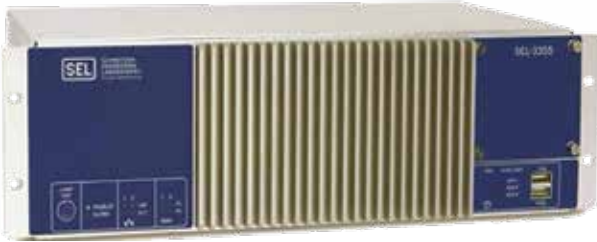


# Power Plant Controller +ESS

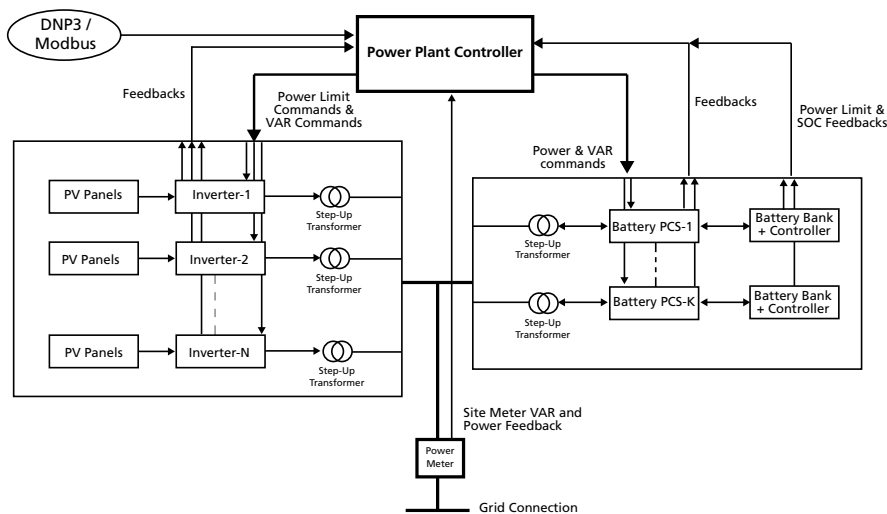
## Centralized management of the entire PV plant system



### Capabilities:

- Overall supervisory control of up to 510 inverters ensuring smooth operation of the plant at all times.
- Includes control of ESS assets when available.
- Precision control of VAR, PF, Voltage, Power, Ramp Rate and Frequency, Peak shifting.
- Robust response to, and recovery from, communication faults.
- Integrated data historian function.

A typical Solar Ware® installation consists of multiple Solar Ware® skid-mounted inverters, each skid is configured with multiple power channels routed through a central DC box and Power Optimization inverter. The Power Plant Controller continually monitors all the solar inverters at the site and adjusts commands to accomplish site-wide power quality goals.



### Key Features

- Remote control of PPC via Modbus/DNP3
- Robust Data Historian
- Live trending available for any transmitted signal
- PV and ESS control from single point
- Can work with non-TMEIC ESS inverters

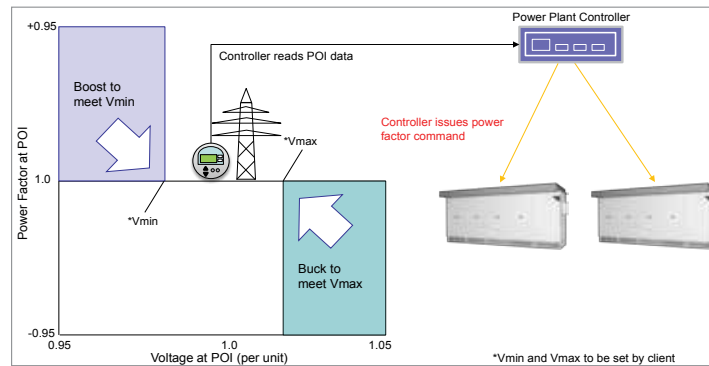
### Data Historian

- 2TB available for Data Historian storage
- Easy data access for troubleshooting, customer support and performance evaluation.

