Grid-Tie Inverters

Often referred to as the "brains" of a renewable energy system, an inverter is an electronic device that converts direct current (DC) power from batteries or solar modules into alternating current (AC) power.

Grid-tie, or utility intertie, inverters convert DC power from photovoltaic (PV) modules directly into AC power to be fed into the utility grid. Storage batteries are not needed, as any power produced that is not consumed by the owner's electrical loads is fed into the utility grid to be used elsewhere. Due to the high voltages involved, grid-tie inverters should be installed and serviced only by qualified electricians.

All grid-tie PV systems use the utility grid for energy storage. Whenever the PV array is generating more power than the loads are using, excess energy is fed into the grid, literally turning the meter backward. When the loads require more power than the PV array can supply, the utility makes up the difference. Known as "net metering," this arrangement is the most efficient and cost-effective for grid-tied applications since there are no batteries to maintain. However, most grid-tie inverters are required by law to shut down during a utility outage. Battery-based dual function grid interactive inverters (See Battery-Based Inverters) are required for a power applications.

Most batteryless grid-tie inverters are "string" inverters because the PV modules must be wired together in series to obtain a higher input voltage. **String Inverters** are designed to run at voltages up to 600 VDC in residential systems and up to 1,000 VDC for commercial and industrial systems. String wiring is quick and easy to install, and the higher voltage helps to minimize line losses and required wire size. However, in string wiring, maximum power point tracking (MPPT), along with any monitoring output, is performed at the string or array level.

An important trend to note is that many string inverter manufacturers, including SMA, Power-One, and SolarEdge have introduced **Transformerless** (aka non-isolated) inverters due to their higher efficiency and lower manufacturing costs. While transformerless inverters have dominated the European market and are arguably even safer than their isolated counterparts, they do impose special "ungrounded system" requirements according to NEC 690.35. This includes the use of PV-Wire for DC connections, including the module outputs, as well as fusing and switching on both output legs. The term *ungrounded* should not be confused with the equipment ground, which is still required; it means that neither the positive nor negative outputs are connected to ground. Some jurisdictions will also require special circuit labels noting that both conductors are "hot". See Electrical Distribution Parts for compliant combiners, switches, and labels.

Module Optimizers can be deployed behind each module to provide individual module-level MPPT tracking and monitoring, optimizing the DC output that is connected to a string inverter for very high efficiency. Systems, such as SolarEdge, that combine optimizers with low-cost high-efficiency string inverters can simplify system design and maximize safety and energy harvest with minimal impact on cost and efficiency.

Microinverters, such as the Enphase unit pictured here, are typically mounted behind each solar module. They convert the DC output of each module to AC, replacing the high DC voltages (up to 600 VDC) with comparatively lower AC potentials (240 VAC or less) and simplifying system design. The microinverter output connects directly to the breakers in the AC load center using conventional wiring. Since microinverters provide MPPT tracking and monitoring for individual modules, the impact of differences in orientation or shading between modules is reduced. Microinverters are a popular solution for electrical contractors that are new to solar as DC wiring is essentially eliminated.

Central inverters are used in larger commercial grid-tie systems, typically more than 30 kW, as they are often more economical than using multiple string inverters. These large inverters are typically configured-to-order with integrated combiners, switchgear, and even monitoring.

SolarEdge

Distributed MPPT Grid-Tie Inverter System

The SolarEdge distributed grid intertie system combines module-level maximum power point tracking (MPPT), DC-DC power optimizers, and monitoring with high-efficiency transformerless string inverters to maximize the energy yield of a PV installation.

The SolarEdge system provides design flexibility by mitigating shading, module mismatch, uneven soiling, and aging variance losses. It automatically maintains a fixed string voltage so the inverter operates at peak efficiency regardless of string size, shading, or temperature. This allows flexible string lengths ranging from 8 to 25 modules for single-phase and 16 to 50 for three-phase inverters as well as varying module sizes, tilts, and orientations. The system is scalable and simplifies expansions and replacements since future modules need not match existing ones. Fewer but longer strings can also reduce DC-side balance-of-system (BOS) requirements.

SolarEdge inverters are ungrounded (non-isolated) on the DC side, so all PV array wiring must use double-insulated PV Wire (including factory-installed module wire leads). The SolarEdge power optimizers have a 25-year warranty, and the SolarEdge inverters have a 12-year warranty (extendable to 20 or 25 years). Power optimizers and inverters are listed to UL 1741 for the U.S. and Canada.

SolarEdge OP Power Optimizers

All SolarEdge power optimizers can be used with crystalline silicon PV modules and include arc fault protection for both series and parallel arcs, which is code required for certain types of installations. Once a power optimizer detects an arc, it automatically shuts the module down, effectively terminating the arc and preventing its re-occurrence. Power optimizers are available with MC4, Tyco, Amphenol H4, or H&S Radox input connections; all units have MC4 connectors on the output side. All power optimizers below have a NEMA6 rating and are rated to +85°C. All power optimizers have 99.5% peak efficiency and are backward-compatible with older SolarEdge products.

The built-in **SafeDC** feature automatically shuts off the power optimizers' DC current and voltage when it detects excessive heat or when the SolarEdge inverter is turned off or disconnected from the grid. This ensures installer and firefighter safety. A safe module voltage of 1 VDC per module eliminates electrocution risk during installation and servicing. This feature also provides a handy way to check for correct string wiring before commissioning and before high voltage DC is present.

The **OP250-LV** power optimizers have a PV module input range of 5-55 VDC and up to 250 W of power output. This unit is the best choice for standard 60-cell PV modules with power outputs of 250 W or less, where the total temperature-corrected open-circuit voltage is below 55 VDC and the maximum current does not exceed 10 A.

The **OP300-MV** power optimizers have a PV module input range of 5-75 VDC and up to 300 W of power output. This unit is the best choice for 60 or 72 cell PV modules with power outputs between 250 W and 300 W. They are also the best choice for high-voltage modules, so long as the total output and voltage does not exceed the above limits and the current output is under 10 A.

The **OP400-MV** power optimizers have a PV module input range of 5-75 VDC but up to 400 W of power output. This unit is the best choice for 72 cell PV modules with power outputs between 300 W and 400 W so long as the total output and voltage does not exceed 400 W and 75 VDC and the current output is under 10 A. The **OP400-EV** power optimizers extend the input voltage limit to 125 VDC.

SolarEdge Power Optimizers							
Model	**Description**	**Output connector**	**Rated input power**	**Operating range**	**Max input DC current**	**PV module output cable connector**	**Item code**
OP250-LV-MC4SM-3NA	250 W (55 VDC max input)	MC4	250 W	5-55 VDC	10 A	MC4	**300-00016**
OP250-LV-TYCRM-3NA						Tyco	**300-00018**
OP250-LV-AH4SM-3NA						H4	**300-00019**
OP300-MV-MC4SM-3NA	300 W (75 VDC max input)	MC4	300 W	5-75 VDC	10 A	MC4	**300-00020**
OP300-MV-TYCRM-3NA						Tyco	**300-00022**
OP300-MV-AH4SM-3NA						H4	**300-00023**
OP400-MV-MC4SM-3NA	400 W (75 VDC max input)	MC4	400 W	5-75 VDC	10 A	MC4	**300-00024**
OP400-MV-TYCRM-3NA						Tyco	**300-00026**
OP400-MV-AH4SM-3NA						H4	**300-00027**
OP400-EV-MC4SM-3NA	400 W (125 VDC max input)	MC4	400 W	60-125 VDC	5.5 A	MC4	**300-00028**
OP400-EV-TYCRM-3NA						Tyco	**300-00030**
OP400-EV-AH4SM-3NA						H4	**300-00031**

SolarEdge Inverters

The SolarEdge inverters are designed to work exclusively with SolarEdge power optimizers. These transformerless inverters perform only DC to AC inversion of incoming power from one or multiple strings because MPPT and voltage management is handled by the power optimizers. They include a code-compliant AC/DC disconnect, on-board Ethernet interface, and RS-485 serial port. All SolarEdge inverters are listed to UL 1741 for the U.S. and Canada and are NEMA 3R rated. The US inverters are rated for use from -4°F to 140°F temperatures. The Canadian version (CAN) inverters are rated for use at temperatures down to -40°.

Single-phase inverters range from 3 kW to 7 kW rated AC power output and work with 208, 240, and 277 VAC systems. Single-phase inverters all weigh 48 lbs and reach 98% CEC weighted efficiency. Three-phase inverters range from 7 kW to 20 kW rated AC power and work with 208V and 480 VAC systems. All three-phase inverters weigh 70.5 lbs and reach 97.5% CEC weighted efficiency.

SolarEdge Single-Phase Inverters

Model	Description	Inverter output watts			Max continuous AC output current			Item code US version	Item code Canadian version
		208	240	277	208	240	277		
SE3000A-US	3.0 kW 1Ø grid-tied inverter	3,000 W			16 A	14 A	--	**030-09473**	**030-09483**
SE3800A-US	3.8 kW 1Ø grid-tied inverter	3,800 W			18.5 A	16 A	--	**030-09474**	**030-09484**
SE5000A-US	5.0 kW 1Ø grid-tied inverter	5,000 W			24A	21 A	18 A	**030-09475**	**030-09485**
SE6000A-US	6.0 kW 1Ø grid-tied inverter	5,200 W	6,000 W	6,000 W	25 A	25 A	21.5 A	**030-09476**	**030-09486**
SE7000A-US	7.0 kW 1Ø grid-tied inverter	5,200 W	6,000 W	7,000 W	25 A	25 A	25 A	**030-09477**	**030-09487**

SolarEdge Three-Phase Inverters

Model	Description	Inverter output watts (VAC)		Max continuous AC output current per phase (VAC)		Item code US version	Item code Canadian version
		208 WYE	480 WYE	208 WYE	480 WYE		
SE7kUS	7.0 kW 3Ø grid-tied inverter	7,000 W		19.5 A	8.5 A	**030-09479**	**030-09501**
SE8kUS	8.0 kW 3Ø grid-tied inverter	8,000 W		22.5 A	10.0 A	**030-09480**	**030-09502**
SE9kUS	9.0 kW 3Ø grid-tied inverter	9,000 W		25.0 A	11.0 A	**030-09481**	**030-09503**
SE10kUS	10.0 kW 3Ø grid-tied inverter	--	10,000 W	--	12.0 A	**030-09478**	**030-09504**
SE12.5kUS	12.5 kW 3Ø grid-tied inverter	--	12,500 W	--	15.5 A	**030-09497**	**030-09505**
SE15kUS	15 kW 3Ø grid-tied inverter	--	15,000 W	--	18.5 A	**030-09498**	**030-09506**
SE18kUS	18.0 kW 3Ø grid-tied inverter	--	18,000 W	--	22.0 A	**030-09499**	**030-09507**
SE20kUS	20.0 kW 3Ø grid-tied inverter	--	20,000 W	--	24.0 A	**030-09500**	**030-09508**

SolarEdge Module-Level Monitoring

SolarEdge provides free web-based monitoring for the first 25 years. The system provides PV performance monitoring, fault detection, and troubleshooting at module, string, and system levels. Web-based software provides real-time monitoring, facilitating increased system uptime, and lowering maintenance costs. Remote fault detection pinpoints the location of underperforming modules on a virtual PV site map.

