CEBEK ELECTRONIC CIRCUITS

MD-3

COMPLEMENTARY BOOSTER

The MD-3 is an auxiliary power unit to increase the supplied one by the MD-1 controller.
This complementary booster could also be used to maintain a railway segmentation system
It allows to connect in serial up to three MD-3.
It includes connection outputs, indicators leds and short-circuit detection on the railway.

TECHNICAL CHARACTERISTICS.

Voltage.	14 - 16 V.AC. (We suggest 14 V).
Minimum Consumption, (sin carga).	90 mA.
Maximum Consumption, (without load).	340 mA.
Maximum constant Output Intensity	3 A.
Maximum Output Intensity	4 A.
Maximum connected MD-3 modules	3.
Data controlled by the system	Speed and Way.
System protocol	Digital ERD-Cebek System.
Maximum output time MD-3 on short-circuit	5 minutes.
Sizes.	144 x 101 x 45 mm.

POWER SUPPLY.

MODULE'S FEED. The module is supplied by 14 V AC, for this reason, you have to install a 4A. transformer in accordance with this voltage.
Exceptionnally, you could supply the module with 16 V AC.
To install the MD-1 and MD-3, we suggest you to supply each one with different and separate transformers with constant and identical output voltage. Nevertheless, you also could use a single transformer for both modules, but its ampere have to be equal at the used booster number multiply by 4. For instance, if you have the MD-1 and 2 complementary boosters MD-3, you will a total of 3 boosters which multiply by 4 correspond to 12 A. Then, you have to use a 14 VDC 12 A Transformer. .
The inconvenient of this installation, is to find a transformer with similar technical characteristics as well as the danger to handle so a high voltage on a single device. For this reason, we insist and recommend to use different and separate transformers for each used booster. Once the transformer available, using a correct plug and cable, you have to connect them to the 230 V transformer input.
Install a fuse and a switch as it is indicated in General Wiring Map (Page Nº4). Both are necessary to protect the module and for your own security, as it is indicated in EEC regulations. Therefore, and using parallel cable, you have to connect the transformer output indicated as "0" and "14" to the booster input. Then, verify that you have correctly connected the module.
Before to connect the module to the mains inserting voltage, please do the rest of connections specified hereafter. Do not forget that in several part of themodule there is voltage (220 VAC), for this reasonwesuggestyoutobecareful.

INFORMATION.

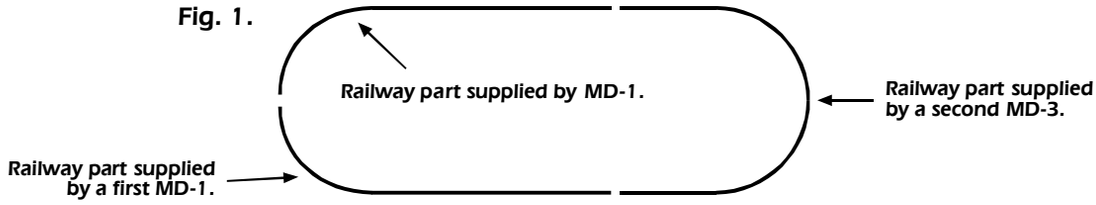
ERD-CEBEK (BOOSTERS) DIGITAL SYSTEM. As we explain in the MD-1 Digital Controller's instruction manual, the ERD-CEBEK system doesn't need railway segmentation to operate, at the opposite, this one have to be on a continuous way. Nevertheless, the MD-1 module could be not able to supply the necessary required power. Indeed, its 3A as constant consumption and 4A as maximum consumption could be not enough regarding the connected locomotives, trains, or other devices on the railway. To increase this power, you have to use a complementary booster (MD-3)
With each MD-3 the system will increase 3A. the maximum constant intensity and 4A the maximum intensity, allowing 4 MD-3 (as maximum) connected to a single MD-1.
The auxiliary MD-3 power unit, could not manage or control locomotives, it have always to be connected to the MD-1 thanks to the corresponding connector.

INSTALLATION.

