



US CMS EMU

# Cathode Strip Chamber AFEB installation

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Revision 2 03/14/02



## I. AFEB/p (plate type Fig.1) installation on the side of the chamber.

Before the AFEB installation on the chamber, all AFEB slots on the chamber must be labeled with their corresponding number.

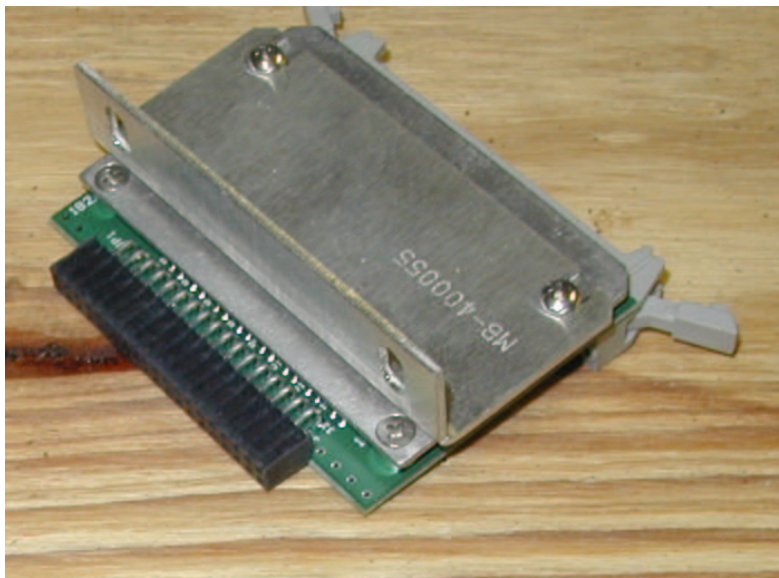


Fig.1. The AFEB plate type assembly.

Note:

It is very important from a grounding and shielding point of view to make all connections firm and reliable.



## AFEB installation

### List of materials

<b>Position #</b>	<b>Assembly component</b>	<b>Part number</b>	<b>Quantity</b>
1	AFEB/p	MC-400010	Number of AFEB slots for that type of.
2	AFEB bracket	MB-400055	
3	Screw M4 x10 (thread forming)	MA-400049	2 x number of brackets.

#### **Tooling:**

Power screwdriver with adjustable torque

Craftsman 111370 or equivalent #11137 1

Philips screwdriver 1

Standard screwdriver 1

Screwdriver socket 7 mm 1

#### **Other material:**

Alcohol 10g



## AFEB installation

The plate type AFEB (AFEB/p drawing number MC-400010) with the right angle mounting bracket (MB 400055) is used to install on the chamber side . See Fig. 2.

