



US CMS EMU

ME4/1 chamber AFEB-ALCT cabling/integration

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Revision #3 01/03/03

List of material

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

Pos.	Assembly component	Part number	Quantity
1	ME4/1 chamber with cooling plate		1
2	ALCT-682		1
3	AFEB/P	MC-400010	36
4	AFEB bracket	MB-400055	36
5	Screw M4 x10 (thread forming)	MA-400049	72
6	AFEB cover stand-off	MB-400021	2
7	AFEB cover stand-off modification		1
8	Screw M6 x25 (thread forming)	BN	6
9	Cable strain relief clamp bottom part	MC-400017	1
10	Cable strain relief clamp top part	MC-400017	1
11	Screw M6 x18	BN610	6
	AFEB-ALCT cable set:		
12	4 Pitch LH	MC-400075	18
13	4 Pitch RH	MC-400076	9
14	5 Pitch RH	MC-400077	5
15	5 Pitch LH	MC-400098	4
16	Cable tie	PLT4S-M 14-1/2	8
17	Cable tie	PLT4S-M	25
18	Cable strain relief part	RBPR-110	24
19	Screw M5 x25 (thread forming)	BN	9
	Tooling:		
20	Torque wrench		1
21	Power screwdriver with adjustable torque Craftsman 111370 or equivalent	#11137	1
22	Screwdriver Philips		1
23	Screwdriver flat		1
24	Screwdriver socket 7 mm		1
25	Screwdriver socket 8 mm		1
26	Screwdriver socket 10 mm		1
27	Hex screwdriver 5 mm		1
28	Wire cutter		1
	Other material:		
29	Alcohol		10g

Before the cable installation:

- Install the cooling plate on the chamber - Pos.1.
 - Install the ALCT board on the cooling plate - Pos.2.
 - Install the bottom part of the cable strain relief clamp MC-400017 on the cooling plate - (Pos.8),
 - Stick labels with the AFEB slot number on the anode side cover as shown on picture Fig.1a. The slot numbering starts from the narrow side of the chamber and from the top slot.
 - Install the anode amplifier boards AFEB/p MC-400011 - Pos.3.
- To install these components, use Fig. 1 for reference and the corresponding instructions.

Note: Before AFEB installation on position 1 of the chamber, the AFEB bracket MB-400055 for this board must be modified according Fig.1b. on the page 4.

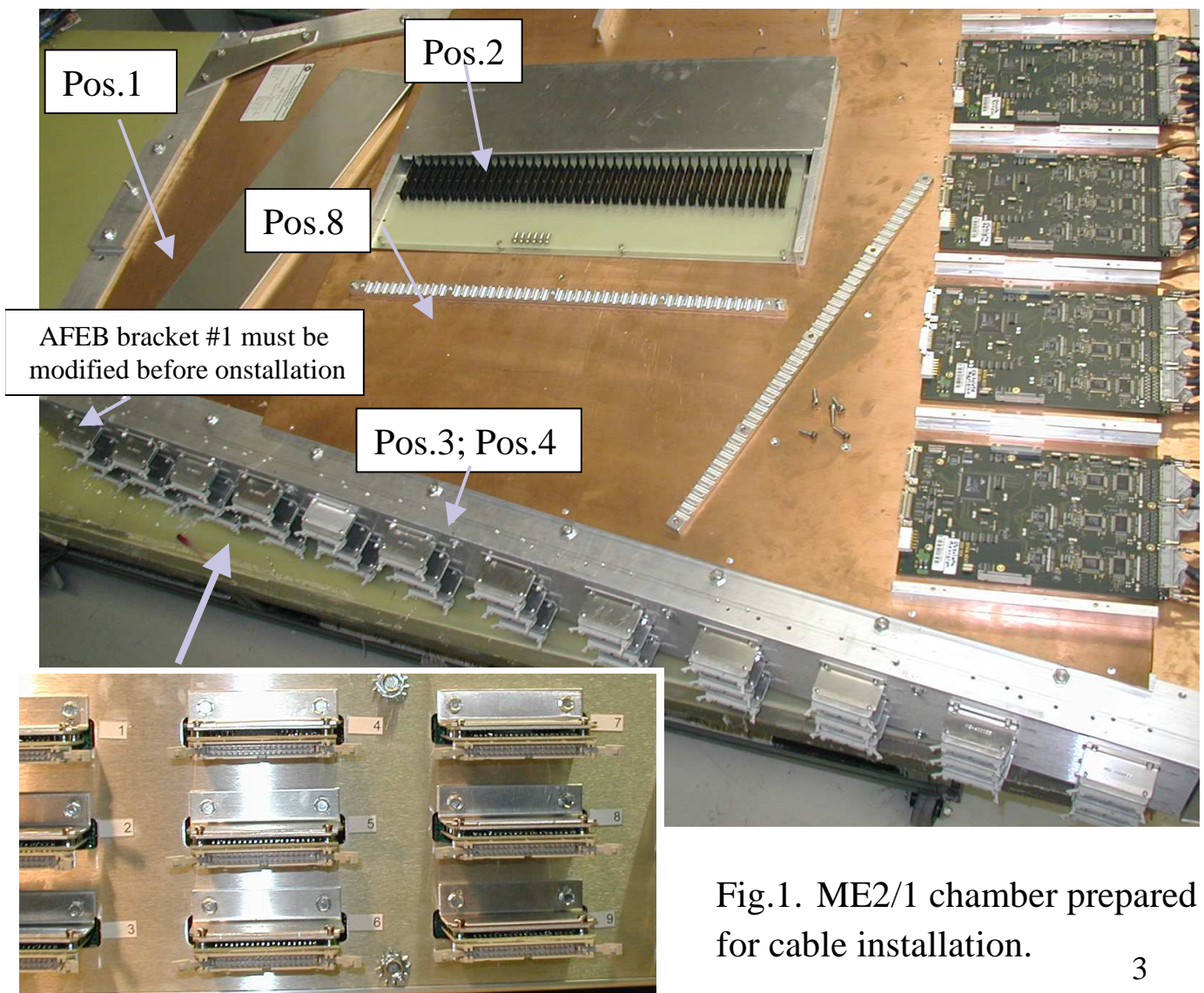


Fig.1a. AFEB slott number labels.

