



US CMS EMU

ME2/1 chamber AFEB-ALCT cabling/integration

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Revision #3 04/01/02

List of material

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

| Pos. | Assembly component | Part number | Quantity |
|------|--|----------------|----------|
| 1 | ME2/1 chamber with cooling pad | | 1 |
| 2 | ALCT 682 | | 1 |
| 3 | AFEb/P | MC-400010 | 42 |
| 4 | AFEb bracket | MB-400055 | 42 |
| 5 | Screw M4 x10 (thread forming) | MA-400049 | 84 |
| 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 | 9 |
| 14 | 5 Pitch LH | MC-400098 | 9 |
| 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 | 12 |
| | 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 of the AFEB slot number on the anode side cover as shown in Fig.1a.
 - Install the anode amplifier boards AFEB/p MC-400011 - Pos.3.
 - Install the AFEB cover standoffs MB-400021 – Pos.6.
- To install these components, use Fig. 1 for reference and the corresponding instructions.

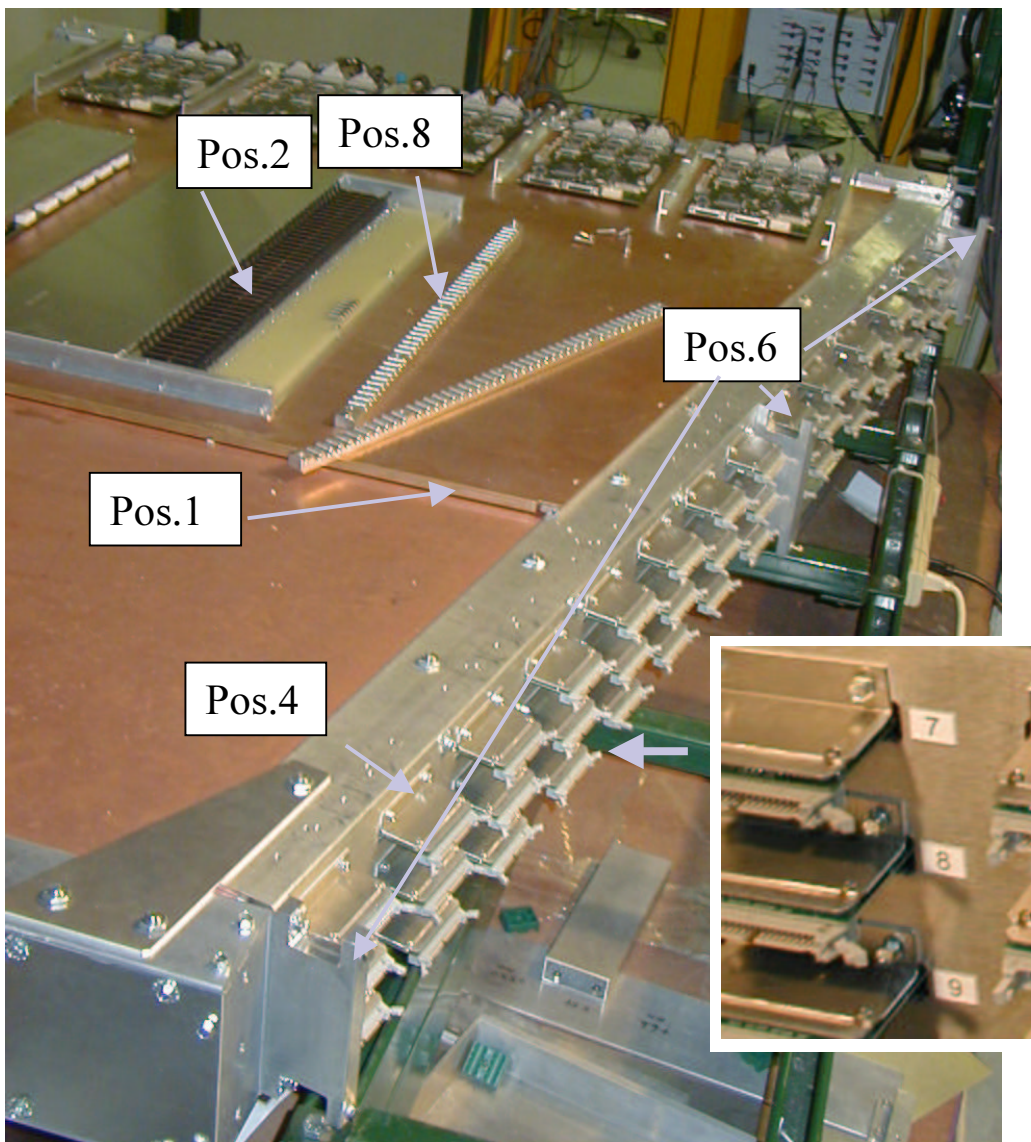


Fig.1a. AFEB slot number labels.

