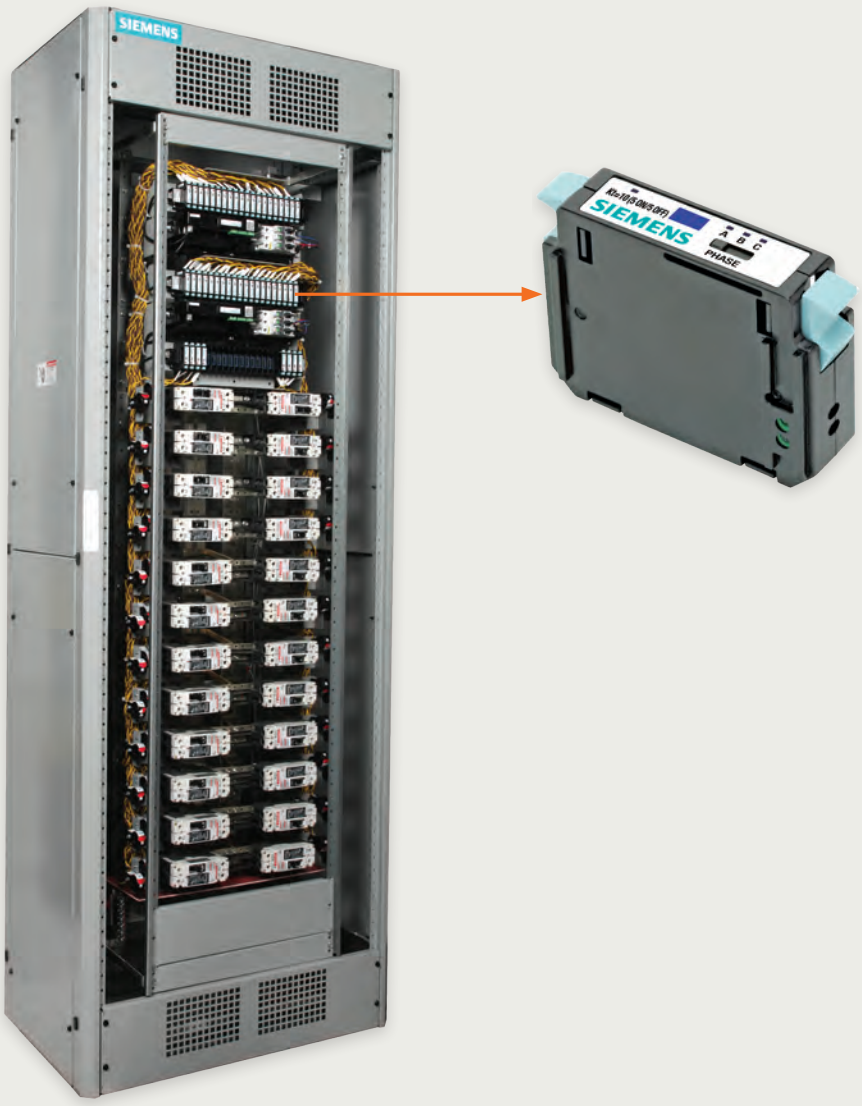
SIEMENS

SEM3™- EMBEDDED MICRO METERING MODULE™

SEM3™ Solutions

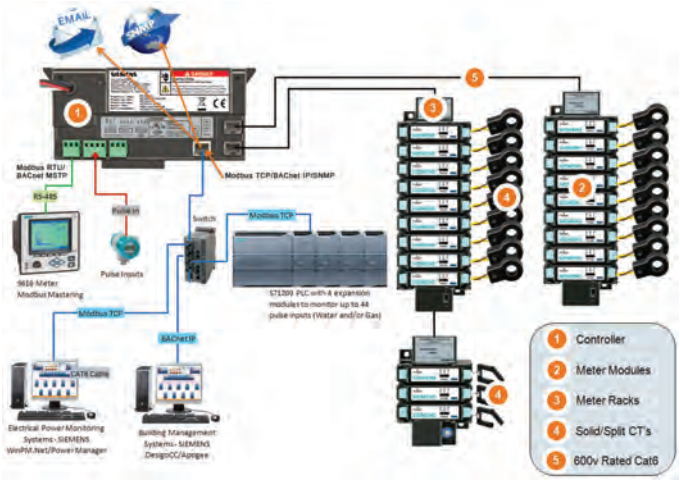
usa.siemens.com/SEM3



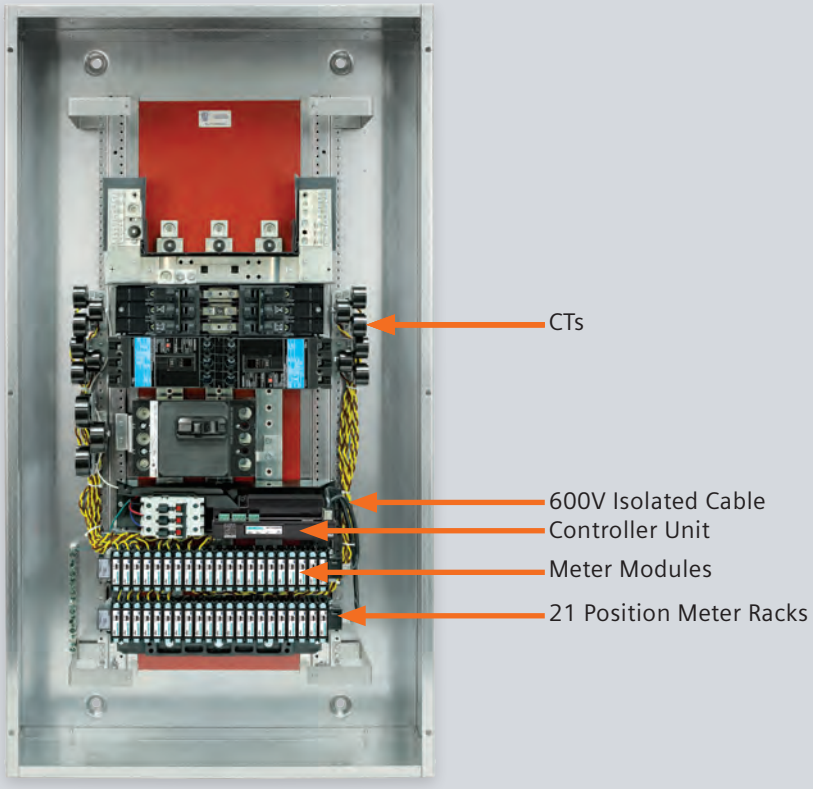
SEM3™ - Embedded Micro Metering Module™

The new Siemens Embedded Micro Metering Module (SEM3) is a modular metering solution for energy monitoring, trending, and sub-billing applications. The flexible design allows for low, medium, and high density metering requirements to be met efficiently and economically using only a few standardized components. Consequently SEM3 can be easily integrated into new Siemens Panelboard and Switchboard products, but has also been designed to be implemented in OEM and retrofit applications as well.

SEM3 provides an innovative and cost effective metering solution that can be incorporated into existing applications such as power monitoring, building automation, and sub-billing systems. SEM3 has the flexibility to be installed as a standalone solution providing real time data through the controller's standard built-in HTML web pages. The data supplied by SEM3 is available in two accuracy classes (0.2% or 1.0%) providing options for the various market requirements.The versatile system allows you to meter the loads you need without the excess hardware and space requirements of traditional solutions.