Fig.1. ME2/1 chamber prepared for cable installation.

AFEB bracket modification.



Fig.1b. AFEB bracket modification.



Fig.1c. Modified AFEB bracket position .

Cable installation.

- Connect the AFEB-ALCT cables to the ALCT board. The ALCT has 42 input connectors, but the chamber has only 36 AFEB-ALCT cables. So the first 6 input connectors on the ALCT board must be empty. Cable #1 must be connected to the ALCT input #7 and cable #36 must be connected to the ALCT input #42. Start connecting from the largest cable number. Attach each cable ground connector to the board ground contact (see figure below).

Note: The cable drawing number should be located on the ALCT end 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 (Pos. 9) with M6 screws (Pos.10) and tighten the cables firmly but gently. Avoid pinching the cables. See Fig.2 for reference.

Note: AFEB-ALCT cable #1 is connected to the ALCT input #7

Ground lug connection

Start connecting from the largest cable number

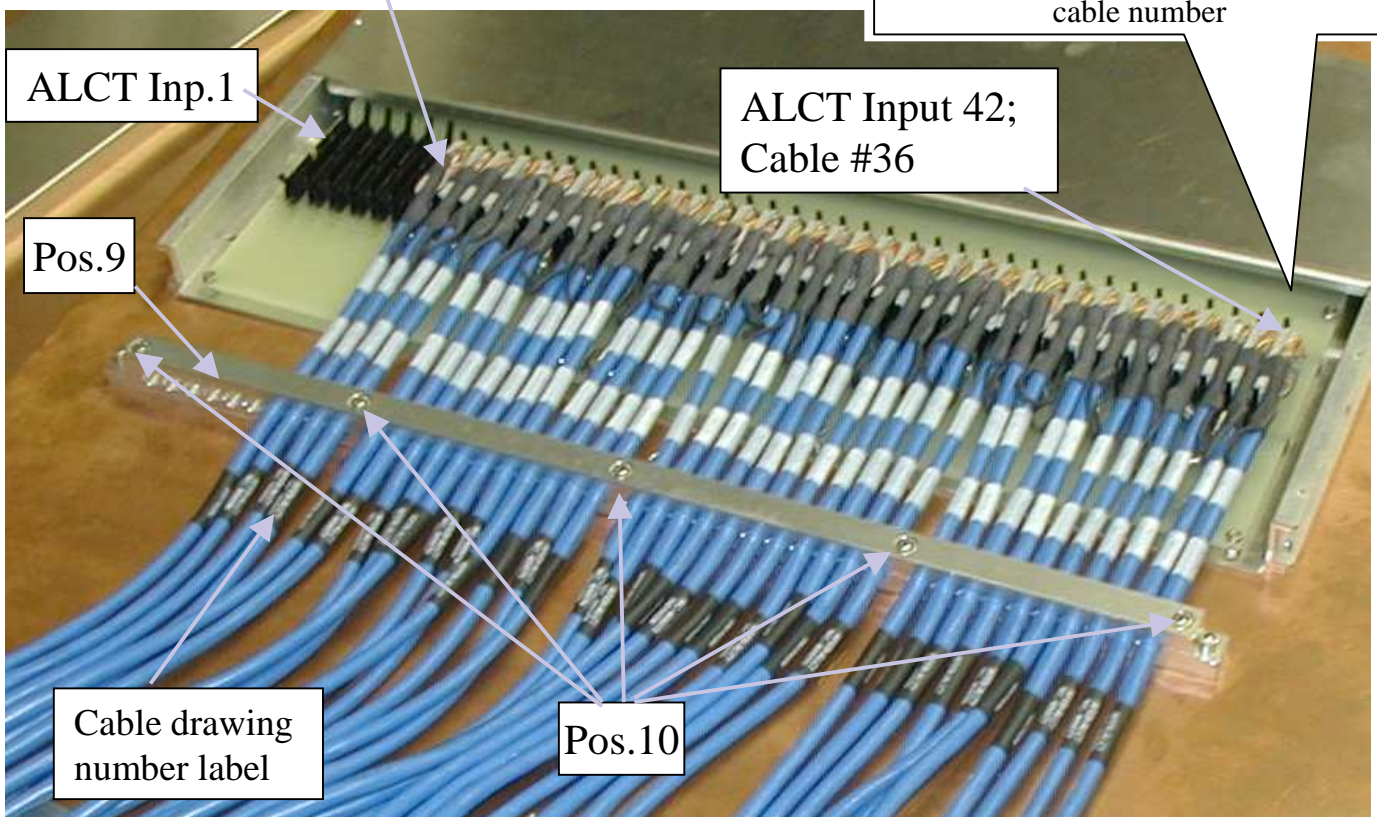


Fig.2. Cables clamped near the ALCT input.

Start the cable arrangement from the narrow side of the chamber (cable numbers 1, 2, 3, 4, 5, 6).

Step 1. Connect cable #1 to amplifier #1 (top position). Then continue connecting in order 2, 3, 4, 5 and 6. Every cable must go over the previous one, as shown in Fig.3.

Insert the cable ground lug under the nearest M4 screw and tighten it (Fig.3b).

Step 2. Set the cables between the cable strain relief RBPR-110 (Pos.17) in order 1, 2, 3, 4, 5, 6, as shown in the picture (Fig.3).

