Basics of Meter Mounting Equipment
A quickSTEP Online Course

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Welcome to Basics of Meter Mounting Equipment. This course covers the following topics:

Chapter 1 - Introduction
- Overview
- Socket Terminology

Chapter 2 – Meter Sockets
- Single & Gang Sockets

Chapter 3 – Meter Combos
- Combo Types

Chapter 4 – Multi-Family Metering
- Ratings
- Uni-Pak Metering
- Power Mod

Final Exam

If you do not have an understanding of basic electrical concepts, you should complete Basics of Electricity before attempting this course.
Course Objectives

Upon completion of this course you will be able to…

• List and describe the main components of a single-position meter socket
• Describe the advantage of a side wire meter socket design for an underground feed application
• Explain why a bypass is sometimes needed and list the types of bypasses available
• Describe important characteristics of Siemens residential and commercial meter sockets
• Explain the difference between a transformer rated meter socket and a K-Base meter socket
• Explain the difference between a meter main and a meter load center combination
• Explain what the term EUSERC means
• Explain the difference between an overcurrent protection device’s continuous current rating and its interrupting rating
• Explain the difference between the full rating method and the series rating method for overcurrent protection
• Describe the key features of Uni-Pak metering
• Describe how features of Siemens Power Mod Modular Metering simplify installation
• List and describe the types of modules available for Siemens Power Mod with QuickSystem
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Power is generated at a power plant and stepped up to a high transmission voltage. As a local substation, power is stepped down to a lower distribution voltage.

When the power reaches its final destination at a residential customer, the voltage is stepped down to 240 volts. Only single-phase power is used in a typical residential application.
The most common supply system used in U.S. residential applications today is a single-phase, three-wire supply system.

In this system, the voltage between either hot wire and neutral is 120 volts and the voltage between the two hot wires is 240 volts.

The 120-volt supply is used for general-purpose receptacles and lighting. The 240 volt supply is used for heating, cooling, cooking, and other high-demand loads.
While single-phase power is needed for most residential applications, three-phase power is used in many other applications.

In a three-phase system, the generator produces three voltages. Each voltage phase rises and falls at the same frequency (60 Hz in the U.S. and 50 Hz in many other countries); however, the phases are offset from each other by 120 degrees.
Three-Phase Transformers

Transformers used with three-phase power require three interconnected coils in both the primary and the secondary. These transformers can be connected in either a wye or a delta configuration. The type of transformer and the actual voltage depend on the requirements of the power company and the needs of the customer.

The accompanying illustration shows the secondary of a wye-connected transformer and the secondary of a delta-connected transformer. These are only examples of possible distribution configurations, the specific voltages and configurations vary widely depending upon the application requirements.
Power purchased from a utility company enters the house through a watt-hour meter, also referred to as a socket meter. The watt-hour meter is typically provided by the power company and is used to determine how much electricity has been consumed for billing purposes.

Watt-hour meters used in most residential applications are designed for use with single-phase power, but meters used in many commercial applications are designed for use with three-phase power.

Residential applications often use a watt-hour meter designated as self-contained (SC). SC meters are directly connected to the power source and the load.

Watt-hour meters designated as transformer rated (TR) use current transformers (CTs) and voltage transformers (also called potential transformers or PTs) to reduce the energy applied to the meter. TR meters are common in commercial applications because of the higher load current required for these applications.
Each watt-hour meter requires a meter socket to safely and securely connect it to the electrical service. Because meter designs and utility requirements vary, Siemens offers a variety of single-position and multiple-position meter sockets.

Single-position meter sockets are used for single-family homes and in some commercial applications. Multiple-position meter sockets, also called gang sockets, are used in multi-family and other commercial applications requiring two to six meters.

Requirements for meter sockets with maximum voltage ratings of 600 volts or less and continuous current ratings of 320 amps or less per socket are covered by American National Standards Institute (ANSI) standard C12.7 and UL standard 414.

Siemens markets many of its meter mounting equipment products under the brand name “Talon.”
Residential Power Distribution

From the watt-hour meter, the incoming power then goes to a load center which provides circuit control and overcurrent protection. The power is distributed from the load center to various branch circuits for lighting, appliances, and electrical outlets.
Most commonly, the load center enclosure is separate from the meter socket. In some cases, however, circuit breakers are housed in the same enclosure as the meter socket. This type of product is referred to as a meter combo.

When only a main circuit breaker is included, the device is called a meter main. If more than a few branch circuit breakers are also included, the device is called a meter load center combination.
Uni-Pak meter centers are an option for multi-family dwellings. These are self-contained systems with two to six meter compartments. Tenant main circuit breakers located in a separate compartment adjacent to each meter socket.

