

## 8.3 External Structure Removal & Installation

### 8.3.1 Grounding and Removal of Cabling, Helium Lines, and Glycol Coolant Lines From Thermal Enclosures

This section describes the procedures to ground instrument and disconnect cabling, helium lines, and coolant lines from the GNIRS dewar. Follow removal procedure in reverse order to reinstall components.

#### 1. Description

Prior to disassembly of instrument, various electronics cabling, cryogenic cooling helium lines, and glycol cooling lines must be disconnected from thermal enclosures and dewar. This section identifies all components that must be disconnected prior to instrument disassembly.

#### 2. Nomenclature

89-NOAO-4202-0049     Detector Pre-Amp Grounding Cable Assembly  
89-NOAO-4202-0052     OIWFS Detector Bulkhead Feed Thru Grounding Cable Assembly  
Helium Lines  
Glycol Coolant Lines

#### 3. Safety Precautions

Electrostatic sensitive device: Follow proper grounding procedures prior to handling components.  
Heavy components: Do not attempt to lift components manually. Use proper lifting equipment.  
High pressure Helium lines. Exercise caution when handling Helium lines.  
Glycol Coolant lines. Exercise caution when handling Glycol lines.

#### 4. Special Tools / Fixtures

Soft Jaw pliers  
Helium fitting tools  
Isopropyl alcohol

#### 5. Personnel Recommended/Required To Complete Task

The required number of personnel to complete this task is 1. The recommended number is 2.

#### 6. Procedures

##### Powering Off & Grounding

- A. Turn off all power sources to instrument and unplug power lines.
- B. Ground instrument by attaching an external wire to ESD grounding plates mounted on both sides of Forward Bulkhead.

##### Starboard Side Cable Removal

- A. Disconnect J708, J709, J710 cables from Detector Pre-Amplifier.
- B. Install 89-NOAO-4202-0049 Detector Pre-Amp Grounding Cable Assembly onto J708, J709, & J710 connectors on the Detector Pre-Amplifier.
- C. Attach the alligator clip end of the 89-NOAO-4202-0049 Detector Pre-Amp Grounding Cable Assembly onto the ESD Grounding Plate on the Forward Bulkhead.

- D. Disconnect J711, J712, & J713 cables from Detector Pre-Amplifier.
- E. Disconnect J717 cable from the Temperature Control Pre-Amplifier.
- F. Disconnect and remove J708, J709, J710, & J717 cable harness from the Detector Controller Thermal Enclosure Box.
- G. Disconnect UPS and Mains Power cables, Ethernet and Serial cables, Time Bus cables, and Fiber Optic cables from the Detector Controller Thermal Enclosure Box. Note: This cable harness stays with the Bulkhead.
- H. Disconnect Glycol supply and return lines from the Detector Controller Thermal Enclosure Box. Wipe up any spilled Glycol if necessary.

#### **Port Side Cable Removal**

- A. Disconnect J740 cable from the Bench Connector Feed Thru Panel Assy.
- B. Install 89-NOAO-4202-0052 OIWFS Detector Bulkhead Feed Thru Grounding Cable Assembly.
- C. Attach the alligator clip end of the 89-NOAO-4202-0052 OIWFS Detector Bulkhead Feed Thru Grounding Cable Assembly onto the ESD Grounding Plate on the Forward Bulkhead.
- D. Disconnect J730, J731, J741, J742, J743, J744, J760, J761, & J762 connectors from the Bench Connector Feed Thru Panel Assy (port side).
- E. Disconnect and remove J730, J731, J741, J742, J743, J744, J760, J761, & J762 cable harness from the Components Controller Thermal Enclosure Box.
- F. Disconnect J718, J790, J791, J792, J793, & J794 connectors from the Components Controller Thermal Enclosure Box.
- G. Disconnect UPS and Mains Power cables, Ethernet and Serial cables, Time Bus cables, Vacuum Gauge cables, Helium Heater Power cable, & DPS Power cable from the Components Controller Thermal Enclosure Box. Note: This cable harness stays with the Bulkhead.
- H. Disconnect Glycol supply and return lines from the Components Controller Thermal Enclosure Box. Wipe up any spilled Glycol if necessary.