The monitoring sensors and transmitters are built-in and data is transmitted over the DC power lines. Connection between the inverter(s) and the internet can either be by Ethernet or a wireless connection using a **ZigBee** gateway with connections between multiple inverters using their RS-485 connection ports.

A free monitoring **iPhone app** is available as a download from the Apple iTunes Store. Registered users can monitor multiple sites from their iPhone. The application provides an at-a-glance view of past and present energy production. Current weather conditions and forecasts are also presented to aid in assessing the system's performance.

The **Site Mapping Tool** software is also available free on the SolarEdge website, which allows barcode scanning for creation of a virtual site map using an iPhone. The **Site Designer** software and an **Inverter Configuration Tool** for on-site configuration and module-level installation verification are available free online as well.

ZigBee Wireless for SolarEdge		
Model	**Description**	**Item code**
SE1000-ZB02-MST-NA	ZigBee wireless module for SE Inverter, External Antenna, Master, Digi International	**030-09492**
SE1000-ZB02-SLV-NA	ZigBee wireless module for SE Inverter, External Antenna, Slave, Digi International	**030-09493**
SE1000-ZBDG2X-NA	ZigBee to Ethernet Interface for SE Inverter, X2 Kit, Extended Range Antenna, and one Slave module, Digi International	**030-09496**

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Enphase

Grid-Tie Microinverter System

A microinverter converts the DC output from a single PV module into grid-compliant AC power and is meant to be located near the module. The Enphase Microinverter System simplifies design and installation by alleviating string-sizing constraints, and it optimizes the energy harvest of each module through independent maximum power point tracking (MPPT). An Enphase System consists of microinverters, Engage trunk cables, the Envoy Communications Gateway, and the web-based Enlighten monitoring and analysis service.

Through individualized MPPT, Enphase microinverters help mitigate the effects of shading, dust, debris, module mismatch, and thermal differences. With module-level monitoring, performance issues can be traced to individual modules to expedite troubleshooting.

Each PV module is connected directly to its own microinverter, typically mounted on the racking underneath. The microinverter's AC wire harnesses are connected to form an AC branch circuit that leads to the AC utility distribution center. System safety is enhanced since all of the output wiring from the PV array is AC and no high-voltage DC is present once the AC power is shut down, reducing risk for maintenance personnel or firefighters.

Enphase Microinverters are rated NEMA 6, operate at full power in ambient temperatures from -40°C (-40°F) to 65°C (149°F), are Listed to UL 1741 for the U.S. and Canada, and comply with IEEE1547, FCC Part 15 Class B, as well as CAN/CSA-C22.2 NO. 0-91, .4-04, and 107.1-01.

Enphase M215 Microinverters

The M215 microinverter is compatible with most 60-cell PV modules (up to 260 W) and works with 208 VAC three-phase or 240 VAC single-phase services. The maximum number of M215 microinverters in an AC branch circuit is 17 for 240 VAC single-phase systems and 25 for 208 VDC three-phase systems. Each AC branch circuit must be protected with a 20 A circuit breaker. The M215 has automatic voltage sensing, but the Engage trunk cable used to complete the circuit is specific to the output voltage required.

Be sure to verify that the voltage and current specifications of your PV module are within the input range of the M215 microinverter. A list of electrically-compatible PV modules can be found on the Enphase.com website. To ensure mechanical compatibility, be sure to order the microinverter with the correct connector type for the PV module that you are using.

The M215 Microinverters are covered by a 25-year limited warranty.

Enphase M215 Microinverter									
Model	Description	Module watts	AC output volts	AC output (max)	Max DC voltage	DC MPPT voltage	Module connector	CEC rated efficiency	Item code
M215-60-2LL-S22	For 60-cell modules, **Ampenol H4** PV connectors	190 -260 W	208 or 240	215 W	45 VDC	22 - 36 VDC	Ampenol H4	96.0%	**030-07701**
M215-60-2LL-S23	For 60-cell modules, **Tyco PV** connectors						Tyco		**030-07703**

Enphase Engage Cable System

The **Engage Cable** is a continuous 12 AWG (2.5 mm²) outdoor rated cable with integrated connectors for M215 microinverters. The connectors are preinstalled at intervals to accommodate PV module widths or lengths. The microinverters plug directly into the connectors, and the Engage Cable is terminated into a junction box that feeds electricity back to the system's AC disconnect.

Engage Cables are specific to portrait or landscape module orientation as well as 208 VAC or 240 VAC output. The gap between connectors on a portrait cable of either voltage is 40" while the landscape cable has a 67" connector spacing to accommodate the width and length of a standard 60-cell module.

The cable can be cut to size. One end is wired directly into a junction box at the head of the branch circuit without a separate AC interconnect cable. The other end is sealed using an **Engage Branch Terminator**. The M215 microinverter AC cable connectors are then plugged into the regularly-spaced Engage Cable connectors. Any unused connectors must be protected with an Enphase waterproof **Sealing Cap** (the plastic covers on the connectors at shipment are not weather-tight and cannot be used in place of a Sealing Cap).

Engage Cables for both portrait and landscape installations are available in 40-connector lengths for 240 VAC single-phase, or in 30-connector lengths for 208 VAC three-phase systems, and include one **Enphase Install Kit** (4 Branch Terminators, 1 Cable Disconnect Tool, 5 Sealing Caps), and 100 wire clips. Cables in 8, 12, and 16-connector lengths with Enphase install kits (1 Branch Terminator, 1 Cable Disconnect Tool, 1 Sealing cap and tool, and 20, 30, or 40 wire clips) for portrait or landscape 240 VAC single-phase systems.

Both types of Engage Cables are also available, without an install kit, in bulk lengths with 240 connectors. This is useful for installers who plan to put in multiple M215 systems. The contents of the install kit can also be ordered individually.

A **Branch Terminator** is used to seal the stub ends of each branch circuit. The terminator separates and insulates the individual conductors contained in the Engage trunk cable. One terminator is needed per branch circuit. ***NOTE:*** The terminator is intended for one-time use only. The latching mechanism will be damaged if the terminator is removed after installation.

A watertight **Sealing Cap** is used to seal any unused trunk cable connectors to IP67 weatherproofing standards. Unused trunk cable connectors generally occur where the trunk cable transitions to another module row or needs to span a gap in the array.

The **Engage Coupler** is used to connect the cut ends of the Engage cable together or to join it to a lower cost standard cable without a junction box.

Stainless Steel **Cable Clips** are used to fasten Engage trunk cable to racking or to secure looped cabling and are available in packs of 100.

The **Disconnect Tool** is required to safely disconnect the microinverter's AC output cable from the Engage connector. The tool is reusable, so one per job is usually sufficient.

Enphase Installation Cable Kits and Accessories - For M215 Microinverters

Model	Description	Item code
ET10-240-08	Trunk Cable Kit, 8 Connectors, Portrait, with Disconnect Tool, Terminator, Cap, and 20 Cable Clips, for M215, 240 VAC	**052-10000**
ET10-240-12	Trunk Cable Kit, 12 Connectors, Portrait, with Disconnect Tool, Terminator, Cap, and 30 Cable Clips,for M215, 240 VAC	**052-10001**
ET10-240-16	Trunk Cable Kit, 16 Connectors, Portrait, with Disconnect Tool, Terminator, Cap, and 40 Cable Clips, for M215, 240 VAC	**052-10002**
ET10-240-40	Trunk Cable Kit, 40 Connectors, Portrait, with Install Kit and Cable Clips, for M215, 240 VAC	**030-07731**
ET10-240-BULK	Bulk Trunk Cable, 240 Connectors, Portrait, for M215, 240 VAC	**030-07739**
ET17-240-08	Trunk Cable Kit, 8 Connectors, Landscape, with Disconnect Tool, Terminator, Cap, and 20 Cable Clips, for M215, 240 VAC	**052-10003**
ET17-240-12	Trunk Cable Kit, 12 Connectors, Landscape, with Disconnect Tool, Terminator, Cap, and 30 Cable Clips, for M215, 240 VAC	**052-10004**
ET17-240-16	Trunk Cable Kit, 16 Connectors, Landscape, with Disconnect Tool, Terminator, Cap, and 40 Cable Clips, for M215, 240 VAC	**052-10005**
ET17-240-40	Trunk Cable Kit, 40 Connectors, Landscape, with Install Kit and Cable Clips, for M215, 240 VAC	**030-07733**
ET10-208-30	Trunk Cable Kit, 30 Connectors, Portrait, with Install Kit and Cable Clips, for M215, 208 VAC	**030-07735**
ET17-240-BULK	Bulk Trunk Cable, 240 Connectors, Landscape, for M215, 240 VAC	**030-07741**
ET17-208-30	Trunk Cable Kit, 30 Connectors, Landscape, with Install Kit and Cable Clips, for M215, 208 VAC	**030-07737**
ET10-208-BULK	Bulk Trunk Cable, 240 Connectors, Portrait, for M215, 208 VAC	**030-07743**
ET17-208-BULK	Bulk Trunk Cable, 240 Connectors, Landscape, for M215, 208 VAC	**030-07745**
ET-INSTL	Install Kit for M215 (includes 4 Branch Terminators, 1 Cable Disconnect Tool, 5 Sealing Caps)	**030-07721**
ET-TERM	Branch Terminator for M215 Trunk Cable	**030-07711**
ET-DISC	Cable Disconnect Tool - for Disconnecting Inverter Cable from Trunk Cable	**030-07715**
ET-SEAL	Sealing Cap, watertight cap for unused trunk cable connector socket	**030-07717**
ET-CLIP-100	Cable Clips - 100-pack	**030-07719**
ET-SPLK-05	Engage Cable Coupler - Splice Kit, 5-pack	**030-07713**

Enphase Module Level Monitoring

Enphase Energy's monitoring technology is integrated into their microinverters, so there is no need for a separate monitoring system. However, the **Envoy Communications Gateway (Envoy)** is required to interface with the microinverters and includes access to the Enphase Enlighten online monitoring service. The Envoy plugs into any standard AC outlet and collects microinverter performance information over the existing power line. An Ethernet cable can then be used to connect the Envoy to the installation site's existing Internet access point or local area network. Once online, the Envoy will automatically access the Enphase Enlighten web service.