Power Mod with QuickSystem Modular Metering is used for multi-family dwellings or other commercial applications where more than six meters are required. As the name indicates, Power Mod incorporates modules that can be quickly combined to meet varied application requirements. Basic modules include circuit breaker mains, fusible switch mains, tap boxes, and residential and commercial meter stacks.
Chapter 1 – Introduction

This chapter covers the following topics:

- Overview
- **Socket Terminology**
A basic meter socket has five components: enclosure, lugs, neutral connections, jaws, and insulating blocks. However, other components are often added to meet application requirements.

The enclosure is simply the box and cover, which are made of galvanized steel or aluminum. Steel enclosures are painted, but aluminum enclosures may be painted or unpainted. The enclosure protects internal components and limits access to the meter and live circuit elements. Talon meter sockets have a NEMA type 3R enclosure.
The lugs connect the wire to the meter socket. Lugs may be factory or field installed and are available with single or multiple ports. Multiple port lugs allow for the use of multiple wires. Lay-in lugs are also available. Lay-in lugs are fixed and may not be changed in the field to accept other wire sizes or parallel conductors.

Stud terminals accept either lugs or compression fittings. Common uses for the studs include applications where the field wiring may be either single or parallel. Terminals may be mixed on the line and load sides. For example, a socket can have studs on the line side and lay-in lugs on the load side.
Neutral Connections

All sockets include a neutral connection. The neutral conductor serves as the current return path. The neutral conductor is connected to ground at the service entrance. This is accomplished in a meter socket by connecting the service ground and neutral conductors to the same point in the meter socket enclosure. A bonding screw at this connection point secures the ground to the interior of the meter socket enclosure. Keep in mind that neutral conductors are not connected directly to ground at any point downstream from the service entrance.

There are three types of meter socket neutral connection configurations.

- Two-connection neutrals, also called double or duplex neutrals, have one connection for the incoming conductor and one connection for the outgoing conductor.
- Three-connection points, also called triplex neutrals, have one incoming and one outgoing connection for neutral conductors and one connection for ground.
- Four-connection points, also called quad neutrals, have one incoming and one outgoing connection for neutral conductors and one incoming and one outgoing connection for ground conductors.
Jaws are connections that accept the blades of the utility meter and establish secure electrical connections between the meter and the meter socket. Some jaws have springs to increase the amount of pressure on the meter blades. An insulating block secures the lugs, jaws, and bussing to the enclosure.

A four-jaw socket is designed for a single-phase application and has one line side and one load side connection for each of the two hot wires. After the line, load, neutral, and ground connectors are installed, the meter can be plugged in.

A watt-hour meter has four blades that plug into the jaws of the meter socket. Once installed, the meter completes the circuit by providing a path for current from the line to the load.

A five-jaw socket is similar to a four-jaw socket, but also has a neutral connection for the meter. The fifth jaw can be factory or field installed. Talon products include sockets with five or more jaws to handle the full range of meter mounting requirements.
Service Conductors

A service entrance is the place where electrical service conductors enter a building. Service conductors can enter from overhead, entering the socket at the top, or from underground, entering the socket at the bottom. Sockets designed for underground service are usually wider in order to provide space for the conductors to loop around the block to the top connectors.

Combination overhead-underground sockets are designed for use with either service. A cover plate for openings at the top of the socket is required in underground feed applications.

Some meter sockets have a side wire design with an offset socket to provide more wire bending space for easier underground wiring.
When in operation, electrical current flows from the service (line-side) conductors through the meter to the load-side conductors and then to the load center or panelboard for distribution to branch loads.

Because a self-contained meter completes the circuit between the utility and the customer, in order to change the meter, the circuit must be broken. This is often not acceptable in some applications and can be a safety hazard to utility personnel. Therefore, some meter sockets have a bypass that, when engaged, provides a path for un-metered current flow when the meter is pulled out.

Common types of bypasses include: lever bypasses, horn bypasses, test block bypasses, and plunger bypasses. The type of bypass used depends on electric utility requirements.
A lever bypass has a manually-operated lever that controls a bypass link that runs between the meter socket jaws.

With a clamping jaw lever bypass, the lever applies pressure to the jaws which grasp the terminals of the meter. With a non-clamping lever bypass, the lever has no effect on the pressure the jaws put on the meter.

A clamping jaw lever bypass has a nylon cylinder with a copper strap running through it. When the lever is moved to engage the bypass, it moves the copper strap into contact with the upper and lower jaws. The strap also forces the jaws open, releasing the meter.

