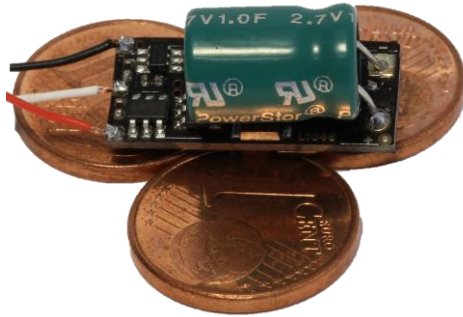




Smart Power Pack SPP

User manual
- version 0.1.4 -



by **TEHNO
LOGISTIC**



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Subject to technical modification



Please read this manual carefully before carrying out the installation!!! Although our products are very robust, incorrect wiring may destroy the module!



During the operation of the device the specified technical parameters shall always be met. At the installation the environment shall be fully taken into consideration. The device must not be exposed to moisture and direct sunshine.



A soldering tool may be necessary for the installation and/or mounting of the devices, which requires special care.



During the installation it shall be ensured that the bottom of the device should not contact with a conductive (e.g. metal) surface!

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1. Important information



Please read this first chapter

- The Smart Power Packs are designed exclusively for use in model trains. Any other use is not supported.
- Any connection must be made without the connected power supply. Please make sure that during installation, the locomotive is not powered, not even accidentally.
- Avoid applying blows or mechanical pressure on the Smart Power Pack.
- Do not remove the heat shrink tube from the Smart Power Pack (on models fitted with a protective sleeve).
- Ensure that neither the Smart Power Pack nor the unused wires come into electrical contact with the locomotive chassis (short-circuit risk). Insulate the ends of any unused wires.
- Do not wrap the Smart Power Pack in an insulating tape, as this may cause overheating.
- Follow the wiring of the Smart Power Pack and any external components as recommended in this manual. Wrong wiring / connection can cause damage to the Smart Power Pack.

- Make sure that there are no wires trapped by the locomotive transmission system when reassembling it.
- Any power source used must be protected by a fuse or electronics to avoid any danger that may arise in a short circuit. Use only transformers or power supplies specially designed for electric trains.
- Unexperienced users are advised to read the manual carefully to fully understand the potential risks involved.
- Do not use the Smart Power Packs in wet environments.



The setting for the startup delay time should be made in CV 124 of the Lokommander II decoders with firmware 3.5.195 or higher, or in CV 152 when firmware version is earlier than 3.5.195.



The exact version of the Lokommander II decoders can be readout from the following CVs: Version Major CV256, Version minor CV255, Build number $256 * CV254 + CV253$.

Example: $CV256 = 3, CV255 = 5, CV254 = 1, CV253=5$. The exact version is: $3.5.(1*256+5) = 3.5.261$.

2. Technical Specifications

- Supply voltage: 12-24 V, (rectified DCC voltage in the tracks)
- Current consumption when fully charged: <10 mA
- maximum current at charging: 300 mA
- maximum buffering time: 4 seconds
- Dimensions (without wires): 20 x 9 x 13 mm
- weight: 10 g
- protection class: IP00
- Operating temperature: $0 \div +60 \text{ }^\circ\text{C}$
- Storage temperature: $-20 \div +60 \text{ }^\circ\text{C}$
- Humidity: max 85 %

3. General description of the Smart Power Pack

The Smart Power Pack can be attached optionally to all Lokommander II decoders and supplies your locomotive with storage energy when running over dirty tracks and long points. The sound, the lights and engine functions are buffered so the locomotive can continue running up to 4 seconds after it loses power. (Actual time will vary depending on certain conditions).

When operated on analogue layouts, the PowerPack will be automatically switched off.

The Smart Power Pack contains an integrated charging circuit controlled by the decoder. It can remain in the locomotive even during programming. The charging current is limited, in order to prevent an excessive load on the boosters if several models are in use. The buffering time can be restricted via the decoder with CV 123.

4. Installation of the Smart Power Pack

The PowerPack comes with loose connection wires. The module itself is wrapped in heat shrink plastic to protect the fragile components as well as to simplify the installation into the locomotive.



Please leave heat shrink intact during assembly, as it prevents possible short-circuits to metal parts within the locomotive.

All Lokommander II decoders can be connected to the Smart Power Pack. The decoders have soldering pads for soldering the Smart Power Pack's wires.

The manuals of the Lokommander II decoders indicates the typical soldering locations. Refer to the figure below for the most common wiring diagram. In order to be able to reach the soldering surfaces, it is permissible to remove the heat shrink sleeve in the contact area. We recommend to make cutouts in the decoder's heat shrink over the contact area. Leave the remaining heat shrink sleeve on the decoder.

