

# Agenda

<https://indico.cern.ch/conferenceDisplay.py?confid=181008>

- I. Workpackage overview – R. Folch (25' + 5')
- II. Functional requirements of the BIDs – R. Folch (5' + 5')
- III. FLUKA simulations - A. Christov (15' + 5')
- IV. Thermo-mechanical analysis – M. Delonca (25' + 5')
- V. BREAK (15')
- V. Conceptual and detailed design – M. Fürtinger (25' + 5')
- VI. Controls for movable BIDs – R. Folch (10' + 5')**
- VII. Manufacturing strategy – R. Folch (15')
- VIII. Discussion – All (15')

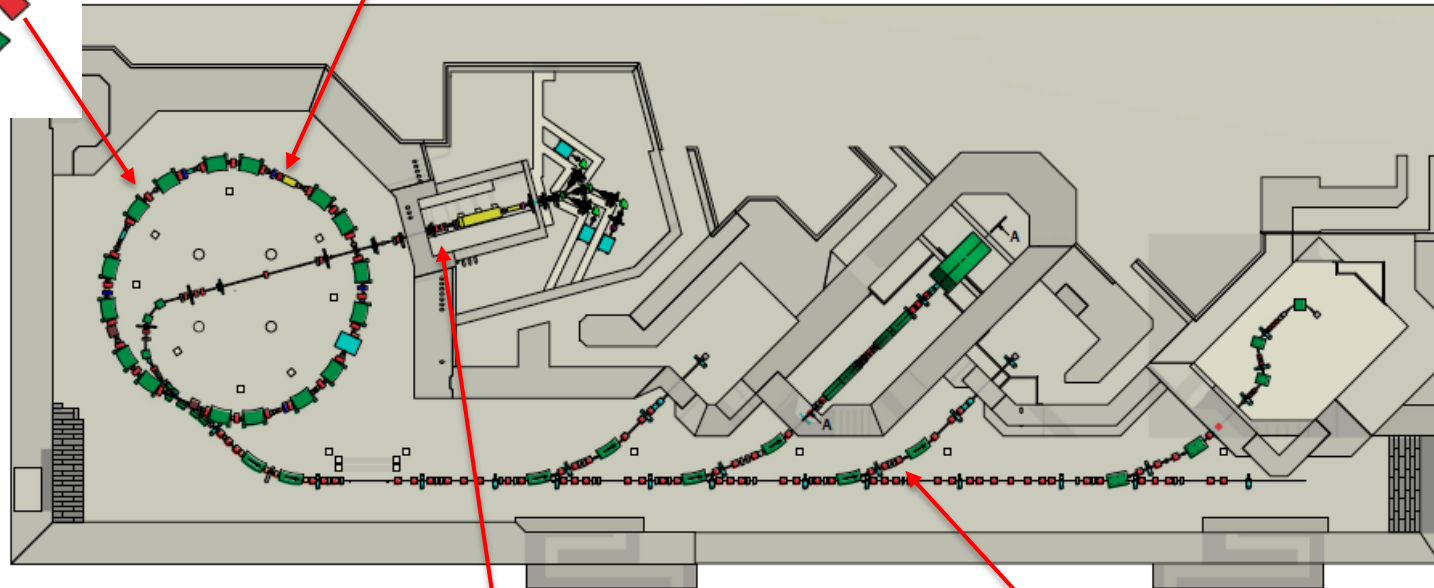
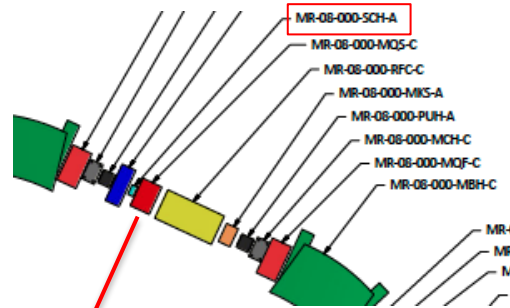
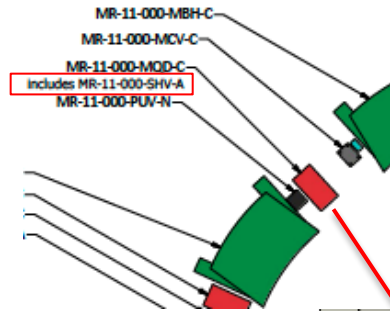
*End 12:00*