Utilities generally prefer the clamping jaw lever bypass because the meter cannot be pulled or installed unless the bypass is engaged. When the bypass is not engaged, the meter is locked into position by the jaw assemblies.
Horn Bypass

Horn bypasses, which are a factory installed option for some residential sockets, are metal tangs attached to each lug in the socket. The tangs provide connection points for utility personnel to attach insulated jumper leads. A single-phase socket requires two jumpers and a three-phase socket requires three jumpers.

When the jumpers are attached, they provide a path for current to flow directly from the socket’s line-side connections to its load-side connections. The meter can then be pulled from the socket without disconnecting the load from the power source.
With a test block bypass (TBB) socket, the line and load connectors are mounted parallel to one another. This provides for a provision to bypass the meter by placing jumpers to connect the line and load buses.

This type of bypass is used primarily by utilities subscribing to EUSERC metering standards. EUSERC is the Electric Utility Service Requirements Committee. EUSERC requirements are mainly used in western states.
A plunger bypass has a spring-loaded bridging contact contained within each housing. This contact is driven away from the spaced end portions of the associated contact brackets by a plunger that is engaged when a watt-hour meter is installed.

When the meter is removed from the socket, the plunger bypass contacts automatically close, providing a path for current to flow from the line to the load. The plunger bypass is only used in CT sockets.
There are two types of meter covers, ring and ringless. A ring type meter has a cover that must be installed before the meter can be installed. This means that the cover does not have to be removed to remove the meter. A metal sealing ring secures the cover and meter to the socket. A power company seal is attached to the sealing ring to prevent tampering.

There are two types of sealing rings. One type has a snap to secure it in place. The other type is secured with a screw type mechanism. Both types of rings are made of stainless steel or aluminum.

A ringless type meter socket requires the meter to be installed before the cover is closed. After the cover is closed, a latch and hasp mechanism holds the cover in place. A power company seal is attached to the mechanism to prevent tampering.
Single-position meter sockets have an AC voltage rating of 300 or 600 volts per Underwriter’s Laboratory (UL) specification 414.

UL 414 also identifies two operational current ratings for single position meter sockets, a continuous current rating and a maximum current rating. Both ratings are in amperes, amps for short.

As the name implies, the continuous current rating is the maximum amount of current that the meter socket can handle continuously without damage. The maximum current rating is the maximum current the socket can handle without damage for a short time. UL 414 allows the maximum current rating for a meter socket designed for a single-phase, three-wire service to be no greater than 125% of the continuous current rating.

Because gang sockets have bussing that must carry the current for all the sockets in the assembly, UL 414 requires that they also have an overall assembly continuous current rating in amperes. This overall rating is also referred to as the line bus rating.
This chapter covers the following topics:

- Single and Gang Sockets
Talon meters sockets are available in both ringless and ring type designs. The enclosures are made of steel or aluminum and accept type RX hubs (0.75” to 2.5”). Continuous current ratings range from 135 to 200 amps.

Residential sockets are available for overhead feed only, underground feed only, overhead or underground feed, or underground feed with a side wire design.

Single-phase, four-jaw and five-jaw sockets are available. A fifth jaw can be installed in the field in the three or nine o’clock position. A horn bypass is also available as a factory-installed option.

2/0 (two aught) oversized lay in lugs on 135 amp sockets make wiring easier. Oversized 350 kcmil lay-in lugs are available for 200 amp devices.

UAT1, UAT3, and UAT4 socket designs are made of modular blocks, meaning there are only five parts to every residential device. UAT1, 3, and 4 designs have a quad neutral as standard. UAS8 offset or side wire sockets, however, have more than 5 parts and do not have a quad neutral.
HQ commercial sockets have a clamping jaw lever bypass design that has been the quality standard for meter mounting equipment for over half a century. HQ sockets are available in the following configurations: overhead feed only, underground feed only, overhead or underground feed, and side-wired. These sockets have a maximum voltage rating of 600 volts and are available with 200 or 320 amp continuous current ratings. However, 200 amp rated sockets are built to the same specifications as 320 amp rated sockets.

200 amp rated sockets can either have lay-in lugs or studs. 320 amp rated sockets generally have studs, but some sockets offer lay-in lugs pre-installed at the factory. Studs can be either 3/8” or 1/2” in diameter. Siemens lugs have either a 13/32” opening to fit 3/8” studs or a 9/16” opening to fit 1/2” studs. It is important to make sure that the lugs ordered fit over the stud sizes in the meter socket.

200 amp sockets accept type RX hubs, which fit 0.75” to 2.5” hub sizes. 320 amp sockets accept type HD hubs, which fit 3” to 4” hubs. HD and RX hubs are all interchangeable with Milbank hubs. A hub adapter plate, part number H9747-1113, is available to adapt an HD hub to an RX opening.

