

# **Diaphragm and Valve Replacement Procedure**

## **For Thermo Scientific # 101011-00**

**SHIMS UNDER DIAPHRAM ARE REQUIRED**  
(KNF # PU2386-N811-3.07 or PU 1961-N811-3.07)

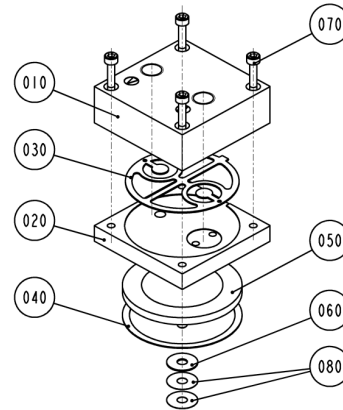
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**Tools and Materials required:**

- Thermo Scientific Pump Rebuild Kit #107751-00
- #1 Phillips head screwdriver
- Marking pencil or marker
- 2.5 mm Allen Wrench

Seq.	Description
010	Headplate
020	Intermediate plate
030	Valveplate
040	Diaphragm ring
050	Diaphragm
060	Shim ring 0.5 thick
070	Socket cap screw
080	Shim ring 0.1 thick

**Exploded View of Pump Head:**



**Disassembly:**

Parts removed must be replaced exactly as found. If repairing multiple pumps, take care not to mix parts.

1. Disconnect the pump from electrical power. Make a sketch of the position of any tubes and fittings for ease of re-assembly later.
2. Mark the position of the pump headplate (010), intermediate plate (020) and compressor housing relative to each other by drawing a line on the edges with a pencil or marker to insure proper re-assembly.
3. One of the aluminum compressor housing covers must be removed to gain access to the inside of the compressor housing. Remove the four screws and then remove the cover. Re-use any gasketing. Remove any debris that may have accumulated in the bottom of the compressor housing.
4. Remove the four screws (070) with the 2.5 mm allen wrench and remove the headplate (010). Note the positioning of the valveplate (030) relative to the valve ports on the headplate (010) and intermediate plate (020). Lift off the valveplate (030).
5. Remove the intermediate plate (020).
6. Check that all parts are free from dirt and clean as necessary. **DO NOT** scratch the parts.
7. Removal of the old diaphragm (050): Rotate the fan so that the diaphragm is positioned at the top dead center. This will help unseat the edge of the diaphragm. If required, push up from underneath the diaphragm or use a **non-metallic** tool to pry up the diaphragm from the housing groove. Do not scratch the head components. Unscrew the old diaphragm (050) by turning it counterclockwise using both hands. Lift up and grip the edges of the diaphragm at 10 and 4 o'clock. High initial force may be required to break the diaphragm loose. **DO NOT use tools!** (Note: - Take care not to lose any shim ring(s) (060) and (080) positioned between the diaphragm (050) and connecting rod, as the exact number of shim ring(s) must be used during re-assembly.) While unscrewing the diaphragm with one hand, use your other hand to secure the shim ring(s) onto the diaphragm stud. Lift the diaphragm (050), and shim ring(s) (060) and (080) from the pump. The compressor

housing cover must be removed (See step 3) to gain access to and secure the shim ring(s) onto the stud. Note: the quantity and thickness of shim ring(s) will vary from pump to pump.

8. Remove the diaphragm ring (040) from the compressor housing groove.

**Assembly with new diaphragm and valveplate:**

1. Secure the diaphragm ring (040) into the compressor housing groove using a technique similar to that used during removal.
2. Place the shim rings (060, 080) removed in step 7 above onto the threaded stud of the new diaphragm. Carefully screw the new diaphragm (050) into the connecting rod. It is helpful to hold the connecting rod at a slight angle until the threads are started. Spin the diaphragm on until it is snug. Lift and grip the edges of the diaphragm at 7 and 2 o'clock and tighten firmly using both hands. **DO NOT** use tools!  
(TIP: If the pump is loose and not mounted, position and hold the pump with the motor shaft vertical when starting the threaded diaphragm stud into the connecting rod. This helps to prevent the small parts from falling off the stud.)
3. Turn the fan until the diaphragm is flat across (mid-point of the stroke). With the diaphragm centered over the compressor housing, firmly seat the diaphragm edge into the compressor housing groove.
4. Place the clean intermediate plate (020) onto the compressor housing using the reference mark made earlier to insure the correct orientation. Then place the new valveplate (030) on top of the intermediate plate.
5. Place the clean headplate (010) on top of the intermediate plate (020) using the reference mark made earlier to insure the correct orientation. Tighten the four head screws (070) snugly in a diagonal pattern and then tighten to a maximum torque of 6-7 inch-lbs. Turn the fan by hand to confirm that the pump turns freely.
6. Replace the compressor housing cover and gasket. Install the four cover screws. Do not over-tighten.
7. If the fittings are removed from the headplate: Remove any old Teflon® tape from all fittings. Carefully apply two layers of Teflon® tape around any fittings before reinstalling into the pump head. Install the tubing and fittings as previously sketched in step 1 above.
8. Do not apply tape beyond threads, as excess tape may tear off and lodge in the valves. Do not substitute any other type of tape. Do not over-tighten metal fittings.