint Clamp, Double Piston, NR50 and Powerguide cylinders still be available with this revised 2000 cylinder?*

The Clean Room, Double Piston and Joint Clamp cylinders will still be offered.

The NR50 and the Powerguide will be phased out from the 2000 series effective immediately. The alternative offering is in our OSP-P cylinder line with the Slideline (NR-50) OSP-P and the Powerslide (Powerguide) OSP-P. As with the standard base cylinders, the critical dimensions haven't changed. You can compare the dimensions in the catalogs for the details.

*What parts were not affected by the revision?*

Those parts are the inner band (item 3), the barrel (item 1) and its magnet (item 2). See Figure 3.



**FIGURE 3**

## UPGRADE KITS

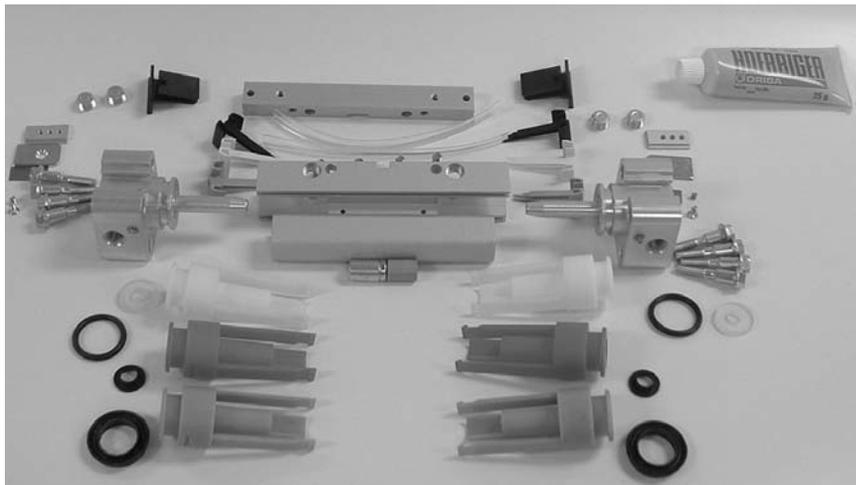
*How do I rebuild my old 2000 series cylinder and at the same time upgrade it to the 2000-revised version?*

An "Upgrade Kit" will now be required to repair a Series 2000 cylinder out in the field.

An "Upgrade Kit" will consist of a piston assembly, end cap assembly, piston mount assembly and service pack.

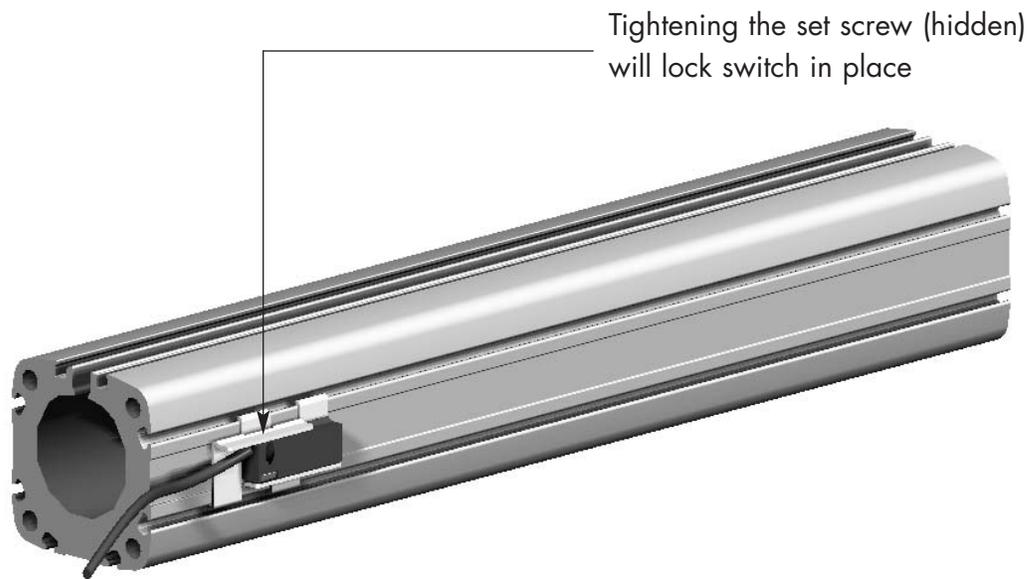
Order No. — Bore–Upgrade–Stroke–B(Buna)–V(Viton)  
32-2020/20x15-BM  
32-UPGRADE-15-B

Once the cylinder has been upgraded to a Revised 2000 Series, just a service pack or seal kit can be ordered in the future (see new part numbers on page 18).