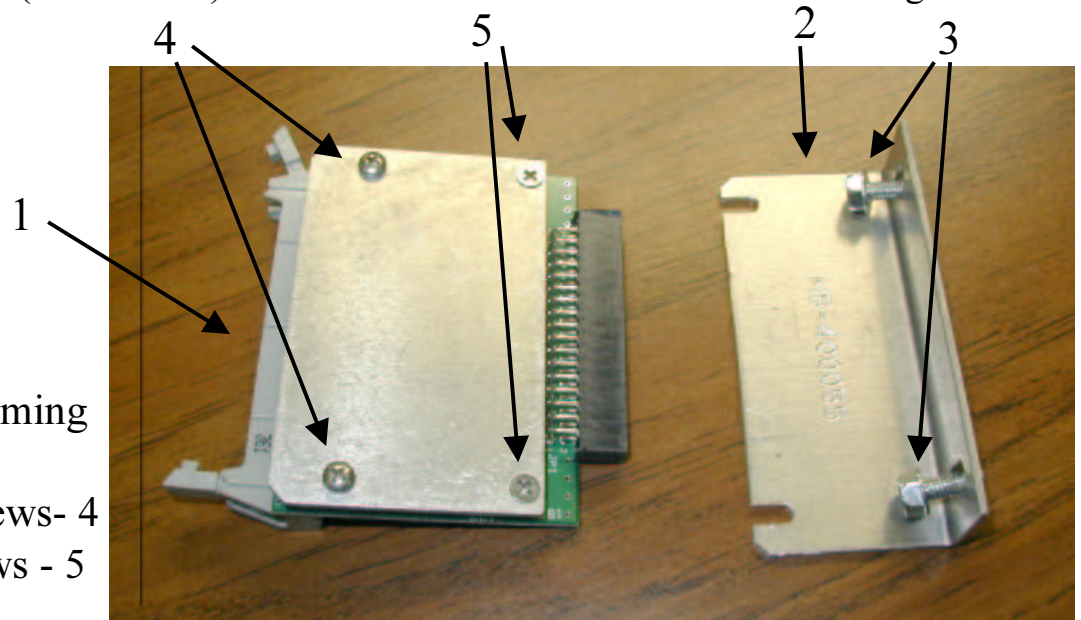


Fig.2. AFEB/p - 1  
AFEB bracket - 2  
M4x10 Thread forming  
screw  
AFEB fixation screws- 4  
AFEB screen screws - 5

Check the AFEB screen screws (5). The screws must be properly screw-tightened. Loosen the two AFEB fixation screws (4) by 2 mm, slide on the AFEB bracket and fix the bracket with the screws. The AFEB/p is now ready to install, see Fig. 3.

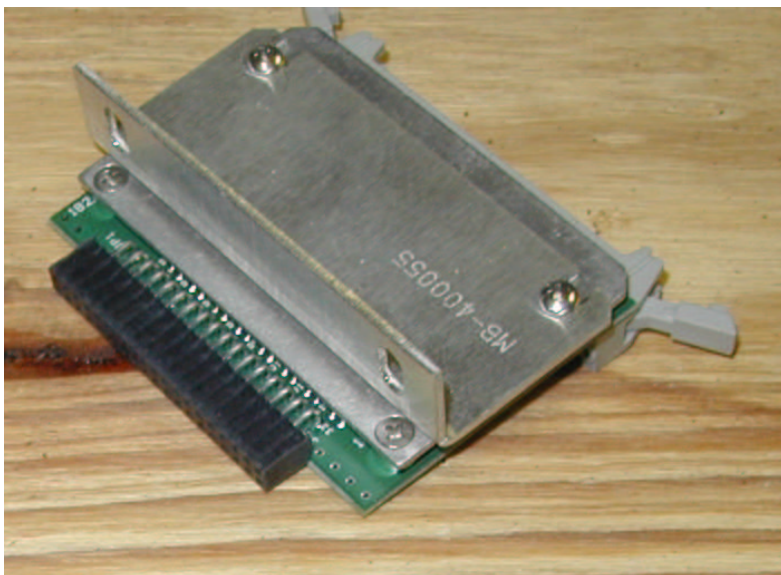


Fig. 3  
The AFEB/p - bracket assembly.



## AFEB installation



Fig.4.

Plug in the board with its bracket into the chamber anode output connector (the protection board output connector). Start from the bottom connector in each column. See Fig. 4.

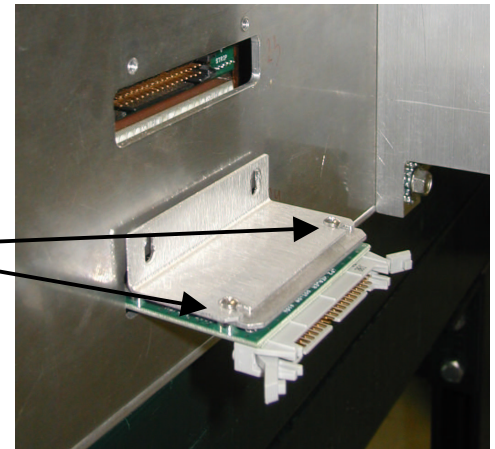


Fig.5.

Loosen the AFEB fixation screws (4), (see Fig.5) slide the bracket towards the chamber side cover and align the bracket holes with the chamber holes as shown in Fig. 6.