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

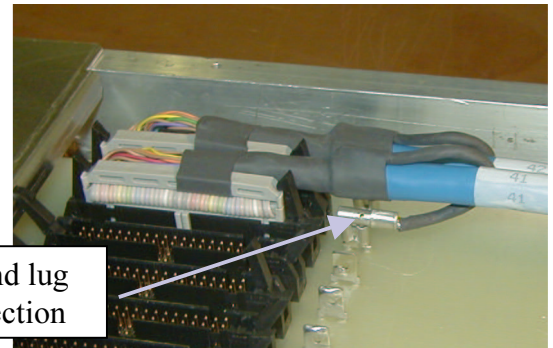
Cables installation.

- Connect AFEB-ALCT cables to the ALCT boards. The cable number must match the ALCT input connector number. 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

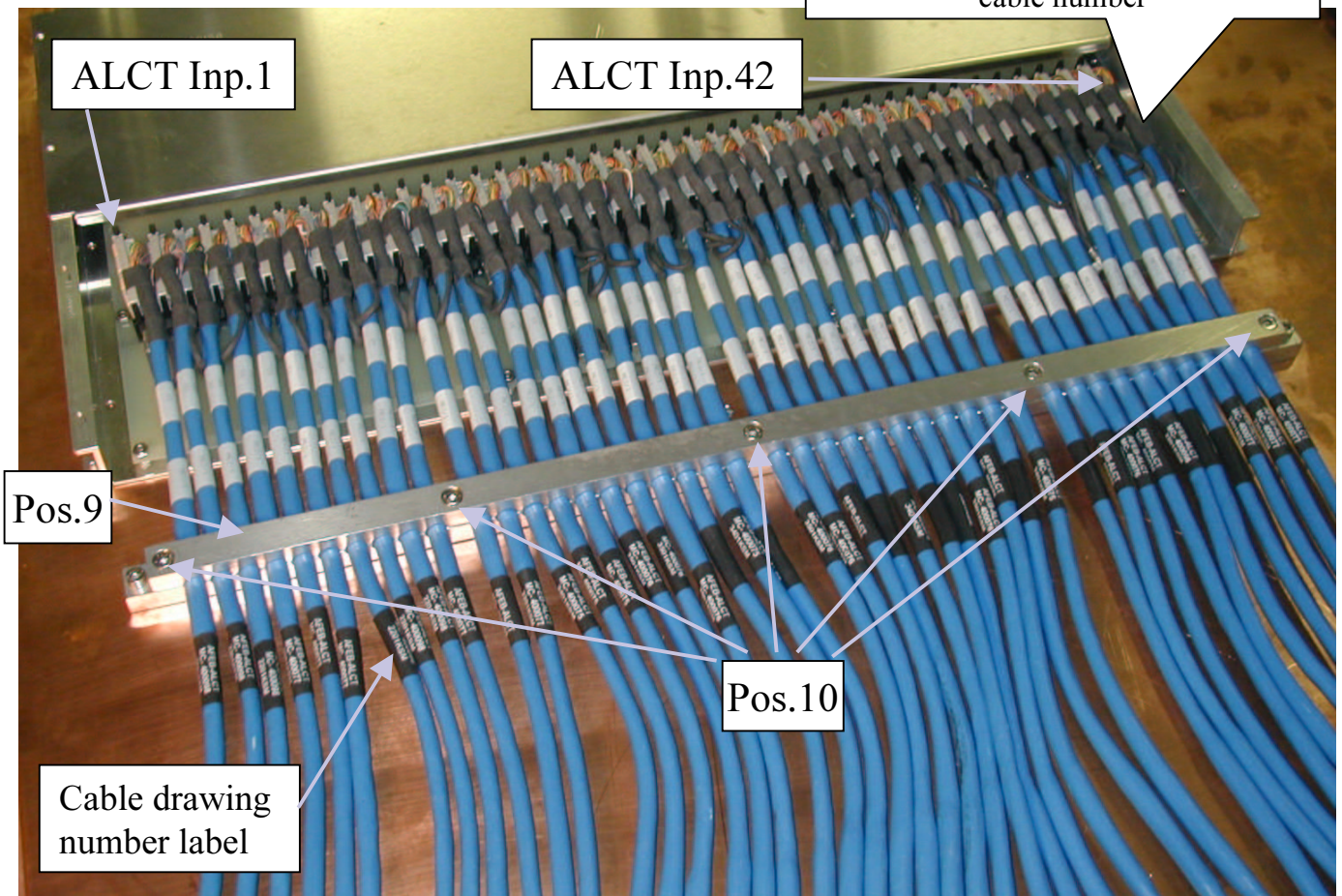


Fig.2. Cables clamped near the ALCT input

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

Step 1. Connect cable #1 to the 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 each 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 the 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.

