OSIRIS™ POWERMETER

Measuring made for E-mobility

feel evolution

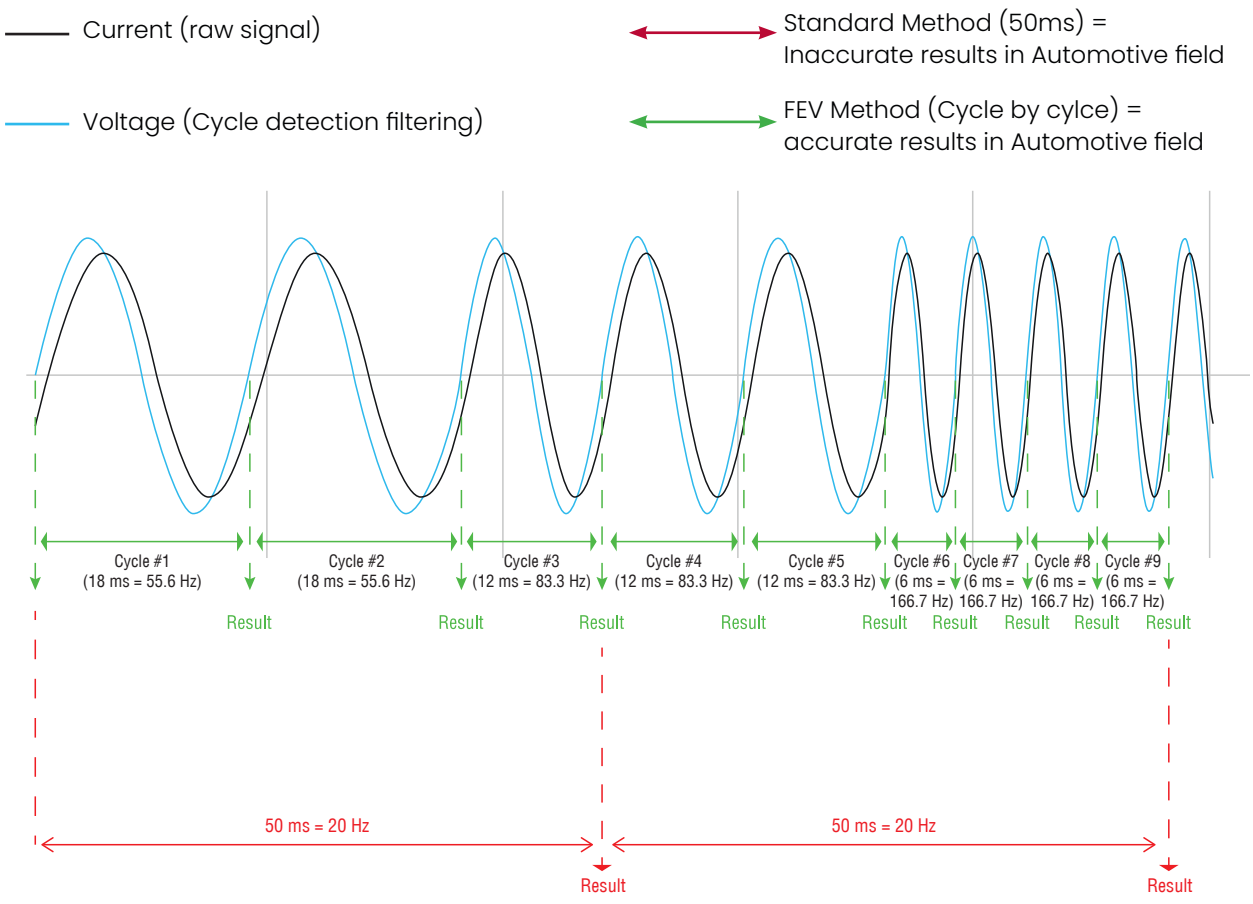
A fast data acquisition system dedicated to E-mobility applications

Measuring transient effects on e-motor

The standard powermeters on the market were originally designed to measure an electrical signal with a fixed frequency – like in a domestic network – with great accuracy. In an electric vehicle being driven at different speeds, new constraints appear as a vehicle on the road will necessarily have to accelerate, brake and stop. To fully develop and validate an electrical propulsion system, it is important that not one element of the various transient phenomena is lost, including those which take place within each rotation of the motor.