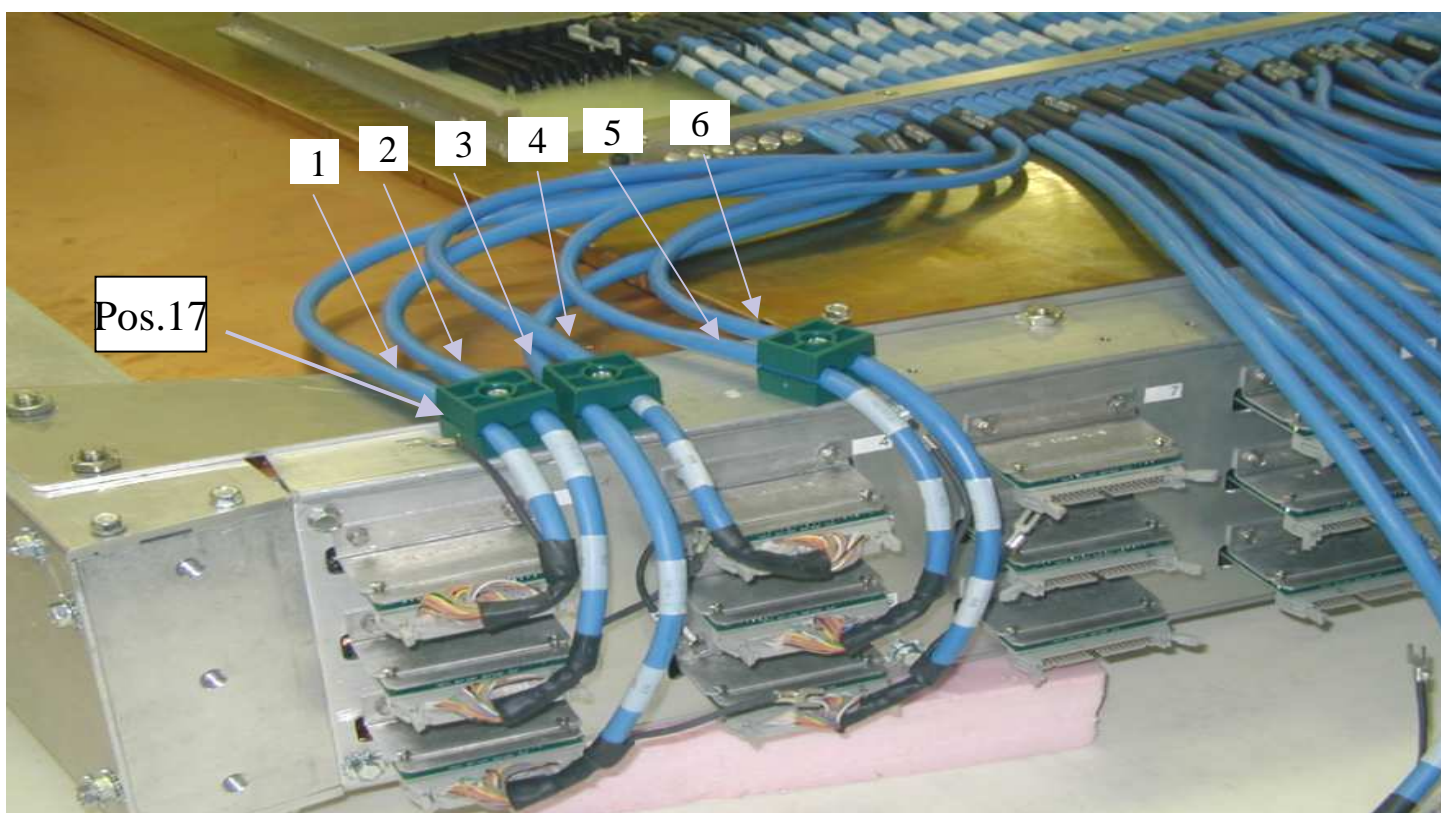
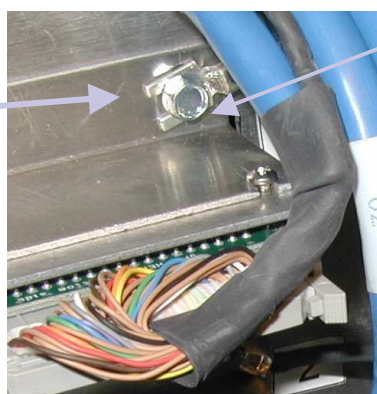


Fig.3. Arrangement of the first bunch of 6 cables.



Fig.3a. Cable arrangement at the AFEB's output. All cables must go along the connector side wall.



Insert the cable ground lug under the nearest M4 screw.

Fig.3b.

Note: RBPR –110 cable strain relief installation.

The RBPR-110 strain relief consists of two identical plastic parts between which two cables are clamped. To clamp the cable into the strain relief, use a M5 x 25 thread-forming screw and a 8 mm screwdriver socket. There are unthreaded holes in the chamber frame fitted to the screw. Use alcohol as a lubricant to install the screws. The maximum allowed torque to use on the screws is 18 pounds-inch.

Step 3. Position the cables at the AFEB outputs as shown in the picture (Fig.3a). All cables must go along the connector side wall.

Step 4. Tighten the cables in the strain relief.

- Repeat all these procedures, steps 1- 4, with the second and third bunches of six cables (numbers 7, 8, 9, 10, 11, 12 and 13, 14, 15, 16, 17, 18). Start from cable #7. Use Figs. 3, 3a, 3b, 4 for reference.