# VI. Controls for the movable BIDs

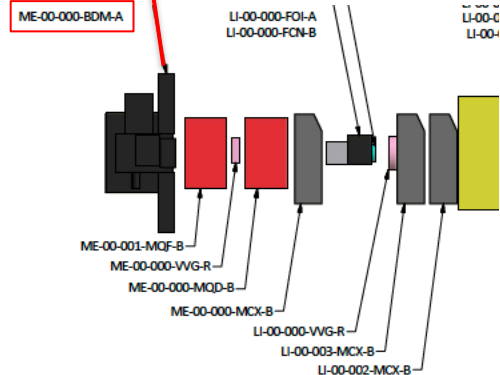
- Devices concerned
  - Scrapers (beam shaping and diagnostic)
  - MEBT dump and Beam stoppers (safety relevant)
- Work status
  - ✓ Define the limit of scope of the workpackage
  - ✓ Define the actuating systems and FE electronics
  - ✓ Create the Xml files for BIS controls
  - ✓ Define the controls and cabling schemes
  - Define the size and location of the patch panels

### Scraper horizontal

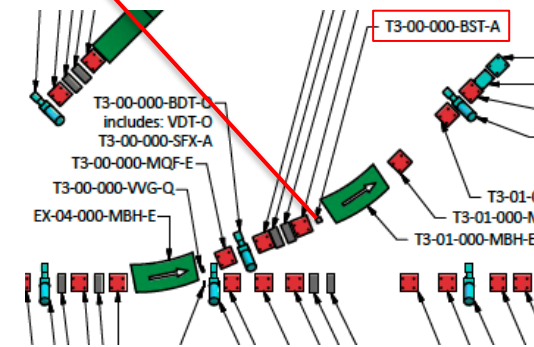
### Scraper vertical



### MEBT Dump



### Beam Stopper (4x)

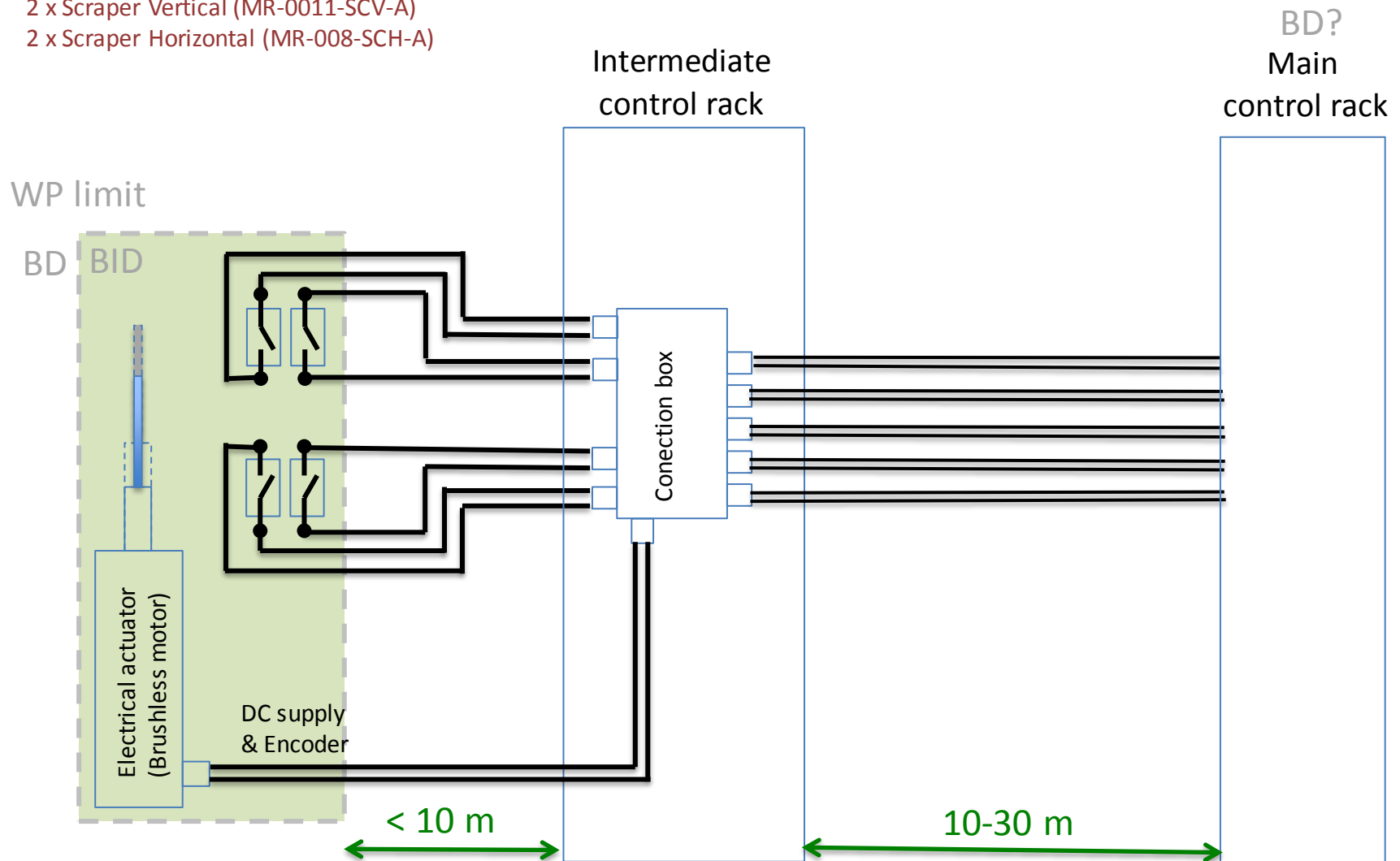


# Master Layout

MA-00492-a-THA-V1.1

# Control scheme for the scrapers

2 x Scraper Vertical (MR-0011-SCV-A)  
2 x Scraper Horizontal (MR-008-SCH-A)



# Risk of radiation on scrapers drivers?

- CERN uses stepping motors with radiation hard resolvers, and has no data on the radiation sensitivity of the opto-encoders of the brushless motors
- CNAO uses brushless motors and does not consider radiation effects as a critical issue (no failure expected  $< 10\text{Gy}$ )
- MedAustron simulations for the ionizing dose rate  $< 0.1 \text{ Gy/y}$  (scrapers losses not considered)