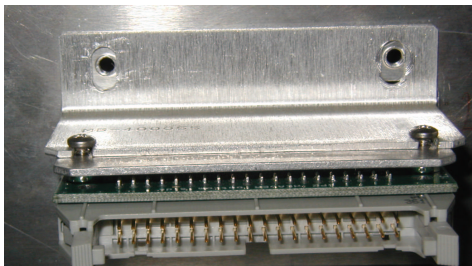


Fig.6.

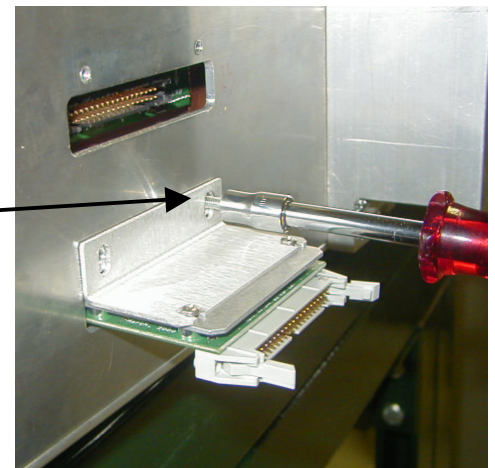


Fig.7.

Tighten the AFEB and the bracket together by hand and fix the bracket on the chamber side with two M4 screws (Fig.7). Use a 7 mm socket with a screwdriver.

Tighten screw firmly, but gentle. If using supplied power screwdriver, set the torque clutch as directed on the attached label.

(Remember, torque more than 15 p/inch may break the thread).

Use alcohol for lubricating the screw (dip the screw into the alcohol before screwing it in, never pour alcohol into the chamber hole).

**Note: Always keep alcohol out of the chamber!**

Re-tighten screws (4).

Write the board serial number and the board position in the table.



## AFEB installation

Repeat this procedure for the middle board and then for the top board. After that, install the boards in the next column in the same order. See Fig. 8 for reference.



← Third installed board

← Second installed board

← First installed board

Fig.8. The AFEB installation order in one column.

Note:

All joints must be firm and durable to create a good ground connection between the AFEB shield and the chamber ground.



## AFEB installation

### II. AFEB/s stack assembly

#### List of material

<b>Position #</b>	<b>Assembly component</b>	<b>Part number</b>	<b>Quantity</b>
1	AFEB/s	MC-400011	3
2	AFEB/s bracket	MC-400027	1
4	AFEB/s strain relief	MB-400029	1
5	Self taping screw M3.5x6.5mm	MA-400051	11
6	Cable position label		1
7	Cable address chart label		1

#### **Tooling:**

8	Power screwdriver with adjustable torque Craftsman 111370 or equivalent	#11137	1
9	Philips screwdriver		1



## AFEB installation

1. Attach the AFEB/s strain relief (pos.4) to the AFEB/s bracket ( pos.2) with two M3.5 self tapping screws (pos.5). No lubricant is needed.
2. Stick the cable position label on the side of the AFEB/s bracket near the strain relief
3. Stick the cable position chart label on the top of the AFEB/s bracket. Write the serial number of the assembly on the spare box of the chart, also write the number into the database. Use picture Fig.9 and Fig.10 for reference.
4. Put the AFEB/s (pos.1) in the AFEB/s bracket (pos.2) on the top position. Before doing any board installation, write the board number and board position for that assembly into the database.

**The AFEB must be oriented in the following way:**

**The AFEBs' output connector should be up and on the strain relief side of the bracket.**

Fix the AFEB/s with two M3.5 self tapping screws (pos.5). No lubricant is needed. Maximum applied torque for tightening the screws - 8 p/inch.

5. Use the same procedure to assemble the two rest other boards.
6. Screw in three M3.5 screws (pos.5) for the AFEB/s cover fixation.

