



US CMS EMU

ME3/1 chamber AFEB-ALCT cabling/integration

Prepared by N.Bondar

Revision #1 03/18/02

List of material

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

Pos.	Assembly component	Part number	Quantity
1	ME3/1 chamber with cooling pad		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	3
7	Screw M6 x25 (thread forming)	BN	6
8	Cable strain relief clamp bottom part	MC-400017	1
9	Cable strain relief clamp top part	MC-400017	1
10	Screw M6 x18	BN610	6
	AFEb-ALCT cable set:		
11	4 Pitch LH	MC-400075	12
12	4 Pitch RH	MC-400076	12
13	5 Pitch RH	MC-400077	6
14	5 Pitch LH	MC-400098	6
15	Cable tie	PLT4S-M 14-1/2	8
16	Cable tie	PLT4S-M	25
17	Cable strain relief part	RBPR-110	24
18	Screw M5 x25 (thread forming)	BN	9
	Tooling:		
19	Torque wrench		1
20	Power screwdriver with adjustable torque Craftsman 111370 or equivalent	#11137	1
21	Screwdriver Philips		1
22	Screwdriver flat		1
23	Screwdriver socket 7 mm		1
24	Screwdriver socket 8 mm		1
25	Screwdriver socket 10 mm		1
26	Hex screwdriver 5 mm		1
27	Wire cutter		1
	Rig:		
28	Cable clamp holder		12
	Other material:		
29	Alcohol		10g

Before the cable installation:

- Install the cooling pad on the chamber - Pos.1.
 - Install the ALCT board on the cooling pad - Pos.2.
 - Install the bottom part of the cable strain relief clamp MC-400017 on the cooling pad - (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 corresponding instructions.

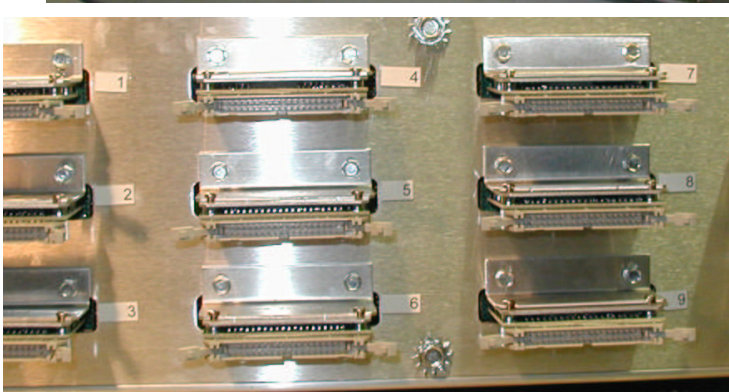
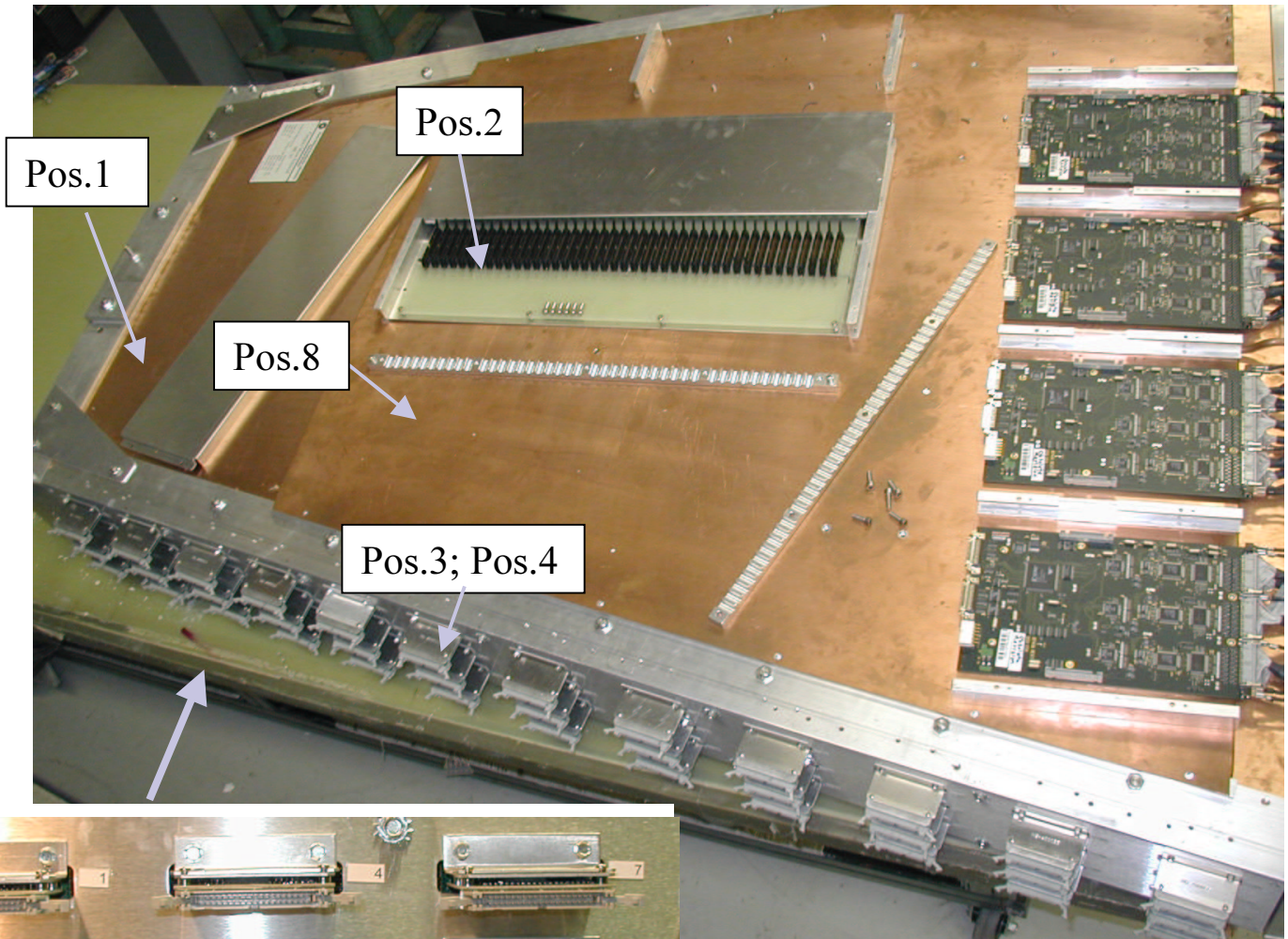