HQ sockets are available with four, five, or seven jaws. For 200 amp rated sockets, a fifth jaw can be installed in the 9 o’clock position in the field, but requires the user to run a wire to ground the jaw.
Gang Sockets

Multi-position sockets, also called gang sockets, group multiple sockets and a pull section in the same enclosure. In general, gang sockets have the same features as single-position sockets. Available configurations include: two-position through six-position gang sockets in a horizontal design and two-position or three-position gang sockets in a vertical designs. A gang socket can come with no bypass, a horn bypass, or a lever bypass on each socket.

The accompanying illustration shows examples of three configurations, a two-position gang socket with a center pull section, a three-position, end-fed gang socket, and a three-position gang socket with one socket to the left of the pull section and two sockets to the right.

Each position has a continuous current rating from 135 to 320 amps depending on the model. The maximum current rating is 400 amps per position for lever bypass sockets and 250 amps per position for horn bypass sockets.

Gang sockets with 100 amp continuous current ratings per position are also available and come in both center feed or end feed versions. Center feed models are designed so that wires can come in from a hub opening over the pull section or from a center knockout below the pull section. An end feed unit has hub openings for wires on both the right and left ends.
PTS Transformer Rated Meter Sockets

For applications with meter loads which have a continuous current above 320 amps and/or when the applied voltage is three-phase, 480 volts, transformer rated watt-hour meters are often used. These meters are also used in off-peak metering applications where the utility controls the power applied to a device such as a water heater to limit energy consumption during peak demand periods.

PTS transformer rated meter sockets come with six, eight, or 13 jaws and are constructed of 16 gauge galvanized steel with polyester powder coat finish. 12 gauge aluminum is available as an option. Both solid and split covers are also available. The block assembly is glass fiber reinforced polyester, which is strong and arc and track resistant.

PTS sockets have a 600 volt maximum voltage rating and a 20 amp continuous current rating. They come equipped with screw type terminals and pressure plate and spacing for multiple test switch configurations. A ground lug is available for all units and a plunger bypass is available on eight-jaw or 13-jaw sockets.
Transformer rated watt-hour meters use current transformers (CTs) mounted internal or external to the meter. A CT is a precision-wound coil of wire through which a conductor is passed.

Each service conductor passes through its own CT and, when power is applied, current from a service conductor induces a proportional current in its CT. Current from each CT is supplied to the transformer rated meter that measures and displays the energy used. CTs are often housed in an enclosure called a CT cabinet located at the service entrance. However, off-peak CT metering systems often do not use a CT cabinet.

One safety issue associated with CTs is that they must remain connected to the load when current is applied. Otherwise, the voltage induced across the CT will rise to a dangerous level.

Instrument-rated meter sockets with test switches provide an excellent method of shorting CT circuits as well as disconnecting voltage sources to the potential coils in the meter. By utilizing these test switches, meters may be changed safely and efficiently. Test switches also provide an opportunity to energize individual stators in the meter. This is important when verifying that an instrument-rated metering installation has been wired correctly. Color coded test switch handles may be ordered to match the utilities wiring color code. This enhancement simplifies wiring of the meter socket.
HQ-T and HQ-TS Transformer Rated Meter Sockets

HQ-T and HQ-TS transformer rated meter sockets are constructed of 16 gauge galvanized steel with polyester powder coat finish. 12 gauge aluminum is available as an option. The block assembly is glass fiber reinforced polyester which is strong and arc and track resistant.

HQ-T and HQ-TS meter sockets have a 600 volt maximum voltage rating and an 80 amp continuous current rating. They come equipped with screw type terminals and a pressure plate. Some sockets come with spacing for multiple test switch configurations. A ground lug is available.

All sockets are equipped with a 200% rated, clamping jaw lever bypass. A removable bypass handle is available as an option. With the handle removed, a solid cover can be placed on the box with the bypass closed when it is necessary to remove the meter for in-shop repair or testing.
K-Base Meter Sockets

Type K-4, K-5, and K-7 meter sockets offer extended range metering, which is the direct metering of loads above 320 amps without separate current transformers. K-Base sockets are available with steel or aluminum enclosures and in overhead service, underground service, and off-set socket (side wire) designs. K-Base sockets use Landis + Gyr bolt-in, self-contained meters.