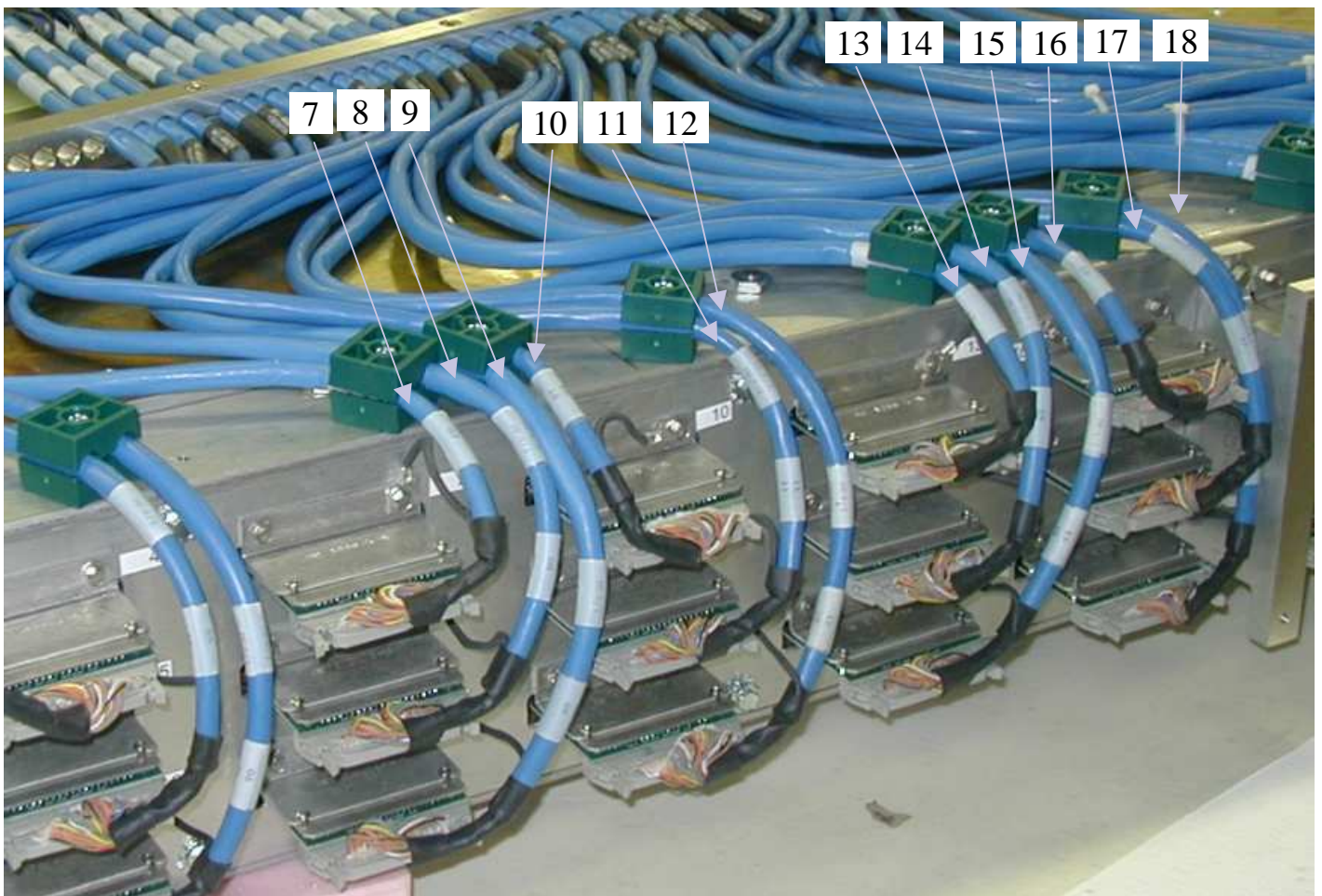


Fig.4. Arrangement of second and third bunches of 6 cables. 7

Arrange the first 18 cables into a harness on top of the chamber and tighten the cables with cable ties. The harness height must be three cable layers tall or less. Use Fig. 5 as a reference.

