

**New Folder Name** Electrical Short at  
South End Axial Drive Corl T950010

CALIFORNIA INSTITUTE OF TECHNOLOGY  
Laser Interferometer Gravitational Wave Observatory (LIGO) Project

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Refer to: LIGO-T9500010-~~100~~-R  
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Subject: ELECTRICAL SHORT AT SOUTH END AXIAL DRIVE COIL (2 MARCH 95) [also see 40-M Logbook #37, p. 40-42]

In February, we had been investigating an unusually high level of line spikes in the spectrum of the 40-meter interferometer; odd harmonics of 60 Hz at 180 Hz, 300 Hz, and 420 Hz were especially prominent. Seiji finally discovered that one of the inputs to the balance network for the axial drive coils was shorted to ground. Disconnecting the four cables to the coils at the feedthrough to the vacuum envelope allowed us to measure the impedance of the two coils separately, and isolate the problem to the rear ('push') coil (it should have been open to ground, but instead was a few ohms).

Visual inspection through the chamber viewport revealed a potential problem with the mounting bracket ('boom') for the coil (which is at ground) shorting to a custom-designed copper block connector for the coil leads. (The copper connector is mounted on a block of teflon, but is flush with the edge of the teflon rather than inset, so that there is no insulation from the side.) See below for drawing and details.

We vented the system and Andy angled the connector so that it no longer touched the bracket, then we remeasured the impedance from the coil to ground; it was open, as it should be. This solution is not ideal; there was no way to adjust the position or angle of the connector holder except by omitting one of the mounting screws which secures it to the post.

From now on we plan to check for electrical shorts in the axial drive coils before each pumpdown; this problem has not come up before, but it may recur, so it is being added to our vent checklist. We also want to design a new connector block and install it during a future vent cycle. Finally, we plan to reevaluate all of the instrument wiring with an eye toward long-term redesign; we hope to reduce noise due to ground loops and upgrade some of the fragile in-vacuo connections to make the system more robust.

dd:bb

Attachment: Drawing

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Chronological File  
Document Control Center

COIL-MOUNTING ASSEMBLY