Fig.1. ME2/1 chamber prepared for cable installation.

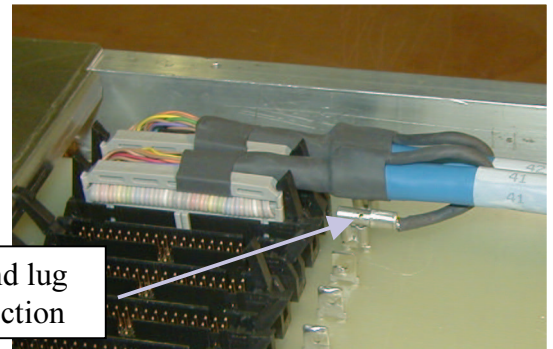
Fig.1a. AFEB slot number labels.

Cable installation.

- Connect the AFEB-ALCT cables to the ALCT boards. The ALCT has 42 input connectors, but the chamber has only 36 AFEB-ALCT cables. So the first 6 input connectors on the ALCT boards 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 the cable ground connector to the board ground contact.

Note: The cable drawing number label is located on the ALCT side of the cable!

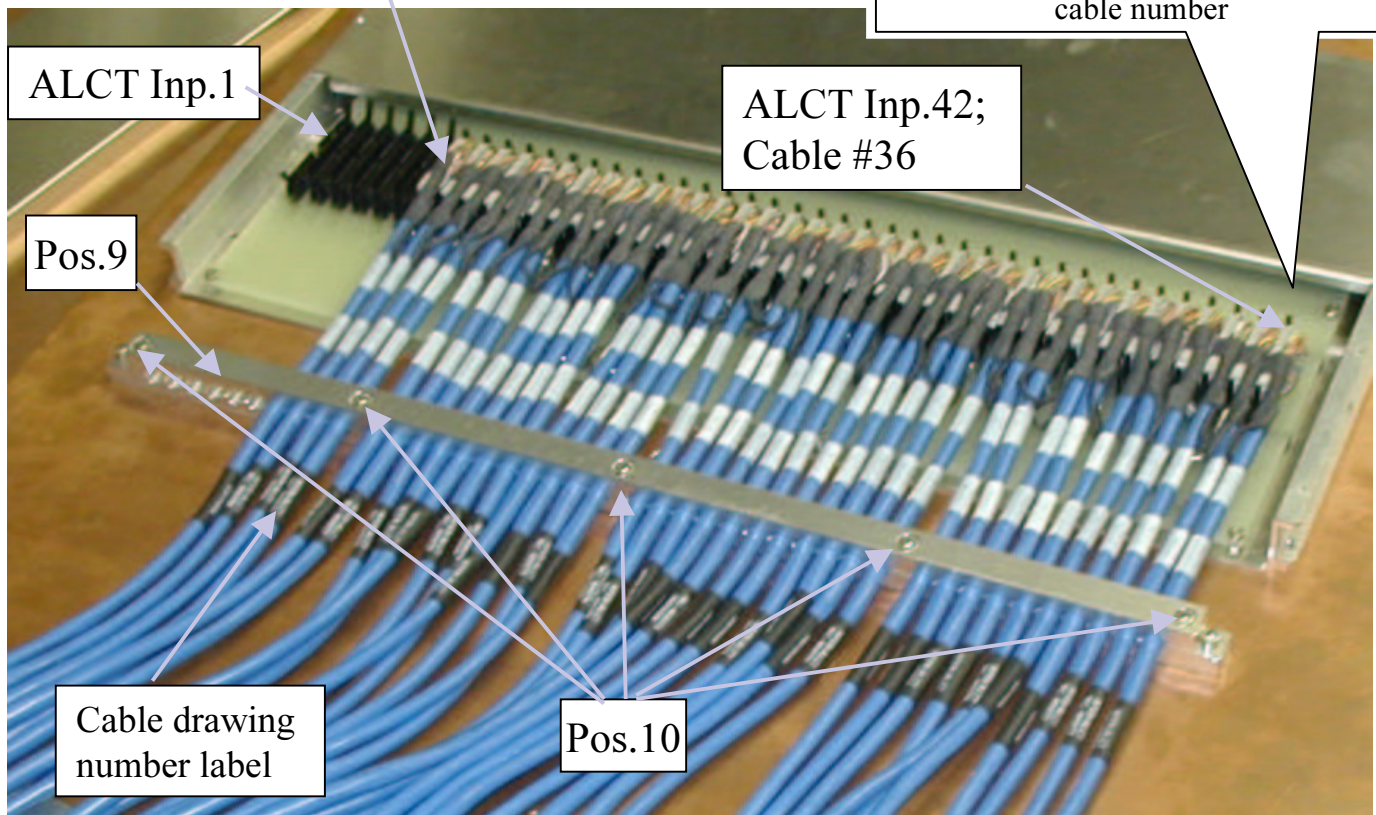
- Spread the cables along the cable strain relief clamp in the corresponding slots.
- Install the top part of the strain relief clamp (pos. 9) with M6 screws (pos.10) and tighten the cables firmly but gently. Avoid pinching the cable. See Fig.2 for reference.



