T2200048-v3 - Grounding and short circuit check

K.Kawabe, edited by B.Weaver Feb 2022

In MEDM – Turn the SERVO's to OFF on OPO_TEC, SFI1_TEC and SFI2_TEC screens. Disable any Picomotors (HAM5, 6, and/or 7depending on which checks you are performing) from the ISC Picomotors screen. (Return these states when finished). Power off any of the chassis below before starting is they have an on/off.

Everything has been reported to work as of Feb/09 2022, so the basic things we need to do are:
1. Disconnect the field cable between the Feedthru and the rack at the rack.
2. Attach a breakout board to the cable, but not to the rack.
3. Check continuity between pin 13 and all other pins. There shouldn't be any continuity.
4. Check continuity between the rack GND and all pins including pin 13. There shouldn't be any continuity.
5. (Cable-specific things will be listed in each individual section that follows below.)

If we're to go paranoid, we can also check continuity between all combinations of all relevant pins. Check boxes for these cable checks below.

Flange layout https://dcc.ligo.org/D1900116
ISC wiring diagram https://dcc.ligo.org/D1900511

1)   105kHz QPD (two DB25 cables)

☑ ISC_SQ_479 ⟶ pin 23 to 13.
☑ ISC_SQ_480 ⟶

The cables are on SQZ-R1 U4 (Apparently U6 at LHO not U4, as found at the rack).
Receiver chassis https://dcc.ligo.org/D2000552
105kHz QPD receiver PCB https://dcc.ligo.org/LIGO-D2100639

(In-chamber enclosure (type 01) https://dcc.ligo.org/LIGO-D2000246
PCB inside the enclosure https://dcc.ligo.org/LIGO-D2000341)
In-chamber shield is cut on the DB25 on this PCB.

All 25 pins are relevant.

☑ **In addition to basic check, make sure that 25-12 (+18v) are tied together, as well as 24-11 (-18v).**
☑ **Also, just to make sure that there's no cross-channel short circuit, check all combinations of pins 2-9, 15-22 (i.e. 2-3, 2-4, … 2-9, 2-15, … 2-22, 3-4, … 3-9, 3-15, … 3-22, … 21-22).**

2) Pico (two DB25 cables)

☐ ISC_SQ_470
☐ ISC_SQ_471

This is on top of SQZT7 labelled Picomotor Driver D110033.
Pico driver board (see page 5) https://dcc.ligo.org/D1100326

Relevant pins are 1-8, 13, 14-21.

3) Peltier/thermistors for SFIs, OPO and OFI (two SFIs, one OPO, one OFI total of 4 DB25 cables)

[handwritten: 1-3 +14-16 are connected]

☑ ISC_SQ_482 *[handwritten: → didn't check "Relevant pins" as in HAM S]*
☑ ISC_SQ_483 *[handwritten: → Rack GRD to Pin13,]*
☑ ISC_SQ_484

[handwritten left margin: 7→20, 8→21, 9→22, 10→23, 11→24, 12→25]

SFIs and OFI cables are on SQZ-R2 U7 (sheet 29 of D1900511-v7).
OFI SFI TEC interface Chassis https://dcc.ligo.org/D2000503
OFI SFI TEC interface PCB https://dcc.ligo.org/LIGO-D2100285
SQZ VAC interface PCB https://dcc.ligo.org/LIGO-D2100370

Relevant pins are 1-3, 7-13, 14-16 and 20-25.

4) OPO TEC, OPO PZT and oven translation, DCPDs/Lens translation/BDV (3x DB25)

Cables are on SQZ-R2 U8 (sheet 29 of D1900511-v7).
SQZ VAC interface PCB
https://dcc.ligo.org/LIGO-D2100370

[handwritten left margin: Pin 13 grounded]

☑ ISC_SQ_304 (OPO TEC)

☑ ISC_SQ_303 ("TO OPO") *[handwritten: c.f. pin 13. DCPD somehow]*

Relevant pins are 1, 2, 4, 13, 14, 15 and 17.

[handwritten: 11-24, 12-25 →]
☐ ISC_SQ_305 (DCPDs) *[handwritten: 10-24 connected]*

Relevant pins are 1-7, 10-13, 14-20, 15 and 17. *[handwritten: 10-20 ?]*

Diode A uses pin (18, 6, 19), diode B (4, 17, 5), C (15, 3, 16) and D (1, 14, 2).

☑ **In addition to basic check, make sure that the DCPD sensor case is isolated from anode and cathode in chamber (no connection between 1-2, 1-14, 15-3, 15-16, 4-5, 4-17, 18-6 and 18-19).**

☑ **Also check connection between different diodes. There shouldn't be any connection from any of e.g. Diode A pins to any of e.g. Diode B pins.**

5) HAM5 DCPD/BDV (one DB25)

☑ ISC_SQ_481 ← 13 to chamber ground.

SQZ VAC interface PCB https://dcc.ligo.org/LIGO-D2100370
The cable is ALSO on SQZ-R2 U8, between the DB25s above).

Relevant pins are pins 1, 10-14, 23-25.
☑ **In addition to basic check, make sure that HAM5 DCPD case is isolated from anode and cathode in chamber (13 should be isolated from 1 and 14).**

All SUS (OPO, ZM, FC1)

Do all of them. Note, is "new SUS cables were used invac, there will be ground loops as there is a systematic fault in the cable to BOSEM re-fabrication process for A+. See FRS ticket https://services1.ligo-la.caltech.edu/FRS/show_bug.cgi?id=10518