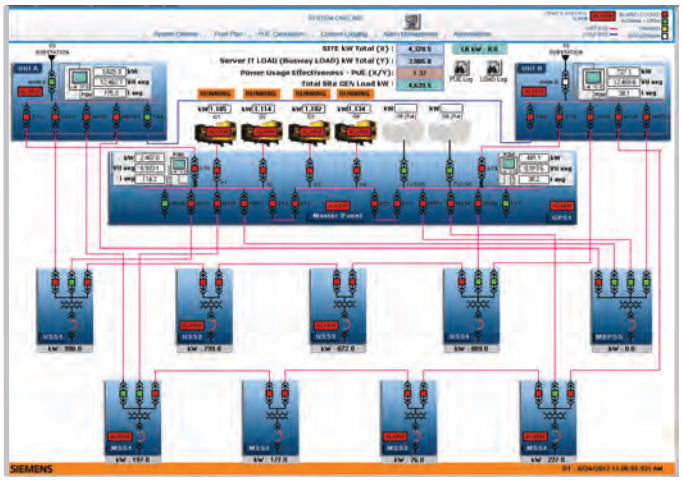
SEM3 in panel



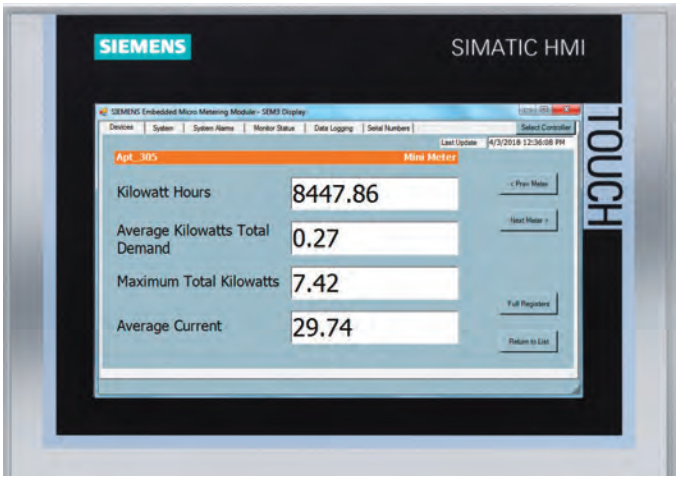
SEM3™ Solution Overview

To provide you with energy management solutions fitting different applications, SEM3 has been integrated with multiple energy monitoring packages. SEM3 is uniquely designed for sub-billing applications where tenant or client billing is required. It is also utilized in many energy management applications where compact, multi-metering is required. SEM3 has been integrated into many Siemens and third party applications including:

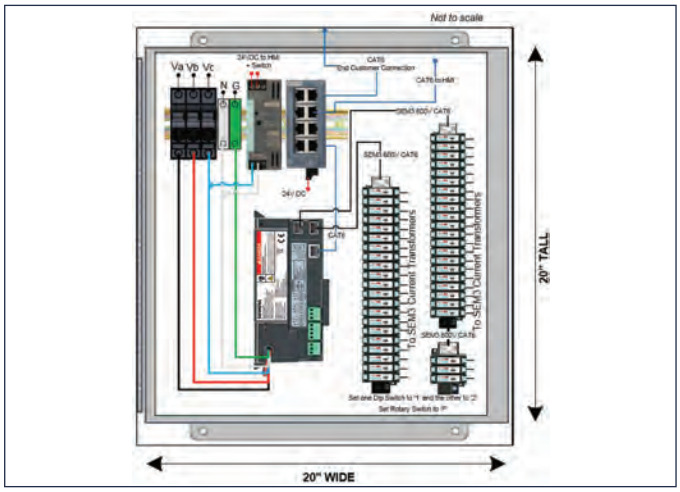
1. Siemens WinPM.Net - Enterprise EPMS software
2. Siemens Powermanager - Energy Management Software
3. Siemens Building Automation, SCADA and DCIM solutions
4. Siemens Simatic HMI Displays - for stand-alone, local display option
5. Remote Enclosures - for retrofit applications with pre-installed components.
6. Priority Submetering Solutions Inc. - An OEM alliance partner for remote billing services.
7. Any third party system or solution that communicates Modbus TCP/IP, Modbus RTU, BACnet IP.



WinPM.Net/Powermanager



Local Touch Display



Multiple Standard Enclosures for Retrofit/External Wall Mount Applications

Energy Monitoring Software Solutions

WinPM.Net - Enterprise Electrical Power Monitoring Software

WinPM.Net is a complete energy information management solution for your business, allowing you to process, analyze, store and share energy usage and power quality data across your organization. It offers control capabilities, comprehensive power quality and reliability analysis and can help you reduce energy-related costs. WinPM.Net allows the user to create power usage reports, a critical feature for LEED certified and billing applications. WinPM.net allows you to manage intelligent metering and protective devices, trend data, and decide on new courses of action to help you save money and keep your business up and running.

Its cutting-edge flexibility and compatibility means you can add one piece at a time, at your own pace, while still maintaining existing investments. Interface with your existing systems through industry-standard protocols and choose newer components as they become available.

To provide you with a complete energy management solution, SEM3 has been integrated with WinPM.Net energy management software allowing you to process, analyze and store your energy data. WinPM.Net allows you to monitor the real-time data from the metering devices of SEM3, as well as the system summary data. The software can log measured data for historical trending and analysis. Furthermore, the SEM3 system alarms can be configured and acknowledged in WinPM. Net software. WinPM.Net software has over fifteen PDF, Excel, and HTML standard report configurations. The following SEM3 data can be monitored in WinPM:

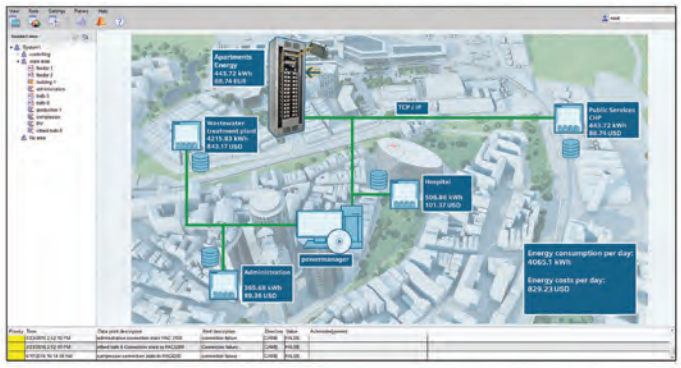
- Total system kWh or kVarh
- Real-time page displays the following data registers for a 1, 2 or 3-phase metering device; volts, amps, kW, kWh, and kVah
- Alarm status (under current, over current, etc.), as well as configuration/setup for each branch circuit

Powermanager Software - Identifying hidden potential for energy optimization and savings