- MedAustron decision:
  - OK for brushless motors for scrapers
  - Design for easy replacing of the driving in case of failure

# Beam interlock interface design

- Applicable to safety related devices
  - Beam stoppers (BST)
  - MEBT dump (BDM)
- Reference document

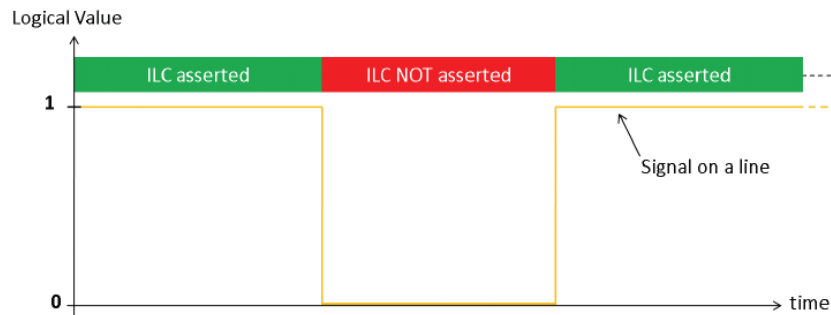
ebg MedAustron <small>2700 Wiener Neustadt - Austria</small>		DOCUMENT ID <b>ES-100107-a-MMA</b>	REV. NO. <b>1.3</b>	STATUS <b>RELEASED</b>
Date: 2011-04-01				
Engineering Specification  <b>Interlock Interface Design Document</b>  Analysis and Design				
PREPARED BY: Markus Marchhart H. Pavetits	CHECKED BY: All WP leaders ALL WP deputy leaders	APPROVED BY: Johannes Gutleber		

# Definitions, channels, specifications

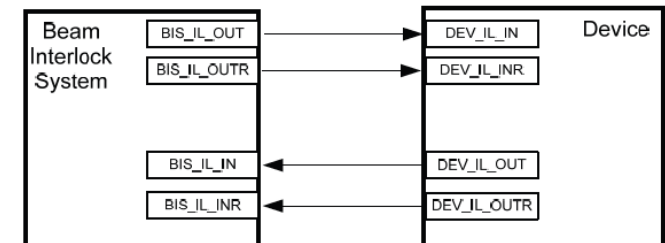
ES-100107-a-MMA v.1.3

## Logic Levels

Each channel implies one or more physical lines (wires). Each line transmits a binary information, a logical "1" or a logical "0". "1" means that the expected interlock condition is asserted (device is ok). "0" means that the expected interlock condition is no longer asserted (device may perform its safety function, device may not be operational or connection to device is lost) (see Figure 2).