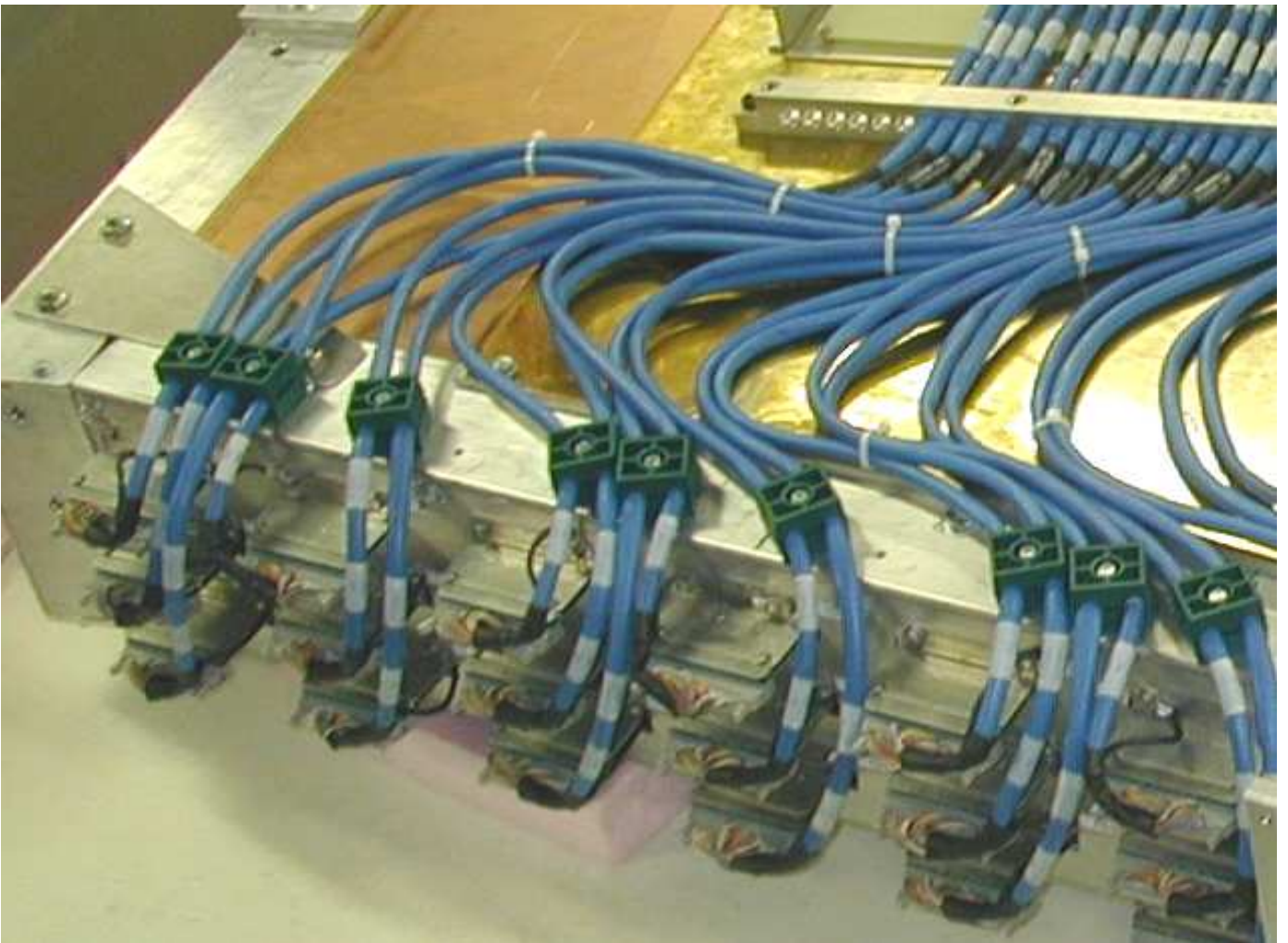


Fig.5. Layout of the first 18 cables on top of the chamber.

Note:

The installation order and positions of the rest of the cables is very important for producing a correct harness of the correct shape. Use Fig.6 for reference.

Continue the installation of the fourth bunch of six cables (steps 1 – 4) according to the following sequence: 19 and 20, 21 and 24 –the lowest layer of cables. Then connect cable 22 (should go over cable 24) and then put cable 23 on the top.

Then connect cables 27 and 26 (cable 26 goes over cable 27 at the AFEB end). These cables create the lowest cable layer.

Then connect cables 25 and 28. Cable 25 goes over cables 27 and 26 go down to the first layer.

Arrange all the cables into two layers and tighten these cables with the cable ties as shown in the Fig.6.

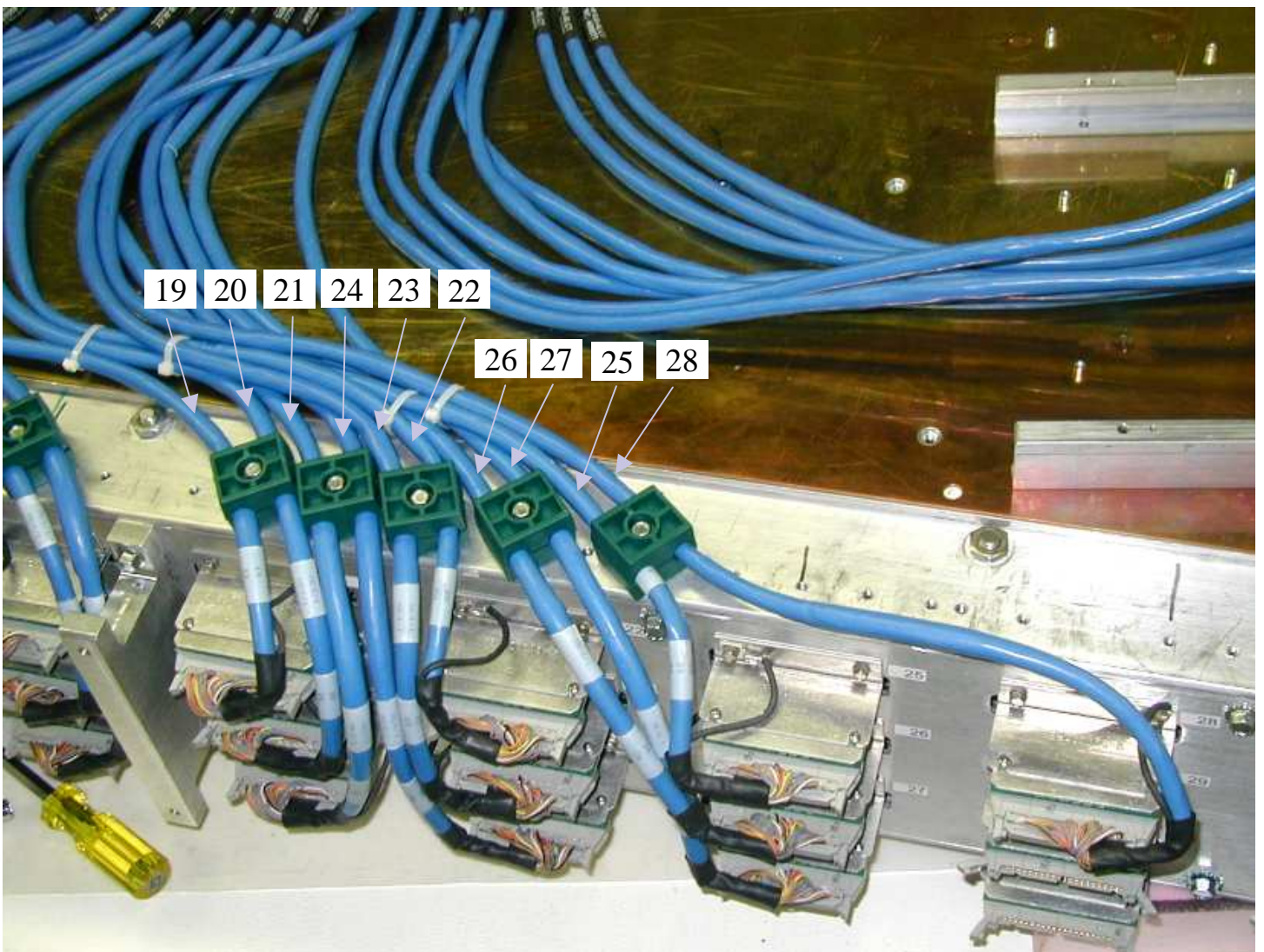


Fig.6. Arrangement of cables 19 -28

Connect cables 31 and 36. Fix the cables with the cable strain relief on the second position of right side. Cable #31 goes along the frame as shown in Fig.7.