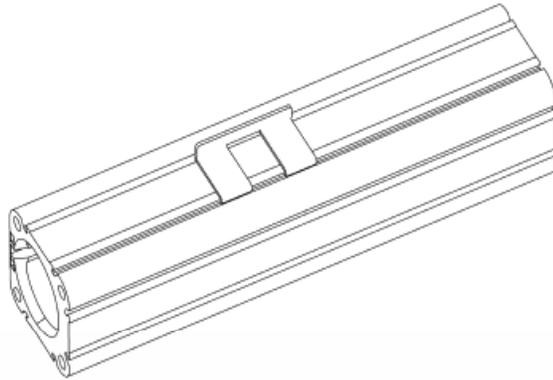
*Did the switches (Hall Effect and Reed) change?*

Yes, it did. The switches used on the revised 2000 cylinders will now be the same switches that are used in our OSP-P line of cylinders. It's worth noting that these switches are more compact. See Figure 4 on how this switch is attached to the barrel.

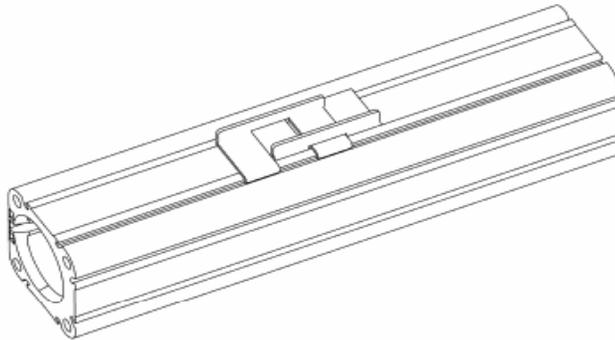


**FIGURE 4**

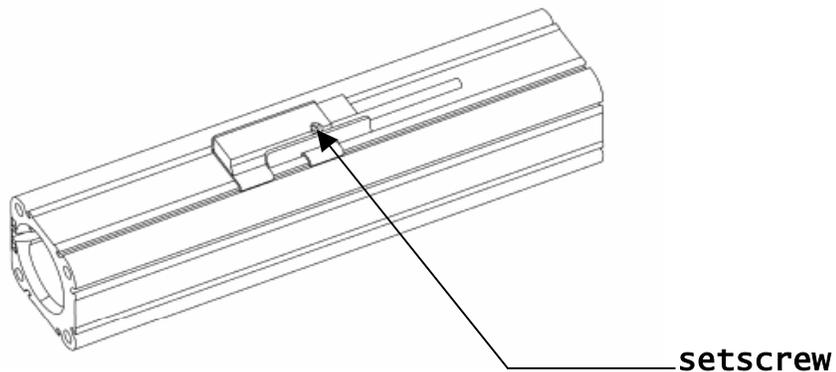
## SWITCH KIT ASSEMBLY FOR 2000 SERIES CYLINDER



1) Choose which of the available barrel sides you want to mount your switch. Assemble one bracket with its two “claws” going inside the barrel groove as shown above.



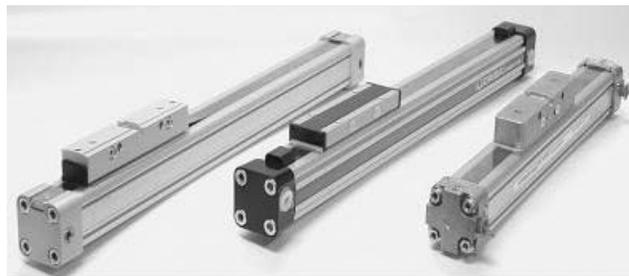
2) Assemble the second bracket facing opposite the first, with one leg going in between the legs of the first bracket as shown above.