For single-phase residential and commercial applications, K-4 and K-5 meter sockets are available for 400 amp continuous-duty or 480 amp continuous duty (600 amps maximum). For three-phase applications, type K-7 sockets provide 480 amps continuous duty (600 amps maximum). Lugs are available in one, two, and three conductor configurations for K-4 and K-7 sockets.
A bypass is generally not included with K-base sockets, but can be ordered separately and installed in the field. K-Base bypasses are clamped onto the studs before the meter is removed. Two types of bypasses are available for K-Base sockets, rake type and rotating link type. The rotating link type bypass is the only bypass that can be used with K-7 sockets.

The rake type bypass clamps from the line to the load bus and is capable of carrying 480 amperes continuously. The insulated handles on the bypasses prevent the enclosure cover from being installed with the bypass in place.
The out-of-service storage position for the watt-hour meter allows utilities to store the meter in the socket when it is taken out of service. A sliding plate with the words “Out of Service” printed on it identifies the meter’s status. A plastic blank meter hole cover could also be used when the meter is out of service.
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This chapter covers the following topics:

- Combo Types
Siemens meter combos include two product families, meter mains and meter load center combinations. Each family is further divided into EUSERC approved and non-EUSERC products. All products are UL listed as suitable for use as service entrance equipment and have padlocking provisions.

Equipment Utility Service Requirements Committee (EUSERC) is an organization of approximately 80 utilities in 14 western states. One of the functions of EUSERC is to specify manufacturing and installation requirements for metering and service equipment. Utility companies dictate when EUSERC conforming equipment must be used, but EUSERC equipment can also be used in areas where it is not required by the utility.
A meter main is a meter socket combined with a main circuit breaker in one enclosure. This arrangement is sometimes required by utilities because it places the main breaker external to the residence, making it easier for service personnel to disconnect power.

All the specified information needed to select a meter socket is also needed when selecting a meter main. This includes the amperage rating, ring type, bypass type, service conductor feed (underground or overhead), and number of jaws. In addition, the frame type, continuous current rating, and interrupting rating for circuit breakers is also needed.
Six Disconnect Rule

The National Electrical Code® requires that the electrical service for a building must have a disconnecting means consisting of no more than six devices (switches or circuit breakers). This means that a load center with more than six branch circuit breakers must have a main circuit breaker unless a main circuit breaker is provided separately. Where a meter main is used, a breaker in the meter main can provide the disconnecting means for a downstream main-lug-only load center and the load center is not limited to only six branch circuit breakers.

For example, meter main MM0404L1400RLM is shown in the accompanying illustration. This meter main allows for up to two circuit breakers. Each breaker can function as the main circuit breaker for downstream equipment. This means that, if both circuit breakers are installed, two main-lug-only load centers could be located downstream and each could contain more than six branch circuit breakers and still comply with the six disconnect rule.
Most Siemens non-EUSERC meter mains are designed for a single-phase, three-wire, 120/240 VAC overhead or underground service and have 100 to 400 amp continuous current ratings and 10,000 or 22,000 amp interrupting ratings. Both ringless and ring type meter sockets are available.

Most of these meter mains have a side-by-side design; however, single-phase and three-phase over-under (meter on top) meter mains are also available.

Some Siemens meter mains contain a limited number of extra spaces to provide easy wiring of outdoor circuits such as air conditioning units and spas.
Siemens EUSERC meter mains are available in the side-by-side configurations shown in the accompanying illustration.

Meter mains with the configuration shown on the left in the accompanying illustration have 100 or 200 amp continuous current ratings.

Side-by-side, 400 amp construction meter mains have provisions for two 200 amp disconnects and have a 320 amp continuous current rating (400 amp maximum rating).
A meter load center combination is a meter socket combined with a load center. A meter load center combination may have a main circuit breaker; however, when only six or fewer branch circuit breakers are included, the NEC® does not require a main breaker.

Meter load center combinations are gaining in popularity because having the meter socket, main breaker, and load center in one location allows contractors to save on labor and material.
Main Breaker and Main Lug Meter Load Center Combinations

Most Siemens meter load center combinations include a main circuit breaker or provisions for a main breaker. The main breaker serves as both the main service disconnect device and the main circuit protection device.

Some meter load center combinations, however, do not include a main breaker and are referred to as main-lug-only or, more simply, main lug meter load center combinations. Main lug meter combos must still comply with the six disconnect rule.
Some Siemens meter load center combinations are designed for overhead service entrance, and others are designed for underground service entrance.

Most, however, are designed for either overhead or underground service, and many of these meter load center combinations include a wire trough for use with underground service conductors.
Some Siemens meter load center combos are designed for surface mounting and others are designed for flush mounting. Units designed for surface mounting can be adapted to flush mounting with use of a flush rail kit.
Some Siemens meter load center combinations have feed-thru lugs on the opposite end of the load center bus from the main breaker.