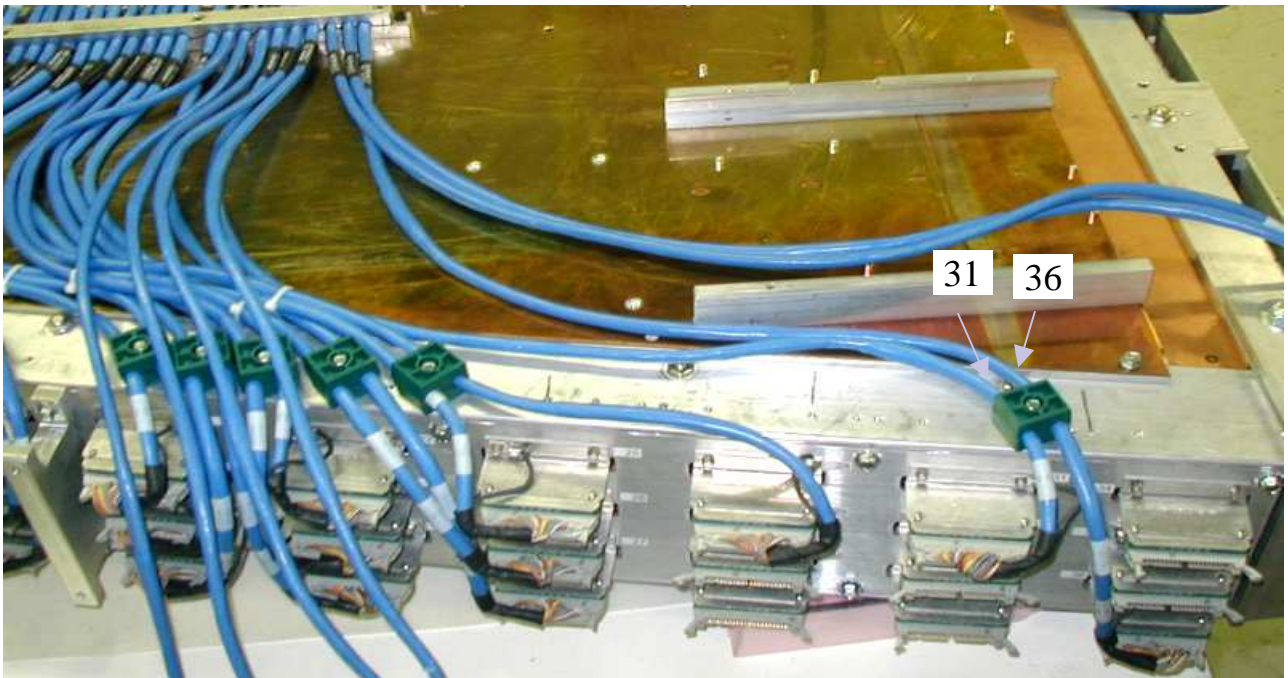


Fig. 7. Layout of cables 31 and 36.

Install cables 29 and 30. Tighten the cables at the AFEB side with the cable tie. (See Fig.8.)

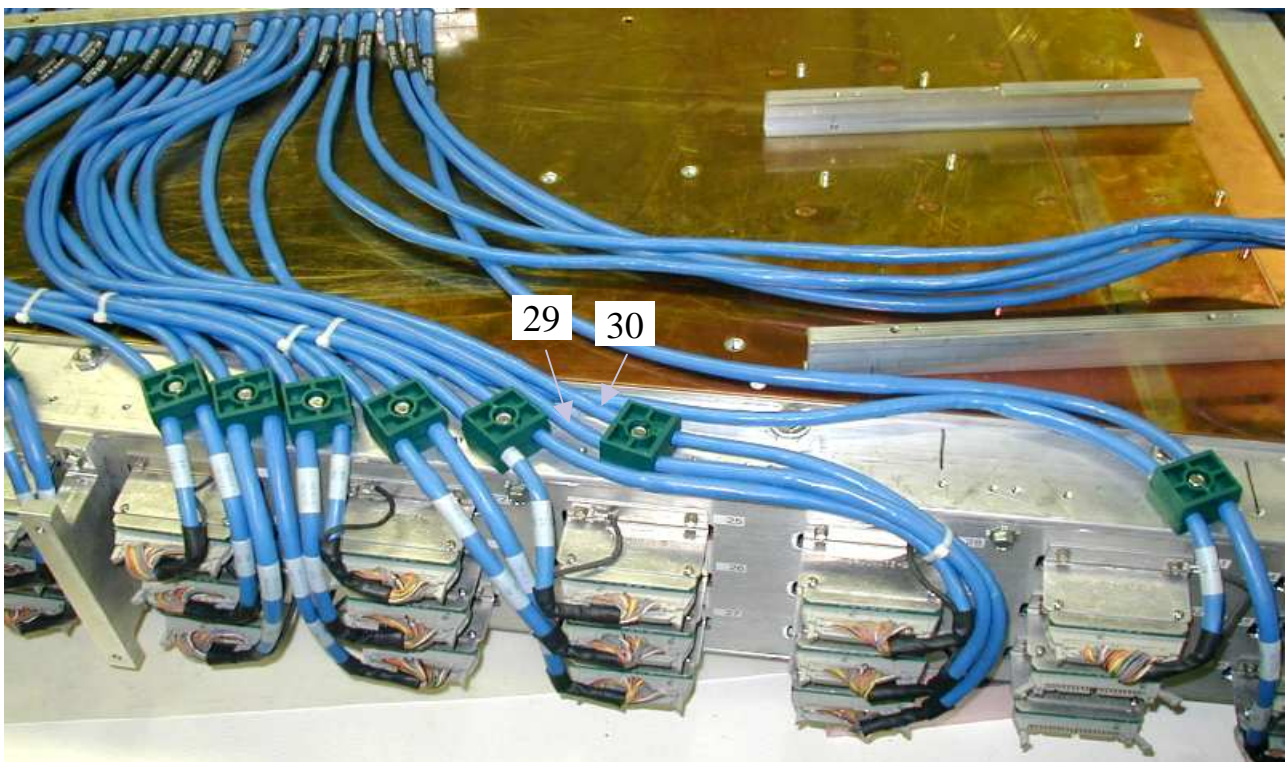


Fig. 8. Layout of cables 29 and 30.

