



US CMS EMU

ME1/3 chamber  
AFEB and AFEB-ALCT  
cabling/integration

Prepared by N.Bondar  
Revision #1 12/02/02

## List of material

Items 2-13 must be installed on the chamber before the cable installation.

<b>Position #</b>	<b>Assembly component</b>	<b>part number</b>	<b>Quantity</b>
1	ME1/3 chamber with cooling pad		1
2	ALCT288		1
3	Cable strain relief clamp top part	MC-400094	1
4	Cable strain relief clamp bottom part	MC-400094	1
5	Screw M4 x10 (thread forming)	MA-400049	16
6	AFEB/s stack assembly	MC-400027-A	4
7	AFEB/s assembly cover	MD-400028-A	4
8	AFEB input cables:		
	Input 1 - 2.5"	MC0400070	4
	Input 2 - 5.0"	MC0400071	4
	Input 3 - 7.5"	MC0400072	4
9	Long spacer AFEB stack	MD-400204	4
10	Short spacer AFEB stack	MD-400203	4
11	Screw M6		5
12	Screw M5 SHCS x10 mm LG., SST	MA-400235	8
13	Screw M5 FSHS x10 mm LG., SST	MA-400205	8
14	Screw M4 THR forming, 10 mm LG., ZPS	MA-400049	16
15	Anode side panel cover	MB-400231	4
	AFEB-ALCT cable set:		
16	3 Pitch RH	MC-400074	6
17	4 Pitch RH	MC-400076	3
18	6 Pitch RH	MC-400079	3
19	Cable tie Nylon 4.0 LG x .10 wide	PLT4S-M	16
20	Adhesive bracket cable tie mount	MA-400331	2
	<b>Tooling:</b>		
	Torque wrench		1
	Power screwdriver with adjustable torque Craftsman 111370 or equivalent	#11137	1
	Screwdriver Philips #2 (P2)		1
	Screwdriver socket 7 mm		1
	Screwdriver socket 10 mm		1
	Hex screwdriver 5 mm		1
	Hex screwdriver 4mm		1
	Hex screwdriver 3mm		1
	Wire cutter		1
	<b>Other material:</b>		
	Alcohol		10g

**Before the cable installation:**

- Install the cooling pad TDME-400000 on the chamber - 1,
- Install the ALCT288 board on the cooling pad - 2,
- Install the bottom part of the cable strain relief clamp MC-400094 on the cooling pad - 3,
- Install the long spacer AFEB stack MD-400204 (4 pieces) for the two AFEB stacks at the narrow side of the chamber and the short spacer AFEB stack MD-400203 (4 pieces) for the two AFEB stacks at the wide side of the chamber.

See Fig.1 for reference.

- Remove the chamber side panel and plug-in the AFEB input cables in the following order : “Input 1” on the top protection boards, “Input 2” on the middle protection boards and “Input 3” on the bottom protection boards.

Use the “Cathode Strip Chamber AFEB Installation” instruction for more details.

