

# OPERATING INSTRUCTIONS

-- AV4m --

## Diagnosing- and Quickcharger with Display for NiCd and NiMH Batteries (AA & AAA)

MEC Art.-Nr.: 153-04122-380



Dear Customer!

Thank you very much for your trust in us and our product.  
Please read these operating instructions carefully **before** start of operation.

MEC-Energietechnik GmbH

### 1. Safety- and Warning notices

- ATTENTION: 100-240 Volts AC voltage, Device is not suitable for children – danger of life!!
- ATTENTION: The charger is exclusively designed for rechargeable batteries (NiCd & NiMH) from 180 to 3300 mAh, contempt leads to EXPLOSION RISK!
- ATTENTION: Please consider the charging instructions from the battery manufacturer before charging!
- During insertion of the battery please mind the correct polarity!
- Don't use the device near flammable gases, solvents or vapours. EXPLOSION RISK!
- Use the device only in dry rooms and protect against dust, heat (>40°C) and humidity (>80% rel.)
- Protect against direct solar radiation.
- No fluids of any kind must get into the device.
- Do not cover the ventilation slots during operation.
- Only use the provided power supply.
- In case of obvious damage or malfunction immediately shut off the device and protect against unintended reconnection.
- Clean with a dry cloth only.
- Repair work must only be accomplished by authorized companies or specialized technical staff.

## 2. Short Description / General Information

The AV4m is a multifunctional diagnosing- and quick charger for rechargeable batteries especially designed for professional users.

Using a wide range power supply the charger can be operated in almost every international power network and via 12V car adapter also in your car.

Each of the 4 charging bays can hold one NiMH- or NiCd-battery of the dimensions AA (Mignon) or AAA (Micro).

Via the selective charging bay choice you can separately or simultaneously charge, discharge, condition and analyse each battery. A slide switch for the selection of the charging current allows you to choose between slow, medium and quick charging time.

The precise charge control, the negative Delta-V detection procedure for detecting a full battery, an integrated safety timer and a temperature monitoring for each charging bay ensure that your batteries are optimal charged and protected.

The systematic usage of your AV4m can extend the lifetime of your battery, therefore save your money and make an effective contribution to environmental protection.

## 3. Specific Features

- Diagnosing- and Quick Charger for 1 to 4 NiCd or NiMH AA (Mignon) or AAA (Micro) batteries.
- Four independent charging bays – charging of different types of batteries is possible (AA and AAA).
- Separate temperature monitoring of each charging bay – battery temperature exceeding 50°C stops the charge process of the affected battery.
- Safety timer – automatic charge stop for defective batteries, error is displayed.
- Quad display – simultaneously display of function- and charge status of the inserted batteries.
- Automatic start of the charging process, max. 1,2 A charge current per battery.
- Automatic switching to trickle charge after end of charging.
- Battery forming – automatic forming of damaged batteries
- Battery capacity measurement – display of capacity (Ah), charging time (h) and energy index.
- Battery cycling – automatic discharge/charge until no more increase of capacity is detected.
- Battery full detection – via negative Delta-V detection.
- Selective charging bay choice – functions can be set individually for each charging bay.
- Wide range input – via provided power supply (100-240VAC 50/60Hz)
- 12 VDC Input – via provided 12V car adapter.

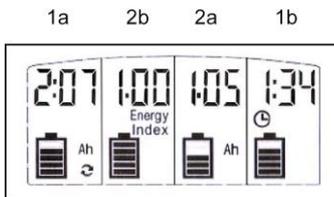
## 4. Scope of delivery including short description of display and control element

1. Power Supply including cable
2. 12V car adapter including cable
3. Capacity-Button → the charged capacity (Ah) is shown in the display.
4. Select Cell-Button → each battery can be selected for the designated function (shown in display).
5. Discharge- & Cycling-button → short push (<2 sec) starts a discharge/charge cycle.  
Long push (>2 sec) starts the cycling function.
6. Charging bays (S1 – S4) → for cylindric NiCd- und NiMH-batteries in dimensions AA (Mignon) and AAA (Micro).
7. LCD-Display → separate display of information for each charging bay (S1 - S4).
8. charge current switch → three charge currents can be selected via the slide switch:

Switch position	Mignon / AA-batteries		Micro / AAA-batteries	
	Charge current	Discharge current	Charge current	Discharge current
<b>L</b> = Large (biggest charge current)	1200 mA	500 mA	600 mA	180 mA
<b>M</b> = Medium (medium charge current)	900 mA	500 mA	400 mA	180 mA
<b>S</b> = Small (smallest charge current)	700 mA	500 mA	250 mA	180 mA



Indications on display:



Display **1a** = **Cycling Function:** Pushing the Capacity button (3) shows the capacity in ampere hours (Ah).

Display **2b** = **Energy Index:** The performance of the batteries compared to each other is shown as energy index (EI).

Display **2a** = **Charging and Discharging:**  
upwards moving bars → charging is in progress;  
downwards moving bars → discharging is in progress;

Display **1b** = **charging time:** Is displayed alternating with the capacity (Ah) after the charging process.

General valid: downwards moving bars → discharge in progress;  
upwards moving bars → charging in progress;  
steady and full bars → function completed;

## 5. Function Overview

### 5.1. Choosing the right charge current

The designated maximal charge current can be set via the slide switch (8) at the long side of the device and is valid for all charging bays. You have the possibility to perform a quick charge of the battery via the setting “L” (Large). Furthermore “M” stands for Medium and “S” for Small. Basically all new batteries should be charged with the smallest charge current “S” to guarantee a lifetime as long as possible. This is also valid for charging/discharging and the cycling mode.

ATTENTION: Use the charger only for rechargeable batteries (NiCd & NiMH)!

ATTENTION: Read the charging instructions from the battery manufacturer before charging!

### 5.2. Choosing the charging bay

You can select each charging bay separately and set its own operating mode via pressing the “SELECT” button (4). The selected charging bay is indicated via blinking LED at the particular display. It is possible to charge, discharge and to condition (cycling) single batteries simultaneously. If no specific charging bay is selected, the operating mode is valid for all inserted batteries.

### 5.3. Starting up and Charging

The proper start up of the AV4m is performed by connecting the cable from the provided power supply or the 12V car adapter with the AV4m and the respective power source. If no battery is inserted during start up, “nob” is shown in the display. After inserting the battery in the particular charging bay, the AV4m starts a cell check. If this check succeeds and all parameters of the battery comply with the specifications for a charge start, the AV4m starts automatically to charge all detected batteries to their full capacity. The charge process is shown in the particular display segment via moving bars and the already charged capacity in ampere hours (Ah). When the charge process has finished, the battery symbol in the display is shown statically and full with bars. The information about the charged capacity is shown in ampere hours (Ah) and alternating with the elapsed time (h) indicated by the clock symbol.

### 5.4. Discharging / Charging – Capacity measuring

The discharging / charging is performed by shortly pressing (<2sec) the “Discharge/Cycling” button (5). This operating mode is indicated by the downwards moving bars. Additionally the discharged ampere hours are shown in the display. After the discharge the charge process starts automatically and the battery is charged to its full capacity which is indicated by upwards moving bars. After the charge process has finished the energy index (EI) is displayed (see 5.5). Pressing the “Capacity” button (3) shows the capacity (Ah) of the battery. For a significant capacity measuring the batteries must be fully charged.

### 5.5. Conditioning - Cycling and Analysing

Before conditioning, the slide switch (8) must be set to “S” to choose a small charge current. The conditioning cycle is activated by pressing the “Discharge/Cycling” button (5) for more than 2 seconds. The battery is charged and discharged as long as no more increase in capacity is detected. The process is indicated by the moving bars, the charged and discharged ampere hours as well as a cycle symbol. At the end of the conditioning cycle the energy index (EI) is shown in the display segments. The battery with the EI-value of 1.00 represents the reference battery. An EI-value of 0,95 means that the battery has an efficiency of 95% compared with the reference battery. A comparison of the EI-Values after conditioning allows an effective selection of batteries.

