LC 110S Pump Head Maintenance

PUMP HEAD MAINTENANCE & REPAIR

When In case of malfunction (leakage, excessive pulsation etc.) or as a part of routine maintenance.

Who The technical service department of Antec or trained service engineers of an authorized distributor. Antec offers a pump head repair service (pn 900.0001A).

Time Approximately 30 minutes. Level of difficulty 7 (1= very easy to 7 = very difficult).

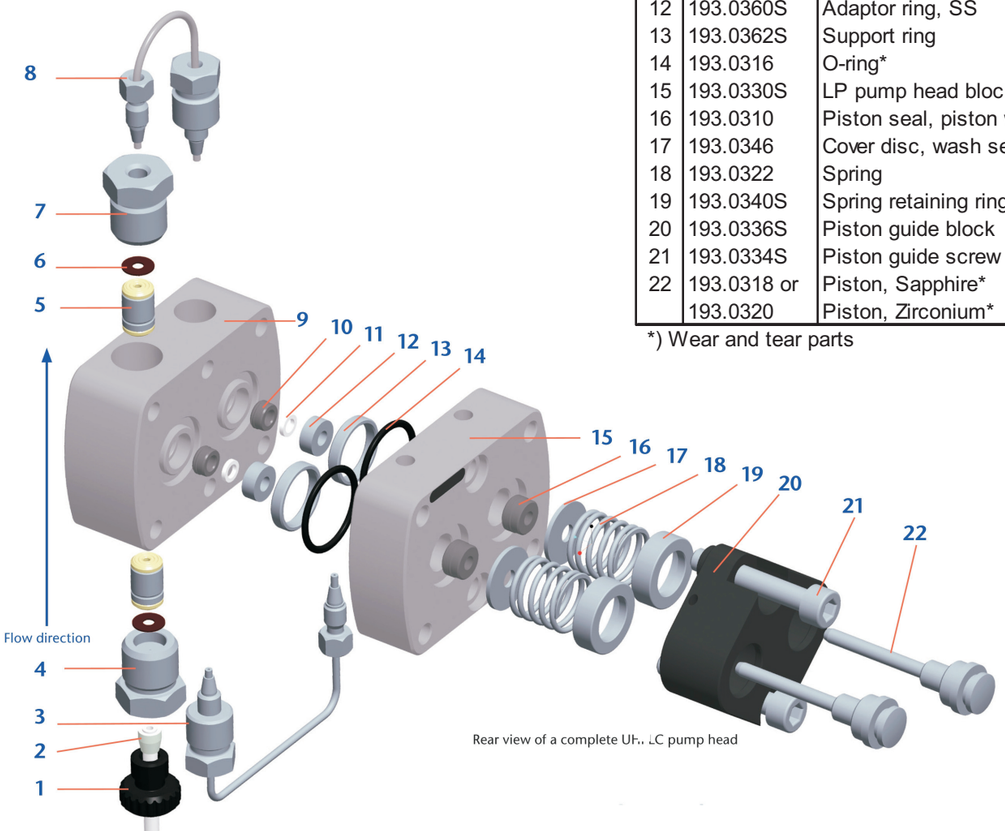
Tools pn 193.0364S LC 110S seal handling tool kit
pn 250.0086 Torque wrench tool kit, consisting of:

pn 250.0080 Torque wrench tool 1-25 Nm
pn 250.0081 Wrench plug-in head 1-10 mm
pn 250.0082 Wrench plug-in head 1-13 mm
pn 250.0083 Wrench plug-in head 1/4”
pn 250.0084 1/4" drive adapter
pn 250.0085 1/4" drive allen socket 4mm

During this procedure, seals, guide discs, springs or pistons can be replaced. It is not necessary to disassemble the pump head to replace the check valves. After maintenance the pump head seals need to be wear-in following the procedure described in document pn 193.0023. An Operational Qualification procedure pn 193.0022 is available to check if the pump operates in accordance with the manufacturers specifications.