<http://www-hep.phys.cmu.edu/cms/ AFEB install>

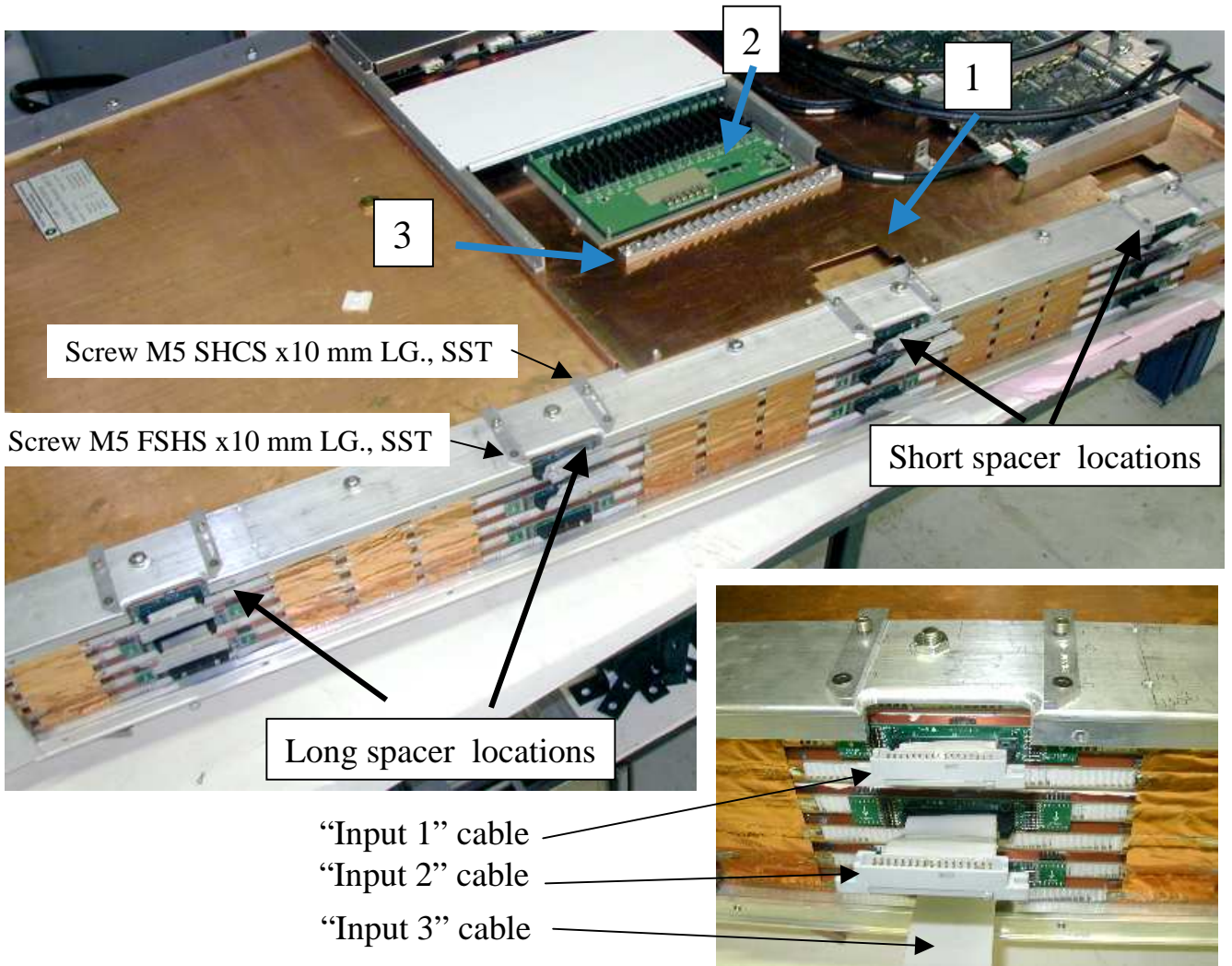


Fig. 1. ME1/3  
chamber preparation for cable installation

- Install the AFEB stack assemblies MC-400027-A at the 4 corresponding places on the chamber frame.
  - Connect the input cables into the AFEB inputs for these 4 stacks. Start connecting from the cable “Input 1” – lowest AFEB, then connect cable “Input 2” into the middle AFEB and the cable “Input 3” into the top AFEB.
  - Put the chamber side panel back on.
- See Fig. 2. Below.