3) Slide the switch into place (between the brackets) as shown. Locate brackets & switch at the point along the barrel where actuation is desired. Tighten the setscrew with the Allen key furnished.

*Will the P120 series Rodless cylinders still be available?*

The P120 Series cylinders haven't changed and are still available.



Revised  
2000 Series

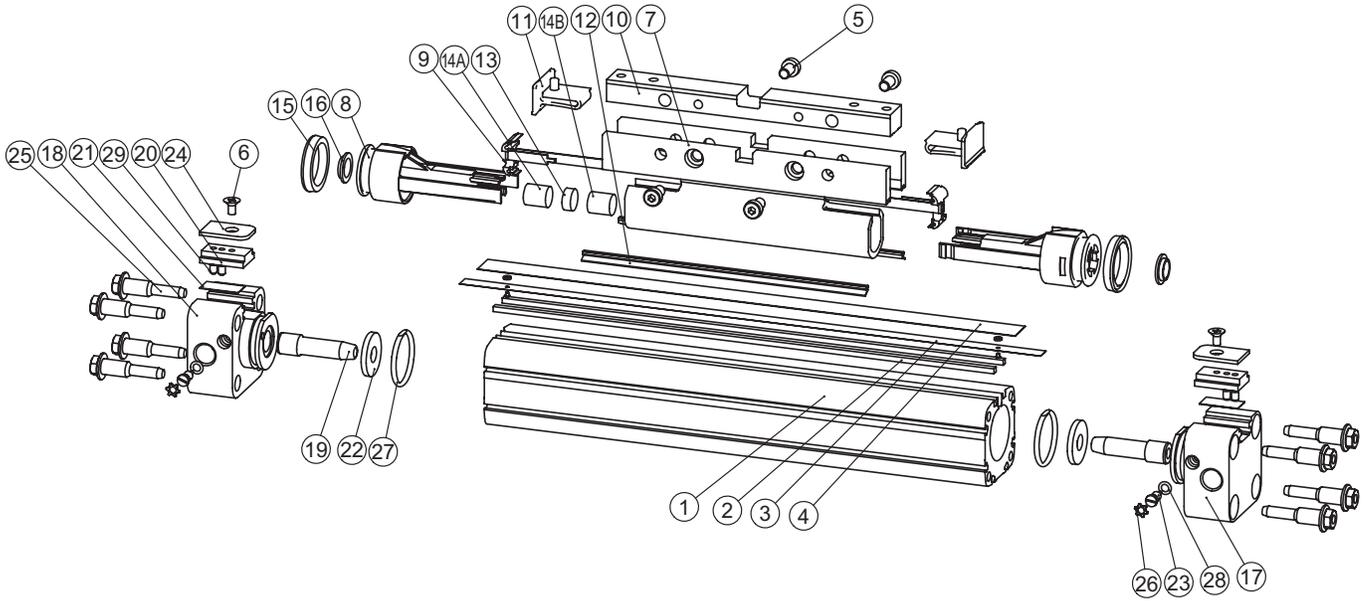
OSP-P  
Series

Old  
2000 Series

**FIGURE 5:** Pictorial contrast of current and old line of Rodless cylinders



# REVISED 2000 SERIES (25mm to 50mm)



NOTE: FOR 25mm ONLY, ITEMS 23, 26 & 28 ARE AN INTEGRAL PART OF THE CAP (ITEMS 17 & 18)

Item	Description	Parts are supplied in the following kit
1	Barrel	Purchase separate
2	Magnet strip	Purchase separate
3	Inner band	Service pack
4	Outer band	Service pack
5	Piston mount screw	Piston mount kit
6	Outer bandlock screw	End cap assembly
7	Piston	Piston assembly kit
8	Support ring (white, red, green)	Piston assembly kit
9	Slide shoe (yellow, tan, black)	Seal kit
10	Piston mounting	Piston mount kit
11	Scraper	Seal kit
12	Side wiper	Seal kit
13	Magnet	Piston assembly kit
14A	Magnet holder (aluminum)	Piston assembly kit
14B	Magnet holder (steel)	Piston assembly kit
15	Piston seal	Seal kit
16	Cushion seal	Seal kit
17	End cap - left hand	End cap assembly
18	End cap - right hand	End cap assembly
19	Cushion pipe	End cap assembly
20	Inner bandlock	End cap assembly
21	Shim piece	End cap assembly
22	Cushion disc	Seal kit
23	Cushion adjustment screw	End cap assembly
24	Outer bandlock	End cap assembly
25	End cap screw	End cap assembly
26	Locking ring	Purchase separate
27	End cap o-ring	Seal kit
28	Cushion screw o-ring	Seal kit
29	Inner bandlock screw	End cap assembly



