Specifying an SMP Gateway

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Specifying an SMP Gateway

To assist you in using the accompanying price list, we have put together the following guidelines that will help you select the appropriate options when specifying an SMP.

- Selecting the SMP Gateway model
- Selecting the hardware options
- Selecting the software options
- Selecting the protocols
- Selecting training, warranty and support options

Selecting the SMP Gateway Model

With few exceptions, all models of the SMP Gateway share the same software capabilities. The differences between the models are mostly hardware, and applications developed on one model can generally be ported to another with minimal configuration effort.

- The **SMP 4** is the low cost solution for small substations and distribution automation projects. It supports all of the software capabilities of the SMP Gateway, except redundancy and the Soft PLC. It provides a single Ethernet port, 3 RS-232 serial ports and 1 universal RS-232/422/485 serial port. An optional internal modem can replace one of the RS-232 ports.

- The **SMP 16/CP** sets the standard for substation gateways. It offers 16 universal serial ports, 2 metallic or optical Ethernet ports, IRIG-B redistribution and optional GPS clock.

- The **SMP 16/SG** adds expansion capabilities to the SMP 16. It supports up to two expansion modules. The serial port module adds 16 universal serial ports to the SMP Gateway, providing a capability of up to 48 serial ports. The Ethernet Switch module provides metallic and Ethernet connectivity for the substation, without requiring the use of an external switch.

The SMP 4-20 and SMP 8-40 remain available and Cybectec will continue to support these models for existing customers.

The following table summarizes the features of each model.

SMP 4, SMP 16/CP, and SMP 16/SG Specifications

	SMP 4	SMP 16/CP	SMP 16/SG
Physical			
Height	1.77" (45 mm)	5.22" (132.6 mm) – 3U	
Width	4.27" (108.5 mm)	19" (482.6 mm)	
Length	6.3" (160 mm)	11.02" (280 mm)	
Power Supply			
Range	9-18 VDC, 18-72 VDC, 85-264 VAC/110-370 VDC	18-36 VDC, 36-75 VDC, 85-264 VAC/105-370 VDC	
Maximum energy consumption	5 W	25 W	25 W
Connectivity			
Ethernet	1 10/100Base-T	2 10/100Base-T, optional 100Base-FX	
Serial Ports	1 RS-232/422/485 3 RS-232 1 RS-232 Console	16 RS-232/422/485 1 RS-232 Console	
Optional Serial Ports	No	No	Up to 2 Serial port expansion modules with 16 RS-232/422/485
Internal Modem	Optional built-in 33.6 Kbps V.34 modem (replaces 1 RS-232 serial port)	Standard built-in 33.6 Kbps V.34 modem	
I/O			
	-	1 normally-closed alarm contact, indicates normal system operation 1 software-controlled normally-open relay contact	
Time Synchronization			
	-	Standard modulated or demodulated IRIG-B input Demodulated IRIG-B distributed to all connected devices Automatically sets SMP internal clock	
		Optional internal GPS clock receiver with 0,083-second accuracy	
Expansion Capabilities			
	-	4 USB ports, 1 VGA output, 1 x PCCARD (for custom requirements)	
	-	-	1 or 2 expansion modules: Serial port expansion module—16 RS-232/422/485 16 port Ethernet switch—10/100Base-T and/or 100Base-FX

	SMP 4	SMP 16/CP	SMP 16/SG
Features			
Real-time clock with battery backup	Yes		
Built-in watchdog timer, power supply monitoring	Yes		
Built-in self-diagnostics	Yes		
Passthru connections	Yes		
Built-in web server	Yes		
Dialup connections	Yes		
Automation functions	Yes		
Windows®–based configuration and maintenance tools	Yes		
Redundancy support for mission-critical applications	No	Yes	
Soft PLC	No	Yes	
Supported Protocols			
	DNP3, IEC 60870-5-101/103/104, MODBUS, SEL, GE, ABB, L&G, COOPER, and most electrical industry proprietary protocols		
	-	IEC 61850, UCA 2.0 and ICCP	
Limits			
Maximum device connections[1] (master connections)	1, 8 or 16[2]	16 or 128[3]	128
Maximum control center connections[4] (slave connections)	1 or 4[5]	2 or 64[6]	64
Maximum data points[7]	5,000	10,000	

[1] Maximum number of individual devices managed by the SMP, connected directly, by a multi-drop link, or by network connection

[2] 1 with **protocol converter** configuration, 8 with **data concentrator** configuration, and 16 with **mini-gateway** configuration

[3] 16 with basic configuration, 128 with **additional connectivity option**

[4] A data point cannot be made available to more that 16 control centers at a time.