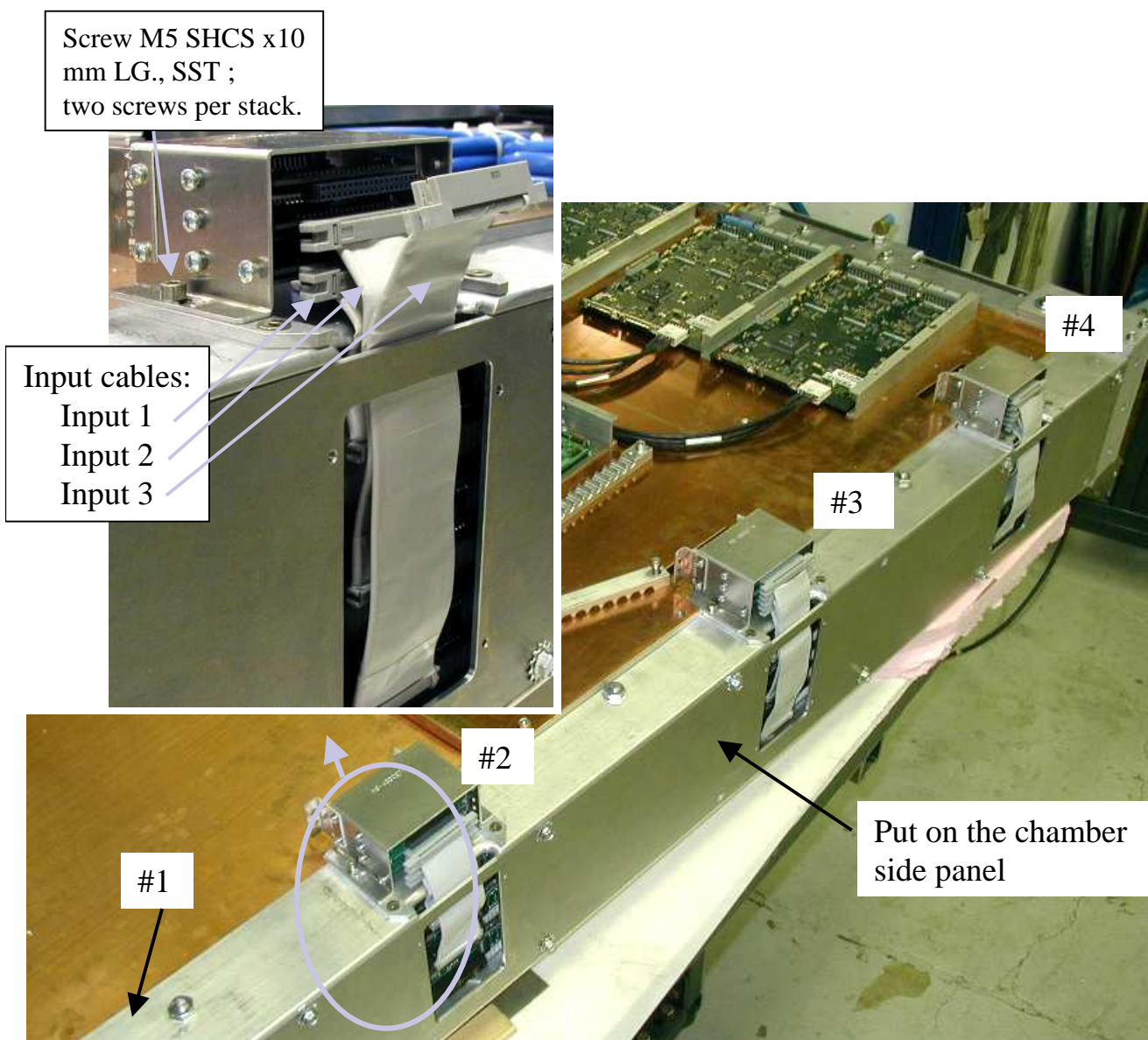


Fig.2. AFEB stack assembly installation.

## Cable installation.

- Connect the AFEB-ALCT cables to the ALCT board. Start from cable number 12 and connect it to the ALCT input connector number 18. Connect the cable ground wire to the nearest ground contact. Then connect cable number 11 to connector number 17 and then go on to the cable number 1, which should be connected to connector number 7. ALCT connectors 1 - 6 are spare.

### Note:

**The cable drawing number label should be located on the ALCT side of the cable!**

- Spread the cables along the cable strain relief clamp in their corresponding slots.
- Install the top part of the strain relief clamp with M6 screws and tighten the cables firmly but gently. Avoid pinching the cables.

See Fig. 3. for reference.