#### **Helium Hose Removal**

- A. Disconnect 2 Helium lines from Helium Heater on port side truss. Use Isopropyl Alcohol to lubricate threads when disconnecting Helium lines.
- B. Install protective covers to Helium line connectors.

#### **LN<sub>2</sub> Precool Line Removal**

- A. Open fill and vent valves on LN<sub>2</sub> Precool Manifold Assembly to depressurize lines.
- B. Disconnect LN<sub>2</sub> lines from LN<sub>2</sub> Precool connections on Bulkhead on port side.
- C. Disconnect other ends of LN<sub>2</sub> lines from LN<sub>2</sub> Precool manifold block on port side and remove LN<sub>2</sub> lines.

#### **Summary**

This section described the procedures to ground instrument and disconnect cabling, helium lines, and coolant lines from the GNIRS dewar. After completion of this section, proceed to Section 8.3.2 to continue with instrument disassembly.

### 8.3.2 Thermal Enclosures

#### 1. Description

This section describes the procedures to remove the Thermal Enclosures and associated mounting trusses from the GNIRS dewar. Prior to removing Thermal Enclosures, ensure instrument has been grounded and all electrical cables, helium hoses, etc. have been disconnected as described in previous section.

#### 2. Nomenclature

89-NOAO-4200-0007	Starboard Thermal Enclosure Truss Assembly
89-NOAO-4200-0008	Port Thermal Enclosure Truss Assembly
89-NOAO-4200-0009	Component Controller Thermal Enclosure Assembly
89-NOAO-4200-0010	Array Controller Thermal Enclosure Assembly
89-NOAO-4200-1555	Clevis Pin
3100-50	External Retaining Ring

#### 3. Safety Precautions

Heavy components: Do not attempt to lift components manually. Use proper lifting equipment.

##### Item

Thermal Enclosures

##### Weight

~450 Lbs (205 Kg)

Shock Hazard: Ensure all electrical connections have been disconnected prior to removal.

#### 4. Special Tools / Fixtures

Snap Ring Pliers

Crane

Lifting Straps

#### 5. Personnel Recommended/Required To Complete Task

The required number of personnel needed to complete this task is 2.



Figure 8.3.2.1. Thermal Enclosure removal.



Figure 8.3.2.2. Thermal Enclosure Truss removal.

**6. Procedures**

1. Ensure instrument has been grounded and all electrical cables, helium hoses, etc. have been disconnected as described in previous section.
2. Attach straps to lift points (4) on each Thermal Enclosure and connect straps to crane.
3. Lift crane until slight preload on straps is achieved.
4. Remove ball lock pins from hinges on thermal enclosures.
5. Lift each thermal enclosure away from trusses and put aside.
6. Remove External Retaining Rings and Clevis Pins on truss rod ends closest to dewar. Lift thermal enclosure truss assemblies away from dewar and put aside.

**7. Summary**

This section outlined the procedures to remove 2 thermal electronics enclosures and trusses from the instrument. Upon completion of this task, proceed to Section 8.3.3 to continue instrument disassembly.

### 8.3.3. Removal of Cabling, DPS, Helium Lines, and Glycol Coolant Lines from Bulkhead

#### 1. Description

This section describes the procedures to remove Cabling, DPS, Helium Lines, and Glycol Coolant Lines from Bulkhead. These components are attached to the Aft Bulkhead and Telescope Interface Connector Panel Assembly and need to be removed prior to further instrument disassembly.

#### Nomenclature

89-NOAO-4200-0013	Environmental Cover Assembly
89-NOAO-4200-0017	Aft Bulkhead Assembly
89-NOAO-4200-0129	Telescope Interface Connector Panel Assembly
89-NOAO-4200-0201	Primary Helium Manifold Assembly
DPS	Differential Pressure Sensor

#### 2. Safety Precautions

No special safety precautions are necessary.

#### 3. Special Tools / Fixtures

Soft Jaw pliers  
Helium Fitting Tools  
Isopropyl Alcohol

#### 4. Personnel Recommended/Required To Complete Task

The required number of personnel needed to complete this task is 1.