This allows cables to be connected to a downstream main-lug-only load center, provided that the meter load center current ratings are not exceeded.
Each meter load center combination has a circuit capacity. For Siemens meter load center combinations, the most common circuit capacity is eight one-inch spaces and 16 possible circuits.

For example, the meter load center combination shown on the left in the accompanying illustration, provides a main circuit breaker and four one-inch branch circuit breaker spaces. These spaces are often used for breakers protecting outdoor circuits. The unit’s feed-thru lugs can be used to supply power to a downstream main-lug-only load center which protects circuits inside the house.

When a meter load center combination is used without another panel to power the entire home, more circuits are needed. For example, the meter load center combination shown on the right in the accompanying illustration has twenty one-inch branch circuit breaker spaces. Siemens offers meter load center combinations with up to 30 branch circuit breaker spaces.
Non-EUSERC Meter Load Center Combinations

Siemens non-EUSERC meter load center combinations are available in the configurations shown in the accompanying illustration. They are designed for single-phase, three wire 120/240 VAC service.

Most meter load center combinations are available with continuous current ratings up to 200 amps. Some side-by-side combinations have current ratings up to 400 amps.
Siemens EUSERC meter load center combinations are available in the configurations shown in the accompanying illustration. They are designed for single-phase, three wire 120/240 VAC service.

Most meter load center combinations are available with continuous current ratings up to 200 amps. Side-by-side, 400 amp construction meter load center combinations have a 320 amp continuous current rating (400 amp maximum rating).
Solar Ready Meter Load Center Combinations

Siemens solar ready meter load center combinations are available with a variety of meter socket configurations including lever bypass and EUSERC approved versions with the features shown in the accompanying graphic.

These meter load center combinations have a dedicated alternative energy input rated for up to 60 amps.
Classroom Learning

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Chapter 4 – Multi-Family Metering

This chapter covers the following topics:

• Ratings
• Uni-Pak Metering
• Power Mod Features
• Power Mod Modules
Overcurrent protection devices are rated according to the maximum voltage they can handle. The voltage rating of the overcurrent protection device must be at least equal to the circuit voltage. The voltage rating can be higher than the circuit voltage, but never lower. For example, the accompanying graphic shows a circuit breaker with a 600 volts rating.

Some circuit breakers have what is referred to as a “slash” voltage rating, such as 120/240 volts. In such cases, the breaker may be applied in a circuit where the nominal voltage between any conductor and ground does not exceed the lower rating and the nominal voltage between conductors does not exceed the higher rating.
Every circuit protection device has a continuous current rating which is the maximum continuous current the device is designed to carry without interrupting current flow. The current rating is sometimes referred to as the ampere rating because the unit of measure is amperes, or, more simply, amps.

Some circuit breakers have a continuous current adjustment like the one shown in the accompanying graphic. For these circuit breakers, $I_n$ is the maximum continuous current that the breaker can be set for. The continuous current setting is $I_r$, which is often shown as a percentage of $I_n$.

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
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<tbody>
<tr>
<td>Continuous Amps ($I_r$)</td>
<td>Varies the level of continuous current the circuit breaker will carry without tripping. Adjustable from 20 to 100% of breaker’s continuous ampere rating. ($I_r = %$ of $I_n$).</td>
</tr>
</tbody>
</table>
Overcurrent Protection Device Interrupting Ratings

Circuit protection devices are rated according to the maximum level of current they can safely interrupt. This is the interrupting rating or ampere interrupting rating (AIR).

The interrupting rating for a circuit protection device is typically specified in symmetrical RMS amperes for rated voltages. RMS stands for root-mean-square and refers to the effective value of an alternating current or voltage. The term symmetrical indicates that the alternating current value specified is centered around zero and has equal positive and negative half cycles.

When designing an electrical power distribution system, a main circuit breaker must be selected that can interrupt the largest potential fault current that can occur in that application. The interrupting ratings for feeder and branch circuit breakers must also be taken into consideration, but the required interrupting ratings for these circuit breakers depend upon whether series ratings can be applied.
Interrupting Rating Methods

When selecting overcurrent protection devices, it is essential to know the available fault current for an application and the interrupting rating for the protective devices intended for use.

NEC® Article 110.9 requires circuit protection equipment to have an interrupting rating sufficient for the available current. There are two ways to achieve this requirement, the full rating method and the series rating method. The accompanying graphic shows an example for each method.

The full rating method requires all circuit protection devices to have an interrupting rating equal to or greater than the available fault current.

