



**usp** - "uninterruptable  
signal processing

Ensures continuous data transfer  
to the decoder even if electrical  
contact to the track is interrupted.

## POWER-1 *usp* Module

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**Digital**  

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**plus**  
by Lenz®

POWER-1 is an energy storage module for use with GOLD Series decoders. This storage unit supplies the decoder and the locomotive with power when there is an interruption of electrical connection to the track (e.g. dirty tracks).

The USP circuit of the GOLD decoders allows the decoder to receive the DCC signal without a direct electrical connection to the track. During the period where track electrical power is not present the USP circuit switches to the backup power provided from the POWER-1 storage module to ensure continued control of the motor. If digital information is no longer transmitted, the motor will be deactivated. This prevents the locomotive wheels from continuing to turn, for example: in the case of a derailment.

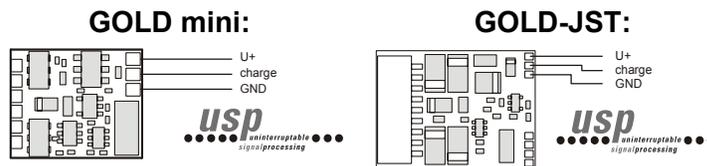
POWER-1 is like an "electronic flywheel", but thanks to the USP technology the stored energy is used only when necessary.

## Connecting and installing the POWER-1 storage module to the GOLD decoder

The POWER-1 storage module measures approximately 0.9" x 0.55" x 0.39" (22 x 13.3 x 9.4 mm) which allows easy installation in most HO and larger locomotives and many N scale tenders.

Three wires provide the connections between the POWER-1 storage module and GOLD decoder. The module is encapsulated by a heat-shrinking sleeve that protects sensitive components and facilitates installation. It also serves to prevent short-circuits to the metal components inside the locomotive - do not remove it from the module on any account.

GOLD decoders are equipped with soldering pads to which the cables of the POWER-1 storage module must be soldered. The precise location of these surfaces is described in the respective decoder manual:



When connecting the POWER-1 storage module to a GOLD decoder, please proceed as follows:

- Solder the blue cable to soldering surface "U+".
- Solder the pink cable to soldering surface "charge".
- Solder the brown cable to soldering surface "GND".

While soldering take care not to create short-circuits between the soldering surfaces and other components of the locomotive decoder as this could severely damage the decoder! Also be sure to not locate the POWER-1 module next to a hot surface.



Note!! Soldering should only be performed using a tool specifically designed for soldering sensitive electrical components.

When no digital signal is present the Gold Decoder will shut down the motor to prevent accidental movement of the locomotive. Gold decoders allow you to configure the time if no digital signal is detected after which the motor is switched off. CV112 is used to set this value. The default setting is approx. 0.25 sec which is fine for most installations,

## Storage time of the POWER-1 storage module

A natural question is:

"How far will my locomotive run if there is a power interruption?"

There is no straight answer to this, because the length of the distance covered is subject to two factors: the power consumption of the motor and the gear of the locomotive.



The higher the power consumption of the motor, the faster the storage module will become empty. Thus, the distance covered will be shorter than it would be if a motor with lower power consumption was used instead.

Current in mA	Current in amps	Time until the POWER-1 output voltage is less than 5V
250	0.25	1000 ms (1 second)
500	0.50	400 ms (0.4 seconds)
750	0.75	100 ms (0.1 seconds)
1000	1.0	< 50ms (0.05 seconds)

Poor electrical contact or dirty track is normally a very short intermittent event. However the result of this brief loss of electrical contact can reduce the typical packet reception of a decoder in a model locomotive to less than 60%. The use of a POWER-1 module results in a nearly 100% packet reception resulting in a significant improvement of actual operating performance of the locomotive.

## North American Warranty

Lenz GmbH does everything it can do to ensure that its products are free from defects and will operate for the life of your model railroad equipment. From time to time even the best engineered products fail either due to a faulty part or from accidental mistakes in installation. To protect your investment in Digital plus products, Lenz GmbH offers a very aggressive 10 year Limited Warranty.

This warranty is not valid if the user has altered, intentionally misused the Digital Plus product, or removed the product's protection, for example the heat shrink from decoders and other devices. In this case a service charge will be applied for all repairs or replacements. Should the user desire to alter a Digital Plus Product, they should contact Lenz GmbH for prior authorization.

**Year One:** A full repair or replacement will be provided to the original purchaser for any item that has failed due to manufacturer defects or failures caused by accidental user installation problems. Should the item no longer be produced and the item is not repairable, a similar item will be substituted at the manufacturer's discretion. The user must pay for shipping to an authorized Lenz GmbH warranty center.

**Year 2 and 3:** A full replacement for any item will be provided that has failed due to manufacturer defects. If the failure was caused by accidental user installation or use, a minimal service charge may be imposed. Should the item no longer be produced and the item is not repairable, a similar item will be substituted at the manufacturer's discretion. The user must pay shipping to and from the authorized Lenz GmbH warranty center during this portion of the warranty period.

**Year 4-10:** A minimal service charge will be placed on each item that has failed due to manufacturer defects and/or accidental user installation problems. Should the item no longer be produced and the item is not repairable, a similar item will be substituted at the manufacturer's discretion. The user must pay shipping to and from the authorized Lenz GmbH warranty center during this portion of the warranty period.

Please contact your dealer or authorized Lenz GmbH warranty center for specific instructions and current service charges prior to returning any equipment for repair.

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This equipment complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**CE** Please save this manual for future reference!

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