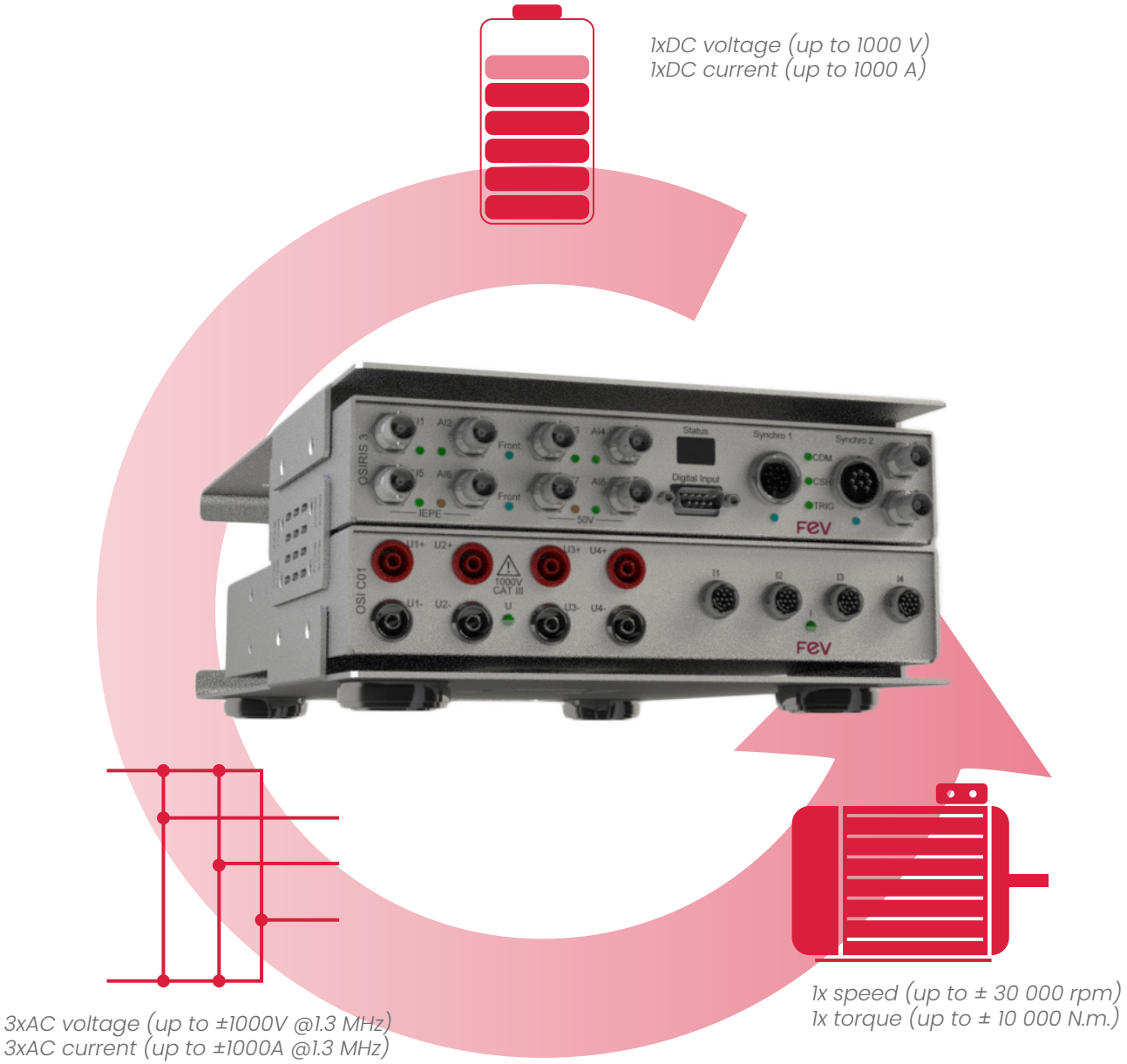
This is why FEV created the OSIRIS™ Powermeter to achieve. In the OSIRIS™, the signal is processed so as to calculate and record at the same frequency as the motor's electrical signal: the signal is therefore recorded regardless of the motor's speed of rotation, rather than over a fixed period of time. This allows calculations to be made not only statically at a fixed speed but also, and most importantly, in transition at variable speeds.

