



METERING

ECOModule NG

Enenergy Calculation Function and Data Handling System for railways application

ECOModule NG is an Energy Measurement System and Data Handling System compliant with the requirements of the reference standard EN50463:2017.

Through 6 analog input ECOModule receives current and voltage data from the external sensors. The values received are used to calculate energy following the requirements of the reference standards. Energy calculated is combined with the time and localisation data to create and store Compiled Energy Billing Data (CEBD). ECOModule NG is also able to send CEBD files to the ground server DCS by means of either the internal 4G mobile module or by the train router.

The ECOModule implements mechanisms of protection and security able to ensure both the integrity of the transmitted data to ground system and the management of data loss due to lack of connectivity.



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Characteristics

Mechanical Characteristics	Value	Reference	
Weight	< 3,200 kg		
Fire and smoke class	HL3	EN45545-2	
Protection class	IP 50	EN60529	
Insulation Coordination	Value	Reference	
Over Voltage Degree	OV2	EN 50124-1	
Pollution degree	PD2		
Analog input channels insulation	500 Vdc	EN 50155	
Analog input channels voltage withstands	500 Vac at 50Hz		
Auxiliary Power Supply	Value	Reference	
Nominal supply voltage	24÷110 Vdc		
Power supply interruptions	Class S2	EN50155	
Power supply change over	Class C2		
Power consumption	<10W		
Environmental Conditions	Value	Reference	
Ambient temperature	OT4 range	EN 50155 EN 50125-1	
Temperature yearly average	45°C		
Temperature variation	±3°C/s		
Altitude	Class AX - Up to 1800 m	EN50125	
Average yearly relative humidity	h<75%	EN 50125-1	
Continuous relative humidity	30 days 75% < h < 95%		
Absolute maximum humidity	30 g/m3		
Shocks and vibrations	Cat. 1 – Class B	EN 61373	
EMC, Conducted or radiated interference immunity	EN 50121-3-2		
EMC, Emitted radio frequency interference			
Electrical Characteristics	Sensor Output Nominal Range DC	Sensor Output Nominal Range AC	Reference
Analog Input 1	25 ÷ 75 mA	25 ÷ 55 mArms	
Analog Input 2	50 ÷ 155 mA	50 ÷ 110 mArms	
Analog Input 3	0,5 ÷ 1,55 A	0,5 ÷ 1,1 Arms	
Analog Input 4	0,5 ÷ 1,55 A	0,5 ÷ 1,1 Arms	
Analog Input 5	30 ÷ 260 V	30 ÷ 205 Vrms	
Analog Input 6	2,5 ÷ 7,89 A	2,5 ÷ 5,6 Arms	
ECF Accuracy Class	0,5 R		EN50463

Inputs/Output

Digital Input

ECOModule provide 2 digital inputs at battery voltage. One digital input is used as shut down command. The shutdown command should remain active until the power supply cut-off. The power supply cut-off should occur not before 60 seconds from the shut down command. The shutdown command level is high when activated.

DHS to Ground Communication

Through an internal 4G GSM module or the train Mobile Router, the ECOModule NG sends information about either voltage, current, energy and timestamps to single or multiple ground server DCS such as Microelettrica ECOLogic NG.

GPS - GNSS Receiver

The ECOModule is equipped with one GNSS (GPS+GLONASS) receiver that can be integrated on public mobile module (when installed) or constituted by a separate receiver. In both cases, the GPS data are acquired by the CPU in NMEA format and can be made available on the various communication ports. The ECOModule is designed to allow an easy upgrade to in-coming location technologies such as the European Galileo and Beidou system.

Ethernet Communication

Two Ethernet communication ports are available and dedicated to the data transfer with the TCMS and for maintenance and diagnostic purpose. Communication protocol with TCMS must be defined according with the Customer.

Relay and Solid-State Digital Output

ECOModule provide two solid state digital output with MOSFET technology and one relay digital output. The relay digital output is used as fault detection. Relay is driven in safety way, it means that when is driven the system is in "no error condition", when is not driven is in "fault condition".

RS485/RS232 Serial Communication (Optional)

The serial communication interface is used to communicate to TCMS, the messages must be defined according with the Customer.

CAN Communication (Optional)

The Can interface is used to communicate with TCMS, the messages must be defined according with the Customer.

MVB Communication (Optional)

The MVB interface is used to communicate with TCMS, the messages must be defined according with the Customer.