[5] 1 with **protocol converter** and **data concentrator** configuration, 4 with **mini-gateway** configuration

[6] 2 with basic configuration, 64 with **additional connectivity option**

[7] The maximum number of data points is the total count of I/O points retrieved from the connected devices, plus the logical data points that can be provided by the SMP itself to indicate its status and the status of the devices.

	SMP 4	SMP 16/CP	SMP 16/SG
Environmental			
Ambient operating temperature	-40°C to 65°C	-40°C to 65°C	
Storage temperature	-40°C to 85°C		
Standards Comliance[8]			
IEC-61850-3 EMI Immunity Type Tests	With few exceptions	Yes	
IEEE-1613 EMI Immunity Specifications	With few exceptions	Yes	
IEEE C37.90 and IEC 60255 Protective Relay Standards	With few exceptions	Yes	
TIA-968-A and CS-03 for Telephone Terminal Equipment	Yes	Yes	
CE Marking for Low Voltage Electrical Equipment	Yes	Yes	
Warranty			
	5 years limited		

- If you have selected an **SMP 4**, continue on page 5 for the hardware options.
- If you have selected an **SMP 16**, skip to "Specifying SMP 16/CP and SMP 16/SG Options", page 7.

[8] Complete compliance information available on request

Specifying SMP 4 Options

Specify the Configuration

The **SMP 4** is available in 3 different configurations, according to the number of devices and control centers to be connected.

Select the required configuration:

P-PSMP-0403	SMP 4 protocol translator configuration "One to one" Connects 1 device to one 1 control center Includes 1 Master and 1 Slave protocol licenses.
P-PSMP-0402	SMP 4 data concentrator configuration "Many to one" Connects a maximum of 8 devices to 1 control center Includes 1 Master and 1 Slave protocol licenses.
P-PSMP-0404	SMP 4 mini-gateway configuration "Many to many" Connects a maximum of 16 devices to a maximum of 4 control centers Includes 1 master and 1 slave protocol licenses.

An SMP 4 configuration can be upgraded at a later time by purchasing one of the following upgrades:

P-SSMP-5001	SMP 4 protocol translator to data concentrator Adds the capability to support up to 8 devices.
P-SSMP-5002	SMP 4 protocol translator to mini gateway Adds the capability to support up to 16 devices and 4 control centers.
P-SSMP-5003	SMP 4 data concentrator to mini gateway Adds the capability to support up to 16 devices and 4 control centers.

Specify the Power Supply

P-PUPG-0403	85-264 VAC, 110-370VDC power supply for SMP 4 (standard)
P-PUPG-0405	9-18 VDC power supply for SMP 4
P-PUPG-0402	18-72 VDC power supply for SMP 4

Specify the Hardware Options

The only hardware option available for the SMP 4 is an internal modem, which replaces one of the 3 RS-232 serial ports. With the modem option installed, the SMP 4 provides 1 RS-232/422/485 and 2 RS-232 serial ports. This option is not field installable and must be specified at time of purchase.

P-PUPG-0404	Internal 33.6 Kbps V.34 Modem Replaces one RS-232 serial port. Adds the capability to establish a dialup connection to remote devices and control centers. Requires P-SSMP-0701 modem support software.

Cabling

In order to configure the networks settings of the SMP 4 and load the firmware, you will need to connect it to a PC using a standard DB-9M to DB-9F cable.

P-CABC-0107	DB-9M to DB-9F, console port cable Used to connect all SMP models to a PC. Required for initial system configuration and loading of SMP firmware.

► Skip to "Specifying SMP Software Options", page 11.

Specifying SMP 16/CP and SMP 16/SG Options

Specify the SMP 16/CP Configuration

The basic **SMP 16/CP** configuration can connect up to 16 devices to a maximum of 2 control centers, using any combination of RS-232, RS-422, RS-485 or TCP/IP connections. The SMP 16/CP **additional connectivity option** raises this capability to 128 devices and 64 control centers.

P-SSMP-5201	SMP 16/CP additional connectivity option Adds to SMP 16/CP the capability to connect to a maximum of 128 devices and a maximum of 64 control centers.

