



## Energy Storage Module



# ZM-ESM-01

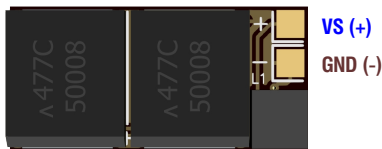
## User's Manual

Ver. 1.05

## Top Side



## Bottom Side



## Specifications

<b>Dimensions (L x W x H):</b>	16 x 7.8 x 4.5 mm
<b>Input:</b>	30 V max, 100 mA
<b>Output:</b>	14.5 V max, 400 mA
<b>Total capacity:</b>	1880 $\mu$ F
<b>Recommended for:</b>	Z and N scale
<b>Buffering time (estimated)*:</b>	

- 0.3-0.5 seconds for locomotives with DC brushed motors
- 0.5-1 seconds for locomotives with coreless motors
- 2-4 seconds for LED interior lighting boards

\*Note: These are approximate values. Real values may differ, depending on the type and efficiency of the motor and the track voltage.

## Package contents

- 1x ZM-ESM-01 energy storage module with 100 mm color cables
- 2x 15 x 7.5 mm double sided stickers for mounting
- 1x User's Manual

## Introduction

ZM-ESM-01 energy storage module can be used with Zmodell ZM05A digital decoder, as well as with all decoders from other manufacturers which provide voltage supply (VS) and ground (GND) connection.

ZM-ESM-01 drastically improves driving characteristics of locomotives equipped with digital decoders on dirty tracks, switches, rail joints and in all other potentially problematic sections where electrical contact between tracks and wheelsets may be lost.

The module also helps to eliminate flickering of interior lighting installed in passenger cars. Latest technology used in this energy storage module allowed to fit very high total electric capacity in a small size.

ZM-ESM-01 energy storage module contains inductor that provides compatibility with asymmetric braking sections and helps eliminating potential issues in programming mode on certain systems.

Information: Completely discharged energy storage module may require 10-15 seconds to become fully charged. Charging current is limited to 100 mA.

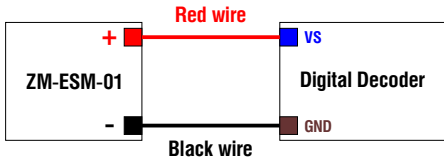
**IMPORTANT: Operation of energy storage module on digital systems without a digital decoder is strictly prohibited! Direct connection to the tracks will destroy the module and void the warranty!**

**Operation of energy storage module on alternating current systems with switching impulse is not allowed! It will destroy the module and void the warranty!**

## Installation

**IMPORTANT: Soldering work required for installation of this device. Soldering iron with thin tip (1-1.5 mm) and good soldering skills needed for this.**

Connect the energy storage module to the digital decoder as shown on the following picture:



The black wire GND (-) coming from the energy storage module should be connected to GND pad of the digital decoder (otherwise indicated as “ground”, or “0V”).

The red wire VS (+) coming from the energy storage module should be connected to VS pad of the digital decoder (otherwise indicated as “common” positive voltage source).

Note: Some digital decoders provide a separate connection for the positive output of the energy storage circuits. This connection is indicated as “ $V_{CAP}$ ”. In case of using such a decoder, connect the red wire VS (+) of the energy storage module to  $V_{CAP}$  instead of VS.

If the digital decoder has ZVS connection instead (supply voltage for SUSI), then the red wire VS (+) of the energy storage module should be connected to it.

It is recommended to always refer to the digital decoder manufacturer's documentation for information on connecting energy storage devices and setting up the digital decoder for using it with storage capacitors.

## Additional Information

When using ZM-ESM-01 energy storage module with Doehler & Haass® and Zmodell digital decoders, the following settings should be applied:

- **Doehler & Haass® digital decoders without sound, Zmodell ZM05A digital decoder:** Energy saving mode should be deactivated by enabling CV 137 Bit 1 (set CV 137 = 2; default value is 0). When the energy saving mode is disabled, the digital decoder does not switch off consumers.
- **Doehler & Haass® sound decoders:** Energy saving mode should be deactivated by enabling CV 137 Bit 1 (set CV 137 = 2; default value is 0). CV 361 (Threshold value ZVS) should be set to 0 in order for the sound to remain functional during track power loss.
- **Doehler & Haass® SUSI sound modules:** CV 961 (Threshold value ZVS for SUSI sound module) should be set to 0 in order for the sound to remain functional during track power loss. In case of using Doehler & Haass® digital decoder with Doehler & Haass® SUSI sound module, energy saving mode in the digital decoder should be deactivated, too by enabling CV 137 Bit 1 (set CV 137 = 2; default value is 0).

**ATTENTION:** This product is intended only to experienced users! Please perform all operations with all precautions that apply to work with ESD sensitive devices. This product is not suitable for children under 15 years. The functioning of every energy storage device is fully tested before delivery. Should nevertheless a failure occur, please contact the supplier where you purchased the product or directly the manufacturer. The warranty period is one year from the date of purchase. The manufacturer is not responsible for any damage to the train model and/or any of its parts caused by improper installation, assembly or disassembly of the model, wrong wiring as well as by exceeding the maximum allowed operating parameters.

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