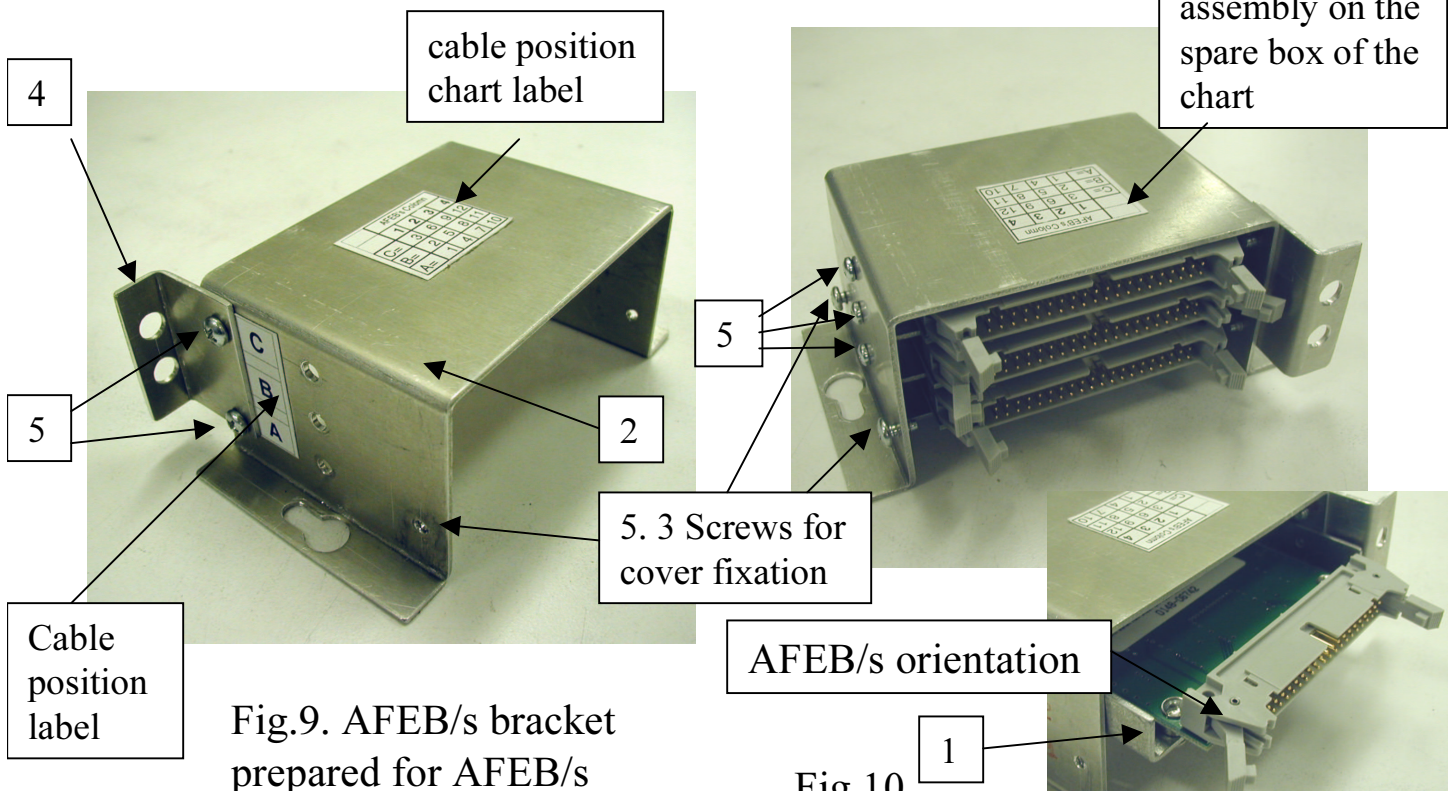


Fig.9. AFEB/s bracket prepared for AFEB/s installation.

Fig.10. AFEB/s orientation and fixation.





## AFEB installation

### III. AFEB/s (stack type Fig.11) installation on the top of the chamber.

Before the AFEB installation on the chamber, all of AFEB slots on the chamber must be labeled with their corresponding number. Slot #1 is on the narrow side of the chamber.