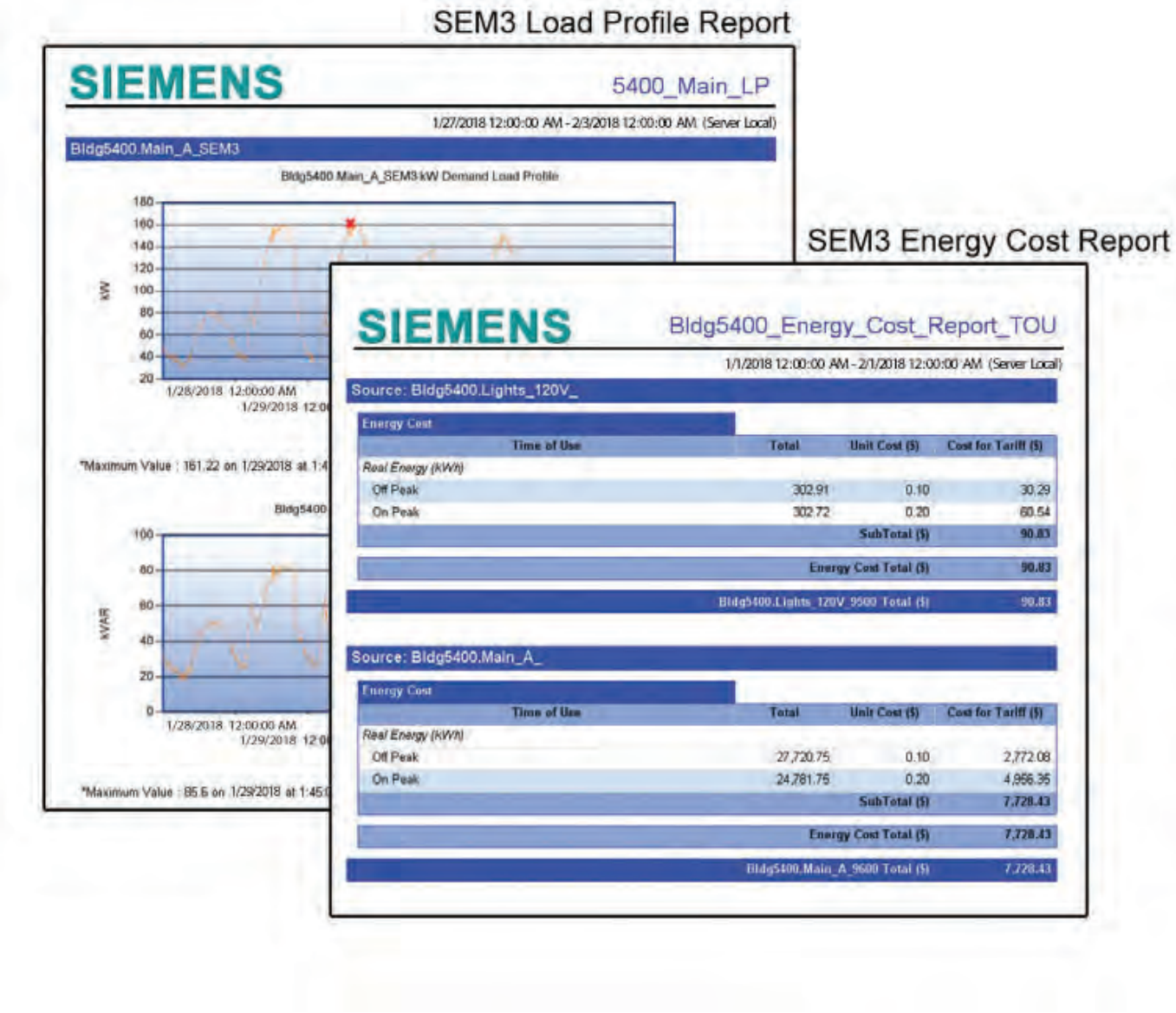
SENTRON Powermanager software, combined with Siemens power meters and low voltage protective devices, provides a complete energy management solution for your business. It allows you to measure, process, analyze, store and share energy usage and status information across your entire enterprise. It offers control capabilities, comprehensive energy usage and reliability, and detailed reporting that will help you reduce energy related costs.

SENTRON Powermanager allows you to manage all your intelligent devices and analyze the data, allowing you to identify hidden potentials for energy optimization and overall savings. Its cutting edge flexibility and compatibility means you can add one piece at a time, at your own pace, while still maintaining your original investments.

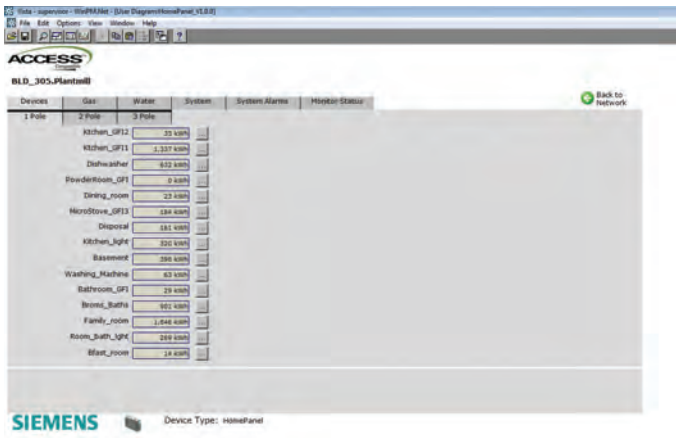
Additionally, the scalability lets you start with an easy to configure, low investment sub-metering solution which can be extended to an enterprise-wide power management system later.



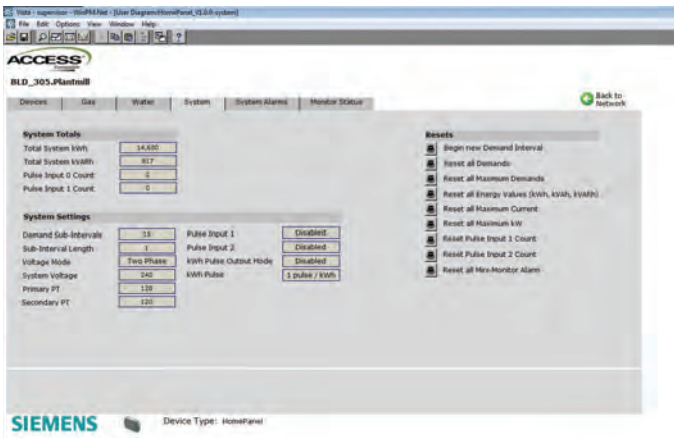
WinPM.Net Power Monitoring Software



Default SEM3™ Displays in WinPM.Net Software

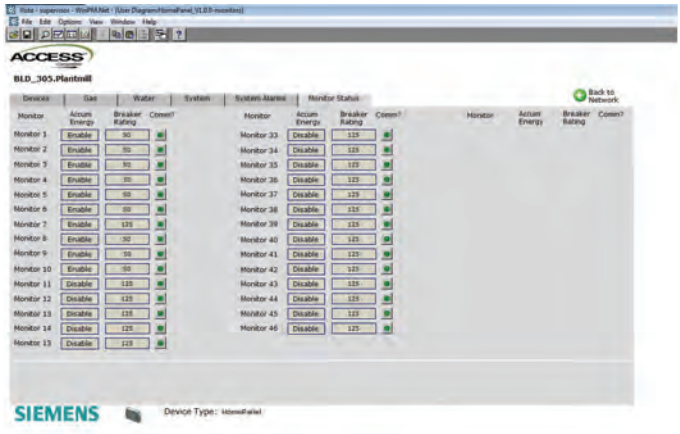


Metering Devices kWh Summary
(1 Pole, 2 Pole, & 3 Pole)



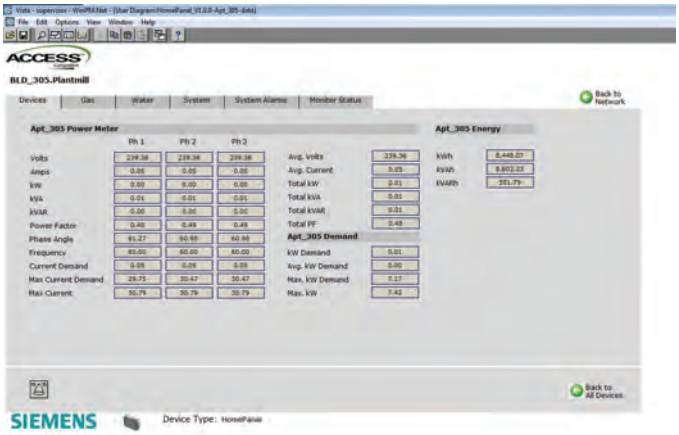
System Total and Settings

System Alarms

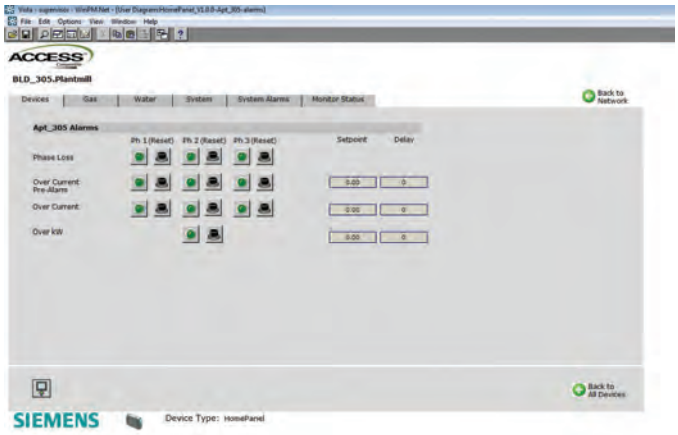


Monitoring Status

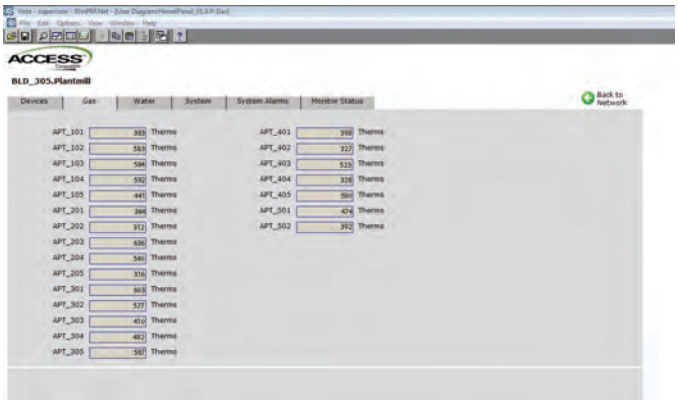
Default SEM3™ Displays in WinPM.Net Software



