

Meeting cables

14/06/2018

Cables LV SOLAR

- Need 112 LV cables (56 on each side) to supply SOLAR crates
- Split LV part and sense part
- LV cables: 1 cable = 1 LV (4 mm²) + 1 GND (4 mm²)
 - Ref CERN: 2x4 mm² SCEM 04.08.61.454.0 (3CHF/m)
- LV connectors
 - bended lugs on LVPS M6
 - no connector on SOLAR crate side (wires inserted in Wago 826-164 on SOLAR crate)
 - connectors multi-conductors for opening stations 4 and 5: **Staubli 16 pins (for 4 mm²) (male and female)** **Ref ??**

Sense SOLAR

- **Sense cables**

- 1 pair of sense per LV channel; 1 LV ch per crate; 2 crates per quad
- We gather senses
- NE4: 2x2 0.5 mm² for stations 1 and 2
 - 2 pairs of sense (1 quad)
 - ref CERN: 04.21.52.104.8 (0.96CHF/m)
- NE10: 5x2 0.5 mm² for station 3
 - 5 pairs of sense
 - ref CERN: 04.21.52.120.8 (1.9 CHF/m)
- NE18: 9x2 0.5 mm² for stations 4 and 5
 - 9 pairs of sense (16 pairs max needed)
 - ref CERN: 04.21.52.130.6 (2.5 CHF/m)

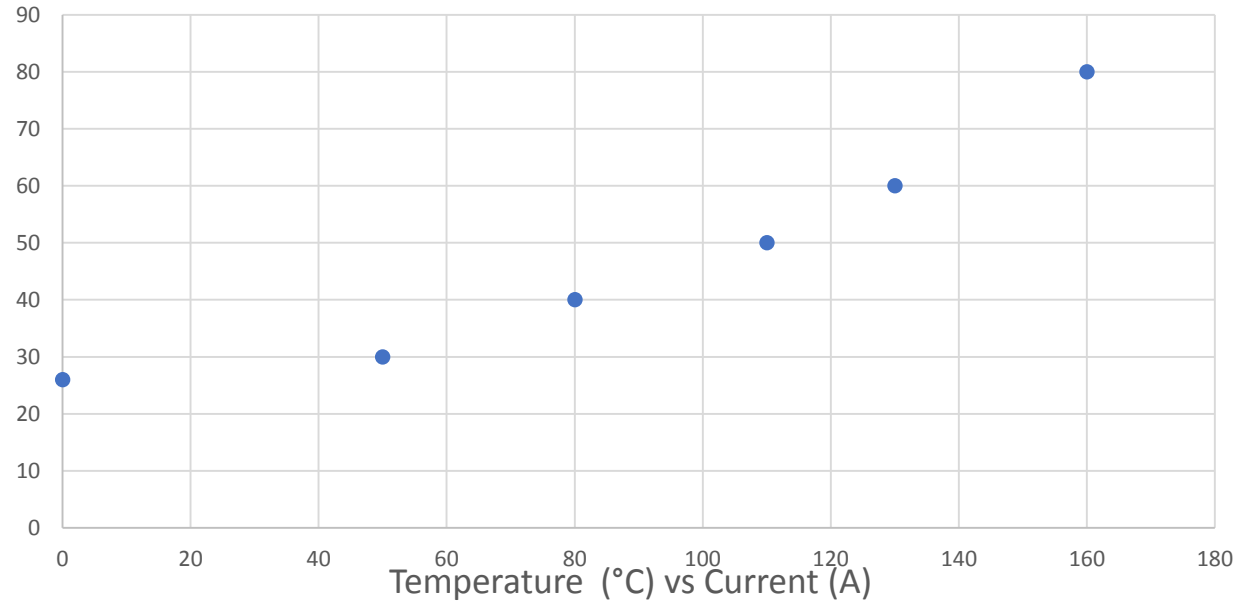
- **Sense connectors**

- no connector on LVPS side (wires will be inserted in LVPS sense connector)
- no connector on SOLAR crate (wires inserted in Wago 826-164 on SOLAR crate)
- connectors multi-conductors for opening stations 4 and 5: **Burndy 16 pins (male & female)** Ref ???