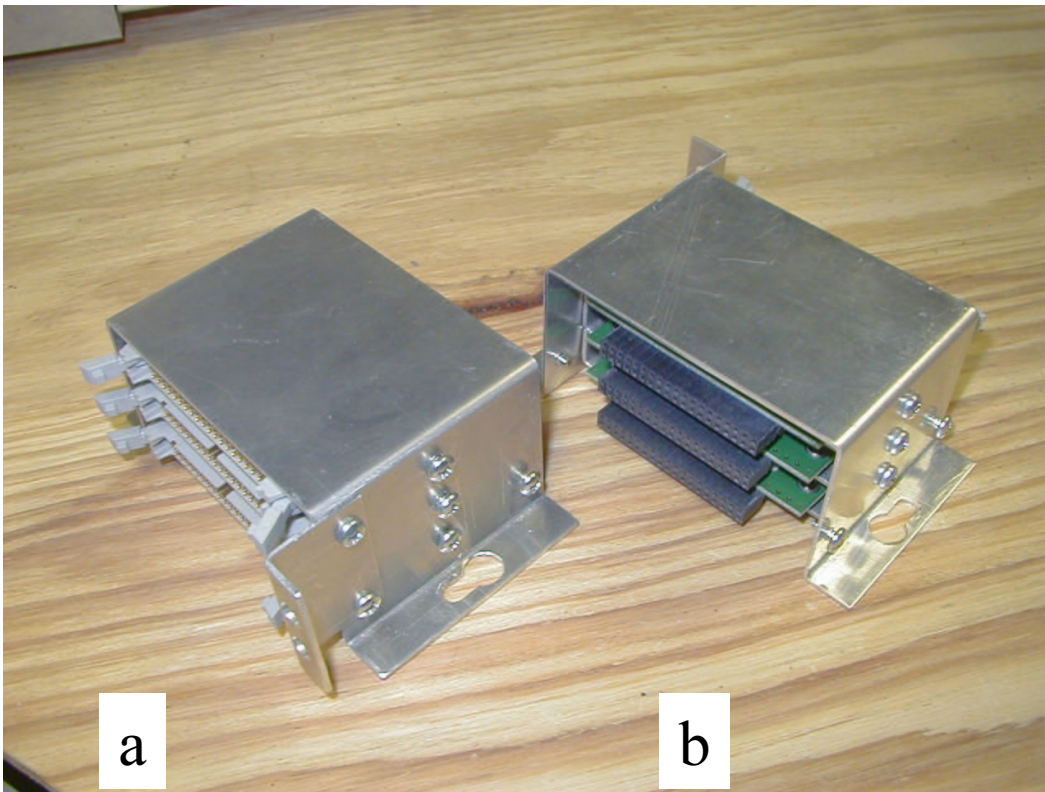


Fig. 11 AFEB stack assembly  
a. - output connectors side view; b. - input connectors side view.

#### Note:

It is very important from a grounding and shielding point of view to make all connections firm and reliable.



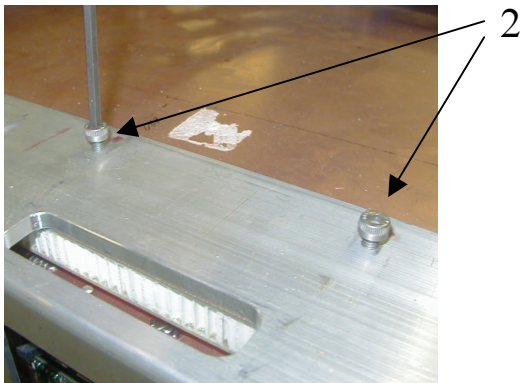
## AFEB installation

### List of material

<b>Position #</b>	<b>Assembly component</b>	<b>Part number</b>	<b>Quantity</b>
1	AFEB/s stack assembly		Number of AFEB columns
2	M5 SHCS x6 LG SS screw	MA-400051	2 x number of columns
3	AFEB/s stack cover	MD-400028	Number of AFEB columns
4	AFEB input cables	2.5" MC-400070	Number of AFEB columns
		5.0" MC-400071	Number of AFEB columns
		7.5" MC-400072	Number of AFEB columns
5	Anode side panel cover	MC-400140	1
6	M4 x10 thread forming screw	MA-400049	6
<b>Tooling:</b>			
	Power screwdriver with adjustable torque		
	Craftsman 111370 or equivalent	#11137	1
	Philips screwdriver		1
	Hex 5mm screwdriver		1
	Screwdriver socket 7 mm		1
<b>Other material:</b>			
	Alcohol		2g

