

LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY  
- LIGO -  
CALIFORNIA INSTITUTE OF TECHNOLOGY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Technical Note    LIGO-E980028-A -    W    2/27/98

**SPECIFICATION FOR BEAM TUBE  
DC CONNECTIONS ASSEMBLY 'D'**

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## ASSEMBLY 'D'

DESCRIPTION

DC tube connection complete including box, cable support structure, terminations, and miscellaneous equipment according to this specification and reference documents.

REFERENCE DOCUMENTS

This section includes reference documents

D	Tube Bakeout DC Tube Connection Bill of Materials	D980077
		D980078
D-1	Tube Bakeout DC Connector Connector Top Piece Detail Connector Bottom Piece Detail Bill of Materials	D980068
		D980069
		D980070
		D980071
D-2	Tube Bakeout DC Connection Box Connection Box Splice Plate Bill of Materials	D980083
		D980084
		D980085

COORDINATION

- A. Provide labor and equipment to assemble the DC tube connection as shown on drawings, described in equipment lists and as specified herein. Provide all material, not specifically listed as provided by LIGO on material lists for a complete assembly. Completed assembly installation, where required, shall be inspected and approved by a Washington State Department Labor and Industries representative and ready for operation.
- B. Provide labor, equipment and necessary miscellaneous materials to disconnect DC tube connection. Disconnected assemblies shall be relocated and connected at a new location at the LIGO facility as specified on plan drawings and as directed by LIGO. Belleville washers used as part of terminations for DC supply cables and DC high temperature cables that are removed for relocation shall be replaced with new. The Contractor shall provide the necessary means to provide for safe and efficient transport of assemblies to new location.

PRODUCTS

- A. All equipment shall be new, UL approved with necessary modifications required for complete installation.

- B. See material lists for type and manufacturer of required equipment.

### INSTALLATION

- A. The Contractor shall fabricate DC cable connection box as shown on drawings and as described in these specifications.
- B. Contractor shall terminate DC supply cables in DC cable connection box. Cables shall be terminated using fasteners as shown on drawings and material lists. All 1/2" bolted connections shall be torqued to 40 Ft. lbs.
- C. The Contractor shall route DC high temperature cables from DC connection box to indicated stiffening ring DC connector located on tube. DC high temperature cables shall be of equal length and supported at a minimum of 18" from termination location. Cables shall be routed in cable tray or other suitable cable supporting structure as required by appropriate articles of NEC and the authority having jurisdiction. Cable tray or cable supporting structure shall be supported and/or braced as required.
- D. The Contractor shall terminate DC high temperature cables at DC connection box with #4/0 2 hole compression connectors as indicated. DC high temperature terminations at stiffening ring extension DC tube connector shall be with high temperature #4/0 2-hole compression connectors as indicated. The Contractor shall install the DC stiffening ring extension DC tube connector as shown on drawings.
- E. The Contractor shall use extreme care to prevent damage to the stainless steel beam tube. The tube is a precision instrument, the interior will be held at as near a perfect vacuum as present technology will allow. Additionally the tube itself will be a current carrying conductor during the bakeout procedure. Unless otherwise stated in these specifications or as directed by LIGO, the Contractor shall not use the beam tube as a support structure, nor shall the Contractor connect any device or devices to the beam tube. The Contractor shall not use power tools, grinders, drills, flame torches, welders etc., on the stainless steel beam tube structure unless prior approval is granted by LIGO. In the event that the Contractor is unable to make required connection to beam tube stiffening ring as shown on the drawing because of interference with structure, weld splatter or irregularity in beam tube surface, the Contractor shall notify LIGO and proceed as directed by LIGO.

### WIRING

- A. All conductor shall be installed in strict accordance with latest requirements of NEC.
- B. All wiring shall be neatly cabled and tied to Engineer's satisfaction..

TESTING AND CLEANUP

- A. Upon completion of this portion of the work the Contractor shall thoroughly clean all equipment and premises of any tools, crates, boxes, wire, etc., related to the electrical work. The Contractor shall perform all tests required to assure a complete safe operating system, including but not limited to all tests required by other sections of this specification.

END OF SECTION