METERING

ECOBox

TCMS Interface for railways application

ECOBox is a device with functions interfaced with the ECOMeter sensor family to receive real time voltage and current measurements and convert to requested analogue signal to interface with traction control unit and other train system. The one-way communication between the ECOMeter and the ECOBox is by optical fibre and by high-speed serial electrical interface.

ECOBox can also provide the following functions that are obtained in bundle with the ECOMeter:

- Catenary detection
- Short circuit detection
- Harmonics detection
- Analog output ripple detection

Key features of the device are high accuracy, slow time delay of provided data information, flexibility in configure the output signals and easy integration.

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Characteristics

Mechanical Characteristics	Value	Reference
Weight	< 4,000 kg	
Fire and smoke class	HL3	EN45545-2
Protection class	IP 50 (IP55 optional)	EN60529
Insulation Coordination	**Value**	**Reference**
Over Voltage Degree	OV3	EN 50124-1
Pollution degree	PD3	
Auxiliary Power Supply	**Value**	**Reference**
Nominal supply voltage	24÷110 Vdc	
Power supply interruptions	Class S3	EN50155
Power supply change over	Class C2	
Power consumption	< 12 W	
Rated current (@ 24V and @ 25°C)	0,25 A	
Inrush current (@ 24V and @ 25°C)	6,3 A peak (over rated current for 20 ms)	
Environmental Conditions	**Value**	**Reference**
Ambient temperature	OT4	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

Inputs/Output

Ethernet Communication

One Ethernet communication ports is available and dedicated to the data transfer to the train communication network and diagnostic purpose. Mechanisms of protection and security can be applied to ensure both the integrity and the management of data transmitted over the line. Data exchange with TCMS is foreseen according to protocol specification to be defined.

Optical Fibre - High Speed Serial Communication

One optical fibre and one serial "digital sensor" at RS485 communication level are available to interface the ECOBox with the ECOMeter. Optical fibre and digital sensor can be used both together or independently. The maximum cable length allowed in case of RS485 communication is 4m.

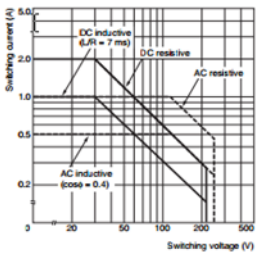
Relay Digital Output

The ECOBox provide 6 relays output fully configurable to let available the detected catenary types and for example overcurrent or harmonic detection. The following figure shows the main characteristics of the used relays.

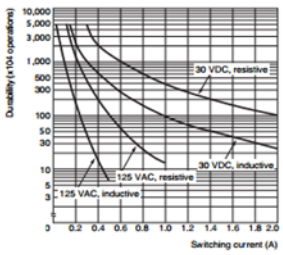
●Contacts

Load / Item	Resistive load	Inductive load (cosϕ = 0.4; L/R = 7 ms)
Contact type	Bifurcated crossbar	
Contact material	Ag (Au-Alloy) contact	
Rated load	0.5 A at 125 VAC; 2 A at 30 VDC	0.3 A at 125 VAC; 1 A at 30 VDC
Rated carry current	3 A	
Max. switching voltage	250 VAC, 220 VDC	
Max. switching current	2 A	1 A

●Maximum Switching Power



●Durability



Current Analogue Output

Characteristic description	Values / remarks
Number of Current Analogue Outputs	4 independent channels
Maximum Output Current	50 mA peak
Load resistance for current output	100 Ω maximum for output 0÷50mA
Accuracy Class	0,5 (Max Error < ±0,5 % at full scale – 0,5R following EN50463 available as option)
Bandwidth	Up to 10kHz

Specific Application Requirements

Catenary Detection

ECOBox can detect the catenary connected to the ECOMeter and provide feedback through the digital outputs and eventually also by Ethernet communication through TRDP protocol.

