

Tenant Submetering Operations



HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Read, understand and follow the instructions before installing this product.
- Turn off all power supplying equipment before working on or inside the equipment.
- Use a properly rated voltage sensing device to confirm power is off.
DO NOT DEPEND ON THIS PRODUCT FOR VOLTAGE INDICATION
- Only install this product on insulated conductors.

Failure to follow these instructions will result in death or serious injury.

The information provided herein is intended to supplement the knowledge required of an electrician trained in high voltage installations. There is no intent to foresee all possible variables in individual situations, nor to provide all training needed to perform these tasks. The installer is ultimately responsible to assure that a particular installation will be and remain safe and operable under the specific conditions encountered.

Introduction

Many commercial buildings today have a variety of tenants with different operational requirements and power usage (watts per sq. ft.). If the building has a single master electrical meter (as is common in most buildings), the building owner must attempt to estimate sufficient lease cost per square foot to cover the additional load requirements. Frequently, this estimated cost does not sufficiently cover the building's electrical bill, leaving the owner with unallocated costs that often translate into higher costs for all the building tenants and an uncompetitive building.

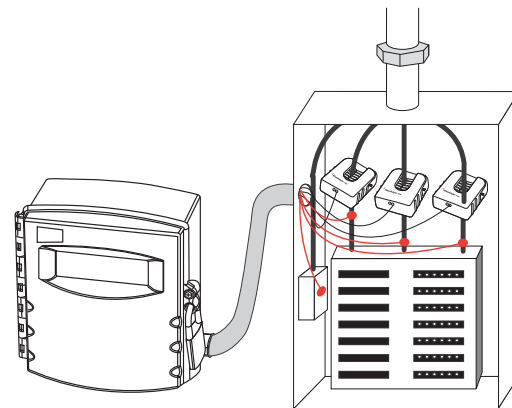
Typical examples of submetering applications include:

- High energy use tenants (computing centers, phone switches)
- Tenants with extended operating hours (restaurants, retail)
- Short-term tenants
- Apartments and condominiums
- Central heating and cooling plants for common systems

Options for recovering these costs have typically been very expensive, with rewiring and installation of a submeter by the utility as the only practical solution to billing energy costs in a fair manner. These installations can run into thousands of dollars and the payback is generally too long to be practical and, often, the owner will simply choose to absorb the unrecovered costs.

Theory of Operation for Electronic Power Meters

Electronic power meters provide a cost-effective means of monitoring multi-phase tenant energy usage using an existing building automation system with totalizing and/or analog input capability. These meters use split-core, high-accuracy current sensors to measure the current flow on each of the phases with no need for expensive rewiring. The voltage on each phase is monitored using input wiring directly into a breaker or other convenient connecting location. The instantaneous current in each phase is multiplied by the instantaneous voltage on the corresponding phase several times per cycle.



Submetering wiring example

The total power is obtained by summing the instantaneous values from each phase and converting to an industry-standard analog output for instantaneous demand (kW). This same calculated value is summed over time to provide a pulse output with a predetermined kWh value per pulse. If one or both of these outputs is connected to a DDC or other automation panel, highly accurate power consumption information is available to the building owner.

The automation system can track both the instantaneous power usage and the total consumption for one or more tenants and provide an output report to indicate the total usage for any time period determined by the owner. This report can be used to generate an additional billing for the tenant based on actual energy usage.

If the owner wants to establish a fixed cost per square foot for off-time usage (weekends, etc.) as well as measuring power usage on the central plant (chillers, pumps, etc.), then the owner can install meters on the central plant equipment only and measure the actual power usage to establish an additional billing cost for the tenant which accurately reflects cooling load.