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MEASURING UP

Sub-metering is becoming an essential part of energy management for commercial buildings. Mike Lawrence of Havells examines the emerging issues and some opportunities for the electrical contractor.

The rising cost of electricity and a general trend to be more responsible with energy is putting pressure on commercial building owners and operators to increase the energy efficiency of their buildings. There is also a growing legislative framework which, when combined with other more short-term initiatives being put in place to lower energy use, adds up to a complex and confusing landscape for building owners and managers. Electrical contractors are in a good position to help owners and managers get to grips with this new landscape as sub-metering has emerged as a popular strategy to achieve better building performance and ultimately, lower energy bills.

Legislation

The requirements for sub metering of electricity in non-domestic buildings mandated in Part L2 of the building regulations for England and Wales have recently been mirrored by the newly introduced Scottish building standards published in October 2015.

Two important pieces of legislation to be aware of as they have implications for switch gear design and installation are Part L2 of the UK Building Regulations, and the requirement for an Energy Performance Certificate (EPC) to be issued and displayed for new buildings (or parts of) that are built, sold or rented.

The UK Building Regulations Part L2 has a requirement that energy meters should be installed in order that 90% of energy consumption can be monitored, analysed and then assigned to categories such as lighting, power, building services (such as lifts), ventilation, IT equipment etc. This requirement applies to any building greater than 500m² and to do this

effectively, installation of sub meters is recommended. For buildings with a total floor area greater than 1000m², provision should be made for automatic meter reading and data collection. The ultimate objective is to achieve energy savings of 5-10% by identifying wastage and replacing any under-performing equipment.

In addition to the above, the Electricity Act (1989), which is incorporated in the Utilities Act (2000), requires that all meters used for recharging must be of an approved type. It's now an offence to bill tenants from a non-approved meter, with maximum penalties of £1000 per metering offence.

MID

In the near future, an 'approved type' will refer to an MID approved meter. The Measuring Instruments Directive (MID) was introduced by the European Commission to promote free trade of measuring instruments throughout Europe. Any meter used for billing of electricity, must be either MID approved or approved under UK national legislation. Meters already installed, that were approved under UK national legislation prior to October 2006 may remain installed indefinitely, as long as they are measuring accurately. Any new meter manufactured and approved after October 2006 must be approved under the MID regulations. In the UK, the MID is applicable for loads up to 100kW. After October 2016 every new meter installed for billing must be MID approved. It is a criminal offence to use a non-approved meter for billing.

Installation

There has been an enthusiastic uptake of sub-metering in the UK since legislation was introduced to encourage it. This is to be applauded and it is satisfying how many are now recognising the benefits that a well-executed sub-metering installation offers. There are various approaches to installing sub-metering. In some cases all metering is provided at the in-coming main switchboard. This has the advantage of installation simplicity and there are many examples of successful sub metering installations, there are also many instances where things have not worked out so well.

Good planning is essential when carrying out a sub-metering installation as, in general, where meters are found to be not operating correctly, experience suggests that the vast majority of these issues are due to incorrect installation or commissioning. Meters can be time-consuming to install so where possible, meters should be pre-installed and ready to go as part of the distribution board design. This helps avoid the risks of getting things wrong. One of the risks of getting it wrong is that often meters can appear to be working but aren't, and unfortunately in this situation historic operating data is lost and not recoverable for the end user.

Solutions

There are a number of distribution boards on the market with integral metering to offer a neat, easy to install and cost-effective solution. An ideal, installer friendly solution, is a TPN MCB distribution board supplied with MID-approved electricity meters as standard. This type of board is particularly ideal for use in commercial buildings where the property is sub-let, and the billing of electricity is required based on kWh used by each tenant.

It is also an advantage if the meters can provide multiple communication outputs as standard, to enable simple connectivity to the majority of energy management systems. A meter that has communication options (pulse output of kWh and modbus over serial RS485) built-in ensures that common integration problems are also avoided.

In essence, the challenge for manufacturers is to focus on delivering products and solutions that minimise the amount of on-site work for the contractor, whilst at the same time, providing the end-user with improved data collection and reporting functionality. These features will be increasingly important as the market for sub-metering in the UK evolves over the next few years. In short, many future business opportunities for electrical contractors will be tied in with understanding the sub-metering and how it can deliver benefits for end users.

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