The series rating method requires the main circuit protection device to have an interrupting rating equal to or greater than the available fault current, but downstream circuit protection devices connected in series can be rated at lower values.

For the series rating method to be used, the selected series combination of circuit protection devices must have been tested and certified by UL. Each series combination of circuit protection devices has a series connected short circuit rating. For additional information, refer to the series connected short circuit ratings tables in the SPEEDFAX catalog.
This chapter covers the following topics:

- Ratings
- Uni-Pak Metering
- Power Mod Features
- Power Mod Modules
Uni-Pak Metering

Siemens offers the following options for multi-family metering: Uni-Pak metering and Power Mod with QuickSystem

Uni-Pak metering is a self-contained system with two to six meter compartments. Uni-Pak metering operates on single phase, three-wire 120/240 VAC power. A fifth jaw accessory kit is available. The pull section accepts either underground or overhead service conductors.

A Uni-Pak configuration always consists of a utility pull section with main lugs or stud terminations, two to six 125 amp meter sockets (up to 65k AIR) or 200 amp meter sockets (up to 100k AIR), tenant circuit breaker provisions, and a floating dead front. Both ring type and ringless meter covers are available.

Because this design limits the number of meter compartments to six, a main switch or circuit breaker is not required to comply with the NEC® six disconnect rule.
Uni-Pak Features

Standard Uni-Pack features include:

- Outdoor/indoor construction
- Overhead or underground service
- 2 to 6 positions
- 125 or 200 amp maximum per position
- Bus ratings up to 1000 amps
- Removable knock-out plate for back exit
- Mounting rail for wall hanging
Additional Uni-Pak Features

Additional features include:

- 125 amp continuous duty sockets feed plug-in tenant breakers through 125 amps
- 200 amp continuous duty sockets feed plug-in tenant breakers through 225 amps
- UL Listed for short circuit ratings up to 100k RMS symmetrical amps at 240 VAC
- Lever bypass models available
- Compact design for ease of handling and installation
- Unmetered bus is designed to prevent unauthorized access.
- Complies with appropriate ANSI, NEMA, and UL standards
Uni-Pak Models

WP Ring Style

WP Ringless, No Bypass

WP Ringless, Horn Bypass

WEP Ring Style, EUSERC

WPL Ringless, Lever Bypass

- 125 amp tenant mains with bus amperage from 200 to 600 amps 65k AIR maximum
- 225 amp tenant mains with bus amperage from 400 to 1000 amps 100k AIR maximum

- 225 amp tenant mains with bus amperage from 400 to 1000 amps 100k AIR maximum
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Chapter 4 – Multi-Family Metering

This chapter covers the following topics:

- Ratings
- Uni-Pak Metering
- Power Mod
Siemens Power Mod with QuickSystem modular metering includes an assortment of module types that can be configured to meet a wide range of residential and commercial group metering applications.

For example, a typical application requires a main device module and one or more residential and/or commercial meters stacks. Depending on the application, additional module types may also be required.

Power Mod service can be single-phase, three-wire 120/240 VAC, three-phase, four-wire 120/208Y, or three-phase, three-wire 240 VAC delta. The cross bus that connects Power Mod modules is aluminum and has a 1200 amp continuous current rating.

Power Mod has a unique combination of labor saving features to aid the contractor during installation. Known collectively as QuickSystem, these features include:

- QuickConnect
- QuickTorque
- QuickBolt
- QuickRoll
- QuickPhase
<table>
<thead>
<tr>
<th>QuickSystem Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QuickConnect™</td>
<td>QuickConnect reduces bussing connections from many to one, ensuring a single reliable connection instead of multiple connections.</td>
</tr>
<tr>
<td>QuickTorque™</td>
<td>QuickTorque eliminates the need for time consuming torque readings. This breakaway nut provides a visual indicator of torque for the QuickConnect. When tightened, the outer head twists off at the proper torque for connection, leaving a single nut for future maintenance.</td>
</tr>
<tr>
<td>QuickBolt™</td>
<td>QuickBolt eliminates the requirement to line up mechanical connections. Instead, bolts remain retracted until the openings line up, allowing the bolts to protrude through automatically. Springs push the bolts through and provide positive pressure to keep bolts in place while wingnuts are attached and tightened.</td>
</tr>
<tr>
<td>QuickRoll™</td>
<td>QuickRoll eliminates typical metal brackets for mounting modules on the wall. Instead of metal scraping metal, QuickRoll allows the module to glide down the mounting rail via a durable nylon wheel inside a mounting bracket.</td>
</tr>
<tr>
<td>QuickPhase™</td>
<td>QuickPhase allows the user the ultimate flexibility to adjust to each application by allowing each meter position to be phased independently.</td>
</tr>
</tbody>
</table>
Additional Power Mod Features

Power Mod has many features designed to speed installation and provide the contractor with maximum flexibility.