#### 5. Procedures

##### Telescope Interface Connector Panel Assembly

- A. Remove all 4 UPS & Mains AC Power connectors, Cryo Head Power connector, and DPS connector.
- B. Disconnect Time Bus cables, and Fiber Optic cables.
- C. Remove Helium supply and return lines. Use Isopropyl Alcohol to lubricate threads when disconnecting Helium lines.
- D. Remove Glycol Coolant supply and return lines.

##### Primary Helium Manifold Assembly

- A. Remove Helium supply and return lines. Use Isopropyl Alcohol to lubricate threads on Helium connectors when removing Helium lines.
- B. Install protective covers to Helium line connectors.

##### Environmental Cover Assembly

- A. Disconnect J790 cable.
- B. Disconnect Dry Air line.

##### Aft Bulkhead

- A. Remove Bulkhead cable harness clamps.

- B. Disconnect Helium lines from DPS. Use Isopropyl Alcohol to lubricate threads with disconnecting Helium lines.
- C. Remove Bulkhead cable harness and DPS.
- D. Remove Glycol Coolant Line clamps.
- E. Remove Glycol Coolant Lines.

**6. Summary**

This section described the procedures to remove Cabling, DPS, Helium Lines, and Glycol Coolant Lines from Bulkhead. These components are attached to the Aft Bulkhead and Telescope Interface Connector Panel Assembly and need to be removed prior to further instrument disassembly. Upon completion of this task, proceed to Section 8.3.4 to continue instrument disassembly.

8.3.4. Instrument Mounting Trusses

1. Description

This section describes the procedures to remove the instrument mounting trusses from the GNIRS dewar. Prior to removing instrument mounting trusses, follow procedures in previous section to remove Thermal Enclosures and their mounting trusses.

Figure 8.3.4.1 Removal of instrument mounting trusses.



2. Nomenclature

89-NOAO-4200-0006	Dewar Mount Truss Assembly
89-NOAO-4202-0010	Vertical Installation Frame Assembly
M10x25 LG SHCS	Socket Head Cap Screw
CL10-BLPL-5-S-C	Ball Lock Pin

For more detailed description of components listed above, refer to accompanying 2D drawing documentation.

3. Safety Precautions

Heavy components: Do not attempt to lift components manually. Use proper lifting equipment.

<i>Item</i>	<i>Weight</i>
Dewar Mount Truss Assembly (with counterweights)	545 Lbs (245 Kg)
Vertical Installation Frame Assembly	175 Lbs (80 Kg)



**4. Special Tools / Fixtures**

Crane  
Lifting Straps

**5. Personnel Recommended/Required To Complete Task**

The recommended number of personnel needed to complete this task is 2.

**6. Procedures**

***Dewar Mount Truss Assembly Removal***

- A. Attach straps to lift points (2) on Dewar Mount Truss Assembly (89-NOAO-4200-0006) and connect straps to crane.
- B. Lift crane until slight preload on straps is achieved.
- C. Remove (16) M10x25 Lg Socket Head Cap Screws.
- D. Carefully move truss away from dewar using caution not to bump dewar. Tilt truss as necessary to clear Forward Dewar Shell lift point.

***Vertical Installation Frame Assembly Removal***

- A. Attach straps to lift points (2) on Vertical Installation Frame Assembly (89-NOAO-4202-0010) and connect straps to crane.
- B. Lift crane until slight preload on straps is achieved.
- C. Remove (4) CL10-BLPL-5-S-C Ball Lock Pins.
- D. Carefully move truss away from dewar using caution not to bump dewar.

**7. Special Reassembly Procedures**

When reinstalling 89-NOAO-4200-0006 Dewar Mount Truss Assembly, tilt truss to engage lower part of truss around forward dewar shell first then pivot upper part of truss around lifting point on upper part of forward dewar shell.

Install 89-NOAO-4202-0010 Vertical Installation Frame Assembly with collapsible truss members on the bottom.

**8. Summary**

This section outlined the procedures to remove the instrument mounting trusses from the instrument. Using a crane and lifting straps, the Dewar Mount Truss and the Vertical Installation Frame are removed from the instrument.

After completion of this task, proceed to Section 8.4.1 to continue instrument disassembly.