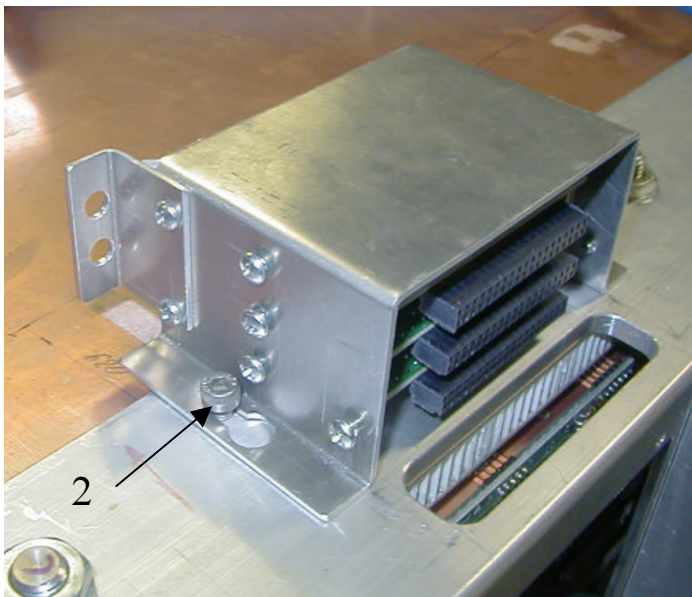


## AFEB installation



Screw in all the AFEB fixation screws M5 SHCSx6 LG SS into their positions (pos. 2 in Fig. 12). Leave ~2.5 mm clearance between the screw head and the aluminum surface.

Fig.12. Position of the AFEB fixation screws.

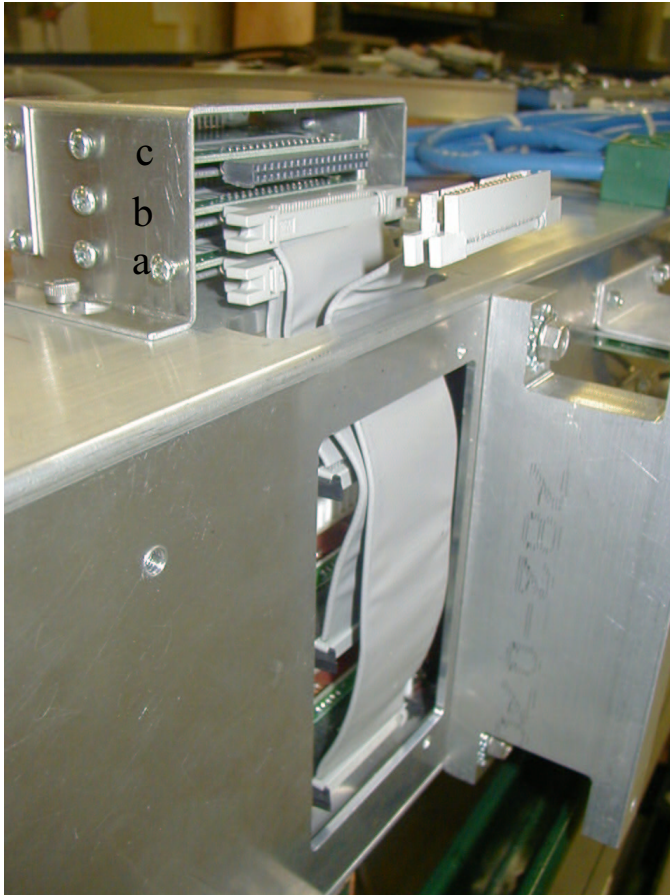


Put the AFEB/s assembly on the two screws through the key-holes and slide the assembly towards the chamber. Fix the AFEB assembly in that position with the two screws (pos. 2, Fig.12, Fig.13). The AFEB input connectors must be over the cable slot on the chamber frame. Use Fig. 13 for the correct orientation of the assembly.

Fig.13. AFEB/s assembly position.



