
PMC Construction Manual

T1000430-v2

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This is the construction manual for the aLIGO Pre-Modecleaner.

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1 Introduction

This document describes the assembly of the aLIGO PSL PMC. The assembly drawings, this document is referring to, can be found in D1001955.

NB! The glue (30) that was used is not TRA-Bond 2101, as stated in the assembly drawings, but Masterbond EP 30-2.

2 Assembly of Spacer

Step 1: In order to glue the mirrors onto the spacer, place the spacer on glue adapter (16) and mark the position of mirrors (35) and (36) on top of the spacer. Place mirrors (35) and (36) in their designated positions. Prepare the two-component glue (30) and glue the two mirrors with several glue points that connect the mirror side with the spacer.

Step 2: Mount PZT glue adapter that consists of parts (18), (19) and (22). Put a thin glue film on the surface of the PZT (37). **NB!** Do not put glue on the side of the PZT stack. Place mirror (35) into gluing adapter and PZT on top of it. Then wait until the glue is dry.

Step 3: Turn PMC spacer around and place it on (17). Mark the designated mirror position and glue the PZT to the spacer. In order to mount mirror (35) a laser beam needs to be injected into the PMC. Mount mirror (36) in a XYZ-alignment holder and place it close to its designated position, such that it is still possible to change the alignment of the mirror. Align and modematch the injected laser beam until the fundamental mode is resonant. Check the beam position on all mirror and center the beam on all mirrors by slight alignment changes of mirror (36). If the eigenmode position is fixed glue mirror (36) to the spacer as described in Step 1. (It might be helpful to wait until the glue is viscose, before applying it to the mirror.)

Step 4: Mount heater pads (32) with (29), BG 39 filters (42) with (29) and temperature sensor (28) with (31) as shown on page 3 of the assembly drawings.

3 Assembly of Tank

Step 1: The AR-coated windows (40) are glued to the window-tank adapter (5) such that a thin, closed adhesive film of (30) is put on the surface of (5). The window is centered with adapter (11) as shown on page 5 of the assembly drawings.

Step 2: Mount the adapter (5) with o-ring (38) and spacer (8) to the tank (1). Mount LEMO connectors (33), (34) and the handles (41) with screws (26) to the spacer. Mount legs (4) with screws (27) from the bottom. Mount screws (10) with o-ring (44) and fix them with hex nut (43) in the two holes at the tank side that are not equipped with LEMO connectors.

4 Assembly of Spacer in Tank

Step 1: Put Viton mat (3) into the tank and place the spacer into the tank. It is possible to temporarily mount one handle (41) to the top of the spacer for the insertion into the tank. **NB!** The PZT should be next to the LEMO connectors in order to keep the cables short.

Mount PMC positioning adapters (12) and (13) on top of the spacer using thread bar (14) and screw nuts (21) as shown on page 7 of the assembly drawings. Use the positioning adapters to center the spacer in the tank. Clamp the spacer with clamps (7), screws (20) and Viton pads (2) to the tank.

Step 2: Solder cables to the temperature sensor (28) and solder cables from PZT (37), heat pads (32) and temperature sensor (28) to the LEMO connectors as shown on page 8 of the assembly drawings.

Step 3: Put o-ring (39) into the tank and lid (9) with screws (24) on top.