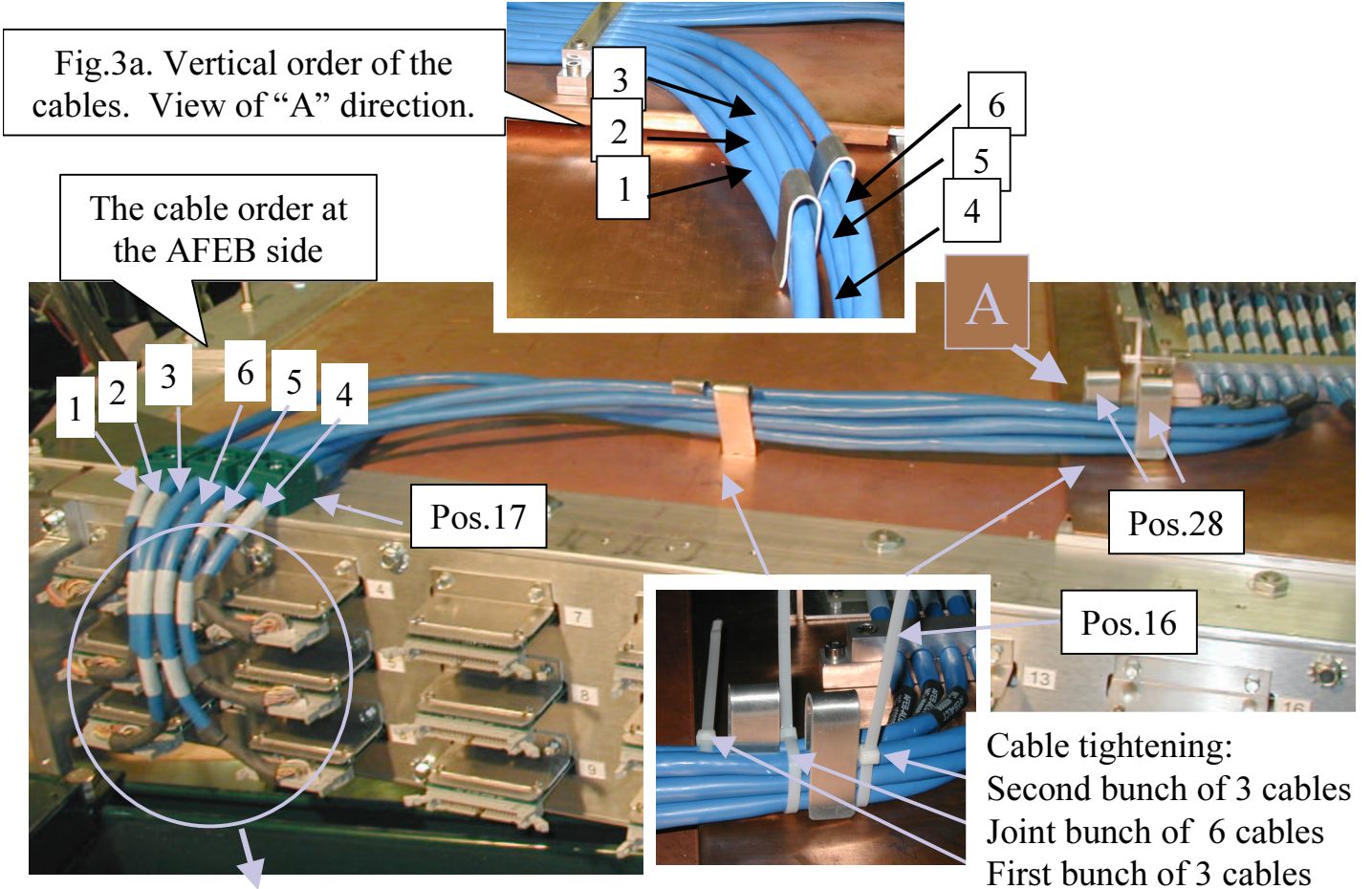


Fig.3. Arrangement of the first bunch of 6 cables.

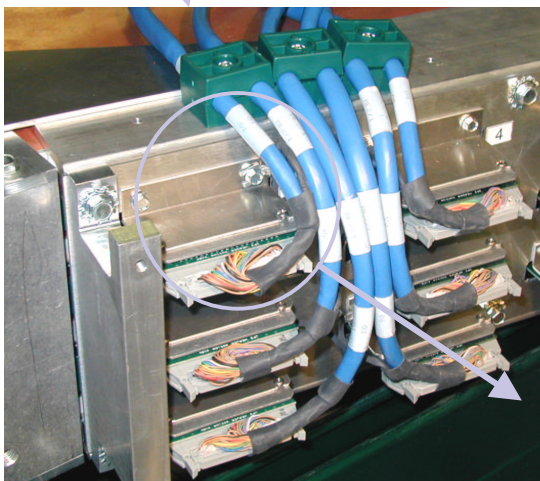


Fig.3b. Cables arrangement at the AFEB's output. All cables must go along the connector side wall.