The Envoy's LCD display provides at-a-glance performance data, and more detailed per-module information is accessible through the Enphase Enlighten website, which displays each module's real-time performance data in a physically accurate representation of the system. The Enphase Enlighten service can also notify the user or service staff via email when it detects underperforming modules or system faults. One Envoy is required for monitoring on each installation of up to 250 inverters. The Envoy is Listed to UL 60950.

An **Enphase Line Communication Filter (ELCF)** is required for installations with more than 250 inverters. The ELCF includes an Envoy and terminals for connecting the combined circuits from the Micro-inverters it is monitoring. Each ELCF can monitor up to 111 micro-inverters at 240 VAC single-phase, and 166 micro-inverters at 208 VAC 3-phase. External communication is by Ethernet. This is all mounted in an outdoor NEMA4 enclosure. The ELCF is listed to UL508A.

The Enphase **RGM-MTR-01** is a revenue grade metering solution for 240 VAC single-phase Enphase systems. This Form 2S kWh meter is installed in the combined output circuits from the entire solar array. Communication from the RGM to the envoy is via ZigBee wireless. The **RGM-ZGB-01** USB ZigBee stick is required for the Envoy. The **RGM-RR-01** ZigBee repeater can be used to increase the ZigBee wireless range.

Enphase Module Level Monitoring		
Model	**Description**	**Item code**
ENV-120-01M	Envoy Energy Management Unit, indoor enclosure, with Ethernet bridge pair and Enlighten monitoring	**030-07705**
ELCF-120-001	Line Communication Filter	**030-03750**
ELPC-01	Powerline Carrier Ethernet bridge pair	**030-03752**
RGM-MTR-01	Enphase compatible GE i210+ revenue grade meter with ZigBee wireless	**030-07710**
RGM-RR-01	ZigBee repeater for RGM	**030-07708**
RGM-ZGB-01	ZigBee USB stick for Envoy communication with RGM	**030-07709**

Enphase Environ Smart Thermostat

The Enphase **Environ Smart Thermostat** integrates with the Enphase Enlighten website, enabling simultaneous management of residential solar power and HVAC systems in a single web-based platform. Users can program or adjust their home temperature using a web browser or smart phone, as well as directly with the Environ's touch-screen display.

Environ wirelessly connects to the Envoy using the ZigBee communications protocol. The Envoy connects the Environ to the Internet and the Enlighten website. The Environ works with most common residential heating and cooling systems as well as with multi-stage heat pumps, humidifiers, de-humidifiers, and external air baffles. The Enlighten website, smart-phone app, or Environ touch screen can be used to program up to 3 heating stages and 2 cooling stages over 7 periods per day with variations for each day of the week. Each Environ includes a 1-year subscription to the Enlighten web service.

Environ Smart Thermostat		
Model	**Description**	**Item code**
EVRN-RT-01	Enphase Environ Smart Thermostat w/ ZigBee kit	**085-03701**
EVRN-RT-02	Enphase Environ Smart Thermostat w/ ZigBee (additional)	**085-03702**
EVRN-RR-01	Enphase Environ repeater for ZigBee interface (optional)	**085-03711**


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Fronius

Fronius IG Plus and IG Plus V Inverters

Fronius IG Plus and IG Plus V inverters offer high efficiency, intelligent thermal management, light weight and easy installation. The inverters' integrated LCD displays and records over 20 inverter and system operation parameters. All Fronius IG Plus and IG Plus V inverters include a lockable code-compliant DC disconnect with a built-in 6-circuit fused string combiner that can remain on the wall when the inverter is removed for servicing.

The internal string combiner can accept fuses up to 20 A per circuit. Fuses sold separately (see Electrical Distribution Parts for KLKD fuses). 2 **busbars** (one of each polarity) are required to bypass the internal combiner for higher current inputs, such as when an external combiner box is used.

Fronius inverters have 3 expansion slots to add external sensors, remote displays, or other options. Inverter firmware upgrades can be made using a PC or laptop. The 5 kW and larger inverters have multiple power stages that can inactivate during periods of low insolation to maximize efficiency and energy harvest.

The single-phase inverters are field selectable 208, 240 or 277 VAC and are available in sizes from 3 kW to 11.4 kW. These inverters can also be used in 3-phase systems by using 3 inverters, each connected across two phases. The **IG Plus 10.0-3**, **11.4-3 (Delta)**, and **12.0-3 (WYE 277)** have true 3-phase output and a single inverter will put current on all three-phases.

All IG Plus V inverters are designed for operating temperatures of -13 °F to +131°F (-25 °C to +55°C), and can be field configured for either positive or negative ground PV arrays. These inverters are Listed to UL 1741-2010 for U.S. and Canada and compliant with IEEE 1547-2003, IEEE 1547.1, ANSI/IEEE C62.41, FCC Part 15 A& B, NEC Article 690, and C22. 2 No. 107.1-01 (Sept. 2001). Each inverter is covered by a 10-year warranty, which can be extended to 15 or 20 years.

The specifications below are for the IG Plus V, the specifications for the IG Plus may be slightly different.

Fronius IG Plus and Plus V Inverters													
Model	Maximum AC power	DC array voltage	MPPT voltage range	CEC rated efficiency			Maximum AC current			AC output volts	Weight	Item code IG Plus V	Item code IG Plus
				208 V	240 V	277 V	208 V	240 V	277 V				
IG Plus V 3.0-1	3,000 W	230-600 VDC	230-500 VDC	95.0%	95.5%	95.5%	14.4 A	12.5 A	10.8 A	208 or 240 or 277 VAC	55 lbs	**030-08481**	**030-03481**
IG Plus V3.8-1	3,800 W			95.0%	95.5%	95.5%	18.3 A	15.8 A	13.7 A			**030-08483**	**030-03483**
IG Plus V 5.0-1	5,000 W			95.5%	95.5%	96.0%	24.0 A	20.8 A	18.1 A		81 lbs	**030-08485**	**030-03485**
IG Plus V 6.0-1	6,000 W			95.5%	96.0%	96.0%	28.8 A	25.0 A	21.7 A			**030-08487**	**030-03487**
IG Plus V 7.5-1	7,500 W			95.5%	95.5%	96.0%	36.1 A	31.3 A	27.1 A			**030-08489**	**030-03489**
IG Plus V 10.0-1	10,000 W			95.0%	95.5%	96.0%	48.1 A	41.7 A	36.1 A		110 lbs	**030-08491**	**030-03491**
IG Plus V 11.4-1	11,400 W			95.5%	96.0%	96.0%	54.8 A	47.5 A	41.2 A			**030-08493**	**030-03493**
Three-Phase IG Plus V Inverters													
IG Plus V 10.0-3	10,000 W	230-600 VDC	230-500 VDC	95.0%	96.0%	--	27.7 A	24.0 A	--	208 or 240 or 277 VAC	110 lbs	**030-08492**	**--**
IG Plus V 11.4-3	11,400 W			95.5%	96.0%	--	31.6 A	27.4 A	--			**030-08495**	**--**
IG Plus V 12.0-3	12,000 W			--	--	96.0%	--	--	14.4 A	277 VAC		**030-08497**	**--**
Extended warranty - 15 years total for IG Plus (V) 3.0 and 3.8 kW inverters (5-year extension over standard)												**030-03477**	
Extended warranty - 20 years total for IG Plus (V) 3.0 and 3.8 kW inverters (10-year extension over standard)												**100-03072**	
Extended warranty - 15 years total for IG Plus (V) 5, 6 & 7.5 kW inverters (5-year extension over standard)												**030-03476**	
Extended warranty - 20 years total for IG Plus (V) 5, 6 & 7.5 kW inverters (5-year extension over standard)												**100-03073**	
Extended warranty - 15 years total for IG Plus (V) 10, 11.4 & 12 kW inverters												**030-03475**	
Extended warranty - 20 years total for IG Plus (V) 10, 11.4 & 12 kW inverters												**100-03082**	

Fronius IG Wireless Personal Display

The **Fronius Personal Display DL** can aggregate data for up to 15 Fronius IG Plus inverters. The wireless display has a range of up to 500' and shows instantaneous power, voltage, and current as well as daily, yearly, and cumulative data. Each inverter must have a com card wired to the Fronius personal display DL box which makes a wireless connection to the Personal Display DL. The DL box also acts as a data logger. The Display DL can connect to a PC via USB to charge its battery and send data to Fronius's free web-hosted data access. The display can be wall-mounted or freestanding. A wireless card is required for each inverter to be monitored. The display unit is covered by a 2-year warranty.

Fronius Datalogger Web and Accessories

Fronius offers a full line of communications and data logging features to record system parameters and weather conditions. **A COM card** can be installed in each inverter to provide RS422 output and is required for any and all monitoring. All Fronius communications equipment has a 2-year warranty.

The **Datalogger Web** provides data storage and PC Interface over a network connection. It works in tandem with COM Cards within the DATCOM System to provide real-time and archival data. The built-in Web server enables the use of network-based monitoring as well as Fronius's free web-hosted data access. Each Datalogger Web Box supports up to 100 Fronius inverters. A WLAN USB stick can be used for wireless communication between the Datalogger Web and the network.

