

# Leading the Charge

Ensuring Compliance with Eichrecht and MID Standards in EV Metering and Charging Infrastructure



**JABIL**

RENEWABLES & ENERGY INFRASTRUCTURE

Measuring instruments — meters and related systems — provide the mechanism for accounting, analysis, and compliance demanded by today's 'smart' grid energy supply and delivery infrastructure.

Whether for utility services or the electric vehicle (EV) charging ecosystem, enhanced precision, accuracy and trackability are all must haves.

Public EV chargers, for example, need to be able to accurately measure the amount of electricity they have delivered to an electric car to ensure they invoice the correct amount. Accurate, transparent pricing — delivered securely — is a minimum requirement and elemental to the industry's continued growth.

Regardless of the product or service being marketed, customers want to know exactly what they're paying before they can trust the company that sells it to them. Transparency is the primary and most critical goal for instilling that trust across the end-user landscape.

How does a fast growing, innovation-driven industry secure this transparency?

The answer: Calibration laws.



# Europe's Robust and Comprehensive Compliance Landscape

Within Europe, Germany's regulatory structures have historically provided reference for adjacent markets. Implementations initiated within Germany, not infrequently, become adopted as standards across the continent.

This has absolutely been the case for electric mobility and energy charging regulations, with Germany's **Eichrecht** regulations establishing a benchmark for the greater EV charging infrastructure. Over the last 20 years, Eichrecht and the European Union's **Measuring Instruments Directive (MID)** have built upon each other to define today's compliance landscape.

In 2004, the MID provided an initial harmonized framework for the design and manufacture of measuring instruments across the EU to ensure accuracy and reliability in measurements.

Among the goals of MID was facilitating a common market so that measuring instruments approved in one EU country would be recognized across the entire EU, enhancing cross-border trade efficiency. The emergence of electromobility and multiple billing models for EV charging prompted a significant revision which took effect on January 1, 2015.

This iteration of **MID** ([Measuring Instruments Directive 2014/32/EU](#)) is a European regulation that aims to align various aspects of measuring instruments, ensuring their reliability and accuracy. It is applicable across a wide range of sectors such as water, gas, electricity meters, and measuring systems used for billing consumers. For electromobility applications, MID compliant charging devices are recognized internationally for consumption-based invoicing.

In Germany, the EU's MID standard is refined further via **Eichrecht** regulations (formally referenced as the "[Mess- und Eichgesetz](#)" – aka., Measurement and Calibration Law, with history dating back to 1988.)

While MID provides a broad regulatory framework applying across EU member states, Eichrecht tailors its standardization principles more specifically to the German market, focusing intensely on accuracy, transparency, and consumer trust.

Together, these regulatory frameworks represent essential pillars for guiding the measurement instrument industry towards precision, reliability, and technological advancement. Their relationship signifies a cohesive effort to align broader European standards with more localized, specific regulatory needs, ensuring a balanced, well-regulated measurement instrument market.

There are of course differences; specifically, it is important to note that complying with MID does not automatically imply compliance with Eichrecht. From a manufacturer's perspective, an optimized product development and support strategy will hinge upon staying abreast of the changing landscape as the standards evolve.

Let's survey the landscape in more detail to gain further understanding.

## MID Regulations – Bird’s Eye View

As referenced earlier, the current MID regulatory framework has been in effect less than six years and replaces the previous directive ([2004/22/EC](#)). Industries impacted by these MID Regulations include the following where metering and billing are requirements:

- Utility Meters
- Fuel Dispensers
- Weighing Instruments
- Taxi Service Meters
- Material Measures
- Dimensioning Systems

MID regulations apply to any European state member and guarantee that meters are correctly designed, manufactured, calibrated such that their measurements cannot be falsified.

MID deals with ten types of measuring instruments and makes the manufacturer responsible for compliance under the supervision of a notified body prior to initial placing on the market (distribution) and putting into use (initial start-up) within the EU, after which national law applies.

Compliance with MID involves application of strict measures starting from the design phase, including:

- Meters must comply with Class B accuracy in the measurement of energy consumption (i.e., maximum error of 1% in the measurement of active energy.)
- Meters must be correctly calibrated at the factory.
- Meters must be sealed/sealable, assuring that configuration parameters established during installation have not been changed.
- Meter manufacturing sites must be certified for the calibration of such equipment.

Additionally, metrology equipment must comply with very specific working conditions, including working temperature, mechanical characteristics, and electromagnetic environments. For example, regarding temperature parameters, four possible conditions are defined: from 5°C to 30°C, from -10°C to 40°C, from -25°C to 55°C, from -40°C to 70°C.

Each counter must be within one of these subsets and measurements valid only within this range. In other words, a charger with a counter with a range -25 to 55°C will only have valid values within that range. In the event temperature is 60°C, the measured value will not be valid.

For total compatibility with MID, there must be regulatory marking for meter traceability with the following printed entries:

- CE mark / metrology mark with the last two digits of the year [a box with an M and the number of the year of manufacture.]
- Registration number of the notified body and manufacturer’s name and product reference, i.e., the meter’s serial number.
- Number of the preliminary or product type test certificate
- In addition to these markings, a declaration of conformity is enclosed with each product sold. This is frequently included in the operating instructions.