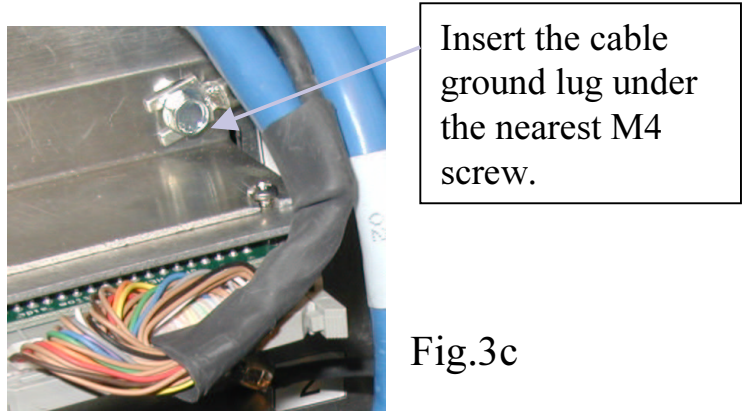


Fig.3c

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.3a). All cables must go along the connector side wall. If necessary, use an extra cable tie to keep the cables in the 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 the picture (Fig. 3). Start from the ALCT side. Use cable clamps

(pos. 28) for preliminary cable fixation.

Step 6. Tighten the cables with the 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, and Fig.4 for reference.

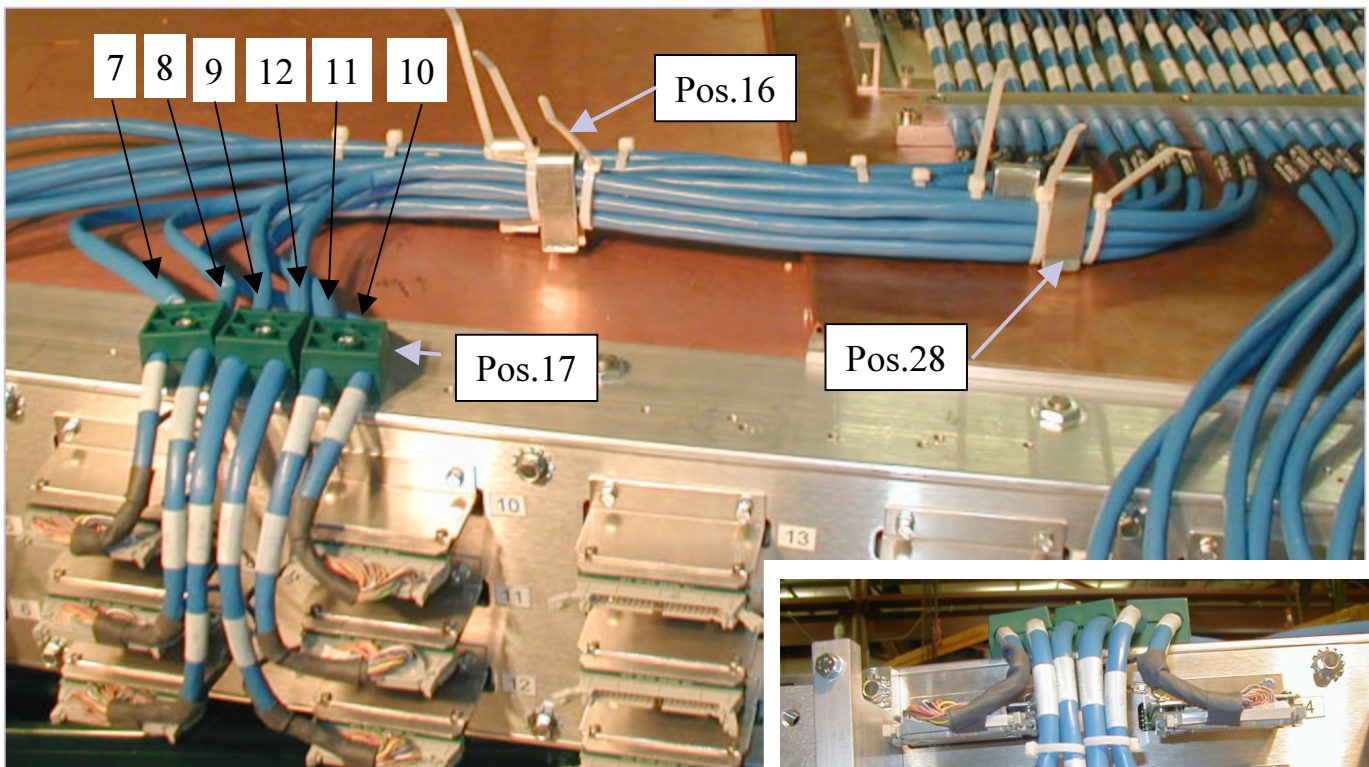
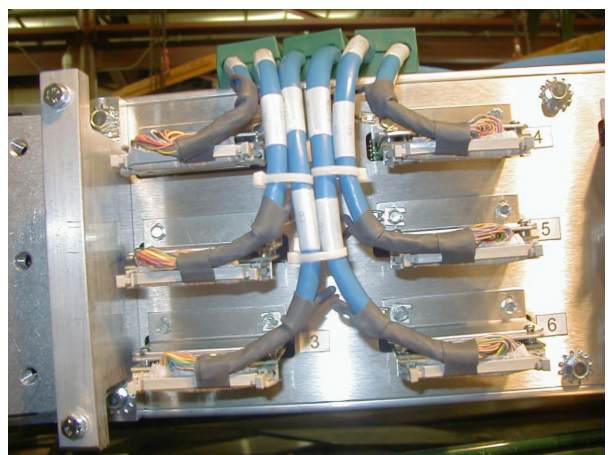


Fig.4. Arrangement of the second bunch of 6 cables.