Ground lug connection

Start connecting from the largest cable number

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



ALCT Inp.1

ALCT Inp.42;
Cable #36

Pos.9

Cable drawing
number label

Pos.10

Fig.2. Cables clamped near the ALCT input.

Start the cables arrangement from the group of the longest cables (numbers 1, 2, 3, 4, 5, 6)

Step 1. Connect cable #1 to amplifier #1 (top position). Then continue connecting in order 2, 3, and 4, 5, 6. Every cable must go over the previous one as shown in Fig.3a. Insert the cable ground lug under the nearest M4 screw (Fig.3c).

Step 2. Set the cables between the cable strain relief RBPR-110 (pos.17) in order 1, 2, 3, 6, 5, 4 as shown in the picture (Fig.3). Use screw M5 x25 and 8 mm socket; apply a torque of 20 lb/in for tightening the strain relief. Use alcohol as a lubricant.

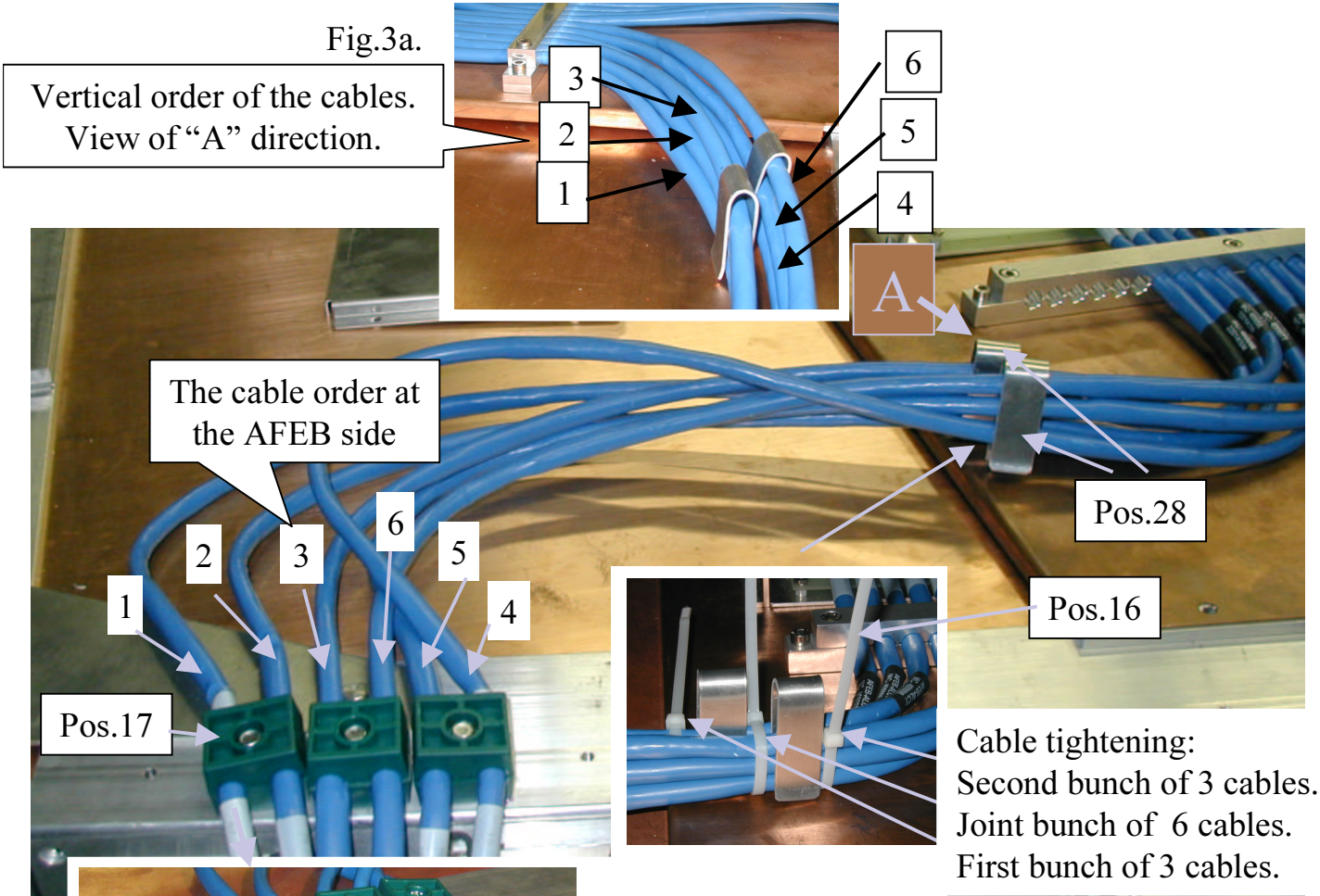


Fig.3. Arrangement of the first bunch of 6 cables.