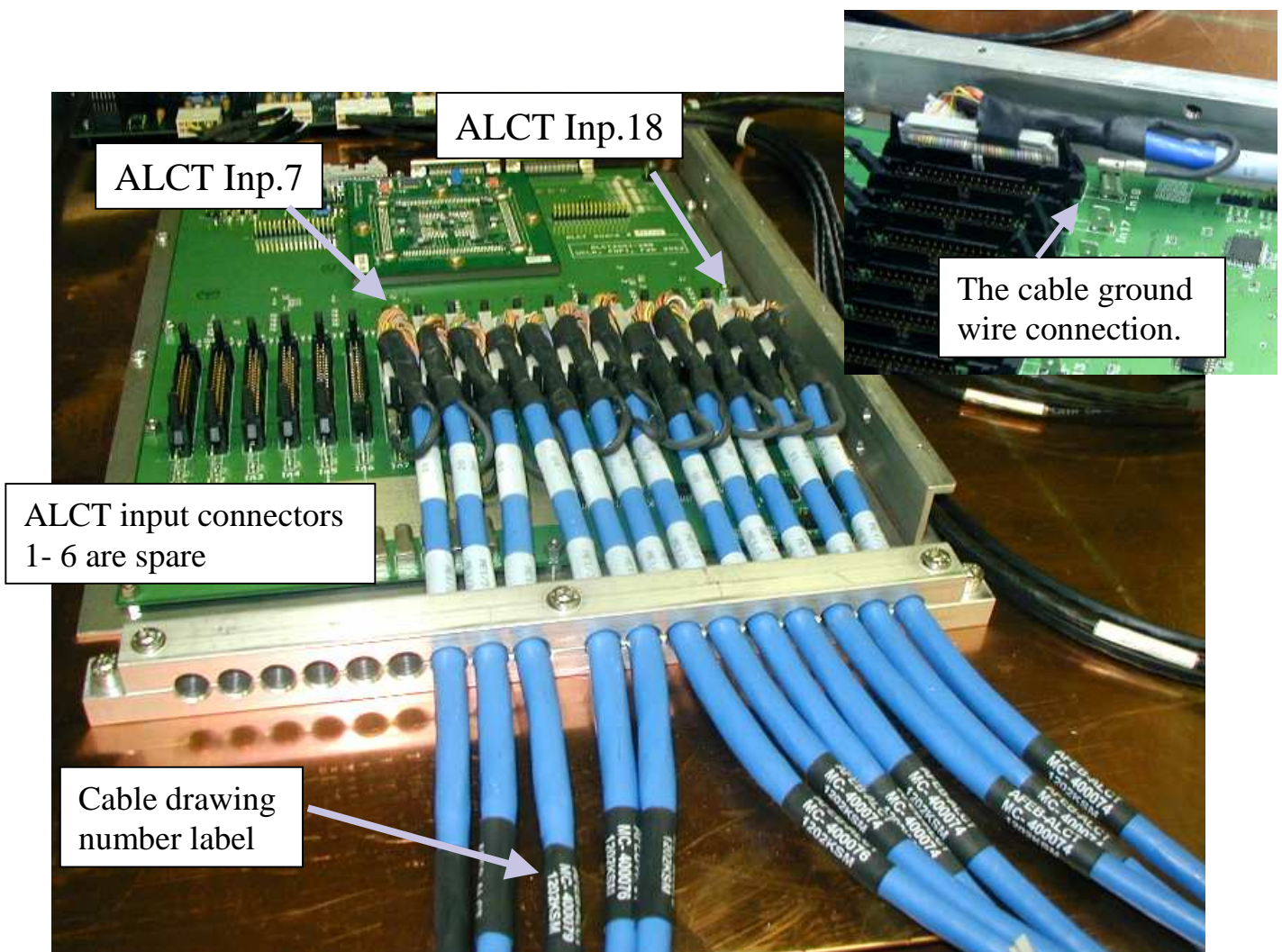


Fig. 3. Cables clamped near the ALCT input.

- Stretch the cables numbered 1, 2, 3 along the chamber, with cable number 1 on the bottom, then cable number 2, and cable number 3 on top.
- Connect cable number 1 to the corresponding AFEB output – the bottom position of the stack assembly.
- Tighten the cable to the special strain relief bracket using a 142 mm cable tie, PLT1.5I-M.
- Attach the grounding lug to the side of the stack assembly using a metal sheet screw.
- Connect cable 2 to the middle position of the stack.
- Connect cable 3 to the top position by using the same procedure.
- Put on the AFEB/s assembly cover MD-400028-A and fix it with 3 self tapping screw (AFEB/s assembly set)

See Fig. 4. for reference and the “Cathode Strip Chamber AFEB Installation” instruction (<http://www-hep.phys.cmu.edu/cms/ AFEB install>).