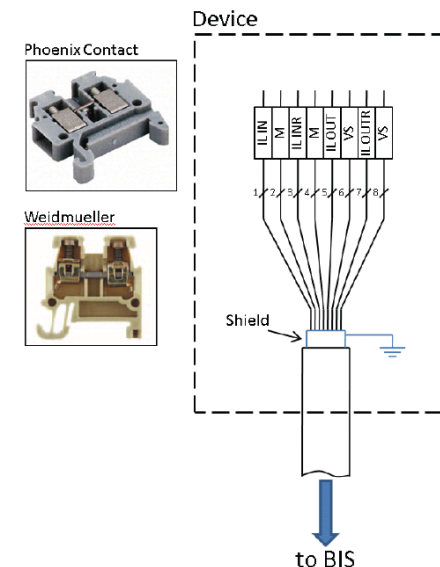


Specifications	Values
Level "1"	nominal 24V (permitted 20-25V)
Level "0"	nominal 0V (permitted 0-5V)
max. current	100mA
min. current	7mA
Detection time for "0" to "1" or "1" to "0" change	The changed level must be stable for at least 30ms



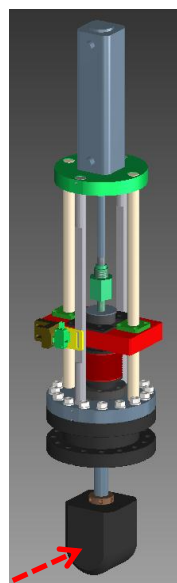
## Clamps and Clamp Layout

Figure 9 shows the recommended configuration if clamps are used for connection. Clamps can be taken from Phoenix Contact, Weidmueller or equivalent (see Table 5).



# Beam Interlock System signals for the beam stoppers and the MEBT dump

Interlock signals between Beam Interlock System (BIS) and Beam Intercepting Devices (BID)

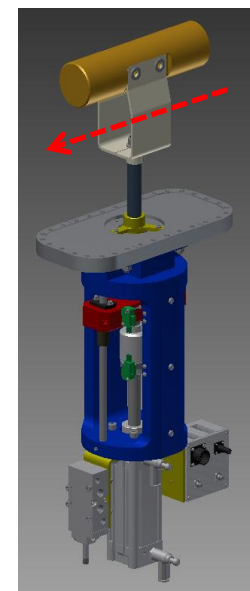


BST

BIS	<b>-IN</b>		<b>- Veto</b>
↓	move BID out of the beam line	<b>1</b>	operate according to -IN
BID	move BID into the beam line	<b>0</b>	shall not operate via -IN (by design)



BID	<b>-OUT</b>		<b>OUT</b>
↑	BID is in the beamline	<b>1</b>	BID is out of the beamline
BIS	BID is out of the beamline	<b>0</b>	BID is in the beamline



BDM



# XML files for the Interlock Control

The XML files for the 4 beam stoppers and the MEBT dump are completed and uploaded on SVN according to WP CO procedure

root / trunk / sdp / documents / Deployment / Configuration

trac  
Powered by Trac 0.11.7  
By Edgewall Software.

Name ▲

- .. /
- BeamDelivery
- BeamDiagnostics
- BeamInterceptionDevices
  - BeamBlockingDevice
    - doc
      - ES-110315-a-MMA\_BeamBlockingDevice.docx
      - ES-110315-b-MMA\_BeamBlockingDevice.xml
    - img
    - review
  - Beamstoppers
    - doc
      - FS-120105-b-RFO-BeamStopper.xml
      - FS-120105-b-RFO-MEBTBeamDump.xml
    - img
    - review
  - BeamInterlock

IT Department

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root / trunk / sdp / documents / Deployment / Configuration / BeamInterceptionDevices / Beamstoppers / doc / FS-120105-b-RFO-BeamStopper.xml

Visit:  View revision:

Revision 5670, 4.9 KB (checked in by hpavetit, 11 days ago)  
references #2373: XML description for BeamStoppers?

