Cabling Test Early Results

2024/08/12 Upgrade Meeting

By Stefano Gramigna on behalf of the working group

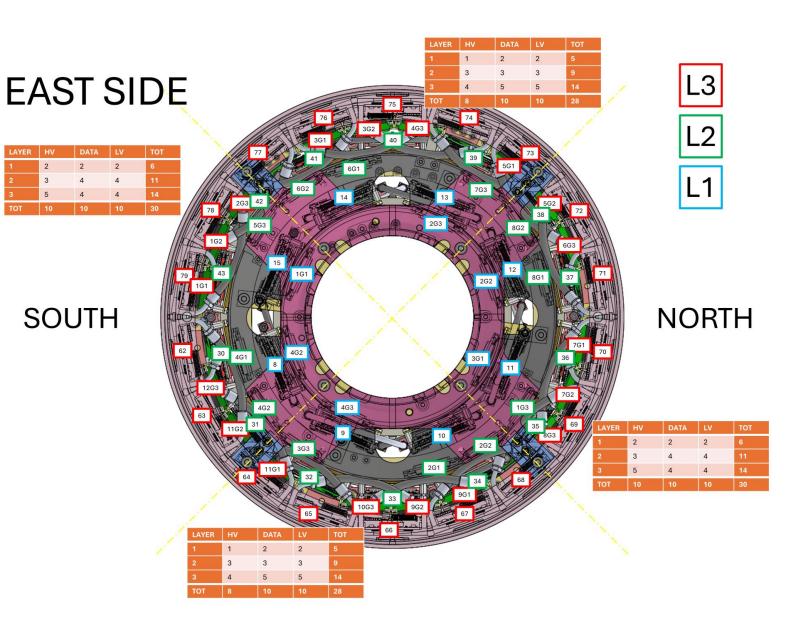
INPUT DETECTOR

The four-spoke flange defines 4 sectors, about 30 cables come out from each sector

Layer 1 cables must travel the longer path

LV cables are the shortest (1 m)

Half of the GEMROCs will be positioned on the north side, half on the south side



INPUT PREAMP MOUNTING POINTS

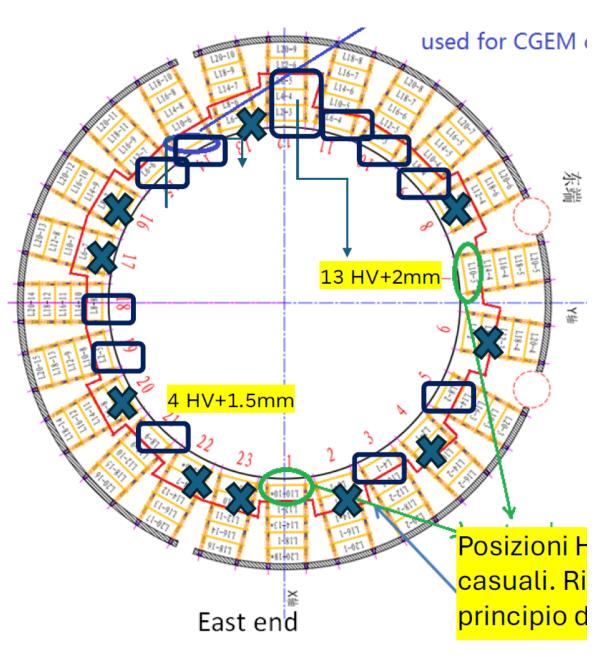
Some preamplifier boards will be removed according to the red line on the scheme

In a single preamplifier slot we can fit:

- Up to 2 DLVPCs
- Up to 4 HVPCs (5 if the slot is one of the innermost ones)