## Assembly Instructions (Series 2000)

Typified by ideally matched materials and fully developed design details, Hoerbiger-Origa cylinders have a very long operational life. However, the service life may be reduced by extreme and demanding environmental conditions. Therefore, occasional maintenance is recommended.

**Upgrade Kit:** an upgrade kit should be used when you are upgrading an old Series 2000 cylinder, into a Revised Series 2000 cylinder. After dismantling the cylinder, all existing components can be put to the side, except for the barrel (item #1). An upgrade kit contains all of the components needed to re-build a cylinder, except for the barrel.

**Service Pack & Seal Kit:** a service pack or seal kit should be used when you are repairing a Revised Series 2000 cylinder. A Revised cylinder can be defined as any cylinder manufactured after January 2002 or any cylinder that has already received an upgrade kit. After dismantling the cylinder, all existing components should be kept close. Many of these components will be re-used.

This assembly process describes the steps needed to upgrade an old Series 2000 cylinder, into a Revised Series 2000 cylinder. Some steps or procedures can be eliminated or modified, if you already have a Revised Series 2000 cylinder, because you will be re-using many of the older components.

### Dismantling The Cylinder:

Comply with local safety regulations:

1. Disconnect air and electrical supplies.
2. Remove cylinder from framework.
3. Remove the piston mounting (item #10), by removing the piston mount screws (item #5).
4. Loosen the outer bandlock screws (item #6).
5. Loosen the inner bandlock screws (item #29).
6. Remove the end cap screws and remove both end caps.
7. Remove the cushion pipes (item #19). You can use the piston as a tool, to lightly tap them free. This step is for the upgrade kits only. The cushion pipes are physically attached to the end cap, on the Revised Series 2000 cylinder.
8. Remove the piston (item #7). The inner band should come out with the piston (item #3).

### Fitting The Piston:

1. Support Rings: kits include 3 sets of support rings (item #8). The support rings are colored white, red, and green. Each color represents a different thickness. White is the thinnest, green is the thickest and red is in the middle. If the cylinder you are re-building already uses this style of support ring, the cylinder can be re-built using the same color. If not, each support ring should be inserted into the barrel, to determine which fit is best for your particular barrel. Start with the thickest support ring (green) and move down.

The support ring should have minimum play, but should still offer free movement inside the barrel.

2. Attach one of the support rings (item #8), to one end of the piston (item #7).
3. Magnet: insert the magnet components into the piston (item #7). The steel magnet holder is inserted first (item #14B). The magnet is inserted next (item #13). The aluminum magnet holder is inserted last (item #14A).
4. Attach the remaining support ring (item #8), to the other end of the piston (item #7). Work with the support rings, until they clip together. The support rings, on both ends of the piston, will hold the magnet assembly in place.
5. Slide Shoe: kits include 3 sets of slide shoes (item #9). The slide shoes are colored yellow, tan, and black. Each color represents a different thickness. Yellow is the thinnest, black is the thickest and tan is in the middle. If the cylinder you are re-building already uses this style of slide shoe, the cylinder can be re-built using the same color. If not, put a slide shoe on one end of the piston. Insert the piston into the barrel, to determine which fit is best for your particular barrel. Start with the thinnest slide shoe (yellow) and move up. The slide shoe should have minimum play, but should still offer free movement inside the barrel.
6. Attach the slide shoes (item #9) to both ends of the piston (item #7). You may need to work with the slide shoes, until they clip together.
7. Attach the side wipers (item #12) to both sides of the piston (item #7). When installing the side wipers, make sure they flair out, away from the piston. A needle nose pliers may be useful when installing this item. The side wipers may need to be trimmed with a scissors, to make sure they are flush with the end of the piston.
8. Cushion Seal: apply grease to the face of the support rings (item #8) and to both cushion seals (item #16). Insert the cushion seals to both ends of the piston.
9. Piston Seal: apply grease to the support ring on one end of the piston (item #8) and to one of the piston seals (item #15). Attach a piston seal to that support ring.