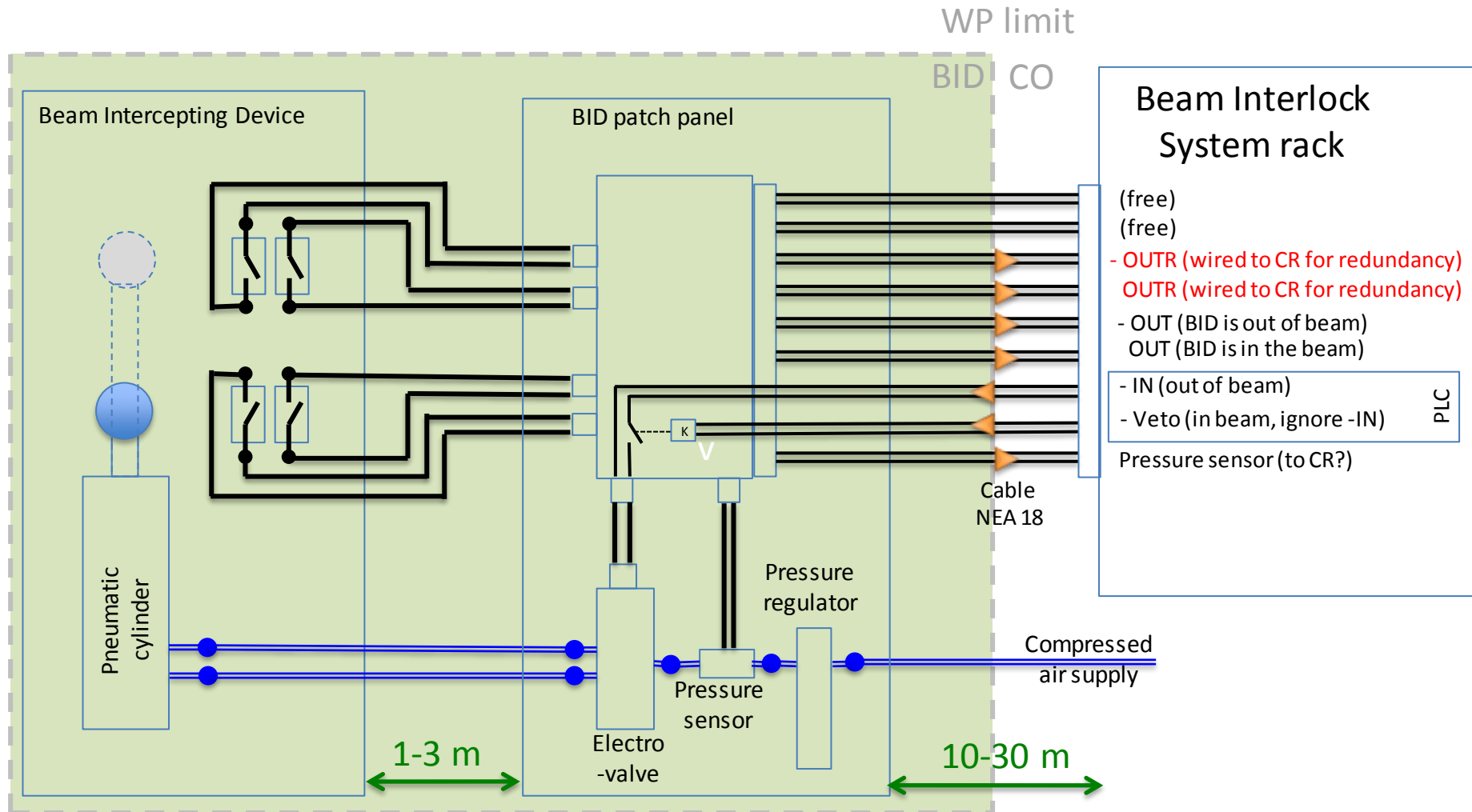
```
Line
1 <?xml version="1.0" encoding="UTF-8" ?>
2 <EQDocument xmlns="MACSEQDOC-schema">
3 <number> FS-120105-b-RFO</number>
4 <date>050112</date>
5 <title>Beam Stopper</title>
6 <author>Ramon Folch</author>
7 <abstract>This document describes the functions of the beam stopper</abstract>
8 <filename>FS-120105-b-RFO-V0.0_BeamStoppersFuncSpec</filename>
9 <equipment ancestorCode="BDE">
10 <equipmentName>Beam stopper</equipmentName>
11 <equipmentCode>BST</equipmentCode>
12 <subclass>A</subclass>
13 <description>Beam stoppers are used to protect irradiation rooms from accidental
beam</description>
14 <!-- define here the properties of this new device class -->
15 <property>
16 <propertyName>isOut_aqn</propertyName>
17 <datatype>bool</datatype>
18 <direction>ro</direction>
19 <description>Is true when the beam stopper is in its top position, out of the beam
line</description>
20 <whereCreate>tier1,tier2,tier3</whereCreate>
21 </property>
22 <property>
23 <propertyName>isIn_aqn</propertyName>
24 <datatype>bool</datatype>
25 <direction>ro</direction>
26 <description>Is true when the beam stopper is in its bottom position, in the beam line
</description>
```

