HV, LV and gas for GE1/1

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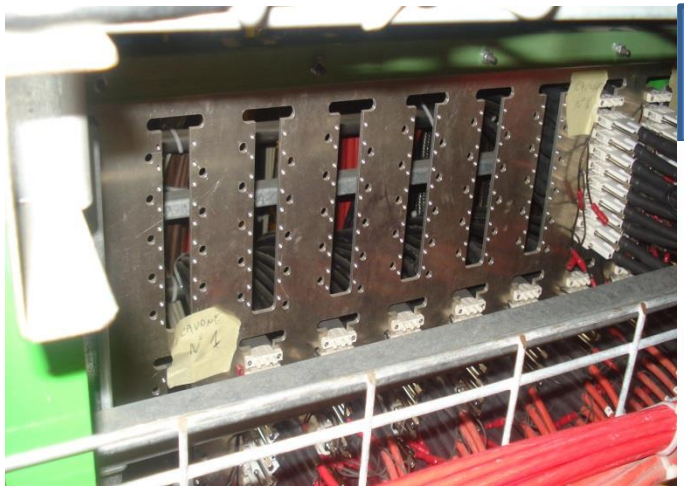
HV System Possibilities

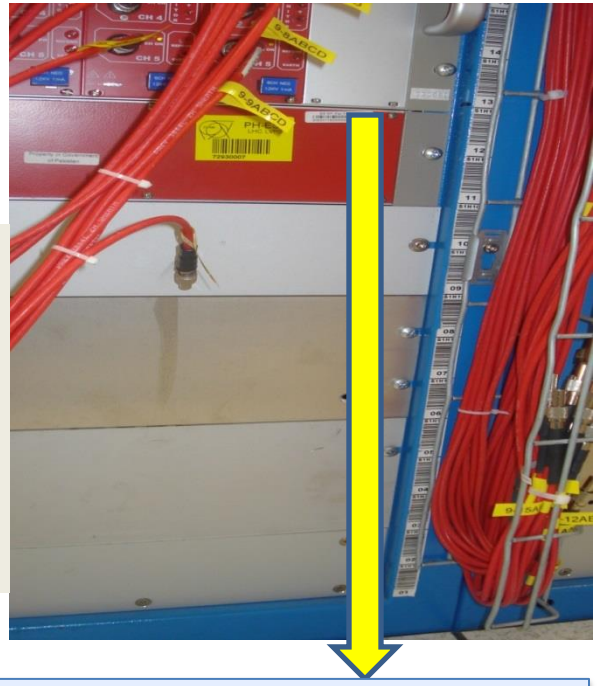


HV PP at X1 in UXC

For GE1/1 Plenty of space is there

Six 12kV/1mA channels

magnetic field and radiation tolerant



HV in USC

Three Possibilities:

- ❑ **For Slice test:** 3 slots are available in each of the 08 EASY Crates to install one HV module. So total 08 modules can be installed in existing RPCs HV setup. BUT GE1/1 to use this space is very risky.
- ❑ A separate system can be built by using 11 available units in each rack which can accommodate 04 EASY crate (6 units/E.C.), fan unit (2 units) and DB (2 units).
- ❑ Separate rack for GE1/1 in USC. (Totally independent setup)

NEED TO WORK IT OUT Precisely for the GE1/1 full HV system, and need to decide in which configuration is chosen from PS to DB back side. 1 to 1, 1to 2 or … (for RPCs we have 1 to 4). major reason is cost factor.

Existing HV cables from UXC PP to GE1/1

- 36 cables exits for one GE1/1 station.
- Both sides are connectorized with tripolar connectors.
- In CASE of GE1/1 SC two separate cables are needed. Here we have two options.

  - Either we cut the connectors and make two independent. (risk of cable short length).