Fig.4a. If necessary use extra cable tie to keep cables in right position



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

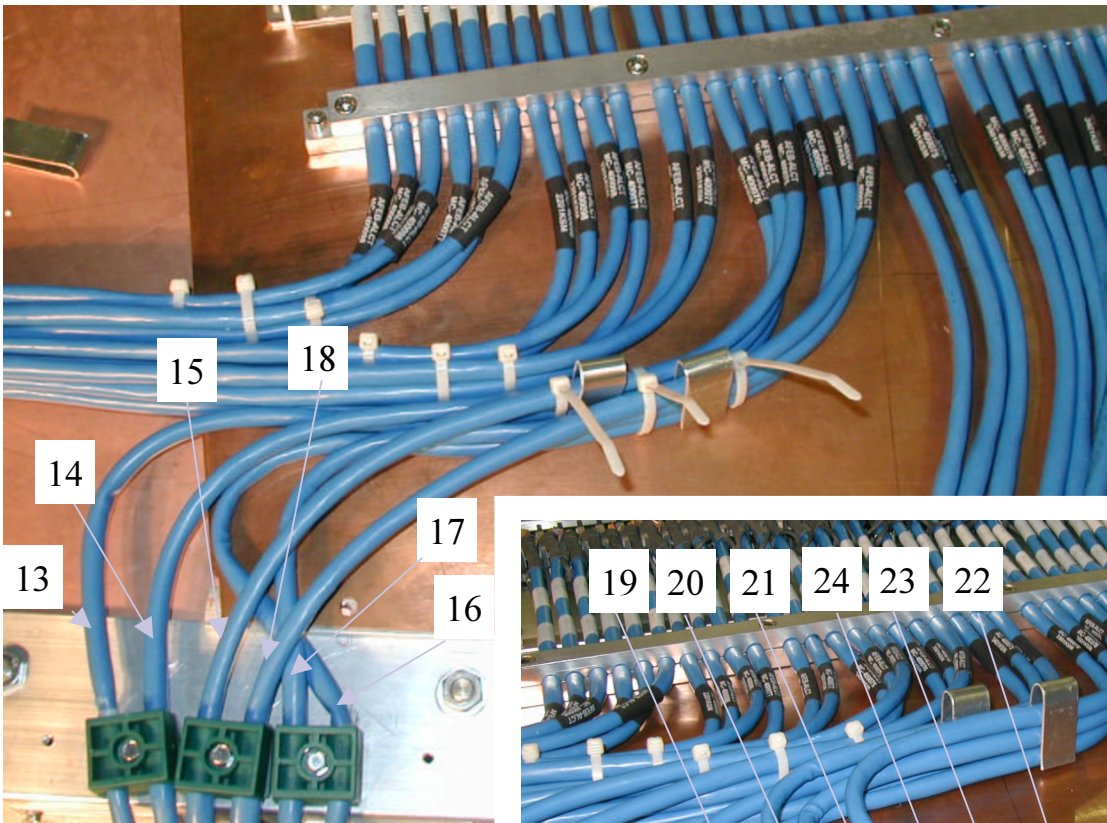


Fig.5a. Arrangement
of cables
13,14,15,16,17,18.

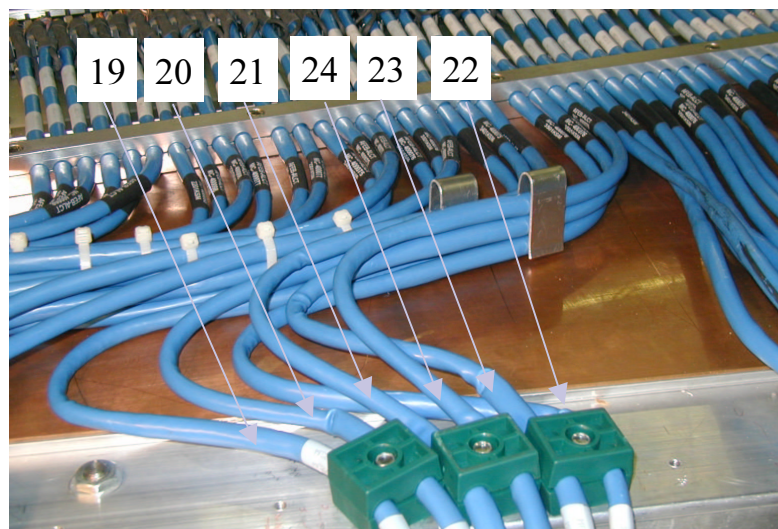


Fig.5b.
Arrangement
of cables
19,20,21,22,23,24.