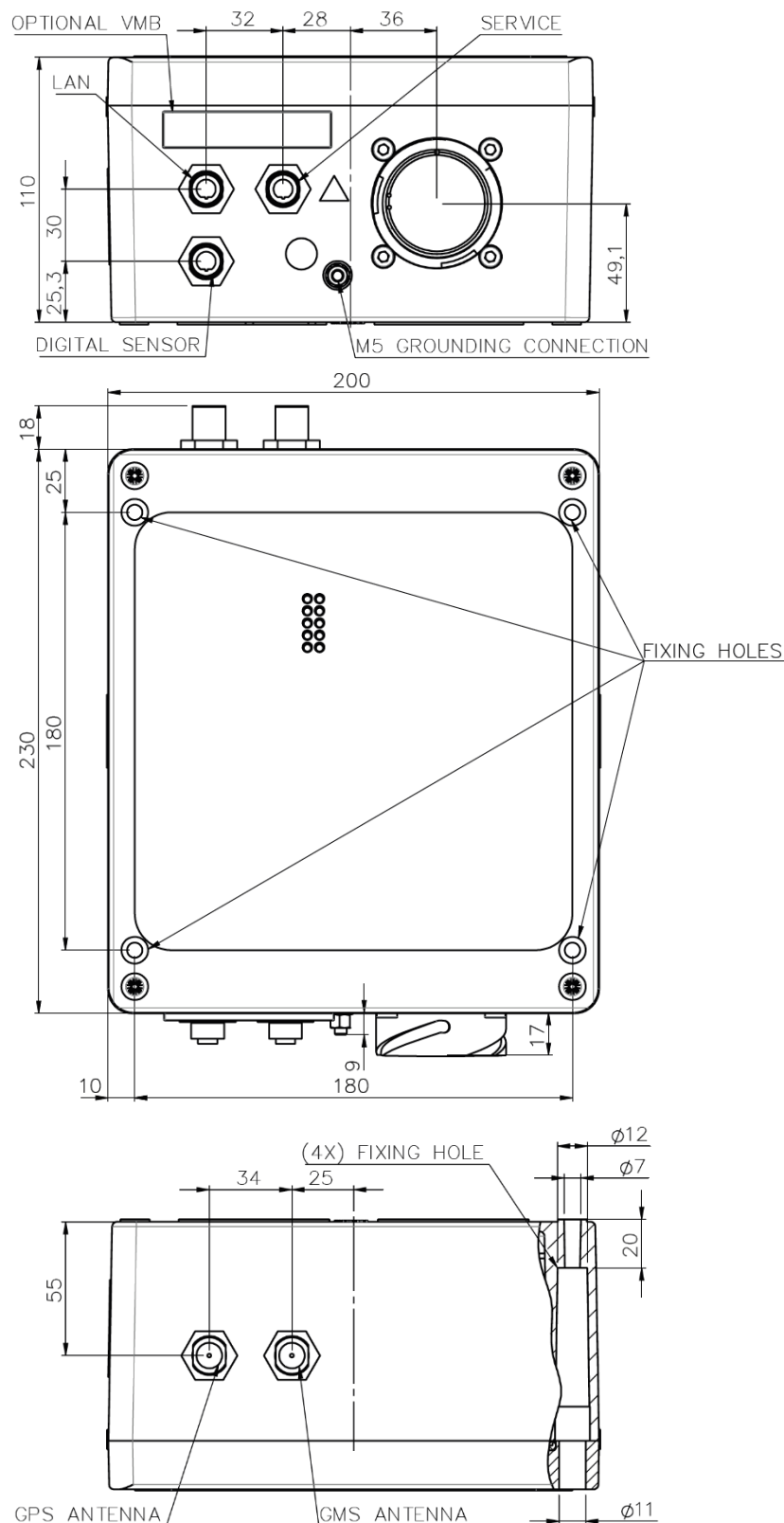
Wi-Fi Interface (Option)

The ECOModule is equipped with one WIFI interface compliant to 802.11/b/g/n standard that can operate in client or access point mode (with up to 8 client). The module is connected to the CPU through a dedicated SDIO channel and therefore is not physically directly connected to the Ethernet interfaces. The Linux-based application installed on the CPU can perform the functions of Bridge or Router NAT3 (with port forwarding for incoming traffic) between the WIFI network and the Ethernet interfaces with appropriate criteria for traffic management and firewall.

USB Interface (Option)

The ECOModule is equipped with one external 2.0 USB interface with Host and device capability to support USB keys for temporary storage or data exchange and USB maintenance interface for debug purposes.

Dimension



For further technical information on our products visit www.microelettrica.com

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