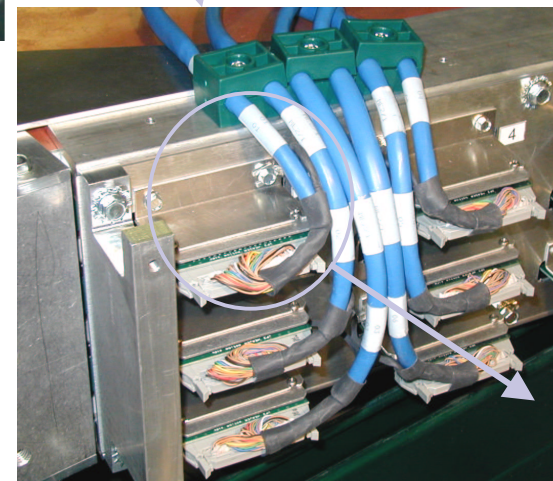


Fig.3b. Cable arrangement at the AFEB's output. All cables must go along the connector side wall.

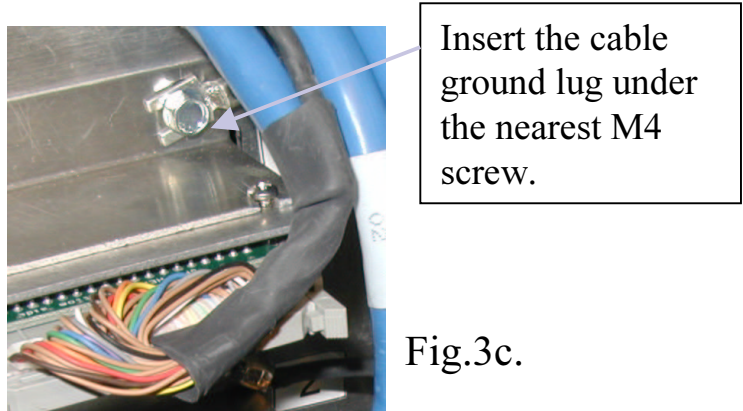


Fig.3c.

Note: RBPR –110 cable strain relief installation.

The RBPR-110 strain relief consists of two identical plastic parts in which to clamp two cables between. 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. Form up the cables at the AFEB outputs as shown in the picture (Fig.3b). All cables must go along the connector side wall. If necessary, use an extra cable tie to keep cables in right position (Fig.4a).

Step 4. Tighten the cables in the strain relief.

Step 5. Arrange the cables on the top of the chamber into two bunches of three cables in the order shown in picture (Fig. 3). Start from the ALCT side. Use cable clamps

(pos. 28) for the preliminary cable fixation.

Step 6. Tighten the cables with cable ties (pos.16), remove the cable clamps.

- Repeat all these procedures steps 1- 6 with the second bunch of six cables (numbers 7, 8, 9, 10, 11, 12). Start from cable #7. Use Fig. 3, 3a, 3b, 3c, 4 for reference.

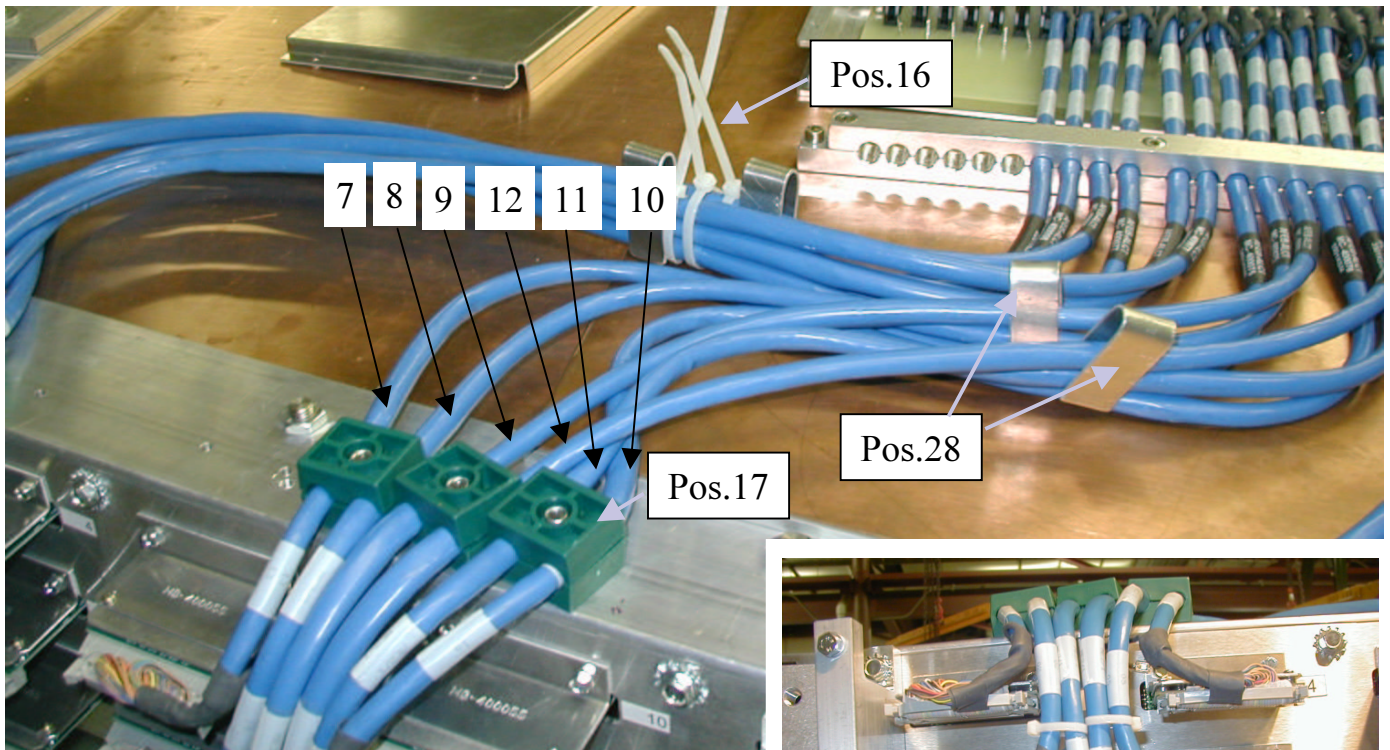
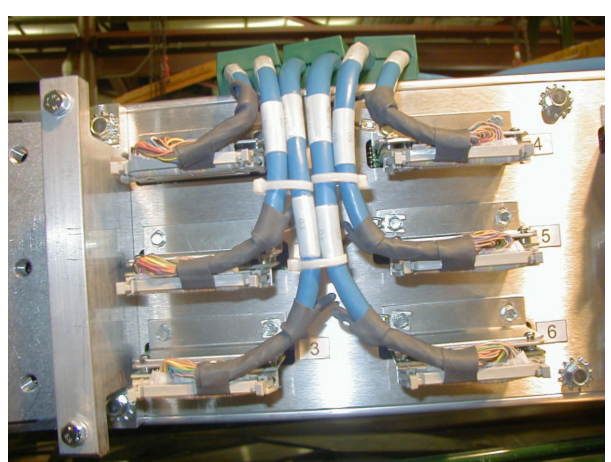