### Inner Band:

1. Inner Band: slide the inner band (item #3) through the piston (item #7). Insert the inner band, with the beveled edge side facing down. Pull the inner band forward, so there is an equal amount extending from both ends of the piston. If necessary, assemble the rivet to the end of the inner band (25mm bore only).

### Greasing:

1. Completely coat the piston assembly with grease, including the support rings, slide shoes, piston seals, and cushion seals.
2. Insert the piston (item #7) into the barrel (item #1). The piston end,

without the piston seal, should be inserted into the barrel first. Slide the piston all the way to one end of the barrel. The piston should be positioned so that it sticks out past the end of the barrel.

3. **Piston Seal:** apply grease to the support ring (item #8) and to the remaining piston seal (item #15). Attach the piston seal to the end of the piston. Carefully pull the piston back into the barrel. Position the piston toward the middle of the barrel.
4. **Cushion Adjustments:** assemble the cushion adjustments, in both end caps (item #17 & 18). This procedure is necessary for all bore sizes, except 25mm. Apply grease to the cushion screw o-ring (item #28). Attach the cushion screw o-ring to the cushion adjustment screw (item #23). The cushion screw assembly should be screwed into the end cap. The locking ring is inserted last (item #26). Repeat this process for both end caps.
5. **End Cap O-ring:** apply grease to the end cap o-ring (item #27). Attach the end cap o-ring to the end cap. Repeat this process for both end caps.
6. **Cushion Disc:** apply grease to the cushion disc (item #22). Attach the cushion disc to the end cap. Repeat this process for both end caps.
7. **End Cap:** apply a coating of grease to the end cap o-ring (item #27), the cushion disc (item #22), and the cushion pipe (item #19). Repeat this process for both end caps. Attach an end cap to each end of the barrel. Insert the end cap screws (item #25). The screws should be tightened in a diagonal pattern. Insert the port plugs, into the ports that you won't be using.
8. Insert the shim piece (item #21) between the inner band (item #3) and the inner bandlock (item #20). Carefully position the inner band. A screwdriver might be needed to help position the inner band. Tension the inner band at one end, by pressing outward on the rivet. Keep pressing, until the slack in the inner band is removed. Tighten the inner bandlock screws (item #29). Check the assembly, by moving the piston to each end of the barrel. There should be no slack in the inner band.

### Outer Band:

1. **Outer Band:** lay the outer band (item #4) across the top of the barrel.
2. **Piston Mounting:** attach the scrapers (item #11), to the underside of the piston mounting (item #10). A raised tab, on the top of the scraper, fits in an indentation on the underside of the piston mounting. Attach the piston mounting to the top of the piston yoke (item #7). Tighten the piston mount screws (item #5).
3. **Outer Bandlock:** place the outer bandlock (item #24) over the outer band (item #4). Tighten the outer bandlock screws (item #6).

### Cleaning of Inner Band (use eye protection):

During the assembly process, dirt particles may become lodged between the sealing band and the barrel. These particles can cause leaks and must be removed.

1. Remove the mounting and the outer band.
2. Apply 30psi (2 Bar) air pressure.
3. Insert the cleaning tool into the slot and depress where it is leaking. The expelled air will "blow out" any foreign particles, if present.
4. When complete, re-install the outer band and the mounting.

Note: If the band continues to leak, a full inspection is recommended.

### Inspection:

1. Clean and inspect all parts.
  - seals for wear
  - bands for nicks and dents
  - tube for wear, along the slot and damage to the bore
2. Replace worn parts.