A **Sensor Box or Sensor Card** is required to add weather **sensors**. The Sensor Box and Card each have 6 inputs—two for measuring temperature, one for measuring irradiance, two digital inputs for a wind speed sensor and/or kilowatt hour meter, and one 20 mA current interface for a humidity sensor.

The **Interface Box** enables a user to output data to an open protocol for systems with up to 100 Fronius IG Plus Inverters for use with third-party monitoring options. This does not replace the need for a Datalogger Box or Card. This interface offers real-time open protocol data without data storage for up to 100 inverters and 10 sensor boxes. **Interface Card Easy** is able to provide data for one Fronius IG inverter without storage. Fronius IG.access Windows-compatible software is supplied free when the Datalogger is ordered or can be downloaded from www.fronius.com.

Fronius IG Plus (V) Inverter Accessories

Model	Mfg. #	Description	Item code
IG Plus V Buss Bar	42,0201,2923	Bypasses internal string combiner for single inputs over 20 A, 2 are required per inverter	**030-03464**
COM card, retrofit	4,240,001,Z	Communications card for all Fronius inverters	**030-03425**
Personal Display DL	4,240,133	Wireless display for IG inverters – needs DL box and com card for each inverter	**030-03421**
Personal Display DL box	4,240,137	Data logger and interface box used with Personal Display DL	**030-03422**
Personal Display DL card	4,240,008,Z	Interface card for Personal Display DL	**030-03419**
Datalogger Web	4,240,123	Data storage & PC Interface wireless enabled w/ built-in Web server for up to 100 inverters	**030-03437**
WLAN USB Stick	41,0018,0070	Connect Datalogger Web wirelessly to WLAN, Indoor use only from 32 to 113 °F	**030-03450**
WLAN USB Stick Outdoor	41,0018,0071	Connect Datalogger Web wirelessly to WLAN, Outdoor rated from -4 to 158 °F	**030-03451**
Sensor card	4,240,004,Z	Monitoring interface with 6 sensor input channels-mounts in inverter	**030-03443**
Sensor box	4,240,104	Monitoring interface with 6 sensor input channels	**030-03442**
Sensor, wind speed	42,0411,0027	Measures wind speed, requires Sensor box	**030-03446**
Sensor, ambient temperature	43,0001,1188	Measures ambient temperature, requires Sensor box	**030-03448**
Sensor, module temperature	43,0001,1190	Adheres to back of PV module and measures temperature, requires Sensor box	**030-03449**
Sensor, irradiance	43,0001,1189	Measures solar insolation, requires Sensor box	**030-03444**
DATCOM power supply	43,0001,1211	Powers Datalogger boxes that are too far from inverters to be powered over com cable	**030-03439**
Cat 5 cable 3.3 feet	43,0004,2435	Connects inverters to each other or to Sensor Box and Datalogger Box	**030-03455**
Smart Converter RS-232 Card	4,240,018,Z	Converts DATCOM system RS422 interface into RS232 interface, mounts in inverter	**030-03460**
Smart Converter RS-232 Box	4,240,118	Converts DATCOM system RS422 interface into RS232 interface	**030-03445**
Smart Converter USB	4,240,119	Converts the DATCOM system interface into USB interface	**030-03447**

Fronius Commercial/Industrial Inverters

The Fronius CL inverter (CL) has modular system architecture with up to 15 identical power modules contained in one central unit. Configurations of 9, 12, or 15 power modules are available for outputs ranging from 33.3 kW to 60 kW. With Fronius' MIX power module management, individual power modules can be automatically activated or disabled depending on solar conditions to achieve 3 separate efficiency peaks. The CL's wide DC input MPPT voltage range maximizes flexibility for system configuration.

The CL's control unit automatically calculates which power modules will be turned on and off in partial load conditions by analyzing the respective operating hours of each unit. This helps to equalize the work load on individual power modules, increasing the service life of the inverter, and provides redundancy in the event of a fault in an individual power module. Individual power modules can be easily removed and replaced for quick servicing via the plug and play drawer design. Power modules can be temporarily removed prior to housing installation, reducing the weight of the housing so it is easier to move and install.

The CL has a NEMA3R enclosure with integrated AC and DC disconnects. An innovative ventilation design prevents dust and moisture from entering the power module area. For indoor installation there is an optional exhaust air guide, allowing the Fronius CL to vent the exhaust hot air to the outside. An integrated relay contact can also be used to control an external fan.

The CL is compatible with the Fronius DATCOM system for comprehensive system monitoring. A Fronius Com Card and a Signal Card are already integrated into the unit. Other components, such as the Fronius Datalogger, the Sensor Box, and environmental sensors, can be added at any time. The **Fronius String Control 250/25** (see below) provides string-level monitoring.

The Fronius CL series inverters are Listed to UL 1741 for the U.S. and Canada. Dimensions (in inches) including optional 4-inch base: 72" H x 43.5" W x 28.5" D. The CL comes with a 10-year warranty.

Fronius String Control 250/25

The Fronius String Control 250/25 combiner and string monitor continually compares the string currents with one another, providing early detection of any problems in individual array strings. It can be used to combine up to 25 module strings with a total current of up to 250 A. The String Control's integrated fuse holder accommodates up to 20 A string fuses. The Fronius String Control 250/25 is compatible with all Fronius inverters and is particularly effective in combination with Fronius CL inverters.

Dimensions (in inches): 26.8" H x 19.7" W x 16.7" D. Weight: 225 lbs.

Fronius IG Plus and Plus V Inverters								
Model	**Max AC power**	**AC output**	**Max AC current**	**Max DC voltage**	**MPPT DC voltage range**	**CEC rated efficiency**	**Weight**	**Item code**
CL 33.3 Delta	33,300 W	208 VAC	92.4 A	600 VDC	230-500 VDC	94.5%	661 lbs	**030-08433**
		240 VAC	80.1 A			95.0%		
L 36.0 WYE 277	36,000 W	277 VAC	43.3 A			95.5%		**030-08436**
CL 44.4 Delta	44,400 W	208 VAC	123.2 A			94.5%	721 lbs	**030-08444**
		240 VAC	106.8 A			95.0%		
CL 48.0 WYE 277	48,000 W	277 VAC	57.8 A			95.5%		**030-08448**
CL 55.5 Delta	55,500 W	208 VAC	154.1 A			94.5%	783 lbs	**030-08455**
		240 VAC	133.5 A			95.0%		
CL 60 WYE 277	60,000 W	277 VAC	72.2 A			95.5%		**030-08460**
CL Mounting Base		Optional cabinet base - 4"						**030-08473**
Fronius String Control 250/25		25 string combiner box, 250 A total current rating						**030-08475**

SMA

SMA Sunny Boy Grid-Tie Inverters

SMA Sunny Boy string inverters are available in sizes from 2,000 W to 11,000 W and can be used in a wide range of applications from small residential systems to very large 3-phase industrial installations. All SMA inverters come standard with built-in LCD digital monitors that display instantaneous power output, the current day's power production, and the total energy produced since installation. All SMA inverters are Listed to UL 1741, UL 1998 for the U.S. and Canada, and are compliant with IEEE-929, IEEE-1547, and FCC Part 15 A & B and are covered by a standard 10-year warranty, with 5- and 10-year extensions available.

SMA Sunny Boy 2000HFUS / 2500HFUS / 3000HFUS

Featuring high efficiency, a slim-line enclosure, and reduced weight, the **Sunny Boy HF-US** series inverters can be mounted between wall studs for new construction and space-constrained applications (requires **Flush Mount**). Installation is simplified by automatic grid voltage detection and field configuration for positive ground. An input voltage range of 175 VDC to 600 VDC increases module selection and string sizing flexibility. The Sunny Boy HFUS series inverters also feature a modern graphic display, wireless Bluetooth communication, and an integrated DC disconnect.

SMA Sunny Boy HF-US Inverters

Model	Max AC power	AC output volts	DC array voltage	MPPT voltage range	CEC rated efficiency	Max AC output		Dimensions (H"x W"x D")	Weight	Item code
						208 VAC	240 VAC			
SB2000HFUS	2,000 W	208 or 240 VAC	175-600 VDC	175-480 VDC	97.0%	9.6 A	8.3 A	29 x 4 x 7	51 lbs	**030-03074**
SB2500HFUS	2,500 W		220-600 VDC	220-480 VDC	96.5%	12 A	10.4 A			**030-03075**
SB3000HFUS	3,000 W				96.5%	14.4 A	12.5 A			**030-03076**
Flush Mount	Mounting-flashing plate for recessed mounting of inverter between studs in wall									**030-03200**

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NEW! SMA Sunny Boy 3000TL-US / 4000TL-US / 5000TL-US

The new **Sunny Boy TL-US** line of transformerless inverters features high efficiency and reduced weight along with both ground and arc fault detection per NEC 2011. An input voltage range of 175 VDC to 600 VDC and dual MPPT input dramatically increases module selection and string sizing flexibility as well as better production when parts of the solar array are shaded. A modern graphic display and an integrated DC disconnect switch are included.

An optional Emergency Power Supply feature enables these inverters to supply up to 12 A at 120VAC to a single outlet for recharging portable devices or a small UPS directly from the PV array. Optional RS485 or Webconnect data modules enable web-based system monitoring with SMA Sunny Portal.

These transformerless inverters work with an ungrounded PV array topology so the requirements of NEC 690.35 must be followed, including using PV Wire for exposed array string wiring. Extended operating temperature range of -40°F to 140°F. Listed to UL1741 and UL1699B.

SMA Sunny Boy TL-US Inverters

Model	Max AC power	AC output	DC array voltage	MPPT voltage range	CEC rated efficiency	Max AC output	Dimensions (H"x W"x D")	Weight	Item code
SB3000TL-US-22	3,000 W	208 or 240 VAC	125-600 VDC	175-480 VDC	97%	15 A	20.5 x 19.3 x 7.3 (add 11.7 height for DC disconnect)	61 lbs including DC disconnect	**030-03204**
SB4000TL-US-22	4,000 W					20 A			**030-03205**
SB5000TL-US-22	5,000 W 4,550 W (208 V)					22 A			**030-03206**

NEW! SMA Sunny Boy 6000 to 11000TL-US

The **Sunny Boy 6-11000TL-US** series inverters feature SMA's innovative H5 topology, resulting in CEC efficiencies up to 98.5%. These transformerless inverters can accommodate most commercial 208 VAC three-phase applications of any size. However, the DC input voltage range is more restrictive when used for a 240 VAC connection, which limits their usefulness in single-phase systems.