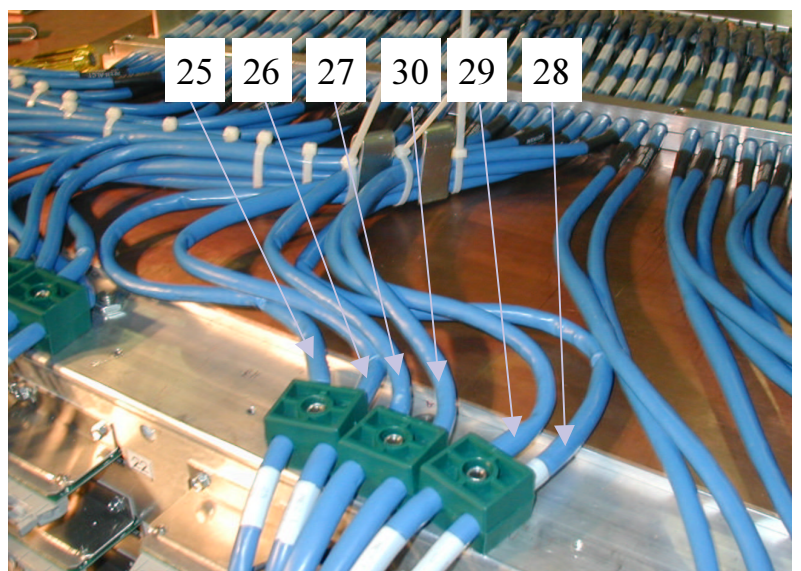


Fig.5c. Arrangement
of cables
25,26,27,28,29,30.

The cable bunches 6 and 7 are arranged in a different way.

Step 1. Connect cable #31 to amplifier #31 (top position). Then continue connecting in the order 32, 33, 34, 35, 36. Every cable must go the over previous one. Cable #36 is upper.

Step 2. Connect cable #37 to the amplifier #37 (top position). Then continue the cable connecting in (different!) order: 38, 39,42, 41, 40. Every next cable must go over previous one. Cable #40 is upper.

See Fig.6 for reference. Insert the cable ground lug under the nearest M4 screw for each cable as shown in the picture (Fig.3c).

Step 3. Set the cables between the cable strain relief RBPR-110 (pos.17) in order 31, 32, 33, 36, 35, 34 and 37, 38, 39, 42, 41, 40 as shown in the picture (Fig.6).

Step 4. Form up the cables at the AFEB outputs as shown in the pictures (Fig.3a 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.