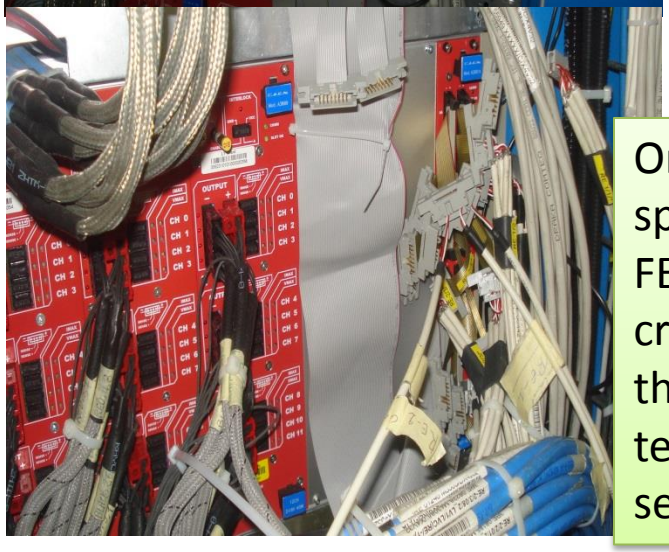
  -OR we can make “ɣ” . One end with male tripolar connector and other end Jupiter or which it decided at GE1/1.

LV space in existing RPCs racks

For Slice test one modules can be mapped in LV EASY crates. Of course by agreement of the RPCs community

X4V32

No space in LBB EASY crate only two slots are available



One module space is there in FEBs EASY crate. (ADC is there for temperature sensors)

X2V32

Full space is there (12 slots in LBB and 8 slots in FEBs)

LV Module for GE1/1

- One option we got from CAEN, it is A3016, with six channels 8V/16A/90W.
- It can work in EASY3000
- A meeting has been arranged with CAEN for on June 18. to discuss it.

- In addition information: one rack on each near side (+ and -) is empty. Possibly can be used if we go to build a separate LV system of GE1/1. Ian and Saleh had a look.

LV cable dimensions

TABLE 4E4A Multicore 90°C armoured thermosetting insulated cables (Copper Conductors)

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature : 30°C
Ground ambient temperature: 20°C
Conductor operating temperature:90°C

Conductor cross-sectional area	Reference Method C (clipped direct)		Reference Method E (in free air or on a perforated cable tray horizontal or vertical		Reference Method D (direct in groundor in ducting in ground, in or around buildings)	
	1 two core cable, single phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two core cable, single phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two core cable, single phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.
1	2	3	4	5	6	7
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)
1.5	27	23	29	25	25	21
2.5	36	31	39	33	33	28
4	49	42	52	44	43	36
6	62	53	66	56	53	44
10	85	73	90	78	71	58
16	110	94	115	99	91	75

NOTES:

1. Where a conductor operates at a temperature exceeding 70°C it must be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512.1.2).

2. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C thermoplastic insulated cables (Table 4D4A) must be used (see also Regulation

Amperes per Conductor in free air @ 30°C ambient temperature:

AWG Size	Dielectric/Copper Temperature				
	@ 80°C	@ 90°C	@ 105°C	@ 125°C	@ 200°C
30	2	3	3	3	4
28	3	4	4	5	6
26	4	5	5	6	7
24	6	7	7	8	10
22	8	9	10	11	13
20	10	12	13	14	17
18	15	17	18	20	24
16	19	22	24	26	32
14	27	30	33	40	45
12	36	40	45	50	55
10	47	55	58	70	75

De-rating Factors for Bundled Conductors:

# Of Bundled Conductors	De-rate / Reduction Factor (x Amps)
2 – 5	0.8
6 – 15	0.7
16 – 30	0.5

Example: 8 conductors of 26 AWG at 90°C = 5 x 0.7 = 3.5 amperes max, each conductor.
Note: For Flat Ribbon configurations with greater than 30 conductors, use 0.5 de-rate factor.

Gas rack for GE1/1

Discussed to Roberto G. and verified with Ian that the GE1/1 manifold has separate line from USC to UXC. Need only modification in rack to make link with the GEM gas mixture.

RE1/2 and RE1/3

12 S+12 R gas lines are there from UXC gas rack to GE1/1. It is making 30 degree sector, it means for 6 SCs one supply and one return

GE1/1, 12 supply and 12 returns