All Sunny Boy TL-US inverters come with an integrated DC disconnect, and a separate SMA TL-US Combiner Box with fusing on both the positive and negative DC conductors.

Safety is enhanced with integrated ground fault and arc fault detection and interruption to meet the requirements of the NEC2011 code. The operating temperature range is -40°F to +140°F. Inverter dimensions (without DC disconnect) are 18.4"W x 24.1"H x 9.5"D. Weight of all models is 78 lbs. DC disconnect dimensions are 7.28'W x 11.7"H x 7.5"D and weight is 8 lbs. Listed to UL1741 and UL1998. 10-year warranty extendable to 15 or 20 years.

SMA Sunny Boy 6000 to 11000 TL-US Inverters

Model	Max AC power	AC output voltage	DC array voltage	MPPT voltage range	CEC rated efficiency		Max AC current		Item code
					208	240	208	240	
SB6000TL-US	6,000 W	208 or 240 VAC	300-600 at 208 VAC 345-600 at 240 VAC	300-480 at 208 VAC 345-480 at 240 VAC	98.0%	98.5%	28.8 A	25.0 A	**030-03018**
SB7000TL-US	7,000 W						33.7 A	29.2 A	**030-03019**
SB8000TL-US	8,000 W				98.0%	98.0%	38.5 A	33.4 A	**030-03020**
SB9000TL-US	9,000 W						43.3 A	41.7 A	**030-03021**
SB10000TL-US	10,000 W				97.5%	98.0%	48.1 A	41.7 A	**030-03022**
SB11000TL-US	11,000 W	240 VAC			98.0%		45.8		**030-03023**
PBL-SBUS-10-NR	Power balancer for three-phase circuit protection								**030-03157**

SMA Sunny Boy 3000US / 3800US / 4000US

The compact **Sunny Boy 3000-US/3800-US/4000-US** inverters are suitable for residential and light commercial use and include an integrated DC disconnect as well as built-in ground-fault and arc-fault detection and interruption. They are field configurable for positive ground systems. The 3000US and 4000US are auto-sensing for use on 240 and 208 VAC applications. The 3800US is for 240 VAC only, and is specifically sized for buildings with a 100A service entrance panel (16 A max AC current). All of these inverters come with an integrated DC disconnect and fused 4-circuit series string combiner that can be used with fuses up to 20 A, and are shipped with 15 A fuses. Made in the USA.

SMA Sunny Boy 5000US / 6000US / 7000US / 8000US

The **Sunny Boy 5000-US/6000-US/7000-US** can be used in 208, 240 and 277 VAC applications. The **8000-US** can be used in 240 and 277 VAC applications. These inverters also come with a DC disconnect switch that connects to the bottom of the inverter. The disconnect has an integrated fused 4-circuit string combiner that can be used with fuses up to 20 amps and are shipped with 15 A fuses The disconnect also has an input main lug for array DC input (to be used with a separate combiner box). All four models are field-configurable for positive ground systems and have built-in ground-fault and arc-fault detection and interruption. Made in the USA.

SMA Sunny Boy Inverters								
Model	Max AC power	AC output volts	DC array voltage	MPPT voltage range	CEC rated efficiency	Max AC current	Weight	Item code
SB3000US	3,000 W	208 VAC	200-500 VDC	175-400 VDC	95.0%	15 A	88.6 lbs	**030-03163**
	3,000 W	240 VAC		200-400 VDC	95.5%	13 A		
SB4000US	3,800 W	240 VAC	250-600 VDC	250-480 VDC	96.0%	16 A	88.6 lbs	**030-03162**
SB5000US	3,500 W	208 VAC	250-600 VDC	220-480 VDC	95.5%	17 A	88.6 lbs	**030-03164**
	4,000 W	240 VAC		250-480 VDC	96.0%	17 A		
SB7000US	5,000 W	208 VAC	250-600 VDC	250-480 VDC	95.5%	24 A	141 lbs	**030-03165**
		240 VAC				21 A		
		277 VAC				18 A		
SB6000US	8,000 W	208 VAC	250-600 VDC	250-480 VDC	95.5%	29 A	141 lbs	**030-03166**
		240 VAC				25 A		
		277 VAC			96.0%	22 A		
SB7000US	7,000 W	208 VAC	250-600 VDC	250-480 VDC	95.5%	34 A	141 lbs	**030-03167**
		240 VAC			96.0%	29 A		
		277 VAC			96.0%	25 A		
SB8000US	8,000 W	240 VAC	300-600 VDC	300-480 VDC	96.0%	32 A	148 lbs	**030-03168**
		277 VAC			96.0%	29 A		

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SMA Sunny Boy Data Monitoring and Communications Accessories

SMA Sunny Beam Bluetooth Wireless Monitor

The **Sunny Beam** communicates wirelessly via Bluetooth with up to 12 Sunny Boy inverters and graphically displays key performance data. It features automatic system monitoring, including an audible alert signal, and is powered by an integrated solar cell and rechargeable battery. The Sunny Beam simultaneously displays power output, daily energy production, and total system energy production. It may also be configured to display other parameters, such as the overall CO_2 offset or dollar value of electricity produced. System performance data can be recorded and transferred via a USB interface or through the Sunny Portal website (www.sunnyportal.com) for long-term storage, display, and evaluation. The Sunny Beam has a standard range of up to 150' that can be extended using an optional Bluetooth repeater. All HFUS inverters are set up to communicate with the Sunny Beam. For all other SMA inverters, order a Bluetooth Piggyback card for each inverter to be monitored. Sunny Beam includes a standard 5-year warranty.

SMA Sunny Beam		
Model	**Description**	**Item code**
BEAM-BT	SMA Sunny Beam Bluetooth	**030-03120**
BTPBINV-NR	SMA Bluetooth Piggyback card	**030-03121**
BTPB-EXTANT-NR/US	SMA Bluetooth Piggyback card with external antenna	**300-00044**
BTREP-IN	SMA Bluetooth repeater	**030-03119**
BEAM-BT-SUPPLY	USB plug-in power supply to charge the Sunny Beam batteries	**030-03117**

SMA Sunny WebBox – Sunny Portal Connection

The **Sunny WebBox** provides a connection between SMA inverters and the free Sunny Portal website (www.sunnyportal.com). The Sunny WebBox stores system performance data in its internal 8 MB memory (12.5 MB with the Bluetooth version) or on a standard SD memory card and can be set to upload the data to the Sunny Portal website at user-selectable intervals. The WebBox can be connected to a **Sunny Boy**, **Sunny Tower, Sunny Island**, or **Sunny Central** inverter, and **Sunny SensorBox** devices (up to 50 units total). The Sunny WebBox reports faults immediately by e-mail or text message. Measurement data can be transmitted to the **Sunny Portal** via a GSM modem from remote locations where no DSL or telephone connection is available.

With the standard Sunny WebBox, connection to the inverter or SensorBox device is made with a 4-conductor twisted pair cable between the inverter's RS-485 output and the WebBox terminals. Each inverter requires an **RS-485-N Communication Module**. With the **Bluetooth** version, wireless communication between the inverter(s) and the Sunny WebBox is automatic with an unobstructed range of up to 330', which can be extended using one or more Bluetooth Repeaters. Each inverter requires integrated or Piggyback card based Bluetooth output. Both Sunny WebBox versions connect to a local area network (LAN) with an Ethernet cable or to a phone line with a modem. Both are password protected and are covered by a 5-year warranty.

SMA Sunny SensorBox

The compact **Sunny SensorBox** installs at the PV array to continuously monitor solar irradiation and module temperature, which can be used to calculate the expected output of the PV array for comparison to the actual power output of the inverters. This can help identify and troubleshoot reductions in energy yield.

The included Power Injector feed-in unit connects to the SensorBox via the RS485 communication bus to provide power to the SensorBox and includes a plug-in power supply (120 VAC required).

The Sunny SensorBox sends data to the Sunny WebBox via an RS-485 data link or by wireless communication with the addition of the Bluetooth version of the Power Injector (purchased separately). From there, the data can be transferred to a PC for further processing or to the Sunny Portal for automatic performance analysis. The Sunny SensorBox can accommodate up to 3 additional sensors, such as ambient temperature, wind speed, and an additional irradiance sensor. The Sunny SensorBox is covered by a 5-year warranty.

SMA Power Measurement Kit

The **Power Measurement Kit** provides ANSI C12 Revenue Grade metering, which is often required for Production Based Incentive (PBI) markets. This kit is based on the i.LON SmartServer, Shark 100 meter, and three current transformers and includes a fuse kit.

The **i.LON SmartServer** Modbus Gateway provides a remote network interface into both LonWorks (ANSI 709.1) devices and Modbus devices. The i.LON has been customized for the SMA line of inverters to access controls and monitor the operation of the inverters.

The **Shark 100 meter** exceeds Ansi C12.20 (0.2%) and IEC 687 (0.2%) energy measurement standards and communicates to the SmartServer over Modbus RTU.

SMA Sunny Boy Data Monitoring and Communications Accessories	
Description	**Item code**
Sunny WebBox - RS-485 connection port	**030-03141**
Sunny WebBox-BT-20 - Bluetooth wireless connection	**030-03139**
Sunny SensorBox - RS-485 connection port	**030-03191**
Sunny SensorBox Anemometer	**030-03193**
Sunny SensorBox Ambient Temp Sensor	**030-03195**
Sunny SensorBox Additional Module Temp Sensor	**030-03197**
RS 485 Card for Sunny Boy US and TLUS inverters	**030-03123**
RS 485 Card for Sunny Boy HFUS inverters	**030-03126**
RS 232 Card for Sunny Boy inverters	**030-03122**
Bluetooth Card for Sunny Boy inverters	**300-00044**

SMA Sunny Boy TL-US Combiner Box

The Sunny Boy TL-US Combiner Box has 6 positive and 6 negative fused inputs for up to 6 module strings and meets the requirement for overcurrent protection on both polarities when using transformerless inverters. Fuses are not included. Use 600 VDC rated KLKD fuses (see Electrical Distribution Parts). The maximum string fuse size is 20 A; however, use the chart below to determine the combined maximum current of the array that can be used.