Differences between FEV method and standard method on e-motor measurement analysis



Measuring global E-Powertrain output

The OSIRIS™ Powermeter takes measurements at different points of the powertrain as demanded by each UUT (Unit Under Test): for example, fixed frequency measurements (50 Hz) at the battery output, or measurements adapted to the 1 Hz to 10 kHz cycle at the inverter output. The OSIRIS™ Powermeter takes the behaviour of each UUT into account.
However, it is also able to measure mechanical values (torque; speed) within each motor rotation cycle at the motor output. Because, of course, what really needs to be measured on a powertrain, if not the efficiency of each of its elements? After all, if the torque and speed are not measured at the output, how can the overall efficiency of the system be calculated?



Different measuring points in OSIRIS™ Powermeter, electric motor torque and speed included.

Why does the OSIRIS™ Powermeter take measurements during each electric or motor cycle? Because FEV understands the end requirements, and has been developing and testing motors in its own test centres for over 40 years: e-motor and e-axle test benches in its 8 test centers, 70 battery test benches with climate chambers (some of which are installed in the largest high-voltage battery test center in the world), and 150 traditional test benches.

With fev solution boost your electric revolution

Automitive challenges...

“How can the unit cost of the tests and the overall cost across the entire test center be reduced?”

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“With such a complex chain of measurements, how can a loss of measurement accuracy be avoided?”

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“How can accurate measurements be taken, despite electromagnetic disturbances in the test cell?”

By benefiting from a flexible system which:
- is easy to move from one test bench to another, as it is so compact (2U, half 19” in the standard version).
- can be used either on a vehicle with a portable PC or in a test bench with an industrial PC.
- covers all requirements from 48 to 1000 V, and measurements on three-phase or six-phase motors by coupling two systems.

By calibrating the entire measurement chain, including the sensors.

By positioning the measurement modules as close as possible to the UUT (Unit Under Test) with a Gigabit Ethernet link to the control room, then performing the calculations in a unit connected by USB3 to the MORPHEE automation system or to the OSIRIS™ software linked by D-Com to another available automation system.

In test bench...

...FEV solution

... as in vehicle.

Available results	
DC	Power DC 1 (kW)
	I Average DC 1 (A)
	I Max DC 1 (A)
	I Min DC 1 (A)
	U Average DC 1 (V)
	U Max DC 1 (V)
	U Min DC 1 (V)
AC	Frequency (Hz)
	Sum of Actives powers (kW)
	I RMS per phase (A)
	U RMS per phase (V)
	Active Power per phase (kW)
	Reactive Power per phase (kVAR)
	Apparent power per phase (kVA)
	Power Factor per phase
	Phi per phase (°)
	I Crest Factor per phase
	U Crest Factor per phase
	I Max Peak per phase (A)
	U Max Peak per phase (V)

Technical features

OSIRIS™ POWERMETER covers all the usual functioninalities of a wattmeter and fits all types of application: e-motor, e-axle, inverter and battery. It performs in real time the usual power measurement calculations used to evaluate the performances at output of converters, and electric motors, such as active power, apparent power, reactive power and the power factor. Whether on board or in a bench, OSIRIS™ can retrieve all the power measurements necessary for the development of your BEV, PHEV and MHEV.