INSTALLATION. *Thanks to the MD-1 exclusive use, all the railway have not to be segmented. Nevertheless, when the system require more power than the supplied by the MD-1, you have to install the MD-3 and segment the railway. Each booster will independently supply a segment of the railway, sharing the total charge. For this reason, each added booster will supply a segment of the railway. For instance, if you only use only the MD-1's booster the railway doesn't be segmented but if you add a MD-3 the railway must to be segmented in two identical parts. If you add an other MD-3, you have to divide the railway in three identical parts, etc... See the picture Nº1. This system, will increase the power and control the railway division.*

Each segment (part) have to be identical in size, or each segment have to share the same potential consumption. Indeed, in the opposite way, the load of the system doesn't be correctly shared between different boosters.

Fig. 1.

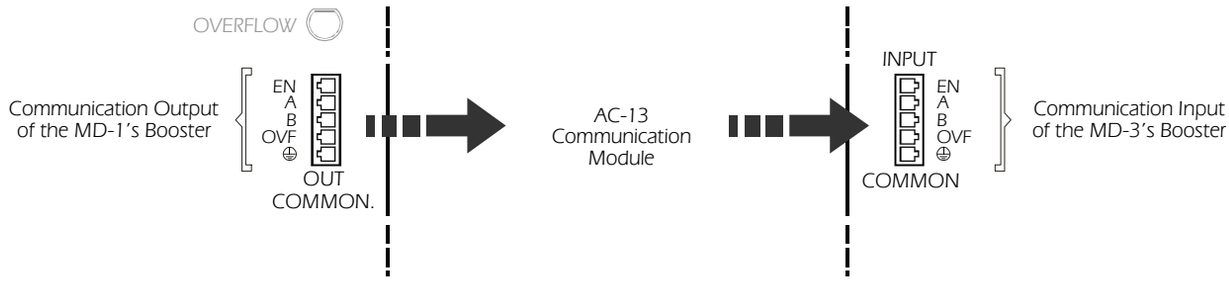


CONNECTION. *The first connection operation that you have to do, after the MD-3 feed, is its connection to the system. Even if each booster will independently control a railway area, and these one won't be in contact between them, through the "communication" connection between boosters, the system will maintain same speed and way signals for all locomotives, independently of the railway area where the locomotives are. Using the AC-13 communication module, connect the "communication" output of the MD-1 booster with the "communication" input of the MD-3. See picture Nº2.*

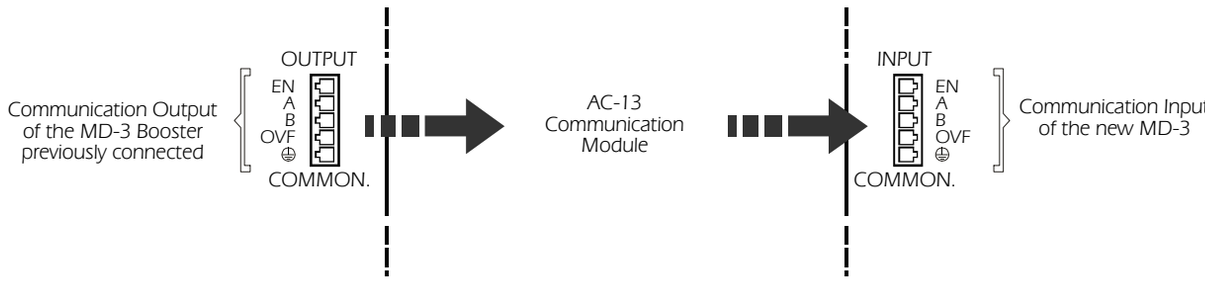
Do not use any other wiring type than AC-13 to connect boosters between them. This one had be designed to avoid connection mistakes and control the maximum distance between boosters.

Use other systems could provoke a wrong connection between contacts or an excessive distance in modules communication, generating mistakes in the operating mode and cancelling the corresponding warranty.

If you wish to install more boosters, you have to connect in serial next boosters, connecting the output of the previous booster to the input of the following booster, etc... up to a maximum of : 1 MD-1 and 3 MD-3 (See picture Nº3).



