



POWER MODULE 24M8000

PURPOSE

Power module 24M8000 is intended to feed electric starter of the internal combustion engine (ICE) with working volume 10÷20 L.

ADVANTAGES

- Usable power increases at sub-zero conditions which guarantees a reliable start at winter.
- The module ensure “gentle” switch-on of the starter which greatly reduces mechanical stress and increases starter’s lifetime tenfold.
- There is no need for replacement, maintenance or repairs of the modules during the entire ICE lifetime.
- They allow to reduce the volume of lead-acid batteries by a factor of three while doubling their lifetime.

MODE OF FUNCTIONING

The module (Fig. 1) contains a supercapacitor, a DC/DC converter and a controller. The supercapacitor acts as an electric power storage. As opposed to the accumulator, the supercapacitor is not a chemical source of the current and it provides more power while being smaller and lighter.

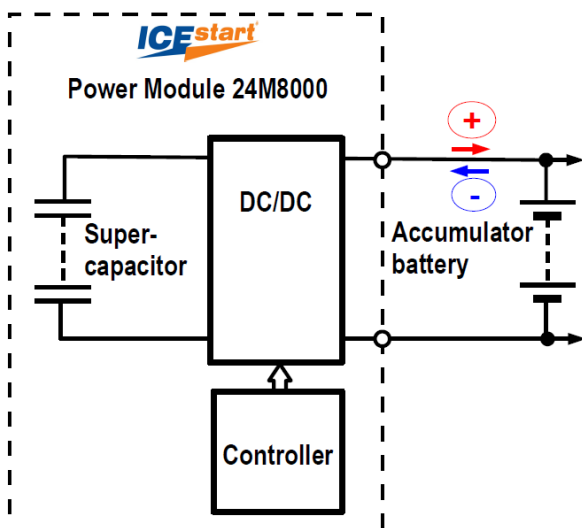


Fig. 1 Functional Block Diagram

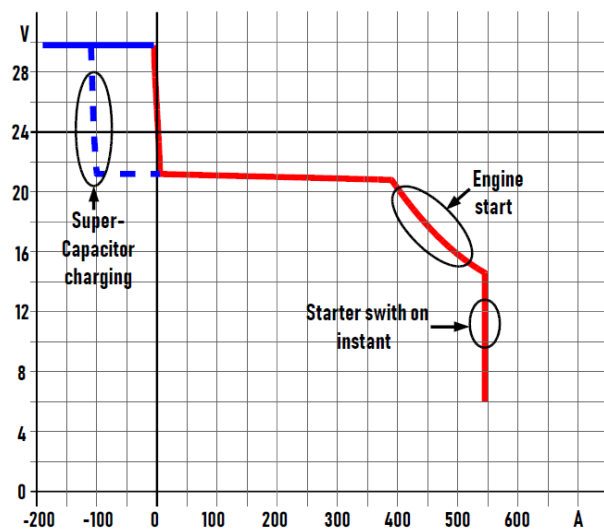


Fig. 2 I-V curve

The voltage of the supercapacitor changes as it is being charged or discharged. DC/DC converter maintains necessary voltage and current at the outputs regardless of those changes.

Digital controller regulates DC/DC converter's operating modes, so the module is a smart energy storage.

The I-V curve of the module (Fig. 2) is formed in a way that improves module's performance:

- Supercapacitor charge mode corresponds to the part of I-V curve with module's negative current (current direction is shown in Fig. 1 as a blue arrow). Duration of charge is 7÷15 seconds. When charge finishes the current becomes equal null - the module is ready for ICE start;
- While the starter is switched on, the module's current is positive (the direction of the current is shown in fig. 1 as the red arrow). The current is set in a way that does not overload the starter but is enough to provide dynamic cranking.
- The start of the engine runs on the part of the I-V curve which corresponds to maximum usable power. Joint discharge of the accumulator and the capacitor provides cranking torque of starter enough for a reliable start.
- The module allows to use widespread and cheap accumulator batteries of 60A*h capacity instead of usual accumulators of 180A*h capacity. Hereby accumulators operation mode is easier because more than 70% of energy is supplied by the module during the ICE cranking.

CHARACTERISTICS

- Rated voltage, V _____ 24
- Maximum usable power, W _____ 8 000
- Current at the switch-on instant, A _____ 540
- Energy capacity, J _____ 48 000
- Operating ambient temperature, °C _____ -50÷+60
- Dimensions, mm _____ 350*175*190
- Weight, kg _____ 8
- Protection class (MEK 529) _____ IP65
- Maintenance and repair _____ not required
- Cycle Life _____ 1 000 000

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