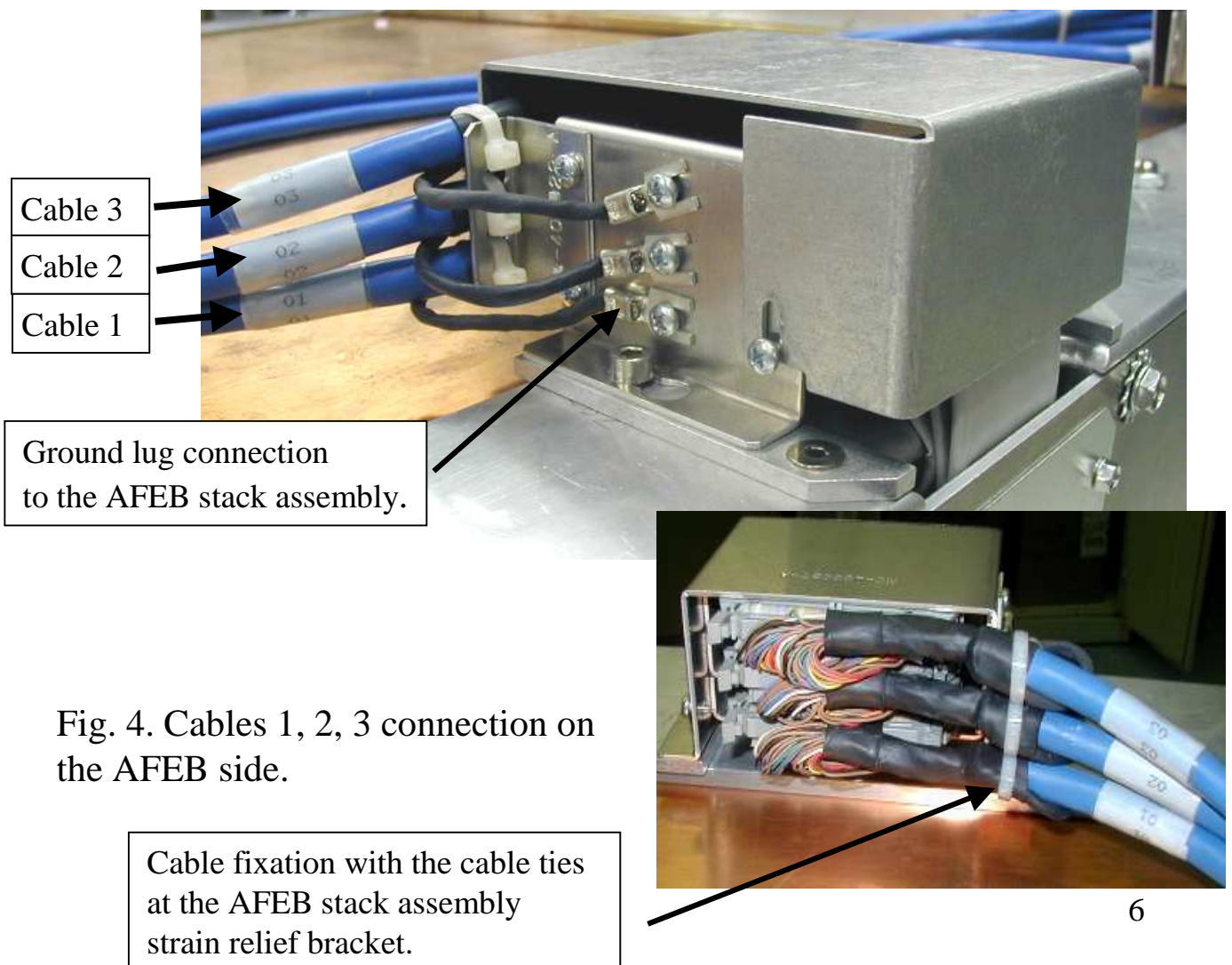


Fig. 4. Cables 1, 2, 3 connection on the AFEB side.

Using the same technique, connect all other cables to the AFEB outputs in the natural order shown at the Fig. 5.

Close the four openings in the chamber side panel with the four anode side panel covers MB-400231. Use M4 thread forming screws and alcohol as a lubricant.