# The Deeper Dive into *Eichrecht*

Within Europe, Eichrecht is currently the strictest calibration law. It requires charge point operators (CPOs) and electric mobility service providers (EMSPs) to ensure that their prices are “reasonable, easily and clearly comparable, transparent and non-discriminatory.”

What this means, in practice, is that EV drivers need to be able to precisely view their energy consumption and clearly understand how they have been invoiced. It also requires charging station manufacturers to go through a rigorous certification process that guarantees their hardware and software are accurately calibrated to measure electricity consumption.

## Transparency and Precision

Each charging point will now have a visible kWh measurement meter which will be registered and periodically calibrated. Charging tariffs can only be based on kWh consumption, meaning time-based and flat-rate session fees are not permitted. EV drivers can easily check the kWh reading on the display or actual kWh meter device and confirm it on their e-mobility app or web interface, ensuring clear and transparent billing processes.

In addition to calibration precision, Eichrecht also provides guidance for other variables such as the integrity and security of data, session management, (including the digital signature of the session,) storage of recharging sessions, and visualization of kWh values. All implementations must be tested by the German federal calibration authority Physikalisch-Technische Bundesanstalt (PTB) for final certification.

## Data Security

To ensure data integrity during EV charging sessions, Eichrecht has mandated the use of a unique public key. This key is used to enable secure communication between the charging station, the EV, and the central management system. This prevents unauthorized access to data, providing a secure and reliable charging experience. The public key can take the form of a QR code, allowing drivers to easily track energy consumption, time, and cost. With the use of secure signatures and encryption, charging stations can also generate invoices for drivers, providing a hassle-free and transparent billing process.

## Requirements for Charging Point Manufacturers

All public charging points that bill for energy must comply with the Eichrecht, as well as private charging points, for example ones that are used by companies for employees with company cars. The only way to sidestep Eichrecht in these instances is to give away the power or charge a flat fee for charging.

Charging point manufacturers must design their charging points following the following requirements:

- The charging point must include a calibrated MID meter.
- In the case of DC charging points (HPC), the losses inherent to the inefficiency of the AC/DC transformation should be billed per the actual energy transmitted to the vehicle. In this case, the MID meter must be DC and not AC.
- Digital signatures must be enabled.
- Private keys used for digital signature must be stored securely at the charging point and must never be separated from the hardware.
- Public keys must be visible and accessible by the user of the charging point. Keys must be displayed digitally or through a QR and not simply as a sticker or vinyl adhered to the device.
- Data displayed upon the screen must also follow the MessEG calibration standard, which requires following MID requirements.

Fulfilling this last requirement can be accommodated in a number of ways:

- Use the device's own screen.
- Add a methacrylate window, visible on the MID counter itself.
- Use a mobile app, however, this is the least viable option as it requires following calibration standards and recertifying for each software update.

# Eichrecht Regulation Summary

Stated simply, Eichrecht regulations address three crucial areas: metering, pricing, and data security with intention of assuring that charging processes have not been manipulated by third parties and comply with official requirements.

OBJECTIVE	DELIVERED BY...
ACCURACY	Meter and measuring device calibration precision
INTEGRITY	Secure, unmanipulated end-to-end transmission
AUTHENTICITY	Indisputable identification of meter / charge point
ATTRIBUTABILITY	Unambiguous customer identity assignation
AVAILABILITY	Transmission data access assurance until contractual completion



For additional information, visit [jabil.com/ev-fastcharging](https://jabil.com/ev-fastcharging)

# Importance of Partnership

Stakeholders, whether they are charging station manufacturers, charge point operators (CPOs), e-mobility service providers (EMSPs) or utility service providers, all share the same goal: interoperability and standardization. They are also asking themselves the same question:

**How do we adopt new solutions and best practices that are fully informed by regulatory criteria and aligned with the lay of the land of evolving calibration laws?**

Manufacturing partnerships and alliances will be crucial as energy storage and delivery protocols continue to evolve.



## How Jabil Supports Certification Requirements

In Europe, several Jabil factories are already certified for both MID electric meter manufacturing and Eichrecht certification. Customers can count on rigorous quality-controlled processes during production including component quality, assembly accuracy and overall functionality.

Jabil's end-to-end services and competency across markets, such as automotive, industrial, telecom and energy allow us to leverage global scale and vertically integrated capabilities to tackle opportunities where there are 'attackable' margin stacks – lowering BOM and other products costs for our customers.

Additionally, Jabil partnership delivers:

- Accelerating time to market with one-stop solutions delivering hardware, firmware, and mechanical design, plus prototyping

- Testing, validation, and verification via Jabil's global test development team
- Exceptional quality performance via Jabil QMS system ensuring quality excellence across multiple industries and segments
- Compliance with evolving standards and certifications through broad regulatory compliance experience, unmatched network depth and active participation in standards committees

For over 50 years, companies have trusted Jabil to navigate complex regulatory landscapes through exceptional program management and quality performance. From initial product design and development through certification, Jabil is ready for entry of these new charging points and MID analyzers. We are well positioned to help support your needs as this dynamic market picks up speed.

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