Specify the Power Supply

P-PUPG-0301	85-264 VAC, 105-370 VDC power supply (standard)
P-PUPG-0303	18-36 VDC power supply
P-PUPG-0302	36-75 VDC power supply

Add Optical Ethernet Interfaces, if Required

The SMP 16 optical Ethernet interfaces are internally mounted on a small piggyback board that includes a PCMCIA (PC CARD) adaptor.

P-POPT-1601	Dual optical interface for SMP 16 Dual 100 Mbps optical interface for 1300 nm multimode fiber with ST full duplex connectors. Includes adaptor for one PCMCIA card. For SMP 16/CP and SMP 16/SG.

Add the Internal GPS Clock, if Required

Both the SMP 16/CP and SMP 16/SG models support an optional internal GPS clock. With this option, the SMP can synchronize its internal clock and distribute an IRIG clock to all connected devices. This option is not field installable and must be specified at time of purchase.

P-POPT-1602	GPS clock for SMP 16 Factory installed GPS clock with 0,083-second accuracy. Requires cable, antenna, amplifier and surge protection to be purchased separately.

Operation of the clock requires the addition of an antenna, mounting bracket and surge suppressor. The GPS clock has been tested to provide the best quality of reception with the recommended antenna, using RG-8 cable. Substitution is not recommended.

POPT-1616	GPS active antenna kit for the SMP 16 GPS Clock Active outdoor bullet III antenna with TNC connector, includes 82 ft. (25 m) of RG-8 cable with TNC connectors at both ends. Mounting bracket P-POPT-1619 and surge suppressor P-POPT-1613 required.
POPT-1619	Mounting bracket for GPS antenna Variable angle mounting bracket, include 0,75 in. (1.9 cm) diameter, 14 thread per 1 in. (2.54 cm) support pole.
POPT-1613	Surge suppressor kit for SMP 16 GPS clock Includes surge suppressor and 6.5 ft. (2 m) cable with TNC connectors at both ends.

The GPS antenna is provided with 82 ft. (25 m) of RG-8 cable. Cable lengths in excess of 25 m require an inline amplifier. Custom cable lengths can be ordered, as well as the connectors and tool necessary to assemble the cable.

POPT-1615	Inline amplifier kit for SMP 16 GPS Clock Includes 20 dB in-line amplifier and 19.7 in. (50 cm) cable with TNC connectors at both ends. Required if antenna cable length exceeds 82 ft. (25 m).
POPT-1617	RG-8 GPS antenna cable, custom length RG-8 cable, without connectors. Requires P-POPT-1618 crimping tool. Price per meter, minimum length of 39 in. (1 m).
POPT-1618	Crimping tool for TNC connectors Includes 4 TNC connectors
POPT-1620	TNC connector for RG-8 cable Price per connector. 2 connectors per cable required. P-POPT-1618 crimping tool required for assembly.

Specify SMP 16/SG Expansion Modules

The SMP 16/SG supports two expansion modules which can be used to add serial ports or the Ethernet switch module.

One or two P-POPT-1603 serial ports modules can be added to extend the SMP 16/SG capability to 32 or 48 serial universal ports.

P-POPT-1603	Serial ports module for SMP 16/SG Adds 16 universal RS232/422/485 serial ports to the SMP 16/SG. Distributes demodulated IRIG-B to each port.

The SMP 16/SG Ethernet switch modules provide substation-grade Ethernet connectivity, in metallic, fiber optic, or mixed configurations. One of the built-in ports of the SMP

16/SG must be connected to the switch module using the provided cable, as if it were an external switch.

The P-POPT-1601 dual optical interface option is required to connect the SMP 16/SG to the P-POPT-1610 fiber-optic switch module.

P-POPT-1605	Ethernet switch module with 16 10/100Base-T ports Adds 16 10/100Base-T ports to the SMP 16/SG, RJ-45 connectors. Includes P-CABC-1601 11.8 in. (30 cm) RJ-45 cable.
P-POPT-1610	16 port fiber-optic Ethernet switch module Adds 16 100Base-FX ports to the SMP 16/SG, LC connectors. Includes P-CABC-1602 30 cm ST to LC fiber optic cable.
P-POPT-1611	16 port fiber-optic plus metallic Ethernet switch module Adds 8 100Base-FX ports with LC connectors, and 8 10/100Base-T ports with RJ-45 connectors to the SMP 16/SG. Includes P-CABC-1601 11.8 in. (30 cm) RJ-45 cable.

Cabling

In order to configure the networks settings of the SMP 16 and load the firmware, you will need to connect it to a PC using a standard DB-9M to DB-9F cable.