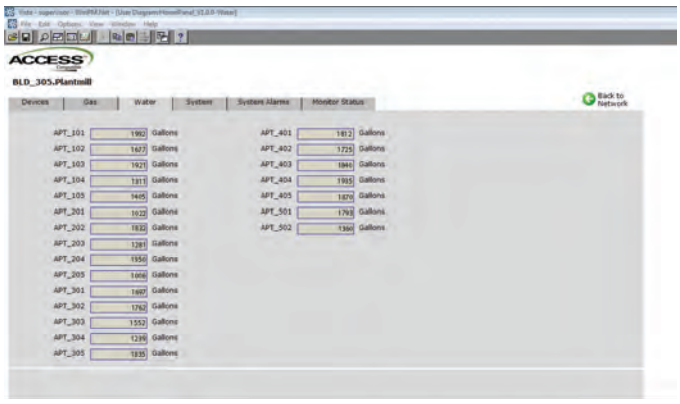
Device Realtime Screen unique to 3 phase monitoring



Device Alarm Screen unique to 3 phase monitoring



Gas Screen

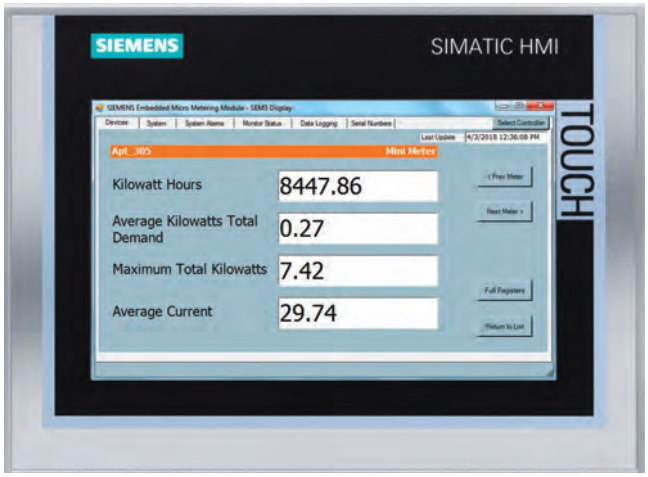


Water Screen

SEM3™ Display Solutions

For a local or remote display of measured data, SEM3 has been integrated with the Siemens SIMATIC touchscreen HMI. Each display can monitor up to 6 controllers, with each controller monitoring up to 45 metering points. The SIMATIC HMI display is available to integrate with Siemens Panelboards (P4 and P5) and Switchboards. The Siemens SIMATIC display is also available as a wall mount enclosure for remote monitoring. Various NEMA ratings are available.

Devices full registers



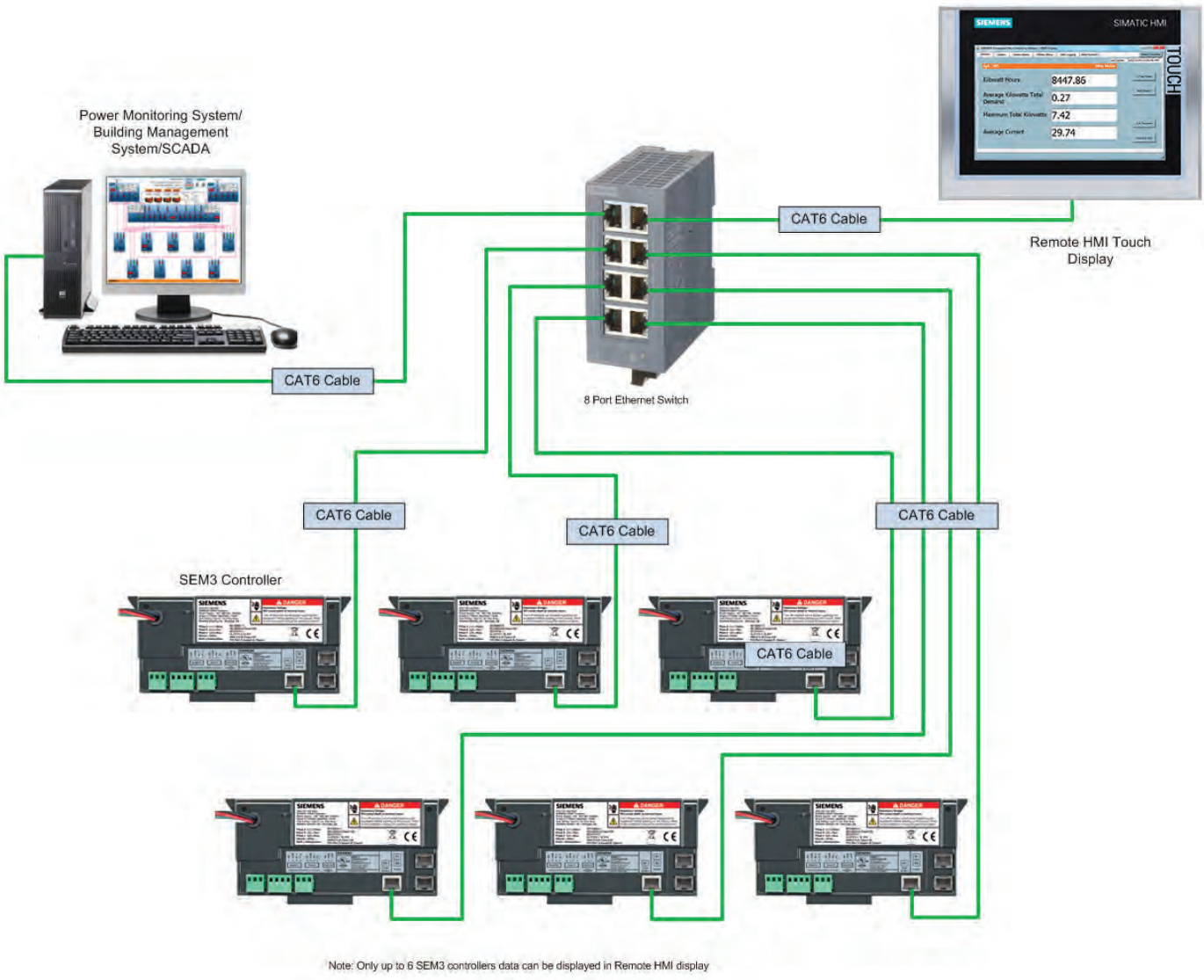
Devices mini registers

System data

SEM3™ Display Applications

The SEM3 controllers standard Ethernet communication feature provides a quick and easy method for connecting to a Siemens SIMATIC HMI display. The topology below highlights how SEM3 may be integrated with an external SIMATIC HMI. This network depicts the maximum number of controllers a single SIMATIC HMI may monitor, six, enabling up to 270 single phase metering points in the system. Connecting the remote display is simple, requiring only an additional CAT6 cable. In this example an eight port Ethernet switch is required to integrate the devices.