We prefer to keep HVPC and DLVPC stacks separate

Each HVPC stack must also fit at least 1 GNDPC

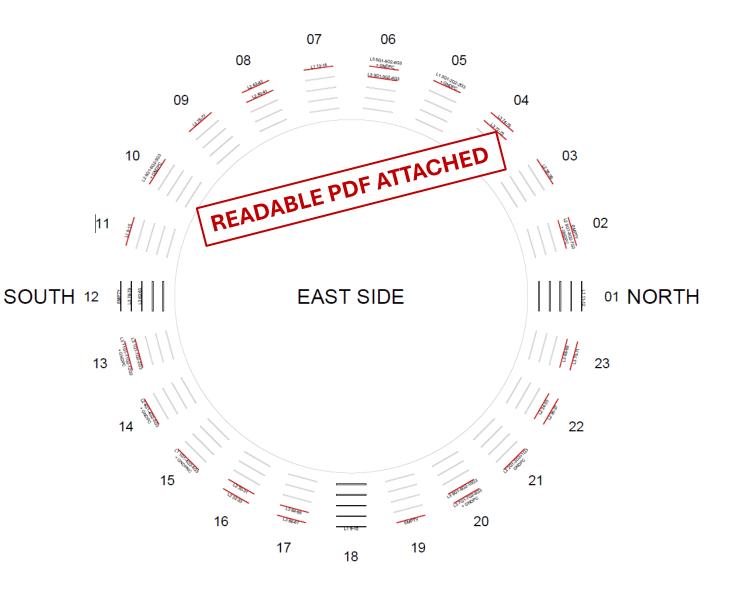


OUTPUT PATCH CARD POSITIONING

Scheme is flipped inside out due to mock-up construction, cable's travel path is conserved

33 slots available according to the documentation, 32 were actually used

FUNDAMENTAL TO CHECK WHICH SLOTS WILL BE FREED AND THE CORRECT ORIENTATION OF THIS SCHEME



OUTPUT CABLE HOLDER FIXING SCHEME

Patch card positioning drives the fixing of the cables near the detector

Cables are fixed to the four cable holders in couples using cable ties

Cables must be fixed in order (L3, L2, L1) to prevent knots near the flange's bottleneck

	10 10 9 9	998888	7 7 7 7 6 6	6 6 5 4 4 4	4 4 4 3 3	2
	L2 662 L2 661 L3 77 D L3 77 LV	L3 76 D L3 76 LV L2 41 D L2 41 LV L2 40 D	L1 14 D L1 14 LV L1 13 D L1 13 LV L1 13 LV L3 5G1 L3 3G2	L3 4G3 L35G1 L1 2G3 L3 75 D L3 75 LV L3 74 D	L <mark>3 74 LV</mark> L3 73 D L2 39 D L2 39 LV	G
	L2 6G2 L2 6G1 L3 77 D L3 77 D	L3 7 L2 4 L2 4 L2 4 L2 4 L2 4 L2 4	L111 L111 L111 L113 L133	L3 4 L35 [,] L3 7 L3 7 L3 7 L3 7 L3 7	L3 74 L3 73 L3 73 L2 39 L2 39	L2 7G3
	30 29 28 27			13 12 11 10 9 8		1
16 8 L2 42 LV 1	15 14	13 12 11	10 9 8 7	6 5 4	3 2 1	10 32
8 1242D 2 ¹						31
8 L2 43 LV 3 2				Lege	nd	15 30 L3 5G2 6
8 L2 43 D 4 ² 10 L2 5G3 5 2						¹³ 29 L3 6G3 6 14 28 L1 2G2 5
6 3						¹⁴ 27 L1 3G1 5
11 L18LV 7 4				2	Twr	13 26 L3 72 D 4
11 L1 8D 8 4 11 L1 15 LV 9 _						¹³ 25 L3 72 LV 4 12 24 L2 38 D 3
11 L1 15 D 10 5				m		12 23 L2 38 LV 3
12 L3 78 LV 11 6				7G3		11 22 L2 8G2 2
12 L3 78 D 12 0 12 L3 79 LV 13				2	Label	¹¹ 21 L2 8G1 2 20 L1 12 D 1
12 L3 79 D 14				2 1 Pos		10 19 L1 12 LV 1
12 L3 62 LV 15 8				1 Slot		9 18 L1 11 D 1
12 L3 62 D 16 8 12 L3 63 LV 17 0						17 L1 11 LV 1 16 L3 71 D 23
12 L3 63 D 18 9					L3 7G2 20	8 15 L3 71 LV 23
13 L3 2G3 19 10				1 1	L3 8G3 20	7 14 L3 70 D 23
13 L3 1G2 20 10 13 L3 1G1 21 11						13 L3 /0 LV 23
13 L3 12G3 22 11						6 11 L3 69 LV 23
13 L3 11G2 23 12				Cabling order	Color scheme	_ 10 L2 37 D 22
14 L2 4G1 24 12 14 L2 4G2 25 12						3 9 L2 37 LV 22 4 8 L2 36 D 22
14 L2 462 25 13 15 L1 1G1 26				1	L3	4 7 L2 36 LV 22
15 L1 4G2 27 14				1		2 6 L2 35 D 22
28				2	L2	3 5 L2 35 LV 22 2 4 L2 1G3 21
16 L2 30 LV 29 16 L2 30 D 30				3	L1	2 4 12 163 21 3 13 7G1 20
16 L2 31 LV 31 16						1 2 L3 7G2 20
16 L2 31 D 32 10 1	2 2	4 5 6	7 8 9 10) 11 12 13	3 14 15 16	1 L3 8G3 20
	2 3 3 4 5 6					
						·
<mark>1161</mark>	363 <mark>463</mark> 32 LV 32 D	33 LV 33 LV 64 LV 64 LV 65 LV 65 LV	.366LV .366D .367D .19LV .19LV .110LV	0 D 0G3 62 61 61 32	34 LV 34 D 68 LV 68 D	
0 <mark>11</mark>	L2 3G3 L <mark>1 4G3</mark> L2 32 LV L2 32 D	L2 33 LV L2 33 LV L2 64 LV L3 64 LV L3 65 LV L3 65 D	L3 66 LV L3 66 D L3 67 D L3 67 D L1 9 LV L1 9 D L1 10 LV	L110D L310G3 L39G2 L39G1 L39G1 L22G1 L22G2	L2 34 LV L2 34 D L3 68 LV L3 68 D	
	14 15 16 16			18 20 20 20 21 21	22 22 23 23	