No	Part number	Description
1	250.1568	1/8" nut, inlet
2	250.1566	1/8" ferrule, inlet
3	193.0350S	Capillary pumphead - transducer
4	193.0324S	Check valve nut 1/8", inlet
5	193.0302	Check valve*
6	193.0303S	Check valve seal*
7	193.0326S	Check valve nut 1/16", outlet
8	193.0342S	Capillary connection, SS
9	193.0304S	HP pump head block, SS
10	193.0308 or	Piston seal, high pressure, PTFE*
	193.0312	Piston seal, high pressure, PE*
11	193.0358S	Centering ring, sapphire
12	193.0360S	Adaptor ring, SS
13	193.0362S	Support ring
14	193.0316	O-ring*
15	193.0330S	LP pump head block, SS
16	193.0310	Piston seal, piston wash, PTFE*
17	193.0346	Cover disc, wash seals
18	193.0322	Spring
19	193.0340S	Spring retaining ring
20	193.0336S	Piston guide block
21	193.0334S	Piston guide screw
22	193.0318 or	Piston, Sapphire*
	193.0320	Piston, Zirconium*

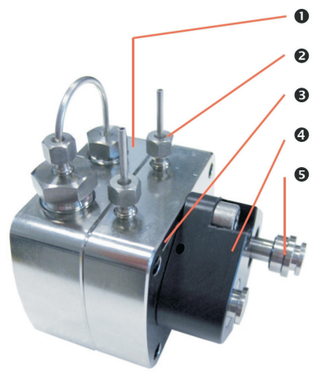
*) Wear and tear parts



Rear view of a complete UH.. LC pump head

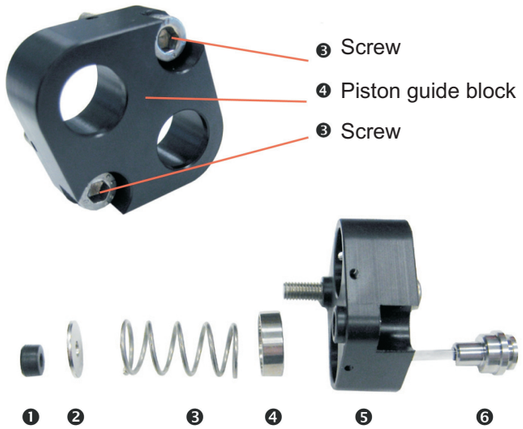
Disassembling the pump head

1. REMOVING & INSPECTING THE PISTONS



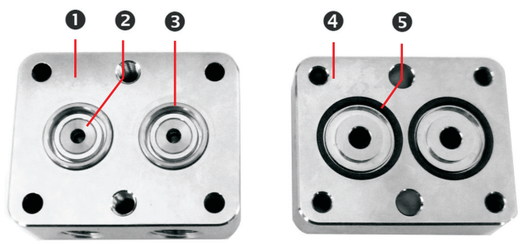
1. Flush the pump head with de-ionized water to remove any mobile phase from the pump head.
2. Make sure the pump is switched off before starting the maintenance procedure.
3. Remove the pump head (see user manual pn 193.0010S) And deposit the pump head on a soft surface.
4. Remove the piston gently by hand, making sure it does not tilt and is pulled out straight.
5. Deposit the piston rod in the correct orientation.
6. Visually inspect both piston for wear tracks. In case of damage always replace the pistons.

2. REMOVING THE PISTON GUIDE BLOCK

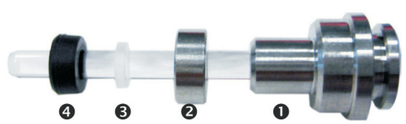


1. Clamp the pump head in a vice if possible.
2. Unfasten screws (3) using the 4 mm Allen socket while pressing down on the piston guide block to protect against the spring pressure.
3. Remove the piston guide block.
4. Remove the parts and securely deposit them in the proper sequence and in the correct orientation. From left to right (bottom figure: LP seal, piston wash (1), cover disc (2), spring (3), spring retaining ring (4), piston guide block (5), piston (6).