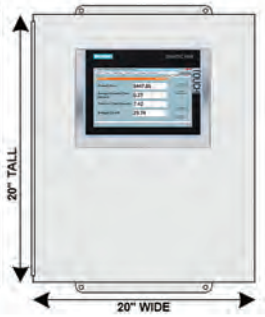
SEM3 Ethernet Network with remote display example

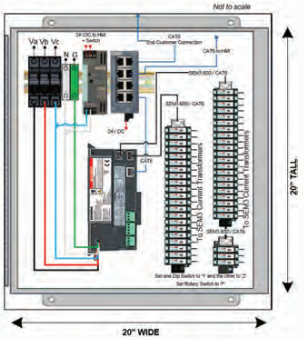


Local Siemens Display Options

Remote Touch Display Enclosure Package - No SEM3 parts included

Description	Catalog Numbers
SEM3 ENCL 7" Touch Display 24 VDC/1.3 Amp Power Supply	US2:SEM3TP7SEN
SEM3 ENCL 7" Touch Display 24 VDC/1.3 Amp PS UL Listed	US2:SEM3TP7SENUL
SEM3 ENCL 7" Touch Display 24 VDC/1.3 Amp PS + 8 Port Switch	US2:SEM3TP7AEN
SEM3 ENCL 7" Touch Display 24 VDC/1.3 Amp PS + 8 Port Switch UL Listed	US2:SEM3TP7AENUL
SEM3 ENCL 9" Touch Display 24 VDC/1.3 Amp Power Supply	US2:SEM3TP9SEN
SEM3 ENCL 9" Touch Display 24 VDC/1.3 Amp PS UL Listed	US2:SEM3TP9SENUL
SEM3 ENCL 9" Touch Display 24 VDC/1.3 Amp PS + 8 Port Switch	US2:SEM3TP9AEN
SEM3 ENCL 9" Touch Display 24 VDC/1.3 Amp PS + 8 Port Switch UL Listed	US2:SEM3TP9AENUL
SEM3 ENCL 12" Touch Display 24 VDC/1.3 Amp Power Supply	US2:SEM3TP12SEN
SEM3 ENCL 12" Touch Display 24 VDC/1.3 Amp PS UL Listed	US2:SEM3TP12SENUL
SEM3 ENCL 12" Touch Display 24 VDC/1.3 Amp PS + 8 Port Switch	US2:SEM3TP12AEN
SEM3 ENCL 12" Touch Display 24 VDC/1.3 Amp PS + 8 Port Switch UL Listed	US2:SEM3TP12AENUL





Optional Loose Remote Touch Display and Power Supply

Description	Catalog Numbers
SEM3 7" TD 100-240VAC ①	US2:SEM3TOUCHP7
SEM3 9" TD 100-240VAC ①	US2:SEM3TOUCHP9
SEM3 12" TD 100-240VAC ①	US2:SEM3TOUCHP12
SEM3 15" TD 100-240VAC ①	US2:SEM3TOUCHP15
SEM3 19" TD 100-240VAC ①	US2:SEM3TOUCHP19

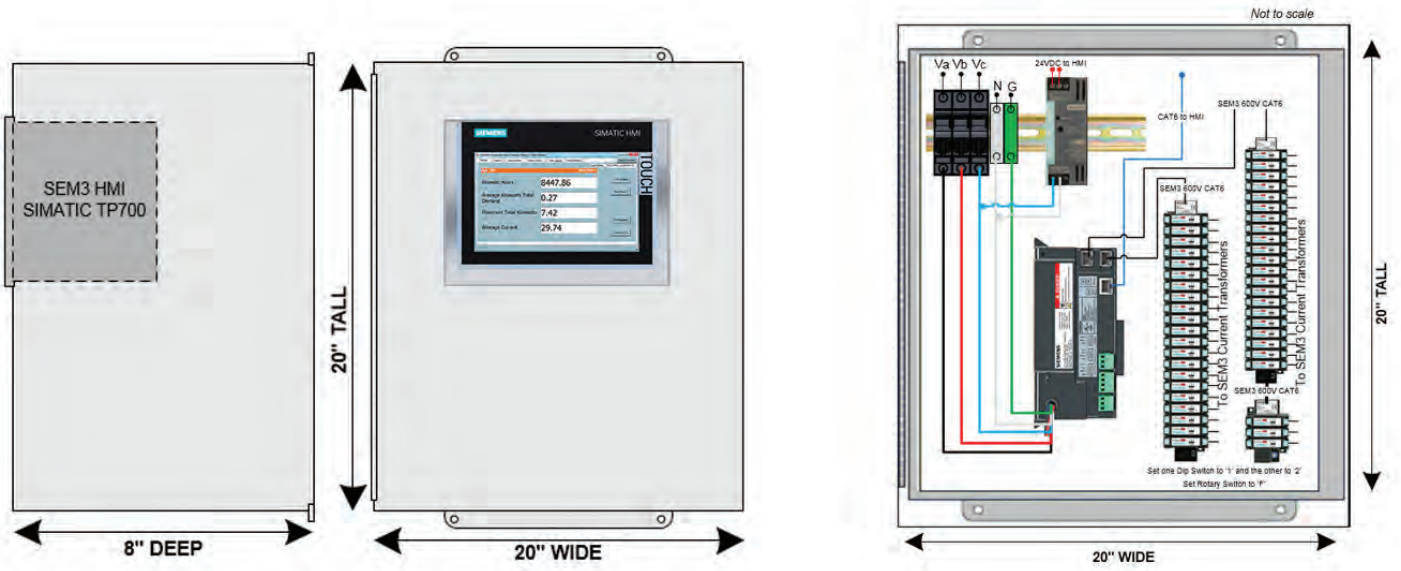
① Order 24VDC power supply separately.

Standard Enclosures for External Applications

The SEM3 standalone enclosure is ideal for retrofit/external wall mount applications, as it requires minimal modification of existing systems while gaining full functionality of the SEM3 branch circuit monitoring solution. Installation of the required milliamp current transformers (CT) is minimized by utilizing the Siemens Split Core CTs ranging from 50 to 2000 amps. See "Split Core CT" section.

SEM3 standard enclosures are available with NEMA 1, 4 and 12 ratings. The SEM3 meter enclosure is shipped with all the required components installed. The control voltage is wired to a fusible disconnect switch to protect the system and to provide a disconnect from outside power to the meter. SEM3 CTs are self shorting, not requiring a shorting block in the enclosure/panel. The enclosure has a ground lug for equipment grounding. When the control voltage is greater than 480 volts, a CPT is provided between the disconnect switch and SEM3 controller. The enclosure is pre-drilled to make mounting quick and easy.

The standard enclosure comes with the controller, power supply, disconnect, meter racks, communication cables. Meter modules and CTs are sold separately and installed in the field by qualified electricians. As mentioned previously, the display is available as an option.