Fig.4. Arrangement of the second bunch of 6 cables.

Fig.4a. If necessary, use an extra cable tie to keep cables in the correct position



Repeat the instruction steps 1 - 6 for bunches 3 and 4 .
Use Fig.5a, 5b, for reference.

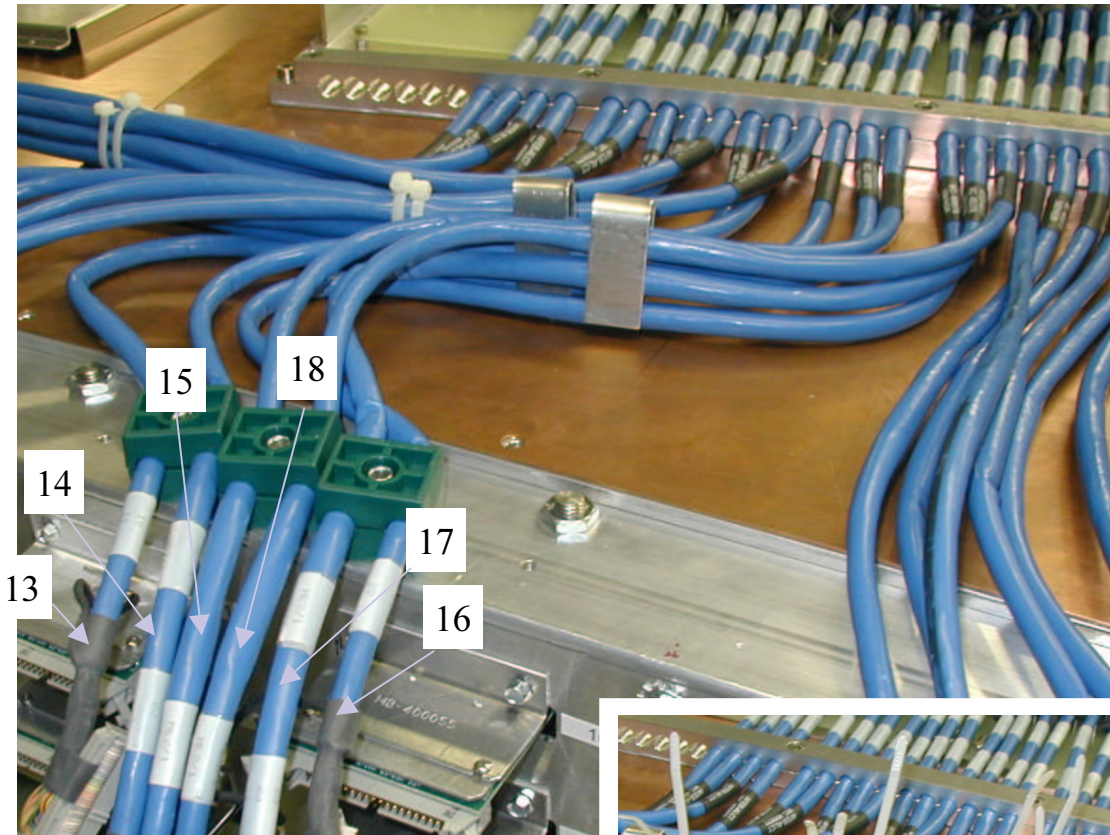


Fig.5a. Arrangement
of the cables:
13,14,15,16,17,18.