TL-US Combiner Box dimensions are 17.2"W x 12.1"H x 3.8"D. Weight is 8.6 lbs. NEMA 3R enclosure.

SMA Sunny Boy TL-US Combiner Box Current Limits		
Number of strings	**Maximum string current**	**Maximum continuous string current**
3	18.7 A	12 A
4	14 A	9 A
5	11.2 A	7.2 A
6	9.4 A	6 A

Sunny Boy TL-US Combiner Box		
Model	**Description**	**Item code**
SBCBTL6-10	6-String fused combiner for TL inverters	**053-03002**

SMA Commercial and Industrial Inverters

SMA offers a wide variety of inverter solutions for large PV arrays. Varying levels of customization are available with each inverter, so be sure to specify DC disconnects, fusing, and monitoring options when ordering.

Sunny Tower 30kW, 36kW, 42kW and 48kW Systems

The Sunny Tower combines the performance and installation advantages of string inverters with the scale of central inverters in assembled 30, 36, 42, and 48 kW systems. Two Sunny Towers can be combined as 60, 72, 84, or 96 kW systems.

Each Sunny Tower consists of six 5kW, 6kW, 7kW, or 8kW inverters mounted on a stainless steel structure which has a sealed electronics enclosure and is prewired at the factory for 3-phase utility interconnection. This type of system offers the advantage of multiple array MPP tracking, optimum operation under partial load, 96% CEC efficiency and quick delivery. Sunny Towers can be assembled on-site, eliminating the need for specialized heavy equipment. Should a problem ever occur with one of the Sunny Boy inverters, it can be replaced onsite with minimal system interruption and without the need to have a manufacturer's technician brought to the site.

Communication via RS485 is pre-wired as a standard feature and they are available with a Sunny Web-Box for internet-readiness.

Sunny Tower systems are NEMA 3R outdoor rated and are designed for use only in three-phase systems at 208 VAC, 240 VAC or 277 VAC.

Each Tower includes an integrated fused series string combiner, with 24 string inputs and 15A fuses (fuse holders are rated for 20A), and load-break rated lockable AC/DC disconnect switches.

Total weight is 1,115 lbs (Tower is 330 lbs, plus six inverters). 10-year warranty standard. UL Listed to UL 1741 for the U.S. and Canada. CSA compliant (C22.2 No.107.1-0).

NOTE: A Sunny Tower can NOT be used with less than 6 inverters, and cannot be used in single-phase systems. US version comes with gray inverter covers.

SMA Sunny Towers								
Model	3-phase AC voltage	Max AC power	Max AC A output (per phase)			MPPT voltage range	Max DC current	Item code
			208 V	240 V	277 V			
ST30	208/240/277 VAC	30 kW	144 A	126 A	108 A	250-480 VDC	125 A	**030-03064**
ST30+WebBox	208/240 VAC		144 A	126 A	--			**030-03065**
ST30+WebBox 277	277 VAC		--	--	108 A			**030-03066**
ST36	208/240/277 VAC	36 kW	100 A	87 A	44 A	250-480 VDC	150 A	**030-03060**
ST36+WebBox	208/240 VAC		100 A	87 A	--			**030-03061**
ST36+WebBox 277	277 VAC		--	--	44 A			**030-03062**
ST42	208/240/277 VAC	42 kW	117 A	101 A	51 A	250-480 VDC	180 A	**030-03070**
ST42+WebBox	208/240 VAC		117 A	101 A	--			**030-03071**
ST42+WebBox 277	277 VAC		--	--	51 A			**030-03072**
ST48	240/277 VAC	48 kW	--	116 A	58 A	300-480 VDC	180 A	**030-03057**
ST48+WebBox	240 VAC		--	116 A	--			**030-03058**
ST48+WebBox 277	277 VAC		--	--	58 A			**030-03059**

SMA Sunny Central 250U / 500U / 500HE-US Inverters

The **Sunny Central 250U** and **500U** include integrated isolation transformers and deliver 97% CEC-rated efficiency. The **Sunny Central 500HE-US** The Sunny Central 250U and 500U include integrated isolation transformers for direct connection to a 480 VAC grid and deliver 97% CEC-rated efficiency. The Sunny Central 500HE-US couples to an external medium voltage transformer to accommodate long distance power feeds to distribution substations. The user interface features a large LCD screen that provides a graphical display of daily plant production as well as the status of the PV array, inverter, and utility grid. With SMA's OptiCool temperature management system, the units can be operated in ambient temperatures of up to 50°C (122°F). The NEMA 3R cabinet is suitable for outdoor or indoor use. The operating temperature range is -25°C to +50°C.

The Sunny Central product line also offers a variety of remote monitoring options. Users can choose from RS-485, Ethernet, or wireless communications via Bluetooth or GSM with the optional WebBox. Daily performance data can be automatically uploaded to the free Sunny Portal website (www.sunnyportal.com). Optional Sunny **Central String-Monitor-US** smart combiners enable string level monitoring. The accuracy of performance data can be increased by using the optional **Sunny SensorBox**, which provides monitoring of local irradiance, temperatures, and wind speed.

All Sunny Central inverters are Listed to UL 1741 and UL 1998 for the U.S. and Canada / IEEE-1547 compliant.

SMA Sunny Central Inverters									
Model	Continuous output	AC output voltage	Max AC	Max DC array volts	MPPT voltage range	CEC rated efficiency	Dimensions (H" x W" x D")	Weight	Item code
SC250U	250 kW	480 VAC	300 A	600 VDC	330-600 VDC	97.0%	80 x 110 x 33	4,200 lbs	**030-03041**
SC500U	500 kW	480 VAC	600 A			97.0%	80 x 140 x 37	7,165 lbs	**030-03046**
SC500HEUS	500 kW	200[1] VAC	1470 A @ 200 V			97.0%[2]	90 x 101 x 38	3,970 lbs	**030-03036**

[1] For connection to MV transformer (not included) [2] With Cooper medium voltage transformer

SMA Disconnect Units for Sunny Central Inverters

The **Disconnect Unit** puts mechanical DC and AC disconnects into a single NEMA 3R enclosure mounted directly next to the inverter. AC disconnect switches are full load break capable with switch handles on the front face that can be locked in the off position. The DC disconnects are accessible for maintenance. Each DC switch has two DC inputs from the array field that can be attached via the provided screw terminals or by installer-supplied cable lugs. Only the ungrounded pole is disconnected by the unit.

Custom units are available with more PV DC inputs, with different amperage ratings, and for 1,000 VDC systems. Call AEE Solar for more information.

UL Listed to UL 1741. NEC 2011 compliant.

SMA Disconnect Units for Sunny Central Inverters							
Model	For inverter	AC output voltage	Max AC	Max DC array volts	Dimensions (H" x W" x D")	Weight	Item code
SMA DU-SC-US-0	SC250U	128 -528 VAC	1,600 A	600 VDC	80 x 59 x 39	1,151 lbs	**053-05000**
SMA DU-SC-US-1	SC500U	128 -528 VAC	1,600 A	600 VDC	80 x 59 x 39	1,151 lbs	**053-05001**
SMA DU-SC-US-2	SC500HEUS	128 -528 VAC	1,600 A	600 VDC	90 x 59 x 39	1,464 lbs	**053-05002**

SMA Sunny Central CP XT Inverters for Utility-Scale PV

The Sunny Central CP XT line of inverters couple to an external medium voltage (MV) transformer to accommodate long distance power feeds to distribution substations and delivers the highest efficiency available for large PV inverters.

Sunny Central CP XT inverters have been optimized for extreme climate conditions, with an operating range of -40°C to +60°C. Full nominal power at ambient temperatures up to 50°C and 10% additional power for continuous operation at ambient temperatures of 25°C and below.

An updated user interface features a large LCD that provides a graphical view of the daily plant production as well as the status of the inverter and the utility grid. With models available from 500 kW to 900 kW, a maximum DC array voltage of 1000 VDC, and up to 98.6% peak efficiency, these Sunny Central inverters are the ideal building blocks for utility power plants of any size. Ontario FIT compliant. Full UL1741 and IEEE 1547 compliance.

These highly customizable inverters are for "behind the fence" installation only. Call AEE Solar for more information.

Power-One

Aurora Inverters

Power-One Aurora grid-tie inverters feature high energy yield and performance efficiencies of up to 97%. Aurora series inverters have a field-adjustable "start voltage" point that allows low end PV operating voltage down to 90 VDC. While there is some loss of efficiency at lower voltage settings, the inverter can operate with as few as 5 standard 60-cell modules in series. See the Inverter sizing chart in the System Design section for configurations that work in most areas.

NEW! Aurora UNO Inverters

The **UNO-2.0-I-OUTD** and **UNO-2.5-I-OUTD** include a built-in heat sink compartment and front panel display system. The smallest of Power-One's outdoor range, these inverters are completely sealed to withstand harsh environmental conditions. The enclosure design enables fan-less cooling through an integrated rear heat sink.

The single high speed MPPT offers real-time power tracking and improved energy capture. The wide input voltage range makes the inverters suitable for low power installations with reduced string sizing. The UNO inverters have a single MPPT input and come with a built-in DC disconnect and wiring box.

An RS-485 connection for the **Aurora Universal Residential** monitoring unit is built-in. Dimensions are 30.3" x 14.4" x 6.3" and weight 42.5lbs. Standard 10-year warranty with available extensions to 15 or 20 years. Listed to UL 1741/IEEE1547 and CSA-C22.2 N.107.1-01 for the U.S. and Canada.