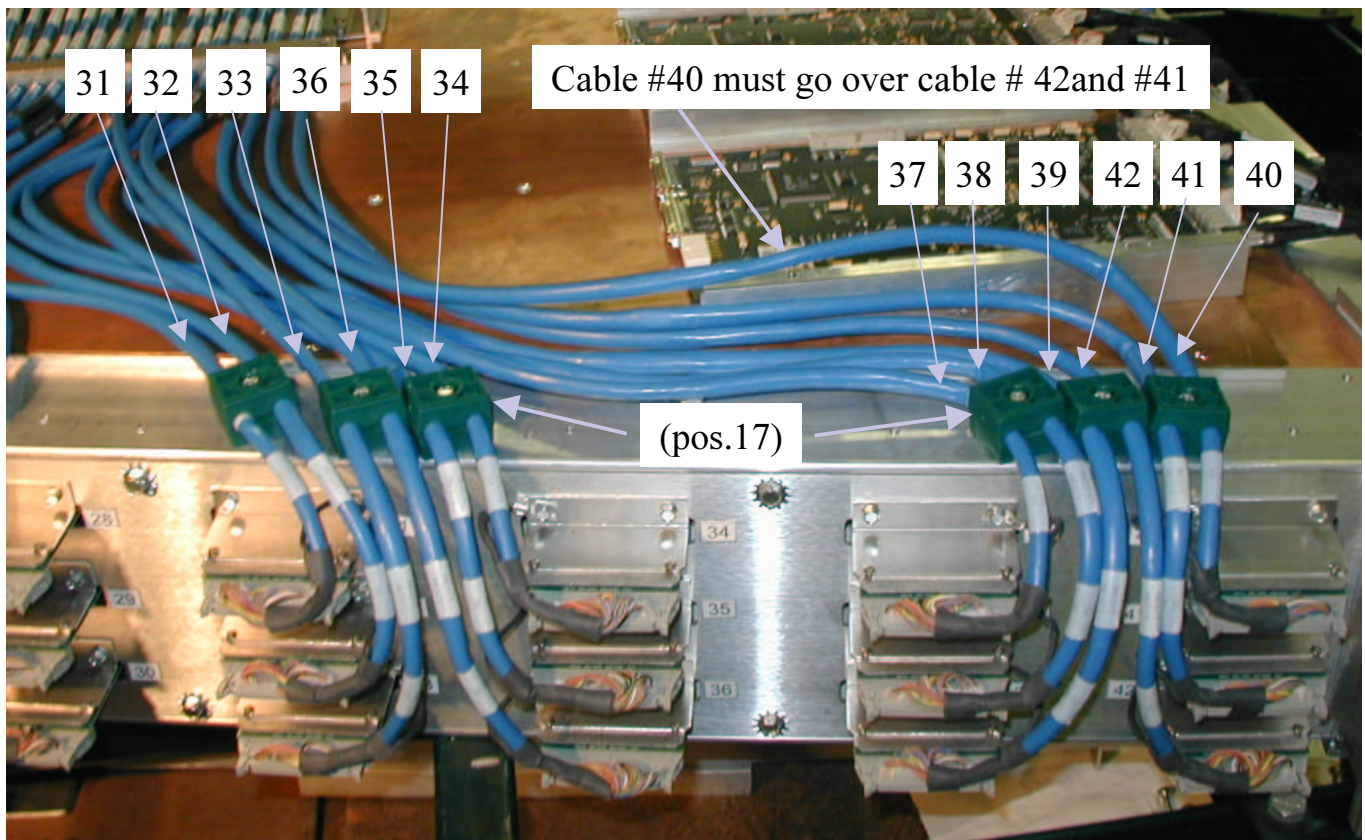


Fig.6. Cable bunch 6 and 7 connection.

Step 6. The cables numbered 37- 42 must lie in one layer.

Start the cable configuring from the shortest cable #39. Put the cable in the most relaxed way on the top of the chamber. Attach cable #40 to cable #39 in 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. The extra length of #40 cable must go above cables #41 and #42 creating a smooth loop on the AFEB side. Use Fig.7 for reference. Then attach cables #41 and #42 (ties #4 - #6 and #7 - #9) .

Starting from the AFEB side, attach cable #38 (ties #10 - #13) and then cable #37 (ties #14-#16). The extra length of cables #38 and #37 will form a loop in the ALCT side.

Step 7. Align all cables and cable ties, tighten all ties in the same order.

