



Cryomodule Assembly: Update

M. Garlaschè on behalf of MME



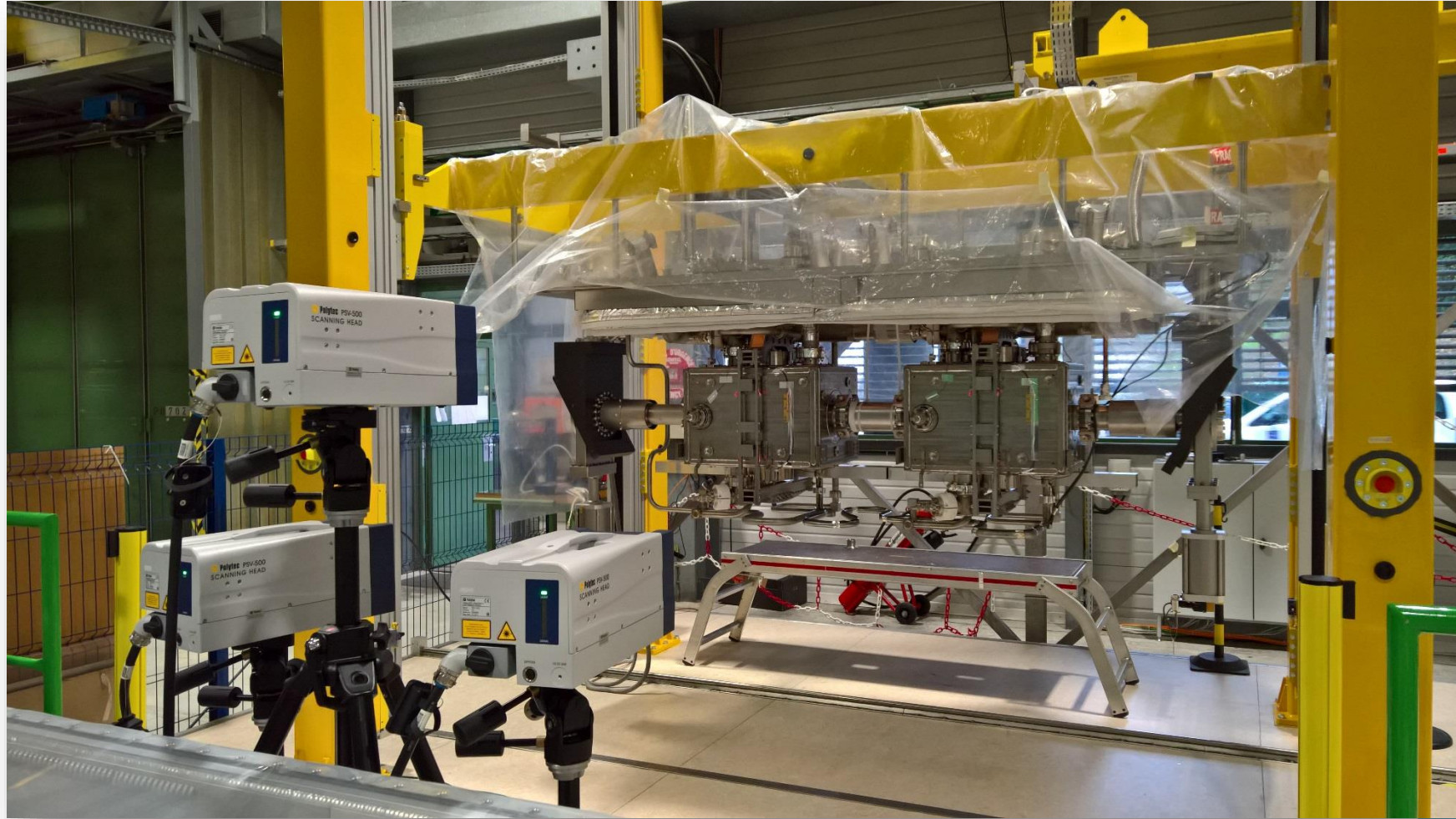
02/10/2017 – CCTC Meeting

Finished Activities

STEP up to 9 finished

THIS WEEK:

- Today: Analysis of String Modal behaviour [MME]
- Finalization of RF meas. And waveguide disassembly [RF]
- String Check and cleaning [all]
- Cold MLI assembly [MME]



Step 1



- 1 Remove clean room equipments
- 2 Mounting equipment protections
- 3 Remove FPC plate protection
- 4 Add support LHCACF_T0409
- 5 Remove support LHCACF_T0347
- 6 Insertion of FPC heaters
- 7 Set the FPC plate as high as possible
- 8 Remove the lateral supports



Step 2

- 1 Weld the cryo extensions and stoppers (DN100 x2 + HDM UP x4 + HOMS Up stopper x4 + He tank x2)
 - 2 Intermediate leak test
 - 3 Positioning and welding of upper cryoline
 - 4 Intermediate leak test
 - 5 Insertion of tuning frame upper part
 - 6 Assembly and positioning of tuning frame
 - 7 Weld hom cooling line (HDM UP x2)
 - 8 Leak test
- See assembly drawing LHCACF_A0008



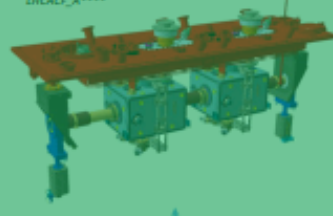
Step 3

- 1 Installation of tuner BELLOWS (WITH SUPPORT TOOLING)
 - 2 Magnetic shield on FPC plates (x2)
 - 3 Installation of Tuner double pipe on tuning frame
 - 4 Adjust the FPC oblong plate to the nominal height
 - 5 Connect the tuner double pipe to the tuner bellows
 - 6 Cryo Instrum. -> FPC Thermal sensors x5
 - 7 Installation partial supports -> for cavity blades and valve supports
- See assembly drawing LHCACF_A0008



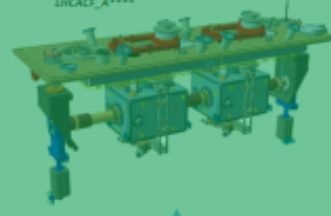
Step 4

- 1 Low the cryostat top plate to the nominal position
 - 2 Connect FPC oblong plate to top plate
 - 3 Intermediate leak test of oblong plate
 - 4 Connect support blades x4
 - 5 Connect valve box to top plate x2
 - 6 Connect cryolines to top plates with tirants
 - 7 Installation of FPC thermal MLI + screen + Braids
 - 8 Attach FPC thermal screen to cryostat thermal screen
 - 9 Cryo Instrum. -> Cernox on helium tank + HDM + Pick Up
 - 10 Meca Instrum. -> Stress gauges on FPC pipes and blades
- See assembly drawing LHCACF_A****



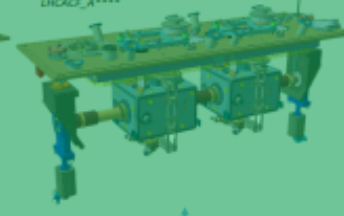
Step 5

- 1 Assembly of the cavity support system
- See assembly drawing LHCACF_A****



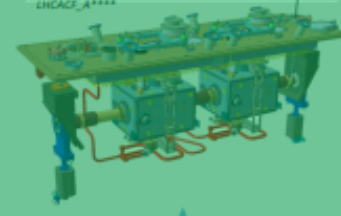
S.6

- 1 Load transfer from trolley to Cryostat top plate
 - 2 Alignment check
 - 3 Remove clean room trolley
- See assembly drawing LHCACF_A****



Step 7

- 1 Welding of extension for pressure measurement
 - 2 Installation of level gauges (x2) + wires
 - 3 Welding of lower cryoline
- See assembly drawing LHCACF_A****



Sub assembly details

Oblong plate support

LHCACF_T0409



Upper cryoline

LHCACFQC0349



Tuner bellows + double pipe

LHCACFTU0053 – Tuner bellows
LHCACFTU0057 – Rod Flange
LHCACFTU0066 – Tuner double pipe
LHCACFTS0019&28 – Braids for tuner