For example, generous gutter space, removable knockout plate, moveable ground and neutral provisions, and hinged rain channel simplify wiring.
Power Mod Mains and Tapboxes

- WB standard circuit breaker mains optimize functionality, features, and size constraints.
- WBT feed-thru mains allow conductors to be pulled in and out of the enclosure for rise cable or loop feed applications. This design allows for connection to Sentron busway. In addition, no tap boxes are needed because the lugs are included.
- WXS switches offer a standardized means for connecting Sentron busway to Power Mod for mid and high-rise applications.
- WTB - standard tapbox modules are designed for versatility, space savings, and flexibility.
- WET tapbox-pullbox combination modules offer EUSERC compatibility, a wider range of lug options, and extra space for pulling in conductors.
- WT feed-thru tap boxes allow conductors to be pulled in and out of the enclosure for riser cable or loop feed applications.
- WTBN ConEd tap boxes meet the requirements of the Consolidated Edison utility service area.
- WEB circuit breaker-pullbox combinations offer EUSERC compatibility, a wider range of lug options, and extra space for pulling in conductors.
- WS standard switch modules are designed for flexibility, space savings, and durability.
- WXS switches offer a standardized means for connecting Sentron busway to Power Mod for mid and high-rise applications.
- WTB - standard tapbox modules are designed for versatility, space savings, and flexibility.
- WET tapbox-pullbox combination modules offer EUSERC compatibility, a wider range of lug options, and extra space for pulling in conductors.
- WT feed-thru tap boxes allow conductors to be pulled in and out of the enclosure for riser cable or loop feed applications.
- WTBN ConEd tap boxes meet the requirements of the Consolidated Edison utility service area.

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**WMM residential meter stacks**

WMM residential meter stacks have the widest product offering and flexibility in the industry. Each meter stack includes QuickSystem features that maximize productivity and minimize labor costs.

**WMN ConEd residential meter stacks**

WMN ConEd residential meter stacks are designed for the Consolidated Edison utility service area. Each meter stack includes QuickSystem features that maximize productivity and minimize labor costs.

**WMT commercial test block**

WMT commercial test block bypass meter stacks meet the requirements of utilities that specify test block bypass meter sockets in areas that comply with EUSERC standards.

**WMLZ/WMLZF lever bypass**

WMLZ/WMLZF lever bypass meter stacks allow the use of class T (400 amp max) fuses ahead of all meter positions. WMLZF stacks feature a 400 amp fusible pull out assembly that connects to a secondary 400 amp thru bus that can feed downstream meter stacks. WMLZ stacks include the secondary thru bus that can connect from WMLZF meter stacks. The standard Power Mod 1200 amp thru bus passes through to downstream modules and the meter sockets in WMLZ and WMLZF do not connect directly to the 1200 amp thru bus.

**WML commercial lever bypass**

WML commercial lever bypass meter stacks feature a 400 Amp, class T - fusible pull out assembly.

**WML commercial lever bypass**

WML commercial lever bypass meter stacks meet the requirements of utilities that specify lever bypass meter sockets.

**WMK commercial K-Base**

WMK commercial K-Base meter stacks meet the requirements of utilities that specify bolt-in meter sockets for 400 and 600 amp applications.
Additional Power Mod Modules

WSPD Integral surge protection devices (SPDs) for multi-family applications are thru-bus connected modules that allow the user to view surge status as well as access the SPD control panel without breaking the utility seal on the enclosure. An optional breaker disconnect is available to enable SPD replacement without disconnecting utility power to the Power Mod installation.

WC residential meter socket with load center distribution panel reduces installation material and labor when compared to applications requiring a separate meter socket and load center.

WCT residential meter socket with load center distribution panel reduces installation material and labor when compared to applications requiring a separate meter socket and load center. WCT modules feature a test block bypass.

WMMB auxiliary pull boxes are used in cases where WEB, WES, or WET modules were not or cannot be used, but compliance with the EUSERC standard is required.

WCL residential meter socket with load center distribution panel reduces installation material and labor when compared to applications requiring a separate meter socket and load center. WCL modules feature the Talon HQ lever bypass.
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Chapter 1 - Introduction
• Overview
• Socket Terminology

Chapter 2 – Meter Sockets
• Single and Gang Sockets

Chapter 3 – Meter Combos
• Combo Types

Chapter 4 – Multi-Family Metering
• Ratings
• Uni-Pak Metering
• Power Mod