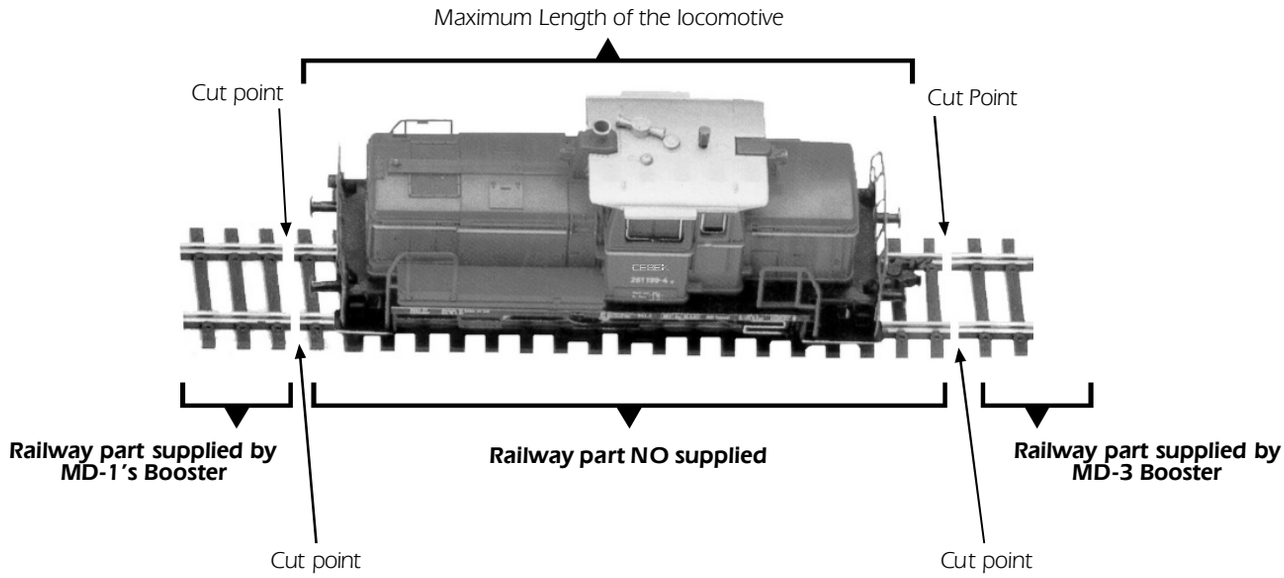
Pic. 2. Communication between MD-1 and complementary Booster MD-3.



Pic. 3. Communication between MD-3 previously connected and a new MD-3.

INSTALLATION.

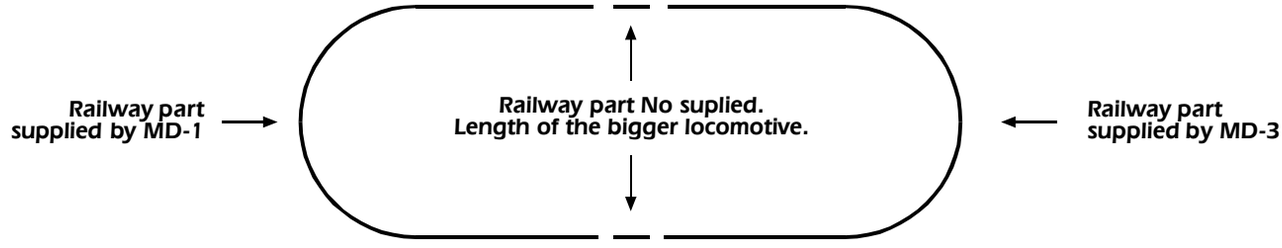
INSTALLATION. Once the "communication" connection between boosters done, you have to connect their railway outputs to their corresponding way segment.
Firstly you have to cut the railway in two different points (never on a single point). The distance between both points will be the length of the bigger locomotive who circulate on the railway. You have to proceed as indicated to avoid that a locomotive's voltage connection could be in contact with two railway parts, supplied by different boosters. See picture Nº4.



Pic. 4. How to cut the railway to add a MD-3 to a MD-1 Digital Controller previously installed.