3.OPENING THE PUMP HEAD BLOCKS



1. Top photo: Open the pump head body by remove the LP pump head block (4) for piston back flushing) gently from the HP pump head block (1).
2. Remove the stainless steel support rings (3).
3. Remove the stainless steel adaptor ring (2) with sapphire centering ring from the HP pump head block (1).



The bottom photo shows the internal structure of the piston guide assembly: (1) piston with (2) adaptor ring with (3) integrated sapphire centering ring and (4) High-Pressure Bal seal®.

Antec (Main office), www.myantec.com, +31 71 581 3333, info@myantec.com
Antec (USA), toll free +1 888 572 0012, phone +1 443 572 0012, sales.usa@myantec.com

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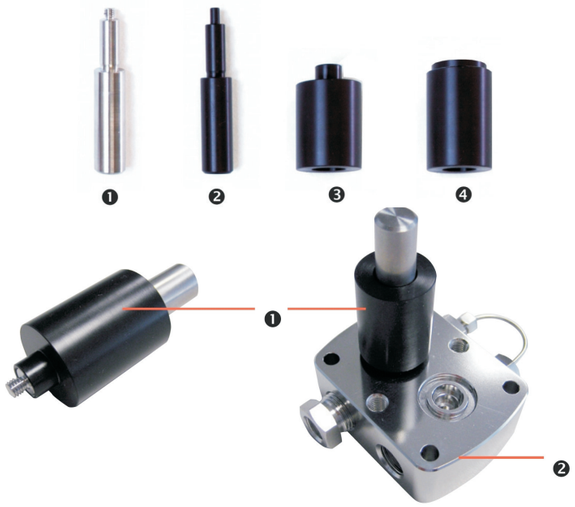
4. REMOVING SEALS



The seal handling kit consists out of 4 parts to remove and insert seals into the pump head, see photo on the left side: (1) seal removal tool, (2) seal insertion tool, (3) adaptor for High pressure (HP) seals and (4) adaptor for low-pressure (LP) seals.

To remove the HP seals (lower-left photo):

1. Insert the adaptor for the HP seals into the seal groove in the HP pump head block (2).
2. Insert the seal removal tool into the adaptor with the thread facing downwards.
3. Turn the seal removal tool one or two revelation into the seal.
4. Pull the seal removal tool out of the adaptor to remove the HP seal.

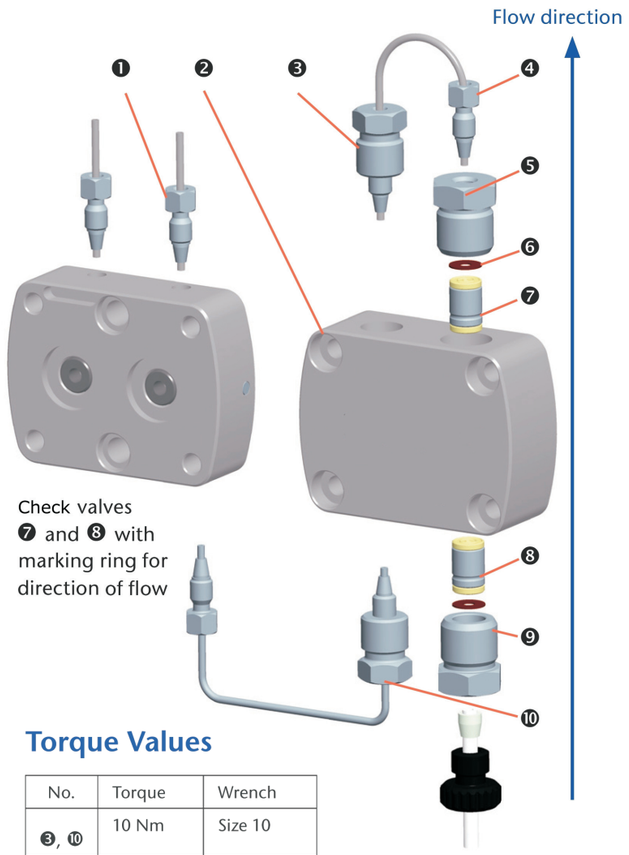
To remove the LP seals in the LP pump head block follow the same procedure using the seal removal tool in combination with the adaptor for low pressure seals.