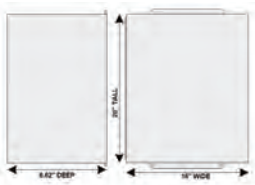


Typical SEM3™ with display example

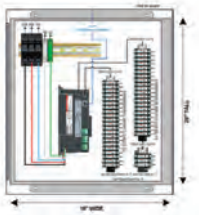
Standard Enclosures for External Applications

No Display Standard Enclosure for External Application - HMI, SEM3 Meter Modules, and CT's are not included

Description	Catalog Numbers
SEM3 3M ENCL Type 1 16T x 12W X 6D	US2:SEM303ENCL1
SEM3 3M ENCL Type 12 16T x 12W X 6D	US2:SEM303ENCL12
SEM3 3M ENCL Type 4 16T x 12W X 6D	US2:SEM303ENCL4
SEM3 9M ENCL Type 1 16DT x 12W X 6D	US2:SEM309ENCL1
SEM3 9M ENCL Type 12W 16DT x 12W X 6D	US2:SEM309ENCL12
SEM3 9M ENCL Type 4 16DT x 12W X 6D	US2:SEM309ENCL4
SEM3 15M ENCL Type 1 16DT x 12W X 6D	US2:SEM315ENCL1
SEM3 15M ENCL Type 12W 16DT x 12W X 6D	US2:SEM315ENCL12
SEM3 15M ENCL Type 4 16DT x 12W X 6D	US2:SEM315ENCL4
SEM3 21M ENCL Type 1 20T x 12W x 6D	US2:SEM321ENCL1
SEM3 21M ENCL Type 12W 20T x 12W x 6D	US2:SEM321ENCL12
SEM3 21M ENCL Type 4 20T x 12W x 6D	US2:SEM321ENCL4
SEM3 42M ENCL Type 1 20T x 16W x 6.62D	US2:SEM342ENCL1
SEM3 42M ENCL Type 12W 20T x 16W x 6.62D	US2:SEM342ENCL12
SEM3 42M ENCL Type 4 20T x 16W x 6.62D	US2:SEM342ENCL4
SEM3 45M ENCL Type 1 20T x 16W x 6.62D	US2:SEM345ENCL1
SEM3 45M ENCL Type 12W 20T x 16W x 6.62D	US2:SEM345ENCL12
SEM3 45M ENCL Type 4 20T x 16W x 6.62D	US2:SEM345ENCL4



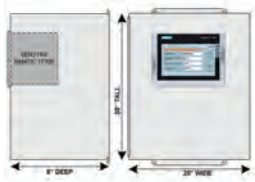
SEM3 Enclosure without display



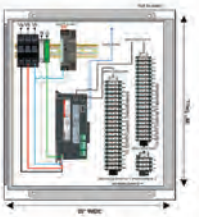
SEM3 Enclosure without meter modules installed

Standard Enclosure with HMI Display & Switch for External Application - SEM3 Meter Modules, and CT's are not included

Description	Catalog Numbers
SEM3 3M w/display/switch 16 x 16 x 6.5	US2:SEM303ENCL1DS
SEM3 3M w/display 16 x 16 x 6.5	US2:SEM303ENCL1D
SEM3 9M w/display/switch 16 x 16 x 6.5	US2:SEM309ENCL1DS
SEM3 9M w/display 16 x 16 x 6.5	US2:SEM309ENCL1D
SEM3 15M w/display/switch 20 x 16 x 8	US2:SEM315ENCL1DS
SEM3 15M w/display 20 x 16 x 8	US2:SEM315ENCL1D
SEM3 21M w/display/switch 20 x 16 x 8	US2:SEM321ENCL1DS
SEM3 21M w/display 20 x 16 x 8	US2:SEM321ENCL1D
SEM3 42M w/display/switch 20 x 20 x 8	US2:SEM342ENCL1DS
SEM3 42M w/display 20 x 20 x 8	US2:SEM342ENCL1D
SEM3 45M w/display/switch 20 x 20 x 8	US2:SEM345ENCL1DS
SEM3 45M w/display 20 x 20 x 8	US2:SEM345ENCL1D



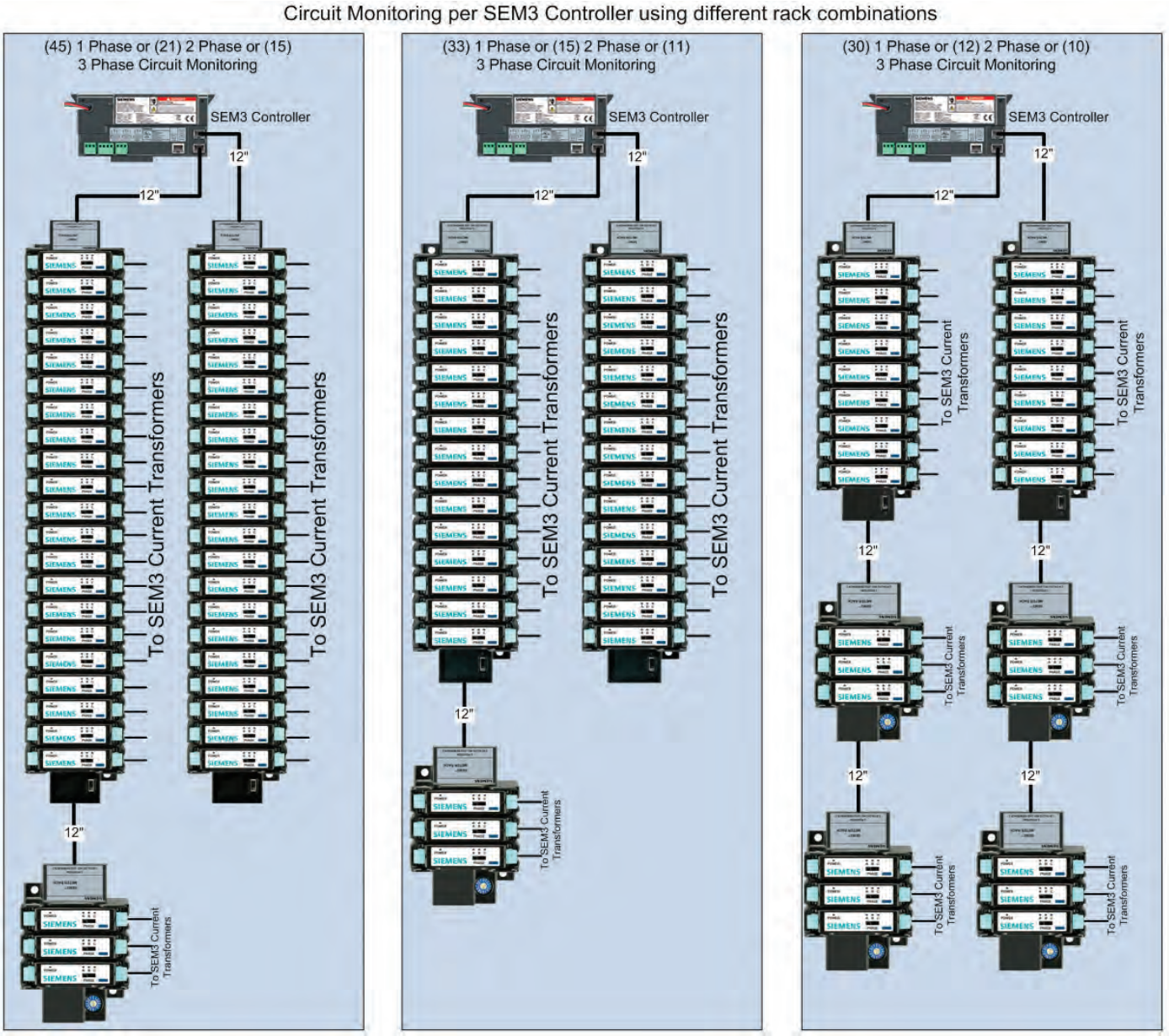
SEM3 Enclosure with display



SEM3™ Network Topology Solutions

Rack Configurations

A few common SEM3 meter rack combinations are shown below. Highlighted on the left is the maximum number of single phase circuits one SEM3 controller may monitor, 45. This configuration is common in applications where the meter points are located relatively close together, such as a panelboard. Moving from left to right, an increased level of flexibility regarding the physical meter rack positioning is observed. This increased flexibility allows for SEM3 to monitor circuits that are stretched across a larger physical area. For example, the configuration on the right would be more commonly found in a switchboard or switchgear retrofit application.



Note: 600V Isolated Ethernet cables between controller and racks are available in 6", 12", 24" and 36" lengths.