Cryostat upper plate

LHCACF_A0007 – Overall top plate assy



Assembly files upper plate

See EDMS N° XXXXXX

Cavity support

LHCACFAH0030 – Support assembly



STEP 5 - Assembly files

See EDMS N° XXXXXX

STEP 6 - Assembly files

See EDMS N° XXXXXX

Cryo Extension line

LHCACFQC0357 – Bellows for cryo measurement



Protections HOMS & Pick Up

LHCACF_T0643 – HDM feedthrough protection
LHCACF_T0694 – Pick up feedthrough protection



Cryo extensions

LHCACFQC0054 – HDM weld jaw
LHCACFQC0091 – HDM stopper
LHCACFQC0053 – DN100 weld jaw



Magnetic shield

LHCACFWM0011 – FPC half plate 1/2
LHCACFWM0018 – FPC half plate 2/2
LHCACFWM0020 – Special washers



Thermalisation braids

LHCACFTS0018 – Braids for FPC & blades



Thermal screen + MLI



Partial support



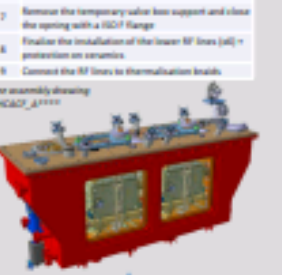
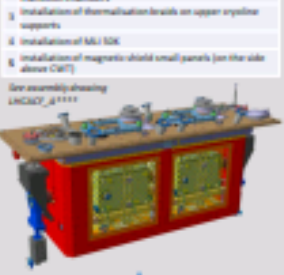
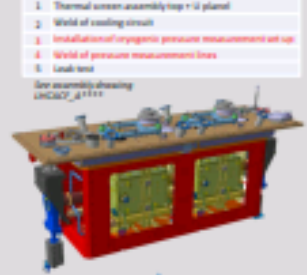
Tuning frame

LHCACFTU0054 – Tuning frame assembly



STEP 1 - Assembly files





Cryo instrumentation
UNCACFAM000

STEP 8 - Assembly files
See EDML N° XXXXXX

BCAM equipment
UNCACFAM000 - BCAM ASSEMBLY

FSI targets
FSI Target and support

STEP 9 - Assembly files
See EDML N° XXXXXX

MLI 2K
UNCACFLE000K

STEP 10 - Assembly files
See EDML N° XXXXXX

Thermal screen
UNCACFTH000 - Thermal screen bottom assembly
UNCACFTH001 - Thermal screen external assembly

Thermal screen preparation
See EDML N° XXXXXX

STEP 11 - Assembly files
See EDML N° XXXXXX

Cryo measurement line
UNCACFQ0000 - Pressure measurement set up

All Preparation of cryogenics measurement set-up
Welding of pipes
Assembly with pressure transmitter and flanges

Thermal screen lateral panels & braids

UNCACFTH001 - Thermal screen lower assembly
UNCACFTH001, 02, 03, 04 - lateral panels
UNCACFTH002 - Thermal braids

MLI 50K
UNCACFTE000K

Magnetic shield panels
UNCACFW0000 - Magnetic shield lateral panel

STEP 12 - Assembly files
See EDML N° XXXXXX

Thermal screen (bottom)
UNCACFAM000 - Cryomodule lower assembly

Lower vessel preparation
See EDML N° XXXXXX

RF lines
UNCACFRL001 - Pick up coaxial line
UNCACFRL004 - Lower NCM Coaxial line
UNCACFRL003 - Upper NCM Coaxial line

STEP 13 - Assembly files
See EDML N° XXXXXX

Jumper
UNCACFQ00100 - Jumper assembly process

FSI flanges
UNCACFAM001 - FSI device on flange

STEP 14 - Assembly files
See EDML N° XXXXXX

Doors
UNCACFV0000 - Doors assembly
All Preparation of doors
Tooling for handling ?
Assemble doors with magnetic shield

Tuner actuation
UNCACFT0111 - work on going

STEP 15 - Assembly files
See EDML N° XXXXXX