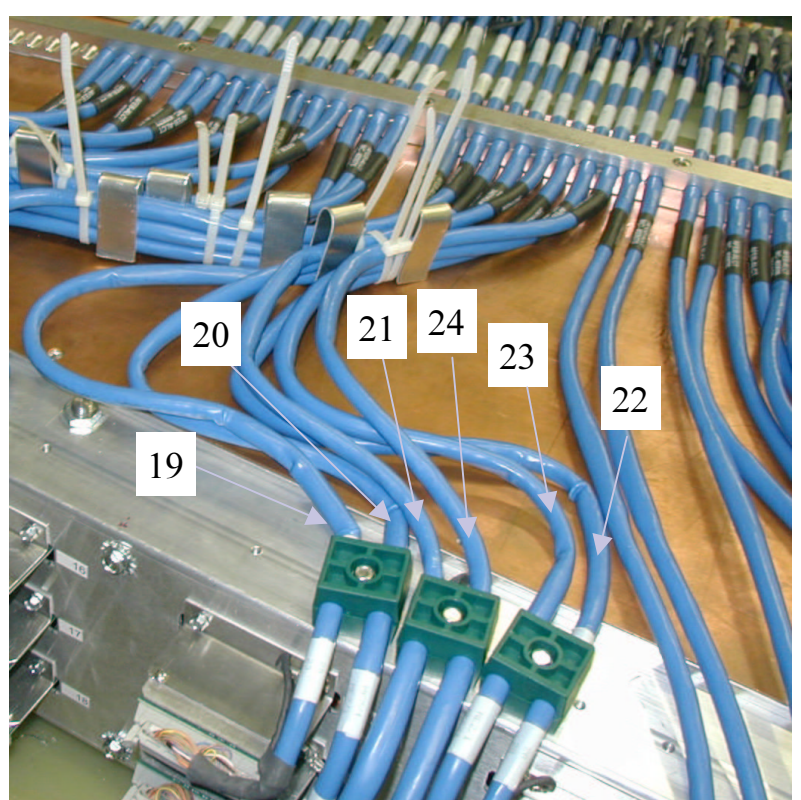


Fig.5b.
Arrangement
of the cables:
19,20,21,22,23,24.

The cable bunches 5 and 6 are arranged in a different way.

Step 1. Connect cable #25 to amplifier #25 (top position). Then continue connecting in the order: 26, 27, 28, 29, 30. Every cable must go over the previous one (cable #30 is upper).

Step 2. Connect cable #31 to amplifier #31 (top position). Then continue connecting in a special order: 32, 33, 36, 35, 34. Every cable must go over the previous one (cable #34 is upper). See Fig.6 for reference.

Insert the cable ground lug under the nearest M4 screw for each cable as shown in picture (Fig.3c).

Step 3. Set the cables between the cable strain relief RBPR-110 (pos.17) in the order 25, 26, 27, 30, 29, 28 and 31, 32, 33, 36, 35, 34 as shown in the picture (Fig.6).

Step 4. Form up the cables at the AFEB outputs as shown in the pictures (Fig.3b and Fig.6). All cables must go along the connector side wall. If necessary, use an extra cable tie to keep the cables in the correct position (Fig.4a).

Step 5. Tighten the cables in the strain relief.