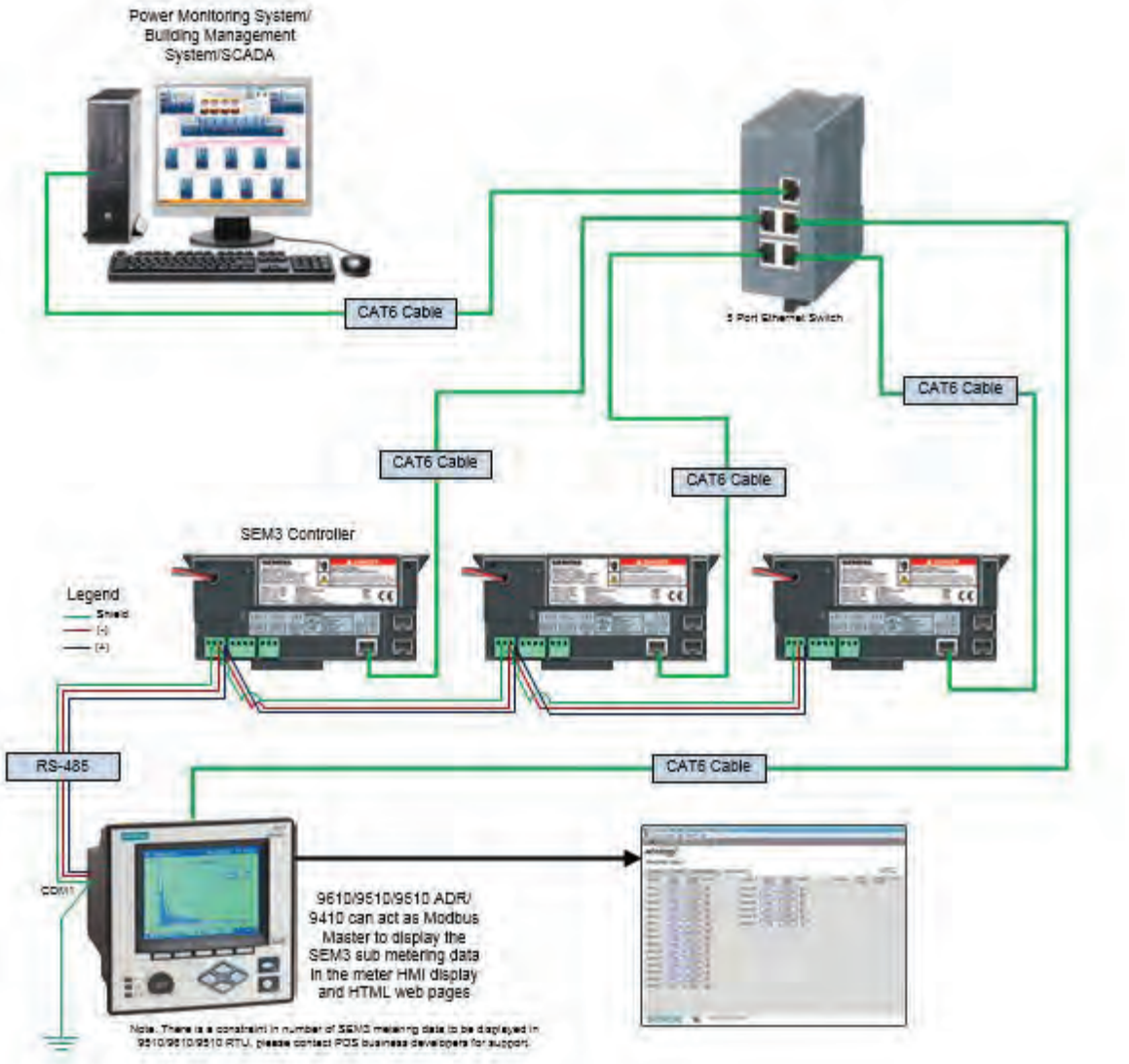
SEM3™ Network Topology Solutions

Modbus Mastering Configurations

The system below highlights an application in which data is displayed via a centralized EPMS/BMS/SCADA system and a Siemens 9610, 9510, 9510 ADR, or 9410 meter. This monitoring scheme is ideal for critical power applications where high levels of redundancy are required as part of a predictive maintenance energy management model. In a switchgear application the 9610/9510/9410 meter can read, consolidate, display, and log the SEM3 system data. The EPMS portion of the system communicates using a CAT6 network integrated with an Ethernet switch. The Modbus master/slave communication with a 9410, 9510, 9510 ADR, or 9610 meter uses an RS-485 Ethernet network. No switch is required in this half of the system.

Please contact your PDS business developer to learn more about constraints dictating the number of SEM3 controllers a single 9610, 9510, 9510 ADR, or 9410 meter may interface with.

Modbus Mastering to display SEM3 system data and Parallel Monitoring in EPMS / BMS / SCADA

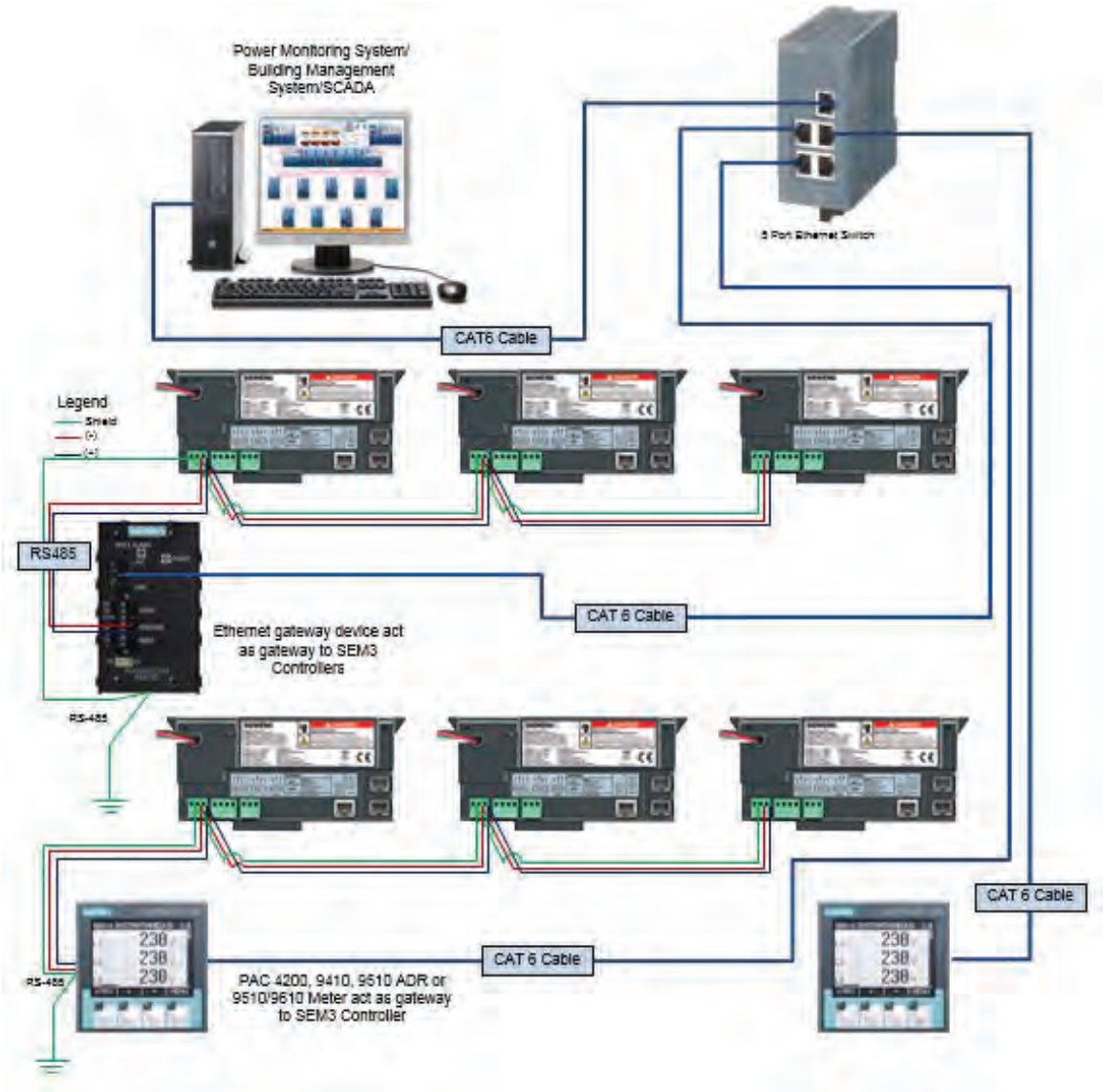


SEM3™ Network Topology Solutions

Serial to Ethernet Gateway Configurations

In the system shown below, two different types of serial to ethernet gateways are employed in the communication channels between the SEM3 controller and a master monitoring system. The first subsystem uses a third party Ethernet converter to act as a gateway for the SEM3 controllers. The controllers communicate via RS-485 to an Ethernet gateway device, which in turn communicates via CAT6 to a centralized Ethernet switch. The second subsystem uses a Siemens PAC 4200, 9410, 9510 ADR or 9510/9610 meter to act as a gateway between the SEM3 controllers and master monitoring system. In this case a 5 port Ethernet switch acts to consolidate the two CAT6 signals to one, which is routed to the master monitoring system.