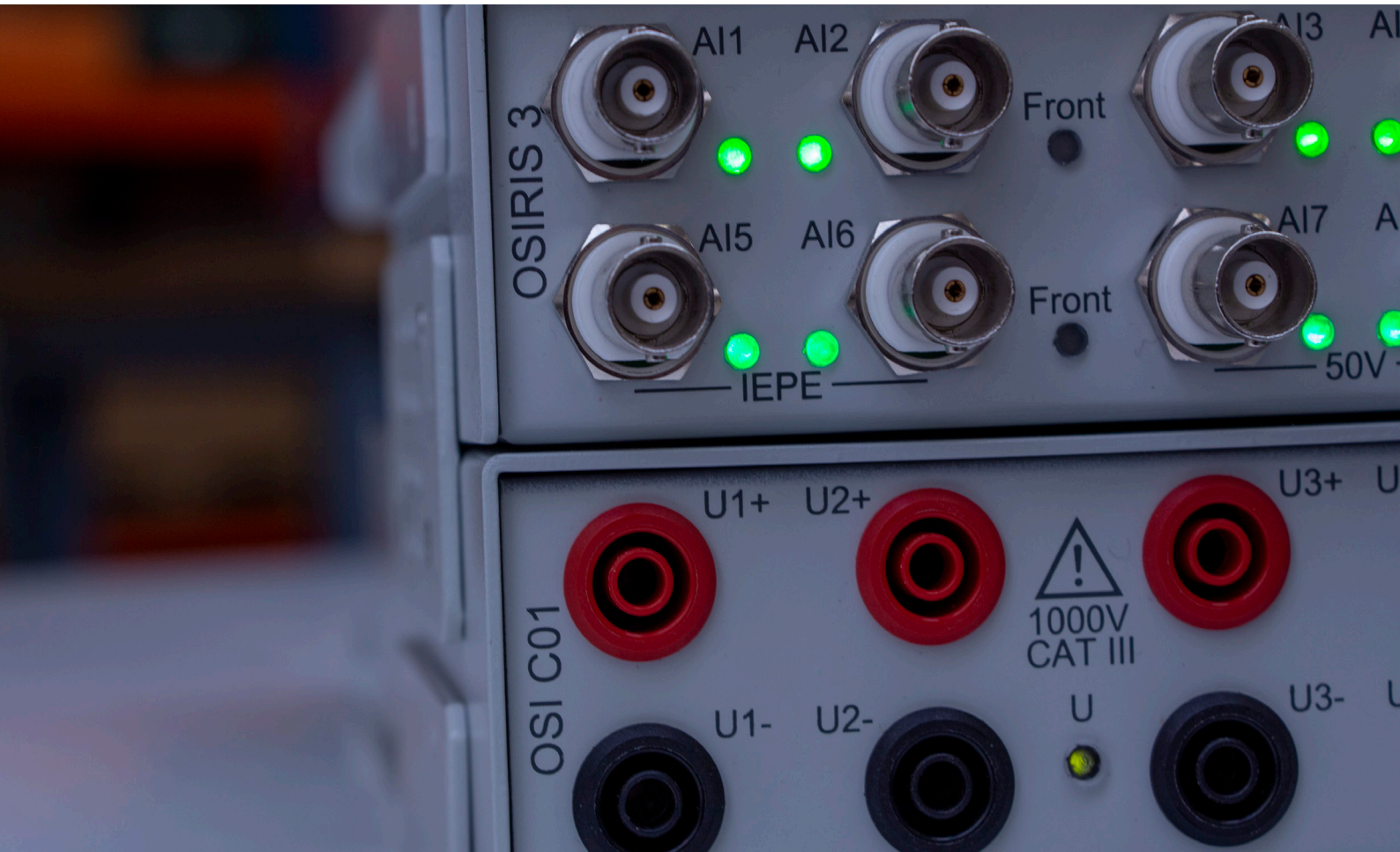
With FEV solutions, boost your electric revolution!

Also, OSIRIS™ can still be used as a Combustion Analysis System by just using the appropriate conditioning FEV charge amplifier, ACPM module, pressure sensors and FEV Combustion software, that allows to optimize its usage and the budget of testing devices.

Measurement	
Voltage	4 inputs (ADC 18 bits) › Range: Up to 1000V (AC/DC) › Accuracy: DC 0.06% FS › [50Hz…1kHz] 0.07% FS › [1kHz…10kHz] 0.5% FS
Current*	4 inputs (ADC 18 bits) › Range: Up to 1000A (AC/DC) › Accuracy: DC 0.004% FS › [50Hz…1kHz] 0.019% FS › [1kHz…10kHz] 0.6% FS
Speed	1 encoder input (LVDS, TTL or RS422) › Range: from -30 000 nm to 30 000 nm
Torque	1 sensor input (HTTL or analog) › Range: from -10 000 nm to 10 000 nm

E-motor	Speed (rpm) averaged per revolution Torque (N.m) averaged per revolution
Acquisition Hardware	
PC Communication	Proprietary Ethernet Gigabit + USB 3
Daisy Chain	Up to 2 acquisition modules (18 channels)
Power supply	9…30 VDC (Support transient from 6 VDC to 48 VDC)
Consumption	60 W
Dimensions (L x h x W)	220 mm x 84 mm x 300 mm (2U, half 19”)
CEM	IEC61326-1
Operating Temperature	-40… +50 °C
Software	
Measurement mode	Time
File formats	ASCII
Graphical displays	Trends, Monitoring, Scatter,etc …
Communication	DCOM interface, INDI or AK over TCPIP and RS232

*FEV can also provides all the necessary current sensors.



Are you interested in innovative, pioneering software solutions?

Contact us!

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