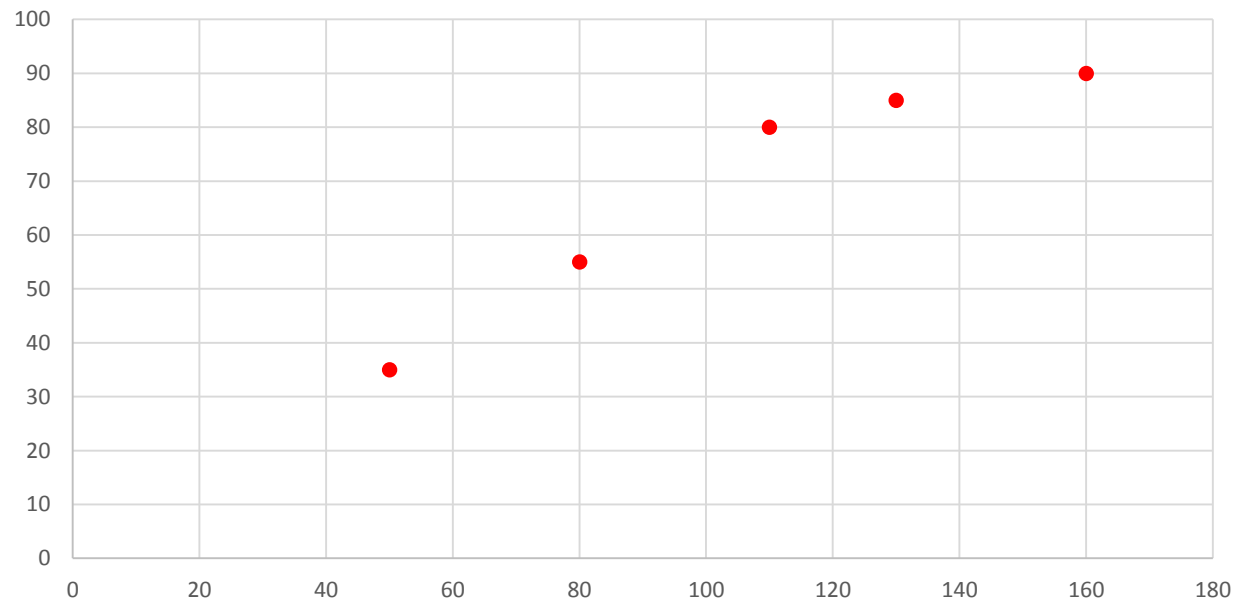
Cables LV FEC

- **Present LV cable: 1 cable = 2 LV wires(16 mm²) + 2 GND wires(16 mm²) + 2 pairs of sense**
 - **Wires characteristics: OMERIN VARPEN 125 (-50°C to 125 °C)**
 - **Current:**
 - **Quadrant:** 1 LV cable per cathode; 16 quadrants → 32 LV cables
 - Expected current: 85A and 60 A → 145 A
 - **Station 3:** 5 cables/half-chamber → 20 cables
 - 8 cables : 65A + 45 A → 110 A
 - Others: < 40 A + < 30 A → < 70 A
 - **Station 4:** 7 cables/half-chamber → 28 cables
 - 8 cables : 65A + 45 A → 110 A
 - Others: < 45 A + < 30 A → < 75 A
 - **Station 5:** 7 cables/half-chamber → 28 cables
 - 8 cables : 75A + 55 A → 130 A
 - Others: < 45 A + < 35 A → < 80 A
- 56 cables with “high” current