### Defect Diagnosis

Defect	Cause	Correction
Audible leak in stopped position	Leakage at inner band due to dirt	Clean inner band with LRF cleaning tool
	Leakage at inner band due to abrasion	Replace inner band
	Leakage at end cap	Replace end cap O-ring
	Leakage at piston	Replace piston seals
Cylinder speed is inconsistent	Insufficient lubrication	Relubricate
	Piston seals worn out	Replace piston seals
Cylinder impacts in end position	Overloaded	Reduce overload or install hydraulic shocks
	Incorrect setting of cushion screws	Reset
	Insufficient buildup of backpressure	Install flow controls or readjust existing ones
	Cushion seal defect	Replace cushion seals



## Part Numbers

### Series 2000\*\*

Designation Series 2000		Bore Sizes					
		10mm	16mm	25mm	32mm*	40mm	50mm**
<b>Buna-N Service Pack Single Piston</b>	Part Number	SP10-B-1	SP16-B-1	SP25R-B-1	SP32R-B-1	SP40R-B-1	SP50R-B-1
<b>Viton Service Pack Single Piston</b>	Part Number	SP10-V-1	SP16-V-1	SP25R-V-1	SP32R-V-1	SP40R-V-1	SP50R-V-1
<b>Buna-N Service Pack Double Piston</b>	Part Number	SP10-B-2	SP16-B-2	SP25R-B-2	SP32R-B-2	SP40R-B-2	SP50R-B-2
<b>Viton Service Pack Double Piston</b>	Part Number	SP10-V-2	SP16-V-2	SP25R-V-2	SP32R-V-2	SP40R-V-2	SP50R-V-2

\*32mm Powerguide Cylinders use part number SPP210-32X stroke.

Designation Series P120		Bore Sizes		
		40mm	63mm	80mm
<b>Buna-N Service Pack Short Piston</b>	Part Number	SP124-B-S	SP126-B-S	SP128-B-S
<b>Viton Service Pack Short Piston</b>	Part Number	SP124-V-S	SP126-V-S	SP128-V-S
<b>Buna-N Service Pack Long Piston</b>	Part Number	SP124-B-L	SP126-B-L	SP128-B-L
<b>Viton Service Pack Long Piston</b>	Part Number	SP124-V-L	SP126-V-L	SP128-V-L

Designation Series P210		Bore Sizes	
		25mm	32mm
<b>Buna</b>	Part Number	SPP210-25-S-B	SPP210-32-S-B
<b>Viton</b>	Part Number	SPP210-25-S-V	SPP210-32-S-V

### Service Pack Information

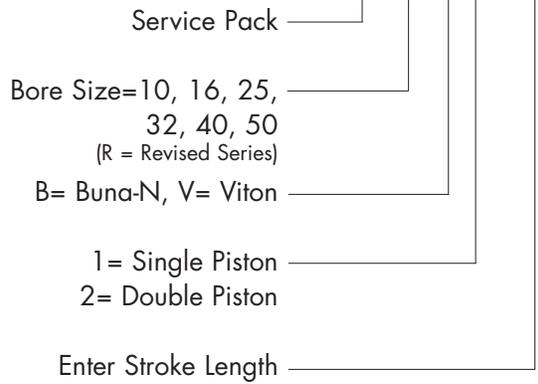
Service Packs, containing all the components necessary to completely rebuild an ORIGA rodless cylinder, are available. Each pack contains a complete seal kit, inner and outer bands, ORIGA grease tube, cleaning tool and repair instructions. It's all packaged in an easy-to-ship, easy-to-store box clearly labeled to indicate the cylinder type, bore and stroke it is intended for. Contact your local ORIGA distributor for more information.

\*\*Service Packs are for cylinders that have already been upgraded. If re-building an older cylinder for the first time, please order an upgrade kit. Please refer to page 9.

### Ordering Information

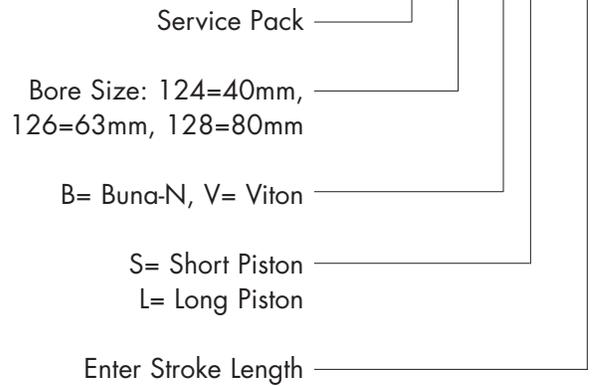
#### Series 2000

SP32R-B-1 X S



#### Series P120

SP124-B-S X S



#### Series P210

SPP210-25-S-V