P-CABC-0107	DB-9M to DB-9F, console port cable Used to connect all SMP models to a PC. Required for initial system configuration and loading of SMP firmware.

- For a single SMP, skip to "Specifying SMP Software Options", page 11.
- For a redundant configuration, continue to "Specifying Redundant SMP", page 10.

Specifying Redundant SMP

Common Considerations

The following guidelines apply when specifying a redundant configuration of SMP 16. The SMP 4 model cannot be used in a redundant configuration.

- Both the active SMP and standby SMP must be of the same model, with the same hardware options, and the same number of additional ports.
- If the GPS clock is installed, both SMP Gateways should have their own antenna.
- Two communications links are required between the active and passive SMP. Serial or Ethernet links can be used.
- Since only one SMP is active at a time, you need only purchase software options and protocol licenses for one SMP.

You must specify the redundancy software option:

P-SSMP-0401	Redundancy support Provides the capability to group two SMP in a redundant configuration. The standby SMP automatically takes over if the main SMP fails. Not available for SMP 4 model.

Connecting Devices to Redundant SMP 16/CP and SMP 16/SG

Use the following splitter cable to connect devices to the serial ports of both SMPs:

P-CABC-0112	Single DB-9F to dual DB-9M cable Used to connect a device to two redundant SMP 16. 1 cable required for each device

► Continue to "Specifying SMP Software Options", page 11.

Specifying SMP Software Options

All SMP models are provided with a CD containing SMP software, PC-based tools and complete documentation.

Before using the SMP, you must select the device protocols, control center protocols, and software options that you intend to use. Using this information, Cybectec will provide you with an activation key that will allow you to create the specific software configuration for each SMP.

The **SMP 16/CP** and **SMP 16/SG** share a common licensing model that is based on the master and slave protocols to use.

The **SMP 4** licensing model is different and is based on the number of connections, as explained further on.

Specifying Master and Slave Protocols

Master protocols are used to communicate with devices. Slave protocols are used to communicate with control centers.

When specifying an SMP Gateway, you must purchase a license for each master and slave protocol that will be used. Both types of protocols are different and must be purchased separately.

Standard protocols can generally be used to communicate with devices from different manufacturers. For instance, the MODBUS protocol is quite common in the automation industry, and can be used to communicate with a large variety of devices from different manufacturers.

Proprietary protocols are often limited to a specific device model. For instance, all SEL device protocols are slightly different, and you will need to purchase different protocol licenses for different models such as SEL-321, SEL-351 and SEL-421. The first SEL protocol is sold at the indicated price; additional SEL protocols are discounted 50%.

SEL protocol licenses are now available in bundles of 5, 10 or 20 different protocols. The selected protocols must be specified at the time of the order.

P-RPKG-1001	SEL master protocol 5 pack Support five different SEL master protocols. Protocols must be selected at time of purchase.
P-RPKG-1002	SEL master protocol 10 pack Support ten different SEL master protocols. Protocols must be selected at time of purchase.
P-RPKG-1003	SEL master protocol 20 pack Support twenty different SEL master protocols. Protocols must be selected at time of purchase.

Note: The ICCP protocol is not available for the SMP 4 model.

Note: Configuration of UCA 2.0, IEC 61850 and ICCP protocols is complex and Cybectec engineering support is recommended.

The SMP 4 Licensing Model

The **SMP 4** licensing model is based on the number of devices, control centers and protocols used.

The **SMP 4 protocol translator** can connect a single device to a single control center. The purchase price includes a master and a slave protocol license. If more devices are required, you should specify an *SMP 4 Data Concentrator*. If additional control centers connections are required, you should specify an *SMP 4 Mini Gateway*.

The **SMP 4 data concentrator** can connect up to 8 devices to a single control center. The purchase price includes a master and a slave protocol license. If all devices use the same protocol, no additional protocol licenses are required. If different protocols are used, you must purchase a master protocol license for each additional protocol.

P-SSMP-5101	SMP 4 master protocol license Provides the SMP 4 data concentrator and SMP 4 mini-gateway with the capability to use an additional master protocol.

The **SMP 4 Mini Gateway** can connect up to 16 devices to 4 different control centers. The purchase price includes a master and a slave protocol license. If all devices use the same protocol, no additional protocol licenses are required. If different protocols are used, you must purchase a master protocol license for each additional protocol.

In the same manner, if different protocols are used for the control centers, you must purchase a slave protocol license for each additional protocol.

