CHARGED FUSION PRODUCT
DIAGOSTIC DESIGN

MAST Design Review
Overview

• Diagnostic Mechanical Design
  • Materials
    • 316 stainless steel
    • Boron Nitride ceramic grade XP
    • PEEK 1000
  • Secure Screws (M6 and M3)
    • Spot-welding SS wire on SS316 screws
    • Brackets for screws on BN ceramic shield

• Data Acquisition
  • Hardware storage and requirements
  • Electronics schematic
Attach diagnostic

Reciprocating probe

MAST mid-plane cross-sectional top view
MAST RP Access Cube

- Clearance Diameter: 148mm
- CFPD Diameter: 111mm
- Clearance Length: RFEA Diagnostic 185mm + few cm
- CFPD Length: 201.7mm = 185mm + 1.7cm
Total Assembled View

- MAST Reciprocating Probe
- Diagnostic
- Shield
- Diagnostic Without Shield
Total Exploded View

MAST RP connector
Connector
Base X 4
Detector X 4
Insulator X 4
Foil X 4
Module
Shield
Shield Dimensions

111

177

202

28

45

7
Assembled view without shield
Module Dimensions

For connector attachment

For shield attachment

vent

96mm

30

55

72
Module Angles

7.50°  7.50°  7.50°
Module Exploded View with Bases
Module Cross Section

- Foil
- Insulator
- Detector
- Base
- BNC connector
Alternate Washer to Change Collimator Size

New collimator size
Alternate Washer to Change Collimator Size

- Hole for machine screw attachment to top of module
- New collimator size
Assembled view without shield and module
This part is replicated from MAST machine drawings to provide for attachment to reciprocating probe
MAST RP Access Cube

- MAST will connect non-terminated cable ends from detectors to RP connector
MAST RP Linkbox

- 4 preamplifiers stored inside linkbox
- MAST will connect non terminated cable ends from preamplifiers to RP
- Bias supply and power supply cables to preamp will run into linkbox (supplies stored in MD05 or under RP)
MD05 Storage

10m to MD05 cubicle

Affected Systems:
1. Infra red camera (28)
2. Reciprocating probe (33)
3. H alpha / spex camera (35)
4. Bollometer blank (38)
5. Reflectometry system (39)
6. S.P.R.E.D. (64)
7. NBI Southwest ???
MD05 Storage

- 4 amplifiers
- 1 NIM BIN
- 1 rack mount computer (with network connection)
- 1 PCI extension box
- 4 power supplies for detector bias Voltage
# Timeline

<table>
<thead>
<tr>
<th>DATE RANGE</th>
<th>GOALS</th>
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<tbody>
<tr>
<td>Summer 2012</td>
<td>• Diagnostic design</td>
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<tr>
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<td>• Purchase: surface barrier detectors, pre-amplifiers, amplifiers</td>
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<tr>
<td>09/2012</td>
<td>• Charged Fusion Products Diagnostic Design Review</td>
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<td>• Machine Drawings Issue A</td>
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<tr>
<td>09/2012 - 11/2012</td>
<td>• Diagnostic construction (connector piece, module, BN shield, male RP connector)</td>
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<td>• Diagnostic assembly, software development and testing</td>
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<td>• Purchase last items: in-vacuum cables, air side cables, foil</td>
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<tr>
<td>12/2012 - 01/2013</td>
<td>Ship items to MAST</td>
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<tr>
<td>12/2012 - 01/2013</td>
<td>• Diagnostic installation</td>
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<td>• Setup computer account</td>
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<td>01/2013</td>
<td>Diagnostic data collection</td>
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