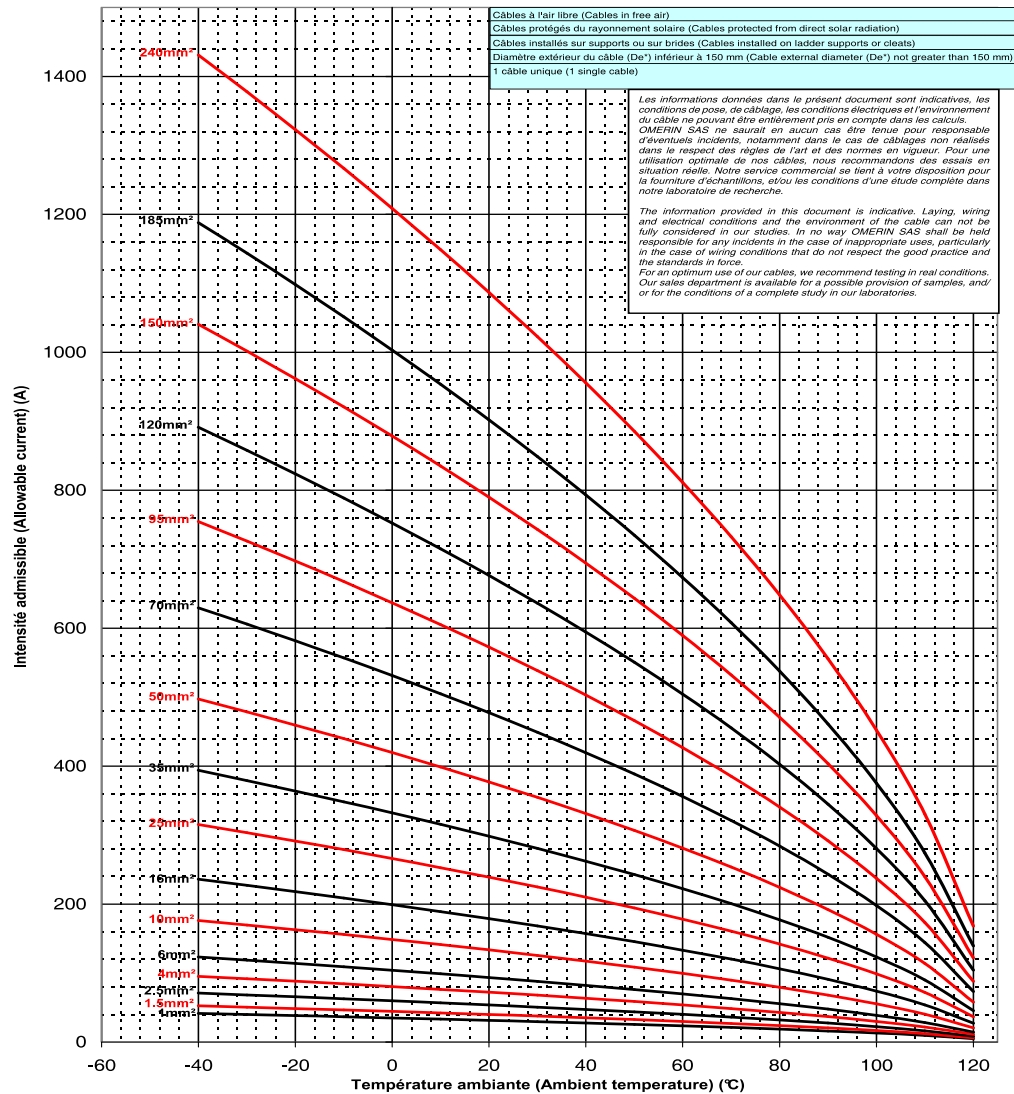
Temperature (°C) vs Current (A)



Temperature on braid
(Thermal camera)



Temperature on black cover
(Thermal camera)



	I (A)	T camera	T thermocouple
15 cm from connector (middle part of black cover)	160	115°C	130°C
35 cm (end of black cover)	160	90°C	101°C
45 cm (braid)	160	81°C	91°C

Temperature probe "inside" the braiding: with thermocouple
At the level on each LV wire: + 10 – 15 °C compared to surface temperature

	145 A	130 A	110 A	< 80 A
Braid Tcam	70°C	60°C	50°C	< 40°C
Black cover Tcam	90°C	85°C	80°C	< 55°C
Wire (+15°C) Ttc	85 °C	75°C	65°C	< 55°C
	105°C	100°C	95°C	< 70°C

LV cables for FEC

- Split new LV and sense cables
- 56 new LV cables in parallel with the present ones + 56 new sense cables
- LV cables: 1 cable = 2 LV (16mm²) + 2 GND (16 mm²)
 - At CERN no 4x16 mm² found
 - At CERN found only : 5x16 mm² SCEM: 04.08.61.591.2 (10 CHF/m)
- LV connectors
 - bended lugs on LVPS: M6
 - lugs in LV Filter box: M8 (due to new capacitors in LV filter box)
 - Rq: need to change lugs on LV FEC cables on LV filter side ! (M4 → M8)
 - connectors multi-conductor for opening stations 4 and 5: Burndy 4 pins on G1, G7 per half-chamber ref ??
- Sense cables:
 - need for sense ??: already on present cables (which are in parallel)