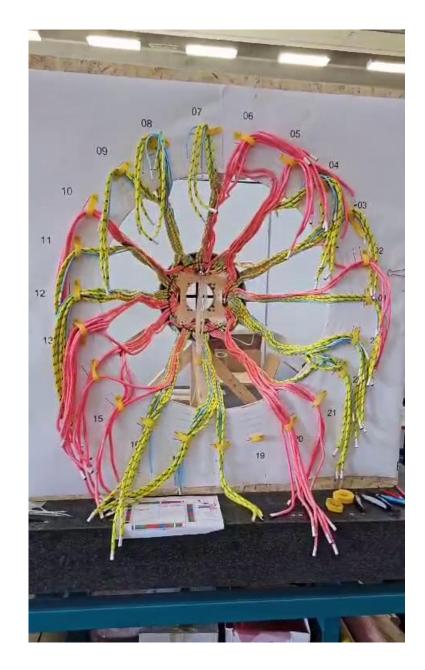
EAST SIDE TEST

The presented scheme is feasible, all cables reach their destination with a reasonable amount of extra length

Cables are stretched to evaluate extra length available

Limiting the cable routing to 0°, 90°, 180°, and 270° as requested earlier this year, to separate CGEM and MDC cables, is not possible

Access to cable grooves over the full 360° is necessary due to the shortness of LV cables (the length of which was determined in 2018 according to the possibility of accessing **all** the slots to be freed)



EAST SIDE TEST

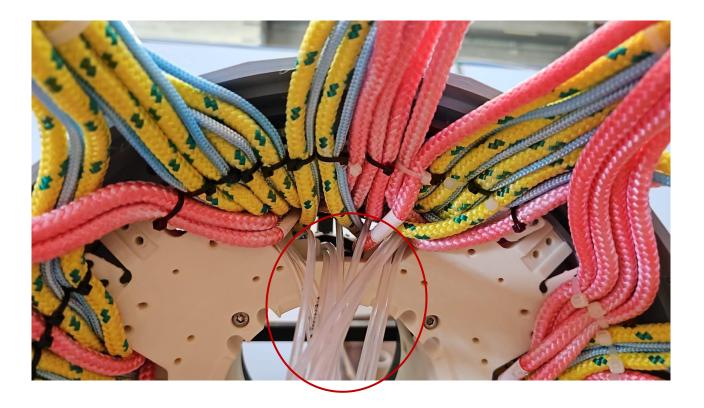
Clean exit at the flange, knots are handled in the back or in the MDC cone



Inner cable holder not serviceable, outer cable holder redesigned to accommodate all cables in pairs

Tools for adjusting the beam pipe positioning screws identified (ratchet combination keys, probably hinged)

EAST SIDE TEST



Routing of the gas pipes still undefined, input from the gas system group necessary

Conclusion and Future Plan

- The **schemes** presented are **still subject to changes** (few minor adjustments still being discussed), final schemes will be submitted via e-mail upon finalization
- Mock-up conversion for west side test within the next two weeks
- West side test and cabling scheme production within the end of August
- Mandatory stop of the cabling studies in September (all people working on this will be at IHEP in early September)