Connect cable 33 to its AFEB first, and then lay cable 32 over cable 33, as shown in Fig.9. Fix the cables with the cable strain relief.

Tighten cables 31, 32, 33 together with cable ties 1 and 2. Cable 31 goes on the bottom layer.

Tighten cable 32 to cable 30, cable 30 to cable 29 and cable 29 to cable 28 with cable ties 3,4,5.

These cables must form a one-layer harness on the top of the cooling plate (see Fig.10).

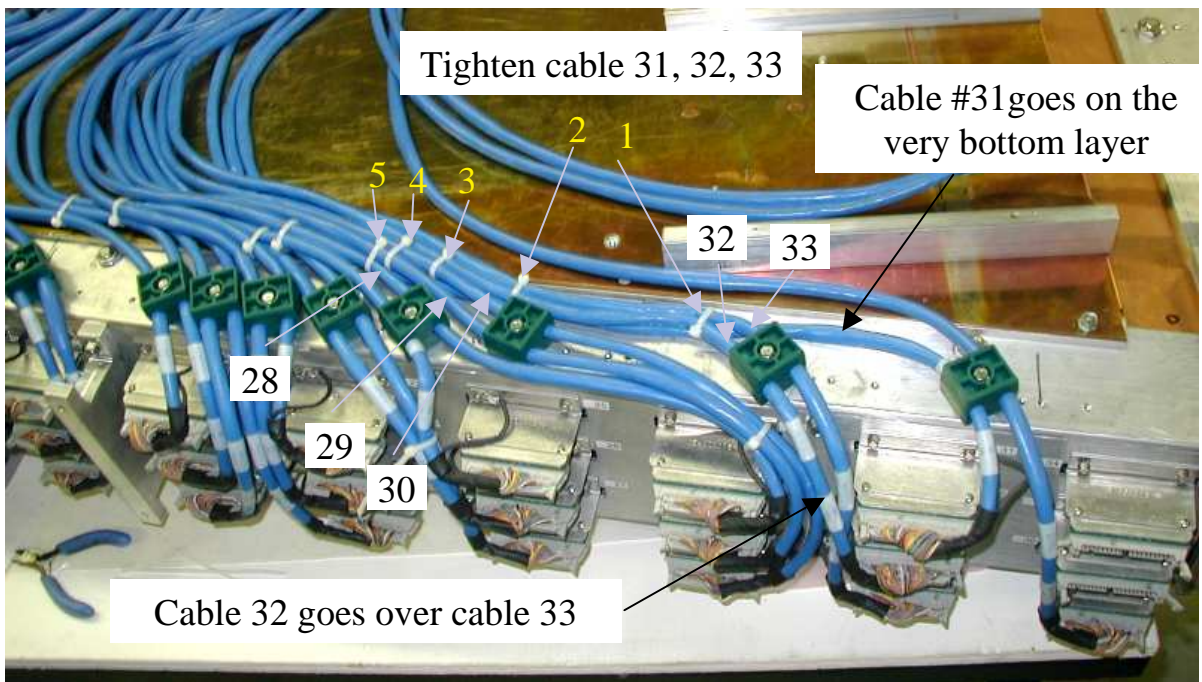


Fig.9. Cables 28 – 33 arrangement.

Connect cable 35 and then cable 34 to their corresponding AFEs.
Fix the cables with a cable strain relief. See fig. 10 for reference.
Create a smooth wave with the three cables 33, 34, 35 at the strain relief side, as show in Fig.10. Tighten the cables with cable ties 1 and 2. Fix the wave with cable tie 3. Align all the cables into one layer on the cooling plate and fix the harness with cable ties 4,5,6