Overcurrent Detection

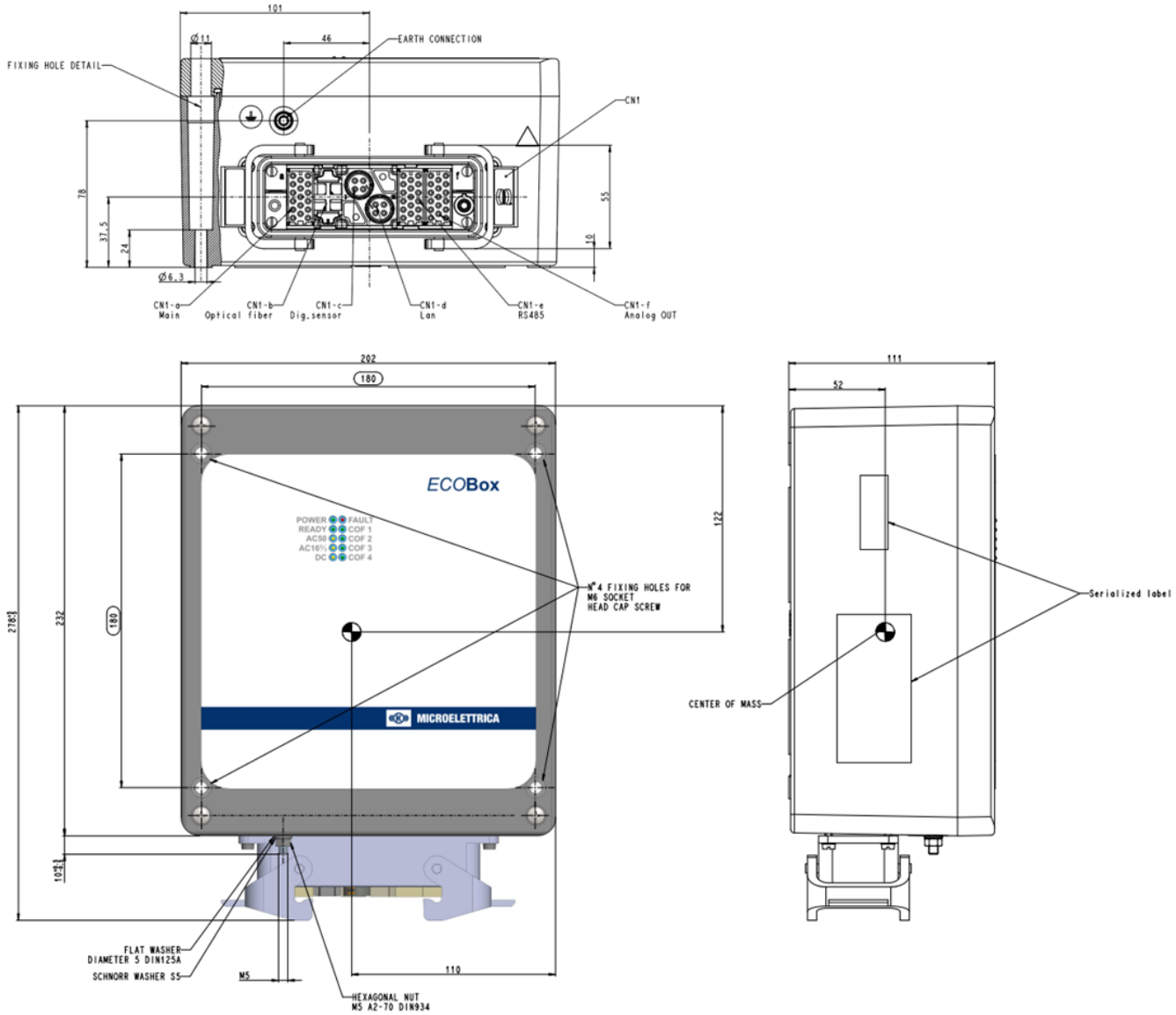
The overcurrent can be detected by the ECOBox with the following options:

- AC/DC Fast Overcurrent Detection – Useful to drive the train VCB in case of short-circuit
- AC/DC Slow Overcurrent Detection – Useful to protect the system against overloads

Harmonic Detection

Harmonic detection function is one of the main features of the ECOBox, different software filter can be implemented with order up to 8th to detect the harmonics according to the specific national standards.

Dimension



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