P-SSMP-5102	SMP 4 slave protocol license Provides the SMP 4 Mini Gateway with the capability to use an additional slave protocol.

Note: While an SMP 4 protocol license provides the capability to use any of the available protocols, Cybectec requests that your orders specify the protocols that will be used. This information will help us complete your customer profile and provide the best service possible.

Specify Software Options

The following software options are available for all models of the SMP, unless otherwise indicated.

To simplify configuration and commissioning, you should always specify the **Web Server** and **Passthru** options.

P-SSMP-0101	Embedded SMP Web server Provides access to SMP real-time and maintenance data using a standard web browser.
P-SSMP-0301	Passthru support Used to establish a transparent connection between programs running on a PC and any device connected to the SMP.
P-SSMP-0201	Soft PLC engine Provides the SMP with the capability to run automation scripts developed with the CoDeSys IEC 61131-3 workbench. Not available for SMP 4 model.
P-SSMP-0501	SNMP agent Allows an SNMP manager to poll the SMP for statistics, link-up alarms, link-down alarms, SMP reset alarms. Supports SMP reset and statistic reset.
P-SSMP-0603	Automation function package Comprehensive set of logic and group operations for the SMP Gateway.
P-SSMP-0701	Modem support Adds the capability to establish a dialup connection to remote devices and control centers. Required to use an external modem or the SMP 4, SMP 16/CP or SMP 16/SG internal modem.

Documentation

All SMP Gateways are provided with all the required software and documentation on CD.

Printed documentation can be ordered separately, or in combination with the console port cable in the SMP Starter Kit.

P-DPRN-0102	Printed SMP documentation SMP Gateway user manual, covers all SMP models.
P-DPRN-0103	SMP starter kit Includes P-DPRN-0102 printed SMP documentation and P-CABC-0107 DB-9M to DB-9F console port cable

Training

The SMP Gateway is a complex product. You should always plan for basic training in order to help you make the most out of your SMP Gateway.

While the SMP is provided with first quality documentation, the following basic course should be considered a prerequisite to getting started:

P-TTRN-0101	Using the SMP Gateway training Basic SMP Gateway training. Covers principles of operation, applications, setting-up the gateway, configuring master and slave protocols. Two days.

The following courses can be combined with the basic SMP Gateway training to provide additional protocol knowledge and experience:

P-TTRN-0106	Using the DNP3 protocol training Expands on the protocol knowledge presented in the basic SMP training. Covers advanced functions and data types, event classes, configuring a master to poll a device, configuring a slave to process polling requests. One day. Must be combined with "Using the SMP Gateway" training.
P-TTRN-0107	Using the IEC 60870-5-101/103/104 protocol training Expands on the protocol knowledge presented in the basic SMP training. Covers advanced functions and data types, configuring a master to poll a device, configuring a slave to process polling requests. One day. Must be combined with "Using the SMP Gateway" training.

The following course is recommended before using the built-in automation functions or the Soft PLC options:

P-TTRN-0102	SMP automation functions training Implementing substation automation applications using the gateway's built-in automation functions and the Soft PLC. Basic SMP training is prerequisite.

SMP Warranty and Maintenance

SMP 4, SMP 16/CP and SMP 16/SG

Cybectec will promptly replace or repair any device that fails during a period of 5 years after delivery.

SMP Software and Tools

During a period of 18 months after delivery or 12 months after installation, whichever occurs first, Cybectec will correct any software problem that prevents the system from meeting stated customer requirements.

Technical Support

The basic warranty includes free technical support from our engineering staff for up to 5 incidents during a period of 18 months after delivery or 12 months after installation. Questions and problems can be submitted by the designated customer contact by email, fax or phone during our normal business hours: 8 AM to 5 PM EST.

Warranty Extension, Maintenance Plan and Engineering Support

The basic SMP warranty and support can be extended using one of the following options:

P-TWAR-0101	SMP warranty extension plan The SMP warranty extension plan ensures that your SMP and its accessories will promptly be replaced with a pre-configured unit in the event of a hardware failure.
P-TMNT-0101	SMP maintenance plan The SMP maintenance plan provides continuous access to the latest version of the gateway software and of the PC-based configuration and maintenance tools. The plan also ensures unlimited access to our technical support staff to assist in you using the tools to configure your SMP.
P-TENG-0101	SMP engineering support plan The SMP engineering support plan provides you with access to our technical support staff to assist you with your automation project.