REPLACING CHECK VALVES

A dirty or damaged check valve may not open and close correctly, resulting in a loss of pressure or excessive pressure pulsations. In such case replace the check valve. For removal of the check valves its recommended to remove the pump head. Make sure that the pump head is flushed with water (removal of mobile phase).

1. Loosen the capillary connections (3 and 10) with a wrench. Alternate sides every revolution to avoid jamming (due to tilting).
2. Loosen the check valve nuts (5 and 9) using a 13 mm wrench.
3. Inspect the Rulon® check valve seals (6) and replace when damaged.
4. Replace the check valves (7 and 8). Pay attention to the alignment of the valves. The marking ring (groove) indicates the direction of flow (see illustration). The marking of the check valve must be on the bottom side for proper operation. In reversed direction the flow of eluent will be blocked.

Fasten all connections with the torque values indicated in the table.



Check valves ❼ and ❽ with marking ring for direction of flow

Torque Values

No.	Torque	Wrench
❸, ❿	10 Nm	Size 10
❹	5 Nm	1/4"
❺, ❾	15 Nm	Size 13

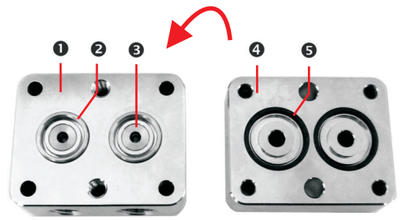
Assembling the pump head

1. INSERTING NEW HIGH-PRESSURE SEALS

Assembling of the pump head begins with inserting new high-pressure seals and low-pressure seals (piston wash) using the seal insertion tool.

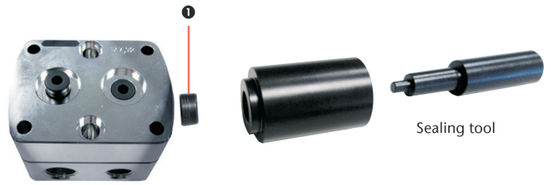
1. Pre-form the high-pressure seal using the seal insertion tool. Set the seal on the tip of the tool with the metal spring pointing outwards. Use the correct adaptor.
2. Insert the seal in the HP pump head block as indicated on the photo on the left side. Press fit seal using the tool.
3. Insert the sapphire centering ring into the adaptor ring.
4. Use the seal handling tool to insert the adaptor ring with sapphire centering ring into the HP pump head block (on top of the HP seal).

2. ASSEMBLING THE PUMP HEAD BLOCKS



1. Insert the support rings (2) into the designated grooves in the HP pump head block(1).
2. Insert new O-rings (5) in the designated grooves in the LP pump head block(4).
3. Put the HP and LP pump head blocks together in the correct orientation (place the LP pump head block on top of the HP pump head block, this avoids

3. INSERTING NEW LOW-PRESSURE SEALS



1. Pre-form the low-pressure sea using the seal insertion tool. Set the seal on the tip of the tool with the metal spring pointing outwards. Use the correct adaptor.
2. Insert the seal in the LP pump head block as indicated on the photo on the left side. Press fit seal using the tool.
3. Place the cover discs on top of the low-pressure seals.

4. ASSEMBLING THE PISTON GUIDE BLOCK

1. Position the springs (3) onto the cover discs. Make sure that the cover discs are positioned flat as any tilting will shorten the pump head service life.
2. Position the spring retaining rings (4) in the correct orientation on top of the springs.
3. Position the piston guide block (5) and manually press it down to be able the screw in the Allen screws.
4. Fix the Allen screws in an alternating fashion using the 4 mm Allen socket. Fix the screws with a torque of 3 Nm. Make sure no tilting or jamming occurs.
5. Carefully insert the piston rods individually by hand. Make sure that the pistons are not tilted at an angle.
6. Install all peripherals (checkvalves, capillaries etc.) and mount the pump head back on the pump body.

Antec (Main office), www.myantec.com, +31 71 581 3333, info@myantec.com
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