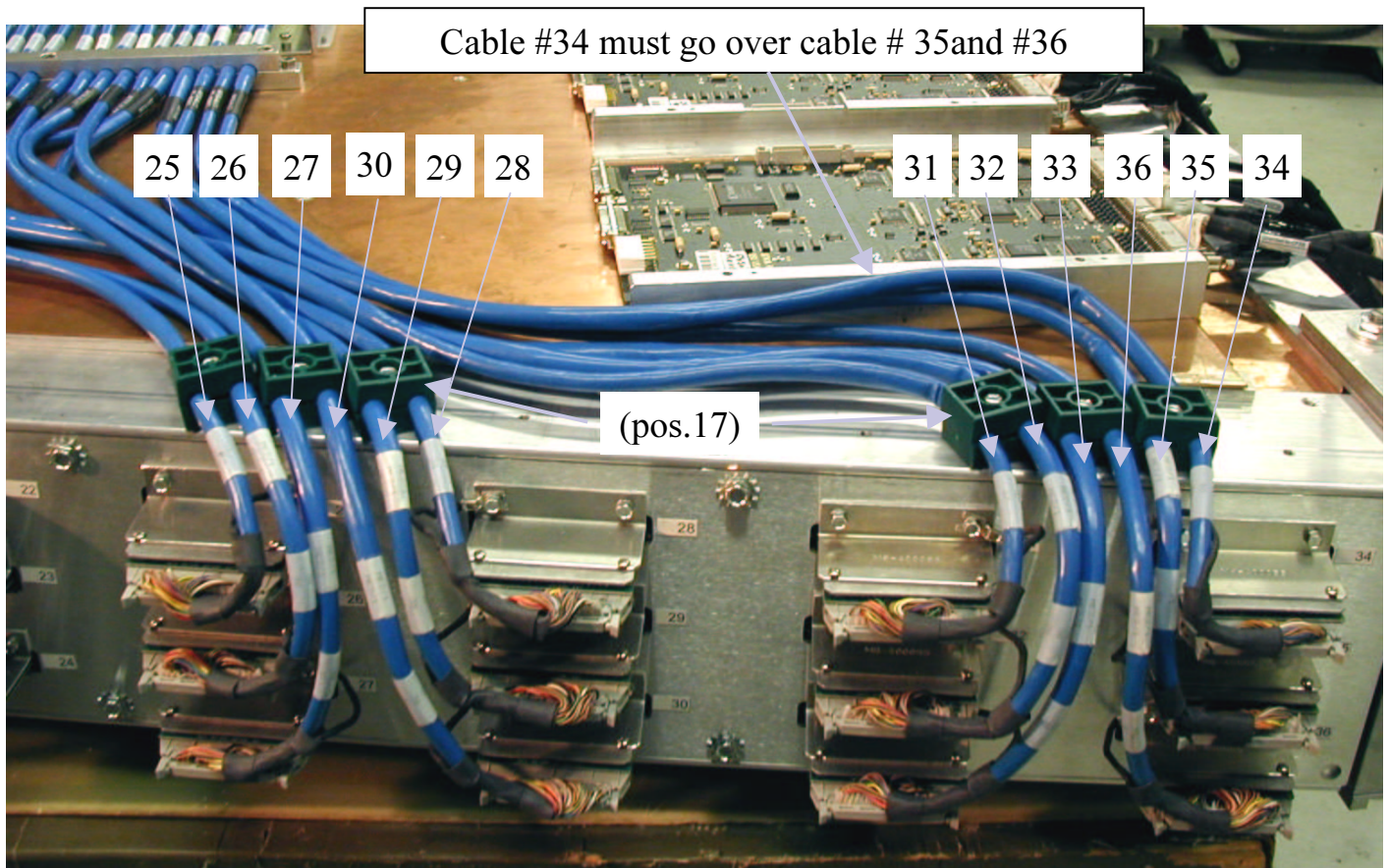


Fig.6. Cable bunch 5 and 6 connection.

Step 6. The cables numbered 25-36 must lie in one layer.

Start the cable configuring from the shortest cable #33. Put the cable in the most relaxed way on the top of the chamber. Attach cable #34 to cable #33 at 3 points with cable ties. Start from the ALCT side (tie #1). Follow the recommended order and the cable tie position as shown in the picture (Fig.7). The cable tie order is labeled with a yellow digit near the corresponding tie. Do not tighten the ties until all cable ties are put on. Extra length of #34 cable must go above cables #35 and #36 creating a smooth loop on the AFEB side. Use Fig.7 for reference. Then attach cables #35 and #36 (ties #4 - #6 and #7 - #9).

Starting from the AFEB side, attach cable #32 (ties #10 - #13) and then cable #31 (ties #14 - #16). These extra lengths of #32 and #31 cables will form a loop on the ALCT side.

Step 7. Align all cables and cable ties and tighten all ties. (For best result, use the same order).

Step 8. Put on ties #17 and #18 to consolidate the harness. If necessary, add more cable ties.