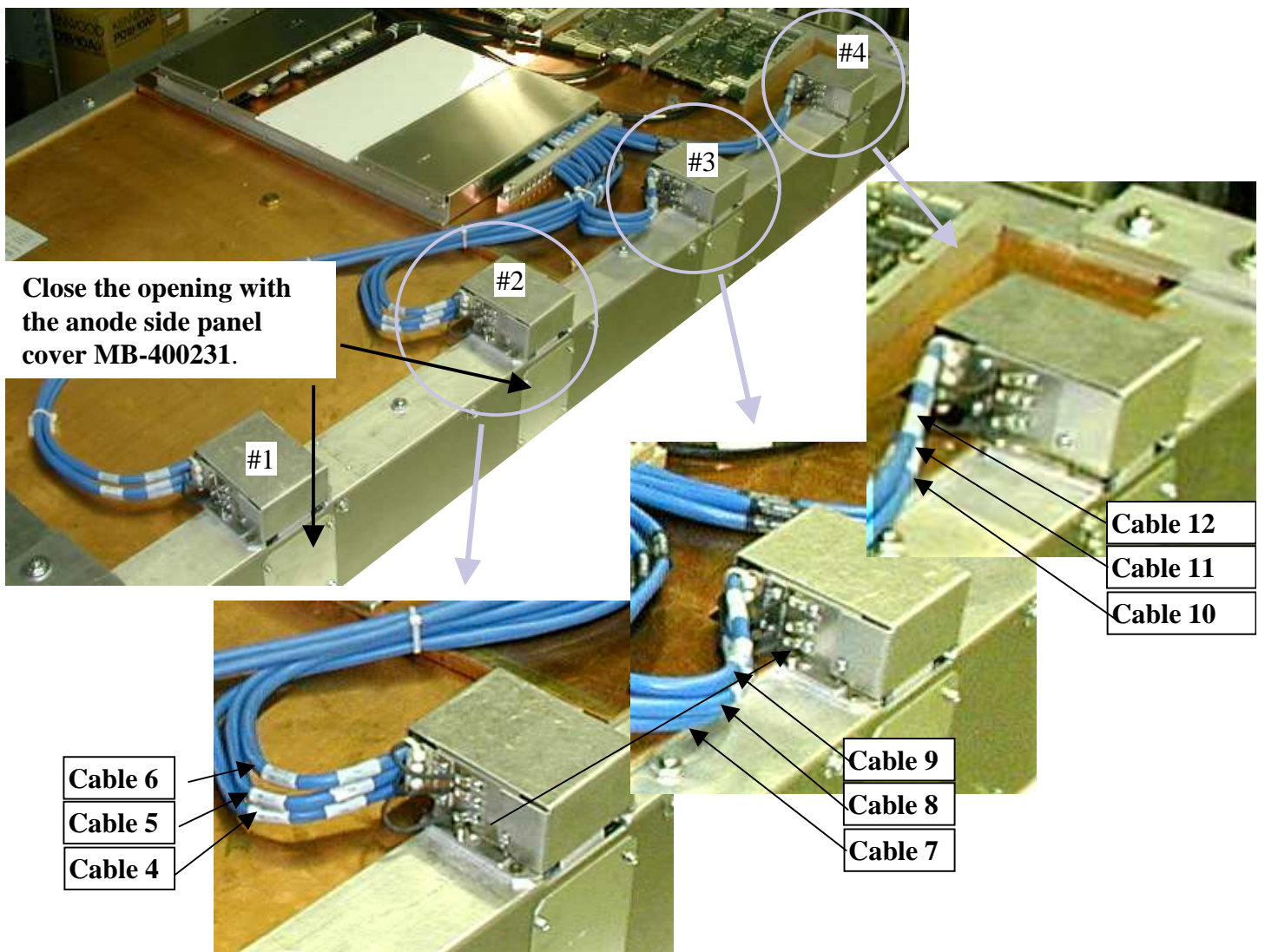


Fig. 5. Cables 4 –12 connection on the AFEB side.

### AFEBAALCT cable arrangement.

- Tighten cables 1, 2, 3 together near the ALCT board with cable tie 1;
- Tighten cables 4, 5, 6 together with cable tie 2;
- Tighten cables 7, 8, 8 together with cable tie 3;
- Tighten all three bundles together into one with cable tie 4.
- Stick two adhesive bracket cable tie mounts on the chamber top surface and fix the 1, 2, 3 cable bundle with cable ties 5, 6.
- Tighten cables 10, 11, 12 with cable tie 7.
- You may put more cable ties to consolidate the harness.

