



# **LMBHA-001\_CR00001 manufacture electrical test history**

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Acknowledgements to the LMF e-e electrical test team

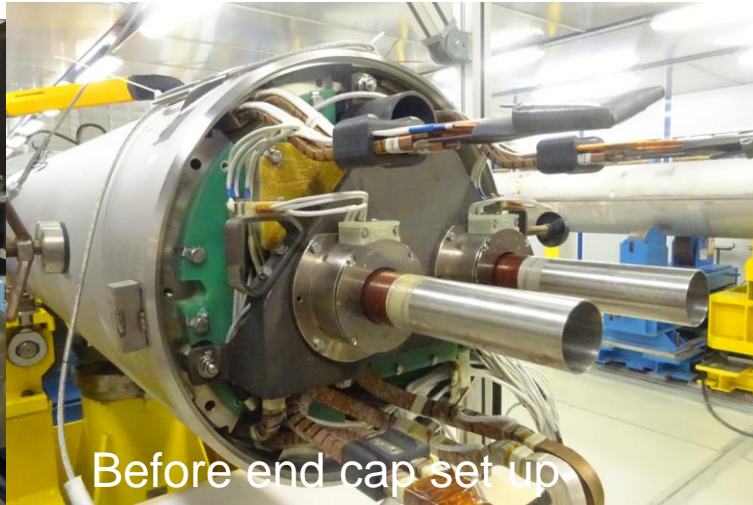
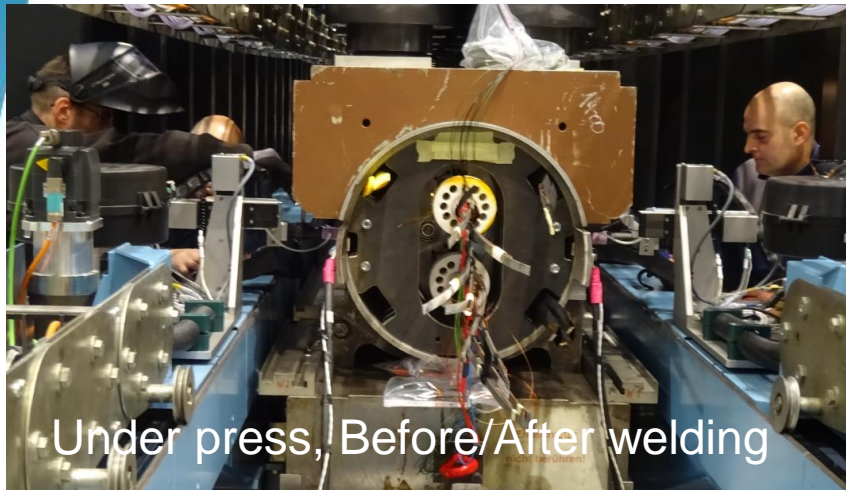


***2020, 15th January – 11T task force meeting***

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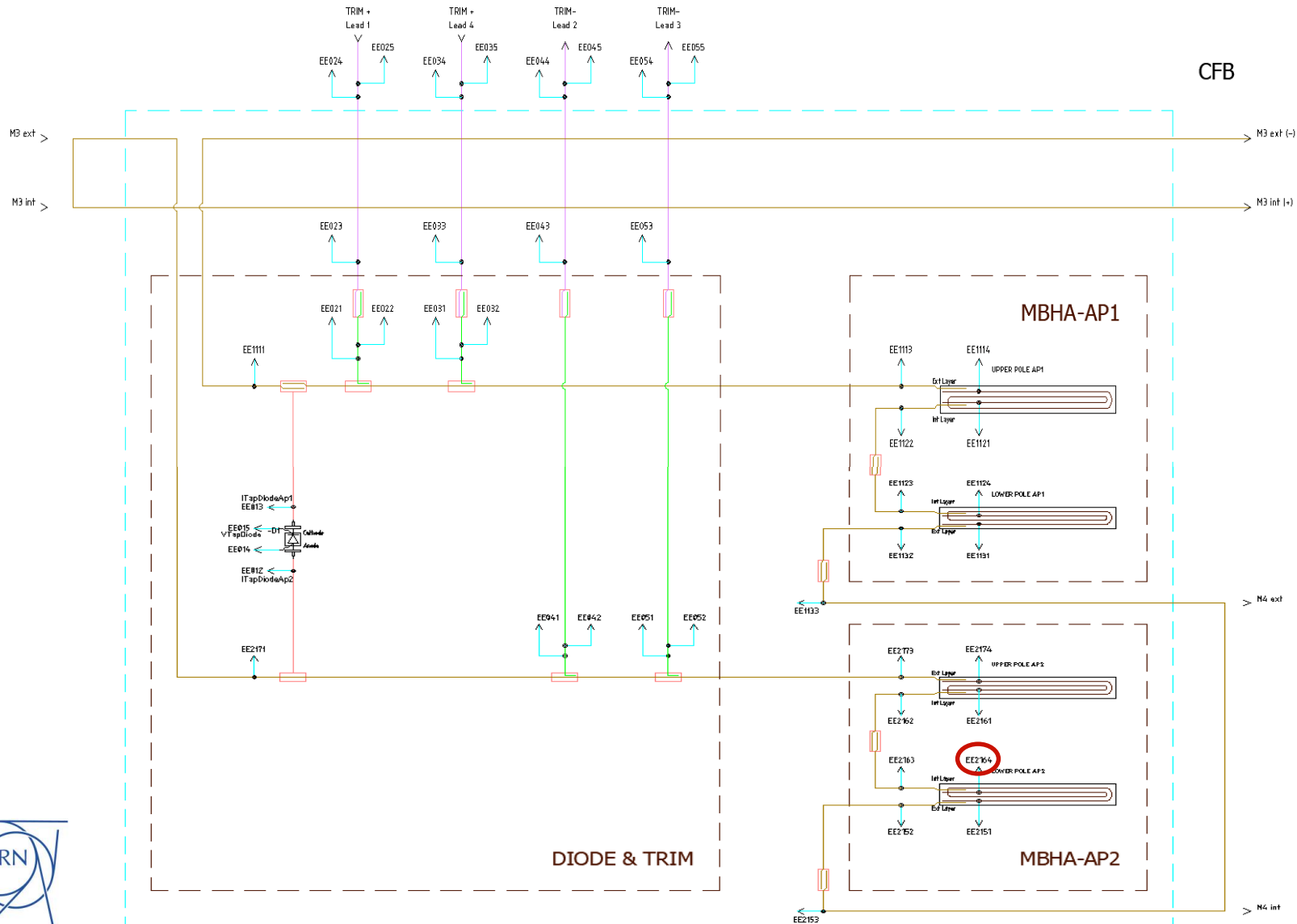
- **Electrical test manufacture steps**
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- **Manufacture electrical test on LMBHA001-CR00001**
- **New IFS capillary test**

