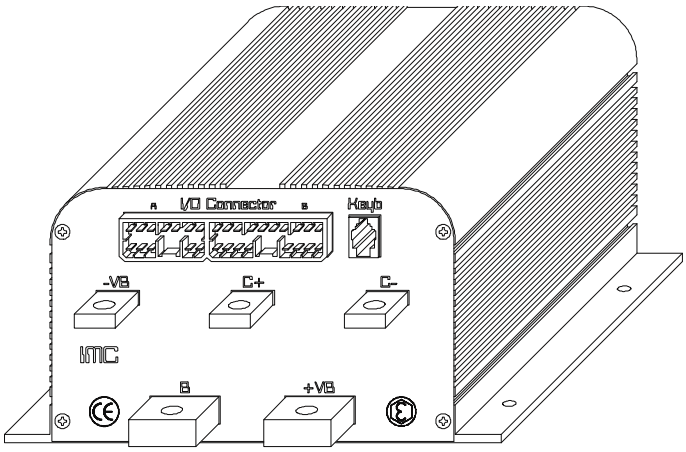
INTELLIGENT MOSFET CHOPPER "IMC"



OPEN SYSTEM

The new line of control units manufactured by ELEKTROSISTEM has been designed according to recent developments, that have led to the application of the microprocessor in every sector of electronics. The chopper implemented by ELEKTROSISTEM is not only a microprocessor aided chopper, but a real control equipment representing the new generation of DC control systems.

The basic principle of this unit is to be found in the so-called "OPEN SYSTEM", that is a system with a variable configuration composed of 1 up to 3 elements:

- Traction controller type IMC T
- Pump controller type IMC P
- Graphic display type IGS

Each element can be connected with the other components of the "chain" through a double-wire serial line, to allow an interchange of data and functioning synchronism. These units have been devised and configurated to interact among them to create an "open system", but at the same time are independent and can work even if not connected to the other elements of the new intelligent line created by ELEKTROSISTEM.

VERSATILITY

The most important advantage coming from the use of a microprocessor aided logic is the possibility to control on the same HARDWARE different functions , that can be rapidly adjusted for special applications.

The IMC chopper can be used with series excited motors with 2 or 4 terminals, braking may be modulated by running controls and may be regenerative (only for motors with 4 terminals) or reverse current.

The model IMC POWER 2 has been specially conceived to control 2 series excited motors with the function of "electronic differential" as it is provided with an input for position absolute encoder or potentiometer to determine the position of steering wheels. According to the measured steering angle, the chopper can decrease the power supplied to the motor controlling the internal wheel of the vehicle and even reverse its rotation, for reduced bending radius.

The accelerator potentiometer is available with 2 or 3 wires, with a value included from 1 and 10 Kohm. The potentiometer adjustment is "read" and permanently recorded by the logic microprocessor. This avoids long and complicated setting operations and those problems concerned with non-perfectly centered potentiometers.

Moreover, the IMC chopper is able to control the motor speed through a speedometer dynamo or a pulses rev. transducer.

SAFETY AND RELIABILITY

The "IMC" has been specially designed by ELEKTROSISTEM's electronic engineers to offer the operator safety working conditions and to avoid the immediate stop of the vehicle in case of temporary anomaly. This has so far represented quite a hindrance, inducing the operator to prefer a "stupid system".

The intelligent chopper IMC is equipped with a logic that constantly checks the internal power section as well as external actuators. In this way the chopper running is stopped only in case of events that may be dangerous for the operator's safety (i.e. MOSFET short circuit, control potentiometer blocked at max. value, etc.). On the contrary, in case of "not serious" anomalies (short circuit or damage of the coil of a weakening field contactor, that could only limit the max. speed of the motor) the logic signals the irregularity on the IGS display or by means of an intermittent led.

Many other inputs are available for further safety signals, including:

- operator presence on the vehicle
- dead man function
- speed reduction (ex. to slow down running with forks up)
- hand brake.

The safety system is moreover integrated with a series of protections:

- proportional control of the max. current, when the heatsink reaches 70°C
- protection against short circuit of contactor drivers
- protection against motor overload or short circuit
- protection against polarity reversal by means of an external contactor.

SIMPLE FUNCTIONING

The IMC control unit has been devised to completely interact with the graphic display type IGS to offer the operator a complete understanding of the system functioning. Processes, numerical data and possible anomalies are visualised and explained through the IGS display, which combines three important elements:

- simple functioning (no numerical codes to understand how the system operates)
- exhaustive information (in the desired language)
- synthesis.

TECHNOLOGY

The IMC chopper has been designed and built with high technology components, such as high voltage and high current MOSFETs, high frequency switching diodes able to stand 100% overloads, filter capacitors for high current and temperature. All components are assembled inside a strong specially shaped aluminium case allowing a rapid heat disposal.

Every single electronic component is automatically tested by a computer aided device (Automatic Test Equipment) to check the quality of the finished product before the power test.