## AFEB installation



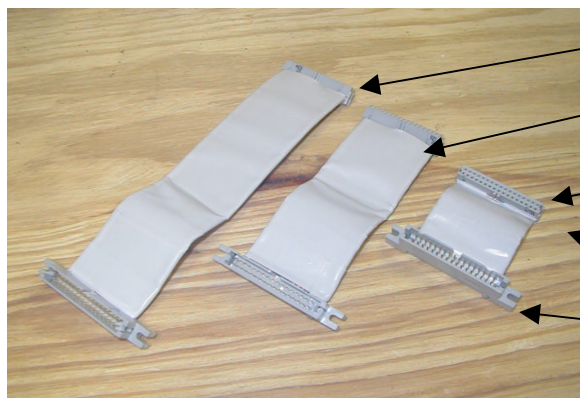
Connect the chamber output connectors to the AFEB input connectors with the special input cables (Fig. 15). Start with the shortest cable.

Pass the first cable (a) through the hole from the top (socket connector down), plug in the chamber connector first, then plug in the AFEB's connector.

Repeat with the second cable (b), then the third cable (c).

See Fig. 14.

Fig.14. AFEB's input cable connection.



c. - MC-400072

b. - MC-400071

a.- MC-400070

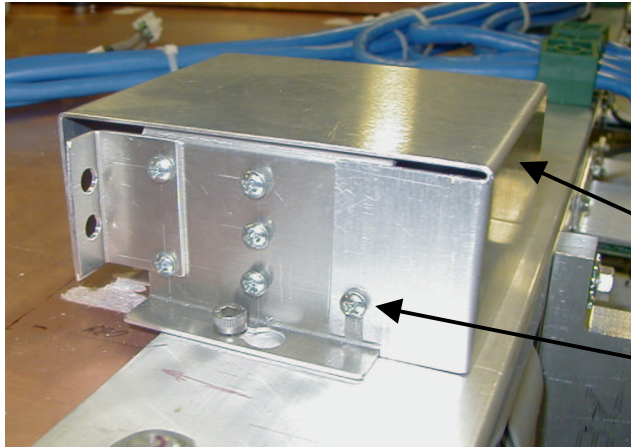
Cable's socket connector (chamber side)

Cable's pin connector (AFEB side)

Fig.15. AFEB's input cable set.



## AFEB installation

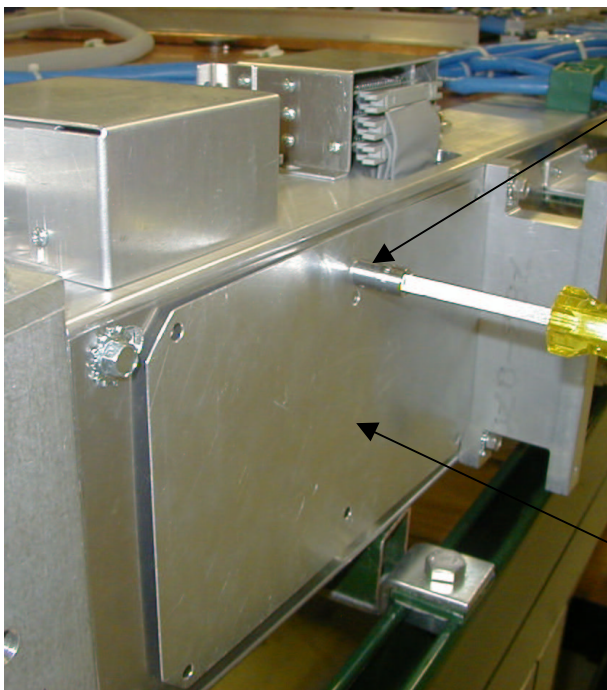


Put on the AFEB/s stack cover (pos.3, Fig. 16) and fix the cover with three screws.

3

7. AFEB/s cover fixation screw. Two screws are on the other side.

Fig.16. The AFEB/s assembly on the chamber.



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Put on the anode side panel cover (pos. 5, Fig. 17) and fix it with 6 M4 x 10 thread forming screws (pos. 6). Use a 7 mm socket with a screwdriver. Tighten the screw firmly but gently. Use alcohol for lubrication (dip the screw into the alcohol just before screwing it in), never pour alcohol into the chamber hole.

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Fig.17. Anode side panel cover installation.

Note:  
Always keep alcohol out of the chamber!