<b>Controller Performance</b>		
Controller access speed		Fast using Remote Desktop Protocol (RDP)
Control cycle speed		<1 second
Data Historian		Access all live inverter data & through historian at: 1 sec. resolution – 1 year (all points)
Third party control access		MODBUS/DNP3
Control accuracy		Zero long term error, transient errors limited to less than 1% of rated
Performance snapshot		Included
<b>Controller Capability</b>		
Slew Rate Control		Min 1% per second, Max 100% in 15 seconds ESS enhanced for control during loss of irradiance
Real Power Limit Control		In ACKW. ESS enhanced to maintain power limit with loss of irradiance
Reactive Power Control	Voltage Control	90-110% (within limits of the inverters) ESS enhanced to use extra capability of the ESS inverters and can be used at night
	Power Factor Control	+85% - 85% (within limits of the inverters) ESS enhanced to use extra capability of the ESS inverters and can be used at night
	Direct VAR Control	Set a KVAR output value for the plant (within limits of the inverters) ESS enhanced to use extra capability of the ESS inverters and can be used at night
Sequential start-up / shut-down		Included
System start-up / shut-down		Included
Frequency control included		ESS enhanced for better performance
ESS Peak Shifting		Included
ESS Nighttime Power Limit		Reduces plant DC power consumption at night by discharging batteries

# Power Plant Controller + ESS

## Voltage Control - How it Works



Communications	
Ethernet Ports	2 rear, 10 or 100 Mbps TCP/IP
USB Ports	2 front, 4 rear
Encrypted Communications	SSL / TLS, SSH, HTTPS
Protocols	DNP3, Modbus TCP / IP
User Interface	Front panel displays
Security	Internet Protocol security (IPsec) virtual private network (VPN)
Data	
Update Rate / Band Width	1 sec per inverter; 100 kbps per inverter (approx.)
Physical Characteristics	
Dimensions/Weight	18.31" x 11.49" x 5.22" and 20 lbs. max.
Mounting	Horizontal rack mount
Enclosure	Treated for chemically harsh / humid environments
Operating Temperature	Operating Temperature: -40°F to +167°F (-40°C to +75°C) Storage Temperature: con -40°F to +185°F (-40°C to 85°C)
Altitude	5,000 m max.
Operating System	
Conformal Coat	None
Chassis and Mounting	3U Horizontal Rack Mount
Processor	Intel i7-3555LE Dual Core 2.5GHz Temperature Range: -40°F to +167°F (-40° to +75°C)
Expansion Slots	5 Slots: 1 PCI, 2 PCIe-x1, 2 PCIe-x4
Power Supply A	SEL-9331 160W HV Power Supply, Euro Terminal Block 125/250 Vdc or 120/240 Vac SEL-9331 160W HV Power Supply, Euro Terminal Block 125/250 Vdc or 120/240 Vac
Power Supply A	Line cord; 120 Vac North American Plug 8 Ft*
Power Supply B	None
RAM Slot 1	4GB DDR3 1333MHz ECC MiniDIMM
RAM Slot 2	None
SSD Slot 1	250GB Industrial Grade SLC SSD*
Power Consumption	AC < 30 VA; DC < 30 W
Input Voltage Range	85 - 300 Vdc / 88-132 Vac; 85 - 264 Vdc / 88 - 132 Vac; 18 - 60 Vdc polarity dependent
Rated Supply Voltage	125 - 250 Vdc / 110 - 230 Vac; 48 - 125 Vdc, 110 Vac; 24 - 48 Vdc
Standards	
Enclosure Protection	IEC60529:2001 + CRGD: 2003
Vibration	Vibration Standards: IEEE 1613-2009, IEC 60255-21-1; 1988, IEC 60255-21-2; 1988, IEC 60255-21-3; 1993 16 hours at 167°F (75°C) (i7-3555LE CPU)
Dry Heat	Dry Heat Standards: IEEE 1613-2009, IEC 60068-2-2; 2007
Certifications	NRAQ, NRAQ7 per UL 508, C22.2 No. 14, ISO 9001, IEC 60255-5, EN 61000-6-2

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