# Control scheme for the BST and the BDM

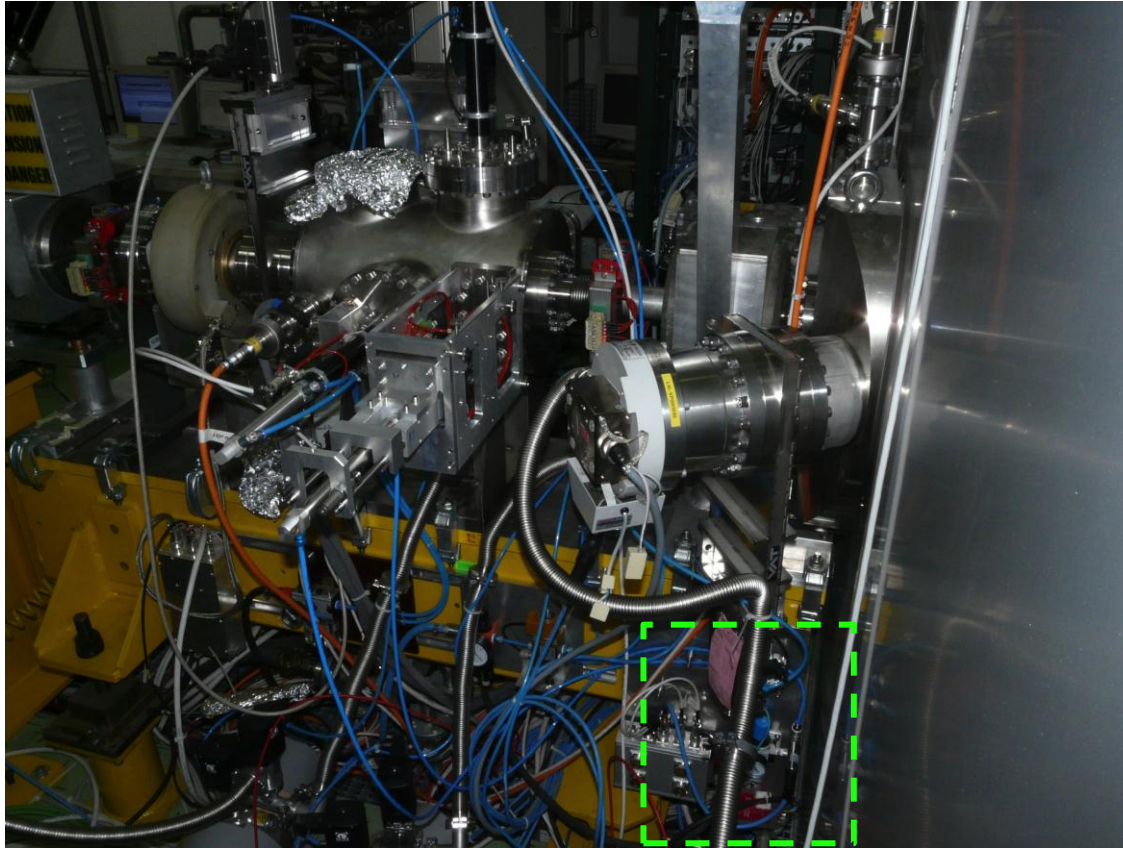
1 x MEBT Dump (ME-00-000-BDM-A)

4 x Beam Stoppers ( $Tn$ -00-000-BST-A)

$n = 1, 2, 3, 4$



# Cables routing and patch panel



Proposal from D. Grenier  
based on Linac 4 design



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