Use Fig. 6. for reference.

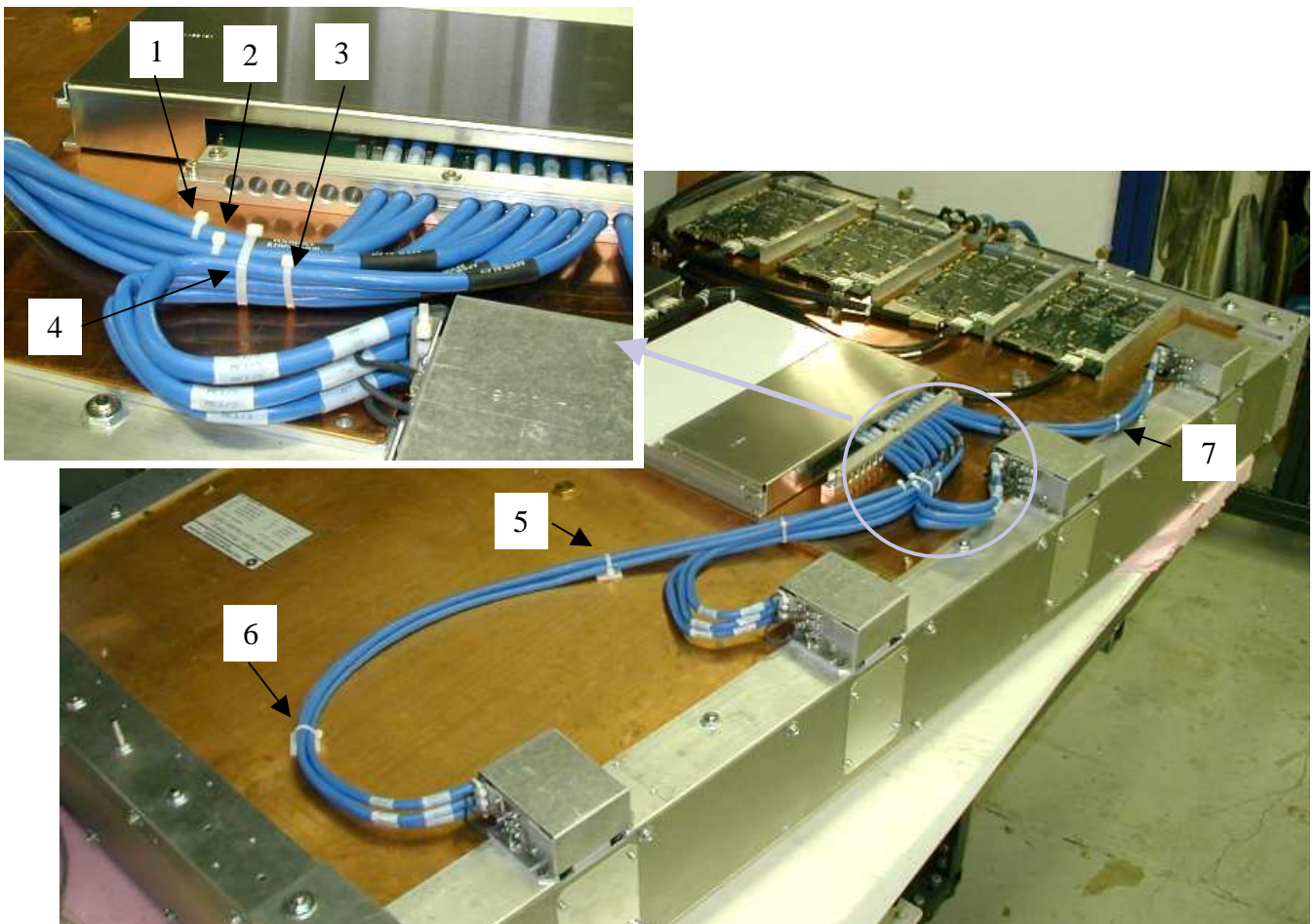


Fig. 6. AFEBAALCT cable fixation on the chamber frame.