

# TECHNICAL MEMO

ECAP

POLYMER

FILM

**ENERGY-C**

## AUTOMATED GUIDED VEHICLES

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>> Whether in the logistics sector, industry, in factory halls or in multi-story car parks: driverless transport vehicles (Automated Guided Vehicles, abbr. AGV) are often already an integral part of operational processes and transport usually completely autonomous loads of all kinds.

### DISADVANTAGES OF BATTERY-POWERED VEHICLES

As with many fork lifts, the required energy comes from batteries. This results in some restrictions in the practical operation of these vehicles: the required charging times prevent a continuous operation of the vehicle. Accordingly, other vehicles have to take over the work, while the system is blocked for hours at the charging station without any productivity. It therefore requires a higher number of vehicles to do the same work. After a few years, the batteries must also be replaced in order to reach their initial range again. Finally, the limited number of charge and discharge cycles of batteries should be noted.

### MODULAR VERSIONS OF LI-C CREATE A REMEDY

New technologies offer a solution here. Jianghai has been developing and producing alternatives to battery systems under the term Energy-C for years. For the AGVs, the lithium-ion capacitors (LiC) based on the technology of double-layer capacitors (EDLC) are predestined in a compact module variant. The fast-charging property of LiC technology is the key argument here.

Similar to double-layer capacitors, LiC modules can be charged in a few seconds to minutes. In operation, the vehicles can work almost continuously without any significant interruption. During the short stops of the AGV for loading and unloading, the LiC modules are charged with energy for the next trip. A practical example compares the properties of a battery and LiC module:

	BATTERIE	ENERGY-C
CONSTRUCTION	2 x 12V 75 Ah in series	6 x 5000F in series
RATED VOLTAGE	24V	24V
EFFECTIVE STORAGE ENERGY	1.800Wh	40Wh
RANGE	6 - 8h	700 meters (ca. 12 min)
CHARGE TIME	ca. 4h	<2min
VOLUME	16l	5l
WEIGHT	53kg	4,4kg (in future 2kg)
NUMBER OF CYCLES	~1000 cycles	>500.000 cycles

### DIFFERENT USE CONCEPTS AND HIGHEST SECURITY REQUIREMENTS

Jianghai offers Energy-C modules for any vehicle size and performance. The individual adaptation of the modules to the



**ALL ADVANTAGES OF Li-C OPERATED AGV:**

- ✓ CHARGES IN UNDER 2 MINUTES
- ✓ LOWER VOLUME
- ✓ MORE THAN 500,000 CYCLES
- ✓ LESS WEIGHT
- ✓ LOW MAINTENANCE AND SAFE

respective task allows the realization of a wide variety of vehicle and usage concepts. Whether many short distances or a few medium distances, suitable modules can be put together for each application.

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The advantage is obvious: reduction of the number of necessary vehicles (cost, space and effectiveness), maintenance-free use while avoiding battery replacement, enhanced safety, better sustainability by avoiding large quantities of raw materials and increased reliability. ■

**AUTHOR**



**Alexander Schedlock** completed his state examination at the Heinrich Hertz Vocational College in Düsseldorf as state-certified Technician specialized in electrical engineering. After successfully completing his training as an IT system electronics technician

(2010), he worked as a service technician in the field and was thus able to gain experience with end devices for various applications. As a part-time job, he studied for four years at the technical college for electrical engineering and successfully completed his state technical school exam in 2017. Since 2018 he has been working in the sales team of Jianghai Europe Electronic Components GmbH as Technical Sales Manager and looks after customers across Europe with technical designs. Mr. Schedlock is the contact person for the Energy Capacitors division.

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