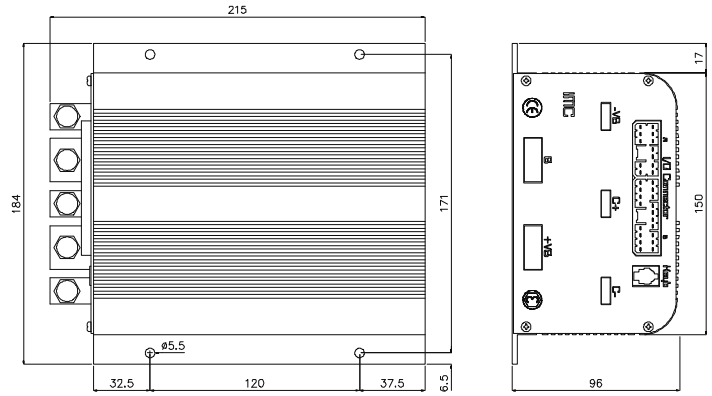
GENERAL FEATURES

- Parameters adjustment by keyboard
- Safety code to enter adjusting function
- Possibility to program more units with the same adjusting parameters
- Hour meter and battery charge control inside the logic or synchronized with the IGS display (if present)
- Automatic recording of working hours and conditions of the vehicle in case of breakdowns, for a simple anomaly diagnosis
- Malfunctioning file
- Real time chopper monitoring (only with IGS display)
- Possibility to drive the vehicle by means of remote controls
- Control of up to 5 contactors with programmable functions for the model with a single motor:
  - Forward running function
  - Backward running function
  - Regenerative braking or line function
  - Field weakening or bypass function
  - 2nd field weakening function or activation of the hydraulic steering motor
- Control of up to 6 contactors with programmable functions for the model POWER 2, i.e. with 2 motors:
  - LH Forward running function
  - LH Backward running function
  - RH Forward running function
  - RH Backward running function
  - Regenerative braking function
  - Contactor for field weakening or activation of the hydraulic steering motor
- Electrically insulated case
- Retroaction of the motor speed by means of a speedometer dynamo or a proximity sensor

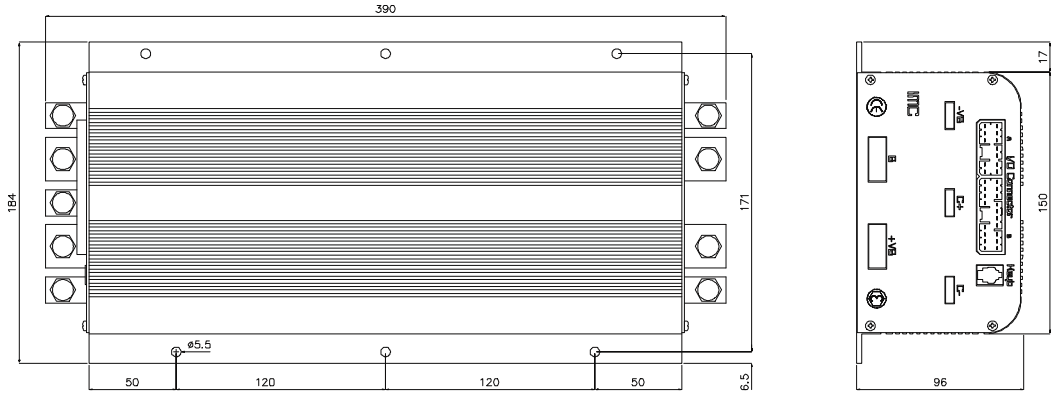
TECHNICAL SPECIFICATIONS

Rated current	400A - 600A - 800A - 1000A
Multivoltage	from 24 to 80V or from 96 to 144V (-33% +20%)
Operation frequency	15800 Hz
Max. ambient temperature	-20 +40°C
Relative humidity at 25°C	90%
Thermal limiter action	from 70 to 80 °C

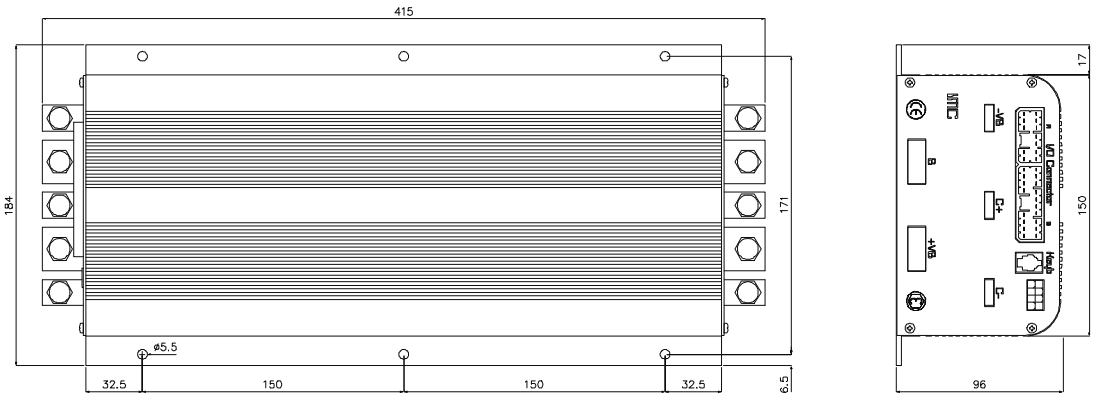
MODELS, SIZE AND FIXING HOLES



IMC	400 A	600 A
24 / 80 V	IMC 40	IMC 60
96 / 144 V	IMC 41	IMC 61



IMC 100	800 A	1000 A
24 / 80 V	IMC 80	IMC 100
96 / 144 V	IMC 81	IMC 101



IMC POWER2	400 + 400 A	600 + 600 A
24 / 80 V	IMC 40 POWER2	IMC 60 POWER2
96 / 144 V	IMC 41 POWER2	/