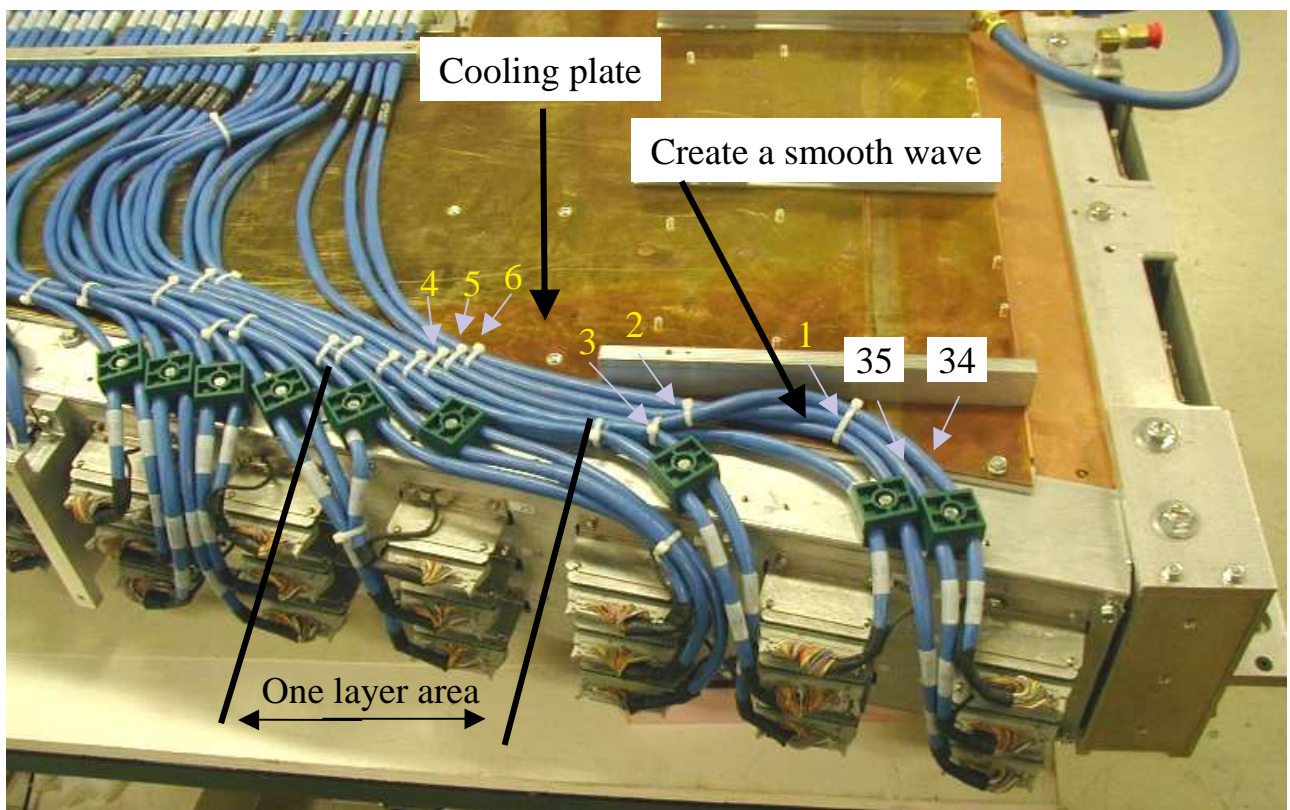


Fig.10. Arrangement of cables 34, 35, 36.
Cables 30 – 36 must be assembled into a one-layer harness on the top of the cooling plate.

Put 4-5 more ties to consolidate the harness. See Fig.8 for reference.

After assembling the AFEB-ALCT cables:

- Check all connectors. Each connector must be properly inserted and the connector latches must be locked.
- The cable ground connections must be inserted on the ALCT end and firmly tightened under M4 screw at the AFEB side.
- Each AFEB bracket MB-400055 (pos.4) must be properly attached to the chamber side cover.
- Each AFEB/p MC-400010 (pos.3) must be properly inserted and attached to the AFEB bracket.

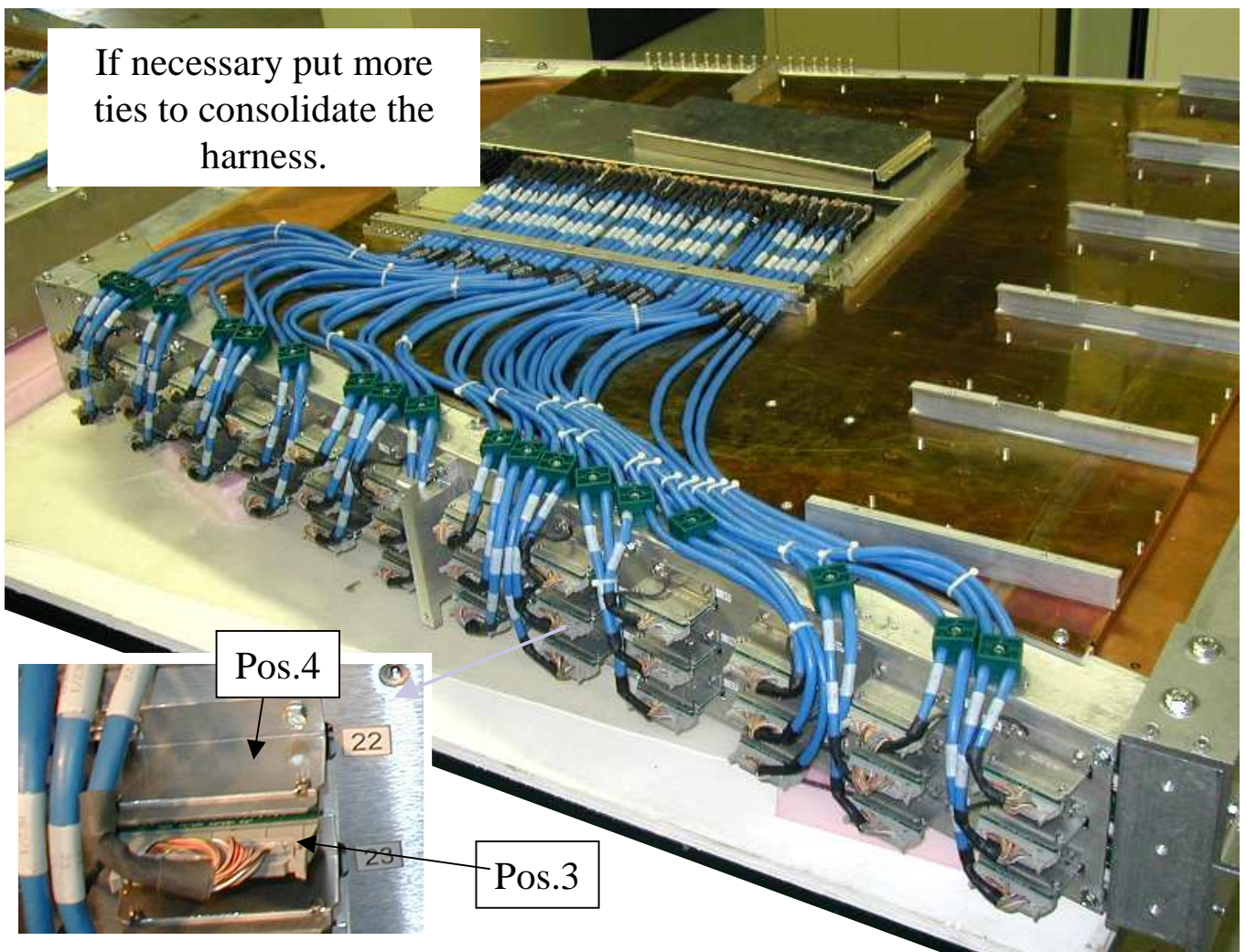


Fig.11. ME4/1 chamber equipped with the AFEB-ALCT cables.