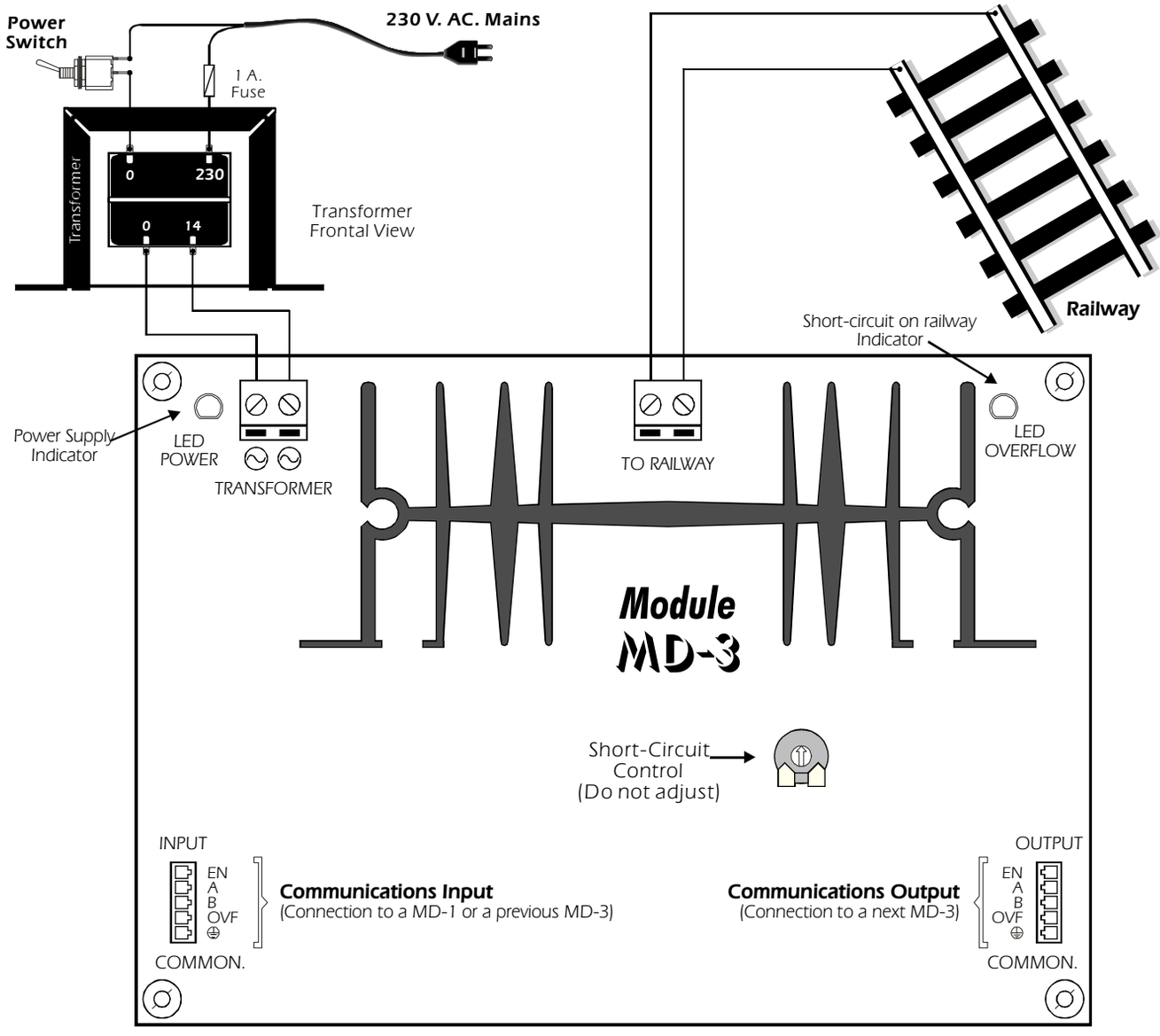
Cuts on railway have to be 1 or 1.5 mm. As minimum. Do not forget that you have to divide railway in same parts than boosters you install, then if you have for instance one MD-1 and one complementary booster MD-3, the railway had to be separate in two parts. See picture Nº5.

Pic. 5. How to separate the railway in two parts to be supplied thanks to one MD-1 and one MD-3.



The length of the railway part which won't be supplied could not be on the stop area of locomotives. Nevertheless, the machine inertia, if you have correctly done the cut of the railway (according to the length of the locomotive), will avoid that the locomotive is without any contact with supplied parts.

GENERAL WIRING MAP.



TECHNICAL CONSULTATIONS.

If you have any doubt, you could contact your wholesaler or our Technical Department.
- Via E-Mail, **sat@cebek.com** | by Fax. +34.93.432.29.95 | by mail P.O Box 23455 - 08080 Barcelona- Spain
- **Keep the invoice of this module**. For any repair, the corresponding invoice had to be added. If the invoice is not presented together with this module, the module's warranty will be automatically cancelled.