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

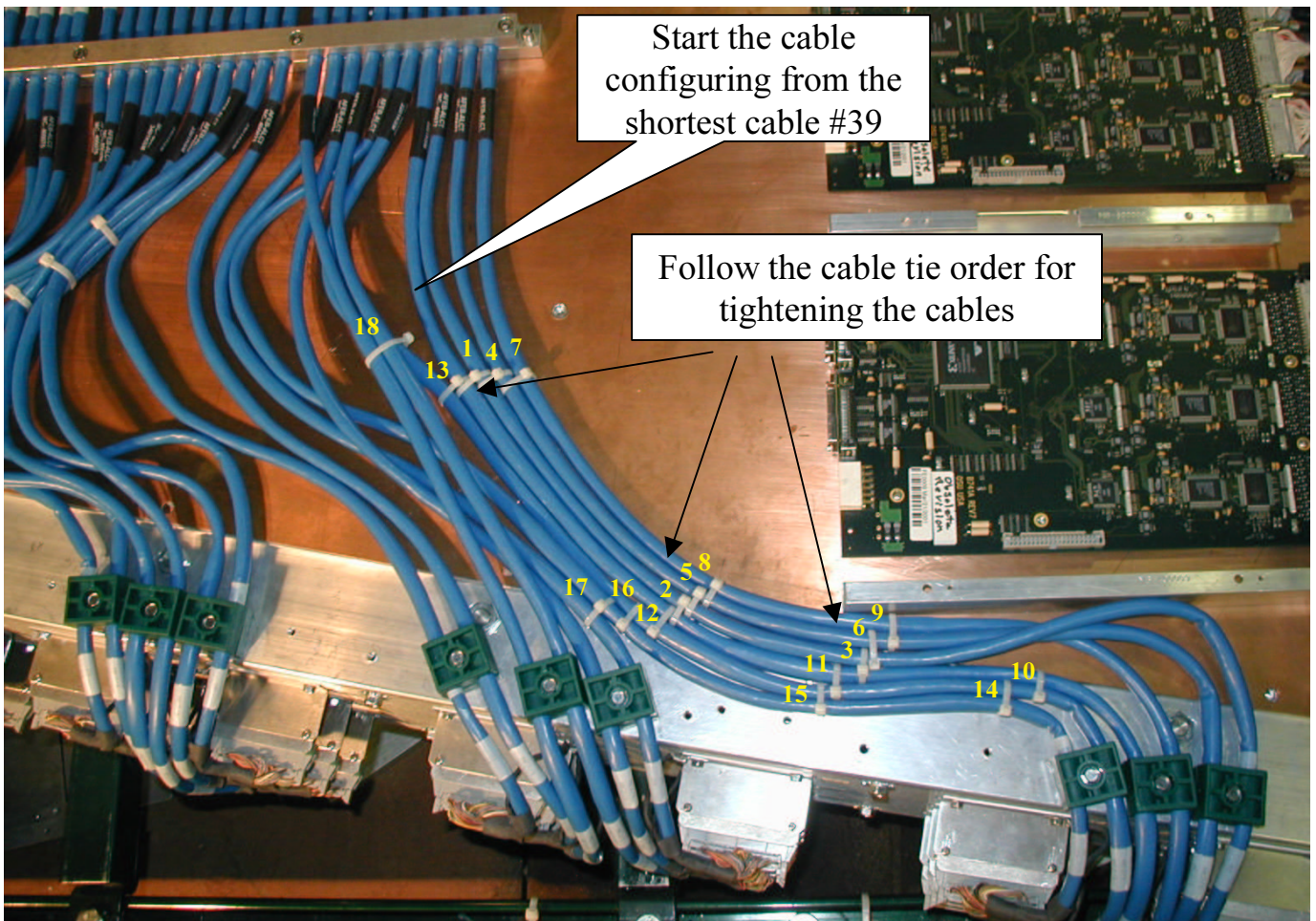


Fig.7. Cable harness of cables #31 - #42.

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

After assembling AFEB-ALCT cables:

- Check all connectors. Connectors must be properly inserted and the connector latches must be locked.
- The cable ground connections must be inserted on the ALCT side and firmly tightened under an M4 screw on 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.

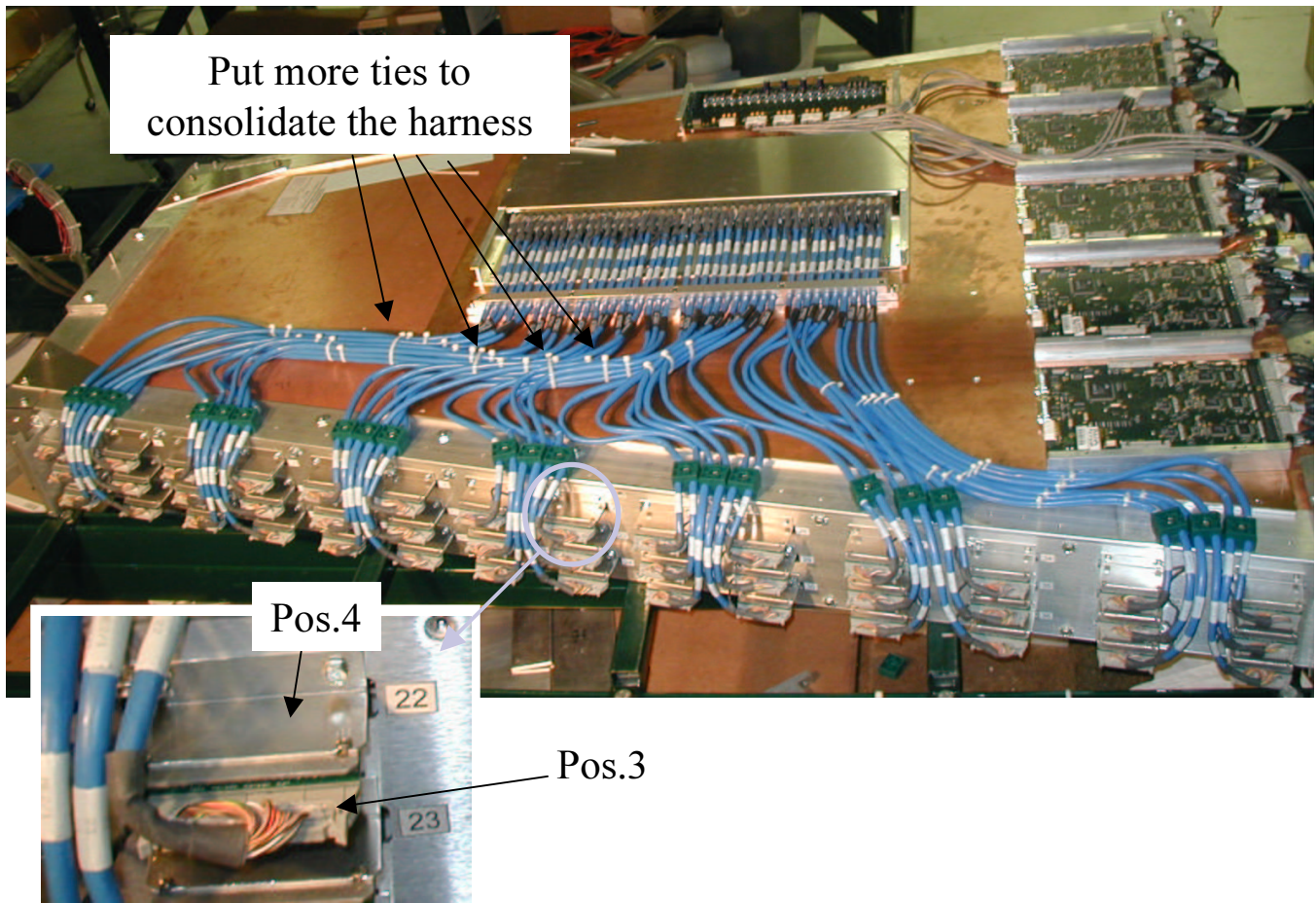


Fig.8. ME2/1 chamber equipped with the AFEB-ALCT cables.