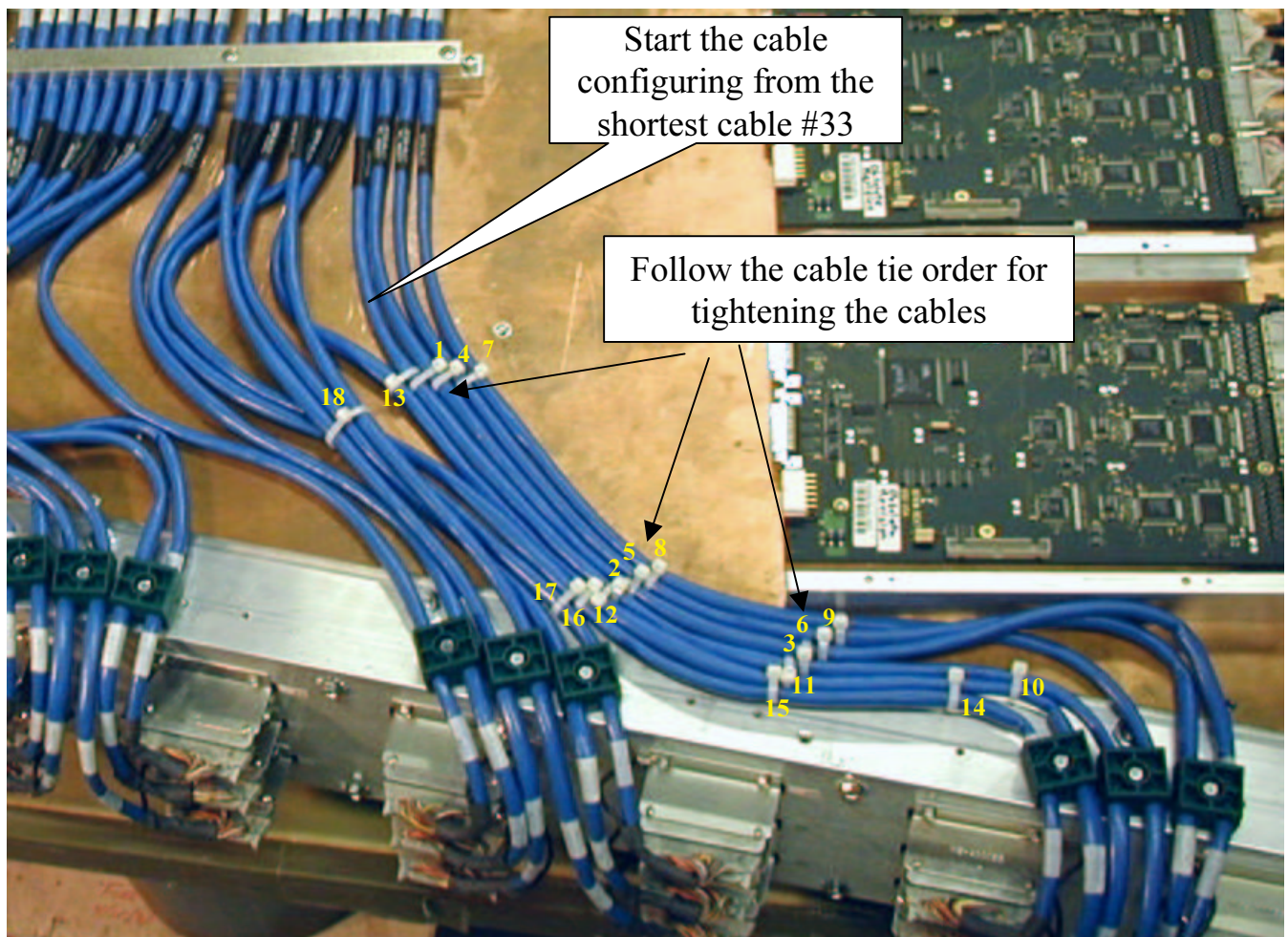


Fig.7. Cable harness of cables #31 - #42.

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.

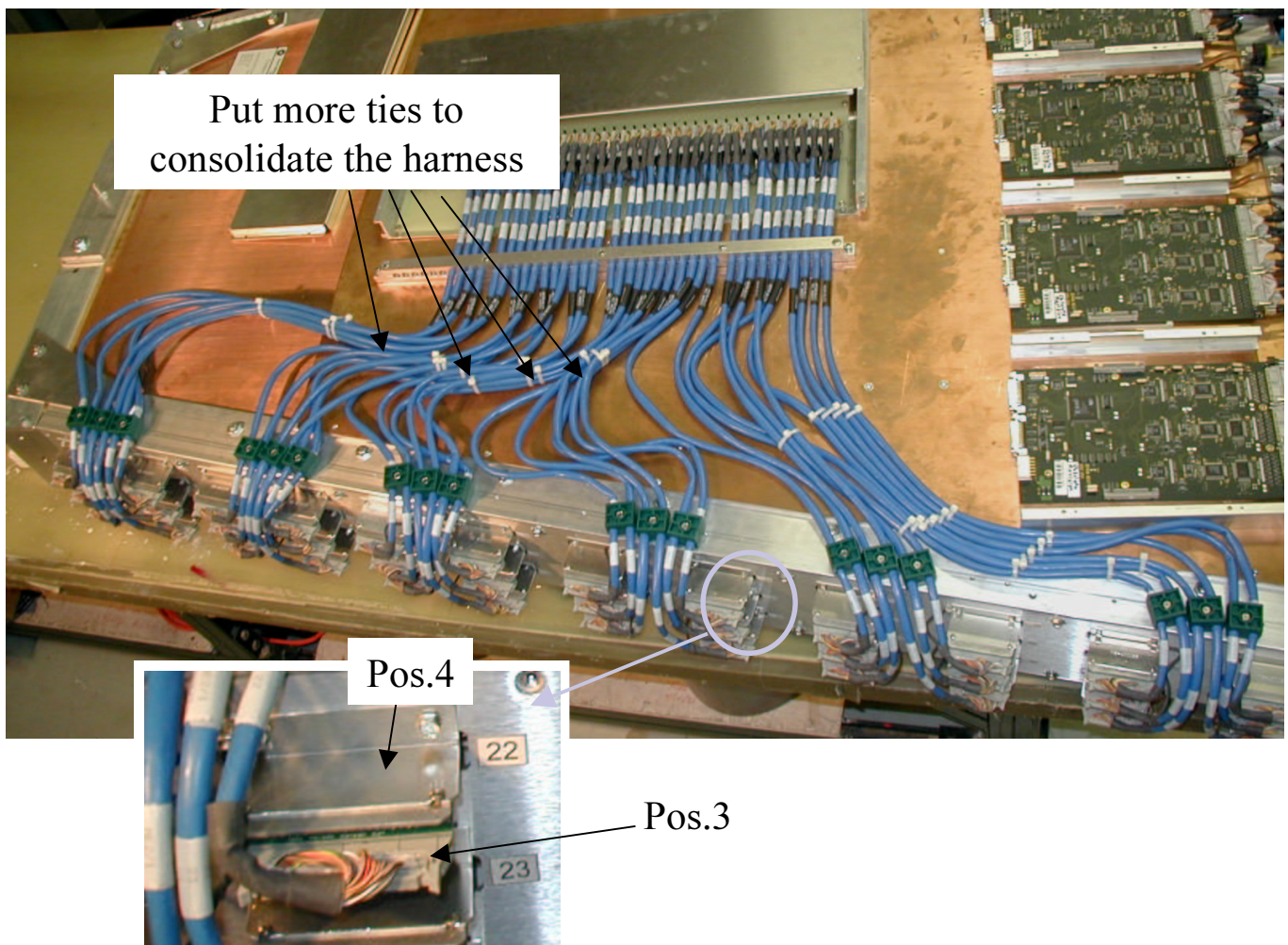


Fig.8. ME3/1 chamber equipped with the AFEB-ALCT cables.