Power-One Aurora UNO Grid-Tie Inverters

Model	Max AC power	AC output voltage	DC array voltage (adjustable)	MPPT DC voltage range (adjustable)	CEC rated efficiency	Max AC current	Weight	Item code
UNO-2.0-I-OUTD-S-US	2,000 W	240 VAC	84-520 VDC	84-270 VDC (>205 full power)	95.5%	10 A	37.4 lbs	**030-09711**
UNO-2.5-I-OUTD-S-US	2,500 W				96.0%	12 A		**030-09712**

Aurora PVI Inverters

The Aurora PVI series are some of the most flexible string inverters available. PVI inverters have two separate MPPT inputs, allowing for two sub-arrays to be configured with differing string lengths, orientations, or even different PV modules. Conditions on one string will not affect the other. Additionally, the PVI inverters have two input terminals for each separate MPPT section allowing as many as four strings of modules (two on each MPPT) to be connected without separate string fusing. Both MPPT inputs can also be paralleled for use with a single array. A wide input voltage range allows for low wattage installations with reduced string sizes where needed.

An integrated LCD displays real-time operating parameters, and RS-485 and USB interfaces can connect remote monitoring systems. An integrated DC disconnect is standard on all "S" models (models without a DC disconnect are available by special order). Aurora PVI inverters can produce full-rated power at ambient temperatures up to 122°F (50°C). The fan-less design and NEMA 4X enclosure provide a water and airtight seal. Output voltage can be set for 240 VAC split-phase, or 208 VAC or 277 VAC (480 VAC WYE) for 3-phase systems (3 inverters required for phase balancing). All PVI inverters are Listed to UL 1741/IEEE1547 and CSA-C22.2 N.107.1-01 for the U.S. and Canada, and come with a 10-year warranty, which is extendable to 15 or 20 years.

Tech Tip:

Power-One makes "isolated" inverters for negative or positive grounded PV arrays (These have an "-I-" in the model number), and also transformerless inverters for "ungrounded" arrays. With transformerless inverters, all PV array wiring must be PV Wire, and any separate DC string combiners or disconnects used must provide for fusing or switching on both the positive and negative conductors.

Get Maximum Design Flexibility and Highest Energy Harvest

Maximum Design Flexibility: Power-One solar inverters equipped with true dual Maximum Power Point Tracking (MPPT) capability support solar plants with multiple orientations. The power allocated to one array can be up to 80% of the total power leaving 20% to support a smaller array to augment the total system output.

Highest Energy Harvest: With their extremely wide operating range, Power-One inverters provide more energy each day during low sunlight conditions in the early morning, late evening or even on a cloudy day. The rugged designs of our inverters allow full power output from a wide temperature range of -25° C to 50° C.

Power-One offers a full range of photovoltaic and wind power inverters from small residential units to large utility-grade applications.

For more information contact 480-643-1700 – www.power-one.com

power-one®
Renewable Energy Solutions

Aurora PVI Transformerless Inverters

Power-One's Aurora transformerless single-phase inverters are available in sizes covering most common residential requirements, and can be used in groups of 3 for commercial 3-phase applications. The transformerless design reduces internal power losses for high efficiencies. Output voltage can be set to 240 VAC split-phase, or 208 VAC or 277 VAC (480 VAC WYE) for three-phase systems. All 5 units have dimensions of 33.75"H x 12.75"W x 8.25"D, including the DC disconnect.

Power-One Aurora PVI Transformerless Inverters								
Model	Max AC power	AC output volts	DC array voltage (adjustable)	MPPT DC voltage range (adjustable)	CEC rated efficiency	Max AC current	Weight	Item code
PVI-3.0-OUTD-S-US	3,300 W	208 VAC	90-600 VDC	90-580 VDC (>200 full power)	96.0%	12 A	47 lbs	**030-09713**
		240 VAC				14.5 A		
		277 VAC				14.5 A		
PVI-3.6-OUTD-S-US	3,600 W	208 VAC	90-600 VDC	90-580 VDC (>200 full power)	96.0%	17.2 A	47 lbs	**030-09714**
		240 VAC				16 A		
		277 VAC				16 A		
PVI-4.2-OUTD-S-US	4,600 W	208 VAC	90-600 VDC	90-580 VDC (>200 full power)	96.0%	20 A	47 lbs	**030-09715**
		240 VAC						
		277 VAC						
PVI-5000-OUTD-US	5,000 W	208 VAC	90-600 VDC	90-580 VDC (>140 full power)	96.0%	24 A	66 lbs	**030-09716**
		240 VAC			96.5%	20 A		
		277 VAC			96.5%	18 A		
PVI-6000-OUTD-US	6,000 W	208 VAC	90-600 VDC	90-580 VDC (>170 full power)	96.0%	29 A	66 lbs	**030-09717**
		240 VAC			96.5%	25 A		
		277 VAC			96.5%	21.6 A		

Power-One Aurora PVI Isolated Inverters

These isolated inverters are useful in applications that require PV array grounding, such as when certain thin-film modules are used or when an inspector refuses to accept a non-isolated/ungrounded system. These inverters can be used in most countries and regions and feature specific field-configurable set-ups for major country grid codes and display languages.

Power-One Aurora PVI Isolated Inverters								
Model	Max AC power	AC output volts	DC array voltage (adjustable)	MPPT DC voltage range (adjustable)	CEC rated efficiency	Max AC current	Weight	Item code
PVI-3.8-I-OUTD-S-US-NG	3,800 W	208 VAC	84-520 VDC	84-470 VDC (>100 full power)	96.0%	12 A	61 lbs	**030-09721**
		240 VAC			96.5%	14.5 A		
		277 VAC			96.5%	14.5 A		
PVI-4.6-I-OUTD-S-US-NG	4,600 W	208 VAC	84-520 VDC	84-470 VDC (>130 full power)	96.0%	17.2 A	61 lbs	**030-09723**
		240 VAC			96.5%	16 A		
		277 VAC			96.5%	16 A		

Aurora PVI Isolated Three-Phase Inverters

The Aurora PVI 10 kW and **12 kW** inverters are isolated 3-phase string inverters designed for commercial applications. They have dual independent MPPTs and a CEC efficiency rating of 97%. Designed without electrolytic capacitors and housed in a fan-less NEMA 4X enclosure, these inverters are equipped for long life even in harsh conditions. The 10 kW unit is available in 208 VAC or 480 VAC versions. The 12 kW unit has 480 VAC output. Both models are also available with 600 VAC output for use in Canada.

"S" models have a DC disconnect and "S2" models have both DC and AC disconnects. All versions have inputs for up to four strings (two per MPPT). The "S2" versions are available with fused input kits mountable inside the inverter to allow six total strings (three per MPPT).

Both the 10 kW and the 12 kW inverters, "S" and "S2" models are 37.7"H x 25.4"W x 8.8"D. The 10 kW Aurora PVI inverter received an A+ from Photon International after their independent laboratory tests. The Aurora PVI 10 kW and 12 kW carry a standard 10-year warranty, which can be extended for up to 20 years.

Power-One Aurora PVI Isolated Three-Phase Inverters

Model	Max AC power	AC output volts	DC array voltage (adjustable)	MPPT DC voltage range (adjustable)	CEC rated efficiency	Max AC current	Weight	Item code
PVI-10-I-OUTD-S-208-US-NG	10 kW	208 VAC	90-520 VDC	90-470 VDC (>220 full power)	96.0%	30 A	107 lbs	**030-09731**
PVI-10-I-OUTD-S2-208-US-NG							114 lbs	**030-09732**
PVI-10-I-OUTD-S-480-US-NG		480 VAC			97.0%	14 A	107 lbs	**030-09733**
PVI-10-I-OUTD-S2-480-US-NG							114 lbs	**030-09734**
PVI-10-I-OUTD-S-600-CAN-NG		600 VAC			--	10.6 A	107 lbs	**030-09735**
PVI-10-I-OUTD-S2-600-CAN-NG							114 lbs	**030-09736**
PVI-12-I-OUTD-S2-480-US-NG	12 kW	480 VAC			97.0%	16 A	114 lbs	**030-09738**
PVI-12-I-OUTD-S2-600-CAN-NG		600 VAC			--	12.8 A	114 lbs	**030-09740**

NEW! Aurora TRIO Transformerless Three-Phase Inverters

The **Aurora TRIO 20 kW** and **27.6 kW** transformerless inverters are for commercial installations with 480 volt three-phase AC interconnection. Input on this line of inverters is up to 1,000 VDC, enabling a 97.5% CEC efficiency, and a reduced number of array strings. There are two MPPT input channels giving greater flexibility for array sizing and orientation. Multiple inverters can be used to build larger systems.

"S" models have a DC disconnect switch and "S1A" models have a DC disconnect, DC fuses, as well as DC and AC surge protection. "S1B" models have a DC disconnect, DC fuses, DC surge protection, and an AC fused disconnect.

These inverters also feature a dual channel RS-485 communications system, and can be simultaneously monitored by two different devices or controlled and monitored by two different parties.

Both units are 41.7"H x 27.6"W x 11.5"D. NEMA4X enclosures. Listed to UL 1741, IEEE 1547 and CSA C22.2 107.1-01-2001. The Aurora TRIO product line carries a standard 10-year warranty which can be extended for up to 20 years.

Power-One Aurora TRIO Three-Phase Inverters

Model	Max AC power	AC output volts	DC array voltage (adjustable)	MPPT DC voltage range (adjustable)	CEC rated efficiency	Max AC current	Weight	Item code
TRIO-20.0-TL-OUTD-S-US-480	20.0 kW	480 VAC	175-1,000 VDC	175-950 VDC (>450 full power)	97.5%	27.0 A	155 lbs	**030-09743**
TRIO-20.0-TL-OUTD-S1A-US-480								**030-09744**
TRIO-20.0-TL-OUTD-S1B-US-480								**030-09745**
TRIO-27.6-TL-OUTD-S-US-480	27.6 kW		175-1,000 VDC	175-950 VDC (>520 full power)		36.0 A	165 lbs	**030-09746**
TRIO-27.6-TL-OUTD-S1A-US-480								**030-09747**
TRIO-27.6-TL-OUTD-S1B-US-480								**030-09748**

Power-One Monitoring Options

Aurora Communicator software, included with each inverter, requires an **RS485-to-USB** communication module for connection to a PC. The **PVI-DESKTOP** device provides remote monitoring with a color touch-screen display and connects up to 6 inverters with either a wired or wireless option. Bluetooth models will wirelessly connect to a Bluetooth-enabled PC for free firmware updates. Aurora Vision and the Aurora Universal monitoring system offer full web-based monitoring.