Batteries used in combination (battery packs) should only show marginal different EI-values because the efficiency of a battery pack is defined by the battery with the lowest EI-value.

#### Advice:

New batteries should always be trained with a conditioning cycle. For a long lifetime at maximal capacity you should maintain your batteries every 4 to 6 weeks. One conditioning cycle can last up to 48 hours depending on the state of the batteries and their capacities.

## 5.6. Forming

If one or more deep discharged batteries are inserted, the AV4m automatically tries to reach the required cell voltage via forming. Therefore the battery is reactivated by regulated current pulses.

This process is indicated in the display by showing “**For**”. If the forming succeeds a complete charging cycle is started automatically. If the forming has no success and the cell cannot be reactivated (max. 30 minutes), no charging cycle will be started and “**Err**” is shown in the display.

Following errors are shown for the particular charging bay if applicable:

<b>Err</b>	= Battery defective, cell could not be reactivated
<b>bAd</b>	= Internal resistance is too high, cell is dried up

In both cases the battery is damaged, therefore no more suitable and must be disposed professionally.

## 6. Errors and Troubleshooting

- |                                  |  |
|----------------------------------|--|
| 1. No indication on the display: | -Check if power supply or adapter is plugged-in in a proper way;<br>-Check if the cable at the charger is plugged-in in a proper way;<br>-Check if the cable is defective; |
| 2. Charging does not start:      | -Check if the battery is inserted reverse-poled;   |
| 3. Charging abort:               | -Remove batteries and disconnect the charger for a short time;   |
| 4. “Err” shown in display:       | -Battery deep discharged (defective) → dispose according to regulations;   |
| 5. “bAd” shown in display:       | -Battery dried up (defective) → dispose according to regulations;  |

## 7. Technical Data

Input	
Power supply	100-240 VAC
Frequency	50/60 Hz
Input voltage	9 – 14 VDC
Power	max. 18 W
Output	
Output voltage	4 x 1,45 V
Charge current AA/AAA	1200/600mA, 900/400mA, 700/250mA
Discharge curr. AA/AAA	500/180mA
Thermic	
Temperature range	0°C to +40°C
Cooling	Convection cooled

Dimensions	
Charger (L x B x H)	145 x 70 x 45 mm
Power Supply (L x B x H)	80 x 50 x 80 mm
Weight	400g (Charger and Power supply)
Mains connection	Power supply w.plug-Typ C (CEE 7/16) 12V car adapter
Charging connection	4 separate charging bays (AA & AAA)
Certificates	
Norm	EN60335-1, EN60335-2-29, IEC60335
Type	CE
Country approval	GB, EU, AU, NZ

## 8. Disclaimer of Warranty

- MEC-Energietechnik GmbH guarantees replacement or repair of chargers that are recognized as defective within 2 years under common environmental conditions. The validation of the warranty time starts with the delivery date from the manufacturer. MEC-Energietechnik GmbH is limiting the free guaranteeing to working hours and spare parts only.
- For damages caused by non-observance of the operating instructions, inappropriate start up or handling as well as reconstructions and modifications of the device, the warranty claim expires and MEC-Energietechnik GmbH assumes no liability for consequential damage to property or persons!
- Repair work must only be accomplished by authorized companies or professional staff!

## 9. Advice for Disposal



It is prohibited to dispose the charger into the house- and residual waste removal (WEEE-Richtlinie 2002/96/EG und EAG-VO) , it must be disposed at the according collection points. For the protection of our environment please inform yourself at your communal administrative agency about your nearest disposal point.



The charger equates to the RoHS-directive 2002/95/EG, for the restriction of the use of certain hazardous substances in electrical and electronic equipment.