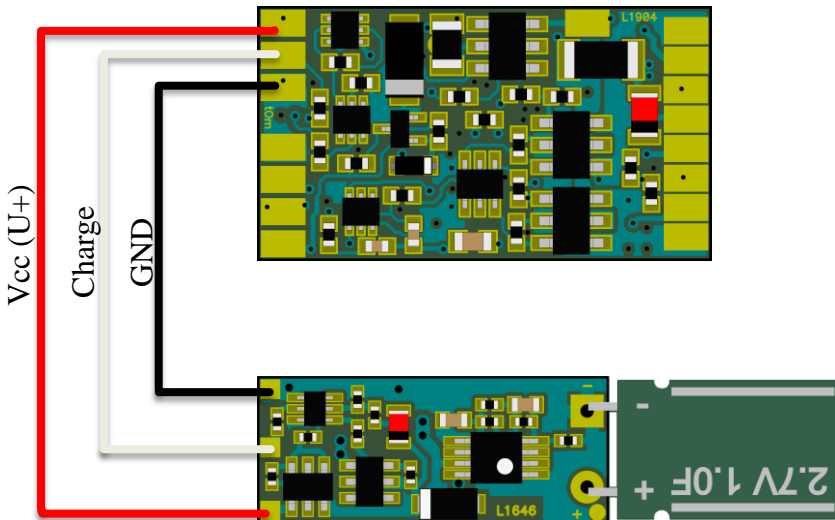


Illustration of Smart Power Pack connection for Lokommander II
PLUX12/PLUX16/NEM652

Follow the next step for the connection of the wires to the Lokommander II decoders:

- Solder the red cable at the soldering surface Vcc/U+ .
- Solder the white cable to the soldering surface Charge.
- Solder that black cables to the soldering surface GND.



Absolutely make sure when soldering that you do not make short circuits between the soldering surfaces or to other components on the decoder circuit board! A short circuit might damage the decoder!



The Smart Power Pack will generate some heat during operation, this is normal. Please be sure to leave space around the Smart Power Pack for ventilation.

5. Analog operation (DC)

The Smart Power Pack charge control is automatically switched off by the Lokommander II decoders when operated on an analog DC layout. In such cases, the buffering function is unfortunately not possible due to technical limitations.

6. Storage time of the Smart Power Pack

The power consumption of the motor of the locomotive influences the storage time of the Smart Power Pack. The higher the power consumption of the motor, the faster the storage module will be discharged. The covered distance without track power will depend on the locomotive gear box. In the below table we present the average discharge time of the Smart Power Pack to a voltage of 5V (required by the control circuit of the decoders to operate). Previously the Smart Power Packs were fully charged with a 16V DCC track power.

Decoder current Consumption (motor current + AUX)	Discharge time down to 5Vdc [seconds]
40 mA (locomotive speed = zero)	> 4
250 mA	> 2
500 mA	> 0.5
1000 mA	> 0.3

7. CV settings

The Lokommander II series locomotive decoders require the disabling of DC operation, to control the Smart Power Pack. This must to be done in CV29, setting bit 2 to zero value (please see the Lokomamnder II manual).

The Lokommander II series locomotive decoders allow the locomotives to run up to 4 seconds in the absence of DCC signal from rails (fully loaded, depending on locomotive consumption).

This duration is set in CV123, in steps of 16ms (default value 16, timeout = CV123 value * 16ms = 0.25 seconds). After this time expires in the absence of the DCC signal, even if the Smart Power Pack is not fully discharged, the locomotive will perform an emergency stop (as a safety measure). The movement will be resumed only after the DCC signal reappears.

In order to avoid very high current consumption, due to the simultaneous charging, when powering model layouts with multiple Smart Power Packs, start delay for each Smart Power Pack can be set up. In CV152/124 we can set the time in seconds after which the Smart Power Pack module will start its charge operation (once the power is applied to the tracks). When multiple decoders are used at on same track, this time should be set differently for each decoder to avoid the simultaneous start of all Smart Power Packs.



Starting with firmware 3.5.195 the Smart start-up delay CV152 is moved to CV124. The default value is 10, which is equivalent to a start-up delay of 10 seconds.



8. Technical support

If you have any questions or suggestions about Train-O-Matic products, you can write to us at support@train-o-matic.com

Any positive feedback or constructive criticism is very much encouraged. We are continually working on the improvement of our products by adding new functionality and correcting any unforeseen bugs that that may still exist.



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