The **VSN-MGR-RES-P1-US** Aurora Universal Residential monitor is a datalogger and internet gateway for all Aurora inverters. This gateway collects data from up to 5 Aurora inverters and sends it to the Power-One website for visibility from any internet browser. It will hold up to 30 days of data as a backup until an Internet connection is restored. Connection to the inverters is via RS-485 cable and to the router via Ethernet. An AC power supply is included. For indoor installation only. The gateway is 5.5" x 5.5" x 1", and weighs 2 lbs.

The **PVI DESKTOP** features a wall- or desk-mounted touch screen color TFT data display for PVI inverters. The PVI DESKTOP can communicate with up to 6 PVI inverters via RS-485 with CAT5 cables or wirelessly when a **PVI-RADIOMODULE** is installed on each inverter. The PVI-RADIOMODULE provides a 960 ft. open-air range for wireless connection. The PVI-DESKTOP can be linked via USB, or Bluetooth with the **PVI-Desktop BT** unit, to a personal PC. The Desktop is 4"H x 5"W x 2.5"D, weight <1 lb.

Power-One Residential Data Monitoring and Communications Accessories	
Description	**Item code**
VSN-MGR-RES-P1-US - Aurora Universal Residential datalogger, internet gateway with power supply	**029-07003**
PVI Desktop-US - Desktop monitor with RS-485 or wireless to inverters and USB to a PC	**030-09777**
PVI-Desktop-BT-US - Desktop monitor with RS-485 or wireless to inverters and Bluetooth to a PC	**030-09778**
PVI-Radiomodule-US - Card required in each inverter for wireless communication to Desktop	**030-09779**
PVI-USB-RS485-232 - Adapter RS485 to USB and RS232 for connection to a PC, with power supply	**030-09776**

Power-One PVI Central Inverters

The **Power-One PVI Central inverters** are based on 50 kW inverter modules that can operate independently for improved efficiency and fault tolerance. These inverters feature high-frequency switching to reduce audible noise, reverse polarity protection, and easy front-panel accessibility for installation and servicing. Both AC and DC distribution and circuit protection is integrated into each inverter to reduce balance-of-system components and wiring.

The 250 kW and 300 kW units have 3 separate MPPT input channels for more flexibility in array design. A 5.7" LCD screen on each inverter provides for local monitoring and control. These inverters also have integrated RS-485 interfaces for inverter and string combiner monitoring.

The **PVI-50** and **PVI-100** have **NEMA1** enclosures for indoor installations, while the **PVI-250** and **PVI-300** are NEMA3R rated for outdoor installations. These have a standard warranty of 5 years, which can be extended.

All Power-One Aurora PVI-Central inverters are CSA Listed to UL1741 for the US and Canada. CSA - C22.2 N. 107.1-01

The **PVI-Central-50** has a single 50 kW inverter module with led indicators and an interactive display.

The **PVI-Central-100** (left) has two 50 kW modules in a master/slave configuration. Each inverter module has its own interactive display.

The **PVI-Central-250** contains five 50 kW inverter modules.

The **PVI-Central-300** contains six 50 kW inverter modules.

Due to the modular design, these larger inverters each have three separate MPPT array inputs allowing for high-efficiency power point tracking of sub-arrays within a larger PV field.

These two inverters come in **NEMA3R** enclosures for outdoor mounting. Ambient operating temperature range is -25 to +60°C / -13 to +140°F with de-rating above 50°C / 122°F.

SMA Sunny Central Inverters									
Model	**Continuous output**	**AC output voltage**	**Max AC amps**	**Max DC array volts**	**MPPT voltage range**	**CEC rated efficiency**	**Dimensions (H" x W" x D")**	**Weight**	**Item code**
PVI-CENTRAL-50	50 kW	208 VAC	139 A	600 VDC	330-600 VDC	95.0%	50 x 66 x 34	1,550 lbs	**030-06810**
		480 VAC	61 A						**030-06811**
PVI-CENTRAL-100	100 kW	208 VAC	278 A					1,873 lbs	**030-06812**
		480 VAC	121 A						**030-06813**
PVI-CENTRAL-250	250 kW	480 VAC	315 A	600 A	320-550 VDC	97.2%	85 x 116 x 50	5,500 lbs	**030-06814**
PVI-CENTRAL-300	300 kW	480 VAC	378 A					6,000 lbs	**030-06815**
PVI-STRINGCOMB-US	String combiner w/ 200 A disconnect 20 circuit with monitoring for 10 channels via RS485						32 x 26 x 10	67 lbs	**053-02752**

Advanced Energy

AE TX Central Inverters

Advanced Energy's AE TX (formerly PV Powered) line of commercial inverters is efficient, reliable, and cost-effective. Busbars for all power connections, a sealed electronics module and an instrumented cooling system provide for over 20 years of operation. These inverters are well-integrated and offer load break rated AC and DC service disconnects, certification for installation without a neutral conductor, and excellent cable management tools to streamline installation.

AE TX commercial three-phase inverters offer a voltage window of 295-600 VDC, so they can be used with most crystalline and thin film modules. All sizes have NEMA4 enclosures. The AE 50TX is available in an optional stainless steel enclosure.

Optional integrated sub-array combiners are configured to order and options include built-in 3rd–party monitoring and revenue-grade metering solutions, such as ArgusON, DECK Monitoring, Draker Laboratories, ESA Renewables, Locus Energy, and Noveda Technologies. The monitoring-specific gateway, array sub-combiner monitoring and revenue meter are integrated at the factory directly into the UL-listed inverter. String-level monitoring and external weather station data can be connected to the integrated gateway for additional data collection. Additional options include integrated revenue grade meter and sub-combiner monitoring.

10-year warranty, with extension to 20 years available. Listed to UL 1741 for the U.S. 600 VAC units available for Canada—call for information.

Advanced Energy PV Powered Central Inverters

Model	Continuous AC output	AC output voltage	Max AC amps	Max DC array voltage	MPPT voltage range	CEC rated efficiency	Dimensions (H" x W" x D")	Weight (lbs)	Item code
AE 35TX	35 kW	208 VAC	100 A	600 VDC	295-595 VDC	95.5%	67 x 44 x 27	1,200 lbs	**030-10000**
		480 VAC	43 A			96.0%			**030-10002**
AE 50TX	50 kW	208 VAC	141 A			96.0%	74 x 44 x 32	1,500 lbs	**030-10004**
		480 VAC	61 A			96.0%			**030-10006**
AE 75TX	75 kW	208 VAC	208 A			95.5%	92 x 60 x 27	2,750 lbs	**030-10008**
		480 VAC	91 A			95.5%			**030-10010**
AE 100TX	100 kW	208 VAC	278 A			95.5%	92 x 60 x 27	3,000 lbs	**030-10012**
		480 VAC	120 A			96.0%			**030-10014**
AE 250TX	250 kW	480 VAC	304 A			96.5%	93 x 104 x 34	5,000 lbs	**030-10016**
AE 260TX	260 kW	480 VAC	316 A			97.0%			**030-10018**
AE 500TX	500 kW	480 VAC	608 A		310-595 VDC	97.0%	100 x 120 x 49	8750 lbs	**030-10020**

AE NX PV Inverters

Advanced Energy's **AE NX (formerly Solaron)** line of commercial/utility-sized inverters offers 97.5% CEC and over 98% peak efficiency for better energy harvest and lower levelized cost of energy. The AE NX inverters use a transformerless bi-polar array design that allows a smaller, lighter, more efficient package. The inverter has a small display and keypad for local control and comes with integrated online monitoring. Due to the bi-polar array design, the addition of the **AE Remote PV Tie (RPT)** accessory permits the neutral conductors to be reduced from full size to six AWG#16 wires. This reduces the cost of wire when an array is a long distance from the inverter. Extended warranties, annual preventive maintenance, and other options are available.

Normal temperature range is -4°F to 122°F, with a cold weather option for -31°F operation. AE NX inverters are NEMA3R with a NEMA4 electronics enclosure. 5-year warranty standard, expandable up to 20 years. These systems are highly customizable, so please contact AEE with your project needs to get a custom quote

AE PowerStation TX

The **PowerStation TX** (formerly known as PVPowered PowerVault) is an integrated power conversion solution for MW-scale PV projects requiring medium voltage (MV) AC output. The PowerStation is built around the Advanced Energy transformer-based (TX) line of reliable, efficient commercial inverters with an expected 20+ year operating life. The PowerStation TX also offers a wide MPPT input range.

The pre-wired outdoor-rated enclosure reduces project engineering costs and on-site labor time. The entire package is also designated to be pier mounted to further simplify installation. A wide range of options are available. Select AC output from 4,160 VAC to 35 kVAC, loop feed or radial feed, and multiple protection and switching options. A single-phase load center with branch breakers provides tracker power and other on-site power requirements.

These systems are highly customizable, so please contact AEE with your project needs to get a custom quote.

IntelliString Smart Combiners

String-level performance data enables fast diagnosis of PV system under-performance due to failed modules, shading, or soiling. Advanced Energy's **IntelliString™** line of smart string combiner boxes provide string-level data via RS-485 open Modbus that is compatible with most third-party monitoring providers. Suitable for either positive or negative grounded arrays with no mechanical changes required. NEMA4X fiberglass construction. ETL Listed to UL 1741 for the U.S. (1,000 VDC) and Canada (600 VDC). 5-year warranty.

Advanced Energy IntelliString Smart Combiners					
Model	Number of PV inputs	Continuous current rating	Max output wire size	Dimensions (H" x W" x D")	Item code
IntelliString 8 Standard	8	120 A	1 x 350 MCM	14 x 12 x 6	Call
IntelliString 8 With Disconnect		250 A		20 x 16 x 8	
IntelliString 12 Standard	12	180 A		14 x 12 x 6	
IntelliString 12 With Disconnect		250 A		20 x 16 x 8	
IntelliString 16 Standard	16	240 A		16 x 14 x 8	
IntelliString 16 With Disconnect		250 A		20 x 16 x 8	
IntelliString 24 Standard	24	360 A	2 x 350 MCM	20 x 16 x 8	
IntelliString 24 With Disconnect		400 A		24 x 24 x 8	