# Cold mass electrical test steps



# Electrical diagram

- Reference Dwg LHCLMBHA0052 - LMBHAR



# Manufacture electrical test LMBHA001-CR0001 (1/3)

- MTF: <https://edms.cern.ch/document/2207245/1>

Cold mass manufacture stage	Test voltage @ RT	Items	Results
Under press, before welding no load	V = 1 000 V, t = 2'	Dielectric All Coils + All QHs / All + gnd	28.8 GOhms
		All QHs / All + gnd	3.9 GOhms
		All coils / All + gnd	3 GOhms
After longitudinal welding	Coil discharge U = 3 800 V ; C= 2 μF	Api : Up/Down / Up & Down	Passed
	QH discharge U =450 V, 80 A	QH left,right up/down	Passed
	V = 1 000 V, t = 2'	All Coils+QH+busbars /GND	16.6 GOhms
		All QHs / All + gnd	3.9 GOhms
		All coils / All + gnd	2.7 GOhms
	V = 1 500 V, t = 1'	Busbar aux #1 / All + gnd	300 GOhms
	V = 2500 V, t = 2'	All QHs / All + gnd	4.9 GOhms
		All coils + All Mx bus bars + All QHs / gnd	18 GOhms
	V = 3300 V, t = 2'	All QHs / All + gnd	3.9 Gohms, OK
	V = 5 000 V, t = 2'	All coils + All M3 bus bars + All QHs / gnd	11.8 Gohms, OK

# Manufacture electrical test LMBHA001-CR0001 (2/3)

- MTF: <https://edms.cern.ch/document/2207245/1>

Cold mass manufacture stage	Test voltage @ RT	Items	Results
<b>Before end cap set up (inter aperture splicing, V taps installation)</b>	V taps continuity	V taps, intern splices, inter splice diode, trim	One VT 2164 broken, repaired
	Coil discharge U = 2 400 V ; C= 2 μF	Ap1 + AP2 ( nom. 2800V)	Passed
	QH discharge U =450 V, 80 A	QH left, right, up,down	Passed
	V = 1 000 V / 2100 V, t = 2'	All QHs / All + GND	1.44 /3.5 GOhms
		All Coils + connected bus bars + QHs /GND	1.38 /10 GOhms
	V = 3200 V *, t = 2'	All Coils + connected bus bars + QHs /GND	* Vtaps wires damaged, repaired -> qualification test voltage capped at 3.2 kV, <a href="#">NCR 2216062/2.0</a> 10.3 Gohms, OK
<b>At Capillary set up tack welding</b>	V = 1000 / 3200 V, t = 2'	All QHs / All + GND	1.35 / 2.8 Gohms, OK
	V =1000 V , t = 2'	All Coils / All + GND	0.9 GOhms
	V = 3200 V **, t = 2'	MBH Coils + QHs + EE023 + EE043 + EE014 /GND	** HV breakdown to GND at 2kV, repaired actions on 3 wires, tested at 3.2 kV, <a href="#">NCR 2226886/1.0</a> 9.7 GOhms OK

# Manufacture electrical test LMBHA001-CR0001 (3/3)

- MTF: <https://edms.cern.ch/document/2207245/1>

Cold mass manufacture stage	Test voltage @ RT	Items	Results
After capillary forming	V = 1000 / 3200 V, t = 2'	All QHs / All + GND	1.4 / 1.03 GOhms, OK
	V = 1000 V, t = 2'	All Coils / All + GND	1.18 GOhms
	V = 3200 V, t = 2'	MBH Coils + QHs + EE023 + EE043 + EE014	10.2 GOhms, OK