SEM3 Ethernet gateway pass through configurations



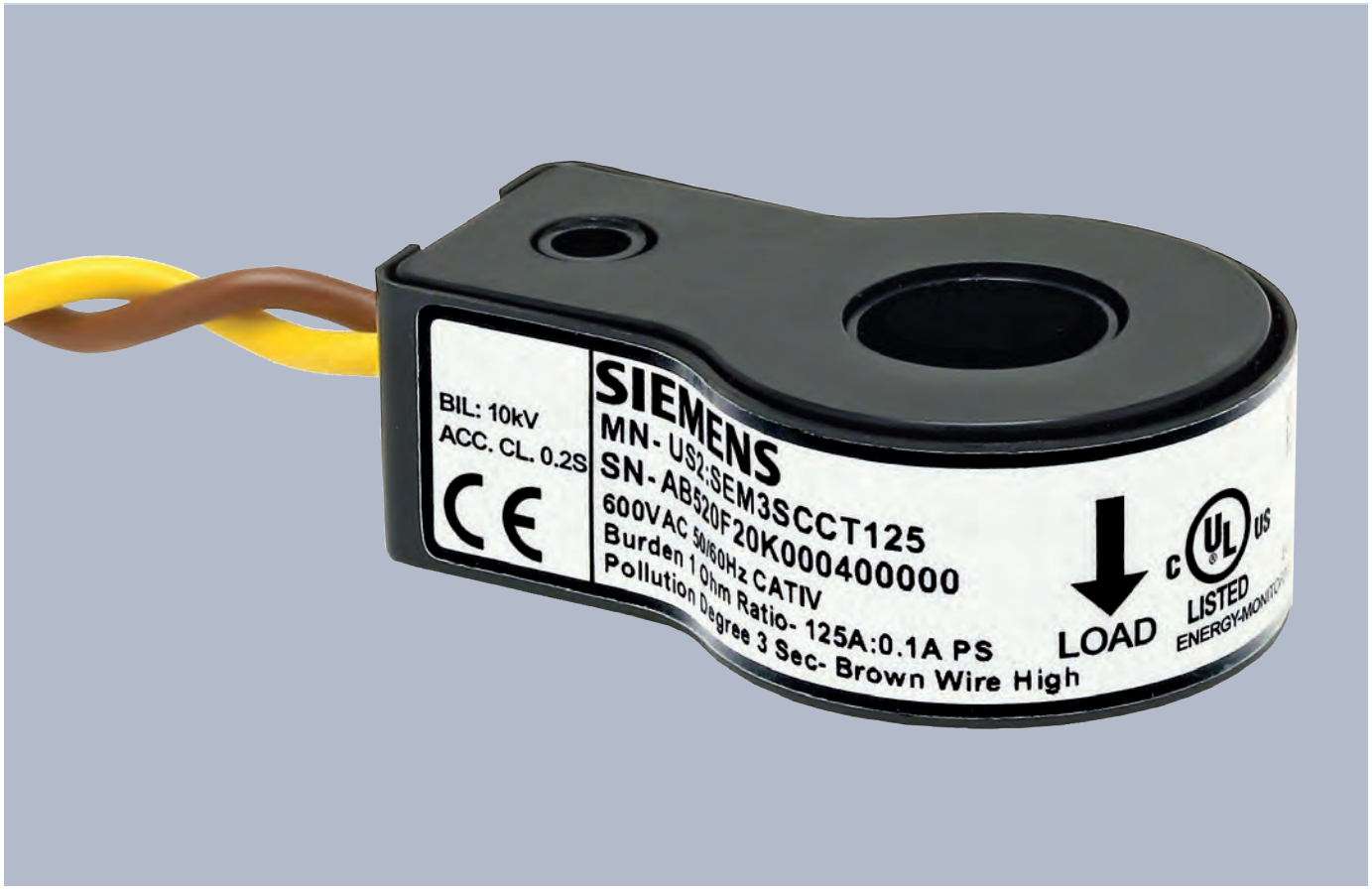
Solid and Split Core CTs

To ensure installation of SEM3 is a quick and simple process, Siemens offers a range of solid and split core milliamp CTs with current ratios ranging from 50 to 2000A. These milliamp CTs provide an easy and safe solution because of their self shorting design. No CT shorting blocks are needed. The split core style allows an installer to provide an easy and fast installation without removing the existing wiring in a retrofit application. Both solid and split core CTs have a standard lead length of 6 feet, but will maintain rated accuracy with lead lengths up to 500 feet.

Please contact your local sales representative to confirm availability of these components.

Solid Core CTs

Description	Catalog Numbers	Accuracy
Solid Core CT 50:01 (0.38" Window) - 100 mA Output	US2:SEM3SCCT50	0.2 or 1.0%
Solid Core CT 125:01 (0.66" Window) - 100 mA Output	US2:SEM3SCCT125	0.2 or 1.0%
Solid Core CT 250:01 (0.90" Window) - 100 mA Output	US2:SEM3SCCT250	0.2 or 1.0%
Solid Core CT 400:01 (1.60" Window) - 100 mA Output	US2:SEM3SCCT400	0.2 or 1.0%
Solid Core CT 600:01 (2.30" Window) - 100 mA Output	US2:SEM3SCCT600	0.2 or 1.0%
Solid Core CT 800:01 (2.60" Window) - 100 mA Output	US2:SEM3SCCT800	0.2 or 1.0%
Solid Core CT 1200:01 (2.80" Window) - 100 mA Output	US2:SEM3SCCT1200	0.2 or 1.0%
Solid Core CT 1600:01 [square] (4.50" Window) - 100 mA Output	US2:SEM3SCCT1600	0.2 or 1.0%
Solid Core CT 2000:01 [square] (4.50" Window) - 100 mA Output	US2:SEM3SCCT2000	0.2 or 1.0%



Solid and Split Core CTs

Split Core CTs

Description	Catalog Numbers	Accuracy
Split Core CT 50:01 (0.50 x 0.50" Window) - 100 mA Output	7KT1280-5MA00	1.00%
Split Core CT 125:01 (0.75 x 0.75" Window) - 100 mA Output	7KT1280-5MA01	1.00%
Split Core CT 250:01 (1.00 x 1.00" Window) - 100 mA Output	7KT1280-5MA02	1.00%
Split Core CT 400:01 (1.50 x 1.50" Window) - 100 mA Output	7KT1280-5MA03	1.00%
Split Core CT 600:01 (2.14 x 2.17" Window) - 100 mA Output	7KT1280-5MA04	1.00%
Split Core CT 800:01 (3.00 x 3.14" Window) - 100 mA Output	7KT1280-5MA05	1.00%
Split Core CT 1200:01 (3.27 x 3.02" Window) - 100 mA Output	7KT1280-5MA06	1.00%
Split Core CT 1600:01 (4.50 x 4.50" Window) - 100 mA Output	7KT1280-5MA07	1.00%
Split Core CT 2000:01 (4.50 x 4.50" Window) - 100 mA Output	7KT1280-5MA08	1.00%

Notes

Notes

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